

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

February 13, 2004

MEMORANDUM FOR: J. Kent Fortenberry, Technical Director
FROM: C. H. Keilers, Jr.
SUBJECT: Los Alamos Report for Week Ending February 13, 2004

Goff, Kupferer, Martin, and Quirk were here this week reviewing the new TA-18 temperature scrams.

Critical Experiments Facility (TA-18): NNSA owes the Board a report on how the new Safety Class in-core temperature monitoring systems (ITMS) will perform their intended safety function and thereby prevent core and sample damage (site rep weekly 1/30/04). While some progress has been made, the questions posed in the Board letter (7/9/03) and accompanying staff report remain open.

According to approved safety analyses, the ITMS is Safety Class to prevent postulated accidents with off-site consequences up to 1,000 Rem CEDE range. Only critical assemblies with transuranic cores or samples are capable of generating consequences in this range. Accidents for uranium fueled assemblies with small samples (e.g., less than ~25 g Pu metal) fall below the evaluation guidelines.

NNSA and LANL have no expectation of the temperature scrams working for higher reactivity insertions (e.g., above \$0.80, including Godiva & SHEBA burst operations). The current administrative controls are the primary defense against the accident and thereby appear to be Safety Class admin controls, in the sense of the Board's Recommendation 2002-3, *Requirements for the Design, Implementation, and Maintenance of Administrative Controls*.

In approving the temperature scrams, the NNSA vision is to remove the human element from the scram sequence for reactivity insertions ranging from \$0.20 to \$0.80. This range requires scram response times ranging from several minutes down to about 10 sec to prevent damage. In advance of ITMS being declared operational, LANL has admin controls and interim compensatory measures in place now to prevent the accident. These are also equivalent to Safety Class admin controls.

The admin controls cited above have not yet been evaluated per Recommendation 2002-3. The effectiveness of these controls relies highly on the training and qualification of the TA-18 operators. TA-18 currently is undergoing operations management turnover. TA-18 also has lacked a Facility Rep (FR) since mid-December and will likely not have a full-time qualified FR for several months.

The answer on whether ITMS will work depends on a benchmark study that TA-18 expects to issue in March. The answer on whether the design needs to meet Safety Class separation and independence requirements depends on a fault tree analysis still in review in TA-18. These are major open issues, considering that the new systems are installed in 2 assemblies and 90% designed for the other 3.

Another major issue with the ITMS is the lack of a thorough independent design review. TA-18 acknowledges this deficiency, but has not yet factored time into the schedule for such a review and for deliberate resolution of comments. TA-18 also has issues with the recent NNSA evaluations that raised questions on whether the designs have been correctly developed, components properly purchased, and installation properly tested for Safety Class (e.g., TA-18 used graded approach). NNSA and LANL now consider those evaluations as "draft" while TA-18 conducts factual accuracy reviews, to be done soon.

Besides ITMS, the staff reviewed TA-18 preparations to operate SHEBA (the Solution High Energy Burst Assembly) in burst mode. SHEBA has never been in burst mode. While progress is evident, there is a lack of independent review and of formality of closure for issues, some years old. Clear criteria are also needed on what would constitute an abnormality during approach to burst warranting further evaluation.