UNITED STATES GOVERNMENT DEPARTMENT OF ENERGY

memorandum

National Nuclear Security Administration
Los Alamos Site Office
Los Alamos, New Mexico 87544

DATE: JAN 2 0 2010
REPLY TO
ATTN OF: FO:19CK-227050
SUBJECT: Worker Safety During Programmatic and Research Operations

TO: Isaac E. Richardson III, Deputy Director, Los Alamos National Security, LLC, MS-A100

References:
1) LANL Procedure P300, *"Integrated Work Management"*, Revision 1, October 30, 2009.
2) DNFSB Letter from John E. Mansfield, DNFSB to Thomas P. D'Agostino, NNSA-HQ, dated December 2, 2009
3) Contract No. DE-AC52-06NA25396, Los Alamos National Security, LLC, and the Department of Energy, National Nuclear Security Administration

The National Nuclear Security Administration (NNSA) is concerned about recent safety incidents that have a programmatic or conduct-of-research nexus. These events are similar to each other and to prior events, indicating that prior corrective actions have not been fully effective or have degraded with time. Without appropriate management focus, evaluation, and response, these could become precursors to incidents of even greater significance, up to and including serious injuries or fatalities.

Relevant recent events include but are not limited to the following:
- January 9-10, 2010 – A rapid energetic reaction occurred in an oven during the weekend in Technical Area (TA) 48. The experiment was set up by a postdoctoral assistant working under direction of a mentor to duplicate an experiment described in a published paper; however, the researcher was using higher constituent concentrations and a pressure vessel instead of glassware. The work was done to a "generic" integrated work document (IWD). While the work had been reviewed by a mentor, there was no formal work release. The relevant material safety data sheets indicate that there were unidentified hazards that a more formal hazards review and work release, as intended by the IWD process, would likely have discovered;
- December 16, 2009 – The large-bore powder gun at TA-15 failed in a manner that caused extensive damage to equipment and the building but no injuries;
- July 24, 2009 – A TA-53 researcher received an extremity dose higher than anticipated while handling a TA-48 target with elevated beta dose rates;
- July 23, 2009 – An eructation occurred at TA-35-213 when a technician disposed of a caustic-acid mixture in a carboy. This led to an evacuation of several facilities;
- July 8, 2009 – An energetic reaction occurred in an occupied room in TA-35-2 after a student erroneously disposed of acetone into a sealed acid waste container. A secondary reaction later resulted in a brown cloud that caused emergency responders in the room to evacuate; and
- March 20, 2009 – An employee received a 3,500 VDC shock when he inadvertently contacted the high-voltage end of a battery string from a trainer fire-set.

Accident investigations for some of these events have lagged and have been under-scoped. While the two TA-35 events occurred in July 2009, the investigation report was only recently finalized, nearly six months later. The TA-15 powder gun failure event is being appropriately investigated now, but the initial investigation team composition appears to have been inadequate. Following the most recent event (TA-48), Los Alamos National Security, LLC

(LANS) personnel cleaned up the scene before formal investigation, LANS management discouraged a formal critique, and LANS did not aggressively pursue whether the event constituted a repeat occurrence considering other similar events, such as the TA-35 events.

The lag in accident investigations also leads to a lag in identification and implementation of corrective actions and delay in improving the safety of research and programmatic operations. These events are also strikingly similar to prior events, such as:

- June 7, 2005 – Two postdoctoral assistants at TA-48 inhaled acid vapors while cleaning glassware on a bench-top instead of in a hood;
- May 27, 2005 – An explosion occurred in TA-9 while researchers were attempting to scale up a chemical synthesis process described in a published article. Both a post-doctoral assistant and a student received facial lacerations and other injuries;
- July 14, 2004 – A student sustained a severe eye injury while working with a laser;
- July 23, 2003 – A post-doctoral assistant performing a column separation accidently sprayed acid into his eyes. Subsequently, the same person received a skin contamination;
- April 4, 2003 – An unanticipated flash resulted in severe burns to a TA-9 researcher who was in the process of removing a formulation from a petri dish; and
- January 8, 2002 – An explosion occurred in TA-54-1009 after researchers, synthesizing liquid chlorine dioxide, increased the chlorine concentration from 4 % to 100 %. Serious injuries were avoided only by the researchers recognizing a rapid temperature rise and immediately evacuating seconds before the explosion occurred.

Each of these earlier events represents hard lessons learned that culminated in the site's current integrated work control process, Reference (1). However, the commonalities between recent and earlier events indicate that the organizational learning and the sustained focus on improvement necessary for a proactive safety culture have not been embraced across this site. Reference (1) is still not adequately and sustainably implemented for some programmatic and research activities. Prior corrective actions have exhibited a "half-life" and will not be sustained without continuous management vigilance.

Active and aggressive management of event investigations, corrective actions, and effective reviews do not appear to be occurring. Management commitment to improving the safety of research and programmatic operations is not universally evident across the site. Operational excellence is just as important in research under the scientific method as it is in other areas.

As evidenced by the above incidents, achieving mature, sustainable work control implementation has lagged in research and development and in other programmatic work. NNSA has not seen a consistent senior management emphasis on addressing these issues. The Defense Nuclear Facilities Safety Board (DNFSB) made similar observations in Reference (2). Los Alamos Site Office (LASO) also expects LANS's response to Reference (2) to address all aspects of work control, with special focus on programmatic, and research and development work.

REQUEST FOR ACTION

By February 5, 2010, LANS is requested to consider the above and provide NNSA its evaluation of recent safety incidents that have a programmatic or conduct-of-research nexus, and the actions that will be taken to improve institutional safety in programmatic and research environments. Please also provide a detailed briefing to the LASO Manager on this subject no later than February 5, 2010.

If the Contractor believes the Performance Direction violates Contract No. DE-AC52-06NA25396 Clause H-2, entitled *"Performance Direction"*, the Contractor shall suspend implementation of the Performance Direction and promptly notify the LASO Contracting Officer of its reasons for believing that the Performance Direction violates this clause. Oral notification to the Contracting Officer shall be confirmed in writing within ten calendar days of the oral notification. To contact the LASO Contract Office, call (505) 665-9175.

If you have any questions, contact C. Keilers (505)-665-6352 or J. Vozella (505)-665-6351.

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