

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

August 25, 2006

**MEMORANDUM FOR:** J. Kent Fortenberry, Technical Director

**FROM:** C. H. Keilers, Jr.

**SUBJECT:** Los Alamos Report for Week Ending August 25, 2006

Anderson, Ogg, Plaue, and Winters were here this week reviewing legacy nuclear materials and transuranic (TRU) waste operations. This is part of a series of staff reviews focused on developing an integrated perspective of LANL's current and future nuclear operations and their safety implications.

NNSA and LANL envision dramatic increases in material through-put and operating tempo for the Plutonium Facility (TA-55) during the next six years, including an order-of-magnitude increase in pit production (~80 pits/yr), a Pu-oxide campaign to provide startup feed for the Savannah River Sites's new mixed oxide fuel plant (~80 kg/yr), and a Pu-238 heat-source campaign (~9 kg/yr). NNSA and LANL are also planning to complete roughly two billion dollars of nuclear facility investment by 2014, including an analytical chemistry and material characterization lab (CMRR), a radioactive liquid waste treatment facility (RLWTF), a TRU waste processing and shipping facility, a pit radiography facility, and TA-55 programmatic, security, and facility upgrades. By 2022, NNSA intends to consolidate such plutonium operations at an unspecified DOE site, as part of the new NNSA vision for the 2030 Complex.

While process knowledge exists, synthesis for the next decade's objectives is largely lacking, particularly for support functions (e.g., residue and waste processing). Pre-conceptual studies on pit manufacturing options are the most mature of studies contemplated and are based on recent TA-55 experience. The least desirable option from a safety perspective involves concurrently modifying rooms while conducting operations; this may become the choice by default without NNSA close engagement, not now evident.

Longstanding infrastructure problems have also allowed plutonium residue and TRU waste inventories to grow to where they impact both mission and safety, virtually ensuring failure unless addressed as a priority. For example:

- half of LANL's 9,000 nuclear material containers are non-standard and suspect.
- the 1960s-era RLWTF is a potential single point failure; it has not processed significant TRU liquid waste from TA-55 in two years.
- as a result of RLWTF issues, TA-55 has been unable to process residues, is now near its residue storage capacity, and is within 6 months of having to curtail pit operations unless resolved.
- LANL expects RLWTF TRU processing to resume during the next 18 months, starting in November, and needs it to ramp up to 2 to 5 times its previous throughput.
- LANL has been slow to pursue options (e.g., CLEAR line) to capture more source term at TA-55, the more robust facility, and thereby reduce the load on RLWTF.
- TA-55 needs to remove 30 to 60 contaminated glove-boxes within the next few years to make space for new equipment, but LANL has no capability now for large item size reduction.
- LANL has 50,000 TRU waste drums to ship to WIPP by 2010; shipment rate is limited by facility authorization basis and material condition issues; hundreds of higher activity drums still have no approved pathway off-site.
- TA-55 is nearly three decades old and at a point when equipment needs to be upgraded or replaced; however, NNSA is delaying and scaling back the TA-55 reinvestment project.

These problems are linked to some of LANL's most fundamental nuclear safety issues. For example:

- resolution of the TA-55 confinement strategy issue may depend on TA-55 reinvestment project upgrades that are now being delayed or are unscheduled (e.g., ventilation, fire protection).
- the off-site risk from TA-54 TRU waste drums remains high until nearly all the drums are shipped, according to DOE approved accident analyses.
- the LANL comprehensive nuclear materials packaging and storage plan – which was developed in response to the 2003 Pu-238 Type B investigation and the 2004 Secretary's 00-1 implementation plan – is still draft and unapproved by NNSA (ref: Secretary's ltr 7/23/04); this plan is a key element in LANL systematically and safely addressing its large plutonium residue backlog.