

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

February 8, 2002

**MEMORANDUM FOR:** J. Kent Fortenberry, Technical Director  
**FROM:** C. H. Keilers, Jr.  
**SUBJECT:** Los Alamos Report for Week Ending February 8, 2002

**Weapons Engineering Tritium Facility (WETF):** WETF has had two events in the last two weeks that indicate that improvements are needed in emergency response planning and training, facility preventive maintenance, and system checkout before gas transfers. This week, operators transferred gas to an unintended location because of an incorrect system alignment. There was no release. Recurrence could be prevented by an independent verification of system alignment before transfers.

Last Wednesday, WETF released about 175 Curies of 1% oxidized tritium to the environment while responding to a system leak into a glovebox and from there into a process room. While the consequences were minor (1 mrem or less), the lessons are important. During the event, the installed glovebox tritium monitor saturated. The facility then connected a high range portable monitor, which in turn not only saturated but also leaked – significantly increased the release to the room. In hindsight, attaching the portable monitor could not have provided useful information. Before it was connected, the glovebox was performing its confinement function. The facility later determined that, during this period, tritium levels in the room were about 7 orders of magnitude lower than those in the glovebox. Also, the two leaking fittings are similar and susceptible to improper connection or being loosened by line vibration. The event might have been prevented by either a periodic tightness check of installed fittings or an integrity check on the gas transfer path before the transfer. Currently, WETF does rate-of-rise integrity checks on lines when modified. Implementing both practices may be worth pursuing. After this week's event, WETF curtailed operations. The facility has done a good job investigating these events and needs to be thorough in following up on lessons learned.

**Preliminary Functional Classification:** Engineering design and safety analyses need to be tightly coordinated, whether designing a new facility or modifying an existing one. Preliminary function classification (PFC) is a primary interface mechanism for achieving this integration. PFC involves an early and recurring identification of potential engineered safety features and systems. It forms the rational basis for proceeding with design. PFC may initially be based on analyses from older facilities or on engineering judgement arising from, in some cases, up to five decades of relevant experience.

In four recent projects reviewed, there appears to have been little to no effort or intent to establish functional classification, including PFC, in advance of the final accident analyses, which can be years away. In fact, there is resistance to this approach because, if engineering judgement or early analyses prove wrong, then PFC may have missed important safety systems, or project funds may have been expended on systems that are later concluded not vital to safety.

The site rep believes that there needs to be a greater effort in LANL projects to formally establish early and iterate on a reasonably conservative set of potential safety systems, in advance of final accident analyses. The risks of using the PFC process can be addressed by timely iteration and active programmatic risk management. If managed, these risks can be less than those posed by not using the PFC process, which could lead to a major iteration late in detailed design, a major unanticipated upgrade, or a major reconstitution of system pedigree. What often occurs in these cases is that the design or facility is not corrected. Instead, the project defaults to using administrative controls over engineered safety features. This can be avoided by a proper, balanced use of the PFC process.