

**Independent Oversight Review of the
Los Alamos National Laboratory Nuclear Facility
Configuration Management Program**



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**Office of Safety and Emergency Management Evaluations
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Acronyms

CFR	Code of Federal Regulations
CM	Configuration Management
CMR	Chemistry and Metallurgy Research
CSE	Cognizant System Engineer
DNFSB	Defense Nuclear Facilities Safety Board
DOE	U.S. Department of Energy
DSA	Documented Safety Analysis
HSS	Office of Health, Safety and Security
LANL	Los Alamos National Laboratory
LASO	Los Alamos Site Office
PF-4	TA-55 Plutonium Facility
TA	Technical Area
USQ	Unreviewed Safety Question

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1.0 PURPOSE

The U.S. Department of Energy (DOE) Office of Enforcement and Oversight (Independent Oversight), within the Office of Health, Safety and Security (HSS), conducted an independent review of the Los Alamos nuclear facility configuration management (CM) program in conjunction with a Los Alamos Site Office (LASO) scheduled assessment. Field activities focused on review of the generation and control of design change documents; review of maintenance and modification documentation; walkdowns of affected systems; and interviews with selected staff associated with maintenance and modification of Technical Area (TA)-55, the TA-55 Plutonium Facility (PF-4), and the Chemical and Metallurgy Research (CMR) facility.

The purpose of this assessment was to determine the efficacy of CM activities within Los Alamos National Laboratory (LANL) design change, maintenance, and modification processes as key elements affecting the protection of the safety bases of nuclear facilities. LASO was the overall lead organization for the CM assessment, which was conducted August 8-18, 2011. The HSS subject matter expert participated in the assessment to evaluate the LASO assessment process and to independently assess along with the LASO assessment team leader each technical area delineated in the LASO assessment plan. The review scope was selected based on current LASO and HSS oversight priorities to focus on nuclear facilities, including actions being taken by DOE and LANL management to address Defense Nuclear Facilities Safety Board (DNSFB) Recommendation 2009-2, *LANL Plutonium Facility Seismic Safety*.

2.0 BACKGROUND

LANL is engaged in an extensive list of maintenance and modification activities for its nuclear facilities, with significant efforts focused on TA-55 and CMR.

TA-55, which includes PF-4, is classified as a hazard category 2 nuclear facility. DOE's Implementation Plan for DNSFB Recommendation 2009-2 requires facility upgrades to be implemented to ensure that the mitigated consequences for seismically-induced events at PF-4 no longer challenge DOE's 25-rem Evaluation Guideline. As a result, an intensive effort is underway to develop, manage, and implement a large number of design change packages for seismic and fire suppression upgrades. The modifications are necessary to justify continued operation in light of the projected evaluation basis seismic event mitigated consequences, which are well in excess of the 25-rem guideline. In addition, hundreds of legacy design packages are being dispositioned by a CM team as part of the TA-55 reinvestment project.

CMR is classified as a hazard category 2 nuclear facility. Its current programmatic missions include analytical chemistry and support of major experimental programs at LANL and within the DOE complex; however, at the time of this assessment the facility was being operated on a "run-to-replacement" approach in anticipation of the completion of the CMR replacement project. The safety basis for the CMR facility allows for limited operations and supports continued risk reduction activities until final decommissioning. LANL has implemented several positive actions to restrict operations in the CMR facility, namely reducing the material at risk in the facility by over 50 percent and completing various facility upgrades. Despite these efforts to reduce operational risk, the CMR facility is beyond its design life and does not meet current seismic standards and safety requirements. The design change efforts at

CMR are not as extensive as in TA-55. Notably, they include upgrades to the safety related ventilation system in order to support continued use, and construction of a temporary facility within the CMR structural envelope to support the confinement vessel disposition project.

3.0 SCOPE

LANL's contract requires compliance with the CM requirements of DOE Order 420.1B, DOE Order 433.1B, and 10 CFR 830, which are integrated and embedded in LANL's nuclear safety management programs and processes. CM is therefore required for design changes implemented as full line-item projects, direct-funded (facility controlled) projects, and corrective maintenance packages, all of which were encompassed by this review. Although the field activities of this assessment were intentionally limited to TA-55, PF-4, and CMR, the results reflect many similar issues found across LANL's nuclear facilities and thus have broader applicability, especially since the same processes and procedures are used across LANL. The efficacy of LANL's CM processes was evaluated primarily through a performance-based assessment, the methodology and process of which were based on LASO Procedure MP 06.02, Rev. 4, *System Safety Oversight*. The scope of the LASO and HSS activities assessing LANL's CM program included:

- Reviewing procedures, processes, and implementation documentation for design changes, procedure changes, temporary and permanent modifications, work package development and approval, post-maintenance/modification testing and approval, unreviewed safety question (USQ) screening and determinations, document control, and independent validation to ensure consistent performance of CM activities
- Conducting interviews with TA-55, PF-4, and CMR facility engineering and maintenance staff
- Walking down TA-55, PF-4, and CMR nuclear safety systems that were the subject of team-reviewed design change, modification, and maintenance documentation.

Based on agreement between LASO and HSS, this assessment did not review the technical adequacy of TA-55 seismic and fire suppression upgrade design change packages, based on the unavailability of appropriately qualified review personnel.

4.0 RESULTS

The assessment determined that the DOE CM program requirements were well integrated into the management processes at the reviewed LANL nuclear facilities. The Conduct of Maintenance, Conduct of Engineering, and Construction Management Commissioning and Turnover procedures provide a comprehensive set of processes to maintain CM of the safety basis. Engineering management's directed development and use of a desktop instruction and electronic forms to facilitate compliance with Conduct of Engineering procedures for developing and approving design change packages was noted to be a strength. The use of a dedicated CM staff was also determined to be a key element in achieving quality and timely processing of TA-55 design change packages. The design change documents that were reviewed for TA-55, PF-4, and CMR, as implemented, were found to be generally effective and met expectations. In addition, design packages developed by an external design agency were appropriately reviewed and approved by LANL before release for construction. All reviewed design change packages and associated field change requests contained USQ screening/determination documentation confirming that the planned facility changes did not introduce a USQ; however, several USQ screenings/determinations evidenced inattention to detail and lack of rigor. For example, the USQ Screen of the Design Change package for the "TA-55 Seismic Design for Electrical Power Shutoffs in GBs" (gloveboxes) did not assess failure of the seismic switches based on an incorrect statement in the USQ

Screening document that the switches themselves were not safety related. Completed design change package documentation generally demonstrated that appropriate post-modification testing and inspection activities were specified and implemented to verify that safety basis functional and performance requirements were satisfied. Line-item projects generally demonstrated excellent CM formality, but the corrective maintenance packages, specifically at TA-55, were often not adequate to ensure that configuration management requirements were met. Although reviewed CMR corrective maintenance packages exhibited rigor nearly equivalent to that expected of design change packages, most reviewed TA-55 corrective maintenance packages evidenced failure to follow procedures in supporting processes, such as the Unreviewed Safety Question Screenings/Determinations, Engineering Equivalency Determinations, and Post Maintenance Testing .

The LASO lead, in conjunction with Independent Oversight, identified three findings, three observations, and one noteworthy practice. The findings included:

- Corrective maintenance packages are not planned and executed with adequate rigor at TA-55 to ensure that design assumptions and performance requirements in the safety basis are protected by the configuration management processes;
- The USQ screening process is not implemented with adequate rigor and quality to ensure configuration management of the safety basis is ensured in all cases; and,
- Inconsistent implementation of supporting processes for design changes demonstrate noncompliance with quality assurance and configuration management requirements.

The findings were provided to LANL in LASO's formal report on its safety system oversight of the LANL nuclear facility CM program, issued in September 2011.

5.0 CONCLUSIONS

Overall, the LASO assessment was competently planned, implemented and documented by the LASO lead using appropriate criteria as defined in LASO Procedure MP 06.02, *System Safety Oversight*, Revision 4, Attachment 6. The LASO lead was technically well qualified and, based on prior experience, preparation, and knowledge, demonstrated a high degree of familiarity with the TA-55, PF-4, and CMR facilities, processes, and staff. The final report accurately reflected the team's results.

The assessment identified findings that require LANL management attention related to the adequacy of corrective maintenance packages, rigor and quality of USQ screenings, and consistency of implementation of some requirements for design change packages. Independent Oversight concurs with the objectives and results of the assessment and believes that sufficient rigor was applied before and during the CM program review.

6.0 ITEMS FOR FOLLOW-UP

Based on the results of the assessment, the principal need for improvement in LANL CM activities is in the area of development, review, and approval of TA-55 corrective maintenance packages. Future assessments of the TA-55 maintenance management program should focus on the status of LANL's efforts to improve the rigor of CM requirement implementation.

Finally, because this assessment did not include a review of the technical adequacy of the TA-55 seismic and fire suppression upgrade design changes, Independent Oversight, in coordination with LASO, should determine how the adequacy of these design changes will be assessed.

Appendix A Supplemental Information

Dates of Review

Onsite Review: August 8-18, 2011

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