

**Office of Enterprise Assessments
Assessment of Selected Conduct of Operations
Processes at the Waste Isolation Pilot Plant**



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**Office of Nuclear Safety and Environmental Assessments
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ACRONYMS

CBFO	Carlsbad Field Office
CFR	Code of Federal Regulations
CMR	Central Monitoring Room
CMRO	Central Monitoring Room Operator
ConOps	Conduct of Operations
CRAD	Criteria Review and Approach Document
DOE	U.S. Department of Energy
EA	Office of Enterprise Assessments
ECO	Engineering Change Order
FSM	Facility Shift Manager
LO/TO	Lockout/Tagout
NWP	Nuclear Waste Partnership, LLC
OFI	Opportunity for Improvement
OJT	On-the-Job Training
ORPS	Occurrence Reporting and Processing System
PMT	Post-Maintenance Testing
RCT	Radiological Control Technician
SME	Subject Matter Expert
TRUPACT	Transuranic Package Transporter
TSR	Technical Safety Requirement
WCN	Work Change Notice
WIPP	Waste Isolation Pilot Plant

EXECUTIVE SUMMARY

The U.S. Department of Energy's Office of Environment, Safety and Health Assessments, within the independent Office of Enterprise Assessments (EA), assessed the conduct of operations program at the Waste Isolation Pilot Plant. The purpose of this EA assessment effort was to evaluate the effectiveness of selected elements of the conduct of operations program and processes used by the contractor, Nuclear Waste Partnership, LLC (NWP).

The purpose of conduct of operations is to ensure that management systems and processes are designed to anticipate and mitigate the consequences of human fallibility, inadequate conditions and/or configurations such as missed operational prerequisites and/or system misalignments. Conduct of operations provides a vital barrier to prevent injury, environmental insult or asset damage, and to promote mission success. Complying with procedures, implementing requirements, proper utilization of engineering systems, and other conduct of operations requirements are crucial to protecting personnel, the environment, equipment, and the prevention of industrial and radiological incidents.

EA examined procedures and processes related to overall execution of the conduct of operations program, on-shift training, control of equipment and system status, lockouts and tagouts, required reading, technical procedures, and operator aids. EA also reviewed historical records and observed operations and maintenance work activities during the January 11-15, 2016, onsite assessment.

EA found that the conduct of operations program has been improving over the last 12-18 months. NWP's use of field mentors and a new operations procedure program have contributed to a downward trend in the number of events related to conduct of operations. In addition, EA observed some operators and maintenance workers exhibiting good questioning behavior by stopping to raise questions to NWP management if procedures or work documents could not be performed as written. However, EA also found examples of NWP management decisions that did not reflect the same questioning attitude, contrary to conduct of operations requirements. These management behaviors have the potential to erode the good behaviors found at the working level.

EA also noted deficiencies in NWP management oversight of the conduct of operations program that have resulted in program misalignment and inconsistent conduct of operations performance in technical procedures, control of equipment and system status, required reading, and operator aids. The most significant deficiency was a safety system modification that was implemented through instructions in a maintenance work order package, without the required technical justification by engineering. For this modification, NWP did not follow its temporary change procedure, did not obtain the required engineering change order, and did not have a qualified cognizant engineer review the package.

While conduct of operations improvements have been achieved by NWP and has resulted in more consistent and safer work activities, significant challenges still remain to fully meet DOE requirements and consistently implement established procedural requirements. These challenges include improvement in conduct of operations by NWP management and better and more rigorous use of the engineering department and cognizant engineers.

Office of Enterprise Assessments
Assessment of Selected Conduct of Operations Processes at the Waste Isolation Pilot Plant

1.0 PURPOSE

The U.S. Department of Energy (DOE) independent Office of Enterprise Assessments (EA) conducted an assessment of conduct of operations processes at the Waste Isolation Pilot Plant (WIPP). The purpose of this EA assessment was to evaluate the effectiveness of selected areas of the WIPP conduct of operations program. Nuclear Waste Partnership, LLC (NWP) is the management and operations contractor at WIPP.

EA performed an onsite planning visit December 6-10, 2015, and completed this assessment onsite January 11-15, 2016. This report discusses the scope, background, methodology, results, and conclusions of the assessment, as well as any findings, deficiencies, and opportunities for improvement (OFIs) identified by the assessment team.

2.0 SCOPE

EA examined six selected areas of conduct of operations, including on-shift training, control of equipment and system status, lockouts and tagouts (LO/TO), required reading, technical procedures, and operator aids. EA also assessed the overall execution of conduct of operations at WIPP. The assessment consisted of an evaluation of the programs, procedures, and processes used to demonstrate compliance with applicable sections of DOE Order 422.1, *Conduct of Operations*. The assessment also included observation of on-shift training, procedure execution, maintenance, and routine operational activities. The criteria defining the scope of this assessment were based on objectives and criteria from EA Criteria Review and Approach Document (CRAD) 30-02, *Conduct of Operations*. EA conducted the assessment within the scope defined in the *Plan for The Office of Enterprise Assessments Review of Selected Conduct of Operations Processes at the Waste Isolation Pilot Plant*, dated October 2015.

3.0 BACKGROUND

This assessment of conduct of operations is part of a series of assessments established by EA in coordination with the Carlsbad Field Office (CBFO) in response to issues identified at WIPP after two emergency events in February 2014. Compliance with conduct of operations is a crucial element in ensuring the safety of personnel, equipment, the environment and the prevention of both minor and significant incidents.

4.0 METHODOLOGY

Criteria used to define the scope of this assessment are derived from CRAD 30-02, which includes criteria, activities, and lines of inquiry structured to support the assessment.

EA divided the assessment process into several stages, including offsite and onsite planning, onsite data gathering activities, report writing, validation, and review. Planning included discussions with responsible site and CBFO personnel, scheduling of the assessment, collection of applicable site procedures and documents, and document reviews. After the onsite data collection period, EA prepared a draft independent assessment report identifying overall perspectives, deficiencies, and OFIs and made it available to line management for review and feedback.

EA initially identified and reviewed the applicable procedures that implement the conduct of operations program as defined in the WIPP Conduct of Operations Implementation Matrix. Several operating procedures, LO/TO documents, training materials, and maintenance work packages were also reviewed against the requirements of DOE Order 422.1 and WIPP conduct of operations processes. EA also interviewed NWP management, operators, and craft personnel.

The DOE independent oversight program is described in and governed by DOE Order 227.1A, *Independent Oversight Program*. 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 varying 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. In accordance with DOE Order 227.1A, DOE line management and/or contractor organizations must develop and implement corrective action plans for the deficiencies identified as findings. Other important deficiencies not meeting the criteria for a finding are also highlighted in the report. These deficiencies should be addressed consistent with site-specific issues management procedures.

During this assessment, EA discussed all identified deficiencies and other observations with CBFO and NWP on a real time basis and during daily briefings. Any significant deficiencies requiring a high level of management attention are reflected in the findings of this report (summarized in Section 6.0), and suggested program or process improvements for management consideration are listed as OFIs in Section 7.0. The members of the EA assessment team, the Quality Review Board, and EA management responsible for this assessment are listed in Appendix A. Appendix B provides a detailed list of the documents, personnel interviews, and observations relevant to the conclusions of this report. Appendix C provides a list of deficiencies that should be addressed consistent with site-specific corrective action management procedures.

5.0 RESULTS

This assessment reviewed program execution and six areas of conduct of operations: on-shift training, control of equipment and system status, LO/TO, required reading, technical procedures, and operator aids.

5.1 Program Execution

EA observed WIPP workers performing several tasks, including operation routines, maintenance, and operation of systems and equipment. Although EA identified deficiencies and OFIs in certain aspects of WIPP’s conduct of operations program execution (as noted in Sections 5.2 through 5.7 of this report), workers in each group (Facility Operations, Waste Operations, Hoisting Operations, and Maintenance) exhibited a good questioning attitude, stopped when they identified issues associated with work documents and procedures, and raised issues to management for resolution. WIPP’s conduct of operations program execution has improved over the last year, as indicated by Occurrence Reporting and Processing System (ORPS) data, NWP mentor observation reports, and direct observations by the EA site lead and the assessment team. Workers have shown a consistent improvement in procedural compliance, questioning attitude, and general conduct of operations compliance. This conduct of operations progress has improved the general safety posture at the site.

Although workers have shown a healthy respect for the principles of conduct of operations, EA identified several recent NWP management decisions affecting WIPP safety systems that are counter to DOE Order 422.1 and WIPP conduct of operations program requirements. Specifically, DOE Order 422.1, Attachment 2, Section 2.p, *Technical Procedures*, and the corresponding section of WIPP procedure WP

04-CO.01, *Conduct of Operations*, require management to establish the expectation that workers are to follow procedures as written and to stop and notify management when they cannot. The examples discussed below illustrate a lack of rigor and non-conservative decision-making in conduct of operations within NWP management. These are contrary to the requirements discussed above and the overall purpose of conduct of operations, as stated in DOE Order 422.1: “A Conduct of Operations Program consists of formal documentation, practices, and actions implementing disciplined and structured operations that support mission success and promote worker, public, and environmental protection.” (See **Finding-NWP-01**.) The following are examples of observations supporting the cited finding:

- NWP suspended biennial managerial qualification card reviews required by WP 14-TR3307, Section 2.2.1, *Qualification Program*, after the February 2014 fire and radiological events. The suspension of the qualification card reviews violated WP 14-TR3307 as well as the training program evaluation requirements of DOE Order 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*, and DOE Standard 1070-94, *Criteria for Evaluation of Nuclear Facility Training Programs*. Additionally, the decision process was not documented (nor was the decision maker). The immediate period after the fire and radiological events represented a changed condition when the qualification cards should have been reviewed to drive training requirements. Instead, NWP chose not to perform the qualification reviews and performed training without the benefit of a qualification card biennial review/analysis.
- During EA’s observation of a work package implementation to replace a tank level indicator on a fire water tank, NWP management realized the work package referenced the wrong post-maintenance test (PMT). Instead of changing the package to reference the correct PMT, the facility shift manager (FSM) initially decided to allow the package to proceed with the wrong PMT but to subsequently run the correct PMT before returning the system to operable status, since the FSM was responsible for system operability. This approach is contrary to a conservative decision-making philosophy of only authorizing work packages that can be performed as written and is not in compliance with WP 10-WC3011 *Work Control Process*, “A WIPP employee who has a concern for employee safety, the safety of the environment, or the quality of the activity has the responsibility and authority to stop the performance of that activity based on the guidance in WP 15-GM1003, *Stop Work Process*.” After EA questioned this approach with senior NWP management, the work package was properly revised. However, the WIPP FSM’s action was contrary to DOE Order 422.1 and WIPP conduct of operations requirements (i.e., DOE Order 422.1, Attachment 2, Section 2.p.(1)a., “Management policies establish the expectation that operators will use written procedures for operations, will perform them as written, and will stop work and notify management when procedures cannot be executed as written”). Management declining to execute the appropriate policy and expectations of DOE Order 422.1 can lead to a culture of improper conduct of operations execution by the workforce.
- During underground operations, the Waste Hoist Operating Room reached its maximum operating temperature limit of 75 degrees Fahrenheit due to the loss of air conditioning, requiring the waste hoist to be taken out of service and personnel in the underground to be evacuated. Later that evening, with the air conditioning still out of service but the temperature in the operating room below 75 degrees, NWP management returned the waste hoist to emergency service and returned personnel to the underground, increasing the number of allowed personnel to 98. Management believed that although the air conditioning unit was still out of service, the waste hoist could perform one or two emergency evacuations of personnel while the control room remained below 75 degrees. This decision was made even though: (1) the air conditioning unit remained out of service, and air conditioning is needed to keep temperatures below 75 degrees even when outside ambient temperatures are well below 75 degrees; (2) the Waste Hoist

procedure requires the waste hoist to be taken out of service whenever any component is non-functional; because air conditioning is needed to keep operating temperatures below 75 degrees, NWP and CBFO consider air conditioning to be a required component of the waste hoist; and (3) even if the temperature in the operating room dropped below 75 degrees, past experience has shown if the hoist is used, because of the lack of air conditioning the temperature can quickly rise. There was no engineering analysis supporting the supposition that the waste hoist could indeed perform any emergency evacuations before exceeding its temperature limit. After subsequent discussions between CBFO and NWP, the waste hoist was appropriately taken out of service until the air conditioning unit was repaired.

- The safety significant fire protection system was modified without engineering justification (as discussed in Section 5.5), reflecting NWP management decisions that allow multiple revisions of a work order to accomplish different types of work instead of properly scoping, reviewing, approving, executing, and closing out a job. This is another example of non-conservative management decision-making contrary to the purpose of conduct of operations requirements. For example, the initial issuance of Work Order 1406781 was to conduct troubleshooting activities on the fire water tank level indication; Revision 2 of the work order installed a modification to the system; Revision 4 was corrective maintenance to replace a level transmitter; and Revision 5 took the work order back to a troubleshooting package to identify the source of a completely new problem with the level indication.

Throughout this report, EA discusses program deficiencies and weaknesses in conduct of operations implementation in certain segments of the WIPP organization. EA found that program execution is inconsistent because multiple parts of the organization (e.g., Facility Operations, Waste Operations, Underground Services, Mining Operations, and Maintenance) implement conduct of operations for their respective organizations, independent of each other and without adequate guidance from the operations manager. For example, EA found that required reading included various types of information, and staff participation was also inconsistent. Some organizations used ORPS reports and lessons learned, while others did not. One organization had its administrative staff read all the required reading, another organization had the administrative staff read the material on a graded approach, and another organization did not have its administrative staff do any required reading. Approved operator aids had received the required six-month management reviews in all organizations except Underground Services, where none of the approved operator aids had received the required management reviews. EA also found a number of operator aids that were posted but unapproved. Adequate direction is not being provided to ensure consistent compliance with conduct of operations requirements. (See **OFI-NWP-01**.)

Program Execution Conclusions. WIPP's execution of the conduct of operations program has improved over the last year, based on ORPS data, NWP mentor observation reports, and direct observations by the EA site lead and the assessment team. Workers have shown improvement in procedural compliance, questioning attitude, and general conduct of operations compliance, thereby improving the general safety posture and nuclear safety culture. However, attention is needed to improve conduct of operations compliance and conservative decision-making culture within NWP management.

5.2 On-shift Training

Criteria

The operator has established and implemented operations practices that control on-shift training of facility operators and prevent inadvertent or incorrect trainee manipulation of equipment.

EA observed and interviewed subject matter experts (SMEs) and trainees while on watch. Operations managers were also interviewed and qualification records were reviewed. SMEs had a good knowledge

of the requirements pertaining to their responsibilities for their trainees. SMEs knew not to leave their trainees alone while they were performing any evolutions and to remove the trainees from performing any duties during emergencies. In general, SMEs stated that for on the job training (OJT), they would train only one person at a time, but there is a conflict between NWP procedures. WP TR3308, *On-the Job Training*, allows one instructor to train multiple trainees in the OJT process, including allowing multiple trainees to demonstrate operation of equipment. However, this practice conflicts with WP 04-CO.01-5, *Control of On-Shift Training*, which states that each instructor will train only one trainee at a time for all OJT. DOE Order 422.1, Attachment 2, Appendix A, 2.e.(1)b, states: “For positions requiring operator certification, candidates receive one-on-one instruction on station.”

During this assessment, EA discovered a potential deficiency that is outside the scope of the assessment but is noted for NWP’s attention. There is a general weakness in final qualification boards. EA’s review of approximately 30 final qualification board records and hundreds of individual questions and responses identified that no failures or remedial actions were taken for any boards or individual questions, possibly indicating the final boards lack effectiveness. During the outbrief, NWP noted that it had self-identified and rectified this issue in the radiological control technician (RCT) qualification program. EA found that over the last 60 days, the RCT qualification board program had experienced an approximately 30% failure rate, indicating that qualification boards for RCTs have been strengthened.

On-shift Training Conclusions. Overall, on-shift training is effective. Though outside the scope of this assessment, qualification boards may need to be strengthened.

5.3 Control of Equipment and System Status

Criteria

The operator has established and implemented operations practices for initial equipment lineups and subsequent changes to ensure that facilities operate with known, proper configuration as designed.

Multiple operations organizations at WIPP (e.g., Facility Operations, Underground Services, Hoisting, Mining/Ground Control, and Waste Operations) are responsible for implementing conduct of operations, including control of equipment and system status. The multiple organizations maintain a number of logs, including narrative logs, logs of equipment locked out, and logs of equipment inactivated. EA reviewed logs and interviewed staff from multiple operations organizations to ensure that requirements are implemented uniformly. Although the operations organizations are meeting most requirements, EA noted numerous non-compliances in the equipment inactivation process in the underground, as described later in this section.

Narrative logs are maintained in accordance with WP 04-CO.01-11, *Logkeeping*. NWP has instituted electronic logs for the Central Monitoring Room (CMR), and this system records who makes entries in the log and the time and date of the entry. EA reviewed copies of this log from November 15, 2015, through January 7, 2016. The log contained a daily summary of the status of key equipment and also noted when various hoists and other items were in service or shut down. The CMR log also noted which CMR alarms were disabled, in accordance with WP 04-AD3007, *CMS Alarm Disable Authorization*. In general, the CMR log captures the information required by WP 04-CO.01-11, but EA noted that many of the log entries did not comply fully with WP 04-CO.01-11. For example:

- WP 04 CO.01-11 requires narrative log entries to address what, when, how, where, and who, as applicable to the particular entry, but some entries were too brief to address these criteria fully. An example is “sec 812/816 placed 813/817 I/S,” which describes securing one set of ventilation fans, and placing another set into service.
- WP 04-CO.01-11 states: “Use only approved abbreviations, acronyms, and symbols found in WP

04 AD3008, *Shift Briefings – Packages and Round Sheets*, Attachment 2, *Acronyms and Abbreviations*, when making entries.” However, EA identified numerous examples of acronyms in the CMR log that did not appear in Attachment 2. Examples include FF for firefighter, FD for Fire Department, CCP for Central Characterization Project, and SS for substation (Attachment 2 uses SUB for substation).

- Some log entries used acronyms to mean something other than the definition in WP 04-AD3008, Attachment 2. Examples include SAA meaning shaft access area instead of satellite accumulation area, and CMS referring to Carlsbad medical service instead of central monitoring system.

EA discussed these concerns with the Facility Operations Deputy Manager. NWP has initiated increased mentoring of Central Monitoring Room Operators (CMROs) to improve logkeeping (see below), and the Facility Operations Deputy Manager stated he would provide the examples to the mentors to assist in their efforts.

NWP’s quarterly management review by the Facility Operations Manager of the log dated December 2015 also noted that many log entries were not fully compliant with management expectations, and NWP management has assigned a mentor, as noted above, to coach CMROs to improve compliance. However, at least two previous quarterly management reviews did not identify the non-compliant log entries. WP 04-CO.01-11 has no criteria for the quarterly management review of the logs, other than that the review by the Facility Operations Manager be recorded in the log. Lacking such criteria, some management reviews have identified non-compliant log entries and other reviews have missed obvious errors.

In addition to electronic logkeeping for the CMR, NWP has also instituted an electronic display for limiting conditions for operation and technical safety requirement (TSR) required surveillances. This electronic display uses a color coded system to help operators remain aware of the time remaining for these time-critical operations. The system works well and has received favorable feedback from CMROs.

NWP has a daily meeting for turnover and work release to review the status of key plant equipment with management and various work groups. One of the items reviewed was the status of the Waste Hoist Control Room air conditioning. High temperatures in the control room cause operability issues with the hoist, and procedure WP 04-HO1003, *Waste Operations Hoist Operation*, reads: “The temperature in the Waste Hoist Control Room is required to be maintained at 75 degrees Fahrenheit or less for normal operations. If the temperature in the Waste Hoist Control Room exceeds 75 degrees Fahrenheit, Hoist Operator notify Hoisting Manager and Central Monitoring Room Operator (CMRO). Complete any trips in progress, secure hoist operations, and perform cold shutdown.” During a portion of the EA assessment, the Waste Hoist Control Room air conditioning had been performing erratically and required an electrical breaker to be reset frequently. The Hoisting Manager contacted Engineering, and troubleshooting was initiated. However, as also noted in Section 5.1 of this report, the hoist was not removed from service, contrary to WP 04-HO1003, which requires: “IF it is found or suspected that ANY part of the shaft or hoisting equipment is NOT functioning properly, the Hoist SHALL NOT be used until the malfunction has been repaired or adjustments made.” Because the air conditioning unit is required to maintain temperatures within operating range and other mitigating actions such as opening doors cannot be taken, NWP and CBFO consider the air conditioning unit to be part of the hoisting equipment. After discussions with CBFO, NWP declared the waste hoist to be out of service until the air conditioning system was repaired. (See Section 5.1 and **Finding-NWP-01**.)

EA was observing preventive maintenance activities on the salt handling hoist when the waste hoist was declared out of service. On learning of this situation, the NWP salt hoist operator immediately suspended the preventive maintenance and returned the hoist to service for mantrips from the underground. The operator then quickly relocated to the Air Intake Shaft Hoist and initiated pre-operational startup activities

to place it in service. These actions ensured the availability of two means of egress, in compliance with MWO00534, *Underground Entry/Exit*.

EA also reviewed NWP's compliance with WP 08-NT3105, *Transportation "Out-of-Service" Tags*. The transportation engineer had completed all required reviews and the logs were satisfactory. EA, the transportation engineer, and a CBFO Facility Representative performed a walkdown of the transuranic package transporters (TRUPACTs). During the walkdown, the Facility Representative and the transportation engineer found some TRUPACTs with "Out-of-Service" tags that were faded, and two tags had become detached during inclement weather. The log sheets for the affected TRUPACTs contained all the relevant information regarding the TRUPACT status, as required by WP 08-NT3105, and the transportation engineer completed replacement tags.

NWP uses WP 04-AD3016, *Equipment Inactivation*, to control equipment that is currently not in use or is out of service for various reasons, including equipment in layup or needing maintenance. The tags are controlled by use of sequential logs maintained by the various operating organizations. EA reviewed the logs maintained by Facility Operations, Underground Services, and Mining Operations. Many tags were properly issued and cleared in compliance with WP 04-AD3016. However, during a walkdown of equipment in the underground, EA noted that many pieces of mobile equipment had tags without numbers and in two cases had numbered tags that were no longer present in the relevant log, contrary to the requirements of WP-04-AD3016. EA informed NWP management, who initiated corrective action.

NWP uses WP 04-AD3012, *Temporary Plant Modification Control*, for temporary changes in the plant configuration. However, NWP is not adequately implementing this process. **(Deficiency)** WP 04-AD3012 requires "Temporary modifications to Structure, System, and Component (SSC) that must be returned to service in a configuration other than designed" to be numbered, logged, and controlled in accordance with WP 04-AD3012. The work package associated with the Firewater Level Transmitter Replacement had steps to remove a pair of previously-installed temporary resistors, but the log had no record of this temporary modification, and numbered temporary plant modification tags were not used for the installation.

Control of Equipment and System Status Conclusions. For the most part, NWP adequately controls the status of equipment and systems. EA noted deficiencies in CMR logkeeping, in the use of the equipment inactivation process in the underground, and in the control of temporary plant modifications.

5.4 Lockouts and Tagouts

Criteria

The operator has established and implemented operations practices for the installation and removal of lockout/tagouts for the protection of personnel.

EA evaluated the acceptability of the WIPP LO/TO program for ensuring the safety of personnel working on equipment. The focus was on proper isolation of energized equipment and verification of zero-energy checks prior to maintenance work.

The multiple operating organizations at WIPP all use a common procedure, WP 04-AD3011, *Equipment Lockout/Tagout*, to control equipment LO/TO. The procedure calls the operating organizations "Controlling Organizations" that are responsible for identifying lockout points and installing Controlling Organization locks before releasing the equipment for maintenance. As part of the process, the lockout is independently verified, and the appropriate Controlling Organization maintains a record of the lockout. WP 04-AD3011 has been revised four times in a 12-month period, possibly presenting a challenge to keeping the workforce trained on implementation. EA found the process to be in compliance with DOE

Order 422.1 requirements.

EA observed several Controlling Organizations locking out equipment before maintenance. In all cases, the use of some human performance error-reduction tools, such as self-checking, was evident, and a second person from the Controlling Organization performed an independent verification. In one case, a breaker had to be racked out prior to LO/TO, requiring a trained, qualified person with appropriate arc-flash personal protective equipment to perform the activity. During all of the LO/TOs that EA observed, workers performed the activities in accordance with established requirements.

EA reviewed lockout logs of several Controlling Organizations. NWP requires periodic review of the lockout logs, and EA found evidence that this requirement has been met. As NWP had already identified, some locks have remained in place for extended time periods. Additional management attention is being focused on this issue.

EA attended a critique of a LO/TO violation that occurred a few days before EA's January site data collection visit. The violation involved an operations forklift driver operating a forklift with red and white striped Danger Tags attached to the keys. The critique reviewed the circumstances that led up to the request by the tag-holders (maintenance workers) to relocate the vehicle. During the critique, some of the maintenance personnel referred to a former practice of using the Authorized Worker tags as a "Maintenance in Progress" tag, in accordance with obsolete procedure WP 10-AD3005, *Control and Use of Maintenance Locks*. That procedure was not compliant with 29 CFR 1910.147(c)(5), so it was cancelled in July 2015 and the practice is no longer authorized. The critique was effective in identifying this formerly acceptable and now superseded practice as a contributor to the event.

During the critique, maintenance noted that the work package did not call for a LO/TO and that many preventive maintenance procedures for mobile equipment do not require a LO/TO. However, WP 04-AD3011 states: "The red and white striped Danger Tag ... shall be used ... when working on mobile equipment" (**Deficiency**)

A review of ORPS, WIPP forms, and other data sources identified a number of LO/TO violations during the recovery effort. For example, WIPP Form WF15-870 states: "ORPS Quarterly Performance Analyses has identified twenty-nine (29) hazardous energy control issues that have occurred over the last 13-month period. Eight (8) of these issues met ORPS reporting criteria." In January 2016, the WIPP Form recommends initiation of a common cause analysis and NWP committed to performing this analysis. As of March 1, 2016, this analysis is yet to be performed.

Lockouts and Tagouts Conclusions. NWP has adequately established processes to control LO/TO for the protection of personnel. NWP conducts critiques to identify contributing factors to LO/TO non-compliances and plans to perform a common cause analysis of recent hazardous energy control issues.

5.5 Required Reading

Criteria

The operator has established and implemented operations practices for an effective required reading program to keep operators updated on equipment or document changes, lessons learned, or other important information.

EA assessed this area to ensure that the required reading program at WIPP was effective and had been properly established and implemented. The review focused on the required reading records, the records administrators, and the four operations area managers (Waste Operations, Facility Operations, Maintenance, and Underground Services) responsible for their required reading programs.

The required elements of a required reading program have been implemented, items are generally read on time, and with one exception, management reviews have been performed on schedule. Each organization's manager maintains effective control of the organization's required reading program and is responsible for that area's compliance with the WIPP required reading program. However, EA found no coordination among these managers leading to inconsistent and poor implementation of DOE Order 422.1 requirements. As discussed above in Section 5.1, NWP has not assigned a manager responsible for the overall conduct of operations to ensure compliance with DOE Order 422.1 requirements, and the WIPP Operations Manager has not ensured that each operations organization adequately meets the requirements of the required reading program to ensure consistent implementation within the various organizations. (See **OFI NWP-01**.) These issues indicate less than full compliance with DOE Order 422.1, Attachment 2, Appendix A, 2.a.(1)e and f. For example, one organization stresses ORPS reports in its required reading program, whereas other organizations include few, if any, ORPS reports. ORPS reports contain lessons learned, which is an element of a required reading program per DOE Order 422.1, Attachment 2, Appendix A, 2.n., and should be included in that organization's required reading program. Additionally, some operations organizations required their administrative staff to read all of the required reading items, another selects some items for the administrative staff, and one did not have its administrative staff read any of the required reading items. WP 04-CO.01-14 ConOps Required Reading, 3.2.1. states, "The responsible manager shall designate specific required reading items to the RRA for specific operators/personnel or groups of operators/personnel." NWP noted during a daily outbrief it self-identified this issue in a WIPP Form in December 2015 and are in the process of developing and implementing corrective actions. Not all the operations organizations include administrative personnel in their required reading programs which would include safety lessons that directly impact their safety posture. Further, NWP is aware that extensive procedural changes are often implemented through required reading without the benefit of training, in violation of DOE Order 422.1, Attachment 2, Appendix A, 2.p.(5)a: "Directives include provisions for communicating important procedure changes and revisions to operating personnel through required reading or other appropriate method." The NWP operations manager stated that extensive procedural changes are beyond the mandated scope of required reading, but no guidance is provided to managers to define which procedural changes are sufficient for the required reading program and which would require training. Finally, quarterly managerial reviews of the required reading logs were ineffective in finding and correcting problems, such as delayed or missing reviews without frontline supervisor comments, improper lineouts or overwrites, and other obvious errors.

Required Reading Conclusions. Overall, NWP implements the required elements of the required reading program but applies these elements inconsistently and inadequately across the different operations organizations. NWP has no single focal point to ensure execution of conduct of operations responsibilities for required reading, flowdown of these requirements to the operations organizations, consistent application of the requirements, and inclusion of all personnel in a required reading program. Additionally, though NWP effectively tracks required reading, management reviews have been ineffective in identifying and correcting errors.

5.6 Technical Procedures

Criteria

The operator has established and implemented operations practices for developing and maintaining accurate, understandable written technical procedures that ensure safe and effective facility and equipment operation.

EA assessed the NWP procedures implementing DOE Order 422.1, Attachment 2, Appendix A, Section 2.p against the order requirements. The NWP program procedures acceptably flow down the requirements of the order for procedure development, use, and adherence. NWP management properly conveyed requirements and expectations for using procedures, performing them as written, and stopping

work and notifying management when procedures cannot be performed as written. Processes have been established for procedure changes, including emergent changes.

EA found that the NWP technical procedures were generally current and that the required biennial reviews have been performed as scheduled. EA observed numerous instances where WIPP supervisors and/or workers properly verified the procedures about to be used as the latest approved/controlled version. However, EA noted that some technical procedures/work instructions issued through the WIPP procedure development, review, and approval processes included errors and deficiencies that prevented their performance as written. **(Deficiency)** For example:

- Waste operations procedure WP 05-WH1101, *CH Surface Transuranic Mixed Waste Handling Area Inspection*: EA identified procedure flow problems that prevented performance of some sections of the procedure.
- Work Order 1406781, *Investigate and Repair Tank Level Indication, Work Change Notice (WCN) 3*, included multiple errors.
 1. Step 5.3.1: Craft workers at the work location pointed out that a step did not contain adequate detail to perform the step correctly.
 2. Step 5.3.1: EA identified that a safety significant resistor part number documented in the work instructions was incorrect.
 3. Step 6.1.2: This step referenced an incorrect PMT.
 4. WCN 4: This WCN was issued to correct the above errors, but with no review by the cognizant system engineer, as required by WP 10-WC3011, *Work Control Process*.

NWP has established proper use categories for procedures, including “continuous use” (procedure in hand and followed step by step) and “reference use” (procedure is available for reference during procedure performance if needed). During onsite data collection, EA observed WIPP workers installing a jumper as part of corrective maintenance using the “reader-worker” method, in which one worker has the procedure in hand and reads the step to another worker, who then takes the action. During this observation, the reader and the worker did not use formal communications (including repeat-backs), thus increasing the possibility of errors during jumper installation. EA also observed that WIPP staff and CMROs did not use effective communications techniques, including repeat-backs. (See **OFI-NWP-01**.)

WP 15-PS.01, *Procedures Program*, covers development of management control procedures and technical procedures at WIPP. The procedure states that “Some organizations have their own programs to implement DOE O 422.1 requirements and are not covered under this program” and gives one example: the “Central Characterizations Program, which has a separate program for procedures.” EA identified other procedures, including those for radiological control and engineering, that are not covered by the procedures program credited in the DOE-approved WIPP Conduct of Operations Implementation Matrix or any other conduct-of-operations program document. The WIPP Conduct of Operations Implementation Matrix for procedures is incomplete and does not fully comply with Section 2.p of DOE Order 422.1, Attachment 2, Appendix 1, which states: “The operator must establish and implement operations practices for developing and maintaining accurate, understandable written technical procedures that ensure safe and effective facility and equipment operation....” Radiation protection procedures and engineering procedures are treated as technical procedures by NWP and affect safety and facility and equipment operation, but they are not covered by the WIPP procedures program. **(Deficiency)**

NWP has established a process for conducting maintenance/modification on WIPP structures and components through WP 10-WC3011. This procedure directs the development, review, approval, and execution of work instructions as part of WIPP’s conduct of operations program for procedures. For

work orders involving modifications, the procedure states: “When planned work involves a modification, copies of applicable portions of an Engineering Change Order (ECO) will be included and the work package will be subject to Engineering review for modification impacts EA10WC3011-19-0, Modification Impact Sheet.” Contrary to these requirements, EA identified the following issues during review of Work Order 1406781: **(Deficiency)**

- Revision 2 of the work order (WCN 2) included a modification of a safety system to install two 500-ohm resistors (in parallel) in the fire protection water tank level instrumentation circuitry. This modification was to be temporary, until a single 250-ohm resistor could be properly procured. The work order package did not include an ECO as required by procedure.
- The temporary modification contained in Work Order 1406781 did not follow the requirements of WP 04-AD3012, which lists several items excluded from the temporary modification control procedure. This work order did not meet any of the exclusions listed in the procedure and thus was required to follow the temporary modification control process.
- No engineering justification was ever prepared for this modification of the fire protection system.
- Revision 4 (WCN 4) was issued to replace a faulty level transmitter and return the safety system to the original design configuration (i.e., removal of the temporary 500-ohm resistors and installation of the single 250-ohm resistor) but did not receive an engineering review.

NWP has generally established procedures for all anticipated operations, including abnormal and emergency situations. Emergency operating procedures have been consolidated into one procedure, WP 12-ER4925, *CMR Incident Recognition and Initial Response*. The procedure is in the proper format and includes a section on entry conditions, automatic actions, immediate actions, subsequent actions, and exit conditions for the CMR operator. The procedure identifies 12 entry conditions, no automatic actions, and a common set of six immediate actions. However, some steps in the immediate actions are not properly ordered, including steps that do not appear to be true immediate actions. **(Deficiency)** For example, actions to actuate evacuation alarms and strobe lights and make public address announcements to evacuate for a fire in the underground are not performed until the sixth immediate action following entry into the procedure. Step one of the immediate actions is to record incident information in the “Initial Information” section of the “CMR Incident Information Checklist,” which requires documenting 11 areas of information. Since the procedure is followed step by step, the stated order of the immediate actions could delay actuation of evacuation alarms and verbal notification to personnel regarding the emergency for several minutes.

Technical Procedures Conclusions. NWP has generally established and implemented operations practices for developing and maintaining accurate, understandable written technical procedures that ensure safe and effective facility and equipment operation. The procedures that EA reviewed are in the correct format, sufficiently detailed, and technically accurate (except as noted above). However, management attention is needed to ensure that procedures are consistently accurate and executable, modifications to facility systems are technically justified, and the conduct of operations program for technical procedures remains consistent across all WIPP organizations.

5.7 Operator Aids

Criteria

The operator must establish and implement operations practices to provide accurate, current, and approved operator aids.

EA assessed the WIPP operator aid program for compliance with DOE Order 422.1 requirements and for effective implementation across the site. As previously discussed, several organizations independently implement the WIPP conduct of operations program. EA found that the procedures used to implement the operator aid section of DOE Order 422.1 were acceptable. All active operator aids approved by the respective organization were properly posted and up to date. However, EA found three operator aids that had not received the required six-month management review. All of these were associated with the Underground organization.

During multiple walkdowns of the site, EA found seven uncontrolled, unapproved documents, posted in various parts of the site, that WIPP personnel use while performing work activities. These documents are not included in the WIPP operator aid program but are used by several operating organizations (e.g., Facility Operations, Waste Operations, and Underground Operations). EA discussed these deficiencies with NWP and CBFO management during a daily outbrief and NWP stated it will correct the issue. The failure to identify these posted items and unapproved operator aids is an example of inadequate conduct of operations program management. (See **OFI-NWP-01**.)

Operator Aids Conclusions. NWP has established operations practices to provide accurate, current, and approved operator aids. However, management attention is needed to improve the consistency of management review of operator aids and to eliminate unapproved operator aids.

6.0 FINDINGS

As defined in DOE Order 227.1A, *Independent Oversight Program*, findings are significant deficiencies or safety issues 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. Findings may identify aspects of a program that do not meet the intent of DOE policy or Federal regulation. 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. A deficiency is an inadequacy in the implementation of an applicable requirement or performance standard that is found during an appraisal. Deficiencies that did not rise to the level of a finding are in Appendix C.

Finding-NWP-01: NWP management has not adequately implemented conduct of operations requirements in DOE Order 422.1 in the areas of procedural compliance, system maintenance, and engineering maintenance, resulting in degraded operations performance and non-conservative management decision making.

7.0 OPPORTUNITIES FOR IMPROVEMENT

This EA assessment identified one OFI. OFIs are not intended to be prescriptive or mandatory. Rather, they are suggestions offered by the EA team that may assist site management in implementing best practices, or provide potential solutions to minor issues identified during the assessment. In some cases, OFIs address areas where program or process improvements can be achieved through minimal effort. It is expected that the responsible line management organizations will evaluate these OFIs and accept, reject, or modify them as appropriate, in accordance with site-specific program objectives and priorities.

OFI-NWP-01: Consider taking steps to make a single organization coordinate implementation of conduct of operations to ensure that DOE Order 422.1 is properly applied across all organizations:

- Ensure consistent compliance and alignment with program and DOE order requirements.
- Strengthen conduct of operations by increasing management and mentor observations' emphasis on maintenance work step performance to reinforce reader-worker expectations.

Appendix A Supplemental Information

Dates of Assessment

Onsite Assessment: January 11-15, 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
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Quality Review Board

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EA Site Lead for WIPP

Jeff Snook

EA Assessors

Jeff Snook – Lead
Glenn Morris
Gregory Teese

Appendix B
Key Documents Reviewed, Interviews, and Observations

Documents Reviewed

Central Monitoring Room Operator's Daily Logs, November 15, 2015 through January 7, 2016

00CD-0001, *WIPP Mine Ventilation Plan*
04-HO1002, *Salt Handling Shaft Hoist Operation*
04-VU1001, *Surface Underground Ventilation and Filtration System...*
04-ED1301, *Diesel Generator Operation*
04-AD3001, *Facility Mode Compliance*
04-HV1201, *Exhaust Filter Building HVAC*
04-AD3013, *Underground Access Control*
04-VU1003, *Operation of UVFS in Auxiliary Air Supply Configuration*
04-HO1003, *Waste operations Hoist Operation*
04-AD3008, *Shift Briefings-Packages, and Round Sheets*
04-AD3011, *Equipment Lockout/Tagout*
04-ED1021, *Surface Electrical Distribution*
04-EM4200, *Radiological Monitoring System Alarm Response*
04-FP2201, *Electric Fire Pump Emergency Start*
04-FP2202, *Diesel Fire Pump Emergency Start*
04-CM2003, *Loss of CMS Indication*
04-ED1341, *Surface Backup Power Distribution*
04-VU4605, *UVFS Alarm Response*
04-AU2006, *Underground Work Areas Shiftly Inspection*
04-AD3005, *Administrative Control of System Lineups*
04-ED1001, *13.8 KV Surface Transformer Operating Instructions*
04-VU1004, *Remote Operation of Underground Bulkhead Regulators and Door*
04-ED1631, *Underground Backup Power Distribution*
04-HO4003, *Waste operations Hoist Alarm Response*
04-FP1201, *Site Fire Water Supply System Operations*
04-ED1621, *Underground Electrical Distribution*
04-ED2001, *Normal and Alternate Power for Underground EADS*
04-HV4021, *HVAC Alarm Response*
04-HO2002, *Salt Hoist Dynamic Lowering (AO)*
04-ED1542, *Central Uninterruptible Power Supply (45P-UPS03/2)*
04-HO2003, *Waste Hoist Dynamic Hoisting and Lowering*
04-ED4301, *Diesel Generators 1 And 2 Local Alarm Response*
04-HO2003, *Waste Hoist Dynamic Hoisting and Lowering*
04-HO3003, *Waste operations Hoist Off Normal Operation*
04-HO4002, *Salt Hoist Alarm Response*
04-HO4003, *Waste operations Hoist Alarm Response*
04-HOO010, *Mine Hoist Emergency Responses*
04-HV4021, *HVAC Alarm Response*
04-VU001, *Surface Underground Ventilation and Filtration System...*
04-VU1002, *Operability Testing of Underground Filtration*
04-VU1003, *Operation of UVFS in Auxiliary Air Supply Configuration*
04-VU1004, *Remote Operation of Underground Bulkhead Regulators*
04-VU1611, *Pressurization of U/G Bulkhead 74-B-309*
04-VU1612, *WIPP Mine Ventilation Rate Monitoring*

04-VU1613, *Underground Airflow Configuration and Verification*
 04-VU4605, *UVFS Alarm Response*
 05-WH1004, *Facility, SCA, And TRUPAC-II Pallet Handling*
 05-WH1005, *CH Packaging Trailer Loading/Unloading*
 05-WH1010, *Container Overpacking*
 05-WH1011, *CH Waste Processing*
 05-WH1015, *Preparation of CH Packaging for Empty Shipment*
 05-WH1025, *CH Waste Downloading and Emplacement*
 05-WH1036, *Site-Derived Mixed Waste operations*
 05-WH1037, *Inline HEPA Filter Testing*
 05-WH1038, *Repackaging of Low-Level Waste*
 05-Wh1058, *CH Waste Operations Abnormal Operations*
 05-Wh1083, *CH Packaging Operations*
 05-WH1101, *CH Surface Transuranic Mixed Waste Operations Area Inspections*
 05-WH1102, *Access to The CH Bay in the Waste Operations Building*
 05-WH1201, *TRUPACT-III Handler*
 05-WH1202, *TP-III Monorail Hoist*
 05-WH1203, *TRUPACT-III Bolting Robot and Station*
 05-WH1213, *TURPACT-III Packaging Operations*
 05-WH1218, *TP-III Abnormal Operations*
 DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis, Revision 4*
 DOE/WIPP 07-3373, *Waste Isolation Pilot Plant Technical Safety Requirements, Revision 4*
 EA15PS3004-1-0 - *Procedure Verification Checklist*
 EA15PS3004-2-0 - *Procedure Verification Checklist*
 MP 1.30, *Policy, Required Reading*
 MWO00534, *Underground Entry/Exit, Revision 8*
 WP 15-RM, *WIPP Records Management Program*
WIPP Form WF 15-870 (No title – Addresses the potential common causes amongst 29 hazardous energy control issues.)
 WIPP Site Active Operator Aids
 Required Reading logs for all operations divisions.
 TRG-293 *SME/OJT Instructor Course*
 WP 02-AR3001, *Unreviewed Safety Question Determination*
 WP 04-AD3001, *Facility Mode Compliance*
 WP 04-AD3005, *Administrative Control of System Lineups*
 WP 04-AD3007, *CMS Alarm Disable Authorization*
 WP 04-AD3008, *Shift Briefings - Packages and Round Sheets*
 WP 04-AD3011, *Equipment Lockout/Tagout*
 WP 04-AD3012, *Temporary Plant Modification Control*
 WP 04-AD3013, *Underground Access Control*
 WP 04-AD3016, *Equipment Inactivation*
 WP 04-AD3027, *TSR Violation Response and Recovery*
 WP 04-AD3034 - *Technical Procedure Compliance*
 WP 04-CO.01, *Conduct of Operations*
 WP 04-CO.01-2, *Conduct of Operations Program - Shift Routines and Operating Practices*
 WP 04-CO.01-5, *Conduct of Operations Program – Control of On-Shift Training*
 WP 04-CO.01-8, *Conduct of Operations Program - Control of Equipment and System Status*
 WP 04-CO.01-9, *Conduct of Operations Program - Lockout/Tagout*
 WP 04-CO.01-11, *Conduct of Operations Program - Logkeeping*
 WP 04-CO.01-12, *Conduct of Operations Program - Turnover and Assumption of Responsibilities*
 WP 04-CO.01-14, *Conduct of Operations Program – Required Reading*

WP 04-CO.01-15 - *ConOps - Timely Orders to Operators*
WP 04-CO.01-16 - *ConOps - Operations Procedures*
WP 04-CO.01-17, *Conduct of Operations Program – Operator Aid Postings*
WP 04-CO.01-18, *Conduct of Operations Program - Equipment and Piping Labeling*
WP 04-GC3005, *Performance of System Lineup*
WP 04-HO1001, *Waste Handling Hoist Operation*
WP 04-HO1003, *Waste Handling Hoist Operation*
WP 04-MD3003, *Control of Operator Aids*
WP 05-WH1406, *Conveyance Loading Car*
WP 08-NT3105, *Transportation “Out-of-Service” Tags*
WP 09-CN3005, *Graded Approach to Application of QA Controls*
WP 09-CN3007, *Engineering Change Order Preparation and Design Document Change Control*
WP 09-CN3022, *Engineering File Room Operations*
WP 09-CN3023, *Functional Classification Determination for Design*
WP 09-CN3034, *Configuration Management Determination*
WP 10-AD3005, *Control and Use of Maintenance Locks*
WP 10-WC3010 - *Periodic Maintenance Administration and Controlled Document Processing*
WP 10-WC3011 - *Work Control Process*
WP 10-WC3012 - *WCD Writer's Guide*
WP 10-WC3013 - *WCD User's Guide*
WP 10-WC3015, *Scheduling and Work Authorization*
WP 12-ER3903, *Termination, Reentry, and Recovery*
WP 12-IS.01-1, *Industrial Safety Program - Barricades and Barriers*
WP 12-IS.03, *Electrical Safety Program Manual*
WP 13-QA3004, *Nonconformance Report*
WP 14-TR.01, *WIPP Training Program*
WP 14-TR3305, *Instructor Qualification*
WP 14-TR3307, *Qualification Programs*
WP 14-TR3308, *On-the-Job Training*
WP 14-TR3310, *Training Determination*
WP 14-TR3310, *Training Determination*
WP 15-MD3102, *Event Investigation*
WP 15-PS.01, *Procedures Program*
WP 15-PS.2, *Procedure Writer's Guide*
WP 15-PS.2, Rev 12, *Procedure Writer's Guide*
WP 15-PS3002, *Controlled Document Processing*
WP 15-PS3004, *Procedure Verification and Validation*
WP 16-2, *Software Screening and Control*

Interviews

CBFO Program Manager
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

Observations

Operator rounds
Corrective maintenance to replace the fire protection tank level transmitter
Central Monitoring Room activities
Contact Handled Waste operations
Contact Handled Waste operations qualification activity (3)
Critique of a recent tagout violation
Hoist preventive maintenance performance
Multiple Lockout/Tagout Installations
NWP Work Release Meeting
NWP Waste Handler Morning Meeting
NWP Underground Operations Morning Meeting
NWP Plan of the Day
Operation of Salt Handling Shaft Hoist
Startup of Air Intake Shaft Hoist
Walkdown of Underground with CBFO Facility Representative (2)
Walkdown of Transportation Packages

Appendix C Deficiencies

A deficiency is an inadequacy in the implementation of an applicable requirement or performance standard that is found during an appraisal. Deficiencies may serve as the basis for one or more findings. Deficiencies shall be addressed in accordance with established issues management processes (DOE O 226.1) and quality assurance programs (DOE O 414.1).

- WP 04-AD3012, *Temporary Plant Modification Control*, is not fully applied to temporary changes in plant configuration. Instead, temporary modifications are being implemented outside WP 04-AD3012, leading in at least in one case to a modification to plant systems without engineering technical justification and poor configuration management.
- Work packages and preventive maintenance procedures for mobile equipment do not include the tagout required by WP 04-AD3011, *Equipment Lockout/Tagout*.
- Some procedures and work instructions cannot be executed as written, in violation of DOE Order 422.1, Attachment 2, Appendix A, Section 2.p.(3).
- The procedures program credited in the DOE-approved conduct of operations matrix does not address all site technical procedures in each organization, as required by DOE Order 422.1, Attachment 2, Appendix 1, Section 2.p.
- Work Order 1406781 was not executed properly, as indicated by significant issues in planning, engineering, and management control of the work being performed.
- WP 12-ER4925, *CMR Incident Recognition and Initial Response*, contains immediate action steps that are not properly ordered and could lead to delays in initiation of alarms and public address notifications.