

**Office of Enterprise Assessments  
Assessment of Work Planning and Control at the  
Waste Isolation Pilot Plant**



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**Office of Worker Safety and Health Assessments  
Office of Environment, Safety and Health Assessments  
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## ACRONYMS

AIB	Accident Investigation Board
ALARA	As Low As Reasonably Achievable
Am	Americium
Anti-C	Anti-Contamination
ARA	Airborne Radiation Area
CA	Contamination Area
CAM	Continuous Air Monitor
CAQ	Condition Adverse to Quality
CAR	Corrective Action Report
CARB	Corrective Action Review Board
CAS	Contractor Assurance System
CBFO	Carlsbad Field Office
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CRAD	Criteria and Review Approach Document
DEAR	Department of Energy Acquisition Regulation
DOE	U.S. Department of Energy
DPM	Diesel Particulate Matter
EA	Office of Enterprise Assessments
ECP	Employee Concerns Program
ES&H	Environment, Safety, and Health
FR	Facility Representative
FRAM	Functions, Responsibilities, and Authorities Manual
FY	Fiscal Year
GHA	General Hazard Analysis
HAZCOM	Hazard Communication
HCA	High Contamination Area
HEC	Hazardous Energy Control
HEPA	High-Efficiency Particulate Air
ICE	Issue Collection and Evaluation System
IEP	Integrated Evaluation Plan
IH	Industrial Hygiene
IMPS	Issues Management Processing System
ISMDS	Integrated Safety Management System Document
JON	Judgment of Need
JHA	Job Hazard Analysis
LO/TO	Lockout/Tagout
MOU	Memorandum of Understanding
MSHA	Mine Safety and Health Administration
NO	Nitric Oxide
NO <sub>2</sub>	Nitrogen Dioxide
NWP	Nuclear Waste Partnership, LLC
OFI	Opportunity for Improvement
OOO	Office of Operations Oversight
OQA	Office of Quality Assurance
ORPS	Occurrence Reporting and Processing System
OSHA	Occupational Safety and Health Administration
PAPR	Powered Air Purifying Respirator
PBI	Performance Based Incentive

PM	Preventive Maintenance
PPE	Personal Protective Equipment
Pu	Plutonium
QER	Quarterly Evaluation Report
RBA	Radiological Buffer Area
RCT	Radiological Control Technician
RP	Radiological Protection
RPP	Radiological Protection Program
RW	Radiological Worker
RWP	Radiological Work Permit
SME	Subject Matter Expert
SRAS	Status Report and Assessment Strategy
SSO	Safety System Oversight Engineer
T-0	Start of Work
T-1	One Week Out from Start of Work
T-2	Two Weeks Out from Start of Work
TBD	Technical Basis Document
TLV	Threshold Limit Value
TQP	Technical Qualification Program
TRU	Transuranic
TSR	Technical Safety Requirement
USQ	Unreviewed Safety Question
VOC	Volatile Organic Compound
WBG	Wet Bulb Globe Thermometer
WCD	Work Control Document
WIPP	Waste Isolation Pilot Plant
WP&C	Work Planning and Control
WRPS	Washington River Protection Solutions
WSHPD	Worker Safety and Health Program Description

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**EXECUTIVE SUMMARY**

The U.S. Department of Energy (DOE) Office of Worker Safety and Health Assessments, within the independent Office of Enterprise Assessments (EA), conducted an assessment of work planning and control (WP&C), and selected elements of the radiological protection program, the industrial hygiene program, and the contractor assurance system (CAS) at the Waste Isolation Pilot Plant (WIPP). EA also examined the DOE Carlsbad Field Office (CBFO) oversight activities at WIPP. Nuclear Waste Partnership, LLC (NWP) operates WIPP, and the CBFO provides Federal oversight. EA conducted this assessment June 13-16 and July 11-14, 2016.

During this assessment, WIPP was in the recovery phase for resumption of waste emplacement operations since a shutdown of operations as a result of two events in February 2014. EA observed work in the areas of maintenance, underground services, and other mine recovery operations.

**Work Planning and Control**

For the most part, the work that EA observed was generally performed within the established controls by trained and qualified workers. Most work packages detail the appropriate scope of work, and the WP&C process effectively identifies and analyzes the hazards in accordance with a well-documented hazard analysis process and identifies and implements the appropriate hazard controls.

However, EA identified deficiencies in several areas of WP&C. In several cases, inadequate work coordination delayed the completion of work on some critical tasks, such as mine roof bolting. Communication and coordination between departments (engineering, facilities, operations, surface facility maintenance, work planners, etc.) have not been adequate to support timely completion of work. Other deficient areas include work planner training; flowdown of health and safety requirements into subcontracts; job hazard analysis; and conduct of pre-job briefings.

**Radiological Protection and Industrial Hygiene Programs**

The WIPP radiological protection and industrial hygiene programs and procedures provide sufficient mechanisms to address a wide spectrum of hazards, including chemical, physical, biological, ergonomic, and radiological hazards and controls associated with both aboveground and underground work activities. NWP took action to review and strengthen many aspects of the radiological protection program, including performance of a comprehensive assessment in 2015 and development and implementation of a high-quality radiation protection program document. In addition, the WIPP industrial hygiene program has increased in capabilities and resources since the February 2014 events; the staff has increased from one full-time to six industrial hygienists, three of whom are certified. NWP has also achieved measureable progress in the identification and sampling of volatile organic compounds in underground waste areas.

Although progress since the February 2014 events has been significant, EA identified several vulnerabilities in program development and implementation of the radiological protection and industrial hygiene programs. The radiological control program lacks sufficient procedures for job-specific air sampling, and the NWP internal dosimetry program did not sufficiently evaluate the possibility of insoluble plutonium isotopes at WIPP in the current bioassay protocol. EA identified several vulnerabilities and/or deficiencies in the current IH program, particularly with respect to the sampling of underground diesel particulate matter; the assessment and characterization of underground air

contaminants, particularly from chemicals other than volatile organic compound present in embedded waste containers; the potential limitations of existing respiratory protection in protecting workers exposed to those contaminants; exposure assessments for some work activities and some IH and Underground Services sampling practices. Collectively, these deficiencies warrant increased management attention to ensure all hazards are identified, characterized, and controlled.

### **Contractor Assurance System**

The organizational structure and programmatic documentation supporting the NWP CAS have improved. The NWP Contractor Assurance office is currently hiring and training staff to fill key positions to execute such necessary functions as self-assessments, and is identifying software changes to supplement or replace manual trending of data to support timely trending reports. Actions in response to the judgments of need from both accident investigation reports regarding the 2014 events are in progress and are scheduled for completion in 2017.

EA identified some continuing problems in the CAS. NWP is not fully effective in identifying precursor issues. NWP has not implemented a self-assessment program that produces self-critical analyses of Safety Management Programs' implementation and resulting effectiveness, identified key performance indicators and metrics, or effectively performed data trending analysis to provide early detection and correction of trends adverse to safety and quality. Additionally, although the CAS program to report employee concerns meets the minimum requirements of the DOE Order 442.1A *Contract Requirements Document*, it does not fully implement a comprehensive program in accordance with DOE Guide 442.1-1, *Employee Concerns Program*, as required by the NWP contract.

### **CBFO Oversight**

CBFO has improved its operational oversight, including hiring additional Office of Operations Oversight staff and updating CBFO oversight processes. The Office of Operations Oversight has identified substantive issues in WP&C through operational awareness oversight and formal assessments, and CBFO is strengthening its Facility Representative and safety system oversight programs. CBFO is effective in evaluating the CAS, including a review of closed issues, contractor self-assessments, and event response. CBFO also provides adequate evaluation of WP&C, which has been incentivized through the award fee process. EA identified some areas in CBFO's oversight programs that could be improved, including integration of oversight processes (e.g., assessments were overlapping with inconsistent results), an inadequate document management process, and the elimination of a designated WP&C position without a clear redistribution of the WP&C oversight responsibilities.

**Office of Enterprise Assessments  
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**1.0 PURPOSE**

The U.S. Department of Energy (DOE) Office of Enterprise Assessments (EA) conducted an independent assessment of work planning and control (WP&C), and selected elements of the radiological protection program (RPP), the industrial hygiene (IH) program, the contractor assurance system (CAS), and DOE Carlsbad Field Office (CBFO) oversight activities at the Waste Isolation Pilot Plant (WIPP). The onsite portions of this review were conducted June 13-16 and July 11-14, 2016.

EA performed this independent assessment of WIPP in consideration of the Deputy Secretary's response to the Defense Nuclear Facilities Safety Board (DNFSB) letter and technical report (DNFSB/Tech-37) that included, in part, a commitment to enhance Federal oversight of activity-level WP&C. Additionally, the WP&C program assessment is within the broader context of EA's targeted assessments of programs at DOE sites that have high-consequence activities or whose performance may present significant risks in accordance with DOE Order 227.1A, *Independent Oversight Program*. EA also identified the WP&C, the IH program, and the RPP as areas for future assessments within the *Plan for the Independent Oversight of the Recovery at the WIPP*.

**2.0 SCOPE**

EA conducted this assessment in accordance with the *Plan for the Office of Enterprise Assessments Assessment of Work Planning and Control Program at the Waste Isolation Pilot Plant*. This assessment evaluates select areas of the WP&C program and the integration of the RPP and the IH program into the WP&C processes at WIPP. This assessment also included evaluation of elements of the Nuclear Waste Partnership, LLC (NWP) CAS pertaining to WP&C, as well as the DOE Office of Environmental Management's CBFO processes for oversight of the contractor's WP&C activities. In addition, actions taken to address previous findings were evaluated to verify effectiveness of corrective action and confirm closure of findings.

**3.0 BACKGROUND**

WIPP is located approximately 30 miles southeast of Carlsbad, New Mexico, within a remote, 16-square-mile tract. Project facilities include excavated rooms 2,150 feet underground in an ancient, stable salt formation, as well as various surface structures designed for unloading transporters and transferring drums to the underground rooms. WIPP activities, which include transport container unloading, drum movement, mining, and facility maintenance, involve various potential hazards that need to be effectively controlled, including exposure to external radiation, radiological contamination, and various physical hazards associated with mining activities and facility operations (e.g., subsurface hazards, toxic gases, confined space, machine operations, high-voltage electrical equipment, pressurized systems, and noise).

On February 5, 2014, an underground mine fire involving a salt haul truck occurred at WIPP. All 86 workers who were in the mine (underground) when the fire occurred were evacuated safely. On February 14, 2014, an incident in the underground repository resulted in the release of americium (Am) and plutonium (Pu) from one or more transuranic (TRU) waste containers into the mine and the environment. The release was detected by an underground continuous air monitor (CAM) and then directed through

high-efficiency particulate air (HEPA) filter banks located in the surface exhaust building. WIPP has been shut down since February 14, 2014, and is presently scheduled to reopen in December 2016.

NWP is the prime management and operating contractor at WIPP. CBFO provides Federal oversight of WIPP and is responsible for the WIPP and the national TRU program. The CBFO mission is to provide safe, compliant, and efficient characterization, transportation, and disposal of defense-related TRU waste. NWP is an AECOM-led entity with partner B&W Technical Services Group and major subcontractor AREVA Federal Services. NWP provides day-to-day operation and maintenance services for WIPP.

The underground WIPP facility and work activities pose hazards typical of those found in commercial mining operations. Although the Federal requirements addressing mine safety contained in the *Federal Mines Safety and Health Act* of 1977 apply only to mining for commercial purposes, and would therefore not cover WIPP operations, the WIPP Land Withdrawal Act, Section 11(a), requires the Mine Safety and Health Administration (MSHA) to inspect WIPP for mine safety at least four times a year and requires DOE to address MSHA inspection findings. The 2014 *Memorandum of Understanding (MOU) Between the U.S. Department of Energy and the Mine Safety and Health Administration, U. S. Department of Labor*, implements the MSHA inspection requirement of the Land Withdrawal Act. The MOU specifically indicates that MSHA will apply 30 CFR Part 57, *Safety and Health Standards - Underground Metal and Nonmetal Mines*, and Part 62, *Occupational Noise Exposure*, during inspections. This MOU also confirms that MSHA does not have regulatory authority and will not assess penalties for any resulting inspection findings. NWP has included MSHA regulations Parts 47, *Hazard Communication*; 48, *Training and Retraining of Miners*; 49, *Mine Rescue Teams*; 57; and 62 in WP 15-GM.02, *Worker Safety and Health Program* (program required by 10 CFR 851). A number of the MSHA requirements included in WP 15-GM.02 are similar to the DOE and DOE-adopted Occupational Safety and Health Administration (OSHA) requirements, but may have differing occupational exposure limits and programmatic requirements. Therefore, attention is necessary to ensure that the appropriate requirements are integrated in the IH program and WP&C processes for hazard identification and control for the work activities.

The EA oversight program is designed to enhance DOE safety and security programs by providing DOE and contractor managers, Congress, and other stakeholders with an independent evaluation of the adequacy of DOE policy and requirements and the effectiveness of DOE and contractor line management performance in safety, security, and other critical functions as directed by the Secretary of Energy. The EA oversight program is described in and governed by DOE Order 227.1A.

#### **4.0 METHODOLOGY**

EA implements the independent oversight program through a comprehensive set of internal protocols, operating practices, assessment guides, and process guides. Organizations and programs within DOE use various terms to document specific assessment results. In this report, EA uses the terms “deficiencies, findings, and opportunities for improvement (OFIs)” as defined in DOE Order 227.1A. DOE line management and/or contractor organizations must develop and implement corrective action plans for deficiencies identified as findings. Other important inadequacies not meeting the criteria for a finding are also highlighted in this report and are summarized as deficiencies in Appendix C. These deficiencies should be addressed consistent with site-specific issues management procedures.

As identified in the assessment plan, this assessment considered requirements related to WP&C, the RPP, and the IH program. The criteria guiding this assessment were based on selected objectives, criteria, and lines of inquiry associated with activity-level WP&C contained in 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.* EA also used selected objectives and criteria from Sections A, B, and C of Criteria and Review Approach Document (CRAD) 45-35, Rev. 1, *Occupational Radiation Protection Program Inspection Criteria, Approach and Lines of Inquiry*, and EA CRAD EA-32-03, Rev. 0, *Industrial Hygiene Criteria Review and Approach Document*, for further evaluation of certain identified programmatic weaknesses related to air sampling and internal dosimetry.

In addition, EA collected and analyzed data on the CBFO oversight and NWP CAS activities related to WP&C, the RPP, and the IH program at WIPP and used elements of CRAD 45-21, Rev. 1, *Feedback and Continuous Improvement Assessment Criteria and Approach - DOE Field Element*, and CRAD 30-10, Rev. 0, *Contractor Assurance System Criteria Review and Approach Document*.

EA examined key documents, such as work packages, procedures, manuals, analyses, policies, and training and qualification records. EA also interviewed key personnel responsible for developing and executing the associated programs and observed electrical and mechanical maintenance, underground routines and work activities, recovery activities, and routine meetings, such as plan of the day and briefings on the status of mine roof bolting. The members of the EA assessment team, the Quality Review Board, and EA management responsible for this assessment are listed in Appendix A, Supplemental Information. The documents reviewed, personnel interviewed, and observations made during this assessment that are relevant to the findings and conclusions of this report are listed in Appendix B, Key Documents Reviewed, Interviews, and Observations.

## **5.0 WORK PLANNING AND CONTROL AND RELATED PROTECTION PROGRAMS**

### **5.1 Work Planning and Control Program**

*Objective:*

*The Organization has developed and approved WP&C processes to enable safe performance of work. (DOE Guide 226.1-2A, Appendix D, Objective WP&C1-1) (Criteria #3 and 6)*

*The Organization has developed and approved WP&C processes that promote safe and efficient execution of work activities. (DOE Guide 226.1-2A, Appendix D, Objective WP&C1-3) (Criterion #4)*

*The Organization has established a management and organizational framework for (1) initiating, analyzing, planning, and approving activity level work and (2) authorizing, releasing, and safely performing activity level work. (DOE Guide 226.1-2A, Appendix D, Objective WP&C1-4) (Criterion #5)*

The WP&C procedure, WP 10-WC3011, *Work Control Process Management Control Procedure*, has undergone numerous revisions and changes with each new change in management following the two events in February 2014. The work control procedure describes the requirements for various types of work packages (Types 1 through Type 4). Work scope definition for Type 1 and 2 work packages and model work orders typically include the appropriate detailed work task descriptions. Type 3 work packages consist of a (written) bounded scope statement rather than detailed step-by-step instructions. Type 4 work activities are considered low hazard and routine work where worker knowledge and skills and relevant facility postings are deemed sufficient for the work activity. However, the requirements and expectations for defining work scope, and how these work scope requirements vary based on a graded approach, are not clear, particularly for skill-of-the-craft/worker tasks. Tasks performed within either a Type 3 or Type 4 package, if performed frequently, and are considered routine and low hazard, may be performed within the skill-of-the-craft/worker and without detailed work instructions. Skill-of-the-craft

work (Types 3 and 4) is described in NWP procedures WP 10-WC.04 and WP 10-WC3011. However, the *Skill of the Craft/Skill of the Worker Program Procedure* WP 10-WC.04 does not adequately define boundaries of these work activities, the type of work that may not be considered to be low hazard or routine, or the type of controls (safety permits, etc.) that may require a planned work package. NWP management is currently working to address these skill-of-the-craft related shortcomings in the WP&C process.

WP 10-WC3015, *Scheduling and Work Authorization*, describes an adequate process to develop a rolling work-week schedule with input from various organizations, such as Operations, Maintenance, Mining, Waste Operations, and Engineering. Outage planning and preparation is also considered during this schedule development period. The schedules are based on a weekly schedule, whereby the T-2 schedule represents work that is two weeks out, the T-1 schedule represents work that is one week out, and the T-0 is work scheduled to be performed. The T-1 schedule meeting is conducted to ensure that activities are de-conflicted, confirm resource availability to support the schedule and get final buy-in from Operations and other organizations, and authorized by the facility shift manager. The T-0 schedule is authorized when approved by the cognizant operations manager and subject to change control if emerging work has the potential to impact scheduled work or scheduled resources.

WP 15-GM1003, *Stop Work Process Management Control Procedure*, appropriately gives employees who have a concern about employee safety, the safety of the environment, or the quality of the activity the responsibility and authority to pause or stop the performance of that activity. Several employees interviewed during this assessment were familiar with the process and stated that they have used one or both options, without hesitation or fear of reprisal. Several work pauses were documented on WIPP forms in the issues management system.

At the work activity level, hazard analyses are required to be conducted and documented through the general hazard analysis (GHA) process. When hazards are present beyond those evaluated within the GHA, WIPP procedure WP 12-IS3002, *Job Hazards Analysis Performance and Development*, requires the job hazards analysis (JHA) process to be followed to identify, evaluate, control, and communicate potential hazards associated with performing work. The JHA performance and development process is well documented in WIPP procedure WP 12-IS3002.

NWP WP 10-WC3011 expectations and requirements for work planners is that they be trained and qualified based on the type of work packages they develop. For example, Type 1 work documents are to be developed by planners qualified to develop Type 1 work packages. The same requirement applies to Types 2 and 3.

## **Work Planning and Control Program Evaluation Conclusion**

NWP's expectations and requirements for performing work in compliance with procedures and work documents is expressed adequately in the WIPP work control procedures.

## **5.2 Subcontractor Safety Programs and Requirements Flowdown**

*Criterion:*

*Processes are developed and effectively implemented to ensure that DOE integrated safety management (ISM), 10 C.F.R. 851, and DOE contract safety requirements are implemented and flowed down to all subcontractors at all tiers. (DEAR Clause 48 CFR 970.5223-1(i); 10 CFR 851; EA CRAD 30-01)*

EA reviewed the set of contractual and regulatory requirements that apply to the WIPP worker safety and health hazards to ensure that they were appropriately addressed and flowed down to subcontractors. DOE contract No. EM0001971 and 10 CFR 851, *Worker Safety and Health*, provide the primary set of requirements to address worker safety and health hazards at WIPP. The NWP procurement and safety management processes are mostly effective, with some exceptions noted below.

EA evaluated two subcontracts – one for electrical work (Master Task Order Number MTO504990 with Stellar, Inc.) and one for janitorial work (Purchase Order/Subcontract Number DOE13-PO501318 with HBS National Corp) – to determine the extent to which the DOE safety requirements flowed down to subcontractors. The subcontracts adequately include the safety requirements, except as noted below. Both contracts invoke the NWP Integrated Safety Management System Description (ISMSD), Worker Safety and Health Program Description (WSHPD), and WP-12IS.01-6 (all of which include a number of specific safety programs/controls for the contract work) in their entirety, as well as WP 12-IS03, *Electrical Safety Program Manual*, and WP 15-HS02, *Occupational Health Program*. Both contracts require the subcontractor to submit a JHA for the hands-on work to be performed 15 days before commencing work, and NWP provided a guidance document on how to meet the JHA expectations. However, the subcontracts do not include Department of Energy Acquisition Regulation (DEAR) clause 852.203-70, *Whistleblower Protection for Contractor Employees*, or similar language to invoke 10 CFR 708, as required by section/article I.106 of DOE contract number DE- DE-EM0001971 with NWP. Whistleblower protection is not directly addressed by the NWP ISMSD or WSHPD. **(Deficiency)**

Some subcontracts require contactors to submit environment, safety, and health (ES&H) deliverables. EA reviewed contract ES&H deliverables for the Stellar subcontractor to determine whether they met DOE regulatory and ES&H-related contract clause requirements and/or requirements in the subcontract terms and conditions. EA also observed one work activity performed by Stellar for the modification of local processing units. In this example, the Stellar electricians were integrated with and augmented the NWP workforce, consistent with the Stellar-NWP contract.

The “corporate” Stellar ES&H programs accepted by NWP do not always meet DOE and contract requirements. **(Deficiency)** For example:

- The lockout/tagout (LO/TO) and electrical safety program do not reference or include all requirements of National Fire Protection Association 70E. For example, it does not include a procedure/requirement to verify electrically safe conditions after installation of a LO/TO lock and allows testing for electrical energy in a panel by the “tap it with the BACK of your hand” method if a voltage meter is not available.
- The hazard communication (HAZCOM) program is not up to date with the current OSHA 29 CFR 1910.1200 HAZCOM standard. It references only material safety data sheets instead of the updated requirement for safety data sheets. In addition, the Stellar HAZCOM program does not address the 2012 OSHA revised standard’s use of the globally harmonized system for classification and labeling of hazardous chemicals.
- The hearing protection program does not implement the American Conference of Governmental Industrial Hygienists threshold limit value (TLV) for noise, which is more protective than the OSHA permissible exposure limit implemented in the Stellar program and is required in the Stellar subcontract.

EA’s limited work observations of Stellar work practices indicated that the Stellar workers generally follow the NWP ES&H procedures as augmented staff, integrated with NWP workers.

## **Subcontractor Programs and Requirements Flowdown Conclusion**

The process for ensuring that regulatory and contractual requirements flow down into WIPP programs and procedures and into subcontracts is mostly effective, with the exception that some subcontracts do not include whistleblower requirements and some subcontractor corporate safety procedures do not meet DOE safety requirements.

### **5.3 Radiological Protection Program**

*Criterion:*

*Radiation protection program (RPP) design, including organizational structure and administration, is sufficient to provide for effective implementation and control of all radiological protection activities. (10 CFR 835.101)*

The WIPP RPP has undergone numerous improvement initiatives as a result of assessments and corrective actions following the radiological event on February 14, 2014. In the aftermath of this event, NWP took action to review and strengthen many aspects of the program, including a comprehensive assessment in 2015, followed by revision of many of the WIPP institutional requirements to better align with DOE-STD-1098-2008, *Radiological Control*. Many of the programmatic changes are recent and have not been in place long enough to fully assess their effectiveness. Consequently, EA conducted field observations to identify any concerns in activity level implementation of current radiological control program elements. Those vulnerabilities are discussed in Section 6.0.

NWP's documented RPP, required by 10 CFR 835, is contained in DOE/WIPP-95-2054, Rev. 19, *WIPP Radiation Protection Program*, approved by DOE on April 20, 2015. The WIPP RPP appropriately links its programmatic radiological protection (RP) documentation – the Site Radiation Safety Manual, technical bases documents (TBDs), and operations procedures – to the compliance commitments in the RPP.

WIPP's RPP is appropriately structured with a centralized RP group, headed by a site Radiological Controls Manager who has direct responsibility for site radiation protection programs and operations. The Radiological Controls Manager reports directly to the NWP ES&H Manager, who reports to the NWP President/Project Manager. The Radiological Controls Manager is supported by radiological control program staff in the areas of radiological engineering, dosimetry, instrumentation, and laboratory analyses, as well as deployed field radiological staff consisting of field radiological control superintendents and/or supervisors and deployed radiological control technicians (RCTs) who support line management in the conduct of radiological work.

EA's review of program documents indicated that NWP has developed an appropriate RP document hierarchy, including a documented RPP required by 10 CFR 835, a Site Radiation Safety Manual, a variety of radiological control implementing procedures, and several TBDs. WIPP WP-12-5, *WIPP Radiation Safety Manual*, sets forth the WIPP RP policy and provides detailed guidance for the RP organization and line management, including specific measures that should be implemented in support of its RP responsibilities. This document appropriately invokes the applicable provisions of the DOE Radiological Control Standard for WIPP operations. Portions of the radiological control program are more fully implemented through detailed operating procedures for the radiological controls organization and support organizations. Collectively, the radiological control document hierarchy and organizational structure are sufficient to support compliance with most 10 CFR 835 requirements.

However, while the upper tier radiological control documents (Site Radiation Safety Manual and TBDs) contain appropriate requirements and implementation objectives, NWP lacks sufficient flowdown procedures for job-specific air sampling to ensure proper implementation and compliance with stated requirements. WIPP TBD-022, *WIPP Workplace Air Monitoring Technical Basis Document*, states that workplace air monitoring at WIPP consists of four main components: fixed location air sampling, grab air sampling, real-time air monitoring, and breathing zone (lapel) sampling. While NWP has procedures and conducts fixed location air sampling and real-time air monitoring, the organization lacks procedures to ensure that grab and/or breathing zone air sampling is implemented during work requiring it. As discussed in Section 6.0, EA's observation of work in contamination areas (CAs), high contamination areas (HCAs), and airborne radioactivity areas (ARAs) indicated that NWP was not conducting representative grab air sampling and/or breathing air sampling as necessary to characterize airborne concentrations of radioactive material in work areas, as described by TBD-022, Article 555 of WP-12-5, and 10 CFR 835.403. **(F-NWP-RAD-01)**

EA also identified a programmatic concern in bioassay monitoring at WIPP. WIPP 12.DS-06, *Waste Isolation Pilot Plant Internal Dosimetry Technical Basis*, appropriately provides for both routine confirmatory bioassay monitoring for a sampling of radiological workers, and compliance bioassay monitoring for all workers who sign in on radiological work permits (RWPs) requiring respiratory protection for airborne radioactivity. Compliance bioassay monitoring is performed with a goal of providing evidence that no unexpected intakes resulting in exceedance of regulatory dose limits have occurred and to verify the effectiveness of engineering and administrative controls in containing radioactive materials. As outlined in the International Commission on Radiological Protection (ICRP) Publication 66, the behavior of radionuclides entering the human body via inhalation is modeled by one of three categories, based on the solubility rate of the appropriate chemical form: Fast (F), Moderate (M) and Slow (S), along with default bio kinetic parameters to be used in internal dose assessment for these categories. Type S represents the slowest absorption rate from the lungs, resulting in more difficulty in detecting intakes from insoluble actinides through bioassay. While NWP conducts quarterly bioassay monitoring for high risk workers, the current bioassay protocol for Type S Pu-238/239 is not sufficient to demonstrate compliance with the annual dose limit of 5000 mrem. WIPP 12.DS-06 lacks any information on the solubility and absorption characteristics for Pu source terms that may be present at WIPP but presents minimum detectable doses, which represent the potential missed doses from bioassay, for both Type M Pu (Moderate solubility and absorption) and Type S Pu (Slow solubility and absorption). These values range from about 500 mrem for Type M to 9000 mrem for Type S Pu. Thus, in the case of Type S Pu, the program cannot demonstrate compliance with the 5000 mrem annual dose limit, as required by 10 CFR 835. Correspondence between WIPP consultants and site subject matter experts (SMEs) identified this same concern in 2014. While the TBD presents the missed dose values for both Type S and Type M Pu, it lacks any discussion of the presence and/or distribution of these solubility classes at WIPP. Type S Pu oxides have been generated at several DOE sites across the complex, so it is likely that they have been dispositioned at WIPP. For Type S Pu material, more frequent bioassays or a more sensitive measurement technique would be necessary to meet the regulatory limits. **(F-NWP-RAD-01)**

It should be noted that the 2014 correspondence also identified a similar concern with lack of proper integration between the internal dosimetry and air monitoring programs that has not been effectively resolved through the NWP issues management process.

### **Radiological Protection Program Conclusion**

Overall, the radiological control document hierarchy and organizational structure are sufficient to support compliance with most 10 CFR 835 requirements. NWP's actions following the 2014 event have resulted in a much improved document hierarchy that is generally well aligned with DOE's Radiological Control Technical Standard. In addition, the current RP organizational structure consists of appropriate

centralized RP program support personnel as well as RP resources deployed to line management in support of field operations. However, while the upper tier radiological control documents contain appropriate requirements and implementation objectives, NWP lacks sufficient flowdown mechanisms (procedures) for job-specific air sampling to ensure proper implementation and compliance with institutional and regulatory requirements. In addition, the NWP internal dosimetry program lacks any documented evaluation of insoluble Pu isotope source terms that may be present at WIPP, possibly rendering the current bioassay protocol ineffective in detecting intakes of Type S Pu below the annual dose limit, as required by 10 CFR 835. This concern is exacerbated by the air sampling weaknesses and lack of proper integration between the internal dosimetry and air monitoring programs. These concerns were identified in 2014 in correspondence between WIPP consultants and site SMEs but have not been effectively addressed through revision of TBDs based on revised assumptions, or use of more conservative source terms.

#### **5.4 Industrial Hygiene Program**

*Criterion:*

*The contractor has established a comprehensive IH program that adequately addresses the elements of 10 CFR Part 851 applicable to worker exposures to chemical, physical, biological, and ergonomic hazards. (10 CFR 851 Appendix A.8)*

*Dust, gas, mist, and fume surveys are to be conducted as frequently as necessary to determine the adequacy of control measures. (30 CFR §57.11050)*

*Mine operators must monitor as often as necessary to effectively determine, under conditions that can be reasonably anticipated in the mine, whether the average personal full-shift airborne exposure to diesel particulate matter (DPM) exceeds the DPM limit specified in §57.5060. (30 CFR §57.5071 (a))*

In general, WIPP IH programs and procedures provide sufficient mechanisms to address a wide spectrum of chemical, physical, biological, and ergonomic hazards and controls associated with both aboveground and underground work activities. The WIPP IH program has increased in capabilities and resources since the February 2014 accidents, with the staff increasing from one full-time to six professional industrial hygienists, including three Certified Industrial Hygienists.

Since the radiological event in 2014, the underground ventilation system has been operating in filtration mode, reducing the average total underground airflow from 465,000 standard cubic feet per minute (scfm) to approximately 60,000 scfm and resulting in new IH challenges. Among these are air quality issues, such as the potential buildup of carbon monoxide (CO), nitric oxide (NO), nitrogen dioxide (NO<sub>2</sub>), and DPM from diesel fueled vehicles, as well as volatile organic compounds (VOCs) near waste panels where the air has become more stagnant. The NWP IH organization is responding to these air quality issues and challenges through increased air monitoring, new or revised IH procedures, and area postings to address changes in air quality. In March 2016, WIPP hosted an Air Quality Workshop with representation of industrial hygienists (DOE and contractor) from other DOE sites as well as WIPP to review air quality procedures and practices, resulting in 32 opportunities for improvement that are currently being addressed by the WIPP ES&H and IH staffs.

The WIPP Environmental and IH Groups have expended considerable effort in recent years to characterize the nature and concentration of VOCs in the underground areas. VOC monitoring is required by the hazardous waste facility permit and is conducted by the WIPP Regulatory Environmental Services Group throughout the disposal phase of operations to measure VOC concentrations originating from TRU-mixed waste disposed of in the underground. In February 2011, the WIPP Regulatory

Environmental Services Group conducted a detailed risk assessment of VOCs in the underground to evaluate factors influencing source term monitoring and allowable emission rates. VOCs in the containers in Panels 6 and 7 were analyzed in September 2014; based on head space analyses, the actual and maximum concentration of each VOC detected above quantification limits was evaluated. That information demonstrates that VOCs released from the containers in Panels 6 and 7 can be detected by an 11.7 eV photon ionization detector. Subsequent grab sample gas chromatograph analysis of air outside the waste drums has also been performed, and IH has focused sampling efforts on the primary (top three) VOCs identified outside the waste drums. The underground monitoring program for VOCs by the WIPP Regulatory Environmental Services Group is ongoing. In 2016, IH initiated a three-phase sampling program for selected VOCs consistent with expected changes in underground airflow leading up to the restart of waste emplacement in the underground.

Although the IH program has achieved a number of accomplishments since the February 2014 underground events, EA identified several concerns in the current IH program. With respect to underground work activities, worker exposures to the most prevalent three VOCs resulting from stored waste (i.e., carbon tetrachloride, trichloroethylene, and trichloroethane) and the dominant diesel contaminants (i.e., CO and NO<sub>2</sub>) have been characterized in a number of underground locations. However, EA identified several vulnerabilities or limitations with respect to the characterization of underground air contaminants in the following areas:

- Worker exposures to DPM when operating underground diesel equipment have evolved since the fire and radiological events. MSHA regulations require an ongoing program of monitoring workers for exposures to total carbon emissions for their work shift when operating diesel equipment. At WIPP, limited DPM samples were obtained in 2014 after the ventilation flows were reduced underground. Many were partial shift samples or area samples. Diesel operations were not resumed until late in 2014. The DPM sampling program was ramped up and there were 26 samples in 2015, but this sampling program ceased in October 2015 (no further sampling). The WIPP IH manager stated that DPM sampling is planned to resume in the third quarter of 2016, although such plans have not been formalized. Diesel activities have recently been expanding to include additional equipment types, such as fuel trucks, cutting equipment operations, and scaling operations, and have not been sampled and characterized. None of the earlier sample results exceeded the MSHA DPM limits for full shift sampling (160 µg per cubic meter of air).
- Although WIPP IH program has made noticeable progress in characterizing VOCs in the underground, it has not ensured that all potentially hazardous chemicals in the underground to which workers may be exposed (e.g., non-VOC waste effluents, diesel equipment emissions, welding) have been identified, analyzed, and documented as required by 10 CFR 851.21(a)(2) and 10 CFR 851, Appendix A.6(a). For example, diesel emissions from operating heavy equipment may include other combustion products, such as NO, that are not routinely monitored, in addition to CO and NO<sub>2</sub>, which are routinely monitored. The MX-6 multi-gas monitor routinely monitors and data logs airborne concentrations of hydrogen sulfide, but the identification and significance of the underground emission source for hydrogen sulfide and associated alarm set points is not documented. WIPP waste streams are likely to include polychlorinated biphenyls (PCBs); toxic metals, such as cadmium, mercury, and beryllium; and other inorganics (acids, bases, salts), as well as VOCs. Like the organic wastes, some of these non-organic wastes were initially in a liquid form but were absorbed prior to waste packaging. A number of waste products (organic and inorganic) may be volatile or semi-volatile, and if released could present a health risk to workers. The IH waste sampling program has focused almost exclusively on sampling for VOC emissions from the embedded waste containers but has not identified, analyzed, or sampled other potential chemical hazards identified in the waste streams. In addition, many of these other chemicals could not be sampled, detected, or analyzed by the sampling and analysis methods currently in place for VOC sampling. For example, according to Section 8.3 of the WIPP documented safety analysis, the WIPP

hazardous material protection program samples for beryllium and PCBs that may be present in the TRU waste. This is indicative of the potential for airborne contaminants in addition to VOCs in an event of a waste container breach. After the container breach of 2014, area air samples and surface wipe samples were taken for beryllium, and all results were negative; PCBs do not typically present an exposure hazard to workers wearing dermal and respiratory protection, since PCBs are not volatile under normal conditions. The WIPP central characterization project reviews the hazardous constituents of new waste shipments, but the IH Group has not routinely analyzed those hazards to determine whether additional monitoring or sampling may be required. There is insufficient sampling data and/or a technical basis to validate that such hazardous chemicals would not be present under certain conditions and potentially pose a hazard to workers. **(F-NWP-IH-01 and OFI-NWP-IH-01)**

- The lack of a comprehensive, documented hazard analysis in the underground as required by 10 CFR 851 may also result in the selection of hazard controls (e.g., respirators and respirator cartridges) that are not fully protective of the underground workforce for some hazardous chemicals identified in the waste streams. When workers are in the underground waste embedment areas, the WIPP Respirator Group typically provides workers with an MSA OptimAir TL powered air purifying respirator (PAPR) with twin OptiFilter organic vapor acid gas and particulate respirator cartridges (OVAG/P-100 respirator cartridge). The selection of respirator cartridges is based on the assumption that only airborne particulates (radioactive and non-radioactive particulates) and VOCs would be present in the underground. In addition, although respiratory protective equipment was evaluated in September 2014 on the basis of an eight-year history of gas chromatography results from the underground, the evaluation focused primarily on VOCs. However, EA's review of a sample of Acceptable Knowledge Summary Reports prepared by the WIPP central characterization project indicated that more than 100 chemicals are present in a typical waste stream, including a variety of acids, inorganics, metals, and phosphates, in addition to VOCs. For example, the Oak Ridge National Laboratory Reactor Fuels Research and Development Contact-Handled Transuranic Waste Stream Report (#CCP-AK-ORNL-004) identifies ammonia, formaldehyde, and mercury in the waste stream. According to the MSA instruction manual and the MSA Cartridge Life Expectancy Calculator, the OVAG/P-100 respirator cartridge currently in use at WIPP does not provide effective protection against these three hazardous chemicals and others identified in the waste streams. **(F-NWP-IH-01)**
- IH has not ensured that chemical hazards from new waste streams are identified, analyzed, and documented as required by 10 CFR 851.21(a)(2). IH has not developed an IH strategy or procedure for systematically reviewing the chemical contents of new incoming waste containers or waste streams when waste operations resume to ensure that the IH monitoring and sampling program addresses the potential chemical emissions from those waste containers before they are embedded underground. **(F-NWP-IH-01)**
- EA identified a few IH and/or Underground Services air sampling methods that were not optimal. For example, during EA's observation of underground ventilation measurements performed by Underground Services, the vane anemometer flow meter lacked sufficient underground air flow to be effective in measuring low air flow conditions in some drifts, since the device does not operate in linear air flows below 30 linear feet per minute. Smoke tubes are used to determine low flow rates, but in some observed conditions the smoke dissipated when released, and no reliable measurement for air flow could be determined at those locations. For VOC samples obtained by IH, all worker exposure and area sampling to date has been by passive diffusion badges. Although passive diffusion badges are useful and provide a number of sampling advantages, Chapter II of the OSHA Technical Manual says they are "frequently less accurate than active sampling" and more prone to some errors and limitations than using a sample pump and absorption media. Passive badges are



typically not useful for short-term exposure limit sampling for chemicals with low TLVs, as indicated in Section II of the OSHA Technical Manual. As previously mentioned, the basis for limiting the analysis of chemicals collected on the badges to only three VOCs is unclear. Other hazardous VOCs, such as methylene chloride and chloroform, are typically present in the underground environment (based on the Summa canister sampling data), and although these chemicals are collected on the passive badges, they are not routinely analyzed. **(OFI-NWP-IH-02)**

With respect to aboveground work activities, 10 CFR 851 and 30 CFR 57 require assessment of worker exposures to chemical, physical, and biological hazards from all work areas and activities. The mechanisms that IH uses to assess and document worker exposure hazards at WIPP are the JHA and the IH Status Report and Assessment Strategy (SRAS) process, which is the mechanism for identifying, evaluating, and documenting baseline worker exposures at WIPP. Title 10 CFR 851 Appendix 6.(a) requires an initial or baseline survey and periodic resurveys and/or exposure monitoring as appropriate of all work areas or operations to identify and evaluate potential worker health risks. However, EA observed that a number of work areas at WIPP have not been fully evaluated for worker exposures (e.g., aboveground machine shops and welding shops) or included in the SRAS, and a number of additional work activities and/or work areas have not been periodically resurveyed. **(F-NWP-IH-01)**

EA identified the following shortcomings in the implementation of some IH procedures and programs for workplace hazards at WIPP:

- The WIPP heat stress program includes a number of documents that have improved with recent revisions. However, as EA discovered during interviews, line supervisors do not use these documents to identify, evaluate, and control heat stress hazards in the field. For example, the revised heat stress procedures require work supervisors to assess the heat stress conditions associated with their work activities. However, the WIPP surface supervisors interviewed by EA were not aware of how to use the wet bulb globe thermometer (WBGT) devices stationed in the field to assess heat stress conditions, nor were they aware of the computer-based training and job performance measure on heat stress that were available to them. None of the surface maintenance supervisors were aware that the IH heat stress procedure had recently been revised or that IH could give them WBGT monitors to evaluate heat stress conditions for their jobs in the field. Each underground work team, however, is issued a WBGT instrument, which is operated by qualified personnel when heat stress conditions are present. A particular challenge for monitoring heat stress conditions in radiological areas in the underground is when workers must wear two sets of radiological clothing. New heat stress training was developed in July 2016 and is being implemented. Training will be required annually at the beginning of summer for all personnel. **(OFI-NWP-IH-03)**
- The WIPP MSHA Air Quality Monitoring procedure specifies that Underground Services conducts routine sampling for diesel exhaust gases. However, Underground Services conducts these tests only before operation of diesel equipment. Roof bolting crews are equipped with MX6 instruments.

### **Industrial Hygiene Program Conclusion**

The WIPP IH programs and procedures provide sufficient mechanisms to address a wide spectrum of chemical, physical, biological, and ergonomic hazards and controls associated with both aboveground and underground work activities. Overall, the capabilities and resources of the WIPP IH program have increased significantly since the February 2014 events, with the staff increasing from one full-time to six industrial hygienists, including three Certified Industrial Hygienists. However, EA identified several vulnerabilities and/or deficiencies in the current IH program, particularly with respect to the sampling of underground DPM; the assessment and characterization of underground air contaminants, particularly from chemicals other than VOC present in embedded waste containers; the potential limitations of

existing respiratory protection in protecting workers exposed to those contaminants; exposure assessments for some work activities and some IH and Underground Services sampling practices. Collectively, these deficiencies warrant increased management attention to ensure all hazards are identified, characterized, and controlled.

## 6.0 WORK PLANNING AND CONTROL IMPLEMENTATION

### *Objective:*

*The scope of work is described in sufficient detail to allow the work planning process to identify hazards associated with the work and to develop necessary schedules, priorities, and work instructions. (DOE Guide 226.1-2A, Appendix D, Objective WP&C2-1))(Criteria #2 and 3)*

Overall, work scopes, limitations and precautions were well defined in most of the procedures and work packages reviewed by EA. An example is the detailed work scopes associated with the mechanical maintenance preventative maintenance work packages reviewed by EA.

EA observed few skill-of-the-craft work activities, but for those observed (mainly aboveground shop activities), work scopes were only marginally defined in shop JHAs, and the boundaries or restrictions on shop work were not well documented. While the work package identifies much of the work performed in a shop, the actual shop activity or shop equipment use is not detailed in the work package or in shop work instructions. For example, the Building 455 Maintenance Shop contains an ultrasonic degreaser, and parts to be degreased may be identified in a Type 2 work package. However, the use of the degreaser and the associated hazards and controls are not identified in either the work package or any shop document. Furthermore, the skills, training, and experience to operate the degreaser are not in a documented worker skill set. The current NWP skill-of-the-craft procedures do not adequately define the boundaries of skill-of-the-craft work based on hazards, requirements for safety permits, and related considerations. Similar concerns were identified by NWP during a management assessment; NWP management is working to address this shortcoming and is drafting a revised Skill of the Craft procedure.

EA observed a number of instances where lack of detailed work scope definition led to coordination concerns that delayed work completion or needlessly expended limited resources. Although work is scheduled through the T-1/T-2 meetings. EA observed examples where the planned activities were not coordinated with ongoing work activities. One example was the scheduled annual maintenance for the waste hoist lift. Although the hoist lift annual planned maintenance was on the T-2 and T-1 planning lock-in schedule, and authorized by the facility shift manager, the life safety restriction on the number of people (24) in the underground was not well understood. The cognizant operations manager approves the work release at the T-0 meeting where it became apparent that more than the approved 24 personnel had been scheduled to work in the underground during the planned maintenance, so NWP had to reassign those personnel. EA also noted examples where tools, materials, and/or support were not ready to support work. For example, a lack of appropriate respirators was identified during the T-0 meeting, so the work could not be conducted that day. In another case, the requirement for a RWP due to the changing conditions in the facility was not well understood, resulting in the need to revise the JHA for conducting quarterly maintenance of the underground exhaust fans before beginning this work, which was on the T-0 schedule. Roof bolting is a high priority task to ensure that ground support is adequate to protect workers and the facility from collapse of the drifts. A number of incidences were identified where these activities were adversely impacted due to inadequate coordination of functions such as ensuring diesel roof bolter machines were timely fueled or appropriate radiation control support was available for crews to perform planned activities. **(Deficiency)**

*Objective:*

*All hazards that could potentially adversely impact workers, the public, the environment, the facility, and its equipment are documented and analyzed for severity/significance. (DOE Guide 226.1-2A, Appendix D, Objective WP&C2-2)(Criteria # 2, 4, 5, 7 and 8)*

EA observed a number of work activities involving the application of the hazard analysis process, reviewed several JHAs, and observed the performance of JHA walkdowns. All observed work activities were supported by a documented hazard analysis, either a GHA, a JHA, a standing JHA, or a hazard analysis performed by a subcontractor in accordance with their own procedures. In most work observations, the documented hazard analysis was consistent with the work activity and the documented work scope, and identified and documented the applicable hazards associated with the work. For example, the JHA associated with the PM for electric cart maintenance in Building 455 identified all the pertinent hazards associated with the work activity.

However, for a number of work activities, such as Type 2 maintenance PMs, the JHA is archived at the Work Control Center, does not accompany the work package in the field, and is not routinely reviewed with the workers immediately before work execution. Consequently, some JHAs do not reflect changing hazards in the field. For example, the work package associated with the installation of a fire suppression system underground did not identify the potential heat stress concern, possibly because the JHA walkdown was performed several months before performance of the work activity. During work observations, EA identified several other concerns about the implementation of the JHA process. For example:

- During the JHA tabletop review in support of revising a JHA for the monthly inspection of a 25 ton crane in the waste handling building, the supervisor omitted several steps required by Section 4.3 of the JHA procedure, such as reviewing relevant lessons learned, validating and updating the work scope, reviewing the basic job steps, and modifying as needed.
- In some cases, the JHA did not identify all the work activities or potential hazards or controls, particularly with respect to shop work activities, such as those in the Building 455 Maintenance Shop and, in the Building 247 Mine Operator's Weld Shop.
- In one work example involving vendors installing fire suppression systems, the hazards and controls in the vendor's JHA did not identify several of the hazards and controls in the NWP JHA. In addition, the NWP JHA did not include the full range of tasks performed and associated hazards (e.g., hot work).
- The JHA procedure requires JHAs to be reviewed every two years or when there is a change in hazards or work scope. EA observed an example of an outdated hazard analysis in use during the performance of the monthly bridge crane inspection in the Waste Handling Building. The most recent hazard analysis document associated with this PM procedure was a Hazard Identification Summary (a predecessor to the JHA) that had last been reviewed on July 28, 2013. Since the hazard analysis or JHA does not always accompany the work package, the field work supervisor was unaware of the outdated Hazard Identification Summary and, when the EA assessor noted the discrepancy, the work supervisor paused work until a new JHA could be developed and approved.

NWP WP 10-WC3011 expectations and requirements for work planners is that they be trained and qualified in the areas for which they develop work packages (e.g., Type 1, 2 and 3). NWP work planners'

training records indicated that five WP&C planners do not meet the training and qualification requirements: **(Deficiency)**

- Two Underground Planners have no WIPP Planning and Control Training.
- One Prioritization and Surface Planner has no WIPP Planning and Control Training.
- Two PM Planners have no WIPP Planning and Control Training.

The RWP is the principal administrative mechanism used at WIPP to inform workers of area radiological conditions and establish radiological controls for intended work activities. RWPs are developed as part of the hazard analysis process using the As Low As Reasonably Achievable (ALARA) Pre-Job Review process defined in WIPP 12-2, *WIPP ALARA Program Manual*, and Procedures 12-HP-3600 and 12-HP-3601, which govern RWP development. EA reviewed NWP RWPs and found the scope and span of control of most RWPs in the underground to be too broad to effectively meet institutional requirements stipulating that RWPs convey specific information and requirements for discrete job evolutions/tasks and ensure that controls are adequately tailored to the work being performed. Most WIPP RWPs reviewed were broadly written to allow entry into different types of radiological areas to govern the performance of a variety of operations and conditions over long periods of time, and thus are not sufficient to ensure that current radiological conditions are communicated to workers and that controls and work processes are tailored to the specific work being performed. This concern is further discussed below.

EA observed several jobs in the underground that were covered by RWP 16-0010, *General Work in High Contamination/Airborne Radioactivity Areas and/or High Contamination/Airborne Radioactivity Areas/Radiation Areas*, and found that this RWP lacked some specificity and information required by institutional requirements. As a result, this RWP did not effectively communicate current radiological conditions to the work groups and/or tailor the controls and work processes to the specific work being performed. Other RWPs had similar concerns, including the following:

- NWP has not classified these RWPs as job specific RWPs as required by WIPP 12-2 and procedures 12-HP-3600 and 12-HP-3601. For example, RWP 16-0010 is classified as a general RWP, but the work and hazards it governs dictate a job-specific RWP per Article 322 of the WIPP Radiation Safety Manual and RWP procedures. **(Deficiency)**
- NWP has not effectively followed requirements of WIPP 12-2 when completing ALARA pre-job review forms, (EA12-2-2-0), as part of RWP development. The result has been overly broad RWPs that are not linked to any of the technical work documents governing the work. WIPP 12-2 and procedures 12-HP-3600 and 12-HP-3601 all require that the relevant work order numbers and/or technical work document be listed on the ALARA pre-job review form and the RWP. Instead, these fields are denoted as Not Applicable. **(Deficiency)**
- Completed and signed ALARA pre-job review forms were incomplete, so the associated ALARA reviews were of limited quality and value. For example, when the ALARA pre-job review checklist boxes are checked in the affirmative, the information requested by checking “yes” in the box is not documented as part of the review, as required. For example, Item 3A asks “*Is historical information available on this job? If yes, provide information.*” Similarly Item 3B asks “*Is current survey information available? If yes, provide information.*” This information is not documented in response to any of the checkboxes marked as “yes.” WIPP 12-2 states that any additional requirements/recommendations are to be specified in the Remarks section and incorporated into the RWP. However, all Remarks sections were blank, and there were no attachments to these ALARA reviews. **(Deficiency)**

Overall, for most of the observed work, the hazards were identified, analyzed, and documented in accordance with established procedures. However, there were some inadequacies in the implementation of the JHA process, and some hazards were not identified or documented in the hazard analysis or were insufficiently analyzed. In addition, NWP has not followed the requirements of the institutional ALARA pre-job review process and RWP procedures, resulting in overly broad RWPs that do not address the specific work and radiological conditions, as called for by institutional requirements.

*Objective:*

*Controls are identified and implemented that effectively protect against identified hazards and approved activity-level work control documents can be performed as written. (DOE Guide 226.1-2A, Appendix D, Objective WP&C2-3)(Criteria #2, 3, 4, 5, 6, 7 and 8)*

At the work activity level, EA observed a number of work activities in which the hazard controls were clear, adequately imbedded in work documents, and consistent with the controls identified through the hazard analysis process. For example, in the observed PM on electric carts, the hazard controls of chemical gloves, aprons, and area postings were consistent with the hazard controls within the JHA for this work activity. Similarly, for the installation of local processing units (e.g., switches for providing upgraded network connectivity for the Central Monitoring System), a task performed by subcontractors, the hazard controls in both the JHA prepared by the subcontractor and the Automated JHA Hazard Report prepared by NWP for the same work activity were consistent, appropriate, and well communicated at the pre-job briefings before the work activity commenced. However, EA observed that in the installation of fire suppression systems underground, there was a considerable difference in the specification of hazard controls within the subcontractor JHA and the NWP JHA.

The underground work areas present a very challenging environment for implementing many routine radiological engineering controls. These work areas have limited availability of electrical power, less than ideal lighting, lack of fixed structures designed as change rooms, and no automated radiological counting equipment (due to environmental limitations in the underground). Thus, radiological controls are implemented primarily through administrative controls, such as RWPs and job coverage by RCTs, as well as the use of personal protective equipment (PPE) by workers.

NWP has established robust PPE requirements for individuals entering radiological areas (e.g., HCA/ARAs and CAs). These include double sets of anti-contamination (anti-c) clothing and PAPRs (for HCA/ARAs) and/or single set of anti-c clothing (for CAs). The inventory of radiological PPE is generally more than sufficient and offers a wide array of size options and types of acceptable material (e.g., uncoated, coated for chemical protection, fire rated disposable), based on needs for the actual work assignment. However, during the assessment, NWP experienced an impact to scheduled work because respirators were not available for some workers, as previously discussed.

EA also observed excellent RCT support in assisting workers with proper donning and doffing multiple layers of PPE and equipment during HCA/ARA and/or CA entries. Radiological boundary area (RBA) transition areas were fully staffed by RCTs, who also conduct radiological surveys (fixed and removable measurements) to support release of equipment and materials from the radiological controlled areas. Assignment of radiological job coverage by RCTs was consistent with RWP requirements.

As indicated in Section 5.3, EA identified a systematic weakness in that no job-specific air sampling was performed during operations that could generate airborne radioactivity and/or that required respiratory protection to protect workers from airborne radioactivity. For example, during observed fire suppression system upgrade work and other work in the Panel 7 ARA, individuals were in full PPE and respiratory protection, but no representative job-specific air sampling (grab sampling) was performed to characterize

the airborne concentrations in the work area. While stationary fixed air samplers are present in various areas of the underground and fixed and portable CAMs are used to provide early warning of a release or upset, this sampling is inadequate to meet the purpose for grab air sampling as defined in WIPP TBD-022. **(F-NWP-RAD-01)**

EA also identified a potential for worker injury because of conflicts between anti-c PPE requirements and arc flash protection requirements. EA observed a LO/TO within the underground CA that required PPE for protection against both radiological contamination and arc flash. While the arc flash PPE assigned for the task consisted of appropriately arc- and fire-rated clothing, the radiological anti-c PPE, which was required by the RWP and worn for entry into the CA, left the workers wearing clothing capable of melting next to their skin. WP 12-IS.03 states, "PPE required by a Radiological Work Permit (RWP) shall not be worn next to the skin unless it also meets, as a minimum, the requirements in table 8.1." Table 8.1 states, "Materials which melt, such as hard hat liners and hair nets shall not be permitted to be worn." Subsequent discussion with Radiological Engineering supervision indicated that anti-c fire-rated garments are being procured, however no interim compensatory measures were currently in-place to remedy this condition. **(Deficiency)**

Overall, at the work activity level, hazard controls are identified, developed, documented, and appropriately implemented for most work activities observed by EA. However, EA noted systematic deficiencies in that representative job-specific radiological air sampling is not being performed for all work requiring it.

*Objective:*

*Work is conducted diligently in accordance with approved work instructions and within established controls. (DOE Guide 226.1-2A, Appendix D, Objective WP&C2-4)(Criteria #2, 3 and 5)*

Work observed by EA was typically performed within the established controls by trained and qualified workers, although in a limited number of cases workers did not follow some JHA requirements, particularly when the JHAs were not readily available at the work location.

Most pre-job briefings observed by EA appropriately addressed the pertinent hazards and controls of the work packages, and the pre-job briefing typically involved workers through a variety of mechanisms. Some pre-job briefings were informative and engaged workers through such techniques as repeat-back interactions (e.g., observation of electric cart PM by surface mechanics, quarterly underground fan maintenance).

EA observed that both workers and work supervisors were aware of their authority to stop or pause work if a concern was identified during a work evolution. For example, EA observed that work was paused during a monthly PM of a bridge crane when workers and supervisors recognized the need for additional lighting that was not addressed in either the work document or the associated hazard analysis.

However, EA observed several pre-job briefings that did not discuss some elements required to ensure readiness to perform work, particularly for radiological work. For example, the RWP briefings to support underground work activities in both the HCA/ARA and CA areas covered the required PPE and limiting conditions of the RWPs, but they provided no discussion of the radiological contamination levels present in the area or on surfaces of equipment being worked (including disturbing the equipment surfaces by wiping, drilling, etc.). Also, these briefings did not discuss actual radiological conditions of the specific work areas or equipment, and survey maps of these areas were not discussed or provided to workers, limiting their ability to understand specific conditions and plan their tasks so as to maintain potential exposures ALARA. For one observed activity, the RCT providing job coverage in the CA had signed in

on the pre-job briefing form without having actually received a briefing related to the task, hazards, and controls associated with the work evolution, as required by WP 04-AD3030, *Pre-Job Briefings and Post-Job Reviews*, which states, “Regardless of the type of pre-job briefing used, the intent is to ensure worker acknowledgement and understanding of the work scope, hazards, controls...” In another example, for a LO/TO to be performed within the CA, the electrical supervisor from Underground Services incorrectly assumed that no formal pre-job brief was required because a Long Term Timely Order had been rescinded. Timely Order 16:002, *Compensatory Measures Resulting from Failure to Follow a Prescribed Hazardous Energy Control Process*, provided compensatory measures following a LO/TO event in February 2016. While this Timely Order was terminated after a revision and/or training associated with NWP procedure WP 04-AD3011, *Equipment Lockout/Tagout*, it did not supersede the requirements of NWP procedure WP 04-AD3030, which for LO/TO requires the conduct of a pre-job briefing that includes other aspects, such as discussion of automated external defibrillator (AED) locations and other hazard controls. In this briefing, the supervisor only discussed lockout points with the electricians assigned to the LO/TO. **(Deficiency)**

In the area of radiological contamination control, EA observed a work group with six individuals performing self-frisk whole body surveys after exiting a radiological area (HCA and CA). Each individual performed the self-frisk using a scan rate too fast to ensure detection of potential contamination, and without pausing as required by area postings. The actual survey scan times observed by EA were less than two minutes (ranging from 48 seconds to 108 seconds), sometimes without appropriate pause time at the nose and mouth as required by the WIPP Radiation Safety Manual. **(Deficiency)** This has traditionally been a common problem with reliance on self-frisking techniques for alpha emitting transuranic isotopes within the DOE complex, and most sites have therefore adopted the use of automated counting systems with consistent count times and geometries to provide verification of personnel contamination status after exiting contamination areas. WIPP does not currently utilize automated counting systems such as hand and foot monitors and/or personnel contamination monitors when personnel exit the area/facility. **(OFI-NWP-RAD-01)**

In a related concern, RCTs routinely survey the outer surfaces of respirators for radiological contamination when workers exit radiological areas but not the inner surfaces, thereby missing an opportunity to identify a workplace indicator that could drive a special bioassay. Contamination inside a respirator is specifically called out in WP-12-HP-3400, *Contamination Control*, as an indicator for special bioassay and notification by the RCT to the Radiological Control and Dosimetry Manager.

Overall, the work that EA observed was generally performed within the established controls by trained and qualified workers. Concerns were identified in of the pre-job briefings. EA noted a vulnerability with respect to poor self-frisking techniques and the lack of automated whole body counting instruments. These conditions limit the ability to properly detect contamination and could lead to inadvertent spread of low levels of contamination to areas outside of radiological areas and/or off site.

*Objective:*

*The WP&C processes are routinely evaluated by the organization’s contractor assurance system and feedback and improvement processes, and lessons learned are adequately captured and incorporated into the planning and performance of ongoing and future work activities. (DOE Guide 226.1-2A, Appendix D, Objective WP&C2-5)(Criteria #3, 4, 5 and 6)*

NWP has significantly increased the number of critiques and fact-findings over the last year. Lessons Learned are generated at the end of the critique and shared at subsequent staff meetings. Incident reports are generated on a WIPP form and submitted to a review committee to determine whether they are reportable to the Occurrence Reporting and Processing System (ORPS). EA reviewed a list of 76 WIPP

forms and reviewed 27, 7 of which were identified as reportable and were reported through ORPS. Of the remaining 20, one report was identified as a near miss and non-reportable (WF16-954, cart brakes failed) based on their evaluation of ORPS reporting criteria. This report appears to satisfy the reporting criteria in ORPS as a near miss under Group 10 (Management Concerns and Issues). The event involved a cart that impacted objects at low speed (a portable air sampler, a power skid sled, a fire extinguisher holder containing a fire extinguisher and an ICAM) as a result of brake failure. The impact to the fire extinguisher alone could have made it into a missile, with possibly catastrophic results. Additionally, after EA left the site, an ORPS report generated on July 28, 2016, identified that “during a Radiological Work Permit briefing in the underground lunch room, an 8 inch x 8 inch x 3/8 inch metal roof bolt plate (6.8 pounds) fell approximately ten feet and struck the floor one to two feet from the presenter. The incident was not reported by the Radiological Control Technician, Ground Control Engineer or the Geotechnical personnel to Underground Services or the Central Monitoring Room at that time.” **(Deficiency)** With these two significant exceptions, the WIPP forms adequately captured the events.

WP 10-WC3011, *Work Control Process Management Control Procedure*, provides direction regarding work document feedback and improvement. During interviews, some workers stated that although they provided feedback on work documents, they mostly were not incorporated. EA requested that redline and/or WIPP forms documenting worker feedback as evidence of this process for review. EA was provided five examples for review that identify feedback.

## **Work Planning and Control Implementation Conclusion**

Overall, work observed was generally performed within the established controls by trained and qualified workers. The WP&C scope-of-work process is generally well-defined, but communication and coordination issues between departments are an area of concern that impacts the ability to accomplish work as planned, including essential activities such as mine roof bolting and ground control. NWP has established robust PPE requirements for individuals entering radiological areas (e.g., HCA/ARAs and CAs). EA observed excellent RCT support in assisting workers with proper donning and doffing multiple layers of PPE and equipment during HCA/ARA and/or CA entries. However, the NWP skill-of-the-craft procedures do not adequately define the boundaries of some skill-of-the-craft work, but NWP management is working to address this shortcoming. EA also identified issues in the use of general RWPs, pre-job briefings, air sampling, readiness to perform work, frisking, and timely reporting. EA did not receive samples of feedback and improvement inputs to work packages for review.

## **7.0 CONTRACTOR ASSURANCE AND OVERSIGHT**

### **7.1 Contractor Assurance**

*Objective:*

*The site contractor management has established a CAS that includes assignment of management responsibilities and accountabilities and provides evidence to assure both DOE and the contractor’s management that work is being performed safely, securely, and in compliance with all requirements; risks are being identified and managed; and that the systems of control are effective and efficient in accordance with the policy and key elements outline in DOE Order 226.1B, Implementation of Department of Energy Oversight Policy, Attachment 1 Contractor Requirements Document; quality assurance requirements (as stated in 10 CFR 830, Subpart A, DOE Order 414.1D, Quality Assurance, or other applicable regulations); other applicable DOE directives; and contract terms and conditions. (EA CRAD 30-01)*



*Criterion #1 - A CAS is established*

NWP established a new CAS organization in early 2015 that consolidated several components of the CAS, including self-assessment and continuous improvement, issues and corrective action management, and regulatory reporting. Required training for the CAS organization and line management has been identified, new positions have been filled, and these employees will receive necessary training to meet qualification criteria.

NWP developed and documented a new CAS in WP 15-CA.01, *Contractor Assurance System Program Description*, in November 2014. CBFO approved this initial CAS, as well as a significant revision made in June 2015 and a minor revision made in November 2015 with CBFO input. EA found that the NWP CAS, as documented in WP 15-CA.01, meets DOE Order 226.1B. In addition, a number of new documents were developed in late 2015 providing additional details to implement key aspects of the CAS, such as:

- WP 15-CA1002, *Self-Assessment*
- WP 15-CA1003, *Management Observation*
- WP 15-CA1004, *Performance Monitoring and Reporting*
- WP 15-CA1007, *Fact Findings and Critiques*.

EA included MP 4.2, *Employee Concerns*, in the review of DOE requirement flowdown documentation and found that it meets the requirements of the DOE Order 442.1A *Contract Requirements Document*. However, MP 4.2 does not fully implement a comprehensive program outlined in DOE Guide 442.1-1, *Employee Concerns Program* (ECP), as required by clause H.26 of DOE contract number DE-EM0001971. **(Deficiency)** For example, the program does not provide for periodic reporting of employee concerns to DOE line organizations, does not indicate how to track completion of employee concern investigations and resulting corrective actions; and does not provide for a 24-hour access ECP hotline. There is evidence that employees are informed by various methods on how to report employee concerns, including a July 2016 email, subject: *Employee Concerns Program*, from the CBFO manager to WIPP site employees and a recent NWP all-hands meeting briefing. The ECP manager's log of employee concerns for FYs 2015 and 2016 through July shows a total of 32 concerns, with about 40 percent submitted anonymously and 33 percent being safety and health related. Employees generally received a response to their concerns within the timeframes allotted. The ECP manager reports metrics on the ECP through the T-1 metric process. The ECP manager indicated that CAS management periodically reviews the employee concerns log for recurring event and trend issues.

*Criterion #2 - Rigorous, risk-informed and credible self-assessments are planned and conducted; feedback and improvement activities are performed and documented.*

The NWP CAS provides for a number of documented evaluations, including management and organizational self-assessments and management observations. As required by WP 15-CA1002, schedules for self-assessments are developed on an annual basis. The scheduled self-assessments for 2015 focused on corrective actions from the radiological release and underground fire accident investigation board (AIB) reports. NWP indicated that the decreased number of self-assessments in 2016 was due to resources being used to prepare for readiness review activities to restart underground waste placement work. A management self-assessment for the NWP CAS in April 2016 was comprehensive and CRAD-based; however, it did not benefit from a strong "questioning attitude" on whether the CAS components are effectively identifying and correcting precursors to potential events and accidents. The self-assessment report simply reported that a CAS activity was done, not whether the results of the activity were effective. In addition, NWP has not conducted formal self-assessments of WP&C or

scheduled a self-assessment in key program areas that were identified as deficient from the accident events, such as the radiological and IH program areas, even though NWP was aware of a number of deficiencies since 2014. While NWP conducted an air-quality workshop that addressed a number of specific IH exposure monitoring issues, the workshop did not meet the NWP procedure requirements for a formal self- assessment. Overall, the number, type, and rigor of self-assessments are not self-critical of their program implementation and resulting effectiveness, such as those reported for the RPP and the IH program in Sections 5.3 and 5.4, respectively. **(F-NWP-CAS-01)**

NWP has established sufficient program requirements for managers to conduct management observations. The NWP project manager formally emphasized his expectations for conducting management observations. Management observation training was developed, and metrics were established to monitor whether the program requirements and management expectations were being met. July metrics for conducting observations show that managers are conducting more management observations of their work spaces. EA reviewed a sample of documented management observations and found that managers were observing work evolutions against work orders and had noted both positive and negative observations. One documented observation form indicates that a WIPP form, as required by the NWP procedure, was generated to track a needed corrective action.

*Criterion #3 - A structured issues management and corrective action system is established.*

The NWP Issues Management Processing System (IMPS) provides a mechanism for managing the identification, management, and closure of issues adverse to quality and safety submitted on WIPP Forms (issue identification documentation). NWP management appropriately encourages WIPP employees to submit WIPP forms when they identify issues that need evaluation and resolution and has monthly performance indicators to track use of WIPP forms. An example of how NWP encourages use of the WIPP forms is in training at NWP Leaders Forums on the importance of their use, to ensure that effective corrective actions are provided to employees. NWP has recently established a Corrective Action Review Board (CARB) to provide senior management oversight and input to WIPP form action levels, causal analyses, and corrective actions. Action levels are to be assigned to ensure that the rigor of analysis, tracking, corrective action, and closure matches the significance of the issue. EA observed a CARB meeting and found the CARB process to provide structured management oversight to the issues management system.

NWP management has been making a strong effort to close WIPP form issues. The NWP CAS requires effectiveness reviews only for a few types of corrective actions by the CAS organization, and none by the responsible line manager. This approach severely limits the opportunity to ensure that corrective actions are preventing recurrence of the issue that caused the initial adverse event or trend that the corrective action is intended to address. **(OFI-NWP-CAS-01)**

*Criterion # 4 - Results of CAS are effectively used to improve performance.*

WP 15-GM1002 provides a generally appropriate set of trend codes to be assigned to WIPP forms (issues) to facilitate trending for identification of adverse trends or programmatic issues. Although CAS organization employees manually input the trend codes in IMPS, the system lacks automated trend coding and database manipulation/search capability. **(OFI-NWP-CAS-02)** Trending of issues is therefore limited to what CAS organization employees can manually accomplish. As a result, management and the CARB do not use trending of the WIPP forms effectively, and trends are not reported to DOE line management as required by DOE Order 226.1B and NWP procedures WP 15-CA1004 and WP 15-GM1002. For example, the second quarter, fiscal year (FY) 2016 *Quarterly Performance Analysis Report for the Waste Isolation Pilot Plant* did not indicate that the WIPP form trending codes for the 1,176 WIPP forms (issues) submitted for the 12 months before the performance analysis were trended or

analyzed. While the quarterly performance analysis identified 66 issues that fell into ORPS categories but were below ORPS reporting thresholds, the performance analysis did not take advantage of the WIPP form trending code tool to trend and analyze the other 1,110 identified issues for trends and programmatic issues before they become significant and/or reportable. The lack of automated trending in the IMPS is likely a factor in this deficiency. Further, NWP does not capture programmatic issues in the IMPS, such as those found in the IH and occupational RP functional areas identified in this report. **(F-NWP-CAS-01)**

NWP experienced about 30 hazardous energy control (HEC) events throughout 2015. NWP did not document these events in a recurring ORPS report when they started to accumulate/recur. An NWP cause review of these events in January 2016 did not support reporting the 30 HEC trend as “recurring” for the purpose of ORPS reporting. As noted in a CBFO facility oversight report, CBFO suggested to NWP that the series of HEC events had common causes and met ORPS reporting criteria for a recurring report. NWP then reported the HEC events in March 2016 as a recurring ORPS report. Overall, NWP has not been timely in formally documenting and addressing emergent recurring trends that may become significant if not analyzed and appropriately addressed systematically and proactively. **(F-NWP-CAS-01)**

EA observed several shortcomings with NWP performance metrics related to WP&C. For example, the goal for the *T-1 Schedule Adherence* performance metric (which measures work accomplished within the week scheduled as a percentage of the total work scheduled in the T-1 authorized schedule) is set at 80 percent. Work that is not on the T-1 schedule is not captured in this metric, so it provides only partial insights into the overall work accomplished. This NWP work performance goal is consistently met and does not sufficiently challenge NWP to perform self-critical analysis for ways to improve. Reasons for schedule non-delivery are also captured, but this data is not analyzed further. For example, reasons for delays are binned in such categories as resource availability, work coordination issues, nuclear safety/plant equipment, work control document, and higher-priority work, with some examples within each bin. Further analysis of each bin may provide more insights into the systemic causes of delays and may lead to effective solutions. During work observations, EA noted that many of the scheduled work evolutions were not performed as planned due to issues with work planning documentation and/or lack of personnel/resources assigned or available to support the work. Overall, the NWP performance metrics for WP&C are not effective as required by DOE Order 226.1B and WP 15-CA.01. **(F-NWP-CAS-01)**

The NWP performance metrics for roof bolting and other ground control rehabilitation activities underground are not adequate or appropriate to provide a measure for safe, effective ground control. Although roof bolting and other ground control activities are high priority activities and paramount to the safety and stability of the underground workings, metrics are not adequately defined, tracked, and utilized to improve effectiveness in these activities. Roof bolting metrics are limited to rudimentary data identifying the number of bolts installed and the estimated total area of the underground identified as accessible, restricted, or prohibited. Additional data and information that has been added includes the availability of roof bolter machines to operate, the reasons for operational delays, and similar matter. The goals established and measured are subjective and not based on objective, concrete, safety-based priorities for rehabilitating the mine roof and ribs. WP 15-CA1004 provides the key processes for the NWP performance monitoring program, including the performance indicators to be monitored and reported monthly. Roof bolting and other ground control activities are not tracked in these monthly reports. **(F-NWP-CAS-01)**

### **Contractor Assurance Conclusion**

The organizational structure and programmatic documentation supporting the NWP CAS has improved since a DOE AIB found the CAS ineffective in identifying the precursor issues that led to the 2014 radiological release accident. However, NWP’s implementation of its revised CAS has not been fully

effective, particularly in addressing the CAS vulnerabilities identified in the AIB report. **(F-NWP-CAS-01)** EA observed several conditions that detract from CAS effectiveness:

- Performance metrics are not effective in trending and tracking safe and efficient accomplishment of work, as well as CAS activities (such as conduct of self-assessments and management observations and issue/corrective action management).
- Self-assessments are not always scheduled and conducted, and the corrective actions are not always tracked (including WP&C and safety functional areas, such as the IH and occupational RP programs).
- Trending mechanisms to identify emergent work and safety issues/events/concerns are inadequate.
- Documentation, analysis, and correction of emergent adverse trends related to safety are not proactive.

## 7.2 Carlsbad Field Office Oversight

*Criterion:*

*DOE field element line management has established and implemented effective oversight processes that evaluate the adequacy and effectiveness of contractor assurance systems and DOE oversight processes. (DOE Order 226.1B)*

CBFO has adequate procedures and processes in place for Federal line oversight, including assessments and issues management. The overall approach for CBFO oversight is described in DOE-CBFO-04-3299, *CBFO Contractor Oversight Plan*, which addresses separate processes for oversight of TRU waste certification, packaging, and transportation, and for oversight of WIPP operations. The oversight process for the national TRU program was developed to satisfy quality assurance requirements in the hazardous waste permit, whereas the oversight process for WIPP operations is based upon the line oversight provided by Facility Representatives (FRs), SMEs, and safety system oversight personnel. Both processes include schedules for assessments and allow tailoring based upon risk. Headquarters oversight and the role of the central technical authority are addressed in the oversight plan.

Although CBFO has documented oversight processes, they are not effectively integrated. This lack of integration has resulted in conflicting results being sent to the contractor, as discussed below.

National TRU program oversight is included in an assessment schedule, called the Integrated Evaluation Plan (IEP), developed by the Office of Quality Assurance (OQA). The Office of Operations Oversight (OOO) develops a separate assessment schedule (or IEP). The assessment schedule on the CBFO homepage is the one developed by the OQA. The OQA schedule is a three-year assessment schedule, which is updated monthly and transmitted to the New Mexico Environment Department in accordance with the hazardous waste permit. The WIPP Operations IEP is a rolling 12-month oversight schedule that is updated quarterly.

The assessment schedules are neither coordinated nor integrated, so the organizations perform assessments in the same area and sometimes provide conflicting results to the contractor. The OQA assessment schedule includes assessments of some functional areas that fall under OOO's purview, according to the CBFO Functions, Responsibilities, and Authorities Manual (FRAM); these include logkeeping, conduct of operations, and WP&C. In general, the OQA assessments in the Operations functional areas do not identify substantive issues and contradict the results of assessments conducted by the OOO. For example, in the unreviewed safety question (USQ) program, the OQA surveillance stated that "procedures are adequate and satisfactorily implemented," whereas the OOO Safety Program

Division surveillance of the USQ program stated that the “NWP procedure is not satisfactorily implemented.” Similarly, in work control, the OQA surveillance stated that “the NWP Work Control program is adequate and satisfactory,” while the OOO surveillance stated that “NWP management has not adequately communicated and enforced expectations for the execution of the Work Control Process.” **(OFI-CBFO-01)**

The Operations IEP includes operational awareness activities, formal assessments (surveillances), and other oversight activities, such as readiness assessments. The IEP is updated quarterly based on the results of the previous quarter’s oversight, emerging issues, and similar considerations. The 12-month rolling IEP that EA reviewed was labeled as “Draft” and had not been updated to indicate which assessments had been completed. The Division Manager could not provide the status of which assessments had been completed within the past year. **(OFI-CBFO-01)** He did indicate that the oversight processes for the OOO were relatively new and were still evolving.

CBFO utilizes two processes for managing issues: the condition adverse to quality (CAQ) process (used primarily by OQA and the national TRU program); and, the ICE system (used primarily by OOO). The CBFO issues management processes are partially described in various documents, but no single cohesive document describes the interrelationship between the two processes. This process difference has resulted in at least one instance where an issue related to technical safety requirement (TSR) violations was submitted to the contractor both: (1) via a letter from the OOO through the contracting officer; and, (2) by being entered into the corrective action report (CAR) system by the OQA. The FRAM assigns responsibility for oversight of the issues management program, including the ICE system, to the OQA Director. The hazardous waste permit requires that issues identified as a result of permit-related assessments be handled through the CAQ process, and that a CAR be prepared. The CARs are not entered into the ICE system; instead, OQA maintains hardcopy files. EA reviewed one of the OQA CAR files and found it to be thorough and complete. Issues identified as a result of WIPP operational oversight are defined in CBFO MP 10.9, *Surveillance, Operational Awareness, and Issues Management*, as “deficiencies, findings or other types of assessment results” and are entered in the ICE system. The ICE Manual (DOE/CBFO 14-3533, *Issue Collection and Evaluation User Manual*) also states that a priority level must be selected for the issue (major, normal, and minor) but does not state the criteria for determining the priority level. MP 3.1, *Corrective Action Reports*, addresses root cause analysis for CARs and development, completion, and closure of corrective actions but does not address effectiveness reviews. The ICE system is relatively new, and provides the necessary structure for tracking issues when they are entered into the system. EA notes that CBFO has established an ICE Council in order to continually improve issues management processes. **(OFI-CBFO-01)**

CBFO lacks an effective document management process. CBFO could not produce several documents that EA requested (e.g., FR triennial assessment, nuclear maintenance management program assessment, approval of CAS), and there was some confusion about whether documents were draft or issued (e.g., work control assessment, conduct of operations assessment). Pursuant to EA’s request for documentation of CBFO’s approval of the contractor’s CAS, the contracting officer was able to produce evidence of approval of the initial submittal, but CBFO has not approved the most recent revision submitted June 2015. **(OFI-CBFO-01)**

CBFO has assigned a new lead for the ECP. EA’s interview with the new ECP lead indicated that he received no training, and the turnover of duties was minimal. He was in the midst of revising the procedure. EA reviewed the existing procedure and the draft procedure and found them to adequately address the order requirements. He was not aware of previous assessments of the contractor’s ECP. The responsible employee resides at CBFO and makes infrequent trips to the WIPP site. EA noted outdated contact information on ECP documents at the WIPP site. **(OFI-CBFO-02)**

*Objective:*

*DOE Oversight processes must evaluate contractor and DOE programs and management systems, including site assurance systems, for effectiveness of performance (including compliance with requirements). Such evaluations must be based on the results of operational awareness activities; assessments of facilities, operations, and programs; and assessments of the contractor's assurance system. (DOE Guide 226.1-2A)*

CBFO includes WP&C in its assessment schedules and has conducted formal assessments of the contractor's WP&C programs. The OOO conducted a work control surveillance in August 2015 and identified 16 issues: 2 in the area of scope of work; 8 in the area of hazard identification and analysis; and, 6 in the area of performing work within controls. The surveillance concluded that "NWP management has not adequately communicated and enforced expectations for the execution of the work control process." This surveillance was thorough and identified appropriate issues. A subsequent surveillance of the NWP work control program by OQA in June 2016 identified one CAQ with regard to the Records Inventory and Disposition Schedule. The OOO has identified substantive issues in WP&C through operational awareness oversight and formal assessments, as documented in the monthly Facility Oversight Division reports. The FRs perform most of the routine operational awareness oversight. OOO also provides oversight of startup activities. EA observed three daily OOO group meetings, during which assignments for overseeing the WIPP Cold Operations Plan were discussed. EA reviewed the CBFO Line Management Assessment of the WIPP Interim Ventilation System Contractor Readiness Assessment, dated June 14, 2016, and found it to be thorough, technically accurate, and well documented. Another positive example of oversight is a review recently completed by the CBFO full-time industrial hygienist stationed at the WIPP site. In March 2016, CBFO completed an IH surveillance of air quality monitoring in the WIPP underground. This surveillance was detailed and thorough, and it resulted in the issuance of 2 strengths, 11 findings, and 4 areas for improvement.

Oversight results are communicated to the contractor through assessment reports, monthly operational awareness reports, and Quarterly Evaluation Reports (QERs), which evaluate functional areas and CAS performance. WIPP Operations oversight includes the designation of a CAS oversight lead and the evaluation of selected contractor assessments and completed issues. Additionally, the QER includes an evaluation of CAS performance in each functional area and an overall CAS performance evaluation for the quarter under review. EA reviewed two weekly reports, six monthly Facility Oversight Division reports, and the QER for the last quarter of 2015. The weekly reports provided an appropriate summary of facility and vital safety system status, planned upcoming work, completed oversight results, and operational events. The monthly Facility Oversight Division reports demonstrated ongoing operational awareness oversight by the FRs, safety system oversight engineers (SSOs), and SMEs, and each report identified issues in WP&C and other functional areas. As an example, the February 2016 monthly report documented concerns in LO/TO, a safety pause due to air quality alarms, issues with proper signage, and vehicle chocking issues. Twenty-eight issues were submitted to the Issue Collection and Evaluation (ICE) system on these and other issues, with follow-up WIPP forms as required to document corrective actions and CBFO evaluation. The monthly reports also included an evaluation of the CAS, addressing a review of closed WIPP forms, contractor self-assessments, and event response. DOE/CBFO 04-3299, *Contractor Oversight Plan*, Attachment 3, includes criteria for evaluating the CAS system. CBFO's evaluation of closed WIPP forms in the monthly reports was thorough and identified several issues in the closure of the forms. The QER provides an acceptable summary of performance in the functional areas, including WP&C, and the CAS.

Although communications of oversight results to the contractor were generally acceptable, no QER had been issued for the first quarter of 2016 as required by the CBFO contractor oversight plan. Instead, OOO was preparing a six-month evaluation report. **(OFI-CBFO-01)**

*Objectives:*

*The DOE field element has implemented an effective FR program. (DOE Order 422.1)(EA CRAD 45-21)*

*Maintain sufficient technical capability and knowledge of site and contractor activities to make informed decisions about hazards, risks, and resource allocation; provide direction to contractors; and evaluate contractor performance. (DOE Order 226.1B)*

DOE/CBFO-13-3505, *WIPP Facility Representative Manual*, appropriately defines the FR program as well as the FR duties and responsibilities. Additionally, CBFO Office Procedure OP 5.9, *Facility Representative Responsibilities and Routine Activities*, appropriately identifies FR program requirements and FR responsibilities. Although the manual includes the requirement to conduct an annual FR staffing analysis and a triennial FR program self-assessment, the most recent staffing analysis was conducted in 2012. **(OFI-CBFO-01)** A self-assessment of the FR program was conducted in 2012, but the report was not available for EA review; CBFO only provided the findings from review. **(OFI-CBFO-01)**

CBFO is in the process of strengthening its FR program. Five FRs are on board, but only one is fully qualified; two others are scheduled to be fully qualified by October 2016. Based on both the 2014 CBFO annual workforce analysis and staffing plan (issued January 15, 2015) and the 2012 Determination of Facility Representative Coverage per DOE-STD-1063-2011a, Facility Representatives, there is adequate FR coverage for the facilities. The current staffing level of five is more than that determined by either staffing analysis (3 per the 2012 analysis, and 4 per the 2014 analysis). EA reviewed the CBFO technical qualification program (TQP) participants' qualification status. The FRs were within their initial qualification date. EA accompanied one of the FRs to a shift turnover meeting and on daily operator surveillances and rounds. The FR was experienced and was knowledgeable of the safety systems and system operations. The FRs document their operational awareness activities in the weekly and monthly reports, and in ICE as appropriate. Also, the FRs conduct surveillances of conduct-of-operations areas. EA reviewed the December 2015 conduct-of-operations surveillance, which assessed the areas of shift routines and operating practices and communications. The surveillance noted issues in the public announcement and alarm notification systems, the conduct of operator rounds, and expired General Employee Training and other qualifications. A total of seven issues were entered into the ICE system, and the surveillance results were included in the February 2016 Facility Oversight Division monthly report. The surveillance was an adequate assessment of these conduct-of-operations elements, but the report formatting was inadequate (e.g., did not identify team members, no approval signatures, no approval date) and the issues were numbered out of order. FRs are also involved in the review of safety basis documents, as indicated by the team list on the safety basis review plan for the recent revision 5 of the WIPP documented safety analysis. An up-to-date FR on-call list was displayed, and also confirmed that quarterly performance indicators are being provided to the DOE FR program manager. The OOO daily tactical meetings are an effective method of communication, and they give the FRs and other technical staff access to senior management. Overall, FRs are providing effective oversight.

In addition to FRs, the SMEs and SSOs provide oversight of WP&C elements. CBFO currently staffs a work control specialist position; however, that position is slated to be eliminated in a proposed reorganization, and the duties are to be reassigned to a recently hired electrical/maintenance SSO. Also, CBFO TP 9.2, *CBFO Work Control Oversight*, is slated to be eliminated. **(OFI-CBFO-01)** The SSO program is described in DOE/CBFO 09-3439, *Office of Operations Oversight Safety System Oversight Program Plan*. The Facility Engineering Division is staffed with six SSOs, half of whom have completed technical qualification for their positions. The remainder are either recently hired or still in the qualification process. Evidence of oversight provided by the SSOs included surveillances of two annual system health reports for waste handling systems. The surveillances did not address the performance

objectives included in Attachment A of the SSO procedure. No formal assessments of the nuclear maintenance program have been documented. **(OFI-CBFO-01)**

DOE/CBFO 02-3219, *Technical Qualification Program Plan*, meets the requirements of DOE Order 426.1, *Federal Technical Capability*, except that it is limited to CBFO staff responsible for overseeing WIPP Operations (not applicable to the technical staff providing oversight for the national TRU program, see below). EA interviewed the CBFO manager for the technical training and technical qualification programs. She has 14 years' experience in the field of technical training. She adequately tracks the status of progress toward technical qualification and documents it on the CBFO TQP Participants Qualification Status report. She also coordinates quarterly continual training classes. Topics this year have included ICE and ground control, which are relevant to the TQP participants. EA reviewed the initial qualification package and the requalification package for one of the FRs. The records included completed qualification cards for the General Technical Base and the site-specific and FR standards. Per the technical training manager, site-specific qualification cards have just been created for the SSOs and the Senior Technical Safety Managers. Several of the TQP positions do not currently have site-specific qualifications, per the TQP status sheet. As noted above, the national TRU program technical personnel are not currently in the TQP. The national TRU program has tentatively agreed to participate in the TQP, as indicated by draft implementation plan commitments. **(OFI-CBFO-01)**

CBFO provides adequate evaluation of the contractor's performance in WP&C and incentivizes performance through the award fee process as subjective and/or performance based incentive (PBI) items. Per discussion with the contracting officer, the assigned task monitor for PBI metrics and award fee items provides feedback on contractor performance, and a monthly report is issued. In the FY 2014 Performance Evaluation and Measurement Plan, WP&C was incentivized through subjective criteria as an element of management performance, and with a PBI tied to revising 220 PM procedures. CBFO reviewed the PM PBI and identified a 100 percent failure rate for quality/operability through field observation and tabletop reviews. CBFO also conducted a follow-up management assessment to review the corrective actions, and identified additional issues. These reviews were thorough and detailed. In the FY 2016 plan, WP&C continues to be incentivized through the subjective criteria as an element of management performance.

### **Carlsbad Field Office Oversight Conclusion**

As the result of permitting requirements, CBFO previously relied primarily upon a quality assurance approach for line management oversight. CBFO has substantially improved its operational oversight since the events of 2014, including hiring additional OOO staff and updating CBFO oversight processes. OOO has identified substantive issues in WP&C through operational awareness oversight and formal assessments, as documented in the monthly Facility Oversight Division reports. CBFO is in the process of strengthening its FR and SSO programs. Five FRs are on board, but only one is fully qualified; two others are scheduled to be fully qualified by October 2016. The Facility Engineering Division is appropriately staffed with six SSOs, half of whom have completed technical qualification for their positions. CBFO currently staffs a work control specialist position; however, that position is slated to be eliminated in a proposed reorganization. The loss of this position could result in reduced focus on the WP&C program, as well as a lack of a centralized point for consolidating input from the FRs, SSOs, and SMEs. OOO's evaluation of the CAS, includes a review of closed WIPP forms, contractor self-assessments, and event response. CBFO provides adequate evaluation of the contractor's performance in WP&C and has incentivized performance through the award fee process as subjective and/or PBI items. CBFO lacks integration of its oversight processes. Other concerns include an inadequate document management process, the need for continued development of the FR and SSO programs, transition of the ECP program and the need for focus on the TQP.



## 8.0 PREVIOUS FINDINGS FOLLOW-UP

*Criterion:*

*The DOE field element has an issues management process that is capable of categorizing findings based on risk and priority, ensuring relevant line management findings are effectively communicated to the contractors, and ensuring that problems are evaluated and corrected on a timely basis. (DOE O 226.1B 4b(4))*

EA reviewed the corrective actions taken to address Finding F-1 from *Independent Oversight Review of the WIPP Work Planning and Control Activities*, dated April 2013. This finding addresses CBFO's failure to document issues in a manner that would ensure timely corrective action. CBFO documented an assessment of past open findings in a Historical Assessment Report on November 2015. This report identified corrective actions associated with the accident investigation judgments of need (JONs) that would also serve to correct Finding F-1. EA reviewed the evidence files for the following:

- JON 14.03, Item 6: Identify an issues management system.
- JON 14.04: Train staff on CBFO Contractor Oversight Plan.
- JON 14.05: Develop procedure MP 10.9 and CBFO 14-3533.
- JON 14.06: Train staff on MP 10.9 and CBFO 14-3533.
- JON 24.04: Train staff on SAF-384 and SAF-385.
- JON 25.01: Approve procedure MP 10.9 and CBFO 14-3533 and train staff.

The corrective actions include documenting new processes and procedures for contractor oversight and issues management. Procedure 10.9, *Operational Awareness*, was issued on October 2, 2014, and DOE/CBFO 14-3533, *Issues Collection and Evaluation User Manual*, was issued on July 21, 2014. DOE/CBFO-04/3299, *Contractor Oversight Plan*, was also revised. CBFO staff received training on these new processes and procedures. The issues management system, ICE, was developed subsequent to the finding and provides the necessary structure for tracking issues when they are entered into the system (See Section 7.2 of this report). These improvements to contractor oversight and issues management are adequate to address the finding.

## 9.0 FINDINGS

Findings are deficiencies that warrant a high level of attention from management. If left uncorrected, findings could adversely affect the DOE mission, the environment, the safety or health of workers and the public, or national security. DOE line management and/or contractor organizations must develop and implement corrective action plans for EA appraisal findings. Cognizant DOE managers must use site- and program-specific issues management processes and systems developed in accordance with DOE Order 227.1A to manage these corrective action plans and track them to completion. In addition to the findings, deficiencies that did not meet the criteria for a finding are listed in Appendix C, with the expectation from DOE Order 227.1A for site managers to apply their local issues management processes for resolution.

**F-NWP-RAD-01: NWP has not implemented and integrated some required internal dosimetry program elements, such as sufficiently sensitive compliance bioassay monitoring coupled with representative grab air sampling and/or breathing zone sampling, as necessary to ensure compliance with 10 CFR 835.401 and 402, and to prevent the potential for unmonitored internal exposures.**

- NWP does not have appropriate flowdown mechanisms (health physics procedures) to drive compliance with institutional requirements in the areas of grab air sampling and breathing zone air sampling, as needed to ensure compliance with 10 CFR 835.401 and 403.
- NWP conducts compliance bioassay monitoring for high risk work, but the WIPP 12.DS-06 technical basis does not define the solubility and absorption characteristics for Pu source terms that may exist at WIPP, and the minimum detectable dose for Type S Pu-238/239 using the current quarterly sampling frequency is not sufficient to demonstrate compliance with the annual dose limit of 5 rem, as required by 10 CFR 835.402(C).
- NWP has not ensured that job-specific air sampling is properly performed during work evolutions that could generate airborne radioactivity and/or where respiratory protection is required for protection against airborne radioactivity, as required by 10 CFR 835.401 and 403, and Article 555 of WP-12-5.

**F-NWP-IH-01: NWP has not identified, analyzed, and documented all the potential chemical hazards associated with WIPP as required by 10 CFR 851.**

- IH has not identified, analyzed, and documented all the potential hazardous chemicals in the underground to which workers may be exposed (e.g., waste effluents, diesel equipment emissions, welding) and linked the IH sampling and monitoring program to these hazards as required by 10 CFR 851, Appendix A.6(a).
- The lack of a documented hazard analysis for all potentially hazardous chemicals in the underground as required by 10 CFR 851.21(a)(2) may result in the selection of hazard controls (e.g., respirators and respirator cartridges) that are not fully protective of the underground workforce. Current respirators and respirator cartridges have not been evaluated for some hazardous chemicals that have been identified in the waste streams (e.g., ammonia, formaldehyde, and mercury).
- IH has not ensured that chemical hazards from new waste streams are identified, analyzed, and documented as required by 10 CFR 851.21(a)(2). IH has not developed a strategy, procedure or other mechanism for systematically reviewing the chemical contents of new incoming waste containers or waste streams when waste operations resume to ensure that chemical hazards from the waste containers are analyzed and that the IH monitoring and sampling program addresses the potential chemical emissions from those waste containers before they are embedded underground.
- A number of work areas have not been fully evaluated for health risks (e.g., aboveground machine shops and welding shops) or included in the SRAS as required by 10 CFR 851, Appendix 6. (a), which requires an initial or baseline survey and periodic resurveys and/or exposure monitoring as appropriate of all work areas or operations to identify and evaluate potential worker health risks.

**F-NWP-CAS-01: NWP has not implemented a CAS that provides evidence to assure that work is being performed safely, securely, and in compliance with all requirements; risks are being identified and managed; and that systems of control are effective and efficient in accordance with DOE Order 226.1B, CRD.**

- NWP has not conducted trending analysis for all WIPP form issues and their associated WP 15-GM1002 assigned trend codes with documented results provided to senior managers/CARB as required by the DOE Order 226.1B *Contractor Requirements Document*, 2.b and NWP procedures WP 15-CA1004 and WP15-GM1002.
- NWP has not established and measured metrics and goal based on objective concrete safety-based priorities for rehabilitating the mine roof and ribs (including roof bolting and other ground control activities) in the monthly NWP performance indicator reporting per NWP procedure WP 15-CA1004.

- NWP has not implemented a self-assessment process that has the rigor to identify latent organization errors, program deficiencies, and other precursors to adverse safety trends and events. This action applies particularly to self-assessments of the CAS, WP&C, IH, and occupational RP programs, and effectiveness reviews of corrective actions.

## 10.0 OPPORTUNITIES FOR IMPROVEMENT

EA identified some OFIs to assist cognizant managers in improving programs and operations. While OFIs may identify potential solutions to findings and deficiencies identified in appraisal reports, they may also address other conditions observed during the appraisal process. EA offers these OFIs 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-NWP-IH-01:** NWP should consider developing an Industrial Hygiene Chemical Waste Technical Basis document(s) that identifies and characterizes the sources of all potential airborne chemical contaminants in the underground (e.g., embedded waste, diesel emissions, welding fumes, paint), the worker exposure pathways from these contaminants, a short list of chemicals of primary concern, and that establishes a basis for a comprehensive IH sampling and monitoring program for the underground. As an example, consider the approach used by Washington River Protection Solutions (WRPS) at the Hanford Tank Farms in characterizing, sampling, and monitoring tank wastes as documented in the *WRPS Industrial Hygiene Chemical Vapor Technical Basis* (RPP-22491).

**OFI-NWP-IH-02:** NWP should consider the use of active sampling with a sample pump and absorption media to supplement the current use of passive badges.

**OFI-NWP-IH-03:** For heat stress conditions for which the traditional WBGT monitoring may not be fully effective (i.e., when wearing double sets of radiological contamination control clothing in the underground), NWP should consider the use of more advanced physiological monitoring instrumentation in lieu of WBGT instrument monitoring. An example of a useful approach to physiological monitoring (heart rate monitoring & temperature monitoring) is being used by WRPS at the Hanford waste tank project and is documented in WRPS Procedure TFC-ESHQ-S IH-C-07.

**OFI-NWP-RAD-01:** NWP should consider installing and requiring the use of automated counting systems such as hand and foot monitors and/or personnel contamination monitors, either in the underground or above ground, for all individuals prior to exiting the area/facility, so as to validate the effectiveness of self-frisking techniques which are currently performed at the RBA when exiting contamination areas.

**OFI-NWP-CAS-01:** NWP should consider enhancing the use of documented effectiveness reviews of completed safety-related corrective actions to ensure that they are effective before closing WIPP form issues. Consideration should be given to:

- Requiring line managers, in addition to the CAS staff, to perform effectiveness reviews for safety-related corrective actions before closing the WIPP form issue.
- Increasing reliance on development and use of effectiveness metrics as closure evidence, rather than one-time actions (e.g., changing a procedure or providing training).

**OFI-NWP-CAS-02:** NWP should consider adding an automated database capability in the IMPS for

entering and manipulating WIPP form issue trend codes to assist the CAS organization and line managers in trending to identify emergent adverse work performance and safety trends.

**OFI-CBFO-01:** CBFO should consider improving its oversight processes by such means as:

- Integrating the oversight processes of the OQA, the national TRU program, and OOO, including coordinating and integrating the IEPs into one CFBO assessment plan, the conduct of assessments, and the issues management processes. Clarify the roles and responsibilities for operational oversight.
- Improving the document management processes, notably by implementing an efficient document storage and retrieval system and report format standardization.
- Adhering to assessment and report schedules, performing self-assessments of the FR and SSO programs, and conducting an annual determination of facility representative coverage. Adding the national TRU program oversight personnel in the TQP, completing TQP qualification for technical staff, adding site-specific qualification cards for all of the TQP positions, and performing a self-assessment of the TQP program. Revising DOE/CBFO 02-3219, *Technical Qualification Program Plan*, to include the national TRU program personnel.
- Ensuring that the duties currently assigned to WP&C position are captured in the position description and in the performance appraisal of the person assuming the duties. CBFO should consider revising CBFO TP 9.2, *CBFO Work Control Oversight*, instead of eliminating it.

**OFI-CBFO-02:** CBFO should provide additional focus on the ECP, including training for the new lead, increased presence at the WIPP site, and an assessment of the contractor's ECP.

## **Appendix A Supplemental Information**

### **Dates of Assessment**

Onsite Assessment: June 13-16 and July 11-14, 2016

### **Office of Enterprise Assessments (EA) Management**

Glenn S. Podonsky, Director, Office of Enterprise Assessments  
William A. Eckroade, Deputy Director, Office of Enterprise Assessments  
Thomas R. Staker, Director, Office of Environment, Safety and Health Assessments  
William E. Miller, Deputy Director, Office of Environment, Safety and Health Assessments  
C.E. (Gene) Carpenter, Jr., Director, Office of Nuclear Safety and Environmental Assessments  
Patricia Williams, Director, Office of Worker Safety and Health Assessments  
Gerald M. McAteer, Director, Office of Emergency Management Assessments

### **Quality Review Board**

William A. Eckroade  
John S. Boulden III  
Kevin L. Dressman  
Thomas R. Staker  
William E. Miller  
C.E. (Gene) Carpenter, Jr.  
Patricia Williams  
Gerald M. McAteer  
Michael A. Kilpatrick

### **EA Site Lead for WIPP**

Jeff Snook

### **EA Assessors**

Kevin E. Horace, Team Leader  
Patricia Williams  
Terry E. Krietz  
Joseph Lischinsky  
James R. Lockridge  
Terry B. Olberding  
Peter M. Turcic  
Mario A. Vigliani

**Appendix B**  
**Key Documents Reviewed, Interviews, and Observations**

**Documents Reviewed**

- 10 CFR 851 *Worker Safety and Health Program*
- Activity Level Work Documents Associated with MWO00003 Rev. 1, Bulkhead Installation – Removal and Maintenance.
- Activity Level Work Documents Associated with MWO00013, Ground Control.
- Activity Level Work Documents Associated with MWO00022, Automatic Fire Suppression System Installation/Removal and Maintenance.
- Activity Level Work Documents Associated with PM041042, Rev. 11 1B, *Underground Exhaust Fan 41-B-860, B&C Maintenance*, Rev. 11 1B.
- Activity Level Work Documents Associated with Work Package 1618628, 534-AU02 Perform Milling and Ground Clean Up Activities.
- Activity Level Work Documents Associated with Work Package 1618883, 74-B-226 Fabricate Bulkhead for New UG Lube Oil Storage Area.
- Activity Level Work Documents Associated with Work Packages 1509861 and 1510996, Install New 480VAC Power to Refuge Chambers.
- DOE Contract Number DE-EM0001971 with NWP
- DOE/WIPP-95-2054, *WIPP Radiation Protection Program*, Revision 19, 04/20/15
- Email from CBFO Manager to WIPP site employees, Employee Concerns Program, 8/19/16
- EM-CBFO-NWP-WIPP-2016-0005, *ORPS report, Underground Air Quality Management Program*
- IC240023, *Calibration of MX6 Ibrid Multigas Monitors Maintenance Procedure*, Revision 0, TRN 1
- List of ORPS reports, *Electrical Issues and Significance Category*, 2014, 2015, 2016
- Long Term Timely Order: 16:002, Compensatory Measures Resulting from Failure to Follow a Prescribed Hazardous Energy Control Process, 2016
- Management Assessment, *Annual Lockout/Tagout Audit*, MA-OPS2014-27, 05/01/2014
- MA-OPS-2013-18, *Management Assessment Work Control, WP10-WC3011, Department Records Inventory and Disposition Schedule (RIDS)*, 10/30/13
- MA-OPS-2013-20A, *Management Assessment Work Release of PIV 13 WCD, Excavations*, 12/18/13
- MA-OPS-2014-01, *Management Assessment Work Control, Work Planning Team Walk Downs/JHAs, WP12-IS3002, WP10-WC3011 and WP10-WC3012*, 05/28/14
- MA-OPS-2014-02, *Management Assessment Work Control, Lessons Learned in the Work Planning Process, WP10-WC3011*, 05/30/14
- MA-OPS-2014-04, *Management Assessment Work Control, WP10-WC3011 and WP12-IS3002*, 08/22/14
- MA-OPS-2014-06, *Management Assessment Work Control, Type 4 Work Determination, WP10-WC3011*, 12/12/14
- MA-OPS-2014-15, *Self-Assessment Report, Findings from MSHA Inspection*, 01/28/14-01/30/14
- MA-OPS-2014-20, *Management Assessment Work Control, Review Calibration Type Maintenance Work Orders to ensure procedural compliance, CTS 43089*, 06/23/14
- MA-OPS-2014-29, *Management Assessment Work Control, Conduct of Operations Implementation and Compliance with Work Control Processes, WP04-CO.01 and WP10-WC3011*, 05/08/14-11/17/14
- MA-OPS-2015-06, *Management Assessment Work Control, Planning, Scheduling, and Coordination of Maintenance*, 04/01/15
- MA-OPS-2015-07, *Management Assessment Work Control, Management Scheduled Assessment*, 06/01/15

- MA-OPS-2015-09, *Management Assessment Work Control, Management Scheduled Assessment*, 09/01/15
- MA-OPS-2015-16, *Management Assessment Work Control, Verify Areas for Improvement from the AIB investigation are complete for JON 15.1*, 09/21/15
- MA-WC-2013-01, *Management Assessment Work Control, Work Control Metrics / Trending, DOE O 433.1B / DOE G 433.1.1A*, 07/15/13
- MC 1.16, *Corrective Action Review Board Management Charter*, Revision 0, 08/14/15
- Meeting Minutes, *Drill Dry Scrubbers*, 03/15/16
- Meeting Minutes, *OSHA/MSHA requirements for hoisting maintenance*, 02/19/16
- MP 4.2, *Employee Concerns*, Revision 9, 4/30/15
- MSA-ESH-2016-001, *SMP Effectiveness and Implementation Review*, 12/02/15
- MSA-MAINT-2016-001, *Maintenance and Work Planning & Control Self-Assessment - Compliance with DOE 433.1B, Ch 1*, 12/14/15
- NWP Assessment Schedule - FY 16, Revision 1, 01/21/16
- NWP Assessment Schedule - FY/CY 2015, Sept 29, 2015
- NWP CAS Assessment Schedule - FY 15
- NWP *Employee Concerns Form*
- NWP Employee Concerns Logs – FY15/16
- NWP *Employee Concerns Poster*
- NWP Health Dashboard
- NWP Management Policy, *Electrical Safety Committee Charter*, MC 6.3.3, Rev. 7, 11/27/12
- NWP Performance Index - Oct/Nov/Dec 2014
- PM041042, *Underground Exhaust Fan 41-B-860, B&C Maintenance*, Rev. 11 1B
- QA:16:00020, *I15-13 Radiation Protection Report*, 09/29/2015-11/15/2015
- RW I and RW II Training Modules 6 and 9, *General Guidelines for Handheld Monitoring*, 2016
- RWP 16-0011/General, *CA/ARA and CA/ARA/RA at the WIPP Site including U/G*, 03/07/16-03/07/17
- RWP 16-0012/General, *Various location at the WIPP site including U/G*, 03/07/16-03/07/17
- RWPs in effect for 2016 including 16-0010/General, HCA/ARA and HCA/ARA/RA, 16-0009/General, RAs and 16-0008/General for CAs at the WIPP Site including U/G and associated ALARA Pre-Job Reviews
- Scheduled Work / Daily Release Sheets for weeks of 6/13-16/2016 and 7/11-14/2016
- TBD-022, *WIPP Workplace Air Monitoring Technical Basis Document*, Revision 0, December 2014
- TE-15-001, *WIPP Workplace Air Monitoring Program Technical Evaluation*, Revision 2, 03/03/16
- Type 1 Work Order Package, WO 1505125, *At Substation 7 (25P-SWG05/7)*, 06/02/16
- Type 2 Work Order Package, WO 1514045, *41B994 SAG SM EXH. FAN*, 03/05/16
- Type 3 Work Order Package, WO 1514068, *413 Ensure Access Ports are Freed Up for 41-B-856 and 41-B-857 Outlet Duct work*, 01/07/16
- Type 4 Work Order Package, WO 1514897, *Several Lights are out in the Plant Sub*, 02/09/16
- WF 16-954 - Details Report - Cart 74-C-111 - Underground - Near Miss
- WF 16-945 - Details Report - Management Observation - Flammable Liquid Cabinet N1400
- WF 16-942 - Details Report - MX6 Alarm - Underground
- WF 16-904 - Details Report - Sample media may have become lodged in Tennelec 240-RI-000-1032
- WF 16-903 - Details Report - Instrument 240-RI-000-1031 Not Ranged In
- WF 16-874 - Details Report - Breaker Tripped in EXO - 480v cable pinched
- WF 16-821 - Details Report - Fire Extinguisher Monthly check
- WF 16-754 - Details Report - PID went into Alarm
- WF 16-658 - Details Report - PAPR not operating
- WF 16-653 - Details Report - Bolting Crew Contacted GeoTech Instrument

- WF 16-652 - Details Report - PA Communications Test
- WF 16-620 - Details Report - Bolting Crew Contacted GeoTech Instrument
- WF 16-108 - Details Report - Work Control Document
- WF 16-1036 - Details Report - GeniZ Lift
- WF 16-1010 - Details Report - UG 480v Lighting Panel Damage
- WF 16-947 - Details Report - PAPR Mask Hose Disconnect
- WF 16-845 - Details Report - TSR DP Alarm Set Pt Violation - ORPS Reported
- WF 16-666 - Details Report - Failure to follow HEC Mobile Equip - ORPS Reported
- WF 16-661 - Details Report - Failed to Enter LCO Obstruction Testing
- WF 16-602 - Details Report - Forklift Mast Hits Building
- WF 16-493 - Details Report - UG Vehicle Fire Suppression
- WF 16-383 - Details Report - Stop Work 308 Bulkhead
- WF 16-033 - Details Report - Forklift Broke Thru Salt Floor
- WF 15-855 - Details Report - Failed Sling - ORPS Reported
- WF 15-793 - Details Report - Generator LO-TO - ORPS Reported
- WF 15-692 - Details Report - Air Hose Striking Hand - ORPS Reported
- WF 15-576 - Details Report - Fire Water Repair LO-TO - ORPS Reported
- WF16-108 Details Report, *Work Control Documents Worked Without Required Scheduling and/or Release Authorization (WCDs 1510085, 1615261, 1615262, 1615263, 1615264)*, 01/27/2016
- WIPP 12.DS-06, Waste Isolation Pilot Plant Internal Dosimetry Technical Basis
- WIPP TBD-022, WIPP Workplace Air Monitoring Technical Basis Document
- WP 04-AD3011, *Equipment Lockout/Tagout Management Control Procedure*, Revision 15-FR1, 03/01/16
- WP 04-AD3013, *Underground Access Control*, 2/29/16
- WP 04-AD3030, *Pre-Job Briefings and Post-Job Reviews Management Control Procedure*, Revision 6, 04/06/15
- WP 04-AD3032, *Senior Management Review Board Management Control Procedure*, Revision 4, 09/29/14
- WP 04-AU0534, *Underground Access Initiation/Termination Technical Procedure*, Revision 3, 03/24/16
- WP 10-WC.01, *Cross-Connection Control Program*, Revision 5, 04/19/13
- WP 10-WC.03, *NWP Equipment Calibration Program*, Revision 0, 11/05/14
- WP 10-WC.04, *Skill of the Craft/ Skill of the Worker Program*, Revision 1, 08/26/15
- WP 10-WC3008, *Facility Inspections Management Control Procedure*, Revision 18, 02/03/15
- WP 10-WC3010, *Periodic Maintenance Administration and Controlled Document Processing Management Control Procedure*, Revision 28, 04/13/16
- WP 10-WC3011, *Work Control Process Management Control Procedure*, Revision 36, 11/30/15
- WP 10-WC3012, *Work Control Document Writer's Guide*, Revision 1, 09/29/14
- WP 10-WC3013, *Work Control Document (WCD) User's Guide*, Revision 1, 09/29/14
- WP 10-WC3014, *Periodic Maintenance Activity Screening Process Management Control Procedure*, Revision 0, 09/29/14
- WP 10-WC3015, *Scheduling and Work Authorization Management Control Procedure*, Revision 1, 03/30/15
- WP 10-WC3017, *Post-Maintenance Testing Management Control Procedure*, Revision 1, 09/29/14
- WP 10-WC3018, *Skill of the Craft/ Skill of the Worker Documentation Management Control Procedure*, Revision 0, 04/06/15
- WP 12 IH1007, *Personal Sampling Pump Calibration Technical Procedure*, Revision 4, 02/11/16
- WP 12-2 Rev, 21, WIPP ALARA Program Manual, 2/08/16



- WP 12-3 Rev, 22, Dosimetry Program 3/04/15
- WP 12-5 Rev. 19, WIPP Radiation Safety Manual, 5/17/16
- WP 12-DS.06, *Waste Isolation Pilot Plant Internal Dosimetry Technical Basis*, Revision 0, 02/26/15
- WP 12-DS.08, *Waste Isolation Pilot Plant External Dosimetry Technical Basis*, Revision 0, 02/26/15
- WP 12-DS3350 Rev. 1, Internal Dosimetry Program Participation, 12/15/15
- WP 12-ES1124, *Operation of Breathing-Air Compressor, 45-G-621 Technical Procedure*, Revision 5, 04/09/13
- WP 12-ES1124, *Operation of Breathing-Air Compressor, 45-G-621 Technical Procedure*, Revision 5, 04/09/13
- WP 12-ES3918, *Reporting Occurrences in Accordance with DOE Order 232.2 Management Control Procedure*, Revision 17, 03/10/15
- WP 12-FP0060 Semi-Annual Inspection of Automatic Fire Suppression for Diesel Powered Equipment, 2016
- WP 12-HP1100, *Radiological Surveys Technical Procedure*, Revision 20, 04/29/15
- WP 12-HP1301, *Operation of the 3220 Series Depth Moisture Gauge Am-Be*, Revision 0, 07/13/01
- WP 12-HP1306, *Canberra Alpha Sentry Continuous Air Monitor Technical Procedure*, Revision 9, 08/14/14
- WP 12-HP1307, *Portable Instrument Operability Checks Technical Procedure*, Revision 16, 03/10/16
- WP 12-HP1314, *Remote-Handled Waste Service Room Technical Procedure*, Revision 7, 11/19/10
- WP 12-HP1317, *Canberra iSolo Alpha/Beta Counting System Technical Procedure*, Revision 1, 11/20/13
- WP 12-HP1320, *Operation of the DMC 2000X Electronic Dosimeter Technical Procedure*, Revision 0, 07/07/14
- WP 12-HP1321, *Bladewerx SabreAlert Alpha Continuous Air Monitor Technical Procedure*, Revision 5, 11/10/15
- WP 12-HP1324, *Direct Frisks of Station A Filter Technical Procedure*, Revision 2, 02/15/15
- WP 12-HP1325, *Station B Canberra iCAM Alpha Continuous Air Monitor Technical Procedure*, Revision 5, 02/15/16
- WP 12-HP1326, *Operability Check of Sirius 5AB Cuff, Hand and Foot Monitor and Argos 5AB Personnel Contamination Monitor Technical Procedure*, Revision 3, 08/08/14
- WP 12-HP1327, *Collection and Analysis of Soil Samples Technical Procedure*, Revision 0, 09/30/15
- WP 12-HP1328, *Control, Identification, and Use of Site Approved HEPA Filters and HEPA Filtered Equipment and Systems Technical Procedure*, Revision 0, 09/30/15
- WP 12-HP1500, *Radiological Posting and Access Control Technical Procedure*, Revision 20, 07/16/15
- WP 12-HP2001, *Abnormal Radiological Conditions Abnormal Operating Procedure*, Revision 8, 02/15/16
- WP 12-HP3000, *Radiological Control Administration Management Control Procedure*, Revision 22, 10/14/15
- WP 12-HP3200, *Radioactive Material Control Technical Procedure*, Revision 19, 11/24/15
- WP 12-HP3201, *Radioactive Source Accountability and Control Technical Procedure*, Revision 2, 02/29/16
- WP 12-HP3300, *Radiation Exposure Control Technical Procedure*, Revision 3, 06/26/15
- WP 12-HP3400, *Contamination Control Management Control Procedure*, Revision 12, 11/24/15
- WP 12-HP3500, *Airborne Radioactivity Technical Procedure*, Revision 21, 11/24/15
- WP 12-HP3600, *Radiological Work Permits Technical Procedure*, Revision 20, 01/19/16
- WP 12-HP3601, *Sentinel Radiological Work Permits Technical Procedure*, Revision 0, 02/04/16
- WP 12-HP3800, *Radiological Control Logbook Technical Procedure*, Revision 0, 03/30/15

- WP 12-HP4000, *Emergency Radiological Control Responses Alarm Response Procedure*, Revision 9, 04/09/15
- WP 12-IH.01, *WIPP Chemical Hygiene Plan*, Revision 5, 11/20/12
- WP 12-IH.02, *WIPP Industrial Hygiene Program Manual*, Revision 12, 11/20/12
- WP 12-IH.02-1, *WIPP Industrial Hygiene Program - Health Hazard Assessment*, Revision 6, 11/20/12
- WP 12-IH.02-10, *WIPP Industrial Hygiene Program - Inorganic Lead Management Program*, Revision 2, 3/30/15
- WP 12-IH.02-11, *WIPP Industrial Hygiene Program - Polychlorinated Biphenyls (PCBs)*, Revision 1, 12/06/12
- WP 12-IH.02-12, *WIPP Industrial Hygiene Program - Cryogenics, Refrigerants, and Process Gases*, Revision 1, 12/06/12
- WP 12-IH.02-13, *Industrial Hygiene Program - Approved Plastic Suit, Airline Respirator*, Revision 1, 04/29/14
- WP 12-IH.02-14 *Industrial Hygiene Program - Approved Plastic Hood, Airline Respirator with Disconnect*, Revision 1, 04/29/14
- WP 12-IH.02-15, *Industrial Hygiene Program - Heat Stress*, Revision 1, 07/29/15
- WP 12-IH.02-16, *WIPP Industrial Hygiene Program - Asbestos Management*, Revision 0, 09/16/15
- WP 12-IH.02-18, *Industrial Hygiene Program - Indoor Air Quality*, Revision 1, 01/06/16
- WP 12-IH.02-2, *WIPP Industrial Hygiene Program – Confined Space*, Rev. 9, 04/22/14
- WP 12-IH.02-3, *WIPP Industrial Hygiene Program - Hazardous Waste Operations and Emergency Response*, Revision 4, 10/17/12
- WP 12-IH.02-4, *WIPP Industrial Hygiene Program – Hazard Communication and Hazardous Materials Management Plan*, Revision 10, 11/20/12
- WP 12-IH.02-5, *WIPP Industrial Hygiene Program – Hearing Conservation*, Rev. 4, 11/20/12
- WP 12-IH.02-6, *WIPP Industrial Hygiene Program - Respiratory Protection*, Revision 8, 01/14/16
- WP 12-IH.02-7, *WIPP Industrial Hygiene Program - Lasers, Lighting, Pest Control, and Sanitation*, Revision 5, 4/30/15
- WP 12-IH.02-8, *WIPP Industrial Hygiene Program - Office and Industrial Ergonomics*, Revision 3, 05/13/13
- WP 12-IH.02-9, *WIPP Industrial Hygiene Program - Beryllium Exposure Prevention Program*, Revision 3, 3/12/2015
- WP 12-IH1004, *Noise Surveys Technical Procedure*, Revision 4, 11/26/12
- WP 12-IH1006, *Airborne Contaminant Sampling Technical Procedure*, Revision 4, 10/30/12
- WP 12-IH1008, *Indoor Air Quality Evaluations and Response Technical Procedure*, Revision 0, 02/11/16
- WP 12-IH1020, *Abnormal Condition Involving Cryogenics/Process Gas Technical Procedure*, Revision 1, 11/27/12
- WP 12-IH1022, *Sampling for Waste Generated VOCs Technical Procedure*, Revision 10, 03/23/16
- WP 12-IH1815, *Local Exhaust Annual Face Velocity Testing Technical Procedure*, Revision 4, 02/11/16
- WP 12-IH1828, *MSHA Air Quality Monitoring Technical Procedure*, Revision 7, 03/07/16
- WP 12-IS.01, *Industrial Safety Program - Structure and Management*, Revision 15, 1/16/13
- WP 12-IS.01-1, *Industrial Safety Program - Barricades and Barriers*, Revision 7, 03/10/16
- WP 12-IS.01-10, *Industrial Safety Program - Fall Protection*, Revision 4, 09/09/15
- WP 12-IS.01-11, *Industrial Safety Program - Compressed Gases*, Revision 5, 3/25/15
- WP 12-IS.01-12, *Industrial Safety Program - Hoisting and Rigging*, Revision 4, 04/01/16
- WP 12-IS.01-13, *Industrial Safety Program - Excavations*, Revision 3, 10/29/15
- WP 12-IS.01-14, *Industrial Safety Program - Blind Penetrations*, Revision 0, 10/01/13

- WP 12-IS.01-15, *Industrial Safety Program - Scaffolds*, Revision 3, 06/24/15
- WP 12-IS.01-16, *Industrial Safety Program - Hand Safety*, Revision 0, 01/23/15
- WP 12-IS.01-17, *Industrial Safety Program - Towing and Dragging*, Revision 0, 02/24/16
- WP 12-IS.01-18, *Industrial Safety Program - Aerial Lifts and Elevating Work Platforms*, Revision 0, 03/25/15
- WP 12-IS.01-19, *Industrial Safety Program - Safety Signs and Controls*, Revision 0, 3/30/15
- WP 12-IS.01-21, *Industrial Safety Program - Portable Generators and Vehicle-Mounted Generators*, Revision 0, 3/26/15
- WP 12-IS.01-3, *Industrial Safety Program - Power and Hand Tools*, Revision 12, 02/27/15
- WP 12-IS.01-4, *Industrial Safety Program - Personal Protective Equipment*, Revision 7, 01/23/15
- WP 12-IS.01-5, *Industrial Safety Program - Walking and Working Surfaces and Ladders*, Revision 12, 02/09/15
- WP 12-IS.01-6, *Industrial Safety Program - Visitor, Vendor, User, Tenant, and Subcontractor Safety Controls*, Revision 11, 02/03/14
- WP 12-IS.01-7, *Industrial Safety Program - General Electrical Safety*, Revision 4, 11/15/12
- WP 12-IS.01-7HV, *Industrial Safety Program - Craft Manual - Electrical Safety*, Revision 6, 01/30/13
- WP 12-IS.01-8, *Industrial Safety Program - Vehicle Safety*, Revision 10, 4/27/15
- WP 12-IS.01-9, *Industrial Safety Program - Responsibilities for the Oversight of Visitors, Vendors, Users, Tenants, and Subcontractors*, Revision 4, 04/05/13
- WP 12-IS.03, *Electrical Safety Program Manual*, Revision 13, 03/08/16
- WP 12-IS0301, *Nationally Recognized Testing Laboratory Process Management Control Procedure*, Revision 2, 11/15/12
- WP 12-IS1001, *Chlorine Sampling of WIPP Drinking Water Technical Procedure*, Revision 8, 8/27/13
- WP 12-IS1002, *Coliform Sampling of WIPP Drinking Water Technical Procedure*, Revision 6, 11/26/12
- WP 12-IS1005, *Respirator/Facepiece Cleaning and Inspection Technical Procedure*, Revision 7, 4/1/15
- WP 12-IS1810, *Quantitative Fit Testing Technical Procedure*, Revision 7, 09/25/14
- WP 12-IS1818, *Sampling Air from Mako Compressor Technical Procedure*, Revision 4, 06/01/12
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- WP 12-IS1832, *Emergency Eyewash and Shower Equipment Technical Procedure*, Revision 7, 10/29/13
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- WP 12-IS3002, *Job Hazard Analysis Performance and Development Management Control Procedure*, Revision 13, 06/08/15
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- WP 15-CA1001, *Independent Safety Management Program Evaluation Management Control Procedure*, Revision 0, 05/27/14
- WP 15-CA1002, *Self-Assessment Management Control Procedure*, Revision 0, 11/09/15
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- WP 15-GM1003, *Stop Work Process Management Control Procedure*, Revision 0, 09/11/15
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- WP 15-PA.01, *Operating Experience/Lessons Learned Program*, Revision 3, 09/02/14
- WP 15-PA.02, *Causal Analysis Guidance*, Revision 2, 05/29/14
- WP 15-PA1000, *Regulatory Requirements Impact Assessment Process Management Control Procedure*, Revision 5, 12/09/14
- WP 15-PA1002, *Requirements Management Control Procedure*, Revision 4, 09/30/15
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- Contract ID MTO501716, *Constructors Inc., PO Box 988, 3003 S. Boyd Drive, Carlsbad NM*, 10/01/2013 to 09/30/2014
- Contract ID MTO504990, *Stellar Inc., PO Drawer 1539, Carlsbad NM*, 01/28/2016 to 01/27/2021
- Purchase Order/Subcontract DOE13-PO501318, *HBS National Corp, PO Box 79195, 1634 W. Sam Houston Pkwy N, Houston TX*, 09/25/2013
- STELLAR INC., *Safety Policy and Procedure Manual, Assured Equipment Grounding*, Revision 07.2012
- STELLAR INC., *Safety Policy and Procedure Manual, Basic Rules of Conduct, Discipline and Organizational Functions*, Revision 07.2012
- STELLAR INC., *Safety Policy and Procedure Manual, Electrical Safety*, Revision 07.2012
- STELLAR INC., *Safety Policy and Procedure Manual, Hazard Communication Program*, Revision 07.2012
- STELLAR INC., *Safety Policy and Procedure Manual, Hearing Protection*, Revision 07.2012
- STELLAR INC., *Safety Policy and Procedure Manual, Lockout/Tagout Program*, Revision 07.2012
- STELLAR INC., *Safety Policy and Procedure Manual, Permit Required Confined Space*, Revision 07.2012
- STELLAR INC., *Safety Policy and Procedure Manual, Personal Protective Equipment*, Revision 07.2012
- STELLAR INC., *Safety Policy and Procedure Manual, Powered Industrial Truck*, Revision 07.2012

- STELLAR INC., *Safety Policy and Procedure Manual, Scaffolding Policy*, Revision 07.2012
- STELLAR INC., *Safety Policy and Procedure Manual, Sub-Contractor Policy*, Revision 07.2012
- STELLAR INC., *Safety Policy and Procedure Manual, Vehicle Mounted Elevated and Rotating Work Platforms*, Revision 07.2012

#### **CBFO Files**

- CBFO Assessment schedule June 2016
- CBFO 2016 12-Month Rolling Integrated Evaluation Plan, Facility Oversight Division Draft
- CBFO MA 15-06, Management Assessment Report, Review of Corrective Actions/Steps Taken by NWP from Oversight Evaluation Report (220 PM Rewrite Report); dated 9/19/15
- CBFO MP 10.3, *Audits*, Revision 8, 11/12/15
- CBFO MP 10.7, *CBFO Oversight Evaluation*, Revision 0, 01/24/13
- CBFO MP 10.9, *Surveillance, Operational Awareness, and Issues Management*, Revision 2, 10/13/15
- CBFO OP 10.4, *Surveillances*, Revision 0, 09/28/15
- CBFO OP 5.8, *On-Call/On-Watch Facility Representative Duties*, Revision 0, 04/07/14
- CBFO OP 5.9, *Facility Representative Responsibilities and Routine Activities*, Revision 0, 04/07/14
- CBFO TQP Qualification Card, *Waste Operations Project Manager - Waters*, 03/11/09
- CBFO TP 9.2, *CBFO Work Control Oversight*, Revision 0, 04/11/14
- CBFO TQP, *Facility Representative GAP Qualification Card - Padilla*, 07/29/15
- CBFO TQP, *Waste Operations Project Manager Qualification Card - Waters*, 08/25/11
- CBFO TQP Qualification Standard, R3, Facility Representative, 3/09
- CBFO Technical Qualification Program Participants Qualification Status, 6/15/16
- CBFO Work Control Surveillance, *Compliance Based Surveillance of the Nuclear Waste Partnership (NWP) Work Control Program*, 08/12/15-08/18/15
- CBFO, *Assessment Schedule*, October 2015
- CBFO, *Monthly Facility Oversight Division Report by FR and SSO of Operational Awareness and Contractor Assurance System (CAS) Oversight Activities*, December 2015
- CBFO, *Monthly Facility Oversight Division Report by FR and SSO of Operational Awareness and Contractor Assurance System (CAS) Oversight Activities*, November 2015
- CBFO, *Monthly Facility Oversight Division Report by FR and SSO of Operational Awareness and Contractor Assurance System (CAS) Oversight Activities*, October 2015
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- CBFO, *Monthly Facility Oversight Division Report by FR and SSO of Operational Awareness and Contractor Assurance System (CAS) Oversight Activities*, 2/16
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- CBFO FR Weekly Evaluation Report, 6/18/15
- CBFO FR Weekly Evaluation Report, 6/10/16
- CBFO, *Quarterly Evaluation of NWP Performance in Work Control*, 4<sup>th</sup> Quarter FY15
- CBFO, *Quarterly Evaluation Report of NWP Performance from the Office of Operational Oversight*, 4<sup>th</sup> Quarter FY15
- CBFO, *Summary: Air Quality Monitoring Workshop*, March 17, 2016
- CBFO, *Waste Isolation Pilot Plant Hazardous Waste Permit Part 1-8 and Attachment A-O*, 4/15/11
- CBFO, *Work Control Specialist Roles & Responsibilities*, Not Dated
- CBFO:OOOJWM:SC:15-1201:UFC 3410.00, *2014 CBFO Annual Workforce Analysis and Staffing Plan*, 01/15/15
- CBFO:SHO:JS:LW:15-1515:UFC 3790.00, *Approval of WP 15-GM.02, Worker Safety and Health Program Description*, Revision 10, 09/30/15

- CO:15:03027, *Submittal of the Integrated Safety Management System Description under Prime Contract DE-EM0001971*, 11/23/15
- CO:15:03038, UFC:4250.00, *Submittal of the Integrated Safety Management Annual Review under NWP LLC Prime Contract DE-EM0001971*, 12/18/15
- Corrective Action Report 15-045, WIPP TSR violations, date 2/23/16
- DOE/CBFO 02-3219, *Technical Qualification Program Plan*, Revision 6, August 2013
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- DOE/CBFO 09-3441, *Safety Management Functions, Responsibilities and Authorities Manual*, Revision 4, 06/12/15
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- DOE/CBFO-13-3505, *Waste Isolation Pilot Plant Facility Representative Manual*, Revision 1, June 2014
- DOE/CBFO-14-3533, *Issue Collection and Evaluation User Manual*, Revision 1, 04/15/15
- DOE/CBFO-15-3551, R1, *Safety Basis Review Plan for Revision 5 of the WIPP Documented Safety Analysis (WIPP 07-3373) and Technical Safety Requirements (WIPP 07-3373)*
- DOE/WIPP 02-3197, *Employee Concerns Program*, Revision 1.1, July 2009
- DOE/WIPP 02-3197, *Employee Concerns Program*, Revision 2, draft, June 2016
- Enhanced National TRU Program Implementation Plan Pre-and Post-Start activities Primavera Report, 7/26/16
- ICE Council Charter
- ICE ID#: 987, *Observed (with EM-42) how MX-6 Gas Monitors are calibrated and used, as well as data collection and maintenance records on said items*, 03/09/16
- Issue Report #117, LO/TO, date 4/1/15
- Issue Report #353, JHA walkdown not performed, 12/16/15
- Issue Report #358, Inadequate work control document, 12/16/15
- Issue Report #359, JHA not presented to the Board, 12/16/15
- Issue Report #364, Work release procedures conflict, 12/16/15
- Issue Report #361, zero energy checks and PPE, 12/16/15
- Issue Report #360, zero energy check not performed until questioned, 12/16/15
- Issue Report #362, multiple versions of procedure available, 12/16/15
- Issue Report #363, LO/TO personal tags and locks, 12/16/15
- Issue Report #365, JHA not reviewed, 12/16/15
- Issue Report #400, Dec 2015 Conduct of Operations Surveillance, operators do not regularly tour their facilities, 2/12/16
- Issue Report #422, USQ Screen S26-0069 is incorrect, 2/17/16
- Issue Report #424, Inadequate WIPP form, 2/19/16
- Issue Report #427, Respirator Qualifications not ensured, 2/22/16
- Issue Report #428, WP 15-PS3004 on the use of tabletop validation for procedures. Associated WIPP Form WF16-277
- Issue Report #504, inadequate field revision documentation, date 5/12/16
- Issue Report #431, *No documented event investigation appears to have been conducted after the detection of ~60ppm on an MX6 gas monitor on 16 Nov 2015*, 02/25/16
- Legal ID Report 2901857, *Waste Isolation Pilot Plant (WIPP)*, Update, 04/07/14
- Attachment 1 “Enhanced National TRU Program Implementation Plan”

- Memorandum of Understanding (MOU), *between the Department of Energy and Mine Safety and Health Administration, US Department of Labor*, 10/07/14
- Performance Evaluation and Measurement Plan Annual Fee Plan 3/31/16
- Public Law 102-579, *The Waste Isolation Pilot Plant Land Withdrawal Act, as amended by Public Law 104-201 (H.R. 3230, 104th Congress)*, Approved 10/30/92, Amended 9/23/96.
- Public Law 91-173, *Federal Mine Safety and Health Act of 1977*, as Amended through P.L. 109-280, Enacted 08/17/06
- Letter from CBFO Manager to New Mexico Environment Department, subj: CBFO Monthly Assessment Schedule – June 2016; dated 6/14/16
- Letter from NWP Gonzales to CBFO Contracting Officer Snow, subj: NWP LLC Contractor Assurance Organization Responses to CBFO Comments on WIPP 15-CA.01, Rev 2, Draft Contractor Assurance Program Description Under Prime Contract DE-EM0001971, date 11/3/15
- Letter from NWP Gonzales to CBFO Contracting Officer Snow, subj: Request for Approval of WIPP 15-CA.01, Revision 01, Contractor Assurance Program Description, Under Prime Contract DE-EM0001971, date, Under Prime Contract DE-EM0001971, date 6/30/15
- Letter from NWP Gonzales to CBFO Contracting Officer Snow, subj: Request for Approval of WIPP 15-CA.01, Contractor Assurance Program Description, Under Prime Contract DE-EM0001971, date 9/29/14
- Letter from CBFO Contracting Officer Snow to NWP Gonzales, subj: Contract DE-EM0001971, Nuclear Waste Partnership – Contracting Assurance System Program Description per NWP Letter CO:14:02977, date 11/7/14
- Letter from NPW Contracting Officer Snow to NWP President, subj: NWP – Contracting Officer Direction for NWP to Perform an Extent of Condition Review of the Evaluation of the Safety of the Situation Controls, date 4/23/15
- Letter from CBFO QA Director to NWP QA Manager, subj: Issuance of CBFO Corrective Action Report 16-043, date 6/14/16
- Letter from CBFO QA Director to NWP QA Manager, CBFO Verification and Acceptance of the Closure Package for CAR 15-045, 2/23/16
- Facility Representative On-Call List, July 2016
- DOE/WIPP 16-3565, Safety Evaluation Report, 4/16
- Status of Completed corrective actions to address findings from 2012 FR Triennial Assessment, formal closure pending, 2014
- Table 1 – Determination of Facility Representative Coverage, 12/13/12
- WIPP Cold Operations Plan, WP 04-AD.20, Rev 0
- Surveillance Report S-16-10, NWP USQ Program, 1/27/16
- Surveillance Report S-15-68, NWP Facility Operations Training, 9/28/15
- Surveillance Report S-16-38, NWP Work Control Program, 6/7/16
- Office of Operations Oversight, Surveillance #29, Conduct of Operations Surveillance, 12/3/15
- CBFO Safety Program Division Surveillance of Aspects of the WIPP USQ process, FY 2016

## Interviews

### **CBFO**

CBFO Manager  
 CBFO Office of Operations Oversight Assistant Manager  
 CBFO Office of Quality Assurance Director  
 CBFO TRU Sites and Transportation Division Director  
 CBFO Safety Programs Division Director

CBFO Facility Oversight Division Director  
CBFO Facility Engineering Division Director  
CBFO Work Control Specialist  
CBFO Technical Qualification and Training Specialist  
CBFO Facility Representative Lead  
CBFO Facility Representative  
CBFO Contracting Officer  
CBFO Employee Concerns Program manager  
CBFO Corrective Action Manager for Accident Investigation Judgement of Needs

***NWP***

President and Project Manager  
Deputy Project Manager  
Radiological Control Program Management  
Radiological Engineering Professional Staff  
Internal Dosimetry/Bioassay Professional Staff  
ALARA Engineer  
Radiological Control Technicians  
Under Ground Operations Maintenance Supervisor  
Under Ground Operations Maintenance Workers  
Facility Operations Workers  
Vendor Maintenance Workers  
Central Monitoring Room Operator (2)  
Engineering Manager  
Facility Operations Deputy Manager  
Facility Operations Manager  
Facility Shift Manager  
Hoisting Crew Manager  
Hoisting Operator  
Maintenance Manager  
Maintenance Foreman  
Mining Manager  
Mining Operations and Ground Control Acting Manager  
Operations Deputy Manager  
Operations Manager  
Operation Mentor (2)  
Operations Procedure Manager  
Remote Handled Waste Acting Manager  
System Engineering Manager  
Training Manager  
Transportation Engineer  
Underground Facility Engineer  
Underground Operations Manager  
Waste Operations Manager  
Underground Planning Manager  
Preventative Maintenance Planning Manager  
Maintenance and Work Control Manager  
Work Control Manager  
Work Control Planner  
Work Control Scheduler  
Facility Engineer



Maintenance Electrician  
Safety and Health Deputy Manager – Programs  
Industrial Safety Manager  
Mine Maintenance Manager  
Procedures Manager  
Training Coordinator  
Employee Concerns Manager

## **Observations**

CBFO Office of Operations Oversight Daily Tactical Meeting  
CBFO Facility Representative Oversight of shift turnover and Operator rounds  
NWP Plan of the Day meetings (T-0 meeting)  
Plan of the Week (POW) Meeting (T-1/T-2 meeting)  
Daily Work Release Meeting  
Action Request Prioritization Meeting  
Maintenance Crew Briefings  
Work Package 1618649 and 1618648, Automatic Fire Suppression System Installation/Removal and Maintenance, Pre-Job Briefing and Conduct of Maintenance Activity.  
Work Package 1513957, Install Bulkhead, Pre-Job Brief and Crew Mobilization.  
Work Package 1618370, Weekly Underground Openings Inspections, Pre-Job Brief and Crew Mobilization.  
Work Package 1619979, Bolting in CA, Pre-Job Brief and Crew Mobilization.  
Engineering Activities – Geotech Inspections, Pre-Job Briefing and Crew Mobilization.  
LOTO evolutions associated with Work Package 1513957 and 1618649  
Walkdown of Underground, General Areas, RBA, CA and HCA/ARA  
Donning and Doffing of Radiological PPE Practices at Underground RBA  
Radiological Self-Survey Conduct in RBA of Individuals Exiting CAs and HCA  
RCT Support provided in RBA to Donning and Doffing, as well as, Radiological Contamination Survey of equipment including PPE  
Worker use of Computerized RWP System, as well as manual RWP entries  
RCT use of Radiological Survey and Counting Equipment in Underground RBA

## **Appendix C Deficiencies**

Deficiencies that do not meet the criteria for a finding are listed below, with the expectation from DOE Order 227.1A that site managers will apply their local issues management processes for resolution.

All deficiencies noted here apply to NWP.

### **Contractor Assurance**

- NWP has not developed an ECP document that meets DOE Guide 442.1A and ensures a robust management structure for submitting, evaluating, and resolving employee concerns as required by clause H.26 of DOE contract No. EM0001971, which implements DOE Guide 442.1A as a contract requirement.

### **Radiological Protection Program**

- NWP incorrectly classifies RWPs as general RWPs instead of job-specific RWPs as required by WIPP 12-2, *WIPP ALARA Program Manual*, and procedures 12-HP-3600 and 12-HP-3601.
- ALARA pre-job review forms are not prepared and documented in accordance with form instructions, resulting in overly broad RWPs that are not formally linked to applicable technical work documents as required by WIPP 12-2 and procedures 12-HP-3600 and 12-HP-3601.
- A number of individuals observed conducting a self-frisk after exiting CAs, HCAs, and ARAs did not spend the 2-3 minutes needed for the whole body survey defined by institutional requirements, as necessary to ensure compliance with 10 CFR 835 1102 (a) and (d) to prevent the inadvertent spread of contamination outside radiological areas.

### **Work Planning and Control**

- Five of the seventeen work planners have not completed all applicable Work Planner training for the type of work being planned as required by the NWP process WP 10-WC3011.
- NWP subcontracts do not include DEAR clause 852.203-70, *Whistleblower Protection for Contractor Employees*, or similar language to invoke 10 CFR 708, as required by I.106, DOE contract number DE- DE-EM0001971 with NWP.
- NWP does not ensure that subcontractor corporate safety programs and procedures meet DOE regulatory and contractual safety requirements when NWP directs their use, consistent with DEAR Clause 48 CFR 970.5223-1(i) and 10 CFR 851.
- Contrary to NWP process WP-WC3011 and DOE Guide 226.1-2A, Appendix D, in some cases planned work was not integrated with ongoing work activities, work packages were not reviewed to ensure that all supporting documents were current, no verification was performed to ensure that work site conditions had not changed, and there was no verification that tools, materials, parts, and support were ready and available.
- Contrary to NWP WP 12-IS.03, PPE required by a Radiological Work Permit (RWP) was made of materials capable of melting and was observed being worn next to the skin under designated arc

flash PPE. These multiple layers of PPE were not de-conflicted prior to being required for the assigned LO/TO task, resulting in the workers wearing clothing capable of melting next to their skin.

- NWP has not ensured that pre-job briefings are properly performed in accordance with NWP procedure WP 04-AD3030, as needed to ensure readiness to perform work.
- NWP employees have not reported deficiencies in a timely manner, as identified in WIPP form WF16-954 (cart brakes failed) and ORPS CBFO-NWP-WIPP-2016-0013 (underground roof bolt plate falls near employee).