



U.S. Department of Energy
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Management Controls over the National Nuclear Security Administration's Ability to Maintain Capability of the TA-18 Mission

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February 2007



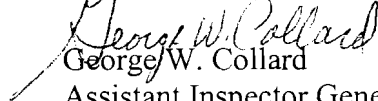
Department of Energy

Washington, DC 20585

February 20, 2007

MEMORANDUM FOR THE DEPUTY ADMINISTRATOR FOR DEFENSE PROGRAMS

FROM:


George W. Collard
Assistant Inspector General
for Performance Audits
Office of Inspector General

SUBJECT:

INFORMATION: Audit Report on "Management Controls over the National Nuclear Security Administration's Ability to Maintain Capability of the TA-18 Mission"

BACKGROUND

The mission of Technical Area 18 (TA-18) at the National Nuclear Security Administration's (NNSA) Los Alamos National Laboratory (Los Alamos) was to conduct nuclear criticality experiments and hands-on training in nuclear safeguards, criticality safety and emergency response. TA-18 was the only facility in the United States capable of performing these nuclear criticality experiments needed to validate safety evaluations, establish limits for operations involving special nuclear material (SNM), and provide criticality training. Experiments were performed on five one-of-a-kind criticality machines and required a diverse set of SNM and highly skilled technical personnel.

To consolidate SNM in a more secure facility, in December 2002, NNSA announced its decision to relocate the TA-18 mission to the Device Assembly Facility (DAF) at the Nevada Test Site. NNSA planned to construct a new Criticality Experiment Facility (CEF) within DAF to house this mission. To minimize the mission impact of the relocation, the NNSA Administrator directed program officials to prepare a Closure Plan and establish interim criticality operations capability at Los Alamos and DAF as soon as mid-Fiscal Year (FY) 2005 and to terminate TA-18 operations by FY 2008.

Because of its importance to security and safety, we initiated this audit to determine whether NNSA minimized the impact of the TA-18 relocation on mission operations.

RESULTS OF AUDIT

Although its goal was to establish interim operations as early as FY 2005, NNSA had not maintained the capability to conduct unique TA-18 criticality operations and is at risk of delays in re-establishing this capability. Specifically, four of the five criticality machines were not moved to DAF as planned but remain at Los Alamos where they are being disassembled and refurbished. The fifth machine is being decommissioned. Additionally, 17 of the 20 criticality experts have left the mission.

NNSA did not establish interim criticality operations capability as planned because in FY 2005, officials determined that the associated cost and time required would negatively impact higher priority relocation activities, including removing SNM from TA-18 and

construction of CEF. Completion of CEF, now scheduled for the first quarter of FY 2010, and related activities may allow NNSA to re-establish its criticality operations.

While management had a reasonable basis to delay establishing interim operations, we concluded that full resumption of criticality operations by FY 2010 is at risk because NNSA had not adequately planned to replace, train, and certify the staff needed to conduct criticality experiments once CEF is completed. Although Los Alamos prepared a staffing plan in September 2006, full execution of the plan will likely require at least four years because some new staff may require a four-year apprenticeship before they can meet the unique requirements of the mission. In addition to the apprenticeship period, there is a lead time of 18-24 months to meet the requirements of the Human Reliability Program and to obtain a Department of Energy Q Clearance. Based on these requirements, new recruits may not be fully certified to operate the criticality machines until at least FY 2011, a year after CEF is scheduled to become operational.

The need to maintain the pre-requisite human capital skills to achieve mission objectives is not unique to the TA-18 mission relocation. As the Office of Inspector General recognized in our report "*Management Challenges at the Department of Energy*" (DOE/IG-748, December 13, 2006), human capital management is an ongoing challenge that will require the attention of Department management in the years to come.

Until criticality operations are resumed, NNSA cannot fully support the mission of the Nuclear Criticality Safety Program (NCSP) and other activities important to national security. For example, NNSA was unable to perform activities scheduled for FY 2005 in support of the NCSP and the Emergency Response Program. Other priority experiments in support of the NCSP and other national security programs scheduled during FYs 2006 through 2010 will also not be completed due to the loss of the criticality capability. The Defense Nuclear Facility Safety Board has also expressed concern about the risk of losing criticality expertise due to inactivity or attrition and the subsequent inability to perform critical experiments once the CEF becomes operational.

NNSA recognized the importance of re-establishing the nuclear criticality and safety training missions. On May 23, 2006, Los Alamos was directed to remove the criticality machines from TA-18; complete refurbishment activities on the machines at an alternate Los Alamos location; and once the refurbishment is complete, immediately transfer the machines, along with assigned personnel to DAF. Fiscal Year 2006 funding support for the other activities related to establishing some interim operations at DAF has also been provided. These actions represent positive steps toward re-establishing mission capability at DAF. However, prompt action is needed to ensure that a fully trained and certified staff is available to carry out the unique functions of the criticality experiments machines, once the CEF is completed.

MANAGEMENT REACTION

Management agreed with the recommendation. Management stated that Los Alamos completed a staffing plan at the end of FY 2006 that was consistent with NNSA's planning. Management also cited actions taken to minimize the impact of the TA-18 relocation on criticality operations, including funding hands-on-criticality safety

training in FY 2006. However, management commented that it was misleading to state that Los Alamos staff would not be fully certified until FY 2011. Management comments are summarized on page 4 and are included in their entirety in Appendix 3.

While we acknowledge that management took a number of actions to minimize the impact of TA-18 relocation on criticality operations, these actions did not provide the hands-on-training needed by a staff to qualify and become certified to operate the specific machines that comprise the TA-18 mission. We also acknowledge that the preparation of a staffing plan is a positive step toward resuming criticality operations. However, as noted in the staffing plan, "while certain positions require completion of specific training classes, others may require as many as four years of training and hands-on-experience before the staff can become qualified and/or certified." Accordingly, we believe that it is essential that the staffing plan be implemented without delay to ensure the resumption of criticality operations vital to national security.

Attachment

cc: Deputy Secretary
Acting Administrator, National Nuclear Security Administration
Chief of Staff
Director, Policy and Internal Controls Management, NA-66

**REPORT ON MANAGEMENT CONTROLS OVER THE NATIONAL
NUCLEAR SECURITY ADMINISTRATION'S ABILITY TO MAINTAIN
CAPABILITY OF THE TA-18 MISSION**

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MAINTAINING CRITICALITY MISSION CAPABILITY

Mission Capability

The National Nuclear Security Administration (NNSA) had not maintained the capability to conduct the unique Technical Area 18 (TA-18) criticality operations during the transition to the Device Assembly Facility (DAF) and is at risk of delays in re-establishing this capability. Specifically, as of September 2006, the five TA-18 criticality machines were not operational. Four machines were being disassembled and refurbished at Los Alamos National Laboratory (Los Alamos) while the fifth machine was being decommissioned. Further, 17 of the 20 experts conducting TA-18 criticality experiments and training on the machines had left the mission.

Criticality Machines

To expedite interim criticality operations, the TA-18 Closure Plan called for NNSA to move four machines to DAF by the summer of 2005, two of which were to be operational by mid-Fiscal Year (FY) 2006. Additionally, the fifth machine was to remain operational at TA-18 to support nuclear criticality training courses in FY 2006. At the time of this audit, however, the four machines scheduled for delivery to the DAF had not been moved as called for in the Closure Plan. According to current estimates, the machines will not be moved to DAF until early 2008, approximately three years later than originally planned. Los Alamos personnel advised that all four machines will remain at Los Alamos for disassembly, decontamination, and installation of new components before being transferred to DAF.

The goal to keep the fifth machine operational at TA-18 during the transition period also was not met. In a January 2006 report to Congress, NNSA stated that no appropriate location at Los Alamos could be identified that allowed sufficient distance from the public to support operations of the machine. As a result, the Department of Energy (Department) planned to initiate a separate National Environmental Policy Act action to assess the impacts of relocating the fifth machine to another Department site.

Human Capital

NNSA also has not maintained the human resource skills necessary to carry out TA-18's unique nuclear criticality mission. Since NNSA began the TA-18 move, the number of personnel with the expertise to perform the TA-18 criticality operations has declined from 20 to 3. NNSA has hired one replacement. However, since its criticality machines are not operational, NNSA has been unable

to provide the required biennial hands-on training necessary for its remaining personnel to maintain their certifications as criticality machine operators or provide required training to the one new hire.

Re-establishing Criticality Capability

The NNSA Deputy Administrator for Defense Programs recognized the importance of re-establishing the criticality mission. On May 23, 2006, he directed Los Alamos to remove the criticality machines from TA-18; complete refurbishment activities on the machines at an alternate Los Alamos location; and, once the refurbishment is complete, immediately transfer the machines, along with assigned personnel to DAF. The Deputy Administrator also provided FY 2006 funding support for the other activities related to establishment of some interim operations at DAF.

Mission Resumption

Due to higher priority relocation activities, including moving the special nuclear materials (SNM) from TA-18 and constructing the Criticality Experiment Facility (CEF), NNSA did not pursue establishing interim criticality operations capability in FY 2005 as originally scheduled. NNSA officials determined that criticality operations capability would resume at DAF upon completion of CEF, now scheduled for the first quarter of FY 2010.

However, NNSA's ability to re-establish its criticality mission capability is at risk because it has not adequately planned to have the staffing resources available to conduct criticality experiments once CEF is completed. Although eighty-five percent of the trained personnel with the pre-requisite TA-18 criticality machine certifications are no longer working in this program, Los Alamos did not prepare a staffing plan to hire, train, and certify new recruits until the end of FY 2006. NNSA may not fully resume criticality experiments once CEF is completed in FY 2010 since some new staff may require a four-year apprenticeship to meet the unique requirements of the mission. In addition to the apprenticeship period, there is a lead time of 18-24 months to meet the requirements of the Human Reliability Program and to obtain a Department of Energy Q Clearance.

NNSA management indicated that it had a small cadre in NNSA and within contractor organizations to support criticality training and experiments. Specifically, there are generic skills and proficiencies common to all reactors and the approach to critical operations that can be maintained through a combination of activities at Sandia National Laboratories, Lawrence Livermore National Laboratory and foreign sites. For example, NNSA developed an agreement with Russia to participate in their criticality experiments in order to provide criticality training to its remaining staff. However, management acknowledged that these activities do not constitute certification to operate TA-18's one-of-a-kind criticality machines that will be moved to CEF.

**Impact on
Mission Needs**

NNSA cannot currently support the mission needs of the Nuclear Criticality Safety Program (NCSP) and other activities important to national security. For example, NNSA did not perform activities scheduled during FY 2005 in support of the NCSP and the Emergency Response Program. Additionally, priority experiments to support the NCSP and other national security programs that were scheduled during FYs 2006 through 2010 will not be performed as a result of the loss of this capability. A Los Alamos official at DAF also advised us that the loss of capability has resulted in slippages in work to support the development of radiation detection monitors for the Department of Homeland Security.

The Defense Nuclear Facility Safety Board has also expressed concerns about the risk of losing criticality expertise due to inactivity or attrition and the subsequent inability to perform critical experiments once CEF becomes operational. Specifically, the criticality machines being moved to CEF at Nevada not only provide hands-on training for Nuclear Criticality Safety engineers, but also the expertise needed to perform critical experiments; both are indispensable components of a robust NCSP infrastructure.

RECOMMENDATION

We recommend that the NNSA Deputy Administrator for Defense Programs ensure that the staffing plan is implemented in a timely manner to provide the pre-requisite number of trained and certified personnel to carry out the unique functions of the criticality experiments machines, once CEF is completed.

**MANAGEMENT
REACTION AND
AUDITOR COMMENTS**

Management agreed with the recommendation and stated that Los Alamos had completed a staffing plan at the end of FY 2006 that was consistent with NNSA's planning. Management also cited actions it had taken to minimize the impact of the TA-18 relocation on criticality operations, including providing funding to the Lawrence Livermore National Laboratory for hands-on-criticality safety training.

Management also indicated that it was misleading to state that Los Alamos recruits would not be fully certified until FY 2011. The current CEF integrated schedule show Los Alamos staff writing operating procedures for criticality machines as early as March 2007. Criticality machine operators are expected to start their training on these new procedures in November 2007 and to fully demonstrate the procedures during FY 2010. Management's verbatim comments are included in their entirety at Appendix 3.

While Los Alamos prepared a staffing plan in September 2006, full execution of the plan will likely require at least four years. As noted in the staffing plan, "while certain positions require completion of specific training classes, others may require as many as four years of training and hands-on-experience before the staff can become qualified and/or certified." Based on these requirements, new recruits may not be fully certified until at least FY 2011, a year after CEF is scheduled to become operational.

We also acknowledge that management took a number of actions to minimize the impact of the TA-18 relocation on criticality operations, including providing funding for hands-on-criticality safety training. However, these actions do not provide the training and operational experience needed to be qualified on the TA-18 criticality machines since certification is machine specific. Accordingly, we believe that it is essential that the staffing plan be implemented without delay to ensure the resumption of criticality operations vital to national security.

Appendix 1

OBJECTIVE

The objective of our audit was to determine whether the National Nuclear Security Administration (NNSA) met its goal to minimize the impact of the TA-18 relocation on the criticality operations mission.

SCOPE

The audit was performed between November 2005 and June 2006. Audit work was performed at NNSA Headquarters; Los Alamos National Laboratory (Los Alamos); the Los Alamos Site Office; Nevada Site Office; and Nevada Test Site.

METHODOLOGY

To accomplish the audit objective, we:

- Reviewed the TA-18 Closure Plan, Staffing Plan and key memoranda;
- Interviewed key personnel at Headquarters, Los Alamos, the Los Alamos Site Office, Nevada Site Office and Nevada Test Site;
- Toured the Design Assembly Facility and Technical Area 18;
- Reviewed laws and regulations; and,
- Reviewed results of prior audits and reviews.

The audit was conducted in accordance with generally accepted government auditing standards for performance audits and included tests of internal controls and compliance with laws and regulations to the extent necessary to satisfy the objective of the audit. Accordingly, we assessed the significant internal controls and performance measures established under the Government Performance and Results Act of 1993 and found that measures specifically related to establishing TA-18 interim operations had not been established. Because our review was limited, it would not necessarily have disclosed all internal control deficiencies that may have existed at the time of our audit. We determined that controls over computer-processed data were not integral to meeting the objectives of our audit. NNSA management waived an exit conference.

Related Audit Reports

The Office of Inspector General has previously reported on improvements needed in the management of other nuclear-related projects at the Los Alamos National Laboratory (Los Alamos), including:

- *The Stabilization of Nuclear Materials at Los Alamos National Laboratory* (DOE/IG-0659, August 2004). The Department of Energy had made some progress in stabilizing the most hazardous fissionable materials; however, stabilization had not been accelerated to the level anticipated. The Department missed interim milestones and project tasks, which may further delay stabilization and increase risk that stabilization will not be completed by 2010. Delays occurred because (1) the Department had not fully funded the stabilization effort at Los Alamos; (2) Los Alamos had not made full use of available project management tools; and, (3) performance measures and incentives were not incorporated into the Los Alamos contract. By extending the schedule until 2010, the Department will incur an estimated \$78 million in additional costs to stabilize these dangerous materials.
- *Transuranic Waste at Los Alamos National Laboratory* (DOE/IG-0673, February 2005). The Department will not meet its commitments for removing transuranic waste from Los Alamos. Based on current projections, the Department will complete removal of all high-risk waste in October 2005, at the earliest, and we estimate it is unlikely to complete removal of the legacy transuranic waste before 2014 - four years beyond the commitment date. The Department will not meet the accelerated waste disposal goals because (1) Los Alamos had not consistently followed approved waste processing procedures; (2) of the July 2004 Laboratory site-wide stand down; and, (3) the Department did not supply the mobile waste processing equipment because of its concern regarding the Laboratory's ability to use the equipment in a timely manner. Unless the Department accelerates processing rates, the total cost of completing the waste disposition project could increase by over \$70 million.

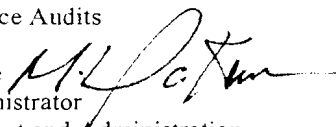


Department of Energy
National Nuclear Security Administration
Washington, DC 20585



December 11, 2006

MEMORANDUM FOR George W. Collard
Assistant Inspector General
for Performance Audits

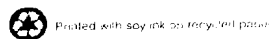
FROM: Michael C. Kane 
Associate Administrator
for Management and Administration

SUBJECT: Comments to TA-18 Draft Report;
A06LA012/2005-39334

The National Nuclear Security Administration (NNSA) appreciates the opportunity to review the Inspector General's draft report, "Management Controls over the National Nuclear Security Administration's Ability to Maintain Capability of the TA-18 Mission." We understand that this audit was conducted to determine whether NNSA met its goal to minimize the impact of the TA-18 relocation on the criticality operations mission. We further understand that based on audit work that the IG is recommending that a staffing plan be prepared and implemented.

NNSA understands the report and the corresponding recommendation. It is important to note that while NNSA has oversight responsibilities, under contractor assurance systems the contractor is required to maintain human resource skills and to fulfill contract requirements. Los Alamos National Laboratory's TA-18 Mission Relocation/Criticality Experiments Facility Staffing Plan that answers the IG's recommendation is attached. That plan is consistent with NNSA's planning, but also relies on other programs. NNSA does have additional comments related to the report.

Where the report states that: "*NNSA did not minimize the impact of the TA-18 relocation on criticality operations ... Specifically, four of the criticality machines were not moved to DAF as planned but remain at Los Alamos where they are being disassembled and refurbished ... Additionally, 17 of the 20 criticality experts have left the missions.*" As discussed with the Defense Nuclear Facilities Safety Board, the Nuclear Criticality Safety Program Manager provided funding to the Lawrence Livermore National Laboratory for hands-on criticality safety training in FY 2006. The Criticality Experiments Facility (CEF) project, Critical Decision 2, was based on the four criticality experiment machines being



disassembled and decontaminated for “cold testing” with the new machine control components at Los Alamos. This work is being performed as the Device Assembly Facility (DAF) modifications are being performed in order to accept “beneficial occupancy” of these machines. Also, the DAF is currently finalizing the approvals for Los Alamos to perform source repackaging and measurement emergency preparedness for two key items: the Beryllium-Reflected Plutonium (BeRP) ball and the Neptunium Sphere. This will then stand up the Material Control and Accountability program at the DAF and provide training for operators that have moved to Nevada to operate the relocated TA-18 mission.

The report further states that, “*Although management had a reasonable basis to delay establishing interim operations, we concluded that full resumption of criticality operations by FY 2010 is at risk because NNSA had not adequately planned to replace, train, and certify staff to conduct criticality experiments once CEF is completed. Specifically, NNSA is not scheduled to complete a staffing plan until early FY 2007 detailing how it will replace the experts who left the mission.... Based on the FY 2007 completion date, new recruits would not be fully certified until at least FY 2011, a year after CEF is scheduled to become operational.*” In July 2006, Los Alamos prepared a Transition Plan that addressed the relocation and restructuring of the CEF institutional organizations project management functions in conjunction with the DAF construction activities. The Transition Plan identified key project personnel resident in Nevada, in addition to five Los Alamos employees from the Advanced Nuclear Technology Group, who moved to Nevada to support the interim operations such as the Nuclear Material Handling and Measurements project, in which the repackaging and emergency preparedness referenced above is performed. We believe that it is misleading to state that Los Alamos recruits would not be fully certified until FY 2011 when the current CEF integrated schedule shows Los Alamos staff starting to write operating procedures for the criticality machines as early as March 2007. The criticality machine operators will start their training on these new procedures in November 2007 and will fully demonstrate these procedures during the Operational Readiness Review at the DAF which is expected to be completed in FY 2010.

Should you have any questions about this response, please contact Richard Speidel, Director, Policy and Internal Controls Management.

Attachment

cc: Thomas P. D’Agostino, Deputy Administrator for Defense Programs
Ed Wilmot, Manager, Los Alamos Site Office
Jay Norman, Manager, Nevada Site Office
David Boyd, Senior Procurement Executive
Karen Boardman, Director, Service Center

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