Triad National Security, LLC
Management and Operations Contract
Los Alamos National Laboratory

Report from the Department of Energy
Voluntary Protection Program
Transitional Review
September 26-November 4, 2022

U.S. Department of Energy
Office of Environment, Health, Safety and Security
Office of Health and Safety
Office of Worker Safety and Health Assistance
Washington, DC 20585

PREFACE

The Department of Energy (DOE or Department) recognizes that excellence can be encouraged and guided but not standardized. On January 26, 1994, the Department initiated the DOE Voluntary Protection Program (VPP) to encourage and recognize excellence in occupational safety and health protection. This program closely parallels the Occupational Safety and Health Administration's (OSHA) VPP. Since its creation by OSHA in 1982, and implementation by DOE in 1994, VPP has demonstrated that cooperative action among Government, industry, and labor can achieve excellence in worker safety and health.

DOE-VPP outlines areas where DOE contractors and subcontractors can surpass compliance with DOE Orders and OSHA standards. The program encourages excellence through systematic approaches, emphasizing creative solutions through managers, employees, and DOE cooperative efforts.

DOE bases requirements for DOE-VPP participation on comprehensive management systems, with employees actively involved in assessing, preventing, and controlling the potential safety and health hazards at their sites. DOE-VPP is open to all contractors in the DOE complex, including production facilities, laboratories, subcontractors, and support organizations. DOE contractors are not required to apply for participation in DOE-VPP. In keeping with OSHA and DOE-VPP philosophy, *participation is strictly voluntary*. Additionally, any participant may withdraw from the program at any time.

DOE-VPP consists of three levels of participation with names and functions similar to those in OSHA's VPP: Star, Merit, and Demonstration. The Star level is the core of DOE-VPP. This level recognizes outstanding protectors of employee safety and health. The Merit level is a steppingstone for participants that have good safety and health programs that need time and DOE guidance to achieve Star status. The Demonstration level allows DOE to recognize achievements in unusual situations that DOE needs to learn more about before determining approval requirements for the Merit or Star level.

By approving an applicant for participation in DOE-VPP, DOE recognizes that the applicant exceeds the basic elements of ongoing, systematic protection of employees at the site. The symbols of this recognition provided by DOE are certificates of approval and the right to use flags showing the program level in which the site is participating. The participant may also choose to use the DOE-VPP logo on its letterhead or award items for employee incentive programs.

This report summarizes the results from the transitional review of Triad National Security, LLC (Triad), at the Los Alamos National Laboratory in Los Alamos, New Mexico, conducted from September 26 to November 4, 2022, and provides the Director of the Office of Environment, Health, Safety and Security with the necessary information to make the final decision regarding Triad's continued participation in DOE-VPP at the Star level.

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ABBREVIATIONS AND ACRONYMS

AED	Automated External Defibrillator
ALD	Associate Laboratory Director
ALDESHQ	Associate Laboratory Directorate for Environment, Safety, Health, and Quality
ALDFO	Associate Laboratory Directorate for Facility Operations
ALDWP	Associate Laboratory Directorate for Weapons Production
ATS	Activity Tracking System
BLS	Bureau of Labor Statistics
CAIRS	Computerized Accident Injury Reporting System
CAT	Customer Action Team
CBS	Caught Being Safe
CFR	Code of Federal Regulations
CMMS	Computerized Maintenance Management System
CSA	Craft Safety Advocate
CSP	Confined Space Program
CSR	Craft Safety Representative
CTS	Comprehensive Tracking System
DART	Days Aways, Restricted and Transferred
DD	Deputy Director
DDOPS	Deputy Director Operations
DDSTE	Deputy Director for Science, Technology, and Engineering
DDW	Deputy Director Weapons
DOE	Department of Energy
DS	Deployed Services
EHSS	Office of Environment, Health, Safety and Security
EHSS-12	Office of Worker Safety and Health Assistance
EMD	Emergency Management Division
EMP	Emergency Management Plan
EOC	Emergency Operations Center
ESH	Environment, Safety and Health
ESHQ	Environment, Safety, Health, and Quality
FLM	First Line Manager
FOD	Facility Operations Director/Directorate
FSR	Facility Service Request
FY	Fiscal Year
HE	High Explosive
HR-ITMS	Human Resources-Institutional Talent Management Services
IH	Industrial Hygiene
IQPA	Institutional Quality and Performance Assurance
ISH	Industrial Safety and Health
ISM	Integrated Safety Management
IWD	Integrated Work Document
IWESST	Institutional Worker, Environment, Safety and Security Team
IWM	Integrated Work Management
LANL	Los Alamos National Laboratory
LANS	Los Alamos National Security, LLC
LIHSM	Laboratory Industrial Hygiene Safety Manual

LMS	Learning Management System
LOMA	Laboratory Operations Management Academy
LOSA	Laboratory Operations Supervisor Academy
LOTO	Lock-Out, Tag-Out
MSC	Motorcycle Safety Committee
MEL	Master Equipment List
MOV	Management Observation and Verification
MRB	Management Review Board
MSS	Maintenance and Site Services
MSS-MP	Maintenance and Site Services – Maintenance Programs
NA-LA	NNSA/Los Alamos Field Office
NAICS	North American Industry Classification System
NET	New Employee Training
NFPA	National Fire Protection Association
NNSA	National Nuclear Security Administration
OH	Occupational Health
OJT	On-the-Job Training
ORISE	Oak Ridge Institute for Science and Education
ORPS	Occurrence Reporting and Processing System
OSH	Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PD	Program Description
PdM	Predictive Maintenance
PIC	Person-in-Charge
PM	Preventive Maintenance
PPE	Personal Protective Equipment
RCT	Radiological Control Technician
RFID	Radio Frequency Identification
RIC	Radiological Instrumentation Calibration
RLM	Responsible Line Manager
RLUOB	Radiological Laboratory Utility Office Building
RPP	Respiratory Protection Program
SAT	Systematic Approach to Training
SBP	Safety Basis Procedure
SCoR	Safe Conduct of Research
SEG	Similar Exposure Group
SME	Subject Matter Expert
SSIP	Safety and Security Improvement Plan
ST&E	Science, Technology & Engineering
STO	Science, Technology, and Operations
STR	Subcontractor Technical Representative
SWESST	Student WESST
TA	Technical Area
Team	Office of Environment, Health, Safety and Security DOE-VPP Team
TRC	Total Recordable Case
TRIAD	Triad National Security, LLC
U.S.	United States
VPP	Voluntary Protection Program

WESST Worker, Environment, Safety and Security Team

EXECUTIVE SUMMARY

The Department of Energy's (DOE) Voluntary Protection Program (VPP) Assessment Team (Team) from the Office of Environment, Health, Safety and Security (EHSS) recommends that Triad National Security, LLC (Triad) at the Los Alamos National Laboratory (LANL) in Los Alamos, New Mexico, continue to participate in DOE-VPP as a Star participant based on the transitional review conducted September 23 to November 4, 2022.

The National Nuclear Security Administration (NNSA) awarded the LANL contract to Triad, which began operating LANL on November 1, 2018. Triad applied for transitional status per DOE-VPP Technical Standard 1232-2019 requirements. Triad was due for its transitional review in the 2019/2020 timeframe, but EHSS postponed that review due to the COVID-19 pandemic's travel restrictions. The previous contractor at LANL, Los Alamos National Security, LLC (LANS), became a DOE-VPP Star participant in 2014 and was recertified in September 2017.

Established in 1943 under the Manhattan Project, LANL continues to operate as a federally funded research and development center and shares responsibility for safety and reliability of the Nation's nuclear stockpile. Triad currently has about 15,000 employees and 4,500 subcontractors engaged in its mission, including many skilled crafts represented by several unions.

EHSS conducted this onsite review to verify that Triad continues to meet DOE-VPP expectations for continued participation as a Star site. Personnel from the Office of Worker Safety and Health Assistance (EHSS-12), within EHSS, conducted the review in two phases. The Team conducted an initial virtual review from September 26 to October 14, 2022, to interview workers and managers, attend meetings, and review documents. The Team then performed onsite work observations, validations, and interviews from October 24 to November 4, 2022.

The results of the review indicated that Triad is:

- Committed to ensuring LANL accomplishes its missions safely, without unnecessary or unanalyzed risks;
- Engaging the workforce in safety culture improvements, and using Worker Environment Safety and Security Teams to identify issues, recommend improvements, and promote workers' ability to stop and pause work when questions or issues arise;
- Correctly identifying and analyzing hazards using teams of subject matter experts, workers, supervisors, and managers, and maintaining an extensive baseline hazards analysis system;
- Properly controlling hazards using the appropriate hierarchy of controls, and using integrated work management processes to properly define, authorize, control, and complete work safely;
- Appropriately training and qualifying all workers, supervisors, managers, and subcontractors to recognize and control the hazards they may encounter during their work; and
- Maintaining accident and injury rates that are lower than the comparison industry.

Triad has successfully transitioned its workforce from the previous contractor. Over the past 5 years, Triad has expanded the LANL missions and capabilities as directed by the NNSA. Site capital improvements at several facilities and improvements in site infrastructure are helping workers conduct hazardous work vital to the Nation's security, nuclear stockpile stewardship,

and global security. Triad effectively manages its resources and provides workers with the necessary training, tools, and procedures. Triad has opportunities to increase engagement with workers, supervisors, and middle managers, and gain their support for, and participation in, those programs and processes Triad considers vital for continued safety improvement and excellence. The Team did not identify any systemic noncompliance with requirements, or any suppression of concerns or reporting. Triad fully demonstrates continuous improvement and pursuit of excellence expected for continued participation in DOE-VPP. The Team recommends that Triad continue participating in DOE-VPP at the Star level.

TABLE 1
OPPORTUNITIES FOR IMPROVEMENT

Opportunity for Improvement	Page
Triad should establish higher expectations (e.g., 2-3 MOVs each week for each manager), and reinforce that those MOVs should be opportunities to converse with workers, mentor, and guide first-line supervisors, understand issues or concerns, and establish credibility with the workforce.	**7**
Triad should consider sponsoring a safe driving campaign where employees could voluntarily track their commute using their personal smartphones, and then share that data.	**9**
Triad should look for more effective means to provide earned rewards to large segments of the workforce, meaningfully recognize and encourage participation in WESST, and identify regular safety emphasis programs with defined rewards that personnel can earn for participation in those programs.	**10**
Triad should ensure that all WESSTs reinstitute their activities to record, track, and provide closure (whether approved or not) regarding employee-raised concerns.	**14**
Triad should consider expanding WESSTS at the division or group level to foster greater employee engagement and encourage employee participation in safety programs.	**14**
Triad should contact ORISE for information regarding the ORISE DOE-VPP Ph.D program, and work with ORISE to adapt the program at LANL.	**15**
Triad should team WESST members with CSAs for a day or two, giving them firsthand experience in interacting with workers, inquiring about concerns or issues, and raising those issues to higher levels.	**16**
As a means of fostering additional employee engagement, Triad could consider expanding the use of Learning Teams to identify other potential improvements, rather than limiting it to events, occurrences, or other failures.	**17**
Triad should ensure that supervisors and managers reinforce that the additional IWD revision process helps document and implement the most effective and efficient controls to accomplish their work safely.	**21**
Triad should continue to drive the effort to implement site-wide IWM process controls to completion and use this revision as a means to incorporate internal lessons-learned and input from various ALD stakeholders to align IWM methods site-wide and implement engineered controls to drive consistent compliance with critical IWM requirements (e.g., activity hazard level rating, hazard controls, facility and colocated hazard consideration, etc.) and auditing capability.	**22**

Triad should review its workplace inspection policies, procedures, training, and qualification requirements to ensure personnel assigned to conduct safety inspections are familiar with common hazards and safety-related deficiencies, and document monthly inspections that cover the entire worksite each quarter as required by the DOE-VPP Standard.	**26**
Triad should improve the FSR feedback process and develop informational material to train LANL personnel on FSR effectiveness and acknowledge receipt of an FSR to the submitter.	**32**
Triad should review the temporary equivalency letter and ensure it is up to date for current operations and requirements.	**35**
Triad should inspect and inventory all AEDs placed around the facilities as required by P102-4 while waiting for new AEDs.	**35**

I. INTRODUCTION

This report provides the Department of Energy's (DOE) Director, Office of Environment, Health, Safety and Security (EHSS), with the results of the transitional review of Triad National Security, LLC (Triad) at the Los Alamos National Laboratory (LANL) in Los Alamos, New Mexico from September 26 to November 4, 2022. Based on this review, the DOE Voluntary Protection Program (VPP) Assessment Team (Team) recommends that Triad continue in DOE-VPP as a Star participant.

The DOE-VPP encourages excellence in occupational safety and health protection by recognizing DOE contractors and subcontractors who maintain safety programs that surpass compliance with DOE; Occupational Safety and Health Administration (OSHA); and local, State, and Federal safety standards.

The Star level is the core of DOE-VPP. This level recognizes outstanding protectors of employee safety and health. A participant at the Star level should be a model for other members of its industry and other DOE contractors and subcontractors. Because this is a dynamic and continuous improvement program, participants cannot allow their efforts to stagnate. DOE does not limit approvals to set durations but uses triennial reevaluations to ensure that the participant still warrants Star level participation.

The National Nuclear Security Administration (NNSA) awarded the LANL contract to Triad, which began operating LANL on November 1, 2018. Triad is a partnership comprised of the Battelle Memorial Institute, the Texas A&M University System, and the University of California. Triad applied for transitional status per DOE-VPP Technical Standard 1232-2019 requirements, which was approved by the Office of Worker Safety and Health Assistance (EHSS-12), within EHSS. Triad was due for its transitional review in the 2019/2020 timeframe, but EHSS postponed that review due to the COVID-19 pandemic's travel restrictions. The previous contractor at LANL, Los Alamos National Security, LLC (LANS), became a DOE-VPP Star participant in 2014, and was recertified in September 2017.

Established in 1943 as part of the Manhattan Project, LANL is located about 25 miles northwest of Santa Fe, New Mexico. LANL's overall mission is to solve national security challenges through scientific excellence. The Laboratory makes significant contributions to national security science, technology, and engineering (ST&E) in support of missions across NNSA, DOE, and other government agencies.

Triad manages LANL as a multi-program, federally funded research, and development center for the NNSA. Triad's mission priorities are:

- Sustaining the United States (U.S.) nuclear weapons stockpile, which includes both design and production missions;
- Providing options to the U.S. government that enhances the future resilience of the U.S. strategic deterrent over the next 25 years; and
- Anticipating, reducing, and responding to emerging national security threats in a dynamic geopolitical environment.

LANL's world-class workforce of about 15,000 workers span ST&E expertise across a variety of mission areas. LANL covers 24,612 acres and 896 buildings, including 6 nuclear, 96 radiological, and 164 hazardous facilities. To accomplish LANL's nuclear design and production missions; anticipate, reduce, and respond to national security threats; and innovate in mission-focused ST&E research and development, the Laboratory engages in numerous complex and challenging efforts. This work spans areas, such as the Plutonium Center of Excellence and Actinide Science; the Dual-Axis Radiographic Hydrodynamic Test Facility and firing sites; the Los Alamos Neutron Science Center and accelerator operations; restricted data and sensitive compartmented information; high-performance computing; the National Criticality Experiments Research Center and Nevada test operations; and explosives research and development. A wide range of hazards resulting from these activities include:

- Cranes, hoists, lifting devices, and rigging equipment;
- Inadvertent release of energy:
- Oxygen-deficient atmospheres;
- Radiological hazards;
- Non-ionizing radiation;
- Lasers;
- Asbestos;
- Exposure to lead;
- Moving vehicles;
- Welding and brazing;
- Spark and flame producing operation;
- Working in elevated work areas;
- Energetic materials' handling and processing;
- Excessive noise;
- Electrical hazards;
- Pressurized systems;
- Chemicals;
- Beryllium;
- Biohazards;
- Confined spaces;
- Ergonomics; and
- Engineered nanoparticles.

Organizationally, Triad retained a structure similar to its predecessor. Three Deputy Directors (DD) support the Laboratory Director. These DDs lead and execute Triad's three primary missions: Science, Technology, and Engineering; Weapons; and Operations. Each of these DDs' organizations have several Associate Laboratory Directors (ALD), which are further divided into divisions, groups, teams, and programs.

The DD for Weapons (DDW) leads the weapons programs that ensure the long-term safety, reliability, and security of the nation's nuclear weapons stockpile, including the annual stockpile certification. DDW also directs the fundamental research, development of physical models, integration of those models in computer simulation codes, experimental validation and engineering required to maintain the certification of the existing nuclear deterrent and to provide options for the future strategic deterrent. Finally, DDW plans and executes the Laboratory's weapons manufacturing and production mission.

The DD for Science, Technology, and Engineering (DDSTE) is responsible for research and development of mission-enabling ST&E, including Science, Energy, and Global Security Programs. DDSTE applies world-class research and development to deliver its mission, enhance the nation's nuclear deterrent, and reduce global threats. DDSTE also leads the Laboratory-Directed Research and Development portfolio, establishes industry and academic partnerships, and champions existing high-quality LANL scientific capabilities and their expansion.

The DD Operations (DDOPS) coordinates operational activities and standards and leads, implements, and sustains the transformation of Laboratory and site operations to a culture focused on safety, security, and continuous improvement. The DDOPS also champions disciplined conduct of operations and operational excellence, provides infrastructure and activities that support the LANL missions, and implements and maintains the LANL safety basis program.

EHSS conducted this onsite review to verify that Triad continues to meet DOE-VPP expectations for continued participation as a Star site. The Team conducted the review in two phases. The Team used the initial virtual review from September 26 to October 14, 2022, to interview workers and managers, attend meetings, and review documents. The Team then performed onsite work observations, validations, and interviews from October 24 to November 4, 2022.

This report contains a review and discussion of Triad's injury and illness rates and an assessment of safety management system elements compared to the DOE-VPP tenets of Management Leadership, Employee Involvement, Worksite Analysis, Hazard Prevention and Control, and Safety and Health Training. The Team's conclusion provides an overall assessment of Triad's safety program and its continued participation in DOE-VPP.

II. INJURY INCIDENCE CASE RATES

The contractor's average for both Days Away, Restricted, or Transferred (DART) case rates and Total Recordable Case (TRC) rates for the most recent 3-year period shall be at or below the most recent specific industry national average North American Industry Classification System (NAICS) code published by the Bureau of Labor Statistics (BLS). The following table presents the most recent 3-year period data validated by the Team using the site's OSHA 300 logs, DOE's Computerized Accident Incident Reporting System (CAIRS), the Team's calculation of the TRC and DART rates, and the specific industry national averages for the comparison industry.

Injury Incidence Case Rates - Contractor Employees (LANL Triad – CAIRS* Org Code 0544003)					
Calendar Year	Hours Worked	TRC	TRC Incidence Rate per 200,000 hours	DART Cases	DART Case Rate per 200,000 hours
2019	19,640,522	128	1.3	56	0.57
2020	21,179,548	176	1.66	105	0.99
2021	22,137,506	200	1.81	83	0.75
3-Year Totals	**62,957,576**	**504**	**1.59**	**244**	**0.78**
Bureau of Labor Statistics (BLS-2020) average for NAICS** 5612, 5629 & 5417 Industry Composite Comparison			2.54		1.78
Injury Incidence Case Rates - Subcontractors (LANL Triad – CAIRS* Org. Code 0544014 & 05448096)					
Calendar Year	Hours Worked	TRC	TRC Incidence Rate per 200,000 hours	(DART Cases	DART Case Rate per 200,000 hours
2019	1,344,396	12	1.79	8	1.19
2020	1,427,670	11	1.54	9	1.26
2021	1,325,399	27	4.07	18	2.72
3-Year Totals	**4,097,465**	**50**	**2.44**	**35**	**1.71**
Bureau of Labor Statistics (BLS-2020) average for NAICS** 5612 Facility Support Services			4.5		3.2

*Computerized Accident and Incident Reporting System
**Bureau of Labor Statistics, North American Industry Classification System

TRC Incidence Rates, including subcontractors: 1.65
DART Case Rates, including subcontractors: 0.83

Discussion

As of October 1, 2022, Triad employs approximately 14,022 workers and 4,475 service subcontractors. For the 3 years before this assessment, from 2019 to 2021, Triad experienced 504 TRCs, resulting in a 3-year TRC composite rate of 1.59. During the same period, Triad had 244 DART cases, resulting in a DART composite case rate of 0.77. Triad has had 141 TRC and 40 DART cases for the current year to date. The 2022 recordable cases include strains/sprains, contusions, and lacerations. During the COVID-19 pandemic period between March 2020 and December 2021, Triad experienced 45 work-related COVID cases. Triad has not reported any work-related COVID-19 cases in the current calendar year. The Team did not identify any incentives that would discourage workers from reporting injuries. Interviews with workers indicate they do not fear reprisal for reporting and acknowledge managers encourage the reporting of an injury, incident, near-miss, or first aid case.

The Team conducted a random sampling of Triad's DOE CAIRS database cases, and the results indicate the site is maintaining complete and accurate recordkeeping logs, including the OSHA 300 Log and 300A Summary. The 300A Summary meets the requirements of the recordkeeping standard, was posted during the required period, and remains accessible to all personnel throughout the calendar year.

Triad's recordkeeper has completed CAIRS training and on-the-job training from her predecessor and is knowledgeable of the recordkeeping requirements. Triad's TRC/DART rates are 37.4/56.7 percent respectively lower than the BLS comparison industry average for its NAICS code and meet the expectations for continued VPP participation.

III. MANAGEMENT LEADERSHIP

Management Leadership is a key element in obtaining and sustaining an effective safety culture and implementing the guiding principles of Integrated Safety Management (ISM). The contractor shall demonstrate senior level management commitment to ISM, occupational safety and health, and meeting the requirements of DOE-VPP. Management systems for comprehensive planning shall address safety and health requirements and initiatives. Elements of that management system shall include: (1) clearly communicated policies and goals; (2) clear definition and appropriate assignment of responsibility and authority; (3) adequate resources; (4) accountability for both managers and workers; and (5) managers shall be visible, accessible, and credible to employees. As with any other management system, the organization shall integrate authority and responsibility for employee safety and health with its management system and shall involve employees at all levels of the organization.

The Triad senior management team consists of individuals with extensive experience both within LANL and from other Battelle-managed laboratories. They bring a wealth of knowledge from a variety of other national laboratories and academia, including some implementing DOE-VPP in a scientific arena. Based on their knowledge and experience, Triad senior managers value safety as a mission contributor, a value that Battelle corporately holds.

From the first day managing LANL, Triad established a set of 12 policies that would govern all work at LANL. The first of those policies was "Safety – We conduct our work safely and responsibly to achieve our mission. We ensure a safe and healthful work environment for workers, contractors, visitors, and other on-site personnel. We protect the health, safety, and welfare of the general public. We do not compromise safety for personal, programmatic, or operational reasons." This policy statement demonstrates Triad's commitment to safety as its highest value and establishes safety as the foundation for mission success.

Triad instituted an organizational structure similar to its predecessor, with three directorates, each headed by a DD. The directorates reflect the three primary mission areas for LANL: Science, Technology, and Engineering; Weapons; and Operations. Each DD has four ALDs. During the onsite assessment, Triad reorganized the ALD for Environment, Safety, Health, Quality Assurance, Safeguards, and Security . This reorganization created a new ALD for Safeguards and Security and kept the ESHQ function in a reduced ALDESHQ, making the organizations more manageable and establishing a reasonable scope of responsibility for each ALD. Within the ALDESHQ, there are divisions for each of the major disciplines (Occupational Safety and Health, Radiation Protection, Institutional Quality and Performance Assurance, Environment and Waste programs). Divisions consist of Groups, Teams, and Programs responsible for executing the mission requirements.

DOE/NNSA Approved Los Alamos National Laboratory 10 CFR 851 Worker Safety and Health Program Description, Program Description (PD)100, and *Integrated Safety Management System (ISMS) Description*, SD100, work in tandem to describe how Triad meets or exceeds the regulatory requirements established in Title 10, Code of Federal Regulations (CFR) part 851 (10CFR851), *Worker Safety and Health Program*. An extensive system of policies and procedures described in these documents is available on LANL's Yellow Network, which is the Laboratory's internal unclassified computer system for easy retrieval and reference to the most recent versions.

Triad has grown from an initial $2 billion annual program to over $4 billion for fiscal year (fiscal year) 2023. In April 2020, with a laboratory population of 10,000-12,000 people, Triad had over 2,000 people dedicated to ESHQ functions. Triad committed approximately 4.6 percent of its budget to safety and health programs. The Team did not hear any complaints from program personnel regarding the availability of resources for ESHQ. The Team did hear about difficulty finding and retaining qualified people related to finding housing in Los Alamos or the surrounding areas or competing with the commercial industry for limited resources, particularly radiation protection personnel and skilled construction craft.

All managers interviewed by the Team expressed their commitment to safety as an essential part of their mission success. They often repeated LANL's culture statement that how they accomplish work is just as important as what they accomplish. Triad provides ESHQ services using a mix of permanently deployed and centralized environment, safety and health (ESH) staff coordinated through an integration office with an assigned integrator for each ALD. This integrator serves as a liaison between programs needing support and the available ESHQ expertise. The integrator helps line managers prepare and approve integrated work documents, ensuring the right subject matter experts (SME) are available when questions arise, or incidents occur. Triad expects these integrators to reach out to the programs they support, maintain awareness of program activities, and not just wait for programs to ask for assistance.

As it was for its predecessor, manager visibility remains a challenge for Triad. The size of LANL and the scope of its activities make it difficult for senior managers to visit all their areas of responsibility and spend meaningful time interacting with workers. Triad has a program of Management Observation and Verification (MOV) that it uses to encourage managers to interact with workers. Most managers reported an expectation to perform one MOV each month, although several managers reported performing more than one. All managers interviewed recognized the importance of meaningful, regular interactions with people in their organizations and identified that they tried to get out of their offices a few times each week. Although Triad recognizes the value of MOVs, the expectation of only one MOV per month does not reflect that value. Triad has implemented systems to make reporting MOVs easier, and there have been a few examples of inter-organizational competitions related to the number of MOVs. MOVs need not be long and complex to achieve the desired communication and visibility, but they need to be frequent. Triad should establish higher expectations (e.g., 2-3 MOVs each week for each manager), and reinforce that those MOVs should be opportunities to converse with workers, mentor, and guide first-line supervisors, understand issues or concerns, and establish credibility with the workforce.

Opportunity for Improvement: Triad should establish higher expectations (e.g., 2-3 MOVs each week for each manager), and reinforce that those MOVs should be opportunities to converse with workers, mentor, and guide first-line supervisors, understand issues or concerns, and establish credibility with the workforce.

Triad recognized from the beginning that the transition of the workforce to a new contractor would create uncertainty and stress for the Laboratory workforce. With that in mind, Triad established the philosophy of "Change where necessary - Continuity where critical." Triad intended this approach to ensure it carefully considered any changes implemented under the new contract as critical to the mission and that workers understood the reason for the change. Triad

did not make any wholesale changes in processes or policies related to worker safety and health. There were some major changes in the organizational structure to move logistics personnel (warehouse) out of the ALD for Business Operations, where it had resided for years, into the ALD for Facility Operations (ALDFO). Since many of those people were bargaining unit members, this change made sense to both managers and the workforce. ALDFO already had most bargaining unit employees and was able to consolidate the labor relations functions. This also allowed warehouse personnel to feel more connected to other bargaining unit members. The overall approach to changes used by Triad helped most personnel transition to the new company with few problems or concerns.

The workforce views Triad's upgrades to the aging infrastructure at LANL positively. Much of the current infrastructure dates to the 1960s, 1970s, and 1980s. The Laboratory population has grown significantly over the past 5 years, going from roughly 9,000 laboratory employees and 2,500 subcontractor employees to almost 15,000 laboratory employees and approximately 4,500 subcontractors. Additionally, NNSA selected LANL as one of two sites that would be producing war reserve pits for the nuclear weapons stockpile. This mission has had several stops and starts over the years. As the date approaches when new pits will be essential for stockpile reliability, NNSA is providing the necessary funds to improve the laboratory infrastructure supporting that mission. Infrastructure upgrades include new and leased office spaces, a New Employee Training (NET) Academy in leased space in the town proper, improvement and expansion of the Radioactive Liquid Waste Treatment Facility, improvements to access controls for high explosive firing sites, new parking garages in Technical Area (TA)-03 and TA-50, cleaning, and restoration of spaces in Sigma, and moving work out of the old Chemistry and Metallurgy Research facility to the Radiological Laboratory Utility Office Building (RLUOB) to support work in TA-55. These infrastructure upgrades reassure the workforce that Triad and NNSA are committed to real improvements at LANL.

Triad's inclusion of many managers from LANS on the Triad bid team helped minimize impacts on the workforce. These managers were typically Associate Directors or below under LANS whom Battelle recruited as part of the bid team to better understand what was working at the Laboratory, what needed improvement, and what needed changing. These managers teamed with experienced Battelle or University of Texas personnel to better understand the inner workings at Los Alamos.

The increase in the laboratory workforce from 9,000 to 15,000 workers has presented special challenges to establishing and improving the safety culture of the workforce. The challenges of operating during the pandemic compounded this impact. Initially, Triad struggled with requirements for personnel to telecommute given the classified nature of much of its work. Triad used rotating shift schedules for workers in classified computing spaces and identified workers who could work remotely either full or part-time, but many workers had to work onsite. As the pandemic fades, Triad has settled into a mix of remote, telework, and onsite work, depending on the mission, although a significant majority of employees work onsite.

The expansion of the workforce, and the return to work, have created a new set of challenges for Triad. With more people than ever working at the laboratory, traffic congestion, and limited office spaces are taking a toll on the workforce culture. People are doubling or tripling up in available offices and sharing workspaces. The coordination of construction and program work in PF-4 as Triad prepares for pit production is especially difficult. In some cases, the work at TA-

55 is drawing available workers from other areas of the laboratory, making it difficult to hire and retain the necessary skills and experience to keep programs running. The unavailability of people to perform some simple repair tasks may be leading to frustration for people submitting facility service requests (FSR) when they do not hear back on the status of a requested repair. It also creates a "perception of poverty" among workers who have simply quit submitting FSRs thinking "the work will not get done due to lack of funding." Triad is aware of this problem and has recognized the need for better feedback on FSRs. The VPP Steering committee and the Laboratory Operations Council are both discussing the problem, and looking for effective, sustainable solutions.

The amount of traffic onsite and the lack of parking creates another challenge to safety culture improvement. Some people park in restricted or prohibited areas because they have no other choice. This accepted normalized deviation from the rules reinforces a belief in workers that the rules only matter when they do not interfere with work. Triad is aware of the parking and traffic issues and is pursuing options to reduce congestion, improve parking, and address the normalized deviations. Triad is discussing ideas that include contracted commuter buses, additional multilevel parking structures, and stronger enforcement of parking restrictions. The increased traffic is also the source of a major complaint by workers observing aggressive driving on the roads approaching and leaving Los Alamos. Drivers observe these incidents daily, often with multiple incidents each day. The Team observed this condition firsthand while commuting to and from the site. Triad has limited options to address this behavior but should recognize that people changing their behaviors when they arrive onsite or leave at the end of the day is an indicator that they have not internalized the value of safety. Triad should look for ways to encourage safe driving behaviors both on and offsite. For example, Triad could sponsor a safe driving campaign where employees could voluntarily track their commute using their personal smartphones, and then share that data. Participants could receive rewards for reaching established safe driving goals (e.g., not exceeding the posted speed limit for a certain percentage of time, not parking in restricted or prohibited areas, or carpooling). Participants could display a window or bumper sticker indicating their participation in the program to help increase the visibility of the program to other drivers. Triad could give program credit to other drivers for observing and recognizing participants' safe driving during the commute. The program could go on for a period of months with recognition for top performers (e.g., quarterly). Encouraging more people to model the desired behaviors could exert additional peer pressure on aggressive drivers that might help change the overall culture.

Opportunity for Improvement: Triad should consider sponsoring a safe driving campaign where employees could voluntarily track their commute using their personal smartphones, and then share that data.

When Triad took over management of LANL, one of its primary efforts was embedding the Safe Conduct of Research (SCoR) principles into all work at LANL. SCoR is eight statements of operating principles, developed by Battelle, to help personnel perform research work safely. Triad did not associate the SCoR principles with existing safety programs and efforts at LANL, such as the Worker Environment Safety and Security Teams (WESST) or DOE-VPP. Support from managers for many of the efforts that initially earned the VPP star at LANS waned as Triad worked to brand its own safety approach using the SCoR principles. Under LANS, the WESST teams had expanded and saw themselves as helping the Laboratory address significant issues.

With the focus on SCoR, and then COVID-19, the WESST teams lost their momentum. Although WESST teams continued to meet virtually, personnel onsite became too busy with other work to participate. As work ramped up, and hiring lagged behind mission growth, participation in WESSTs became even more difficult, with first line managers (FLM) and supervisors strapped for personnel to perform the work. Like other issues, Triad has recognized that it needs to reinvigorate the WESSTs and use the WESSTs and DOE-VPP as avenues to implement the SCoR principles.

In April 2022, Triad contracted the Dupont Safety Institute to conduct the Dupont Safety Survey. The remote survey included followup virtual interviews with members of the workforce. Dupont has been using this approach to gauge the safety culture at facilities for many years. Triad encouraged workers to participate and approximately 69 percent of laboratory employees responded. The results, though statistically significant, were somewhat disappointing to Triad managers, but were not surprising for most managers. The survey identified Triad as a primarily dependent safety culture. When questioned about those results, most managers believed that result rested on the question of the extent to which injuries are preventable, with only 22 percent of respondents answering all injuries are preventable. Most managers interviewed had not looked at other lower-scoring areas on the survey related to involvement in safety programs, and recognition for good safety performance. As a result, Triad has not yet identified strategies using those results to effect improvement in the workforce culture. The Laboratory Director did produce a short video discussing the results of the survey and focused on the issue of preventable injuries. He made an excellent point during that video that every time an accident or injury occurs, the investigation determines it was preventable. Few people interviewed by the Team recalled seeing that video or hearing the Laboratory Director's point. Triad has begun to recognize that the movement of the workforce from the dependent to the independent safety culture requires more emphasis on team building, individual recognition, and credit for doing things right. When queried about recognition programs, most managers referred to isolated cases of individual recognition for exemplary acts that result in cash awards. Although these awards are commendable, they are not effective in altering the culture of the broader laboratory population. Triad should look for more effective means to provide earned rewards to large segments of the workforce, meaningfully recognize and encourage participation in WESST, and identify regular safety emphasis programs with defined rewards that personnel can earn for participation in those programs (e.g., the safe driving campaign previously discussed).

Opportunity for Improvement: Triad should look for more effective means to provide earned rewards to large segments of the workforce, meaningfully recognize and encourage participation in WESST, and identify regular safety emphasis programs with defined rewards that personnel can earn for participation in those programs.

Senior managers recognize the value of safety culture, but some FLMs may not believe the safety programs contribute to operational effectiveness. These FLMs' beliefs may contribute to senior managers' perception that FLMs and supervisors are not driving the safety culture improvement Triad desires. These FLMs and supervisors focus on scientific success as the key to their professional advancement because that success is what got them promoted. The resulting self-imposed "production pressure" leads to the perception that safety programs, such as Integrated Work Management (IWM), Integrated Work Documents (IWD), peer reviews, readiness reviews, or MOVs are bureaucratic hurdles and delays they must overcome or bypass

to get work done, rather than value-added processes. Without effective training and mentoring, early career team leaders and FLMs may not understand how to lead their teams and drive safety improvements. The status quo is typically better than what they experienced in university laboratories, which discourages them from seeking further improvements.

The Laboratory Operations Supervisor Academy (LOSA) is helping address this situation by putting first-line supervisors into realistic situations where they can gain experience dealing with noncompliant or at-risk situations. Before COVID-19, Triad was making good progress getting all supervisors through LOSA. With the recent growth in laboratory population, there are approximately 500-1,000 first-line supervisors who need this training. Triad has 300 billets per year to send people to the LOSA training in Columbus, Ohio. That means at least 2-4 years to get current first-line supervisors trained.

The onset of COVID-19 further affected Triad's efforts to improve its safety culture because remote work prevented senior managers from getting into workspaces and creating a high level of trust and familiarity. With working conditions stabilizing, Triad is now getting back to the business of driving cultural improvement. Triad has formed several groups to help with this task. Most visible are the Laboratory Operations Council and the VPP Steering Committee. Triad recently formed the VPP Steering committee championed by the DDOPS and chaired by the Acting ALDESHQ. Other committee members include the Institutional Worker Environment, Safety, and Security Team (IWESST) co-chairs. The VPP Steering committee is supporting many efforts to address the cultural barriers already identified by the DOE-VPP Team. For example, a spring leadership retreat for Triad managers identified four efforts to invest in FLMs, simplify management processes, and provide more opportunities to collaborate on safety. Those efforts include: developing FLM/Responsible Line Manager (RLM) management/leadership training, including a new manager boot camp, to help FLMs and RLMs understand the full expectations of their positions; renewing the institutional focus on LOSA training for all FLMs (previously discussed); conducting two-way discussions between Senior Leadership and groups of FLM/RLMs; and, implementing an expert mentoring program for FLMs/RLMs in the area of MOV execution that will use expert/contract mentors to help FLMs and RLMs hone their skills. The VPP Steering Committee is also supporting initiatives by the IWESST to improve participation and reinvigorate the WESSTs (see Employee Involvement).

Triad has an extensive process it uses each year to perform self-assessments of its safety and health programs. These assessments include surveys, interviews, and work observations, and include the WESSTs. The Laboratory Director requires each directorate within the laboratory to develop an annual Safety and Security Improvement Plan (SSIP) with identified goals and objectives drawn from those self-assessments. Each ALD has periodic Management Review Boards (MRB) as well. These MRBs focus on safety and security performance indicators, outstanding corrective actions, and a review of the status of completed actions. This process ensures ongoing manager awareness of safety performance and improvement actions.

Conclusion

Triad managers are committed to ensuring LANL accomplishes its missions safely without unnecessary or unanalyzed risks. They have retained and revised an extensive system of policies and procedures and obtained the necessary resources to accomplish their work. Since taking over management and operations of LANL, Triad has faced several challenges from mission and

population growth and the COVID-19 pandemic. Over the past 5 years, an experienced and knowledgeable senior management team has partnered with the workforce to improve safety culture, engage the workforce, and ensure LANL has the necessary personnel and resources to meet its mission. In its zeal to promote the SCoR principles, it missed an opportunity to use the already established DOE-VPP infrastructure to help promote and encourage the desired improvements. The senior management team is reestablishing the connection between SCoR and DOE-VPP. It is also working to train and mentor new supervisors and ensure they recognize SCoR, DOE-VPP, and safety in general as mission-enabling functions. Triad is working with NNSA to improve the laboratory infrastructure and ensure LANL can safely and compliantly fulfill its vital national security missions. Managers are visible, and Triad is helping middle managers demonstrate the organization's commitment to safety, but challenges remain. Triad meets the expectations for Management Leadership and continued participation in DOE-VPP.

IV. EMPLOYEE INVOLVEMENT

Employees at all levels shall continue to be involved in the structure and operation of the safety and health program and in decisions that affect employee safety and health. Employee involvement is a major pillar of a strong safety culture. Employee participation is in addition to the individual right to notify appropriate managers of hazardous conditions and practices. Managers and employees shall work together to establish an environment of trust where employees understand that their participation adds value and is welcomed. Managers shall be proactive in recognizing, encouraging, facilitating, and rewarding workers for their participation and contributions. Both employees and managers shall communicate and collaborate in open forums to discuss continuing improvements, recognize, and resolve issues, and learn from their experiences.

Since the start of LANL's VPP journey, the WESSTs have been the primary source of employee involvement. LANL established the WESSTs specifically to promote worker involvement. The structure of the WESST mirrors the Triad organizational structure. There is an Institutional WESST (IWESST) championed by the DDOPS and the ALD for ESHQ. The IWESST members represent all workers at LANL and report to the DDOPS. Members include at least two representatives from each of the thirteen ALDs and the Director's office. The IWESST helps identify, define, communicate, educate, act, and resolve Laboratory environment, safety, and security issues. IWESST objectives include promoting environment, safety, and security as core values; supporting the development of institutional goals, objectives, and measures; developing and pursuing methods to help workers take personal responsibility for a safe and secure environment; and facilitating and encouraging worker engagement. A chair, vice-chair, chair emeritus, and an administrator lead the IWESST. The chairs serve 3-year rotating terms ensuring that as each chair leaves, the other two have at least a year of experience for continuity.

Eleven ALD level WESSTs report to their ALDs. These WESSTs mirror the IWESST function within their organizations and report through the IWESST on ideas or issues that apply to the whole laboratory. Worker-level chairs, cochairs, or vice-chairs lead the ALD WESSTs. Normally, the ALD WESSTs' chairs and cochair members rotate every year. Each ALD WESST has a charter written with workers' input and implemented with management's approval. The WESST charters outline reporting lines and mechanisms, responsibilities and participation metrics for all members and chairs, and overall objectives and strategies for achieving them.

The ALD WESST teams conduct monthly meetings to specifically identify the safety, environmental, and security needs of their organization. These meetings provide an opportunity to identify institutional issues that they cannot address at their level and need to elevate to the IWESST for assistance and senior-level management attention. Each ALD WESST provides representatives to attend the IWESST meetings and provide input or concerns to the IWESST membership.

Triad expects the WESSTs to identify, communicate, and champion the resolution of safety, environmental, and security issues. In past reviews of Triad's predecessor (LANS), this was a staple of the WESST meetings. However, during the current review, several of the WESST meetings observed by the Team did not discuss any tracked concerns, open or closed. This is likely an artifact that has developed since the onset of COVID-19 restrictions. During the COVID-19 pandemic, WESST team activity onsite slowed significantly. Triad conducted the

meeting virtually. Although meeting attendance in many cases increased, WESST team members were not onsite as frequently, if at all, reducing their visibility to the workforce and their awareness of safety issues. The reduction in safety issues or concerns to track led to WESST team meetings becoming more sharing of institutional safety information. With onsite activity increasing, Triad should ensure that all WESSTs reinstitute their activities to record, track, and provide closure (whether approved or not) regarding employee-raised concerns.

Opportunity for Improvement: Triad should ensure that all WESSTs reinstitute their activities to record, track, and provide closure (whether approved or not) regarding employee-raised concerns.

In 2017, LANL had approximately 60 WESSTs (including division and group-level WESSTs). In 2022, there are approximately 15 WESSTs (with several more division and group-level WESSTs in existence but not meeting regularly). The identified WESSTs included the IWESST, 11 ALD WESSTs, the Student WESST (SWESST), and the Directors WESST. The SWESST only recently re-initiated its function due to the COVID-19 pandemic reduction in student onsite activity. The lack of division and group-level WESSTs engagement over the past 3 years has hindered employee engagement at the working level. Triad should consider expanding WESSTs at the division or group level to foster greater employee engagement and encourage employee participation in safety programs.

Opportunity for Improvement: Triad should consider expanding WESSTS at the division or group level to foster greater employee engagement and encourage employee participation in safety programs.

In 2017, LANS recognized that the WESSTs were “stagnating” and introduced efforts to revitalize the WESSTs’ involvement in Laboratory-wide issues. LANS was seeking WESSTs’ involvement in addressing larger site-wide issues, such as signage improvements, and traffic and pedestrian safety concerns. In the transition, as Triad introduced new contract goals and priorities, other activities overcame those efforts. The COVID-19 pandemic, combined with significant mission expansion, new staffing, and large numbers of retirements further detracted from efforts to revitalize the WESSTs. As Triad and LANL grew, they lost experienced employees with historical knowledge of the site’s activities and workplace expectations and replaced them with new hires unfamiliar with the VPP culture they had worked so hard to develop in the previous years. As a result of new staff and new management not being familiar with the WESSTS, Triad lost some of the management encouragement and initiative to improve the WESSTs begun in 2017.

Triad recognized the need to reinvigorate WESST participation early in 2022 and initiated new efforts to increase employee participation and convince new employees to recognize the value of participation within the WESST. As was done under LANS, all ALDs work with their WESSTs to develop short-term and long-term SSIPs to improve overall safety performance based on their specific ALD concerns.

An effort Triad may wish to consider for engaging its workforce and improving new employees’ participation and awareness of safety culture is a program instituted at the Oak Ridge Institute for Science Education (ORISE), another DOE-VPP participant managed by Oak Ridge

Associated Universities and Battelle. Several years ago, recognizing the need to engage a highly educated workforce, ORISE implemented its VPP PhD program. This program established a curriculum that participants would follow to earn a "Bachelor," "Master," and eventually "PhD," in VPP. This program appealed to the workforce's value of higher education and created academic challenges for the staff. The VPP PhD curriculum included "required" training and activities which focused on ORISE's safety culture initiatives and VPP training courses. The second set of curricula identified elective activities or training that the employee could select from to achieve the necessary points to satisfy the curriculum requirements. Triad could apply the same approach, modified to match Triad's mission, to help reengage its workforce, improve employee participation in the WESSTs, and encourage workers to participate in other safety culture improvement processes. Triad should contact ORISE for information regarding the ORISE DOE-VPP PhD program, and work with ORISE to adapt the program at LANL.

Opportunity for Improvement: Triad should contact ORISE for information regarding the ORISE DOE-VPP PhD program, and work with ORISE to adapt the program at LANL.

In 2017, LANS instituted a craft safety representative (CSR) position. This position, selected from the craft unions, interfaces directly with craft workers on safety issues and mentors craft on desired safe behaviors and practices. The success of this effort led to its expansion to four CSRs. Triad has further expanded this to seven representatives and renamed the position to Craft Safety Advocates (CSA). CSAs bridge the gap between workers and managers while establishing a working environment where craft workers can raise safety concerns. The CSAs represent approximately 1,350 craft workers onsite composed of 12 different crafts (e.g., electricians, carpenters, pipefitters). The CSAs spend each day in contact with the craft workers, both directly hired by Triad and those hired by subcontractors from the unions. Triad is in the process of creating a new CSA position before the end of calendar year 2022 which will be responsible for construction activities onsite. This added CSA will bring the total number of CSAs to eight. A VPP Steering Committee meeting the Team attended highlighted the value of the CSAs' advocacy for workers. The committee chair invited two CSAs to attend and report on issues raised by craft workers. The CSAs identified a concern with the Triad lock-out/tag-out (LOTO) process that was leading to confusion among workers. Specifically, each ALD is implementing the procedure differently. The CSAs reported that these different approaches create challenges and potential safety hazards for craft personnel deployed from central shops to LANL facilities. The VPP Steering Committee members immediately requested specific details of where and how the LOTO process varied from directorate to directorate to aid in resolving the issue.

The CSA also highlighted the concern that sometimes safety requirements change too fast, often because of events or occurrences. Corrective actions frequently include safety requirement changes, requiring new training for affected crafts. Most new training is now computer-based, and crafts have limited access to computers to complete the training. This sometimes delays the completion of training before the next event or occurrence happens. The result is that the requirements or expectations change again, leading to worker frustration. Once the CSAs identified this problem, the Information Technology manager immediately offered to assist the craft with computer access. The training organization representative also revealed an ongoing effort to revitalize person-to-person, hands-on training to address this issue now that COVID-19 restrictions were relaxing. CSAs were unaware of these efforts and were willing to take that information back to the crafts. The VPP Steering Committee members' ability to recognize the

seriousness of the concerns and institute immediate action effectively demonstrated the value of employee engagement and participation.

The CSA approach is a model of what Triad expects of WESST committee members in identifying worker concerns and elevating them to the proper level of management for resolution. Triad should team WESST members with CSAs for a day or two, giving them firsthand experience in interacting with workers, inquiring about concerns or issues, and raising those issues to higher levels. This could supplement WESST team member training along with Triad's other training, such as LOSA.

Opportunity for Improvement: Triad should team WESST members with CSAs for a day or two, giving them firsthand experience in interacting with workers, inquiring about concerns or issues, and raising those issues to higher levels.

Triad has a multitude of specific safety committees focused on specific issues. For example, the Triad DOE-VPP application identified several safety committees in addition to the WESSTs. Committees included a LOTO, electrical safety, beryllium, bicycle safety, motorcycle safety, laser safety, explosives safety, and biosafety. During the onsite portion of the DOE-VPP review, the Team observed meetings of the LOTO Committee and the Motorcycle Safety Committee (MSC). The MSC represent over 500 motorcyclists from LANL, Lawrence Livermore National Laboratory, and Idaho National Laboratory. LANL makes up the majority with approximately 420 of the 500 total riding community. The MSC publishes a weekly newsletter to raise awareness about motorcycling at the participating sites. The committee has installed banners and posters across the site to raise awareness of motorcycle riders sharing the road with other vehicles. This committee is also working on the approval of a New Mexico Motorcycle license plate to bring awareness to motorcycle riders on State roads and highways.

The MSC is a cohesive and well-organized group of workers focused on a common goal. Committee members were engaged and enjoyed their roles and sharing lessons learned with other motorcycle riders. Committee members talked about the purchase of a new motorcycle helmet by a member, as well as the reasons why the old helmet needed replacing among other topics of interest to motorcycle riders. The committee is a model to follow at LANL as it illustrates a group of workers at LANL, and other laboratories, working towards a common goal.

Learning Teams are another initiative engaging employees in safety and health. Learning Teams are worker-driven teams assembled to review, understand, and learn from events, near-misses, best practices, good catches, and interesting operational successes at the Laboratory. Learning Teams are based on the belief that employee involvement is vital to performing successful work at LANL. By learning and explaining problems from the workers' perspective, Learning Teams assist managers with solutions that support a continuous improvement culture. Managers support the workforce learning team process. In this process, the workers are the experts as they know the work best and can provide the most applicable lessons and solutions to problems as they arise. By fostering worker buy-in and establishing trust in managers, Learning Teams foster strong partnerships between managers and workers, which promotes collaboration when solving safety and health problems.

Learning Teams include people from any level of an organization who learn and communicate information (event, process, work planning, and execution) to leaders, managers, employees, and

(if appropriate) other LANL organizations. Teams usually consist of four to five workers, but they may be larger if needed. The Learning Team members are usually workers who are involved in the work process and understand the requirements to accomplish the mission. Learning Team members come from various organizations and backgrounds, thus providing each Learning Team with its unique identity and skill set.

The Team review of previous Learning Team activities demonstrated that employee engagement and participation are foundational in the Learning Teams process. The OPEX® system lists 84 Learning Team reports. Learning Teams incorporate employee participation as workers reevaluate how they perform their work processes with management support. SMEs monitor the Learning Team's recommendations to ensure that any suggested improvements meet the requirements. Triad has primarily used Learning Teams in response to events or occurrences. As a means of fostering additional employee engagement, Triad should consider expanding the use of Learning Teams to identify other potential improvements, rather than limiting it to events, occurrences, or other failures.

Opportunity for Improvement: As a means of fostering additional employee engagement, Triad could consider expanding the use of Learning Teams to identify other potential improvements, rather than limiting it to events, occurrences, or other failures.

Triad has several recognition programs that provide instant positive feedback for performing everyday safe behaviors, but most of these programs are for craft workers. The "Caught Being Safe" (CBS) recognition program provides employees with CBS packets when their peers or supervisors observe them performing everyday safe behaviors. The initial pack consists of a CBS logo card, hard hat sticker, and a face mask. The CBS card has five blocks for signatures on the back. Every time an employee is subsequently caught being safe and recognized by another laboratory employee, the individual doing the recognition can ask the recognized employee for their card and sign it on the back. The employee doing the recognition explains to the recognized employee the reason for the recognition and they use the opportunity to get to know each other better. When the card is full, the employee presents it to the Safety Integrator or Construction Management-Division Office Senior Supervisory Watch for a token of appreciation, such as a CBS logoed thermos, mug, or safety glasses. These items are then visible during everyday use further advertising the employee's safe behavior and the program in general. Examples of recognized behaviors, included an employee acting as a spotter while another employee was backing a vehicle (Observed by a Team member while attending a CSA meeting at the Canyon School), holding a ladder for a fellow employee, or reminding workers to put on required personal protective equipment (PPE) when workers inadvertently forget to do so. The CBS program allows workers who might never get in contact with one another to interact with each other and establish a working relationship.

A "Job Well Done" is another recognition process for LANL personnel, craft, and craft managers who go above and beyond their normal duties to improve craft safety. This shows appreciation and thanks to workers for pausing unsafe work conditions, having a questioning attitude, identifying alternative ways to safely execute work activities, and demonstrating LANL's SCoR principles. Each month, CSAs, safety professionals, managers, deployed managers, and customers identify employees who are acting as their brothers' and sisters' keepers for raising and executing ideas that result in a safer workplace. The Weekly Keeper (weekly newsletter for

craft employees) and the monthly ALD-Infrastructure and Capital Projects feature the employee's picture and description of the "Job Well Done." Additional recognition may also occur in the "LANL Today" publication.

The "Spot Award Program" is available to all Triad employees who contribute to the success of a team or a specific accomplishment. Any employee can nominate another employee for a spot award of $100 at any time during the FY. Triad awarded 3,991 spot awards in FY 21, and 3,807 awards in FY 22.

The WESST Star Award recognizes badge-holding employees for their commitment to environmental protection, safety, and security in the workplace. This award program promotes employee involvement in identifying, improving, and resolving, issues related to environment, safety and security by helping to prevent and reduce safety and security incidents at the Laboratory. The awards are presented quarterly at IWESST meetings to which the awardee and their manager are invited. During 2022, 77 employees received a WESST Star Award.

A "Hazard Hunters" initiative began in June 2022, and Triad has performed 17 Hazard Hunter evaluations since June. "Hazard Hunters" is another employee involvement initiative within ALDFO where approximately 20 craft employees visit each other's facilities to look for unrecognized hazards at selected locations. At the end of the "Hazard Hunting" session, the craft workers get together as a group with their respective CSAs and managers to discuss the findings among themselves. The Logistics Senior Director awards the employee with the most findings with a small tool related to safety that can be used during their daily work. This initiative started approximately 19 weeks before the onsite review. Craft workers state they feel that their input matters in keeping and maintaining their work areas free of recognized hazards.

The Team had the opportunity to observe a "Hazard Hunters" session and saw a group of workers functioning with a high level of collaboration and interaction among themselves. Craft workers were engaged during the process looking for hazards and sharing lessons learned during the activity. Team interviews of craft employees revealed a group of workers that worked with the CSAs, Logistics management, and the facility and maintenance teams, to remove hazards from their work environment. While the "Hazard Hunters" excelled at identifying hazards, Logistics is still establishing a process to track hazard fixes to closure by utilizing the facility maintenance teams, resident craft for a shop area, and a small execution team within Logistics. Triad should provide feedback to workers on the "Hazard Hunters" teams regarding the resolution of identified hazards when those hazards are not immediately abated (see Opportunity for Improvement in Hazard Prevention and Control).

As discussed in Management Leadership, most of these recognition programs are for craft workers. Triad should work with the other ALDs and their respective WESSTs to identify similar approaches for all the ALDs.

Conclusion

Due to the COVID pandemic and the resulting restrictions on normal operations, Triad's employee involvement experienced several setbacks due to the restrictions on personnel contact, which negatively affected workers' participation in the WESSTs. Triad recognized these challenges immediately after resuming normal operations in mid-2022 and committed to

improving WESST participation. Triad continues to implement the Learning Teams to improve their understanding of why an injury or abnormal event occurred without attributing blame to anyone. Triad also created the "Hazard Hunters" program to further increase employee participation in identifying hazards and resolving those issues. Triad expanded the CSA program to eight representatives to improve the representative's ability to identify craft concerns and elevate them to management attention for resolution. Triad meets the expectations of the Employee Involvement tenet for continued participation in DOE-VPP.

V. WORKSITE ANALYSIS

Management of safety and health programs begins with a thorough understanding of all hazards that workers might encounter during work, and the ability to recognize and correct new hazards. The first two core functions of ISM, *Defining the Scope of Work* and *Identifying and Analyzing Hazards*, form the basis for a systematic approach to identifying and analyzing all hazards encountered during work. Work planners use the results of the analysis in subsequent work planning efforts. Effective safety programs also integrate feedback from workers regarding additional hazards that they encounter and include a system to address new or newly recognized hazards. Successful worksite analysis also involves implementing preventive and/or mitigating measures during work planning to anticipate and minimize the impact of hazards.

At LANL, appropriate personnel analyze new facilities, equipment, materials, and process for hazard prevention and control before implementation. Interviews conducted with LANL staff consistently reiterated the principle that "all work is planned." PD-110, *Safety Basis,* outlines the safety basis requirements and processes for hazardous facilities and activities at LANL. Safety Basis Procedure (SBP)-112-3, *Unreviewed Safety Question Process,* and SBP-113-3, *Unreviewed Safety Issue Process,* outline unreviewed safety question and issue evaluation processes to analyze nuclear and accelerator facility changes. SBP-111-3, *New or Changed Activity Approval Process,* provides the safety basis process to obtain authorization for new, changed, or resumed work activities at low-hazard facilities. Facility Operations Directors (FOD) implement New Activity Reviews using various processes. For example, the Science, Technology, and Operations (STO) FOD identifies and approves new activities under the STO-AP-006 *STO, Activity Approval,* process. SMEs or planners compare activity hazards to existing facility hazard analyses and document the analysis for approval. Approved activities are subject to IWM requirements of P300, *Integrated Work Management,* or P300-1, *Integrated Work Management for R&D,* for activity and task hazard analysis before work release. Other interviews with LANL staff identified activity walkdowns as a critical element of both new activity planning and IWD development.

P300, P300-1, and the AP-WORK procedure series drive IWM for the various work activities at LANL. RLMs categorize activity hazards as high, moderate, or low based on established criteria with input from work planners, persons-in-charge (PIC), deployed industrial hygiene (IH) and safety professionals, and other SMEs. RLMs and work planners work with deployed IH and safety professionals to analyze hazards based on activity hazard level. The IWM procedures include hazard screening questions to facilitate initial hazard identification for IWD. Triad's primary Work Control Document procedure, P300 allows other formats, such as maintenance work orders and standard procedures provided they meet basic content requirements, such as hazard analysis. The questions aid work planners in determining the need for assessment and analysis by specific technical SMEs and ESH program SMEs. The IWD development process follows the five ISM Core Functions. RLMs perform final approval of the activity IWDs or other work control documents and consider hazard prevention and control recommendations from exposure assessments or SME reviews. IWDs require review in intervals not to exceed 3 years.

All work at LANL must have a current IWD or comparable work control documents. Planners may incorporate broad wording in IWDs to allow flexibility for scientific work. The potential for personnel performing work in "gray areas" that might not be part of the original IWD scope

is an unintended consequence of such flexibility. Workers may also perform activities in ways not originally envisioned during IWD approval. For example, a laboratory electroplating activity IWD control required workers to tend a hose while adding deionized water to a large tank containing other chemicals. They equipped the hose with a nozzle that locks open since the flow rate was very low. Technicians would typically hook the nozzle on the edge of the mixing tank and work on other activities while the tank filled. Earlier this year, a distracted worker did not check on the filling process, and a spill occurred. The DOE-VPP Team Leader and Triad Group Leader discussed the event with laboratory personnel. Laboratory personnel had previously agreed that, in the future, personnel filling the tank would have a timer on their laboratory coat as a tank-level check reminder. They did not consult with other SMEs for more effective engineered controls, such as a timed shutoff valve, or even a tank level shutoff, and did not review the IWD for new control inclusion. They believed the IWD revision process was too bureaucratic and did not think the follow-up reviews would have added value to their work. Triad should ensure that supervisors and managers reinforce that the additional IWD revision process helps document and implement the most effective and efficient controls to accomplish their work safely.

Opportunity for Improvement: Triad should ensure that supervisors and managers reinforce that the additional IWD revision process helps document and implement the most effective and efficient controls to accomplish their work safely.

Work planners enter high hazard/complex and moderate hazard activities into the Activity Tracking System (ATS), which is an online IWD tracking tool. Planners enter details such as activity location, assigned PIC and SMEs, hazard grading level, exposure assessment completion status, and other general IWD information in ATS for quick reference. Planners can attach IWD files or other supporting documents in ATS. Planners or RLMs may also enter low hazard IWDs in ATS. RLMs validate completed hazard analyses and exposure assessments. The IWD development procedures provide optional form templates to aid hazard classification, analysis, exposure assessment, prevention and control, and evaluation (Forms 2100-2104). For all High Hazard/Complex and Moderate Hazard activities, ESH SMEs, including industrial hygienists, are involved in the scoping review, brainstorming, planning, walk-downs, exposure assessments, and hazard control validations. ESH SMEs identify, assess, and control hazards before the start of work. For activities characterized as low hazard, ESH SMEs may be involved in planning stages if deemed necessary by the RLM but are not a required signature. ESH SMEs interviewed during the onsite review were aware of instances where RLMs had characterized new activities as low hazard work despite involving potential hazards and exposure risks requiring more analysis. For example, three-dimensional printing activities are becoming commonplace and often characterized as low hazard activities. However, the processes can employ hazardous substances or generate exposure risks. Those interviewed indicated that RLMs were typically receptive when approached by the ESH SMEs suggesting further hazard assessment and analysis in these instances.

The Team interviewed LANL workers, managers, and program leads about the IWM processes. Interviewees mentioned instances of strong coordination between work planners or PICs, deployed safety professionals, and RLMs when developing IWDs. However, interviewees also noted strong reliance on RLMs and IH professionals to correctly categorize activity hazard levels and provide detailed task hazard analysis and mitigation. The high-level process guidance and

reliance on individual rigor allow inconsistent and tailored application of IWD development and hazard documentation. For example, the ALD for Chemical, Earth, and Life Sciences uses electronic templates and workflows to develop consistent IWD formatting, routing for stakeholder reviews, and file storage for electronic document control. Other ALDs or FODs use individual files which may or may not be based on P300 form templates and a manual review routing process leveraging email or hard copy circulation. Sample IWDs reviewed generally align with P300 requirements but varied in format, level of detail, technical rigor, and documented evidence of stakeholder input and periodic evaluation.

Interviewed IWM program leads identified and presented a new software package currently under development to streamline IWD development, improve process consistency, and implement critical aspects of the IWM process, such as activity hazard level assignment, facility and colocated hazard integration, and activity hazard identification. The software developers are using benchmark code information from another national laboratory with tailored inputs from LANL stakeholders. Interview discussions and presentations of the in-process software showed strong management support and thoughtful consideration of current IWM process improvements. Interviewed managers, workers, and deployed industrial hygienists varied in awareness of this initiative, but most were enthusiastic to provide thoughts, ideas, and comments during the tool planning and development phase.

Triad should continue to drive the effort to implement site-wide IWM process controls to completion and use this revision to incorporate internal lessons-learned and input from various ALD stakeholders to align IWM methods site-wide and implement engineered controls to drive consistent compliance with critical IWM requirements (e.g., activity hazard level rating, hazard controls, facility, and colocated hazard consideration, etc.) and auditing capability.

Opportunity for Improvement: Triad should continue to drive the effort to implement site-wide IWM process controls to completion and use this revision as a means to incorporate internal lessons-learned and input from various ALD stakeholders to align IWM methods site-wide and implement engineered controls to drive consistent compliance with critical IWM requirements (e.g., activity hazard level rating, hazard controls, facility and colocated hazard consideration, etc.) and auditing capability.

Triad conducts comprehensive baseline exposure assessments to identify and control safety, health, and radiological hazards. Triad currently maintains an adequate number of certified safety, health, and radiological control technicians (RCT) to evaluate facilities, procedures, projects, and work tasks for employee risks. However, as previously mentioned, it is hard to maintain the numbers due to the difficulty in recruiting and training new RCTs. Industrial hygienists, safety professionals, and ESH Integrators collaborate with facility SMEs when questions arise about conducting assessments or about unknown exposures. Safety professionals apply sampling data within a defined geographic area to assign hazard controls and preventive actions according to program guidelines.

P101-32, *Worker Exposure Assessments,* establishes an exposure assessment policy and includes requirements, authority, and roles and responsibilities. The *Laboratory Industrial Hygiene and Safety Manual (LIHSM,)* sets expectations and guides industrial hygienists conducting exposure assessments. Industrial hygienists employ both qualitative and quantitative exposure evaluation

techniques as deemed appropriate by policy, regulations, and ESH SMEs in consultation with the FOD, PIC, and RLM.

Industrial hygienists conduct baseline qualitative exposure assessments for activities. Industrial hygienists conduct periodic reassessments every 3 years for activities classified as high hazard/complex, and every 6 years for moderate, and low hazard activities. Reassessments occur when prompted by changes in activities, IWDs, or other work control documents, and when required for regulatory compliance. Professionals qualified in IH, occupational safety, ergonomics, electrical safety, and other disciplines are involved in exposure assessments depending on the identified activity hazards. Deployed IH staff only perform assessments for exposure risks within their knowledge, skills, and abilities and must reach back to other FOD and Occupational Safety and Health – Industrial Safety and Hygiene (OSH-ISH) group industrial hygienists as needed for technical assistance. The RLMs, FODs, industrial hygienists, and ESH SMEs have access to ESH Integrators who serve as liaisons for other specific, hazard analysis SME input.

Industrial hygienists document exposure assessments in the Comprehensive Tracking System (CTS), which is a customized Open Range® software application. CTS tracks, inventories, and documents engineered ventilation controls and confined space entry permits and prompts periodic control reassessment. Triad has integrated and customized several exposure assessments tools (e.g., vapor and particulate hazard judgment) developed by the American Industrial Hygiene Association to aid exposure assessment efficiency, standardization, and consistency. The exposure assessment program establishes similar exposure groups (SEG) for craft trades. However, the program is generally unable to establish exposure groups for other laboratory workers due to their exposure risk uniqueness and dynamic environments. The SM38 Shop area walkdown with CSAs, ESH Integrator, and shop forepersons revealed recent efforts between craft and ESH SMEs to update steel worker and welder SEG exposure risk data. The existing welding exposure assessments were over 10 years old and collected during staged work scenarios that were unrealistic and did not represent typical welder activities. The updated assessment data collected during routine work activities represented typical exposures and showed significantly lower exposure risks than the historical staged work sampling results. Deployed industrial hygienists expressed appreciation and support for the CTS application but also believe that it is somewhat laborious to populate. They feel empowered to recommend changes and are currently working with IH professionals across LANL to develop enhancements to exposure assessment data entry and gain CTS efficiencies.

Exposure assessment policy requires industrial hygienists to follow recognized exposure assessment strategies and protocols and to analyze samples in accredited and certified laboratories. The RLM, PIC, and other stakeholders for work planning and IWD development receive CTS exposure assessment information, such as work activity details, exposure profiles, exposure judgments, and hazard controls. Triad IH exposure assessment strategy requires assessors to collect and document general workplace information and specific information on processes, equipment, materials, exposure agents, key exposure determinants, and sufficiency of existing controls. CTS has an assessment and survey peer-review feature which is available to all industrial hygienists and mandatory for new and less experienced professionals.

The OSH-ISH Equipment Room has a coordinator responsible for ensuring proper instrument calibration, performance testing, documentation, and sampling supply maintenance. The

coordinator loans IH instrumentation to qualified OSH-ISH personnel for quantitative exposure assessments. CTS provides online access to a real-time IH instrument inventory showing both equipment availability and calibration status. OSH-ISH develops and maintains IH equipment guides to quickly familiarize and orient qualified and deployed industrial hygienists on analytical sampling instrument operation, calibration, use, limitations, and care.

Interviews and CTS demonstrations showed that qualified medical personnel, industrial hygienists, safety professionals, and other ESH SMEs are involved in baseline survey steps including hazard identification, hazard control, and medical surveillance.

Triad's injury and illness trending program analyzes data, identifies trends, and informs risk prioritization and hazard mitigation activities. The Institutional Quality and Performance Assurance (IQPA) team supporting the ESH organization developed a portfolio of slides to analyze injuries, including frequency, locations, job positions, body parts, nature of injuries and accidents, and causes, among other factors. Managers review the monthly management attention areas, ALD program health indicators, operations performance health indicators, and other business metrics to analyze trends and apply resources. Statistical process analysis tools aid in issues management trending to illustrate the big picture and demonstrate Triad's commitment to continuous improvement. In addition to injury and illness trend analysis, the IQPA team leader conducts quarterly metric reviews of each ALD to determine its overall health indicator (green, yellow, red). A demonstration of the online quarterly metrics report format showed a user-friendly visual presentation with the capability to quickly drill down to details. Participants update the status of programs and discuss incidents or occurrences and how they affect programs within the topic. Reviewers develop performance health indicator quad charts from the quarterly metrics review and present them at the quarterly Institutional Management Review Board. The IQPA team leader enters and tracks actionable issues in the iLink issues management module.

Employee interviews at various LANL facilities verified hazard reporting procedure familiarity per PD100, *DOE/NNSA Approved Los Alamos National Laboratory 10 CFR 851 Worker Safety and Health Program Description*. Consolidated Annual Training, General Employee Training, new employee onboarding presentations, and bulletin board posters throughout the site highlighted hazard reporting procedures. Workers can report hazards to their supervisors, ESH staff, facility managers or other FOD representatives, and WESST representatives under open-door policies. FODs have a 24/7 on-call duty officer with the ability to make event notifications in iLink if required. Workers can also report to the safety concerns group by phone (5-SAFE hotline) or by email (safety@lanl.gov). The Employee Concern Program (ECP) is an additional option for reporting, as detailed in P793, *Employee Concerns*. Workers know they can report their safety concerns, anonymously if they wish, without fear of repercussion. Triad documents, investigates, and tracks reported safety concerns and facility hazards to resolution through its Footprints® database.

P102-2, *Occupational Injury and Illness Reporting and Investigation*; P1201-4, *Los Alamos National Laboratory Incident Reporting and Protective Actions*; and P322-3, *Performance Improvement from Abnormal Events;* guides the conduct of investigations of accidents, injuries, events, occurrences, and near-misses at Triad. FODs are responsible for the accident investigation process with support from IQPA. The Institutional Reporting Team Leader, within the IQPA organization, directs and leads accident and injury investigations. An Institutional Reporting Team of trained and qualified Occurrence Investigators conducts factfinding in

collaboration with the FOD or RLM and updates iLink inputs associated with the accident. The investigation process uses a graded approach based on the severity of the incident and the potential for lessons learned. Triad developed a pocket quick reference guide and abnormal event trifold brochure to facilitate investigation standardization and consistency and address new manager process unfamiliarity. Triad instituted the 7-2400 reporting line as a single place to report non-emergency events and occurrences received at a central operation center manned 24/7, which simplified the reporting process. Workers call 911 for fire or medical emergencies, and then call 7-2400. The operators at 7-2400 can also contact 911. Triad follows the CAIRS and Occurrence Reporting and Processing System reporting requirements.

Onsite safety and health surveys play a significant role in identifying, analyzing, and controlling hazards at Triad. Field observations and interviews confirmed Triad conducts a variety of surveys and assessments to identify and mitigate hazards to ensure employee workplace safety. The Team identified some conditions during worksite walkthroughs that indicate Triad should continue to pursue improvements to its worksite inspection program. The Team observed surge protectors, power strips, and extension cords powering appliances and other equipment in place of permanent power connections. The Team also observed several piggybacked extension cords, extension cords plugged in without a load, fire doors propped open, standing water in walkways, and ladders improperly stowed. The presence of these conditions may indicate personnel conducting routine inspections are either not adequately trained to identify potential hazards or might be indifferent to these types of hazards.

MOV is the primary documented inspection method promoted by senior leadership and implemented by all management levels. Managers document MOVs in the iLink software tool MOV module which includes features, such as direct issues management module linkage for observations resulting in conditions or issues. Other inspection methods discussed onsite, include Peer-2-Peer observations (also documented in a designated iLink module), Hazard Hunters, and CSA daily inspections.

While the Team acknowledges inspections are being conducted and providing workers at LANL a safe work environment, none of the processes mentioned above meets the entire expectation of DOE-Standard (STD)-1232-2019/1, *U.S. Department of Energy Voluntary Protection Program - Program Structure, Volume 1 of 4, section II.E.3.c.(1)* and DOE-STD-1232-2019/1, *U.S. Department of Energy Voluntary Protection Program – Onsite Review, Volume 4 of 4, section Appendix A, section IV.D.1.* The DOE-VPP standard requires participants "to have a system for conducting routine, general hazard control/compliance verifications that follow written procedures or guidance and result in written reports of findings and tracking of hazard correction. For continuous activities, these routine, general hazard control/compliance verifications shall be conducted at least monthly and cover the whole worksite at least quarterly." OSH-LIHSM-61-003, *Laboratory Industrial Hygiene Safety Manual (LIHSM) Chapter 61 – 10 CFR 851 Surveillance Program*, paragraph 3.3, *Performing Audits and Inspections,* was the only document provided that specifically described an inspection program (annual). Triad should review its workplace inspection policies, procedures, training, and qualification requirements to ensure personnel assigned to conduct safety inspections are familiar with common hazards and safety-related deficiencies, and document monthly inspections that cover the entire worksite each quarter as required by the DOE-VPP Standard.

Opportunity for Improvement: Triad should review its workplace inspection policies, procedures, training, and qualification requirements to ensure personnel assigned to conduct safety inspections are familiar with common hazards and safety-related deficiencies, and document monthly inspections that cover the entire worksite each quarter as required by the DOE-VPP Standard.

Conclusion

Triad maintains an adequate workforce of certified safety, health, industrial hygiene, occupational health, and radiological professionals to analyze facilities, procedures, and projects, identify hazards and assess employee risk. The site uses proven methods, processes, and procedures to identify and analyze workplace hazards. It augments high and extremely hazardous processes and procedures with facility-specific directions to address unique facility hazards. Triad conducts in-depth baseline assessments and a variety of surveys, exposure evaluations, assessments, and inspections to ensure employees work in a safe environment. Field observations, documents, and interviews confirmed that Triad conducts workplace inspections but needs to ensure it documents those inspections, and ensure personnel are not missing or ignoring some common hazards. Workers at LANL conduct pre- and post-job briefings which serve as a vital element of the Triad safety program. Planners continue to describe hazards that workers might encounter during work, in the work planning and control system. Work planning and package development leverage workers' understanding of hazards and experience to assist in the control of hazards and exposures. Triad should continue to drive the effort to implement site- wide IWM process controls. Managers and supervisors seek and respect workers' opinions and ideas before finalizing work packages or implementing controls. Triad meets the expectation in Worksite Analysis for continued participation as a DOE-VPP participant.

VI. HAZARD PREVENTION AND CONTROL

The third and fourth core functions of ISM, *Identify and Implement Controls,* and *Perform Work in Accordance with Controls*, ensure that once hazards have been identified and analyzed, they are eliminated (by substitution or changing work methods) or addressed by implementing effective controls (engineered controls, administrative controls, or PPE). The equipment maintenance processes, and emergency preparedness plans shall ensure compliance with requirements. The organization shall develop and communicate safety rules and work procedures that all employees understand and follow to prevent, control the frequency of, and reduce the severity of mishaps.

Triad has a wide range of complex, dynamic, and unique hazards associated with its mission. The site ensured the OSH organization employs knowledgeable personnel to address these hazards and support the mission based on their educational background, professional experience, and the institutional tools in place. The site's OSH-DO is comprised of three main groups: ISH, Occupational Health (OH), and Deployed Services (DS). Experienced and certified professionals capable of controlling and correcting hazards adequately staff Triad's OSH-DO ensuring a safe work environment in all areas exists for workers, visitors, and subcontractors. Triad currently has approximately 19 certified industrial hygienists, 28 certified safety professionals, and numerous other professionals with credentials or experience in safety, IH, ergonomics, electrical safety, hazardous material management, and other relevant OSH areas split between the OSH DO and DS ISH staff. Overall, despite the increased workload and demands resulting from personnel shortages, the industrial hygienists interviewed during the visit remained hopeful and believed that Triad's efforts to recruit and hire professionals are adequate. Interviews with managers, work planners, and the Radiological Protection Program group highlighted RCT as a critical staffing need that sometimes inhibits work planning and operations. RCT availability is a nationwide issue. Triad is actively working to address the RCT shortage with focused recruiting efforts and enhanced in-house training programs. Interviews with RCT recruiters and walkthroughs of the RCT training facility, discussed in the Safety and Health Training section, revealed a strong management priority and collaboration with educational institutions, like Northern New Mexico College, and other national laboratories. In general, Triad provides funding, procurement of equipment, training, and other professional services necessary to ensure mission readiness.

Interviewed workers know it is the individual right of every employee, including subcontractors, to pause or stop work if they have a reasonable belief that the task poses a safety, health, environmental, procedural, security, quality, or waste generation noncompliance concern or observe an unsafe condition or act as outlined in P101-18, *Procedure for Pause/Stop Work.* Employees confirmed they can correct any unsafe act or condition or notify their supervisor as soon as possible.

The safety program encompasses the environment, safety, and health of visitors, subcontractors, and suppliers as required by 10 CFR 851 and PD100. Health and safety specialists regularly review subcontractors' Worker Protection Plans. P101-12, *ESH Requirements for Subcontracted Work*, and Exhibit F, *S&H requirements for subcontractors,* provide requirements for subcontractors' safety plans. Triad subcontractor technical representatives (STR) or procurement officers attach applicable Exhibit F hazard identification forms for work classified as moderate/high consequence work, low consequence work, offsite work, or contingent work.

Depending on the hazards or complexity of work accomplished by the subcontractor, site STRs visit the work location and conduct inspections or remain at the location for the duration of the subcontractor work. The Exhibit F program is targeting initiatives to enhance understanding of roles and responsibilities and standardize ESH plans for similar subcontractor work. Visitors, subcontractors, and suppliers receive safety briefing handouts and orientations from their site point-of-contact or escort.

Several major wildland fires have threatened LANL lands and surrounding laboratories over the past few decades. These wildfires had the potential to damage or destroy LANL facilities and pose a risk to the nuclear materials in those facilities, as well as the workers at LANL. In January 2020, Triad hired a new LANL Wildland Fire Management officer with extensive experience in wildfires, aviation, and forest management. This person has led Triad efforts to analyze the wildfire risks, worked with the multiple wildfire response and mitigation agencies around Los Alamos, and developed long-term strategies to reduce wildfire risks and restore surrounding forest health. Triad has worked with NNSA to identify and procure equipment, such as new masticators (equipment used to clear low-level brush), thin the ponderosa pine forests (donating the resultant wood to the local Pueblos), and significantly increase fire road and evacuation route maintenance resources. During the 2022 Cerrado Pelado Fire that consumed 45,605 acres, NNSA's Los Alamos Field Office (NA-LA) was part of an integrated wildland fire response managed by four different Incident Management Teams under a joint Delegation of Authority. Local authorities discovered the fire on April 22, and by May 1, Triad and NNSA activated the emergency operations center (EOC) in a Monitoring Mode response posture when the fire came within five miles of the site. The EOC activation level increased on May 9 when the fire breached Forest Road 289, less than five miles from LANL. In response to this fire, Triad has worked with NNSA to nearly quadruple the resources available and planned the next 5 to 6 years of wildfire mitigation and prevention efforts.

Triad performs hazardous work and implements controls to mitigate these hazards. The Team observed a sampling of facility-specific safety and IH hazard control programs, handling plans, processes, procedures, and briefings. The Team saw no deviations or improper acts during the onsite assessment. Program managers are well-informed, and workers were familiar with, and comply with, the requirements of the programs.

The Team and Triad managers both heard some concerns voiced by workers regarding Triad's P101-3, *Lockout/Tagout for Hazardous Energy Control (LOTO)* program. Craft workers identified that FODs and LOTO coordinators implement the program with minor differences in some areas of the Laboratory. Those differences lead to workers' confusion when performing work in different areas. Triad self-assessments over the past 2 years have also noted LOTO implementation errors. A Team member observed the use of an improperly tagged lockbox and lockbox tag not entered in the APEX® LOTO database. Triad personnel corrected the lockbox tag and entered the tag into the APEX® database during the VPP assessment. Triad has a LOTO improvement initiative in progress that includes revised laboratory procedures, supplemental guidance, and audits.

Triad emphasizes the hierarchy of controls to mitigate and reduce hazards, as demonstrated by the following examples:

- Low Oxygen Exposure: A worker entered an oxygen deficient atmosphere to manually shut off a liquid nitrogen (LN2) supply line that caused a low oxygen alarm in the Nonproliferation and International Security Center. As a corrective action, to prevent future exposures, maintenance personnel installed an automated shutoff on the LN2 supply triggered by the low oxygen alarm. Triad installed the same system at the National High Magnetic Field Laboratory where the same risk existed. (Engineered)

- Pump Motor: Pipefitters from Logistics Fire Protection perform routine maintenance on the area's (TA-55) single-stage inline fire pumps. The task requires two pipefitters to simultaneously tighten a pair of hex nuts, one on either side of a rotating shaft, to ensure even distribution of the gland. To adjust the gland nuts, the shaft must be in operation exposing workers to a rotating shaft at approximately 1,770 revolutions per minute (rpm). Complicating the work is the fact that there are no built-in safety guards on the pump to prevent pipefitters from getting tools, or even body parts, caught in the rotating shaft while performing the adjustment. The pipefitters and SMEs surveyed the issue considering several possible designs for a machine guard. They settled on one design that features a wide slot to give pipefitters access to the hex nuts while also acting as a barrier from accidental contact of tools or fingers with the rotating shaft. Machinists fabricated and installed a guard on the four pumps at the facility. Since the installation of the machine guards, pipefitters have been able to perform the required adjustments on the fire pumps safely. (Engineered)

- Pocket Dosimeter: To eliminate the ergonomic hazard associated with the calibration of pocket chambers (self-reading pocket dosimeters), LANL purchased a DTS-75 Automated Dosimeter Reader from Hopewell Designs Inc. Each year the Radiological Instrumentation Calibration (RIC) team at TA 36-0214 calibrates approximately 300 pocket chambers. The process exposes the chamber during calibration to three dose rates, three separate times. RIC team members calibrate 30 pocket chambers during each calibration run, for a total of 270 reads/resets per calibration run. The calibrator must hold the chamber head up to a bright light to read the pocket chambers, creating an ergonomic hazard. A strain occurs to the user's neck from angling up or down due to the number of times performed per calibration run. The pocket chamber charger requires users to squeeze a trigger repeatedly until enough charge has built up in the pocket chamber to reset it to zero. When squeezed, the trigger provides resistance against the user. The combination of the required pressure and the number of repetitions creates an additional ergonomic hazard and increases the potential for injuries that have occurred in RIC personnel. The new reader eliminates these ergonomic hazards. (Elimination)

- Access Control at high explosive (HE) Firing Sites: Since taking over from LANS, Triad has improved and reduced the risks to personnel associated with the access controls and accountability procedures for the HE firing sites at LANL. All personnel must obtain permission to enter from the Firing site central control office by swiping their HSPD-12 badge at boundary access gates. Only Z-numbered personnel verified in U-Train who have completed the required training and briefing may enter the HE firing Site. Alternatively, personnel visiting the site can complete the training onsite and then have their Z number entered into the access control system. The control point issues a radio to responsible

personnel if they do not have an approved cell phone or are going to areas where cell phones are restricted. Triad has also preidentified firefighting/emergency response staging points within those boundaries that response personnel can use if necessary. Before authorizing a HE firing test, the control point establishes contact with individuals within the affected area to verify they are in a safe location for the planned shot. (Administrative)

The OSH-ISH ergonomics program has established demonstration rooms to showcase vetted ergonomic equipment and furniture. Employees can easily sign up to visit the demonstration rooms to evaluate and try out equipment and get fitted for ergonomic chairs. Industrial ergonomic equipment is available via a loaner program, which allows customers to try out the equipment before committing to purchase. The Office Ergonomics Program proactively tests (in-service) new ergonomic equipment before commissioning. OSH-ISH established a tiered ergonomics qualifications program including the following levels: advocate, office evaluator, non-office evaluator, glovebox evaluator, and ergonomist. The ergonomics team is made up of twelve team members, ten of which are deployed to organizations to provide ergonomic support. Four of the team members are qualified Ergonomists. Employees request ergonomic assessments via email to Ergo@LANL.gov, through the WeCare (Cority®) application, Early Intervention Program, or via an ergonomic-related injury report.

The RIC facility has made significant updates in radiation detection, monitoring, and sampling instrumentation. These updates have enhanced operational reliability and efficiency and produced marked ergonomic and worker safety improvements. For example, RIC worked with an instrument manufacturer to replace 40-year-old analog radiological detection technology with updated digital devices. In addition to providing more accurate and quicker results, these enhancements significantly reduced device weight and associated ergonomic hazards across LANL.

The Triad Respiratory Protection Program (RPP) fit-tests 3,500-4,500 respirator wearers required to use N95 filtering facepieces up to self-contained breathing apparatuses. The RPP established dedicated fit-testing teams, including one industrial hygienist and three to five respiratory protection technicians to provide all required fit-test services at three sites. Trained teams equipped with TSI Port-a-count fit-test instruments provide quantitative fit-testing for all LANL needs. Fit-testers provide wearers with respirator wallet cards identifying the type of respirators fit-tested and the size of the respirator for future reference. OSH-ISH recently worked with a third-party qualified assessor from Savannah River Nuclear Solutions, LLC to evaluate the LANL RPP. The assessor identified that IWDs did not consistently contain proper respirator cartridge changeout schedules. As a result, the RPP administrator reported the findings to the MRB and opened an iLink issues management moderate hazard entry. Ultimately, these efforts corrected respirator changeout schedule documentation in IWDs across LANL.

The Confined Space Program (CSP) manages confined space entry in accordance with 10 CFR 851 and 29 CFR 1910.146 requirements. The site's CTS database includes an inventory of identified confined spaces and evaluations, lists of qualified evaluations and entry supervisors, and assigns confined space permit numbers. In addition to the confined space permits, IWDs also identify confined space air monitoring and hazard controls. The previous CSP lead recognized challenges with unresolved/open CSP permits in CTS and increased audit frequency to validate open CSP permits. This effort helped CSP permit submitters reconcile their permit statuses and improved CSP information reliability and accuracy.

The PPE program complies with various federal regulations, including 10 CFR 851, and 29 CFR 1910.132, and the governing policies of LANL. Workers have access to role-specific PPE based on RLM review and receive training and resources for proper PPE usage and care. General PPE is available for craft workers at the Maintenance and Site Services (MSS)-Logistics toolroom. Field hazard assessments and review of IWDs and work packages by safety professionals and industrial hygienists identify appropriate PPE for each activity. Interviews noted concerns about online PPE purchases for other workers and lack of custom fit causing issues in some applications. Interviews also noted instances of incorrect PPE when RLMs do not incorporate IH guidance, particularly with low hazard categorized IWDs (See Worksite Analysis).

ALDs, following P713, *Terminations*, administer disciplinary action for noncraft workers in cooperation with the Human Resources Office. P713 identifies that Triad encourages managers to use a progressive approach to discipline, but also identifies the ALD can decide if an infraction warrants termination. The Labor Relations organization manages the disciplinary program for craft workers per the *Craft Employees Handbook*. The disciplinary program can be either progressive (i.e., verbal warning, written warning, time off, up to dismissal) or immediate, based on the type and severity of the offense. Interviewees stated they believed Triad administered the discipline program fairly and equitably to everyone.

The MSS – Maintenance Programs (MP) organization implements preventive maintenance (PM) and predictive maintenance (PdM) programs per P950, *Conduct of Maintenance*. AP-MNT-005, *Annual Maintenance Work* Plan, AP-MNT-006, *Preventive (PM) and Predictive Maintenance (PdM)*, and the AP-WORK series direct planning, funding, and performance of PM and PdM work. These documents provide a graded approach to the performance of PM and PdM.

Facility engineering services provides guidance based on Management Level (ML) when entering equipment and systems into the Master Equipment List (MEL) contained in the Computerized Maintenance Management System (CMMS). Engineering services categorize MEL equipment and systems in risk based MELs one (highest) through four (lowest). Engineering services identify maintenance requirements for levels one through three, and facility maintenance managers determine requirements for level four equipment. The MEL provides standard equipment and system nomenclature. Interviewees mentioned some FODs have varying equipment nomenclature and some systems are excluded from the MEL where it is determined that PM is not required based on equipment criticality and/or replacement cost. Inadequate MEL representation results in inefficient or inaccurate recording and challenges developing an accurate maintenance history. The MSS – Work Control (WC) organization is currently working to improve MEL alignment and has completed realignment of the MEL within TA-55.

Maintenance support specialists develop CMMS model work orders using inputs from engineering services and maintenance managers including Original Equipment Manufacturer recommendations, standard equipment type maintenance, hazard analysis, and periodicity. CMMS automatically generates PM or PdM work packages based on PM frequency 90 days before the required maintenance. Craft representatives, maintenance managers, and other FOD managers meet for plan-of-the-day and plan-of-the-week to discuss upcoming PMs.

MSS-MP implements a small PdM program with only one qualified team member and one vacant position. The PdM program focuses primarily on vibration inputs and oil analysis

performed by an outside party. FOD maintenance managers determine PdM needs at each facility. The Team did not observe any PM or PdM issues during facility walkdowns. The Triad PM and PdM programs establish a balance to offset critical structures, systems, and components breakdown and corrective maintenance with planned upkeep.

LANL implements two primary mechanisms for tracking safety hazards and site issue resolution. Issues Management via the iLink system captures conditions and issues and documents corrective action plans, approvals, and subjective evidence of resolution. FSRs, via the Footprints® database, capture facility-related safety hazards and work requests and track resolution. As previously discussed in the Management Leadership section, workers, craft, VPP Ambassadors, WESST, and ESH integrators mentioned the perception that the FSR program is not working effectively. Employees submit FSRs, but do not see immediate repairs, and subsequently cease to submit future FSRs. Operations and maintenance are aware of the concern. Data provided by the FSR maintenance manager identified 15,386 FSRs completed in FY21, 17,692 FSRs completed in FY 22 year-to-date, and a current backlog of 10,738 FSRs. The maintenance manager admitted feedback needs improvement and information describing how the FSR program works needs to be developed and communicated to LANL employees and customers. The FSR information should address the full FSR process, including determining if the job is simple or complex, how operations sets the priorities, a scheduling process for FSRs, and if the FSR needs changing to an Engineering Service Request. LANL recently implemented a Customer Action Team (CAT) pilot program in FODs 6 and 7 to fix simple issues, including those that would make life better at LANL, within 3 working days of submission. The CAT closed 649 tickets in FY22, with an average closure rate of 8.4 days, and 79 tickets year-to-date for FY23, with an average closure rate of 5.9 days. The CAT is working to improve closure rates. Triad should improve the FSR feedback process and develop informational material to train LANL personnel on FSR effectiveness and acknowledge receipt of an FSR to the submitter.

Opportunity for Improvement: Triad should improve the FSR feedback process and develop informational material to train LANL personnel on FSR effectiveness and acknowledge receipt of an FSR to the submitter.

Interviews with iLink administrators showed a robust issues management module with tracking and trending capabilities. The issues management tool contains screening questions and required fields to guide RLMs through issue resolution with management oversight. The IQPA teams provide issues management trend data to support RLM screening and at senior leadership meetings. Organizations use the iLINK tool as required by P322-4 as the tool of record for all conditions and issues identified. All those assigned a task in iLINK receive an automated email from the system informing them that they have a task to complete. Interviewees noted that although RLMs and any required reviewers can elect to have issue updates emailed to them by the system, the individuals entering the issue do not receive updates automatically.

Triad complies with DOE Order 151.1D, *Comprehensive Emergency Management System,* and *PD*1200*, Triad Emergency Management Program (EMP).* Triad's Emergency Management Division (EMD) -PLAN-100*, All Hazard Emergency Management Plan;* EMD-PLAN-120, *Exercise Program Plan;* EMD-PLAN-148, *Drill Program Plans;* and EMD-PLAN-151, *Facility Preparedness Program Plan;* are some of the programmatic plans that augment the EMP. Los Alamos County Police and Fire Departments provide law enforcement, fire, rescue, emergency

medical, and paramedic services to the site. Los Alamos County has two fire stations onsite, three offsite, and one training station offsite. Emergency services can reach most of Triad's facilities within four minutes, but there are many exceeding the four-minute response with one site needing 30 minutes. Triad has completed a baseline needs assessment (LA-CP-21-20811, *LANL Baseline Needs Assessment for Fire Protection and Emergency Response*) that addresses facility spacing distance. Triad conducts hazard analysis using DOE O 151, *Comprehensive Emergency Management System*, Emergency Planning Hazard Surveys and Assessments , and develops disaster processes and procedures using threat and hazard identification and risk assessments. The Emergency Preparedness group provides emergency preparedness training for new hires and subcontractors.

Triad's EMD operates its state-of-the-art EOC with full-time Continuity of Operations and Wildland Fire Protection program managers and group and deputy leaders responsible for emergency response, operations, and preparedness. Triad equipped the EOC with a mobile command center and a mobile communication unit, which provides EOC connectivity and cellular networks in remote or no-service areas. The site conducts emergency evacuation drills at all occupied buildings annually as required by DOE Order 151.1D. The division also conducts an annual full-scale exercise, including plume monitoring. Another function of the EMD is to ensure deployed employees' well-being and safety when on official travel through its Active Travel Tracker program. The program keeps travelers advised of issues that may affect them while offsite. The travel scheduling and funding process auto-enrolls all personnel. Interviews and walkdowns of the EOC and Hazmat Training Centers revealed a robust emergency response system well supported with funding and management support.

The Triad OH Group includes 85 employees covering seven disciplines, in four main areas: clinic and diagnostic, integrated services and information management, clinical providers, and employee well-being. Two internal medicine doctors, one family practitioner, six nurse practitioners, two physician's assistants, five clinical psychologists, and one physical therapist provide clinical services. Administrative staff, contract physical therapy services, case management personnel, approximately 12 ergonomists, deployed safety and health personnel, schedulers, and medical records staff support OH operations. The OH group has one main facility, one satellite site, 36 heart health stations for blood pressure testing, and six MaMaVa pods for nursing mothers. LANL contracts clinical laboratory/diagnostic work out to the Los Alamos Medical Center. The OH group provides three key services: occupational medicine, institutional health and wellness, and employee assistance programs. Triad's policy is for the main Occupational Medicine facility to see all nonemergency work-related injuries first. Emergency response personnel immediately send critical cases to the nearby Los Alamos Medical Center. First line supervisors go with injured workers to the clinic or medical center.

OH, has established a robust return-to-work program designed to keep workers engaged throughout work-related injury treatment, rehabilitation, and fitness for full duty leveraging Family Medical Leave Act Worker's Compensation and ability to provide onsite physical therapy services. The Post-Offer Employee Testing program, established to screen new workers for mechanical and strength deficits, enabled proactive intervention measures, such as improving worker strength, flexibility, or balance before the prospective employee performed work identified as putting them at risk for potential injury. Occupational Medicine established case management for worker's compensation with behavioral health experience to evaluate newly injured workers for barriers to recovery and mitigations to eliminate those barriers. The

Occupational Medicine Director developed and has maintained strong relationships with craft leadership and CSAs, which has improved worker participation and reduced injury occurrence.

The OH group conducts visual assessments, audiograms, blood tests, pulmonary function tests, electrocardiograms, radiologic studies including chest x-rays, physical fitness assessments for industrial athletes enrolled in certain medical certification programs, Phase I & II new hire physicals, termination evaluations, medical surveillance, fitness-for-duty, remedial fitness programs, post-offer employment testing, and safe return-to-work function task assessments. In addition, OSH-OH sponsors Influenza (flu) Vaccine clinics each fall, administering 3,500 flu vaccines annually. The Hearing Conservation Program (HCP) currently has approximately 2,000 enrollees for occupational medical surveillance. OSH-ISH developed a job-, task-, building-, and operation-specific matrix supported by existing exposure assessment data to guide LANL-wide occupational medical surveillance enrollments. Area monitoring and targeted personal dosimetry primarily collect noise hazard exposure assessment data due to limited resources.

When injuries occur, medical organization personnel initiate the injury and illness report using the cloud based Cority® system (WeCare). WeCare links the medical organization directly with site management to form a closed loop system. Occupational Medicine providers conduct monthly field trips to familiarize themselves with LANL workplaces, activities, and operations. OH, also assists in hazard analysis and IWD development when requested.

Triad's Medical Director has implemented a two-prong holistic wellness program approach to helping workers stay healthy. The first part focuses on occupational health and a wellness center providing physical fitness, trainers, nutritionists, and fitness instructors. The second part focuses on the four dimensions of Wellbeing: physical, social/emotional, occupational, and financial. Triad's *LANLInside* website's "employee wellbeing" section provides webpages for each of the four dimensions with links to internal and external resources, events calendars, and monthly newsletters. The wellness program offers monthly challenges centered around different areas and aspects of health, various in-person, and web-based classes, in-person group exercise classes, and a library of educational presentations and sessions on various health related topics. The site has one main 16,500 ft^2 fitness center with approximately 400 personnel using the facility each month and six satellite fitness facilities used by approximately 2,000 personnel per month. Satellite facilities require a buddy system for use. The Team observed compliance with the buddy system policy when conducting walkthroughs.

During the COVID-19 pandemic, Triad tested over 35,000 personnel with approximately 1,000 positives. Fifty-five of the COVID positive cases were work-related. LANL administered 17,823 vaccine shots, of which 3,696 were boosters. In addition, LANL performed 35,000 COVID-19 PCR tests onsite throughout the pandemic and 1,045 of those tested positive. The LANL Hotline became a COVID-19 case management system. LANL issued POL 1201-6, *Covid-19 Risk and Exposure Control Measures for On-Site Work Activities,* and referred approximately 15 personnel to participate in the online Johns Hopkins COVID-19 Contract Tracing Screening training. COVID-19 policies implemented enabled Triad to meet all mission critical needs.

OSH-OH currently supports a LANL-wide cardiopulmonary resuscitation and automated external defibrillator (AED) program, regardless of distance from emergency medical services,

by supplying necessary equipment, supplies, and worker training. The site medical officer informed the Team that a site AED recently saved a LANL employee's life. LANL has several remote areas that fall outside of response time objectives stated in the National Fire Protection Association's (NFPA) 1710.15. In response to concerns about remote LANL area travel times, a temporary equivalency to DOE O 420.1C, Chg. 3, and NFPA 1710 criteria (LANL-DOE-O-420.1C-EQ-2010-003, Rev. 1), including compensatory measures was prepared and submitted to NA-LA on October 5, 2015 (LANL letter AD-NHHO:15-211). NA-LA approved the temporary equivalency on April 6, 2016, by letter S&S:033-16 (expiration date of September 30, 2020).

Opportunity for Improvement: Triad should review the temporary equivalency letter and ensure it is up to date for current operations and requirements.

P102-4, *LANL Cardiopulmonary Resuscitation and Automated External Defibrillator Program,* provides the AED program description and requirements. LANL has approximately 430 AEDs deployed throughout the facilities. During a walkthrough of TA 53-0006, the Team observed an AED at the building entrance last inspected a year ago (October 2021). The building manager attributed the inspection lapse to an ongoing program review. The LANL Medical Director confirmed the program review which includes replacing the various models of AEDs currently around the site with a standardized new model. In addition, LANL expects to increase the total number of AEDs onsite to approximately 600. During various facility walkthroughs, the Team spot-checked 13 additional AEDs and only one of them met the inspection, inventory, and responsibility requirements of P102-4, Revision 1, dated 7/26/22, para 3.1.3, 3.1.4, and 4.2.

Opportunity for Improvement: Triad should inspect and inventory all AEDs placed around the facilities as required by P102-4 while waiting for new AEDs.

Conclusion

Triad conducts a variety of surveys, inspections, and assessments to eliminate, reduce, and control workplace hazards but needs to improve the frequency and thoroughness of surveys and inspections to identify and mitigate more common types of discrepancies observed by the Team. PPE is available and worn to prevent mishaps or control their frequency and/or severity. Triad maintains an OSH division staffed with knowledgeable and experienced professionals capable of adequately controlling and correcting hazards ensuring a safe work environment in all areas exists for workers, visitors, and subcontractors. The site provides a full range of medical services, emergency response and planning, and wellness program support to its workers. Triad effectively eliminates or controls hazards and exposures using the hierarchy of controls. It takes the health and welfare of its staff, workers, and subcontractor workforce seriously. Updates to the RIC facility have significantly enhanced operational reliability and efficiency have significantly enhanced operational reliability and efficiency and produced marked ergonomic and worker safety improvements. Triad has completed and implemented a Fire and Response Equivalency for its remote areas. Triad plans, schedules, and completes maintenance safely using certified professionals commensurate with the potential risks. It recognized the need to have an expert in wildfire control and hired a new LANL Wildland Fire Management Officer with extensive experience in wildfires, aviation, and forest management. The Team did not identify any programmatic noncompliance with DOE, OSHA, State, or local safety requirements. Triad's injury and illness rates are well below the comparative industry average and reflect

effective hazard prevention and control methods. Triad meets the Hazard Prevention and Control expectations for continued participation in DOE-VPP.

VII. SAFETY AND HEALTH TRAINING

Managers, supervisors, and employees shall know and understand the policies, rules, and procedures established to prevent exposure to hazards. Training for safety and health shall ensure that personnel understand their responsibilities, recognize hazards they may encounter, and can act in accordance with management expectations and approved procedures.

Human Resources-Institutional Talent Management Services (HR-ITMS) at LANL provides the ESH training, in conjunction with ALDESHQ Divisions. HR-ITMS provides the facilities, platforms, and support staff, and ESHQ provides ESH professionals to develop, deliver, and manage institutional ESH training.

Triad staff develop institutional ESH training materials using a Systematic Approach to Training (SAT) according to P781-1, *Conduct of Training*, relevant DOE handbooks, and HR-ITMS policies and procedures. The SAT formally addresses the analysis, design, development, implementation, and evaluation of institutional ESH training and helps to document a graded approach to training. Institutional ESH training focuses on knowledge, skill, and ability level training and presents hazards, controls, and resources at a high level, applicable throughout LANL.

Facility- and job-specific training address additional training requirements based on the facility, location, job duties, and/or tasks. Some positions require that employees maintain qualifications or certifications. Qualification programs consist of entry-level requirements (i.e., education and prior experience), medical examination requirements, initial training requirements, continuing training requirements, and requalification requirements. Certification is the process by which management verifies, endorses, and documents in writing, the satisfactory achievement of qualification of a person for a position. Certification also entails a higher rigor of the requirements associated with continuing training, testing, and re-examination for recertification than required for qualification.

The HR-ITMS group coordinates periodic internal and external audits of institutional ESH training programs. Training staff revises institutional ESH training courses when a change to a requirements driver affects the validity of course materials or when a review of field conditions or incidents warrants modification.

The Laboratory's Learning Management System (LMS), UTrain, assigns a set of required health and safety courses to new employees upon hiring based on system requirements in accordance with factors including, but not limited to, employee type and clearance level. These courses include LANL Charging Practices, Substance Abuse Policy and Procedure IPP 732.0, Ethics Training, Halting Harassment for Workers: Rules of the Road for a Respectful and Inclusive Workplace, Initial Security Information Briefing, Annual Information Security Refresher, General Employee Radiological Training, General Employee Training, Beryllium: General Employee Overview, Export Control Fundamentals, Environmental Awareness Training, and Incident Reporting and Protective Actions. Additionally, managers and/or Training Program Owners (typically RLMs) create training plans based on job duties for new employees or employees who change positions. Institutional ESH assigns employee training plans the trainee must complete based on the trainee's potential for exposure to specific hazards or job performance.

This LMS provides the following features including, but not limited to: employee training transcripts that list all of the training courses an employee has completed, automated reminders to employees and RLMs when training is due, lists of employees who are enrolled in specific training plans (curricula), lists of employees who have completed specific courses, reports that indicate all of the curricula an employee is enrolled in and whether the employee is complete or incomplete in each, and reports that indicate those courses an employee needs to complete to comply with their assigned training programs (curricula). Employees at LANL may obtain additional information on how to properly use this software from the UTrain manual and available job aids.

DOE O 426.2, Adm., Chg. 1, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities,* defines nuclear facility qualification requirements at LANL. Managers and workers implementing nuclear facility qualifications must follow the requirements listed in DOE O 426.2, *Adm., Chg. 1,* for the position categories listed and as identified in the facility's Training Implementation Matrix. Triad does not grant the qualification until a worker completes all requirements (including written and operational evaluations) and other requirements specified in the qualification standard. UTrain records and documents all qualifications.

Triad develops and provides on-the-job training (OJT) for workers who require formal task qualification, such as those who work in nuclear facilities or perform moderate- or high-hazard/complex work, need to complete employee training that is formalized by qualification standards, have been assigned new work activities that require OJT learning, or need a refresher or continuing training on difficult and important tasks that are seldom performed or are performed during abnormal conditions. Nuclear facility workers undergo formal OJT as part of their initial training, qualification, or certification. ALDs develop and match employees' training to localized work procedures, operations, and IWDs and includes mentoring activities, such as OJT.

To meet the needs of the expanded weapons production mission at TA-55, the ALD for Weapons Production (ALDWP) established a NET Academy that opened in January, 2020, with a new location opening in May 2021. New employees join as a cohort of about 15 people, with a new cohort starting about every 45 days. The current cohort observed by the Team is number 14. The NET Academy provides nuclear waste operators, fissionable material handlers, and glovebox operators with training in their jobs in a safe environment offsite. This allows them to begin training before their clearances are complete, reducing the burden on qualified personnel to provide security escorts. It also relieves the strain on office space and other employee needs. The curriculum consists of self-study, OJT, and classroom instruction, with proctored tests to verify students understand the materials. There is a portion of the academy dedicated to practical hands-on instruction with simulated waste handling, criticality limits, material control and accountability exercises, and vault operations, and there will soon be clean gloveboxes installed where personnel can learn to work in gloveboxes.

Simulations in the practical exercise area include a variety of scenarios that give students the experience of dealing with abnormal conditions that would otherwise cause reportable events, incidents, loss of control of material, or violate criticality safety controls. For example, one area has training-use-only storage canisters that are identical to canisters used in vaults. These training canisters can have different calibrated weights inserted so that the student must correctly

weigh and verify against the procedures and labels on the container. Instructors can also simulate other labeling errors based on actual historical events, or possible scenarios identified in the safety bases. Triad is installing gloveboxes in the training area that will have a negative pressure (below room pressure) to simulate the environment in the actual gloveboxes in PF-4 and RLUOB. Instructors will be able to simulate a variety of accidents or incident conditions that operators might encounter so students can train on those scenarios. Finally, in the drum handling area, students will be able to use the same drum handling equipment in use at TA-55. Students will learn (in a more controlled environment) the proper techniques for loading waste drums, sealing the drums, and staging the drums for shipment, along with all the associated verifications and paperwork. This training will allow Triad to reinforce essential behaviors and conduct of operations in a safe space where operators can make and identify errors and discuss actions before they work inside plutonium areas with the potential for exposure. Once all the areas are fully functional, the NET Academy will also provide training to experienced operators to maintain proficiency and train on abnormal operations. Triad recognized the success and potential of the NET Academy approach to training and is evaluating this approach for new-hire training across the site. Triad recognizes that this in-depth approach may be excessive for some work, and a graded approach to the NET Academy structure may provide a more effective training experience.

During a Team walkthrough of the RCT Training Facility, the Team observed an environment conducive to training where employees and instructors are free to interact with one another and exchange ideas on how to improve the overall effectiveness of safety measures taken at the Laboratory. During the COVID-19 slowdown, instructors took the opportunity to make improvements to the RCT training program. The group incorporated new radio frequency identification (RFID) technology into instruments used for training. This technology allows instructors to preprogram training instrument readings that simulate real scenarios and test correct instrument survey techniques. Mannequins equipped with RFIDs communicate with a computer program to simulate different contamination locations on a person's body and track RCT monitoring speed and location of the detector. These improvements make training courses more realistic and provide better feedback to the students.

LANL instructors have begun using open-ended feedback forms, which has increased the feedback provided by students. Instructors emphasize the importance of students' feedback and explain that training programs evolve based on previous feedback from students. The training staff works closely with craft workers and CSAs to credit craft workers based on union training and previous job experience. This process makes craft employees feel empowered and enthusiastic about their jobs.

Triad is using the Battelle corporate training for supervisors, managers, and executives to improve leadership and management at LANL. The previously discussed LOSA targets supervisors and first-line managers. Triad has added a Laboratory Operations Management Academy (LOMA) that targets the next levels up. LOSA and LOMA focus on implementing the SCoR principles. The courses, structured around classroom training sessions followed by role-playing scenarios, provide students the opportunity to practice responding using the SCoR principles. Upon scenario completion, the group evaluates the student and offers positive observations of how he or she handled the scenario (shine), and then where the student could have performed better (polish). Students travel to Columbus, Ohio, for the 2-day LOSA training class, which allows them to focus on the training without the distractions of their daily tasks.

LOMA is similar in structure but is taught at LANL and generally only takes one day. The Team observed a LOMA class during the review and saw challenging scenarios presented by very convincing role-players, making the scenarios credible.

Conclusion:

Triad has an established training program for managers and employees that ensures they can recognize and control workplace hazards. The Triad training group continuously seeks methods to improve how it provides training for its workers. The ALDWP's NET Academy is an excellent example of those improvements. Triad has also adopted the use of Battelle's LOSA and LOMA training for its managers. Triad meets the expectations of the Safety and Health Training tenet for continued participation in DOE-VPP.

VIII. CONCLUSIONS

Triad has successfully transitioned its workforce from the previous contractor. Over the past 5 years, Triad has expanded the LANL missions and capabilities as directed by the NNSA. Site capital improvements at several facilities and improvements in site infrastructure are helping workers conduct hazardous work vital to the Nation's security, nuclear stockpile stewardship, and global security. Triad effectively manages the resources provided and provides workers with the necessary training, tools, and procedures. Triad has opportunities to increase engagement with workers, supervisors, and middle managers, and gain their support for, and participation in, those programs and processes Triad considers vital for continued safety improvement and excellence. The Team did not identify any systemic noncompliance with requirements, nor did it identify any suppression of concerns or reporting. Triad fully demonstrates continuous improvement and pursuit of excellence expected for continued participation in DOE-VPP. The Team recommends that Triad continue participating in DOE-VPP as a Star participant.

Appendix A: Onsite VPP Assessment Team Roster

Management

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Name	Affiliation/Phone	Project/Review Element
Bradley K. Davy (Retired)	DOE/EHSS	Team Lead, Management Leadership
Michael S. Gilroy	DOE/EHSS	Employee Involvement, Safety and Health Training
Moises Atiles	DOE/EHSS	Employee Involvement, Safety and Health Training
Wallace E. Czapla	DOE/EHSS	Worksite Analysis, Hazard Prevention and Control, Recordkeeping
Matthew M. Ramsey	DOE/EHSS	Worksite Analysis, Hazard Prevention and Control,
Michael D. Boley	DOE/EHSS	Worksite Analysis, Hazard Prevention and Control
Bruce E. Hill	Mission Support and Test Services, LLC/Los Alamos Office	Worksite Analysis, Hazard Prevention and Control