

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

September 30, 2011

MEMORANDUM FOR: Timothy Dwyer, Technical Director
FROM: Jonathan Plaue, DNFSB Site Representative
SUBJECT: LLNL Activity Report for Week Ending September 30, 2011

Tritium Facility: In a letter dated September 27, 2011, the laboratory contractor responded to the Livermore Site Office (LSO) request for information concerning the need to revisit the condition of approval limiting the content of hydrogen isotopes to less than 2 percent of the glovebox volume (see weekly report dated September 23, 2011). As a solution, the contractor proposed revising the Specific Administrative Control limit to 4 percent by volume and implementing a programmatic administrative control at the Technical Safety Requirement (TSR) level to limit hydrogen to 2 percent by volume for any continuous, un-isolated volume.

As a basis for this proposal, the contractor provided an analysis of estimated minimum programmatic hydrogen isotope loading ranges, as well as an analysis of the potential to release hydrogen isotopes. The latter analysis examines potential releases from single process volumes and the frequency of inadvertent mixing scenarios. This analysis of volumes and frequencies appears to inherently assume design information of process components that are not currently protected by the safety basis. LSO is reviewing the information.

Plutonium Facility: Recently, personnel have observed an increase in the number of glovebox glove changes. Glovebox gloves are not a credited component in the facility safety basis; however, they perform a critical function to protect workers from the hazards of the glovebox environment. During the period from August 25 to September 29, 2011, about 15 gloves were replaced in glovebox lines associated with machining operations located in 3 separate rooms. An additional 6 glove changes were performed elsewhere in the facility. Of these 21 total glove changes, only 4 were performed on gloves that were positively determined to have been breached. Many of these changes resulted from the detection of contamination on a glove surface, which may indicate either a glove breach or cross-contamination from another source. Unfortunately, the facility currently does not have technical capability beyond visual examination to determine if a breach occurred.

In response to the machining events, facility and program personnel have scrutinized operations and implemented enhanced contamination monitoring to further minimize the potential for cross-contamination. Contamination on floor mats and other equipment was detected coincident with some of the glove events; however, none of the events have resulted in the identification of airborne contamination. Program personnel have also given consideration to changing to more robust gloves, either thicker material or a composite material known to provide better puncture and cut resistance, but judged that the ergonomic and dexterity benefits of the existing gloves outweighed the durability gains of the other options.

Glovebox glove integrity inspections are cited as a key element of the TSR Quality Assurance Program. This program is not fully documented, but in practice includes comprehensive receipt inspection and collection of certain information when gloves are changed. Facility personnel are examining the need to strengthen this program, including improved capability for analysis of contaminated gloves and refined data collection.