

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

October 14, 2011

MEMORANDUM FOR: T. J. Dwyer, Technical Director
FROM: B.P. Broderick and R.T. Davis
SUBJECT: Los Alamos Report for Week Ending October 14, 2011

Plutonium Facility: This week, the NNSA site office approved revision 1 of the 2011 Plutonium Facility Document Safety Analysis (DSA) and its associated Technical Safety Requirements (TSR). This is the first major Plutonium Facility DSA update to be approved by NNSA since December 2008. The approved DSA presents mitigated doses that are below the DOE Evaluation Guideline for all postulated accident scenarios, including the bounding seismically-induced fire scenario. The approved DSA also addresses NNSA comments generated during prior reviews of the never-approved 2009, 2010, and 2011 revision 0 DSA annual update packages. The NNSA approval letter requests for LANL to provide an implementation plan for the updated set of TSRs within 30 days.

The approved update includes a completely revised accident analysis for the bounding seismically-induced fire scenario. The reanalyzed scenario in the 2011 DSA is significantly different from the 2008 DSA seismically-induced fire scenario in a number of respects. First, the 2011 DSA provides a basis to assume that post-seismic fires will be confined to four laboratory rooms rather than using the 2008 DSA assumption that a post-seismic fire would engulf the entire laboratory floor. This collection of four smaller fires provides less energy to drive released material out of the building than a large floor-wide fire, resulting in a leak path factor of 0.18 in the 2011 DSA down from 0.40 in the 2008 DSA. The 2011 DSA also limits the total amount of material at risk (MAR) allowed on the laboratory floor to approximately 50% of that allowed by the 2008 DSA. Finally, unlike the 2008 DSA that assumed all MAR was present in a single extremely dispersible form, the 2011 DSA disaggregates the MAR based on the various physical forms of material that are actually found in the facility and assigned dispersibility values based on each specific form. The aggregate effect of reduced MAR, dispersibility (i.e. airborne release fractions and respirable fractions), and leak path factor values result in a mitigated offsite consequence for the seismically-induced fire in the 2011 DSA that is below the DOE Evaluation Guideline and is two orders of magnitude lower than the 2008 DSA consequence.

Importantly, the revised seismic accident analysis in the 2011 DSA assumes that an earthquake does not cause the facility to collapse and does not breach the confinement integrity of the building structure. In April, results of the SAFER seismic analysis for the Plutonium Facility identified a number of structural vulnerabilities that could cause facility collapse or loss of confinement integrity in the event of an evaluation basis earthquake. This new information prompted the development and approval of a Justification for Continued Operation (JCO). This JCO remains in force while NNSA and LANL aggressively pursue structural upgrades to address the identified vulnerabilities. One key upgrade milestone occurred last weekend as concrete was placed to form a heavily reinforced strengthening member on the Plutonium Facility roof to address the one currently known vulnerability that could lead to facility collapse in a severe earthquake. This week, Plutonium Facility management also completed formal implementation of all compensatory measures included in the seismic JCO after performing and resolving issues from an independent Implementation Verification Review.

Presently, the 2008 DSA, its associated TSRs, and the seismic JCO remain the Plutonium Facility safety basis of record. The 2011 DSA and TSRs can be implemented to supersede the 2008 documents, but some version of a seismic JCO must remain in place until the seismic performance of credited controls (e.g. no building collapse or confinement breach) conforms to assumptions made in the DSA.