

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

November 10, 2006

MEMORANDUM FOR: J. K. Fortenberry, Technical Director
FROM: A. Matteucci, Acting DNFSB Site Representative
SUBJECT: Lawrence Livermore National Laboratory (LLNL)
Report for Week Ending November 10, 2006

DNFSB Site Representative Activity: M. Merritt was at Los Alamos National Laboratory this week. A. Matteucci was on site to provide support for the DNFSB site office.

Degradation of a Safety Class System. On November 3, 2006, the Plutonium Facility Manager determined that a previously repaired crack in the safety-class structure (floor) of the loft area above the Radioactive Materials Area (RMA) had degraded. On November 2 it was discovered that water had seeped through the repaired crack into the RMA indicating the repair was not water tight. The seepage of water through the cracked flooring into the RMA did not affect operations involving nuclear material.

The building structure for the Plutonium Facility, as stated in the current safety analysis report (SAR), functions as a final confinement barrier to prevent the release of radioactive materials from the RMA. The seepage of water through the concrete floor of the loft area indicates a degradation of the building structure as a confinement barrier. The SAR also credits the ceiling in the RMA (which is the floor of the loft) with having a fire-resistance rating of 2 hours and where penetrations are made in the structure, fire-retardant material approved by Underwriters Laboratories is to be installed to preserve the fire-resistance rating of the structure.

The Plutonium Facility Manager directed initiation of an engineering evaluation of the original repair to the crack and the extent of the conditions regarding the repair of other cracks in the loft area, and an evaluation of the ability of the repaired crack that is seeping to maintain the fire-resistance rating of the structure. Repair to some of the cracks in the flooring of the loft area may have occurred after LLNL sustained damage from an earthquake in 1980 that was centered 10 miles northwest of Livermore, California.

An accident scenario in the current SAR bounds the degraded condition of the confinement structure and states that the room ventilation system is designed to maintain a negative differential pressure with respect to the environment to prevent the release of radioactive materials from the RMA. There appears to be no discussion in the SAR regarding cracks that penetrate the structural confinement barrier.

Periodic Maintenance and Replacement Activities. Completion of the periodic (5 year interval) maintenance and inspection activities for the two safety-class fire water tanks in the basement of the Plutonium Facility were completed and the fire protection systems were returned to an operational mode. Corroded piping associated with the sight glass marker was replaced. Modifications to improve the operations of the sight glass markers for each fire water tank and the air pressure system for the tanks are being considered. The replacement of one room ventilation system exhaust fan was also completed and the remaining exhaust fan is anticipated to be replaced in 2007.