

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

December 2, 2005

**MEMORANDUM FOR:** J. K. Fortenberry, Technical Director  
**FROM:** Michael J. Merritt, DNFSB Site Representative  
**SUBJECT:** Lawrence Livermore National Laboratory (LLNL)  
Report for Week Ending December 2, 2005

**Plutonium Facility Configuration Management (CM):** In January 2005 DOE committed to perform a Livermore Site Office (LSO) and LLNL joint review of the CM program for LLNL nuclear facilities. The review was consistent with the Phase II assessment criteria established in response to Board Recommendation 2000-2, *Configuration Management, Vital Safety Systems* (VSSs). Phase II reviews of the VSSs in the Plutonium Facility were completed in June 2005, and a report documenting the results was issued in mid-October. This week, an occurrence was reported (ORPS report OAK-LLNL-LLNL-2005-0096) regarding portions of the safety-class room ventilation system. Specifically, LLNL reported that a potential inadequacy in the safety analysis (PISA) exists for non-metallic flexible connections in the room ventilation system. The flexible connections are part of the safety-class boundary that prevents release of radioactive material to the environment in the event of a fire in the basement of one increment of the facility. The Plutonium Facility Safety Analysis Report (SAR) requires the flexible connections to withstand a two-hour evaluation-basis fire. The PISA was declared because LLNL has not been able to determine the exact material specifications of the flexible connections, and therefore cannot demonstrate that the connections are capable of performing the function assumed by the SAR.

This issue has been discussed with LLNL management in the past and was recently re-visited based on a walk-through by the site representative and a Board staff member reviewing the adequacy of VSS as-built conditions. The criteria, review and approach document (CRAD) used for the joint reviews was intended to “define physical boundaries of the systems that provide the safety function” and “inspect for physical material condition and consistency of the system configuration with safety documentation.” In this case, the joint review was not sufficiently rigorous to identify this potentially discrepant condition.

**Plutonium Facility Specific Administrative Controls (SAC):** A Plutonium Facility Technical Safety Requirements (TSRs) SAC requires that the quantity of fissionable material in any laboratory room be limited to 20 kilograms of 30 year old fuel-grade plutonium or the equivalent based on conversions specified in the Facility Safety Plan (FSP). Currently, there is a 5 kilogram room limit as part of compensatory measures resulting from the facility stand-down. The TSR SAC is implemented in accordance with the requirements specified in a section of the FSP. Specifically, the FSP requires that equivalent room inventory calculations be made using equivalent mass multipliers (EMMs) for other fissionable radionuclides as specified in the FSP. The calculations are required to be performed by a material handler and verified by a second knowledgeable person as part of the material transfer process. In practice, a parallel process is also used for material accountability and control. The *Controlled Materials Accountability and Tracking System* (COMATS) utilizes computer software and hardware combined with administrative procedures to account for material.

The site representative has observed instances where only COMATS was used to calculate the equivalent mass of fissionable material in a room. This approach is not consistent with the FSP requirements. Facility management needs to define which process is intended to satisfy the TSR requirements. Furthermore, if COMATS becomes the default system to meet safety requirements, the software should undergo a software quality assurance (SQA) review to ensure the software meets the safety requirements and uses the appropriate EMMs. It should be noted that there is no indication that any mass limits have been exceeded.