



Department of Energy
National Nuclear Security Administration
Washington, DC 20585

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DEFENSE NUCLEAR FACILITIES SAFETY BOARD

The Honorable John T. Conway
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue NW, Suite 700
Washington, D. C. 20004-2901

Dear Mr. Chairman:

Thank you for your November 3, 2004, letter on the Device Assembly Facility (DAF). Ambassador Brooks asked me to respond to you.

In your letter, you expressed concern regarding concurrent operations of existing and future mission activities at the DAF on the Nevada Test Site with respect to facility design, modern nuclear safety requirements, critical Safety Management Programs (SMPs), and facility infrastructure. The National Nuclear Security Administration (NNSA) is planning to increase the scope and operational tempo of activities at the DAF. We will continue to ensure that hazards are properly identified and analyzed and that the SMPs and engineered safety features credited in the Documented Safety Analysis (DSA) are able to safely support the proposed activities prior to authorization.

The scope of the current DAF DSA includes such activities as subcritical experiment operations, glovebox operations to support Joint Actinide Shock Physics Experimental Research (JASPER) and storage of material, including receipt and storage of TA-18 nuclear materials. The criticality experiments mission and the downdraft table operations were not sufficiently defined for explicit inclusion and require additional DSA analysis. The downdraft table analysis is now complete and in the review process. The Criticality Experiment Facility (CEF) project is developing a preliminary DSA for the missions transferring from Los Alamos National Laboratory, scheduled for completion in March 2005. The current DAF scope of work does not include interim criticality experiment or weapon dismantlement activities.

NNSA and Lawrence Livermore National Laboratory understand that nuclear operations demand a high level of technical competence, analysis and documentation rigor, appropriate physical systems and administrative processes, and increased federal oversight. We recognize the transition to compliance with nuclear safety requirements mandates a change to the way DAF had been operated. As summarized in the enclosed report and detailed in the Safety Basis Implementation Plan (DAF-PLN-MG-15) dated June 2004 (previously provided to your office), there is a clear understanding of the path forward, supported by a sound technical basis and a strong management commitment to both nuclear safety and programmatic success in support of DAF activities.



Our vision of the DAF as a fully subscribed Category 2 nuclear facility supporting vital national security missions with a management and operational nuclear safety culture that is established and maintained to the highest standards is well under way. Resolutely focused on this course and in the context of the security and safety posture of the NNSA complex, we will not begin programmatic work until we assure the integrity and robustness of the DAF safety basis. Both NNSA and LLNL are committed to this vision and believe that the rigorous processes established have, and will continue to identify and address any deficiencies in the DAF, its equipment, or safety management programs.

NNSA will continue to work with your staff to ensure continued communication. Please call me at 202-586-2179 if you have additional questions.

Sincerely,



Everet H. Beckner
Deputy Administrator
for Defense Programs

Enclosure

cc: L. Brooks, NA-1
J. Paul, NA-2
J. McConne11, NA-2.1

Report to the Defense Nuclear Facilities Safety Board
Device Assembly Facility Operations
January 27, 2005

Introduction

Recent correspondence from the Defense Nuclear Facilities Safety Board (DNFSB) expressed concern regarding concurrent operations of existing and future mission activities at the Device Assembly Facility (DAF) on the Nevada Test Site with respect to facility design, modern nuclear safety requirements, critical Safety Management Programs (SMPs), and facility infrastructure. Although the National Nuclear Security Administration (NNSA) is planning to increase the scope and operational tempo of activities at the DAF, the NNSA will ensure that the SMPs and engineered safety features credited in the Documented Safety Analysis (DSA) are able to safely support the proposed activities prior to authorization. As further described below, there is a clear understanding of the path forward, supported by a sound technical basis and a strong management commitment to both nuclear safety and programmatic success in support of the important national security work coming to the DAF.

Subsequent to the approval of the DAF DSA in December 16, 2003, analysis was conducted to determine the status of the DAF facility, its equipment, and safety management programs. This analysis identified the changes necessary to ensure the safety of planned missions. The Safety Basis Implementation Plan DAF-PLN-MG-15, distributed in June 2004 (retransmitted in support of this report under separate cover) documents the issues and actions to implement the DAF DSA for designated Category 2 nuclear facility operations.

This document is structured into three sections: (1) management commitment to safety basis implementation, (2) start-up approach for individual projects and phased implementation methodology, and (3) NNSA oversight of DAF activities.

Management Commitment to Safety Basis Implementation

The safety basis for the DAF was recently upgraded and documented in the DSA and Technical Safety Requirements (TSR) per 10 CFR 830. This resulted in the DAF being re-categorized from a moderate-hazard high-explosives facility to a Hazard Category 2 non-reactor nuclear facility. Based on information from the DAF Programmatic Working Group (DPWG) review of proposed new projects, the new safety basis documentation included significant new project scope with large material-at-risk (MAR) quantities, operational hazards, and accident scenarios. The only projects included in the DSA were glovebox operations to support Joint Actinide Shock Physics Experimental Research (JASPER) and storage of nuclear materials (bounding for receipt and storage of TA-18 nuclear materials). The Criticality Experiments Facility (CEF) mission and the downdraft (DDT) operations were not sufficiently defined to permit explicit inclusion and required additional DSA analysis. Subsequently, the DDT DSA analysis has been completed and is in review. The CEF program is working on a preliminary DSA to be submitted in March 2005.

This DSA effort created the vision of DAF not only as a Category 2 nuclear facility based upon the MAR, but also included a major paradigm shift from assembly with encapsulated

components to nuclear operations. This shift in activities required and received senior management commitment at both the Lawrence Livermore National Laboratory (LLNL) and the NNSA/Nevada Site Office (NSO) to establish and maintain a strong enduring nuclear safety culture and basis of operations for the DAF. This management commitment is evidenced by the significant increase in the DAF funding profile from fiscal year (FY) 2002–FY2005 (\$10.9M, \$12.4M, \$19.9M, \$23.5M) in support of the safety basis alone.

The basis for the DAF transition to a Category 2 nuclear facility was captured in the DSA and the TSR, which identified a comprehensive set of new requirements and controls in terms of personnel, facility, systems, equipment, processes, programs, and procedures. Everything required for the “early move” portion of the storage of TA-18 nuclear materials was completed and in place prior to material receipt. A Safety Basis Implementation Plan (SBIP) was developed and submitted to NNSA/NSO for approval. The attachment provides a small sample of examples describing how the DAF is satisfying nuclear safety requirements. Everything required for the “early move” portion of the storage of TA-18 nuclear materials was completed and in place.

A subset of the SBIP is a TSR implementation plan that assures commensurate attention to these controls. In conjunction with the SBIP, LLNL developed a detailed schedule to capture and track the implementation process. Utilizing this rigorous approach, the SMPs and TSRs for safety class and safety significant systems are being implemented. The Operational Readiness Review (ORR) for Early Move will establish the basis to conduct that limited scope activity within a nuclear hazard Category 2 facility. The readiness reviews for subsequent activities will build on the first assessment to ensure that at all times, the programs and controls necessary to support authorized nuclear work are adequate. In addition, LLNL is using detailed crosswalks to ensure the full implementation and validation of identified Work Smart Standards.

The implementation of the DAF safety basis in a rigorous, detailed, and systematic manner is the top priority of NSO and LLNL management. The implementation approach for the DAF is intended to be as complete and verifiable as would be the case for a newly constructed nuclear facility. NSO approval of the LLNL management decision to employ a phased startup methodology is predicated upon LLNL’s ability to successfully meet the requirements of the SBIP. NNSA programmatic goals can be pursued during this period only if they neither compromise the SBIP process nor introduce new safety concerns or vulnerabilities.

Start-up Approach for Individual Projects & Phased Implementation Methodology

LLNL, with the support of Los Alamos National Laboratory (LANL) and the NSO, has developed a systematic and documented process for project introduction into the DAF. This process provides a basis for review of proposed projects resulting either in acceptance and appropriate scheduling or rejection. Nuclear activities, prior to being accepted at the DAF, must be thoroughly reviewed by LLNL in terms of integration into the SBIP process. The phased approach includes prioritizing and scheduling the tasks in the SBIP in a manner that supports the needs of various project teams.

Each individual start-up activity is separately evaluated through a process that includes, but is not limited to, Unreviewed Safety Question (USQ) screens, hazard and accident analyses, design

reviews, requirements identification, and assessments for quality assurance, safety control, documentation, and training. Each of these elements is evaluated, as appropriate, by internal and/or external reviews, assessments, and dry-runs. Any issues identified during these evaluations are resolved through NNSA-approved corrective actions that are tracked to closure and validated. Finally, the ORR process will provide an independent confirmation of readiness to begin operations. The ORR scope determination in the Plan of Action (POA) for each nuclear activity is focused strongly and comprehensively on those SMPs, engineered safety systems, and infrastructure elements determined to be applicable to ensure the safety of operational startup for each activity.

The DAF Project Introduction Process is summarized below. Activities proposed to use DAF capabilities are reviewed during the conceptual phase by the DAF Steering Committee, the DPWG, and the DAF Facility Operations and Review Committee (FORC). These groups assess proposals from different perspectives such as:

- Programmatic (Steering Committee/DPWG)
 - Compatibility with the NTS mission
 - Availability of required resources (identifying what is provided by LLNL via RTBF and what is provided by the programmatic sponsor)
 - Scheduling considerations, maintaining the integrity of the SBIP as the primary objective
- Operational aspects (DPWG/FORC)
 - Space requirements
 - Interfaces with other projects
 - Operational and nuclear safety requirements
 - Facility design adequacy and extent of modifications
 - Staffing and training
 - Maintenance
- Authorization/Safety basis (DPWG/FORC DAF AB Team)
 - USQ screen
 - Hazard and accident analyses
 - Controls and implementation
 - System design descriptions
 - Reviews and approval

During the implementation period for the SBIP, NNSA will execute a phased start-up of three nuclear activities at the DAF: receipt and storage of TA-18 nuclear materials; glovebox operations to support JASPER experiments; and downdraft table operations to support subcritical experiments. The first two projects listed were accepted by the DAF. LLNL developed, and NNSA/NSO approved, POAs for those two projects that identified specific SMP elements and engineered safety systems required for operations. These projects will be subsequently reviewed by both the contractor and NNSA through the ORR process. Any issues identified in these ORRs will be dispositioned prior to their respective NNSA authorization to commence operations. The NNSA ORR will verify that each applicable nuclear safety requirement has been met. The

downdraft table operations have also been accepted by the DAF and, although the assessment of that project is less mature, the same process is being executed.

NNSA Oversight of DAF Activities

In addition to the ORR process, the NSO federal oversight assessment program is being structured to focus priority attention on safety-class and safety-significant structures, systems, and components (SSCs), other engineered design features, and administrative controls for all nuclear facilities. The Safety System Oversight Program has been designed, is being institutionalized through NSO directives, and is being implemented. Safety System Oversight (SSO) Personnel have been identified and are currently undergoing training and preparation for technical qualification program achievement consistent with DOE M 426.1. Identified safety class/safety significant SSCs will be technically evaluated to develop Criteria Review and Approach Documents (CRADs) that will ensure a proper level and specificity of federal oversight.

With respect to the DAF, the following safety systems have been assigned to federal Safety System Oversight Personnel and are being given priority attention with the first priority to effectively accommodate the TA-18 Early Move activities.

- Emergency Lighting and UPS
- HEPA Filtered Ventilation Systems
- Radiography Safety System
- Certified Crane
- Blast Doors and Interlocks
- Blast Valves
- Fire Suppression System

NV M 220.XC, Oversight Management System, is a NSO directive that is being revised to include the federal oversight of other active and passive design features, Specific Administrative Controls, and other administrative controls for nuclear facilities. These type hazard controls will also be evaluated by federal personnel assigned to perform this oversight. Well defined CRADs will be written and utilized in the assessment process. Safety Management Program (SMP) CRADs are being developed and will include facility-specific aspects of each appropriate SMP.

NSO functional area managers will perform several additional assessments during the summer of 2005. In addition, the facility representative oversight includes specific focus on work control and conduct of operations with priority emphasis on the TSR control set.

While the forgoing perspective captures the formal assessment approach, NSO also utilizes a less formal mechanism to acquire performance information. Federal staff perform "walkthrough" evaluations that do not require formal assessment planning yet may identify issues. Additionally, federal staff validate contractor self-assessment activities to monitor their effectiveness. Issues resulting from these activities are managed through the NSO Issues Management System.

In the near term, NSO technical experts will monitor any corrective actions resulting from CORR findings and any Pre- and Post-Startup findings resulting from federal readiness reviews. Issues identified from federal and contractor readiness reviews, assessments/validations, and “walkthroughs” are entered and tracked to closure on the NSO CaWeb Site Wide Issues Tracking System. These data are analyzed for potential trends by NSO and our contractors. NSO utilizes a senior management group, the Management System Steering Panel, to monitor NSO oversight results and identify priority areas for further management attention. Specific attention will be given to federal oversight of nuclear facilities.

To be clear, the project introduction process for the CEF and the Weapon Dismantlement projects has not been executed. Neither of these projects is, nor will be included, in the phased approach currently underway initiating nuclear facility operations in the DAF. LLNL and NSO are, however, cognizant of these projects and strive to make decisions and establish processes that may facilitate accepting these activities in the future.

Conclusion

The vision of the DAF as a fully subscribed Category 2 nuclear facility supporting vital national security missions with a management and operational nuclear safety culture that is established and maintained to the highest standards is well under way. Resolutely focused on this course and in the context of the security and safety posture of the NNSA complex, we will not begin programmatic work until we assure the integrity and robustness of the DAF safety basis. Both NNSA and LLNL are committed to this vision and believe that the rigorous processes established have and will continue to identify and address any deficiencies in the DAF, its equipment, or safety management programs.

The phased start-up methodology described in this report embodies two commitments at the DAF as the scope and operational tempo of activities increase. First, we remain committed to the safety of our workers, the public, and the environment. Every operation that occurs will be performed in accordance with our reviewed and validated quality management and integrated safety management systems. Second, we will assure that the SBIP, the infrastructure, and staffing (for example) are implemented and maintained in a complete and robust manner.

NNSA and LLNL believe that the rigorous processes described above and in the SBIP, have and will continue to identify and address any deficiencies in the DAF, its equipment, or safety management programs and provide the necessary confidence to ensure that these projects are ready to commence safe operations.

Attachment
Examples of Actions at the DAF to Implement Nuclear Safety Requirements

Completed

- Evaluated and re-established a robust work control program that includes:
 - A work planning and control process that is activity level based
 - Integrated controls for the work process of various entities (BN, LLNL, LANL, WSI, etc.)
 - Increased the work planning staff from 2 to 10 FTE
- Established a Cognizant System Engineer (CSE) program consistent with DNFSB 2000-2
 - Five CSEs currently on-board
- Enhanced the Radiological Control Program to include:
 - Facility based core of health physicists and radiological control technicians
 - Project specific augmentation across all elements including health physics and radiological control
- Upgraded Nuclear Explosive Safety Master Study using the DAF DSA as key input document
- Completed and currently validating the implementation of SMPs
 - Conduct of Operations (includes mentoring)
 - Quality assurance
 - Fire Protection
 - Industrial Safety & Health
 - Criticality Safety
- Established strict configuration management program to assure control of the designated 6 safety-class structures, systems, and components (SSCs) (3 active) and 10 safety-significant SSCs (4 active).
- Established System Implementation Process that includes:
 - Walk downs where needed or necessary
 - Updated drawings
 - Updated Master Equipment List
 - Updated system documents (e.g., System Design Descriptions)
 - Labeled components
 - Developed maintenance documents
 - Performed Surveillance Requirements and In-Service Inspections
 - Conducted validations
- Established SBIP-identified processes (SMP or other documented systems) for:
 - Surveillance Requirements (SRs): 7 of 23 complete
 - In-Service Inspections (ISIs): 5 of 10 issued
 - New procedures: 7 of 16 issued
 - Revised procedures: 32 of 44 issued
 - Plans: 1 new and 12 revised are issued
 - Work Smarts Standards Crosswalks

Ongoing

- Actively addressing facility infrastructure issues
 - Replaced uninterruptible power supply (UPS) batteries and reviewing the UPS system
 - Repairing non-conforming building penetrations
 - Upgrade of fire suppression water supply planned to support future missions (existing system is adequate for current missions)
- Continue to expand “best-in-class” staffing to support sustained nuclear operations
 - LLNL dedicated staff before 2003 was 8; currently 13 with 20 planned
 - BN dedicated staff before 2003 was 24; currently 69 with 78 planned
 - Included in the staff increases detailed above
 - Document control and records management as part of the configuration management effort increased from 0 to 6 FTE
 - Authorization Basis analysts increased from 1 to 6 FTE
- Implementing Specific Administrative Control consistent with DOE STD 1186
- Addressing the deficiencies in the NNSA review of the DAF Training Program
 - Developed corrective action plan (CAP) that included compensatory measures and short-term milestones, accelerating timely training program improvements. (transmitted CAP to NNSA October 15, 2004)
 - Developed and issued Training & Qualification Plan DAF-PLN-MG-03 (current plan dated January 6, 2005)
- Developing a BN Maintenance Transition Plan, achieving full DOE O 433.1 compliance includes several Performance Based Incentives (PBIs): (note: completed for TA-18 EM activity specific requirements)
 - Development of Type 1 and Type 2 maintenance work packages
 - Development of Maintenance Implementation Plan (MIP)
 - Development of Master Equipment List (MEL)
 - Training and qualification
 - Independent Assessment