

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

April 20, 2012

MEMORANDUM FOR: Timothy Dwyer, Technical Director
FROM: Jonathan Plaue, DNFSB Site Representative
SUBJECT: LLNL Activity Report for Week Ending April 20, 2012

Plutonium Facility: This week, a four person contractor team completed the readiness assessment (RA) for an upcoming experiment involving plutonium and high explosives. The RA was conducted over a three-day period using a checklist format. The team's work observations included demonstrations of two off-normal scenarios, in addition to the surrogate experiment conducted prior to the RA (see weekly report dated March 30, 2012). In their outbrief, the team noted strong support from the health and safety technicians, proactive management involvement, and good integration. The team identified six prestart findings involving: (1) inaccurate training documentation, (2) inadequate communication of expectations implementing the lightning warning system, (3) incomplete implementation of a control for post-shot inspection, (4) incomplete analysis of a load path for a critical lift, (5) steps in a procedure for response to an off-normal event could not be performed as written, and (6) actions in a different off-normal procedure were inconsistent with existing controls in the Facility Safety Plan. The lessons learned included having documents (e.g., procedures) ready before commencement of the RA, the need to complete adequate dry runs ahead of the RA, and the need to better establish the bounds for demonstrations of off-normal scenarios during the RA.

Tritium Facility: LSO and the contractor continue to debate resolution of comments on the safety basis associated with the safety significant gloveboxes. The contractor's most recent page changes for the 2010 safety basis provide a performance criterion for the gloveboxes stating: "The structural integrity and configuration of the tritium gloveboxes shall be maintained." This performance criterion is supported by a formal surveillance requirement for a differential pressure test. For comparison, the current safety basis dated September 2008 provides a measurable performance criterion that mirrors the surveillance requirement. LSO challenged the technical validity of this newly proposed performance criterion and the associated surveillance and identified that neither comports with Department of Energy guidance, best management practices, or consensus industry standards for gloveboxes. For example, the American Glovebox Society specifies an acceptable leakage rate for all types of gloveboxes (not strictly those handling radioactive materials) of 0.5 % of the glovebox volume per hour.

In response to these comments, the contractor noted that in accordance with DOE-STD-3009, the operability requirements for credited safety systems are determined by safety analysis and that the analysis did not demonstrate a need for the low leak rates embraced by industry. The contractor further noted that these other standards were not required by contract and that in practice, changes in temperature and atmospheric pressure during the course of the five minute differential pressure test preclude the ability to reliably measure leak rates below about 3.7 % of the glovebox volume per hour.

Currently, LSO awaits additional requested information substantiating that the proposed performance and surveillance requirements ensure adequate mitigation for postulated tritium leaks that pose high consequences to facility workers. LSO also indicated the acceptability of formally crediting the process piping and equipment in lieu of the gloveboxes, noting that demonstration of leak tightness is straightforward and preventing a leak precludes the accident.