

# **Consolidated Nuclear Security, LLC Y-12 National Security Complex**

Report from the Department of Energy Voluntary Protection Program Recertification Review May 15-July 20, 2023





Office of Environment, Health, Safety and Security

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 (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 encourages DOE contractors and subcontractors to surpass compliance with DOE requirements and achieve excellence through systematic approaches emphasizing creative solutions through cooperative efforts with managers, employees, and DOE.

DOE-VPP bases program participation on the existence of comprehensive management systems that ensure employees are actively involved in assessing, preventing, and controlling the potential safety and health hazards at their sites. All DOE complex contractors may participate in DOE-VPP, including production facilities, laboratories, subcontractors, and support organizations. However, participation is not required. In keeping with 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 (similar to those in OSHA VPP): Star, Merit, and Demonstration. The Star level recognizes outstanding protectors of employee safety and health. The Merit level is a steppingstone for participants that have good safety and health programs but 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.

Approving an applicant for participation in DOE-VPP demonstrates DOE recognition that the applicant exceeds the basic elements of systematic protection of employees at the site. Participants are provided certificates of approval and the right to use flags showing the appropriate DOE-VPP program level the contractor has achieved. Participants 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 recertification review of Consolidated Nuclear Security, LLC (CNS) at the Y-12 National Security Complex in Oak Ridge, Tennessee, conducted from May 15 to July 20, 2023, and provides the Director of the Office of Environment, Health, Safety and Security with the necessary information to make the final decision regarding CNS Y-12's continued participation in DOE-VPP at the Star level.

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### ABBREVIATIONS AND ACRONYMS

A/I	Accident/Incident
ALARA	As Low As Reasonably Achievable
APEX	Advanced Programming Experience
ATLC	Atomic Trades and Labor Council
B/FEP	Building/Facility Emergency Plan
Be	Beryllium
BLS	Bureau of Labor and Statistics
BNI	Bechtel National, Inc.
CAIRS	Computerized Accident Injury Reporting System
CBM	Condition-based Maintenance
CFR	Code of Federal Regulations
CTM	Compliance-training Matrix
CNS	Consolidated Nuclear Security, LLC
CTS	Comprehensive Tracking System
DART	Days Aways, Restricted and Transferred
DoD	Department of Defense
DOE	Department of Energy
EAP	Educational Assistance Program
EEWP	Energized Electrical Work Permit
EHSS	Office of Environment, Health, Safety and Security
EHSS-12	Office of Worker Safety and Health Assistance
EMBOS	Electronic Medical Business Operating System
EMF	Electromagnetic Force
EMT	Emergency Medical Technician
EOC	Emergency Operations Center
ER&M	Engineering Enterprise Reliability and Maintainability
ES&H	Environment, Safety, and Health
ET	Employee Team
GET	General Employee Training
HAT	Hazard Analysis Team
HIW	Hazard Identification Worksheet
H&R	Hoisting and Rigging
HQ	Headquarters
IH	Industrial Hygiene
I&I	Injury and Illnesses
ISM	Integrated Safety Management
ISMS	Integrated Safety Management System
IWC	Integrated Work Control
JHA	Job Hazard Analysis
KPM	Knowledge Preservation Management
LOTO	Lockout/Tagout
NAICS	North American Industry Classification System
NFPA	National Fire Protection Association
NNSA	National Nuclear Security Administration
NPO	National Nuclear Security Administration Production Office
OC	Operations Center
OEA	Occupational Exposure Assessments

OSHA	Occupational Safety and Health Administration
OJT	On-the-job Training
Pantex	Pantex Plant
PAUSE	Practical, Achievable, Understandable, Safety Expectation
PDC	Performance Documentation Checklist
PDF	Portable Document Format
PHA	Preliminary Hazard Analysis
PM	Preventive Maintenance
POMC	Performance Objectives, Measures, and Commitments
PPE	Personal Protective Equipment
PST	Proactive Safety Team
RCT	Radiological Control Technician
S&IH	Safety and Industrial Hygiene
SEC	Significant Events Council
SIRI	Serious Injury Reduction Initiative
SME	Subject Matter Expert
SOW	Skill of the Worker
SPOMC	Safety Performance Objectives, Measures, and Commitments
SSC	Structures, Systems and Components
STARRT	Safety Task Analysis and Risk Reduction Talk
STR	Subcontractor Technical Representative
SSP	Safety Sustainment Plan
Team	Office of Environment, Health, Safety and Security DOE-VPP Team
TWG	Training Working Group
TOPIC	Tool for Opportunity-Performance Improvement through Communication
UPF	Uranium Processing Facility
TRC	Total Recordable Case
VPP	Voluntary Protection Program
VSET	Value Stream Element Team
Y-12	Y-12 National Security Complex

#### **EXECUTIVE SUMMARY**

The Department of Energy (DOE) Voluntary Protection Program (VPP) Assessment Team (Team) from the Office of Environment, Health, Safety and Security (EHSS) conducted the triennial review of Consolidated Nuclear Security, LLC (CNS) at the Y-12 National Security Complex (Y-12), located in Oak Ridge, TN, from May 15 to July 20, 2023, and recommends that CNS Y-12 continue to participate in DOE-VPP at the Star level.

Since initial construction began in 1943 as part of the Manhattan Project, Y-12 has been processing, manufacturing, and storing uranium for multiple defense purposes. The National Nuclear Security Administration (NNSA) Production Office (NPO) manages the joint operations of Y-12 and the Pantex Plant (Pantex), both managed by CNS. Y-12 is the nation's only source of enriched uranium nuclear weapons components and provides enriched uranium for the U.S. Navy. Y-12 maintains materials science expertise and precision manufacturing techniques to support its mission, and the site also supports efforts to reduce nuclear proliferation risk. Y-12 is completing efforts to reduce long-term facility footprint, including decommissioning of legacy buildings, and redesigning the Protected Area layout. Recent activities include ongoing Uranium Processing Facility (UPF) construction to replace operations in aging Building 9212, smaller scale new Emergency Operations Center and Fire Station construction, and planning for contract separation of Y-12 and Pantex operations.

EHSS conducted the DOE-VPP review using a combined virtual and onsite approach to verify that CNS Y-12 continues to meet expectations for participation at the Star level. The results of the review indicated that CNS Y-12 is:

- Committed to ensuring it accomplishes its missions safely, without unnecessary or unanalyzed risks;
- Engaging the workforce in maintaining a strong safety culture and empowering workers to identify issues, recommend improvements, and stop and pause work when questions or issues arise;
- Correctly identifying and analyzing hazards using teams of subject matter experts, workers, and managers, and maintaining job hazard analyses for all work;
- Properly controlling hazards using the appropriate hierarchy of controls, and engaging safety and health professionals in processes to properly define and analyze, control, and complete work safely;
- Appropriately training and qualifying all workers, managers, and subcontractors to recognize and control the hazards they may encounter; and
- Maintaining accident and injury rates that are lower than the comparison industry.

CNS Y-12 continues to promote a strong safety culture and employs a staff proud to support its mission safely. It has proactive leaders who prioritize safety and consistently seek effective ways to pulse workforce needs and communicate safety initiatives. CNS Y-12 managers, technical staff, safety professionals, and bargaining unit workers exhibit a partnership focused first on safe work execution. The Team observed a workforce willing to ask questions and raise concerns. These are traits of managers and workers that understand their responsibilities towards each other's safety and serve as an example to peers throughout the DOE complex.

The Team identified some opportunities for improvement that may assist CNS Y-12's continuing efforts to empower its workforce and recognize the strengths of its staff. The Team did not identify any programmatic noncompliance with DOE safety requirements that would preclude participation in DOE-VPP. CNS Y-12 continues to meet all the expectations for DOE-VPP, and the Team recommends CNS Y-12 continue to participate in DOE-VPP at the Star level.

# TABLE 1OPPORTUNITIES FOR IMPROVEMENT

Opportunity for Improvement	Page
CNS should consider developing and implementing a regular sitewide safety culture survey at Y-12, including straightforward and easy to understand multiple choice questions and open feedback options tailored to provide data about how CNS Y-12's safety priorities penetrate all layers of the workforce.	9
CNS Y-12 should consider reinstating the "Highlights" publication online and post it in break areas to advertise the successes of the PST in making positive changes for its workers.	12
CNS Y-12 should review its workplace inspection policies to ensure personnel assigned to conduct inspections document monthly inspections that cover the entire worksite each quarter as required by the DOE-VPP Standard.	17
CNS Y-12 should revise the UCN-100030, Incident Investigation form to include a field for causal analysis.	18
The CNS Y-12 Organizational Development and Training Group should formally evaluate training effectiveness and student satisfaction with site training, including online training, by gathering feedback via post-course surveys.	30

#### I. INTRODUCTION

This report provides the Department of Energy (DOE) Director, Office of Environment, Health, Safety and Security (EHSS), the results of the triennial review of Consolidated Nuclear Security, LLC (CNS) at the Y-12 National Security Complex (Y-12), located in Oak Ridge, TN, from May 15 to July 20, 2023. Based on this review, the DOE Voluntary Protection Program (VPP) Assessment Team (Team) recommends that CNS Y-12 continue to participate in DOE-VPP at the Star level.

Since initial construction began in 1943 as part of the Manhattan Project, Y-12 has been processing, manufacturing, and storing uranium for multiple defense purposes, including the production of uranium feedstock for the U.S. nuclear navy. Y-12 played a key part in the production of thermonuclear weapons with 8,000 employees working around the clock to produce nuclear weapon components. Y-12 includes 314 buildings, encompassing 5 million square feet on 811 acres. At its peak in 1945, Y-12 employed over 22,000 workers. Today, Y-12 processes and stores special materials vital to National security and helps prevent nuclear proliferation and terrorism. The National Nuclear Security Administration (NNSA) Production Office (NPO) manages the joint Y-12 and Pantex Plant (Pantex) contract. The contract is held by CNS, comprised of member companies Bechtel National, Inc.; Leidos; ATK Launch Systems; and SOC LLC, with Booz Allen Hamilton, Inc. as a teaming subcontractor. CNS is currently operating under a maximum of five years contract extension as of October 2022.

When CNS began managing and operating Y-12, the former contractor B&W Y-12 was participating in DOE-VPP at the Star level. CNS formally requested "Transitional Star" status in 2014, and the request was granted in 2016. CNS submitted a DOE-VPP application in 2016. The Pantex element of CNS withdrew from DOE-VPP and is not part of this Recertification Plan. DOE evaluated CNS at Y-12 per the DOE-VPP transitional process requirements (DOE-VPP Technical Standard, 1232-2019) in 2017 and determined that CNS met expectations for continued participation at the Star level.

EHSS-12 conducted this 2023 triennial review in accordance with DOE-VPP requirements to verify that CNS Y-12 continues to meet DOE-VPP expectations for participation at the Star level. The Team conducted the review in two phases. From May 15 to June 2, 2023, the Team utilized virtual methods to interview workers and managers, attend meetings, and review documents. The Team then performed onsite work observations, validations, and interviews July 11-20, 2023.

CNS Y-12 commitment to safety and health programs that protect employees, and the public is strong and evident. CNS Y-12 maintains an excellent safety performance record, consistently maintaining injury rates below its comparison industry. This report contains a review and discussion of CNS Y-12 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 report also supports the Team's recommendation that CNS Y-12 continue participating in DOE-VPP at the Star level.

#### II. **INJURY INCIDENCE CASE RATES**

To maintain DOE-VPP Star status, the contractor's average for both Total Recordable Case (TRC) rates and Days Away, Restricted, or Transferred (DART) case rates for the most recent 3year 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 CNS Y-12's OSHA 300 Logs, the DOE Computerized Accident Incident Reporting System (CAIRS), the Team's calculation of the TRC and DART rates, and the specific industry national average for the comparison industry.

Injury Incidence Case Rates - Contractor Employees (CNS Y-12 – CAIRS Org. Codes 0558102 & 0558909)							
Calendar	Hours	TRC	TRC Incidence Rate	DADT	DART Case Rate		
Year	Worked		per 200,000 hours	DARI	per 200,000 hours		
2020	9,438,824	74	1.57	60	1.27		
2021	11,210,830	28	0.50	13	0.23		
2022	12,135,648	50	0.82	27	0.44		
3-Year Totals	32,785,302	152	0.93	100	0.61		
(BLS-202	1) industry ave	erage for					
NAICS 332	2999 All other		3.8		1 9		
miscellaneous fabricated metal product			5.0		1.7		
manufactu	ring						
Injury Inc	Injury Incidence Case Rates – Subcontractor Employees (CNS Y-12 – CAIRS Org. Codes						
0558104,0	558105 & 053	58919)		1			
Calendar	Hours	TRC	TRC Incidence Rate	DART	DART Case Rate		
Year	Worked		per 200,000 hours	21111	per 200,000 hours		
2020	4,212,322	16	0.76	10	0.47		
2021	5,861,532	18	0.61	9	0.31		
2022	6,380,620	14	0.44	3	0.09		
3- Year Totals	16,454,474	48	0.58	22	0.27		
(BLS-2021) industry average for NAICS 332999 All other miscellaneous fabricated metal product manufacturing			3.8		1.9		

3-Year \*TRC Incidence Rates, including subcontractors: 0.81 3-Year \*\*DART Case Rates, including subcontractors: 0.50

#### Discussion

As of July 10, 2023, CNS Y-12 employs approximately 6,830 workers and approximately 3,990 service subcontractors. CNS Y-12 has had 12 TRC and 4 DART cases for the current year to date. The 2023 recordable cases include finger cuts, head cuts, a concussion, and a leg fracture. During the COVID-19 pandemic period between January 2020 and December 2022, CNS Y-12 experienced 47 work-related COVID-19 cases. The TRC/DART case rate table above does not reflect work related COVID-19 cases per the DOE Deputy Assistant Secretary for Safety, Security, and Quality Assurance memo dated October 16, 2020, *Supplemental Guidance for Recording and Reporting COVID-19 Cases*. CNS Y-12 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 CNS Y-12's DOE CAIRS cases, and the results indicate the recordkeeper is documenting all injuries/illnesses in the database properly. CNS Y-12 is maintaining complete and accurate recordkeeping logs, including the OSHA 300 Log, 300A Summary, and comparable 301's. The recordkeeper posts the OSHA 300A Summary during the required period, meeting the requirements of the recordkeeping standard, and remains accessible to all personnel throughout the calendar year. The logs reflect the safety and health conditions under this contractor's control. The CNS Y-12 recordkeeper has completed CAIRS and on-the-job training and is knowledgeable of the recordkeeping requirements.

#### Conclusion

CNS Y-12's combined contractor and subcontractor TRC/DART rates from the table above are -78.7/-73.7 percent lower, respectively, than the BLS comparison industry average for its NAICS code and meets 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 integrated safety management, 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.

During the 2017 DOE-VPP assessment, the Team found that CNS Y-12 leadership focused its first few years of site management on engaging employees in its performance excellence model, coordinating with bargaining units to elevate and resolve worker concerns, and prioritizing safety in pursuit of challenging contract goals. In 2023, the CNS Y-12 management team continues to show a strong commitment to safety and health and emphasizes this commitment in its communications, actions, and flowed-down organizational expectations.

CNS Y-12 has a written Safety and Health policy in Y72-001, Environment, Safety and Health *Policy*, but CNS Y-12 leadership has gone beyond that minimum requirement and taken an interactive approach to distributing the policy throughout the organization. Beginning early in the 2023 assessment and continuing throughout, the Team observed a variety of direct engagement between site managers and workers. The Site Manager's Safety Council Meeting and the Y-12 Town Hall meeting are methods in which senior site operations leaders communicate with managers and workers at all levels. During these meetings, the Team observed reinforcement of safety policy, recognition of safety milestones and achievements, and emphasis that even individuals or single work groups can have a major impact on safe operations. Senior leaders utilize the Safety and Industrial Hygiene (S&IH) group to set policy, but line organizations are expected to understand the policy and take ownership of safety in their operations. CNS Y-12 also incorporates policy, including safety, into weekly Principal Shares where 11 mission success principles are applied in rotation to brief, easily digested focus topics shared via the CNS Y-12 website and discussed during a wide variety of site meetings. Site managers collaborate with the Environment, Safety, and Health (ES&H) and Communication organizations to package safety policy into a prioritized steady stream of relevant communication with the workforce, therefore, maintaining a safe work environment.

CNS outlines its safety and health program for both Y-12 and Pantex in E-SD-2009, *Integrated Safety Management Program Incorporating Worker Safety and Health Program Requirements*, and Y-12 compliance with Title 10, Code of Federal Regulations (CFR), Part 851, is further driven by Y73-010, *Y-12 Safety and Industrial Hygiene Program*. These documents are readily available via the company intranet and leverage the elements of DOE-VPP, as well as ISM core functions, to drive safe operations. CNS sets the foundation of its Y-12 safety program with these documents. In a similar way as their active approach to safety policy, CNS senior leaders emphasize visibility in the field, constant and meaningful exposure to safety concepts during meetings and briefs, and line ownership of safety to keep safety requirements relevant.

CNS Y-12 establishes safety goals from multiple angles, which allows senior leadership to flow down safety expectations, ES&H to push out data-driven safety priorities, and line organizations to highlight area-specific safety needs. Each operational and support organization annually produces a Safety Sustainment Plan (SSP), recognizing the continuing need to maintain momentum from safety gains and avoid stagnation of institutional policy. SSPs allow S&IH to encourage annual focus areas for the entire site to address observed trends or necessary safety improvements in a standard general format. All organizations then adapt those overall safety objectives with area-specific goals. For example, recent SSPs focused on situational awareness, largely in response to observed challenges with hand injuries and motor vehicle incidents. Individual organizations included various response actions and commitments emphasizing situational awareness such as increasing management walkdowns, bringing in subject matter experts (SME) to highlight focus areas during working group meetings and emphasizing use of the "Good Catch" recognition program to showcase positive behaviors. CNS Y-12 senior leadership holds organizations accountable for SSP implementation with periodic scorecards from S&IH reviews to help focus attention towards areas needing improvement and requiring organizations to present and share progress during regular Site Manager's Safety Council meetings. The Team observed ownership of SSP development and implementation when interviewing a variety of line and support managers about safety. Senior leaders also employ performance management to instill goals and objectives for CNS Y-12 to pursue annually. CNS Y-12 managers and staff receive flowed-down performance goals with some discretion to develop area specific objectives, but safety compliance objectives are mandatory. The combination of performance incentive goal setting and paying high attention to SSP implementation allows the contractor to continually keep a focus on safety improvement.

CNS Y-12 incorporates safety and health considerations into both short- and long-term planning. For day-to-day operations, line organizations have embedded S&IH personnel who regularly engage with work planners to support job walkdowns and work package reviews. The Team observed a Production safety team walkthrough of a Beta-2 lithium handling facility process which included S&IH staff assigned to the area. The direct inclusion of safety staff and other key stakeholders in both the pre-job brief and the process walkthrough allowed real-time review of issues and implementation of field process improvements. S&IH also participates in larger scale planning ranging from traffic infrastructure management to production planning. For Y-12 production operations, S&IH has a significant role in evaluating new materials and participating in readiness reviews to support manufacturing and processing changes or new equipment installations. At the Uranium Processing Facility (UPF) construction project, S&IH staff have regular meetings with the project director and are included in construction planning. Annual planning cycles and rolling 5-year planning efforts include ES&H management and are incorporating hiring plans for S&IH personnel considering a notable forecast workload increase.

The plan to split Y-12 and Pantex Plant (Pantex) operations is a notable contrast to regular site activities that has the potential to distract managers and workers. CNS currently operates both sites under a joint contract but has been tasked by the National Nuclear Security Administration (NNSA) to prepare for a split into individual operating contracts with one for each site. Planning for site separation has been in process since 2022. The Team observed serious and thoughtful attention put towards site separation during the Y-12 Town Hall meeting and through discussions with senior leadership. The Team did not hear feedback during the assessment of anxiety or concern from the workforce that site separation would significantly impact safe work. CNS has thus far managed the potential distraction with a clear strategy, including a dedicated website for

frequently asked questions and key date communication, to mitigate impacts that the notable site separation effort may have on normal operations.

During the assessment, the Team explored senior leadership, ES&H department, and line organization perspectives on the adequacy of the safety and health program to support site operations. CNS Y-12 recognizes that it is in the midst of a notable workload increase with continued year-over-year ramp-up expected in the near term. CNS Y-12 has already incorporated hiring of safety professionals, industrial hygienists, and radiological technicians into forecasting to keep up with predicted workload. The ES&H director reported strong support from senior leadership when considering upcoming safety staffing plans, noting that safety would not be compromised in personnel budgeting. The S&IH director noted that the department implements succession planning to mitigate the loss of key knowledge bases. S&IH identifies primary and backup personnel for all programs, and managers regularly consider any expertise gaps when recruiting. S&IH managers also look ahead for potential retirements and pair up staff members with SMEs to prevent knowledge drain. Some ES&H managers noted being at capacity in some areas, requiring prioritization and rebalancing of S&IH resources. For example, some areas are able to cover day to day activities, such as specific document reviews and job walkdown requests, but have limited S&IH staff time remaining for proactive general oversight. CNS Y-12 developed contingency strategies such as Production Safety Team job observations to gain the value of field observations while supplementing S&IH availability. Additionally, safety representatives from the various bargaining units onsite serve as additional eyes and ears in the field, supporting S&IH with field walkdowns, direct worker engagement, and safety issue escalation. Feedback from various line organization managers and staff highlighted availability of S&IH or union safety representatives and no denial of support from the ES&H organization. Additionally, line and safety managers noted ready access to personal protective equipment (PPE) with authority and funding to change or improve PPE when inadequate. Although CNS Y-12 may be at capacity in some safety staffing areas, line organizations are adequately supported with personnel and safety supplies, and staffing for forecast workload is actively being managed with recruiting and succession planning.

CNS Y-12 senior leadership clearly holds line organizations responsible for operations safety as noted in E-SD-2009, Integrated Safety Management Program Incorporating Worker Safety and Health Program Requirements, and the S&IH organization is responsible for providing technical support, program and policy guidance, and safety oversight to operations groups. The Team observed widespread accountability for these roles during assessment interviews and observations. For example, SSPs were frequently referenced by line managers when highlighting proactive ways that their organizations pursue safety excellence. The Site Manager's Safety Council meeting provides a strong opportunity not only to hold group managers accountable for plan development and implementation but also for benchmarking and feedback when presenting them to peer organizations. CNS Y-12 staff, from senior leaders to line workers, consistently expressed both appreciation for S&IH support and a general comfort level providing clear feedback to S&IH staff and holding them accountable when expectations are not met. Senior leaders also provided the Team with examples of efforts to promote communities of practice among safety and line organizations when responding and addressing safety incidents. For example, the Mission Assurance vice-president meets regularly with S&IH to review weekly events. Line supervisors of the areas where events occurred also participate in the discussion, resulting sometimes in immediate actions and line accountability. The recent implementation of the Significant Events Council (SEC) provides another forum for line ownership of safety issues.

Responsible line managers present selected incidents in detail during each meeting, which includes a mix of senior leaders, organization directors, and supporting directors and managers. The responsible managers then field questions and take actions from feedback within the forum. CNS Y-12 leadership also works to empower line organizations in their ownership of safety. For example, the Mission Assurance organization has recently implemented a Serious Injury Reduction Initiative (SIRI) aimed, in part, at improving hazard recognition across all levels of CNS Y-12 staff. Hazard recognition training has already been updated and is rolling out along with future plans to establish a controlled "hazard house" environment for hands-on hazard identification practice. The Team has observed hazard recognition challenges, particularly among line supervisors and workers, at other DOE-VPP sites and encourages the continued pursuit of novel solutions of this issue at Y-12. CNS Y-12 senior leaders recognize that the workforce pays attention to their actions and set priorities. The Team observed successful line ownership of safety responsibilities and understanding of division of roles between safety and line staff.

CNS Y-12 senior leaders lead by example and exhibit a clear presence and focus on safety throughout CNS Y-12's operations. At the highest levels of operations, the chief executive officer, site manager, and deputy site manager regularly conduct field visits to engage with the workforce and "check the pulse" of the CNS Y-12 safety culture. Safety incidents are walked down by one or more senior leaders to ensure adequate attention and response to events while continually calibrating the priorities of line managers towards safety first. In 2023, Y-12 experienced significant safety events, including material ignition incidents and a lost time injury to an employee loading a heavy tool chest into a vehicle. The Team discussed these events thoroughly during the assessment with both senior leaders and responsible managers in the affected areas. Although these events included opportunities for corrective actions in response, the Team noted that senior leadership responded urgently and placed heavy emphasis on followup actions and communication of the incidents for workforce awareness. During the assessment, the Team observed managers performing general area walkdowns and coordinating group walkdowns of specific incidents. CNS Y-12 has been successful with manager engagement using these techniques, due in part to strong and driven senior leaders who have built rapport and equity with directors, managers, bargaining unit representatives, and the workforce in general. Ad hoc manager walkdowns that result in open communication with workers can reveal issues and serve as leading indicators of safety culture shifts. Sustained leadership outreach and involvement, particularly in the event of future position turnover, will be critical to continue successful safety priority communication and regular safety culture assessment in the field. The Team observed a similar emphasis on field engagement from ES&H leaders and directors of various line organizations, showing a culture promoting management visibility and a unified message to the workforce. CNS Y-12 has employed strong methods for communicating senior leaders' safety emphasis out to the organization and receiving valuable feedback on safety from the field, and the site benefits from visible manager involvement in safe operations.

CNS Y-12 bargaining unit leaders and safety representatives also share a common focus on safety and regularly coordinate with senior managers to address safety concerns and promote sitewide safety consciousness. The Team also observed union safety representatives complementing S&IH staff to provide another layer of visible safety emphasis in the field. Dedicated bargaining unit safety representatives can often more easily build credibility among

craft workers than managers, and such positions are a best practice in the DOE-VPP. As union safety representatives at Y-12 serve to cast a wider net for safety observations and concern escalation, their collaborative work with S&IH staff and senior leaders makes employees safer at the site.

CNS Y-12 employees receive communication on site safety beginning in their earliest days of employment. CNS Y-12 holds new employee orientation that includes presentations from both senior leaders and leaders in the S&IH organization. ES&H is also updating General Employee Training (GET) to infuse and update safety elements into the presentations. The Team heard feedback from both S&IH staff and union representatives that a site challenge, particularly with the high volume of new hiring, is orienting new employees to the nuclear safety culture and to work in unique, potentially high-hazard jobs. The Mission Assurance vice-president noted efforts to push new employees in orientation towards overcoming the fear of speaking up to a coworker or supervisor and raising a safety concern. The Team heard various reports of new employees being paired with more experienced staff in their respective work areas to continue job-specific orientation and work area safety indoctrination to things, such as emergency assembly stations. Interviews with new employees in multiple work areas noted an understanding of safety contacts, responsibility to stop working when unsure, and an appreciation for the enhanced safety consciousness that CNS Y-12 emphasizes.

Subcontractors to CNS Y-12 receive orientation to site safety requirements and job-specific hazards and expectations during pre-bid meetings. A preliminary hazard analysis (PHA) is completed when scoping subcontracted work and is included in solicitations and reviewed during pre-bid meetings. Additionally, pre-bid meetings include extensive walkdowns of the work areas with CNS Y-12 stakeholders and prospective subcontractors. Subcontractor technical representatives (STR) and S&IH staff also provide follow-up oversight of subcontractors to reinforce expectations. The UPF construction project is a larger effort and has designated CNS Y-12 staff serving as oversight to Bechtel National, Inc. (BNI), the main UPF construction subcontractor. CNS Y-12 oversight of UPF has a small staffing of safety professionals, but CNS Y-12 staff coordinate closely with BNI safety staff. CNS Y-12 performs assessments of BNI, participates in routine walkdowns and inspections, and flows condition reports of issues to BNI for evaluation and resolution. CNS Y-12 also serves as a liaison between Federal oversight of the UPF project and BNI, giving CNS Y-12 the ability to drive compliance and set priorities. Because CNS and BNI are both Bechtel affiliates, safety expectations and procedural requirements are relatively compatible. The Team observed oversight interactions between CNS Y-12 staff and construction workers during a facility walkdown and noted clear expectations by CNS Y-12 and receptive responses by workers. CNS Y-12 understands the responsibility of bringing subcontractors onsite and setting safety expectations, and the site has clear mechanisms to address safety and hazard controls in subcontracts.

CNS evaluates the effectiveness of its safety and health program at Y-12 using various mechanisms. The Team reviewed the annual DOE-VPP assessment, which noted opportunities for improvement such as continued efforts against personnel contamination, supported by the As Low As Reasonably Achievable (ALARA) committee. SSPs are CNS Y-12's primary mechanism for establishing goals and evaluating program performance. The Team also discussed and observed safety culture survey results distributed within the direct-hire construction organization. Although the results had not yet been fully analyzed and shared by area managers at the time of the assessment, the effort had garnered a good response and was highlighted by

senior leaders. The survey was part of corrective actions responding to recent incidents in the organization, but area leaders saw it as an opportunity to recalibrate assumptions about the group status quo. The construction organization selected a simple set of straightforward multiple-choice questions with the ability to provide written feedback. The results provided managers with focus areas to develop action plans for maintaining a strong safety culture. Discussions with site senior leaders and ES&H noted that safety culture surveys had been performed sitewide in the past but not in recent years. As previously noted, site leaders conduct subjective checks on site safety culture with field walkdowns and direct conversations with workers. However, data-driven analysis of safety culture, particularly with notable personnel turnover in recent years, would provide another facet of actionable input to senior leadership. CNS should consider developing and implementing a regular sitewide safety culture survey at Y-12, including straightforward and easy to understand multiple choice questions and open feedback options tailored to provide data about how CNS Y-12's safety priorities penetrate all layers of the workforce.

**Opportunity for Improvement:** CNS should consider developing and implementing a regular sitewide safety culture survey at Y-12, including straightforward and easy to understand multiple choice questions and open feedback options tailored to provide data about how CNS Y-12's safety priorities penetrate all layers of the workforce.

#### Conclusion

CNS Y-12 leadership is proactive and recognizes the risk of employee stagnation to a strong safety culture. An engaged site management team coordinates with S&IH resources and union safety representatives to seek out opportunities to improve and create new ways to communicate safety as the top priority. Employees at Y-12 voiced pride to work at the site and saw their senior leaders visibly connecting with the workforce and reinforcing safety. CNS Y-12 has found unique ways, such as principal shares, to package safety messaging into consistent and digestible communications. Site managers take recent safety events seriously and push the organization to learn from shortcomings and strive for excellence. CNS Y-12 leaders celebrate safety wins but also understand that complacency reduces diligence and invites distraction, precursors for the next safety incident. CNS Y-12 provides tools and resources to enable line managers to own safe operations and safety professionals to provide technical expertise and oversight. CNS Y-12 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 structuring and operating the safety and health program and in decision making that affects employee health and safety. Employee involvement is a major pillar of a strong safety culture. Employee participation is in addition to the right to notify 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, is crucial, and is welcome. Managers shall be proactive in recognizing and rewarding workers for their participation and contributions. Employees and managers shall communicate and collaborate in open forums to discuss continuing improvements, to recognize and resolve issues, and to learn from their experiences.

Team interviews demonstrated that CNS Y-12 employees are fully aware of their safety responsibilities and look out for their coworkers' safety. Employees feel empowered to pause or stop work for safety concerns without fear of reprisals. New and experienced workers alike expressed that CNS Y-12 is the best place they have ever worked. Many workers stated their morale is very high, working conditions are safe, and their concerns are heard and addressed by CNS Y-12. Workers at all levels of the company stated that they have no concerns about pausing work and raising issues they feel may be unsafe or that are outside the conditions for which the work was prescribed.

Since the 2017 review, the CNS Y-12 employee teams (ET) continue to provide employees with one of several avenues to raise safety concerns. CNS Y-12 prefers that workers raise concerns or questions with their immediate supervisor for efficient resolution. If the issue cannot be resolved at that level, employees are encouraged to elevate it through the chain of command, ETs, or discuss it with one of the union safety representatives. CNS Y-12 sought to improve the efficacy of the ETs, particularly since COVID-19 restrictions were in place. Previously, CNS Y-12 had over 177 ETs. Under COVID-19 restrictions, CNS Y-12 recognized that using video conferencing applications allowed collaboration between team members that were not colocated. They were able to reduce the number of ETs and combine groups that shared common goals without seeing reductions in participation due to location and time availability for workers to attend. CNS Y-12 also implemented changes that allowed craft morning safety briefings to incorporate the ET agenda by making those meetings part of the already established daily meetings. Consolidating meetings and helping workers engage amid busy work schedules improved overall ET participation.

As noted in the Management Leadership section, CNS Y-12 employs union safety representatives who act as dedicated safety advocates not only for union member concerns but supporting the entire workforce. CNS Y-12 also entrusts the union safety representatives to work full-time seeking employee input regarding work conditions and any safety issues identified by the employees. The actions of the union safety representatives also reinforce the craft worker's belief that their concerns are appreciated, and that the worker is supported in raising their concerns. The union safety representatives also work overtime and back shift hours to ensure safe working conditions on all shifts. Interviews demonstrated that the union safety representatives continue to believe their role is to represent all employees at Y-12 and not limit their attention to only union personnel. The Team observed that the union safety representatives are seasoned union workers with strong relationships with employees. For example, Atomic Trades Labor Council (ATLC) safety representatives took ownership of slip simulator training after seeing the value of this experience towards worker awareness of common slip and fall hazards. The Team participated in this activity, in which employees are harnessed and allowed to walk on a low-friction surface and feel the importance of center-of-mass placement and stride technique in such conditions. ATLC safety representatives engaged and eased trainees with humor while also giving strong attention to individual comfort level and health concerns. Their encouragement ensured that trainees from varying organizations benefitted from the unique hazard control experience.

During this review, interviews with union safety representatives demonstrated their continued effectiveness in identifying day-to-day worker safety concerns, encouraging worker input, and reinforcing the value of workers' voices. The Team participated in a post-incident walkdown with Knoxville Building and Construction Trades Council safety representatives and observed manager and worker appreciation for their expertise and input. Interviews also confirmed continued union safety representative involvement in multiple safety committees. The union safety representative's unique perspective gives workers, safety committees, safety professionals, and managers a highly effective partner in safety communication and issue resolution.

The CNS Y-12 Infrastructure organization continues the Proactive Safety Team (PST) model initiated in 2015. The PST monthly meetings are an approach to predicting and mitigating accidents or incidents before occurrence. The PST charter reviews the following three elements at each monthly meeting: (1) multi-discipline infrastructure review of injuries (as required by the established Injury Review Board (IRB)); (2) "Voice from the Floor," which includes a discussion of issues from volunteer workers or union leadership; and (3) proactive assessments or briefings to identify and eliminate potential safety issues. The Team observed two PST meetings and noted the breadth of experience of PST members, their knowledge of the division's history, and their relationship with the workforce. The PST members were well-versed in both organizational needs and employee concerns. For example, the PST received employee input that due to phone restrictions in secure areas, the division had a growing need for more radio availability. Infrastructure workers often work in secluded areas such as roofs or basements. In an emergency, an incapacitated worker's partner must leave them to seek assistance through either landline telephone or security personnel. The PST thoroughly evaluated the situation to determine an appropriate path forward. First, the PST members recognized that more radios would require a greater radio channel capacity, and they implemented a capacity increase. Then, the PST evaluated radio usage and identified that some radio owners had not used their radios in several months, allowing reassignment. The PST's evaluation ultimately resulted in some additional radio procurements, but their thoughtful analysis saved unnecessary expenditures and technical issues. Other PST meeting discussions included implementing radio system changes to improve communications using certain respirator types and piloting new heat stress monitoring techniques. The Team observed CNS Y-12 recognition that Infrastructure initiatives like PSTs and "Voice from the Floor" feedback sessions have value throughout the organization. Through management conduits such as the Site Manager's Safety Council meeting, organization leaders can share good practices to engage their respective employees. The Team heard ES&H staff pilot a new "Voice from the Floor" initiative during the assessment and also observed the Production organization's PST version performing a process walkdown. CNS Y-12 showed the Team that it values opportunities to permeate such employee involvement throughout its organization and makes a proactive effort to expand good practices.

The Infrastructure organization previously published the "Highlights" publication to communicate information associated with the Infrastructure organization to its workforce. During the COVID-19 pandemic, the organization eliminated this publication. CNS Y-12 should consider reinstating the "Highlights" publication online and post it in break areas to advertise the successes of the PST in making positive changes for its workers.

**Opportunity for Improvement:** CNS Y-12 should consider reinstating the "Highlights" publication online and post it in break areas to advertise the successes of the PST in making positive changes for its workers.

The Team also observed Production division processes to improve employee involvement. The Production organization has transitioned to a "tier" system that gathers information from the shop floor level and provides communication methods to flow that input to the first line supervision and ultimately to senior management. Tier 4 includes the line worker, and the process escalates up to Tier 1 senior management. The process ensures communication of issues from Tier 4 and ensures clear language describing the issues reaches as high as Tier 1, when necessary. The Tier system is used in daily meetings to ensure employee involvement and empowerment. The Production organization also adopted the "digital dashboard" that uses the "rail and card" computer tracking system. The system allows for all division Tiers to input their issue updates into the cards for all to evaluate. The Service Now® software system digitally highlights and tracks the issues identified through the Tier escalation process. As a result, the highlighted issues are tracked in real time and updated electronically as developments occur until closure. The Production division also recognized that workers have limited computer access to track the ongoing identified issues. As a result, the division maintains a whiteboard on each shop floor updated daily with in-process issues. The Team observed the efficiency of the tier process software and its ability to highlight ongoing issues and provide daily input and updates on issue resolution. This program could be beneficial to other DOE-VPP participants trying to identify concerns, track those issues real time to closure, and involve all levels of worker and management inputs.

CNS Y-12 implemented the monthly Town Hall Meeting which is led by the site manager with support from rotating organizations. The Team had the opportunity to observe the meeting during the review. The Town Hall Meeting represents an excellent opportunity for the site manager to address developing issues for the company and the workforce in an open forum. During Team observations, the Site Manager recognized individuals and organizations for their successes, discussed safety concerns such as increases in hand injuries, and reviewed all injuries for the prior month. In addition, the Site Manager asked workers to routinely "step back and focus on things that can get us into trouble." He reinforced that workers should feel free to initiate pauses whenever they identify safety concerns with performing their work as described in their work plans. The Town Hall Meeting reaches most of the site personnel virtually and is an effective method for senior management to connect with employees and to ensure the same message reaches all CNS personnel at Y-12 regularly.

CNS Y-12 highlighted its participation in the Department of Defense (DOD) Skill Bridge Internship Program since December 2019. The program transitions active-duty service members within the last 180 days of their active service into temporary work duty at Y-12. The service members are evaluated based on their performance and are considered for full employment upon completion of their internship. From its adoption by CNS Y-12 to this assessment, these activeduty service personnel have an 83 percent hire rate. Interviews demonstrated that the active service personnel were recognized for their work ethic and the experience that they brought to the organization.

#### **Conclusion:**

CNS Y-12 continues to encourage worker input to improve worker safety through employee involvement. CNS Y-12 implemented changes to improve the ET process, increasing worker involvement while reducing the need for additional meetings. CNS Y-12 continues utilizing union safety representatives to ensure craft level worker input is brought to management attention and addressed. CNS Y-12 managers utilize large forums like the Town Hall Meeting to cultivate effective communication with the workforce. CNS Y-12 continues to meet the expectations for Employee Involvement within 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 as work planners use the results of the analysis in subsequent work planning efforts. Effective safety programs integrate feedback from workers regarding hazards and include a system to address newly recognized hazards. Successful worksite analysis also involves implementing mitigating measures during work planning to anticipate and minimize the impact of hazards.

In 2017, CNS Y-12 had established effective programs to analyze the work site for potential safety and occupational health hazards. The safety policy of CNS Y-12 states: "The safety and health of our workers and the protection of public health and safety are paramount in all that we do. We maintain a safe workplace and plan and conduct our work to ensure hazard prevention and control methods are in place and effective." A combination of interviews, document reviews, tours of the site and work observations shows management continues to have an effective system in place to identify, analyze, and correct hazards and has a thorough understanding of all hazardous conditions and practices.

CNS Y-12 continues to use a variety of tools, both management and employee based, to identify, analyze, and correct hazards including Occupational Exposure Assessment (OEA) Teams, Hazard Analysis Teams (HAT), Value Stream Element Tool (VSET), Site Manager's Safety Council, SEC, senior leadership and management walkdowns, Integrated Work Control (IWC) packages, and Job Hazard Analysis (JHA). Additionally, program management continues to imbed safety and industrial hygienists in various organizations around the complex which ensures consistency and enables nearly immediate response to organizational challenges.

CNS Y-12 conducts baseline exposure assessments required by Y73-010, *Y-12 Safety and Industrial Hygiene Program*, and Y73-66-IH-032, *Occupational Exposure Assessment Program*, to identify and control safety, health, and radiological hazards. These procedures establish a safety and industrial hygiene program that reduces the risk of work-related injuries and illnesses for employees and visitors through the reporting, evaluation, analysis, and control of workplace hazards. CNS conducts significantly diverse operations at Y-12, many of which are on a relatively small scale, and maintains an adequate number of certified safety, health, and radiological control technicians to evaluate facilities, procedures, projects, and work tasks for employee risks.

Industrial hygienists conduct baseline qualitative exposure assessments for all activities. Reassessments occur when prompted by changes in activities, JHA, or other IWC documents, and when required for regulatory compliance. Professionals qualified in industrial hygiene (IH), occupational safety, and other disciplines are involved in exposure assessments depending on the identified activity hazard. Exposure assessment policy requires industrial hygienists to follow recognized exposure assessment strategies and protocol and to analyze samples in accredited and certified laboratories. CNS Y-12 IH exposure assessment strategy requires assessors to collect and document information on processes, equipment, materials, exposure agents, key exposure determinants, and adequacy of existing controls.

Industrial hygienists document exposure assessments in the Comprehensive Tracking System (CTS), which is a customized Open Range<sup>®</sup> software application. Industrial hygienists conduct routine assessments in production facilities and throughout the site. Non-routine hazards like beryllium (Be) areas require completion of OEAs. Completion of an OEA identifies hazards, ensures completion of exposure surveys and ensures documentation of results in CTS. Most of the potential exposures involve Be. CNS Y-12 collects more than 3,000 Be breathing zone samples and approximately 10,000 Be surface wipe samples per year. Industrial hygienists use Work Plans to conduct Be hazard assessments. The following examples reflect the effectiveness of the OEA team.

- An employee fitted with an implanted electronic medical device and advised by their doctor to be careful around electromagnetic field (EMF) emitters raised this concern to Occupational Health Services. The OEA team identified induction furnaces within the worker's facility and coordinated with other safety and IH professionals. The OEA team surveyed the furnaces and provided revised control guidelines for EMF hazards. Management initiated a temporary pause in induction oven operations to update and implement controls on JHAs for the EMF hazards.
- An employee requested a review of the PPE used when working with a heat-treat oven to validate the adequacy of the PPE to mitigate hazards. The OEA team assessed the process and identified hazards not specified in the existing JHA or work control documents. Sampling for respirable ceramic fibers indicated that additional engineering controls and PPE would be beneficial to prevent exceeding the applicable occupational exposure limits while manipulating fire brick materials. The HAT developed a new JHA addressing all hazards and work controls.

The IWC process at CNS Y-12 complies with E-SD-2008, *CNS Nuclear Maintenance Management Program*, DOE Order 433.1B, *Maintenance Management Program for DOE Nuclear Facilities*, E-PROC-3122, *CNS Enterprise Integrated Work Control Manual*, HNDBK-0006, *CNS Infrastructure Work Control Planning Handbook* and the principles and core functions of E-SD-2009, *CNS Integrated Safety Management (ISM) Program Incorporating Worker Safety and Health Program Requirements*. CNS Y-12 uses a graded approach, Level I-III, to develop and categorize activity-level work planning and control for all structures, systems, and components (SSC), including corrective, preventive, predictive and modification task work packages. Level I is work performed on SSCs with a credited safety function, high hazard work, or high complexity work requiring detailed instructions and place keeping, ensuring strict procedural compliance. Level II work requires some level of instruction beyond the workscope statement to address hazards and controls. Workers conduct Level III work, sometimes referred as skill of the worker, with no formal instructions or controls beyond a bounded statement of work and can include tasks such as changing light bulbs or fixing toilets.

Employees submit work requests using the Request Work web application which generates a numbered work order. Work requests include a clear explanation of the work, problem addressed, and the impact the problem is creating. Planners screen the work request order to

evaluate its need and adequacy. Planners prioritize work as future, low, medium, high, or urgent. The maintenance planning and control program is a multi-organizational process including the following elements: defining the scope of work, scheduling and coordinating work, analyzing, and controlling hazards, planning work, executing work, providing feedback, and performing Maintenance Root Cause and Maintenance Analysis. The work package is comprised of hazard identification and controls, work instructions, forms, permits, checklists, technical documents, approvals and determinations, and other documents. The work package controls work activities and serves as the record for corrective, preventive, predictive, and modification tasks.

UCN-21575, *Maintenance Pre-job Briefing Checklist*, and UCN-22976, *Maintenance Planner Checklist – Hazard Identification Worksheet (HIW)*, guide planners through initial work hazard identification. Planners coordinate walk downs with work stake holders and SMEs to ensure all hazards are identified and hazard controls are implemented. The HAT evaluates jobs and tasks and assists in the development of JHAs. The JHA consists of a detailed summation of work performed including the boundaries of control, evaluation of work activities, the mechanics of each of these activities, and a review of relevant lessons learned and feedback.

CNS Y-12 has integrated the use of JHA, as described in Y73-045, Job Hazard Analysis, into all aspects of hazard analysis and work control processes including pre-use and pre-start-up analysis. HATs evaluate three distinct elements when identifying hazards: the work environment, the equipment and materials, and the worker. HATs include selected members from ES&H, Operations, Infrastructure, knowledgeable task workers, etc., necessary to properly identify workscope hazards, analyze hazards, and develop appropriate controls for a given job. A JHA initiator starts the process using a HIW. The HIW guides the initiator through work hazard identification and helps select SMEs to support hazard analysis. The site has seven versions of HIWs based on the type of work performed by a specific work group. In addition to using HIWs, the HAT will conduct a walkdown of the area in which the job will be performed. CTS retains a library of approximately 22,000 current, in process, cancelled, and expired JHAs for use as templates or starting points for new work JHAs. Construction group utilizes a Focus 4 Safety (previously a Safety Talk and Risk Reduction Task (STARRT)) Card that encourages employees to participate in a task specific JHA prior to performing work. The workforce throughout the site was knowledgeable of the hazards they faced and were confident they could perform work safely. Workers interviewed indicated that they are involved in work planning and package development. This approach leverages workers' understanding of hazards and their experience mitigating those hazards and exposures. Managers and supervisors seek and listen to workers' opinions and ideas before finalizing work packages or implementing solutions.

CNS Y-12 has a hazard control/compliance verification system for conducting routine, general hazard control and compliance verifications described in Y73-010, *Y-12 Safety and Industrial Hygiene Program.* The system looks for ineffective or missing controls, introduced hazards, or noncompliance issues at intervals appropriate for the risks of the workplace operations. Interviews and observations indicate CNS Y-12's primary system includes S&IH inspections conducted monthly based on a level of hazard at an annual, biennial, and triennial frequency. Other inspections include monthly facility evaluations, construction project inspections, fire department inspections, and Infrastructure Management Watch program inspections. In addition, the system incorporates quarterly Engineering Management walkdowns, monthly PrYde

walkdowns, weekly senior leadership walkdowns, and daily shift manager, building manager and union safety representative walkdowns. Workers conduct JHA, pre-job or pre-startup walkdowns as needed.

While the Team acknowledges inspections are being conducted to provide CNS workers at Y-12 a safe work environment, CNS Y-12 is unable to produce documentation clearly showing satisfaction of the monthly and quarterly inspection requirement of DOE-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 verification shall be conducted at least monthly and cover the entire worksite at least quarterly." Team observations and interviews with employees indicate completion of inspections, but the current system is unable to provide clear validation of inspection completion. Additionally, Y73-010, Y-12 Safety and Industrial Hygiene Program, states work area inspections "should be conducted at a minimum quarterly". CNS Y-12 should review its workplace inspection policies to ensure personnel assigned to conduct inspections document monthly inspections that cover the entire worksite each quarter as required by the **DOE-VPP** Standard.

**Opportunity for Improvement:** CNS Y-12 should review its workplace inspection policies to ensure personnel assigned to conduct inspections document monthly inspections that cover the entire worksite each quarter as required by the DOE-VPP Standard.

The site has established a reliable system for employees to notify management about hazards. The system includes the ability to document and track hazard reports through correction and provide feedback. Employees can report hazards utilizing any of the following methods: contacting the Operations Center (OC) 24 hours a day, seven days a week, their supervisor or manager, or union steward safety representative. Employees can also make a report to their safety and IH building representative, the ES&H Homepage, calling the S&IH Department, or the Employee Concerns Helpline, by name, or anonymously, if desired. Additional information on reporting hazards can be found on the CNS OneSource Webpage, Worker Safety and Health posters posted throughout the complex, the employee handbook, and Employee Concerns posters displayed throughout the site. Interviews validated employees report hazards without fear of reprisal.

CNS Y-12 has an adequate system for reporting and investigating accidents, incidents, injuries, and illnesses, first aid, and near-miss cases that includes written procedures, guidance, written reports of findings, hazard correction tracking, and provisions for preventive or corrective actions. Management shares results of investigations with employees. Supervisors or embedded safety specialists submit first reports of injuries. A safety specialist is tasked to work with the medical clinic, serving as the OSHA recordkeeper receiving firsthand reports of accident and incident data. The data is recorded into the Electronic Medical Business Operating System (EMBOS) database which distributes immediate notifications to applicable personnel. Form

UCN-100039, *Injury/Illness Classification Justification*, the site's OSHA 301 equivalent form, documents classification of injuries and illnesses. CNS Y-12 conducts accident and injury investigations per Y73-170, *Incident Reporting and Investigation*, using form UCN-100030, *Incident Investigation* form. The form provides information about the accident, injury, or illness but does not provide a field for causal determination. CNS Y-12 should revise the UCN-100030, *Incident Investigation* form to include a field for causal analysis.

**Opportunity for Improvement:** CNS Y-12 should revise the UCN-100030, *Incident Investigation*, form to include a field for causal analysis.

Employees report accidents, incidents, injuries, and illnesses to the OC which sends out pager notifications, a technology required because of the cyber security requirements in the protected areas, to the applicable distribution list. Triage of minor injuries occurs at the site's occupational health and safety clinic or onsite by CNS Y-12 Emergency Medical Technicians (EMT). EMTs can also transport minor or seriously injured employees by ambulance to a nearby level one trauma center located five minutes from the site. Personnel document and track accidents and incidents and all personnel can view information related to the accidents and incidents. A medical professional conducts a fit-for-duty exam prior to returning an injured employee to work. The program meets the requirement of the DOE-VPP Standard.

CNS Y-12 utilizes a comprehensive trend analysis program that enables safety advisors to sort through data points, identify specific areas for further analysis, and develop safety campaigns to address problematic areas. The recent Prevention of Hand Injury campaign and the 2022 Slip, Trips, and Falls Practical, Achievable, Understandable, Safety Expectation (PAUSE) were a direct result of using data points from trend analysis to effectively reduce injuries and illnesses. The Safety Performance, Objectives, Measures, and Commitments (SPOMC) specifically requires the reporting of TRC/DART trends. CNS Y-12 generates and transmits a monthly CNS ISM POMC report to NPO. This monthly report contains an ISM Core Function Dashboard chart providing cumulative effectiveness rating colors and trend arrows for each of the five ISM Core Functions. This same data is available for all personnel to review on the Safety OneSource Web page. Additionally, S&IH emails a summary of Injury and Illnesses (I&I), first aid, and nearmiss data which is discussed during All Hands meetings twice a month.

#### Conclusion

CNS Y-12 maintains an adequate workforce of certified safety specialists and certified industrial hygienists, as well as safety and radiological control specialists to identify hazards and assess employee risk. CNS Y-12 has an effective work planning and control system to ensure a thorough understanding and mitigation of hazards encountered during work. The workforce is knowledgeable of the hazards they face and are confident they can perform work safely. CNS Y-12 has developed and implemented organizational SSPs which provides each organization with a roadmap on how to implement meaningful and relevant changes. Field observations, documents, and interviews confirmed that CNS Y-12 conducts workplace inspections, but it needs to ensure documentation of inspections required by the DOE-VPP Standard. CNS Y-12 relies primarily on JHAs, supported by the OEA team, HAT, and the use of HIWs to identify, analyze, and control hazards. CNS Y-12 has an adequate system for employees to notify management about hazards. CNS Y-12 has an adequate system for reporting and investigating accidents, incidents,

injuries, illnesses, first aid, and near-miss cases. The CNS Y-12 has developed and uses a comprehensive trend analysis program which enables applicable safety advisors to develop safety campaigns. CNS Y-12 continues to meet the expectation in Worksite Analysis for participation as a DOE-VPP participant.

#### VI. HAZARD PREVENTION AND CONTROL

The third and fourth core functions of Integrated Safety Management System (ISMS), identify and implement controls and perform work in accordance with controls, ensure that hazards are eliminated by substitution or changing work methods once they have been identified and analyzed or addressed by the implementation of controls to include engineering controls, administrative controls, or PPE. Equipment maintenance processes are also considered to ensure requirement compliance. Additionally, emergency preparedness plans must be implemented to respond to and mitigate the impact of incidents. Safety rules and work procedures must be developed, communicated, and understood by supervisors and employees. These rules and procedures must also be followed by everyone in the workplace to prevent, control the frequency of, and reduce the severity of mishaps.

CNS Y-12 maintains an adequate number of qualified professionals as safety and health resources for workers. S&IH staff include certified industrial hygienists, certified safety professionals, and a fire protection specialist. Interviews with managers and workers raised no concerns about understaffed areas or safety initiatives which could not be implemented due to insufficient resources. Discussions with workers confirmed that qualified professionals and safety technicians are actively involved with job walkdowns and regularly visit work areas, performing observations and monitoring the overall safety climate. CNS Y-12 operation and maintenance organizations work closely with S&IH to plan work activities and eliminate or address hazards and concerns prior to work. Employees have ready access to the information required to work safely, and hazard mitigation focuses on proper identification and elimination of hazards in the workplace, regardless of the activity.

CNS Y-12 also maintains laboratory services to support chemistry analysis, such as sampling performed by certified S&IH staff. CNS Y-12 experienced a period when its laboratory could not provide asbestos analysis for health and safety due to equipment limitations. As an interim solution, CNS Y-12 obtained analytical support from a local contract laboratory. An extent of condition review led to an analysis of their other capability limitations. CNS Y-12 is in the final process of obtaining a Basic Order Agreement Contract that can support Safety and Health, Environmental Compliance, and Waste Management analytical services needs for the next 3 years. The analytical chemistry laboratory has been elevated to a Directorate level with a plan to improve the facilities, equipment, and overall capability. CNS Y-12 recognized the critical importance of laboratory services to the hazard monitoring work performed by S&IH staff and prioritized its organizational and fiscal planning to meet future needs.

CNS Y-12 implements a variety of administrative controls via work control documents. The production organization primarily employs procedures for routine work processes. The Team observed a Production Safety walkdown of a process in the Beta-2 facility. The procedure used during the process had recently been updated to include graphic PPE callout boxes in the margins, which identify PPE combinations for each applicable step as an easy reminder during step-by-step implementation. The area supervisor provided positive feedback about the newly created PPE graphics. Subsequent discussions with other production areas noted that similar improvements were being implemented as procedures were updated throughout the organization. The Team noted the use of PPE callouts as a valuable human performance tool for workers and a best practice among DOE-VPP participants.

The Team observed results of another unique CNS Y-12 application of the hazard control hierarchy. In hilly and difficult-to-access terrain on Y-12 property, vegetation overgrowth required maintenance that presented hazards to personnel such as insect stings or trips and falls. CNS Y-12 opted not to use pesticides due to environmental considerations. Instead, CNS Y-12 released several goats and a dog chaperone within areas bounded by temporary fencing. The goats cleared the overgrowth, thus eliminating the risk to human workers. The novelty of goats performing landscape maintenance also drew positive attention from employees to the CNS Y-12 hazard prevention process and helped highlight CNS Y-12 worker safety commitment and willingness to consider unconventional hazard control methods.

CNS Y-12 employs a variety of safety and health programs that guide 10 CFR 851 compliance and manage work controls for specific processes and hazard types. The Team reviewed the Confined Space program with the CNS Y-12 program owner during the assessment. The program uses CTS to manage confined space inventory and entry permits. The program owner noted an established database of over 3,000 entries for permit-required, nonpermit-required confined spaces, and enclosed spaces with ongoing efforts to refine confined space descriptions for more accurate representation. CNS Y-12 is currently working to transition a set of portable document format (PDF) forms into an "E-Flow" electronic form process that automatically prompts input from required stakeholders during confined space evaluation and permitting. Confined space permit development involves evaluation from S&IH staff, fire department staff, and stakeholders involved in the entry. The permit expires 365 days after issue. Prior to entry, the entry supervisor contacts an S&IH professional, who in turn may reach back to the confined space program manager for additional support, if needed. For ongoing confined space operations, air monitoring is performed prior to entry each day by an industrial hygienist. The S&IH professional performs the task-based evaluation of the confined space. If the database information for a confined space is more than 2 years old, the confined space information must be updated as part of the evaluation. Currently, the confined space program manager and deputy are the only people cleared to update the database for configuration management control. The Team confirmed that confined space identification occurs in the work planning stage and the program ensures appropriate SMEs involvement.

The Team reviewed programmatic controls for temperature extremes with S&IH staff as outlined in Y73-030, Temperature Extremes Program. Supervisors and industrial hygienists utilize JHAs as the primary mechanism for documenting heat stress controls to workers. S&IH staff reference the American Conference of Governmental Industrial Hygienists Threshold Limit Values and Biological Exposure Indices when prescribing controls in alignment with 10 CFR 851. Supervisors and S&IH staff keep workers safe using a variety of controls, including documented Temperature Extremes training and medical qualifications to ensure workers are knowledgeable of heat or cold stress hazards and have routine medical evaluations for working in temperature extremes. JHAs identify general control measures for supervisors to employ such as hydration, co-worker observation, and time-of-day work constraints. Industrial hygienists monitor Wet Bulb Globe Temperature using sitewide meteorological tower data or locally, depending on work demands, looking for conditions that increase risk of temperature-related injury. Industrial hygienists document local monitoring surveys when used. JHAs identify specific controls such as work-rest regimens, physiological monitoring, or heat-restrictive PPE limitations by slight, moderate, or high temperature risk categories. Industrial hygienists determine if ambient temperature and work conditions warrant escalation to moderate or high risk and notify supervisors by pager and email. Supervisors include email notifications in work package

documentation to record use of escalated controls. CNS Y-12 workers and S&IH staff interviewed were knowledgeable of temperature extreme controls, and the Team did not identify concerns with the program.

The Team reviewed the Lock Out/Tag Out (LOTO) program with the CNS Y-12 program owner during the assessment. Role-dependent training, such as issuing authority, service supervisor, authorized employee, and technical resource determines the associated LOTO qualifications of each worker. LOTO training is reviewed by the Senior Review Board (SRB), which includes the SRB Chair, an engineering representative, and an industrial safety representative. SRB activities include workscope review, hazard identification and analysis, and ensuring hazard controls are properly developed, integrated, and implemented. The SRB also ensures safety and technical issues are completely evaluated and resolved to the satisfaction of all stakeholders. LOTO work is coordinated with the supervisor, engineering, and other technical representatives. LOTO for standard operations often uses standing or open LOTO permits. Complex process facilities, such as Building 9212, have a separate team of work planners who ensure proper actions are taken for LOTO in their location. The Team did not observe any issues with the LOTO program.

Electrical issues onsite are often identified through preventive maintenance, information gathered during walk downs, and planning for maintenance processes. CNS Y-12 performs most of the electrical work on deenergized equipment. However, there are exceptions if trouble shooting work is required. For example, flow switches must be adjusted while energized. All energized work requires a preapproved and coordinated Energized Electrical Work Permit (EEWP). CNS Y-12 complies with National Fire Protection Association (NFPA) 70E, Electrical Safety in the Workplace, and work controls. In the past, NFPA 70E was not a main resource for training development. The program has been refining processes and adapting to the use of NFPA 70E requirements to set the new standard over the past 2 years. CNS Y-12 is currently revising and revamping the electrical safety manual. The new manual will reference the NFPA 70E 2021 version, as the site wants to use the most up-to-date procedures. The contractor performed an Arc Flash study in 2018 which resulted in a push to ensure panels were correctly labeled. Class 1 and 2 panels were priority for labeling. The labeling of Class 3 and 4 panels is an ongoing process. The methods used to accomplish electrical work, such as the PPE required, steps used, and approvals obtained, are all dictated by the electrical work permit and the project workflow management (E-FLOW) process. Once the level of work is entered into E-FLOW, it auto populates with the minimum required PPE. Energized work above 40 calories per square centimeter is not allowed at CNS Y-12 in alignment with industry standards. Battery maintenance is an example of energized work which presents unique challenges because of limited ability to deenergize batteries. The majority of the electrical work performed on Site is done with the equipment de-energized and under LOTO. The EEWP brings enhanced scrutiny to the process in response to increased worker risk. The electrical safety program aligns with industry practices and did not present issues during the assessment.

CNS Y-12 recognized the need to examine a variety of work processes and procedures as a result of a large new worker influx in recent years. The Team discussed some resulting work practices updates with CNS Y-12 staff. As an example, workers needed to terminate wiring in a manhole which was controlled as a confined space. Instead of entering the space and risking exposure, a remote-control tool was obtained and used. Past practices would have relied heavily on administrative controls, such as confined space permitting, but CNS Y-12 applied a new work practice that encouraged engineered controls consideration. An E-FLOW improvement that is currently in the works will allow follow-up on work orders and a method to process and audit field work. The adjustments to work processes and procedures creates a safer environment for the workers, while instituting more effective hazard control.

Based on the sheer volume of construction projects on site, the Team chose to assess the Hoisting and Rigging (H&R) process. Critical lifts which require exceptional care in handling because of size, weight, close-tolerance installation, or high susceptibility to damage, as well as lifts using multiple pieces of lifting equipment, require a formal written plan and an appropriate rigging sketch approved by the department manager or designee of the requesting organization and the department manager or designee of the performing organization. The rigging engineer and rigging superintendent are active participants in critical lift planning. The H&R SME is actively involved in the process, attending critical lifts whenever possible. For example, a contractor was onsite doing roof repairs, and the H&R SME participated in and witnessed the lifts over buildings and exposed utilities. Before the lift, the plant engineer sets up an H&R plan with the heavy lift planner ensuring all planning is complete. Plans arrive from the plant side, and a review is set up. By the time the H&R SME sees the plan for review, it is complete. The plan is forwarded to a review board for final approval. Workers are involved in pre-job meeting with the rigging superintendent. Equipment Test and Inspection (ET&I) performs Sling and Rigging inspections, installing, and updating yearly tags. Rigging inspections are not the same as the monthly or daily use inspections. On the construction side, mobile cranes are checked and inspected by an outside vendor. Certified riggers onsite provide inspections for construction related rigging. Critical and Pre-Engineered lifts come through a central point. Pre-Engineered lifts are lifts that are performed many times and have clearly established, step-by-step instructions. The H&R program meets the requirement of the DOE-VPP standard.

The Team was invited to the shipping and receiving operation area to showcase the improvements made to both the area and the overall process. The shipping and receiving operation relocated to K-1065 in 2017 and was met by an uneven gravel parking area which was poorly lit and prone to flooding. The VSET comprised of workers and supervisors, identified and ranked improvement efforts for the area. Thanks to the efforts of the VSET team, the parking area is now well-marked asphalt with large crosswalks. The parking area is currently using light carts and awaiting installation of permanent lighting. Upon relocation to K-1065, warehouse operations needed attention. Incoming materials were placed in any open area in the warehouse, and delivery of materials to the site was inconsistent. At the time, drivers were allowed to pick and choose materials for delivery and rarely departed the area with a full truck. Supervision and workers involved in the processes developed a more effective streamlined process. Incoming materials are checked and placed in color coded areas of the warehouse, ensuring fast identification and relocation. Work and process flows were studied, realigned, and adapted to ensure peak efficiency. Load preparation areas are designated to ensure the loaders have a clean, accessible workspace. All vehicle loaders use forms that illustrate the cargo area of the vehicle to be loaded. The illustration shows package or pallet location, order of loading, and cargo securement points. Supervision verifies everything prior to load movement. The changes implemented via this process reduced the average delivery cycle time to less than 20 hours. During a visit to the warehouse, a Team member attended a pre-job brief. The meeting leader greeted everyone and used a safety share appropriate to the audience, citing an OSHA "Ouick Card" about safe forklift operation. The safety share addressed forklift operation, safety training, and forklift maintenance. The safety share concluded with a reminder about Stop Work declarations, stressing that everyone has the ability, authority, and responsibility to stop work if a serious condition or threat to life and limb were present. The teamwork and excellence displayed by the warehouse supervision and workers in addressing and correcting limiting factors illustrates their commitment and dedication to DOE VPP principles.

CNS Y-12 uses recognition programs to promote positive practices and a safe work environment. The "Good Catch" program was initiated in January 2021. The program is owned by the S&IH section and instituted site-wide. The program initially provided gift cards to the recipients and has since shifted to paycheck-based awards. The program allows for selected individuals (such as Employee Engagement Team members, management, and union representatives) to recognize all employees for a "Good Catch" award. Employees do not need to work directly for the people recognizing for them to be eligible. The reason for recognition must demonstrate actions above and beyond the workers' normal responsibilities. One example given described a group involved in a virtual Teams meeting during COVID-19. A participant in the meeting recognized one of their coworker participants was experiencing a medical emergency online during the virtual meeting. The participant contacted 911 and had emergency services dispatched to the coworker's remote home office for emergency care. Since the inception of the "Good Catch" program in 2019, CNS Y-12 statistics have identified that Employee Concerns submissions for unsafe conditions have dropped significantly. CNS Y-12 identified that the "Good Catch" program provides a direct mechanism for employees to raise concerns and have them corrected immediately versus the administrative approach provided by the employee concern program. The statistics indicate that the employees are more likely to identify safety issues through the "Good Catch" program rather than the using the employee concerns program approach, thereby demonstrating the workers acceptance to the "Good Catch" program. Interviews with various union safety representatives indicated their full support for the program. Observations identified several workers in the utilities section who were apparently unaware of the program. S&IH is aware of the issue and is conducting an awareness program and meetings to ensure managers are aware of and capitalize on the program. To date, CNS Y-12 has awarded approximately 1,200 "Good Catches". Numerous discussions with employees included mentions of the "Good Catch" program and how the program helps reinforce positive behaviors and actions with the information shared company wide. Management meetings include a metric giving a running total by division of the number of "Good Catches" awarded year-to-date by division, which resulted in a healthy competition between the organizations for recognizing their employees' good catches. Recognition programs also include "Spotlight of Excellence" which acknowledges employees who exemplify safety excellence, who make significant contributions to safety outside of their regular duties, or who have more than four "Good Catches". CNS Y-12 recognizes the returns of positive reinforcement, such as the use of programs like Good Catch, towards promoting a healthy safety culture.

CNS Y-12 staff in the mission Engineering Enterprise Reliability and Maintainability (ER&M) organization operate a reliability program that employs strong preventive maintenance (PM) practices and extensive use of predictive maintenance, or condition-based maintenance (CBM), to proactively mitigate equipment failure hazards. The Team observed enthusiasm from the engineering group and clear understanding of the reliability program role in operational safety. The organization heavily emphasizes outward communication to system engineers, facility managers, and technicians as well as PM feedback loops for continuous improvement. ER&M staff issue and present monthly reliability reports for all facilities, updating stakeholders on PM and CBM status, PM changes, reactive and corrective maintenance tasks, PM feedback action status, and other system health topics. Regular "graded approach" meetings assemble reliability

engineers, system engineers, and other stakeholders to review PM and CBM work orders, equipment lists, and bills of material. Reliability engineers also proactively work to ensure that technicians performing PM and CBM work orders are able to work safely. For example, engineers can use the maintenance management system and work order bills of material to pre-kit components needed to complete work and ensure that technicians have the appropriate materials on hand to do the job safely and efficiently. Also, engineering staff will deploy upon the first issuance of a new PM work order to observe workability and quickly address safety or operational issues. The technicians implementing PM work orders also implement strategies to ensure work is performed safely. Technicians perform a workability check of any work orders and will stop if conditions are not as expected. PM work orders also have feedback pages at the end to allow for notes about changes to field conditions or area hazards which could impact future performance. ER&M engineers then review and track these technician notes to complete the feedback loop. PM program staff tightly control work orders to avoid unplanned increases in workscope and introduction of unanalyzed hazards. For example, a new fan added within a confined space prompted an update to PM work order of that fan type to implement confined space hazard controls. ER&M have also implemented proactive engineered controls to address equipment maintenance in Y-12-specific environments, such as remote wiring to enable CBM tests from outside of hazardous areas. The CBM group within ER&M has deployed an extensive range of predictive maintenance techniques and advanced tools, including use of vibration testing in applications like valves and steam traps, optical Reliability Concepts B.A.T. Belt Alignment Tool® checks for belted equipment, RSI Technologies Motion Amplification® to remotely measure motion unseen by the naked eve. The Team considers the CNS ER&M implementation of PM and CBM programs at Y-12 to be a best practice among DOE complex and industry peers based on strong feedback mechanisms, forward-thinking use of technology, and close attention to working hazards while planning maintenance activities.

The Team reviewed CNS Y-12 issues management, assessment, and reporting tools. In the past, CNS Y-12 used site-specific systems for routine business and assurance operations. Assessments, event investigations, issues management, and task management all took place in separate systems; these systems did not share information, allowing room for error, gaps, or lost entries between completed assessment reports and event investigations. In response, CNS Y-12 developed the Tool for Opportunity - Performance Improvement through Communication (TOPIC) system to integrate, consolidate, and replace multiple legacy systems, providing a single, integrated system with simple and efficient processes. TOPIC is a modern, user-designed system that integrates assessments, correspondence, issues, and events applications, offering simple, automated, and efficient processes to make employees' work-lives easier. It consolidates and integrates many previous stand-alone, site-specific legacy systems, while continuing to interface with existing CNS Y-12 legacy applications. The name TOPIC was created by the program team to signify CNS's commitment to:

- Tools Integrating the enterprise via a centralized platform that will allow crosscommunication both internally and externally with the precise level of visibility control,
- Opportunities Creating opportunities via a data warehouse and workflow system to resolve issues more efficiently and provide transparent communication,
- Performance Driving performance excellence via consolidated processes across the enterprise to improve decisions using data analytics,

- Improvement Improving how the enterprise executes safety, security, mission delivery, quality, and cost efficiency via a centralized repository of information and resources, and
- Communication Increasing timely and transparent communication (both positive and negative) of CNS Y-12 events throughout the event lifecycle and beyond.

Training on entry of items into TOPIC is required and is accomplished either online or in person. Once access is granted, anyone can enter items into TOPIC. The program allows individuals to delegate actions. All assessment results, events, reportable incidents, non-compliance, customer feedback, and self-identified issues are tracked in TOPIC.

The S&IH department develops and maintains a robust and well executed PPE program, providing technical guidance and regulatory interpretation as necessary. CNS Y-12 actively performs product reviews to seek appropriate replacements for items that are discontinued, thereby ensuring new products meet standards. The PPE program owner noted efforts to research sustainable and responsibly sourced products, such as recently implemented cut-resistant gloves made from bamboo. The PPE program includes gloves, nonprescription eyewear, safety footwear, coveralls, and protective outerwear. Safety shoes are vendor-supplied on demand, with a shoe counter in the tool crib. Over-the-counter safety glasses are stocked in a variety of styles. An onsite optometrist handles orders for prescription safety glasses. The worker brings in a current prescription, chooses the frames, and the optometrist builds the glasses. The tool crib workers run the infrastructure of the entire entity. Direct-hire construction uses a separate process for PPE, and the programs are integrated using best practices. Larger sites can "silo" operations which could cause issues with PPE use. The CNS Y-12 PPE program works diligently to share information across the site to negate that effect; the program manager performs site walkdowns multiple times per week, as a member of OEA and Be teams. Standardized hazard controls and processes are reviewed at least annually with hazard reviews being part of the prejob process. The glove changeout process-schedule is built into the work procedure, especially if permeation or saturation issues could occur. Evaluation of overlapping hazards, identifying conflicts, and assessing the hierarchy of hazards is currently performed on an ad hoc basis. Conflicts in needs (e.g., the health and safety plan calls for Suit "A" and the rad protection plan calls for Suit "B,") are worked out on a case-by-case basis, ensuring the highest level of protection for workers. Each activity performed on site has a PPE plan driven by the applicable JHA. The Team observed thorough application of the PPE program and positive worker response to questions about PPE use.

CNS Y-12 medical staff consists of an occupational health physician, a lead psychologist, several staff psychologists, a nursing supervisor, and four nurses. The clinical staff consists of a full-time physician, several part time physicians, five full-time nurse practitioners, and several physician assistants. Physical therapists and administration staff round out the personnel. The occupational health staff provides a full-service laboratory onsite, performing blood services and digital X-ray.

Also, the Operations manager is a physical therapist, and the wellness coordinator is a registered dietitian. Each licensed person in the medical department receives necessary continuing education training and credentialling. Case reviews occur every 2 weeks in conjunction with inservice meetings.

Site culture drives an "If you suspect an exposure, report the suspected exposure" attitude. In one instance, a firefighter struck their helmet against insulated piping. Loosened insulation dropped into the firefighter's turn-out gear and fell on the ground when the firefighter doffed the equipment. Every firefighter present reported the potential asbestos exposure. OSHA safety personnel are embedded in the medical area, ensuring accurate reporting of incidents. The site injury review boards meet monthly, and the executive leadership team reviews all injuries bimonthly.

The site houses three wellness facilities, plus satellites at security and fire station. Individual consultation is available. Physical therapists are also athletic trainers, and a registered dietitian is available. The site has a plethora of programming dedicated to wellness. Ergonomic assessments are available via wellness staff. Available programs include, lunch and learn, mothers in the workplace, pregnancy care, virtual yoga, hiking club, running club, soccer, kickball, mindfulness, and a fitness bootcamp which meets regularly. Lectures and lunch and learn sessions are often recorded for reuse. Programs also focus on exercise options designed specifically for office workers. Medical services generally reach out to better support staff instead of being only reactive. They are also capable of conducting human performance evaluations for jobs. For example, a CNS Y-12 site IH was approached by Occupational Medicine concerning an employee with a chronic illness not related to site activities or exposure. The employee's medical provider was concerned about minimizing exposure potential at work. S&IH brought Radiological Control Technicians (RCT), union representatives, and others onboard during the process of identifying possible exposure paths and situations. As a result, and with full cooperation from leadership, the employee's work processes were modified, and the exposure potential was reduced. Employee is currently working the newly developed schedule with success. The medical programs cover a wide variety of areas and are well supported by both employees and management.

Emergency management program elements include drills, exercises, readiness assurance, and facilities. Emergency management has 35 employees with 13 of those serving in the Emergency Operations Center (EOC). Emergency response staff is approximately 400 people. All EOC positions are at least three deep, with consistent training and yearly proficiency requirements, providing a holistic response for the organization. New CNS Y-12 employees receive 3 days of orientation which includes emergency management training. The training public address system announcement was recently modified to include common point of reference locations using familiar buildings. Emergency management conducts a Severe Event exercise once every 3 years. Emergency management authors and coordinates a 5-year exercise plan that includes a yearly chemical hazard exercise. Subcontractor and construction workers are subject to participation in the exercises. The exercise plan covers all known hazards over a 12-month period. All site workers have access to the Building Facility Emergency Plans (B/FEP) in various forms. Every facility has an orange binder containing the plan, and the plan is also available on the site home page. Every employee takes annual B/FEP training. The B/FEP contains evacuation routes, assembly station maps, and building specific information for all facilities. The Team did not observe any issues with Emergency Management program implementation.

#### Conclusion

CNS Y-12 developed processes and work procedures to address and analyze hazards and communicates those processes via training, worker engagement meetings, and company webpage

postings. Managers and workers understand the hierarchy of controls applied to their various work area hazards and feel confident in their ability to talk to certified safety professionals when needed. Managers and safety professional successfully strive to ensure proper PPE access and use for all work needs. CNS Y-12 uses specific worker training to protect workers, reduce dose, and meet schedule deadlines. Workers demonstrate extensive employee involvement in hazard prevention and control by regularly providing solutions to challenging problems presented by hazardous work. CNS Y-12 provides workers with extensive occupational medicine support, incident response capabilities, and opportunities to engage in their own health and wellbeing. CNS Y-12 I&I rates reflect effective hazard prevention and control methods. CNS Y-12 meets the expectations for Hazard Prevention and Control and 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 health and safety shall ensure that personnel understand their responsibilities, recognize hazards they may encounter, and are capable of acting in accordance with management expectations and approved procedures.

The 2023 VPP review determined that CNS Y-12 continues to have a well-established and documented training and qualification program that trains workers appropriately to recognize hazards and protect themselves and their coworkers. Workers at all organization levels understood the hazards they faced daily and could implement appropriate controls. In addition, senior managers provided direction for the CNS Y-12 training and qualification program to ensure that worker training needs are satisfactorily met in accordance with DOE orders and guidelines. Managers were accountable for implementing training commensurate with the hazard levels of respective employees' job assignments. Training and qualifications. Supervisors were engaged in managing and monitoring employee training and could verify that training requirements were current before assigning work tasks. CNS Y-12 provided numerous reminders, postings, required reading subjects, and lessons learned safety topics to encourage site safety awareness and continues to abide by E-PROC-3028, *Enterprise Training and Qualification Program*, which establishes the enterprise training program requirements.

Safety and health training derives from programmatic requirements such as 10 CFR 851, DOE Orders, and corporate initiatives. New employees receive initial GET that includes general safety and health training topics such as: ISMS, Fire Safety and Protection, and Hazard Communication among others relevant topic areas. The Team reviewed the GET training materials and found no issues or concerns. In addition, once employees satisfactorily complete GET training, they are provided with more specific in-depth training at their respective job assignments. The training modules were adequate and provided students with the tools necessary to deploy to their respective work units safely.

CNS Y-12 utilizes the System Application and Data Products (SAP) system as its learning management software. This system is used to manage training requirements, course schedules, bookings for training events, and individual or group qualification status. Training scheduling and much of the reporting functionality is also readily available to anyone with a valid Y-12 computer user identification through a web-based interface. SAP also includes integration capability with other systems such as badge readers, medical record repositories, and administrative qualification checks by supervisors. For example, some areas requiring specific access training will deny badge access to workers with expired qualifications. SAP users expressed satisfaction with the application usability and did not raise any concerns to the Team.

The CNS Y-12 training program adequately satisfied training objectives as required by DOE Orders and other applicable regulations. The training program objectives are met through several different methods, including formal classroom instruction, computer-based training (CBT), and web-based training through the SAP Learning Management System. Employees may also receive on-the-job training (OJT), as well as training through informal means, such as videos, newsletters and safety meetings. The OJT evaluations use an established performance documentation checklist (PDC) developed directly from the associated procedure for an activity. After OJT training is completed, the supervisor evaluates the employee using the PDC to ensure adequate proficiency. Upon successful completion of this evaluation, the supervisor and employee sign the PDC and submit it to the SAP system as part of the employee's training records. This documentation approach ensures OJT completion records are retained by the program for future reference.

The Team observed the CNS Y-12 training organization conduct OJT and evaluations in the following learning subjects while onsite: Fall Protection, LOTO, and Articulating/Scissor Lifts. All training courses observed by the Team were well presented by the instructors and employee interaction was a vital part of the learning experience. Instructors provided real life examples of accidents and mishaps to highlight the importance of doing the work correctly while following all safety procedures and regulations. During the practical portions of the training, instructors clearly explained the skills that students must demonstrate to successfully meet the learning objectives. All students were able to illustrate adequate practical skills and successfully completed the observed OJT evaluations.

The Team also observed the Mechanics of Management (MOM) course designed for managers and supervisors. One of the learning objectives of this course is to provide supervisors with the tools required to actively listen and communicate information effectively to the workforce. During safety and health training module, the instructor demonstrated control of the class and proficiency with the course material. The instructor actively engaged with students during the learning activity by asking questions and awarding small prizes for correct answers. This learning technique was well received by the class and kept the students focused on the course material and engaged in a learning discussion.

Managers, supervisors, and employees may also undergo written examinations, oral boards, or demonstrations of proficiency to test knowledge retention. However, the effectiveness of all training offered to CNS employees at Y-12 should be validated by gathering student feedback following training completion. Regular data-gathering of this sort will help keep training relevant to the current audience and maintain the established continuous improvement culture onsite. The CNS Y-12 Organizational Development and Training Group should formally evaluate training effectiveness and student satisfaction with site training, including online training, by gathering feedback via post-course surveys.

**Opportunity for Improvement:** The CNS Y-12 Organizational Development and Training Group should formally evaluate training effectiveness and student satisfaction with site training, including online training, by gathering feedback via post-course surveys.

A best practice observed by the Team was CNS Y-12 approach to reviewing course material by performing intra-department and cross-department audits of their courses. For example, the Construction group not only audits its own training courses but also invites the Production group instructors to audit Construction training courses and vice versa. This practice allows the course instructors to learn from each other's experiences while keeping the course material as accurate and up to date as possible. The combination of intra-department and cross-department audits and student course surveys will allow CNS Y-12 to improve the feedback loop of the systematic

approach to training and maintain the culture of continuous improvement and sharing of lessons learned.

Another training and knowledge transfer method utilized by CNS Y-12 is Knowledge Preservation Management (KPM), which allows for the documentation of work experiences, lessons learned, and skills from SMEs to be shared with less experienced workers. The KPMs consist of videos and PDF documents accessible to new or existing employees when transitioning to a new job or trying to learn new skills. This process allows CNS Y-12 to "collect and connect" information with the right employees to help workers transition into new roles and responsibilities. Also, some managers assign specific KPMs to new employees as part of their departmental onboarding as job performance aids. To complement KPM knowledge transfer, CNS Y-12 has also developed a talent development strategy to align efforts among all Y-12 organizations and create consistency in an employee development throughout the site. This approach makes used of the following six components to aid in employees' development: (1) classroom study, (2) self-study, (3) coaching, (4) mentoring, (5) job rotation, and (6) special assignments and projects. As part of this process, CNS Y-12 considers where employees want to take their careers and what it would take for them to get there. This development strategy encourages institutional knowledge transfer and creates professional growth opportunity for new workers, thus improving employee retention rates.

CNS Y-12 has also created an "Ambassador Program" where newly hired employees are assigned an "ambassador" or co-worker to help orient them to their new positions. This designated employee is someone who has completed ambassador training and has six months minimum experience at the same organization. The ambassador responsibilities vary with each operating unit. However, at a minimum they must meet with the new employee during orientation and perform periodic check-in visits during the new employee's first 6 months of work. Ambassador duties include showing new employees their workspace, verifying accurate procurement of office supplies, performing initial staff introductions within the working group, and providing the contact cards needed for their lanyards. Ambassadors are also responsible for providing organizational structure information and answering any pertinent questions. Ambassadors are meant to serve as role models to new employees and help them assimilate to the CNS Y-12 culture. This program has been well received by participants and allows new employees to feel welcomed during their first months of employment. CNS Y-12 updates the compliance-training matrix (CTM) with new or revised training courses annually. The CTM lists the primary safety-related courses required for specific jobs. Supervisors working with training officers develop new employee training requirements using the CTM. Additionally, CNS Y-12 uses a job task analysis to determine training requirements beyond GET. During this process, a "Needs Analysis" is performed to develop or identify required training courses to satisfy the employees learning requirements. A checklist based on job requirements is also available for supervisors to evaluate additional training needs.

The training working group (TWG) ensures that safety and health training modules are up to date and required course changes are performed on time. All training courses at Y-12 are evaluated and revised by TWG every three years to ensure that course material reflects the latest industry practices and standards. The TWG reviews the applicability of regulatory and process changes and may revise courses sooner in response. The TWG uses the Training Impact form to evaluate training completeness and ensure appropriate training competency as related to regulatory or procedural changes. CNS Y-12 uses the training impact assessment form when it updates Y-12 procedures to establish appropriate training levels and identify employees that may require training or retraining based on the updates. The resulting training decision can range from no training required, supervisor/SME briefing, classroom training, CBT, or flexible continuing training. This method allows CNS Y-12 to provide employees with the required training material on time and effectively.

CNS Y-12 also assists employees' career growth through established reimbursement policies stipulated in the Educational Assistance Program (EAP). The program specifies that workers can be reimbursed up to \$8,000 dollars per fiscal year for educational expenses. CNS Y-12 has a total of \$1 million per year set aside for workers reimbursable educational expenses under the program. There are a total of 152 employees participating in the program as listed in the following educational categories: five non-degree programs, 22 professional certificates, five vocational training, 11 associate degrees, 36 bachelor's degrees, 70 master's degrees, and three PhD students. In addition to the educational programs above listed, CNS Y-12 also sponsors employees to participate in the Systems Engineering degree program at the University of Tennessee. There are approximately 16 employees participating in the systems engineering program at the time of this assessment. To qualify for any of the CNS Y-12 tuition assistance programs, the course work must be related to Y-12's mission and the student must receive a passing grade for the course. All workers participating in the EAP, including the Systems Engineering degree program are required to achieve accreditation on personal time.

Managers and employees receive training commensurate with their level of responsibility. The SAP learning management system identifies the training requirements for each individual job or position, and documents course completion and retraining due dates of employees. This is done both manually by designated training officers who administer the training database or automatically when employees log-on to online CBT. Also, as part of the training opportunities available at CNS Y-12, employees can take courses at higher learning institutions, technical colleges, vocational schools, and non-degree leading courses of studies.

#### Conclusion

CNS Y-12 continues to have an effective training and qualification program where employees are provided with adequate training and retraining as necessary. The Organizational Development and Training Group has established processes to ensure training and qualification records are current. Training needs analyses are performed in conjunction with job hazard analyses to ensure that employee training needs are accurately identified and met. CNS Y-12 provides numerous reminders, postings, required reading subjects, and lessons-learned safety topics to encourage safety awareness at the site. Managers and employees receive training commensurate with their level of responsibility and experience. The training program derived from programmatic requirements, such as 10 CFR 851, DOE Orders, and corporate initiatives adequately meets the training needs of employees at all levels of the enterprise. In addition to routine safety and health training, CNS Y-12 continues to make investments in training managers, supervisors, and employees as part of their strategic plan implementation. The training program derived from programmatic requirements, such as 10 CFR 851, DOE Orders, and corporate initiatives adequately meets the training needs of employees at all levels of the organization. CNS Y-12 meets the Safety and Health Training expectations for continued participation in DOE-VPP.

#### VIII. CONCLUSIONS

CNS Y-12 continues to seek engaging ways for managers to communicate and connect safety to the workforce. The proactive influence of strong communication and planning has prevented the site separation initiative from becoming a safe work distraction. S&IH professionals and union safety representatives collaborate to ensure that workers are protected from hazards and have a voice to identify issues. CNS Y-12 adequately leverages safety initiatives and good practices at Y-12 from other organizations and contractors onsite to ensure the safety of the workforce. CNS Y-12 takes a thorough approach to hazard analysis and prevention and recognizes that continued improvement is possible through efforts such as the SIRI. Interviewed workers consistently responded with pride about their work at Y-12 and their contributions to a safe work environment. The Team identified some opportunities for improvement that will help CNS Y-12 continue towards excellence in safety and health. The Team did not identify any programmatic noncompliance with DOE safety requirements that would preclude participation in DOE-VPP. CNS Y-12 continues to meet all the expectations for DOE-VPP, and the Team recommends CNS Y-12 continue to participate in DOE-VPP at the Star level.

#### Appendix A: Onsite DOE-VPP Assessment Team Roster

#### Management

Todd N. Lapointe Director Office of Environment, Health, Safety and Security

Christopher J. Roscetti Deputy Director for Environment, Health and Safety Office of Environment, Health, Safety and Security

Kevin L. Dressman Director Office of Health and Safety Office of Environment, Health, Safety and Security

Alfred G. Traylor Director Office of Worker Safety and Health Assistance Office of Health and Safety

#### **Review Team**

Name	Affiliation	Project/Review Element	
Matthew M. Ramsey	DOE/EHSS	Management Leadership,	
Team Leader-in-Training		Hazard Prevention and Control	
Wallace E. Czapla	DOE/EHSS	Worksite Analysis,	
		Recordkeeping	
Moises Atiles	DOE/EHSS	Safety and Health Training,	
Team Leader-in-Training		Management Leadership	
Robert N. Meloche	DOE/EHSS	Hazard Prevention and Control,	
Team Leader-in-Training		Worksite Analysis	
Michael S. Gilroy	DOE/EHSS	Employee Involvement	
Team Leader			
Marvelee Brewer	RSI Entech LLC/Office of Legacy	Employee Involvement.	
	Management	Safety and Health Training	
Coby Moke	Mission Support and Test Services,	Worksite Analysis	
-	LLC/Nevada Nuclear Security Site	Hazard Prevention and Control	
James Buckner	Oak Ridge Associated	Worksite Analysis	
	Universities/Oak Ridge Institute for	Hazard Prevention and Control	
	Science and Education		