Department of Energy
Washington, DC 20585

DEC 08 2016

MEMORANDUM FOR JEFFREY CARSWELL
STARTUP AUTHORIZATION AUTHORITY FOR
THE WASTE ISOLATION PILOT PLANT

TODD SHRADER
MANAGER
CARLSBAD FIELD OFFI CE

(b) (6)

FROM: EDWARD WESTBROOK, TEAM LEADER
FOR THE DEPARTMENT OF ENERGY
WASTE ISOLATION PILOT PLANT OPERATIONAL
READINESS REVIEW

SUBJECT: Waste Isolation Pilot Plant Department of Energy Operational Readiness Review Final Report

In accordance with your memorandum of November 12, 2016, the Department of Energy's (DOE) Operational Readiness Review (ORR) of the Waste Isolation Pilot Plant (WIPP) commenced on November 14, 2016. Field work for this review was completed on December 2, 2016, at which time the results of the ORR were briefed to the DOE Carlsbad Field Office (CBFO) and the operating contractor, Nuclear Waste Partnership, LLC (NWP).

Per the Plan of Action, which defined the scope of the review, the ORR focused on contact handled (CH) waste emplacement activities as well as the readiness of the facility to receive waste. In addition, the DOE ORR team paid particular attention to the specific areas of concern identified in the Accident Investigation Reports of 2014, and the attachment to your memorandum during the performance of this review. More specifically, the DOE ORR team addressed each of the core requirements of DOE Order 425.1D, evaluated the suite of safety management programs, and performed a particularly thorough evaluation of the following: 1) fire protection; 2) emergency preparedness; 3) radiological protection; 4) nuclear safety; and 5) operations. The identification of specific focus areas was not intended to diminish the importance of other areas of the review, but to ensure that these areas received a particularly thorough and in-depth evaluation due to their significance with respect to the safe operation of the facility. The ORR Final Report is attached for your information and use.

The DOE ORR team concluded that the WIPP facility can safely restart waste emplacement operations in a manner that is protective of the workers, the public, and the environment when the actions identified in recommendation one of Section 8.0 of the final report have been met (restated below). The contractor has an agreed-upon set of requirements to govern safe operations of the WIPP facility, established in the NWP contract and further defined in the draft Authorization Agreement between NWP and DOE. The Authorization Agreement must be signed/approved by the DOE Startup Authorization Authority prior to starting waste emplacement operations. The DOE ORR review team determined the requirements defined in the contract and the Authorization Agreement were adequately implemented for waste emplacement operations, unless otherwise specifically stated in the attached report.

The DOE ORR team recommends that the Startup Authorization Authority authorize startup of the CH waste emplacement activities upon:

- CBFO verification of closure of previously identified pre-start or prerequisite open items (a full listing of these items is included in the Final Report);
- CBFO and DOE ORR team verification of ORR pre-start Corrective Action Plan (CAP) closures; and
- DOE approval of ORR post-start CAPs as applicable.

The DOE ORR Team is available to assist the CBFO with review of NWP CAPs and the actions required to verify the closure of those CAPs. In addition, the DOE ORR team identified several post-start findings against the DOE, and will review and recommend approval of CAPs prepared by CBFO and DOE Headquarters.

If you have any questions, please contact me directly, at (303) 236-3673 or on my cell phone, at (301) 994-1509.

Attachment

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Department of Energy
Operational Readiness Review
for the
Waste Isolation Pilot Plant

December 2016

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I, by signature here, acknowledge that I concur with the findings and conclusions of this operational readiness review for startup of Contact Handled Waste Emplacement at the Waste Isolation Pilot Plant in my assigned functional area(s).

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AA	Authorization Agreement
AHJ	Authority Having Jurisdiction
AIB	Accident Investigation Board
AK	Acceptable Knowledge
ALARA	As Low As Reasonably Achievable
AR	Applicability Review
ARA	Airborne Radioactivity Fractions
AT	Air Monitoring Technician
BNA	Baseline Needs Assessment
BOK	Basis of Knowledge
CAM	Continuous Air Monitor
CAP	Corrective Action Plan
CAR	Corrective Action Request
CAS	Contractor Assurance System
CAQ	Conditions Adverse to Quality
CBFO	Carlsbad Field Office
CCEM	Chemical Compatibility Evaluation Memos
CCP	Central Characterization Program
CCR	Competence Commensurate with Responsibilities
CE	Cognizant Engineer
CEMRC	Carlsbad Environmental Monitoring and Research Center
CFR	Code of Federal Regulations
CH	Contact Handled
CHAMPS	Computerized History and Maintenance Planning System
CIH	Certified Industrial Hygienists
CM	Crisis Manager
CMR	Central Monitoring Room
COA	Continuous Monitoring Assessment
CORR	Contractor Operational Readiness Review
CRAD	Criteria and Review Approach Document
CRD	Contractor Requirements Document
CSE	Cognizant System Engineer
CSP	Certified Safety Professionals
CTAC	CBFO Technical Assistance Contractor
CY	Calendar Year
DA	Data Administrator
DAC	Derived Air Concentration
DEAR	DOE Energy Acquisition Regulation
DNFSB	Defense Nuclear Facilities Safety Board
DOE	U.S Department of Energy
DOE O	DOE Order
DOELAP	DOE Laboratory Accreditation Program
DORR	DOE Operational Readiness Review
DSA	Documented Safety Analysis
DOT	Department of Transportation
EA	Office of Enterprise Assessments

EAL	Emergency Action Level
ECN	Engineering Change Notice
ECO	Engineering Change Order
EM	Environmental Management
EMT	Emergency Medical Technician
EOC	Emergency Operations Center
EPD	Electronic Pocket Dosimeter
EPHA	Emergency Preparedness Hazard Analysis
EPHS	Emergency Planning Hazard Survey
ERO/ERP	Emergency Response Organization/Emergency Response Personnel
ES&H	Environmental, Safety & Health
ESS	Evaluation of the Safety of the Situation
ETO	Evaluation of Technical Operability
FAQS	Frequently Asked Questions
FHA	Fire Hazard Analysis
FHRA	Fire Hazard Risk Assessments
FR	Facility Representative
FSE	Facility Shift Engineer
FSM	Facility Shift Manager
FY	Fiscal Year
HA	Hazard Analysis
HCA	High Contamination Area
HEPA	High Efficiency Particulate Air
HMP	Hazardous Material Protection
HQ	Headquarters
HRA	High Radiation Areas
HVAC	Heating Ventilation and Air Conditioning
HWFP	Hazardous Waste Facility Permit
I&C	Instrument & Control
IENT	Individual Employee Notification Tracking
IC	Incident Command
ICE	Issue Collection and Evaluation
ICS	Integrated Control System
IDLH	Immediately Dangerous to Life or Health
IH/IS	Industrial Hygiene/Industrial Safety
IMPS	Issues Management Processing System
IP	Implementation Plan
ISMS	Integrated Safety Management System
IVR	Implementation Verification Review
IVS	Interim Ventilation System
JHA	Job Hazard Analysis
JIC	Joint Information Center
JON	Judgment of Need
JPM	Job Performance Measures
JTA	Job Task Analysis

KE	Key Element
KSA	Knowledge, Skills, and Abilities
LCO	Limiting Condition of Operation
LDD	Linking Document Database
LMA	Line Management Assessment
M&O	Management & Operations
M&TE	Measurement and Test Equipment
MAR	Material at Risk
MC	Management Charter
MOE	Monitored Operational Activities
MOP	Management Oversight Personnel
MP	Management Policy
MRT	Mine Rescue Team
MSA	Management Self-Assessment
MSHA	Mine Safety and Health Administration
MW	Megawatt
NCR	Nonconformance Report
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
NNSA	National Nuclear Security Administration
NS	Nuclear Safety
NTP	National TRU Program
NWP	Nuclear Waste Partnership, LLC
OA	Operational Awareness
OFI	Opportunity for Improvement
ORPS	Occurrence Reporting Processing System
ORR	Operational Readiness Review
OSH	Occupational Safety & Health
OSHA	Occupational Safety & Health Administration
OWL	Organizational Watch Stander Lists
PAPR	Powered Air Purifying Respirators
PAS	Public Address System
PBX	Private Branch Exchange
PC	Protective Clothing
PCR	Permittees Confirmation Representative
PISA	Potential Inadequate in the Safety Analysis
PM	Preventive Maintenance
PO	Purchase Order
POA	Plan of Action
PPE	Personnel Protection Equipment
PVS	Permanent Ventilation System
QA	Quality Assurance
QAP	Quality Assurance Plan
QAPP	Quality Assurance Project Plan
QAPD	Quality Assurance Plan Description/Quality Assurance Plan Document

QP	Quality Procedure
QSL	Qualified Supplier List
RA	Radiation Areas
RBA	Radiological Buffer Area
RC&D	Radiological Control and Dosimetry
RCDM	Radiological Control & Dosimetry Manager
RCRA	Resource Conservation and Recovery Act
RCS	Radiological Control Supervisor
RCT	Radiological Control Technician
REDM	Radiological Engineer & Dosimetry Manager
RES	Regulatory Environmental Services
RF	Release Fractions
RH	Remote Handled
RIDS	Records Inventory and Disposition Schedule
RMA	Radioactive Material Areas
RP	Radiological Protection
RPP	Radiological Protection Program
RR	Readiness Review
RWP	Radiological Work Permit
SAC	Specific Administrative Control
SAR	Supplied-Air Respirator
SAT	Systematic Approach to Training
SBRT	Safety Basis Review Team
SBIM	Safety Basis Implementation Matrix
SC	Significance Category
SC/SS	Safety Class/Safety Significant
SCBA	Self-Contained Breathing Apparatus
SDD	System Description Document
SER	Safety Evaluation Report
SI	Special Instruction
SME	Subject Matter Expert
SMP	Safety Management Program
SPM	Site Project Manager
SR	Surveillance Requirement
SSC	Structures, Systems, and Components
SSO	Safety System Oversight
SSW	Senior Supervisory Watch
ST	Survey Technician
STS	Safety Trained Supervisor
SVS	Supplemental Ventilation System
TCO	Transportation Certification Official
TIM	Training Implementation Matrix
TLD	Thermoluminescent Dosimeters
T&Q	Training & Qualification
TQP	Technical Qualification Process
TRNs	Temporary Revision Notices

TRU	Transuranic
TRUPACT	Transuranic Package Transporter
TSR	Technical Safety Requirement
TSTD	TRU Sites and Transportation
UG	Underground
USQ	Unreviewed Safety Question
USQD	Unreviewed Safety Question Determination
UVS	Underground Ventilation System
VFD	Variable Frequency Drive
WAC	Waste Acceptance Criteria
WAP	Waste Analysis Plan
WCD	Work Control Documents
WCO	Waste Certification Officials
WCS	Waste Control Specialist
WDS	Waste Data System
WF	WIPP Form
WHB	Waste Handling Building
WIPP	Waste Isolation Pilot Plant
WP	WIPP Procedure
WPC	Work Control Program
WSHP	Worker Safety and Health Program

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EXECUTIVE SUMMARY

The U.S. Department of Energy (DOE) has completed an Operational Readiness Review (ORR) for the restart of Contact Handled (CH) waste emplacement at the Waste Isolation Pilot Plant (WIPP) located near Carlsbad, New Mexico. The ORR team assessed the readiness of Nuclear Waste Partnership, LLC (NWP) to manage and perform receipt through CH waste emplacement, and associated waste handling and management activities, including the ability of the National TRU Program (NTP) to evaluate the waste currently stored at the WIPP site against the revised and enhanced Waste Acceptance Criteria (WAC). Field work for this review began on November 14, 2015 and was completed on November 30, 2016.

The DOE ORR was conducted in accordance with the *Department of Energy Operational Readiness Review Implementation Plan for the Waste Isolation Pilot Plant*, dated November 8, 2016, and DOE Order 425.1D, *Verification of Readiness to Start Up or Restart Nuclear Facilities*. The review activities included personnel interviews, record reviews, direct observation of operations and maintenance demonstrations, and observation of multiple operational and emergency drills/exercises. The DOE ORR also evaluated the adequacy of the contractor's ORR (CORR) and the readiness of the DOE Carlsbad field Office (CBFO) to oversee the startup and execution of CH waste emplacement activities at the WIPP facility.

The WIPP facility is categorized as a Hazard Category 2 DOE Nonreactor Nuclear Facility for all surface and Underground (UG) operations per DOE-STD-1027-92, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports.* In addition, the WIPP experienced two events in February, 2014 that resulted in Accident Investigations being performed in accordance with the requirements of DOE Order 225.1B, *Accident Investigations*. Based upon the results of the accident investigations and hazard categorization of the facility, the team placed significant emphasis on the following areas: fire protection, emergency preparedness, radiological protection, nuclear safety, and operations. The identification of specific focus areas was not intended to diminish the importance of other areas of the review, but to ensure that these areas received a particularly thorough and in-depth evaluation due to their significance with respect to the safe operation of the facility.

The ORR team identified twenty-one (21) pre-start findings, fifteen (15) post-start findings, thirty (30) opportunities for improvement, and two (2) best practices. Areas of concern identified by this ORR were fire protection, emergency preparedness, radiation protection, nuclear safety, and waste acceptance. Three pre-start findings were identified in fire protection addressing a number of weaknesses including: failure to satisfy Documented Safety Analysis (DSA) Key Element 11-5 which requires automatic fire suppression on diesel powered vehicles in the underground; combustible control implementation; and violations of the Underground Escape and Evacuation Plan due to the improper parking of vehicles. In the emergency preparedness functional area two pre-start findings were identified concerning: less than adequate operability and reliability of the WIPP emergency notification system equipment; and inadequate staffing

of EMTs and first responders during the performance of work in the underground. In the radiological protection area pre-start findings were identified with: radiological personnel proficiency and knowledge; and radiological air monitoring of work in airborne radioactivity areas. In the nuclear safety and engineering area, issues were identified with: weaknesses in the execution of the Unreviewed Safety Question (USQ) process in a few instances; CBFO and Central Characterization Program (CCP) DSA implementing procedures not being subjected to the USQ process; and the failure to perform a Potential Inadequacy in the Safety Analysis Determination (PISAD) process following a larger than analyzed roof fall. In the waste acceptance area four pre-starts were identified, including: the failure to identify the Waste Data System (WDS) as safety software; controls for preventing the placement of waste located in the Waste Handling Building (WHB) into the underground not meeting internal procedural requirements; CBFO procedures being insufficient to satisfy the rigor needed to implement DSA controls; and NWP has not developed the full set of procedures to implement DSA Chapter 18 requirements. One of the ORR focus areas (i.e., operations) identified only one Pre-Start finding. In addition, the ORR team identified two best practices in engineering.

The DOE-CBFO has responsibility for the day-to-day oversight of activities at the WIPP and was also evaluated during this ORR. One (1) of the aforementioned prestart findings and six (6) of the post-start findings were written against DOE (this total includes one (1) post-start finding that was written against DOE HQ). The findings identified against the CBFO were independent of the issues previously identified via internal assessments and external assessments conducted on CBFO by the Office of Enterprise Assessments (EA) and the National Nuclear Security Administration (NNSA). The shortcomings identified in CBFO processes and performance led to the development of recommendation number four (4) below.

Conclusion: The DOE ORR team concluded that the WIPP facility can safely restart waste emplacement operations in a manner that is protective of the workers, the public and the environment when the actions identified in recommendation one (1) have been met. The DORR pre-start findings must be corrected prior to the startup of the facility. Post-start findings are not required to be corrected before startup, but the corrective action plans (CAPs) for these findings should be developed by CBFO, NWP, and DOE HQ and approved by those DOE individuals designated by the Startup Authorization Authority prior to the startup date (see Recommendation number two [2] below). The CAPs for both pre-start and post-start findings should be developed in accordance with DOE-STD-3006-2010, *Planning and Conducting Readiness Reviews*, section 8.11. Additional detail is provided below in the list of recommendations developed by the DOE ORR team.

RECOMMENDATIONS

The DOE ORR team recommends that:

1. The SAA authorize startup of CH waste emplacement upon:
   - CBFO verification of closure of the previously identified pre-start or prerequisite open items (a full listing of these items is included at the end of the Executive Summary);
   - CBFO and DORR team verification of DORR pre-start CAP closure;
   - DOE approval of DORR post-start CAPs as applicable.

2. NWP CAP review, acceptance (pre and post) and closure verification (of pre-starts) should be performed by the DOE ORR team in conjunction with their CBFO counterparts.

3. DOE specific CAPs be reviewed by the DOE ORR team for acceptance and closure.

4. CBFO Management should identify their short term supplemental personnel needs necessary to provide effective oversight of restart to EM HQ management, and take action to fill the open Mine Operations SSO position and transition the Mine Recovery Team to a steady state condition.

5. CBFO should plan and perform Ground Control and DSA/TSR implementation assessments shortly after commencement of waste emplacement operations.

6. Upon receipt of the MSHA report, NWP should develop a comprehensive plan to address the issues and recommendations provided in the MSHA report on the evaluation of WIPP's ground control efforts. Planned actions should be prioritized based on their risk and importance to achieving the stability of the mine for its planned and required life-cycle.

7. An overall mine strategy plan be developed to coordinate and focus the ground control, mining, and waste emplacement activities to maximize the use of competing resources (i.e., equipment, air flow in the mine, personnel, etc.).

DORR PRE-START FINDINGS

EM.1-PRE-1 Improvement is needed in the WIPP's Emergency Notification System (ENS) to support near-term operations; and equipment upgrades are needed for long-term system reliability (post-start component).

EM.1-PRE-2 Current staffing does not provide Emergency Medical Technicians (EMTs) or first responders 100% of the time work is being performed in the underground. According to 30 CFR § 56.18010, a person capable of providing first aid must be available on all shifts. This includes CPR.

ENG.1-PRE-1: Contrary to the requirements of WP 02-AR3001, *Unreviewed Safety Question Determination,* NWP did not enter a Potential Inadequacy in the Safety Analysis Determination (PISAD) upon experiencing a roof fall larger than that postulated in the Hazards Analysis supporting assumptions.

FP.1-PRE-1: Fire suppression systems have not yet been installed/accepted for all non-waste handling vehicles prior to use as required by fire protection equivalency WIPP-EQ-2015-01, and Documented Safety Analysis Key Element (KE) 11-5.

FP.1-PRE-2: Underground vehicles were observed (on several occasions) parked on the wrong side of the drifts, contrary to WP 12-ER.25, *Underground Escape and Evacuation Plan*. This is a repeat pre-start finding from the CORR.

FP.1-PRE-3: The combustible loading program contains conflicting/unclear documentation and is not effectively implemented.

IH.1-PRE-1: The Mine Rescue Team (MRT) did not have an approved procedure for the calibration or calibration check of atmosphere monitoring equipment, were not maintaining records of the tests, and were using expired calibration gas.

IH.2-PRE-1: The contractor's response procedure for investigating and responding to a potentially Immediately Dangerous to Life or Health (IDLH) atmosphere is not protective for responding employees.

MG.1-PRE-1: The Startup Plan does not provide for a graded, systematic approach to unrestricted operations.

NS.2-PRE-1: Contrary to the requirements of 10 CFR 830.203, LCO 3.1.1 Condition C was exited with a NFPA 13 INOPERABLE/non-compliant installed sprinkler system without DOE approval.

NS.2-PRE-2: Contrary to the requirements of 10 CFR 830, the CBFO and Central Characterization Program (CCP) Documented Safety Analysis (DSA) required processes are not subject to NWP's Unreviewed Safety Question (USQ) process.

OP.3-PRE-1: Use and designation of procedures were inadequate and not in compliance with NWP administrative processes (i.e., Management Control versus Technical procedures, and Continuous Use versus Reference Use), jeopardizing effective implementation of safety basis controls.

OSH.1-PRE-1: The waste handling TRUPACT-II dock (TRUDOCK) has an unguarded gap between the TRUPACT-II container and the walking platform, contrary to OSHA requirements.

RP.1-PRE-1: NWP does not have an effective process in place to ensure a timely and appropriate level of response to potential radiological events.

RP.1-PRE-2: Multiple deficiencies in radiation protection personnel proficiency, procedural compliance, and the level of knowledge of some RCTs were noted, directly impacting observed radiation protection performance.

RP.1-PRE-3: NWP radiological air-monitoring practices do not meet 10 CFR 835.403 requirements for air-monitoring.

TRG.1-PRE-1: Some Operators and Radiological Control Technicians (RCTs) are being qualified through an NWP task-based qualification process that does not ensure compliance with DSA KE 12-3 and DOE O 426.2 requirements.

WA.1-PRE-1: CBFO procedures are inadequate to implement the DSA/TSR actions/requirements prior to emplacement of waste containers residing in the Waste Isolation Pilot Plan (WIPP) Waste Handing Building (WHB) and prior to shipment for previously certified waste containers in the complex (including those containers continuing to be certified).
(Note: The process for the waste in the WHB needs to be corrected pre-emplacement, the process for previously certified waste not at WIPP can be completed pre-shipment.)

WA.1-PRE-2: Contractor's procedures/documentation that implement DSA/TSR Waste Acceptance Criteria (WAC) and Chapter 18 actions and requirements have not all been developed and/or revised to incorporate the DSA/TSR requirements.
(Some pre-waste emplacement and separately some pre-waste receipt.)

WA.1-PRE-3: The current administrative controls to preclude the placement of the waste containers located in the Waste Handling Building into the underground prior to satisfactory performance of DSA, Chapter 18.8 requirements do not satisfy the requirements of WP 13-QA3004. (This is a pre-emplacement finding.)

WA.1-PRE-4: The Waste Data System is incorrectly graded as non-safety software. (The WDS does not affect the emplacement of the waste at the WHB. This needs to be address prior to shipment. "Addressed" can be something less than full implementation of all the contractor requirements for safety software, with justification and a corrective action plan to achieve full compliance.)

DORR POST-START FINDINGS

DOE.1-POST-1: Contrary to DOE O 426.1 the Technical Training Program Coordinator, which is a position that is responsible for oversight of safety management programs as identified in the facility DSA, is not included in the TQP.

DOE.2-POST-1: Facility Representatives are not formally reviewing and approving final Occurrence Reporting and Processing System (ORPS) reports for SC-2 and above in the timeframe specified in DOE Order 232.2.

DOE.2-POST-2: CBFO implementation of the Issues Collection and Evaluation (ICE) surveillance process does not result in communicating formal oversight results and issues to the contractor in a timely manner.

DOE.2-POST-3: CBFO has failed to ensure key safety program commitments are tracked and deliberately dispositioned.

DOE.2-POST-4: CBFO has failed to implement ICE issues process for consistently managing issues to ensure timely disposition.

DOE.2-POST-5: DOE-HQ has failed to complete many Accident Investigation Board Judgments of Need corrective actions to support WIPP operations.

ENG.2-POST-1: Contrary to the requirements of the DSA, SDD, and DOE Order 433.1B, the UVS/IVS systems' operability could be impaired by unresolved known issues, lack of spare parts, and incomplete construction punch list items.

MG.1-POST-1: Current contractor staffing (compounded by the lack of qualified personnel) in some critical areas will not fully support the breadth of operations planned in calendar year 2017.

MWC.1-POST-01: Maintenance work control documents (WCDs) contain numerous deficiencies including hazard identification and controls; however, in all but one instance, the hazard controls were present but were mis-located within the WCD.

OP.1-POST-1: Contrary to NWP Conduct of Operations program implementing procedures, there were isolated instances of procedural non-compliance.

OP.2-POST-1: The WIPP Conduct of Operations Implementation Matrix, found in Attachment 1 to WP 04-CO.01, Rev. 3, *Conduct of Operations*, has not been approved by CBFO.

OP.3-POST-1: Contrary to NWP Conduct of Operations program implementing procedures, uncontrolled postings, instructions, and operator aids were found in aboveground and underground facilities.

TRG.1-POST-1: The WIPP Training Implementation Matrix (TIM), both the currently approved document and the revision that is at CBFO for review and approval, do not adequately address all DOE O 426.2 requirements.

TRG.1-POST-2: Operator training programs are not sufficiently comprehensive to cover all areas which are fundamental to their assigned tasks as required by DOE O 426.2.

TRG.1 -POST-3: NWP does not have a formal process to ensure that Managers are evaluated against their job responsibilities and complete facility specific training prior to assuming the duties of the assigned position as required by DOE O 426.2.

BEST PRACTICES

ENG.1-BP-1: The WIPP System Health Walkdown and Health Reports procedure includes a requirement for Cognizant System Engineers (CSEs) to brief management directly on the health and status of their safety system, providing CSEs an opportunity to discuss areas that need management focus or additional funding directly with senior managers.

ENG.2-BP-1: The WIPP Cognizant System Engineer/Alternate Cognizant System Engineer System Assignment List demonstrates a concerted effort on the part of NWP to ensure coverage in accordance with DOE O 420.1C for all safety systems, and ensure succession planning is in place.

PREVIOUSLY IDENTIFIED PRE-START OR PRE-REQUISITE OPEN ITEMS

The following previously identified manageable list of pre-start findings (including open prerequisites) is being carried forward as pre-start findings that must be resolved in addition to the pre-start findings identified by the DORR.

1. Install and turnover the underground high fire occupancy fire suppression systems.
2. Install and turnover networked Panel 7 CAMs that are tied into the Central Monitoring Room (CMR).
3. Panel 7 Ground Control activities to emplace waste.
4. Automatic fire suppression upgrades for underground liquid-fueled vehicles—specifically to resolve the waste transporter NCR.
5. New Mexico Environmental Department (NMED) assessment and approval to start waste emplacement activities.
6. Fire Protection Exemption, WIPP-EX-2015-01, involving automatic fire suppression system in the underground—approval and implementation.
7. Startup Authorization Authority approval for startup and Authorization Agreement approval.
8. DOE O 458.1, Chg. 3 property clearance and release process did not adequately implement the order for uncontrolled release, and procedures did not use Order methodologies sufficient to meet the measurement objectives.
9. Contrary to 10 CFR 835.401(b)(2) and (3), and 835.209(a), bases are inadequate for instrument selection and use, and for air monitoring.
10. A number of ALARA program elements were not implemented.
11. Overall ground control adequacy (tied to Operational Safety SMP JON).
12. Underground workers' heat stress level of knowledge.

13. Engineering processes revised and implemented to incorporate vendor (and other maintenance) requirements.
14. Engineering processes revised and implemented for Cognizant Engineer review of facility changes for impacts to safety.
15. CBFO has not ensured that Senior Technical Safety Manager (STSM) assignments or compensatory measures are in place to maintain an unbroken chain in the reporting structure of qualified STSMs in positions of authority.
16. Contrary to DOE O 426.1, CBFO management has not identified compensatory measures to ensure the Safety System Oversight (SSO) responsibilities associated with the vacant electrical and mine safety positions are fulfilled.
17. Installation and turnover of the underground volatile organic compound (VOC)/Carbon Monoxide (CO) monitoring systems.
18. Reactivation of underground evacuation strobes.

1.0 INTRODUCTION

This Operational Readiness Review (ORR) Final Report has been prepared in accordance with the requirements of United States (U.S.) Department of Energy (DOE) Order (O) 425.1D, *Verification of Readiness to Start Up or Restart Nuclear Facilities*, and the guidance provided in DOE-STD-3006-2010, *Planning and Conducting Readiness Reviews*. The scope of this ORR is described in the *Waste Isolation Pilot Plant Carlsbad Field Office Department of Energy Operational Readiness Review Plan of Action*, prepared by the Carlsbad Field Office (CBFO) and approved by Jeffrey Carswell, the Startup Authorization Authority for Todd Schrader, Manager for CBFO, on October 31, 2016. In addition, the Plan of Action identified the ORR Team Leader.

The WIPP is operated and maintained by Nuclear Waste Partnership, LLC (NWP). This report documents the results of the DOE ORR team's review of NWP's readiness to restart the WIPP facility located in southeastern New Mexico, which is conducted from November 14 to December 2, 2016. Initial restart of this facility begins with the emplacement of waste currently stored in the Waste Handling Building into the underground repository. Upon the successful completion of assessments at the generator sites that are outside the scope of this ORR (and closure of prestart findings), the WIPP will be able to receive and emplace waste streams that are approved per the recently revised Waste Acceptance Criteria (WAC).

The WIPP facility is categorized as a Hazard Category 2 DOE Nonreactor Nuclear Facility for all surface and Underground (UG) operations per DOE-STD-1027-92, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports.* Consequently, the DOE ORR placed a strong focus on its evaluation of fire protection, emergency preparedness, radiological protection, nuclear safety, and operations. The identification of specific focus areas was not intended to diminish the importance of other areas of the review, but to ensure that these areas received a particularly thorough and in-depth evaluation due to their prominence in the 2014 Accident Investigation reports and their significance with respect to the future safe operation of the facility.

The ORR Team Leader selected and approved the team members for the ORR. The team membership, ORR assignments, and biographical summaries are included in the *Department of Energy Operational Readiness Review Implementation Plan for the Waste Isolation Pilot Plant*, dated November 8, 2016. The ORR team participated in the development of the Implementation Plan (IP), with a particular focus on the Criteria and Review Approach Documents (CRADs) that would be used to perform this ORR. The ORR team that performed this review was comprised of experienced individuals from various DOE Environmental Management (EM) sites and two support service contractors to EM Headquarters. A site pre-visit was conducted in October 2016 to provide the ORR team with WIPP facility access and site familiarization training, define the specific operations that would be demonstrated, clarify the expectations for simulated activities, identify the types of emergency and operations drills that would be performed, and obtain agreement on a general schedule for the conduct of the review.

2.0 PURPOSE

The purpose of this ORR was to confirm the contractor's ability to safely re-start contact-handled (CH) waste emplacement at the Waste Isolation Pilot Plant (WIPP), the ability of site and facility programs to sustain safe operations (particularly those that were identified in the 2014 Accident Investigation Board (AIB) reports as needing improvement); and the readiness of the CBFO line organization to effectively oversee the contractor. The ORR was performed to confirm that the preparations, documentation, verifications, and approval processes for the startup of WIPP operations were adequately completed to ensure the safety of workers, the public, and the environment. The DOE ORR was conducted in accordance with the *Department of Energy Operational Readiness Review Implementation Plan for the Waste Isolation Pilot Plant*, dated November 8, 2016, and DOE O 425.1D, *Verification of Readiness to Start Up or Restart Nuclear Facilities.* This report documents the overall approach and guidelines for performance of the DOE ORR, along with the results, conclusions and recommendations.

3.0 BACKGROUND

3.1 Facility Mission

The WIPP facility mission is to provide a safe and permanent disposal location for the government-owned TRU and TRU mixed wastes. The current WIPP mission includes the disposal of both contact-handled (CH) waste (i.e., waste with a radiation level of less than 200 millirem per hour at the surface of the waste container) and remote-handled (RH) waste (i.e., waste with a radiation level of equal to or greater than 200 millirem per hour but less than 1,000 rem per hour) in its underground repository.

3.2 Facility Description

The WIPP facility, located in southeastern New Mexico between Carlsbad and Hobbs, was constructed to determine the efficacy of an underground repository for disposal of TRU waste. Disposal operations began in 1999. WIPP is a deep geologic repository mined within a 2,000-foot-thick bedded-salt formation. The underground is 2,150 feet beneath the ground surface. TRU and TRU mixed waste management activities underground are confined to the southern portion of the 120-acre mined area.

Four shafts connect the underground area with the surface. The Waste Shaft head-frame and hoist are located within the Waste Handling Building and are used to transport TRU and TRU mixed waste, equipment, and materials to the repository. The Waste Hoist can and is used to transport personnel to and from the underground. The Air Intake Shaft (AIS) and the Salt Hoist/Handling Shaft provide ventilation to all areas of the underground except for the Waste Shaft station. The Salt Hoist is used to hoist mined salt to the surface and also serves as a personnel transport shaft. The AIS provides a limited means for transporting personnel to the underground (in comparison to the Waste

Hoist and Salt Hoist). The Exhaust Shaft serves as a common exhaust air duct for all areas of the underground.

The WIPP underground consists of the waste disposal area, construction area, north area, and Waste Shaft station area.

The principle contact-handled (CH) waste operations at the WIPP involve the receipt and disposal of TRU waste, and the mining of underground rooms in which the waste is emplaced. The TRU waste received at WIPP is shipped from multiple, different DOE sites and is from numerous and different waste streams. In the underground, the waste containers are removed from the waste hoist conveyance, placed on the underground transporter, and moved to a disposal room. In the disposal rooms, the CH waste containers are removed from the transporter and placed in the waste stack. Remote-handled (RH) waste in shielded containers is placed in boreholes in the walls (ribs) of the disposal rooms (RH emplacement is not within the scope of this ORR).

WIPP has been issued a Hazardous Waste Facility Permit (HWFP) by the New Mexico Environment Department for Resource Conservation and Recovery Act (RCRA) authorization as a Treatment, Storage, and Disposal Facility (TSDF). Some of these permit requirements are also found in DOE/WIPP-02-3122, *Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant*.

The site has fifty-five permanent buildings and four temporary buildings (trailers) in active status, one temporary building (lab trailer) in excess status, and various connex boxes used for storage. The site buildings provide a total of 358,647 square feet of office and industrial space. Additional leased office space exists in the Skeen-Whitlock Building which is located in Carlsbad. Approximately 800 workers are assigned to WIPP, representing the Carlsbad Field Office (CBFO), the Management and Operating (M&O) contractor (NWP), the warehouse, the document services subcontractor, the information technologies subcontractor, the CBFO Technical Assistance Contractor (Los Alamos National Laboratory-Carlsbad and Sandia National Laboratories-Carlsbad). Prominent features of the WIPP site include:

- **Air Intake Shaft**: The primary source of intake air for the underground ventilation and also used for emergency egress.
- **Waste Handling Building:** This structure provides a confinement barrier. Ventilation is operated to maintain a negative pressure with high-efficiency particulate air (HEPA) filtration.
- **Waste Hoist:** The Waste Hoist transports waste, material and personnel from the surface to the underground and is designed to prevent an uncontrolled fall or descent of the waste conveyance into the Waste Shaft.
- **Salt Handling Shaft Hoist:** This hoist transports mined salt to the surface; material and personnel between the surface and the underground.
- **Radiation Sampling and Monitoring:** Consists of CAMs, fixed air samplers (FAS), and other external radiation monitors.
- **Central Monitoring Room:** Provides a monitoring function and must be staffed and operational, with the ability to shift underground ventilation to filtration.

- **Underground Ventilation System:** Provides acceptable working conditions and a life-sustaining environment during normal operations and off-normal events, including waste handling events.
- **Interim Ventilation System:** Provides supplemental air flow to the underground to enable waste emplacement and is tied into the UVS.
- **Exhaust Filter Building:** Contains the underground ventilation exhaust HEPA filtration equipment and is located north of the Exhaust Shaft.
- **Waste Handling Equipment:** Selected items are designated safety class or safety significant.
- **Emergency Services Bay:** Houses the ambulance, rescue truck, and fire engine.
- **Guard and Security Building:** Houses the security monitoring and alarm systems.

Figure 1 provides the configuration of the underground and its orientation to the above ground facilities.

Figure 1: WIPP Layout

3.3 2014 Accident Investigations

Salt Haul Truck Fire

On Wednesday, February 5, 2014, an underground mine fire involving a salt haul truck occurred. There were 86 workers in the mine (underground) when the fire began. All workers were safely evacuated from the mine; however, six workers were transported to the Carlsbad Medical Center (CMC) for treatment for smoke inhalation and an additional seven workers were treated on-site.

The Deputy Assistant Secretary for Safety, Security, and Quality Programs, U.S. Department of Energy, Office of Environmental Management formally appointed an Accident Investigation Board (the Board) to investigate the accident in accordance with DOE Order (O) 225.1B. The Board began the investigation on February 10, 2014, completed the investigation on March 8, 2014, and concluded that the accident was preventable.

The following is a summary of the investigation:

Root Cause:

The failure to identify and mitigate the hazards associated with a fire in the underground. This includes the failure to recognize and remove combustible materials, and the decision to deactivate the automatic onboard fire suppression on pieces of underground equipment.

Contributing Causes:

- Preventive and corrective maintenance failures
- Weaknesses in the Fire Hazards Analysis and less than adequate flow down of requirements from the Baseline Needs Assessment into implementing procedures
- Training and qualification of equipment operators was less than adequate with respect to fire response
- The response by the CMR Operator was less than adequate
- Ineffective elements of the emergency preparedness program
- Nuclear culture versus mine culture with respect to the maintenance of underground vehicles
- The NWP Contractor Assurance Program (CAS) failed to identify the maintenance issues prior to the event
- CBFO line management oversight programs were ineffective in identifying weaknesses in the NWP CAS and maintenance programs
- DOE Headquarters and other external organizations identified deficiencies in site safety management programs but allowed them to remain unresolved for extended periods

Radiological Event Description

On February 14, 2014, an exothermic reaction involving the mixture of organic materials (Swheat Scoop® absorbent and/or neutralizer) and nitrate salts occurred inside drum 68660. This exothermic reaction resulted in pressurization of the drum, failure of the drum locking ring, and displacement of the drum lid. The energetic release propelled TRU waste from the drum up into polypropylene magnesium oxide (MgO) super sacks on top of the containers and onto adjacent waste containers. The super sacks of MgO are an assurance feature to ensure that consistent and favorable chemical conditions are maintained in WIPP brines after final facility closure by reacting with any carbon dioxide produced by the decay of organic carbon in the waste and waste emplacement materials.

A CAM monitoring airflow in the Panel 7 exhaust drift, where drum 68660 was stored, detected this TRU waste release and generated an alarm that was received on the Central Monitoring System in the Central Monitoring Room on the WIPP surface, and automatically initiated a shift to filtration of the underground ventilation system. While the majority of the release was directed by the ventilation system through high efficiency particulate air (HEPA) filters, a small portion bypassed the HEPAs via leakage around the ventilation system dampers and exhausted directly to the atmosphere.

A DOE AIB was convened to investigate this event. This Accident Investigation was divided into two phases: Phase I focused on the release of TRU waste from the underground to the environment and the site's response; Phase II of the investigation focused on the mechanism(s) of release from the waste containers in the underground and included entries, sampling, and additional forensics. The Phase 1 DOE Accident Investigation Report was issued on April 22, 2014 with 31 CONs and 47 JONs.

In addition to the safety programs identified as contributing causes to the salt haul truck fire, the Phase I radiological event identified significant weaknesses in:

- Radiological Protection Program
- Nuclear Safety Program
- Conduct of Operations
- Safety Culture

Upon conclusion of the Phase II DOE AIB, the Board identified the direct cause of this accident to be an exothermic reaction of incompatible materials in Los Alamos National Laboratory (LANL) waste drum 68660 that led to thermal runaway, which resulted in over-pressurization of the drum, breach of the drum, and release of a portion of the drum's contents (combustible gases, waste, and wheat-based absorbent) into the WIPP underground. The Phase II investigation focused significantly on LANL and it prime contractor Los Alamos National Security, LLC (LANS). The causes from the Phase II report applicable to WIPP include:

- Failure of the Central Characterization program to develop Acceptable Knowledge (AK) for the waste stream responsible for the event.

- Failure of the National TRU Program (NTP)/CBFO to ensure LANL complied with the WIPP Hazardous Waste Facility Permit and the WIPP Waste Acceptance Criteria (WAC).

Figure 2 provides a perspective of the WIPP facility layout, including the orientation of the underground waste emplacement panels, and the locations of the two accidents/events.

Figure 2: Fire and Radiological Event Locations at WIPP

3.4 Major Actions Post February 2014 Fire and Radiological Events

In response to the February 2014 fire and radiological events, NWP developed a WIPP Recovery Plan in conjunction with DOE. This plan was approved by the Secretary of Energy. Key elements of the recovery plan included strengthening safety management programs, regulatory compliance, decontamination of the underground, increasing ventilation, addressing mine stability and underground habitability, and additional workforce retraining.

Major accomplishments following the February 2014 events and in preparation for startup include:

- Development and closure of AIB corrective actions;
- Development and implementation of a revised Documented Safety Analysis (DSA), established in accordance with DOE-STD-3009-2014;
- Revision and implementation of WIPP's Safety Management Programs (SMPs) as a result of independent assessments and AIB corrective actions. Emphasis was placed on Conduct of Operations, Emergency Preparedness/Management, Radiological Controls, Training, Maintenance/Work Planning and Control and Fire Protection;
- Numerous facility and equipment modifications and upgrades, to include:
  - Interim Ventilation System (IVS), which supplies approximately 54,000 acfm of additional filtered air in the underground (UG);
  - Upgraded Emergency Operations Center (EOC) at the WIPP Site and New Alternate EOC in Carlsbad, New Mexico at the Skeen-Whitlock Building;
  - Notification System, that provides real-time monitoring of personnel locations in the UG and direct communications to personnel for enhanced response capability;
  - Installed automatic fire extinguishing capability on UG liquid fueled waste handling equipment, replacing the manual systems;
  - Repaired, replaced and installed new UG dampers and regulators to enhance the control of air flow, address fire protection requirements and MSHA concerns;
  - Implemented new differential pressure gauge instrumentation at numerous locations, e.g., 308 and 309 bulkheads;
  - Multiple work area fire suppression modifications in the UG, e.g., Maintenance Shop, Oil Storage;
  - Interim closure of Panel 6 (inlet and outlet drifts) and Panel 7/Room 7.
- Mine habitability was enhanced, with emphasis on combustible loading and control.

As part of WIPP's Recovery Plan and preparations for recommencing nuclear operations, NWP evaluated its readiness via a cold-run performance period of operations, emergency response drills, line management and independent assessments, and a Management Self-Assessment (MSA).

4.0 SCOPE and BREADTH of REVIEW

An ORR is a formal, documented, performance-based confirmation of line management's ability to achieve, demonstrate, and document readiness of the facility or processes to conduct work safely. An ORR requires a well-defined, graded approach to ensure the effort is adequate to verify readiness. The WIPP DOE ORR will included reviewing the results of the CBFO and NWP line management self-assessments of readiness, and the ORR conducted by NWP. The purpose of this ORR IP was to ensure a confirmatory

review of readiness to commence CH waste emplacement activities at the WIPP. This ORR was not intended to duplicate the activity of previous reviews, but to ensure that those reviews were effectively performed and identified the areas requiring improvement prior to authorization to proceed. This was accomplished by sampling the results of prior reviews and independently confirming through performance demonstrations that WIPP has achieved a state of readiness to start the operations within the scope of the review.

The full scope of this ORR was defined in the *Waste Isolation Pilot Plant DOE-CBFO Operational Readiness Review Plan of Action,* which was prepared by the DOE-CBFO. The section below is taken directly from the POA and describes the scope and breadth of the ORR, sans the details contained in the discussion of specific Core Requirements.

The breadth of the review included all 17 Core Requirements, as defined in DOE O 425.1D, for the commencement of CH TRU waste emplacement at WIPP. The scope and breadth of this ORR included an evaluation of both NWP's and DOE's readiness to resume CH TRU waste emplacement. It assessed the WIPP systems and processes associated with the receipt through emplacement of CH TRU waste in the underground. The readiness review included actual operational demonstrations of those systems, processes, and procedures using simulated CH TRU payloads. Simulated CH TRU payloads were used so that primary process hazards addressed in the DSA were not introduced during the readiness review.

Additionally, the ORR verified that Environmental Safety and Health (ES&H) management programs are adequate to support the waste receipt and emplacement operations. The ORR verified that sufficient staff is available, trained and qualified (as appropriate) to support all phases of operations and identified areas were staffing concerns exist.

Scope/breath of CORR – Specific to CH TRU Waste Disposal/Emplacement:

- On-Site Receipt of CH TRU (e.g., TRUPACT IIs,);
- Management and Storage of CH TRU Waste Exterior to the Waste Handling Building (WHB);
- CH TRU waste Material At Risk (MAR) monitoring and tracking – in both Waste Handling Building (WHB) and active underground (UG) Panel/Room
- Transport of CH TRU Waste into WHB and TRU Docks;
- Unloading (at TRU Docks) and Palletizing CH TRU Waste from TP-II/Half-TP/ in WHB,;
- Storage and Management of CH TRU Waste in the WHB;
- Conveyance of CH TRU Waste from WHB to Waste Hoist;
- Transfer of CH TRU Waste at Waste Shaft Stations to Transporters;
- Movement of CH TRU Waste UG from Waste Station to Active Panel 7;
- Transfer of CH TRU Waste from Transporter to Forklift for movement into Active Panel 7;
- Emplacement of CH TRU Waste in Simulated Active Panel 7/Room.

- Ground control activities specifically associated with preparing a room for waste emplacement.

Scope/breadth of ORR – Specific to the National TRU Program:

The ORR team evaluated portions of the NTP necessary to ensure that the waste currently resident at the WIPP facility can be safety emplaced in the UG. Activities performed by the Central Characterization Program (CCP) and other authorized waste certifiers located at generator sites will be evaluated via a separate review. The ORR evaluated the following as delineated in Chapter 18 of the DSA and, in particular, section 18.8 of the DSA which requires specific actions for previously certified waste at the site:

- NTP procedures and processes to ensure that Enhanced Acceptable Knowledge (AK) requirements have been adequately defined and flowed down into implementing documents;
- The training and qualification (as applicable) of personnel responsible for managing, performing, and approving AK reviews (at Carlsbad) of waste streams and waste documentation;
- Documentation demonstrating the Enhanced AK review of the waste streams currently resident in the WHB (a subset of those waste streams sufficient to provide proof of process).

The ORR also reviewed the credited structures, systems, and components and design features in the WIPP facility to verify their operability, and the effectiveness of processes that ensure their ongoing material condition. The ORR evaluated the ability of WIPP personnel to effectively operate and maintain the material condition of the following:

- Fire Suppression Systems
- Confinement Ventilation Systems (including fan rotations and system alignments)
- Waste Hoist System Brakes
- Underground fuel and oil storage areas
- In-Service Inspections for SC/SS DFs

The DOE ORR team evaluated maintenance activities ongoing during the performance period of the review. In addition, the ORR team identified specific maintenance activities in the Implementation Plan. The ORR evaluated the following maintenance activities:

- Preventive Maintenance (PMs) on credited ventilation systems
- PMs on WHB Diesel Fire Pump
- Calibration and M&TE program for SSC systems

The ORR evaluated the capability of WIPP personnel to respond effectively to emergency and off-normal events in accordance with emergency and alarm response procedures. This included an evaluation of the responses by all affected personnel and the emergency response procedures and equipment during drills conducted prior to the

DOE ORR and during the review itself. The following drills were within scope and were evaluated as part of this ORR:

- Emergency exercise (ORR Team personnel observed execution in June, August, and October, 2016)
- The WIPP facility Drills and cross tables (with Facility Shift Managers) demonstrating response to the following scenarios:
  - Fire and injury during waste disposal mode;
  - Various Abnormal Condition Responses, e.g., Central Monitoring Room (CMR) operations response to UVS ventilation upset issues, loss of Waste Hoist with CH TRU waste payload.
  - Injury in a Contamination Area.

Particular emphasis was placed on the operational system and process upgrades as a result of DOE's AIB JONs and WIPP's SMPs. The corrective action files for the AIB JON's and SMP's actions from individual LMAs were reviewed by the DORR, followed by operational demonstrations to validate implementation.

Potential additional DORR Scope Relating to SMPs and Support Systems/Processes:

- IVS Operations and Related Ventilation Alignments, to include:
  - Reviewed IVS Contractor Readiness Assessment (CRA) findings and corrective actions;
  - Verified the IVS fire detection system is operational and periodic maintenance requirements are performed.

- Other General & Common Conduct of Operations/Facility Operations activities:
  - LOTO Program;
  - CMR – log keeping, event notification, mode change;
  - Facility Status Program – to include TSR surveillances;
  - Mode Change – procedures and demonstration of processes;
  - Surveillances performed by other organizations such as: Firefighter, Waste Handling, Radiological Controls, etc.)

Out of Scope Activities

The following WIPP systems and functional areas were excluded from the scope of the DORR, due to the fact that they were sustained operations following the February 2014 events or the systems/operations require subsequent verification of readiness activities (e.g., SVS):

Sustained Operations:

- *Mining Operations - Ground Control;

- *Underground Geotechnical Inspections (weekly inspections, monitoring/movement);
- TRANSCOM Operations by Transportation and CMRO;
- Hoisting (shaft inspections, mechanical PMs);
- Experimental Operations in the North End Experiments – excluded is actual performance of experiments only; however, these operations will participate in Drills and be evaluated for Conduct of Operations and Maintenance/Work Control;
- NTP activities not performed at the WIPP site or Carlsbad Field Office (e.g., GSTR).
- Supplemental Ventilation System (SVS) – not operational and pending CRA;
- RH Horizontal Emplacement – evaluated once Panel 8 is certified;
- TRUPACT III operations
- CH Waste handling with Shielded containers

* Any ground control activity related to maintenance of the pathway to Panel 7, the Panel 7 itself, and the rooms designated for future waste emplacement are within the scope of this review. Geotechnical Engineering, Geotechnical Monitoring, and Ground Control were evaluated by an MSHA assist visit conducted during the week of October 24, 2016 and a report is scheduled to be provided at a later date. The DOE ORR team may reference this MSHA report depending upon its availability by the conclusion of the ORR.

The MSHA report was not issued prior to the completion of the ORR, consequently, the DOE ORR could neither review the report nor comment on CBFO's and NWP's response to the report. However, the DOE ORR team did examine and observe ground control activities in Panel 7 and interviewed the personnel performing bolting operations.

Process/Operations Requiring Subsequent Verification of Readiness Activities:

- Supplemental Ventilation System (SVS) – not operational and pending CRA;
- RH Horizontal Emplacement – to be evaluated once Panel 8 is certified;
- TRUPACT III operations
- CH Waste handling with Shielded containers

The depth of the ORR was described in the Implementation Plan (IP) and incorporated in the Criteria and Review Approach Documents (CRADs) found in Appendix 3 of that document. The CRADs served as the principal means by which the ORR Team evaluated the readiness of systems, processes and procedures, personnel, and management programs to start safely. The CRADs guided the review to ensure that the total specified scope is included in the ORR, and formed the basis of the Form 1s attached to this report.

5.0 CONDUCT OF ORR

The *Department of Energy Operational Readiness Review Implementation Plan for Waste Isolation Pilot Plant*, dated November 8, 2016 described the approach to the conduct of the ORR. The Implementation Plan (IP) identified the DOE ORR team members and included biographical summaries that established the basic qualifications of each individual to perform their assigned CRADs. Each team member was selected by the DOE ORR Team Leader based upon their expertise in the area to which they were assigned. This ORR reviewed the startup preparations for a Hazard Category 2 non-reactor nuclear facility, categorized per DOE-STD-1027-92, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports.* Consequently, it was imperative that a highly competent and dedicated team be assembled to perform a rigorous and thorough review. The Team Leader decided early in the team selection process that exceptionally capable individuals were required to perform the radiological protection, operations, maintenance and work control, emergency preparedness, DOE, engineering, and nuclear safety CRADs. This was not intended to diminish the other functional areas, but to emphasize the importance of the review in these areas as established by the 2014 Accident Investigation Board reports. By their selection, the Team Leader certified that each team member is technically competent, has assessment experience through previous assessment assignments, is independent for their assigned area, and through the familiarization process, became familiar with the facility.

The team members' independence, coupled with their professional experience, was intended to assure an objective and comprehensive review that provides the Startup Authorization Authority with confidence that the findings and observations are presented in an objective and responsible manner. There were no dissenting opinions as a result of this review.

The team conducted this review in accordance with the approved ORR IP. The ORR team developed the CRADs that provided the basis for conducting this ORR. Each CRAD was based on the core requirements and supplemental expectations contained in the DOE POA. The CRADs are included in the ORR IP and within the forms included in Appendix 3 and 4. The Team Leader reviewed the efforts of the team members to ensure that all of the objectives in the CRADs were thoroughly assessed. The Team Leader, in consultation with the ORR Deputy Team Leader and the appropriate team members, was responsible for making the determination of whether an issue was a pre-start or post-start finding, or an opportunity for improvement (OFI). Appendix 2 provides the criteria used to aid in this determination.

The ORR team met daily during the on-site fieldwork portion of the review to facilitate coordination of efforts and exchange information. These meetings allowed the team members to discuss preliminary issues identified during the day and permitted the Team Leader to identify: possible trends, the need to involve additional team members due to cross-cutting issues, and areas where more detailed information was required. These meetings also helped to highlight potential schedule conflicts or possible information

gaps in time to take corrective action. Subsequent to the daily ORR team meetings, the Team Leader and ORR Deputy Team Leader met with senior managers from NWP and CBFO to discuss the status of the review, areas of potential concern, and questions ORR team members needed to have answered.

The quality of the review process was the Team Leader's responsibility. That responsibility included oversight of the review, daily on-site peer review of the findings of the team members, and specification of the form of the ORR final report.

6.0 TEAM COMPOSITION

Team member assignments and the organizational affiliations of team members are identified in Appendix 1.

7.0 RESULTS

The DOE ORR team identified twenty-one (21) pre-start findings, fifteen (15) post-start findings, thirty (30) opportunities for improvement (OFIs) and two (2) best practices. The team evaluated twenty-four (24) CRAD objectives, and seventeen (17) of these were determined to be met, two (2) partially met, and five (5) not met. Those CRADs not met were EM.1, FP.1, MG.1, RP.1, and WA.1. Those that were partially met were DOE.2 and NS.2. Summaries of the results from each of the functional areas assessed during the ORR are provided below, including a list of pre-start and post-start findings, best practices, and opportunities for improvement. Appendix 3 contains more detailed documentation of the review results in the form of completed assessment forms for each of the review objectives (Form 1s). In addition, Appendix 4 contains a deficiency form for each finding, pre-start and post-start (Form 2s). Best Practices noted during the review are described in the Form 1s associated with the identified strength. The forms in Appendices 3 and 4 are arranged alphabetically and by number (e.g., OP.1, then OP.2, OP.3).

7.1 Department of Energy (DOE)

CBFO has increased staffing and significantly improved processes following the fire and radiological events that occurred in February 2014. The CBFO model to separate out programmatic responsibilities from compliance oversight is sound. CBFO continues to experience attrition challenges and is appropriately prioritizing vacancies (e.g. Mining Operations SSO), but the low level of TQP qualification detracts from CBFO oversight focus to support waste emplacement operations. The staff on board exhibits the necessary skills and competence, but a systematic approach to completing TQP qualifications across CBFO is warranted. Oversight and issues management processes have been adequately defined, however implementation is still immature as evidenced by weaknesses in commitment tracking, approval of formal surveillances in ICE, issuance of periodic oversight evaluations, updates to the integrated evaluation plan, and timely processing of internal issues using the Issue Collection and Evaluation database. It is

critical that CBFO establish processes to prioritize and track the various safety requirements/commitments CBFO must complete to support ongoing safe WIPP operations.

CBFO has implemented a QA program and has self-identified a number of issues that need to be regularly prioritized with emerging issues and events to support continued safe operations. Key issues that were previously identified that need to be managed until closed include: implementing the CBFO management self-assessment program, managing compensatory measures as TQP qualifications are completed, and fostering maturation of CBFO oversight implementation and effectiveness. Consistent with these activities, CBFO is encouraged to add specificity to the drafted CBFO Startup Plan for supplemental oversight, expedited filling of the Mine Operations SSO position to allow retirement of the Mine Recovery Team, and complete assessments of ground control activities and DSA compliance in parallel with initial waste emplacement activities.

NWP and CBFO have established mechanisms to track and document the actions to address Accident Investigation Board (AIB) Judgments of Need (JON) in a systematic manner. A package was created for each JON and the two organizations have been working together to close the actions and a review of a sample of packages indicate they are adequate. Almost half of the DOE-HQ JON actions are still in progress. It is the review team's opinion that of the overdue DOE-HQ JON actions, the only action DOE-HQ action that warrants short term attention is the completion of an assessment of the effectiveness of improvements to the CBFO safety basis review and approval process subsequent to the DOE-HQ assist visit completed to support JON 11-1.

Pre-start Finding(s)
See **WA.1-PRE-1**

Post-Start Finding(s)
DOE.1-POST-1: Contrary to DOE O 426.1 the Technical Training Program Coordinator, which is a position that is responsible for oversight of safety management programs as identified in the facility DSA, is not included in the TQP.

DOE.2-POST-1: FRs are not formally reviewing and approving final ORPS reports for SC-2 and above in the timeframe specified in DOE Order 232.2.

DOE.2-POST-2: CBFO implementation of ICE surveillance process does not result in communicating formal oversight results and issues to the contractor in a timely manner.

DOE.2-POST-3: CBFO has failed to ensure key safety program commitments are tracked and deliberately dispositioned.

DOE.2-POST-4: CBFO has failed to implement ICE issues process for consistently managing issues to ensure timely disposition.

DOE.2-POST-5: DOE-HQ has failed to complete many Accident Investigation Board Judgments of Need corrective actions to support WIPP operations.

7.2 Emergency Management (EM)

The overall mission of DOE emergency management is to be ready to respond promptly, efficiently and effectively to any emergency involving or affecting the Waste Isolation Pilot Plant by applying the necessary resources to mitigate the consequences and protect workers, the public, the environment, and national security. DOE Order 151.1C requires that emergency management efforts begin with the identification and qualitative assessment of the facility/site specific hazards and the associated emergency conditions that may require response, and that the scope and extent of emergency planning/preparedness at the facility/site reflect those specific hazards. At the WIPP site, hazards are identified and analyzed through a technical planning basis program which provides protective actions and protective action recommendations.

The WP 12-9, *WIPP Emergency Management Plan*, has been developed using the technical basis and has been recently approved by CBFO. The plan forms the basis of the program commensurate with the identified hazards at the WIPP site, and provides guidance and requirements for emergency planning, preparedness response, readiness assurance and recovery. The plan also provides a good structure for the program to integrate with local agencies.

While there are identified opportunities for improvement, the basis for a compliant comprehensive Emergency Management program is in place at WIPP. It should be noted, due to the overhaul of the Emergency Management program it will take time before the employees gain full proficiency in the implementation of this program. Two issues and three opportunities for improvement (OFIs) were identified during this review with the most significant being the operability and reliability of the WIPPs site emergency notification system. This problem was very well documented in the CORR but a temporary fix with compensatory measures that were not comprehensive correcting were adopted as a solution.

Pre-Start Findings

EM.1-PRE-1: Improvement is needed in the WIPP Emergency Notification System (ENS) to support near-term operations; equipment upgrades are needed longer-term for system reliability (post-start component).

EM.1-PRE-2: Current staffing does not provide Emergency Medical Technicians (EMTs) or first responders 100% of the time work is being performed in the underground. According to 30 CFR § 56.18010, a person capable of providing first aid must be available on all shifts. This includes CPR.

Opportunities for Improvement
EM.1-OFI-1: Through interviews it was determined that there is no formalized process other than the three year review, for Emergency Management to be notified when new hazards may have arrived on site (esp. Chemical).

EM.1-OFI-2 Procedures did not effectively discuss the implementation protocols of Chelation during the off-shifts. WP 12-ER.09, *WIPP Fire Department Patient Management, Transport, and Documentation Guide*, could be improved by incorporating the after-hours protocols for chelation, to include notification and coordination with Environmental, Safety, and Health Management and Health Services and their appropriate Occupational Medical Director.

EM.1-OFI-3 WP 12-FP3005, *WIPP Fire Department Staffing*, procedure does not reflect the current minimum staffing requirement in the BNA. The Fire Department is also having trouble staffing personnel to meet the BNA's minimum requirements.

EM.2-OFI-1: LEA County Sheriff MOU had expired based on the review completed by CBFO in 2012.

7.3 Engineering (ENG)

Overall, the objectives of the engineering program were MET. The engineering program has improved significantly since 2014, and the knowledge and experience of the personnel in this area largely compensate for the remaining issues. However, the program is not fully implemented and has minimal run-time, evidence of successful implementation is very limited, and resource (funding) shortages could reduce the availability of safety SSCs. It is recommended that continued management attention and DOE oversight of this area be performed until the new program is fully matured.

The area of Ground Control needs increased management focus. Upon receipt of the MSHA report, a cohesive plan for roof bolting to ensure structural integrity of the mine needs to be developed and implemented, and this needs to be created with a clear focus on balance of priorities; waste emplacement cannot be successful long term if the mine is not maintained in an ongoing safe condition An overall mining and emplacement strategy for the future should be developed immediately.

Pre-Start Finding(s)
ENG.1-PRE-1: Contrary to the requirements of WP 02-AR3001, *Unreviewed Safety Question Determination*, NWP did not enter a Potential Inadequacy in the Safety Analysis Determination (PISAD) upon experiencing a roof fall larger than that postulated in the Hazards Analysis supporting assumptions.

Post-Start Finding(s)
ENG.2-POST-1: Contrary to the requirements of the DSA, SDD, and DOE Order 433.1B, the UVS/IVS systems' operability could be impaired by unresolved known issues, lack of spare parts, and incomplete construction punch list items.

Opportunities for Improvement

ENG.1-OFI-1: Design changes were made to safety significant SSCs, but there is no evidence of verification of unverified assumptions being performed during the period between May and August. Once the new procedure set is fully in place, it is very likely that a backward review by CSEs to verify design changes to safety systems implemented within 2016 will resolve this issue.

ENG.1-OFI-2: "Substantial barriers" provided by chain link and brattice cloth would not provide confinement of waste that could be released due to the inevitable roof fall in emplaced panels for which ground control is not ongoing. Recommend an engineering evaluation be performed to determine the most effective means of panel closure to provide confinement, and a closure system be installed ASAP to close off the areas of the mine where waste emplacement is complete, yet only substantial barriers are provided for confinement and worker protection.

ENG.1-OFI-3: Immediate staffing focus in the area of Geotechnical Engineering is needed.

ENG.1-OFI-4: See recommendations section.

ENG.1-OFI-5: An overall mine strategy plan is needed to coordinate and focus the Ground Control, Waste Emplacement, and supporting resources and equipment.

ENG.1-OFI-6: Add periodic assessments in areas beyond fire protection to confirm the configuration management program is working well.

Best Practices

ENG.1-BP-1: The WIPP System Health Walkdown and Health Reports procedure includes a requirement for Cognizant System Engineers (CSEs) to brief management directly on the health and status of their safety system, providing CSEs an opportunity to discuss areas that need management focus or additional funding directly with senior managers.

ENG.2-BP-1: The WIPP Cognizant System Engineer/Alternate Cognizant System Engineer System Assignment List demonstrates a concerted effort on the part of NWP to ensure coverage in accordance with DOE O 420.1C for all safety systems, and ensure succession planning is in place.

7.4 Fire Protection (FP)

A comprehensive fire protection program has been established to include documented fire hazards analysis, clearly defined roles and responsibilities, and development and implementation of fire protection program procedures which include normal operations, off-normal operations, and emergency and alarm response procedures. Additional programmatic fire protection documentation that ensures fire safety hazards are analyzed

and ensures implementation of appropriate engineering and administrative controls to maintain safe operations have not been fully established and implemented. For example, approval of the fire protection exemption for fire suppression throughout the underground has not been obtained; not all provisions of the CBFO-approved fire protection equivalency for alternate egress provisions have been fully implemented; installation and turnover of the underground "high fire load" fire suppression systems have not been completed; installation and turnover of fire suppression systems for all non-waste handling vehicles being used have not been completed; and discrepancies between combustible loading requirements and notable issues regarding implementation of combustible loading requirements have been identified indicating that the combustible loading program is not effectively implemented. Additionally, mine evacuation requirements are not always complied with as indicated by underground vehicles being observed parked on the wrong side of the drifts, which is a repeat pre-start finding from the CORR. The objective of FP.1 is not met.

The fire protection program is staffed with adequate numbers of technically competent, experienced, fully qualified personnel including fire protection engineers and technicians. Procedures and schedules are in place for design, installation, and performance of inspection, testing, surveillance, and maintenance of fire protection systems and features, which includes compensatory measures and an impairment prioritization process, to ensure protection, functionality, and reliability. Numerous legacy design and installation issues with existing systems and features have been self-identified as a result of newly performed assessments and system inspections and testing, therefore continued management attention and action to address legacy fire protection system design and performance issues in a timely manner is warranted.

Procedures and processes for design control and configuration management, feedback through conduct of periodic facility and programmatic assessments, and issues tracking and resolution have been established and adequately implemented. AIB JONS associated with fire protection were determined to have been properly dispositioned and verified as closed. Documented Safety Analysis (DSA) Key Element (KE) 11-2 and KE 11-5 have not been fully and effectively implemented, as previously noted above and in FP.1. The objective of FP.2 is met.

Pre-Start Findings

FP.1-PRE-1: Fire suppression systems have not yet been installed/accepted for all non-waste handling vehicles prior to use as required by fire protection equivalency WIPP-EQ-2015-01, and Documented Safety Analysis Key Element (KE) 11-5.

FP.1-PRE-2: Underground vehicles were observed (on several occasions) parked on the wrong side of the drifts, contrary to WP 12-ER.25, *Underground Escape and Evacuation Plan*. This is a repeat pre-start finding from the CORR.

FP.1-PRE-3: The combustible loading program contains conflicting/unclear documentation and is not effectively implemented.

Opportunity for Improvement
FP.2-OFI-1: Continued management attention and action to address legacy fire protection system design and performance issues in a timely manner is warranted.

7.5 Industrial Hygiene (IH) and Occupational Safety and Health (OSH)

The WIPP IH program is well-established and documented in procedures, and fundamental program elements are in place. Adequate IH staffing is available to support operations. Functions, assignments, responsibilities and reporting relationships for the hazardous material protection program are defined, understood and implemented. The hazardous material protection program documentation and implementing procedures have been developed and implemented.

IH Instrumentation for both the IH group and Underground Services is appropriate and sufficient inventory is provided. Their instruments possess current calibrations. However, the Mine Rescue Team (MRT) did not have an approved procedure for the calibration or calibration check of atmosphere monitoring equipment, were not maintaining records of the tests, and were using expired calibration gas.

Periodic assessments of the IH/IS programs are performed to verify continued robust performance. Corrective actions have been completed for most issues however; the corrective action for the expired gas used in February/March of 2016 has not been closed. This issue was identified again during this assessment.

It was noted that the contractor's response to the IH issues identified during the review has been positive and corrective actions were initiated for the finding during the course of the review. DOE has determined the IH objective has been met.

The Industrial hygiene hazards associated with the WIPP facility have been identified; analyzed and appropriate controls have been developed. These are documented in a JHA or embedded within a procedure. Some of the JHA's reviewed found minor deficiencies and are identified in the maintenance work control section.

Operating procedures have identified and effectively integrate controls or ppe. However, response to cryogenic/inert gases, procedure WP 12-Ih1020, Abnormal Condition Involving Cryogenics/Inert gas does not adequately protect responding employees. The procedure does not address the need for proper respiratory protection as required by OSHA.

NWP has a Competence commensurate Responsibilities (CCR) program to qualify their staff. This CCR identifies and documents training experience required to perform their duties. The WIPP facility is adequately staffed with six (6) qualified industrial hygienists. In addition to the six industrial hygienists, there are four (4) Certified Industrial Hygienists (CIH) on staff. Of these four CIH's, three are dual Certified Safety Professionals (CSP). There are six (6) safety and health managers, of which two are CSP's and one is dual certified CIH/CSP.

The Industrial Safety Program including Hoisting and Rigging is well-established and documented in procedures, and fundamental program elements are in place. Adequate Industrial Safety staffing is available to support operations.

The industrial safety department has an adequate staff for the work to be performed. The staff is qualified per a CCR. The staff has no CSPs on staff but has three safety and health managers that are CSP's and three industrial hygienists that are both CSP and CIH certified. The staff is knowledgeable of the hazards and controls at the WIPP facility.

The safety and health department have performed self-assessments and been assessed by outside groups. These assessments were critical of the safety and health program.

Pre-start Finding(s):
IH.1-PRE-1: The Mine Rescue Team (MRT) did not have an approved procedure for the calibration or calibration check of atmosphere monitoring equipment, were not maintaining records of the tests, and were using expired calibration gas.

IH.2-PRE-1: The contractor's response procedure for investigating and responding to a potentially Immediately Dangerous to Life or Health (IDLH) atmosphere is not protective for responding employees.

OSH.1-PRE-1: The waste handling TRUPACT-II dock (TRUDOCK) has an unguarded gap between the TRUPACT-II container and the walking platform, contrary to OSHA requirements.

Opportunity for Improvement
IH.2-OFI-1: Using odor as a chemical detection method is not an acceptable practice. NWP should be performing exposure monitoring if there is a potential for exposure.

7.6 Management (MG)

A startup program has been developed that contains clear roles and responsibilities for the initial startup of waste emplacement. It includes an established system for verifying the adequacy of operator performance through MOP oversight. After start-up, personnel will demonstrate proficiency on simulated waste materials until management determines performance is adequate. However, the startup plan lacked specific activities for monitoring, did not adequately address a graded startup to unrestricted operations, and failed to take advantage of the existing Senior Supervisory Watch program. Although staffing appeared to be adequate to support limited, near-term waste emplacement operations and activities, added work scope planned in calendar year 2017 may not be possible given the staffing and qualification shortfalls. The CORR evaluation of the startup program was adequate, but did not identify the inadequacy that exists in the Start-up Plan.

Management level roles and responsibilities are adequately defined and effective interfaces were observed. NWP has an approved ISMS description document and is conducting annual effectiveness reviews. NWP ISMS has not undergone formal verification, but the ISMS was observed to be in place and effectively functioning. The management team appeared to be sufficiently staffed, knowledgeable, and experienced to safely manage startup. Recent safety culture improvement efforts have improved NWP safety culture, as observed during work activities, and discussed during interviews.

Pre-Start Findings
MG.1-PRE-1: The Startup Plan does not provide for a graded, systematic approach to unrestricted operations.

Post-Start Findings
MG.1-POST-1: Current contractor staffing (compounded by the lack of qualified personnel) in some critical areas will not fully support the breadth of operations planned in calendar year 2017.

7.7 Maintenance-Work Control (MWC)

The current NWP Maintenance and Work Control Program (WPC) is not yet a mature, efficient program but there has been a vast improvement from past years. The Maintenance and Work Control management has initiated many improvements (e.g., new PM feedback loop, improved communications with Engineering and Operations, improved metrics, technical continuing education for craft, etc.) and the program is headed in a positive direction. Other proposed improvements include development of maintenance JHAs, procedure verification and validation training, first line supervisor training, procedure writer training, maintenance self-assessment training, etc. While the quality of the WCDs has not yet achieved the desired results, the management efforts to improve the program is apparent in the newly initiated processes to improve the program, improved communication between maintenance and work control, and the greatly improved attitude of the personnel. The most notable difference from past years is the willingness of the Maintenance and WPC personnel to work together to improve the program. However, there is a concern regarding the future of the program because several of the key management positions in Maintenance and WPC are not currently staffed by permanent NWP employees and are scheduled to leave sometime in CY2017. NWP must ensure that the progress made in the program is institutionalized so the progress made-to-date is not just a transient condition.

Post-Start Finding(s)
MWC.1-POST-01: Maintenance work control documents (WCDs) contain numerous deficiencies including hazard identification and controls; however, in all but one instance, the hazard controls were present but were mis-located within the WCD.

Opportunities for Improvement
MWC.1-OFI-01: There is a potential path to bypass the USQ process for Type 1 work packages.

MWC.1-OFI-02: WP 12-IS3002, *Job Hazard Analysis Performance and Development*, contains weaknesses.

MWC.1-OFI-03: There is a concern regarding the rigor of the equipment pre-operational check process.

MWC.1-OFI-04: Indecision and/or miscommunication during a drill unnecessarily delayed the repair of the broken Salt Hoist brake spring.

MWC.1-OFI-05: The FY16 Integrated Assessment Schedule listed four assessments of the Maintenance and WPC program but only one was performed

7.8 Nuclear Safety (NS)

While NWP has met the objective of CRAD NS.1 by developing robust facility safety documentation in accordance with DOE-STD-3009-2014, and ensured that safety SSCs are defined, the implementation of the second objective, NS.2, specifically the USQ process, exhibits significant weakness at this time and is only partially met.

NWP has previously identified several issues associated with the USQ program. Significant work has been done in addressing these issues, including independent reviews, hands on training, procedures revision, and compensatory measures. However, the extent of condition did not identify all areas of weakness, as evidenced by the identified findings. This area needs continued management focus and DOE oversight to ensure improvements necessary to address weaknesses identified and ensure the program is effectively implemented.

Overall Conclusion: The objectives of this area are PARTIALLY MET.

Pre-Start Finding(s)
NS.2-PRE-1: Contrary to the requirements of 10 CFR 830.203, LCO 3.1.1 Condition C was exited with a NFPA 13 INOPERABLE/non-compliant installed sprinkler system without DOE approval.

NS.2-PRE-2: Contrary to the requirements of 10 CFR 830, the CBFO and Central Characterization Program (CCP) Documented Safety Analysis (DSA) required processes are not subject to NWP's Unreviewed Safety Question (USQ) process.

7.9 Operations (OP)

The combination of the WIPP Operations Organization's personnel professionalism, facility and process knowledge, operational awareness, command and control, response

to abnormal/upset conditions, procedure and process knowledge, and operational discipline results in sound operational performance. The execution of multiple operating procedures was observed and upset conditions were interjected to verify the competency of operations staff and management. Interviews were conducted with multiple Control Room Operators, Roving Operators, Waste Handling Engineers/Technicians, as well as Facility Shift Managers providing additional evidence of the Operations staff level of facility and systems knowledge.

The WIPP Operations staff demonstrated solid operator watch-standing fundamentals (i.e. place keeping, three-way communications, formality, procedural compliance, etc.) that have resulted in a reliable Operations Organization with detailed knowledge and experience of waste handling and emplacement activities. Operations personnel were able to respond promptly and correctly to upset conditions and consistently demonstrated excellent procedural and DSA/TSR knowledge.

The preparations for the area designated for waste emplacement within the underground at Panel 7 have not been completed. A walk-down of this area during the DORR concluded that a significant level of effort is required to ready the area to receive waste. This effort was not included as a Pre-start finding during the CORR nor was it placed on the manageable list of open items. This effort will include the milling of the floor to allow fork truck access, excess equipment removal, additional bolting activities for ground control, removal of miscellaneous small equipment within the designated drift of S-2520, and the resolution of power distribution issues that are currently limiting additional lighting to be placed into area. Additional oversight is required by both CBFO and NWP to ensure that the area for waste emplacement has been adequately prepared for the safe and complaint waste emplacement. It should be noted that the milling operations within a posted High Contamination Area will add additional complexity that warrants thorough planning and monitoring by the contractor.

The operating procedures for waste handling/emplacement, routine operations, system operations, and response to abnormal situations were generally well written and provided adequate direction to operators and support personnel. These procedures flowed down the applicable DSA/TSR requirements.

Overall, WIPP Operations has developed and implemented an effective Conduct of Operations program.

Pre-Start Findings

OP.3-PRE-1: Use and designation of procedures were inadequate and not in compliance with NWP administrative processes (i.e., Management Control versus Technical procedures, and Continuous Use versus Reference Use), jeopardizing effective implementation of safety basis controls.

Post-Start Finding(s)

OP.1-POST-1: Contrary to NWP Conduct of Operations program implementing procedures, there were isolated instances of procedural non-compliance.

OP.2-POST-1: The WIPP Conduct of Operations Implementation Matrix, found in Attachment 1 to WP 04-CO.01, Rev. 3, *Conduct of Operations*, has not been approved by CBFO.

OP.3-POST-1: Contrary to NWP Conduct of Operations program implementing procedures, uncontrolled postings, instructions, and operator aids were found in aboveground and underground facilities.

Opportunity for Improvement
OP.3-OFI-1: The resequencing of steps within procedures WP 08-NT3020, Rev. 27, *TRU Waste Receipt*, and WP 05-WH1011, Rev. 57, *CH Waste Processing*, should be considered by the contractor.

7.10 Quality Assurance (QA)

The NWP Quality Assurance Program has a mature and detailed document and procedure set. This program is codified in the NWP *Quality Assurance Program Description* (QAPD) and contains the requirements and guidance based on criteria contained in Title 10 *Code of Federal Regulations* (CFR) Part 830, Subpart A, DOE Order 414.1D, and the Carlsbad Field Office (CBFO) Quality Assurance Program Document (QAPD), and supplemented with additional criteria/guidance from such sources as 10 CFR Part 71, 48 CFR §970.5204-2, DOE Policy 450.4A, DOE Order 226.1B, and NQA [Nuclear Quality Assurance]-1 (1989 edition). Thus, its compliance with the various standards is sound. This review has focused primarily on the quality assurance (QA) aspects of site software and purchasing. Software QA makes extensive use of checklists to ensure the details of development, configuration control, testing, installation, checkout and retirement are executed in the appropriate sequence and in sufficient detail. An exception to this is the Waste Data System (WDS) software which is managed by a separate group and who also uses checklists for their managing of this important software set. Software QA is established. Purchasing QA similarly is established and has a mature program of including QA requirements in purchase orders, inspection, and managing nonconforming items. The most significant issue that the QA organization may have to address (in the future) is the use of NQA-1-1989, a nearly 30-year old standard.

NWP has established a CAS that provides for oversight, issues management, and a system to ensure applicable requirements are met. The NWP CAS has undergone significant modifications and upgrades since the accidents in 2014. The NWP CAS has the essential elements discussed in DOE O 226.1B, Implementation of Department of Energy Oversight Policy. The NWP CAS program has not fully matured, but the management and program elements should facilitate continued maturation if staffing remains in place to perform the CAS functions within the CAS organization and within the NWP elements it supports. Since both CBFO and the DOE Office of Enterprise Assessments (EA) are already tracking open issues with NWP regarding overall CAS effectiveness and maturity, no new Findings are provided. An OFI are provided to facilitate improvements in determining the severity level of issues and associate actions. An OFI is provided to facilitate improvements in the use of performance metrics.

Findings:
None.

Opportunities for Improvement:
QA.1-OFI-1: The WDS QAP (WP 08-NT.04, *Waste Data System Software Quality Assurance Plan*) uses some terminology that has multiple definitions. This QAP should be reviewed for consistency of its terminology and ambiguities removed.

QA.1-OFI-1: The WDS QAP (WP 08-NT.04) lists individual positions without identifying the necessary qualifications. These qualifications should be added to specific position descriptions and qualification cards developed.

QA.1-OFI-3: CAM Calibration procedure (IC411031) leaves the air-flow at the extreme end of the measurement range. A final step should be added to the procedure to restore the air-flow rate back to its nominal operating value.

QA.2-OFI-1: Clarifying the wording for screening of Action Level-2 and Action Level-3 issues could provide for more flexibility in issue classification and resolution.

QA.2-OFI-2: Performance Indicators could be improved by incorporating indicators less reliant on basic numbers and more reliant on analyzed data

7.11 Radiation Protection (RP)

The WIPP RP program is adequately established and documented in procedures, and fundamental program elements are in place. Instrumentation and RP facilities were generally adequate to support work activities. All observed in-use radiological instrumentation was within calibration. Posting and labeling of radiological areas and facilities was generally effective.

Observation of simulated waste handling and emplacement activities identified surveys to support the activity were generally being conscientiously performed. Workers entering radiological areas were found to be appropriately trained and qualified. Although some deficiencies were observed, workers generally exhibited adequate radiological work and protective clothing doffing practices.

A number of deficiencies were identified during the review, however, that negatively impact the effectiveness of overall Radiological Control performance. Organizationally, issues were identified with staffing of RCTs and RCSs, the clear definition of roles between the various categories of radiological technicians, and the proficiency/level of knowledge of radiological technicians. Elements of the radiological call in process were noted to be informal and did not ensure a consistent and timely level of radiological response.

Multiple examples of procedural noncompliance were identified during the review. These violations were of varying significance; however their number highlights the need to improve staff knowledge of and adherence to procedures, and the level of supervisory review. Air-monitoring practices related to work requiring respiratory protection were also identified as not meeting regulatory requirements.

Radiological control performance during emergency response drills continues to be an area of deficiency. Some improvements were noted during the most recent drill; however continuing performance issues were observed. NWP drill evaluators provided a critical review of Radcon performance during the recent drill, representing an improvement from prior exercises.

It was noted that specific issues identified during the current review (RCT level of knowledge, lack of defined roles and functions for the radiological technician categories) were also identified during the prior CORR review. NWP corrective actions taken to address the prior concerns consequently appear inadequate to fully address the concern.

Due to the number of issues identified, DOE has determined the RP objective has not been met.

Pre-Start Finding(s)
RP.1-PRE-1: NWP does not have an effective process in place to ensure a timely and appropriate level of response to potential radiological events.

RP.1-PRE-2: Multiple deficiencies in radiation protection personnel proficiency, procedural compliance, and the level of knowledge of some RCTs were noted, directly impacting observed radiation protection performance.

RP.1-PRE-3: NWP radiological air-monitoring practices do not meet 10 CFR 835.403 requirements for air-monitoring.

Opportunities for Improvement
RP.1-OFI-1: Examples were noted of RP procedural inadequacies (lack of specific detail or guidance, not reflective of actual practice, lack of procedural reference to included tables).

RP.1-OFI-2: Review of selected RWPs identified a number of deficiencies and internal inconsistencies, indicating the need for improvement in RWP quality.

7.12 Training (TRG)

Based on document reviews, interviews and observation of activities, the selection, training and qualification programs for managers, supervisors, operations and operations support, and maintenance personnel have been established and documented and the training and qualification programs for most positions encompass the range of duties and activities required to be performed. Modifications to the facility have been evaluated for

impacts on training and qualification and modifications are made to the training and qualification programs accordingly.

The task qualification process recently implemented for some operations positions and RCTs' does not ensure DSA KE-12.3 (Management shall ensure that personnel are not permitted to perform assigned duties independently until requisite training and qualification is completed) is meet, and the operations training programs reviewed lacked core fundamental subjects (basic physics, chemistry, instrumentation and control, thermodynamics, heat transfer, and fluid flow, mechanical systems, and material science, etc.), to ensure adequate base knowledge. The selection process used for manager positions is adequately implemented through the Human Resources (HR) process; however there is no formal process to identify the applicable position/facility-specific training needed for managers prior to them assuming their job function/making decisions that could affect the nuclear safety of the facility.

Many of the training programs and implementing procedures underwent major rewrites and were just approved the week before the DORR team arrived. Several of these programs are in various stages of implementation. Revision 11 to the WIPP TIM has been approved through WIPP management but has not been reviewed or approved by CBFO. The WIPP Training Implementation Matrix (TIM), both the currently approved document and the revision that is at CBFO for review and approval, along with several of the implementing documents do not adequately address all DOE O 426.2 requirements.

Pre-Start Finding(s)
TRG.1-PRE-1: Some Operators and Radiological Control Technicians (RCTs) are being qualified through an NWP task-based qualification process that does not ensure compliance with DSA KE 12-3 and DOE O 426.2 requirements.

Post-Start Finding(s)
TRG.1-POST-1: The WIPP Training Implementation Matrix (TIM), both the currently approved document and the revision that is at CBFO for review and approval, do not adequately address all DOE O 426.2 requirements.

TRG.1-POST-2: Operator training programs are not sufficiently comprehensive to cover all areas which are fundamental to their assigned tasks as required by DOE O 426.2.

TRG.1 -POST-3: NWP does not have a formal process to ensure that Managers are evaluated against their job responsibilities and complete facility specific training prior to assuming the duties of the assigned position as required by DOE O 426.2.

Opportunity for Improvement
TRG.1-OFI-1: During interviews with Radiation Worker II qualified maintenance personnel, there were some weaknesses identified in recalling frisking height and speed of frisking when leaving a contamination buffer area.

7.13 Waste Management (WM)

The contractor has the majority of procedures in place and implemented for the WIPP Waste Acceptance (WAC) Compliance Program. There are some issues that need to be corrected in the WIPP WAC Compliance Program prior to emplacement of waste currently at the WIPP WHB and more extensive issues associated with initiation of receipt of waste containers. The implementation of the DSA/TSR WIPP WAC Compliance Program is intentionally different for the waste containers at the WIPP WHB, the currently certified waste containers not currently at WIPP, and newly certified waste containers. Based on the different requirements in the DSA for these three populations of waste drums, release of each of the three populations could be granted in a step wise manner to facilitate start-up.

All personnel interviewed demonstrated acceptable knowledge of their work areas and the DSA/TSR requirements. The foundation of the Enhanced Acceptable Knowledge (AK) Program and enhanced chemical compatibility evaluation process have been developed and implemented for receipt of CH Waste at WIPP. However, not all procedures and process have been developed and implemented. CBFO has not issued the Basis of Knowledge to facilitate the performance of the delta reviews associated with the enhanced chemical compatibility evaluations. Some of the interface documentation to ensure MAR statistics are certified for future shipments are reviewed to ensure compliance with the DSA has not been finalized. The CBFO role as defined in the DSA has not been fully documented consistent with performance of DSA action/requirement performance.

The WDS undergoes extensive software quality assurance and testing to ensure configuration control and performance. The software performs a vital role in implementation of the DSA/TSR requirements. The WDS has been incorrectly classified as non-safety software. There are some areas of performance within the WDS that needs to be documented and others that need to be strengthened. One of the main areas needing formal documentation is the requirement that need to be met before the DA can make entries for removal of "holds," entry of acceptable waste stream profiles, enhanced chemical compatibility acceptance, and other high level entries. Currently these entries are based on the CBFO letter to the contractor.

The contractor's WIPP WAC Compliance Program contains all the elements required by the DSA/TSR including the Enhanced AK Program and enhanced chemical compatibility evaluation process; however, the elements are not adequate to ensure waste containers are fully compliant with the DSA/TSR prior to emplacement.

In conclusion, this Objective has not been met.

Pre-Start Finding(s):

WA.1-PRE-1: CBFO procedures are inadequate to implement the DSA/TSR actions/requirements prior to emplacement of waste containers residing in the Waste Isolation Pilot Plan (WIPP) Waste Handing Building (WHB) and prior to shipment for

previously certified waste containers in the complex (including those containers continuing to be certified).

(Note: The process for the waste in the WHB needs to be corrected pre-emplacement, the process for previously certified waste not at WIPP can be completed pre-shipment.)

WA.1-PRE-2: Contractor's procedures/documentation that implement DSA/TSR Waste Acceptance Criteria (WAC) and Chapter 18 actions and requirements have not all been developed and/or revised to incorporate the DSA/TSR requirements.
(Some pre-waste emplacement and separately some pre-waste receipt.)

WA.1-PRE-3: The current administrative controls to preclude the placement of the waste containers located in the Waste Handling Building into the underground prior to satisfactory performance of DSA, Chapter 18.8 requirements do not satisfy the requirements of WP 13-QA3004. (This is a pre-emplacement finding.)

WA.1-PRE-4: The Waste Data System is incorrectly graded as non-safety software. (The WDS does not affect the emplacement of the waste at the WHB. This needs to be address prior to shipment. "Addressed" can be something less than full implementation of all the contractor requirements for safety software, with justification and a corrective action plan to achieve full compliance.)

Opportunities for Improvement

WA.1 OFI-1: The Accident Investigation Board (AIB) Judgment of Need (JON) closed out prior to issuance of DSA/TSR Revision 5b and the revised WAC, should be evaluated to determine if any additional document modifications are required.

WA.1 OFI-2: CCP should evaluate the need for continued training requirements for qualification and verification of training on revised documents including working procedures, WAC, and Safety Basis Documents.

WA.1 OFI-3: An evaluation of the ability to overpack a container in the underground within 48 hours as required by LCO 3.7.1 Required Action B.2 should be performed based on the current ground control issues. If determined necessary, the completion time for containers in each process area could be modified to be different. Additionally the lack of ability to enter the evacuated area when LCO 3.7.1 Condition C is entered and a Response Plan is implemented needs to be evaluated.

WA.1 OFI-4: The Start-up Plan could be modified to address a stepwise start-up with respect to the three populations of waste containers (i.e. at WIPP WHB, currently certified but not at WIPP, and newly certified). This will allow a structured and DSA/TSR compliant process to get waste containers properly and safety emplaced.

8.0 ORR TEAM CONCLUSION AND RECOMMENDATIONS

The DOE ORR team concluded that the WIPP facility can safely restart waste emplacement operations in a manner that is protective of the workers, the public and the environment when the actions identified in Recommendation one (1) have been met. The contractor has an agreed-upon set of requirements to govern safe operations of the WIPP facility, established in the NWP contract and further defined in the draft Authorization Agreement between NWP and DOE. The draft Authorization Agreement will be signed/approved by the DOE Startup Authorization Authority upon approval to start waste emplacement operations. The DORR review team determined the requirements defined in the contract and the Authorization Agreement were adequately implemented for waste emplacement operations, unless otherwise specifically stated in this report. The DORR pre-start findings must be corrected prior to the startup of the facility. Post-start findings are not required to be corrected before startup, but the corrective action plans (CAPs) for these findings should be developed by CBFO, NWP, and DOE HQ and approved by those individuals designated by the Startup Authorization Authority prior to the startup date (see Recommendation number two (2) below). The CAPs for both pre-start and post-start findings should be developed in accordance with DOE-STD-3006-2010, *Planning and Conducting Readiness Reviews*, section 8.11. Additional detail is provided below in the list of recommendations developed by the DOE ORR team.

The DOE ORR team recommends that:

1. The SAA authorize startup of CH waste emplacement upon:
   - CBFO verification of closure of the previously identified pre-start or prerequisite open items (a full listing of these items is included at the end of this section);
   - CBFO and DORR team verification of DORR pre-start CAP closure;
   - DOE approval of DORR post-start CAPs as applicable.

2. NWP CAP review, acceptance (pre and post) and closure verification (of pre-starts) should be performed by the DOE ORR team in conjunction with their CBFO counterparts.

3. DOE specific CAPs be reviewed by the DOE ORR team for acceptance and closure.

4. CBFO Management should identify their short term supplemental personnel needs necessary to provide effective oversight of restart to EM HQ management, and take action to fill the open Mine Operations SSO position and transition the Mine Recovery Team to a steady state condition.

5. CBFO should plan and perform Ground Control and DSA/TSR implementation assessments shortly following commencement of waste emplacement operations.

6. Upon receipt of the MSHA report, NWP should develop a comprehensive plan to address the issues and recommendations provided in the MSHA report on the evaluation of WIPP's ground control efforts. Planned actions should be prioritized based on their risk and importance to achieving the stability of the mine for its planned and required life-cycle.

7. An overall mine strategy plan be developed to coordinate and focus the ground control, mining, and waste emplacement activities to maximize the use of competing resources (i.e., equipment, air flow in the mine, personnel, etc.).

PREVIOUSLY IDENTIFIED PRE-START OR PREREQUISITE OPEN ITEMS

The following previously identified manageable list of pre-start findings (including open prerequisites) is being carried forward as pre-start findings that must be resolved in addition to the pre-start findings identified by the DORR.

1. Install and turnover the underground high fire occupancy fire suppression systems.
2. Install and turnover networked Panel 7 CAMs that are tied into the Central Monitoring Room (CMR).
3. Panel 7 Ground Control activities to emplace waste.
4. Automatic fire suppression upgrades for underground liquid-fueled vehicles—specifically to resolve the waste transporter NCR.
5. New Mexico Environmental Department (NMED) assessment and approval to start waste emplacement activities.
6. Fire Protection Exemption, WIPP-EX-2015-01, involving automatic fire suppression system in the underground—approval and implementation.
7. Startup Authorization Authority approval for startup and Authorization Agreement approval.
8. DOE O 458.1, Chg. 3 property clearance and release process did not adequately implement the order for uncontrolled release, and procedures did not use Order methodologies sufficient to meet the measurement objectives.
9. Contrary to 10 CFR 835.401(b)(2) and (3), and 835.209(a), bases are inadequate for instrument selection and use, and for air monitoring.
10. A number of ALARA program elements were not implemented.
11. Overall ground control adequacy (tied to Operational Safety SMP JON).
12. Underground workers' heat stress level of knowledge.
13. Engineering processes revised and implemented to incorporate vendor (and other maintenance) requirements.
14. Engineering processes revised and implemented for Cognizant Engineer review of facility changes for impacts to safety.
15. CBFO has not ensured that Senior Technical Safety Manager (STSM) assignments or compensatory measures are in place to maintain an unbroken chain in the reporting structure of qualified STSMs in positions of authority.

16. Contrary to DOE O 426.1, CBFO management has not identified compensatory measures to ensure the Safety System Oversight (SSO) responsibilities associated with the vacant electrical and mine safety positions are fulfilled.
17. Installation and turnover of the underground volatile organic compound (VOC)/Carbon Monoxide (CO) monitoring systems.
18. Reactivation of underground evacuation strobes.

9.0 INTEGRATED SAFETY MANAGEMENT SYSTEM STATUS

NWP has an approved Integrated Safety Management System (ISMS) Description Document (DD), submitted for approval on August 31, 2016, and pending approval by CBFO. The description document was well-organized and adequately described the NWP ISMS. Annual ISMS declarations are being regularly developed and submitted as required. The most recent ISMS annual declaration, completed and submitted in January 2016, was also thorough, adequately describing the state of ISMS. In this declaration, NWP rated the ISMS as effective and undergoing ongoing, continuous improvement. Interviews with NWP management and staff revealed a mature understanding of the core functions and guiding principles of ISMS. Review of NWP processes and procedures, as well as how these are implemented, revealed adequate implementation of the core functions and guiding principles of ISMS in all aspects of work at WIPP.

During review of ISMS, the team found NWP has not had an ISMS verification (Phase 1 or 2) since assuming the contract in 2012, contrary to the guidance contained in DOE G 450.4-1C, *Integrated Safety Management System Guide*. Since the February 2014 Salt Haul Truck Fire and Radiological Event, a number of independent reviews, including the waste emplacement restart CORR and DORR, have been performed on portions of the NWP ISMS. Using these independent reviews as a basis, NWP (and CBFO) should consider developing a path forward to completing ISMS verifications on the balance of areas not yet reviewed.

10.0 SAFETY CULTURE STATUS

NWP Nuclear Safety Culture Program Plan, Rev. 0, dated April 24, 2015, provides the description and elements of the safety culture improvement plan. This plan was reviewed by EM HQ, who determined the plan adequately describes the state of safety culture improvement efforts, along with planned ongoing actions to improve the NWP safety culture. Interviews with management and staff revealed, without exception, that all NWP employees embrace the safety culture improvement efforts with a desire to instill a strong safety culture. The review team determined that, since the INPO safety culture assist visit in January 2015, NWP has made continuous improvements in their safety culture and has really embraced the recommendations provided in the 2015 review, as well as subsequent reviews and surveys. Continuous improvement actions and survey efforts

described in the NWP safety culture improvement plan should be pursued on an ongoing basis to continue to strengthen the NWP safety culture.

11.0 ORR PROCESS LESSONS LEARNED

There were several lessons learned derived from the performance of this ORR. These are listed below in no particular order with respect to significance.

- Having all team members at the same hotel and social events such as group dinners helped create a positive team dynamic.
- Experience and diversity of the team was beneficial to successful performance of a high profile readiness review.
- Experience and skill of the team lead, deputy, and administrative support fostered a thorough, efficient review.
- Contractor had a "War Room" and dedicated administrative staff that were available to answer team questions and acquire documents as requested by team members.
- Most points of contact were extremely responsive to team needs which helped expedite the review.
- Ensure the readiness to proceed memo has a manageable list that references open items via the same numbering system as the assessment from which they came (CORR, LMA, MSA…) or reference to the unique issues management. number. This will help traceability between the open items and the originating assessments, and will help support closure verification reviews.
- Issue the DOE ORR Plan of Action sooner to allow for DOE planning to facilitate efficient performance of the review.
- The DORR Team was given a thumb drive containing a list of the various procedures that would be evaluated as part of the review. Unfortunately, numerous procedures were revised after receiving the evidence files and the start of the DORR. When the team arrived to start the review they were surprised that many of the documents that were reviewed had been revised. The team had to spend a significant level of effort to try and determine what changed. If a similar approach is used in future reviews, the contractor should issue a list of documents that were revised and what changed in these documents to the review team upon arrival, or provide a mechanism (share drive, link) the ensures DORR ORR team always has the most recent revision to procedures.
- Use of the CBFO Emergency Operations Center with computer stations for all team members in one room and use of the monitors to discuss issue classification during report writing was an excellent practice that allowed for team collaboration.
- Contractor should have verified IT connection and equipment viability in advance of the team's arrival.
- Do not split up the ORR across two weeks with a holiday week in between because of external pressure and desire that the facility will start up within a certain time period.

- Allow sufficient time between the end of the CORR and the beginning of the DORR to allow corrective actions taken in response to CORR findings to take hold. There were several CORR findings identified again by the DORR after they had been verified as closed.
- Allow sufficient time between Endorsement of Readiness to Proceed and start of the ORR, to allow adequate preparation and document reviews by team members prior to arriving on site. Team members will be better prepared and able to perform their oversight roles if documentation is in place and they have had time to prepare for the interviews and field observations.

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APPENDIX 1 – TEAM ASSIGNMENTS

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Team Member	Team Assignment/Functional Area	Organization
Team Leadership		
Edward Westbrook	Team Leader	Office of Operational Safety, EM-3.112
Mark Brown	Deputy Team Leader, Management, MG.1, MG.2	Idaho Operations Office, EM
Rochelle Zimmerman	Coordinator and Technical Support	Office of Safety Programs, EM-3.111
Team Members		
Mat Irwin	Department of Energy, DOE.1, DOE.2	Office of River Protection
Vanessa Turner	Department of Energy, DOE.1, DOE.2	Office of River Protection
Greg Campbell	Emergency Preparedness, EP.1, EP.2	Office of Security and Emergency Preparedness, EM-3.114
Frank Moussa	Emergency Preparedness, EP.1, EP.2	Office of Security and Emergency Preparedness, EM-3.114
Elaine Diaz	Engineering, Nuclear Safety, ENG.1, ENG.2, NS.1, NS.2	Office of River Protection
Jim Kekacs	Engineering, Nuclear Safety, ENG.1, ENG.2, NS.1, NS.2	Savannah River Office
Taryn Couchman-Cates	Fire Protection, FP.1, FP.2	Idaho Operations Office, NE
Karen Kubiak	Industrial Hygiene, Occupational Safety, IH.1, IH.2, OSH.1	Idaho Operations Office, EM
Dimple Patel	Management, MG.1, MG.2	Office of River Protection
Dennis Oba	Maintenance and Work Control, MWC.1	Link Technologies, Inc.
Todd McGhee	Operations, OP.1, OP.2, OP.3	Oak Ridge Environmental Management
Shawn Murphy	Operations, OP.1, OP.2, OP.3	Savannah River Office
Steven Ross	Quality Assurance, QA.1	Quality Assurance Office, EM-3.113
Jerry Lipsky	Quality Assurance, QA.2 (CAS)	Savannah River Office
Tony Weadock	Radiological Protection, RP.1	Link Technologies, Inc.
Julie Finup	Training, TR.1	Idaho Operations Office, NE
Brenda Hawks	Waste Acceptance	Oak Ridge Environmental Management
Support Personnel		
Katherine Vasey	Administrative Support	Edgewater Associates, Inc.
Kellian Egan	Administrative Support	Technical Field Engineering, Inc.

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APPENDIX 2 - ISSUE CLASSIFICATION CRITERIA

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Issue Classification Criteria (Pre- or Post-Start)

A. **Finding Determination:** Is the identified issue or condition a nonconformance with a stated requirement that represents either:

1. a systematic failure to establish or implement an adequate program or control; or
2. a failure or noncompliance that could result in an unacceptable impact on safety of personnel, the facility, the general public, or the environment during nuclear operations?

If the answer is yes, **it is a Finding**. Go to B.

B. **Finding Categorization:** Use the following criteria to categorize the Finding. If the response to any of the questions below is yes, the item should be considered a **Pre-start Finding**. Otherwise, the issue should be considered a post-start finding.

1. Does the loss of operability of the item prevent safe shutdown, or cause the loss of essential monitoring?
2. Does the loss of operability of the item require operator action in a short period of time (defined in the safety basis) to prevent or mitigate the consequences of events described in the safety basis?
3. Does the loss of operability of the item cause operation outside the safety basis?
4. Does the loss of operability of the item result in a reduction of the margin of safety as described in the safety basis?
5. Does the issue indicate a lack of control which can have a near term impact on the operability or functionality of safety related systems?
6. Does the issue involve a violation or potential violation of worker safety or environmental protection regulatory requirements that pose a significant danger to workers, the public, or of environmental insult or release?

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APPENDIX 3 – ORR REVIEW FORM 1s

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DOE ORR for the Waste Isolation Pilot Plant
Review Form 1

Functional Area:	Objective:	Objective Met	
Department of Energy	DOE.1	Yes [X]	No [ ]

OBJECTIVE

DOE.1: The technical and managerial qualifications of those personnel at the DOE-CBFO and at DOE Headquarters who have been assigned responsibilities for providing direction and guidance to the contractor, including the Facility Representatives, are adequate. **(Core Requirement 16)**

CRITERIA

1. Formal training and qualification requirements and staffing levels have been developed for the Federal Project Director(s) (FPDs), Facility Representatives (FRs) and Safety System Oversight personnel (SSO), and safety Subject Matter Experts (SMEs) assigned to the WIPP Project. (DOE-STD-1063-2006; DOE Order 426.1)
2. Records demonstrate that the FPD, FRs, SSOs and SMEs assigned to cover the WIPP operations are fully qualified, and the minimum staffing levels are met. Qualified backup personnel are available, as needed. (DOE-STD-1063-2006; DOE Order 360.1C)
3. FRs assigned to the WIPP facility possess an adequate knowledge of the WIPP facility, operations and hazards, and they are involved in overseeing WIPP activities on a daily basis. (DOE-STD-1063-2006).
4. The SSOs and SMEs are assigned and available to the WIPP Project, and they have sufficient applicable experience and/or training to understand the operations, hazards, and safety systems under their cognizance. (DOE Order 420.1C; DOE Order 360.1C)
5. DOE line management personnel are familiar with the WIPP contract requirements and are using the contract effectively to provide direction and guidance to the contractor. (DOE Order 413.3B; DOE Order 360.1C)
6. DOE personnel demonstrate knowledge of Integrated Safety Management (ISM) principles and core functions. They understand the facility operations and practice an appropriate conduct of operations culture. (DOE Policy 450.4A; DOE Order 450.2)

APPROACH

Record Review:

- Review training and qualification documentation for personnel assigned to the WIPP project; specifically, records for the FPDs, FRs, SSOs, STSM, and SMEs including: FR Staffing Analysis, FR quarterly performance indicators,

Qualifications standards, Evidence of completion of required qualification documentation (i.e., completed qualification cards, exams, etc.). Review staffing plans for DOE pertaining to the WIPP project. Review contract modifications and/or memorandums that demonstrate DOE is using the contract appropriately to achieve project success. Review the most recent FR triennial assessment for results and corrective actions (if any required).Review DOE Delegation of Authority memorandum for CBFO and qualification records for delegates.

Interviews:

- Interview DOE oversight personnel assigned to the WIPP to ascertain their knowledge of the facility, systems, hazards, hazard controls, and safety envelope (for areas in which they have responsibility) including:
  - FRs
  - SSOs
  - SMEs
  - Federal Technical Capability Panel (FTCP) Agent
  - FR Program Sponsor
  - Delegation of Authority Delegates
  - Interview members of the WIPP management team to ensure their knowledge of the technical and contractual aspects of project activities and risks, including: FPD, and the Deputy FPD, and HQ personnel.

Shift Performance:

- Observe FR daily rounds to evaluate compliance with CBFO and DOE requirements and expectations. Perform a facility walk-through with the FR (if not included as part of daily rounds) to ascertain level of facility and system knowledge. Perform a system walk-down with an SSO to evaluate level of system knowledge. Observe and evaluate CBFO personnel performance during any drills or upset conditions invoked throughout the ORR.

Records Reviewed

- *Annual Workforce Analysis and Staffing Plan Report, Carlsbad Field Office,* December 31. 2015
- *Annual Workforce Analysis and Staffing Plan Report, Carlsbad Field Office,* December 31. 2014
- *Review of Carlsbad Field Office Operations Oversight of the Waste Isolation Pilot Plant,* October 2016.
- *CBFO Organizational Chart,* Approved 07/21/16, Effective 08/07/16
- DOE/CBFO 09-3442, *CBFO Integrated Safety Management System Description*, Revision 6, 10/15
- DOE/CBFO 04-3229, *CBFO Contractor Oversight Plan*, Revision 4, 07/25/16
- CBFO MP 10.9, *Surveillance, Operational Awareness, and Issues Management*, Revision 3, 04/08/16
- DOE/CBFO 13-3505, *Waste Isolation Pilot Plant Facility Representative Manual*, Revision 1, 06/14

- DOE/CBFO 09-3439, *Office of Operations Oversight Safety System Oversight Program Plan*, Revision 2, 12/15
- CBFO OP 5.9, Rev 0, *Facility Representative Responsibilities and Routine Activities*, 3/31/2014
- DOE/CBFO-94-1012, *U. S. DOE CBFO Quality Assurance Program Document,* April 17, 2015, Rev. 12
- *CBFO Response Plan to the NNSA Review of Operations Oversight at WIPP*, November 11, 2016
- DOE/CBFO-09-3441, *Safety Management Functions, Responsibilities and Authorities Manual, Rev. 5*
- DOE/WIPP-01-3181, *Authorization Agreement for the Waste Isolation Pilot Plant*, Rev. 9
- *T-0 Daily Scheduled Work/Daily Release,* November 15, 2016
- *CBFO Draft update to the Integrated Evaluation Plan*, November 14
- *CBFO Draft Quarterly Evaluation Report of NWP Performance for 3rd Quarter of FY 2016*, November 15
- CBFO 02-3219 *Technical Qualification Program Plan,* Rev. 6, June 21, 2016
- *Carlsbad Field Office Surveillance: Air Quality Monitoring of the Waste Isolation Pilot Plant Underground,* April 19
- *FOD Draft Monthly Report, September 2015,* November 16
- CBFO Technical Qualification Cards (3)
- CBFO Technical Qualification Program Status, November 16
- Blank CBFO SSO Qualification Cards (4)
- CBFO Qualifying official checklist (2)
- WIPP/FR Weekly Evaluation Report (5)
- Package 1628326, *Replace Evaluation Power Cable in the Waste Handling Shaft*, Rev. 0
- *NWP Ground Control Action Item List,* November 16
- *Shiftly Bolt Installation Count,* November 15
- All 2016 Occurrence Reports declared by CBFO office (19)
- Review of Surveillances in ICE database and status
- Review of sampling of ICE Issue Reports (25)
- Review of sampling of ICE operational awareness reports (20)
- CAR status report, November 16
- 16-3480, *Issuance of CAR 17-00*, October 27
- 16-3481, *Issuance of CARs 17-002 and 17-003*, October 27
- 16-3441, *Issuance of CARs 16-072, 16-073, 16-074 from Audit A-16-027of CBFO Document Control,* September 29
- 16-3472, *Issuance of CBFO Corrective Action Report 17-006 identified During Audit A-17-07,* October 25
- *CBFO Semi-Annual CAR trend analysis report for 1/1/16 through 6/30/16*, July 28, 2016
- *CBFO Semi-Annual CAR trend analysis report for 7/1/15 through 12/31/15,* February 4, 2016

- *FY-16 Annual Management Assessment Summary Report for FY-16*, October 24, 2016
- 16:03067, *Response to Contracting Officer Direction Letter – To Provide a plan for Recovery of Panel 7, under Nuclear Waste Partnership LLC Prime Contract DE-EM-0001971*, November 11
- 16:02930, *Response to Contracting Officer Direction Concerning Issues Collection and Evaluation System, under Nuclear Waste Partnership LLC, Contract DE-EM0001971*, March 16
- *ICE Council Charter*, Rev. 0, July 2016
- DOE/CBFO-14-3533, *Issue Collection and Evaluation User Manual*, Rev. 1, April 15, 2015
- 12-1881, *Transmittal of the Approved Waste Isolation Pilot Plant Determination of Facility Representative Coverage*, December 12, 2012

Interviews Conducted

- Acting Assistant Manager, Office of the WIPP
- Acting Facility Operations Oversight Division Director
- Facility Engineering Division Director
- Confinement Vent SSO
- Mine Recovery Team
- Industrial Hygiene Specialist
- Safety Programs Division Office Director
- Maintenance Program Oversight Specialist SSO
- Quality Assurance Manager
- Quality Assurance Specialist (2)
- Technical Training Coordinator
- CBFO Manager
- WIPP Surface Program Manager
- Nuclear Senior Technical Safety Advisor
- FR Candidate (2)
- Safety and Health Division Director
- ICE administrator (CTAC)
- Nuclear Safety Specialist
- Facility Representatives (3)

Shift Performances Observed

- CBFO Director's Meeting, November 14
- CBFO Manager endorsement memo briefing to CBFO operations staff, November 14
- FR Oversight of Weekly Fire Pump Surveillance Prejob Brief, November 14
- FR Oversight of TRU Waste Receipt and Radcon Inspection, November 14
- FR Oversight of Waste Handling Exercise, November 15
- T-0 Meeting and Maintenance SSO oversight, November 15

- CBFO Daily Tactical Meeting (2)
- Confinement Ventilation SSO oversight of Filter DP transmitter calibration prejob and field performance, November 15
- Ground Control Meeting, November 16
- Mine Recovery Team bi-weekly meeting, November 15
- CBFO ISMS assessment team meeting to support 2016 ISMS Declaration, November 15
- Replace Cable in the Waste Handling Shaft, Pre-job and FR Candidate/Maintenance SSO oversight, November 16
- FR Oversight of Weekly Fire Pump Surveillance Pre-job Brief, November 14
- FR Oversight of TRU Waste Receipt and Radcon Inspection, November 14
- FR Oversight of Waste Handling Exercise, November 15
- FR Oversight of Underground Waste Emplacement Pre-job Brief, November 16
- NWP WIPP Form Screening Meeting, November 16.

Discussion of Results

1. **Formal training and qualification requirements and staffing levels have been developed for the Federal Project Director(s) (FPDs), Facility Representatives (FRs) and Safety System Oversight personnel (SSO), and safety Subject Matter Experts (SMEs) assigned to the WIPP Project. (DOE-STD-1063-2006; DOE Order 426.1)**

   CBFO 02-3219, *Technical Qualification Program Plan*, provides a comprehensive structure for ensuring Federal staff members conducting oversight of the WIPP facilities and systems are technically qualified in accordance with DOE O 426.1. A review of qualification cards for Facility Representatives, Safety System Oversight personnel, and Subject Matter Experts assigned to the WIPP Project revealed that formal training and qualification requirements have been developed in accordance with DOE O 426.1. The qualification packages of Federal Project Directors were not reviewed because that documentation and qualification process occurs at headquarters, but CBFO provided a list of their qualified FPD, which included three personnel. Currently, 12 of the 40 CBFO staff in the TQP are qualified, with seven of those positions having received an extension for the qualification process due to being beyond the identified qualification period, and one position is in the requalification process. Three of ten managers assigned to the STSM qualification card are qualified, although five of the STSM candidates have completed other TQP functional area qualifications prior to commencing STSM qualification. With the exception of the startup approval authority, none of the OWIPP line management (CBFO Manager, Acting AM and 4 Directors) have completed their STSM qualifications, although the CBFO Manager and two of the Directors only need to complete the final walkdown to finish their qualifications.

   Review of the most recent FTCP annual workforce analysis and staffing plan report for 2013 through 2015 indicates a steady increase in CBFO TQP staffing from 54 to 76. Review of the OWIPP organization against the TQP qualification status indicates

that all onboard staff, with the exception of one described below, have been issued a TQP qualification card. From an overall TQP staffing standpoint, all positions are filled with the exception of a few positions including the Mine Operations SSO, Electrical SSO, and the recently departed Occupational Safety SME. It should be noted that the 2015 staffing analysis does not include the Mine Safety Specialist and Mine Operations SSO positions who are both in the TQP program for WIPP and provide critical technical expertise that support WIPP safe operations. Overall TQP staffing to support WIPP operations is adequate.

An interview with the CBFO Technical Training Program Coordinator confirmed implementation of the TQP process that is outlined in CBFO 02-3219. The discussion covered the process by which positions are identified for the TQP program through an analysis of the position using the CBFO Technical Position Survey Form. The form consists of 4 criteria for technical positions and if three of the four criteria apply to the position then the position is included in the CBFO TQP program. Further discussion revealed that the CBFO Technical Training Program Coordinator also provides oversight for the contractor's training program, however this position is not included in the TQP. According to the criteria in the Technical Position Survey, the Technical Training Program Coordinator position meets three of the four criteria and therefore should be included in the TQP. Contrary to DOE O 426.1 the Technical Training Program Coordinator, which is a position that is responsible for oversight of safety management programs as identified in the facility DSA, is not included in the TQP. **(DOE.1-POST-1)** Further, review of CBFO oversight examples indicates the Technical Training Program Coordinator has participated in a recent EA assessment of contractor training programs and completed a number of operational awareness reports of contractor training program implementation. The Safety Programs Director intends to include two training development courses in the Technical Training Program Coordinator's Individual Development Plan. These represent appropriate actions to be taken to support the overall contractor training program oversight depth, in addition to completion of TQP competencies.

The CBFO organization has been revised significantly in response to the fire and radiological event. Review of the most recent organization chart and current staffing indicates the current staffing is adequate to support CBFO oversight of safe operations of WIPP. The model adopted by CBFO to separate programmatic versus compliance functions is appropriate and will result in clarity in oversight responsibilities as processes mature. A number of key vacancies exist that impact CBFO oversight that is discussed further in DOE.2, Criteria 3. The most recent FR staffing analysis was completed in 2012 and identified the need for 3 qualified FRs to support WIPP operations. The staffing analysis has not been updated annually as required by DOE-STD-1063-2011 (**See DOE.2-POST-3**), although the CBFO reorganization has increased actual FR staffing to 5.

The *Review of Carlsbad Field Office Operations Oversight of the Waste Isolation Pilot Plant* conducted by NNSA in October 2016 identified three opportunities for improvement for this DOE Objective criterion. The DOE ORR team reviewed these

OFIs and concurs with the conclusions, however chose to not duplicate the discussion in this section. Discussion in Objective DOE.2 criterion 5 provides additional detail. It is recognized that CBFO has taken initial actions to address the NNSA issues related to TQP qualifications and oversight responsibilities which are deemed to be necessary, but additional actions need to be taken to ensure CBFO oversight is maintained (e.g. waste emplacement watchbill, specific oversight assignments) and time until the majority of TQP qualifications are achieved is minimized. Actions taken to date include required reading for staff (completed forms not verified), requirements for Director approval of issues (Directors are also completing initial STSM qualifications), and the STSM memo identified in ICE 618 is not available as objective evidence in the ICE form and was not provided to the team during the review.

2. Records demonstrate that the FPD, FRs, SSOs and SMEs assigned to cover the WIPP operations are fully qualified, and the minimum staffing levels are met. Qualified backup personnel are available, as needed. (DOE-STD-1063-2006; DOE Order 360.1C)

Review of qualification records indicates 3 of the 5 CBFO Facility Representatives have completed initial qualification and the remaining FRs are approaching qualification. This staffing strength is complicated and diminished by the fact that the Facility Oversight Division (FOD) Director is acting as the AM for OWIPP and 1 of the 3 qualified FRs is acting as the FOD Director. CBFO currently has 3 certified FPDs with one vacancy for the operations activity manager. Only 4 (1 completed recently) of the 14 oversight and compliance staff on the CBFO WIPP organization chart (including 3 vacancies) have completed the assigned technical qualification program. As discussed below, CBFO has identified a compensatory measure to address the Mine Operations SSO vacancy which is critical based upon the status of WIPP mine ground control. Although CBFO is not fully staffed and qualified, this was self-identified and discussed further in DOE.2, Criteria 5. Since CBFO is currently completing initial qualification for a large percentage of staff, backup personnel are currently only in place for the FR and FPD functions. Interview and oversight of CBFO staff demonstrated capable staff members performing appropriate oversight resulting in appropriate issues.

CBFO has appropriately created the Mine Recovery Team consisting of the Acting Deputy Manager, a Facility Representative, the Waste Program Handling Manager, and the Mine Safety Specialist to monitor and evaluate the current hazards and response associated with ground control, geo-technical monitoring and contractor response. The team has the appropriate competence for the assignment, but a good portion of the focus would be performed by the Mining Operations SSO position that is currently vacant. This vacancy is the top priority for the CBFO office and the Mine Recovery team is an appropriate short-term compensatory measure. Unfortunately, the significant investment of resources for the Mine Recovery team results in decreased oversight in the areas normally assigned for the team members. This is further complicated by the fact that CBFO has not completed development of its draft

Mine Safety site specific technical qualification program qualification standard that is intended to be issued to both the Mine Safety Specialist and future Mine Operations SSO. CBFO needs to establish a plan for the prompt filling of the vacancy and transition away from the Mine Recovery team to ensure adequate oversight is available to support ground control, waste emplacement and the future plans for mining of new panels.

3. **FRs assigned to the WIPP facility possess an adequate knowledge of the WIPP facility, operations and hazards, and they are involved in overseeing WIPP activities on a daily basis. (DOE-STD-1063-2006).**

   Interviews and observation of oversight performance and documentation indicate FRs assigned to FR positions possess an adequate knowledge of the WIPP facility. FRs understand the contractor processes to identify and control hazards and remain engaged on daily activities and priorities. The FRs demonstrate an adequate ability to plan oversight and obtain necessary documentation (work instructions, permits, etc.) to oversee contractor performance in a meaningful, rigorous manner. FRs routinely interface with CBFO subject matter experts and Safety System Oversight engineers to plan and perform routine operational awareness oversight. Review of operational awareness reports, surveillances and the ICE issue database indicate FRs are documenting oversight and are proficient in documenting oversight and associated issues. The FRs recognize the unique aspects of performing nuclear operations in a mine. Review of CBFO oversight documentation demonstrates daily FR oversight of WIPP operations and identification of issues as they are encountered. Some opportunities for improvement that support FR oversight are discussed in DOE.2.

4. **The SSOs and SMEs are assigned and available to the WIPP Project, and they have sufficient applicable experience and/or training to understand the operations, hazards, and safety systems under their cognizance. (DOE Order 420.1C; DOE Order 360.1C)**

   Although most of the SSOs and some of the SMEs are recent additions to CBFO, they have sufficient experience and knowledge to be effective in their assigned roles once they are fully qualified. Only 4 of the 14 oversight and compliance staff on the CBFO WIPP organization chart (including 3 vacancies) have completed the assigned technical qualification program. This is primarily due to the recent assignments and is complicated by the fact that none of the CBFO oversight and compliance directors have completed their Senior Technical Safety Manager qualifications. DOE ORR interviews and observations of staff indicate an adequate baseline understanding of WIPP operations, hazards, and general controls used at WIPP, but specific systems and focus areas were only recently communicated to the SSOs. The length of assignment and the ongoing focus on initial qualifications, understandably inhibits the depth of SSO and some SME knowledge, although the DOE ORR team interviews indicate an appropriate depth of knowledge commensurate with the experience at WIPP. SSOs and SMEs have documented both formal and OA oversight consistent with their assigned area and the oversight documentation is adequate. These

observations are in contrast to the NNSA issue identified relative to SSO ability to perform effective safety system oversight, which was likely somewhat mitigated by recent actions taken by CBFO. To facilitate the ongoing depth of SSO and SME knowledge, CBFO should enhance the existing continuing training program to provide key training on topics such as: WIPP DSA and TSR requirements, detailed safety system briefings, oversight techniques and issue development, tools available to support effective contractor interface/continuous improvement, and ground control/geo technical monitoring. Continuing training would benefit the overall Office of WIPP and increase depth of knowledge as WIPP transitions to a more complicated ventilation system and associated controls.

5. **DOE line management personnel are familiar with the WIPP contract requirements and are using the contract effectively to provide direction and guidance to the contractor. (DOE Order 413.3B; DOE Order 360.1C)**

   Interviews with line management and review of documents indicate an understanding of WIPP contractual requirements and use of the contractual tools to communicate and provide direction to the contractor. Mechanisms are in place to provide issues identified by CBFO oversight to the contractor from the Issues Collection and Evaluation (ICE) system to the NWP issues management system or by formal transmittal of a Corrective Action Report (CAR). Contractor performance is informally documented in the OA database and FR weekly report and is formalized in individual surveillance reports and the Operations Quarterly Evaluation Report (See DOE.2 for additional discussion). Line management is engaged with CBFO staff to understand the results of oversight and subsequent issues and adequate examples exist where line management provides direction and guidance to the contractor formally. Furthermore, the Quarterly Evaluation Report provides contractor performance evaluations that support overall contractor fee determination. As discussed in DOE.2, CBFO Directors need to prioritize and delegate as necessary to ensure key oversight products (surveillances, monthly, quarterly) are approved and distributed in a timely manner to maximize the effectiveness in contractor compliance and continuous improvement.

6. **DOE personnel demonstrate knowledge of Integrated Safety Management (ISM) principles and core functions. They understand the facility operations and practice an appropriate conduct of operations culture. (DOE Policy 450.4A; DOE Order 450.2)**

   DOE ORR team oversight indicated appropriate knowledge of Integrated Safety Management principles and core functions. FRs and CBFO oversight personnel discussed ISM during and following oversight and oversight planning properly integrates ISM into the lines of inquiry and oversight approach. Documentation of both informal and formal oversight includes adequate reference and recognition of ISM principles and functions. During the review the DOE ORR team observed an integrated team of CBFO personnel performing the annual ISMS assessment for FY-2016. The assessment team was appropriately communicating with the contractor

and completing the assessment, albeit this effort was complicated and accelerated based upon the loss of the former CBFO ISMS Champion one month earlier. This transition complicated the assessment and has contributed to delays in issuing the CBFO annual ISMS description revision and approval of the FY-2017 Performance Objectives, Measures, and Commitments.

In addition, CBFO informal and formal oversight include appropriate elements of conduct of operations as they relate to WIPP operations and work performance. The FRs perform the primary oversight of conduct of operations although other CBFO SMEs and SSOs demonstrated appropriate awareness of conduct of operations. An assessment of Conduct of Operations is currently included in the Integrated Evaluation Plan, but it is general in nature with the intention to address all attributes over time. Ongoing maturation of the CBFO Integrated Evaluation Plan and use of ICE for documenting oversight and issues, as well as the recent qualification of two more FRs should allow for improved focus on specific areas of Conduct of Operations.

CONCLUSION

The CBFO organization chart evaluated against the Federal Technical Capability Staffing Analysis identifies adequate staffing to support safe WIPP operations. The Mine Safety SSO is the most significant vacancy and it is the highest priority vacancy at CBFO. Other vacancies can be compensated for, however this is complicated by the high percentage (>75%) of TQP personnel who are still completing qualifications. Existing staff demonstrate appropriate capability resulting in adequate baseline oversight; however oversight tools are not fully mature. Staff interviews and review of oversight products indicate base knowledge and competency are adequate once the qualification process is completed, although depth of knowledge and backup support needs to be developed as the organization matures. This can be fostered through cross-training once the base qualifications are complete and ongoing commitment to OWIPP sharing of knowledge and experience through continuing training. The criteria for this objective have been met.

Issue:

DOE.1-POST-1: Contrary to DOE O 426.1 the Technical Training Program Coordinator, which is a position that is responsible for oversight of safety management programs as identified in the facility DSA, is not included in the TQP.

Evaluated by:	**Approved by:**
/s/ Mat Irwin, Team Member /s/ Vanessa Turner, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Review Form 1

Functional Area:	Objective:	Objective Met
Department of Energy	DOE.2	Partially Met

OBJECTIVE

DOE.2: DOE-CBFO's operations oversight programs, such as occurrence reporting, facility representative, corrective action, and safety system oversight, and quality assurance are adequate. **(Core Requirement 17)**

CRITERIA

1. DOE-CBFO has effectively implemented an Occurrence Reporting Program that meets the requirements of DOE Order 232.2.
2. A comprehensive and approved DOE oversight plan has been issued for the WIPP Project.
3. DOE-CBFO's oversight programs (including the Facility Representative, SSO, and subject matter expert programs) ensure operational awareness and formal assessments are scheduled and performed on an appropriate suite of activities.
4. Oversight reports demonstrate and appropriate degree of rigor through identification of issues which are tracked to closure and are provided to appropriate management and used to improve contractor performance. (DOE Order 226.1B)
5. DOE-CBFO's Quality Assurance Program that has been approved and implemented. (DOE Order 414.1D)
6. DOE-CBFO's corrective action program requires corrective actions be evaluated to ensure that the causes of findings are addressed, specific actions are tracked to closure, and a sampling of corrective actions are verified to be implemented. (DOE Order 414.1D)
7. Corrective Action Plans associated with AIB JONs assigned to NWP and CBFO were evaluated, verified to be closed and appropriately documented by CBFO.
8. Corrective action plans associated with AIB JONs assigned to DOE HQ have been evaluated verified to be closed and appropriately documented.

APPROACH

Record Review:

- Review CBFO's process for administering and overseeing the contractor's implementation of DOE Order 232.2. Review CBFO's WIPP Oversight Plan, and CBFO oversight program documents, implementing procedures and schedules to ensure the WIPP Project is adequately included in CBFO's oversight planning. Review completed operational awareness surveillance, assessment, management

walkthrough or inspection reports pertaining to the WIPP Project. Review the CBFO Quality Assurance Plan (QAP). Review sample of WIPP occurrence reports. CBFO performance indicators/metrics, CBFO approved Conduct of Operations Matrix, Contractor Assurance System, latest ISMS declaration, Training Implementation Matrix, Maintenance Implementation Plan, and sampling of CBFO self-assessments. Review CBFO's corrective action/issues management program documentation. Review corrective actions in response to CBFO identified concerns for adequacy, tracking, and closure. Review AIB closure packages for completeness.

Interviews:

- Interview WIPP DOE staff on the WIPP Oversight Plan for understanding of expectations to include: FPD, FRs, and SSOs. Interview FRs on the occurrence reporting process and recent occurrences at the WIPP Project. Interview members of the WIPP management team regarding their use of oversight results: FPD and WIPP Deputy FPD. Interview CBFO personnel responsible for implementing and managing the corrective action program. Interview personnel responsible for tracking, evaluating, and verifying closure of AIB CAPs for both NWP and CBFO.

Shift Performance:

- Observe any oversight follow-up meetings including but not limited to event fact finding, corrective actions meetings, etc… that occur during the course of the ORR.
- Observe any FR or CBFO safety and health interface meetings with NWP.

Records Reviewed

- *Review of Carlsbad Field Office Operations Oversight of the Waste Isolation Pilot Plant*, October 2016.
- *CBFO Organizational Chart*, Approved 07/21/16, Effective 08/07/16
- DOE/CBFO 09-3442, *CBFO Integrated Safety Management System Description*, Revision 6, 10/15
- DOE/CBFO 04-3229, *CBFO Contractor Oversight Plan*, Revision 4, 07/25/16
- CBFO MP 10.9, *Surveillance, Operational Awareness, and Issues Management*, Revision 3, 04/08/16
- DOE/CBFO 13-3505, *Waste Isolation Pilot Plant Facility Representative Manual*, Revision 1, 06/14
- DOE/CBFO 09-3439, *Office of Operations Oversight Safety System Oversight Program Plan*, Revision 2, 12/15
- CBFO OP 5.9, Rev 0, *Facility Representative Responsibilities and Routine Activities*, 3/31/2014
- DOE/CBFO-94-1012, *U. S. DOE CBFO Quality Assurance Program Document,* April 17, 2015, Rev. 12
- *CBFO Response Plan to the NNSA Review of Operations Oversight at WIPP,* November 11, 2016

- DOE/CBFO-09-3441, *Safety Management Functions, Responsibilities and Authorities Manual, Rev. 5*
- DOE/WIPP-01-3181, *Authorization Agreement for the Waste Isolation Pilot Plant*, Rev. 9
- *T-0 Daily Scheduled Work/Daily Release,* November 15, 2016
- *CBFO Draft update to the Integrated Evaluation Plan*, November 14
- *CBFO Draft Quarterly Evaluation Report of NWP Performance for 3rd Quarter of FY 2016*, November 15
- CBFO Technical Qualification Cards (3)
- CBFO Technical Qualification Program Status, November 16
- Blank CBFO SSO Qualification Cards (4)
- CBFO Qualifying official checklist (2)
- WIPP/FR Weekly Evaluation Report (5)
- Package 1628326, *Replace Evaluation Power Cable in the Waste Handling Shaft*, Rev. 0
- *NWP Ground Control Action Item List,* November 16
- *Shiftly Bolt Installation Count,* November 15
- All 2016 Occurrence Reports declared by CBFO office (19)
- Review of Surveillances in ICE database and status
- Review of sampling of ICE Issue Reports (25)
- Review of sampling of ICE operational awareness reports (15)
- CAR status report, November 16
- 16-3480, *Issuance of CAR 17-00*, October 27
- 16-3481, *Issuance of CARs 17-002 and 17-003*, October 27
- 16-3441, *Issuance of CARs 16-072, 16-073, 16-074 from Audit A-16-027of CBFO Document Control,* September 29
- 16-3472, *Issuance of CBFO Corrective Action Report 17-006 identified During Audit A-17-07*, October 25
- *CBFO Semi-Annual CAR trend analysis report for 1/1/16 through 6/30/16*, July 28, 2016
- *CBFO Semi-Annual CAR trend analysis report for 7/1/15 through 12/31/15,* February 4, 2016
- *FY-16 Annual Management Assessment Summary Report for FY-16*, October 24, 2016
- 16:03067, *Response to Contracting Officer Direction Letter – To Provide a plan for Recovery of Panel 7, under Nuclear Waste Partnership LLC Prime Contract DE-EM-0001971*, November 11
- 16:02930, *Response to Contracting Officer Direction Concerning Issues Collection and Evaluation System, under Nuclear Waste Partnership LLC, Contract DE-EM0001971*, March 16
- *ICE Council Charter*, Rev. 0, July 2016
- DOE/CBFO-14-3533, *Issue Collection and Evaluation User Manual*, Rev. 1, April 15, 2015
- *Line Management Assessment of the WIPP Contractor Operational Readiness Review,* October 24, 2016

- *Nuclear Waste Partnership, LLC, Quarterly Performance Analysis Report for the Waste Isolation Pilot Plan, Third Quarter of Fiscal Year 2016*
- *Nuclear Waste Partnership LLC Corrective Action Plan Underground Salt Haul Truck Fire Event*, February 11, 2015
- *Nuclear Waste Partnership LLC Corrective Action Plan Phase 1 Radiological Release Event*, February 11, 2015
- *Nuclear Waste Partnership LLC Corrective Action Plan Addendum Radiological Release Event (Phase II)*, July, 16, 2015
- *U.S. Department of Energy Carlsbad Field Office Corrective Action Plan Addressing the Accident Investigation Board Reports of: the Underground Salt Haul Fire at the Waste Isolation Pilot Plant, February 5, 2014, and the Radiological Release Event at the Waste Isolation Pilot Plant, on February 14, 2014 Revision 1*, July 2015
- *U.S. Department of Energy Corrective Action Plan for Environmental Management Headquarters Salt Haul Truck Fire at the Waste Isolation Pilot Plant on February, 5, 2014*, August 2014
- *U.S. Department of Energy Corrective Action Plan for Environmental Management Headquarters Phase1:Radiological Release Event at the Waste Isolation Pilot Plant on February, 14, 2014*, March 2015
- *U.S. Department of Energy Corrective Action Plan for Environmental Management Headquarters Phase 2: Radiological Release Event at the Waste Isolation Pilot Plant on February, 14, 2014*, August 2015
- A sampling of NWP AIB JON action closure packages
- A sampling of CBFO AIB JON action closure packages
- A sampling of EMHQ AIB JON action objective evidence
- EM 3.112 *WIPP Open CA Narratives*, 11/22/2016
- Office of Standards, and Quality Assurance Management Assessment EM-RA-15-17 of the Corrective Action Hub

Interviews Conducted

- Acting Assistant Manager, Office of the WIPP
- Acting Facility Operations Oversight Division Director
- Facility Engineering Division Director
- Confinement Vent SSO
- Mine Recovery Team
- Industrial Hygiene Specialist
- Safety Programs Division Office Director
- Maintenance Program Oversight Specialist SSO
- Quality Assurance Manager
- Quality Assurance Specialist (2)
- Technical Training Coordinator
- CBFO Manager
- WIPP Surface Program Manager
- Nuclear Senior Technical Safety Advisor

- FR Candidate (2)
- Safety and Health Division Director
- ICE administrator (CTAC)
- Nuclear Safety Specialist
- Facility Representatives (3)
- CBFO Corrective Actions Manager for AIB JONs
- NWP AIB JON action manager
- Office Director, Office of Operational Safety
- Deputy Assistant Secretary for Safety, Security and Quality Programs

Shift Performances Observed

- CBFO Director's Meeting, November 14
- CBFO Manager endorsement memo briefing to CBFO operations staff, November 14
- T-0 Meeting and Maintenance SSO oversight, November 15
- CBFO Daily Tactical Meeting (2)
- Confinement Ventilation SSO oversight of Filter DP transmitter calibration prejob and field performance, November 15
- Ground Control Meeting, November 16
- Mine Recovery Team bi-weekly meeting, November 15
- CBFO ISMS assessment team meeting to support 2016 ISMS Declaration, November 15
- Replace Cable in the Waste Handling Shaft, Pre-job and FR Candidate/Maintenance SSO oversight, November 16
- FR Oversight of Weekly Fire Pump Surveillance Pre-job Brief, November 14
- FR Oversight of TRU Waste Receipt and Radcon Inspection, November 14
- FR Oversight of Waste Handling Exercise, November 15
- FR Oversight of Underground Waste Emplacement Pre-job Brief, November 16
- NWP WIPP Form Screening Meeting, November 16

Discussion of Results

1. DOE-CBFO has effectively implemented an Occurrence Reporting Program that meets the requirements of DOE Order 232.2

CBFO 5.9, *FR Duties and responsibilities, and routine activities* and DOE/CBFO-13-3505, *WIPP Facility Representative Manual*, provide the base requirements for FR oversight to support implementation of the Occurrence Reporting Program in accordance with DOE Order 232.2. Interviews and reviews of Operational Awareness reports indicate adequate FR oversight of occurrence report discovery, categorization, investigation, causal analysis, corrective actions, and development of the report. FRs, however, are not formally reviewing and approving final ORPS reports for SC-2 and above in accordance with DOE Order 232.2 (**DOE.2-POST-1)**. For example, EM-CBFO-NWP-WIPP-2016-0010, EM-CBFO-NWP-WIPP-2016-

0004, and all EM-CBFO ORPS reports for calendar year 2015 that were SC-2 and above final reports were not reviewed and approved in the ORPS database. This is a critical formal interface between DOE and the contractor that is being informally managed through OA oversight by CBFO. There is no deliberate assignment of ORPS reports between the CBFO FR staff. This would help increase overall depth of knowledge and provide clear responsibility to ensure consistent oversight of the report development (investigation, causal analysis, corrective actions development, final report) for all declared ORPS reports, followed by the formal FR approval or rejection of the report for the more significant (SC-2 and above) events. Review of the 2016 reports in ORPS indicates contractor general compliance with formatting and content requirements.

2. A comprehensive and approved DOE oversight plan has been issued for the WIPP Project.

DOE/CBFO -04-3299, *Carlsbad Field Office Contractor Oversight Plan* has been developed and approved to define the overarching CBFO oversight process. This plan, in conjunction with the referenced individual procedures, provides an adequate oversight process to comply with DOE Order 226.1B. This plan and many of its implementing processes (oversight planning, issues management, surveillance processing and approval through Issue Collection and Evaluation (ICE) database) are relatively new and immature as evidenced by the results of CBFO oversight reviews recently performed by NNSA and EA. Some of those issues are relevant to comprehensive CBFO oversight implementation and will be discussed collectively in criteria 5 below. This review will not duplicate those issues, but will identify the significance related to safe waste emplacement from the perspective of the review performed by this team. As discussed below, there are some key processes that require action to support safe waste emplacement and ongoing safe WIPP operations.

In addition to the CBFO Contractor Oversight Plan, CBFO has issued a number of oversight procedures as discussed in more detail in criteria 3 and 4 below. The suite of CBFO procedures defines an adequate process to demonstrate compliance with DOE O 226.1B; however, there have been a number of recent revisions and improvements to processes that are not fully mature. Interviews and review of oversight documents indicate CBFO has competent staff, but their success is complicated by a high percentage of staff working initial TQP qualifications, some key vacancies and a number of capable, albeit recent additions. CBFO oversight has been supplemented by HQ and other staff from across the complex since the accident, which has been beneficial to the office but complicates the maturity of new processes and people. To support safe initiation of waste emplacement operations while completing ongoing actions and the ongoing need for increased ground cover focus, CBFO has drafted a "Startup Oversight Plan". This draft plan provides a good framework for ensuring the focus is maintained on safe waste emplacement operations and includes: additional CBFO TSR training, specific focus for FR/SSO/SME oversight during emplacement, and oversight of contractor management and self-assessment during initial waste emplacement. Items for

consideration to address based upon this review include: how oversight staff should balance ground control vs. waste emplacement oversight, a watch bill for the first few waste emplacement activities, more frequent evaluation of ongoing oversight for adjustments to planned formal oversight, and a structured discussion centered around the past weekly oversight to support ongoing and emerging oversight focus areas. CBFO should consider supplemental oversight and a plan for filling the Mine Operations SSO and transition of the Mine Recovery Team to a steady-state condition to allow for focus on both ongoing ground control and waste emplacement. (**DOE.2 Recommendation 1)**

3. **DOE-CBFO's oversight programs (including the Facility Representative, SSO, and subject matter expert programs) ensure operational awareness and formal assessments are scheduled and performed on an appropriate suite of activities.**

In accordance with the CBFO oversight plan and QAPD, formal oversight is scheduled on the assessment plan and associated WIPP operations Integrated Evaluation Plan (IEP). These plans are intended to both schedule and track formal oversight, however as identified by NNSA in October 2016 (and discussed further in criteria 5), the IEP is not updated quarterly and does not include completed activities and surveillances. This is further exacerbated by the failure to consistently manage and monitor the ICE database to ensure both surveillances and issues are processed in a timely manner. During resolution of the NNSA IEP issue, mechanisms need to be established to ensure timely update of the IEP on a quarterly basis to include completed planned and reactive assessments, as well as adjustments to the schedule based upon contractor performance and emerging operations oversight vulnerabilities and critical activities (e.g. ground control following room 4 collapse). It is noted that CBFO updated the IEP during the DOE ORR and the suite of activities contained the surveillances that were highlighted by the NNSA review and additional surveillances for Conduct of Operations and other functional areas. The overall volume (24) of surveillances for OWIPP appears reasonable based upon staffing, however, the competing priorities of completing qualification, increased ground control oversight, and proposed waste emplacement will require ongoing management attention and quarterly adjustment in accordance with the CBFO procedure. In addition, it will be important to monitor for emerging oversight needs that may require performance of reactive surveillances. OWIPP staff provided examples of reactive surveillances that were performed, but the current IEP process does not recognize this important form of formal DOE oversight. In addition, based upon the dynamic nature of the ground control effort and the significance to the safe operations of waste emplacement, the DOE ORR team recommends that CBFO add a Ground Control Assessment and a DSA/TSR assessment to the IEP to support waste emplacement operations (**DOE.2 Recommendation 2)**. As implementation of the CBFO oversight processes mature, it is expected that CBFO can realign resources to ensure the overall breadth and depth of formal oversight is proactively identifying vulnerabilities

CBFO documents oversight via a combination of operational awareness, formal surveillances, and QA independent oversight (audits and surveillances) via approved

processes. Review of a sampling of these documents indicates an appropriate level of planning (e.g. lines of inquiry), documentation of oversight as completed, and identification of potential issues, when appropriate. Operational awareness reports are generally well-written, although in some instances they are used to document CBFO staff general activities, meetings, and administrative tasks. This is acceptable as long as the focus remains on the field and programmatic oversight of WIPP operations, facilities and contractor performance in accordance with the contract. The team observed one good practice, where the Maintenance SSO develops checklists based upon procedure and directive requirements tailored around select oversight activities (e.g. T-0 meeting, specific jobs). The checklists are used to verify compliance and are uploaded to the resulting OA so they can be used for trending purposes over time. This approach provides focus on key oversight attributes the assessor has evaluated in advance of the field oversight.

Formal oversight reviewed was found to be generally acceptable. Surveillance plans are appropriately used and surveillance results are well-written. When a surveillance is initiated it is in an open status in the ICE database until the author submits it to his/her Director for approval. Any issues resulting from the surveillance have to be separately entered and approved in the issues portion of the ICE database and then referenced in the surveillance report. Once submitted, the surveillance remains in "pending approval" status until the report is either "approved/closed", or returned to the author to resolve comments. Ten of the last 11 ICE surveillance reports entered in the system are either open (5) or pending approval (5), even if a signed surveillance has been uploaded into the system. For example, the CBFO Line Management Assessment (LMA) of the WIPP Contractor ORR was signed for approval on October 24, 2016, however the status of the surveillance report in ICE is "pending approval". Of the 9 surveillances entered in ICE since June 1, only one of the reports is "approved/closed" in ICE, although several have an uploaded signed copy of the surveillance in the ICE entry. In addition, DOE ORR review of a sample of surveillances found that some reports reference the resulting ICE issue numbers as required by MP 10.9, Step 5.4.9, while others do not have references or appear to have issues that exist in ICE (e.g. recent LMA of WIPP CORR results). Subsequent discussions with CBFO management identified that LMA issues were not captured in ICE, but rather were sent directly to NWP to generate the WIPP forms. Furthermore, the ICE software does not contain effective searching functions and the current ICE metrics are limited to entered and closed issues and completed surveillances (not consistent with the status reported in ICE). Thus, CBFO implementation of the ICE surveillance process is not resulting in communicating formal oversight results and issues to the contractor in a timely manner (**DOE.2-POST-2).**

Throughout the review, various CBFO documents were requested from CBFO to demonstrate completion of requirements or self-imposed commitments. These requirements include commitments to external entities (e.g. DOE-HQ), prime contractors, and self-imposed commitments to support CBFO implementation of safety processes. Some of the examples (annual ISMS declaration activities and ISMS description update) were delayed and clearly impacted by overall staff attrition, but many either don't have documentation to demonstrate completion or are not

assigned, tracked, and managed to ensure deliberate completion, reassignment, and/or extension based upon relative priorities and emerging needs. A few examples of required CBFO commitments that are not tracked by the organization include the ISMS annual declaration, ISMS description update (per DOE O 450.2), DOE formal approval of the NWP Conduct of Operations applicability matrix (per DOE O. 422.1AChg2), development and approval of a Startup Notification plan procedure (per DOE O 425.1D), completion of annual FR staffing analysis (DOE-STD-1063-2011) and completion of the NWP ISMS verifications (DOE O 450.2). In addition to requirements related commitments, CBFO does not have a mechanism in place to assign or track completion of self-imposed requirements such as the monthly combustible loading and housekeeping egress walk downs (AIB JON21.1 and 22.1), fire protection AHJ oversight (per formal correspondence on the CBFO website), and timely completion of OWIPP oversight products such as the operations monthly report, operations quarterly evaluation report, and the engineering quarterly evaluation report. The lack of mechanisms to track these commitments also hampers the ability to balance priorities and resources necessary to support safe operation. CBFO has failed to ensure key safety program commitments are tracked and deliberately dispositioned. (**DOE.2-POST-3)** CBFO procedures define an oversight process containing an appropriate suite of oversight activities; however the implementation of the recent changes in the processes and new issues management database is immature.

4. Oversight reports demonstrate an appropriate degree of rigor through identification of issues which are tracked to closure and are provided to appropriate management and used to improve contractor performance. (DOE Order 226.1B)

Review of recent CBFO oversight reports demonstrates an adequate balance of informal (OA), formal (surveillance), and independent oversight (QA audits and surveillances). Individual reports are prepared in accordance with MP 10.9, *Surveillance, Operational Awareness, and Issues Management*. MP 10.9 includes adequate rigor for both oversight documentation as well as the identification and overall processing of contractor issues. A sampling of reviewed issues were clearly written and appropriately vetted between the originator and Director performing the function of the CBFO Issue Manager. CBFO identified issues (633 since ICE inception in mid-CY-2015) against the contractor are manually transferred to the contractor issues management process. The review team observed the screening and processing of a sampling of issues both identified by CBFO and screened by the contractor during the week of the DOE ORR field visit. The recent NNSA assessment (issue F.2-10) identified concerns with the ability of the issues management process to correct and prevent recurrence of issues through timely corrective actions, and the DOE ORR review team observed a similar backlog of issues. CBFO plans to monitor contractor resolution of issues through the ICE council and CBFO oversight evaluation tools described below, but formal corrective actions have not yet been defined. Additional metrics evaluating the individual steps

of the process (submittal, approval, closure) will be necessary to drive the overall processes to the necessary maturity.

In accordance with DOE/CBFO-04-3299, *CBFO Contractor Oversight Plan,* CBFO has established a number of tools to evaluate and communicate overall contractor oversight and resulting performance. Early each week one of the FR candidates mines the OA reports to develop a weekly report. The weekly report contains information about WIPP facility status, planned work and DOE oversight activities, and a summary of all operational awareness reports and issues, operational events, key emerging oversight information (e.g. CORR issue status, bolting status), and an overall federal perspective for the previous week. The weekly is an excellent tool that summarizes CBFO oversight performed and what it means relative to ongoing safe operations.

A monthly report is prepared each month as a formal surveillance in ICE to document FR and SSO operational awareness and CAS oversight activities for the month. The report summarizes external and CBFO oversight performed for the month, WIPP events, a CAS evaluation, closed contractor WIPP forms during the month and an evaluation of NWP event response and completed self-assessments. The report is an excellent tool and CBFO was drafting the September report during the time of the DOE ORR field visit. A review of the ICE surveillance database for monthly reports indicated that a number of the reports have not been approved in ICE (**See DOE.2-POST-2)** and the October report had not been initiated as of November 19. It is also not evident how CBFO is consistently discussing the monthly report with NWP to support continuous improvement of the overall programs as discussed in the monthly.

The Contractor Oversight Plan also requires the development of a Quarterly Evaluation Report for Operations and another report for Engineering. The report performs functional area evaluations for 17 areas. Each functional area evaluation is required to include a paragraph summarizing contractor CAS performance for the area based upon CBFO oversight reports and issues in ICE for the quarter under review. The oversight plan requires that the final reports be available for the WIPP operational oversight planning committee members by the last day of the second full work week of the month following the quarter under review. A review of the ICE database identified that a combined Operations QER was completed for the 2 quarters ending in March of 2016, but the QER for the 3rd quarter of fiscal year 2016 was still in draft at the time of this review, almost five months after the completion of the quarter being evaluated. Neither the operations nor engineering QER have been drafted for the 4th quarter of fiscal year 2016, as required by the CBFO oversight plan (**DOE.2-POST-3)**. The significant delay in issuing both the monthly and quarterly reports, severely hampers the effectiveness of the reports in influencing contractor behavior to address precursor trends. Furthermore, these tools provide valuable information to support ongoing adjustments in formal surveillance planning and performance. CBFO processes have established adequate tools to document oversight and identify issues, but continuous improvement opportunities exist to improve effectiveness of these tools.

5. DOE-CBFO's Quality Assurance Program that has been approved and implemented. (DOE Order 414.1D)

CBFO has documented and implemented a QAP. A number of external assessments and internal audits/surveillances have recently identified issues with both the CBFO oversight and QA program. Based upon the DOE ORR review, the team agrees with the issues identified and provides an analysis below regarding the impacts to safe waste emplacement. The more significant issues from a DOE ORR standpoint, status and analysis are discussed below:

NNSA Review of Operations Oversight at WIPP:
**F.1-1: CBFO has not ensured that STSM assignments or compensatory measures are in place to maintain an unbroken chain in the reporting structure of qualified STSMs in positions of authority:

Status: CBFO agreement, ICE 618 issued, ICE 618 is closed based upon the 4 qualified STSM and 5 in qualifications and commits to a memo from the Safety Basis Approval Authority to staff to detail compensatory measures. No objective evidence in ICE for the memo.

F.1-2: Contrary to CBFO 02-3219, CBFO has not documented compensatory measures and/or duty limitations for unqualified TQP participants providing oversight functions.

Status: CBFO agreement, ICE 620 issued. 3 of 4 actions completed to document limitations for individual TQP staff. Remaining action is delinquent for due 11/16.

**F.1-3: contrary to DOE O 426.1, CBFO management has not identified compensatory measures to ensure the SSO responsibilities associated with the vacant electrical and mine safety positions are fulfilled.

Status: CBFO disagrees compensatory measures were not identified when addressing Mine Recovery Team. DOE ORR team agrees in part, see recommendation below.

F.1-4: Qualifying Official issue: Corrected

F.1-5: SSO qualification card not assigned: Corrected, 1 action still open.

F.1-6: Engineering member not in TQP. Corrected

F.1-7: TQP and FTCP self-assessments not complete.

Status: CBFO agreement, ICE 624 issued. FR self-assessment scheduled for 3Q17. Action assigned to add responsibility to Director performance plans.

F.1-8: SSOs assigned to CBFO do not exhibit the necessary expertise required to fulfill program requirements.

Status: CBFO agreement and assignment of technical support to augment SSO. ICE 625 issued. FED assigned action for staff required reading and evaluation of SSO knowledge. (DOE ORR team found adequate ability, but lack of experience and depth for some SSO staff)

F.2-1: FRAM not updated to Org. Chart.

Status: FRAM was updated. (Captured as part of DOE.2 issue for commitment tracking.)

**F.2-2: IEP is not updated quarterly.

Status: Updated during ORR, ICE24 contains action to put in director performance plans

**F.2-3: No evidence of quarterly engineering report.

Status: ICE 624 for director performance plan, ICE 626 action for Facility Engineering Division to complete quarterly by 12/31/16. The action does not specify

F.2-4: No FR program self-assessment

Status: Scheduled in IEP update for 3Q16 and action to place in director performance plans (ICE 624)

**F.2-5: SSO not providing oversight of assigned safety SSCs as required.

Status: ICE 627 provided memos to each SSO (add to document list). SSOs were aware of memos, but too early to demonstrate overall effectiveness during the DOE ORR.

F.2-6: CBFO is not periodically evaluating SSO program effectiveness and no mgmt. assessment.

Status: Schedule queue + ICE627. (Really part of commitment tracking)

F.2-7: No assessment of maintenance

Status: Added to IEP for 2Q17 + SSO actions identified for F.2-5 above.

F.2-8: Periodic self-assessments of maintenance

Status: Same as F.2-7

**F.2-9: Staff are not evaluating potential significant or recurring issues for reporting CAQ to office of QA.

Status: CBFO discussion about how ICE and CAR interface works. ICE628 action to revise MP
10.9 for originators to address as SCAQ.

**F.2-10: Contrary to DOE O 226.1B, several recurring issues in CBFO QER, identified through ICE reports, indicate that the CBFO issues management process is not capable of ensuring problems are evaluated to prevent recurrence and corrected on a timely basis.

Status: CBFO discussion about how recurring issues are evaluated, but CBFO agrees that timely closure will be monitored through CBFO oversight. Discussion about ICE metrics, ICE council and QA oversight.

EA Work Control Assessment (This assessment has completed factual accuracy, but has not been formally transmitted to CBFO and therefore is not entered in ICE at this time)

**OFI-CBFO-01: Lack of integrated oversight and updated status for what is completed.
OFI-CBFO-02: No training for new Employee Concerns Program manager.

CBFO CARs
CAR 17-01, Issued October 27, 2016: Identified during ISMS effectiveness review: CBFO does not have a LL champion or coordinator as identified in CBFO procedure.

Status: Assigned to T. Schrader with CAP due 11/30/16

**CAR 17-02, Issued October 27, 2016, Identified during ISMS effectiveness review: FRAM does not reflect changes in the delegations of authority as identified in the CBFO organization chart dated 8/7/16.

Status: Assigned to S. Dunagan with CAP due 11/30/16

**CAR 17-03, Issued October 27, 2016, Identified during ISMS effectiveness review: Mgmt Assessments not being completed.

Status: Assigned to S. Dunagan with CAP due 11/30/16

CAR 16-072, Issued September 29, 2016, Identified during CBFO Audit: Minor noncompliances with CBFO procedure process.
Status: Assigned to B. Mackie with CAP due 10/31/16, extended to 11/30

CAR 16-073, Issued September 29, 2016, Identified during CBFO Audit: CBFO record document errors.

Status: Assigned to B. Mackie with CAP due 10/31/16, extended to 11/30

CAR 16-074, Issued September 29, 2016, Identified during CBFO Audit: Inconsistent document approval and posting noncompliances.
Status: Assigned to B. Mackie with CAP due 10/31/16, extended to 11/30

CAR-14-053, Issued 7/15/14. Identified issues with CBFO selection of Quality Levels in alignment with work breakdown structures

Status: Actions are complete with the exception of completion of QLD datasheets which went delinquent as of 8/19/16

15-044: CBFO QA, corrective actions are overdue to establish a training program and associated procedure.

CAR 16-067, CAR16-068, CAR 16-069, and CAR 16-070: CAP response received by QA on 10/27/16 and being evaluated by QA

CAR 16-071, CAP due 10/21/16 by AM OWIPP that has yet to be received as of November 23.

CAR 15-06: NWP cap is the oldest CAR and is over 700 days old.

Status: CBFO rejected the initial closure documentation as being incomplete with a new submittal date of January 20, 2017.

A number of items on the list above have been identified and corrective actions are in progress. The items identified with a double asterisk are considered to be items that should either be corrected or have compensatory measures identified and implemented by the CBFO Contact Handled Waste Emplacement Startup Oversight Plan. Specifically, CBFO needs to establish expectations and tracking to ensure progress towards full TQP qualification, address self-assessment programmatic deficiencies (priority on FR and SSO self-assessments), and add specificity to the Startup Oversight Plan for issues management monitoring and specific SSO system oversight during waste emplacement. These self-identified issues are listed below in the issues section. The QA program elements directly supporting oversight have been defined and independent/external oversight have identified programmatic weaknesses that need to be mitigated to support safe waste emplacement operations.

6. **DOE-CBFO's corrective action program requires corrective actions be evaluated to ensure that the causes of findings are addressed, specific actions are tracked to closure, and a sampling of corrective actions are verified to be implemented. (DOE Order 414.1D)**

The CBFO Issue Collection and Evaluation (ICE) database has been established and is used in accordance with CBFO MP 10.9. The procedure is written to address both contractor and internal CBFO issues and contains multiple approvals and handling depending upon the significance of the issue and the decisions made by the identified Issue Manager. To support concurrence, the Issue Manager can add clarifications or additional information, release or reassign the issue, concur with the issue, or dismiss the issue with a statement of justification. Upon concurrence with the issue, the Issue Manager assigns actions and assigns an approver. The process also describes the link between ICE and the Corrective Action Report (CAR) process that is managed between operations and QA. If an issue is deemed to be programmatic or CBFO needs to formally approve the resulting corrective action plan, a CAR may be used. The ICE process also provides for the interface with the contractor issues management system and CBFO originator closure verification of completed corrective actions. The current process is generally effective at managing issues from initiation through transfer to the contractor and CBFO staff are identifying a healthy volume of issues with 633 issues identified in the first year and a half of ICE operation. Of the 633 issues identified 29 are submitted awaiting issue manager action, 264 are approved and in process, 1 is pending approval (system indicates approver of record is the former OWIPP AM), 12 were dismissed, 13 were deleted and the rest have been closed. Although manual, the process for sharing contractor ICE issues with the contractor is working and the issues are promptly screened by the contractor issues management process. The ICE system does not provide a ready method to identify the difference between CBFO internal issues and contractor issues. Each issue has to be evaluated to determine to whom it was assigned and the ICE searching functions are not robust. Current metrics evaluated by the ICE council are limited to the overall volume of issues being identified and the volume of issues closed with some additional functional area evaluation. This ICE data reinforces the NNSA issue that challenges the ability of the contractor process to close items as quickly as items are being identified. Interviews identified that designation of the significance of ICE issues between "Major, Normal and Minor" has been a challenge. This challenge is highlighted by the fact that 10 of the 29 issues currently in "submitted" status were designated as "Major" by the originator, but has not been dispositioned by the issue manager yet. This failure to act on issues deemed important by originators has significant negative impacts on culture, inhibits future identification of issues, and does not meet CBFO procedure requirements to ensure timely disposition of issues (**DOE.2-POST-4).** The oldest of these 10 "Major" issues was originated on April 12, 2016 and DOE ORR review of the 10 items indicate that actions are in progress to mitigate some of the issues, but the ICE report has not been documented to reference or describe the actions. In addition, to taking action on the population of "submitted" issues, CBFO should also consider revising the issues management procedure to clarify how CBFO internal issues are processed versus issues identified against the contractor and efforts to improve staff understanding of issue significance designations should be pursued to foster consistent designation of issues. CBFO has defined a process that ensures that the causes of findings are addressed, specific actions are tracked to closure, and a sampling of corrective actions

are verified to be implemented, however improvement is needed to support consistent, effective implementation.

7. Corrective Action Plans associated with AIB JONs assigned to NWP and CBFO were evaluated, verified to be closed and appropriately documented by CBFO.

Following the salt haul truck fire and the radiological release events of 2014 accident investigation boards conducted two subsequent investigations. These investigations resulted in three CAPs and Justifications of Need (JONs) for NWP, CBFO, and DOE HQ. NWP had a total of 143 AIB JON actions from the three associated CAPs and CBFO had 98 AIB JON actions from the three associated CAPs.

NWP has reported closing all of their AIB JONs. A review of a sample of NWP AIB JON closure packages found the packages to be complete and included a description of the JON, a description of the action, a description of the required objective evidence, objective evidence, and a form documenting CBFO's review of NWP's objective evidence which included a CBFO technical review in some instances as well as the CBFO corrective actions manager approval signature. Based on the closure packages reviewed, it was determined the NWP CAPs associated with AIB JONs were evaluated, verified to be closed by CBFO, and appropriately documented. CBFO accepted closure of all but 2 of the 143 NWP AIB JON actions and identified those two remaining items as post-starts. These actions are JON 1.4 which requires design and installation of a new PA system and JON 23.6 which requires NWP to complete an effectiveness review of the CAS program. The PA system is not funded and will have to wait for the funding to become available, although the PA system upgrade was noted as having high priority on CBFO's Integrated Project List. The CAS assessment was completed during the CORR for Waste Emplacement. CBFO questioned NWP as to whether the review met all of the procedural requirements in NWP's QA program for an effectiveness review. That issue is in the process of being resolved. Both of these items are being informally tracked by NWP using an ad-hoc table. Effectiveness of the actions for the NWP AIB JONs has not yet been assessed. An effectiveness review of NWP AIB JONs is to be completed by CBFO within 6-12 months following the closure of all actions, CBFO has not scheduled the assessment identified in upcoming assessment activities, i.e. the IEP, however a draft assessment plan has been prepared. Although effectiveness for each AIB JON action was not assessed during the course of this review, there was evidence to suggest that corrective actions in some cases were ineffective. This is discussed in greater detail in the associated functional area (e.g. emergency management, radiological protection).

A review of a sample of CBFO AIB JON closure packages found the packages to be complete, except for documentation of headquarters acceptance, and included documentation such as a description of the JON, the JON action, the required objective evidence, a signature from a technical reviewer in select instances, and an acceptance signature from the CBFO corrective action manager. From the review of the closure packages it was not readily apparent how DOE HQ provides their

acceptance of CBFO AIB JONs. A follow-up discussion with the CBFO corrective action manager revealed that DOE HQ reviews the closure packages via access to an online share area and that acceptance and approval of closure packages is communicated via email, however that email documentation is not included as part of the closure package that is kept by CBFO. CBFO believes that all but 6 of their corrective actions are closed, but CBFO has received acceptance notification from HQ on only 66 out of their 98 JON actions. Since HQ approval is not included as part of CBFO closure package it is difficult to ascertain DOE HQ's acceptance of closure of CBFO JONs. Effectiveness of the actions for the CBFO AIB JONs has not yet been assessed and the CAP is unclear on how and when an effectiveness review will occur. The CAP simply states "Assessment teams will provide assessment reports to the CBFO Manager and the AIB appointing official documenting the effective implementation of the corrective actions". Although effectiveness for each AIB JON action was not assessed during the course of this review, there was evidence to suggest that some corrective actions were ineffective. This is discussed in greater detail in the associated functional area (e.g. nuclear safety).

A review completed by Department of Energy's Office of Operational Safety (EM 3.112) identified 7 open CBFO AIB JON actions (20.1, 24.5, 24.6, 33.4, 35.5, 35.6 and 11.2), two of which were not due yet (35.5 and 35.6). Only one of the remaining open CBFO items, JON action 33.4, is identified as a prestart to waste emplacement. JON action 33.4 calls for CBFO to complete a review of the NWP Conduct of Operations Matrix to ensure adequate flow-down of requirements. The Operations Form 1 evaluated elements of the Matrix and did identify the failure of CBFO to formally approve the matrix as an issue. The evaluation also included evidence of the CBFO review comments, and the only remaining issue appears to be the formal approval of the matrix by CBFO. Although it was requested, CBFO could not provide a schedule for closure of this item however, the due date was verbally communicated as December 8, 2016. JON action 11.2 is identified as a post start to waste emplacement and includes the action for EM TRU waste generator sites to conduct self-assessment of the adequacy of the flow down into the operating procedures and implementation of RCRA requirements contained in the WIPP Waste Acceptance Criteria and hazardous waste permits regarding the treatment and packaging of TRU waste. A schedule to closure for this item could not be provided but the corrective action manager identified that actions were complete and the package was in final closure review. JON actions 24.5 and 24.6 include actions to develop and revise qualification cards, as necessary, for CBFO personnel performing oversight of facility systems, operations, and safety management programs and then qualify personnel to the new qualification cards. CBFO has identified these items as post start items. JON action 20.1 has been rejected for closure by EM-HQ. JON action 20.1 required formal disposition of the need for an underground fire suppression system. The approach for JON action 20.1 indicated it would be covered under a Baseline Needs Assessment of JON 19 action 1. This was not done and submittal of the exemption request is currently being revised to support approval. HQ will not consider the action closed until the exemption updated by WIPP and

approved. The existing open items for CBFO and NWP are being adequately tracked and managed to support safe start-up of waste emplacement operations.

8. Corrective action plans associated with AIB JONs assigned to DOE HQ have been evaluated verified to be closed and appropriately documented.

A review of the three CAPs that contained the AIB JONs for HQ found that HQ was responsible for 67 JON actions. A recent review of HQ JONs completed by Department of Energy's Office of Operational Safety (EM 3.112) identified 38 JON actions remained open and of that 38 only 4 were not due yet, with the remaining items being "overdue and status unknown" or "overdue-contingent". Discussions with EM-HQ and action assignees indicates most of the issues are not being tracked in CA Hub, which is the system established by DOE-HQ to track and manage corrective actions. Based on these numbers it appears that DOE HQ has only completed about half of their assigned AIB JON actions with the remaining half being overdue by more than a year in most cases. (**DOE.2-POST-5)** A sample of closed HQ AIB JONs was reviewed. Objective closure evidence was provided to the team but it was not provided in closure package format which would typically include a description of the JON, a description of the required objective evidence, the objective evidence, formal signoff as complete from the issue owner, and documentation of acceptance as closed. As a result of the lack of rigor in maintaining formal closure packages it is difficult to conclude that corrective action plans associated with AIB JONs assigned to DOE HQ have been evaluated, verified to be closed, and appropriately documented. Although effectiveness was not assessed during the course of the DORR, there was evidence to suggest that corrective actions that were completed were ineffective. For example, JON 27 included actions to establish and implement a corrective action procedure and process and evaluate the process for effectiveness. These actions were completed, but the management assessment, conducted by the Office of Standards and Quality Assurance found that the process was not effectively implemented; however additional actions have not been defined or completed to address the issues identified. The review team also evaluated the remaining open DOE-HQ actions and the only action that may affect waste emplacement operations is JON action 11-1.1 from the Radiological Release Phase 1 CAP which requires an independent assessment to evaluate the CBFO safety basis review and approval process. Discussions with the action owner identified that the visit was completed, but an assessment was not written because it turned into an assist activity. Based upon the other CBFO implementation weaknesses, the review team recommends CBFO request an independent assessment of the implementation of the CBFO safety basis review and approval process to support long term effectiveness. (**DOE.2 Recommendation 3**). The remaining actions will foster ongoing maturation of CBFO, but do not appear to directly affect safe waste emplacement operations.

CONCLUSION

CBFO has defined adequate processes to perform oversight of occurrence reporting, facility operations, and processing of resulting performance evaluations and issues to support safe facility operations. Staff turnover and qualification activities have impacted the overall level of oversight, although completed oversight products are adequate. Implementation of oversight processes are inconsistent and immature resulting in issues with approval of surveillances/evaluations, formal approval of ORPS reports, management of DOE commitments, and managing of issues through the ICE database process.

A review of the AIB JON corrective action plans was completed to ensure actions were tracked, documented closed, and adequately verified. For NWP and CBFO, the processes used to track and close AIB JON actions was adequate resulting in an overall package for each JON, although the overall effectiveness reviews have not been scheduled as of this review since they are intended to occur 6-12 months after completion of the last action. The EM-HQ AIB JON actions were found to be less formally tracked with individual objective evidence products provided, but no closure packages that provide any necessary supporting information or references to provide context regarding the basis for closure.

Resolution of the self-identified issues listed above in Criteria 5, as well as lack of a CBFO commitment tracking system (including safety commitments) and delays in processing formal surveillances and evaluations (monthly, quarterly) identified in Criteria 3 and 4 above are necessary to implement effective CBFO oversight. The oversight performed is adequately documented and the processes are adequate once implemented. Based upon these factors the overall DOE.2 objective is partially met.

Issues

DOE.2-POST-1: Facility Representatives are not formally reviewing and approving final Occurrence Reporting and Processing System (ORPS) reports for SC-2 and above in the timeframe specified in DOE Order 232.2.

DOE.2-POST-2: CBFO implementation of the Issues Collection and Evaluation (ICE) surveillance process does not result in communicating formal oversight results and issues to the contractor in a timely manner.

DOE.2-POST-3: CBFO has failed to ensure key safety program commitments are tracked and deliberately dispositioned.

DOE.2-POST-4: CBFO has failed to implement ICE issues process for consistently managing issues to ensure timely disposition.

DOE.2-POST-5: DOE-HQ has failed to complete many Accident Investigation Board Judgments of Need corrective actions to support WIPP operations.

DOE.2 Recommendation 1: CBFO should consider supplemental oversight and a plan for filling the Mine Operations SSO and transition of the Mine Recovery Team to a steady-state condition to allow for focus on both ongoing ground control and waste emplacement.

DOE.2 Recommendation 2: CBFO should plan a Ground Control assessment and DSA/TSR assessment so support waste emplacement operations.

DOE.2 Recommendation 3: CBFO should request an independent assessment of the implementation of the CBFO safety basis review and approval process to support long term effectiveness.

Evaluated by:	**Approved by:**
/s/ Mat Irwin, Team Member /s/ Vanessa Turner, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Review Form 1

Functional Area:	Objective:	Objective Met	
Emergency Management	EM.1	Yes [ ]	No [X]

OBJECTIVE

EM.1: NWP has established and implemented an Emergency Management program to ensure the ability to protect the workers, the public and the environment in the event of an operational emergency at the Waste Isolation Pilot Plant (WIPP). The Emergency Management program includes the development of planning documents, implementing procedures and an emergency drill and exercise program with associated program records. Sufficient numbers of qualified personnel, as well as adequate facilities and equipment, are available to support emergency operations. (Core Requirements 1, 2, 4, 5, 10, 14, and 15)

CRITERIA

1. The hazards survey, hazard assessment, emergency action levels, and the facility emergency plan has been established, approved, implemented and flowed down to the appropriate levels through plans, procedures, and other technical guidance. DSA Key Elements 15-1 and 15-2 are effectively implemented.
2. Sufficient numbers of drills/exercises are performed and documented. The drills performed are representative of the types of emergency events identified by the hazards survey and hazard assessment process. Drills/exercises are sufficient in their planning and demonstrate the ability to respond to actual emergencies. DSA Key Elements 15-4 is effectively implemented.
3. There is a system for documenting findings and lessons learned, assigning responsibility, and tracking issue resolution associated with upset and emergency drills.
4. Operations support, and emergency response personnel have been adequately trained, and can identify and respond appropriately and effectively to emergency conditions. DSA Key Elements 15-3 is effectively implemented.
5. Adequate facilities, equipment, and supplies are available to support emergency response, including the capability to notify employees of an emergency. DSA Key Elements 15-3 is effectively implemented.
6. A sufficient number of qualified personnel are available to perform emergency management activities. Emergency management personnel demonstrate an acceptable level of knowledge of to effectively support the WIPP project. Emergency management personnel exhibit an awareness of, and commitment to, public and worker safety, health and environmental protection requirements.

7. Functions, assignments, responsibilities, and reporting relationships are clearly defined, understood, effectively implemented, and enable adequate execution of the emergency management program.
8. The emergency management program was adequately evaluated by the CORR

APPROACH

Record Review:

- Review the WIPP Emergency Plan, EPHA and EALs for completeness and adequacy. Review the drill/exercise records that describe the routine drills/exercises that have been conducted for this operation. Determine if the drill scenarios were adequate and if a reasonable number and type of drills have been conducted to adequately test personnel, procedures, and equipment. Review the lessons learned, corrective action plans and closure documents, or other critical outputs of the drill/exercise program. Review sampling of emergency personnel training records to demonstrate initial and refresher training.

Interviews:

- Interview personnel responsible for the managing the emergency management program and determine their level of knowledge of the program and DOE expectations. Interview personnel responsible for the development and conduct of emergency drills/exercises to evaluate their understanding of the purpose and their ability to execute the drill/exercise program. Interview project personnel for understanding of emergency procedures and expected response actions.

Shift Performance:

- Attend and assess drill preparations, pre-briefs, conduct, and critiques (as applicable). Observe emergency drills/exercises sufficiently to determine the capability and effectiveness of emergency response systems, equipment and personnel to respond to an emergency. Determine if the operational drills test operators and operations support personnel with realistic and challenging scenarios. Perform a walk-down of emergency response equipment to ensure adequate quantities, storage, and provisions for maintenance.

Records Reviewed

- WIPP Form WF16-1984
- WIPP Form WF16-1069
- WIPP Form WF16-1755
- WIPP Form WF16-1794
- MP 1.41, Issue Management WIPP FORM
- WP 15-GM 1002, Issue Management Processing of WIPP FORM
- WP 12-9, *WIPP Emergency Management Plan, Rev. 43*
- WP 12-10, *WIPP Incident/Accident Response Team Plan, Rev. 2*
- DOE/WIPP 08-3378. *WIPP Emergency Planning Hazard Analysis, Rev. 5*
- WP 12-RP.01, *Emergency Planning Hazards Survey*

- WP 12-11, *Development and Maintenance of an Emergency Planning Hazards Survey, Rev. 6*
- WP 12-12, *Development and Maintenance of an Emergency Planning Hazard Analysis, Rev. 7*
- WP 12-13, *Development and Maintenance of Emergency Action Levels, Rev .6*
- WP 12-15, *WIPP Emergency Management Communications Plan, Rev. 1*
- WP 12-17, *WIPP Emergency Management Training Program, Rev. 3*
- MP 1.48, *Emergency Management Program, Rev. 3*
- MP 1.55, *Underground Firefighting, Rev. 0*
- *WIPP RCRA Contingency Plan, Rev. 2*
- WP 04-EM4200, *Radiological Monitoring System Alarm Response, Rev. 32*
- WP 12-ER.12, *WIPP Abnormal Condition Drill Program, Rev. 1*
- WP 12-ER.13, *Drills and Exercises, Rev. 2*
- WP 12-ER.25, *Underground Escape and Evacuation Plan, Rev. 1*
- WP 12-ER.30, *WIPP Evacuation Plan, Rev. 0*
- WP 12-ER.01, *WIPP Mine Rescue Program Plan, Rev. 7*
- WP 12-ER3002, *Emergency Operations Center Activation and Operations, Rev. 27*
- WP 12-ER3003, *Functional Checks of EOC Equipment, Rev. 8*
- WP 12-ER3906, *Categorization and Classification, Rev. 19*
- WP 12-ER3907, *Operational Emergency Notifications, Rev. 1*
- WP 12-ER4911, *Underground Fire Response, Rev. 23*
- WP 12-ER4916, *Consequence Assessment, Rev. 23*
- WP 12-ER4920, *RCRA Contingency Plan Implementation*
- WP 12-ER4922, *Incident Command System, Rev. 2*
- WP 12-ER4923, *Emergency Operations Center Personnel Selection and*
- *Qualification, Rev. 2*
- WP 12-ER4925, *CMR Incident Recognition and Initial Response, Rev. 6*
- WP 12-ER4926, *CMR Expanded Staffing Operations, Rev. 5*
- WP 12-ER 4931, *Underground Emergency Response Procedure, Rev. 0*
- WP 12-FP.23, *WIPP Baseline Needs Assessment, Rev. 0*
- WP 12-FP3005, *WIPP Fire Department Staffing, Rev. 0*
- *Staffing Report: October 15 - November 15, 2016, Day/Night Shifts*
- WP 12-FP.04, *WIPP Fire Department Training Plan, Rev. 2*
- WP 05-WH4401, *Waste Handling Operator Event Response, Rev. 3*
- EA12ER3003-2-0, *Site Emergency Operations Center Equipment Operability*
- *Checklist, Rev. 1*
- EM-101, *Emergency Response Organization Overview Refresher, Rev. 0*
- *Emergency Management and Security Department Staffing Plan and Roles and*
- *Responsibilities, 9/21/2016*
- WIPP EX-2016-04, *CY2016 Full Scale Exercise DORR-16 Plan*
- CMT-01, *Emergency Management Crisis/Deputy Crisis Manager Qualification Card, Rev. 1*
- FF-01, *WIPP Fire Department Firefighter (EST) Qualification Card, Rev. 0*

- CMT-14, *ERO Consequence Assessment Team Authorization Signature Record, Rev. 0*
- FO-FOSE-3, *WIPP Operations Facility Operations Shift Engineer Qualification Card Signature Record (RCRA Related Qualification), Rev. 3*
- CMT-08, *EOC Planning Section Chief Authorization Signature Record, Rev. 0*
- *EM-101 Exam Answer Sheets*
- *JIC-100 Attend Sheet, Exam Answer Sheets*
- *NWP Performance Indicators, October FY 2017*
- MP-1.37, *Chelation Policy, Rev. 6*
- WP-12-ER.09, *WIPP Fire Department Patient Management, Transport, and Documentation Guide*,
- Nurse Protocol, *Internal Contamination with Plutonium, Americium or Curium-Chelation Therapy, 02/19/2016*
- *NWP Annual Integrated Assessment Schedule- FY-2017/1st Quarter FY-2018*
- *Emergency Management and Security Department Organization* Chart
- LSPT-2015-1A, *Limited-Scope Performance Test, 11/03-04/2015*
- *Drill/Abnormal Conditions Drills/Exercise List FY 2016*
- DR-2015-49, Drill AAR, WIPP Site Evacuation 05/13/2015
- DR-2015-107, Drill AAR, SWB 12/14/2015

Interviews Conducted

- Emergency Management and Security Department Manager
- Fire Department Chief
- Deputy Fire Chief
- Emergency Management Manager
- Readiness and Mission Support Manager
- Chief of Fire Training/Prevention
- Senior Emergency Planner
- Senior Exercise Planner
- Exercise Planner
- Facility Shift Managers (3)
- Environmental, Safety and Health Manger

Shift Performances Observed

- Full Scale Exercise DORR-16, 11/18/2016
- 11/19/2016 Staffing for FD

Discussion of Results

1. **The hazards survey, hazard assessment, emergency action levels, and the facility emergency plan has been established, approved, implemented and flowed down to the appropriate levels through plans, procedures, and other technical guidance. DSA Key Elements 15-1 and 15-2 are effectively implemented.**

DOE Order 151.1C requires that emergency management efforts begin with the identification and qualitative assessment of the facility/site specific hazards and the associated emergency conditions that may require response, and that the scope and extent of emergency planning/preparedness at the facility/site reflect those specific hazards. At the WIPP site, hazards are identified and analyzed through a technical planning basis program which provides protective actions and protective action recommendations. The documents that are fundamental to this program include WP 12-RP.01, *Emergency Planning Hazard Survey*, *Emergency Planning Hazard Analysis* (08-3378), and WP 12-ER3906, *Categorization and Classification*. These documents were developed following the general approach identified in DOE Guide 151.1-2, *Technical Planning Basis.* Procedures have been developed to maintain the technical base documents.

The *WIPP Emergency Planning Hazard Survey* (EPHS) WP 12-RP.01 does a good job identifying the site hazards that are forward to the EPHA by using appropriate screening thresholds. The EPHS identifies the chemical and radiological hazards located at the WIPP site, and provides a qualitative assessment of the potential emergency conditions that could be realized at the WIPP Site. The EPHS is maintained by following WP 12-11, *Development and Maintenance of an Emergency Planning Hazards Survey*, Rev 6. Through interviews it was determined that there is no formalized process other than the three year review, for Emergency Management to be notified when new hazards may have arrived on site (esp. Chemical). **(EM.1-OFI-1)**

Revision 5 of the WIPP Emergency Planning Hazards Assessment (EPHA), DOE/WIPP-08-3378 has been approved by DOE-CBFO. This document is intended to provide an emergency technical planning basis compliant with the requirements of DOE O 151.1C. The EPHA was developed and is maintained by WP 12-12. After a technical assist review of the HS and EPHA by Enterprise Assessment in April, 2016 the EPHA was altered to be more in-line with the Safety Basis Documents. During this evaluation EM-3.114, EA and NA-40 collaborated to provide guidance regarding the use of airborne release fraction (ARF)/release fractions (RF) found in the Documented Safety Analysis (DSA) in the EPHA. Of question was the use of a less conservative median values than the RF bounding values in the DSA. While DOE G 151.1-2 allows the use of the median ARF/RF values presented in DOE-HDBK-3010-94, the EPHA should document the rational for the decision. EA recommended the use of the DSA standards for MAR and ARF/RF products used within the EPHA. NWP incorporated the statistical methodology used in revision 5 of the DSA reducing the container MAR values from the Waste Acceptance Criteria maximums to include 95^{th} percentile and average values for scenarios involving multiple containers. Also the DSA ARF/RF was used in the consequence calculations. The EPHA has also expanded the number of scenarios from 16 to 46 based on the accident set in revision 5 of the DSA.

Emergency Action Levels (EALs), Protective Actions and Recommended Protective Actions are found in WP 12-ER3906, *Categorization and Classification*, Rev 19. This procedure provides guidance to the Facility Shift Manger (FSM), Crisis Manager (CM) or designee on how to Categorize and Classify incidents that occur at the WIPP in accordance with DOE O 151.1C. This procedure also provides immediate actions to be taken, such as protective actions, activating the EOC, making notifications and activating other emergency response organizations. The Emergency Action Levels listed in this document are basically for the Underground and the Waste Handling Building. DOE G 151.1-2 Technical Planning Basis states that the EALs should be facility based therefore, for the EALs to be more compliant with DOE guidance WIPP should consider including the other surface facilities, even though they may only include OENRC categorization, in the EALs. Discretionary EALs are also provided in WP 12-ER3906 to make the EAL list more all-encompassing.

The WP 12-9, *WIPP Emergency Management Plan*, has been recently approved by CBFO. The plan forms the basis of the program commensurate with the identified hazards at the WIPP site, and provides guidance and requirements for emergency planning, preparedness response, readiness assurance and recovery. The plan also provides a good structure for the program to integrate with local agencies. Implementing procedures have been adequately developed to fully implement the site plan. However, during the review of MP 1.37, Rev. 5 *Chelation Policy*, and WP 12-ER.09, *WIPP Fire Department Patient Management, Transport, and Documentation Guide*, it was identified that WP 12-ER.09 could be improved by incorporating the after-hours protocols for chelation, to include notification and coordination with Environmental, Safety, and Health Management and Health Services and their appropriate Occupational Medical Director **(EM.1-OFI-2)**. NWP quickly created WIPP form WF16-1984 to address the concern of quickly administering a chelation agent when needed during the off hours.

While there are identified opportunities for improvement, the basis for a compliant comprehensive Emergency Management program is in place at WIPP. It should be noted, due to the overhaul of the Emergency Management program since the u/g fire and radiological release; it will take time before the employees gain full proficiency in the implementation of this program.

This criterion is Met.

2. **Sufficient numbers of drills/exercises are performed and documented. The drills performed are representative of the types of emergency events identified by the hazards survey and hazard assessment process. Drills/exercises are sufficient in their planning and demonstrate the ability to respond to actual emergencies. DSA Key Elements 15-4 is effectively implemented.**

DOE Order 151.1C differentiates drills and exercises by their primary purpose. A drill is oriented toward training and is not a graded evaluation of the response activity. An exercise is evaluated to test and grade response activities. The WIPP

drill and exercise program is implemented via WP 12-ER.13, Rev. 1, *WIPP Drills and Exercises.* This procedure was evaluated and provides a good base for the drill and exercise program. A list of completed drills and exercises were reviewed for 2016 which included a wide variety of scenarios and scope. During 2016 the site drill and exercise program conducted 89 drills and exercises. This included 4 exercises which were observed by the DORR.

An operational drill program (abnormal conditions) has been developed to better train and evaluates operational personnel during abnormal conditions. The current owner of the program is the EM department; however, transfer of ownership and leadership to the Operations Department is in progress. The implementing document WP 12-ER.12, Rev. 1, *WIPP Abnormal Condition Drill Program,* provides the direction of the program. It was noted during interviews and the observations during controller/evaluation briefings and critiques that the program does not allow for a graded evaluation format. This was also noted in the CORR and a WIPP form WF16-1676 was submitted. This program is going through transition and is a fairly new program. However, it should be a win-win situation for both operations and emergency management. With the process knowledge of the operations personnel and the mentoring of the emergency management personnel on how to prepare and conduct drills/exercises this should improve the training and proficiency of the operational response personnel.

As stated earlier the DORR observed 4 exercises demonstrated by the WIPP site. The exercises included varying degrees of complexity with noticeable improvements observed in various areas. DORR team members attended the controller/evaluator briefings and exercises critiques for all 4 exercises. The controller/evaluator briefings were very well conducted covering the exercise plan, master scenario events list, messages, controller/evaluator/observer responsibilities and safety. The player "hot wash" were sometimes self-critical but not always. The evaluator post-exercise meetings were much more critical however the team identified that the evaluation criterion may need to be updated. Also, it was noticed that some of the new evaluators really did not know when the objective was met or not met. This was also noted in the CORR.

Below is a quick overview of the exercises which were observed on June 22, August 25, October 8 and November 18, 2016.

<u>BISON-16 June 22, 2016</u>
Bison-16 was a full participation exercise including offsite organizations. The exercise scenario involved future operating conditions for the initiating event. The initiating event in the underground initially leads to an evacuation of the underground. After conditions degrade, the site is evacuated. Radioactive contamination, several injuries and reentry to the underground are included as a consequence of the scenario. Participation at the site included the underground response teams, central monitoring room (CMR) staff, the emergency response organization, the IC, and site response elements (fire, medical, mine rescue teams

(MRT), radiological control (RadCon) and security). The EOC and the JIC ERO located in the Skeen-Whitlock Building (SWB) in Carlsbad also participated. Offsite participation included DOE-HQ, New Mexico State organizations, local county EOCs (Eddy and Lea), Carlsbad Fire Department, Hobbs Fire Department, Carlsbad Medical Center, Native Air Methods, and the Mine Safety and Health Administration (MSHA).

The evaluation found three deficiencies and eight weaknesses as defined in DOE Guide 151.1-3. Several improvement items were observed as well as one superior performance. Exercise objectives were not all successfully completed. Issues included evacuation of the underground, use of procedures, radiological control, and habitability of both the underground and the incident command (IC).

BISON-2 August 25, 2016

FY2016, Functional Exercise, "Bison 2" was conducted to demonstrate specific response capabilities identified as significant findings during the WIPP Annual Full Scale exercise conducted on June 22, 2016 (Bison). The exercise scope was therefore limited to specific site venues including the underground (UG), the central monitoring room (CMR), incident command post (ICP), and forward operations. Specific objectives to be re-demonstrated included evacuation and accountability of the UG, CMR operations, command and control of the CMR and incident command, communications between the CMR, incident command and response entities, and radiological control protection, as well as exercise planning, control and evaluation.

Issue included evacuation of the underground, use of procedures, radiological control, lack of command and control of u/g and at the hoist, problems with the Communicator NXT activating the EOC and PA voice paging at the waste collar was not clear.

BISON-3 October 8, 2016

As part of contractor preparations to resume operations at WIPP, the WIPP contractor conducted Bison-3 emergency exercise on October 8, 2016. Bison-3 exercise was developed as part of the Contractor Operational Readiness Review (CORR). The focus of Bison-3 exercise included the following:

- Underground Evacuation in response to a fire
- Radiological Control (Surveys, Boundaries, Coordination)
- CMR Operations (i.e., categorization and classification, notifications, PA decision making)
- FD Response, IC, and EOC coordination.

Although the scenario for this exercise was considered fairly easy, this included evacuation of the mine due to incipient fire with two minor injuries and some contamination on evacuees. Specific issues from the Bison-1, Bison-2 exercises were given the opportunity to be addressed in Bison 3 including: UG evacuation, accountability, CMR conduct of operations principals, radiological control,

radiological surveys and monitoring, and the planning and conduct of the exercise. While the exercise demonstrated progress in the coordination of the CMR, IC and EOC; improvement is still needed in the coordination and prioritization of personnel during an emergency evacuation of the u/g and radiological control.

DORR-16 November 18, 2016

On November 18, 2016 the DORR staff evaluated the full scale exercise at the WIPP site. The DORR-16 Exercise scenario was very demanding resulting in multiple challenges for the response personnel to mitigate. The exercise also allowed a re-demonstration of specific response capabilities that were identified as significant findings during the WIPP Bison 1-3 Exercises. The exercise was initiated with a roof fall in panel 7 which initiated a vehicle accident resulting in a large pool fire, a release and injured personnel. U/G, Fire Services, CMR, ICP, Site personnel, EOC, MRT and JIC were activated for this exercise.

Overall, the DORR staff concluded that there were improvements shown in some of the critical areas (Command and control within the Underground and the Underground Evacuation) but not all of the expectations of DOE Order 151.1C were met for the exercise. Most of the issues described below were also identified by the contractor exercise evaluators and will be tracked in their corrective action system. The exercise was considered adequate and therefore deemed satisfactory with opportunities for improvement. The main exercise issues which were included:

- Radiological Control
- Individuals identified not having their "brass" on their person while in the underground and leaving the evacuation point to retrieve it.
- Could not activate EOC (possible problems with the Communicator-NXT operations or phone lines)
- Consequence Assessment in the EOC could not generate a plume model in a timely manner
- Personnel removing SR to communicate and leaving them out
- MRT did not have enough members to staff a MRT

WIPP has demonstrated that a sufficient numbers of drills/exercises are performed and are well documented. The drills that were performed are a representative of the types of emergency events identified by the hazards survey and hazard assessment process. WIPP has done a good job in their planning and conduct of the drills/exercises but due to the performances during the listed exercises they have not demonstrated the ability to fully respond to an actual emergency.

During the observations of the four exercises the Radiological Control group stands out as not meeting expected performance during all four of the exercises. Also, Consequence Assessment in the EOC had problems during two of the exercises. **(SEE RP.1-PRE-1)**

This criterion is Met.

3. There is a system for documenting findings and lessons learned, assigning responsibility, and tracking issue resolution associated with upset and emergency drills.

NWP has established the WIPP Form Issues Management process to document, evaluate, and track corrective actions to noted issues, deficiencies, Conditions Adverse to Quality, and process improvements. It is the policy of NWP management that the WIPP Form be used for the identification of issues that may require correction, improvement, or management attention. The scope of the program is open and includes issues of both high and low significance including not only those types of incidents that require reporting through the Occurrence Reporting and Processing System or the Noncompliance Tracking System, but also process improvements and issues that have not been corrected through procedure changes, design changes or other established processes. Assessment findings, whether independent assessments, management assessments, or self-assessments, use the WIPP Form process to formally track the resolution of those findings. Safety issues are also identified and tracked through the WIPP Form process.

After identification of an issue, the WIPP Form Screening Committee will review WIPP Form(s) to ensure that the issue has been assigned to the appropriate manager(s) for resolution, that the proposed corrective actions appropriately address the issue, and that closure documentation provides objective evidence that the corrective actions have been completed. A final review will be conducted by Quality Assurance for trending such that any adverse trends are analyzed for feedback and improvement.

This criterion is Met.

4. Operations support, and emergency response personnel have been adequately trained, and can identify and respond appropriately and effectively to emergency conditions. DSA Key Elements 15-3 is effectively implemented.

DOE O 151.1C requires that a coordinated program of training and drills for developing and/or maintaining specific emergency response capabilities must be an integral part of the emergency management program. The program must apply to emergency response personnel and organizations that the site/facility expects to respond to onsite emergencies. Bothe initial training and annual refresher training must be provided for the instruction of and demonstration of proficiency by all personnel (i.e., primary and alternate) comprising the emergency response organizations.

The ERO training program is implemented by WP 12-17, *Emergency Management Training Program*. The WIPP EM has established the following goals:

- Provide training to support WIPP ERO needs

- Provide, through Initial and Refresher General Employee Training general instructions for all WIPP personnel on the proper response to emergencies and alarm signals
- Provide ERP personnel with basic knowledge of EM topics, fundamentals, and responsibilities
- Provide Controller/Evaluators with effective training that will enable them to adequately control and evaluate drills and exercises

ERO training instructors must meet the instructor qualification requirements identified in WP 14-TR.01 and WP 14-TR3305. Training is based on the tasks associated with the duties to be performed by emergency responders, the hazards that may be encountered by response personnel, and established requirements and standards for emergency responder training. A systematic process is used to identify and document performance-based training requirements for emergency responder positions. New training and revisions to existing training programs are based on comparing regulatory requirements and existing training programs and then developing training in accordance with WP 14-TR.01.

ERO personnel are expected to have a basic understanding of the overall organization and how DOE Order 151.1C is implemented at the WIPP Facility. These general training requirements are in addition to those specified for their normal job requirements. Radiological Control and IH personnel perform their normal job duties during response, so no specific ERO training is required. These personnel practice integration into response structure during drills and exercise**.** Many of the ERO positions utilize skills and knowledge from their every day job position during an emergency response. They have specific job training and qualifications as part of their normal job qualifications and are administered in accordance with WP 14 TR.01 using job specific qualification or authorization cards. During interviews it was noted that not all field personnel receive NIMS ICS instruction. DOE O 151.1C requires that the control of the event/incident scene must be consistent with NIMS ICS. ICS is not in the IH techs qualification cards. It should be noted that Radiological Control has just started training with the Fire Department which included training on contaminated patients and doffing contaminated fire gear. This should become a great benefit in field response in the future. The Facility Shift Manager training requirements are implemented through the FSM/FSE Qualification Card, FO-FOSE-3 which is mandated through the Operations group. The EM course requirements include:

- EM-100 ERO Overview Training
- EM-183, Categorization, Classification, and Emergency Notifications for OEs
- SAF-645, RCRA Emergency Coordinator
- NIMS training 100, 200, 700, 800

Training requirements for Protective Force are found in the *WIPP Safeguards and Security Protective Force Training Plan.* Training requirements for Fire Department

personnel, including the ERT, are found in WP 12 FP.04, *WIPP Fire Department Training Plan*.

During this assessment multiple qualification cards were evaluated for completeness and compliance with WP12-17, *Emergency Management Training Program*. All qualification cards evaluated were in compliance with the program requirements.

Refresher training is provided at a minimum annually to ERO personnel and is integrated into the drill and exercise program. Refresher training may be in the form of pre-drill presentations, drills or drill reviews, required reading, and formal or informal briefings or classroom training. However, every two years, ERO Refresher Training is conducted and requires selected ERO members to attend EM-101 (for EOC), or EM-105 (for ERO Personnel). Refresher Training is updated periodically to include lessons learned, deficiencies, drill and exercise issues, and procedure changes, as determined necessary.

This criterion is Met.

5. **Adequate facilities, equipment, and supplies are available to support emergency response, including the capability to notify employees of an emergency. DSA Key Elements 15-3 is effectively implemented.**

DOE Order 151.1C requires that facilities and equipment adequate to support emergency response must be available, operable, and maintained. At a minimum, facilities must include an adequate and viable command center. Equipment must include, but not be limited to, personnel protective equipment, detectors, and decontamination equipment. Also the contractor must provide facilities and equipment adequate to support emergency response, including the capability to notify employees of an emergency to facilitate the safe evacuation of employees from the work place, immediate work area, or both.

WIPP maintains a number of emergency facilities which are inspected and maintained in accordance with applicable procedures.

The Central Monitoring Room (CMR) manned 24/7 is located in Building 451 and is the coordination point for site activities and communications between the surface and underground facilities. The CMR contains instrumentation and equipment for reading underground and surface operations parameters, radiation monitors/alarms and has the capability to notify personnel and onsite/offsite responders of emergency situations. An alternate CMR is located in Building 458. Capabilities at the alternate location are limited but include landline telephones, mine pager phones and Central Monitoring System.

WIPP has a new EOC located at the Skeen-Whitlock Building in Carlsbad, NM. The EOC or alternate EOC located in building 452 are activated in accordance with WP 12-9, *WIPP Emergency Management Plan*. The EOC consists of various subject

matter experts who ensure an adequate level of support for the onsite response and recovery activities and provide the EOC with site-specific information relative to offsite interaction and strategic decision-making. There are three different staffing levels for the EOC which provide different levels of support based on the potential for or the severity of an incident. Equipment to support the EOC include multiple position workstations, Web EOC software for managing information, wall mounted monitors, and meteorological feeds. Both locations have hard copies of plans, procedures and reference material. Equipment testing is implemented by WP 12-ER3003, *Functional Checks of EOC Equipment,* Rev 8.

The Joint Information Center is located in Rooms T111 and T112 at the Skeen Whitlock Building. The fire station and medical facilities are located on site in building 452. A decontamination trailer is located at the WIPP site. Decontamination equipment available in the trailer includes hot/cold water, towels, soap, shampoo, modesty garments, gloves, etc.

Various types of emergency equipment is located at the WIPP site and is inspected and maintained by the Fire Department, Radiological Control Technicians, Industrial Hygienist, Mine Rescue Team members and emergency management staff

The fire department equipment includes two fully-equipped engines, a rescue unit, and an ambulance with capabilities to respond to onsite and offsite emergencies on the surface. Underground Fire Department equipment includes an ambulance, a fire suppression vehicle, and a rescue unit.

WP 12-9, *WIPP Emergency Management Plan*, identifies multiple communication/notification systems used by the WIPP to notify onsite populations and offsite authorities. The plan refers to WP 12-15, *WIPP Emergency Management Communications Plan*, for the description of the communications systems and equipment used for emergency situations. The plan identifies the following for site communications for day-to-day and emergency operations:

- Telephone System (Site-wide Private Branch Exchange (PBX))
- Cellular Telephone System
- Digital Pager System
- Public Address System (PAS)
- Communicator! NXT System
- Sentinel Underground Communication System

The communications plan identifies the Digital Pager System as a primary emergency notification system for the ERO as well as an alternate to the PBX system and the Public Address System as one of the primary systems used to notify personnel of emergency site and underground evacuations. The communications plan also states that both of these systems are legacy systems and that the manufactures no longer support replacement parts or equipment. Concerning the Digital Pager System the

WIPP EM currently does not have enough functioning pagers for all on-call positions, and new pagers are no longer available. The PAS has several areas of the surface site and underground that are not covered by the audio from the PAS. The problem with the PAS is also well documented in the CORR. Also, it also has been documented during the exercises and interviews there were problems with telephones in the CMR and that there were problems with the Communicator! NXT activating the EOC in two of the exercises observed. It should also be noted that the plan also states that the Cellular Telephone System may be unreliable.

The emergency plan recognizes an underground evacuation signal system that is not included in the communications plan. This system is separate from the PAS and includes electric horns and strobe lights. During Bison-3 and DORR-16 the strobe lights were not in operation. Reliability of this equipment has been well documented at the WIPP. During the CORR a prestart finding was written concerning the operability and testing of equipment (audible, visual) used for abnormal event communication/between workers (both above ground and underground) and CMR is less than adequate. This is contrary to the requirements of SMP KE 11-3 and the WIPP RCRA Contingency Plan Section 2.10. WIPP form WF16-1794 was generated with a corrective action plan developed including a compensatory measure that identifies "dead zones" and for personnel to carry radios before entering the areas. As indicated in the CORR, testing of these systems is still questionable due to the discovery of new dead zones identified by team members during this review. The continuation of problems identified with these important emergency notification systems and the approval to accept inadequate compensatory measures and allowing these compensatory measures to become an operational norm is a major concern. It is therefore requested that the issues with the emergency notification systems be resolved for near-term operations, and permanent equipment upgrades be planned and executed for long-term system reliability. Improvement is needed in the WIPP emergency notification system to support near-term operations; equipment upgrades are needed long-term for system reliability. **(EM.1-PRE-1)**

This criterion is not Met.

6. **A sufficient number of qualified personnel are available to perform emergency management activities. Emergency management personnel demonstrate an acceptable level of knowledge of to effectively support the WIPP project. Emergency management personnel exhibit an awareness of, and commitment to, public and worker safety, health and environmental protection requirements.**

DOE Guide 151.1-4 states that an ERO is a structured organization with overall responsibility for initial and ongoing emergency response to an Operational Emergency (OE) and for mitigation of the consequences. The ERO establishes effective control of response capabilities at the scene of an event/incident and integrates ERO activities with those of local agencies and organizations that provide onsite response services. *An adequate number of experienced and trained personnel,*

including designated alternates, should be available on demand for timely and effective performance of ERO functions.

The emergency management staff at WIPP encompasses personnel with a variety level of emergency management experience. This group has been observed to be very professional and dedicated in improving the emergency management program at the WIPP site. It should be noted that emergency management personnel do not have a documented qualification program however they are encouraged to participate in available emergency management classes offered through DOE and FEMA. During the ORR the *Emergency Management and Security Department Staffing Plan with Roles and Responsibilities* was reviewed. The emergency management staffing plan is sufficient in identifying the clear roles and responsibilities for the emergency management, security and fire department personnel. During the review of this document and during the interview process it was discovered that WIPP has many position vacancies listed in the plan. One position that is of concern is the lack of a Senior Hazards Analyst. The Emergency Management and Security Department Manager stated that they were trying to fill this position but was relying on corporate reach-back to meet the needs of this position at this time.

Performance indicators from November 2015 to November 2016 indicate that the EOC is staffed to at least a primary and an alternate person. In some of the positions the staffing does not meet the recommended 3 deep. WIPP is presently maintaining EOC positions 3 deep in 15 of the 17 positions.

A new WP 12-FP.23, *WIPP Baseline Needs Assessment* (BNA), has been approved by CBFO and became effective 10/03/2016. Per DOE Order 420.1C requires that a BNA be conducted to determine the minimum required capabilities of the site emergency response organization, including an assessment of effective response to extinguish fires; emergency medical response, hazardous materials response, technical rescue response; and staffing apparatus, facilities, equipment, training, pre-incidents plans, mutual aid and procedures. In the CBFO approved BNA it was concluded that the minimum staffing for the WIPP will be *seven personnel per shift* (two Company Officers and five Firefighters of a combination there of), all of which are trained to the EMT-Basic level at minimum; and NFPA 1001 is the applicable standard for professional firefighters. WP 12-FP3005, *WIPP Fire Department Staffing*, was reviewed and it was discovered that the procedure did not reflect the current minimum staffing requirements in the BNA **(EM.1-OFI-3)**. During this review the Fire Department staff worked quickly to provide an updated procedure but it has not gone through NWP's revision process at this time.

Also, it should be noted that WIPP Fire Department is currently having trouble meeting the minimum staffing especially on the off-shift and the weekend. A fire department staffing report from October 15-November15, 2016 was reviewed and minimum staffing on the
off-shift was only met 9 times out of 32 off-shift days. During the day shift it was not met four times during the same time frame. Interviews with management staff

indicated that there is no force overtime rule in-place. Therefore, personnel can turn down any overtime making it difficult to recall personnel to meet minimum staffing. This is also a concern in the staffing and recalling of radiological control personnel if needed during an off-shift radiological incident.

During interviews it was noted that an EMT or first responder is not present in the mine at all times when work is being conducted in the mine. According to 30 CFR § 57.18010, an individual capable of providing first aid shall be available on all shifts. The individual shall be currently trained and have the skills to perform patient assessment and artificial respiration; control bleeding; and treat shock, wounds, burns, and musculoskeletal injuries. The CFR also states first aid training shall be made available to all interested miners. Having an EMT or first responder on surface would not meet this intent. For every minute that passes between collapse and defibrillation, survival rates decrease 7% to 10% if no CPR is provided (Red Cross). The BNA does not discuss any minimum medical staffing for the underground. **(EM.1-PRE-2).**

During DORR-16 exercise, staffing level problems were also exposed. Security was asked to shut down the roads and security stated they did not have enough staff to release from the site to secure the roads. Additionally, the Mine Rescue Team stated they did not have enough personnel to man a team during the exercise.

This criterion is not Met.

7. Functions, assignments, responsibilities, and reporting relationships are clearly defined, understood, effectively implemented, and enable adequate execution of the emergency management program.

Functions, assignments, responsibilities, and reporting relationships are defined in multiple documents. The emergency management program's everyday roles and responsibilities are defined in WP-12-9, *WIPP Emergency Management Plan,* MP 1.48, *Emergency Management Program,* and the *Emergency Management and Security Department Staffing Plan with Roles and Responsibilities*. These documents are very clear on how the Emergency Management and Security department works on a day-to- day basis during steady state operations.

During emergency activation the ERO structure is defined in WP-12-9, *WIPP Emergency Management Plan.* The WIPP ERO has adopted a tiered organizational structure, as defined in the DOE O 151.1 guides, for responding to OEs using the NIMS approach. Each tier provides management, direction, and support of emergency response activities with specific roles and responsibilities during an emergency.

Tier I is comprised of the four main teams. Tier I is also referred to as the field ERO and may also include the ERT, MRT, RCTs, IH etc. Roles and responsibilities are listed in a Table 3.1 in the emergency plan for each entity.

Tier II is comprised of the FSM and the personnel supporting the CMR. Their roles and responsibilities are listed in table 3.2 in the emergency plan.

Tier III is made up of the EOC, the Joint Information Center (JIC), and offsite agencies standing up their EOCs and/or interfacing with the EOC. Table 3.3 in the emergency plan clearly defines their roles and responsibilities.

In Section 3.2.3.2, the emergency plan states that the FSM has overall responsibility for the facility, systems, and events, but does not provide tactical direction to the IC or responders at the incident scene. It is understandable that the FSM is responsible for the facilities and systems, but having the FSM retain overall responsibility for the "events" does not follow NIMS ICS and may confuse response operations. Through interviews it has been identified that presently the organization is working, but it has taken some time for it to work. It is recommended that the FSM responsibilities during emergency events be evaluated during future exercises.

This criterion is Met.

8. The emergency management program was adequately evaluated by the CORR

The CORR team adequately evaluated the emergency management program. Although the scenario for the CORR exercise was considered fairly easy, it included evacuation of the mine due to incipient fire with two minor injuries and some contamination on evacuees. A sufficient review of the technical base documents,

plans and procedures, EALs, drill and exercise program, adequacy of WIPP emergency management personnel and facilities/equipment were well documented in the CORR report. The CORR report does an excellent job in documenting the problems associated with the WIPP emergency notification system and is correct in stating that these problems should be given priority to ensure that reliable emergency notifications to the workers can be implemented. One area which the CORR did not fully review was the possible weakness of the response, and personnel minimum staffing.

This criterion is Met.

CONCLUSION

While there are identified opportunities for improvement, the basis for a compliant comprehensive Emergency Management program is in place at WIPP. It should be noted, due to the overhaul of the Emergency Management program it will take time before the employees gain full proficiency in the implementation of this program. Two deficiencies were identified during this review with the most significant being the operability and reliability of the WIPPs site emergency notification system. This problem was very well documented in the CORR, but a temporary fix (with compensatory measures that were not comprehensive) was adopted as a solution. As stated earlier contractor management has failed to appropriately compensate for the inadequacy of these systems allowing compensatory measures to become an operational normality instead of correcting the problem. NWP should strive to improve existing compensatory measures to support near-term operations, and develop permanent solutions and equipment upgrades to support longer term operations.

Issue(s)

Findings

EM.1-PRE-1: Improvement is needed in the WIPP Emergency Notification System (ENS) to support near-term operations; equipment upgrades are needed longer-term for system reliability (post-start component).

EM.1-PRE-2: Current staffing does not provide Emergency Medical Technicians (EMTs) or first responders 100% of the time work is being performed in the underground. According to 30 CFR § 56.18010, a person capable of providing first aid must be available on all shifts. This includes CPR.

Opportunities for Improvement

EM.1-OFI-1: Through interviews it was determined that there is no formalized process other than the three year review, for Emergency Management to be notified when new hazards may have arrived on site (esp. Chemical).

EM.1-OFI-2: Procedures did not effectively discuss the implementation protocols of Chelation during the off-shifts. WP 12-ER.09, *WIPP Fire Department Patient Management, Transport, and Documentation Guide,* could be improved by incorporating the after-hours protocols for chelation, to include notification and coordination with Environmental, Safety, and Health Management and Health Services and their appropriate Occupational Medical Director.

EM.1-OFI-3: WP 12-FP3005, *WIPP Fire Department Staffing*, does not reflect the current minimum staffing requirement in the BNA. The Fire Department is also having trouble staffing personnel to meet the BNA's minimum requirements.

Evaluated by:	**Approved by:**
/s/ Greg Campbell, Team Member /s/ Frank Moussa, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Review Form 1

Functional Area:	Objective:	Objective Met	
Emergency Management	EM.2	Yes [X]	No [ ]

OBJECTIVE

EM.2: A mutual aid agreement(s) has been established and implemented to ensure emergency response support of WIPP operations. **(Core Requirements 1, 2, and 15)**

CRITERIA

1. A mutual aid agreement(s) for emergency response has been developed and approved by appropriate management personnel from all applicable parties
2. The mutual aid agreement(s) clearly defines the roles and responsibilities of each party and a consistent understanding between the companies regarding the roles and responsibilities of each organization, and each organization has committed sufficient resources to satisfying those responsibilities.
3. The agreements were adequately evaluated by the CORR.

APPROACH

Record Review:

- Review all MOUs and MOAs documents that define the mutual aid program and its functions, responsibilities and organizational relationships and reporting requirements to verify that they are adequate, current and viable. Review Federal, State, County, Hospitals, Security and Law Enforcement MOUs that document formal procedures, and the basis for mutual aid support. Review contractor ORR report for adequacy in this functional area.

Interviews:

- Interview Emergency Preparedness personnel to determine their level of knowledge of the Mutual Aid program, the basis for ensuring the support from Federal, State, County and local agencies, and the controls required to activate the agreements.

Shift Performance:

- N/A

Records Reviewed

- MOU Emergency Radiological Treatment Center for The Waste Isolation Pilot Plant Between The U.S. Department of Energy and Carlsbad Medical Center.
- MOU Emergency Radiological Treatment Center For The Waste Isolation Pilot Plant Between The U.S. Department of Energy and LEA Regional Medical Center.
- MOU Between the United States Department of Energy Carlsbad Field Office and The City of Carlsbad New Mexico concerning Local Law Enforcement Agency Support.
- MOU Between the United States Department of Energy Carlsbad Field Office and The Sheriff of Eddy County concerning Local Law Enforcement Agency Support.
- Waste Isolation Pilot Plant (WIPP) Protective Force (PF) Narcotics K-9 Support Plan (Eddy County, Pecos Texas Police Department, Ruidoso New Mexico Police Department, and Los Lunas New Mexico Police Department)
- MOU Between the U.S. Department of Energy and the Mine Safety and Health Administration, U.S. Department of Labor.
- MOU Between the United States Department of Energy Waste Isolation Pilot Plant Carlsbad Field Office and The New Mexico Department of Homeland Security and Emergency Management Concerning Emergency Response. Mutual Aid Agreement Between The U.S. Department of Energy And The City of Carlsbad, New Mexico.
- Mutual Aid Agreement Between The U.S. Department of Energy And The City of Hobbs, New Mexico.
- Mutual Aid Fire Fighting Agreement Between The Eddy County Commission and The U.S Department of Energy.
- MOU Covering The Establishment, Operation, and Management of a Regional HAZ-MAT Team (Eddy County office of Emergency Management, Eddy County Fire Service, and Carlsbad Fire Department).
- MOU Between the United States Department of Energy Carlsbad Field Office and The Sheriff of LEA County concerning Local Law Enforcement Agency Support.
- Interagency Agreement Between the U.S. Bureau of Land Management (BLM) and the U.S. Department of Energy (DOE) and the U.S. National Park Service (NPS) and the U.S. Forest Service (USFS) Assistance in Search and Rescue Missions and Training.
- MOU Between The U.S. Department of Energy and The U.S. Department of Interior.

Interviews Conducted

- NWP EP Manager and Deputy Manager.

Shift Performances Observed

- None

Discussion of Results

1. **A mutual aid program has been developed and implemented, and the basis for the critical emergency support operations has been documented and approved by appropriate personnel.**

   WP 12-ER4927, *Development and Maintenance of Emergency Management Memoranda of Understanding*, was developed to improve the process. Since the development of this process NWP is working on an improvement project to update all emergency response MOU's to align with the former process. Prior to 2015 there was not a process in place to develop, maintain or review/revise MOU's. Since the development of this process NWP is working on an improvement project to update all emergency response MOU's to align with the process that has been developed to ensure MOU's are current and reviewed regularly. There are number of MOU's in various stages of review, revision, or approval with the Carlsbad Medical Center and the Eddy County MOU's being the nearest to completion.

   This criterion is Met.

2. **The mutual aid agreements clearly defines the roles and responsibilities of each party and a consistent understanding between the companies regarding the roles and responsibilities of each organization, and each organization has committed sufficient resources to satisfying those responsibilities.**

   Functions, assignments, responsibilities for mutual aid are clearly described in the MOUs, and Agencies Agreements. In addition, WP 12-ER 4927 ensures organizational alignment to update and upgrade MOUs in a timely manner. Periodic reviews and revision are performed to verify continued support by Federal, State, County, and Industry to ensure safety performance. Issues, recommendations or findings from reviews, both internal and external are tracked and resolved in a formal manner with all impacted parties in the MOUs or MOAs to ensure satisfactory procedures and protocols are adhered to and limit liability or delayed mutual aid response. Line management has promulgated procedures for updating or modifying MOUs or MOAs to reflect DOE's policies, roles, and responsibilities.

   This criterion is Met.

3. **The agreements were adequately evaluated by the CORR.**

   All MOUs impacting permit requirement were reviewed and approved by CORR. During the DORR review the MOU between CBFO and the LEA County Sheriff had expired based on the review completed by CBFO in 2012. The issue has been corrected by the contractor and the MOU is current. (**EM.2-OFI-1**)

   This criterion is Met.

CONCLUSION

This Nuclear Waste Partnership LLC (NWP) administrative procedure implements and supports the Memoranda of Understanding (MOU) according to WP 12-9, *WIPP Emergency Management Plan*. This provides a standard process for developing, maintaining, and reviewing Waste Isolation Pilot Plant (WIPP) MOUs. MOUs are written agreements between the U.S. Department of Energy (DOE) Carlsbad Field Office (CBFO) and an external organization or jurisdiction that supports the mission and goals of the WIPP Emergency Management Program, federal requirements for treatment, storage and disposal facilities, and the Permit. The procedure is effectively used by the Emergency Management and Security (EMSD) Department staff responsible for developing and maintaining MOUs related to emergency management and response. The mutual aid agreements possess the necessary procedures for preparedness, response, and recovery operations to support any natural or technological emergency.

Issue(s)

Opportunity for Improvement:

EM.2-OFI-1: LEA County Sheriff MOU had expired based on the review completed by CBFO in 2012.

Evaluated by:	**Approved by:**
/s/ Gregory Campbell, Team Member /s/ Frank Moussa, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Review Form 1

Functional Area:	Objective:	Objective Met	
Engineering	**ENG.1**	**Yes [X]**	**No [ ]**

OBJECTIVE

ENG.1: A system has been developed to manage the configuration of the WIPP facility, support facilities, and safety structures, systems and components (SSCs). This system ensures control of the design and [modification] to those facilities and systems. **(Core Requirements 1, 2, 4, 6, 8, 14, and 15)**

CRITERIA

1. A program has been developed and implemented to ensure that configuration management of the WIPP facility, support facilities, and SSCs is maintained.
2. Functions, assignments, responsibilities, and reporting relationships are clearly defined, understood, and effectively implemented for personnel responsible for maintaining facility configuration control.
3. The configuration management program, or engineering change process (including implementing procedures) is adequately documented and ensures that changes to the facility are formally processed to address impacts on procedures, training, drawings, system descriptions, and satisfies the requirements of Key Element 17-1.
4. The configuration of the facility matches the description provided in the DSA, system drawings, and facility descriptions. Any authorized and approved facility modifications have been completed and fully closed, or evaluated and determined not to affect the ability to safely start nuclear operations.
5. The WIPP facility is adequately staffed with qualified and knowledgeable personnel to ensure the configuration control of the WIPP facility and systems is maintained.
6. Periodic assessments of the Configuration Management program are performed to verify continued robust performance. Issues, recommendations or findings from assessments, both internal and external are tracked and resolved in a formal manner to ensure satisfactory correction and prevent reoccurrence.
7. The configuration management program was adequately evaluated by the CORR. (DOE Order 425.1C)

APPROACH

Record Review:

- Review the WIPP documents that define the configuration management program and its functions, responsibilities and organizational relationships and reporting

requirements to verify that they adequate. Review documents and procedures that define the processes for implementing the program.

- Review examples of facility changes or modifications that have been processed to ensure that the changes were captured in drawings, system descriptions, DSA/TSR (if applicable). Within scope are:
  - Interim Ventilation System and associated instrumentation
  - Underground Fire Suppression upgrades (Oil storage, maintenance shop, fabrication shop, select office areas)*
  - Underground notification system
  - Automatic fire suppression for underground liquid fueled equipment*
  - Camera installation at active waste face
  - Skid mounted strobe in Panel 7
  - Networked CAMs at Panel 7
  - Safety Significant Systems new differential pressure gauges, level indicators, and/or transmitters installed to implement the LCO and SRs specified in the TSR: Battery exhaust filtration system; CH waste handling containment ventilation system; underground ventilation system; WHB fire suppression system (fire water storage tank); 308/309 bulkheads.

  *Assessment conducted by Fire Protection engineer team member
- Review SMP monitoring data and/or reports for the Configuration Management program. Review contractor ORR report for adequacy in this functional area. Review staffing plans, position descriptions and qualifications for personnel assigned with these responsibilities.

Interviews:

- Interview personnel responsible for implementing the configuration management program to determine their knowledge of the process.

Shift Performance:

- Perform a facility walk-through of any modified systems to determine whether or not the current as-built configuration matches the controlled drawings.

Records Reviewed

- ENG-RPT-16-003, *NWP Engineering Comprehensive Engineering Improvement Plan*, Oct 2016
- WP 13-1, *NWP Quality Assurance Program Description*, Rev. 36, 12/22/15
- DOE/WIPP 16-3565, *Safety Evaluation Report for Approval of DOE/WIPP 07-3372,* Revision 0 *Waste Isolation Pilot Plant Documented Safety Analysis, Rev 5 and DOE/WIPP 07-3373, Waste Isolation Pilot Plant Technical Safety Requirements*, Rev. 5
- DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis*, Rev. 5, April 2016
- DOE/WIPP 07-3373, *Waste Isolation Pilot Plant Technical Safety Requirements*, Rev. 5, April 2016
- WIPP-021, *Hazards Analysis for WIPP Transuranic Waste*, Rev. 6, 5/4/16

- Calculation WIPP-019, *WIPP DSA External Event and Natural Hazard Phenomena (NHP) Event Hazard Analysis (HA) and Accident Analysis (AA) Calculations*, Rev. 7, 4/15/16
- 00CD-0001, *WIPP Mine Ventilation Plan*, rev 40, (draft sent for CBFO approval 10/28/16)
- 04-VU1612, *WIPP Mine Ventilation Rate Monitoring*, Rev. 0
- WP 09-CN3025, *System Health Walkdown and Health Reports*, Rev. 20, 11/10/16
- WP 12-NS3001, *Changes to Safety Basis and Supporting Documents*, Rev. 3, 5/24/16
- WIPP 07-3373, *Waste Isolation Pilot Plant Technical Safety Requirements*, Rev. 5b, April 2016
- WP 04-VU1614, *Underground (U/G) Air Flow Volume Readings*, Rev. 0, 9/14/16
- *WIPP Cognizant System Engineer/Alternate Cognizant System Engineer System Assignment List*, Rev 56, 11/9/16
- WP 04-VU1003, *Operation of UVFS in Auxiliary Air Supply Configuration*, Rev. 12, 7/5/16
- WP 09, *Conduct of Engineering*, Rev. 42, 8/13/16
- WP 09-CN3007, *Engineering Change Notice* (was Engineering Change Order), Rev. 47, 10/3/16
- WP 09-10, *WIPP Preparation Guide for SDD Documents*, Rev. 7, 12/17/15
- WP 09-11, *NWP Configuration Management Plan*, Rev. 8, 5/17/16
- WP 09-8, *WIPP Specification Preparation*, Rev. 9, 8/13/16
- WP 09-CN3034, *Configuration Management Determination*, Rev. 6, 10/31/12
- WP 09-CN3040, *Commercial Grade Item Dedication*, Rev. 3, 1/29/15
- WP 09-CN3043, *Drawing Change Notice*, Rev. 1, 11/9/16
- WP-09-CN3044, *Developing Technical and Functional Requirements*, Rev. 0, 9/8/16
- WP-09-CN3045, *Engineering Field Change Notice*, Rev. 0, 10/3/16
- WP 09-CN.04, *Backfit Analysis Process*, Rev. 1, 7/15/16
- VU01 Exhaust Fans and Filters System Health Report, 11/29/16
- WO 1617294, HV01 Annual System Walkdown – VSS, 5/31/16
- WO 1509230, VU01 Annual System Walkdown – VSS, 10/30/15
- WO 1508641, VU03 Annual System Walkdown – VSS, 1/14/16
- Slides from UVS/IVS System Health Report briefing, *VU01-Exhaust Fans and Filters Annual System Health Report, VU03, 11/3/16*
- *System Health Report, VU06, TBD*
- WP 09-3005, *Graded Approach to Application of QA Controls*, Rev. 8, 7/19/16
- WP 09-CN3018, *Design Verification*, Rev. 16, 8/13/16
- WP 09-12, *Evaluation of Technical Operability Adequacy of Facility SSCs*, Rev. 2, 4/28/16
- WP 09-1, *Configuration Management Plan*, Rev. 8, 5/17/16
- WP 09-CN.08, *Cognizant System Engineer Training Program Plan*, Rev. 1, 8/13/16
- Cognizant System Engineer Qualification Card COG-ENG-01, Revs 2 & 3, undated
- WP 09-CN3003, *As-Built Drawings Process and Control*, Rev. 15, 11/18/15

- WP 09-CN3021, *Component Indices*, Rev. 17, 5/17/16
- WP 09-CN3023, *Functional Classification Determination for Design*, Rev. 8, 9/8/16
- WP 09-CN3031, *Calculations*, DRAFT Rev. 6, as of 11/19/16
- WP 12-HP1328, *Control, Identification, and Use of Site Approved HEPA Filters and HEPA Filtered Equipment and Systems*, Rev. 1, 11/14/16
- 12-NS.11, *WIPP Nuclear Safety Program Description*, Rev. 0, 11/19/15
- WP 12-NS3007, *DSA/TSR Linking Document Database*, Rev. 6, 12/21/15
- WIPP 12-NS.09, *WIPP Nuclear Safety Training Program Plan*, Rev. 1, 9/13/16
- WP 12-NS.10, *WIPP Nuclear Criticality Safety Training Program Plan*, Rev. 0, 11/13/15
- NCS-01, *WIPP Safety Analysis Nuclear Criticality Safety Specialist Authorization Card*, Rev. 0
- SMP-14-010, *Waste Isolation Pilot Plant Nuclear Safety Program Independent Program*
- *Evaluation Final Report*, Rev. 0, 10/30/14
- WIPP form 16-922 details report, regarding USQs, 6/23/16
- WIPP form 16-1573 details report, regarding AR documents, 9/19/16
- WIPP form 16-1678 details report, regarding USQs, 10/5/16
- WIPP form 16-1748 details report, regarding newness of engineering processes, 10/12/16
- Engineering Change Order (ECO) 13968, *Set Electric Fire Pump Run Time to 8.5 min*, 5/20/16
- Inter-office Correspondence EN:16:00080, *Justification for Continued Performance of Nuclear Safety Tasks Under WP12-NS.09, Revision 1 Requirements*, 9/9/16
- WP 02-AR3001, *Unreviewed Safety Question Determination*, Rev. 12, effective 2/18/15
- USQD 16-109, USQ Determination, *ETO-Z-326, Rev. 3, Fire Protection Engineering Operability Analysis of the 411 Process Area Sprinkler Systems*, Rev. 2, 9/30/16
- ETO-Z-326, Technical Operability Evaluation, *Fire Protection Engineering Operability Analysis of the 411 Process Area Sprinkler Systems*, Rev. 3, 9/29/16
- USQD 16-075, USQ Determination, *Follow up USQD for PISA P16-004, DSA Bases do not Describe Valves Between the Risers and the Sprinkler Heads in WHB*, Rev. 1, 7/7/16
- USQD 16-159, USQ Determination, PM486002, Rev 2, *Internal Mechanical Inspections at Sprinkler System Risers*, 11/15/16
- USQD 16-150, USQ Determination, regarding work orders on roof bolters, lift truck, 11/6/16
- USQD 16-093, USQ Determination, regarding HEPA DP gage calibration, 8/4/16
- Selected employee USQ qualifications, 10/6/09
- PISAD P16-007, PISA Determination, regarding several NCRs involving impairments to the WHB Fire Protection System, cancelled.
- PISAD P16-004, PISA Determination, *DSA Bases do not Describe Valves Between the Risers and the Sprinkler Heads in WHB*, 7/7/16

- LDD Change Request Forms, EA12NS3007-1-0 & EA12NS3007-2-0
- DOE/CBFO 16-3568, *U.S. Department of Energy Carlsbad Field Office, Plan for Validating Currently Certified Waste*, dated 6/1/16
- CBFO MP 4.15, *The Process of TRU Waste Acceptable Knowledge Summary Reports*, Rev. 0, 6/16/16
- CBFO MP 10.5, *Interim Change Notice #1 to CBFO MP 10.5, Rev. 9, Peer Review*, 9/21/16
- CCP-TP-005, *CCP Acceptable Knowledge Documentation*, Rev. 29
- CCP-TP-030, *CCP CH TRU Waste Certification and WWIS/WDS Data Entry*, Rev. 35
- CCP-TP-033, *CCP Shipping of CH TRU Waste*, Rev 22
- CCP-TP-200, *SPM Chemical Compatibility Evaluation Memorandum and Acceptable Knowledge Assessment Review*, Rev. 0
- SDD VU00, Underground Ventilation System Description Document, Rev. 24, 09/22/16
- NWP Interoffice Correspondence EN 16:00407, dated August 13, 2016, regarding compensatory measures in place until revision of Calculations procedure.
- NWP letter to New Mexico Environment Department (NMED), 16-3326, *Request for a*
- *Temporary Authorization for the Referenced Revised Class 3 Permit Modification to the Waste Isolation Pilot Plant Hazardous Waste Facility Permit…,* 11/10/16
- Inter-office correspondence EN: 16:00462, *Geomechanical Mine Stability Surveillance*, 10/25/16
- Inter-office correspondence EN: 16:00463, *Geomechanical Mine Stability Surveillance*, 11/1/16
- Action List from Ground Control meeting (11/16/16)
- Slides on Bolt Installation Count, 11/15/16
- Issue Report #597, *Panels 3 and 4 in the WIPP U/G have been filled with containers of TRU waste but have not been isolated with an explosion-isolation wall and a concrete barrier. There are currently two approved panel closure designs, and Panels 3 and 4 are isolated with the other approved design. This is not consistent with WIPP-021*, 11/17/16.
- ASME NQA-1-1989, *Quality Assurance Program Requirements for Nuclear Facilities*
- 10 CFR 830.203, *Unreviewed Safety Question Process*
- *CORR Final Report for the Commencement of Contact-Handled Waste Emplacement at WIPP, Objectives SB1 and CM1, 10/28/16*
- Email from NWP Nuclear Safety Program Manager, to reviewers, dated 11/22/16, with attached word document "UG-30-001a1.docx"
- CA-2017-NS-002, *Unreviewed Safety Question Process (USQ) Independent Assessment Report: WIPP Compliance with CBFO Approved USQ Procedure and Implementation Effectiveness*
- Management Assessment Number: ENG2016-05, NWP Engineering, Engineering Programs
- S17-01, *Effectiveness Review of the Corrective Actions for WF15-359, Recurring TSR Violations…*

- S17-04, *Effectiveness Review of the Corrective Actions for WIPP Form 14-170, Timer Box Cover Not Closed*
- Management Observation Forms (and associated WIPP Forms): DJM (Diesel Generator Load Bank), 10/9/16,
- E-mail chain from NWP Engineering Manager discussing closure efforts for Fire JON 14.6, 10/23/2016
- Matrix of overdue WIPP Form Closures for Engineering
- E-mail from NWP Performance Assurance Manager for Engineering to Extend WIPP Form
- Action 16-1223-2, Fire Extinguisher Adequacy, dated 11/14/2016
- Engineering 2017 Self-Assessment Meeting Agenda 9/15/16
- Lessons Learned Documents
  - WIPP-JITLL-2016-094, LCO Not Entered During Weekly Fire Pump Test
  - DOE LL: NWP WIPP-2016-005, LCO Actions Exited with System Operability Indeterminate
  - DOE LL: NWP WIPP-2016-006, Safety Basis Compliance
- NWP Health Dashboard package, October FY2017
- WIPP CBFO DOE ORR Plan of Action, Rev. 0, 10/28/16

In addition to the documents specifically listed above, the review included a sampling of Engineering Change Notices (ECNs), Non-conformance Reports (NCRs), Unreviewed Safety Question Screens (USQSs), Unreviewed Safety Question Determination (USQDs), Potential Inadequacy of the Documented Safety Analysis Determination (PISADs), Evaluation of Technical Operability (ETOs), training qualification cards, and calculations.

Feedback from document reviews conducted by other DORR team members was also taken into account in this CRAD.

Interviews Conducted

- CBFO Facility Engineering Division Director
- CBFO Safety Programs Division Director
- CBFO Confinement Ventilation SSO
- CBFO Industrial Hygiene Specialist
- CBFO consultant on Documented Safety Analysis development
- HQ DOE CNS Staff Structural Engineer (for feedback on MSHA visit)
- NWP Engineering Manager/Chief Engineer
- NWP Deputy Engineering Manager
- NWP Design Authority Manager
- NWP Performance Assurance Manager for Engineering
- NWP Nuclear Safety Program Manager
- NWP Nuclear Safety Manager
- DSA Author / Senior Advisor to Nuclear Safety
- NWP Geotechnical & Mine Engineering Director
- NWP Electrical/I&C Systems

- NWP Facility/Ventilation Systems Director
- NWP Engineering Programs Director
- NWP Design Engineering Director
- NWP UVS/IVS Cognizant System Engineer
- NWP WHB CVS Cognizant System Engineer
- NWP Mine Hoists Cognizant System Engineer
- NWP Underground Operations Integration Manager
- NWP Underground Operations personnel assigned to conduct mine air flow quantity measurements 11-16-16
- Feedback from interviews conducted by other DORR team members was also taken into account in this CRAD

Shift Performances Observed

- Underground Air Flow Volume Readings performed 11-16-16 at W30/S1700 and E140/S1950 per WP 04-VU1614, Rev. 0 (W30 smoke test method, E140 anemometer)
- Presentation by NWP Cognizant System Engineer, dated 11-15-16, entitled, *VU01, Exhaust Fans and Filters Annual System Health Report.*
- Filter differential pressure (DP) gage calibration (observed by other team members).
- Attended NWP Ground Control meeting 11-16-16.
- Emergency Preparedness Drill 11-18-16
- Feedback from shift performances observed by other DORR team members were also taken into account in this CRAD

Discussion of Results

1. A program has been developed and implemented to ensure that configuration management of the WIPP facility, support facilities, and SSCs is maintained.

Based upon ENG-RPT-16-003, *Engineering Improvement Plan*, a program has been developed and implemented to improve the engineering program. The actions underway as a result of this plan and the gap analysis that preceded it are intended to address several issues, including the configuration management of the WIPP facility, support facilities, and SSCs. These actions have resulted in significant improvements to the engineering procedure set.

Some procedures, such as WP 09-CN3007, *Engineering Change Notice*, have recently been entirely rewritten. Some procedures are still in revision, including WP 09-CN3031, *Engineering Calculations*, and WP 09-CN3040, *CGID*. These are planned for implementation after the period of this review and therefore could not be evaluated.

New or revised procedures are listed in the table below.

Doc #	Procedure Title	Revision	Date
WP 09	Conduct of Engineering	42	8/13/16
WP 09-3007	Engineering Change Notice (formerly Eng. Chg. Order)	47	10/3/16
WIPP-021	Hazards Analysis for WIPP Transuranic Waste	6	5/4/16
WP 12-NS3001	Changes to Safety Basis and Supporting Documents	3	5/24/16
WP 09-10	WIPP Preparation Guide for SDD Documents	7	12/17/15
WP 09-8	WIPP Specification Preparation	9	8/13/16
WP 09-CN3043	Drawing Change Notice	1	11/9/16
WP-09-CN3044	Developing Technical and Functional Requirements	0	9/8/16
WP-09-CN3045	Engineering Field Change Notice	0	10/3/16
WP 09-CN.04	Backfit Analysis Process	1	7/15/16
WP 09-3025	System Health Walkdown and Health Reports	20	11/10/16
WP 09-3005	Graded Approach to Application of QA Controls	8	7/19/16
WP 09-CN3018	Design Verification	16	8/13/16
WP 09-12	Evaluation of Technical Operability Adequacy of SSCs	2	4/28/16
WP 09-11	Configuration Management Plan	8	5/17/16
WP 09-CN.08	Cognizant System Engineer Training Program Plan	1	8/13/16
WP 09-CN3003	As-Built Drawings Process and Control	15	11/18/15
WP 09-CN3021	Component Indices	17	5/17/16
WP 09-CN3023	Functional Classification Determination for Design	8	9/8/16
WP 09-CN3031	Calculations	6	In draft
WP 09-CN3040	Commercial Grade Item Dedication	3	1/29/15

In some cases, engineers are working to two procedure revisions at once. For instance, older design changes are still worked to the previous Engineering Change Order (ECO) process, while new design changes initiated after issuance of WP 09-CN3007, *Engineering Change Notice*, Rev. 47 fall under the new process. Most of the revised procedures contain new elements, such as tracking and closure of unverified assumptions (required by the new Engineering Change Notice (ECN) process, but not by the previous ECO process).

With some procedures only days old, and the average age of new or revised procedures at just 4 months, the new process has not had much run time, so it is difficult to determine implementation effectiveness. The CORR team identified an

issue in WIPP Form (16-1748) regarding the new procedure set not being well-engrained. This CORR issue is still open.

ECOs that were already in-process when new procedures came out are still being worked to the previous revision of the procedure, which adds to the confusion. Additional oversight of the ECO process is advisable. NWP Engineering Manager/Chief Engineer stated that NWP has adopted additional compensatory measures to provide added assurance that requirements are met. NWP Interoffice Correspondence EN 16:00407, dated August 13, 2016 states that until WP 09-CN3031, *Engineering Calculations*, is revised; all calculations will require an additional approval by the Engineering Design Authority Manager. This compensatory measure controls the scope of the in-revision calculations procedure, but does not provide additional oversight for other procedures, and does not contain a backward look.

No design verifications have been conducted to the new procedure, and there were only two unverified assumptions being tracked.

The NWP Engineering Manager/Chief Engineer explained that the DOE-STD-3009 process utilized for reanalysis of WIPP hazards consequences for the revised Hazards Analysis (HA) published in May of 2016 looked backward to all of the calculation assumptions for safety systems to ensure they were bounding or verified assumptions. The NWP Engineering Manager/ Chief Engineer stated that the aforementioned compensatory measure covered the gap between completion of the new HA and revision of the last procedures slated for revision. Upon following up, the team found these compensatory measures were not in place until August, 2016.

ENG.1-OFI-1: Design changes were made to safety significant SSCs, but there is not evidence of verification of unverified assumptions being performed during the period between May and August. Once the new procedure set is fully in place, it is very likely that a backward review by CSEs to verify design changes to safety systems implemented within 2016 will resolve this issue.

Based upon interviews and document reviews, it is clear that a program is in the process of being developed, and that the program will contain the elements needed to make it effective. A revised System Health WP 09-CN3025, *System Health Walkdown and Health Reports*, procedure was published just 3 days prior to the start of the review. The reviewers observed a System Health Report presentation, the first of its' kind, and found it to be very thorough and informative. The accompanying report was not published yet and could not be reviewed, but system walkdowns and interviews with several system engineers and supervisors confirmed that the level of safety system knowledge and engineering experience is excellent.

ENG.1-BP-1, Best Practice: The WIPP System Health Walkdown and Health Reports procedure includes a requirement for Cognizant System Engineers (CSEs) to brief management directly on the health and status of their safety system, providing CSEs an opportunity to discuss areas that need management focus or additional funding directly with senior managers.

Overall, it is clear that the new procedure set will result in significant improvements to the configuration management program at WIPP.

2. **Functions, assignments, responsibilities, and reporting relationships are clearly defined, understood, and effectively implemented for personnel responsible for maintaining facility configuration control.**

   All of those interviewed had a clear understanding of their functions, assignments, and responsibilities. Reporting relationships were clearly defined and understood.

   In the past few years, NWP created a Design Agent responsibility to ease the burden on the Cognizant System Engineers. The Design Agent organization contains a staff of engineers who support the CSEs by managing all design changes and maintaining configuration management while CSEs cover the day to day operations and health of the systems. The CSEs stay informed on design changes and ultimately approve all design change packages prepared by the Design Agent organization.

   With this new support Design Agent organization, it is largely the responsibility of the Design Agent engineers to initiate design changes based upon requirements set forth by the CSEs, and then work the ECN through the process. The Design Agent engineers and designers also complete as-built drawings and other support functions to the CSEs. When the Design Agent organization was developed, training was conducted with the entire team to ensure roles and responsibilities were clear.

3. **The configuration management program, or engineering change process (including implementing procedures) is adequately documented and ensures that changes to the facility are formally processed to address impacts on procedures, training, drawings, system descriptions, and satisfies the requirements of Key element 17-1.**

   See discussion in Criterion 1 above. WIPP's records management system is a file room, with a paper control copy of the latest revision of each document. This has caused problems with space, but it is a system that has been in place at WIPP for years and is working efficiently. Converting to an electronic system could introduce new inefficiencies and opportunity for error, and the value added is likely marginal.

   ECO's or ECNs are closed out and then reflected in the hanging file. The new procedure set allows engineering to procure long lead components for safety SSCs at risk, i.e. before assumptions are verified and design is complete. In cases where unverified assumptions are not able to be closed out, they are tracked until closed. In

many cases this is necessary to support critical mission needs, and tracking provides adequate control.

4. The configuration of the facility matches the description provided in the DSA, system drawings, and facility descriptions. Any authorized and approved facility modifications have been completed and fully closed, or evaluated and determined not to affect the ability to safely start nuclear operations.

The DORR team was provided with a Manageable List of incomplete modifications that were to be considered out of the scope of the review. Based on a programmatic look they do not appear to represent significant risk, given the compensatory measures in place.

The single most significant Engineering issue is Ground Control and roof fall issues, which have caused several sections of the mine to be designated as inaccessible.

Note: *The scope of the DOE ORR only includes ground control activities related to maintenance of the pathway to Panel 7, as well as Panel 7 rooms designated for future waste emplacement. However, Engineering and Nuclear Safety are within the scope of this review, and the aspects of ground control and geotechnical engineering, that fall within these boundaries, are covered thoroughly in this review.*

Roof fall is identified as an anticipated event in the South end of the mine and filled panels due to the lack of Ground Control maintenance. Some areas (include the South end of E140 and S30, portions of Panel 7 (including Room 4 where a recent roof fall occurred), and portions of S-1950 (providing access to the mined portions of Panel 8), and previously-filled panels (1-6)) are currently designated as inaccessible due to lack of ground control and high closure rates to protect workers.

The November 3rd roof fall in Panel 7 gave cause for the team to examine the portion of the HA devoted to roof fall in a room filled with previously-emplaced waste, (Accidents 30-UG-001a-f) and specifically the supporting analysis (Calculation number WIPP-019), which assumes ten stacks of three drums each (30 total drums) are partially crushed. Given the magnitude of the recent event in Panel 7 room 4, the DORR team raised the question on Monday, Nov 14th regarding whether the HA assumption of 30 drums partially crushed in a moderate impact event is still bounding for the WIPP roof fall events.

NWP prepared a white paper stating qualitatively that an event involving a larger portion of roof fall, with an assumed impact to 90 drums, would have the same consequences as the event evaluated in the HA, because, "In reality, only the waste in the top tier containers would lose containment." This assumption is inconsistent with the assumption made in the original HA that all three tiers of containers lose confinement, and no credible technical basis is provided for the change in philosophy. There is also no technical basis for the assumption that only 90 drums would be

impacted. The area of the Panel 7 Room 4 roof fall was large enough to potentially impact hundreds or thousands of containers if it had occurred in a filled panel.

In interviews with the Nuclear Safety Program Manager and the DSA author / senior advisor to Nuclear Safety, reviewers were told that a fall the size of room 4 (approximately 230' in length and the full width of the room) could not occur in Panels 1-6 because full roof bolting was performed in these panels prior to emplacement of waste, whereas Panel 7 had just been mined and was not bolted.

Follow on discussions with other team reviewers revealed that there was some bolting in place in Panel 7 Room 4, and raised questions regarding how thoroughly other panels were bolted prior to emplacement in times of high operational pace. The NWP Geotechnical Engineer confirmed that Panel 7 Room 4 had a pattern of two 14' bolts placed at 5' spacing down the center of the room, and stated that other panels and rooms had a pattern installed that varied depending on forecast duration of the room emplacement. When reviewers inquired about which bolt pattern was in which room, it became clear that the ground control configuration was not actively tracked for emplaced panels and would have to be pulled from historical work packages for each room.

Further interviews and discussions with Nuclear Safety personnel revealed that calculation PLG-1167, Analysis of Roof Falls and Methane Gas Explosions in Closed Rooms and Panels, August 1997, contains analysis of the force required from a roof fall event to damage canisters in an emplaced and closed panel. Reviewers were also directed to WIPP-019, WIPP DSA External Event and Natural Hazard Phenomena (NHP) Event Hazard Analysis (HA) and Accident Analysis (AA) Calculations, 4/15/16, and were told that several roof fall accidents were included, included a large roof fall in a panel with a substantial barrier or other non-compliant closure. Upon inspection of this calculation, it appears the maximum drums impacted that has been evaluated is 208, which is much less than could fit in a completed panel.

Upon further review of the PLG-1167 calculation, reviewers found that it includes an assumption that emplaced panels have full closure systems in place. Panels 1-6 do not all have compliant closure systems in place, and bulkheads are only credited for confinement in Panels 6 and Panel 7 room 7, where potentially LANL waste is emplaced.

There is much conflicting evidence to address the issue of the magnitude of a large roof fall. After much discussion, it appears there is the potential for an accident of a different type or a higher consequence than has been evaluated. This issue should have been entered into the PISAD process to be addressed through the formal process which requires a solid technical basis as part of the process. To date, NWP has not entered the PISAD process, performed a USQS or USQD on this issue.

ENG.1-PRE-1: Contrary to the requirements of WP 02-AR3001, NWP did not enter a PISAD upon experiencing a roof fall larger than that postulated in the Hazards Analysis supporting assumptions.

The reviewers noted that a recent letter (16-3326) sent 11/10/16 to NMED requests authorization to install closure bulkheads near the intersection of E-300 drift and access drifts for Panels 1 and 2 and in the mains (W-170, W-30, E-140, E-300) north of Panels 3, 4, 5, and 6, in order to provide confinement for a potential roof fall in Panels 1-6. The authorization request also requests relief from the requirement for the run of mine salt portion of the approved closure, meaning that the permanent closure for this area would consist of a bulkhead only. The review team questions the effectiveness of a bulkhead in providing confinement when ground control is not performed and no other means of confinement is installed.

ENG.1-OFI-2: "Substantial barriers" provided by chain link and brattice cloth would not provide confinement of waste that could be released due to the inevitable roof fall in emplaced panels for which ground control is not ongoing. Recommend an engineering evaluation be performed to determine the most effective means of panel closure to provide confinement, and a closure system be installed ASAP to close off the areas of the mine where waste emplacement is complete, yet only substantial barriers are provided for confinement and worker protection.

The recent focus at WIPP has been on getting back to waste emplacement. The Ground Control issue has largely taken a back seat to emplacement and is suffering from lack of equipment, trained staff, and until the recent roof fall, an apparent lack of management attention.

Although NWP's geotechnical program has to date been successful in predicting roof fall events and restricting areas in time, Ground Control problems still represent a serious worker hazard and are costing valuable real estate within the mine, jeopardizing future waste emplacement. The reviewers attended a Ground Control meeting and obtained a copy of the Ground Control Action Items, which are carried from meeting to meeting as open items. Among the actions was Item 29, *the need for written ground control program documents or procedures to address for following areas: standards for restricting or prohibiting access; response to broken bolts; and establishing surveillance frequencies*. With none of these processes established formally, Ground Control at WIPP relies solely on skill of the craft, which fortunately in this area is exemplary.

The reviewers interviewed the NWP Geotechnical Engineering lead, who stated that he could run another bolter in panel 7 if NWP had enough trained mining crews. He also stated that his area is just keeping up in the area of staffing. The skill requires 1-2 years of on the job training, and 50% of the geotechnical engineers on the team are expected to retire within 5 years. There is already one skill set, the mine plot software expert, for which there is no backup or alternate in place. (Included in MG.1-POST-1 regarding staffing)

ENG.1-OFI-3: Immediate staffing focus in the area of Geotechnical Engineering is needed.

Other information garnered from the Ground Control meeting included that weekly communications between Mining Operations and Geotechnical Engineering was only recently implemented, but is working well.

The Mining Safety and Health Administration visited WIPP the last week in October 2016 to evaluate the Ground Control issue. The report from that visit is not yet available, but the reviewers interviewed a DOE structural engineer who attended the visit and interfaced with the team at the outbrief. The MSHA team was reportedly concerned about the inability of the WIPP ground control efforts to gain much ground, given the working conditions in a Radiological Contamination Area and Airborne Radiation Area and the low rate of bolting. The concern was stated that the WIPP Ground Control program is extremely reactive, rather than proactive, at maintaining the structural integrity of the mine.

Several personnel interviewed expressed the opinion that decontamination of the Panel 7 areas where roof bolting needs to occur could be easily accomplished, allowing much greater roof bolting efficiency. This option does not appear to have been fully evaluated.

ENG.1-OFI-4: (RECOMMENDATION) Upon receipt of the MSHA report, NWP should develop a comprehensive plan to address the issues and recommendations provided in the MSHA report on the evaluation of WIPP's ground control efforts. The actions of this plan should receive appropriate priority based on their risk and importance**.**

Although effective to date in predicting roof falls in time to prevent access to weak areas, the WIPP approach to ground control to date is reactive and relies exclusively on skill-of-the-craft.

ENG.1-OFI-5: An overall mine strategy plan is needed to coordinate and focus the Ground Control, Waste Emplacement, and supporting resources and equipment.

5. The WIPP facility is adequately staffed with qualified and knowledgeable personnel to ensure the configuration control of the WIPP facility and systems is maintained.

Staffing and skill mix appeared adequate in most areas of the engineering and nuclear safety divisions, although weaknesses exist in Geotechnical Engineering, where over 50% of the staff is eligible for retirement in less than 5 years, and personnel take 1-2 years to learn the field. Qualification of roof bolters is also an area that needs immediate attention.

Engineering qualifications were evaluated in ENG.2 Criterion 4 below.

6. **Periodic assessments of the Configuration Management program are performed to verify continued robust performance. Issues, recommendations or findings from assessments, both internal and external are tracked and resolved in a formal manner to ensure satisfactory correction and prevent recurrence.**

The NWP Annual Integrated Assessment Schedule - FY2017 / 1st Quarter FY2018, Rev 0 was reviewed and found to include 18 assessments of engineering and nuclear safety process implementation, as well as Contractor Assurance System semi-annual assessments on Adequacy of Action Level 3 WIPP Form Closures. Of these, there are a handful in the fire protection area that specifically address configuration management, and few or none in other disciplines.

ENG.1-OFI-6: Add periodic assessments in areas beyond fire protection to confirm the configuration management program is working well.

A detailed interview and review of the oversight products for the Performance Assurance Manager for Engineering was also conducted by the reviewer for QA.2. A review of the oversight products reviewed generally indicated effective implementation of the CAS program. The NWP Performance Assurance Manager for Engineering provided extensive oversight documentation. Areas for future emphasis and risk management were discussed. The NWP Performance Assurance Manager for Engineering meets periodically with his NWP Engineering counterparts to keep the process on track. The Engineering 2017 Self-Assessment Meeting Agenda for 9/15/16 indicated a reasonable thought process to drive improvement in the self-assessments for Engineering. These include:

- Emphasis on guidance in WP15-CA 1002, *Self-Assessments*
- A listing of good targets for FY17 self-assessment consideration
- CAS Independent Assessments
- Setting up a follow up review for corrective action effectiveness

Objective QA.2 noted that disciplines including Engineering and Maintenance appeared to be lacking effective indicators or performance metrics.
An opportunity for improvement was provided in QA.2:

Cited from CRAD QA.2:

QA.2-OFI-2*:* *Performance Indicators could be improved by incorporating indicators less reliant on basic numbers and more reliant on analyzed data. Specifically:*

- *Plant Systems (ENG-04-2017) lists the Waste Hoist as GREEN for the past three months, despite numerous outages severely hampering access to the underground. Mission impact (including cost/schedule) is not included in this indicator.*

- *Corrective Maintenance Open Backlog (OPS-03-2017) does not draw attention to mission impact due to equipment down time.*
- *Feedback from DOE was not well integrated into the determination of performance indicators.*

The engineering organization could assist in improving the effectiveness of these metrics.

7. The configuration management program was adequately evaluated by the CORR. (DOE Order 425.1C)

The CORR team conducted a thorough evaluation of the configuration management program. Issues identified above were identified through discussions, interviews, and document reviews with NWP and CBFO personnel during the course of the DORR review.

CONCLUSION

The objectives of ENG.1 were MET.

Overall, the objectives of the engineering program were MET. The engineering program has improved significantly since 2014, and the knowledge and experience of the personnel in this area largely compensate for the remaining issues. However, the program is not fully implemented and has minimal run-time, evidence of successful implementation is very limited, and resource (funding) shortages could reduce the availability of safety SSCs.

It is recommended that continued management attention and DOE oversight of this area until the new program is fully matured.

The area of Ground Control needs significant increased management focus. Upon receipt of the MSHA report, a cohesive plan for roof bolting to ensure structural integrity of the mine needs to be developed and implemented. An overall mining and emplacement strategy for the future should be developed immediately.

Issues

Pre-start Finding
ENG.1-PRE-1: Contrary to the requirements of WP 02-AR3001, *Unreviewed Safety Question Determination*, NWP did not enter a PISAD upon experiencing a roof fall larger than that postulated in the Hazards Analysis supporting assumptions.

Opportunities for Improvement
ENG.1-OFI-1: Design changes were made to safety significant SSCs, but there is no evidence of verification of unverified assumptions being performed during the period between May and August. Once the new procedure set is fully in place, it is very likely

that a backward review by CSEs to verify design changes to safety systems implemented within 2016 will resolve this issue.

ENG.1-OFI-2: "Substantial barriers" provided by chain link and brattice cloth would not provide confinement of waste that could be released due to the inevitable roof fall in emplaced panels for which ground control is not ongoing. Recommend an engineering evaluation be performed to determine the most effective means of panel closure to provide confinement, and a closure system be installed ASAP to close off the areas of the mine where waste emplacement is complete, yet only substantial barriers are provided for confinement and worker protection.

ENG.1-OFI-3: Immediate staffing focus in the area of Geotechnical Engineering is needed.

ENG.1-OFI-4: (RECOMMENDATION) Upon receipt of the MSHA report, NWP should develop a comprehensive plan to address the issues and recommendations provided in the MSHA report on the evaluation of WIPP's ground control efforts. The actions of this plan should receive appropriate priority based on their risk and import.

ENG.1-OFI-5: An overall mine strategy plan is needed to coordinate and focus the Ground Control, Waste Emplacement, and supporting resources and equipment.

ENG.1-OFI-6: Add periodic assessments in areas beyond fire protection to confirm the configuration management program is working well.

Best Practice

ENG.1-BP-1: Best Practice: The WIPP System Health Walkdown and Health Reports procedure includes a requirement for Cognizant System Engineers (CSEs) to brief management directly on the health and status of their safety system, providing CSEs an opportunity to discuss areas that need management focus or additional funding directly with senior managers.

Evaluated by:	**Approved by:**
/s/ Elaine Diaz, Team Member /s/ James Kekacs, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Review Form 1

Functional Area:	Objective:	Objective Met	
Engineering	ENG.2	Yes [X]	No [ ]

OBJECTIVE

ENG.2: An engineering program has been implemented that includes Cognizant System Engineers and ensures that the condition and operability of safety SSCs is periodically confirmed and maintained. This includes examination of records of tests and calibration of these systems. The material condition of all safety, process and utility systems is maintained. **(Core Requirements 1, 2, 3, 6, 7, 14, and 15)**

CRITERIA

1. An engineering program has been established and implemented and includes Cognizant System Engineers (CSE) in accordance with DOE Order 420.1C, and is adequately evaluated and monitored by NWP.
2. Engineering program documentation and implementing procedures have been developed and implemented, and are adequate to ensure the effective execution of engineering program responsibilities.
3. CSEs routinely confirm the operability of their assigned systems (SSCs) and possess detailed knowledge of those systems. CSEs identify trends from operations. The material condition of the SSC will support safe operations and satisfy DSA Key Elements 10-1, 10-2 and 10-3.
4. CSEs are involved in activities associated with their assigned systems, including system testing, modifications, maintenance, etc. CSE oversight activities are documented and adequate. CSEs exhibit an awareness of, and commitment to, public and worker safety, health, and environmental protection.
5. The qualifications for WIPP engineering personnel (and CSEs) are formally defined and adequate. Personnel assigned these responsibilities have completed the qualification requirements and have the knowledge to perform their assigned duties effectively. A sufficient number of personnel have are qualified to perform engineering and CSE functions. (DOE O 420.1B)
6. Periodic assessments of the engineering and CSE programs are performed to verify continued robust performance. Issues, recommendations or findings from assessments, both internal and external are tracked and resolved in a formal manner to ensure satisfactory correction and prevent reoccurrence.
7. The engineering and CSE program was adequately evaluated by the contractor Operational Readiness Review. (DOE Order 425.1C)

APPROACH

Record Review:

- Review the WIPP documents that define the engineering program and its functions, responsibilities and organizational relationships and reporting requirements to verify that they adequate. Review documents and procedures that define the processes for implementing the program. Review examples of CSE oversight activities. Review SMP monitoring data for the Engineering program. Review contractor ORR report for adequacy in this functional area. Review staffing plans, position descriptions and qualifications for personnel assigned with these responsibilities.

Interviews:

- Interview personnel responsible for implementing the configuration management program to determine their knowledge of the process. Interview engineering management to evaluate their process for dispositioning concerns identified through routine engineering oversight activities.

Shift Performance:

- Perform system walk-downs of SSC with CSE to evaluate level of knowledge and the material condition of the SSC for the following systems (if actual performance causes a potential operational concern these may be simulated):
  - Confinement Ventilation Systems (including fan rotations and system alignments)
  - Underground Air monitoring Systems
  - Waste Hoist system brakes
  - In-service inspections for Design Features
- Observe CSE performing routine oversight if time allows.

Records Reviewed
See comprehensive list under ENG.1.

Interviews Conducted
See comprehensive list under ENG.1.

Shift Performances Observed
See comprehensive list under ENG.1.

Discussion of Results

An engineering program has been established and implemented and includes Cognizant System Engineers (CSE) in accordance with DOE Order 420.1C, and is adequately evaluated and monitored by NWP. The team interviewed three cognizant system engineers and all CSE supervisors. The training programs for CSEs were reviewed and the system knowledge of the CSEs interviewed was evaluated and found to be acceptable.

The team attended a System Health Report out-brief, which was detailed and thorough. The team's overall impression of the CSE program was very positive. All of the CSEs with whom the team conversed were extremely knowledgeable on their systems, the supporting analysis, and the current and future system configuration.

1. **Engineering program documentation and implementing procedures have been developed and implemented, and are adequate to ensure the effective execution of engineering program responsibilities.**

   See discussion regarding engineering procedures in ENG.1.

   See discussion on Configuration Management in ENG.1.

2. **CSEs routinely confirm the operability of their assigned systems (SSCs) and possess detailed knowledge of those systems. CSEs identify trends from operations. The material condition of the SSC will support safe operations and satisfy DSA Key Elements 10-1, 10-2 and 10-3.**

   A System Health Report out-brief was attended which was detailed and thorough, and systems were walked down with two CSEs. Overall impressions of the CSE system knowledge and experience were excellent.

   Highlighted in the System Health Report briefing and subsequent walkdowns were some issues that require attention on the Underground Ventilation System/Interim Ventilation System (UVS/IVS):

   1) The UVS bypass damper leak test has not been accomplished, which could result in undetected bypass leakage around the HEPA filters.
   2) The UVS ductwork contains a large salt formation that could become an obstruction impeding flow.
   3) The UVS ductwork is corroded and leaking condensate in the upstream (contaminated) duct sections.
   4) The IVS system is still running on temporary power, which could reduce the reliability of the system due to all power coming through one transformer. A system failure of this nature has already occurred.
   5) No spare parts have been procured or are funded for FY17 to support the IVS system. It has consumables but not essential spares.

   The new Interim Ventilation System is running on temporary construction power, meaning one transformer failure can cause failure of both fans, which recently occurred. This configuration also allows for only local fan control at the VFDs outdoors near the filters, although power to the transformers can be cut from the CMR to stop power to the fans.

   The condition of the Underground Ventilation System 860 fans has significantly improved since 2014, but the ductwork is corroded and contains in places large

formations of salt. There is no program in place to monitor salt formations to determine impact on ventilation. No testing has been performed to ensure the partial foam installation is effective in preventing bypass leakage. Continuous Air Monitors have been installed in Station A upstream of the IVS/UVS filters and fans and Station B downstream, but are not credited safety equipment.

ENG.2-POST-1: Contrary to the requirements of the DSA, SDD, and DOE Order 433.1B, the UVS/IVS systems' operability could be impaired by unresolved known issues, lack of spare parts, and incomplete construction punch list items.

Given that ventilation supports bolting and waste emplacement, the cost of these minor issues could become significant.

3. **CSEs are involved in activities associated with their assigned systems, including system testing, modifications, maintenance, etc. CSE oversight activities are documented and adequate. CSEs exhibit an awareness of, and commitment to, public and worker safety, health, and environmental protection.**

   Reviewers interviewed cognizant system engineers or functional leads for all safety systems, and walked down the UVS/IVS and WHB ventilation systems. Reviewers attended the first ever management System Health Report briefing and were very impressed with the format and delivery. The briefing was thorough and detailed, and provided a forum for CSEs to communicate directly to project management about systems status and priorities.

   Overall, the CSE program at WIPP was very robust.

4. **The qualifications for WIPP engineering personnel (and CSEs) are formally defined and adequate. Personnel assigned these responsibilities have completed the qualification requirements and have the knowledge to perform their assigned duties effectively. A sufficient number of personnel have are qualified to perform engineering and CSE functions. (DOE O 420.1B)**

   The NWP Cognizant System Engineer qualification program was assessed. Procedure WP 09-CN.08, Rev. 1, dated 8/13/16 governs the program, and requires completion of a generic qualification card, COG-ENG-01, as well as a system-specific walkdown and oral board. The WIPP Cognizant System Engineer/Alternate Cognizant System Engineer System Assignment List indicates that of the 18 safety systems, all have qualified CSEs, and Alternate Cognizant System Engineers have been assigned for 16 of the 18 systems. Of the 16 alternate cognizant system engineers, 9 have achieved qualification. This table shows a concerted effort on the part of NWP to ensure coverage in accordance with DOE O 420.1C for all safety systems, and ensure succession planning is in place.

   During interviews with the NWP Mine Hoists Cognizant Engineer, he quoted verbatim all of the Surveillance Requirements listed in the TSR for his system, and

described in detail the performance of the tests, the technical basis for them, and the as-found condition of the equipment upon recent testing. The exceptional knowledge and experience of the CSEs is a highlight of the review.

ENG.2-BP-1: The WIPP Cognizant System Engineer/Alternate Cognizant System Engineer System Assignment List demonstrates a concerted effort on the part of NWP to ensure coverage in accordance with DOE O 420.1C for all safety systems, and ensure succession planning is in place.

In the past few years, NWP created a Design Agent responsibility to ease the burden on the Cognizant System Engineers. The Design Agent organization contains a staff of engineers who support the CSEs by managing all design changes and maintaining configuration management while CSEs cover the day to day operations and health of the systems. The CSEs stay informed on design changes and ultimately approve all design change packages prepared by the Design Agent organization.

Besides work experience and prerequisite education necessary to fill the position, there are no specific qualification requirements for the Design Agent engineers. However, 3 of 9 are licensed professional engineers.

Overall, engineering qualifications were found to be adequate.

5. **Periodic assessments of the engineering and CSE programs are performed to verify continued robust performance. Issues, recommendations or findings from assessments, both internal and external are tracked and resolved in a formal manner to ensure satisfactory correction and prevent reoccurrence.**

   See ENG.1 criteria 6.

6. **The engineering and CSE program was adequately evaluated by the contractor Operational Readiness Review. (DOE Order 425.1C)**

   As noted above, the CORR did identify the vulnerability associated with the newness of the program, which has been reflected in a WIPP form. No action has yet been taken on the issue.

CONCLUSION

Overall, the objectives of the engineering program were MET. The engineering program has improved significantly since 2014, and the knowledge and experience of the personnel in this area largely compensate for the remaining issues. However, the program is not fully implemented and has minimal run-time, evidence of successful implementation is very limited, and resource (funding) shortages could reduce the availability of safety SSCs. Recommend continued management attention and DOE oversight of this area until the new program is fully matured.

The area of Ground Control needs significant increased management focus. Upon receipt of the MSHA report, a cohesive plan for roof bolting to ensure structural integrity of the mine needs to be developed and implemented. An overall mining and emplacement strategy for the future should be developed immediately.

Issues

Post-Start Finding
ENG.2-POST-1: Contrary to the requirements of the DSA, SDD, and DOE Order 433.1B, the UVS/IVS systems' operability could be impaired by unresolved known issues, lack of spare parts, and incomplete construction punch list items.

Best Practice
ENG.2-BP-1: The WIPP Cognizant System Engineer/Alternate Cognizant System Engineer System Assignment List demonstrates a concerted effort on the part of NWP to ensure coverage in accordance with DOE O 420.1C for all safety systems, and ensure succession planning is in place.

Evaluated by:	**Approved by:**
/s/ Elaine Diaz, Team Member	/s/ Edward Westbrook, Team Leader
/s/ James Kekacs, Team Member	

DOE ORR for the Waste Isolation Pilot Plant
Review Form 1

Functional Area:	Objective:	Objective Met	
Fire Protection	FP.1	Yes [ ]	No [X]

OBJECTIVE

FP.1: A comprehensive fire protection program has been established and implemented and ensures fire safety hazards are analyzed and appropriate engineering and administrative controls are identified and implemented to maintain safe operations during the facility life cycle. **(Core Requirements 1, 2, 5 and 15)**

CRITERIA

1. A comprehensive fire hazard analysis (FHA) is documented with assumptions, conditions, and controls documented in the FHA are implemented in facility design and operation. Additional programmatic fire protection documentation (e.g., exemptions, Baseline Needs Analysis, etc.) is appropriately developed, approved and implemented.
2. Fire protection program procedures have been developed and implemented and include normal operations, off-normal operations, emergency and alarm response procedures.
3. Fire protection program assignments and responsibilities are documented, clearly defined, and understood. Interfaces between fire protection personnel and the line organization are documented, and understood.
4. Life Safety Code aspects of the WIPP are documented and implemented. Mine evacuation requirements are documented and complied with (DSA Key Element 11-8).
5. Periodic fire prevention and combustible loading inspections are performed and procedures are being implemented to control to minimize the risk from fire. Fire protection personnel exhibit an awareness of, and commitment to, public and worker safety, health and environmental protection requirements.
6. The CORR adequately evaluated the Fire Protection Program and its implementation at the WIPP Facility.

APPROACH

Record Review:

- Review the DSA, TSR, and FHA safety basis documentation, contract, fire protection program documentation, fire protection procedures, organizational charts, fire protection inspections/walkthroughs, fire protection facility modifications, work packages, and facility logs. Review the CORR

implementation plan, final report, and corrective actions resulting from the CORR to determine the adequacy of the scope, depth, and rigor of the review.

Interviews:

- Interview the following individuals: Project Manager, Facility Manager, Fire Protection Engineer, Fire Department Chief, Fire Department staff, Operations Supervisor, and operators.

Shift Performance:

- During facility walkdowns observe existing fire hazards and determine whether the facility is effectively implementing Fire Protection Program consistent with the FHA and operational procedures.

Records Reviewed

- *Contractor Operational Readiness Review (CORR) Final Report for the Commencement of Contact-Handled Waste Emplacement at the Waste Isolation Pilot Plant*, dated 10/28/2016
- Drawing # 24-C-048-W,
- EA12FP3003-2-0, *Underground Combustible Material/Gas Cylinder Check Sheet*, Rev. 4, dated May 30, 2016
- EA12FP3009-2-0, *Monthly Exhaust Filter Building FPE Combustible Control Inspection October 2016*, completed 10/04/2016
- EA12FP3009-3-0, *Monthly Underground FPE Combustible Control Inspection*, completed 10/03/2016
- EA04AD3008-45-0, *Facility Operations Freeze Protection Inspection Round Sheet*, Rev. 4, dated 03/10/2016
- EA04AU9534-1-0, *Operation of Liquid Fueled Vehicles and Equipment Sign-Off Sheet*, Vehicle # 74-U-128 Bolter, completed 11/15/2016
- EA04AU9534-1-0, *Operation of Liquid Fueled Vehicles and Equipment Sign-Off Sheet*, Vehicle # 74-U-128 Bolter, completed 11/14/2016
- EA04AU9534-1-0, *Operation of Liquid Fueled Vehicles and Equipment Sign-Off Sheet*, Vehicle # 74-U-128, completed 11/08/2016
- EA04AU9534-1-0, *Operation of Liquid Fueled Vehicles and Equipment Sign-Off Sheet*, Vehicle # 74-U-131 Bolter, completed 11/15/2016
- EA04AU9534-1-0, *Operation of Liquid Fueled Vehicles and Equipment Sign-Off Sheet*, Vehicle # 74-U-131 Bolter, completed 11/14/2016
- EA04AU9534-1-0, *Operation of Liquid Fueled Vehicles and Equipment Sign-Off Sheet*, Vehicle # 74-U-131, completed 11/07/2016
- EA04AU9534-1-0, *Operation of Liquid Fueled Vehicles and Equipment Sign-Off Sheet*, Vehicle # 74-U-131, completed 11/08/2016
- EA04AU9534-1-0, *Operation of Liquid Fueled Vehicles and Equipment Sign-Off Sheet*, Vehicle # 74-U-145 Panel 7, completed 11/14/2016

- Environmental Protection Agency SNAP Fact Sheet, *Final Rule 21 – Protection of Stratospheric Ozone: Significant New Alternatives Policy Program New and Changed Listings*, dated 09/26/2016
- Fire and Life Safety Assessment WIPP-FSA-411/412, Rev. 0, conducted October 20, 2015
- Fire Protection Baseline Inspection Plan
- Fire Protection Engineering Impairment Priority Matrix
- Fire Protection Program assessment schedule
- Letter A. Gee, Fireaway Inc. to Whom This May Concern, No Subject, dated May 23, 2016
- Letter D. C. Bryson to P. J. Breidenbach, Subject: *Revision of DOE Memorandum CBFO:OESH:JF:ANC:12-0776:UFC 5487.00 from Mr. Jose R. Franco to Mr. Farok Sharif, Dated September 05, 2012, Subject "DOE/CBFO Fire Protection Authority Having Jurisdiction Function Management and Operating Contractor Responsibilities,"* dated September 1, 2015
- Letter P. J. Breidenbach to T. Shrader, Subject: *Request for an Equivalency Involving the Use of Fire Screens for the Interim Ventilation System Filter Assembly*, AA:16:01107, dated July 27, 2016
- Letter T. D. Shrader and W. Mouser to P. J. Breidenbach, Subject: *Approval of Contract DE-EM0001971, Submittal of NWP WIPP Fire Protection Program*, dated July 26, 2016
- Letter T. Shrader and W. Mouser to P. J. Breidenbach, Subject: *Approval of WIPP-EQ-2016-001, Request for an Equivalency Involving the Use of Fire Screens for the Interim Ventilation System Filter Assembly*, dated August 5, 2016
- Letter T. Shrader to P. J. Breidenbach, Subject: *Contract No. DE-EM0001971, Submittal of WIPP-EQ-2015-01 Request for an Equivalency for NFPA 101, Life Safety Code, and Alternative Egress Provisions within the WIPP Underground*, dated September 19, 2016
- Letter W. B. Till to T. Shrader, Subject: *Request for Authority Having Jurisdiction Concurrence and Approval of Alternative Fire Extinguisher Inspections in Certain Areas of the Waste Isolation Pilot Plant Underground*, AA:16:01099, dated July 8, 2016
- Letter, P. J. Breidenbach to T. D. Shrader, Subject: *Completion of Fire Protection Program Conditions of Approval Under Nuclear Waste Partnership, LLC Prime Contract DE-EM0001971*, AA:16:01112, dated August 5, 2016
- Manufacturer Cut Sheet, John Tillman Co., Light Duty Blanket #585
- Memorandum G. M. Balsmeier to P. J. Breidenbach, Subject: *Request for Approval to Proceed with the Contractor Operational Readiness Review for the Commencement of Contract Handled Waste Emplacement at the Waste Isolation Pilot Plant*, dated September 26, 2016
- Memorandum J. R. Fadeley and W. B. Till to H. Handfinger, D. Huddleston, and M. Love, Subject: *Engineering Path Forward Underground Vehicle AFSS Comp Measures*, EN:16:00060, dated July 22, 2016
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- Memorandum W. B. Till to J. R. Fadeley, Subject: *Fire Protection/Fire System Technician Qualifications*, dated August 3, 2016
- Nuclear Waste Partnership LLC, Corrective Action Plan, *Underground Salt Haul Truck Fire Event*, dated 02/11/2015
- SAF-502 Handout, *Annual Underground Refresher*, Rev. 13
- Technical Operability Evaluation, ETO-Z-326, *Fire Protection Engineering Operability Analysis of the 411 Process Areas Sprinkler Systems*, dated 09/29/2016
- Vehicle Fire Hazard Risk Assessment, WIPP Vehicle # 74-H-049, dated 08/03/2016
- *Vehicle Fire System Final Inspection & Testing Report, ANSUL LVS Systems*, American Fire Equipment Sales and Service Corporation
- WIPP Form Number WF16-661
- WIPP-023, *Fire Hazards Analysis for the Waste Isolation Pilot Plant*, Rev. 7, dated August 31, 2015
- WP 04-AU0534, *Underground Access Initiation/Termination*, Rev. 4, dated 05/30/2016
- WP 04-AU1028, *Underground Non-Waste Handling Vehicle Inspection Requirements*, Rev. 2, dated 05/30/2016
- WP 04-AU1030, *Diesel Forklift Preoperational Requirements*, Rev. 3, dated 05/30/2016
- WP 04-AU1031, *Roof Bolter Preoperational Requirements*, Rev. 2, dated 05/30/2016
- WP 04-AU1032, *Scissor Lift Preoperational Requirements*, Rev. 2, dated 05/30/2016
- WP 04-AU1033, *Load Haul Dump Preoperational Requirements*, Rev. 2, dated 05/30/2016
- WP 04-AU1034, *Kubota Tractor Preoperational Requirements*, Rev. 2, dated 05/30/2016
- WP 04-AU1035, *Skid Steer Preoperational Requirements*, Rev. 2, dated 05/30/2016
- WP 04-AU1036, *Tiger Tractor Preoperational Requirements*, Rev. 2, dated 05/30/2016
- WP 04-AU1037, *Scaler/Seal Cutter Preoperational Requirements*, Rev. 2, dated 05/30/2016
- WP 04-AU1038, *Haul Truck Preoperational Requirements*, Rev. 2, dated 05/30/2016
- WP 04-AU1039, *Aerial Boom Lift Preoperational Requirements*, Rev. 2, dated 05/30/2016
- WP 04-AU9534, *Operation of Liquid Fueled Vehicles and Equipment in Underground & Movement of 300 Gallon (Nominal) Fuel Tank*, Rev. 2, dated 05/30/2016
- WP 12-ER.25, *Underground Escape and Evacuation Plan*, Rev. 0, dated 01/07/2016
- WP 12-ER4911, *Underground Fire Response*, Rev. 22, dated 06/16/2016

- WP 12-ER4925, *CMR Incident Recognition and Initial Response*, Rev. 5, dated 06/20/2016
- WP 12-FP.03, *WIPP Fire Department Program Plan*, Rev. 0, dated 08/28/2015
- WP 12-FP.07, *WIPP Combustible Control Program*, Rev. 2
- WP 12-FP.19, *WIPP Fire Protection Self-Assessment Program*, Rev. 0, dated 07/12/2016
- WP 12-FP.28, *Fire Protection Program Implementation Plan and Procedures,* Rev. 0
- WP 12-FP0026, *Weekly Surveillance for Fire Water Supply and Distribution System*, Rev. 11-FR1, dated 11/03/2016
- WP 12-FP0028, *Fire Systems Inspection and Testing*, Rev. 9, dated 10/23/2016
- WP 12-FP3001, *Fire Protection Impairment*, Rev. 9, dated 05/17/2016
- WP 12-FP3003, *Combustible Material and Compressed Gas Cylinder Checks*, Rev. 20, dated 09/14/2016
- WP 12-FP3009, *Fire Protection Engineering Combustible Control Program Inspections*, Rev. 0, dated 05/23/2016
- WP 15-PS.2, *Procedure Writer's Guide*, Rev. 12-FR1
- WP 09-CN3007, *Engineering Change Notice*, Rev. 47, dated 10/03/2016
- EA04AD3001-SR8, *LCO Surveillance Data Sheet, LCO 3.1.1 Waste Handling Building (WHB) Fire Suppression System*, completed 11/14/2016
- Work Order 1625893, *SR8, SR4.1.1.3, LCO3.1.1, 456 – WKY EST FIRE PUMP RUN HWFP*, completed 11/14/2016
- WP 12-FP.01, *WIPP Fire Protection Program*, Rev. 14, dated 08/03/2016
- Facility Operations Essential Plan Equipment status dated 11/15/2016
- WP 12-FP3002, *Hot Work Permits*, Rev. 16, dated 05/17/2016
- Combustible Loading Permit # 16-58, dated 08/15/2016
- Combustible Loading Permit # 16-82, dated 09/19/2016
- Combustible Loading Permit # 16-92, dated 10/20/2016
- AIB Judgements of Need Closure Status, dated 11/04/2016
- Full Scale Exercise Plan, EX-2016-04 DORR-16, Rev. 1 dated 11/07/2016
- Fire Protection Impairment List, dated 11/10/2016
- WP 04-AD3013, *Underground Access Control*, Rev. 40, dated 05/30/2016
- WP 12-FP3006, *WIPP Combustible Permitting*, Rev. 0, dated 10/28/2015
- DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis*, Rev. 5b, dated April 2016
- DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis*, Rev. 5b, dated April 2016
- DOE/WIPP 07-3373, *Waste Isolation Pilot Plant Technical Safety Requirements*, Rev. 5b, dated April 2016

Interviews Conducted

- CAS Manager
- Central Monitoring Room (CMR) Operator
- Deputy Manager of Facility Operations

- Facility Operations Technician
- Fire Department Chief
- Fire Marshal
- Fire Protection Engineer (4)
- Fire Protection Engineer/Fire Protection Cognizant Engineer
- Fire Protection Program Manager
- Fire Protection Systems Project Manager
- Fire Protection Technician
- Firefighter (4)
- Facility Shift Manager
- Nuclear Safety Manager
- Underground Roving Watch (2)
- Waste Handling Engineer

Shift Performances Observed

- Demonstration of Monthly Exhaust Filter Building FPE Combustible Control Inspection
- Demonstration of Monthly Underground FPE Combustible Control Inspection
- Emergency Exercise DORR-16 (EX-2016-04)
- Underground Combustible Material/Gas Cylinder Check
- Weekly Surveillance for Fire Water Supply and Distribution System

Discussion of Results

1. **A comprehensive fire hazard analysis (FHA) is documented with assumptions, conditions, and controls documented in the FHA are implemented in facility design and operation. Additional programmatic fire protection documentation (e.g., exemptions, Baseline Needs Analysis, etc.) is appropriately developed, approved and implemented.**

   WIPP-023, *Fire Hazards Analysis for the Waste Isolation Pilot Plant*, evaluates the current conditions of the WIPP facilities and assesses the risk from fire to determine whether DOE fire safety objectives of DOE Order 420.1C, *Facility Safety*, are met.

   Several findings and recommendations are identified in WIPP-023 related to legacy conditions that are contrary to current National Fire Protection Association (NFPA) 101 requirements. NWP continues to track and plan corrective actions to address legacy compliance issues. Most notably, WIPP-023 identifies the fact that historically, life safety in the underground was based on 30 CFR 57 requirements and that a recent determination was made that NFPA 101, *Life Safety Code*, life safety features were applicable to the underground. Therefore, DOE approval of an equivalent level of life safety provided for the underground was necessary. Subsequently, NWP submitted, and CBFO approved WIPP-EQ-

2015-01, to address the *Life Safety Code* and alternate egress provisions within the WIPP underground, as discussed in Criterion 4 below.

Additionally, WIPP-023 addresses the need for exemption to DOE Order 420.1C requirements for automatic fire suppression throughout the underground area and identifies features and requirements which contribute to an alternative approach to full fire suppression coverage. NWP subsequently submitted an exemption proposal which has not yet been approved by the approval authority. Approval of the exemption is identified on the manageable list of open items and is considered an open pre-start item.

Conditions and controls established by the FHA are implemented in the facility design and operation, except as noted elsewhere in FP.1 and FP.2. To ensure longevity of implementation of FHA and other fire protection program driven controls, NWP is in the process of identifying key controls implemented in procedures by placing the driver document reference at the end of key procedure steps in accordance with WP 15-PS.2, *Procedure Writer's Guide*. These markings serve to protect from accidental deletion and assist in the verification of a procedure to the source documents. This practice is considered a best management practice.

Development, approval, and implementation of the WIPP Baseline Needs Assessment is addressed under CRAD EP.1

This criterion is considered met.

2. Fire protection program procedures have been developed and implemented and include normal operations, off-normal operations, emergency and alarm response procedures.

WP 12-FP.01, *Fire Protection Program*, defines the scope, roles and responsibilities, organizational structure, and requirements for implementing an effective and comprehensive fire protection program for NWP activities. The fire protection program applies to all WIPP facilities and activities for which NWP is contractually responsible. WP 12-FP.28, *Fire Protection Program Implementation Plan and Procedures*, provides a matrix for implementing an effective and comprehensive fire protection program as established in WP 12-FP.01. WP 12-FP.01, as well as WP 12-FP.28, has been approved by CBFO as required by DOE Order 420.1C, *Facility Safety*.

The fire protection program includes various policies, programs and procedures for design, operations, emergency response, fire hazard analysis, assessments, wildland fire, and specific fire protection criteria. These include normal operations, off-normal operations, and emergency and alarm response procedures. A sample of fire protection procedures was reviewed during the DORR to determine adequacy of implementation. Facility walkdowns and interviews were

also conducted to determine effectiveness of implementation. Based on procedure reviews, walkdowns, and interviews, fire protection procedures are generally adequately implemented.

This criterion is considered met.

3. **Fire protection program assignments and responsibilities are documented, clearly defined, and understood. Interfaces between fire protection personnel and the line organization are documented, and understood.**

   WP 12-FP.01 and implementing procedures clearly define and document roles and responsibilities for implementing the fire protection program through all levels of the organization, including line management/operations. Observations of fire protection personnel while conducting routine inspections and interfacing with line organizations indicate that key interfaces are understood and effective.

   This criterion is considered met.

4. **Life Safety Code aspects of the WIPP are documented and implemented. Mine evacuation requirements are documented and complied with (DSA Key Element 11-8).**

   Life Safety Code aspects of the WIPP are addressed in WIPP-023, *Fire Hazards Analysis for the Waste Isolation Pilot Plant*. Several findings and recommendations are identified in WIPP-023 related to legacy conditions that are contrary to current NFPA 101 requirements. NWP continues to track and plan corrective actions to address legacy compliance issues. Most notably, WIPP-023 identifies the fact that historically, life safety in the underground was based on 30 CFR 57 requirements and that a recent determination was made that NFPA 101 life safety features were applicable to the underground. Therefore, DOE approval of an equivalent level of life safety provided for the underground was necessary.

   Subsequently, NWP submitted WIPP-EQ-2015-01, to address the *Life Safety Code* and alternate egress provisions within the WIPP underground. CBFO provided conditional approval in letter T. Shrader to P. J. Breidenbach, Subject: *Contract No. DE-EM0001971, Submittal of WIPP-EQ-2015-01 Request for an Equivalency for NFPA 101, Life Safety Code, and Alternative Egress Provisions within the WIPP Underground*, dated September 19, 2016. The conditional letter of approval requires resolution of ten open items that have not yet been formally dispositioned. CBFO allowed a 120-day period for disposition of the open items.

   Despite the ten open conditions, the equivalency was reviewed to verify implementation of the engineered and administrative controls being relied upon for providing equivalent level of life safety. The identified equivalent approach uses controls including:

- Combustible control program for preventing small fires from becoming large fires,
- Localized automatic fire suppression systems to limit the size of a fire where limiting the amount of combustibles and/or segregation of combustibles is not feasible (e.g. "high fire load" areas and vehicles identified through hazard evaluations),
- Crediting of noncombustible structural composition of the floor, walls, and roof of the mine such that a fire cannot propagate through the structure,
- Personnel training and controlling the number of underground personnel thereby limiting time required to evacuate the mine to less than 1 hour,
- Pre-incident escape and evacuation planning, training and drills to enhance the worker's knowledge and execution of evacuation procedures,
- Dual and separate egress routes from any point of the mine to the surface, with exception of an active work face which is required to have limited occupancy and limited common travel path distance,
- Posted evacuation signage, and
- Personnel protective equipment including miner's lamps for personal light source to enhance visibility, self-rescuers to provide breathable air, and individual employee notification and tracking (IENT) system to provide notification and enhance situational awareness.

With the exception of localized automatic fire suppression systems, the above controls were verified as being implemented based on document reviews, walkdowns, and interviews with key personnel. Installation and turnover of the underground "high fire load" fire suppression systems is identified on the manageable list of open items and is considered an open pre-start item. At the time of the DORR, the status of this pre-start item had not changed. Installation of the automatic fire suppression kill switch for Contact-Handled (CH) Waste Transporter 52-H-008A is also identified on the manageable list of open items and is also considered a pre-start item. Although the kill switch has since been installed on CH Waste Transporter 52-H-008A, nonconformance conditions still exist and Non Conformance Reports (NCRs) on this equipment have not been closed, therefore this pre-start item also remains open.

Equivalency WIPP-EQ-2015-01 states that underground diesel powered equipment is evaluated for fire risk in accordance with NFPA 122 and that all equipment determined to pose an unacceptable fire risk in the NFPA 122 analysis will be protected with an automatic fire suppression system prior to use. NWP has established a priority list for conducting Fire Hazard Risk Analysis (FHRA). Essentially, three groups of vehicles have been identified: the first group, vehicles used for waste handling, being the highest priority; second group, vehicles used for non-waste handling, being the second highest priority; and the third group, vehicles not currently being used, being the lowest priority. Vehicles in groups one and two have been evaluated using the FHRA which have determined they

pose an unacceptable fire risk, thus requiring automatic fire suppression. Fire suppression systems have been installed on the waste handling vehicles identified in group one, as required (except as noted in the pre-start open item discussed above). However, fire suppression systems have not yet been installed for all non-waste handling vehicles prior to use as required by fire protection equivalency WIPP-EQ-2015-01, Documented Safety Analysis Key Element (KE) 11-5, and the associated FHRAs (**FP.1-PRE-1**). Procedures for preoperational checks of vehicles, such as WP 04-AU1031, *Roof Bolter Preoperational Requirements*, and WP 04-AU1039, *Aerial Boom Lift Preoperational Requirements*, allow use of non-waste handling vehicles if an automatic fire suppression system is not installed, requiring only a fire watch to be established as a compensatory measure. It was noted that equipment specific FHRAs do not provide justification of use of vehicles that have not been provided with the specified risk mitigation. It should also be noted that the accident investigation board for the *Underground Salt Haul Truck Fire Event* identified a contributing cause related to an existence of a nuclear versus mine culture where there were significant differences in the treatment of waste-handling versus non-waste-handling equipment. This differentiation has not been fully remedied.

Mine evacuation requirements (e.g. unobstructed planned escape routes, mine exit markings, communications, Abnormal Operations Procedures), as specified by DSA KE 11-8 are documented and implemented with one noted weakness. WP 12-ER.25, *Underground Escape and Evacuation Plan*, provides information and requirements regarding escape and evacuation of the mine during an emergency. The plan is focused on underground escape and evacuation protocols according to WIPP emergency plans and procedures that address firefighting, emergency notifications, site emergency response, emergency equipment, and mutual aid. In accordance with WP 12-ER.25, life safety egress markings are installed on the right side of the drift when egressing toward the conveyance. Vehicles are required to be parked on the side of the drift that is opposite the egress reflectors in order to prevent obstruction of the markings. Underground vehicles were observed (on several occasions) parked on the wrong side of the drifts, contrary to WP 12-ER.25. This is a repeat pre-start finding from the CORR (**FP.1-PRE-2**).

This criterion is considered not met.

5. Periodic fire prevention and combustible loading inspections are performed and procedures are being implemented to control to minimize the risk from fire. Fire protection personnel exhibit an awareness of, and commitment to, public and worker safety, health and environmental protection requirements.

NWP has developed a new combustible loading program that is still in its infancy with implementation. WP 12-FP.07, *WIPP Combustible Control Program*, establishes requirements for managing combustible control limits and provides guidance and instructions for controlling the introduction, storage, and handling of ordinary transient combustibles that are used in facility operations to decrease

the possibility and consequence of fire. The combustible control program is established to ensure that combustibles are managed in accordance with requirements delineated in DOE 420.1C, *Facility Safety*; NFPA 801, *Standard for Facilities Handling Radioactive Materials*; NWP Policy for Underground Combustible Controls; WP 12-FP.01, *WIPP Fire Protection Program*; WIPP-023, *WIPP Fire Hazards Analysis*, and the DSA Key Elements 11-2 and 11-5.

Introduction of combustible materials into WIPP facilities are managed and controlled using WP 12-FP3006, *WIPP Combustible Permitting*. Fire prevention and combustible loading inspections are conducted routinely by multiple organizations in accordance with WP 12-FP3003, *Combustible Material and Compressed Gas Cylinder Checks*, and WP 12-FP3009, *Fire Protection Engineering Combustible Control Program Inspections*. Demonstration of these inspections and review of past inspection forms indicate that fire protection personnel exhibit an awareness of, and commitment to, public and worker safety, health and environmental protection requirements by identifying and communicating issues to facility management for corrective action.

Additionally, combustible loading related training is provided to all employees with underground access through the Annual Underground Refresher (SAF-502) training.

Based on walkdowns, document reviews, and personnel interviews, discrepancies between combustible loading requirements were identified as well as notable issues regarding implementation of combustible loading requirements, indicating that the combustible loading program is not effectively implemented (**FP.1-PRE-3**). For example:

a. Inconsistencies noted between WP 12-FP.07, EA12-FP3003-2-0, and SAF-502 regarding size of fuel packages (3 megawatt (MW) vs 5 MW), separation requirements (7 feet vs 10 feet), and allowances to reduce separation.
b. "Fire blankets" are being used not in accordance with their approved and intended function (i.e. weld curtain for vertical plane protection only) and are falsely relied upon to mitigate exposure to adjacent fires, thus allowing reduction of separation distances (see EA12FP3003-2-0, item 1h).
c. Four wooden spools/reels of wire were observed staged together in the underground. WP 12-FP.07 identifies one wooden spool/reel or wire as an example of a 3 MW fuel package requiring a minimum seven feet of separation between fuel packages. Proper separation was not provided for the subject fuel packages.
d. Combustible materials were repeatedly observed staged on the same side of the drift as the exit reflectors, contrary to WP 12-FP.07.
e. Combustible loading permit includes a question of whether an unreviewed safety question (USQ) is required without any criteria established to

enable a Yes/No response or training/qualification of the Fire Protection Engineer to enable a correct response.

This criterion is considered partially met.

6. **The CORR adequately evaluated the Fire Protection Program and its implementation at the WIPP Facility.**

   Review of the *Contractor Operational Readiness Review (CORR) Final Report for the Commencement of Contact-Handled Waste Emplacement at the Waste Isolation Pilot Plant* was conducted to compare conclusions regarding adequacy of the WIPP fire protection program and its implementation at the WIPP facility. The CORR was judged to have adequately evaluated the WIPP fire protection program and its implementation to support waste emplacement.

   This criterion is considered met.

CONCLUSION

A comprehensive fire protection program has been established to include documented fire hazard analysis, clearly defined roles and responsibilities, and development and implementation of fire protection program procedures which include normal operations, off-normal operations, and emergency and alarm response procedures. Additional programmatic fire protection documentation that ensures fire safety hazards are analyzed and ensures implementation of appropriate engineering and administrative controls to maintain safe operations have not been fully established and implemented. For example, approval of the fire protection exemption for fire suppression throughout the underground has not been obtained; not all provisions of the CBFO-approved fire protection equivalency for alternate egress provisions have been fully implemented; installation and turnover of the underground "high fire load" fire suppression systems have not been completed; installation and turnover of fire suppression systems for all non-waste handling vehicles being used have not been completed; and discrepancies between combustible loading requirements and notable issues regarding implementation of combustible loading requirements have been identified indicating that the combustible loading program is not effectively implemented. Additionally, mine evacuation requirements are not always complied with as indicated by underground vehicles being observed (on several occasions) parked on the wrong side of the drifts, which is a repeat pre-start finding from the CORR.

This Objective has not been met.

Issue(s)

FP.1-PRE-1: Fire suppression systems have not yet been installed/accepted for all non-waste handling vehicles prior to use as required by fire protection equivalency WIPP-EQ-2015-01, and Documented Safety Analysis Key Element (KE) 11-5.

FP.1-PRE-2: Underground vehicles were observed (on several occasions) parked on the wrong side of the drifts, contrary to WP 12-ER.25, *Underground Escape and Evacuation Plan*. This is a repeat pre-start finding from the CORR.

FP.1-PRE-3: The combustible loading program contains conflicting/unclear documentation and is not effectively implemented.

Evaluated by:	**Approved by:**
/s/ Taryn S. Couchman-Cates, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Review Form 1

Functional Area:	Objective:	Objective Met	
Fire Protection	FP.2	Yes [X]	No [ ]

OBJECTIVE

FP.2: Fire protection systems are capable of providing their intended functions and are operable. Adequate numbers of technically competent, experienced, and fully qualified personnel are assigned to address the fire protection commitments. **(Core Requirement 4, 8, 14, and 15)**

CRITERIA

1. The WIPP Site Fire Protection program is staffed with adequate numbers of technically competent, experienced, fully qualified personnel including fire protection engineers, fire fighters and technicians.
2. Fire protection systems and features are designed, installed, surveilled and maintained to provide a level of protection, functionality, and reliability. Procedures are in place for performing inspection, testing, surveillance and maintenance of fire protection systems and features. There is a schedule for performing the inspection, testing, surveillance and maintenance of the fire protection systems, including compensatory measures and an impairment prioritization process.
3. DSA Key Elements 11-2 and 11-5 are effectively implemented.
4. Contractor engineering disciplines ensure that the requirements of the Fire Protection Program are incorporated into facility design modifications and construction. This includes a documented review by a qualified fire protection engineer of plans, specifications, procedure for all modifications, and acceptance tests.
5. Procedures ensure feedback is captured including periodic facility assessments to verify continued robust implementation of a compliant fire protection program that evaluates on-going implementation of the fire protection program commitments documented by the FHA.
6. Issues, recommendations or findings from assessments or evaluations, both internal and external, are tracked and resolved in a formal manner to ensure satisfactory correction and prevent reoccurrence. AIB JONS associated with fire protection have been properly dispositioned and verified to be closed.
7. The CORR adequately evaluated the fire protection systems and equipment, and fire protection personnel at the WIPP Facility.

APPROACH

Record Review:

- Review work packages, inspections, safety basis documentation, and other contractor's procedures. Review fire department staffing documents. Review inspection, testing, surveillance and maintenance records for fire protection systems and life safety features. Review corrective action records for fire protection related issues, including those associated with the AIB JONs. Evaluated inspection testing and maintenance procedures for impairment procedures and compensatory measures.

Interviews:

- Interview operators, supervisors, and managers to ensure they understand their responsibilities and roles with regard to minimum staffing requirements during all phases of facility operations. Evaluate staff experience and qualifications.

Shift Performance:

- Assess staffing levels to determine their adequacy and ability to satisfy administrative and safety basis requirements. Walk down fire protection systems with system engineer to ensure adequacy of system documentation and IT&M procedures. Walk down facility to observe installation and operability of all elements of the fire protection systems including physical systems and components and combustion control and storage programs.

Records Reviewed

- AIB Judgements of Need Closure Evidence Binders
- AIB Judgements of Need Closure Status, dated 11/04/2016
- Combustible Loading Permit # 16-58, dated 08/15/2016
- Combustible Loading Permit # 16-82, dated 09/19/2016
- Combustible Loading Permit # 16-92, dated 10/20/2016
- DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis*, Rev. 5b, dated April 2016
- DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis,* Rev. 5b, dated April 2016
- DOE/WIPP 07-3373, *Waste Isolation Pilot Plant Technical Safety Requirements*, Rev. 5b, dated April 2016
- Drawing # 24-C-048-W,
- EA12FP3003-2-0, *Underground Combustible Material/Gas Cylinder Check Sheet*, Rev. 4, dated May 30, 2016
- EA12FP3009-2-0, *Monthly Exhaust Filter Building FPE Combustible Control Inspection October 2016*, completed 10/04/2016
- EA12FP3009-3-0, *Monthly Underground FPE Combustible Control Inspection*, completed 10/03/2016

- EA04AD3001-SR8, *LCO Surveillance Data Sheet, LCO 3.1.1 Waste Handling Building (WHB) Fire Suppression System*, completed 11/14/2016
- EA04AD3008-45-0, *Facility Operations Freeze Protection Inspection Round Sheet*, Rev. 4, dated 03/10/2016
- EA04AU9534-1-0, *Operation of Liquid Fueled Vehicles and Equipment Sign-Off Sheet*, Vehicle # 74-U-128 Bolter, completed 11/15/2016
- EA04AU9534-1-0, *Operation of Liquid Fueled Vehicles and Equipment Sign-Off Sheet*, Vehicle # 74-U-128 Bolter, completed 11/14/2016
- EA04AU9534-1-0, *Operation of Liquid Fueled Vehicles and Equipment Sign-Off Sheet*, Vehicle # 74-U-128, completed 11/08/2016
- EA04AU9534-1-0, *Operation of Liquid Fueled Vehicles and Equipment Sign-Off Sheet*, Vehicle # 74-U-131 Bolter, completed 11/15/2016
- EA04AU9534-1-0, *Operation of Liquid Fueled Vehicles and Equipment Sign-Off Sheet*, Vehicle # 74-U-131 Bolter, completed 11/14/2016
- EA04AU9534-1-0, *Operation of Liquid Fueled Vehicles and Equipment Sign-Off Sheet*, Vehicle # 74-U-131, completed 11/07/2016
- EA04AU9534-1-0, *Operation of Liquid Fueled Vehicles and Equipment Sign-Off Sheet*, Vehicle # 74-U-131, completed 11/08/2016
- EA04AU9534-1-0, *Operation of Liquid Fueled Vehicles and Equipment Sign-Off Sheet*, Vehicle # 74-U-145 Panel 7, completed 11/14/2016
- Environmental Protection Agency SNAP Fact Sheet, *Final Rule 21 – Protection of Stratospheric Ozone: Significant New Alternatives Policy Program New and Changed Listings*, dated 09/26/2016
- Facility Operations Essential Plan Equipment status dated 11/15/2016
- Fire and Life Safety Assessment WIPP-FSA-411/412, Rev. 0, conducted October 20, 2015
- Fire Protection Baseline Inspection Plan
- Fire Protection Engineering Impairment Priority Matrix
- Fire Protection Impairment List, dated 11/10/2016
- Fire Protection Program assessment schedule
- Full Scale Exercise Plan, EX-2016-04 DORR-16, Rev. 1 dated 11/07/2016
- Letter A. Gee, Fireaway Inc. to Whom This May Concern, No Subject, dated May 23, 2016
- Letter D. C. Bryson to P. J. Breidenbach, Subject: *Revision of DOE Memorandum CBFO:OESH:JF:ANC:12-0776:UFC 5487.00 from Mr. Jose R. Franco to Mr. Farok Sharif, Dated September 05, 2012, Subject "DOE/CBFO Fire Protection Authority Having Jurisdiction Function Management and Operating Contractor Responsibilities,"* dated September 1, 2015
- Letter P. J. Breidenbach to T. Shrader, Subject: *Request for an Equivalency Involving the Use of Fire Screens for the Interim Ventilation System Filter Assembly*, AA:16:01107, dated July 27, 2016
- Letter T. D. Shrader and W. Mouser to P. J. Breidenbach, Subject: *Approval of Contract DE-EM0001971, Submittal of NWP WIPP Fire Protection Program*, dated July 26, 2016

- Letter T. Shrader and W. Mouser to P. J. Breidenbach, Subject: *Approval of WIPP-EQ-2016-001, Request for an Equivalency Involving the Use of Fire Screens for the Interim Ventilation System Filter Assembly*, dated August 5, 2016
- Letter T. Shrader to P. J. Breidenbach, Subject: *Contract No. DE-EM0001971, Submittal of WIPP-EQ-2015-01 Request for an Equivalency for NFPA 101, Life Safety Code, and Alternative Egress Provisions within the WIPP Underground*, dated September 19, 2016
- Letter W. B. Till to T. Shrader, Subject: *Request for Authority Having Jurisdiction Concurrence and Approval of Alternative Fire Extinguisher Inspections in Certain Areas of the Waste Isolation Pilot Plant Underground*, AA:16:01099, dated July 8, 2016
- Letter, P. J. Breidenbach to T. D. Shrader, Subject: *Completion of Fire Protection Program Conditions of Approval Under Nuclear Waste Partnership, LLC Prime Contract DE-EM0001971*, AA:16:01112, dated August 5, 2016
- Manufacturer Cut Sheet, John Tillman Co., Light Duty Blanket #585
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- Nuclear Waste Partnership LLC, Corrective Action Plan, *Underground Salt Haul Truck Fire Event*, dated 02/11/2015
- NWP Performance Indicators for October FY2017
- SAF-502 Handout, *Annual Underground Refresher*, Rev. 13
- Technical Operability Evaluation, ETO-Z-326, *Fire Protection Engineering Operability Analysis of the 411 Process Areas Sprinkler Systems*, dated 09/29/2016
- Vehicle Fire Hazard Risk Assessment, WIPP Vehicle # 74-H-049, dated 08/03/2016
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- WIPP Form Number WF16-661
- WIPP-023, *Fire Hazards Analysis for the Waste Isolation Pilot Plant*, Rev. 7, dated August 31, 2015
- Work Order 1625893, *SR8, SR4.1.1.3, LCO3.1.1, 456 – WKY EST FIRE PUMP RUN HWFP*, completed 11/14/2016
- WP 04-AU0534, *Underground Access Initiation/Termination*, Rev. 4, dated 05/30/2016

- WP 04-AU1028, *Underground Non-Waste Handling Vehicle Inspection Requirements*, Rev. 2, dated 05/30/2016
- WP 04-AU1030, *Diesel Forklift Preoperational Requirements*, Rev. 3, dated 05/30/2016
- WP 04-AU1031, *Roof Bolter Preoperational Requirements*, Rev. 2, dated 05/30/2016
- WP 04-AU1032, *Scissor Lift Preoperational Requirements*, Rev. 2, dated 05/30/2016
- WP 04-AU1033, *Load Haul Dump Preoperational Requirements*, Rev. 2, dated 05/30/2016
- WP 04-AU1034, *Kubota Tractor Preoperational Requirements*, Rev. 2, dated 05/30/2016
- WP 04-AU1035, *Skid Steer Preoperational Requirements*, Rev. 2, dated 05/30/2016
- WP 04-AU1036, *Tiger Tractor Preoperational Requirements*, Rev. 2, dated 05/30/2016
- WP 04-AU1037, *Scaler/Seal Cutter Preoperational Requirements*, Rev. 2, dated 05/30/2016
- WP 04-AU1038, *Haul Truck Preoperational Requirements*, Rev. 2, dated 05/30/2016
- WP 04-AU1039, *Aerial Boom Lift Preoperational Requirements*, Rev. 2, dated 05/30/2016
- WP 04-AU9534, *Operation of Liquid Fueled Vehicles and Equipment in Underground & Movement of 300 Gallon (Nominal) Fuel Tank*, Rev. 2, dated 05/30/2016
- WP 09-CN3007, *Engineering Change Notice*, Rev. 47, dated 10/03/2016
- WP 10-WC3011, *Work Control Process*, Rev. 37 dated 05/17/2016
- WP 12-ER.25, *Underground Escape and Evacuation Plan*, Rev. 0, dated 01/07/2016
- WP 12-ER4911, *Underground Fire Response*, Rev. 22, dated 06/16/2016
- WP 12-ER4925, *CMR Incident Recognition and Initial Response*, Rev. 5, dated 06/20/2016
- WP 12-FP.01, *WIPP Fire Protection Program*, Rev. 14, dated 08/03/2016
- WP 12-FP.03, *WIPP Fire Department Program Plan*, Rev. 0, dated 08/28/2015
- WP 12-FP.07, *WIPP Combustible Control Program*, Rev. 2
- WP 12-FP.19, *WIPP Fire Protection Self-Assessment Program*, Rev. 0, dated 07/12/2016
- WP 12-FP.28, *Fire Protection Program Implementation Plan and Procedures*, Rev. 0
- WP 12-FP0026, *Weekly Surveillance for Fire Water Supply and Distribution System*, Rev. 11-FR1, dated 11/03/2016
- WP 12-FP0028, *Fire Systems Inspection and Testing*, Rev. 9, dated 10/23/2016
- WP 12-FP3001, *Fire Protection Impairment*, Rev. 9, dated 05/17/2016
- WP 12-FP3002, *Hot Work Permits*, Rev. 16, dated 05/17/2016

- WP 12-FP3003, *Combustible Material and Compressed Gas Cylinder Checks*, Rev. 20, dated 09/14/2016
- WP 12-FP3006, *WIPP Combustible Permitting*, Rev. 0, dated 10/28/2015
- WP 12-FP3009, *Fire Protection Engineering Combustible Control Program Inspections*, Rev. 0, dated 05/23/2016
- WP 15-GM1002, *Issues Management Processing of WIPP Forms*, Rev. 4, dated 06/09/2015
- WP 15-PS.2, *Procedure Writer's Guide*, Rev. 12-FR1

Interviews Conducted

- CAS Manager
- Central Monitoring Room (CMR) Operator
- Deputy Manager of Facility Operations
- Facility Operations Technician
- Fire Department Chief
- Fire Marshal
- Fire Protection Engineer (4)
- Fire Protection Engineer/Fire Protection Cognizant Engineer
- Fire Protection Program Manager
- Fire Protection Systems Project Manager
- Fire Protection Technician
- Firefighter (4)
- Facility Shift Manager
- Nuclear Safety Manager
- Roving Watch
- Underground Roving Watch (2)
- Waste Handling Engineer

Shift Performances Observed

- Demonstration of Monthly Exhaust Filter Building FPE Combustible Control Inspection
- Demonstration of Monthly Underground FPE Combustible Control Inspection
- Emergency Exercise DORR-16 (EX-2016-04)
- Underground Combustible Material/Gas Cylinder Check
- Weekly Surveillance for Fire Water Supply and Distribution System

Discussion of Results

1. **The WIPP Site Fire Protection program is staffed with adequate numbers of technically competent, experienced, fully qualified personnel including fire protection engineers, fire fighters and technicians.**

The WIPP Site fire protection program is adequately staffed with qualified Fire Protection Engineers, Fire Protection/Fire System Technicians, and Fire Protection Cognizant System Engineers. Currently, the program is staffed with nine permanent NWP personnel and eight subcontracted personnel. Three additional personnel are on staff using corporate reach back resources with additional resources available if needed. The program is also supported by WIPP Fire Department personnel who perform periodic inspections and fire protection systems testing. Fire Department staffing is evaluated and discussed in CRAD EP.1.

Documentation of qualifications was reviewed and personnel interviews were conducted to determine requisite knowledge and competency of fire protection staff. Qualifications are granted and documented in memorandum W. B. Till to J. R. Fadeley, Subject: Fire Protection Engineer Qualifications, dated August 23, 2016, and memorandum W. B. Till to J. R. Fadeley, Subject: Fire Protection/Fire System Technician Qualifications, dated August 3, 2016, based on virtue of education, experience, and credentials consistent with DOE-STD-1137, *Fire Protection Engineering Functional Area Qualification Standard*, and DOE-STD-1066, *Fire Protection*. Personnel hold a variety of credentials, including licensed professional engineers in fire protection and certifications granted by the National Institute for Certification in Engineering Technologies (NICET). Fire protection staff are technically competent, experienced, and qualified commensurate to their responsibilities.

Although some near term reduction in subcontracted resources is anticipated, sufficient numbers of qualified and technically competent staff will remain available to support continued implementation and improvement of the fire protection program.

This criterion is considered met.

2. Fire protection systems and features are designed, installed, surveilled and maintained to provide a level of protection, functionality, and reliability. Procedures are in place for performing inspection, testing, surveillance and maintenance of fire protection systems and features. There is a schedule for performing the inspection, testing, surveillance and maintenance of the fire protection systems, including compensatory measures and an impairment prioritization process.

New fire protection systems and features are designed and installed to provide protection, functionality, and reliability in accordance with WP 09-CN3007, *Engineering Change Notice*. However, numerous legacy design and installation issues with existing systems and features have been self-identified as a result of newly performed comprehensive facility assessments as well as newly performed system inspections and testing. It should be noted that inspection, testing, and maintenance of facility fire protection systems and equipment was lacking for

some time prior to the *Underground Salt Haul Truck Fire Event*. Some inspection, testing, and maintenance activities have recently been conducted for the first time, for example obstruction investigation of wet pipe sprinkler systems.

Systems and features not meeting design or performance requirements are being tracked via fire protection system impairments in accordance with WP 12-FP3001, *Fire Protection Impairment*, until design changes can be funded and implemented. A Fire Protection Engineering Impairment Priority Matrix has been established to enable timely attention and resolution of the higher risk impairments. Continued management attention and action to address legacy fire protection system design and performance issues in a timely manner is warranted (**FP.2-OFI-1**).

Procedures are in place for performing inspection, testing, surveillance, and maintenance of fire protection systems and features. Observation of performance of a sample of procedures was conducted. Procedures appeared to be adequate and meet performance requirements established in applicable NFPA codes and standards.

This criterion is considered met.

3. DSA Key Elements 11-2 and 11-5 are effectively implemented.

DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis*, specifies key elements (KE) related to fire protection.

KE 11-2 relies on formal Fire Protection Engineer combustible control inspections to include inspection criteria, specified frequency of inspections, documentation of identified issues, issue disposition, tracking and trending of issues, and performance metrics.

A combustible control program has been developed via WP 12-FP.07, *WIPP Combustible Control Program*, and associated procedures, which include inspection criteria, frequency of inspections by multiple organizations, and documentation, disposition, tracking and trending of issues. CRAD FP.1 discusses discrepancies between combustible loading requirements as well as notable issues regarding implementation of combustible loading requirements, indicating that the combustible loading program is not effectively implemented (See **FP.1-PRE-3**). Performance metrics regarding open fire protection deficiencies, which include combustible control, have been established and are reported on a monthly basis.

KE 11-5 relies on fire prevention/suppression controls which include the following:

- Underground diesel powered equipment is evaluated for fire risk in accordance with NFPA 122. All equipment determined to pose an unacceptable fire risk in the NFPA 122 analysis will be protected with an automatic fire suppression system prior to use.
- Areas in the underground where there is an increased combustible loading (e.g., refueling station, maintenance shop, combustible storage area, maintenance offices, lunch room, oil storage area) will be protected by automatic fire suppression systems.
- Ignition sources (e.g., hot work, designated smoking areas, portable heaters, and electrical equipment) are controlled in accordance with the WIPP Fire Protection Program and Design Control Program.
- Underground combustible materials are controlled in accordance with the WIPP Fire Protection Program (e.g., combustible control zone around personnel conveyances, combustible load permit process).

Provisions for evaluation of underground diesel powered equipment for fire risk in accordance with NFPA 122 have been provided, however not all fire suppression systems have been installed/accepted for all non-waste handling vehicles prior to use as discussed in CRAD FP.1 and as identified in **FP.1-PRE-1**.

Local automatic fire suppression systems for areas in the underground where there is increased combustible loading have not yet been turned over. Installation and turnover of the underground "high fire load" fire suppression systems is identified on the manageable list of open items and is considered an open pre-start item. At the time of the DORR, the status of this pre-start item had not changed. See also discussion in CRAD FP.1.

Ignition sources are controlled as established in, and in accordance with, WP 12-FP.01, *WIPP Fire Protection Program*. Design control and configuration management is implemented via WP 09-CN3007, *Engineering Change Notice*, for controlling plant modifications and plant configuration, which includes fire safety/protection evaluation of design changes. Additionally, the fire protection program interfaces with
WP 10-WC3011, *Work Control Process*, to ensure fire protection review and concurrence when planned work involves a recognizable and credible fire hazard or potential impact to a fire protection or life safety system.

A combustible control program has been developed via WP 12-FP.07, *WIPP Combustible Control Program*, and associated procedures, which include combustible control zones and a combustible load permit process. CRAD FP.1 discusses discrepancies between combustible loading requirements as well as notable issues regarding implementation of combustible loading requirements (See **FP.1-PRE-3**).

This criterion is considered not met.

4. **Contractor engineering disciplines ensure that the requirements of the Fire Protection Program are incorporated into facility design modifications and construction. This includes a documented review by a qualified fire protection engineer of plans, specifications, procedure for all modifications, and acceptance tests.**

   Design control and configuration management is implemented via WP 09-CN3007, *Engineering Change Notice*, for controlling plant modifications and plant configuration, which includes evaluation of proposed facility design changes by a qualified fire protection engineer. The established process ensures requirements of the fire protection program are incorporated into facility design modifications and construction.

   This criterion is considered met.

5. **Procedures ensure feedback is captured including periodic facility assessments to verify continued robust implementation of a compliant fire protection program that evaluates on-going implementation of the fire protection program commitments documented by the FHA.**

   WP 12-FP.01, *WIPP Fire Protection Program*, ensures feedback of fire protection program effectiveness through procedure WP 12-FP.19, *WIPP Fire Protection Self-Assessment Program*. The procedure addresses assessments of fire hazards analysis, the fire protection program, and facilities in accordance with DOE orders and standards requirements. The fire protection engineer is responsible for completing program self-assessments, fire hazard analysis reviews, and building assessments in accordance with this procedure. A schedule for assessing fire protection programmatic elements has been established.

   Numerous legacy issues with existing fire protection systems and life safety features have been self-identified as a result of newly performed assessments. It should be noted that comprehensive assessments were lacking for some time prior to establishment of the new fire protection program and associated procedures.

   This criterion is considered met.

6. **Issues, recommendations or findings from assessments or evaluations, both internal and external, are tracked and resolved in a formal manner to ensure satisfactory correction and prevent reoccurrence. AIB JONS associated with fire protection have been properly dispositioned and verified to be closed.**

   Issues, recommendations, and findings from assessments or evaluations are managed in accordance with WP 15-GM1002, *Issues Management Processing of WIPP Forms*. This procedure establishes the process for initiation, tracking, resolution, and closure of issues or process improvements to ensure satisfactory correction and prevent reoccurrence. Issues identified externally are processed in

accordance with WP 13-QA3007, *External Oversight Activities*, through the Issues Management Processing System (IMPS).

CRAD FP.1 identified an issue regarding underground vehicles being observed (on several occasions) parked on the wrong side of the drifts, contrary to WP 12-ER.25, *Underground Escape and Evacuation Plan* (see **FP.1-PRE-2**). This issue was also identified as a pre-start during the CORR, indicating inadequate corrective actions to prevent reoccurrence. No other examples of inadequate corrective actions for fire protection-related issues were noted.

A sample of closure of the Judgements of Need (JONs) from the *Underground Salt Haul Truck Fire Event* provided in evidence binders was reviewed to determine proper disposition and verification of closure. Fire protection specific JONs have been dispositioned and verified closed and accepted by CBFO.

This criterion is considered met.

7. **The CORR adequately evaluated the fire protection systems and equipment, and fire protection personnel at the WIPP Facility.**

   Review of the Contractor Operational Readiness Review (CORR) *Final Report for the Commencement of Contact-Handled Waste Emplacement at the Waste Isolation Pilot Plant* was conducted to compare conclusions regarding adequacy of the fire protection systems and equipment and fire protection personnel at the WIPP facility. The CORR was judged to have adequately evaluated systems and equipment as provided at that point in time. The level of knowledge of fire protection managers and staff was also evaluated sufficiently.

CONCLUSION

The WIPP fire protection program is staffed with adequate numbers of technically competent, experienced, fully qualified personnel including fire protection engineers and technicians. Procedures and schedules are in place for design, installation, and performance of inspection, testing, surveillance, and maintenance of fire protection systems and features, which includes compensatory measures and an impairment prioritization process, to ensure protection, functionality, and reliability. Numerous legacy design and installation issues with existing systems and features have been self-identified as a result of newly performed assessments and system inspections and testing, therefore continued management attention and action to address legacy fire protection system design and performance issues in a timely manner is warranted.

Procedures and processes for design control and configuration management, feedback through conduct of periodic facility and programmatic assessments, and issues tracking and resolution have been established and adequately implemented. AIB JONS associated

with fire protection were determined to have been properly dispositioned and verified as closed.

DSA KE 11-2 and KE 11-5 have not been fully and effectively implemented. For example, discrepancies between combustible loading requirements and notable issues regarding implementation of combustible loading requirements have been identified, indicating that the combustible loading program is not effectively implemented; installation and turnover of fire suppression systems for all non-waste handling vehicles being used have not been completed; and installation and turnover of the underground "high fire load" fire suppression systems have not been completed. See CRAD FP.1 conclusion.

This Objective is considered met.

Issue(s)

See FP.1-PRE-1 and FP.1-PRE-3.

FP.2-OFI-1: Continued management attention and action to address legacy fire protection system design and performance issues in a timely manner is warranted.

Evaluated by:	**Approved by:**
/s/ Taryn S. Couchman-Cates, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Review Form 1

Functional Area:	Objective:	Objective Met	
Industrial Hygiene	IH.1	Yes [X]	No [ ]

OBJECTIVE

IH.1: A hazardous material protection program is established and implemented, sufficient numbers of qualified personnel are provided, and adequate facilities and equipment are available to ensure that a work is performed safely and in accordance with ALARA principles. (Core Requirements 1, 2, 4, 14, and 15)

CRITERIA

1. Functions, assignments, responsibilities, and reporting relationships for the hazardous material protection program are clearly defined, understood, effectively implemented, and enable adequate execution of the hazardous material protection program.
2. Hazardous material protection program documentation and implementing procedures have been developed and implemented, and include provisions for ALARA, hazard analysis, exposure control, personnel and field monitoring, PPE identification (including respiratory protection), decontamination, emergency response (including first aid and occupational medicine contingencies), etc. WIPP DSA Key element 8-1 is effectively implemented.
3. Instrumentation supporting the hazardous material protection program is appropriate, and a sufficient inventory is provided. Instruments possess current calibrations.
4. The WIPP facility is adequately staffed with qualified Industrial Hygiene/Industrial Safety (IH/IS) personnel to adequately implement the hazardous material protection program and to perform the necessary IH/IS functions to ensure activities can be performed safely. The level of knowledge of IH/IS staff is adequate to perform assigned duties. (DOE O 420.1a)
5. Periodic assessments of the IH/IS programs are performed to verify continued robust performance. Issues, recommendations or findings from assessments, both internal and external are tracked and resolved in a formal manner to ensure satisfactory correction and prevent reoccurrence.
6. AIB JONS associated with the hazardous material protection program have been appropriately addressed and verified to be closed.
7. The hazardous material program was adequately evaluated by the CORR. (DOE Order 425.1C)

APPROACH

Record Review:

- Review the WIPP documents that define the hazardous material protection program and its functions, responsibilities and organizational relationships and reporting requirements to verify that they adequate and approved.

- Review documents and procedures that define the processes for implementing the program requirements for adequacy (i.e., ALARA, DOE Operational Readiness Review Implementation Plan for the Waste Isolation Pilot Plant process hazard analyses, personnel and field monitoring requirements, PPE identification, decontamination, emergency response, etc.). Review the output of WIPP processes that include IH/IS analyses, planning, input, etc. for adequacy and compliance. Review calibration records for associated instrumentation. Review CORR report for adequacy in this functional area. Review staffing plans, position descriptions and qualifications for IH/IS staff for adequacy. Review previously completed assessments of the program as well as corrective action plans and closure documentation. Review the WIPP DSA, Key element 8.1 to ensure it has been incorporated into implementing procedures and documentation.

Interviews:

- Interview IH/IS personnel who support operations to determine if they are familiar with the chemical hazards associated with WIPP operations and the associated requirements and controls for protection from those hazards. Ensure IH personnel understand the appropriate response to abnormal indications. Evaluate their knowledge of WIPP hazardous material control procedures and instrumentation usage.

Shift Performance:

- Observe dry runs/simulations and drill response. Determine the adequacy of compliance with hazardous material protection requirements, the ALARA plans, and controls specified in the hazard analyses, etc. Evaluate the use of associated instrumentation.

Records Reviewed:

- WP 05-WH1002, Rev. 15, 41-T-152 & 41-T-153, Trudock, Operation, Effective Date 09/21/15
- WP-05-WH1402, Rev.20, 13-Ton Electric Forklifts, Effective Date 08/13/16
- WP 05-WH1101, Rev. 29, CH Surface Transuranic Mixed Waste Handling Area Inspections, Effective 10/23/16
- WP 05-WH1011, Rev. 57, CH Waste Processing, Effective 11/02/16
- WP 05-WH1407, Rev. 15, 6-Ton Bridge Cranes 41-T-151 A,B, C, &D, Effective 07/16/16

- WP 05-WH1405, Rev. 17, Trailer Jockey 41-H-151 A&B and 41-H-151 C&D Operation, Effective 06/16/16
- WP 05-WH1406, Rev. 17, Conveyance Loading Car, Effective 11/08/16
- WP 12-IH1828, MSHA Air Quality Monitoring, Rev. 9. Effective 08/23/16
- WP 04-AU0534, Underground Access Initiation/Termination, Effective 09/13/16
- Calibration Certificates for MX 6 Instrument #SN 151137D-006, 151137D-009
- Root Cause Analysis Report, Mine Rescue Teams-Equipment Compliance Program Issues, RCAR15-012, January 2016
- WIPP Form WF15-456, AL-1, 09/24/16
- WP 15-HS.02, Attachment 2-Pre-placement Process Instructions for New Hire Candidates, Rev. 09, WIPP Occupational Health Program
- Job Change Analysis Form, EA02RC4000-1-0, Rev 0, August 30, 2010
- Waste Isolation Pilot Plant (WIPP) Industrial Hygiene Status Report and Assessments Strategy (SRAS), August 2016
- WIPP Operation MiniRae Model 3000 Photoionization Detector PID Training Guide SAF-102, Rev. 0
- WIPP EX-2016-04, DORR-2016 WIPP Full Scale Exercise Master Scenario Events Listing (MSEL)Worker Safety and Health Program Description, 11/10/16
- WIPP Hoisting and Rigging Committee, MC 6.14, Rev.2, 04/27/15
- WIPP JTILL-2016-039, Powered Air Purifying Respirator Malfunctions, 05/12/16
- PPE 002A, Rev 0 Fall Protection Refresher
- WP 12-IH.02-1, WIPP Industrial Hygiene Program – Health Hazard Assessment, Rev. 6, 11/20/12
- WIPP ES&H Organization Chart, 11/03/16
- WP 15-HS.02 Rev. 09, Occupational Health Program, 02/09/16
- WP 15-HS.01-12, Rev. 5, Industrial Safety Program, Hoisting and Rigging, 05/17/16
- WP 12-IH.02-15, Rev. 2, WIPP Industrial Hygiene Program-Heat Stress
- Office of Enterprise Assessments, October 2016
- Task Card Title: ToxiRae II Nitrogen Dioxide Detector, Task Card # SAF-104-TC, Revision 0
- Task Card Title: MiniRae Model 3000 Photoionization Detector (PID), Task Card # SAF-102-TC, Revision 0
- Daily Rounds Sheet: Industrial Hygiene
- Underground Gas Survey
- IH Calibration Records: Drycal 1395935, Due 02/11/16; Cal Gas 1-1-1Trichloroethane and Carbon Tetrachloride Expiration Date 07/18/16
- 10 CFR 851, Worker Safety and Health Assessment, 12/16/15
- 30 CFR 57 Implementation Matrix, Safety and Health Standards Underground Metal and Nonmetal Mines
- WP 04-HO1002, Rev.16, Salt Handling Shaft Hoist Operation
- WP 12-IH1020, Rev. 2, Abnormal Condition Involving Cryogenics/Inert Gas
- WP 12-IH.02, Rev. 13, WIPP Industrial Hygiene Program Manual

- WP 12-IH1022, Rev. 12, Sampling for Waste Generated VOCs
- Confined Space Program and Procedure Evaluation, October 2016
- Heat Stress Program and Procedure Evaluation, September 2016
- WP 13-1, Rev. 36, Quality Assurance Program Description

Interviews Conducted:

- Hoisting and Rigging SME
- Waste Hoist Tender
- Bolter (4)
- Welder (1)
- Mechanic (1)
- Waste Handling Technician (6)
- Rad Con Tech (2)
- WIPP Fire Department Lieutenant
- Underground Services (4)
- Underground Services Manager
- Lamp Room Attendant
- Industrial Safety Professional (2)
- Industrial Hygienists (4)

Shift Performance Observed:

- Waste preparation for waste placement in Waste Handling building
- Emergency exercise
- Underground Services air quality check and morning rounds
- Lamp Room Operations
- Waste Hoist Operations

Discussion of Results

1. **Functions, assignments, responsibilities, and reporting relationships for the hazardous material program are defined, understood, effectively implemented and enable adequate execution of the hazardous material protection program.**

   The procurement of chemicals is controlled with the use of MP 1.34, Rev. 5, NWP Procurement Program, and WP 02-EC.07, Rev. 6, Waste Isolation Pilot Plant Sustainable Procurement Plan. This management policy identifies roles and responsibilities in the procurement of hazardous materials for WIPP. An NWP Industrial Hygienist reviews all chemical procurements and tracks the inventory at WIPP.

   The HMP program is documented in the WP 12-IH.02, Rev. 13, WIPP Industrial Hygiene Program Manual, which references seventeen subprograms that address

specific topics, such as heat stress, health hazard assessment, hazard communication, and respiratory protection. Medical services at WIPP are addressed in WP 15-HS.02, Occupational Health Program, which describes how occupational health services, including medical surveillance, are provided. It was noted that the identification of personnel for medical monitoring is weak and there is a potential for not identifying all personnel correctly for medical surveillances. At the time of this report, the industrial hygiene organization was not involved in the identification of medical monitoring for employees.

In reviewing WP 15-HS.02, Rev. 9, Attachment 2, Pre-placement Process Instructions for New Hire Candidates, "WIPP Occupational Health Program and Job Change Analysis Form," EA02RC4000-1-0, Rev. 0, August 30, 2010, it appears that not all medical monitoring may be identified. NWP has a known associated beryllium worker. NWP does not have a system for that employee to obtain the voluntary medical surveillance. NWP stated they would send any self-identified employees back to the sites where their exposure originated. However NWP has not contacted other sites and do not have a memorandum of agreement or contract in place with other site. It is recommended that WIPP develop and request approval of beryllium program that would meet the intent of 10 CFR 850. At this time, if WIPP were to have a beryllium event/release, they do not have an approved Beryllium program to go forward for with work without one. If an event were to occur, WIPP could respond per their procedure but to perform clean up and work afterwards WIPP would be at a standstill. The Status Report and Assessments Strategy (SRAS) addresses beryllium monitoring in the event of a release and their beryllium program should reflect this.

The WIPP Training Program is documented in WP 14-TR.01. It establishes processes to ensure that workers receive required training including HMP program-related training. In addition, WIPP has an Integrated Safety Management System Description, WP 15-GM.03, defines how safety requirements including HMP program requirements are integrated into all levels of management and work practices. At the work activity level, a JHA process is used to ensure that potential hazards associated with work activities are identified, evaluated, and controlled. This process is documented using WP 12-IS3002, Job Hazard Analysis Performance and Development.

This Criterion is met.

2. **Hazardous material protection program documentation and implementing procedures have been developed and implemented, and include provisions for ALARA, hazard analysis, exposure control, personnel and field monitoring, PPE identification (including respiratory protection), decontamination, emergency response (including first aid and occupational medicine contingencies), etc. WIPP DSA Key element 8-1 is effectively implemented.**

The procurement of chemicals is controlled with the use of MP 1.34, Rev. 5, NWP Procurement Program, and WP 02-EC.07, Rev. 6, Waste Isolation Pilot Plant Sustainable Procurement Plan. This management policy identifies roles and responsibilities in the procurement of hazardous materials for WIPP. An NWP Industrial Hygienist reviews all chemical procurements and tracks the inventory at WIPP.

The HMP program is documented in the WP 12-IH.02, Rev. 13, WIPP Industrial Hygiene Program Manual, which references seventeen subprograms that address specific topics, such as heat stress, health hazard assessment, hazard communication, and respiratory protection. Medical services at WIPP are addressed in WP 15-HS.02, Occupational Health Program, which describes how occupational health services, including medical surveillance, are provided. It was noted that the identification of personnel for medical monitoring is weak and there is a potential for not identifying all personnel correctly for medical surveillances. At the time of this report, the industrial hygiene organization was not involved in the identification of medical monitoring for employees.

It was noted during the review that NWP had carpet adhesive identified on their hazardous material inventory. During an inquiry, NWP stated that a subcontractor had used this in the past and the chemical was no longer on site. The inventory had not been updated to reflect this action.

In reviewing WP 12-IH.02-15, Rev. 2, WIPP Industrial Hygiene Program-Heat Stress, there is no clothing category that includes respiratory protection except Level A PPE or Firefighter Turnout Gear. In fact, the clothing adjustment factors subtract 2 for using a PAPR. Most literature does not provide addition or subtraction factors for respirators. The procedure also does not address acclimated or non-acclimated workers for determining stay times.

On November 17, 2016 members of the DOE ORR team entered the contamination area wearing the required personal protective clothing. During the pre-job brief there was no discussion of heat stress or stay times for these individuals. The RCT provided a thorough briefing of the radiological hazards but the entry supervisor did not address heat stress. It was noted that there was a Wet Bulb Globe Temperature (WBGT) at the entry point. Though the ambient temperature was less than 82 degrees Fahrenheit, due to the use of PPE, it would have been expected that heat stress and fitness for duty would be discussed in the pre-job brief.

Interviews with bolters also indicate that heat stress limits are not discussed and potentially not implemented. It was stated that the bolters were told to leave the area when they get hot. This does not take into account their protective clothing, the temperature or the work they are performing.

The WIPP Documented Safety Analysis (DSA) Key Element 8-1 states “Establish provisions to monitor and control air quality to ensure UG workers are protected from

VOCs; protective measures include posting hazardous areas, establishing monitoring requirements, ensuring local ventilation, and requiring personal protective equipment such as respiratory protection as needed." NWP has developed the Waste Isolation Pilot Plant (WIPP) Industrial Hygiene Status Report and Assessments Strategy (SRAS), August 2016. Underground Services performs industrial hygiene air quality checks throughout the mine prior to work each morning and when ventilation changes or diesel equipment is moved. The ventilation in the underground is evaluated and reconfigured based upon the work to be performed each shift. Appropriate PPE is identified for work with Volatile Organic Compounds (VOC).

This Criterion is met.

3. Instrumentation supporting the hazardous material protection program is appropriate, and a sufficient inventory is provided. Instruments possess current calibrations.

Industrial hygiene instrumentation supporting the hazardous material protection program is appropriate, and there is a sufficient number in inventory. The industrial hygiene instruments are calibrated and bump tested. It was verified that the calibration gas is within its expiration dates.

The instrumentation used by operations is calibrated by an Industrial Scientific docking station DS2. The operations instruments are calibrated and bump tested with computer documentation available for easy record keeping. It was verified that the calibration gas is within its expiration dates. On November 16, 2016, the DORR team member accompanied two Underground Services in performing their mine air quality checks and their morning rounds. The two Underground Services personnel were knowledgeable of their instruments, how they perform the monitoring, what results to expect and what to do if there is an abnormal reading.

During a walk down of the Mine Rescue Team (MRT) on 11/17/16 a calibration gas bottle (nitrogen dioxide 5 ppm (vol), carbon monoxide 100 ppm (vol), methane (50% LEL) 2.5% (vol), nitrogen balance, oxygen 19 % (vol)) was found in their gas cabinet that had an expiration date of July 2016. THE MRT team member stated they had used the gas that morning. When asked if they had gas that was not beyond the expiration date, they could not readily find any.

The MRT team does not have a procedure to perform their calibration or calibration check ("bump test") and there is no documentation of either the bump test or calibration. The MRT team member stated that a procedure is not required and they are not documenting the calibration results. If there is no documentation of the calibration or bump test, NWP cannot tie it back to the proper calibration gas or sensor if there were to be a problem. The Mine Rescue Team (MRT) did not have an approved procedure for the calibration or calibration check of atmosphere monitoring equipment, were not maintaining records of the tests, and were using expired calibration gas (IH.1-PRE-1). The contractor's extent of condition review for the

expired calibration gas resulted in the discovery of three other calibration gas bottles that were beyond their expiration date.

A fact finding was conducted on 11/18/16 concerning this matter. NWP at that time stated they did not use this gas past its expiration date. They also stated that they have difficulty ordering and receiving calibration gas. One example was provided of a calibration gas ordered in August and they had not received it as of mid-November. The MRT team members stated they did not know how to dispose of the expired gas bottles. However, that MRT team member works for I&C and they do not have a problem disposing of expired gases or receiving calibration gases. Discussions with the industrial hygiene department revealed they do not have either problem. The calibration gas was neither segregated nor labeled. When the MRT Team member was asked what he would do to ensure he used calibration gas, he stated he would look for it and not use the expired gas. In the fact finding, the MRT team members stated they would go to I&C and use their instruments rather than the MRTs.

NWP had an issue in February/March of 2016 where employees entered were using expired calibration gas. WIPP form WF 15-582 was submitted but the corrective actions have not been completed.

This Criterion is met.

4. **The WIPP facility is adequately staffed with qualified Industrial Hygiene/Industrial Safety (IH/IS) personnel to adequately implement the hazardous material protection program and to perform the necessary IH/IS functions to ensure activities can be performed safely. The level of knowledge of IH/IS staff is adequate to perform assigned duties. (DOE O 420.1a)**

   The WIPP facility is adequately staffed with six (6) qualified industrial hygienists and are Competent Commensurate with Responsibilities (CCR). In addition to the six industrial hygienists, there are four (4) Certified Industrial Hygienists (CIH) on staff. Of these four CIH's, three are dual Certified Safety Professionals (CSP). There are six (6) safety and health managers, of which two are CSP's and one is dual certified CIH/CSP. At the time of this assessment, the safety and health department had two vacancies for industrial hygiene technicians, and one industrial safety professional.

   NWP has a Competence Commensurate with Responsibilities (CCR) program to qualify their staff. This CCR identifies and documents training experience required to perform their duties.

   This Criterion is met.

5. **Periodic assessments of the IH/IS programs are performed to verify continued robust performance. Issues, recommendations or findings from assessments, both internal and external are tracked and resolved in a formal manner to ensure satisfactory correction and prevent reoccurrence. AIB JONS associated**

with the hazardous material protection program have been appropriately addressed and verified to be closed.

The ES&H department has performed several self-assessments. A Confined Space Program and Procedure Evaluation was conducted in October 2106 and the evaluation was a programmatic review to compare the programmatic procedure to the implementing procedure. It also evaluated compliance with the OSHA confined space standard. There were improvements noted but no indication of completion. Also, no confined space entries were evaluated to ensure compliance with procedures.

NWP has performed a Heat Stress Program and Procedure Evaluation that was conducted in September 2106. The evaluation was a comparison of their program and technical procedures to each other and OSHA. There were improvements noted but not closed because this evaluation was just completed. Evaluation of implementation in the field was not included in this review. WIPP forms have been submitted but the corrective actions for this report were not provided to the DOE ORR team.

CBFO conducted a review of the Air Quality Monitoring of the WIPP Underground in March of 2016. There were 11 Findings identified in this report. Two strengths were identified for NWP. WIPP forms have been submitted but the corrective actions for this report were not provided to the DOE ORR team.

The Office of Enterprise Assessments performed an Assessment of Work Planning and Control at the Waste Isolation Pilot Plant, October 2016. This assessment noted several vulnerabilities and/or deficiencies in the current IH program, particularly with respect to the sampling of underground DPM; the assessment and characterization of underground air contaminants particularly from chemicals other than VOC present in embedded waste containers; the potential limitations of existing respiratory protection in protecting workers exposed to those contaminants; exposure assessments for some work activities and some IH and Underground Services sampling practices. Collectively, these deficiencies warrant increased management attention to ensure all hazards are identified, characterized, and controlled.

This Criterion is met.

6. The hazardous material program was adequately evaluated by the CORR. (DOE Order 425.1C)

The CORR report has been reviewed and determined to be adequate in depth and breadth. The CORR adequately evaluated the NWP hazardous material program.

This Criterion is met.

CONCLUSION

The WIPP IH program is well-established and documented in procedures, and fundamental program elements are in place. Adequate IH staffing is available to support operations. Functions, assignments, responsibilities and reporting relationships for the hazardous material protection program are defined, understood and implemented.

The hazardous material protection program documentation and implementing procedures have been developed and implemented.

IH Instrumentation for both the IH group and Underground Services is appropriate and sufficient inventory is provided. Their instruments possess current calibrations. The Mine Rescue Team (MRT) did not have an approved procedure for the calibration or calibration check of atmosphere monitoring equipment, were not maintaining records of the tests, and were using expired calibration gas (IH.1-PRE-1).

Periodic assessments of the IH/IS programs are performed to verify continued robust performance. Corrective actions have been completed for most issues however, the corrective action for the expired gas used in February/March of 2016 has not been closed. This issue was identified again during this assessment. It was noted that the contractor's response to the IH issues identified during the review has been positive and corrective actions were initiated for the finding during the course of the review.

DOE has determined the IH objective has been met.

Issues

Pre-Start Finding(s)

IH.1-PRE-1: The Mine Rescue Team (MRT) did not have an approved procedure for the calibration or calibration check of atmosphere monitoring equipment, were not maintaining records of the tests, and were using expired calibration gas.

Evaluated by:	Approved by:
/s/ Karen Kubiak, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Review Form 1

Functional Area:	Objective:	Objective Met	
		Yes [X]	No [ ]
Industrial Hygiene	IH.2		

OBJECTIVE

IH.2: The industrial hygiene program is effectively engaged in WIPP processes to ensure that industrial hazards are appropriately identified and analyzed, controls are developed and implemented, and procedures and training are sufficient to ensure an effective response to abnormal and emergency situations from an IH perspective. (Core Requirements 1, 5, and 15)

CRITERIA

1. The industrial hygiene hazards associated with operating the WIPP facility have been identified and analyzed, and appropriate controls have been developed to either eliminate or mitigate those hazards.
2. Operating, abnormal and emergency procedures and work control documents include and effectively integrate the suite of controls and/or protective equipment needed to operate safely from an IH perspective.
3. The industrial hygiene monitoring limits are set, and above these the defined response actions are taken, including increased monitoring frequency, work stoppage, and evacuation.
4. IH personnel are able to use monitoring and measurement equipment appropriately. Industrial Hygiene (and Hazardous material protection) personnel exhibit an awareness of, and commitment to, public and worker safety, health and environmental protection requirements.
5. The Industrial Hygiene program was adequately evaluated by the contractor ORR.

APPROACH

Record Review:

- Review hazard analysis documents to determine the types of hazards identified and the controls selected to eliminate or mitigate the hazards. Review work control documents, normal and abnormal operating procedures, and emergency response procedures to ensure appropriate IH controls are included.

Interviews:

- Interview the ESH Manager and IH personnel to determine their involvement in the hazard analysis and hazards control selection processes during work planning.
- Evaluate IH staff understanding of operating procedures, alarm response procedures, and emergency procedures.

Shift Performance:

- While observing the simulations, determine whether the facility is effectively implementing industrial hygiene practices and monitoring. Observe activities and drills to assess procedure usage, communications, and response to alarms.

Records Reviewed:

- WP 05-WH1002, Rev. 15, *41-T-152 & 41-T-153, Trudock, Operation*, Effective Date 09/21/15
- WP 05-WH1402, Rev. 20, *13-Ton Electric Forklifts*, Effective Date 08/13/16
- WP 05-WH1101, Rev. 29, *CH Surface Transuranic Mixed Waste Handling Area Inspections*, Effective 10/23/16
- WP 05-WH1011, Rev. 57, *CH Waste Processing*, Effective 11/02/16
- WP 12-IH1828, Rev. 9 *MSHA Air Quality Monitoring*, Effective 08/23/16
- WP 04-AU0534, *Underground Access Initiation/Termination*, Effective 09/13/16
- Calibration Certificates for MX 6 Instrument #SN 151137D-006, 151137D-009
- Root Cause Analysis Report, Mine Rescue Teams-Equipment Compliance Program Issues, RCAR15-012, January 2016
- WIPP Form WF15-456, AL-1, 09/24/16
- WP 15-HS.02, Attachment 2-Pre-placement Process Instructions for New Hire Candidates, Rev. 09, WIPP Occupational Health Program
- Job Change Analysis Form, EA02RC4000-1-0, Rev 0, August 30, 2010
- Waste Isolation Pilot Plant (WIPP) Industrial Hygiene Status Report and Assessments Strategy (SRAS), August 2016
- WIPP Operation MiniRae Model 3000 Photoionization Detector PID Training Guide SAF-102, Rev. 0
- WIPP EX-2016-04, DORR-2016 WIPP Full Scale Exercise Master Scenario Events Listing (MSEL)Worker Safety and Health Program Description, 11/10/16
- WIPP JTILL-2016-039, Powered Air Purifying Respirator Malfunctions, 05/12/16
- PPE 002A, Rev. 0, Fall Protection Refresher
- WP 12-IH.02-1, Rev. 6, *WIPP Industrial Hygiene Program – Health Hazard Assessment*, 11/20/12
- WIPP ES&H Organization Chart, 11/03/16
- WP 15-HS.02 Rev. 9, *Occupational Health Program*, 02/09/16
- WP 12-IH.02-15, Rev. 2, *WIPP Industrial Hygiene Program-Heat Stress*

- Office of Enterprise Assessments, October 2016
- Task Card Title: ToxiRae II Nitrogen Dioxide Detector, Task Card # SAF-104-TC, Revision 0
- Task Card Title: MiniRae Model 3000 Photoionization Detector (PID), Task Card # SAF-102-TC, Revision 0
- Daily Rounds Sheet: Industrial Hygiene
- Underground Gas Survey
- IH Calibration Records: Drycal 1395935, Due 02/11/16; Cal Gas 1-1-1Trichloroethane and Carbon Tetrachloride Expiration Date 07/18/16
- 10 CFR 851, Worker Safety and Health Assessment, 12/16/15
- 30 CFR 57 Implementation Matrix, Safety and Health Standards Underground Metal and Nonmetal Mines
- WP 04-HO1002, Rev.16, *Salt Handling Shaft Hoist Operation*
- WP 12-IH1020, Rev. 2, *Abnormal Condition Involving Cryogenics/Inert Gas*
- WP 12-IH.02, Rev. 13, *WIPP Industrial Hygiene Program Manual*
- WP 12-IH1022, Rev. 12, *Sampling for Waste Generated VOCs*
- Confined Space Program and Procedure Evaluation, October 2016
- Heat Stress Program and Procedure Evaluation, September 2016
- WP 13-1, Rev. 36, *Quality Assurance Program Description*

Interviews Conducted:

- Hoisting and Rigging SME
- Waste Hoist Tender
- Bolter (4)
- Welder (1)
- Mechanic (1)
- Waste Handling Technician (6)
- Rad Con Tech (2)
- WIPP Fire Department Lieutenant
- Underground Services (4)
- Underground Services Manager
- Lamp Room Attendant
- Industrial Safety Professional (2)
- Environmental Safety and Health Deputy Manager (2)
- Industrial Safety Manager
- Industrial Hygiene Manager

Shift Performance Observed:

- Waste preparation for waste placement in Waste Handling building

- Emergency exercise
- Underground Services air quality check and morning rounds
- Lamp Room Operations
- Waste Hoist Operations including crane and forklift inspections

1. **The industrial hygiene hazards associated with operating the WIPP facility have been identified and analyzed, and appropriate controls have been developed to either eliminate or mitigate those hazards.**

   The industrial hygiene hazards associated with the WIPP facility have been identified and analyzed, and appropriate controls have been developed to either eliminate of mitigate the hazards.

   At the work activity level, a JHA process is used to ensure that potential hazards associated with work activities are identified, evaluated, and controlled. This process is documented using WP 12-IS3002, *Job Hazard Analysis Performance and Development*. Some of the JHA's reviewed found minor deficiencies and are identified in the maintenance work control section.

   Procedures were reviewed and found to have identified the hazards and controls. These may be in caution boxes or in the precautions and limitations sections such as in WP 04-AU0534, *Underground Access Initiation/Termination*. The underground services employees working this procedure were knowledgeable of the hazards and controls for this work.

   WP 05-WH1011, *CH Waste Processing,* is another procedure that was observed during this assessment. The industrial hygiene controls are written into the steps of the procedure. An example is at step 5.4.34 requires the waste handling engineer to verify the oxygen content is greater than 20% in the worker breathing zone if the ICV body was backfilled with inert gas for that shipment.
   This Criterion was met.

2. **Operating, abnormal and emergency procedures and work control documents include and effectively integrate the suite of controls and/or protective equipment needed to operate safely from an IH perspective.**

   Operating, abnormal and emergency procedures and work control documents include and effectively integrate the suite of controls and/or protective equipment needed to operate safely from an IH perspective.

   In reviewing WP 12-IH1020, Rev. 2, *Abnormal Condition Involving Cryogenics/Inert Gas*, it was noted that when responding to a potential oxygen deficient atmosphere, personnel are not required to wear the appropriate respiratory protection (pressure demand Self-Contained Breathing Apparatus (SCBA)). Personnel are to perform remote monitoring through a port if one is available. If a port is not available, they are to sample along the doorframe or edge of brattice for the area starting at the

bottom. They are then allowed to crack open the door and insert the wand as far as possible. If all readings are greater than 19.5%, they may declare the facility safe to re-enter. This method does not protect the employee performing the monitoring of a potentially Immediately Dangerous to Life or Health (IDLH) atmosphere and it does not ensure that all areas of the space are safe for re-entry. These steps are documented in sections 5.2.8 and 5.2.9 of WP 12-IH1020. The contractor's response procedure for investigating and responding to a potentially IDLH atmosphere is not protective for responding employees **(IH.2-PRE-1)**. 10 CFR 851.22 requires proper protection for employees potentially exposed to dangerous safety and health conditions. OSHA 29 CFR 1910.134(d)(2)(i), (ii) and (iii) requires a full face piece pressure demand Self Contained Breathing Apparatus (SCBA) or A combination full face piece pressure demand supplied-air respirator (SAR) with auxiliary self-contained air supply for IDLH atmospheres. 29 CFR 1910.134 (d)(iii) states that all oxygen-deficient atmospheres shall be considered IDLH.

Normal operations procedures WP 04-HO1002, Rev.16, *Salt Handling Shaft Hoist Operation,* and WP 04-AU0534, *Underground Access Initiation/Termination*, effective 09/13/16 were reviewed and include and effectively integrate the suite of controls and/or protective equipment needed to operate safely from an IH perspective. During the pre-job for the waste handling emplacement on November 15, 2016, it was stated by the job supervisor that "if you smell something we will step back and call IH." This is due to the waste potentially off-gassing volatile organic carbon (VOC) compounds and, on occasion, the waste handlers will smell an odor when they remove the TRUPAC II lid. NWP had permanent VOC monitoring equipment in place previously, but has removed it from service. Using odor as a chemical detection method is not an acceptable practice. NWP should be performing exposure monitoring if there is a potential for exposure. (**IH.2-OFI-1)**

Rad Con is performing head space monitoring prior to removing the TTRUPAC II lid. It was noted that the Rad Con instruments are not intrinsically safe. Therefore, it would be a best management practice to perform industrial hygiene monitoring prior to performing the Rad Con monitoring and removing the lid to identify any potential chemical exposure or explosive gases.

This Criterion was not met.

3. **The industrial hygiene monitoring limits are set, and above these the defined response actions are taken, including increased monitoring frequency, work stoppage, and evacuation.**

The industrial hygiene monitoring limits are set, and above these, the defined response actions are taken, including increased monitoring frequency, work stoppage, and evacuation. The industrial hygiene monitoring limits are set to the appropriate limits. The team reviewed WP 04-AU0534, Rev. 5, *Underground Access Initiation/Termination*, which provides underground services set limits for initial entry into underground and final exit from underground. It also establishes

provisions for Operations and Industrial Hygiene to monitor and control air quality to ensure underground workers are protected from volatile organic compounds (VOCs); protective measures include posting hazardous areas, establishing monitoring requirements, ensuring local ventilation and required personnel protective equipment such as respiratory protection as needed. The high limit for nitrogen dioxide is 5 parts per million (ppm). This is the OSHA ceiling limit, and is an absolute exposure limit that should not be exceeded at any time. If the ceiling limit were to be exceeded, it would result in a documented overexposure. However the lower alarm limit is 3 ppm and personnel are trained to evacuate at any alarm and consistently gave the same answer. The American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) Short –term Exposure Limit (STEL) is 5 ppm for nitrogen dioxide. WP-IH1828, *MSHA Air Quality Monitoring*, Rev. 9 was also reviewed and both procedures are consistent in their limits for oxygen, carbon monoxide, nitrogen dioxide, lower explosive limit, hydrogen, and hydrogen sulfide.

On November 15, 2016, Underground Services was observed performing WP 04-AU0534. Personnel were knowledgeable of their instrumentation, limits and the procedural requirements. It was noted that personnel were entering the underground prior to all locations of the underground being surveyed. When they entered the mine, only the bottom of the waste shaft had been surveyed/monitored. The Underground Services personnel stated this monitoring process had changed approximately 6 months earlier but did not know why. The ES&H staff was questioned regarding this change in policy—no answer was provided.

In reviewing WP 12-IH.02-15, Rev. 2, *WIPP Industrial Hygiene Program-Heat Stress*, there is no clothing category that includes respiratory protection except Level A PPE or Firefighter Turnout Gear. In fact, the clothing adjustment factors subtract 2 for using a PAPR. Most literature does not provide addition or subtraction factors for respirators. The procedure also does not address acclimated or non-acclimated workers for determining stay times.

On November 17, 2016 members of the DOE ORR team entered the contamination area wearing the required personal protective clothing. During the pre-job brief there was no discussion of heat stress or stay times for these individuals. The RCT provided a thorough briefing of the Rad hazards but the entry supervisor did not address heat stress. It was noted that there was a Wet Bulb Globe Temperature (WBGT) at the entry point. Though the ambient temperature was less than 82 degrees Fahrenheit, due to the use of Personal Protective Equipment (PPE) it would have been expected that heat stress and fitness for duty would be discussed in the pre-job brief.

Interviews with bolters also indicate that heat stress limits are not discussed and potentially not implemented. It was stated that the bolters were told to leave the area when they get hot. This does not take into account their protective clothing, the temperature, or the work they are performing.

This Criterion is met.

4. **IH personnel are able to use monitoring and measurement equipment appropriately. Industrial Hygiene (and Hazardous material protection) personnel exhibit an awareness of, and commitment to, public and worker safety, health and environmental protection requirements.**

   IH personnel are able to use monitoring and measurement appropriately. Industrial Hygiene (and Hazardous material protection) personnel exhibit an awareness of, and commitment to, public and worker safety, health and environmental protection requirements.

   The WIPP facility is adequately staffed with six (6) qualified industrial hygienists and are Competent Commensurate Responsibilities (CCR). In addition to the six industrial hygienists, there are four (4) Certified Industrial Hygienists (CIH) on staff. Of these four CIH's, three are dual Certified Safety Professionals (CSP). There are six (6) safety and health managers, of which two are CSP's and one is dual certified CIH/CSP. At the time of this assessment, the safety and health department had two vacancies for industrial hygiene technicians, and one industrial safety professional.

   NWP has a Competence Commensurate with Responsibilities (CCR) program to qualify their staff. This CCR identifies and documents training experience required to perform their duties. Their CCR file also includes training such as technical training SAF-104-TC, Rev. 0, *WIPP Operations ToxiRae II Nitrogen Dioxide Detector Task Card* that includes a requirement for the employee to read the user manual and the training guide for the instrument; pass a knowledge requirement quiz and hands on practical. These are reviewed by a qualified industrial hygienist and signed off for completion. All of the WIPP instruments have similar task cards and the IH's are trained and tested on each.

   This Criterion is met.

5. **The Industrial Hygiene program was adequately evaluated by the contractor ORR.**

   The CORR report has been reviewed and determined to be adequate in depth and breadth. The CORR adequately evaluated the NWP Industrial Hygiene program.

   This Criterion is met.

CONCLUSION

The Industrial hygiene hazards associated with the WIPP facility have been identified, analyzed, and appropriate controls have been developed. These are documented in a JHA or embedded within a procedure. Some of the JHA's reviewed found minor deficiencies and are identified in the maintenance work control section.

Operating procedures have identified and effectively integrate controls or PPE. However, response to cryogenic/inert gases, procedure WP 12-IH1020, *Abnormal*

Condition Involving Cryogenics/Inert Gas, does not adequately protect responding employees. The procedure does not address the need for proper respiratory protection as required by OSHA. **(IH.2-PRE-1)**

NWP has a Competence Commensurate with Responsibilities (CCR) program to qualify their staff. This CCR identifies and documents training experience required to perform their duties. The WIPP facility is adequately staffed with six (6) qualified industrial hygienists. In addition to the six industrial hygienists, there are four (4) Certified Industrial Hygienists (CIH) on staff. Of these four CIH's, three are dual Certified Safety Professionals (CSP). There are six (6) safety and health managers, of which two are CSP's and one is dual certified CIH/CSP.

This Objective was met.

Issue(s)

Pre-start Findings

IH.2-PRE-1: The contractor's response procedure for investigating and responding to a potentially Immediately Dangerous to Life or Health (IDLH) atmosphere is not protective for responding employees.

Opportunity for Improvement

IH.2-OFI-1: Using odor as a chemical detection method is not an acceptable practice. NWP should be performing exposure monitoring if there is a potential for exposure.

Evaluated by:	**Approved by:**
/s/ Karen Kubiak, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Project
Review Form 1

Functional Area:	Objective:	Objective Met	
Management	MG.1	Yes [ ]	No [X]

OBJECTIVE

MG.1: An adequate startup program has been developed that includes plans for graded operations and testing after startup to simultaneously confirm the operability of equipment, the validity of procedures, and the performance and knowledge of operators. The plans should indicate validation processes for equipment, procedures, and operators after resumption of operations including any required restrictions and additional oversight. **(Core Requirements 2, 4, 11, and 15)**

CRITERIA

1. Functions, assignments, responsibilities, and reporting relationships between organizations and management levels are clearly defined, understood, effectively implemented, and enable adequate execution of the initial startup program.
2. Program documentation and implementing procedures have been developed and implemented for performing resumption of operations and testing.
3. The program/plan to accomplish startup is documented and approved. The plan clearly identifies the methods to be used to confirm the operability of the equipment, the viability of the procedures and knowledge of operators. (DOE Order 425.1D, DOE-STD 3006-2010)
4. The start-up program clearly identifies management personnel responsible for performing enhanced levels of oversight during testing and graded start-up activities. The duties, responsibilities, and shift staffing requirements of these management personnel are identified. The activities requiring this additional oversight is clearly identified as is the point at which enhanced management oversight is no longer required. (DOE Order 425.1D, DOE-STD 3006-2010)
5. Test plans (if any) are adequately described in the plan or a referenced document. These plans identify specific tests to be performed, prerequisites, and acceptance criteria for verifying equipment operability. Management approvals and hold points (for key events or progression to the next phase of testing) required for specific tests or activities are identified. A schedule is included that clearly illustrates the systematic approach to full operations. (DOE Order 425.1D, DOE-STD 3006-2010)
6. The Startup Plan identifies the mechanisms for verifying the viability of procedures during actual performance, and identifies the management observers required for first time execution. The processes for revising plans and procedures are summarized, and provisions for increased procedure revision support are addressed during the initial execution of procedures.

7. Sufficient numbers of qualified personnel are available to execute the initial testing program. Personnel assigned responsibilities for developing *DOE Operational Readiness Review Implementation Plan for the Waste Isolation Pilot Plant* and executing testing possess the knowledge and experience to perform these responsibilities safely and effectively. (DOE O 420.1C)
8. Mechanisms for verifying the adequacy of operator performance are clearly described, as well as the methods for remediating any identified weaknesses.
9. Compensatory measures and the use of surrogate materials (if any) during startup are clearly identified along with the criteria for phasing these controls and materials out. (DOE Order 425.1D, DOE-STD 3006-2010)
10. The startup program was adequately evaluated by the CORR. (DOE Order 425.1D)

APPROACH

Record Review:

- Review the WIPP documents that define the initial startup program and its functions, responsibilities and organizational relationships and reporting requirements to verify that they adequate and approved. Review documents and procedures that define the specific processes for preparing, approving, and executing the initial startup/resumption program. Review the CORR report for adequacy in this functional area. Review for adequacy staffing plans, position descriptions and qualifications for personnel with responsibilities in the area of initial startup oversight.

- Review the WIPP startup program/plan to ensure the stated criteria are met. Review any supplemental or referenced documents from the startup plan (if any) to ensure an adequate level of detail is described. Review test plans and the CORR report for adequacy.

Interviews:

- Interview management personnel responsible for executing the startup plan, and those identified as management observers/evaluators in the plan. Evaluate personnel understanding of their specific responsibilities identified in the plan, and the points at which activities will be halted or additional controls introduced.

- Interview personnel with responsibilities for preparing, approving, modifying, or executing startup plans and procedures to determine their knowledge of the WIPP facility and equipment, the scope of the startup, the risks and controls associated with startup, and the process for formally resolving failed evolutions or processes.

Shift Performance:

- Observe a sample of performance demonstrations during the ORR with a focus on management roles and execution of those roles.

- Observe a sample of equipment testing that may occur during the time frame of the ORR.

Records Reviewed

- WP 15-GM.03, *Integrated Safety Management System Description*, Rev. 9
- NWP Document AA:16:01163 UFC:1410.00 dated September 19, 2016, *U.S. Department of Energy Waste Isolation Pilot Plant Startup Plan for Commencement of Contact Handled Waste Emplacement Waste Isolation Pilot Plant*, Rev. 4
- WP 04-AD3031, *Monitoring Operational Activities,* Rev. 2
- DE-EM0001971, *Waste Isolation Pilot Plant Management and Operations Contract,* Thru Mod 152
- CBFO:OOM:JC:GS:16-0049:UFC 1410.00, DOE memorandum from Jeff Carswell and Todd Shrader, DOE, to Ed Westbrook, DOE ORR Team Lead, "Endorsement to NWP Readiness to Proceed Memorandum," dated November 12, 2016
- *CBFO Review Status of Open NWP JONs as of 11/4/16*
- *AIB Judgments of Need Closure Status,* 11/4/16
- WP 15-MD3101, *Verification of Readiness to Startup or Restart WIPP*, Rev. 7-FR2
- DOE O 425.1D Chg1, *Verification of Readiness to Start Up or Restart Nuclear Facilities, 4/2/2013.*
- *DOE-STD-3006-2010, Planning and Conducting Readiness Reviews*
- 15-OR.01, *MSA Plan for Startup and Restart of WIPP Nuclear Facilities, Activities, and Operations*
- *Management Self-Assessment Waste Isolation Pilot Plant Final Report, Revision 0*
- NWP Document AA:16:01163 UFC:1410.00 dated September 19, 2016, *U. S. Department of Energy Waste Isolation Pilot Plant Startup Plan (Revision6 draft) for Commencement of Contact Handled Waste Emplacement Waste Isolation Pilot Plant*
- NWP Letter number OP:1600150 UFC1100.00 from Mike Love to Ed Garza, dated August 29, 2016, subject: *Startup Notification Report for Fourth Quarter of Fiscal Year 2016* and attached *Startup Notification Report*
- CBFO Letter 16-*1011:UFC1000.00 dated September 13, 2016, subject: Approval of Startup Notification Report for the 4th Quarter of FY16*
- CA-2017-CORR-001, *CORR Final Report for the Commencement of Contact-Handled Waste Emplacement at WIPP*
- 15-CA.01, *Contractor Assurance System Program Description*
- MC 1.4, *Contractor Assurance Department*
- MP 1.41, *Issues Management WIPP Form*
- *Multiple WIPP Forms from 2016*
- WP 15-CA1003, *Management Observation*

- INF-900, Management Oversight Brief Slides, *Commencement of Contact Handled Waste Emplacement Start Up Plan*
- Training Attendance Sheets for INF-900, Startup Plan, Commencement of Contact Handled Waste Emplacement
- *Multiple Management Observation Forms from 2016 (WP 15-CA1003 Attachment 1)*
- Inter-Office Correspondence OP:16:00182 UFC:1000.00 from M.D. Love to E.M. Balsmeier dated October 26, 2016 subject: *Selection of Management Oversight Personnel*
- *Multiple MOP Monitored Operational Evolution Forms (Startup Plan Attachment A)*
- 15-GM1002, *Issues Management Processing of WIPP Forms*
- MC 1.13, Rev. 1, *Executive Safety And Quality Review Board*
- NWP letter number AA:16:01179 UFC:1410.00 from Philip J. Breidenbach to Jeff Carswell dated November 7, 2016, subject: *Recommendation to Commence the Department of Emergy Operation Readiness Review for the Commencement of Contact Handled Waste Emplacement at the Waste Isolation Pilot Plant*
- Excel spreadsheet, *CORR Findings with WIPP Forms Assigned*
- PDF, *Manageable List for ORR, 11/12/2016*
- *List of NWP personnel assigned to perform monthly Management Observations*
- *WIPP POD 11/17/2016–11/30/2016*
- *Endorsement of the Readiness to Proceed with the DOE Operational Readiness Review for Resumption of Waste Emplacement Memorandum*
- *Staffing Analysis for Facility Operations personnel, Underground Facility Operations personnel, and Mine Operations Personnel*
- *Issue Collection and Evaluation Operational Awareness Reports for CORR Prestart Finding Closure Verification (multiple)*
- Excel spreadsheet, *DORR Pre-Start Matrix*
- Word Document, *DORR vs CORR requirement and Prerequisite Matrix rev24*
- Word Document, *CORR Pre-Start Post Start Finding Status – 11/29/16*
- *WIPP Emergency Management EEG: Emergency Operations Center (EOC)*

Interviews Conducted

- President and Project Manager
- Vice President and Director of Recovery Operations
- Restart Manager
- Operations Director
- Deputy Manager Underground Operations
- Deputy Manager ISMS/VPP/ES&H Programs
- Contractor Assurance Manager
- Assessment and Continuous Improvement Manager
- CBFO Accident Investigation Board CAP Manager
- Deputy Restart Manager
- Operations Manager

- Deputy Waste Operations Manager
- Waste Handling Crew Manager
- Infrastructure and Site Services Senior Project Manager
- Corrective Actions Program Manager
- CBFO Acting Assistant Manager for Office of WIPP

Shift Performances Observed

- DORR Emergency Exercise
- PM033013, Air Intake Shaft Hoist 33-H-001 Weekly Inspection and Lubrication
- T0 Daily Planning Meeting
- Executive Safety and Quality Review Board
- Surface Waste Handling of Contact Handled TRU Waste
- Emergency Exercise EOC Operations
- Post Job Briefing after Surface Waste Handling Operations

Discussion of Results

1. **Functions, assignments, responsibilities, and reporting relationships between organizations and management levels are clearly defined, understood, effectively implemented, and enable adequate execution of the initial startup program.**

   Roles, responsibilities, and reporting relationships are adequately defined for the restart of waste emplacement operations at the Waste Isolation Pilot Plant (WIPP) in the *U.S. Department of Energy Waste Isolation Pilot Plant Startup Plan for Commencement of Contact Handled Waste Emplacement Waste Isolation Pilot Plant*, Rev. 4, developed by NWP and approved by CBFO. The plan adequately describes the roles and responsibilities of the President and Project Manager, the Operations Manager, the Restart Manager, and other key management personnel involved in the restart of CH TRU waste emplacement operations. Based on observations and interviews, these responsibilities are understood and effectively executed, although the Startup Plan is not yet in effect. Based on review of the plan, interviews with management, and observations of performance demonstrations, the plan's definition of roles and responsibilities should enable adequate execution of the initial restart of waste emplacement operations.

   This criterion was met.

2. **Program documentation and implementing procedures have been developed and implemented for performing resumption of operations and testing.**

   Programmatic procedures and implementing procedures were reviewed by the DORR review team. Overall, the programmatic processes and implementing procedures were deemed adequate to support safe restart of CH TRU waste emplacement

operations. Details for the results of the programmatic and implementing procedure review can be found in the applicable sections within this report.

This criterion was met.

3. **The program/plan to accomplish startup is documented and approved. The plan clearly identifies the methods to be used to confirm the operability of the equipment, the viability of the procedures and knowledge of operators. (DOE Order 425.1D, DOE-STD 3006-2010)**

   The approved startup plan, documented in *U.S. Department of Energy Waste Isolation Pilot Plant Startup Plan for Commencement of Contact Handled Waste Emplacement Waste Isolation Pilot Plant*, Rev. 4, clearly outlined roles and responsibilities for operations oversight during the startup period. The plan also described how management oversight personnel (MOP) will conduct monitored operational evolutions (MOE), using WP 04-AD3031, *Monitoring Operational Activities*, Rev. 2, during the startup period. The plan also clearly described the process whereby the Restart Manager and Operations Manager would evaluate the results of the documented MOEs conducted thru the management observation program described in WP 04-AD3031. Based on satisfactory results from the MOEs, the Operations Manager and Restart Manager could then release portions of the startup activities for unrestricted operations (i.e., without required management oversight).

   The plan mentioned in at least one section of the document that the level of operator knowledge would be evaluated during the startup activities; however, this area of review was not particularly emphasized. The startup plan contains an MOE form to be used by management observers to document review of procedure viability and use, evaluation of equipment, and performance of operators. However, the form contained in the plan contained no review criteria to evaluate worker level of knowledge (see **MG.1-PRE-1** in criterion 5).

   The plan was weak in evaluating inspections, testing, and calibrations of safety significant (SS) structures, systems, and components (SSC). Although the startup plan included MOPs of daily preoperational verifications and facility mode changes, there was no real focus on monitoring inspections, testing, and calibrations of SS SSCs (see **MG1-PRE-1** in criterion 5).

   This criterion was met.

4. **The start-up program clearly identifies management personnel responsible for performing enhanced levels of oversight during testing and graded start-up activities. The duties, responsibilities, and shift staffing requirements of these management personnel are identified. The activities requiring this additional oversight is clearly identified as is the point at which enhanced management oversight is no longer required. (DOE Order 425.1D, DOE-STD 3006-2010)**

Direct management involvement in the oversight of the graded, deliberate approach to unrestricted operations should be a critical element of the startup plan. As such, the plan should require the involvement of senior, experienced management in conducting such oversight. The NWP startup plan did not describe such management involvement. Specifically, the plan minimized the importance of the first time performance of significant activities and evolutions by only requiring "management oversight personnel" to observe the evolutions, vice using Senior Supervisory Watches (SSW) as described in WP 04-AD3031. Per WP 04-AD3031, personnel who perform MOEs "should be WIPP managers or personnel with appropriate DOE and/or commercial nuclear experience, as approved by the Operations Manager. . ." This is in contrast to the definition of SSWs: "Personnel who perform SSW are approved by the President & Project Manager or designee, or Operations Manager or designee." SSWs, per the procedure, "must be experienced and senior personnel, with a background in Conduct of Operations, who can provide an independent and objective view of an activity or operation." SSW's are the appropriate type of management to conduct the first-time observation of activities, operations, and evolutions (see **MG1-PRE-1** in criterion 5).

This criterion was met.

5. **Test plans (if any) are adequately described in the plan or a referenced document. These plans identify specific tests to be performed, prerequisites, and acceptance criteria for verifying equipment operability. Management approvals and hold points (for key events or progression to the next phase of testing) required for specific tests or activities are identified. A schedule is included that clearly illustrates the systematic approach to full operations. (DOE Order 425.1D, DOE-STD 3006-2010)**

There are no test plans required for the resumption of CH TRU waste emplacement activities. Safety significant structures, systems, and components defined in the DSA are already in place and functional.

Based on review of the plan and discussion with NWP management, the startup plan did not detail how the various CH TRU waste emplacement and waste receipt activities would be conducted in a graded, systematic approach to unrestricted operations. Specifically, the plan was sparse, in that it required management observation of only one successful simulated payload of waste to be emplaced in Panel 7 prior to actual CH TRU waste emplacement. The plan did require an observed emplacement of a simulated payload once every 2 months following the initial simulated payload emplacement (presumably, this contingency was in place should the first actual waste emplacement be delayed). The plan should clearly describe specific activities, operations, and evolutions that need to be observed by management in a graded manner. As stated in the plan, the first simulated payload of waste emplaced in Panel 7 should be closely monitored, as all simulated emplacements up to this point have been performed in uncontaminated areas of the

underground, and not in Panel 7. Other operations or activities that should also be closely monitored by SSWs include:

- Safety significant structure, systems, or component inspections, surveillances, and testing
- The first actual CH TRU waste transport to and emplacement in Panel 7
- Stacking of actual waste containers in Panel 7, up to and including three-high stacking with MgO bags
- Unpacking of the first CH TRU waste containers from the TRUPAC II containers located onsite
- Receipt and unpacking of the first off-site shipment of CH TRU waste from waste generator sites

Based on the evaluations provided in criteria 3, 4, and 5, the review team determined the Startup Plan does not provide for a graded systematic approach to unrestricted operations. (**MG.1-PRE-1**)

This criterion was not met.

6. **The Startup Plan identifies the mechanisms for verifying the viability of procedures during actual performance, and identifies the management observers required for first time execution. The processes for revising test plans and procedures are summarized, and provisions for increased procedure revision support are addressed during the initial execution of procedures.**

   The startup plan adequately identified the criteria and means to evaluate and document the viability of procedures. The processes for revising maintenance and technical procedures were adequately described as well.

   This criterion was met.

7. **Sufficient numbers of qualified personnel are available to execute the initial testing program. Personnel assigned responsibilities for developing and executing testing possess the knowledge and experience to perform these responsibilities safely and effectively. (DOE O 420.1C)**

   Staffing analyses have been conducted to determine the number of personnel needed to perform various tasks at the WIPP facility. This analysis is based on the Performance Measurement Baseline, Baseline Needs Analysis, and planned schedule of activities. Shortages due to training and leave time away are not formally calculated, but considered by management knowledge. Once these personnel are hired, training and qualifications are tracked by individual department managers.

   Manager training and qualification is ensured by position description and performance reviews through continuous improvement. Leadership academy allows

managers to learn about the rest of the organization. See Training (TR) for a Finding related to management training.

Current contractor staffing in some critical areas will not fully support the breadth of operations planned in calendar year 2017. This staffing shortage is also compounded by the lack of qualified personnel in some areas (see below for issue statement).

The Operations organization has adequate staffing for initial waste receipt and emplacement, but the current staffing levels will not be able to support the planned schedule of five shipments per week. The Contact Handled (CH) Waste Handling Operations staffing will be inadequate to accommodate simultaneous unloading of TRUPACT II containers and waste emplacement operations. NWP Management has acknowledged the need for additional qualified waste handling staff to ensure the forecasted waste acceptance schedules are met. NWP is working on qualifying additional staff to support the forecasted waste delivery and emplacement schedule, but it will take approximately three months to fully qualify the current staff.

The WIPP Baseline Needs Assessment (BNA) determined that site emergency response organization requires minimum staffing of seven personnel per shift. The WIPP Fire Department Staffing procedure did not reflect the current BNA minimum staffing requirements. In addition, WIPP Fire Department is having trouble meeting the minimum staffing, especially on the off-shift and weekends. A review of fire department staffing report from October 15-November 15, 2016 found that minimum staffing on the off-shift was only met nine times out of thirty-two off-shift days. The inability to force overtime makes it difficult to recall personnel to meet minimum staffing. This is also a concern in staffing radiological control personnel if needed during an off-shift radiological incident.

The Radiological Controls organization is currently understaffed for the staffing analysis projected needs for future full scale operations (four active TRUDOCK positions and underground emplacement) – this does not include the current bolting campaign in Panel 7. The RC&D manager indicated current staffing was adequate to provide coverage for a limited scope of operations (2 TRUDOCK positions, bolting in Panel 7, no concurrent waste emplacement). Only eight of the thirty four Radiological Control Technicians (RCTs) are fully qualified, and there are only four of five Radiological Controls Supervisor positions filled, two of whom are managers filling in for these positions. The limited number of qualified RCTs also limits the ability to train technicians in the qualification process. Filling of these positions will not immediately bring staffing up to levels discussed in the staffing plan since significant training and qualification time will be required until the new incumbents are at a working level.

The NWP Contractor Assurance Organization is not fully staffed, and there is not a clear path forward to maintain current staffing levels. Existing staff members are attempting to cover the duties of four vacancies and covering for positions which are not on the organization chart. Four support service contractors are not funded past CY

2016 and needed subcontract technical expert support for independent assessments on SMPs and other mission critical areas is not currently funded, and may adversely impact this Contractor Assurance function. Current staffing levels may not be sufficient to sustain the Contactor Assurance function over time.

Currently, there is a shortage of qualified roof bolting personnel, preventing sufficient ground control in this area. The number of trained roof bolting personnel is the limiting factor preventing a second shift of roof bolting; another bolting crew could be deployed in panel 7 if there were enough trained mining personnel. In addition, Geotechnical Engineering is facing future staffing challenges. These positions require 1-2 years of on-the-job training, and 50% of the current geotechnical engineers are expected to retire within 5 years. There is already one skill set, the mine plot software expert, for which there is no backup or alternate in place. In addition, future work in the areas of engineering and nuclear safety will stretch the existing staffing resources. Upcoming design of the Permanent Ventilation System will be difficult with current staffing levels, especially given that subcontractors are used for design and Calendar Year 2017 funding significantly decreases these personnel. The planned revision of the Documented Safety Analysis will also require additional Nuclear Safety personnel to keep on track with the current schedule.

In summary, the existing staffing appears to be adequate for near-term, limited initial waste emplacement operations. However, if future staffing needs are not considered prior to positions becoming open or work scope increasing, the long lead time in training and qualifying staff will lead to personnel lacking the knowledge and experience to perform their responsibilities safely and effectively. **(MG.1-POST-1)**

In addition to these staffing concerns, **EP.1-PRE-2** discusses inadequate staffing for Emergency Medical Technicians and First Responders; **TRG.1-PRE-1** discusses issues with the current task based qualification process; **TRG.1-POST-3** describes manager training issues; and **RP.1-PRE-2** Radiological Protection (RP) discusses level of knowledge issues of Radiological Control Technicians.

This criterion was not met.

8. Mechanisms for verifying the adequacy of operator performance are clearly described, as well as the methods for remediating any identified weaknesses.

NWP Management have an established system for verifying the adequacy of operator performance through Management Oversight Program (MOP) oversight, which includes real-time feedback and the ability to analyze causes and implement corrective actions through the existing issues management system.

The Start-up Plan, *Department of Energy Waste Isolation Pilot Plant Startup Plan (Revision4) for Commencement of Contact Handled Waste Emplacement Waste Isolation Pilot Plant* describes the process that Management Oversight Personnel (MOP) will use to perform oversight of operations. This includes use of the procedure

WP 15-CA1003, and the MOP Monitored Operational Evolution Form (MOE) attached to the start-up plan. The plan lists the operations that will be observed by MOPs, including work associated with Safety Management Programs and Waste Handling Operations. The Managers approved as MOPs were selected by the Operations Manager via formal correspondence and trained on the responsibilities and expectations via training course INF-900.

Multiple MOPs were observed by DORR Team members in the areas of Waste Handling Operations. MOPs provided on-the-spot corrections in areas such as conduct of operations and procedure compliance and attended post-job briefings to discuss their observations. The startup plan states that safety significant (SS) systems, structures and components (SSCS) inspections, surveillances and emergency response will require oversight, but MOPs were not conducted on these activities during the DORR.

MOPs submitted completed MOE Forms after their oversight was completed. A review of MOPs MOEs from the DORR evolutions and previous work scope found that on-the-spot corrections are being made and WIPP Forms are being submitted. MOP MOEs are well written and include positive and negative aspects of the work observed. The Start-up Plan requires that the MOP MOE forms are reviewed by start-up and operations manager, and it was found that multiple forms were not reviewed and approved by startup and operations managers until the day the documents were provided to the DORR Team Member, which in some cases was a week or two after the MOP completed the form. MOP MOEs of simulated evolutions will be relied upon by management to determine if TRU CH emplacement can begin and should warrant a commensurate amount of attention from management.

In addition to review of MOP MOEs, a review was conducted of MOEs conducted per WP 04-AD3031. Many of these MOEs cited creation of WIPP forms, showing that management readily report issues that are found during their observations. In addition, these MOE Forms described on-the-spot corrections that were made, and discussed both positive and negative aspects of the job.

NWP Management has a formal process for performing oversight during start-up operations, including simulated waste emplacement and real waste emplacement. Based on review of previous Management Evolution Forms and DORR oversight of MOPs performing observations, the Managers performing oversight seem knowledgeable and willing to identify issues that are found.

This criterion was met.

9. Compensatory measures and the use of surrogate materials (if any) during startup and testing are clearly identified along with the criteria for phasing these controls and materials out. (DOE Order 425.1D, DOE-STD 3006-2010)

As part of maintaining proficiency prior to restart of waste emplacement, workers have been performing their tasks using simulated waste. These waste drums filled with dunnage were used for performance demonstrations during CORR and DORR. According to the Start-Up Plan, personnel will demonstrate proficiency on the dunnage simulant materials until management determines performance is adequate to work with real waste. The Start-Up Plan discusses transitioning from simulant to real waste, but did not sufficiently describe the graded approach to initiating real waste emplacement (see **MG.1-PRE-1** in criterion 5).

Observations of simulated waste emplacement found that personnel appropriately treat simulated waste as real. This included Radiological Control Technicians believing their indications while working with dunnage. This showed that personnel are able to perform their tasks with the surrogate materials, and this will be a reliable indicator for management observations to make decisions on phasing into operations with real waste.

This criterion was met.

10. The startup program was adequately evaluated by the CORR. (DOE Order 425.1D)

The CORR determined that the start-up program was adequate. The CORR included review of Start-Up Plans (Revisions 2 and 4), correspondence related to start-up, NWP Readiness procedures, the NWP Management Self-Assessment (MSA), and multiple local technical documents such as the Documented Safety Analysis, Technical Safety Requirements, and Authorization Agreement. The CORR did not identify that the Start-up Plan did not sufficiently describe the graded approach to initiating real waste emplacement.

During review of CORR Prestart Finding, it was found that some WIPP Forms were not closed in the Issues Management Processing System (IMPS) prior to the start of the Department of Energy Operational Readiness Review (DORR) and not included in the Manageable List of items. Through interviews with NWP Restart Manager and CBFO Acting Assistant Manager of Office of WIPP, it was found that NWP and CBFO had agreed that certain corrective actions for the prestart findings would be acceptable as post-start actions. This was found not to be formally documented, but based on the scope of the actions, seemed appropriate as post-start.

In addition, prior to the CORR, NWP performed a Management Self-Assessment (MSA). The MSA also did an adequate assessment of the Start-Up program by reviewing Revision 1 of the Start-Up Plan and other local documentation.

In summary, the CORR evaluation of the startup program was adequately thorough by reviewing appropriate documentation and comparing information to applicable requirements.

This criterion was met.

CONCLUSION

Objective MG.1 is met. A startup testing program has been developed that contains clear roles and responsibilities for the initial startup of waste emplacement. It includes an established system for verifying the adequacy of operator performance through MOP oversight, which includes real-time feedback and formal causal analysis and long term corrective actions through the existing issues management system. After start-up, personnel will demonstrate proficiency on simulant materials until management determines performance is adequate to work with real waste. However, the startup plan lacked specific activities for monitoring, did not adequately address a graded startup to unrestricted operations, and failed to take advantage of the existing Senior Supervisory Watch program and personnel to observe specific, first-time startup activities. Review of NWP staffing also revealed issues in current and future staffing in critical areas. Although staffing appeared to be adequate to support limited, near-term waste emplacement operations and activities, added work scope planned in calendar year 2017 may not be possible given the staffing and qualification shortfalls. Added work scope planned for 2017 includes, but is not limited to: simultaneous waste emplacement, ground control, and waste receipt, installation and startup of the supplemental ventilation system, and work associated with the permanent ventilation system.

Issues

MG.1-PRE-1: The Startup Plan does not provide for a graded systematic approach to unrestricted operations.

MG.1-POST-1: Current contractor staffing (compounded by the lack of qualified personnel) in some critical areas will not fully support the breadth of operations planned in calendar year 2017.

Evaluated by:	**Approved by:**
/s/ Mark C. Brown, Team Member	/s/ Edward Westbrook, Team Leader
/s/ Dimple Patel, Team Member	

DOE ORR for the Waste Isolation Pilot Plant
Review Form 1

Functional Area:	Objective:	Objective Met	
Management	**MG.2**	**Yes [X]**	**No [ ]**

OBJECTIVE

MG.2: The management, organization and institutional safety provisions are adequately defined, implemented and meet the intent of the safety management program description. **(Core Requirements 2, 4, and 5)**

CRITERIA

1. Functions, assignments, responsibilities, and reporting relationships between organizations and management levels are clearly defined, understood, effectively implemented.
2. The management team is adequately staffed. Assigned management personnel possess the knowledge, training, and experience to perform their assignments effectively.
3. An approved Integrated Safety Management System Description (ISMSD) exists.
4. NWP management personnel exhibit an understanding of the institutional safety programs, their responsibilities for safety, and the mechanisms for ensuring safe performance of work.
5. In accordance with Key Attribute KA 17-12 of the DSA, NWP embraces and develops strategies to attain a strong safety culture consistent with DOE Policy 450.4A and DOE Guide 450.4-1C.

APPROACH

Record Review:

- Review the WIPP organizational structure, and documents describing functions, responsibilities and authorities. Review staffing plans and current staffing levels. Review the ISMSD and any assessment reports documenting the adequacy of the ISMS and associated performance metrics. Review safety culture strategies, documentation, and metrics, including a review of the Safety Culture Sustainment Plan (SCSP).

Interviews:

- Interview WIPP management personnel to verify their responsibilities are consistent with infrastructure documents. Determine their level of knowledge of safety infrastructure systems and implementation of safety culture is adequate and supports a safe working environment.

- Interview WIPP personnel to verify their understanding of safety culture expectations and to verify WIPP safety culture meets Policy and Guide expectations.

Shift Performance:

- Observe performance demonstrations and drills to determine that a sound safety culture exists.

Records Reviewed

- WP 15-GM.03, *Integrated Safety Management System Description,* Rev. 9
- DE-EM0001971, *Waste Isolation Pilot Plant Management and Operations Contract,* Thru Mod 152
- MP 1.28, *Integrated Safety Management Policy ,* Rev. 9
- WP 15-GM1003, *Stop Work Process,* Rev. 1
- MC 1.13, *Executive Safety and Quality Review Board,* Rev. 1
- MC 1.16, *Corrective Action Review Board,* Rev. 0
- MC 9.5, *Nuclear Review Board,* Rev. 16
- MP 1.21, *Management Responsibility and Accountability,* Rev. 8
- MP 1.29, *Mission, Goals, and Responsibilities,* Rev. 4
- CO:16:02912, *NWP letter from M. P. Gonzales, Manager Contracts, to Vicki Diane Snow, CBFO Contracting Officer, "Submittal of the Integrated Safety Management Annual Declaration, Contract Deliverable No. 84, Under Nuclear Waste Partnership LLC Contract DE-EM0001971," dated January 26, 2016*
- CO:15:02940, *NWP letter from M. P. Gonzales, Manager Contracts, to Vicki Diane Snow, CBFO Contracting Officer, "Submittal of Nuclear Safety Culture Program Plan Revision 0, Under Nuclear Waste Partnership LLC Contract DE-EM0001971," dated April 27, 2015*
- CO:15:03038, *NWP letter from M. P. Gonzales, Manager Contracts, to Vicki Diane Snow, CBFO Contracting Officer, "Submittal of Submittal of the Integrated Safety Management Annual Review Under Nuclear Waste Partnership LLC Contract DE-EM0001971," dated December 18, 2015*
- CO:16:03007, *NWP letter from M. P. Gonzales, Manager Contracts, to Vicki Diane Snow, CBFO Contracting Officer, "Submittal of the Integrated Safety Management System Description, Deliverable Eighty-Five, Under Nuclear Waste Partnership LLC Contract DE-EM0001971," dated August 31, 2016*
- *Waste Isolation Pilot Plant Partnering Performance Agreement,* May 6, 2013
- PM033013, *Air Intake Shaft Hoist 33-H-001 Weekly Inspection and Lubrication,* Rev. 7
- EM Safety Culture Sustainment Plan Review Summary Table 4/16/15
- NWP Nuclear Safety Culture Program Plan, Rev. 0, dated April 24, 2015

Interviews Conducted

- President and Project Manager
- Recovery Manager
- Restart Manager
- Operations Manager
- ES&H Manager
- Deputy Manager ISMS/VPP/ES&H Programs
- Engineering Manager
- Maintenance Manager
- Contractor Assurance Manager
- Numerous NWP employees

Shift Performances Observed

- PM033013, Air Intake Shaft Hoist 33-H-001 Weekly Inspection and Lubrication
- T0 Daily Planning Meeting
- Executive Safety and Quality Review Board
- DORR Emergency Exercise

Discussion of Results

1. **Functions, assignments, responsibilities, and reporting relationships between organizations and management levels are clearly defined, understood, effectively implemented.**

   The NWP organizational structure was reviewed, as well as WP 15-GM.03, *Integrated Safety Management System Description*. The ISMSD provides a discussion of roles and responsibilities with respect to safety with further detail provided in derived company level procedures. These documents clearly document line management responsibility for safety and ensuring a safe work environment for personnel. Other company level charters and administrative processes further describe the responsibilities and interfaces among project organizations, functional support areas and facility management. Discussions with NWP management and staff revealed that functions, assignments, responsibilities, and reporting relationships were clearly understood and adequately demonstrated during this review.

   This criterion was met.

2. **The management team is adequately staffed. Assigned management personnel possess the knowledge, training, and experience to perform their assignments effectively.**

   The NWP organization chart was reviewed, as well as the staffing plan provided by NWP. Based on review of the staffing plan and interviews with the management team, the management team is adequately staffed with sufficiently knowledgeable,

trained, and experienced personnel. Based on interviews with management and staff, required tasks are being effectively performed. The review team did observe a strained work load amongst the management team due to the pace of activities. However, it did appear all assignments are being effectively managed and accomplished.

This criterion was met.

3. **An approved Integrated Safety Management System Description (ISMSD) exists.**

NWP has an approved Integrated Safety Management System (ISMS) Description Document (DD). Their most recent version of the ISMSDD, submitted for approval on August 31, 2016, is pending approval by CBFO. The description document was well-organized and adequately described the NWP ISMS. Annual ISMS declarations are being regularly developed and submitted as required. The most recent ISMS annual declaration, completed and submitted in January 2016, was also thorough, adequately describing the state of ISMS. In this declaration, NWP rated the ISMS as effective and undergoing ongoing, continuous improvement. Interviews with NWP management and staff revealed a mature understanding of the core functions and guiding principles of ISMS. Review of NWP processes and procedures, as well as how these are implemented, revealed adequate implementation of the core functions and guiding principles of ISMS in all aspects of work at WIPP.

During review of ISMS, the team found NWP has not had an ISMS verification (Phase 1 or 2) since assuming the contract in 2012, contrary to the guidance contained in DOE G 450.4-1C, *Integrated Safety Management System Guide*. Since the February 2014 Salt Haul Truck Fire and Radiological Event, a number of independent reviews, including the waste emplacement restart CORR and DORR, have been performed on portions of the NWP ISMS. Using these independent reviews as a basis, NWP (and CBFO) should consider developing a path forward to completing ISMS verifications on the balance of areas not yet reviewed.

This criterion was met.

4. **NWP management personnel exhibit an understanding of the institutional safety programs, their responsibilities for safety, and the mechanisms for ensuring safe performance of work.**

WP 15-GM.03, *Integrated Safety Management System Description*, describes the contractor roles and responsibilities for the safe performance of work, along with an overall discussion of the institutional safety programs. Likewise, review of the Waste Isolation Pilot Plan Documented Safety Analysis revealed clear descriptions and key elements of the institutional safety programs related to the safety analysis. Review of implementing contractor procedures, down to the work control and technical procedure level revealed a clear line of responsibility down to the worker level.

Observance of shift operations, maintenance activities, and emergency exercises demonstrated effective mechanisms are in place to ensure the safe performance of work. Review of the contractor's stop work process, along with interviews of workers revealed a strong safety culture with no fear in stopping work for unsafe work conditions.

This criterion was met.

5. **In accordance with Key Attribute KA 17-12 of the DSA, NWP embraces and develops strategies to attain a strong safety culture consistent with DOE Policy 450.4A and DOE Guide 450.4-1C.**

   NWP Nuclear Safety Culture Program Plan, Rev. 0, dated April 24, 2015, provides the description and elements of the safety culture improvement plan. This plan was reviewed by EM HQ, who determined the plan to adequately describe the state of safety culture improvement efforts, along with planned ongoing actions to improve the NWP safety culture. Interviews with management and staff revealed, without exception, that all NWP employees embrace the safety culture improvement efforts with a desire to instill a strong safety culture. The review team determined that, since the INPO safety culture assist visit in January 2015, NWP has made continuous improvements in their safety culture and has really embraced the recommendations provided in the 2015 review, as well as subsequent reviews and surveys. Continuous improvement actions and survey efforts described in the NWP safety culture improvement plan should be pursued on an ongoing basis to continue to strengthen the NWP safety culture.

   This criterion was met.

CONCLUSION

This Objective was met. Management level roles and responsibilities are adequately defined and effective organizational interfaces were observed. NWP has an approved ISMS description document and is conducting annual effectiveness reviews. Although the NWP ISMS has not undergone formal verification, the ISMS was observed to be in place and effectively functioning. The management team appeared to be sufficiently staffed, knowledgeable, and experienced to safely manage the activities encompassed by this startup review. The safety culture improvement efforts over the past year and a half have been successful in improving the overall NWP safety culture, as observed during work activities, and as discussed during interviews with management and staff.

Issue(s)

None.

Evaluated by:	**Approved by:**
/s/ **Mark C. Brown, Team Member**	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Review Form 1

Functional Area:	Objective:	Objective Met	
Maintenance and Work Control	MWC.1	Yes [X]	No [ ]

OBJECTIVE

MWC.1: The Contractor has established a comprehensive and integrated maintenance program to maintain the facility, systems, and equipment in a condition suitable for its intended use. The Contractor's implementation of the program promotes operational effectiveness, worker safety and health, environmental protection, and property preservation while meeting the project mission. **(Core Requirements 1, 2, 4, 5, 14, and 15)**

CRITERIA

1. The Contractor Maintenance Program calls for established work control requirements (e.g., define scope of work, analyze the hazards, develop hazard controls, perform the work safely, provide continuous feedback) and procedures in the planning, development, and performance of maintenance work.
2. Functions, assignments, responsibilities, and reporting relationships are clearly defined, understood, effectively implemented, and enable adequate execution of the Maintenance and Work Control Programs. There are adequate numbers of trained and qualified personnel and facilities, equipment, and materials effectively support maintenance activities.
3. The planning, scheduling, and control of work ensures that identified maintenance actions are properly completed in a safe, timely, and effective manner.
4. Workers and subject-matter-experts actively participate in the work planning and hazard analysis process.
5. Work control documents are written in a clear, user-friendly manner and effectively identify critical work steps (i.e., steps with significant importance to safety, the safety basis, or regulatory requirements) and specific hazard and their associated controls.
6. Preventive/corrective maintenance is performed in accordance with applicable code requirements, manufacturer recommendations, established technical requirements, and engineering judgment consistent with tracking, trending, and failure history.
7. Work Orders/Work Packages are adequately reviewed and approved in accordance with Verification and Validation requirements delineated in the contractor's internal manuals/procedures.
8. Work activities are authorized, released, and performed in accordance with the work control document. Pre-job briefings and walkdowns effectively identify the work scope and the potential hazards/controls that may be encountered. The

status of the work is effectively documented, including unexpected conditions and the responses taken.

9. Maintenance personnel exhibit an awareness of, and commitment to, public and worker safety, health and environmental protection requirements. They are fully aware of their Stop Work Authority and are willing to exercise that authority.
10. There is an effective continuous feedback process that ensures the improvement of the succeeding generation of WOs/WPs.
11. Periodic assessments of the maintenance and work control programs are performed to verify continued robust performance. Issues, recommendations or findings from assessments, both internal and external are tracked and resolved in a formal manner to ensure satisfactory correction and prevent reoccurrence.
12. The Contractor ORR has effectively evaluated the Maintenance and Work Control Programs.

APPROACH

Record Review:

- Work Planning and Control procedures
- Maintenance Program Procedures
- Hazard Analysis Procedure
- Maintenance and Work Control Organizational Chart(s)
- Maintenance Implementation Plan (MIP)
- Work Orders/Work Packages
- Master Equipment List (MEL)
- Calibration Schedule
- Maintenance Planner Qualification Standard and Card
- Feedback documents, including assessment reports pertaining to maintenance and work control, corrective action plans, and closure documentation
- Contractor ORR Final Report

Interviews:

- Maintenance Manager
- Work Control Manager
- Maintenance Planners
- System Engineer
- Safety/IH
- Maintenance Superintendent
- Maintenance supervisor
- Maintenance worker

Shift Performance:

- Plan-of-Day
- Morning scheduling/coordination meetings
- Job Hazard Analysis
- Maintenance work planning walkdown

- WO/WP authorization of maintenance work
- WO/WP release of maintenance work
- Pre-Job Briefings
- Workability walkdowns
- Preventative maintenance activities
- Corrective maintenance activities

Records Reviewed

- DOE/WIPP-06-3335, *WIPP Nuclear Maintenance Management Plan*, Rev. 4
- DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis, Rev. 5b*
- DOE/WIPP 07-3373, *Waste Isolation Pilot Plant Technical Safety Requirements, Rev. 5b*
- MP 1.28, *Integrated Safety Management, Rev. 9*
- MP 6.5, *Maintenance Management, Rev. 6*
- WP 02-AR3001, *USQ Determination, Rev. 12*
- WP 04-AD3011, *Equipment Lockout/Tagout. Rev. 16*
- 04-AD3030, *Pre-Job Briefings and Post-Job Reviews, Rev. 6*
- WP 04-AD.02, *Technical Safety Requirements Surveillance Program, Rev. 5*
- WP 10-WC.03, *NWP Equipment Calibration Program, Rev. 1*
- WP 10-WC3010, *Periodic Maintenance Administration and Controlled Document Processing, Rev. 29*
- WP 04-CO.01-8, *Conduct of Operations Program – Control of Equipment and System Status,* Rev. 5
- WP 10-WC3011, *Work Control Process, Rev. 37*
- WP 10-WC3012, *Work Control Document Writer's Guide, Rev. 1*
- WP 10-WC3013, *Work Control Document User's Guide, Rev. 1*
- WP 10-WC3014, *Periodic Maintenance Activity Screening Process, Rev. 1*
- WP 10-WC3015. *Scheduling and Work Authorization, Rev. 1*
- WP 10-WC3017, *Post Maintenance Testing, Rev. 1*
- WP 10-WC3018, *Skill of the Craft/Skill of the Worker, Rev.* 4
- WP 10-WC.03, *NWP Equipment Calibration Program, Rev. 1*
- WP 12-IS3002, *Job Hazard Analysis Performance and Development, Rev. 14*
- WP 15-GM.03, *Integrated Safety Management System Description, Rev. 9*
- WP 15-GM1003, *Stop Work Process*, Rev. 0
- WP 15-PS.2, *Procedure Writer's Guide,* Rev. 12
- WP 15-PS3004, *Procedure Verification and Validation, Rev. 2*
- EA04AD3030-1-0, *Pre-Job Briefing Checklist, Rev. 2*
- EA04AD3030-2-0, *Post-job Review Checklist, Rev. 0*
- EA04AD3011-5-0, *Lockout/Tagout Control Sheet, Rev. 0*
- EA15PS3004-2-0, *Procedure Validation Checklist, Rev. 1*
- WO 1626529, *CM-UPS will not come on line*
- WO 1623319, *CM-41P-MCC04/6: Handle on the breaker is broken*

- WO 1626627, *CM-25S7-LC2-FPR Investigate RTD trip function at breaker cell LC-2 in Substation 7*
- WO 1623378, *CM-The fire alarm control panel is locked in trouble*
- WO 1623120, *MOD-The legacy door security devices and conduit are interfering with the manual crank operation of the vertical lift tornado door (Door No 5). They need to be removed to allow for manual operation of Door No. 5*
- WO 1623391, *TEST-52H008AA1 Complete functionality testing on fire suppression system*
- WO 1629804, *Bottom East Brake Engine Coil Spring Is Broken, 11/18/16*
- PM053031, *Weekly A/C Unit Cleaning and Inspection, Rev.* 6, 6-TRN 1
- PM033013, *Air Intake Shaft Hoist 33-H-001 Weekly Inspection and Lubrication, Rev. 7*
- PM045010, *Diesel Fire Pump Batteries Inspection, Rev.* 9-TRN 2 IB, 9-TRN 3
- PM025039, *Inspection and Maintenance of Diesel Generator Batteries and Chargers, Rev.* 5, 6, 7
- PM074085, *Kubota Tractor Inspection and Maintenance, Rev.* 4, 4-TRN 1
- IC411031, *Canberra TRU-Dock Continuous Air Monitors Calibration, Rev. 2*
- IC041202, *41-B-956 and 41-B-957 HEPA Filter Unit Differential Pressure Gauge Calibrations, Rev.* 0-TRN 3, 0-TRN 3 IA
- STD JHA-171, *Waste Processing JHA, Rev. 6*
- STD JHA-304, *CH Waste Downloading and Emplacement, Rev. 11*
- STD JHA-439, *WIPP General Job Hazard Analysis Checklist, Rev. 10*
- STD JHA-1040, *Ground Control, Rev. 6*
- Job Hazard Analysis Checklist (JHAC), *PM053031 3 Ton AC Unit Inspection and Cleaning*
- JHAC, *PM033013 AIS Hoist 33-H-001 Weekly Inspection and Lubrication*
- JHAC, *PM045010 Battery Inspection on Diesel Fire Pump 45-G-602*
- JHAC, *PM025039 Inspection and Maintenance of Diesel Generator Batteries and Chargers*
- JHAC, *IC411031 Canberra TRU-Dock CAM Calibration*
- JHAC, *IC041202 41-B-956 and 41-B-957 HEPA Filter Unit Differential Pressure Gauge Calibrations*
- JHAC, *PM074085 Kubota Tractor*
- JHAC, *WO1613120, Remove legacy security devices and associated conduit associated with security panel 412-SP-001-02 from Room 102 of Building 412 to allow for manual operations of the vertical lift tornado door*
- JHAC, *WO1626627, Repair FPR RTD at Sub 7, LC-2*
- JHAC, *WO1626529, Replace 711-UPS-322*
- AJHA Hazard Report, *Fire Protection: Fire Alarms and their ancillary devices and equipment(Plant Equipment [Zone 4]) 10/6/14*
- AJHA Hazard Report, *Repair and maintenance of surface electrical distribution and power panels, feeder and branch circuits 50Volts to 600 Volts nominal 11/17/14*
- JHAC, *American Fire Equipment Company-WIPP Fire Suppression System Installations 4/26/16*

- JSA, *American Fire Equipment Sales and Service Corporation-AFSS Testing 7/25/16*
- *Qualification Records of Type 1, 2, and 3 Work Planners*
- *Maintenance Craft Training and Qualification Records(Sampling of Mechanical, Electrical, and IC Craft)*
- *WIPP Plan of the Day*
- *T-0 Daily Scheduled Work/Daily Release*
- *WIPP Form WF 16-1961, LMA-WPC1-PRE-1*
- *WIPP Form WF 16-1802, CORR Post Start Finding WPC1-POST-1*
- *Maintenance and Work Control Organization Chart*
- *Reverse Pre-Job Briefs Training*
- *October FY 2017 NWP Health Dashboard*
- *Underground Salt Haul Truck Fire Event Corrective Action Plans and Corrective Action Status AIB JON 13.2, 13.3, 13.4, 13.7, 14.3, 14.5, 15.1, 15.2, 18.1, 18.2*
- *Maintenance and Work Control Internal Assessments, Surveillances, and Management Observation (FY2016)*
- *MSA Deficient Conditions*
- *MSA Exit Brief*
- *MSA Pre & Post-Start Findings*
- *MSA Objective Evidence Files*
- *NWP CORR Plan of Action for the WIPP*
- *NWP CORR Implementation Plan for the WIPP*
- *NWP CORR Daily Issues List*
- *NWP CORR Out-Brief*
- *NWP CORR Final Report for the WIPP*
- *CORR Objective Evidence Files*

Interviews Conducted

- Maintenance and Work Control Manager
- Maintenance and Work Control Deputy Manager
- Work Control Manager
- PM Planning and Administration Manager
- Facility Shift Manager (FSM)
- Cognizant Operations Manager (COM)
- U/G Planning Manager
- Work Planners (3)
- Cognizant Engineer
- Occupational Safety and Industrial Hygiene (2)
- U/G Work Group Manager (WGM)
- U/G Field Work Manager (FWM) [2]
- U/G Field Work Supervisor (FWS) [2]
- Surface Mechanical/Electrical Maintenance Manager
- Surface FWS (3)
- Surface and U/G Maintenance Craft (10)

Shift Performances Observed

- T-0 Morning Meetings (3)
- Plan-of-the-Day (1)
- Work Planning/JHA Team Walkdown and JHA Development
- Corrective Maintenance on Salt Shaft Hoist Brake Spring
  - Pre-Job Brief
  - Job Performance
  - Post Job Review
- Air Intake Shaft Hoist 33-H-001 Weekly Inspection and Lubrication
  - Pre-Job Briefing
  - Field Readiness Walkdown
  - Job Performance
  - Post Job Review
- Inspection and Maintenance of Diesel Generator Batteries and Chargers
  - Pre-Job Briefing
  - Field Readiness Walkdown
  - Job Performance
  - Post Job Review
- Kubota Tractor Inspection and Maintenance
  - Pre-Job Briefing
  - Field Readiness Walkdown
  - Job Performance
  - Post Job Review
- 41-B-956 and 41-B-957 HEPA Filter Unit Differential Pressure Gauge Calibrations
  - Pre-Job Briefing
  - Field Readiness Walkdown
  - Job Performance
  - Post Job Review

Discussion of Results

1. **The Contractor Maintenance Program calls for established work control requirements (e.g., define scope of work, analyze the hazards, develop hazard controls, perform the work safely, provide continuous feedback) and procedures in the planning, development, and performance of maintenance work.**

   A review of Maintenance, Work Planning and Control (WPC), and associated procedures revealed a maturing and more rigorous program than in past years. These procedures provide adequate guidance and requirements to establish a process for the implementation of the core functions delineated in the Integrated Safety Management System (ISMS) and the details of planning, development, and performance of maintenance work.

WP 10-WC3010, *Periodic Maintenance Administration and Controlled Document Processing*, defines the initiation of a maintenance procedure and change control requirements. WP 10-WC3011, *Work Control Process*, defines the process for development of work orders and work instructions used for performing non-PM maintenance on systems/components. WP 10-WC3012, *Work Control Document Writer's Guide,* establishes the minimum requirements for development of technical instructions (procedures or work instructions). WP 10-WC3013, *Work Control Document User's Guide,* establishes the minimum expectations for use of work control documents developed in support of the Maintenance program. WP 10-WC3015, *Scheduling and Work Authorization*, discusses the development of the integrated activity level schedule and provides information on the scheduling process flow. Other procedures typically used in the development of work orders are:

- WP 10-WC3014, *Periodic Maintenance Activity Screening Process*
- WP 10-WC3017, *Post-Maintenance Testing*
- WP 12-HP3600, *Radiological Work Permits*
- WP 12-IS3002, *Job Hazard Analysis Performance and Development*

WP 10-WC3011 is an improved procedure from past revisions but it contains administrative errors and does not define some key terms (e.g., Facility Shift Manager, Field Work Manager, frequently, routine, repetitive, etc.) which are used to make process determinations. The most significant concern is the pathway to determine whether a Type 1 work package requires entry into the USQ process. Step 3.3.5 of WP 10-WC3011 states that "Type 1 work planning is used for tasks where detailed work instructions are needed to accomplish the activity. Type 1 work packages are routinely used for activities involving: safety SSCs, high/medium complexity, high hazardous/consequence, and/or involves implementing complex hazard controls." Sub-step 33 in Step 3.3.5 states that a Type 1 work package does not require entry into the USQ process if the work is considered routine maintenance and does not have any interaction with safety SSCs. By its very definition and use, Type 1 work packages are not routine maintenance; other type work packages perform routine maintenance. There is a **potential** path to bypass the USQ process where none should exist for Type 1 work packages **(MWC.1-OFI-01)**.

There are also concerns with procedure WP 12-IS3002, *Job Hazard Analysis Performance and Development* **(MWC.1-OFI-02)**. The policy of "grandfathering" Automated Job Hazard Analyses (AJHA) and Hazard Identification Summary's (HIS) and introducing undefined terms such as Standing AJHA and AJHA Hazard Report, are confusing and may lead to inconsistent implementation. During review of numerous JHA, two AJHAs were encountered that provided little or no value to the hazard analysis process, but do not require modification unless they are expired or a revision is required. Also, a review of several Standing JHAs revealed some concerns regarding work scope and activity level hazard analysis. These Standing JHAs for technical operations such as Waste Emplacement and Ground Control had no list of procedures or activities that were under the cognizance of these Standing JHAs. These Standing JHAs rarely identified any specific controls, but even if they

did, the lack of an identified task to which that control applied would render the controls as ineffective. Standing JHAs are typically used to identify hazards and their associated controls for similar activities that have common hazards. Since these Standing JHAs do not identify the similar activities, it is difficult to determine their adequacy. Another concern is the confusing statements in Section 4.1 regarding the mandatory participants of the JHA walkdown. Section 4.1 states that safety and the work planner are invited to the walkdown; an invitation does not imply mandatory attendance. Section 4.2 has a list of "Required walk down participants" which include the work planner and safety. The section also includes another list of "SME representative as determined by the work scope" which again includes the planner and safety. It is unclear whether safety and the work planner are mandatory participants or invited/requested participants based on the work scope. Another concern is a note that states "Work Planner walk down may be performed concurrently with the scoping walk down." This is troubling if the "Work Planner walkdown" is the Work Planning/JHA walkdown because the planner should develop a draft work instruction after the scoping walkdown so the Planning/JHA Team has an aid with which to identify hazards during the performance of the job steps/tasks. If done concurrently, the Work Planning/JHA Team has no aid to effectively identify the hazards and develop their associated controls. These concerns are only examples and are not all inclusive.

2. **Functions, assignments, responsibilities, and reporting relationships are clearly defined, understood, effectively implemented, and enable adequate execution of the Maintenance and Work Control Programs. There are adequate numbers of trained and qualified personnel and facilities, equipment, and materials effectively support maintenance activities.**

   A review of NWP organizational charts, roles and responsibilities statements, position descriptions, and interviews with Maintenance and Work Planning and Control (WPC) personnel reveal that the Maintenance and WPC organizations have a well-defined structure and reporting hierarchy. The managers have a clear understanding of their roles, responsibilities, and inter-relationships.

   A review of work planner qualification standards and cards revealed an adequate qualification process and that there are adequate numbers of qualified work planners but almost half of the current planners are subcontractors and are subject to termination after the start of waste emplacement. Interviews with maintenance management and a review of the Maintenance and Work Control proposed staffing plan indicates that there were 145 Full Time Employees (FTEs) and 16 vacancies in FY16. The proposed staffing for FY17 is 159 FTEs (Maintenance-104 and WPC-55) which is a reflection of filling vacancies in both Maintenance and WPC from the previous year. If the FTEs remain intact and the vacancies are filled, the Maintenance and WPC organizations will be able to maintain their progress in improving the Maintenance and WPC organization. The proposed staffing plan provides adequate justification for the FY17 staffing.

A review of the WIPP Maintenance Training Program Plan, qualification records for mechanical, electrical, and instrument & control maintenance personnel revealed a more than satisfactory program. The qualification standard for the craft is comprehensive and contains rigorous elements. Maintenance management is also initiating advanced professional training for the crafts as a part of their continuing training.

The NWP MSA team identified that the current shop availability at WIPP does not meet the requirements of DOE O 433.1, DOE G 433.1-1A, and DOE O 4201.1C, in that a facility requires sufficient resources to support the described requirements, support planned outages, and perform pre-outage tasks to reduce outage resources. The MSA finding resulted in the generation of WIPP Form WF16-1415 to track the issue to closure. The CORR Team concluded that further evaluation of assets that are critical for safe execution of the WIPP mission (critical parts list) should be considered and a WIPP Form WF16-1752 was generated for this action. The DORR did not pursue these issues any further as planned actions are underway to resolve them.

A newly initiated process has been implemented for acquiring and staging of maintenance parts and equipment. Previously, the acquisition and staging of materials and component parts required for maintenance were performed by the planners, supervisors, and/or the workers. There are now dedicated personnel to locate and stage materials, equipment, and parts for maintenance activities although the process is in its infancy and the staging area may not be sufficient but they are trying to address this issue.

3. The planning, scheduling, and control of work ensures that identified maintenance actions are properly completed in a safe, timely, and effective manner.

The planning, scheduling, and coordination of work at WIPP are controlled through WP 10-WC3015, *Scheduling and Work Authorization*, which directs the development of the integrated activity level schedule and provides information on the scheduling process flow. The schedule consists of rolling work weeks where initial preparation of the integrated schedule starts 8 weeks (T-8) prior to the execution week (T-0). The rolling schedule is linked to a current T-1 schedule (one week ahead of the execution week) and finally to the current T-0 (execution week) schedule that addresses all significant work activities to be performed at the facility and considers the restraints required on each work activity and the restraints that each work activity places on other work activities.

The T-1 schedule meeting is conducted to ensure activities are de-conflicted, confirm resource availability to support the schedule and get final buy-in from Operations and other organizations. When approved by the FSM, Work Authorization is complete and the schedule is locked-in and is subject to change control if merging work has the potential to impact scheduled work.

The T-0 integrated schedule is controlled by Facility Operations. The FSM and Cognizant Operations Manager (COM) review of T-0 scheduled work ensures current configuration aligns with scheduled work. The COM releases operations related work and thus controls work in his area. A daily 7:15 am meeting discusses and coordinates the T-0 integrated schedule.

The NWP Maintenance and Work Control organization has performed an excellent job of reducing the backlog of Periodic Maintenance (PM) and Corrective Maintenance (CM). A review of Maintenance and WPC Metrics for October FY2017 revealed an overall PM delinquency of seventeen (17) of which twelve (12) are eyewash stations that are tracked as maintenance activities but are mostly owned by other organizations. Four (4) of the remaining delinquent items have been submitted to Engineering for deferral. There is a backlog of one hundred-twenty two (122) high priority (3A and above) CMs of which sixteen (16) are Safety Significant. The backlog is high based on the number of CMs but with more equipment being returned to service for Operations re-start, there is an increased demand for these emergent CMs which impacts the efforts to reduce older CMs. There are questions whether some of these older CMs will actually need to be performed and the evaluation of these CMs is ongoing.

4. Workers and subject-matter-experts actively participate in the work planning and hazard analysis process.

Interviews of workers, supervisors, Safety/IH, system engineer, and planners and an observation of a Work Team Planning/JHA walkdown revealed that the workers, their supervisors, planners, and SMEs are very involved in the WCD planning, review, and approval process. However, that involvement has not necessarily resulted in identifying the proper work steps, the job hazards, and proper implementation of controls. The disparity may be that they have not been trained properly in work planning, work development, and reviewing the WCDs with the rigor that is required of a Category II nuclear facility. During the DORR, it was apparent that the craft and their supervisors were becoming more attuned to the requirements and based on the number of Temporary Revision Notices (TRN) for PMs scheduled to be performed during the DORR, there was a more rigorous review of WCDs being performed. In one case, a PM that was scheduled to be performed was cancelled due to a review that determined the PM required a revision.

5. Work control documents are written in a clear, user-friendly manner and effectively identify critical work steps (i.e., steps with significant importance to safety, the safety basis, or regulatory requirements) and specific hazard and their associated controls.

A review of fourteen (14) work control documents (WCDs) revealed that the WCDs had numerous weaknesses and deficiencies (**MWC.1-POST-01)**. Although most of the deficiencies were non-compliance with NWP internal requirements and did not

have immediate safety significance, the sheer number of these deficiencies resulted in issuing Finding. However, among those deficiencies, there were several that were more significant than editorial/administrative deficiencies. Several of the deficiencies would have created a situation where the work could not be performed as written or the hazards and/or controls were not adequately identified at the proper location in the WCD. Overall, the WCDs were written in a clear, concise, and user-friendly manner with only a few exceptions.

Four Standard Job Hazard Analyses (JHAs), ten JHA Checklists, two Automated JHAs, and one Job Safety Analysis were reviewed along with their associated WCDs which revealed that JHA products are inconsistent and contain deficiencies in basic hazard identification, hazard control development, and hazard control integration into WCDs. Some of these deficiencies were self-identified in WIPP Form WF16-1961. Based on the elements discussed in the description and the addition of concerns of the DORR into the WIPP Form, a DORR Finding regarding the same issue (inadequacies of JHAs) will not be issued.

6. **Preventive/corrective maintenance is performed in accordance with applicable code requirements, manufacturer recommendations, established technical requirements, and engineering judgment consistent with tracking, trending, and failure history.**

   NWP WPC has revised maintenance procedures to incorporate engineering-identified maintenance requirements, revised PMs for U/G, revised operator pre-use checklists based on manufacturers' manuals, revised the WPC procedure to ensure that appropriate SMEs are involved in evaluating changes to facilities, equipment, and operations, and revised NWP procedures that provides instructions on evaluating the impact on critical systems and safety related equipment impairments. Based on these improvements, interviews with Maintenance, WPC, and a Cognizant Engineer, review of the WCD development process, review of the Maintenance organization metrics for PMs and CMs, and the adequacy of the other applicable criteria in MWC.1, this criterion is satisfied.

7. **Work Orders/Work Packages are adequately reviewed and approved in accordance with Verification and Validation requirements delineated in the contractor's internal manuals/procedures.**

   A review of WP 15-PS3004, *Procedure Verification and Validation*, Revision 2, Draft B, and the Verification and Validation Checklists, revealed an adequate procedure. However, the implementation of the verification and validation process currently does not ensure that the workers are provided with quality WCDs as evidenced by the WCDs deficiencies discussed in Criterion 5 and DORR Form 2 **(MWC.1-POST-01)**.

8. Work activities are authorized, approved, released, and performed in accordance with the work control document. Pre-job briefings and walkdowns effectively identify the work scope and the potential hazards/controls that may be encountered. The status of the work is effectively documented, including unexpected conditions and the responses taken.

The WCD is approved by the Work Control Manager and/or the COM, depending on the type of work and can occur days before the work is released. Work is authorized by the Facility Shift Manager (FSM) based on his approval of the T-1 schedule. The work on the T-0 schedule is released by the COM or WGM, if the work is not related to Operations. One concern is the release of some WCDs by the off-shift FSM without interface with the FWS performing the work. For simple, routine maintenance activities, the off-shift FSM determines whether the plant configuration for the on-coming shift can support the maintenance activity and, if so, he releases the work and the FWS picks up the WCD without interfacing with the FSM. This "pre-release" by the FSM does not meet the literal definition of work release but it appears that it meets the intent of work release for simple, routine maintenance activities.

Six maintenance work activities were observed from the pre-job briefing (PJB) through the WCD post-job reviews. The quality of PJBs covered the range from adequate to excellent with most in the "good" range. A PJB conducted by a U/G Field Work Manager (FWM) was exceptionally well performed. The FWM conducted an exemplary reverse PJB and engaged the entire crew while encompassing all the required elements of a PJB. The field readiness walkdowns, while not a formal walkdown, was performed by the crew and supervisor for all the observed activities.

All observed maintenance activities were performed without incident with one exception. During the performance of PM033013, *Air Intake Shaft Hoist 33-H-001 Weekly Inspection and Lubrication*, three instances were noted of non-compliance to written instructions **(see OP.1-POST-1)**. In two instances, the craft did not perform steps in the work instructions because he visually inspected the component and determined that the steps did not need to be performed. The other instance of non-compliance was the result of a poorly worded work step. The craftsman is an experienced and skilled worker who made determinations that the WCD did not allow thus resulting in this Finding (which is combined with a similar concern identified in the Operations CRAD). The reasoning for his actions was sound, but the WCD should have been modified to reflect his reasoning and provide the craft options based on skill-of-the-craft/worker **prior** to performance of the work activity.

During the performance of a pre-operational check of a Kubota Tractor, the U/G maintenance craft identified that the mounted fire extinguisher did not meet the capacity requirement. The mounted fire extinguisher was 5 lbs. but the requirement in the pre-operational check procedure was for a 10 lb. fire extinguisher. This discrepancy raises the question regarding the rigor of the pre-operational check

process and how long this Kubota Tractor has operated with a deficient fire extinguisher **(MWC.1-OFI-03)**.

On November 18, a Type 3 Work Order was developed to remove and replace a broken bottom East brake coil spring on the Salt Hoist 38-H0-12A2. While attempting to obtain the proper approvals, the DORR site-wide drill was initiated and most surface maintenance personnel were sequestered in Maintenance Trailer 950. Because the Salt Hoist is also a life-safety piece of equipment, an exemption from the drill was sought by maintenance management for a crew to repair the spring. Indecision and/or miscommunication as to whether the crew had been granted an exemption contributed to an unnecessary delay in repairing the broken Salt Hoist spring **(MWC.1-OFI-04)**. The crew was finally granted an exemption from the drill and the broken Salt Hoist spring was repaired satisfactorily.

A review of the Work Status Logs for the six observed PM activities and seven completed CMs revealed an adequate-to-good use of the log. Entries were made that recorded the status of the work and the final condition of the work activity. An exception was WO 1625472, *Air Intake Shaft Hoist 33-H-001 Weekly Inspection and Lubrication*, where two comments were recorded on improving the PM (belonged in the post-job review) but the status of the work and the instances of procedural non-compliance were not recorded.

9. Maintenance personnel exhibit an awareness of, and commitment to, public and worker safety, health and environmental protection requirements. They are fully aware of their Stop Work Authority and are willing to exercise that authority.

Based on interviews with maintenance personnel and observations of field readiness walkdowns, pre-job briefings, and work activities, maintenance personnel exhibited a very good attitude toward safety and health in their job and protecting their co-workers. However, it was difficult to quantify or qualitatively measure the exhibition of awareness and commitment to the public and environmental requirements but their awareness and commitment to their co-workers would effectively translate to the public and environment.

During the interviews with maintenance and support personnel, they exhibited a superior understanding of Stop Work Authority. It was evident that the maintenance personnel were not hesitant to invoke their Stop Work Authority which was supported by their anecdotal discussion of instances when they invoked their Stop Work Authority. All of the personnel who had invoked stop work authority stated that there was no retaliation by management and several received an incentive for having stopped the work.

10. There is an effective continuous feedback process that ensures the improvement of the succeeding generation of WOs/WPs.

The observation of six post-job reviews revealed a much improved review process which contained the rigor required to provide meaningful comments which will hopefully improve the quality of the WCDs. Most of the Field Work Supervisors (FWSs) who conducted the post job reviews did an excellent job of eliciting comments from the craft. The completed post job review forms are part of the WCD and are sent to WPC where they will be entered into the feedback process. In previous years, the feedback process was not effective in improving the succeeding generation of WCDs. Currently, there is a new process for capturing the feedback comments and documenting comment resolutions so that the initiators of the comment(s) are made aware of the disposition of their comments. This is a significant improvement in the feedback process.

11. Periodic assessments of the maintenance and work control program are performed to verify continued robust performance. Issues, recommendations or findings from assessments, both internal and external are tracked and resolved in a formal manner to ensure satisfactory correction and prevent reoccurrence.

There has been one internal assessment for FY16 of the Maintenance and WPC program. There have also been two Management Self-Assessments and numerous (over 100) Management Observations. A sampling of these assessments and their associated corrective action plans were reviewed for content which revealed an adequate assessment of the targeted elements, but the number of Contractor Assurance System/Performance Assurance type assessments performed (four were scheduled but only one was performed) is minimal **(MWC.1-OFI-05)**. The Management Observations performed by the Maintenance and WPC organization are extensive and observation criteria are well documented. A review of the FY17 Integrated Assessment Schedule reveals a much more comprehensive assessment schedule for the Maintenance and WPC organization.

A review of the Underground Salt Haul Truck Fire Event Corrective Action Plan-AIB JON 13.2, 13.3, 13.4, 13.7, 14.3, 14.5, 15.1, 15.2, 18.1, 18.2, revealed adequate corrective action plans and all fifty-four (54) corrective action tasks (Findings and OFIs) have been closed with the exception of Closure Action 13.7, *Implement Revised Procedures*. The training to close the action was conducted but the attendance rosters for the training have not been located and the resolution of this closure item is still being determined. As a result of the closure actions, NWP WPC has revised maintenance procedures to incorporate engineering-identified maintenance requirements, revised PMs for U/G, revised operator pre-use checklists based on manufacturers' manuals, revised the WPC procedure to ensure that appropriate SMEs are involved in evaluating changes to facilities, equipment, and operations, and revised NWP procedures that provides instructions on evaluating the impact on critical systems and safety related equipment impairments.

12. The Contractor ORR has effectively evaluated the Maintenance and Work Control Programs.

The CORR of the Maintenance and Work Planning and Control Programs adequately reviewed all areas and several concerns were captured in the CORR Report, but the omission of a concern regarding the quality of JHAs and WCDs was puzzling. The identified concerns by the CORR are less significant than the overall quality of the JHAs and WCDs deficiency. Although the DORR Team is disappointed in the lack of concern for JHA and WCD quality, the DORR Team agrees with the CORR conclusion that Objectives MT1, MT2, and WPC were met.

CONCLUSION

The current NWP Maintenance and Work Control Program is not yet a mature, efficient program, but there has been a vast improvement from previous years. The Maintenance and Work Control management has initiated many improvements (e.g., new PM feedback loop, improved communications with Engineering and Operations, improved metrics, technical continuing education for craft, etc.) and the program is headed in a positive direction. Other proposed improvements include development of maintenance JHAs, procedure verification and validation training, first line supervisor training, procedure writer training, maintenance self-assessment training, etc. While the quality of the WCDs has not yet achieved the desired results, the management efforts to improve the program is apparent in the newly initiated processes to improve the program, improved communication between maintenance and work control, and the greatly improved attitude of the personnel. The most notable difference from past years is the willingness of the Maintenance and WPC personnel to work together to improve the program.

This Objective has been met.

Issue(s)

MWC.1-POST-01: Maintenance work control documents (WCDs) contain numerous deficiencies including hazard identification and controls; however, in all but one instance, the hazard controls were present, but were mis-located within the WCD.

MWC.1-OFI-01: There is a potential path to bypass the USQ process for Type 1 work packages.

MWC.1-OFI-02: WP 12-IS3002, *Job Hazard Analysis Performance and Development*, contains weaknesses.

MWC.1-OFI-03: There is a concern regarding the rigor of the equipment pre-operational check process.

MWC.1-OFI-04: Indecision and/or miscommunication during a drill unnecessarily delayed the repair of the broken Salt Hoist brake spring.

MWC.1-OFI-05: The FY16 Integrated Assessment Schedule listed four assessments of the Maintenance and WPC program but only one was performed.

Evaluated by:	**Approved by:**
/s/ Dennis Y Oba, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant

Review Form 1

Functional Area:	Objective:	Objective Met	
Nuclear Safety	NS.1	Yes [X]	No [ ]

OBJECTIVE

NS.1: Facility safety documentation is in place and has been implemented that describes the "safety envelope" of the facility. The safety documentation characterizes the hazards/risks associated with the facility and identifies preventative and mitigative measures (systems, procedures, administrative controls, etc.) that protect workers and the public from those hazards/risks. Safety structures, systems, and components (SSCs) are defined. Formal agreements between the operating contractor and DOE have been established via the contract or other enforceable mechanism to govern the safe operation of the facility.
(Core Requirements 1, 2, 3, 4, 6, 13, 14, and 15)

CRITERIA

1. A DOE approved Documented Safety Analysis (DSA), Technical Safety Requirement (TSR) and authorization agreement are in place. These documents adequately characterize the facility hazards and identify preventive and mitigative measures to protect workers, the public, and the environment from those hazards. SSCs are clearly identified as well as the safety functions of those SSCs.
2. A process has been developed and implemented to ensure SRs, and other safety basis commitments are performed, reviewed and approved in accordance with the timeframes established in the TSRs or other appropriate document (i.e., Safety Evaluation Report.) Implementing documents for these commitments are appropriately identified.
3. Personnel responsible for performing, reviewing, and approving SRs have the appropriate training and skills to perform these duties. Personnel responsible for ensuring TSR implementation (i.e. Operations Management) demonstrate adequate understanding of TSR requirements.
4. The qualifications for personnel responsible for maintaining the safety basis for the WIPP are documented and adequate.
5. A sufficient number of qualified individuals are available to execute the nuclear safety program, including: performing updates to the DSA/TSR, preparing page changes to the DSA/TSRs, performing USQDs, etc.
6. The functions, responsibilities, and reporting relationships for personnel performing safety basis activities are clearly defined and understood. Hazard analysis personnel maintain appropriate interactions with personnel analyzing environmental, safety and health concerns.

7. Periodic assessments of the nuclear safety program are performed to verify continued robust performance. Issues, recommendations or findings from assessments, both internal and external are tracked and resolved in a formal manner to ensure satisfactory correction and prevent reoccurrence.
8. This objective was adequately evaluated by the CORR.

APPROACH

Record Review:

- Review the WIPP DSA, TSRs, and authorization agreement for completeness and to verify consistency between the documents. Review implementing documents and procedures to verify that requirements are appropriately flowed down into those procedures. Review completed TSR surveillances. Review staffing plans and qualification requirements for personnel responsible for maintaining the safety basis. Review Nuclear Safety SMP status report that monitor program health. Review the CORR final report.

Interviews:

- Interview facility personnel, who perform, review and approve SRs. Interview personnel who are responsible for ensuring operational compliance with the safety basis. Interview personnel responsible for maintaining the safety basis documents for the WIPP to assess their level of knowledge.

Shift Performance:

- Observe the performance of TSR SRs. Perform a facility walk-down of the WIPP facility with a focus on the facility's design features and their material condition.

Records Reviewed
See comprehensive list under ENG.1.

Interviews Conducted
See comprehensive list under ENG.1.

Shift Performances Observed
See comprehensive list under ENG.1.

Discussion of Results

1. **A DOE approved Documented Safety Analysis (DSA), Technical Safety Requirement (TSR) and authorization agreement are in place. These documents adequately characterize the facility hazards and identify preventive and mitigative measures to protect workers, the public, and the environment from those hazards. SSCs are clearly identified as well as the safety functions of those SSCs.**

DOE issued the SER approving the WIPP DSA and TSRs, Revision 5b, on 4/29/2016. DOE issued the Authorization Agreement (AA), Revision 9, on 4/28/2016 (DOE/WIPP-01-3181). The AA establishes an agreement for the safe operation of the WIPP facility between the DOE CBFO and NWP, the management and operating contractor. The scope of activities authorized for NWP in conjunction with the operation of WIPP is defined by: (1) the statement of work contained in Prime Contract No. DE-EM0001971; (2) the WIPP DSA and WIPP TSR, as approved in the DOE-issued SER, including the DOE approved page changes, and (3) Supplemental Environmental Impact Statement-II.

Receiving, handling, and emplacing CH and RH TRU waste in disposal configuration in the WIPP underground repository are currently not authorized by the CBFO.

- Retrieving and returning potentially noncompliant payloads from WIPP to generator sites and transportation of payloads to the WIPP are currently not authorized by the CBFO.
- Receiving TRU waste in Criticality Controlled Overpack containers is currently not authorized by the CBFO.

The following activities are authorized by CBFO:

- Storing and using radioactive samples and sources within the WIPP and transferring these samples and sources between the WIPP and analytical laboratories or other facilities, as required to support operations (e.g., for contract laboratory analyses);
- Storing CH and RH TRU waste on the parking lot south of the WHB and within the WHB, as required to support operations and as allowed by applicable permits and approvals;
- Movement of existing TRU waste in the WHB; and
- Other work as defined in the contract, DE-EM0001971.

To ensure a robust safety basis in support of resumption of operations, DOE directed that WIPP use DOE-STD-3009-2014 as the governing safe harbor methodology, a new revision that imposes specific requirements for mandatory compliance as well as other guidance. The new standard reflects proven best-practices in safety basis development from throughout the DOE Complex. DOE also directed the use of DOE G 423.1-1B, *Implementation Guide for Use in Developing Technical Safety Requirements*. Because WIPP handles transuranic (TRU) waste, the Revision 5 safety basis development was also governed by DOE-STD-5506-2007, *Preparation of Safety Basis Documents for Transuranic (TRU) Waste Facilities*, developed to guide programs dealing with TRU waste within DOE-EM. This application of DOE-STD-5506- 2007 is not its first use at WIPP; it has been applied since Revision 0 of the combined CH and RH DSA and TSR. To facilitate implementation of DOE-STD-3009-2014 and, more importantly, to help ensure timely preparation of an approvable safety basis in support of WIPP restart, DOE elected to charter their Safety Basis Review Team (SBRT) built on the concept of an Integrated Project Team in DOE-

STD-1189-2008, *Integration of Safety into the Design Process*. As referenced in DOE STD-1104-2014, the SBRT provided an in-process review during the contractor's DSA and TSR development in order to more expeditiously address development issues. The SBRT plan is documented in DOE/CBFO-15-3551, *Review Plan for the Documented Safety Analysis and Technical Safety Requirements Waste Isolation Pilot Plant WIPP* 07-3372 & WIPP 07-3373 Revision 5.

2. A process has been developed and implemented to ensure SRs, and other safety basis commitments are performed, reviewed and approved in accordance with the timeframes established in the TSRs or other appropriate document (i.e., Safety Evaluation Report.) Implementing documents for these commitments are appropriately identified.

WP 04-AD3036, *WIPP Safety Basis Implementation Process*, describes the process that NWP uses to ensure that the requirements that are contained in a change to the DSA and/or TSRs are adequately evaluated against the existing authorization basis, and any necessary changes to facility documentation is appropriately identified and available for use and reference. The implementation process includes Safety Basis Implementation Plan, Safety Basis Implementation Matrix, Notice of Readiness, and Notice of Implementation Checklist. The Implementation Verification process (described below) is accomplished between the Notice of Readiness and Notice of Implementation Checklist. The Safety Basis Implementation Process also provides input to the LDD changes needed.

WP 15-CA1006, *Safety Basis Implementation Verification Reviews*, describes that process for verifying adequate implementation of safety basis requirements and controls. The process included the IVR plan and final report, CA-IVR-2016-002, *Implementation Verification Review Final Report (for the) Waste Isolation Pilot Plant Documented Safety Analysis/Technical Safety Requirements, Revision* 5b. The final report was reviewed by the CORR team for findings and opportunities for improvements. Other than items on the NWP manageable list of open items, all IVR findings and opportunities for improvements were found to be corrected.

The Safety Basis Implementation and IVR processes were applied to DSA and TSRs Revision 5b. The records were reviewed and found to provide adequate documentation to demonstrate that the approved DSA and TSRs, including and COAs, with the exceptions contained within them, are fully implemented. The exceptions noted are being tracked by WIPP Forms, the WIPP issues management system.

NWP utilizes a Linking Document Database as described in WP 12-NS3007, *DSA/TSR Linking Document Database*, to ensure the DSA/TSR credited controls are implemented. This online LDD was reviewed to confirm that it reflects the changes contained in the DSA and TSRs Revision 5b and contains the list of documents credited to meet those requirements. In addition, the LDD coordinator, a member of the Nuclear Safety Department was interviewed to discuss how the LDD is

maintained and updated on a periodic basis. The governing procedure for the LDD is WP 12-NS3007, which describes the process to initiate LDD Change with a LDD Change Request Form (EA12NS3007-1-0), providing the LDD Coordinator with the all documents associated with a USQ review for an LDD review, and changes to SMPs or annual SMPs assessments with both could drive changes to the LDD. Changes to the LDD are captured on the LDD Change Log (EA12NS3007-2-0), along with associated document that are provided with the draft revision to the LDD to a reviewer who ensures that the draft LDD is technically correct. Then, the LDD is provided to the Nuclear Safety Manager for approval. A noteworthy practice is provided in the LDD by the TSR LCO statements being linked to procedures and other documents that could result in entering the LCO during the execution of the procedure or document.

3. **Personnel responsible for performing, reviewing, and approving SRs have the appropriate training and skills to perform these duties. Personnel responsible for ensuring TSR implementation (i.e. Operations Management) demonstrate adequate understanding of TSR requirements.**

   Personnel were knowledgeable and understood the system safety functions and significance of surveillance requirements. For instance, the Cognizant System Engineer for the Hoist Systems recited surveillance requirements by number from memory. The Cognizant System Engineers for the WHB ventilation and the UVS/IVS filters and fans provided excellent walkdowns and thoroughly described system functional requirements.

   The safety basis documentation is maintained by the following procedures:

   - WP 04-AD3036, *WIPP Safety Basis Implementation Process*
   - WP 02-AR3001, *Unreviewed Safety Question Determination*
   - WP 12-NS3008, *Nuclear Safety Basis Control Selection*
   - WP 15-CA1006, *Safety Basis Implementation Verification Reviews*

   These procedures were reviewed for adequacy to implement and maintain the safety basis documentation. In addition, the documentation associated with the Safety Basis Implementation Process for DSA and TSRs, Revision 5b, and the USQ Determinations and Potential Inadequacy of Safety Analysis Determinations were reviewed and determined to be effective for maintaining the safety documentation.

4. **The qualifications for personnel responsible for maintaining the safety basis for the WIPP are documented and adequate.**

   WIPP 12-NS.09, *WIPP Nuclear Safety Training Program Plan*, Rev. 1, 9/13/16, was recently revised and is in the process of being implemented. This procedure allows 180 days in which qualifications are grandfathered before all employees will be required to be qualified to the new requirements. Inter-office Correspondence EN:16:00080, *Justification for Continued Performance of Nuclear Safety Tasks*

Under WP12-NS.09, Revision 1 Requirements, 9/9/16, documents that Nuclear Safety personnel currently possess the knowledge and experience to continue to perform Nuclear Safety related tasks prior to completion of the new training program documentation.

There were no position specific training requirements for management positions, and these personnel did not have formal qualifications in place.

5. **A sufficient number of qualified individuals are available to execute the nuclear safety program, including: performing updates to the DSA/TSR, preparing page changes to the DSA/TSRs, performing USQDs, etc.**

   The existing Nuclear Safety Department and the T&Q records were reviewed for adequacy. The current Nuclear Safety Department has two management positions and six Nuclear Safety Engineers. Corporate reach-back resources are being utilized on an as-needed basis, including the development and approval of Rev. 5b of the WIPP DSA/TSRs. Some corporate reach-back resources are likely to be used for the next revision of the DSA and TSRs. Nuclear Safety personnel were interviewed and stated that there were adequate resources going forward to implement and maintain the nuclear safety program in terms of day to day activities. However, pending or recent funding cuts to subcontractor funding may result in delays to issuance of Rev. 6 of the DSA and TSRs.

6. **The functions, responsibilities, and reporting relationships for personnel performing safety basis activities are clearly defined and understood. Hazard analysis personnel maintain appropriate interactions with personnel analyzing environmental, safety and health concerns.**

   Based upon interviews, NWP demonstrated adequate functions, responsibilities, and reporting relationships, which are described in governing procedures. There has been recent emphasis on training and qualifications, and documentation which governs interactions with line management to strengthen this communication.

7. **Periodic assessments of the nuclear safety program are performed to verify continued robust performance. Issues, recommendations or findings from assessments, both internal and external are tracked and resolved in a formal manner to ensure satisfactory correction and prevent reoccurrence.**

   The NWP Annual Integrated Assessment schedule – FY2017 / 1st Quarter FY2018, Rev. 0 was reviewed and found to include 18 assessments of engineering and nuclear safety process implementation, as well as Contractor Assurance System semi-annual assessments on Adequacy of Action Level 3 WIPP Form Closures. Of these, four assessments were scheduled specifically addressing nuclear safety topics; semiannual USQ implementation, safety program procedures, and an assessment of the nuclear criticality safety program. The reviewers deemed this assessment schedule to be adequate in evaluating the nuclear safety program.

8. This objective was adequately evaluated by the CORR.

The reviewers found the CORR report to have adequately covered this area. The DORR team identified no issues that were not already noted by the CORR team.

CONCLUSION

Facility safety documentation is in place and has been implemented that describes the "safety envelope" of the facility. The safety documentation characterizes the hazards/risks associated with the facility and identifies preventative and mitigative measures (systems, procedures, administrative controls, etc.) that protect workers and the public from those hazards/risks. Safety structures, systems, and components (SSCs) are defined. Formal agreements between the operating contractor and DOE have been established via the contract or other enforceable mechanism to govern the safe operation of the facility.

This objective was met.

Issue(s): None

Evaluated by:	**Approved by:**
/s/ Brenda Hawks, Team Member	/s/ Edward Westbrook, Team Leader
/s/ Elaine Diaz, Team Member	
/s/ James Kekacs, Team Member	

DOE ORR for the Waste Isolation Pilot Plant

Review Form 1

Functional Area:	Objective:	Objective Met
Nuclear Safety	NS.2	Partially Met

OBJECTIVE

NS.2: The facility systems and procedures, as affected by facility modifications, are consistent with the description of the facility, procedures, and accident analysis included in the safety basis. **(Core Requirements 6, and 8)**

CRITERIA

1. A DOE approved Unreviewed Safety Question Determination (USQD) procedure is effectively implemented.
2. Modifications to the WIPP facility have been evaluated for impact on the facility authorization basis through the USQ process.
3. Modifications to the facility have been managed to ensure changes are incorporated into safety basis documents. Safety basis changes as a result of facility modifications flow into the TSRs and TSR SRs appropriately.

APPROACH

Record Review:

- Review documentation of any facility modifications that have been made. Review the USQD procedure for adequacy as well as any recently completed USQDs; specifically, any completed USQDs for facility modifications. Review the DSA and TSRs to ensure these documents capture any facility modifications that have been made.

Interviews:

- Review documentation of any facility modifications that have been made. Review the USQD procedure for adequacy as well as any recently completed USQDs; specifically, any completed USQDs for facility modifications. Review the DSA and TSRs to ensure these documents capture any facility modifications that have been made.

Shift Performance:

- Perform a walkdown of any modifications that have been made to ensure their description is adequately captured in safety basis documents.

Records Reviewed
See comprehensive list under ENG.1.

Interviews Conducted
See comprehensive list under ENG.1.

Shift Performances Observed
See comprehensive list under ENG.1.

Discussion of Results

1. **A DOE approved Unreviewed Safety Question Determination (USQD) procedure is effectively implemented.**

   The WIPP Procedure WP 02-AR3001, Rev. 12, *Unreviewed Safety Question Determination (USQD)*, was approved by CBFO on 1/16/ 2015. The implementation of the procedure for all facility changes that have occurred since initial approval of the final DSA/TSRs, Rev. 5b, is currently ongoing and at times has been challenging for USQ preparers.

   On 6/23/2016, WIPP Form WF16-922 was created to address several ICE issues that were submitted by DOE for concerns with the NWP USQ program. A Causal Analysis Report was issued on 7/8/2016. The following are the corrective actions which were identified from the report and are being tracked by WF16-922:

   - Revise WP 12-AR3001 to simplify the process review of documents implementing DOE approved Safety Basis documents – due 10/31/2016;
   - Provide additional resources to assist in the USQ Reviews – completed 6/16/2016 (verified by a review of a sampling of USQDs);
   - Revise WP 12-AR3001 to clarify the Potential Inadequacy of Safety Analysis timeline requirements – due 10/31/2016; and
   - Update the USQ Process training to provide a clear set of expectations for USQ Screenings and USQ Determinations – completed 8/31/2016.

   Since these USQ corrective actions were appropriately self-identified, are being appropriately tracked via WF16-922, and are ongoing, they will not be identified as deficiencies.

   During performance of a TSR Mode Change demonstration for the Contractor Operational Readiness Review, a CORR team member noted that WP 05-WH1603, *CH TRU Underground Transporter, 52-H-008 A AND B*; Rev. 17-FR1 was very recently revised. The CORR team member asked to see the USQ review, which happened late in the day on 10/4/2016. The Nuclear Safety Program Manager found the procedure revision documentation and based on the review of the Applicability Review (AR) documentation, it was determined that the AR process came to the wrong conclusion (i.e. not to enter the USQ process) on a TSR Surveillance

procedure (WP 05-WH1603). A WIPP Form (WF16-1678) was initiated on 10/5/2016 and an extent of condition review was initiated. During the initial extent of condition review, 35 additional procedures ARs on were reviewed and another AR on a procedure was found that came to the wrong conclusion. This resulted in a CORR finding:

"SB1-PRE-1: Contrary to 10 CFR 830.203, changes to some procedures described in the DSA did not formally enter the USQ process covered by WP12-AR3001."

After a fact finding meeting, USQ compensatory measures were put in place on 10/11/2016 that are similar to the USQ compensatory measures that were communicated via letter EN: 16:00085, *Applicability Review Interim Compensatory Action*. The compensatory action is as follows:

Effective immediately the "Applicability Review" process is suspended except for proposed activities associated with the following existing facilities/structures:

- Modular Buildings;
- Trailers;
- Maintenance Shops (aboveground);
- Warehouses;
- Engineering Building;
- Training Building;
- Guard & Security Building (other than the Alternate CMR system/equipment);
- Connexes;
- Sheds; and
- Portions of the underground that do not interact with the safety SSCs and/or equipment associated with implementation of SMP KEs.

Note: Relocation of existing facilities/structures is not included.

The "Applicability Review" process is also allowed for nontechnical administrative documents that do not implement SMP requirements, e.g., HR and financial/budget operations are also allowed.

All other procedures or work packages will require USQ screening or determination by Nuclear Safety. Further extent of condition reviews associated with WF16-1678 are ongoing with more procedure ARs and work package ARs being revised.

The extent of condition review was performed by looking at all documents that had been reviewed for applicability since July 1, 2016. This corresponds to the presentation of the revised USQ training. Training presented was specifically for performance of ARs. A list of all the documents reviewed as part of the EOC review is attached. The documents consisted of operations procedures and electronic attachments, engineering change orders, work control documents, and

nonconformance reports. In addition to the document originally identified in WF16-1678 (05-WH1603, Rev. 17 Field Revision 1 reevaluated by USQ Screen S16-778), a total of 359 documents that received an AR were reviewed and 68 documents (19%) were identified as requiring a USQ screen aligning with management expectations that were communicated during the meeting on 10/5/16. This review was completed on 10/20/16. USQ re-evaluation on the 68 identified documents was completed on 10/28/16.

During review of several documents to evaluate the effectiveness of the implementation of the USQ process several findings were identified and are individually discussed below:

The WHB fire suppression system was inoperable when NWP implemented DSA Rev. 5b at the end of May. They entered LCO3.1.1 when they implemented the DSA and remained in the LCO until October 2nd. However, the attached excerpt from the CMR log documents the LCO exit on 10/2/16, including references to the NCR's prepared to document the known impairments and the technical operability determination prepared in support of a Conditional Release for use of the system until the NCR dispositions are complete. Each of the NCR's includes a final REWORK disposition to restore the systems to full compliance with the NFPA codes. The NCR's clearly delineate how each of the code discrepancies impacts the system's operability; however, the associated ETO-Z-326 incorrectly concluded that the system could be "considered" operable due to the existence operational procedures. The operability of the system should be solely based upon its ability to provide its intended safety function. This failure also resulted in USQD D16-109 answering several questions incorrectly resulting in a negative determination.

In addition, USQD D16-075 for PISA P16-004, does not provide adequate technical basis to support the answer to question #3.

An additional example is identified as ENG.1-PRE-1 in the Engineering CRAD.

These issues constitute a weakness in the implementation of the USQ process as required by 10 CFR 830.203.

NS.2-PRE-1: Contrary to the requirements of 10 CFR 830.203, LCO 3.1.1 Condition C was exited with a NFPA 13 INOPERABLE/non-compliant installed sprinkler system without DOE approval.

2. Modifications to the WIPP facility have been evaluated for impact on the facility authorization basis through the USQ process.

The WIPP Waste Acceptance Criteria (WAC) Compliance Program Description in section 18.3 of the DSA states that certification audits at generator sites are conducted by CBFO, ensuring that the generator sites are qualified to maintain compliance with

the WAC. CBFO MP 4.15, *The Process of TRU Waste Acceptable Knowledge Summary Reports*, is the procedure governing the certification process.

The review team found that there is no language in the CBFO MP 4.15 procedure that ties it to the DSA and thus would trigger a USQ upon revision or cancellation of the procedure.

The same is true of the Central Characterization Program (CCP) procedures which implement the DSA/TSR requirements. Essentially, this portion of the NWP contract is not integrated with the NWP nuclear safety process and thus has no formal USQ process to follow.

NS.2-PRE-2: Contrary to the requirements of 10 CFR 830, the CBFO and CCP DSA required processes are not subject to NWP's USQ process.

3. **Modifications to the facility have been managed to ensure changes are incorporated into safety basis documents. Safety basis changes as a result of facility modifications flow into the TSRs and TSR SRs appropriately.**

   See discussion in criteria 1 and 2 above. Most modifications have been managed appropriately, however weaknesses have been identified.

CONCLUSION

While NWP has met the first objective of this CRAD by developing robust facility safety documentation in accordance with DOE-STD-3009-2014, and ensured that safety SSCs are defined, the implementation of the second objective, specifically the USQ process, exhibits significant weakness at this time and has not been met.

NWP has previously identified several issues associated with the USQ program. Significant work has been done in addressing these issues, including independent reviews, hands on training, procedures revision, and compensatory measures. However, the extent of condition did not identify all areas of weakness, as evidenced by the identified findings. This area needs continued management focus and DOE oversight to ensure improvements necessary to address weaknesses identified and ensure the program is effectively implemented.

The objectives of this area were PARTIALLY MET.

Issue(s)

NS.2-PRE-1: Contrary to the requirements of 10 CFR 830.203, LCO 3.1.1 Condition C was exited with a NFPA 13 INOPERABLE/non-compliant installed sprinkler system without DOE approval.

NS.2-PRE-2: Contrary to the requirements of 10 CFR 830, the CBFO and Central Characterization Program (CCP) Documented Safety Analysis (DSA) required processes are not subject to NWP's Unreviewed Safety Question (USQ) process.

Evaluated by:	**Approved by:**
/s/ Brenda Hawks, Team Member	/s/ Edward Westbrook, Team Leader
/s/ Elaine Diaz, Team Member	
/s/ James Kekacs, Team Member	

DOE ORR for the Waste Isolation Pilot Plant
Review Form 1

Functional Area:	Objective:	Objective Met	
Operations	OP.1	Yes [X]	No [ ]

OBJECTIVE

OP.1: Level of knowledge of operations and operations support personnel is adequate to operate the facility safely and effectively. Operations and operation support personnel demonstrate an awareness of public and worker safety, health, and environmental protection requirements. There are sufficient numbers of qualified personnel to support safe operations. The contractor has implemented an adequate Conduct of Operations Safety Program Safety Management Program. The qualification requirements for operations and operations support personnel performing WIPP operations have been established and met.
(Core Requirements 1, 2, 4, 5, 10, 14, and 15)

CRITERIA

1. The level of operations and operations support personnel knowledge of facility systems, safety, health, and environmental protection requirements, and procedural compliance is adequate to operate safely. Operators demonstrate the ability to carry out normal, abnormal, and emergency procedures.
2. Minimum staffing requirements have been established and implemented for operations and operations support personnel. These staffing levels are met and are consistent with the authorization basis requirements and assumptions.
3. Periodic assessments of the Operations SMP are performed to verify continued robust performance. Issues, recommendations or findings from assessments, both internal and external are tracked and resolved in a formal manner to ensure satisfactory correction and prevent reoccurrence.
4. The roles and responsibilities of operations staff and management personnel are clearly defined and understood.
5. The CORR adequately addressed this objective.

APPROACH

Record Review:

- Review qualification records and examinations to determine if they adequately test the operators understanding of technical fundamentals, facility systems, safety, health, and environmental protection requirements, procedure compliance policy and operating procedures.
- Evaluate processes supervisory personnel utilize to verify personnel are qualified to perform assigned tasks.

- Review safety documentation and associated administrative controls for staffing requirements.
- Review Conduct of Operations Safety Management Program (SMP) documentation.
- Review CORR Report to verify this Objective was adequately evaluated.

Interviews:

- Interview operators and supervisors to assess their understanding of the processes, procedures, and fundamentals associated with WIPP operations.
- Interview the Facility Shift Manager, operations and operations support personnel to assess their understanding of the safety envelope, and the implementation of the safety, health, and environmental protection requirements in procedures and operator round sheets.
- Interview operators and supervisors to ensure they understand the minimum staffing requirements for all phases of WIPP operations.
- Interview Conduct of Operations SMP owner to ensure owner has adequate knowledge and established a satisfactory implementation methodology.

Shift Performance:

- Observe drills, and simulated operations (as described in the Scope section) to assess technical understanding and ability of the operators and supervisors to carry out their duties and to safely operate WIPP systems and components in accordance with approved plant procedures.
- Observe drills, and simulated operations (as described in the Scope section) to assess the understanding and significance operators and supervisors place on ensuring facility operations are performed within the established safety envelope.
- Assess procedure compliance when conducting evolutions and responding to abnormal conditions.
- Assess staffing levels while observing drills and routine evolutions to determine if they are adequate and satisfy administrative and safety basis requirements.

Records Reviewed

- 00CD-0001, Rev.40, *WIPP Mine Ventilation Plan*
- ACD-2016-49, Rev. 0, *Power failure to Hoist during DOWNLOADING*
- CA-2017-CORR-001, *WIPP Contractor Operational Readiness Review*
- *CMRO Daily Log from November 14, 2016 to November 18, 2016*
- *CMRO Exercise Log from Exercise Conducted November 18, 2016*
- *Contractor Operational Readiness Review (CORR) Final Report for the Commencement of Contact-Handled Waste Emplacement at the Waste Isolation Pilot Plant (WIPP)*
- DOE/WIPP 07-3372, R5b, *Waste Isolation Pilot Plant Documented Safety Analysis*

- DOE/WIPP 07-3373, R5b, *Waste Isolation Pilot Plant Technical Safety Requirements*
- DOE/WIPP 02-3212 R15, *Ground Control Annual Plan for the Waste Isolation Pilot Plant*
- EA04AD3001-1-0, Rev. 15, *Facility Operations Mode Checklist*
- EA04AD3001-SR8, Rev. 4, *LCO 3.1.1 Waste Handling Building (WHB) Fire Suppression System*
- EA04AD3008-11-0, Rev. 5, *Facility Operations Bldg 458/456 Round Sheet*
- EA04AD3008-12-0, Rev. 5, *Facility Operations Domestic/Fire Water Round Sheet*
- EA04AD3008-2-0, Rev. 6, *Facility Operations Diesel Generator #1 and #2 Round Sheet*
- EA04AD3008-20-0, Rev. 5, *Facility Operations Support Bldg Substation/UPS Round Sheet*
- EA04AD3008-3-3, Rev. 5, *Facility Operations Substation #1/#3/Spare Round Sheet*
- EA04AD3008-4-0, Rev. 5, *Facility Operations Seismic/Substation #7/Duct Round Sheet*
- EA04AD3008-48-0, Rev. 22, *Facility Operations HEPA and Mine Ventilation System Inspection Round Sheet*
- WP 12-ER4926, Rev. 5, *CMR Expanded Staffing Operations*
- EA12ER4926-3-0, *EOC Activation*
- EA12ER4926-7-0, *RCRA Contingency Plan Implementation Decision Checklist*
- EA12ER4926-8-0, *Notification of Implementation of the WIPP RCRA Contingency Plan*
- 12-ER3906, *Categorization and Classification*
- EA12ER3907-1-0, *Emergency Notification Form*
- 12-ES3918, *Reporting Occurrences in Accordance with DOE O 232.2*
- EA04AD3008-49-0, Rev. 5, *Facility Operations HEPA and Mine Ventilation System FSM Inspection*
- EA04AD3008-5-0, Rev. 4, *Facility Operations Air Dryer/Dampers Round Sheet*
- EA04AD3008-50-0, Rev. 0, *Facility Operations Operator Rounds Cover Sheet*
- EA04AD3008-53-0, Rev. 1, *Facility Manager Turnover Checklist*
- EA04AD3008-55-0, Rev. 1, *Roving Watch Turnover Checklist*
- EA04AD3008-6-0, Rev. 5, *Facility Operations Exhaust Filters Round Sheet*
- EA04AD3008-7-0, Rev. 7, *Facility Operations Ventilation Fans Round Sheet*
- EA04AD3030-1-0, Rev. 2, *Pre-Job Briefing Checklist*
- EA04AD3036-1-0, Rev. 1, *Safety Basis Implementation Matrix*
- *Exercise Log 11-19-16*
- FO-CMRO-2, *WIPP Operations Facility Operations Central Monitoring Room Operator Qualification Card Signature Record (5)*

- FO-FOSE-3R, Rev. 3, *WIPP Operations Facility Operations Shift Engineer Requalification Card Signature Record*
- FO-RW-1, *WIPP Operations Facility Operations Roving Watch Qualification Card Signature Record*
- *NWP Organization Charts dated 11/14/2016*
- PROC-01, R0, *Technical Procedure Writer Qualification Card*
- *Qualified Watch List for Weeks of November 3, 2016 and November 11, 2016*
- STD JHA-171, Rev. 7, *JHA for CH Waste Processing*
- STD JHA-304, Rev. 11, *JHA for CH Waste Downloading and Emplacement*
- *T-0 Daily Scheduled Work/Daily Release 11/14/2016 thru 11/18/2016*
- *TSR Surveillance Schedule – 30 day Look Ahead as of 11/09/2016*
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- WP 04-CO.01-9, Rev. 3, *Conduct of Operations Program – Lockout/Tagout*
- WP 04-CO.01-10, Rev. 3, *Conduct of Operations Program – Independent Verification*
- WP 04-CO.01-11, Rev. 5, *Conduct of Operations Program – Logkeeping*
- WP 04-CO.01-12, Rev. 3, *Conduct of Operations Program – Turnover and Assumptions of Responsibilities*
- WP 04-CO.01-14, Rev. 5, *Conduct of Operations Program – Required Reading*
- WP 04-CO.01-15, Rev. 7, *Conduct of Operations Program – Timely Orders to Operators*
- WP 04-CO.01-16, Rev. 3, *Conduct of Operations Program – Operations Procedures*
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- FO-FOSE-3R, Rev. 3, *WIPP Operations Facility Operations Shift Engineer Requalification Card Signature Record*
- FO-RW-1, *WIPP Operations Facility Operations Roving Watch Qualification Card Signature Record*
- FO-CMRO-2, *WIPP Operations Facility Operations Central Monitoring Room Operator Qualification Card Signature Records (5)*
- PROC-01, R0, *Technical Procedure Writer Qualification Card*
- EA043036-1-0, Rev. 1, *Safety Basis Implementation Matrix*
- WP 04-PC3017, Rev. 6, *Essential Plant Communication Systems Testing*
- WP 04-PC3018, R3, *Annual Essential Plant Communication Systems Testing*
- WP 04-VU2001, Rev. 8, *Interim Ventilation System Operation*
- WP 04-VU4605, Rev. 37, *UVS Alarm Response*
- WP 04-VU1001, Rev. 51, *Surface Underground Ventilation and Filtration System Operation*
- MSA-OPS-2016-002, *SMP Effectiveness and Implementation Review on Required Reading*
- MSA-OPS-2016-004, *SMP Effectiveness and Implementation Review on Shift Training*
- MSA-OPS-2016-008, *Management Self-Assessment for Conduct of Operations at WIPP*

- S16-26, *Quality Assurance Surveillance on Equipment Lockout/Tagout Audit Records*

Interviews Conducted

- Senior Technical Advisor
- Operations Manager
- Deputy Operations Manager
- Waste Operations Manager
- Facility Operations Manager
- CH Waste Handling Manager
- Facility Shift Manager - 4
- Deputy Operations Manager for U/G Operations
- Deputy Waste Operations Manager
- Waste Handler Engineer - 2
- Waste Handler Technician - 4
- CMR Operator - 4
- CMR Roving Operator - 2
- DOE Qualified Facility Representative – 2
- Acting DOE Assistant Manager of Office of Operations Oversight
- ES&H Manager
- Procedure Manager
- Deputy Operations Manager for Performance Improvement

Shift Performances Observed

- General Site Walkdown (Surface)
- General Site Walkdown (Underground)
- Pre-job Briefing for Waste Handling/Surface Processing
- Pre-job Briefing for Underground Waste Emplacement
- Waste Handling Operations TRUPACT II Material Receipt
- WIPP Full Scale Evacuation Exercise
- CMR Exercise Player Hotwash
- Exercise Controller Evaluator Debrief
- Walkdown and Inspection of Panel 7 within the Underground
- Abnormal Event Exercise (Lost of Waste Hoist Power)
- Abnormal Table Top Exercise (Loss of CMS Indication)
- Post-job Briefing for Waste Handling/Surface Processing
- Weekly Fire Pump Surveillance and Pre/post job brief
- Establishment of Waste Handling Mode
- Receipt of TRUPACT Waste Shipment
- CH waste downloading and emplacement
- FSM, Shift Turnover (2)
- CMRO, Shift Turnover (2)

- CMRO, Operator Shift Rounds (2)
- Daily T-0 Schedule Meeting

Discussion of Results

1. **The level of operations and operations support personnel knowledge of facility systems, safety, health, and environmental protection requirements, and procedural compliance is adequate to operate safely. Operators demonstrate the ability to carry out normal, abnormal, and emergency procedures.**

   Operations personnel knowledge and ability to safely operate the WIPP facility including waste emplacement into the underground in accordance with approved procedures were evaluated through interviews, facility walkdowns, and observation of NWP operating procedure performance demonstrations, emergency evacuation exercise, control room activities, and operator facility rounds. Specific focus areas during these evaluations included pre/post job briefings, procedural compliance, communications, operational awareness, and operator knowledge. The combination of the Operations organization personnel professionalism, facility and process knowledge, operational awareness, command and control, response to abnormal/upset conditions, and operational discipline resulted in adequate operational performance. However, additional emphasis has to be placed on strict procedural compliance to procedures and ensuring that procedure steps are sequenced appropriately.

   The NWP Operations staff demonstrated adequate operational fundamentals (i.e. place keeping, three-way communications, formality, procedural compliance, etc.) that have resulted in a reliable Operations Organization that is able to support waste receipt, processing, and waste emplacement into the underground. Specific examples include:

   - Pre-Job Briefings: The pre-job briefings conducted for observed waste handling activities and the surveillances performed on the fire pumps at WIPP were adequate to resume waste handling operations at WIPP. Items covered during most of the observed pre-job briefings included task assignments; procedural precautions and limitations; critical procedure steps; the applicable hazard analysis and controls, and Radiological Work Permit (RWP) controls; lessons learned; and upset condition response. During the pre-job briefing for underground waste emplacement, the Waste Handling Engineer conducting the pre-job briefing performed an excellent job at ensuring that the highlights of each procedure to be used were thoroughly discussed with the participants and that each participant was comfortable with their role and responsibility in the execution of the procedure.

   - Procedural Compliance: Operations and maintenance personnel had instances that demonstrated less than adequate procedural compliance while executing the procedures associated with some of the observed operations performed during the DORR. The vast majority of the observed activities showed sound

procedural compliance including adherence to the various TSR level controls within the procedures. However, there were several instances of procedural non-compliance that were identified during the execution of routine work as well as the demonstrations of waste handling/emplacement for the DORR. (**OP.1-POST-1**)

- Communications: Effective three-way communication use was noted throughout the various demonstrations and routine operations as part of the ORR. There were minor exceptions to effective three-way communications during the evacuation exercise within the CMR where it was noted that the formality of some internal communications degraded during the course of the exercise. However, during the waste handling and emplacement activities workers demonstrated the principles of effective communication between all disciplines of the work team performing the work scope.

- Operational Awareness: The Operations staff demonstrated a high level of operational awareness during the execution of routine operations as well as waste handling and emplacement activities. CH Waste Handling personnel were extremely knowledgeable of equipment procedures and expected plant conditions during waste handling activities. During both abnormal drill scenarios as well as the evacuation exercise, Operations personnel, including Control Room Operators, successfully navigated from acknowledging the alarming conditions, identifying appropriate alarm response procedures, and establishing/confirming safe facility conditions. Additionally, during the evolution for moving simulated waste to the U/G, an abnormal condition was noted with an electrical disconnect for the waste conveyance cart. Work was appropriately paused, and a work request written and executed to correct the condition prior to resumption of the activity.

- Operator Knowledge: Operations personnel exhibited adequate knowledge of procedures and processes and the ability to complete each operation associated with waste handling activities at WIPP. The operators were very familiar with facility equipment, facility alignments, and both TSR surveillance and LCO requirements that were associated with the work scope they were performing.

  Training records were reviewed of the testing of operations personnel to evaluate the knowledge level used to qualify personnel. This material included qualification cards, oral boards, and comprehensive written tests. The test question content was excellent; however, it was noticed that there were no questions on fundamentals and theory in the sampling. All the oral board and written exams were open reference as well. Interviews were performed with the Training Manager which confirmed the testing was performed as open reference and the absence of fundamental and theory content in the testing was known. More details on the results of operator training, knowledge, and testing is found in (**TRG.1 POST-2**). Interviews that were conducted

included elements specific to fundamental and theory questions with satisfactory results. The team determined that operations personnel have adequate knowledge of all areas to safety perform facility evolutions and emergencies.

- Post-Job Briefing: Post-job briefings attended as part of this ORR were conducted in a professional manner. Participants of these briefings freely discussed issues that arose during operations and/or drills including potential procedure upgrades, process improvements, and any additional equipment and/or supplies that may be warranted to perform the job in a more efficient and safe manner. The post-job briefing for the underground waste emplacement activity resulted in numerous potential improvements as a result of extensive worker feedback.

2. Minimum staffing requirements have been established and implemented for operations and operations support personnel. These staffing levels are met and are consistent with the authorization basis requirements and assumptions.

Minimum staffing requirements for operations are identified in the Technical Safety Requirements (TSR) Section 5.3.1. These staffing requirements are adequately incorporated into operating procedures. TSR minimum staffing requirements were met during all observed operations and these minimum staffing levels have been effectively flowed down into the NWP procedures. Based upon interviews with operations personnel and review of the NWP Organization Chart, NWP has adequate staffing to commence waste receipt and emplacement. Though the TSR minimum staffing levels were observed to be met, there are concerns that CH Waste Handling Operations may not be staffed appropriately to accommodate unloading of TRUPACT II containers and waste emplacement simultaneously **(MG.1-POST-1)**. The NWP Management has acknowledged the need for additional qualified waste handling staff to ensure that the forecasted waste acceptance schedules are met. NWP is working on qualifying additional staff to support the forecasted waste delivery and emplacement schedule.

3. Periodic assessments of the Operations SMP are performed to verify continued robust performance. Issues, recommendations or findings from assessments, both internal and external are tracked and resolved in a formal manner to ensure satisfactory correction and prevent reoccurrence.

The Operations organization at the WIPP site performs periodic assessments of elements within the Operations SMP on a routine basis. These assessments were reviewed and determined to be adequate for ensuring ongoing improvement to operations. The assessments were available in the contractor's Integrated Assessment Schedule (IAS) database, were of an appropriate depth and breadth to validate the status of the Conduct of Operations program at the WIPP, were identified and entered into the contractor's issue tracking and resolution process, and corrective actions had been identified to prevent/minimize recurrence.

4. **The roles and responsibilities of operations staff and management personnel are clearly defined and understood.**

   A review of the WIPP Staffing Plan, Roles and Responsibility and various operations staff position descriptions, along with interviews of all levels of the WIPP Operations organization clearly demonstrated that the roles and responsibilities are defined and understood by the WIPP Operations staff.

5. **The CORR adequately addressed this objective.**

   Based on review of the Contractor Operational Readiness Review Final Report, the team concluded that the CORR adequately addressed this objective.

CONCLUSION

Based on observed work demonstrations (waste handling activities, routine operations and response to abnormal conditions scenarios), interviews with Operations staff, and review of applicable documents, WIPP personnel successfully demonstrated knowledge of facility systems, safety, health, and environmental protection requirements, and meet minimum staffing requirements as referenced in the TSR. Roles and responsibilities of Operations staff are clearly defined and understood. Periodic assessments of the Operations SMPs are performed and used to provide ongoing improvements to WIPP operations. The CORR adequately addressed this objective.

Issue(s)

OP.1-POST-1: Contrary to NWP Conduct of Operations program implementing procedures, there were isolated instances of procedural non-compliance.

Evaluated by:	**Approved by:**
/s/ Todd McGhee, Team Member	/s/ Edward Westbrook, Team Leader
/s/ Shawn Murphy, Team Member	

DOE ORR for the Waste Isolation Pilot Plant
Review Form 1

Functional Area:	Objective:	Objective Met	
Operations	OP.2	Yes [X]	No [ ]

OBJECTIVE

OP.2: The formality and discipline of operations is adequate to conduct work safely and programs are in place to maintain this formality and discipline.
(Core Requirements 12 and 15)

CRITERIA

1. Applicable programmatic elements of conduct of operations have been documented, approved by the head of the DOE field element, and implemented in support of WIPP operations. The following areas of DOE O 422.1will be evaluated at a minimum: Ventilation system operation and alignments; LOTO program; and logkeeping.
2. Operations implementation of DSA driven processes such as Mode changes and TSR surveillances (including scheduling, tracking, and completion) are proceduralized and effectively implemented. DSA Key Elements 11-3, 11-4, 11-7, 11-8, 11-9, and 11-12 are effectively implemented.
3. Surveillances performed by fire department, waste handling, and radiological protection are scheduled, coordinated with and the results communicated to the Operations organization.
4. Operations personnel demonstrate the principles of the conduct of operations requirements during WIPP operations.
5. The CORR adequately addressed this objective.

APPROACH

Record Review:

- Review DOE-CBFO approved DOE O 422.1 Conduct of Operations Matrix and associated implementing documents for adequacy.
- Review recently completed operations logs, shift turnover documents, and other plant records to assess compliance with conduct of operations principles.
- Review CORR Report to verify this Objective was adequately evaluated.

Interviews:

- Interview operators and supervisors to assess their understanding of conduct of operations principles, modes and mode changes, and TSR compliance.

Shift Performance:

- Observe drills, and simulated operations (as described in the Scope section) to determine if facility personnel are effectively implementing conduct of operations requirements.
- Perform facility walkdown to evaluate equipment labeling, operator aids, status board use, and housekeeping.

Records Reviewed

- 00CD-0001, Rev.40, *WIPP Mine Ventilation Plan*
- ACD-2016-49, Rev. 0, *Power failure to Hoist during DOWNLOADING*
- CA-2017-CORR-001, *WIPP Contractor Operational Readiness Review*
- *CMRO Daily Log from November 14, 2016 to November 18, 2016*
- *CMRO Exercise Log from Exercise Conducted November 18, 2016*
- *Contractor Operational Readiness Review (CORR) Final Report for the Commencement of Contact-Handled Waste Emplacement at the Waste Isolation Pilot Plant (WIPP)*
- DOE/WIPP 07-3372, Rev. 5b, *Waste Isolation Pilot Plant Documented Safety Analysis*
- DOE/WIPP 07-3373, Rev. 5b, *Waste Isolation Pilot Plant Technical Safety Requirements*
- DOE/WIPP 02-3212 Rev. 15, *Ground Control Annual Plan for the Waste Isolation Pilot Plant*
- EA04AD3001-1-0, Rev. 15, *Facility Operations Mode Checklist*
- EA04AD3001-SR8, Rev. 4, *LCO 3.1.1 Waste Handling Building (WHB) Fire Suppression System*
- EA04AD3008-11-0, Rev. 5, *Facility Operations Bldg 458/456 Round Sheet*
- EA04AD3008-12-0, Rev. 5, *Facility Operations Domestic/Fire Water Round Sheet*
- EA04AD3008-2-0, Rev.6, *Facility Operations Diesel Generator #1 and #2 Round Sheet*
- EA04AD3008-20-0, Rev. 5, *Facility Operations Support Bldg Substation/UPS Round Sheet*
- EA04AD3008-3-0, Rev.5, *Facility Operations Substation #1/#3/Spare Round Sheet*
- EA04AD3008-4-0, Rev. 5, *Facility Operations Seismic/Substation #7/Duct Round Sheet*
- EA04AD3008-48-0, Rev. 22, *Facility Operations HEPA and Mine Ventilation System Inspection Round Sheet*
- WP 12-ER4926, Rev. 5, *CMR Expanded Staffing Operations*
- EA12ER4926-3-0, *EOC Activation*
- EA12ER4926-7-0, *RCRA Contingency Plan Implementation Decision Checklist*
- EA12ER4926-8-0, *Notification of Implementation of the WIPP RCRA Contingency Plan*
- 12-ER3906, *Categorization and Classification*

- EA12ER3907-1-0, *Emergency Notification Form*
- 12-ES3918, *Reporting Occurrences in Accordance with DOE O 232.2*
- EA04AD3008-49-0, Rev. 5, *Facility Operations HEPA and Mine Ventilation System FSM Inspection*
- EA04AD3008-5-0, Rev. 4, *Facility Operations Air Dryer/Dampers Round Sheet*
- EA04AD3008-50-0, Rev. 0, *Facility Operations Operator Rounds Cover Sheet*
- EA04AD3008-53-0, Rev. 1, *Facility Manager Turnover Checklist*
- EA04AD3008-55-0, Rev.1, *Roving Watch Turnover Checklist*
- EA04AD3008-6-0, Rev. 5, *Facility Operations Exhaust Filters Round Sheet*
- EA04AD3008-7-0, Rev. 7, *Facility Operations Ventilation Fans Round Sheet*
- EA04AD3030-1-0, Rev. 2, *Pre-Job Briefing Checklist*
- EA04AD3036-1-0, Rev. 1, *Safety Basis Implementation Matrix*
- *Exercise Log 11-19-16*
- FO-CMRO-2, *WIPP Operations Facility Operations Central Monitoring Room Operator Qualification Card Signature Record (5)*
- FO-FOSE-3R, Rev. 3, *WIPP Operations Facility Operations Shift Engineer Requalification Card Signature Record*
- FO-RW-1, *WIPP Operations Facility Operations Roving Watch Qualification Card Signature Record*
- *NWP Organization Charts dated 11/14/2016*
- PROC-01, Rev. 0, *Technical Procedure Writer Qualification Card*
- *Qualified Watch List for Weeks of November 3, 2016 and November 11, 2016*
- STD JHA-171, Rev. 7, *JHA for CH Waste Processing*
- STD JHA-304, Rev. 11, *JHA for CH Waste Downloading and Emplacement*
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- WP 15-PS3103, Rev. 18, *Document Distribution*
- *Critical Component Equipment Status Log*
- FO-FOSE-3R, Rev. 3, *WIPP Operations Facility Operations Shift Engineer Requalification Card Signature Record*
- FO-RW-1, *WIPP Operations Facility Operations Roving Watch Qualification Card Signature Record*
- FO-CMRO-2, *WIPP Operations Facility Operations Central Monitoring Room Operator Qualification Card Signature Records (5)*

- PROC-01, Rev. 0, *Technical Procedure Writer Qualification Card*
- EA04AD3036-1-0, Rev. 1, *Safety Basis Implementation Matrix*
- WP 04-PC3017, Rev. 6, *Essential Plant Communication Systems Testing*
- WP 04-PC3018, Rev. 3, *Annual Essential Plant Communication Systems Testing*
- WP 04-VU2001, Rev. 8, *Interim Ventilation System Operation*
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- WP 04-VU1001, Rev. 51, *Surface Underground Ventilation and Filtration System Operation*
- MSA-OPS-2016-002, *SMP Effectiveness and Implementation Review on Required Reading*
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- S16-26, *Quality Assurance Surveillance on Equipment Lockout/Tagout Audit Records*
- WP 04-AU0534, Rev. 5, *Underground Access Initiation/Termination.*
- WP 04-AD3038, Rev. 1, *Critical Plant Equipment Status Board Maintenance*
- WP 10-WC301, Rev. 37, *Work Control Process*
- WP 13-QA3004, Rev. 15, *Nonconformance Report*
- WP 12-FP3001, Rev. 9, *Fire Protection Impairment*
- WP 04-AD3016, Rev. 6, *Equipment Out of Service Process.*

Interviews Conducted

- Senior Technical Advisor
- Operations Manager
- Deputy Operations Manager
- Waste Operations Manager
- Facility Operations Manager
- CH Waste Handling Manager
- Facility Shift Manager - 4
- Deputy Operations Manager for U/G Operations
- Deputy Waste Operations Manager
- Waste Handler Engineer - 2
- Waste Handler Technician - 4
- CMR Operator - 4
- CMR Roving Operator - 2
- DOE Qualified Facility Representative - 2
- Acting DOE Assistant Manager of Office of Operations Oversight
- ES&H Manager
- Procedure Manager
- Deputy Operations Manager for Performance Improvement

Shift Performances Observed

- General Site Walkdown (Surface)
- General Site Walkdown (Underground)
- Pre-job Briefing for Waste Handling/Surface Processing
- Pre-job Briefing for Underground Waste Emplacement
- Waste Handling Operations TRUPACT II Material Receipt
- WIPP Full Scale Evacuation Exercise
- CMR Exercise Hotwash
- Exercise Controller Evaluator Debrief
- Walkdown and Inspection of Panel 7 within the Underground
- Abnormal Event Exercise (Lost of Waste Hoist Power)
- Abnormal Table Top Exercise (Loss of CMS Indication)
- Post-job Briefing for Waste Handling/Surface Processing
- Weekly Fire Pump Surveillance and Pre/post job brief
- Establishment of Waste Handling Mode
- Receipt of TRUPACT Waste Shipment
- CH waste downloading and emplacement
- FSM, Shift Turnover (2)
- CMRO, Shift Turnover (2)
- CMRO, Operator Shift Rounds (2)
- Daily T-0 Schedule Meeting

Discussion of Results

1. **Applicable programmatic elements of conduct of operations have been documented, approved by the head of the DOE field element, and implemented in support of WIPP operations. The following areas of DOE O 422.1 will be evaluated at a minimum: Ventilation system operation and alignments; LOTO program; and logkeeping.**

   The WIPP Operations group has developed programs and processes that flow down the elements of conduct of operations per the requirements of DOE O 422.1. Approved procedures have been developed that provide specific guidance to operations personnel on approved conduct of operations practices. Operations personnel were found to be knowledgeable with the requirements of these procedures and practiced adequate conduct of operations in the execution of the observed work during the DOE ORR.

   NWP has developed a Conduct of Operations Implementation Matrix, found in Attachment 1 to WP 04-CO.01, Rev. 3, *Conduct of Operations*, dated 12/7/2015. The cover sheet to "Attachment 1- Conduct of Operations Implementation Matrix" indicates that the matrix was reviewed by NWP management and CBFO, and that the review/approval signatures are on file. A record of approval

signatures was not found. A series of letters and emails between NWP and CBFO indicates the matrix was accepted, and CBFO's acting Assistant Manager of the Office of WIPP verbally concurred with this. However, there is no formal record documenting CBFO's approval of this document (**OP.2-POST-1).**

The following areas of DOE O 422.1 were evaluated**:**

- Ventilation system operation and alignments

  During the DORR, the ventilation system was in the proper configuration for underground operations. Interviews were performed with FSMs, Operators, and other Operations staff to determine the level of knowledge for the operation and alignment of the ventilation system. Multiple procedures for the configuration/alignment and operation of the ventilation system were reviewed and determined to be adequate for continued operation of this system. It was determined that the FSM takes a lead role in ensuring that the operation of the ventilation system is within system parameters and is functioning as intended. Routine system checks are made to ensure that the ventilation system continues to operate within specified parameters every shift. The FSM and Underground Services work closely to ensure that ventilation requirements are being maintained for underground operations. The FSM and Operators were knowledgeable of procedural requirements associated with the ventilation system including system startups, system alignment, response to abnormal conditions, and normal operations.

- LOTO program

  For the above ground, during the Roving Watch rounds, Diesel Fire Pumps Surveillance, and the general site walkdowns, a review of existing/hanging Lockout and Tagouts (LO/TO) was performed. Numerous tags were spot-checked for accuracy and conformity to WIPP procedures and Conduct of Operations. No deviations were noted and all sampled tags and associated locks were legible and accurate. It was noted that red devices used to control valve position, informally called clam shells, were used to for administrative locks to control large valve positions. Interviews conducted and review of the local WIPP LOTO procedure (WP 04-AD3011) confirmed the devices are not considered exclusive to the lockout program. Only the Danger Tag and associated red lock are controlled devices to be used exclusively for LOTO use as defined by the local WIPP procedure that conforms to 29 CFR 1910.147. The use of the clam shell is appropriate as an administrative control. A single instance was noted of a red LOTO lock being inappropriately used to lock the personnel gate fence around an electrical substation. The Roving Watch displayed knowledge of WIPP LOTO procedure requirements and corrected the situation upon discovery and prior to leaving the area.

Multiple interviews were conducted with separate crews, Roving Watches, FSMs, and Managers regarding the requirements and conditions of the local WIPP LOTO procedures. There were no issues identified and personnel displayed satisfactory knowledge of program requirements.

- Logkeeping

  Log keeping practices were observed during both normal operations, off-normal drills, and the emergency exercise conducted during the DOE ORR. The only official log defined by management is an electronic log kept in the CMR. A review of all entries of this log was performed for the week of field activities during the DOR ORR. Very few conduct of operations errors occurred and the entries made were acceptable. The log is electronic, therefore it is also legible. It was noted that some surveillances and the receipt of completed surveillance checklist to support mode change were not all logged; however, WIPP programmatic log keeping procedures (WP 04-CO.01-11) does exempt system surveillances from required log entry and the completed SR forms and procedures that document the work are retained as records.

  Many other unofficial logs are kept throughout the facility. These include specific equipment logs and area logs such as CH Bay. During waste handling the CH Bay log book was reviewed and contained many entries which could be useful for event reconstruction. Management consideration should be given to capturing such logs into the log keeping program. The entries in this log book documented evolutions and work occurring in the bay. The CH bay log book entries were compliant with conduct of operation principles.

  For the Exercise, NWP uses a separate exercise log. Those entries can also be viewed by the EOC. During the emergency Exercise, the exercise logs and event sequence was entered on a large white board in the CMR that was periodically scanned. The resulting printout was provided to the CMRO for entry into the electronic CMR log. These scanned entries from the white board were then entered into an exercise-specific electronic log. Review of the exercise entries noted that there was some loss of detail as one person was writing the entries without all the conduct of operations details on the white board and the CMRO operator replicated those entries at a later time. The overall result was a satisfactory capture of the events and sequence observed during the exercise.

2. **Operations implementation of DSA driven processes such as Mode changes and TSR surveillances (including scheduling, tracking, and completion) are proceduralized and effectively implemented. DSA Key Elements 11-3, 11-4, 11-7, 11-8, 11-9, and 11-12 are effectively implemented.**

WIPP has effectively flowed down DSA/TSR implementation into applicable procedures. EA04AD3036-1-0, Rev. 1, *Safety Basis Implementation Matrix,* documents the implementing documents and actions to take for all DSA/TSR requirements including mode changes, TSR surveillances, and the DSA key elements. Reviews performed on multiple procedures show that WIPP has effectively implemented these DSA-driven processes. Additionally, during both simulated exercises and routine operations, it was identified that the procedures used for these activities contain the necessary action steps to ensure compliance with DSA/TSR requirements. During the demonstrations of the waste handling and emplacement process, it was observed that WIPP Operations staff could fully execute the necessary requirements for a mode change and numerous surveillance and LCO actions. DSA Key Elements requirements are also flowed down into applicable procedures that provide assurance that the Key Elements are being met. During the execution of procedures and during interviews, NWP Operations staff were found to be extremely knowledgeable of the DSA-driven processes and how these processes are flowed down into implementing documents.

Key Element 11-3 is implemented through NWP procedure WP 04-PC3018, *Annual Essential Plant Communication Systems Testing*. This procedure provides instructions for the complete testing of the communication system at the WIPP site. Testing of this communication system is performed on an annual basis to test all speakers, strobe lights, site notification system units, and mine pager phones. In addition, procedure
WP 04-PC3017, *Essential Plant Communication Systems Testing*, requires monthly communication testing as identified in the WIPP Hazardous Waste Facility Permit. These procedures were reviewed and flow down the Key Element requirements.

Key Element 11-4 is implemented through NWP procedure WP 05-WH1025, *CH Waste Downloading and Emplacement,* and has a surveillance requirement included within this procedure to provide assurance of compliance. This procedure was demonstrated for the DORR and verification was made that this Key Element was addressed. Visual observation was made that the absorbent barrier was placed at the static waste face during the demonstration per the requirements of this Key Element and included within the procedure requirements for waste emplacement.

Key Element 11-7 is implemented through NWP procedures WP 04-AD3013 Rev. 40, *Underground Access Control,* and WP 04-AU0534 Rev. 5, *Underground Access Initiation/Termination.* A review of these procedures has concluded that the contractor has adequately flowed down the requirements for mine entrance requirements impacting personnel safety including Continuous Air Monitor operation, radiological conditions, ventilation capabilities, personnel training, back-up power, and personnel limits for in service conveyances.

Key Element 11-8 is implemented through NWP procedures WP 04-AD3013 Rev. 40, *Underground Access Control*, 12 ER.25 R1, *Underground Escape and Evacuation Plan*, and WP 04-AU0534 Rev. 5, *Underground Access Initiation/Termination*. These procedures were reviewed and flow down the Key Element requirements.

Key Element 11-9 is implemented through NWP procedures WP 04-AD3038 Rev. 1, *Critical Plant Equipment Status Board Maintenance*, WP 10-WC3011 Rev. 37, *Work Control Process*, and WP 13-QA3004 Rev. 15, *Nonconformance Report*,
WP 12-FP3001 Rev. 9, *Fire Protection Impairment*, WP 04-AD3016 Rev. 6, *Equipment Out of Service Process*. A review of these procedures concludes that the Key Element requirements have been incorporated into the referenced procedures.

Key Element 11-12 is implemented through NWP procedures WP 12-ER4925 Rev. 5, *CMR Incident Recognition and Initial Response*, WP 04-AU0534 Rev. 5, *Underground Access Initiation/Termination*, and WP 12-9 Rev. 43, *WIPP Emergency Management Plan*. A review of these procedures concludes that the Key Element requirements have been incorporated into the referenced procedures.

3. Surveillances performed by fire department, waste handling, and radiological protection are scheduled, coordinated with and the results communicated to the Operations organization.

The surveillance requirements for TSRs are implemented through various NWP procedures and work control documents identified in WP 04-AD3001, *Facility Mode Compliance*, and documented on the electronic attachment EA04AD3001-SR series forms. Surveillances are scheduled in accordance with requirements in DOE/WIPP-07-3373, Table 1.3-1, *Surveillance Requirement Frequencies*. The Operations Manager assigns an LCO coordinator who ensures that surveillances are scheduled and completed as required. The LCO coordinator is also responsible for communicating the surveillance schedule to Operations personnel. Communications are made via the 30-day look ahead schedule that shows upcoming surveillances and their due dates. FSM personnel were knowledgeable of the scheduling of each SR, the due dates assigned, and the importance of ensuring that SRs are completed prior to the end of the due date. At the beginning of each shift, the Facility Shift Manager reviews the status of each scheduled surveillance to determine required actions for the upcoming shift. The Facility Shift Manager reviews and approves the electronic series forms at the completion of each surveillance. The LCO coordinator is responsible for collecting completed surveillance forms and updating the tracking systems.

During DORR interviews, Facility Shift Manager(s) demonstrated a thorough knowledge of the TSRs and the status of the surveillances. Observation of surveillances completed in the field and the updating of the status of the completed surveillance was observed. WIPP has an approved method of scheduling, coordinating, and communicating the results of each surveillance performed to the operations organization.

4. Operations personnel demonstrate the principles of the conduct of operations requirements during WIPP operations.

The combination of Operations Organization's personnel professionalism, facility and process knowledge, operational awareness, command and control, response to abnormal/upset conditions, and operational discipline resulted in adequate operational performance. The WIPP Operations staff demonstrated a thorough knowledge of the Conduct of Operations principles, facility status, procedure familiarity, and overall understanding of the various steps associated with accepting and emplacing waste. Communications between Operators and Supervisors during the execution of the work scope was found to be clear and thorough during most observed evolutions. There were minor exceptions to effective three-way communications during the evacuation exercise within the CMR where it was noted that the formality of some internal communications degraded during the course of the exercise. Operations staff were familiar with the procedures that flow down the requirements of DOE O 422.1.

Overall, WIPP Operations has developed and implemented an effective Conduct of Operations program.

5. The CORR adequately addressed this objective.

Based on review of the Contractor Operational Readiness Review Final Report, the team concluded that the CORR adequately addressed this objective.

CONCLUSION

The combination of the WIPP Operations Organization's personnel professionalism, facility and process knowledge, operational awareness, command and control, response to abnormal/upset conditions, procedure and process knowledge, and operational discipline resulted in sound operational performance. The team observed satisfactory execution of multiple operating procedures with interjected upset conditions to verify the competency of operations staff and management. Interviews were conducted with multiple Control Room Operators, Roving Operators, Waste Handling Engineers/Technicians, as well as Facility Shift Managers providing additional evidence and assurance of the Operations staff level of facility and systems knowledge.

The WIPP Operations staff demonstrated solid operator watch-standing fundamentals (i.e. place keeping, three-way communications, formality, procedural compliance, etc.) that have resulted in a reliable Operations Organization with detailed knowledge and experience of waste handling and emplacement activities. Operations personnel were able to respond promptly and correctly to the upset conditions and consistently demonstrated excellent procedural and DSA/TSR knowledge.

Issue(s)

OP.2-POST-1: The WIPP Conduct of Operations Implementation Matrix, found in Attachment 1 to WP 04-CO.01, Rev. 3, *Conduct of Operations* has not been approved by CBFO.

Evaluated by:	**Approved by:**
/s/ Todd McGhee, Team Member	/s/ Edward Westbrook, Team Leader
/s/ Shawn Murphy, Team Member	

DOE ORR for the Waste Isolation Pilot Plant
Review Form 1

Functional Area:	Objective:	Objective Met	
Operations	OP.3	Yes [X]	No [ ]

OBJECTIVE

OP.3: There are adequate and correct procedures for operating the process systems and utility systems associated with WIPP operations that include revisions for modifications that have been made to the facility. Facility Processes ensure that only the most current revision to each procedure is in use. **(Core Requirements 9 and 15)**

CRITERIA

1. Operations procedures provide adequate direction for operating systems and equipment during normal, abnormal, and emergency condition and adequately incorporate DOE O 422.1 and safety basis requirements. (DSA Key Element 12-1)
2. Operations procedures are current and accurate, reviewed and approved prior to use, and controlled to ensure only the latest revision is used.
3. Procedures contain clear roles and responsibilities.
4. The CORR adequately addressed this objective.

APPROACH

Record Review:

- Review the procedures to be used to perform WIPP operations to determine if they are of sufficient detail to safely perform the activities, are consistent with approved safety basis, and reflect current facility configuration. Review the contractor's document control process for adequacy.
- Review recently changed WIPP procedures for adequate implementation of document control processes.
- Review Contractor Operational Readiness Review Report to verify this Objective was adequately evaluated.

Interviews:

- Interview operators and supervisors and evaluate their understanding of the processes used for the development, approval, and change control of operational procedures.
- Interview operators and supervisors and assess their understanding of site procedure compliance policy.

Shift Performance:

- Observe drills, and simulated operations (as described in the Scope section) to determine if facility procedures properly implement safety requirements and are adequate in content, level of detail, and acceptance criteria.
- If procedure changes are necessary, assess the steps taken by an operator and supervisors in the review and approval process.
- Verify procedures used by the operators are properly controlled to ensure only the latest revision is used.

Records Reviewed

- 00CD-0001, Rev. 40, *WIPP Mine Ventilation Plan*
- ACD-2016-49, Rev. 0, *Power failure to Hoist during DOWNLOADING*
- CA-2017-CORR-001, *WIPP Contractor Operational Readiness Review*
- *CMRO Daily Log from November 14, 2016 to November 18, 2016*
- *CMRO Exercise Log from Exercise Conducted November 18, 2016*
- *Contractor Operational Readiness Review (CORR) Final Report for the Commencement of Contact-Handled Waste Emplacement at the Waste Isolation Pilot Plant (WIPP)*
- DOE/WIPP 07-3372, Rev. 5b, *Waste Isolation Pilot Plant Documented Safety Analysis*
- DOE/WIPP 07-3373, Rev. 5b, *Waste Isolation Pilot Plant Technical Safety Requirements*
- DOE/WIPP 02-3212 Rev. 15, *Ground Control Annual Plan for the Waste Isolation Pilot Plant*
- EA04AD3001-1-0, Rev. 15, *Facility Operations Mode Checklist*
- EA04AD3001-SR8, Rev. 4, *LCO 3.1.1 Waste Handling Building (WHB) Fire Suppression System*
- EA04AD3008-11-0, Rev. 5, *Facility Operations Bldg 458/456 Round Sheet*
- EA04AD3008-12-0, Rev. 5, *Facility Operations Domestic/Fire Water Round Sheet*
- EA04AD3008-2-0, Rev. 6, *Facility Operations Diesel Generator #1 and #2 Round Sheet*
- EA04AD3008-20-0, Rev.5, *Facility Operations Support Bldg Substation/UPS Round Sheet*
- EA04AD3008-3-3, Rev. 5, *Facility Operations Substation #1/#3/Spare Round Sheet*
- EA04AD3008-4-0, Rev. 5, *Facility Operations Seismic/Substation #7/Duct Round Sheet*
- EA04AD3008-48-0, Rev. 22, *Facility Operations HEPA and Mine Ventilation System Inspection Round Sheet*
- WP 12-ER4926, Rev. 5, *CMR Expanded Staffing Operations*
- EA12ER4926-3-0, *EOC Activation*
- EA12ER4926-7-0, *RCRA Contingency Plan Implementation Decision Checklist*

- EA12ER4926-8-0, *Notification of Implementation of the WIPP RCRA Contingency Plan*
- 12-ER3906, *Categorization and Classification*
- EA12ER3907-1-0, *Emergency Notification Form*
- 12-ES3918, *Reporting Occurrences in Accordance with DOE O 232.2*
- EA04AD3008-49-0, Rev. 5, *Facility Operations HEPA and Mine Ventilation System FSM Inspection*
- EA04AD3008-5-0, Rev. 4, *Facility Operations Air Dryer/Dampers Round Sheet*
- EA04AD3008-50-0, Rev. 0, *Facility Operations Operator Rounds Cover Sheet*
- EA04AD3008-53-0, Rev. 1, *Facility Manager Turnover Checklist*
- EA04AD3008-55-0, Rev. 1, *Roving Watch Turnover Checklist*
- EA04AD3008-6-0, Rev. 5, *Facility Operations Exhaust Filters Round Sheet*
- EA04AD3008-7-0, Rev. 7, *Facility Operations Ventilation Fans Round Sheet*
- EA04AD3030-1-0, Rev. 2, *Pre-Job Briefing Checklist*
- EA04AD3036-1-0, Rev. 1, *Safety Basis Implementation Matrix*
- *Exercise Log 11-19-16*
- FO-CMRO-2, *WIPP Operations Facility Operations Central Monitoring Room Operator Qualification Card Signature Record (5)*
- FO-FOSE-3R, Rev. 3, *WIPP Operations Facility Operations Shift Engineer Requalification Card Signature Record*
- FO-RW-1, *WIPP Operations Facility Operations Roving Watch Qualification Card Signature Record*
- *NWP Organization Charts dated 11/14/2016*
- PROC-01, Rev. 0, *Technical Procedure Writer Qualification Card*
- *Qualified Watch List for Weeks of November 3, 2016 and November 11, 2016*
- STD JHA-171, Rev. 7, *JHA for CH Waste Processing*
- STD JHA-304, Rev. 11, *JHA for CH Waste Downloading and Emplacement*
- *T-0 Daily Scheduled Work/Daily Release 11/14/2016 thru 11/18/2016*
- *TSR Surveillance Schedule – 30 day Look Ahead as of 11/09/2016*
- WIPP 07-3373, Rev. 5b, *Waste Isolation Pilot Plant DOE Technical Safety Requirements*
- *WIPP Emergency Management EEG Monitoring Room: Central (CMR)*
- PROC-01, Rev. 0, *Technical Procedure Writer Qualification Car*
- WP 15-PS3002, Rev. 39, *Controlled Document Processing*
- WP 15-PS3004, Rev. 1, *Procedure Verification and Validation*
- WP 04-AD3034, Rev. 2, *Technical Procedure Compliance*
- *WIPP EOC On-Call List*, Rev. 1, *11/14/2016*
- WIPP EX-2016-04, Rev. 0, *DORR-16 WIPP Full Scale Exercise Master Scenario Events Listing*
- *WIPP Training Implementation Matrix, Appendix 1, October 2016*
- WP 04-AD.02, Rev. 5, *Technical Safety Requirements Surveillance Program*
- WP 04-AD.12, Rev. 0, *WIPP Facility Operations Training Program Plan*
- WP 04-AD.20, Rev. 1, *WIPP Cold Operations Plan*
- WP 04-AD3001, Rev. 37, *Facility Mode Compliance*

- WP 04-AD3008, Rev. 15, *Preparation and Use of Round Sheets, Surveillance Data Sheets, Shift Briefing Packages, and Critical Component/Equipment Status Sheets*
- *WP 04-AD3013, Rev. 40, Underground Access Control*
- WP 04-AD3024, Rev. 2, *Technical Procedure Compliance*
- WP 04-AD3027, Rev. 8, *TSR Violation Response and Recovery*
- WP 04-AD3030, Rev. 6, *Pre-Job Briefings and Post-Job Reviews*
- WP 04-AD3031, Rev. 2, *Monitoring Operational Activities*
- WP 04-AU1007, Rev. 15, *Underground Openings Inspections*
- WP 04-AU1031, Rev. 2, *Roof Bolter Preoperational Requirements*
- WP 04-AU2006, Rev. 0, *Underground Work Areas Shift Inspection*
- WP 04-AU9534, Rev. 2, *Operation of Liquid Fueled Vehicles and Equipment in Underground & Movement of 300 Gallon (Nominal) Fuel Tank*
- WP 04-CM2003, Rev. 3, *Loss of CMS Indication*
- WP 04-CM2005, Rev, 1, *Central Monitoring Room Electronic Logkeeping*
- WP 04-CO.01, Rev. 3, *Conduct of Operations*
- WP 04-CO.01-1, Rev. 4, *Conduct of Operations Program – Operations Organization and Administration*
- WP 04-CO.01-2, Rev. 5, *Conduct of Operations Program – Shift Routines and Operating Practices*
- WP 04-CO.01-3, Rev. 5, *Conduct of Operations Program – Control Area Activities for WIPP*
- WP 04-CO.01-4, Rev. 4, *Conduct of Operations Program – Communications*
- WP 04-CO.01-5, Rev. 5, Conduct of Operations Program – *Control of On-Shift Training*
- WP 04-CO.01-6, Rev. 6, Conduct of Operations Program – *Investigation of Abnormal Events, Conditions, and Trends*
- WP 04-CO.01-7, Rev, 3, *Conduct of Operations Program – Notifications*
- WP 04-CO.01-8, Rev. 5, *Conduct of Operations Program – Control of Equipment and System Status*
- WP 04-CO.01-9, Rev. 3, *Conduct of Operations Program – Lockout/Tagout*
- WP 04-CO.01-10, Rev. 3, *Conduct of Operations Program – Independent Verification*
- WP 04-CO.01-11, Rev. 5, *Conduct of Operations Program – Logkeeping*
- WP 04-CO.01-12, Rev. 3, *Conduct of Operations Program – Turnover and Assumptions of Responsibilities*
- WP 04-CO.01-14, Rev. 5, *Conduct of Operations Program – Required Reading*
- WP 04-CO.01-15, Rev. 7, *Conduct of Operations Program – Timely Orders to Operators*
- WP 04-CO.01-16, Rev. 3, *Conduct of Operations Program – Operations Procedures*
- WP 04-CO.01-17, Rev. 33, *Conduct of Operations Program – Operator Aid Postings*
- WP 04-CO.01-18, Rev. 35, *Conduct of Operations Program – Equipment and Piping Labeling*

- WP 05-WH.04, Rev. 31, *WIPP Waste Handling Operations Training Program Plan*
- WP 05-WH1002, Rev. 315, *41-T-152 & 41-T-153, TRUDOCK Operation*
- WP 05-WH1004, Rev. 36, *Facility, SCA, and TRUPACT-II Pallet Handling*
- WP 05-WH1005, Rev. 22, *CH Packaging Trailer Loading/Unloading*
- WP 05-WH1011, Rev. 57, *CH Waste Processing*
- WP 05-WH1025, Rev. 19, *CH Waste Downloading and Emplacement*
- WP 05-WH1058, Rev. 16, *CH Waste Handling Abnormal Operations*
- WP 05-WH1101, Rev. 29, *CH Surface Transuranic Mixed Waste Handling Area Inspections*
- WP 05-WH1402, Rev. 20, *13-Ton Electric Forklifts*
- WP 05-WH1405, Rev. 17, *Trailer Jockey 41-H-151A and B and 41-H-151C and D Operation*
- WP 05-WH1406, Rev. 17, *Conveyance Loading Car*
- WP 05-WH1407, Rev. 15, *6-Ton Bridge Cranes 41-T-151A, B, C, and D*
- WP 05-WH1410, Rev. 13, *Adjustable Center of Gravity Lift Fixture*
- WP 05-WH1412, Rev. 14, *CH Waste Handling Toyota Forklifts (and related equipment logbooks)*
- WP 05-WH1603, Rev. 17-FR2, *CH TRU Underground Transporter, 52-H-008A and B (and 52-H-008A equipment logbook)*
- WP 05-WH1810, Rev. 16, *Underground Transuranic Mixed Waste Disposal Area Inspections*
- WP 08-NT3020, Rev. 27, *TRU Waste Receipt*
- WP 10-WC3011, Rev. 37-FR1, *Work Control Process*
- WP 12-ER.25, Rev. 1, *Underground Escape and Evacuation Plan*
- WP 12-ES3918, Rev. 17, *Reporting Occurrences in Accordance with DOE Order 232.2*
- WP 12-FP0026, Rev. 11-FR1, *Weekly Surveillance for Fire Water Supply and Distribution System*
- WP 12-IS.01-1 Rev. 7, *Industrial Safety Program – Barricades and Barriers*
- WP 12-IS3002, Rev. 14, *Job Hazard Analysis Performance and Development*
- WP 12-NS3018, Rev. 0, *Material at Risk Statistics Verification*
- WP 15-CA1004, Rev. 0, *Performance Monitoring and Reporting*
- WP 15-GM.03, Rev. 9, *Integrated Safety Management System Description*
- WP 15-PS.01, Rev. 1, *Procedures Program*
- WP 15-PS.2, Rev. 12-FR1, *Procedure Writer's Guide*
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- CMR Exercise Player Hotwash
- Exercise Controller Evaluator Debrief
- Walkdown and Inspection of Panel 7 within the Underground
- Abnormal Event Exercise (Lost of Waste Hoist Power)
- Abnormal Table Top Exercise (Loss of CMS Indication)
- Post-job Briefing for Waste Handling/Surface Processing
- Weekly Fire Pump Surveillance and Pre/post job brief
- Establishment of Waste Handling Mode
- Receipt of TRUPACT Waste Shipment
- CH waste downloading and emplacement
- FSM, Shift Turnover (2)
- CMRO, Shift Turnover (2)
- CMRO, Operator Shift Rounds (2)
- Daily T-0 Schedule Meeting

Discussion of Results

1. **Operations procedures provide adequate direction for operating systems and equipment during normal, abnormal, and emergency condition and adequately incorporate DOE O 422.1 and safety basis requirements. (DSA Key Element 12-1)**

   Procedures associated with the DOE ORR observed field activities were reviewed along with a sampling of others containing TSR requirements or implementation requirements associated with the program implementation of Conduct of Operations. This procedure review identified one finding. Several examples of procedures were found that were classified as Management Procedures but contain steps used to ensure TSR level controls. Additionally, some procedures containing an action intended to ensure compliance with the TSR were "Reference Use" procedures and not "Continuous Use" procedures. Per a WIPP implementing document, WP 15-PS.2, *Procedure Writer's Guide*, a procedure must be "Continuous Use" if it meets any one of four criteria including, "An error during the performance of the activity would result in an unnecessary risk." Any activity required to ensure TSR level controls has the potential to violate TSR requirements if not followed, therefore should be included in a "Continuous Use" procedure. This issue is identified as a finding under **(OP.3-PRE-1).**

   The use and control of procedures was observed during normal and simulated abnormal/emergency conditions during the conduct of the ORR. The procedures used for work activities performed during the DORR included the TSR mode change surveillances and associated pre-operational inspections of equipment and vehicles, operational checks performed by Roving Watches, and periodic equipment performance tests by operations personnel. Extensive emergency procedure use was observed in the

CMR during the conduct of the Exercise. Off-normal procedure use included a field abnormal drill during waste handling and a table-top exercise conducted by the ORR team. Procedures used for the waste handling activities were evaluated including: waste receipt, waste handling in the above ground, and emplacement activities in the underground. Noted concerns were identified with the procedures for waste handling and waste receipt that involve the sequencing of procedure steps.

During the execution of procedure WP 08-NT3020, Rev. 27, *TRU Waste Receipt*, it was noted that the procedure step for inspecting for damage to the shipment is at the end of the procedure sequence for waste receipt and that the action to take for observed damage be denoted in the remarks section of the receipt paperwork only. This sequence and required action does not appear to be appropriate for the receipt of TRU waste at the site. Inspecting for damage should be considered for initial action upon the arrival of a waste shipment to the site and an appropriate level of notification should be considered for the discovery of identified damage.

An additional procedure sequencing issue was identified in procedure WP 05-WH1011, Rev. 57, *CH Waste Processing*. Procedure step 5.3.21 requires that a contamination swipe be performed on the RAF assembly quick connect. The activity on these swipes is not verified until procedure step 5.4.20, after the handling of potentially contaminated items have occurred. It would appear that the delayed processing and verification of these swipes could lead to contamination control issues. Although transferable contamination may be considered a low probability, the assurance that swipes are verified to be less than acceptable limits should be performed prior to additional handling of suspect equipment. Additionally, a note placed prior to step 5.4.18 allows the RCT to alter the configuration of the equipment by allowing procedure step 5.4.23 to be performed prior to the verification of swipe data within procedure step 5.4.20.

The resequencing of procedure steps within procedures WP 08-NT3020, Rev. 27, *TRU Waste Receipt,* and WP 05-WH1011, Rev. 57, *CH Waste Processing*, should be considered by the contractor. **(OP.3-OFI-1)**

Multiple interviews were conducted with operators, supervisors, and the Procedures Manager. Their understanding of the processes used for the development, approval, and change control of operational procedures as well as compliance policies was satisfactory without any noted issues or weaknesses.

Key Element 12-1 is implemented through NWP procedures WP 15-PS.01, Rev. 1, *Procedures Program*, WP 10-WC3010 Rev. 1, *Periodic Maintenance Administration and Controlled Document Processing*, WP 15-PS3002, Rev. 39, *Controlled Document Processing*, and WP 15-PS3004, Rev. 1, *Procedure Verification and Validation*. The preparation of procedures are systematic, include participation of the end user, have appropriate subject matter experts, and are verified to be technically correct and validated to be workable prior to use. A review of these procedures concludes that the Key Element requirements have been incorporated into the referenced procedures.

The CORR noted a significant percentage of operations procedures had some development or revision within the last few months. The interviews with waste handlers, operators, supervisors and managers indicated a desire to improve the procedures and a functional procedure program is necessary to do so in a reasonable and timely manner. The procedure feedback process was evaluated as satisfactory with the workforce willing to participate. Several of the post-job reviews observed by the team had minor procedure revisions suggested for improved performance. Interviews with the Procedures Manager indicated a reasonable time frame of completion of procedure revisions despite the large number of changes and systematic structured approvals from the proper subject matter experts with validations performed.

2. Operations procedures are current and accurate, reviewed and approved prior to use, and controlled to ensure only the latest revision is used.

The use and control of procedures was observed during normal and simulated abnormal and emergency conditions during the conducted during the ORR. In all cases of the observed work, the operations procedures used had been reviewed and approved prior to use and accurate to safely accomplish the work observed. Procedures use various forms and surveillance sheets to document into records TSR surveillances or selected steps and actions during the performance of a procedure. These surveillance forms are not stamped prior to use and approved as the procedures are required to be. Normally, these forms are a specific reference the supervisor is expected to printout with the procedure when he validates it. These forms are expected to printed from the electronic database system which ensures only current forms are used. In one instance it was observed that multiple blank copies of the turn-over sheets (controlled forms) were contained within the Facility Manger's turn-over binder. This instance has been documented under **(OP.1-POST-1).**

Facility walk-downs were performed in the aboveground and underground facilities. There were some examples of uncontrolled instructions or aids that were found during the walk-downs performed. In the Waste Handling Building, at door 130, an orange paper sign providing instructions for entering LCO 3.2.1 was posted and hung with tape; it contained no approval markings. In a room adjacent to the waste shaft collar room, instructions related to actions for fire impairments and a roster were contained in a binder above the door controls. At the Waste Station desk within the underground, an unapproved aid was posted for "Waste Station Inspection" while a similar aid at the Waste Collar had an approved Operator Aid approval sticker attached to the aid.

During walk-downs within the underground, numerous plain tags were observed to be hanging in various locations. These tags documented an identified ground control issue, the date the issue was observed, and the initials of the evaluator who identified the issue. The tags used were a plain type Manila tag with no other identifying marks that could be used for tracking and required action purposes. There is no formal program or process within the NWP command media that documents the use and actions for these tags. The DOE ORR Team observed that identifying these safety concerns through routine walk-

downs and the use of a unique identifier at the location of the identified issue is considered by the team to be a positive attribute to ground control inspection; however, NWP should formalize the use and required actions for the use of this level of inspection and hazard identification. These examples of uncontrolled instructions are documented as a finding under **(OP.3-POST-1).**

3. Procedures contain clear roles and responsibilities.

Based on the procedures reviewed and the observed work demonstrations (waste handling activities, routine operations and response to abnormal conditions scenarios), WIPP procedures provided adequate clarity to the roles and responsibilities. During the activities observed during the DORR there were no confusion by the workers on their roles and responsibilities. Although the procedures do not specifically address performers for each procedure step or sections, workers were confident in the role they played in each observed procedure.

4. The CORR adequately addressed this objective.

Based on review of the Contractor Operational Readiness Review Final Report, the team concluded that the CORR adequately addressed this objective.

CONCLUSION

Based on the procedure reviewed and the observed work demonstrations (waste handling activities, routine operations and response to abnormal conditions scenarios), WIPP procedures provide adequate and correct procedures for operating the process systems and utility systems associated with WIPP operations and included revisions for any modifications that have been made to the facility. The procedures adequately incorporate conduct of operations, roles and responsibilities, and safety basis principles.

The WIPP procedure requirements provide adequate direction to attain only the most current revision to each procedure that is in use. There were no cases found of outdated procedure use. There was one finding during the performance of acquiring procedures and forms according to WIPP program requirements that was identified. There were some instances of unapproved operator aids identified during facility walk-downs. With the exception of these two findings, the overall implementation and performance of attaining current and approved procedures was judged effective.

During the interviews process with operators, supervisors, and managers, WIPP personnel successfully demonstrated understanding of procedure use requirements of the program as well as the delineated roles and responsibilities and procedure change requirements. The CORR adequately addressed this objective.

Issue(s)

Pre-start Findings

OP.3-PRE-1: Use and designation of procedures were inadequate and not in compliance with NWP administrative processes (i.e., Management Control versus Technical procedures, and Continuous Use versus Reference Use), jeopardizing effective implementation of safety basis controls.

Post-start Findings

OP.3-POST-1: Contrary to NWP Conduct of Operations program implementing procedures, uncontrolled postings, instructions, and operator aids were found in aboveground and underground facilities.

Opportunities for Improvement

OP.3-OFI-1: The resequencing of procedure steps within procedures WP 08-NT3020, Rev. 27, *TRU Waste Receipt,* and WP 05-WH1011, Rev. 57, *CH Waste Processing,* should be considered by the contractor.

Evaluated by:	**Approved by:**
/s/ Todd McGhee/Shawn Murphy, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant

Review Form 1

Functional Area:	**Objective:**	**Objective Met**	
Occupational Safety and Health	**OSH.1**	**Yes [X]**	**No [ ]**

OBJECTIVE

OSH.1: NWP has developed a Worker Safety and Health Program that meets the requirements of 10 CFR 851, Worker Safety and Health Program (WSHP). **(Core Requirements 1, 2, 4, 5, 14, and 15)**

CRITERIA

1. WIPP WSHP is current for operational phase and has been approved by the appropriate DOE official.
2. Procedures implementing the WSHP have been developed, are adequate, and are effectively implemented. Procedures have been implemented that ensure occupational and industrial hazards are adequately evaluated for all work activities and that controls are identified to either eliminate or control those hazards.
3. The qualifications for OSH personnel are defined, adequate for the type of work activities to be performed, and met by the current staff.
4. Sufficient numbers of WIPP safety personnel are available to plan, evaluate, and monitor activities with occupational and industrial safety concerns including hoisting and rigging.
5. Personnel have received training or information regarding the occupational and industrial hazards that they may be exposed to and the methods to perform the work safely. WIPP personnel demonstrate an awareness of safety and health through their actions and are able to discuss their rights and responsibilities in regards to worker safety and health as described in 10 CFR 851, "Worker Safety and Health Program."
6. A hoisting and rigging program (DSA Key element 11-6) is effectively implemented at the WIPP. The formality and discipline of hoisting and rigging work tasks is sufficient to support safety operations. Hoisting and rigging procedures clearly identify functions, assignments, and responsibilities, including those between the line operating organization and safety and health support organizations.
7. Periodic assessments of the hoisting and rigging program and WSHP are performed to verify continued robust performance. Issues, recommendations or findings from assessments, both internal and external are tracked and resolved in a formal manner to ensure satisfactory correction and prevent reoccurrence.

8. The hoisting and rigging program and WSHP were adequately evaluated by the CORR.

APPROACH

Record Review:

- Review the WIPP Worker Safety and Health Program to ensure it meets the requirements of 10 CFR 851.
- Review selected WIPP procedures and manuals that implement the WSHP DOE Operational Readiness Review Implementation Plan for the Waste Isolation Pilot Plant for adequacy.
- Review WIPP OSH Training and Qualification process, including position descriptions, to ensure that personnel who plan, control, and perform OSH activities possess the necessary knowledge and abilities.
- Review staffing plans for the OSH organization.
- Review NWP contractor assurance system documentation such as OSH assessments and self-assessments as well as facility base-line hazards analysis to ensure worker safety and health program is effectively implemented.

Interviews:

- OSH staff to assess their level of knowledge of OSH and of NWP's WSHP and mechanisms for implementation at WIPP; workers to determine their knowledge of occupational and industrial hazards, the effectiveness of the training they received, and their understanding of hazard controls; management personnel to determine their level of knowledge of the WSHP, and commitment to ensuring a safe workplace

Shift Performance:

- Observe procedure demonstrations, particularly those with occupational and industrial hazards.
- Observe work planning meetings, walk downs, pre-job briefs and/or post job briefs to view worker participation in work planning and identification and control of OSH hazards.

Records Reviewed:

- WP 05-WH1002, Rev. 15, *41-T-152 & 41-T-153, Trudock Operation*, Effective Date 09/21/15
- WP-05-WH1402, Rev.20, *13-Ton Electric Forklifts*, Effective Date 08/13/16
- WP 05-WH-1101, Rev. 29, *CH Surface Transuranic Mixed Waste Handling Area Inspections*, Effective 10/23/16
- 15- GM.02, Rev. 10, *Worker Safety and Health Program Description*
- WP 05-WH-1011, Rev. 57, *CH Waste Processing*, Effective 11/02/16

- WP 05-WH-1407, Rev. 15, *6-Ton Bridge Cranes 41-T-151 A,B, C, &D*, Effective 07/16/16
- WP 05-WH-1405, Rev. 17, *Trailer Jockey 41-H-151 A&B and 41-H-151 C&D Operation*, Effective 06/16/16
- WP 05-WH-1406, Rev. 17, *Conveyance Loading Car*, Effective 11/08/16
- WP 12-IH1828, *MSHA Air Quality Monitoring*, Rev. 9, Effective 08/23/16
- WP 04-AU0534, *Underground Access Initiation/Termination*, Effective 09/13/16
- WIPP EX-2016-04, DORR-2016 WIPP Full Scale Exercise Master Scenario Events Listing (MSEL)Worker Safety and Health Program Description, 11/10/16
- WIPP Hoisting and Rigging Committee, MC 6.14, Rev.2, 04/27/15
- PPE 002A, Rev 0 Fall Protection Refresher
- WIPP ES&H Organization Chart, 11/03/16
- WP 15-HS.01-12, Rev. 5, *Industrial Safety Program*, Hoisting and Rigging, 05/17/16
- Office of Enterprise Assessments, October 2016
- 10 CFR 851, Worker Safety and Health Assessment, 12/16/15
- 30 CFR 57 Implementation Matrix, Safety and Health Standards Underground Metal and Nonmetal Mines
- WP 04-HO1002, Rev.16, *Salt Handling Shaft Hoist Operation*
- 10 CFR 851, Worker Safety and Health Program
- WP 15-GM.02, Rev. 11, *Worker Safety and Health Program Description*
- WP 15-GM.03, Rev. 9, *Integrated Safety Management System Description*
- Competence Commensurate Responsibility (CCR) Folder for Industrial Safety Professional
- WP12-IS.01-12, Rev. 5. *Industrial Safety Program – Hoisting and Rigging*

Interviews Conducted:

- Industrial Safety Manager
- Industrial Safety Professional (2)

Shift Performance Observed:

- Waste preparation for waste placement in Waste Handling building
- Emergency exercise
- Underground Services air quality check and morning rounds (pre-job brief)
- Lamp Room Operations
- Waste Hoist Operations

DISCUSSION of RESULTS

1. WIPP WSHP is current for operational phase and has been approved by the appropriate DOE official.

WIPP submitted WP 15-GM.02, *Worker Safety and Health Program Description* (WSHP), on May 23, 2016 and received approval on November 4, 2016 from CBFO. 10 CFR 851.11(b) states "The worker safety and health program and any updates are deemed approved 90 days after submission if they are not specifically approved or

rejected by DOE earlier." CBFO did not respond within the 90 days and at that time NWP could have deemed it approved.

The WSHP also covers NWP personnel supporting/performing work at other DOE facilities.

NWP has also implemented a process to assure that the requirements of 10 CFR Part 851 are appropriately flowed down to subcontractors performing work at NWP covered sites.

This criterion has been met.

2. **Procedures implementing the WSHP have been developed, are adequate, and are effectively implemented. Procedures have been implemented that ensure occupational and industrial hazards are adequately evaluated for all work activities and that controls are identified to either eliminate or control those hazards.**

Procedures implementing the WSHP have been developed, are adequate, and are effectively implemented. Procedures have been implemented that ensure occupational and industrial hazards are adequately evaluated for all work activities and that controls are identified to either eliminate or control those hazards.

WP 12-IS.01, Rev. 15, *Industrial Safety Program – Structure and Management*, is the umbrella document for the implementation of 10 CFR 851. The safety program integrates various procedures including those for hoisting and rigging, aerial lifts and elevating work platforms, excavations, scaffolds, fall protection and others.

At the work activity level, a JHA process is used to ensure that potential hazards associated with work activities are identified, evaluated, and controlled. This process is documented using
WP 12-IS3002, *Job Hazard Analysis Performance and Development*. Some of the JHA's reviewed found minor deficiencies and are identified in the maintenance work control section.

During the observation of the waste emplacement operations in the CH bay, it was noted that the waste handling TRUDOCK has an unguarded gap between the TRUPACK-II container and the walking platform that does not protect employees from accidentally walking into the gap, causing an injury potential. During discussion with the waste handlers they stated they knew of at least two employees that had fallen into the gap in the past. 29 CFR 1910.23(a)(8) requires every floor hole into which person can accidentally walk shall be guarded by either a railing w/toe board on all sides or floor hole cover. A spill pig is used to identify the hazard but offers no protection. The waste handling TRUPACT-II dock (TRUDOCK) has an unguarded gap between the

TRUPACT-II container and the walking platform, contrary to OSHA requirements. (**OSH.1-PRE-1**)

This criterion was met.

3. **The qualifications for OSH personnel are defined, adequate for the type of work activities to be performed, and met by the current staff.**

   The qualifications of OSH personnel are defined in a CCR folder that specifies and documents required training. At this time 10 Safety personnel are employed and qualified per their Competence Commensurate with Responsibilities (CCR). The CCR defines the qualifications and training required for the OSH personnel. Because industrial safety is not a DSA-identified support group, they are not required to have a training implementation matrix (TIM). At the time of this assessment there were no Certified Safety Professionals working at NWP performing field work. The Industrial Safety Manager is a Safety Trained Supervisor (STS) by the Board of Certified Safety Professionals (BCSP). The STS certification is intended for managers at all levels. The Environmental Safety and Health Manager stated they plan on cross-qualifying two safety personnel in industrial hygiene. NWP has three safety and health managers that are CSP's and three industrial hygienists that are both CSP and CIH certified.

   Interviews with the Industrial Safety staff indicated an adequate knowledge of safety programs, work activities, and hazard controls. As discussed above, there are no Certified Safety Professionals on the Industrial Safety staff; however, the staff has shown good work experience at the WIPP facility and have CSP's on staff that allow for a proper mentoring.

   This criterion was met.

4. **Sufficient numbers of WIPP safety personnel are available to plan, evaluate, and monitor activities with occupational and industrial safety concerns including hoisting and rigging.**

   WIPP has an adequate number of safety personnel (10 safety personnel) available to plan, evaluate, and monitor activities with occupational and industrial safety concerns including hoisting and rigging. At this time there are no field persons that are Certified Safety Professionals. NWP has safety personnel working seven days a week to ensure proper coverage. The Manager is certified by the Board of Certified Safety Professionals as a Safety Trained Supervisor (STS). WIPP has a Subject Matter Expert (SME) for the hoisting and rigging.

   The "ESH Bottoms Up Headcount Analysis Rev2 ESHR-1.xlsx" report identifies FY17 OSH needs but does not project for future years. This is due to the unknown budget at this time due to a Continuing Resolution. This analysis does not specifically identify a hoisting and rigging SME.

The Industrial Safety Manager is a Safety Trained Supervisor (STS) by the Board of Certified Safety Professionals (BCSP). The STS certification is intended for managers at all levels. The Environmental Safety and Health Manager stated they plan on cross qualifying two safety personnel in industrial hygiene. NWP has three safety and health managers that are CSP's and three industrial hygienists that are both CSP and CIH certified.

This criterion was met.

5. **Personnel have received training or information regarding the occupational and industrial hazards that they may be exposed to and the methods to perform the work safely. WIPP personnel demonstrate an awareness of safety and health through their actions and are able to discuss their rights and responsibilities in regards to worker safety and health as described in 10 CFR 851, "Worker Safety and Health Program."**

   Personnel have received training or information regarding the occupational and industrial hazards that they may be exposed to and the methods to perform the work safely. WIPP personnel demonstrate an awareness of safety and health through their actions and are able to discuss their rights and responsibilities in regards to worker safety and health as described in 10 CFR 851, Worker Safety and Health Program.

   Worker rights and responsibilities for safety are described in WP 15-GM.02, section 12.0**,** "Worker rights and Responsibilities" Subpart C, §851.20(b), and WP 15-GM.03, Rev. 9, *Integrated Safety Management System Description*, in section 5.7 "Each NWP Employee" under section 5.0 "Roles and Responsibilities." Workers were very knowledgeable of the NWP Stop Work Process. Interviews of first line management and workers, as well as observation of work activities, indicate that personnel understand their rights to a safe and healthy work environment. Employees feel free to bring up safety issues without fear of reprisal, and to take a time out or request a formal stop work. Workers interviewed were able to discuss and explain pause/stop work processes, and all interviewed personnel indicated they were not afraid to call a pause or stop to work activities when they felt there was a need. The employees stated they believe management has improved over the last two years in their willingness to listen to safety concerns.

6. **A hoisting and rigging program (DSA Key element 11-6) is effectively implemented at the WIPP. The formality and discipline of hoisting and rigging work tasks is sufficient to support safety operations. Hoisting and rigging procedures clearly identify functions, assignments, and responsibilities, including those between the line operating organization and safety and health support organizations.**

   WIPP has a hoisting and rigging program effectively implemented at WIPP. The Hoisting and Rigging program is documented in WP12-IS.01-12, Rev. 5, *Industrial*

Safety Program – Hoisting and Rigging. The program is designed to implement the requirements in DOE-STD-1910, *DOE Hoisting and Rigging Standard*; 29 CFR 1910, *OSHA General Industry Standards*; and 29 CFR 1926, *OSHA Construction Industrial Industry Standards*. WP 12-IS.02-12 clearly identifies functions, assignments and responsibilities.

WIPP has an active Hoisting and Rigging Committee that is charged with maintaining the
Hoisting and Rigging program, acting as interpretive authority for the program; and reviewing and recommending solutions for hoisting and rigging issues. The committee meets semiannually.

Implementation of the Hoisting and Rigging program was evident during observation of the waste handling evolutions. A detailed pre-operational inspection was performed for the bridge crane using WP 05-WH-1407, Rev. 15, *6-Ton Bridge Cranes 41-T-151 A, B, C, &D.*

The capacity ratings were posted on the bridge cranes, the lifting component had a current inspection tag, and the Adjustable Center of Gravity Lifting Fixture (ACGLF) had an automatic overload indicator. In addition, during the waste processing operations demonstration, workers wore proper PPE (e.g., hard hats, and steel-toed shoes) and used safe work practices (e.g., spotters were used and the operator carefully ensured that he was receiving clear instruction from the spotters prior to performing key part of the lifts). The lifts performed were pre-engineered lifts. The steps for these lifts are contained in the Waste Processing Procedure,
WP 05-WH1011, *CH Waste Processing*.

A detailed pre-operational inspection of the 13-Ton Forklift was also demonstrated using
WP 05-WH1402, Rev. 20, *13-Ton Electric Forklifts*, was observed. Employees were diligent in following the procedure and ensuring the forklift was ready per the implementing procedure.

This criterion was met.

7. Periodic assessments of the hoisting and rigging program and WSHP are performed to verify continued robust performance. Issues, recommendations or findings from assessments, both internal and external are tracked and resolved in a formal manner to ensure satisfactory correction and prevent reoccurrence.

WIPP has performed periodic assessments of their hoisting and rigging and WSHP programs. Four assessments for hoisting and rigging were reviewed including the CORR report. Quality Assurance Surveillance S15, Critical Lift Plan Performance, May 29, 2015 was reviewed and had one finding identified after the lift had been performed. Training for the rigger and the designated leader's qualification had

expired. This was found after the evolution. This was a good finding by the assessment but should have been caught by the supervisor prior to the lift.

The second assessment, "Quality Assurance Surveillance S16-07, Critical Lift Operations for the Interim Ventilation System (IVS) Construction," was performed in the period September – October 2015. Some weaknesses were identified including a lack of training equivalency by the subcontractor.

Quality Assurance Surveillance S14-25, *Hoisting and Rigging*, September 2014, was reviewed and it identified one finding. The finding was the critical lift plan did not appear to meet the requirements of WP12-IS.01-12, Rev. 5, *Industrial Safety Program – Hoisting and Rigging*.

The three assessments appear to be self-critical. A WIPP form was developed for the findings and tracked to closure.

Carlsbad Field Office (CBFO) Surveillance Report S- 16-12 NWP Industrial Safety and Hygiene Program were performed January 2016. This assessment was critical of the safety and health program.

8. The hoisting and rigging program and WSHP were adequately evaluated by the CORR.

The hoisting and rigging program at WIPP was adequately evaluated by the CORR. The CORR identified that WIPP was not implementing "Critical Lift" correctly. The CORR report states: "The program stated that a load being lifted in access of 80% of a mobile crane's gross load chart rating would be considered a critical lift. This was not consistent with the DOE Hoisting and Rigging Standard, which specifies that a lift that exceeds 75 % of the rating capacity of the crane or derrick shall be designated as a critical lift." However a Critical Lift per DOE-STD-1090 section 2.1.2 E. states "For steel erection, a lift shall be designated as a critical lift if: 1. The lift exceeds 75 percent of the rated capacity of the crane or derrick." Therefore, WIPP is following DOE-STD-1090 correctly for critical lifts.

CONCLUSION

The Industrial Safety Program including Hoisting and Rigging is well-established and documented in procedures, and fundamental program elements are in place. Adequate Industrial Safety staffing is available to support operations. The industrial safety department has an adequate staff for the work to be performed. The staff is qualified per a CCR. The staff has no CSPs on staff but has three safety and health managers that are CSP's and three industrial hygienists that are both CSP and CIH certified. The staff is knowledgeable of the hazards and controls at the WIPP facility. The safety and health department have performed self-assessments and been assessed by outside groups. These assessments were critical of the safety and health program. One issue was identified with a gap in the working platform around the TRUPACT II container dock.

Issue(s)

Pre-start Findings

OSH.1-PRE-1: The waste handling TRUPACT-II dock (TRUDOCK) has an unguarded gap between the TRUPACT-II container and the walking platform, contrary to OSHA requirements.

Evaluated by:	Approved by:
/s/ Karen Kubiak, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Review Form 1

Functional Area:	Objective:	Objective Met	
Quality Assurance	QA.1	Yes [X]	No [ ]

OBJECTIVE

QA.1: A quality assurance program is established, approved, implemented, and contains sufficient numbers of qualified personnel to ensure the effective implementation of the program. **(Core Requirements 1, 2, 4, 9, 15)**

CRITERIA

1. Functions, assignments, responsibilities, and reporting relationships are clearly defined, understood, effectively implemented, and enable adequate execution of the quality assurance program.
2. Sufficient numbers of qualified personnel are available to perform quality assurance functions at WIPP.
3. Quality assurance program documentation and implementing procedures have been developed and implemented and include:
   - Processes to ensure the quality of procured systems, equipment and materials meet appropriate standards and requirements;
   - Effective document control and records management systems;
   - Processes to monitor and control the calibration of process and test instrumentation are developed and implemented.
   - Processes that address nonconforming items and equipment.
4. WIPP quality assurance managers demonstrate an acceptable level of knowledge of the project activities and requirements to provide proper management oversight.
5. WIPP quality assurance personnel demonstrate acceptable level of knowledge of operations to conduct work safely and acceptable procedure compliance during interviews or performance demonstrations.
6. Periodic assessments of the Quality Assurance (QA) program are performed to verify continued robust performance. Issues, recommendations or findings from assessments, both internal and external are tracked and resolved in a formal manner to ensure satisfactory correction and prevent reoccurrence. Performance indicators are maintained and monitored to demonstrate adequate performance.
7. Appropriate equipment, in sufficient quantities, is available to support the facility calibration requirements.
8. The QA program was adequately evaluated by the contractor Operational Readiness Review.

APPROACH

Records Reviewed

- EA16-2-1-0, Rev. 6, *Software Screening Checklist*,
- EA16-2-2-0, Rev. 6, *Software Quality Assurance Elements Checklist for Surfer 13*;
- EA16-2-2-0, Rev. 5, *Software Quality Assurance Elements Checklist for CAP88-PC* Version 3, Release 020913;
- EA16-2-2-0, Rev. 6, *Software Quality Assurance Elements Checklist for 413-CP-321-03 PLC and HMI Application Program;*
- EA16-2-3-0, Rev. 0, *Software Installation and Checkout Form for MetData*, Version 0;
- EA16-2-3-0, Rev. 4, *Software Installation and Checkout Form for Safety Significant Instrument Loops*, Version 0;
- EA16-2-3-0, Rev. 4, *Software Installation and Checkout Form for Learning Management System*, Version 0;
- EA16-2-3-0, Rev. 0, *Software Installation and Checkout Form for MetData*, Version 0*;*
- EA16-2-3-0, Rev. 4, *Software Installation and Checkout Form for Learning Management System*, Version 0*;*
- EA16-2-3-0, Rev. 4, *Software Installation and Checkout Form for SW 15017 001 ControlLoopsSS.ACD*, Version 0*;*
- EA16-2-4-0, Rev. 0 *Software Problem Report for MACCS2/1.13.1*, SPR # 09-001;
- EA16-2-4-0, Rev. 0 *Software Problem Report for MACCS2/1.13.1*, SPR # 09-002;
- EA12IS3002-3-0, Rev. 1, *Job Hazard Analysis Checklist*;
- IC411031, Rev. 2 IB, *Canberra TRU-Dock Continuous Air Monitor*;
- WP 08-NT.04, Rev. 23, *Waste Data System Software Quality Assurance Plan*;
- *Controlled Software Log*, 14 November 2016;
- WP 13-1, Rev. 36, *Nuclear Waste Partnership LLC Quality Assurance Program Description*;
- WP 09-CN3040, Rev. 3, *Commercial Grade Dedication*;
- CBVFO Surveillance Report S-16-42, 2 – 4 August 2016, *NWP Commercial Item Dedication*;
- WP 15-PC3609, Rev. 30, *Preparation of Purchase Requisitions*;
- WP 15-PC3042, Rev. 17, *Credit Card Purchases*;
- WP 15-PC3044, Rev. 10, *Q-Card Purchases*;
- WP 13-QA1003, Rev. 26, *Quality Assurance Receipt-Source Inspections*;
- WP 15-PM3526, Rev. 5, *Receipt Discrepancies;*
- EA15PC3609-3-0, Rev. 3, *Certificate of Conformance*;
- WP 15-RM3006, Rev. 5, *Records Inventory and Disposition Schedule Review and Approval*;
- EA15RM3002-2-0, Rev. 2, *Waste Isolation Pilot Plant Records Inventory and Disposition Schedule (RIDS)*;

- WP 16-2, *Software Screening and Control*
- WF 16-1760 Details Report Addressing Issue #73 of CORR, 12 October 2016;
- Organization Chart of Nuclear Waste Partnership, November 2016;
- WP 15-GM1002, Rev. 4, *Issues Management Processing of WIPP Forms*;

Interviews Conducted

- Corrective Actions Program Manager
- Software Quality Assurance Specialist
- Senior WDS Database Administrator
- WTS Team Lead
- I&C Manager
- I&C Supervisor
- CBFO Maintenance
- I&C Technician
- I&C Technician
- Sr. Quality Assurance Engineer

Shift Performances Observed

- Calibration of East TRU Dock Continuous Air Monitor

Discussion of Results

1. **Functions, assignments, responsibilities, and reporting relationships are clearly defined, understood, effectively implemented, and enable adequate execution of the quality assurance program.**
   Nuclear Waste Partnership (NWP) has a detailed organizational structure shown in the chart included in the Handbook distributed on 14 November 2016. This chart clearly depicts reporting relationships down to the individual staff member. Each main office (for example, NWP Quality Assurance [QA]) presents a description of the major activities in the program description and the positions responsible for those actions. QA assignments and responsibilities are clearly identified in procedures and documentation and understood by QA personnel.

2. **Sufficient numbers of qualified personnel are available to perform quality assurance functions at WIPP.**
   The NWP QA office has a sufficient number of qualified personnel. No instance was observed in which additional personnel were needed. Conditions Adverse to Quality (CAQs) are quickly addressed by the WIPP Form process and assigned to a responsible person.

   Additional emphasis is given to the Waste Data System (WDS). The WDS was reviewed relative to its Quality Assurance Program which is separate from the NWP Quality Assurance Program Description (WP 13-1). The WDS software is considered to be sufficiently complex to require its own QA program (WP 08-NT.04) and there is sufficient staff to manage this software independently. The status of the WDS as

safety software is discussed in the Waste Acceptance area of this report (WA.1). It is, however, subject to the NWP Quality Assurance Program Description (QAPD) and to Quality Assurance Program Requirements for Nuclear Facilities (NQA)-2-1990, Part 2.7 and is listed on the Controlled Software Log. WDS software is prepared by a subcontractor which uses their own QP plan which must be approved by NWP. Changes to the software are accomplished by a controlled pathway that includes Statements of Work, a Configuration Control Board, and testing prior to general use on a separate server.

Review and discussion of the WDS Quality Assurance Plan (QAP) shows some inconsistencies in terminology and some omissions in qualifications of certain positions. The term *tuning* is used with at least two different meanings. While the specific meaning can be obtained from context by someone well versed in the program and its terminology, less well prepared individuals would be confused when reading the QAP (**QA.1-OFI-1**). The QAP also identifies specific positions with defined functions. For example, Database Administrator, Independent Reviewer, and Software Quality Assurance Specialist are defined to have specific functions requiring specialized backgrounds. There is no list of qualifications for staff filling these positions and, consequently, no qualification cards (**QA.1-OFI-2**).

3. Quality assurance program documentation and implementing procedures have been developed and implemented and include:

- **Processes to ensure the quality of procured systems, equipment and materials meet appropriate standards and requirements;**

  NWP requires each vendor to either work to WP 13-1, or to prepare a specific Quality Assurance Project Plan (QAPP) based on NQA-1-1989. For example, Chicago Bridge & Iron is designing the Permanent Ventilation System (PVS) and developed a NQA-1-1989-based QAP (500655-QA-PL-00002) specific for that project. Less complicated items are purchased from vendors on a Qualified Suppliers List (QSL) or from suppliers providing a Certificate of Compliance.

  WP 09-CN3040, *NWP Commercial Grade Dedication Program*, was reviewed by the Carlsbad Field Office (CBFO) in August of 2016. That review resulted in the following determinations: (1) the program as described in the program document is satisfactory, (2) the implementation of the program is unsatisfactory, and (3) the program is not effective at obtaining the desired results. These determinations resulted in the creation of four corrective actions. These corrective actions are:

  - CAR 16-060: Descriptions of critical characteristics is Less Than Adequate, in this case design/safety functions;
  - CAR 16-061: No recorded formal training;

- CAR 16-062: Multiple changes to form EA09CN3040-1-0 without officially revising the form (new verbiage added, revision number changed without review);

- CAR 16-063: Procedure WP 09-CN3040 has no process to change form

The response to these CAQs was examined during the review. NWP responded with Corrective Action Plans for each CAQ. Each plan includes the performance of remedial actions, investigative actions, preparation of a corrective action plan, determining the extent of condition, the impact of these conditions, determining the root cause (for only 2 of 4 plans), the determination of actions to prevent recurrence, and an implementation schedule. Many of the corrective actions on the schedule are not due for completion until the second quarter of 2017. More than 50% of each plan is complete.

- **Effective document control and records management systems;**

Records retention is managed, in part, by procedure WP 15-RM3006, *Records Inventory and Disposition Schedule Review and Approval*. This procedure instructs individual departments on how to create a Records Inventory and Disposition Schedule (RIDS). In general, individual procedures list all possible records that might be generated by use of that procedure. The user is then referred to that department's RIDS for the management and storage of any user-generated records identified in that procedure. Each office has a designated records coordinator who is required to take periodic training which is presented on a quarterly basis.

The NWP Office of Quality Assurance has its own RIDS procedure (EA15RM3002-2-0). Throughout this review, all records requested were readily retrievable.

- **Processes to monitor and control the calibration of process and test instrumentation are developed and implemented.**

The calibration schedule is maintained in the CHAMPS database. This database generates a periodic report advising of instruments coming due for calibration. This report is used by the work control group to schedule resources needed for various site activities including calibrations. This calibration was initiated on Wednesday, 16 November 2016 and performed according to procedure IC411031, Rev. 2 IB, *Canberra TRU-Dock Continuous Air Monitor* under Work Order #1625678. The activity began with a pre-job briefing which included a Job Hazards Analysis review (EA12IS3002-3-0, Rev. 1, *Job Hazard Analysis Checklist*). The work was performed professionally using the reader-worker approach. Each step of the procedure was executed in turn. On those few occasions when the communication was not entirely clear, the team backed up to the most recent step that was clearly understood and went forward from there. The work proceeded smoothly until the end of the calibration activity. On

returning the unit to service, a caution light occurred. A Pause Work was issued, the Central Monitoring Room, Radiation Control, and the Cognizant Engineer were all notified immediately. The post-job briefing eventually was postponed pending analysis of the event.

During the calibration, several opportunities to improve the procedure were noted by both the observers and by the Instrument and Control (I&C) technicians:

- The procedure contains at least one step (6.2.7) that should be a sub-step of the preceding step (6.2.6, becoming 6.2.6.1);
- The procedure contains no instructions regarding the application of a calibration sticker to the unit or of updating the calibration log. Calibration stickers have several shortcomings such as failing to adhere to the substrate or the ink fading below the ability to be read. The calibration schedule is kept in the CHAMPS database;
- Ambient air must flow through the Continuous Air Monitor (CAM) at a known rate; thus the air flow measurement must be calibrated as well. This calibration is performed by measuring the air-flow at different rates, lowest to highest, using a calibrated air flow meter. The procedure leaves the air flow at the upper limit of the air flow range as it provides no instruction to return the CAM air flow back to its nominal operating range (**QA.1-OFI-3**).

The post-job briefing was held on Thursday, 17 November 2016. At the time of the event, the I&C technicians speculated that the illumination of the caution light was caused by the high flow due to removing the calibration flow meter from the pneumatic circuit. The Central Monitoring Room confirmed the high flow. Radiation Control Technicians return the air flow to its nominal rate and placed the CAM back in service after performing the functional tests of the CAM and obtaining satisfactory results.

This event identifies a shortcoming of workers trying to perform a task while in the presence of observers. I&C technicians are trained to return a system under calibration to its nominal operating conditions without being instructed to do so by the procedure. Actually, this step is regarded as a skill of the craft. In this case and given the importance of the DOE Operational Readiness Review, the I&C technicians were reluctant to perform a step they would do as a matter of routine even though it is not in the procedure.

During this briefing, the I&C Supervisor made several recommendations to improve the procedure (many of which are noted above) including a suggestion to improve the clarity of data record table of Attachment 2 of the procedure. All of the suggestions have been forwarded to the Cognizant Engineer for consideration. Throughout the calibration and subsequent event, the I&C staff displayed a questioning and professional attitude. The professional behavior of the I&C staff was excellent.

- **Processes that address nonconforming items and equipment.**

  Processes to address nonconforming items are in place and work effectively. For example, Purchase Order (P/O) 506921 specified eight circuit breakers of three types. The P/O included the Quality Requirement of provision of a Certificate of Conformance as the circuit breakers were scored at ML-4 (balance of plant) and required only conformance to industry codes and standards. The vendor used the NWP standard form EA15PC3609-3-0. However, these items were determined to be used although NWP expected new, unused circuit breakers. This resulted in the generation of NCR 2016-38. The resolution of the issue was that the circuit breakers provided by the vendor were provided to the training organization and new circuit breakers were purchased from a different vendor. Because of the low dollar value of the P/O, the Office of Inspector General declined to pursue the investigation. The vendor claimed to be unaware of the WIPP policy regarding refurbished electrical components.

4. **WIPP quality assurance managers demonstrate an acceptable level of knowledge of the project activities and requirements to provide proper management oversight.**
   Senior management, junior managers, team leads, shift supervisors, and first echelon staff demonstrated thorough and detailed knowledge of procedures. No question on procedure or process went unanswered or even partially answered. The NWP staff has the appropriate level of knowledge commensurate with their position in the organization.

5. **WIPP quality assurance personnel demonstrate acceptable level of knowledge of operations to conduct work safely and acceptable procedure compliance during interviews or performance demonstrations.**
   Interactions with senior QA management, QA team leads, and QA Engineers were productive and could be conducted at both a high level and at a challenging level of detail. None of the individuals ever faltered in their knowledge of QA processes or QA procedures. When the reviewer reached an erroneous conclusion regarding an entry on the form EA16-2-3-0 (it appeared that the technician did something on his own initiative which would lead to an Opportunity for Improvement [OFI] in the procedure), the QA Manager and the Software QA Team Lead were quickly able to demonstrate text in WP 16-2, *Software Screening and Control,* that showed the technician actually was following the procedure. The NWP QA staff has the appropriate level of knowledge commensurate with their position in the organization.

6. **Periodic assessments of the QA program are performed to verify continued robust performance. Issues, recommendations or findings from assessments, both internal and external are tracked and resolved in a formal manner to ensure satisfactory correction and prevent reoccurrence. Performance indicators are maintained and monitored to demonstrate adequate performance.**

The contractor has an active issues management system (WIPP Forms). The Quality Assurance office performs periodic assessments and places additional emphasis on software quality assurance. An external assessment by the Carlsbad Field Office (CBFO) in August of 2016 reviewed of the NWP Commercial Grade Dedication Program (WP 09-CN3040). That review resulted the following determinations: (1) the program as described in the program document is satisfactory, (2) the implementation of the program is unsatisfactory, and (3) the program is not effective at obtaining the desired results. These determinations resulted in the creation of four corrective actions. These corrective actions are:

- CAR 16-060: Descriptions of critical characteristics is Less Than Adequate, in this case design/safety functions;
- CAR 16-061: No recorded formal training;
- CAR 16-062: Multiple changes to form EA09CN3040-1-0 without officially revising the form (new verbiage added, revision number changed without review);
- CAR 16-063: Procedure WP 09-CN3040 has no process to change form

The response to these Conditions Adverse to Quality (CAQs) was examined during the review. NWP responded with Corrective Action Plans for each Condition Adverse to Quality. Each plan includes the performance of remedial actions, investigative actions, preparation of a corrective action plan, determining the extent of condition, the impact of these conditions, determining the root cause (for only 2 of 4 plans), the determination of actions to prevent recurrence, and an implementation schedule. Many of the corrective actions on the schedule are not due for completion until the second quarter of 2017. More than 50% of each plan appears to be complete now.

7. Appropriate equipment, in sufficient quantities, is available to support the facility calibration requirements.

Adequate and sufficient equipment is available. Interview with the I&C Manager indicates, prior to his tenure, that occasional equipment unavailability was possible. However, more recently, equipment availability has been much less of a problem. He has been allowed to have a "plus one" inventory on critical items: the minimum number required for the site plus at least one spare. If a situation warrants, needed equipment may be rented or leased.
Equipment and procedures required for calibration is identified in the CHAMPS database.

8. The QA program was adequately evaluated by the contractor Operational Readiness Review.

The Contractor Operational Readiness Review identified one item that was determined to be a Condition Adverse to Quality (CAQ). Item 73 describes the lack of entering the Unresolved Safety Question (USQ) process in procedure WP 16-2,

Rev. 15, *Software Screening and Control* when controlled software is changed. This lack of entering the USQ process may potentially include safety software. Since the contractor determined that this issue is a CAQ, they initiated WF 16-1760 which has three separate actions. Two of the three actions are complete and the remaining action is scheduled for completion on 31 January 2017.

CONCLUSION

A quality assurance program is established and appears to have a sufficient number of qualified personnel. Purchases from external sources are reviewed and inspected for correctness and conformance to the conditions of the purchase order and the PO's listed quality requirements. Procedures to address quality issues are in place and appear to be implemented effectively in general. NWP's response to external reviews is adequate and employs the same process as internally identified CAQs, the WIPP Form process.

Issue(s)

None.

Opportunities for Improvement

QA.1-OFI-1: The WDS QAP (WP 08-NT.04) uses some terminology that has multiple definitions. This QAP should be reviewed for consistency of its terminology and ambiguities removed.

QA.1-OFI-2: The WDS QAP (WP 08-NT.04) lists individual positions without identifying the necessary qualifications. These qualifications should be added to specific position descriptions and qualification cards developed.

QA.1-OFI-3: CAM Calibration procedure (IC411031) leaves the air-flow at the extreme end of the measurement range. A final step should be added to the procedure to restore the air-flow rate back to its nominal operating value.

Evaluated by:	**Approved by:**
/s/ Steven L. Ross, PhD, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Review Form 1

Functional Area:	Objective:	Objective Met	
Quality Assurance	QA.2	Yes [X]	No [ ]

OBJECTIVE

QA.2: A Contractor Assurance System is established, approved, implemented, and effectively identifies, evaluates, and resolves deficiencies and recommendations made by contractor line management, independent contractor, and external audit and assessment groups. (e.g., DOE O 226.1B, *Implementation of Department of Energy Oversight Policy*) **(Core Requirements 1, 2, 4, 14, 15)**

CRITERIA

1. NWP has established a CAS that provides evidence that work is being performed safely, securely, and in compliance with all requirements; risks are being identified and managed; and that the systems of control are efficient and effective.
2. Functions, assignments, responsibilities, and reporting relationships are clearly defined, understood, effectively implemented, and enable adequate execution of the CAS program.
3. Sufficient numbers of qualified personnel are available to perform CAS functions at WIPP.
4. NWP CAS ensures the performance of rigorous assessments (management an independent assessments) and evaluations that are risk based, formally described and documented; assessments are performed by individuals with appropriate training and qualification.
5. The NWP CAS oversight and assessment processes identify and capture program and performance deficiencies.
6. The issues management system is formally described and documented, categorizes the significance of issues based on risk and priority, and analyzes higher significance issues for their underlying causes.
7. Timely and appropriate corrective actions that correct the immediate problem and prevent recurrence are developed, implemented, and verified as effective.
8. Issues and corrective actions are tracked to closure. Management reviews outstanding issues on an appropriate periodicity and takes actions to address delinquencies.
9. Feedback and improvement processes, including worker feedback mechanisms, improvements in work planning and hazard identification activities, and lessons learned are implemented and effective.

10. The corrective actions developed by NWP in response to the 2014 AIB reports have been completed (per the schedule), and effectively closed.
11. The CAS program was effectively reviewed by the CORR.

APPROACH

Record Review:

- Review the WIPP documents that define the CAS program to verify that they are adequate and approved.
- Review the assessment processes and procedures, the issues management and corrective action procedures, and the lessons learned process for adequacy and a focus on continuous improvement.
- Review the assessment schedule to ensure appropriate risk based coverage, and sample completed assessment reports for rigor and adequacy.
- Review corrective action plans and tracking systems for timely development and closure.
- Review of training and qualification records of assessment personnel, including examinations and examination results.
- Review AIB CAP documentation for appropriate objective evidence of closure and effectiveness (as appropriate)
- Review the CORR final report and any corrective action plans resulting from the CORR to determine the adequacy of scope, depth, and rigor of review.

Interviews:

- Interview CAS and management personnel to determine their knowledge of the program.
- Interview the personnel that perform assessments, develop corrective actions, or verify closure to ensure their knowledge of the processes
- Interview key personnel in planning and scheduling to verify management processes are in place to adequately plan, schedule and provide the resources for work.

Shift Performance:

- Observe any meeting ESRB meetings that occur (if any during the review) for engagement with the CAS program and knowledge of issues.
- Observe any CAS related meetings (assessment planning, scheduling, etc.)
- Attend Plan of the Day meeting, evaluate methods to verify management processes are in place to adequately plan, schedule and provide the resources for CAS related work activities.

Records Reviewed

- CBFO Readiness to Proceed Memo
- CBFO Monthly Evaluation Report of NWP Performance September of FY 2016
- CBFO July 2016 Self-Assessment Report
- Carlsbad Field Office Facility Oversight Division Monthly Report, August 2016

- CBFO Quarterly Evaluation Report of NWP Performance 3rd Quarter of FY 2016
- CBFO Corrective Action Report (CAR) 16-043 (June 4, 2014)
- DRAFT DOE Office of Enterprise Assessments (EA) Report from summer 2016, section 7.0 evaluating NWP CAS
- Assessment notes from T.J. Jackson summarizing November 2016 assessment of closure of AIB JONs
- NWP response to CBFO CAR 16-043(July 12, 2016)
- CBFO Rejection of the CAP for CAR 16-043(July 27, 2016)
- Organization chart, NWP Contractor Assurance Organization, 10/31/2016
- Database for IMPS, Issues Management Processing System
- NWP WIPP Form Trend Analysis, 1/1/16 to 6/30/16
- Briefing Slides, Contractor Assurance (with embedded CAS performance metrics)
- CORR Final Report for the Commencement of Contact-Handled Waste Emplacement at WIPP
- NWP Health Dashboard, October 2017
- NWP CAS SMP Health Review - May 2016
- WP 15-CA.01, Contractor Assurance System (CAS) Program Description, Rev. 1
- WP 15-CA.02, Line Management Assessment Implementation Plan, Rev. 0
- WP 15-CA1001, Independent Assessments, Rev. 2
- WP 15-CA1002, Self-Assessment, Rev. 1
- WP 15-CA1003, Management Observation, Rev. 0
- WP 15-CA1004, Performance Monitoring and Reporting, Rev. 0
- WP 15-CA1005, Change Management, Rev. 0
- WP 15-CA1007, Fact Finding and Critiques, Rev. 1
- WP 15-CA1009, Causal Analysis, Rev. 0
- WP 15-GM, Issues Management Processing, Rev. 5
- DRAFT WP 15-CA1011, Annual Integrated Assessment Schedule, Rev. 0
- WP 15-PA.01, Operating Experience/Lessons Learned Program, Rev. 4
- WP 15-PA2000, Lessons Learned Bulletin Development, Rev. 5
- MC 1.4, Contractor Assurance Department, Rev. 0
- MC 1.16, Corrective Action Review Board, Rev. 0
- MC 10.1, Quality Assurance Department, Rev. 9
- MP 1.20, Management Assessments, Rev. 12
- NWP Annual Integrated Assessment Schedule FY-2017 / 1st Quarter FY-2018, dated 9/27/16
- NWP Assessments (and associated WIPP Forms)
- MA-CCP-0018-16, Central Characterization Program (CCP) Training
- MSA-OPS-2016-021, Facility Operations Management Assessment of Operator Aids
- MSA-OPS-2016-005, Management Self-Assessment Plan for Conduct of Operations Control of Equipment and System Status at the Waste Isolation Pilot Plant (WIPP)
- MSA-OP-2016-008, Management Self-Assessment for Conduct of Operations (SMP) at the Waste Isolation Pilot Plant (WIPP)

- CA-2017-NS-002, Unreviewed Safety Question Process (USQ) Independent Assessment Report: WIPP Compliance with CBFO Approved USQ Procedure and Implementation Effectiveness
- MSA-OPS-2016-003, Management Self-Assessment Plan for Conduct of Operations Technical Procedures Use and Adherence at the Waste Isolation Pilot Plant (WIPP)
- Management Assessment Number: ENG2016-05, NWP Engineering, Engineering Programs
- S16-57, Effectiveness Review of the Corrective Actions for WF13-317, Storage Tank Training Records
- S17-01, Effectiveness Review of the Corrective Actions for WF15-359, Recurring TSR Violations…
- S17-04, Effectiveness Review of the Corrective Actions for WIPP Form 14-170, Timer Box Cover Not Closed
- MSA-CA-2016-003, WIPP Operating Experience/Lessons Learned Program Assessment
- Management Observation Forms (and associated WIPP Forms):
    - 10/05/2016 TJF (MSHA)
    - 10072015dss (860 Fan LOTO)
    - 10252016DSS (CMR CAM Alarm)
    - 101216 (Procedure Compliance)
    - 10/9/16DJM (Diesel Generator Load Bank)

- WIPP Forms (additional WIPP forms were reviewed as parts of evidence packages, issue packages, etc.)
    - WF15-599
    - WF15-605
    - WF16-099
    - WF16-948
    - WFs 16-1961through 16-1982
    - WIPP Forms related to CORR Issue closure
        - WF16-1069
        - WF16-1795
        - WF16-1755
        - WF16-1794
        - WF16-1795
        - WF16-1796
        - WF16-1797
        - WF16-1798
- E-mail chain from NWP Engineering Manager discussing closure efforts for Fire JON 14.6 dated 10/23/2016
    - Matrix of overdue WIPP Form Closure for Engineering

- E-mail from NWP Corrective Action Program Manager rejecting WIPP Form WF16-099 Closure Package dated 11/9/2016
- E-mail from NWP Corrective Action Program Manager to NWP Project Manager (and staff) providing Overdue Corrective Actions Report 11-08-2016 and Total Corrective Actions Report 11/08/2016
- E-mail from NWP Performance Assurance Manager for Engineering to Extend WIPP Form Action 16-1223-2, Fire Extinguisher Adequacy dated 11/14/2016
- Engineering 2017 Self-Assessment Meeting Agenda 9/15/16
- Causal Analysis Report WF16-1641, Fire Department Connections Blocked (Red lined)
- Causal Analysis Report WF16-939, ICE Form 525, Electric Fire Water Pump Marker Displacement/Removal, R1
- Closure documents related to closure of SCAQ – WF13-327, relating to training records not in a fireproof safe
- DOE Order Implementing Matrices for:
    - DOE O 420.1C
    - DOE O 151.1C
    - DOE O 430.1B
    - DOE O 422.1
- Lessons Learned Documents
    - WIPP Lessons Learned database
    - OE-3: 2015-05 (incorporated into WO# 1514078)
    - LL ID 2009-PTX-LL-0705 (incorporated into WO#1504176)
    - WIPP Safety Knews – Fall 2014 (incorporated into WO #1623429)
    - Arc Flashes (incorporated into WO#1510270)
    - WIPP-JITLL-2016-105, *Radiation Area Boundary Violation*
    - WIPP-JITLL-2016-094, *LCO Not Entered During Weekly Fire Pump Test*
    - DOE LL: NWP WIPP-2016-005, *LCO Actions Exited with System Operability Indeterminate*
    - DOE LL: NWP WIPP-2016-006, *Safety Basis Compliance*
- Occurrence Report, EM-CBFO-NWP-WIPP-2016-0019, Roof fall occurred in the underground.
- Occurrence Report, EM-CBFO-NWP-WIPP-2016-0018, TSR Violation: Response Plan not fully implemented
    - Associated Four Quadrant Matrix
    - Associated Lessons Learned
- Occurrence Report, EM-CBFO-NWP-WIPP-2016-0016, Subcontractor Employee Approached Edge of Roof Without Required Fall Protection
    - Associated Four Quadrant Matrix
    - Associated Lessons Learned
    - Associated WIPP Form WF16-1521
    - Associated Apparent Cause Analysis

- WF16-2012 – MRT Gas Cylinders with Expired Tags
    - Associated Four Quadrant Model, *Expired Calibration Gas Cyl. in MRT Area*
    - Associated Lessons Learned: WIPP-JITLL-2016-108,*Control of Expired Calibration Gas Cylinders*
- Training Documentation
    - WP15-CA.03, *Contractor Assurance Training Plan*, Rev. 0
    - Contractor Assurance Training Matrix
    - CAS Training Records (4)
        - Includes *Required Reading and Training Checklists*
        - Position Descriptions
    - RAD 102R, *Radiological Worker I*, Rev. 2
    - RAD 202R, *Radiological Worker I*, Rev. 2
- NWP AIB Judgments of Need Closure Status (10/26/16)
- NWP Accident Corrective Action Plans
    - Underground Salt Haul Truck Fire Event
    - Phase 1 Radiological Release Event
    - Radiological Release Event (Phase 1)
- NWP Accident Investigation JON Closure Files and evidence documents within each folder
    - Fire 2.1
    - Fire 2.2
    - Fire 2.3
    - Fire 2.4
    - Fire 11.1
    - Fire 13.3
    - Fire 13.4
    - Fire 33.5
    - Rad I JON 3.1
    - Rad I JON 4.1
    - Rad I JON 4.2
    - Rad I JON 4.3
    - Rad II JON 7.1

Interviews Conducted

- CBFO Acting Assistant Manager of Office of WIPP
- CBFO Acting Director, Facility Oversight Division (also CAS oversight)
- CBFO Director, Safety and Health Division
- CBFO Senior Technical Advisor, Office of WIPP
- CBFO FACREP
- CBFO Corrective Actions Manager

- NWP Assistant Project Manager
- NWP Contractor Assurance Manager
- NWP Assessments and Continuous Improvement Manager
- NWP Corrective Actions Program Manager
- NWP Regulatory Program Manager
- NWP Change Management Coordinator
- NWP Performance Assurance Manager for Engineering
- NWP Drill Evaluator for Forward Operations
- NWP CAS Training Coordinator
- Director, Office of Operational Safety (EM-3.112)
- Associate Deputy Assistant Secretary, Field Operations Oversight/Chief of Nuclear Safety (EM-3.1)

Shift Performances Observed

- Executive Safety and Quality Review Board Meeting Agenda for NWP Health Dashboard, October 2017
- Executive Safety and Quality Review Board Meeting Agenda for AIB JON Closure
- WIPP Form Screening Meeting
- Pre-Job Brief for HEPA Filter DP Gage Calibration
- Site Drill (including Hot Wash for the Forward Ops Responders)
- Fact Finding for Expired Instrument Calibration Gas

Discussion of Results

1. **NWP has established a CAS that provides evidence that work is being performed safely, securely, and in compliance with all requirements; risks are being identified and managed; and that the systems of control are efficient and effective.**

   NWP has established a CAS that provides for oversight, issues management, and a system to ensure applicable requirements are met. The NWP CAS has undergone significant modifications and upgrades since the events in 2014. The CAS has the essential elements discussed in DOE O 226.1B, Implementation of Department of Energy Oversight Policy. The level of maturity of the NWP CAS program is discussed in the following criteria.

   The CAS uses a variety of internal and external assessment tools to ensure management expectations are being met. These assessment tools include Management Observations, Independent Assessments, and Self Assessments.

   The CAS organization ensures that requirements, such as DOE Orders, are flowed into site procedures. Four implementing matrices were reviewed and each demonstrates how the respective DOE orders were flowed into NWP documents.

Detailed review of the adequacy of the flow down of requirements are addressed in program specific CRADs of this report.

Effectiveness is discussed in Criterion 7.

Based on internal and external DOE oversight efforts, the CBFO Office of WIPP has expressed concerns over the maturity of the NWP CAS. In the CBFO readiness to Proceed Memo, CBFO states:

The CAS program at WIPP has essentially been created in its entirety since the accidents of 2014. It has suffered understandably from the growing pains of a program in its infancy but has now established a functional foundation to move forward. In CBFO's opinion, it suffers from a considerable flaw of not being able to properly categorize events. As a result, it is not capable of conducting collective significance reviews of repeat events and prevent there recurrence. Oversight by CBFO has identified this issue but has been and continues to be met with significant resistance from CAS management. Recent actions, like formation of a new WIPP Form Screening committee with more senior management staff may have the effect of correcting this flaw; however there has been no evidence to that thus far.

Detailed discussions of the CBFO concerns with CBFO field oversight management and staff confirm that the level of concern should not preclude the resumption of waste emplacement, while the CAS continues to mature. Also, the corrective action for Truck Fire JON 23.6, *NWP will perform an effectiveness review on the implementation of the Contractor Assurance System,* was accepted by CBFO to be completed as Post-Start. Since both CBFO and the DOE Office of Enterprise Assessments (EA) are already tracking open issues with NWP regarding overall CAS effectiveness and maturity, no new Post-Start Finding is provided.

2. Functions, assignments, responsibilities, and reporting relationships are clearly defined, understood, effectively implemented, and enable adequate execution of the CAS program.

Functions, assignments, responsibilities and reporting relationships for the CAS Managers and staff are outlined in WP 15-CA.01, *Contractor Assurance System (CAS) Program Description,* and detailed in multiple implementing procedures referenced above.

Interviews of staff with Roles and Responsibilities in administering of the CAS program indicate they are knowledgeable in their duties. Each of the CAS Management team was interviewed and their oversight products were discussed in detail. A detailed interview and review of the oversight products for the Performance Assurance Manager for Engineering was also conducted. A review of the oversight products generally revealed an effective implementation of the CAS program. Concerns noted are discussed in the respective criteria of this Objective.

3. **Sufficient numbers of qualified personnel are available to perform CAS functions at WIPP.**

   WP15-CA.03, *Contractor Assurance Training Plan*, defines function/qualification requirements that may be assigned by CAS management based on CAS work scope. Minimum position qualification requirements are established in position descriptions that specify education and experience requirements for the position. Additional training requirements are detailed in the Contractor Assurance Training Matrix. Four CAS personnel training records were reviewed. The records include *Required Reading and Training Checklists* which document the requirements have been met.

   The NWP CAS Organization is not fully staffed and there is not a clear path forward to maintain current staffing levels. The *NWP Contractor Assurance Organization* (Org Chart), which captures requirements from the staffing plan, provides for a workable division of labor to help bring the CAS into a mature and effective CAS. The CAS organization has grown from 6 to 16 NWP staff during the recovery period. Currently, there are four vacancies (Performance Assurance Manager, Senior CAS Assessor, and two CAS Assessors). Other staff members are attempting to cover these duties. Additional duties are also being covered for positions which are not on the Org Chart, including Lessons Learned, Directives Management, and Management Observations coordination. Four support service contractors are not funded past CY 2016.

   The NWP Contractor Assurance Manager acknowledged that resource constraints, including attracting qualified permanent employees, has been challenging for NWP. Temporary sub-contract support has been used to augment NWP staff as the CAS has been established. Temporary subject matter expertise for independent safety basis implementation verifications conducted for ESS and DSA Rev. 5b implementation was used effectively to ensure thorough and comprehensive reviews. A concern was expressed that needed subcontract technical experts to tap as needed to support the Contractor Assurance (CA) independent assessments on SMPs and other mission critical areas, is not currently funded, and may adversely impact this CA function. Overall, the NWP Contractor Assurance Manager was concerned that current staffing levels may not be sufficient to sustain the CA function over time. CBFO Office of WIPP Management shared this same concern.

4. **NWP CAS ensures the performance of rigorous assessments (management and independent assessments) and evaluations that are risk based, formally described and documented; assessments are performed by individuals with appropriate training and qualification.**

   The processes for management and independent assessments are flowed down from WP 15-CA.01, *Contractor Assurance System (CAS) Program Description*, through:
   - WP 15-CA1001, *Independent Assessments*
   - WP 15-CA1002, *Self-Assessment*
   - WP 15-CA1003, *Management Observation*

Independent Assessments, Self-Assessments and Management Assessments reviewed were appropriate in depth, and breadth. Most identified issues indicated that the assessments were critical of programs and processes.

The assessment program for NWP Engineering was reviewed in more detail in an attempt to drill down further. The NWP Performance Assurance Manager for Engineering provided extensive oversight documentation. Areas for future emphasis and risk management were discussed. The NWP Performance Assurance Manager for Engineering meets periodically with his NWP Engineering counterparts to keep the process on track. The Engineering 2017 Self-Assessment Meeting Agenda 9/15/16 indicated a reasonable thought process to drive improvement in the self-assessments for Engineering. These include:

- Emphasis on guidance in WP15-CA 1002, *Self-Assessments*
- A listing of good targets for FY17 self-assessment consideration
- CAS Independent Assessments
- Setting up a follow up review for corrective action effectiveness

WP 15-CA.02, *Line Management Assessment Implementation Plan,* is a separate plan of the CAS to verify that closure actions fully address the accident JONs and that the related actions have been completed, and that objective evidence files demonstrating completion of these actions are established and are organized and complete. The Line Management Assessments (LMAs) are not expected to include an effectiveness review of completed actions. See Criterion 10 below.

Training and qualification is discussed in Criterion 3.

5. The NWP CAS oversight and assessment processes identify and capture program and performance deficiencies.

Oversight activities which identify program and performance deficiencies capture these as issues on WIPP Forms. Issues management is discussed in Criteria 6 and 7. Oversight and assessment processes include:

- WP 15-CA1001, *Independent Assessments*
- WP 15-CA1002, *Self-Assessment*
- WP 15-CA1003, *Management Observation*

Assessments listed in the documents section of this objective were reviewed. The majority of the assessments reviewed identified findings, opportunities for improvement, noteworthy practices and follow-on recommendations. Over 2500 WIPP Forms have been generated, thus far, in CY 2016. Most of these are generated from these oversight processes. Issues management is discussed in the criteria below.

6. The issues management system is formally described and documented, categorizes the significance of issues based on risk and priority, and analyzes higher significance issues for their underlying causes.

WP 15-GM, *Issues Management Processing*, provides the framework for issues management. NWP uses a four tier issue system ranging from Action Level (AL) one through four. AL-1 issues require extreme rigor in causal analysis, corrective action planning and closure. AL-2 issues require an apparent cause analysis and a corrective action plan. AL-3 issues require correction and tracking, while AL-4 issues are observations. A WIPP Form Screening Committee comprised of senior management, supported by the CA organization, meet to screen WIPP Forms for Action Level, issue code, and assignment of Responsible Manager for resolution.

CBFO field oversight staff and management have expressed concerns over the proper categorization of issues. Documentation of these concerns has been ongoing in the form of CARs, ICE issues and periodic CBFO reports. Interviews with CBFO field staff and management indicated that many still have concerns over issue classification, although some believed improvements were being made. NWP CA managers expressed that they have been working to steadily improve this aspect of their program.

NWP conducts a semi-annual WIPP Form Trend Analysis, which is used to analyze for trends/common causes over a large number of issues. Since the process is relatively new, only one has been completed (*WIPP Form Trend Analysis: 1/1/16 to 6/30/16)*. This *WIPP Form Trend Analysis* provided a reasonable first step in a maturing process. The report includes five suggestions for improving the next effort, indicative of intent to improve the process. The next trend analysis will be completed after December 2016.

A WIPP Form Screening Meeting was observed. Twenty three issues were screened by the WIPP Form Screening Committee of NWP Department Managers and CA Management. A CBFO FAC REP also attended. Seven of the issue screening decisions were discussed further with the Corrective Actions Program Manager. The rationale behind the categorization of each of the seven issues discussed was logical. The overall screening process yielded reasonable results. An opportunity for clarifying the screening process and providing for reasonable flexibility on causal analysis and corrective action planning was discussed.

WP 15-GM, *Issues Management Processing* attempts to tie determination of what constitutes an AL-2 issues (An Adverse Condition) to both the potential consequences and what is perceived to be the level of understanding needed to resolve the issue. For the AL-2, the wording for consequences is highly subjective, and there is a consequence gap between AL-2 and AL-3. In contrast, the determination of what constitutes an AL-3 issue (Track Until Fix Condition) solely based on a much lower level of consequence and level of effort. Clarifying the wording for screening of Action Level-2 and Action Level-3 issues could provide for

more flexibility in issue classification and resolution **(QA.2-OFI-1)**. Some issues that were the subject of debate between DOE and NWP, or the DORR Team and NWP, frequently could exhibit characteristics that were not clearly in one category or another. The potential consequence of an issue (or event) is not always related to the complexity of the issue (or event), therefore the current coupling of these parameters leads to excessive debate, vice dealing with the issue.

7. Timely and appropriate corrective actions that correct the immediate problem and prevent recurrence are developed, implemented, and verified as effective.

This discussion also addresses Criterion 8.

Improvements and increased use of the WIPP Form System following the 2014 accidents caused a several fold increase in the number of issues being generated. Due to the concerted efforts of NWP CA and Senior Management to encourage the work force to identify low significance issues along with the large number of JON actions from the three accident investigations (143 for NWP), many of which caused additional assessments (such as Extent of Condition Reviews), the WIPP Form system has swelled to a number that is larger than what will likely be the new normal. In late 2015, a large number of overdue actions resulted, but metrics provided by NWP indicate significant improvements in timeliness of closure of actions. The Issues Management Processing System provides real time reminders of actions that are overdue as well as an email report of overdue and upcoming actions for individuals and management three times each week. The NWP CA Issues Manager reviews all open issues in the IMPS, *Issues Management Processing System*, and provides frequent reporting to the NWP Project Manager on delinquent actions. The NWP Project Manager has been *personally involved* with ensuring management remains focused on timely issue closure. Current staffing is managing the current workload, but a follow-on review would be needed to see if projected staffing losses (discussed in Criterion 3) will impact the steady-state issue management volume after start up and JON closure.

Responsible managers and the NWP CA Issues Manager review all closed issues to ensure appropriate actions were implemented and documented. Five examples of rejected or revised (due to rejection or critical look) closure attempts were provided by the NWP CAS Issues Manager (WF13-327, WF16-099, WF16-939, WF16-948, WF16-1641). The rejection of some CAPs/closure is a healthy indicator that the CAS is driving managers to critically evaluate proposed closures and not simply accept them on face value.

WP 15-GM1002, *Issues Management Processing of WIPP Forms*, is the process established for reporting conditions, and documenting and tracking required actions through resolution. A graded approach is used for managing conditions based on the risk posed to safe operations of the facility and compliance with facility and contract

requirements. Requirements for follow up on the effectiveness of actions are discussed in the two sub-paragraphs below:

Action Level (AL) 1 conditions are the most significant and require root cause analysis, extent of condition determination, corrective and preventive actions, and effectiveness review. Upon closure of AL1 WIPP Forms, an action is assigned in the CTS for QA to perform an effectiveness review 3 to 12 months after the WIPP Form closure. QA documents the effectiveness review as a surveillance.

WP 15-CA1002, *Self-Assessment*, establishes the processes for scheduling, preparing, performing, and reporting management and organizational self-assessments. This document provides guidance for Department Managers to consider when developing the annual self-assessment schedule including follow-up or effectiveness reviews on actions taken to address previously identified issues. Draft procedure WP 15-CA1011, *Annual Integrated Assessment Schedule*, Rev. 0 provides additional emphasis or clarity for ensuring reviews of effectiveness are accomplished.

The NWP Annual Integrated Assessment Schedule FY-2017/1st Quarter FY-2018, dated 9/27/16, was reviewed with CA Managers. Assessments are scheduled to address effectiveness of closure actions and program upgrades (often related).

Examples of assessments which incorporated a review of the effectiveness of the actions taken to address issues were provided. The examples frequently identified issues for further action. In some cases, subsequent reviews, including this DORR, found instances where implementation issues still exist. Those specific instances are addressed programmatically in the respective Objectives of the DORR, as the general effectiveness and structure of the CAS were supportive of an appropriate outcome. Other instances are already captured in the concerns raised by CBFO in their oversight activities and are mentioned in other sections of this report. The assessments that reviewed effectiveness of closure actions include:

- S16-57, *Effectiveness Review of the Corrective Actions for WF13-317, Storage Tank Training Records*
- S17-01, *Effectiveness Review of the Corrective Actions for WF15-359, Recurring TSR Violations…*
- S17-04, *Effectiveness Review of the Corrective Actions for WIPP Form 14-170, Timer Box Cover Not Closed*
- Management Assessment Number: ENG2016-05, *NWP Engineering, Engineering Programs* provided follow up to WIPP Form 16-1145
- MA-CCP-0018-16, *Central Characterization Program (CCP) Training* – This assessment was an effectiveness evaluation of the training program revisions discussed in RAD Phase 2 JONs 2.3 and 2.4.
- MSA-OPS-2016-021, *Facility Operations Management Assessment of Operator Aids* – This assessment was an effectiveness follow up on the procedure revision addressed in Fire JON 33.3.

- MSA-OPS-2016-005, *Management Self-Assessment Plan for Conduct of Operations Control of Equipment and System Status at the Waste Isolation Pilot Plant (WIPP)* - This assessment was an effectiveness follow up on implementation of procedure 04-CO.01-18, Control of Equipment and System Status, revised to address Fire JON 33.3.
- MSA-OP-2016-008, *Management Self-Assessment for Conduct of Operations (SMP) at the Waste Isolation Pilot Plant (WIPP)* - This assessment was a follow up on the implementation of the 2015 Conduct of Operations global procedures revision following the 2015 Independent Assessment, addressed in Fire JON 33.3.
- CA-2017-NS-002, *Unreviewed Safety Question Process (USQ) Independent Assessment Report: WIPP Compliance with CBFO Approved USQ Procedure and Implementation Effectiveness* – The independent assessment was an effectiveness follow up for USQ process and changes enacted to address Fire JON 14.2 and WIPP Form 16-922.
- MSA-OPS-2016-003, *Management Self-Assessment Plan for Conduct of Operations Technical Procedures Use and Adherence at the Waste Isolation Pilot Plant (WIPP)* – This assessment was an effectiveness follow up on implementation of procedure 04-CO.01-16, Operations Procedures, revised to address Fire JON 33.3.

The closure actions for the seven CORR Pre-Start Findings were reviewed and are detailed in Criterion 11. Four Pre-Start Findings have been closed and three have been partially closed with some actions deferred as Post-Start. Continuing problems or issues were observed with three of the Pre-Start closure attempts. Although some of the actions related to closure of Pre-Start Findings have effectiveness issues, the overall review of WIPP Forms and issues does not indicate that the problem remains systemic enough to generate a new Finding.

The CAP and closure actions for one SCAQ (AL-1) issue, which was not related to the readiness reviews/MSA, was also reviewed. A SCAQ was identified in a drill, relating to records not stored in a fire-proof safe, and was tracked n WF13-327. The issue closure was initially rejected due to inadequate actions noted in effectiveness reviews (April 2014) then subsequently closed in 2016.

8. Issues and corrective actions are tracked to closure. Management reviews outstanding issues on an appropriate periodicity and takes actions to address delinquencies.

See related discussion in Criterion 7.

9. Feedback and improvement processes, including worker feedback mechanisms, improvements in work planning and hazard identification activities, and lessons learned are implemented and effective.

Feedback and improvement processes include the following:

- Worker feedback
- A Lessons Learned program
- Performance Indicators
- SMP Health Reports
- Fact Findings and Critiques

Worker feedback is a part of each post-job discussion as part of the Work Package Form. The worker feedback is incorporated into lessons learned or rolled back into the procedure. Examples observed include:

- Waste Handling Operations TRUPACT II Material Receipt
- Waste Handling/Surface Processing
- Weekly Fire Pump Surveillance
- Receipt of TRUPACT Waste Shipment
- CH waste downloading and emplacement

The Lessons Learned Program is implemented by WP 15-PA.01, *Operating Experience/Lessons Learned Program,* and WP 15-PA2000, *Lessons Learned Bulletin Development*. Lessons learned are generated on site for local and DOE-wide use. Lessons Learned from external sources are incorporated into local processes. Examples were provided showing lessons learned incorporation into work documents and pre-job/post-job briefs. Team members observing post-job briefs verified lessons learned and feedback were discussed. Examples were provided where lessons learned were incorporated into training. MSA-CA-2016-003, *WIPP Operating Experience/Lessons Learned Program Assessment,* was conducted in July 2016 and was used to incorporate identified needs for improvement into the process.

The Executive Safety and Quality Review Board Meeting (ESQRB) for NWP Health Dashboard, October 2017 was observed and a follow-on discussion of the process was held with the NWP CAS Manager. The NWP performance indicators were also discussed. The NWP Manager and his team were engaged in the details of the indicators and the NWP Manager was critical of both NWP performance and NWP performance indicators that he felt were sub-par. The performance indicators covered a wide range of SMPs. New indicators are being worked and introduced and additional indicators are being worked or contemplated for revision; it is a living and growing process. Feedback from DOE was not well integrated into the determination of performance indicators. For example, the CAS program performance indicators did not mention the ICE issues against the program, the CAR against the program or the information CBFO has been sending to them about CAS in the monthly reports. An opportunity for improvement is provided:

QA.2-OFI-2: Performance Indicators could be improved by incorporating indicators less reliant on basic numbers and more reliant on analyzed data.
Specifically:

- Plant Systems (ENG-04-2017) lists the Waste Hoist as GREEN for the past three months, despite numerous outages severely hampering access to the underground. Mission impact (including cost/schedule) is not included in this indicator.
- With approximately 100 Management Observations per month, in addition to other oversight, the RADCON and ESH issues noted in these may provide additional useful leading indicators to the ones currently in use (protective clothing failures and TRCR/DRTR).
- Corrective Maintenance Open Backlog (OPS-03-2017) does not draw attention to mission impact due to equipment down time.
- Feedback from DOE was not well integrated into the determination of performance indicators.

Feedback and improvement efforts also utilize periodic SMP Health Reports. SMP owners report to the ESQRB on 12-18 month cycle. The Board directed CAS report back in 12 months (May 2017). The CAS SMP Health Report that was provided to the ESQRB May 2016 was reviewed. This Health Report does capture the results of one CBFO Audit, but since there have been enough major concerns raised by DOE regarding some elements of the CAS (discussed in other criteria of this objective), the performance indicator briefings would provide a more timely venue to incorporate DOE concerns into the total picture.

Fact Findings and critiques are conducted in accordance with WP 15-CA1007, *Fact Finding and Critiques*. Documentation was reviewed for three Fact Findings. A Fact Finding for expired calibration gas was observed and the Fact Finding process was followed. The end products of this Fact Finding process include a WIPP Form, a Lessons Learned, and a "Four Quadrant Model" (FQM). The FQM records the Description/Chronology, Issues, Causes, and Immediate/Compensatory/Corrective Actions. The WIPP Form is intended to be used to also drive any follow-on actions and ensure they are tracked to closure. CBFO has expressed concerns over the conduct of the Fact Finding process and generation of the FQM without completing each of the four topics in a logical chronological order (i.e. timeline, then issues, then causes, then actions). The Fact Finding process, as observe during this ORR, demonstrated it is adequate to achieve it intended outcome. Specific instances where CBFO was not satisfied with the outcome of Fact Findings are being managed by CBFO. The WIPP Form, WF16-2012 – *MRT Gas Cylinders with Expired Tags,* its associated Four Quadrant Model and lessons learned, captured the salient points from the Fact Finding.

10. The corrective actions developed by NWP in response to the 2014 AIB reports have been completed (per the schedule), and effectively closed.

Except as noted below, corrective actions developed by NWP in response to the 2014 AIB reports have been completed. The effectiveness of closure turned out to be a more complex question, and additional discussion is provided below.

Discussion on Completion:
NWP developed three CAPs for the respective 2014 AIB reports. A total of 143 actions were generated from the CAPs. NWP has submitted all 143 actions for closure. CBFO has accepted all but two of the closure packages. These two are to be closed after to waste emplacement. JON actions, which were open at the start of this DORR (but are now closed), were addressed in the CBFO Readiness to Proceed Memo. (The numbers were in flux, as the open actions were still being worked during this DORR.) The CBFO *Readiness to Proceed Memo* states, "*AIB JONs related to SMPs have been addressed through effective corrective actions for each SMP, and all JONS identified by CBFO as pre-starts to Waste Emplacement are verified to be complete. The OWIPP does not agree that all of the SMPs have been adequately addressed.*"

At the beginning of the DORR, seven Pre-Start JON actions, which had been closed by NWP, had not yet been accepted by CBFO. An ESQRB was attended where the NWP Management Team discussed a path forward with each other and with the CBFO Acting Director Facility Oversight Division. The ESQRB was not clear on what issues were holding up the CBFO closure of the remaining Pre-Start JONs. The CBFO Acting Assistant Manager of Office of WIPP indicated that the basis for CBFO not closing the remaining Pre-Start JONs had been communicated to the appropriate NWP Manager. These JON actions were accepted by the end of the DORR.

Discussion on Effectiveness:
The SMPs affected by AIB JONs/Corrective Actions are expected to be functional, in order to determine that NWP is ready to emplace waste. A requisite level of functionality has been assessed by this DORR and documented in the respective SMP Objectives of this report, but the following discussion clarifies that this DORR is not the sole or final effectiveness review that will be used to formally close out the AIBs.

Section 5 of the three NWP CAPs each states, "*Six to twelve months after the completion of the actions, NWP will evaluate whether the actions have been effectively implemented and have addressed the Judgments of Need.*" In order to ensure a consistent expectation of what this statement meant, two DORR Evaluators and the Team Lead conferred with Director, Office of Operational Safety (EM-3.112) and Associate Deputy Assistant Secretary, Field Operations Oversight/Chief of Nuclear Safety (EM-3.1). The following understanding was reached:

- The evaluation of whether the actions have been effectively implemented is expected to be conducted 6-12 months after ALL of the actions in the respective CAPs have been completed.

- The timing of this AIB close out evaluation is anticipated to be after startup of waste emplacement.
- The AIB close out evaluation is expected to be oriented along the major programs impacted by the JONs, with emphasis on program specifics related to the details of the issues associated with the JONs. This is not intended to mandate a specific LOI (or LOIs) for each action closure effectiveness evaluation.
- The role of the Readiness Process is to ensure readiness of NWP and CBFO to safely resume waste emplacement operations. While this role is not to close out the JONs, the WIPP Readiness Reviews are providing emphasis on the evaluating the adequacy of the support programs impacted by the AIB JONs.
- Although the MSA, CORR, and this DORR may ultimately be referenced to support effectiveness closure in the future, the specific evaluation tools and involvement of all stakeholders will be decided in a venue outside of the Readiness Review Process.

Thirteen NWP JON Closure packages were reviewed under this Criterion, and other team members reviewed JON closures related to their CRAD programs. Assessment notes from T.J. Jackson summarizing November 2016 assessment of closure of AIB JONs was also reviewed. Overall, comments on JON closure:

- Each JON closure package has a deliverable required in order to close each of the actions for the respective JON. The completed NWP closure packages each have an *NWP Corrective Action Objective Evidence Cover Sheet*, which summarizes the basis of closure. There is a similar CBFO form, *CBFO Review of NWP Corrective Action Objective Evidence* used to document CBFO closure, once CBFO has concurred with closure. CBFO closure forms document any subject matter expert review that was leveraged in closing the action.
- Some of the closure actions are overcome by events, some are superseded and some may have had relapse, but were generally meeting the deliverable requirement at time entered. For example:
  - Fire 33.5 required a CONOPS mentoring Program, which was implemented by WP-04-CO.02, WIPP Mentoring Program, Rev.0. This program has since been revised. It had been implemented, but funding constraints have recently ended the contract. Although NWP is trying to get a new contract in place, at the time of this DORR, there is not a robust CONOP mentoring program. The action was completed and implemented, but there was no discussion of an endpoint. This is a good example of an action that would be evaluated as part of the AIB closure, in a lens of programmatic effectiveness.
  - JONs related to EP required a new EP Plan and effective drill. Since closure, the plans and drills have been updated several times.
- Examples of assessments which incorporated a review of the effectiveness of the actions taken to address some of the JONS were provided. The examples frequently identified issues for further action. In some cases, subsequent

reviews, including this DORR, found instances where implementation issues still exist. Those specific instances are addressed programmatically in the respective Objectives of this DORR. Other instances are already captured in the concerns raised by CBFO in their oversight activities and are mentioned in other sections of this report. The assessments that reviewed effectiveness of closure actions include:

- MA-CCP-0018-16, *Central Characterization Program (CCP) Training* – This assessment was an effectiveness evaluation of the training program revisions discussed in RAD Phase 2 JONs 2.3 and 2.4.
- MSA-OPS-2016-021, *Facility Operations Management Assessment of Operator Aids* – This assessment was an effectiveness follow up on the procedure revision addressed in Fire JON 33.3.
- MSA-OPS-2016-005, *Management Self-Assessment Plan for Conduct of Operations Control of Equipment and System Status at the Waste Isolation Pilot Plant (WIPP)* - This assessment was an effectiveness follow up on implementation of procedure 04-CO.01-18, Control of Equipment and System Status, revised to address Fire JON 33.3.
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- CA-2017-NS-002, *Unreviewed Safety Question Process (USQ) Independent Assessment Report: WIPP Compliance with CBFO Approved USQ Procedure and Implementation Effectiveness* – The independent assessment was an effectiveness follow up for USQ process and changes enacted to address Fire JON 14.2 and WIPP Form 16-922.
- MSA-OPS-2016-003, *Management Self-Assessment Plan for Conduct of Operations Technical Procedures Use and Adherence at the Waste Isolation Pilot Plant (WIPP)* – This assessment was an effectiveness follow up on implementation of procedure 04-CO.01-16, Operations Procedures, revised to address Fire JON 33.3.

11. **The CAS program was effectively reviewed by the CORR**.

The CORR Final Report for the Commencement of Contact-Handled Waste Emplacement at WIPP was reviewed to determine the effectiveness of the review of the NWP CAS. The details and conclusions of the CORR report were generally similar to the conclusions of this report. Concerns over staffing, issue classification, and performance indicators, which are raised in this DORR report as OFIs were not discussed. Open issues raised by CBFO and DOE-EA are also not mentioned. Overall, the CORR was effective in its review of the NWP CAS.

General issue closure is discussed in Criterion 7. Specific closeout of CORR issues is addressed here.

The closure actions for the seven CORR Pre-Start Findings were reviewed. Four Pre-Start Findings have been closed and three have been partially closed with some actions deferred as Post-Start. Continuing problems or issues were observed by the DORR team with three of the Pre-Start closure attempts. CBFO field oversight staff members have expressed some concerns with the effectiveness of some corrective actions, and they are managing those concerns. Although some of the actions related to closure of Pre-Start Findings may have effectiveness issues, the overall review of WIPP Forms and issues does not indicate the problem remains systemic enough to generate a new Finding. CORR Issue closures of Pre-Start Findings are captured on the following WIPP Forms:

- WF16-1069 and WF16-1755 address EP2-PRE-1 (Immediate U/G evacuation). Actions are addressed and closed, except for one that has been moved to a Post-Start action. The EP CRAD provides additional detail.
- WF16-1795 addresses OPS-PRE-1 (Impairing visibility of egress markers). Although the actions taken to close this Finding appeared reasonable, the DORR observed the practice of parking vehicles where they can obstruct visibility of egress markers continues. This issue was closed on October 27, 2016, but an effectiveness review was not conducted. Closure was not effective. The FP CRAD provides additional detail.
- WF16-1794 addresses EP1-PRE-1 (Abnormal event communication). Although the Finding was closed by NWP, CBFO rejected the closure based on concerns with the strobe lights, and additional concerns have been raised over the use of radios as a compensatory action. The EP CRAD provides additional detail.
- WF16-1796 addresses RP1-PRE-2 (Radiological control level of knowledge). Actions are addressed and closed, except for one that has been moved to a Post-Start action. The DORR observed that there are still significant concerns with radiological controls level of knowledge. The RP CRAD provides additional detail.
- WF16-1797 addresses TQ-PRE-1 (Technical qualifications). Actions are addressed and closed. No significant related concerns were noted during the DORR.
- WF16-1798 addresses RP1-PRE-1 (Radiological Control procedure use). Action 4 was to, "Train RCTs on the proper use of reference procedures." Action 4 was closed with only 91% of the RCTs being trained.
- WF16-1678 addresses SB1-PRE-1 (USQ process). Three actions are not closed and have been made Post-Start actions. The NS CRAD provides additional detail.

CONCLUSION

NWP has established a CAS that provides for oversight, issues management, and a system to ensure applicable requirements are met. The NWP CAS has undergone significant modifications and upgrades since the accidents in 2014. The NWP CAS has the essential elements discussed in DOE O 226.1B, Implementation of Department of Energy Oversight Policy. The NWP CAS program has not fully matured, but the management and program elements should facilitate continued maturation if staffing

remains in place to perform the CAS functions within the CAS organization and within the NWP elements it supports. Since both CBFO and the DOE Office of Enterprise Assessments (EA) are already tracking open issues with NWP regarding overall CAS effectiveness and maturity, no new Findings are provided. An OFI are provided to facilitate improvements in determining the severity level of issues and associate actions. An OFI is provided to facilitate improvements in the use of performance metrics.

This objective is met.

Issue(s)

QA.2-OFI-1: Clarifying the wording for screening of Action Level-2 and Action Level-3 issues could provide for more flexibility in issue classification and resolution.

QA.2-OFI-2: Performance Indicators could be improved by incorporating indicators less reliant on basic numbers and more reliant on analyzed data.

Evaluated by:	**Approved by:**
/s/ Jerry Lipsky, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Review Form 1

Functional Area:	Objective:	Objective Met	
Radiological Protection	RP.1	Yes [ ]	No [X]

OBJECTIVE

RP.1: A radiological protection program is established and implemented, sufficient numbers of qualified personnel are provided, and adequate facilities and equipment are available to ensure that radiological work is performed safely and in accordance with ALARA principles. **(Core Requirements 1, 2, 4, 14, and 15)**

CRITERIA

1. The WIPP Radiation Protection (RP) organization has been formally established, with clearly defined and effectively implemented roles and responsibilities. The organization is adequately staffed with qualified RP personnel. RP personnel exhibit an awareness of, and commitment to, public and worker safety, health and environmental protection requirements.
2. RP program documentation and implementing procedures have been developed and implemented, and include provisions for ALARA, Bioassay, RWPs, survey and monitoring requirements, decontamination, PPE identification, boundary controls, emergency response, etc. CAMs are properly located and operable (DSA Key Element 7-1).
3. The WIPP facility has established radiological posting and entry control measures that ensure worker access to radiological areas is appropriately planned and controlled and performed consistent with the requirements of 10 CFR 835. DSA Key Element 7-2 is satisfied.
4. Radiological surveys and monitoring performed to support demonstrated radiological operations are effective in ensuring hazards are identified and worker exposures are evaluated and minimized. WIPP personnel (operators, maintenance staff and radiological support personnel) demonstrate sound radiological practices during demonstrations and upsets. Contamination control activities are properly planned and conducted and address potential upcasting from the underground (DSA Key Element 7-3).
5. Facilities, equipment and instrumentation needed to support the RP program are available in sufficient quantities to meet requirements. Instruments possess current calibrations.
6. Periodic assessments of the RP program (including the bioassay laboratory) are performed to verify continued robust performance. Issues, recommendations or findings from assessments, both internal and external are tracked and resolved in a formal manner to ensure satisfactory correction and prevent reoccurrence.

7. Corrective actions have been developed and effectively implemented for RP program deficiencies identified as a result of the 2014 release.
8. The RP program was adequately evaluated by the CORR.

APPROACH

Record Review:

- Review the WIPP documents that define the RP program and its functions, responsibilities and organizational relationships and reporting requirements to verify that they adequate and approved. Review documents and procedures that define the processes for implementing the program requirements for adequacy (i.e., ALARA, Bio-assay, RWPs, survey and monitoring requirements, decontamination, PPE identification, boundary controls, emergency response, etc.).
- Review the output of the radiological processes such as RWPs, ALARA Job Reviews, etc., for adequacy and compliance. Review calibration records for radiological instrumentation. Review assessment reports pertaining to RP along with any corresponding corrective action plans, and closure documentation.
- Review contractor ORR report for adequacy in this functional area. Review staffing plans, position descriptions and qualifications for radiological protection staff for adequacy

Interviews:

- Interview radiation protection personnel who support operations to determine if they are familiar with the radiological hazards associated with WIPP operations and the associated radiation protection requirements. Evaluate their knowledge of WIPP radiological control procedures and radiological instrumentation usage.

Shift Performance:

- Observe dry runs/simulations and drill response. Determine the adequacy of compliance with radiation protection requirements, the RWP and ALARA plans. Evaluate the use of radiological instrumentation

Records Reviewed

- Office of Enterprise Assessments, *Assessment of Work Planning and Control at the Waste Isolation Pilot Plant*, October 2016 (Draft)
- CA-2017-CORR-001, *Contractor Operational Readiness Review (CORR), Final Report for the Commencement of Contact-Handled Waste Emplacement at the Waste Isolation Pilot Plant (WIPP)*, 10/28/16
- 10 CFR 835, *Occupational Radiation Protection*
- DOE G 441.1-1C, Chg. 1, *Radiation Protection Programs Guide*, 7/8/11
- Radiological Control/Dosimetry Organization Chart dated 10/24/16
- Listing "Current Rad Con Staffing October 24, 2016"
- Radiological Control Organization Staffing Plan 10-21-16

- Radiological Control Organization Roles, Responsibilities, Accountabilities and Authorities (R2A2) for Various Positions, dated 10/31/16
- DOE/WIPP-95-2054, *WIPP Radiation Protection Program*, Rev. 19 (approved by DOE 4/20/15)
- *Safety Basis Implementation Matrix (SBIM)*, Rev. 1
- TBD-022, *WIPP Workplace Air Monitoring Technical Basis Document*, Rev. 0
- TE-15-001, *WIPP Workplace Air Monitoring Program Technical Evaluation*, Rev. 3
- TE-16-006, *Placement of Air Monitoring Equipment in Relation to Current WIPP Ventilation Configurations*, Rev. 0
- WP 12-5, *Waste Isolation Pilot Plant Radiation Safety Manual*, Rev. 19
- WP 12-DS3350, *Internal Dosimetry Program Participation*, Rev. 1
- WP 12-HP3600, *Radiological Work Permits*, Rev. 20
- WP 12-DS1361, *Bioassay Scheduling, Sampling, Shipping, and Analysis Results Receipt*, Rev. 11
- WP 12-HP1321, *Bladewerx SabreAlert Alpha Continuous Monitor*, Rev. 5
- WP 12-HP3500, *Airborne Radioactivity*, Rev. 21
- WP 12-HP1500, *Radiological Posting and Access Control*, Rev. 21
- WP 12-HP1100, *Radiological Surveys*, Rev. 22
- WP 12-HP1307, *Portable Instrument Operability Checks*, Rev. 16
- WP 12-HP2001, *Abnormal Radiological Conditions*, Rev. 10
- WP 12-RE3003, *Radiological Release of Potentially Contaminated Materials, Waste And Items*, Rev. 9
- WP 12-DS.08, *Waste Isolation Pilot Plant External Dosimetry Technical Basis*, Rev. 0
- WP 12-DS.06, *Waste Isolation Pilot Plant Internal Dosimetry Technical Basis*, Rev. 0
- WP 12-DS3324, *External Dosimetry Background Monitoring*, Rev. 8
- WP 05-WH1011, *CH Waste Processing*, Rev. 57
- WP 05-WH1025, *CH Waste Downloading and Emplacement*, Rev. 19
- WP 05-WH1005, *CH Packaging Trailer Loading/Unloading*, Rev. 22
- WP 05-WH1724, *RH Hot Cell Complex Key Control*, Rev. 6
- WP 08-NT3020, *TRU Waste Receipt*, Rev. 27
- WP 12-RC.02, *WIPP Radiological Control and Dosimetry Department Training Program Plan*, Rev. 1
- WP 15-CA1001, *Independent Assessments*, Rev. 2
- Quality Assurance (QA) Audit I16-08, *Radiation Protection Program*, 10/25/16
- QA Audit I15-13, *Radiation Protection Program*, 1/12/16
- QA Audit I15-04, *Radiation Protection Program*, 8/17/15
- QA Audit E16-10, *Carlsbad Environmental Monitoring and Research Center*, 9/12/16
- RCT-01-1, *Radiological Control Survey Technician Qualification Card*, Rev. 14
- RCT-01-2, *Radiological Control Air Monitoring Technician Qualification Card*, Rev. 13

- RCT-01-3, *Radiological Control Technician (RCT) Qualification Card*, Rev. 13
- Radiological Work Permit (RWP) 16-0010, *General Work in High Contamination/Airborne Radioactivity Areas*…, 3-17-16
- RWP 16-0027, *Waste Handling Activities including Receipt to Panel 7 Transfer*, 11-11-16
- RWP 16-0028, *Waste Handling Activities; Emplacement*, 11-11-16
- RWP 16-0030, *Waste Handling Activities; Panel 7 transfer to Emplacement*, 11-16-16
- RWP 16-0031, *Waste Handling Activities including Receipt to Panel 7 Transfer*, 11-16-16
- Radiological Survey Report (RSR) 16-3184, *CH Bay*, dated 11/12/16
- RSR 16-3227, *E2520/W170*, dated 11/15/16
- RSR 16-3239, *E2520/W170*, dated 11/16/16
- RSR 16-3272, *U/G 2520 and Exhaust CA/HCA*, dated 11/19/16
- RSR 16-3273, *Surface Brine Basins*, dated 11/19/16
- RSR 16-3055, *Panel 7*, dated 11/13/16
- Resumes for selected Radiological Protection management staff
- WIPP Forms WF16-1170, -1710, -1798, -1767, -1765, -1766, -1721, -1724, -1725, -1786
- Area Thermoluminescent Dosimeter (TLD) Monitoring Results, dated 5/19/16

Interviews

- Radiological Control & Dosimetry Manager
- Radiological Control & Dosimetry Deputy Manager
- Radiological Control Field Operations Manager
- Radiological Engineering and Dosimetry Manager
- Dosimetry Team Lead
- Radiological Control Supervisor
- Radiological Control Technicians (3)
- Survey Technician (2)
- Air Monitoring Technician
- Assessments/Continuous Improvement Manager

Shift Performances Observed

- Daily operational check on iCam
- Radiological receipt/survey of TRUPACT Trailer
- Pre-job briefings for TRUPACT unloading and waste emplacement
- TRUPACT Unloading
- Underground waste emplacement
- Evacuation Drill

Discussion of Results

1. **The WIPP Radiation Protection (RP) organization has been formally established, with clearly defined and effectively implemented roles and responsibilities. The organization is adequately staffed with qualified RP personnel. RP personnel exhibit an awareness of, and commitment to, public and worker safety, health and environmental protection requirements.**

   The NWP Radiological Control and Dosimetry (RC&D) Organization consists of the Radiological Control Field Operations Group and the Radiological Engineering and Dosimetry Group. The Radiological Control (Radcon) Field Operations Group houses the Radiological Control Technicians (RCTs) and Radiological Control Supervisors (RCSs). Current staffing is 34 RCTs (24 NWP technicians and 10 subcontract technicians) and two RCSs. Only 8 of the RCTs are fully-qualified to support waste handling activities. R2A2 documents for the key organization positions have been recently developed; they generally provide an adequate description of position responsibilities and authorities but they do not address the three levels of RCT qualification as discussed below.

   NWP has recently developed a Radcon staffing plan that identifies projected staffing levels for full-scale operations. Review of current staffing levels against those projected in the staffing plan identifies a significant shortfall in the current level of RCT and RCS staffing. This shortfall would limit the scope of operations that could be covered by the Radcon organization, and is also hampering the timely qualification of junior RCTs. A post-start issue was identified in this area (see **MG.1-POST-1**).

   Review of current shift staffing identified that no Radiological Control (Radcon) coverage is available onsite from 1 am to 6 am. NWP relies on a call-in process to bring in Radiological Control supervisory or management level support if an incident or emergency occurs during the 1 am to 6am time period. The need for a supervisory/management level of response was highlighted during the 2014 radiological release event.

   Discussion with Radiological Management identified the call-in responsibility is shared between two individuals, the Radiological Control and Dosimetry Manager and the Deputy Manager. No RP procedure is in place that describes/controls this call-in responsibility. Decisions as to who will have the call in "duty" for specific time periods are made informally between the two individuals.

   Discussion with the CMR operator identified the operator was not familiar with the above arrangement. When asked who would be called from the Radcon organization in the event of an emergency, the operator indicated she would consult the Qualified Watchstander's list and start calling Radcon managers. She indicated the Watchstander's list did not provide any indication who would be available or "on call" for certain time periods; instead she would just start calling managers until someone answered. The CMR operator listed four individuals from the Radcon

organization that she would initially try calling – the Radiological Control and Dosimetry Manager was not mentioned, and one of the four was a non-NWP subcontractor.

In conclusion, the existing informal process does not ensure the CMR operator would call the appropriate level of Radiological Control supervision intended by the Radcon organization. Additionally, the use of a general listing of names that does not indicate who has specific call-in responsibility may significantly increase the time required to reach an appropriate responder. (**RP.1-PRE-1**).

During the CORR, a pre-start finding was identified related to level of knowledge deficiencies associated with the Radiological Control management and staff. This review focused on RCT level of knowledge, and identified deficiencies in RCT knowledge regarding radiological fundamentals relevant to their work activities (type of detectors in instruments, posting thresholds, etc.). A pre-start issue was identified (**RP.1-PRE-2**); additionally, this continuing concern suggests corrective actions taken in response to the CORR finding were ineffective.

At WIPP the RCT qualification process is a three-step sequential process, as candidates progress through Radiological Survey Technician (ST) qualification, then Radiological Air Monitoring Technician (AT), and finally Radiological Control Technician (RCT). Differences between the three levels of technicians and the types of activities they can perform are not formally identified, and can only be subjectively determined by review of the three relevant qualification cards. This concern was noted during the CORR and NWP undertook corrective actions via WF 16-1710; however review of the resulting procedural revisions identified they did not adequately address the concern. Field observations performed during the ORR also identified that STs and ATs are performing job coverage without first completing relevant/applicable training requirements (see **TRG.1-PRE-1**).

2. RP program documentation and implementing procedures have been developed and implemented, and include provisions for ALARA, Bioassay, RWPs, survey and monitoring requirements, decontamination, PPE identification, boundary controls, emergency response, etc. CAMs are properly located and operable (DSA Key Element 7-1).

The WIPP documented Radiation Protection Program (RPP) is in place and has been approved by DOE. Discussions with the DOE HQ DOELAP Program Administrator identified WIPP is current in both their external dosimetry and bioassay DOELAP conditions of accreditation.

Review of the Radcon procedures index and a sampling of RP procedures identified that all fundamental RP program elements are generally captured and described by site procedures. The CORR did identify a concern that ALARA/work planning program elements are not adequately reflected in procedures; this deficiency is already adequately covered by a CORR finding.

During the course of the ORR numerous examples were identified where Radcon procedures were not complied with (**RP.1-PRE-2**). These procedural violations were of varying significance; however the number noted in the relatively short period of observation highlights the need to improve Radcon staff knowledge of and adherence to procedural requirements, and the level of supervisory review.

Examples were also noted of RP procedural inadequacies (lack of specific detail or guidance, not reflective of actual practice, lack of procedural references to included tables) (**RP.1-OFI-1**). The following examples were noted.

- NWP currently lacks internal dosimetry expertise and relies on an independent consultant to provide internal dosimetry dose assessment services. Current NWP internal dosimetry procedures (the Internal Dosimetry Technical Basis Document and WP 12-DS3350, *Internal Dosimetry Program Participation*) don't specifically identify or acknowledge this important contractual relationship.

- Table 2 of WP 12-DS3350 provides overly subjective guidance for bioassay sampling to be performed in response to workplace indicators or events. Discussion with the Dosimetry Team Lead indicates the guidance provided in the table is not reflective of actual practice (NWP typically requires more samples than the table recommends).

- Table 1 (Radiological Limits) of the TRU Waste Receipt procedure (WP 08-NT3020) lists DOT and DOE dose rate and contamination limits. The intent of Table 1 is unclear, as it is not specifically referenced in the action steps of the procedure. Instead, the RCT is directed to compare survey results to the limits in the radiological survey procedure, WP 12-HP1100, *Radiological Surveys.* Additionally, Table 1 was noted to contain both the DOE Sr-90 contamination limits and the DOE general beta/gamma contamination limits, with no indication which of the limits would be relevant.

- During observation of the TRU waste receipt on 11/16/16, it was noted that 1 meter dose rate measurements were not being performed, but zero values for such measurements were being recorded on the survey form. Discussion with the RCTs indicated they had adopted the practice of skipping the 1 meter readings and recording a zero value if contact or 30 centimeter readings indicated no dose rates above background. Discussion with Radiological Control management indicated this practice was not consistent with management expectations. Review of the general survey procedure (WP 12-HP1100) identified it provides no guidance on performing contact dose rate measurements, scanning of items for maximum contact dose rates, or performance of 1 meter dose rate measurements.

CAM location and operation is discussed in Criterion 4 below.

3. The WIPP facility has established radiological posting and entry control measures that ensure worker access to radiological areas is appropriately planned and controlled and performed consistent with the requirements of 10 CFR 835. DSA Key Element 7-2 is satisfied.

Access to radiological areas at WIPP is controlled through the use of radiological postings, training, and the Radiological Work Permit (RWP) system. Evaluation of these areas was performed by observation of radiological posting and labeling during facility tours, verifying the training status of selected workers, and review of facility RWPs.

Facility radiological areas were generally observed to be adequately established and posted, and radioactive material was generally effectively labeled and controlled. Some concerns were noted in this area, however, and represent examples of procedural violations (see **RP.1-PRE-2**). These included the lack of posted doffing or frisking instructions at contamination control step-off pad areas and the disposal of used anti-C gloves in an unmarked trash container. Although troubling, these represent relatively minor concerns and overall area posting and labeling was determined to be effective. Review of the training status of a sampling of workers entering radiological areas identified all were appropriately trained and qualified for access.

During the timeframe of this review NWP was utilizing a hardcopy RWP sign-in system. An automated RWP/access control system (Sentinel System) had been procured and initially implemented; however software issues have prevented full implementation.

Review of selected RWPs identified a number of deficiencies and internal inconsistencies, indicating the need for improvement in RWP quality (**RP.1-OFI-2**). Specific examples include the following.

<u>RWP 16-0027</u>

- Block 15 – Electronic Pocket Dosimeter (EPD) not indicated although later Special Instruction (SI) number 7 requires wearing an EPD.
- Block 19 – Does not authorize entry to High Radiation Areas (HRAs) although SI's 6 and 7 and RWP Limiting Conditions allow work in HRAs.
- Block 14 requires a full set of Protective Clothing (PCs). SI number 1 notes PCs are not required for entry to Radiological Buffer Areas (RBA), Radiation Areas (RA), or HRA. RWP consequently requires PCs for all other areas, including outside receipt of TRUPACT trailer (although full PCs were not worn during this evolution).

<u>RWP 16-0028</u>

- Block 15 – EPD not checked although SI 6 requires wearing an EPD.

- Block 19 – Does not authorize entry to HRAs although SI 6 and limiting conditions allow work in HRAs.

RWP 16-0010

- RWP 16-0010 is a General RWP; with an excessively broad scope covering all work in HCAs/ARAs at the site. Review of the inclusive list of work tasks identifies them to have significantly different radiological hazards, and should be considered for separate RWPs.
- Blocks 8 thru 12 – specific radiological survey data and reference to radiological survey numbers are not provided; instead the RWP lists non-specific upper range values (<100 mrem/hr, <200,000 dpm/100 cm2) for area radiological conditions. Reviewed survey information indicates radiological conditions in Panel 7 are much lower; consequently the RWP does little to inform the worker as to actual conditions.

Discussion with the RC&D Manager and review of the CORR report identifies similar concerns regarding RWP adequacy were raised during the CORR. Corrective action plans are in place to revise RWPs, conduct training for RCSs in RWP adequacy, and make revisions to the controlling RWP procedure with a scheduled completion date of 12/22/16. The above deficiencies are considered to generally fall within the concerns raised by the CORR and consequently will be dispositioned as an OFI versus a finding.

DSA Key Element 7-2 relates to the appropriate control of access to the Remote Handling Waste Hot Cells. As noted in the CORR, an approved procedure (05-WH1724, *RH Hot Cell Complex Key Control*) is in place that implements a key control and authorization process to control access to the hot cells. During the current review it was noted WP 05-WH1724 is not included as required reading or training in the RCT qualification card process, even though RCTs play a significant role in the key issue and control process (see **TRG.1-POST-3**).

4. Radiological surveys and monitoring performed to support demonstrated radiological operations are effective in ensuring hazards are identified and worker exposures are evaluated and minimized. WIPP personnel (operators, maintenance staff and radiological support personnel) demonstrate sound radiological practices during demonstrations and upsets. Contamination control activities are properly planned and conducted and address potential upcasting from the underground (DSA Key Element 7-3)

Radiological monitoring and survey performance was evaluated through the direct observation of simulated and actual radiological evolutions, review of survey records, and observation of the site drill. Radiological work practices were evaluated during observations of the above evolutions.

Observed RCTs appeared conscientious in the performance of work-related radiological surveys. Frequent surveys of the immediate work area, waste containers, and worker's gloved hands were performed by the RCTs during simulated waste handling evolutions. Although some poor performance was observed, workers generally exhibited adequate radiological work and PC doffing practices during the work evolutions. Several instances were noted where RCTs corrected workers frisking too quickly.

Observations of radiological control performance during the drill identified the need for significant improvement. Although response actions in the underground appeared appropriate, deficiencies were noted in the above ground response related to inconsistent protective clothing (PC) use by responding RCTs, inconsistent survey practices, the need for improved radiological command and control at the scene, and the lack of appropriate procedures at the decontamination trailer (see **RP.1-PRE-2**).

A concern was noted with NWP's performance of job-specific air-sampling to evaluate if assigned respiratory protection was appropriate (**RP.1-PRE-3**). NWP's sampling approach relied on portable CAMs that were not positioned to provide samples representative of the worker's breathing air. The documentation of air-monitoring results also failed to meet regulatory requirements.

Additional examples of inappropriate monitoring, or the failure to evaluate and respond to monitoring results, were also noted (**RP.1-PRE-2**). These included the failure to perform weekly surveys of outside posted Radioactive Materials Areas (RMAs), and the failure to formally follow-up to elevated Area Thermoluminescent Dosimeter (TLD) readings.

SMP KE 7-1 requires CAMS to be properly placed and operated. The SBIM identifies WP 12-5 (*WIPP Radiation Safety Manual*) and TE-15-001 (*WIPP Workplace Air Monitoring Program Technical Evaluation*) as the two implementing documents for this KE. During the CORR review, it was noted that the air monitoring evaluation described in TE-15-001 required the performance of additional air flow testing to evaluate new ventilation patterns in the WHB. NWP subsequently issued TE-16-006 (*Placement of Air Monitoring Equipment in Relation to Current WIPP Ventilation Configurations*) which evaluated air-monitoring equipment placement in the underground and WHB in light of the Interim Ventilation System operation. The TE-16-006 review concluded that CAMS and passive air samplers in the underground and WHB were properly located, and indicated that any modification to the locations would require specific review and approval. It should be noted that the CAM placement issues discussed above and in **RP.1-PRE-3** relate to NWP's use of portable CAMs as job-specific air samplers, and would not affect the conclusions of TW-16-006.

All operating CAMs observed during the current review were found to be within their calibration period. It was noted during the review that new CAMs are currently being installed in the Panel 7 intake (single CAM) and exhaust drifts (redundant CAMs). These CAMs were not operational at the time of this review but are

necessary for waste emplacement. Status of these CAMs is tracked on the Manageable List of Items.

While observing the TRUPACT receipt evolution on 11/14/16, it was noted the initial receipt inspection is performed in the vehicle trap but the radiological receipt survey is not performed until after the trailer is moved to the WHB parking area. This radiological survey can consequently occur several hours after initial receipt of the trailer. Although this delay is allowed by 10 CFR 835, performing the radiological survey as part of the initial receipt would represent a more conservative approach and allow for the early identification and control of potential contamination or dose concerns.

DSA Key Element 7-3 relates to contamination controls to address potential up-casting from the underground. As noted in the review of this area in the CORR, approved WP 05-WH1724 requires CAMs be placed in specific locations and periodically surveilled when Bulkhead 308 regulator and waste hoist d/p instruments are in alarm or inoperable. During the current review it was verified that the relevant procedure (12-HP2001) is included as part of the ST Qualification Card.

5. Facilities, equipment and instrumentation needed to support the RP program are available in sufficient quantities to meet requirements. Instruments possess current calibrations.

The adequacy of WIPP facilities and equipment was evaluated during tour of the aboveground and underground facilities, including the Room 108 instrument room in the WHB; observation of instrument use during waste unloading and emplacement activities, evaluation of the facility drill (including the decontamination trailer), and interview of personnel.

No issues were identified during the above review. All in use instrumentation (installed and portable) was found to be within current calibration. Ample numbers of portable radiological instruments are generally in place; it was noted that NWP currently lacks the capability for job-specific/lapel air sampling (see **RP.1-PRE-3**).

A general concern was noted based on the reliance on hand-held portable contamination monitoring (frisking) instruments versus use of more automated hand and foot or whole body contamination monitors. NWP personnel indicated both types of instruments (hand and foot and whole body monitors) had been used in the past but suffered from significant reliability issues due to the tracking of salt debris into the monitor. Such contamination monitors have been used successfully at EM cleanup sites that suffer from similar tracking issues (dirt, gravel); NWP is encouraged to seek out potential lessons-learned that may help successful implementation of such monitors.

6. Periodic assessments of the RP program (including the bioassay laboratory) are performed to verify continued robust performance. Issues, recommendations or findings from assessments, both internal and external are tracked and resolved in a formal manner to ensure satisfactory correction and prevent reoccurrence.

Triennial audits of the Radiation Protection program to meet the requirements of 10 CFR 835.102 are performed by the QA group. Annual audits are conducted, with each audit reviewing approximately one-third of the 10 CFR 835 program. Annual QA audits of the Carlsbad Environmental Monitoring and Research Center (CEMRC), the offsite laboratory responsible for analyzing bioassay samples and performing in-vivo counting, are also performed.

Review of a sample of QA audits indicate they have a compliance focus and appear to cover the required functional elements of 10 CFR 835. More recent audits included Technical Specialists on the team, with more extensive RP backgrounds – this was noted as an improving trend and has resulted in the identification of more issues in the more recent audits. It was noted the Independent Assessment FY2017/2018 audit schedule identified the need to include Technical Specialists on the upcoming RP audits.

Audit findings are tracked through the WIPP Form system. Review of a summary listing of QA RP findings identified they appeared to be tracked and closed out within a reasonable timeframe.

The WIPP RP program has also been subjected to extensive review in conjunction with the readiness process, most recently by the CORR. It was noted that in their response to the RP portion of the CORR report, NWP developed corrective actions to both the specifically numbered findings and to negative performance comments included in the CORR report. This was viewed as a positive initiative. Examples were noted, however, in which corrective actions taken in response to CORR issues were ineffective (see Criterion 1 above) in resolving the concern.

7. Corrective actions have been developed and effectively implemented for RP program deficiencies identified as a result of the 2014 release.

The Accident Investigation Board (AIB) Report associated with the 2014 radiological release identified several broad Judgements of Need (JONs) specific to the area of Radiological Controls. Corrective actions were developed by NWP to address the concerns reflected in the JONs. Discussion with cognizant NWP personnel identified all corrective actions associated with the Radcon JONs (specifically JONs 33, 34 and 37) have been closed and validated by NWP, with closure approval by the Carlsbad Field Office (CBFO). It was noted no corrective action effectiveness reviews were explicitly planned as part of the closure validation process; instead NWP indicated they were relying on reviews performed in association with the readiness process (Management Self-Assessment, CORR, ORR) to provide that effectiveness determination.

Review of corrective action closure packages for JON 37 actions 4 and 5 identified all cited closure documentation was contained in the package, as well as documentation of NWP validation and CBFO closure approval.

Concerns identified during the ORR indicate corrective actions were not completely effective in resolving identified deficiencies. Jon 37 Action 4, for example, required the development of a technical basis for monitoring airborne radioactivity in the underground. Review of the resulting technical basis document identified it discusses grab-air sampling and lapel air-sampling as means to perform job-specific and breathing zone sampling; it was noted during this review that these capabilities are not being effectively implemented (**RP.1-PRE-3**).

JON 37 Action 5 required NWP to assess the proficiency of the Radiological Control Organization management and staff. As a result of the action, the entire Radiological Control Organization went through the RCT core technical training. Level of knowledge concerns among RP staff were noted, however, during both the CORR and this ORR, indicating this corrective action was not fully effective.

8. The RP program was adequately evaluated by the CORR.

Review of the RP section of the CORR report identified the review as being broad in scope, critical in its level of review, and successful in identifying a significant number of issues requiring resolution. Given the level of the CORR review, this assessor was able to rely on the conclusions of the CORR evaluation of specific areas (such as the program technical basis and ALARA program documents and implementation) with confidence, and was consequently free to focus on other areas (increased time evaluating work evolutions).

CONCLUSION

The WIPP RP program is adequately established and documented in procedures, and fundamental program elements are in place. Instrumentation and RP facilities were generally adequate to support work activities. All observed in-use radiological instrumentation was within calibration. Posting and labeling of radiological areas and facilities was generally effective.

Observation of simulated waste handling and emplacement activities identified surveys to support the activity were generally being conscientiously performed. Workers entering radiological areas were found to be appropriately training and qualified. Although some deficiencies were observed, workers generally exhibited adequate radiological work and protective clothing doffing practices.

A number of deficiencies were identified during the review, however, that negatively impact the effectiveness of overall Radiological Control performance. Organizationally, issues were identified with staffing of RCTs and RCSs, the clear definition of roles

between the various categories of radiological technicians, and the proficiency/level of knowledge of radiological technicians. Elements of the radiological call in process were noted to be informal and did not ensure a consistent and timely level of radiological response.

Multiple examples of procedural noncompliance were identified during the review. These violations were of varying significance; however their number highlights the need to improve staff knowledge of and adherence to procedures, and the level of supervisory review. Air-monitoring practices related to work requiring respiratory protection were also identified as not meeting regulatory requirements.

Radiological control performance during emergency response drills continues to be an area of deficiency. Some improvements were noted during the most recent drill; however continuing performance issues were observed. NWP drill evaluators provided a critical review of Radcon performance during the recent drill, representing an improvement from prior exercises.

It was noted that specific issues identified during the current review (RCT level of knowledge, lack of defined roles and functions for the radiological technician categories) were also identified during the prior CORR review. NWP corrective actions taken to address the prior concerns consequently appear inadequate to fully address the concern.

Due to the number of issues identified, DOE has determined the RP objective has not been met.

Issue(s)

RP.1-PRE-1: NWP does not have an effective process in place to ensure a timely and appropriate level of response to potential radiological events.

RP.1-PRE-2: Multiple deficiencies in radiation protection personnel proficiency, procedural compliance and the level of knowledge of some RCTs were noted, directly impacting observed radiation protection performance.

RP.1-PRE-3: NWP radiological air-monitoring practices do not meet 10 CFR 835.403 requirements for air-monitoring.

RP.1-OFI-1: Examples were noted of RP procedural inadequacies (lack of specific detail or guidance, not reflective of actual practice, lack of procedural reference to included tables).

RP.1-OFI-2: Review of selected RWPs identified a number of deficiencies and internal inconsistencies, indicating the need for improvement in RWP quality.

Evaluated by:	**Approved by:**
/s/ Tony Weadock, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Review Form 1

Functional Area:	Objective:	Objective Met	
Training	TRG.1	Yes [X]	No [ ]

OBJECTIVE

TRG.1: The selection, training and qualification programs for managers, supervisors, operations and operations support, and maintenance personnel have been established, documented, and implemented. The selection process and applicable position-specific training for managers assures competence commensurate with responsibilities. (The training and qualification program encompasses the range of duties and activities required to be performed.) Modifications to the facility have been evaluated for impacts on training and qualification. **(Core Requirements 1, 2, 3, 14, and 15)**

CRITERIA

1. Training and qualification programs have been developed and adequately implement the requirements of DOE Order 426.2 for managers, supervisors, operators, support staff, and maintenance personnel. A training implementation matrix (TIM) has been developed and approved. Responsibilities for the training program and its interfaces with WIPP project are defined and understood.
2. The training organization has developed and provided training for WIPP staff based on the tasks required for competent job performance, and personnel are not permitted to perform duties independently until the required training is complete. (DSA Key Element 12-3).
3. Training for managers, supervisors, operations, operations support, and maintenance personnel includes: normal, off-normal operations, and emergency situations; facility hazards, controls, and safety basis requirements. (DSA Key Element KE 12-2).
4. Training for operations, maintenance, operations support and contract personnel emphasizes the importance of compliance with procedures and safety requirements.
5. Training has been completed by a sufficient number of managers, supervisors, operators, operations support personnel and maintenance personnel to safely operate and maintain the WIPP facility.
6. Requirements for continuing training have been adequately defined to ensure that operating organization personnel will continue to enhance their knowledge and skills and address emergent conditions such as Evaluation of the Safety of the Situation documents. (DSA Key Element 12-3).
7. Facility modifications have been evaluated for any impacts on training and qualification (if any). Impacts that were identified have been incorporated into the training program.

8. Training personnel possess the knowledge and experience to effectively implement the training program. Sufficient numbers of qualified training personnel and supplemental training resources are available to meet WIPP training requirements.
9. Periodic assessments of the training program are performed to verify continued robust performance. Issues, recommendations or findings from assessments, both internal and external are tracked and resolved in a formal manner to ensure satisfactory correction and prevent reoccurrence.
10. This functional area was adequately evaluated by the CORR.

APPROACH

Record Review:

- Review the TIM and training program documents for adequacy. Review lesson plans to ensure training is reflective of ongoing and planned operations, is consistent with procedures and facility configuration. Review a sampling of personnel training records for WIPP personnel to ensure required training has been completed satisfactorily. Verify that training for abnormal and emergency situations is provided to all personnel and is reflective of their individual responsibilities. Review staffing plans and position descriptions for the training organization. Review the continuing training program for adequacy and its implementation of Key Element 12-3. Review position descriptions for WIPP management personnel. Review a sampling of qualification cards for personnel determined requiring a formal qualification. Review documentation for on-the-job training. Review the analysis of any facility modification to determine the training impacts identified (if any). Review any recent assessments of the training program, associated corrective actions plans, and closure documentation.

Interviews:

- Interview training personnel to determine their level of knowledge of the WIPP training program, including continuing training. Interview training management personnel to discuss the program and staffing. Ascertain the level of knowledge of managers, supervisors, operations, operations support, and maintenance personnel from the other functional area Team members.

Shift Performance:

- Observe classroom training, job-specific training (e.g., mockup training if available), and continuing training, if available. Observe evolutions/drills and/or coordinate with the Operations evaluator to assess the technical knowledge and ability of the operators and supervisors to conduct their duties and to safely operate systems and components in accordance with approved plant procedures.

Records Reviewed

- NWP Contract DE-EM0001971
- DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis, Rev. 5b*

- DOE O 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*
- WP 14-TR.01, *WIPP Training Program, Rev. 17*
- WP 14-TR3301, *Administrative Review Board, Rev. 5*
- WP 14-TR3005, *Preparation, Administration, and Grading of Examinations, Rev. 8*
- WP 14-TR3008, *Analysis and Design, Rev. 4*
- WP 14-TR3004, *Training Development, Rev. 15*
- WP 14-TR3305, *Instructor Qualification, Rev. 13*
- WP 14-TR3307, *Qualification Programs, Rev. 8*
- WP 14-TR3308, *On-the-Job Training, Rev. 14*
- WP 14-TR3309, *Training Evaluation, Rev. 6*
- WP 14-TR3310, *Training Determination, Rev. 2*
- WP 14-TR3311, *Vendor Training,* Rev. 0
- WP 14-TR3312, *Exceptions/Equivalencies and Extensions, Rev. 0*
- WP 14-TR3313, *Conduct of Oral Boards, Rev. 1*
- WP 05-WH.04, *WIPP Waste Handling Operations Training Program Plan, Rev. 1*
- WP 12-RC.02, *WIPP Radiological Control and Dosimetry Department Training Program Plan, Rev. 1*
- WP 12-NS.09, *WIPP Nuclear Safety Training Program Plan, Rev. 1*
- WP-12-NS.10, *WIPP Nuclear Criticality Safety Training Program Plan, Rev.0*
- WP 09, *Conduct of Engineering, Rev. 42*
- WP 09-CN.08, *WIPP Cognizant System Engineer Training Program Plan (Safety Significant Systems), Rev. 1*
- WP 04-AD.12, *WIPP Facility Operations Training Program Plan, Rev. 1*
- WP 10-AD.02, *WIPP Maintenance Training Program Plan, Rev. 1*
- WP 12-ER3006, *Abnormal Condition Drills, Rev. 1*
- WP 02-RC4000, *Hazardous Waste Facility Permit Training Requirements Implementation, Rev. 4*
- *Task Card M-02A, LHD Bucket Addendum, Rev. 0*
- *RCT-01-1, Radiological Control Survey Technician Qualification Card*
- *RCT-01-2, Radiological Control Air Monitoring Technician Qualification Card*
- *RCT-01-3, Radiological Control Technician Qualification Card*
- *FO-ADM-03, Administrative Requirements –Work Authorization Task Card*
- *FO-ADM-01, Administrative Requirements-Equipment Lockout/Tagout Task Card*
- WP-CO.01-5, *Conduct of Operations Program-Control of On-shift Training, Rev. 5*
- SAF-502, Annual Underground Refresher, Rev.13
- MP 1.40, *Management and Supervisor Training and Qualifications, Rev.5*
- MP 4.7, *Alternatives to Education and Experience Requirements, Rev.6*
- *NWP Management Position Descriptions for various TIM Management Positions*
- GET-216B, General Employee Training, Rev. 1
- WP 12-9, *WIPP Emergency Management Plan, Rev 43*

- WP 12-ER.13, *WIPP Drills and Exercises, Rev. 2*
- WP 12-FP.04, *WIPP Fire Department Training Plan, Rev. 2*
- WP 12-17, *WIPP Emergency Management Training Program, Rev.3*
- Selection of Qualification Cards for various EOC positions
- SBD-101, *DSA/TSR Training Plan*
- *Inter-Office Correspondence FC:16:00211, Authorization to Conduct Training on WIPP DSA/TSRs*
- *Technical Training Report of Training for SBD series of Training (101, 102, 103, 105, 201, and 202)*
- *Lesson Plans, Student Handouts, Presentation for SBD 101, 102, 103, 105, 201, and 202*
- *Process and Plan for the Evaluation and Upgrade of the RC&D Department Training and Qualification Program*
- *Radiation Control Technician Core Fundamentals Training Program*
- *2016 RCT Continuing Training Plan*
- *TRG-293, Lesson Plan and Student Handouts and Qualification Card for SME Training (OJT/OJE Level I Instructor)*
- *Radiation Worker 101/201, Radiation Worker Training Lesson Plan and student handouts*
- *November Training Calendar November 2016*
- Letter FC: 16:00069, *Justification for approval of Employees who do not meet education and experience requirements in the WIPP TIM and NWP MP 4.7 but overall balance of the workforce is sufficient to allow placement.*
- *HR NWP Headcount and Staffing Status as of October 27, 2016*
- *NWP Exempt Progression List effective date January 1, 2014*
- *Position description for NWP Training staff*
- *Various training history reports for personnel in TIM positions*
- *Task Cards for various NWP Positions*
- *CCR documentation for Senior IH (Senior Scientist B)*
- *Draft RCT Job Performance Measures (JPM) Watch Stander List*
- *Draft FO Task Watch Stander List*
- *Various RCT Task Cards JPM's*
- *NWP Organizational Charts*
- CL 2.05, *4th Quarter RCT continuing Training Lesson Plan, Student Handouts, and Instructor Notes*
- FO-Guide-1, *Facility Operations Watch Station Qualification Card Guide Book, Rev.11*
- *MO-UGRW-4, Underground Roving Watch Initial Qualification Signature Card and Guide Book, Rev. 11*
- *Various Training Web Page Qualified Watch Standers Lists*
- *Facility Operations Comprehensive Exam and Answer Keys- Roving Watch, Facility Shift Manager/Facility Shift Engineer, and Central Monitoring Room*
- *CORR and MSA final Reports*
- *WIPP Form 15-599, Management Self-Assessment for WIPP Training Program*

- *WIPP Form 15-605, Management Self-Assessment for WIPP Training Program*
- *Management and Leadership Academy April 4-29 Outline*
- *WP 15-CA1002 Training Self-Assessment issues*
- WP MA-TT-2015-02, Independent Management Assessment NWP Technical Training Program, June 2015
- FO-RW-1, *Qualification Card for NWP Surface Roving Watch, Rev. 11*

Interviews Conducted by DORR Team

- NWP Training and Procedures Manager
- NWP Procedures Manager
- NWP Operations Training Manager
- NWP Level I Instructors
- NWP Level II Instructors
- NWP Level III Instructors
- NWP Radiological Controls and Dosimetry Manager
- NWP Work Control Manager
- NWP Nuclear Safety Manager
- NWP Quality Assurance Manager
- NWP Maintenance Manager
- NWP Environment, Safety and Health Manager
- Associate Operations Engineer
- Backup Training Coordinator
- Training Records Coordinator
- NWP Human Resources, Manager of Compensation and Staffing
- NWP Deputy Project Manager
- Bolters
- Electrical Maintenance
- Mechanical Maintenance
- Radiological Control Technicians
- Fire Chief
- Fire Department Chief of Training
- Deputy Manager for Emergency Management and Security
- Roving Watch Operators
- Waste Handlers
- Emergency Response Organization personnel
- Supervisors

Shift Performances Observed

- 4th Qtr. RCT Continuing Training, 11/16/2016 (Cancelled due to RCT's needed in the plant)
- OJT/OJE Training, 11/17/2016 (Cancelled due to nobody signed up)
- Facility Operations focused mentoring evolutions on Equipment LO/TO and Work Authorization
- Radiation Worker I, Test-out and Practical Exam

- Pre-Job briefing for Contact Handled- Waste Handling
- Daily briefing for the Bolters
- GET training – (DORR Team)
- SAF-502, Annual Underground Refresher (DORR Team)
- GET-301- Initial Training Video to the SWB- (DORR Team)
- Pre-Exercise Briefing 11/17/2016
- WIPP Emergency Exercise 11/18/2016

Discussion of Results

1. **Training and qualification programs have been developed and adequately implement the requirements of DOE Order 426.2 for managers, supervisors, operators, support staff, and maintenance personnel. A training implementation matrix (TIM) has been developed and approved. Responsibilities for the training program and its interfaces with WIPP project are defined and understood.**

   The NWP contract contains the requirement to implement DOE O 426.2, Personnel Selection, Training, Qualification, and Certification Requirements for a DOE Nuclear Facility. Based on a review of the WIPP Documented Safety Analysis (DSA), WIPP is a Hazard Category 2, non-reactor nuclear facility. Per DOE O 426.2, NWP is required to submit a Training Implementation Matrix (TIM) to the head of the Field Element for review and approval. WIPP has a current TIM, revision 10, which was concurred on by the Carlsbad Field Office (CBFO) on 9/30/2015, along with the MP 4.7, *Alternatives to Education and Experience Requirements*. **(This issue is further discussed in DOE.2-POST-3)** The TIM was updated in October of 2016 based on corrective actions from the Contractor Operational Readiness Review (CORR). The updated TIM, revision 11, was approved by NWP Management on 11/2/2016 and submitted to CBFO for review and approval on 11/7/2016. Several implementing documents identified in the updated TIM were approved by NWP management and became effective between November 2 and November 13, 2016. The current and pending TIM revisions were reviewed to determine if the documents adequately implement the requirements of DOE O 426.2. Both documents were compared against with the requirements contained in the DOE O 426.2 Contractors Requirements Document (CRD), Chapters I and II, for a Hazard Category 2, non-reactor nuclear facility. During the documents review, several instances were identified where neither revisions of the TIM adequately addressed the order requirements.

   These included but were not limited to:

   - TIM Section 1.6 – "Training Organization" identifies that the WIPP Technical Training program responsibilities are documented in WP-14-TR.01, *WIPP Training Program*, which is an implementing document that is approved by NWP management only. *DOE Order 426.2 requires that the TIM must clearly define the organization, planning, and administration of the program and set forth the*

responsibilities, authority, and methods for conducting training. Per DOE O 426.2, the TIM is required to be approved by DOE Head of the Field Element. The current and pending TIMs do not clearly define the organization, planning, and administration of the program or set forth the responsibilities, authorities, or methods for conducting training. These requirements are contained in documents outside the TIM and are not reviewed and approved by the DOE head of the field element. By handing off to other documents that implement these requirements that are modified by the contractor without DOE review and approval, this process bypasses the requirement for review and approval by the DOE Head of the Field Element (**TRG.1-POST-1)**.

- Rev. 10 of the TIM, Table DOE O 426.2 CRD Chapter I, 4 a (5), identifies that the applicability is "yes" with an implementing mechanism of 14 TR.01 and section of WP 14 TR3004. In Rev. 11 of the TIM, this same requirement is noted with an Implementing Mechanism of 14-TR-3004 and has applicability as "no" with a note that there are no certified positions at the WIPP facility. *This requirement is applicable to all nuclear facility positions where job functions require team solutions and is not specific to just certified positions.*

- In both revision 10 and 11 of the TIM, Table DOE O 426.2 CRD Chapter II, 6 c, and 6 d(1) and 6 d (2) have applicability listed as " no", with comments that "There are no Fissionable Material Handlers at the WIPP." *These requirements are applicable to all nuclear facility positions of operations supervisors and operations management personnel.*

- There are some positions at NWP that could affect the nuclear safety of the facility that are not included in the TIM tables. Some of these positions have formal training and qualification programs developed (Packaging and Information Systems, Waste Confirmation Technicians & Work Planers) while others (Industrial Hygienists/Safety Professionals) are not.

A review of WP 14-TR-01, which is identified as the implementing mechanism in many of the order requirements in the TIM Table, contained language that had been "softened." "Must" had been changed to "may" in some instances. For example, in Step 5.0 of WP 14-TR-01, verbiage was softened from a "must" statement in the order to a "may" statement in the procedure; the procedure states: "General Training may consist of, but not be limited to classroom instruction . . ." This is not consistent with DOE O 426.2, which states: ". . . that Training must consist of, but is not limited to . . ."

During the document reviews, it was also noted that Section 13.7 of WIPP Document 14-TR.01, *WIPP Training Program*, does not adequately implement the DOE O 426.2 Attachment, Chapter 2, Section 6 (a) requirement. WP 14-TR.01, *WIPP Training Program*, section 13.7 states "Operators will be trained and qualified to perform their assigned tasks. Training will include such subjects as industrial safety, operating experience, and facility systems." Section 13.7 eliminated the rest of the

core of subjects identified in DOE O 426.2, (For example, instrumentation and control, basic physics, and chemistry), and did not address any topics specific to the WIPP operations positions as should have been identified in the analysis phase of the Systematic Approach to Training (SAT). The initial Job Task Analysis (JTA) for the Facility Operator positions that were conducted in 1996 included a statement that fundamentals training needed to be developed. The lack of identifying fundamentals training was additionally identified in a June 2015 Training Assessment. During a discussion with the WIPP Training and Procedures Manager and the Operations Training Manager and a review of the WIPP form that addressed this issue, it was identified that Systems Training was being developed to address the June 2015 finding and would be complete by July of 2017. It was also stated during interviews that applicable fundamentals training was imbedded in the qualification cards and task cards for the positions. From a review of a sampling of the Training Program Plans, the Job Task Analysis (JTA), the task and qualification cards, and written exams, fundamental core subjects like basic physics, chemistry, instrumentation and control, thermodynamics and fluid flow, mechanical systems, material science, etc., (the foundation for operations training programs) are not being addressed. (**TRG.1-POST-2)**

Training Program Plans have been developed and implemented for most of the positions identified in the TIMs. There was no identified Training Program Plan for Operations Manager or Manager Positions

Document reviews and interviews were conducted to determine the process used to ensure Managers, as identified in the WIPP TIM, are evaluated and complete facility specific training prior to assuming the duties of the assigned position. The WIPP TIM states that this requirement is implemented in the HR Job descriptions. The manager job descriptions were reviewed and determined that they do not contain a comparison of the individual's background and abilities with the responsibilities and duties of the position and no needed training is identified. From a discussion with the Training and Procedures Manager it was stated that MP 1.40 implements the Management and Supervisor Training Qualification process. This process allows the candidate two years to complete this training. Further discussions revealed that the review was done informally, is undocumented, and was based on what the manager's manager and the training manager thought the new manager needed. Discussions with some managers indicated that their facility specific training was GET training. Discussions with other managers indicated that they received facility specific training on the DSA/TSRs and would get additional training as part of the Leadership Academy.

No documented evidence was provided that a formal review has been conducted to determine what facility specific training is needed for the various managers that are identified in the WIPP TIM. (**TRG.1 -POST-3)**

All Managers received extensive training on the DSA/TSR's as part of implementation of the new revision to these WIPP documents.

2. The training organization has developed and provided training for WIPP staff based on the tasks required for competent job performance, and personnel are not permitted to perform duties independently until the required training and qualification is complete. (DSA Key Element 12-3).

The NWP training organization supports facility line management in the development of training programs to meet DOE O 426.2 requirements. Training Program Plans have been developed and are in various stages of implementation for Facility Operations, Waste Handling, Engineering, Nuclear Safety, Criticality Safety, Maintenance, Radiological Controls, and Firefighters. The Emergency Response Organization has also developed a Training Program Plan that covers all of its ERO positions. Training and qualification of WIPP Managers is described in Management Policy MP-1.40.

10-AD.02 establishes the Training Program Plan for Maintenance Personnel. The Maintenance training program is undergoing a major overhaul, and is the first program to utilize the new Vision Software to document its Job and Task Analysis. NWP Level III instructors are currently going through all of the preventive maintenance work packages, historical JTA documentation, and reports and have loaded over 672 maintenance tasks into the database. Discussions with the Vision Administrator (a Level III Instructor) indicated that they started with the maintenance positions because their training programs were in the worst shape and needed validating. The Vision database is a software program that ties the analysis, design, learning objectives, training, and testing (Exam Questions tied to learning objectives), together for a specific Training Program. Once the task lists are complete and validated, the maintenance training program will be updated, training material developed/modified, qualification cards updated, and exams updated.

During interviews, electrical and mechanical maintenance personnel were able to adequately describe their training and qualification programs, answer basic hazard and emergency response training questions, and discuss where they were in the training and qualification process. The programs described were consistent with what is contained in the Maintenance Training Program Plan. All maintenance personnel interviewed had also recently completed DSA/TSR training and could adequately discuss their nuclear safety roles and how the DSA/TSR's applied to their job function. During interviews with some Radiation Worker II qualified maintenance staff, there were some weaknesses identified in the level of knowledge on Radiation Worker fundamentals such as frisking height and speed of frisking when leaving a contamination buffer area. (**TRG.1-OFI-1)**

WP 12-RC.02, *WIPP Radiological Control and Dosimetry Department Training Program Plan,* establishes the training and qualification program for Radiological Control and Dosimetry (RC&D) Department personnel, including the Radiological Control Technician (RCT) Position. RCT qualification is established as a three-step sequential process, with individuals first qualifying as a Radiological Survey

Technician (ST), then as a Radiological Air Monitoring Technician (AT), and finally as an RCT. Each step has a separate qualification card.

Discussion with Radiological Control supervision and management revealed the distinctions between the three technician qualification levels, and the types of activities they could perform, but the distinctions could only be determined by reference to the specific qualification cards. No discrete listing was maintained elsewhere in the procedures or roles and responsibilities documentation. This was done deliberately, to prevent duplication across procedures and the need to make multiple revisions if changes were required.

Discussion with Radiological Control management and staff identified the following anecdotal distinctions between the three technician categories:

- STs could perform job coverage of all radiological work activities except those involving waste handling;
- ATs could perform the activities of STs and additionally could perform air-monitoring activities (air-sampling, CAM operational checks, etc.);
- RCTs could perform the activities of STs and ATs and could also perform job coverage for waste handling activities.

Based on the above and a review of the three technician qualification cards, the following concerns were identified:

- None of the qualification cards explicitly and succinctly identified those activities the incumbent was qualified to perform upon successful qualification. Instead, the reviewer would have to glean through the list of training activities and Job Performance Measures in the qualification card, and make their own determination. This creates a system highly subject to individual interpretation and extremely difficult to manage.
- The RC&D Manager indicated the intent to start using "task qualification", where an individual could qualify to a specific task and start performing that activity prior to completion of the entire qualification card. It was noted that procedure WP 12-RC.02 does not provide for such task qualification.
- Although Radiological Control management indicated STs and ATs could provide job coverage, it was noted that the relevant site specific training (CL-2.11, Radiological Work Coverage) was only listed on the RCT qualification card. Consequently, job coverage was being performed by STs and ATs without relevant (and available) training.
- Discussion with an ST providing job coverage for bolting activities identified such coverage include air monitoring through the use of a Bladewerx CAM. Review of the ST qualification card identified no JPM dealing with the Bladewerx CAM; this JPM was only included on the later AT qualification card. Follow-up identified the ST had completed the JPM for use of the Bladewerx CAM although

it was not on his ST qualification card; however, as noted in bullet 2 above the use of a "task qualification" process was not discussed in the relevant training procedure.

Review of all three technician qualification cards identified they did not require review or training on two procedures (WP 12-HP2001 and WP 05-WH1724) necessary to implement DSA Key Elements in the radiological area.

05-WH.04, *WIPP Waste Handling Operations Training Program Plan,* describes the Waste Handling positions Training Programs and 04-AD.12, *WIPP Facility Operations Training Program Plan,* describes the Facility Operations positions Training Programs. During document reviews and interviews, it was identified that NWP had transitioned their Facility Operations qualifications to a task based process. It was noted that procedure WP 04-AD.12 does not provide for such task qualification. Reviews of approved task cards for the Roving Watch identified that there was no pre-requisite training, no required classroom training, and no required reading identified in these task cards. During an interview with the training records coordinator, it was stated that only pre-requisite training is checked for completion prior to issuing qualification and task cards. Since the task cards did not contain any pre-requisites, all task cards were issued to the new Roving Watch trainees for completion. Review of these task cards also revealed that many of the tasks in the task cards were not actually tasks. A task by definition is "a well-defined unit of work having an identifiable beginning and end which is a measurable component of the duties and responsibilities of a specific job."

Reviews of roving watch qualification and task cards and interviews with training staff revealed that a trainee could be issued all task cards for a qualification, complete all task cards for a qualification and be allowed to perform every task within a qualification card unsupervised, without ever completing the classroom knowledge courses, a comprehensive written exam, standing required qualification watches, or being approved by their management as qualified.

Note 3 of WP-14-TR3307, *Qualification Programs*, states: "Because full qualification may involve the training and evaluation of multiple tasks, a qualification candidate (trainee) once trained and signed off on a particular task or tasks may perform that/those tasks unsupervised." The tasks cards are evaluated by an On-the-Job Training (Level I Instructor/Evaluator) who signs that the trainee is able to perform the task unsupervised Based on this a trainee would be allowed to perform any task within their job qualification independently once the task card is completed and notated on the overall qualification card. This is not in compliance with the qualification process that requires passing a comprehensive written exam over all task areas to be granted qualification.

During an interview with a Senior Manager it was stated that the Task based qualification process was being implemented to allow quicker utilization of operations personnel prior to full qualification.

This process, as implemented by NWP, is not in compliance with DOE O 426.2 or WIPP DSA KE-12.3 requirements to ensure that personnel are not allowed to perform independently until qualification is complete. (**TRG.1 -PRE-1)**

3. **Training for managers, supervisors, operations, operations support, and maintenance personnel includes: normal, off-normal operations, and emergency situations; facility hazards, controls, and safety basis requirements. (DSA Key Element KE 12-2).**

   All personnel that need access to WIPP are required to take GET training for unescorted access. The self-paced GET training was taken by the DORR team and was adequately comprehensive to cover emergency situations and response. Also, personnel are issued a WIPP Fundamentals handbook that covers management standards and expectations. The GET training includes topics such as: General Employee Radiological Training, Facility emergency plans, the IS/IH program, Fire protection program, Safety signage, and Criticality safety.

   Individual qualification programs plans and implementation documents contain training on normal and off-normal operations. Also, all personnel that need access to the underground must complete various underground training. SAF-502, the 8 hour underground training, was reviewed by attending the training course. This training was given by a new trainer for this topical area, and showed a lack of proficiency in delivering this lesson plan. However the trainer was very knowledgeable in this topic area, the hazard were adequately addressed, all class participants passed the exam, and adequately donned the rescue breathing equipment.

   An Independent Verification Review (IVR,) was performed for DSA/TSRs Revision 5b controls, including TSR Administrative Control 5.3.4 and KEs 12-2 and 12-3. The IVR is documented in CA-IVR-2016-002. The IVR documented adequate implementation of these controls with the exception of 2 Findings and one Opportunity for Improvement (OFI). IVR finding F-52 related to TSR AC 5.3.4 identified the lack of a qualification for the ATTENDANT position (a TSR defined term). This was addressed in WIPP Form WF16-759. The SBD Attendant course completion report was generated on 11/12/2006 and is contained in the WIPP Training Reports web page. IVR finding F-45 identified the need for additional DSA/TSRs-related training for other non-waste handling activities (such as performance of surveillances). WIPP Form WF16-715 was generated to track this issue. A DSA/TSR training program was implemented and was focused for the various groups based on their job function and this issue was closed.

4. **Training for operations, maintenance, operations support and contract personnel emphasizes the importance of compliance with procedures and safety requirements.**

   From a review of the various training and qualification programs, and team member discussions with various operations, maintenance, RCTs, operations support, and contract personnel, training has been given and completed and reinforced by management on compliance with procedures and safety requirements. Facility operations training was observed for new Roving Watch operators and procedure compliance was emphasized in all aspects of the mentoring and training during the OJT session. Personnel were interviewed on what they would do if a procedure could not be performed as written, or a safety issue was identified and all personnel stated that they would step back and get the procedure issues fixed or the safety issue addressed before proceeding.

5. **Training has been completed by a sufficient number of managers, supervisors, operators, operations support personnel and maintenance personnel to safely operate and maintain the WIPP facility.**

   NWP has created TIM and Organizational Watch Stander Lists (QWLs) for all TIM positions with the exception of Managers and Operations Manager. Reviews of these QWL's and discussions with NWP management and the other DORR team members indicated that there are inadequate numbers of qualified personnel to safely operate and maintain the WIPP facility. This is documented in **MG.1-POST-1**

6. **Requirements for continuing training have been adequately defined to ensure that operating organization personnel will continue to enhance their knowledge and skills and address emergent conditions such as Evaluation of the Safety of the Situation documents. (DSA Key Element 12-3).**

   Continuing training requirements are included in each of the Training Program Plans. The Facility Operators complete a subset of the initial qualification card (based on the JTA analysis) as part of their continuing training and requalification process. The morning meeting for the Bolters was attended and following this meeting, Addendum Task Qualification Cards for the LWD were issued to already qualified Bolters. During discussions, this addendum was needed to address new attachments to the LWD.

7. **Facility modifications have been evaluated for any impacts on training and qualification (if any). Impacts that were identified have been incorporated into the training program.**

   NWP has developed a procedure for Training Determinations. This procedure is used to determine the level of training needed for any procedure and facility changes. The newly issued Training Procedures were reviewed to determine if this process is being

adequately implemented. All of the new procedures had a training determination form completed and the training staff had all been trained on the changes.

8. Training personnel possess the knowledge and experience to effectively implement the training program. Sufficient numbers of qualified training personnel and supplemental training resources are available to meet WIPP training requirements.

There are sufficient qualified personnel available to effectively implement the WIPP Training Programs. There are three levels of instructors specified in WP 14-TR.01. Level I Instructors (On-the-Job Trainers/Evaluators) are authorized to perform instruction on equipment that they have been trained, qualified, and competent to operate. There is a one year qualification requirement enforced prior to being qualified as a Level I instructor. Level II Instructors (Classroom Instructors) are authorized to perform instruction on topics, subject matter, and equipment for which they are trained, qualified, and competent. Level III Instructors (Technical Training Staff/Analysts/Developers) are authorized to perform in the same capacity as a Level II instructor, and are additionally authorized to perform and implement the Systematic Approach to Training (SAT) process.

Technical Training maintains QWLs for each of these positions on their website. The QWLs show adequate numbers of qualified personnel to implement the training program. One area of interest is the limited number of Level 1 (OJT/OJE) in the RCT organization. Currently there are only 8 qualified RCTs, and interviews with personnel in the ST and AT progressions to RCT have indicated that it is very difficult to get time with a RCT Level I instructor to make progress on their qualification because the qualified RCTs are in constant demand to cover jobs. Interviews with Training management indicated that their RCT Level III Trainer would be available to pick up some of the Level I OJT workload.

Interviews indicated that current staffing of Level II and Level III instructors is adequate to meet ongoing training needs, but requires current funding levels to be maintained in order to accomplish this. Staffing plans for FY16 and FY17 were provided. Workload for some individuals is high primarily because of the increased training needs driven by a larger WIPP workforce during the recovery. The Technical Training organization continues to meet the training needs of the WIPP organization and planned staffing is adequate to support those needs.

9. Periodic assessments of the training program are performed to verify continued robust performance. Issues, recommendations or findings from assessments, both internal and external are tracked and resolved in a formal manner to ensure satisfactory correction and prevent reoccurrence.

Assessments were conducted by NWP in June of 2015 utilizing the criteria contained in DOE STD-1070-94, *Criteria for the Review of Nuclear Facility Training Programs.* Additionally the Office of Environment, Safety and Health Assessments

(EA), conducted an assessment in October of 2015 using select criteria from DOE STD-1070-94 and issued one finding (F-NWP-2015-01) NWP) did not adequately ensure respirator qualifications through its job performance measures as required by DOE O 426.2.. All issues from these two assessments were entered into WIPP forms and are being corrected or tracked to closure.

10. This functional area was adequately evaluated by the CORR.

The CORR did a thorough evaluation of the Implementation of Training and Qualification programs in effect at the time of their review. It was of adequate depth and breadth. However the CORR team failed to recognize major deficiencies in the TIM that was concurred on by CBFO. The TIM did not contain the needed elements of a TIM and WP 14-TR.01 should actually be part of the narrative section of TIM and not modified without DOE CBFO review and approval. The CORR also failed to recognize that the DSA chapter 12, Conduct of Normal, Abnormal, and Emergency Operations states that training methods for normal, abnormal, and emergency operations and qualifications are described in the TIM; however they are actually described within the implementing documents to the TIM. This issue is currently address in **TRG.1-POST-1**

CONCLUSION

Based on document reviews, interviews and observation of activities, the selection, training and qualification programs for managers, supervisors, operations and operations support, and maintenance personnel have been established and documented and the training and qualification programs for most positions encompass the range of duties and activities required to be performed. Modifications to the facility have been evaluated for impacts on training and qualification and modifications are made to the training and qualification programs accordingly.

The task qualification process recently implemented for some operations positions and RCTs' does not ensure DSA KE-12.3 (Management shall ensure that personnel are not permitted to perform assigned duties independently until requisite training and qualification is completed) is met, and the operations training programs reviewed lacked core fundamental subjects (basic physics, chemistry, instrumentation and control, thermodynamics, heat transfer, and fluid flow, mechanical systems, and material science, etc.), to ensure adequate base knowledge. The selection process used for manager positions is adequately implemented through the Human Resources (HR) process; however there is no formal process to identify the applicable position/facility-specific training needed for managers prior to them assuming their job function/making decisions that could affect the nuclear safety of the facility.

Many of the training programs and implementing procedures underwent major rewrites and were just approved the week before the DORR team arrived. Several of these programs are in various stages of implementation. Revision 11 to the WIPP TIM has

been approved through WIPP management but has not been reviewed or approved by CBFO. The WIPP Training Implementation Matrix (TIM), both the currently approved document and the revision that is at CBFO for review and approval, along with several of the implementing documents do not adequately address all DOE O 426.2 requirements.

Issue(s)

TRG.1-PRE-1: Some Operators and Radiological Control Technicians (RCTs) are being qualified through an NWP task-based qualification process that does not ensure compliance with DSA KE 12-3 and DOE O 426.2 requirements.

TRG.1-POST-1: The WIPP Training Implementation Matrix (TIM), both the currently approved document and the revision that is at CBFO for review and approval, do not adequately address all DOE O 426.2 requirements.

TRG.1-POST-2: Operator training programs are not sufficiently comprehensive to cover all areas which are fundamental to their assigned tasks as required by DOE O 426.2.

TRG.1 -POST-3: NWP does not have a formal process to ensure that Managers are evaluated against their job responsibilities and complete facility specific training prior to assuming the duties of the assigned position as required by DOE O 426.2.

TRG.1-OFI-1: During interviews with Radiation Worker II qualified maintenance personnel, there were some weaknesses identified in recalling frisking height and speed of frisking when leaving a contamination buffer area.

Evaluated by:	**Approved by:**
/s/ Julie Finup, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Plant
Review Form 1

Functional Area: WASTE ACCEPTANCE COMPLIANCE	**Objective:** WA.1	**Objective Met**	
		Yes [ ]	**No [X]**

OBJECTIVE

WA.1: The contractor's WIPP Waste Acceptance Criteria (WAC) Compliance Program, including the Enhanced Acceptable Knowledge (AK) Program, has been developed and implemented for receipt of CH Waste at WIPP. The enhanced chemical compatibility evaluation process for the waste currently stored in the Waste Handling Building (WHB) has been developed and implemented, and is adequate to support release of that waste for emplacement in the underground. (Activities performed as part of the WIPP certification program and authorized waste certifiers' activities (both CCP and those located at generator sites) will be evaluated via a separate review.)
(Core Requirements 2, 4, 6, 9, and 15)

CRITERIA

1. Functions, assignments, responsibilities, and reporting relationships are clearly defined, understood, effectively implemented, and enable adequate execution of the WIPP enhanced acceptable knowledge program.
2. WIPP WAC Compliance Program DSA Chapter 18 requirements and TSR Administrative Controls (i.e., Key Elements 18-1, 18-2, 18-3, 18-4, and 18-5) are appropriately flowed down into the implementing procedures.
3. WIPP WAC Compliance Program DSA Chapter 18, Sections 18.6, *Upon Receipt at WIPP,* and 18.8, *Previously Certified Waste Preclusion of Shipments*, are appropriately flowed down into the implementing procedures and have been appropriately implemented for waste in the WHB.
4. All previously certified waste streams are controlled via the Waste Data System, or other sufficiently robust process, to prevent placement in the underground until all enhanced acceptable knowledge reviews have been satisfactorily performed.
5. Documentation exists that demonstrates the enhanced chemical compatibility evaluation has been adequately performed for at least two of the waste streams currently resident in the WHB.
6. Sufficient numbers of qualified personnel are available to effectively implement the WIPP WAC Compliance Program at WIPP including enhanced chemical compatibility reviews for waste currently at the WHB and the MAR statistics for waste certification for future shipments.
7. TSR LCO 3.7.1 and associated Surveillances have been appropriately implemented and sufficient numbers of qualified personnel are available to effectively implement these requirements.

8. The training and qualification of personnel responsible for managing, performing, and approving chemical compatibility evaluations for waste currently at the WHB and performing MAR statistical evaluations for waste certified for future shipment to WIPP is adequate to implement those elements of the WIPP WAC Compliance Program. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.
9. Accident Investigation Board (AIB) Judgments of Need (JONs) related to WAC Compliance Program have been verified by the site to be addressed through effective corrective actions.
10. The waste acceptance compliance program was adequately evaluated by the CORR.

APPROACH

Record Review:

- Review NTP documentation and procedures that implement the DSA/TSR Key Elements to ensure flow down of requirements. Ensure procedures and program documents adequately define responsibilities and authorities for waste acceptance. Review the process and procedures that preclude unaccepted waste from being placed in the underground or accepted on site. Review documentation that demonstrates the waste currently stored in the WHB has been appropriately evaluated for emplacement in accordance with the requirements of the current DSA/TSR or are controlled to prevent placement in the underground. Review the current staffing plan for NTP activities performed in Carlsbad relative to enhanced chemical compatibility evaluations for waste currently at the WHB. Review corrective action plans and closure documents for AIB JONs relative to waste acceptance. Review sampling of personnel training records to demonstrate initial and refresher training. Review the CORR final report for its review of this objective.

Interviews:

- Interview personnel responsible for the managing the NTP's waste acceptance process. Interview personnel responsible for performing the enhanced chemical compatibility evaluation of the waste currently stored in the WHB to verify their knowledge and understanding of the DSA requirements and the enhanced acceptance criteria. Interview personnel responsible for ensuring that waste in the WHB that has not successfully passed the enhanced chemical compatibility evaluation cannot be moved to the underground. Interview waste handling personnel (who work in the WHB) to verify that waste that has not be recertified cannot be moved into the underground. Interview transportation personnel (who work at WIPP) to verify they will not accept waste receipts at WIPP that has not successfully completed the enhanced AK process. Interview safety basis personnel and CCP personnel to ensure clear understanding of the roles and responsibilities associated with the interface for MAR statistics evaluations.

Shift Performance:

- Observe the performance or a demonstration of the process for accepting waste at the WIPP site. Observe the performance or a demonstration of the process for removal of waste containers from shipping packages. Observe activities in the WHB to confirm waste that has not successfully completed the chemical compatibility evaluation is precluded from movement to the underground by robust measures.

Records Reviewed:

- Acceptable Knowledge Source Document Summary for Waste Stream SR-221H-PUOX, dated April 25, 2016
- CBFO Review of NWP Corrective Action Objective Evidence – P2Jon#7 – AIB Report: Radiological Release Report – Action #5, CBFO approval dated 6/22/16
- CBFO Review of NWP Corrective Action Objective Evidence – P2JON#7 – AIB Report: Radiological Release Report – Action #4, CBFO Approval date 4/9/16
- CBFO Review of NWP Corrective Action Objective Evidence – P2JON#7 – AIB Report: Radiological Release Report – Action #3, CBFO Approval date 7/1/16
- CBFO Review of NWP Corrective Action Objective Evidence – P2JON#7 – AIB Report: Radiological Release Report – Action #2, CBFO Approval date 12/5/2015
- CBFO Review of NWP Corrective Action Objective Evidence – P2JON#7 – AIB Report: Radiological Release Report – Action #1, CBFO Approval date 4/7/16
- CCP Mobile Loading Unit (MLU) Transportation Personnel – List of Qualified Individuals (LOQI) – dated 11/17/2016 3:34 pm
- CCP Wastes Stream to be Re-evaluated per CCP-TP-005, Rev. 27 – Draft for Internal Use Only, Rev. 2
- Central Characterization Program Acceptable Knowledge Summary Report For Savannah River Site Waste Stream SR-221H-PuOx, CCP-AK-SRS-21,
- E-mail from Ed Gulbransen to Veronica Ballew, dated Friday, October 28, 2016 2:52PM – CBFO Hold Tag Removal Approval.pdf - to remove the QA Hold tags from waste containers in waste streams ID-RF-S3114 and SR-221 H-PuOx in the WHB
- IMPS WF16-1739 – Issue details
- Issue 27 – CRAD WA-1 – DORR Potential Issue Response Written discussion handed out at meeting on 11/16/16
- Letter Donald C. Gadbury to Ms. Gonzales, Approval of Hold Tag Removal from Waste Containers in Waste Streams ID-RF-S3114 and SR-221H-PuOx Currently Stored in the Waste Handling Building at the Waste Isolation Pilot Plant, dated October 6, 2016
- Letter from Donald C. Gadbury to M.P. Gonzales, Approval of Hold Tag Removal from Waste Containers in Waste Streams ID-RF-S3114 and SR-221H-PuOx Currently Stored in the Waste Handing Building at the Waste Isolation Pilot Plant, dated October 6, 2016
- Letter from Donald C. Gadbury to Ms. Gonzales, Approval of Hold Tag Removal from Waste Containers in Waste Streams ID-RF-S3114 and SR-22 H-PuOx

Currently Stored in the Waste Handling Building at the Waste Isolation Pilot Plant, dated October 6, 2016

- Letter from Donald C. Gadbury, CBFO to Ms. M.P. Gonzales of NWP, Approval of Hold Tag Removal from Waste Containers in Waste Streams ID-RF-A3004 and SR-221H-PuOx Currently Stored in the Waste Handing Building at the Waste Isolation Pilot Plant, dated October 6, 2016
- Letter from L.R. Stroble to Ed Gulbransen, CBFO Concurrence of Chemical Compatibility Evaluation Memorandum for Waste Stream ID-RF-S3114 AK Source Document C531, dated April 1, 2016
- Letter from L.R. Stroble to Ed Gulbransen, CBFO Concurrence of Chemical Compatibility Evaluation Memorandum for Waste Stream SR-221H-PuOx, dated March 28, 2016
- Letter from Vicki Diane Snow to Mr. Breidenbach, Contract DE-EM0001971 – Nuclear Waste Partnership LLC – Contracting Officer Direction to Hold Taking Action Until Further Notice on CBFO Letter No. CBFO: TSTD: VS: MT; 15-1174: UFC: 5900.00, dated February 2, 2016, Titled Contracting Officer Direction Letter for Placing All Currently Certified TRU Waste Containers in the "Holder Cert" Category in WDS, dated February 4, 2016
- Letter from Vicki Diane Snow to Mr. Breidenbach, Contract DE-EM0001971 – Nuclear Waste Partnership LLC – Contracting Officer Direction to Place all Currently Certified TRU Waste Containers in the "Holding Cert" Category in WDS, with the Exception of Certified Waste for Shipping Site INL, dated February 11, 2016
- Letter J.R. Stroble to Ed Gulbransen, CBFO Concurrence of Chemical Compatibility Evaluation Memorandum for Waste Stream SR-221H-PuOx, dated March 28, 2016
- Letter J.R. Stroble to Ed Gulbransen, CBFO Concurrence on Chemical Compatibility Evaluation Memorandum for Waste Stream ID-RF-S3114 AK Source Document C531, dated April 1, 2016
- Letter Vicki Diane Snow to Mr. Breidenbach, Contract DE-EM0001971 – Nuclear Waste Partnership LLC – Contracting Officer Direction Letter for placing all currently certified TRU waste containers in the "Holding Cert" category in WDS, dated February 2, 2016
- List of Qualified Individuals for Waste Stream Profile Form Program WSPF-01 as of 9/16/16
- List of qualified Waste Confirmation Radiographers Level 1 as of 11/17/2016
- Listing of Containers in the CH Bay of the Waste Handing Bay at the WIPP Site (Status on 11/10/2016) - Along with statement from Beverly Schrock on placement of Hold Tags on November 13, 2016and removal of tags
- Listing of Qualified SPMs as of 11/17/16
- Listing of Qualified WCOs as of 11/17/16
- MAS and CORR printout Combined Number CR 1.11.6, dated 1/17/16
- Memorandum from Jeff Harrison to Jake Knox, Waste Stream Chemical Compatibility Evaluation, dated March 16, 2016, Chemical compatibility evaluation for waste stream SR-221H-PuOx

- QA Hold Tab Log and Verification Sheet for the tags placed per WP 13-QA3004 for waste containers currently at the Waste handling Building, Rev. 15
- Request for Review and Concurrence on Chemical Compatibility Evaluation for Waste Stream ID-RF-S3114, February 10, 2016, from CCP to CBFO.
- Screen search demonstrating – Packaging Table is annotated as "Read Only" – Table: wds.packaging
- Screen Shop of Dashboard for Manual Payload Planning
- Section 3.9.3 Documented Safety Analysis (DSA) Evaluation – General - of Software Requirements Specification 09/29/2016 03:49:52 PM
- TCO listing of Qualified People dated 11/17/16
- Test of Payload for MAR statistical check – data base WWIS2-REQ-3056 – Page 245-247 of Software Requirements Specification 09/29/2016 03:49:52 PM (DSA KE 18-5)
- Waste Isolation Pilot Plant Container Data Report, Report Statistic Report Version 2.7.2 – Generated on November 16, 2016 04:35 PM, Selection Criteria Container Number: LA00000052250
- Waste Isolation Pilot Plant Reference Data Change Log Report; Report Statistics Version 2.7.1 – Generated on November 16, 2016 5:02 PM, Selection Criteria Report Content: Chemicals/Materials
- Waste Isolation Pilot Plant Reference Data Change Log Report; Report Statistics Version 2.6.1 – Generated on November 16, 2016 4:59 PM – Selection Criteria Certification Program ID % and Shipping Program ID: % Report Content all
- Waste Isolation Pilot Plant Shipment Summary Report Selection Criteria: Shipment Number LA16001 (training only)
- Waste Stream Acceptable Knowledge Assessment Memorandum, Acceptable Knowledge Assessment of containers from CCP – AK – INL – 005 waste stream ID – RF – S3114 Stored in the waste isolation pilot Plant waste handling building and the Idaho national laboratory, Carrie Johnson to Daniel Wade, March 30, 2016
- Waste Stream Chemical Compatibility Evaluation Memorandum, Chemical Compatibility Evaluation for Waste Stream ID-RF-S3114, AK Source Document C531, dated March 29, 2016
- WCPCR-01 Permittee Confirmation Representative listing of qualified people, dated 11/17/16
- WCR-01 Waste Confirmation Radiographer Level 1 listing of qualified people, dated 11/17/16
- WCR-02 Waste Confirmation Radiographer Level 2 listing of qualified people, dated 11/17/16
- WCV-01 Waste Confirmation Visual Examination listing of qualified people, dated 11/17/16
- WCV-02 Waste Confirmation Visual Examination Level 2 listing of qualified people, dated 11/17/16
- WDS Manual Payload Planning Screen Shot from WDS data base
- WDS payload MAR Limits - Payload Completion – DSA Assembly MAR Limits for CH Containers; Functional Test – Test Case 16 – Scope Item: 6

- WDS Software Requirements Specification; Generated On: 09/29/2016 03:49:52 PM
- 10 CFR 830, Subpart A , Quality Assurance Requirements
- 10 CFR 830, Subpart B , Safety Basis Requirements
- AA:16:01045, Letter Philip Breidenbach to Todd Shrader, Resubmittal of the Waste Isolation Pilot Plant Documented Safety Analysis, Rev.5a, dated April 18, 2016
- CA-2017-CORR-001, CORR Final Report for the Commencement of Contact Handled Waste Emplacement at WIPP
- CBFO MP 10.5, Peer Review, effective date January 8, 2016, Rev. 9
- CBFO MP 4.15, *The Processing of TRU Waste Acceptable Knowledge Summary Reports*, effective date June 16, 2016, Rev. 0
- CCP-PO-001, CCP Transuranic Waste Characterization Quality Assurance Project Plan, Rev. 22
- CCP-PO-002, CCP Transuranic Waste Certification Plan, effective 07/22/2016, Rev. 29
- CCP-PO-043, CCP Interface Document Preparation, dated 9/9/2015, Rev. 0
- CCP-QP-002, CCP Training and Qualification Plan, Rev. 41
- CCP-TP-005, CCP Acceptable Knowledge Documentation, Rev. 29
- CCP-TP-030, CCP CH TRU Waste Certification and WWIS/WDS Data Entry, Rev. 35
- CCP-TP-033, CCP Shipping of CH TRU Waste, NOTE: Rev. 23 is approved by CBFO waiting on the Sites to do a USQ Screen before becomes effective – revision made to implement changes per DSA, Rev. 22
- CCP-TP-200, SPM Chemical Compatibility Evaluation Memorandum and Acceptable Knowledge Assessment Review, Rev. 0
- CP: 16:01213, UFC:3420.00, Inter-Office Correspondence; from Sellmer to Hejmanowksi, Waste Information Tracking System Data Administrator Qualification Card WH-03, Rev. 9, dated November 20, 2016
- DOE Order 414.1D, Chg 1, Quality Assurance,
- DOE/CBFO 16-3568, U.S. Department of Energy Carlsbad Field Office Plan for Validating Currently Certified Waste, dated 6-1-16, Rev. 0
- DOE/WIPP 07-3372, Waste Isolation Pilot Plant Documented Safety Analysis, Rev. 5b
- DOE/WIPP 07-3372, Waste Isolation Pilot Plant Technical Safety Requirements, Rev. 5b
- DOE/WIPP-02-3122, Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant, Rev. 8
- DOE/WIPP-98-2296, Waste Isolation Pilot Plant Certification Management Plan – dated November 2014, Rev. 8
- EA16-2-1-0, *Software Screening Checklist* -- Software/Application Name: Waste Data System Version 2.7.2 Signed 10/11/16, Rev. 6
- EA04AD3001-SR47, *LCO Surveillance Data Sheet* for LCO 3.7.1 Waste Acceptability Controls for Surveillance Requirement 4.7.1.2, 4.7.1.3, and 4.7.1.4, dated May 30, 2016

- EA04AD3001-SR54, LCO Surveillance Data Sheet for LCO 3.7.1 Waste Acceptance Control for Surveillance Requirement 4.7.1.1 – (training only), dated May 30, 2016
- Generator ID #: NM080010515, Uniform Hazardous Waste Manifest – Tracking Number 010784666JJK – For Training Only
- SPM-01, Contact Handled (CH) Site Project Manager (SPM) Qualification Card, Rev. 19
- TCO-01, Transportation Certification Official (TCO) Qualification Card Central Characterization Program Effective Date: 11/19/2014, Rev. 15
- USQD Number D16-118, NTP-WDS-SCO-0037, WDS Software Release 2.7.1 Scope Document – Version 0
- WCO-01, Waste Certification Official (WCO) Qualification Card, Rev. 16
- WCPCR-01, RES Operations TRU Waste Confirmation Permittee Confirmation Representative Qualification Signature Record, Rev. 1
- WCR-01, RES Operations Waste Confirmation Radiographer Level 1 Qualification Signature Record, Rev. 3
- WCR-02, RES Operations TRU Waste Confirmation Radiographer Level 2 Qualification Signature Record, Rev. 1
- WCV-01, RES Operations Waste Confirmation Visual Examination Level 1 Qualification Signature Record, Rev. 3
- WCV-02, *RES Operations TRU Waste Confirmation Visual Examination Level 2 Qualification Signature Record*, Rev. 1
- WP 02-RC1102, *Review of Radiography Media for TRU Waste Confirmation*, Rev. 14
- WP 02-RC1105, *Electronic Notification and Container Selection for TRU Waste Confirmation*, Rev. 15
- WP 02-RC1107, *Management of Nonconforming Waste Identified During TRU Waste Confirmation*, Rev. 8
- WP 02-RC1108, *Review of Visual Examination Records for TRU Waste Confirmation*, Rev. 14
- WP 05-WH1010, *Container Overpacking*, Rev. 12
- WP 05-WH1011, *CH Waste Processing*, Rev. 57
- WP 08-NT.01, *Waste Data System Program and Data Management Plan*, Rev. 31
- WP 08-NT.03, *Waste Stream Profile Form Review and Approval Program*, Rev. 18
- WP 08-NT.04, *Waste Data System Software Quality Assurance Plan*, Rev. 23
- WP 08-NT.14, *Waste Data System Contingency and Incident Response Plan*, Rev. 7
- WP 08-NT.15, *Waste Data System Maintenance of Administrative Reference Tables*, Rev. 8
- WP 08-NT1001, *Waste Data System Waste Stream Profile Form Review*, Rev. 2
- WP 08-NT1002, *WDS Administration Reference Tables*, Rev. 5
- WP 08-NT1003, *Completion of Access Request Form and Assignment of Permissions in WDS*, Rev. 2
- WP 08-NT1004, *Waste Data System Verification, Validation, and Deployment of Application Software*, Rev. 3

- WP 08-NT3020, *TRU Waste Receipt*, Rev. 27
- WP 12-NS3018, *Material at Risk Statistics Verification*, Rev. 0
- WP 13-1, *Nuclear Waste Partnership LLC Quality Assurance Program Description (QAPD)*, Rev. 36
- WP 13-QA3004, *Nonconformance Report*, Rev. 15
- WP-08-NT1005, *RCRA Review Criteria for Waste Stream Profile Forms*, Rev. 0
- WSPF-01, RES Operations Waste Stream Profile from Review and Approval Program Qualification Signature Record, Rev. 0

Interviews Conducted

- Central Characterization Program Manager
- Certification Manager
- WIPP Waste Operations Manager
- CH Waste Handling Manager
- Waste Handling Technician
- Waste Handling Operators
- Safety Basis Engineer
- Transportation Engineer
- Transportation Manager
- Radiological Technician/Engineers
- Packaging and Information System Manager
- Waste Information Tracking System Team Lead
- Waste Information Tracking System Personnel
- Data Administrators
- Transportation Certification Official (TCO)
- Site Project Managers (SPMs)
- Waste Certification Official Team Lead (WCO)
- Waste Certification Officials (WCO)
- CCP Field Operations Manager and TCO
- Waste Confirmation Technician
- Manager, Waste Confirmation
- NWP QA Manager
- NWP QA Programs/Project Integration Manager
- NWP QA
- CCP Manger
- CCP Site Project Manager
- DOE-CBFO Quality Assurance Director
- DOE-CBFO TRU Sits and Transportation Division Director
- DOE-CBFO Nuclear Safety Senior Technical Advisor

Shift Performances Observed

- TRU Waste Receipt – WP 08-NT3020
- CH Waste Processing – WP 05-WH1011

Discussion of Results

1. **Functions, assignments, responsibilities, and reporting relationships are clearly defined, understood, effectively implemented, and enable adequate execution of the WIPP enhanced acceptable knowledge program.**

   Review of personnel and processes at Idaho were not evaluated. The interface between the enhanced acceptable knowledge (AK) and the Waste Data System (WDS) was evaluated and is applicable to anyone executing enhanced acceptable knowledge activities.

   The DSA Chapter 18 clearly identifies roles and responsibilities for CBFO with regards to Program Certification/Recertification (Section 18.4.1), review and approval of Chemical Compatibility Evaluation Memos (CCEMs) (Section 18.4.2.1.2), issuance of the Basis of Knowledge (BOK) (Section 8.4.2.1.3), Approval of waste stream profile (Section 8.5.1); and responsibilities for previously certified waste (including currently certified waste containers in the complex and waste containers residing in WIPP's Waste Handling Building (WHB)). These responsibilities are integral to the implementation of the WIPP Waste Acceptance Criteria Compliance Program, which is a Safety Management Program (SMP) contained within the DSA/TSR. CBFO currently utilizes CBFO MP 4.15, *The Processing of TRU Waste Acceptable Knowledge Summary Reports,* to process TRU Waste AK summary reports. When questioned about the applicability of the document to the USQD process, CBFO stated that CBFO documents, including CBFO MP 4.15, do not undergo USQD review. **(See NS.2-PRE-2)**

   The "Plan" that governs validation of currently certified waste stream including the enhanced AK process is DOE/CBFO 16-3568. CBFO documents/procedure are inadequate to satisfactorily implement the DSA/TSR actions/requirements in a quality manner consistent with a DSA SMP. It is a unique situation where DOE actually performs DSA/TSR implementation requirements and that responsibility needs to be documented and executed in a manner consistent with the expectation DOE has for contractor DSA implementation. **(WA.1-PRE-1)**

   CCP executes the Acceptable Knowledge reviews for the waste being shipped from most sites mainly utilizing CCP-TP-005 and CCP-TP-200. WIPP Waste Analysis Plan (WAP) AK requirements are addressed in CCP-PO-001 and implemented via CCP-TP-005. The Enhanced Chemical Compatibility Evaluation and Basis of Knowledge Evaluation have been added to CCP-TP-005. DOE/WIPP-02-3122 *WIPP-Waste Acceptance Criteria (WAC)* AC AK requirements are addressed in CCP-PO-002. Only CCP personnel trained in accordance with CCP-QP-002 are allowed to compile, evaluate, and document AK information. CCP-QP-002 clearly identifies the responsibilities and qualification requirements for the various CCP personnel. Each of the CCP specified positions executing Enhanced AK activities has a qualification card that is generated in accordance with CCP-QP-002. All personnel interviewed

were knowledgeable of their functions, assignments, responsibilities, and reporting relationships. All CCP personnel authorized to perform enhanced AK evaluations and/or enhanced chemical compatibility evaluation demonstrated acceptable knowledge of those processes and overall knowledge of the DSA and WAC requirement and an understanding of waste streams and enhanced chemical compatibility evaluation issues.

The SPMs enter the enhanced chemical compatibility information into the WDS. Then two independent SPMs reviews are required in the WDS for each enhanced chemical compatibility evaluation. This process and requirement was demonstrated by the WDS Data Administrator (DA). When the names of the personnel who could enter the data were initially looked at, an individual other than SPMs was an authorized person on the dashboard. When the documented qualification and procedure for performance of the review of the individual was questioned, it was determined to remove the individual from the dashboard. The individual had not performed any reviews since being added to the dashboard. This revealed a weakness in the control of write access to the WDS dashboards. Further evaluation revealed the lack of formality in WP 08-NT-1003, *Completion of Access Request Form and Assignment of Permissions in WDS*. This procedure governs the process of requesting and granting access to the various WDS dashboards. Read access does not allow the reader to affect the WDS information; however, personnel with write access have the ability to affect the information in the system. Since data entry into the WDS can directly affect implementation of the DSA/TSR, access needs to be appropriately controlled. Currently, the DA utilizes knowledge of the overall organizations, and process to determine who gets access to the various dashboards. The procedures that affect write access to the WDS dashboards need to be revised or new procedures generated to better control the access for personnel with write authority. **(WA.1-PRE-2)**

While the CCP documented process for generating the Enhanced AK documents have clear responsibilities and requirements, the overall reporting relationships associated with the Enhanced AK program are not clearly defined and documented. All personnel interviewed were very knowledgeable of the WDS and the requirements in the DSA and WAC and were aware of the reporting relationships. They clearly understood their role and the overall expectations for interactions and reporting relationships. However, the "release" of various aspects within the WDS based on a letter from CBFO is not clearly documented. The DSA in Section 18.5.1 states that upon receipt of the approval letter for the waste stream the DA "enters the approval date in the WSPF Administrative Table, which causes the WDS database to recognize the approved waste stream profile number." There are other CBFO approvals that take place in accordance with the DSA requirements and letters are issued to document that approval/concurrence. The DAs stated that upon receipt of the CBFO letter, they make the appropriate annotations/changes in the WDS. The release of waste containers, waste profile streams, recognition of approved Enhanced AK evaluation, concurrence with enhanced chemical compatibility evaluations and implementation of Basis of Knowledge (BOK) based solely on a CBFO letter is not

documented. The process of annotation/release in the WDS needs to be clearly documented to ensure all parties are fully aware of the safety basis and WAC implications of their actions and responsibilities and that all required actions have been satisfactorily completed and documented prior to "release". **(WA.1-PRE-1 and WA.1-PRE-2)**

This Criterion was not fully met.

2. WIPP WAC Compliance Program DSA Chapter 18 requirements and TSR Administrative Controls (i.e., Key Elements 18-1, 18-2, 18-3, 18-4, and 18-5) are appropriately flowed down into the implementing procedures.

The WIPP WAC Compliance Program DSA Chapter 18 requirements are flowed down in various methods. Each of the Key Elements (KEs) are discussed below.

KEs 18.1 through 18.5 are performed utilizing the WDS. The WDS plays an integral part of the implementation of all 5 of the KEs. The WDS performs checks of the waste containers, shipment/payload to ensure compliance with the DSA Chapter 18 requirements and TSR Administrative Key Elements from Section 18. The WDS is the gate keeper to ensure waste containers are not shipped unless compliance with the DSA has been verified. The WDS actually executes the checks for many of the applications internal to the system. The DAs interviewed provided evidence of the performance of all 5 KEs within the system and test data demonstrating implementation. The WDS clearly performs a vital safety function in relation to implementation of the TSR Waste Acceptance Criteria Compliance Program KEs. The current grading classification of non-safety software for the WDS is not compliant with DOE O 414.1D, Chg 1. Based on the explicit requirements within the DSA/TSR for the WDS and the importance of compliance with the DSA/TSR Waste Acceptance requirements, the WDS is safety software. The DAs demonstrated the robustness of the testing and the various controls on the software changes prior to being placed into the operating system. The contingency and incident response plan, WP 08-NT.14, states that in the event of a system failure, CBFO will be notified and at the direction of CBFO, "waste shipments may be placed in a safe condition and further waste movement halted." This document is a positive proactive action and provides needed response for such an important database. **(WA.1-PRE-4)**

KE 18.2 and 18.3 are executed by Regulatory Environmental Services (RES). The review and approval of Waste Stream Profile Forms (WSPFs) are performed by RES utilizing WP 8-NT.03, *Waste Stream Profile Form Review and Approval Program*. The cover page clearly states "THIS DOCUMENT IMPLEMENTS TSR PAC 5.6.1, KE 18-2." After a completed AK record has been compiled and either a Determination Request has been approved by DOE or the generator/storage site has completed the applicable testing requirements, the DOE site will complete a WSPF and submit it to the Permittees for review. "Upon receipt of the Permittees' approval letter for the waste stream, the DA enters the approval date into the WSPF Administrative Table, which causes the database to recognize the approved waste

stream profile number. This allows the shipper generator WDS user to submit certification data to the WDS for waste containers from the approved waste stream and subsequently allows DA approval of certified container data prior to shipment of containers from the approved waste stream." This document clearly states actions the DA must perform; however, the DA does not work to these documents. All DAs interviewed clearly understood their roles and responsibilities but a document that clearly links documented steps for compliance with the Chapter 18 KE for the DAs was not identified.

The WDS generates an e-mail to RES when a shipment is ready. An RES Permitees Confirmation Representative (PCR) executes a WDS randomizer per WP 02-RC1105, *Electronic Notification and Container Selection for TRU Waste Confirmation,* to select the appropriate number of waste containers in the shipment for confirmation. The PCR executes the applicable review of the certified waste prior to shipment to verify HWFP requirements have been met. The shipment cannot be released until the PCR makes the appropriate entries in the WDS dashboard. The two main procedures utilized are WP 02-RC1108, *Review of Visual Examination Records for TRU Waste Confirmation*, and WP-RC1102, *Review of Radiography Media for TRU Waste Confirmation*. On the front of these procedures is a rectangle that states "THIS DOCUMENT IMPLEMENTS TSR PAC 5.6.1, KE 18-3." These procedures go through the USQD process. The box on the front of the procedure is utilized as the whole procedure implements the KE and RES stated that that was more effective to communicate, as insertion of a symbol on every step would be impractical. This is a good practice and clearly communicates the TSR requirement being implemented. The PCRs have a qualification card and are the only one allowed access to the Confirmation dashboard in WDS. (This was verified with the DA pulling up the authorized personnel to make entries and crosschecked against the list of qualified PCRs.) The PCR releases the shipment in the WDS system once they have satisfactorily reviewed all the data pulled from the Integrated Data Center including any Non-compliance Reports for the identified waste containers. If the waste confirmation indicates that a container does not conform to the waste confirmation requirements, the PCR performs WP 02-RC1107, *Management of Nonconforming Waste Identified During TRU Waste Confirmation*.

KE 18.4 is executed by CBFO with NWP.
The WDS prevents shipment of waste containers not previously certified until the DA has entered a date for the performance of the reviews. The DAs stated they enter the date in the WDS based on a copy of the CBFO letter stating the Generator Site Technical Review has been satisfactorily completed. The DA demonstrated this function in the WDS and presented the test to demonstrate waste containers could not be shipped from a generator prior to the date being entered. No technical procedure governing the DA actions directly linked to the DSA was provided. **(WA.1-PRE-1, WA.1-PRE-2)**

KE 18.5 is executed by the TCO, WCO, and NWP Nuclear Safety personnel.

The WCO puts certified containers into the WDS and after appropriate review, releases them in the WDS for generation of shipment/payload by the TCO. The TCO picks containers to place in a shipment. After a set of waste containers has been selected for shipment, the TCO runs the edit checks in WDS. WDS evaluates the set of containers against internal MAR values. If the shipment/payload passes the check, the TCO can release the container shipment/payload for actual shipment. If the shipment/payload exceeds the statistical MAR limit, the WDS will not let the shipment/payload go the next step. The TCO can either re-configure the shipment by revising the content or he sends an e-mail to the WCO. The WCO works with the NWP Nuclear Safety personnel to evaluate the specifics of the shipment/payload to determine if the shipment/payload can be shipped. If the NWP safety basis personnel perform the required evaluation and determine the shipment/payload can be accepted appropriate communication with the WCO takes place. The WCO in turn has to appropriately communicate with the DA to release the "edit – limit" in the WDS for the shipment/payload. **These actions have not been documented in an issued procedure**. CCP-TP-033 is being revised to address part of the process; however, that document will not address all functions and responsibilities associated with this activity. WP 12-NS3018, *Material at Risk Statistics Verification,* is the procedure utilized by Nuclear Safety for performance of this KE. The cover page clearly annotates "THIS DOCUMENT IMPLEMENTS TSR PAC 5.6.1, KEY ELEMENT 18-5." However, WP 12-NS3018 is classified as a Management Control Procedure even though it implements TSR KEs. **(See OP.3-PRE-1)** Therefore, **this KE has not been satisfactorily flowed down to implementing procedures**. **(WA.1-PRE-1, WA.1-PRE-2)**

The other Chapter 18 Requirements are discussed in other criteria.

This criterion was not fully met.

3. WIPP WAC Compliance Program DSA Chapter 18, Sections 18.6, *Upon Receipt at WIPP,* and 18.8, *Previously Certified Waste Preclusion of Shipments*, are appropriately flowed down into the implementing procedures and have been appropriately implemented for waste in the WHB.

The DSA Section 18.6 requirements are flowed down into procedures.

WP O8-NT3020, *TRU Waste Receipt,* performs receipt inspection and is executed mainly by the Transportation Engineer. This procedure is a management procedure that implements TSR LCO requirements **(See OP.3-PRE-1)**. The procedure has the required TSR Surveillances flowed down and steps are appropriately flagged to indicate TSR SR performance. Observation of the performance demonstrated adequate implementation of the SR 4.7.1.1.

WP 05-WH1011, *CH Waste Processing,* performs the CH Waste Processing and is executed mainly by the Waste Handlers. This procedure implements the TSR Surveillances 4.7.1.2, 4.1.2.3, and 4.7.14. The TSR SR are properly stated in the

procedure and annotated as TSR SR steps. Observation of the performance demonstrated adequate implementation of the SRs.

The personnel performing both procedures were knowledgeable of the DSA/TSR requirements and waste activities. There were some issues with the wording of the step(s) (Steps 2.16 and 5.5.54 respectively) that "Complete the Surveillance Check Sheet." The check sheet is not actually completed at this step, as there are still two additional signatures required on the sheet. Some other minor procedure issues were noted but they do not directly affect the flow down of the TSR SRs.

Section 18.6 is adequately flowed down into procedures (except for the classification of WP O8-NT3020).

The Requirements in Section 18.8 have not been adequately flowed down into procedures adequately.

All payloads previously virtually built in the payload module of WDS have been removed and the packaging table in the WDS has been temporarily coded as "Read Only." For currently certified waste containers in the complex as well as those containers continuing to be certified, the coding of "Read Only" on the packaging table will prevent shipment. The DA within the WDS demonstrated this both of these actions. Only the DA can release the "Read Only" coding. These two actions of Section 18.8 have been satisfactorily implemented.

The permanent modification to the WDS to delineate all the checks in Section 18.8 and 18.9 has not been completed. The infrastructure for the checks for Section 18.9 has been implemented, but some of the implemented features will not protect the currently certified waste containers. The actions/requirements for the currently certified waste protection in the WDS still needs to be finalized, documented in procedures, and implemented. CBFO generated DOE/CBFO 16-3568 to document the plan for validating currently certified waste. This plan does not specifically address the requirements of DSA Section 18.8 for either the waste containers in the complex or those residing in the WHB. **(WA.1-PRE-1)**

The requirement for the waste containers residing in WIPP's WHB prior to DSA Rev. 5b approval are not adequately protected to ensure the enhanced chemical compatibility evaluation and BOK, if applicable, are performed prior to emplacement. There are hold tags on the waste containers that were not released by CBFO. However, the administrative control required by WP 13-QA3004, *Nonconformance Report,* have not been applied. The hold tag is the only control currently that is preventing emplacement. The WDS system does not have the ability currently to control the waste containers in the WHB as all the "gates" to ensure compliance have been passed. It was determined that a change in the programming of the WDS was not appropriate for control of these containers and that other methods would be more appropriate. The current control of a simple hold tag with no other implementing documentation is inadequate to preclude the

placement of the containers. **(WA/1-PRE-3)** Additionally, the CBFO approval to release the two waste streams (ID-RF-S3114 and SR-221H-PuOx) was based on memorandums that provide insufficient detail regarding the actions taken to reach the decision to release the waste (i.e., there is no objective evidence demonstrating that CBFO performed the actions demanded by the DSA). **(WA.1-PRE-1)**

This criterion was not fully met.

4. **All previously certified waste streams are controlled via the Waste Data System, or other sufficiently robust process, to prevent placement in the underground until all enhanced acceptable knowledge reviews have been satisfactorily performed.**

   This Criterion has not been met. See Criterion 2 and 3 for details. (See **WA.1-PRE-3; WA.1-PRE-4)**

5. **Documentation exists that demonstrates the enhanced chemical compatibility evaluation has been adequately performed for at least two of the waste streams currently resident in the WHB.**

   CBFO procedures are not adequate to ensure the satisfactory implementation of the DSA requirements for currently certified waste containers in the complex, as well as those containers continuing to be certified and waste containers residing in the WIPP WHB. The prior release of the two waste streams (ID-RF-S3114 and SR-221H-PuOx) by CBFO was documented via memoranda that lacked sufficient detail to determine that all the requirements imposed by the DSA were adequately performed. **(WA.1-PRE-3)**

   Section 3.5.3 of the WAC specifies that chemical compatibility is required for acceptance of the waste for disposal at WIPP and Attachment H.3 of the WAC provides detailed guidance on what is expected from the enhanced chemical compatibility evaluation. Section 18.4.2.1.2, 18.4.2.1.3, and 18.8 of the WIPP DSA also requires completion of an enhanced chemical compatibility evaluation and Basis of Knowledge (for waste subject to this requirement – waste having oxidizing chemicals or when treatment is required).

   CBFO issued DOE/CBFO 16-3568 and a revision to DOE/CBFO MP 4.15 to address CBFO actions for validating currently certified waste. These documents do not identify the direct linkage to the DSA nor do they ensure all required actions/requirements have been satisfactorily completed prior to release for shipment.

   The waste containers residing in the WIPP's WHB prior to DSA Rev. 5b were placed on quality hold based on the Letter Vicki Diane Snow to Mr. Breidenbach, dated February 2, 2016. The letter stated for "NWP will place hold tags on the containers in the waste handling building and will not emplace waste from this population in the underground without written authorization from CBFO."

The letter from Donald Gadbury to Ms. Gonzales dated October 6, 2016 states that based on the two CBFO attached memorandums (J. R. Stobel to Mr Gulbransen dated March 28, 2016 and April 1, 2016), CBFO Contracting Officer Representative approves the removal of the hold tags from the waste containers in waste streams ID-RF-S3114 and SR-21H-PuOx currently stored in the WHB at WIPP "in accordance with step 4.6 of DOE/CBFO 16-3568, Plan for Validating Currently Certified Waste which implements Section 18.8 of DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis*."

The first reference memorandum dated March 28, 2016 evaluated the NWP request submitted on February 11, 2016 and the second reference memorandum dated April 1, 2016 evaluated a NWP request submitted on February 10, 2016. The reference memorandums state: "The CBFO has reviewed and determined that the comments generated have been adequately addressed and the document meets the CBFO requirements. The Central Characterization Program is authorized to use the waste stream" SR-221-PuOx/ ID-RF-S3114 "in the Waste Data System (WDS) and to enter containers into the WDS using your procedures for characterizing and certifying TRU waste for disposal at WIPP." Per DSA Section 18.8, CBFO is required to concur with the enhanced chemical compatibility evaluation and approve waste stream with acceptable enhanced chemical compatibility evaluation documentation. The containers are already in the WDS and certified for disposal, they were never removed from the system nor was certification pulled. These reference memorandums do not address the required CBFO required actions and the "authorization to use waste stream" are inadequate basis for release of the hold tags. Therefore, the basis for removal of the hold tags in the WIPP WHB is not compliant with the DSA requirements.

The dates of the NWP documents submitted for review in the two referenced memorandums are before the approval of the DSA. The dates of the CBFO TRU Sites and Transportation Division authorization to release the hold are before issuance of DSA, DOE/CBFO 16-3568, and CBFO MP 4.15. Based on the dates, a formal evaluation in accordance with the DSA Section 18.8 and stated plan DOE/CBFO 16-3568 could not have been completed at that time. Additionally, the statement to authorize the use of the waste streams in the WDS and entry of the containers into the WDS is inconsistent with the fact the waste streams and containers have been in the WDS the whole time. The procedures for characterizing and certifying TRU waste for disposal happen prior to shipment, and are not applicable to the waste containers at the WIPP WHB.

Evaluation of the NWP technical document:
There are a total of seven waste streams currently in the WHB with a total of 234 containers. The two waste streams examined during this review total 197 containers or 84% of the inventory in WHB. Waste stream ID – RF – S3114 has 100 containers and SR – 221H – PUOX has 97 containers.

The SR-221H-PUOX waste stream is CH-TRU plutonium oxide (also referred to as DE-3013 material) blended with a non-hazardous inorganic material to facilitate termination of safeguards practices. The plutonium oxide materials in this waste stream were generated at the Savannah River Site (SRS) and other DOE sites. The methodology and approach used for this evaluation was done per procedure CCP – TP – 005. Attachment 16 of this procedure provides detailed instructions and guidance regarding how the evaluation should be conducted, the basis for eliminating chemicals from further consideration, and the overall expectation for a comprehensive chemical review of the waste. Chemicals and materials of concern were identified and evaluated for their chemical compatibility using the approved EPA method. The major chemical components are listed along with chemicals that may be expected in trace amounts because they were used at the facility but not in this particular process. Since this waste stream is essentially a mixture of plutonium oxide and a non-reactive diluent, the acceptable knowledge expert concluded that the final waste form is nonreactive and incapable of initiating unexpected or adverse hazardous chemical reactions.

The enhanced chemical compatibility evaluation for waste stream SR-221H-PUOX was completed and sent to CBFO for review and concurrence on February 11, 2016. During the review process comments were incorporated and the CCE was reissued on March 16, 2016 and was concurred on by CBFO on March 28, 2016.

The ID-RF-S3114 waste stream is more complex than the PUOX stream. It is predominantly a mixture of halogenated organic solvents, lubricating oils, and absorbents. The waste originated at Rocky Flats from the machining of metal. The machined metal parts were cleaned with halogenated solvents, (for example, carbon tetrachloride and tri-chloroethanes), which removed the lubricating/cutting oil. The oil was typically a purified mineral oil (alkanes and cyclo-alkanes). The solvent containing the oil was mixed with an absorbent to form a paste like waste. After shipping the waste to Idaho, this waste stream was subsequently repackaged and treated to meet waste acceptance requirements (at that time) prior to shipment to WIPP for disposal.

The chemical compatibility evaluation includes a detailed analysis of the major constituents associated with this waste stream. It also includes a very detailed analysis of other minor constituents which may be present. The chemical compatibility analysis was performed according to procedure CCP TP-005 as explained above. Potential interactions of these chemicals were evaluated and eliminated on the basis of quantity expected, sampling data, and observation that this waste has remained stable for several years. The acceptable knowledge expert performing this evaluation concluded that the chemicals and materials of concern in waste stream ID-RF-S3114 are non-reactive, or rendered non-reactive in the final waste form. The final waste form has been determined to be incapable of initiating unexpected or adverse hazardous chemical reactions.

The chemical compatibility evaluation was transmitted to CBFO for review and concurrence on February 10, 2016. The evaluation was made final on March 29, 2016 after the incorporation of comments received during the review. CBFO concurred with the evaluation on April 1, 2016.

6. **Sufficient numbers of qualified personnel are available to effectively implement the WIPP WAC Compliance Program at WIPP including enhanced chemical compatibility reviews for waste currently at the WHB and the MAR statistics for waste certification for future shipments.**

   There were no issues with the number of qualified personnel to effectively implement the WIPP WAC Compliance Program at WIPP including performance of the enhanced chemical compatibility reviews and MAR statistics. Qualification cards and a list of currently qualified personnel were presented that demonstrates sufficient qualified personnel. The number of SPMs allowed to perform the enhance chemical compatibility evaluations are currently being limited to ensure consistent implementation of the evaluation and provide additional time for the supervisor to give On-the-Job training to enhance the other SPM skills in executing this new requirement. The number currently qualified and authorized are sufficient and the plan to authorize additional SPMs in the future will ensure the number is sufficient for future shipments.

   This Criterion was met.

7. **TSR LCO 3.7.1 and associated Surveillances have been appropriately implemented and sufficient numbers of qualified personnel are available to effectively implement these requirements.**

   The LCO 3.7.1 and associated Surveillances implementation is discussed in Criterion 3. The one additional piece is the procedures required for performance of the required action B.2. WP 05-WH1010, *Container Overpacking,* has been issued that performs over packing containers.

   Sufficient number of qualified personnel is available to effectively implement these requirements.

   There is an opportunity for improvement with regards to the LCO Required Actions and completion times. An evaluation of the ability to overpack a container in the underground with the current ground control issues should be evaluated. If determined necessary, the completion time for containers in each process area could be modified to be different. Additionally the lack of ability to enter the evacuated area when Condition C is entered and a Response Plan is implemented needs to be evaluated.

   This Criterion has been met.

8. The training and qualification of personnel responsible for managing, performing, and approving chemical compatibility evaluations for waste currently at the WHB and performing MAR statistical evaluations for waste certified for future shipment to WIPP is adequate to implement those elements of the WIPP WAC Compliance Program. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.

The qualification cards and training records for the SPM personnel managing and performing chemical compatibility evaluations for waste currently at the WHB provide evidence that they are appropriately trained and qualified to execute the stated task.

CBFO performs the approval of the chemical compatibility evaluations. This objective did not evaluate the training and qualification of the CBFO staff in the execution of that task. The personnel interviewed were aware the requirement for the CBFO approval requirement in the DSA. CBFO does not have a role in the MAR statistical evaluations.

The TCO and WCO personnel determining the need for statistical evaluation have the applicable knowledge and skills. The lack of implementing procedures for the statistical MAR evaluation process prevented the demonstration of the specific training and qualification for this task. The WDS was demonstrated that is will "Flag" the shipment/payload when MAR statistical evaluation is required. The WDS executes the initial screen. The safety basis personnel interviewed demonstrated appropriate knowledge for execution of the MAR statistical evaluation. The safety basis personnel qualification is the same as that for performance of safety basis USQD evaluation and DSA/TSR changes.

All personnel involved demonstrated knowledge of the project activities and safety basis requirements commensurate with their responsibilities.

This Criterion was met for NWP personnel. (This objective did not evaluate CBFO training and qualification.)

9. Accident Investigation Board (AIB) Judgments of Need (JONs) related to WAC Compliance Program have been verified by the site to be addressed through effective corrective actions.

The AIB Phase II JONs related to this criterion from the *Nuclear Waste Partnership Corrective Action Plan Addendum Radiological Release Event (Phase II)* are identified below in Table WA.1.1. The AIB JONs identified in Table WA.1.2 were not part of this criterion and are covered by Objective QA.1.

The JONs identified in Table WA.1.1 have been verified closed by CBFO as effective corrective actions completion.

Table WA.1 1 AIB Phase II JONs identified and delineated within the scope of WA.1 objective

ITEM	JON	Descriptions
1	7	The Central Characterization Program needs to improve implementation of requirements in **CCP-PO-001** such that characterization methods are able to ensure that all [WIPP] [WAC] requirements are met.
2	8	The CCP needs to improve the level of rigor in reviewing and approving AK Summary Reports for compliance with requirements.
3	12	The CCP needs to reevaluate and strengthen the process used to conduct review and approval of source documents that have an impact on Acceptable Knowledge.

Table WA.1 2 AIB Phase II JONs not within the scope of the WA.1 Objective

ITEM	JON	Description
1	2	The National TRU Program needs to reevaluate and strengthen the certification audit process across the DOE complex at all generator sites.
2	33	Nuclear Waste Partnership (NWP) needs to re-evaluate the quantities, type, and form of exposed combustible emplacement materials used in the waste array and take action to minimize the fire ignition and propagation risk (e.g., eliminate unnecessary materials, and include retardant additives).
3	34	NWP needs to revise the waste array emplacement strategy to include criteria that limit the risk of fire propagation within the array and to include limiting of radiological waste that is at-risk from a single fire or explosion event.
4	35	NWP needs to revise the FHA to identify and address all credible fire and explosion scenarios initiated within the waste array underground.
5	36	NWP needs to reevaluate and revise WIPP FHA to better characterize the fire risks associated with transuranic waste packaging during handling and storage. This needs to include reevaluation of actions detailed in the WIPP Recovery Plan.

Based on the objective evidence submitted by NWP on the above referenced JONs and acceptance by CBFO , completion of corrective actions by NWP within the scope of this criterion were met and approved. The objective evidence for each corrective action associated with JON 7 was replicated to meet the need of objective evidences for corrective actions in JON 8 and 12. The described approach for JON 8 and 12 were exact and each having three corrective actions identical to corrective action #1,

#3, #5 of JON 7. Therefore, successful acceptance of all corrective actions of JON 7 ensures successfully completion of corrective actions for JON 8 and 12.

The CCP *Transuranic Waste Characterization Quality Assurance Project Plan (CCP-PO-001)* was revised promoting more robust techniques and checkpoints to ensure compliance with the *Waste Isolation Pilot Plant Hazardous Waste Facility Permit* (HWFP), Attachment C-C6, *Waste Analysis Plan* (WAP), and *Nuclear Waste Partnership LLC Quality Assurance Program Description* (WP 13-1). Compliance with *Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant (WAC) DOE/WIPP 02-3122*, is handled in CCP-PO-002, *CCP Transuranic Waste Certification Plan,* which was not included in the JON statements.

The prevention of a future recurrence of a potential radiological release was a key driver to revise the *CCP Acceptable Knowledge [AK] Documentation*. The AK documentation, which includes new enhanced Chemical Compatibility Evaluations and AK assessments, will support the elimination of potentially energetic transuranic waste hazardous for emplacement at WIPP. Cognizant point of contact at generator sites will be involved directly in the preparation of AK documentation to ensure the information of associated waste streams are accurate and current. Also, a key element in the AK documentation will be the Basis of Knowledge (BOK) for evaluating oxidizing chemicals. However, CBFO acknowledges the BOK has not been finalized, nonetheless will be integral to the AK documentation (JON 7).

Complementary to the new, enhanced features for waste characterization is the requirement and implementation of interface documents for each generator site (e.g. LANL, SRS, and ORNL) with active characterization activities. *CCP Interface Document Preparation* (CCP-PO-043) was prepared and approved identifying the requirement for CCP to develop programmatic procedures for the preparation of Interface documents. Interface documentation defines roles and responsibilities for the characterization of transuranic waste by CCP. Furthermore, based on objective evidence, CCP has developed training documentation to keep appropriate personnel informed on the Interface documents as revised. To accomplish this, CCP identified and prepared a roster of individual who needed to be aware of changes to the Interface documents. Upon further review of the objective evidence on training material, it was verified that training on the interface document was based on the latest revision. It was noted that documentation was filed mentioning that an Interface document for INL was not required as characterization activities are performed by the Contractor for AMWTP (JON 7, JON 8, and JON 12).

This criterion was met.

10. The waste acceptance compliance program was adequately evaluated by the CORR.

The CORR did an acceptable evaluation. There are some issues identified by the DORR that should have been caught by the CORR and/or corrected as a result of the

issues identified by the CORR. The inclusion of CBFO in the DORR revealed weaknesses in interface elements and when further evaluated revealed other issues in the WIPP WAC Compliance Program.

This criterion is met.

CONCLUSION

The contractor has the majority of procedures in place and implemented for the WIPP Waste Acceptance (WAC) Compliance Program. There are some issues that need to be corrected in the WIPP WAC Compliance Program prior to emplacement of waste currently at the WIPP WHB and more extensive issues associated with initiation of receipt of waste containers. The implementation of the DSA/TSR WIPP WAC Compliance Program is intentionally different for the waste containers at the WIPP WHB, the currently certified waste containers not currently at WIPP, and newly certified waste containers. Based on the different requirements in the DSA for these three populations of waste drums, release of each of the three populations could be granted in a step wise manner to facilitate start-up. Each of the three populations of waste containers has unique issues with implementation of the WIPP WAC Compliance Program.

All personnel interviewed demonstrated acceptable knowledge of their work areas and the DSA/TSR requirements. A positive attitude and willingness to improve and correct issues was demonstrated throughout the review. The foundation of the Enhanced Acceptable Knowledge (AK) Program and enhanced chemical compatibility evaluation process have been developed and implemented for receipt of CH Waste at WIPP. However, not all procedures and process have been developed and implemented. CBFO has not issued the Basis of Knowledge to facilitate the performance of the delta reviews associated with the enhanced chemical compatibility evaluations. Some of the interface documentation to ensure MAR statistics are certified for future shipments are reviewed to ensure compliance with the DSA has not been finalized. The CBFO role as defined in the DSA has not been fully documented consistent with performance of DSA action/requirement performance.

The DA and others associated with the WDS demonstrated extensive knowledge of the software and understanding of their roles and responsibilities. The WDS undergoes extensive software quality assurance and testing to ensure configuration control and performance. The software performs a vital role in implementation of the DSA/TSR requirements. The WDS has been incorrectly classified as non-safety software. There are some areas of performance within the WDS that needs to be documented and others that need to be strengthened. One of the main areas needing formal documentation is the requirement that need to be met before the DA can make entries for removal of "holds," entry of acceptable waste stream profiles, enhanced chemical compatibility acceptance, and other high level entries. Currently these entries are based on the CBFO letter to the contractor. There needs to be a deliberate evaluation of full compliance with the DSA/TSR, WAC, and other documents which is not currently a requirement for the CBFO letter.

The contractor's WIPP WAC Compliance Program contains all the elements required by the DSA/TSR including the Enhanced AK Program and enhanced chemical compatibility evaluation process; however, the elements are not adequate to ensure waste containers are fully compliant with the DSA/TSR prior to emplacement.

In conclusion, this Objective has not been met.

Issue(s):

WA.1-PRE-1: CBFO procedures are inadequate to implement the DSA/TSR actions/requirements prior to emplacement of waste containers residing in the Waste Isolation Pilot Plan (WIPP) Waste Handing Building (WHB) and prior to shipment for previously certified waste containers in the complex (including those containers continuing to be certified).
(The process for the waste in the WHB needs to be corrected pre-emplacement; the process for previously certified waste not at WIPP can be completed pre-shipment.)

WA.1-PRE-2: Contractor's procedures/documentation that implement DSA/TSR Waste Acceptance Criteria (WAC) and Chapter 18 actions and requirements have not all been developed and/or revised to incorporate the DSA/TSR requirements.

WA.1-PRE-3: The current administrative controls to preclude the placement of the waste containers located in the Waste Handling Building into the underground prior to satisfactory performance of DSA, Chapter 18.8 requirements do not satisfy the requirements of WP 13-QA3004.(This is a pre-emplacement finding.)

WA.1-PRE-4: The Waste Data System is incorrectly graded as non-safety software. (The WDS does not affect the emplacement of the waste at the WHB. This needs to be address prior to shipment.)

Opportunities for Improvement:

WA.1 OFI-1: The Accident Investigation Board (AIB) Judgment of Need (JON) closed out prior to issuance of DSA/TSR Rev. 5b and the revised WAC, should be evaluated to determine if any additional document modifications are required.

WA.1 OFI-2: CCP should evaluate the need for continued training requirements for qualification and verification of training on revised documents including working procedures, WAC, and Safety Basis Documents.

WA.1 OFI-3: An evaluation of the ability to overpack a container in the underground within 48 hours as required by LCO 3.7.1 Required Action B.2 should be performed based on the current ground control issues. If determined necessary, the completion time for containers in each process area could be modified to be different. Additionally the

lack of ability to enter the evacuated area when LCO 3.7.1 Condition C is entered and a Response Plan is implemented needs to be evaluated.

WA.1 OFI-4: The Start-up Plan could be modified to address a stepwise start-up with respect to the three populations of waste containers (i.e. at WIPP WHB, currently certified but not at WIPP, and newly certified). This will allow a structured and DSA/TSR compliant process to get waste containers properly and safety emplaced.

Evaluated by:	**Approved by:**
/s/ Brenda L. Hawks, Team Member	/s/ Edward Westbrook, Team Leader

APPENDIX 4 – ORR REVIEW FORM 2s

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DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start:**	**Issue No: DOE.1-POST-1**
Dept. of Energy	**DOE.1**	**Observation:**	**Post-Start: X**	**Rev: 0** **Date: 11/29/2016**

ISSUE

Contrary to DOE O 426.1, the Technical Training Program Coordinator, which is a position that is responsible for oversight of safety management programs as identified in the facility DSA, is not included in the TQP.

REQUIREMENT

DOE Order 426.1, *Federal Technical Qualification,* Section 4.1.4(a).(3), states: "Each organization must document its TQP requirements in a TQP plan. Organizations across the Department must use FAQS competencies and KSAs as written in developing their TQP plans. The plans must be approved by the head of the element and include processes and requirements for the following:
(a) Identifying employees and/or positions required to participate in the TQP;
(b) Identifying employees and/or positions participating in the TQP responsible for oversight of safety management programs as identified in the respective facility Documented Safety Analysis (DSA);"

DOE/CBFO-02-3219, Revision 6, *Technical Qualification Program Plan,* Section 7.2, states Determination of TQP Participants Criteria for inclusion in the TQP have been established. The determination of CBFO federal positions requiring inclusion in TQP and qualification requirements/expectations are described in the TPS (Attachment 1).

REFERENCE(S)

- CBFO Technical Qualification Participants Qualification Status, dated 11/16/16

DISCUSSION

Discussion with CBFO staff revealed that the CBFO Technical Training Program Coordinator provides oversight for the contractor's training program, however, this position is not included in the TQP. According to the criteria in the CBFO Technical Position Survey, the Technical Training Program Coordinator position meets three of the four criteria and therefore should be included in the TQP. Further review of CBFO oversight examples indicates the Technical Training Program Coordinator has

participated in a recent EA assessment of contractor training programs and completed a number of operational awareness reports of contractor training program implementation. The Safety Programs Director intends to include two training development courses in the Technical Training Program Coordinator's Individual Development Plan.

Evaluated by:	**Approved by:**
/s/ Mat Irwin, Team Member	/s/ Edward Westbrook, Team Leader
/s/ Vanessa Turner, Team Member	

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start:**	**Issue No: DOE.2-POST-1**
Dept. of Energy	**DOE.2**	**Observation:**	**Post-Start: X**	**Rev: 0**
				Date: 11/30/2016

ISSUE

Facility Representatives (FRs) are not formally reviewing and approving final Occurrence Reporting and Processing System *(*ORPS) reports for SC-2 and above in the timeframe specified in DOE Order 232.2.

REQUIREMENT

DOE Order 232.2, *Occurrence Reporting and Processing of Operations Information*, Section 5.f(3), FR responsibilities states to review and assess reportable occurrence information from facilities under their cognizance to determine the acceptability of the Facility Manager's evaluation of the significance, causes, generic implications, and corrective action implementation and closeout, and to ensure that facility personnel involved in these operations perform the related functions.

DOE Order 232.2, *Occurrence Reporting and Processing of Operations Information*, Attachment 4 7.b, states that within 14 calendar days after receipt of the report, the Facility Representative must review, approve or reject, and add comments, as necessary for Operational Emergencies and Significance Category 1, R, and 2 Final Reports.

REFERENCE(S)

- CBFO MP 10.9, *Surveillance, Operational Awareness, and Issues Management*, Revision 3
- EM-CBFO-NWP-WIPP-2016-0007, *TSR Violation: Fire water suppression system test failures were not properly reported during work evolutions*
- EM-CBFO-NWP-WIPP-2016-0010, *TSR Violation: Differential Pressure alarm set points inoperable*
- EM-CBFO-NWP-WIPP-2016-0004, *Recurring Failures to follow a prescribed hazardous energy control process*
- All EM-CBFO ORPS reports for calendar year 2015 that were SC-2 and above

DISCUSSION

CBFO 5.9, *FR Duties and Responsibilities, and Routine Activities* and DOE/CBFO-13-3505, *WIPP Facility Representative Manual*, provide the base requirements for FR oversight to support implementation of the Occurrence Reporting Program in accordance with DOE Order 232.2. Interviews and reviews of Operational Awareness reports indicate adequate FR oversight of occurrence report discovery, categorization, investigation, causal analysis, corrective actions, and development of the report. FRs, however, are not formally reviewing and approving final ORPS reports for SC-2 and above within 14 days of approval by the facility manager in accordance with DOE Order 232.2. This is a critical formal interface between DOE and the contractor that is being informally managed through OA oversight by CBFO. Furthermore, deliberate assignment of ORPS reports across the CBFO FR staff would help increase overall depth of knowledge and provide clear responsibility to ensure consistent oversight of the report development (investigation, causal analysis, corrective actions development, final report) for all declared ORPS reports, followed by the formal FR approval or rejection of the report for the more significant (SC-2 and above) events.

Evaluated by:	**Approved by:**
/s/ Mat Irwin, Team Member /s/ Vanessa Turner, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start:**	**Issue No: DOE.2-POST-2**
				Rev: 0
Dept. of Energy	**DOE.2**	**Observation:**	**Post-Start: X**	**Date: 11/30/2016**

ISSUE

CBFO implementation of Issues Collection and Evaluation (ICE) surveillance process does not result in approving and communicating formal oversight results and associated issues to contractor in a timely manner.

REQUIREMENT

DOE Order 226.1B, *Implementation of Department of Energy Oversight Policy*, Section 4.b, states to include an issues management process that is capable of categorizing findings based on risk and priority, ensuring relevant line management findings are effectively communicated to the contractors, and ensuring that problems are evaluated and corrected on a timely basis.

CBFO MP 10.9, *Surveillance, Operational Awareness, and Issues Management*, Rev. 3, Section 5.4.5 states, "surveillance personnel shall include a listing of ICE issue numbers and/or CAR numbers that were generated as a result of the surveillance."

REFERENCE(S)

- DOE Order 226.1B, *Implementation of Department of Energy Oversight Policy*, Section 4.b
- CBFO MP 10.9, *Surveillance, Operational Awareness, and Issues Management*, Rev. 3
- EM-CBFO-NWP-WIPP-2016-0007, *TSR Violation: Fire water suppression system test failures were not properly reported during work evolutions*
- EM-CBFO-NWP-WIPP-2016-0010, *TSR Violation: Differential Pressure alarm set points inoperable*
- EM-CBFO-NWP-WIPP-2016-0004, *Recurring Failures to follow a prescribed hazardous energy control process*
- All EM-CBFO ORPS reports for calendar year 2015 that were SC-2 and above

DISCUSSION

CBFO documents oversight via a combination of operational awareness, formal surveillances, and quality assurance independent oversight (audits and surveillances) via approved processes. Surveillance plans are appropriately used and surveillance results are well-written. How the ICE database is used to integrate surveillance issue results and approval of the reports is not mature, resulting in incomplete reports (in ICE) and inconsistent integration between the final surveillance report and ICE issues. For example, the CBFO Line Management Assessment (LMA) of the WIPP Contractor ORR was signed for approval on October 24, 2016; however the status of the surveillance report in ICE is "pending approval." Of the 9 surveillances entered in ICE since June 1, 2016, only one of the reports is "approved/closed" in ICE, although several have an uploaded signed copy of the surveillance in the ICE entry. Several of the operations monthly reports are not approved in ICE and WIPP is currently working on finalizing the draft September report as of November 19, 2016.

In addition, DOE ORR review of a sampling of surveillances found that some reports reference the resulting ICE issue numbers as required by CBFO MP 10.9, Step 5.4.9, while others do not have references or appear to have issues that exist in ICE (e.g. recent LMA of WIPP CORR results). The ICE software does not contain effective searching functions and the current ICE metrics are limited to entered and closed issues and completed surveillances (not consistent with the status reported in ICE). Thus, CBFO implementation of the ICE surveillance process is not resulting in approving and communicating formal oversight results and issues to the contractor in a timely manner.

Evaluated by:	**Approved by:**
/s Mat Irwin, Team Member	/s/ Edward Westbrook, Team Leader
/s/ Vanessa Turner, Team Member	

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start:**	**Issue No: DOE.2-POST-3**
Dept. of Energy	**DOE.2**	**Observation:**	**Post-Start: X**	**Rev: 1**
				Date: 11/30/2016

ISSUE

CBFO has failed to ensure key safety program commitments (e.g., contractor-submitted documents for review/approval, federal implementing procedures, etc.) are tracked and deliberately dispositioned.

REQUIREMENT

DOE Order 450.2, *Integrated Safety Management,* Requirement 5.c.(3), states to ensure the establishment of the annual Field Element safety goals and objectives and contractor safety performance objectives, measures, and commitments.

DOE Order 422.1 Chg.2, *Conduct of Operations,* Requirement Attachment 2.b, states the operator must obtain DOE line management approval of the Conduct of Operations Matrix or other documentation demonstrating conformance with the specific requirements.

REFERENCE(S)

- AIB JON 21, Action 1, Monthly combustible walk downs.
- AIB JON 22, Action 1, Periodic housekeeping walk downs for egress.
- *DOE/CBFO Electrical Safety Authority Having Jurisdiction Function Management and Operating Contractor Responsibilities* (Letter from Jose R. Franco, CBFO, to Farok Sharif, WTS), August 23, 2012
- DOE Order 450.2, *Integrated Safety Management*
- DOE Order 422.1 Chg.2, *Conduct of Operations*

DISCUSSION

Throughout the review, various CBFO documents were requested from CBFO to demonstrate completion of requirements or self-imposed commitments. These requirements include commitments to external entities (e.g. DOE-HQ), prime contractors, and self-imposed commitments to support CBFO implementation of safety processes. Some of the examples (annual Integrated Safety Management System (ISMS) declaration activities and ISMS description update) were delayed and clearly impacted by overall

staff attrition, but many either don't have documentation to demonstrate completion or are not assigned, tracked, and managed to ensure deliberate completion, reassignment, and/or extension based upon relative priorities and emerging needs. Examples of required CBFO commitments that are not tracked by the organization include the ISMS annual declaration, ISMS description update (per DOE O 450.2), DOE formal approval of the NWP Conduct of Operations applicability matrix (per DOE O. 422.1a), development and approval of a Startup Notification plan procedure (per DOE O 425.1D), and completion of the NWP ISMS verifications (DOE O 450.2). In addition to requirements-related commitments, CBFO does not have a mechanism in place to assign or track completion of self-imposed requirements such as the monthly combustible and housekeeping egress walk downs (AIB JON 21 Action 1 and JON 22 Action 1), electrical and fire protection Authority Having Jurisdiction oversight (per formal correspondence on the CBFO website), and timely completion of WIPP oversight products such as the operations monthly report, operations quarterly evaluation report, and the engineering quarterly evaluation report. The lack of mechanisms to track these commitments also hampers the ability to balance priorities and resources necessary to support safe operation. It should be clear that these are merely examples and not an exhaustive listing of all such commitments.

The Contractor Oversight Plan also requires the development of a Quarterly Evaluation Report (QER) for Operations and another report for Engineering. The report performs functional area evaluations for 17 areas. Each functional area evaluation shall include a paragraph summarizing the Contractor Assurance System performance for the area based upon CBFO oversight reports and issues in ICE for the quarter under review. The oversight plan requires that the final reports are available for the WIPP operational oversight planning committee members by the last day of the second full work week of the month following the quarter under review. A review of the ICE database identified that a combined Operations QER was completed for the 2 quarters ending in March of 2016, but the QER for the 3rd quarter of fiscal year 2016 was still in draft at the time of this review, almost five months after the completion of the quarter being evaluated. Neither the operations nor engineering QER have been drafted for the 4th quarter of fiscal year 2016, as required by the CBFO oversight plan. The significant delay in issuing both the monthly and quarterly reports severely hampers the effectiveness of the reports in influencing contractor behavior to address precursor trends. Furthermore, these tools provide valuable information to support ongoing adjustments in formal surveillance planning and performance. CBFO processes have established adequate tools to document oversight and identify issues, but continuous improvement opportunities exist to improve effectiveness of these tools.

Evaluated by:	**Approved by:**
/s/ Mat Irwin, Team Member /s/ Vanessa Turner, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start:**	**Issue No: DOE.2-POST-4**
Dept. of Energy	**DOE.2**	**Observation:**	**Post-Start: X**	**Rev: 0**
				Date: 11/30/2016

ISSUE

CBFO has failed to implement the ICE issues process for consistently managing issues to ensure timely disposition.

REQUIREMENT

CBFO MP 10.9, *Surveillance, Operational Awareness, and Issues Management,* Rev. 3, Section 4.2.4, states to ensure issues generated by assigned CBFO personnel are taken to resolution in a timely manner.

REFERENCE(S)

- DOE Guide 450.1-c, attachment 10: "Effective resolution of reported problems, vigorous corrective and improvement action programs are established and effectively implemented, providing both transparency and traceability of all corrective actions. Corrective action programs effectively prioritize issues, enabling rapid response to imminent problems while closing minor issues in a timely manner to prevent them from escalating into major issues."
- CBFO MP 10.9, *Surveillance, Operational Awareness, and Issues Management*

DISCUSSION

The CBFO Issue Collection and Evaluation (ICE) database has been established and is used in accordance with CBFO MP 10.9. The procedure is written to address both contractor and internal CBFO issues and contains multiple approvals and handling depending upon the type of issue and the decisions made by the identified Issue Manager. To support concurrence, the Issue Manager can add clarifications or additional information, release or reassign the issue, concur with the issue, or dismiss the issue with a statement of justification. Of the 633 issues identified, 29 are in the "submitted" awaiting issue manager action, 264 are approved and in process, 1 is pending approval (system indicates approver of record is the former WIPP Assistant Manager), 12 were dismissed, 13 were deleted, and the rest have been closed. Interviews identified that designation of the significance of ICE issues between "Major, Normal and Minor" has been a challenge. This challenge is highlighted by the fact that 10 of the 29 issues

currently in "submitted" status were designated as "Major" by the originator, but none of these 10 issues have been dispositioned by the issue manager yet. This failure to act on issues deemed important by originators has significant negative impacts on culture, inhibits future identification of issues, and does not meet CBFO procedure requirements to ensure timely disposition of issues. The oldest of these 10 "Major" issues was originated on April 12, 2016, and DOE ORR review of the 10 items indicate that actions are in progress to mitigate some of the issues, but the ICE report has not been documented to reference or describe the actions.

Evaluated by:	**Approved by:**
/s/ Mat Irwin, Team Member	/s/ Edward Westbrook, Team Leader
/s/ Vanessa Turner, Team Member	

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area: **Dept. of Energy**	**Objective #:** **DOE.2**	**Finding: X** **Observation:**	**Pre-Start:** **Post-Start: X**	**Issue No: DOE.2-POST-5** **Rev: 0** **Date: 12/01/2016**

ISSUE

DOE-HQ has failed to complete many Accident Investigation Board Judgments of Need corrective actions to support WIPP operations.

REQUIREMENT

DOE Order 414.1D Admin Chg. 1, *Quality Assurance,* Attachment 2, 3. a., states to establish and implement processes to detect and prevent quality problems.

U.S. Department of Energy Corrective Action Plan for Environmental Management Headquarters Salt Haul Truck Fire at the Waste Isolation Pilot Plant on February, 5, 2014, August 2014

U.S. Department of Energy Corrective Action Plan for Environmental Management Headquarters Phase1:Radiological Release Event at the Waste Isolation Pilot Plant on February, 14, 2014, March 2015

U.S. Department of Energy Corrective Action Plan for Environmental Management Headquarters Phase 2: Radiological Release Event at the Waste Isolation Pilot Plant on February, 14, 2014, August 2015

REFERENCE(S)

- EM 3.112 *WIPP Open CA Narratives*, 11/22/2016
- Office of Standards and Quality Assurance Management Assessment EM-PA-15-17 of the Corrective Action Hub

DISCUSSION

A review of the three CAPs that contained the AIB JONs for HQ found that HQ was responsible for 67 JON actions. A recent review of HQ JONs completed by Department of Energy's Office of Operational Safety (EM 3.112) identified 38 JON actions remained

open and of that 38 only 4 were not due yet, with the remaining items being "overdue and status unknown" or "overdue-contingent". Discussions with EM-HQ and action assignees indicates most of the issues are not being tracked in CA Hub, which is the system established by DOE-HQ to track and manage corrective actions. Based on these numbers it appears that DOE HQ has only completed about half of their assigned AIB JON actions with the remaining half being overdue by more than a year in most cases. A sample of closed HQ AIB JONs was reviewed. Objective closure evidence was provided to the team but it was not provided in closure package format which would typically include a description of the JON, a description of the required objective evidence, the objective evidence, formal signoff as complete from the issue owner, and documentation of acceptance as closed. As a result of the lack of rigor in maintaining formal closure packages it is difficult to conclude that corrective action plans associated with AIB JONs assigned to DOE HQ have been evaluated, verified to be closed, and appropriately documented. Although effectiveness was not assessed during the course of the DORR, there was evidence to suggest that corrective actions that were completed were ineffective. For example, JON 27 included actions to establish and implement a corrective action procedure and process and evaluate the process for effectiveness. These actions were completed, but the management assessment of the Corrective Action Hub, conducted by the DOE EM Office of Standards and Quality Assurance, found that the process was not effectively implemented; however additional actions have not been defined or completed to address the issues identified.

Evaluated by:	**Approved by:**
/s/ Mat Irwin, Team Member	/s/ Edward Westbrook, Team Leader
/s/ Vanessa Turner, Team Member	

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area: **Emergency Preparedness**	**Objective #:** **EM.1**	**Finding: X** **Observation:**	**Pre-Start: X** **Post-Start:**	**Issue No: EM.1-PRE-1** **Rev: 0** **Date: 11/30/2016**

ISSUE

Improvement is needed in the WIPP's Emergency Notification System to support near-term operations; and equipment upgrades are needed for long-term system reliability (post-start component).

REQUIREMENT

DOE Order 151.1C, *Comprehensive Emergency Management System*, requires that facilities and equipment adequate to support emergency response must be available, operable, and maintained. At a minimum, facilities must include an adequate and viable command center. Equipment must include, but not be limited to, personnel protective equipment, detectors, and decontamination equipment. Also the contractor must provide facilities and equipment adequate to support emergency response, including the capability to notify employees of an emergency to facilitate the safe evacuation of employees from the work place, immediate work area, or both.

For Operational Emergencies, initial emergency notifications must be made to workers, emergency response personnel, and organizations, including DOE/NNSA elements and other local, State, Tribal, and Federal organizations.

REFERENCE(S)

- DOE Order 151.1C, *Comprehensive Emergency Management System*
- WP 12-9, *WIPP Emergency Management Plan*
- WP 12-15, *WIPP Emergency Management Communications Plan*
- DOE G 151.1-4, Response Elements

DISCUSSION

Pre-Start Discussion (i.e., these identified issues should be resolved prior to waste emplacement operations)

The difficulties with the reliability of this equipment have been well documented at the WIPP. During the CORR a prestart finding was written concerning the operability and

testing of equipment (audible, visual) used for abnormal event communication/between workers (both above ground and underground) and CMR is less than adequate. This is contrary to the requirements of SMP KE 11-3 and the WIPP RCRA Contingency Plan Section 2.10. WIPP form WF16-1794 was generated with a corrective action plan developed that included a compensatory measure that identifies "dead zones" and requires personnel to carry radios before entering these areas. The CORR indicated in their report the testing of these systems was inadequate. During the DORR it was determined that in a number of areas the PA system could not be heard by all personnel; therefore, this may indicate potential inadequacies still in the testing process. This important emergency notification system or compensatory measures must achieve the level of availability and operability required by DOE O 151.1C and eliminate the ongoing reliance on questionable and ineffective compensatory measures.

The emergency plan recognizes an underground evacuation signal system that is separate from the PAS and includes electric horns and strobe lights. During Bison-3 and DORR-16 the strobe lights were not in operation. Although this system is listed in the manageable list it should be re-evaluated and addressed for reliability prior to operations.

Post Start Discussion (i.e., these identified issues should be resolved, but not necessarily prior to waste emplacement operations)

WP 12-9, *WIPP Emergency Management Plan*, identifies multiple communication/notification systems used by the WIPP to notify onsite populations and offsite authorities. The plan refers to WP 12-15, *WIPP Emergency Management Communications Plan*, for the description of the communications systems and equipment used for emergency situations. The plan identifies the following for site communications for day-to-day and emergency operations:

- Telephone System (Site-wide Private Branch Exchange (PBX))
- Cellular Telephone System
- Digital Pager System
- Public Address System (PAS)
- Communicator! NXT System
- Sentinel Underground Communication System

The communications plan identifies the Digital Pager System as a primary emergency notification system for the Emergency Response Organization as well as an alternate to the PBX system and the Public Address System (PAS) as one of the primary systems used to notify personnel of emergency site and underground evacuations. The communications plan also states that both of these systems are legacy systems and that the manufactures no longer support replacement parts or equipment. Concerning the Digital Pager System the WIPP EM currently does not have enough functioning pagers for all on-call positions, and new pagers are no longer available. The PAS has several areas of the surface site and underground that are not covered by the audio from the PAS. The problem with the PAS is also well documented in the CORR. Also, it has been

documented during the exercises and interviews there were problems with telephones in the Central Monitoring Room (CMR) and that there were problems with the Communicator! NXT activating the Emergency Operations Center in two of the exercises observed. It should also be noted that the plan states that the Cellular Telephone System may be unreliable.

The evaluation for equipment upgrades are needed to maintain long term system operability and reliability.

Evaluated by:	**Approved by:**
/s/ Greg Campbell, Team Member	/s/ Edward Westbrook, Team Leader
/s/ Frank Moussa, Team Member	

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area: Emergency Preparedness	**Objective #:** EM.1	**Finding: X** Observation:	**Pre-Start: X** Post-Start:	**Issue No: EM.1-PRE-2** Rev: 0 Date: 11/29/2016

ISSUE

Current staffing does not provide Emergency Medical Technicians (EMTs) or first responders 100% of the time work is being performed in the underground. According to 30 CFR § 56.18010, a person capable of providing first aid must be available on all shifts. This includes CPR.

REQUIREMENT (Individual requirements were not cited from the *procedures below)*

30 CFR 57.18010 - An individual capable of providing first aid shall be available on all shifts. The individual shall be currently trained and have the skills to perform patient assessment and artificial respiration; control bleeding; and treat shock, wounds, burns, and musculoskeletal injuries. First aid training shall be made available to all interested miners.

NFPA 1710 Chapter 4 – Four minutes or less for the arrival of a unit with first responder or higher level capability at an emergency medical incident.

DOE Order 151.1C, Comprehensive Emergency Management System – Medical support for contaminated or injured personnel must be planned and promptly and effectively implemented. Arrangements with offsite medical facilities to transport, accept, and treat contaminated, injured personnel must be documented.

REFERENCE(S)

- 30 CFR 57, Safety and Health Standards – Underground Metal and Nonmetal Mines
- NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments*
- DOE 151.1C, *Comprehensive Emergency Management System*
- DOE G 151.1-4, *Response Elements*

DISCUSSION

During interviews personnel could not confirm that an EMT or first responder is present in the mine at all times when work is being conducted in the mine. According to 30 CFR

§ 56.18010, a person capable of providing first aid must be available on all shifts; this includes CPR. All interested miners must be trained.

DOE G 151.1-4 refers to NFPA 1710 for response times which states that the response time 90% of the time shall be four minutes or less for the arrival of a unit with first responder or higher level capability at an emergency medical incident. Having an EMT or first responder on surface would not meet this intent due to the time it takes to enter the underground. Also, it should be noted for every minute that passes between collapse and defibrillation; survival rates decrease 7% to 10% if no CPR is provided (Red Cross). The Baseline Needs Assessment does not discuss any minimum medical staffing for the underground.

Evaluated by:	**Approved by:**
/s/ Greg Campbell, Team Member /s/ Frank Moussa, Team Member	/s/ Mark C. Brown, Deputy Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start: X**	**Issue No: ENG.1-PRE-1**
Engineering	**ENG.1**	**Observation:**	**Post-Start:**	**Rev: 0**
				Date: 11/29/2016

ISSUE

Contrary to the requirements of WP 02-AR3001, *Unreviewed Safety Question Determination,* NWP did not enter a Potential Inadequacy in the Safety Analysis Determination (PISAD) upon experiencing a roof fall larger than that postulated in the Hazards Analysis supporting assumptions.

REQUIREMENT

10 CFR 830.203, "Unreviewed Safety Question Process" requires contractors responsible for hazard category 1, 2, and 3 DOE nuclear facilities to establish, implement, and take actions consistent with a USQ process that meet the requirements within the section. 10 CFR 830.203 is implemented by NWP via the following documents:

12-NS.11, Rev. 0, 11/19/15, section 2.4, lists Design and/or Engineering Organization responsibilities, including, "Ensure unreview safety question determinations screens/evaluations are performed as outlined in WP 02-AR3001, for new or modified designs."

WP 02-AR3001, Rev. 12, effective 2/18/15, implements 10 CFR 830.203.

The response to a PISA is outlined in 10 CFR §830.203(g). From page 42 of the NWP procedure,

> "The PISA portion of the USQ process begins when a contractor identifies or is informed of a situation that indicates that the accident analyses that support the DOE approved DSA may not be bounding or may be otherwise inadequate. A PISA determination (PISAD) must be completed within three working days after the situation has been identified, and a PISA USQD completed within five working days after a PISA has been declared."

Per the NWP procedure, the PISA determination would include answering question 2:

> "Does the discrepant as-found condition, operational event, or the discovery of new information indicate that parameters used or assumed in safety analysis calculations or in calculations in supporting documents referenced in the safety

basis may not be conservative with respect to consequence or frequency?" (p. 53 of the NWP procedure)

REFERENCE(S)

- 10 CFR 830.203, "Unreviewed Safety Question Process"
- WP 02-AR3001, *Unreviewed Safety Question Determination*, Rev. 12, effective 2/18/15
- 12-NS.11, *WIPP Nuclear Safety Program Description*, Rev. 0, 11/19/15
- Interviews with NWP and CBFO engineering and nuclear safety personnel
- WIPP-021, Hazards Analysis for WIPP Transuranic Waste, Rev. 6, 5/4/16
- Calculation WIPP-019, WIPP DSA External Event and Natural Hazard Phenomena (NHP) Event Hazard Analysis (HA) and Accident Analysis (AA) Calculations, Rev. 7, dated 4/15/16
- Email from NWP Nuclear Safety Program Manager, to reviewers, dated 11/22/16, with attached word document "UG-30-001a1.docx"

DISCUSSION

Note: The scope of the DOE ORR only includes ground control activities related to maintenance of the pathway to Panel 7, as well as Panel 7 rooms designated for future waste emplacement. However, Engineering and Nuclear Safety are within the scope of this review and the aspects of ground control and geotechnical engineering that fall within these boundaries and are covered thoroughly in this review.

Because no Ground Control maintenance is performed in the south end of the mine or the filled panels, roof fall is inevitable in these areas, which represents an anticipated event. Areas currently designated as inaccessible include the South end of E-140 and W-30, portions of Panel 7 including Room 4 where a recent roof fall occurred, and portions of S-1950 providing access to the mined portions of Panel 8, and all of the previously-filled panels (1-6).

The November 3rd roof fall in Panel 7 highlighted (to the DORR team) the portion of the Hazard Analysis (HA) devoted to roof fall in a room filled with previously-emplaced waste, (Accidents 30-UG-001a-f) and specifically the supporting analysis (Calculation number WIPP-019), which assumes ten stacks of three drums each (30 total drums) are partially crushed. Given the magnitude of the recent event in Panel 7 room 4, the team raised the question whether the HA assumption of 30 drums partially crushed in a moderate impact event is still bounding for the WIPP roof fall events.

The NWP response was to prepare a white paper stating qualitatively that an event involving a larger portion of roof fall, with an assumed impact to 90 drums, would have the same consequences as the event evaluated in the HA, because, "In reality, only the waste in the top tier containers would lose containment." This assumption is inconsistent with the assumption made in the original HA that all three tiers of containers lose confinement, and no credible technical basis is provided. There is also no technical basis for the assumption that only 90 drums would be impacted…the area of the Panel 7 Room

4 roof fall was very likely large enough to impact hundreds or thousands of containers if it had occurred in a filled panel.

This issue should have been raised as a PISAD and addressed through the formal process with a solid technical basis.

Evaluated by:	**Approved by:**
/s/ Elaine Diaz, Team Member /s/ James Kekacs, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area: **Engineering**	**Objective #:** **ENG.2**	**Finding: X** **Observation:**	**Pre-Start:** **Post-Start: X**	**Issue No:** **ENG.2-POST-1** **Rev: 0** **Date: 11/29/2016**

ISSUE

Contrary to the requirements of the Documented Safety Analysis (DSA), System Description Document (SDD), and DOE Order 433.1B, the Underground Ventilation System/ Interim Ventilation System (UVS/IVS) systems' operability could be impaired by unresolved known issues, lack of spare parts, and incomplete construction punch list items.

REQUIREMENT

WIPP is a Hazard Category 2 nuclear facility, and as such is required to follow Department Order 433.1B Administrative Change 1, *Maintenance Management Program for DOE Nuclear Facilities*, dated 03/12/ 2013, which defines the safety management program required by Title 10 Code of Federal Regulations (CFR) 830, *Nuclear Safety Management*. DOE Order 433.1B Attachment 2 lists the specific requirements for a Nuclear Material Management Plan, including procurement to ensure the availability of parts, materials, and services for maintenance activities.

WIPP DSA, DOE/WIPP 07-3372, Rev 5b, Chapter 10.1, KE 10-2, "Testing, calibration, operability and preventative/corrective maintenance in accordance with code requirements, manufacturer recommendations, established technical requirements, and engineering judgment consistent with tracking, trending, and failure history."

KA 10-5: "The Maintenance Program ensures that maintenance activities are conducted to preserve and restore the availability, operability, and reliability of Safety SSCs…"

SDD VU00, *Underground Ventilation System Description Document*, Rev. 24, 09/22/16, section 4.3.4.1, Maintenance Approach, describes the preferences for maintenance of the systems, including "Remove and Replace with available spare."

4.3.4.3, describes the Preventative Maintenance and Predictive Maintenance program for the UVS/IVS. Included in this section is a list of major equipment, such as fan motors, variable inlet vanes, that is considered major equipment requiring preventative and predictive maintenance.

REFERENCE(S)

- UVS/IVS System Health Report (To be issued)
- Slides from UVS/IVS System Health Report briefing
- Walk down of UVS/IVS with Cognizant System Engineer, 11/17/16.
- DOE Order 433.1B, Administrative Change 1, *Maintenance Management Program for DOE Nuclear Facilities*
- DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis*, Rev. 5, 04/16
- DOE/WIPP 07-3373, *Waste Isolation Pilot Plant Technical Safety Requirements*, Rev. 5, 04/16
- SDD VU00, *Underground Ventilation System Description Document*, Rev. 24, 09/22/16

DISCUSSION

A System Health Report out-brief was observed which was detailed and thorough. Subsequent to this the systems discussed were walked down with two Cognizant System Engineers (CSE). Overall impressions of the CSE system knowledge and experience were excellent.

Highlighted in the System Health Report briefing and subsequent walkdowns were some issues that require attention on the Underground Ventilation System/Interim Ventilation System (UVS/IVS):

1) The UVS bypass damper leak test has not been accomplished, which could result in undetected bypass leakage around the HEPA filters.
2) The UVS ductwork contains a large salt formation that could become an obstruction impeding flow.
3) The UVS ductwork is corroded and leaking condensate in the upstream (contaminated) duct sections.
4) The IVS system is still running on temporary power, which could reduce the reliability of the system due to all power coming through one transformer. A system failure of this nature has already occurred. There is no FY17 funding to connect the IVS to permanent power, although the equipment is in place and 90% complete, requiring only final tie-ins.
5) No spare parts have been procured or are funded for FY17 to support the IVS system. It has consumables but not essential spares.

The new IVS is running on temporary construction power, meaning one transformer failure can cause failure of both fans, which recently occurred. This configuration also allows for only local fan control at the Variable Frequency Drives outdoors near the filters, although power to the transformers can be cut from the Central Monitoring Room to stop power to the fans.

The condition of the UVS 860 fans has significantly improved since 2014, but the ductwork is badly corroded and leaking, and the exhaust shaft elbow contains a large formation of salt. There is no program in place to monitor the salt formation to determine impact on ventilation. The filtration bypass dampers were experiencing significant bypass leakage after the radiological release in 2014, and were partially blocked with foam until the foam experienced an exothermic reaction within the duct. No testing has been performed to ensure the partial foam installation is effective in preventing bypass leakage. Continuous Air Monitors have been installed in Station A upstream of the IVS/UVS filters and fans and Station B downstream, but are not credited safety equipment and thus are susceptible to falling into the same state of disrepair that was found with the UVS in 2014.

Given that ventilation supports bolting and waste emplacement, the cost of neglecting these seemingly minor maintenance issues could become surprisingly significant in terms of personnel safety and mine real estate.

Evaluated by:	**Approved by:**
/s/ Elaine Diaz, Team Member	/s/ Edward Westbrook, Team Leader
/s/ James Kekacs, Team Member	

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start: X**	**Issue No: FP.1-PRE-1**
Fire Protection	**FP.1**	**Observation:**	**Post-Start:**	**Rev: 0** **Date: 11/30/2016**

ISSUE

Fire suppression systems have not yet been installed/accepted for all non-waste handling vehicles prior to use as required by fire protection equivalency WIPP-EQ-2015-01, and Documented Safety Analysis (DSA) Key Element (KE) 11-5.

REQUIREMENT

Fire protection equivalency WIPP-EQ-2015-01 states that underground diesel powered equipment is evaluated for fire risk in accordance with National Fire Protection Association (NFPA) 122 and that all equipment determined to pose an unacceptable fire risk in the NFPA 122 analysis will be protected with an automatic fire suppression system prior to use.

DSA KE 11-5 states that underground diesel powered equipment is evaluated for fire risk in accordance with NFPA 122. All equipment determined to pose an unacceptable fire risk in the NFPA 122 analysis will be protected with an automatic fire suppression system prior to use.

REFERENCE(S)

- Letter T. Shrader to P. J. Breidenbach, Subject: *Contract No. DE-EM0001971, Submittal of WIPP-EQ-2015-01 Request for an Equivalency for NFPA 101, Life Safety Code, and Alternative Egress Provisions within the WIPP Underground*, dated September 19, 2016
- DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis*, Rev. 5b, dated April 2016

DISCUSSION

Equivalency WIPP-EQ-2015-01 states that underground diesel powered equipment is evaluated for fire risk in accordance with NFPA 122 and that all equipment determined to pose an unacceptable fire risk in the NFPA 122 analysis will be protected with an automatic fire suppression system prior to use. Fire Hazard Risk Assessments (FHRAs)

have been performed and fire suppression systems have been installed on the waste handling vehicles as required; however, fire suppression systems have not yet been installed for all non-waste handling vehicles prior to use. Procedures for preoperational checks of vehicles allow use of non-waste handling vehicles if an automatic fire suppression system is not installed, requiring only a fire watch to be established as a compensatory measure. It was noted that equipment specific FHRAs do not provide justification of use of vehicles that have not been provided with the specified risk mitigation.

Evaluated by:	**Approved by:**
/s/ Taryn Couchman-Cates, Team Member	/s/ Mark C. Brown, Deputy Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area: Fire Protection	Objective #: FP.1	Finding: X Observation:	Pre-Start: X Post-Start:	Issue No: FP.1-PRE-2 Rev: 0 Date: 11/30/2016

ISSUE

Underground vehicles were observed (on several occasions) parked on the wrong side of the drifts, contrary to WP 12-ER.25, *Underground Escape and Evacuation Plan*. This is a repeat pre-start finding from the CORR.

REQUIREMENT

WP 12-ER.25, requires vehicles to be parked on the side of the drift that is opposite the egress reflectors in order to prevent obstruction of the markings.

REFERENCE(S)

- WP 12-ER.25, *Underground Escape and Evacuation Plan*, Rev. 0, dated 01/07/2016

DISCUSSION

In accordance with WP 12-ER.25, life safety egress markings are installed on the right side of the drift when egressing toward the conveyance. Vehicles are required to be parked on the side of the drift that is opposite the egress reflectors in order to prevent obstruction of the markings. A weakness in implementation was identified when improper parking of vehicles was noted on multiple occasions during the DORR, contrary to the requirements of WP 12-ER.25. This issue was also identified as a pre-start during the CORR, indicating inadequate CORR corrective actions.

Evaluated by:	Approved by:
/s/ Taryn Couchman-Cates, Team Member	/s/ Mark C. Brown, Deputy Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start: X**	**Issue No: FP.1-PRE-3**
				Rev: 0
Fire Protection	**FP.1**	**Observation:**	**Post-Start:**	**Date: 11/30/2016**

ISSUE

The combustible loading program contains conflicting/unclear documentation and is not effectively implemented.

REQUIREMENT

DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis*, specifies key element (KE) 11-2 for formal Fire Protection Engineer combustible control inspections.

DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis*, specifies key element (KE) 11-5 for underground combustible materials controlled in accordance with the WIPP Fire Protection Program.

REFERENCE(S)

- DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis,* Rev. 5b, dated April 2016
- WP 12-FP.07, *WIPP Combustible Control Program*, Rev. 2
- WP 12-FP3003, *Combustible Material and Compressed Gas Cylinder Checks,* Rev. 20, dated 09/14/2016
- WP 12-FP3006, *WIPP Combustible Permitting*, Rev. 0, dated 10/28/2015
- WP 12-FP3009, *Fire Protection Engineering Combustible Control Program Inspections*, Rev. 0, dated 05/23/2016
- EA12FP3003-2-0, *Underground Combustible Material/Gas Cylinder Check Sheet*

DISCUSSION

Based on walkdowns, document reviews, and personnel interviews, discrepancies between combustible loading requirements were identified as well as notable issues regarding implementation of combustible loading requirements, indicating that the documented combustible loading program is not fully established and implemented. For example:

- Inconsistencies noted between WP 12-FP.07, *WIPP Combustible Control Program,* EA12-FP3003-2-0, *Underground Combustible Material/Gas Cylinder Check Sheet,* and SAF-502 regarding size of fuel packages (3 megawatt (MW) vs 5 MW), separation requirements (7 feet vs 10 feet), and allowances to reduce separation.
- "Fire blankets" are being used not in accordance with their approved and intended function (i.e. weld curtain for vertical plane protection only) and are falsely relied upon to mitigate exposure to adjacent fires, thus allowing reduction of separation distances (see EA12FP3003-2-0, item 1h).
- Four wooden spools/reels of wire were observed staged together in the underground. WP 12-FP.07, identifies one wooden spool/reel or wire as an example of a 3 MW fuel package requiring a minimum seven feet of separation between fuel packages. Proper separation was not provided for the subject fuel packages.
- Combustible materials were repeatedly observed staged on the same side of the drift as the exit reflectors, contrary to WP 12-FP.07.
- Combustible loading permit is inadequate: there is no criteria provided for evaluating whether an Unreviewed Safety Question (USQ) is required. All fire protection engineers have not received specific USQ training to complete this evaluation in an expert-based manner.

Evaluated by:	**Approved by:**
/s/ Taryn Couchman-Cates, Team Member	/s/ Mark C. Brown, Deputy Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start: X**	**Issue No: IH.1-PRE-1**
Industrial Hygiene	**IH.1**	**Observation:**	**Post-Start:**	**Rev: 0**
				Date: 11/17/2016

ISSUE

The Mine Rescue Team (MRT) did not have an approved procedure for the calibration or calibration check of atmosphere monitoring equipment, were not maintaining records of the tests, and were using expired calibration gas.

REQUIREMENT

- WP 13-1, Rev. 36, *Quality Assurance Program Description*

REFERENCE(S)

- WP 13-1, Rev. 36, *Quality Assurance Program Description*, section 2.5.1.1 Control of Out-of-Calibration Equipment which states:
  A. Monitoring, measuring, testing, and data collection equipment shall be considered to be out-of-calibration and shall NOT be used until calibrated if any of the following conditions exist:

     - The calibration due date has passed without recalibration
     - The device produces results known or suspected to be in error
     - The equipment has been damaged

  B. Out-of-calibration monitoring, measuring, testing, and data collection equipment shall be controlled. The controls shall include the following requirements:

     - Out-of-calibration monitoring, measuring, testing, and data collection equipment shall be tagged, segregated, or otherwise controlled to prevent use until they have been recalibrated
     - When Measuring and Testing Equipment is found to be out-of-calibration during recalibration, the validity of results obtained using that equipment since its last valid calibration shall be evaluated

       - The evaluation shall include the determination of acceptability of previously collected data, processes monitored, or items previously inspected or tested

- The evaluation shall be documented
- The user and quality assurance management shall be notified
- Corrective actions shall be taken, as applicable

DISCUSSION

During a walk down of the MRT on 11/17/16 a calibration gas bottle (nitrogen dioxide 5 ppm (vol), carbon monoxide 100 ppm (vol), methane (50% LEL) 2.5% (vol), nitrogen balance, oxygen 19 % (vol) was found in their gas cabinet that had an expiration date of July 2016. The MRT team member stated they had used the gas that morning. When asked if they had gas that was not beyond the expiration date, they could not readily find any.

The MRT team does not have a procedure to perform their calibration or calibration check ("bump test") and there is no documentation of either the bump test or calibration. The MRT team member stated that a procedure is not required and they are not documenting the calibration results. If there is no documentation of the calibration or bump test, NWP cannot tie it back to the proper calibration gas or sensor if there were to be a problem. The contractor's extent of condition review for the expired calibration gas resulted in the discovery of three other calibration gas bottles that were beyond their expiration date.

Evaluated by:	**Approved by:**
/s/ Karen Kubiak, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start: X**	**Issue No: IH.2-PRE-1**
Industrial Hygiene	**IH.2**	**Observation:**	**Post-Start:**	**Rev: 0**
				Date: 11/29/2016

ISSUE

The contractor's response procedure for investigating and responding to a potentially Immediately Dangerous to Life or Health (IDLH) atmosphere is not protective for responding employees.

REQUIREMENT

10 CFR 851.22(a)(1) and (2), which states: "851.22 Hazard prevention and abatement.
(a) Contractors must establish and implement a hazard prevention and abatement process to ensure that all identified and potential hazards are prevented or abated in a timely manner.
(1) For hazards identified either in the facility design or during the development of procedures, controls must be incorporated in the appropriate facility design or procedure.
(2) For existing hazards identified in the workplace, contractors must:
(i) Prioritize and implement abatement actions according to the risk to workers;
(ii) Implement interim protective measures pending final abatement; and
(iii) Protect workers from dangerous safety and health conditions;

And

1910.134(d)(2) (i), (ii) and (iii) which states:
Respirators for IDLH atmospheres.
1910.134(d)(2)(i)
The employer shall provide the following respirators for employee use in Immediately Dangerous to Life or Health (IDLH) atmospheres:
1910.134(d)(2)(i)(A)
A full facepiece pressure demand Self-Contained Breathing Apparatus (SCBA) certified by NIOSH for a minimum service life of thirty minutes, or
1910.134(d)(2)(i)(B)
A combination full facepiece pressure demand Supplied-Air Respirator with auxiliary self-contained air supply.
1910.134(d)(2)(ii)

Respirators provided only for escape from IDLH atmospheres shall be National Institute for Occupational Safety and Health-certified for escape from the atmosphere in which they will be used.

1910.134(d)(2)(iii)

All oxygen-deficient atmospheres shall be considered IDLH. Exception: If the employer demonstrates that, under all foreseeable conditions, the oxygen concentration can be maintained within the ranges specified in Table II of this section (i.e., for the altitudes set out in the table), then any atmosphere-supplying respirator may be used.

REFERENCE(S)

- WP 12-IH1020, Rev. 2, *Abnormal Condition Involving Cryogenics/Inert Gas*
- 10 CFR 851, *Worker Safety and Health Program*
- 29 CFR 1910.134, *Respiratory Protection*

DISCUSSION

In reviewing WP 12-IH1020, Rev. 2, *Abnormal Condition Involving Cryogenics/Inert Gas*, it was noted that when responding to a potential oxygen deficient atmosphere, personnel are not required to wear the appropriate respiratory protection (SCBA). Personnel are to perform remote monitoring through a port if one is available. If a port is not available, they are to sample along the doorframe or edge of brattice starting at the bottom. They are then allowed to crack open the door and insert the wand as far as possible. If all readings are greater than 19.5%, they may declare the facility safe to re-enter. This method does not protect the employee performing the monitoring of a potentially IDLH atmosphere and it does not ensure that all areas of the space are safe for re-entry. These are documented in sections 5.2.8 and 5.2.9 of WP 12-IH1020.

Evaluated by:	**Approved by:**
/s/ Karen Kubiak, Team Member	/s/ Mark Brown, Deputy Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start: X**	**Issue No: MG.1-PRE-1**
Management	**MG.1**	**Observation:**	**Post-Start:**	**Rev: 1**
				Date: 11/20/2016

ISSUE

The Startup Plan does not provide for a graded, systematic approach to unrestricted operations.

REQUIREMENTS

DOE O 425.1D, Verification of Readiness to Startup or Restart Nuclear Facilities
DOE-STD-3006-2010, Planning and Conducting Readiness Reviews

REFERENCE

- U.S. Department of Energy Waste Isolation Pilot Plant Startup Plan for Commencement of Contact Handled Waste Emplacement Waste Isolation Pilot Plant, Rev. 4

DISCUSSION

WIPP's documented process for graded operations after resumption of operations is defined in the *U.S. Department of Energy Waste Isolation Pilot Plant Startup Plan for Commencement of Contact Handled Waste Emplacement Waste Isolation Pilot Plant,* Rev. 4. DOE Order 425.1D, *Verification of Readiness to Start Up or Restart Nuclear Facilities*, requires the restart program include plans for graded operations and testing after resumption to simultaneously confirm operability of equipment, the viability of procedures, and the performance and knowledge of the operators.

Based on review of the referenced Startup Plan for WIPP, the startup plan failed to adequately describe discrete steps or requirements for graded operations. The plan also failed to require the use of Senior Supervisory Watch personnel, which would be expected upon initial resumption of operations for specified evolutions.

Evaluated by:	**Approved by:**
/s/ Mark C. Brown, Team Member /s/ Dimple Patel, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start:**	**Issue No: MG.1-POST-1**
Management	**MG.1**	**Observation:**	**Post-Start: X**	**Rev: 0**
				Date: 11/30/2016

ISSUE

Current contractor staffing (compounded by the lack of qualified personnel) in some critical areas will not fully support the breadth of operations planned in calendar year 2017.

REQUIREMENT

WP 15-MD3101, Rev. 7-FR2, *Verification of Readiness to Startup or Restart WIPP,* Attachment 5, Core Requirements to Address in a Readiness Review Plan of Action Core requirements verify the readiness of personnel, procedures, programs, and equipment within the scope of the RR to safely start nuclear operations. These core requirements are directly related to the seven guiding principles of ISM:

1. Line management has established Safety Management Programs (SMPs) to ensure safe accomplishment of work:
    a. Contract requirements for the SMPs have been flowed down into facility specific procedures.
    b. SMP implementing procedures have been effectively implemented in support of the facility.
    c. A sufficient number of qualified personnel are available to effectively implement the SMPs in support of the facility.

12. The formality and discipline of operations are adequate to conduct work safely, and programs are in place to maintain this formality and discipline. Sufficient numbers of qualified personnel are available to conduct operations.

DOE O 425.1D, *Verification of Readiness to Start Up or Restart Nuclear Facilities,* Attachment 1, Contractor Requirements Document

2. Contractor Requirements
    f. Core Requirements. Core requirements verify the readiness of personnel, procedures, programs, and equipment within the scope of the Readiness Review to safely start nuclear operations. These core requirements are directly related to the seven guiding principles of ISM.
        (1) Line management has established Safety Management Programs (SMPs) to ensure safe accomplishment of work:

(c) A sufficient number of qualified personnel is available to effectively implement the SMPs in support of the facility; and

(12) The formality and discipline of operations are adequate to conduct work safely, and programs are in place to maintain this formality and discipline (e.g., DOE O 422.1, *Conduct of Operations*). Sufficient numbers of qualified personnel are available to conduct operations.

DOE O 420.1C, *Facility Safety*
Attachment 2, Facility Safety Requirements
Chapter II, Fire Protection
3. Requirements

e. Emergency Response. Provide emergency response capabilities, as necessary, to meet site needs as established by the baseline needs assessment (BNA), safety basis requirements, and applicable regulations, codes and standards.

(1) Baseline Needs Assessment. A BNA of the fire protection and emergency response organization must be conducted and the BNA must:

(a) establish capabilities to provide:

1. effective response to extinguish fires;

2. emergency medical, rescue and hazardous materials response

3. staffing, apparatus, facilities, equipment, training, pre-incident plans, mutual aid, and procedures.

(b) reflect applicable requirements of NFPA codes and standards, and DOE direction;

REFERENCE(S)

- Interview, NWP Contractor Assurance Manager
- Interview, NWP Geotechnical Engineering lead
- Interview, NWP Operations personnel
- Interview, NWP Management
- Interview, NWP Fire Department Personnel
- Interview, NWP Engineering Manager/Chief Engineer
- Interview, NWP Deputy Engineering Manager
- Interview, NWP Design Authority Manager
- Interview, NWP Nuclear Safety Program Manager
- Interview, NWP Nuclear Safety Manager
- Fire Department Staffing Report, October 15-November 15, 2016
- NWP Organization Chart
- Baseline Needs Assessment
- WIPP Form WF16-922 Corrective Actions
- Radiological Control Organization Staffing Plan 10-21-16

- Operations Staffing Plan
- Contractor Assurance Staffing Plan
- DOE O 420.1C, *Facility Safety*
- DOE O 422.1, *Conduct of Operations*
- DOE O 425.1D, *Verification of Readiness to Start Up or Restart Nuclear Facilities*
- WP 15-MD3101, Rev. 7-FR2, *Verification of Readiness to Startup or Restart WIPP*

DISCUSSION

Current contractor staffing in some critical areas will not fully support the breadth of operations planned in calendar year 2017. This staffing shortage is also compounded by the lack of qualified personnel in some areas.

The Operations organization has adequate staffing for initial waste receipt and emplacement, but the current staffing levels will not be able to support the planned schedule of five shipments per week. The Contact Handled (CH) Waste Handling Operations staffing will be inadequate to accommodate simultaneous unloading of TRUPACT II containers and waste emplacement operations. NWP Management has acknowledged the need for additional qualified waste handling staff to ensure the forecasted waste acceptance schedules are met. NWP is working on qualifying additional staff to support the forecasted waste delivery and emplacement schedule, but it will take approximately three months to fully qualify the current staff.

The WIPP Baseline Needs Assessment (BNA) determined that site emergency response organization requires minimum staffing of seven personnel per shift. The WIPP Fire Department Staffing procedure did not reflect the current BNA minimum staffing requirements. In addition, WIPP Fire Department is having trouble meeting the minimum staffing, especially on the off-shift and weekends. A review of fire department staffing report from October 15 - November 15, 2016 found that minimum staffing on the off-shift was only met nine times out of thirty-two off-shift days. The inability to force overtime makes it difficult to recall personnel to meet minimum staffing. This is also a concern in staffing radiological control personnel if needed during an off-shift radiological incident.

The Radiological Controls organization is currently understaffed for the staffing analysis projected needs for future full scale operations (four active TRUDOCK positions and underground emplacement); this does not include the current bolting campaign in Panel 7. The Radiological Control & Dosimetry Manager (RCDM) indicated current staffing was adequate to provide coverage for a limited scope of operations (2 TRUDOCK positions, bolting in Panel 7, not concurrent with waste emplacement). Only eight of the thirty four Radiological Control Technicians (RCTs) are fully qualified, and there are only four of five Radiological Controls Supervisor positions filled, two of whom are managers filling in for these positions. The limited number of qualified RCTs also limits the ability to train technicians in the qualification process. Filling of these positions will

not immediately bring staffing up to levels discussed in the staffing plan since significant training and qualification time will be required until the new incumbents are at a working level.

The NWP Contractor Assurance Organization is not fully staffed, and there is not a clear path forward to maintain current staffing levels. Existing staff members are attempting to cover the duties of four vacancies and covering for positions which are not on the organization chart. Four support service contractors are not funded past CY 2016 and needed subcontract technical expert support for independent assessments on Safety Management Programs and other mission critical areas is not currently funded, and may adversely impact this Contractor Assurance function. Current staffing levels may not be sufficient to sustain the Contactor Assurance function over time.
Currently, there is a shortage of qualified roof bolting personnel, preventing sufficient ground control in this area. The number of trained roof bolting personnel is the limiting factor preventing a second shift of roof bolting; another bolting crew could be deployed in panel 7 if there were enough trained mining personnel. In addition, Geotechnical Engineering is facing future staffing challenges. These positions require 1-2 years of on-the-job training, and 50% of the current geotechnical engineers are expected to retire within 5 years. There is already one skill set, the mine plot software expert, for which there is no backup or alternate in place. In addition, future work in the areas of engineering and nuclear safety will stretch the existing staffing resources. Upcoming design of the Permanent Ventilation System will be difficult with current staffing levels, especially given that subcontractors are used for design and Calendar Year 2017 funding significantly decreases these personnel. The planned revision of the DSA will also require additional Nuclear Safety personnel to keep on track with the current schedule.

In summary, the existing staffing appears to be adequate for near-term, limited initial waste emplacement operations. However, if future staffing needs are not considered prior to positions becoming open or work scope increasing, the long lead time in training and qualifying staff will lead to personnel lacking the knowledge and experience to perform their responsibilities safely and effectively.

Evaluated by:	**Approved by:**
/s/ Dimple Patel, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start:**	**Issue No: MWC.1-POST-01**
Maintenance and Work Control	**MWC.1**	**Observation:**	**Post-Start: X**	**Rev: 0** **Date: 11/29/2016**

ISSUE

Maintenance work control documents (WCDs) contain numerous deficiencies including hazard identification and controls; however, in all but one instance, the hazard controls were present but were mis-located within the WCD.

REQUIREMENT (Individual requirements were not cited from the procedures below)

WP 10-WC3011, Rev. 37, *Work Control Process*
WP 10-WC3010, Rev. 29, *Periodic Maintenance Administration and Controlled Document Processing*
WP 10-WC3012, Rev. 1, *Work Control Document Writer's Guide*
WP 10-WC3013, Rev. 1, *Work Control Document User's Guide*
WP 12-IS3002, Rev. 14, *Job Hazard Analysis Performance and Development*
WP 15-PS.2, Rev. 12, *Procedure Writer's Guide*

REFERENCE(S)

- PM033013, Air Intake Shaft Hoist 33-H-001 Weekly Inspection and Lubrication, R7-TRN 2 IA
- PM053031, Weekly A/C Unit Cleaning and Inspection, R6-TRN 1
- PM 045010, Diesel Fire Pump Batteries Inspection, R9-TRN 2 IB
- PM 025039, Inspection and Maintenance of diesel Generator Batteries and Chargers, R5-TRN 5 ID
- IC 411031, Canberra TRU-Dock Continuous Air Monitors Calibration, R2 IA
- PM 074085, Kubota Tractor Inspection and Maintenance, R4-TRN 1 IC
- IC041202, 41-B-956 and 41-B-957 HEPA Filter Unit Differential Pressure Gauge Calibrations, R0-TRN 3
- WO 1623120, *Security Control Panel*, Modification, 8/9/16
- WO 1623378, *Fire Panel*, Corrective, 8/18/16
- WO 1623319, *Motor Control Center*, Corrective, 8/22/16
- WO 1623391, *Fire Suppression System*, Test, 7/26/16
- WO 1626627, *Feeder Protective Relay*, Corrective, 9/24/16
- WO 1626529, UPS for LPU822, Corrective, 10/20/16

- WP 04-AD3011, Rev. 16, *Equipment Lockout/Tagout*
- WP 10-WC3012, Rev. 1, *Work Control Document Writer's Guide*

DISCUSSION

After review of the referenced WCDs and their associated Job Hazard Analysis (JHAs), deficiencies were identified that did not conform to internal NWP requirements and raised numerous questions. There is also inconsistent WCD structure and implementation of guidelines contained in WP 10-WC3012, *Work Control Document Writer's Guide.* The following are deficient areas of concern and the numerous, detailed permutations of these deficiencies have been discussed with the Maintenance and Work Control organization:

- Hazard identification and their associated controls are improperly located within the Precautions and Limitations section of multiple WCDs.
- Section 2.0, *Equipment,* contain numerous errors.
- The level of detail of some work steps is expert-based (outside skill-of-the-craft/worker knowledge) instead of standards-based.
- There are many inappropriate uses of "ENSURE."
- Some work steps are ambiguous and/or confusing.
- Many work steps are similar to Notes and direct no action.
- Some work steps cannot be worked as written and/or are unnecessarily burdensome for the craft.
- There is no standard for what work steps require sign-offs.
- Some Warnings identify hazards that have no controls identified to mitigate them.
- Some hazard Warnings are improperly located within the work control document.
- The generic step to "Perform Lockout/Tagout (LO/TO) in accordance with WP 04-AD3011, *Equipment Lockout/Tagout,* does not identify what is being Locked Out/Tagged Out. The details of the LO/TO do not need to be included in the work instructions, but the location (system-equipment-component) requires identification.

Although most of the deficiencies were non-compliances with NWP requirements and did not have immediate safety significance, the sheer number of these deficiencies resulted in issuing this Post-Start Finding. There were also several identified deficiencies in the area of hazard identification, hazard control development, and hazard integration into WCDs that were more significant than editorial and administrative deficiencies. However, all but one instance was the mis-location of hazards and/or controls within the WCD. Also a mitigating factor was that the Field Work Supervisors compensated for these WCD deficiencies in their Pre-Job Briefings.

Most of the WCD deficiencies did not require a subject matter expert in maintenance and work control to identify them which implies that the process for implementing program

requirements into WCDs is not mature. A mitigating factor regarding this concern is the progress that has been made and the systematic plan initiated by the Maintenance and Work Control Manager for improving the quality of the WCDs. During the time that the DORR started observing the performance of WCDs, numerous Temporary Revision Notices were generated to improve the quality of the WCDs that were to be performed during the DORR and one WCD was deleted from the list of evolutions to be performed as a result of recent craft reviews.

Evaluated by:	**Approved by:**
/s/ Dennis Y Oba, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start: X**	**Issue No: NS.2-PRE-1**
				Rev: 0
Nuclear Safety	**NS.2**	**Observation:**	**Post-Start:**	**Date: 11/29/2016**

ISSUE

Contrary to the requirements of 10 CFR 830.203, LCO 3.1.1 Condition C was exited with a NFPA 13 INOPERABLE/non-compliant installed sprinkler system without DOE approval.

REQUIREMENT

10 CFR 830.203, "Unreviewed Safety Question Process" requires contractors responsible for hazard category 1, 2, and 3 DOE nuclear facilities to establish, implement, and take actions consistent with a Unreviewed Safety Question (USQ) process that meet the requirements within the section. 10 CFR 830.203 is implemented by NWP via the following documents:

12-NS.11, *WIPP Nuclear Safety Program Description*, Rev. 0, 11/19/15, section 2.4, lists Design and/or Engineering Organization responsibilities, including,

> "Ensure unreviewed safety question determinations screens/evaluations are performed as outlined in WP 02-AR3001, *Unreviewed Safety Question Determination*, for new or modified designs."

WP 02-AR3001, *Unreviewed Safety Question Determination*, Rev. 12, effective 2/18/15, implements the USQ requirements outlined in 10 CFR 830.203 on the WIPP project.

REFERENCE(S)

- 10 CFR 830.203, *Unreviewed Safety Question Process*
- WP 02-AR3001, *Unreviewed Safety Question Determination (USQD)*, Rev. 12, 01/16/ 15
- USQD 16-109, USQ Determination, *ETO-Z-326, Rev. 3, Fire Protection Engineering Operability*
  - *Analysis of the 411 Process Area Sprinkler Systems*, Rev. 2, 09/30/16
- ETO-Z-326, Technical Operability Evaluation, *Fire Protection Engineering Operability*
  - *Analysis of the 411 Process Area Sprinkler Systems*, Rev. 3, 09/29/16
- USQD 16-075, USQ Determination, *Follow up USQD for PISA P16-004, DSA Bases do not Describe*

  - *Valves Between the Risers and the Sprinkler Heads in WHB,* Rev. 1, 07/07/16
- USQD 16-159, USQ Determination, PM486002, Rev 2, *Internal Mechanical Inspections at Sprinkler*
  - *System Risers*, 11/15/16
- PISAD P16-004, PISA Determination, *DSA Bases do not Describe Valves Between the Risers and the Sprinkler Heads in WHB,* dated 07/07/16
- WP 02-AR3001, *Unreviewed Safety Question Determination*
- WP 12-NS.11, *WIPP Nuclear Safety Program Description*, Rev. 12, dated 02/18/15

DISCUSSION

During review of several documents to evaluate the effectiveness of the implementation of the USQ process several findings were identified and are individually discussed below:

1) The WHB fire suppression system was inoperable when NWP implemented DSA Rev. 5b at the end of May. They entered LCO 3.1.1 when they implemented the DSA and remained in the Limiting Condition of Operation (LCO). The Central Monitoring Room log documents the LCO exit on 10/02/16, including references to the Nonconformance Report (NCRs) written to document the known impairments, and the technical operability determination prepared in support of a Conditional Release for use of the system until the NCR dispositions are complete.

   Each of the NCR's include a final REWORK disposition to restore the system to full compliance with the National Fire Protection Association codes. The NCRs clearly delineate how each of the code discrepancies impact the system's operability; however, the associated ETO-Z-326 incorrectly concluded that the system could be "considered" operable due to the existence of operational procedures. The operability of the system should be solely based upon its ability to provide its intended safety function. This failure also resulted in USQD D16-109 answering several questions incorrectly resulting in a negative determination.

2) In addition, USQD D16-075 for PISA P16-004, does not provide adequate technical basis to support the answer to question #3.

3) Finally, the issue identified under ENG.1 in which NWP did not enter a Potential Inadequacy in the Safety Analysis Determination (PISAD) upon experiencing a roof fall larger than that postulated in the Hazards Analysis supporting assumptions represents a failure of the USQ process.

These issues indicate a significant weakness in the implementation of the USQ process as required by 10 CFR 830.203.

Evaluated by:	**Approved by:**
/s/ Taryn Couchman-Cates, Team Member /s/ Elaine Diaz, Team Member /s/ James Kekacs, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area: **Nuclear Safety**	**Objective #:** **NS.2**	**Finding: X** **Observation:**	**Pre-Start: X** **Post-Start:**	**Issue No:** **NS.2-PRE-2** **Rev: 0** **Date: 11/29/2016**

ISSUE

Contrary to the requirements of 10 CFR 830, the CBFO and Central Characterization Program (CCP) Documented Safety Analysis (DSA) required processes are not subject to NWP's Unreviewed Safety Question (USQ) process.

REQUIREMENT

10 CFR 830.203, *Unreviewed Safety Question Process,* requires contractors responsible for hazard category 1, 2, and 3 DOE nuclear facilities to establish, implement, and take actions consistent with a USQ process that meet the requirements within the section.

REFERENCE(S)

- DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis*, Rev. 5, 04/16
- DOE/CBFO 16-3568, U.S. Department of Energy Carlsbad Field Office, *Plan for Validating Currently Certified Waste*, dated 06/01/16
- CBFO MP 4.15, *The Process of TRU Waste Acceptable Knowledge Summary Reports*, Rev. 0, 06/16/16
- CBFO MP 10.5, *Interim Change Notice #1 to CBFO MP 10.5*, Rev. 9, Peer Review, 09/21/16
- CCP-TP-005, *CCP Acceptable Knowledge Documentation*, Rev. 29
- CCP-TP-030, *CCP CH TRU Waste Certification and WWIS/WDS Data Entry*, Rev. 35
- CCP-TP-033, *CCP Shipping of CH TRU Waste*, Rev. 22
- CCP-TP-200, *SPM Chemical Compatibility Evaluation Memorandum and Acceptable Knowledge Assessment Review*, Rev. 0
- 10 CFR 830.203, *Unreviewed Safety Question Process*

DISCUSSION

The WIPP Waste Acceptance Criteria (WAC) Compliance Program Description in section 18.3 of the Documented Safety Analysis (DSA) states that certification audits at generator sites are conducted by CBFO, ensuring that the generator sites are qualified to

maintain compliance with the WAC. CBFO MP 4.15, *The Process of TRU Waste Acceptable Knowledge Summary Reports,* and CBFO MP 10.5, *Interim Change Notice #1,* are the procedures governing the certification process.

The DSA Section 18.8 specifies actions and requirements for Previously Certified Waste Preclusion of Shipment. These requirements ensure that waste certified prior to the DSA Revision 5b are subject to adequate reviews prior to shipment and/or emplacement. The DOE/CBFO 16-3568 provides the basis for validating currently certified waste.

The review team found that there is no language in the CBFO MP 4.15 and MP 10.5 or DOE/CBFO 16-3568 that tie them to the DSA and thus would trigger a USQ upon revision or cancellation of these documents.

The same is true of the CCP procedures listed above, which implement the DSA/TSA requirements. Essentially, this portion of the NWP contract is not integrated with the NWP nuclear safety process and thus has no formal USQ process to follow.

Evaluated by:	**Approved by:**
/s/ Brenda Hawks, Team Member /s/ Elaine Diaz, Team Member /s/ James Kekacs, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start:**	**Issue No: OP.1-POST-1**
Operations	**OP.1**	**Observation:**	**Post-Start: X**	**Rev: 0**
				Date: 11/29/2016

ISSUE

Contrary to NWP Conduct of Operations program implemented procedures, there were isolated instances of procedural non-compliance.

REQUIREMENT

WP 04-AD3034, Rev. 2, *Technical Procedure Compliance*, requires procedure steps are performed as written.

WP 04-CO.01-2, Rev. 5, *Conduct of Operation Program – Shift Routines and Operating Practices*, Section 3.5, requires red circling of out of specification readings

WP 04-CO.01-12, Rev. 3, *Conduct of Operations Program Turnover and Assumption of Responsibilities*, Section 3.7, requires the checklist be reviewed for completeness, accuracy, legibility, and then signed by the person completing it.

WP 04-CO.01-16, Rev. 3, *Conduct of Operations Program Operations Procedures*, Section 3.8, requires operators obtain the most current document copy from the electronic database or from hard copy controlled document set.

WP 15-PS.01, Rev. 1, *Procedures Program*, Section 3.5 and 6.7, require compliance with procedures and verification of most recent copies of procedures 10 CFR §830.122 Quality Assurance Criteria (e), Criterion 5, (1) Performance/Work Processes, requires work performed consistent with technical standards using approved procedures.

REFERENCE(S)

- WP 04-CO.01-2, Rev. 5, *Conduct of Operation Program – Shift Routines and Operating Practices*
- WP 04-CO.01-12, Rev. 3, *Conduct of Operations Program Turnover and Assumption of Responsibilities*
- WP 04-CO.01-16, Rev. 3, *Conduct of Operations Program Operations Procedures*
- WP-05-WH1011, Rev. 57, *CH Waste Processing*
- WP 15-PS.01, Rev. 1, *Procedures Program*

- EA04AD3008-26-0, Rev. 4, *WHB CH Room D/P / HVAC / Air Dryer Round Sheet*
- EA04AD3008-53-0, Rev. 11, *Facility Manager Turnover Checklist*
- DOE O 422.1, *Conduct of Operations*
- PM033013, *Air Intake Shaft Hoist 33-H-001 Weekly Inspection and Lubrication*, R7-TRN 2 IA

DISCUSSION

Overall, NWP personnel demonstrated adequate procedural compliance. However, there were isolated instances of procedural non-compliance by Operations and Maintenance personnel. The items noted below did not create a situation which induced an immediate safety issue and were not related to TSR step performance. The following list of items was found during document review or observation of work:

- During performance of WP-05-WH1011, Rev 57, *CH Waste Processing*, precaution and limitation 3.5 was not performed as written. The signature required in this step was not contained/available in attachment 1 of the procedure. The signature in step denotes a completed radiological survey of the waste shipment. The performance of this same radiological survey is also referenced later in step 5.2.2 of the procedure.

- Previously completed Facility Shift Manager turnover sheets are kept in a binder in the CMR. After the shift briefing the morning of November 15, 2016, a review of that day's shift turnover sheet and the previous Facility Shift Manager turnover documentation was performed. A number of blank Facility Shift Manager turnover sheets were found within the turnover binder. These controlled forms are expected to be printed out prior to use to ensure outdated forms are not used (see WP 04-CO.01-16, Rev. 3, *Conduct of Operations Program Operations Procedures).*

- During turnover observation the morning of November 15, 2016, the Roving Watch signed for completion of the turnover on the turnover checklist, accepting the watch. He had failed to document completion of all the checklist items for the on-coming watch. The on-coming column of initials was blank. Similarly, the contractor provided a packet of completed Facility Shift Manager Turnover Checklist for review. One dated October 1, 2016 had not been signed by the on-coming FSM.

- During a review of previously performed round sheets provided by the contractor, about three days of out of specification readings starting from October 17, 2016 were recorded without red circling the condition and commenting as required. The round sheet, EA04AD3008-26-0, *WHB CH Room D/P / HVAC / Air Dryer Round Sheet*, had been reviewed by the FSM and not corrected. The item was not a TSR related reading.

- During the performance of PM033013, *Air Intake Shaft Hoist 33-H-001 Weekly Inspection and Lubrication*, three instances were noted of non-compliance to the work steps. In two instances, the craft did not perform steps in the work instructions because the craft person visually inspected the component and determined that the steps did not need to be performed. Although correct in his determination, the work steps did not allow him to make the determination to omit those steps. These non-compliances were mitigated because the Cognizant Engineer (CE), after the performance of the work steps, directed the craft to perform the omitted steps. However, the correct action would have been for the craft "reader", Field Work Supervisor, or the CE to intervene the first time a step was not performed. The other instance of non-compliance was the result of a poorly worded work step. The work step directed the craft to fill a reservoir with oil to ensure it was at the correct level although there was a local oil level indicator. The craft checked the level indicator and determined that oil did not need to be added although the work step did not allow the craft to make that determination. It is not clear why this PM does not allow the craft to make determinations of necessity when the determinations are within the skill-of-the-craft/worker.

Evaluated by:	**Approved by:**
/s/ Todd McGhee, Team Member /s/ Shawn Murphy, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area: Operations	Objective #: OP.2	Finding: X Observation:	Pre-Start: Post-Start: X	Issue No: OP.2-POST-1 Rev: 0 Date: 11/29/2016

ISSUE

The WIPP Conduct of Operations Implementation Matrix, found in Attachment 1 to WP 04-CO.01, Rev. 3, *Conduct of Operations* has not been approved by CBFO.

REQUIREMENT

DOE O 422.1 requires that the Conduct of Operation matrix be provided to DOE line management for their review and approval.

REFERENCE(S)

- WP 04-CO.01, Rev. 3, *Conduct of Operations* (Attachment 1)
- DOE O 422.1, Conduct of Operations

DISCUSSION

NWP has developed a Conduct of Operations Implementation Matrix, found in Attachment 1 to WP 04-CO.01, Rev. 3, *Conduct of Operations*, dated 12/07/2015. The cover sheet to "Attachment 1- Conduct of Operations Implementation Matrix" indicates that the matrix was reviewed by NWP management and CBFO, and that the review/approval signatures are on file. A record of approval signatures was not found. A series of letters and emails between NWP and CBFO indicates the matrix was accepted, and CBFO's acting Assistant Manager of the Office of WIPP verbally concurred with this, however, there is no formal record documenting CBFO's approval of this document.

Evaluated by:	Approved by:
/s/ Todd McGhee, Team Member /s/ Shawn Murphy, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start: X**	**Issue No: OP.3-PRE-1**
Operations	**OP.3**	**Observation:**	**Post-Start:**	**Rev: 0**
				Date: 11/29/2016

ISSUE

Use and designation of procedures were inadequate and not in compliance with NWP administrative processes (i.e., Management Control versus Technical procedures, and Continuous Use versus Reference Use), jeopardizing effective implementation of safety basis controls.

REQUIREMENT

WP 15-PS.01, Rev. 1, *Procedures Program,* requires that TSRs are flowed down into Technical Procedures.
WP 15-PS.2, Rev. 12, *Procedure Writer's Guide,* establishes criteria for a Continuous Use procedure.

REFERENCE(S)

- WP 04-AD3001, Rev. 37, *Facility Mode Compliance*
- WP 04-AD3013, Rev. 40, *Underground Access Control*
- WP 04-HO1003, Rev. 24, *Waste Handling Hoist Operation*
- WP 05-WH1004, Rev. 6, *Facility, SCA, and TRUPACT-II Pallet Handling*
- WP 05-WH1207, Rev. 7, *SLB2 Handler*
- WP 05-WH1405, Rev. 17, *Trailer Jockey 41-H-151 A&B and 41-H-151 C&D Operation*
- WP 05-WH1406, Rev. 17, *Conveyance Loading Car*
- WP 05-WH1603, Rev. 17-FR2, *CH TRU Underground Transporter, 52-H-008A and B*
- WP 08-NT3020, Rev. 27, *TRU Waste Receipt*
- WP 12-NS3018, Rev. 0, *Material at Risk Statistics Verification*
- WP 15-PS.01, Rev. 1, *Procedures Program*
- WP 15-PS.2, Rev. 12, *Procedure Writer's Guide*

DISCUSSION

Procedural action steps used to ensure compliance with TSR level controls are required to be in Technical Procedures per the requirements of WP 15-PS.01, Rev. 1, *Procedures*

Program. Several examples of procedures were found during this ORR that were classified as Management Procedures but contain steps used to ensure TSR level controls. These procedures include, but are not limited to:

- WP 04-AD3001, Rev. 37, *Facility Mode Compliance*
- WP 04-AD3013, Rev. 40, *Underground Access Control*
- WP 08-NT3020, Rev. 27, *TRU Waste Receipt*
- WP 12-NS3018, Rev. 0, *Material at Risk Statistics Verification*

Further, the review team has a concern that any procedure containing an activity intended to ensure compliance with the TSR should be "Continuous Use" rather than "Reference Use".
Per WP 15-PS.2, *Procedure Writer's Guide*, a procedure must be "Continuous Use" if it meets any one of four criteria including "[B] An error during the performance of the activity would result in an unnecessary risk". Any activity required to ensure TSR level controls has the potential to violate TSR requirements if not followed, therefore should be included in a "Continuous Use" procedure. Example of procedures that are identified as Reference Use and flow down TSR level controls include, but are not limited to:

- WP 04-HO1003, Rev. 24, *Waste Handling Hoist Operation*
- WP 05-WH1207, Rev. 7, *SLB2 Handler*
- WP 05-WH1405, Rev. 17, *Trailer Jockey 41-H-151 A&B and 41-H-151 C&D Operation*
- WP 05-WH1406, Rev. 17, *Conveyance Loading Car*
- WP 05-WH1603, Rev. 17-FR2, *CH TRU Underground Transporter, 52-H-008A and B*

WP 15-PS.2 requires that any Technical Procedure not designated as "Continuous Use" will be marked "Reference Use". However, WP 05-WH1004, Rev. 6, *Facility, SCA, and TRUPACT-II Pallet Handling,* does not have either designation.

Evaluated by:	**Approved by:**
/s/ Todd McGhee, Team Member /s/ Shawn Murphy, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start:**	**Issue No: OP.3-POST-1**
Operations	**OP.3**	**Observation:**	**Post-Start: X**	**Rev: 0**
				Date: 11/29/2016

ISSUE

Contrary to NWP Conduct of Operations program implementing procedures, uncontrolled postings, instructions, and operator aids were found in aboveground and underground facilities.

REQUIREMENT

WP 04-CO.01-16, Rev. 3, *Conduct of Operations Procedures,* Section 3.1.1, requires that operators use approved procedures.

WP 04-CO.01-17, Rev. 3, *Conduct of Operations Program Operation Aid Postings*, Section 2, requires that operator aids are controlled and approved.

REFERENCE(S)

- WP 04-CO.01-16, Rev. 3, *Conduct of Operations Procedures*
- WP 04-CO.01-17, Rev. 3, *Conduct of Operations Program Operation Aid Postings*
- WP 04-MD3003, Rev 6, *Control of Operator Aids*
- WP 12-IS.01-19, Rev. 0, *Industrial Safety Program – Safety Signs and Controls*
- DOE O 422.1, *Conduct of Operations*

DISCUSSION

Various uncontrolled instructions or aids were found during the facility walk-downs performed in the above ground and underground facilities.

- In the Waste Handling Building, at door 130, an orange paper sign providing instructions for entering LCO 3.2.1 was posted and hung with tape; it contained no approval markings.
- In a room adjacent to the waste shaft collar room, instructions related to actions for fire impairments and a roster were contained in a binder above the door controls.

- At the Waste Station desk within the underground, an unapproved aid was posted for "Waste Station Inspection" while a similar aid at the Waste Collar had an approved Operator Aid approval sticker attached to the aid.

During walk-downs within the underground, numerous plain tags were observed to be hanging in various locations. These tags documented an identified ground control issue, the date the issue was observed, and the initials of the evaluator who identified the issue. The tags used were a plain type Manila tag with no other identifying marks that could be used for tracking and required action purposes. There is no formal program or process within the NWP program procedures that documents the use and actions for these tags. The DOE ORR Team observed that identifying these safety concerns through routine walk-downs and the use of a unique identifier at the location of the identified issue is considered by the team to be a positive attribute to ground control inspection; however, NWP should formalize the use and required actions for the use of this level of inspection and hazard identification.

Evaluated by:	**Approved by:**
/s/ Todd McGhee, Team Member	/s/ Edward Westbrook, Team Leader
/s/ Shawn Murphy, Team Member	

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start: X**	**Issue No: OSH.1-PRE-1**
Occupational Safety and Health	**OSH.1**	**Observation:**	**Post-Start:**	**Rev: 0** **Date: 11/29/2016**

ISSUE

The waste handling TRUPACT-II dock (TRUDOCK) has an unguarded gap between the TRUPACT-II container and the walking platform, contrary to OSHA requirements.

REQUIREMENT

29 CFR 1910.23(a)(8) requires every floor hole into which person can accidentally walk shall be guarded by either a railing with toe board on all sides or floor hole cover.

REFERENCE(S)

- 29 CFR 1910.23(a)(8), Guarding Floor and Wall Openings and Holes
- 10 CFR 851, Worker Safety and Health Program

DISCUSSION

During the observation of the waste emplacement operations in the CH bay, it was noted that the waste handling TRUDOCK has an unguarded gap between the TRUPACK-II container and the walking platform that does not protect employees from accidentally walking into the gap, causing an injury potential. During discussion with the waste handlers they stated they knew of at least two employees that had fallen into the gap in the past. 29 CFR 1910.23(a)(8) requires every floor hole into which person can accidentally walk shall be guarded by either a railing w/toe board on all sides or floor hole cover. A spill pig is used to identify the hazard but offers no protection.

Evaluated by:	**Approved by:**
/s/ Karen Kubiak, Team Member	/s/ Mark Brown, Deputy Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area: Radiation Protection	**Objective #: RP.1**	**Finding: XX**	**Pre-Start: X**	**Issue No: RP.1-PRE-1**
				Rev: 0
		Observation:	**Post-Start:**	**Date: 11/30/16**

ISSUE

NWP does not have an effective process in place to ensure a timely and appropriate level of response to potential radiological events.

REQUIREMENT

WP 12-9, WIPP Emergency Management Plan, Rev. 43

REFERENCE(S)

DOE AIB Report, Phase I Radiological Release Event at the WIPP on February 14, 2014

DISCUSSION

Review of current shift staffing identified that no Radiological Control (Radcon) coverage is available onsite from 1 am to 6 am. NWP relies on a call-in process to bring in Radiological Control supervisory or management level support if an incident or emergency occurs during the 1 am to 6am time period. The need for a supervisory/management level of response was highlighted during the 2014 radiological release event.

Discussion with Radiological Management identified the call-in responsibility is shared between two individuals, the Radiological Control and Dosimetry Manager and the Deputy Manager. No RP procedure is in place that describes/controls this call-in responsibility. Decisions as to who will have the call in "duty" for specific time periods are made informally between the two individuals.

Discussion with the CMR operator identified the operator was not familiar with the above arrangement. When asked who would be called from the Radcon organization in the event of an emergency, the operator indicated she would consult the Qualified Watchstander's list and start calling Radcon managers. She indicated the Watchstander's list did not provide any indication who would be available or "on call" for certain time periods; instead she would just start calling managers until someone answered. The

CMR operator listed four individuals from the Radcon organization that she would initially try calling – the Radiological Control and Dosimetry Manager was not mentioned, and one of the four was a non-NWP subcontractor.

In conclusion, the existing informal process does not ensure the CMR operator would call the appropriate level of Radiological Control supervision intended by the Radcon organization. Additionally, the use of a general listing of names that does not indicate who has specific call-in responsibility may significantly increase the time required to reach an appropriate responder.

Evaluated by:	**Approved by:**
/s/ Tony Weadock, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start: X**	**Issue No: RP.1-PRE-2**
Radiation Protection	**RP.1**	**Observation:**	**Post-Start:**	**Rev: 0**
				Date: 11/29/2016

ISSUE

Multiple deficiencies in radiation protection personnel proficiency, procedural compliance and the level of knowledge of some Radiological Control Technicians (RCTs) were noted, directly impacting observed radiation protection performance.

REQUIREMENT

WP 12-HP3400, *Contamination Control,* section 1.1 requires RCTs to verify procedure Attachment 2 (Frisking Instructions) are posted adjacent to instruments being used for survey by personnel other than RCTs. Section 2.3 indicates RCTs should post Attachment 5 (Donning and Doffing Instructions) at dress-out and step-off pad areas.

WP 12-HP1100, *Radiological Survey*s, section 3 bullet 10, states "direct contamination readings shall be performed before the swipe surveys, whenever possible."

WP 12-HP3400, *Contamination Control,* section 2.3, bullet 3 indicates that all personal protective equipment and protective clothing (PC) used during transuranic (TRU) waste-related activities that could be contaminated from the activities will be laundered or disposed of as site-derived waste.

WP 12-HP3600, *Radiological Work Permits*, step 1.4 indicates the Radiological Control Supervisor completes blocks 1 – 20 of the RWP (including block 2, "RWP Prepared By").

WP 12-HP1100, Attachment 4 (Radiological Survey Frequencies) indicates that Radioactive Material Areas (RMAs) will be surveyed "weekly or upon entry if entry is less frequent"

10 CFR 835.402 – Requires that personnel dosimeters shall be provided to individuals who are likely to receive an effective dose of 0.1 rem (100 millirem) or more in a year.

WP 12-DS3324, *External Dosimetry Background Monitoring,* step 2.16 requires the Dosimetry Team Lead to review results of area Thermoluminescent Dosimeters (TLD)

monitoring. Step 2.17 requires notification of Radiological Controls of any results above expected values.

WP 12-HP1307, *Portable Instrument Operability Checks,* section 5.12 requires that, while performing operability checks for the Model 17 ion chamber, that "N/A" be recorded for the background reading.

WP 12-HP3600, section 2.2 indicates that the Job Supervisor/Field Work Supervisor use "current survey information if available" in performing a pre-job brief of personnel.

WP 12-HP1100, section 5.5.2 indicates Model 9DP ion chamber "less than" values will be recorded as <0.1 microR/hr on radiological survey forms.

10 CFR 835.103 – "Individuals responsible for developing and implementing measures necessary for ensuring compliance with the requirements of this part shall have the appropriate education, training and skills to discharge these responsibilities."

REFERENCE(S)

- WP 12-DS3324, *External Dosimetry Background Monitoring*
- WP 12-HP1100, *Radiological Surveys*
- WP 12-HP1307, *Portable Instrument Operability Checks*
- WP 12-HP3400, *Contamination Control*
- WP 12-HP3600, *Radiological Work Permits*
- Area TLD monitoring report generated May 19, 2016.

DISCUSSION

Observations during the course of the ORR identified multiple instances of Radiation Protection procedural violation and the consequent need for improved performance. Specific examples included the following.

- During observation of the underground waste emplacement on 11/16/16, it was noted Frisking instructions were not posted adjacent to the hand-held contamination detectors as required by WP 12-HP3400. There was also an absence of lighting in the frisking area, preventing the frisker user from verifying the instrument had been operationally checked and was on the correct scale. At the Panel 7 step-off pad area on 11/17/16, it was noted PC doffing instructions were not posted as recommended by WP 12-HP3400.

- During observation of the Panel 7 step-off pad area on 11/19/16, RCTs were observed taking smears on handheld radios, hardhat lights, and multi-gas meters prior to performing direct scans for contamination on the items, contrary to WP 12-HP1100.

- During observation of the transuranic package transport (TRUPACT) unloading activities on 11/15/16, it was noted a pair of used anti-C gloves had been thrown into

an unmarked green waste container in the Contact Handled (CH) bay, rather than in a radiologically-marked container. Disposal in an unmarked container is not consistent with the objectives of WP 12-HP3400.

- Review of Radiological Work Permits (RWPs) 16-0027 and 16-0028 identified they had been prepared by the Radiological Engineering and Dosimetry Manager (REDM) rather than by a Radiological Control Supervisor as required by WP 12-HP3600. Further discussion identified the RWPs were written by the REDM to ensure a high degree of RWP quality; however, the procedure as written does not provide for this flexibility.

- During the timeframe of the ORR ten large catch basins were staged under the exhaust ventilation to capture condensate water from the vent ducting. The basins were posted as Radioactive Material Areas (RMA), consequently requiring weekly contamination surveys in accordance with WP 12-HP1100. Review of completed weekly surveys identified the catch basins were not being regularly surveyed as intended and required; the most recent survey of the RMAs was performed on August 2, 2016.

- During the timeframe of the ORR the access point to the majority of the CH Bay and the Cask Receiving Room of the Waste Handling Building (WHB) was not posted as requiring a TLD for entry. Review of survey data and quarterly TLD monitoring results indicated unmonitored individuals residing in the areas without restriction had the potential to exceed 100 millirem annually, contrary to requirements in 10 CFR 835.402. For example, an area TLD located in the Cask Receiving Room indicated a dose of approximately 450 millirem/quarter (majority neutron); an area TLD on the East Dock indicated a dose of approximately 90 millirem/quarter (Note these values represent continuous occupancy). During discussions the Dosimetry Team Lead indicated the TLD result for the Cask Receiving Room appeared anomalous, based on the high neutron result; however, no formal investigation of the result had been conducted.
  WP 12-DS3324 requires review of area TLD results and notification to Radiological Controls for any unusual results; however, NWP indicated no documentation exists to demonstrate such notification was made or any actions taken.

- Review of instrument source check/operability test logs in Room 108 of the WHB indicated that the majority of RCTs performing operability checks of the Model 17 ion-chamber were recording "O" for background rather than "N/A" as required by WP 12-HP1100. One example was noted where the RCT failed to document their initials and the result (SAT) of the operability check. These errors were viewed as administrative only; no instances were observed during review of logs where an instrument failed the source check but was identified as OK for use.

- During a tour of the underground on 11/19/16, it was noted current radiological survey information was not available at the Panel 7 step-off pad area or in the underground lunchroom (commonly used for briefings) to support pre-job RWP

briefings. RP personnel indicated the current Panel 7 survey was typically maintained in the lunchroom (as had been observed by the ORR team earlier in the week); however on 11/19/16 no survey information was available. This lack of current survey information, and the lack of specific radiological information contained on the RWP (see RP.1-OFI-2) collectively makes it difficult to accomplish the intent of WP 12-HP3600.

- Review of recent surveys (CH Bay survey dated 11/12/16, TRUPACT receipt survey performed 11/14/16) identified Decision Level values for the 9DP ion chamber were not recorded on the survey consistent with procedural requirements. Values of "<1 mR/hr" and "N/A" were recorded; the procedure requires "< 0.1 microRem/hr".

- Radiological control staff performance has repeatedly not met performance expectations during multiple evaluated exercises over the past year. Recurring deficiencies in segregation of potentially contaminated personnel, lack of appropriate RP command and control, poor contamination monitoring practices (surveying too fast), and a lack of evacuation urgency were noted during the earlier exercises. An evaluated exercise performed during the ORR timeframe demonstrated acceptable underground evacuation urgency and segregation of potentially contaminated personnel in the underground; however, concerns were still noted in the radiological control aboveground activities. These included inconsistent use of protective clothing by responding RCTs, inconsistent monitoring practices of personnel, lack of air-monitoring to demonstrate habitability, lack of Radcon command and control over personnel segregation and monitoring practices, and lack of applicable procedures in the decontamination trailer. It should be noted that NWP evaluators provided a critical evaluation of performance and appropriately failed the radiological control performance sections of the most recent drill; corrective actions are being developed and will be tracked through the WIPP Form process.

The above examples of procedural noncompliance vary in significance, but collectively indicate a need to improve knowledge of an adherence to requirements, and the adequacy of supervisory review.

Ongoing interviews of RCTs during observation of field activities identified deficiencies in their level of knowledge, potentially hampering their ability to effectively discharge their responsibilities. Five technicians were quizzed regarding radiological fundamentals; the interviewees included two Survey Technicians, one Air Monitoring Technician, and two RCTs. Four of the five interviewed technicians had difficulty answering questions directly applicable to their jobs, such as:

- Type of detector in the radiological survey instrument they were using
- Type of air filter used in the CAM they were checking
- Defining a DAC/hr
- Posting threshold for a High Radiation Area
- DAC value for Pu-239
- Controlling alpha DAC value for the WIPP facility.

The CORR identified a similar pre-start finding (RP1-PRE-2) indicating that some radiological control personnel exhibited a less than adequate level of knowledge and skills. Review of the resulting WIPP form (WF 16-1796) indicated that, although the scope of the CORR issue included RCTs, radiological engineers, and radiological control supervisors and managers, the NWP corrective actions were limited to addressing radiological engineer level of knowledge.

Evaluated by:	**Approved by:**
/s/ Tony Weadock, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area: Radiation Protection	**Objective #: RP.1**	**Finding: X** **Observation:**	**Pre-Start: X** **Post-Start:**	**Issue No: RP.1-PRE-3** **Rev: 0** **Date: 11/30/2016**

ISSUE

NWP radiological air-monitoring practices do not meet 10 CFR 835.403 requirements for air-monitoring.

REQUIREMENT

10 CFR 835.403(a)(2) requires that monitoring of airborne radioactivity be performed as necessary to characterize the airborne radioactivity hazard where respiratory protection devices for protection against airborne radionuclides have been prescribed.

10 CFR 835.703(a) requires that the results of monitoring for radiation and radioactive material required by subparts E and L of 10 CFR 835 (which includes air-monitoring) be documented and maintained.

REFERENCE(S)

- WP 12-HP1321, Rev. 5, *Bladewerx Sabrealert Alpha Continuous Air Monitor*
- WIPP Form (WF) 16-1170
- EA Work Planning and Control Assessment (Draft)
- WIPP Workplace Air Monitoring Technical Basis Document

DISCUSSION

During the timeframe of this review, the WIPP Panel 7 was posted as a High Contamination Area and Airborne Radioactivity Area. Personnel performing work activities in the area (primarily ground control activities) were required to wear respiratory protection (Powered Air Purifying Respirators or PAPRs) with a protection factor of 1000.

NWP was relying on the use of portable Bladewerx continuous air monitors (CAMs) to meet the air-monitoring requirements of 10 CFR 835.403 while personnel were wearing respiratory protection. The CAMs provide an alarm capability when alarm setpoints are reached.

The Radiological Control & Dosimetry Manager (RCDM) acknowledges that the reliance on portable CAMs is unconventional, and such monitoring is typically performed at other sites by the use of lapel air samplers. The RCDM indicated, however, that given the significant protection factor of the PAPRs the current practice was meeting 10 CFR 835 requirements. The RCDM acknowledged that prior to eventually down-posting the area (and dropping respirator protection requirements) more conventional air-monitoring practices would have to be implemented.

NWP's position that 10 CFR 835 requirements are being met due to the large PAPR protection factor is in error – the 10 CFR 835.403(a)(2) requirement for monitoring is not conditional based on whether workers are "over-protected." Additionally, review of NWP's air-monitoring practices identified the following deficiencies:

- Observation of air-monitoring practices during bolting in the Panel 7 exhaust shaft identified that the portable CAM (and a battery powered air-sampler) were located approximately 50 feet downstream from the worker operating the bolter. Consequently, air concentrations representative of those being experienced by the bolter operator were not being effectively monitored.

- Follow-up discussion with two Radiological Control Technicians (RCTs) indicated there is no real effort to ensure the Bladewerx CAMs are used to representatively sample the breathing air of the potentially highest exposed individual (bolter operator). One technician indicated the CAM should be placed within 50 feet of the operator; the other indicated he tries to position the CAM so it samples the bolter operator and the standby support personnel.

- The Bladewerx CAM procedure provides no guidance on positioning the CAM for job-specific air-monitoring situations.

- Recording of Bladewerx CAM results is inconsistently performed, and would not meet the requirements of 10 CFR 835.703(a). The Bladewerx CAM procedure provides no direction or guidance on recording results. Review of Radiation Protection (RP) documentation indicated that some RCTs are recording CAM results in the RP logbook, and some are recording them on the post-job contamination survey. There is no control or assurance, however, to ensure that the CAM results are always being recorded. It was also noted that when CAM results were recorded they were often incomplete, with no indication of the CAM serial number and calibration due date (as is required by NWP for other radiological instruments on documented surveys).

- Similar concerns regarding the use of the Bladewerx CAM in lieu of more conventional monitoring practices were raised during an Office of Enterprise Assessment review of work planning and control (report not yet issued). NWP subsequently generated a corrective action plan (WF 16-1170) to improve the air-monitoring program and procured several battery powered air-samplers and several lapel air-samplers. Review of the corrective action plan identified it only addresses the battery powered
air-samplers, and does not discuss the lapel samplers nor address any of the implementation issues noted above. For these reasons, the ORR considers generation of this issue form to be necessary.

Evaluated by:	**Approved by:**
/s/ Tony Weadock, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start: X**	**Issue No: TRG-1 PRE-1**
Training	**TRG.1**	**Observation:**	**Post-Start:**	**Rev: 0**
				Date: 11/16/2016

ISSUE

Some Operators and Radiation Control Technicians (RCT) are being qualified through an NWP task-based qualification process that does not ensure compliance with DSA KE 12-3 and DOE O 426.2 requirements.

REQUIREMENT

DOE O 426. 2, Appendix I, Chapter 1, Section 4 (a) (7). The contractor must ensure that personnel who are in the process of completing training on tasks and activities for which they are not fully qualified must work under the direct supervision of someone who is qualified, and must not independently make decisions or take action when that work could affect facility safety. Additionally, contractor management must not place personnel who are in training in such positions.

WIPP DSA KE 12-3: Training and qualification programs are designed and developed to ensure personnel obtain initial requisite knowledge and skills resulting in abilities to effectively execute assigned duties during normal, abnormal, and emergency conditions. Continuing training is provided to maintain requisite knowledge and skills as warranted for changes such as emergent Evaluation of the Safety of the Situation documents. Personnel are not permitted to perform assigned duties independently until requisite training and qualification are complete.

10 CFR 835.103 – "Individuals responsible for developing and implementing measures necessary for ensuring compliance with the requirements of this part shall have the appropriate education, training and skills to discharge these responsibilities."

WP 12-RC.02, *WIPP Radiological Control and Dosimetry Department Training Program Plan,* Scope section – "Personnel are not permitted to perform assigned duties independently until requisite training and qualification are complete."

REFERENCE(S)

- NWP Contract

- DOE/WIPP 07-3372, WIPP Documented Safety Analysis, Rev. 5b, dated 04/2016 2016
- DOE O 426.2, Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities, dated 4/21/2010
- WP 04-AD.12, *WIPP Facility Operations Training Program Plan*, Rev. 1, dated 11/09/2016
- WP 05-WH1724, *RH Hot Cell Complex Control Key,* Rev. 5, dated 05/17/16
- WP 12-HP2001, *Abnormal Radiological Conditions*, Rev. 10, dated 11/14/16
- WP 12-RC.02, *WIPP Radiological Control and Dosimetry Department Training Program Plan,* Rev. 1, dated 11/1/16
- WP 14-TR.01, *WIPP Training Program*, Rev. 17, dated 11/13/2016
- WP-14-TR3307, *Qualification Programs*, Rev. 8, dated 11/13/2016
- RCT-01-1, Radiological Control Survey Technician Qualification Card
- RCT-01-2, Radiological Control Air Monitoring Technician Qualification Card
- RCT-01-3, Radiological Control Technician Qualification Card
- FO-ADM-03, Administrative Requirements –Work Authorization Task Card
- FO-ADM-01, Administrative Requirements-Equipment Lockout/Tagout Task Card

DISCUSSION

Radiological Control:
WP 12-RC.02 establishes the training and qualification program for Radiological Control (RC) and Dosimetry (D) Department personnel, including RCTs. RCT qualification is established as a
three-step sequential process, with individuals first qualifying as a Radiological Survey Technician (ST), then as a Radiological Air Monitoring Technician (AT), and finally as a RCT. Each step has a separate qualification card.

Discussion with RC supervision and management indicated the distinctions between the three technician qualification levels, and the types of activities they could perform, could only be determined by reference to the specific qualification cards. No discrete listing was maintained elsewhere in the procedures or roles and responsibilities documentation. This was done deliberately, to prevent duplication across procedures and the need to make multiple revisions if changes were required.

Discussion with RC management and staff identified the following anecdotal distinctions between the three technician categories:

- STs could perform job coverage of all radiological work activities except those involving waste handling

- ATs could perform the activities of STs and additionally could perform air-monitoring activities (air-sampling, Continuous Air Monitor operational checks, etc.)
- RCTs could perform the activities of STs and ATs and could also perform job coverage for waste handling activities.

Review of the three technician qualification cards in light of the above, however, identified the following concerns:

- None of the qualification cards explicitly and succinctly identified those activities the incumbent was qualified to perform upon successful qualification. Instead, the reviewer would have to glean through the list of training activities and Job Performance Measures (JPM) in the qualification card, and make their own determination. This creates a system highly subject to individual interpretation and extremely difficult to manage.

- The RC&D Manager indicated the intent to start using "task qualification", where an individual could qualify to a specific task and start performing that activity prior to completion of the entire qualification card. It was noted that procedure WP 12-RC.02 does not provide for such task qualification.

- Although Radiological Control management indicated STs and ATs could provide job coverage, it was noted the relevant site specific training (CL-2.11, Radiological Work Coverage) was only listed on the RCT qualification card. Consequently, job coverage was being performed by STs and ATs without relevant (and available) training.

- Discussion with an ST providing job coverage for bolting activities identified such coverage include air monitoring through the use of a Bladewerx CAM. Review of the ST qualification card identified no JPM dealing with the Bladewerx CAM; this JPM was only included on the later AT qualification card. Follow-up identified the ST had completed the JPM for use of the Bladewerx CAM although it was not on his ST qualification card; however as noted in bullet 2 above the use of a "task qualification" process was not discussed in the relevant training procedure.

The above concern related to the lack of formal definition of the activities the STs, ATs and RCTs can perform was identified as a concern in the CORR. NWP undertook corrective actions via WF 16-1710; however review of the resulting procedural revisions identified they did not adequately address the concern.

Review of all three technician qualification cards identified they did not require review or training on a procedure (WP 05-WH1724, *RH Hot Cell Complex Control Key)*, necessary to implement DSA Key Element 7-2.

Operations:

During document reviews and interviews it was identified that NWP had transitioned their Facility Operator qualifications to a task based process. It was noted that procedure WP 04-AD.12, *WIPP Facility Operations Training Program Plan,* does not provide for such task qualification. Reviews of approved task cards for the Roving Watch identified that there was no pre-requisite training, no required classroom training, and no required reading identified in the task cards. During an interview with the training records coordinator it was stated that only pre-requisite training is checked for completion prior to issuing qualification and task cards. Since task cards do not contain any prerequisites, all task cards were issued to the new Roving Watch trainees for completion.

Note 3 of WP-14-TR3307, *Qualification Programs*, states, "Because full qualification may involve the training and evaluation of multiple tasks, a qualification candidate (trainee) once trained and signed off on a particular task or tasks may perform that/those tasks unsupervised." The tasks cards are evaluated by an On-the-Job Training (Level I Instructor/Evaluator) who signs that the trainee is able to perform the task unsupervised Based on this a trainee would be allowed to perform a task within their job qualification independently once the task card is completed and notated on the overall qualification card. This is not in compliance with the qualification process that requires passing a comprehensive written exam over all task areas to be granted qualification.

Reviews of roving watch qualification and task cards and interviews with training staff revealed that a trainee could be issued all task cards for a qualification, complete all task cards for a qualification and be allowed to perform every task within a qualification card unsupervised, without ever completing the classroom knowledge courses, a comprehensive written exam, standing required qualification watches, or being approved by their management as qualified.

During an interview with a Senior Manager it was stated that the Task based qualification was being implemented to allow quicker utilization of operations personnel prior to full qualification.

This process, as implemented by NWP, is not in compliance with DOE O 426.2 or WIPP DSA KE 12-3 requirements to ensure that personnel are not allowed to perform independently until qualification requirements are complete.

Evaluated by:	**Approved by:**
/s/ Julie Finup, Team Member /s/ Tony Weadock, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	Objective #:	Finding: X	Pre-Start:	Issue No: TRG.1 POST-1
Training	TRG.1	Observation:	Post-Start: X	Rev: 0 Date: 11/30/2016

ISSUE

The WIPP Training Implementation Matrix (TIM), both the currently approved document and the revision that is at CBFO for review and approval, do not adequately address all DOE O 426.2 requirements.

REQUIREMENT

DOE O 426. 2, Appendix I, Chapter 1, Section 1. The contractor must prepare a Training Implementation Matrix (TIM) to identify those sections of this Contractor Requirements Document (CRD) that are applicable to a particular facility. The TIM defines and describes the application of the selection, qualification, certification, and training requirements of the CRD. It must clearly define the organization, planning, and administration of the program and set forth the responsibility, authority, and methods for conducting training. Suitable justification must be included in the TIM for CRD provisions that are not implemented. Throughout the CRD, the word must is used to denote actions that are required to be performed if the objectives of the CRD provisions are to be met.

REFERENCE(S)

- NWP Contract, Applicable Directives
- DOE O 426.2, Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities, dated 04/21/2010
- Nuclear Waste Partnership (NWP) Training Implementation Matrix, Rev. 10, concurred on by CBFO 09/30/2015
- Nuclear Waste Partnership (NWP) Training Implementation Matrix, Rev. 11, submitted to CBFO for review and approval on 11/07/2015
- WP 14-TR.01, *WIPP Training Program*, dated 11/13/2016
- WP 14-TR3004, *Training Development*

DISCUSSION

The current NWP TIM Rev. 10 and pending Rev. 11 were reviewed to determine if the documents adequately implement the requirements of DOE O 426.2. Both documents

were compared with the requirements for a Hazard Category II Non-Reactor Nuclear Facility contained in DOE O 426.2. Several instances were identified where both revision 10 and 11 did not adequately address the order requirements. These included but are not limited to:

- Section 1.6 – "Training Organization" identifies that the WIPP Technical Training program responsibilities are documented in WP-14-TR.01, *WIPP Training Program*. *DOE Order 426.2* requires that the TIM must clearly define the organization, planning, and administration of the program and set forth the responsibilities, authority, and method for conducting training. Per DOE O 426.2, the TIM is required to be approved by DOE Head of the Field Element. By handing off to other documents that implement these requirements that can be modified by the contractor without DOE approval, this bypasses the requirement for review and approval by the DOE Head of the Field Element.

- In Rev. 10 of the TIM, Table DOE O 426.2 CRD Chapter I, 4 a (5), identifies that the applicability is "yes" with an implementing mechanism of WP 14 TR.01 and section of
  WP 14-TR3004, *Training Development*. In Rev. 11 of the TIM, this same requirement is noted with an Implementing Mechanism of WP 14-TR3004 and has applicability as "no" with a note that there are no certified positions at the WIPP facility. *This requirement is applicable to all nuclear facility positions where job functions require team solutions and is not specific to just certified positions.*

- In both Rev. 10 and 11 of the TIM, Table DOE O 426.2 CRD Chapter II, 6 c, and 6 d(1) and 6 d (2) have applicability listed as " no", with comments that "There are no Fissionable material handlers at the WIPP." *These requirements are applicable to all nuclear facility positions of operations supervisors and operations management personnel.*

- A review of WP 14-TR.01, which is identified as the implementing mechanism in many of the order requirements in the TIM Table, contained language that had been softened. "Must" had been changed to "may" in some instances. For example, in Step 5.0 of
  WP 14-TR.01, verbiage was softened from a "must" statement in the order to a "may" statement in the procedure; the procedure states: "General Training may consist of, but not be limited to classroom instruction . . ." This is not consistent with DOE O 426.2, which states: ". . . that Training must consist of, but is not limited to . . ."

Evaluated by:	**Approved by:**
/s/ Julie Finup, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start:**	**Issue No: TRG.1-POST-2**
Training	**TRG.1**	**Observation:**	**Post-Start: X**	**Rev: 0**
				Date: 11/30/2016

ISSUE

Operator training programs are not sufficiently comprehensive to cover all areas which are fundamental to their assigned tasks, as required by DOE O 426.2.

REQUIREMENT

DOE O 426.2 Attachment, Chapter 2, Section 6 (a): Operator training must be sufficiently comprehensive to cover areas which are fundamental to the candidate's assigned tasks to ensure that personnel are capable of safely performing their job duties. The training program must include the following:

(1) A core of subjects such as industrial safety, instrumentation and control, basic physics, chemistry, industry operating experience, and major facility systems, as applicable to the position.
(2) On-the-job and classroom-type training to ensure that personnel are familiar with all aspects of their positions. Such training must include but not be limited to:
   (a) Normal and emergency procedures:
   (b) Administrative procedures;
   (c) Radiation control practices;
   (d) Location and function of pertinent safety systems and equipment;
   (e) Procedures for making changes or alterations in operations and operating procedures;
   (f) Technical Safety Requirements

REFERENCE(S)

- NWP Contract, Applicable Directives
- DOE O 426.2, Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities, dated 4/21/2010
- Nuclear Waste Partnership (NWP) Training Implementation Matrix, Rev. 10, concurred on by CBFO 9/30/2015
- Nuclear Waste Partnership (NWP) Training Implementation Matrix, Rev. 11, submitted to CBFO for review and approval on 11/7/2015
- WP 14-TR.01, *WIPP Training Program*, dated 11/13/2016

- WP 04-AD.12, *WIPP Facility Operations Training Program Plan*, Rev.1, dated 11/09/2016
- Central Monitoring Room Operator Job Analysis File Rev. 0 dated 11/20/1996
- Facility Operator Roving Watch Job Analysis File, Rev. 0, dated 12/9/1996
- Underground Roving Watch Job Analysis File, Rev 0, dated 10/3/1996

DISCUSSION

A review of the referenced documents and interviews with training staff were conducted to determine the adequacy of implementation of DOE O 426.2 requirements. During the document reviews it was noted that Section 13.7 of WP 14-TR.01, *WIPP Training Program*, does not adequately implement the DOE O 426.2 Attachment, Chapter 2, Section 6 (a) requirement.

WP 14-TR.01, section 13.7 states, "Operators will be trained and qualified to perform their assigned tasks. Training will include such subjects as industrial safety, operating experience, and facility systems." Section 13.7 eliminated the rest of the core of subjects identified in the order and did not add any specific to the WIPP operator positions as should have been identified by analysis. For example, instrumentation and control, basic physics, and chemistry.

The initial 1996 Job Task Analysis (JTA) for the Facility Operator position included a statement that fundamentals training needed to be developed. During a discussion with the WIPP Training and Procedures Manager and the Operations Training Manager it was stated that Systems Training was still being developed to address the June 2015 finding. It was also stated that the applicable fundaments training was imbedded in the qualification cards and task cards for the positions. From a review of a sampling of the Training Program Plans, the JTA, the task and qualification cards, and written exams, fundamental core subjects are not being addressed.

Evaluated by:	**Approved by:**
/s/ Julie Finup, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start:**	**Issue No: TRG.1 -POST-3**
Training	**TRG.1**	**Observation:**	**Post-Start: X**	**Rev: 0**
				Date: 11/30/2016

ISSUE

NWP does not have a formal process to ensure that Managers are evaluated against their job responsibilities and complete facility specific training prior to assuming the duties of the assigned position as required by DOE O 426.2.

REQUIREMENT

DOE O 426. 2, Appendix I, Chapter II, Section 2. Persons at the Manager level must meet the requirements shown in Table 1, 2, and 3 below prior to assuming the duties of the assigned positions shown in the tables.

DOE O 426. 2, Appendix I, Chapter II, Section 2, Table 1, Hazard Category 2 and 3 Nonreactor Nuclear Facility Personnel Education and Experience Requirements. Manager and Operations position, Job Related Experience – note 8, "Managers must receive facility-specific training based upon a comparison of the individual's background and abilities with the responsibilities and duties of the position."

WIPP DSA KE 12-3: Training and qualification programs are designed and developed to ensure personnel obtain initial requisite knowledge and skills resulting in abilities to effectively execute assigned duties during normal, abnormal, and emergency conditions. Continuing training is provided to maintain requisite knowledge and skills as warranted for changes such as emergent Evaluation of the Safety of the Situation documents. Personnel are not permitted to perform assigned duties independently until requisite training and qualification are complete.

REFERENCE(S)

- NWP Contract
- DOE/WIPP 07-3372, *WIPP Documented Safety Analysis*, Rev. 5b, dated April 2016
- DOE O 426.2, Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities, dated 4/21/2010
- WIPP Training Implementation Matrix Rev. 10 and 11
- WP 14-TR.01, *WIPP Training Program*, Rev. 17, dated 11/13/2016

- WP 14-TR3307, *Qualification Programs*, Rev.8, dated 11/13/2016
- MP 1.40, *Management and Supervisor Training Qualifications*, Rev. 5, dated 05/10/2016
- MP 4.7, *Alternatives to Education and Experience Requirements*, Rev. 6, dated 05/26/2015

DISCUSSION

Document reviews and interviews were conducted to determine the process used to ensure Managers, as identified in the WIPP Training Implementation Matrix (TIM), are evaluated and complete facility specific training prior to assuming the duties of the assigned position.

The WIPP TIM states that this requirement is implemented in the human resources job descriptions. The manager job descriptions were reviewed and determined that they do not contain a comparison of the individual's background and abilities with the responsibilities and duties of the position and no needed training is identified. From a discussion with the Training and Procedures manager it was stated that Management Policy (MP) 1.40, *Management and Supervisor Training Qualifications*, implements the Management and Supervisor Training Qualification process. This process allows the candidate two years to complete this training. Further discussions revealed that the review was done informally based on undocumented knowledge requirements and what the manager's manager and the training manager thought the new manager needed.

Discussions with some managers indicated that their facility specific training was General Employee Training. Discussions with other managers indicated that they received facility specific training on the Documented Safety Analysis/Technical Safety Requirements and would get additional training as part of the Leadership Academy.

No documented evidence was provided that a formal review has been conducted to determine what facility specific training is needed for the various managers that are identified in the WIPP TIM.

Evaluated by:	**Approved by:**
/s/ Julie Finup, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start: X**	**Issue No: WA.1-PRE-1**
Waste Acceptance Compliance	**WA.1**	**Observation:**	**Post-Start:**	**Rev: 0** **Date: 11/30/2016**

ISSUE

CBFO procedures are inadequate to implement the DSA/TSR actions/requirements prior to emplacement of waste containers residing in the Waste Isolation Pilot Plan (WIPP) Waste Handing Building (WHB) and prior to shipment for previously certified waste containers in the complex (including those containers continuing to be certified).

REQUIREMENT

DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis*, Rev. 5b Chapter 18, Section 18.8, *Previously Certified Waste Preclusion of Shipments*

REFERENCE(S)

- DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis*, Rev. 5b
- DOE/CBFO 16-3568, Rev. 0, *U.S. Department of Energy Carlsbad Field Office Plan for Validating Currently Certified Waste*, dated 06/01/16
- CBFO MP 4.15, Rev. 0, *The Processing of TRU Waste Acceptable Knowledge Summary Reports*, effective dated 06/16/16
- AA:16:01045, Letter Philip Breidenbach to Todd Shrader, *Resubmittal of the Waste Isolation Pilot Plant Documented Safety Analysis*, Rev. 5a, dated 04/18/16
- Letter Vicki Diane Snow to Mr. Breidenbach, *Contract DE-EM0001971 – Nuclear Waste Partnership LLC – Contracting Officer Direction Letter for placing all currently certified TRU waste containers in the "Holding Cert" category in WDS*, dated 02/02/16
- Letter from Donald C. Gadbury to M.P. Gonzales, Approval of Hold Tag Removal from Waste Containers in Waste Streams ID-RF-S3114 and SR-221H-PuOx Currently Stored in the Waste Handing Building at the Waste Isolation Pilot Plant, dated 10/06/16 with attachments:
    - Letter J.R. Stroble to Ed Gulbransen, CBFO Concurrence on Chemical Compatibility Evaluation Memorandum for Waste Stream ID-RF-S3114 AK Source Document C531, dated 04/01/16

  - Letter J.R. Stroble to Ed Gulbransen, CBFO Concurrence of Chemical Compatibility Evaluation Memorandum for Waste Stream SR-221H-PuOx, dated 03/28/16
- Screen search demonstrating – *Packaging Table is annotated as "Read Only" – Table: wds.packaging*

DISCUSSION

NOTE: Although CBFO oversight processes were evaluated, those processes specifically associated with oversight of the National TRU Program (NTP) were reviewed in a limited manner. Only the processes required for implementation of the DSA/TSR for waste currently at the site and the process controls in place to prevent future shipments (until all DSA/TSR controls have been adequately implemented with regard to waste acceptance) in accordance with the DORR Plan of Action were evaluated.

CBFO procedures are not adequate to ensure the satisfactory implementation of the DSA requirements for currently certified waste containers in the complex, as well as those containers continuing to be certified and waste containers residing in the WIPP WHB. The prior release of the two waste streams (ID-RF-S3114 and SR-221H-PuOx) by CBFO was documented via memoranda that lacked sufficient detail to determine that all the requirements imposed by the DSA were adequately performed.

EMPLACEMENT

The waste containers residing in the WIPP's WHB prior to DSA Rev. 5b were placed on quality hold based on the Letter Vicki Diane Snow to Mr. Breidenbach, dated February 2, 2016. The letter stated for "NWP will place hold tags on the containers in the waste handling building and will not emplace waste from this population in the underground without written authorization from CBFO."

The primary CBFO document for validating currently certified waste is DOE/CBFO 16-3568. DOE/CBFP 16-3568 is a "Plan" and is not appropriate to implement DSA requirements. The Plan does not contain direct linkage to the actions/requirements in the DSA/TSR nor does it generate appropriate quality documentation of compliance with DSA requirements. Section 4, Validation Process for Waste at WIPP and Waste Control Specialist, requires the completion of Attachment 1 for documentation which does not address the waste containers residing in WIPP's WHB.

The letter from Donald Gadbury to Ms. Gonzales dated October 6, 2016 has two reference memorandums that establish the basis for CBFO approval to remove the hold tags from waste containers in waste streams ID-RF-S3114 and SR-221-H-PuOx in accordance with Step 4.6 of DOE/CBFP 16-3568.

The first reference memorandum dated March 28, 2016 evaluated a NWP request submitted on February 11, 2016 and the second reference memorandum dated April 1, 2016 evaluated a NTP request submitted on February 10, 2016. The reference memorandums state: "The CBFO has reviewed and determined that the comments

generated have been adequately addressed and the document meets the CBFO requirements. The Central Characterization Program is authorized to use the waste stream" SR-221-PuOx/ ID-RF-S3114 "in the Waste Data System (WDS) and to enter containers into the WDS using your procedures for characterizing and certifying TRU waste for disposal at WIPP." Per the DSA, CBFO is required to concur with the enhanced chemical compatibility evaluation and approve waste stream with acceptable enhanced chemical compatibility evaluation documentation. The containers are already in the WDS and certified for disposal, they were never removed from the system nor was certification pulled. These reference memorandums are inadequate basis for release of the hold tags.

The dates of the documents submitted for review in the two referenced memorandums are before the approval of the DSA and revised WAC. The dates of the CBFO TRU Sites and Transportation Division memorandums to authorization hold release are before issuance of DSA, DOE/CBFO 16-3568, revised WAC approval, and issuance CBFO MP 4.15, *The Processing of TRU Waste Acceptable Knowledge Summary Reports*. Based on the dates, it is not clear how a formal evaluation per the DSA Section 18.8 and stated plan DOE/CBFO 16-3568 could have been performed.

SHIPMENT:

CBFO documents do not directly contain confirmation of compliance with the DSA or assurance that all CBFO actions/requirements have been performed in accordance with the DSA/TSR.

The contractor removed all payloads previously "virtually built" in the payload module of the WDS and the packaging table in the WDS has been coded as "Read Only" as required by Section 18.8 of the DSA. The Data Administrator demonstrated the placement of the "Read Only" coding in the WDS will prevent any payload from being generated; thereby, preventing any waste from being shipped. This coding is only a temporary measure until a permanent modification to the WDS is implemented to delineate all the checks. The modification to the WDS has not been implemented and is required prior to release of any waste containers for shipments per Chapter 18 of the DSA.

The Letter from Vicki Snow to Mr. Breidenbach dated February 2, 2016 directed the waste containers currently certified or to be certified in the WDS to be placed on "Holding Cert" container status until CBFO provides a release on a waste stream basis. The letter further states "Once CBFO has released the waste stream, NWP may release specific containers to the WDS status of "Approved Cert" according to NWP procedures. The release of waste will be in writing by the CBFO Director of TRU Sites and Transportation." Therefore, the CBFO release is the final action that allows previously certified waste containers to be shipped.

DOE/CBFO 16-3568 is the primary document for CBFO actions required by the DSA. The document is a plan which is an inappropriate mechanism to implement CBFO DSA directed actions. The plan content does not adequately ensure performance and documentation of the CBFO DSA Chapter 18.8 actions/requirements. CBFO document(s) that appropriately implement the requirements of DSA Section 18.8 are required prior to shipment of currently certified waste containers in the complex as well as those containers that are continuing to be certified.

Evaluated by:	**Approved by:**
/s/ Brenda L. Hawks, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area: **Waste Acceptance Compliance**	**Objective #:** **WA.1**	**Finding: X** **Observation:**	**Pre-Start: X** **Post-Start:**	**Issue No: WA.1-PRE-2** **Rev: 0** **Date: 12/01/2016**

ISSUE

Contractor's procedures/documentation that implement DSA/TSR Waste Acceptance Criteria (WAC) and Chapter 18.actions and requirements have not all been developed and/or revised to incorporate the Documented Safety Analysis (DSA)/Technical Safety Requirement (TSR) requirements.

REQUIREMENT

10 CFR 830 Subpart B

REFERENCE(S)

- DOE/WIPP 07-3372, Rev. 5b, *Waste Isolation Pilot Plant Documented Safety Analysis*
- DOE/WIPP 07-3372, Rev. 5b, *Waste Isolation Pilot Plant Technical Safety Requirements*
- CCP-TP-030, Rev. 35, *CCP CH TRU Waste Certification and WWIS/WDS Data Entry*
- CCP-TP-033, Rev. 22, CCP *Shipping of CH TRU Waste*
- WP 08-NT.01, Rev. 31, *Waste Data System Program and Data Management Plan*
- WP 08-NT-1002, Rev. 5, *WDS Administrative Reference Tables*
- WP 08-NT1003, Rev. 2, *Completion of Access Request Form and Assignment of Permissions in WDS*

DISCUSSION

Not all actions and requirements from DSA/TSR WAC and Section 18 have been included in procedures that ensure adequate implementation.

The permanent modification to the Waste Data System (WDS) to delineate all the checks for the currently certified waste containers in the complex as well, as those containers continuing to be certified, has not been finalized. This modification is required prior to any waste being shipped. The packaging table in the WDS is coded as "Read Only"

which prevents any payloads from being generated; thereby, preventing any shipments. This coding has to be changed to the permanent modification before any shipments can take place. The permanent modification must ensure that all checks required by DSA Section 18.8 have been completed prior to release of waste containers for shipment. This modification, along with implementing documents/changes must be completed before any waste can be shipped.

Rev. 22 to CCP-TP-033, CCP *Shipping of CH TRU Waste,* has been approved by CBFO and is undergoing USQD review at user sites before it can be made effective. This change is required to facilitate implementation of statistical material at risk (MAR) DSA requirements. Additional procedures will have to be generated to fully implement the full statistical MAR for instance, and how the WDS Data Administrators (DA) will handle overriding the "error' message that prevents acceptance of a payload based on the safety basis analysis review of the generated payload MAR values. These procedures/documents need to be completed and effective prior to any waste container shipment.

CCP-TP-030, *CCP CH TRU Waste Certification and WWIS/WDS Data Entry,* needs to be updated to incorporate changes needed for DSA/TSR implementation. This update is being drafted.

Technical DSA implementing procedures related to the WDS DA release of any "hold," authorize a waste stream profile, or override a system are compliant with the DSA do not exist. The release by the Data Administrator (DA) in the WDS is an integral part of the implementation of the DSA for waste shipments compliance with the WAC and DSA.

The requirements on personnel write access control to the various dashboards to ensure authorized users possess and maintain the appropriate training and qualifications needs to be enhanced. Write access to the WDS directly affects the implementation of the DSA directly.

These are only examples of procedures/documents that need to be generated and/or modified to ensure the implementation of the DSA/TSR WAC compliance and Section 18 controls.

Evaluated by:	**Approved by:**
/s/ Brenda L. Hawks, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start: X**	**Issue No: WA.1-PRE-3**
Waste Acceptance Compliance	**WA.1**	**Observation:**	**Post-Start:**	**Rev: 0** **Date: 11/29/2016**

ISSUE

The current administrative controls to preclude the placement of the waste containers located in the Waste Handling Building into the underground prior to satisfactory performance of DSA, Chapter 18.8 requirements do not satisfy the requirements of WP 13-QA3004, *Nonconformance Report*.

REQUIREMENT

WP 13-QA3004, *Nonconformance Report*, Step 8.1.4 – "If it is not practical to place the tagged item in a segregated hold area, establish appropriate administrative controls as necessary to preclude use. (Using yellow caution tape is acceptable.)"

REFERENCE(S)

- WP 13-QA3004, Rev. 15, *Nonconformance Report*
- Listing of Containers in the CH Bay of the Waste Handing Bay at the WIPP Site (Status on 11/10/2016) Along with statement from Beverly Schrock on placement of Hold Tags on November 13, 2016 and removal of tags
- Letter Vicki Diane Snow to Mr. Breidenbach, *Contract DE-EM0001971 – Nuclear Waste Partnership LLC – Contracting Officer Direction Letter for placing all currently certified TRU waste containers in the "Holding Cert" category in WDS*, dated February 2, 2016
- Letter from Donald C. Gadbury to M.P. Gonzales, *Approval of Hold Tag Removal from Waste Containers in Waste Streams ID-RF-S3114 and SR-221H-PuOx Currently Stored in the Waste Handing Building at the Waste Isolation Pilot Plant*, dated October 6, 2016 with attachments:
    - Letter J.R. Stroble to Ed Gulbransen, *CBFO Concurrence on Chemical Compatibility Evaluation Memorandum for Waste Stream ID-RF-S3114 AK Source Document C531*, dated April 1, 2016
    - Letter J.R. Stroble to Ed Gulbransen, *CBFO Concurrence of Chemical Compatibility Evaluation Memorandum for Waste Stream SR-221H-PuOx*, dated March 28, 2016
- DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis*, Revision 5b

DISCUSSION

The waste containers with quality hold tags are not segregated from the released containers, nor do they have any administrative controls established as required per WP 13-QA3004, *Nonconformance Report*, Step 8.1.4.
The containerized waste in the waste handling building (WHB) either has a quality hold tag or is part of the waste stream identified in letter from Donald C. Gadbury to M.P. Gonzales, *Approval of Hold Tag Removal from Waste Containers in Waste Streams ID-RF-S3114 and SR-221H-PuOx Currently Stored in the Waste Handing Building at the Waste Isolation Pilot Plant*, dated October 6, 2016 that allows removal of the hold tags.

The Waste Data System (WDS) does not have any controls in place for the containers in the waste handling building since shipping has been completed. Therefore, the WDS does not provide any administrative controls to prevent placement in the underground. If the quality hold tag were to be accidentally removed from the pallet or container, there would be nothing in place to prevent the waste containers from being placed underground.

The two attachments to Letter from Donald C. Gadbury to M.P. Gonzales, *Approval of Hold Tag Removal from Waste Containers in Waste Streams ID-RF-S3114 and SR-221H-PuOx Currently Stored in the Waste Handing Building at the Waste Isolation Pilot Plant*, dated October 6, 2016 stated: "The Central Characterization Program is authorized to use waste stream ID-FR-3114 in the Waste Data System (WDS) and to enter containers into the WDS using your procedures for characterizing and certifying TRU waste for disposal at WIPP." and "The Central Characterization Program is authorized to use waste stream SR-221-PuOx in the Waste Data System (WDS) and to enter containers into the WDS using your procedures for characterizing and certifying TRU waste for disposal at WIPP." The issue with the statement is the waste containers are already in the WDS as they could not be removed since were already shipped and received at the Waste Isolation Pilot Plant (WIPP). Additionally only the containers located in the WHB are being released from the hold and not the whole waste stream. The waste containers not currently located in the WHB currently are prevented from being shipped by the packaging table in the WDS read only coding. It is recognized that the read only coding is only a temporary measure until a more permanent modification to the WDS is implemented to delineate all the checks from the DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis*, Revision 5b, section 18.8 for currently certified waste containers in the complex as well as those containers continuing to be certified.

The requirement in DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis*, Revision 5b for waste containers residing in the WIPP's WHB is that they must undergo the same enhanced chemical compatibility evaluation described for currently certified waste containers prior to emplacement. Those waste containers subject to the Basis of Knowledge requirement cannot be emplaced until that evaluation has been completed and properly documented as well.

Evaluated by:	**Approved by:**
/s/ Brenda L. Hawks, Team Member	/s/ Edward Westbrook, Team Leader

DOE ORR for the Waste Isolation Pilot Plant
Deficiency Form 2

Functional Area:	**Objective #:**	**Finding: X**	**Pre-Start: X**	**Issue No: WA.1-PRE-4**
Waste Acceptance Compliance	**WA.1**	**Observation:**	**Post-Start:**	**Rev: 0** **Date: 11/30/2016**

ISSUE

The Waste Data System (WDS) is incorrectly graded as non-safety software.

REQUIREMENT

DOE Order 414.1D, Chg 1, *Quality Assurance* - definition Safety Software – "Safety Management and Administrative Controls Software. Software that performs a hazard control function in support of nuclear facility or radiological safety management programs or technical safety requirements or other software that performs a control function necessary to provide adequate protection from nuclear facility or radiological hazards. This software supports eliminating, limiting, or mitigating nuclear hazards to workers, the public, or the environment as addressed in 10 CFR Parts 830 and 835, the DEAR integrated Safety Management System clause, and 48 CFR 970-5223.1."

REFERENCE(S)

- DOE Order 414.1D, Chg 1, *Quality Assurance*
- DOE/WIPP 07-3372, Rev. 5b, *Waste Isolation Pilot Plant Documented Safety Analysis*
- DOE/WIPP 07-3372, Rev. 5b, *Waste Isolation Pilot Plant Technical Safety Requirements*
- EA16-2-1-0, *Software Screening Checklist, Software/Application Name: Waste Data System Version 2.7.2* Signed 10/11/16
- WP 08-NT.04, Rev. 23, *Waste Data System Software Quality Assurance Plan*
- DOE/WIPP-02-3122, Rev. 8, *Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant*

DISCUSSION

The WDS is specifically called out in the Documented Safety Analysis (DSA), including several of the Key Elements in DSA Section 18.8, Technical Safety Requirement (TSR) LCO 3.7.1 (action conditions, required actions; surveillance requirements) and TSR Safety Management Program 5.6.1 Chapter 18, WIPP Waste Acceptance Criteria Compliance Program.

The WDS provides the control of waste containers to prevent shipment prior to appropriate checks against the DSA/TSR.

The payloads are generated in the WDS and checked for compliance utilizing checks in the WDS system for compliance with the Waste Acceptance Criteria (WAC) and DSA/TSR. These checks are no longer performed by hand.

The description in the software screening checklist for the WDS Version 2.7.2 does not adequately describe all the activities performed by software. It does state "The WDS is fully compliant with and implements the data requirements summarized in DOE/WIPP-02-3122, Transuranic WAC for the Waste Isolation Pilot Plant, and other specified authorization basis documents."

The fact the WDS implements DSA and TSR requirements meets the definition of Safety Software type 3, Safety Management and Administrative Controls Software. The Software Screening Checklist incorrectly checked "no" for item 3.

Evaluated by:	**Approved by:**
/s/ Brenda L. Hawks, Team Member	/s/ Edward Westbrook, Team Leader