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*Author(s):*  
William Haag  
Nancy Jo Nicholas  
Paul Mann\*  
\*DOE/NNSA

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**PRELIMINARY PLANS TO MOVE THE SPECIAL NUCLEAR MATERIAL  
SUPPORTING CATEGORY I AND II MISSIONS FROM TA-18 TO THE DEVICE  
ASSEMBLY FACILITY**

William Haag and Nancy Jo Nicholas, LANL, N-2  
Los Alamos National Laboratory  
Los Alamos, New Mexico, 87545, USA 505/667-1194  
Paul Mann, DOE/NNSA, NA-124

**ABSTRACT**

In December 2002, the National Nuclear Security Agency (NNSA) issued a Record of Decision announcing its intent to relocate safeguards Category I and II missions and associated special nuclear materials (SNM) from Los Alamos National Laboratory (LANL) Technical Area 18 (TA-18) to the Device Assembly Facility (DAF) at the Nevada Test Site (NTS). The Cat I and II missions support nuclear criticality safety, nuclear emergency response, nuclear nonproliferation, and homeland security. TA-18 is the sole remaining facility in the United States with the capability to perform general-purpose nuclear materials handling experiments and training. Hands-on and remote control experiments, measurements, and training with special materials and devices are conducted.

The conceptual design for modifying the DAF to house these Cat I and II missions includes plans for packaging and transporting the SNM inventory associated with the missions. This paper discusses these preliminary packaging and transporting plans, including how they fit into the plans for transitioning the relevant TA-18 missions to DAF while ensuring that mission, cost, and schedule requirements are met.

**INTRODUCTION/BACKGROUND**

In December 2002, NNSA issued a Record of Decision announcing its intent to relocate safeguards Category I and II missions and associated SNM from LANL TA-18 to the DAF at NTS. The Cat I and II missions support nuclear criticality safety, nuclear emergency response, nuclear nonproliferation, and homeland security. A wide range of SNM source material—from fractions of grams to kilograms in forms such as metals, oxides,  $UF_6$ , small fuel assemblies, well-characterized calibration standards, and other forms (including classified parts and shapes)—is needed to support these missions. TA-18 is the sole remaining facility in the United States with the capability to perform general-purpose nuclear materials handling experiments, measurements, and training.

The conceptual design for modifying the DAF to establish a criticality experiments facility (CEF) to house these Cat I and II missions has been approved. Plans for packaging and transporting the SNM inventory associated with the missions are under way. This paper discusses these preliminary packaging and transportation plans, including how they fit into the plans to transition the relevant TA-18 missions to DAF while ensuring that mission, cost, and schedule requirements are met.

NNSA is preparing to modify the DAF to accommodate four critical assemblies and permanent storage vaults for SNM. The modifications are expected to be complete in the FY09 time frame. As part of an effort to minimize security risk and cost across the Department of Energy (DOE) complex, NNSA is expediting shipment of the materials from TA-18 to the DAF, with the first shipment planned for September 2004.

TA-18 will continue to support Cat III/IV missions for at least the next 5 years. Cat I/II material will be brought back to TA-18 on infrequent occasions for urgent, high profile missions. To accommodate these activities, some of the SNM currently associated with TA-18 will remain at LANL.

## **TRANSPORTATION PLAN OVERVIEW**

The packaging and transportation segment of the TA-18 Relocation Project to the DAF will require a significant effort from the NNSA community. Packaging and transportation work for the TA-18 relocation is performed under DOE Order 461.1A, *Packaging and Transfer or Transportation of Materials of National Security Interest*. As documented in the order, NNSA uses safety analysis reports for packaging and subsequent off-site transportation certificates and off-site transportation authorizations as the bases for documenting material types and configurations that meet the regulatory safety requirements for transporting nuclear materials off-site. Packages with Nuclear Regulatory Commission or DOE certificates of compliance or those authorized by the Department of Transportation will also be considered for use. NNSA also has the ability to ship materials under a National Security Exemption (NSE) when those shipments are needed in the interest of national security and can be shown to not be prohibited by law and do not pose an undue risk to the workers, public health and safety, or the environment. The NNSA Transportation Safeguards System with its safe, secure trailers will physically move material from TA-18 to the DAF.

A packaging and transportation team was formed consisting of members from LANL, Lawrence Livermore National Laboratory (LLNL), the Y-12 Plant, the Savannah River Site, the NNSA Packaging Certification Division, and NNSA Headquarters. The team represents all the organizations required for a successful move: the material owners, facility owners, packaging owners, packaging certification, packaging programs, and secure transportation. The team sought to identify ways to move the materials using the existing container inventory wherever possible because the schedule for relocating the TA-18 materials was too compressed to develop new transportation packages.

Several team meetings have been held to evaluate the material inventory and define the packaging scope of work. The team identified transportation container assignments for each inventory item, estimated the degree of item consolidation for each transportation container, and identified the number of containers that will be needed for the move. The team also outlined any additional analyses required to assure the materials will either be approved contents in the transportation containers, or to document the supporting rationale for a NSE. The team also developed, and continues to refine, a shipping schedule seeking to balance the programmatic needs for the material with transportation package and secure transportation asset availability.

A significant amount of work will be required to develop the storage container configurations that will be the contents of the transportation packages and all the required material characterization data for use in the packaging safety and risk analyses. Characterization data such as fission products and isotopic composition, mass, physical dimensions, drawings, nonnuclear constituents, and other data have to be located, and in some cases developed, in order to provide the package owners with the necessary input for analysis. LANL is presently working to better define the storage container configurations, packing configurations, and consolidation of material items into transportation packages.

The packaging and transportation team has evaluated some of the risks associated with this project. The foremost risk factor is the availability of resources within NNSA. Packaging engineers are highly specialized and substantial training is required for an engineer to become proficient in packaging design and analysis. The TA-18 work will significantly add to packaging work currently being performed by both Y-12 and Savannah River packaging engineers, and has the potential to overwhelm these organizations. Additionally, many of the packaging analyses will have to be reviewed by the NNSA Packaging Certification Division that itself is experiencing resource availability concerns. The TA-18 Relocation Project will work closely with these organizations and ensure that proposed packaging work schedules can be accommodated.

While there is much work to be done, the team remains confident that early material relocation can be supported and the first half of the programmatic material can be transferred to the DAF by March 2006.

#### **MATERIAL CONTROL AND ACCOUNTABILITY IMPLICATIONS**

In addition to putting together the shipments, how large quantities of nuclear material (NM) would impact the current material control and accountability (MC&A) program at NTS needs to be reviewed before material is received.

In September 2002, before the announcement of the TA-18 early move, NNSA/NSO asked the LANL/TA-18 MC&A Coordinator to tour the DAF and draft a proposal for an MC&A plan. The plan addressed the staging and accounting of Cat I/II quantities of NM from TA-18 to the DAF.

In November 2002, NNSA/NSO requested the formation of an MC&A team (consisting of two Office of Assessment experts and one MC&A expert from LANL). The team would review the proposal and provide observations that would (1) help implement an effective MC&A program for the movement of TA-18 material to the DAF, and (2) revise the current NTS plan to reflect this movement. Their final report ("TA-18 Mission Relocation Project: MC&A Implications Final Report") was completed in December 2002. It became the foundation for integrating the TA-18 material into the current NTS MC&A Plan.

From the report, it was determined that some of the current documents used at NTS had to be revised to reflect the influx of Cat I and II quantities of material; the current plan had been used to manage only Cat III and IV material. In the past, NTS received Cat I items in assemblies that

were eventually expended and written off the inventory. Now NTS would have to account for Cat I and II material daily.

Several contractor organizations perform work at NTS. Because of this joint activity, a joint test organization (JTO) consisting of LLNL and LANL has existed at the site for some time. Through this JTO, certain MC&A responsibilities are delegated: LANL/Nevada (NV) manages MC&A and LLNL/NV manages the accountability system. This structure ensures continuity in procedures and practices within all work areas; the Joint Laboratory MC&A Program ensures the same continuity in safeguard requirements at NTS.

When NNSA decided on the early move in April 2004, MC&A experts from LANL, LANL/NV, LLNL, and Wackenhut Security, came together to get a program in place to cover the first shipments. They decided to draft and implement an addendum to the current NTS joint labs MC&A plan. The addendum would cover the MC&A requirements for handling and staging Cat I and II NM within the DAF.

When the addendum is implemented, it will allow enough time to rewrite and implement an improved joint labs MC&A plan that will address all of the NM categories used at NTS. The following is a list of the priorities involved:

- Revise the current joint labs MC&A plan to incorporate some past assessment observations into the current plan.
- Perform a fact-finding walk-through of the DAF to collect data on the facility. LANL and LLNL walked the space proposed for staging the material for the early move, reviewed documents (technical safety requirements, safety analysis, security requirements, etc.), and talked with personnel involved in DAF operations.
- Prepare a draft of the addendum.
- Finalize the addendum for submittal to NSO, LANL/NV, and LLNL/NV for signatures.

After the addendum has been completed, the following must be implemented (with the assistance of LLNL and Bechtel-Nevada) to get a program in place before the DAF can receive NM from LANL:

- Establish the staging material balance areas (MBAs) within the DAF and lay out the physical locations (develop a grid-like arrangement for each location within the MBA). This task will require criticality, hazard, safety, and other required assessments be completed.
- Revise the current joint lab MC&A procedures to receive and inventory the items after they are staged.
- Install measurement equipment (i.e., scales and gamma measurement devices) within the DAF for transfer check.
- Ensure that (1) all required internal procedures are in place, (2) sufficient manpower is available, (3) all LANL personnel involved with the early move have completed all

required training for the DAF and NTS, and (4) all resources are in place prior to the acceptance of shipments.

- Ensure that all of the required paperwork is submitted in time, such as the authorization to ship and transport secure requests, etc.
- Prepare a shipper/receiver agreement that requires measurement of all identified items at TA-18 when the material is repackaged into new inner containers. The agreement should also state that all inventory adjustments would be completed prior to shipping. (No inventory adjustments will be performed under the NAB RIS associated with the shipments.)

The addendum will only cover the first shipments. LANL/NV, LLNL, and NNSA/NSO will then begin drafting a new NTS MC&A plan that will encompass all of the new material staged at DAF, plus the remaining MBAs located throughout the site. This effort will allow the development and revision of a strong MC&A plan at NTS. The new plan will accomplish the following:

- It will encompass all NM organizations at NTS and ensure continuity in the implementation of MC&A requirements throughout the MBAs.
- It will be defensible during any DOE audits or assessments.
- It will null the addendum and address the long-term storage of Cat I or II material within the DAF as well as Cat III and IV MBAs located within the test site.
- It will ensure consistent use of MC&A requirements between all organizations in the MC&A for handling and staging nuclear material. For example, if LLNL needed to store excess Cat I material at NTS, they would comply with the same requirements as LANL.

The new MC&A plan will be a living document that (1) can be revised as the TA-18 Relocation Project progresses, and (2) can handle other new programs that may come to the site in the future. This flexibility will also allow the NM organizations at NTS to be informed of changes and, if appropriate, to approve the changes within an established change control system.

## **SUMMARY**

The NNSA has decided to relocate the Cat I/II nuclear threat reduction missions and associated SNM from TA-18 at Los Alamos to the DAF at the NTS. Preliminary packaging and transportation plans for this material are being developed in concert with plans to transition the relevant TA-18 missions to DAF. Plans for managing, controlling, and accounting for this material are also being developed as a part of the effort to modify the DAF to accept these new missions.