



**Independent Assessment of
Construction Safety
at the
Waste Isolation Pilot Plant
for the
Safety Significant Confinement
Ventilation System Project**

December 2021

Office of Enterprise Assessments
U.S. Department of Energy

Table of Contents

Acronyms.....	ii
Executive Summary.....	iii
1.0 Introduction.....	1
2.0 Methodology.....	1
3.0 Results.....	2
3.1 Construction Safety Requirements Flowdown	2
3.2 Construction Safety Requirements Implementation	3
3.3 Industrial Hygiene.....	5
3.4 Contractor Assurance System.....	7
3.5 Field Office Oversight	8
4.0 Best Practices	9
5.0 Deficiencies.....	9
6.0 Opportunities for Improvement.....	10
Appendix A: Supplemental Information.....	A-1

Acronyms

ACGIH	American Conference of Governmental Industrial Hygienists
CAS	Contractor Assurance System
CBFO	Carlsbad Field Office
CFR	Code of Federal Regulations
CRAD	Criteria Review and Approach Document
DOE	U.S. Department of Energy
EA	Office of Enterprise Assessments
FR	Facility Representative
ICE	Issue Collection and Evaluation
IH	Industrial Hygiene
IPT	Integrated Project Team
JHA	Job Hazard Analysis
MSHA	Mine Safety and Health Administration
NFB	New Filter Building
NWP	Nuclear Waste Partnership, LLC
OFI	Opportunity for Improvement
OSHA	Occupational Safety and Health Administration
OWIPP	Office of Waste Isolation Pilot Plant
PPE	Personal Protective Equipment
QR	Quick Response
SME	Subject Matter Expert
SSCVS	Safety Significant Confinement Ventilation System
TIC	The Industrial Company
TLV	Threshold Limit Value
WIPP	Waste Isolation Pilot Plant
WP	Work Package

INDEPENDENT ASSESSMENT OF CONSTRUCTION SAFETY AT THE WASTE ISOLATION PILOT PLANT FOR THE SAFETY SIGNIFICANT CONFINEMENT VENTILATION SYSTEM PROJECT

Executive Summary

The U.S. Department of Energy Office of Enterprise Assessments (EA) conducted an independent assessment of construction safety for the Safety Significant Confinement Ventilation System (SSCVS) capital asset project at the Waste Isolation Pilot Plant from July 19-22, 2021. This assessment evaluated subcontracted construction activities of The Industrial Company (TIC), a subcontractor to the management and operating contractor Nuclear Waste Partnership, LLC (NWP). Additionally, this assessment evaluated oversight of the SSCVS project by NWP and the Carlsbad Field Office (CBFO).

EA identified several strengths, including one best practice:

- TIC uses quick response scan codes that can be scanned with a mobile application and used on work documents (work package instructions, drawings, and specifications) to verify that current versions are used in the field. This user-friendly process ensures that design changes and modifications can be verified in the field during construction. (**Best Practice**)
- NWP effectively flowed down requirements to subcontractors and provided oversight.
- TIC demonstrated a strong commitment to safety and has a mature construction safety program.
- NWP's contractor assurance system provided meaningful feedback to help improve construction safety.
- CBFO's project oversight was effectively implemented using an integrated project team approach.

EA also identified a weakness regarding TIC's recognition and control of industrial hygiene (IH) hazards including silica, noise, concrete splash (eye), and heat stress. Workers can be exposed to harmful levels of these hazards if effective controls are not in place.

In summary, NWP and TIC have developed and implemented a satisfactory construction safety program for the SSCVS construction project; and CBFO has provided effective oversight. NWP and TIC should consider providing additional professional IH resources so that IH hazards are identified and controlled. Until the IH concerns identified in this report are addressed or effective mitigations are put in place, workers can potentially be exposed to the IH hazards mentioned above.

INDEPENDENT ASSESSMENT OF CONSTRUCTION SAFETY AT THE WASTE ISOLATION PILOT PLANT FOR THE SAFETY SIGNIFICANT CONFINEMENT VENTILATION SYSTEM PROJECT

1.0 INTRODUCTION

The U.S. Department of Energy (DOE) Office of Worker Safety and Health Assessments, within the independent Office of Enterprise Assessments (EA), assessed the safety of construction work performed on the Safety Significant Confinement Ventilation System (SSCVS) at the Waste Isolation Pilot Plant (WIPP). This assessment was requested by the DOE Carlsbad Field Office (CBFO). Assessment planning and document collection began in May 2021, and the onsite assessment was conducted on July 19-22, 2021.

Nuclear Waste Partnership, LLC (NWP) is the management and operating contractor for WIPP. NWP manages the SSCVS construction project, with the physical construction work primarily conducted under a subcontract with The Industrial Company (TIC), a wholly owned subsidiary of Kiewit Corporation. Consistent with the *Plan for the Construction Safety Assessment at the Waste Isolation Pilot Plant Safety Significant Confinement Ventilation System, July 2021*, this assessment evaluated NWP's implementation of DOE requirements to control construction hazards associated with SSCVS work activities. During the onsite portion of this assessment, TIC self-performed all construction work with the exception of the mixing and delivery of concrete to the worksite, which was performed by a TIC subcontractor. EA also reviewed NWP and CBFO oversight of the SSCVS construction work activities.

The SSCVS project, scheduled to be completed in 2025, will be the largest confinement ventilation system among DOE facilities and will provide an air supply system designed to run continuously in unfiltered or high efficiency particulate air (HEPA) filtration mode. The system will provide approximately 540,000 cubic feet per minute (cfm) of air to the underground transuranic waste repository, significantly more than the 170,000 maximum cfm provided by the current ventilation system. The SSCVS project includes two primary buildings, the Salt Reduction Building and the New Filter Building (NFB), as well as support facilities, such as the Fabrication Building and emergency generators.

2.0 METHODOLOGY

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

As identified in the assessment plan, this assessment considered selected objectives and criteria from within criteria and review approach document (CRAD) EA-32-10, Rev. 0, *Construction Safety*. Additionally, criteria from DOE Guide 226.1-2A, *Federal Line Management Oversight of Department of Energy Nuclear Facilities*, Appendix D: *Activity-Level Work Planning and Control Criterion Review and Approach Documents with Lines of Inquiry*, was used to assess the development of activity-level work control documents regarding the five core functions of integrated safety management. EA also used elements of CRAD EA-30-07, Rev. 0, *Federal Line Management Oversight Processes*, to collect and analyze data on DOE field office oversight activities related to construction safety. EA also used selected objectives and criteria from CRAD EA-32-03, Rev. 1, *Industrial Hygiene*, and CRAD EA-30-01, Rev. 1, *Contractor Assurance System*.

EA examined key documents, including contracts, work packages (WPs), procedures, manuals, analyses, and training and qualification records. EA also interviewed key personnel responsible for developing and executing the associated programs. The members of the assessment team, the Quality Review Board, and management responsible for this assessment are listed in appendix A.

There were no past findings for follow-up during this assessment.

3.0 RESULTS

3.1 Construction Safety Requirements Flowdown

The objective of this portion of the assessment was to verify the flowdown of DOE construction safety requirements through contract documents, implementing procedures, and oversight mechanisms.

DOE construction safety requirements specified in contract documents are appropriately flowed down from DOE to NWP, to TIC, and to TIC's lower-tier subcontractors. The DOE contract with NWP includes appropriate requirements related to construction safety, integrated safety management, occurrence reporting, whistleblower protection, stop-work authority, and DOE Guide 440.1-8, *Implementation Guide for Use with 10 CFR Part 851, Worker Safety and Health Programs* (the guide is a requirement of the contract). NWP adequately flows down these DOE contract requirements into its subcontract with TIC. Additionally, the NWP subcontract with TIC includes instructions on how to implement the contract and 10 CFR 851 requirements, and addresses TIC responsibilities with respect to NWP construction safety oversight. This approach provides clear contract direction to TIC. Further, TIC flows down its construction safety requirements to lower-tier subcontractors to ensure that all applicable DOE and NWP contract requirements are specified. For example, TIC's *Subcontract Agreement No. 7200007052104803, NWP WIPP SSCVS*, with Tindall Corporation for the installation of precast concrete walls properly flows down the appropriate construction safety requirements related to Tindall's work scope.

Further, TIC contract requirements are appropriately institutionalized through implementing procedures. TIC has effectively established its procedures to meet the construction safety requirements of its contract with NWP; these procedures were approved by NWP. For example, A-GN-ML-001-104627, *Kiewit Energy Group Safety Manual* (with hyperlinks to corporate TIC forms and procedures), and SA-GN-ML-002-104627, *WIPP SSCVS Project Site Specific Safety Plan*, provide adequate instructions to TIC employees to implement safe work practices.

Finally, NWP has established robust oversight mechanisms for ensuring that its subcontractors implement construction safety requirements. These mechanisms include real-time oversight of construction work by project subcontractor technical representatives, frequent walkthroughs by project managers and safety professionals, and analysis of safety performance metrics.

Construction Safety Requirements Flowdown Conclusions

The DOE contract with NWP includes appropriate construction safety requirements, which are effectively flowed down to lower-tier subcontractors. TIC has effectively implemented contract requirements through established procedures and appropriately flows down TIC construction safety requirements to lower-tier subcontractors to ensure that all applicable DOE and NWP contract requirements are specified. NWP has also established robust oversight mechanisms for ensuring that its subcontractors implement construction safety requirements.

3.2 Construction Safety Requirements Implementation

The objective of this portion of the assessment was to verify that TIC and a TIC subcontractor meet construction safety requirements in the development and implementation of WP content and in the performance of general construction work.

Work Package Content and Implementation

WPs developed by TIC appropriately addressed work scopes and job hazard analyses (JHAs). WP scopes were properly defined to cover observed work activities. Each WP identified the appropriate hazards and controls on a “long form” JHA. JHAs are prepared in the field by TIC superintendents or foremen prior to starting work, reviewed weekly with work crews, and updated as needed, resulting in accurate and current WPs. In addition, quick response (QR) codes are included on WP instructions, drawings, and specifications, and can be scanned with a mobile application to assure the user of the current, authorized version. Every page of the WP contains a QR code, and scanning the code displays a green checkmark if the page is current, or a red “X” if it is not. This user-friendly process ensures that design changes and modifications can be verified in the field during construction. **(Best Practice)**

TIC hazard controls (identified in WPs) for observed work were effectively implemented through mini JHAs, pre-job briefs, and work performance. Mini JHAs are written at the start of each work shift to describe the hazards and controls of tasks being performed. Each work crew develops, reviews, and signs its own mini JHA using the *Kiewit Life Saving Actions Verification Book*, ensuring that the entire crew is familiar with job-specific hazards. Mini JHAs are generated or revised any time during the shift as new tasks are assigned. Hazards recognized by others or hazards created by adjacent work are added to the mini JHA. Two examples illustrate this effective work performance:

- While a work crew pulled new power cables through a confined space, a water leak occurred in an adjacent fire main excavation. When the new response crew arrived to stop the water leak, they coordinated with the work crew that was pulling the cables to identify and document the co-located hazards and required controls. The mini JHAs for the work in the excavations were appropriately updated to address all hazards.
- When additional structural supports were installed for a cable tugger (a device used for exerting a pull force on a cable), a mini JHA was appropriately completed for the revised scope of work.

TIC hazard controls identified in mini JHAs were adequately addressed during pre-job briefs, and safety concerns were appropriately addressed during work performance. Pre-job briefs were thorough and appropriately focused on hazards and controls. Observed work was appropriately paused or stopped each time there was a safety concern. All interviewed craft and field supervisory personnel understood that they could stop or pause work when they had a concern without fear of reprisal. Workers independently expressed that their safety concerns are appropriately addressed by management. Safety concerns identified by TIC and NWP safety staff were promptly addressed, indicative of a positive safety culture.

General Construction Performance

The following discussion addresses specific evaluations of excavation work, confined-space entries, hoisting and rigging, crane safety activities, fall protection planning, and material handling, along with select Occupational Safety and Health Administration (OSHA) standards invoked by 10 CFR 851.23.

Excavations (29 CFR 1926 Subpart P)

Observed trenching and excavations were conducted in compliance with the requirements of 29 CFR 1926 Subpart P. Excavations around the site were enclosed with barricade rope with adhesive labels identifying the hazards for each excavation. Excavated soil was placed more than the required two feet from the trench, and the excavations were appropriately sloped to eliminate the potential for cave in. Access by ramp was adequate for safe entry and egress. Trench inspections were performed by a trained excavation-competent person prior to entry, in accordance with 29 CFR 1926.651(k)(1), and documented on the TIC inspection form.

Confined Spaces in Construction (29 CFR 1926 Subpart AA)

Observed confined-space entries were conducted in compliance with the requirements of 29 CFR 1926 Subpart AA regarding permitting, air monitoring, and access and rescue arrangements. TIC confined-space entry forms adequately captured the data needed to confirm that entries were properly categorized as non-permit entries. Air monitoring was appropriately conducted with a four-gas meter prior to entry to confirm acceptable entry conditions, and readings were documented. Workers entering the confined space wore air monitoring devices to provide continuous monitoring of the confined-space atmosphere as required by OSHA 29 CFR 1926.1203(e)(2)(vi). Ladders were installed and tied off at the top to provide safe access and egress to and from the confined space. A rescue retrieval device was immediately available for use at each space to support the rescue plan, which included rescue support from the WIPP fire department, if needed.

Hoisting and Rigging (29 CFR 1926.251 & Subpart CC)

Observed hoisting and rigging were conducted in compliance with the requirements of 29 CFR 1926.251 and Subpart CC associated with rigger training, and equipment inspections and labeling. Training records confirmed that observed hoisting and rigging activities were performed by level 2 certified riggers. Level 2 riggers properly inspected rigging prior to use, made crane connections to the load, and gave direction to the crane operator. All lifting devices EA observed, including wire rope slings, spreader bars, and specialty fixtures for lifting custom-fabricated wall forms, were clearly labeled with maximum lifting capacities per OSHA requirements. Also, observed wire rope slings were properly affixed with permanent labels stating size, rated capacity for the types of hitches used, leg angle, and number of legs.

Cranes in Construction (29 CFR 1926 Subpart CC)

Observed work involving crane safety was conducted in compliance with the requirements of 29 CFR 1926 Subpart CC with respect to operator qualifications, crane inspections, and lift plans for safely lifting loads (e.g., rebar, wall forms, tools, and supplies). The crane operator was appropriately certified by the National Commission for the Certification of Crane Operators. Daily crane inspections were appropriately documented on iPad forms for each crane. The annual crane inspection for the crane complied with the requirements of 29 CFR 1926.1412(f) and confirmed that the crane was safe to operate. This crane had the required load capacity chart properly posted in the cab. The WP for safely lifting a wall form included an appropriate written lift plan with vendor-provided calculations. TIC provided supplemental information in the lift plan on rigging, line loads, and the maximum working radius for the crane used with multiple concrete form configurations. Ordinary lifts, as defined by DOE STD-1090-2011, *Hoisting and Rigging*, were adequately documented on a daily lift plan completed by the crane operator, which properly included total load weight, planned swing radius, and a calculation of the percentage of crane capacity being used. Crane swing areas were appropriately barricaded to prevent access.

Fall Protection (29 CFR 1926 Subpart M)

No work activities requiring the use of fall protection were observed; however, EA reviewed four fall protection permits for WP IWP-STR-WAL-048, *NFB Cast in Place Lower Wall Pour KDI WP*, which were adequate. One TIC permit adequately addressed fall hazards through use of a pre-installed walkway on the formwork prior to lifting the form into place. Rescue plans were properly included on each fall protection permit. Fall protection equipment is required to be inspected by the user prior to use per 29 CFR 1926.502(d)(21). Additionally, Corporate Safety Manual SA-GN-ML-001-104627, *Fall Protection Procedure*, section 4.9.2, imposes a quarterly inspection of fall protection equipment by a competent person. However, TIC could not provide evidence that quarterly inspections had been conducted or documented for this project. (See **Deficiency D-TIC-1.**) Although not required by OSHA, this TIC requirement, if implemented, can identify and prevent the use of defective fall protection equipment.

Material Handling & Material Handling Equipment (29 CFR 1926 Subpart H & 1926.602)

Observed material handling and material handling equipment operation were conducted in compliance with the requirements of 29 CFR 1926 Subpart H & 1926.602. Material storage, powered industrial truck (PIT) and equipment operation, and PIT operator training were adequate. Staged materials, such as rebar, base mat, lumber, and concrete forms stored around the site, were safely stored and stacked to prevent movement. The stored materials were appropriately roped off to eliminate a tripping or striking hazard. To limit manual handling or moving of material, TIC primarily used a rough-terrain PIT to safely move material around the site and place material close to the work activity. Spotters were observed guiding the PIT operator and concrete delivery trucks, when needed. Training documentation for the PIT operator was satisfactory.

Other Construction

Walking and working ground surfaces were continuously maintained to prevent slips, trips, and falls. Observed small, portable generators that provide power to the construction site were fitted with the required grounding and ground-fault circuit interrupters when in use.

Construction Safety Requirements Implementation Conclusions

TIC has effectively implemented a mature construction safety program, with one exception. Work is satisfactorily planned, performed, and overseen by a competent, experienced, and trained workforce. Workers were observed stopping or pausing work to address safety concerns at the construction site. The excavation work, confined-space entries, hoisting and rigging, crane safety activities, fall protection, and material handling that EA observed were compliant with OSHA requirements. However, quarterly fall protection equipment inspections required by TIC are not being performed.

3.3 Industrial Hygiene

The objective of this portion of the assessment was to verify that TIC and a TIC subcontractor identify and control industrial hygiene (IH) hazards associated with work involving concrete pours, concrete chipping and drilling activities, and other activities.

Concrete pour WPs were inadequate and contributed to the IH deficiencies noted below. Concrete pours were appropriately conducted overnight to avoid the anticipated daytime high temperatures and potential heat-stress levels. Temporary lighting used around the site satisfactorily illuminated the work area for the night concrete work. The JHA identified the concrete splash hazard and specified personal protective equipment (PPE) including the use of safety glasses and face shields. Workers performing the pours were

properly protected by PPE including eye protection, face shields, and gloves. Tape was used to seal boot tops to prevent skin exposure to splashing concrete, which is caustic and can cause skin burns. However, several weaknesses regarding the identification and control of IH hazards were observed associated with concrete pours, chipping and drilling activities, and other sitewide activities as identified below. (See **OFI-TIC-1.**)

- During an observed concrete pour, no eyewash station was available in the work area for immediate emergency use. Face shields, worn by the pour crew in close proximity to the discharge hose, were nearly covered in concrete splashes from as far as 20 feet from the pour, which represented a potential eye exposure to caustic concrete. Small eyewash bottles were observed in the work area in the event first aid was needed for concrete splashed into an eye. However, the eyewash bottles were not listed as a control on the JHA. Also, eyewash bottles do not meet the American National Standards Institute Z358.1, *Standard for Plumbed and Portable Eyewash Stations*, as specified in the OSHA interpretation of 29 CFR 1926.50 (g). Lack of adequate eyewash facilities could result in eye injuries from the concrete splash hazard. (See **Deficiency-D-TIC-2.**)
- TIC did not identify and analyze vibration hazards associated with the use of concrete vibrators in the concrete pour WP JHA or the mini JHA per the *Kiewit Energy Group Safety Manual*, and did not evaluate exposures in relation to the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV). In addition, workers did not use any controls to mitigate potential vibration hazards, such as anti-vibration gloves and rotation of workers exposed to the vibration hazard. Lack of a hazard analysis associated with the concrete vibrators could result in potential harmful exposures to hand, arm, and whole-body vibration. (See **Deficiency-D-TIC-3.**)
- TIC work controls for concrete drilling and chipping activities and post-work cleanup activities (i.e., blowing dust off clothing after drilling holes) did not appropriately implement TIC's SA-GN-ML-001-104627, *Industrial Hygiene Procedure*.
 - TIC has not developed a monitoring/mitigation plan to evaluate and control silica dust.
 - There is no evidence that silica monitoring has been performed using ACGIH TLV for silica as required by 10 CFR 851.23(a)(9).
 - Of three WPs reviewed, none adequately addressed silica hazard controls; one did not address dust controls, and two allowed use of pressurized air to blow dust from drilled holes.
 - Potentially exposed workers did not wear respiratory protection from silica dust.

Without appropriate silica occupational exposure assessments, sufficient controls to protect workers from the work activity exposures to silica dust cannot be properly identified nor can controls be confirmed as effective, which could result in potential overexposures to silica. (See **Deficiency D-TIC-4.**)

- Safety personnel are not using appropriate techniques and equipment to monitor heat stress. TIC relies on a phone application instead of an appropriate wet bulb globe thermometer and does not identify when to implement the ACGIH work-rest cycles, thereby increasing the potential for heat-related illnesses. TIC's SA-SP-PR-112, *Heat Illness Prevention*, does not provide clear instructions for monitoring temperature and humidity indices per ACGIH methods, including consideration of clothing worn, and for implementing work-rest cycles to meet required ACGIH Heat Stress TLVs. (See **Deficiency D-TIC-5.**)
- Safety personnel did not use proper equipment for monitoring noise hazards. A cell phone application was observed being used to determine the noise level of a power generator, contrary to TIC's procedure SA-GN-ML-001-104627, *Industrial Hygiene Procedure*, sections 4.6.2.3, 4.6.3, and

4.6.7.1. The TIC IH procedure requires the use of calibrated noise-measuring instruments to evaluate noise-generating equipment and work activities against the ACGIH noise TLVs to determine exposures and controls, such as hearing protection and signage. The cell phones are not calibrated noise-level meters or dosimeters and are not adequate to accurately determine occupational noise-exposure levels. Noise hazards will increase as construction progresses with work in enclosed areas and additional use of power tools that could result in exposures over the ACGIH TLV without proper monitoring. (See **Deficiency D-TIC-6.**)

Industrial Hygiene Conclusions

TIC implemented several good controls during the concrete pours, including the use of proper PPE for splash hazards and scheduling work at night to avoid potential heat-stress periods. However, TIC has not implemented an effective IH program, as demonstrated by identified weaknesses in the occupational exposure assessment and control of eye, silica, heat-stress, and noise hazards.

3.4 Contractor Assurance System

The objective of this portion of the assessment was to verify that NWP has established a contractor assurance system (CAS) to acquire feedback information, identify and manage construction safety issues and associated corrective actions, and analyze CAS results to provide feedback on the adequacy of controls and continue to improve safety management.

NWP has implemented an effective CAS for identifying issues and providing feedback and improvement input for its construction safety programs. Construction safety program and performance issues are captured from internal and external feedback sources, including results from NWP environment, safety, and health walkthroughs; quality assurance program audits; assessments; management observations; and CBFO surveillance and observational awareness tours of the SSCVS construction site. Issues identified from these internal sources are entered into the DevonWay issues management software system, where they are effectively tracked and trended. Additionally, external observations garnered from quarterly Mine Safety and Health Administration (MSHA) inspections are also captured in DevonWay. MSHA citations categorized as “Significant and Substantial” are tracked and trended as a key performance indicator and discussed during monthly NWP management meetings. Although environment, safety, and health walkthroughs provided timely feedback on most construction safety issues, IH issues that EA identified in this assessment were not being captured effectively.

Results of NWP and CBFO feedback were appropriately categorized to ensure that problems are evaluated, reported, and corrected on a timely basis. EA observed that most construction safety issues identified during internal walkthroughs by NWP and TIC personnel were corrected on the spot. Even though they were corrected immediately, these issues were still entered into DevonWay to facilitate trending efforts to effectively improve performance. A review of 65 construction safety issues related to the SSCVS project, entered into DevonWay since December 2020, determined that 12 (18%) were currently being corrected and 53 (82%) had been effectively closed. None had overdue corrective actions.

Contractor Assurance System Conclusions

NWP has an effective CAS to assure NWP and CBFO management that SSCVS construction project work is being performed safely and in compliance with requirements; that risks are being identified and managed; and that work control systems are effective and efficient. Construction safety issues identified through feedback sources are effectively captured in the site issues management system for tracking and

trending. CAS results are effectively used to improve construction safety performance; however, some IH issues identified in this assessment by EA were not being captured.

3.5 Field Office Oversight

The objective of this portion of the assessment was to assess the CBFO oversight process for overseeing construction safety for the SSCVS project and the implementation of specific CBFO programs, including assessments, operational awareness activities, and issues management. The Office of Waste Isolation Pilot Plant (OWIPP) is one of six staff offices that reports to the CBFO Manager and is responsible for providing occupational safety and health oversight for the contractors involved with construction of the SSCVC project as described below.

DOE/CBFO-09-3442, *CBFO Integrated Safety Management System Description*, effectively describes how the principles and core functions of integrated safety management are implemented by CBFO to ensure that construction work is performed safely at the SSCVS site. WI UVS NFB 006, *Integrated Project Team (IPT) Charter for the Waste Isolation Pilot Plant Line Items*, 15-D411, *Safety Significant Confinement Ventilation System*, defines the Federal oversight relationship between CBFO and the Federal Project Director (FPD), who is charged with overseeing the SSCVS construction project. Through the IPT, the CBFO (OWIPP) Assistant Manager provides the FPD with a cadre of experienced and qualified Facility Representatives (FRs) and subject matter experts (SMEs). The FPD has effectively leveraged these resources from CBFO to conduct field observations and perform periodic reviews and assessments of project performance and status against established performance parameters, baselines, milestones, deliverables, and requirements.

The OWIPP Assistant Manager schedules FRs and SMEs to conduct regular site operational awareness field observations of the construction site with an NWP project subcontractor technical representative. EA observed that safety and/or health concerns identified during these joint walkthroughs were immediately communicated to TIC safety management and entered into the field office Issue Collection and Evaluation (ICE) system. Additionally, EA observed that a referral for IH support from the OWIPP Safety and Health Division was promptly relayed when concerns about the control of silica-containing dust were identified. Safety and health concerns that are identified during field observations are reported the following morning during the daily tactical meeting attended by senior CBFO leaders.

The COVID-19 pandemic presented challenges to the completion of Federal oversight activities. On August 2, 2020, the CBFO Facility Oversight Division Director issued *OWIPP Plan and Expectations for Conducting Oversight on Waste Isolation Plant Project (WIPP) Construction Projects*. This document instructs oversight staff to attend plan-of-the-day and plan-of-the-week meetings, attend ad hoc safety meetings, conduct work planning and execution field observations, and effectively direct the oversight activities of the FRs and SMEs within a minimum onsite staffing framework.

The OWIPP Safety and Health Division mine safety specialist accompanies MSHA inspectors on unscheduled quarterly safety and health inspections and ensures that all citations and corrective actions are tracked through conclusion in the ICE issues management system. By incorporating these external Federal oversight results into the issues management system, CBFO has more data to use in tracking safety and health issues, and targeting effective corrective action towards higher-risk activities. The CBFO issues management system, ICE, and the NWP issues management system, DevonWay, are two separate and distinct systems that do not interface with each other. CBFO plans to migrate the ICE issues management system into DevonWay beginning in the first quarter of fiscal year 2022. This migration will improve the coordination of issues management at the project.

CBFO OP 5.9, 1, *Facility Representative Duties, Responsibilities, and Routine Activities*, is consistent with DOE-STD-1063-2017, *Facility Representatives*, and adequately describes FR duties, responsibilities, and authorities. The FRs are well integrated into NWP construction activities and have open lines of communication to resolve issues as they arise. The FR activity reports document critical results of daily operational awareness activities at SSCVS and are included in the quarterly assessment reports reviewed by management.

The current amount of oversight by the FR and SMEs is sufficient for the SSCVS project. CBFO currently has one FR providing an average of 10 hours of oversight to the SSCVS and one newly hired FR working remotely and completing qualifications. CBFO is aggressively working to fill two open FR positions with one of the FRs to augment current oversight as additional construction projects begin to ramp up by the middle of fiscal year 2022.

Field Office Oversight Conclusions

CBFO provides qualified and experienced FRs and SMEs through the IPT framework to conduct Federal oversight of the SSCVS project construction safety. These FRs and SMEs are scheduled to conduct operational awareness activities, and the results of these activities are tracked and trended in an issues management system. EA observed that FRs and SMEs maintain clear and open lines of communication with NWP, which results in effective resolution of issues.

4.0 BEST PRACTICES

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

QR codes included on WP instructions, drawings, and specifications can be scanned with a mobile application to inform the user whether they are using the current, authorized version for use in the field.

5.0 DEFICIENCIES

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

The Industrial Company

Deficiency D-TIC-1: TIC has not conducted inspections of fall protection equipment by a fall protection-competent person on at least a quarterly basis. (SA-GN-ML-001-104627, *Safety Manual*, Fall Protection, section 4.9.2)

Deficiency D-TIC-2: TIC did not provide an eyewash station that meets American National Standards Institute Z358.1 requirements. (29 CFR 1926.50(g))

Deficiency D-TIC-3: TIC did not identify and analyze vibration hazards (associated with the use of vibrating tools) in concrete pours. (10 CFR 851.21(a)(1) and 851.23(a)(9))

Deficiency D-TIC-4: TIC has not adequately implemented proper monitoring and controls for silica exposures. (SA-GN-ML-001-104627, *Industrial Hygiene Procedure*; 10 CFR 851.21(a)(1); 10 CFR 851.23(a)(9))

Deficiency D-TIC-5: TIC has not developed and implemented an adequate heat-stress procedure that implements the required ACGIH heat-stress TLVs. (10 CFR 851.23(a)(9))

Deficiency D-TIC-6: TIC did not use calibrated sound-level monitoring equipment to conduct occupational exposure assessments of potential noise hazards. (10 CFR 851, appendix A, *Industrial Hygiene*, section 6(a); SA-GN-ML-001-104627, *Industrial Hygiene Procedure*, sections 4.6.2.3, 4.6.3, and 4.6.7.1))

6.0 OPPORTUNITIES FOR IMPROVEMENT

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

OFI-TIC-1: TIC should consider providing additional professional IH resources to focus on the implementation of IH programs and identified IH weaknesses at the SSCVS project, including requesting corporate IH support for the project.

Appendix A Supplemental Information

Dates of Assessment

Onsite Assessment: July 19-22, 2021

Office of Enterprise Assessments Management

John E. Dupuy, Director, Office of Enterprise Assessments
William F. West, Deputy Director, Office of Enterprise Assessments
Kevin G. Kilp, Director, Office of Environment, Safety and Health Assessments
David A. Young, Deputy Director, Office of Environment, Safety and Health Assessments
Kevin M. Witt, Director, Office of Nuclear Safety and Environmental Assessments
Charles C. Kreager, Director, Office of Worker Safety and Health Assessments
Jack E. Winston, Director, Office of Emergency Management Assessments
Joseph J. Waring, Director, Office of Nuclear Engineering and Safety Basis Assessments

Quality Review Board

William F. West
James W. Lund
Thomas C. Messer
Michael A. Kilpatrick – Advisor to the Board

Office of Enterprise Assessments Assessors

Harrichand Rhambarose – Team Lead
Charles C. Kreager – Assistant Team Lead
David Olah
Terry E. Krietz
Daryl D. Magers