



Independent Assessment of the Triad National Security, LLC Management of Nuclear Safety Issues at the Los Alamos National Laboratory

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Acronyms

ALDWP	Associate Laboratory Directorate for Weapons Production
ANSI/ANS	American National Standards Institute/American Nuclear Society
CAS	Contractor Assurance System
CFR	Code of Federal Regulations
CONOPS	Conduct of Operations
CSE	Criticality Safety Evaluation
DOE	U.S. Department of Energy
EA	Office of Enterprise Assessments
EOC	Extent of Condition
iLINK	Issues management software tool (Triad)
IM	Issue Report
IQPA	Institutional Quality and Performance Assurance
LANL	Los Alamos National Laboratory
NA-LA	NNSA Los Alamos Field Office
NCS	Nuclear Criticality Safety
NNSA	National Nuclear Security Administration
NQA	Nuclear Quality Assurance
OE	Objective Evidence
OFI	Opportunity for Improvement
PF-4	Plutonium Facility
PNOV	Preliminary Notice of Violation
RLM	Responsible Line Manager
SME	Subject Matter Expert
TA-55	Technical Area 55
Triad	Triad National Security, LLC

**INDEPENDENT ASSESSMENT OF THE
TRIAD NATIONAL SECURITY, LLC
MANAGEMENT OF NUCLEAR SAFETY ISSUES
AT THE LOS ALAMOS NATIONAL LABORATORY**

Executive Summary

The U.S. Department of Energy (DOE) Office of Enterprise Assessments (EA) conducted an independent assessment of the management of nuclear safety issues at the Los Alamos National Laboratory (LANL) in June and July 2023. This assessment evaluated Triad National Security, LLC's (Triad's) identification, categorization, correction, and prevention of the recurrence of safety issues in nuclear engineering, conduct of operations, and criticality safety, focusing on those affecting pit production in the Plutonium Facility in Technical Area 55. The National Nuclear Security Administration (NNSA) Los Alamos Field Office's oversight of Triad's issues management was also assessed. Additionally, this assessment followed up on significant weaknesses documented in the EA report *Assessment of the Management of Nuclear Safety Issues at the Los Alamos National Laboratory, April 2019* (hereafter referred to as the April 2019 EA report).

Triad implemented its Issues Management Improvement Initiative to resolve the weaknesses documented in the April 2019 EA report, resulting in several significant improvements. Specifically, Triad:

- Deployed an improved issues management software tool (iLINK) and transferred all open issues into this software tool.
- Significantly improved the categorization of issue significance, resulting in the correct application of Triad's graded approach for the rigor used to resolve more issues.
- Employed causal analyses and extent-of-condition reviews more frequently.
- Adequately resolved most of the more recently identified issues in a timely manner.
- Significantly improved the quality of objective evidence documented to support closure of issues, demonstrating some of the best performance in this area.

However, EA identified weaknesses that persist, including two findings, as well as potential vulnerabilities that could impact Triad's ability to maintain and further improve performance:

- Issues are inadequately identified, as evidenced by the lack of issues originated by working-level personnel, the incorrect screening out of many issues from iLINK, and inadequate identification of adverse trends in issues. (Finding)
- Training on iLINK and the issues management process is inadequate, with managers receiving minimal training and working-level personnel receiving none. Additionally, the analysts relied upon to determine the causes of nuclear safety issues are not qualified and are required to complete only basic causal analysis training, omitting advanced techniques. (Finding) Consequently, Triad's analyses did not identify all the causes or corresponding corrective actions for several significant, systemic nuclear safety issues.
- Weaknesses in invoking the requirements of DOE directives and consensus standards persist, as evidenced by inadequate flowdown of requirements for managing nuclear safety issues into Triad's procedures for managing nuclear safety issues, including criticality safety infractions.
- Triad's issues management processes are overreliant on the capabilities and performance of responsible line managers, who receive minimal training. Additionally, over the past two years Triad has had five higher-level managers managing 28% of the issues. This overreliance on a few higher-

level managers and responsible line managers in general are common factors for several of the weaknesses and vulnerabilities identified.

- Triad's oversight of its management of safety issues continues to be insufficient to adequately assess performance and resolve negative trends. Additionally, efforts to continue to improve issues management performance are pursued inconsistently within different LANL directorates.

The NNSA Los Alamos Field Office adequately oversees the management of specific nuclear safety issues via a variety of oversight activities. However, the required assessment of the effectiveness of Triad's assurance system, which includes issues management, has not been performed or scheduled. In the absence of an assessment of Triad's assurance systems, previously-identified weaknesses, especially concerning compliance with DOE requirements, have persisted.

In summary, Triad has significantly improved the management of nuclear safety issues since the April 2019 EA assessment. However, several weaknesses persist, and Triad's processes and training programs do not provide sufficient resiliency to maintain the improved performance. Additionally, Triad's oversight of its management of safety issues remains insufficient to identify and correct negative trends in performance, and efforts to continue to improve performance are pursued inconsistently. The effective and timely resolution of the causes of safety issues will be essential to supporting LANL's challenging plutonium pit production mission.

Recommendation

EA recommends that Triad increase the oversight of its management of safety issues and the coordination of its improvements across the Laboratory. These improvements should be based on an evaluation of the more resilient practices that other DOE contractors and Federal agencies use to correct the causes of issues before significant safety consequences or mission impacts occur.

INDEPENDENT ASSESSMENT OF THE TRIAD NATIONAL SECURITY, LLC MANAGEMENT OF NUCLEAR SAFETY ISSUES AT THE LOS ALAMOS NATIONAL LABORATORY

1.0 INTRODUCTION

The U.S. Department of Energy (DOE) Office of Environment, Safety and Health Assessments, within the independent Office of Enterprise Assessments (EA), assessed the Triad National Security, LLC (Triad) management of nuclear safety issues at the Los Alamos National Laboratory (LANL). This assessment was conducted in June and July 2023 and included significant remote data collection and analysis. The onsite portion of this assessment was conducted July 10-14, 2023.

Triad replaced Los Alamos National Security, LLC as the management and operations contractor at LANL for the National Nuclear Security Administration (NNSA) on November 1, 2018. The EA report *Assessment of the Management of Nuclear Safety Issues at the Los Alamos National Laboratory, April 2019* (hereafter referred to as the April 2019 EA report) assessed the management of nuclear safety issues that were open January 2016 to January 2019. That assessment identified significant weaknesses in the process and institutional behaviors that have allowed identified problems to go uncorrected, problem recurrences to be routinely accepted, and corrective actions to be delayed, often for years.

Triad implemented its Issues Management Improvement Initiative to resolve the weaknesses identified in the April 2019 EA report. Actions from this initiative included replacing the issues management software tool with iLINK, a version of the DevonWay, LLC contractor assurance software used by several DOE management and operations contractors. As of July 1, 2021, Triad required all new conditions, abnormal events, and issues to be entered into iLINK. After September 1, 2022, any remaining open issues in the previous issues management software tool were transferred into iLINK. Additionally, Triad is working on transferring pre-existing, closed issues into iLINK.

In accordance with the *Plan for the Independent Follow-up Assessment of the Management of Nuclear Safety Issues at the Los Alamos National Laboratory, May 2023*, this follow-up assessment evaluated Triad's management of nuclear safety issues open after July 1, 2021, to determine whether issues were adequately resolved and whether Triad has resolved the weaknesses identified in the April 2019 EA report. For consistency with the April 2019 EA assessment and due to the plutonium pit production mission at LANL, this team assessed the management of issues in areas key to nuclear safety in the LANL plutonium facility (PF-4), specifically nuclear criticality safety, safety bases, engineering and design, and the conduct of operations (CONOPS) supporting plutonium processing and pit manufacturing and facility operations, maintenance, and modification. This assessment also evaluated the NNSA Los Alamos Field Office (NA-LA) oversight of Triad issues management.

2.0 METHODOLOGY

The DOE independent oversight program is described in and governed by DOE Order 227.1A, *Independent Oversight Program*, which EA implements through a comprehensive set of internal protocols, operating practices, assessment guides, and process guides. This report uses the terms "best practices, deficiencies, findings, opportunities for improvement (OFIs), and recommendations" as defined in the order.

EA used criterion 5 of objective 1 and objectives 3-5 of EA Criteria and Review Approach Document 30-01, revision 1, *Contractor Assurance System*, February 15, 2018, to assess the flowdown and implementation of issues management requirements from DOE directives and invoked consensus standards.

EA examined key documents, such as procedures, quality assurance program descriptions, internal and external assessments, and 264 safety issues, including associated extent-of-condition reviews, causal analyses, corrective action plans, and effectiveness reviews. The review of safety issues included: (1) those Triad identified as being of high significance (serious impact on safety), (2) a representative sample of issues Triad identified as having less significant (moderate or low) impact on safety, and (3) 165 other conditions, observations, and OFIs that Triad personnel identified for consideration, trending, or management via other processes (e.g., facility service requests). These reviews enabled EA to determine whether issues impacting safety are being adequately identified and corrected, using a graded approach, to prevent recurrence.

EA interviewed Triad personnel responsible for individual issues and for implementation of the Triad issues management processes, as well as NA-LA managers and subject matter experts (SMEs) responsible for overseeing Triad's issues management, nuclear engineering, safety bases, nuclear criticality safety, and CONOPS. In addition, EA assessment team members attended teleconferences that Triad managers use to monitor the management of issues within their directorates.

The members of the EA assessment team, Quality Review Board, and management responsible for this assessment are listed in appendix A. EA's comments on individual issues are in appendix B.

3.0 RESULTS

In this section, results are grouped into the following functions for issues management: the flowdown of issues management requirements; issue identification and categorization; issue resolution, including evaluations of the effectiveness of actions; the timeliness of actions and closure of issues; and the monitoring and oversight of issues management. Additionally, this section documents the overall effectiveness of Triad actions taken to resolve the weaknesses identified in the April 2019 EA report.

3.1 Flowdown of Issues Management Requirements

This portion of the assessment examined whether Triad has adequately invoked requirements in applicable consensus standards and DOE directives per the Triad contract with NNSA and the NNSA-approved Triad SD330, *Los Alamos National Laboratory Quality Assurance Program*.

For the management of nuclear safety issues, SD330 commits to the requirements in DOE directives and the American Society of Mechanical Engineers consensus standard Nuclear Quality Assurance (NQA)-1-2008, *Quality Assurance Requirements for Nuclear Facility Applications*, with the NQA-1a-2009 addendum. Triad revised SD330 and P322-4, *Issues Management*, to better reflect these requirements. However, the following recurring issues show that some of the weaknesses identified by Finding F-Triad-1 of the April 2019 EA report, concerning the establishment and management of a compliant quality assurance program, persist:

- Contrary to DOE Order 414.1D, *Quality Assurance*, attachment 1, paragraph 1.b, which states that the quality assurance program must "Implement [quality assurance] criteria as defined in Attachment 2, ... and describe how the criteria/requirements are met, using the documented graded approach," SD330 does not contain this required information for managing issues. (See **Deficiency D-Triad-1.**)

For example, section 3.1.1.c of SD330 states that “[c]orrective action planning includes identification of the causes of problems and prevention of recurrence” but does not describe how corrective action planning and causal analyses will be graded (varied) by issue significance. Instead, P322-4 establishes that corrective action plans and causal analyses are required only for issues of high significance. DOE Guide 414.1-2B, *Quality Assurance Program Guide*, states that the graded approach cannot be used to “grade quality assurance criterion to zero,” and “[e]ven in the least stringent application, compliance with applicable portions of stated requirements is mandatory unless an exemption is approved through an appropriate process.” Consequently, key requirements for managing and resolving issues are established in sub-tier procedures that are not subject to approval by NA-LA.

- SD330 states that P322-4 “categorizes issues by significance (high, moderate, low). Significant conditions adverse to quality are categorized as high significance and conditions adverse to quality are categorized as moderate significance or low significance.” However, even though a large portion of Triad’s work is high hazard nuclear work, the base processes of P322-4 do not flow down requirements for managing nuclear safety issues. Instead, P322-4, attachment A, provides the NQA-1 requirements for issues determined to be conditions and significant conditions adverse to quality but does not define those conditions or require them to be categorized per SD330. (See **Deficiency D-Triad-2.**) Several of the interviewed personnel managing nuclear safety issues were not familiar with the NQA-1 definitions and defaulted to using the criteria in P322-4, table 1, which do not invoke the requirements of NQA-1 for all significant conditions adverse to quality.
- Triad continues to not adequately flow down the responsibility in attachment 1, sec. 4.b of DOE Order 232.2A, *Occurrence Reporting and Processing of Operations Information*, that facility managers “[d]etermine causes and generic implications ... for reportable occurrences.” P322-3, *Performance Improvement from Abnormal Events*, table 2, states that causes and corrective actions for low and informational reporting level occurrences are determined per P322-4, but P322-4 does not require determination of the causes, or their corrective actions, for the issues that led to those occurrences. For example, P322-4 requires that causes and their corrective actions be determined only for high significance issues. Additionally, neither P322-3 nor P322-4 discuss determination of the “generic implications” of reportable occurrences. (See **Deficiency D-Triad-3.**) Not fully flowing down this DOE Order 232.2A responsibility into P322-3 or P322-4 increases the likelihood that causes and generic implications will not be determined or corrected for all reportable occurrences as required by the DOE order, including those impacting layers of defense ensuring nuclear safety.

Triad SD130, *Nuclear Criticality Safety Program*, commits to the requirements of American National Standards Institute/American Nuclear Society (ANSI/ANS)-8 series consensus standards for nuclear criticality safety, including the resolution of nuclear criticality safety issues. ANSI/ANS-8.1-2014, *Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors*, and 8.19-2014, *Administrative Practices for Nuclear Criticality Safety*, both state that “[a]ction shall be taken to prevent recurrence” of unintended deviations to processes or procedures and potential nuclear criticality safety infractions. SD130, revision 8, required actions “to prevent recurrence,” but SD130, revision 9, changed the requirements invoked by Triad “to reduce the likelihood of recurrence,” which is inconsistent with the ANSI/ANS standards. NQA-1 and DOE Order 414.1D also require actions to preclude or prevent recurrence to ensure causes are corrected. (See **Deficiency D-Triad-4.**) Requiring actions only to reduce the likelihood of recurrence does not ensure that causes are corrected to preclude or prevent recurrence.

SD330, section 3.1.1.a, states that “[t]he Triad organizational structure and interfaces are documented on the LANL Organization page. However, this page has not been updated to reflect recent major organizational changes and replacements of personnel supporting the management of nuclear safety issues. (See **OFI-Triad-1.**) For example, the Triad Associate Laboratory Directorate for Plutonium Infrastructure was significantly reorganized on May 29, 2023, to improve the management of ongoing

modifications in PF-4 supporting increases in plutonium pit production rates. However, an organization chart for that Directorate dated February 9, 2023, continued to be posted on the LANL Organization page until July 10, 2023. With the high level of personnel turnover and reorganization ongoing at LANL, inadequate maintenance of the posted organization structure and interfaces can lead to inefficiencies as personnel responsible for nuclear safety functions and issues are not accurately identified on the LANL organizational page.

Flowdown of Issues Management Requirements Conclusions

Triad revised SD330 and P322-4 to better reflect requirements for managing nuclear safety issues from appropriate consensus standards and applicable DOE orders. However, recurring issues indicate that some of the weaknesses identified in the April 2019 EA report concerning the establishment and management of a compliant quality assurance program persist. Specifically, SD330 does not adequately describe the graded approach for managing issues, P322-4 does not flow down requirements concerning the management of nuclear safety issues, and neither P322-3 nor P322-4 flows down the facility managers' responsibility to determine the causes and generic implications for all reportable occurrences. Additionally, contrary to DOE Order 414.1D and appropriate consensus standards, SD130 no longer requires actions to "prevent recurrence" of nuclear criticality safety issues. Finally, Triad has not updated/maintained the organization charts for managing nuclear work, including safety issues which can lead to inefficient problem resolution.

3.2 Issue Identification and Categorization

This portion of the assessment examined whether issues and trends are identified and properly categorized to meet the requirements for issues management.

3.2.1 Issue Identification

Triad initiates and manages approximately 1,700 issues per year, with most entries in iLINK originating from self-revealing events and Triad assessments. Although these actions demonstrate a willingness to identify and enter issues into iLINK, working-level (non-supervisory) personnel are insufficiently involved in identifying issues, condition reports entered into iLINK identifying potential issues are not always screened correctly, and identification of adverse trends in issues is inadequate. Together, these shortcomings demonstrate extensive weaknesses in Triad's processes for complying with the requirements of DOE Order 414.1D, attachment 2, criterion 3, for identifying or detecting quality problems (issues) and items, services, and processes that do not meet established requirements or that need improvement. (See **Finding F-Triad-1.**) These vulnerabilities allow some issues to persist, increasing the risks to the safe operation of LANL nuclear facilities.

Working-level Personnel Involvement in Issue Identification

SD100, *Integrated Safety Management System*, states that Triad "added an eighth principle, *Worker Involvement*, which is imperative to [integrated safety management] implementation strategy success... As such, reaching the Laboratory's goals depends on worker involvement in identifying and resolving concerns." Accordingly, SD320, *Contractor Assurance System Description*, states that the Triad workforce "is responsible for effectively incorporating contractor assurance system (CAS) processes, tools, policies, and procedures into their work activities" and that their managers are responsible for holding "employees in their respective organizations accountable for implementing CAS processes, tools, policies, and procedures" (e.g., identifying and entering issues into iLINK for resolution per P322-4). However, contrary to these responsibilities listed in SD320, working-level personnel have not independently identified or entered issues into iLINK in the areas examined. (See **Deficiency D-Triad-**

5.) EA identified the following conditions that likely inhibit the identification of issues by non-supervisory Triad personnel:

- Contrary to DOE Order 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*, attachment 1, chapter 1, sections 4.b.(1) and 4.b.(1)(d), Triad working-level personnel receive little or no training in the issues management procedures or use of iLINK. (See **Finding F-Triad-2** and **OFI-Triad-2**.) Inadequate training or direction on Triad’s issues management processes can impede personnel’s identification of issues that may be precursors to more significant self-revealing issues.
- Several impediments to working-level personnel directly entering issues into iLINK have not been removed to “create an environment that enables worker involvement” per SD100:
 - P322-4 does not state that working-level personnel can identify issues independent of “assessments, audits, program reviews, abnormal events, surveillances, metrics, [management observations], and routine operational awareness activities.”
 - To identify safety issues via assessment activities, working-level personnel must request to be assigned and/or be assigned to an assessment team by their supervisor. Issues identified by team members are reviewed and screened by the assessment team leader before being entered into iLINK as findings identified from the assessment.
 - P322-4 does not provide a means for personnel with infrequent computer access, such as craft workers, to independently identify and enter issues into iLINK.

Screening of Issues Newly Entered into iLINK

P322-4 defines an issue as “a condition that negatively impacts performance or could potentially degrade performance ... often [identifying] inadequacies or deficiencies in operations or non-compliances with requirements.” However, EA identified several conditions meeting the definition of an issue that were not entered by responsible line managers (RLMs) into iLINK to be managed as issues. (See **Deficiency D-Triad-6**.) Specifically:

- On May 18, 2023, Preliminary Notice of Violation (PNOV) NEA-2023-01 stated that Triad had not identified or resolved some of the causes of a skin contamination event and two flooding events. The PNOV attributed this to weaknesses in the Triad causal analyses and corrective action completion. As documented in DIR-23-036 on June 6, 2023, Triad acknowledged receipt of the PNOV and stated: “Triad will not provide a reply to the PNOV pursuant to 10 CFR 851.42(c) and acknowledges that the PNOV will thereby become final and constitute a final order... Triad takes the events and circumstances relating to this PNOV seriously. We remain fully committed to the continued improvement of the safety of our nuclear facility operations.” However, as of July 2023, Triad had not entered the issues identified in the PNOV into iLINK to determine and correct the causes of the identified weaknesses – neither the unidentified causes of the skin contamination and flooding events nor the causes of the insufficient Triad causal analyses of these events and corrective action completion.
- Per P322-4, initial issue entries into iLINK are designated as condition reports, which an RLM must confirm as valid entries before they are re-designated as issues. In this process, if an RLM independently determines a condition report to be invalid, it is closed without being subject to the issues management requirements and processes in P322-4 (e.g., without being corrected). Of 55 condition reports reviewed that were closed without corresponding issue reports, 24 (47%) met the definition of an issue and were incorrectly closed; these are listed in the Conduct of Operations Issues portion of the table in appendix B of this report. Six of these involved potential noncompliances with

DOE Order 426.2, were identified by Triad independent assessment LANL-ASMT-2021-0143, and could impact the qualifications of personnel performing nuclear work in PF-4.

- Twenty-two (20%) of 110 reviewed management observations identified valid issues as defined in P322-4 that were not entered into the issues management module of iLINK; these are listed in the Conduct of Operations Issues portion of the table in appendix B.

EA identified the following conditions that likely contributed to issues not being screened into iLINK for management as issues:

- Per P322-4, “[t]he owning RLM has the authority and responsibility to evaluate the condition and determine if the condition will be managed as an issue through the [issues management] process and tool.” However, having RLMs solely responsible for screening issues, without requiring input or concurrence from SMEs and/or with no oversight, means that the misconceptions or biases of individual RLMs could allow some safety issues to go unresolved. (See **OFI-Triad-3.**)
- Contrary to DOE Order 426.2, attachment 1, chapter 1, sections 4.b.(1)(d), 4.b.(5)(a), and 5.c., RLMs are only required to take one-time training on issues management (i.e., required reading of P322-4 and subsequent revisions), instead of completing problem analysis training and meeting requirements for experience with managing issues. RLMs are not required to take continuing training and training on lessons learned and improvements for maintaining or improving issues management practices and proficiency. (See **Finding F-Triad-2.**)
- Triad has 340 individuals designated as RLMs. Over the past 2 years, 5 of the 340 RLMs (1%) have managed between 117 and 305 issues each, for a total of 28% of all issues sitewide; 274 (81%) of the RLMs managed only 1 to 10 issues over the past 2 years. The Technical Area 55 (TA-55) Facilities Operations Director has been the RLM for 305 issues, including complex nuclear safety issues. Assigning too many issues to higher-level RLMs (e.g., facility operations directors), rather than assigning less significant issues or issues with relatively confined extent to lower level RLMs, can dilute the management attention provided to ensure that issues are adequately addressed and resolved in a timely manner. Additionally, the improved performance since 2019 largely depends on the continued performance of just a few RLMs.

Identification of Adverse Trends

The evaluation of performance information and repetitive, similar issues for discernable trends is an important mechanism for identifying safety concerns. P322-4 requires RLMs to assign codes to each issue to facilitate trending using the capabilities of iLINK. However, Triad has not developed a process for evaluating issues in iLINK for trends as required by DOE Order 226.1B, attachment 1 and DOE Order 414.1D, attachment 2 to “communicate issues and performance trends and analysis” and “to detect and prevent quality problems” and “items, services, and processes needing improvement,” respectively. (See **Deficiency D-Triad-7.**) Not performing trend analysis and instead relying primarily on informal trending by managers (i.e., relying on managers recalling multiple, related issues to identify trends in performance) has resulted in missing some trends. Additionally, during interviews RLMs from different directorates stated that they use trend codes they developed individually, potentially hindering the ability to identify trends in nuclear safety functions (e.g., CONOPS) that impact multiple directorates. (See **OFI-Triad-4.**) EA identified issues indicative of trends that were not identified by Triad in the following areas:

- Configuration management (see Nuclear Engineering issues 2022-6948, 2022-8138, 2022-8139, 2022-8145, and 2023-9347 in appendix B)
- Material mass control issues (see CONOPS issues 2020-1031, 2021-0730, 2022-7236, 2022-7846, 2022-8491, and 2023-2134 in appendix B)

- Unapproved or uncontrolled work resulting in violations of criticality safety postings (see CONOPS issues 2020-1332, 2021-0336, 2021-0597, and 2022-7362 in appendix B)
- Maintenance work (see CONOPS issues 2020-0911, 2020-1306, 2022-8042, and 2023-9282 in appendix B)
- Glovebox glove separation from the glovebox glove port (see CONOPS 2020-1017, and 2020-1214 in appendix B)
- Glovebox glove breach contaminations (see CONOPS issues 2020-0918, 2021-0294, 2021-0728, and 2022-6128 in appendix B).

3.2.2 Issue Categorization

Per P322-4, Triad RLMs determine the significance level of each issue (i.e., low, moderate, or high). As discussed in section 3.1 of this report, P322-4 does not adequately flow down the requirements in SD330 to categorize significant conditions adverse to quality as high significance issues and other conditions adverse to quality as low or moderate significance. P322-4, table 1, provides criteria for categorizing issue significance. RLMs appropriately categorized most issues using table 1, a significant improvement since the April 2019 EA assessment. However, RLMs categorized some of the more significant or complex safety issues associated with nuclear operations as lower than required by table 1. (See **Deficiency D-Triad-8.**) For example, RLMs categorized the following issues as moderate instead of high significance:

- 2021-0392, which demonstrated the extended failures of multiple layers of defense for controlling the level in the vault water bath for fissionable material
- 2021-5087, which documented that unqualified workers performing nuclear work resulted in flooded gloveboxes containing fissionable materials
- 2023-9282, which identified a recurring issue and significant risk of fatality to personnel when a 300-pound transformer was dropped, hitting scaffolding below
- 2022-6128, which reported skin contaminations that could have exceeded the annual limit.

Other operational issues categorized contrary to P322-4, table 1, are CONOPS issues 2023-0210, 2022-7145, 2021-0730, and 2020-1214, discussed in appendix B.

EA identified the following conditions that likely contributed to issues not being appropriately categorized to ensure their resolution:

- Per P322-4, the RLM alone, without requiring input or concurrence from SMEs and/or oversight, categorizes the significance of individual issues. This approach to categorization (and hence the application of the graded approach to issue resolution) is subject to the misconceptions or biases of individual RLMs and has resulted in some more-significant or complex nuclear safety issues being graded lower than required to ensure resolution. (See **OFI-Triad-3.**)
- As discussed in section 3.2.1 above, RLMs are only required to take one-time training on issues management. Training on lessons learned and improvements to maintain or improve issues management practices is optional. (See **Finding F-Triad-2** and **OFI-Triad-5.**)
- The criteria for categorizing issues in table 1 of P322-4 are vague and can be interpreted to allow significant issues to be inappropriately categorized as moderate. For example, issues that could result in a single fatality can be and were categorized as moderate significance per table 1.

Issue Identification and Categorization Conclusions

Triad demonstrates a willingness to identify issues and enter issues into iLINK with most entries originating from self-revealing events and Triad assessments. However, there are significant weaknesses in the involvement of working-level (non-supervisory) personnel, the screening of conditions in iLINK by RLMs to identify issues, and the identification of adverse trends in issues. Several RLMs have significantly improved the categorization of issues since the April 2019 EA assessment. However, RLMs did not correctly categorize some more-significant or complex nuclear safety issues to ensure that they would be analyzed with sufficient rigor to ensure resolution. Overreliance on RLMs, especially a few higher-level RLMs to manage most issues, and inadequate training of RLMs and working-level personnel on issues management processes are common factors contributing to the identified weaknesses and vulnerabilities to continuing to improve the management of safety issues.

3.3 Issue Resolution

This portion of the assessment evaluated whether the issues management system includes structured processes using a graded approach for identifying the causes of issues, assessing the extent of the condition identified, and developing/implementing appropriate corrective actions for those issues, and for reviewing the effectiveness of actions taken to ensure that the issues are resolved.

P322-4 specifies more rigor for evaluating issues of greater significance and complexity and for validating the effectiveness of corrective actions. For example, causal analyses, corrective action plans, and effectiveness reviews are required for issues of high significance and optional for issues of moderate and low significance. For issues of moderate significance, the RLM is required to annotate in iLINK the “decision basis” for not conducting a causal analysis. Per P322-4, extent-of-condition reviews are optional for all issues, but the RLM is required to annotate in iLINK the “decision basis” for not conducting an extent-of-condition review for high significance issues. For all issues, P322-4 requires the RLM to identify trend codes and corrective actions and provide objective evidence of actions taken to fix the condition (including minor found-and-fixed issues).

For most of the reviewed issues, Triad adequately implemented its graded approach and implemented actions for resolution. However, EA identified weaknesses in Triad’s implementation of elements of its graded approach, as discussed below.

Causal Analyses

P322-4, section 3.2.3, states that the “causal analysis process is a systematic, structured process that identifies root or apparent causes and contributing factors and helps to ensure effective and sustainable corrective actions.” However, Triad’s analyses did not identify all the causes or the associated corrective actions to prevent recurrence for several significant, systemic weaknesses. (See **Deficiency D-Triad-9**.) Specifically:

- PNOV NEA-2023-01 identified that Triad had not identified or corrected some causes of events leading to skin contaminations, a vault water bath flooding event, and a glovebox flooding event, and that the causal analyses were limited to human performance issues and did not identify other conditions (poor equipment and management programs) leading to the events.
- Despite recurring glovebox breaches over the past two years and three causal analyses, Triad had not identified or corrected the common causes or root causes for systemic weaknesses leading to these recurring events.

EA identified the following conditions that likely contributed to Triad’s analyses not determining all the causes:

- P322-4 requires causal analysts to complete a training course, but not a qualification. Per DOE Order 426.2, technical staff supporting nuclear operations are required to be qualified. (See **Finding F-Triad-2.**)
- The training required by P322-4 for causal analysts covers only basic apparent causal techniques, with no requirement for training on more-advanced techniques for more-complex and significant analyses.
- IQPA-PA-GU-003.000, *Causal Analysis Guide*, dated July 31, 2019, has not been updated to reflect changes made in the past four revisions of P322-4. As a result, the guide is inconsistent with P322-4 (e.g., it states that apparent cause analyses are required for moderate issues and root cause analyses are required for high significance issues).

Extent-of-Condition Reviews

Some issues categorized as moderate significance have had broad implications, in that the conditions extended beyond the scope of cognizance or authority of the assigned RLM. For example, the common cause analysis of the recurring prestart findings identified during the sequential assessments of the readiness to start nuclear operations in PF-400 (formerly known as the Radiological Laboratory, Utilities, Office Building (RLUOB)) identified weaknesses in issues management processes. However, the Triad RLM did not determine whether these weaknesses impacted issues management in other facilities within TA-55 or across LANL that also rely on P322-4. In appendix B, Nuclear Engineering issue 2022-6699 identified that no extent-of-condition review was performed for a nonconservative error in a calculation of the material-at-risk for a storage area in PF-4. Without such extent-of-condition reviews, weaknesses may persist in other areas or facilities, and efforts to improve issues management across Triad may be uncoordinated or fragmented. (See **OFI-Triad-3.**)

Corrective Actions

P322-4, section 3.3.1 states that the RLM assigned to an issue “[d]evelops corrective actions, or a [corrective action plan] if applicable, to resolve the issue, including any causal factors identified in a causal analysis ... to prevent reoccurrence for high-significance issues and to reduce the likelihood of reoccurrence for other than high-significance issues.” However, for several reviewed issues, RLMs did not develop adequate corrective actions to resolve the issue or its causes to prevent recurrence. (See **Deficiency D-Triad-10.**) Examples include Nuclear Engineering issues 2021-5355, 2021-5946, and 2022-6699 and Criticality Safety issue 2021-5807 in appendix B.

Effectiveness Reviews

In addition to requiring effectiveness reviews of corrective actions for high significance issues, P322-4, section 3.4.1, states that those reviews are “for determining the effectiveness of implemented corrective actions in sustainably resolving an issue, to prevent reoccurrence for high-significance issues and to reduce the likelihood of reoccurrence for other than high-significance issues.” However, RLMs rarely direct effectiveness reviews of other than high-significance issues. (See **OFI-Triad-6.**) Only one effectiveness review was completed for the 264 reviewed issues, and several others were awaiting completion of all the planned corrective actions. Contrary to P322-4, section 3.4.1, the single effectiveness review verified only the completion of corrective actions, not their effectiveness. (See **Deficiency D-Triad-11.**) Inadequate effectiveness reviews can allow the causes of issues to persist and ineffective corrective actions to remain, placing an unnecessary, nonproductive burden on operations.

IQPA-PA-GU-001, R61, *Issues Management Guide*, recommends performing effectiveness reviews “several months after all actions for an issue have been completed” but does not discuss the potential use of interim effectiveness reviews for issues. Some actions take a long time to complete or can be delayed (for multiple years, in some capital projects). In these circumstances, interim effectiveness reviews can ensure the effectiveness of actions implemented closer to when the issue was identified, including compensatory actions providing interim protection from an adverse condition. (See **OFI-Triad-6**.)

Issue Resolution Conclusions

For most of the reviewed issues, Triad adequately implemented its graded, structured approach for issue resolution and took adequate action to resolve them. However, causal analyses of some more-complex and significant nuclear safety issues did not identify all the causes for resolution; weaknesses in the training process for causal analysts are a likely contributing factor. Additionally, the corrective actions taken for a few issues were inadequate to resolve the issues or associated causes. Effectiveness reviews are required only for issues of high significance and are rarely performed, and the single effectiveness review that was completed verified corrective action completion without verifying effectiveness.

3.4 Timeliness and Closure

This portion of the assessment evaluated whether planned corrective actions are completed in a timely manner and whether closure is adequately documented.

Timeliness of Issue Closure

Most issues identified since July 1, 2021, have been resolved in a timely manner – a significant improvement since the April 2019 EA report. However, the Triad Institutional Quality and Performance Assurance division’s (IQPA’s) *Deep Dive Review of Institutional Issues Open 12–24, [Fiscal Year] FY 22 Q4* identified many older issues that are “stale” (not being actively worked on to ensure timely resolution per P322-4 or as soon as practical as required by NQA-1). (See **Deficiency D-Triad-12**.) Specifically, IQPA identified that 33-35% of issues that were 12 to 24 months old and 42.5% over 24 months old were stale. For example, issue report LANL-IM-2022-6358, regarding where magnesium oxide is needed in gloveboxes for fire suppression, has remained open since March 9, 2009. This issue was formerly tracked as 2018-1436 in the previous issues management tool used at LANL; the April 2019 EA report cited it as an example of nuclear safety issues not being resolved in a timely manner as required. Delayed resolution of issues allows weaknesses in safety (e.g., degradations in the layers of defense ensuring nuclear safety) to persist, unnecessarily increasing the risk of more significant consequences.

The following may be contributing to inactivity on many older issues:

- Many issues are assigned to only a few RLMs and their respective issues management SMEs to manage.
- Many of the older issues were identified and initially managed by personnel who no longer work at LANL.
- RLMs can extend due dates an unlimited number of times without higher-level management approval. (See **OFI-Triad-7** and **OFI-Triad-8**.)
- Metrics presented to senior management are based on the average age of issues and bins depicting the number of issues in age categories (i.e., less than 6 months, 6 – 9 months, 9 – 12 months, 12 – 15

months, 15 – 18 months, 18 – 21 months, and greater the 24 months), without identifying which issues are over 24 months old or their age.

At EA’s request, IQPA reviewed issues transferred into iLINK from previous issues management systems used at LANL and determined that:

- 43 (36%) of 118 reviewed issues that were transferred had the incorrect “identified date,” showing the date the issue was entered into iLINK rather than the date the issue was originally identified.
- 24 of those 43 issues are still open, including 19 assigned to the Associate Laboratory Directorate for Weapons Production and 11 of those assigned to the TA 55 Facilities Operations Director.

The difference between the “identified dates” and the original identification dates of issues that are still open varies from 0.8 to 14.1 years, with an average of 3.4 years. The discrepancy can impact the accuracy of the timeliness metrics monitored by IQPA and can further obscure the level of inactivity on older issues.

Documentation of Issue Closure

The documentation provided in iLINK to support the closure of corrective actions and issues has significantly improved since the April 2019 EA assessment, demonstrating some of the best performance in this area when compared with other facilities across the DOE complex. However, contrary to P322-4, section 3.3.3, EA identified that RLMs close some issues with inadequate documentation of corrective action completion. (See **Deficiency D-Triad-13.**) Specifically, EA identified the following (see appendix B):

- There was inadequate evidence or documentation of completion for Nuclear Engineering issues 2021-5355, 2022-6279, 2022-6934, and 2022-6952.
- Nuclear Engineering issues 2022-6470 and 2022-6641 were closed on the basis of a promise of future action.
- CONOPS issues 2020-1352, 2021-5439, 2022-6128, 2022-7846, and 2023-0046 were closed on the basis of draft documents, project plans, or managers receiving training intended to be provided to working-level personnel.
- Criticality Safety issue 2021-6060 did not adequately document the basis for level determination of related nuclear criticality safety infractions.

Timeliness and Closure Conclusions

Most of the reviewed issues were resolved in a timely manner, showing significant improvement since the April 2019 EA report. However, the Triad IQPA has identified many older issues that are “stale,” or not actively being worked on for resolution, and that 24 older issues transferred to iLINK from previous LANL issues management systems are actually 3.4 years older, on average, than indicated in iLINK.

The documentation provided in iLINK to support the closure of corrective actions and issues has significantly improved since the April 2019 EA report, demonstrating some of the best performance in this area when compared with other facilities across the DOE complex. However, EA identified some cases for which closure documentation did not meet the requirements of P322-4.

3.5 Monitoring and Oversight of Issues Management

This portion of the assessment examined how Triad and NA-LA monitor and assess the management of issues and take action to improve performance.

Triad Monitoring and Oversight

Per P322-4, IQPA “[m]onitors institutional performance of the [issues management] process and provides feedback to owning organizations.” For example, IQPA had a management assessment (LANL-ASMT-2022-0433, *CAS Maturity*) and an external, independent assessment (LANL-ASMT-2022-0051, *Contractor Assurance System (CAS) Issues Management (IM)*) performed to assess the effectiveness of the Triad’s Issues Management Improvement Initiative. Additionally, IQPA monitoring includes informal reviews (a.k.a., “deep dives”) into the implementation of issues management processes. IQPA provides staff support to the Triad Institutional Management Review Board by providing metrics for Triad’s executive-level dashboard and informally to the Triad directorates by emailing them additional metrics on their issues management performance. However, these IQPA activities address only some of the weaknesses identified in the April 2019 EA report, and contrary to the requirements of DOE Order 226.1B, attachment 1, paragraph 2.b., Triad’s overall oversight of its issues management performance does not meet the requirements for monitoring and improving issues management performance. (See **Deficiency D-Triad-14.**) Specifically:

- Triad has not set “[m]etrics and targets to assess the effectiveness of performance” of issues management processes. For example:
 - Triad senior management does not monitor the number of issues Triad identified versus those revealed by equipment failures or events or issues identified by external organizations.
 - P322-4 states that issues should be identified promptly and resolved in a timely manner without defining targets for timely issue identification, corrective action plan development, causal analysis, or closure.
 - The age of open issues is monitored based on the average of the ages of the open issues and bins depicting the number of issues in age categories (i.e., less than 6 months, 6 – 9 months, 9 – 12 months, 12 – 15 months, 15 – 18 months, 18 – 21 months, and greater the 24 months), without identifying which issues are over 24 months old or their age.
- Triad is not taking adequate action to “correct negative performance/compliance trends before they become significant issues.” For example:
 - The percentage of open issues over 12 months old has been steadily increasing, doubling from approximately 19% in August 2022 to 38% in May 2023. This negative trend in performance has not been identified as an issue, and no formal corrective actions have been taken.
 - On May 31, 2023, IQPA identified the average time for categorizing “Conditions with no Significance Assigned” was 38 days, 44 days, and 50 days for the Facility Operations; Environmental Safety, Health, and Quality; and Weapons Production directorates, respectively. However, Triad has not determined the cause for these delays or committed to actions to improve the timeliness of its screening processing for categorizing issue significance.
- The IQPA informal reviews (“deep dives”) of issues management performance does not provide “[r]igorous ... and credible self-assessment” required by DOE Order 226.1B. For example, IQPA does not document them as assessments per P328-5, *Assessments*, to ensure that factual accuracy reviews are conducted, management is notified of identified issues, and issues are managed per P322-4.

EA identified the following factors that likely contributed to continuing weaknesses in Triad’s monitoring and oversight of its issues management performance:

- P322-4 does not state who has the overall lead and responsibility for improving issues management across LANL.
- Assessments LANL-ASMT-2022-0433 and LANL-ASMT-2022-0051 identified weaknesses similar to some of those EA identified, but IQPA has not taken timely action in response to these assessments. Specifically, during this EA assessment, 4 OFIs from LANL-ASMT-2022-0433 were still in the “analysis and action development” step more than nine months after the report was issued, and the RLM did not categorize the significance of the 5 findings and 15 OFIs in LANL-ASMT-2022-0051 for more than two months after the report was issued.

As discussed in previous sections of this report, Triad has made some significant improvements in its issues management performance since 2019. Additional improvements in Triad’s management of nuclear safety issues would help ensure that the causes of issues are adequately resolved to prevent recurrence and impacts to safety and pit production. However, efforts within Triad’s different directorates to continue to improve issues management processes, training, and performance are being pursued inconsistently and without coordination. Additionally, the base processes of P322-4 do not include the requirements for managing nuclear safety issues, despite the potential consequences of nuclear safety issues and the relatively large percentage of Triad personnel performing nuclear work. Without more proactive oversight and coordination of efforts to increase the resiliency of Triad’s issues management processes and improve their implementation across Triad, the improved performance may not be enduring or sufficient to achieve the high reliability of nuclear operations needed at LANL to support and sustain its pit production mission.

NA-LA Monitoring and Oversight

Per DOE Order 226.1B, evaluations of contractor management systems “must be based on the results of operational awareness activities; assessments of facilities, operations, and programs; and assessments of the contractor’s assurance system. The level and/or mix (i.e., rigor or frequency in a particular area) of oversight may be tailored based on considerations of hazards, the maturity and operational performance of the contractor’s programs and management systems.” NA-LA procedure MP 00.08, *Implementation of NA-LA Line Oversight*, describes the NA-LA oversight approach, which allows oversight through a variety of activities, including independent assessments, shadow assessments, document reviews, and operational awareness activities. Annually, NA-LA develops an assessment schedule that is consolidated with the Triad assessment schedule to form the site integrated assessment plan.

Procedure MP 00.08, section 5.2.1, states that, “NA-LA regularly assesses the effectiveness of the contractor’s assessment processes, including the following processes: issues management including causal analysis, extent of condition, identification of corrective actions, corrective action tracking and monitoring, closure of corrective actions and verification of effectiveness and trend analysis.” NA-LA assesses aspects of issues management via independent assessments and operational awareness activities of other functional areas. For example, NA-LA Facility Representatives routinely attend management review boards, monitor contractor evaluations and corrective actions for events and issues within their purview, and assess whether effective recurrence controls are identified and implemented. Additionally, SMEs within the NA-LA Nuclear Safety, Engineering and Readiness department stay abreast of Triad’s management of nuclear safety issues in their areas of expertise. The NA-LA CAS Program Manager, who serves as the lead SME in performing oversight and evaluation of the CAS, routinely shadows Triad’s CAS-related assessments.

In the fiscal year 2020 *Performance Evaluation Summary*, NA-LA noted that Triad’s methods for validating the effectiveness of assurance system processes, although improving, were not completely effective. However, contrary to DOE Order 226.1B, paragraph 4.b.(1), NA-LA has not performed any “assessments of the contractor’s assurance system” or issues management system, and no assessments of these areas have been included in subsequent site integrated assessment plans, despite the significant weaknesses identified in the April 2019 EA report and the ineffectiveness of Triad’s CAS processes identified by NA-LA. (See **Deficiency D-NA-LA-1.**) In the absence of an NA-LA assessment of Triad’s assurance systems, previously-identified weaknesses in CAS effectiveness, especially concerning compliance with DOE requirements, have persisted and NA-LA approved three revisions to SD330 that include noncompliances identified in the April 2019 EA assessment.

Monitoring and Oversight of Issues Management Conclusions

IQPA has made several improvements in the support it provides to Triad senior management and directors overseeing the management of safety issues within Triad’s directorates but has not addressed all of the weaknesses identified in the April 2019 EA report. Additionally, Triad’s overall oversight of its issues management performance does not meet the requirements for monitoring and improving performance. For example, Triad’s metrics for monitoring issues management program performance are not adequate to ensure timely identification and correction of issues; Triad did not identify the average age of open issues doubling in a year as an issue requiring correction; and responsibility for improving Triad’s overall issues management performance is not clearly assigned. Without more proactive oversight and coordination of efforts to increase the resiliency of Triad’s issues management processes and their implementation across Triad, the improved performance may not be enduring or sufficient to achieve the high reliability of nuclear operations needed at LANL to support and sustain its pit production mission. (See **Recommendation R-Triad-1.**)

Regarding Federal oversight, NA-LA generally meets the requirements of DOE Order 226.1B through a variety of oversight activities. However, NA-LA has not performed or scheduled an assessment of the effectiveness of Triad’s CAS, despite significant weaknesses in Triad’s CAS and issues management processes.

4.0 BEST PRACTICES

No best practices were identified during this assessment.

5.0 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 findings. Cognizant DOE managers must use site- and program-specific issues management processes and systems developed in accordance with DOE Order 226.1, *Implementation of Department of Energy Oversight Policy*, to manage the corrective actions and track them to completion.

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Finding F-Triad-1 Triad inadequately identifies or detects quality problems (issues) and items, services, and processes that do not meet established requirements or that need improvement. (DOE Order 414.1D, att. 2, criteria 3a, 3b, and 3d)

Finding F-Triad-2 Triad does not adequately train and qualify its workforce on processes for identifying and resolving nuclear safety issues. For example, working-level personnel are not trained on how to identify issues and support their resolution, responsible line managers (RLMs) are not required to take problem analysis training, and technical staff leading causal analyses are not qualified or provided advanced training necessary to resolve complex and/or significant nuclear safety issues. (DOE Order 426.2, att. 1, chapter 1, secs. 4.b.(1), 4.b.(1)(d), 4.b.(4), 4.b.(5)(a), and 5.c.)

6.0 DEFICIENCIES

Deficiencies are inadequacies in the implementation of an applicable requirement or standard. Deficiencies that did not meet the criteria for findings are listed below, with the expectation from DOE Order 227.1A for site managers to apply their local issues management processes for resolution.

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Deficiency D-Triad-1 SD330 does not adequately describe how a graded approach is applied in managing issues, leaving this information to be provided in lower-tier procedures not subject to NA-LA approval. (DOE Order 414.1D, att. 1, par. 1.b)

Deficiency D-Triad-2 P322-4 does not adequately flow down requirements for managing conditions adverse to quality. (SD330, table 8 and NQA-1, requirement 16)

Deficiency D-Triad-3 P322-3 and P322-4 do not require determination of causes and generic implications for all reportable events. (DOE Order 232.2A, att. 1, sec. 4.b)

Deficiency D-Triad-4 SD130's latest revision, revision 9, is inconsistent with the requirements for managing nuclear criticality safety issues. (DOE Order 414.1D, att. 2, criterion 3.c; NQA-1, requirement 16; and ANSI/ANS-8.1-2014 and 8.19-2014)

Deficiency D-Triad-5 Triad managers are not holding "employees in their respective organizations accountable for implementing CAS processes, tools, policies, and procedures" (e.g., identifying and entering issues into iLINK for resolution per P322-4). (SD100, sec. 3.3.8 and SD320, sec. 4.5 and 4.6)

Deficiency D-Triad-6 RLMs are not screening many conditions meeting the P322-4 definition of an issue into iLINK to be managed as issues. (P322-4, sec. 3.1.3)

- Deficiency D-Triad-7** Triad has not developed a process for evaluating issues in iLINK to detect, prevent, and “communicates issues and performance trends and analyses” and “items, services, and processes needing improvement.” (DOE Order 414.1D, att. 2, criterion 3.a and 3.d and DOE Order 226.1B, att. 1, par. 2.b.)
- Deficiency D-Triad-8** RLMs categorized some significant issues lower than required by P322-4. (P322-4, table 1)
- Deficiency D-Triad-9** Triad’s analyses did not identify all the causes or the associated corrective actions to prevent recurrence for several significant, systemic weaknesses. (P322-4, sec. 3.2.3)
- Deficiency D-Triad-10** For several issues, RLMs did not develop adequate corrective actions “to resolve the issue, including any causal factors identified in a causal analysis ... to prevent reoccurrence for high-significance issues and to reduce the likelihood of reoccurrence for other than high-significance issues.” (P322-4, sec. 3.3.1)
- Deficiency D-Triad-11** The single completed effectiveness review verified only the completion of corrective actions, not their effectiveness. (P322-4, sec. 3.4.1)
- Deficiency D-Triad-12** RLMs are not actively correcting (or actively working on) and closing many old nuclear safety issues. (NQA-1, requirement 16 and DOE Order 226.1B, att.1, sec. 2.b.)
- Deficiency D-Triad-13** RLMs closed some issues with inadequate documentation. (P322-4, sec. 3.3.3)
- Deficiency D-Triad-14** Triad has not set “[m]etrics and targets to assess the effectiveness of performance” or taken adequate action to “correct negative performance/compliance trends” in issues management processes. (DOE Order 226.1B, att. 1, sec. 2.b.)

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- Deficiency D-NA-LA-1** NA-LA has not performed “assessments of the contractor’s assurance system.” (DOE Order 226.1B, par. 4.b.(1))

7.0 RECOMMENDATION

EA identified one recommendation for consideration by senior line management. Recommendations do not require formal resolution through a corrective action process and are not intended to be prescriptive or mandatory. Rather, they are suggestions derived from the aggregate results of an assessment that may assist senior line management in improving the effectiveness of programs or site management.

Triad National Security, LLC

- Recommendation R-Triad-1** Triad should increase the oversight of its management of safety issues and the coordination of its improvement efforts. This should include:

- Designating in P322-4 a management position with the responsibility and authority for leading efforts to improve the resiliency of Triad’s issues management processes and the performance across Triad.
- Evaluating the strengths and best practices other DOE contractors and Federal agencies use to correct the causes of issues before significant safety consequences or mission impacts occur.

8.0 OPPORTUNITIES FOR IMPROVEMENT

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

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- OFI-Triad-1** Consider improving the processes for maintaining the accuracy of the Triad organizational structure and interfaces on the LANL organizational page.
- OFI-Triad-2** In addition to training working-level personnel on how to identify and originate issues in iLINK, consider providing them familiarization training on the subsequent elements of the issues management processes to increase their involvement.
- OFI-Triad-3** Consider revising P322-4 to have a board of functional area experts (e.g., experts in issues management, CONOPS, nuclear safety, engineering, industrial safety and health, quality assurance, and radiological controls) daily meet to screen each condition entered into iLINK and categorize and identify an appropriate RLM for each issue considering its significance and scope.
- OFI-Triad-4** Consider having performance assurance personnel and functional area experts develop consistent trend codes for binning issues and data analysis tools (e.g., thresholds for significant changes in the number of issues) and having functional area experts review them and periodically assess overall performance including trends. Also, consider getting NA-LA’s input on trend codes and bins they would use for their oversight.
- OFI-Triad-5** Consider requiring annual training for RLMs on the use of iLINK, P322-4, lessons learned, as well as familiarization training on more advanced causal analysis techniques and when they should be used.
- OFI-Triad-6** Consider taking actions to have the effectiveness of issue corrective actions verified more often. For example, revising P322-4 to require RLMs: 1) include, for moderate-significance issues, specific actions verifying the effectiveness of corrective actions or formal effectiveness reviews, or document in iLINK why these not warranted and 2) consider use of interim

effectiveness reviews when actions are to be completed in the near term as well as over a much longer term (years) or when some corrective actions are significantly delayed.

OFI-Triad-7

Consider revising P322-4 to require the RLM's supervisor to approve corrective action due dates (including extensions) greater than a Triad-established goal (e.g., 60 days beyond the origination date).

OFI-Triad-8

Consider revising P322-4 to require that RLMs annually present the status and barriers precluding resolution of issues over two years old to Triad executives for validation of current action plans and/or additional action as warranted.

9.0 ITEMS FOR FOLLOW-UP

EA, in coordination with NA-LA, will schedule an independent assessment of the Triad nuclear worker training and qualification program, considering **Finding F-Triad-2** and the potential noncompliances with DOE Order 426.2, attachment 1, discussed in condition reports LANL-C-2022-8251, LANL-C-2022-8253, LANL-C-2022-8254, LANL-C-2022-8257, LANL-C-2022-8260, and LANL-C-2022-8368.

Appendix A Supplemental Information

Dates of Assessment

Onsite Assessment: July 10-14, 2023

Office of Enterprise Assessments (EA) Management

John E. Dupuy, Director, Office of Enterprise Assessments
William F. West, Deputy Director, Office of Enterprise Assessments
Kevin G. Kilp, Director, Office of Environment, Safety and Health Assessments
David A. Young, Deputy Director, Office of Environment, Safety and Health Assessments
Thomas E. Sowinski, Director, Office of Nuclear Safety and Environmental Assessments
Kimberly G. Nelson, Director, Office of Worker Safety and Health Assessments
Jack E. Winston, Director, Office of Emergency Management Assessments
Brent L. Jones, Director, Office of Nuclear Engineering and Safety Basis Assessments

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Appendix B Comments on Individual Issue Reports

An assessment team from the U.S. Department of Energy (DOE) Office of Enterprise Assessments (EA) conducted a detailed review of 264 issue reports (IMs): including 107 nuclear engineering issues, 55 safety basis and criticality safety issues, and 102 issues related to conduct of operations. The review scope also included an examination of 110 management observations and 55 conditions that were documented in iLINK but did not subsequently become IMs. EA’s comments on individual issues, observations, and conditions are documented in this appendix. The significance level (Low, Moderate, High) assigned by Triad National Security, LLC for each issue is in parentheses preceding the comment.

Nuclear Engineering Issues	
iLINK Entry	Comment
IM-2021-5022	(Low) This issue was originated in 7/2021. Action 4 remains open with a due date of 6/28/2024. It affects the Weapons Engineering Tritium Facility’s documented safety analysis and technical safety requirement document. This is a timeliness issue.
IM-2021-5355	(Moderate) This issue is noted as a “child” record of IM-2021-0442. Action 21 does not provide objective evidence of completion. Walkdown markups do not meet the evidence requirement. This issue still lacks actions to update the design basis with information from the walkdowns. This issue and IM-2021-0442 are intended to bring pressurized systems into compliance with design requirements. This issue has not been resolved in a timely manner and the corrective action plan is not adequate to completely correct the issue.
IM-2021-5946	(Low) This issue is a transfer from IM-2017-537. It has a single action to issue a design change. There is no other action, such as “Implement design change.” Therefore, the corrective action plan is not sufficient to correct the identified problem. Since it was originally documented in 2017, it is also a timeliness issue.
IM-2022-6309	(Low) This issue documents that long term fire impairments are not being corrected. It was transferred from IM-2018-1155. This issue has three actions to report status annually for 2022, 2023, and 2024, but has no actual corrective actions. This is a timeliness issue.
IM-2022-6371	(Low) This issue is a transfer from IM-2020-1389. It has multiple open actions stretching out to April 2024. This is a timeliness issue.
IM-2022-6470	(Low) Action 4 of this issue was closed on the basis of a future action. It states that facility service request (FSR) 256830 was created and is in planning stages to install a TCCB (undefined acronym).
IM-2022-6641	(Moderate) Action 2 was closed on the basis of a design change form that was not fully approved at the time of closure. There was no verification that the design change form was ever worked. This item was closed on the basis of a promise of future action.
IM-2022-6699	(Low) This issue identified a non-conservative error in a material-at-risk calculation for a storage area in Plutonium Facility (PF-4). No extent-of-condition (EOC) review was performed, and there was no causal analysis or any explanation of why this was considered to be an isolated occurrence.

IM-2022-6934	(Moderate) Action 3 of this issue called for an EOC review of required electrical inspections for all Technical Area 55 (TA-55) projects. The actual EOC documented was for the GB2 foundry project only. Therefore, this action contains inadequate objective evidence of completion.
IM-2022-6952	(Low) Actions 3, 10, & 11 of this issue were closed on the basis of vessel tagout/lockout. There is no documented evidence that the corrective action was accomplished. Actions 4, 9, and 13 only include documentation for a different tank than noted in the action to be completed. The action 5 documentation of completion is not legible. These actions do not contain adequate objective evidence of completion.
IM-2022-8144	(Moderate) This issue documented that an evaluation of a 2021 lightning strike completed eleven months later in November 2022 was inadequate. Actions to do a better evaluation are now scheduled for August and September 2023. This is a timeliness issue.
IM-2022-6948 IM-2022-8138 IM-2022-8139 IM-2022-8145 IM-2023-9347	These issues are included here because each identified a problem with configuration management. In aggregate, these issues reflect a negative trend that may warrant further management attention.

Conduct of Operations (CONOPS) Issues	
iLINK Entry	Comment
IM-2020-1352	(Moderate) On October 28, 2020, Associate Laboratory Directorate for Weapons Production (ALDWP) senior management determined that several events involving challenges with radiation protection controls and work planning and control warranted a broad-based review and corrective action set. Corrective actions 4 and 11 included draft documents for objective evidence (OE) for closure, contrary to the requirements stated in P322-4, section 3.3.1, "OE must directly address the action, and ensure that it is complete, in final form, and verifiable."
IM-2022-7153	(Moderate) An equipment operator started filling the vault water bath and blocked the fill valves open. Consequently, radiological control technicians discovered water on the floor of the vault corridor. As a significant condition adverse to quality this issue should have been categorized as high significance.
IM-2022-6128	(Moderate) On January 7, 2022, glove operations in TA-55 resulted in air monitoring alarms and workers receiving skin contamination, with nasal swabs showing potential radiological uptakes. Contrary to the requirements stated in P322-4, section 3.3.1, the corrective action 6 response does not address all aspects of the corrective action, specifically proof of workers being trained.

IM-2023-9282	(Moderate) On May 8, 2023, workers were preparing to remove a transformer weighing approximately 300 pounds from above a false ceiling. Without creating a lift plan, the workers began to lower the transformer by hand when it became stuck on the wall. The workers released the transformer, which then fell, impacting and damaging the scaffolding below. This was a significant condition adverse to quality and as such should have been categorized as high significance.
IM-2021-5087	(Moderate) A large spill resulted in about 1/8th of an inch of water in one room undergoing demolition, and water in half of an adjacent room. This was a significant condition adverse to quality and as such should have been categorized as high significance.
IM-2023-0210	(Low) On February 3, 2023, an electrician lifted a live lead and made contact with the panel casing, resulting in a short to ground and loss of power to critical facility loads. This was a significant condition adverse to quality and as such should have been categorized as high significance.
IM-2020-1214	(Low) On September 23, 2020, a glovebox glove and ring assembly being used during glovebox operations at TA-55 unexpectedly separated from the glovebox port, creating an opening into the contaminated glovebox. This was the second instance of a glovebox glove separating from a glove port. This was a significant condition adverse to quality and as such should have been categorized as high significance.
IM-2021-5439	(High) As part of PF-4 overflow fact finding meetings, ALDWP identified deficient conduct of operations. ALDWP developed this issue to track near- and mid-term actions for various issues associated with the CONOPS events. In this item, ALDWP stated that additional long-term actions are being considered and will be developed based on what is learned from the actions in this issue. However: <ul style="list-style-type: none"> • Corrective action 11 includes no action to implement the template developed. • Corrective actions 15, 16, 19, and 21 establish expectations by memo without changing a process instruction or procedure. • The corrective action 17 closure is incomplete and missing details. These closures are contrary to the requirements stated in P322-4, section 3.3.1, which states that actions must be “clearly stated, sustainable, and structured to prevent reoccurrence” and that “OE must directly address the action.”
IM-2022-7846	(Moderate) On June 1, 2022, personnel at TA-55 were conducting operations and identified an item not recorded in the material accountability program, LANMAS, contrary to process instructions. During the EOC review, additional mislabeled items were found. Documentation used to close corrective action 3 does not include the content of the identified training, the dates conducted, or the attendance, contrary to specific requirements stated in procedure P322-4, sections 3.3.1 and 3.3.2.
IM-2023-0046	(Moderate) On January 9, 2023, personnel reported a potential process deviation associated with sparking and small flame on a piece of lapping sandpaper in a dropbox. Corrective actions 2 and 6 included draft documents for OE for closure, contrary to specific requirements stated in procedure P322-4, sections 3.3.1 and 3.3.2.
IM-2022-7145	(Low) On June 2, 2022, a trolley bucket containing special nuclear material struck a closed damper during a material move. The trolley line was out of service to allow for maintenance work. The process for taking the trolley out of service was inadequate to prevent its use, resulting in the incident. Per the criteria in P322-4, table 1, this issue should have been categorized as moderate significance based on the inadequate lockout/tagout for this work and similarity with other recurring CONOPS issues.

IM-2021-0730	(Low) On June 21, 2021, fissile material handlers deviated from the procedure and violated the posted material limit for criticality safety. Per the criteria in P322-4, table 1, this issue should have been categorized as moderate significance based on the significance of the violation and similarity with other recurring CONOPS issues.
IM-2020-1331 IM-2021-0222 IM-2022-7236 IM-2022-8491 IM-2023-2134 IM-2022-7237	These issues are included here because each identified a problem with criticality safety program violations. In aggregate, these issues reflect a negative trend that may warrant further management attention.
IM-2020-1331 IM-2021-0222 IM-2020-1332 IM-2021-0730 IM-2022-7846 IM-2023-9271 IM-2021-5931 IM-2022-6699 IM-2020-1031 IM-2023-0210 IM-2023-4071	These issues are included here because each identified a problem with material mass controls. In aggregate, these issues reflect a negative trend that may warrant further management attention.

IM-2020-1034 IM-2021-0294 IM-2021-5970 IM-2021-0728 IM-2023-9048 IM-2023-9003 IM-2022-6414 IM-2023-9003 IM-2021-6052 IM-2021-5434 IM-2021-5653 IM-2021-5603 IM-2022-7848 IM-2020-0918 IM-2022-7164	<p>These issues are included here because each identified a problem with glovebox glove breaches. In aggregate, these issues reflect a negative trend that may warrant further management attention.</p>
IM-2022-7616 IM-2022-7892 IM-2021-5095 IM-2021-5928 IM-2022-6663 IM-2022-7892 IM-2020-0934 IM-2022-7145 IM-2023-0210 IM-2022-8042 IM-2021-5647	<p>These issues are included here because each identified a problem with the control of maintenance activities. In aggregate, these issues reflect a negative trend that may warrant further management attention.</p>

IM-2020-1657 IM-2023-4080 IM-2023-2280 IM-2021-5070 IM-2022-7551 IM-2023-9001 IM-2023-9282	These issues are included here because each identified a problem with equipment moves. In aggregate, these issues reflect a negative trend that may warrant further management attention.
IM-2023-4984 IM-2021-5079 IM-2021-5296	These issues are included here because each identified a problem with measurement and test equipment. In aggregate, these issues reflect a negative trend that may warrant further management attention.
IM-2020-1017 IM-2020-1214	These issues are included here because each identified a problem with glove separation from a glovebox port. In aggregate, these issues reflect a negative trend that may warrant further management attention.
Management Observations	The following is a listing of management observations that meet the criteria for being an issue but were not entered into the iLINK issues management system. <ul style="list-style-type: none"> ○ 2021-0216: Potential process deviation (PPD) in MRR (undefined acronym) Lab ○ 2021-0212: Housekeeping in PF-4 ○ 2021-0673: Toolbox in trolley line ○ 2021-0300: PPD violation of RD-1009 ○ 2021-0308: Chewing of gum in radiation area (multiple) ○ 2021-0325: Direction to install anchors contrary to design ○ 2021-0327: O₂ monitor alarming ○ 2021-0371: Procedure past review date ○ 2021-0370: Confusing directions rarely followed in procedure on records retention ○ 2021-0611: LANMAS move issue ○ 2023-7075: Red lit room not communicated to room owner ○ 2023-7004: Cluttered emergency equipment ○ 2023-6951: Illegible N₂ flow meters to the glovebox ○ 2021-6601: Multiple delays during outage work execution ○ 2023-6714: Combustibles left out, poor housekeeping ○ 2023-6421: Multiple hand/foot monitors out of service ○ 2023-6425: Potential glove breach ○ 2023-6544: Lockout/tagout issue ○ 2023-6542: Poor housekeeping ○ 2023-6794: Work resulting in tent contamination ○ 2023-6753: Supervisor on job not attentive ○ 2023-6786: Glovebox glove breach

Conditions	<p>The following is a listing of conditions (category of iLink entry prior to becoming an issue) by categories that meet the criteria for being an issue but were not entered into iLINK.</p> <ul style="list-style-type: none"> ○ Criticality Safety: LANL-C-2022-6120, LANL-C-2022-6121 ○ Software Quality Assurance: LANL-C-2023-1112 ○ Oxygen Monitors: LANL-C-2021-5726, LANL-C-2022-7474, LANL-C-2022-6365 ○ Hazardous Material Spills: LANL-C-2022-7697, LANL-C-2023-0214, LANL-C-2022-6705, LANL-C-2022-6741 ○ PF-4 Continuous Air Monitor Alarm: LANL-C-2022-7707 ○ Los Alamos Fire Department Response: LANL-C-2021-5011, LANL-C-2023-8200, LANL-C-2023-9272, LANL-C-2021-5879, LANL-C-2021-5701, LANL-C-2022-7033 ○ Training: LANL-C-2022-8251, LANL-C-2022-8253, LANL-C-2022-8254, LANL-C-2022-8257, LANL-C-2022-8260, LANL-C-2022-8368 ○ Beryllium: LANL-C-2021-5163 <p>The six training condition reports noted above involved potential noncompliances with DOE Order 426.2 identified by Triad independent assessment LANL-ASMT-2021-0143. During an interview, the responsible line manager (RLM) stated that the RLM’s factual accuracy comments concerning the potential noncompliances had not been resolved during the development of the report for LANL-ASMT-2021-0143. After the report was issued and the identified noncompliances were entered into iLINK as condition reports, the RLM closed six of these conditions because the RLM did not consider them valid issues. These condition reports were closed without additional oversight or management involvement, despite the potential significant impact these noncompliances could have on the qualifications of personnel performing nuclear work in PF-4. Records in iLINK show that a factual accuracy review was performed for the assessment, without indicating how any of the factual accuracy comments were resolved.</p>
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Nuclear Criticality Issues	
iLINK Entry	Comment
IM-2021-5679	(Low) This item documents Finding F-Triad-1 from the EA <i>Assessment of the Triad National Security, LLC Nuclear Criticality Safety Program at the Los Alamos National Laboratory</i> , May 2021, hereafter referred to as the May 2021 EA report. The item description is just the title of the assessment and thus does not adequately describe the identified problem: that Triad criticality safety analysts authoring and providing independent technical and quality reviews of criticality safety evaluations (CSEs) do not always ensure that “CSE documentation ... meet[s] the content guidance of DOE-STD-3007-2017, <i>Preparing Criticality Safety Evaluations at Department of Energy Nonreactor Nuclear Facilities.</i> ” In response to the finding, an EOC review and training on the development of CSE documents that are compliant with content guidance in DOE-STD-3007-2017 were performed. However, revisions to affected CSE documents are ongoing. This finding is still open and warrants additional EA follow-up to review a sample of the revised CSE documents.
IM-2021-5695	(Low) This item documents Deficiency D-Triad-8 from the May 2021 EA report. The item description is just the title of the assessment and thus does not adequately describe the identified problem. There was an action to review facility-specific nuclear

	criticality safety (NCS) administrative procedures to evaluate the flowdown of the NCS program requirement for Facilities Operations Directors. As a result of this action, revision 9 of SD130, <i>Nuclear Criticality Safety Program</i> , revises section 3.9.5 to “Action must be taken to reduce the likelihood of recurrence. The event should be evaluated for appropriate lessons learned.” ANSI/ANS-8.1-2014, <i>Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors</i> , and ANSI/ANS-8.19-2014, <i>Administrative Practices for Nuclear Criticality Safety</i> , state that actions shall be taken to prevent a recurrence for process deviations.
IM-2022-8545	(Moderate) This item documents a potential process deviation involving issues with the lids for Bruntmor containers. An action is still open to determine the level of the NCS infraction, although the issue was discovered on December 7, 2022. This is a timeliness issue.
IM-2021-6060	(Moderate) This item documents a potential process deviation where a new absorbent wipe was stored on top of a safe in the north basement. An action to determine the level of infraction for related events (NCS-21-095, NCS-21-088, NCS-21-090) was completed. The justification for the level of infraction as a level 4 does not include any detail on the determination.
IM-2021-5683	(Low) This item documents Deficiency D-Triad-2 from the May 2021 EA report. The item description is just the title of the assessment and thus does not adequately describe the identified problem. An action to develop a technical document to support the 30 pit per year mission with more up-to-date analyses to define the minimum required separation between operations or locations to ensure neutronic decoupling has been open for 629 days. This is a timeliness issue.
IM-2021-5807	(Low) This item documented that several containers were identified with contents not allowed. The corrective action plan was developed to look for other occurrences (EOC) but does not include any steps to correct the identified problem. The corrective actions are not adequate to resolve the identified issue.
IM-2022-8450	(Low) This item documented that bagged piping from prior maintenance was found in the PF-4 basement. The corrective action was to create a recovery memo stating how the material was to be handled for removal. The item was closed on the basis of a promise of future action, but there was no action to actually remove the material, nor any reference to an implementing work order.