

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

September 2, 2016

TO: Steven A. Stokes, Technical Director
FROM: Matthew P. Duncan, Cognizant Engineer
SUBJECT: Lawrence Livermore National Laboratory Report for August 2016

DNFSB Staff Activity: Outside expert D. Boyd was at Lawrence Livermore National Laboratory for Radiological Worker II training.

Radiography Facility: As discussed in last month's report, the contractor declared a potential inadequacy of the safety analysis and determined there was a positive unreviewed safety question for the Building 239 (Radiography Facility) documented safety analysis. The concern related to a safety basis calculation that evaluated the peak temperature resulting from a postulated fire at the surface of the metal barrier of a component containing plutonium. The calculation is referenced in the documented safety analysis to demonstrate that there is no plausible accident in which a fire could heat a component containing plutonium to the point at which the plutonium would ignite, given the combustible loading of the facility. As such, the design basis accident scenario does not use an airborne release fraction and respirable fraction associated with self-sustained oxidation of plutonium per DOE-HDBK-3010-94, *Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities*. Instead, the scenario assumes that the worst case insult to a plutonium component is "room temperature oxidation," which uses a much lower airborne and respirable release fraction per the handbook. Lower release fractions result in a lower estimate of the radiological dose consequences to the collocated worker and the public.

On August 9, 2016, the facility manager transmitted an evaluation of the safety of the situation to the Livermore Field Office. The letter noted that with the compensatory action still in place—limiting the total inventory of plutonium allowed in the facility to a small fraction of the current limit—the current risk remains approximately the same as the risk in the currently approved documented safety analysis. Specifically, a calculation showed that using the increased release fractions associated with self-sustained oxidation in conjunction with the decreased material-at-risk results in approximately the same source term.

The facility manager plans to keep the compensatory action in place for now. The safety basis calculations—another Building 239 calculation has the same concern—will be revised and issued by November 15, 2016. The documented safety analysis will then be revised and submitted to the Livermore Field Office for approval. The compensatory measure will remain in effect until the revised documented safety analysis is implemented in the field.