



Assessment of the Management of Nuclear Safety Issues at the Los Alamos National Laboratory

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Acronyms

ADNHHO	LANS Associate Directorate, Nuclear and High Hazard Operations
ADPSM	LANS Associate Directorate, Plutonium Science and Manufacturing
ALDWP	Triad Associate Laboratory Director, Weapons Production
AMNSER	NA-LA Assistant Manager of Nuclear Safety, Engineering, and Readiness
AMPP-DO	Actinide Material and Processing and Power Division Office
ASME	American Society of Mechanical Engineers
CAS	Contractor Assurance System
CFR	Code of Federal Regulations
CGD	Commercial Grade Dedication
ConOps	Conduct of Operations
CRAD	Criteria and Review Approach Document
CRD	Contractor Requirements Document
CS	Criticality Safety
CSED	Criticality Safety Evaluation Document
DCF	Design Change Form
DOE	U.S. Department of Energy
DSA	Documented Safety Analysis
EA	Office of Enterprise Assessments
ES-DO	Engineering Services Division Office
ESR	Engineering Service Request
ESS	Evaluation of the Safety of the Situation
FHA	Fire Hazard Analysis
FMH	Fissile Material Handler
FOD	Facility Operations Director
FY	Fiscal Year
IG	Inspector General
IM	Issues Management
IMC	Issues Management Coordinator
IMRB	Institutional Management Review Board
IMT	Issues Management Tool
IQ&PA	Institutional Quality and Performance Assurance Division
IRM	Issue Responsible Manager
JON	Judgment of Need
LANL	Los Alamos National Laboratory
LANS	Los Alamos National Security, LLC
LCO	Limiting Condition of Operation
LIMITS	Laboratory Issues Management Tracking System
M&O	Management and Operations
MAR	Material at Risk
MOV	Management Observation and Verification
MRB	Management Review Board
N3B	Newport News Nuclear BWXT-Los Alamos
NA-LA	NNSA Los Alamos Field Office
NCS-DO	Nuclear Criticality Safety Division Office
NCSB	Nuclear Criticality Safety Board
NNSA	National Nuclear Security Administration
NPI-DO	Nuclear Process Infrastructure Division Office
NQA	Nuclear Quality Assurance
OFI	Opportunity for Improvement

ORI-DO	Operational Readiness Implementation Division Office
ORPS	Occurrence Reporting and Processing System
ORS	Operations Responsible Supervisor
PF-4	Plutonium Facility
PAIP	Performance Assurance Improvement Plan
PFITS	Performance Feedback and Improvement Tracking System
PIC	Person in Charge
PT-DO	Plutonium Technology Division Office
SB-DO	Safety Basis Division Office
SPE-DO	Strategic Projects and Engineering Division Office
SSC	Structure, System, or Component
TA-55	Technical Area 55
TSR	Technical Safety Requirement
Triad	Triad National Security, LLC
TWF	Transuranic Waste Facility
USQ	Unreviewed Safety Question

Assessment of the Management of Nuclear Safety Issues at the Los Alamos National Laboratory

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 management and operations (M&O) contractors' management of nuclear safety issues at the Los Alamos National Laboratory (LANL). The purpose of this assessment was to evaluate the issues management (IM) processes and their implementation relative to nuclear safety issues since EA and the DOE Inspector General identified significant weaknesses in IM at LANL in August 2015 and February 2016, respectively.

Los Alamos National Security, LLC (LANS) was the M&O contractor for LANL from June 1, 2006, until October 31, 2018. Newport News Nuclear BWXT-Los Alamos replaced LANS as the legacy cleanup contractor for the DOE Office of Environmental Management on April 29, 2018. Triad National Security, LLC (Triad) replaced LANS as M&O contractor for the National Nuclear Security Administration on November 1, 2018. Triad adopted the LANS IM process with minor changes and retained most of the managers of nuclear safety issues from LANS. EA examined IM by LANS and Triad for this assessment.

Since 2016, LANS extensively revised its IM process, issued an IM guide, and replaced the database it used for IM to improve its performance (e.g., by improving the causal analyses, extent-of-condition reviews, and effectiveness evaluations performed for higher-significance issues). These actions led to only limited improvement in addressing longstanding weaknesses in IM, as shown by the following:

- LANS's management of the revisions to the IM process did not ensure that the process adequately invoked the IM requirements of DOE directives and the American Society of Mechanical Engineers consensus standard. These requirements are intended to ensure that more rigor (e.g., causal analyses, extent-of-condition reviews, and effectiveness evaluations) is applied to nuclear safety issues that pose more risk.
- Managers of nuclear safety issues at LANL rarely elect to use causal analyses, extent-of-condition reviews, or effectiveness evaluations; in fact, managers of non-nuclear issues at LANL used these IM tools over three times as often as managers for nuclear safety issues. The managers of nuclear safety issues also did not follow some of the IM process requirements in conducting the few causal analyses, extent-of-condition reviews, and effectiveness evaluations that were performed.
- Oversight of the management of nuclear safety issues has been limited to verifying the closure of overdue actions and issues; neglecting to ensure that issues were appropriately categorized and rigorously evaluated, based on their risk, to preclude recurrence.
- LANS closed the weaknesses identified by EA and the Inspector General, along with numerous nuclear safety issues, without taking adequate action to correct problems and preclude recurrence.
- The EA assessment team identified significant comments on the management (resolution) of 64 (approximately 19%) of the 334 nuclear safety issues reviewed in detail by the team. These comments provide further evidence that significant weaknesses in IM at LANL persist, which can lead to the degradation of nuclear safety.

Overall, this assessment identified significant weaknesses in the LANS IM process and institutional behaviors that have allowed identified problems to go uncorrected, problem recurrences to be routinely accepted, and corrective actions to often be delayed for years. Although the assessment team did not identify any immediate threats to workers, the public, or the environment, these weaknesses in IM, if uncorrected, can allow layers of defense for nuclear safety to degrade to the extent they did leading to the pause in July 2013 of key fissile material operations in the Plutonium Facility at LANL for over four years.

Having adopted the LANS IM process with only minor changes, Triad is now responsible for correcting the weaknesses in that process and in the associated institutional behaviors identified in this report. Triad's development and implementation of its strategic initiatives to improve IM and to "achieve culture change with an emphasis on organizational learning" will be key to safely supporting increased production rates of plutonium pits through 2030.

Assessment of the Management of Nuclear Safety Issues at the 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 management and operations (M&O) contractors' management of nuclear safety issues at the Los Alamos National Laboratory (LANL). The purpose of this assessment was to independently evaluate the issues management (IM) processes and their implementation relative to nuclear safety issues since EA and the DOE Inspector General (IG) identified significant weaknesses in IM at LANL in August 2015 and February 2016, respectively. An EA team conducted the onsite portions of this assessment December 3-7, 2018, and January 14-18, 2019.

2.0 SCOPE

Per the *Plan for the Office of Enterprise Assessments Assessment of Issues Management at the Los Alamos National Laboratory, December 2018 – January 2019*, this assessment evaluated IM processes and their implementation by selected divisions that are key to nuclear safety at LANL for Triad National Security, LLC (Triad) (i.e., divisions cognizant of nuclear criticality safety, engineering and design, facility operations, and plutonium manufacturing). The scope included nuclear safety issues identified since January 1, 2016. Individual issues were examined to determine the effectiveness of the LANL IM program in correcting problems and precluding recurrence. Since Triad recently became the M&O contractor, the issues reviewed were primarily managed by the previous M&O contractor, the Los Alamos National Security, LLC (LANS).

3.0 BACKGROUND

LANL's primary mission is to develop and apply science and technology to ensure the safety, security, and reliability of the U.S. nuclear deterrent; reduce global threats; and solve other emerging national security challenges. For more than 75 years, LANL has served as a research center for science, technology, and engineering and has made achievements that focus on safety, security, environmental stewardship, nuclear deterrence, threat reduction, operations, communications, and community involvement. LANL has the only plutonium pit production facility in the U.S. and manages its waste from these and other operations.

DOE oversight of the maintenance and operation of LANL is provided by the National Nuclear Security Administration (NNSA) Los Alamos Field Office (NA-LA) and the Environmental Management Los Alamos Field Office (EM-LA). LANS was the M&O contractor for LANL from June 1, 2006, until October 31, 2018. EM-LA selected Newport News Nuclear BWXT-Los Alamos (N3B) to replace LANS as its legacy cleanup contractor, and the transition from LANS to N3B was completed in April 2018. NNSA selected Triad to replace LANS as its M&O contractor, and the transition from LANS to Triad was completed on November 1, 2018.

Attachment 1 to DOE Order 226.1B, *Implementation of Department of Energy Oversight Policy*, dated April 25, 2011, requires the contractor to establish a contractor assurance system (CAS) that provides evidence that work is being performed safely, securely, and in compliance with all requirements; that risks are identified and managed; and that the systems of control are effective and efficient. Attachment 1

to DOE Order 226.1B also requires the CAS to include a structured IM system that captures program and performance deficiencies for timely reporting and correction using a graded approach.

DOE has identified significant weaknesses (i.e., non-compliances with significant impact) in the IM program for over the past eleven years. During this time, LANS had recurring, systemic weaknesses in its safety management programs that it did not adequately resolve with its IM program. For example, in July 2013, the LANS Laboratory Director paused all fissile material operations in the Plutonium Facility (PF-4) due to systemic and recurring weaknesses in the LANS criticality safety program and conduct of operations. Due to the scope and significance of these weaknesses that had been allowed to develop, the mitigation by LANS took over four years to be completed for some of the key fissile material operations supporting plutonium pit production in PF-4.

EA, in its 2015 review of LANS management of issues on vital nuclear safety systems, determined that LANS was not adequately implementing its IM program; this was documented in the assessment report entitled, *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 – August 2015*. For example, the 2015 EA report identified that:

- LANS had a recurring practice in which nuclear safety issues were “inappropriately rolled into other issues for which existing actions were insufficient or irrelevant.”
- LANS had not adequately evaluated six of nine EA findings related to fire protection and that LANS did not address safety basis compliance or the adequacy of systems that challenged nuclear safety basis requirements.

After that EA assessment, the DOE IG issued an audit report, *Issues Management at the Los Alamos National Laboratory*, dated February 2016, that also identified systemic, significant weaknesses in IM across LANL by LANS. For example:

- The IG identified that 84% of the high-significance (reportable) issues did not have an extent-of-condition review to identify potential recurring or systemic issues.
- The IG reported that LANS did not document the causes for 35% of the high-significance issues that LANL identified and for 55% of the high-significance issues that involved nuclear safety analyses.
- The IG reported that approximately 46% of 196 high-significance issues had been closed without addressing the underlying cause of the event, and 96% of those issues lacked effectiveness evaluations.
- The IG reported that its “results are consistent with both the Office of Enterprise Assessments January 2013 report, *Independent Oversight Review of the Los Alamos National Laboratory Corrective Action Effectiveness Review*, and DOE IG report, *Followup on Nuclear Safety/Safety Basis and Quality Assurance at the Los Alamos National Laboratory*,” indicating recurring, systemic weaknesses in IM at LANL.

Based on these DOE reports, as well as LANS internal reviews and audits of its IM program, in March 2016 LANS reported its weaknesses in IM in the DOE Noncompliance Tracking System. LANS also incorporated additional actions into its Performance Assurance Improvement Plan (PAIP), originally

developed to improve the performance of its CAS (which includes IM), to include more actions to improve its IM program.

Per LANL System Description SD330, *Los Alamos National Laboratory Quality Assurance Program*, LANS managed issues per Procedure P322-4, *Laboratory Performance Feedback and Improvement Process*, to satisfy the quality assurance criteria and requirements for IM in 10 CFR 830, *Nuclear Safety Management*; DOE Order 414.1D, *Quality Assurance*, dated April 25, 2011; DOE Order 226.1B; and American Society of Mechanical Engineers (ASME) consensus standard Nuclear Quality Assurance (NQA)-1-2008, with the NQA-1a 2009 addenda, *Quality Assurance Requirements for Nuclear Facility Applications* (NQA-1). In September 2017, LANS implemented its new Issues Management Tool (IMT), replacing the Performance Feedback and Improvement Tracking System (PFITS), which LANS had used to manage performance feedback, including both issues and non-issues (e.g., recommendations and improvement initiatives). LANS issued Revision 12, Administrative Change 1 of Procedure P322-4, renaming the procedure *Issues Management* to reflect the reduced scope of the IMT and incorporating other changes to P322-4 to improve LANS's IM process. LANS also issued two other major revisions to P322-4 and issued QPA-PA-GU-001.003, *Issues Management Guide* and three major revisions to QPA-PA-GU-001.003 to improve IM across LANL. Both N3B and Triad continue to use P322-4 as the basis for their IM processes. Triad also retained most of the managers of nuclear safety issues from LANS. While N3B was not within the scope of this assessment, the results will also be of benefit to their IM program.

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. This report 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 the deficiencies identified as findings. Other important deficiencies not meeting the criteria for a finding are also highlighted in the report and summarized in Appendix C of this report. These deficiencies should be addressed consistent with site-specific IM procedures.

As identified in the assessment plan, this assessment considered the requirements related to IM in Attachment 1 of DOE Order 226.1B. The EA assessment team used the criteria for Objective 3 of EA Criteria and Review Approach Document (CRAD) 30-01, Revision 1, *Contractor Assurance System – Criteria Review and Approach Document*, dated February 15, 2018, supplemented with the LANL specific lines of inquiry (based on P322-4 requirements) listed in Appendix E of this report to assess IM and corrective action systems used by LANS and Triad.

The assessment team examined key documents, such as policies, process instructions, problem reports, extent-of-condition reviews, causal analyses, corrective action plans, effectiveness evaluations, evidence of corrective action completion; NA-LA and contractor assessments and metrics on IM; and other documents and data in the IM database. The team also interviewed key personnel responsible for contractor IM process implementation, focusing on issues associated with nuclear safety, and observed Management Review Board (MRB) meetings discussing nuclear safety issues.

For the initial set of issues for this assessment, the assessment team collected the issues that had been identified since January 1, 2016; then, a team member, who is a qualified Nuclear Safety Specialist,

selected over 300 issues (problem reports) from this set to review for this assessment. This approach ensured that the team was able to adequately assess the management and rigor applied to nuclear safety issues, and the sample included nearly all of the significant nuclear safety issues assigned to specific LANS and Triad divisions key to nuclear safety at LANL: the Nuclear Criticality Safety Division Office (NCS-DO), the Safety Basis Division Office (SB-DO), the Engineering Services Division Office (ES-DO), the Technical Area 55 (TA-55) Facility Operations Director (FOD), the Actinide Material Processing and Power Division Office (AMPP-DO), the Nuclear Process Infrastructure Division Office (NPI-DO), the Operational Readiness Implementation Division Office (ORI-DO), the Plutonium Technology Division Office (PT-DO), and the Strategic Projects and Engineering Division Office (SPE-DO).

Appendix A of this report lists the members of the EA assessment team, the Quality Review Board, and EA management responsible for this assessment. 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 in Appendix B. Appendix C lists the deficiencies (other than findings) described in the report. Appendix D summarizes the completion and effectiveness of corrective actions for previous findings on IM and nuclear safety. Appendix E lists additional lines of inquiry for assessing IM and corrective action systems used by LANS and Triad. Finally, Appendix F provides comments on the management of specific issues associated with nuclear safety.

5.0 RESULTS

The assessment team reviewed the LANL IM process and its overall implementation for nuclear safety issues by LANS and Triad since January 1, 2016. The criteria and observations are grouped below into the following functions for IM: categorization and grading of issues, analysis of issues, resolution of issues (including evaluations of the effectiveness of actions), and closure of issues. The observations of IMT functionality and the results of the examination of the NA-LA actions for its finding in Appendix D are then provided.

5.1 Categorization and Grading of Issues

This section discusses observations on the processes for categorizing and grading issues and their implementation for nuclear safety issues, based on the following criteria.

Criteria:

The issues management system effectively captures program and performance issues from many sources, and issues are appropriately categorized to ensure that problems are evaluated, reported, and corrected (including compensatory actions when needed) on a timely basis. (DOE Order 226.1B, Contractor Requirements Document (CRD) 2.b(3))

The issues management system must include structured processes for:

- *Determining the risk, significance, and priority of deficiencies. (DOE Order 226.1B, CRD 2b.(3)(b))*
- *Evaluating the scope and extent of the condition or deficiency (e.g., applicability to other equipment, activities, facilities, or organizations). (DOE Order 226.1B, CRD 2.b(3)(a))*

- *Determining event reportability under applicable requirements (e.g., Price-Anderson Amendments Act, Occurrence Reporting and Processing System, security incident reporting). (DOE Order 226.1B, CRD 2.b.)*
- *For higher significance findings, an effective causal factor analysis/evaluation, timely actions and plans to correct and prevent recurrence, tracking plans and actions to closure, and performing effectiveness reviews must be completed. (DOE Order 226.1B, CRD 2.b(3)(b))*

5.1.1 Processes for Categorizing and Grading Issues

P322-4 defines qualitative criteria for categorizing issues based on risk and defines roles, responsibilities, and processes for reporting, evaluating, and correcting issues (including nuclear safety issues) and distributing lessons learned for issues. For issues with greater risks, P322-4 specifies correspondingly more rigorous approaches (i.e., a graded approach) for evaluating these issues and validating the effectiveness of corrective actions. For example, causal analyses, extent-of-condition reviews, and effectiveness evaluations are required for high-risk issues but are optional for low-risk issues, at the discretion of the assigned Issue Responsible Manager (IRM). The categorization of risk for each issue by the IRM therefore dictates the subsequent rigor required by P322-4 for the issue.

Since 2016, LANS had made several improvements in its IM process by revising procedures; however, management of these revisions by the Institutional Quality and Performance Assurance Division (IQ&PA) was inadequate to ensure that the revised P322-4 adequately invoked the IM requirements of DOE directives and NQA-1. During the transition to Triad as the M&O contractor, Triad did not identify the omission of these requirements in P322-4. (See **Finding F-Triad-1**.) The EA assessment team identified the following cases in which P322-4 does not adequately invoke requirements for categorizing the risk of issues and grading (selecting) the process tools (e.g., causal analyses, extent-of-condition reviews, and effectiveness evaluations) for correcting and precluding recurrence of nuclear safety issues:

- Revisions of P322-4 issued since 2016 no longer require cause(s) to be determined and actions taken to preclude recurrence for all “significant conditions adverse to quality” as required by NQA-1. (**Deficiency-Triad-1**) Per SD330, “significant conditions adverse to quality” are to be categorized as high-risk issues, thus requiring causal analyses and corrective actions for each cause per P322-4. However, the definition of high-risk issues in P322-4 does not include all of the issues that would meet the NQA-1 definition of “significant conditions adverse to quality.” Per NQA-1, “significant conditions adverse to quality” include conditions (issues) that, “if uncorrected, could have a serious effect on safety or operability.” The definitions of high-risk and moderate-risk issues in P322-4 include non-compliances with regulatory requirements but do not include, for example, potential systemic weaknesses in safety management plans or significant degradations in safety class or safety significant structures, systems, or components (SSCs) that provide layers of defense for nuclear safety. If uncorrected, the loss of layers of defense can have serious effects on nuclear safety.
- P322-4 does not include criteria for identifying issues significantly adverse to quality as stated in Section 3.13 of NAP-24 ADW-Q-0001U, Rev. J, *Los Alamos Laboratory Design Agency Weapons Quality Assurance Program*. (**Deficiency-Triad-2**) Section 3.13 states “Conditions adverse to quality are documented, tracked, and corrected per the LANL institutional procedure P322-4 which requires that issues are entered into the LANL Issues Management Tool. Issues are categorized with respect to their significance, including criteria for identification of issues significantly adverse to quality.” An ancillary document, QPA-DO-FSD-015.001, *NAP-24 Issues*

Management, provides these criteria for quality issues associated with weapons production, but not for nuclear safety issues.

- P322-4 does not implement the responsibility in DOE Order 232.2A, *Occurrence Reporting and Processing of Operations Information*, for facility managers to “determine the causes and generic implications for reportable occurrences and implement corrective actions and closeout activities.” **(Deficiency-Triad-3)** Instead, P322-4 allows facility managers to categorize occurrences as low-risk issues, for which P322-4 does not require extent-of-condition reviews (generic implications), causal analyses, and corrective actions. In 2016, the DOE IG identified systemic weaknesses in LANS’s performance of extent-of-condition reviews, causal analyses, corrective actions, and effectiveness evaluations for events reportable per DOE Order 232.2A. Revisions of P322-4 issued since 2016 have not addressed (precluded) these weaknesses.
- Section 3.7 of P322-4 does not establish an explicit expectation for MRBs to oversee the screening or risk categorization of nuclear safety issues. P322-4 specifically requires MRBs to confirm appropriate screening, including risk categorization, for environmental-related issues; low-level and mixed low-level waste-related issues; and all moderate- and high-risk issues. However, it does not establish an explicit expectation to oversee the screening or risk categorization of other issues, including nuclear safety issues categorized as low risk by the IRMs.

5.1.2 Categorization and Grading by Nuclear Safety Managers

P322-4 states that “although Table 1 outlines the criteria for each risk level, the IRM/MRB has the latitude, and is ultimately responsible for applying professional judgement when categorizing issues. Once categorized, issues must follow the appropriate risk level requirements.” Nuclear safety IRMs, however, stated that they preferred to categorize issues as low risk to keep issues under their direct control and give them more flexibility in managing them.

The assessment team generated the table below with data available from IQ&PA for fiscal year (FY) 2018:

	LANS	Selected Nuclear Safety Divisions*
Issues (October 2017 to September 2018)	1784**	585**
Issues LANS Categorized as High Risk	4 (<0.1%)	1 (< 0.2%)
Issues LANS Categorized as Moderate Risk	74 (4.2%)	1 (< 0.2%)
Issues LANS Categorized as Low Risk	925 (52%)	249 (42.6%)
Issues LANS Categorized as Potential Risks or Improvements	781 (44%)	334 (57.1%)
Causal Analysis Performed	111 (6.2%)	13 (2.2%)
Extent-of-condition Performed	107 (6.0%)	8 (1.4%)
Effectiveness Evaluations	99 (5.5%)	2 (0.3%)

* NCS-DO, SB-DO, ES-DO, TA-55 FOD, AMPP-DO, NPI-DO, ORI-DO, PT-DO, and SPE-DO. The issues, potential risks, and improvements assigned to these IRMs are predominately related to nuclear safety.

** Excluding 165 and 33 issues that had not been categorized across LANS and the selected nuclear safety divisions, respectively.

The data above shows that IRMs in the selected nuclear safety divisions categorized over 99% of their issues as low risk or below, consistent with their stated preference. IRMs for non-nuclear issues performed relatively few causal analyses, extent-of-condition reviews, and effectiveness evaluations

compared to the total number of issues, but at a rate of over three times that of IRMs for nuclear safety issues. IRMs also stated that they have not significantly changed the management of issues since the transition from LANS to Triad. Overall, IRMs for nuclear safety issues at LANL rarely use the more rigorous analysis tools of P322-4 for resolving issues of higher significance and therefore inadequately implement the graded approach required by Section 2.b(3)(b) of Attachment 1 of DOE Order 226.1B for resolving issues. (See **Finding F-Triad-2**.) For example, IRMs did not categorize the following issues per the criteria in P322-4:

- Recurring issues in the safety class fire water supply pump (see TA-55 FOD issues 2016-621, 2016-643, and 2017-674 in Appendix F) were categorized as low risk even though these issues impacted operations in the Plutonium Facility (PF-4) for weeks. Per P322-4, issues with “significant negative impact or significant deficiencies related to mission or operations” are to be categorized as high-risk issues.
- EA’s report *Office of Enterprise Assessments Assessment of the Development and Maintenance of Safety Bases at Los Alamos National Laboratory – April 2018*, identified a finding that was “indicative of a systemic weakness in SB-DO implementation of quality assurance processes” for issues management, metrics, management assessment, and lessons learned. SB-DO categorized this finding as low risk, contrary to P322-4, which requires “systemic ineffective resolution of issues” to be categorized as high risk. (See SB-DO issue 2018-1126 in Appendix F.)
- LANS incorrectly categorized the finding and systemic weaknesses identified in the 2015 EA targeted review and the 2016 DOE IG report as general performance feedback or process improvements, rather than higher-risk (e.g., Risk Level 1) issues. P322-4 requires issues “representing failure to systematically implement [DOE] or regulatory requirements” (e.g., the IM requirements in DOE Order 226.1B) or “systemic ineffective resolution of issues” to be categorized as “Risk Level 1” or “high risk,” depending on the revision of P322-4.

Other comments on the categorization of issues are presented in Appendix F for ORI-DO issues 2017-1964 and 2017-1605 and TA-55 FOD issues 2018-1730, 2018-1084, 2017-1617, 2017-389.

NA-LA letter BA:04JJ-771613, *Reduction of Los Alamos National Security, LLC, Fiscal Year 2017 Earned (At Risk Performance Incentive) and Fixed Fee*, dated January 4, 2018, identified that LANS had viewed issues with plutonium shipments as isolated events, missing the indications of a programmatic breakdown in a LANS safety management system. NA-LA also stated its concern that LANS identified only one root cause for the issue with the latest shipment until NNSA discussions with LANS prompted them to critically analyze other recent safety failures to identify systemic weaknesses. LANS’s inadequate rigor in addressing issues with plutonium shipments was a factor in reduction of the LANS award fee by over \$3 million in FY 2017.

5.1.3 Contractor Senior Management Oversight of the Categorization and Grading of Nuclear Safety Issues

P322-4 states that “laboratory senior management and division leaders responsible for issues management” are responsible for establishing MRBs and for ensuring that “the IM process is implemented effectively by IM personnel.” P322-4 requires contractor management in MRBs to review and approve the screening, causal analyses, extent-of-condition evaluations, corrective actions, documentation of action and issue closure, and effectiveness evaluations for issues categorized as moderate risk and high risk to meet the requirements of DOE Order 226.1B for higher-significance findings.

However, the MRBs established by LANS and Triad senior management do not adequately ensure that P322-4 is effectively implemented, based on the following observations:

- As discussed above, IRMs for nuclear safety issues at LANL inadequately implemented the graded approach in P322-4 as required by DOE Order 226.1B for resolving issues.
- MRBs for the TA-55 FOD and the Nuclear Criticality Safety Board (NCSB) for TA-55, SB-DO, ES-DO, and NCS-DO are chaired by the respective IRMs instead of by higher-level managers who could oversee and override the IRM's decisions. Thus, there is an inherent conflict of interest between the IRM functions and the MRB oversight functions assigned to the same individual.
- PA-CHTR-01005, R2, *TA-55 FOD Management Review Board (MRB) Charter*, states that “the TA-55 FOD will be the IRM on all TA-55 records, except Criticality Safety (CS), unless otherwise determined by the FOD. The NCSB Chair will be the IRM on all TA-55 CS records.” The TA-55 FOD and the NCSB Chair (i.e., the ORI-DO division leader) are therefore predominantly the IRMs and the MRB chairs for all of the implementation issues within TA-55. The division leaders of AMPP-DO, NPI-DO, PT-DO, and SPE-DO were not assigned as the IRM for any of the issues that the assessment team reviewed, even though issues existed within their scope of responsibility and cognizance. The division leaders of AMPP-DO, NPI-DO, PT-DO, and SPE-DO typically implemented actions selected and directed by the TA-55 FOD or the NCSB Chair.
- The charters for the TA-55 FOD, SB-DO, and the NCS-DO MRBs state that only the MRB chairman and the Issues Management Coordinator (IMC) are required for a quorum. Because IMCs are not trained experts in nuclear safety, decisions of the MRB are determined by the Chair, who is also the IRM, so no additional contractor management oversight is provided by these MRBs.
- Directorate-level MRBs do not review low-risk issues to ensure that they are appropriately categorized and analyzed with the appropriate rigor. Although the charters for directorate-level MRBs – i.e., the charters for the LANS Associate Directorate, Plutonium Science and Manufacturing (ADPSM) and the Associate Directorate, Nuclear and High Hazard Operations (ADNHHO) and for the Triad Associate Laboratory Director, Weapons Production (ALDWP) – state that they ensure issues are screened (categorized) appropriately based on risk, the managers interviewed and meeting minutes reviewed showed that directorate-level MRBs do not review the screening (categorization) of low-risk issues. These directorate-level MRBs review the number and status of open issues and actions (e.g., due within 30 days or overdue), and because they do not also ensure that issues are appropriately categorized and analyzed, this approach can have the unintended consequence of prioritizing closure of issues and actions over ensuring adequate corrective action and precluding recurrence.
- QPA-DO-CTR-002.003, *Los Alamos National Laboratory Institutional Management Review Board (IMRB) Charter*, states that the IMRB monitors issues categorized as moderate risk and high risk “to identify, improve, and manage matters of institutional significance and to monitor efficiency drivers to improve mission performance.” The IMRB would therefore not monitor higher-risk issues (potentially impacting mission performance) that IRMs had incorrectly categorized as low risk.
- The IMRB charter also states that special consideration is taken for “near misses” of serious injury or death, environmental-related items, suspect/counterfeit items, and waste-related

assessment items. The IMRB charter does not specifically state that special consideration should be taken for nuclear safety-related issues to ensure that defense in depth is maintained, considering the potential impact of nuclear safety issues on workers, the public, the environment, and LANL's mission.

In addition to the oversight of nuclear safety IM via MRBs, System Description SD320, *Los Alamos National Laboratory Contractor Assurance System*, includes process metrics and assessments that can provide evidence of appropriately identification and management of risks. However, the following deficiencies in IM metrics and assessments have allowed poor IM practices to persist:

- Although the index for IM in LANL Executive Dashboard Metrics steadily changed from “red” to “green” from the first quarter of FY 2016 to the last quarter of FY 2018, this change does not indicate improved IM at LANL because:
 - Between FY 2016 and FY 2018, fewer metrics were used to determine the index for IM. LANS stopped monitoring the metric based on the percentage of causal analyses performed per number of issues after the first quarter of FY 2017, even though this metric remained below its goal (i.e., remained “red”). In the second quarter of FY 2017, LANS stopped using its metric for how many issues were self-reported after this metric had been above its goal, “green,” for only two cycles.
 - None of the metrics used for the IM index in FY 2018 provided sufficient detail to indicate the level of rigor involved in, or the effectiveness of, LANS IM in analyzing, bounding (defining the extent of condition), and correcting the root causes of the more significant issues at LANL. Instead, the metrics for FY 2018 monitored progress in changing IM tools or processes, any increase in the number of effectiveness evaluations, and the closure or transfer of issues in PFITS to the new IMT.
- In September 2017, IQ&PA developed a pivot table with detailed statistics on IM. For example, the table provides data over the previous 12 months by division on the number of open issues and corrective actions, number of closed issues and actions, types of actions (e.g., use of engineering or administrative controls), number of extensions, timeliness of corrective actions and aging of open issues, causal analyses (the number performed and distribution of cause codes), extent-of-condition reviews, effectiveness evaluations, and whether issues were identified by the contractor or by external organizations. However, IRMs and MRBs do not generally use this IQ&PA pivot table for nuclear safety issues. (See **OFI-Triad-1**.)
- Most IM assessments were performed as part of the assessments required by DOE Order 425.1D, *Verification of Readiness to Start Up or Restart Nuclear Facilities*, and thus focused on ensuring that issues associated with specific processes being restarted in TA-55 were closed, rather than assessing overall IM performance.
- LANS Assessment PAQ-MA-18-002, *NAP-24A Quality Requirements - Requirement 3.13 Corrective Actions*, Rev 1, dated May 15, 2018, noted “almost an exclusive use of low and potential risk level categories at ADPSM and an abundance of entries to the non-issue tracking” system. The former Deputy Director of the LANS ADPSM stated that this observation was discussed at an ADPSM MRB meeting, but that no further action was taken to ensure that issues were being appropriately categorized and rigorously analyzed.

Based on the weaknesses with the MRBs, metrics, and assessments discussed above, LANS and Triad senior management did not adequately meet the responsibility of Section 4.4 of P322-4 for ensuring that personnel effectively implement the IM process. (See **Finding F-Triad-3.**)

The assessment team also identified that many issues entered by the IMCs contain unclear or incomplete issue statements, contrary to QPA-PA-GU-001.003, which states that “clear issue (or non-issue) statements should include title of the source document..., finding or opportunity for improvement (OFI) number, or other document, followed by a concise description of the issue.” Additionally, P322-4 does not require that problem statements be clear and understandable. As a result, IMCs often entered multiple paragraphs from fact-finding minutes or just a reference to the source document as issue statements. NCS-DO issue 2018-1192 in Appendix F is an example of an unclear or incomplete problem statement impacting issue resolution. (**Deficiency-Triad-4**)

5.1.4 Conclusions on the Categorization and Grading of Issues

Although LANS had taken steps to improve the IM process and guidance since 2016, P322-4 does not adequately invoke the requirements of several DOE directives and NQA-1 for implementing a graded approach for IM. Despite the expectation stated in P322-4, IRMs for nuclear safety issues did not categorize issues as moderate- and high-risk issues when warranted. IRMs for nuclear safety issues instead predominantly categorize issues as low risk, avoiding the more rigorous IM tools (e.g., causal analyses, extent-of-condition reviews, and effectiveness evaluations) required for higher-risk issues. Contractor senior management did not adequately meet the responsibilities set out in P322-4 for ensuring that personnel effectively implement the IM process. For example, oversight by LANS and Triad senior management did not identify that nuclear safety IRMs categorized over 99% of their issues as low risk or less, nor did senior management identify that nuclear safety IRMs used the more rigorous analysis tools for issues (e.g., causal analyses, extent-of-condition reviews, and effectiveness evaluations) at a significantly lower rate than did IRMs for non-nuclear issues, by over a factor of three.

5.2 Analysis of Issues

This section discusses observations on the processes for analyzing issues and their implementation for nuclear safety issues based on the following criteria.

Criteria:

The issues management system must include structured processes for identifying root causes (applied to all items using a graded approach based on risk). (DOE Order 226.1B, CRD 2.b(3)(b)(1))

5.2.1 Analysis Processes

P322-4 adequately specifies more rigorous approaches (i.e., a graded approach) for determining the causes and the extent of condition of issues based on their risk category:

- Moderate-risk issues are analyzed with a simplified method (e.g., the Learning Team Process, Six Sigma Process Maps, and the Five Whys method) to identify apparent causes.
- High-risk issues are analyzed with a more advanced method (e.g., Fishbone Diagrams, Fault Tree Analyses, Failure Modes and Effects Analyses, and engineering calculations and analyses) to identify root causes.

- The advanced methods can also be used for moderate-risk issues, and any causal analysis method can be used for low-risk issues at the discretion of the IRM.
- Extent-of-condition evaluations are required for moderate- and high-risk issues and can be used for low-risk issues at the discretion of the IRM.

P322-4 states “the IRM must ensure a trained causal analyst conducts an appropriate causal analysis for each identified risk level” and requires causal analysis documentation for each issue to justify the causal analysis method used and the scope, history, risk, causes, contributing factors, and the relevant DOE cause codes for the issue. P322-4 requires extent-of-condition reviews to identify the applicability of the causes and contributing factors to other vulnerabilities (e.g., similar weaknesses at other locations or in other processes).

5.2.2 Analyses by Nuclear Safety Managers

P322-4 was revised and QPA-PA-GU-001.003 was issued by October 2017 to improve causal analyses and extent-of-condition reviews. The benefits from these improvements have been limited, especially for nuclear safety. As discussed in Section 5.1.2 of this report, IRMs at LANL rarely use causal analyses or extent-of-condition reviews for nuclear safety issues. The EA assessment team’s review of causal analyses and extent-of-condition reviews identified that:

- The documentation of these causal analyses did not meet the requirements of Section 3.3.1 of P322-4. **(Deficiency-Triad-5)** Instead of generating a separate causal analysis report as discussed in P322-4, reports generated for the Occurrence Reporting and Processing System (ORPS) were used as documentation of these causal analyses. These ORPS reports lacked cause statements, justification for the type of causal analysis method used, a list of documents reviewed, and a list of interviews performed as required by P322-4.
- Typically, cause codes were listed in the IM database documents without actionable statements of the causes and contributing factors leading to the issues. Clear, actionable statements of the causes and contributing factors significantly facilitate effective execution of corrective actions, especially when the personnel assigned to these actions may not have participated in the causal analysis.
- Of the two moderate-risk issues reviewed, the extent-of-condition reviews were overdue or not assigned as required by P322-4 (see TA-55 FOD issues 2017-41 and 2018-252, respectively, in Appendix F).

5.2.3 Conclusions for Analysis of Issues

P322-4 adequately defines a graded approach for causal analyses and extent-of-condition reviews. Although LANS issued major revisions of P322-4 and QPA-PA-GU-001.003 to improve causal analyses and extent-of-condition reviews, the benefits from these efforts have been limited since nuclear safety IRMs at LANL rarely use causal analyses or extent-of-condition reviews. Additionally, many of the requirements in P322-4 to ensure that these analyses are adequate and actionable are not being met for nuclear safety issues.

5.3 Resolution of Issues

This section discusses observations on the processes for resolving issues and evaluating the effectiveness of actions and the implementation of these processes for nuclear safety issues based on the following criteria.

Criteria:

The issues management system must include structured processes for:

- *Identifying and documenting suitable corrective actions and recurrence controls, based on analyses, to correct the conditions and prevent recurrence. (DOE Order 226.1B, CRD 2.b(3)(b)(2))*
- *Identifying individuals/organizations responsible for implementing corrective actions. (DOE Order 226.1B, CRD 2.b(3)(b))*
- *Establishing appropriate milestones for completion of corrective actions, including consideration of significance and risk. (DOE Order 226.1B, CRD 2.b(3)(b)(2))*
- *Tracking progress toward milestones such that responsible individuals and managers can ensure timely completion of actions and resolution of issues. (DOE Order 226.1B, CRD 2.b(3)(b)(2))*
- *Verifying that corrective actions are fully complete. (DOE Order 226.1B, CRD 2.b(3)(b))*
- *Validating that corrective actions are effectively implemented and correct the entire extent of condition, using a graded approach based on risk. (DOE Order 226.1B, CRD 2.b(3)(b)(3))*
- *Ensuring that individuals and organizations are accountable for effectively performing their assigned responsibilities. (DOE Order 226.1B, CRD 2.b(3)(a) and (b)(1)(2)(3)(4)(5))*

5.3.1 Processes for Resolving Issues

P322-4 defines roles, responsibilities, and processes for identifying, tracking, and verifying completion and effectiveness of corrective actions for issues (including nuclear safety issues). P322-4 specifies levels of rigor for corrective action plans and effectiveness reviews based on risk:

- Corrective actions and effectiveness evaluations are at the discretion of the IRM for low-risk issues.
- Corrective actions and simplified effectiveness evaluations are required for moderate-risk issues.
- Corrective action plans and comprehensive effectiveness evaluations are required for high-risk issues.
- IRMs are required to ensure timely completion of actions and validate completion of all actions before closing an issue.

- For moderate- and high-risk issues, MRBs approve corrective actions, action updates (including due date extensions, personnel assigned each action, and action language), action/issue closure, and effectiveness evaluation plans and reports.

Despite the improvements in the LANS IM process since 2016, the following deficiencies indicate that the LANS and Triad reviews of these changes did not adequately ensure that P322-4 appropriately invoked the requirements of DOE directives and NQA-1: (See **Finding F-Triad-1**.)

- P322-4 does not require all “conditions adverse to quality” to be corrected as required by NQA-1. (**Deficiency-Triad-6**) Per SD330, “conditions adverse to quality” are to be categorized as low- or moderate-risk issues. Per P322-4, corrective actions for low-risk issues are at the discretion of the IRM.
- P322-4 does not require actions to prevent recurrence of higher-significance findings (issues) as required by DOE Order 226.1B, Attachment 1, paragraph 2.b.(3)(b)(2). (**Deficiency-Triad-7**) Instead, paragraph 3.4 of P322-4 states that “actions to prevent issue recurrence should be considered as necessary.”

P322-4 states that IRMs “should always consider the need for compensatory measures (i.e., an immediate corrective action), which may be put in place prior to long-term corrective actions.” Neither P322-4 nor QPA-PA-GU-001.003 provides any guidance to ensure that these compensatory actions are terminated when long-term actions have been implemented. Unnecessary legacy compensatory actions can lead to cumbersome work practices and impact the efficient implementation of long-term actions. Additionally, temporary compensatory actions that remain in effect during effectiveness evaluations can inaccurately indicate that the implemented long-term actions are effective.

5.3.2 Resolution of Issues by Nuclear Safety Managers

Many open issues had received multiple extensions. Although the EA assessment team did not identify any immediate threats to workers, the public, or the environment, the planned corrective actions are not timely and no longer support compliance with NQA-1, Part 1, Requirement 16, which states that “conditions adverse to quality shall be identified promptly and corrected as soon as practicable.” (**Deficiency-Triad-8**) For example:

- TA-55 FOD issue 2018-1436, regarding where magnesium oxide is needed in gloveboxes for fire suppression, is a recurring issue that has been open since March 9, 2009, and thus has not been resolved in a timely manner.
- An evaluation for ORI-DO issue 2018-1197, to determine whether or not a dedicated contractor team should perform more-complex special nuclear material moves in PF-4, has been delayed until February 2019. Taking longer than six months to determine what long-term action to take to address recurring criticality safety infractions during material moves (evolutions essential to production work in PF-4) does not represent timely action.
- Problems with procedure AP-341-605, *Calculations*, were noted in ES-DO issue 2017-519. This procedure controls an important safety-related process within engineering. Revision of that procedure is now scheduled for July 31, 2019. In the interim, six other issue reports have been written against this procedure. Taking over 18 months to correct problems with this key engineering procedure does not represent timely action.

- An action in ES-DO issue 2015-1228, for revising Chapter 15 of the ES Manual on software quality requirements for commissioning was transferred to issue 2018-128 and remains unimplemented more than three years after the project plan to improve software quality management was issued.
- ES-DO issue 2017-513 was identified November 2017 and has one open action: to identify a team to develop a plan to fix the problem. That action is due in March 2019, reflecting a 16-month interval to put a team together to develop the corrective action.
- ES-DO issue 2017-509, documenting a process compliance issue, was identified in August 2017, has been extended twice, and now has a due date of July 2019. ES-DO issue 2017-96, which also documents a process compliance issue, was identified in September 2017, and the due date was extended to July 2019. Both of these issues are associated with violations of ES-DO processes for design work that will remain uncorrected for over 21 months. ES-DO also did not establish any interim compensatory actions to preclude recurrence of these non-compliances during ongoing design work at LANL.
- Other examples discussed in Appendix F are ES-DO issues 2018-1033, 2018-1028, 2018-1027, 2018-1015, 2018-128, and 2017-513; ORI-DO issues 2017-498 and 2015-377; and TA-55 FOD issues 2018-1395, 2018-1084, and 2018-252.

Interviews with IRMs indicated that oversight by MRBs is generally limited in this area, usually focusing on overdue actions. IRMs routinely extend action due dates as a means of avoiding overdue actions. As a result, timeliness issues were pervasive in the sample that the assessment team reviewed.

The assessment team also identified several redundant actions entered into the IM database for the same issue, typically resulting from entering preliminary actions from the fact-finding meeting and then entering the final actions listed in the ORPS reports without deleting any unnecessary or duplicative actions entered previously. This practice can lead to confusion about the action status and indicates that the IMC and IRM apply insufficient detail and rigor to managing corrective actions. Examples of this practice were identified in TA-55 FOD issues 2017-389 and 2017-674 (see Appendix F).

Since 2016, LANS has revised P322-4 and QPA-PA-GU-001.003 to improve effectiveness evaluations. As discussed in Section 5.1.2 of this report, the benefits from these changes have been limited, especially for nuclear safety, because IRMs rarely perform effectiveness evaluations for nuclear safety issues. The assessment team's review identified that only two (0.3%) of the issues managed by nuclear safety IRMs from October 2017 to September 2018 had an effectiveness evaluation. Over that same period, 99 (5.5%) of the broader LANS issues had an effectiveness evaluation, more than 18 times the relative rate for nuclear safety issues.

In the few instances where effectiveness evaluations were required by P322-4, based on the risk category selected by the IRM, the assessment team found that they were not completed as required (see ORI-DO issue 2017-2017 and TA-55 FOD issue 2018-252), that they did not evaluate the effectiveness of corrective actions (see ORI-DO issue 2017-576), and that IRMs for nuclear safety did not act on deficiencies identified from the evaluation (see TA-55 FOD issue 2017-457).

LANL memorandum QPA-DO: 18-021, *Transmittal of the Final Report for the Independent Effectiveness Evaluation of the Contractor Assurance System JON [Judgment of Need] 25 and 12 at Los Alamos National Laboratory*, stated that the independent verification team observed an "institutional culture that appears to accept recurrence of issues and findings" and "an institutional attitude that 'bad news' is to be avoided and not addressed head on. In order to improve there are certain approaches that

must be common practice including frank discussions of deficiencies and issues without fear of recrimination or punishment.” The IQ&PA Division leader stated that no specific action was taken in response to these observations. Instead, IQ&PA relied on the actions of the ongoing PAIPs to address these issues. There was no further analysis to validate these significant observations about the safety culture at LANL or to ensure that the PAIP actions addressed the causes. (Section 8 of this report notes EA’s plan to follow up on LANL’s processes for sustained monitoring of its safety culture.)

5.3.3 Conclusions on the Resolution of Issues

Results of this portion of the assessment indicate that insufficient attention is given to ensuring timely and effective correction of nuclear safety issues. This condition may result in part from the previously mentioned concerns with the very high percentage of nuclear safety issues categorized as low risk, ineffective oversight by MRBs of issue categorization, and diminished objectivity by IRMs to chairing their division-level MRBs.

5.4 Closure of Issues

This section discusses observations on the processes for closing issues and their implementation for nuclear safety issues and assessment of whether corrective actions were accomplished as planned, whether those corrective actions were sufficient to resolve the identified problem, and whether the actions taken were adequately documented. The review was based on the following criteria.

Criteria:

The issues management system must include structured processes for:

- *Verifying that corrective actions are fully complete. (DOE Order 226.1B, CRD 2.b(3)(b))*
- *Ensuring that individuals and organizations are accountable for effectively performing their assigned responsibilities. (DOE Order 226.1B, CRD 2.b(3)(a) and (b)(1)(2)(3)(4)(5))*

5.4.1 Processes for Closing Issues

P322-4 adequately defines requirements for corrective actions and for objective evidence demonstrating completion of actions. Specifically, P322-4 states that “corrective actions should be specific, measurable, accountable, reasonable, timely, effective, and resilient/ sustainable (i.e., S-M-A-R-T-E-R)” and defines a hierarchy of controls for hazards (i.e., preferentially resolving hazard via elimination, substitution, engineering, administrative controls, and personnel protective equipment, in order of most to least effective). P322-4 further states that “action completion is demonstrated when personnel assigned the action provides adequate objective evidence...to the IRM/IMC. Objective evidence that is a commitment to do something . . . does not demonstrate action completion and is insufficient for closure.”

5.4.2 Closure of Issues by Nuclear Safety Managers

Most of the reviewed issues had been closed at the time of this assessment. In many cases, however, IRMs’ closure of issues did not comply with the requirements of P322-4 and DOE Order 226.1B and did not provide adequate resolution of the issues. (See **Finding F-Triad-4**.) As evident by these numerous examples, LANS and Triad senior management did not adequately meet the responsibilities set out in P322-4 for ensuring that personnel effectively implement the IM process to resolve problems. (See **Finding F-Triad-3**.) The assessment team did not identify any immediate threats to workers, the public, or the environment resulting from these improper closure of issues.

- Several issues were closed with a transfer of action to other issues in a manner that did not provide adequate continuity to ensure resolution of the closed issues. For example, ES-DO issues 2018-1016, 2018-1023, 2018-1027, 2018-1028, 2017-1078, and 2017-519 each identified problems in engineering procedure AP-341-605. All of these issues were closed and transferred (with no action taken) to issue 2018-1015. Issue 2018-1015, however, was not revised to include the problem statements from any of these issues, nor does it reference them or otherwise note that it is now the vehicle for resolving those other issues. This process did not ensure traceability to the six closed issues, so the corrective actions for 2018-1015 are unlikely to resolve those issues. (See also the Appendix F discussions for ES-DO issues 2017-1081, 2017-1082, and 2017-512.)
- DOE documented weaknesses in the LANS IM program in the EA targeted review and the DOE IG report discussed in Section 3 of this report. LANS closed these issues prematurely without taking any action, incorrectly assuming that the finding and systemic weaknesses identified by EA and the IG would be resolved by other ongoing initiatives. LANS did not perform a causal analysis to ensure that the ongoing initiatives would address the causes of the weaknesses identified by EA and the IG. Per P322-4, recurring (systemic) issues are required to have causal analyses and actions for each cause. Specifically:
 - Actions to address the finding identified during the EA targeted review were from the ongoing investigation of an accident associated with maintenance on an energized, high-voltage substation. This accident investigation generated actions (i.e., CAS JON 12 actions) to improve effectiveness evaluations. These JON 12 actions did not address elements of the finding associated with the identification and categorization of nuclear safety issues or the implementation of the specific IM requirements for nuclear safety issues in NQA-1.
 - Actions to address the systemic weaknesses identified in the IG report were in the ongoing IQ&PA PAIP. Contrary to the requirement in P322-4, IQ&PA did not perform a causal analysis of those systemic weaknesses in LANS IM, even though IQ&PA is the office responsible for maintaining P322-4 and training personnel on its use.
 - Contrary to the NNSA response in Appendix 4 of the DOE IG report, IQ&PA concluded that no further action was required to address the timeliness of issues resolution, since this was the responsibility of the IRMs, not IQ&PA. NNSA stated that it would “direct LANS to demonstrate that their internal policy promotes reliable compliance with DOE Order 226.1B requirements for timely corrective action for high significance findings.” However, IQ&PA did not transfer the timeliness issue to IRMs or their management for resolution or seek NA-LA’s concurrence with the plan to take no action.
- The actions developed in response to the finding and systemic weaknesses identified by the EA targeted review and the DOE IG audit were associated with revising processes or providing additional guidance and neglected to address other potential causes.
 - P322-4 states that IRMs may use more rigorous approaches or tools (e.g., causal analyses, extent-of-condition reviews, effectiveness evaluations) for specific problems, but the division leaders who are typically the assigned IRMs stated that they considered this additional rigor too time- and resource-intensive.

- The IQ&PA Division leader did not direct any additional action to validate the observations about LANL’s safety culture in LANL memorandum QPA-DO: 18-021 or ensure that PAIP actions addressed the causes of these observations.
- The assessment team also found several issues that had been closed, based on the scheduling of future actions instead of objective evidence of completed actions. This approach conflicts with the requirements of P322-4 Section 3.5.1 and Attachment B, which states that any “promise” to complete an action in the future is an example of unacceptable objective evidence for closure. Examples of this include ES-DO issues 2018-1031, 2018-1024, 2017-673, 2017-532, and 2017-531; ORI-DO issue 2017-660; SB-DO issue 2018-1126; and, TA-55 FOD issue 2018-1278 in Appendix F.
- Other issue reports were closed with no, incomplete, or inadequate actions taken to resolve the problem identified. Examples include:
 - ES-DO issue 2018-1032 identified a noncompliance with SD330 to perform “monitoring activities against acceptance criteria in a sufficient manner to provide assurance that the activities affecting quality are performed sufficiently.” This issues was closed with no actions taken.
 - ES-DO issue 2018-1026 identified problems found in calculations performed by a subcontractor. The subcontractor was removed from the approved supplier list, but the issue was closed without any action to correct the faulty calculations.
 - ES-DO issue 2017-673 identified missing documentation from commercial grade dedication packages on the Transuranic Waste Facility (TWF) project. This issue was closed without any action to correct the packages.
 - SB-DO issue 2016-696 identified that the qualification standard does not specifically require evaluators of unreviewed safety questions (USQs) to maintain a thorough knowledge of the safety basis. The action taken was to have evaluators complete facility-specific safety basis training, but the qualification standard was not revised to resolve the issue.
 - TA-55 FOD issue 2018-1627 includes test data on overpack containers, but the action plan does not identify follow-on actions (e.g., relative to the certification of these containers.)
 - TA-55 FOD issue 2017-457 includes actions to improve PF-4 worker/supervisor performance, accountability, and communication. Several actions in the corrective action plan are similar to actions in previous improvement and sustainment plans for PF-4 but do not state why the actions in the most recent plan need to be repeated or how they differ from previous actions.
 - TA-55 FOD issue 2017-1953 identified that waste drum codes “0” (zero) and “O” were confused while personnel were wearing respirators, resulting in 20% with incorrect waste characterization codes. The issue was closed without corrective action because “there has never been a significant issue with being able to tell the difference between an O and a 0 until recently, so we feel that making the change to the [material balance areas] would negatively affect [nuclear material control and accountability].” The problem was not

corrected, implicitly acknowledging that the IRM considers the potential recurrence of this issue acceptable.

- Other examples discussed in Appendix F include ES-DO issue 2018-1033; NCS-DO issue 2017-292; ORI-DO issues 2018-1151, 2017-566, 2017-578, 2017-579, 2017-498, and 2017-838; and, TA-55 FOD issues 2018-252, 2017-456, 2017-457, and 2016-2734.
- SB-DO issues 2017-106, 2017-1351, and 2017-946; and TA-55 FOD issues 2018-1505, 2018-83, and 2016-1999 were closed with inadequate evidence that the planned corrective actions had been accomplished.

5.4.3 Conclusions on the Closure of Issues

Although the requirements in P322-4 adequately define corrective actions and objective evidence demonstrating action completion, IRMs inadequately closed nuclear safety issues. Numerous examples revealed practices that allowed nuclear safety issues to be lost, closed by transfer to unrelated issues, closed with promises of future action, or intentionally closed without taking any corrective action. These practices and behaviors by the IRMs responsible for nuclear safety issues and by IQ&PA persisted despite warning signs since 2016 and indicate an embedded “institutional culture that appears to accept recurrence of issues and findings,” as discussed in Section 5.3.2.

5.5 Issues Management Tool Functionality

The IMT is an update of PFITS, which was used from 2010 to 2017 to manage performance feedback, including both issues and non-issues (e.g., recommendations and improvement initiatives). (Before 2010, LANL used the Laboratory Issues Management Tracking System, or LIMTS). LANS replaced PFITS with IMT to apply more focus on IM. Concurrent with the shift to the IMT, the *Improvement* Management Coordinators became *Issues* Management Coordinators (IMCs), and Responsible Managers became *Issue* Responsible Managers (IRMs).

To gain a level of access to the IMT that allows entry of data, an individual must complete the two-day IMC classroom training. The IMT records the date an issue is identified, its source and description, assignment of responsible organization and IRM, individual owners for actions, immediate corrective actions, categorization/risk level, and IRM decisions regarding extent-of-condition evaluation, causal analysis, and effectiveness evaluations. Automated search reports are available to show the number of open issues and actions by risk, extensions, and other data. Documents in many formats can be attached as records supporting the identification, evaluation, management (e.g., approvals of extensions), and closure of actions and issues.

The assessment team identified the following limitations and OFIs based on interviews of users and its use of this IMT compared to IM systems at other sites.

- Contrary to P322-4, Attachment B, which states that “All Laboratory employees have the ability to enter issues into the IM database, as well as read access,” working-level individuals have no way to easily input concerns or potential issues. (See **OFI-Triad-2**.) Items can only be entered in the IMT by individuals that have completed the two-day IMC training, which covers more information than needed by working-level individuals.

During prior benchmarking studies supporting development of the IMT, LANS identified systems at other sites that implemented a zero-threshold system, where any employee or subcontractor could enter a question, observation, or concern for review and disposition. This level of

engagement and participation by employees has been touted as a key element supporting the safety culture at other sites.

- Individuals assigned actions in the IMT cannot easily make updates for their assigned actions. (See **OFI-Triad-3**.) When actions are assigned, the assigned individual usually have the IMC accept the action for them. If the action taken is different than that planned, then the action statement is typically revised by an IMC based on an email.

P322-4 states that the IM process flow is: Identify, Analyze, Mitigate, Evaluate, and Communicate. However, the IMT does not facilitate communication among those involved with an issue, nor does it interface with the operating experience and lessons-learned process or the quality assurance non-conformance report system, as seen at other sites.

- The IMT does not provide automated notification capabilities. (See **OFI-Triad-4**.) All data in the system is input by the few trained IMCs, usually on the basis of emails, and users are notified of assigned actions by the IMC, often via email. This process unnecessarily delays issue resolution.
- The IMT does not provide a method or field for recording codes for trending issues. (See **OFI-Triad-5**.) As a result, the organization's ability to identify or trend recurrent issues concerning equipment, safety management programs, or other problems is limited. IRMs and subject matter experts for nuclear safety have developed various ad hoc methods for issues under their cognizance; for example, the TA-55 FOD developed codes for safety management programs that are input into the issue description field of issues for which the TA-55 FOD is the IRM. These ad hoc methods provide only limited search and trending capabilities, especially with respect to identifying issues that may be common to multiple divisions and/or directorates, since no guidance has been provided on standard key words or searchable terms or codes.

Conclusions on Issues Management Tool Functionality

The IM database used by LANS and, now, Triad has significant limitations that degrade its effectiveness. Its inaccessibility by working-level personnel effectively creates a barrier against identification of precursor issues at a level where preventive action might be taken, and its insufficient capability to perform trending searches inhibits the identification of recurring issues. Additionally, because the system was designed to use "gatekeeper" personnel, it is time-consuming and inefficient to use, and it makes it easy for problems to arise from inadequate communication.

5.6 Follow-up on Previous Findings

This section discusses the assessment of the NA-LA response to finding F-NA-LA-1 of the EA report *Assessment of the Development and Maintenance of Safety Bases at Los Alamos National Laboratory*. Assessment results and items for follow-up with respect to the contractor's response to the other findings (higher-significance issues) are summarized in Appendix D of this report and discussed throughout Section 5 and Appendix F.

Criteria:

For higher significance findings, an effective causal factor analysis/evaluation, timely actions and plans to correct and prevent reoccurrence, tracking plans and actions to closure, and performing effectiveness reviews must be completed. (DOE Order 226.1B, CRD 2.b(3)(b))

Finding F-NA-LA-1 states that “contrary to 10 CFR 830, Appendix A, Section I. Paragraph 1, NA-LA has not ensured timely reviews of [Evaluations of the Safety of the Situation (ESSs)] for existing [Hazard Category]-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.” NA-LA has responded appropriately to this finding:

- NA-LA revised its procedure for safety basis reviews, MP 01.03, *Nuclear Facility Safety Basis Document Review and Approval*, to require the Safety Basis Review Team Lead to formally provide comments on safety bases to the contractor and to include the expectation for NA-LA to respond to ESSs proposing removal of operational restrictions within 30 calendar days of receipt.
- The NA-LA Assistant Manager of Nuclear Safety, Engineering, and Readiness (AMNSER) monitors the responses to ESSs, along with other safety basis submittals. NA-LA responses to the ESSs demonstrating safe and stable conditions over the past year have met the 30-day expectation.
- The NA-LA AMNSER also works with his staff to ensure that they quickly notify the contractor of any potential inadequacies in safety analyses for resolution per the contractor’s USQ process.

No further EA action is warranted.

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 IM processes and systems developed in accordance with DOE Order 227.1A to manage these corrective action plans and track them to completion. In addition to the findings, deficiencies that did not meet the criteria for a finding are listed in Appendix C, with the expectation from DOE Order 227.1A for site managers to apply their local IM processes for resolution.

All findings pertain to Triad National Security, LLC.

Finding F-Triad-1: IQ&PA did not meet the responsibilities in Section 4.2 of SD330 for managing the IM program and verifying “that an appropriate quality assurance program has been established.” Specifically IQ&PA did not ensure the quality assurance requirements of DOE Order 226.1B, DOE Order 232.2A, and NQA-1 for a graded approach for IM and recurrence control were implemented (invoked) as specified in SD330. Additionally, Triad’s transition team, which reviewed LANS processes before Triad became the M&O contractor and accepted P322-4 as its IM process, with only minor changes, did not identify the omission of those requirements.

Finding F-Triad-2: IRMs for nuclear safety issues are not adequately implementing the graded approach required by P322-4 and Section 2.b(3)(b) of Attachment 1 of DOE Order 226.1B to ensure that adequate rigor is applied to analyzing nuclear safety issues.

Finding F-Triad-3: Senior Triad management is not adequately ensuring its personnel effectively implement the IM process. Triad senior management has continued to use the

MRBs and practices of LANS senior management relative to IM for over two months since becoming the M&O contractor on November 1, 2018. LANS senior management did not adequately meet the responsibility in Section 4.4 of P322-4 for ensuring that personnel effectively implement the IM process to ensure the implementation of the graded approach and the correction of nuclear safety issues as required by DOE Order 226.1B and NQA-1.

Finding F-Triad-4: IRMs for nuclear safety issues are not ensuring that corrective actions are adequately completed and documented as required by Section 3.5 of P322-4 and Subparagraphs (2) and (4) of Section 2.b(3)(b) of Attachment 1 of DOE Order 226.1B to ensure that issues are resolved.

7.0 OPPORTUNITIES FOR IMPROVEMENT

The assessment team 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.

All OFIs pertain to Triad National Security, LLC.

OFI-Triad-1: Consider developing IM metrics that are more indicative of IM performance (e.g., the level of rigor used, the age of issues, and the effectiveness of corrective actions and recurrence controls) using the data and analysis capabilities provided by IQ&PA to better focus actions on improving IM.

OFI-Triad-2: P322-4 Attachment B states that, “All Laboratory employees have the ability to enter issues into the IM database, as well as read access.” In practice, only employees who have gone through IMC training can enter a new issue into the tool. Other employees are not trained to use the tool for direct entry. Consider revising the tool or providing a mechanism for working-level individuals to identify potential issues without going through an IMC.

OFI-Triad-3: Consider revising the IM database to permit write access by IRMs.

OFI-Triad-4: Consider revising the IM database to perform automated notifications at issue generation, when ownership is assigned, when individual actions are closed, and at closure.

OFI-Triad-5: Consider revising the IM database to include fields for cause codes and common trend codes to assist in the identification of recurring issues.

8.0 ITEMS FOR FOLLOW-UP

Safety culture sustainment processes were identified as an independent oversight targeted assessment area in a memorandum dated February 6, 2018, from the Acting Director, EA to DOE senior line management. An EA team will assess these processes at LANL as part of this targeted assessment by September 2019.

Appendix A Supplemental Information

Dates of Assessment

On site December 3-7, 2018, and January 14-18, 2019

Office of Enterprise Assessments (EA) Management

Nathan H. Martin, 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
John S. Boulden III
Michael A. Kilpatrick

EA Site Lead for LANL

Joseph Probst

EA Assessors

Joseph Probst – Lead
Charles Allen
Sarah Rich
Eric Swanson

Appendix B

Key Documents Reviewed, Interviews, and Observations

LANL Documents Reviewed

- ADNHHO MRB meeting slides, 6/6/18, 7/12/18, 8/8/18, and 9/5/18
- ADPSM MRB Meeting Agenda and Minutes, 5/17/18
- ADPSM-17-025, *Plutonium Science and Manufacturing Management Review Board Charter*, Revision 6, 12/19/2017
- ADPSM: 18-008, *February 2018 ADPSM ConOps Report*, 3/8/2018
- ADPSM: 18-025, *June 2018 ADPSM ConOps Report*, 7/25/2018
- ADPSM: 18-034, *August 2018 ADPSM ConOps Report*, 9/27/2018
- ADPSM: 18-036, *September 2018 ADPSM ConOps Report*, 10/24/2018
- ALDWP MRB Meeting Agenda and Minutes, 11/8/18
- DIR-18-180, *Internal Audit IA-18-08, Contractor Assurance – Issues Management Transition*, 10/29/18
- Executive Dashboard Metrics FY 2016-2018
- Facilities and Operations Directorate MRB slides, 11/26/18
- LANL Memorandum DIR-15-131, *LANL Integrated Corrective Action Plan for the TA-53 Arc-Flash Joint Accident Investigation Team, Judgements of Need*
- *LANL Independent Effectiveness Evaluation of the CAS JON 25 and 12 at LANL*, 10/30/17
- *Mission Assurance Plan for ADPSM*, 4/20/18
- NHHO-CTR-010,R0, *Safety Basis Division Management Review Board Charter*, 1/19/18
- NHHO-CTR-008,R0, *Engineering Services Division Management Review Board Charter*, 1/19/18
- NHHO-PLAN-022, R0, *Associate Directorate for Nuclear and High Hazard Operations Mission Assurance Plan*, 4/11/18
- NPI-DO-17-015, *Nuclear Process Infrastructure Division MRB Charter*, Revision 0, 1/11/2018
- *Nuclear Criticality Safety Division Management Review Board Committee Charter*, 8/22/18
- P322-3, *Performance Improvement from Abnormal Events*, Revision 5, 11/8/2018
- P322-4, *Issues Management*, Revision 14, 11/1/2018 and Revision 10, Change 1, 4/21/2016
- P322-4, *Issues Management*, Revision 12, Change 1, 9/25/17
- P322-4, *Issues Management*, Revision 12, Change 2, 12/4/17
- P322-4, *Issues Management*, Revision 13, 7/23/18
- PD323, *LANL Operating Experience Program*, Revision 2, 11/1/2018
- P323-1, *Operating Experience and Lessons Learned Process*, Revision 3, 11/01/18
- PA-CHTR-01005, *TA-55 FOD Management Review Board (MRB) Charter*, Revision 2, 5/17/18
- PFITS IAS 2016-176, *LANL Management of Measuring & Test Equipment (M&TE) Effectiveness Evaluation for PFITS 2016-176*, 2/16/17
- PAQ-MA-18-002, *NAP-24A Quality Requirements - Requirement 3.13 Corrective Actions*, Rev. 1, 5/15/18
- POFMR 2016-467, *Follow-up on Performance Assurance Improvement Plan Implementation*
- QPA-DO: 18-218, *Transmittal of SR (18)-031.002, Surveillance and Extent of Condition (EOC) of the QPA-PE Action Way/Issues Management System*, 4/23/18
- QPA-DO: 18-271, *Transmittal of the Final Report for the Independent Assessment of PFITS Record 2016-1423 Actions to Address Issues Management Weakness*, 7/3/18
- QPA-DO-CTR-002.003, *Los Alamos National Laboratory Management Review Board (IMRB) Charter*, 8/7/18
- QPA-DO-CTR-001.005, *Quality & Performance Assurance Division Management Review Board Charter*, 2/21/18

- QPA-PA-GU-001.003, *Issues Management Guide*, Revision 0, 4/25/2018
 - Attachment 1: Extent of Condition Evaluation
 - Attachment 2: Causal Analysis Report Checklist / Cover Sheet
 - Attachment 3: Corrective Action Plan Template
 - Attachment 4: Corrective Action “SMARTER” Checklist
 - Attachment 5: Simplified Effectiveness Evaluation Worksheet
 - Attachment 6: EE Tool
 - Attachment 7: MRB Charter Template
 - Attachment 8: Management Review Board (MRB) Agenda
 - Attachment 9: Corrective Action Closure Form Template
 - Attachment 10: Comprehensive Approach Effectiveness Evaluation Report Format
 - Attachment 11: Systems and Processes Reference List
 - Attachment 12: Additional Examples of Risk Level
- QPA-PA-PLAN-001.000, *Quality & Performance Assurance (QPA) Performance Assurance Improvement Plan (PAIP)*, 3/8/16
- QPA-PA-PLAN.001.003, *FY 17 Performance Assurance Improvement Plan (PAIP)*, 3/9/18
- QPA-DO-PLAN-005-1.002, *FY 18 Institutional Performance Assurance Improvement Plan (IPAIP)*, 11/1/18
- QPA-DO-PLAN-005.002, *FY 19 Institutional Performance Assurance Improvement Plan (IPAIP)*, 9/5/18
- SD 320, *LANL Contractor Assurance System*, Revision 5, 4/19/18
- SD320, *LANL Contractor Assurance System*, Revision 6, 11/1/18
- SD330, *LANL Quality Assurance Program*, Revision 10, 11/27/17 and Change 1, 11/1/18
- TA55-CHTR-014, R7, *PSM Nuclear Criticality Safety Board Charter*, 9/22/16
- TA-55 FOD *Event Summary Report (Fact Finding)*, multiple, 2016-2018
- TA-55 FOD *Event Summary Report (Post Job Review)*, multiple, 2017-2018
- *TRIAD Due Diligence Report on the LANL Issues Management System*, 11/13/18

DOE Documents Reviewed

- DOE-OIG-16-07, *Issues Management at the Los Alamos National Laboratory*, February 2016
- NA-LA Transmittal CS:40PG-666575, *Issues Management at the Los Alamos National Laboratory, OIG-16-07, issued February 25, 2016*, 3/3/16
- NNSA Memorandum, *Los Alamos National Security (LANS), LLC DE-AC52-06NA25396 Fiscal Year 2016 Award Fee Determination*, 11/26/16
- NNSA Memorandum, *Los Alamos National Security (LANS), LLC DE-AC52-06NA25396 Fiscal Year 2017 Award Fee Determination*, 11/30/17
- NNSA Memorandum, *Los Alamos National Security (LANS), LLC DE-AC52-06NA25396 Fiscal Year 2018 Award Fee Determination*, 12/4/18
- *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*, August 2015

List of Issues Reviewed

ES-DO Issues

2018-1735	2018-1025	2018-34	2017-511	2017-1083
2018-1461	2018-1024	2017-681	2017-510	2017-1082
2018-1449	2018-1023	2017-673	2017-509	2017-1081
2018-1448	2018-1022	2017-625	2017-464	2017-1080
2018-1447	2018-1018	2017-624	2017-96	2017-1079
2018-1446	2018-1017	2017-623	2017-12	2017-1078
2018-1445	2018-1016	2017-532	2017-11	2017-1077
2018-1444	2018-1015	2017-531	2017-2059	2017-1076
2018-1443	2018-895	2017-530	2017-2058	2017-1075
2018-1359	2018-894	2017-522	2017-2057	2017-993
2018-1357	2018-893	2017-521	2017-2056	2017-918
2018-1083	2018-834	2017-520	2017-2055	2017-826
2018-1033	2018-827	2017-519	2017-2054	2017-825
2018-1032	2018-826	2017-518	2017-1725	2017-824
2018-1031	2018-91	2017-517	2017-1561	2016-2675
2018-1030	2018-90	2017-516	2017-1510	2016-2489
2018-1029	2018-495	2017-515	2017-1112	2016-2101
2018-1028	2018-494	2017-514	2017-1086	2016-1532
2018-1027	2018-493	2017-513	2017-1085	2016-661
2018-1026	2018-128	2017-512	2017-1084	2016-625

NCS-DO Issues

2018-1691	2018-1192	2017-633	2017-418	2016-1070
2018-1196	2018-1191	2017-615	2017-292	2016-1069
2018-1195	2018-1190	2017-526	2017-1822	2016-1068
2018-1194	2018-1189	2017-525	2016-1072	2016-1067
2018-1193	2018-1188	2017-5	2016-1071	

ORI-DO (NCSB Chair) Issues

2018-88	2018-1151	2017-576	2017-1939	2016-1311
2018-211	2018-1090	2017-566	2017-1607	2016-1310
2018-1592	2017-843	2017-2154	2017-1605	2016-1309
2018-1548	2017-838	2017-2017	2017-1600	2016-1308
2018-1336	2017-660	2017-1993	2017-1599	
2018-1197	2017-579	2017-1989	2017-1355	
2018-1161	2017-578	2017-1964	2017-1278	

SB-DO Issues

2018-496	2017-492	2017-113	2016-843	2016-2457
2018-306	2017-491	2017-1109	2016-832	2016-2114
2018-299	2017-490	2017-109	2016-699	2016-2113
2018-1128	2017-294	2017-108	2016-698	2016-2112
2018-1127	2017-1670	2017-107	2016-697	2016-2107
2018-1126	2017-167	2017-106	2016-696	2016-1856
2017-949	2017-1635	2016-976	2016-695	2016-1621
2017-948	2017-1351	2016-975	2016-694	2016-1192
2017-947	2017-1350	2016-974	2016-693	2016-1109
2017-946	2017-1187	2016-973	2016-692	2016-1102
2017-945	2017-1186	2016-951	2016-2798	
2017-931	2017-114	2016-869	2016-2609	
2017-884	2017-1137	2016-859	2016-2570	

TA-55 FOD Issues

2018-891	2018-1627	2017-572	2017-2036	2016-643
2018-874	2018-1508	2017-571	2017-1956	2016-621
2018-871	2018-1505	2017-570	2017-1953	2016-617
2018-856	2018-1504	2017-569	2017-1950	2016-2734
2018-83	2018-1438	2017-568	2017-1818	2016-2551
2018-810	2018-1436	2017-567	2017-1805	2016-1999
2018-803	2018-1395	2017-566	2017-1804	2016-1756
2018-78	2018-1334	2017-565	2017-1638	2016-1747
2018-707	2018-1278	2017-459	2017-1637	2016-1519
2018-622	2018-116	2017-458	2017-1636	2016-1459
2018-604	2018-1084	2017-457	2017-1617	2016-1333
2018-513	2018-1010	2017-456	2017-1608	2016-1245
2018-456	2017-936	2017-455	2017-1587	2015-2663
2018-443	2017-894	2017-454	2017-1564	2015-2382
2018-361	2017-871	2017-450	2017-1511	2015-1901
2018-259	2017-7	2017-41	2017-1449	2015-1713
2018-252	2017-674	2017-389	2017-1448	2013-2964
2018-252	2017-579	2017-378	2017-119	2013-2864
2018-236	2017-578	2017-362	2017-1098	2011-3740
2018-219	2017-577	2017-329	2017-1087	2009-874
2018-1870	2017-575	2017-298	2017-1031	2009-3403
2018-1757	2017-574	2017-2151	2017-1027	
2018-1730	2017-573	2017-2086	2017-003	

IQ&PA Issues

2016-1423	2016-435	2015-2382	2015-2263
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Interviews

- TA-55 Facility Operations Director
- TA-55 Deputy Facility Operations Director
- TA-55 Operations Manager
- Chemistry & Waste Facilities Operations Manager
- Radioactive Liquid Waste/Radiological Laboratory Utility Office Building/ Chemistry and Metallurgy Research Facility Engineering Manager
- IQ&PA Division Leader
- IQ&PA Group Leader – Issues Management
- Quality Assurance Specialist (2)
- Deputy Division Leader, Safety Basis Division
- Chief of Staff, Safety Basis Division
- Associate Laboratory Director, Weapons Production (ALDWP) Directorate
- Chief Operations Officer ALDWP
- Actinide Material Processing and Power Division – Division Leader
- Environmental, Safety, Health, Quality, Safeguards, and Security Directorate – Associate Laboratory Director
- Facilities and Operations Directorate – Associate Laboratory Director
- Office of Mission Assurance and Prime Contracts – Director
- Nuclear Criticality Safety Division – Division Leader
- Nuclear Process Infrastructure Division – Division Leader
- Operational Readiness Implementation Division – Division Leader
- Strategic Projects and Engineering Division – Division Leader
- Actinide Operations Director ALDWP
- Director, Operational Readiness Implementation, ALDWP
- Division Leader, Pit Technologies, ALDWP
- Cognizant System Engineer (5)
- Issue Management Coordinators (8)
- ES-DO Division Leader
- SB-DO Division Leader
- SB-DO Deputy Division Leader
- NCS-DO Division Leader
- NCS-DO Executive Advisor
- NA-LA Deputy Manager for Technical Operations (acting)
- NA-LA Deputy Manager for Business, Security, and Missions
- NA-LA Assistant Manager for Business and Contract Management
- NA-LA Assistant Manager for Field Operations
- NA-LA Assistant Manager for Nuclear Safety, Engineering, and Readiness

Observations

- ES-DO MRB Meeting
- TA-55 MRB Meeting (3)
- ORI-DO MRB Meeting (2)

Appendix C Deficiencies

Deficiencies that did not meet the criteria for a finding are listed below, with the expectation from DOE Order 227.1A for site managers to apply their local IM processes for resolution.

All deficiencies apply to Triad National Security, LLC.

- Deficiency-Triad-1:** Contrary to Attachment B, Section 1.17 of SD330, the risk ranking criteria in Table 1 of P322-4 do not provide adequate guidance to identify all “significant conditions adverse to quality” related to nuclear safety issues to ensure their resolution in accordance with the requirements of Part I, Requirement 16 of NQA-1, as invoked by Attachment B, Section 1.17 of SD330. Requirement 16 of NQA-1 requires causal analyses and actions to preclude recurrence for all “significant conditions adverse to quality.”
- Deficiency-Triad-2:** Contrary to Section 3.13 of NAP-24 ADW-Q-0001U, P322-4 does not provide criteria to identify “significant conditions adverse to quality.”
- Deficiency-Triad-3:** P322-4 does not adequately implement the requirement in Section 4.b. of Attachment 1 of DOE Order 232.2A requiring facility managers to determine causes, generic implications, and corrective actions for reportable occurrences. P322-4 allows facility manager to categorize some occurrences as low risk, a category for which none of these are required.
- Deficiency-Triad-4:** Many issues entered by the IMCs contain unclear or incomplete issue statements, contrary to Section 2.2 of QPA-PA-GU-001.003. P322-4 contains no requirement(s) for clear, understandable problem statements.
- Deficiency-Triad-5:** IRMs use ORPS reports as documentation of causal analyses instead of the causal analysis reports required by Section 3.3.1 of P322-4, resulting in missing cause statements, missing justification for the methodology used, and missing references/interview lists.
- Deficiency-Triad-6:** Requirement 16 of NQA-1, invoked by Attachment B, Section B.1.17 of SD330, requires that all conditions adverse to quality be corrected. The risk ranking criteria in Table 1 of P322-4 do not adequately implement this requirement, allowing some conditions adverse to quality to be categorized as low risk, a category that does not require corrective action.
- Deficiency-Triad-7:** P322-4 does not require actions to prevent recurrence for higher-significance issues as required by DOE Order 226.1B, Attachment 1, Paragraph 2.b(3)(b)(2), stating only that actions to prevent recurrence should be considered as necessary.
- Deficiency-Triad-8:** NQA-1, Part 1, Requirement 16, states that “conditions adverse to quality shall be identified promptly and corrected as soon as practicable.” Contrary to this requirement, IRMs have allowed numerous issues remain open for extended periods, with corrective actions delayed for years.

Appendix D Follow-up Items

This assessment included following up on findings from two previous reports related to the management of nuclear safety issues. The results are summarized below.

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

Finding LANS-F&I-1: LANS has not adequately implemented an IM program with processes and controls that are fully effective in ensuring that process and performance problems are identified and entered into PFITS, accurately described and categorized for significance, appropriately evaluated on a graded approach for extent-of-condition and causes, and addressed with effective action and recurrence controls, as required by DOE Order 226.1B, ASME NQA-1, and the LANS CAS description document SD320.

Summary: As discussed in Section 5.1.2 of this report, LANS incorrectly categorized this finding and the systemic weaknesses in IM identified in the 2016 DOE IG report as general performance feedback or process improvements, rather than higher-risk (e.g., Risk Level 1) issues as required by P322-4. As discussed in Section 5.4.2 of this report, LANS closed this finding and the related weaknesses in the DOE IG report prematurely without taking any action. Based on the assessment in this report, additional action and follow-up of IM at LANL is warranted.

Office of Enterprise Assessments Assessment of the Development and Maintenance of Safety Bases at Los Alamos National Laboratory, dated April 2018

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

Summary: As discussed in the April 2018 EA report, actions in the safety basis improvement plan and the SB-DO performance assurance plan for LANS “self-monitoring” the quality of its safety basis submittals were not effectively implemented. In response to this finding, LANS issued a corrective action plan to revise the SB-DO performance assurance plan to improve its “self-monitoring.” As discussed in Section 5.1.2 and SB-DO issue 2018-1126 in Appendix F of this report, LANS categorized this finding as low risk, contrary to P322-4, and developed this corrective action plan without performing a causal analysis to determine why the existing actions in SB-DO performance assurance plan were not effectively implemented. As discussed in SB-DO issue 2018-1126 in Appendix F, LANS did not provide adequate documentation to support closing this finding.

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 Hazard Category 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.

Summary: As discussed in Section 5.6 of this report, NA-LA revised its procedure for safety basis reviews and demonstrated its actions have effectively resolved this finding. No further EA follow-up is warranted.

Appendix E
Additional Lines of Inquiry for Assessing Issues Management at LANL

In addition to the lines of inquiry for Objective 3 of EA CRAD 30-01, Revision 1, *Contractor Assurance System – Criteria Review and Approach Document*, the EA team assessed the management of selected nuclear safety issues using the following lines of inquiry. These lines of inquiry were based on requirements and guidance in LANL Procedure P322-4, Revision 12, Administrative Change 1, *Issues Management*.

1. Was the problem categorized based on risk as specified in Table 1 of P322-4?
2. Would a higher risk category be more appropriate?
3. Were a causal analysis, extent-of-condition, and effectiveness reviews performed as required based on the assigned risk category per Table 1 of P322-4?
4. Did the extent-of-condition review meet the requirements of Section 3.3.2 of P322-4?
5. Did the causal analysis meet the requirements of Section 3.3.1 of P322-4?
6. Were corrective actions Specific, Measurable, Accountable, Reasonable, Timely, Effective, and Resilient/Sustainable (i.e., SMARTER) per Section 3.4.1 of P322-4?
7. Did corrective actions follow the hierarchy of controls (elimination, substitution, engineering, administrative, and personal protective equipment) per Section 3.4.1 of P322-4? If not, what preferred control was omitted?
8. Did the corrective action plan include actions to preclude recurrence?
9. Is this a recurring issue? If so, what are the indications that it is a recurring issue?
10. Does the documentation of actions taken meet the requirements of Section 3.5.1 of P322-4?
11. Does the effectiveness evaluation meet the requirements of Section 3.5.3 of P322-4?
12. Did the EA team verify that the actions were effective? For example, did the actions result in any changes to work?
13. Is the remaining risk high enough that Triad should investigate the issue?

Appendix F
Comments on the Management of Specific Issues Associated with Nuclear Safety

Comments on the management (resolution) of specific nuclear safety issues are listed below following each issue's tracking number and a summary of the issue. The comments are listed by Issue Responsible Manager, but are not listed sequentially.

Engineering Services Division Office (ES-DO)

2018-1033: Contrary to the requirements of P322-4, in several instances ES-DO did not communicate and correct issues in a timely manner.

Comment: No actions were taken with regard to the specific examples provided in the issue description. No process-related or other actions were taken to preclude recurrence. During this review, several additional examples of failure to address issues in a timely manner were noted: 2018-1028, 2018-1027, 2018-1015, 2018-128, 2017-513, 2017-509, and 2017-96. Contrary to the conclusions documented in the closure statement for this issue, the timeliness of corrective actions is a recurring problem for the ES-DO organization as evident by other examples of untimely corrective actions discussed below.

2018-1032: Contrary to SD 330, the ES-DO metric for quality does not support “monitoring activities against acceptance criteria in a sufficient manner to provide assurance that the activities affecting quality are performed sufficiently.”

Comment: This issue identified a non-compliance with upper-tier document SD 330. The issue was closed with no actions taken. Section 7.0 of SD 330 states that an approved exception or variance is required to deviate from the documented requirements.

2018-1031: Contrary to Section 3.6 of PD 340, ES-DO did not list any management assessments on the LANS Site Integrated Assessment Plan for FY 2018 to meet the requirement to twice annually assess one of the three core areas of its conduct of engineering program. [In fact, no management assessments had been done for over 4 years.]

Comment: This issue was closed based on scheduling of three future assessments, contrary to Attachment B of P322-4, which states that “Any ‘promise’ to complete an action in the future” is unacceptable as objective evidence to support closure of corrective actions.

2018-1028: Contrary to 10 CFR 830.122, judgement memoranda, or “intelligent design evaluations” dated May 25, 2016, and July 22, 2016, per AP-341-605, were used as the bases for facility modifications without providing adequate technical justification.

Comments:

- This issue was closed with no actions taken, citing 2018-1015 for the corrective actions. The problem statement for 2018-1015 was not revised to include the additional scope represented by this issue, and 2018-1015 does not include any traceable reference to 2018-1028. Therefore, there is no basis to conclude that the corrective action for 2018-1015 will resolve this issue.
- Extensions have been approved allowing corrective action for this issue to be completed by July 31, 2019, over 14 months after initial identification.

2018-1027: Contrary to the requirements of AP-341-605, LANS did not correctly identify the Management Level of several issued calculations.

Comment: This issue involved several examples of inadequately implementing provisions of procedure AP-341-605 as it is currently written. The proposed corrective action appropriately includes training on those provisions; however, it is tied to issuance of a future revision to AP-341-605 and is now scheduled for completion in October 2019, over 17 months after the issue was identified. Management Levels determine the quality assurance requirements invoked for calculations, including those for nuclear safety systems. This action is not correcting the issue in a timely manner considering the calculations being performed by ES-DO for ongoing design work of nuclear safety systems during this period.

2018-1026: Contrary to the requirements of ASME NQA-1, LANS and its subcontractor, Weidlinger-Navarro, did not perform sufficient checking and design verification to ensure that design inputs were identified and controlled, and that unverified portions of the design were identified and controlled.

Comment: This issue was identified during an external assessment. Removal of the vendor involved in this issue from the approved supplier list adequately addressed recurrence control. However, no actions were taken to correct the affected calculations or to address LANS's failure to identify the problem. Therefore, the corrective actions for this issue were not adequate to correct the identified problem.

2018-1024: Contrary to ASME NQA-1 and DOE-STD-1073-2003, *Configuration Management*, procedure AP-341-517, *Design Change Form*, allows modification of safety-related SSCs with no engineering involvement, bypassing the design change requirements in that procedure.

Comment: This issue was closed based on a future planned revision to AP-341-517, contrary to Attachment B of P322-4, which states that "Any 'promise' to complete an action in the future" is unacceptable as objective evidence to support closure of corrective actions. The non-compliant provision in AP-341-517 remains available for use by facility personnel.

2018-1023: Contrary to 10 CFR 830.122 and ASME NQA-1, procedure AP-341-605 permits "intelligent design evaluations" in lieu of calculations on safety-related applications, bypassing all engineering requirements for identification of design inputs, checking, and design verification.

Comment: This issue was closed to 2018-1015, similar to 2018-1028. Also similar to that issue, the problem statement for 2018-1015 was not revised to include the additional scope represented by this issue, and 2018-1015 does not include any traceable reference to 2018-1023. Therefore, there is no basis to conclude that the corrective action for 2018-1015 will resolve this issue.

2018-1016: Revise AP-341-605 to provide more detailed guidance in Attachment A for the technical review of external subcontractor-produced calculations. Reference to Attachment B of AP-341-622, *LANL Review of Designs Produced by External Design Agencies*, would be appropriate in this application.

Comment: This issue was closed to 2018-1015, similar to 2018-1028 and 2018-1023. Also similar to those issues, the problem statement for 2018-1015 was not revised to include the additional scope represented by this issue, and 2018-1015 does not include any traceable reference to 2018-1016. Therefore, there is no basis to conclude that the corrective action for 2018-1015 will resolve this issue.

2018-1015: Revise AP-341-605 to require that all calculations be issued as standalone documents and entered into the LANL Electronic Document Management System (EDMS) as such to meet the retrievability requirements of NQA-1.

Comments:

- The corrective action to revise AP-341-605 to resolve this issue is now scheduled to be complete by July 31, 2019, over 14 months after the issue was documented. Given the issues identified affecting this procedure in items 2018-1016, 2018-1023, 2018-1027, 2018-1028, 2017-1078, and 2017-519, the response to these issues is not timely considering the calculations being performed ES-DO for by ongoing design work of nuclear safety systems during this period.
- Also, as previously noted, three other issues identified for the same procedure have been closed to this issue; however, this issue has not been updated to reference those items or describe the issues involved. The corrective action for this issue is therefore very unlikely to correct all of the identified issues.

2018-128: Execute the Software Quality Management (SQM) Project Implementation Plan.

Comments:

- The issue statement does not provide a description of the issues (e.g., it does not state why the SQM Project Implementation Plan is needed).
- PFITS Item 2015-1228 Action #2, originally due October 31, 2016, was transferred to this item, extended to November 30, 2018, and remains unimplemented over two years after the action was originally due. This action is not timely.

2017-673: In reviewing commercial grade dedication (CGD) packages, the responsible engineer manages acceptance of the item or service by one or more of the acceptance methods and attaches (or references a retrievable source) the objective evidence, such as inspection and test reports, the receipt inspection report, and other pertinent vendor-supplied documentation. Contrary to this requirement, none of the CGD packages contained adequate objective evidence upon initial quality assurance review.

Comments:

- This issue was closed on the basis that the affected procedure, AP-341-703, *Commercial Grade Dedication*, is being revised in the future for other reasons (no other issues referenced). There is no basis to conclude that the future revision will resolve this issue. This closure violates Attachment B of P322-4, which states that “Any ‘promise’ to complete an action in the future” is unacceptable as objective evidence to support closure of corrective actions.
- This issue was identified against CGD packages for the TWF project. However, no actions were identified to correct the affected packages. Closure of this item leaves the actual “problem identified” untracked for resolution by any means.

2017-531: Los Alamos Field Office report, *Pressure Safety – Safety Management Program*, ASM-OPS-1.9.2017-713695, identified issues related to pressure safety program implementation that were documented in these two issue reports.

Comment: These two issue reports remained open for approximately a year and then were both closed to a corrective action plan that was developed in response to these issues and to a pre-existing condition identified during the Triad contract transition. The plan remains under senior management review and therefore has not yet been entered into the IM system for tracking.

2017-519: Consider establishing a clear differentiation between “Unverified Assumptions” and those “Assumptions” being applied to the technical basis of the calculation. Unverified assumptions should have a justification statement.

Comment: Similar to several other issues identified above, this issue was closed to 2018-1015, which was an action to revise AP-341-605 for other reasons. Because 2018-1015 was not revised to include this issue, there is no traceability back to this issue and no basis to conclude that the corrective action for 2018-1015 will resolve this issue.

2017-513: Document control processes were not compliant with P1020-2, Laboratory Document Control. Documents were managed using the following tools and applications: local servers, SharePoint(s), Design Change Form (DCF) and Engineering Service Request (ESR) tools, UMap (Institutional Information), and hardcopies located in personnel files. The LANL Electronic Document Management System was being used for 2 (22%) of 9 evaluated projects: (TA-03-440 HVAC Upgrades and TA-35, Bldg. 0425, Cooling Tower Water Treatment System). Personnel were unclear as to what documents should be managed and how.

Comments:

- This issue was categorized as low risk, although it documented significant non-compliances with upper-tier requirements.
- This issue was identified on November 16, 2017. The only action still open is to assign and assemble a team to define a plan to achieve compliance with P1020-2, with a due date of March 22, 2019. Taking 16 months to put a team together to develop the corrective action plan does not reflect a timely response to this issue.

2017-512: Record management processes were not compliant with P1020-1, Laboratory Records Management. The Engineering Services organization was unable to produce a Records Inventory and Disposition Schedule. Controls for records could not be demonstrated. Records management personnel were appointed for only two of the four organizations evaluated. Records holdings were not identified. Records were kept in the ESR and DCF tools, on local servers, and as hardcopies in engineer’s file cabinets.

Comment: This issue was closed to 2017-513; however, 2017-513 was not revised to capture the problem scope identified in this issue, nor does it indicate any connection to this issue by reference. Therefore, there is no traceability back to this issue and no basis to conclude that the corrective action for 2017-513 will resolve this issue.

2017-509: The Design Review Record (DRR), or alternately, the electronic Design Review System (DRS) was not used to document design reviews for the following: DCF-15-35-0002-994, TA-35-0002, Replace Boiler BHW-01, and BHW-02 Informal design review; drawing markups; informal comment resolution, DCF-17-53-0028-1736, TA53-28 REB BEMP Power Supply Replacements, Informal design review; drawing markups; informal comment resolution. Contrary to requirements, design reviews were documented using the Design Change for Simple Modifications, form FM019.

Comment: This issue was identified on August 31, 2017, and has been extended twice, with a current due date of July 31, 2019. This is not timely response to a process compliance issue considering ongoing design work at LANL during this period and since no interim, compensatory actions were taken to preclude recurrence.

2017-96: An NA-LA safety system oversight report identified that LANS is not implementing AP-341-517, *Design Change Form*, when completing DCFs as specified in AP-341-517, and omits some steps.

Comment: This issue was identified on September 27, 2017, and has now been extended to July 31, 2019. This is not timely response to a process compliance issue considering ongoing design work at LANL during this period and since no interim, compensatory actions were taken to preclude recurrence.

2017-1083: NQA-1, Requirement 6, Document Control Engineering document numbers were not being generated in accordance with AP-341-402, Engineering Document Management in Operating Facilities.

2017-1081: **Comment:** The planned corrective action was a revision to AP-341-402, but this issue was then closed with a statement that it had been transferred to 2018-1083. However, 2018-1083 does not include this issue and is written against an entirely different topic (fire protection). 2017-1081 and 2017-1082 contained related records management issues. Both were closed with no actions taken. AP-341-402 has not been revised since 2014, so no corrective actions for these issues have been implemented to date. Traceability has been lost for these issues, and the planned corrective action to revise AP-341-402 is very unlikely to be accomplished as a result.

2017-1078: Clarify conduct of engineering (CoE) expectations for documentation of engineering judgment on Management Level-1 and -2 projects when informal calculations are used during the design process. Benefit: Reduces inconsistent applications of CoE.

Comment: This issue was closed with no actions taken, based on existing provisions in AP-341-605 that were not technically defensible and that were subsequently identified as inadequate in an independent DOE assessment in 2018 (2018-1023).

Nuclear Criticality Safety Division Office (NCS-DO)

2017-292: NA-LA identified that a previous NA-LA finding on criticality safety requirements was not adequately resolved.

Comment: Although additional action was taken to address the NA-LA finding, no action was taken to understand why it was not addressed originally, or to improve future efforts to address NA-LA findings.

2018-1192: This issue is intended to address opportunity for improvement #5 from the management assessment of nuclear criticality safety at the Chemistry and Metallurgy Research facility.

Comments:

- The issue description for this issue (and other issues associated with the same assessment) is only the title of the assessment.
- The opportunity for improvement description was a paragraph, but the only part that was included in the issue was the first sentence, which did not cover the entire issue. As a result, the action taken did not address the full scope of the opportunity for improvement.

Operational Readiness Implementation Division Office (ORI-DO)

NOTE: ORI-DO is the co-chair of the TA-55 Nuclear Criticality Safety Board and the Issues Responsible Manager for nuclear criticality safety implementation issues in TA-55.

2015-377: The contractor readiness assessment for the TA-55 Moore T-Base 2 machining operations, conducted from January 12-23, 2015, identified a post-start finding that the control sets and postings for the transfer line, drop box, and attached gloveboxes are not coordinated and can be confusing. To address that finding, an action was planned to update the criticality safety evaluation document to be compliant with DOE STD 3007-2007, *Guidelines for Preparing Criticality Safety Evaluations at Department of Energy Nonreactor Nuclear Facilities*. This action was transferred to 2018-211 with the move to the new IM database.

Comment: PFITS and the IM database do not have a way to show previous due dates, and approved extension requests were not always attached to this item; however, enough were attached to show that this action has been extended at least three times, each time for about six months (April 30 to December 22, 2016; June 7 to December 12, 2018; and December 12, 2018 to May 30, 2019). Also, the action has been assigned to at least three different people, which can contribute to the delays with resolving this issue.

2017-1605: An annual fissionable material operational review identified two gloveboxes that had criticality safety postings allowing several activities, but the criticality safety evaluation document (CSED) only supported staging material in those gloveboxes. The nuclear criticality safety analyst group had reviewed the posting and did not comment on the discrepancy at the time.

Comment: The only action taken was to correct the criticality safety postings. Contrary to P322-4, this issue was categorized as low risk, despite the violation of criticality safety requirements. Since it was categorized as low risk by the IRM, a causal analysis was not required by P322-4. LANS did not determine why the postings were incorrect or why the nuclear criticality safety analyst group did not catch the discrepancy, so no action was taken to address those causes. As a result, the corrective actions for this issue were not adequate to correct the identified problem.

2017-1964: During an Annual Operational Review in a vault in PF-4, operators found that three rooms had criticality safety postings allowing storage of material without a technical basis for it in the CSED, and one of the rooms actually was storing such material. A process deviation was declared, and an extent-of-condition review found three additional affected rooms, one of which also had material. (Level 3 Infraction)

Comment: This issue was screened as low risk, so a causal analysis was not required by P322-4. The only action taken to address this issue was to revise the identified criticality safety postings to match the CSEDs. No action was taken to determine why so many postings were incorrect. Therefore, no action could be taken to address that cause, and there is no basis to conclude that the corrective action for 2017-1964 will resolve the larger issue.

2017-498: On February 13, 2017, workers identified that unmeasured waste drums had been moved from the required three-foot spacing between drums into a linear array that did not have three-foot spacing between the drums. Who moved the drums is not known.

Comments:

- The action to address this issue was to update criticality safety postings for floor locations that do not currently require spacing between drums to include the spacing requirements contained

in procedure PA-RD-01009, *TA55 Criticality Safety Requirements*, Section 5.1.13. No standing order or other interim action was put in place to address the issue until this action could be completed.

- On June 22, 2017, an unmeasured waste drum was left less than the required three-foot spacing from other drums at a floor location where the criticality safety posting had not yet been updated (2017-1600). The only action taken in response to the more recent issue was to update that specific criticality safety posting. There was no evaluation of why the posting was not already updated.
- The action from 2017-498 was transferred to 2018-1592 with the switch from PFITS to the IMT; this action is still not complete. During this assessment, the due date was extended from December 21, 2018, to January 31, 2019.
- Overall, this nuclear safety issue is scheduled to remain uncorrected for nearly two years and no interim, compensatory actions were taken in a timely manner to preclude the recurrence of this issue.

2017-660: A waste drum that came from an area with a high beryllium content was inappropriately assayed with a neutron counter, resulting in an erroneous reading of 71 kg of plutonium. The drum was treated as a possible criticality infraction.

Comment: The action to address this issue was to evaluate how to communicate which drums contained abnormal waste. The action was closed out with a statement that the issue would be addressed by developing a new administrative procedure. No new action was created to track the development of the procedure, so this issue was closed on a “promise.”

2017-838: On March 30, 2017, four items that were being treated as heat source plutonium material were found to be below the minimum 65% Pu-238, and the operators treated the discovery as a potential process upset because there was no clear guidance on how to handle the items. This discrepancy was addressed by writing NCS-CSED-17-050, *Clarification of Language for Non-HS-Pu Mass Limits*, issued on June 12, 2017, and updating several criticality safety postings to state that items below the minimum percentage should be treated under Pu-239 mass limits.

Comment: On August 3, 2017, a different group of operators found two items that were being treated as heat source plutonium material that were below the minimum 65% Pu-238, and treated the discovery as a potential process upset (2017-1993). The actions taken for 2017-838 were not sufficient because the clarification was not communicated to all groups that needed it. The second group of operators was unaware of the CSED issued less than two months earlier, and further action was taken under issue 2017-1993 to provide training to them on the CSED.

2018-1151: On July 3, 2018, following an engineering review of seismically qualified carts, one was declared out of service because it did not have a hole drilled in it as required by the design. On July 9, 2018, another cart was found to be missing a bolt.

Comment: The action to address the missing bolt was to issue a preventive maintenance item to periodically check and tighten bolts as required. This action was closed with closure evidence of a pre-existing preventive maintenance work order with a handwritten instruction to check for missing hardware and replace it. However, there is no evidence that the added instructions will be included in future preventive maintenance work orders.

2018-1197: On July 13, 2018, two different work groups transferred special nuclear material to the same drop box at the same time, resulting in a level 4 criticality infraction.

Comment: One of the initial actions to address this event was to evaluate implementing a team for conducting all of the longer or more complicated material moves. This action was closed out in September 2018 with the decision that a move team would not be a beneficial solution. Another action was created in October 2018 to re-review the potential implementation of move teams “in light of the recent infraction.” This action was originally due in December 2018 but was extended to February 2019 with no documented justification. Taking longer than six months to determine what long-term action to take to address recurring criticality safety infractions during material moves (evolutions that are frequently performed and essential to production work in PF-4) does not represent timely action.

2017-2017: A process deviation was declared after an over-mass condition in a glovebox during foundry operations in August 2017.

Comments: The event was categorized as low risk, but actions were assigned to:

- Implement compensatory measures for nuclear material movement.
- Remove the fissile material handler (FMH) qualifications for all associated workers and supervisors.
- Perform an extent-of-condition review. (See 2017-566.)
- Direct managers to perform additional management observation verifications (MOVs) of material movements.
- Develop an improvement plan. Accordingly, the PF-4 Conduct of Operations Sustainment/Improvement Plan was issued with numerous actions (2017-455 through 459).
- Perform a causal analysis. Accordingly LA-CP-17-20507, *August 2017-TA-55 Over-Mass Condition Causal Analysis*, dated October 6, 2017, was issued, identifying two actions for effectiveness evaluations. (See 2017-576, 2017-578, and 2017-579).

2017-566: The TA-55 foundry area over-mass condition causal analysis resulted in a number of actions, including an extent-of-condition review (Action #3) to conduct a “review of TA55 procedures that authorize material moves relating to the responsibilities for verification of criticality safety compliance prior to material moves.”

Comment: The extent-of-condition review found several applicable procedures, but 2017-566 was closed based on having conducted the review without including actions to correct the identified procedure issues.

2017-576: The TA-55 foundry area over-mass condition causal analysis resulted in a number of actions, including an effectiveness evaluation (Action #12).

Comment: One corrective action was for management to observe work, via MOVs, “to verify that modified requirements and expectations are fully implemented on the floor, as defined and communicated to personnel.” The effectiveness evaluation was to “conduct an effectiveness evaluation consisting of a review of completed MOVs through March [2018] related to the new material move requirements.” The evaluation concluded that the MOVs were accomplishing several goals but did not state whether the “modified requirements and expectations are fully implemented on the floor.”

2017-578: The TA-55 foundry area over-mass condition causal analysis resulted in a number of actions, including an effectiveness evaluation (Action #14) to “evaluate training for FMH, FMH

supervisors, and [operations responsible supervisor (ORS)] positions for adequacy in light of this event.”

Comment: Action was closed stating, “See IM-2017-566 for Causal Analysis Recommended Action #2.” Action #2 was to “formalize and specify responsibilities for verification of criticality safety compliance prior to material moves” and included a training determination of “Required Reading: PA-RD-01027, R2A2s for TA-55 Programmatic Work.” While the response to Action #2 establishes responsibilities, it did not evaluate the overall effectiveness or adequacy of the training provided to the FMH, FMH supervisors, and ORS.

2017-579: The TA-55 foundry area over-mass condition causal analysis resulted in a number of actions, including Action #15, which states that “following clarification of requirements, conduct management observations to confirm compliance to revised requirements.”

Comment: The action was closed with the notation, “See IM-2017-577 for Causal Analysis Recommended Action #13.” Action #13 to “evaluate the ADPSM Conduct of Operations Program, giving consideration to additional [senior supervisory watch (SSW)] participation in activities outside of readiness-specific activities as well as readiness activities” resulted in evaluation and revision of SSW role and responsibilities. It did not address the MOVs to confirm compliance with the revised requirements.

Safety Basis Division Office (SB-DO)

2016-696: This issue is one of several resulting from a field office assessment of the USQ process. The issue here was that the qualification standard does not specifically require USQ evaluators to maintain a thorough knowledge of the safety basis. The finding acknowledges that the evaluators may have required training in this area, but the issue is with the qualification standard.

Comment: The action proposed, and taken, was to have evaluators complete facility-specific safety basis training. This action was inadequate to address the identified issue.

2017-106: The first semi-annual 2016 USQ assessment identified six full determinations that were inadequate but did not require revision to address the inadequacies.

Comment: One of the actions to address this was to review the six determinations with the reviewer and preparer for each of them, and go over the inadequacies. A similar action was proposed to address issue 2017-107, regarding inadequate screens, and 2017-108, regarding inadequate categorical exclusions. The same email that stated that two specific people were coached was used as closure evidence for all 3 actions, addressing a total of 16 inadequate documents. There is insufficient evidence to conclude that the action was taken, because it is not clear that those two people were the reviewer and preparer for all the documents in question.

2017-1351: The second semi-annual 2016 USQ assessment identified three proposed changes for which the categorical exclusion process was not adequately performed.

Comment: The “action taken” description suggests taking another action (revising the USQ procedure) to resolve the issue, but no closure evidence is attached to show how the suggested was resolved, and no new action was created to track the change.

2017-946: The second semi-annual 2015 USQ assessment identified two full determinations that were inadequate but did not require revision to address the inadequacies.

Comment: The proposed action was to remediate the two specific evaluators who performed the work. The closure evidence provided showed that 11 people attended refresher training, but those two specific people were not on the attendance roster.

2018-1126: This is the issue associated with finding F-LANS-1 from EA report *Assessment of the Development and Maintenance of Safety Bases at Los Alamos National Laboratory*, dated April 2018, as listed in Appendix D. Specifically, F-LANS-1 states that “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.” As discussed in the April 2018 EA report, actions in the safety basis improvement plan and the SB-DO performance assurance plan for LANS “self-monitoring” the quality of its safety basis submittals were not effectively implemented.

Comments:

- The finding was identified in the EA report as “indicative of a systemic weakness in SB-DO implementation of quality assurance processes” for issues management, metrics, management assessment, and lessons learned. SB-DO categorized this finding as low risk, contrary to P322-4, which requires “systemic ineffective resolution of issues” to be categorized as high risk.

- The corrective action plan for this finding was developed without performing a causal analysis to determine why the existing actions in the safety basis improvement plan and the SB-DO performance assurance plan were not effectively implemented.
- One action taken was to revise the performance assurance plan to specify that two management assessments per year are to be directed toward safety basis submittals. Contrary to P322-4, this action was closed to a “promise” (i.e., none of these management assessments have been performed). Additionally, no SB-DO management assessments of safety basis submittals are listed in the LANL Site Integrated Assessment Plan for 2018 or 2019.
- Another action was to invite the field office staff to participate in hazard identification and control selection meetings and discussions. This action relies on efforts from another organization to make the improvement, which cannot be guaranteed, and attending these meetings and discussions could impede the independence of the field office staff’s judgments.
- SB-DO did not perform an evaluation of the effectiveness of its actions for improving its implementation of quality assurance requirements or for reducing the rework associated with safety basis submittals. An effectiveness evaluation is required by P322-4 for issues categorized as high risk or moderate risk.

TA-55 Facility Operations Directorate (TA-55 FOD)

2018-1730: A non-compliance with the documented safety analysis (DSA) was reported when the nuclear material in a glovebox exceeded the authorization limit (ORPS NA--LASO-LANL-TA55-2018-0015).

Comments:

- The IM record (categorized as low risk) was incorrectly marked as not involving a non-compliance, despite the amount of nuclear material exceeding the authorization limit in the DSA (i.e., a non-compliance). As a result, 2018-1730 was inappropriately categorized as a low-risk issue. P322-4 requires issues involving non-compliances with safety requirements to be categorized as moderate- or high-risk issues.
- Action 3 to “include the Lessons Learned in the upcoming PIC [Person in Charge] training” was inappropriately completed before action 1, which develops the lessons learned. Action 1 is not complete.
- A contributing cause to this issue was the PIC stepping out of the supervisory role and performing work. This is a common cause from prior events (e.g., 2017-457) where appropriate action may have prevented this issue.

2018-1627: Material at risk (MAR) in pipe overpack containers was incorrectly assigned a damage ratio less than one due to issues with the certification of the containers. (NA--LASO-LANL-TA55-2015-0014)

Comment: The action plan does not identify follow-on action to the container testing. The report provides data from testing but makes no recommendations for further action.

2018-1505: A readiness review found that several TWF technical safety requirement (TSR) limiting condition of operation (LCO) actions do not always ensure the adverse condition is corrected in a specified time frame or place the facility in a mode where the DSA-credited safety function is no longer required.

Comment: The closure documentation was a DSA update that did not discuss the action to review TSRs for weakness identified by the issue. With no documentation of the review results, the DSA change does not demonstrate that the review was completed. Section 3.5.1 of P322-4 requires adequate objective evidence specifically demonstrating action completion (e.g., highlighting revised portions of text).

2018-1436: The 2006 CMR Fire Hazard Analysis (FHA) identified that no fire extinguishing agent is inside gloveboxes. This issue was identified in the 2009 FHA as item 2006-10.

Comment: The issue regarding determination of where magnesium oxide is needed in gloveboxes has been open since March 9, 2009 (see 2009-874 and 2011-3740) and is a recurring issue at TA-55 that has not been resolved in a timely manner.

2018-1395: Fire sprinkler placement in relation to potential obstructions within the facility requires further assessment, documentation, and correction.

Comment: Although the record shows good investigation and engineering effort to resolve this issue, the corrective actions have not been completed due to funding limitations in the past four years. Taking in excess of four years to resolve deficiencies in a safety class system (i.e., systems credited for providing the highest level of protection to the public) is untimely.

2018-1278: Milliwatt generators were not stored in compliance with the TA-55 DSA. An effectiveness and sustainability review for 2015-1713, action 5, determined that additional actions are warranted regarding the storage of milliwatt generators and this record tracks those actions.

Comment: One action was closed based on scheduling of three future assessments, in violation of Attachment B of P322-4, which states that “Any ‘promise’ to complete an action in the future” is unacceptable as objective evidence to support closure of corrective actions. The IRM included two new open actions following discussions with the assessment team on this and deleted the record of the prior action closure to a “promise.”

2018-1084: TA-55-System Alignment Checklists (SACs) require that the Operations Center “maintain the most current full SAC and any partial SACs that update the full performance in accordance with PA-AP-01040.” However, a NA-LA Facility Representative review of valve lineups found that several were missing, several were years out of date, and some operating procedures do not maintain the required valve lineups. Valves were also determined to be out of the position required by the TSR.

Comments:

- This issue was inappropriately categorized as low risk. P322-4 requires non-compliances with safety requirement (e.g., in the TSR) to be categorized as moderate- or high-risk issues. The risk associated with 2018-1084 is increased by the extent of the problem with alignments, the systemic failure of the systems that should have maintained the alignments, and the lack of self-assessment that should have identified the failure.
- The finding was identified in March 2018, and only 4 of 12 actions have been completed. Although the action plan incorporates 10 procedure changes, revisions that implement the TSR and conduct of operations independent verification are scheduled more than a year later, which is not timely resolution of systemic weaknesses in the ongoing implementation of requirements providing layers of defense for nuclear safety.
- Vault water bath valves that were found not to be in the required positions were corrected without further follow-up as to why they were misaligned.
- Action #12 to revise PA-DOP-01176, R0, *Transferring Nitric Acid from Tank Trucks*, is scheduled for August 5, 2019, exceeding the maximum review cycle required by P315 *Conduct of Operations Manual*, Section 16.7.1 (i.e., PA-DOP-01176 should have been reviewed and revised as necessary by May 16, 2016).

2018-252: A potentially inadequate safety analysis and USQ were declared on August 7, 2013 regarding the DSA and TSRs not adequately demonstrating operability of the TA-55-4 ventilation system and Facility Control System. The last remaining unresolved issue in the evaluation of the safety of the situation (ESS) is a discrepancy between the DSA (which indicates that both glovebox exhaust fans must be operational) and the TSRs (which indicate that only one glovebox exhaust fan must be operational).

Comments:

- The previous issue record (2013-2964) reflects closure of action 1 upon submittal of the ESS, which was not approved and was later revised.

- The original record discusses the compensatory measure, but no action was assigned to implement the compensatory measure or even reference the Standing Order that executes it.
- This follow-on record similarly does not reflect that a compensatory measure is required or is in place.
- Extent-of-condition is checked “Yes,” but there is no record of such a review being done or scheduled in actions, and the ORPS report indicates that “one was not warranted.”
- An effectiveness review is required by P322-4 but has not been scheduled as an action.
- Overall, the discrepancy between the DSA and TSR (documents key to defining and implementing nuclear safety controls) has remained for over five years since identification with no documentation of the compensatory measure in the IMT and no evaluation of its effectiveness.

2018-361: TA-55 PF-4 Updated FHA identified a deficiency (Item #23) in that the power supply to the PF-11 electric-driven fire pump is not protected from a fire as required by National Fire Protection Association 20. This issue was identified in 2009 in a previous issues management system (i.e., LIMTS #2009-3403).

Comment: The issue has existed since 2009, and five of nine related actions are still open.

2018-83: Electrorefining (ER) Operations Federal Readiness Assessment (FRA) identified a Pre-Start finding (CS-PRE-1) that the design requirements for the primary staging glovebox underestimated actual operational net weight, which resulted in inadequate seismic and static loading analyses.

Comment: For the ER Pre-Start, a cause analysis is indicated as required and is required by DOE Order 425.1D, but it is not attached in the IM database to ensure implementation of the corrective actions addressing the cause of the design/analysis error.

2017-456: PF-4 Conduct of Operations Sustainment/Improvement Plan (ADPSM-17-022) Task 2 is to improve the fidelity and efficiency of nuclear material moves in PF-4. Action #4 was to “Develop a project plan for ‘iCrit’ and/or other software tools to improve the efficiency of nuclear material moves.”

Comment: Action #4 was closed when planning and estimating were done, with no tracking for development and implementation of the tool.

2017-457: PF-4 Conduct of Operations Sustainment/Improvement Plan (ADPSM-17-022) Task 3 is to improve PF-4 worker/supervisor performance, accountability, and communication.

Comments:

- Several actions in the corrective action plan are similar to actions in previous improvement and sustainment plans but do not state why the actions in the most recent plan need to be repeated or how they differ from previous actions.
- Although the first effectiveness evaluation resulted in two follow-on actions to evaluate additional improvements, the same issues continue (e.g., 2018-1730).
- Action #3 was to “Perform an Effectiveness Evaluation of ADPSM Work Practices against P315 Conduct of Operations Manual Requirements.” *ADPSM Conduct of Operations Effectiveness Evaluation Final Report*, dated March 9, 2018, documented an

assessment of communications, on-shift training, turnover and assumption of responsibilities, and technical procedures supporting the conduct of operations. The report indicated that deficiencies were noted in each area, with more-significant issues in the communication area. No recommendations were made, and action #3 was closed without further corrective action assignment. Instead, the IRM assigned two production groups to perform follow-on effectiveness evaluations that focused on communications (i.e., reader/worker repeating back work steps to ensure clear communications), neglecting to address other deficiencies identified in the *ADPSM Conduct of Operations Effectiveness Evaluation Final Report*.

2017-41: In September 2017, continuous air monitors alarmed during glovebox support system modification (NA--LASO-LANL-TA55-2017-0026, Moderate risk). This was one of two similar events involving construction workers taking actions beyond the authorized scope.

Comments:

- A causal analysis was appropriately conducted to look for common causes of the two events: a skin contamination occurred during a hot job at TA-55 (2017-0041), and an individual alarmed a hand and foot monitor when exiting the work area (2018-1177).
- Action #10 for an extent-of-condition review, as required by P322-4, remains open after over a year.

2017-1953: Waste drum codes “0” (zero) and “O” were confused when workers were wearing respirators, resulting in 20% incorrect waste characterization codes.

Comment: This issue was closed without corrective action because “there has never been a significant issue with being able to tell the difference between an O and a 0 until recently, so we feel that making the change to the [material balance areas] would negatively affect [nuclear material control and accountability].” The problem was not corrected, implicitly acknowledging that the IRM considers the consequences of the potential recurrence of this issue to be acceptable.

2017-1617: An Implementation Validation Review found that procedure TA55-STP-003, R17-IPC1, *Mode Change, Attachment C, External Mode 1 Entry LCOs*, lists incorrect MAR limits for the High Efficiency Neutron Counter and waste pads. The procedure needs to be revised for the implementation of TSR R1.1.

Comment: The procedure was corrected to reflect the revised TSR but the IRM did not address the cause of listing incorrect MAR limits. This issue was inappropriately categorized as low risk, for which P322-4 does not require a causal analyses.

2017-1448: Aqueous Chloride Federal Operational Readiness Review Pre-Start SB-PRE-1 identified that the assumed americium-241 quantities in the DSA Section 3.4.8 accident analysis supporting LCO 3.7.2.6.d MAR limits are not identified in documentation to ensure that accident analysis assumptions are protected.

Comment: A cause analysis is not attached to the record (DOE Order 425.1D requires correction of each cause) to ensure that implementation of the corrective actions (i.e., posting, procedures, and briefing) adequately addresses the cause.

2017-871: In April 2017, at Technical Area 55-4, a small pyrophoric fire was caused by a chemical reaction involving material that was being repackaged on a cart. One employee sustained second and third degree burns to four fingers but did not require follow-up surgery.

Comments:

- Categorization as a moderate-risk issue resulted in more rigorous analysis. Actions 5 and 14 address the extent-of-condition through an extensive identification campaign.
- The effectiveness evaluation was inappropriately closed to a “promise” of a planned assessment 2018-273 (January 2019).

2016-621: The diesel fire water pump (safety class SSC) outboard packing was found degraded (smoking) during weekly surveillance (NA--LASO-LANL-TA55-2016-0005).

2016-643: The diesel fire water pump (safety class SSC) performance was degraded by the failure of the engine block heater on the fire pump coolant system (NA--LASO-LANL-TA55-2016-0007).

2017-674: The diesel fire water pump (safety class SSC) outboard packing was found degraded (smoking) during weekly surveillance (NA--LASO-LANL-TA55-2017-0011).

Comments:

- Recurring problems in the diesel fire water pump have primarily been attributed to the design and equipment age. However, mechanics not adjusting packing with the engine running to obtain proper flow could be a contributing cause. The Maintenance Manager declined to retrain mechanics (action #4).
- ORPS and the IM record are not consistent in their cause discussions and other elements. For example:
 - The immediate actions reported in ORPS are not recorded in the IM record.
 - The IM record states that a cause analysis will be done, but this was not assigned as an action.
 - The ORPS report concludes that the cause was “communication [less than adequate],” whereas the fact-finding record indicates that the cause was a “Design/Engineering Problem and Equipment/Material Problem.” Neither of the cause statements clearly states the cause in a way that facilitates effective implementation of corrective actions.
 - Action was not assigned to address the Design/Engineering Problem cause.
 - Action #2 from the fact-finding and action #5 from the ORPS report are duplicates.
- Despite this recurring failure of a safety class component, the IRM did not categorize the second event as an ORPS “Recurring R” event (or a “systemic ineffective resolution of issues”), for which P322-4 would have required more rigor in the management of this issue (e.g., a root cause determination, senior management oversight) to ensure a more timely resolution.

2017-389: Management reported a near miss after a glovebox glove was breached during size reduction activities (NA--LASO-LANL-TA55-2017-0007).

Comments:

- This event involved a PIC who was assigned to supervise the work but performed the work in the glovebox. This practice is allowed by procedure at LANL for moderate hazard work. The PIC, without anyone else supervising his work, did not follow the

work document that required armored gloves. Corrective action was not taken for inadequate supervision.

- This event was categorized as low risk despite the breach of a containment structure. P322-4 does not require extent-of-condition review, effectiveness evaluation, or causal analysis for low-risk issues, although the latter was done for the ORPS report.
- The IM record has 17 actions (2 duplicate), 7 of which were reported in the ORPS report. Overall, the IM record is a comprehensive set of actions, which was improved by the causal analysis performed for the ORPS report.

2016-2734: One criticality alarm system channel (safety significant SSC) was declared inoperable (NA--LASO-LANL-TA55-2016-0024). After replacement with a spare, analysis of the detector head determined that a resistor had failed. The repaired part was returned to spares.

Comment: Criticality alarms are a subject of repeated failures; at least two were reported each year from 2014 through 2016. The ORPS report text says, “The [criticality alarm system] has been in service at TA-55 since the late 1970s and components are becoming unreliable.” The only action taken was to replace the resistor, and no action was identified in the IM record to address the unreliability. While the IM record makes no mention of a fix for the unreliability, a new criticality alarm system was installed in 2017 in PF-4 as part of the TA-55 Reinvestment Project II (TRP II) Line Item Project.

2016-1999: The diesel fire water pump (a safety class component) shut down from over-speed during weekly surveillance (NA--LASO-LANL-TA55-2016-0019). The electric pump was operable but is not credited as a safety class component because it does not have a power supply credited as a safety class component.

Comments:

- Corrective action #1 was to determine a repair strategy, and action #2 was to include the diesel fire water pump in a Project Execution Plan strategy to overhaul/replace the pump. The record does not include any action(s) to track/complete the overhaul/replacement strategy and put the diesel fire water pump back in service.
- The ORPS report discussion of causal analysis stated that “deficiencies were identified in the maintenance process and engineering review for the fire [water] pumps in which the procedures did not evaluate the need for replacing relays or sockets on the controller or an evaluation of the need for life cycle related replacement of the controllers.” However, the causes of these problems were not addressed by completed corrective actions.
- The ORPS report indicates that “Troubleshooting and repairs were performed,” but no corrective action was assigned in the IM database and no record of completion was attached.
- Diesel fire water pump inoperability was a failure that should have been considered a significant condition adverse to quality, since it is a safety significant component.
- An extent-of-condition review was done for purposes of the ORPS report, not because of the risk category assigned in the IM system.