

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

April 18, 2003

MEMORANDUM FOR: J. Kent Fortenberry, Technical Director
FROM: C. H. Keilers, Jr.
SUBJECT: Los Alamos Report for Week Ending Apr 18, 2003

Quirk was here this week reviewing TA-18 instrumentation & control and software quality assurance.

Authorization Basis (AB): LANL met the April 10th deadline to submit AB upgrades, per the Nuclear Safety Management rule (10 CFR 830). NNSA is currently reviewing the proposed upgrades for waste operations (TA-50, TA-54), radiography (TA-8-23), and facility management realignment (site-wide). Nuclear facilities continue to operate under previous ABs during the NNSA review.

Preliminary Notice of Violation (PNOV): Last Thursday, NNSA sent LANL a PNOV for several nuclear safety issues that arose last year. Specific events involve the following facilities (refer to site rep weekly of date in parenthesis for details): the Critical Experiments Facility (1/11/02, 2/15/02), Plutonium Facility (3/15/02), Radiochemistry Laboratory (8/9/02), and non-nuclear radiography facility (10/18/02). NNSA also identified examples where LANL processes for identifying causes and correcting quality problems were not effective - a longstanding institutional issue. Based on the longstanding nature, NNSA considered escalating the severity level of the quality improvement findings; however, NNSA decided against this because of significant commitments LANL has made to strengthen senior management and implement site-wide improvements to quality processes. While it's in the early stages, the site rep has seen progress in this area.

Critical Experiments Facility (TA-18): Last July, DOE approved a new TA-18 AB that includes 11 newly designated Safety Class systems – intended to address about 100 hazard scenarios that challenge the evaluation guidelines (site rep weekly 9/13/02). Among these systems are the existing scram chains and the new in-core temperature monitoring systems. The latter are in design now. They are intended to provide a signal to the existing scram chains and thereby prevent fuel and irradiated samples from melting and partially vaporizing during a rapid, uncontrolled reactivity insertion while in delayed critical mode. Such an event hypothetically leads to TA-18's highest consequence accident, unless prevented by a scram. LANL has compensatory measures in place until the monitoring systems are installed (e.g., sample size limits, reduced neutron flux trip set points).

There appear to be significant engineering challenges to developing a temperature-based scram system that is capable of measuring peak temperature during a fast transient; has adequate response time; has justified trip set points; meets standard Safety Class requirements (e.g., separation); and can be shown, via combined analysis and test, to satisfy the AB functional requirements. While the design is being competently executed, neither the new in-core system, as currently envisioned, nor the existing scram system appear to fully meet standard Safety Class requirements. The shortfalls warrant justification. An independent design review, perhaps by the LANL Reactor Safety Committee, may be helpful at identifying improvements (TA-18 agreed). To address some challenges, TA-18 is having to develop engineering procedures that are currently not specified fully at the institutional level, such as: Safety Class guidance, back-fit guidance, commercial item dedication, and independent design reviews.

Weapons Engineering Tritium Facility (WETF): On Tuesday, WETF had a tritium release into a glovebox and from there into a process room. The room was evacuated, operations were secured, and the tritium (about 0.7 Ci) was exhausted to the environment via an approved stack. Health consequences were minimal (2 mrem to the effected worker). LANL has appropriately investigated this event and identified potential weaknesses that need to be reviewed and corrected.