DEFENSE NUCLEAR FACILITIES SAFETY BOARD

January 16, 2004

MEMORANDUM FOR: J. Kent Fortenberry, Technical Director
FROM: C. H. Keilers, Jr.
SUBJECT: Los Alamos Report for Week Ending January 16, 2004

Integrated Safety Management (ISM): Last September, 5 workers in the Plutonium Facility (TA-55) were exposed to highly toxic vapors while soldering a rerouted coolant line in a poorly ventilated anti-contamination tent. The event and conclusions of a thorough LANL accident investigation have been previously reported (site rep weeklies 10/3/03, 12/5/03), but they warrant further consideration.

Even though there had been months of planning, the workers had no forewarning of possible toxic hazards. One of their first indications of a problem was when they observed spraying liquid from a line that they thought had been purged. They continued to work. Their first warning was when they experienced respiratory distress after heating piping joints for about 5 minutes. Per the LANL report, if they had not immediately evacuated the tent, there could have been serious injuries, including possible fatalities.

During the investigation, LANL identified multiple breakdowns. Some were driven by conflicting safety controls. Others resulted from mis-communication, misunderstandings on responsibilities, and reliance on conversation or other records over work-site walk-downs. For example:

- Due to radiological control and waste minimization concerns, the workers were wearing flammable coveralls and latex gloves while working with the acetylene torch, counter to their flame permit. This has some similarities to conditions that resulted in a fatality at Oak Ridge K-25 in 1997. In that case, the worker's vision was more obstructed, and he was working alone.

- During the actual work, the workers expressed conflicting concerns on when to operate the ventilation blower – considering the potential for contamination spread vs the need for air flow during hot work. Even then, the controls in place did not include local task exhaust recommended by the coolant Material Safety Data Sheet when applying heat.

- The tent was an informal addition to the work package, and the hazards it presented were not evaluated. It may have amplified the toxic vapor concentration by an order of magnitude.

- There were multiple opportunities by various organizations to identify the chemical hazards during the planning phase, but they did not engage appropriate subject matter experts. They did not realize how ill-informed they were on the hazards, and incorrectly identified the hazards on multiple work package forms. Since no chemical hazards were identified, the workers believed that all the hazards had been identified and removed.

The LANL report includes a gap analysis of the event against the new integrated interim work controls being implemented (site rep weekly 10/31/03). It concludes that these new work controls could conceivably have prevented the accident, but they must be strengthened. The site rep believes that these new controls are the most positive actions that have taken place here to improve worker safety during the last two years. This event and LANL's subsequent investigation strongly reinforce the needs for full implementation and continued improvement in LANL work control.