

**Office of Enterprise Assessments
Assessment of the Development and Maintenance
of Safety Bases at
Los Alamos National Laboratory**



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Acronyms

ADNHHO	Associate Director for Nuclear and High Hazard Operation
CFR	Code of Federal Regulations
CRAD	Criteria and Review Approach Document
DOE	U.S. Department of Energy
DSA	Documented Safety Analysis
EA	Office of Enterprise Assessments
ESS	Evaluation of the Safety of the Situation
FTWC	Flanged Tritium Waste Container
HC	Hazard Category
IG	DOE Inspector General
LANL	Los Alamos National Laboratory
LANS	Los Alamos National Security, LLC
MOV	Management Observation and Verification
NA-LA	National Nuclear Security Administration - Los Alamos Field Office
NNSA	National Nuclear Security Administration
NSS	Nuclear Safety Specialist
OFI	Opportunity for Improvement
PF-4	Plutonium Facility
PDSA	Preliminary Documented Safety Analysis
PFHA	Preliminary Fire Hazard Analysis
PFITS	Performance Feedback and Improvement Tracking System
PISA	Potential Inadequacy in the Safety Analysis
QEV	Qualified Evaluator
SA	Safety Analyst
SAPR	Senior Analyst Panel Review
SB-DO	Safety Basis Division Office
SBDL	Safety Basis Document List
SBIP	Safety Basis Improvement Plan
SBP	Safety Basis Procedure
TLW	Transuranic Liquid Waste
TSR	Technical Safety Requirement
TWF	Transuranic Waste Facility
USQ	Unreviewed Safety Question
USQD	Unreviewed Safety Question Determination

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EXECUTIVE SUMMARY

The U.S. Department of Energy (DOE) Office of Nuclear Safety and Environmental Assessments, within the independent Office of Enterprise Assessments (EA), conducted an assessment of the development and maintenance of safety bases by the Los Alamos National Security, LLC (LANS) and the National Nuclear Security Administration - Los Alamos Field Office (NA-LA). As part of this assessment, EA assessed the effectiveness of corrective actions taken to resolve recurring weaknesses in the safety basis processes at Los Alamos National Laboratory (LANL). An EA team was on site at LANL from September 11–15, 2017, to obtain documents for this assessment. EA reviewed this documentation through November 2017.

In 2012, LANS developed a safety basis improvement plan to resolve the recurring weaknesses in its safety basis processes. This improvement plan includes actions to develop and retain staff members, develop assessment tools to ensure continuing improvement and quality of safety basis products, streamline safety basis processes, and improve alignment with NA-LA on the requirements for safety basis documentation. The remaining open action was to revise the LANS safety basis program description. EA’s review of the LANS and NA-LA actions identified the following:

- LANS substantially increased its staffing from 22 qualified safety analysts to 39 in calendar year 2017 to meet its staffing plan, and the revised safety basis procedures and training and qualification program are adequate.
- For its process for unreviewed safety questions (USQs), LANS adequately implemented its quality assurance processes and tools developed per the safety basis improvement plan to assess and improve the quality of the LANS USQ reviews. Accordingly, EA was able to verify that LANS implementation of its USQ processes adequately ensures that changes to safety basis documents are submitted to DOE for approval when required.
- For safety basis submittals, LANS has not adequately implemented its quality assurance processes and tools to assess and improve the quality of its safety basis submittals. Actions in the safety basis improvement plan for LANS “self-monitoring” the quality of its safety basis submittals have not been effectively implemented. Of the 41 submittals that EA reviewed, NA-LA consistently required resubmittal of approximately 20% of LANS’s safety basis submittals per year in 2015, 2016, and 2017, despite actions in the safety basis improvement plan to minimize rework. LANS management has not formally assessed the quality of its safety basis submittals in the past four years and does not have a metric for safety basis submittal quality.
- NA-LA continues to identify a significant number of comments concerning LANS identification and control of hazards in LANS safety basis submittals. This is indicative of persistent differences between LANS and NA-LA on the understanding of safety basis requirements, despite actions taken by LANS per its safety basis improvement plan to improve their alignment.

The National Nuclear Security Administration (NNSA) biennial review report of NA-LA issued in April 2017 identified systemic management concerns and findings in the areas of NA-LA staffing and review, approval, and oversight of LANS safety basis documentation. NA-LA had not issued a casual

analysis or corrective action plans for any of the management concerns and findings from the NNSA Headquarters biennial review before this EA assessment. Accordingly, the compensatory measures requiring NNSA Headquarters concurrence with NA-LA safety basis approval actions remained in effect. In addition to confirming the management concerns and findings from the NNSA biennial review, EA identified that NA-LA has not appropriately communicated to LANS in a timely manner its concerns with evaluations of the safety of the situation (ESSs) for emergent situations existing in high-hazard nuclear facilities. In several cases, NA-LA communicated significant concerns with LANS's ESSs 6-12 months after receipt, significantly delaying NA-LA formal verification that LANS established safe and stable conditions for emergent situations.

Overall, although LANS has implemented many elements of its improvement plan, the persistent differences between LANS and NA-LA on their understanding of safety basis requirements continues to delay safety basis document development and maintenance. Except for the delays associated with resolving concerns about emergent situations, these delays do not impact safety because changes to safety basis documents must be approved before changes are made or implemented in high-hazard nuclear facilities. The program management concerns and findings identified during the NNSA biennial review (e.g., associated with insufficient NA-LA staffing) may have contributed to the delayed NA-LA responses to ESSs. Additional NA-LA action is warranted to ensure timely, formal verification of safe and stable conditions for emergent situations in existing high-hazard nuclear facilities.

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Safety Bases at Los Alamos National Laboratory**

1.0 PURPOSE

The U.S. Department of Energy (DOE) Office of Nuclear Safety and Environmental Assessments, within the independent Office of Enterprise Assessments (EA), conducted an assessment of the development and maintenance of safety bases at the Los Alamos National Laboratory (LANL). An EA team was at LANL from September 11–15, 2017, to obtain documents and collect information, which were reviewed off-site through November 2017. The purpose of this assessment was to evaluate the effectiveness of processes used at LANL to develop and maintain safety basis documentation in accordance with 10 CFR 830, *Nuclear Safety Management*, and applicable DOE orders and standards. This assessment also evaluated the actions taken to improve performance and correct recurring weaknesses per the Los Alamos National Security, LLC (LANS) safety basis improvement plan (SBIP).

2.0 SCOPE

Per the *Plan for the Office of Enterprise Assessments Assessment of Safety Basis Development and Maintenance at the Los Alamos National Laboratory*, dated August 9, 2017, this assessment evaluated the performance of LANS, the contractor responsible for management and operation of LANL, and the National Nuclear Security Administration (NNSA) - Los Alamos Field Office (NA-LA) in the development, review, approval, and maintenance of safety basis documents from fiscal year (FY) 2014 to 2017.

3.0 BACKGROUND

LANL provides support to national security programs (including the fabrication of nuclear weapon components), performs scientific research, and manages the waste from these operations, requiring operation of various hazard category two and three (HC-2 and HC-3) nuclear facilities.

NA-LA led the Federal review and approval of all LANS safety basis documentation for HC-2 and HC-3 nuclear facilities until the DOE's Office of Environmental Management - Los Alamos Field Office obtained safety basis approval authority for Environmental Management facilities on June 30, 2017. This EA assessment was, therefore, limited to assessing LANS and NA-LA performance.

In June 2006, the Safety Basis Division Office (SB-DO) was established within LANS's Nuclear High Hazards Operations Directorate to address weaknesses in safety basis processes at LANL. After the May 31, 2012, URS Corporation report, *URS Corporate Review of the LANL Safety Basis and Documented Safety Analysis (DSA) Development and Management Process*, SB-DO developed SBD-PLAN-12-001-R0, *Safety Basis Improvement Plan*, dated January 2013, to develop and retain SB-DO safety analysts, develop assessment tools to ensure continuing improvement and quality of safety basis products, streamline safety basis processes, and improve alignment with NA-LA on their understanding of requirements for safety basis documentation. SB-DO continues to update the SBIP to reflect the completion of action items and to add actions to address weaknesses identified since the original plan was developed. For example, a March 2015 revision to the SBIP, SBD-PLAN-13-001-R2, included actions to improve the LANL processes for reviewing changes (i.e., the LANL processes for unreviewed safety

questions [USQs]) to determine whether the changes require approval from the safety basis approval authority.

The DOE Inspector General (IG) audit report *Follow-up on Nuclear Safety: Safety Basis and Quality Assurance at the Los Alamos National Laboratory*, dated July 2015, stated that LANS “had acted to improve nuclear safety,” but “continued to have problems in fully meeting a number of critical nuclear safety management requirements. This contributed to multiple safety basis iterations and lengthy update, review, and approval processes.” The DOE IG report also stated that “corrective actions were not effectively designed to prevent recurrence,” “in some instances, implementation was ineffective,” and that “LANL lacked sufficient qualified staff to resolve certain safety issues.”

The NNSA *Headquarters Biennial Review of Field Nuclear Safety Performance Final Report for the Los Alamos Field Office*, dated April 2017, stated that NA-LA “is effectively implementing several of its nuclear safety responsibilities, but is not meeting expectations for its safety basis responsibilities and has oversight deficiencies common across multiple functional areas.” The biennial review identified significant systemic management concerns about and findings on NA-LA procedural compliance, staffing, issues management, and its review, approval, and oversight of LANS’s safety basis and design documents and their subsequent implementation. The biennial review also affirmed that current compensatory measures (e.g., requiring NNSA Headquarters concurrence with NA-LA safety basis approval actions) would remain in effect until improvements are made.

Considering the recurring weaknesses in safety basis processes at LANL and the results of the NNSA biennial review, NA-LA requested that EA perform this independent assessment of safety basis development and maintenance at LANL.

4.0 METHODOLOGY

The DOE independent oversight program is described in and governed by DOE Order 227.1A, *Independent Oversight Program*. EA implements the independent oversight program through a comprehensive set of internal protocols, operating practices, assessment guides, and process guides. Organizations and programs within DOE use varying terms to document specific assessment results. In this report, EA uses the terms “deficiencies, findings, and opportunities for improvement (OFIs)” as defined in DOE Order 227.1A. In accordance with DOE Order 227.1A, DOE line management and/or contractor organizations must develop and implement corrective action plans for deficiencies that have been identified as findings.

As identified in the assessment plan, this assessment considered requirements related to safety basis development and maintenance. This assessment was guided by objectives and criteria outlined in the following criteria and review approach documents (CRADS):

- EA CRAD 31-03, *Safety Basis Upgrade Review*, Revision 0, dated August 20, 2014, and EA CRAD 31-07, *New Nuclear Facility Documented Safety Analysis and Technical Safety Requirements*, Revision 0, dated December 2, 2014. EA used these CRADS to assess LANL safety basis procedures (SBPs) and comments provided by contractor, field office, and EA safety basis review teams over the past three years for trends and/or recurring weaknesses.
- EA CRAD 31-13, *Conduct of Engineering*, Revision 0, dated May 4, 2015. EA used the criteria of Section 4, Objective 4, to assess the programs and processes in place to identify and correct weaknesses in safety basis development and maintenance, ensure that safety basis personnel are

appropriately trained and qualified, and assess performance of the LANS SB-DO in identifying lessons learned and implementing appropriate corrective actions.

- EA CRAD 30-01, *Contractor Assurance System*, Revision 0, dated April 29, 2015. EA used Criteria 3.b. and 4.a. through 4.c. of Section 4, Objective CAS.1, to assess how LANS is using its contractor assurance system to resolve the recurring issues and findings that led to the development of the SBIP. These criteria were also used to assess performance of causal analyses and oversight of corrective action implementation.

EA also used elements three through six of the oversight criteria of Health, Safety, and Security CRAD 45-21, Rev. 1, *Feedback and Continuous Improvement Assessment Criteria and Approach – DOE Field Element*, dated December 4, 2012, to collect and analyze data on NA-LA oversight of LANL safety basis documentation development, review, approval, and maintenance processes.

EA examined key documents, such as procedures, analyses, policies, safety basis submittals, and NA-LA responses; training and qualification records; and numerous other documents. EA also conducted interviews with key personnel responsible for developing and executing the associated programs and observed a refresher training class and meetings on safety basis issues, developing revisions to SBPs, and coordinating safety basis documentation between SB-DO and NA-LA. The members of the EA assessment team, the Quality Review Board, and EA management responsible for this assessment are listed in Appendix A. A detailed list of the documents reviewed, personnel interviewed, and observations made during this assessment, relevant to the findings and conclusions of this report, is provided in Appendix B.

EA also followed up on corrective actions for findings relating to safety basis development and maintenance identified in a previous EA assessment, *Office of Enterprise Assessments Targeted Review of the Safety Significant Ventilation System and Interconnected Portions of the Associated Safety Class Confinement System, and Review of Federal Assurance Capability at the Los Alamos National Laboratory Technical Area 55 Plutonium Facility*, dated August 2015. Section 5.6 of this report discusses EA's follow-up on the completion and effectiveness of corrective actions for certain findings from the August 2015 assessment.

5.0 RESULTS

5.1 Safety Basis Document Development

This section discusses EA's assessment of the LANS safety basis program description, procedures, and performance in developing safety basis documentation from fiscal year 2014 to 2017.

Criteria:

In establishing the safety basis for a HC-1, -2, or -3 DOE nuclear facility, the contractor responsible for the facility must: (1) Define the scope of the work to be performed; (2) Identify and analyze the hazards associated with the work; (3) Categorize the facility consistent with DOE-STD-1027-92; (4) Prepare a documented safety analysis (DSA) for the facility; and (5) Establish the hazard controls upon which the contractor will rely to ensure adequate protection of workers, the public, and the environment. [10 CFR 830 Section 830.202.b]

In maintaining the safety basis for a HC-1, -2, or -3 DOE nuclear facility, the contractor responsible for the facility must: (1) Update the safety basis to keep it current and to reflect changes in the facility, the

work, and the hazards as they are analyzed in the DSA; (2) Annually submit to DOE either the updated DSA for approval or a letter stating that there have been no changes in the DSA since the prior submission; and (3) Incorporate in the safety basis any changes, conditions, or hazard controls directed by DOE. [10 CFR 830 Section 830.202.c]

Procedures for Safety Basis Document Development

LANL PD 110, *Safety Basis Program Description*, defines the elements of the LANS safety basis program, including the roles and responsibilities of LANS personnel and requirements for facility hazard classification; hazard and accident analysis; DSA and technical safety requirement (TSR) development and maintenance, including the USQ process; and references to the SBPs used to implement the program. The PD 110 safety basis program description and the suite of SBPs are adequate, providing a clear purpose and direction for their implementation.

EA confirmed that SB-DO revised its SBPs to meet the actions of the SBIP to streamline development of safety basis documentation and revised SBP 114-4, *Safety Basis Document Review*, based on lessons learned documented in SBD-LL-14-300-R0, *Lesson Learned: Analysis of Los Alamos Field Office Comments on Transuranic Waste Facility Preliminary Documented Safety Analysis (Revision 1)*, dated February 20, 2014. The SB-DO Group Leaders and analysts interviewed by EA demonstrated adequate working-level knowledge of the SB-DO procedures.

Performance in Developing Safety Basis Documents

EA reviewed NA-LA responses to 41 safety basis documents that SB-DO submitted between fiscal year 2014 and 2017 for trends and/or recurring weaknesses. NA-LA requested resubmittal of two of 12 submittals in 2015 and 2016 and three of 12 submittals in 2017 (i.e., NA-LA requested resubmittal of approximately 20% of the SB-DO submittals EA reviewed from 2015, 2016, and 2017). In particular, NA-LA required resolution of significant comments and/or resubmittal of four of the 16 evaluations of the safety of the situation (ESSs) that EA reviewed. ESSs are developed to demonstrate adequate safety while potential inadequacies in the safety analysis (PISAs) or new information affecting the safety basis are resolved. Rework associated with ESSs can delay verification of the safety of emergent situations in high-hazard nuclear facilities. NA-LA identified the following in ESS submittals despite actions in the SBIP to improve the SB-DO alignment with NA-LA on the requirements for safety basis documentation:

- Inadequate quality and rigor of the analyses of the potential release during a fire in Area G from pressurized sealed sources used for waste characterization activities.
- Inappropriate citation of requirements for ductless hoods that direct air to the building's recirculation ventilation system while personnel work with hazardous chemicals within the hoods.
- Technical inadequacies that undermine the adequacy of the safety analysis of the as-found condition of improperly packaged flanged tritium waste containers (FTWCs) in Area G and the methods for mitigating these hazards. For example, NA-LA commented that the energy capable of igniting the pressurized hydrogen and oxygen in these waste containers could be over five orders of magnitude below that documented in ESS-AREAG-114-R0, *PISA: MLLW Flanged Waste Containers Stored at Area G*, dated October 13, 2016. NA-LA also questioned the adequacy of the existing controls to prevent natural phenomena (e.g., high winds, wildland fire, and lightning) from igniting these gases, potentially releasing low-level airborne radiation to the public below the low consequence threshold of DOE-STD-3009-94, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses*.

EA also reviewed NA-LA comments on the more complex safety basis submittals of the preliminary documented safety analyses (PDSAs) supporting the design and construction of the new Transuranic Waste Facility (TWF) and the Transuranic Liquid Waste (TLW) facility. EA reviewed NA-LA comments provided via NA-LA letters COR-SO-8.15.2013-529314, *Transuranic Waste Facility – Original Comments for the Preliminary Design Safety Analysis Rev 1.0*, dated September 4, 2013, and COR-OPS-59JR-728168, *Transuranic Liquid Waste – Comments from Review of the Preliminary Documented Safety Analysis*, dated April 11, 2017, to compare NA-LA feedback on new safety basis documents issued in 2013 (for TWF) to that generated by NA-LA in April 2017 (for TLW). SB-DO did not retain in-process feedback (e.g., comments received from peers, management, and an SB-DO Quality Review Board) for analysis of potential systemic weaknesses. EA also reviewed the SB-DO analysis of the comments provided by NA-LA in the SB-DO report *Lesson Learned: Analysis of Los Alamos Field Office Comments on Transuranic Waste Facility Preliminary Documented Safety Analysis (Revision 1)*. SB-DO did not issue a lessons learned report or a report developed by a Quality Review Board for the NA-LA comments received on the TLW PDSA or the two subsequent revisions of the TWF PDSA.

EA's comparison of the comments that NA-LA provided to SB-DO on these PDSA submittals for the TWF and TLW revealed improvement in some areas, but also indicated that differences between LANS and NA-LA on their understanding of safety basis requirements persist despite SB-DO actions taken, and that SB-DO missed opportunities to improve its performance. For example:

- The number of comments precluding approval increased by approximately 30% (from 43 for the TWF PDSA to 55 for the TLW PDSA) despite actions taken by SB-DO to improve its alignment with NA-LA on their understanding of safety basis requirements and the lower complexity and risk from hazards in TLW. TWF is a HC-2 nuclear facility with safety class controls, and TLW will be a HC-3 facility without safety class controls.
- The percentage of comments on the hazard and accident analyses increased slightly from 14% on the TWF PDSA to 20% on the TLW PDSA. The SB-DO report *Lesson Learned: Analysis of Los Alamos Field Office Comments on Transuranic Waste Facility Preliminary Documented Safety Analysis (Revision 1)* noted the comments on the hazard and accident analysis for the TWF PDSA but did not identify any lessons learned or causes for these NA-LA comments. This represents a missed opportunity for improvement in the development of the TLW PDSA for which NA-LA provided significant comments on the hazard and accident analysis, identifying, for example, insufficient technical basis for stating that multiple scenarios of chemical spills have low consequences and how automated process controls are used to control or limit nuclear hazards in the safety basis.
- The percentage of comments requesting additional information or clarification decreased substantially from 68% to 36%, indicating improved level of detail and clarity in the TLW PDSA content, whereas the percentage of comments identifying conflicting information within the two PDSAs more than doubled (i.e., increased from 14% to 35%), indicating issues with the rigor of the TLW PDSA development and review by LANS.
- The percentage of comments on the preliminary fire hazard analyses decreased slightly from 18% to 14%. Many of the comments on the TLW PDSA identified inconsistencies between the PDSA and the preliminary fire hazard analysis with regard to the facility fire protection system descriptions, system design parameters, and process equipment design. The SB-DO report *Lesson Learned: Analysis of Los Alamos Field Office Comments on Transuranic Waste Facility Preliminary Documented Safety Analysis (Revision 1)* identified, as lessons learned, the need for clarification in the PDSA about the fire protection system and removing inconsistencies between the safety basis documents and fire hazard analyses, but these problems persisted in the TLW PDSA submittal.

Safety Basis Document Development Conclusion

The LANL PD 110 safety basis program description and the SBPs are adequate. SB-DO revised its SBPs consistent with the actions of the SBIP to streamline safety basis document development and documented lessons learned from the development of the TWF PDSA. SB-DO Group Leaders and analysts demonstrated working-level knowledge of the SB-DO procedures.

Despite LANS actions to improve alignment with NA-LA on their understanding of safety basis requirements, EA observed the following indications that efforts have not been adequate.

- NA-LA consistently required resubmittal of approximately 20% of LANS safety basis submittals in 2015, 2016, and 2017. In particular, NA-LA required resolution of significant comments and/or resubmittal of four of the 16 ESSs, significantly delaying NA-LA verification that adequate operational restrictions and/or controls have been established to ensure safety with emergent situations discovered in existing facilities.
- NA-LA continues to provide a significant number of comments concerning SB-DO identification and control of hazards in its safety basis submittals.
- NA-LA provided more technically significant comments on the TLW PDSA submitted in 2017 than on a TWF PDSA submitted in 2013 despite the lower risk and complexity of the HC-3 TLW compared to the HC-2 TWF.

5.2 Safety Basis Maintenance

This section discusses EA's assessment of the USQ process as implemented by LANS for high-hazard nuclear facilities at LANL. USQ processes review changes for high-hazard nuclear facilities to determine whether the changes are within the safety basis or whether changes to safety basis documents are required to be submitted for DOE approval.

Criterion:

The contractor responsible for an HC-1, -2, or -3 DOE nuclear facility must establish, implement, and take actions consistent with a USQ process that meets the applicable requirements. [10 CFR 830 Section 830.203]

Unreviewed Safety Question Process

The USQ process implemented by LANS is adequately defined by procedure SBP-112-3-R3.1, *Unreviewed Safety Question (USQ) Process*. As required by 10 CFR 830.203, the USQ procedure was approved by NA-LA, with directed actions, in a letter dated April 22, 2016 (i.e., COR-OPS-2.2.2016-661781). LANS administers this process under the management and leadership of SB-DO; however, qualified personnel in facility engineering groups can also perform the USQ process.

The SBP-112-3-R3.1 USQ procedure defines how to evaluate whether a change to the safety basis of a facility or an activity can be made without first seeking prior approval from DOE. An unreviewed safety question determination (USQD) determines whether the proposed change does (i.e., a "positive USQD") or does not (a "negative USQD") involve a USQ warranting DOE approval. The USQ procedure also defines a method of screening proposed changes to determine the need to perform the more detailed USQD, as well as a process for declaring a categorical exclusion from the requirement to perform a USQD (e.g., correction of typographical, spelling, punctuation, or grammatical errors are categorically excluded provided the meaning or intent does not change).

Procedure SBP-112-3-R3.1, Section 3.1.1, *Actions or Changes that Do Not Require Review under 10 CFR 830.203, Unreviewed Safety Question Process*, lists specific actions and changes for which LANS is not required to get DOE approval. For example, LANS does not require its USQ process to be performed for a new or revised procedure solely developed or modified to implement a safety basis change that DOE has already approved. This approach differs from the approach taken for most DOE high-hazard nuclear facilities and is inconsistent with the guidance in NNSA Technical Bulletin 2007-2. Specifically, the NNSA technical bulletin states that these new or revised procedures should be screened by a Qualified Evaluator (QEV) to verify that the procedure is within the approved safety basis. SBP-112-3-R3.1 states that it is not applicable to these new or revised procedures solely implementing a DOE-approved safety basis and that screening by a QEV is not required for these procedures. NA-LA stated that the cognizant DOE Office of Primary Interest is reviewing this approach.

Attachment H of the SBP-112-3-R3.1 USQ procedure defines an “Expert USQD Process,” which is an alternative to the “full” USQD process when a proposed change cannot be categorically excluded or screened out. LANS based this process on a process implemented at the Y-12 National Security Complex intended to “optimize the USQ process by eliminating the need to create excessive documentation for changes which cannot be screened or excluded, but that obviously cannot adversely affect the applicable safety basis.” Procedure SBP-112-3-R3.1 does not explicitly distinguish between the proposed changes that are allowed to be evaluated using the Expert USQD process and the proposed changes that are to be evaluated using the full USQD process. Expert USQD and full USQD evaluations are documented using nearly identical worksheets, so the documentation requirements for an Expert USQD are not significantly different from the requirements for a full USQD. There is also no evidence that the Expert USQD process has been used within the past year. Section 3.5 of the SBP-112-3-R3.1 USQ procedure also refers to an “expert screen” being an option, but this process is not discussed anywhere else in the procedure. The revision log for SBP-112-3-R3.1 notes the addition of a pilot Expert USQ screening process in revision 1, and then its removal and replacement with the Expert USQD process in revision 1.1.

Unreviewed Safety Question Process Implementation and Performance

LANS QEVs use procedure SBP-112-3-R3.1 to perform USQ evaluations for LANL facilities. A sample of recent USQ evaluations (i.e., 19 screens, 7 categorical exclusions, and 33 determinations) confirmed that, in general, QEVs closely followed the procedure.

The examples of USQ screens and determinations that EA reviewed appropriately implemented the “Unreviewed Safety Question Screening Worksheet” and “Unreviewed Safety Question Determination Worksheet,” which are Attachments D and F, respectively, to procedure SBP-112-3-R3.1. Overall, the descriptions of the proposed changes were written clearly; adequate bases were provided for each of the screening criteria; and references were cited when appropriate. Each screen and determination that EA reviewed had been appropriately signed and dated by a qualified preparer and reviewer. USQ screen TA55-17-0059-S, *Locking Mechanism for Upper Door*, did not identify whether the proposed change was “completely enveloped by a previous USQD” as required by the SBP-112-3-R3.1 Attachment D worksheet. Ultimately, this USQ screen appropriately determined that a USQD was not necessary, but, neither the QEV preparer nor the QEV reviewer identified the omission and ensured proper completion of the form/worksheet.

All but one of the categorical exclusion evaluations that EA reviewed followed the appropriate format and guidance prescribed in procedure SBP-112-3-R3.1 and referenced the appropriate justification that is detailed in SBP-112-3-R3.1, Attachment A. In TA55-17-0056-C, R0, *Solvent Extraction*, the categorical exclusion form that was used came from a previous revision of the USQ procedure, despite being signed and dated over six months after approval and implementation of the current USQ procedure revision (i.e.,

revision 3.1). Nonetheless, the outdated form captured the information essential to the categorical exclusion evaluation.

SBD-PLAN-14-326-R4, *Performance Assurance Plan*, established processes for facilitating continuous improvement in safety basis development and maintenance. This performance assurance plan incorporated a senior analyst panel review (SAPR) of USQ evaluation documentation into the USQ process defined in procedure SBP-112-3-R3.1. The SAPR is intended to provide an additional check beyond what is normally provided by an authorized USQ reviewer to ensure technical quality of USQ screens, categorical exclusions, and determinations. Per SB-DO management direction, all QEVs are subject to the SAPR until SB-DO management judges their USQ evaluations to be of high enough quality to be released from the requirement.

Although the SAPR has been formally implemented as part of the USQ process, as dictated by SBD-PLAN-14-326-R4, the SAPR process is not formally defined by a LANL procedure, allowing some variation in how the SAPR process is implemented for USQ evaluations. The SAPR usually consists of two senior safety analysts (SAs) conducting reviews via email, telephone, or in-person. For many of the USQ evaluations reviewed, EA observed signatures on the associated form, indicating that a SAPR had been performed and documented, per SBD-PLAN-14-326-R4 guidance. SBD-PLAN-14-326-R4 also directs SAPR members to notify SB-DO management of repeated poor performance. There is no evidence that any QEV has been the subject of such documented management notification. Nevertheless, the SAPR provides targeted, additional review of USQ evaluations performed by QEVs when such review is considered warranted by SB-DO management to improve a QEV's performance.

SBD-PLAN-13-001-R2.2, *Safety Basis Improvement Plan*, and SBD-PLAN-12-002-R3, *Unreviewed Safety Question (USQ) Document Sampling and Monitoring Plan*, also identify additional performance assurance activities to promote continuous improvement in the USQ process. SBD-PLAN-13-001-R2.2 identifies completed USQ process improvement actions directed by memorandum SBD-15-004, *SB-DO Unreviewed Safety Question (USQ) Process Improvements*, dated March 17, 2015. For example, the following are some of the completed USQ process improvement actions that EA observed to be adequately implemented:

- SBP-112-4-R6, *USQ Qualified Evaluator (QEV) Qualification Standard*, was revised to institute a qualification program based on completion of core training requirements and mandatory performance activities.
- SBP-112-3-R3.1 was revised to state the need to analyze the safety of changes before entering the USQ process (to address issues with the USQ process being inappropriately relied on to evaluate the safety of changes instead of being used solely to determine whether DOE approval was required for the change).
- LANL-specific DSA/TSR and USQ examples were incorporated into initial and refresher/continuing USQ training courses.

The SBD-PLAN-12-002-R3 sampling and monitoring plan establishes a process for periodically monitoring the implementation of the USQ process. The plan requires that USQ documentation be randomly sampled semi-annually, using an approved methodology to determine the sample size, and that QEVs, management personnel, or Level 5 SAs perform the evaluations. The evaluation process is largely qualitative and measures quality in terms of strengths and weaknesses when assessed against subjective criteria specified in SBD-PLAN-12-002-R3, Attachment 2. SBD-PLAN-12-002-R3, Section 7, however, identifies a quantitative metric for the percentage of USQ documents of that are not of "minimally acceptable quality" (as determined by the LANS assessors) with a goal of keeping this metric below 10%.

Of the nine USQ monitoring reports issued since fiscal year 2014, all but one concluded that the goal for this metric of USQ quality had been met. RPT-SBD-463, *Unreviewed Safety Question (USQ) Monitoring Report from the First-Half of Calendar Year 2016*, which covered January through April 2016, reported that the metric of defective USQs spiked to 20%. A lessons learned report, LL-SBD-432, *USQ Document Monitoring for First-Half of Calendar Year 2016*, attributes the increase primarily to inadequate level of detail, content, and/or incomplete rationale. The report does not explicitly explain this sudden spike in those kinds of errors. A supplemental report, RPT-SBD-464, *Unreviewed Safety Question (USQ) Monitoring Report from the First-Half of Calendar Year 2016 Supplement*, which covered May and June 2016, showed that the metric decreased to 12%. Although this decrease was substantial, it still did not meet the “minimal acceptable quality” metric established in SBD-PLAN-12-002-R3. The supplemental report, nonetheless, concludes that SB-DO expectations had been met. The metric of defective USQs for the following period decreased even further to 8.8%. The report for the first half of 2017 was not available (i.e., not issued) for assessment by EA, delaying confirmation that performance remains within LANS’s goals.

Documenting Safety Basis Changes and Updates

As required, LANL DSAs are updated annually. Between annual updates, changes may be made to safety bases resulting from the USQ process. These changes are tracked using the safety basis document list (SBDL), which identifies all documents that comprise the safety basis of a given facility. The process for maintaining the SBDL is defined in procedure SBP 111-2-R2.1, *Safety Basis Document Lists*, and Form 2168, *Safety Basis Document List for Individual Facility/Operation*, provides a format. In addition to the DSA and TSR, the SBDL identifies any ESSs, justifications for continued operations, and associated safety evaluation reports that communicate safety control requirements. The SBDL Document Custodian/Coordinator is responsible for updating the SBDL upon approval or implementation of a safety basis change (e.g., DSA updates, ESSs, justifications for continued operations implementing compensatory measures, and associated safety evaluation reports), or when a safety basis document is removed from the list.

SB-DO technical staff and USQ QEVs correctly cited the SBDL for a facility identifies the current safety basis documents in effect for that facility. Upon approval of a revised SBDL, the SBDL Document Custodian is required to update the SB-DO website. Many SAs and QEVs indicated that they also have received email notification of SBDL revisions from the SBDL Document Custodian. The SBDL process supports safety basis maintenance at LANL by identifying the safety basis documentation in effect for each high-hazard nuclear facility.

Safety Basis Maintenance Conclusion

LANS developed and implemented an adequate process for maintaining safety bases for high-hazard nuclear facilities at LANL per 10 CFR 830.203. LANS has taken substantial action with respect to USQ qualification, review, performance monitoring, continuous improvement, and facility-specific training, significantly enhancing the performance of USQ evaluations at LANL. EA identified only minor issues with a few recent USQ evaluations. LANS had a spike in its metric of defective USQs during the first half of calendar year 2016, but later in the year the performance improved. The SBDL process supports safety basis maintenance at LANL by identifying the safety basis documentation in effect for each high-hazard nuclear facility.

5.3 Safety Basis Training and Qualification

This section discusses EA's assessment of the SA and QEV training and qualification program implemented by LANS.

Criterion:

A training program is in place that identifies required training on an individual basis, performs notifications, and tracks completion. Requirements are established to identify retraining periodicity for key procedures. Failure to accomplish required training can result in disqualification from performance of assigned tasks.

SBD-PLAN-15-336-R1, *Training Program Plan*, supplements the overarching training program defined by NHHO-PLAN-002, *ADNHHO Training Plan*, by defining elements and implementing actions specific to SB-DO. The SBD-PLAN-15-336-R1 training program plan identifies qualification programs for two technical positions that have safety basis development and maintenance responsibilities: Safety Basis Analyst (a.k.a., Safety Analyst) and USQ QEV. The qualification standards for these two positions are NHHO-SB-SA-QS-638-R4, *Safety Analyst*, and SBP-112-4-R6, *USQ Qualified Evaluator (QEV) Qualification Standard*, respectively.

EA confirmed that SA and QEV qualification standards define a training and qualification program that complies with DOE Order 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*. The SA and QEV qualification standards provide clear guidelines for personnel selection, initial training, qualification processes, continuing training, and requalification. All of the SAs and QEVs interviewed for this assessment demonstrated a thorough understanding of the qualification processes and were able to identify their current status.

SBD-PLAN-13-001-R2.2, *Safety Basis Improvement Plan*, provided direction to improve the training and qualification standards and processes managed and administered by SB-DO. As a result of the actions associated with this improvement plan and other assessment observations, SB-DO implemented positive changes. For example, SB-DO used DOE National Training Center courses and training materials associated with DOE Nuclear Safety Specialist (NSS) qualifications in developing its prescribed SA qualification training and continuing education training courses. EA observed that substantial effort has been made to improve, enhance, and better formalize the program. Qualified technical staff confirmed during interviews that the training and qualification program for SAs and QEVs has become more formal over the past year.

An improvement made to the training program is the incorporation of formal mentoring for entry-level SA candidates in the SA qualification standard. The mentor serves as a source of information and counsel at key points during the qualification and training process. The SAs who qualified before formal implementation of the current revision of the SA qualification standard did not often have an assigned mentor; therefore, only a small minority of the SAs directly benefit from the formal addition of mentoring to the qualification standard. The USQ QEV standard notes that QEV reviewers have a responsibility to mentor QEV preparers in addition to their USQ reviewer responsibilities. Mentoring is not formally integrated into the QEV qualification process.

All SA and QEV candidates must satisfy education, experience, and performance requirements specified in the attachments and appendix of NHHO-PLAN-002 and SBP-112-4-R6, respectively (e.g., a Bachelor of Science degree in engineering, two years of job-related experience, and one year of nuclear-related experience). In addition to specific training courses, the qualification standards include performance requirements (e.g., QEVs perform a PISA evaluation, and SAs prepare or review two accident analysis

scenarios), which help to ensure that qualified individuals are proficient. Exceptions to the SA and QEV qualification standards have to be approved by the SB-DO Group Leader.

The SA and QEV qualifications are valid for two years. Requalification reminders and notifications of continuing training assignments are automatically emailed via the UTrain system, which LANS uses for managing training and qualifications records. The UTrain system is effective in communicating training needs, and EA did not identify any past-due or delinquent qualification records. For all USQ records that EA reviewed, the QEV preparer, the QEV reviewer, and any additional reviewers had all met the appropriate training and qualification standards.

In accordance with the expectations of DOE Order 426.2, the QEV qualification standard, SBP-112-4-R6, Section 6.4, and the SA qualification standard, NHHO-PLAN-002, Section 6.5, appropriately define the conditions (e.g., not completing required training) under which a QEV and an SA can be disqualified from their duties (e.g., performing or reviewing USQs, safety basis analysis). These sections of the standards also outline the process for reinstatement.

SB-DO management indicated that the number of QEVs has been reduced within the past year to improve the performance or proficiency of USQ QEVs. For example, many cognizant system engineers (not in SB-DO) are no longer QEV qualified. The SBP-112-4-R6 USQ QEV standard enables QEV qualification to be revoked for performance deficiencies; however, performance deficiencies warranting disqualification are not defined within the standard.

Safety Basis Training and Qualification Conclusion

The training and qualification programs for SAs and QEVs comprehensively address the requirements of DOE Order 426.2. Both programs are defined by processes that are clearly explained in the applicable SB-DO qualification standards. The SA standard formally implements mentorship during the qualification process for new SAs, while the QEV standard incorporates mentorship after qualification using qualified QEV reviewers. Per the SBIP, SB-DO used DOE National Training Center courses and training materials for NSSs in developing prescribed SA qualification training and continuing education training courses.

5.4 Safety Basis Division Office Performance Oversight and Improvement

This section discusses EA's assessment of the issues management, performance assessment, and lessons learned processes implemented by SB-DO for improving performance in the development and maintenance of safety basis documentation.

Criterion:

Programs and processes are in place to identify and correct problems, ensure that personnel are appropriately trained and qualified, and assess internal performance, identifying lessons learned and implementing appropriate corrective actions. [DOE Order 414.1D, Quality Assurance, and DOE Order 210.2A, DOE Corporate Operating Experience Program]

Issues Management

SB-DO manages its issues and SBIP initiatives using P322-4, *Laboratory Performance Feedback and Improvement Process*. These procedures include performance feedback collection, assignment of ownership, determination of significance, development of corrective or improvement actions, and action tracking and closure which, until September 25, 2017, was accomplished using the LANS Performance Feedback and Improvement Tracking System (PFITS). On September 25, 2017, LANS replaced PFITS

with a new Issues Management Tool that will be used to track SB-DO issues. The *Laboratory Performance Feedback Process* allows alternative approaches to collect, evaluate, and address performance feedback based on the level of risk involved. For example, causal analyses, extent of condition reviews, and effectiveness evaluations are required for only high risk (i.e., Risk Level 1) feedback representing a significant condition adverse to quality.

The SB-DO performance issues or feedback being addressed by the SBIP have been categorized by LANS as Risk Level 2. Per the *Laboratory Performance Feedback Process*, a causal analysis, an extent of condition consideration, and effectiveness evaluations are optional for Risk Level 2 issues. Table A-2 of the *Laboratory Performance Feedback Process*, however, states that deficiencies in processes that require substantial rework may be significant and accordingly categorized as Risk Level 1. SB-DO, however, has not re-categorized SB-DO performance issues as Risk Level 1 or initiated a causal analysis, extent of condition consideration, or effectiveness evaluation of actions taken despite the substantial rework associated with safety basis submittals discussed in Section 5.1. The only causal analyses of SB-DO performance issues with safety basis documentation were directed by NA-LA for NA-LA findings on the SBIP or causal analyses required by DOE Order 232.2A, *Occurrence Reporting and Processing of Operations Information*, for a reportable incident with the SB-DO USQ process.

Over 70% of the actions of the SBIP (i.e., 40 out of 55 closed actions) were closed on schedule. The approximately 30% that were closed late were closed on average within 20 calendar days of the scheduled due date. The only open action at the time of this assessment is to revise LANL PD 110, *Safety Basis Program Description*. EA's review confirmed that actions per the SBIP were taken to increase SB-DO staffing of qualified SAs, revise SB-DO procedures for safety basis document development and maintenance, and improve the SB-DO training and qualification program for SAs and USQ QEVs; however, as discussed below, actions taken to improve SB-DO's assessment of its performance have not been adequate.

Performance Assessment

The SBIP included actions to establish a "robust assessment process" to meet the goals of SD 320, *Los Alamos National Laboratory Contractor Assurance System*, system description. SB-DO developed and maintained SBD-PLAN-14-326-R4, *Performance Assurance Plan*, dated June 6, 2017, including use of the following:

- A suite of process-related metrics to monitor performance and identify areas for improvement
- Management assessments per LANL procedure P-328-3, *Management Assessment*
- Management Observations and Verifications (MOVs) per LANL procedure P-328-4, *Management Observation and Verification*
- Semi-annual monitoring of USQ documents per SBD-PLAN-12-002-R3, *Unreviewed Safety Question (USQ) Document Sampling and Monitoring Plan*
- Sharing of relevant lessons learned per PD-323, *LANL Operating Experience Program*, and P-323-1, *Operating Experience and Lessons Learned Process*.

SB-DO metrics track the number of qualified SAs, the backlog of DSA updates and changes, the number of instances in which SB-DO identified new information or potentially inadequate safety analyses, and USQ quality based on the semi-annual assessment. Each of these metrics has improved during calendar year 2017, and SB-DO assessed that it has met its performance goals (i.e., overall performance is

qualitatively assessed as “green”) since April 2017. In particular, SB-DO increased its critical staffing from 22 SAs to 39 in calendar year 2017.

EA’s review of SB-DO metrics identified the following:

- The SB-DO metric for measuring USQ quality is the percentage of USQ documents that did not meet the SB-DO qualitative criteria for the content and clarity of the USQ documentation during the semi-annual assessments of USQ documentation. The periodic monitoring and metric provide good indications of USQ performance and trends. Additionally, deficiencies identified during these semi-annual assessments are distributed to USQ QEVs via the SB-DO lessons learned process and training sessions to improve performance.
- SB-DO metrics do not monitor the quality of SB-DO safety basis submittals. SB-DO did not generate a metric per the action in the SBIP to develop process-related metrics to monitor, and improve the quality of, SB-DO safety basis submittals to minimize rework (see **OFI-LANS-1** and **Finding F-LANS-1**). SD 330, *Los Alamos National Laboratory Quality Assurance Program*, Attachment B, Section B1.3, Subsection 100 Basic, Paragraph (a) requires “monitoring activities against acceptance criteria in a sufficient manner to provide assurance that the activities affecting quality are performed sufficiently.”
- The SB-DO Division Leader stated that the quality of SB-DO safety basis submittals is improving, but the NA-LA Nuclear Safety Team Supervisor characterized the quality of SB-DO submittals as cyclic. Neither the SB-DO Division Leader nor the NA-LA Nuclear Safety Team Supervisor had any data or metrics to support their differing, informal assessments. Paragraph 3.1.3.a. of SD 320 states that the LANL “metrics process creates an environment for aligned and fact-based improvement of LANL performance and provides the basis for performance accountability,” which are not being met by the metrics currently used by the SB-DO. As discussed in Section 5.1, EA identified that approximately 20% of the safety basis documents submitted by SB-DO required significant rework and resubmittal in 2015, 2016, and 2017.
- Despite the delays reported in the DOE IG audit report *Follow-up on Nuclear Safety: Safety Basis and Quality Assurance at the Los Alamos National Laboratory*, SB-DO metrics do not track the time for resolving comments provided by NA-LA or for getting NA-LA approval of annual updates to safety basis documents. Although there is not a DOE requirement to track the time for resolving comments or for getting NA-LA approval of updates, SB-DO missed the opportunity to utilize LANL quality assurance processes to determine whether performance has improved or if action is warranted to improve performance.

In contrast to SB-DO, the LANL Nuclear Criticality Safety Program (NCSP) uses a more comprehensive set of 22 metrics (with five related to work quality) to track and trend performance relative to defined performance targets for each month. An overall summary of NCSP accomplishments and areas of concern are distributed to LANL and NA-LA management with the metrics to ensure alignment on progress in addressing known performance and compliance issues with the NCSP. The summary and metrics for October 2017 were provided in NCS-MEMO-17-057, *Nuclear Criticality Safety Program Performance Metrics through October FY18*, dated November 14, 2017.

The SBD-PLAN-14-326 performance assurance plan includes the use of MOVs and management assessments to assess SB-DO performance and identify areas warranting improvement. Specifically, the SBD-PLAN-14-326 performance assurance plan revised on June 6, 2017, states that the LANL Associate Director for Nuclear High Hazard Operations requires SB-DO managers (Level 2 and above) to perform

two MOVs per month. SB-DO managers did not document accomplishment of any MOVs in the past year. Since May 2013, management assessments performed by SB-DO have been the semi-annual assessments of USQ documentation, an assessment of SB-DO SAs and USQ training, and an assessment of SB-DO document control and records management. SB-DO has not conducted a management assessment per LANL procedure P-328-3 of the quality of its safety basis submittals in over four years. SD 330, Attachment B, Section B1.3, Subsection 100 Basic, Paragraph (a) requires “monitoring activities against acceptance criteria in a sufficient manner to provide assurance that the activities affecting quality are performed sufficiently” (see **Finding F-LANS-1**). An assessment by the LANS independent quality assurance division, rather than by SB-DO personnel, of the implementation of the SB-DO quality program is scheduled for January 2018. Because, per LANL procedure P-328-3, cognizant managers are responsible for the planning, execution, and reporting of management assessments, Parent Organization Functional Management Reviews (POFMRs) (which are planned, executed, and documented by non-LANS personnel) and assessments by the LANS independent quality assurance division are not equivalent to management assessments.

A LANS parent company report, POFMR-2015-82, *Parent Organization Functional Management Review, LANL Safety Basis Program*, dated June 4, 2015, concluded that the LANL safety basis program complied with 10 CFR 830 and DOE-STD-3009-94. This parent company assessment team also noted that:

- safety basis product quality warrants improvement
- “how effectiveness of [SBIP] implementation will be measured, communicated, and evaluated” is unclear, and
- “LANS and the NNSA should move forward on the proposed facilitated workshop to improve the interface and interaction between the two organizations.”

The follow-on assessment *Parent Organization Functional Management Review (FMR) 2016-470, LANL Safety Basis Sustainability*, dated April 26, 2017, verified compliance and assessed the sustainability of the safety basis program and the interface with NA-LA. Although this latest parent company assessment noted improvements in SB-DO staffing and management, it also identified that “resolution of safety basis comments is often ineffective and untimely” and that the “relationship with the customer continues to warrant attention.” The lack of SB-DO quality-related metrics and assessments allows inconsistencies between SB-DO, the parent organization functional management review teams, and NA-LA regarding SB-DO safety basis submittal quality and areas still warranting improvement (see **OFI-LANS-2**).

Lessons Learned Processes

The SBD-PLAN-14-326 performance assurance plan contains the roles and responsibilities for SB-DO personnel for sharing relevant lessons learned per PD-323, *LANL Operating Experience Program*, and P-323-1, *Operating Experience and Lessons Learned Process*, and for verifying assimilation of relevant lessons learned. For example, the SB-DO Division Leader works with his management team to determine actions to be taken (and entered into PFITS) for lessons learned, and the SB-DO Group Leaders distribute, and verify assimilation of, relevant lessons learned. The SBD-PLAN-14-326 performance assurance plan states that MOVs or reviews of safety basis documents may be used to verify assimilation of lessons learned.

EA’s review of lessons learned reports issued since February 2014 identified the following:

- Of the 17 reports issued, 11 discussed lessons learned on the USQ process. These reports were distributed to USQ QEVs to improve performance. Lessons learned (e.g., examples of USQDs that did not adequately document the basis for the determination) were also incorporated into the USQ QEV refresher training.
- Of the 17 reports issued, six discussed topics relevant to safety basis submittals, but only SBD-LL-14-300-R0, *Lesson Learned: Analysis of Los Alamos Field Office Comments on Transuranic Waste Facility Preliminary Documented Safety Analysis (Revision 1)*, provided lessons learned from an analysis of comments from NA-LA. SB-QRB Charter-13-001-R0, *Safety Basis Quality Review Board Charter*, dated June 17, 2013, states that “the [Quality Review Board] is expected to (1) review past [Quality Review Board]-generated lessons learned reports, and (2) convene to develop a new report based on the [NA-LA] feedback received on the [safety basis document] submitted.” The Quality Review Board did not generate a lessons learned report for comments provided by the NA-LA Safety Basis Review Team and the EA team of safety basis experts on Revisions 2 and 3.1 of the TWF PDSA or the NA-LA comments on the PDSA for the TLW facility (see **Finding F-LANS-1**).
- MOVs are not being performed to verify assimilation of lessons learned (see **Finding F-LANS-1**).

Safety Basis Division Office Performance Oversight and Improvement Conclusion

Per the SBIP, SB-DO developed its SBD-PLAN-14-326 performance assurance plan by using LANL processes for metrics, assessments, and management oversight to facilitate continuous improvement and monitoring of SB-DO processes. SB-DO has effectively implemented its SBD-PLAN-14-326 performance assurance plan for monitoring and improving USQ evaluations and documentation.

For safety basis submittals, SB-DO has not effectively implemented LANL quality assurance requirements and practices for issues management, metrics, management assessment, and lessons learned to identify problems, root causes, and areas needing improvement, indicative of a systemic weakness in SB-DO implementation of quality assurance processes warranting senior management attention (see **Finding F-LANS-1**).

5.5 Field Office Approval and Oversight of Safety Basis Documents

This section discusses EA’s assessment of NA-LA progress in improving its processes and performance for overseeing, reviewing, and approving safety basis documents in relation to the management concerns and findings that were identified in the NNSA *Headquarters Biennial Review of Field Nuclear Safety Performance Final Report for the Los Alamos Field Office*, dated April 2017.

Safety Basis Review and Approval Criteria:

As part of the approval process, DOE will review the content and quality of the safety basis documentation. DOE intends to use the approval process to assess the adequacy of a safety basis developed by a contractor to ensure that workers, the public, and the environment are provided reasonable assurance of adequate protection from identified hazards. [10 CFR 830 Appendix A, Section E.2]

Because DOE has ultimate responsibility for the safety of its facilities, DOE will review each DSA to determine whether the rigor and detail of the DSA are appropriate for the complexity and hazards expected at the nuclear facility. In particular, DOE will evaluate the DSA by considering the extent to which the DSA (1) satisfies the provisions of the methodology used to prepare the DSA and (2) adequately addresses the criteria set forth in 10 CFR 830.204(b). DOE will prepare a Safety Evaluation Report to

document the results of its review of the DSA. A DSA must contain any conditions or changes required by DOE. [10 CFR 830 Appendix A, Section F.3]

Oversight Criteria:

The DOE field element has an issues management process that is capable of categorizing findings based on risk and priority, ensuring relevant line management findings are effectively communicated to the contractors, and ensuring that problems are evaluated and corrected on a timely basis. [DOE Order 226.1B 4b(4)]

Oversight processes are tailored according to the effectiveness of contractor assurance systems, the hazards at the site/activity, and the degree of risk, giving additional emphasis to potentially high consequence activities. [DOE Order 226.1B 4b(5)]

DOE line management must have effective processes for communicating oversight results and other issues in a timely manner up the line management chain, and to the contractor as appropriate, sufficient to allow senior managers to make informed decisions. [DOE Order 226.1B 4d]

The NNSA Headquarters Biennial Review of Field Nuclear Safety Performance Final Report for the Los Alamos Field Office, dated April 2017, reported significant systemic management concerns about and findings on NA-LA review, approval, and oversight of LANS's safety basis and design documents, issues management, procedural compliance, and staffing. This biennial review also affirmed that current compensatory measures (i.e., requiring NNSA Headquarters concurrence with NA-LA safety basis approval actions) should remain in effect until improvements are made.

NA-LA had not issued a causal analysis or corrective action plans for the management concerns and findings of the biennial review before this EA assessment. EA confirmed these management concerns and findings relative to safety basis development and maintenance, as discussed below.

Review and Approval of Safety Basis Submittals

The compensatory measures (e.g., requiring NNSA Headquarters concurrence with NA-LA safety basis approval actions) have remained in effect after the NNSA biennial review. Based on a sample of safety basis documents reviewed by EA, comments from NA-LA (with input from NNSA Headquarters personnel and other Federal experts) indicate that the content, quality, and rigor of safety basis documentation is being adequately reviewed to ensure that workers, the public, and the environment are protected from identified hazards.

An NA-LA and LANS SB-DO bi-weekly meeting (commonly referred to as the "30-60-90 meeting") is held to coordinate and prioritize safety basis document processing. EA observed a bi-weekly meeting that included discussions about the schedule and priority for future SB-DO safety basis submittals to allow for more efficient resource loading and improved document approval timeliness. The meeting included the review of commitment dates for submitting or approving safety basis documents but lacked discussion of significant issues and barriers to document approval. In addition, commitment dates are changed during the meeting; however, the original commitment date and the reason for the changes are not documented for future performance assessment (see **OFI-NA-LA-1**).

The DOE IG audit report *Follow-up on Nuclear Safety: Safety Basis and Quality Assurance at the Los Alamos National Laboratory* noted the "lengthy update, review, and approval processes" for safety basis documents at LANL. The NNSA Headquarters Biennial Review of Field Nuclear Safety Performance Final Report for the Los Alamos Field Office included a finding that "NA-LA is not tracking time based

nuclear safety documents such as: annual safety basis submittals, conditions of approvals, directed changes, Evaluations of Safety/Justifications of Continued Operation, and other 10 CFR 830 compliance requirements contrary to DOE-STD-1104-2014.” Per 10 CFR 830.207(b), “pending issuance of a safety evaluation report in which DOE approves a safety basis for a hazard category 1, 2, or 3 existing DOE nuclear facility, the contractor responsible for the facility must continue to perform work in accordance with the safety basis for the facility in effect,” so delays in processing most changes to safety basis documents do not impact the safety of ongoing operations or conditions in nuclear facilities.

EA reviewed NA-LA performance in reviewing ESSs, because these safety basis submittals require timely and proper review to ensure that adequate safety is provided while PISAs or new information about operations or conditions in existing HC-2 or -3 nuclear facilities are resolved. Contrary to 10 CFR 830, Appendix A, Section I. Paragraph 1, NA-LA has not ensured timely review of LANS’s ESSs (see **Finding F-NA-LA-1**). EA’s assessment of NA-LA’s review of ESSs identified the following:

- ESS-AREAG-114-R0, *PISA: MLLW Flanged Waste Containers Stored at Area G*, was submitted to NA-LA on October 13, 2016. NA-LA letter COR-OPS-3.8.2017-724367, dated April 11, 2017 (i.e., six months later), provided information that the energy capable of igniting the pressurized hydrogen and oxygen in these waste containers could be over five orders of magnitude below that documented in ESS-AREAG-114-R0. NA-LA also questioned the adequacy of the existing controls to prevent natural phenomena (e.g., high winds, wildland fire, and lightning) from igniting these gases and potentially releasing low-level airborne radiation to the public below the low consequence threshold of DOE-STD-3009-94. The NA-LA safety basis review team and SB-DO personnel discussed NA-LA concerns about this ESS in several weekly teleconferences during the NA-LA review of the ESS. NA-LA, however, did not ensure that LANS used its USQ process to have this new information (or error in the ESS) properly evaluated by LANS in a timely manner to determine whether a new PISA (relative to the safety analysis in ESS-AREAG-114-R0) existed and whether LANS should take additional immediate actions to ensure safe and stable conditions. Per the LANS USQ process, reviews of new information “to the determination of whether a PISA exists should typically be on the order of hours or days, not weeks.” DOE’s Office of Environmental Management – Los Alamos Field Office (EM-LA) obtained safety basis approval authority for Environmental Management facilities (including Area G) on June 30, 2017. EM-LA *Transmittal of Area G PISA – MLLW Flanged Tritium Waste Containers Stored at Area G* dated March 5, 2018 approved a revision to the ESS (ESS-AREAG-114-R1.1 dated February 6, 2018) which included the results of subsequent LANS technical evaluations and controls adequately addressing the NA-LA concerns.
- ESS-WETF-116-R0, *PISA: Three Flanged Tritium Waste Containers (FTWCs) stored at WETF loaded with AL-MIs*, was submitted on December 16, 2016. NA-LA letter COR-OPS-3.16.2017-725581, dated June 22, 2017, (i.e., over six months later) approved the ESS and directed changes to the controls in effect to ensure that they were adequately implemented as specific administrative controls, per DOE-STD-3009-94. NA-LA also provided comments that required resolution to ensure that the potential for deflagration and detonation of the hydrogen and oxygen gases in these FTWCs is correctly characterized for remediation of these FTWCs. These FTWCs are inside the Weapon Engineering Tritium Facility and are therefore not subject to the same risks from natural phenomena (e.g., high winds) as the FTWCs in Area G.
- ESS-AREAG-113-R0, *PISA: Fire Analysis Concerns Identified with ANSI Sealed Sources*, was submitted on July 8, 2016. Almost a year later, NA-LA letter *Request for Resubmittal of the Area G Evaluation of the Safety of the Situation, Fire Analysis Concerns Identified with ANSI Sealed Sources*, dated June 21, 2017, requested LANS to resubmit the ESS to improve the rigor and quality of the associated fire analysis. The NA-LA letter stated that “the concerns associated with the ESS were

communicated to LANS informally.” DOE Order 226.1B, *Implementation of Department of Energy Oversight Policy*, requires “communicating oversight results and other issues in a timely manner up the line management chain, and to the contractor as appropriate, sufficient to allow senior managers to make informed decisions,” which would warrant documenting the NA-LA concerns/issues to ensure that managers (including those who did not participate in the informal discussions) understood the NA-LA concerns/issues.

- As a positive, the average number of days required for NA-LA to review an ESS/justification declined from 2015 to 2016. Specifically, SB-DO reported that NA-LA took an average of 64 days and 25 days in 2015 and 2016, respectively, to respond to an ESS/justification for continued operations. NA-LA did not track its average response time.
- NA-LA procedures MP 01.03, *Nuclear Facility Safety Basis Document Review and Approval*, Revision 2, dated June 4, 2014, and MP 01.01, *Nuclear Safety Team Program*, Revision 4, dated June 4, 2014, do not provide guidance or expectations on how to resolve issues with ESSs in a timely manner.

The management concerns and findings in the NNSA *Headquarters Biennial Review of Field Nuclear Safety Performance Final Report for the Los Alamos Field Office* for improving NA-LA performance in the long-term do not specifically address NA-LA performance associated with timely communication of results of NA-LA reviews for ESSs.

Oversight of Safety Basis Division Office

Some of the weaknesses in NA-LA oversight of SB-DO that were identified in the NNSA biennial report still remain. NA-LA assessment reports *Safety Basis Development, Maintenance, and Sustainability*, dated October 2013; *Los Alamos National Security Safety Basis Training and Qualification Program*, dated July 2014; and *Unreviewed Safety Question Process at Los Alamos National Laboratory (LANL) Nuclear Facilities*, dated April 2016, are the most recent NA-LA independent assessments of SB-DO performance and processes. While not a substitute for the need for regular and rigorous oversight by NA-LA, the NA-LA Nuclear Safety Team Supervisor requested EA to perform this assessment to supplement NA-LA oversight of safety basis document development and maintenance.

Issues Management

NA-LA identified systemic weaknesses in its issues management performance while preparing for the biennial review. NA-LA had not issued a causal analysis or corrective action plans for any of the management concerns and findings of the biennial review before this EA assessment.

Procedural Compliance

NNSA’s management concern about NA-LA compliance with its procedures for overseeing LANS remained open during this assessment. EA identified that the expectations for the review or interaction of NA-LA NSSs with SB-DO personnel on safety basis submittals differed among the current NA-LA procedures, the NA-LA Nuclear Safety Team Supervisor, the NA-LA NSSs, and SB-DO management. SB-DO management and most of the NA-LA NSSs stated that the NSSs are expected to provide comments on informally provided safety basis submittals (i.e., before senior LANS management review). The NA-LA Nuclear Safety Team Supervisor expected the NSSs to only review the draft safety basis submittals after LANS management had reviewed them to ensure that LANS is fully responsible for the development of the safety basis submittal, consistent with NA-LA procedure MP 01.03, Rev 2, *Nuclear Facility Safety Basis Document Review and Approval*, effective June 4, 2014. The NA-LA Nuclear

Safety Team Supervisor and the SB-DO Division Leader agreed that the inconsistent expectations in NSS involvement can impact the workload of the understaffed NA-LA Nuclear Safety Team.

Staffing

The NA-LA Nuclear Safety Team has four out of the eight qualified NSSs allotted in its staffing plan. Two additional personnel are in training to become qualified NSSs, and the Nuclear Safety Team Supervisor has two open job announcements for two additional NSSs in order to meet the staffing level. In addition to understaffing, the biennial review noted that the lack of continuity in key management and staff positions negatively impacted NA-LA performance. The NA-LA Field Office Manager and Nuclear Safety Team Supervisor left in September 2017, requiring additional changes to NA-LA management positions.

Field Office Approval and Oversight of Safety Basis Documents Conclusion

NA-LA had not issued a causal analysis or corrective action plans for any of the management concerns and findings from the NNSA Headquarters biennial review of its nuclear safety performance before this EA assessment. Accordingly, the compensatory measures requiring NNSA Headquarters concurrence with NA-LA safety basis approval actions remained in effect. In addition to confirming the management concerns and findings from the NNSA biennial review, EA identified that in some cases, NA-LA has not ensured timely reviews of ESSs for existing HC-2 or -3 nuclear facilities at LANL to verify that safe and stable conditions have been established by LANS and has not always provided timely and formal communication of concerns to LANS. In one case, NA-LA took six months to formally provide its concerns about the adequacy of an ESS instead of ensuring LANS used its USQ process to have new information (or error in the ESS) discovered by NA-LA properly evaluated by LANS in a timely manner (e.g., “hours or days”).

5.6 Follow-up on Previous EA Findings on Safety Basis

The previous EA assessment *Targeted Review of the Safety Significant Ventilation System and Interconnected Portions of the Associated Safety Class Confinement System, and Review of Federal Assurance Capability at the Los Alamos National Laboratory Technical Area 55 Plutonium Facility*, dated August 2015, included findings related to safety basis development and maintenance. This section discusses EA’s assessment of the completion and effectiveness of corrective actions for certain findings from this previous assessment.

Finding LANS-ST-1: “LANS did not sufficiently incorporate the Surveillance Requirement for an annual system functional test of the ventilation system and facility control system into the associated facility surveillance test procedure to meet the Surveillance Requirement and verify the operability of the facility control system and the Plutonium Facility ventilation system as required by the TSRs.”

The documentation in the LANS issues management system, PFITS, confirmed that the surveillance test procedure was revised. No further EA follow-up is necessary.

Finding LANS-CSE/CM-2: “Contrary to the requirements of DOE Order 420.1B Change 1, LANS made changes to the physical configuration of vital safety system components without adequately documenting that the changes were technically acceptable and would not invalidate the capability of those components to perform their required functions. This lack of adequate technical basis was also carried forward into USQDs, which are not always accurate or factual and therefore do not meet the requirements of 10 CFR 830.”

Although the USQ processes have improved the screening and evaluations of technical issues to determine whether DOE approval is required, the engineering processes associated with configuration management were outside the scope of this assessment. Additional follow-up for this finding was performed during the EA assessment of the conduct of engineering in January 2018. The results of this follow-up will be in the report for this assessment of conduct of engineering.

6.0 FINDINGS

Findings are deficiencies that warrant a high level of attention from management. If left uncorrected, findings could adversely affect the DOE mission, the environment, the safety or health of workers and the public, or national security. DOE line management and/or contractor organizations must develop and implement corrective action plans for EA appraisal findings. Cognizant DOE managers must use site- and program-specific issues management processes and systems developed in accordance with DOE Order 227.1A to manage these corrective action plans and track them to completion.

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Finding F-LANS-1: For safety basis submittals, SB-DO has not effectively implemented LANS processes for issues management, metrics, management assessment, and lessons learned to identify problems, root causes, and areas needing improvement as required by SD 330, *Los Alamos National Laboratory Quality Assurance Program*, thereby allowing significant levels of rework to persist.

EA identified deficient SB-DO implementation of LANS quality assurance requirements and practices and inadequate implementation of the actions of the SBIP for improving the quality of safety basis submittals and for resolving long-term and persistent differences with NA-LA on the requirements for safety basis documentation. This SB-DO performance in this area is indicative of a systemic weakness in SB-DO implementation of quality assurance processes. EA identified the following observations from Section 5.0 supporting this finding:

- Significant differences in the expectations for hazard identification and control between NA-LA and SB-DO persist and sometimes significantly delay NA-LA verification that LANS established adequate controls to ensure safety with emergent situations discovered in high-hazard nuclear facilities.
- For safety basis submittals, SB-DO has not performed “monitoring activities against acceptance criteria in a sufficient manner to provide assurance that the activities affecting quality are performed sufficiently” as required by SD 330, *Los Alamos National Laboratory Quality Assurance Program*, Attachment B, Section B1.3, Subsection 100 Basic, Paragraph (a).
 - SB-DO has not conducted a management assessment of the quality of its safety basis submittals in over four years. Actions in SBD-PLAN-14-326-R4, *Performance Assurance Plan*, to perform management assessments to meet the goals of SD 320, *Los Alamos National Laboratory Contractor Assurance System*, were not effectively implemented.
 - SB-DO did not establish metrics to monitor the quality of its safety basis submittals as part of its actions in the SBIP and SBD-PLAN-14-326-R4, *Performance Assurance Plan*.

- NA-LA consistently required resubmittal of approximately 20% of SB-DO submittals per year in 2015, 2016, and 2017 and provided feedback on the quality of SB-DO PDSA and ESS submittals and their revisions.
- SB-DO missed the opportunity to initiate a causal analysis, extent of condition consideration, or effectiveness evaluation of actions as discussed in Table A-2 of P322-4, *Laboratory Performance Feedback and Improvement Process*, for safety basis submittal processes requiring substantial, significant, and persistent rework from 2013 to 2017.
- Only the *Lesson Learned: Analysis of Los Alamos Field Office Comments on Transuranic Waste Facility Preliminary Documented Safety Analysis (Revision 1)* report issued in 2014 provided lessons learned from an analysis of comments from NA-LA. The expectation in SB-QRB Charter-13-001-R0, *Safety Basis Quality Review Board Charter*, for a Quality Review Board to analyze NA-LA feedback on subsequent safety basis submittals was not fulfilled. Performance issues identified in the issued lessons learned report were also evident in the TLW PDSA submittal in 2017.
- SB-DO managers did not document accomplishment of any MOVs in the past year contrary to the SBD-PLAN-14-326 performance assurance plan that states SB-DO managers (Level 2 and above) are to perform two MOVs per month.

NNSA - Los Alamos Field Office

Finding F-NA-LA-1: Contrary to 10 CFR 830, Appendix A, Section I. Paragraph 1, NA-LA has not ensured timely reviews of ESSs for existing HC-2 or -3 nuclear facilities at LANL to verify that safe and stable conditions have been established by LANS and has not always provided timely and formal communication of concerns to LANS.

In one case, NA-LA did not formally communicate its concerns with an ESS to LANS after reviewing it for almost a year. NA-LA also took six months to document its concerns with an ESS instead of ensuring that LANS used its USQ process to have an error evaluated by LANS in “hours or days” to determine whether additional immediate actions were warranted to ensure safe and stable conditions.

7.0 OPPORTUNITIES FOR IMPROVEMENT

EA identified some OFIs to assist cognizant managers in improving programs and operations. While OFIs may identify potential solutions to findings and deficiencies identified in appraisal reports, they may also address other conditions observed during the appraisal process. EA offers these OFIs only as recommendations for line management consideration; they do not require formal resolution by management through a corrective action process and are not intended to be prescriptive or mandatory. Rather, they are suggestions that may assist site management in implementing best practices or provide potential solutions to issues identified during the assessment.

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OFI-LANS-1: LANS should consider developing metrics of its safety basis submittal quality based on feedback and comments provided by NA-LA and LANS personnel from their review of the safety basis submittals. Feedback and comments from LANS reviewers have significant potential for identifying barriers or challenges for SAs developing high quality safety basis submittals.

OFI-LANS-2: LANS should consider assessing its performance (including the quality of its work) for select safety basis submittals soon after receiving NA-LA comments, presenting this assessment to NA-LA, and then identifying, with NA-LA and an independent, professional facilitator, actions for improving LANS performance and the collaboration between NA-LA and LANS.

NNSA - Los Alamos Field Office

OFI-NA-LA-1: NA-LA should consider assessing its performance in responding to specific safety basis submittals (selected in coordination with LANS for OFI-LANS-2), presenting this assessment to LANS, and then identifying, with LANS and an independent, professional facilitator, actions for improving NA-LA performance and the collaboration between NA-LA and LANS.

8.0 ITEMS FOR FOLLOW-UP

EA is following up on the engineering aspects of the findings from the previous EA assessment described in Section 5.6. EA will also review the actions taken by NA-LA in response to the management concerns and findings from the NNSA *Headquarters Biennial Review of Field Nuclear Safety Performance Final Report for the Los Alamos Field Office*, dated April 2017.

Appendix A Supplemental Information

Dates of Assessment

Onsite Data Collection and Assessment: September 11-15, 2017

Documentation Reviews: August – November 2017

Office of Enterprise Assessments (EA) Management

William A. Eckroade, Acting Director, Office of Enterprise Assessments

Thomas R. Staker, Director, Office of Environment, Safety and Health Assessments

William E. Miller, Deputy Director, Office of Environment, Safety and Health Assessments

C.E. (Gene) Carpenter, Jr., Director, Office of Nuclear Safety and Environmental Assessments

Kevin G. Kilp, Director, Office of Worker Safety and Health Assessments

Gerald M. McAteer, Director, Office of Emergency Management Assessments

Quality Review Board

Steven C. Simonson

Thomas R. Staker

William E. Miller

Michael A. Kilpatrick

EA Site Lead for Los Alamos National Laboratory

Joseph Probst

EA Assessors

Joseph Probst – Lead

Alem Boatright

Frank Inzirillo

Appendix B Key Documents Reviewed, Interviews, and Observations

Documents Reviewed

- ADNHHO Program Health Metrics Quad Charts for SB-DO, 1/4/2017 - 8/11/2017
- COR-OPS-2.2.2016-661781, *Site Wide Unreviewed Safety Question Process – Approval of SB-112-3-R3, Unreviewed Safety Question (USQ) Process, Revision 3, with Direction*, 4/22/2016
- DOE IG audit report *Follow-up on Nuclear Safety: Safety Basis and Quality Assurance at the Los Alamos National Laboratory*, 7/2015
- ESS-AREAG-113-R0, PISA: *Fire Analysis Concerns Identified with ANSI Sealed Sources*, 7/8/2016
- ESS-AREAG-114-R0, PISA: *MLLW Flanged Waste Containers Stored at Area G*, 10/13/2016
- ESS-AREAG-114-R1.1, PISA: *MLLW Flanged Waste Containers Stored at Area G*, 2/6/2018
- ESS-WETF-116-R0, PISA: *Three Flanged Tritium Waste Containers (FTWCs) stored at WETF loaded with AL-MIs*, 12/16/2016
- LANS Safety Basis Division Lessons Learned Reports from 2014 to 2017
- LL-SBD-432, *USQ Document Monitoring for First-Half of Calendar Year 2016*, 1/11/2017
- EM-LA Letter EM-LA-20AE-00224 to Cheryl D. Cabbil, ADNHHO, LANS, from Doug Hintze, Manager, EM-LA, Subj: *Transmittal of Area G PISA – MLLW Flanged Tritium Waste Containers Stored at Area G*, 3/5/2018
- NA-LA Letter COR-SO-8.15.2013-529314, to W. T. Bivens, Acting ADNHHO, from C. H. Keiler, Contracting Officer Representative, Los Alamos Field Office, Subj: *Transuranic Waste Facility – Original Comments for the Preliminary Design Safety Analysis Rev 1.0*, 9/4/2013
- NA-LA Letter SO:4026-559642, to Cheryl D. Cabbil, ADNHHO, LANS, from John A. Krepps AMFO, Los Alamos Field Office, Subject: *Transuranic Waste Facility (TWF) – Official Comments for the Preliminary Documented Safety Analysis Revision 2.0*, 2/19/2014
- NA-LA Letter to Cheryl D. Cabbil, ADNHHO, LANS, from John A. Krepps, Contracting Officer Representative, NA-LA, Subject: *Response to the Resubmittal of the Safety of the Situation for the Ventilation System with Regard to Using Chemicals in the Hoods*, 8/20/2015
- NA-LA Letter to Cheryl D. Cabbil, ADNHHO, LANS, from Kimberly Davis Lebak, Manager, NA-LA, Subject: *Transuranic Liquid Waste – Comments from Review of the Preliminary Documented Safety Analysis*, 4/11/2017 (COR-OPS-59JR-728168)
- NA-LA Letter to Cheryl D. Cabbil, ADNHHO, LANS, from Kimberly Davis Lebak, Manager, NA-LA, Subject: *Response to ESS-AREAG-114-R0, MLLW Flanged Tritium Waste Containers Stored at Area G*, 2/13/2017 (COR-OPS-1.26.2017-716857)
- NA-LA Letter to Cheryl D. Cabbil, ADNHHO, LANS, from Kimberly Davis Lebak, Manager, NA-LA, Subject: *Transmittal of Comments on ESS-AREAG-114-R0, MLLW Flanged Tritium Waste Containers Stored at Area G*, 4/11/2017 (COR-OPS-3.8.2017-724367)
- NA-LA Letter to Cheryl D. Cabbil, ADNHHO, LANS, from Kimberly Davis Lebak, Manager, NA-LA, Subject: *Weapons Engineering Tritium Facility – Los Alamos Field Office Approval with Directed Changes of Submittal of ESS-WETF-116-R0, PISA: Three Flanged Tritium Waste Containers stored at WETF loaded with AL-MIs*, 6/22/2017 (COR-OPS-3.16.2017-725581)
- NA-LA Letter to Cheryl D. Cabbil, ADNHHO, LANS, from Kimberly Davis Lebak, Manager, NA-LA, Subject: *Request for Resubmittal of the Area G Evaluation of the Safety of the Situation, Fire Analysis Concerns Identified with ANSI Sealed Sources*, 6/21/2017
- NA-LA Letter to Cheryl D. Cabbil, ADNHHO, LANS, from Kimberly Davis Lebak, Manager, NA-LA, Subject: *Transmittal of Comments on ESS-AREAG-114-R0, MLLW Flanged Tritium Waste Containers Stored at Area G*, 4/11/2017
- NA-LA Letter to Cheryl D. Cabbil, ADNHHO, LANS, from Kimberly Davis Lebak, Manager, NA-LA, Subject: *Approval of the Safety of the Situation (ESS) for TA-54-0038: Radioassay and*

Nondestructive Testing (RANT) Facility Incorrect Assumption for RANT Basis for Interim Operation (BIO) Seismic Analysis, 6/24/2015

- NA-LA Letter to Cheryl D. Cabbil, ADNHHO, LANS, from Kimberly Davis Lebak, Manager, NA-LA, Subject: *Approval of the Safety of the Situation (ESS) for TA-54-0038: Radioassay and Nondestructive Testing (RANT) Facility Concerns Relative to Damage Ratios Associated with Pipe Over-pack Containers, 10/26/2015*
- NA-LA Letter to Cheryl D. Cabbil, ADNHHO, LANS, from Kimberly Davis Lebak, Manager, NA-LA, Subject: *Approval of the Safety of the Situation (ESS) ESS-WCRRF-105-R0, PISA- Building Structural Integrity Declared Inoperable due to Roof Leak, for the Waste Characterization, Reduction, and Repackaging Facility (WCRRF), 10/7/2015*
- NA-LA management procedure MP 01.01, *Nuclear Safety Team Program, Revision 4, 6/4/2014*
- NA-LA management procedure MP 01.03, *Nuclear Facility Safety Basis Document Review and Approval, Revision 2, 6/4/2014*
- NCS-MEMO-17-057, *Nuclear Criticality Safety Program Performance Metrics through October FY18, 11/14/2017*
- NHHO-PLAN-002, *ADNHHO Training Plan, 5/29/2014*
- NHHO-SB-SA-QS-638-R4, *Safety Analyst (SA), 2/15/2017*
- NNSA Headquarters Biennial Review of Field Nuclear Safety Performance Final Report for the Los Alamos Field Office, 4/2017
- P-322-4, *Laboratory Performance Feedback and Improvement Process, Revision 10, effective 4/21/2016*
- P-328-3, *Management Assessment, Revision 8, Administrative Change 3, effective 5/4/2017*
- *Parent Organization Functional Management Review LANL Safety Basis Sustainability, POFMR-2016-470, 4/26/2017*
- *Parent Organization Functional Management Review, LANL Safety Basis Program, POFMR-2015-82, 6/4/2015*
- PD 110, *Safety Basis Program Description*
- RPT-SBD-463, *Unreviewed Safety Question (USQ) Monitoring Report from the First-Half of Calendar Year 2016, 1/11/2017*
- RPT-SBD-464, *Unreviewed Safety Question (USQ) Monitoring Report from the First-Half of Calendar Year 2016 Supplement), 1/11/2017*
- SBD-15-004, *SB-DO Unreviewed Safety Question (USQ) Process Improvements, 3/17/2015*
- SBD-LL-14-300-R0, *Lesson Learned: Analysis of Los Alamos Field Office Comments on Transuranic Waste Facility Preliminary Documented Safety Analysis (Revision 1), 2/20/2014*
- SBD-PLAN-12-001-R0, *Safety Basis Improvement Plan, 1/2013 (and subsequent revisions through SBD-PLAN-13-001-R2.2)*
- SBD-PLAN-12-002-R3, *Unreviewed Safety Question (USQ) Document Sampling and Monitoring Plan, 11/2014*
- SBD-PLAN-14-326-R4, *Performance Assurance Plan, 6/2017*
- SBD-PLAN-15-336-R1, *Training Program Plan, effective 7/20/2017*
- SBP 111-2-R2.1, *Safety Basis Document Lists, effective 9/29/2013*
- SBP 112-3-R3.1, *Unreviewed Safety Question (USQ) Process, 12/31/2014*
- SBP 112-4-R6, *USQ Qualified Evaluator (QEV) Qualification Standard, effective 5/1/2017*
- SBP 114-1-R2, *Safety Basis Development for Projects, 9/24/2014*
- SBP 114-4-R2, *Safety Basis Document Review, 6/22/2017*
- SBP 114-5-R0.1, *Safety Basis Document Generation, Change, or Update, 9/30/2014*
- SBP-112-3-R3.1, *Unreviewed Safety Question (USQ) Process, effective 7/15/2016*
- SB-QRB Charter-13-001-R0, *Safety Basis Quality Review Board Charter, 6/17/2013*

- SD 320, *Los Alamos National Laboratory Contractor Assurance System*, Revision 4, Administrative Change 1, effective 3/22/2017
- SD 330, *Los Alamos National Laboratory Quality Assurance Program*, Revision 9, Effective 9/26/16
- Tracking Spread Sheet for the Bi-weekly NA-LA / LANS Safety Basis Status Update meeting (“30-60-90” meeting)
- *URS Corporate Review of the LANL Safety Basis and Documented Safety Analysis (DSA) Development and Management Process*, 5/31/2012
- USQ monitoring reports from fiscal year 2014 to fiscal year 2016
- WI 112-2-R2, *Technical Safety Requirements Work Instruction*, 4/16/2015
- W-10-TR-0405U, *Analysis of Flanged Tritium Waste Container Lightning Susceptibility*, Revision A, 10/4/2017
- W-10-TR-0406U, *Analysis of Electrostatic Discharge Mechanisms in a Flanged Tritium Waste Container*, Revision A, 10/4/2017
- WETF-CALC-TCV-17-009, *Flanged Tritium Waste Container Vessel Analysis*, R1, 10/6/2017

Interviews

- Safety Basis Division – Division Leader
- Safety Basis Division – Deputy Division Leader
- Safety Basis Division Group Leaders (3)
- Safety Basis Division Analysts (5)
- TA-55 Deputy Facility Operations Deputy Director
- Weapons Deputy Facility Operations Deputy Director
- LANSCE Deputy Facility Operations Deputy Director
- Environmental & Waste Deputy Facility Operations Deputy Director
- NA-LA Nuclear Safety Team Supervisor
- NA-LA Nuclear Safety Team Leads (4)

Observations

- Safety Basis Division Staff Meeting
- Price Anderson Act / Safety Basis Division Meeting
- Bi-weekly NA-LA / LANS Safety Basis Status Update meeting (“30-60-90” meeting)
- USQ QEV Refresher Training