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DEFENSE NUCLEAR FACILITIES SAFETY BOARD

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September 13, 2004

The Honorable Linton Brooks
Administrator
National Nuclear Security Administration
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0701

Dear Ambassador Brooks:

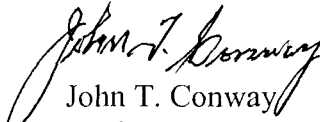
The Defense Nuclear Facilities Safety Board (Board) has followed closely the suspension of nuclear operations at Los Alamos National Laboratory (LANL) on July 16, 2004, and the subsequent resumption planning effort. In addition, members of the Board and its technical staff visited LANL on August 18 and 19, 2004, to assess conditions at the laboratory and review the restart approach. The enclosure to this letter describes several of the Board's observations and is provided for your information.

Several points in the enclosure warrant emphasis. The National Nuclear Security Administration (NNSA) and LANL need to closely monitor and LANL needs to appropriately adjust plant conditions to maintain safe and stable configuration during the stand-down. The currently envisioned stand-down of a few months, coupled with appropriate monitoring, appears reasonable, but NNSA and the Department of Energy (DOE) need to anticipate and prepare for the emergence of new nuclear safety issues should the stand-down be protracted. The LANL Director's decision to stand down all operations was strongly influenced by an injury on July 14, 2004, that apparently occurred because of a breakdown in the laboratory's interim work control process. It would perhaps be beneficial to undertake an effort focused on identifying the necessary work control improvements during the assessments now under way, and then fully and aggressively implementing an improved work control process in parallel with other resumption activities.

The stand-down is delaying several NNSA and LANL actions that are necessary to address long-term safety liabilities. These include aggressively completing nuclear material stabilization activities in response to the Board's Recommendations 94-1, *Improved Schedule for Remediation*, and 00-1, *Prioritization for Stabilizing Nuclear Materials*; dispositioning corroding cans of plutonium-238 and completing clean-up of the room contaminated in August 2003 during an event that resulted in plutonium-238 uptakes to workers; resuming characterization and shipment of transuranic waste drums to the Waste Isolation Pilot Plant (WIPP); addressing the large backlog of LANL safety bases that need to be updated, particularly for the Plutonium Facility; and pursuing other longer-term initiatives to improve safety, such as full implementation of DOE Order 420.1A, *Facility Safety*, and conduct of engineering. These actions warrant priority.

The Board will continue to closely monitor resumption activities at LANL. In particular, the Board plans to have technical staff members on site during LANL's readiness assessments for nuclear facilities, expected to start in mid-September 2004. These staff members will supplement the coverage already provided by the Board's two full-time site representatives at LANL. Consistent with the current practice for site representatives, these staff members will work with NNSA's Los Alamos Site Office and will provide real-time feedback to NNSA and LANL personnel responsible for resumption activities.

Sincerely,



John T. Conway
Chairman

c: Mr. Mark B. Whitaker, Jr.
Mr. Edwin L. Wilmot

Enclosure

Enclosure

Defense Nuclear Facilities Observations of Restart Efforts and Safety Conditions During the Shutdown of Work Activities

On July 16, 2004, the Los Alamos National Laboratory (LANL) Director suspended all but essential operations because of safety, security, and compliance issues. Subsequently, LANL developed a resumption plan, with which the Manager of the National Nuclear Security Administration's (NNSA) Los Alamos Site Office (LASO) concurred. LANL plans a staggered resumption of operations in its facilities. The decision to resume each operation will be based on a series of assessments that evaluate eight functional areas encompassing the competency of management, the behavior of personnel, the risks of the operation, and the adequacy of controls. These assessments are now expected to be completed by mid-September 2004 for moderate-risk activities and by November or December for higher-risk activities. The LANL Director is the approval authority for resumptions not involving classified removable electronic media. The LASO Manager will concur on each resumption based on input from his representatives.

The Defense Nuclear Facilities Safety Board (Board) visited LANL on August 18 and 19, 2004. During this visit, the Board observed restart efforts and held discussions with LANL and LASO representatives concerning the safety conditions during the stand-down and the safe resumption of work activities. Prior to the visit, the Board received a briefing from the NNSA Administrator, who is responsible for the overall safety and security of NNSA's weapons laboratories and who had recently returned from LANL. The Board has also received frequent updates from its technical staff. As a result of the information thus obtained, the Board has the following observations:

- The Board's first concern following the stand-down is for the safe and stable configuration of the nuclear operations and facilities. There are numerous examples of accidents or hazardous conditions elsewhere resulting from improperly planned and executed stand-downs. The Board has learned that LANL took such actions as categorizing compliance with safety basis requirements as an essential activity that must continue through the stand-down, prioritizing maintenance of vital safety systems, and implementing periodic monitoring and inspection of facility equipment. Overall, it appears that LANL achieved an orderly stand-down of its nuclear facilities.
- LANL needs to closely monitor and appropriately adjust plant conditions to maintain safe and stable conditions during the stand-down. During its recent visit, the Board observed that, while LANL had taken many appropriate actions, some personnel responsible for programmatic equipment were still confused about the frequency and scope of inspections they should be conducting during the stand-down and about the actions to take if abnormal conditions were found. The Board and its staff communicated this observation to DOE and LANL management.
- The Board is also concerned about the potential for new nuclear safety issues to emerge should the stand-down be longer than anticipated. There are examples

elsewhere of idling processes eventually leading to hazardous conditions and accidents, such as the hydroxylamine nitrate (HAN) explosion at Hanford. An extended stand-down could possibly affect operators' familiarity with the facility and equipment, increase the probability of equipment failure, or create unexpected or off-normal conditions. The currently envisioned stand-down of a few months, coupled with aggressive monitoring, appears reasonable in this regard.

- While the resumption planning effort is impressive, the extensive reviews required could result in a protracted stand-down if they are not managed closely and appropriately. LANL expects these reviews to cover a broad scope, examining nearly every aspect of operations in a short time. For example, the Plutonium Facility and the Chemistry and Metallurgy Research (CMR) Facility have identified about 200 processes within scope, each to be evaluated against 53 lines of inquiry, possibly resulting in about 10,000 point assessments. To keep this effort manageable, these facilities and others are screening processes and pursuing risk-based sampling. The challenge for LANL is to achieve proper balance in all these reviews between being too superficial to satisfy the objectives of the stand-down and being too detailed, leading to protracted facility shutdowns that create new and potentially more serious safety issues.
- The LANL Director's decision to stand down all operations was strongly influenced by an injury on July 14, 2004, that apparently occurred because of a breakdown in LANL's interim work control process. Early in 2004, several near-misses at LANL indicated that the process was incompletely implemented, and the laboratory made some adjustments. Early observations from LANL reviews now under way suggest that the interim work control process is still implemented incompletely or inconsistently in many nuclear and nonnuclear facilities. LANL's commitment to implementing major process improvements in September 2004 has been impacted by the stand-down. The laboratory might achieve maximal benefit from a priority effort focused on identifying the necessary work control improvements during the assessments now under way and then fully and aggressively implementing them in parallel with other resumption activities.
- In 1989, several DOE sites suspended nuclear operations but failed to resume operations within a short period as originally intended. In Recommendation 94-1 to the Secretary of Energy (May 26, 1994), the Board observed that the halt in the production of nuclear weapons and materials had frozen the manufacturing pipeline in a state that, for safety reasons, should not be allowed to persist unremediated. The subsequent effort to address the emergent safety issues across the DOE complex has been massive and remains incomplete. LANL lags behind nearly all other DOE sites in this regard, and has a significant inventory of nuclear material that has not been properly stabilized and packaged or otherwise dispositioned. During its visit, the Board learned that the stand-down will further delay the nuclear material stabilization

effort. It is imperative that stabilization of nuclear materials not be excessively delayed and that when it resumes, it be assigned priority.

- Relatedly, the LANL stand-down, as well as unresolved safety basis issues, has delayed the laboratory's efforts to disposition corroding cans of plutonium-238 residues and to clean up the room in the Plutonium Facility that was contaminated in August 2003 during an event that resulted in plutonium-238 uptakes to workers. The clean-up stalled 3 to 4 months ago. The stand-down is also delaying other NNSA and LANL commitments made in response to the NNSA's Type B investigation of the uptakes, completed last December. Plutonium Facility personnel recognize that the contaminated room and the residues constitute a safety liability that should not be allowed to persist. They need the full support of NNSA and LANL management to resume this activity safely and quickly as a priority.
- The stand-down has delayed LANL's efforts to characterize and resume shipment of higher-activity transuranic waste drums to the Waste Isolation Pilot Plant (WIPP) under the Quick-to-WIPP Program. This program is aimed at reducing the risks associated with the highest-consequence accident postulated at LANL in approved nuclear safety analyses. Its resumption warrants priority.
- The stand-down has delayed NNSA and LANL efforts to address the large backlog of LANL safety bases that need to be updated. The safety bases constitute the LANL proposed and NNSA approved set of analyses and requirements for safe operation of nuclear facilities. NNSA has not enforced the annual update requirements for LANL safety bases. Several nuclear facilities (e.g., the Plutonium Facility) are operating now with safety bases that are more than 5 years old. In particular, processes in the Plutonium Facility that were judged acceptable in accordance with the 1996-era safety basis and were subsequently started up within the last few years may not meet today's DOE safety requirements. NNSA and LANL efforts to quickly review and update the safety basis for the Plutonium Facility proposed 2 years ago have been delayed by the stand-down and warrant priority.
- The stand-down has also delayed longer-term improvement initiatives at LANL, including those being pursued in response to issues raised by the Board. For example, NNSA has proposed a second 90-day slip in issuing its report on LANL's implementation of DOE Order 420.1A, *Facility Safety*, and application of uniformly sound design and engineering practices. The Board's staff has identified many instances in which NNSA and LANL have provided inadequate assurance that the engineered controls selected have clearly defined safety functions, that they will fulfill those functions, and that they constitute a complete set. Significant effort remains to finalize the implementation plan for Order 420.1A, particularly for the application of engineering practices to nonfacility work. Another example may be LANL addressing training issues described in the recent NNSA training assessment, which was done in response to a Board letter dated July 9, 2003.

- The stand-down has the potential to significantly impact design and construction planning efforts, such as the replacement for the CMR Replacement Facility. Certain of these efforts will enhance nuclear safety in the long term and should not be delayed.
- Finally, it would be advisable to attempt to limit the effect of this stand-down on the laboratory's analytical work in support of the Pantex Plant's efforts to assemble, disassemble, and dismantle nuclear weapons safely.