

**Office of Enterprise Assessments
Assessment of Emergency Management
at the Waste Isolation Pilot Plant**



February 2018

**Office of Emergency Management Assessments
Office of Environment, Safety and Health Assessments
Office of Enterprise Assessments
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Acronyms

CAT	Consequence Assessment Team
CRAD	Criteria and Review Approach Document
DOE	U.S. Department of Energy
EA	Office of Enterprise Assessments
EAL	Emergency Action Level
EOC	Emergency Operations Center
EPHA	Emergency Planning Hazards Assessment
ERO	Emergency Response Organization
IC	Incident Commander
LSPT	Limited-Scope Performance Test
MOU	Memorandum of Understanding
NARAC	National Atmospheric Release Advisory Center
NWP	Nuclear Waste Partnership, LLC
OFI	Opportunity for Improvement
WIPP	Waste Isolation Pilot Plant

**Office of Enterprise Assessments
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EXECUTIVE SUMMARY

The U.S. Department of Energy (DOE) Office of Emergency Management Assessments, within the independent Office of Enterprise Assessments (EA), conducted an assessment at the Waste Isolation Pilot Plant (WIPP) from October 3 to November 2, 2017. The purpose was to examine the effectiveness of the Nuclear Waste Partnership, LLC (NWP) corrective actions for four findings and one deficiency from EA's 2016 report *Office of Enterprise Assessments Emergency Management Assessment of the Waste Isolation Pilot Plant – April 2016*.

EA's 2016 assessment used limited-scope performance tests (LSPTs) to evaluate emergency response organization personnel's performance, followed by a programmatic assessment of four emergency management program elements. EA evaluated NWP's and the DOE Carlsbad Field Office's ability to respond to a simulated Operational Emergency and their capability to make decisions, formulate protective actions, and demonstrate mitigating strategies. EA also assessed the conduct of the LSPTs to validate the effectiveness of NWP's exercise program. Based on the results of the LSPTs, EA then assessed the NWP emergency management program technical basis, plans and procedures, training and drills, and exercise program elements.

During this assessment, EA observed that NWP had implemented a number of improvements to the WIPP emergency management program, through the implementation of new equipment, technology, capabilities, and plans and procedures. However, further effort is necessary to address four previous findings regarding protective actions, consequence assessment, training and proficiency, and corrective actions from drills. In addition, a deficiency regarding required National Atmospheric Release Advisory Center access to site meteorological data remains unresolved.

EA determined that NWP closed three of the four findings and the one deficiency from the 2016 EA assessment without fully resolving the original issues, because the corrective action plans for the 2016 EA assessment findings and deficiency each omitted several important actions. In addition, NWP has not fully integrated the issues management process for emergency management findings, which requires verification and validation for corrective actions resulting from EA assessment findings and exercise findings, into the site's issues management process. Consequently, NWP did not verify or validate the effectiveness of corrective actions for the past closed EA assessment findings and deficiency.

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1.0 PURPOSE

The U.S. Department of Energy (DOE) Office of Emergency Management Assessments, within the independent Office of Enterprise Assessments (EA), conducted an assessment of the emergency management program at the Waste Isolation Pilot Plant (WIPP) to determine the program's effectiveness in ensuring that emergency plans, implementing procedures, and resources are adequate and sufficiently maintained, exercised, and evaluated and that improvements are made in response to identified needs, as required by DOE Order 151.1C, *Comprehensive Emergency Management System*. EA performed this assessment at WIPP from October 3 to November 2, 2017.

2.0 SCOPE

This assessment examined the effectiveness of corrective actions for four findings and one deficiency from EA's previous emergency management assessment report, *Office of Enterprise Assessments Emergency Management Assessment of the Waste Isolation Pilot Plant – April 2016*. The DOE Carlsbad Field Office requested that EA include the one deficiency, even though EA does not typically perform follow-up on deficiencies. EA conducted this assessment in accordance with the *Plan for the Office of Enterprise Assessments Assessment of Emergency Management at the Waste Isolation Pilot Plant, October – November 2017*.

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, such as 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).

The DOE Carlsbad Field Office provides Federal oversight of WIPP and is responsible for the national transuranic waste program. The office's mission is to provide safe, compliant, and efficient characterization, transportation, and disposal of defense-related transuranic waste. The prime contractor, Nuclear Waste Partnership, LLC (NWP), provides day-to-day operation and maintenance services for WIPP.

EA's April 2016 emergency management assessment used limited-scope performance tests (LSPTs) to evaluate emergency response organization (ERO) personnel's performance, which were followed by a programmatic assessment of four emergency management program elements. The LSPTs consisted of two scenarios from the WIPP documented safety analysis: a radiological release initiated by an earthquake, and a radiological release from a waste assembly dropped down the mineshaft. Two shifts of ERO personnel participated in these LSPTs. EA evaluated the organization's ability to respond to a

simulated Operational Emergency and its capability to make decisions, formulate protective actions, and demonstrate mitigating strategies. EA also assessed the conduct of the LSPTs to validate the effectiveness of NWP's exercise program. Based on the results of the LSPTs, EA then assessed WIPP's emergency management program technical basis, plans and procedures, training and drills, and exercise program elements.

4.0 METHODOLOGY

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.

EA used specific criteria from objective RA.1 of Criteria and Review Approach Document (CRAD) EA-33-05, *Contractor Readiness Assurance and Exercise Program CRAD*, dated March 22, 2017.

EA reviewed available records associated with corrective actions for the four findings and one deficiency from EA's previous assessment. In addition, EA interviewed individuals with direct knowledge of the findings and deficiency. The members of the EA assessment team, the Quality Review Board, and EA management responsible for this assessment are listed in Appendix A. A detailed list of the documents reviewed and personnel interviewed, relevant to the findings and outcomes of this report, is provided in Appendix B.

5.0 RESULTS

Criterion: DOE and National Nuclear Security Administration facilities must implement a readiness assurance program consisting of evaluation, improvements, and emergency readiness assurance plans. [DOE O 151.1C, Attachment 2 (Contractor Requirements Document), 7.]

This section discusses EA's assessment of the effectiveness of NWP corrective actions for the findings and deficiencies identified in the 2016 assessment of the WIPP emergency management program, particularly the validation of effectiveness of the corrective actions. In response to DOE/IG-0657, *The Department's Continuity Planning and Emergency Preparedness* (2004), which identified potential risks to DOE employees and surrounding communities when the effectiveness of corrective actions is not evaluated, DOE revised DOE Order 151.1C to supplement DOE Order 414.1D, *Quality Assurance*, and required verification and validation of the effectiveness of emergency management corrective actions.

NWP Emergency Management has defined a process to address its assessment, drill, and exercise issues. WP 12-9, *WIPP Emergency Management Plan*, appropriately includes the preparation, implementation, verification, and validation of corrective actions for findings. Emergency Management appropriately categorizes issues as a finding (deficiency or weakness) or OFI, for dispositioning in accordance with DOE Order 151.1C.

Emergency Management uses the NWP enterprise issues management process, WP 15-GM1002, *Issues Management Processing of WIPP Forms*, to manage the completion of corrective actions and closure of

findings. This process requires NWP to rank each finding for its significance to establish its type that dictates the rigor of causal analysis, tracking of corrective action status, and closure requirements. The ranking process establishes action levels 1 – 4, with action level 1 requiring the most rigorous process. WP 15-GM1002 does not address the need for verification and validation of emergency management issues and only action level 1 requires an effectiveness review of corrective actions to ensure resolution of the original finding.

NWP assigned all four findings and the deficiency as action level 3 to address the identified issues. Because the NWP enterprise issues management system does not require verification or validation of the effectiveness of the corrective actions for this action level, the plans did not include verification or validation of the effectiveness of the actions. Overall, as discussed below, the NWP issues management system has not effectively integrated and implemented the DOE Order 151.1C requirements for resolving emergency management findings through verification and validation of correction actions.

5.1 Protective Actions (2016 Finding F-NWP-1)

The 2016 EA assessment report states, “NWP has not fully developed protective actions implementing procedures that identify areas that exceed protective action criteria or a procedure to implement a site evacuation plan.” NWP developed a corrective action plan for this finding that is partially implemented and scheduled for completion in calendar year 2018.

During the 2016 LSPTs, predetermined dose projections were based on overly conservative calculations in the emergency planning hazards assessment (EPHA) as discussed in section 5.2. Also, EA identified that NWP’s predetermined protective actions in the emergency action levels (EALs) were based on the dose consequences at the building where the release occurred and did not consider potential exposure to other onsite receptors. These predetermined protective actions evacuated the immediate area and placed the remainder of the site in sheltered-in-place protective action. Consequently, workers who sheltered-in-place nearby were subject to significant exposures over a short period of time due to infiltration of the projected high concentrations of outdoor airborne radioactive material into the shelters. Thus, the initial protective actions for the declared General Emergencies were not conservative or appropriate for the predetermined dose projections.

The corrective action plan has adequate short-term and long-term strategies for correcting these conditions and is partially implemented. NWP’s short-term strategy resulted in the development of WP 12-ER.30, *WIPP Evacuation Plan*. The plan includes a well-conceived strategy for local area, building, zone, and site evacuations; identifies essential personnel who are to remain on site to support its implementation; and assigns responsibility for personnel accountability to key positions. NWP implements the local, building, and zone strategies via response procedures and implements a site evacuation via a worksheet in the plan. The *WIPP Evacuation Plan* appropriately identifies the need to train ERO members, have a well-developed relationship with offsite implementing partners, and have up-to-date memoranda of understanding (MOUs) with offsite partners that support its implementation. Furthermore, the *WIPP Evacuation Plan* recognizes that using offsite relocation areas requires the largest amount of preplanning and considerations. Except for the Skeen Whitlock Building parking lot, the offsite relocation sites are public facilities. Although the corrective action plan does not include updating the offsite interface MOUs, NWP has a separate ongoing effort to update them.

Although onsite protective actions are implemented via procedures, NWP has not developed an implementing procedure for the site evacuation plan. Moreover, programmatic implementing details are not in place, such as for an evacuation in response to a radioactive material release. Although the *WIPP Evacuation Plan* takes into consideration the possible spread of contamination to WIPP personnel and vehicles in the WIPP parking lot, the plan does not fully describe the process for contamination control

and personnel accountability. For radioactive material release events, the evacuation plan identifies the need to acquire school buses from Lea and Eddy Counties for transporting site workers to offsite relocation facilities, in order to avoid the spread of radioactive materials on contaminated vehicles, and discusses the need to acquire support from Hobbs and Carlsbad city fire departments for decontamination activities, with support from NWP radiological control technicians. The *WIPP Evacuation Plan* appropriately describes the establishment of these offsite interface support functions via MOU. Nonetheless, the steps to implement contamination control have not been included in the MOUs or implementing procedures. The *WIPP Evacuation Plan* also identifies the NWP IC, facility safety manager, or the crisis manager as the person responsible for personnel accountability, but does not provide implementing instructions when evacuating to a remote location or when these essential personnel remain on site while all others evacuate.

NWP has an appropriate long-term strategy, which is to develop a technical basis for selection of protective actions (shelter or evacuation) during a radiological release. The long-term strategy for updating the EPHA analysis for General Emergency incidents should lead to more reasonable consequence assessment results and better management of an incident. This long-term strategy is not complete due to a delay in obtaining a subject matter expert for its implementation. NWP has recently assigned a subject matter expert to implement this task, and the current due date for developing specific protective actions is January 30, 2018.

Overall, NWP's corrective action plan for 2016 Finding F-NWP-1 has appropriate short-term and long-term strategies, but the corrective actions do not include the development of sufficiently detailed implementing instructions for executing a site evacuation or verification and validation necessary to ensure that completed corrective actions are effective in resolving the finding. The long-term strategy for updating the EPHA analysis for General Emergency incidents, in order to obtain more reasonable consequence assessment results that will enable better management of an incident, was recently initiated by acquiring a subject matter expert to implement this task. The long-term strategy is scheduled for completion in 2018. (See **2018 Finding F-NWP-1**.)

5.2 Consequence Assessments (2016 Finding F-NWP-2)

The 2016 EA assessment report states, "NWP did not provide accurate and timely consequence assessments during the LSPTs, resulting in the lack of safe route information, initial plume projections, and estimates of exposure at receptors of interest." NWP developed a corrective plan, implemented the corrective actions, and closed the finding.

During the 2016 LSPTs, neither of the two consequence assessment teams (CATs) performed the initial consequence assessment activities to provide safe route information and timely estimates of exposure at receptors of interest, as described in the WIPP protocols. Specifically, the CAT representatives did not provide timely initial analyses, use accurate source terms for the underground radiological releases, use the EPHA to ensure development of accurate plume projections, provide all the consequence assessment data to key ERO members, or check the quality of consequence assessment output products before their distribution. NWP's pre-calculated doses in the EPHA, used in EAL development for actions before the CAT is available, were completed using very conservative assumptions that would result in very high dose projections, which would present difficulties in managing an incident because the unrealistically high predicted doses would make it unsafe for personnel to remain on site.

NWP has taken adequate steps to change its procedures to expedite the CAT analysis and sharing of accurate consequence assessment information. NWP completed the corrective action plan by:

- Revising the EALs to add source term information for developing plume projections and identify receptors of interest
- Clarifying instructions in the consequence assessment procedure and adding a graph for the CAT to quickly correlate instrument readings, in units of derived air concentration hours, to a source term
- Revising the CAT checklist with additional instructions
- Issuing a new CAT briefing worksheet.

All of these completed actions are appropriately designed to expedite sharing of accurate consequence assessment information, when performed by proficient ERO personnel.

Although NWP closed the finding, the completed actions did not fully resolve the issues associated with dose projections at the onset of a radioactive material release or ensure that personnel are proficient in implementing the new protocols. Although NWP has added some receptors of interest to the EALs, the set of sheltering-in-place protective actions does not address all the receptors of interest. Further, estimates of exposure remain to be developed at receptors of interest. The unfinished technical planning activities are part of the corrective action for 2016 Finding F-NWP-1 and NWP has not revised the EPHA to update the analysis in effect in 2016, which should greatly reduce projected doses during the early stages of response to a radioactive material release. NWP established May 2019 as the next due date for an EPHA revision. Finally, NWP did not provide training to ERO responders on the procedure changes or include verification and validation activities in the corrective action process to ensure the proficiency of users and the timeliness of availability of the consequence assessment results. Proficient ERO personnel and verification and validation activities are essential to effectively resolve 2016 Finding F-NWP-2. (See **2018 Finding F-NWP-1.**)

5.3 Training and Proficiency (2016 Finding F-NWP-3)

The 2016 EA assessment report states “NWP does not provide initial training to develop some specific emergency response capabilities, provide annual refresher training, ensure that required training is completed, or describe how the ERO will demonstrate proficiency.” NWP recorded the tracking of this finding on two separate issues management forms, developed two corrective plans, completed the corrective actions, and closed the finding.

The 2016 EA assessment report documented a number of weaknesses in some aspects of the NWP training program, specifically:

- NWP did not provide a formalized methodology for determining ERO members’ proficiency
- NWP did not ensure that ERO members outside the EOC completed their emergency management training requirements
- Key field response personnel had not been trained to understand the plume projections they received
- Consequence assessment training lacked the rigor necessary to ensure that CAT representatives made appropriate recommendations and provided them to ERO decision-makers to protect emergency responders
- NWP offered refresher training biannually rather than annually as specified in the training program.

One of the issues management forms (WIPP Form WF 16-451) documented the issues relating to proficiency and the other issues management form (WIPP Form WF 16-475) included the corrective actions to address initial training of key field responders and consequence assessment training. Neither of the issues management forms addressed ensuring that refresher training was conducted annually or that emergency management training requirements were completed in accordance with the training program.

NWP addressed the proficiency element of the finding by revising WP 12-17, *WIPP Emergency Management Training Program*, and procedure WP-12-ER4923, *Emergency Operations Center Personnel Selection and Qualification*. The revised documents adequately describe how ERO members attain, maintain, and track their proficiency qualifications. Except for consequence assessment training and annual refresher training described below, the procedures adequately address all ERO member proficiency requirements. Additionally, NWP now tracks the status of all ERO members' qualifications using a site-wide Organizational Watch Stander computer database to ensure that only qualified ERO members are placed on the duty roster.

To address the weakness associated with plume projections, NWP made minor changes to lesson plan EM-104, *Emergency Response Organization Awareness Training*, adding an enabling objective to address the purpose of consequence assessment and information to support the new objective. However, NWP did not provide training to field responders on the interpretation and use of CAT plume projections before closure of the finding. Further, NWP only trained currently-qualified fire and protective force ICs using the revised lesson plan and did not add the course to the qualification curriculum and qualification cards for new personnel. Consequently, current and future ICs and radiation control engineers may not be effectively prepared for using plume projections.

Also, NWP's corrective actions were limited to requiring only current CAT representatives to read the EPHA and attend two drills to demonstrate proficiency, but did not update the training program to increase the rigor of the training and effectively prepare personnel for their position assignments. Further, only two of the nine CAT representatives attended both drills, and one of these attendees served as a controller/evaluator rather than as a responder, resulting in limited validation of the proficiency for all CAT representatives. NWP does not require training for CAT representatives on the dispersion model programs, such as Hotspot and the National Atmospheric Release Advisory Center (NARAC) programs. Additionally, NWP did not revise the training matrix, *ERO General Training Requirements Matrix*, in the *WIPP Emergency Management Training Program* or CMT-14, *EOC Consequence Assessment Team Qualification Card* to include training on the EPHA and the dispersion model programs. The CAT representatives training program was not effectively updated to improve CAT performance, as demonstrated by a NWP finding on CAT representative performance in a subsequent full-scale exercise.

Although the components are in place, NWP's annual refresher training program, as currently implemented, is not fully effective. NWP did not address implementation of annual emergency management refresher training in the closeout of the finding, a condition that could have been detected by performing a verification or validation. Although NWP maintains and requires ERO members to take training courses EM-101, *Emergency Response Organization Overview Refresher*, and EM-105, *Emergency Response Organization Awareness Refresher*, this training is only required every two years, not annually. Also, WP 12-17, *Emergency Management Training Program*, states that annual ERO refresher training will normally be scheduled on a quarterly basis as part of the quarterly EOC drill requirement. In response to the finding, NWP initiated informal training sessions covering lessons learned from previous drills, new and revised procedures, and other appropriate issues prior to the quarterly drill. However, this informal training is not the same every quarter and, consequently; ERO members do not consistently receive the same training. For example, subjects covered in some informal training sessions, but not in others, included the frequency of Crisis Manager briefings, command and control, and approaching the hot wash with a self-critical attitude. In a subsequent exercise, NWP noted

that the frequency of Crisis Manager briefings needs to be improved.

In summary, NWP adequately addressed some but not all of the issues in this finding. NWP appropriately revised the training program to address ERO proficiency and implemented a site-wide database to track ERO training; however, NWP did not effectively address key field responder's ability to interpret CAT plume projections, CAT representatives' training and performance, and implementation of annual refresher training. Also, NWP did not verify or validate the closure of the corrective actions for this finding. (See **2018 Finding F-NWP-1** and **OFI-NWP-1**.)

5.4 Drill Deficiencies (2016 Finding F-NWP-4)

The 2016 EA report identified that "NWP does not always incorporate corrective actions into the emergency management program for significant issues identified during drills." NWP developed a corrective action plan, implemented corrective actions, and closed the finding (WIPP Form WF16-452).

The corrective actions for this finding included chartering the Emergency Management Drill and Exercise/Readiness Assurance Working Group to review drill findings and updating WP 12-ER.13, *WIPP Drills and Exercises* plan to include instructions on capturing and processing significant issues identified during drills.

Implementation of the two corrective actions resulted in programmatic improvements to the drill and exercise program. EA reviewed documentation from 10 drills and found that NWP identified and effectively processed 3 findings and 16 OFIs. NWP included the issue management form (WIPP Form) number for these OFIs and findings in the applicable after-action report, providing traceability for the improvements. Also, the expanded role of the Emergency Management Drill and Exercise/Readiness Assurance Working Group in reviewing all emergency management program issues (from assessments, drills, and exercises) and associated corrective actions provides a consistent oversight of the emergency management issues management process. NWP completed both actions and closed the finding.

However, NWP did not effectively implement the issues management process for some significant issues identified during drills and exercises, which requires verifying and validating that corrective actions were effective in resolving the original finding. Consequently, some ERO performance issues remain recurring problems, such as issues related to employees using the underground tracking and communication system and response personnel that did not follow evacuation procedures. Furthermore, NWP often assigns drill and exercise findings to organizations other than Emergency Management; therefore, Emergency Management was not always aware of some corrective action completions or the need to initiate verification and validation. (See **2018 Finding F-NWP-1** and **OFI-NWP-2**.)

5.5 NARAC Access (2016 Deficiency D-NWP-1)

The 2016 EA report included one deficiency: "NWP has not granted access to NARAC personnel for direct access to WIPP-specific meteorological data to perform accurate and near real-time consequence assessments." NWP resolved the deficiency using the site issues management system (WIPP Form WF16-456).

EA reported that NWP had not granted permission for NARAC personnel to access the site's real-time weather data, as required by DOE Order 151.1C. The lack of access to real-time meteorological data was also a finding in NARAC's *After-Action Report for the Radiological Incident of 2014*, as well as the *WIPP Emergency Management Independent Safety Management Program Evaluation Final Report*.

NWP consolidated the two related consequence assessment issues into a single-issue management form (WIPP Form WF 16-456) to address revising the meteorological input parameters in EPHA procedure WP 12-12, *Development and Maintenance of an Emergency Planning Hazards Assessment*, and granting permission for NARAC personnel to access the site's real-time weather data. An NWP-recommended corrective action to address the analytical input parameters required reviewing and revising, if necessary, the meteorological input parameters. NWP performed a review and appropriately revised WP 12-12 to incorporate the input parameters from the emergency management guide, satisfying the corrective action for the consequence analysis. NWP recorded the action as complete.

The corrective action plan also included a corrective action to develop a project plan for providing NARAC continuous access to the meteorological tower data. NWP documented that a statement-of-work for the central monitoring room's NARAC weather monitoring upgrade adequately illustrated that there was a plan to have the project implemented. NWP expected this statement of work to satisfy the corrective action. NWP recorded the action as complete, and closed the deficiency (WIPP Form WF16-456); stating that the actions taken and evidence supplied were adequate.

NWP also performed numerous supplemental activities, beyond the corrective actions stated in the issue management form, that were also intended to enable NARAC access to WIPP meteorological data but that were not effective. NWP implemented an interim measure to manually acquire 24-hours of meteorological data and email the data to NARAC, while seeking a long-term fix to grant NARAC direct access to real-time data from the existing operating tower. However, NWP did not grant NARAC access to the existing tower information due to security concerns with data logger access. NWP Information Resources Management and Engineering developed and implemented an alternative approach by installing new meteorological instrumentation on the abandoned Far Field meteorological tower. However, after NWP provided NARAC access to the Far Field tower's data logger, NARAC determined that the data was not valid or useable because the instrumentation that was installed did not meet technical specifications for NARAC connectivity. NWP has opened a new issue management form (WIPP Form WF16-2014) and initiated a new project to install the correct instrumentation on the Far Field tower. Significantly, NWP does not plan to use the Far Field tower for plume modeling and instead will continue to use the primary tower's data. This concept of operations does not fully support the role of NARAC in providing corroboration and refinement of site consequence assessments.

Similar to the closure of the 2016 EA findings, NWP did not verify adequacy of the corrective actions or validate that the corrective actions were effective in resolving Deficiency D-NWP-1, allowing the deficiency to be closed even though the corrective actions were ineffective. (See **2018 Finding F-NWP-1** and **OFI-NWP-3**.)

5.6 Conclusion

Corrective action implementation for the previous EA findings resulted in two improvements to the WIPP emergency management program, but NWP corrective actions did not fully address the findings and deficiency from EA's 2016 assessment report and the corrective action plans did not include verification and validation of the effectiveness of the corrective actions.

NWP closed three of the four findings and the deficiency from the 2016 EA assessment without fully resolving the original issues. Although the corrective actions led to program improvements, the corrective action plans for the 2016 EA assessment findings and deficiency omitted several important actions. For example, the protective actions corrective action plan did not include the development of sufficiently detailed implementing instructions for executing a site evacuation or validation and verification steps that will ensure that the completed corrective actions were effective in resolving the finding. Similarly, the corrective actions for consequence assessment and NARAC access did not include

interim measures to address NWP's pre-calculated, unrealistically-high predicted doses in the EPHA, which are used in EAL development for actions before the CAT is available, compounding the difficulties of managing an event because the projected doses make it unsafe for personnel to remain on site under DOE Order 151.1C.

In addition, the lack of integration between the Emergency Management and site issues management processes resulted in omitting verification and validation of the effectiveness of the corrective actions. Although the Emergency Management issues management process appropriately includes the preparation, implementation, verification, and validation of corrective actions, the site issues management process, used to implement the corrective actions, does not address the need for verification and validation of emergency management findings. NWP assigned an action level to the corrective actions that did not require verification and validation of effectiveness and NWP did not include the emergency management requirements for verification and validation in the corrective action plans. Consequently, the corrective action process did not verify or validate the effectiveness of corrective actions in resolving the original findings.

6.0 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.

Nuclear Waste Partnership, LLC

2018 Finding F-NWP-1: NWP corrective actions did not fully address the findings and deficiency from EA's 2016 assessment report, and the corrective actions did not include verification and validation of the effectiveness of corrective actions in resolving the original finding. (DOE Order 151.1C, Attachment 2, paragraph 7.b.(1)(b))

7.0 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.

Nuclear Waste Partnership, LLC

OFI-NWP-1: To improve the effectiveness of the ERO training program, NWP should consider:

- Revising the enabling objective in EM-104 on consequence assessment for key field responders to require the skills and ability to understand and interpret the plume projections.

- Revising training program documents, such as WP 12-17, and qualification cards to:
 - Require future on-scene IC and radiation engineers/managers to receive training on interpreting the plume projections.
 - Require future CAT representatives to read the EPHA and train on its source terms, analyses, inputs, and assumptions.
 - Require future CAT representatives to train on the methodology, assumptions, inputs, and interpretation of outputs for modeling tools such as Hotspot and NARAC.
- Revising the informal training given before each quarterly drill to include the same material covered in each session and making this training formal.
- Revising WP 12-17 to require that EM-101 and EM-105 only be required if individuals do not maintain their annual proficiency.
- Revising WP 12-17 to only allow demonstration of knowledge and skills as a means to satisfy proficiency requirements.

OFI-NWP-2: To improve the emergency management issues management validation and verification process, NWP should consider:

- Re-establishing a database to track and trend drill and exercise findings.
- Assigning the emergency management manager overall responsibility for corrective action implementation on all of the WIPP Forms that originate from drill and exercise findings.
- Developing an implementing procedure for emergency management issues management or modifying the site issues management procedure to incorporate verification and validation steps for emergency management drill and exercise findings.
- Incorporating a summary of finding validation into drill and exercise after action reports.
- Updating the emergency management Drill and Exercise/Readiness Assurance Working Group charter objectives to reflect the current scope of the working group.

OFI-NWP-3: To improve the quality of ongoing consequence assessments, NWP should consider:

- Incorporating the meteorological input parameters in the EPHA development and maintenance procedure.
- Enabling NARAC personnel to access the site's real-time weather data.

Appendix A Supplemental Information

Dates of Assessment

Onsite Assessment: October 3 – November 2, 2017

Office of Enterprise Assessments (EA) Management

William A. Eckroade, Acting Director, Office of Enterprise Assessments
Thomas R. Staker, Director, Office of Environment, Safety and Health Assessments
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Quality Review Board

Steven C. Simonson
John S. Boulden III
Thomas R. Staker
William E. Miller
Michael A. Kilpatrick

EA Site Lead for the Waste Isolation Pilot Plant

Aleem Boatright

EA Assessors

Gerald McAteer – Lead
John Bolling
Dirk Foster
Tom Rogers
Bill Scheib

Appendix B

Key Documents Reviewed and Interviews

Documents Reviewed

- CMT-14, *EOC Consequence Assessment Team Qualification Card*, Rev. 2, 11/8/16
- EM-101, *Emergency Response Organization Overview – Refresher*, Rev. 0, 9/29/16
- EM-104, *Emergency Response Organization Awareness Training*, Rev. 1, 6/29/16
- EM-105, *Emergency Response Organization Awareness – Refresher*, Rev. 0, undated
- EA12ER3002-4-0, *CAT Checklist*, Rev. 2, 6/16/15
- EA12ER3002-34-0, *Consequence Assessment Briefing Checklist*, Rev. 0, 6/20/16
- WP 12-ER.30, *WIPP Evacuation Plan*, Rev. 0, 10/6/16
- WP 12-ER-3002, *EOC Operations*
- WP 12-ER3906, *Categorization and Classification*, Rev. 16, 5/30/16
- WP 12-ER4918, *Consequence Assessment*, Rev. 23, 6/20/16
- WP 12-ER4923, *Emergency Operations Center Personnel Selection and Qualification*, Rev. 2, 6/15/16
- WP 12-9, *WIPP Emergency Management Plan*, Rev. 43, 10/26/16
- WP 12-12, *Development and Maintenance of an EPHA*, Rev. 6, 5/6/15
- WP 12-17, *Emergency Management Training Program*, Rev. 3, 10/05/16
- WP 12-ER.13, *WIPP Drills and Exercises*, Rev. 0, 11/20/14
- WP 12-ER.13, *WIPP Drills and Exercises*, Rev. 1, 6/9/16
- WP 12-ER.13, *WIPP Drills and Exercises*, Rev. 2, 10/5/16
- *WIPP EM Drill & Exercise/Readiness Assurance Working Group Charter*, Rev. 0, 1/14/16
- *WIPP Three-Year Drill and Exercise Plan FY2016 – FY2018*, 7/1/15
- *WIPP Three-Year Drill and Exercise Plan FY2017 – FY2019*, 4/27/16
- *WIPP Three-Year Drill and Exercise Plan FY2018 – FY2020*, 7/31/17

Interviews

- NWP Emergency Management and Security Department Manager
- NWP Emergency Management Section ERO Training Officer
- NWP Emergency Management Technical Analyst
- Emergency Planners (2)