



**Independent Assessment of
Work Planning and Control
at the
Los Alamos National Laboratory
Los Alamos Neutron Science Center**

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Acronyms

ASME	American Society of Mechanical Engineers
CAS	Contractor Assurance System
CFR	Code of Federal Regulations
CRAD	Criteria and Review Approach Document
DOE	U.S. Department of Energy
DPO	Differing Professional Opinion
EA	Office of Enterprise Assessments
ECP	Employee Concerns Program
FR	Facility Representative
FRPR	Facility Radiation Protection Requirement
IH	Industrial Hygiene
IS	Industrial Safety
ISMS	Integrated Safety Management System
IWD	Integrated Work Document
IWM	Integrated Work Management
LANL	Los Alamos National Laboratory
LANSCE	Los Alamos Neutron Science Center
LOTO	Lockout/Tagout
MDA	Minimum Detectable Activity
MMH	Mechanical Material Handling
MOV	Management Observation and Verification
MP	Management Procedure
MSS	Maintenance and Site Services
NA-LA	National Nuclear Security Administration Los Alamos Field Office
OAA	Operational Awareness Activity
OFI	Opportunity for Improvement
POD	Plan of the Day
RCT	Radiological Control Technician
R&D	Research and Development
RP	Radiation Protection
RWP	Radiological Work Permit
SME	Subject Matter Expert
TA	Technical Area
THOR	Tracking and Handling Oversight Records
Triad	Triad National Security, LLC
WCD	Work Control Document
WO	Work Order
WP&C	Work Planning and Control

INDEPENDENT ASSESSMENT OF WORK PLANNING AND CONTROL AT THE LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS NEUTRON SCIENCE CENTER

Executive Summary

The U.S. Department of Energy Office of Enterprise Assessments (EA) conducted an independent assessment of work planning and control (WP&C) at the Los Alamos National Laboratory's Los Alamos Neutron Science Center (LANSCE) in January and February 2023. This assessment focused on Triad National Security, LLC's (Triad's) implementation of the integrated safety management system core functions (define the scope of work, identify and analyze hazards, develop and implement controls, perform work safely within the controls, and provide feedback and improvement), with an emphasis on material handling activities. Also assessed were the flowdown of safety requirements to subcontractors, effectiveness of the Triad contractor assurance system, and the National Nuclear Security Administration Los Alamos Field Office (NA-LA) oversight processes for WP&C.

EA identified the following strengths, including one best practice:

- For high-hazard and complex work activities, Triad effectively performs a review that is similar to a tailored readiness review, called a "rehearsal-of-concept drill," to ensure that the work is ready to be performed. (Best Practice)
- Triad adequately flows down the requirements of 10 CFR 851, *Worker Safety and Health Program*, to subcontractors. Subcontract workers were very familiar with the Triad work control processes, well integrated into facility operations, and closely overseen and supported by Triad subcontract technical representatives.
- Triad's implementation of the electronic radiological access controls system (ERACS) in conjunction with the Sentinel radiological work permit (RWP) system greatly simplifies the validation of worker credentials to work under a specific RWP.
- Triad workers didn't hesitate to pause ongoing work activities when unanticipated hazards were identified.
- The NA-LA Facility Representative (FR) assigned to LANSCE is adequately qualified and performs operational oversight in an effective manner by attending plan-of-the-day meetings, reviewing work packages, participating in NA-LA assessments, shadowing Triad planned assessments, and conducting frequent site walkdowns.

EA also identified several weaknesses, as summarized below:

- Triad procedure P300, *Integrated Work Management*, and P300-1, *Integrated Work Management for R&D*, lack sufficient objective criteria to determine hazard grading, resulting in hazardous work being performed without a job task analysis to identify potential hazards and controls.
- Triad procedure P300-1 does not adequately define the roles and responsibilities for work planners/preparers of research-and-development programmatic work.
- Hazard controls for two observed work evolutions were not properly specified in governing integrated work documents.
- Work associated with three observed work evolutions was not properly performed within the controls specified in institutional WP&C requirements and governing work control documents.
- NA-LA did not conduct a triennial self-assessment of its FR program and does not have a current staffing analysis. (Finding)

- NA-LA did not conduct a biennial self-assessment of its employee concerns program or maintain case file records for a differing-professional-opinion case, the only such case since 2017.

In summary, Triad has developed and implemented a satisfactory institutional WP&C framework, safety requirements are appropriately flowed down to subcontractors, and TRIAD subcontract technical representatives closely monitor ongoing subcontracted work. Most observed work was performed without incident and in accordance with established control sets and appropriately paused when safety concerns were evident. However, integrated work management procedures lack sufficiently objective criteria and examples for determining when jobs should be considered as low-hazard work. EA observed jobs where proper hazard controls were appropriately described in integrated work documents, but workers did not perform the work within the controls. NA-LA has implemented generally effective oversight of Triad for WP&C at LANSCE. However, NA-LA has not prepared a current staffing analysis and has not conducted self-assessments of its FR program and employee concerns program. Additionally, NA-LA did not maintain case file records for the differing-professional-opinion case. Until the concerns identified in this report are addressed or effective mitigations are put in place, workers will continue to perform moderate-hazard work without using appropriate hazard controls for their protection.

INDEPENDENT ASSESSMENT OF WORK PLANNING AND CONTROL AT THE LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS NEUTRON SCIENCE CENTER

1.0 INTRODUCTION

The U.S. Department of Energy (DOE) Office of Worker Safety and Health Assessments, within the independent Office of Enterprise Assessments (EA), conducted an assessment of work planning and control (WP&C) performed by Triad National Security, LLC (Triad) at the Los Alamos National Laboratory (LANL) Los Alamos Neutron Science Center (LANSCE), with an emphasis on material handling activities. EA began planning calls and document collection in December 2022 and conducted the assessment on site from January 23 to 26 and February 6 to 9, 2023.

Consistent with the *Plan for the Independent Assessment of Work Planning and Control for the Los Alamos Neutron Science Center at the Los Alamos National Laboratory, January 2023*, this assessment evaluated the effectiveness of Triad’s implementation of the integrated safety management (ISM) core functions (define scope of work, identify and analyze hazards, develop and implement controls, perform work safely within the controls, and provide feedback and make improvements) with respect to activity-level work being conducted at LANSCE. During this assessment, the LANSCE accelerator was in a scheduled shutdown, so no beamline experiments were being performed, and most of the ongoing work was related to maintenance, construction, experimental setup, and housekeeping. Additionally, the assessment evaluated the effectiveness of Triad’s contractor assurance system (CAS) and its flowdown of requirements to subcontractors and sub-tier contractors. EA also evaluated the effectiveness of Federal oversight by the National Nuclear Security Administration’s Los Alamos Field Office (NA-LA).

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, and opportunities for improvement (OFIs)” as defined in the order.

As identified in the assessment plan, this assessment considered objectives and criteria from DOE Guide 226.1-2A, *Federal Line Management Oversight of Department of Energy Nuclear Facilities*, app. D, *Activity Level Work Planning and Control Criterion Review and Approach Documents with Lines of Inquiry*. EA also used elements of Criteria and Review Approach Document (CRAD) EA-30-07, Rev. 0, *Federal Line Management Oversight Processes*, to collect and analyze data on the NA-LA oversight activities related to WP&C. In addition, EA used selected objectives and criteria from the following EA CRADs:

- EA CRAD 30-01, Rev. 1, *Contractor Assurance System*
- EA CRAD 30-09, Rev. 0, *Occupational Radiation Protection Program*
- EA CRAD 32-03, Rev. 1, *Industrial Hygiene Program*
- EA CRAD 32-10, Rev. 0, *Construction Safety*
- EA CRAD 32-11, Rev. 0, *Control of Hazardous Energy (Lockout/Tagout)*
- EA CRAD 32-12, Rev. 0, *Material Handling Safety*.

EA observed the planning and implementation of 25 onsite work activities at LANSCE. EA examined key activity-level work control documents (WCDs), such as integrated work documents (IWDs), work orders (WOs), hazard analysis documents, and other relevant WP&C documentation. EA also interviewed key personnel responsible for developing and executing the associated programs and walked down relevant portions of specific facilities. The members of the assessment team, the Quality Review Board, and the management responsible for this assessment are listed in appendix A.

EA conducted a previous assessment of WP&C at LANL in 2015, as documented in *Office of Enterprise Assessments Targeted Review of Work Planning and Control and Biological Safety at the Los Alamos National Laboratory, December 2015*. The current EA assessment examined the completion and effectiveness of corrective actions for two findings cited in the previous assessment. Results of the corrective action assessment are discussed in section 3.5 of this report.

3.0 RESULTS

3.1 Work Planning and Control Institutional Programs

This portion of the assessment evaluated Triad's WP&C programs and processes at the institutional level that enable the safe performance of work in accordance with DOE's ISMS requirements.

Triad effectively implements contract requirements for WP&C through established and generally well-written program documents and procedures that adequately address DOE's ISMS requirements in accordance with DOE Policy 450.4A, *Integrated Safety Management Policy*. In support of the WP&C programs, Triad's safety and health programs provide thorough programmatic requirements and procedures to enable the proper identification, analysis, and control of radiation protection (RP), industrial hygiene (IH), industrial safety (IS), and electrical safety hazards.

Further, Triad has developed an adequate WP&C framework to support implementation of the core functions of ISMS, including contract language that incorporates DOE Acquisition Regulation clause 970.5223-1, *Integration of Environment, Safety, and Health into Work Planning and Execution*. System description SD100, *Integrated Safety Management System*, adequately describes LANL's ISMS, including the integrated work management (IWM) processes for WP&C. Program description PD100, *DOE/NNSA Approved Los Alamos National Laboratory 10 CFR 851, Worker Safety and Health Program Description*, adequately addresses worker safety and health requirements, including the flowdown of requirements to subcontractors and a cross-reference of 10 CFR 851, *Worker Safety and Health Program*, requirements to the relevant LANL requirements.

The IWM processes are appropriately addressed, with some exceptions as noted below, in procedures P300, *Integrated Work Management*, and P300-1, *Integrated Work Management for R&D*. Procedure P300 provides overarching requirements that are applicable to facilities and maintenance work, as well as subcontracted work, and P300-1 is applicable to program work in support of the research and development (R&D) mission, including maintenance on R&D equipment. Both procedures adequately address requirements for IWDs, hazard analysis and control selection, plan-of-the-day (POD) and plan-of-the-week coordination meetings, work authorization and release, pre-job briefings, and other relevant aspects of WP&C. IWDs, which are required only for moderate- and high-hazard work, include a job task analysis using a team approach for hazard analysis and control selection. IWD forms are adequate for preparing WCDs.

LANL's Maintenance and Site Services (MSS) division has effectively developed additional procedures and processes that properly flow down the P300 requirements and include supplemental enhancements.

Administrative procedures (AP-WORK-001, *Work Initiation, Screening and Acceptance*; AP-WORK-002, *Work Planning*; AP-WORK-003, *Work Scheduling*; AP-WORK-004, *Work Performance*; AP-WORK-005, *Annual Maintenance Work Plan*; and AP-MNT-006, *Preventive and Predictive Maintenance*) thoroughly describe the WP&C processes for facility maintenance and appropriately align with P300. Additionally, MSS-Guide-010, *Job Hazards Analysis Manual*, provides appropriate job hazard analyses for an extensive set of low-hazard maintenance and operations activities.

Triad has also effectively developed an online resource to support work planning called the IWM Toolbox, from which personnel can readily obtain information, such as relevant procedures, guides, forms, manuals, and other WP&C documents (e.g., MSS-Guide-010). A useful document in the IWM Toolbox is FSD-300-3-001, *Hazard Analysis Manual*, which provides a detailed description of various hazard analysis methods, including the what-if checklist, hazard and operability (HAZOP) analysis, and failure modes and effects analysis.

For high-hazard and complex work activities, Triad has a readiness process that is similar to a tailored readiness review, called a “rehearsal-of-concept drill,” to ensure that the work is ready to be performed. Requirements notice RN-300-01, *Rehearsal of Concept Drill*, effectively describes the process, identifies roles and responsibilities, and includes a checklist for the drill. A reviewed report of a rehearsal-of-concept drill conducted in September 2022 performed for a high-hazard work activity (P-2-044, *Filling Newer Style Mercury Shutter Systems*) demonstrated adherence to RN-300-01. The report included a checklist of resolved issues that had been identified during the drill. A comprehensive critical lift plan was developed and reviewed by personnel performing the lift and move, and a pre-job briefing and dry-run were performed prior to the lift. Triad also built a mockup of the mercury transfer system for this activity. The rehearsal-of-concept drill is cited as a **Best Practice** because it increases confidence that high-hazard and complex work activities can be completed in a safe and proficient manner.

Triad’s safety and health programs, including IS and IH, material handling, electrical safety, and RP, are structured appropriately to support activity-level WP&C. These programs are well-aligned with the WP&C framework and provide comprehensive requirements and procedures to enable proper analysis of task based hazards and identification of appropriate hazard controls, as demonstrated by the following examples:

- Triad’s IH and IS programs include a thorough document hierarchy that flows down 10 CFR 851 requirements to the working level. Examples include the mechanical material handling (MMH), hoisting and rigging, and silica control programs. IH and IS hazards associated with MMH, hoisting and rigging, electrical safety, and the IH silica program are also addressed in P300, P300-1, and exhibit F subcontractor requirements (discussed below).
- For material handling, P101-25, *Crane, Hoists, Lifting Devices, and Rigging Equipment*, adequately covers LANL institutional requirements for use, testing, maintenance, and inspection, consistent with the manufacturer’s specifications for lifting and moving loads. These requirements meet applicable provisions of crane- and rigging-related documents, such as Occupational Safety and Health Administration construction standards (29 CFR 1926, *Safety and Health Regulations for Construction*), general industry standards (29 CFR 1910, *Occupational Safety and Health Standards*), the American Society of Mechanical Engineers (ASME) B30 series standards, and DOE-STD-1090-2011, *Hoisting and Rigging*. P101-25 includes adequate procedures for pre-lift planning and lift categorization through a detailed, documented screening process. A master equipment list is maintained to track annual equipment inspections and certifications.
- P101-13, *Electrical Safety Program*, is thorough and provides the necessary electrical safety requirements and principles to protect workers from hazards associated with energized and de-energized electrical work. P101-3, *Lockout/Tagout for Hazardous Energy Control*, and RN101-3-01,

Interim Requirements for Hazardous Energy Identification and Control, are thorough and provide the necessary hazard controls to protect workers from exposure to hazardous energy.

- Triad’s RP program includes a radiological work hazard grading process consistent with the P300 and P300-1 hazard grading requirements, and contains appropriate program plans, manuals, and procedures that flow down the radiological requirements of 10 CFR 835, *Occupational Radiation Protection*, to the working level.

Triad adequately flows down 10 CFR 851 requirements to subcontractors and sub-tier contractors through P101-12, *ESH Requirements for Subcontractors*. Exhibit F of the Triad subcontract process is used to prescribe these and other WP&C requirements for subcontractors. Interviewed and observed subcontract workers (from Eaton and RG Construction Services, LLC) were very familiar with the Triad work control processes, well integrated into facility operations, and closely overseen and supported by Triad subcontract technical representatives (STRs). Observed STRs at subcontractor projects were engaged with contractor management and participated in pre-job activities.

While WP&C institutional programs are generally robust, the following four weaknesses were observed:

- Contrary to SD100, sec. 3.4.2, and PD100, sec. 3.1.1, procedures P300 and P300-1 lack sufficiently objective criteria and examples to determine the hazard grading of low-hazard work, potentially resulting in moderate-hazard work being performed without a job task analysis to identify potential hazards and controls. (See **Deficiency D-Triad-1**.) Incorrectly classifying moderate-hazard work as low-hazard work could result in worker injury or unnecessary exposure to IH or radiological hazards. The hazard grading tables and work examples in P300 and P300-1 are inconsistent and require the responsible line manager (RLM) to make a final, subjective determination, which resulted in some moderate-hazard work being incorrectly graded as low-hazard work, as discussed in section 3.2 of this report. Further, procedure P300, table A-1, *Hazard Grading Table*, question 4, recommends that the RLM maintain a record if a conscious decision was made to grade an activity as low-hazard work, as no other way exists to document why there is no IWD associated with the activity. This same language for the RLM to maintain a decision record for low-hazard work is not contained in procedure P300-1, table B-1, *Hazard Grading Table*, question 4, under which the work discussed in section 3.2 was incorrectly graded.
- Contrary to SD100, sec. 3.3.2, procedure P300-1 does not adequately define the roles and responsibilities for work planners/preparers of R&D programmatic work. (See **Deficiency D-Triad-2**.) Specifically, P300-1, sec. 3.3.6, assigns responsibility for preparing the IWD to the person in charge (PIC) or a “preparer.” However, P300-1, sec. 4.0, does not include the work preparer, and the duties for the PIC do not include preparing the IWD. Unclear roles and responsibilities for work preparers can result in poorly planned work, unanalyzed hazards, and unidentified controls.
- Training requirements for programmatic work planners/preparers are not adequately specified in P300-1. All personnel involved in WP&C are required to take training class 52214, *Integrated Work Management – Understanding Your Role and Responsibilities*, which provides an overview of the process but does not provide detailed guidance for any of the WP&C roles, including preparer. Two of the eight team leads/preparers who were interviewed had not received class 52214 training, and some work preparers were not included in other WP&C-related training curricula. (See **OFI-Triad-1**.)
- P101-40, *Mechanical Material Handling*, lacked guidance for conducting inspections of MMH equipment not covered by ASME B30.1, *Jacks, Industrial Rollers, Air Casters, and Hydraulic Gantries*, such as stair climbers and hydraulic lift tables. An internal MMH self-assessment conducted between June 27, 2022, and August 12, 2022, has previously identified this issue. (See **OFI-Triad-2**.)

Work Planning and Control Institutional Programs Conclusions

Triad's WP&C documents and procedures adequately address DOE's ISMS requirements. Triad's supporting ES&H programs provide thorough programmatic requirements and procedures to enable proper identification, analysis, and control of safety and health hazards. For high-hazard and complex work activities, Triad implements a rehearsal-of-concept drill—which is cited as a best practice—to ensure that the work is ready to be performed. However, procedures P300 and P300-1 lack sufficient objective criteria and examples to determine the hazard grading of low-hazard work, and procedure P300-1 does not adequately define the roles and responsibilities for work planners/preparers of programmatic work.

3.2 Work Planning and Control Implementation

This portion of the assessment evaluated Triad and subcontractor implementation of WP&C institutional programs for ongoing work at LANSCE through the proper implementation of the ISM core functions.

Defining the Scope of Work

With one exception discussed below, the work-scope definition for all observed WCDs, including IWDs and WOs, was sufficiently detailed and adequate to permit the proper identification of hazards and necessary controls, as demonstrated by the following examples:

Integrated Work Documents

- AOT-MDE-IWD-015-023, *805 Quadrupole Magnet Removal for Repair/Replacement*, adequately defined the specific magnet to be worked, as well as the work tasks and steps to perform the job.
- IWDs 001 through 009, *Office Space Renovation in TA53, Bldg. 19*, fully described the various stages of the renovation project and steps to implement safety requirements at the task level.
- An observed preliminary walkthrough of a project to remove a large ventilation louver system and replace it with a rollup access door in Technical Area (TA)-53 Building 0002 was comprehensive and attended by numerous personnel from construction management and support organizations. The IWD preparer was present and captured information for development of the initial IWD.
- Standing IWD AOT-OPS-IWD-19-004, *Forklift Operations at TA-53*, associated with two moderate-hazard work observations involving forklifts to move a six-ton lathe and other equipment at Building 3M, properly described the work scope in detail from pre-planning activities to completion of the lifts.

Work Orders

- WO 737752-01, *Crane PM*, adequately identified the requirements for the crane lockout/tagout (LOTO) and preventive maintenance procedures.
- WOs 00737814-02, *Annual Inspection (530364 CTO-001 HE-001)*, 737778-02, *Annual Inspection (530030 CTO-001 HE-001)*, 00737772-01, *530007-24 CJ-001 HE-009 PM*, and 00737813-01, *530007-24 CM-008 HM-002 PM*, associated with the annual preventive maintenance and inspection of overhead, monorail, and jib cranes, contained a properly defined work scope, including precautions and limitations for potential unforeseen situations, permit requirements, special work instructions for hazardous energy, and hold points for manlift work.

- WO 737489, *Lead Organization in Fraser Dome & Area A*, provided adequate procedures for the handling, segregation, and packaging of used lead bricks.
- Subcontract EP47196 TA-53-0003M, *Breaker Replacement T26 and T29*, adequately identified the requirements and procedures for breaker replacement and ancillary work.
- WO 712840-01, *480 VAC Facility Upgrade Switchyard*, provided adequate procedures for using ground penetrating radar to identify any embedded systems prior to drilling (penetration of) the concrete floor to install anchors for mounting an equipment rack.

While the work-scope definition was generally adequate, the work scope was not properly documented or defined for one observed work evolution involving shield plug removal where a worker handled a heavy steel manhole cover without sufficient personal protective equipment (PPE). This work was improperly classified as low-hazard work, which is not subject to the IWD processes that require a well-defined, documented work scope, hazards identification and analysis, and control selection. Improper classification of moderate-hazard work as low-hazard work could result in worker injury. Specifically, the worker moved and rolled a steel manhole cover away from the shield plug opening without wearing safety toe shoes. In addition, the worker's hand protection (nitrile gloves) was not adequate for handling the manhole cover over the shield plugs. There was no evidence that the task had been reviewed for potential hazards. This weakness represents a vulnerability with the subjective nature of the determination of low-hazard work and lack of any documented justification to support a low-hazard determination (see the discussion related to Deficiency D-Triad-1 in section 3.1 of this report).

Identifying and Analyzing Hazards

For observed work covered by IWDs and WOs, most hazards were adequately identified and analyzed, including proper engagement of appropriate subject matter experts (SMEs) to analyze task-based hazards and identify necessary controls. For example, WO 737489 adequately identified various hazards involved in the movement and reorganization of used lead bricks. Hazards from lead exposure, radiological exposure, hantavirus, lifting, exposure to temperature extremes, moving equipment, and wildlife were all appropriately identified. Similarly, WOs 00737814-02, 737778-02, 00737772-01, and 00737813-01 adequately identified and analyzed most hazards involving hazardous energy and elevated work, including fall protection and manlift operation. IWDs 001 – 009 also identified applicable hazards for the different tasks involved in the renovation of the building.

For radiological work graded as moderate-hazard work that does not require a job-specific radiological work permit (RWP), radiological hazards were appropriately analyzed and included in IWDs or the TA-53 facility radiation protection requirements (FRPRs). For example, IWD AOT-MDE-IWD-015-023 and IWD 001, *TA-53 Building 0003P*, appropriately identified the potential for radiological contamination for work requiring a breach of potentially contaminated systems at LANSCE. For high-hazard radiological work requiring an RWP, radiological hazards were properly analyzed, and controls identified in job-specific RWPs were appropriately developed using the Sentinel RWP process defined in RP-PROG-TP-104, *Radiological Work Permit (RWP) Process Using Sentinel*. Examples of reviewed high hazard radiological work RWPs included RWP 23-0234, *LANSCE Zr-88 Sample in DICER/FP-13*, and RWP 23-0142, *LANSCE IPF Cooling Skid Maintenance, Decon, Repair and Water Sampling*.

Reviewed WCDs demonstrated that WP&C processes properly flowed down the P101-25 requirements and other applicable regulations for identified hazards associated with facility maintenance activity-level work. WCDs adequately reflected the identified hazards associated with observed hoisting and rigging preventive maintenance and inspection work in form 2100-WC, *Facilities Maintenance IWD-Facility Maintenance Activity Specific Information*. Interviewed hoisting and rigging inspectors, who are

qualified crane operators and riggers, and incidental operators and riggers, clearly understood the identified hazards.

EA identified a hazard identification concern with respect to the inconsistent use of form 1611, *Ordinary/Moderate Risk Lift Procedure*, covered in P101-25, sec. 3.0. Form 1611 is a pre-planning document intended to help planners determine whether an activity involves an ordinary or moderate lift by a crane or other lifting device. P101-25, sec. 3.0, states that documentation is achieved by completing form 1611 or by incorporating the elements of an ordinary lift in a WCD. Form 1611 was not completed for the shield plug removal work, during which an underhung crane lifted shield plugs weighing 188 and 1,608 pounds. As discussed above in *Defining the Scope of Work*, no IWD was required because this work was incorrectly categorized as low-hazard work.

An additional concern was identified with WO 712840-01, which did not identify the silica hazard from concrete drilling. However, the work crew implemented the proper controls despite the missing hazard in the WO.

Developing and Implementing Hazard Controls

Hazard controls were generally effectively developed and implemented in WCDs, such as IWDs, WOs, and hazard-specific permits (e.g., RWPs, pre-lift checklists, fall-hazard-prevention analyses). For example, IWD AOT-MDE-IWD-015-023 included a work step to ratchet-strap a forklift to an accelerator support beam to prevent unanticipated movement of the forklift during the removal of a magnet. As an added level of safety, strapping not identified in the IWD was provided to secure the magnet to the forklift bed and material handling table. Additionally, critical lift plans were comprehensive and fully covered the necessary planning of and documentation for a hydraulic lift table, forklift, and bridge crane combination to safely conduct the P-2-044 mercury filling operation for the newer style mercury shutter system in September 2022.

Work permits were properly obtained and contained specific and appropriate controls. For example, a penetration permit was properly obtained and approved for a blackboard installation (UP-749384-01). In addition, a well-documented and executed special work permit covering the high-hazard and preparatory work associated with removing and replacing an activated target moderator reflector system in April 2022 served as the high-consequence lift permit and critical lifting plan for all lifts performed in the task by forklifts and cranes.

Radiological controls were appropriately defined in IWDs for moderate-hazard radiological work and in RWPs for high-hazard radiological work. For example, IWD AOT-MDE-IWD-015-023 and IWD 001 appropriately included RP hold points for radiological control technician (RCT) surveys before potentially contaminated systems were breached. Similarly, RWP 23-0234 and RWP 23-0142 provided appropriate radiological controls, including continuous RCT coverage, thermoluminescent dosimeters, wrist dosimetry, electronic pocket dosimeters, protective clothing, bioassay, hold points, and radiological suspension limits.

Triad's implementation of the electronic radiological access controls System (ERACS) in conjunction with the Sentinel RWP system greatly simplifies the validation of worker credentials to work under a specific RWP. When a worker signs into an RWP using ERACS, the system automatically checks their radiological worker training, site-specific training, and dosimetry enrollment to ensure that the worker is current in each. The system will not allow a worker to complete the RWP sign-in if they have any expired credentials.

While controls for observed work were generally adequate, contrary to P300, sec. 3.1.3, and P300-1, sec. 3.3.8, hazard controls were not properly identified in two WCDs. (See **Deficiency D-Triad-3**.) Not specifying appropriate controls in WCDs could result in worker injury or unnecessary exposure to IH or radiological hazards. Specifically, IWD 741895-01, *Demo Heaters HUG-1 and HUG-2*, did not systematically describe the work activity, the associated potential fall hazards, or the controls required to prevent employees from falling. An employee was exposed to a potential fall during the manual removal and lowering of a heater while working on a baker's scaffold with an open gate. Similarly, IWD OSH-ISH-IWD-01, *In Place Field HEPA Filter Inspection and Testing*, part 1, did not adequately specify the radiological controls required for breaching a potentially contaminated system at TA-53. Part 1 of this IWD stated to "have RCT/IH perform a survey of sampling ports before opening and inserting sample probes." However, this approach would not have detected contamination inside the system. Per the TA-53 FRPR, surveys are required immediately after breaching potentially contaminated systems before work in the systems can take place, and the RCT performed appropriate sampling inside the system when it was opened.

Additionally, some controls specified in IWDs for work with similar hazards were not consistent or sufficiently protective. Specifically, IWD AOT-MDE-IWD-015-023, *805 Quadrupole Magnet Removal for Repair/Replacement*, did not require head protection for workers exposed to overhead hazards while crouching under the beamline to repetitively cross to the opposite side. Also, IWD P-3-23-1, *Operation of DICER/FP-13 with a Radioactive Zr-88 Sample*, did not require any head protection despite the potential for bump hazards due to a low overhead. Conversely, workers replacing pumps under beamline equipment associated with IWD 53000, *3J Sector J DI Water Pump Replacement*, wore hard hats as required by the IWD.

Performing Work within Controls

Plan of the Day meetings were effectively used to communicate the specific work planned to be performed each day. With one exception, observed pre-job briefings for work governed by an IWD were effective in confirming the readiness to perform work. Pre-job briefings were generally comprehensive and covered work scope, hazards, and controls relative to the tasks of the day, including critical work steps and possible plan deviations. Workers and SMEs were engaged and participated in the briefings.

Observed work was generally performed without incident and in accordance with established control sets, as demonstrated by the following examples:

- Observed MMH equipment, such as pallet jacks, carts, and stair climbers, were properly maintained with permanently affixed and legible markings showing their recommended workloads. Appropriate PPE was used and required permits for ordinary lifts and energy isolation controls were completed and instituted. Similarly, forklift operators properly documented pre-use inspections and evaluated the MMH activity to determine the type of load to be lifted.
- Equipment inspection records showed that cranes, other lifting devices, and rigging equipment are consistently maintained, inspected, tested, and tagged by qualified and trained operators and riggers from Logistics Division (LOG-DIV) and the MSS division.
- WO 712840-01 was conducted using appropriate silica controls during the installation of Unistrut supports. A HEPA vacuum was used at the point of drilling, and low energy puffs of air were used to clear dust from the drill holes, also supported by the HEPA vacuum.
- Work was appropriately paused when safety concerns were evident. EA observed work pauses during in-field HEPA measurement testing due to poor lighting conditions and during construction work at the proton radiography (pRAD) dome to address work coordination issues with LOTO.

While observed work was generally performed within the controls, some weaknesses were identified. Contrary to SD100, sec. 3.4.4, and P300-1, secs. 3.3.12.c and 3.3.13, some observed work was not performed within the controls specified in institutional requirements and governing WCDs. (See **Deficiency D-Triad-4.**) Not performing work within the required controls could result in worker injury or unnecessary exposure to IH or radiological hazards, as demonstrated by the following examples:

- Several required controls in IWD OSH-ISH-IWD-01 were not followed, including performing a formal pre-job briefing, using safety glasses, placing electrical cords and sample tubing in non-traffic areas (i.e., no trip hazards), ensuring appropriately sized electrical extension cords (i.e., no daisy chaining), and ensuring sufficient ventilation to avoid inhalation of polyalphaolefin aerosols.
- Crane and rigging requirements were not appropriately applied during chiller maintenance associated with WO 741439-04, *Chiller Maintenance in Building 3e*. A Ruger straddle crane was left unattended with a suspended load and its operational key was inserted.
- For work being performed under IWD IWD-RFE-10004, *Troubleshoot, Repair and Test DC Magnet Power Supply*, and WO 731960-03, *TA-53-0003 pRAD Barrier Wall*, workers were not fully prepared with LOTO locks, tags, and lock boxes. The LOTO workers did not fully understand the LOTO process.

A radiological measurement practice observed by EA during a magnet replacement may not be sufficiently sensitive to detect beta-gamma contamination at the limits required by P121, *Radiation Protection*, table 14.2, *Removable Surface Contamination Limits*. This practice involved field evaluation of removable contamination on large area wipes and smears using a survey instrument exclusively in ratemeter mode, with no static counting (total counts integrated over a fixed time period) to ensure that the calculated minimum detectable activity (MDA) could be achieved. This concern is relevant when ratemeter-mode screening is the only counting method used. For other observed work, smears were field counted and later submitted for laboratory static counting. (See **OFI-Triad-3.**)

Work Planning and Control Implementation Conclusions

The work-scope definition in WCDs for observed work was generally adequate to permit proper identification of hazards and necessary controls, with one exception for moderate-hazard work that was improperly graded as low-hazard work. For observed work covered by WCDs, most hazards were appropriately analyzed and documented, including proper engagement of appropriate SMEs to analyze the task-based hazards and identify necessary controls. Isolated exceptions included one IWD that did not identify silica hazards associated with concrete drilling work, and one work evolution that was improperly graded as low hazard involved manual handling of a heavy steel manhole cover and a crane lift, with no IWD to identify hazards and appropriate controls.

Hazard controls were also effectively developed and implemented, in most instances, in IWDs, WOs, and hazard-specific permits, including RWP, pre-lift checklists, and fall-hazard-prevention analyses. Importantly, for most observed jobs, work was performed without incident and in accordance with established control sets, and work was appropriately paused when safety concerns were evident. However, hazard controls for two observed work evolutions were not properly specified in governing WCDs. Further, work was not properly performed within the controls specified in governing WCDs for three observed work evolutions.

3.3 Contractor Assurance System and Feedback and Improvement

This portion of the assessment evaluated Triad's established CAS to plan and conduct risk-based assessments, analyze and manage WP&C-related issues and associated corrective actions, review performance (including feedback and improvement), and share lessons learned.

Contractor Assurance System

Triad has established a generally comprehensive and adequate CAS as required by DOE contract 89233218CNA000001, sec. J, app. A. Triad's CAS is adequately described in SD320, *Contractor Assurance System*, and SD100. Significant changes to the CAS are issued periodically, appropriately reviewed by NA-LA staff, and submitted for NA-LA Manager approval. The NA-LA Manager approved the current CAS description on August 21, 2020. The Triad Institutional Quality and Performance Assurance Division, along with work control and safety and health organizations, provide satisfactory processes for planning and conducting assessments, managing issues, overseeing training, and issuing periodic performance reports to support CAS implementation.

Assessments

Triad plans and conducts a generally comprehensive set of assessments. PD328, *LANL Assessment Program*; P328-1, *Performance Assurance Planning Cycle and Integrated Assessment Schedule Maintenance*; P328-2, *Independent Assessments*; and P328-3, *Management Assessments*, provide effective guidance on processes, requirements, and responsibilities for conducting assessments. Triad effectively uses input from events, assessments, lessons learned, and enterprise risk management processes to collect and appropriately consider risks during the development of the annual integrated assessment plan. Formal assessments listed in the annual integrated assessment plan include independent assessments, management assessments, corporate parent assessments, and assessments required by regulation. Three reviewed training records demonstrated that Triad assessors received satisfactory formal training as required by P328-2, P328-3, and P781-1, *Conduct of Training*. In fiscal year 2022, Triad conducted eight formal assessments at LANSCE, all of which included aspects of WP&C. Of those eight assessments, four appropriately included observations in the field. In addition, 123 management observation and verification (MOV) activities were conducted at LANSCE during the same timeframe. EA reviewed 7 management assessments, 2 independent assessments, and 10 MOVs related to LANSCE activities; these assessments were generally robust and self-critical, with findings and corrective actions tracked in the Triad issues management system (iLink). However, Triad does not conduct periodic independent assessments to determine whether applicable lessons learned are captured and subsequently implemented through changes to IWDs. (See **OFI-Triad-4**.)

Issues Management

Triad uses a generally systematic and useful approach to analyze events and issues, develop corrective actions, and track corrective action status. P322-4, *Issues Management*, provides guidance on managing events, issues, extent-of-condition reviews, corrective actions, and effectiveness reviews. The iLink system effectively supports tracking of issue/event causal analyses, corrective actions, extent-of-condition reviews, development of applicable lessons learned, and effectiveness reviews. Four reviewed training records demonstrated that causal analysts are appropriately trained and qualified. Ten reviewed Occurrence Reporting and Processing System (ORPS) reports demonstrated appropriate causal analysis and adequate development of corrective action plans. Three of these ORPS reports were related to material handling at LANSCE. A management assessment, *Issues Management Improvement Initiative Implementation*, dated 10/31/2022, demonstrated that additional improvements are still needed (e.g., in the areas of line ownership of the IM program and application of graded approach to IM) to effectively

address IM related findings identified in a 2019 EA Nuclear Safety Assessment. Triad has established an institutional management review board consisting of senior managers to approve, monitor, and track formal assessments and significant corrective actions (similar to corrective action review boards at other sites).

Performance Review, Feedback and Improvement, and Lessons Learned

Triad has generally effective processes and tools for performance review, collection of worker feedback, and sharing of lessons learned. Periodic performance reviews and reports include effective monthly metrics (including LANSCE data), LANL executive dashboards, monthly operations performance and program health indicators, monthly occupational safety and health metrics, and institutional quality and performance assessment metrics. However, Triad has not used available information (e.g., assessment results and worker feedback collected from such sources as post-job reviews, the activity tracking system, field revisions to IWDs, learning teams, worker environment, safety, and security teams, and MOVs) to develop, track, and trend a set of WP&C-leading indicators to allow managers to identify negative performance trends before they become significant issues. (See **OFI-Triad-5**.)

PD323, *LANL Operating Experience Program* and P323-1, *Operating Experience and Lessons Learned Process*, provide adequate guidance on the collection and distribution of lessons learned. The Triad Operating Experience (OPEX) Program Coordinator sends out a weekly email with a wide distribution to inform Triad personnel of the lessons learned being added to the LANL OPEX website. This website is maintained on the LANL intranet site, which is accessible to anyone with a LANL badge. LANL personnel can set up a personal library (a LANL OPEX option) of pertinent lessons learned that are of interest to them. In addition, the OPEX Program has a subscription capability where employees can sign up to receive email notifications automatically (immediately, weekly, or monthly).

Contractor Assurance System and Feedback and Improvement Conclusions

Triad has established a generally comprehensive and adequate CAS that provides appropriate corporate processes, assessments, issue management tools, training, and periodic performance reports. Reviewed formal assessments were generally robust and self-critical. Triad uses a generally systematic and useful approach to analyze events and issues, develop corrective actions, and track corrective action status. However, a recent management assessment noted additional improvements are still needed to effectively address IM related findings from a 2019 EA nuclear safety assessment. Triad has generally effective processes and tools for performance review, collection of worker feedback, and sharing of lessons learned. However, weaknesses were identified in the areas of assessing the implementation of lessons learned and developing leading indicators for WP&C.

3.4 Los Alamos Field Office Oversight

This portion of the assessment evaluated NA-LA's oversight of WP&C at LANSCE, as well as specific NA-LA programs, including the technical qualification, employee concerns, and differing professional opinion (DPO) programs.

Oversight of Triad

NA-LA is updating management procedure MP 00.08, *Implementation of NA-LA Oversight*, which outlines NA-LA's approach for line management oversight and describes NA-LA oversight planning and scheduling. Oversight activities include shadowing of Triad's self-assessments, NA-LA operational awareness activities (OAAs), NA-LA self-assessments, report reviews, external assessments, and NA-LA planned assessments of Triad. NA-LA acknowledged that MP 00.08 contains outdated references and

procedures and does not reflect current NA-LA oversight practices. NA-LA is revising MP 00.08, with an anticipated completion date of March 30, 2023. In conjunction with this revision, MP 00.13, *Risk Informed Oversight Planning*, and work instruction WI 00.13, *Assessment Planning*, were cancelled. Oversight planning will be included in attachment III of the update to MP 00.08. The National Training Center provided onsite training for 27 attendees on oversight planning to assist NA-LA in developing risk-informed annual assessment plans. MP 00.10, *NA-LA Issues Management Process*, adequately outlines the implementation of the NA-LA issues management system. In March 2022, NA-LA launched a SharePoint issues management system named Tracking and Handling Oversight Records (THOR), which replaced the previous issues management tool, ePegasus. However, THOR does not categorize or trend issues to aid in selecting activities or functional areas to support annual assessment planning. (See **OFI-NA-LA-1.**) Additionally, NA-LA has not conducted user training on THOR and MP 00.10. (See **OFI-NA-LA-2.**)

The Facility Representative (FR) assigned to LANSCE is adequately qualified and performs effective operational oversight. The FR maintains adequate oversight by attending daily planning meetings, reviewing work packages, participating in NA-LA assessments, shadowing Triad planned assessments, and conducting frequent site walkdowns. Issues identified from oversight activities are entered into the OAA tool. Activities from the OAA tool that require Triad to develop corrective actions are appropriately entered into the performance assessment reporting (PAR) tool, which feeds into Triad's interim feedback report. Federal-related issues are entered into THOR. In calendar year 2022, 43 OAA and 9 PAR entries were made, adequately documenting shadowing activities or OAAs at LANSCE. Documentation showed that the FR participated in a quality assurance review, *Accelerator Safety Review*, conducted July to September 2021. The FR also shadowed a Triad management assessment in July 2022, evaluating the implementation of pre-job briefings. Both activities were appropriately entered into THOR.

Procedure MP 02.04, *Technical Qualification Program [TQP]*, supplemented by MP 06.05, *Facility Representative Training and Qualification*, adequately describes the NA-LA training and qualification process. The NA-LA TQP coordinator performs overall program management of the NA-LA TQP and effectively tracks TQP participant progress and completion in e-TQP. Documentation showed that 6 of 15 FRs and 2 of 4 SMEs assigned to oversight duties throughout the LANL complex are qualified, and the ongoing qualifications of the remaining FRs and SMEs are within the 18-month timeline recommended by DOE Order 426.1B, *Department of Energy Federal Technical Capabilities*, for completing qualification. The last staffing analysis prepared by NA-LA, dated February 6, 2019, states that LANSCE "should have at least 2 FRs." Currently, one FR is assigned to LANSCE and was full time at LANSCE until October 2022, but now the FR spends approximately 36 hours at LANSCE and 4 hours at the TA-55 Plutonium Facility per week. FR training is effectively tracked and reported to the Federal Technical Capabilities Panel quarterly. However, contrary to MP 06.04, sec. 4.2.2 and DOE-STD-1063-2021, *Facility Representatives*, sec. 5.6.2 and app. A-1, NA-LA did not conduct a triennial self-assessment of its FR program and does not have a current staffing analysis. (See Finding **F-NA-LA-1.**) The lack of the required self-assessment and staffing analysis can result in an inadequate allocation of qualified FRs to perform safety oversight of LANL facility operations.

Employee Concerns

The NA-LA *Employee Concerns Program [ECP] Implementation Plan* effectively meets the requirements of DOE Order 442.1B, *Department of Energy Employee Concerns Program*, and the ECP is appropriately managed by a competent manager who has a direct line to the Field Office Manager for ECP matters. NA-LA has an ECP Hotline, mailbox, and NA-LA ECP SharePoint page and publicizes its ECP via posters on bulletin boards within the field office. Information regarding the NA-LA ECP program is also

included on the management and operating contractor's ECP SharePoint page and posters placed across the laboratory.

NA-LA currently has one employee concern case; the concerned individual chose to directly handle his or her concern with line management informally. NA-LA completed an assessment of Triad's ECP in 2022, and the results were appropriately communicated to Triad. However, a biennial self-assessment of the NA-LA ECP has not been conducted, contrary to DOE Order 442.1B, app. A, sec. 6.b.(1). (See **Deficiency D-NA-LA-1.**) Not conducting the required self-assessment of the ECP prevents management from measuring the effectiveness of the program and directing any necessary improvement actions. The ECP manager stated that a self-assessment of the NA-LA ECP is scheduled for the end of February or early March 2023. The DOE Headquarters ECP Director, in the Office of Environment, Health, Safety and Security, completed a review of the NA-LA ECP on January 18, 2023, but the report had not been published at the time of this assessment.

Differing Professional Opinions

Procedure MP 00.18, *NA-LA Differing Professional Opinion Procedure*, provides adequate guidance and implementing instructions for processing DPOs, and the DPO program is managed by a competent manager, the Senior Technical Safety Manager. The NA-LA DPO program was appropriately advertised at the NA-LA all-hands meeting on January 25, 2023. There has been one DPO case since 2017, and the case was elevated to Headquarters and subsequently resolved. However, contrary to MP 00.18, NA-LA did not maintain the case file records. (See **Deficiency D-NA-LA-2.**) Inadequate recordkeeping may hinder the preservation of evidence needed for future reference.

Los Alamos Field Office Oversight Conclusions

At the time of this assessment, NA-LA oversight and issues management programs were undergoing significant transition, including ongoing revisions of procedures and a new issues management tool. The LANSCE FR conducts adequate assessments and OAAs and communicates issues from oversight activities to Triad. However, NA-LA has not conducted self-assessments of its FR program and ECP, and NA-LA did not maintain case file records for a DPO case.

3.5 Follow-up on Previous EA Findings

This portion of the assessment examined the completion and effectiveness of corrective actions for previous EA findings documented in *Office of Enterprise Assessments Targeted Review of Work Planning and Control and Biological Safety at the Los Alamos National Laboratory, December 2015*.

The 2015 EA assessment cited two findings: (1) Finding F-NALA-01 identified that NA-LA was not approving the LANL CAS, contrary to DOE Order 226.1B, *Implementation of Department of Energy Oversight Policy*, and (2) Finding F-NALA-02 identified that NA-LA was not performing an FR staffing analysis, contrary to MP 06.04, sec. 4.2.2 and DOE-STD-1063-2011, and not preparing a staffing plan to address the FR shortfalls, contrary to DOE Order 426.1. EA identified that NA-LA did not develop corrective action plans for either of these findings. NA-LA's memorandum approving Triad's CAS was signed on August 21, 2020, and, as such, NA-LA has adequately addressed Finding F-NALA-01. However, NA-LA has not adequately addressed Finding F-NALA-02 as NA-LA does not have a current staffing analysis.

Follow-up on Previous EA Findings Conclusions

NA-LA did not develop corrective action plans for the two previous EA findings. NA-LA actions have resolved one of the findings. NA-LA approved Triad's CAS; however, NA-LA has not prepared a staffing analysis for the FR program since 2019.

4.0 BEST PRACTICES

Best practices are safety-related practices, techniques, processes, or program attributes observed during an assessment that may merit consideration by other DOE and contractor organizations for implementation. The following best practice was identified as part of this assessment:

Best Practice: The Triad rehearsal-of-concept drill results in greater confidence that high-hazard and complex work activities can be completed in a safely and efficiently.

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 to manage the corrective actions and track them to completion.

Los Alamos Field Office

Finding F-NA-LA-1: NA-LA did not conduct a triennial self-assessment of its FR program and does not have a current staffing analysis. (MP 06.04, sec. 4.2.2 and DOE-STD-1063-2021, sec. 5.6.2 and app. A-1)

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.

Triad National Security, LLC

Deficiency D-Triad-1: Triad procedures P300 and P300-1 lack sufficiently objective criteria and examples to determine the hazard grading of low-hazard work, potentially resulting in moderate-hazard work being performed without a job task analysis to identify potential hazards and controls. (SD100, sec. 3.4.2, and PD100, sec. 3.1.1)

Deficiency D-Triad-2: Triad procedure P300-1 does not adequately define the roles and responsibilities for work planners/preparers of programmatic work. (SD100, sec. 3.3.2)

Deficiency D-Triad-3: Triad does not always ensure that hazard controls are identified in governing IWDs. (P300, sec. 3.1.3, and P300-1, sec. 3.3.8)

Deficiency D-Triad-4: Triad does not always ensure that work is properly performed within the controls specified in institutional WP&C requirements and governing WCDs. (SD100, sec. 3.4.4, and P300-1, secs. 3.3.12.c and 3.3.13)

Los Alamos Field Office

Deficiency D-NA-LA-1: NA-LA has not conducted a biennial self-assessment of its ECP. (DOE Order 442.1B, app. A, 6.b.(1))

Deficiency D-NA-LA-2: NA-LA did not maintain case file records for a DPO case. (MP 00.18)

7.0 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.

Triad National Security, LLC

OFI-Triad-1: Consider developing training for programmatic work planners/preparers that includes hazard grading and hazard analysis techniques. UChicago Argonne, LLC has developed virtual micro-learning sessions that cover WP&C topics through focused, interactive 30-minute (or less) training sessions.

OFI-Triad-2: Consider revising P101-40 to include equipment that supports MMH work but is not covered by ASME B30.1 and the associated manufacturer's safe-work practices and inspection requirements.

OFI-Triad-3: Consider evaluating whether current ratemeter-mode counting practices can achieve an MDA less than the limits identified in P121, table 14.2, and documenting the results. If this MDA is unachievable through current ratemeter-mode counting practices, consider clarifying instrument procedures to require that static counts be performed in a low background area in the field or a nearby low background area to ensure that an MDA below the required limits can be achieved.

OFI-Triad-4: Consider conducting periodic independent assessments to determine whether applicable lessons learned are captured and subsequently implemented through changes to IWDs. Similar assessments conducted by the Four Rivers Nuclear Partnership, LLC lessons-learned coordinator at the Paducah Gaseous Diffusion Plant may provide useful examples.

OFI-Triad-5: Consider identifying a set of leading indicators for monitoring WP&C performance to supplement existing lagging indicators. Review of WP&C-related metrics developed by Lawrence Livermore National Laboratory's WP&C program management may be useful.

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OFI-NA-LA-1: Consider adding categorizing and trending capabilities to THOR to assist NA-LA in developing risk-informed annual assessment plans.

OFI-NA-LA-2: Consider providing training on MP 00.08, MP 00.10, and THOR that addresses the significant revisions to the procedures and the new issues management tool.

Appendix A Supplemental Information

Dates of Assessment

Onsite Assessment: January 23-26 and February 6-9, 2023

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