CONTRACTOR OPERATIONAL READINESS REVIEW (CORR)

FINAL REPORT

FOR THE

COMMENCEMENT OF CONTACT-HANDLED WASTE EMPLACEMENT

AT THE

WASTE ISOLATION PILOT PLANT (WIPP)

CA-2017-CORR-001

APPROVED BY: (b) (6) 10-28-2016

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Acronyms

AA	Authorization Agreement
AHJ	Authority Having Jurisdiction
AIB	Accident Investigation Board
AK	Acceptable Knowledge
AKE	Acceptable Knowledge Expert
ALARA	As Low As Reasonably Achievable
AR	Applicability Review
CA	Contamination Area
CAM	Continuous Air Monitor
CAP	corrective action plan
CARB	Corrective Action Review Board
CAS	Contractor Assurance System
CBFO	DOE Carlsbad Field Office
CCP	Central Characterization Project
CFR	Code of Federal Regulations
CGD	Commercial Grade Dedication
CH	contact-handled
CHAMPS	Computerized History and Maintenance Planning System
CM	Crisis Manager
CMR	Central Monitoring Room
CMRO	Central Monitoring Room Operator
CO	carbon monoxide
COA	Condition of Approval
CORR	Contractor Operational Readiness Review
CR	Core Requirement
CRAD	Criteria Review and Approach Document
CSE	cognizant system engineer
DAC-hours	derived air concentration-hours
DF	Design Feature
DOE	Department of Energy
DOE-EA	DOE Office of Enterprise Assessments
DSA	Documented Safety Analysis
EAL	emergency action level
ECN	Engineering Change Notice
ECO	Engineering Change Order
EFR	Engineering File Room
ENS	Emergency Notification System
EOC	Emergency Operations Center
EPHA	emergency planning hazards assessment

ERO	Emergency Response Organization
ESH	Environmental Safety & Health
ESQRB	Executive Safety and Quality Review Board
FPE	Fire Protection Engineer
FSM	Facility Shift Manager
HCA	High Contamination Area
HEPA	high-efficiency particulate air
HMP	Hazardous Material Protection
HWFP	Hazardous Waste Facility Permit
I&C	instrumentation and controls
IC	Incident Commander
ICE	Issues Collection and Evaluation
ICP	Incident Command Post
IP	Implementation Plan
IS/IH	Industrial Safety / Industrial Hygiene
ISH	Industrial Safety and Health
ISI	in-service inspection
ISM / ISMS	Integrated Safety Management / Integrated Safety Management System
IVR	Implementation Verification Review
IVS	Interim Ventilation System
JIC	Joint Information Center
JON	Judgment of Need
JTA	Job Task Analysis
KE	Key Element
LCO	Limiting Condition of Operation
LWA	Land Withdrawal Area
M&TE	measuring and test equipment
MAR	material at risk
MARSAME	Multi-Agency Radiation Survey and Assessment of Materials and Equipment Manual
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MDA	minimum detectable activity
MRT	Mine Rescue Team
MS	Mine Safety
MSA	Management Self-Assessment
MSEL	master scenario events list
MSHA	Mine Safety and Health Administration
NFPA	National Fire Protection Association
NMED	New Mexico Environment Department
NWP	Nuclear Waste Partnership
O	Order
ORR	Operational Readiness Review

PA	protective action
PAPR	powered air purifying respirator
PAR	protective action recommendation
PAS	Public Address System
PCR	Permittees Confirmation Representative
PID	Photo Ionization Detector
PLC	programmable logic controller
PM	periodic maintenance
POA	Plan of Action
POD	plan of the day
PPE	personal protective equipment
Q&MIS	Quality & Manufacturing Integrated System
QA	Quality Assurance
QEA	qualitative exposure assessment
QWL	Qualified Watchstander List
R2A2s	roles, responsibilities, authorities, and accountabilities
RCRA	Resource Conservation and Recovery Act
RCS	Radiological Control Supervisor
RCT	Radiological Control Technician
RES	Regulatory and Environmental Services
RH	remote-handled
RP	Radiological Protection
RPP	Radiation Protection Program
SDD	System Design Description
SEC	Site Environmental Compliance
SER	Safety Evaluation Report
SHR	System Health Report
SME	subject matter expert
SMP	Safety Management Program
SSCs	structures, systems, and components
T&Q	Training and Qualification
TIM	Training Implementation Matrix
TPP	Training Program Plan
TRU	transuranic
TRUPACT	Transuranic Package Transporter
TSR	Technical Safety Requirement
UFE	Underground Facility Engineer
UGRW	Underground Roving Watch
UNS	Underground Notification System
USQ / USQD	Unreviewed Safety Question / Unreviewed Safety Question Determination

VOC	volatile organic compound
VSS	Vital Safety Systems
WAC	Waste Acceptance Criteria
WDS	Waste Database System
WHB	Waste Handling Building
WIPP	Waste Isolation Pilot Plant
WSHP	Worker Safety and Health Program
WSPF	Waste Stream Profile Form

Executive Summary

The Contractor Operational Readiness Review (CORR) was conducted October 3-14, 2016, in accordance with the approved Plan of Action (POA), *Plan of Action, Revision 3, for Nuclear Waste Partnership's Contractor Operational Readiness Review for Commencement of Contact-Handled Waste Emplacement*, dated September 14, 2016, and Implementation Plan (IP) *Contractor Operational Readiness Review Implementation Plan for Commencement of Contact Handled Waste Emplacement at the Waste Isolation Pilot Plant, Revision 3*, dated October 13, 2016.

The CORR encompassed all aspects of the restart of the contact-handled (CH) waste emplacement operations at the Waste Isolation Pilot Plant (WIPP). The review addressed safety-significant structures, systems, and components (SSCs); operations and operations support personnel and procedures; and Safety Management Programs (SMPs) germane to CH waste emplacement operations. The CORR provided the Nuclear Waste Partnership, LLC. (NWP) and the Department of Energy (DOE) Carlsbad Field Office (CBFO) Startup Authorization Authority with an independent assessment of NWP's readiness to commence CH waste emplacement operations.

The CORR team was led by Mr. Frank McCoy of AECOM Technical Services. Fourteen other team members were selected by the Team Leader based on their relevant experience in management, nuclear operations, engineering, nuclear safety, quality assurance and safety management; expertise in their assigned areas of review; and freedom from conflict of interest in their assigned review area. Team members conducted their reviews, inspections, interviews, and observations in accordance with the 29 Criteria Review and Approach Documents (CRADs) of the IP.

During the course of the review, more than 650 documents were reviewed, more than 250 personnel interviews were conducted, and more than 100 observations of evolutions (including plans of the day, shift briefs, pre-job briefings, critiques, management meetings and briefings, work performance, in-plant demonstrations, and facility and equipment walkdowns) were conducted. The results of the team's evaluations were documented in Appendix 1, *Assessment Forms* (Form 1s) associated with each of the 29 CRADs.

The CORR identified seven pre-start findings (see Table ES1) and five post-start findings (see Table ES2).

At the completion of the CORR, three prerequisites from the POA had still not been completed. These prerequisites, which were included on the manageable list of open items prior to start of the CORR, are delineated below.

- **PR-6.7**: Fire protection requirements, including in-service inspections (ISIs) and surveillances, have been fully implemented as evidenced during facility walkdowns, record reviews, and performance demonstrations.

NWP submitted an exemption request, WIPP-EX-2015-01, R0, involving the safety requirements for an automatic suppression system for the WIPP underground facilities for Authority Having Jurisdiction (AHJ) approval. This exemption request was reviewed by CBFO and was submitted to DOE-Office of the Assistant Secretary for Environmental Management and DOE-Office of the Associate Under Secretary for Environment, Health, Safety, and Security for approval but has not yet been approved. The facility does not meet the requirements of DOE Order (O) 420.1C for automatic suppression systems without the approved exemption. This is being tracked on the NWP manageable list of open items.

- **PR-8.1**: Facility modification and change control packages, for the modifications listed in Core Requirement (CR) 8, have been properly prepared, approved, implemented, and closed to ensure affected systems, procedures, and associated safety basis documentation are reviewed and revised, as needed, for consistency. Any outstanding change control packages have been screened and determined not to affect startup of operations.

Projects for two system modifications have not yet been completed and turned over to Operations at the completion of the CORR:

- Underground fire suppression upgrades, and
- Automatic fire suppression upgrades for underground liquid-fueled equipment.

Facility modification and change control packages for these two projects have not been completely implemented and closed to ensure affected systems, procedures, and associated safety basis documentation are reviewed and revised, as needed, for consistency. These open modifications are being tracked on the NWP manageable list of open items with completion scheduled before the end of October 2016.

- **PR-8.2**: Pre-start projects listed in CR-8 have been completed (except as noted in the individual project descriptions), and Interim Ventilation System (IVS) is operational via readiness startup authorization from CBFO.

Projects for two system modifications have not been completed and turned over to Operations at the completion of the CORR:

- Underground fire suppression upgrades, and
- Automatic fire suppression upgrades for underground liquid-fueled equipment.

As noted above, these open modifications are being tracked on the NWP manageable list of open items with completion scheduled before the end of October 2016.

At the time of completion of the CORR, four fire event Accident Investigation Board (AIB) Judgments of Need (JONs) associated with the Configuration Management program had not yet been accepted by CBFO (fire event JONs 13.1, 14.1, 14.6, and 18.1). Based on the CORR team's review, the improvement actions within these AIB JONs were implemented; therefore, prerequisite PR-1.2 is met for Configuration Management (the prerequisite does not require CBFO acceptance).

NWP had also identified a number of other pre-start items on manageable list of open items that still remained open at the completion of the CORR. These items are:

- Installation and turnover of the Underground Volatile Organic Compound (VOC)/carbon monoxide (CO) monitoring systems (scheduled for completion by October 30, 2016);
- Installation and turnover of the IVS Permacons (scheduled for completion by October 21, 2016);
- Installation and turnover of the Networked Panel 6 and Panel 7 Continuous Air Monitors (CAMs) that are tied into the Central Monitoring Room (CMR) (originally scheduled for completion by October 7, 2016 and rescheduled to October 31, 2016);
- Completion of Panel 7 ground control activities to emplace waste in Panel 7, Room 5 (originally scheduled for completion by October 7, 2016 and rescheduled to October 31, 2016); and
- Completion of the New Mexico Environmental Department (NMED) assessment.

The CORR team concluded that 24 CORR Objectives were met and five were partially met (CM2, EP2, FP1, OPS3, and RP1). Satisfactory resolution of pre-start findings, completion of incomplete prerequisites, and completion of the manageable list of open items associated with completion of Panel 7 ground control activities to emplace waste in Panel 7, Room 5 will enable all partially met objectives to be fully met.

The CORR team concluded that, subject to resolution of pre-start findings and completion of prerequisites, NWP has established an agreed upon set of requirements to govern safe CH waste emplacement operations; this set of requirements was formalized with DOE through the contract or other enforceable mechanism; these requirements were implemented in the facility; and adequate protection of public health and safety, worker safety, and the environment was maintained.

Accordingly, the team concluded that waste emplacement operations can proceed safely once pre-start findings have been satisfactorily resolved, all prerequisites have been completed, and the remaining open pre-start items on the manageable list of open items have been completed.

The CORR team concluded, based on interviews and observations, that with some limited observed exceptions and subject to resolution of pre-start findings, the core functions and guiding principles of Integrated Safety Management and several important elements of an effective safety culture were evident among the CH waste emplacement operations team. Examples of the safety culture elements are:

- Willingness to stop/pause work when faced with uncertainty or problems and get clarification and resolution before proceeding
- Good commitment, attitude, and behavior towards safety
- Positive attitude and willingness to raise safety and quality issues without fear of retribution.

Notwithstanding these positive attributes, several workers expressed concerns with the stability of specific areas of the mine and management’s commitment to resolve those issues. Several other workers expressed concern with functionality of the Emergency Notification System (ENS) equipment and entry/exit doors and management’s commitment to resolve those issues. This may

be indicative of a need for better communication that, if left unattended, could result in unwanted consequences. The CORR team noted that management is proactively engaging the workforce with resolution of ground control concerns, and applauds and encourages continued attention and support of that approach until fully resolved.

The team noted recent and extensive process and procedural changes in support of waste emplacement operations. The team also noted that the current waste emplacement experience is based on simulation that, in some cases, introduces confusion into the activity (such as that encountered with Bulkhead 309 during waste emplacement demonstrations), and in other cases, may mask potential pitfalls that could be encountered during actual operation. The team recommends that NWP schedule some substantial time (a number of weeks) where the facility functions as if it has returned to normal operations. Personnel should note problems with procedures, interfaces, material problems, etc., for resolution at the end of the trial period. Changes (i.e. to procedures, etc.) should be minimized during the period, unless absolutely mandatory, to avoid injecting uncertainty and interface issues.

The team also noted the ground control program is largely experience-based, and has recently become influenced by the nuclear safety basis. While the program is effective, it is highly dependent on a select group of individuals. To ensure sustainability, the team recommends that considerations be given to transitioning the program over time to an institutionalized program with established standards and documented processes.

Furthermore, the CORR team noted that the Waste Data System (WDS) software had not been rescreened after the implementation of Documented Safety Analysis (DSA)/Technical Safety Requirements (TSRs) to ensure the classification is correct. The CORR team believes that WDS should be classified as safety software in order to protect the WDS data used to calculate the statistical material at risk (MAR) required by Key Element (KE) 18-5. If rescreening does not support safety software classification, the CORR team would challenge the sufficiency of the screening process and associated screening criteria.

TABLE ES1 LISTING OF PRE-START FINDINGS

Finding Number	Description
EP1-PRE-1	The operability and testing of equipment (audible, visual) used for abnormal event communication/notification between workers (both aboveground and underground) and CMR is less than adequate, and management has not appropriately compensated for this weakness. This is contrary to the requirements of SMP KE 11-3, and the WIPP RCRA Contingency Plan section 2.10 (Preparedness and Prevention).

Finding Number	Description
EP2-PRE-1	Contrary to EA12ER4925-3-0 Revision 5, *CMR Initial Response Actions*, during the June exercise, the WIPP CMR Staff failed to activate the HEPA filtered ventilation in the CMR during a simulated unfiltered release from the underground. This failure could have resulted in unnecessary exposure of CMR personnel in a real event. Contrary to WP 12-ER4911, *Underground Fire Response*, personnel in the underground are consistently failing to evacuate the mine immediately. Additionally, WP 12-ER4911 has a complicated set of instructions regarding the donning of respiratory protection, which instructs the employees to wait until smoke is visible before donning. The workers should in all instances involving fire don the appropriate respiratory protection and immediately evacuate.
OPS1-PRE-1	Contrary to WP 12-ER.25, on at least two observed occasions, vehicles in the mine were parked along the same side as the placed egress markers, impairing the visibility of the markers.
RP1-PRE-1	Contrary to WP 04-AD3034, numerous examples, as identified in the RP1 Form 1, were observed where radiological control reference procedures were not used.
RP1-PRE-2	Contrary to 10 CFR Part 835.103, numerous examples, as identified in the RP1 Form 1, were observed where some radiological control personnel exhibited a less than adequate level of knowledge and skills, and management has not appropriately compensated for this weakness.
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.
TQ-PRE-1	Contrary to the requirements of WP 14-TR.01, Section 4.11, one Radiological Control Supervisor (RCS) and one CH Waste Handling Manager did not have current qualifications in place during the performance demonstration on 10/4/2016, based on a comparison of training records vs. the qualification requirements specified in the relevant Training Program Plans. In addition, remaining RCSs also do not have current qualifications in place and are supervising work.

TABLE ES2 LISTING OF POST-START FINDINGS

As described in the associated CRADs, the post-start findings were evaluated by the team against Appendix 3 Criteria and were determined not to involve a violation or potential violation of worker safety or environmental protection regulatory requirements that would pose a significant danger to workers, the public, or of environmental insult or release. Accordingly, they were classified as post-start findings.

Finding Number	Description
HMP1-POST-1	WIPP does not have a formal process or implementing procedure to provide consistent approved methods for performing qualitative exposure assessments (QEAs), and they are not documenting QEAs. This is not compliant with 10 CFR 851.21.

Finding Number	Description
RP1-POST-1	Contrary to DOE O 458.1, Sections 4.K (1) & (8)(a), the property clearance and release process did not adequately implement the order for uncontrolled release, and the procedures do not use methodologies sufficient to meet the measurement objectives, such as MARSSIM or MARSAME, or include an evaluation of non-uniform distributed residual radioactive material.
RP1-POST-2	Contrary to 10 CFR Part 835.401(b)(2) & (3) and 835.209(a), the basis to identify that the instruments in use are appropriate for type(s), levels, and energies of radiation to be encountered and appropriate for existing environmental conditions, as well as the basis for the air monitoring conducted to control exposures, are inadequate.
RP1-POST-3	Contrary to 10 CFR Part 835, Section 835.1003 (b) and 835.104, there were a number of ALARA program requirements that are not implemented, and written procedures are not developed for radiological work planning.
WPC1-POST-1	Contrary to 10 CFR 851 Section 22 and WP12-IS3002, R14, *Job Hazard Analysis Performance and Development*, additional activity introduced hazards and protective measures were frequently added to the Job Hazard Analysis (JHA) without an approved revision of the JHA.

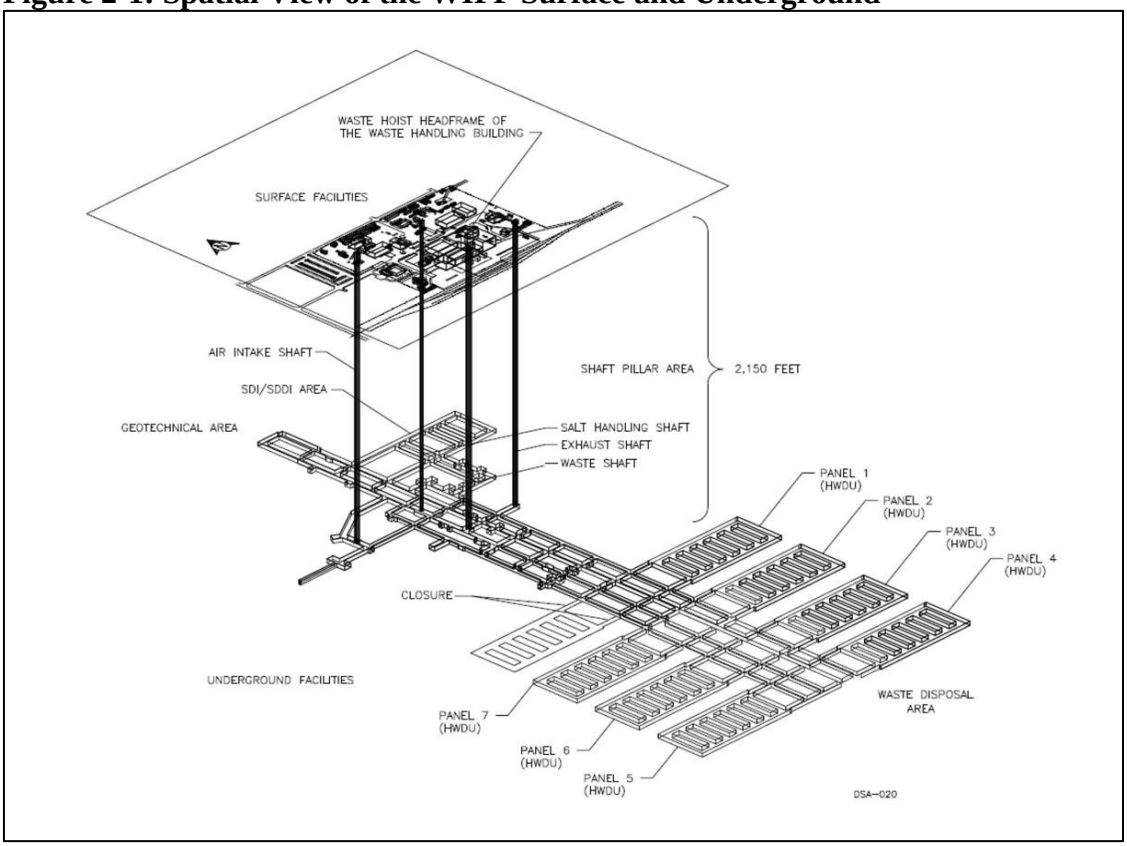
1.0 Introduction

1.1 Facility Description

The 10,240-acre WIPP site is located in Eddy County in southeastern New Mexico, 26 miles east of Carlsbad. The WIPP site is located in an area of low population density. The area surrounding the facility is used primarily for grazing and the development of potash, oil, and gas resources. No mineral resource development is allowed within the WIPP site boundary, with the exception of existing leases in Section 31 (the far southwest corner of the Land Withdrawal Act) which will be acquired if needed. All other sections are reserved to the center of the earth.

The WIPP site is divided into surface structures, shafts, and subsurface structures as shown in Figure 2-1 below and is designed to receive and handle 500,000 cubic feet per year of CH waste (i.e. waste with a radiation level of less than 200 millirem per hour at the surface of the waste container) and 10,000 cubic feet per year of 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). The WIPP surface structures support the receipt of transuranic (TRU) waste from generator sites.

Figure 2-1: Spatial View of the WIPP Surface and Underground



The Waste Handling Building (WHB) is the surface location for the unloading of generator-prepared waste containers from DOE-owned and Nuclear Regulatory Commission-certified U.S. Department of Transportation Type-B shipping containers. The CH waste and RH waste

containers are transferred from the surface to the underground through the Waste Shaft using the Waste Shaft Conveyance. The surface entry/egress from the Waste Shaft Conveyance and the waste hoist system and support structure are within the WHB. The CH waste or RH waste containers are removed from the Waste Shaft Conveyance at the Waste Shaft Station in the underground at 2,150 feet below the surface. The waste containers are moved along a predetermined transport path to their final disposal location. The WIPP facility is designed to have a TRU waste disposal capacity of 6.2 million cubic feet.

The nearest site boundary from either the WHB or the underground exhaust shaft is approximately 2.9 kilometers.

1.2 Salt Haul Truck Fire Event Description

On February 5, 2014, a fire occurred in the underground involving a salt haul truck. This event was investigated by both DOE and NWP. The DOE Accident Investigation Report was issued on March 13, 2015, including 22 Conclusions and 35 JONs.

There were 86 workers underground when the fire occurred. All workers were safely evacuated. Six workers were transported to the Carlsbad Medical Center for treatment for smoke inhalation, and an additional seven workers were treated on-site.

On Friday, February 7, 2014, the Deputy Assistant Secretary Safety, Health, Security, and Quality Program, Environmental Management, appointed an AIB to determine the cause and of the accident and to develop recommendations for corrective actions to prevent recurrence. The following is a summary of the AIB's investigation (also includes some Radiological Event conclusions):

- Nuclear Facility versus Mine Culture: Difference in expectations between waste handling and non-waste handling vehicles; e.g., combustible buildup, manual versus automatic fire detection and suppression system, fire resistant hydraulic oil.
- Operability and recognition of impaired critical safety equipment, e.g., salt haul truck combustible build up; discontinued use of the vehicle wash station; chaining open of ventilation doors impairing remote operation; inoperable ventilation fans; out-of-service regulator/damper; inoperable mine phones; emergency lights in the Waste Handling Facility; obscured evacuation reflectors; decision and analysis to disable the automatic fire detection and suppression system, etc. No concise method to readily understand status and impact of impaired mine safety related equipment.
- Ineffective training and drill programs:
    - Limited unannounced drills,
    - Inadequate donning of self-rescuers or self-contained self-rescuers during training or drills, or hands on training with portable fire extinguishers,
    - Inconsistencies between Baseline Needs Analysis, underground fire response procedures, and drills/training.
- Unreasonable expectations and uncertain capabilities of the Facility Shift Manager (FSM) to manage all aspects of an emergency or abnormal event:
    - Identified problems with communications and alarms during the fire/evacuation delaying egress,

    - Shifting ventilation configuration during an ongoing evacuation.; inconsistent with procedures and mining best practices,
    - During the radiological event, 8 hours elapsed before ordering sheltering in place.
- Emergency Operating Center (EOC) Ineffective as an Incident Command System:
    - No tactical and strategic role/inconsistent with DOE Order 151.1C,
    - Failure to classify and categorize, and make required notifications and declarations during both the fire and radiological events.
- Inadequate combustible loading program in the underground.
- Inadequate Fire Hazard Analysis (i.e. analysis of a fire near a shaft).
- Ineffective Maintenance, Emergency Management/Preparedness, Contractor Assurance System (CAS) programs.
- Ineffective CBFO oversight.
- Inadequate Headquarters oversight: ineffective emergency management Incident Command System and exercises; inadequate corrective action and closure on repeat externally identified issues; need for technical expertise available at Headquarters to support CBFO in overseeing the operation of a Hazard Category 2 facility in a mine or leveraging technical expertise at Mine Safety and Health Administration (MSHA).

1.2 Radiological Event Description

On February 14, 2014, an exothermic reaction involving the mixture of the 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 super sacks on top of the containers and onto adjacent waste containers. The super sacks of magnesium oxide 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.

At 2314 on February 14, 2014, a CAM monitoring airflow in Panel 7 exhaust drift, where drum 68660 was stored, detected this release and an alarm was received on the Central Monitoring System in the CMR 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 Phase II, DOE AIB was convened to investigate this event. 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 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 I DOE Accident Investigation Report was issued on April 22, 2014 with 31 Conclusions and 47 JONs. Following the completion of a virtual survey of the affected panel room, the Phase II Accident Investigation Report was issued on April 16, 2015, with 24 Conclusions and 40 JONs.

1.3 Major Actions After February 2014 Fire and Radiological Events

In response to the February 2014 fire and radiological events, NWP in conjunction with DOE developed a WIPP Recovery Plan. This plan was approved by the Secretary of Energy. Key elements of the recovery plan include strengthening safety management programs, regulatory compliance, decontamination of the underground, increasing ventilation, mine stability and underground habitability, and additional workforce retraining. In support of the Recovery Plan, NWP prepared and submitted a Performance Management Baseline. This baseline has been approved by DOE, and presents the scope, cost and schedule of activities that comprise the WIPP recovery and commencement of waste emplacement operations, including both operating and capital asset project scopes of work. Major accomplishments following the February 2014 events and in preparation for startup include:

- Development and closure of AIB corrective actions;
- Implemented a revised DSA, established in accordance with DOE-STD-3009-2014;
- Revision and implementation of WIPP's 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:
    - IVS, which supplies approximately 54,000 scfm of additional filtered air in the underground;
    - Upgraded EOC at the WIPP Site and new alternate EOC in Carlsbad, NM, at the Skeen-Whitlock Building;
    - Underground Notification System (a.k.a. Sentinel system), that provides real-time monitoring of personnel locations in the underground and direct communications to personnel for enhanced response capability;
    - Installed automatic fire extinguishing capability on underground liquid-fueled equipment, replacing the manual systems;
    - Repaired, replaced and installed new underground 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 underground, e.g., Maintenance Shop, Oil Storage;
    - Interim closure of Panel 6 (inlet and outlet drifts) and Panel 7 Room 7.
- Mine habitability was significantly enhanced, with emphasis on combustible loading and control, and ground control.

As part of WIPP's Recovery Plan and preparations for recommencing nuclear operations, NWP has and continues to evaluate its readiness via a two-month cold-run performance period,

emergency response drills, line management and independent assessments, and a Management Self-Assessment (MSA).

1.4 Purpose and Scope of the CORR

The purpose of the CORR was to verify/validate readiness for resumption of CH waste emplacement operations following recovery from the February 2014 fire and radiological release events. The POA specified the CRs (scope and breadth of the CORR) and identified the prerequisites and projected dates for performing a CORR and a DOE Federal Operational Readiness Review (ORR). The CORR was structured to assess the equipment, personnel, operating procedures, and safety features for the CH waste emplacement operations and support systems provided by the WIPP facility that houses the activities. The approaches and methodologies used verified that the facility, equipment, programs, procedures, personnel, and management have provided reasonable assurance for adequate protection of workers, the public, and the environment in preparation for and execution of CH waste emplacement operations.

Because WIPP is a hazard category 2 nuclear facility, and because CH waste emplacement operations were paused for safety reasons in excess of a year, DOE O 425.1D, *Verification of Readiness to Start Up or Restart Nuclear Facilities*, requires that both a CORR and ORR be satisfactorily completed prior to resumption of CH waste emplacement operations at WIPP. To this end, the DOE CBFO Startup Authorization Authority directed that a CORR and ORR be conducted.

The CORR was performed commensurate with various factors, including the relative risk to the worker, risk to the public in the event of an accident, the level of confidence inherent in controls and mitigating systems.

1.5 CORR Conduct and Team Composition

The CORR was a performance-based review. The breadth of the CORR was defined in the POA and IP. The depth to which the CORR evaluated this scope was identified in the CRADs, which served as the principal means by which the CORR evaluated the fourteen CRs identified for review in the approved POA. The reviews conducted by each CORR team member were guided by CRADs, which were grouped into functional areas and Objectives. Each functional area, Objective, and CRAD addressed one or more CRs and contained specific criteria upon which CORR team members objectively verified CR adequacy and the readiness of systems, processes, procedures, personnel, and management programs to restart CH waste emplacement operations safely.

The Team Leader conducted the planning and overall management of the CORR. The CORR team members reviewed documentation and procedures; inspected equipment, systems, and buildings; interviewed personnel; and observed performance of simulated or actual evolutions, including operational drills, in order to ascertain the extent to which TSRs, specified SMPs, and waste emplacement operations were safely and effectively implemented. The team also evaluated

the proficiency of personnel and determined if the personnel, equipment, and procedure preparations were sufficient to ensure safe and effective operation.

CORR team members reviewed more than 650 documents, conducted more than 250 personnel interviews, and observed more than 100 evolutions, including plans of the day, shift briefs, pre-job briefings, critiques, management meetings and briefings, work performance, in-plant demonstrations, and facility and equipment walkdowns. These reviews, interviews, and observations were conducted in accordance with the CRADs of the IP. The results of the team's evaluations associated with each of the CRADs were documented in Appendix 1, *Assessment Forms* (Form 1s).

The CORR team was led by Mr. Frank McCoy of AECOM Technical Services. Fourteen other team members were selected by the Team Leader based on their relevant experience in management, nuclear operations, engineering, nuclear safety, quality assurance and safety management; expertise in their assigned areas of review; and freedom from conflict of interest in their assigned review area. Biographical information regarding the Team Leader and team members is provided in Appendix 2.

The CORR team, associated roles, responsibilities, and interfaces, and assessment objectives and CRADs were organized and assigned, as described in Table 1.

Table 1 – CORR Team Assignments

NAME	FUNCTIONAL AREA	CRAD
Frank McCoy	Team Leader	
Bonnie Barnes	Maintenance / Work Planning & Control	MIT1, MIT2, WPC1
Jeff Buczek	Fire Protection / Safety Basis	FP1, SB1
Sam Glenn	Maintenance / Operations	MIT2, OPS1, OPS2, OPS3
Paul Gubanc	Configuration Management	CM1, CM2
Deborah Hojem	Management	MG1, MG5
Forest Holmes	Emergency Preparedness	EP1, EP2
Russ Hulvey	Management / Procedures Management	MG2, MG3, PM1
Mike Huyck	Maintenance / Operations	MIT2, OPS1, OPS2, OPS3
Jerry Kurtz	Radiological Protection	RP1
Cheryl Lucas	Environment Safety & Health / Hazardous Material Protection / Industrial Hygiene	ESH2, HMP1, ISH1
Mike Montini	Environment Safety & Health / Quality Assurance	ESH1, QA1
Brian Trawinski	Training & Qualification	TQ1, TQ2
Joe Uptergrove	Management / Waste Acceptance Criteria Compliance	MG4, WACC1
Bill Webb	Mine Safety / Waste Management	MS1, WM1

2.0 CORR Evaluation

2.1 Summary Results and Conclusions

The CORR identified seven pre-start findings (see Table 2) and five post-start findings (see Table 3). The CORR team concluded that 24 of the CORR Objectives were met and five were partially met. Findings were identified and determined to be pre- or post-start findings according to the criteria found in Appendix 3 of this report.

TABLE 2 LISTING OF PRE-START FINDINGS

Finding Number	Description
EP1-PRE-1	The operability and testing of equipment (audible, visual) used for abnormal event communication/notification between workers (both aboveground and underground) and CMR is less than adequate, and management has not appropriately compensated for this weakness. This is contrary to the requirements of SMP KE 11-3, and the WIPP RCRA Contingency Plan section 2.10 (Preparedness and Prevention).
EP2-PRE-1	Contrary to EA12ER4925-3-0 Revision 5, *CMR Initial Response Actions*, during the June exercise, the WIPP CMR Staff failed to activate the HEPA filtered ventilation in the CMR during a simulated unfiltered release from the underground. This failure could have resulted in unnecessary exposure of CMR personnel in a real event. Contrary to WP 12-ER4911, *Underground Fire Response*, personnel in the underground are consistently failing to evacuate the mine immediately. Additionally, WP 12-ER4911 has a complicated set of instructions regarding the donning of respiratory protection, which instructs the employees to wait until smoke is visible before donning. The workers should in all instances involving fire don the appropriate respiratory protection and immediately evacuate.
OPS1-PRE-1	Contrary to WP 12-ER.25, on at least two observed occasions, vehicles in the mine were parked along the same side as the placed egress markers, impairing the visibility of the markers.
RP1-PRE-1	Contrary to WP 04-AD3034, numerous examples, as identified in the RP1 Form 1, were observed where radiological control reference procedures were not used.
RP1-PRE-2	Contrary to 10 CFR Part 835.103, numerous examples, as identified in the RP1 Form 1, were observed where some radiological control personnel exhibited a less than adequate level of knowledge and skills, and management has not appropriately compensated for this weakness.
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.

Finding Number	Description
TQ-PRE-1	Contrary to the requirements of WP 14-TR.01, Section 4.11, one Radiological Control Supervisor (RCS) and one CH Waste Handling Manager did not have current qualifications in place during the performance demonstration on 10/4/2016, based on a comparison of training records vs. the qualification requirements specified in the relevant Training Program Plans. In addition, remaining RCSs also do not have current qualifications in place and are supervising work.

TABLE 3 LISTING OF POST-START FINDINGS

As described in the associated CRADs, the post-start findings were evaluated by the team against Appendix 3 Criteria and were determined not to involve a violation or potential violation of worker safety or environmental protection regulatory requirements that would pose a significant danger to workers, the public, or of environmental insult or release. Accordingly, they were classified as post-start findings.

Finding Number	Description
HMP1-POST-1	WIPP does not have a formal process or implementing procedure to provide consistent approved methods for performing qualitative exposure assessments (QEAs), and they are not documenting QEAs. This is not compliant with 10 CFR 851.21.
RP1-POST-1	Contrary to DOE O 458.1, Sections 4.K (1) & (8)(a), the property clearance and release process did not adequately implement the order for uncontrolled release, and the procedures do not use methodologies sufficient to meet the measurement objectives, such as MARSSIM or MARSAME, or include an evaluation of non-uniform distributed residual radioactive material.
RP1-POST-2	Contrary to 10 CFR Part 835.401(b)(2) & (3) and 835.209(a), the basis to identify that the instruments in use are appropriate for type(s), levels, and energies of radiation to be encountered and appropriate for existing environmental conditions, as well as the basis for the air monitoring conducted to control exposures, are inadequate.
RP1-POST-3	Contrary to 10 CFR Part 835, Section 835.1003 (b) and 835.104, there were a number of ALARA program requirements that are not implemented, and written procedures are not developed for radiological work planning.
WPC1-POST-1	Contrary to 10 CFR 851 Section 22 and WP12-IS3002, R14, *Job Hazard Analysis Performance and Development*, additional activity introduced hazards and protective measures were frequently added to the Job Hazard Analysis (JHA) without an approved revision of the JHA.

Review results and conclusions of the CRADs summarized here are found in detail in the Assessment Forms (Appendix 1).

CM1: This objective was met. NWP has established a Configuration Management SMP to ensure safe accomplishment of work. The level of knowledge of Engineering managers and staff

responsible for Configuration Management, and the facilities and equipment they use are adequate to ensure the program is effectively implemented. Additional run time with a stable set of procedures and processes is needed to reduce the potential for individual human performance errors. There were no findings identified.

CM2: This objective was **partially** met, on account of two incomplete modifications on the NWP manageable list of open items. With the exception of two modifications within the scope of the readiness review, the facility systems and procedures, as affected by facility modifications, are consistent with the facility description, procedures, accident analysis, and assumptions in the safety documentation. Installation of these two modifications remains incomplete and they are not yet operational. However, the incomplete modifications are being tracked on the NWP manageable list of open items to assure completion of prerequisites PR-8.1 and 8.2. There were no findings identified.

EP1: This objective was met. Efforts to stand up an Emergency Management (EM) program that is compliant with DOE O 151.1C and the WIPP Resource Conservation and Recovery Act (RCRA) Permit have produced a program that is significantly improved over the program in place at the time of the fire and radiological release in 2014. NWP's comprehensive training, drill, and exercise program helps ensure that responders at WIPP are prepared and demonstrate the capability to protect the workers and the public. A strong set of procedures implementing the NWP emergency plan provides for a consistent response to a wide variety of initiating event conditions. The WIPP modern EOC offers responders the tools needed to carry out their responsibilities effectively during operational emergencies postulated by the Emergency Planning Hazards Assessment (EPHA). Nevertheless, longstanding problems identified with the WIPP ENS remain unresolved. Resolution of these problems must be given the priority needed to ensure reliable notification of required protective actions and to restore employee confidence in this system. There was one finding identified.

EP1-PRE-1: The operability and testing of equipment (audible, visual) used for abnormal event communication/notification between workers (both aboveground and underground) and CMR is less than adequate, and management has not appropriately compensated for this weakness. This is contrary to the requirements of SMP KE 11-3, and the WIPP RCRA Contingency Plan section 2.10 (Preparedness and Prevention).

EP2: This objective was **partially** met. In summation, the EM exercise and drill program, along with the abnormal condition drill program, are still in a growth stage. The staff planning and conducting the drills are learning, and the responders are becoming accustomed to running exercises and drills. The CORR team has observed a continually improving trend in performance over the three observed emergency exercises and the drills. Additional planned exercises and drills will continue to improve responder proficiency and help the exercise and drill team to run more realistic exercises and drills. Additional rigor in the evaluation, identification, and assignment of needed improvement actions is warranted. There was one finding identified. Satisfactorily addressing the pre-start finding will enable NWP to meet the objective fully.

EP2-PRE-1: Contrary to EA12ER4925-3-0 Revision 5, *CMR Initial Response Actions*, during the June exercise, the WIPP CMR Staff failed to activate the HEPA filtered ventilation in the

CMR during a simulated unfiltered release from the underground. This failure could have resulted in unnecessary exposure of CMR personnel in a real event. Contrary to WP 12-ER4911, *Underground Fire Response*, personnel in the underground are consistently failing to evacuate the mine immediately. Additionally, WP 12-ER4911 has a complicated set of instructions regarding the donning of respiratory protection, which instructs the employees to wait until smoke is visible before donning. The workers should in all instances involving fire don the appropriate respiratory protection and immediately evacuate.

ESH1: This objective was met. The WIPP Environmental Safety & Health (ESH) program was evaluated through a combination of personnel interviews, document reviews, and observations/walkdowns and found to be sufficiently implemented to support resumption of waste emplacement activities. There are sufficient and compliant program documents, procedures, and processes as determined by the CORR. NWP personnel demonstrated awareness of and a high priority commitment to comply with public safety, worker safety and health, and environmental protection requirements. There were no findings identified.

ESH2: This objective was met. Review of evidence files, program plans, procedures, and implementing documents indicates that, with limited exception noted in two findings (RP1-POST-3 and HMP1-POST-1), the worker safety and requirements from Code of Federal Regulations (CFR) 10, Section 851 were adequately flowed down into facility plans, procedures, and other implementing documents. Observation of work evolutions and interviews with managers, ESH personnel, line and support managers, supervisors, and workers demonstrated that the 10 CFR 851 program requirements were implemented and are effective in providing a safe and healthy work environment for WIPP employees. There were no findings identified.

FP1: This objective was **partially** met. The criteria for this objective were partially met because of the exemption request not approved by the AHJ and incomplete underground fire suppression systems and automatic fire suppression system modifications which are identified on the NWP manageable list of open items. With the exception of that incomplete work, the fire protection SMP was established and implemented to ensure safe accomplishment of work. The level of knowledge of fire protection managers and staff is adequate based on review of records, interviews, and observation of operational demonstrations. The exemption request not approved by the AHJ, completing the installation of automatic vehicle fire suppression systems, and making the high combustible loading areas installed automatic fire suppression systems fully operational are being tracked on the NWP manageable list of open items to assure completion. Satisfactorily addressing these issues on the manageable list of open items will enable NWP to meet the objective fully. There were no findings identified.

HMP1: This objective was met. With the exception of one finding, it was evident through document reviews, interviews, operational demonstrations, and site walkdowns that line management has established and implemented a Hazardous Material Protection (HMP) SMP. With limited exception, the level of knowledge of managers and staff responsible for HMP is

adequate, based on review of records, interviews, and observation of hazardous material work activities. There was one finding identified.

HMP1-POST-1: WIPP does not have a formal process or implementing procedure to provide consistent approved methods for performing qualitative exposure assessments (QEAs), and they are not documenting QEAs. This is not compliant with 10 CFR 851.21.

The CORR team observed substantial Industrial Hygiene monitoring (including VOC), with no unusual exposure concerns indicated; the type, extent, and method of monitoring appeared conservative with respect to conditions in the mine. As such, the team concluded that, the issue did not involve a violation or potential violation of worker safety or environmental protection regulatory requirements that would pose a significant danger to workers, the public, or of environmental insult or release. Consequently, the issue was determined to be a post-start finding.

ISH1: This objective was met. Based on document review, interviews, and operational observations, line management demonstrated that they have implemented an Industrial Safety and Health (ISH) SMP to ensure safe accomplishment of work; and the level of knowledge of ISH managers and staff is adequate. There were no findings identified.

MG1: This objective was met. NWP has established and implemented SMPs to ensure safe accomplishment of work. The level of knowledge of managers and staff is adequate based on review of records, interviews, and observation of operational demonstrations. Senior Management presence is evident in the field, and their expectations for safety are understood and evident in the workforce. There were no findings identified.

MG2: This objective was met. Line management at WIPP is responsible for safety regarding personnel, facilities, the public, and the environment. Processes and functions, assignments and responsibilities, and reporting relationships (including those between the line operating organization and ESH and Quality Assurance (QA) support organizations) are adequately defined, understood, and effectively implemented. There were no findings identified.

MG3: This objective was met. The *WIPP Startup Plan for the Commencement of Contact Handled Waste Emplacement*, Revision 2, was approved and issued September 29, 2016. This plan specifically calls for controls and oversight to confirm operability of equipment, the viability of procedures, and the performance and knowledge of the operations staff. Revision 4 to this plan was approved and issued on October 19, 2016. Revision 4 incorporates a requirement to assure that, as a prerequisite to the issuance of authorization to emplace CH waste, the WIPP AA be revised to include the appropriate language addressing CH waste emplacement operations at WIPP. The revision also addresses in greater detail the requirements and expectations for management oversight and presence during the initial restart phase. There were no findings identified.

MG4: This objective was met. Formal agreements between the operating contractor and DOE were established via the contract. A systematic review of the facility's conformance to requirements of the Safety Basis documents was performed by NWP, and the requirements were

demonstrated by NWP to be implemented. Appropriate compensatory measures associated with fire protection and nuclear safety are in place. A systematic review of the facility's conformance to requirements of the initial Hazardous Waste Facility Permit (HWFP) was performed by NWP, and subsequent changes were systematically managed through the change control process. The CORR team is confident that the past and present actions demonstrate the requirements were implemented. There were no findings identified.

MG5: This objective was met. NWP has developed a comprehensive CAS that includes directives management; regulatory screening and reporting; assessments; issues management and corrective actions; performance analysis, trending, and reporting; and lessons learned and continuous feedback and improvement. Senior management's Executive Safety and Quality Review Board (ESQRB) is actively using the outputs of the CAS to develop and monitor system health metrics. Issues and process improvements are captured on WIPP Forms, and tracked from initiation through closure. NWP's prioritization of issues resolution is ineffective, which can cause significant safety related items to be addressed in a less than timely manner, as reflected in Objectives EP1, ISH1, and RP1. There were no findings identified.

MIT1: This objective was met. Efforts to improve conduct of operations in the maintenance organization have resulted in a substantial improvement in the rigor applied to the performance of work. Coaching and mentoring through management time in the field is evident, as the craft personnel seemed very comfortable being observed and, for the most part, were not resistant to questions. Maintenance requirements were flowed down into facility-specific procedures, as is evident in the WIPP Nuclear Maintenance Management Plan. Those procedures are effectively implemented to support the facility. Staffing is adequate at the present time, but additional resources will be needed once CH waste emplacement activities resume. All personnel are adequately trained, qualified, and are proficient to perform their jobs; their level of knowledge is commensurate with their level of responsibility. However, maintenance metrics do not contain the level of granularity needed to be a useful tool to manage the business effectively. A Periodic Maintenance (PM) Optimization compensatory action is in place to improve the PM program. Based on interviews with maintenance workers, the number of spare parts, including those deemed critical, may be insufficient to sustain continued facility operation. The Maintenance Manager recognizes this condition and is working with the engineering organization to determine an appropriate path forward for operational sustainability. And, while verbatim procedure compliance issues have decreased significantly, there are still instances being observed. Continued Maintenance Program vigilance, and continued management presence in the field will continue to improve conduct of maintenance at WIPP. There were no findings identified.

MIT2: This objective was met. The team conducted a review of programmatic procedures and selected System Health Reports (SHRs), and interviewed engineering managers and Cognizant System Engineers (CSEs). Based on these activities, the team concluded that a program is in place to confirm and reconfirm periodically the condition and operability of Vital Safety Systems (VSSs). WIPP management is aware of program and implementation weaknesses with the SHRs, and a comprehensive plan was developed to improve the process and reports, and make the resulting assessments more useful and meaningful. There were no findings identified.

MS1: This objective was met. An effective Mine Safety (MS) and Ground Control program was established. Based on document reviews, interviews (informal and structured), and operational activity observations, implementing procedures are being followed by experienced and trained staff, both in the Underground Operations organization and the Geotechnical Engineering organization. There were no findings identified.

OPS1: This objective was met. Based on observed work demonstrations, interviews, and review of applicable procedures, WIPP personnel successfully demonstrated discipline and a formality of operations sufficient to receive, unpack, transfer to the underground safely, and emplace CH TRU waste packages. Conduct of operations and oversight programs are in place to ensure personnel maintain this formality and proficiency of disciplined operations.

The level of knowledge of operators and managers was demonstrated to be adequate to resume CH waste operations through interviews of WIPP staff, reviews of selected Training and Qualification (T&Q) records, and observation of normal, off-normal, and emergency demonstrations. There was one finding identified.

OPS1-PRE-1: Contrary to WP 12-ER.25, on at least two observed occasions, vehicles in the mine were parked along the same side as the placed egress markers, impairing the visibility of the markers.

OPS2: This objective was met. Based on the team's review of selected procedures and observation of normal work evolutions, responses to alarm and off-normal scenarios, and conduct of TSR Surveillances, adequate and accurate procedures and safety limits are approved and in place for operating the process systems and utility systems. Facility processes ensure that only the most current revision to each procedure is in use. There were no findings identified.

OPS3: This objective was **partially** met. Based on an assessment of the WIPP Maintenance Program, observation of representative work evolutions, and walkdowns of selected systems and facilities, the team determined that adequate equipment is available for safe facility operation. Adequate facilities are not yet available, as Panel 7, Room 5 is not fully prepared to receive waste. This issue is currently on the manageable list of opens items. The material condition of all safety, process, and utility systems will support the safe conduct of work. There were no findings identified. Satisfactorily addressing the Panel 7 ground control on the manageable list of open items will enable NWP to meet the objective fully.

PM1: This objective was met. Line management has established a Procedures Management SMP to ensure safe accomplishment of work, and the level of knowledge of managers and staff responsible for administering and implementing the Procedures Management program is adequate. This conclusion was based on satisfactory flow-down of contract requirements, sufficient qualified staffing with acceptable knowledge levels of the procedure program and its implementing documents, as well as the interface with Operations, and adequate facilities and processing equipment to support the Procedure Management program at WIPP. There were no findings identified.

QA1: This objective was met. The WIPP QA Program was evaluated through a combination of personnel interviews, document reviews, and observations/walkdowns, and found to be sufficiently implemented to support resumption of waste emplacement activities. There are sufficient and compliant program documents, procedures, and processes in place, as determined by the CORR. There are adequate personnel, facilities, and equipment to support quality program requirements based on interviews with QA management and walkdown of facilities. There were no AIB JONs related to the QA Program specifically, but the QA involvement in JON closure was determined to be acceptable. There were no findings identified.

RP1: This objective was **partially** met. The review of the Radiological Protection (RP) functional area found that the project has made great strides in improving its programs since 2014. However, most of that effort was made in the field implementation of programs, which lack a solid technical basis based on source term and requirements. This resulted in some elements being overly conservative, while others were nonconservative. Issues identified in this objective are being placed in the WIPP issues management tracking system (WIPP Forms).

The NWP RP program was determined to be safe for CH TRU waste emplacement (pending resolution of the two pre-start findings) and, with some limited exception, compliant with 10 CFR 835. The 10 CFR 835 compliance exceptions were: Part 103 (addressed by finding RP1-PRE-2); Parts 401.b (2) and (3) and 209 (a) (addressed by finding RP1-POST-2); and Parts 1003 (b) and 104 (addressed by finding RP1-POST-3). There were five findings identified. Satisfactorily addressing the pre-start findings will enable NWP to meet the objective fully.

RP1-PRE-1: Contrary to WP 04-AD3034, numerous examples, as identified in the RP1 Form 1, were observed where radiological control reference procedures were not used.

RP1-PRE-2: Contrary to 10 CFR Part 835.103, numerous examples, as identified in the RP1 Form 1, were observed where some radiological control personnel exhibited a less than adequate level of knowledge and skills, and management has not appropriately compensated for this weakness.

RP1-POST-1: Contrary to DOE O 458.1, Sections 4.K (1) & (8)(a), the property clearance and release process did not adequately implement the order for uncontrolled release, and the procedures do not use methodologies sufficient to meet the measurement objectives, such as MARSSIM or MARSAME, or include an evaluation of non-uniform distributed residual radioactive material.

RP1-POST-2: Contrary to 10 CFR Part 835.401(b)(2) & (3) and 835.209(a), the basis to identify that the instruments in use are appropriate for type(s), levels, and energies of radiation to be encountered and appropriate for existing environmental conditions, as well as the basis for the air monitoring conducted to control exposures, are inadequate.

The CORR team observed radiological monitoring taking place and, based on other experience with TRU waste and associated instruments, the type of instruments used appeared appropriate for monitoring contact handled TRU waste. The crux of the issue – in the case of CH TRU waste only – is that there is insufficient technical basis for the instruments being used. Accordingly, the

issue did not involve a violation or potential violation of worker safety or environmental protection regulatory requirements that would pose a significant danger to workers, the public, or of environmental insult or release. Consequently, the issue was determined to be a post-start finding.

RP1-POST-3: Contrary to 10 CFR Part 835, Section 835.1003 (b) and 835.104, there were a number of ALARA program requirements that are not implemented, and written procedures are not developed for radiological work planning.

The Administrative Control Limit for WIPP radiological workers is currently 150 mrem/year for CH TRU waste activities. Accordingly, the issue did not involve a violation or potential violation of worker safety or environmental protection regulatory requirements that would pose a significant danger to workers, the public, or of environmental insult or release. Consequently, the issue was determined to be a post-start finding. The ALARA program will have more importance and safety significance for RH TRU waste activities.

SB1: This objective was met. Facility safety documentation (DSA/TSRs) is in place that describes the safety envelope of the facility. This conclusion is based on interviews conducted and a review of a sampling of procedures and facility records. There was one finding identified.

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.

TQ1: This objective was met. With a few exceptions, a T&Q Program was developed, documented, and approved, and it implements the requirements of DOE O 426.2, as documented in an NWP- and CBFO-approved Training Implementation Matrix (TIM). T&Q requirements for operations and support personnel were established, and personnel were trained to these requirements. Managers are selected and trained in a manner that ensures competence commensurate with their responsibilities. WIPP has adequate numbers of qualified and knowledgeable Technical Training staff, as well as adequate facilities and equipment to support safe facility operations appropriately. There was one finding identified.

TQ-PRE-1: Contrary to the requirements of WP 14-TR.01, Section 4.11, one Radiological Control Supervisor (RCS) and one CH Waste Handling Manager did not have current qualifications in place during the performance demonstration on 10/4/2016, based on a comparison of training records vs. the qualification requirements specified in the relevant Training Program Plans. In addition, remaining RCSs also do not have current qualifications in place and are supervising work.

TQ2: This objective was met. Recent modifications to the facility were reviewed for potential impacts on T&Q. As required by training determination and the state of the modification, training was developed and delivered to appropriate personnel. There were no findings identified.

WACC1: This objective was met. A Waste Acceptance Criteria (WAC) Compliance program is in place to assure packaged waste conforms to the WIPP WAC prior to underground placement.

The level of knowledge of WAC Compliance managers and staff is exceptional based on interviews and observation of operational demonstrations.

The CORR team did observe, however, that the WDS software has not been rescreened after the implementation of DSA/TSRs to ensure the classification is correct. The CORR team believes that WDS should be classified as safety software in order to protect the WDS data used to calculate the statistical MAR required by KE 18-5. If rescreening does not support safety software classification, the CORR team would challenge the sufficiency of the screening process and associated screening criteria. There were no findings identified.

WM1: This objective was met. The Site Environmental Compliance (SEC) portion of the Waste Management (WM) program was reviewed and found to support environmental compliance and ensure safe accomplishment of work. The level of knowledge of the SEC staff is adequate based on interviews, supporting documentation, and observation of operational demonstrations. There were no findings identified.

WPC1: This objective was met. The work control program at WIPP continues to improve the integration of the identification and analysis of hazards and controls at the activity level. Maintenance work group participation in the process results in improved teaming, an improved safety culture, and a safer work environment. Technical work document formats, while not perfect, show significant improvement. This reduces the likelihood for human performance errors. However, while improvement was observed, there are still issues that require attention. There was one finding identified.

WPC1-POST-1: Contrary to 10 CFR 851 Section 22 and WP12-IS3002, R14, *Job Hazard Analysis Performance and Development*, additional activity introduced hazards and protective measures were frequently added to the Job Hazard Analysis (JHA) without an approved revision of the JHA.

2.2 Evaluation of Prerequisites

The CORR reviewed the justifications of acceptability from the MSA report for those prerequisites the MSA team verified as having been met, as contained in the Form 1s for the functional area related to the prerequisite. The justification for acceptability appeared adequate. The CORR also selected a sample of seven prerequisites to perform a validation of closure evidence, including one prerequisite that was not included in the MSA list but was verified during the MSA separately. The prerequisite that was not listed in the approved MSA report was PR 10.5, which was separately identified not to have been approved by DOE at the conclusion of the MSA. PR 10.5 was validated by the CORR as being acceptably met through approval of WP 12-FP.23, R0, on 10/3/2016. The prerequisites selected for validation and the CORR status are as follows:

- **PR-1.1**: An MSA, as a best practice, has been performed against the same CR assessment criteria listed in the CORR POA, and all pre-start items have been resolved and their respective corrective actions are completed with adequately documented objective evidence. Those not completed prior to the CORR are properly

represented and tracked on a short manageable list of actions. Post-start findings have approved corrective action plans (CAPs).

CORR determination: A review of the approved MSA report, dated 9/30/2016, verifies that the MSA was performed to the same criteria as identified in the CORR Implementation plan, and that the MSA sufficiently validated completion of the prerequisites needed for the CORR with several exceptions. Following completion of the MSA, the CORR has verified that the MSA pre-start findings and POA prerequisites are either closed or identified on the manageable list of open items and accepted by the CORR lead, and that the MSA post-start finding have either been closed or adequate CAPs were approved.

- **PR-4.2**: Interviews with approximately 10% of the operations, operations support, and managerial personnel demonstrate a satisfactory level of knowledge to support start of operations.

  CORR determination: Based on the WIPP evidence files, this prerequisite could not readily be determined to be met. A discussion with the MSA Team Leader indicated that the MSA reviewer identified the same issue, so the MSA performed its own sample of personnel to assure the 10% number was met. The CORR further assessed a sample of personnel to assure the MSA determination was adequate, and found it to be acceptable. Results of the level of knowledge determination are included in each of the CRADs in this report.

- **PR-5.2**: Worker safety and health requirements, verified by means of interview, procedure review and operator performance, have been implemented within the facility.

  CORR determination: The CORR evaluated the Worker Safety and Health Program (WSHP) adequacy and implementation and found it to be acceptable as documented in CRADs ESH1 and ESH2.

- **PR-6.4**: Industrial Safety/Industrial Hygiene (IS/IH) hazards have been analyzed and their mitigating controls are approved and implemented through procedures, including Industrial Hygiene monitoring limits.

  CORR determination: The CORR evaluated the identification and analysis of industrial Safety and Hygiene hazards and adequacy and implementation of appropriate controls and found them to be acceptable as documented in CRADs ISH1 and HMP1.

- **PR-6.9**: Software quality assurance program documentation and mechanism are in place, compliant and will maintain compliance.

  CORR determination: The CORR evaluated the program documentation, implementation, and planned improvements for the Software quality assurance

program and determined them to be in compliance with the CBFO QA Program requirements. As documented in CRAD QA1, several deficiencies with program compliance were identified which do not detract from the MSA validation of this prerequisite. The QA organization has an improvement plan in place that will clarify requirements for software custodians and provide additional T&Q to improve performance.

- **PR-14.1**: A condition tracking system has been implemented in order to identify, evaluate, and resolve internal and external assessment findings, observations, or recommendations.

  CORR determination: The WIPP Form process is in place and effectively used to identify, track, trend, and close internal issues identified by various sources such as walkdowns, assessments, nonconformances, etc. External issues such as DOE Corrective Action Report s are either placed into the WIPP Form process or tracked separately through the External Commitment management System. Details of the CORR evaluation of this program are covered in CRAD MG5.

- **PR-10.5**: A Baseline Needs Assessment has been developed and approved by CBFO.

  CORR determination: PR 10.5 was validated by the CORR as being acceptably met through approval of WP 12-FP.23, R0, on 10/3/2016.

The remaining prerequisites determined to be adequately validated by the MSA were:

- **PR-1.2**: AIB JONs related to SMPs have been addressed through effective corrective actions for each SMP, submitted to DOE for review, and all pre-starts are complete.
- **PR-1.3**: A readiness to proceed with the CORR memorandum has been issued by the responsible manager to the CORR Team Leader since all prerequisites were met and those not yet met are contained on a short manageable list of actions required to be completed prior to the ORR.
- **PR-1.4**: Selected assessments of the individual SMPs, Chapters 6 through 18, by functional area along with the MSA have verified that each SMP has been implemented at WIPP and will support the start of operations.
- **PR-1.5**: Assessment of Central Characterization Project's (CCP's) enhanced Acceptable Knowledge (AK) process has been validated for waste containers certified in the WDS.
- **PR-2.1**: Roles, responsibilities, and reporting relationships are defined, understood and effectively implemented by personnel in accordance with NWP documentation.
- **PR-3.1**: A training program assessment, by Technical Training and CCP, has been performed and identified issues resolved.
- **PR-3.2**: Training records for operations, technical, and management personnel are established and controlled in an organized and retrievable format.
- **PR-3.3**: NWP training implementation matrix is approved by the DOE.
- **PR-4.1**: Current simulated waste emplacement demonstrations were exercised against current underground radiological conditions, therefore the MSA validated a satisfactory level of knowledge of plant operations, conditions, and procedures to

support waste emplacement operations in an high contamination area (HCA)/airborne radiation area.

- **PR-4.3**: Documentation exists to show that facility modifications, as listed in CR-8, were reviewed for potential impacts on the T&Q Program, and that, where necessary, T&Q modules were modified to incorporate aspects of these changes.
- **PR-4.4**: Identified personnel have completed training on the latest version of facility operating documents to include training module updates and other training delivery methods.
- **PR-5.1**: Personnel demonstrate, as verified by means of interview, procedure knowledge and operator performance, an awareness of and demonstrated compliance with public and worker safety and health and environmental protection requirements.
- **PR-6.1**: DOE has approved the DSA and TSRs for operations by means of their Safety Evaluation Report (SER).
- **PR-6.2**: Documentation exists to show that approved DSA and TSRs, including any Conditions of Approval (COAs) are fully implemented.
- **PR-6.3**: Unreviewed Safety Questions (USQs) and document control programs are fully implemented for facility changes following approval of the DSA and TSRs.
- **PR-6.5**: Hazardous material protection program documentation and implementing procedures have been developed and implemented.
- **PR-6.6**: Documentation exists to show that the fire protection documentation is current with regard to operations and the emergency response personnel have been trained on the current revision.
- **PR-6.8**: Quality assurance program documentation and mechanisms are in place and compliant.
- **PR-6.10**: Radiological protection documentation is in place that establishes and implements the requirements of the program.
- **PR-7.1**: Documentation exists to confirm and periodically reconfirm the condition and operability of safety SSCs have been developed, approved, scheduled, and executed in compliance with the DSA/TSRs. Required surveillances have been practiced and are complete and current.
- **PR-7.2**: The configuration control program, by means of procedure review and process validation, has been effectively implemented.
- **PR-7.3**: Essential drawings are as-built; the required technical baseline is complete.
- **PR-7.4**: Safety SSCs are in a condition to support the safe performance of operations as evidenced by equipment walkdowns and reviews of maintenance and surveillance records that have been generated in accordance with the NWP's Nuclear Maintenance Management Program.
- **PR-7.5**: For new or modified systems, completed individual system test procedures and the integrated test procedure and their related acceptance criteria are completed and validated that individual start-up performance has been recorded, reviewed, corrective actions taken if necessary. Applicable design criteria have been verified through the startup and test program.
- **PR-7.6**: Documentation exists to show that required facility equipment calibrations and tests are complete, current, and scheduled in Computerized History and

Maintenance Planning System (CHAMPS), which is WIPP's computerized maintenance management system.

- **PR-7.7**: Documentation exists to establish the basis for process set points, and acceptable tolerances.
- **PR-7.8**: Documentation exists to show that a review of incomplete maintenance actions, for safety SSCs, has been conducted and none of the outstanding actions impact the ability to perform operations in accordance with requirements of the DSA/TSRs.
- **PR-9.1**: Documentation exists to show that operation and maintenance procedures have been approved and issued as controlled documents. The configuration management and design change control procedures have been approved and are effectively implemented.
- **PR-9.2**: Documentation exists to show that operations procedures adequately implement appropriate administrative controls, as described in the DSA, and reflect the current configuration of the facility including facility modifications.
- **PR-10.1**: The operational drill program (abnormal conditions) has been developed and scheduled drills have been carried out along with post-drill critique sessions to ensure appropriate response to abnormal conditions.
- **PR-10.2**: The emergency response drill and exercise program has been developed and scheduled drills and exercises have been performed to ensure appropriate response to actual events.
- **PR-10.3**: Site EM plan and associated procedures and checklists have been updated to reflect appropriate protocols to respond to the hazards introduced to the site by NWP operations. Site emergency plans have been reviewed and updated to reflect feedback from drills and exercises through an established continuous improvement process. Emergency response equipment and contact lists for off-site support services and notifications have been defined and have been tested.
- **PR-10.4**: An EPHA has been developed and approved by CBFO that establishes the basis for pre-determined protective actions through a set of standard Emergency Action Levels (EALs).
- **PR-11.1**: An adequate and NWP approved startup plan for operation has been developed for the period following authorization to start nuclear operation through escalation to full production capacity. The startup plan was approved by CBFO on September 29, 2016.
- **PR-12.1**: The facility conduct of operations applicability matrix has been approved by the DOE CBFO.
- **PR-12.2**: Formality of operations is adequate to support safe operations as evidenced during performance demonstrations, interviews, and facility walkdowns.
- **PR-13.1**: Assessments of site license and permit requirements have been completed. Results indicate that the licenses and permits have been properly approved and are satisfactorily implemented.
- **PR-13.2**: If applicable, compensatory measures are established or implementation plans have been submitted and approved by DOE for contract and license, or permit requirements not yet fully implemented.
- **PR-13.3**: WP 02-PC3005, *Permit Reporting 24-Hour, 5-Day Follow-Up, Other Non-compliances*, has been implemented as WIPP's program to evaluate nonconformances

has been developed, approved, and implemented. Verify that this procedure contains actions for Regulatory Environmental Services (RES) organization to ensure these NMED notifications are made, in response to Administrative Compliance Order HWB-14-21, *Waste Isolation Pilot Plant*, December 6, 2014 Violations 2, 8, and 9.

- **PR-14.2**: Documentation exists to show that an evaluation of open issues has been performed to determine their impact on the ability to safely conduct operations. Open actions have been categorized as pre-start or post-start and pre-start issues have been resolved. There is an approved resolution plan for handling post-start actions and the plan is on schedule.
- **PR-14.3**: A feedback and improvement program is implemented and appropriate assessments have been completed. Assessment results reflect a comprehensive and maturing assessment program. An adequate integrated schedule in support of initial operations has been developed and is current. Assessment data has been evaluated to determine that information can be used by management to affect process improvements.

The MSA team had determined that three prerequisites had not been met at the conclusion of the MSA review (PR 6.7, 8.1, and 8.2). These prerequisites were included on the manageable list of open items.

At the completion of the CORR, these three prerequisites from the POA had still not been completed. These prerequisites, which were included on the manageable list of open items prior to start of the CORR, are delineated below.

- **PR-6.7**: Fire protection requirements, including ISIs and surveillances, have been fully implemented as evidenced during facility walkdowns, record reviews, and performance demonstrations.

NWP submitted an exemption request, WIPP-EX-2015-01, R0, involving the safety requirements for an automatic suppression system for the WIPP underground facilities for AHJ approval. This exemption request was reviewed by CBFO and was submitted to DOE-Office of the Assistant Secretary for Environmental Management and DOE-Office of the Associate Under Secretary for Environment, Health, Safety, and Security for approval but has not yet been approved. The facility does not meet the requirements of DOE O 420.1C for automatic suppression systems without the approved exemption. This is being tracked on the NWP manageable list of open items.

- **PR-8.1**: Facility modification and change control packages, for the modifications listed in CR-8, have been properly prepared, approved, implemented, and closed to ensure affected systems, procedures, and associated safety basis documentation are reviewed and revised, as needed, for consistency. Any outstanding change control packages have been screened and determined not to affect startup of operations.

Projects for two system modifications have not yet been completed and turned over to Operations at the completion of the CORR:

- Underground fire suppression upgrades, and
- Automatic fire suppression upgrades for underground liquid-fueled equipment.

Facility modification and change control packages for these two projects have not been completely implemented and closed to ensure affected systems, procedures, and associated safety basis documentation are reviewed and revised, as needed, for consistency. These open modifications are being tracked on the NWP manageable list of open items with completion scheduled before the end of October 2016.

- **PR-8.2**: Pre-start projects listed in CR-8 have been completed (except as noted in the individual project descriptions), and IVS is operational via readiness startup authorization from CBFO.

Projects for two system modifications have not been completed and turned over to Operations at the completion of the CORR:

- Underground fire suppression upgrades, and
- Automatic fire suppression upgrades for underground liquid-fueled equipment.

As noted above, these open modifications are being tracked on the NWP manageable list of open items with completion scheduled before the end of October 2016. NWP had also identified a number of other pre-start items on the manageable list of open items that still remained open at the completion of the CORR. These items are:

- Installation and turnover of the Underground VOC/CO monitoring systems (scheduled for completion by October 30, 2016);
- Installation and turnover of the IVS Permacons (scheduled for completion by October 21, 2016);
- Installation and turnover of the Networked Panel 6 and Panel 7 CAMs that are tied into the CMR (originally scheduled for completion by October 7, 2016 and rescheduled to October 31, 2016);
- Completion of Panel 7 ground control activities to emplace waste in Panel 7, Room 5 (originally scheduled for completion by October 7, 2016 and rescheduled to October 31, 2016); and
- Completion of the NMED assessment.

2.3 Integrated Safety Management (ISM) and Safety Culture

As noted in discussions with Senior Management, and highlighted in the WIPP Fundamentals Handbook, the WIPP Integrated Safety Management System (ISMS) is based on the seven guiding principles and five core functions of ISMS as defined by DOE G 450.4-1C. Additionally, NWP has identified an eighth guiding principle they consider integral in the implementation of ISMS at the WIPP project: Employee Involvement. During the CORR, the assessment team evaluated NWP's implementation of these principles and core functions, and offers the following observations.

2.3.1 ISM Guiding Principles

1. Hazard Controls Tailored to Work Being Performed – Adherence to the guiding principle was adequate with some exceptions: (1) NWP implements overly conservative radiological controls and fire impairments (on account of code of record requirements); (2) the WDS should be safety software; and (3) as noted in finding RP1-POST-2, the basis to identify that the instruments in use are appropriate for type(s), levels, and energies of radiation to be encountered and appropriate for existing environmental conditions, as well as the basis for the air monitoring conducted to control exposures, are inadequate.

2. Line Management Responsible for Safety – Adherence to the guiding principle was adequate with some exceptions: (1) restricted access approval to Panel 7 was assigned to the cognizant engineer, rather than to the Underground Facility Engineer (UFE), who oversees all underground operation activities; and (2) while most employees indicated strong management support of safety, it is the perception of some workers that senior management is not addressing worker concerns related to ground control and emergency notification and entry/exit door functionality.

3. Identification of Safety Standards and Requirements – Adherence to the guiding principle was adequate with some exceptions: (1) as noted in finding HMP-POST-1, WIPP does not have a formal process or implementing procedure to provide consistent approved methods for performing QEAs, and they are not documenting QEAs; (2) as noted in finding RP1-POST-1, the property clearance and release process did not adequately implement the order for uncontrolled release, and the procedures do not use methodologies sufficient to meet the measurement objectives, or include an evaluation of non-uniform distributed residual radioactive material; and (3) as noted in finding RP1-POST-3, a number of As Low As Reasonably Achievable (ALARA) program requirements are not implemented.

4. Competence Commensurate with Responsibilities – Adherence to the guiding principle was adequate with one exception: as noted in finding RP1-PRE-2, the technical knowledge of some radiological personnel is weak.

   On a positive note, NWP is commended for the implementation and conduct of the Leadership Academy, which is providing vital leadership skills to the workforce.

5. Clear Roles and Responsibilities – Adherence to the guiding principle was adequate with one exception: while roles and responsibilities were generally understood by the workforce, the authority and accountability elements of roles, responsibilities, authorities, and accountabilities (R2A2s) were not clear to many individuals during the team's interviews and observations.

6. Operations Authorization – Adherence to this principle was adequate. NWP's crisp, professional conduct of the T-0 and plan of the day (POD) meetings was noted as a strength by the team.

7. Balanced Priorities – Adherence to this principle was adequate, with one exception: NWP's prioritization of issues resolution is ineffective, which can cause significant safety related items to be addressed in a less than timely manner. Also, the team understands the challenge of performing nuclear operations in a mine while maintaining ground control and considers that it is imperative the ground control issues remain a top priority. The team considers that ground control actions currently underway demonstrate NWP's commitment to maintaining ground control as a top priority.

8. Employee Involvement – Adherence to this principle was adequate. Worker involvement has been essential in the facility's successful recovery and the step change observed in terms of deliberate operations and verbatim compliance. Changes involving worker input to both processes and the supporting paperwork necessary to resume operations have resulted in stakeholder buy-in at all levels of the organization and the development of a cohesive team. Facility pride and ownership can be observed at all levels. The team also observed interactive participation of workers in pre-job briefings sometimes with worker group discussions. Additionally, the CORR team noted that management is proactively engaging the workforce with resolution of ground control concerns, and applauds and encourages continued attention and support of that approach until fully resolved.

2.3.2 ISM Core Functions

1. Define the Scope of Work – Adherence to this core function is generally satisfactory. NWP recognizes that work scopes must be clearly defined, expectations set, tasks identified and prioritized, and resources allocated. This core function is clearly demonstrated through the new Action Request initial work screening process where a multi-disciplined facility team reviews all new work as it enters the system to ensure the scope is clearly defined and bounded, and priority is assigned based on facility mission. It then enters the Work Control process for planning where the activity is broken down to the task level for resource allocation. Expectations are established as the facility develops its integrated project schedule for work execution

2. Analyze the Hazards – Adherence to this core function is generally satisfactory, with the following exceptions: (1) as noted in finding HMP-POST-1, WIPP does not have a formal process or implementing procedure to provide consistent approved methods for performing QEAs, and they are not documenting QEAs; (2) as noted in finding RP1-POST-3, there are a number of ALARA program requirements that are not implemented, and written procedures are not developed for radiological work planning; and (3) as noted in finding SB1-PRE-1, changes to procedures described in the DSA did not formally enter the USQ process covered by WP12-AR3001.

3. Develop and Implement Hazard Controls – Adherence to this core function is generally satisfactory, with one following exception: as noted in finding WPC1-POST-1, additional activity-introduced hazards and protective measures were frequently added to the JHA prior to going to the field without an approved revision of the JHA.

4. Perform the Work within Controls – Adherence to this core function is generally satisfactory, with the following exceptions: (1) as noted in finding RP1-PRE-1, numerous examples were observed where reference procedures were not used; (2) as noted in Objective EP2 and finding EP2-PRE-1, the important procedures were not followed during emergency exercises which could have unwanted consequences in a real event; (3) as noted in finding OPS1-PRE-1, emergency egress markers are blocked by vehicles; and (4) as noted in finding TQ-PRE-1, one RCS and one CH Waste Handling Manager did not have current qualifications in place during a work evolution, and remaining RCSs do not have current qualifications in place and are supervising work.

   On a positive note, the review team observed excellent pre-job briefings during several evolutions.

5. Provide Feedback and Continuous Improvement – Adherence to this core function is generally satisfactory, with one exception: lack of timeliness in resolving issues with the ENS. Notable items identified by the team: (1) timely action on feedback from post-job briefs; (2) timeliness in developing WIPP Forms as issues are identified; (3) noticeable improvement in the quality of pre-job briefs since the June 2016 exercise; and (4) a positive improvement in performance during operational drills and emergency exercises.

2.3 Conclusion

The CORR team concluded that 24 CORR Objectives were met and five were partially met (CM2, EP2, FP1, OPS3, and RP1). Satisfactory resolution of pre-start findings, completion of incomplete prerequisites, and completion of the manageable list of open items associated with completion of Panel 7 ground control activities to emplace waste in Panel 7, Room 5 will enable all partially met objectives to be fully met.

The CORR team concluded that, subject to resolution of pre-start findings and completion of prerequisites, NWP has established an agreed upon set of requirements to govern safe CH waste emplacement operations; this set of requirements was formalized with DOE through the contract or other enforceable mechanism; these requirements were implemented in the facility; and adequate protection of public health and safety, worker safety, and the environment was maintained.

Accordingly, the team concluded that waste emplacement operations can proceed safely once pre-start findings have been satisfactorily resolved, all prerequisites have been completed, and the remaining open pre-start items on the manageable list of open items have been completed.

The CORR team concluded, based on interviews and observations, that with some limited observed exceptions and subject to resolution of pre-start findings, the core functions and guiding principles of Integrated Safety Management and several important elements of an effective safety culture were evident among the CH waste emplacement operations team. Examples of the safety culture elements are:

- Willingness to stop/pause work when faced with uncertainty or problems and get clarification and resolution before proceeding

- Good commitment, attitude, and behavior towards safety
- Positive attitude and willingness to raise safety and quality issues without fear of retribution.

Notwithstanding these positive attributes, several workers expressed concerns with the stability of specific areas of the mine and management's commitment to resolve those issues. Several other workers expressed concern with functionality of the ENS equipment and entry/exit doors and management's commitment to resolve those issues. This may be indicative of a need for better communication that, if left unattended, could result in unwanted consequences. The CORR team noted that management is proactively engaging the workforce with resolution of ground control concerns, and applauds and encourages continued attention and support of that approach until fully resolved.

The team noted recent and extensive process and procedural changes in support of waste emplacement operations. The team also noted that the current waste emplacement experience is based on simulation that, in some cases, introduces confusion into the activity (such as that encountered with Bulkhead 309 during waste emplacement demonstrations), and in other cases, may mask potential pitfalls that could be encountered during actual operation. The team recommends that NWP schedule some substantial time (a number of weeks) where the facility functions as if it has returned to normal operations. Personnel should note problems with procedures, interfaces, material problems, etc., for resolution at the end of the trial period. Changes (i.e. to procedures, etc.) should be minimized during the period, unless absolutely mandatory, to avoid injecting uncertainty and interface issues.

The team also noted the ground control program is largely experience-based, and has recently become influenced by the nuclear safety basis. While the program is effective, it is highly dependent on a select group of individuals. To ensure sustainability, the team recommends that considerations be given to transitioning the program over time to an institutionalized program with established standards and documented processes.

Furthermore, the CORR team noted that the Waste Data System (WDS) software had not been rescreened after the implementation of DSA/TSR to ensure the classification is correct. The CORR team believes that WDS should be classified as safety software in order to protect the WDS data used to calculate the statistical MAR required by KE 18-5. If rescreening does not support safety software classification, the CORR team would challenge the sufficiency of the screening process and associated screening criteria.

3.0 Noteworthy Practices & Lessons Learned

The following noteworthy practices were identified by the team:

- The enthusiasm and mine safety competence of the Mine Rescue Team (MRT) was noted by several agency evaluators as commendable. While attending the MRT Controller Hotwash, the MSHA Representative stated the "MRT did a super job."
- The comprehensive Bison 2 exercise package and the briefing and simulation cell activities were noteworthy. The briefing displayed a strong emphasis on the safe conduct of the exercise and specific heat illness precautions to be carried out. The use of scripted

simulation cell responses helped to organize and focus the responses provided to exercise players to help demonstrate exercise objectives.

- Using senior-experienced fire protection individuals to provide mentoring to mid- and early career-level fire protection professionals to lead the fire protection department going forward after the senior-experienced individuals leave, is a noteworthy practice. As the fire protection program is being rebuilt from the ground up by all of these individuals, the fire protection program should be sustainable for the long term.
- NWP is commended for the implementation and conduct of the Leadership Academy, which is providing vital leadership skills to the workforce.
- NWP's crisp, professional conduct of the T-0 and POD meetings was noted as strength by the team.
- The CORR team noted that management is proactively engaging the workforce with resolution of ground control concerns, and applauds and encourages continued attention and support of that approach until fully resolved.

Lessons learned from the review team execution problems, as well as successes encountered during this review, could be used by future teams to improve the review process.

- The WIPP evidence files were incomplete and ineffective, and required excessive time to find sufficient information to demonstrate readiness. The team believes that recent, ongoing, extensive process and procedural changes in support of waste emplacement operations contributed to this condition. The team also believes that scheduling some substantial time (a number of weeks) prior to the CORR (where the facility functions as if it has returned to normal operations and changes (e.g., to procedures, etc.) should be minimized during the period, unless absolutely mandatory) would have helped this situation.
- There were too many specific modifications and specific maintenance activities identified for assessment in the POA, some of which were not even scheduled. The POA should be more general so that actual, ongoing activities can be assessed, providing a more realistic view of work performance.
- Contracts need to be in place much earlier to allow document reviews before arriving on-site. Also, the hours allowed in the contracts were approximately 24 hours less than what were needed for a review of this scope.
- Documents need to be reviewed at least two weeks prior to coming on-site.
- Engaging the entire team to discuss individual results in terms of ISM was efficient and worked well.
- CRADs ESH1 and ESH2 should be combined, as should CRADs ISH1 and HMP1.
- Issues management should be consolidated with one MG5 reviewer, not distributed to each of the reviewers for assessment under their particular CRADs.
- Eliminating the Deficiency Forms (Form 2s) from the IP was a benefit, and reduced unnecessary, duplicative writing.
- During final on-site report preparation time, site personnel should minimize approaching team members for discussion.
- During emergency exercises, a CORR member should monitor the emergency communications network.

- All required project personnel should be on-site and available to team members during the CORR. All project personnel should view the upcoming ORR as a high priority and schedule time off accordingly.
- Team members should initiate their Form 1 documentation early in the review, and update them daily.
- One reviewer should not assess more than one high-priority CRAD.

Appendix 1: Assessment Forms (Form 1)

ASSESSMENT FORM
(FORM 1)

Functional Area: **Configuration Management**	Objective: CM1 Date: 10/14/2016	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

CM1: Line management has established a Configuration Management SMP to ensure safe accomplishment of work. The level of knowledge of Engineering managers and staff responsible for Configuration Management is adequate based on review of examinations and examination results, interviews, and observation of operational demonstrations. (CR 1, 4, 6, 8)

CRITERIA

1. Configuration Management contract requirements are flowed into facility-specific procedures.
2. A Configuration Management program to maintain control over facility design with emphasis on VSS is established, and Configuration Management procedures are effectively implemented. With respect to WIPP's safety related systems, this program ensures that design requirements, physical configuration, and associated documentation of the SSCs are controlled throughout the life of the facility, even as changes are made.
3. Sufficient qualified personnel are available to effectively implement the Configuration Management program.
4. WIPP has adequate facilities, and equipment is available to ensure that Configuration Management support and services are adequate for safe facility operation.
5. The level of knowledge of managers and staff responsible for administering and implementing the Configuration Management program is adequate based on review of records, interviews, and observation of operational demonstrations. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.
6. The technical baseline program is established and configuration control plan is implemented to control the technical baseline and changes thereto with emphasis on VSS.
7. A formal Engineering Change Order (ECO) program is implemented to identify and control the issuance or modification of engineering design documents.
8. A process is in place (e.g., the USQ process) to ensure that facility modifications are evaluated for impact to the safety basis, to ensure continued consistency between the facility's physical configuration, its procedures, and the safety basis.
9. A formal program for modifying facility systems and procedures as applied to the project is adequate and implemented.
10. A Configuration Management program is effectively implemented to control approved modifications and to prevent unauthorized modifications to safety SSCs (SMP KE 17-1).
11. AIB JONs related to Configuration Management were addressed through effective corrective actions for the SMP.

APPROACH

Records Reviewed

- CA-IVR-2016-002, *Implementation Verification Review Final Report (for the) Waste Isolation Pilot Plant Documented Safety Analysis/Technical Safety Requirements, Revision 5b,* 5/24/2016
- COG-ENG-01, R2, *Cognizant System Engineer,* Qualification Card 9/14/2016
- CBFO Surveillance Report S-16-54, *NWP Configuration Management Program Activities,* 8/31/2016
- DOE/WIPP 07-3372, R5b, *Waste Isolation Pilot Plant Documented Safety Analysis,* April 2016
- EA 10WC3011-19-0, R2, *Modification Impact Sheet,* 4/28/2016
- EA09CN3025, R10 DRAFT, *System Health Report,* provided on 10/6/2016
- Engineering-related NWP Performance Indicators for August 2016
    - ENG-01-2016, *Engineering Change Order (ECO) Status*
    - ENG-02-2016, *Plant Systems Performance Indicators*
    - ENG-03-2016, *No. of MLDs Supporting New and Credited Components in CHAMPS*
- Letter, from Gadbury to Breidenbach, Subject: *Technical Direction Regarding CBFO's Expectations for NWP to Address Concerns Related to Contract Section C Performance Work Statement, 4.1.1.4 Configuration Management and CBFO QAPD, DOE/CBFO-94-1012, section 2.2,* 9/21/2016
- Letter, from Staker to Schrader, Subject: *Office of Enterprise Assessments Operational Awareness Record for the Follow-up on Engineering Process Issues from the November 2015 Assessment Report at the Waste Isolation Pilot Plant, July 12-14, 2016 (OAR-EA-WIPP-2016-07-12),* 9/27/2016
- Memorandum, from Fadeley to Hejmanowski, Subject: *Grandfathered Qualification for Cognizant System Engineer (CSE) listed on the Approved WIPP CSE/ACSE System Assignment List, Revision54,* 8/23/2016
- MSA-NWP-2016-001, R0, *Management Self-Assessment Waste Isolation Pilot Plant Final Report,* 9/30/2016
- *NWP Engineering Evaluated Walkdown for CSE Qualification To Demonstrate Adequate System Specific Knowledge*, 10/8/2016 (no document number)
- NWP Engineering Improvement Schedule, updated 10/3/2016
- *NWP Engineering Oral Evaluation to Demonstrate Adequate System Specific Knowledge of DSA Rev. 5b Changes and Impacts on SS systems*, 6/15/2016
- NWP Manageable List of Open Items as of 9/25/2016
- Operations Turnover Verification, *Installation of additional skid-mounted strobes in Panel 7 in Underground,* 9/29/2016
- Operations Turnover Verification, *Installation of Underground Notification System,* 9/29/2016
- Operations Turnover Verification, *Installation of Underground Surveillance Camera System at Waste Face,* 9/29/2016

- SDD GPDD, R16, *System Design Description, General Plant Design Description,* 10/1/2013
- SDD VU00, R24, *System Design Description, Underground Ventilation System,* 9/22/2016
- SDD WD00, R12, *System Design Description, Water Distribution System,* 5/23/2016
- *WIPP Cognizant System Engineer Job Task Analysis*, 9/30/2016 (no document number)
- *WIPP Cognizant System Engineer/Alternate Cognizant System Engineer System Assignment List*
- WIPP Forms WF16-1691, WF16-1700
- WP 09, R42, *Conduct of Engineering,* 8/13/2016
- WP 09-11, R8, *NWP Configuration Management Plan,* 5/17/2016
- WP 09-12, R2, *Evaluation of Technical Operability Adequacy of Facility Systems, Structures, and Components,* 4/28/2016
- WP 09-CN.04, R1, *Backfit Analysis Process,* 7/15/2016
- WP 09-CN.08, R1, *WIPP Cognizant System Engineer Training Program Plan (Safety Significant Systems),* 8/13/2016
- WP 09-CN3007, R46, *Engineering Change Order Preparation and Design Document Change Control,* 7/15/2016
- WP 09-CN3007, R47, *Engineering Change Notice,* 10/3/2016
- WP 09-CN3023, R7, *Functional Classification Determination for Design,* 10/30/2012
- WP 09-CN3025, R20, Draft A, *System Health Walkdown and Health Reports,* not yet issued
- WP 09-CN3031, R6, Draft B, *Engineering Calculations,* not yet issued
- WP 09-CN3034, R6, *Configuration Management Determination,* 10/31/2012
- WP 12-NS3017, R0, *In Service Inspection of WIPP Design Features,* 5/24/2016

Interviews Conducted

- Civil/Structural Design Engineer
- Engineering Instructor, Training Department
- Engineers (10), including CSEs for safety-significant systems (5)
- Instrumentation & Controls Maintenance Manager
- Linking Documents Database maintainer and Subject Matter Expert (SME)
- Maintenance Instructor, Training Department
- NWP Component Indices Engineer
- NWP Design Authority Manager
- NWP Electrical and Instrumentation & Controls Systems Manager
- NWP Engineering Acting Deputy Manager
- NWP Engineering consultant
- NWP Engineering Manager/Chief Engineer
- NWP Engineering Programs Manager
- NWP Engineering Programs Supervisor
- NWP Facility/Ventilation Systems Manager
- NWP Geotechnical & Mining Engineering Manager

- NWP Mining Department Manager
- NWP Nuclear Safety Program Manager
- NWP Operations Training Manager
- NWP Project Engineering Manager
- NWP SME on AIB JON closure
- NWP Training Records Management personnel
- CSEs for the systems listed below

Evolutions/Operations Witnessed

- Walkdowns with the cognizant engineer of the following:
  - VU01, Underground Ventilation System including the IVS, 10/6/2016
  - FP02, Underground fire suppression upgrades, in the Maintenance Shop, UFE Office, Maintenance Offices, Lunch Room, and Maintenance/Combustible Storage, 10/7/2016
  - CM00-PC00, Underground notification system, 10/6/2016
  - AU04 and FP02 Automatic fire suppression upgrades for underground liquid-fueled equipment:
    - five for Waste Handling operations, 10/7/2016
    - twelve for ground control, 10/7/2016
  - New differential pressure gauges, level indicators, and/or transmitters installed in safety-significant systems:
    - HV00, Battery Exhaust Filtration System, 10/6/2016;
    - HV01, Contact Handled Waste Handling Containment Ventilation System, 10/6/2016;
    - VU01, Underground Ventilation System, 10/6/2016;
    - FP01, WHB Fire Suppression System (Fire Water Storage Tank), 10/7/2016;
    - and VU03, 308/309 Bulkheads, 10/6/2016
- Operational verification in the CMR of the CM00-PC00, Underground Notification System, and the camera installed at active room's Waste Face in Underground, 10/6/2016
- Participated in controlled egress of the underground, 10/6/2016

DISCUSSION OF RESULTS

1. *Configuration Management contract requirements are flowed into facility-specific procedures.*

In addition to the comprehensive review of requirements flow-down as documented in the WIPP MSA Final Report, MSA-NWP-2016-001, *Management Self-Assessment Waste Isolation Pilot Plant Final Report*, the CORR team conducted a criterion-by-criterion walkthrough of DOE-STD-1073-2003, *Configuration Management*. This walkthrough confirmed that NWP's Engineering program has procedurally incorporated all the required elements of the DOE Standard with very few minor exceptions, which do not materially detract from implementation (e.g., NWP procedure WP09 CN-3007, *Engineering Change Notice*, does not require a listing of

alternative proposed solutions as suggested by the DOE Standard Section 5.2.1., Documenting Proposed Changes).

This criterion was met.

2. *A Configuration Management program to maintain control over facility design with emphasis on VSS is established, and Configuration Management procedures are effectively implemented. With respect to WIPP's safety related systems, this program ensures that design requirements, physical configuration, and associated documentation of the SSCs are controlled throughout the life of the facility, even as changes are made.*

As documented in the MSA Final Report, NWP has established the procedural basis for a Configuration Management program, which ensures that design requirements, physical configuration, and associated documentation of the SSCs (safety-related and otherwise) remain aligned as changes are made. This includes procedures such as WP 09, *Conduct of Engineering*, WP 09-11, *NWP Configuration Management Plan*, and WP 09-CN3034, *Configuration Management Determination.* This procedure set is implemented and supported by a cadre of qualified CSEs, who serve as design authority for their assigned systems; a Design Engineering group, which serves as design agent and performs formal engineering calculations and analysis to codes and standards; and a Project Engineering group, which ensures that modification projects are installed consistent with the design.

Changes to the configuration of engineered systems (both safety-related and non-safety-related) are formally controlled in accordance with WP 09-CN3007, *Engineering Change Notice.* This procedure and its associated forms ensure that all modifications are preceded with a verification of the technical baseline, that proposed modifications are reviewed for impacts to the safety basis, procedures and training, and that for Management Level (ML)-1 (i.e. safety-significant) systems, turnover of the modification to operations does not occur until essential as-built drawings, training, and procedures are in place. Walkdowns of several recent modifications, documented in Objective CM2, verify that these controls are being effectively implemented.

The CORR team noted, however, that many aspects of the Engineering program have evolved significantly over the last several months. Some procedures, such as WP 09-CN3007, were completely rewritten and recently issued (Rev 47 issued 10/3/2016). The CSE qualification process is likewise undergoing significant revision to bring greater focus on safety-significant systems and increase the rigor of qualification. As a result, many of the key processes within Engineering are not well-engrained into routine practice and a small cadre of senior engineering managers and consultants are coaching staff on the new expectations and providing additional process oversight as a compensatory measure. Until such time as the engineering processes stabilize and can become "normal business," minimizing any turnover in the key engineering managers will help ensure the engineering processes are executed as intended. This concern is captured in WIPP Form WF16-1748.

This criterion was met.

3. *Sufficient qualified personnel are available to effectively implement the Configuration Management program.*

The CORR reviewed the roster of assigned CSEs and confirmed that all systems have a qualified system engineer assigned and, in many cases, a qualified backup also. The NWP Engineering organization currently numbers 132 personnel, 89 of which are NWP employees, with the balance provided by subcontractors. A September 2016 staffing analysis by the Chief Engineer concluded that the required staffing for Fiscal Year (FY)17 should be 142 at the start of FY17, tapering down to 134 by FY end. Engineering management stated they currently possess sufficient qualified personnel to effectively deliver the Engineering program, including the Configuration Management program.

Relative to the T&Q of system engineers, the Engineering program is undergoing a significant upgrade. In August 2016, the *Cognizant System Engineer (CSE) Training Program Plan*, WP 09-CN.08, was substantially revised/strengthened and incumbent system engineers were grandfathered for a period of up to 180 days. Compensatory measures, including oral boards, were also delivered to incumbent system engineers to ensure their adequacy. Within the grace period, system engineers will need to complete the full, revised qualification card, COG-ENG-01, including an evaluated system walkdown and oral board.

In support of the CSE-evaluated walkdown and oral board, Engineering has developed evaluation criteria documents to ensure consistency and quality. While laudable, these criteria documents have not been subject to review or concurrence by Training or Human Resources. To be credible, the qualification program must be capable of denying qualification to those considered unable to meet the standard; for those unable to qualify, this can be perceived as an adverse personnel action. To be defensible, the Engineering-developed criteria for grading CSE evaluated walkdowns and oral boards should receive the concurrence of Training and Human Resources. WIPP Form WF16-1747 was created to track this issue.

This criterion was met.

4. *WIPP has adequate facilities, and equipment is available to ensure that Configuration Management support and services are adequate for safe facility operation.*

The NWP Engineering staff has adequate office space, computing equipment, and software to adequately execute the Configuration Management program and ensure safe operations. With the exception of the Engineering File Room (EFR), interviews with the Engineering management and staff did not identify any concerns with their facilities or equipment.

The EFR holds the record file copies of facility modifications, system design documentation and drawings. The EFR is near capacity with overflow being managed by use of the on-site Technical Library and the in-town records vault. Many records are on microfiche, although NWP has only one vendor who can still support microfiche generation. The DOE Office of Enterprise Assessments (DOE-EA) has identified a continuing concern with NWP's reliance on hardcopy engineering records and the absence of an effective electronics records system. DOE-EA has not asserted that resolving this concern should be attached to the startup schedule and the CORR

team agreed. NWP agreed with the DOE-EA desire to move to electronic records management, but the prior attempt to implement this change was disrupted by the events of February 2014 and the subsequent reprioritization of funds. NWP continues to work on identifying the best commercial offering to meet all NWP records management needs in an integrated manner. The EFR situation, while not optimal, is currently manageable.

On a related note, the CORR team review of radiological controls (see Objective RP1) identified significant difficulty in NWP's retrieval of radiological controls technical basis documents. For example, the technical bases for topics such as airborne monitoring and radiological instrument selection and detectability took more than a month to be provided to the CORR. NWP indicates they intend to transition radiological control technical basis documents management to the Quality & Manufacturing Integrated System (Q&MIS) to improve retrievability. WIPP Form WF16-1703 was created to track this action.

This criterion was met.

5. *The level of knowledge of managers and staff responsible for administering and implementing the Configuration Management program is adequate based on review of records, interviews, and observation of operational demonstrations. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.*

The Configuration Management program is primarily implemented by the NWP Engineering staff. Interviews were conducted with Engineering management, CSEs, fire protection engineers, nuclear safety staff and design and project engineering staff; all appeared familiar with the NWP Conduct of Engineering standards and the Engineering Change Notice (ECN) process (which implements Configuration Management) in particular. Interviews of the engineering management found them to be well experienced in nuclear facilities. Walkdowns with the CSEs of their systems found them to be knowledgeable of their systems, the design and safety basis requirements associated with their systems, and familiar with the operations staff.

A sampling of system engineer T&Q records verified that the engineers hold appropriate engineering credentials (Bachelor of Science and Master of Science degrees in engineering disciplines and/or extensive technical experience) in satisfaction of DOE and NWP requirements. As discussed in Criterion 3 above, the system engineers are currently undergoing requalification to the revised NWP CSE Qualification Standard, COG-ENG-1, R2, 9/14/2016.

This criterion was met.

6. *The technical baseline program is established and configuration control plan is implemented to control the technical baseline and changes thereto with emphasis on VSS.*

WP 09-11, *NWP Configuration Management Plan*, describes the means and methods by which the Configuration Management program is implemented. Section 7 of that document defines the Technical Baseline as the latest approved versions of the document types listed in Table 2. Section 7 and Tables 1 and 2 further explain how the Technical Baseline is comprised of 1) "Essential" documents, which are required to respond to alarms and abnormal conditions, 2)

"Support" documents, which provide the details necessary to support operations, maintenance and engineering, and 3) "Non-Technical Baseline" documents, which provide illustration, supplemental or legacy information. The Technical Baseline is under the control of the NWP Design Authority.

The System Design Descriptions (SDDs) serve as the summary compendiums of each system's Design Basis and Technical Baseline. The EFR holds the official record copies of the Technical Baseline documents owned by Engineering. SDDs exist for all the safety-related systems and are updated as needed based on modifications and new information identified in SHRs. Modifications to engineered systems are controlled in accordance with WP 09-CN3007, *Engineering Change Notices.* A review of recently completed modifications (including safety-significant systems) identified that Technical Baseline documents such as drawings, Master Equipment List, and Operating and Maintenance procedures were updated.

This criterion was met.

7. *A formal ECO program is implemented to identify and control the issuance or modification of engineering design documents.*

As documented in the MSA Final Report, the ECO process is procedurally implemented via WP 09, *Conduct of Engineering*, and WP 09-CN3007, formerly titled *Engineering Change Order Preparation and Design Document Change Control*. Effective 10/3/2016, NWP procedure WP 09-CN3007 (Rev 47) was revised with the new title of *Engineering Change Notice*. The revision is intended to address weaknesses self-identified by NWP with the quality and repeatability of the ECO process. The former requirements remain largely unchanged although the ECN process adds several key changes:

- ECNs will be accompanied by a "traveler," as reflected in form EA09CN3007-1-0, which assures completeness in the processing of ECNs.
- Expectations and requirements are strengthened regarding the design process always starting with an evaluation of the Technical Baseline and Design Basis.
- Operations Turnover is explicitly addressed and requires that turnover of ML-1 (safety-significant) modifications cannot occur until all key documents identified as Essential are updated and approved.

As described in Objective CM2, the CORR team also examined a variety of modifications turned over to Operations and found them to adequately comply with the ECO process in their creation of physical equipment modifications, USQ reviews, as-built drawings, updated procedures, and modified training.

This criterion was met.

8. *A process is in place (e.g., the USQ process) to ensure that facility modifications are evaluated for impact to the safety basis, to ensure continued consistency between the facility's physical configuration, its procedures, and the safety basis.*

The recently revised procedure WP 09-CN3007 describes the process for managing all facility modifications. Step 5.26.2 specifically requires that all modifications receive a USQ evaluation

performed by the Nuclear Safety organization. Although some are trained as USQ screeners, System, Project, and Design engineers are not assigned responsibility to perform USQ screenings or evaluations under WP 09-CN3007. In interviews, Engineering management expressed the belief that insisting the USQ evaluations be completed by Nuclear Safety was a means of assuring robust USQ quality and objectivity.

This criterion was met.

9. *A formal program for modifying facility systems and procedures as applied to the project is adequate and implemented.*

Whereas Criteria 6 and 7 discuss how the Configuration Management program maintains engineering documentation, this criterion focuses on the physical changes and modification of operating procedures. The core process remains the same as described in Criteria 6 & 7, starting with an *Engineering Service Request*, EA09CN3007-9-0, which identifies the need for a modification. After confirming the applicable Technical Baseline, a *Modification Impact Sheet*, EA10WC3011-19-0, is completed by Engineering which identifies the operations and maintenance procedures and training likely to be impacted (USQ review is automatic). In the modification development process, Operations and Maintenance review the ECN package to confirm the need for procedural and training changes. WP 09-CN3005, *Graded Approach to Application of QA Controls*, provides instructions for applying adequate quality controls to SSCs, based on their safety and mission significance. Design Engineering, either directly or with the assistance of a contractor, develops a design based on the technical and functional requirements (WP 09-CN3044, *Developing Technical and Functional Requirements*) specified by the requestor and the Design Authority. The ECN package remains the focal point for tracking and administering these steps.

Upon creation of an approved final design package, fabrication and installation of the modification is assigned to in-house or subcontracted entities for the acquisition of materials and installation utilizing NWP procurement and work control processes. The Cognizant System Engineering and project engineering/management, in coordination with Operations, Procurement, and QA, monitors and manages the modification installation, tie-in, and testing process. Acceptance testing and drawing updates to reflect the as-built condition are performed as part of conducting the field work. Once field work is completed, the ECN process continues, ensuring engineering documentation, procedures, training, and labeling are completed. For ML-1 modifications, these essential steps must be completed before turnover to Operations. The R2A2s associated with System, Design, and Project Engineers, and how they each support the modification process, are outlined in WP 09, *Conduct of Engineering.*

This criterion was met.

10. *A Configuration Management program is effectively implemented to control approved modifications and to prevent unauthorized modifications to safety SSCs (SMP KE 17-1).*

As reflected in Criteria 1 through 9 above, NWP has established an effectively implemented Configuration Management program. The program includes sufficient numbers of qualified

engineering personnel (people), adequate physical and software tools for the administration of the technical baseline (plant), and procedures and practices that describe and implement the Configuration Management processes (paper). The CORR acknowledges that individual performance shortfalls, as identified in recent correspondence from DOE-EA and CBFO, may still occur because of the high level of procedural flux, but the system as a whole is adequate to satisfy the KE.

This criterion was met.

11. AIB JONs related to Configuration Management were addressed through effective corrective actions for the SMP.

The WIPP MSA identified six JONs from the WIPP Fire AIB as applicable to Configuration Management. As identified by the MSA, closure packages were prepared by NWP for all these JONs, although three had not yet been accepted by CBFO. The CORR team examined additional Fire AIB JONs considered applicable to Configuration Management, as identified in the table below, which was extracted from the CORR IP. One additional AIB JON was also identified as submitted but not yet accepted. At the time of the CORR, four Fire event AIB JONs associated with the Configuration Management program had not yet been accepted by CBFO (fire event JONs 13.1, 14.1, 14.6, and 18.1). Based on the CORR team's review, the improvement actions within these AIB JONs were implemented; therefore, prerequisite PR-1.2 is met for Configuration Management (the prerequisite does not require CBFO acceptance).

In reviewing the submission packages for the unaccepted Configuration Management-related JONs, the data within the packages is dated (some are over a year old) and were overtaken by significant changes continuing to be made in NWP Engineering procedures and processes. For example, the closure package for JON 18.1 on tracking and trending of deficiencies takes no credit for the SHR development process described in WP 09-CN3025. NWP has created WIPP Form WF16-1744 to re-examine the currency and completeness of the Configuration Management-related AIB JON closure packages not yet accepted by CBFO.

Action Number	Action	Waste Emplacement		Status
NWP Fire Event CAP		**Pre-Start**	**Post-Start**	
JON 1.1	Evaluate the CMR control panel switch, for replacement with a time delay open relay switch to minimize the CMR operator's actions during an emergency.	**X**		Submitted by NWP Accepted by CBFO
JON 13.1	Revise engineering procedures to provide a formal process to identify applicable maintenance requirements (vendor and other).	**X**		Submitted by NWP
JON 13.2	Revise maintenance procedures to incorporate engineering-identified maintenance requirements.	**X**		Submitted by NWP Accepted by CBFO
JON 13.5	Evaluate the use of alternative fire resistant fluids in the hydraulic systems of underground equipment.	**X**		Submitted by NWP Accepted by CBFO

Action Number	Action	Waste Emplacement		Status
NWP Fire Event CAP		**Pre-Start**	**Post-Start**	
JON 14.1	Evaluate and revise NWP engineering procedure to require the cognizant system engineer to evaluate changes to facilities, equipment, and operations for impact to safety.	X		Submitted by NWP
JON 14.2	Evaluate and revise NWP USQ procedure to ensure changes to facilities, equipment, and operations are reviewed for their impact to safety.	X		Submitted by NWP Accepted by CBFO
JON 14.3	Evaluate and revise the NWP work control procedure to ensure the appropriate SMEs are involved in evaluating changes to facilities, equipment, and operations.	X		Submitted by NWP Accepted by CBFO
JON 14.4	Develop a list of critical plant systems and safety-related equipment.	X		Submitted by NWP Accepted by CBFO
JON 14.5	Revise or develop an NWP procedure that provides instructions on evaluating the impact on critical systems and safety-related equipment impairments and guidance on establishing compensatory measures. Additionally, this procedure will direct the prioritization of maintenance activities.	X		Submitted by NWP Accepted by CBFO
JON 14.6	Implement revised procedures.	X		Submitted by NWP
JON 15.1	NWP will conduct an extent of condition review with respect to JON 14 for non-safety systems and equipment.	X		Submitted by NWP Accepted by CBFO
JON 15.2	Implement recommendations.	X		Submitted by NWP Accepted by CBFO
JON 18.1	Revise the applicable work control and engineering procedures to include a process for the trending of deficiencies and to evaluate the aggregate effects of out-of- service equipment.	X		Submitted by NWP
JON 18.2	Implement procedure revisions.	X		Submitted by NWP Accepted by CBFO

This criterion was met.

CONCLUSION

NWP has established a Configuration Management SMP to ensure safe accomplishment of work. The level of knowledge of Engineering managers and staff responsible for Configuration Management, and the facilities and equipment they use are adequate to ensure the program is effectively implemented. Additional run time with a stable set of procedures and processes is needed to reduce the potential for individual human performance errors.

This objective was met. There were no findings identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	Paul Gubanc **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Configuration Management**	Objective: CM2 Date: 10/14/2016	OBJECTIVE MET	
		YES ☐	NO ☒

OBJECTIVE:

CM2: The facility systems and procedures, as affected by facility modifications, are consistent with the description of the facility, procedures, accident analysis, and assumptions included in the safety documentation. Authorized modifications within the scope of the readiness review were completed and fully closed, or evaluated and determined not to affect the ability to safely start nuclear operations. The procedures include necessary revisions for all modifications that were made to the facility. (CR 8, 9)

CRITERIA

1. As affected by facility modification since the February 2014 events, processes and procedures are implemented to assure WIPP procedures, drawings, facility physical configuration, and safety basis are consistent. The facility documentation for WIPP's safety systems and modifications after the February 2014 events include design bases, SDDs, design and vendor drawings, as-built drawings, equipment labeling, and engineering, operations, and maintenance procedures.
2. Authorized modifications within the scope of the readiness review were identified and completed as follows:
    - IVS operations were authorized by DOE.
    - Review of Work Control Documents demonstrates the modifications listed below are installed/complete and accepted into the WIPP Configuration Control program:
        a. Underground fire suppression upgrades, in the following areas:
            - Maintenance Shop
            - UFE Office
            - Maintenance Offices
            - Lunch Room
            - Maintenance/Combustible Storage
        b. Underground Notification System (UNS)
        c. Automatic fire suppression upgrades for underground liquid-fueled equipment:
            - five for waste handling operations
            - twelve for ground control (prerequisite to support within 200 feet of CH waste face must be upgraded, otherwise compensatory measures are in place that comply with DSA/TSRs Revision 5b requirements).
        d. Camera installed at active room's Waste Face in underground
        e. Skid mounted strobes in Panel 7 in underground

f. The following safety-significant systems have new differential pressure gauges, level indicators, and/or transmitters installed to implement Limiting Conditions of Operation (LCO), and Surveillance Requirements 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), and
    - 308/309 Bulkheads.

3. Procedures were revised in response to facility modifications identified above.
4. The Training organization was notified of the modifications identified above by the project team prior to completion of installation/operation.

APPROACH

Records Reviewed

- CA-IVR-2016-002, *Implementation Verification Review Final Report (for the) Waste Isolation Pilot Plant Documented Safety Analysis/Technical Safety Requirements, Revision 5b,* 5/24/2016
- COG-ENG-01, R2, *Cognizant System Engineer,* Qualification Card 9/14/2016
- CBFO Surveillance Report S-16-54, *NWP Configuration Management Program Activities,* 8/31/2016
- DOE/WIPP 07-3372, R5b, *Waste Isolation Pilot Plant Documented Safety Analysis,* April 2016
- EA 10WC3011-19-0, R2, *Modification Impact Sheet,* 4/28/2016
- EA09CN3025, R10 DRAFT, *System Health Report,* no date but provided 10/6/2016
- Engineering-related NWP Performance Indicators for August 2016
    - ENG-01-2016, *Engineering Change Order (ECO) Status*
    - ENG-02-2016, *Plant Systems Performance Indicators*
    - ENG-03-2016, *No. of MLDs Supporting New and Credited Components in CHAMPS*
- Letter from Gadbury, CBFO, to Breidenbach, NWP, Subject: *Technical Direction Regarding CBFO's Expectations for NWP to Address Concerns Related to Contract Section C Performance Work Statement, 4.1.1.4 Configuration Management and CBFO QAPD, DOE/CBFO-94-1012, section 2.2,* 9/21/2016
- Letter from Staker, EA/DOE Headquarters, to Schrader, CBFO, Subject: *Office of Enterprise Assessments Operational Awareness Record for the Follow-up on Engineering Process Issues from the November 2015 Assessment Report at the Waste Isolation Pilot Plant, July 12-14, 2016 (OAR-EA-WIPP-2016-07-12),* 9/27/2016
- Memorandum from Fadeley to Hejmanowski, Subject: *Grandfathered Qualification for Cognizant System Engineer (CSE) listed on the Approved WIPP CSE/ACSE System Assignment List, Revision54,* 8/23/2016
- MSA-NWP-2016-001, R0, *Management Self-Assessment Waste Isolation Pilot Plant Final Report*, 9/30/2016

- *NWP Engineering Evaluated Walkdown for CSE Qualification To Demonstrate Adequate System Specific Knowledge*, 10/8/2016 (no document number)
- NWP Engineering Improvement Schedule, updated 10/3/2016
- *NWP Engineering Oral Evaluation to Demonstrate Adequate System Specific Knowledge of DSA Rev. 5b Changes and Impacts on SS systems*, 6/15/2016
- NWP Manageable List of Open Items as of 9/25/2016
- Operations Turnover Verification, *Installation of additional skid-mounted strobes in Panel 7 in Underground*, 9/29/2016
- Operations Turnover Verification, *Installation of Underground Notification System*, 9/29/2016
- Operations Turnover Verification, *Installation of Underground Surveillance Camera System at Waste Face*, 9/29/2016
- SDD GPDD, R16, *System Design Description, General Plant Design Description*, 10/1/2013
- SDD VU00, R24, *System Design Description, Underground Ventilation System*, 9/22/2016
- SDD WD00, R12, *System Design Description, Water Distribution System*, 5/23/2016
- *WIPP Cognizant System Engineer Job Task Analysis*, 9/30/2016 (no document number)
- *WIPP Cognizant System Engineer/Alternate Cognizant System Engineer System Assignment List*
- WIPP Forms WF16-1691, WF16-1700
- WP 09, R42, *Conduct of Engineering*, 8/13/2016
- WP 09-11, R8, *NWP Configuration Management Plan*, 5/17/2016
- WP 09-12, R2, *Evaluation of Technical Operability Adequacy of Facility Systems, Structures, and Components*, 4/28/2016
- WP 09-CN.04, R1, *Backfit Analysis Process*, 7/15/2016
- WP 09-CN.08, R1, *WIPP Cognizant System Engineer Training Program Plan (Safety Significant Systems)*, 8/13/2016
- WP 09-CN3007, R46, *Engineering Change Order Preparation and Design Document Change Control*, 7/15/2016
- WP 09-CN3007, R47, *Engineering Change Notice*, 10/3/2016
- WP 09-CN3023, R7, *Functional Classification Determination for Design*, 10/30/2012
- WP 09-CN3025, R20, Draft A, *System Health Walkdown and Health Reports*, not yet issued
- WP 09-CN3031, R6, Draft B, *Engineering Calculations*, not yet issued
- WP 09-CN3034, R6, *Configuration Management Determination*, 10/31/2012
- WP 12-NS3017, R0, *In Service Inspection of WIPP Design Features*, 5/24/2016

Interviews Conducted

- Civil/Structural Design Engineer
- Engineering Instructor, Training Department
- Engineers (10), including 5 CSEs for safety-significant systems
- Instrumentation & Controls Maintenance Manager
- Linking Documents Database maintainer and SME

- Maintenance Instructor, Training Department
- NWP Component Indices Engineer
- NWP Design Authority Manager
- NWP Electrical and Instrumentation & Controls Systems Manager
- NWP Engineering Acting Deputy Manager
- NWP Engineering consultant
- NWP Engineering Manager/Chief Engineer
- NWP Engineering Programs Manager
- NWP Engineering Programs Supervisor
- NWP Facility/Ventilation Systems Manager
- NWP Geotechnical & Mining Engineering Manager
- NWP Mining Department Manager
- NWP Nuclear Safety Program Manager
- NWP Operations Training Manager
- NWP Project Engineering Manager
- NWP SME on AIB JON closure
- NWP Training Records Management personnel
- CSEs for the systems listed below

Evolutions/Operations Witnessed

- Walkdowns with the cognizant engineer of the following:
    - VU01, Underground Ventilation System including the IVS, 10/6/2016
    - FP02, Underground fire suppression upgrades, in the Maintenance Shop, UFE Office, Maintenance Offices, Lunch Room, and Maintenance/Combustible Storage, 10/7/2016
    - CM00-PC00, Underground notification system, 10/6/2016
    - AU04 and FP02 Automatic fire suppression upgrades for underground liquid-fueled equipment:
        - five for Waste Handling operations, 10/7/2016
        - twelve for ground control, 10/7/2016
    - New differential pressure gauges, level indicators, and/or transmitters installed in safety-significant systems:
        - HV00, Battery Exhaust Filtration System, 10/6/2016;
        - HV01, Contact Handled Waste Handling Containment Ventilation System, 10/6/2016;
        - VU01, Underground Ventilation System, 10/6/2016;
        - FP01, WHB Fire Suppression System (Fire Water Storage Tank), 10/7/2016;
        - and VU03, 308/309 Bulkheads, 10/6/2016
- Operational verification in the CMR of the CM00-PC00, Underground Notification System and the camera installed at active room's Waste Face in Underground, 10/6/2016
- Participated in controlled egress of the underground, 10/6/2016

DISCUSSION OF RESULTS

1. *As affected by facility modification since the February 2014 events, processes and procedures are implemented to assure WIPP procedures, drawings, facility physical configuration, and safety basis are consistent. The facility documentation for WIPP's safety systems and modifications after the February 2014 events include design bases, SDDs, design and vendor drawings, as-built drawings, equipment labeling, and engineering, operations, and maintenance procedures.*

In addition to the procedural controls identified in the MSA Final Report, MSA-NWP-2016-001, *Management Self-Assessment Waste Isolation Pilot Plant Final Report*, the CORR team examined multiple examples of design bases, SDDs, design drawings, as-built drawings, equipment labeling, and operating procedures for safety-significant systems turned over to operations and identified in this CRAD. In all cases, the SDDs discussed the associated design bases, as-built drawings reflected the configuration in the field, operating procedures assured routine readings and functional checks, and equipment was found with current calibrations. These observations provide objective evidence that the engineering procedures and processes for Configuration Management are being effectively implemented.

As discussed in Objective CM1, the CORR team noted that the NWP engineering procedures and processes continue to evolve and some changes were being implemented as the CORR was underway (e.g., WP 09-CN3007 was revised on 10/3/2016 from the "Engineering Change Order" process to the "Engineering Change Notice" process which now includes a "traveler," EA09CN3007-1-0). Notwithstanding the update training being delivered to the engineering staff, the newness and extent of changes introduce the potential for errors of understanding and compliance. Engineering management is cognizant of this concern and has compensatory measures in place, including more extensive management review of engineering staff deliverables.

This criterion was met.

2. *Authorized modifications within the scope of the readiness review were identified and completed.*

Where possible, walkdowns were completed with the CSE for each of the systems listed in the Evolutions/Operations Witnessed above. Projects for two system modifications have not been completed and turned over to Operations at the time of the CORR:

- Underground fire suppression upgrades, and
- Automatic fire suppression upgrades for underground liquid-fueled equipment.

These open modifications are being tracked on the NWP manageable list of open items with completion scheduled before the end of October 2016.

- *IVS operations were authorized by DOE.*

This criterion was confirmed by the MSA and deleted from the DOE-approved CORR POA, R3. The CORR did confirm the operational status of the IVS and observed the installation of the

Permacons around the IVS to facilitate filter replacement. Completion of the Permacons is being tracked on the NWP manageable list of open items and is scheduled for completion before the end of October 2016.

- *Review of Work Control Documents demonstrates the modifications listed below are installed/complete and accepted into the WIPP Configuration Control program:*
    a. *Underground fire suppression upgrades, in the following areas:*
        - *Maintenance Shop*
        - *UFE Office*
        - *Maintenance Offices*
        - *Lunch Room*
        - *Maintenance/Combustible Storage*

Underground fire suppression upgrades in the Maintenance Shop, UFE Office, Maintenance Offices, and Lunch Room are installed but awaiting permanent power and communication linkage to the CMR. Relative to Maintenance/Combustible Storage, 1) the Lube Oil Storage Room system is installed but awaiting rollup door installation and permanent power, and 2) Underground fire suppression upgrades in the Diesel Fuel Storage Room are installed but are past the scheduled PM so the underground fire suppression is considered impaired.

b. Underground Notification System (UNS)

Although the UNS was installed and turned over to Operations in February 2016, the associated documentation supporting this modification was not confirmed completed until 9/29/2016. The CORR team also noted that this system is classified as ML-4, although NWP senior management considers it of high significance for underground personnel accountability and notification, and the system is displayed for reference in the EOC during emergency response. SMP KE 11-3 specifically calls out the importance of operability and testing of equipment used for abnormal event communication (without specifying which equipment that is).

The CORR team believes the UNS meets the NWP criteria to be classified as ML-3 in accordance with WP 09-CN3005, on account of the fact that the UNS constitutes an “injury mitigation” SSC and contributes to the satisfaction of abnormal event communication/notification, as credited in SMP KE 11-3. NWP has created WIPP Form WF16-1750 to perform this evaluation.

c. Automatic fire suppression upgrades for underground liquid-fueled equipment:
- *five for waste handling operations*
- *twelve for ground control*

The five automatic fire suppression system upgrades for underground liquid-fueled equipment for Waste Handling operations were all completed, except for installation of an automatic kill switch on waste transporter 52-H-008A. For the twelve automatic fire suppression system upgrades for underground liquid-fueled equipment for mining/ground control, compensatory measures will be required for the start of CH waste handling. These pieces of equipment are each equipped with some level of fire suppression system, although the installations are no longer

automatic or compliant with either code or manufacturer recommendations. To comply with DSA/TSRs Revision 5b requirements, compensatory measures (e.g., fire watch) will be required for ground control equipment to be located within 200 feet of the CH waste face.

d. Camera installed at active room's Waste Face in Underground

Installation of cameras at the active room's waste face in the underground was completed and accepted by Operations on 9/26/2016. Although not physically walked down by the CORR, the images and zoom, pan, and tilt functions provided by these cameras were observed in the CMR.

e. Skid mounted strobes in Panel 7 in Underground

Installation of the skid-mounted strobes in Panel 7 in the underground was completed and accepted by Operations on 9/29/2016. The CORR team was unable to view this equipment, because of high contamination and Panel 7 restrictions; however, the team did conduct a tabletop review of the associated documentation.

f. The following safety-significant systems have new differential pressure gauges, level indicators, and/or transmitters installed to implement LCOs and Surveillance Requirements specified in the TSR:
- *Battery Exhaust Filtration System,*
- *CH Waste Handling Containment Ventilation System,*
- *Underground Ventilation System,*
- *Waste Handling Building Fire Suppression System (Fire Water Storage Tank), and*
- *308/309 Bulkheads.*

The following safety-significant systems have new differential pressure gauges, level indicators, and/or transmitters installed and operational, in order to implement LCOs and Surveillance Requirements specified in the TSR. Walkdowns physically confirmed that each of these instruments was installed and operational:
- Battery Exhaust Filtration System,
- CH Waste Handling Containment Ventilation System,
- Underground Ventilation System (i.e. differential pressure instruments located in the exhaust filter building),
- WHB Fire Suppression System (Fire Water Storage Tank), and
- 308/309 Bulkheads.

This criterion was **not** met.

3. Procedures were revised in response to facility modifications identified above.

While conducting walkdowns of the systems listed above, calibrations were identified as being current, which was indicative of proper incorporation in maintenance procedures. CMR operating procedures for completing TSR surveillances or checking operational status of the installed equipment were confirmed to be in place for systems turned over to Operations. Operations Verification Checklists were also confirmed as completed for the three systems

turned over 9/26 and 9/29/2016. Each checklist identified the procedures that were revised to incorporate the applicable modifications.

This criterion was met.

4. *The Training organization was notified of the modifications identified above by the project team prior to completion of installation/operation.*

Based on discussions with the NWP Training organization, they were notified by Engineering early in the process for several of the modifications identified above. As an example, the Maintenance organization confirmed that, for the listed modifications, new skills and refresher training were identified and delivered to the instrument technicians. Engineering contributed technical content to assist with operations and maintenance training. The Operations turnover packages also identify the training requests generated in support of these modifications.

This criterion was met.

CONCLUSION

With the exception of two modifications within the scope of the readiness review, the facility systems and procedures, as affected by facility modifications, are consistent with the facility description, procedures, accident analysis, and assumptions in the safety documentation. Installation of these two modifications remains incomplete and they are not yet operational. However, the incomplete modifications are being tracked on the NWP manageable list of open items to assure completion of prerequisites PR-8.1 and 8.2.

This objective was **partially** met, on account of two incomplete modifications on the NWP manageable list of open items. There were no findings identified.

FINDINGS

<u>Pre-Start</u>
None

<u>Post-Start</u>
None

Assessed by:	Paul Gubanc **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Emergency Preparedness**	Objective: EP1 Date: 10/14/2016	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

EP1: Line management has established and implemented an Emergency Preparedness (EP) SMP to ensure safe accomplishment of work. The level of knowledge of EP managers and staff is adequate based on review of examinations and examination results, interviews, and observation of operational demonstrations. (CR 1, 4)

CRITERIA

1. Contract requirements for the EP SMP were incorporated into facility-specific procedures.
2. An EM plan was developed and implemented; an Emergency Planning Hazards Assessment (EPHA) was developed and approved by DOE-CBFO; pre-determined EALs were implemented to protect workers and public; EP implementing procedures were effectively implemented in support of the facility; and identified EP SMP controls (e.g., KEs) and referenced procedures are implemented, including:
    - Hazards are identified and analyzed through a technical planning basis process to provide pre-determined protective actions and protective action recommendations to protect workers and the public (SMP KE 15-1).
    - Emergency plans and procedures provide the framework for actions to be taken by workers and responders (SMP KE 15-2).
    - Emergency response capabilities (e.g., OPERABLE equipment, minimum staffing, Incident Command System, EOC) are identified and maintained to respond and protect workers, public, property, and environment (SMP KE 15-3).
    - Operability and testing of equipment (audible, visual) used for abnormal event communication/notification between workers (both aboveground and Underground) and CMR is accomplished (SMP KE 11-3).
    - Emergency drills and exercises are planned and conducted to provide validation of plans, procedures, and response capabilities (SMP KE 15-4).
3. WIPP has a sufficient number of trained personnel to fulfill the EP SMP effectively and provide safe site operations.
4. The level of knowledge of EP managers and staff is adequate based on review of records, interviews, and observation of operational demonstrations. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.
5. WIPP has adequate facilities, and equipment is available to ensure that EP support and services are adequate for safe facility operation.
6. AIB JONs related to EP were addressed through effective corrective actions for the EP SMP.

APPROACH

Records Reviewed

- Drawing DWG 24-C-0220-W, Rev. BB
- EA 12ER4925-3-0, R5, *CMR Initial Response Actions*
- EA12ER3003-1-0, R2, *SWB Emergency Operations Center Equipment Operability Checklist*
- EA12ER3003-2-0, R1, *Site Emergency Operations Center Equipment Operability Checklist*
- EM-101, R0, *Emergency Response Organization Overview Refresher*
- *Emergency Management and Security Department Staffing Plan and Roles and Responsibilities*, 9/21/2016
- MP 1.48, R3, *Emergency Management Program*
- MP 1.55, R0, *Underground Firefighting*
- *WIPP RCRA Contingency Plan*, R2
- WP 04-EM4200, R32, *Radiological Monitoring System Alarm Response*
- WP 05-WH4401, R3,*Waste Handling Operator Event Response*
- WP 12-9, R42, *WIPP Emergency Management Plan*
- WP 12-ER.12, R1, *WIPP Abnormal Condition Drill Program*
- WP 12-ER.13, R1, *Drills and Exercises*
- WP 12-ER3002, R27, *Emergency Operations Center Operations*
- WP 12-ER3003, R7, *Functional Equipment Checks of Emergency Response Organization Facilities and Equipment*
- WP 12-ER3906, R16, *Categorization and Classification*
- WP 12-ER3907, R1, *Operational Emergency Notifications*
- WP 12-ER4911, R22, *Underground Fire Response*
- WP 12-ER4916, R23, *Consequence Assessment*
- WP 12-ER4920, R2, *RCRA Contingency Plan Implementation*
- WP 12-ER4922, R2, *Incident Command System*
- WP 12-ER4923, R2, *Emergency Operations Center Personnel Selection and Qualification*
- WP 12-ER4925, R5, *CMR Incident Recognition and Initial Response*
- WP 12-ER4926, R3, *CMR Expanded Staffing Operations*
- WP 12-FP.23, R0, *WIPP Baseline Needs Assessment*
- WP 12-HP3400, R12, *Contamination Control*
- WP 12-HP4000, R10, *Emergency Radiological Control Responses*, 7/28/2016

Interviews Conducted

- Department Manager, EM and Security Department
- Deputy Chief Fire Department
- Emergency Response Organization (ERO) Training Officer, EM Section
- EOC Watch Officer, EM Section

- Fire Department Chief
- Manager, EM Section
- Senior Exercise Planner, EM Section
- Senior Planner, EM Section
- Team Lead, Training and Support, Protective Force Section
- Training Division Chief, WIPP Fire Department

Evolutions/Operations Witnessed

- Abnormal Conditions Drill, pre-drill briefing, and post-drill briefing on 10/5/2016
- EM-101, R0, *Emergency Response Organization Overview Refresher*, training session on 10/6/2016

DISCUSSION OF RESULTS

1. *Contract requirements for the EP SMP were incorporated into facility-specific procedures.*

During the course of this review, document reviews and personnel interviews were conducted to determine the status of implementation of the EP SMP at WIPP. Program elements defined by DOE O 151.1C, *Comprehensive Emergency Management System*, and the WIPP RCRA Contingency Plan are reflected in the program administration implementing procedures and emergency response procedures for the WIPP ERO. For example, one EM program requirement is for the ERO to be able to categorize and classify emergency events. To that end, WP 12-ER3906, *Categorization and Classification*, meets that requirement. While there are opportunities to improve, the framework of a compliant, comprehensive EM program is in place at WIPP. In some instances, the required items for compliance are in place, and in other instances, as discussed in other sections of the review documentation, elements of the program exceed the standards for compliance.

This criterion was met.

2. *An EM plan was developed and implemented; an EPHA was developed and approved by DOE-CBFO; pre-determined EALs were implemented to protect workers and public; EP implementing procedures were effectively implemented in support of the facility; and identified EP SMP controls (e.g., KEs) and referenced procedures are implemented, including:*
    - *Hazards are identified and analyzed through a technical planning basis process to provide pre-determined protective actions and protective action recommendations to protect workers and the public (SMP KE 15-1).*
    - *Emergency plans and procedures provide the framework for actions to be taken by workers and responders (SMP KE 15-2).*
    - *Emergency response capabilities (e.g., OPERABLE equipment, minimum staffing, Incident Command System, Emergency Operations Center) are identified and maintained to respond and protect workers, public, property, and environment (SMP KE 15-3).*

- *Operability and testing of equipment (audible, visual) used for abnormal event communication/notification between workers (both aboveground and Underground) and CMR is accomplished (SMP KE 11-3).*
- *Emergency drills and exercises are planned and conducted to provide validation of plans, procedures, and response capabilities (SMP KE 15-4).*

An approved EPHA (DOE/WIPP-08-3378, *Waste Isolation Pilot Plant (WIPP) Emergency Planning Hazards Assessment*, R5) was issued in May 2016. This EPHA identifies hazards identified and analyzed in the WIPP DSA issued in April 2016. The WIPP EPHA identifies areas where protective actions (PAs) for workers are required and where protective action recommendations (PARs) are to be issued to off-site agencies. The WIPP EPHA Section 4.7 states:

> The WIPP SB [Safety Basis] distinguishes the perimeter of the 16 sections (or 10,240 acres) established by the WIPP Land Withdrawal Area (LWA). This tract includes properties outlying the PPA, the EUA, and the Off Limits Area. This sector is designated at point of ingress and egress as a Multiple Land Use Area, and is managed accordingly as described in DOE/WIPP 93-004, Waste Isolation Pilot Plant Land Management Plan. DOE G 151.1-2 states that if the general public can gain unescorted access to areas of the DOE site, those areas should be considered as "off-site" for purposes of emergency classification, unless it is ensured that those areas can be evacuated and access control established within about 1 hour of any emergency declaration. Because the north access gate at the LWA boundary can be closed and access control established within about 1 hour of an emergency declaration, this reinforces the SB as the LWA for the criteria of declaring a General Emergency (GE).

During the player hotwash for the Bison 3 emergency exercise, and during a subsequent conversation to gain additional information, the security responder in the EOC identified a concern with the ability of the Protective Force to accomplish the tasks of establishing access control and tracking down LWA users that failed to respond to the notification during an emergency, given the resources available and the taskings these resources already have. WIPP Protective Force Lieutenants are provided training on establishing priorities for responding to events at the WIPP facility. Additional training should be provided related to interfacing with the Incident Commander, the FSM, and the EOC to review all sources of taskings and communicating capabilities and limitations in emergencies. NWP has submitted WIPP Form WF16-1753 was for this issue.

A set of EALs and PAs/PARs are provided for in WP 12-ER3906. This procedure was reviewed and an issue with compliance with DOE O 151.1C was identified during the conduct of the WIPP Bison 2016 emergency exercise. The current revision to WP 12-ER3906 does not allow for categorizing and/or classifying when conditions are predicted to meet EAL criteria, as required by DOE O 151.1C. A decision was made in the Bison 2016 exercise to categorize and classify the event as a general emergency before reaching the actual EAL conditions. While this was technically a correct action, WP 12-ER3906 does not procedurally allow this action. WP 12-EP3906 needs to be revised to meet DOE O 151.1C standards allowing a predictive EAL declaration. WIPP Form WF16-1675 was submitted to address this issue.

A review of EALs in WP 12-ER3906 identified a redundant EAL (HS-OE-8). This EAL states in very general terms (one or more waste container breached) what is already covered in EALs with specific initiating event conditions identified in the EPHA. Additionally, depending on the initiating event, selection of EAL HS-OE-8 could have been provided an avenue for under-categorizing and under-classifying an event. WIPP should remove EAL HS-OE-8 from WP 12-ER3906. WIPP Form WF16-1675 was submitted to address this issue.

During a review of WP 12-ER4925, *CMR Incident Recognition and Initial Response*, the CORR team identified a need to clarify what specific element of the ERO had the capabilities and should be assigned the task (e.g., Protective Force) to perform public address announcement in the event of a site Public Address System (PAS) failure. WIPP Form WF16-1675 was submitted to address this issue.

The WIPP Emergency Plan (WP 12-9, *WIPP Emergency Management Plan*, issued in November 2015) forms the basis for procedural development in support of implementing procedures for compliance with DOE O 151.1C and for responding to operational emergencies. The response procedures provide a framework for responding to the spectrum of operational emergencies identified in the EPHA as credible emergencies. In some instances, the WIPP EM procedures use checklists to provide specific actions to response organization personnel. Use of the checklists and procedures is mandatory in responding to emergencies. During the course of observing emergency exercises and abnormal condition drills, the WIPP ERO demonstrated an inconsistent use of response procedures; in some cases, responders failed to review procedures or checklists while responding. Additional information on this condition is documented in Objective EP2.

Equipment reliability was found to be an issue with the ENS. Problems, initially identified in WIPP Form WP16-022 on 1/9/2016, were identified by a DOE observation that compensatory measures were not in place for areas where the PAS cannot be heard. This PAS and the underground mine pager phone serve as the required audible ENS for initiation of actions to protect the workers during an emergency. The underground strobe system provides for a visual indication of an emergency condition requiring an evacuation.

Compensatory measures and corrective actions, for the aforementioned systems, that were put into place were less than effective as identified in WIPP Forms submitted subsequent to the initial WIPP Form. In support of compensatory measures, the CMR has to issue three separate notifications, using three separate systems to accommodate ENS deficiencies. This additional operator burden offers opportunities for delayed notifications in time sensitive situations. Furthermore, a testing program for the PAS initially was not placed on a fixed schedule to ensure it was completed on a monthly basis. While the scheduling problem was corrected, the continued identification of areas where the system cannot be heard calls into question the effectiveness of the testing and adequacy of the current frequency for the testing. Parts of the underground strobe system were returned to service just prior to conducting the 10-08-16 Bison 3 emergency exercise. Compensatory measures should have been in place for the out-of-service strobes and, later, for that portion of the underground strobe system remaining out-of-service.

The continuing identification of serious problems with the ENS system, the continued extension of due dates for actions associated with resolving issues identified in WIPP Forms, and the lack

of progress in improving system reliability indicates that this is an area for concern. Further, based on interviews with workers during the CORR, there is a perception that management is not concerned with resolving this problem. Workers are aware the problem was identified long ago, and a WIPP Form was submitted, yet the problems remain. Adding fuel to concerns is the widely held knowledge that funding to replace the system was removed. Ongoing issues with the ENS need to be resolved and the status communicated to the WIPP employees.

EP1-PRE-1: The operability and testing of equipment (audible, visual) used for abnormal event communication/notification between workers (both aboveground and underground) and CMR is less than adequate, and management has not appropriately compensated for this weakness. This is contrary to the requirements of SMP KE 11-3, and the WIPP RCRA Contingency Plan section 2.10 (Preparedness and Prevention).

This criterion was **partially** met.

3. *WIPP has a sufficient number of trained personnel to fulfill the EP SMP effectively and provide safe site operations.*

The WIPP ERO training program (WP 12-17, *Emergency Management Training Program*, and WP 12-ER4923, *EOC Personnel Selection and Qualification*) provides for initial qualification and periodic refresher training as required by DOE O 151.1C and the RCRA permit for WIPP. Whilst 40 CFR 264.16 requires periodic refresher training, the approved RCRA permit does not require such training. WIPP ERO personnel are provided annual refresher training in the form of classroom training and/or participation in emergency drills and exercises. The ERO positions for the EOC are staffed to at least a primary and alternate level of staffing. In many instances the staffing extends to three or more people per ERO position, thus providing for greater assurance of the ability to carry out prolonged staffing. A recently implemented Qualified Watchstanders List (QWL) allows the EM department to track the status of personnel qualifications. A review of training records for the EOC and the personnel staffing the CMR as Emergency Coordinators under RCRA revealed that all training requirements were currently met. In the case of the ERT, there were three ERT personnel who are fully qualified.

Personnel who are fully qualified to respond sign in on a daily status sheet that is controlled by the on-duty Captain at the WIPP Fire Department. This sign-in sheet is the control to ensure untrained personnel are not allowed to participate in an emergency response. Responsibility for managing and providing training to the ERT is transitioning from Technical Training to the WIPP Fire Department'; a formal transition plan is being developed. During this transition period, review and revision of training materials is an ongoing process; the WIPP Fire Department is evaluating providing extensions for required training that expires in the transition period to allow training to be provided with updated lesson materials. When developed and approved, the formal transition plan should provide specific actions and deadlines for this transition. A WIPP Form WF16-1718 was submitted to address this issue.

This criterion was met.

4. *The level of knowledge of EP managers and staff is adequate based on review of records, interviews, and observation of operational demonstrations. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.*

The WIPP EM staff is comprised of experienced and knowledgeable individuals with a wide variety of experiences and background. The staff has a basic level of knowledge of the Safety Basis requirements. Interviews with staff, observation of activities, and review of records shows that in other areas of EM, the staff is very knowledgeable, innovative, and dedicated. The *Emergency Management and Security Department Staffing Plan and Roles and Responsibilities* was reviewed and found to be a prudent application of resources to implement a compliant EM program. Sustainability of this level of staffing will be of concern in the face of reductions in funding as recovery efforts wind down.

Regarding the implementation of the Safety Basis is within the EPHA, the current issued EPHA does not have an in-house expert, nor is a contracted resource available, that can serve as a resource for answering staff questions or supporting updates to the EPHA. This is a critical gap in capabilities. Efforts to fill this gap ended when a hiring freeze was implemented at the WIPP. Failing the ability to obtain an in-house resource, a contracted capability needs to be obtained.

EM leadership has developed a set of performance indicators that measure EOC T&Qs, drills and exercises, and EOC operational readiness. These metrics provide for a good measure of the tangible readiness elements that can be reviewed and reported to senior management to assess program health. An activity that is not tracked, and could be used as a measure of management commitment to the EM program, is training attendance. Currently, the practice is to conduct additional make up training sessions, which decreases the overall effectiveness. Technical Training uses attendance tracking as a metric for training delivered by their organization. Attendance at Technical Training delivered courses has improved significantly since this metric was put into place. Implementing a similar metric could improve the organizational effectiveness within EM.

This criterion was met.

5. *WIPP has adequate facilities, and equipment is available to ensure that EP support and services are adequate for safe facility operation.*

The WIPP has an EOC at the WIPP site and a new EOC in the Skeen-Whitlock Building in Carlsbad, NM. The EOCs are single-use facilities with equipment dedicated to emergency response activities. The Skeen-Whitlock Building EOC was stood up within the last two years. Computer workstations are in place to support use of WebEOC software for managing information, along with other response-oriented and general-use software packages. Wall-mounted monitors provide the ability to share information with all personnel in the EOC. The EOC Watch Officer position manages the display of information on the monitors to support the needs and desires of the EOC ERO. Meteorological information is also displayed on monitors in the EOC. A similar, but not as sophisticated capability exists at the WIPP site EOC. In each location, there are hardcopies of reference materials and posted response information.

Emergency equipment testing for the EOC at the WIPP site and the Skeen-Whitlock Building EOC is addressed in WP 12-ER3003, R7, *Functional Equipment Checks of Emergency Response Organization Facilities and Equipment*. Review of the document found that equipment testing did not review the drawings and posted information to ensure that the latest revision of that information is posted. Furthermore, when interviewed, EM department personnel revealed that there is no formal process to notify EM of any changes to WIPP facility hazards, operations, or changes to configuration. Given this condition, the ability to maintain operations and hazards bounded by the EPHA and current reference materials in the EOCs is severely challenged. The WIPP EM department needs to establish a formal process for notification of the aforementioned changes. Additionally, the periodic equipment testing procedure for the EOCs needs to be revised to include verifying reference materials, drawings, and posted information are the current revision. A WIPP Form WF16-1674 was submitted to address this issue.

This criterion was met.

6. AIB JONs related to EP were addressed through effective corrective actions for the EP SMP.

A review of the AIB JONs related to EP was carried out with the EM department staff. In the course of this review, AIB JON 19.1 was found to be updated from the status provided in the MSA. The *WIPP Baseline Needs Assessment* (WP 112-FP.23, R0) was approved. In reviewing AIB JONs 8.1 and 9.2, the emergency response, as demonstrated by the response history over three emergency exercises observed by the CORR team, indicated that closure actions for the two JONs were not effective. The details of this are addressed in Objective EP2, as this was the activity where the observations occurred. No other problems were found with actions related to the remaining EM-related AIB JONs and closure actions.

This criterion was met.

CONCLUSION

Efforts to stand up an EM program that is compliant with DOE O 151.1C and the WIPP RCRA Permit have produced a program that is significantly improved over the program in place at the time of the fire and radiological release in 2014. NWP's comprehensive training, drill, and exercise program helps ensure that responders at WIPP are prepared and demonstrate the capability to protect the workers and the public. A strong set of procedures implementing the NWP emergency plan provides for a consistent response to a wide variety of initiating event conditions. The WIPP modern EOC offers responders the tools needed to carry out their responsibilities effectively during operational emergencies postulated by the EPHA. Nevertheless, longstanding problems identified with the WIPP ENS remain unresolved. Resolution of these problems must be given the priority needed to ensure reliable notification of required protective actions and to restore employee confidence in this system.

This objective was met. There was one finding identified.

FINDINGS

Pre-Start

EP1-PRE-1: The operability and testing of equipment (audible, visual) used for abnormal event communication/notification between workers (both aboveground and underground) and CMR is less than adequate, and management has not appropriately compensated for this weakness. This is contrary to the requirements of SMP KE 11-3, and the WIPP RCRA Contingency Plan section 2.10 (Preparedness and Prevention).

Post-Start

None

Assessed by:	Forest Holmes **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Emergency Preparedness**	Objective: EP2 Date: 10/14/2016	OBJECTIVE MET	
		YES ☐	NO ☒

OBJECTIVE:

EP2: A routine operations drill program and an EM drill and exercise program were established and implemented. Records for each program are adequate to demonstrate the effectiveness of completed drills and exercises as well as planning for future drills and exercises. (CR 4, 10)

CRITERIA

1. A WIPP drills and exercises program procedure was established and implemented.
2. Drills and emergency exercises were performed and evaluated in order to demonstrate proficiency, and when weaknesses (or opportunities for improvement) are identified, corrective actions are developed and tracked through closure.
3. Records for each drill are adequate to demonstrate the effectiveness of completed drills and exercises, as well as plan for future drills and exercises.
4. Operations and operations support personnel demonstrate abnormal and emergency event response in emergency exercises, operational drills, tabletop drills, and/or field performance demonstrations, including effective interfaces with WIPP Project stakeholders and ERO.

APPROACH

<u>Records Reviewed</u>

- ACD-2016-06, *Abnormal Condition Drill Plan Radiological Monitoring System Alarm Response*, 3/2/2016
- ACD-2016-22, *Abnormal Condition Drill After Action Report*, 7/12/2016
- ACD-2016-22, *Abnormal Condition Drill Plan CMR IVS*, 7/12/2016
- ACD-2016-41, *Dock CAM Alarm Waste Handling Building*, 10/5/2016
- ACD-2016-42, *Loss of Ventilation*, 10/6/2016
- ACD-2016-43, *U/G CM Alarm*, 10/6/2015
- ACD-2016-45, *Decontamination Trailer*, 10/11/2016
- DR-2015-49, *Drill After Action Report WIPP Site Evacuation – Wild Land*, 5/13/2015
- DR-2016-39, *Drill After Action Report No Notice Underground Evacuation*, 8/2/2016
- RE-2016-05, *After Action Report for Real World Event (Argon Gas Leak)*, 8/16/2016
- *WIPP Bison 2 2016 Full Scale Exercise After Action Report*, R0
- *WIPP Bison 2 FY'2016 Functional Exercise Plan and Master Scenario Events List*, R0
- *WIPP Bison 2016 Full Scale Exercise After Action Report*, R0
- *WIPP Bison 3 FY'2016 Full Scale Exercise Plan and Master Scenario Events List*, R0

- *WIPP EX-2016 Bison 2016 Full Scale Exercise Plan and Master Scenario Events List*, R1
- *WIPP Three-Year Drill & Exercise Plan FY 2016 – FY 2018*, R1
- WP 04-AD3013, R40, *Underground Access Control*
- WP 12-ER.12, R1, *WIPP Abnormal Condition Drill Program*
- WP 12-ER.13, R1, *WIPP Drills and Exercises*

Interviews Conducted

- Deputy Operations Manager
- EM and Security Manager
- EM Drills and Exercise Lead
- EM ERO Training Lead
- EM Facilities and Equipment Lead
- EM Manager
- EM Staff
- Facility Operations Manager
- Fire Department Deputy Chief of Operations
- Fire Department Division Chief of Training
- SEC Manager
- Security Support Responder in the EOC for 10-08-16 BISON 3 Exercise

Evolutions/Operations Witnessed

- BISON FY'2016 Full Scale Exercise and associated briefing and training, 6/24/2016
- BISON 2 FY'2016 Functional Exercise and associated briefings and training, 8/25/2016
- ACD-2016-41, *Dock CAM Alarm Waste Handling Building*, 10/5/2016
- BISON 3 FY'2016 Full Scale Exercise and associated briefings, 10/8/2016

DISCUSSION OF RESULTS

1. A WIPP drills and exercises program procedure was established and implemented.

The drill and exercise program at the WIPP facility is implemented via WP 12-ER.13, R1, *WIPP Drills and Exercises*. This plan provides guidance to the EM and other WIPP organizations for all aspects of the DOE O 151.1C-mandated drill and exercise program. A full evaluation of the implementation of this procedure was conducted. The program provides for implementation of an effective and compliant EM drill and exercise program. *WIPP Three-Year Drill & Exercise Plan covering FY 2016 – FY2018*, R1, captures scheduling of functional exercises, full scale/full participation exercises, and abnormal condition drills. The schedule was altered in order to demonstrate proficiency to the several organizations performing WIPP resumption readiness reviews. The CORR team noted, during interviews with the personnel involved in this process, that the transition in ownership from the EM department to WIPP Operations is an ongoing effort, with the goal of Operations having the lead and EM providing technical support. The EM department maintains a set of performance indicator metrics that track monthly the number of

exercises and drills conducted as scheduled, the number rescheduled, and the number not conducted. Overall, there is a low percentage that were rescheduled or not conducted. This metric is a very good tool to maintain management awareness of the state of the drill and exercise program effectiveness.

An Abnormal Condition Drill Program was established at the WIPP facility. 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, R1, *WIPP Abnormal Condition Drill Program*, is the current program implementation tool. This document constrains the facility to conducting the drills in an evaluation format, instead of as a training evolution. Implementation of WP 12-ER.12 in support of CORR abnormal condition drills identified inconsistencies in understanding of the process for planning and executing drills. Additionally, WP 12-ER.12 does not offer operations management the flexibility needed to conduct drills in support of training/improving proficiency and drills in support of an evaluation of worker performance. WIPP Form WF16-1676 was submitted to address this issue.

In reviewing the after action reports from the abnormal condition drills for 2016, the CORR team noted that additional rigor is needed in reviewing participant performance and recommending actions needed to improve performance. Not all observations where substandard performance was observed have identified “Needs Improvement” actions in the report. For example, in DR-2016-39, *No Notice Underground Evacuation*, the report shows two random workers did not know where the closest self-contained self-rescuers caches were located. Another example is ACD-2016-22, *CMR IVS Low D/Ps*, where the drill was stopped to correct conduct of operations substandard performance. No actions were taken to conduct the drill with additional crews or to determine if the substandard performance was an anomaly or a systemic problem. Given the deficient conduct of operations performance demonstrated during the BISON 2016 Full Scale Exercise by CMR personnel, there is a need for follow-up actions with all crews, especially with the new data point gained in the drill.

As demonstrated by the three emergency exercises of varying degrees of complexity witnessed by the CORR team, progress was made in improving emergency responder performance; areas of most noted improvement were the coordination at the Incident Command Post (ICP), use of procedures in the CMR, and conduct of operations in the EOC. Incremental improvements in the response of radiological controls and underground workers have also been observed. Nevertheless, the procedural compliance and multiple occasions of failure to evacuate the underground immediately constitute a significant failure that could result in unacceptable impact on the safety of personnel.

EP2-PRE-1: Contrary to EA12ER4925-3-0 Revision 5, *CMR Initial Response Actions*, during the June exercise, the WIPP CMR Staff failed to activate the HEPA filtered ventilation in the CMR during a simulated unfiltered release from the underground. This failure could have resulted in unnecessary exposure of CMR personnel in a real event. Contrary to WP 12-ER4911, *Underground Fire Response*, personnel in the underground are consistently failing to evacuate the mine immediately. Additionally, WP 12-ER4911 has a complicated set of instructions regarding the donning of respiratory protection, which instructs the employees to wait until

smoke is visible before donning. The workers should in all instances involving fire don the appropriate respiratory protection and immediately evacuate.

It is the team's opinion that, at the time of the CORR, the WIPP organization's response to emergencies received a minimally passing grade overall. Resolving the underground worker evacuation issue would raise the response to well above passing.

This criterion was **partially** met.

2. *Drills and emergency exercises were performed and evaluated in order to demonstrate proficiency, and when weaknesses (or opportunities for improvement) are identified, corrective actions are developed and tracked through closure.*

EM exercises were observed on June 22, August 25, and October 8 of 2016. In addition to the exercises, a training drill in the EOC on September 30 was observed, as well as abnormal condition drills on October 5 and 11 of 2016. The results of the observations are provided below, grouped by date of performance.

June 22, 2016: BISON FY'2016 Full Scale Exercise

An evaluated EM exercise was observed by five members of the CORR team at WIPP. The scenario involved an underground vehicle accident and fire with injuries and an accompanying breached waste package, resulting in an unfiltered release to the environment. NWP was able to demonstrate mobilization of the ERO, categorization and classification of the accident, communication with off-site agencies, rescue of site personnel from the mine, immediate treatment and medical transport of injured personnel, consequence assessment, establishment of protective actions for site personnel, and protective action recommendations for off-site agencies. As such, NWP demonstrated a much-improved capability to respond to an emergency when compared to their February 2014 emergency responses to the salt haul tuck fire and radiological release accidents.

Notwithstanding, some issues were observed, including:

- Significant operational and radiological control weaknesses that, in event of actual conditions, could have resulted in unnecessary spread of radioactive contamination and unnecessary radiation exposure to personnel;
- Examples of established response procedures not being consistently followed, resulting, in part, in a failure to place CMR ventilation in a filtered mode of operation, as required, and failure to implement appropriate radiological controls (including failures to establish hot zones for contamination control, use proper procedurally identified decontamination materials, take nasal smears, monitor the air for beta radiation present in the source term, and perform contamination or radiation surveys at key response locations for habitability). These examples may call into question NWP's ability to perform to expectations consistently.
- Weakness with team work and coordination between the MRT, Radiological Controls, Operations, and Fire Department Emergency Medical Technicians. This weakness can be

attributed to a lack of a visible leader at the scene. Specific examples are provided in the "Conduct of Exercise" section of below.

Exercise Preparations

Prior to the exercise, the CORR team attended a drill controller/evaluator training session and briefing. The controller/evaluator training content was comprehensive; personnel were provided lesson materials and a knowledgeable, very experienced instructor provided a comprehensive review of the lesson materials. An open-book examination was included in the training. Overall, this training was effective.

The team observed the controller/evaluator briefings on June 20 and 21, 2016. The review consisted of a review of the exercise plan, master scenario events list (MSEL), and exercise messages. Personnel were attentive and asked questions. Messages associated with the radiological supplement to the exercise materials were missing. Last minute pen-and-ink changes to the radiological control portion of the MSEL and exercise messages indicated a lack of rigor in the development and review of materials by functional SMEs (e.g., operations and radiological control organizations). The briefing displayed a strong emphasis on the safe conduct of the exercise and specific heat illness precautions to be carried out. Two exercise safety officers were assigned to monitor the safe conduct of the exercise at the WIPP facility.

Conduct of the Exercise

The exercise was initiated at 0812 on June 22, 2016, and the CORR team observed the exercise at the CMR, ICP, event scene (egress point), MRT room, field monitoring team areas of deployment, the Joint Information Center (JIC), and the Skeen-Whitlock EOC. With one exception (the MSEL and initiation message for the exercise specified an initiating alarm for the exercise that does not exist in the CMR), the exercise message provided to the CMR Operators (CMROs) provided sufficient information to the FSM to make a correct initial emergency categorization. The exercise scenario and associated materials were developed using "trusted agents." (I.e. SMEs providing input to the emergency exercise or drill scenario. As trusted agents they must agree not to divulge any information related to the scenario to personnel that are or could be players in the drill or exercise.) While the exercise package was reviewed by SMEs acting as trusted agents and technical input was provided during the course of the scenario development, the incorrect initiating alarm input indicates a lack of rigor in review by operations personnel.

An emergency categorization of an "operational emergency not requiring classification" using EAL UG-F3-F (from WP 12-ER3906) was made by the FSM at 0825. Protective actions defined by the EAL were implemented. The underground was directed to evacuate and a shelter-in-place was directed for the above-ground area of the WIPP. An emergency notification form was completed and approved by the FSM at 0844. DOE O 151.1C time requirements for categorization and notification were met with this first set of actions. An actual event (low-flow CAM alarm) caused a pause in exercise conduct. The exercise resumed after a short delay. Response actions on the part of personnel in the underground, fire department, and MRT were not halted by controllers during the exercise pause. As an example, when the exercise pause was

announced, personnel in the MRT room continued to review the underground maps and discuss best routes of access and egress relative to the injured personnel. Controllers were in the room and did not remove the maps from the players or direct the players to cease planning discussions. Additionally, the Radiological Control Technician (RCT) players at the hoist egress scene continued setting up area and donning personal protective equipment (PPE).

The EOC was activated at 0907. Minimum staffing was reported in place in the EOC at 0921. At 0935, the FSM transferred EM decision-making responsibilities to the Crisis Manager (CM). Initial media releases were generated and released, media releases via Twitter were generated, approved, and released by the EOC and the JIC. The JIC monitored a simulated media feed during the course of the exercise. Several press briefings to a set of mock media participants were completed.

An evacuation of several sections of the WIPP facility was initiated as reported in a 1000 update to the EOC. Follow-up notifications were completed for the "operational emergency not requiring classification." At 1100 the emergency was classified as a General Emergency using EAL UG-F3-U1, *Indicators for Events Occurring in the Underground*, by the CM. The notification form was approved for release at 1133, and this notification did not meet the DOE order 151.1C time limit of fifteen minutes from the time of classification and declaration to completing the notification to state/local agencies. The notification to DOE headquarters was completed within the fifteen minutes. A recommendation to off-site agencies to evacuate to 5.2 kilometers away was provided in accordance with the EAL. Periodic briefings to the EOC were provided by the CM. The Consequence Assessment element of the EOC provided periodic updates of plume projections as additional information was made available. Plume models displayed provided information on the projected doses and the anticipated deposition concentrations.

When it was discovered that two individuals were still in the mine, development of a MRT Reentry Plan was initiated during the exercise. The MRT entered the mine and performed a rescue of the two remaining personnel. These two victims were conveyed to the surface and subsequently transported to off-site medical facilities. After a delay caused by confusion over the identity of the victims, notifications to emergency contacts were completed. At 1315 all personnel were reported as out of the underground and ventilation to the shafts was secured.

The CM and Planning Section Chief reviewed the RCRA Contingency Plan implementation matrix. At 1359, the CM reported to the EOC that the RCRA Contingency Plan should be implemented, and notified the FSM. At 1422, the RCRA Contingency Plan was entered. Interactions between the recently initiated Policy Group and the EOC were generally positive. Field monitoring teams were deployed and results were reported to the EOC. At 1534, the exercise termination announcement was made in the EOC.

The CORR team observed the following operational weaknesses in the CMR:

- Procedures were not effectively used during conduct of the exercise, and place-keeping was not used to support procedure use. In one case, actions were initiated in accordance with EA12ER4925-3-0 but were not completed, resulting in the CMR ventilation not being placed in "filtered" mode, as required. Although the wind direction in the scenario

would not have resulted in an exposure, under actual radiological release conditions, this failure, in concert with a subsequent failure to determine CMR habitability, could have resulted in unplanned and unnecessary radiation exposure to all CMR personnel. This was identified as finding EP2-PRE-1.

- Message inject M-7 from the MSEL provided the CMR with a loss of indication for IVS 956 and 957. This event should have prompted CMR personnel to enter an LCO, 3.2.3 condition b, regarding an indicated differential pressure across the in-service HEPA filter bank. Entry into this LCO by CMR personnel was not apparent and was not reflected on the CMRO daily log. The MSEL injected messages that indicated the CMR should have entered LCOs 3.2.3(B) and 3.2.4(B) respectively, with a notation that stated: "Due to the emergency conditions entering the LCO was optional." The optional note for this scenario is considered to be an inappropriate interpretation of LCO 3.0.3 and AC 5.4.3, and entry into LCO 3.2.3(B) was appropriate; there was no apparent reason the LCO could not be entered and complied with, so neither LCO 3.0.3 or AC 5.4.3 would apply. The MSEL reference to 3.2.4(B) appears to be in error, as the mode applicability was not met. Practices and behaviors associated with TSR compliance were made a focus area during subsequent drills for the CORR.
- An RCT responded to the CMR in order to support CMR evacuation, if necessary. The RCT could have supported determination of habitability (given the appropriate equipment and instruction from whoever sent them), but because the individual stated that he was only there in case of evacuation, the RCT was told to wait outside the CMR and no actions to determine habitability of the CMR were taken.
- There were no evident access controls observed for the "At the Controls" area of the CMR. CMR-assigned personnel and others regularly transgressed the At the Controls boundary without verbal or visual acknowledgement by the CMRO throughout the exercise.
- While the FSM generally maintained strong command and control, communications in the CMR were confusing, and use of three-way communications was inconsistent. Communications were not always controlled by the FSM or the on-watch CMRO. Several individual telephone communications continued through status briefings, announcements, and message injects. Ringing phones interrupted the FSM and the CMRO. During critical periods, personnel answering phones broke from the event status briefing to prioritize taking the calls instead of focusing on the briefings.
- Multiple CMRO-in-Training personnel were used during the exercise in official capacities. While the trainees fulfilled a function, the degree of oversight necessary for them to fulfill that function was an additional task, primarily levied on the FSM (not the CMRO or other qualified personnel in the CMR). This condition appeared to introduce additional vulnerability to the FSM during an already stressful event.

The team observed the following Radiological Control weaknesses in outside areas near the scene of the accident:

- RCTs did not use response procedures during the exercise and did not take appropriate actions consistent with those procedures. As a consequence, they failed to establish a hot zones for contamination control, failed to use proper procedurally-identified decontamination materials, failed to monitor for beta radiation, which would have been present in the source term, and failed to perform contamination or radiation surveys at

key response locations for habitability. In addition, nasal smears were not observed to be taken during the exercise. While response procedures discussed the acquisition of nasal smears, nasal smear instructions were removed from the procedure in 2014. These areas were further assessed during later drills for the CORR.

- Grab air sampling consisted of the use of SabreAlert CAMs, which is instrument that measure alpha radiation only. The beta radiation component was not measured during the response, and there was not a sufficient technical basis to support adequacy of only measuring the alpha component. This could have affected the ability to control exposure of the responders as required by 10 CFR 835. This is identified as a finding for air monitoring in Objective RP1.
- The team observed poor use of RCT personnel resources. There was an inadequate number of RCTs (approximately six) responding to the event during the exercise, which resulted in too few people trying to do too many activities. Examples include: three or four RCTs trying to setup an area, obtain equipment, perform surveys, and decontaminate personnel, as well as maintain contamination control, which resulted in loss of situational control.
- RCTs did not have and did not use staged and inventoried emergency response kits at the ICP. As a result, many items readily needed for a quick and effective response had to be obtained in an inefficient manner. There was also a lack of staged materials and equipment at the egress points to be used for posting, control, response, etc., and the "go-bags" in use contained only bare essential consumables; all other materials had to be collected as needed, resulting is delayed actions. In addition, evidence of a field monitoring team kit inventory was not available, tamper seals were not used to indicate kit tampering, the kits were not marked to indicate contents, and the respirators in the kits were not properly sealed or labeled with expiration dates.
- Personnel manning the decontamination trailer were unfamiliar with the trailer, or its procedures, capabilities, and associated support services. This resulted in ineffective operation of the trailer and a delayed decontamination (personnel were decontaminated in field).
- The CORR team found the WIPP personnel decontamination procedures to be weak in detail and diversity of methods, resulting in a lack of effective decontamination methods for many source term constituents. They also found weaknesses in RCT and on-site medical staff knowledge of and proficiency in proper decontamination practices. The team did not evaluate practices at off-site medical facilities during the exercise. Specific observations include:
    - RCTs discussed using decontamination methods not in procedures (shaving cream);
    - Medical staff did not know that procedures required them to give direction on decontamination of eyes, ears, nose, and mouth;
    - Medical staff did not have proper training to direct decontamination efforts, but had only two-day Radiation Emergency Assistance Center orientation;
    - Medical staff indicated that the contracted doctor did not have Radiation Emergency Assistance Center physician training; and
    - Procedures do not contain decontamination methods for variety of source term constituents that may be encountered (e.g., acid-based contaminants).

The CORR team observed the mine rescue at the mine egress area. Weaknesses with preplanning and teamwork between various responding organizations resulted in slowing the transport of injured personnel, potentially endangering the injured man by unnecessarily placing him in a vertical position while strapped to a stretcher with his arms bound to his chest, and enabling the potential spread of contamination. Specific examples include:

- The MRT entered the RH-TRU handling area of the WHB to measure gas levels at the waste shaft. The MRT encountered yellow plastic in the outer area near the remote controlling station with no RCT present and no radiological barricades, postings, or Step Off pads present. The MRT proceeded onto the plastic and transited the area until RCTs were encountered near the main access doors. Upon leaving the hoist bay, the MRT received hand and shoe frisks, then again transited across the yellow plastic. Hours later, the MRT again entered the area to execute the approved Mine Rescue Plan. No radiological postings, barricades, or Step Off pads were established. Inadequate integration and command and control by RCT personnel that were responsible for access control resulted in the potential for spread of radioactive contamination.
- The MRT Lead noticed one of his RCT team members was missing and asked the team if anyone knew where the RCT had gone. Previously, an MRT-qualified RCT had met the team in-transit and received turnover from the RCT supporting the MRT. The RCT then departed the team for an undetermined location (from the MRT Lead perspective) and did not return to the MRT. His location was not investigated by the MRT Lead.
- The MRT was not informed of changes in victim location that occurred between the time the plan was approved and when the MRT was conducting underground search and rescue. This data was reportedly available in the Sentinel system.
- The deployed MRT in the underground was not informed when the HEPA filters failed. The HEPA filter failure would have resulted in an increase in shaft ventilation flow. As reported by the MRT and the MRT controller/evaluator in the hotwash immediately following the exercise, any change in ventilation flow direction and/or flow rate detected by a deployed MRT would be a major concern to the MRT relative to both MRT and victim safety.
- When the MRT returned to the surface with the victims, the MRT members, who were wearing masks and gear in high-heat conditions for over an hour, were sweating profusely through their shirts and into their masks. Though an RCT was at the collar and several RCT and Fire Department personnel were sitting in chairs in the parking lot outside the building, no radiological or Fire Department preparations were made to receive the MRT and victims at the waste hoist, as was expected by the MRT. Lack of communication and coordination among these teams resulted in delaying the transport of injured personnel, endangering an injured man by unnecessarily placing him in a vertical position while strapped to a stretcher with his arms bound to his chest, and enabling the potential spread of contamination.
- The Mine Rescue Plan took approximately an hour to be approved, and the MRT spent over an hour at the Lamp Room station in full gear awaiting plan approval. The plan approval process did not generate any improvements or identify any deficiencies with the Mine Rescue Plan “as submitted.” During the post-exercise MRT controller hotwash, the MSHA Representative stated the delays in Mine Rescue Reentry Plan approval “needed to be fixed.”

The team observed the following weaknesses in the EOC and JIC:

- The WIPP CM declared a General Emergency prior to reaching the EAL UG-F3-U1, *Indicators for Events Occurring in the Underground*. This conservative action on the part of the CM was the correct action to take; however, the action was contrary to the procedure being used, WP 12-ER3906, *Categorization and Classification*. Procedure 12-ER3906 indicates that it is appropriate and conservative to declare an Operational Emergency for events in progress that may not initially meet the criteria for an Operational Emergency but have the potential to deteriorate; however, the actual action step would require the CM to meet one of the specific criteria prior to declaring the Operational Emergency. DOE O 151.1C Chapter V states: "A General Emergency must be declared when events are predicted, in progress, or have occurred that result in one or more of the following situations…" The action steps in procedure 12-ER3906 should be revised to reflect the actual requirements and intent of DOE O 151.1C.
- Some responders in the EOC did not consistently demonstrate fundamental conduct of operations principles in use of procedures, use of position and procedure support checklists, use of logs, and repeat-backs. A majority of the responders displayed proper conduct of operations principles during the course of the exercise; however, the CORR team observed numerous examples of EOC responders either initiating use of the checklist but setting it aside to be completed once the exercise was terminated, or not initiating or completing a checklist after the exercise was terminated, contrary to WP 12-ER3002, *Emergency Operations Center Operations.*
- The EOC significant events status board was not effectively used, in that some significant items of interest were not captured on it (e.g., HEPA filter failure was not entered on it). A contributing factor to this was an inconsistent use of WebEOC logs by the EOC responders. Without entries into logs, the information is not available to populate into the significant events status board.
- The JIC did not follow response actions of EA11EA3000-4-0, *JIC Writer/Social Media Writer Checklist*, with regards to social media monitoring.

The team observed the following weaknesses with controller/evaluator performance during the exercise

- An EOC Safety and Health Physics person provided an EOC Consequence Assessment Team assessor erroneous radiological data in error by orders of magnitude; 1.8 trillion derived air concentration (DAC)-hours was provided versus the correct value of 1.8 million DAC-hours. The EOC Consequence Assessment Team controller prematurely provided the consequence assessor a correction to the incorrect data, thereby terminating any effort of the part of the consequence assessor to evaluate the data and determine on his own its validity. While a controller inject may be appropriate when incorrect information is provided, doing so without giving the players the chance to perform is inappropriate.
- The MRT controller provided the MRT with an incorrect wind direction. The exercise plan and message stated the wind was from the south. The controller stated the wind was to the east.
- The field monitoring team controller provided the field monitoring team with data that was not part of the approved exercise plan. The controller stated the data were created the

night before the exercise and had not undergone peer review or independent review or approval process.

- There were insufficient radiological control controllers for the scope of the exercise. This resulted in instances where players were without exercise information or feedback upon completion of actions. Examples include a Radiological Control controller leaving the play scene multiple times, resulting in players taking actions without controller input and an RCT asking to simulate action without controller input (only an observer was present).
- Several controllers and evaluators were observed to be inattentive and conducting non-exercise-related activities, like checking email, at the event scene, haul truck shed, and building 952.
- On more than one occasion, some controllers assisted the players instead of monitoring them. For example, a CMR controller assisted with CMR access control; in one instance a CMR controller tried to get CMR Staff to stop talking on phones; the MRT controller assisted in obtain missing plastic bags for players; and a controller repeated communications provided by one player to another player when the second player did not hear the first.
- In some cases, players appeared to initiate their own level of simulation. In one case, an out-of-service radiological control instrument was spontaneously requested to be simulated as being usable by a player on the MRT without controller authorization. No attempt was made to obtain a working instrument and this was not challenged by controllers.
- The MRT controller provided unearned feedback to players when queried about the safety of the team when assembled approximately 250 feet west-northwest of the ventilation system upwind of an adjacent structure.
- Controllers at the ICP and MRT failed to stop players from continuing response actions when a drill pause was initiated.
- An observer in the EOC Consequence Assessment Team room interacted with players to the point of distracting the players. While this was observed by controllers, actions to terminate this distracting behavior were not taken.

<u>Post-Exercise Evaluations</u>

The team observed the following weaknesses with post-exercise evaluations during the exercise:

- There were some examples of players who evaluated their exercise performance as satisfactory and were not self-critical including: three CMR staff members, with the exception of the FSM and the rest of the CMR Expanded Staff; radiological control players who did not self-identify any deficiencies; and JIC players.
- The controller/evaluator organization evaluated the exercise during the formal objective review meeting as all objectives met with findings and opportunities for improvement. After further breakout sessions, additional findings were identified and reviewed with some objectives not being met. During those evaluations, the CORR team observed the following:
    - Evaluators at the controller/evaluator critique breakout session for radiological control did not appear to be aware of how the evaluation forms were to be filled out. If responders did not take required actions per the evaluation criteria, the

evaluators incorrectly marked "Not Observed" for criteria that had not been met. These criteria should have been marked as "Not Met."

- Radiological control controllers agreed surveys were acceptable.
- Most controller/evaluator debriefs were not self-critical of the exercise performance or their own performance, and did not self-identify some issues observed by either the MSA or CORR team members, including weaknesses in the exercise planning (such as annotations in the MSEL that "...entering the LCO is optional"), providing inaccurate message injects (M-5), and providing inadequate detail regarding radiological conditions via the MSEL for players to make the appropriate judgments. A notable exception was a very well done evaluator/controller evaluation of the JIC performance.
- Many of the exercise evaluators did not identify instances where responders failed to use procedures or follow procedures as written.

The CORR team observed a post-exercise evaluation conducted by the MSA team. The MSA team performed a critical assessment that identified many issues also identified by the CORR team members, and concluded the exercise performance to be marginally satisfactory with need for substantial improvement, particularly in radiological control and conduct of operations. The CORR team concluded that the MSA did a good job of monitoring and evaluating NWP's performance during and after the exercise, and concurred with the evaluation shared by the MSA team. A formal report was issued that identifies the observations and findings, along with a CAP to correct the problems identified.

August 25, 2016: **BISON 2 FY'2016 Functional Exercise**

An EM functional exercise was observed by three members of the CORR team at WIPP. The scenario involved a forklift fire and breaching of two drums from a collision with the forklift. The breached containers result in a filtered release to the environment. Scope of participation was limited to the underground, radiological control, Fire Department, Protective Force, and CMR personnel. Response from other elements of the NWP, MRT, facility operations and ERO were simulated. The team observed marked improvement in radiological control practices and behaviors as well as conduct of operations from those observed during the June 24 exercise. Notwithstanding, issues were observed in the exercise, as described below; the fact that responders were unsure whether to evacuate immediately (as required by procedure) or to conduct personnel monitoring prior to exiting the underground was of particular concern, as it resulted in unnecessary evacuation delay, albeit within time requirements.

Exercise Preparations

Prior to the exercise, the CORR team attended a drill controller/evaluator training session and briefing. The controller/evaluator training content was comprehensive; personnel were provided lesson materials and a knowledgeable, very experienced instructor provided a comprehensive review of the lesson materials. An open-book examination was included in the training. Lessons learned from performance shortcomings demonstrated in the Bison 2016 (June) exercise were integrated into the training provided. Overall, this training was effective.

The team observed the controller/evaluator briefing on August 23, 2016. This consisted of a review of the exercise plan, MSEL, and exercise messages. The scope of the exercise focused on demonstrating capabilities for areas where performance issues were identified in the Bison 2016 exercise. Specifically, CMR response, underground response, radiological control response, and ICP response were target areas for demonstration. A simulation cell provided support to responders by simulating interactions and communications with outside the physical WIPP area. To that end, the MRT, WIPP EOC, and off-site memorandum-of-understanding medical and emergency response resource support was simulated. Personnel were attentive and asked questions during the briefing. Emphasis was placed on conducting self-critical evaluations and adherence to exercise message input forms. These two areas were identified as areas where performance was in need of improvement from the Bison 2016 exercise.

The exercise package was reviewed by trusted agents, and technical input was provided during the course of the scenario development. Additionally, a recent change included adding a signature sheet for personnel to certify that the materials supporting the drill/exercise development process were correct. This is a process improvement and addresses performance issues observed in Bison 2016.

The drill and exercise program does not currently provide a means for physical identification of personnel exempted from drill/exercise participation. Failing to provide a physical means of identification can lead to player confusion and distraction of those exempted from play.

A noteworthy practice found with the Bison 2 exercise package is the comprehensive set of materials and briefing provided to support the simulation cell. The briefing displayed a strong emphasis on the safe conduct of the exercise and specific heat illness precautions to be carried out. Two exercise safety officers were assigned to monitor the safe conduct of the exercise at the WIPP facility.

The exercise was planned to initiate on August 24 at 0800. A storm passing through the area the night before had knocked out power to the underground and initiation of the exercise was delayed until August 25. Discussions with personnel at WIPP indicated this event has occurred previously.

Conduct of the Exercise

The CORR team observed the exercise at the CMR, the underground event scene, and ICP. The exercise was initiated in the underground at 0846. Exercise participants in the underground experienced difficulty in getting the emergency signal from their radio to work. The incident was reported to the FSM in the CMR. Exercise message provided to the CMR provided sufficient information to the FSM to make a correct initial emergency categorization. The FSM completed emergency categorization of an “operational emergency not requiring classification” using EAL UG-F3-F from WP 12-ER3906 at 0908. Protective actions defined by the EAL were implemented. The underground was directed to evacuate and a shelter-in-place (simulated) was directed for the above-ground area of the WIPP. An emergency notification form was completed and faxed by the FSM at 0925.

Emergency response actions were initiated in the underground and above-ground at the waste hoist. An ICP was established outside the facility and outside any protective action areas. Radio communications were difficult between the ICP and the CMR. On several occasions, the Incident Commander (IC) was told to call back when attempting to communicate with the FSM. At the ICP were the senior protective force member, an MRT member, an RCS, and the Fire Department Captain (the IC). Radio communications with the above-ground scene were established by the IC and the responding Fire Department unit, along with radio communications between the RCS and the above-ground incident scene. Radio communications between the ICP RCS and the waste hoist radiological control team were somewhat disruptive to the operation of the ICP, because the RCS did not use a speaker mike with an ear piece.

With limited exception, coordination of response actions, conduct of operations, communications, and response checklist use was very visible and prevalent.

An incident action plan was developed by the IC in conjunction with the responders at the ICP.

At 0935, an exercise pause was initiated in response to an actual waste hoist delta pressure alarm. Exercise controllers directed personnel to pause all response actions. The IC directed response personnel to check the safety of all responders during the exercise pause.

The exercise resumed at 0957. Personnel were removed from the underground and transported to off-site medical facilities. The emergency exercise was terminated at 1055.

Radiological control response was observed to be mostly positive, including good use of procedures for decontamination and very good coordination between the radiological control personnel and emergency medical service personnel at the surface. While demonstrated radiological control performance was markedly improved over that observed during the June exercise, it was still observed to be lacking in several areas:

- Personnel in the underground were unsure about the response to fire, whether to evacuate immediately (as required by procedure) or triage and monitor first and then evacuate. This resulted in unnecessary evacuation delay, albeit within time requirements. Additionally, the injured were not triaged to the front of the personnel contamination survey line, and PPE removal techniques could have spread contamination.
- Contamination levels were often reported and communicated in counts-per-minute versus the appropriate disintegrations-per-minute.
- Personnel in the underground did not wear the appropriate PPE (shoe covers) in responding, and no minimum PPE for basic response (such as shoe covers and gloves) was established for radiological control or emergency medical service responders. Contaminated shoe removal process could have led to spread of contamination inside boundaries.
- A “go-bag” of response equipment was missing at the waste station.
- A visible contamination control barrier was not established in the underground, which could have resulted in a complex cross contamination scenario.

- Regular scissors were used for PPE removal. Safety scissors should have been used, since regular scissors pose a puncture risk and do not cut thick materials, like clothing or PPE, very well.
- Personnel decontamination surveys were not properly documented.

The team observed the following weaknesses at the ICP:

- Confusion persisted throughout the response regarding the number of injured, injury locations, and contamination levels of those involved in the response. Initial reports from the underground identified one victim, versus the actual two.
- The exit path to ambulance was not controlled.
- The RCS at the ICP did not have a response checklist or response procedures. The response demonstrated (ad hoc) would have benefited from those response tools instead, of relying on memory and skill of the craft.
- Radio communications between the ICP RCS and the waste hoist radiological control team were disruptive to the operation of the ICP, because the RCS did not use a speaker mike with an ear piece.

The team observed the following in the CMR.

- Prior to drill initiation, the CMRO noted that the IVS 956 indicated “green” on the monitoring system, when conditions should have had it indicating “red.” It subsequently alarmed and the operator responded by entering an alarm procedure. Operations verified the system condition and found IVS 956 to be de-energized, and locked out with inlet and outlet dampers closed, as desired. By the time the drill began, the cause for the alarm was not understood, but the condition of the facility was.
- The communicator at the whiteboard maintained a portion of the whiteboard for open actions to assist the FSM in tracking them. This was a good practice.
- The communicator at the whiteboard initially began logging events Eastern Daylight Time instead of Mountain Daylight Time. No one in the CMR noticed, but the communicator corrected his own error on the second round of whiteboard entries. No impact to reporting times was noted.
- On several occasions, the FSM referred to his wristwatch instead of the CMR clock to establish event and reporting times, resulting in slightly different reporting deadlines from those noted by the whiteboard communicator.
- FSM used regular briefs for status reporting, immediate actions, ongoing actions, and assignments within the CMR. This was a good practice.
- The CMR’s habitability was not established in a timely manner. The responding RCT came with a CAM, but did not have the necessary instruments to survey for surface contamination.
- Instead of establishing an estimated response time for resources, the CMR established a time duration (e.g., “180 minutes” instead of 11:02). As the exercise progressed, this created some confusion regarding the anticipated arrival time, because the same duration was reported at a later time.
- Some confusion was created after a 100% accountability report came from the underground, when two patients were reported (one burned and one with a wrist injury) by an “U/G controller.” The term U/G controller has more than one possible definition

during an exercise, so this may have contributed to the confusion. This confusion was resolved within approximately ten minutes.

- There was a "venue pause" at 1036 on account of alarms associated with radiological control equipment; the alarms were associated with configuration change of radiological control equipment. It was unclear whether or not the alarms were because of actual work or activities to support the exercise, but it was clear that the FSM was not previously aware of changes being made to plant configuration.
- Conduct of Operations, while much improved over the June 2016 exercise, still has room for improvement. The CMR information checklist was not used. Use of repeat-backs by CMR personnel was intermittent. While the At the Controls area was controlled better than previously noted, one FSM-qualified controller/evaluator entered and exited the At the Controls area at least three times without requesting permission from the on-watch FSM or CMRO.

Control of the Exercise

The control of the exercise demonstrated in August 2016 was markedly improved over that observed in June 2016. Additional radiological control controllers from Los Alamos National Laboratory were brought in to support the exercise. The use of skilled personnel improved the ability of the exercise control team to present scenario information in a manageable fashion.

The CORR team observed the following controller-related weaknesses;

- Limiting the scope of simulation for donning respirators to a few players in the underground resulted in the players who were not wearing respirators being able to communicate much more effectively (verbally) than would have been the situation if all responders were wearing respirators. Future drills and exercises should use a consistent method for simulating all participants' use of respirators to provide a more realistic response in the underground.
- The exercise controller assigned to the ambulance encountered a confrontational and argumentative radiological control responder when arriving at the hold location. While the controller effectively dealt with this individual, consideration should be given to providing responders with a more effective briefing on rules of play and the authority of controllers when conducting a drill/exercise.
- The ICP RCS requested a pause to respond to a situation. The ICP controller processed the request and it was turned down. Still, the ICP RCS assumed the exercise was in pause, in spite of being told otherwise by the controller. This situation was eventually overcome by the termination of the exercise.
- One CRM controller/evaluator (who is FSM-qualified) entered and exited the At the Controls area at least three times during the exercise without permission from the CMRO or FSM.
- The use of a venue pause over an exercise pause created some confusion between the CMROs and the ICP. It is not clear that all CMROs understand the difference between the two.

- The CMR controller/evaluators ensured players understood when they were in a pause and did not continue playing; the one exception to this was during an external notification. The EP organization may want to consider how to handle external notifications differently from internal communications during an exercise pause and brief the players accordingly.

Post-Exercise Evaluations

During the exercise hotwash and controller/evaluator critiques, an attitude of critical assessment of performance was demonstrated. However, the majority of radiological feedback was provided by LANL evaluators and controllers, not facility personnel.

October 8, 2016: BISON 3 FY'2016 Full Scale Exercise

An evaluated EM exercise was observed by thirteen members of the CORR team at WIPP, this time on a Saturday. The scenario involved an outside-normal working hours underground vehicle incipient-stage fire with injuries. NWP was able to demonstrate mobilization of the Skeen-Whitlock ERO, categorization and classification of the accident, simulated communication with off-site agencies, evacuation of site personnel from the mine, immediate treatment and simulated medical transport of injured personnel, consequence assessment, establishment of protective actions for site personnel, and protective action recommendations for off-site agencies. As such, some elements of NWP demonstrated a much-improved capability to respond to an emergency when compared to their June and August exercise performance. Notwithstanding, some issues were observed, including:

- Failure of workers to evacuate the underground immediately, as required by WP 12-ER4911, *Underground Fire Response*,
- Operational and radiological control weaknesses that, in event of actual conditions, could have resulted in unnecessary spread of radioactive contamination during the decontamination process,
- Examples of established response procedures not being consistently followed by radiological control personnel,
- Weakness with leadership at incident scenes where the WIPP Fire department is not the lead response agency; no one visibly took charge at the scene; and
- Improved team work and coordination between the MRT simulation cell, radiological control, operations, Fire Department Emergency Medical Technicians at the surface and in the ICP was observed. Specific examples are provided in the Conduct of Exercise section below.

Exercise Preparations

Prior to the exercise, the CORR team EP assessor attended a controller/evaluator/observer briefing. The briefing consisted of a review of the exercise plan, MSEL, and exercise messages. Personnel were attentive and asked question. Two exercise safety officers were assigned to monitor the safe conduct of the exercise at the WIPP facility. Following the briefing, the CORR exercise review team lead briefed the remainder of the CORR team.

Conduct of the Exercise

The exercise was initiated at 1150, and the CORR team observed the exercise at the CMR, ICP, event scene (underground and surface egress point), and the EOC. An exercise message provided to the CMRO required to CMRO to deviate from his normal procedurally driven message (see EA 12-ER4925-3-0, *CMR Initial Response Actions*). The CMRO misinterpreted the desired actions and failed to initiate the underground strobes. This failure to activate the strobes was not corrected by the controller. Additional information is provided in the Exercise Conduct section below. The CMRO and Facility Shift Engineer were undecided as to who was in charge in the absence of the FSM in the CMR. However, when the FSM returned to the CMR, an immediate "I am in charge" statement was made by the FSM. The FSM made a correct initial emergency categorization (EAL HS-OE-7) within fifteen minutes, as required by DOE O 151.1C. Emergency notifications were completed within the requisite thirty minutes for an "operational emergency not requiring classification."

Protective actions defined by the EAL were implemented. The underground was directed to evacuate and a conservative action to shelter-in-place was directed for the above-ground area of the WIPP. Response actions on the part of personnel in the underground were not as expected per WP 12-ER4911, *Underground Fire Response*, in that an immediate evacuation did not take place. Workers in the underground unnecessarily delayed evacuating the underground by not making an immediate egress to the waste hoist and continuing to conduct radiological surveys. The waste hoist operator in the mine was waiting for the RCTs to direct loading, and the RCTs were waiting for the waist hoist operator to tell them to load. No one took charge in the underground.

The EOC was activated at 1210 and declared operational at 1249. At 1302, EM responsibilities were transferred from the FSM to the CM. Periodic briefings to the EOC were provided by the CM. The CM displayed a strong command presence and emphasized use on conduct of operations communications, procedure use, and checklist use. The Consequence Assessment element of the EOC provided periodic updates. The EOC staff looked at other EALs that could be in play if the situation degraded. Given there was no release, no plume projections were made available. An initial media release was issued in a timely manner. Subsequent releases via Twitter were slow to be generated, approved, and released by the EOC. An attempt was made to approve thirteen tweets updating the status. As events overcame the information on the tweets, the Public Affairs Officer was directed to redo the tweet list. It took more than two hours for the tweets to be issued. The exercise was terminated at 1420.

The CORR team observed the following operations weakness in the CMR:

- Less than adequate control of access to the At the Controls area of the CMR and access control to the CMR.

The CORR team observed the following radiological control weaknesses:

- RCTs were pre-staged at a staffing level not commensurate with the scheduled work activities. To that end, the exercise did not portray a true off-shift response by the WIPP facility.

- RCTs did not use response procedures during the exercise and did not take appropriate actions at all times consistent with those procedures. By segregating the personnel on the waste hoist, they placed the contaminated personnel in the location from which the waste hoist operator must operate the waste hoist. This shows a decided lack of familiarity with the conditions that could be encountered in an emergency in the underground and displays a need for continued training and drills. Decontamination efforts would have spread contamination to non-contaminated areas of those being decontaminated. Surveys in some cases were conducted with the probe between two and three inches of the surface, which is far outside the required survey distance.
- RCTs did not have adequately supplied and staged emergency response kits to support postings areas, and provide equipment that is needed at an egress point.

The CORR team observed the following weakness in surface response.

- The Fire Department entered the salt hoist eye protection area with their helmet visors in the up position. A controller did not note or intervene in this action.

The CORR team observed the following weaknesses in underground response.

- Response actions on the part of personnel in the underground were not as expected per WP 12-ER4911, *Underground Fire Response*, in that an immediate evacuation did not take place. Workers in the underground unnecessarily delayed evacuating the underground by not making an immediate egress to the waste hoist and continuing to conduct radiological surveys. While the initial direction from the CMR to the workers in the HCA was to make an orderly egress from the area, the subsequent direction to evacuate should have changed the speed of their exiting the area, but it did not have that effect. It was noted that WP 12-ER4911 has a complicated set of instructions regarding the donning of respiratory protection, which instructs the employees to wait until smoke is visible before donning. The workers should in all instances involving fire don the appropriate respiratory protection and immediately evacuate.
- There was a demonstrated lack of command and control in the underground. The waste hoist operator in the mine was waiting for the RCTs to direct loading and the RCTs were waiting for the waist hoist operator to tell them to load. No one took charge in the underground. This unnecessarily delayed the evacuation of the mine. This behavior was displayed in other drills and exercises and is not being addressed in a timely manner by WIPP management.

The CORR team observed the following weakness in the ICP:

- The ICP displayed improved coordination and cooperation among all responding organizations. Because of rain, the ICP was relocated to inside a bus. This provided for a confined response area and considerable noise because of the radio traffic.

The CORR team observed the following weaknesses in the EOC:

- While most responders demonstrated fundamental conduct of operations principles in use of procedures, use of position and procedure support checklists, use of logs, and repeat-backs, it was not a consistent practice. The CM emphasized use of checklists and logs, but at the end of the exercise, the controller review identified inconsistent use of checklists at the request of the CORR team EP reviewer. This is a repeated observation.

- The EOC significant events status board and situation awareness status board were not effectively used. The updates to the boards was infrequent and delayed. A contributing factor to this was an inconsistent use of WebEOC logs by the EOC responders. Without entries into logs, the information is not available to populate into the significant events status board. This is a repeated observation.
- Media releases via Twitter were slow to be generated, approved, and released by the EOC. An attempt was made to approve thirteen tweets updating the status. As events overcame the information on the tweets, the Public Affairs Officer was directed to redo the tweet list. It took more than two hours for the tweets on the tweet list to be issued.

The CORR team observed the following weaknesses with exercise development, conduct, and controller/evaluator performance:

- An observer from the DOE CBFO distracted players. No controller action to stop this behavior was initiated.
- The CMR message inject and subsequent failure to initiate underground strobes should have warranted an controller intervention.
- The fidelity of the actual mine and CMR conditions with the exercise package initiating conditions needs to be institutionalized to ensure players and the evaluation team are operating with a valid set of initiating conditions This was not accomplished and, if used, would have caught the underground strobes being back in service and needing to be initiated.

<u>Post-Exercise Evaluations</u>

The team observed the following weaknesses with post-exercise evaluations during the exercise:

- There were some examples of players who evaluated their exercise performance as satisfactory and were not self-critical. In other areas, the hotwashes by the players were self-critical. This is an improvement over past exercise performance.
- The controller/evaluator organization evaluated the exercise during the formal objective review meeting as all objectives met with findings and opportunities for improvement. The overall nature of the evaluation was more self-critical.

This criterion was **partially** met.

3. *Records for each drill are adequate to demonstrate the effectiveness of completed drills and exercises, as well as plan for future drills and exercises.*

The following records were reviewed during the course of the CORR:

- *WIPP Bison 2016 Full Scale Exercise After Action Report*, R0
- *WIPP Bison 2 2016 Full Scale Exercise After Action Report*, R0
- RE-2016-05, *After Action Report for Real World Event (Argon Gas Leak)*, 8/16/2016
- DR-2015-49, *Drill After Action Report WIPP Site Evacuation – Wild Land*, 5/13/2015
- ACD-2016-22, *Abnormal Condition Drill After Action Report*, 7/12/2016
- ACD-2016-22, *Abnormal Condition Drill Plan CMR IVS*, 7/12/2016

- ACD-2016-06, *Abnormal Condition Drill Plan Radiological Monitoring System Alarm Response*, 3/2/2016
- DR-2016-39, *Drill After Action Report No Notice Underground Evacuation*, 8/2/2016

In general, the exercise reports offer a somewhat critical assessment. Observations from organizations outside of WIPP were of a more critical nature than those from the WIPP drill and exercise evaluation organization. This is an area for improvement. In reviewing the after action reports from the abnormal condition drills for 2016, it was noted that additional rigor is needed in reviewing participant performance and recommending actions needed to improve performance. It was noted in the review that not all of the instances where substandard performance was observed have Needs Improvement actions identified in the report. For example, for DR-2016-39, *No Notice Underground Evacuation*, the report shows two random workers did not know where the closest self-contained self-rescuer caches were located. Another example is ACD-2016-22, *CMR IVS Low D/Ps*, where the drill was stopped to correct conduct of operations substandard performance. No actions were noted to conduct the drill with additional crews or to determine if the substandard performance was an anomaly or a systemic problem. Given the deficient conduct of operations performance demonstrated during the BISON 2016 Full Scale Exercise by CMR personnel, there is a need for follow-up actions with all crews, especially with the new data point gained in the drill.

This criterion was **partially** met.

4. *Operations and operations support personnel demonstrate abnormal and emergency event response in emergency exercises, operational drills, tabletop drills, and/or field performance demonstrations, including effective interfaces with WIPP Project stakeholders and ERO.*

The following records were reviewed during the course of the CORR in regards to operational drills:

- WP 12-ER.12, R1, *WIPP Abnormal Condition Drill Program*
- ACD-2016-41, *Dock CAM Alarm Waste Handling Building*, 10/5/2016
- ACD-2016-43, *U/G CM Alarm*, 10/6/2015
- ACD-2016-42, *Loss of Ventilation*, 10/6/2016
- ACD-2016-45, *Decontamination Trailer*, 10/11/2016
- ACD-2016-06, *Abnormal Condition Drill Plan Radiological Monitoring System Alarm Response*, 3/2/2016

Two abnormal condition drills were observed, the Dock CAM Alarm in the WHB and the Decontamination Trailer, on October 6 and 11, respectively. The responses in the Dock CAM Alarm drill displayed issues with a lack of leadership among the responders, a lack of pre-staged resources for RCTs to post areas, the lack of response in a timely manner, as well as a failure to use PPE consistently when needed and a failure to correct incorrect PPE use among responders. Additionally, use of a public address announcement about the opening of a drill window should be considered in order to prevent inappropriate responses from personnel not directly participating in the drill.

For the Decontamination Trailer drill on October 11, the responders demonstrated an unfamiliarity with the equipment, and inconsistent survey practice. In addition, an abnormal condition drill was observed by the CORR team involving the failure of a forklift with a loaded waste pallet within 25 feet of the waste face. This is discussed in Objective OPS1.

In summation, the abnormal condition drill program is still in a growth stage, with the staff planning and conducting the drills learning and the responders becoming accustomed to running drills. Additional drills are needed to improve responder proficiency and to help the drill team to run more realistic drills. Additional rigor in the evaluation, identification, and assignment of needed improvement actions is warranted.

This criterion was met.

CONCLUSION

In summation, the EM exercise and drill program, along with the abnormal condition drill program, are still in a growth stage. The staff planning and conducting the drills are learning, and the responders are becoming accustomed to running exercises and drills. The CORR team has observed a continually improving trend in performance over the three observed emergency exercises and the drills. Additional planned exercises and drills will continue to improve responder proficiency and help the exercise and drill team to run more realistic exercises and drills. Additional rigor in the evaluation, identification, and assignment of needed improvement actions is warranted.

This objective was **partially** met. There was one finding identified. Satisfactorily addressing the finding will enable NWP to meet the objective fully.

FINDINGS

Pre-Start
EP2-PRE-1: Contrary to EA12ER4925-3-0 Revision 5, *CMR Initial Response Actions*, during the June exercise, the WIPP CMR Staff failed to activate the HEPA filtered ventilation in the CMR during a simulated unfiltered release from the underground. This failure could have resulted in unnecessary exposure of CMR personnel in a real event. Contrary to WP 12-ER4911, *Underground Fire Response*, personnel in the underground are consistently failing to evacuate the mine immediately. Additionally, WP 12-ER4911 has a complicated set of instructions regarding the donning of respiratory protection, which instructs the employees to wait until smoke is visible before donning. The workers should in all instances involving fire don the appropriate respiratory protection and immediately evacuate.

Post-Start
None

Assessed by:	Forest Holmes **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Environment Safety & Health**	Objective: ESH1 Date: 10/14/2016	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

ESH1: Personnel exhibit an awareness of public and worker safety and health and environmental protection requirements and, through their actions, demonstrate a high priority commitment to comply with those requirements. (CR 1, 5)

CRITERIA

1. WIPP has implemented applicable programs related to worker safety and health and environmental protection requirements.
2. Line and support managers, supervisors, and workers are aware of and understand safety and health requirements and controls that are implemented for WIPP waste emplacement operations in order to protect the public, worker, and environment. Personnel also demonstrate a high priority commitment to comply with those requirements.
3. Line and support managers, supervisors, and workers are able to discuss worker's rights and responsibilities and ISMS guiding principles in regard to worker safety and health, as described in *Worker Safety and Health Program Description* and the *Integrated Safety Management System Description*.
4. Line and support managers, supervisors, and workers understand the processes established and implemented to raise safety concerns without fear of retaliation, are knowledgeable of the established processes, and demonstrate willingness for their use.
5. Line and support managers, supervisors, and workers understand the processes established and implemented to pause or stop work when safety is in question, unexpected conditions are encountered, or procedures cannot be followed as written. They are knowledgeable of the established processes and demonstrate willingness for their use.

APPROACH

<u>Records Reviewed</u>

- 10 CFR 851, *Worker Safety and Health Assessment Implementation Matrix*, 12/15/2015
- 30 CFR, *Mine Safety and Health Administration*, Parts 47, 48, 49, 57, and 62, *Safety and Health Standards-Underground Metal and Nonmetal Mines*, 7/1/2014
- AA:09:00793, UFC: 1410.0, R0, *Central Monitoring System Equivalency*, 6/16/2009
- AA:16:01127, UFC:1410.00, R3, *U.S. Department of Energy Contractor Readiness Review Plan of Action for Commencement of Contact Handled Waste Emplacement Waste Isolation pilot Plant*, 9/14/2016

- CBFO:FED:JKF:LW: 16-0609, UFC 1410.00, *Approval of WIPP-EQ-2016-01, Request for an Equivalency Involving the use of Fire Screens for the Interim Ventilation System Filter Assembly*, August 5, 2016
- CBFO:OSH:GLS:KBS:09-0423; UFC:l410.00, *Approval for Central Monitoring System Equivalency Evaluation*, 6/24/2009
- DOE O 420.1C, Change 1, *Facility Safety*, 2/27/2015
- DOE/WIPP 04-3310, R6, *Waste Isolation Pilot Plant Environmental Policy Statement*, March 2016
- DOE-STD-1066-2012, *Fire Protection*, 12/5/2012
- EA 12IS 3002-3-0, R2, *Job Hazards Analysis Checklist*, 3/30/2016
- EA04AD3001-2-0, *Facility TSR and Administrative Controls Checklist*, 5/30/2016
- EA04AD3001-SR8, *R4, LCO Surveillance Data Sheet – LCO 3.1.1, Waste Handling Building Fire Suppression System*, 9/1/2016
- EA12FP3009-1-0, R0, *Monthly Waste Handling Building FPE Combustible Control Inspection*, 5/23/2016
- EA12FP3009-2-0, R0, *Monthly Exhaust Filter Building FPE Combustible Control Inspection*, 5/23/2016
- EA12FP3009-3-0, R0, *Monthly Underground FPE Combustible Control Inspection*, 5/23/2016
- EA12FP3009-4-0, R0, *Annual General Building FPE Combustible Control Inspection*, 5/23/2016
- Email, from Handfinger to Lucas, Subject: *Doors*, 10/12/2016
- Email, from Schultz to Handfinger, Subject: *Draft Door Mitigation Plan*,10/5/2016
- ESH-01-2016 through ESH-08-2016, *ESH Performance Indicators through August 2016*
- *Functional Area Managers' – Affidavit of Readiness for Commencement of Contact Handled Transuranic Waste Operations*, 9/29/2016
- *Hazardous Materials Management Plan*, R12, 7/7/2016
- *Hoisting & Rigging Committee Meeting Minutes*, 10/3/2016
- *Hoisting & Rigging Committee Meeting Minutes*, 9/12/2016
- *Integrated Safety Management Training slides*
- *Management Assessment of the NWP Respiratory Protection Program*, 10/10/2016
- MC 1.18, R0, *Safety Culture Monitoring Panel*, Draft A
- Memorandum, AA:16-01129, from Breidenbach to McCoy, Subject: *Approval of Readiness to Commence the Contractor Operational Readiness Review for the Commencement of Contact Handled Waste Emplacement at the Waste Isolation Pilot Plant*, 9/30/2016
- Memorandum, CO:15:02940, from Snow to Gonzales, Subject: *Submittal of Nuclear Safety Culture Program Plan Revision 0, Under Nuclear Waste Partnership LLC Contract DE-EM0001971*, 4/27/2015
- Mentoring Moment cards for heat stress, insect bites or stings, web sling inspection, always do a walkdown, proper PPE, and aerial lift fall protection
- MP 1.12, R13, *Worker Protection Policy*, 8/5/2015
- MP 1.28, R9, *Integrated Safety management*, 12/5/2015
- MP 1.41, R6, *Issues Management WIPP Form*, 7/26/2013
- MP 4.10, R0, *Exempt Overtime Policy*, 8/24/2016

- MP 4.5, R9, *Overtime Guidelines*, DRAFT
- MP 6.9, R0, *WIPP Underground Combustible Controls*, 3/30/2015
- SAF-116, R1, *Advanced Hazard Analysis (training package)*
- STD JHA-171, R6, *WP05-WH 1011 CH Waste Processing*, 9/28/2016
- STD JHA-304, R11, *CH Waste Downloading and Emplacement*, 7/20/2016
- STD JHA-304, R11, *WP05-WH 1025 Waste Downloading and Emplacement*, 9/28/2016
- STD JHA-439, R10, *WIPP General Job Hazard Analysis Checklist*, 8/25/2016
- STD JHA-1040, R6, *Ground Control JHA*, 7/11/2016
- *Waste Isolation Pilot Plant (WIPP) Industrial Hygiene Status Report and Assessment Strategy (SRAS)*, August 2016
- *Waste Isolation Pilot Plant (WIPP) Respirator Protection Program Evaluation*, 8/2014
- WF16-344, WIPP Form, *On 15 Mar during work on Door 41-N-119, the LO/TO control sheet specified the tagged position of several breakers as "OPEN. The actual indicated positions on the breaker are "OFF." This is contrary to step 2.3 in WP04-AD3011*, 3/23/2016
- WF16-350, WIPP Form, *Not all equipment at WIPP is labeled per NFPA 70E 130.5(D)*, 3/24/2016
- WF16-946, *Fire Protection Equivalency WIPP-EQ-2015-01 Actions*, 6/30/2016
- WF16-1589, WIPP Form, *Multiple egress Doors in the RH Bay are non-functional*, 9/23/2016
- WF16-425, WIPP Form, *During the outage on 2 Apr 15, a worker performing independent verification of the positioning of several switches… watched the switching operation from a close distance while it was occurring*, 4/7/2016
- WH-GUIDE-1, R23, *WIPP Operations Qualification Program Guide Book*, 6/14/2014
- *WIPP Fundamentals Handboo*k
- WIPP-023, R7, *Fire Hazard Analysis for the Waste Isolation Pilot Plant*, 8/31/2015
- WIPP-049, R2, *NFPA Codes and Standards Applicable for Use at the Waste Isolation Pilot Plant*, 10/5/2015
- WIPP-EQ-2015-01, R0, *Request for an Equivalency for NFPA 101, the Life Safety Code, and Alternative Egress Provisions within the WIPP Underground*, 7/8/2016
- WIPP-EQ-2016-01, R0, *Request for an Equivalency Involving the use of Fire Screens for the Interim Ventilation System Filter Assembly*, 7/27/2016
- WIPP-EX-2015-01, R0, *Request for an Exemption to U.S. Department of Energy Order 420.1C, Facility Safety Requirement for an Automatic Fire Suppression System for the WIPP Underground Facilities*, August 3, 2016
- WP 02-AR3001, R12, *Unreviewed Safety Question Determination*, 2/18/2016
- WP 02-AR3001, R13, *Unreviewed Safety Question Determination*, 9/30/2016 DRAFT
- WP 02-EC.06, R12, *WIPP Site Effluent and Hazardous Materials Sampling Plan*, 11/24/2015
- WP 02-EC.06, R12, *WIPP Site Effluent and Hazardous Materials Sampling Plan*, 11/24/2015
- WP 02-EC.07, R6, *Waste Isolation Pilot Plant Sustainable Procurement Plan*, 7/23/2016
- WP 02-EC.08, R6, *National Environmental Policy Act Compliance Plan*, 11/5/2012
- WP 02-EC.11, R12, *Waste Isolation Pilot Plant Pollution Prevention Program Plan*, 8/25/2016

- WP 02-EC.13, R9, *Environmental Compliance Walk Around and Assessment Plan*, 5/19/2015
- WP 02-EC3506, R10, *Environmental Incident Reporting*, DRAFT
- WP 02-EC3506, R9, *Environmental Incident Reporting*, 6/9/2015
- WP 02-EC3801, R16, *Environmental Compliance Review and NEPA Screening*, 8/24/2015
- WP 02-EM1012, R17, *Airborne Particulate Sampling*, 1/9/2015
- WP 02-EM1029, R0, *Special Soil Sampling*, 3/13/2014
- WP 02-EM1030, R0, *Special Vegetation Sampling*, 3/13/2014
- WP 02-EM1031, R1, *Event Evaluation Airborne Particulate Sampling*, 1/9/2015
- WP 02-PC3005, R0, *Hazardous Waste Facility Permit Notification and Reporting*, 10/21/2015
- WP 04-HO1003, R26, *Waste Handling Hoist Operations, Technical Procedure*, 8/23/2016
- WP 05-WH1011, R56, *CH Waste Processing*, 9/29/2016
- WP 05-WH1025, R18, *CH Waste Downloading and Emplacement*, 9/30/2016
- WP 05-WH1025, R18, *CH Waste Downloading and Emplacement*, 9/30/2016
- WP 05-WH1101, R28, *CH Surface Transuranic Mixed Waste Handling Area Inspections, Technical Procedure*, 9/2/2016
- WP 05-WH1407, R15, *6-Ton Bridge Cranes 41-T-151 A, B, C & D*, 7/14/2016
- WP 05-WH1410, R13, *Adjustable Center of Gravity Lift Fixture*, 8/10/2016
- WP 05-WH1412, R14, *CH Waste Handling Toyota Forklifts, Technical Procedure*, 9/7/2016
- WP 05-WH1603, R17-FR1, *CH TRU Underground Transporter*, 10/3/2016
- WP 08-NT1005, *RCRA Review Criteria for Waste Stream Profile Forms*, 9/28/2015
- WP 08-NT3020, R27, *TRU Waste Receipt*, 5/30/2016
- WP 12-FP.01, R14, *WIPP Fire Protection Program*, 8/3/2016
- WP 12-FP.20, R0, *WIPP Equivalency, Exemption and Variance Program*, 7/20/2016
- WP 12-FP.23, R0, *WIPP Baseline Needs Assessment*, 10/3/2016
- WP 12-FP0026, R10-FR3, *Weekly Surveillance for Fire Water Supply and Distribution System*, 10/3/2016
- WP 12-FP3001, R9, *Fire Protection Impairment*, 5/17/2016
- WP 12-FP3002, R16, *Hot Work Permits*, 5/17/2016
- WP 12-FP3003, R20, *Combustible Material Checks for the Waste Handling Building, Exhaust Filter Building, and Underground*, 9/14/2016
- WP 12-FP3006, R0, *Combustible Permitting for the WIPP Underground*, 10/28/2015
- WP 12-FP3009, R0, *Fire Protection Engineering Combustible Control Program Inspections*, 5/23/2016
- WP 12-IH.02, R13, *WIPP Industrial Hygiene Manual*, 5/30/2016
- WP 12-IH.02-1, R6, *WIPP Industrial Hygiene Program – Health Hazard Assessment*, 11/20/2012
- WP 12-IH.02-15, R2, *WIPP Industrial Hygiene Program – Heat Stress*, 6/16/2016
- WP 12-IH.02-2, R10, *WIPP Industrial Hygiene Program – Confined Spaces*, 10/5/2016

- WP 12-IH.02-4, R12, *WIPP Industrial Hygiene Program – Hazards Communications and Hazardous Materials Management Plan*, 7/7/2016
- WP 12-IH.02-5, R4, *WIPP Industrial Hygiene Program – Hearing Conservation*, 11/20/2012
- WP 12-IH.02-6, R8, *WIPP Industrial Hygiene Program – Respiratory Protection*, 1/14/2016
- WP 12-IH.02-8, R3, *WIPP Industrial Hygiene Program – Office and Industrial Ergonomics*, 5/13/2013
- WP 12-IH1004, R5, *Noise Surveys*, 9/21/2016
- WP 12-IH1200, R0, *Heat Stress*, 6/16/2016
- WP 12-IH1300, R0, *Confined Space Entry*, 10/5/2016
- WP 12-IS.01, R15, *Industrial Safety Program – Structure and Management*, 1/16/2013
- WP 12-IS.01-1, R7, *Industrial Safety Program – Barricades and Barriers*, 3/10/2016
- WP 12-IS.01-10, R4, *Industrial Safety Program – Fall Protection*, 9/9/2015
- WP 12-IS.01-15, R3, *Industrial Safety Program – Scaffolds*, 6/24/2015
- WP 12-IS.01-16, R0, *Industrial Safety Program – Hand Safety*, 1/23/2015
- WP 12-IS.01-18, R0, *Industrial Safety Program – Aerial Lifts and Elevating Work Platforms*, 3/25/2015
- WP 12-IS.01-3, R12, *Industrial Safety Program – Power and Hand Tools*, 2/27/2015
- WP 12-IS.01-4, R7, *Industrial Safety Program –Personal Protective Equipment*, 1/23/2015
- WP 12-IS.01-5, R12, *Industrial Safety Program – Walking and Working Surfaces and Ladders*, 2/9/2015
- WP 12-IS.01-7, R4, *Industrial Safety Program – General Electrical Safety*, 11/15/2012
- WP 12-IS.01-8, R10, *Industrial Safety Program – Vehicle Safety*, 4/27/2015
- WP 12-IS1832, R8, *Emergency Eyewash and Shower Equipment*, 8/25/2016
- WP 12-IS3001, R2, *Voluntary Protection Program Assessments*, 11/28/2012
- WP 12-IS3002, R14, *Job Hazard Analysis Performance and Development*, 3/30/2016
- WP 12-RC.01, R11, *Quality Assurance Program Plan for Sampling Emissions of Radionuclides to the Ambient Air at the Waste Isolation Pilot Plant*, 3/2/2015
- WP 12-RE3002, R5, *Radiological Engineering Off-Site Air Sampling*, 10/24/2014
- WP 15-GM.02, R10, *Worker Safety and Health Program Description*, 10/1/2015
- WP 15-GM.03, R9, *Integrated Safety Management System Description*, 12/1/2015
- WP 15-GM1003, R0, *Stop Work Proc*ess, 9/11/2015
- WP 15-HS.02, R9, *Occupational Health Program*, 2/9/2016
- WP 15-HS.05, R2, *Health Services Hearing Conservation Program*, 11/28/2012
- WP 8-NT3020, R27, *TRU Waste Receipt Management Control Procedure*, 5/30/2016
- WP-PS.2, R12, *Procedure Writer's Guide*, 12/18/2015

Interviews Conducted

- Advisory Scientist
- Assistant Deputy ESH Manager
- Battalion Chief Fire Captain

- Deputy ESH Manager
- Deputy Waste Operations Manager
- Electrical Safety Committee Chair
- ESH Manager
- Facility operations (4)
- Facility Operations Manager
- Fire Captain
- Fire Chief
- Fire Marshal
- Fire Protection Engineering Manager
- Fire Protection System Design Authority
- Fire Protection System Tester
- Fire Trainer
- Fire Protection Engineer (FPE) Lead
- FPEs (2)
- FSM
- Hoisting and Rigging Committee Chair
- Industrial Hygiene Manager
- Industrial Safety Manager
- Industrial Safety Manager
- Maintenance Manager
- Miner/Bolters (6)
- Nuclear Safety Engineer
- Operational Safety Engineers (2)
- Procedure Writer
- RCTs (4)
- Regulatory Environmental Services Manager
- Site Environmental Services Manager
- Waste Handler
- Waste Handling Engineers (2)
- Waste Handling Operators (8)
- Waste Handling Technicians (5)
- Waste Hoist Attendant
- Waste Operations Supervisors (2)
- Waste Shaft Tender
- See also the Interviews for SMP CRADs

Evolutions/Operations Witnessed

- 13-Ton Electric Forklift Pre-Operational Checks
- 6-Ton Bridge Crane Pre-Operations Inspection
- Corrective Action Review Board (CARB) meeting on 9/4/2016
- CMRO, Operator Shift Rounds
- CMRO, Shift Turnover

- CH Bay Off-Normal Event, CAM Alarm
- CH Waste Downloading and Emplacement
- CH Waste Downloading and Emplacement Pre-job Briefing
- CH Waste Downloading and Emplacement Post-job Briefing
- CH Waste Handling Toyota Forklift Pre-Operations Inspection
- CH Waste Processing
- CH waste stacking
- Daily T-0 Schedule Meeting
- Emergency Exercise Bison Final on 10/8/2016
- Establishment of Waste Handling Mode
- FSM, Shift Turnover
- Operations Drill, Underground Off-Normal Event, Toyota forklift failure while loaded with waste
- Receipt of Transuranic Package Transporter (TRUPACT) Waste Shipment
- Toyota forklift pre-checks
- TRUPACT Unloading
- Underground Access Initiation/Termination
- Underground transporter pre-checks
- Waste Handling Hoist Operation Pre-Job Briefing
- Waste Handling Hoist Pre-Operation Inspection
- WIPP Form Daily meetings on 10/4/2016 and 10/10/2016
- See also the Evolutions for SMP CRADs

DISCUSSION OF RESULTS

1. *WIPP has implemented applicable programs related to worker safety and health and environmental protection requirements.*

Interviews with ESH program managers, ESH SMEs, line and support managers, supervisors, and workers, as well as review of evidence files, program plans, procedures, and implementing documents, indicate that contract level requirements from 10 CFR 851, *Worker Safety and Health Program*, DOE P 450.4A, *Integrated Safety Management Policy*, DOE G 450.4-1C, *Occupational Exposure Assessment*, and 48 CFR 970.5223-1, *Integration of Environment, Safety, and Health into Work Planning and Execution*, were adequately flowed down into facility plans, procedures, and implementing documents.

WP 15-GM.02, *Worker Safety and Health Program Description*, describes the Worker Safety and Health plan for the project that complies with applicable requirements of 10 CFR 851. The WSHP also covers NWP personnel activities at waste generation sites and coordination with other WIPP organizations, such as the CCP and NWP subcontractors; excluding organizations that have direct contracts with DOE, such as the national labs, non-DOE funded work on the WIPP site, companies providing supply services to WIPP; and activities, such as transportation, radiological control, or nuclear explosives. Review of this document indicates that it provides adequate guidance and sufficiently describes the implementing procedures to cover the applicable functional areas of 10 CFR 851.

WP 15-GM.03, *Integrated Safety Management System Description*, describes the NWP ISMS in sufficient detail to demonstrate compliance with the core requirements and guiding principles of DOE P 450.4A and G 450.4-1C. This document identifies the implementing policies, plans, and procedures that define the ISMS and describes the integration of other SMPs that require balancing of priorities, such as the Environmental Management System, QA, Safeguards and Security, Communications and Training, and Voluntary Protection Program (VPP). Review of the program documents and interviews with management personnel for these other programs indicate sufficient knowledge of the integration processes between programs and the importance of their individual program within the framework of safety integration. Their overall knowledge of program integration, and the CORR team review of compliance within their individual programs, indicate sufficient integration for safe performance of waste emplacement and support activities. The current approved version of the ISMS Description document is Revision 9, dated 12/1/2015, although Revision 10 was submitted to DOE for review and approval. Revision 9 is somewhat dated regarding the performance objectives, measures, and commitments (POMCs) committed to for the FY16 period against the POMCs that are described in Revision 10 submitted to DOE. This is on account of the timing of submission and approval of the document, which significantly reduces the timeframe for performance of actions. Revision 10 was submitted earlier in 2016 to ensure sufficient time to execute the POMCs following DOE approval. It should also be noted that the current revision of WP 15-GM.03 located on the ESH page of WIPP Central is still Revision 6 from 2013.

Contract requirements for the ISH SMP were incorporated into facility-specific procedures. Chapter 17 of the WIPP DSA, R5b, addresses the requirements that drive ISH, four key attributes associated with ISH, a description of the organizational structure that supports ISH, and the programs and procedures that were established to implement ISH. An inconsistency between the WP 15-GM.02 and MP 1.12, *Worker Protection Policy*, was identified that involved selecting hazard controls. Evaluation of the ISH program and associated issues are addressed in Objective ISH1.

The Hoisting and Rigging Program is documented in WP12-IS.01-12, *Industrial Safety Program – Hoisting and Rigging*. The program implements nationally recognized requirements, such as DOE-STD-1910, *DOE Hoisting and Rigging Standard*; 29 CFR 1910, *OSHA General Industry Standards*; and 29 CFR 1926, *OSHA Construction Industrial Industry Standards*. One issue was identified with the WIPP Hoisting and Rigging Program related to consistency with the DOE Hoisting and Rigging Standard for definition of a critical lift. Evaluation of the hoisting and rigging program and associated issues are addressed in Objective ISH1.

The WIPP Respiratory Protection Program is documented in WP 12-IH.02-6, *WIPP Industrial Hygiene Program – Respiratory Protection*. The program includes provisions for medical evaluations, training, and fit testing. Two years ago, the ESH manager hired a consultant to perform an independent review of the program. Another program review was recently completed and was reviewed during the CORR. The program reviews were found to be comprehensive, and actions identified were incorporated into WIPP Forms. The detailed review of the respiratory protection program is covered in Objective ISH1.

The WIPP Hazardous Material Program is adequately documented in WP 12-IH.02, *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. The WIPP Medical Services program is addressed in WP 15-HS.02, *Occupational Health Program*, which describes how occupational health services, including medical surveillance, are provided. The WIPP Training Program is documented in WP 14-TR.01, *WIPP Training Program*. It establishes processes to ensure that workers receive required training including HMP program-related training.

The WIPP Environmental Program is addressed in various program plans and procedures, such as WP 02-EC.08, *National Environmental Policy Act Compliance Plan*; WP 02-EC.11, *Waste Isolation Pilot Plant Pollution Prevention Program Plan*; WP 02-EC3506, *Environmental Incident Reporting*; WP 02-EC3801, *Environmental Compliance Review and NEPA Screening*; and various sampling procedures. An interview with the RES Manager indicated that changes in the environmental program were initiated based on the NMED compliance order following issuance of the AIB reports, and included changes in reporting procedures and protocols (WP 02-PC3005 and 3506), chemical compatibility reviews for the waste at the generator sites (WP 08-NT1005), a procedure to perform event evaluations (WP 02-EM1012), and addition of low volume air monitors across the site. The AIB JONs related to the ESH program were determined to be closed acceptably. Review of the procedures and interviews with RES personnel indicate the program is effectively implemented in support of CH waste emplacement resumption.

This criterion was met.

2. *Line and support managers, supervisors, and workers are aware of and understand safety and health requirements and controls that are implemented for WIPP waste emplacement operations in order to protect the public, worker, and environment. Personnel also demonstrate a high priority commitment to comply with those requirements.*

Based on interviews with a sample of line and support managers, supervisors, and workers, as well as observation of work activities, there is strong evidence that personnel understand the requirements and controls necessary to perform waste emplacement and support activities in a safe and compliant manner, and they are willing to step back and pause work when conditions change or are uncertain, or work documents are confusing or cannot be performed as written.

Pre-job briefs and post-job reviews were excellent and were interactive with the employees. Topics such as hazards, controls, responsibilities, and stop work were covered during the pre-job briefing. The post-job review covered topics such as communication, work conditions, safety, adequacy of the procedure, and adequacy of the pre-job briefing. The participation and discussion among the workers was outstanding.

Review of work package execution and operations evolutions verified that workers understand the hazards associated with their tasks, adequately identify hazards during pre-job briefings and pre-job walkdowns, and revise work documents prior to executing the work. However, a noncompliance to 10 CFR 851 and WP IS3002, *Job Hazard Analysis Performance and*

Development, was identified regarding review and approval of JHA changes by ESH prior to work execution. This is discussed in Objective WPC1.

Implementation of ISH programs was evident during the CORR. For example, National Fire Protection Association (NFPA) 70E, *Standard for Electrical Safety in the Workplace*, posted warnings of potential arc flash hazards were affixed to electrical boxes throughout the underground and the WHB. Compressed gas cylinders in the WHB were properly labeled and properly secured. Pre-operational inspections were performed on forklifts prior to use. Forklifts were marked with their capacity ratings, and operators used seatbelts and spotters during lifting activities. The operators ensured clear communication with spotters prior to performing key parts of their lifts.

Workers in the CH Bay of the WHB demonstrated that they were able to access and obtain the online safety date sheets. The CORR team found no evidence indicating that hazardous materials were being stored in waste handling areas (i.e. CH Bay, RH Bay, and Waste Shaft Collar) or in the path used for waste transport, which is prohibited. The Industrial Safety/Industrial Hygiene (IS/IH) organization is reviewing and approving new chemical purchases as required.

Daily Industrial Hygiene air monitoring is performed in the underground using an MSHA-approved multi-gas detector as required. The methods used to perform this monitoring are in accordance with WP 12-IH1828, *MSHA Air Quality Monitoring*. The daily monitoring is documented on the *U/G Air Quality Round Sheet*, EA04AD3006.

Interviews and observations of activities of organizations that report under the National TRU Program and Regulatory and Environmental Services indicate that the environmental and TRU waste programs are adequate to support safe resumption of waste emplacement. Discussions with a variety of support managers, supervisors, and exempt workers confirmed a strong safety culture that is at least an order of magnitude above that which was experienced before the events of 2014, and is improving on a continuing basis. Personnel interviewed and observed are knowledgeable of the processes implemented to raise safety concerns without fear of retaliation, and to pause or stop work when safety is in question, unexpected conditions are encountered, or procedures cannot be followed as written. One example was an observed walkdown of waste storage areas where the SEC manager pulled out his *WIPP Fundamentals Handbook – Our Standards and Expectations* and used Human Performance tool “two-minute rule” hazard evaluation process, in order to brief what activities exactly were going to occur during the walkdown, to remind his people of the controls, and to make sure the CORR reviewer understood the hazards that could be encountered in the area. The main hazard was that rattlesnakes were recently observed in the area and everyone was cautioned to keep their eyes and ears open.

The National TRU Program and Regulatory and Environmental Services organizations perform very little field work. The Transportation organization receives TRUPACT shipments at WIPP gatehouse and the Environmental Compliance personnel perform environmental field sampling. During observance of a TRUPACT receipt, the Transportation Engineer stated a pre-job brief was not required because he was the only individual involved in the activity and was fully aware of the hazards of the activity. Although no field environmental field sampling was being

performed, the SEC manager provided copies of pre-job briefings that are performed and documented prior to sampling activity. This indicates a strong commitment to safety by both organizations.

This criterion was met.

3. *Line and support managers, supervisors, and workers are able to discuss worker's rights and responsibilities and ISMS guiding principles in regard to worker safety and health, as described in* Worker Safety and Health Program Description *and the* Integrated Safety Management System Description.

Worker rights and responsibilities for safety are described in WP 15-GM.02, section 12.0 and WP 15-GM.03, section 5.7, as well as implementing procedures, such as 15-GM1003, *Stop Work Proc*ess. Interviews with a sample of line and support managers, supervisors, and workers, as well as observation of work activities, indicate that personnel understand their rights to a safe and healthy work environment, to bring up safety issues without fear of reprisal, and to take a time out or request formal stop work when unknown hazards are identified, controls to perform work safely are not sufficient, work conditions change or are uncertain, or work documents are confusing or cannot be performed as written. Workers interviewed were able to discuss and explain pause/stop work processes, and all interviewed personnel indicated that they were not afraid to call a pause or stop to work activities when they felt there was a need. Workers indicated that management had been out in the field helping and coaching them. Worker involvement in developing the JHA for their activities received a mixed response, with some crews stating they were actively involved and others stating they were rarely involved.

Interviews with workers indicate that refresher training on the ISMS is needed, as a significant number of those interviewed could not discuss the core functions and guiding principles of ISM, nor identify the section in the *WIPP Fundamentals Handbook* where that information is contained. It was noted by the CORR team that WIPP has not had an ISM Verification since the start of the contract, which explains why a mass communication of the basics of ISMS has not been performed for WIPP employees. The ESH organization has developed an ISMS briefing package and presented it to the ESH organization as a pilot, but has not yet converted it into a training package for the WIPP workforce.

This criterion was met.

4. *Line and support managers, supervisors, and workers understand the processes established and implemented to raise safety concerns without fear of retaliation, are knowledgeable of the established processes, and demonstrate willingness for their use.*

NWP has several processes and mechanisms for reporting of safety concerns. These include pre-job briefings, job hazard walkdowns, employee concerns program, safety committees, and bargaining unit input. Interviews with a sample of line and support managers, supervisors, and workers, as well as observation of work activities, indicate that personnel understand the requirements and processes for pausing work when conditions change or are uncertain, or work documents are confusing or cannot be performed as written and for bringing up safety or other

concerns to management. Personnel indicated that they have no fear of reprisal for identifying issues and examples were identified during the observation of evolutions and attendance of meetings.

Workers raised two issues during the CORR interviews that they felt had not been adequately addressed. One issue involved non-functional doors in facility structures; personnel identified concerns with the operability of many doors in the facility, with one in particular that hindered egress. This issue was documented on a WIPP Form and is being tracked in the Issues Management Processing System. The second issue involved ground control in the underground. Underground Waste Handling workers reported that they were concerned about the mine roof, and the fact that roof bolting had not been maintained in some areas of the mine. They also reported that areas are marked where they are not allowed to enter without permission; however, when permission is requested, they are allowed to enter; they do not see how that makes it safe. They reportedly had no problem raising the issue with supervisors and lower level managers; however, they felt that senior management does not understand their concern or understand the issue, because these managers either do not work in the underground or are experienced and comfortable with mine operations. Discussion of these issues is covered in Objective ISH1.

This criterion was met.

5. *Line and support managers, supervisors, and workers understand the processes established and implemented to pause or stop work when safety is in question, unexpected conditions are encountered, or procedures cannot be followed as written. They are knowledgeable of the established processes and demonstrate willingness for their use.*

Procedure WP 15-GM1003, *Stop Work Authority*, adequately describes the expectations and processes for the entire stop work program, including use of the time out process. Interviews with a sample of line and support managers, supervisors, and workers, as well as observation of work activities, provide strong evidence that personnel understand the requirements and controls necessary to perform waste emplacement and support activities in a safe and compliant manner, and are willing to pause or stop work when conditions change or are uncertain, or work documents are confusing or cannot be performed as written.

This criterion was met.

CONCLUSION

The WIPP ESH program was evaluated through a combination of personnel interviews, document reviews, and observations/walkdowns and found to be sufficiently implemented to support resumption of waste emplacement activities. There are sufficient and compliant program documents, procedures, and processes as determined by the CORR. NWP personnel demonstrated awareness of and a high priority commitment to comply with public safety, worker safety and health, and environmental protection requirements.

This objective was met. There were no findings identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	Mike Montini **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Environment Safety & Health**	Objective: ESH2 Date: 10/14/2016	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

ESH2: Worker safety and health requirements of 10 CFR Part 851, *Worker Safety and Health Program*, were implemented within the facility. (CR 5)

CRITERIA

1. Worker safety and health requirements of 10 CFR Part 851, *Worker Safety and Health Program*, were implemented at WIPP.

APPROACH

Records Reviewed

- 10 CFR 851, *Worker Safety and Health Assessment Implementation Matrix*, 12/15/2015
- 30 CFR, *Mine Safety and Health Administration*, Parts 47, 48, 49, 57, and 62, *Safety and Health Standards-Underground Metal and Nonmetal Mines*, 7/1/2014
- AA:09:00793, UFC: 1410.0, R0, *Central Monitoring System Equivalency*, 6/16/2009
- AA:16:01127, UFC:1410.00, R3, *U.S. Department of Energy Contractor Readiness Review Plan of Action for Commencement of Contact Handled Waste Emplacement Waste Isolation pilot Plant*, 9/14/2016
- CBFO:FED:JKF:LW: 16-0609, UFC 1410.00, *Approval of WIPP-EQ-2016-01, Request for an Equivalency Involving the use of Fire Screens for the Interim Ventilation System Filter Assembly*, August 5, 2016
- CBFO:OSH:GLS:KBS:09-0423; UFC:l410.00, *Approval for Central Monitoring System Equivalency Evaluation*, June 24, 2009
- DOE O 420.1C, Change 1, *Facility Safety*, 2/27/2015
- DOE/WIPP 04-3310, R6, *Waste Isolation Pilot Plant Environmental Policy Statement*, March 2016
- DOE-STD-1066-2012, *Fire Protection*, 12/5/2012
- EA 12IS 3002-3-0, R2, *Job Hazards Analysis Checklist*, 3/30/2016
- EA04AD3001-2-0, *Facility TSR and Administrative Controls Checklist*, 5/30/2016
- EA04AD3001-SR8, *R4, LCO Surveillance Data Sheet – LCO 3.1.1, Waste Handling Building Fire Suppression System*, 9/1/2016
- EA12FP3009-1-0, R0, *Monthly Waste Handling Building FPE Combustible Control Inspection*, 5/23/2016
- EA12FP3009-2-0, R0, *Monthly Exhaust Filter Building FPE Combustible Control Inspection*, 5/23/2016

- EA12FP3009-3-0, R0, *Monthly Underground FPE Combustible Control Inspection*, 5/23/2016
- EA12FP3009-4-0, R0, *Annual General Building FPE Combustible Control Inspection*, 5/23/2016
- Email, from Handfinger to Lucas, Subject: *Doors*, 10/12/2016
- Email, from Schultz to Handfinger, Subject: *Draft Door Mitigation Plan*,10/5/2016
- ESH-01-2016 through ESH-08-2016, *ESH Performance Indicators through August 2016*
- *Functional Area Managers' – Affidavit of Readiness for Commencement of Contact Handled Transuranic Waste Operations*, 9/29/2016
- *Hazardous Materials Management Plan*, Rev. 12, 7/7/2016
- *Hoisting & Rigging Committee Meeting Minutes*, 10/3/2016
- *Hoisting & Rigging Committee Meeting Minutes*, 9/12/2016
- *Integrated Safety Management Training slides*
- *Management Assessment of the NWP Respiratory Protection Program*, 10/10/2016
- MC 1.18, R0, *Safety Culture Monitoring Panel*, Draft A
- Memorandum, AA:16-01129, from Breidenbach to McCoy, Subject: *Approval of Readiness to Commence the Contractor Operational Readiness Review for the Commencement of Contact Handled Waste Emplacement at the Waste Isolation Pilot Plant*, 9/30/2016
- Memorandum, CO:15:02940, from Snow to Gonzales, Subject: *Submittal of Nuclear Safety Culture Program Plan Revision 0, Under Nuclear Waste Partnership LLC Contract DE-EM0001971*, 4/27/2015
- Mentoring Moment cards for heat stress, insect bites or stings, web sling inspection, always do a walkdown, proper PPE, and aerial lift fall protection
- MP 1.12, R13, *Worker Protection policy*, 8/5/2015
- MP 1.28, R9, *Integrated Safety management*, 12/5/2015
- MP 1.41, R6, *Issues Management WIPP Form*, 7/26/2013
- MP 4.10, R0, *Exempt Overtime Policy*, 8/24/2016
- MP 4.5, R9, *Overtime Guidelines*, DRAFT
- MP 6.9, R0, *WIPP Underground Combustible Controls*, 3/30/2015
- SAF-116, R1, *Advanced Hazard Analysis (training package)*
- STD JHA-171, R6, *WP05-WH 1011 CH Waste Processing*, 9-28-16
- STD JHA-304, R11, *CH Waste Downloading and Emplacement*, 7/20/2016
- STD JHA-304, R11, *WP05-WH 1025 Waste Downloading and Emplacement*, 9/28/2016
- STD JHA-439, R10, *WIPP General Job Hazard Analysis Checklist*, 8/25/2016
- STD JHA-1040, R6, *Ground Control JHA*, 7/11/2016
- *Waste Isolation Pilot Plant (WIPP) Industrial Hygiene Status Report and Assessment Strategy (SRAS)*, August 2016
- *Waste Isolation Pilot Plant (WIPP) Respirator Protection Program Evaluation*, 8/2014
- WF16-1589, *Multiple egress Doors in the RH Bay are non-functional*, 9/23/2016
- WF16-344, *On 15 Mar during work on Door 41-N-119, the LO/TO control sheet specified the tagged position of several breakers as "OPEN. The actual indicated positions on the breaker are "OFF." This is contrary to step 2.3 in WP04-AD3011*, 3/23/2016

- WF16-350, *Not all equipment at WIPP is labeled per NFPA 70E 130.5(D)*, 3/24/2016
- WF16-425, *During the outage on 2 Apr 15, a worker performing independent verification of the positioning of several switches… watched the switching operation from a close distance while it was occurring*, 4/7/2016
- WF16-946, *Fire Protection Equivalency WIPP-EQ-2015-01 Actions*, 6/30/2016
- WH-GUIDE-1, R23, *WIPP Operations Qualification Program Guide Book*, 6/14/2014
- *WIPP Fundamentals Handbook*
- WIPP-023, R7, *Fire Hazard Analysis for the Waste Isolation Pilot Plant*, 8/31/2015
- WIPP-049, R2, *NFPA Codes and Standards Applicable for Use at the Waste Isolation Pilot Plant*, 10/5/2015
- WIPP-EQ-2015-01, R), *Request for an Equivalency for NFPA 101, the Life Safety Code, and Alternative Egress Provisions within the WIPP Underground*, 7/8/2016
- WIPP-EQ-2016-01, R0, *Request for an Equivalency Involving the use of Fire Screens for the Interim Ventilation System Filter Assembly*, 7/27/2016
- WIPP-EX-2015-01, R0, *Request for an Exemption to U.S. Department of Energy Order 420.1C, Facility Safety Requirement for an Automatic Fire Suppression System for the WIPP Underground Facilities*, August 3, 2016
- WP 02-AR3001, R12, *Unreviewed Safety Question Determination*, 2/18/2016
- WP 02-AR3001, R13, *Unreviewed Safety Question Determination*, 9/30/2016 DRAFT
- WP 02-EC.06, R12, *WIPP Site Effluent and Hazardous Materials Sampling Plan*, 11/24/2015
- WP 02-EC.07, R6, *Waste Isolation Pilot Plant Sustainable Procurement Plan*, 7/23/2016WP 02-EC.06, R12, *WIPP Site Effluent and Hazardous Materials Sampling Plan*, 11/24/2015
- WP 02-EC.08, R6, *National Environmental Policy Act Compliance Plan*, 11/5/2012
- WP 02-EC.11, R12, *Waste Isolation Pilot Plant Pollution Prevention Program Plan*, 8/25/2016
- WP 02-EC.13, R9, *Environmental Compliance Walk Around and Assessment Plan*, 5/19/2015
- WP 02-EC3506, R10, *Environmental Incident Reporting*, DRAFT
- WP 02-EC3506, R9, *Environmental Incident Reporting*, 6/9/2015
- WP 02-EC3801, R16, *Environmental Compliance Review and NEPA Screening*, 8/24/2015
- WP 02-EM1012, R17, *Airborne Particulate Sampling*, 1/9/2015
- WP 02-EM1029, R0, *Special Soil Sampling*, 3/13/2014
- WP 02-EM1030, R0, *Special Vegetation Sampling*, 3/13/2014
- WP 02-EM1031, R1, *Event Evaluation Airborne Particulate Sampling*, 1/9/2015
- WP 02-PC3005, R0, *Hazardous Waste Facility Permit Notification and Reporting*, 10/21/2015
- WP 04-HO1003, R26, *Waste Handling Hoist Operations, Technical Procedure*, 8/23/2016
- WP 05-WH1011, R56, *CH Waste Processing*, 9/29/2016
- WP 05-WH1025, R18, *CH Waste Downloading and Emplacement*, 9/30/2016
- WP 05-WH1101, R28, *CH Surface Transuranic Mixed Waste Handling Area Inspections, Technical Procedure*, 9/2/2016

- WP 05-WH1407, R15, *6-Ton Bridge Cranes 41-T-151 A, B, C & D*, 7/14/2016
- WP 05-WH1410, R13, *Adjustable Center of Gravity Lift Fixture*, 8/10/2016
- WP 05-WH1412, R14, *CH Waste Handling Toyota Forklifts, Technical Procedure*, 9/7/2016
- WP 05-WH1603, R17-FR1, *CH TRU Underground Transporter*, 10/3/2016
- WP 08-NT1005, *RCRA Review Criteria for Waste Stream Profile Forms*, 9/28/2015
- WP 08-NT3020, R27, *TRU Waste Receipt*, 5/30/2016
- WP 12-FP.01, R14, *WIPP Fire Protection Program*, 8/3/2016
- WP 12-FP.20, R0, *WIPP Equivalency, Exemption and Variance Program*, 7/20/2016
- WP 12-FP.23, R0, *WIPP Baseline Needs Assessment*, 10/3/2016
- WP 12-FP0026, R10-FR3, *Weekly Surveillance for Fire Water Supply and Distribution System*, 10/3/2016
- WP 12-FP3001, R9, *Fire Protection Impairment*, 5/17/2016
- WP 12-FP3002, R16, *Hot Work Permits*, 5/17/2016
- WP 12-FP3003, R20, *Combustible Material Checks for the Waste Handling Building, Exhaust Filter Building, and Underground*, 9/14/2016
- WP 12-FP3006, R0, *Combustible Permitting for the WIPP Underground*, 10/28/2015
- WP 12-FP3009, R0, *Fire Protection Engineering Combustible Control Program Inspections*, 5/23/2016
- WP 12-IH.02, R13, *WIPP Industrial Hygiene Manual*, 5/30/2016
- WP 12-IH.02-1, R6, *WIPP Industrial Hygiene Program – Health Hazard Assessment*, 11/20/2012
- WP 12-IH.02-15, R2, *WIPP Industrial Hygiene Program – Heat Stress*, 6/16/2016
- WP 12-IH.02-2, R10, *WIPP Industrial Hygiene Program – Confined Spaces*, 10/5/2016
- WP 12-IH.02-4, R12, *WIPP Industrial Hygiene Program – Hazards Communications and Hazardous Materials Management Plan*, 7/7/2016
- WP 12-IH.02-5, R4, *WIPP Industrial Hygiene Program – Hearing Conservation*, 11/20/2012
- WP 12-IH.02-6, R8, *WIPP Industrial Hygiene Program – Respiratory Protection*, 1/14/2016
- WP 12-IH.02-8, R3, *WIPP Industrial Hygiene Program – Office and Industrial Ergonomics*, 5/13/2013
- WP 12-IH1004, R5, *Noise Surveys*, 9/21/2016
- WP 12-IH1200, R0, *Heat Stress*, 6/16/2016
- WP 12-IH1300, R0, *Confined Space Entry*, 10/5/2016
- WP 12-IS.01, R15, *Industrial Safety Program – Structure and Management*, 1/16/2013
- WP 12-IS.01-1, R7, *Industrial Safety Program – Barricades and Barriers*, 3/10/2016
- WP 12-IS.01-10, R4, *Industrial Safety Program – Fall Protection*, 9/9/2015
- WP 12-IS.01-15, R3, *Industrial Safety Program – Scaffolds*, 6/24/2015
- WP 12-IS.01-16, R0, *Industrial Safety Program – Hand Safety*, 1/23/2015
- WP 12-IS.01-18, R0, *Industrial Safety Program – Aerial Lifts and Elevating Work Platforms*, 3/25/2015
- WP 12-IS.01-3, R12, *Industrial Safety Program – Power and Hand Tools*, 2/27/2015

- WP 12-IS.01-4, R7, *Industrial Safety Program –Personal Protective Equipment*, 1/23/2015
- WP 12-IS.01-5, R12, *Industrial Safety Program – Walking and Working Surfaces and Ladders*, 2/9/2015
- WP 12-IS.01-7, R4, *Industrial Safety Program – General Electrical Safety*, 11/15/2012
- WP 12-IS.01-8, R10, *Industrial Safety Program – Vehicle Safety*, 4/27/2015
- WP 12-IS1832, R8, *Emergency Eyewash and Shower Equipment*, 8/25/2016
- WP 12-IS3001, R2, *Voluntary Protection Program Assessments*, 11/28/2012
- WP 12-IS3002, R14, *Job Hazard Analysis Performance and Development*, 3/30/2016
- WP 12-RC.01, R11, *Quality Assurance Program Plan for Sampling Emissions of Radionuclides to the Ambient Air at the Waste Isolation Pilot Plant*, 3/2/2015
- WP 12-RE3002, R5, *Radiological Engineering Off-Site Air Sampling*, 10/24/2014
- WP 15-GM.02, R10, *Worker Safety and Health Program Description*, 10/1/2015
- WP 15-GM.03, R9, *Integrated Safety Management System Description*, 12/1/2015
- WP 15-GM1003, R0, *Stop Work Proc*ess, 9/11/2015
- WP 15-HS.02, R9, *Occupational Health Program*, 2/9/2016
- WP 15-HS.04, *R3, NWP Workplace Substance Abuse Plan*
- WP 15-HS.05, R2, *Health Services Hearing Conservation Program*, 11/28/2012
- WP 8-NT3020, R27, *TRU Waste Receipt Management Control Procedure*, 5/30/2016
- WP-PS.2, R12, *Procedure Writer's Guide*, 12/18/2015

Interviews Conducted

- Advisory Scientist
- Assistant Deputy ESH Manager
- Battalion Chief Fire Captain
- Deputy ESH Manager
- Deputy Waste Operations Manager
- Electrical Safety Committee Chair
- ESH Manager
- Facility operations (4)
- Fire Captain
- Fire Chief
- Fire Marshal
- Fire Protection Engineering Manager
- Fire Protection System Design Authority
- Fire Protection System Tester
- Fire Trainer
- FPE Lead
- FPEs (2)
- FSM
- Hoisting and Rigging Committee Chair
- Industrial Hygiene Manager
- Industrial Safety Manager

- Maintenance Manager
- Miner/Bolters (6)
- Nuclear Safety Engineer
- Operational Safety Engineers (2)
- Procedure Writer
- RCTs (4)
- Regulatory Environmental Services Manager
- Site Environmental Services Manager
- Waste Handler
- Waste Handling Engineers (2)
- Waste Handling Operators (8)
- Waste Handling Technicians (5)
- Waste Hoist Attendant
- Waste Operations Supervisors (2)
- Waste Shaft Tender

Evolutions/Operations Witnessed

- 13-Ton Electric Forklift Pre-Operational Checks
- 6-Ton Bridge Crane Pre-Operations Inspection
- Above-ground facility tour
- CARB meeting on 9/4/2016
- CMRO, Operator Shift Rounds
- CMRO, Shift Turnover
- CH Bay Off-Normal Event, CAM Alarm
- CH Waste Downloading and Emplacement
- CH Waste Downloading and Emplacement Post-Job Briefing
- CH Waste Downloading and Emplacement Pre-Job Briefing
- CH Waste Handling Toyota Forklift Pre-Operations Inspection
- CH Waste Processing
- CH waste stacking
- Daily T-0 Schedule Meeting
- Diesel and electric fire pump walkdown
- Emergency Exercise Bison Final on 10/8/2016
- Establishment of Waste Handling Mode
- FSM, Shift Turnover
- IC Maintenance Shop (aboveground)
- Observed inspection, testing, and maintenance
- Operations Drill, Underground Off-Normal Event, Toyota forklift failure while loaded with waste
- Receipt of TRUPACT Waste Shipment
- Toyota forklift pre-checks
- TRUPACT Unloading
- Underground Access Initiation/Termination

- Underground facility tour
- Underground transporter pre-checks
- Waste Handling Hoist Operation Pre-Job Briefing
- Waste Handling Hoist Pre-Operation Inspection
- Weld Shop (underground)
- WIPP Form Daily meetings on 10/4/2016 and 10/10/2016

DISCUSSION OF RESULTS

1. *Worker safety and health requirements of 10 CFR Part 851,* Worker Safety and Health Program*, were implemented at WIPP.*

Review of evidence files, program plans, procedures, and implementing documents indicates that the worker safety and requirements from 10 CFR 851 were adequately flowed down into facility plans, procedures, and other implementing documents. Observation of work evolutions and interviews with managers, ESH personnel, line and support managers, supervisors, and workers demonstrated that the 10 CFR 851 program requirements were implemented and are effective in providing a safe and healthy work environment for WIPP employees. Compliance to the 10 CFR 851 program requirements is further documented in Objectives ISH1, HMP1, and FP1. Although there are findings identified in these Objectives, they do not constitute a complete failure to implement the 10 CFR 851 program requirements.

WP 15-GM.02, *Worker Safety and Health Program Description*, describes the Worker Safety and Health plan for the project that complies with applicable requirements of 10 CFR 851. The WSHP also covers NWP personnel activities at waste generation sites and coordination with other WIPP organizations, such as the CCP and NWP subcontractors; excluding organizations that have direct contracts with DOE, such as the national labs, non-DOE funded work on the WIPP site, companies providing supply services to WIPP; and activities, such as transportation, radiological control, or nuclear explosives. Review of this document indicates it provides adequate guidance and sufficiently describes the implementing procedures to cover the applicable functional areas of 10 CFR 851.

Interviews with line and support managers, supervisors, and workers, as well as observation of work activities, provide strong evidence that personnel understand work requirements and hazard controls necessary to safely perform waste emplacement and support activities, and are willing to step back when conditions change or are uncertain, or work documents are confusing or cannot be performed as written. Witnessed pre-job briefs and post-job reviews were excellent. Topics such as hazards, controls, responsibilities, and stop work were covered by the person-in-charge. Post-job reviews covered topics such as communication, work conditions, safety, adequacy of the work documents, and adequacy of the pre-job briefing. The participation and discussion among the workers was outstanding. The witnessed evolutions verified that workers understand the hazards associated with their tasks, adequately identify hazards during pre-job briefings and pre-job walkdowns, and revise work documents prior to executing the work. A noncompliance to 10 CFR 851 and WP IS3002, *Job Hazard Analysis Performance and Development*, was identified regarding review and approval of JHA changes by ESH prior to work execution. This is discussed in Objective WPC1.

The Industrial Safety requirements of 10 CFR 851 are addressed in WP 15-GM.02, *Worker Safety and Health Program Description* and WP 12-IS.01, R15, *Industrial Safety Program – Structure and Management.* This Industrial Safety program document is augmented by subprogram documents addressing specific topics, such as electrical safety, vehicle safety, and hand safety. Review of these documents indicates that the requirements of 10 CFR 851 are adequately addressed. The core Industrial Safety program is managed as an operational service, but implementation of the program is integrated into the planning and execution of all site work. Interviews with line and support managers, supervisors, and workers, as well as observation of work activities, indicate that personnel understand the requirements of the Industrial Safety program and exhibit a strong level of compliance. Further discussion on the compliance to the Industrial Safety program requirements is provided in Objective ISH1.

The HMP program is documented in the WP 12-IH.02, *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 the Occupational Health Program. WP 15-HS.02 also describes how occupational health services, including medical surveillance, are provided. Review of HMP plans, procedures, and implementing documents indicates that the requirements of 10 CFR 851 are adequately addressed. Based on work activity observations, document reviews, interviews, and facility walkdowns, it was evident that HMP procedures are effectively implemented. One finding was identified in HMP1 relating to the lack of a formal process or implementing procedure to provide consistent approved methods for performing qualitative exposure assessments (QEAs), and a lack of documenting such assessments. This finding does not constitute a complete lack of implementation to 10 CFR 851 requirements. Further discussion on the compliance to the hazardous material program requirements is provided in Objective HMP1.

The fire protection program requirements of 10 CFR 851 are addressed in WP 12-FP.01, *Fire Protection Program*, and other fire protection program procedures as described in WP 12-FP.01. WP 12-FP.28, *Fire Protection Program Implementation Plan and Procedures*, and the fire protection code of record, as modified by the contract, forms the design basis requirements for fire protection systems at the WIPP facility. A review of select fire protection procedures, interviews with line managers and fire protection program personnel, and facility walkdowns indicate those procedures were effectively implemented. SMP KEs identified in DSA R5b were found to be adequately implemented.

Three prerequisites related to fire protection have not been completed, and remain open as identified in the manageable list of open items (the AHJ has not approved the underground fire suppression system exemption request, installation of automatic vehicle fire suppression systems is not complete, and automatic fire suppression systems installed in the high combustible loading area are not fully operational). None of the three open items constitute a lack of implementation to 10 CFR 851 requirements. Further discussion on the compliance to the fire protection program requirements is provided in Objective FP1.

This criterion was met.

CONCLUSION

Review of evidence files, program plans, procedures, and implementing documents indicates that, with limited exception noted in two findings (HMP1-POST-1 and RP1-POST-3), the worker safety and requirements from 10 CFR 851 were adequately flowed down into facility plans, procedures, and other implementing documents. Observation of work evolutions and interviews with managers, ESH personnel, line and support managers, supervisors, and workers demonstrated that the 10 CFR 851 program requirements were implemented and are effective in providing a safe and healthy work environment for WIPP employees.

This objective was met. There were no findings identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	Cheryl Lucas **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Fire Protection**	Objective: FP1 Date: 10/14/2016	OBJECTIVE MET	
		YES ☐	NO ☒

OBJECTIVE:

FP1: Line management has established and implemented a Fire Protection SMP to ensure safe accomplishment of work. The level of knowledge of fire protection managers and staff is adequate based on review of examinations and examination results, interviews, and observation of operational demonstrations. (CR 1, 4)

CRITERIA

1. Fire protection contract requirements are flowed into facility-specific procedures.
2. Fire protection procedures are effectively implemented in support of the facility, including:
    - Routine maintenance and inspection of non-waste handling vehicles in the Underground is accomplished for leaks and accumulation of combustible materials (fire protection) (SMP KE 11-1).
    - Formal FPE combustible control inspections are accomplished, including inspection criteria, specified frequency of inspections, documentation of identified issues, issue disposition, tracking and trending of issues, and performance metrics (SMP KE 11-2).
    - Placement of fuel barrier of absorbent materials at the static waste face is accomplished when waste emplacement or retrieval has not occurred for a period of 10 days. (SMP KE 11-4).
    - Fire prevention/suppression controls include the following (SMP KE 11-5):
        a. 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.
        b. 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.
        c. Ignition sources (e.g., hot work, designated smoking areas, portable heaters, electrical equipment) are controlled in accordance with the WIPP fire protection program and Design Control Program.
        d. 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).
3. An approved Fire Hazard Analysis is established and implemented.

4. Commitments, compensatory measures and COAs associated with fire protection exemptions and equivalencies are effectively implemented.
5. Sufficient qualified personnel are available to effectively implement the fire protection program in support of the facility.
6. The level of knowledge of managers and staff responsible for administering and implementing the fire protection program is adequate based on review of records, interviews, and observation of operational demonstrations. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.
7. WIPP has adequate facilities, and equipment is available to ensure that fire protection support and services are adequate for safe facility operation.
8. AIB JONs related to fire protection were addressed through effective corrective actions for the fire protection SMP.

APPROACH

Records Reviewed

- 30 CFR 57, *Mine Safety and Health Administration*, Parts 47, 48, 49, 57, and 62, *Safety and Health Standards-Underground Metal and Nonmetal Mines*, 7/1/2014
- AA:09:00793, UFC: 1410.0, R0, *Central Monitoring System Equivalency*, 6/16/2009
- AA:16:01098, *Request for an Equivalency for NFPA 101, the Life Safety Code, and Alternative Egress Provisions within the WIPP Underground*, 7/8/2016
- AA:16:01080, R14, *Contract DE-EM0001971, WIPP Fire Protection Program, WP 12-FP.01*, 6/17/2016
- AA:16:01107, *Request for an Equivalency Involving the use of the Fire Screens for the Interim Ventilation System Filter Assembly*, 7/27/2016
- AA:16:01112, *Completion of Fire Protection Program Conditions of Approval under Nuclear Waste Partnership, LLP Prime Contract DE-EM0001971*, 8/8/2016
- AA:16:01113, *Request for an Exemption to the United States Department of Energy Order 420.1C, Facility Safety Requirement for an Automatic Fire Suppression System for the WIPP Underground Facilities*, WIPP-EX-2015-01, 8/3/2016
- AIB JONs 8, 9, 13, 20, 21
- CBFO:FED:JKF:LW: 16-0609, UFC 1410.00, *Approval of WIPP-EQ-2016-01, Request for an Equivalency Involving the use of Fire Screens for the Interim Ventilation System Filter Assembly*, 8/5/2016
- CBFO:FED:RDE:LW: 16-0608, UFC 1410.00, *Approval of Contract No. DE-EM0001971, Submittal of NWP WIPP Fire Protection Program, WP 12-FP.01 Rev. 14*, 7/26/2016
- CBFO:FED:RDE:LW: 16-0611, UFC 1410.00, *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*, 9/19/2016
- CBFO:OSH:GLS:KBS:09-0423; UFC:l410.00, *Approval for Central Monitoring System Equivalency Evaluation*, 6/24/2009
- DOE O 420.1C, Change 1, *Facility Safety*, 2/27/2015
- DOE-STD-1066-2012, *Fire Protection*, 12/5/2012

- EA04AD3001-SR8, *R4, LCO Surveillance Data Sheet – LCO 3.1.1, Waste Handling Building Fire Suppression System*, 9/1/2016
- EA12FP3009-1-0, R0, *Monthly Waste Handling Building FPE Combustible Control Inspection*, 5/23/2016
- EA12FP3009-2-0, R0, *Monthly Exhaust Filter Building FPE Combustible Control Inspection*, 5/23/2016
- EA12FP3009-3-0, R0, *Monthly Underground FPE Combustible Control Inspection*, 5/23/2016
- EA12FP3009-4-0, R0, *Annual General Building FPE Combustible Control Inspection*, 5/23/2016
- EM:15:01158, *Fire Hazard Analysis Related Actions*
- EN: 16:00064, *Fire Protection / Fire System Technician Qualifications*, 8/3/2016
- EN: 16:00066, *Fire Protection Engineer Qualifications*, 8/5/2016
- EN: 16:00070, *Cognizant Engineering Reaffirmation of Qualification*, 8/15/2016
- FPE-12-01, *Fire Protection Engineer Qualification Cards*
- MP 6.9, R0, *WIPP Underground Combustible Controls*, 3/30/2015
- Phase 2 JON 33, 34, 35, 36
- WF16-946, *Fire Protection Equivalency WIPP-EQ-2015-01 Actions*, 6/30/2016
- WIPP-023, R7, *Fire Hazard Analysis for the Waste Isolation Pilot Plant*, 8/31/2015
- WIPP-049, R2, *NFPA Codes and Standards Applicable for Use at the Waste Isolation Pilot Plant*, 10/5/2015
- WIPP-052, *Project Fire Hazard Analysis for the WIPP Interim Ventilation System*
- WIPP-EQ-2015-01, R0, *Request for an Equivalency for NFPA 101, the Life Safety Code, and Alternative Egress Provisions within the WIPP Underground*, 7/8/2016
- WIPP-EQ-2016-01, R0, *Request for an Equivalency Involving the use of Fire Screens for the Interim Ventilation System Filter Assembly*, 7/27/2016
- WIPP-EX-2015-01, R0, *Request for an Exemption to U.S. Department of Energy Order 420.1C, Facility Safety Requirement for an Automatic Fire Suppression System for the WIPP Underground Facilities*, 8/3/2016
- WP 12-FP.01, R14, *WIPP Fire Protection Program*, 8/3/2016
- WP 12-FP.20, R0, *WIPP Equivalency, Exemption and Variance Program*, 7/20/2016
- WP 12-FP.23, R0, *WIPP Baseline Needs Assessment*, 10/3/2016
- WP 12-FP0026, R10-FR3, *Weekly Surveillance for Fire Water Supply and Distribution System*, 10/3/2016
- WP 12-FP3001, R9, *Fire Protection Impairment*, 5/17/2016
- WP 12-FP3002, R16, *Hot Work Permits*, 5/17/2016
- WP 12-FP3003, R20, *Combustible Material Checks for the Waste Handling Building, Exhaust Filter Building, and Underground*, 9/14/2016
- WP 12-FP3006, R0, *Combustible Permitting for the WIPP Underground*, 10/28/2015
- WP 12-FP3009, R0, *Fire Protection Engineering Combustible Control Program Inspections*, 5/23/2016
- WP 12-NS.02, R7, *Fire Hazard Analysis Updates*, 8/13/2016

Interviews Conducted

- Battalion Chief Fire Captain
- Fire Captain (2)
- Fire Chief
- Fire Marshal
- Fire Protection Engineering Manager
- Fire Protection System Design Authority
- Fire Protection System Technicians (4)
- FPE Lead
- FPEs (2)

Evolutions/Operations Witnessed

- Underground facility tour
- Weld Shop (underground)
- Above-ground facility tour
- IC Maintenance Shop (aboveground)
- Diesel and electric fire pump walkdown
- Hazardous Material Storage Area walkdown
- Observed inspection, testing, and maintenance

DISCUSSION OF RESULTS

1. Fire protection contract requirements are flowed into facility-specific procedures.

Fire protection contract requirements include 10 CFR 851, *Worker Safety and Health Program*; DOE O 420.1C, *Facility Safety*, Chapter II; DOE-STD-1066-2012, *Fire Protection*; and 30 CFR 57, *Mine Safety and Health Administration*, Subpart B. Each of these directives invokes various other codes and standards (i.e. NFPA). The rules, directives, codes, and standards flow into WP 12-FP.01, *Fire Protection Program*, and other fire protection program procedures as described in WP 12-FP.01. DOE approval of the WIPP fire protection program document is required by DOE. NWP submitted the fire protection program document for approval by CBFO on 6/17/2016 in Letter AA:16:01080 and CBFO provided approval on 7/26/2016 in 16-0608. In the CBFO letter 16-0608, CBFO provided COAs with respect to fire protection plans and procedure implementation, and fire protection code of record provided by the contract. NWP responded to the COAs in letter AA:16:01112 in which issuance of WP 12-FP.28, *Fire Protection Program Implementation Plan and Procedures*, and concurrence that the fire protection code of record, as modified by the contract, forms the design basis requirements for fire protection systems at the WIPP facility.

This criterion was met.

2. *Fire protection procedures are effectively implemented in support of the facility, including:*
    - *Routine maintenance and inspection of non-waste handling vehicles in the underground is accomplished for leaks and accumulation of combustible materials (fire protection) (SMP KE 11-1).*
    - *Formal FPE combustible control inspections are accomplished, including inspection criteria, specified frequency of inspections, documentation of identified issues, issue disposition, tracking and trending of issues, and performance metrics (SMP KE 11-2).*
    - *Placement of fuel barrier of absorbent materials at the waste face is accomplished (SMP KE 11-4).*

The CBFO has approved WP 12-FP.01and WP 12-FP.28. The plan (WP 12-FP.28) provides the fire implementation road map for the fire protection procedures at WIPP. In the course of this CORR, a selection of the fire protection procedures was reviewed, and facility walkdowns and interviews were performed to determine that those procedures were effectively implemented.

During the performance of WP 12-FP0026, *Weekly Surveillance for Fire Waste Supply*, it was noted by a DOE observer that the Fire Alarm Panel 456-FP-012-01 tag misidentified Pump 45-G-601 Running as Pump 45-6-601; the same issue of misidentification in the panel was true for Pump 45-G-602. The FPE in attendance during the performance of the procedure took the issue and new tags were installed by the next day. Those tags were verified correct by two CORR team members.

During the same evolution, it was noted by another DOE observer that there were an Issues Collection and Evaluation (ICE) form and a WIPP Form on the electric pump starting at 130 psig, which meets the TSR criterion but does not meet NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*. In discussions with the Fire Protection Manager, this issue was known by DOE, but he noted that NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection*, was the applicable code; however, the actual discussion of the set point for pump starts was contained in the non-mandatory Appendix A. The Fire Protection Manager will close the WIPP Form and provide the information to DOE to close their ICE form.

Routine maintenance and inspection of non-waste handling vehicles in the underground is accomplished for leaks and accumulation of combustible materials (SMP KE 11-1), which was verified as completed by JON 13.4. The evidence package was reviewed and found to be acceptable.

WP 12-FP3009, *Fire Protection Engineering Combustible Control Program Inspections*, was reviewed and the implementation of the procedure was discussed with the author (an FPE), the Fire Protection Manager, and another FPE that had performed the inspections. Combustible control inspection criteria and issue management was discussed with the Fire Protection Manager, Fire Marshal, and firefighters. Other combustible control procedures and associated data sheets including monthly checks and daily checks were also reviewed and discussed. Additionally, the combustible permitting process procedure and current combustible permit log book was reviewed. Furthermore, during walkdowns, no significant issues with combustible

controls was observed, and during discussions, any items mentioned by the CORR team were known by FP personnel and being addressed. Overall, the combustible control program is healthy and supports proper execution of SMP KE 11-2: "formal FPE combustible control inspections are accomplished, and include inspection criteria, specified frequency of inspections, documentation of identified issues, issue disposition, tracking and trending of issues, and performance metrics."

Placement of fuel barrier of absorbent materials at the static waste face is accomplished when waste emplacement or retrieval has not occurred for a period of ten days (SMP KE 11-4). There is no current static waste face in the underground at which to place an absorbent material fuel barrier.

- *Fire prevention/suppression controls include the following (SMP KE 11-5):*
    a. *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.*

WP 12-NS.02, R7, *Fire Hazard Analysis Updates*, provides procedural directions to complete the Fire Protection Vehicle Fire Hazard Risk Analysis Guide, which is attachment to the procedure. The Fire Protection Vehicle Fire Hazard Risk Analysis guide (R1) was reviewed for code implementation and completeness. A fire protection technician (or designee) performs the task, an FPE reviews, a CSE approves, and the Cognizant Engineering Manager approves the assessment. The completed vehicle fire hazard analyses are stored on a fire protection share drive.

b. *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.*

Automatic fire suppression systems are installed in the underground areas with increased combustible loading; however, the systems are not completed, turned over, or operational (see Criterion 7).

c. *Ignition sources (e.g., hot work, designated smoking areas, portable heaters, electrical equipment) are controlled in accordance with the WIPP fire protection program and Design Control Program.*

Ignition sources are effectively controlled by various methods, including WP 12-FP3002, *Hot Work Permits*; WP 12-FP3009; WP 12-FP3003, *Combustible Material and Compressed Gas Cylinder Checks*, i.e. daily round sheet done by firefighters; and design control procedures (see Objective CM1). Review of these procedures and associated documentation, and the level of FPEs' and firefighters' performance provide effective implementation of this portion of KE 11-5.

d. *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).*

Combustible materials in the underground are effectively controlled by WP 12-FP3006, *Combustible Permitting for the WIPP Underground*, including the Combustible Loading Permit Book, WP 12-FP3009, and WP 12-FP3003. Review of these procedures and associated documentation, and the level of fire protection, fire marshal, and firefighter performance provide effective implementation of this portion of KE 11-5.

This criterion was met.

3. *An approved Fire Hazard Analysis is established and implemented.*

The submittal of a WIPP-023, R7, *Fire Hazard Analysis for the Waste Isolation Pilot Plant*, on 8/31/2015, demonstrates that approved facility safety documentation is available. WIPP internal memo, EM: 15:01158, *Fire Hazard Analysis Related Actions*, stated that there were no procedure changes based on Revision 7 of the FHA and no training required. For the IVS project (ECO 13503), a project-specific FHA was developed, WIPP-052, *Project Fire Hazard Analysis for the WIPP Interim Ventilation System*. No actions were stated in the FHA. Based on the fire protection procedure implementation documented in criteria above and the actions related from the FHAs, the FHAs are also considered implemented.

This criterion was met.

4. *Commitments, compensatory measures and COAs associated with fire protection exemptions and equivalencies are effectively implemented.*

One exemption has not been approved by the AHJ or fully implemented. The procedure for exemptions and equivalencies, WP 12-FP.20, *WIPP Equivalency, Exemption and Variance Program*, establishes the process for requesting "relief from Department of Energy Directives, Mandatory Codes and Standards, and the Building Code," in accordance with DOE-STD-1066-2012, *Fire Protection*. The equivalency, exemption, and variance process of WP 12-FP.20 was reviewed and effectively implements the relief process.

NWP submitted WIPP-EX-2015-01, involving the safety requirements for an automatic suppression system for the WIPP underground facilities for AHJ approval in letter AA:16:01113, but the exemption has no yet been approved. The exemption discusses the installed automatic fire suppression systems in the high combustible load areas. These suppression systems described in the exemption are not in service (see Criterion 7). The facility does not meet the requirements of DOE O 420.1C for automatic suppression systems without the approved exemption. Because the exemption is on the manageable list of open items, it did not constitute a finding.

Two equivalencies were submitted by NWP and were approved the AHJ. NWP submitted WIPP-EQ-2016-01, involving the IVS filter assembly using fire screens in letter AA:16:01107 and CBFO provided approval via letter 16-0609 on 8/5/2016. NWP submitted WIPP-EQ-2015-01, involving an equivalency for the Life Safety Code and alternate egress provisions within the WIPP underground in letter AA:16:01098 and CBFO provided approval via letter 16-0611 on

9/19/2016. However, CBFO provided COAs in the letter that are required to be implemented within the facility within 120 days.

An historical equivalency remains in place: upgrades and changes to the Central Monitoring Station have caused the system to be out of compliance with the code (NFPA 72, see FHA Section 10.1). The conditions under which this equivalency was approved are still in existence. Therefore, this equivalency is valid and in effect. The equivalency was approved on 6/24/2009.

This criterion was **not** met.

5. *Sufficient qualified personnel are available to effectively implement the fire protection program in support of the facility.*

The existing fire protection department and the T&Q records were reviewed for adequacy. The current fire protection engineering department has a management position, four FPEs, two of which are CSEs, six Fire Protection Fire System Technicians, and a Fire Marshal. Corporate reach-back resources are being utilized on an as-needed basis and are included in the numbers above. They are being used to develop and strengthen the fire protection program. The current plan for staffing fire protection is to have sufficient staff of senior-level experienced individuals to mentor a sufficient number of mid-level and early career fire protection professionals to lead the fire protection department after the senior-level individuals leave. As the fire protection program is being rebuilt by all of these individuals, the fire protection program should be sustainable for the long term. As such, during the interviews, fire protection engineering personnel stated that there were adequate resources going forward to implement and maintain the fire protection program. This long-term vision using various levels of experience is a noteworthy practice for the fire protection department.

The qualification of personnel is provided several letters (EN: 00064, EN: 00066, EN: 00070) and several *Fire Protection Engineer Qualification Cards* (FPE-12-01). Those were reviewed for adequacy and were found to meet the requirements of DOE O 420.1C, DOE-STD-1066-2012 and consistent with applicable codes and standards (i.e. NPFA). Several of the fire protection professionals are Professional Member Grade (or higher) in the Society of Fire Protection Engineers, and many are certified by National Institute for Certification in Engineering Technologies for Fire Alarm Systems, Inspection and Testing of Water Based Systems, and Special Hazards.

This criterion was met.

6. *The level of knowledge of managers and staff responsible for administering and implementing the fire protection program is adequate based on review of records, interviews, and observation of operational demonstrations. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.*

Interviews evaluated the fire protection program manager and staffs' capability to support waste emplacement operations. The fire protection engineering department has the necessary knowledge and understanding of the fire protection program, Revision 5b of the DSA and TSRs,

and applicable DOE directives and NFPA code requirements; are familiar with the impairments, equipment deficiencies, projects and upgrades that are ongoing; and understand what is necessary to maintain and implement the fire protection SSCs.

The level of knowledge and experience is recognized by CBFO in that NWP was granted day-to-day AHJ responsibilities to the Fire Protection Manager (15-1806). The DOE Memorandum delegated the AHJ responsibilities to NWP in the following areas:

- Participate in planning and design review for projects and modifications as they affect fire protection.
- Provide oversight of fire system acceptance testing or witnessing and approval of such testing by other qualified personnel.
- Provide oversight of periodic inspections, testing, and maintenance of fire systems, or approval of procedures and training conducted by other qualified personnel.
- Conduct fire safety acceptance inspections for approval of occupancy of new surface facilities, the WIPP underground, or facilities having undergone major modifications, and issue certificates of occupancy.
- Act as WIPP Site Building Code Official.
- Review fire protection/life safety action requests and work orders.
- Participate in writing and review of associated fire protection documents.
- Prepare and recommend for approval documented equivalencies and exemptions.
- Exercise authority to provide fire code interpretations.
- Provide concurrence for fire related significant documented equivalencies and exemptions prior to submittal to CBFO.
- Participate in investigation of all fires, explosions and occurrences involving installed fire protection and life safety systems.

This criterion was met.

7. *WIPP has adequate facilities, and equipment is available to ensure that fire protection support and services are adequate for safe facility operation.*

The WIPP facilities have numerous fire impairments, many with compensatory measures in place. The fire impairments are on a list that is reviewed at the POD on a regular basis in which the next action and due date are reviewed. The POD list, which is subject to change as items are corrected and new impairments are added, from 9/29/2016 through 10/5/2016 contained 52 fire impairments. The number of impairments is a concern, as the impairments were selected conservatively based on the code of record, which in some cases would not be impairments based on current code requirements. With the number of impairments, determining which are the highest risk is challenging. Working off as many of the impairments as quickly as possible to lower the number would help to identify the high risk impairments.

During discussion with the Fire Chief and Deputy Fire Chief, concerns over various fire department equipment and structure issues, along with various maintenance problems, were mentioned. These are covered in Objective MG1. In addition, it was mentioned that, at times, the relationship with fire protection engineering was less than optimal. In subsequent discussions with both the Fire Chief and Fire Protection Engineering Manager, it was recognized that a

"Partnership Meeting" between the two groups was being held. This is a good practice to smooth out relationships among the groups, and should be continued.

The manageable list of open items included the following items: 1) Installation and turnover of the underground high fire occupancy fire suppression system; and 2) Installation of the automatic fire suppression kill switch for CH Waste Transporter 52-H-008A. Because these improvements are on the manageable list of open items, no finding will be made.

This criterion was **not** met.

8. *AIB JONs related to fire protection were addressed through effective corrective actions for the fire protection SMP.*

A sampling of AIB JONs and Phase 2 JONs (JONs 8, 9, 13, 20, 21, Phase 2 JONs 33, 34, 35, 36) associated with fire protection were reviewed. The official closure files for all of the sampled JON and Phase 2 JONs were reviewed and were closed based on sufficient closure documentation of the necessary actions. It should be noted that different statuses of the JONs and Phase 2 JONs exist in the WIPP Forms, Issues Management System; however, the official records that are maintained by Contractor Assurance are closed.

This criterion was met.

CONCLUSION

The criteria for this objective were partially met because of the exemption request not approved by the AHJ and incomplete underground fire suppression systems and automatic fire suppression system modifications which are identified on the NWP manageable list of open items. With the exception of that incomplete work, the fire protection SMP was established and implemented to ensure safe accomplishment of work. The level of knowledge of fire protection managers and staff is adequate based on review of records, interviews, and observation of operational demonstrations. The exemption request not approved by the AHJ, completing the installation of automatic vehicle fire suppression systems, and making the high combustible loading areas installed automatic fire suppression systems fully operational are being tracked on the NWP manageable list of open items to assure completion.

This objective was **partially** met. There were no findings identified. Satisfactorily addressing these issues on the manageable list of open items will enable NWP to meet the objective fully.

FINDINGS

<u>Pre-Start</u>
None

Post-Start
None

Assessed by:	Jeff Buczek **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Hazardous Material Protection**	Objective: HMP1 Date: 10/14/2016	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

HMP1: Line management has established and implemented an HMP SMP to ensure safe accomplishment of work. The level of knowledge of managers and staff responsible for HMP is adequate based on review of examinations and examination results, interviews, and observation of hazardous material work activities. (CR 1, 4)

CRITERIA

1. HMP contract requirements are flowed into facility-specific procedures.
2. HMP procedures are effectively implemented in support of the facility, including:
    - Provisions are established to monitor and control air quality to ensure underground workers are protected from Volatile Organic Compounds; protective measures include posting hazardous areas, establishing monitoring requirements, ensuring local ventilation, and requiring PPE, such as respiratory protection, as needed.
3. Sufficient qualified personnel are available to implement the HMP program effectively in support of the facility.
4. WIPP has adequate facilities, and equipment is available to ensure that HMP support and services are adequate for safe facility operation.
5. The level of knowledge of managers and staff responsible for administering and implementing the HMP program is adequate based on review of records, interviews, and observation of operational demonstrations. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.
6. AIB JONs related to HMP were addressed through effective corrective actions for the HMP SMP.

APPROACH

<u>Records Reviewed</u>

- 10 CFR 851, *Worker Safety and Health Assessment Implementation Matrix*, 12/15/2015
- EA 12IS 3002-3-0, R2, *Job Hazards Analysis Checklist*, 3/30/2016
- EA04AD3001-2-0, *Facility TSR and Administrative Controls Checklist*, 5/30/2016
- *Management Assessment of the NWP Respiratory Protection Program*, 10/10/2016
- MP 1.12, R13, *Worker Protection Policy*, 8/5/2015
- MP 1.28, R9, *Integrated Safety Management*, 12/4/2015
- OPS-133-JP, *MiniRAE 3000 Photoionization Detector, Job Performance Measure*, 7/13/2015

- STD JHA-171, R6, *WP05-WH 1011 CH Waste Processing*, 9/28/2016
- STD JHA-304, R11, *CH Waste Downloading and Emplacement*, 7/20/2016
- STD JHA-439, R10, *WIPP General Job Hazard Analysis Checklist*, 8/25/2016
- *Waste Isolation Pilot Plant (WIPP) Industrial Hygiene Status Report and Assessment Strategy (SRAS)*, August 2016
- *Waste Isolation Pilot Plant (WIPP) Respirator Protection Program Evaluation*, 8/2014
- WH-GUIDE-1, R23, *WIPP Operations Qualification Program Guide Book*, 6/14/2014
- *WIPP MSA Interim Report*, 9/7/2016
- WP 02-EC.13, R9, *Environmental Compliance Walk Around and Assessment Plan*, 5/19/2015
- WP 04-AD.19, *WIPP Response to Recent Air Quality Issues*, 3/22/2016
- WP 04-HO1003, R26, *Waste Handling Hoist Operations, Technical Procedure*, 8/23/2016
- WP 05-WH1011, R55, *CH Waste Processing, Technical Procedure*, 7/5/2016
- WP 05-WH1025, *CH Waste Downloading and Emplacement*, 8/2/2016
- WP 05-WH1101, R28, *CH Surface Transuranic Mixed Waste Handling Area Inspections, Technical Procedure*, 9/2/2016
- WP 05-WH1407, R15, *6-Ton Bridge Cranes 41-T-151 A, B, C & D*, 7/14/2016
- WP 05-WH1410, *Adjustable Center of Gravity Lift Fixture, Technical Procedure*, 8/10/2016
- WP 05-WH1412, R14, *CH Waste Handling Toyota Forklifts, Technical Procedure*, 9/7/2016
- WP 12-IH.02, R13, *WIPP Industrial Hygiene Manual*, 5/30/2016
- WP 12-IH.02-1, R6, *WIPP Industrial Hygiene Program – Health Hazard Assessment*, 11/20/2012
- WP 12-IH.02-15, R2, *WIPP Industrial Hygiene Program – Heat Stress*, 6/16/2016
- WP 12-IH.02-2, R9, *WIPP Industrial Hygiene Program – Confined Spaces*, 10/5/2016
- WP 12-IH.02-4, R12, *WIPP Industrial Hygiene Program – Hazards Communications and Hazardous Materials Management Plan*, 7/7/2016
- WP 12-IH.02-5, R4, *WIPP Industrial Hygiene Program – Hearing Conservation*, 11/20/2012
- WP 12-IH.02-6, R8, *WIPP Industrial Hygiene Program – Respiratory Protection*, 1/14/2016
- WP 12-IH.02-8, R3, *WIPP Industrial Hygiene Program – Office and Industrial Ergonomics*, 5/13/2013
- WP 12-IH1004, R4, *Noise Surveys*, 11/26/2012
- WP 12-IH1200, R0, *Heat Stress*, 6/16/2016
- WP 12-IS1832, R8, *Emergency Eyewash and Shower Equipment*, 8/25/2016
- WP 12-IS3002, R14, *Job Hazard Analysis Performance and Development*, 3/30/2016
- WP 15-HS.02, R9, *Occupational Health Program*, 2/9/2016
- WP 15-HS.05, R2, *Health Services Hearing Conservation Program*, 11/28/2012
- WP 8-NT3020, *TRU Waste Receipt Management Control Procedure*, 5/30/2016

Interviews Conducted

- Assistant Deputy Manager ESH Manager
- Certified Industrial Hygienist (2)
- Deputy ESH Manager
- Deputy Waste Operations Manager
- ESH Manager
- Facility Operations Manager
- Industrial Hygiene Manager
- Industrial Hygiene Technicians (2)
- Maintenance Manager
- Miner/Bolters (6)
- Occupational Health Nurse
- RCTs (4)
- Waste Handler
- Waste Handling Engineers (2)
- Waste Handling Operators (8)
- Waste Handling Technicians (5)
- Waste Operations Supervisors (2)

Evolutions/Operations Witnessed

- Underground Access Initiation/Termination
- CH Waste Downloading and Emplacement
- CH Waste Downloading and Emplacement Pre-Job Briefing
- CH Waste Downloading and Emplacement Post-Job Briefing
- CH Waste Processing
- Waste Handling Hoist Pre-Operation Inspection
- Waste Handling Hoist Operation Pre-Job Briefing
- 6-Ton Bridge Crane Pre-Operations Inspection
- CH Waste Handling Toyota Forklift Pre-Operations Inspection
- 13-Ton Electric Forklift Pre-Operational Checks

DISCUSSION OF RESULTS

1. HMP contract requirements are flowed into facility-specific procedures.

HMP contract requirements are specified in the DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis*, Chapter 8.0. The DSA Chapter 8.0 lists program requirements, and identified one KE and nine key attributes. The DSA also described how the HMP program is organized, including the WIPP programs and procedures that were established to implement the program. Examples of requirements listed in the DSA that drive the HMP program include 10 CFR 851, *Worker Safety and Health Program*, and 29 CFR 1910.1200, *Hazard Communication*. The HMP KE listed in the DSA (KE 8.1) involves establishing provisions to monitor and control air quality specifically related to volatile organic compounds (VOCs) in the underground. The

DSA key attributes include hazard communication, hazard control, hazard control hierarchy, chemical control, hazard analysis/evaluation, hazard communication training, hazardous materials operations and emergency response training, respiratory protection, and medical surveillance.

The HMP program is documented in the WP 12-IH.02, *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 the *Occupational Health Program*, WP 15-HS.02, which describes how occupational health services, including medical surveillance, are provided. 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, that 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 in the *Job Hazard Analysis Performance and Development Management Control Procedure*, WP 12-IS3002.

To ensure that conditions in the underground are safe prior to entry, technical procedure WP 04-AU0534, *Underground Access Initiation/Termination*, is executed on a daily basis. WP 04-AU0534 addresses various, necessary prerequisites and items, such as hoists and underground ventilation filtration system fan operability, air quality, and ground control. The procedure states that it establishes provisions for Operations and Industrial Hygiene to monitor and control air quality to ensure underground workers are protected from exposure to VOCs but it did not contain a step to initiate air monitoring. See HMP1-POST-1 for additional discussion. During the Implementation Verification Review (IVR) for the WIPP DSA/TSRs a Finding (F-38) associated with WP 04AU0534 was identified. F-38 stated that the technical procedure, “WP 04AU0534, ‘Underground Access Initiation/Termination’ does not provide instruction for performing or documenting VOC monitoring.” During the MSA, the HMP reviewer pointed out that Procedure WP 04AU0534, R4, was revised to include text to acknowledge that VOC monitoring is performed and also specifies the instrument (MiniRAE 3000 Photo Ionization Detector [PID]) to be used, but still does not include instructions for performing and documenting the monitoring. Technical procedure WP12-IH1022, *Sampling for Waste Generated VOCs*, provides guidance to IS/IH personnel for monitoring VOCs using a PID, and allows IS/IH to provide calibrated PIDs to workers for monitoring VOCs in certain underground locations. However, WP 12-IH1022 does not provide instructions to these workers other than IS/IH staff for performing and documented VOC monitoring in the underground. Job Performance Measure OPS-133-JP establishes the knowledge requirements for operating a PID but also does not provide instructions to underground workers for performing and documented VOC monitoring. This issue was included in finding HMP1-POST-1.

This criterion was met.

2. *HMP procedures are effectively implemented in support of the facility, including:*
    - *Provisions are established to monitor and control air quality to ensure underground workers are protected from Volatile Organic Compounds; protective measures include posting hazardous areas, establishing monitoring requirements, ensuring local ventilation, and requiring PPE, such as respiratory protection, as needed.*

HMP procedures are effectively implemented in support of the facility. During work activity observation, document reviews, interviews, and facility walkdowns, it was evident that HMP procedures are effectively implemented. For example, the elements of hazard communication and hazardous material management – such as a chemical inventory, an electronic file of safety data sheets, and container labels – were present. Chemicals were stored in proper storage cabinets. Documentation showing that required quarterly chemical inventories were completed by designated workers called Hazardous Waste Worker and Hazardous Material Area Representatives was available and reviewed. Workers in the CH Bay of the WHB demonstrated that they were able to access and obtain the online safety date sheets. The CORR team found no evidence indicating that hazardous materials were being stored in waste handling areas (i.e. CH Bay, RH Bay, and Waste Shaft Collar) or in the path used for waste transport, which is prohibited. IS/IH is reviewing and approving new chemical purchases as required.

There were also some areas of chemical management that need improvement. Several hazardous material storage areas were walked down across the site (i.e. Buildings 411, 453, 455, and 459). During these walkdowns, the CORR reviewer observed secondary chemical containers that did not have proper hazard warning labels, and housekeeping was very poor in the Facility Operations Locker Room, as salt spreaders were blocking egress.

Industrial Hygiene program expectations associated with identifying and assessing chemical, physical, and biological hazards are specified in WP 12-IH.02-1, *WIPP Industrial Hygiene Program – Health Hazard Assessment*. Nevertheless, WIPP does not have a formal process or implementing procedure to provide consistent approved methods for performing QEAs. QEAs at WIPP are performed using expert based approaches that are not documented. As a result, there is no formal QEA for exposure to VOCs and, therefore, there are no technical bases for performing additional sampling and/or monitoring, for specifying mitigation and control strategies, or for justifying decisions not to perform sampling and/or monitoring. Extensive air monitoring was performed, indicating that personnel are not being over exposed to VOCs and that the areas where potential exposures are most likely are in the south end of the underground near the waste panels. However, supporting documents and procedures did not provide a consistent approach on VOC monitoring; were missing information and steps to establish VOC monitoring and protective measures; and, in some cases, field implementation was not consistent with supporting procedures. Examples of this include:

1. WP 04-AU0534, *Underground Access Initiation/Termination*, states that it,

    > 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.

However, the procedure has only one statement in the Equipment List, Section 3.0 that directly addresses where and when to monitor VOCs. The statement read as follows: "Required when working at the waste face or downwind of Panel 5, 6, and 7 or in the E-300 when area volatile organic compound (VOC) monitoring results indicate potential for VOC level greater than 5 PPM." There is nothing in the procedure explaining when or how the E-300 area VOC monitoring would be performed or who would be responsible for checking the monitoring results.

2. WP 04-AU0534 also stated that it, "establishes provisions for… required personnel protective equipment such as respiratory protection, as needed" with respect to VOCs, but the procedure did not address where and when respiratory protection is required.
3. WP 04-AU0534 had no step(s) to instruct workers to perform VOC monitoring downwind of Panel 5, 6, and 7, and the procedure also does not include instructions to the workers for performing and documenting the VOC monitoring.
4. WIPP Industrial Status Report and Assessment Strategy listed a "daily" monitoring frequency target for PID VOC monitoring with respect to surface personnel working in the WHB, and management reported that they are planning to install stationary PID VOC monitors in the WHB, yet STD JHA-171, *WP05-WH 1011 CH Waste Processing*, was marked "No" for vapors including VOCs and did not require monitoring; neither did procedure WP 05-WH1011, *CH Waste Processing*, require VOC monitoring.
5. PID monitoring for VOCs was performed during the waste emplacement evolution, but STD JHA-304, *CH Waste Downloading and Emplacement*, was marked "No" for vapors including VOCs and did not require monitoring; neither did procedure WP 05-WH1025, *CH Waste Downloading and Emplacement*, required VOC monitoring.
6. Three stationary PID VOC monitors were installed in the underground at (1) the Waste Shaft; (2) the Salt Shaft (both of which lie on the north end of the underground); and (3) the CA Transition Boundary. There are no technical bases for the installation.

HMP1-POST-1: WIPP does not have a formal process or implementing procedure to provide consistent approved methods for performing qualitative exposure assessments (QEAs), and they are not documenting QEAs. This is not compliant with 10 CFR 851.21.

10 CFR 851.21 states:

> Contractors must establish procedures to identify existing and potential workplace hazards and assess the risk of associated with worker injury and illness. Procedures must include: (1) Assess worker exposure to chemical, physical, biological, or safety workplace hazards through appropriate work place monitoring; (2) Document assessment for chemical, physical, biological, and safety workplace hazards using recognized exposure assessment and testing methodologies and using of accredited and certified laboratories.

The CORR team observed substantial Industrial Hygiene monitoring (including VOC), with no unusual exposure concerns indicated; the type, extent, and method of monitoring appeared conservative with respect to conditions in the mine. As such, the team concluded that, the issue did not involve a violation or potential violation of worker safety or environmental protection regulatory requirements that would pose a significant danger to workers, the public, or of environmental insult or release. Consequently, the issue was determined to be a post-start finding.

IS/IH has a technical procedure, WP 12-IH1006, *Airborne Contaminant Sampling*, that provides a process for performing air sampling, and evidence that IS/IH is performing air sampling and noise monitoring was observed. According to the WIPP Status Report and Assessment Strategy, 174 air samples were collected in 2015. So far this year, over 90 air samples were collected. All samples were below applicable occupational exposure limits. The WIPP Status Report and Assessment Strategy also reported that 43 noise surveys were completed in 2015 and 2016. Two deficiencies with respected to air monitoring were self-identified by IS/IH: air sampling to assess exposure to diesel exhaust had not been performed in the underground for waste downloading and emplacement, and air sampling to assess exposure to underground welding fume was only partially compete.

Daily air monitoring for mine gases is performed in the underground using an MSHA-approved multi-gas detector as required. The process used to perform this monitoring is detailed in technical procedure WP 12-IH1828, *MSHA Air Quality Monitoring*. This air monitoring is documented on the *U/G Air Quality Round Sheet*, EA04AD3006. This process was observed and several Air Quality Round Sheets were reviewed during the CORR. In addition, personnel during certain work activities carry a portable MSHA-approved multi-gas detector with them to provide continuous monitoring.

WIPP's Respiratory Protection Program is documented in the *WIPP Industrial Hygiene Program – Respiratory Protection*, WP 12-IH.02-6. The program includes provisions for medical evaluations, training, and fit testing. The majority of respirators issued are powered air purifying respirators (PAPRs) with high efficiency/organic vapor/acid gas cartridges used in the underground beyond the CA boundary. The Respirator Issue Room was clean and well organized and the respirators were properly stored. Respirator issue records showed that the Respirator Technician checks to ensure that the medical evaluation and training is completed prior to performing a fit test. The fit test is a quantitative test performed using TSI Portacount Pro®. A sticker affixed to the instrument indicated that the calibration was current. The PAPR/Respirator Cartridge Room was also clean and well organized. One item noted during the walkdown was that many of the respirator cartridges were not dated after they were open and installed into the PAPRs in accordance with the WIPP policy. The date needs to be marked because, once opened, the cartridges have a shelf life. The program was evaluated twice in a little over two years. Two years ago IS/IH hired a consultant to do an independent review of the program, and recently an MSA of the program was completed.

WIPP has an Occupational Medicine Program that provides comprehensive medical services to their workers. They rely on a Corporate Medical Director who specializes in occupational medicine and provides consultation for the program on an as-needed basis. They use a medical provider in town for employee physical examinations. Employees receive an initial evaluation and are evaluated again when they transfer to a new job, are absent with an illness for more than five days, or experience other events that could affect their ability to work, such as a hospitalization. "Absence Notifications and Job Change Analysis Forms" are used by the human resources department to inform the clinic about employees who need to be re-evaluated. Fitness for duty examinations are conducted for security guards, firefighters, emergency rescue personnel, waste handlers, and hoist men. The program includes an on-site clinic that is managed

by the Assistant Deputy ESH Manager and staffed with three registered nurses. The clinic is equipped to do basic medical screening – such as blood pressure checks, blood sugar monitoring, and cholesterol checks – and annual flu shots are provided. Random drug tests and breath alcohol testing are also conducted by the clinic. Employees who wear respirators or those exposed to high noise levels are evaluated annually. Audiometric testing for the Hearing Conversation Program is performed in the clinic using a Benson audiometer. The audiometer was current on its calibration. Testing for the Respiratory Protection Program is performed at the on-site clinic using an OMI Next Gen True Flow Spirometer®. The spirometer is current on its calibration.

This criterion was met.

3. *Sufficient qualified personnel are available to implement the HMP program effectively in support of the facility.*

IS/IH management and staff reported that they felt they were adequately staffed to effectively support the facility, and the Deputy ESH Manager had done an analysis of work scope compared to staffing and concluded that ESH was adequately staffed. Specifically, there were three full-time and one part-time Certified Industrial Hygienists, one Advisory Scientist, and three Industrial Hygiene Technicians to carry out industrial hygiene functions at the site. In addition, there are several organizational Hazardous Material Representatives that are responsible for performing quarterly chemical inventories.

This criterion was met.

4. *WIPP has adequate facilities, and equipment is available to ensure that HMP support and services are adequate for safe facility operation.*

Management and staff reported that they have adequate equipment for HMP support and services; during facility walkdowns and operational demonstrations, evidence was observed indicating that facilities and equipment are adequate to support HMP program implementation. For example, the Industrial Hygiene Lab is equipped with an ample supply of sampling and monitoring equipment (e.g., air sampling pumps, noise dosimeters, wet bulb globe temperature monitors). Multiple PIDs with alarm capability to monitor VOCs in real-time are maintained in the Industrial Hygiene Lab and are issued to workers for self-monitoring in certain areas of the underground. The PIDs are returned daily to equipment room for calibration and maintenance. Three stationary PID VOC monitors were installed in the underground and the installation of three more is planned for the WHB. WIPP also has an adequate supply of PAPRs to support Waste Handling Activities. PAPR face pieces are stored and issued in the Respirator Issue Room, and the PAPR pump unit is maintained in PAPR/Respirator Cartridge Room. Instrumentation is available to perform respirator fit testing (a TSI Portacount Pro®). See Criterion 2 above for additional discussion on WIPP's respiratory protection capabilities. The Portacount is maintained in the Respiratory Protection Technicians office, which is a fairly small and crowded space. A larger dedicated fit testing space would be an improvement for the program. The WIPP Occupational Health Clinic is well equipped with medical testing equipment

and supplies (see Criterion 2 above for additional discussion on occupational Health Clinic's capabilities).

This criterion was met.

5. *The level of knowledge of managers and staff responsible for administering and implementing the HMP program is adequate based on review of records, interviews, and observation of operational demonstrations. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.*

During interviews with IS/IH managers and staff, it was evident that they were knowledgeable concerning HMP program requirements. They demonstrated their knowledge through discussions of topics such as chemical management, the specific VOCs that originate from the TRU waste, areas of the mine where the highest potential for VOC exposure exists, specific mine gases that could create problems in the underground, and the necessity and limitations associated with the underground ventilation system. In general, their knowledge of safety basis requirements is adequate, but one knowledge deficiency was identified. Not all IS/IH staff understood the reasoning associated with the step in the Waste Processing Procedure that requires IS/IH approval prior to opening the waste container. The approval is dependent on a review of head space sampling data provided by the waste generator. This allows the IS/IH team an opportunity to identify any unusual or highly hazardous materials, including VOCs, that could cause an unacceptable risk.

During interviews, pre- and post-job briefings, and operational demonstrations, it was evident that waste handling personnel both on the surface and in the underground were knowledgeable concerning their HMP responsibilities. During underground waste handling activities, workers used a PID to monitor for VOC exposure and properly donned their PAPRs. During surface waste handling activities and walkdowns of the WHB, chemical management compliance was observed and is discussed earlier under Criterion 2.

This criterion was met.

6. *AIB JONs related to HMP were addressed through effective corrective actions for the HMP SMP.*

There were no AIB JONs specifically related to the HMP program. The MSA supported this conclusion and reported that "a search confirmed none of the AIB JONs specifically address hazardous material program issues."

This criterion was met.

CONCLUSION

With the exception of one finding, it was evident through document reviews, interviews, operational demonstrations, and site walkdowns that line management has established and implemented an HMP SMP. With limited exception, the level of knowledge of managers and

staff responsible for HMP is adequate, based on review of records, interviews, and observation of hazardous material work activities.

This objective was met. There was one finding identified.

FINDINGS

Pre-Start
None

Post-Start
HMP1-POST-1: WIPP does not have a formal process or implementing procedure to provide consistent approved methods for performing qualitative exposure assessments (QEAs), and they are not documenting QEAs. This is not compliant with 10 CFR 851.21.

Assessed by:	Cheryl Lucas **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Industrial Safety & Hygiene**	Objective: ISH1 Date: 10/14/2016	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

ISH1: Line management has implemented an ISH SMP to ensure safe accomplishment of work. The level of knowledge of ISH managers and staff is adequate based on review of examinations and examination results, interviews, and observation of operational demonstrations. (CR 1, 4)

CRITERIA

1. Contract requirements for the ISH SMP were incorporated into facility-specific procedures.
2. ISH implementing procedures were effectively implemented in support of the facility, including:
    - The Hoisting and Rigging Program protects safety SSCs, waste packaging, and personnel from dropped loads (SMP KE 11-6).
3. WIPP has a sufficient number of trained personnel to fulfill the ISH SMP effectively and provide safe site operations.
4. The level of knowledge of ISH managers and staff is adequate based on review of examinations and examination results, interviews, and observation of operational demonstrations. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.
5. WIPP has adequate facilities, and equipment is available to ensure that ISH support and services are adequate for safe facility operation.
6. AIB JONs related to ISH were addressed through effective corrective actions for the ISH SMP.

APPROACH

<u>Records Reviewed</u>

- 10 CFR 851, *Worker Safety and Health Assessment Implementation Matrix*, 12/15/2015
- EA 12IS 3002-3-0, R2, *Job Hazards Analysis Checklist*, 3/30/2016
- EA04AD3001-2-0, *Facility TSR and Administrative Controls Checklist*, 5/30/2016
- *Electrical Safety Committee Meeting Minutes*, for 1/19/2016, 2/16/2016, and 6/8/2016
- Email, from Handfinger to Lucas, Subject: *Doors*, 10/12/2016
- Email, from Schultz to Handfinger, Subject: *Draft Door Mitigation Plan*,10/5/2016
- *Hoisting & Rigging Committee Meeting Minutes*, for 9/12/2016 and 10/3/2016
- *Management Assessment of the NWP Respiratory Protection Program*, 10/10/2016
- MP 1.12, R13, *Worker Protection Policy*, 8/5/2015
- MP 1.28, R9, *Integrated Safety Management*, 12/4/2015

- STD JHA-1040, R6, *Ground Control JHA*, 7/11/2016
- STD JHA-171, R6, *Waste Processing JHA*, 9/28/2016
- STD JHA-304, R11, *CH Waste Downloading and Emplacement*, 7/20/2016
- STD JHA-439, R10, *WIPP General Job Hazard Analysis Checklist*, 8/25/2016
- *Waste Isolation Pilot Plant (WIPP) Industrial Hygiene Status Report and Assessment Strategy (SRAS)*, August 2016
- *Waste Isolation Pilot Plant (WIPP) Respirator Protection Program Evaluation*, 8/2014
- WF16-1589, *Multiple egress Doors in the RH Bay are non-functional*, 9/23/2016
- WF16-344, *On 15 Mar during work on Door 41-N-119, the LO/TO control sheet specified the tagged position of several breakers as "OPEN. The actual indicated positions on the breaker are "OFF." This is contrary to step 2.3 in WP04-AD3011*, 3/23/2016
- WF16-350, *Not all equipment at WIPP is labeled per NFPA 70E 130.5(D)*, 3/24/2016
- WF16-425, *During the outage on 2 Apr 15, a worker performing independent verification of the positioning of several switches… watched the switching operation from a close distance while it was occurring*, 4/7/2016
- WH-GUIDE-1, R23, *WIPP Operations Qualification Program Guide Book*, 6/14/2014
- *WIPP MSA Interim Report*, 9/7/2016
- WP 02-EC.13, R9, *Environmental Compliance Walk Around and Assessment Plan*, 5/19/2015
- WP 04-HO1003, R26, *Waste Handling Hoist Operations, Technical Procedure*, 8/23/2016
- WP 05-WH1011, R55, *CH Waste Processing, Technical Procedure*, 7/5/2016
- WP 05-WH1025, *CH Waste Downloading and Emplacement*, 8/2/2016
- WP 05-WH1101, R28, *CH Surface Transuranic Mixed Waste Handling Area Inspections, Technical Procedure*, 9/2/2016
- WP 05-WH1407, R15, *6-Ton Bridge Cranes 41-T-151 A, B, C & D*, 7/14/2016
- WP 05-WH1410, *Adjustable Center of Gravity Lift Fixture, Technical Procedure*, 8/10/2016
- WP 05-WH1412, R14, *CH Waste Handling Toyota Forklifts, Technical Procedure*, 9/7/2016
- WP 12-IH.02, R13, *WIPP Industrial Hygiene Manual*, 5/30/2016
- WP 12-IH.02-1, R6, *WIPP Industrial Hygiene Program – Health Hazard Assessment*, 11/20/2012
- WP 12-IH.02-15, R2, *WIPP Industrial Hygiene Program – Heat Stress*, 6/16/2016
- WP 12-IH.02-2, R9, *WIPP Industrial Hygiene Program – Confined Spaces*, 4/22/2014
- WP 12-IH.02-5, R4, *WIPP Industrial Hygiene Program – Hearing Conservation*, 11/20/2012
- WP 12-IH.02-6, R8, *WIPP Industrial Hygiene Program – Respiratory Protection*, 1/14/2016
- WP 12-IH.02-8, R3, *WIPP Industrial Hygiene Program – Office and Industrial Ergonomics*, 5/13/2013
- WP 12-IH1004, R4, *Noise Surveys*, 11/26/2012
- WP 12-IH1200, R0, *Heat Stress*, 6/16/2016
- WP 12-IH1300, R0, *Confined Space Entry*, 10/5/2016

- WP 12-IS.01, R15, *Industrial Safety Program – Structure and Management*, 1/16/2013
- WP 12-IS.01-1, R7, *Industrial Safety Program – Barricades and Barriers*, 3/10/2016
- WP 12-IS.01-10, R4, *Industrial Safety Program – Fall Protection*, 9/9/2015
- WP 12-IS.01-15, R3, *Industrial Safety Program – Scaffolds*, 6/24/2015
- WP 12-IS.01-16, R0, *Industrial Safety Program – Hand Safety*, 1/23/2015
- WP 12-IS.01-18, R0, *Industrial Safety Program – Aerial Lifts and Elevating Work Platforms*, 3/25/2015
- WP 12-IS.01-3, R12, *Industrial Safety Program – Power and Hand Tools*, 2/27/2015
- WP 12-IS.01-4, R7, *Industrial Safety Program –Personal Protective Equipment*, 1/23/2015
- WP 12-IS.01-5, R12, *Industrial Safety Program – Walking and Working Surfaces and Ladders*, 2/9/2015
- WP 12-IS.01-7, R4, *Industrial Safety Program – General Electrical Safety*, 11/15/2012
- WP 12-IS.01-8, R10, *Industrial Safety Program – Vehicle Safety*, 4/27/2015
- WP 12-IS1832, R8, *Emergency Eyewash and Shower Equipment*, 8/25/2016
- WP 12-IS3002, R14, *Job Hazard Analysis Performance and Development*, 3/30/2016
- WP 15-HS.02, R9, *Occupational Health Program*, 2/9/2016
- WP 15-HS.05, R2, *Health Services Hearing Conservation Program*,11/28/2012
- WP 8-NT3020, *TRU Waste Receipt Management Control Procedure*, 5/30/2016

Interviews Conducted

- Advisory Scientist
- Assistant Deputy ESH Manager
- Deputy ESH Manager
- Deputy Waste Operations Manager
- Electrical Safety Committee Chair
- ESH Manager
- ESH Readiness Manager
- Hoisting and Rigging Committee Chair
- Industrial Safety Manager
- Maintenance Manager
- Miner/Bolters (6)
- Nuclear Safety Engineer
- Operational Safety Engineers (2)
- Procedure Writer
- RCTs (4)
- Waste Handler
- Waste Handling Engineers (2)
- Waste Handling Operators (8)
- Waste Handling Technicians (5)
- Waste Operations Supervisors (2)

Evolutions/Operations Witnessed

- Underground Access Initiation/Termination
- CH Waste Downloading and Emplacement
- CH Waste Downloading and Emplacement Pre-Job Briefing
- CH Waste Downloading and Emplacement Post-Job Briefing
- CH Waste Processing
- Waste Handling Hoist Pre-Operation Inspection
- Waste Handling Hoist Operation Pre-Job Briefing
- 6-Ton Bridge Crane Pre-Operations Inspection
- CH Waste Handling Toyota Forklift Pre-Operations Inspection
- 13-Ton Electric Forklift Pre-Operational Checks

DISCUSSION OF RESULTS

1. Contract requirements for the ISH SMP were incorporated into facility-specific procedures.

Contract requirements for the ISH SMP were incorporated into facility-specific procedures. Chapter 17 of the WIPP DSA, R5b, address the requirements that drive ISH, four key attributes associated with ISH, the organizational structure that supports ISH, and the programs and procedures that were established to implement ISH. Examples of the requirements that drive the ISH include 10 CFR 851, *Worker Safety and Health Program*, 29 CFR 1910, *Occupational Safety and Health Standards*, and 48 CFR 970.5223-1, *Integration of Environment, Safety, and health into Work Planning and Execution*. The four key attributes involve ISMS program implementation, line management responsibility for safety, 10 CFR 851 implementation, and attaining a strong safety culture. Management and operations for the site are divided into operational and operating services. The core ISH program is managed as an operational service, but implementation of the program is integrated into the planning and execution of all site work. The primary documents that provide for overall implementation of the ISH program include, but are not limited to: (1) WP 15-GM.02, *Worker Safety and Health Program (WSHP) Description Document*, which outlines the policies, processes, methods, and procedures used for 10 CFR 851 compliance; (2) WP 15-GM.03, *Integrated Safety Management System (ISMS) Description Document*, that explains how the WSHP is integrated into management and work activities. (3) WP 12-IS3002, *Job Hazard Analysis Performance and Development Management Control Procedure*, which defines how ISH program requirements are integrated into individual work activities; (4) MP 1.12, *Worker Protection Policy*, that incorporates the VPP, ISMS, and ISH program implementation; (5) WP 12-IH.02, *Industrial Hygiene Program Manual*, which addressed industrial hygiene aspects of the program; and (6) WP 12-IS.01, *Industrial Safety Program – Structure and Management*, which addresses industrial safety elements of the ISH program.

An inconsistency between WP 15-GM.02 and MP 1.12 was identified that involved selecting hazard controls. The Worker Protection Policy stated that: “The methods and procedures used for controlling hazards (in the preferred order of implementation) will include (1) engineering techniques, (2) administrative controls, and (3) personal protective equipment (PPE).” This is inconsistent with the WIPP WSHP and not compliant with 10 CFR 851, which specifies the

following hierarchy for selecting hazard controls: (1) Elimination or substitution of the hazards where feasible and appropriate, (2) Engineered controls where feasible and appropriate, (3) Work practices and administrative controls that limit worker exposures, (4) PPE. The Worker Protection Policy needs to be revised for consistency and compliance with the WSHP and 10 CFR 851. The flow-down of ISH contract requirements are also addressed in Objective HMP1.

This criterion was met.

2. *ISH implementing procedures were effectively implemented in support of the facility, including:*
    - *The Hoisting and Rigging Program protects safety SSCs, waste packaging, and personnel from dropped loads (SMP KE 11-6).*

Implementation of ISH procedures was evident during demonstrated evolutions and walkdowns. Compressed gas cylinders in the WHB were properly labeled and properly secured. Pre-operational inspections were performed on forklifts prior to use. Forklifts were marked with their capacity ratings. Forklift operators used seatbelts and spotters during lifting activities.

The Hoisting and Rigging program is documented in *Industrial Safety Program – Hoisting and Rigging*, WP12-IS.01-12. The program is designed to implement nationally recognized requirements, such as DOE-STD-1910, *DOE Hoisting and Rigging Standard*; 29 CFR 1910, *OSHA General Industry Standards*; and 29 CFR 1926, *OSHA Construction Industrial Industry Standards*.

One issue associated with the WIPP Hoisting and Rigging program was identified. The program sated 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.

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 at least semi-annually. The Committee Chair reported that they had recently reviewed the Hoisting and Rigging program against the DOE Hoisting and Rigging Standard; and that the committee is in the process of revising the program to address identified gaps.

During the CORR, implementation of the Hoisting and Rigging program was evident. For example, prior to the waste processing evolution, a detailed pre-operational inspection was performed, 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.

Initially, it appeared that this procedure did not include all of the information required by the DOE Hoisting and Rigging Standard for pre-engineered lifts. For example, the procedure only mentioned the ACGLF and did not include other types of specific lifting hardware used for lifts. It also did not include: (1) the class and capacity of the lifting equipment to be used, (2) a requirement to verify that all lifting equipment is up-to-date on required inspections and maintenance, or (3) specific instructions for attaching and removing the ACGLF from the load and lifting equipment. But after additional review, it was apparent that these items were addressed in other procedures or through the design of the lifting system. For example, two other procedures (WP-04-AD3001, *Facility Mode Change TSR Compliance Procedure*, and WP 05-WH1101, *CH Surface Transuranic Mixed Waste Handling Area Inspections Technical Procedure*) initiate pre-operational inspections. These procedures must be executed prior to lifting or moving waste. The pre-operational checks are conducted in accordance with technical procedure WP 05-WH1407, *6-Ton Bridge Cranes 41-T-151 A, B, C, & D*, which includes as a prerequisite an action to check for outstanding deficiencies and to ensure that required inspections are current and satisfactory. In addition, the ACGLF and its associated lifting components and loads were designed together for efficiency making attachment and detachment one simple step performed remotely by the operator; therefore, detailed instructions for attachment and detachment are not necessary.

During interviews with the waste handling workers who performed the waste processing operations demonstration, a concern about malfunctioning entry/exit doors was raised. Some of the problem doors could pose life safety egress issues. A WIPP Form was entered for the doors on 9/23/2016, but the workers reported that they raised the issue a long time ago. The WIPP Maintenance Manager was recently assigned to address the issue and had prioritized the doors into high, medium, low, and very low categories based on the potential for egress issues. Prior to the end of the CORR, the Maintenance Manager reported that he was given the approval to start working on the doors, but did not provide a timeline for closing the issue.

The waste downloading and emplacement operations demonstration was performed safely and without incident. During an interview after the demonstration, underground waste handling workers raised concerns about ground control. The workers reported that they were concerned about the underground roof and the fact that roof bolting had not been maintained in some areas of the mine. They said that some areas of the mine had a 70% roof bolt failure rate and reported that they had repeatedly raised the issue to management. Additional roof bolts were added, but the workers felt the issue still exists. They also reported that areas of the underground are marked “No entry without permission.” However, when permission is requested, they are allowed to enter; they do not see how that makes it safe. They reportedly had no problem raising the issue with supervisors and lower level managers; however, they felt that senior management does not understand their concern or understand the issue, because these managers do not work in the underground and are not experienced and comfortable with mine operations.

The pre-operational inspection for the waste hoist was observed during the CORR. The inspection was performed safely without any issues. The pre-job briefing was comprehensive, covering hazards and controls associated with the activity, and the supervisor and the hoist men demonstrated knowledge of safety requirements including electrical safety.

The WIPP Electrical Safety Program is documented in the *Electrical Safety Program Manual*, WP 12-IS.03. WIPP has an active Electrical Safety Committee chartered to provide a technical resource for addressing and resolving electrical safety issues. The Committee meets quarterly. Electrical hazard analyses (e.g., arc flash calculations) were performed on major pieces of power distribution equipment but not on every electrical panel. According to the Electrical Safety Committee Chair, arc flash PPE is conservatively selected based on the amount of potential energy determined by the calculations. NFPA 70E hazard warning labels were evident throughout the site both on the surface and in the underground, but there was an open issue in the WIPP Issues Management Processing System concerning NFPA 70E warning labels missing from electrical equipment associated with the direct current powered hoists. In addition, there were two other open electrical issues being tracked in the WIPP Issues Management Processing System: (1) an independent verification was performed in close proximity and at the same time as the switching operator's action, and (2) there were differences in procedural wording (i.e. "off" vs "open") with respect to breakers between documents that need to have consistent wording.

Heat stress at WIPP has received increased attention in the past two years. Workers have had to start dressing out in full sets of PPE, including double anti-contamination PPE, because of the radiological contamination area (CA) created by the drum accident. This condition increases worker risk with respect to heat-related illness. The IS/IH management and staff reported that improvements were made to the heat stress program during this same time period. The heat stress program is documented in *WIPP Industrial Hygiene Program – Heat Stress*, WP12-IH.02-15. When the temperature reaches a certain level, a wet bulb globe temperature monitor is stationed outside the Lamp Room with Work/Rest Guidelines. Workers are taught to go by and read the monitor and compare the reading to the Work/Rest Guidelines, which provides a recommended work/rest regiment applicable to their work activities. In addition, when the monitor reaches a level that warrants a certain work/rest regiment, an announcement is made over the site-wide public address system to alert workers. The IS/IH management and staff reported that during the summer, WIPP had zero incidents of heat related illness despite enduring 35 days where temperatures exceeded 100º Fahrenheit.

WIPP has a confined space program that is documented in *WIPP Industrial Hygiene Program – Confined Spaces*, WP 12-IH.02-2, and a new technical procedure covering confined space entry recently became effective. IS/IH maintains a database of the confined spaces on-site and they are responsible for evaluating spaces before a permit is developed. IS/IH is responsible for verifying that the permit is complete and accurate and for documenting this verification with a signature on the permit. The implementation of ISH procedures are also addressed in Objective HMP1.

This criterion was met.

3. *WIPP has a sufficient number of trained personnel to fulfill the ISH SMP effectively and provide safe site operations.*

IS/IH management and staff reported that they were adequately staffed to effectively support the ISH SMP, and the Deputy ESH Manager did an analysis of work scope compared to staffing and concluded that the ESH was adequately staffed. Specifically, there were six full-time Operations

Safety Engineers and one Operations Engineer. The number of trained personnel necessary to fulfill ISH responsibilities is also addressed in Objective HMP1.

This criterion was met.

4. *The level of knowledge of ISH managers and staff is adequate based on review of examinations and examination results, interviews, and observation of operational demonstrations. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.*

During interviews with IS/IH managers and staff, it was evident that they were knowledgeable concerning ISH program requirements. For example, industrial safety personnel were able to discuss requirements associated with topics such as hoisting and rigging and electrical safety. During interviews, pre- and post-job briefings, and operational demonstrations, it was evident that waste handling personnel both on the surface and in the underground, as well as mining and bolting personnel, were knowledgeable concerning ISH requirements. Pre-job briefs and post-job reviews were excellent and were interactive with the employees. Topics such as hazards, controls, responsibilities, and stop work were covered during the pre-job briefing. The post-job review covered topics such as communication, work conditions, safety, adequacy of the procedure, and adequacy of the pre-job briefing. The participation and discussion among the workers was outstanding. During interviews and observations, managers, supervisors, and workers demonstrated their knowledge of safety and health. An understanding with respect to following procedural steps to ensure the Safety Basis was evident. The knowledge of ISH managers and staff is also addressed in Objective HMP1.

This criterion was met.

5. WIPP has *adequate* facilities, and equipment is available to ensure that ISH support and services are adequate for safe facility operation.

Management and staff reported that they have adequate equipment and facilities available for ISH support and services to support safe facility operations. For example, hard hats, safety glasses, and hearing protection were available and used. An allowance is provided for safety shoes and vendors periodically come into the parking lot for workers to be fitted and to make selections. Hoisting and rigging equipment and fall protection harnesses were available, well maintained, and properly stored in the tool crib building. The availability of adequate facilities and equipment for ISH is also addressed in Objective HMP1.

This criterion was met.

6. *AIB JONs related to ISH were addressed through effective corrective actions for the ISH SMP.*

The WIPP MSA verified that JON 10.1, which involved identifying fire-related personal safety equipment required in the underground, was effectively addressed. Six other AIB JONs related

to safety culture (i.e. 35.1, 35.2, 35.3, R24.1, R24.2, and R24.3) are addressed under Objective MG1.

This criterion was met.

CONCLUSION

Based on document review, interviews, and operational observations, line management demonstrated that they have implemented an ISH SMP to ensure safe accomplishment of work; and the level of knowledge of ISH managers and staff is adequate.

This objective was met. There were no findings identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	Cheryl Lucas **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Management**	Objective: MG1 Date: 10/14/2016	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

MG1: Line management has established and implemented SMPs to ensure safe accomplishment of work. The level of knowledge of SMP managers and staff is adequate based on review of records, interviews, and observation of operational demonstrations. (CR 1, 4)

CRITERIA

1. Radiation Protection (DSA7); HMP (DSA8); Radioactive and Hazardous Waste Management (DSA9); Maintenance, In-Service Inspection, and Testing (DSA10); Fire Protection (DSA11); Conduct of Operations (DSA11); Mine Safety and Ground Control (DSA11 and 17); Procedures Management (DSA12); T&Q (DSA12); Quality Assurance (DSA14); Emergency Preparedness (DSA15); Industrial Safety and Health (DSA17); Configuration Management (DSA17); Waste Acceptance Criteria Compliance (DSA18); Work Planning and Control (POA) SMPs are established and implemented, including:
    - SMP contract requirements are flowed into facility specific procedures.
    - SMP procedures are effectively implemented in support of the facility; specifically, KE Controls and referenced procedures.
    - AIB JONs related to each SMP were addressed through effective corrective actions for each SMP.
    - Sufficient qualified personnel are available to effectively implement each SMP in support of the facility.
    - Adequate facilities and equipment are available to ensure that SMP support and services are adequate for safe facility operation.
2. The level of knowledge of managers and staff responsible for administering and implementing each SMP is adequate based on review of examinations and examination results, interviews, and observation of operational demonstrations.
3. Senior management's key expectations for safe work performance, including SMP administration and implementation, are appropriately established, understood and demonstrated by workers and managers.
4. Senior management appropriately champions safe and effective implementation of SMP activities through engagement, participation, resourcing, and funding and fosters both a compliant and performance based focus on SMP activities to drive effective implementation.
5. Management awareness of SMP related issues and shortcomings are in evidence at all levels of the organization. Managers are visible at the worksite monitoring work performance and providing feedback and reinforcement of expectations. In addition, appropriate forums are chartered and implemented, for senior management review and

evaluation of activities affecting safe performance of work, including periodic review of the "health" of SMP implementation.

APPROACH

Records Reviewed

- DOE O 210.2A, *DOE Corporate Operating Experience Program*
- DOE O 232.2, *Occurrence Reporting and Processing of Operations Information*
- MC 1.13, R1, *Executive Safety and Quality Review Board*, 8/25/2015
- MP 1.21, R8, *Management Responsibility and Accountability*, 1/23/2015
- *WIPP Fundamentals Handbook – Our Standards and Expectations*, Current Revision 10/10/2016
- WP 04-AD3032, R4, *Senior Management Review Board*, 9/29/14
- WP 13.QA3006, R9, *Data Analysis and Trending*, 12/20/2012
- WP 15-GM1000, R9, *Management Assessments*, 12/9/14
- WP 15-GM1001, R5, *Root Cause Analysis*, 5/29/14
- WP 15-GM1002, R4, *Issues Management Processing of WIPP Forms*, 6/9/2015
- WP 15-MD3102, R10, *Event Investigation*, 9/30/2015
- WP 15-PA.01, R4, *Operating Experience/Lessons Learned Program*, 5/17/2016
- WP 15-PA1000, R5, *Regulatory Requirements Impact Assessment Process*, 12/9/14
- WP 15-PA1001, R3, *Safety Management Program Health Assessment Methodology*, 7/15/14
- WP 15-PA2000, R5, *Lessons Learned Bulletin Development*, 9/2/14
- WP 15-PA4000, R3, *Self-Assessments*, 8/20/2013
- WP 15-RA-01, R11, *Nuclear Safety & Worker Safety and Health Compliance Program*, 6/26/2015

Interviews Conducted

- Business and Finance Manager
- Change Management Coordinator
- Contractor Assurance Manager
- Deputy Project Manager
- EM & Security Manager
- Engineering Manager
- Deputy ESH Manager
- ESH Manager
- Infrastructure & Site Services Manager
- Issues Management and Corrective Action Program Manager
- Maintenance Manager
- Operations Manager
- President and Project Manager, NWP
- Quality Assurance Manager

- Recovery Manager
- Regulatory Reporting Manager
- Self-assessment and Continuous Improvement Manager
- Technical Training and Procedures Manager
- See also the Interviews for SMP CRADs

Evolutions/Operations Witnessed

- ESQRB meeting
- CARB meeting
- See also the Evolutions for SMP CRADs

DISCUSSION OF RESULTS

1. *Radiation Protection (DSA7); HMP (DSA8); Radioactive and Hazardous Waste Management (DSA9); Maintenance, In-Service Inspection, and Testing (DSA10); Fire Protection (DSA11); Conduct of Operations (DSA11); Mine Safety and Ground Control (DSA11 and 17); Procedures Management (DSA12); T&Q (DSA12); Quality Assurance (DSA14); Emergency Preparedness (DSA15); Industrial Safety and Health (DSA17); Configuration Management (DSA17); Waste Acceptance Criteria Compliance (DSA18); Work Planning and Control (POA) SMPs are established and implemented, including:*
    - *SMP contract requirements are flowed into facility specific procedures.*
    - *SMP procedures are effectively implemented in support of the facility; specifically, KE Controls and referenced procedures.*
    - *AIB JONs related to each SMP were addressed through effective corrective actions for each SMP.*
    - *Sufficient qualified personnel are available to effectively implement each SMP in support of the facility.*
    - *Adequate facilities and equipment are available to ensure that SMP support and services are adequate for safe facility operation.*

The team determined that, with limited exception, SMP contract requirements are flowed into facility specific procedures. SMP procedures are effectively implemented in support of the facility, specifically, KE controls and referenced procedures. AIB JONs related to each SMP were addressed for each SMP through effective CAPs. Sufficient qualified personnel are available to implement each SMP effectively in support of the facility. Adequate facilities and equipment are available to ensure that SMP support and services are adequate for safe facility operation. This was determined through evaluation of SMPs during assessments performed for each objective applicable to an SMP. The results of the subject assessments are summarized below; issues identified for each criterion are captured in the appropriate sections of this report.

- Radiation Protection – Review of the radiation protections functional area found that the project has made great strides in improving its programs since 2014. However, most of that effort was made in the field implementation of programs, which lack a solid technical basis based on source term and requirements. This resulted in some elements being overly conservative, while others were nonconservative. The team identified

several issues that need to be addressed in this area. The NWP RP program was determined to be safe for CH TRU waste emplacement (pending resolution of the two pre-start findings) and, with some limited exception, compliant with 10 CFR 835. The 10 CFR 835 compliance exceptions were: Part 103 (addressed by finding RP1-PRE-2); Parts 401.b (2) and (3) and 209 (a) (addressed by finding RP1-POST-2); and Parts 1003 (b) and 104 (addressed by finding RP1-POST-3).

- Hazardous Material Protection – The team determined through document reviews, interviews, operational demonstrations, and site walkdowns that line management has established and implemented an HMP program. With limited exception, the level of knowledge of managers and staff responsible for HMP is adequate, based on review of examinations and examination results, interviews, and observation of hazardous material work activities.

- Radioactive and Hazardous Waste Management – The SEC portion of the WM program was reviewed and found to support environmental compliance and ensure safe accomplishment of work. The level of knowledge of the SEC staff is adequate based on interviews, supporting documentation, and observation of operational demonstrations.

- Maintenance, In-Service Inspection, and Testing – NWP's efforts to improve the conduct of maintenance organization have resulted in a substantial improvement in the rigor applied to the performance of work. Coaching and mentoring through management time in the field is evident as the craft seemed very comfortable being observed and were generally not resistant to questions. Maintenance requirements were flowed down into facility-specific procedures, and are effectively implemented to support the facility. All personnel are adequately trained, qualified, and proficient to perform their jobs and their level of knowledge is commensurate with their level of responsibility.

- Fire Protection – The criteria for this objective were partially met because of the exemption request not approved by the AHJ and incomplete underground fire suppression systems and automatic fire suppression system modifications which are identified on the NWP manageable list of open items. With the exception of that incomplete work, the fire protection SMP was established and implemented to ensure safe accomplishment of work. The level of knowledge of fire protection managers and staff is adequate based on review of records, interviews, and observation of operational demonstrations. The exemption request not approved by the AHJ, completing the installation of automatic vehicle fire suppression systems, and making the high combustible loading areas installed automatic fire suppression systems fully operational are being tracked on the NWP manageable list of open items to assure completion.

- Conduct of Operations – WIPP personnel successfully demonstrated discipline and a formality of operations sufficient to safely receive, unpack, transfer to the underground, and emplace CH TRU waste packages. Conduct of operations and oversight programs are in place to ensure personnel maintain this formality and proficiency of disciplined operations.

- Mine Safety and Ground Control – An effective MS and Ground Control program was established. Based on document reviews, interviews (informal and structured), and operational activity observations, implementing procedures are being followed by experienced and trained staff, both in the Underground Operations organization and the Geotechnical Engineering organization.

- Procedures Management – An effective procedures management plan is in place. An example of this control I seen in the *WIPP Startup Plan for the Commencement of Contact Handled Waste Emplacement*, specifically calls for controls and oversight to confirm operability of equipment, the viability of procedures, and the performance and knowledge of the operations staff.

- Training and Qualification – A T&Q Program was developed, documented, and approved and implements the requirements of DOE O 426.2, as documented in an NWP- and DOE-CBFO-approved TIM. T&Q requirements for operations and support personnel were established, and personnel were trained to these requirements.

- Quality Assurance – The WIPP QA Program was evaluated through a combination of personnel interviews, document reviews, and observations/walkdowns and found to be sufficiently implemented to support resumption of waste emplacement activities. There are sufficient and compliant program documents, procedures, and processes as determined by the CORR. There are adequate personnel, facilities, and equipment to support quality program requirements based on interviews with QA management and walkdown of facilities.

- Emergency Preparedness – Efforts to stand up an EM program that is compliant with DOE O 151.1C and the WIPP RCRA Permit have produced a program that is significantly improved over the program in place at the time of the fire and radiological release in 2014. NWP's comprehensive training, drill, and exercise program helps ensure that responders at WIPP are prepared and demonstrate the capability to protect the workers and the public. A strong set of procedures implementing the NWP emergency plan provides for a consistent response to a wide variety of initiating event conditions. The WIPP modern EOC offers responders the tools needed to carry out their responsibilities effectively during operational emergencies postulated by the EPHA.

- Industrial Safety and Health – There are sufficient and compliant program documents, procedures, and processes as determined by interviews and document reviews. NWP personnel demonstrated awareness of and a high priority commitment to comply with public safety, worker safety and health, and environmental protection requirements.

- Configuration Management – NWP has established a Configuration Management SMP to ensure safe accomplishment of work. The level of knowledge of Engineering managers and staff responsible for Configuration Management, and the facilities and equipment they use are adequate to ensure the program is effectively implemented.

- Waste Acceptance Criteria Compliance – A WAC Compliance program is in place to assure packaged waste conforms to the WIPP WAC prior to underground placement.

- Work Planning and Control – The Work Control program at WIPP continues to improve the integration of the identification and analysis of hazards and controls at the activity level. Maintenance work group participation in the process results in improved teaming and an improved safety culture and safer work environment

This criterion was met.

2. *The level of knowledge of managers and staff responsible for administering and implementing each SMP is adequate based on review of examinations and examination results, interviews, and observation of operational demonstrations.*

Interviews were conducted with managers and staff during work activities (e.g., POD meetings, scheduling meetings, and maintenance evolutions) and also during one-on-one sessions. Additional evidence was obtained through observation of operational demonstrations and training exercises. The interviews and observations confirmed that managers and staff are engaged and demonstrate competency, responsibility, and accountability for safe and effective work performance, including implementation of SMP activities. R2A2s were generally understood, but more work needs to be done to ensure all personnel clearly understand their requirements.

This criterion was met.

3. *Senior management's key expectations for safe work performance, including SMP administration and implementation, are appropriately established, understood and demonstrated by workers and managers.*

Interviews and observations of work activities showed that managers, supervisors, and workers (including support organizations) are aware of and understand management's key expectations for a safe work performance, including SMP integration. Multiple work activities were observed to assess this criterion, and interviews were conducted with all levels of the workforce throughout the review. Appropriate to their positions, each was able to articulate how those expectations translated to his/her particular job. The employees demonstrated a high priority commitment to comply with those requirements. For example, operations, maintenance, and radiological controls personnel interviewed and observed during evolutions demonstrated adequate knowledge of SMPs applicable to the work they were performing. Waste Handling and Radiological Control personnel were aware of safety requirements related to evolutions the CORR team observed and properly implemented required actions or controls. Managers observed and interviewed were aware of potential hazards and ensured workers implemented appropriate controls, wore required PPE, etc. Additionally, underground miners were interviewed to gain insight into their perspective and attitude toward management and safety. Several questions focused on mid- to senior-level management's involvement and interest in the workplace and what they see as management's top priorities. The consensus was that

management is involved and senior management has communicated and reinforced that safety is the top priority.

This criterion was positively demonstrated through the worker's actions and words. During observations of operational activities and abnormal events, emphasis was repeatedly made by the workers and their first line supervision that safety took precedence over all other facets of their work. The workers expressed no reservation at involving themselves in the planning of safe work, execution of work, and, where they felt necessary, challenging management. This view is consistent with management's stated expectation that everyone is responsible for their own safety and the safety of others. Implementation of management's expectations was apparent during waste handling pre-job briefs and response to a planned abnormal drill while waste handling.

During interviews with the waste handling crew (including waste handling technicians and RCTs, but not supervision or management), concerns were expressed regarding ground control decisions by management. Where the crew expressed confidence in their immediate management's responsiveness to safety concerns, they also indicated they lacked confidence in management's decisions regarding the response to recent ground control issues in Panel 7. In discussions with WIPP management, management indicated they had focused on keeping the miners involved in ground control developments but were less focused on involving waste handling personnel. Management immediately planned to include waste handling personnel in future Panel 7 ground control communications.

Management stated expectations in the area of conduct of operations are consistent and adequate, and in some venues, that expectation is fulfilled. For example, waste handling operations communications are crisp, repeat-backs are adequate, and procedure use is also adequate. Improvement opportunities in the area of repeating steps and use of "N/A" were noted and communicated to operations. Conduct of operations was less crisp in the CMR. Examples include multiple examples of weak access controls to the CMR and At the Controls area, three-way communications, and CMR procedure use. Between the June EP exercise and completion of the CORR, CMR conduct of operations has improved.

This criterion was met.

4. *Senior management appropriately champions safe and effective implementation of SMP activities through engagement, participation, resourcing, and funding and fosters both a compliant and performance based focus on SMP activities to drive effective implementation.*

Interviews conducted with managers, supervisors, and workers (including support organizations) confirmed that the senior management team does champion effective SMP implementation. A number of activities sponsored by senior management demonstrate their commitment – e.g., publication and use of the *WIPP Fundamentals Handbook*; conduct of all-hands meetings; monetary rewards such as "Safety Bucks" to recognize safe behaviors; the "Mentoring Moments" cards that cover targeted areas such as heat stress mitigation; and implementation of the Management Observation program. The latter program is tracked as a measure of the priority and importance placed by NWP management on time spent in the field. Between March and

August 2016, a total of 545 Management Observations were conducted in the focus areas of Field Work, EM, Pre-job Briefings, Procedures Compliance, and Values and Expectations. Of the 545 observations, 395 determined to be "value added," which means that they addressed plant conditions, coaching of unwanted behaviors, and reinforcement of positive behaviors.

Compliant and performance-based focus on SMP activities was positively demonstrated by operations personnel reliably indicating regular use of the tenets of conduct of operations, including data taking, procedure use, and three-way communications. Reluctance was not indicated by operations (workers, first line supervision, or management) to delay work to answer questions regarding status, in expressing safety concerns, and invoking stop work authority.

In the interviews conducted for Objectives EP1 and EP2, it was very clear that line management had established and implemented SMPs to ensure safe accomplishment of work. During an interview with the senior staff of the WIPP Fire Department, there was a concern expressed for the condition of the Fire Department apparatus, station habitability, maintenance problems, lack of an equipment maintenance plan for the apparatus, and slow pace for correcting simple problems, like headlights or station light bulbs. The Fire Station is too small for storing the apparatus indoors, thus exposing the apparatus to the weather. This can be a serious problem in cold weather. The lack of progress in resolving these problems is of concern to the workers. Another problem is the inability to force overtime for coverage of the Fire Department. This gives little-to-no assurance that staffing can be guaranteed. Reliance on mutual aid for main response support of an inability to staff is not realistic given the distance to respond and the current run frequency for the mutual aid organizations.

This criterion was met.

5. *Management awareness of SMP related issues and shortcomings are in evidence at all levels of the organization. Managers are visible at the worksite monitoring work performance and providing feedback and reinforcement of expectations. In addition, appropriate forums are chartered and implemented, for senior management review and evaluation of activities affecting safe performance of work, including periodic review of the "health" of SMP implementation.*

Management awareness and emphasis on SMP related issues were evident at all levels of the organization. Many managers and staff are visible in the field and demonstrate responsibility and accountability for safe and effective work performance, including implementation of SMP activities. SMP issues and status are elements of all senior staff weekly meeting, the ESQRB, the CARB, and the monthly NWP Health Dashboard meeting. Leading and lagging indicators of SMP health are monitored by senior management and revised as necessary to ensure emerging issues are recognized and addressed in a timely manner.

The criterion was positively demonstrated during interviews with operations management, facility operations, waste operations, hoist operations, and underground operations. Most field personnel noted a regular management presence in the field. Some waste operations personnel expressed concern with ground control activities and management's commitment to resolve them because of perception that "senior management does not understand the mine."

Interviews with operations management indicated where management believes their personnel perform well (such as safety) and where personnel have room for improvement (such as development of procedures which work efficiently as-written). Management has sponsored improvement efforts in the area of conduct of operations through classroom courses, refresher training, mentorship of crews, and management observations.

Four Underground Mine Operators were interviewed following lines of inquiry designed to gain insight into their perspective and attitude toward management and safety. Several questions focused on mid- to senior-level management's involvement and interest in the workplace and what they see as management's top priorities. The consensus was that management is involved and the top priority is safety. They shared that senior management is seen in the underground regularly (approximately monthly). They also shared that it is widely understood that waste emplacement is the mission that everyone at WIPP is working toward, but senior management has communicated and reinforced by their decisions that safety while emplacing waste is the top priority.

When asked what their biggest concern was, one operator shared his belief that the significant increase in "paperwork" could, at some point, impact his ability to remain focused and concentrate on his primary job of operating equipment safely. They were specifically questioned concerning recent roof control issues, whether they believed management was making the correct decisions, and whether they ever felt pressured to work in conditions they believed to be unsafe. They all agreed the decision not to roof bolt a portion of the roof in Panel 7, Room 5 was a good decision and that it was characteristic of management's approach, from their immediate supervisor to the Project Manager. When asked whether they would be comfortable working in Room 5 if management decided to emplace waste around the unsupported area, two operators had no concerns but the other two shared their reservations. They were two of the operators involved in identifying the issue the week before and they were present when the large portion of roof was scaled down with the milling machine. They shared belief that the conditions were similar to a portion of the S-2750 drift in the Panel 3 entry where a roof fall recently occurred in a Prohibited Area. They also shared they had not been briefed on the plan for Room 5, which management was in the process of finalizing and briefing crews.

This criterion was met.

CONCLUSION

NWP has established and implemented SMPs to ensure safe accomplishment of work. The level of knowledge of managers and staff is adequate based on review of records, interviews, and observation of operational demonstrations. Senior Management presence is evident in the field, and their expectations for safety are understood and evident in the workforce.

This objective was met. There were no findings identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	Deborah Hojem **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Management**	Objective: MG2 Date: 10/14/2016	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

MG2: Functions, assignments, responsibilities, and reporting relationships (including those between the line operating organization and ESH & QA support organizations) are clearly defined, understood, and effectively implemented with line management responsibility for control of safety. (CR 2, 5)

CRITERIA

1. Clear, unambiguous and appropriate R2A2s and lines of authority for safe and effective work performance – including administration and implementation of SMPs – at all levels of management and within the workforce are established, understood, maintained, and demonstrated with WIPP operations line management responsible and accountable for safety.
2. Assigned and/or delegated safety R2A2s were identified, reviewed, and documented.
3. Line managers at all levels demonstrate responsibility and accountability for safe and effective work performance, including administration and implementation of SMP activities.
4. Organizational charts and documentation (e.g., procedures and other appropriate mechanisms) are in place that: (1) clearly define R2A2s; (2) clearly establish line management's responsibility, and (3) ensure safety is maintained at all levels.

APPROACH

Records Reviewed

- Email, from Love to Hulvey, Subject: *Sampling of Job Descriptions*, October 5, 2016
- MC 1.16, R0, *Corrective Action Review Board*, 8/14/2015
- MC 1.4, R0, *Contractor Assurance Department*, 4/14/2014
- MC 10.1, R9, *Quality Assurance Department*, 3/12/2015
- MC 10.1, R9, *Quality Assurance Department*, 3/12/2015
- MC 5.1, R5, *Human Resources*, 5/6/2013
- MC 6.1, R9, *Operations Department*, 7/29/2013
- MC 9.8, R12, *Configuration Management Board*, 6/26/2016
- MP 1.20, R12, *Management Assessments*, 10/22/2012
- MP 1.21, R8, *Management Responsibility and Accountability*, 1/23/2015
- MP 1.28, R9, *Integrated Safety Management*, 12/4/2015
- MP 1.29, R4, *Mission, Goals, and Responsibilities*, 2/22/2013

- MP 1.48, R3, *Emergency Management Program*, 11/15/2014
- MP 4.6, R8, *Ethical Conduct*, 7/14/2015
- OPS-01-2016, R0, *NWP Performance Indicators*, August FY 2016, 10/3/2016
- *WIPP Fundamentals Handbook – Our Standards and Expectations*, Current Revision 10/10/2016
- *WIPP NWP Organization Chart*, current revision, 10/10/2016
- WP 04-AD3032, R4, *Senior Management Review Board*, 9/29/2014
- WP 04-CO.01, R3, *Conduct of Operations*, 12/7/2015
- WP 09, R42, *Conduct of Engineering*, 8/31/2016
- WP 09-11, R8, *NWP Configuration Management Plan*, 5/17/2016
- WP 12-5, R19, *Waste Isolation Pilot Plant Radiation Safety Manual*, 5/17/2016
- WP 12-9, R42, *Emergency Management Plan*, 11/2/2015
- WP 12-FP.01, R14, *WIPP Fire Protection Program*, 8/3/2016
- WP 12-NS.04, R5, *WIPP Nuclear Criticality Safety Program*, 4/27/2016
- WP 13-1, R36, *Nuclear Waste Partnership LLC Quality Assurance Program Description*, 12/22/2015
- WP 14-TR.01, R16, *WIPP Training Program*, 5/17/2016
- WP 15-CA.01, R1, *Contractor Assurance System (CAS) Program Description*, 6/29/2015
- WP 15-GM.02, R10, *Worker Safety and Health Program Description*, 10/1/2015
- WP 15-GM.03, R9, *Integrated Safety Management System Description*, 12/1/2015
- WP 15-GM.08, R0, *Project Management Plan*, 3/18/2015
- WP 15-PA1002, R4, *Requirements Management*, 9/30/2015
- WP 15-PS.01, R1, *Procedures Program*, 2/8/2016

Interviews Conducted

- Assessment and Continuous Improvement Manager
- Business Manager
- Contract Assurance Manager
- Deputy Manager – Maintenance, Work Control and Fac. Ops.
- Deputy Project Manager, NWP
- EM Manager
- ESH Manager
- Facility Operations Manager
- Maintenance Manager
- Manager, Chief Engineer
- Nuclear Safety Manager
- NWP Senior Management Team (President/Project Manager plus direct reports)
- Operations Manager
- President and Project Manager, NWP
- Quality Assurance Manager
- Recovery Manager
- Regulatory Reporting Manager
- See also the Interviews for SMP CRADs

Evolutions/Operations Witnessed

- CORR In-Brief, 10/3/2016
- ESQRB Meeting – Ground Control and South End of Mine Closure Proposal, 10/5/2016
- POD T-0 Meetings – 10/4/2016; 10/6/2016; 10/7/2016; 10/10/2016
- Plan of the Week/Plan of the Month Meeting – 10/7/2016
- Abnormal Event Observation – CAM Alarm Drill in the WHB; Observed Responses in CMR – 10/5/2016
- Electrical Safety Issue Observation – Report and Response by Facility Operations and Facility Maintenance – 10/5/2016
- Barrier Busters Meeting – 10/5/2016
- Bison 3 Emergency Drill; Observed Responses in CMR – 10/8/2016
- See also the Evolutions for SMP CRADs

DISCUSSION OF RESULTS

1. *Clear, unambiguous and appropriate R2A2s and lines of authority for safe and effective work performance – including administration and implementation of SMPs – at all levels of management and within the workforce are established, understood, maintained, and demonstrated with WIPP operations line management responsible and accountable for safety.*

Organizational R2A2s were assessed by interview and discussions with managers and staff, using the program documents, management charters, and WIPP procedures listed above. During this assessment, R2A2s were found to fall in a wide range of format and content that lead the CORR team to conclude that the WIPP R2A2s are ambiguous and unclear.

Most program and charter documents reviewed provided written organizational roles and responsibilities; however, the documented authorities and accountabilities for individuals or positons within the organization were lacking. R2A2s were not written in an unambiguous and consistent manner, nor were they documented in a consistent format. WIPP Form WF16-1745 was submitted to address this issue.

Based on observations and interviews conducted by the CORR team, the WIPP staff knows and understands their roles and responsibilities; however, the staff's knowledge of accountabilities and authorities is not as apparent. WIPP Form WF16-1746 was submitted to address this issue.

R2A2s are one of the key ISMS guiding principles; NWP would benefit from a standardized methodology for defining, documenting, and rolling out their R2A2s across the organization. In assessing the adequacy of WIPP meeting this specific criterion, the SMPs, as documented in Chapters 7 through 18 of the DSA, were reviewed and found to provide an acceptable level of direction and guidance for the WIPP R2A2s.

In addition, while conducting this review for the CORR, the WIPP WSHP Description and the WIPP ISMS Description were reviewed; they were found to have been adequately established, and stated the expectations for line management being responsible for safety at the WIPP.

This criterion was met.

2. *Assigned and/or delegated safety R2A2s were identified, reviewed, and documented.*

The WIPP WSHP Description and in the WIPP ISMS Description contain assigned safety responsibilities; safety responsibilities were also found in some of the management charters and organizational program documents. Some organizational documents reviewed are silent concerning safety roles or expectations for that organization (i.e. MC 5.1, R5, *Human Resources*; MC 10.1, R9, *Quality Assurance Department*; and MP 1.48, R3, *Emergency Management Program*).

This criterion was met.

3. *Line managers at all levels demonstrate responsibility and accountability for safe and effective work performance, including administration and implementation of SMP activities.*

As determined by observations and interviews, the entirety of the line management team at WIPP is responsible for and accountable for safe and effective work at the site, including personnel, facility, and environmental safety. Safe and effective work performance includes the implementation and use of SMP documents and requirements, and fosters execution of the ISMS and the WSHP at WIPP.

This criterion was met.

4. *Organizational charts and documentation (e.g., procedures and other appropriate mechanisms) are in place that: (1) clearly define R2A2s; (2) clearly establish line management's responsibility, and (3) ensure safety is maintained at all levels.*

The NWP organization charts and WIPP documentation that is in place confirm that line management is responsible for safety. The documentation clearly articulates the expectation that line management is to maintain safety at all levels across the organization. Furthermore, safety of the staff, the facilities, and the environment is a shared expectation between line management, functional management, and the staff assigned to the plant. This is best seen in the WIPP ISMS Description.

This criterion was met.

CONCLUSION

Line management at WIPP is responsible for safety regarding personnel, facilities, the public, and the environment. Processes and functions, assignments and responsibilities, and reporting

relationships (including those between the line operating organization and ESH and QA support organizations) are adequately defined, understood, and effectively implemented.

This objective was met. There were no findings identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	Russ Hulvey **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Management**	Objective: MG3 Date: 10/14/2016	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

MG3: An adequate startup or restart program was developed that includes plans for graded operations and testing after startup or resumption to confirm operability of equipment, the viability of procedures, and the performance and knowledge of the operators simultaneously. The plans should indicate validation processes for equipment, procedures, and operators after startup or resumption of operations, including any required restrictions and additional oversight. Any compensatory measures required during the approach to full operations are described. (CR 11)

CRITERIA

1. A startup plan was developed and approved, implements the guidance of DOE-STD-3006-2010 (including confirming equipment operability, procedure viability, and personnel performance and knowledge), and is adequate to control initial waste emplacement operations following receipt of authorization to restart those operations from the Startup Authorization Authority.
2. The startup plan describes validation processes for equipment, procedures, and operators after resumption of operations, including any required restrictions and additional oversight.
3. For any compensatory measures, restrictions, and additional oversight required by the startup plan during the approach to full unrestricted operation, the startup plan also identifies conditions that must be satisfied in order to remove them.

APPROACH

<u>Records Reviewed</u>

- AA.16:01128, R2, *US DOE WIPP Startup Plan for Commencement of Contract Handled Waste Emplacement at the Waste Isolation Pilot Pla*nt, 9/16/2016
- AA:16:01163, R4, *US DOE WIPP Startup Plan for Commencement of Contract Handled Waste Emplacement at the Waste Isolation Pilot Pla*nt, 10/19/2016
- Affidavit, R0, *Functional Managers – Affidavit of Readiness for Commencement of Contact Handled Transuranic Waste Operations*, 9/29/2016
- DOE 3006-2010, *Planning and Conducting Readiness Reviews*, 5/6/2010
- DOE O 425.1D, Chg. 1, *Verification of Readiness to Start Up or Restart Nuclear Facilities*, 4/2/2013
- DOE/WIPP-01-3181, R9, *Authorization Agreement for the Waste Isolation Pilot Plant*, 4/28/2016

- DOE/WIPP 07-3372, R5b, *Waste Isolation Pilot Plant Documented Safety Analysis*, April 2016
- DOE/WIPP 07-3373, R5b, *Waste Isolation Pilot Plant Technical Safety Requirements*, April 2016
- Memorandum, AA.16:01129, from Breidenbach to McCoy, Subject: *Approval of Readiness to Commence the Contractor Operational Readiness Review for the Commencement of Contract Handled Waste Emplacement at the Waste Isolation Plant*, 9/30/2016
- MP 1.31, R10, *Authorization Agreement*, 8/5/2015
- Prime Contract No. DE-EM0001971, *Management and Operation of the Waste Isolation Pilot Plant*, current modification
- *US DOE WIPP Startup Plan for Commencement of Contract Handled Waste Emplacement at the Waste Isolation Pilot Pla*nt, R3 Draft
- WP 15-GM.08, R0, *Project Management Plan*, 3/18/2015
- WP 15-MD31-1, R7-FR2, *Verification of Readiness to Startup or Restart WIPP*, 9/29/2016
- WP 15-OR.01, R10, *Management Self-Assessment Plan for Startup or Restart of WIPP Nuclear Facilities, Activities, and Operations*, 8/13/2016

Interviews Conducted

- Deputy Project Manager, NWP
- Operations Manager
- President and Project Manager, NWP
- Recovery Manager
- Restart Manager

Evolutions/Operations Witnessed

- Contractor Operational Readiness Review In-Brief, 10/3/2016
- ESQRB Meeting – Ground Control and South End of Mine Closure Proposal, 10/5/2016
- POD T-0 Meetings – 10/4/2016; 10/6/2016; 10/7/2016; 10/10/2016
- Plan of the Week/Plan of the Month Meeting – 10/7/2016

DISCUSSION OF RESULTS

1. *A startup plan was developed and approved, implements the guidance of DOE-STD-3006-2010 (including confirming equipment operability, procedure viability, and personnel performance and knowledge), and is adequate to control initial waste emplacement operations following receipt of authorization to restart those operations from the Startup Authorization Authority.*

The NWP WIPP startup plan, *US DOE WIPP Startup Plan for Commencement of Contract Handled Waste Emplacement at the Waste Isolation Pilot Plant*, R2, was developed under the guidance of DOE-STD-3006-2010, *Planning and Conducting Readiness Reviews*, specifically

Appendix 2 of the Standard, and was subsequently approved and issued on September 16, 2016. In reviewing the plan and after discussing it with the Restart Manager and the Operations Manager, it was determined that this plan appropriately calls for the confirmation of waste handling equipment operability, waste handling operations procedure viability, and plant personnel performance and knowledge. Furthermore, through interviews, it became evident that, when it is implemented, the startup plan will confirm, by ongoing management oversight reviews and increased management presence in the field, that equipment, procedures, and staff are adequate to control initial CH waste emplacement operations following receipt of authorization to restart.

Revision 4 to this plan was approved and issued on October 19, 2016. Revision 4 incorporated a requirement to assure that, as a prerequisite to the issuance of authorization to emplace CH waste, the WIPP AA be revised to include the appropriate language addressing CH waste emplacement operations at WIPP. The revision also addresses in greater detail the requirements and expectations for management oversight and presence during the initial restart phase.

This criterion was met.

2. *The startup plan describes validation processes for equipment, procedures, and operators after resumption of operations, including any required restrictions and additional oversight.*

The startup plan is developed to confirm, through ongoing management oversight reviews and increased management presence in the field, that equipment, procedures, and staff are adequate to control initial CH waste emplacement operations following receipt of authorization to restart. In addition to the above discussed validation processes, management oversight reviews and increased management presence will be in place prior to the receipt of authorization to restart. This will help assure that the WIPP staff is building operational experience and momentum, and that they will be ready to sustain increased operations.

This criterion was met.

3. *For any compensatory measures, restrictions, and additional oversight required by the startup plan during the approach to full unrestricted operation, the startup plan also identifies conditions that must be satisfied in order to remove them.*

The startup plan, specifically Sections 4.0 through 7.0, addresses the compensatory measures, restrictions, and ongoing oversight required as the plant approaches full, unrestricted waste emplacement operations, as well as the conditions that must be satisfied in order to remove them.

This criterion was met.

CONCLUSION

The *WIPP Startup Plan for the Commencement of Contact Handled Waste Emplacement*, Revision 2, was approved and issued September 29, 2016. This plan specifically calls for controls and oversight to confirm operability of equipment, the viability of procedures, and the

performance and knowledge of the operations staff. Revision 4 to this plan was approved and issued on October 19, 2016. Revision 4 incorporates a requirement to assure that, as a prerequisite to the issuance of authorization to emplace CH waste, the WIPP AA be revised to include the appropriate language addressing CH waste emplacement operations at WIPP. The revision also addresses in greater detail the requirements and expectations for management oversight and presence during the initial restart phase.

This objective was met. There were no findings identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	Russ Hulvey **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Management**	Objective: MG4 Date: 10/14/2016	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

MG4: Formal agreements between the operating contractor and DOE were established via the contract or other enforceable mechanism to govern safe facility operations. A systematic review of the facility's conformance to these requirements was performed. These requirements were implemented in the facility, or compensatory measures are in place during the period of implementation. The compensatory measures and the implementation period are approved by DOE. (CR 13)

CRITERIA

1. The following documents are approved and in place: a Nuclear Operations AA for CH TRU waste, a DOE approved DSA and TSRs, and a DOE Safety Evaluation Report (SER) including any COAs. A Safety Basis Document List accurately describes the latest approved DSA and TSR governing WIPP activities. The AA does not authorize RH waste emplacement.
2. A systematic review of the facility's conformance to requirements of these documents was performed by NWP, and the requirements were demonstrated by NWP to be implemented with any identified compensatory measures in place. Compensatory measures and their implementation period are approved by DOE.
3. Fire Exemptions and Equivalencies pursuant to DOE O 420.1C were approved by DOE and required compensatory actions were implemented.
4. A program to evaluate and report HWFP nonconformances was implemented and assures timely reporting to the NMED.

APPROACH

<u>Records Reviewed</u>

- CA-IVR-2016-002, *Implementation Verification Review Final Report (for the) Waste Isolation Pilot Plant Documented Safety Analysis/Technical Safety Requirements, Revision 5b,* 5/24/2016
- CCP-PO-001, *CCP TRU Waste Characterization Quality Assurance Project Plan*
- DOE/WIPP-01-3181, R9, *Authorization Agreement for the Waste Isolation Pilot Plant,* 4/28/2016
- DOE/WIPP 07-3372, R5b, *Waste Isolation Pilot Plant Documented Safety Analysis,* April 2016
- DOE/WIPP 07-3373, R5b, *Waste Isolation Pilot Plant Technical Safety Requirements,* April 2016

- DOE/WIPP 16-3565, R0, *Safety Evaluation Report for Approval of DOE/WIPP 07-3372, Waste Isolation Pilot Plant Documented Safety Analysis, Revision 5b and DOE/WIPP 07-3373, Waste Isolation Pilot Plant Technical Safety Requirements, Revision 5b*, 4/29/2016
- *Hazardous Waste Facility Permit*, EPA I.D. Number NM4890139088-TSDF, January 2016
- HWB-14-21, *Administrative Compliance Order HWB-14-21 Waste Isolation Pilot Plant*, EPA I.D. Number NM4890139088, 12/6/2014
- Letter, from Kieling to Bryson and Breidenbach, *subject: Non-Financial Records Review Inspection of Permittees Post-Release Event, August 2014 Waste Isolation Pilot Plant EPA* I.D. Number NM4890139088, dated 8/12/2015
- Letter, from Kieling to Franco and McQuinn, subject: *Compliance Evaluation Inspection USDOE Waste Isolation Pilot Plant, EIA I.D. Number NM4890139088*, dated 4/22/2015
- Letter, from Kieling to Shrader and Breidenbach, *subject: Non-Financial Records Review Inspection of Permittees Annual NMED RCRA Permit Inspection, November 2015 Waste Isolation Pilot Plant, EPA I.D. Number NM4890139088*, dated 6/10/2016
- Letter, from Kieling to Shrader and Breidenbach, subject: *Non-Financial Records Review Inspection of Permittees Annual WIPP Inspection, December 2014, Waste Isolation Pilot Plant, EPA I.D. Number NM4890139088*, dated 10/26/2015
- Letter, from Shrader and Breidenbach to Kieling, subject: *Carlsbad Field Office Procedure Change Report for January 2016*, 16-1847, dated 3/1/2016
- MP 1.31, R10, *Authorization Agreement*, 8/5/2015
- RCAR 16-004, *Root Cause Analysis Report, NMED Permit Inspection Deficiencies*, 6/28/2016
- WIPP-021, R6, *Hazards Analysis for the Waste Isolation Pilot Plant Transuranic Waste Handling Safety Basis*, 5/4/2016
- WP 02-PC.03, R8, *WIPP Hazardous Waste Facility Permit Reporting and Notifications Compliance Plan*, 8/26/2013
- WP 02-PC1006, *WIPP Permit Modification Implementation Process for Permit Required Inspections, draft undated*
- WP 02-PC3001, R0, *WIPP Hazardous Waste Facility Permit Screening*, 7/6/2015
- WP 02-PC3002, R11, *WIPP Hazardous Waste Facility Permit Change Request and Modification Processing*, 7/6/2016
- WP 02-PC3005, R0, *Permit Reporting 24-Hour, 5-Day Follow Up, Other Noncompliance*, 10/21/2015
- WP 02-PC3005, R0, *Permit Reporting 24-Hour, 5-Day Follow-up, Other Non-compliances*, 10/2112015
- WP 15-GM1002, R4, *Issues Management Processing of WIPP Forms*, 6/9/2015
- WP-02-PC.08, R0, *Project Execution Plan for the Shielded Container Shipping and Disposal Project*, draft
- WP-02-PC1006, R0, *WIPP Permit Modification Implementation Process for Permit Required Inspections*, 9/27/2016
- WP-12-NS3018, R0, *Material at Risk Statistics Verification*, 10/12/2015

Interviews Conducted

- Deputy Restart Manager
- RES Manager
- Restart Manager
- Safety Basis Manager
- Safety Basis Program Manager
- SEC Manager

Evolutions/Operations Witnessed

- None

DISCUSSION OF RESULTS

1. *The following documents are approved and in place: a Nuclear Operations AA for CH TRU waste, a DOE approved DSA and TSRs, and a DOE SER including any COAs. A Safety Basis Document List accurately describes the latest approved DSA and TSR governing WIPP activities. The AA does not authorize RH waste emplacement.*

The following documents are approved and in place:

- DOE/WIPP-01-3181, R9, *Authorization Agreement for the Waste Isolation Pilot Plant*, 4/28/2016,
- DOE/WIPP 16-3565, R0, *Safety Evaluation Report for Approval of DOE/WIPP 07-3372, Waste Isolation Pilot Plant Documented Safety Analysis, Revision 5b and DOE/WIPP 07-3373, Waste Isolation Pilot Plant Technical Safety Requirements, Revision 5b*, 4/29/2016,
- DOE/WIPP 07-3373, R5b, *Waste Isolation Pilot Plant Technical Safety Requirements*, April 2016,
- DOE/WIPP 07-3372, R5b, *Waste Isolation Pilot Plant Documented Safety Analysis*, April 2016, and
- WIPP-021, R6, *Hazards Analysis for the Waste Isolation Pilot Plant Transuranic Waste Handling Safety Basis*, 5/4/2016.

The SER for DSA/TSRs Revision 5a identified 13 COAs, including DSA, TSR, and WIPP-021 Revision 5 page changes that had to be addressed prior to final approval of the DSA/TSRs. The SER states:

> Revision 5b of the DSA/TSR incorporating these changes and an updated version of WIPP-021 will be retransmitted to CBFO for information and are approved for implementation. Restart of waste receipt and emplacement is subject to the AA requirements for an Operational Readiness Review…Thus, the Safety Basis Review Team (SBRT) recommends that the DOE Safety Basis Approval Authority (SBAA) approve the submitted safety basis documents, subject to the specified condition of approval, to support the restart of waste receipt and emplacement at WIPP.

NWP transmitted DSA/TSRs Revision 5b and an updated version of WIPP-021, and the SER was approved on 4/29/2016. The SER states in the Executive Summary Restrictions paragraph:

> The following additional restrictions are planned to continue even when waste receipt and emplacement are authorized:
>
> - Prohibition on receipt of certain Pipe Overpack Containers (POCs) and all Criticality Controlled Overpacks until issues discussed in SER section 3.3.5 are resolved;
> - Prohibition on RH waste receipt and emplacement (This statement would cover another statement in the DSA that states, "The 10-160B mission for which the hot cell was designed is not authorized")
> - Prohibition on startup of Supplemental Ventilation System.

The SER also states:

> CBFO plans to utilize an Authorization Agreement in conjunction with the implementation of DSA/TSRs Revision 5b principally to restrict waste receipt and emplacement pending the successful performance of an ORR. The Authorization Agreement is written to address environmental, regulatory, and safety requirements applicable to facility operations, as well as any other conditions applicable to implementation prior to or following the ORR that are otherwise not ensured by DSA and TSR, Revision 5b.

DOE/WIPP-01-3181, *Authorization Agreement (AA) for the Waste Isolation Pilot Plant*, was approved on 4/28/2016. The AA states:

> 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 AA must be revised and approved by CBFO prior to CH waste emplacement. The team could not identify a document (e.g., the startup plan, Revision 2) that would remind NTP that this is a prerequisite to CH waste handling. A WIPP Form was generated for this item.

DOE/WIPP-01-3181 does not prohibit the startup of the Supplemental Ventilation System as stated in the SER. A WIPP Form was generated for this item.

This criterion was **partially** met.

2. *A systematic review of the facility's conformance to requirements of these documents was performed by NWP, and the requirements were demonstrated by NWP to be implemented with any identified compensatory measures in place. Compensatory measures and their implementation period are approved by DOE.*

NWP could not provide to the CORR team objective evidence that a systematic review of the facility's conformance to requirements of the HWFP (RCRA permit) was performed by NWP that demonstrated implementation of the requirements. A WIPP Form was submitted for this issue.

The RES Manager and the SEC Manager were interviewed to understand how the RCRA Permit requirements are implemented at NWP. The history behind ensuring the permit requirements are implemented is as follows:

- A baseline review of the permit requirements was performed in 1996 shortly after the permit was issued. This baseline implementation matrix was to ensure the permit requirements were implemented into facility documents. There was no documentation available without an exhaustive record search.
- A baseline review of the permit requirements was also performed in 1997 in preparation for the Operational Readiness Review conducted to provide authorization for WIPP to receive TRU waste. There was no documentation available without an exhaustive record search.
- These baseline reviews were not kept up-to-date, as there were many changes to the permit, and the decision was made not to expend the resources for upkeep.
- For new projects that would require major permit modifications, a project management approach was used. The team reviewed a draft copy of the *Project Execution Plan for the Shielded Container Shipping and Disposal Project*, WP-02-PC.08. As part of the Project Execution Plan, as the documents were developed, a permit modification was drafted. The project was tasked with obtaining the modification approval and helping the NWP operations and generator sites in implementing the permit requirements.
- The permit requires the Waste Analysis Plan, Attachment C-C6 of the permit, requirements to be rolled-down. This roll-down is captured in CCP-PO-001, *CCP TRU Waste Characterization Quality Assurance Project Plan*.
- Currently, the Site Environmental Group screens all documents in accordance with WP 02-PC3001, *WIPP Hazardous Waste Facility Permit Screening.* This screening process is to determine if proposed changes would affect compliance to the permit. The types of changes reviewed include: facility configuration changes; equipment changes or additions; changes or cancellation of controlled documents that direct the performance of work; inspection schedules; waste operations, acceptance, or closure process; training program; and new procedures. Table A of WP 02-PC3001 and the RES website have a list of items that are exempt from the screening. Screeners must complete the self-paced training class, SAF-108. A listing of a broad categories of items that are covered in the permit is provided. The screener uses a searchable copy of the permit to determine if the change will require a modification to the permit. A list of effective tools for searching the permit is provided. Attachment 1 of the procedure provides guidance for completing the screening sheet. Section A of the screen sheet helps determine if the change affects the permit. If any questions in Section A are answered yes, Section B is completed to take a closer look at the changes that might affect the permit. The screen sheet is reviewed and approved by RES.

The team reviewed four NMED RCRA inspection reports from 2015 and 2016. No deficiencies were noted in the reports.

The team reviewed five NWP assessments related to the RCRA program.

- QA Surveillance S15-08, *Groundwater Detection Monitoring Program*, 6/10/2015 – No deficiencies.
- QA Surveillance S16-01, *Emergency Management*, 1/8/2016 – Ten findings (two conditions corrected during assessment) and seven observations; all are closed.
- QA Audit I15-02, Volati*le Organic Compound (VOC), Hydrogen, and Methane Monitoring*, 10/27-10/29/2014 – One condition (corrected during the audit).
- QA Audit I16-02, *Volatile Organic Compound (VOC), Hydrogen, and Methane Monitoring*, 11/30-12/17/2015 – No deficiencies.
- QA Surveillance S15-24, *CH Waste Handling Operations and VSS Equipment* – No findings; one observation.

Considering that NMED has performed four RCRA inspections over the past two years without noting any deficiencies and QA has performed surveillances and audits, with only one surveillance of EM having significant findings, and the rigorous screening process currently being performed, the CORR team is confident that the permit requirements are implemented. The team suggests NWP conduct an audit of EM to see if improvements were made. No compensatory measures are in place.

NWP has conducted a systematic review of conformance to the requirements of the DSA, TSRs, and the SER. This systematic review was the performance of an IVR process as documented in CA-IVR-2016-002, *Implementation Verification Review Final Report (for the) Waste Isolation Pilot Plant Documented Safety Analysis/Technical Safety Requirements, Revision 5b*. The IVR identified 51 findings. Nuclear safety procedure WP-12-NS3018, *Material at Risk Statistics Verification*, was approved on 10/12/2016. The approval of this procedure closes the last IVR finding. No compensatory measures are in place.

Issue WF16-619 identified that the Hazardous Waste Facility Permit (HWFP) inspections were partially completed, but it was not understood that the inspection criteria needs to be completed for all steps in order to note an inspection as compete which constitutes compliance. Examples of this issue were found with sprinkler inspections, fire hoses, hazardous material supplies stored in the hazardous material trailer, and the condition of the hazardous material trailer itself. (Action Level 1; Significant Condition Averse to Quality)

The following initial actions were taken: the immediate actions were to review recent records provided to the NMED to ensure additional inspection criteria provided were accurate. Additional records will be reviewed as an extent of conditions review, to ensure that previous submittals to NMED were accurate. NWP was to establish a schedule to complete the delinquent inspections.

The extent of conditions review team evaluated 2,661 completed inspections. Of those inspections, 12% were either unsatisfactory (6%) or missed (6%). The unsatisfactory inspections were deemed thus because the documentation contained evidence that brought into question the results of the inspection. In some instances, signatures were missing; in others, the required number of consumables was not present as required by the procedure and/or permit. Many of the missed inspections were related to underground inaccessibility or the inability of inspectors to

locate certain pieces of equipment in a timely manner. A much smaller percentage were missed because of performing the inspection outside of the time period designated by the tracking system, either early or late. The remaining ones were missed as a result of tracking issues related to CHAMPS, WIPP's computerized maintenance management system. All corrective actions are on track to be completed per the schedule identified.

As an Action Level 1 condition, a root-cause analysis was required. The root-cause analysis was to help WIPP transition to an operations organization in the coming months by identifying what is needed to apply nuclear-level quality expectations to the permit inspection process.

One of the actions taken as a result of this event was the development of a procedure for a permit implementation matrix, which includes inspections, frequencies, and implementing document. This procedure, WP-02-PC1006, *WIPP Permit Modification Implementation Process for Permit Required Inspections*, was issued on 9/27/2016. An implementation matrix spreadsheet was developed and is being used on a daily basis to ensure inspections are completed as required. An independent assessment (similar to an IVR) will be performed in November to validate the matrix.

This criterion was met.

3. *Fire Exemptions and Equivalencies pursuant to DOE O 420.1C were approved by DOE and required compensatory actions were implemented.*

One exemption has not been approved by the AHJ or fully implemented. The procedure for exemptions and equivalencies, WP 12-FP.20, *WIPP Equivalency, Exemption and Variance Program*, establishes the process for requesting "Relief from Department of Energy Directives, Mandatory Codes and Standards, and the Building Code," in accordance with DOE-STD-1066-2012, *Fire Protection*. The equivalency, exemption, and variance process of WP 12-FP.20 was reviewed and effectively implements the relief process. This subject is discussed further in Objective FP1, Criterion 4.

This criterion was **not** met.

4. *A program to evaluate and report HWFP nonconformances was implemented and assures timely reporting to the NMED.*

WP 02-PC3005, *Permit Reporting 24-Hour, 5-Day Follow Up, Other Noncompliance*, is a recently implemented procedure (10/21/2015) that establishes actions to be performed to ensure timely notifications and reports are made to the NMED Hazardous Waste Bureau, including those required by the HWFP Part 1, Sections 1.7.13 and 1.7.14. The procedure contains actions for the RES organization to ensure these notifications are made. The procedure was developed in response to *Administrative Compliance Order HWB-14-21 Waste Isolation Pilot Plant*, December 6, 2014 Violations 2, 8, and 9, in the areas of permit nonconformance evaluation and reportability. It provides the criteria used to determine if an incident is reportable to the NMED and how it is to be reported.

Two "Other Noncompliance" reports were reviewed that provide objective evidence of the implementation of WP-02-PC3005:

- WP 02-PC3005, Attachment 3 – Noncompliance Description – "The permittees were late in submitting the 'Carlsbad Field Office Procedure Change Report for January 2016.'" This report was required to be submitted on February 29, 2016 . The report was sent to NMED on March 1, 2016; notification to NMED was made on 3/7/2016.
- WP 02-PC3005, Attachment 3 – Noncompliance Description – "The Class 2 Permit modification, dated October 8, 2016 was not sent to the facility mailing list within 90 days of submittal to the NMED." The Class 1 Permit modification was sent to the facility mailing list on February 12, 2016. Notification was made to NMED on 2/11/2016. It was noted by the team that the date on the WP02-PC3005 form Noncompliance Description was October 8, 2016 instead of October 8, 2015.

Other Noncompliance reports are approved by the RES Manager and kept in the RES permitting network folder. These are reported to NMED yearly in October along with the Semi-Annual VOC, Hydrogen, and Methane Data Summary Report.

This criterion was met.

CONCLUSION

Formal agreements between the operating contractor and DOE were established via the contract. A systematic review of the facility's conformance to requirements of the Safety Basis documents was performed by NWP, and the requirements were demonstrated by NWP to be implemented. Appropriate compensatory measures associated with fire protection and nuclear safety are in place. A systematic review of the facility's conformance to requirements of the initial HWFP was performed by NWP, and subsequent changes were systematically managed through the change control process. The CORR team is confident that the past and present actions demonstrate the requirements were implemented.

This objective was met. There were no findings identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	Joe Uptergrove **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Management**	Objective: MG5 Date: 10/14/2016	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

MG5: An effective feedback and improvement process (i.e. Contractor Assurance System [CAS]) was established to identify, evaluate, and resolve deficiencies and recommendations made by contractor line management and independent contractor audit and assessment groups. The process also provides for resolution of issues and recommendations by external official review teams and audit organizations. An effective CAS pursuant to DOE O 226.1 is established. (CR 14)

CRITERIA

1. Pre-start findings resulting from the MSA and IVRs were appropriately closed. CAPs were established for post-start findings resulting from the MSA and IVRs. These do not negatively affect waste emplacement operations based on collective significance review
2. A corrective action and lessons learned process is established and in place for WIPP activities as follows:
    - Strong line management leadership of issues management program activities (problem identification, prioritization, analysis, and timely resolution) is evidenced through: (1) demonstrated ownership of and involvement with issues management program activities commensurate with significance; (2) problem and corrective action backlogs are kept low enough to avoid impeding management's ability to determine and respond to issues of safety and mission significance in a timely manner; (3) problem resolution and backlog reduction efforts focus concurrently on timely and effective issue resolution; and (4) corrective action information is used to support organization and project trending and performance analysis activities.
    - A means to identify work product deficiencies, human performance, and process concerns and issues that potentially impact safe and effective project execution or personnel safety is available to all staff and is used to identify such concerns and issues to management.
    - Condition reports are promptly evaluated for safety, mission impact, facility operability, and regulatory reportability concerns. Problems, lessons learned, and suggestions for improvement are prioritized, analyzed, and addressed commensurate with their importance. Managers are promptly made aware of significant project problems and follow-up to ensure timely resolution (issue screening).
    - Issue analysis is effectively delivered as evidenced by: (1) skilled, knowledgeable personnel perform causal analyses and event investigations, and such analyses and investigations are completed in a timely manner; (2) significant problems are

analyzed to identify technical, human performance, and organizational causes and contributors; the extent of condition and causes are evaluated during the analyses of significant and repetitive problems.

- Corrective actions are effectively managed and implemented as evidenced by: (1) corrective actions are timely, commensurate with the significance of the problems; (2) effectiveness reviews are conducted on corrective actions intended to prevent recurrence of significant problems; (3) responsibilities for implementing corrective actions are clearly assigned. Actions to address problems and other improvement initiatives are tracked through the project corrective action system or some other formal tracking system until completed.

3. Procedures and/or mechanisms are in place and utilized by personnel to collect feedback information such as self-assessment, monitoring against performance objectives, occurrence reporting, event investigation, and routine observation. Personnel assigned these roles are competent to execute these responsibilities.
4. Procedures are in place that develop feedback and improvement information opportunities at the site and facility levels (ESRB, Quality Review Board, etc.). Note that activity level post-job reviews will be assessed as part of CRAD WPC1.
5. Procedures and/or mechanisms are in place, which include a process for oversight that ensures regulatory compliance is maintained.

APPROACH

Records Reviewed

- CAS Presentation entitled, *Change Management Producing the 'Pace of Change' at its Optimal Level*
- *Change Management User Workbook* (adapted from WP 15-CA1005)
- *Configuration Management SMP, Analysis from 8/2015 thru 9/2016*, presented at 10/6/2016 ESQRB
- *Corrective Action Program Performance Report*, presented at 10/4/2016 CARB
- DOE O 210.2A, *DOE Corporate Operating Experience Program*, 4/8/2011
- DOE O 232.2, *Occurrence Reporting and Processing of Operations Information*, 3/12/2014
- DOE O 414.1D, *Quality Assurance*, 4/25/2011
- Lessons Learned, *128 Roof Bolt Hydraulic Tank Equipment*, WIPP-JITLL-2015-014, 8/24/2015
- Lessons Learned, *Deficient Fire Suppression Equipment Identified by Third Party*, WIPP-JITLL-2016-027, 4/21/2016
- Lessons Learned, *Missed Instrument Calibration Results in Procedure Violation*, WIPP-JITLL-2016-064, 8/8/2016
- Lessons Learned, *Missed Step – LOTO During Filter Change*, WIPP-JITLL-2016-005, 1/25/2016
- MC 1.13, R1, *Executive Safety and Quality Review Board*, 8/25/2015
- MC 1.16, R0, *Corrective Action Review Board*, 8/14/2015
- MP 1.20, R12, *Management Assessments*, 10/22/2012

- MP 1.21, R8, *Management Responsibility and Accountability*, 1/23/2015
- *News from Contractor Assurance* Newsletters, August 2015, November 2015, March 2016
- *NWP Annual Assessment Schedule – FY'17/1st Quarter FY'18*, R0
- *NWP Health Dashboard, August 2016*, presented at 10/6/2016 ESQRB
- WF16-661, *Root Cause Analysis Report RCAR-2016-005, LCO Actions Exited with System Operability Indeterminate*
- WF16-815, *Root Cause Analysis Report RCAR-2016-007, Ground Support in E300 between S2520 and S2750*
- *WIPP Form Trend Analysis: 1/1/2016 to 6/30/2016*, R0, 9/14/2016
- WIPP Forms (representative samples)
- WP 04-AD3032, R4, *Senior Management Review Board*, 9/29/2014
- WP 13.QA3006, R9, *Data Analysis and Trending*, 12/20/2012
- WP 15-CA.01, R1, *Contractor Assurance Program Description*, 6/29/2015
- WP 15-CA.02, R0, *Line Management Assessment Implementation Plan*, 4/9/2015
- WP 15-CA1001, R2, *Independent Assessments*, 8/16/2016
- WP 15-CA1002, R1, *Self-Assessment*, 7/25/2016
- WP 15-CA1003, R0, *Management Observation*, 9/21/2015
- WP 15-CA1004, R0, *Performance Monitoring and Reporting*, 11/9/2015
- WP 15-CA1005, R0, *Change Management*, 12/9/2015
- WP 15-CA1006, R2, *Safety Basis Implementation Verification Reviews*, 5/17/2016
- WP 15-CA1007, R1, *Fact Finding and Critiques*, 8/23/2016
- WP 15-CA1009, R0, *Causal Analysis*, 8/23/2016
- WP 15-GM1000, R9, *Management Assessments*, 12/9/2014
- WP 15-GM1001, R5, *Root Cause Analysis*, 5/29/2014
- WP 15-GM1002, R4, *Issues Management Processing of WIPP Forms*, 6/9/2015
- WP 15-MD3102, R10, *Event Investigation*, 9/30/2015
- WP 15-PA.01, R4, *Operating Experience/Lessons Learned Program*, 5/17/2016
- WP 15-PA.02, R2, *Causal Analysis Guidance*, 5/29/2014
- WP 15-PA1000, R5, *Regulatory Requirements Impact Assessment Process*, 12/9/2014
- WP 15-PA1001, R3, *Safety Management Program Health Assessment Methodology*, 7/14/2015
- WP 15-PA1002, R4, *Requirements Management*, 9/30/2015
- WP 15-PA2000, R5, *Lessons Learned Bulletin Development*, 9/2/2014
- WP 15-PA4000, R3, *Self-Assessments*, 8/20/2013
- WP 15-RA.01, R11, *Nuclear Safety & Worker Safety and Health Compliance Program*, 6/26/2015

Interviews Conducted

- Business and Finance Manager
- Change Management Coordinator
- Contractor Assurance Manager
- Deputy ESH Manager

- Deputy Project Manager
- Deputy QA Manager
- EM & Security Management
- Engineering Manager
- ESH Manager
- Infrastructure & Site Services Manager
- Issues Management and Corrective Action Program Manager
- Maintenance Manager
- Operations Manager
- President & Project Manager
- QA Manager
- Regulatory Reporting Manager
- Restart Manager
- Self-assessment and Continuous Improvement Manager
- Technical Training and Procedures Manager
- See interviews for other SMP CRADs

Evolutions/Operations Witnessed

- ESQRB
- CARB meeting
- WIPP Form Screening Committee – 10/11/2016
- T-0 Daily Scheduled Work/ Daily Release – 10/4/2016
- See evolutions for other SMP CRADs

DISCUSSION OF RESULTS

1. *Pre-start findings resulting from the MSA and IVRs were appropriately closed. CAPs were established for post-start findings resulting from the MSA and IVRs. These do not negatively affect waste emplacement operations based on collective significance review.*

Pre-start findings from the MSA and IVRs were appropriately addressed, with the exception of the exemption request involving automatic suppression systems for the underground facilities that is awaiting approval by DOE headquarters; two projects (underground fire suppression upgrades and fire suppression upgrades for liquid-fueled equipment) scheduled for completion in October 2016; and five other items (including completion of Panel 7 ground control activities to support emplacing waste in Panel 7, Room 5), which are also scheduled for completion in October.

This criterion was met.

2. *A corrective action and lessons learned process is established and in place for WIPP activities as follows:*
    - *Strong line management leadership of issues management program activities (problem identification, prioritization, analysis, and timely resolution) is evidenced*

through: (1) demonstrated ownership of and involvement with issues management program activities commensurate with significance; (2) problem and corrective action backlogs are kept low enough to avoid impeding management's ability to determine and respond to issues of safety and mission significance in a timely manner; (3) problem resolution and backlog reduction efforts focus concurrently on timely and effective issue resolution; and (4) corrective action information is used to support organization and project trending and performance analysis activities.

NWP has assembled a qualified Contractor Assurance staff to ensure focus on issues management, and has integrated the requirements into other organizations to maintain focus on timely identification of issues throughout the organization. Senior management champions the use of WIPP Forms to capture issues, and communicates management support of issue identification through frequent communications to the workforce. This attention also ensures that the issues are addressed in a timely manner and that the backlog is maintained at a level that does not affect the mission. During the period of 1/1/2016 to 10/12/2016, 1718 WIPP Forms were generated; of the current 745 open actions, only 56 are overdue. NWP senior management tracks a weekly metric for delinquent WIPP Form actions to ensure timely action is taken to address critical issues. The senior management CARB conducts formal reviews to ensure that important issues are evaluated and corrected. Additionally, the ESQRB monthly reviews performance indicators and the health of SMPs to monitor trends and to adjust priorities based on leading and lagging indicators.

- *A means to identify work product deficiencies, human performance, and process concerns and issues that potentially impact safe and effective project execution or personnel safety is available to all staff and is used to identify such concerns and issues to management*

NWP's Contractor Assurance program uses a three-pronged approach to focus on issues that affect work product deficiencies, human performance, and operations (i.e. Issues Management and Corrective Actions, Self-Assessments and Continuous Improvement, and Regulatory Reporting). As noted previously, all employees are encouraged to submit WIPP Forms to capture issues and concerns, especially safety- and process-related items. The WIPP Form screening committee reviews the new issues daily, assesses priority, assigns cause codes, and designates a responsible manager. A comprehensive Annual Integrated Assessment Plan and schedule is formulated to target areas identified by management to ensure continuous improvement opportunities are recognized. Regulatory reporting ensures compliance with DOE O 232.2 and other regulatory reporting requirements, and ensures that lessons learned both at WIPP and at other facilities are captured and disseminated.

- *Condition reports are promptly evaluated for safety, mission impact, facility operability, and regulatory reportability concerns. Problems, lessons learned, and suggestions for improvement are prioritized, analyzed, and addressed commensurate with their importance. Managers are promptly made aware of significant project problems and follow-up to ensure timely resolution (issue screening).*

The WIPP Form Screening Committee, chaired by the CAS Issues Management and Corrective Action Program Manager, meets daily to screen new WIPP Forms for significance, ascribe trend

codes, and assign a responsible manager. Representatives from operations, engineering, ESH, nuclear safety, QA, emergency and security management, and the National TRU Program are on the committee. The committee also assigns the significance level to the issue. Actionees are notified through electronic workflows, where progress is tracked by management. The CARB provides senior management oversight to ensure that important issues are effectively evaluated and corrected. Additionally, senior management tracks WIPP Form date extensions as a performance indicator, to ensure that dates and commitments are met.

- *Issue analysis is effectively delivered as evidenced by: (1) skilled, knowledgeable personnel perform causal analyses and event investigations, and such analyses and investigations are completed in a timely manner; (2) significant problems are analyzed to identify technical, human performance, and organizational causes and contributors; the extent of condition and causes are evaluated during the analyses of significant and repetitive problems.*

NWP has a cadre of personnel trained in causal analysis and event investigation. To ensure incidents are investigated in a timely manner, NWP conducts fact finding reviews with all individuals involved in an event to capture critical information, namely, the event chronology, causes, issues, and actions. These meetings are for data gathering purposes only, and are not designed to assign blame. A simple four-quadrant form is used to capture the data, and to make an initial determination of the significance of the event. The need for a root-cause analysis, apparent cause analysis, and lessons learned can result from this review. A WIPP Form is then developed and processed for action.

- *Corrective actions are effectively managed and implemented as evidenced by: (1) corrective actions are timely, commensurate with the significance of the problems; (2) effectiveness reviews are conducted on corrective actions intended to prevent recurrence of significant problems; (3) responsibilities for implementing corrective actions are clearly assigned. Actions to address problems and other improvement initiatives are tracked through the project corrective action system or some other formal tracking system until completed.*

The increased use of WIPP Forms is evidence that corrective actions are being addressed in a timely manner. The multi-disciplined WIPP Form Screening Committee ensures that corrective actions are assessed for significance and assigned to responsible managers. Progress is tracked electronically in the Issues Management Tracking System, which provides insight to management on the progress of all issues. The CARB and ESQRB regularly review the progress of all actions and act proactively to ensure commitments are met.

This criterion was met.

3. *Procedures and/or mechanisms are in place and utilized by personnel to collect feedback information such as self-assessment, monitoring against performance objectives, occurrence reporting, event investigation, and routine observation. Personnel assigned these roles are competent to execute these responsibilities.*

Procedures are in place within Contractor Assurance for fact findings and critiques, independent and self-assessments, management observations, performance monitoring and reporting, and

operating experience and lessons learned. Personnel assigned to these roles are experienced professionals with in-depth knowledge of tools and concepts required to execute an effective program. The CAS team, in partnership with senior management, has socialized the programs with the employees and developed new metrics to focus on continuous improvements based on trends and meaningful operational data.

This criterion was met.

4. *Procedures are in place that develop feedback and improvement information opportunities at the site and facility levels (ESRB, Quality Review Board, etc.). Note that activity level post-job reviews will be assessed as part of CRAD WPC1.*

Procedures are in place to ensure performance feedback is provided and opportunities for improvement are identified and investigated. Management observations, lessons learned, the WIPP Form trend analysis process, and the new change management all provide avenues feedback and improvements. NWP has also developed a comprehensive set of performance metrics – the NWP Health Dashboard – which is actively monitored by the ESQRB to keep focus on trends and mission critical activities.

This criterion was met.

5. *Procedures and/or mechanisms are in place, which include a process for oversight that ensures regulatory compliance is maintained.*

Strong senior management support, coupled with a comprehensive Contractor Assurance program, provide strong programmatic emphasis on regulatory compliance. Processes are in place to screen issues and events against the requirements of DOE 232.2, *Occurrence Reporting and Processing of Operations Information*, and in the Price-Anderson Act. WP 15-PA1000, *Regulatory Requirements Impact Assessment Process*, defines the process in place to review new orders and directives for impact to processes and procedures.

This criterion was met.

CONCLUSION

NWP has developed a comprehensive CAS that includes directives management; regulatory screening and reporting; assessments; issues management and corrective actions; performance analysis, trending, and reporting; and lessons learned and continuous feedback and improvement. Senior management's ESQRB is actively using the outputs of the CAS to develop and monitor system health metrics. Issues and process improvements are captured on WIPP Forms, and tracked from initiation through closure. NWP's prioritization of issues resolution is ineffective, which can cause significant safety related items to be addressed in a less than timely manner, as reflected in Objectives EP1, ISH1, and RP1.

This objective was met. There were no findings identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	Deborah Hojem **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Maintenance**	Objective: MIT1 Date: 10/7/2016	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

MIT1: Line management has established a Maintenance SMP, including ISIs, to ensure safe accomplishment of work. The level of knowledge of Maintenance and ISI managers and staff is adequate based on review of records, interviews, and observation of operational demonstrations. (CR 1, 4)

CRITERIA

1. Maintenance contract requirements are flowed into facility-specific procedures.
2. Maintenance procedures are effectively implemented in support of the facility, including:
    - ISIs of Design Features are accomplished (SMP KE 10-1).
    - Testing, calibration, operability, and preventive/corrective maintenance are accomplished for safety-significant and defense-in-depth SSCs, CAMs, and liquid-fueled vehicles, in accordance with applicable code requirements, manufacturer recommendations, established technical requirements, and engineering judgment consistent with tracking, trending, and failure history (SMP KE 10-2).
    - Tracking and trending of the performance and deficiencies associated with safety-significant and defense-in-depth SSCs, CAMs, and liquid-fueled vehicles is accomplished. (SMP KE 10-3).
    - Equipment deficiency tracking is accomplished for equipment (including equipment in reduced status). This activity identifies, tracks, and evaluates safety impacts and implements compensatory measures until equipment is returned to service. (SMP KE 11-9).
3. Sufficient qualified personnel are available to implement the Maintenance program effectively in support of the facility.
4. WIPP has adequate facilities, and equipment is available to ensure that Maintenance support and services are adequate for safe facility operation.
5. The level of knowledge of managers and staff responsible for administering and implementing the Maintenance program is adequate based on review of records, interviews, and observation of operational demonstrations. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.
6. AIB JONs related to maintenance, inspection and testing were addressed through effective corrective actions for the Maintenance SMP.

APPROACH

Records Reviewed

- 04-AD3030, R6, *Pre-Job Briefings and Post-Job Reviews*, 4/2015
- 12-NS3017, R0, *In Service Inspection of WIPP Design Features*, 5/2016
- AIB JON 13.2, 13.3, 13.4, 13.7, 14.3, 15.1, and 15.2
- DOE/WIPP 07-3372, R5b, *Waste Isolation Pilot Plant Documented Safety Analysis*, 4/2016
- DOE/WIPP 07-3373, R5b, *Waste Isolation Pilot Plant Technical Safety Requirements*, 4/2016
- DOE/WIPP-06-3335, R4, *WIPP Nuclear Maintenance Management Plan*, 12/2015
- EA04AU9534-1-0, R2, *Operation of Liquid Fueled Vehicles and Equipment Sign-Off Sheet*, 5/2016
- EA12NS3017-1-0, *Design Feature Inspection Form*
- Memorandum, DW:16:01007, UFC:4700.00, from Gadbury to Breidenbach, Subject: *Contract DE-EM0001971- Nuclear Waste Partnership LLC – Contracting Officer Representative direction for delivery of Minimum Set of Maintenance Metrics by NWP to CBFO on a Quarterly Basis*, 2/8/2015
- WO 1618719, *In Service Inspection of WIPP Design Feature-Waste Hoist Support Structure* performed 5/26/2016
- WO1618715, *In Service Inspection of WIPP Design Feature-Panel 6 and Panel 7 room 7 Bulkheads* performed 5/25/2016
- WO1618716, *In Service Inspection of WIPP Design Feature-FCLR, CUR and Transfer Cell Shielding* performed 5/26/2016
- WO1618717, *In Service Inspection of WIPP Design Feature-Remote Handling (RH) Facility Cask/WIPP Site* performed 5/25/2016
- WO1618718, *In Service Inspection of WIPP Design Feature-Underground Fuel and Storage Locations* performed 5/25/2016
- WO1618720, *In Service Inspection of WIPP Design Feature-Facility Pallets for CH Waste 52-Z-002 series* performed 5/25/2016
- WO1618721, *In Service Inspection of WIPP Design Feature-Type B Shipping Package RH 72B, TRUPACT-III, TRUPACT-II, HalfPACT*, performed 5/25/2016
- WO1618721, *In Service Inspection of WIPP Design Feature-Vehicle Barriers* performed 5/26/2016
- WO1618722, *In Service Inspection of WIPP Design Feature-Waste Handling Building (WHB)*, performed 5/25/2016
- WO1623537, *PM Waste Handling Hoist Lilly Controller Weekly Inspection and Maintenance*
- WO1623560, *PM Underground Exhaust Fan 41-B-860A, B & C*
- WO1623668, *PM Diesel Generator Load Bank*
- WO1626803, *PM Fletcher Roof Bolters Inspection and Maintenance*
- WO1626889, *PM Stationary iCam Alpha/Beta Air Monitor Calibration*
- WO1626891, *PM Filter Units 41-B-856 and 41-B-857 Mod and High Filter Differential Pressure Loop Calibrations*

- WP04-AD.02, R5, *Technical Safety Requirements Surveillance Program*, 5/2016
- WP04-AD3011, R16, *Equipment Lockout/Tagout*, 6/2016
- WP04-AU1031, R2, *Roof Bolter Preoperational Requirements*, 5/2016
- WP04-AU9534, R2, *Operation of Liquid Fueled Vehicles and Equipment in Underground and Movement of 300 Gallon (Nominal) Fuel Tank*, 5/2016
- WP10-AD3032, R3, *Lube Truck Preoperational Requirements*, 5/2016
- WP10-WC3010, R29, *Periodic Maintenance Administration and Controlled Document Processing*, 5/2016
- WP10-WC3011, R37, *Work Control Process*, 5/2016
- WP10-WC3017, R1, *Post-Maintenance Testing*, 9/2014
- WP12-HP3201, R2-FRI, *Radioactive Source Accountability and Control*, 9/2016
- WP12-IS3002, R14, *Job Hazard Analysis Performance and Development*, 3/2016

Interviews Conducted

- Deputy Maintenance Manager
- Maintenance Foreman (2)
- Maintenance Manager
- Maintenance Supervisor (2)
- Maintenance Workers (11)
- Underground Planning Manager
- Work Package Closeout Personnel
- Work Package Planner (3)
- Work Package Scheduler

Evolutions/Operations Witnessed

- PM031019, *Waste Handling Hoist Lilly Controller Weekly Inspection and Maintenance*, 10/4/2016
- Pre-job briefing for performance of IC411042, 10/5/2016
- IC411042, *Stationary iCam Alpha/Beta Air Monitor Calibration*, 10/5/2016
- Post-job review for performance of IC411042, 10/5/2016
- Pre-job briefing for performance of IC041001, 10/6/2016
- IC041001, *PM Filter Units 41-B-856 and 41-B-857 Mod and High Filter Differential Pressure Loop Calibrations*, 10/6/2016
- Post-job review for performance of IC041001, 10/6/2016
- Pre-job briefing for performance of PM041042, 10/7/2016
- PM041042, *PM Underground Exhaust Fan 41-B-860A, B & C*, 10/7/2016
- Pre-job briefing for performance of PM025088, 10/8/2016
- PM025088, *Diesel Generator Load Bank*, 10/8/2016
- Post-job review for performance of PM025088, 10/8/2016
- Pre-job briefing for performance of PM074123, 10/10/2016
- PM074123, *Fletcher Roof Bolters Inspection and Maintenance*, 10/10/2016

- Post-job review for performance of PM074123, 10/10/2016
- Fact Finding – Underground Exhaust Fan 860A Lockout/Tagout

DISCUSSION OF RESULTS

1. *Maintenance contract requirements are flowed into facility-specific procedures.*

A review of the WIPP Nuclear Maintenance Management Plan demonstrated that there is an adequate flow-down of contract requirements into facility-specific procedures. The plan provides a narrative section describing credited WIPP implementing procedures; the DOE orders, guides, and regulations to which the procedures are tied; and a table and attachment that provide a cross reference with an integration of regulations, DOE orders, manuals against WIPP program documents. WIPP maintenance procedures were reviewed to validate programmatic implementation of the governance documents.

This criterion was met.

2. *Maintenance procedures are effectively implemented in support of the facility, including:*
    - *ISIs of Design Features are accomplished (SMP KE 10-1).*
    - *Testing, calibration, operability, and preventive/corrective maintenance are accomplished for safety-significant and defense-in-depth SSCs, CAMs, and liquid-fueled vehicles, in accordance with applicable code requirements, manufacturer recommendations, established technical requirements, and engineering judgment consistent with tracking, trending, and failure history (SMP KE 10-2).*
    - *Tracking and trending of the performance and deficiencies associated with safety-significant and defense-in-depth SSCs, CAMs, and liquid-fueled vehicles is accomplished. (SMP KE 10-3).*
    - *Equipment deficiency tracking is accomplished for equipment (including equipment in reduced status). This activity identifies, tracks, and evaluates safety impacts and implements compensatory measures until equipment is returned to service. (SMP KE 11-9).*

By review of completed DSA Design Feature KE ticklers and interviews, the team determined that the ISIs identified in the WIPP DSA were accomplished with acceptable results, with one exception (the ISI for Design Feature 6.9, RH shipping package 5-year PMs, is overdue for several containers). This action is being tracked in the fleet inventory/maintenance tracking schedule for all shipping containers authorized for shipment to WIPP. The status is tracked through the Packaging Group computerized maintenance management system, the CHAMPS database (separate from Maintenance CHAMPS). This schedule is a living document that is updated (typically weekly) for status changes. When a unit is out of service, the CCP Transportation Group tags it to prevent its use. Additionally, the next scheduled due date for each ISI is listed in the *WIPP TSR Surveillance Schedule – 30-Day Look Ahead*. One additional concern was identified with the performance of the ISI for Design Feature 6.10-FCLR, *CUR, and Transfer Cell Shielding*. Attribute 2 requires “viewing window(s) are not damaged or show signs of degradation (e.g., cracks open to the surface and or leaking oil, degraded or missing seal) to the extent that it can no longer perform its credited function.” The inspection is marked as

"Acceptable," but the comment section states that the "FCLR, cracked window, previously evaluated in ECO 10261. Limits of crack marked and dated." Since this window is serving a Design Feature function, consideration should have been taken to replacing the window while the facility is not processing waste. SMP KE 10-1 was met.

Through technical work document reviews; reviews of calibration records, completed work packages and surveillances; and observation of work evolutions and interviews with Maintenance Managers, Supervisors, and workers; it was determined that testing, calibration, operability, and corrective maintenance are successfully accomplished for safety-significant and defense-in-depth SSCs, CAMs, and liquid fueled vehicles. WIPP Form WF16-1141, ICEs 451, 452, 453, 482, 485, and Corrective Action Report 16-016 all relate to inadequacies of the PM program. In response, the maintenance organization has developed the WIPP NWP Periodic Maintenance Optimization Evaluation to provide compensatory measures until existing procedures are revised or replaced. This document provides a comprehensive set of maintenance definitions, proposed performance classifications – with required levels of performance based on specific component criteria – clearly defined roles and responsibilities, and a performance section that clearly outlines the steps necessary to conduct a thorough PM evaluation. This documented program was endorsed by both the WIPP Maintenance Manager and the Engineering Design Authority Manager. Engineering has an additional compensatory measure requiring the Design Authority Manager (or his designee) to approve all periodic maintenance identification forms to verify justifications are acceptable. WIPP Form WF16-1809 was generated to track this issue to completion. SMP KE 10-2 is not met.

A review of current metrics developed for the tracking and trending of performance and deficiencies associated with safety-significant and defense-in-depth SSCs, CAMs, and liquid-fueled vehicles is accomplished through data analysis of equipment records and information contained in the Maintenance CHAMPS. High level metrics exist for overall Maintenance Program health and are used by the management team to trend performance and include Corrective Maintenance Backlog (with safety-significant component), Periodic Maintenance performance, Non-PM Open Backlog – Safety and Facility Mission Action Backlog, and Schedule Adherence. WIPP also monitors metrics (developed quarterly) in response to the DOE Deferred Maintenance Report Recommendations and Implementation Plan. Those metrics include Scheduled vs. Completed Work, PM Backlog (without Grace), Corrective Maintenance Backlog, Fire Protection System Impairment Age, Fire Protection/Detection (Unplanned) Impairments, Maintenance Budget, number of Unplanned TSRs, LCOs, Safety-Significant/Class System Availability, and Corrective Maintenance Work Request Age (medium to high priority). Lower-tier metrics used to manage the business, however, have not been automated. All necessary information to populate lower-tier metrics has to be mined manually out of the CHAMPS, which can lead to inconsistencies in metric data (resulting from variations in data pulled from the database), through an extremely labor-intensive process. A request for Information Technology support to automation of metrics was generated by the facility (TARP # 7272015-1), but such support is limited and response has been slow. WIPP Form WF16-1824 was generated for this issue. SMP KE 10-3 is met.

Procedure 10-WC3011, *Work Control Procedure*, Revision 37, is the management control procedure that implements the WIPP Action Request initiation and use of CHAMPS for

equipment deficiency tracking (including equipment in reduced status). This process identifies equipment that requires repair or replacement and tracks the equipment through the work control process until it is returned to service. During new work screening, the WIPP team prioritizes the work activity, evaluates safety impacts, and implements compensatory measures until equipment is returned to service. The team performing screening activities is comprised of representatives from operations, maintenance, work control, engineering, and other organizations to ensure that priority is appropriate based on facility needs, and compensatory actions are identified as required. Trending is performed using the metrics listed. The facility would benefit from the re-implementation of a logic-tied Primavera 6 schedule to facilitate long range scheduling of key modifications and projects to manage critical path activities. WIPP Form WF16-1825 was generated for this activity. SMP KE 11-9 was met.

This criterion was met.

3. *Sufficient qualified personnel are available to implement the Maintenance program effectively in support of the facility.*

The determination of sufficient qualified personnel being available to implement the Maintenance Program and effectively support the facility was made through interviews with personnel at all levels of the organization, observations of activity level work performance, and an evaluation of the CR 12.4.7 Evidence File developed to demonstrate adequate staffing for the operations department to conduct operations. Additional staffing evaluations were performed by the maintenance organization to determine impacts resulting from facility changes, upgrades, and modifications, including the change in SSC classification and resulting impact on work planning and control. This document identifies baseline staffing levels in FY13, current (FY16) staffing levels with sixteen vacancies identified, and projected staffing needs for FY17. Staffing levels are adequate to support the current WIPP mission. Headcount for FY17 reflects the additional personnel that will be needed to support the facility once CH waste emplacement resumes. Vacancies identified include one manager, one administrative assistant, one electrician, three maintenance engineers, two hoisting workers, two underground electrical workers, three work control center workers, and three corrective maintenance planners. These vacancies were identified to Human Resources, and are under evaluation based on funding.

This criterion was met.

4. *WIPP has adequate facilities, and equipment is available to ensure that Maintenance support and services are adequate for safe facility operation.*

An evaluation of facility configuration to support maintenance activities performed by the 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. WIPP Surface Maintenance currently has one adequate instrumentation and controls (I&C) shop, one maintenance shop with limited space and shop equipment, and no electrical maintenance shop. The MSA finding (F-MIT-001) resulted in the generation of WIPP Form WF16-1415 to track the issue to proper closure.

The provided list of WIPP Critical Spare Parts consists of an Inventory Data Listing Report from the WIPP warehouse. The criteria listed for the report was Quality Level: ML-1 and Inventory Type: Spare. A total of 167 parts are listed as critical for 275 safety-significant (ML-1) SSCs, and approximately 2,000 ML-2 SSCs. Further evaluation of assets that are critical for safe execution of the WIPP mission should be considered. WIPP Form WF16-1752 was generated for this action.

This criterion was **not** met.

5. *The level of knowledge of managers and staff responsible for administering and implementing the Maintenance program is adequate based on review of records, interviews, and observation of operational demonstrations. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.*

This was demonstrated through interviews with Maintenance and Work Control Managers, Supervisors, programs personnel, craft personnel, and work control personnel, and through observations of activities. Individuals observed and interviewed demonstrated a level of knowledge appropriate for their level of responsibilities. Several observations were made where craft individuals showed very high levels of technical competency, and it was noted they were often paired with slightly less experienced individuals to help advance the organization's overall level of proficiency by discipline. Observed pre-job briefings were very thorough, often exercising the reverse briefing process. The two-minute rule hazard evaluation process was emphasized, where the workers take two minutes to evaluate the work location to determine if there are additional hazards or unexpected conditions. Excellent use of reader/worker three-way communications were observed, as well as discussions of Human Performance tools that can be used in the field during activity-level work, and lessons learned from previous performance of the activity. Almost every job had a detailed, formal post-job review to discuss what went well and what did not, including possible improvement opportunities for work instruction sequencing or clarity. One concern was raised in the underground in that the workers who are housed in the maintenance office area have not been trained on the newly-installed fire suppression system and have a voiced a concern that they would like training on the system prior to it becoming operational. Instances were also noted where issues, including verbatim compliance with technical work documents, were identified during the performance of work.

During the performance of PM025088, *Diesel Generator Load Bank*, multiple craft were working multiple steps at the same time. This was observed by a senior manager, who asked the first line manager to take a pause and remind his crew of the requirement to complete one step before moving to the next. A post-job review was conducted and the first line manager again discussed the requirement, and offered that an additional option would be to revise the procedure to identify which steps could be performed in parallel.

During the performance of Lockout/Tagout installation for the performance of PM041042, *Underground Exhaust Fan 41-B-860A*, the initial lock out installation sequence was not consistent with the first step in the work instructions.

During the performance of PM IC041001, *Filter Unit 41-B-857 Mod and High Filter Differential Pressure Loop Calibration*, a worker read an installed instrument with greater detail than the scale on the gauge allowed (i.e. finer than half of the indicator mark). WIPP Form WF16-1837 was generated for these issues.

This criterion was met.

6. *AIB JONs related to maintenance, inspection and testing were addressed through effective corrective actions for the Maintenance SMP.*

This was demonstrated through the review of the work control/maintenance-related AIB JONs (13.2, 13.3, 13.4, 13.7, 14.3, 15.1, 15.2), closure files as maintained by the Contractor Assurance organization. All closure files, with the exception of JON 13.7, contained the required documentation for prescribed actions required for closure. JON 13.7 was listed as on "CBFO Comment Hold" and the time of review.

This criterion was met.

CONCLUSION

Efforts to improve conduct of operations in the maintenance organization have resulted in a substantial improvement in the rigor applied to the performance of work. Coaching and mentoring through management time in the field is evident, as the craft personnel seemed very comfortable being observed and, for the most part, were not resistant to questions. Maintenance requirements were flowed down into facility-specific procedures, as is evident in the WIPP Nuclear Maintenance Management Plan. Those procedures are effectively implemented to support the facility. Staffing is adequate at the present time, but additional resources will be needed once CH waste emplacement activities resume. All personnel are adequately trained, qualified, and are proficient to perform their jobs; their level of knowledge is commensurate with their level of responsibility. However, maintenance metrics do not contain the level of granularity needed to be a useful tool to manage the business effectively. A PM Optimization compensatory action is in place to improve the PM program. Based on interviews with maintenance workers, the number of spare parts, including those deemed critical, may be insufficient to sustain continued facility operation. The Maintenance Manager recognizes this condition and is working with the engineering organization to determine an appropriate path forward for operational sustainability. And, while verbatim procedure compliance issues have decreased significantly, there are still instances being observed. Continued Maintenance Program vigilance, and continued management presence in the field will continue to improve conduct of maintenance at WIPP.

This objective was met. There were no findings identified.

FINDINGS

<u>Pre-Start</u>
None

Post-Start
None

Assessed by:	Bonnie Barnes **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Maintenance**	Objective: MIT2 Date: 10/14/2016	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

MIT2: A program is in place to confirm and reconfirm periodically the condition and operability of VSSs. This includes examinations of records of tests and calibration of these systems. (CR 7)

CRITERIA

1. Procedures for surveillance and calibration testing, ISI, and safety assessment of safety-significant SSCs are effectively implemented in support of WIPP operations.
2. VSS assessments and associated SHRs were completed as scheduled, and were adequate and effective.
3. ISIs were performed and documented to confirm operability of the required VSSs.
4. Surveillance and calibration tests were performed and documented to confirm operability of required VSSs.
5. A surveillance tracking system is in place and effective to ensure TSR surveillance requirements are completed and confirms operability of associated SSCs within the required periodicity.
6. The daily Facility Mode Compliance Review is effectively implemented to assure compliance with the DSA and TSRs.

APPROACH

<u>Records Reviewed</u>

- 12-NS3017, R0, *In Service Inspection of WIPP Design Features*, 5/2016
- DOE/WIPP 07-3372, R5b, *Waste Isolation Pilot Plant Documented Safety Analysis*, 4/2016
- DOE/WIPP 07-3373, R5b, *Waste Isolation Pilot Plant Technical Safety Requirements*, 4/2016
- *T-0 Daily Scheduled Work/Daily Release*, 10/4/2016 – 10/11/2016
- *WIPP / NWP Health Dashboard*, August FY 2016
- *WIPP TSR Surveillance Schedule – 30-Day Look Ahead*, 9/28/2016
- WO 1618719, *In Service Inspection of WIPP Design Feature-Waste Hoist Support Structure* performed 5/26/2016
- WO1411985, *System Walkdown of Waist Hoist*, 5/8/2015
- WO1509230, *System Walkdown of Exhaust Fans and Filters*,12/5/2015
- WO1618718, *In Service Inspection of WIPP Design Feature-Underground Fuel and Storage Locations* performed 5/25/2016

- WO1618720, *In Service Inspection of WIPP Design Feature-Facility Pallets for CH Waste 52-Z-002 series* performed 5/25/2016
- WO1623560, *PM Underground Exhaust Fan 41-B-860A, B & C*
- WO1623668, *PM Diesel Generator Load Bank*
- WO1626803, *PM Fletcher Roof Bolters Inspection and Maintenance*
- WO1626891, *PM Filter Units 41-B-856 and 41-B-857 Mod and High Filter Differential Pressure Loop Calibrations*
- WP 04-CO.01-8, R5, *Conduct of Operations Program – Control of Equipment and System Status*, 7/13/2016
- WP 09-CN3025, R19, *Annual System Health/Walkdown/Requalification*, 4/19/2016
- WP04-AD.02, R5, *Technical Safety Requirements Surveillance Program*, 5/2016
- WP10-WC3010, R29, *Periodic Maintenance Administration and Controlled Document Processing*, 5/2016
- WP10-WC3011, R37, *Work Control Process*, 5/2016
- WP10-WC3017, R1, *Post-Maintenance Testing*, 9/2014
- WP12-IS3002, R14, *Job Hazard Analysis Performance and Development*, 3/2016

Interviews Conducted

- CMR Roving Watch
- CMRO
- CSEs (2)
- FSMs (3)
- Maintenance Foreman (2)
- Maintenance Supervisor (2)
- Maintenance Workers (4)
- Waste Handling Engineers, CH Bay (2)
- WIPP Design Engineering Manager (2)
- WIPP Maintenance Manager
- WIPP Work Control Manager
- WIPP Work Planning SME
- Work Package Planner
- Work Package Scheduler

Evolutions/Operations Witnessed

- Establishment of Waste Handling Mode
- PM041042, *PM Underground Exhaust Fan 41-B-860A, B & C*, 10/7/2016
- PM025088, *Diesel Generator Load Bank*, 10/8/2016
- PM074123, *Fletcher Roof Bolters Inspection and Maintenance*, 10/10/2016
- IC041001, *PM Filter Units 41-B-856 and 41-B-857 Mod and High Filter Differential Pressure Loop Calibrations*, 10/6/2016
- Underground transporter pre-checks

- Toyota forklift pre-checks
- CMRO Rounds

DISCUSSION OF RESULTS

1. *Procedures for surveillance and calibration testing, ISI, and safety assessment of safety-significant SSCs are effectively implemented in support of WIPP operations.*

Based on reviews of selected programmatic and implementing procedures, the team confirmed that processes for ensuring required surveillances, calibration testing, ISIs, and periodic assessments of system safety are in place at WIPP. Observation and interviews of WIPP maintenance and engineering personnel (managers, technicians, CSEs, System Design Authority) confirmed that procedures and tracking systems are effectively implemented to ensure programmatic requirements are met.

Personnel interviewed and observed performing work were aware of the safety (TSR) significance of their actions commensurate with their responsibilities. For example, a technician performing a calibration on a safety-significant component was aware of its importance and could explain its function. CSEs were able to explain why a component was safety-significant and its tie to the facility's DSA. All were able to explain what actions and notifications were necessary if they encountered problems or delays, or if an SSC failed a surveillance or calibration.

This criterion was met.

2. *VSS assessments and associated SHRs were completed as scheduled, and were adequate and effective.*

The team ensured SHRs were prepared for all VSSs. Each VSS had an SHR but not all were current (prepared in the last twelve months). Each overdue report had an approved 90-day extension.

While each report met WIPP format requirements (per WP 09-CN3025, *System Health Walkdown and Health Reports*), several provided a superficial evaluation of system health. The most widespread weakness was failure of evaluators to address all required topics within major report sections. For example, some reports failed to provide documentation of system availability and an explanation, assessment, and justification of why the system was not available.

Selected reports were reviewed in detail. Resulting follow-up actions were evaluated as to whether they were appropriate with respect to identified weaknesses or deficiencies. Most actions appeared to have been appropriate, and the team is confident that the actions will result in improvements in system health.

Overall, the team concluded that the SHRs minimally met program requirements and were adequate to support current and expected near term operations; however, the reports' effectiveness in increasing general VSS health requires improvement. WIPP engineering and

design authority management is aware of program and implementation weaknesses with the SHRs. A comprehensive plan was developed to improve the process and reports, and make the resulting assessments more useful and meaningful.

This criterion **partially** met.

3. *ISIs were performed and documented to confirm operability of the required VSSs.*

By review of completed DSA Design Feature KE ticklers and interviews, the team determined that the ISIs identified in the WIPP DSA were accomplished with acceptable results, with one exception (the ISI for Design Feature 6.9, RH shipping package 5-year PMs, is overdue for several containers). Resolution of this issue is explained in MIT1. Additionally, the next scheduled due date for each ISI is listed in the *WIPP TSR Surveillance Schedule – 30-Day Look Ahead*. Required ISIs are also tracked by the FSM and CMROs via daily T-0 schedules and the TSR surveillance status board in the CMR.

This criterion was met.

4. *Surveillance and calibration tests were performed and documented to confirm operability of required VSSs.*

Team members reviewed the WIPP surveillance tracking database to identify representative surveillances and calibration tests that were recently completed, scheduled for performance during the review, and required to be completed in the next thirty days.

Completed work packages were reviewed to confirm the completion of recently required surveillances/calibrations. Minor issues were identified by the team with how data was recorded in some packages and inconsistencies between some packages. None of the identified problems or inconsistencies resulted in significant safety or technical issues, or procedure noncompliances. Work planning schedules were reviewed to ensure upcoming surveillances/calibrations were identified and properly scheduled. No issues were identified and all required surveillances were performed or scheduled appropriately.

The team also observed surveillances performed on safety systems as part of simulated waste emplacement evolutions. Completed checklists, signoffs, survey records, etc., were reviewed to ensure completion of the surveillance/calibration was properly documented.

This criterion was met.

5. *A surveillance tracking system is in place and effective to ensure TSR surveillance requirements are completed and confirms operability of associated SSCs within the required periodicity.*

WIPP has a surveillance tracking database that tracks all TSR surveillances and ISI ticklers to ensure surveillance requirements are completed and to provide confirmation of operability for associated SSCs. The database provides the *WIPP TSR Surveillance Schedule – 30-Day Look*

Ahead. It provides the last performed date, the next due date, and, in some instances, it also includes future due dates. It also specifies if the particular surveillance or tickler has an associated grace period.

This criterion was met.

6. *The daily Facility Mode Compliance Review is effectively implemented to assure compliance with the DSA and TSRs.*

CMR staff was observed placing WIPP surface and underground areas in Waste Handling Mode. This process is dependent on facility and waste handling operators performing numerous inspections and verifications of facility and vehicle status then providing the CMRO with completed checklists. This is a relatively new mode change process, and procedures correctly implement safety requirements of the most recent facility DSA. However, it has proven to be more time consuming than expected, with delays often exacerbated by less-than-adequate attention to detail (missed signatures, wrong boxes checked). Overall, WIPP personnel demonstrated they can safely perform mode changes, but some operations efficiency may be lost in the long run because of the time required to perform and document required inspections and actions.

This criterion was met.

CONCLUSION

The team conducted a review of programmatic procedures and selected SHRs, and interviewed engineering managers and CSEs. Based on these activities, the team concluded that a program is in place to confirm and reconfirm periodically the condition and operability of VSSs. WIPP management is aware of program and implementation weaknesses with the SHRs, and a comprehensive plan was developed to improve the process and reports, and make the resulting assessments more useful and meaningful.

This objective was met. There were no findings identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	Sam Glenn **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Mine Safety & Ground Control**	Objective: MS1 Date: 10/14/2016	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

MS1: Line management has implemented an MS and Ground Control SMP to ensure safe accomplishment of work. The level of knowledge of MS managers and staff is adequate based on review of examinations and examination results, interviews, and observation of operational demonstrations. (CR1, CR4)

CRITERIA

1. Contract requirements for the MS SMP were incorporated into facility-specific procedures.
2. MS implementing procedures were effectively implemented in support of the facility, and identified MS SMP controls (e.g., KEs and referenced procedures) are implemented, including:
    - Mine entrance requirements impacting personnel safety are in place (e.g., continuous air monitor operation, radiological conditions, ventilation capabilities, personnel training, personnel limits for IN SERVICE conveyances, back-up power) (SMP KE 11-7).
    - Mine evacuation requirements are in place (e.g., unobstructed planned escape routes, mine exit markings, communications, Abnormal Operations Procedures) (SMP KE 11-8).
    - Ground control inspections are conducted routinely, and remedial actions for unstable ground conditions are performed by qualified personnel (SMP KE 11-10).
    - Maintenance and configuration management of ground control equipment is accomplished (SMP KE 11-11).
3. WIPP has a sufficient number of trained personnel to fulfill the MS SMP effectively and provide safe site operations.
4. The level of knowledge of MS managers and staff is adequate based on review of records, interviews, and observation of operational demonstrations. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.
5. WIPP has adequate facilities, and equipment is available to ensure that MS support and services are adequate for safe facility operation.
6. AIB JONs related to MS were addressed through effective corrective actions for the MS SMP.

APPROACH

Records Reviewed

- 00CD-0001, R39, *WIPP Mine Ventilation Plan*, 8/5/2015
- *Daily Hazards and Restriction Area Awareness Sheet*, 10/6/2016
- EA 04-AD3001-2-0, R9, *Facility TSR Administrative Controls Checklist CH Waste Handling Mode*, 5/30/2016
- EA 04-AD3001-SR22, R2, *LCO Surveillance Data Sheet*, 5/30/2016
- EA 04-AD3001-SR57, R0, *LCO Surveillance Data Sheet*, 5/30/2016
- Long Term Timely Order No: 16:024, *Underground Escape and Evacuation Compensatory Measure*,
- Memorandum, EN: 13:00043, from Carrasco to Kennedy, Subject: *Waste Emplacement Area Clearance – Room 7 of Panel 7*, 5/3/2013
- Memorandum, EN: 13:00043, from Carrasco to Kennedy, Subject: *Waste Emplacement Area Clearance – Room 7 of Panel 7*, 5/3/2013
- Memorandum, EN:16:00442, from Carrasco to Love, Subject: *Engineering Evaluation of Ground Condition in South Panels Access*, 10/3/2016
- Memorandum, HA: 97:2529, Subject: *Operational Guidance for Waste Disposal Area Acceptability and Closure*, 3/24/1997
- *Panel 9 Closure Recommendations*, draft, 10/4/2016
- *T-0 Daily Scheduled Work/Daily Release*, 10/10/2016
- *Underground Services Critical Component/Equipment Status*, 10/3/2016
- W0790-S2350, *Convergence Points, Room 4 Panel 7, 11/11/2016*
- WF16-1683
- Work Order: 1622895, *534 Weekly Underground Openings Inspections*, performed on 8/4/2016, 8/8/2016, 8/15/2016, 8/23/2016, 8/29/2016, 9/6/2016, 9/16/2016, and 9/22/2016
- WP 04-AD3013, R40, *Underground Access Control*, 5/30/2016
- WP 04-AU0013, R0, *Ground Control*, 8/15/2016
- WP 04-AU0534, R5, *Underground Access Initiation/Termination*, 9/13/2016
- WP 04-AU1007, R16, *Underground Openings Inspections*, Draft B
- WP 04-VU1611, R8, *Pressurization of U/G Bulkhead 74-B-309*, 5/30/2016
- WP 04-VU1614, R0, *Air Flow Volume Reading Worksheet*
- WP 07-1, R1, *WIPP Geotechnical Engineering Program Plan*, 11/19/2012
- WP 07-EU1001, R6, *Geologic and Fracture Mapping of Facility Horizon Drifts*, 12/9/2014
- WP 07-EU1308, R3, *Installing Wire Extensometers*, 11/11/2013
- WP 12-ER.30, R0, *WIPP Evacuation Plan*, 10/6/2016
- WP 12-ER4911, R22, *Underground Fire Response*, 6/16/2016
- WP 15-CA1007, R1, *Fact Findings and Critiques*, 8/23/2016
- WP WMI 1000065

Interviews Conducted

- Deputy Operations Manager
- Geotechnical Engineer
- Ground Control Cognizant Engineer
- Mining Manager
- Operations Manager
- Safety Representative (2)
- UFE – Crew A
- UFE – Crew B
- Underground Controller – Crew A
- Underground Controller – Crew B
- Underground Roving Watch (UGRW) – Crew A (2)
- Underground FSM
- Underground Mine Operator – Crew B (2)
- Underground Mine Operator – Crew C (2)
- Underground Miner – Crew A (4)
- Underground Miner – Crew B (3)
- Underground Operations Manager
- Underground Repository Projects Manager

Evolutions/Operations Witnessed

- Underground access initiation and termination
- Ground control openings inspection
- UGRW rounds
- Fact Finding meeting
- T-0 Daily meeting
- Roof bolting planning meeting
- Escape and evacuation plan compensatory measures briefing (2)
- Panel 9 closure recommendation meeting
- Hoisting operations
- Roof Bolting Productivity Planning meeting
- Roof Bolting Productivity Briefing
- Ground Control Committee Bi-weekly meeting

DISCUSSION OF RESULTS

1. Contract requirements for the MS SMP were incorporated into facility-specific procedures.

The WIPP Implementation Matrix for 30 CFR 57, *Mine Safety and Health Administration*, was reviewed to evaluate incorporation of Mine Safety (MS) SMP contract requirements into facility-specific procedures. The matrix covers each section of 30 CFR 57 and addresses applicability and three levels of implementation documentation: DSA, mining program plans, and implementing procedures. Section 11.5 of the DSA covers the WIPP Ground Control Program,

which incorporates requirements of 30 CFR 57. A sampling of the implementing procedures involving the MS SMP were reviewed for applicability and currency.

The 37 CFR 57 Implementation Matrix was discussed with a Safety Representative knowledgeable of the matrix process. The matrix appears to be complete in covering all CFR-applicable requirements and the list of implementing procedures for each section is provided. A sampling of the procedures related to SMP KEs were checked for applicability and completeness. Requirements associated with ground conditions and associated hazards are listed the Requirements Matrix under 30 CFR Section 57.3200, *Correction of Hazardous Conditions*. The corresponding program is the WIPP Ground Control Program.

The program-level reference (mining program plans) in the Implementation Matrix for Ground Control is DOE/WIPP 02-3212, *Ground Control Annual Plan for the Waste Isolation Pilot Plant*. The stated purpose of this document is, "a guidance document for short and long-term planning for Nuclear Waste Partnership (NWP) underground control operations." While the annual plan is a valuable document, it does not provide program-level requirements from which implementing procedures reference.

When checked in Q&MIS, WP WMI 1000065 was found to be expired and was not available for review; however, review of other procedures and practices indicate these requirements, as related to the MS SMP, were incorporated.

Section 57.8520, *Ventilation Plan*, addresses ventilation requirements, and states, "Revisions of the system shall be noted and updated at least annually." The current approved Ventilation Plan (00CD-0001, Revision 39) has an effective date of August 5, 2015. Given the current plan is beyond a year since its approval and the system was recently revised with the addition of the IVS, it appears a revision is due for regulator review and approval. Discussion with the Ventilation Cognizant Engineer and review of associated documentation, confirmed the current plan is out of compliance, with respect to the requirement of an update. It also confirmed the change process was initiated, via ECO 13805, on 10/15/2015 and that the final revision has not yet been submitted to DOE for approval.

The discrepancies discussed above indicate the need to review the 37 CFR 57 Implementation Matrix and provide updates where procedures were superseded or are no longer applicable. Also, efforts to issue the latest revision to the WIPP Ventilation Plan should be expedited to ensure full compliance with the Section 57.8520 requirement.

This criterion was met.

2. *MS implementing procedures were effectively implemented in support of the facility, and identified MS SMP controls (e.g., KEs and referenced procedures) are implemented, including:*
   - *Mine entrance requirements impacting personnel safety are in place (e.g., continuous air monitor operation, radiological conditions, ventilation capabilities, personnel training, personnel limits for IN SERVICE conveyances, back-up power) (SMP KE 11-7).*

The implementing procedures and performance activities associated with KE 11-7 involving mine entrance requirements were reviewed and evaluated. Technical procedure WP 04-AU0534, *Underground Access Initiation/Termination*, and management control procedure WP 04-AD3013, *Underground Access Control*, cover the UFE responsibilities for initiation and termination of underground access. The WP 04-AU0534 scope is defined as entry and exit requirements as well as provisions for Operations and Industrial Hygiene to monitor and control air quality to ensure underground workers are protected, including VOCs. UFE initiation of entry was observed on two occasions. The prerequisite actions require the UFE to, "verify hoists to be used in service," and "verify operability of a decontamination facility." The UFE did not directly verify either of these prerequisites; instead, he contacted the hoist operator who actually verifies the hoists and the Radiological Control manager who verified the decontamination facility, which met the intent.

Per WP 04-AD3013 persons requiring access to the underground are required to obtain a 30-day Underground Access Permit, a brass tag, and read and sign form, EA04AD3013-2-0, *Daily Hazards and Restricted Area Awareness Sheet.* Proper access control by the controller was observed on several occasions. Mine entry via the salt shaft conveyance was also observed. When entering the conveyance, everyone is required to present their brass tag and the Underground Access Permit to the Shaft Tender. The access authorization process was observed from lamp room preparation, controller interaction and control, and conveyance entrance and exit, with interaction with the Toplander and the Bottomlander. All persons involved understood their roles and appeared highly proficient at performing them.

The Changing Restrictions Class section of WP 04-AD3013 (section 2.0) was reviewed and discussed with various underground personnel, including the Underground Operations Manager, the Underground Mining Manager and the Underground FSM. Specific area access reclassifications were observed during the CORR and discussed with Underground Operations Management, including the following prohibited areas:

- S-3080 west of W-170 (10/7/2016),
- S-2750 west of W-30 (10/7/2016),
- All areas south of S-3080 (Panel 9 – 10/7/2016), and
- Panel 7 Room 4 (10/8/2016).

In addition, there were several areas changed to restricted access. Based on review of the procedure, discussions with management personnel, and observed application, entry to the mine and underground access control is being adequately and conservatively implemented; however, several examples where individuals were confused on terminology (i.e. restricted versus prohibited) and misunderstanding of color coding on the lamp room status board and map. For example, several personnel, including one controller, did not clearly understand the difference between orange and orange stripped areas. He believed orange represented restricted areas when in fact they are "catch up areas." During interviews, several operators also confused the terms restricted and prohibited, but when questioned, they did have an understanding of the distinction between the terms. Based on these observations and the related significance, consideration should be given to proceduralizing the process of changing access to underground areas. In additional, clarification should be provided to ensure WP 04-AD3013 is updated and similar terminology (e.g., Blue Restricted Areas) is clarified or modified. Specific observations are

provided below that support the recommendation to consider enhancing the process for evaluating and classifying restricted and prohibited areas.

- There does not appear to be standard criteria for officially restricting access and prohibiting access. More importantly, there is no apparent standard criteria for returning a prohibited area or restricted area to normal access.
- Clarify roles and responsibilities of all involved positions (Controller, UFE, Cognizant Manager).
- Reinforce line management responsibility with respect to access control. The procedure states that access to restricted areas requires Cognizant Manager approval. It also requires personnel requesting change in restriction class to contact "U/G Services or U/G Controller." It should be made clear that the UFE controls access in the underground and the controller controls mine entry access.
- Attachment 1 of WP 04-AD3013 provides the following definition: "BLUE RESTRICTED AREA – U/G area where working conditions present potential hazards to personnel." The term BLUE is not reflected on the lamp room map, nor was it communicated during the various changes observed during the CORR.

WP 04-AD3013 Section 5.0 requires all brass tags and one-day Underground Access Permits to be given to the Underground Controller. In one instance, two days after mine exit, it was identified that one escorted CORR team member had not returned the brass tag. The Underground Operations Manager and the Underground FSM were notified as soon as the condition was identified. Follow-up questioning revealed the controller on duty at the time was contacted and stated they remembered seeing the individual and proceeded to replace the brass, as is the practice when a brass is lost. It does not appear that any attempt was made to find the person to retrieve the brass on the day of the occurrence. The observed practice in this case was not consistent with underground training and the requirement in step 6.3.2 of WP 04-AU0534 for the UFE to verify personnel accountability (last person brassed-out).

The daily initial mine entry was observed, as well and the initial inspection of the mine (areas outside the CA and HCA). The initial ground control condition inspection was observed as well as air quality monitoring by the UGRW. No abnormal conditions were observed, and the CMRO was notified that underground entry is authorized.

The staffing and qualification of on-shift underground Facility Services personnel were discussed with the UFE. The minimum staffing for underground access is one UFE and one UGRW, which was verified, as well as the applicable training status. Step 6.2 WP 04-AU0534 covers Industrial Hygiene air quality checks and requires daily air quality inspections, in accordance with WP 12-IH1828, *MSHA Air Quality Monitoring*. It is unclear how this step is completed, since an Industrial Hygiene representative is not included in the initial mine entry. The completed sign-off sheet (EA04AU0534) was reviewed, including the prerequisites actions and performance. No issues were identified.

- *Mine evacuation requirements are in place (e.g., unobstructed planned escape routes, mine exit markings, communications, Abnormal Operations Procedures) (SMP KE 11-8).*

The two primary procedures referenced for emergency mine evacuation are WP 12-ER.30, *WIPP Evacuation Plan*, and WP 12-ER4911, *Underground Fire Response.* These procedures were reviewed and performance involving unobstructed escape routes, exit markings, communications, and abnormal and emergency responses procedures were observed during the CORR.

A controlled egress from the underground of all personnel was observed and evaluated from the lamp room. All personnel exited in a safe and timely manner. Once all personnel were counted and reported to the FSM, the controller was questioned and found to understand fully his responsibilities and was knowledgeable of the approved process. Compensatory measures resulting from the controlled egress were developed and approved by CBFO prior to underground access being restored. The compensatory measures were also reviewed and discussed with underground operations management. The measures included a Long Term Timely Order and a change to the *Daily Hazards and Restriction Area Awareness Sheet.* Long Term Timely Order No: 16:024, *Underground Escape and Evacuation Compensatory Measure*, was issued to highlight Underground Facility Operations responsibilities for providing the Lamp Room Controller with any dynamic changes to hazardous conditions and prohibited or restricted areas and any impediments to escape ways. Workers' responsibilities were also detailed and their signature was required to document that they reviewed the lamp room underground map and primary and secondary escape routes, as well as current prohibited and restricted areas relative to their assigned work locations. The compensatory measures were developed, agreed upon by CFBO, and implemented over a few hours in an effort to regain mine access in a timely manner. Compensatory measures briefings were also held for affected groups of personnel entering the mine to communicate the changes and to provide clarification to workers' questions. The briefings were well-conducted and workers appeared to understand the changes.

Some concerns were identified with the compensatory measures. Only two groups of personnel were identified as affected, Underground Facility Operations and EM and Security. The reason given for just these two groups was that their procedures were affected and not the other groups. It appears the intent of the "Affected Groups" may have been misunderstood; however, it was clear every individual and associated group was to receive the briefing, not just the two identified groups.

A second concern involved the *Daily Hazards and Restricted Area Awareness Sheet*. Previously, it was explained to the CORR team that signing the sheet covered awareness of any hazardous conditions that may be encountered. Specific reference to hazardous conditions was not included in the revision, which states; "By signing below, I acknowledge I have reviewed the lamp room map and primary and secondary escape routes based on my work location and current prohibited and restricted areas." The underground map does not cover hazardous conditions, nor does it show primary or secondary egress routes.

Another potential concern involved how NWP was going to ensure all personnel entering the mine were aware of the compensatory measures. Initial briefings were being conducted by the

Underground Operations Manager during the work week, but coverage through the weekend was unclear. In addition, it was unclear how emerging conditions potentially impacting egress routes were to be handled, since mine ground conditions are constantly changing and any given area could be restricted, if access control was warranted, at any given time throughout any given shift, after personnel have reviewed the underground map and entered the mine. These questions and concerns were brought to the attention of underground operations management for their consideration and use.

Some confusion was observed with respect to the posting of Panel 7 as restricted. Initially, the lamp room map identified the entrance as restricted but not the entire panel. Once the confusion was realized, action was taken to post the entire panel as restricted. The Cognizant Engineer was listed on the posting as the Cognizant Manager to be contacted for entry. The Cognizant Engineer was questioned and understood that access approval must go through Underground Services. WP 04-AD3013, Section 2.0 requires individuals desiring entry to a restricted area to contact Underground Services or the Underground Controller, who in turn contacts the Cognizant Manager. Improved access control could be realized if all requests were made to the UFE, who then gets in touch with the Cognizant Manager for concurrence. The UFE should be in charge of access; as written, the controller could obtain access approval through the Cognizant Manager.

Emergency response and evacuation actions were also observed under the Emergency Preparedness portion of the CORR. Details are provided in Objective EP.2. Several issues were identified which are captured in finding EP2-PRE-1.

- *Ground control inspections are conducted routinely, and remedial actions for unstable ground conditions are performed by qualified personnel (SMP KE 11-10).*

The WIPP Ground Control Program is a component of the Operational Safety SMP, Section 11. The primary objective of the WIPP Ground Control Program is to provide a safe environment for personnel and equipment in a manner that is consistent with the primary facility operational objective of waste disposal. Section 11.5 of the DSA, Ground Control, lists four components: visual inspections of openings, geotechnical monitoring, installation of ground support components, and analysis/mitigation of ground support issues.

Instrumentation is in place primarily along the main transient route (E-140), the shaft areas, and the operating panels (Panel 7). Convergence and extensometer data are collected on a continuing basis with remote monitoring data provided for analysis of degrading ground conditions. Additional instrumentation, providing local manual measurements, is also installed to augment continuous monitoring. Geomechanical measurements are monitored in the areas listed above and taken elsewhere, where visual inspections or monitored indications identify degrading conditions that warrant further analysis. Geotechnical technicians are tasked with taking geotechnical measurements, which are factored into Ground Control mitigation actions. A certain amount of skill, according to vendor (extensometer) information, is required. The vendor information also states, “The precision of the instrument will depend to a large degree on the skill of the operator.” A training needs analysis, conducted per WP 14-TR.01, *WIPP Training Program*, concluded that skill of the craft is adequate and “no training” is required for the

geotechnical technicians. This conclusion is in contrast to WP 07-1, *WIPP Geotechnical Engineering Program Plan*. Section 2.3 requires that, "Personnel who perform specific tasks associated with geological and geotechnical data collection, …are trained and qualified in the application of the specific requirements to complete their tasks." This issue is considered a procedure noncompliance, which should be resolved but does not diminish the technicians' experience and performance in taking manual measurements.

In addition to instrumentation, visual inspections are a major component of the Ground Control Program. Geotechnical engineers conduct visual inspections as requested or as required, in cases where their analysis indicates the need for additional information. In addition, they conduct an annual inspection of every accessible mine area in support of the *Ground Control Annual Plan*. Mine Operations personnel also conduct weekly ground control inspections focused on conditions and potential emerging hazards from the ribs, floor, and the roof. Technical procedure WP 04-AU1007, *Underground Openings Inspections*, was reviewed and discussed with underground operations personnel and an inspection round was observed. Weekly inspections are conducted by mine operations personnel (e.g., miner operators, roof bolters) on a rotating basis. These inspections are conducted over a period of three to five days, depending on the level of mine activities in a given week. While the practice of rotating the inspections provides the benefit of "fresh eyes," it does not provide a clear baseline from one week to the next, which can make it more difficult to determine whether an observed condition is new or whether localized conditions are worsening. During the observed inspection, the two miners were clear that if there is any question they make a conservative default decision to report and document the conditions they observe. One area was identified as needing further evaluation. The location was properly documented and reported to the UFE. The next day, the site was checked to see what action was taken. A bi-fold sign was setup to restrict access to the area deemed necessary by the UFE.

<u>Ground Control Roof Bolting Improvement Plan</u>

A planning meeting for improving ground control maintenance, specifically roof bolting, was observed. The meeting was led by the Underground Operations Manager and included senior management (Deputy Project Manager), operations management, geotechnical engineering, and a bargaining representative. The objective was discussed and agreed to focus on deploying two bolting crews in a fully-supported integrated manner, and expand to a third crew, if and as needed. The current ground control conditions were discussed for specific areas of priority interest, including E-300 S-2520 – S-2750, S-2180 and Panel 7, and a plan was outlined with priorities for the planned bolting crews. The meeting concluded with the Underground Operations Manager having the assignment to solidify the plan and present to senior management (Senior Management Review Board).

The following morning, a pre-shift toolbox meeting was observed for Crew A Underground Operations personnel. The Underground Repository Projects Manager led the meeting. The main topic discussed was the developing plan to improve roof bolting efforts. A good discussion of the topic occurred, and the crew clearly was free to express their opinions and air their concerns, some of which included:

- Concerns over working in and around Substation 5 and Panel 7 Room 5;
- Sufficient staffing (additional operators) is needed;

- Additional qualifications are needed;
- RCT coordination is often lacking;
- The required timeframe to implement the plan (the timeframe discussed was two to three months); and
- Concerns over how matrix or integrated crews would work.

The toolbox meeting concluded with a good safety message and encouragement for each worker to remain focused on his/her jobs and keeping safety as the highest objective.

Review of ground control weekly inspection reports revealed a significant variance between the inspection reports. Some reports provided good detail and some only a minimum amount; some had only a few areas with no comments and some had as many as twenty. A significant number of comments raised questions of concern but no means for clarification or explanation was provided; examples included: “bad roof,” “many failed bolts, “loose bolts,” and “ribs taking weight.” This process could benefit from standard terminology with degrees of degradation and a means to reflect trends and points at which mitigating actions are required. The Cognizant Engineer reported he reviews these reports weekly, “if able, depending on other competing priorities.” The process could also benefit from regular feedback provided to the operators conducting the inspections. The Cognizant Engineer shared that geotechnical engineers also conduct visual inspections, annually in support of the Annual Report, and frequently, when required or requested by Underground Operations.

The number of access-controlled areas, documented in the ground control inspection sheets, appears to have significantly increased over the last eight weeks. In response to increasing ground control challenges, NWP management has submitted a request to CBFO to close Panel 9 (main entries south of 2520). This request, in part, was submitted to gain some relief in the total area requiring ground control maintenance. The closure of Panel 9 will free up critical ground control resources (roof bolting crews, routine inspections) that can now focus on ensuring Panel 7 readiness for waste emplacement. In addition to the Panel 9 Closure Plan, NWP senior management has also initiated efforts to develop and implement a roof bolting productivity plan (discussed above).

<u>Panel 7 Room 7 Readiness</u>

Over the two week CORR period, several ground control issues emerged, including:

- Unexpected roof fall in a Prohibited Panel 3 entry (S-2750);
- Degraded roof condition (portion of the roof on the west side near S2520) in Panel 7 Room 5, resulting in restricted access;
- Significant increase (~ 6 inches/year to ~33 inches/year) in the rate of convergence in Panel 7 Room 4 resulting in access being prohibited;
- Degraded roof conditions in the following areas requiring access to be prohibited:
    - S-3080 west of W-170
    - S-2750 west of W-30
    - Area south of S3080 (Panel 9 Closure Proposal, Phase 1); and
- Bolting in S-2520 and Room 5 Panel 7, where the gap between actual bolts installed versus bolts projected for waste operations continued to increase.

At the conclusion of the CORR, ground control conditions in Panel 7 – the planned active panel for the resumption of waste emplacement activities – was not supportive of safe operations. At that time, Panel 7 access was restricted, Room 5 was restricted with a portion prohibited, Room 4 was prohibited, and a portion of the main entry (W-170) in front of Panel 7 was prohibited. As discussed above, measures were in place to stabilize roof, rib, and floor conditions in Panel 7, starting with Room 5. Measures were also in place for management to ensure Panel 7 readiness, including placing an item on the manageable list of open items, which is identified as critical path schedule item, and commitment to a waste emplacement area clearance process, which is an established practice. Additional review of Panel 7 readiness is also provided in Objective OPS.1.

Long-Term Sustainability Recommendation

The current Ground Control Program has matured over the life of the facility and is largely expert-based with WIPP-experienced and skilled engineers. Established practices for monitoring and analysis of ground conditions are in place, supported by committed and experienced geotechnical engineers and mining operations personnel. In addition, qualified operators are tasked with installing roof bolts according to bolt patterns designed for specific geologic conditions. While the program is effective, it is highly dependent on a select group of individuals who are proficient with the established practices. A number of the geotechnical and mine operations experts are at or near retirement age. This represents some margin of risk because of the degree of reliance on individualized expertise. To ensure long-term sustainability, consideration should be given to transitioning the program over a period of time to an institutionalized process fully, with performance objectives, enabling attributes, and implementing requirements. In addition, consideration should be given to succession planning and to updating the geotechnical software to benefit the latest data analytic and visual analytic technology. Following are a few examples to illustrate the benefits of this recommendation:

- The operational decision-making process for taking ground control mitigation actions, including increasing monitoring, restricting access, and prohibiting access, is not proceduralized. This results in a fair amount of confusion, which the CORR team observed.
- Some geotechnical practices, like waste emplacement area clearance and visual inspections, involve important knowledge that is resident with individuals and not captured by procedure. The current staff do not need procedures, as they possess the knowledge; however, future geotechnical engineers will benefit from these and other practices being incorporated into approved procedures.
- Manual geotechnical measurements are taken when requested or directed by the Cognizant Engineer. Regular measurements in high interest areas (e.g., waste handling routes, active panels, shaft areas) should be a requirement, with results reported to management for their regular review.
- Development and implementation of geotechnical criteria (i.e. quantitative criteria, see the consulting firm's (RESPEC) report dated February 2016 for examples) that informs expert knowledge and provides objective input could improve the operational decision-making process.

Also, consideration should be given to establishing a structured process for resolving ground control issues/concerns. This process should factor in experience and subjective points of view, as well as a technical framework supported by objective data. Such a process would help resolve ground control issues where subjective experience-based opinions overly influence decisions involving access controls. Overly conservative opinions, with little or no technical basis, can drive decisions that impact critical resources. As well, prohibited access to areas results in suspended geotechnical monitoring, which could result in worsening conditions and the undesirable consequence of a complete loss of portions of the mine.

The Ground Control Program is being effectively implemented through routine and as-required visual inspections, monitoring, and analysis of degrading conditions, and completion of remedial actions by trained and qualified personnel.

- *Maintenance and configuration management of ground control equipment is accomplished (SMP KE 11-11).*

The configuration management of Ground Control equipment was discussed with the Geotechnical and Mine Engineering Manager. There were two primary types of equipment included in this discussion, roof bolting machines and geomechanical instruments.

With the possible exception of the horizontal boring machine used to create holes for RH waste casks, all other mobile equipment is standard mining equipment commercially purchased. The horizontal boring machine was also commercially purchased. Mining equipment is classified as ML-4 (commercial grade), except for the Automatic Fire Suppression Systems (ML-1) and select pieces associated with lifting like forklift tines (ML-2).

Configuration management is assured via the following:

- Pre-operational checks performed by operators,
- Routine preventive maintenance based on manufacturer recommendations,
- Repairs using like-for-like original equipment manufacturer repair parts. (All equipment is still supported with original equipment manufacturer spare parts)
- System engineer ownership, and
- In the unlikely circumstance of modifying the equipment design, the modification would be required to be processed under the ECN process, WP09-CN3007. The CORR team was told that no such modifications were made.

With respect to installed instrumentation, there are three types of equipment: (1) transducers which measure movement in long holes drilled into the back, (2) convergence measurement using fixtures mounted to the back and floor, and (3) rock bolt strain gauges, which are attached to rock bolts. These instruments are classified as ML-1 based on requirements from RCRA. As ML-1, they should receive the highest level of configuration management control; however, underground applications present unique limitations. The transducers are calibrated upon initial installation only. There is no provision for continuing calibration once installed. If the transducer is removed, it destroys the instrument sensors which are anchored in the hole. Convergence anchor points require no calibration. The “tape extensometer” used to measure between the anchor points is calibrated and maintained by the site calibration shop. If a floor anchor is

removed because of floor leveling, a new floor anchor is installed and its treated as a new measuring location in the database. Rock bolt strain gauges cannot be calibrated once installed. A database of all the instrumentation installations is maintained by engineering. No one other than the users have a need to manipulate or handle the installed instrumentation.

Maintenance of underground equipment, including roof bolting machines is covered the WIPP Maintenance Program, which was evaluated under the Maintenance Objectives of the CORR.

Underground Critical Equipment Status

Underground Facility Services personnel on Crew A were observed as they performed activities supporting the waste handling and emplacement demonstration for the CORR. Air reading activities were observed as well as operator rounds. The Underground Services Critical Component/Equipment Status was reviewed and discussed with the UFE. The Underground Evacuation System, all four zones, were listed as “unsat” with a note stating the evacuation lights are out of service with a bad contactor at “SS#1” and noted work request (AR #1626879). The 74-B-309 bulkhead system is not included on the Underground Critical Equipment Status List, even though it is a safety-significant system. Technical procedure WP 04-VU1611, *Pressurization of U/G Bulkhead 74-B-309*, was reviewed and discussed with the UFE. Section 4.0 states: “Pressure shall be established at >0.2" wg in Bulkhead 74-B-309 before establishing Waste Handling mode in the U/G.” Discussions with the UFE and the UGRW revealed their understanding that the 309 Bulkhead is required prior to “waste download,” and not required for entering the Waste Handling mode. Review of the procedure revealed only one step flagged as a TSR step (step 4.2.2), which states: “Verify system enable switch is in ENABLE. (LCO 3.2.4). This is the only reference to the 309 Bulkhead system being a safety-significant system with TSR implications.” The related LCO Surveillance Data Sheet, Table 3.2.4-2, *309 Bulkhead, Local Differential Pressure Instrumentation*, was reviewed. The UGWR completed the table logging the gauge indication. A value of -0.20 in. was documented, and “SAT” was checked by the UGRW. The Surveillance Acceptable Range is ≤ +0.14 in., so the required surveillance value was not met. The UGWR incorrectly indicated the value was satisfied and did not circle it in red, as required for a TSR-related out-of-specification reading. In addition, the value of -0.20 in. was also incorrect, since the proper gauge does not cover negative values. The UGRW was questioned about the incorrect value, he stated it was being simulated. When he was questioned what the step marked with “$” meant, he stated it indicated a recent change. Other Underground Services personnel were questioned on this point; four others fully understood the meaning and one UFE in-training did not. Further questioning revealed the UGRW and the UFE in-training are recent hires from the local mining industry. The TSR training effectiveness of the UGRW and the UFE in-training is in question, as well as their knowledge of the 309 Bulkhead system.

As discussed above, the CORR team observed several issues related to the 309 Bulkhead. These issues were discussed with Mine Operations management and actions were taken during the CORR to evaluate the significance further (e.g., fact finding, WIPP Form initiation, and review of the significance of TSR-related steps with the personnel involved). The CORR team concluded the issues were production-related and that procedure requirements are in place to ensure full operability of the bulkhead prior to underground waste handling operations; consequently, no significant or undue risk to the public or workers exists. However, the team’s

observation regarding simulating a satisfactory condition when an unsatisfactory negative pressure condition existed on Bulkhead 309 contributes significantly to a team recommendation that NWP schedule some substantial time (a number of weeks) where the facility functions as if it has returned to normal operations and where changes (i.e. to procedures, etc.) should be minimized during the period, unless absolutely mandatory, to avoid injecting uncertainty and interface issues.

Completed LCO Surveillance Data Sheets, completed by the UGRW in support of the waste handling demonstration, were reviewed. LCO 3.3.5 covers the location of the underground Lube Truck, which is prohibited within 200 feet of the CH waste face and prohibited from being in the Lube Truck Exclusion Zone. The TSR-related signoff addresses the truck being greater than 200 feet from the waste face and the Bottomlander is assigned responsibility to verify the Lube Truck Exclusion Zone.

74-B-309 Bulkhead Fact Finding

As a result of the 309 Bulkhead being found out-of-service in support of a waste handling demonstration for the CORR, a fact-finding process was initiated. The fact-finding meeting was observed. The “Four Quad” process used was a simple, repeatable construct for conducting fact-finding sessions. Specifically, aligning follow-up actions with issues helps ensure key actions are not missed and the issues are fully addressed. The practice of having a dedicated scribe, allowing the facilitator to focus on the process and not be distracted with note taking, was observed to work well.

While the basic process steps were followed, a couple key issues were missed. The group incorrectly concluded there was no issue related to the operability of the 309 Bulkhead system, since the proper pressure range is verified prior to proceeding with CH waste operations underground. This conclusion failed to take into consideration proper return to service of a safety-significant system. The fact that the system status with respect to operability was unknown for some time following completion of maintenance was not identified as an issue. A WIPP Form was issued to resolve the question concerning equipment return to service.

Another incorrect conclusion involved the expectation of simulation. The fact finding concluded that an issue existed with CORR expectations changing or not be clear. One reason that may have contributed to the incorrect conclusions was that the individuals directly involved in communicating with the FSM were not involved in the fact-finding meeting. The fact-finding procedure, WP 15-CA1007, *Fact Finding and Critiques*, has the Fact Finding Leader invite “affected workers and their supervision.” In this case, the procedure was followed in that the supervisor of the affected workers was invited; however, the workers were off-shift and were not called in, nor was the meeting rescheduled to support their involvement. Another contributing factor, which the fact finding did identify, was that the Underground Facility Services personnel were not included in the pre-job brief by the Waste Handling group. While this issue was identified and briefly discussed during the fact finding, the cause, or any indication of what contributed to the cause, was not identified. A clear policy and understanding of how to conduct

simulated demonstrations is needed. In addition, the reason underground personnel were not included in the waste handling pre-job briefing should be explored.

This criterion was met.

3. *WIPP has a sufficient number of trained personnel to fulfill the MS SMP effectively and provide safe site operations.*

The staffing and associated training in support of the Ground Control Program were reviewed. The WIPP Ground Control Program incorporates requirements of 30 CFR 57, and includes visual inspections of openings, geotechnical monitoring, installation of ground support components, and analysis/mitigation of ground support component failures and potential ground failures.

Visual inspections are conducted by underground operations personnel (miners, operators, and roof bolter operators). Visual inspection assignments are rotated to different individuals between crew members on Crews A and B. Each crew is sufficiently staffed, and training is being maintained to support the required weekly ground control inspections.

Installation of ground support components are performed by underground operations roof bolters. Each crew is staffed with a sufficient number of qualified roof bolters, given the number of roof bolting machines, with the exception of the hybrid bolters. New hybrid bolting machines were purchased to help make up for the restrictions on diesel operated machines. Newly hired personnel were trained and qualified on at least one type of bolter. Qualification records for roof bolting were reviewed. Following is a summary of the number of qualified roof bolt operators.

	Total Qualified	Fletcher (diesel powered)	Hybrid
Crew A	9	9	4
Crew B	8	8	2
Crew C	8	8	1
Total	25	25	7

The recently developed plan to increase roof bolting productivity has as an objective to staff three bolting crews on the day and evening shifts. Currently, there appears to be sufficient qualified operators to support this objective, assuming some relief is provided for staffing positions not requiring qualified operators (e.g., fire watch, spotter). However, it does not appear there are sufficient qualified operators for the two hybrid bolters, with only 2 operators on Crew B, and only 1 on Crew C. The need for additional qualifications was identified and is being factored into the productivity improvement plan.

Geotechnical monitoring and analysis is conducted by a staff of geotechnical engineers with assistance from geotechnical technicians. This group is very experienced, with the bulk of the WIPP geotechnical experience residing with three individuals, two of which are within range of retirement (i.e. could retire now or within the next two years). The geotechnical engineering function is highly expert-based, with minimum structure and documented process in place with

respect to the analysis of geotechnical data. While this approach has served WIPP well in the past and is currently doing so, the need for sustained expertise and consistent quality and reliability warrants consideration of a more structured and documented process. This would aid in capturing critical knowledge for sustained, long-term support. A knowledge capture and management program coupled to a qualification process for the geotechnical technicians is recommended.

One issue with respect to staffing arose during the CORR. The need for a priority geotechnical inspection emerged when manual measurements showed a rapid increase in the rate of ground movement in Panel 7 Room 4. Initial direct measurements obtained in Panel 7 Room 4 revealed a possible significant increase in ground movement. All three manual-read instruments showed indication of a prompt jump in ground movement compared to the previous trend. The installed remote-read instrument in Room 4 is not functional, so manual measurements were required to confirm the trend. Follow-up inspection by the geotechnical engineering group was scheduled for the next day but was not completed, on account of a required controlled egress of mine. The following day was on an alternate Friday, which is a normal off-day for the geotechnical engineering staff. As a result, there was not sufficient staff to perform the inspection and take the required measurements. When the Restart Manager realized the scheduled inspection was not in progress, he took action to initiate call-out requests, which were successful in getting the inspection completed. The results showed the significant rate increase was real (increase from approximately six inches per year to over 80 inches per year) and as a result, Room 4 was posted as a prohibited area. Subsequent review over the weekend revealed a mistake in the measurement technique, which resulted in approximately a 50 inch-per-year correction (from over 80 inches per year to 33 inches per year). This mistake was in a conservative direction and the action to prohibit access was unchanged. This is an example of the benefit of a qualification process which would help ensure consistency and quality of measurement results and increased reliability of geotechnical data.

There are a few critical skills possessed by individual engineers that, if lost, would result in a significant decline in the level of proficient experience. For example, the geotechnical knowledge of the mine throughout its entire history resides with two engineers. Proficiency and understanding of the geotechnical software primarily resides with one engineer.

This criterion was met.

4. *The level of knowledge of MS managers and staff is adequate based on review of records, interviews, and observation of operational demonstrations. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.*

Informal interviews with Underground Operations Managers and scheduled operator interviews were conducted to assess the MS level of knowledge and pulse knowledge of current project activities. In addition, operational activities were observed with informal interviews before and following the activities.

Several operational activities were observed to evaluate underground operations staff's and management's level of knowledge, including project activities and safety basis requirements

commensurate with their responsibilities. The activities observed are listed above and described in detail in Criterion 2 above. One issue relating to level of knowledge was identified. One UGRW was observed filling in an out-of-specification reading for a TSR-related procedure step. When questioned, he did not know what the $ represented, and he could not explain the relationship to the safety basis requirement as a qualified watchstander. The rest of the Underground Facility Services personnel on the crew were questioned and all but one, an UFE in-training, fully understood the significance of the $ step. When questioned further, both individuals shared that their backgrounds are in potash mining, and that they are relatively new to the site (within the past year and a half). Other underground personnel involved in TSR-related steps were questioned in interviews and found to understand the TSR significance of steps flagged with a $.

Four Underground Mine Operators were interviewed following lines of inquiry designed to gain insight into their perspectives and attitudes toward management, safety, and their assigned responsibilities. Three of the four operators have WIPP experience of seven years or greater, and one was hired from the local mining industry since the February 2014 incidents. Several questions focused on mid- to senior-level management's involvement and interest in the workplace, and what the operators see are management's top priorities. The general response was that management is involved and the top priority is safety. They shared senior management is seen in the underground regularly (approximately monthly). Operators also shared that it is widely understood that waste emplacement is the mission toward which everyone at WIPP is working, but senior management has communicated and reinforced by their decisions that safety while emplacing waste is the top priority.

When asked what their biggest concern was, one operator shared his belief that the significant increase in "paperwork" could, at some point, impact his ability to remain focused and concentrate on his primary job of operating equipment safely. The operators were specifically questioned concerning recent ground control issues and whether they believed management was making the correct decisions and whether they ever felt pressured to work in conditions they believed to be unsafe. They all agreed the decision not to bolt a portion of the roof in Panel 7 Room 5 was a good decision, and that it was characteristic of management's approach, from their immediate supervisor to the Project Manager. When asked whether they would be comfortable working in Room 5 if management decided to emplace waste around the unsupported area, two operators had no concerns but the other two shared their reservations. They were two of the operators involved in identifying the issue with the roof in Room 5 the week before, and they were present when the large portion of roof was scaled down with the milling machine. They shared belief that the conditions were similar to a portion of the S-2750 drift in the Panel 3 entry, where a roof fall recently occurred in a prohibited area. They also shared they had not been briefed on the plan for Room 5, which management was in the process of finalizing and briefing crews.

Questions involving their jobs and assigned responsibilities were all answered positively; each operator affirmed understanding of his/her assignments and full support from management. The operators were specifically questioned about their knowledge of the DSA/TSRs. All have received training and confirmed their understanding that procedure steps flagged with an $ have special significance and ties to the DSA/TSRs. The conclusion of the CORR team is that MS

managers and staff personnel provide a sufficient level of knowledge and understanding to sufficiently support the MS and safe waste emplacement activities.

This criterion was met.

5. *WIPP has adequate facilities, and equipment is available to ensure that MS support and services are adequate for safe facility operation.*

The primary equipment supporting the Ground Control Program includes diesel and hybrid roof bolting machines and geotechnical instrumentation. New roof bolting machines (hybrid bolters) with dual-power capability (diesel and electric) were purchased and deployed to the underground, bringing the total number of machines to five: three diesels and two hybrids. Discussion with the Geotechnical Cognizant Engineer indicates that, previous to the two incidents (i.e. prior to the extended period of suspended ground control maintenance), a minimum of three machines were required to maintain sufficient ground control. The Cognizant Engineer shared this is based on extensive experience at WIPP under normal operational conditions. Since that time, various constraints and additional controls have significantly increased the required level of ground control resources, including roof bolting machines. These additional demands and constraints include:

- Increased number of degraded areas, because of the extended suspension in underground activities and various suspensions since (e.g., VOC safety pause, recent controlled egress),
- Roof bolting productivity was significantly decreased because of work in the CAs and HCAs,
- More conservative decision making resulting in increased competition for roof bolting opportunities, and
- Increased regulatory inspections and resulting ground control actions required.

While the Cognizant Engineer has not had substantial runtime under the newly added constraints and mine conditions, he shared his belief that five roof bolting machines should be sufficient to maintain the required level of ground control maintenance; however, to this point, the five machines have not been fully utilized, on account of various issues including qualified manpower and sufficient RCT support.

The Cognizant Engineer also shared that sufficient installed instrumentation is available. Remote monitoring instruments are installed along main waste handling routes (e.g., E-140), around shaft areas, and in active panels (e.g., Panel 7). And other instruments requiring manual measurement are installed on a broader basis, resulting in every portion of the mine having geotechnical instrumentation within 50-to-75 feet apart, depending on local conditions. The process for replacing faulty instruments was discussed, specifically, Panel 7 Room 4, which has four instruments: three local-read and one remote-read. The remote-read instrument was reported to be out-of-specification or not properly functioning. The geotechnical engineer assigned to maintain the data software and plots shared that faulty instruments are replaced by WIPP-approved procedures (e.g., WP 07-EU1308).

This criterion was met.

6. *AIB JONs related to MS were addressed through effective corrective actions for the WM SMP*.

The list of AIB JONs was reviewed and discussed with the Underground Operations Manager, who confirmed there are no JONs applicable to MS, and specifically to Ground Control.

This criterion was met.

CONCLUSION

An effective Mine Safety (MS) and Ground Control program was established. Based on document reviews, interviews (informal and structured), and operational activity observations, implementing procedures are being followed by experienced and trained staff, both in the Underground Operations organization and the Geotechnical Engineering organization.

This objective was met. There were no findings identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	Bill Webb **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Operations**	Objective: OPS1 Date: 10/14/2016	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

OPS1: The formality and discipline of operations are adequate to conduct work safely, and programs are in place to maintain this formality and discipline. The level of knowledge of operations personnel (including managers) is adequate based on reviews of records, selected interviews of operations managers and staff, and observations of operational demonstrations. (CR 1, 3, 4, 12)

CRITERIA

1. A conduct of operations program is developed and approved for operations. The applicability of DOE O 422.1 Admin Chg 2, *Conduct of Operations*, requirements was documented; this applicability determination (e.g., matrix) was approved by DOE; associated contract requirements are flowed into facility-specific procedures.
2. Sufficient numbers of qualified personnel and adequate facilities and equipment are available to conduct operations safely, including implementation of Conduct of Operation program elements.
3. Conduct of operations principles and practices are documented in approved facility procedures and effectively implemented. The level of knowledge of operators and their supervisors and managers regarding conduct of operations principles and practices (e.g., command and control, procedure utilization, rounds, system status control, etc.) and their effective implementation is adequate based on interview results and on observation of performance during routine evolutions and field performance demonstrations, tabletop exercises, and operational and emergency drills.
4. The level of knowledge of operators and their supervisors and managers associated with the operational processes, associated hazards and controls, and the bases for those controls is adequate based on review of records, interview results, and observation of performance during routine evolutions and field performance demonstrations, tabletop exercises, and operational and emergency drills. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.
5. Operations personnel effectively demonstrate proficiency for and ability to execute normal, abnormal, and emergency operations in accordance with approved operating procedures based on observed practical operations demonstrations.
6. Operations and operations support personnel demonstrate acceptable formality, procedure compliance and discipline of operations to conduct work safely. These attributes are demonstrated during interviews and observations of performance during routine evolutions and field performance demonstrations, tabletop exercises, and operations and emergency drills.

7. Procedures and/or mechanisms are in place to ensure there is a process used to authorize and release work activities and operations.
8. Procedures and/or mechanisms are in place that demonstrate effective integration of safety management and ensure safety requirements are integrated into work performance, to confirm that the facility or activity and the operational work force are in an adequate state of readiness prior to authorizing the performance of work.
9. Procedures and/or mechanisms are in place that ensures adequate performance measures and indicators, including safety performance measures are established for the work.
10. AIB JONs related to conduct of operations were addressed through effective corrective actions for the conduct of operations SMP.

APPROACH

Records Reviewed

- ACD-2016-41, *WHB Hood CAM Alarm (drill package)*, 10/5/2016
- RWP 16-0022, Vali from 9/29/2016 to/General
- T-0 Daily Scheduled Work/Daily Release 10/4/2016 – 10/11/2016
- WP 04-CM2001, R0, *Safety Instrument Alarm System Annunciator Panel 711-AP-451*, 5/23/2016
- WP 04-CM2003, R3, *Loss of CMS Indication*, 9/12/2016
- WP 04-CO.01, R3, *Conduct of Operations*, 12/7/2015
- WP 04-CO.01-1, R4, *Conduct of Operations Program – Operations Organization and Administration*, 4/17/2015
- WP 04-CO.01-10, R3, *Conduct of Operations Program – Independent Verification*, 3/6/2015
- WP 04-CO.01-11, R5, *Conduct of Operations Program – Logkeeping*, 9/15/2016
- WP 04-CO.01-12, R3, *Conduct of Operations Program – Turnover and Assumptions of Responsibilities*, 4/17/2015
- WP 04-CO.01-13, R3, *Conduct of Operations Program – Control of Interrelated Processes*, 3/25/2015
- WP 04-CO.01-14, R5, *Conduct of Operations Program – Required Reading*, 7/13/2016
- WP 04-CO.01-15, R7, *Conduct of Operations Program – Timely Orders to Operators*, 5/18/2016
- WP 04-CO.01-16, R3, *Conduct of Operations Program – Operations Procedures*, 4/15/2015
- WP 04-CO.01-17, R3, *Conduct of Operations Program – Operator Aid Postings*, 3/6/2015
- WP 04-CO.01-18, R5, *Conduct of Operations Program – Equipment and Piping Labeling*, 4/8/2016
- WP 04-CO.01-2, R4, *Conduct of Operations Program – Shift Routines and Operating Practices*, 5/12/2015
- WP 04-CO.01-3, R5, *Conduct of Operations Program – Control Area Activities for WIPP*, 4/17/2015
- WP 04-CO.01-4, R4, *Conduct of Operations Program – Communications*, 1/27/2015

- WP 04-CO.01-5, R5, *Conduct of Operations Program – Control of On-Shift Training*, 9/1/2016
- WP 04-CO.01-6, R6, *Conduct of Operations Program – Investigation of Abnormal Events, Conditions, and Trends*, 9/30/2015
- WP 04-CO.01-7, R3, *Conduct of Operations Program – Notifications*, 4/25/2016
- WP 04-CO.01-8, R5, *Conduct of Operations Program – Control of Equipment and System Status*, 7/13/2016
- WP 04-CO.01-9, R3, *Conduct of Operations Program – Lockout/Tagout*, 7/16/2015
- WP 04-EM4200, R32, *Radiological Monitoring System Alarm Response*, 10/4/2016
- WP 04-HV4021, R6, *HVAC Alarm Response*, 5/30/2016
- WP 04-VU4605, R37, *UVS Alarm Response*, 10/4/2016
- WP 05-WH1002, R15, *41-T-152 & 41-T-153, TRUDOCK Operation*, 9/21/2015
- WP 05-WH1004, R6, *Facility, SCA, and TRUPACT-II Pallet Handling*, 5/1/2013
- WP 05-WH1005, R22, *CH Packaging Trailer Loading/Unloading*, 6/16/2016
- WP 05-WH1011, R56, *CH Waste Processing*, 9/29/2016
- WP 05-WH1025, R18, *CH Waste Downloading and Emplacement*, 9/30/2016
- WP 05-WH1058, R16, *CH Waste Handling Abnormal Operations*, 5/30/2016
- WP 05-WH1406, R16, *Conveyance Loading Car*, 8/15/2016
- WP 05-WH1412, R14, *CH Waste Handling Toyota Forklifts*, 9/7/2016 (and related equipment logbooks)
- WP 05-WH1603, R17-FR1, *CH TRU Underground Transporter, 52-H-008A and B*, 10/3/2016 (and 52-H-008A equipment logbook)
- WP 10-WC3011, R37-FR1, *Work Control Process*, 10/5/2016
- WP 12-ER.25, R0, *Underground Escape and Evacuation Plan*, 1/7/2016
- WP 15-CA1004, R0, *Performance Monitoring and Reporting*, 11/9/2015
- WP 15-PS.01, R1, *Procedures Program*, 2/8/2016
- WP 15-PS.2, R12-FR1, *Procedure Writer's Guide*, 9/6/2016
- WP 15-PS3002, R39, *Controlled Document Processing*, 8/19/2016
- WP 15-PS3004, R1, *Procedure Verification and Validation*, 7/18/2016

Interviews Conducted

- CMROs (3)
- CMR Roving Watch (2)
- FSMs (3)
- RCSs (2)
- RCTs (6)
- Waste Handling Engineers, CH Bay, (2)
- Waste Handling Engineers, Underground (2)
- Waste Handling Manager
- Waste Handling Operators, CH Bay, (4)
- Waste Handling Operators, Underground, (4)
- WIPP Design Engineering Manager

- WIPP Work Control Manager
- WIPP Work Planning SME

Evolutions/Operations Witnessed

- Establishment of Waste Handling Mode
- Underground transporter pre-checks
- Toyota forklift pre-checks
- CH waste downloading and emplacement
- CH waste stacking
- Receipt of TRUPACT Waste Shipment
- TRUPACT Unloading
- CH Bay Off-Normal Event, CAM Alarm
- Operations Drill, Underground Off-Normal Event, Toyota forklift failure while loaded with waste
- Site Exercise, Underground Off-Normal Event, Vehicle Fire, Contaminated Injured Worker
- FSM, Shift Turnover
- CMRO, Shift Turnover
- CMRO, Operator Shift Rounds
- Daily T-0 Schedule Meeting

DISCUSSION OF RESULTS

1. *A conduct of operations program is developed and approved for operations. The applicability of DOE O 422.1 Admin Chg 2,* Conduct of Operations*, requirements was documented; this applicability determination (e.g., matrix) was approved by DOE; associated contract requirements are flowed into facility-specific procedures.*

The CORR team reviewed WP 04-CO.01, R3, *Conduct of Operations*, dated 12/7/2015. The cover sheet to "Attachment 1- Conduct of Operations Implementation Matrix" indicates that the matrix was reviewed for WIPP and CBFO, and that the review 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. The matrix describes where in the WIPP document structure the requirements of DOE O 422.1 are implemented. DOE O 422.1 is included in the WIPP operations prime contract. The order was implemented through a suite of conduct of operations procedures found in the contractor's conduct of operations procedures manual, WP 04-CO.01.

CORR team members reviewed the suite of conduct of operations procedures prepared by WIPP to implement DOE O 422.1 to ensure appropriate Order and contract requirements were flowed down into applicable facility procedures. Applicable requirements are addressed in WIPP conduct of operations procedures (also see Criterion 3 below).

This criterion was met.

2. *Sufficient numbers of qualified personnel and adequate facilities and equipment are available to conduct operations safely, including implementation of Conduct of Operation program elements.*

The minimum qualified personnel required to operate the facility per AC 5.3.1 is one shift manager, one CMRO, one facility operations roving watch, an attendant (activity-specific), and a shaft tender (activity-specific). The first three personnel are to be available on each shift. Attendants are activity-specific and must attend liquid-fueled vehicles under given conditions in the WIPP safety basis; therefore, establishing minimum manning is necessarily tied to the activity and not to shift assignment. This same approach applies to the shaft tender, who must be available during certain waste movement. Observation of CMR operations, CH Bay operations, and underground waste handling activities did not indicate a shortage of qualified personnel during observed normal operations and scheduled abnormal drills/emergency exercises.

Interviews of FSMs and CMROs and Roving Watches confirmed that an approved QWL is maintained in the CMR and personnel qualifications are confirmed at the start of each shift by the oncoming FSM. This was confirmed by the observation of two shift turnovers between different FSMs.

Review of the QWL showed that there are four shifts of personnel with at least the minimum number of qualified individuals to meet AC 5.3.1 requirements. At least one other individual is qualified as FSM.

Adequate equipment is available for safe waste emplacement. Adequate facilities are addressed in detail in Objective OPS3.

This criterion was met.

3. *Conduct of Operations principles and practices are documented in approved facility procedures and effectively implemented. The level of knowledge of operators and their supervisors and managers regarding conduct of operations principles and practices (e.g., command and control, procedure utilization, rounds, system status control, etc.) and their effective implementation is adequate based on interview results and on observation of performance during routine evolutions and field performance demonstrations, tabletop exercises, and operational and emergency drills.*

Conduct of operations was codified in the WP 04-CO.01 series of procedures, which make up WIPP's conduct of operations manual. During monitoring of operational activities above and below ground, procedure use and control of system status was adequate. Two examples of inadequate procedure use were noted during emergency exercises. This is addressed in Objective EP2. Other tenets of conduct of operations reviewed were satisfactory.
Team members observed FSMs, CMROs, and CMR Roving Watches during shift turnover, normal operations (including Facility Mode changes), and during off-normal events. All personnel demonstrated adequate knowledge and understanding of conduct of operations requirements associated with formal turnovers, record keeping, conduct of rounds, and disciplined communications. During normal operations and off-normal drills, CMROs

adequately controlled access to the CMR including the At the Controls area. A weakness in controlling CMR access was identified during the emergency exercise and is addressed elsewhere in this report.

CMROs and Roving Watches were able to explain and demonstrate how they controlled and ensured system status. CMROs were questioned as to what systems or portions of systems they could control remotely and those they could not. CMR personnel were also questioned on the status (impairments) of fire protection systems and their significance. All were able to discuss the status of individual impairments, and attendant compensatory measures, but not always the significance with respect to the safety basis (if applicable).

Operations personnel (FSM, CMRO, Rover, and Shaft Tender) were interviewed for knowledge level, including safety basis requirements and implementation, safety, conduct of operations and management support. Operators were sensitive to the operability of equipment required to support safety basis requirements and permit requirements, including use of the $ symbol on procedures.

CMR staff was observed placing WIPP surface and underground areas in Waste Handling Mode. This process is dependent on facility and waste handling operators performing numerous inspections and verifications of facility and vehicle status then providing the CMRO with completed checklists. This is a relatively new mode change process and procedures correctly implement safety requirements of the most recent facility DSA. However, it has proven to be more time consuming, with delays often caused by less than adequate attention to detail. Overall, WIPP personnel demonstrated they can safely perform mode changes but some operations efficiency may be lost in the long run because of the time required to perform and document required inspections and actions.

CMRO Roving Watches were observed conducting daily facility and instrument checks. Operators demonstrated adequate knowledge of conduct of operations requirements including good knowledge of facility conditions and record keeping. Early in the review it was noted that some data recorded on facility logs did not meet conduct of operations standards in that available instruments could not have been read to the accuracy implied in the records. Roving watches observed and interviewed later in the review recorded data correctly and were able to explain the requirement for interpreting instrument readings (i.e. ½ of the smallest graduation)

During observed turnovers, work evolutions, and off-normal/drill demonstrations, WIPP personnel demonstrated adequate knowledge and the ability to execute tasks while complying with applicable conduct of operations requirements. Minor conduct of operations mistakes and weaknesses were noted by team members but none pointed to a systemic weakness or a failure of the WIPP conduct of operations program to implement particular requirements of DOE O 422.1.

This criterion was met.

4. *The level of knowledge of operators and their supervisors and managers associated with the operational processes, associated hazards and controls, and the bases for those controls is adequate based on review of records, interview results, and observation of performance*

during routine evolutions and field performance demonstrations, tabletop exercises, and operational and emergency drills. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.

Operators were interviewed before and after field operations, including waste handling, facility rounds, underground operations, and CH Bay operations. Pre-job briefs observed met applicable WIPP requirements, were detailed, and interactive. Post-job briefs were less interactive, but adequate. At both pre- and post-job briefings, waste handling operators and RCTs were vocal with respect to positive or negative observations. Supervisors encouraged the workers to bring up any concerns or good practices observed.

Operators and RCTs observed performing waste handling operations in the underground and CH Bay demonstrated a good level of knowledge of potential hazards, procedures, equipment status and use, and general conduct of operations practices (communications, record keeping, procedure use, etc.). Procedure requirements related to DSA/TSRs, including how the requirements/steps were notated with a $, were reviewed at all pre-job briefing. During observed evolutions, procedure readers and operators were careful to ensure those procedure steps were properly performed and documented.

Operational knowledge of facilities, procedures, hoisting/rigging, and equipment rounds were found to be satisfactory. Heavy equipment use has resulted in multiple vehicles being parked on the same side of E-140 as the egress reflectors. In Section 4 of WP 12-ER.25, *Underground Escape and Evacuation Plan*, it states that "vehicles shall be parked on the side opposite the reflectors." This was noted during an August underground tour and reported to the guide by one CORR team member, then was noted again in October by another CORR team member following completion of underground evolutions and reported to operations. In both cases, there were multiple examples of improperly parked vehicles noted.

OPS1-PRE-1: Contrary to WP 12-ER.25, on at least two observed occasions, vehicles in the mine were parked along the same side as the placed egress markers, impairing the visibility of the markers.

CMRO Roving Watches were observed conducting daily facility and instrument checks. Operators demonstrated adequate knowledge of conduct of operations requirements, including good knowledge of facility conditions and record keeping. Early in the review, it was noted that some data recorded on facility logs did not meet conduct of operations standards in that available instruments could not have been read to the accuracy implied in the records. Roving watches observed and interviewed later in the review recorded data correctly and were able to explain the requirement for interpreting instrument readings (i.e. ½ of the smallest graduation).

This criterion was met.

5. *Operations personnel effectively demonstrate proficiency for and ability to execute normal, abnormal, and emergency operations in accordance with approved operating procedures based on observed practical operations demonstrations.*

The team observed normal waste handling activities on the surface, including the receipt of a waste shipment at the WIPP security gate through to loading of a facility pallet with simulated waste drums and transferring the waste to the underground via the waste hoist.

A simulated TRU waste shipment consisting of three standard TRUPACT containers was met at the WIPP security gate, surveyed by RCTs, and transferred to the yard outside the WHB airlock. Shipment inspections/verifications related to WIPP WAC and other shipping requirements are addressed in WACC1.

After a detailed pre-job briefing, the waste handling demonstration began with the unloading of a TRUPACT and its transfer to a TRUDOCK, a hydraulic dock leveler, in the WHB CH Bay. The unloading and transfer was performed per applicable WIPP procedures. No significant safety or procedure compliance issues were noted.

After the TRUPACT was placed in the TRUDOCK, simulated waste (two Standard Waste Boxes) was unloaded and placed on a facility pallet for transfer to the underground and emplacement in the mine. The procedure used to unload the TRUPACT (WP 05-WH1011, R56, *CH Waste Processing*) was evaluated to be adequate but could be significantly improved to make it easier, less confusing, and more efficient to use. The single procedure covers unloading of ALL types of waste that could be received. Most waste types and configurations require essentially the same procedure steps, radiological surveys, etc. A small number of shipment types require additional surveys or steps. Navigation through the procedure creates unnecessary opportunities for waste handlers and RCTs to make mistakes. Division of the procedure into several streamlined documents or specific procedure sections should be considered. The procedure also uses numerous “Notes” to allow some steps to be performed in any order, or re-performed, potentially leading to noncompliances. There are two instances where notes allow/direct work. These should be specific work steps. None of the identified procedure problems or inconsistencies resulted in significant safety or technical issues, or procedure noncompliances. Detailed comments on how the procedure could be improved were provided to WIPP personnel and discussed with facility procedure writers and Waste Handling Managers. Waste handling operators and procedure writers have prepared a draft procedure revision to resolve the comments and issues stemming from the waste handling demonstration. They have scheduled a tabletop review with waste handling operators and RCTs to work through the revised procedure and ensure its workability.

The team also observed the movement of a facility pallet containing simulated waste from a TRUDOCK to the waste hoist and its transfer to the underground. No significant safety, procedural, or technical issues were noted during this evolution.

The team observed the response of Waste Handling and Radiological Controls personnel to a simulated CAM alarm in the CH Bay. All personnel quickly exited the Bay through an airlock at the opposite end of the Bay from the alarming CAM. Overall response to the drill was satisfactory. Drill players and evaluators identified several deficiencies, opportunities for improvement, and good practices. For example, the controller’s simulation of the CAM alarm using an actual recorded alarm and flashing red light from a cell phone, was an improvement over previous simulations, the controllers and players identified further improvements that could

be easily made. The techniques used by RCTs to survey the CH Bay floor as they reached the CAM were identified as good practices.

The underground activities observed included receipt, transfer, and emplacement of waste, including stacking. Prior to waste emplacement, personnel are required to complete pre-checks on associated equipment in compliance with the safety basis. Activities required by a single surveillance may have different periodicities, resulting in multiple surveillances being performed for each shipment with parts of that surveillance being required less often. This results in parts of a given surveillance being marked as not applicable (N/A) (e.g., shift surveillances already performed that shift) while others are completed (e.g., surveillances applicable to each waste emplacement). The observed surveillance did not provide conditional allowances for marking steps not applicable, and neither are allowances provided by other WIPP procedures. This results in unauthorized procedure revisions using the N/A without prior consideration by Operations management. WIPP Form 16-1730 was generated to address this issue.

Some operations procedures are written to repeat steps, but do not include an instruction or allowance to do so. One example includes the waste emplacement procedure, where two waste loads are included on a single facility pallet but emplaced separately. The steps required to transfer the waste from a transition point to the final emplacement are repeated, but the procedure neither addresses nor allows this. WIPP Form WF16-1717 was generated to address this issue.

During abnormal drill planning, the intended drills were announced to operations personnel, so operations chose to revise the intended drill to include a situation neither announced nor supported by abnormal operations procedures.

The alternate drill conducted by operations involved a scenario where a forklift, loaded with a facility waste pallet, failed (stopped running) within 25 feet of the waste face. This scenario had not been previously used for an operations or off-normal drill.

Personnel in the underground responded appropriately and made calm, measured decisions. Workers were removed from the high CA surrounding the forklift and waste with an Attendant, required by TSR, remaining to monitor the vehicle.

The CMRO was initially slow to appreciate the significance of the forklift's failure near the waste face but quickly realized the problem as Waste Handling personnel described the actions being taken in the underground. When notified, the FSM immediately responded to the CMR, requested additional technical assistance, and began making preparations to repair, remove, or replace the forklift to ensure a liquid fueled vehicle did not remain within 25 feet of the waste face.

Subsequent CMR and underground actions were appropriate. Personnel in charge clearly understood the TSR/LCO implications of the scenario (not an emergency) and began preparing a reasoned plan to fix or remove the forklift.

Overall conduct and response to the drill was good, especially considering there is no specific procedure governing how to respond to the given scenario and it is the first time the scenario was used in an operations drill.

This criterion was met.

6. *Operations and operations support personnel demonstrate acceptable formality, procedure compliance and discipline of operations to conduct work safely. These attributes are demonstrated during interviews and observations of performance during routine evolutions and field performance demonstrations, tabletop exercises, and operations and emergency drills.*

Operations and rounds both above and below ground indicated adequate formality and performance in waste and facility operations. Occasions of poor three-way communications were noted, but most were adequate.

During observed turnovers, work evolutions, and off-normal/drill demonstrations, WIPP personnel demonstrated adequate operations discipline and formality, and the ability to execute tasks while complying with applicable conduct of operations requirements. Minor conduct of operations mistakes and weaknesses were noted by team members but none pointed to a systemic weakness or a failure of the WIPP conduct of operations program to implement particular requirements of DOE O 422.1.

This criterion was met.

7. *Procedures and/or mechanisms are in place to ensure there is a process used to authorize and release work activities and operations.*

The team reviewed applicable WIPP procedures and attended daily T-0 Scheduled Work/Daily Release meetings during the CORR. Team members ensured that work evolutions observed were on the T-0 schedule and accurately described.

Interviews were conducted with FSMs, CMROs, the WIPP Work Control Manager, Maintenance Manager, Facility Operations Manager, Waste Handling Engineers, and RCSs. All interviewees were able to describe the work control/release process in sufficient detail to validate their level of knowledge and understanding. While various Cognizant Operations Managers (Waste Operations, Mining, and Facility Operations and Underground Services) may ultimately release specific work, all work packages must first be identified on the daily T-0 schedule and were approved by the FSM.

Work scheduled for a particular day, but not performed or completed, is addressed at an afternoon meeting and re-released via the next day's T-0 schedule. The only weakness identified was that organizations that did not start or complete a task are supposed to notify the FSM, but in some cases the FSM only learns of a delay or cancellation via the next day's T-0 schedule.

This criterion was met.

8. *Procedures and/or mechanisms are in place that demonstrate effective integration of safety management and ensure safety requirements are integrated into work performance, to confirm that the facility or activity and the operational work force are in an adequate state of readiness prior to authorizing the performance of work.*

Procedures adequately implement safety basis and permit requirements as indicated by specific notations in the procedures. Precautions and limitations address process initial conditions. While not noncompliant, operational procedures reviewed provided a significant number of notes for clarification. On occasion, notes and cautions and warnings are stacked four and five deep, with execution steps nested between. There are two instances in WP 05-WH1011, where notes allow or direct work. These should be specific work steps. Excessive amplifying information within a procedure can make its execution confusing for the end user.

Safety management is integrated through programs which implement the core functions and guiding principles of WIPP's ISMS. Examples include work package development, which identifies and mitigates hazards, procedure verification and validation by operations personnel, and continuous emphasis that personnel are responsible for their own safety.

None of the identified procedure problems or inconsistencies resulted in significant safety or technical issues, or procedure noncompliances. Where appropriate, the team provided comments on how procedures could be improved. Comments were provided to WIPP personnel and discussed with facility procedure writers and Waste Handling Managers.

This criterion was met.

9. *Procedures and/or mechanisms are in place that ensures adequate performance measures and indicators, including safety performance measures are established for the work.*

The project has developed and monitors performance indicators adequately as per WP 15-CA1004, *Performance Monitoring and Reporting*. Examples of performance indicators monitored include measures of SMP health and trends in WIPP's issues management process. Senior management participates in the process through the ESQRB. A review of the WIPP Form trends includes adequate analysis of data and trends across more than one trending period.

This criterion was met.

10. *AIB JONs related to conduct of operations were addressed through effective corrective actions for the conduct of operations SMP.*

Reviewed the operations management JONs closure packages. No weaknesses were noted in how the actions addressed the judgments of need. All reviewed packages were reviewed and accepted by NWP and CBFO.

This criterion was met.

CONCLUSION

Based on observed work demonstrations, interviews, and review of applicable procedures, WIPP personnel successfully demonstrated discipline and a formality of operations sufficient to receive, unpack, transfer to the underground safely, and emplace CH TRU waste packages. Conduct of operations and oversight programs are in place to ensure personnel maintain this formality and proficiency of disciplined operations.

The level of knowledge of operators and managers was demonstrated to be adequate to resume CH waste operations through interviews of WIPP staff, reviews of selected T&Q records, and observation of normal, off-normal, and emergency demonstrations.

This objective was met. There was one finding identified.

FINDINGS

Pre-Start
OPS1-PRE-1: Contrary to WP 12-ER.25, on at least two observed occasions, vehicles in the mine were parked along the same side as the placed egress markers, impairing the visibility of the markers.

Post-Start
None

Assessed by:	Sam Glenn **CORR Team Member** Mike Huyck **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Operations**	Objective: OPS2 Date: 10/14/2016	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

OPS2: Adequate and accurate procedures and safety limits are approved and in place for operating the process systems and utility systems. Facility processes ensure that only the most current revision to each procedure is in use. (CR 9)

CRITERIA

1. There are adequate and correct procedures that implement the administrative and engineering controls and safe operating parameters required for the work scope and associated support systems.
2. Procedures related to safe operation of the facility and/or safety SSCs are prepared with participation by end users and appropriate SMEs, verified to be technically correct, and validated to be workable as written (SMP KE 12-1).
3. Facility processes ensure that only the most current revision to each procedure is in use.
4. Procedures address the actions to be performed by operators in response to CMR notifications, annunciators, and other types of facility displays that indicate an abnormal condition (SMP KE 11-12).

APPROACH

Records Reviewed

- 04-AD.02, R5, *Technical Safety Requirements Surveillance Program*, 5/17/2016
- ACD-2016-41, *WHB Hood CAM Alarm (drill package)*, 10/5/2016
- EA04AD3036-1-0, R1, *Safety Basis Implementation Matrix*, 2/19/2016
- EA04AD3036-2-0, R0, *Safety Basis Implementation Plan Development*, 2/19/2016
- EA12NS3007-1-0, R0, *LDD Change Request Forms*, 12/21/2015
- EA12NS3007-2-0, R0, *Linking Document Database Change Request Log*
- WP 02-AR3001, R12, *Unreviewed Safety Question Determination*, 2/18/2015
- WP 04-AD3036, R1, *WIPP Safety Basis Implementation Process*, 2/19/2016
- WP 04-CM2001, R0, *Safety Instrument Alarm System Annunciator Panel 711-AP-451*, 5/23/2016
- WP 04-CM2003, R3, *Loss of CMS Indication*, 9/12/2016
- WP 04-EM4200, R32, *Radiological Monitoring System Alarm Response*, 10/4/2016
- WP 04-HV4021, R6, *HVAC Alarm Response*, 5/30/2016
- WP 04-VU4605, R37, *UVS Alarm Response*, 10/4/2016
- WP 05-WH1002, R15, *41-T-152 & 41-T-153, TRUDOCK Operation*, 9/21/2015

- WP 05-WH1004, R6, *Facility, SCA, and TRUPACT-II Pallet Handling*, 5/1/2013
- WP 05-WH1005, R22, *CH Packaging Trailer Loading/Unloading*, 6/16/2016
- WP 05-WH1011, R56, *CH Waste Processing*, 9/29/2016
- WP 05-WH1025, R18, *CH Waste Downloading and Emplacement*, 9/30/2016
- WP 05-WH1058, R16, *CH Waste Handling Abnormal Operations*, 5/30/2016
- WP 05-WH1406, R16, *Conveyance Loading Car*, 8/15/2016
- WP 05-WH1412, R14, *CH Waste Handling Toyota Forklifts*, 9/7/2016
- WP 05-WH1603, R17-FR1, *CH TRU Underground Transporter, 52-H-008A and B*, 10/3/2016
- WP 12-NS3007, R6, *DSA/TSR Linking Document Database*, 12/21/2015
- WP 15-CA1006, R2, *Safety Basis Implementation Verification Reviews*, 5/17/2016
- WP 15-PS.01, R1, *Procedures Program*, 2/8/2016
- WP 15-PS.02, 12-FR1, *Procedure Writer's Guide*, 9/6/2016
- WP 15-PS3004, R1, *Procedure Verification and Validation*, 7/18/2016
- WP 15-PS3103, R18, *Document Distribution*, 9/15/2016

Interviews Conducted

- CMR Roving Watch (2)
- CMROs (3)
- FSMs (3)
- RCSs (2)
- RCTs (6)
- Waste Handling Engineers, CH Bay, (2)
- Waste Handling Engineers, Underground (2)
- Waste Handling Manager
- Waste Handling Operators, CH Bay, (4)
- Waste Handling Operators, Underground, (4)
- WIPP Work Control Manager

Evolutions/Operations Witnessed

- Establishment of Waste Handling Mode
- Underground transporter pre-checks
- Toyota forklift pre-checks
- CH waste downloading and emplacement
- CH waste stacking
- Receipt of TRUPACT Waste Shipment
- TRUPACT Unloading
- CH Bay Off-Normal Event, CAM Alarm
- Operations Drill, Underground Off-Normal Event, Toyota forklift failure while loaded with waste
- Site Exercise, Underground Off-Normal Event, Vehicle Fire, Contaminated Injured Worker

- FSM, Shift Turnover
- CMRO, Shift Turnover
- CMRO, Operator Shift Rounds
- Daily T-0 Schedule Meeting

DISCUSSION OF RESULTS

1. *There are adequate and correct procedures that implement the administrative and engineering controls and safe operating parameters required for the work scope and associated support systems.*

The team reviewed the programmatic and implementing procedures associated with establishing and maintaining the approved safety envelope developed in DSA Revision 5b and associated TSRs. Selected TSR Surveillance Requirements were reviewed and associated field surveillance activities were observed, including pre-operational inspections of equipment and vehicles, inspections and operational checks performed by roving watches, and periodic equipment performance tests by operations personnel.

No significant deficiencies were noted with the procedures. Minor conduct of operations issues were observed with execution of procedures, but none of these problems affected the correct accomplishment of the required test or surveillance.

This criterion was met.

2. *Procedures related to safe operation of the facility and/or safety SSCs are prepared with participation by end users and appropriate SMEs, verified to be technically correct, and validated to be workable as written (SMP KE 12-1).*

WIPP instructions governing procedure and work package development require varying levels of user involvement based on the complexity of work; whether the job is repetitive; and whether a procedure implements safety basis or permit requirements. The team considers this to be a reasonable approach. For example, a major revision to the TRUPACT unloading procedure should include full participation by waste handling operators and RCTs, while a work package to troubleshoot and repair the training building air conditioning could be prepared by a planner alone.

Interviews of operators, procedure writers, engineers, and managers indicated that this system is working reasonably well but could be improved. Several operators and operation supervisors stated that they sometimes are not involved in procedure development or revision until the verification and validation stage is reached. They believe their input could be much more helpful at the beginning of the process (i.e. as procedure steps and outlines are prepared).

A large number of operations, alarm response, and programmatic procedures reviewed by the team were revised in the last sixty days. Based on these reviews, observations of work evolutions, and interviews of procedure preparers/users, the team concluded that the explicit requirement to validate each procedure to be workable was met. However, the team is concerned

that with so many procedure revisions issued in a relatively short period of time, WIPP personnel have not had time to become comfortable with new processes or requirements, and unexpected problems or interface issues may not become apparent until more realistic operations are conducted. For example, during the CORR demonstrations, placing the WHB and underground in Waste Handling Mode required much longer than the time allotted in daily the event schedules. It is not apparent that the process, as it is currently configured, can be routinely accomplished in substantially less time.

Because so many procedures were recently changed, and the facility has not been operated in a realistic, sustained operations, manner using the new processes, the team recommends that NWP schedule some substantial time (a number of weeks) where the facility functions as if it has returned to normal operations. Personnel should note problems with procedures, interfaces, material problems, etc., for resolution at the end of the trial period. Changes (i.e. to procedures, etc.) should be minimized during the period, unless absolutely mandatory, to avoid injecting uncertainty and interface issues.

This criterion was met.

3. *Facility processes ensure that only the most current revision to each procedure is in use.*

WIPP document control personnel maintain the latest approved revision of activity level work documents, facility operations procedures, and programmatic documents in Q&MIS. Each WIPP employee has access to Q&MIS via the WIPP computer network and is trained that Q&MIS is the only source of the latest approved revision of a document.

During interviews, pre-job briefs, operator rounds, etc., all WIPP personnel were consistent in answering that Q&MIS was the source of the latest approved revision of any document. Some individuals referred to Q&MIS as the Electronic Document Management System, per the terminology in the WIPP Document Distribution procedure (WP 15-PS3103).

This criterion was met.

4. *Procedures address the actions to be performed by operators in response to CMR notifications, annunciators, and other types of facility displays that indicate an abnormal condition (SMP KE 11-12).*

The team reviewed selected off-normal and alarm response procedures related to waste handling/emplacement activities on the surface and in the WIPP underground. The procedures were evaluated to ensure they required operators to take appropriate and sufficient actions based on direction from the CMR. The procedures were also evaluated with respect to actions required by operators in response to local CAM alarms, evacuation beacons in the underground, etc.

With the exception discussed below, all procedures required appropriate responses by operators to alarms, and direction from the CMR.

During the emergency exercise (fire on a waste handling vehicle in the underground), operators and RCTs did not immediately evacuate the work location and underground when the fire occurred. While there may have been some confusion resulting from drill simulation issues (by procedure, a fire in the incipient stage may be fought), all personnel not fighting the fire should have evacuated. This issue is discussed in detail in the EP CRADs.

This criterion was met.

CONCLUSION

Based on the team's review of selected procedures and observation of normal work evolutions, responses to alarm and off-normal scenarios, and conduct of TSR Surveillances, adequate and accurate procedures and safety limits are approved and in place for operating the process systems and utility systems. Facility processes ensure that only the most current revision to each procedure is in use.

This objective was met. There were no findings identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	Sam Glenn **CORR Team Member** Mike Huyck **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Operations**	Objective: OPS3 Date: 10/14/2016	OBJECTIVE MET	
		YES ☐	NO ☒

OBJECTIVE:

OPS3: Adequate facilities and equipment are available for safe facility operation. The material condition of all safety, process, and utility systems will support the safe conduct of work. (CR 1, 7)

CRITERIA

1. Adequate facilities and equipment are available for safe facility operation.
2. The material condition of safety, process, and utility systems will support the safe conduct of work.

APPROACH

Records Reviewed

- 12-NS3017, R0, *In Service Inspection of WIPP Design Features*, 5/2016
- DOE/WIPP 07-3372, R5b, *Waste Isolation Pilot Plant Documented Safety Analysis*, 4/2016
- DOE/WIPP 07-3373, R5b, *Waste Isolation Pilot Plant Technical Safety Requirements*, 4/2016
- DOE/WIPP-06-3335, R4, *WIPP Nuclear Maintenance Management Plan*, 12/2015
- *T-0 Daily Scheduled Work/Daily Release*, 10/4/2016 – 10/11/2016
- WO 1618719, *In Service Inspection of WIPP Design Feature-Waste Hoist Support Structure*, performed 5/26/2016
- WO1618718, *In Service Inspection of WIPP Design Feature-Underground Fuel and Storage Locations*, performed 5/25/2016
- WO1618720, *In Service Inspection of WIPP Design Feature-Facility Pallets for CH Waste 52-Z-002 series*, performed 5/25/2016
- WO1623560, *PM Underground Exhaust Fan 41-B-860A, B & C*
- WO1623668, *PM Diesel Generator Load Bank*
- WO1626803, *PM Fletcher Roof Bolters Inspection and Maintenance*
- WO1626891, *PM Filter Units 41-B-856 and 41-B-857 Mod and High Filter Differential Pressure Loop Calibrations*
- WP 04-CO.01-8, R5, *Conduct of Operations Program – Control of Equipment and System Status*, 7/13/2016
- WP 05-WH1002, R15, *41-T-152 & 41-T-153, TRUDOCK Operation*, 9/21/2015
- WP 05-WH1004, R6, *Facility, SCA, and TRUPACT-II Pallet Handling*, 5/1/2013

- WP 05-WH1005, R22, *CH Packaging Trailer Loading/Unloading*, 6/16/2016
- WP 05-WH1011, R56, *CH Waste Processing*, 9/29/2016
- WP 05-WH1025, R18, *CH Waste Downloading and Emplacement*, 9/30/2016
- WP 05-WH1406, R16, *Conveyance Loading Car*, 8/15/2016
- WP 05-WH1412, R14, *CH Waste Handling Toyota Forklifts*, 9/7/2016
- WP 05-WH1603, R17-FR1, *CH TRU Underground Transporter, 52-H-008A and B*, 10/3/2016
- WP04-AD.02, R5, *Technical Safety Requirements Surveillance Program*, 5/2016
- WP10-WC3010, R29, *Periodic Maintenance Administration and Controlled Document Processing*, 5/2016
- WP10-WC3011, R37, *Work Control Process*, 5/2016
- WP10-WC3017, R1, *Post-Maintenance Testing*, 9/2014
- WP12-IS3002, R14, *Job Hazard Analysis Performance and Development*, 3/2016

Interviews Conducted

- CSEs (2)
- FSMs (3)
- Maintenance Foreman (2)
- Maintenance Supervisor (2)
- Maintenance Workers (4)
- Waste Handling Engineers, CH Bay, (2)
- WIPP Design Engineering Manager
- WIPP Design Engineering Manager
- WIPP Maintenance Manager
- WIPP Work Control Manager
- WIPP Work Planning SME
- Work Package Planner
- Work Package Scheduler

Evolutions/Operations Witnessed

- PM041042, *PM Underground Exhaust Fan 41-B-860A, B & C*, 10/7/2016
- PM025088, *Diesel Generator Load Bank*, 10/8/2016
- PM074123, *Fletcher Roof Bolters Inspection and Maintenance*, 10/10/2016
- IC041001, *PM Filter Units 41-B-856 and 41-B-857 Mod and High Filter Differential Pressure Loop Calibrations*, 10/6/2016
- Underground transporter pre-checks
- Toyota forklift pre-checks
- CMRO Rounds
- CH waste downloading and emplacement
- CH waste stacking
- Receipt of TRUPACT Waste Shipment
- TRUPACT Unloading

DISCUSSION OF RESULTS

1. *Adequate facilities and equipment are available for safe facility operation.*

Based on reviews of selected facility operations, equipment maintenance, and procedures, the team identified representative facilities, systems, and equipment necessary to support the safe receipt and emplacement of CH TRU waste. Where possible, team members observed simulated or actual evolutions/tests demonstrating the availability and operability of these facilities, systems, or equipment. Where this was not possible or practicable, team members walked down systems and facilities with cognizant engineers or roving watches to ensure required facilities and equipment were available.

In cases where facilities or equipment were not fully functional or were impaired (for example some fire protection systems), the team ensured appropriate compensatory measures were in place, and that plans were in place or being developed to return the facility, equipment, or system to full service. At the conclusion of the CORR, ground control conditions in Panel 7 are not supportive of safe operations and access is restricted. As such, adequate facilities are not available. This is currently captured on the manageable list of open items and will be tracked there.

Based on Panel 7 ground control being maintained on the manageable list, this criterion was **partially** met.

2. *The material condition of safety, process, and utility systems will support the safe conduct of work.*

Team members evaluated the material condition of safety, process, and utility systems in conjunction with assessment of the WIPP Maintenance Program, and performed observation of simulated and actual work evolutions and operator rounds/walkdowns of WIPP facilities.

As documented in CRAD MIT1, the WIPP Maintenance Program was evaluated to be implemented effectively. Testing, calibration, operability, and preventive/corrective maintenance are accomplished for safety-significant and defense-in-depth SSCs, CAMs, and liquid-fueled vehicles, in accordance with applicable code requirements, manufacturer recommendations, established technical requirements, and engineering judgment consistent with tracking, trending, and failure history.

During simulated waste handling and emplacement operations, all required systems and equipment performed satisfactorily. No significant material deficiencies were noted.

While accompanying operators on normal rounds, and other WIPP staff on system walkdowns, no significant material deficiencies were noted that were not already identified and being tracked to ensure they are corrected.

This criterion was met.

CONCLUSION

Based on an assessment of the WIPP Maintenance Program, observation of representative work evolutions, and walkdowns of selected systems and facilities, the team determined that adequate equipment is available for safe facility operation. Adequate facilities are not yet available, as Panel 7, Room 5 is not fully prepared to receive waste. This issue is currently on the manageable list of opens items. The material condition of all safety, process, and utility systems will support the safe conduct of work.

This objective was **partially** met. There were no findings identified. Satisfactorily addressing the Panel 7 ground control on the manageable list of open items will enable NWP to meet the objective fully.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	Sam Glenn **CORR Team Member** Mike Huyck **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Procedures Management**	Objective: PM1 Date: 10/14/2016	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

PM1: Line management has established a Procedures Management SMP to ensure safe accomplishment of work. The level of knowledge of managers and staff responsible for administering and implementing the Procedures Management Program is adequate based on review of records, interviews, and observation of routine activities. (CR 1, 4)

CRITERIA

1. Procedures management contract requirements are flowed into facility-specific procedures.
2. Procedures management procedures are effectively implemented in support of the facility.
3. Sufficient qualified personnel are available to implement the Procedures Management Program effectively in support of the facility.
4. WIPP has adequate facilities, and equipment is available to ensure that procedures management support and services are adequate for safe facility operation.
5. The level of knowledge of managers and staff responsible for administering and implementing the Procedures Management Program is adequate based on review of records, interviews, and observation of routine activities. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.
6. AIB JONs related to procedures management were addressed through effective corrective actions for the Procedures Management SMP.

APPROACH

<u>Records Reviewed</u>

- DOE O 422.1, Chg. 2, *Conduct of Operations*, 12/3/2014
- DOE/WIPP 07-3372, R5b, *Waste Isolation Pilot Plant Documented Safety Analysis*, April 2016
- DOE-STD-1029-92, Chg. 1, *Writer's Guide for Technical Procedures*, 1/7/1999
- Email, from Medders to Hulvey, Subject: *Questions on Restart MSA Deficiencies: Status on Procedures Management Program Deficiencies Identified During the Restart MSA*, 10/11/2016, with the following four attachments:
    - WP 15-PS.2, R12-FR1, *Procedure Writer's Guide*, 9/6/2016
    - WIPP Action Form, R0, *Action Item List for ACT16-1410* (five action items), 10/11/2016
    - WP 14-TR3310, R2, *Training Determination*, 9/21/2016
    - EA14TR3310-2-0, R0, *Informal Training Briefing Template*, 9/21/2016

- MA-Procedures-2015-01, R0, *Management Assessment NWP Procedures and Document Services*, 9/18/2015
- MP 1.21, R8, *Management Responsibility and Accountability*, 1/23/2015
- MP 1.54, R2, *Conduct of Operations Policy*, 6/14/2013
- *NWP Annual Integrated Assessment Schedule, FY-2017 – First Quarter 2018*, R0, 9/27/2016
- *WIPP Form Trend Analysis: 1/1/2016 to 6/30/2016*, R0, 9/14/2016
- WP 04-AD3034, R2, *Technical Procedure Compliance*, 5/25/2016
- WP 04-CO.01, R3, *Conduct of Operations*, 12/7/2015
- WP 05-WH1603, R16, *Field Revision Documentation (Procedure Change)*, 8/13/2016
- WP 13-1, R36, *Nuclear Waste Partnership LLC Quality Assurance Program Description*, 12/22/2015
- WP 14-TR.01, R16, *WIPP Training Program*, 5/17/2016
- WP 15-3004, R1, *Verification and Validation*, 7/18/2016
- WP 15-GM.03, R9, *Integrated Safety Management System Description*, 12/1/2015
- WP 15-PS.01, R1, *Procedures Program*, 2/8/2016
- WP 15-PS.2, R12, *Procedure Writer's Guide*, 12/18/2015
- WP 15-PS3002, R39, *Controlled Document Processing*, 8/19/2016
- WP PS-3103, R17, *Document Distribution*, 5/11/2016

Interviews Conducted

- Deputy Project Manager, NWP
- President and Project Manager, NWP
- Procedures Management Manager
- Restart Manager
- Technical Procedures Writer
- Technical Training and Procedures Manager
- Waste Handling Operators (2)

Evolutions/Operations Witnessed

- Interview Concerning Procedure Review and Revision, 10/12/2016

DISCUSSION OF RESULTS

1. Procedures management contract requirements are flowed into facility-specific procedures.

In conducting a review of related Procedures Management Program procedures for WIPP, it was confirmed that the necessary documents were developed, approved, and implemented. In addition, the review and interviews conducted with the Technical Training and Procedures Manager and the Procedures Manager confirmed that SMP KE 12.1 for procedures management was implemented.

The CORR team completed a review the WIPP Revision 5b of the DSA and the TSRs; specific attention was paid to Chapters 7.0 through 18.0 of the DSA, looking at the SMPs and the KEs.

Chapter 12.0 of the DSA was discussed with the Technical Training and Procedures Manager and the Procedures Manager. The WIPP prime contract requires that:

> The Contractor shall maintain a configuration management system that ensures that required documentation such as…procedures…are maintained up to date, ... Changes shall be integrated so that all documentation, training, permits, and facility and equipment modifications are verified complete prior to implementation.

It was confirmed through interviews and document reviews, that technical procedures and management procedures are being maintained in accordance with these contract requirements.

This criterion was met.

2. *Procedures management procedures are effectively implemented in support of the facility.*

The WIPP *Procedures Program* (WP 15-PS.01, R1, 9/8/2016) established the program-related R2A2 interfaces with operations. Additional documentation reviewed (e.g., procedures management administrative procedures and the current WIPP organization charts) indicate that the procedures management organization is postured and sized to support the resumption of CH waste emplacement and WIPP.

The CORR team reviewed several documents and records to assess the status of implementation of the Procedures Management Program at WIPP. These documents included:

- Management and independent assessments of the Procedures Management Program:
    - WIPP Action Form, R0, *Action Item List for ACT16-1410* (five action items), 10/11/2016,
    - MA-Procedures-2015-01, R0, *Management Assessment NWP Procedures and Document*, 9/18/2015, and
    - *NWP Annual Integrated Assessment Schedule, FY-2017 – First Quarter 2018*, R0, 9/27/2016
- A detailed review and discussion of the *WIPP Form Trend Analysis: 1/1/2016 to 6/30/2016*, with the Procedures Program Manager. These materials are prepared every six months for senior management by the Contractor Assurance organization. The ESQRB conducts the review, where in this specific case it was a critical review dealing with the "health" of procedures management implementation, including analyses, conclusions, and actions (e.g., WIPP Form entries), and the status of action plan completion. This review and discussion includes a review of documentation of open and recently closed WIPP Forms and lesson learned.
- Reviewed AIB JONs and MSA pre-start findings and confirmed that there were no issues pertaining to the Procedures Management Program.

This criterion was met.

3. *Sufficient qualified personnel are available to implement the Procedures Management Program effectively in support of the facility.*

Review of the Procedures Management Program organization chart and interviews with the Technical Training and Procedures Program Manager and the Procedures Management Program manager demonstrated that there are sufficient qualified personnel available to implement the Procedures Management Program effectively in support of the facility.

This criterion was met.

4. *WIPP has adequate facilities, and equipment is available to ensure that Procedures Management support and services are adequate for safe facility operation.*

During the course of an interview with the Procedures Program Manager and a separate interview with a technical writer, both displayed sound understanding and knowledge concerning their roles and responsibilities for writing, reviewing, maintaining, and controlling procedures.

The field assessment indicated that there is adequate understanding of procedure management protocols and requirements, validation processes, and implementation of safety requirements. This review confirmed that interfaces exist and requirements are established and communicated between the Procedures Managements group and other organizations responsible for providing SMEs (e.g., Operations, Engineering, safety, Radiation Control) in the procedure writing and management processes.

In discussing the 2014 events and their AIB reports with the Procedures Program Manager, he made it clear that procedures management processes and the quality of procedures have improved, and that they have more areas in which to improve. The organization attitude concerning procedures management and control is as expected for an organization like WIPP. There is a known reliance on procedures and there is a conscious effort to provide and use quality procedures. The ground gained on procedures management and the momentum made in using and maintain good procedures in the field must be sustained by this organization to effectively move forward with CH waste emplacement.

In completing the interviews with the Technical Training and Procedures Manager and the Procedures Program Manager, along with the documentation review and walk through of the office area, it was concluded that there is adequate facilities and equipment to fulfill the procedures management function.

This criterion was met.

5. *The level of knowledge of managers and staff responsible for administering and implementing the Procedures Management Program is adequate based on review of records, interviews, and observation of routine activities. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.*

As was stated and documented above, the observed level of knowledge of managers and staff responsible for administering and implementing the Procedures Management Program is adequate based on review of records, interviews, and observation of activities. This includes

knowledge of project activities and safety basis requirements commensurate with their responsibilities.

This criterion was met.

6. *AIB JONs related to Procedures Management were addressed through effective corrective actions for the Procedures Management SMP.*

A review of the AIB JONs was completed; there are no JONs related to the Procedures Management Program and its SMP.

This criterion was met.

CONCLUSION

Line management has established a Procedures Management SMP to ensure safe accomplishment of work, and the level of knowledge of managers and staff responsible for administering and implementing the Procedures Management Program is adequate. This conclusion was based on satisfactory flow-down of contract requirements, sufficient qualified staffing with acceptable knowledge levels of the procedure program and its implementing documents, as well as the interface with Operations, and adequate facilities and processing equipment to support the Procedure Management Program at WIPP.

This objective was met. There were no findings identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	Russ Hulvey **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Quality Assurance**	Objective: QA1 Date: 10/14/2016	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

QA1: Line management has established and implemented a Quality Assurance (QA) SMP to ensure safe accomplishment of work. The level of knowledge of QA managers and staff is adequate based on review of examinations and examination results, interviews, and observation of operational demonstrations. (CR 1, 4)

CRITERIA

1. QA contract requirements are flowed into facility-specific procedures.
2. QA procedures are effectively implemented in support of the facility, including:
    - Safety-significant programmable logic controllers (PLCs) are password protected (SMP KE 14-1).
3. Sufficient qualified personnel are available to implement the QA Program effectively in support of the facility.
4. WIPP has adequate facilities, and equipment is available to ensure that QA support and services are adequate for safe facility operation.
5. The level of knowledge of managers and staff responsible for administering and implementing the QA Program is adequate based on review of records, interviews, and observation of operational demonstrations. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.
6. AIB JONs related to QA were addressed through effective corrective actions for the QA SMP.

APPROACH

<u>Records Reviewed</u>

- 15-011 NWP Line Management Assessment, *Quality Assurance*, 5/5/2015
- AA:16:01127, UFC:1410.00, R3, *U.S. Department of Energy Contractor Readiness Review Plan of Action for Commencement of Contact Handled Waste Emplacement Waste Isolation pilot Plant*, 9/14/2016
- *Controlled Software Log*, 10/4/2016 version
- *Controlled Software Log*, 8/31/2016 version
- *Crosswalk of ASME NQA-1-1989 to NMP QAPD WP 13-1, R36 and NWP Implementing Procedures*
- DOE O 414.1D, *Quality Assurance*, 4/25/2011
- DOE/WIPP 07-2272, R5b, *Waste Isolation Pilot Plant Documented Safety Analysis*, April 2016

- DOE/WIPP 07-3373, R5b, *Waste Isolation Pilot Plant Technical Safety Requirements*, April 2016
- DOE/WIPP-99-2194, R9, *Waste Isolation Pilot Plant Environmental Monitoring Plan*, September 2015
- EA 16-2-3-0, R4, *Software Installation and Checkout Form for Application 413-CP-321-03 PLC Application Program*, 9/4/2016
- EA 16-2-4-0, R1, *Software Problem Report*, 5/11/2010
- EA16-2-1-0, R6, *Software Screening Checklist for Qualified Watchstanders list (QWL) database*, 10/10/2016
- EA16-2-1-0, R6, *Software Screening Checklist for Rbase raining database excel spreadsheet*, 10/10/2016
- EA16-2-1-0, R6, *Software Screening Checklist*, 3/1/2011
- EA16-2-1-3, R4, *Software Installation and Checkout Form*, 1/5/2012
- EA16-2-2-0, R6, *Software Quality Assurance Elements Checklist*, 8/23/2013
- Email from Faulk to Love, *Updated 8 NCRs to add to USQD #D16-109, Rev. 2: 9/30/2016 Open plant NCRs*, 9/30/2016
- Evidence File of QA Implementing Procedures
- I15-07, NWP Quality Assurance Audit, *Software Quality Assurance Requirements*, 5/27/2015
- Letter from DOE-EM Headquarters to CBFO, Subject: *Exemption from Implementing NQA-1-2004/2007 Quality Assurance Programs at the Carlsbad Field Office and Waste Isolation Pilot Plant*, 10/5/2012
- MSA-QA-2016-002, R12, *Management Self-Assessment of CBFO Quality Assurance Program Document Matrix to NWP Quality Assurance Program Description, 8/5/2016*
- MSTI-NWP-R-0001, R3, *Gap Analysis and Crosswalk of WIPP NQA-1 Requirements: ASME NQA-1-1989/NQA-2a-1990 Part 2.7 to NQA-1-2008/NQA-1a-2009*, 9/8/2016
- NTP-WDS-ATR-010, R0, *Waste Data System (WDS) Version 2.7.1 Acceptance Test Report*, August 2016
- NWP MSA-QA-2016-001, *Effectiveness Review of Corrective Actions Resulting for Independent SMP-14-015 QA*, 4/18/2016
- NWP Performance indicators for August FY16 related to WIPP Form generation, closure, and extensions
- *NWP Quality Assurance Rolling 2-Year Supplemental and Ad Hoc Assessment Schedule, FY 2016/ FY 2017*
- Position descriptions for QA Manager, Assurance Programs Manager, Oversight Programs Manager, QA Specialist, Associate QA Analyst, QA Inspector I, II and III
- S15-22, NWP QA Surveillance, *QA Safety Management Program*, 7/1/2015
- SMP-14-015, R0, *Waste Isolation Pilot Plant Quality Assurance Independent Safety Management Program Evaluation Report*, 2/5/2015
- SMP-14-105, R0, *Waste Isolation Pilot Plant Quality Assurance (QA) Independent Safety Management Program Evaluation Report*, 12/18/2014
- Third Party Independent Assessment, *Software Quality Assurance Report of the Nuclear Waste Partnership Software Quality Assurance Program*, 9/30/2015
- WF16-1649 through 1656, *WIPP Form detail reports*
- WP 02-AR3001, R12, *Unreviewed Safety Question Determination*, 2/18/2016
- WP 02-AR3001, R13, *Unreviewed Safety Question Determination*, 9/30/2016 DRAFT

- WP 02-EC.06, R12, *WIPP Site Effluent and Hazardous Materials Sampling Plan*, 11/24/2015
- WP 02-EC.11, R12, *Waste Isolation Pilot Plant Pollution Prevention Program Plan*, 8/25/2016
- WP 02-EM1012, R17, *Airborne Particulate Sampling*, 1/9/2015
- WP 02-EM1029, R0, *Special Soil Sampling*, 3/13/2014
- WP 02-EM1030, R0, *Special Vegetation Sampling*, 3/13/2014
- WP 02-EM1031, R1, *Event Evaluation Airborne Particulate Sampling*, 1/9/2015
- WP 08-NT.04, R22, *Waste Data System Software Quality Assurance Plan*, 10/1/2014
- WP 08-NT.04, R23, *Waste Data System Software Quality Assurance plan*, 10/3/2016
- WP 08-NT1004, R3, *Waste Data System Verification, Validation, and Deployment of Application Software*, 8/3/2015
- WP 08-PT.03, R12, *NWP 10 CFR Part 71, Subpart H, Quality Assurance Program plan*, 4/19/2016
- WP 09-CN3005, R7, *Graded Approach to Application of QA Controls*, 8/8/2014
- WP 09-CN3005, R8, *Graded Approach to Application of QA Controls*, 7/19/2016
- WP 09-CN3007, R37, *Engineering Change Notice*, 10/3/2016
- WP 09-CN3040, R3, *Commercial Grade Item Dedication*, 1/29/2015
- WP 12-RC.01, R11, *Software Quality Plan for Sampling Emissions of Radionuclides to the Ambient Air at the Waste isolation pilot Plant*, 3/2/2015
- WP 12-RE3002, R5, *Radiological Engineering Off-Site Air Sampling*, 10/24/2014
- WP 13-1, R36, *Nuclear Waste Partnership LLC Quality Assurance Program Description*, 12/22/2015
- WP 13-QA.03, R26, *Quality Assurance Independent Assessment Program*, 7/8/2016
- WP 13-QA.04, R22, *Quality Assurance Department Administrative Program*, 7/22/2016
- WP 13-QA.06, R10, *Quality Assurance Department Qualification and Certification of Nondestructive Examination Personnel*, 4/30/2015
- WP 13-QA1001, R9, *Liquid Penetrant Examination*, 10/26/2015
- WP 13-QA1002, R9, *Visual Examination*, 10/28/2015
- WP 13-QA1003, R26, *Quality Assurance Receipt/Source Inspection*, 7/29/2013
- WP 13-QA1004, R8, *Magnetic Particle Examination*, 10/28/2015
- WP 13-QA1006, R17, *Quality Assurance Plant Inspections*, 8/10/2015
- WP 13-QA3004, R15, *Nonconformance Report*, 5/17/2016
- WP 13-QA3012, R22, *Supplier Evaluation/Qualification*, 2/26/2015
- WP 13-QA3020, R8, *Fabrication Oversight*, 3/6/2015
- WP 13-QA3021, R2, *Facility Restoration and Revitalization Oversight*, 7/1/2013
- WP 16-2, R15, *Software Screening and Control*, 5/23/2016

Interviews Conducted

- Environmental Compliance Manager
- Environmental Monitoring Manager
- National TRU Program Manager
- NQA-1 Specialist
- Nuclear Safety recovery Manager
- Packaging Implementation & Technical Support Manager

- QA Assurance Programs Manager
- QA Measuring and Test Equipment (M&TE) Coordinator
- QA Oversight Program Manager
- QA Program/Project Integration Manager
- Quality Assurance Manager
- Quality Engineer/level III Nondestructive Examination SME
- Quality Engineers (2)
- RES Manager
- Sr. QA Analyst/Software QA Specialist
- Waste Information Tracking Systems Team Lead

Evolutions/Operations Witnessed

- WIPP FORM morning meeting on 10/4/2016
- Corrective Action review Board meeting on 10/4/2016
- Walkdown of QA group M&TE cage
- Walkdown of WIPP M&TE cage
- Bison Final Emergency Exercise
- Bison Final Exercise Hotwashes (2)

DISCUSSION OF RESULTS

1. QA contract requirements are flowed into facility-specific procedures.

Interview with the QA manager; review of the crosswalk between NQA-1-1989, WP 13-1, *Nuclear Waste Partnership LLC Quality Assurance Program Description*, and the implementing procedures; and review of the CBFO QA Program Document Matrix to NWP QA Program Description indicates that contract requirements are adequately flowed down into NWP implementing documents and are under adequate configuration management. The *Management Self-Assessment Waste Isolation Pilot Plant Final Report* was reviewed for adequacy of evaluation and found to be acceptable, based on the timing of the review. To validate the MSA, the CORR reviewed a sample of QA Program elements and implementing procedures that can affect authorization for waste emplacement. These include EA16-2-1-0, *Software Screening Checklist*, WP 08-NT.04, *Waste Data System Software Quality Assurance Plan*, WP 13-QA.04, *Quality Assurance Department Administrative Program*, WP 09-CN3005, *Graded Approach to Application of QA Controls*, and WP 09-CN3040, *Commercial Grade Item Dedication*, as well as others identified in the list of documents reviewed above. Review of the documents indicates that the requirements of the CBFP QA Program and NQA-1-1989/NQA-2a-1990 are appropriately incorporated. The compliance was also validated by a set of independent reviews as documented under *Third Party Independent Assessment, Software Quality Assurance Report of the Nuclear Waste Partnership Software Quality Assurance Program*, and SMP-14-015, *Waste Isolation Pilot Plant Quality Assurance Independent Safety Management Program Evaluation Report.*

This criterion was met.

2. *QA procedures are effectively implemented in support of the facility, including:*
    - *Safety-significant PLCs are password protected (SMP KE 14-1).*

Review of documentation for the IVS PLC and an interview with the CSE indicate that password protection for the non-credited IVS PLCs was established and is being controlled by the CSE through the ECO and work control processes. The PLC operation was verified during the startup testing, and configuration was maintained on the PLCs following that activity. Other safety software associated with PLC operations was password-protected in accordance with the requirements of WP 16-2, *Software Screening and Control*, Section 2.2, as determined by reviews with the quality department.

An updated list of the controlled software includes the safety software posted on the quality page of WIPP Central. The controlled software inventory listing is maintained by the QA organization based on input received from the individual software owners. A sample of software programs was evaluated for compliance with the requirements of WP 16-2 and one piece of software (the WDS) was found to be out of compliance with respect to the requirements in section 7.2.1 of WP 16-2 and Section 3.6.2 of the WDS QA Plan, WP 08-NT.04, R22. The WDS program, although identified as controlled software, was not rescreened to determine if it needs to be reclassified as safety software based on the additional functionality recently added and the additional credit detailed in Chapter 18 and KE 18-1 of DSA R5b. WIPP Form WF16-1739 was generated to address the rescreening of the WDS. Because the WDS is not classified as safety software, the reviewer questioned whether a USQ screen would ever be performed on changes to the software that were not driven by a change to the WAC, which could impact the WDS ability to perform the expected functions specified in the DSA. A further discussion with the CCP organization indicates that there is extensive testing performed on all changes to WDS, no matter how minor, and that the basic functionality of WDS as a simple database of compliance information used to produce reports was strictly maintained to keep the program out of safety software space. All analyses using the data from WDS are verified as separate activities and WDS has no analytical capabilities. The functional classification of WDS based on its use as a source of data for MAR calculations, chemical compatibility, and radiological control monitoring basis is still an open issue; it is addressed in CRAD WACC1.

An interview with the QA specialist who manages the controlled software list indicated that no specific action was identified in the restart readiness program or the IVR to perform a comprehensive review of existing controlled software to determine if any reclassification (rescreening) was needed following approval of the current DSA. No additional instances were identified where software on the controlled software listing was discussed in the DSA.

A review of WP 16-2 identified that there is no requirement for a USQ screen for changes to safety software that are not controlled by the ECO process. The current USQ procedure does not identify software in the definition of a proposed activity, so changes to software are not specifically addressed by the USQ procedure. WP 09-CN3007, R47, *Engineering Change Notice*, also does not address the requirement to perform an applicability review or USQ screen for software other than for the Central Monitoring System. This procedure also should be reviewed for changes to tie in the reviews for software. These issues were identified as deficiencies in the procedures to the QA and engineering organizations.

During the review, the QA organization initiated a revision to WP 16-2 that will adequately address the QA side of this issue, and generated WIPP Form WF16-1760 that will track the revision to the software QA procedure 16-2. CCP generated WIPP Form WF16-1739 to track a re-performance of the software screen of the WDS, which will follow software QA procedure revisions, to ensure the screening of WDS is to the latest version of the procedure. WIPP Form WF16-1778 was generated to track addressing review of the list of approved software as part of implementation of safety basis changes.

A review of WP 12-RC.01, R 11, *Software Quality Plan for Sampling Emissions of Radionuclides to the Ambient Air at WIPP*, identified one computer code that is not listed on the controlled software list. That code is NARAC, which is a tool box code owned by Lawrence Livermore National Laboratory (LLNL); it is not currently listed on the controlled software log. It is understood that the software is owned by LLNL, and that users log onto the LLNL site to use it, but each site should have a software QA plan that addresses how they validate the use of the software for their application and address how they handle change control and error reporting notifications with LLNL. This type of software is still covered under Section 5.0 of WP 16-2. This is deemed a deficiency in the Controlled Software Log.

The Commercial Grade Dedication (CGD) process was also reviewed by the CORR team based on its importance in implementing the revised DSA and impact on equipment needed for resumption of waste emplacement. The procedure is currently undergoing revision based on issues identified by CBFO and documented in Corrective Action Reports 58, 59, and 60. An interview with the Engineering Manager indicates that the CGD packages for the fire pump repair were performed by outside experts as a compensatory measure. There is currently a hold on the CGD process until the WIPP engineering organization can undergo training and the program procedure revision is approved. Compensatory measures for performing any needed CGDs based on maintenance needs are for any CGD to require approval by both the engineering manager and the QA CGD SME. Based on the planned improvement actions and compensatory measures in place, the CGD program does not pose any significant concerns for resumption of waste emplacement.

This criterion was met.

3. *Sufficient qualified personnel are available to implement the QA Program effectively in support of the facility.*

Discussions with the QA management staff and other QA personnel indicate that there is sufficient qualified staff to support QA responsibilities defined in programmatic procedures, such as procurement, CGD, Software QA, audits and surveillances, M&TE, inspection and testing, etc. The QA staff has increased substantially in support of readiness to perform waste emplacement, and specific activities that were required to be completed, such as independent review of the QA Program documentation, were addressed through the use of contractors. The current budget supports the current staffing level, but reduction of budget to pre-event budget levels will impact the QA staffing and result in reduction in the current contractor support staff. At this time, there is no indication this will affect safe and compliant resumption of waste

emplacement. Roles, responsibilities, and qualification requirements for QA staff are identified in the QA plan, WP 13-1, and implementing procedures, such as:

- WP 13-QA.04, *Quality Assurance Department Administrative Program*
- WP 13-QA.06, *Quality Assurance Department Qualification and Certification of Nondestructive Examination Personnel*
- WP 13-QA1001, *Liquid Penetrant Examination*
- WP 13-QA1002, *Visual Examination*
- WP 13-QA1003, *Quality Assurance Receipt/Source Inspection*
- WP 13-QA1004, *Magnetic Particle Examination*
- WP 13-QA1006, *Quality Assurance Plant Inspections*
- WP 13-QA3004, *Nonconformance Report*
- WP 13-QA3012, *Supplier Evaluation/Qualification*
- WP 13-QA3020, *Fabrication Oversight*, and
- WP 13-QA3021, *Facility Restoration and Revitalization Oversight*.

Review of personnel qualification documents and training files indicates that all QA personnel are currently qualified to perform their assigned duties.

An interview with the engineering manager indicates that the CGD process is currently restricted to compensatory measures because of the lack of personnel with experience and ability to adequately prepare a CGD package. Based on the interviews, document reviews, and observations, as well as compensatory measures established for the CGD program, there are sufficient qualified personnel to perform quality-affecting activities in support of waste emplacement resumption.

This criterion was met.

4. *WIPP has adequate facilities, and equipment is available to ensure that QA support and services are adequate for safe facility operation.*

Interviews with QA managers and Quality Engineers and Inspectors indicate that there are sufficient facilities and equipment to provide required support for safe facility operation and resumption of waste emplacement activities. The QA organization has sufficient M&TE to perform quality inspections and verifications, and contracts are in place to ensure the instruments are calibrated. A walkdown of the M&TE cage in the warehouse indicates that the equipment is stored and properly controlled. QA M&TE is managed by the QA M&TE coordinator, who is one of the Quality Engineers in the QA organization. The Quality Engineer was able to demonstrate the traceability program for both identification of M&TE within work documents and traceability of M&TE to the work document. Traceability information is transmitted to the site metrology lab and the site M&TE custodian for incorporation into the site traceability program. Any out-of-calibration or damaged M&TE is also transferred to the site program for calibration or processing. Based on the interviews, document reviews, and observations, the processes are sufficient to support resumption of waste emplacement.

This criterion was met.

5. *The level of knowledge of managers and staff responsible for administering and implementing the QA Program is adequate based on review of records, interviews, and observation of operational demonstrations. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.*

Interviews with all QA managers and a sample of QA support personnel indicate that they are knowledgeable of their R2A2s, and are aware of the role that the QA SMP has in meeting the revised DSA, including implementation of the KEs. Sufficient documentation exists to demonstrate the qualification of Nondestructive Examination personnel, and the organization has a level-III certified individual who can qualify and maintain qualification of other QA inspectors in the disciplines of visual, magnetic particle, liquid penetrant, and pressure testing. Personnel involved with the nonconformance, CGD, and M&TE processes were found to be knowledgeable of their program requirements and the outstanding issues associated with their program implementation. Based on the interviews, document reviews, and observations, the knowledge and administration of the QA Program elements is sufficient to support resumption of waste emplacement.

This criterion was met.

6. *AIB JONs related to QA were addressed through effective corrective actions for the QA SMP*.

A review of the evidence packages for closure of the JONs indicates that corrective actions for QA-related findings were completed and verified to be implemented. Effectiveness reviews have not always been completed because of the recent closure of the program changes. It should be noted that there are no JONs specifically tied to QA.

This criterion was met.

CONCLUSION

The WIPP QA Program was evaluated through a combination of personnel interviews, document reviews, and observations/walkdowns, and found to be sufficiently implemented to support resumption of waste emplacement activities. There are sufficient and compliant program documents, procedures, and processes in place, as determined by the CORR. There are adequate personnel, facilities, and equipment to support quality program requirements based on interviews with QA management and walkdown of facilities. There were no AIB JONs related to the QA Program specifically, but the QA involvement in JON closure was determined to be acceptable.

This objective was met. There were no findings identified.

FINDINGS

<u>Pre-Start</u>
None

Post-Start
None

Assessed by:	Mike Montini **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Radiological Protection**	Objective: RP1 Date: 10/14/2016	OBJECTIVE MET	
		YES ☐	NO ☒

OBJECTIVE:

RP1: Line management has established and implemented a Radiological Protection (RP) SMP to ensure safe accomplishment of work. The level of knowledge of RP managers and staff is adequate based on review of examinations and examination results, interviews, and observation of operational demonstrations. (CR 1, 4)

CRITERIA

1. RP contract requirements are flowed into facility-specific procedures.
2. RP implementing procedures were effectively implemented in support of the facility, and identified RP SMP controls (e.g., KEs) and referenced procedures are implemented, including:
    - CAMs are properly placed and operated (SMP KE 7-1).
    - Access and entrance to Remote Handling Waste Hot Cells is controlled (SMP KE 7-2).
    - Contamination control to address potential up-casting from underground (SMP KE 7-3).
3. RP permits are effectively implemented in support of the facility.
4. Sufficient qualified personnel are available to implement the RP program effectively in support of the facility.
5. WIPP has adequate facilities, and equipment is available to ensure that RP support services are adequate for safe facility operation. Radiological instruments and equipment required for support are available and calibrated.
6. The level of knowledge of managers and staff responsible for implementing the RP program is adequate based on review of records, interviews, and observation of routine evolutions, performance demonstrations, tabletop exercises, and operational and emergency drills. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.
7. RP personnel have demonstrated proficiency for normal, abnormal, and emergency operations, and have demonstrated acceptable abnormal and emergency event response during routine evolutions, performance demonstrations, tabletop exercises, and operational and emergency drills.
8. AIB JONs related to RP were addressed through effective corrective actions for the RP SMP.

APPROACH

Records Reviewed

- 10 CFR Part 835, *Occupational Radiation Protection Program*
- 13537, Engineering Change Order, *Qualify the iCam for use Underground*, 12/3/2014
- 16-1457, *Radiological Survey Report*, 6/10/2016
- 16-2155, *Radiological Survey Report*, 8/11/2016
- 2002-06, R5, *Alarm Setpoints for the Radiation Monitoring Instrumentation in the Remote-Handled Waste Facility at WIPP*, 10/11/2006
- 41-R-007-W1, Rev. T, *Surface Facility Radiological Monitoring System, Location, Bldg. 411 & 451 Fixed Air Samplers*
- 41-R-007-W2, Rev. R, *Surface Facility Radiological Monitoring System, Location, P&ID and Interface*
- 41-R-007-W3, Rev. L, *Surface Facility Radiological Monitoring System, Location, P&ID and Interface*
- Accountable Source Leak Test Records – Various
- ACD-2016-45, *Abnormal Condition Drill Plan*, 10/11/2016
- Air Sample Reports – Various
- ALA105, *Technical Training – Report of Training*, 10/7/2016
- ALARA – *Radiological Goals for the WIPP In Calendar year 2015*, 8/17/2015
- ALARA Committee Meeting Minutes, 6/30/2016, 9/7/2016
- ALARA Pre-Job Review for Radiological Work Permit 16-0022
- ALARA Pre-Job Review for Radiological Work Permit 16-0023
- *August FY 2016, NWP Performance Indicators*, 10/5/2016
- Bison 1, 2, 3 Exercise Plans & MSELs – Various Dates
- DOE O 458.1, DOE O 458.1, *Radiation Protection of the Public and the Environment*
- DOE/TRU-13-3425, R1, *Annual Transuranic Waste Inventory Report – 2013, February 2014*
- DOE/WIPP 07-3372, R5b, *Waste Isolation Pilot Plant Documented Safety Analysis*, April 2016
- DOE/WIPP-95-2054, R19, *WIPP Radiation Protection Program*, 2/24/2014
- EA12HP1100-1-0, R2, *Radiological Survey Report form*, 12/5/2012
- IC240014, R1, *Ludlum Model 17 Ion Chamber Calibration*, Draft
- IC240017, R1, TRN 1 IC, *Calibration and Maintenance of Ludlum Model 3030E Alpha/Beta Scaler*, 2/8/2016
- Instrument Daily Checks – Various
- Letter from Podonsky to Sharif, Subject: *Pu-241 Exemption Authorization*, 1/3/2011
- MC 1.10, R3, *Radiological Instrument Committee*, 8/5/2013
- MC 9.4, R12, *Radiological ALARA Committee*, 4/28/2015
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- *Qualified Watchstander List, Radiological Control Technician*, 10/7/2016
- *Qualified Watchstander List, Survey Technician*, 10/7/2016
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- *Radiological Control Organization Staffing Plan*, 10/9/2016
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- TBD-16-002, R0, *WIPP Radiological Control Technical Basis Document/Technical Evaluation*, 2/10/2015
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- TBD-2014-022, *WIPP Workplace Air Monitoring Technical Basis*, 12/12/2014
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- WIPP Forms – Various
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- WP 12-5, R19, *Waste Isolation pilot Plant Radiation Safety Manual*, 5/17/2016
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- WP 12-HP1304, R14, *Canberra iCam Alpha/Beta Continuous Air Monitor*, 8/17/2016
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- WP 12-HP3200, R19, *Radioactive Material Control*, 11/24/2015
- WP 12-HP3201, R2, *Radioactive Source Accountability and Control*, 2/29/2016
- WP 12-HP3400, R12, *Contamination Control*, 11/24/2015
- WP 12-HP3500, R21, *Airborne Radioactivity*, 11/24/2015
- WP 12-HP3600, R20, *Radiological Work Permits*, 1/19/2016
- WP 12-HP3700, R5, *Radiological Event Reporting*, 2/7/2013
- WP 12-HP3800, R0, *Radiological Control Logbook*, 3/30/2015
- WP 12-HP4000, R10, *Emergency Radiological Control Responses*, 7/28/2016
- WP 12-RC.02, R0, *WIPP Radiological Control and Dosimetry Department Training Program Plan*, 11/9/2015
- WP 12-RC.02, R1, *WIPP Radiological Control and Dosimetry Department Training Program Plan*, Draft
- WP 12-RE3003, R9, *Radiological Release of Potentially Contaminated Materials, Waste, and Items*, 8/15/2016
- WP 12-RE3006, R1, *Air Monitoring Equipment Placement*, 3/17/2016
- WP 15-PM3509, R12, *Utilization and Disposal of Excess/Surplus Government Personal Property*, 8/24/2015

Interviews Conducted

- Manager, Assessment and Continuous Improvement
- Manager, Radiological Controls and Dosimetry
- Manager, Radiological Engineering and Dosimetry
- Manager, Regulatory Reporting
- QA Engineer
- Radiological Controls Engineer/ALARA Coordinator
- Radiological Controls Superintendent
- RCTs (6)
- Senior Exercise Planner, EM Section
- Training Assistant
- Waste Handling Crew Manager
- Waste Handling Engineer
- Waste Handling Technicians (2)

Evolutions/Operations Witnessed

- Waste Emplacement Demonstration
- Radiological Instrument checks
- Bison 2016 1, 2, 3 Exercises
- Radiological Worker Training – Advanced
- Respirator Fit Testing
- 8-hour Escorted Mine Training
- Controller/Evaluator training
- General Employee Training
- Release surveys
- Field surveys
- Controlled egress of the underground, 10/6/2016
- Walkdown of RH Waste Hot Cell access controls
- Decontamination trailer operational drill

DISCUSSION OF RESULTS

1. RP contract requirements are flowed into facility-specific procedures.

Regulatory and contractual requirements consist of 10 CFR Part 835, *Occupational Radiation Protection Program*, and DOE O 458.1, DOE O 458.1, *Radiation Protection of the Public and the Environment*. 10 CFR 835 is implemented via WIPP/DOE 95-2054, *WIPP Radiation Protection Program*. The RP Program stipulates the implementing document to each provision.

Requirements from the RP Program and DOE O 458.1 flow down to WP 12-5, *The Waste Isolation Pilot Plant Radiation Safety Manual*. This manual reflects DOE-STD-1098-2008, *Radiological Control*. While this is a good start, it contains many “consider,” “may,” or “encouraged” statements. Facilities using STD-1098-2008 as the base manual require going

through each article and designing a program based on type of facility, source term, business practices, and other contractual requirements.

A review of RP implementation at WIPP identified two procedures related to this order: WP 12-HP3200, *Radioactive Material Control*, for non-complex clearance and release of property, and WP 12-RE3003, *Radiological Release of Potentially Contaminated Materials, Waste, and Items*, for the clearance and release of complex items, items with inaccessible surfaces that cannot be evaluated by other means, or items exiting a CA, HCA, or Airborne Radioactivity Area to uncontrolled areas.

WP 12-HP3200 regulates controlled (10 CFR 835) personal property clearance and refers to "restricted" and "unrestricted" areas. This release process is also governed by DOE O 458.1, but these two terms are not recognized by it. For uncontrolled release, use of WP 12-RE3003 is required. The issue is that, once an item is cleared and released to the controlled area, there are no markings applied to tell the user that further surveying or analysis is required to move outside of the WIPP fence. The procedure using terms (such as restricted, unrestricted, etc.) not found in DOE O 458.1 or 10 CFR Part 835 makes it difficult to crosswalk the process to requirements. In addition, no process exists to control/monitor personal property cleared and released to an uncontaminated/controlled area that would prevent the potential for subsequent release to an uncontrolled area.

Contrary to the approved RP Program, WP 12-RE3003 Attachment 4 identifies the equivalent of a revised WP 12-5 Table 2-2 as material release authorized limits. Table 2-2 was modified per an approved DOE exemption, but that exemption is only applicable to 10 CFR 835 requirements. It is not applicable to authorized limits for material release. WP 12-RE3003 allows volumetric release of metals and materials, which is not allowed by DOE O 458.1 and DOE's metals release moratorium.

DOE O 458.1 also requires the user to have a process defining methods for meeting measurement objectives, such as Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) or Multi-Agency Radiation Survey and Assessment of Materials and Equipment Manual (MARSAME). To comply with DOE O 458.1, a technical basis must be developed to vet the statistical models and methods required for meeting the objectives. No technical basis could be located.

RP1-POST-1: Contrary to DOE O 458.1, Sections 4.K (1) & (8)(a), the property clearance and release process did not adequately implement the order for uncontrolled release, and the procedures do not use methodologies sufficient to meet the measurement objectives, such as MARSSIM or MARSAME, or include an evaluation of non-uniform distributed residual radioactive material.

10 CFR Part 835 specifies RP instrument requirements which are generic in nature. To establish which instruments may be used at which facilities, a technical basis which addresses each CFR requirements is necessary. This technical basis is necessary to detail counting statistics used for determining instrument operational parameters. TBD-16-002, *WIPP Radiological Control Technical Basis Document/Technical Evaluation*, was issued as an instrument detectability

technical basis. A review of this technical basis revealed that it was based on the Oak Ridge National Laboratory facility and operations, and did not consider the WIPP facility or source term, and did not consider instruments used at WIPP. The equations in the Oak Ridge report do not match those used in WP 12-HP1100.

SabreAlert CAMs were used for grab air sampling during the Bison 2016 exercise. The SabreAlert is an alpha-only instrument, which results in the beta component not being measured. This affected the ability of RCTs to control responder exposure as required by 10 CFR 835. On further review, it was determined that this monitoring would be acceptable for CH waste streams following proper documented analysis.

The facility believes the SabreAlert is adequate for RH source terms. This is not accurate. The source term information contained in TBD-2014-008, *Radiological Engineering Evaluation of the WIPP Waste Inventory*, being used for evaluation shows beta/gamma emitters as the primary radionuclides. By TBD-2014-008 the primary beta/gamma emitters (Cs/Ba/Sr/Y) account for 83% of the RH source term. While the CORR team agrees that the alpha emitters would constitute most of the dose following an intake, the facility must be able to detect the potential intake to make that analysis. In this case, beta emitters would be detected well before the alpha. If the total beta activity is >10 times the alpha activity, the source term is beta-dominant. In this case, the total alpha is approximately 3.1% of the total, so the beta activity is approximately 27 times the alpha activity.

RP1-POST-2: Contrary to 10 CFR Part 835.401(b)(2) & (3) and 835.209(a), the basis to identify that the instruments in use are appropriate for type(s), levels, and energies of radiation to be encountered and appropriate for existing environmental conditions, as well as the basis for the air monitoring conducted to control exposures, are inadequate.

The CORR team observed radiological monitoring taking place and, based on other experience with TRU waste and associated instruments, the type of instruments used appeared appropriate for monitoring contact handled TRU waste. The crux of the issue – in the case of CH TRU waste only – is that there is insufficient technical basis for the instruments being used. Accordingly, the issue did not involve a violation or potential violation of worker safety or environmental protection regulatory requirements that would pose a significant danger to workers, the public, or of environmental insult or release. Consequently, the issue was determined to be a post-start finding.

Sufficient source term data exists in TBD-2014-008 to implement the requirements of the regulatory and contractual obligations. However, a review of the facility implementing procedures indicates source term data was not flowed down. This appears to result in over-conservative activities, such as causing additional surveys to be performed in some cases.

A hard-to-detect analysis needs to be performed on CH waste stream. TBD-2014-008 indicates Pu-241 is ~60% of beta activity. Pu-241 is placed into the standard beta group for posting and control (10 CFR 835). Based on these numbers, Pu-241 activity may hit 1000/5000 dpm/100 cm^2 before easy-to-detect radionuclides are detected and could be an issue for not only posting and control, but material clearance also.

The 200 dpm/100 cm^2 surface contamination limit is not supported by CH source term identified in TBD-2014-008 and may be over-conservative. Sr/Y-90 is much less than 50% of the total activity. This low limit makes instrument operation more complicated. Even with the RH waste profile, the Sr/Y-90 component is less than 50% of the total activity (see DOE G 441.1-1C, *Radiation Protection Programs Guide*).

Based on TBD-2014-008, a dual survey exemption may be possible allowing just surveys for alpha. Calculations would need to be performed to enable such an exemption.

The Area Radiation Monitor technical basis currently resides in Engineering. SDD RM00, *Radiation Monitoring System Design Description*, identifies Radiological Engineering as the responsible organization for this document. The document is ten years old and should be reviewed and updated, since it also contains CAM set points, which are now covered by TBD-2014-022.

The WIPP Dosimetry Program is approved by the DOE Laboratory Accreditation Program. The program consists of the standard dosimetry elements.

The ALARA program manual has no implementing procedures. For pre-job ALARA reviews, the manual mentions completing a pre-job ALARA review form. This form is only used for non-routine or complex operations. A review of the form found a simple checklist with no documentation of calculations performed or source of data used. This manual is basically a higher level requirements document, not suitable for direct implementation into field work. The manual discusses placing controls in the Radiological Work Permit (RWP), which is not a technical work document that will control work and implement the controls. The RWP is an administrative document to authorize work and define the radiological safety envelope, not to perform work. Other indicators of a less than adequate implementation of ALARA include:

- No 2016 ALARA Goals,
- 2015 ALARA goals issued in August of 2015,
- No awareness activities to workforce,
- No ALARA goal review at committee meetings,
- No evidence of ALARA Committee review of design activities,
- No discussion of low dose standby areas at pre-job briefings,
- No publication of the approved Administrative Control Level,
- No annual re-evaluation of Administrative Control Level,
- Attendance at ALARA Committee meetings averages 50%,
- No monitoring of worker dose via supplemental dosimetry to evaluate controls except as provided in WP 12-5,
- No agenda for committee meetings, and
- Records consist of handwritten notes.

Radiological work planning is only mentioned in the WP 12-5 manual, which is a requirements manual. No implementing procedures were found. WP 12-5 Article 312.1 requires that work plans and procedures be reviewed to identify and incorporate RP requirements such as engineering controls and dose/contamination reduction considerations. Procedure/work plan development procedures and writer's guides do not implement this requirement.

The same article also requires the concurrence of the radiological control organization to the work plans and procedures. Currently, the work control and procedures programs do not require this.

There is some review being performed of radiological work, however the process is not documented and may vary from individual to individual.

RP1-POST-3: Contrary to 10 CFR Part 835, Section 835.1003 (b) and 835.104, there were a number of ALARA program requirements that are not implemented, and written procedures are not developed for radiological work planning.

The Administrative Control Limit for WIPP radiological workers is currently 150 mrem/year for CH TRU waste activities. Accordingly, the issue did not involve a violation or potential violation of worker safety or environmental protection regulatory requirements that would pose a significant danger to workers, the public, or of environmental insult or release. Consequently, the issue was determined to be a post-start finding. The ALARA program will have more importance and safety significance for RH TRU waste activities.

Triennial required assessments of 10 CFR 835 program elements are required every 36 months. A review of assessment reports found satisfactory completion of the requirement. The CORR team had a concern that one assessment found eighteen findings, whereas there was only a single finding in the previous assessment of the same functional area.

In discussions with the Radiological Control Manager, it is not a program goal to perform MSAs during the interval between assessments by QA to meet the triennial requirement. Only three past MSAs were found, with each one covering one functional area (out of thirteen). Two of these, performed by WIPP personnel, were inadequate in that most lines of inquiry were answered by a reference to a procedure. The latest MSA on instrumentation was performed by non-WIPP personnel and was adequate. With thirteen functional areas in the program, only having three assessments on file is less than adequate.

The analysis sections of Radiological Performance Indicators provide little analysis of the evaluation period.

This criterion was **partially** met.

2. *RP implementing procedures were effectively implemented in support of the facility, and identified RP SMP controls (e.g., KEs) and referenced procedures are implemented, including:*
    - *CAMs are properly placed and operated (SMP KE 7-1).*

Placement of the CAMs in the underground has not been validated since the implementation of the IVS system (doubling air flow). Air flow testing should be completed and documented and the results reviewed for any monitoring changes necessary.

TE-15-001, R3, *WIPP Workplace Air Monitoring Technical Evaluation*, specifies that air flows in the WHB need to be re-verified prior to work commencing. This has not been completed yet. Air flow testing needs to be completed, documented and any monitoring changes made.

The same technical evaluation specifies that airflow at W170/S2180 intersection will "eventually" be monitored as it was before the accident. Air flow testing needs to be completed and documented, and equipment needs to be in place prior to starting operations. Work is ongoing to complete the implementation of this KE, so it is not yet met.

- *Access and entrance to Remote Handling Waste Hot Cells is controlled (SMP KE 7-2).*

Procedure WP 05-WH1724, *RH Hotcell Complex Key Control*, controls the access to the hot cells via a deliberate key control and permissions process. This KE is met.

- *Contamination control to address potential up-casting from underground (SMP KE 7-3).*

Procedure WP 12-HP2001, *Abnormal Radiological Conditions*, contains section for when Bulkhead 308 regulator and waste hoist Tower d/p instruments are in alarm or inoperable. This is the key indicator of potential for up-casting from the underground. The response is to place CAMs at key locations to monitor for potential up-casting. This KE is met.

All instruments observed were current in their calibration, operational, and source checks.

Procedures are in place for most radiological control operations. Based on technical basis weaknesses, some activities may be inappropriate. Some observed examples of procedure noncompliance or issues include:

- Water collection tote under ventilation ducts is not inside posted radioactive material area and not labeled in accordance with WP 12-HP-1500.
- Ventilation condensate collection catch culverts not posted in accordance with WP 12-HP1500. Currently posted radioactive material area/Contact radiological control. Procedure requires radioactive material area/Radiological Worker 1 for entry.
- Spare gooseneck air samplers numbers, 240-RI-000-1704 and 1689, are overdue for calibration and not tagged out-of-service.
- The air sample utility calculation spreadsheet uses a beta DAC that is not referenced in TBD-2014-0022. 7.0E-9 vs. 1.0E-8. The Air Sample utility spreadsheet uses correction factors not listed in TBD-2014-0022.
- Not all air monitoring sample filters were evaluated and authorized for use. TBD-2014-0022 specifies filter to be used a WIPP. The filters used in iCams and Bladewerx CAMs are not listed.
- Several completed and archived radiological survey reports were found with instruments that were used that did not meet the minimum detectable activity for the survey. A review of the data on page 2 did not allow differentiation if the analysis was performed using the instrument that did not meet the survey requirements of another listed instrument that did meet the requirements. A review of radiological survey reports found one completed and archived survey that was missing information. The survey was through both a radiological control and records review.

- Contamination limits specified in WP 05-1011 list both Department of Transportation and DOE limits. RCTs mentioned that this is confusing. Process controlled to DOE limits.
- WP 12-5 specifies supplemental posting criteria in Table 2-4, which was not included on posting used in waste placement demo or in WP 12-HP1500 procedure for posting.
- Observations of RCTs using 2360s to count swipes indicated an average count time of approximately five seconds. Survey reports record an MDA for the analysis from WP 12-HP1100 for a one minute count. No MDA is given in the procedure for a five second count.
- Alpha MDA for the Ludlum 3030 scaler is greater than allowed alpha surface contamination limit. Using the equation of WP 12-HP1100 (one of two equations) and instrument check allowed limits of WP 12-HP1307, returns an MDA of 43 dpm vs. the surface contamination limit of 20 dpm.
- Two different MDA equations are published in facility documents; TBD-022 and WP 12-HP1100 equations are different.
- Observations of WIPP Forms for radiological control, found that the actions typically address only the symptom with no evaluation of the real cause or extent of condition review. Part of the problem is the WIPP process, where a corrective action is submitted with the form instead of identifying the issue and requiring an analysis of the problem before corrective actions are developed. When this is combined with other observations during the review, it indicates an organization that is not a self-critical, learning organization.
- SDD RM00 contains Table G-2, which is inconsistent with WIPP 12-5 Table 2-2.

Procedures are generally not referenced by Radiological Control personnel as tasks are performed or completed. Most radiological control procedures are “reference” use which does not require the procedure to be in hand, but all steps are to be completed and procedure checked to ensure all steps were completed. Procedures were generally observed around the work place. During multiple weeks of observations, only three occasions were noted where procedures were referenced in radiological operations. For example, personnel decontamination procedures were not used during personnel decontamination in two of the three exercises. This is a high-consequence procedure, where failure to perform the decontamination correctly could spread contamination to uncontaminated parts of the body or into body openings.

RP1-PRE-1: Contrary to WP 04-AD3034, numerous examples, as identified in the RP1 Form 1, were observed where radiological control reference procedures were not used.

This criterion was **not** met.

3. RP permits are effectively implemented in support of the facility.

A review of provided CH waste emplacement RWPs identified a number of issues.

RWP 16-0023 1) does not authorize work in a CA when one must be utilized for the work, 2) lists highest radiation levels in the CH bay, not in emplacement area, and the “unknown” block is marked, 3) is very vague in locations of highest radiation and contamination levels to which a

worker may be exposed, 4) does not include required respiratory protection training, even though a PAPR is required by this RWP (everyone signed into this RWP needs respiratory protection even if working in non-airborne radiation areas), and 5) dose estimate uses a dose rate of 0.05 mrem/hr to calculate total dose, which does not correlate with the unknown marking and estimate of <10 mrem/hr. Estimated dose rates do not include the allowed dose rates on actual waste that may be received. The values come from the highest container they have in holding. These RWPs must be written for the maximum dose rates expected in order not to hold up work if a container is received with higher than the normal dose rates.

RWP 16-0022 for above-ground waste activities has several administrative issues and is issued as a general RWP. General RWPS are specified for work and areas that have little or no potential for changing radiological conditions. The very act of unpacking TRUPACs exposes workers to unknown levels of contamination, hence the controls used. This RWP should be a job-specific RWP. Dose estimate is calculated the same as RWP 16-0023 using the same inputs, so therefore the same issue.

RWP 16-0003 is the RWP for CA/HCA/airborne radiation area work at WIPP including the underground. This is authorized as a general RWP. This work has many opportunities to change radiological conditions; therefore, it should not be a general RWP. Dose estimate is identical to the two previous RWPs discussed even though the dose rates are significantly different. This RWP requires the use of two pairs of anticontamination clothing, even in a CA.

Similar issues are noted on other RWPs. Field observations indicate personnel were utilizing the correct controls and no reduction in safety was identified because of these RWP issues

None of the RWPs allow for partial body entries like surveying items across boundaries, which the RCTs must be able to perform. Observations found RCTs crossing CA boundaries with only surgeons' gloves which are not specified in any RWP.

The identical dose estimates on these RWPs indicates either the facility is trying to avoid a higher level review of this work or there is no understanding of estimating dose. In either case, it is not acceptable.

The Sentinel Radiological Access Control system is not being used for tracking dose to the RWP. This is key to understanding the dose utilization during emplacement activities. The only mechanism in use is quarterly TLD readings which only supplies total dose worker received. The use of supplemental dosimetry is not identified for emplacement work. While this is directly in keeping with the program manual minimum, consideration must be given to potential doses for the work and the need to understand the dose expenditures for monitoring the effectiveness of controls and ALARA. Entries are not tracked via Sentinel Radiological Access Control program, so it is not possible to evaluate utilization of dose across work groups, RWPs, and work activities. The current practice of workers signing RWP acknowledgment sheet is the only way to know who was on what job.

Each of the ALARA pre-job reviews for RWPs 16-0022 and 16-0023 specify DAC-hour tracking is required, but according to the Airborne Radioactivity procedure, it is used when there

is a possible internal exposure situation with no mention of performing bioassay. This contrary to 10 CFR Part 835.209(b).

Actual radiological conditions, as briefed at pre-jobs and on survey reports, only identifies two spots barely over CA levels and no airborne radioactivity. The implementation of HCA and airborne controls without corresponding data, increases the worker's risk from other industrial hazards such as heat related illness, reduced visibility in dark underground, and additional respiratory system stress. This indicates that the work was not planned on actual or expected conditions from the work activity and only trades hazards. This practice also increases costs and introduction of additional hazards/risks on account of the need to transfer loads multiple times.

Work observations demonstrated that these deficiencies did not negatively impact the safe conduct of waste emplacement.

This criterion was **partially** met.

4. *Sufficient qualified personnel are available to implement the RP program effectively in support of the facility.*

No approved staffing plan is in place to identify needed staffing levels for operation. A draft staffing plan was received on 10/10/2016 from the Radiological Control Manager. The plan identifies the need for many additional RCTs to complete the required work. Absent from the staffing plan are the Radiological Control Superintendents, technical staff analysis, and allowances for vacation. A review of the AIB JON related to adequate radiological control staffing was closed with a statement of what staff was brought on to handle the event recovery with no mention of operations. A review of the available QWL found six waste handling qualified RCTs. With the application of the standard 20% of staff not available because of illness, vacations, training, etc., this leaves four available to perform operations. Other technicians are in the pipeline for qualifications. A number of the overall available staff are contract technicians.

No R2A2 document exists for Radiological Control. This is indicative of the fact that technical staff are not really assigned program elements that they are responsible for. Discussions with the Radiological Control Manger indicated that they generally work on what needs to be worked on. This is part of the issue with insufficient technical basis of the programs and insufficient ownership.

Undressing assistance in the CA or HCA exits was not provided. This causes an almost impossible situation for the worker to maintain contamination control during egress as he/she must touch items with potentially contaminated gloves while getting undressed. These potentially highly contaminated items are then transferred across the CA in a lesser amount of PPE. Discussions with the Radiological Control Superintendent assigned to the underground indicated that this was because of a shortage of staff. Evaluating the staffing (one RCT in HCA and five in radiological buffer area) shows that poor utilization of resources may be a contributor.

During the review of training records, it was discovered that none of the Radiological Control Superintendents were currently qualified in accordance with WP 12-RC.02, *WIPP Radiological Control and Dosimetry Department Training Program Plan*. Each was missing completion of the ALARA Coordinator and Source Custodian courses as specified. NWP stated that these courses are not critical to the execution of the core capability of the Superintendents and a revision to WP 12-RC.02 is currently in the change process to remove these two courses from the training plan.

No QWL exist for superintendents and several of the other identified key positions in WP 12-RC.02.

The current QWL for RCTs contains seven qualified individuals. One of these individuals is a Radiological Control Superintendent. With six qualified RCTs, this is not sufficient for more than the most minimal waste emplacement activities. Air sampling technician and survey technician are lesser qualifications than RCT. No data could be found on what work they are authorized to perform until draft staffing plan was developed on 10/10/2016.

The current organization chart identifies two radiological engineers to support facility operations. With thirteen program elements to manage, this requires the use of the Radiological Engineering and Dosimetry manager to perform engineer work, limiting their ability to oversee all program elements, establish goals, and plan for the future. A WIPP Form issued for missed accountable source leak tests, on account of the absence of the source control Technical Authority, underscores that there is no depth to the organization.

This criterion was **partially** met.

5. *WIPP has adequate facilities, and equipment is available to ensure that RP support services are adequate for safe facility operation. Radiological instruments and equipment required for support are available and calibrated.*

This area is one that had significant work done in the preceding two years. While the facilities are not optimum, they provide space for current work. If staffing increases consistent with the implementation of the draft staffing plan, the facilities may not be adequate.

Monitoring equipment is sufficient to support proposed work evolutions. Again, based on staffing, an increase in quantities may be needed.

The facility is placing too much reliance on Bladewerx CAMs for air monitoring. Use of Personal Air Samplers (PAS) or high volume air samplers was not observed. In fact, no PAS or high volume air samplers were even seen in or around the facility during walkdowns. Each has its use and work must be evaluated for best type of monitoring to accomplish the monitoring goal.

This criterion was met.

6. *The level of knowledge of managers and staff responsible for implementing the RP program is adequate based on review of records, interviews, and observation of routine evolutions, performance demonstrations, tabletop exercises, and operational and emergency drills. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.*

Multiple interviews with radiological control staff over multiple visits, field observations, and document reviews found that the level of knowledge of Radiological Control management and staff is insufficient. While trying to obtain documents for the review over many days, some key items were noted that led to this conclusion.

- The ALARA Coordinator did not know what an Administrative Control Level was.
- A Radiological Engineer did not know what an Area Radiation Monitor was when asked for the technical basis for placement and set points as required by SDD RM00, *Radiation Monitoring System Design Description*.
- The Radiological Engineering Manager did not know what was meant by the term "source term report" and when asked for this report, he provided the DOE complex wide TRU inventory document.
- The Deputy Radiological Control Manager did not understand why survey documentation needed to be able to be interpreted by people not involved in the work.
- The Radiological Control Manager did not understand why monitoring air for beta was necessary, during response actions, when the alpha gives the most dose and the sample would be read eventually. At the time of this discussion, there was no properly documented analysis or technical basis available that could support the manager's premise.
- The RCTs were observed discussing the use decontamination methods not approved by procedure.
- The Health Services staff did not know that they were responsible for giving direction on eye, ear, and mouth decontamination and stated that they are not skilled in those methods.
- When asked to demonstrate flow-down of radiological control associated requirements in the contract (List B), the Radiological Control Manager indicated he was unaware of such requirements in the contract.
- The Radiological Control organization was observed prescribing excessive controls than warranted for the actual radiological hazards, thus potentially increasing worker exposure to other industrial hazards.
- The Radiological Controls Manager and other technical staff were unaware of the Emergency Planning Hazards Analysis (EPHA).
- The Radiological Control organization uses no method to track radiation dose by job to evaluate performance beyond quarterly TLD readings unless triggers are reached in WP 12-5. These trigger levels are based on entering a HRA, a certain percentage of the Administrative Control Level, or 50 mrem in one work day.
- The radiological control program procedures were written by a junior Health Physicist with approximately 2 years' experience.
- The Radiological Control Superintendents did not meet all of their documented qualification requirements.

- The Radiological Control Manager cited 10 CFR 851 while discussing monitoring of beta in air to control exposures. 10 CFR 851 is excluded specifically for elements under 10 CFR 835.

Field Execution Issues:

- The RCTs were observed monitoring for alpha at distances much greater than ¼ inch.
- The RCTs were observed routinely transferring potentially contaminated survey materials across clean areas without using containment.
- The RCTs were observed routinely crossing CA boundaries without the RWP prescribed PPE
- The RCTs were observed routinely watching their instrument meter for detection. RCTs should be listening for a change in audible rate when surveying for detection. Audible always responds faster than meter movement. This could cause missed detection of contamination.
- The RCTs were observed performing material release surveys that were not in accordance with WP 12-HP3200. All surveys were done the same.
- The RCTs were observed routinely monitoring swipes with portable instruments using count times not authorized by procedure.
- The RCTs were observed not wearing a minimum of PPE while responding to a radiological event, thus becoming part of the problem not the solution.

These issues may be indicative of the way the program was developed following the February 2014 events. The immediate need was to stabilize and investigate the underground situation which required the immediate, dramatic increase in field operations. This continued to be in the forefront as work was initiated to re-enter and commence ground control operations. It does not appear that sufficient attention was given to the technical, programmatic aspects of the program. Observations of the field elements indicate safe work is being performed and some reinforcement of good contamination control practices and operational standards needs to be incorporated. Some specific technical assistance is necessary to bring technical programs up to standards and improve technical knowledge of personnel. Once programs are established correctly, the facility staff should have no issues maintaining them. The organization appears to be heavy with field experienced personnel and not technical personnel.

RP1-PRE-2: Contrary to 10 CFR Part 835.103, numerous examples, as identified in the RP1 Form 1, were observed where some radiological control personnel exhibited a less than adequate level of knowledge and skills, and management has not appropriately compensated for this weakness.

While the organization appears to be sufficiently staffed with field experienced personnel, there appears to be a lack of technical personnel. This may have led to a program with insufficient technical basis.

This criterion was **not** met.

7. *RP personnel have demonstrated proficiency for normal, abnormal, and emergency operations, and have demonstrated acceptable abnormal and emergency event response during routine evolutions, performance demonstrations, tabletop exercises, and operational and emergency drills.*

Three exercise level evaluations were performed during this review. Improvement was noted in radiological response from the first exercise to the third. Observations of the abnormal condition drill on the use of the decontamination trailer was satisfactory with good input from both the players and evaluators during hotwashes. See Objective EP2 write up.

Response actions within WP 12-HP4000 direct a generic set of actions that are to cover a broad spectrum of events (five) as defined in the entry conditions of section 5.1.1. The actions directed are not appropriate to all circumstances, and unnecessarily rely on “skill of the craft” instead of segregating the response actions into a more focused set of appropriate actions for each event type.

Responders at the incident scene failed to refer to WP 12-HP4000, WP 04-EM4200 and WP 12-HP4000. Readily available copies of these response procedures are not in place in the CH Bay. Facility procedures do not contain requirements for where and what type of habitability surveys are to be performed.

This criterion was met.

8. *AIB JONs related to RP were addressed through effective corrective actions for the RP SMP.*

A review of the AIB JONs associated with Radiological Control found that they were closed through the WIPP Form process with CBFO approval. Records did not identify any causal analysis or CAPs associated with these JONs.

With no formal, approved staffing plan for Radiological Controls, closure of the JON related to radiological control staffing is questionable as related to restart activities.

Corrective actions for WF16-1172 did not include an effectiveness review corrective action to retest worker knowledge following remediation. This WIPP Form was issued based on failure of Radiological Control staff to satisfactory answer questions during Prerequisite 4.2 interviews.

This criterion was met.

CONCLUSION

The review of the RP functional area found that the project has made great strides in improving its programs since 2014. However, most of that effort was made in the field implementation of programs, which lack a solid technical basis based on source term and requirements. This resulted in some elements being overly conservative, while others were nonconservative. Issues identified in this objective are being placed in the WIPP issues management tracking system (WIPP Forms).

The NWP RP program was determined to be safe for CH TRU waste emplacement (pending resolution of the two pre-start findings) and, with some limited exception, compliant with 10 CFR 835. The 10 CFR 835 compliance exceptions were: Part 103 (addressed by finding RP1-PRE-2); Parts 401.b (2) and (3) and 209 (a) (addressed by finding RP1-POST-2); and Parts 1003 (b) and 104 (addressed by finding RP1-POST-3).

This objective was **partially** met. There were five findings identified. Satisfactorily addressing the pre-start findings will enable NWP to meet the objective fully.

FINDINGS

Pre-Start
RP1-PRE-1: Contrary to WP 04-AD3034, numerous examples, as identified in the RP1 Form 1, were observed where radiological control reference procedures were not used.

RP1-PRE-2: Contrary to 10 CFR Part 835.103, numerous examples, as identified in the RP1 Form 1, were observed where some radiological control personnel exhibited a less than adequate level of knowledge and skills, and management has not appropriately compensated for this weakness.

Post-Start
RP1-POST-1: Contrary to DOE O 458.1, Sections 4.K (1) & (8)(a), the property clearance and release process did not adequately implement the order for uncontrolled release, and the procedures do not use methodologies sufficient to meet the measurement objectives, such as MARSSIM or MARSAME, or include an evaluation of non-uniform distributed residual radioactive material.

RP1-POST-2: Contrary to 10 CFR Part 835.401(b)(2) & (3) and 835.209(a), the basis to identify that the instruments in use are appropriate for type(s), levels, and energies of radiation to be encountered and appropriate for existing environmental conditions, as well as the basis for the air monitoring conducted to control exposures, are inadequate.

RP1-POST-3: Contrary to 10 CFR Part 835, Section 835.1003 (b) and 835.104, there were a number of ALARA program requirements that are not implemented, and written procedures are not developed for radiological work planning.

Assessed by:	Jerry Kurtz **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Safety Basis**	Objective: SB1 Date: 10/14/2016	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

SB1: Facility safety documentation (normally DSA and TSRs) is in place that describes the "safety envelope" of the facility. (CR 4, 6)

CRITERIA

1. Facility safety documentation characterizes the hazards/risks associated with the facility and identifies preventive and mitigating measures (systems, procedures, administrative controls, etc.) that protect workers and the public from those hazards/risks.
2. Facility safety documentation is developed and approved by DOE with an associated SER, is available to facility personnel, and is implemented. Implementation of facility safety documentation was verified and is current.
3. COAs from the DOE SER, if identified, are implemented in project implementing procedures.
4. Safety SSCs are defined.
5. Procedures for maintaining the safety documentation were adequately defined and implemented and provide for required updates.
6. A DOE-approved USQ procedure was effectively implemented for all facility changes that have occurred since initial approval of the final DSA/TSRs, Revision 5b.
7. The Linking Document Database (LDD) was updated to reflect DSA/TSRs, Revision 5b safety basis requirements and list of documents that are credited to meet those requirements.
8. Sufficient qualified personnel are available to implement the nuclear safety program effectively in support of the facility.
9. The level of knowledge of managers and staff responsible for administering and implementing the nuclear safety program is adequate based on review of records, interview results, and observation of performance during field performance demonstrations, tabletop exercises, and operational and emergency drills. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.
10. AIB JONs related to nuclear safety were addressed through effective corrective actions.

APPROACH

<u>Records Reviewed</u>

- AA:15:01203, R5, *Submittal of WIPP Documented Safety Analysis*, 12/2015
- AA:16:00085, *Applicability Review Interim Compensatory Action*, 10/11/2016

- AIB JON 14
- CA-IVR-2016-002, *Implementation Verification Review Final Report (for the) Waste Isolation Pilot Plant Documented Safety Analysis/Technical Safety Requirements, Revision 5b*, 5/24/2016
- DOE G 423.1-1, *Implementation Guide for use in Developing Technical Safety Requirements*, 10/24/2001 with a sunset review 10/24/2003
- DOE G 423.1-1B, *Implementation Guide for use in Developing Technical Safety Requirements*, 3/18/2015
- DOE G 424.1-lB, Change 2, *Implementation Guide for Use in Addressing Unreviewed Safety Question Requirements*, 4/2013
- DOE/WIPP 07-3372, R5b, *Waste Isolation Pilot Plant Documented Safety Analysis*, 4/29/2016.
- DOE/WIPP 16-3565, R0, *Safety Evaluation Report for Approval of DOE/WIPP 07-3372, Waste Isolation Pilot Plant Documented Safety Analysis, Revision 5 and DOE/WIPP 07-3373, Waste Isolation Pilot Plant Technical Safety Requirements, Revision 5*, 4/29/2016
- DOE/WIPP-01-3181, R9, *Authorization Agreement for the Waste Isolation Pilot Plant*, 4/28/2016
- DOE/WIPP-07-3373, R5b, *Waste Isolation Pilot Plant Technical Safety Requirements*, 4/29/2016.
- EA12NS3007-1-0, R0, *LDD Change Request Form*, 12/15/2015
- EA12NS3007-2-0, R0, *LDD Change Log*, 1/22/2016
- ETO-K-318, *Use of ASME N511 Instead of ASME N510 for In-Place Leak Testing of HEPA Filters in 41-B-956 and 41-B-957 Filter Units*, 7/18/2016
- IC041001, *Filter Units 41-B-857 MOD Filter Differential Pressure Loop Calibration*
- INF-722, *USQ Interim - Compensatory Measures*, 5/19/2016
- PISAD P16-001, R0, *NCR 2016-001, MgO Stored longer than recommended 3 months*, 3/11/2016
- PISAD P16-002, R0, *NCR 2016-16, Purchased skid steer loader did not have installed fire suppression system*, 4/27/2016
- PISAD P16-003, R1, *NCR 2016-19, 413-HD-056-012B, Duct bolt not stainless steel*, , 5/9/2016
- PISAD P16-004, R0, *DSA Bases do not Describe Valves Between the Risers and the Sprinkler Heads in WHB*, 6/30/2016
- PISAD P16-004, R1, *DSA Bases do not Describe Valves Between the Risers and the Sprinkler Heads in WHB*, 7/7/2016
- PSID P16-004, R2, *DSA Bases do not Describe Valves Between the Risers and the Sprinkler Heads in WHB*, 9/14/2016
- PISAD P16-005, R0, *NCR 2016-41, HEPA Filter in-place leak test performed to ASME N511 instead of ASME N510*, 7/19/2016
- PISAD P16-006, R0, *NCR 2016-42, Dyno-meter Test Variance from CGID 16-017 Acceptance Criterion*, 8/16/2016
- Radiological JON 3, WF15-089-S001
- Radiological JON 4, WF15-641
- Radiological JON 5, WF15-089-S003
- Radiological JON 8, WF15-089-S006

- Radiological JON 9, WF15-089-S007
- SMP-14-010, R0, *WIPP Nuclear Safety Program Independent Program Evaluation Final Report*, 10/2014
- USQD D16-056, R2, *WO: 1617550, Install new transformer 25P-TR15/3A at Substation 3*, 6/30/2016
- USQD D16-056, R3, *WO: 1617550, Install new transformer 25P-TR15/3A at Substation 3*, 7/7/2016
- USQD D16-056, R4, *WO: 1617550, Install new transformer 25P-TR15/3A at Substation 3*, 7/13/2016
- USQD D16-056, R5, *WO: 1617550, Install new transformer 25P-TR15/3A at Substation 3*, 7/21/2016
- USQD D16-056, R6, *WO: 1617550, Install new transformer 25P-TR15/3A at Substation 3*, 8/20/2016
- USQD D16-075, R0, *Follow-Up USQD for PISA P16-004, DSA Bases do not Describe Valves Between Risers and the Sprinkler Heads in WHB*, 7/7/2016
- USQD D16-077, R0, *EA04D3001-SR51, Rev. 1, LCO 3.2.3 Surveillance Data Sheet*, 7/7/2016
- USQD D16-082, R0, *ETO-K-318, Use of ASME N511 Instead of ASME N510 for In-Place Leak Testing of HEPA Filters in 41-B-956 and 41-B-957 Filter Units*, 7/18/2016
- USQD D16-087, R0, *WP 12-FP-0080, Rev. 0 Supplemental Fire Water Supply Compensatory Measures*, 7/22/2016
- USQD D16-093, R0, *TRN1 for IC41088, Rev. 1, Calibration of 1st and 2nd HEPA Filter Differential Pressure Transmitters 413-PDIT-321-006A, 413-PDIT-321-007A, 413-PDIT-321-006B and 413-PDIT-321-007B*, 8/4/2016
- USQD D16-107, R0, *WP 04-VU2001, Rev. 7-FR-1 Interim Ventilation System (IVS) Operation*, 8/7/2016
- USQD D16-112, R0, *WP 12-FP0066 Rev 1, Main Drain Testing- 411 CH Bay, WP 12-FP0067 Rev. 1, Main Drain Testing- Room 108*, 9/20/2016
- USQS S16-0577, R0, *WP 15-PS3103, Rev. 18 Document Distribution*, 6/28/2016
- USQS S16-0578, R0, *ECO 13974, Construct and Install 30 amp Interlocked Receptacle w/ Enclosed Disconnect*, 6/28/2016
- USQS S16-0580, R0, *WP 12-FP0034, Rev. 4, Fire Hydrant and Isolation Valve Inspection*, 6/30/2016
- USQS S16-0581, R0, *WP 12-FP.19, Rev. 0, WIPP Fire Protection Self Assessment Program*, 6/30/2016
- USQS S16-0582, R0, *WP 12-FP.17, Rev. 0, WIPP Flammable and Combustible Liquid Control, Handling and Storage Program*, 7/15/2016
- USQS S16-0584, R0, *WO 169997, Perform Additional Obstruction Testing on Room 108 Sprinkler System in Building 411*, 7/1/2016
- USQS S16-0585, R0, *Replacement of U/G Exhaust Ventilation HEPA Filters*, 7/1/2016
- USQS S16-0586, R0, *WP 04-VU1003, Rev. 12 Operation of UVFS in Auxiliary Air Supply Configuration*, 7/5/2016
- USQS S16-0587, R0, *IC041090 Rev. 1, Annual Inlet Temperature Transmitter Calibration 413-TT-321-003A, 413-TT-321-003-B*, 7/6/2016

- USQS S16-0588, R0, *ECO 13958 Pilot for Fixed Real Time Gas/VOC Monitoring Underground*, 7/6/2016
- USQS S16-0589, R0, *WO 1623025 Replace Blu-Jel Seals in 41-B-956 IVS HEPA Filters, WO 1623026 Replace Blu-Jel Seals in 41-B-957 IVS HEPA Filters*, 7/6/2016
- USQS S16-0597, R0, *EA04AD3008-20-0, Rev. 4, Facility Operations Support Bldg Substation / UPS Round Sheet*, 7/12/2016
- USQS S16-0624, R0, *WO 1623391, Acceptance Testing for Automatic Fire Suppression System on CH Transporter (52-H-008-A)*, 7/24/2016
- USQS S16-0650, R0, *WP 15-CA1001, Rev. 2, Independent Assessments*, 8/11/2016
- USQS S16-0672, R0, *WO 1622353, Removal of Concrete Barriers for Access to TRUPACT III Packages*, 8/25/2016
- USQS S16-0698, R0, *WP 12-NS.09, Rev. 1, WIPP Nuclear Safety Training Program Plan*, 9/7/2016
- USQS S16-0716, R0, *ECO 14054, Underground Hoisting System (UH00) System Design Description (SDD), Rev. 12*, 9/16/2016
- USQS S16-0737, R0, *WO 1626544, Test and Repair Circuit Breaker 25P-SWG04/3-4*, 9/21/2016
- USQS S16-0767, R0, *WP 12-HP1321, Revision. 5, Field Revision 1, Bladewerx SabreAlert Alpha Continuous Air Monitor*, 10/4/2016
- WIPP-021, R6, *Hazards Analysis for the Waste Isolation Pilot Plant Transuranic Waste Handling Safety Basis*, 5/4/2016
- WP 02-AR3001, R12, *Unreviewed Safety Question Determination*, 1/15/2015
- WP 04-AD3036, R1, *WIPP Safety Basis Implementation Process*, 2/19/2016
- WP 12-FP0026, R10-FR3, *Weekly Surveillance for Fire Water Supply and Distribution System*, 10/3/2016
- WP 12-NS.l 1, R0, *WIPP Nuclear Safety Program Description*, November 2015
- WP 12-NS3001, R3, *Changes to Safety Basis and Supporting Documents*, 5/24/2016
- WP 12-NS3007, R6, *DSA/TSR Linking Document Database*, 12/21/2015
- WP 12-NS3007, R6, *DSA/TSR Linking Document Database*, 12/21/2015
- WP 15-CA1006, R2, *Safety Basis Implementation Verification Reviews*, 5/17/2016
- WP IC-41001, R0, *TRN3, Filter Units 41-B-856 and 41-B-857 MOD and High Filter Differential Pressure Loop Calibrations*, 10/7/2016

Interviews Conducted

- CSEs (2)
- Facility Operations Deputy Manager
- Facility Operators (6)
- Fire Department Captain
- Fire Department Fire Fighter (2)
- FPEs (3)
- FSMs (2)
- Nuclear Safety Engineers (2)
- Nuclear Safety Program Manager
- Nuclear/Criticality Safety Manager

Evolutions/Operations Witnessed

- Changing TSR Modes and TSR Mode Change Checklist (4)
- IC041001, *Filter Units 41-B-857 MOD Filter Differential Pressure Loop Calibration*
- TSR SR 4.1.1.3, 4.1.1.4, *Weekly Surveillance for Fire Water Supply and Distribution System*

DISCUSSION OF RESULTS

1. *Facility safety documentation characterizes the hazards/risks associated with the facility and identifies preventive and mitigating measures (systems, procedures, administrative controls, etc.) that protect workers and the public from those hazards/risks.*

The submittal of WIPP DSA and TSRs (AA:15:01203) in compliance with DOE-STD-3009-2014, and the subsequent approval by DOE through the issuance the SER for Revision 5b, demonstrates that approved facility safety documentation is available.

WIPP-021, *Hazards Analysis*, and DSA Chapter 3, *Hazard Assessment and Accident Analysis*, evaluated the hazards and risks associated with the facility and identified the preventive and mitigating measures that protect the workers and the public from those hazards. safety-significant controls were identified for SSCs and several administrative controls were also identified. No Safety-Class controls were identified.

This criterion was met.

2. *Facility safety documentation is developed and approved by DOE with an associated SER, is available to facility personnel, and is implemented. Implementation of facility safety documentation was verified and is current.*

DOE issued the SER approving the WIPP DSA and TSRs, Revision 5b, on 4/29/2016. Prior to the SER, 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.

It is noted that the DOE SER also prohibits the startup of the Supplemental Ventilation System; however, this prohibition is not mentioned in the AA. CBFO needs to update the AA to prohibit Supplemental Ventilation System operation.

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.

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 (see Criterion 7 below).

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 facility records from the application of the Safety Basis Implementation and IVR processes were reviewed against the SER and Revision 5b of the DSA and TSRs. The approved EA04AD3036-4-0, *Notice of Implementation Checklist*, was executed on 5/30/2016. It was noted that KE 18-5, MAR statistics for waste certified for future shipment to WIPP, was not implemented at the time of the beginning of the CORR, and was listed on the manageable list of open items. The KE 18-5 implementing documents were issued on 10/12/2016, and were reviewed. Therefore, KE 18-5 is implemented (see WACC-1 Criterion 2 for further discussion).

This criterion was met.

3. COAs from the DOE SER, if identified, are implemented in project implementing procedures.

Facility records were reviewed from the application of the Safety Basis Implementation and IVR processes against the SER and Revision 5b of the DSA and TSRs. These processes included

using the Safety Basis Implementation Matrix; Safety Basis Implementation Plan; IVR Plan; IVR Final Report; Notice of Readiness; Notice of Implementation Checklist; and the LDD (see SB1 Criteria 2 and 7).

The Safety Basis Review Team identified a COA that included directed page changes affecting various sections in the DSA and TSRs. The directed page changes were provided in Enclosure 2 of the transmittal letter for the SER. The SER directed that the page changes be made to the WIPP DSA Revision 5a, WIPP TSRs Revision 5a, and WIPP-021 *Hazard Analysis*, Revision 5a. In summary the issues included:

a. Updates to references throughout the DSA and TSRs to reflect the latest supporting documents;
b. DOE decision to require both fire pumps for the WHB fire suppression system, rather than just one in LCO 3.1.1; to correct Chapters 4 and 5 to be consistent; to add worker notification to the directed Specific Administrative Control scope in LCO 5.5.8 and clarify the basis; and to correct Chapter 4, including Table 4.5.1, and Chapter 5 to be consistent;
c. Correction of inconsistencies in instrument uncertainties between the DSA (Chapters 4 and 5) and TSRs;
d. Clarifying KE 11-4 as a defense-in-depth measure applicable to a static waste face (i.e. no waste emplacement for ten days or more);
e. Moving KE 11-13 to become KE 8.1 in both the DSA and TSRs;
f. Clarification in Section 3.3.2.3 that VOCs were not screened out, but were an evaluated hazard;
g. Correction in Section 3.3.2.3 regarding analyzed MAR in certain WHB pool fires;
h. Correction in Section 3.3.2.3 and WIPP-021 to reflect the bounding risk outlier event involving ordinary combustible fire in the Cask Loading Room with door 140 closed;
i. Add loss of confinement events as protected by the Underground Ventilation and Filtration System/IVS in Table 3.3-10;
j. Correction of the basis Section 3.4.3.1.1 for judging certain Waste Shaft drop events to be extremely unlikely;
k. Additional operational upgrades discussed in DSA Section 3.6 and 4.4.2.3 related to the fire suppression system;
l. Clarification in Chapter 4 of the basis for NFPA-13-1983 compliance;
m. Clarifications in Chapter 5 and the TSRs related to conducting surveillances of airflow into an “active room” as described in SR 4.2.3.3; and
n. Correction to WIPP-021 for the WAC Initial Condition for drum deflagrations.

These issues were verified to be incorporated into WIPP DSA and TSRs Revision 5b and an updated version of WIPP-021. Project-level implementing procedures were derived from WIPP DSA and TSRs Revision 5b.

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. Based on the review of this information and interviews conducted, CORR PR-6.2 is considered to be adequately met.

This criterion was met.

4. Safety SSCs are defined.

The submittal of WIPP DSA and TSRs in compliance with DOE-STD-3009-2014, and the subsequent approval by DOE through the issuance the SER for Revision 5b demonstrates that safety SSCs are defined.

DSA Chapter 3, *Hazard Assessment and Accident Analysis*, evaluated the hazards and risks associated with the facility and identified safety-significant SSCs as preventive and mitigating measures that protect the workers and the public from those hazards. DSA Chapter 4, *Facility Structures, Systems, and Components*, described the safety-significant SSCs, including Design Features that were identified DSA Chapter 4. Table 4.4-1 provides a summary of the safety-significant Controls including the safety functions, functional requirements, and performance criteria.

This criterion was met.

5. Procedures for maintaining the safety documentation were adequately defined and implemented and provide for required updates.

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 (see SB1 Criterion 2), and the USQ Determinations and Potential Inadequacy of Safety Analysis Determinations were reviewed and determined to be effective for maintaining the safety documentation.

This criterion was met.

6. A DOE-approved USQ procedure was effectively implemented for all facility changes that have occurred since initial approval of the final DSA/TSRs, Revision 5b.

The WIPP Procedure WP 02-AR3001, Revision 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, Revision 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 was 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:

a. Revise WP12-AR3001 to simplify the process review of documents implementing DOE approved Safety Basis documents – due 10/31/2016;
b. Provide additional resources to assist in the USQ Reviews – completed 6/16/2016 (verified by a review of a sampling of USQDs);
c. Revise WP12-AR3001 to clarify the Potential Inadequacy of Safety Analysis timeline requirements – due 10/31/2016; and
d. 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 adequately 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, a CORR team member noted that WP 05-WH1603, Revision 17-FR1 was very recently revised. The 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 results in a 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 revision.

Additional USQ documents (Potentially Inadequate Safety Analysis Determinations [PISAD], USQ Screenings, and USQDs) were reviewed for completeness and procedural compliance. It was noted by the reviewer that several of the USQ documents were well done with excellent initial general text and answers to the questions. At times, some of the questions were answered in the initial general text and not transferred to answer the USQ questions. Several USQ Screenings were reviewed and could have been performed as USQDs; however, the screening questions were answered correctly as No (e.g., S16-0582, S16-0588). The items above were discussed with the Nuclear Safety Program Manager, Nuclear Safety Manager, and the USQ SME, and will be addressed as part of the overall USQ program improvements.

In PISAD P16-005, *NCR: 2016-412, Rev. 0, HEPA Filter In-Place Leak Test Performed to ASME N511 Instead of ASME N510*, and USQD D16-082, *ETO-K-318, Use of ASME N511 Instead of ASME N510 for In-Place Leak Testing of HEPA Filters in 41-B-956 and 41-B-957 Filter Units*, both reviews answered all the questions No, indicating that DOE approval of the activity was not required. The TSR bases for Surveillance Requirement 4.2.3.4 states that the performance test of the HEPAs is done in accordance with ASME N510. There was an appearance that potentially the DSA and TSR bases for Surveillance Requirement 4.2.3.4 were not being met. The PISAD, USQD and ETO-K-318 were discussed with the Nuclear Safety Program Manager, Nuclear Safety Manager, Nuclear Safety and DSA Recovery Manager, and the USQ SME. It was determined that the operative statement from USQD D16-082 was that AMSE N511 met the requirements of ASME N510. ETO-K-318 concluded that using ASME N511 for the surveillance test meets or exceeds the requirements from ASME N510. As such, the surveillance was considered meeting ASME N510 as described in the DSA and TSR Rev. 5b.

This criterion was **not** met.

7. *The LDD was updated to reflect DSA/TSRs Revision 5b safety basis requirements and list of documents that are credited to meet those requirements.*

The online LDD, updated 8/26/2016, was reviewed to confirm that it reflects the changes contained in the DSA and TSRs Revision 5b and contains the list of documents that are 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, *DSA/TSR Linking Document Database*, 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.

This criterion was met.

8. *Sufficient qualified personnel are available to implement the nuclear safety program effectively in support of the facility.*

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 Revision 5b of the WIPP DSA/TSRs. It is noted that 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.

This criterion was met.

9. *The level of knowledge of managers and staff responsible for administering and implementing the nuclear safety program is adequate based on review of records, interview results, and observation of performance during field performance demonstrations, tabletop exercises, and operational and emergency drills. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.*

Interviews evaluated the nuclear safety program managers' and staffs' capability to support waste emplacement operations. The Nuclear Safety Department has the necessary knowledge and understanding of the nuclear safety program and Revision 5b of the DSA and TSRs, is familiar with the projects and upgrades that are ongoing, and is familiar with what is necessary to maintain and implement the safety basis.

This criterion was met.

10. AIB JONs related to nuclear safety were addressed through effective corrective actions.

A sampling of six AIB JONs and Radiological JONs (JON 14, Radiological JONs 3, 4, 5, 8, 9) associated with Nuclear Safety were reviewed. The official closure files for all of the sampled JON and Radiological JONs were reviewed and were closed, based on sufficient closure documentation of the necessary actions. It should be noted that different statuses of the JONs and

Radiological JONs exist in the WIPP Forms, the WIPP issues management system; however, the official records that are maintained by Contractor Assurance are closed.

This criterion was met.

CONCLUSION

Facility safety documentation (DSA/TSRs) is in place that describes the safety envelope of the facility. This conclusion is based on interviews conducted and a review of a sampling of procedures and facility records.

This objective was met. There was one finding identified.

FINDINGS

Pre-Start
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.

Post-Start
None

Assessed by:	Jeff Buczek **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Training & Qualification**	Objective: TQ1 Date: 10/14/2016	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

TQ1: Line management has established a T&Q SMP to ensure safe accomplishment of work. The selection, training, and qualification programs for operations and operations support personnel were established, documented and effectively implemented. T&Q requirements for each position encompass the range of assigned duties and activities. The selection process and applicable position specific training for managers ensures competence commensurate with these responsibilities. The level of knowledge of Training managers and staff is adequate based on review of records, interviews, and observation of training activities. (CR 1, 3, 4)

CRITERIA

1. A T&Q Program was developed, documented, and approved and implements the requirements of DOE O 426.2. In this regard:
    - T&Q contract requirements are flowed into facility-specific procedures.
    - T&Q procedures are effectively implemented in support of the facility.
2. A TIM was developed, approved by NWP, and approved by DOE-CBFO.
3. T&Q requirements (encompassing the range of duties and activities to be performed) for operations and support personnel were established and documented, and personnel were trained and qualified to these requirements, including:
    - Workers are trained and qualified on responding to incidents (e.g., use of rescue equipment, assembly areas) (SMP KE 12-2).
    - T&Q 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 (SMP KE 12-3).
    - Personnel are not permitted to perform assigned duties independently until requisite T&Q are complete (SMP KE 12-3).
    - Continuing training is provided to maintain requisite knowledge and skill as warranted for changes such as emergent Evaluation of the Safety of the Situation documents (SMP KE 12-3).
4. The selection process and applicable position-specific training for managers ensures competence commensurate with responsibilities.
5. Sufficient qualified personnel are available to effectively implement the T&Q Program in support of the facility.
6. WIPP has adequate facilities, and equipment is available to ensure that T&Q support and services are adequate for safe facility operation.
7. The level of knowledge of managers and staff responsible for administering and implementing the T&Q Program is adequate based on review of records, interviews, and

observation of operational demonstrations. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.

8. AIB JONs related to T&Q were addressed through effective corrective actions.

APPROACH

Records Reviewed

- 15-GM.13, R0, *Waste Isolation Pilot Plant, Contractor Readiness Assessment, Interim Ventilation System, Final Report*, 6/9/2016
- *AIB Judgements of Need Closure Status*, status as of 9/29/2016.
- CA-IVR-2016-002, *Implementation Verification Review Final Report (for the) Waste Isolation Pilot Plant Documented Safety Analysis/Technical Safety Requirements, Revision 5b*, 5/24/2016
- *CH Waste Operations JTA 2016 Rev. 0, WIPP Waste Operations Training Job Task Analysis Contact Handled Waste Operations*, effective date 2/17/2016
- DOE O 426.2 Chg 1, *Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities*, 7/29/2013
- DOE/WIPP 07-3372, R5b, *Waste Isolation Pilot Plant Documented Safety Analysis*, April 2016
- DOE/WIPP 07-3373, R5b, *Waste Isolation Pilot Plant Technical Safety Requirements*, April 2016
- *DOE-STD-1070-94 Assessment of the WIPP Training and Qualification Programs*, 6/18/2014
- DOE-STD-1070-94, *Criteria for Evaluation of Nuclear Facility Training Programs*, reaffirmed July 2014
- EA14TR3308-3-0, R0, *Level I Instructor (On-the-Job Instructor/Evaluator & SME) Evaluation Checklist (INS-11)*, 8/23/2016
- EA16-2-1-0, R6, *Software Screening Checklist*, 3/1/2011, for QWL, approved 10/10/2016
- EA16-2-1-0, R6, *Software Screening Checklist*, 3/1/2011, for Rbase Version 6.5++, approved 10/10/2016
- Email, from Hejmanowski to Trawinski, Subject: *Staffing Plan*, 10/11/2016 12:54 PM
- Email, from Hejmanowski to Trawinski, Subject: *Standing Orders*, 10/11/2016 10:12 AM
- *Federal Readiness Assessment, Final Report for the Startup of Interim Ventilation System at the Waste Isolation Pilot Plant*, 8/12/2016
- *I&C Maintenance DIF Survey 2016 Rev. 0, WIPP I&C Maintenance Training Job Task List and DIF Survey Acceptance*, effective date 5/12/2016
- *I&C Maintenance DIF Survey 2016 Rev. 0, WIPP I&C Maintenance Training Task # Knowledges & Objectives & Skills & Objectives Acceptance*, effective date 5/31/2016
- Letter, from Bryson to Breidenbach, Subject: *Department of Energy Concurrence of the NWP Training Implementation Matrix and WP 14-TR3312, Exceptions/Equivalencies and Extensions Procedure*, 9/30/2015
- MP 1.40, R5, *Management and Supervisor Training Qualifications*, 5/10/2016
- MP 4.7, R6, *Alternatives to Education and Experience Requirements*, 5/26/2015

- MSA-NWP-2016-001, R0, *Management Self-Assessment Waste Isolation Pilot Plant Final Report*, 9/30/2016
- MSA-TT-2016-001, *Training Program Effectiveness*, 4/10/2016
- OPS-402, R11, *WIPP Operations Incidental Rigger Qualification Signature Record*, no date
- Pre-Job Briefing Checklist for 10/4/2016 Aboveground Evolution
- QWLs, found at http://wippcentral/sites/groups/TechTraining/Pages/Watch%20Stander.aspx
- *Radiological Control & Dosimetry Department, Revised Active Task List, Radiological Control Technician*, 2015, updated 6/2016
- Selected *Manager's Report of Refresher Training*, examples (30/60/90 Reports)
- Selected Operations Turnover Verification Binders for Recent WIPP Modifications
- Selected Technical Training Completion Reports
- Selected Technical Training Course Training Materials Files
- Selected Technical Training Personnel Files
- Selected Training-Related AIB JON Closure Evidence Packages
- Selected Training-Related WIPP Forms
- Standing Order Number 14, *Lesson Plans with pen and ink markups are not to be used*, 10/6/2016
- *Template – WIPP Job Task Analysis, Facility Operations Roving Watch, Appendix C Skills and Knowledge Task-to-Training Matrix*, no date
- *Waste Isolation Pilot Plant Training Implementation Matrix*, approved 9/30/2015
- Waste Operations Watchbill, 10/4/2016, *CH Waste Handling Staffing*
- WH-01A, R21, *WIPP Operations Backfill, Floor, Yard, & Emplacement Technician Qualification Program Signature Record*, approved 6/16/2014
- WH-01B, R12, *WIPP Operations CH Waste Handling Technician Qualification Program Signature Record*, approved 3/12/2012
- WH-02R, R7, *WIPP Operations CH Waste Handling Engineer Requalification Card Signature Record*, approved 11/29/2011
- *WIPP Cognizant System Engineer / Alternate Cognizant System Engineer, System Assignment List*, R55, 9/28/2016
- WP 04-AD.12, R0, *WIPP Facility Operations Training Program Plan*, 11/16/2015
- WP 04-CO.01-14, R4, *Conduct of Operations Program – Required Reading*, 7/13/2016
- WP 04-CO.01-5, R4, *Conduct of Operations Program – Control of On-Shift Training*, 4/21/2015
- WP 05-WH.04, R0, *WIPP Waste Operations Training Program Plan*, 11/18/2015
- WP 09-CN.08, R1, *WIPP Cognizant System Engineer Training Program Plan (Safety Significant Systems)*, 8/13/2016
- WP 10-AD.02, R0, *WIPP Maintenance Training Program Plan*, 11/18/2015
- WP 10-WC3011, R37, *Work Control Process*, 5/17/2016
- WP 12-17, R2, *WIPP Emergency Management Training Program*, 6/9/2016
- WP 12-NS.09, R0, *WIPP Nuclear Safety Training Program Plan*, 11/12/2015
- WP 12-NS.10, R0, *WIPP Nuclear Criticality Safety Training Program Plan*, 11/13/2015
- WP 12-RC.02, R0, *WIPP Radiological Control and Dosimetry Department Training Program Plan*, 11/9/2015
- WP 14-TR.01, R16, *WIPP Training Program*, 5/17/2016

- WP 14-TR.03, R0, *WIPP Leadership Academy Training Program Plan*, 10/1/2015
- WP 14-TR3004, R15, *Training Development*, 5/17/2016
- WP 14-TR3005, R8, *Preparation, Administration, and Grading of Examinations*, 8/25/2015
- WP 14-TR3008, R3, *Analysis and Design*, 7/30/2015
- WP 14-TR3301, R5, *Administrative Review Board*, 7/12/2016
- WP 14-TR3305, R12, *Instructor Qualification*, 4/23/2015
- WP 14-TR3307, R7, *Qualification Programs*, 6/10/2015
- WP 14-TR3308, R14, *On-the-Job Training*, 8/23/2016
- WP 14-TR3309, R5, *Training Evaluation*, 6/15/2015
- WP 14-TR3310, R2, *Training Determination*, 9/21/2016
- WP 14-TR3311, R0, *Vendor Training (SAT Programs Only)*, 3/10/2015
- WP 14-TR3312, R0, *Exceptions/Equivalencies and Extensions*, 10/13/2015
- WP 14-TR3313, R1, *Conduct of Oral Boards*, 6/20/2016
- WP 16-2, R15, *Software Screening and Control*, 5/23/2016

Interviews Conducted

- Assessment and Continuous Improvement Manager
- CH Waste Handling Managers (2)
- Deputy Waste Operations Manager
- Design Authority Manager
- Engineering Programs Manager
- Qualified Level 3 Instructors (2)
- Technical Training and Procedures Manager
- Technical Training Records Administrative Assistant
- Technical Training Records Administrator
- Technical Training Senior Systems Administrator
- Training Coordinator
- Training Operations Manager

Evolutions/Operations Witnessed

- Pre-Job Briefing for Aboveground Evolution, 10/4/2016
- Classroom Training, ELC-103A, *Electrical Safety Refresher*, 10/5/2016
- Classroom Training, SAF-502, *Annual Underground Refresher / Hazard Training*, 10/6/2016
- Classroom Training, TRG-293, *Subject Matter Expert Training*, 10/6/2016
- Radiological Control Training Review Group Meeting, 10/6/2016

DISCUSSION OF RESULTS

1. *A T&Q Program was developed, documented, and approved and implements the requirements of DOE O 426.2. In this regard:*
    - *T&Q contract requirements are flowed into facility-specific procedures.*
    - *T&Q procedures are effectively implemented in support of the facility.*

The overall WIPP training program is described in WIPP 14-TR.01, *WIPP Training Program*, and implements the requirements of DOE O 426.2, *Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities*, as well as of 40 CFR 264.16, *Personnel Training*, and the WIPP HWFP (see discussion under Criterion 2). A number of WP 14-TR series procedures implement aspects of the program in greater detail; WP 14-TR3312, *Exceptions/Equivalencies and Extensions*, is CBFO-approved as required by DOE O 426.2. Other program procedures include MP 4.7, *Alternatives to Education and Experience Requirements*, and WP 04-CO.01-14, *Conduct of Operations Program – Required Reading*. Taken together, WP 14-TR.01 and associated WIPP training procedures describe a formal and rigorous process that implements the elements of the Systematic Approach to Training.

A number of Training Program Plans (TPPs) are in place. These TPPs address subsets of TIM positions and define the specific T&Q requirements for each position, including continuing training and requalification requirements. More detailed T&Q requirements are developed through the use of Job Task Analysis (JTA) which is governed by WP 14-TR3008, *Analysis and Design*. Requirements for qualification and requalification are then captured on qualification cards, as governed by WP 14-TR3307, *Qualification Programs*. The Technical Training organization is underway with an effort to update TPPs, JTAs, and qualification cards for the various TIM positions, and it is clear that this will improve the quality and usability of these documents. In some cases, qualification cards are being updated in advance of the JTA (reversed from ideal sequence), and in some cases, TPPs containing T&Q details have not been updated (which led to a finding as discussed under Criterion 3 below). Continued management attention is warranted to ensure that as these updates to TPPs, JTAs, and qualification cards continue, and internal consistency is maintained.

The Technical Training organization has processes in place for feedback and improvement. These processes are described in WP 14-TR3309, *Training Evaluation*, and include course evaluations, post-training surveys, instructor evaluations, training program evaluations, and training records periodic evaluations. In particular, this procedure specifies that "An evaluation of training and qualification programs shall be conducted on a periodic basis, not to exceed three years (in accordance with DOE-STD-1070-94, *Guidelines for Evaluation of Nuclear Facility Training Programs*.)" Discussions with the Technical Training and Procedures Manager indicate that he is fully aware of this requirement and has a plan for conducting the required assessments over the next three years.

The training program was heavily assessed over the last two years as part of the recovery efforts from the February 2014 events. This started with a comprehensive baseline assessment in June 2014, which used the DOE-STD-1070-94 criteria. Other assessments included a Training Program Effectiveness MSA in April 2016, an IVR of DSA/TSRs Revision 5b in May 2016, the

IVS Contractor Readiness Assessment in June 2016, the IVS Federal Readiness Assessment in August 2016, and the MSA in September 2016. WIPP Forms were generated for issues identified during these reviews in order to track corrective actions to closure.

This criterion was met.

2. A TIM was developed, approved by NWP, and approved by DOE-CBFO.

The *Waste Isolation Pilot Plant Training Implementation Matrix* was approved by NWP on 9/29/2015, and was approved by CBFO on 9/30/2015. It comprehensively addresses the requirements of the DOE O 426.2 Attachment 1, *Contractor Requirements Document*; identifies which requirements are applicable to WIPP; and flows them down into WIPP implementing mechanisms, primarily WIPP 14-TR.01.

A crosscheck of selected DOE O 426.2 requirements to corresponding TIM entries demonstrated good alignment. Similarly, a crosscheck of selected TIM entries to referenced implementing mechanisms also demonstrated good alignment.

Some minor discrepancies related to the TIM were noted:

- Table 1, Hazard Category 2 and 3 Nonreactor Nuclear Facility Personnel Education and Experience Requirements, has some misalignments with the corresponding Table 1 in DOE O 426.2, Attachment 1, Chapter II. Specifically:
    - For Managers, the Order specifies no job-related experience and includes a Note (8); the TIM inadvertently shows this as eight years of job-related experience.
    - For Technicians and Maintenance Personnel, the Order specifies no Education requirement, but the TIM requires a high school diploma. This is conservative, but interviews indicated this was not intentional.
- Table 1 has some misalignments with the QWLs as well as internally. Specifically:
    - All of the Managers, Operations Management, and Supervisors, with the exception of the “Facility Shift Manager / Facility Shift Engineer,” are not on the QWL.
    - There is no “Radiological Controls Supervisor” listed in the TIM or on the QWL.
    - “Radiological Controls Engineer,” “Nuclear Safety Engineer,” and “Nuclear Criticality Safety Engineer” are listed in the TIM but do not appear on the QWL.
    - The title “Waste Operations Manager” appears under both Operations Management and Supervisors. In addition, under Supervisors, there is an “RH Waste Operations Manager” but no “CH Waste Operations Manager.”
    - The QWL “Central Monitoring Room Operator” title does not appear in the TIM, even though this position is key to ensuring DSA/TSRs compliance.
    - Some titles are inconsistent between the TIM and the QWL. Examples include, but are not limited to:
        - “Facility Shift Manager / Facility Shift Engineer” is called the “Facility Operations Shift Engineer (FOSE)”
        - “Electrical Maintenance” is called “Electricians: Surface” and “Electricians: Underground.” “Mechanical Maintenance” is similar.

        - "Training Instructors" are called "Level 1 Instructors" (also known as "SMEs") and "Level 2 Instructors."
        - "Instructional Analyst/Developer" is called "Level 3 Instructor."
- TIM Chapter I, 5.e.(3), related to comprehensive written examinations for initial qualification, is marked "No" for Implementation Complete, with a comment that "Comprehensive oral exams have been the standard at WIPP." Evidence exists that WIPP is administering comprehensive written examinations where they were previously omitted; however, the TIM does not reflect this path forward or specify a date for full implementation of this requirement.
- Several items in the TIM marked as "Information" contain requirements, or specify helpful allowances/permissions that should be flowed down into procedures. No noncompliances with these requirements statements were observed. Examples include, but are not limited to:
    - Chapter I, 3.c, 3.c.(1), and 3.c.(2) contain a mix of "may" and "must" statements.
    - Chapter I, 4.c.(4) on challenge examinations.
    - Chapter I, 5.c on the different application of the term "qualification" to managers and technical staff personnel.
    - Chapter I, 8.a on mandatory requalification examinations, and allowed options for meeting this requirement.

WIPP Form WF16-1616 was submitted and will be used to address these items. This WIPP Form was initiated to prepare and submit an addendum of the NWP TIM, including the job position of Fire Fighter, to CBFO by 10/31/2016, as well as to make other position/job title-related adjustments, and will be expanded to address the above items as well.

This criterion was met.

3. *T&Q requirements (encompassing the range of duties and activities to be performed) for operations and support personnel were established and documented, and personnel were trained and qualified to these requirements, including:*
    - *Workers are trained and qualified on responding to incidents (e.g., use of rescue equipment, assembly areas) (SMP KE 12-2).*
    - *T&Q 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 (SMP KE 12-3).*
    - *Personnel are not permitted to perform assigned duties independently until requisite T&Q are complete (SMP KE 12-3).*
    - *Continuing training is provided to maintain requisite knowledge and skill as warranted for changes such as emergent Evaluation of the Safety of the Situation documents (SMP KE 12-3).*

An IVR, documented in CA-IVR-2016-002, was performed for DSA/TSRs Revision 5b controls, including T&Q-related TSR Administrative Control 5.3.4 and SMP KEs 12-2 and 12-3. The IVR documented adequate implementation of these controls with the exception of 2 Findings. One Opportunity for Improvement (OFI) was also noted.

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. However, as discussed in the TQ1 write-up of the *Management Self-Assessment Waste Isolation Pilot Plant Final Report*, all identified personnel had not completed the required training. WIPP Form 16-1365 was generated to track completion of this training for the remaining personnel, with a due date of 11/4/2016. There is also a completion report for SBD-105, *Attendant Training*, on the Technical Training web page.

IVR finding F-45 related to DSA KE 12-3 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, and was closed based on the development and delivery of additional training.

IVR OFI-9 related to DSA KE 12-3 recommended a mechanism to allow managers to determine who was qualified. WIPP Form WF16-741 was generated to track this issue, and was closed based on the initial issue of the QWLs. QWLs continue to be updated and additional positions added to the Technical Training web page, including some during this CORR.

There were three other training-related issues identified in the IVR:

- F-51 (WF16-728) – This finding relates to the need for Technicians and Maintenance Personnel to be trained on Engineered Safety Features. The WIPP Form was closed on the basis of there being no safety-class SSCs in the DSA/TSRs Revision 5b. This response overlooks that there are safety-significant SSCs in the DSA/TSRs, which are also Engineered Safety Features. However, based on the evidence that training on safety-significant SSCs was developed and delivered, no further action related to this IVR finding is judged necessary.
- OFI-6 (WF16-738) – This OFI relates to updating the Nuclear Criticality Safety training program. The projected completion date is 12/15/2016. Per the POA, the Nuclear Criticality SMP is out of scope for this CORR, so no further evaluation of this issue will be performed.
- OFI-11 (WF16-743) – This OFI relates to developing a training/qualification standard for personnel completing Waste Stream Profile Forms (WSPFs). The projected completion date is 12/15/2016.

<u>Personnel Trained and Qualified on Responding to Incidents</u>

As required by SMP KE 12-2, workers are trained and qualified on responding to incidents (e.g., use of rescue equipment, assembly areas). All workers having unescorted access to the WIPP site are required to be current on General Employee Training, which addresses the following safety-related elements as applicable to the jobs and duties of personnel:

- Radiological health and safety program (General Employee Radiological Training)
- Facility emergency plans
- IS/IH program
- Fire protection program
- Safety signage
- Criticality safety

For underground workers, the primary training is the SAF-501/SAF-502 series of courses, which includes classroom instruction on underground safety, hazards, and assembly areas, as well as on-the-job training and evaluated job performance measures on the use of rescue equipment. This training must be successfully completed every twelve months. Facility personnel also participate in periodic abnormal event drills and emergency exercises to build and demonstrate proficiency. This program is discussed under Objective EP1 in this report.

Procedure WP 04-AD3013 for underground access specifies that an Underground Controller controls access to the underground so that only appropriately qualified personnel have unescorted access to the underground, and other personnel (workers, visitors) have training and are escorted.

Portions of the SAF-502 classroom training were observed. The instructor was highly knowledgeable of the subject matter and encouraged good interactions and participation from the trainees.

SAF-502 student handout and instructor notes have differences in the document information (title, revision level, pagination) on certain pages. There are also some inconsistencies in the content; for example, the instructor notes cover diesel particulate matter and radiological hazards which are not included in the student handouts. A subsequent review of the course file in the Technical Training Records Room showed that the approved training materials in that file were current and consistent, and contained none of the issues noted during the observation of the class; it is unclear from where the material used in the class was obtained. (The approval date on the Material Verification Sheet for the R13 training materials is 3/16/2015, well before the 10/6/2016 date of class observation.) A WIPP Form will be generated to address this issue.

<u>T&Q Programs Ensure Personnel Obtain Initial Requisite Knowledge and Skills</u>

As required by SMP KE 12-3, T&Q 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. This topic is discussed in several locations in WP 14-TR.01, *WIPP Training Program*:

- Section 5.1.1, Initial Training
- Section 10.0, Specific Training Programs
- Section 13.0, Qualification, including Section 13.1, Initial Qualification
- Section 14.0, Operator Qualification
- Section 15.0, Qualification Competency Evaluations

Initial T&Q requirements for specific positions are described in the TPPs, and are derived in detail through JTAs and Task-to-Training Matrices. Document review indicated that WIPP personnel were following an orderly process in defining and implementing the training requirements for the various TIM qualified positions.

Personnel Authorized to Work Independently Only When Fully Trained and Qualified

As required by SMP KE 12-3, personnel are not permitted to perform assigned duties independently until requisite T&Q are complete. This is clearly stated in WP 14-TR.01, *WIPP Training Program*, which states that "WIPP employees are authorized to work independently **ONLY** when fully trained and qualified to do so," and that contains sections for exceptions and extensions to training, qualification extensions, and T&Q lapses. This is reinforced through the administrative procedures of the various WIPP organizations. For example, WP 10-WC3011, *Work Control Process*, Section 1.3, Training, states: "Prior to performing work, Field Work Supervisor (FWS) must ensure workers/craft possess the skills required to perform the assigned work and are adequately trained/qualified. Personnel who are not fully trained and qualified for the specific job at hand must be accompanied by qualified personnel." Similarly, WP 04-CO.01-5, *Conduct of Operations Program – Control of On-Shift Training*, states in Section 2.0:

> Trainees shall not perform work requiring a formal qualification unless they are under the direction of an OJT [on-the-job training] instructor/evaluator. …OJT instructor/evaluators are responsible for ensuring that a trainee under their cognizance operates equipment such that personnel and facility safety is not adversely affected. …Managers are responsible for ensuring that operators under their cognizance do not perform tasks that require formal qualification or training, unless the operator is under the direct supervision of an OJT instructor/evaluator.

Overall, the CORR team observed good compliance with this SMP KE requirement; however, some weaknesses were noted, as described below.

TQ-PRE-1: Contrary to the requirements of WP 14-TR.01, Section 4.11, one Radiological Control Supervisor (RCS) and one CH Waste Handling Manager did not have current qualifications in place during the performance demonstration on 10/4/2016, based on a comparison of training records vs. the qualification requirements specified in the relevant Training Program Plans. In addition, remaining RCSs also do not have current qualifications in place and are supervising work.

Additional details follow:

- WP 14-TR.01, R16, *WIPP Training Program*, Section 4.11, states that "WIPP employees are authorized to work independently **ONLY** when fully trained and qualified to do so."
- The current Radiological Controls TPP (WP 12-RC.02, Table 5-1) requires RCSs to have two courses (ALARA Coordinator and Source Custodian), which none of the RCSs have completed; therefore, they do not meet the qualification requirements defined in the TPP. Additionally, during the CORR, an RCS QWL was posted to the Technical Training web page. This QWL shows three out of four RCSs as qualified, does not reflect the two courses, and omits a subcontractor RCS that is shown on the Radiological Controls organizational chart.
- For the CH Waste Handling Manager, WP 05-WH.04, *WIPP Waste Operations Training Program Plan*, specifies the requalification requirement as "Demonstration of WO Waste Operations Manager knowledge and task performance as predetermined by asterisks items listed on the [WO CH Waste Handling Engineer Qualification Card] and

demonstrated performance as approved by the WO Manager." One of the asterisked items on WH-02R, *WIPP Operations CH Waste Handling Engineer Requalification Card Signature Record*, is "Current Incidental Rigger Qualification (OPS-402)." The individual's qualification on this item lapsed in March 2016. Although the Waste Handling Engineer QWL clearly showed the individual as "Not Qualified," this situation was exacerbated by the facts that (1) there is no posted QWL for the CH Waste Handling Manager, and (2) discussions with WIPP personnel indicated they were not aware of this linkage between Waste Handling Engineer and Waste Handling Manager qualifications; they thought the Waste Handling Manager had to have the more high-level/less hands-on manager/supervisor qualifications.

- In discussions over this issue, WIPP management indicated that the courses/qualifications in question were not part of the positions' core competencies, and therefore should not have been specified in the TPPs. They indicated that they are revising the two TPPs to address this issue.

During the performance demonstration on 10/4/2016, one Waste Handling Technician who did not have current qualifications made it through several checks before the situation was finally identified and the individual reassigned. The Waste Handling Technician's qualification expired at the end of September 2016 (and this was shown on the QWL), but he was initially assigned to waste emplacement activities on the approved watchbill, and was verbally confirmed as qualified during the pre-job brief. Subsequently, but before work started, his lapsed qualification status was identified by a CH Waste Handling Manager and he was reassigned to duties that did not require this qualification. Several items are of concern: (1) the individual made it through several checks (including being added to the approved watchbill), which should have prevented this situation; (2) the QWL clearly showed that the individual was not qualified, but this was not recognized; (3) the watchbill does not show which assignments require qualification; (4) the 10/4/2016 watchbill provided to the CORR team, while showing several pen-and-ink markups related to reassignments, does not show the reassignment of this individual; and (5) there are several other Waste Handling Technicians shown on the 10/4/2016 watchbill as on-leave or in training classes who are also not current on their qualifications, and could have the same situation happen to them as well. A WIPP Form will be generated to address this issue.

WP 12-RC.02, Table 5-1, contains requirements for qualification that do not contain course numbers and descriptive terms do not match actual course titles. This requires assumptions to be made on which course satisfies which qualification requirement. A WIPP Form will be generated to address this issue.

Personnel training history and due dates are captured in a database called RBASE, and data from RBASE is loaded into lookup tables in an Excel workbook called *Qualified Watchstanders List*, which is used to generate the QWL portable document formats (PDFs) on the QWL page in the Technical Training website. Information from these systems is used daily to confirm workers are qualified to perform assigned tasks; however, neither RBASE nor QWL was on the controlled software list, and had not been screened in accordance with WP 16-2, *Software Screening and Control*. Subsequently, WIPP personnel prepared and approved Software Screening Checklists for these two items, which determined that they did not meet any of the fifteen criteria listed on the checklist, and therefore were software that is "not controlled." However, given the

significance of these two software items in determining the day-to-day qualifications of workers, continued attention to quality and configuration control is warranted.

A sampling of personnel training paper records was reviewed, and was also compared against QWL dates. Overall, the paper records supported the qualifications that the individuals held, and the QWL due dates were consistent with the completion dates from the paper records.

Continuing Training to Maintain Requisite Knowledge and Skill

As required by SMP KE 12-3, continuing training is provided to maintain requisite knowledge and skill as warranted for changes such as emergent Evaluation of the Safety of the Situation documents. Continuing training is discussed in Section 5.1.2 of the WIPP Training Program, WP 14-TR.01, and position-specific continuing training requirements are discussed in the various TPPs. Continuing training that is part of requalification is tracked on the QWLs. Continuing training may be developed for:

- Changes to DOE and regulatory requirements,
- Changes to the job position,
- Significant changes in procedures,
- Changes in plant systems or equipment,
- Lessons Learned and industry operating experience, and
- Selected fundamentals, with an emphasis on seldom-used knowledge and skills necessary to ensure safety.

This criterion was **not** met.

4. *The selection process and applicable position-specific training for managers ensures competence commensurate with responsibilities.*

MP 1.40, *Management and Supervisor Training Qualifications*, specifies that designated NWP managers (i.e. those management and supervisory positions identified in TIM Appendix 1 as requiring training per DOE O 426.2) receive training on:

- Facility Specific Management Training: quality, plant security emergency preparedness, purchasing and accounting, material control, plant modifications, environmental protection, budgeting and cost control, industrial safety and radiological control; and
- Manager and Supervisory Skills Training: leadership, interpersonal communication, responsibility and authority, motivation, problem solving and decision making, fitness for duty, and administrative requirements, policies and procedures.

Initial training on these topics is provided via a four-week Leadership Academy. Additional detail on this program is provided in WP 14-TR.03, *WIPP Leadership Academy Training Program Plan*. MP 1.40 requires personnel in identified TIM manager/supervisor positions to complete the Leadership Academy within two years of occupying the management position. Alternates to Leadership Academy modules are allowed, subject to being approved under the WP 14-TR3312, the training exception/equivalency process. To date, approximately 130 WIPP personnel have completed the Leadership Academy; however, interviews indicated that some managers have not yet been scheduled for this training. Continued attention is warranted to

ensure that these managers are scheduled so as to meet the two-year requirement of MP 1.40. Once personnel have completed the Leadership Academy, MP 1.40 requires continuing leadership training to be completed.

This criterion was met.

5. *Sufficient qualified personnel are available to effectively implement the T&Q Program in support of the facility.*

There are sufficient qualified personnel available to effectively implement the T&Q Program in support of the facility. 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 are trained, qualified, and competent to operate. 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 requirements of the Systematic Approach to Training.

Technical Training maintains QWLs for each of these positions on their website. Currently the QWLs show approximately ninety individuals qualified as Level I Instructors, eleven individuals qualified as Level II Instructors, and eight individuals qualified as Level III Instructors. (Note that there is significant overlap between the Level II and Level III lists – all of the Level III Instructors also appear on the Level II list.)

Interviews indicated that current staffing 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 temporarily increased training needs driven by a larger WIPP workforce during the recovery. However, the Technical Training organization continues to meet the training needs of the WIPP organization in spite of this temporarily increased workload.

This criterion was met.

6. *WIPP has adequate facilities, and equipment is available to ensure that T&Q support and services are adequate for safe facility operation.*

Observations and interviews indicate that WIPP Technical Training has adequate facilities and equipment available to allow them to provide the necessary level of training to support safe facility operation. Classrooms and classroom equipment were upgraded during the recovery, after having been largely unchanged for many years prior. Because of the increased workforce and workload during the recovery, demand for classroom space is high, driven both by increased training needs as well as by the need to use the classrooms for other purposes such as pre-job briefs. However, this increased demand is being managed without adversely affecting productivity.

During observations of classroom training in Training Building 489, it was noted that there were no public announcement speakers installed in the classrooms; public announcements were difficult to hear in the classrooms with the doors closed. In addition to safety implications, this condition also caused disruptions to training and other meetings. In one case during a pre-job brief, the person sitting nearest the door was asked to open the door if a public announcement occurred. In another case, the instructor walked from the front of the room to the door to open it when public announcements occurred. It was also noted that there were no public announcement speakers installed in the Technical Training Records Room, and public announcements were difficult to hear in this location as well. Action Request #1627880 was generated to address this issue. There is also a previously existing WIPP Form WF16-1423 that addresses the need for public announcement speakers in the classrooms, although not in the records room.

This criterion was met.

7. *The level of knowledge of managers and staff responsible for administering and implementing the T&Q Program is adequate based on review of records, interviews, and observation of operational demonstrations. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.*

Level of knowledge of managers and staff responsible for administering and implementing the T&Q Program is adequate. Interviews and observations of both managers as well as staff from the various functions within the Technical Training department indicated that personnel uniformly understood and executed their roles and responsibilities as defined in WP 14-TR.01 and subordinate procedures. They also demonstrated an appropriate level of knowledge of topics such as project activities and safety basis requirements commensurate with their individual responsibilities. Portions of several classroom training sessions were observed, and the instructors were knowledgeable of the subject matter and actively engaged the students in a way that promoted effective and efficient learning.

As discussed under Criterion 5, there are three levels of instructor qualification (Level I, Level II, and Level III) defined, and qualifications are tracked to ensure they are maintained current via the QWLs. A sampling of personnel training paper records was reviewed, and was also compared against QWL dates. Overall, the paper records supported the qualifications that the individuals held, and the QWL due dates were consistent with the completion dates from the paper records.

During the review of training records, an isolated case of an INS-11 form, *Level I Instructor (On-the-Job Instructor/Evaluator & SME) Evaluation Checklist*, being filled out incorrectly was noted. The form had roughly half of the evaluation items marked “No,” including several critical items, but the overall evaluation was marked “Satisfactory,” contrary to the form’s instructions. The Training Operations Manager was notified and promptly pulled the individual’s qualifications, updated the Level 1 Instructor QWL, and notified the individual’s manager. Additional actions are being taken to check for any similar issues and to prevent recurrence. WIPP Form WF16-1779 was generated to address this issue.

This criterion was met.

8. AIB JONs related to T&Q were addressed through effective corrective actions.

There were three actions from the Fire Event JONs for which the Training Manager was the action owner: JON 1.5, JON 10.2, and JON 10.3. All three were CBFO accepted between November 2015 and March 2016. Closure evidence was overall sound, with some minor exceptions as noted below.

In a review of training-related AIB JON closure evidence files, two referenced courses (SAF-130 and FWT-101 R2) lacked documentation of approval, and a revision to the Fire Watch training that was referenced in a response to a CBFO comment could not be located. Training located all three missing items and provided them to the Assessment and Continuous Improvement Manager for inclusion in the relevant closure evidence files.

In reviewing the training-related AIB JON closure evidence files, two issues were noted with WD 04-AD3013: (1) while it appears the maximum number of underground workers that can be escorted by a single escort is five, there are two locations in the procedure that are worded to restrict this to three; and (2) Precautions & Limitations contains two training requirements that do not reference a course number, but which are in fact part of SAF-501/SAF-502, which is also referenced. WIPP Form WF16-1696 was generated to address this issue.

Two additional AIB JON actions (Radiological JON 17.3 and Phase 2 JON 2.4) were reviewed, which, although not assigned to the Training Manager, had training implications. No issues were noted with these closure evidence files.

This criterion was met.

CONCLUSION

With a few exceptions, a T&Q Program was developed, documented, and approved, and it implements the requirements of DOE O 426.2, as documented in an NWP- and CBFO-approved TIM. T&Q requirements for operations and support personnel were established, and personnel were trained to these requirements. Managers are selected and trained in a manner that ensures competence commensurate with their responsibilities. WIPP has adequate numbers of qualified and knowledgeable technical training staff, as well as adequate facilities and equipment to support safe facility operations appropriately.

This objective was met. There was one finding identified.

FINDINGS

<u>Pre-Start</u>
TQ-PRE-1: Contrary to the requirements of WP 14-TR.01, Section 4.11, one Radiological Control Supervisor (RCS) and one CH Waste Handling Manager did not have current qualifications in place during the performance demonstration on 10/4/2016, based on a comparison of training records vs. the qualification requirements specified in the relevant

Training Program Plans. In addition, remaining RCSs also do not have current qualifications in place and are supervising work.

Post-Start
None

Assessed by:	Brian Trawinski **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Training & Qualification**	Objective: TQ2 Date: 10/14/2016	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

TQ2: Modifications to the facility were reviewed for potential impacts on T&Q. Training was performed to incorporate all aspects of these changes (CR 3)

CRITERIA

1. Modifications to the facility were reviewed for potential impacts on T&Q.
2. As required, training was performed to incorporate all aspects of the relative changes to ensure safe operations.

APPROACH

Records Reviewed

- Email, from Kruger to Trawinski, Subject: *FW: Mod Training*, 10/11/2016 1:20 PM
- Operations Turnover Verification Binder, *Installation of Additional HEPA Filter Differential Pressure Instrumentation, CH Waste Handling Containment Ventilation System and Battery Exhaust Filtration System*, 5/18/2016
- Operations Turnover Verification Binder, *Installation of Underground Surveillance Camera System at Waste Face*, 9/29/2016
- Operations Turnover Verification Binder, *Waste Handling Building Fire Suppression System (Fire Water Storage Tank) Level Indicator*, 10/4/2016
- WP 09-CN3007, R46, *Engineering Change Order Preparation and Design Document Change Control*, 7/15/2016
- WP 10-WC3010, R29, *Periodic Maintenance Administration and Controlled Document Processing*, 5/17/2016
- WP 10-WC3011, R37, *Work Control Process*, 5/17/2016
- WP 14-TR3310, R2, *Training Determination*, 9/21/2016
- WP 15-PS3002, R39, *Controlled Document Processing*, 8/19/2016

Interviews Conducted

- Design Authority Manager
- Engineering Programs Manager
- Technical Training and Procedures Manager
- Training Operations Manager

Evolutions/Operations Witnessed

- None

DISCUSSION OF RESULTS

1. Modifications to the facility were reviewed for potential impacts on T&Q.

The CORR team found that modifications to the facility are being reviewed for potential impacts to T&Q, and requisite training is being identified, developed, and delivered. However, the process that is actually being followed, while effective, is somewhat different than the process currently documented in WIPP procedures. Details of the team's review are discussed below.

Several Operations Turnover Verification Binders for recent modifications were reviewed. ECOs (form EA09CN3007-1-0, R3, governed by WP 09-CN3007, *Engineering Change Order Preparation and Design Document Change Control*) contain an Interfacing Documents section which has a Modification Impacts line; in some cases, this line was incorrectly marked "N/A." Modification work orders contain a Modification Impact Form (form EA10WC3011-19-0, R3, governed by WP 10-WC3011, *Work Control Process*), which contains lines addressing fire protection system training, maintenance training, and operations training. For the most part, no training impacts were identified, and in some cases, procedure impacts were not identified, even though the binders contain procedures that were revised as a result of the modification.

Interviews indicated that the WP 09-CN3007 procedure has recently been revised and now specifies an ECN process versus the previous ECO process. It was felt that the new ECN process would facilitate modification impact identification, resulting in improvements over what was observed in the Operations Turnover Verification Binders that were prepared using the previous ECO process; however, no ECNs following the new process were available for review because of the newness of the revised process.

WP 10-WC3010, *Periodic Maintenance Administration and Controlled Document Processing*, which addresses periodic maintenance procedures, contains no instructions on training determination. Interviews indicated that technical procedures have a strong linkage to training determinations, and Technical Training management had a large number of active training determination forms on-hand. A review of WP 15-PS3002, *Controlled Document Processing*, confirmed that step 2.13 states, "If the document is a technical, response, or administrative procedure, GO TO WP 14-TR3310, *Training Determination*, and perform process."

WP 10-WC3011 addresses work control processes. For modifications, the CSE / Alternate CSE is required to (a) perform an evaluation for impacts and document the impacts on a modification impact sheet (EA10WC3011-19-0), ensuring identification of pre-startup actions; and (b) ensure actions are initiated to make required changes (e.g., submittal of a PM Identification and Change form, EA10WC3010-1-0) (Section 3.3.5, Step 17). After installation, it requires the Cognizant Operations Manager to ENSURE pre-startup actions identified on the Modification Impact Sheet have been completed BEFORE restoration of the SSC (Section 3.6.5, Step 13.b). It also requires

the CSE / Alternate CSE to ensure required action is taken for items identified as post-startup, including training materials (Section 3.6.5, Step 14).

The Training Operations Manager forwarded an email from the Maintenance Training Lead Instructor that summarized the training status for recent WIPP modifications. It is evident from the email that training determinations are being performed, and include decisions of "No Training," informal training, formal training, and procurement of outside vendor training. The Underground Fire Suppression System Upgrades are still not powered-up, and decisions regarding who will maintain them are still pending, which will drive the training determination. For training that has already been conducted, the email attached evidence of completion for many of the courses.

Discussions with the CM2 CORR team member indicated that he had an interview with the Maintenance Training Lead Instructor and the Maintenance I&C Manager, where they had discussed training on these recent modifications. While it is realized that the WP 10-WC3011 work control procedure makes the CSE the focal point with regard to identifying and tracking modification impacts to training, the reality is that this is a shared responsibility, with individuals like the I&C Manager identifying training impacts as the work package comes to them for review.

In summary, modifications to the facility are being reviewed for potential impacts to T&Q, and requisite training is being identified, developed, and delivered. The process that is actually being followed is effective in achieving this end result; however, it is somewhat different than the documented process as defined in WP 10-WC3011 and is more reliant on training impacts being identified during the review cycle by various managers and reviewers, instead of singular reliance on the CSE described in WP 10-WC3011. It may be beneficial to consider adjustments to the WP 10-WC3011 process to reflect how training impact determinations are actually (and with a high degree of effectiveness) being done.

This criterion was met.

2. *As required, training was performed to incorporate all aspects of the relative changes to ensure safe operations.*

As discussed under Criterion 1, modifications were reviewed for training impacts, and based on the results of the training determination and the state of the modification, training was developed and delivered to appropriate personnel in support of safe operations.

This criterion was met.

CONCLUSION

Recent modifications to the facility were reviewed for potential impacts on T&Q. As required by training determination and the state of the modification, training was developed and delivered to appropriate personnel.

This objective was met. There were no findings identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	Brian Trawinski **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Waste Acceptance Criteria Compliance**	Objective: WACC1 Date: 10/14/2016	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

WACC1: A WAC Compliance program is in place to assure packaged waste conforms to the WIPP WAC prior to underground placement. The level of knowledge of WAC Compliance managers and staff is adequate based on review of examinations and examination results, interviews, and observation of operational demonstrations. (CR 1, 4)

CRITERIA

1. WAC Compliance TSRs and HWFP requirements are flowed into facility-specific procedures.
2. NWP WAC Compliance procedures for DSA SMP Chapter 18 were implemented, with the exception of the Site Generator Technical Reviews to re-evaluate containers certified in the WDS, to allow emplacement of the containers at WIPP and receipt and emplacement of containers certified and ready for shipment at the generator sites, including:
    - NWP verifies each container is part of an approved waste stream with the enhanced Acceptable Knowledge (AK) process prior to authorizing shipment in WDS (SMP KE 18-1).
    - NWP reviews WSPFs to verify the information provided is complete and accurate, and that the waste stream complies with the HWFP Waste Analysis Plan and the WIPP WAC (DOE/WIPP 02-3122, *Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant*) prior to authorization for shipment (SMP KE 18-2).
    - NWP verifies the HWFP requirement for confirmation of certified waste prior to shipment to the WIPP from the generator/storage sites (SMP KE 18-3).
    - The NWP performs Generator Site Technical Reviews, which are reviews of DOE sites' and certified programs' implementation of WIPP requirements (excluding DOE activities) (SMP KE 18-4).
    - The MAR statistics for waste certified for future shipment to WIPP are reviewed periodically by NWP (no less frequently than annually) to ensure the values stated in DSA Tables 3.4-1 and 3.4-2 continue to provide conservative unmitigated consequences in the Safety Analysis; further each payload proposed for shipment to WIPP is additionally screened to ensure handling and emplacement of small groupings of containers will remain bounded by the Safety Analysis (SMP KE 18-5).
3. Sufficient qualified personnel are available to effectively implement the WAC Compliance program in support of the facility.

4. The level of knowledge of managers and staff responsible for administering and implementing the WAC Compliance program is adequate based on review of records, interviews, and observation of operational demonstrations. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.
5. WIPP has adequate facilities, and equipment is available to ensure that WAC Compliance support services are adequate for safe facility operation.
6. AIB JONs related to WAC Compliance were addressed through effective corrective actions for the WAC Compliance Program.

APPROACH

Records Reviewed

- CA-IVR-2016-002, *Implementation Verification Review Final Report (for the) Waste Isolation Pilot Plant Documented Safety Analysis/Technical Safety Requirements, Revision 5b,* 5/24/2016
- CCP-QP-002, *CCP Training and Qualification Plan*, 7/22/16
- CCP-TP-005, R28, *CCP Acceptable Knowledge Documentation*, 2/29/2016
- DOE/CBFO 16-3563, R0, *WIPP Generator Site Technical Review Plan*, 5/24/2016
- DOE/CBFO 16-3564, R0, *Generator Site Technical Review Procedures*, 5/24/2016
- DOE/WIPP 07-3372, R5b, *Waste Isolation Pilot Plant Documented Safety Analysis*, Chapter 18, April 2016
- DOE/WIPP 07-3373, R5b, *Waste Isolation Pilot Plant Technical Safety Requirements*, April 2016
- MSA-NWP-2016-001, R0, *Management Self-Assessment Waste Isolation Pilot Plant Final Report*, 9/30/2016
- *Nuclear Waste Partnership LLC, Corrective Action Plan Addendum Radiological Release Event (Phase II)*, 7/16/2015
- WIPP-057, R0, *Statistical Parameters for Bounding MAR Limits at the* WIPP, 10/12/16
- WP 02-PC3005, R0, *Permit Reporting 24-Hour, 5-Day Follow-Up, Other Noncompliances*, 10/21/2015
- WP 02-RC.11, *Qualification and Certification of NDE Personnel Performing Radiography for TRU Waste Confirmation*
- WP 02-RC.12, *Qualification and Certification of Visual Examination for TRU Waste Confirmation*.
- WP 02-RC1102, R14, *Review of Radiography Media for TRU Waste Confirmation*, 5/30/2016
- WP 02-RC1108, R14, *Review of Visual Examination Records for TRU Waste Confirmation*, 5/30/2016
- WP 08-NT.03, R17, *Waste Stream Profile Form Review and Approval Program*, 5/17/2016
- WP 08-NT1001, R2, *Waste Data Stream System Waste Stream Profile Review*, 4/18/2016
- WP 08-NT1005, R0, *RCRA Review Criteria for Waste Stream Profile Forms*, 9/28/2015
- WP 08-NT3020, R27, *TRU Waste Receipt*, 5/30/2016

- WP 08-PT3400, R2, *Criteria for Packaging Implementation and Technical Support Review of Waste Stream Profile Forms*, 4/7/2016
- WP-12-NS3018, R0, *Material at Risk Statistics Verification*, 10/12/16

Interviews Conducted

- AK Inventory and Support Manager
- CCP Host Site Operations Manager
- CCP Program Manager
- Deputy Restart Manager
- Nuclear Safety Engineer
- Packaging and Information System Manager
- RES Manager
- Safety Basis Manager
- SEC Manager
- Site Project Managers (3)
- Transportation Engineers (2)
- Transportation Manager
- Waste Certification Official

Evolutions/Operations Witnessed

- None

DISCUSSION OF RESULTS

1. *WAC Compliance TSRs and HWFP requirements are flowed into facility-specific procedures.*

Based on document reviews, the TSRs and HWFP requirements are flowed into these procedures:

- WP 08-NT.03, *Waste Stream Profile Form Review and Approval Program*, which captures SMP requirements KE 18-1 and KE 18-2,
- WP 02-RC1108, R14, *Review of Visual Examination Records for TRU Waste Confirmation*, which captures SMP requirement KE 18-3,
- WP 02-RC1102, R14, *Review of Radiography Media for TRU Waste Confirmation*, which captures SMP requirement KE 18-3,
- Per the POA, KE 18-4 (Site Generator Technical Reviews) was out of scope for the CORR, and
- WP 12-NS3018, R0, *Material at Risk Statistics Verification*, which captures SMP requirement KE 18-5.

See Objective MG4 for a detailed discussion of TSR and HWFP flow-down of requirements into applicable procedures and other documents.

This criterion was met.

2. *NWP WAC Compliance procedures for DSA SMP Chapter 18 were implemented, with the exception of the Site Generator Technical Reviews to re-evaluate containers certified in the WDS, to allow emplacement of the containers at WIPP and receipt and emplacement of containers certified and ready for shipment at the generator sites, including:*
    - *NWP verifies each container is part of an approved waste stream with the enhanced AK process prior to authorizing shipment in WDS (SMP KE 18-1).*
    - *NWP reviews Waste Stream Profile Forms to verify the information provided is complete and accurate, and that the waste stream complies with the HWFP Waste Analysis Plan and the WIPP WAC (DOE/WIPP 02-3122, Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant) prior to authorization for shipment (SMP KE 18-2).*

NWP verifies each container is part of an approved waste stream with the enhanced Acceptable Knowledge process prior to authorizing shipment in WDS (SMP KE 18-1). NWP reviews WSPFs to verify the information provided is complete and accurate, and that the waste stream complies with the HWFP Waste Analysis Plan and the WIPP WAC (DOE/WIPP 02-3122, *Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant*) prior to authorization for shipment (SMP KE 18-2).

SMP KE 18.1 and 18.2 are both implemented by WP 08-NT.03, *Waste Stream Profile Review and Approval Program*. CCP generates AK utilizing CCP-TP-005, *CCP Acceptable Knowledge Documentation*. A waste stream is defined as waste materials that have common physical form, that contain similar hazardous constituents, similar radiological properties, and that are generated from a single process or activity.

The enhanced AK process includes:

- Increased diligence in the retrieval of historical documentation that define the origin of the waste stream, and
- The AK Assessment and the Chemical Compatibility Evaluation Memorandum portions of the AK package are generated by the Acceptable Knowledge Expert (AKE) and approved by the Site Project Manager.

An AKE, qualified in accordance with CCP-QP-002, *CCP Training and Qualification Plan*, gathers historical documentation in accordance with Attachment 1 of the plan. Attachment 1 contains an exhaustive list of information that describes or verifies site history, mission, and operations in addition to the waste-stream-specific information used to define the generating process, waste matrix, waste quantities, contaminants (radiological and chemical), and packaging that must be compiled at the generator site. Relevant documents associated with the waste stream are captured on the Interface Waste Management Documents List. Documents that change must be walked down by the AKE to see if the change affects the waste stream. A record of communication must document the method used by the AKE in evaluating required parameters,

such as radionuclides, waste matrix codes, assignment of hazardous waste numbers, approximate weight of waste material, AK Summary Report, AK Assessments, chemical compatibility evaluations, etc.

From the data collected, the AKE develops the AK record containing the AK document, the AK Summary Report, the AK Assessment, and the Chemical Compatibility Evaluation Memorandum. The record is reviewed and approved by the Site Project Manager, in accordance with CCP-QP-002.

CCP will initially characterize the waste stream using Visual Examination or Real Time Radiography (for physical form and absence of prohibited items) and Nondestructive Assay (for radiological data) to for comparison against the waste stream AK. This comparison certifies a waste stream for disposal at WIPP.

After a complete AK record was compiled, and either a Determination Request was approved by DOE or the generator site has completed the applicable testing requirements, the generator site will compile a WSPF and submit to NWP for review. The WSPF is reviewed in accordance with WP 08-NT.03, *Waste Stream Profile Review and Approval Program*. The WSPF is reviewed to verify that the information provided is complete and accurate, and that the waste stream complies with the WAC and the Waste Acceptance Plan prior to approval. If more detailed information is required to review the WSPF, the generator site will be asked to provide a characterization package that supports the characterization determination. Additionally, chemical sampling and analysis an approved EPA Method and identification of the laboratory to be used for the analysis may be requested.

Prior to the first shipment of containers from the approved waste stream, NWP will provide copies of the approved WSPF to the NMED. Upon written notification of approval of the WSPF by the NWP, the generator site is authorized to ship waste to WIPP. Upon receipt of the NWP approval letter for the waste stream, the Data Administrator enters the approval date into the WSPF Administrative Table, which causes the database to recognize the approved waste stream profile number. This allows the generator site WDS user to submit certification data to the WDS for waste containers from the approved waste stream, and subsequently allows Data Administrator approval of certified container data prior to shipment of containers from the approved waste stream.

- *NWP verifies the HWFP requirement for confirmation of certified waste prior to shipment to the WIPP from the generator/storage sites (SMP KE 18-3).*

SMP KE 18-3 is implemented by WP 02-RC1108 and WP 02-RC1102. Personnel performing the review under WP 02-RC1108 are qualified as a Visual Examination Level 1 and/or Level 2 Operator in accordance with WP 02-RC.12, *Qualification and Certification of Visual Examination for TRU Waste Confirmation*.

The Permittees Confirmation Representative (PCR) obtains a daily listing of 7% of certified waste containers in each waste stream shipment that were randomly selected in WDS. The PCR contacts the generator site, obtains the Visual Examination media and/or data forms (batch data

reports and nonconformance reports) for the selected containers, and forwards this to the operator for confirmation. The operator performs a data package and hazardous waste number verification. The operator reviews the video/audio media for confirmation to ensure all waste items placed in the container are recorded in sufficient detail, capture the waste container number, the personnel loading the waste are identified, and the date of loading is recorded. He/she verifies the media and/or data records for the absence of unvented compressed gas containers (unpunctured aerosol cans), observable liquid equal to or greater than 1% volume of the outermost container, or internal containers with greater than 60 milliliters of 3% volume of observable liquid, verifies the physical form is consistent with the waste stream description and waste matrix code, and verifies that nonconformance reports are dispositioned.

The Independent Technical Reviewer then reviews the data package for completeness and verifies that the data generation and reduction were conducted in a technically correct manner, the data were reported in proper units and number of significant figures, media are complete, and no transcription errors exist.

The PCR then reviews the data packages and verifies that data are technically reasonable based on the technique used, data have received Independent Technical Reviewer review, data indicate that no ignitable, corrosive, or reactive waste is present, the physical form is consistent with the waste stream description on the WSPF, and the data meets the QA Objectives. The PCR provides a link to the data confirmation data package via email to a trained DOE TRU Sites and Transportation Division Designee for review. Once the DOE review is complete, the PCR verifies that shipment payloads have not changed and notifies the generator site that the confirmation process is complete and the waste can be shipped to WIPP. The PCR then transfers all Visual Examination media and data sheets to the WIPP Operating Record. The Operator, Independent Technical Reviewer, and PCR must be different personnel in order to perform the confirmation.

Personnel performing the review under WP 02-RC1102 shall be qualified as a Nondestructive Examination Level 1 and/or Level 2 Operator in accordance with WP 02-RC.11, *Qualification and Certification of NDE Personnel Performing Radiography for TRU Waste Confirmation.*

The PCR obtains a daily listing of 7% of certified waste containers in each waste stream shipment which were randomly selected in WDS. The PCR contacts the generator site and obtain the Real Time Radiography media and/or data forms (batch data reports and nonconformance reports) for the selected containers and forwards to the operator for confirmation. The operator performs a data package and hazardous waste number verification. The operator reviews the video/audio media for confirmation to ensure all waste items placed in the container are recorded in sufficient detail, capture the waste container number, the personnel loading the waste are identified, and the date of loading is recorded. He/she verifies the media and/or data records for the absence of unvented compressed gas containers (unpunctured aerosol cans), observable liquid equal to or greater than 1% volume of the outermost container, or internal containers with greater than 60 milliliters of 3% volume of observable liquid, verifies the physical form is consistent with the waste stream description and waste matrix code, and verifies that nonconformance reports are dispositioned.

The Independent Observer then selects two containers per day or per shipment and reviews the Real Time Radiography media and data for the containers and signs concurrence in the Independent Observer log.

The Independent Technical Reviewer then reviews the data package for completeness and verifies that the data generation and reduction were conducted in a technically correct manner, the data were reported in proper units and number of significant figures, media are complete, and no transcription errors exist. If a review of the Real Time Radiography scans recorded by the generator site was used to perform confirmation, the reviewer verifies that confirmation has performed by two Independent Observers for each shipment or two Independent Observers for each day.

The PCR then reviews the data packages and verifies data are technically reasonable based on the technique used, data have received Independent Technical Reviewer review, data indicate that no ignitable, corrosive, or reactive waste is present, the physical form is consistent with the waste stream description on the WSPF, and the data meets the QA Objectives. The PCR provides a link to the data confirmation data package via email to a trained DOE TRU Sites and Transportation Division Designee for review. Once the DOE review is complete, the PCR verifies that shipment payloads have not changed and notifies the generator site that the confirmation process is complete and the waste can be shipped to WIPP. The PCR then transfers all Real Time Radiography media and data sheets to the WIPP Operating Record. The Operator, Independent Technical Reviewer, and PCR must be different personnel in order to perform the confirmation.

- *The NWP performs Generator Site Technical Reviews, which are reviews of DOE sites' and certified programs' implementation of WIPP requirements (excluding DOE activities) (SMP KE 18-4).*

Generator Site Technical Reviews are out of scope for the CORR.

- *The MAR statistics for waste certified for future shipment to WIPP are reviewed periodically by NWP (no less frequently than annually) to ensure the values stated in DSA Tables 3.4-1 and 3.4-2 continue to provide conservative unmitigated consequences in the Safety Analysis; further each payload proposed for shipment to WIPP is additionally screened to ensure handling and emplacement of small groupings of containers will remain bounded by the Safety Analysis (SMP KE 18-5).*

SMP KE 18-5 is implemented by WP-12-NS3018, *Material at Risk Statistics Verification*. This procedure reaffirms the MAR statistics on an annual basis to ensure the plutonium-equivalent curie loading of the existing backlog of unshipped certified waste containers is bounded by the mean and 95% values in the DSA. Data from the WDS is used to update the statistical evaluations described in calculation WIPP-057, *Statistical Parameters for Bounding MAR Limits at the WIPP*.

After updating the statistical evaluation, a Nuclear Safety Engineer (NSE) compares the values to DSA, Chapter 3, Table 3.4.1. If the statistics incorporating the unshipped certified waste

containers are bounded by the DSA, the results are documented. If the statistics are not bounded by the values in the DSA, the NSE informs the Nuclear Safety Manager.

Individual payloads are checked before leaving the generator sites to ensure local groupings of high MAR remain bounded by the DSA. Individual payload's shipment information is supplied to the NSE by the Waste Certification Official (WCO) or the CCP WCO for screening by the NSE. If the payload is within MAR limits or within the bounding source term, the NSE provides approval to the applicable WCO for the shipment. If the individual payload falls outside the MAR limits or bounding source term, the NSE informs the WCO to disapprove or modify the shipment. The screening process is repeated until the shipment falls inside the bounding limits.

The WDS software has not been rescreened after the implementation of DSA/TSRs to ensure the classification is correct. Although WDS does not specifically perform internal calculations related to the WIPP MAR or chemical compatibility, the information contained in WDS is used to calculate and track the MAR, as well as track important-to-safety information, such as chemical compatibility and plastic/organic material content of the waste packages. The radiological content of each package, as contained in WDS and on the paperwork created by WDS, is used by the Radiological Control organization to select monitoring protocols, and a similar database of radiological information at WIPP is currently classified as safety software.

The CORR team believes that WDS should be classified as safety software in order to protect the WDS data used to calculate the statistical MAR required by KE 18-5. If rescreening does not support safety software classification, the CORR team would challenge the sufficiency of the screening process and associated screening criteria. This issue was previously identified in Objective QA1 and a WIPP Form was initiated.

This criterion was met.

3. *Sufficient qualified personnel are available to effectively implement the WAC Compliance program in support of the facility.*

As demonstrated by a review of current staffing plans and interviews with management personnel, sufficient NWP and CCP qualified personnel are available to implement the WAC Compliance program effectively in support of the facility. The numbers are based on the expectation of receipt of five TRUPACT shipments a week after startup. Each of the staffing plans contained a ramp-up of personnel for FY17, expecting an increase of up to seventeen shipments a week during FY17.

A new position of Site Management Representative from each generator site was developed. This person interfaces with CCP and will have the ability to obtain resources needed for the compilation and review of AK packages.

This criterion was met.

4. *The level of knowledge of managers and staff responsible for administering and implementing the WAC Compliance program is adequate based on review of records,*

interviews, and observation of operational demonstrations. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.

Based on review of records, observation of field activities, and interviews with a number of exempt support personnel, supervisors, and managers, each person had what the team member would consider expert-level knowledge in his or her own piece of the project activity (for exempt personnel) and very broad-based knowledge of the activities by management personnel. Each were aware, as applicable, of the changes in the project performance brought about by the events of 2014. This level of knowledge would be expected by the team, as the personnel have undergone specific, rigorous qualifications (qualification documents were reviewed for five different positions), and most have been working at the same or similar activities for over ten years. Those that were affected by the safety basis requirement changes have a good understanding of the changed safety basis requirements.

A performance demonstration of the receipt of three TRUPACT containers was observed by the team. This receipt was performed under WP 08-NT3020, *TRU Waste Receipt*. The Transportation Engineer (TE) that performed the procedure was qualified Transportation Analyst, which included all the TE functions required for the receipt in accordance with the procedure requirements. This was verified with a qualification listing from the training organization. The TE performed the duties in accordance with the Exempt Position Description for a Transportation Analyst. The TE informed the team member that a pre-job briefing was not required, as he was the only person performing the actions. All the paperwork required for receipt was a mock-up of an actual shipment. The TE performed the procedure verbatim by using the procedure in-hand and checking off each step as it was performed. The step was not checked off until the TE had entered the required data on Attachment 1 of the procedure.

The activity began with a notification from the CMR phone call that the transporter had arrived at the security gate. The receipt began with a walkdown and recording of the number of CH and RH packages in the parking area unit behind the WHB. The TE then received the shipping papers from the transporter driver and compared the data of the WDS Shipping Summary Report against the data contained on the Uniform Hazard Waste Manifest (UHWM) that came with the shipping papers. This step performed LCO 3.7.1, Surveillance Requirement 4.7.1. The TE understood the significance of the $ label identifying the step as TSR-related, and understood that exact performance of the Surveillance Requirement was required; he completed the form required by the Surveillance Requirement. The TE then compared the UHWM against the data on each TRUPACT.

At this time, another TE (a lead who was observing the activity) helped the TE performing the activity by helping him check of UHWM data against the labels, markings, and package serial numbers. This person was a qualified as a Transportation Specialist and carried the same qualifications required by the procedure to perform the receipt activities. The second TE was briefed by the first one on what step in the procedure they were to perform. One read the labels, markings, and the packaging serial number, and the other compared the data with the UHWM. This was seen as a notable human performance action, since the data was complicated and created an error-likely situation with only one performer. After data verification, the driver was instructed to park the payload trailer in a certain position behind the WHB. The on-duty RCT

was informed in writing (by email) that the payload was ready for radiological surveys. After completion of the survey, the RCT notified the TE by email of the survey results for the TE to enter on his Attachment 1. The TE then delivered the completed Surveillance Requirement data sheet to the CMR. The TE then went to his desk and reverified that the data from Attachment 1 agreed with the UHWM. The only item noted by the team was that places left blank on the Attachment 1 were not indicated as being not applicable (N/A), which is a conduct of operations good practice. The knowledge level of both TEs was excellent.

This criterion was met.

5. *WIPP has adequate facilities, and equipment is available to ensure that WAC Compliance support services are adequate for safe facility operation.*

As demonstrated by interviews of various managers and observation of work activities, no specific equipment, other than computers and computer software, is necessary for WAC compliance support services at the WIPP site. The CCP field equipment at the Waste Generator Sites necessary to obtain the characterization data for the certification of waste for emplacement at WIPP is extremely important. At the present time, the CCP is performing characterization activities at various generator sites and has adequate equipment to support safe and compliant operations.

This criterion was met.

6. *AIB JONs related to WAC Compliance were addressed through effective corrective actions for the WAC Compliance Program.*

As demonstrated by a 100% review of the AIB JONs related to WAC Compliance, all JONs were addressed through effective corrective actions for the WAC Compliance Program and were approved by CBFO.

During a review of the *NWP CAP Addendum, Radiological Release Event (Phase II) JON* hardcopy files, the team noted that the evidence listed on various documents in the file (3) were not located in the folder. After discussion with the Assessment and Process Improvement Manager, it was found that the evidence was also not in the record file on the WIPP Form database. The cases noted were evidence requested by CBFO during their review of the JON closure. WIPP Form 16-1754 was generated for this item. The Assessment and Process Improvement Manager performed an extent of condition of this issue and found fourteen additional similar occurrences of files missing documents. The CORR team was told that all seventeen files have since been corrected.

This criterion was met.

CONCLUSION

A WAC Compliance program is in place to assure packaged waste conforms to the WIPP WAC prior to underground placement. The level of knowledge of WAC Compliance managers and staff is exceptional based on interviews and observation of operational demonstrations.
This objective was met. There were no findings identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	Joe Uptergrove **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Waste Management**	Objective: WM1 Date: 10/14/2016	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

WM1: Line management has implemented a Waste Management (WM) SMP to ensure safe accomplishment of work. The level of knowledge of WM managers and staff is adequate based on review of examinations and examination results, interviews, and observation of operational demonstrations. (CR 1, 4)

CRITERIA

1. Contract requirements for the WM SMP were incorporated into facility-specific procedures.
2. WM implementing procedures were effectively implemented in support of the facility and identified WM SMP controls (e.g., KEs) and referenced procedures are implemented.
3. WIPP has a sufficient number of trained personnel to fulfill the WM SMP effectively and provide safe site operations.
4. The level of knowledge of WM managers and staff is adequate based on review of records, interviews, and observation of operational demonstrations. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.
5. WIPP has adequate facilities, and equipment is available to ensure that WM support and services are adequate for safe facility operation.
6. AIB JONs related to WM were addressed through effective corrective actions for the WM SMP.

APPROACH

<u>Records Reviewed</u>

- 474 Brine Tote Storage Area Map, 10/5/2016
- *Hazardous Waste Compliance Evaluation Report*, 11/18/2015
- Memorandum, E.P.A. I.D. Number NM489013088, from Kieling to Bryson and Breidenbach, Subject: *Non-Financial Records Review Inspection of Permittees Post-Release Event, August 2014 Waste Isolation Pilot Plant*, 4/22/2015
- Memorandum, E.P.A. I.D. Number NM489013088, from Kieling to Bryson and Breidenbach, Subject: *Non-Financial Records Review Inspection of Permittees Post-Release Event, August 2014 Waste Isolation Pilot Plant*, 6/10/2016
- Memorandum, E.P.A. I.D. Number NM489013088, from Kieling to Bryson and Breidenbach, Subject: *Non-Financial Records Review Inspection of Permittees Post-Release Event, August 2014 Waste Isolation Pilot Plant*, 8/12/2015

- Memorandum, E.P.A. I.D. Number NM489013088, from Kieling to Bryson and Breidenbach, Subject: *Non-Financial Records Review Inspection of Permittees Post-Release Event, August 2014 Waste Isolation Pilot Plant*, 9/30/2013
- Memorandum, EN: 13:00043, from Carrasco to Kennedy, Subject: *Waste Emplacement Area Clearance – Room 7 of Panel 7*, 5/3/2013
- R2A2 Package – Site Environmental Compliance, 5/17/2016
- *RCRA Inspection Tracking Report*, 10/6/2016
- WP 02-EC.13, R9, *Environmental Compliance Walk Around and Assessment Plan*, 5/19/2016
- WP 02-RC3109, R10, *Waste Accumulation Area Inspections*, 11/4/2014
- WP 02-RC3110, R7, *Low-Level and Mixed Low-Level Waste Characterization for Off-Site Release for Disposal*, 3/29/2016

Interviews Conducted

- SEC Manager
- Waste Specialist (2)

Evolutions/Operations Witnessed

- Environmental compliance walk-around inspection
- Waste accumulation area inspection

DISCUSSION OF RESULTS

1. Contract requirements for the WM SMP were incorporated into facility-specific procedures.

The contract requirements associated with non-TRU site-generated waste were discussed and reviewed with the SEC Manager. The SEC organization exists to ensure all regulatory requirements are in full compliance. This is accomplished through experienced and trained environmental specialists and engineers and up-to-date, mature procedures. SEC procedures were developed and refined over the past several years specifically to confirm regulatory compliance. Periodic SEC and management assessments and regular inspections are conducted to confirm compliance. In addition, periodic regulatory compliance inspections are conducted. The NWP RCRA inspection plan and SEC routine inspections, as well as the regulatory inspection reports (NMED) over the past four years, were reviewed and discussed with the SEC Manager. Completed inspections through 2013 confirm compliance with regulatory/contract requirements related to site environmental compliance, and thus confirm effective incorporation of requirements into SEC facility-specific procedures.

This criterion was met.

2. *WM implementing procedures were effectively implemented in support of the facility and identified WM SMP controls (e.g., KEs) and referenced procedures are implemented.*

Two primary procedures were reviewed and discussed with the SEC Manager: WP 02-RC3109, *Waste Accumulation Area Inspections*, covers the inspection of waste accumulation areas, and WP 02-EC.13, *Environmental Compliance Walk Around and Assessment Plan*, covers environmental compliance walk around assessments. Both procedures have undergone significant revisions to address changes resulting from the two incidents and the subsequent recovery activities. The inspection criteria for Satellite Accumulation Areas and Hazardous Waste Accumulation Areas were significantly expanded to ensure expanded required activities and associated requirements are effectively incorporated. These procedures provide sufficient support to the environmental compliance and storage and disposal of non-TRU site-generated waste.

This criterion was met.

3. *WIPP has a sufficient number of trained personnel to fulfill the WM SMP effectively and provide safe site operations.*

Staffing level and qualification status was discussed with the SEC Manager and associated documents were reviewed. The SEC organization currently has twelve positions, including the Manager, Records Support, and Administrative Assistant. The remaining positions consist of four Environmental Specialists, two Engineers, one Bargaining Unit Representative, and two vacant positions. Since the shutdown, the level of required SEC support has increased significantly in the area of radiological waste disposal, including collection, sampling, and analysis of potentially contaminated water. Given the increased demand, an additional position was added, which appears to make the SEC organization sufficient to support continued operations, including waste handling and emplacement activities.

This criterion was met.

4. *The level of knowledge of WM managers and staff is adequate based on review of records, interviews, and observation of operational demonstrations. This includes knowledge of project activities and safety basis requirements commensurate with their responsibilities.*

A team member performed a walkdown of the surface Waste Storage Areas located south of the Guard and Security Building with the SEC Manager and two Waste Compliance Specialists. NWP maintains a Hazardous Waste 90-day storage area and a Universal Waste storage area behind a locked fence in locked conex containers.

Before entry into the area, the SEC manager invoked the Human Performance tool two-minute rule hazard evaluation process and held a discussion in accordance with the *WIPP Fundamentals Handbook*. He wanted to make sure a visitor (CORR team member) understood the hazards of the area (principally, that rattlesnakes were found in the area).

NWP has recently made an off-site shipment of waste, such that only one container containing diesel soaked rags was in the Hazardous Waste 90-day storage area. This container was placed in the storage area August 19, 2016. Only one box of used fluorescent bulbs was in the Universal Waste area. This box was placed in the area in June 26, 2016, which meets the one-year storage requirement for Universal Waste.

NWP stores brine water collected from the underground in totes stored in Area 474 just east of the Guard and Security Building. SEC maintains a map of the 143 totes and their status. Seventeen totes contain Radiological Low Level Waste water for shipping off-site; 45 are sampled with the analysis pending; 23 contain clean water, ready to be pumped to pond H-19; 58 are clean.

A major revision was made to WP 02-RC3110, *Low-Level and Mixed Low-Level Waste Characterization for Off-Site Release for Disposal*, procedure after the radiological event to include the radiological component to the characterization.

This criterion was met.

5. *WIPP has adequate facilities, and equipment is available to ensure that WM support and services are adequate for safe facility operation.*

An inspection walk-around with SEC personnel covered the various facilities and equipment available to support the non-TRU site-generated waste management program. No deficiencies were identified.

This criterion was met.

6. *AIB JONs related to WM were addressed through effective corrective actions for the WM SMP*.

Review of the AIB JONs and discussion with the SEC Manager revealed there are no JONs related to the SEC portion of WM.

This criterion was met.

CONCLUSION

The SEC portion of the WM program was reviewed and found to support environmental compliance and ensure safe accomplishment of work. The level of knowledge of the SEC staff is adequate based on interviews, supporting documentation, and observation of operational demonstrations.

This objective was met. There were no findings identified.

FINDINGS

Pre-Start
None

Post-Start
None

Assessed by:	Bill Webb **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

ASSESSMENT FORM
(FORM 1)

Functional Area: **Work Planning & Control**	Objective: WPC1 Date: 10/7/2016	OBJECTIVE MET	
		YES ☒	NO ☐

OBJECTIVE:

WPC1: Procedures and/or mechanisms are in place to ensure that work planning is integrated at the individual maintenance or activity level, fully analyzes hazards, and develops appropriate controls, and workers actively participate in the work planning process. (CR 1, 14)

CRITERIA

1. The scope of work is described in sufficient detail to allow the work planning process to identify hazards associated with the work and to develop necessary schedules, priorities, and work instructions.
2. Personnel involved in work planning activities have the appropriate technical and operational backgrounds and expertise, given the work to be performed and the hazards associated with the work. SMEs and system engineers are used where appropriate; workers are involved in hazard identification.
3. All hazards that could adversely impact workers, the public, the environment, the facility and its equipment are documented and analyzed for severity/significance. “What if” and error-likely scenarios are analyzed to determine if additional protective measures are appropriate. Walkdowns are used where appropriate to identify hazards associated with both the work tasks and the work environment. Over-reliance on automated JHA tools, permits, generic work documents, etc. is not used as a substitute for thorough hazard evaluation and analysis.
4. Appropriate controls are identified for all hazards associated with the work activity using a hierarchy of controls methodology that seeks to eliminate the hazards, reduce the level of hazards, and control the hazards, first through the use of engineered controls, then through administrative controls, and lastly through PPE. Unnecessary controls are avoided.
5. The work document clearly defines the work scope and boundaries, and is written in a clear, concise, and worker-friendly manner, with properly sequenced work steps and clearly identified hazard controls. Hazard controls are adequately designed and implemented to remain in effect as long as the hazards pose a health or safety threat. The work document includes necessary prerequisites, precautions, limitations, features, controls, warnings, cautions, notes, hold points, and independent verifications to ensure worker safety, protection of critical equipment, and continuity of operations. Appropriate SMEs and system engineers concur with the work document.
6. Procedures are in place that develops feedback and improvement information opportunities at the activity level (post-job review). The information developed through post-job review at the individual maintenance or activity level is utilized to provide feedback and improvement during future, similar, or related activities.

APPROACH

Records Reviewed

- 04-AD3030, R6, *Pre-Job Briefings and Post-Job Reviews*, 4/2015
- AIB JON 13.2, 13.3, 13.4, 13.7, 14.3, 15.1, and 15.2
- DOE/WIPP 07-3372, R5b, *Waste Isolation Pilot Plant Documented Safety Analysis*, 4/2016
- DOE/WIPP 07-3373, R5b, *Waste Isolation Pilot Plant Technical Safety Requirements*, 4/2016
- DOE/WIPP-06-3335, R4, *WIPP Nuclear Maintenance Management Plan*, 12/2015
- EA04AD3011-5-0, R0, *Lockout/Tagout Control Sheet*, 7/2015
- EA04AD3030-1-0, R2, *Pre-job Briefing Checklist*, 3/2016
- EA04AD3030-2-0, R0, *Post-job Review Checklist*, 2/2014
- EAWC3011-31-0, R0, *Work Status Log*, 4/2014
- MP 1.28, R9, *Integrated Safety Management*, 12/2015
- *T-0 Daily Scheduled Work/Daily Release* (10/4/16 through 10/7/16)
- *T-1 Weekly Lock In*, 10/3/16 – 10/9/16; 10/10/16 – 10/16/16
- *WIPP POD*, 9/29/2016 – 10/5/2016
- WO 1618719, *In Service Inspection of WIPP Design Feature-Waste Hoist Support Structure*, performed 5/26/16
- WO1618715, *In Service Inspection of WIPP Design Feature-Panel 6 and Panel 7 room 7 Bulkheads*, performed 5/25/2016
- WO1618716, *In Service Inspection of WIPP Design Feature-FCLR, CUR and Transfer Cell Shielding*, performed 5/26/2016
- WO1618717, *In Service Inspection of WIPP Design Feature-Remote Handling (RH) Facility Cask/WIPP Site*, performed 5/25/2016
- WO1618718, *In Service Inspection of WIPP Design Feature-Underground Fuel and Storage Locations*, performed 5/25/16
- WO1618720, *In Service Inspection of WIPP Design Feature-Facility Pallets for CH Waste 52-Z-002 series*, performed 5/25/16
- WO1618721, *In Service Inspection of WIPP Design Feature-Type B Shipping Package RH 72B, TRUPACT-III, TRUPACT-II, HalfPACT*, performed 5/25/16
- WO1618722, *In Service Inspection of WIPP Design Feature-Waste Handling Building (WHB)*, performed 5/25/2016
- WO1623537, *PM Waste Handling Hoist Lilly Controller Weekly Inspection and Maintenance*, performed 10/4/2016
- WO1623560, *PM Underground Exhaust Fan 41-B-860A, B & C*, scheduled for 10/7/2016
- WO1623668, *PM Diesel Generator Load Bank*, performed 10/9/2016
- WO1626803, *PM Fletcher Roof Bolters Inspection and Maintenance*, performed 10/11/2016
- WO1626889, *PM Stationary iCam Alpha/Beta Air Monitor Calibration*, performed 10/5/2016

- WO1626891, *PM Filter Units 41-B-856 and 41-B-857 Mod and High Filter Differential Pressure Loop Calibrations*, performed 10/6/2016
- WP04-AD.02, R5, *Technical Safety Requirements Surveillance Program*, 5/2016
- WP10-WC3010, R29, *Periodic Maintenance Administration and Controlled Document Processing*, 5/2016
- WP10-WC3010, R29, *PM Administration and Controlled Document*, 5/2016
- WP10-WC3011, R37, *Work Control Process*, 5/2016
- WP10-WC3012, R1, *Work Control Document Writer's Guide*, 9/2014
- WP10-WC3013, R1, *Work Control Document User's Guide*, 9/2016
- WP10-WC3015, R1, *Scheduling and Work Authorization*, 3/2015
- WP10-WC3017, R1, *Post-Maintenance Testing*, 9/2014
- WP10-WC3018, R4, *Skill of the Craft/Skill of the Worker*, 4/2015
- WP12-HP3201, R2-FRI, *Radioactive Source Accountability and Control*, 9/2016
- WP12-IS3002, R14, *Job Hazard Analysis Performance and Development*, 3/2016

Interviews Conducted

- Deputy Maintenance Manager
- Maintenance Foreman (2)
- Maintenance Manager
- Maintenance Supervisor (2)
- Maintenance Workers (11)
- PM Planning and Administration Manager
- Underground Maintenance Supervisor
- Underground Planning Manager
- Work Control Manager
- Work Control Manager
- Work Package Planner (3)
- Work Package Scheduler
- Work Planning and Prioritization Manager

Evolutions/Operations Witnessed

- T-0 Meeting 10/4/16
- T-0 Meeting 10/6/16
- IC041071 Waste Hoist Tower Differential Pressure Transmitter 411-PDIT-060-01 and Loop 41F06001 Planning and JHA Walkdown, 10/6/16
- Post-job Review for performance of IC411042, 10/5/16
- Post-job Review for performance of IC041001, 10/6/16
- Post-job Review for performance of PM025088, 10/9/16

DISCUSSION OF RESULTS

1. *The scope of work is described in sufficient detail to allow the work planning process to identify hazards associated with the work and to develop necessary schedules, priorities, and work instructions.*

The scope of work is described in sufficient detail to allow the work planning process to identify hazards associated with the work and to develop necessary schedules, priorities, and work instructions. This was demonstrated through the review of Action Requests used for the identification of new work activities, and the subsequent work requests and work orders that the actioned Action Requests become. All new work is screened by the facility during a new work screening meeting, where the scope is evaluated to determine the work package type. If the scope does not contain sufficient detail, the requester is contacted to provide additional detail. If an appropriate detail level is still not obtained, a scoping walkdown will be performed to define and bound the scope clearly so that appropriate task level instructions can be developed (based on work type) and an activity level hazard analysis can be performed, as needed. Additional review of both developed and completed work packages also indicate that activity scope is clearly defined and bounded. Scheduling of work activities is performed as described in 10-WC3015, *Scheduling and Work Authorization*.

This criterion was met.

2. *Personnel involved in work planning activities have the appropriate technical and operational backgrounds and expertise, given the work to be performed and the hazards associated with the work. SMEs and system engineers are used where appropriate; workers are involved in hazard identification.*

Personnel involved in work planning activities have the appropriate technical and operational backgrounds and expertise, given the work to be performed and the hazards associated with the work; SMEs and system engineers are used where appropriate; workers are involved in hazard identification. This was demonstrated through interviews, evaluation of qualification cards (for select positions), and observations of work activities. The WIPP work control organization has a mixture of seasoned staff, with extremely high levels of proficiency, and newer individuals who have come from other organizations or sites; all have a high degree of technical capability and expertise. Mixing best practices from multiple sites will yield a better final product for the WIPP work planning and control organization. The use of SMEs and system engineers is an option often exercised in resolving technical issues, such as the obsolescence of parts used for replacement during repairs (corrective maintenance work package development). Workers are involved in all planning and hazard identification activities during maintenance planning.

This criterion was met.

3. *All hazards that could adversely impact workers, the public, the environment, the facility and its equipment are documented and analyzed for severity/significance. "What if" and error-likely scenarios are analyzed to determine if additional protective measures are appropriate. Walkdowns are used where appropriate to identify hazards associated with both the work*

tasks and the work environment. Over-reliance on automated JHA tools, permits, generic work documents, etc. is not used as a substitute for thorough hazard evaluation and analysis.

Procedures 10-WC3011, *Work Control Process*, and WP12-IS3002, *Job Hazard Analysis Performance and Development*, work together to define the hazard identification and analysis processes at WIPP. Observation of planning and hazard identification activities, as well as interviews with the disciplines involved, demonstrated that the level of rigor applied to the process has improved significantly in the last several years, with a greater level of ownership taken by both the maintenance and work control organizations. The maintenance group who will be performing the work now has the lead in identifying activity level hazards based on their work tasks as they would perform them, supported by their first line manager and other SMEs as appropriate for the task. The planning group creates the first draft, often based on their planning walkdown, but group discussion and consensus derive hazards identified in the output document. Analysis and mitigation or protective measures are suggested by the planner, but often the craft personnel provide more worker-friendly alternatives to reduce or eliminate the hazards. What-if scenarios are discussed and, at the pre-job briefing before every field activity, the maintenance craft is asked to follow the two-minute rule to take two minutes to evaluate the job location to ensure there are no unevaluated hazards or unsafe conditions prior to beginning work. Additional "activity introduced" hazards and protective measures were frequently mentioned during this process and were added to the JHA prior to going to the field. The current process records the change after the work activity is completed at the post-job review.

WPC1-POST-1: Contrary to 10 CFR 851 Section 22 and WP12-IS3002, R14, *Job Hazard Analysis Performance and Development*, additional activity introduced hazards and protective measures were frequently added to the Job Hazard Analysis (JHA) without an approved revision of the JHA.

10 CFR 851, section 22 states, "For hazards identified…during the development of procedures, controls must be incorporated in the appropriate facility design or procedure." WIPP procedure 12-IS3002 requires that all JHA revisions require the approval signature of all pertinent SMEs (with a safety review and signature at a minimum) on the revised JHA prior to use. WIPP Form WF16-1802 was generated to track this issue to closure.

This criterion was **not** met.

4. *Appropriate controls are identified for all hazards associated with the work activity using a hierarchy of controls methodology that seeks to eliminate the hazards, reduce the level of hazards, and control the hazards, first through the use of engineered controls, then through administrative controls, and lastly through PPE. Unnecessary controls are avoided.*

Through observation of pre-job briefings, planning walkdowns, interviews and observation of work activities, it was determined that the use of hierarchy of controls is taken into consideration when selecting compensatory actions, but PPE and administrative controls are the primary and secondary control for hazards. Unnecessary controls are avoided. However, there were some

instances observed where unnecessary controls were observed in the technical work document, and some instances where there were no controls identified for an observed hazard. For example:

- STD JHA 856, R1, expiration date 10/21/17: "Chemical use/Safety" is checked "No," but the PM includes multiple fluids including the potential for battery acid.
- STD JHA 807, R3, expiration date 9/25/17: The JHA addresses guard removal. The procedure only checks that the guard is installed and does not allow removal.
- STD JHA 1014, R0, expiration date 11/19/17: "Chemical use/Safety" is checked "No," but the PM includes multiple fluids including the potential for battery acid.
- "Heat Stress" is marked "No." The Toyotas may be used in a CA or and HCA, requiring PPE up to double PCs and a PAPR. The heat stress block specifically refers to "task specific required PPE use." The JHA does acknowledge the radiological conditions.

The WIPP Form generated for the JHA finding will address these issues as well.

This criterion was met.

5. *The work document clearly defines the work scope and boundaries, and is written in a clear, concise, and worker-friendly manner, with properly sequenced work steps and clearly identified hazard controls. Hazard controls are adequately designed and implemented to remain in effect as long as the hazards pose a health or safety threat. The work document includes necessary prerequisites, precautions, limitations, features, controls, warnings, cautions, notes, hold points, and independent verifications to ensure worker safety, protection of critical equipment, and continuity of operations. Appropriate SMEs and system engineers concur with the work document.*

This was demonstrated by the evaluation of numerous work packages in various stages of completion and through observation of the performance of work in the field. Generally, technical work documents, or work instructions contain clearly defined and bounded scope. Planning walkdowns include craft personnel and their first line managers, so the planner is given input as to how the craft want to see the package written. Hazard identification and control determination also have more craft input, resulting in a better final product. The use of prerequisites, precautions, and warnings are used appropriately. Packages are approved by the appropriate SMEs. However, some minor issues were still observed.

During the performance of IC041001, *Filter Units 41-B-856 and 41-B-857 Mod and High Filter Differential Pressure Loop Calibrations*, the craft identified an inconsequential error in the work instructions. The equipment number in the technical work document did not match the bake-lite tag installed on the component in the field. The tag in the field contained an additional zero, which was determined to be inconsequential and was corrected prior to starting work.

During the performance of PM025088, it was identified that several steps could be performed concurrently. This information was captured at the post-job review to provide to the planner.

During the performance of IC411042, *Stationary I-Cam Alpha/Beta Air Monitor Calibration*, the procedure identified that the monitor display units could be either CFM or l/min. The unit had to be placed in the l/min scale in order to achieve the appropriate level of accuracy during the

calibration. This information was captured in the post-job review to provide feedback to the planner. WIPP Form WF16-1837 was generated to address this issue.

It was also noted that procedure format in some instances was inconsistent. PM074123, *Fletcher Roof Bolters Inspection and Maintenance*, has data collection sheets only after the work instructions; IC041071, *Waste Hoist Tower Differential Pressure Transmitter 411-PDIT-060-01 and Loop 41F06001*, has sign off step embedded in the work instructions performance section with a data collection, sign off sheets in the back of the procedure, and a personnel data page. IC411042, *Stationary I-Cam Alpha/Beta Air Monitor Calibration*, has the personnel data block embedded in the data collection pages and no sign off sheets. The Work Control Manager stated that they have initiated an effort to standardize format for work control documents, but it will be implemented slowly as each document (PM) comes up for its periodic review. WIPP Form WF16-1823 was generated to track this issue.

This criterion was met.

6. *Procedures are in place that develops feedback and improvement information opportunities at the activity level (post-job review). The information developed through post-job review at the individual maintenance or activity level is utilized to provide feedback and improvement during future, similar, or related activities.*

This was demonstrated through the use of procedure 04-AD3030, *Pre-Job Briefings and Post-Job Reviews*. This procedure provides a graded approach for performing post-job reviews at the completion of any work activity to discuss as a group what went well, as well as what areas for improvement exist, and to discuss any unexpected conditions or results observed during the performance of the task. Post-job reviews were performed for all but one maintenance task observed, and good information relating to work package performance steps, step sequencing, steps that could be performed concurrently, and additions to the tools and equipment section of the work instructions were all observed. The supervisors conducting the post-job reviews all used the post-job review checklist, and workers were engaged in identifying lessons learned to improve the work instructions and JHA improvement suggestions for future performance of the activity.

This criterion was met.

CONCLUSION

The work control program at WIPP continues to improve the integration of the identification and analysis of hazards and controls at the activity level. Maintenance work group participation in the process results in improved teaming, an improved safety culture, and a safer work environment. Technical work document formats, while not perfect, show significant improvement. This reduces the likelihood for human performance errors. However, while improvement was observed, there are still issues that require attention.

This objective was met. There was one finding identified.

FINDINGS

Pre-Start
None

Post-Start
WPC1-POST-1: Contrary to 10 CFR 851 Section 22 and WP12-IS3002, R14, *Job Hazard Analysis Performance and Development*, additional activity introduced hazards and protective measures were frequently added to the Job Hazard Analysis (JHA) without an approved revision of the JHA.

Assessed by:	Bonnie Barnes **CORR Team Member**	**Approved by**:	Frank McCoy **CORR Team Leader**

Appendix 2: Review Team Biographies

FRANK R. MCCOY (TEAM LEADER)

Mr. McCoy has over 45 years of experience in the operation, regulation, and management of Department of Energy (DOE), commercial, and naval nuclear facilities including power and production reactors, chemical processing facilities, and laboratories. This experience has included management and senior executive positions with DOE, Department of Navy, and the U.S. Nuclear Regulatory Commission (NRC), as well as private sector companies. Currently Mr. McCoy is the Chief Nuclear Safety Officer with URS Professional Solutions. In this capacity, he provides technical and programmatic leadership for nuclear safety programs and initiatives, and advises and provides nuclear safety oversight services for URS affiliate projects and operations. He also serves as the Senior Advisor for the URS multi-site Nuclear Safety Functional Area Coordination Team (FACT), serves as the Chair for the URS multi-site Performance Assurance FACT, and is leading a working group to improve Emergency Preparedness across the corporation. Mr. McCoy frequently interacts with regulatory and oversight bodies including the NRC, DOE and NNSA-Headquarters, and the Defense Nuclear Facilities Safety Board (DNFSB) in the US; Department of Natural Resources and Canadian Nuclear Safety Commission in Canada; and the Nuclear Decommissioning Authority and Office of Nuclear Regulation in the United Kingdom (UK).

Over the past 14 years, Mr. McCoy has personally supported many national and international government sites and laboratories in the areas of safety review; incident and accident investigation; and safety culture and Safety Conscious Work Environment consultation and evaluation. He has also provided consultation and assessment services in the areas of high hazard facility management and operations; Integrated Safety Management (ISM), Environment Safety and Health (ESH), nuclear safety authorization basis development and implementation, activity level work planning and control, Operational Readiness, and SMP implementation including engineering, maintenance, radiological protection, quality assurance, chemical safety, environmental protection, EM, waste management and decommissioning. Mr. McCoy also recently led the successful corporate improvement initiatives to 1) develop and implement a URS Corporate Work Planning and Control Standard for activity level work planning and control and 2) develop and implement protocols and practices for improved Corporate Governance of AECOM affiliate sites and projects.

Mr. McCoy has served on third party independent review committees at DOE's Hanford Reservation, Brookhaven National Laboratory, West Valley Demonstration Project, Savannah River Site, and Los Alamos National Laboratory. He also has led Operational Readiness Reviews for nuclear facility startups – recently including those for the Los Alamos National Laboratory Plutonium Pit Machining and Pit Flow Sheet Operations (Readiness Assessments), Idaho Cleanup Project Integrated Waste Treatment Unit Startup (ORR), Oak Ridge National Laboratory High Flux Isotope Reactor Startup, the Brookhaven National Laboratory High Flux Beam Reactor Decommissioning, the Hanford River Corridor Project Building 324 Stabilization (Readiness Assessment) and the Separations Process Research Unit (SPRU) Intrusive Decontamination and Decommissioning Resumption (Readiness Evaluation) – and has led Contractor Integrated Safety Management (ISM) Verifications – recently including those for

Idaho National Laboratory and Idaho Cleanup Project, Lawrence Livermore National Laboratory, Hanford Tank Operations Project and Hanford River Corridor Project. Additionally, he served as the Senior Advisor for the Savannah River Liquid Waste Operations and the Hanford Mission Support Operations Contractor ISM Verifications and the Contractor Readiness Assessment for startup of the Integrated Waste Treatment Unit following the June 2012 pressurization event.

From 2008 – 2012, Mr. McCoy was involved in international nuclear consultation in Canada and the UK. He led independent program and project reviews for the Canadian Government and Canada's Crown Corporation, Atomic Energy Canada Limited (AECL). These reviews included independent 3rd party reviews of the $2 billion investment and infrastructure needs at Chalk River Laboratories; independent 3rd party reviews of the appropriateness of actions, projects, and programs established to assure reliable medical isotope production in Canada with the National Research Universal Reactor; and program and project reviews of the multi-billion dollar Canadian Nuclear Legacy Liabilities Program. He also provided consultation, support, and assistance to executive management with Sellafield Limited in the United Kingdom in the areas of nuclear safety improvement, performance assurance, incident investigation, and corrective action management.

Before retiring from government service and joining URS Professional Solutions, Mr. McCoy was a senior executive for the DOE where his last assignment was serving as the Deputy Manager at the Savannah River Site. He also served as a Special Assistant to the Under Secretary of Energy where he (1) led DOE's successful effort to establish and implement an Integrated Safety Management System across the DOE complex and (2) led the United States delegation of nuclear safety experts to Japan in order to provide assistance to the Japanese government regarding the nuclear criticality accident at the Tokaimura uranium processing facility. Prior to joining DOE, Mr. McCoy held management positions at the NRC and Department of Navy.

Mr. McCoy earned a Bachelor of Science degree from The Citadel and a Master of Science degree in Physics from the Georgia Institute of Technology. He is a recipient of the Meritorious Executive Presidential Rank Award, two Secretary of Energy Awards, several DOE Exceptional Service Awards, and many other special act and service awards.

BONNIE BARNES (MAINTENANCE / WORK PLANNING & CONTROL)

Ms. Barnes received a Bachelor of Science degree in Pathobiology from the University of Connecticut in 1981, and an Associate of Science degree in Nuclear Engineering Technology from Aiken Technical College in 1991. She has been employed by AECOM [WSRC, WTS, SRR LLC and AECOM-TS (SPRU-DP)] for 26+ years with her most recent assignment at Separations Process Research Unit (SPRU) Disposition Project where she is the Quality Assurance and Performance Assurance Manager. Prior to her current assignment Ms. Barnes held positions as the Work Management Manager for Savannah River Remediation LLC with Functional Area Responsibility for Maintenance and Work Control, and the Work Management Manager at the WIPP where she participated as a core contributor in the development of the AECOM Work Planning and Control Standard and helped develop the Energy Facilities Operations Contractor Group (EFCOG) Work Planning and Control

Handbook, which served as the model for the DOE Work Planning and Control Guide. Prior to her assignment at the WIPP, Ms. Barnes worked at the Savannah River site, where she held positions as the Manager of the Fire Systems Testing and Maintenance group, Transportation Operations Manager and Operations Evaluation Department (OED) Lead Evaluator participating in numerous Independent Nuclear Facility Assessments, Readiness Assessments, Operational Readiness Reviews, and Due Diligence Reviews. Prior to working for OED, Ms. Barnes held positions as the Deputy Operations Manager for Outside Facilities in H-Completion, Work Management Center Manager for H-Completion, and served as the HB-Line and H-Canyon Deputy Maintenance Manager. Additionally, she has held a variety of other assignments in Liquid Waste and Reactors.

JEFF BUCZEK (FIRE PROTECTION / SAFETY BASIS)

Mr. Buczek has over 28 years of experience in the operation, regulation, and management of Department of Energy (DOE), and commercial facilities including power and production reactors, chemical processing facilities, and laboratories. Mr. Buczek has held positions as Licensing and Nuclear Safety Manager, Senior Engineer, Assistant Project Manager, Task Leader, and Design Engineer. He is experienced in licensing, accident analyses, safety analysis documentation, reactor engineering, systems engineering, start-up, commissioning, projects, operations, procedures and restart efforts. Mr. Buczek assisted with the Savannah River Site reactor restart, outage, and shutdown efforts, where he was responsible for the development of operations procedures, safety analyses, safety documentation, and other safety support functions. Most recently, Mr. Buczek assisted on the One System team at the DOE Hanford Site for the Tank Operations Contractor managing the efforts to develop consistent engineering programs and programmatic elements, and supporting the efforts to develop consistent nuclear safety programs and safety basis documents for both the TOC facilities and the WTP facilities.

As a licensing and safety analysis engineer and manager, Mr. Buczek assisted on or managed numerous project such as: Nuclear Safety Manager for DUF6 Conversion Facilities DSA, TSRs, PDSA, Construction, Commissioning, ORR Cycle and Startup Testing and Cylinder Yards DSA and TSRs; Nuclear Safety Manager for a support contractor on the Yucca Mountain Project License Application and design effort; Lead Analyst for the Mixed Oxide Fuel Fabrication Facility Integrated Safety Analysis; Engineering and Project Management Support Manager for International Tokamak Experimental Reactor, Tokamak Cooling Water System design and fabrication project; team member on the Palisades FSAR verification effort, Lawrence Livermore National Laboratory SARs, SRS Receiving Basin for Offsite Fuels SAR, SRS Tank Farm SAR and TSRs development and implementation, SRS Tank Farm Waste Removal efforts, Oak Ridge Y 12 Enriched Uranium Operations OSR implementation and accident analyses, and Spent Nuclear Fuel data collection at SRS. Mr. Buczek assisted with the Savannah River Site reactor restart, outage, and shutdown efforts, where he was responsible for the development of operations procedures, safety analyses, safety documentation, and other safety support functions.

At Tennessee Valley Authority, he developed various core loading patterns, reviewed the Sequoyah Nuclear Plant FSAR sections involving fuel, and performed reactor engineer duties at Sequoyah Nuclear Plant during a refueling outage and full power operations.

Mr. Buczek earned a Bachelor's of Science degree and Masters of Science degree in Nuclear Engineering from the University of Tennessee in Knoxville.

MELTON (SAM) GLENN, JR. (MAINTENANCE / OPERATIONS)

Mr. Glenn has more than 34 years of experience in technical and strategic management of nuclear operations and large projects including: design, project management, risk evaluation and mitigation, budgeting, construction, and startup/testing. He has successfully served in diverse leadership roles for the US Navy, Department of Energy (DOE), and the National Nuclear Security Administration (NNSA): Manager of engineering and training organizations; senior technical advisor to the DOE Savannah River Site Manager; Manager of a project management, engineering, and construction oversight organization for a multi-billion-dollar nuclear fuel cycle facility. Mr. Glenn has detailed knowledge of DOE and NRC regulatory and licensing regimes and has significant experience resolving issues with both NRC and Defense Nuclear Facility Safety Board staffs.

Mr. Glenn has served on numerous Operational Readiness Review (ORR) and Readiness Assessment teams including teams for ORRs at the Waste Isolation Pilot Plant in New Mexico, the West Valley Demonstration Project in New York, and smaller projects at Savannah River and other DOE sites. He has served as a team member on Readiness Assessments at the Savannah River Site and Los Alamos National Laboratory.

Mr. Glenn was the Director, MOX Project Management Office, and Acting Deputy Federal Project Director, for the MOX Fuel Fabrication Facility, a $5 billion facility to manufacture fuel for US commercial power reactors from surplus weapons plutonium. In that role he managed oversight of construction, testing, design, procurement, project management, and contracting. Mr. Glenn was the Division lead for NRC licensing activities and preparations for testing/operations.

From 1995 to 1998 Mr. Glenn was the Technical Assistant to the Manager, DOE Savannah River Operations Office. He independently evaluated Savannah River Site operations, technical and administrative issues and recommend solutions to the site Manager. Mr. Glenn observed facility operations and evaluated projects to provide the Manager with an independent assessment of operations, status, and conditions.

During completion of construction and testing, Mr. Glenn was the DOE Program Manager for the Defense Waste Processing Facility, a $2.4 billion facility to vitrify liquid high level radioactive waste stored at the site.

Before joining DOE Mr. Glenn managed/supervised operation of the US Navy's schools for Radiological Controls Officers and Radiological Control Monitors in Charleston, SC. He supervised Health Physicist and technicians who trained Navy enlisted personnel and officers in radiological controls prior to their being assigned to Navy maintenance commands.

Mr. Glenn earned a Bachelor of Science degree in Mechanical Engineering from Clemson University. He is a recipient of the NNSA Administrator's Gold Medal, and DOE Distinguished Career Service Award.

PAUL GUBANC (CONFIGURATION MANAGEMENT)

Mr. Gubanc has over 34 years of experience in all facets of nuclear safety, operations, and introducing business improvements. His specific skills include Interpersonal and Organizational Leadership and Communications, Business Management, Team Building, Program & Project Management, Conduct of Nuclear Operations, Engineering, Emergency Preparedness, Integrated Safety and Safeguards & Security Management (ISM/ISSM), Nuclear Quality, Operational Readiness, and Training. Mr. Gubanc worked for 3 years at the United Kingdom's Sellafield Nuclear Site organizing, managing, and delivering a comprehensive, integrated set of performance improvement initiatives. While at Sellafield, Mr. Gubanc also served as a nuclear safety expert on a WANO Technical Support Mission, a Sellafield Board of Inquiry, a post-Fukushima response steering group, and a corporate Nuclear Safety Council.

While serving as a senior consultant, Mr. Gubanc delivered a variety of assignments including the following:

- Leading an Integrated Safety Management Phase-2 verification review for a high-level radioactive waste tank farm's operating contractor
- Leading a readiness review for demolition of a graphite research reactor
- Serving on a five-expert team evaluation of recurring nuclear quality issues at one of DOE's largest nuclear facility construction projects (2009)
- Validating and improving the application and implementation of engineered safety controls at multiple DOE nuclear sites in Oak Ridge, Tennessee
- Conducting root-cause analyses and improvement determinations for issues at a high-level radioactive waste processing facility

Prior to joining AECOM, Mr. Gubanc worked at the Oak Ridge National Laboratory (ORNL) for 7 years (2002–2009) in a variety of capacities, including Operations Manager for the National Security Directorate, Director of ORNL's Laboratory Protection Division, and Deputy Director for the Non-Reactor Nuclear Facilities Division. Highlights of his ORNL accomplishments include formation of a new division responsible for operating 10 nuclear facilities, achieving ORNL's initial compliance with 10 CFR 380 Subpart B, successfully delivering post-9/11 security requirements, and successfully reconstituting ORNL's event investigation program.

Prior to his service with ORNL, Mr. Gubanc spent 11 years with the U.S. Defense Nuclear Facilities Safety Board (1991–2002), where he served both as a Senior Program Manager (Washington, DC) and Site Representative (Hanford Site, Washington; and Oak Ridge Site, Tennessee). Mr. Gubanc also served as a detailee to the Assistant Secretary of Energy for Environmental Management to lead a nuclear safety implementation study. Mr. Gubanc has 8 years' experience working with the U.S. Naval Nuclear Propulsion Program, where he served as a Nuclear Engineer and a Group Leader for five land-based prototype reactor plants. Mr. Gubanc is a graduate of the Massachusetts Institute of Technology (MS and BS, Chemical Engineering), the Bettis Reactor Engineering School (MS, Nuclear Engineering equivalent) and the University

of Tennessee (MBA). Mr. Gubanc is a Licensed Professional Engineer in the Commonwealth of Virginia, is a Certified Safety Professional with the Board of Certified Safety Professionals (BCSP), and is a certified Project Management Professional with the Project Management Institute.

DEBORAH HOJEM (MANAGEMENT)

Ms. Hojem has over 40 years of experience in leading both technical and operations & maintenance organizations. She has extensive experience in the Department of Energy complex, in both the nuclear and fossil energy arenas. As Operations Director for AECOM, Ms. Hojem provided technical expertise for AECOM operations and maintenance, engineering, and project management initiatives; and serves as AECOM representative on the Parent Organization Oversight Committee for the Nevada National Security Site contract. Ms. Hojem served as NSTec Deputy Director of Operations & Infrastructure at the Nevada National Security Site during transition to new leadership. She has participated in numerous conduct of operations reviews, readiness assessments, operational readiness reviews, and OSHA and DOE VPP pursuits. Ms. Hojem previously served as Operations & Maintenance Director for DOE's Strategic Petroleum Reserve (SPR), where she led a team of 350 personnel responsible for operations and maintenance of four SPR sites. Ms. Hojem managed all operations planning, maintenance execution, cavern operations, Presidentially ordered drawdown and exchange activities, operations planning, crude oil acquisitions and sales, logistics, utility operations, and energy and database management. Her team executed the SPR fill plan to 727 MMB, filling the reserve to capacity for the first time. Ms. Hojem served as Incident Commander during Hurricanes Ike and Gustav, directing all continuity of operations functions. She also served as Engineering Director, managing all design, mechanical, electrical, civil, and control systems engineering functions for the SPR. Ms. Hojem received an Engineering Sciences degree from Tulane University, CMII Certification from Arizona State University, and is a NIMS-Qualified Incident Commander.

FOREST HOLMES (EMERGENCY PREPAREDNESS)

Mr. Holmes served in the US Navy from 1976 until 1985. During his years of service he achieved qualifications as Machinist Mate 1st Class Petty Officer. In 1978, he completed Naval Nuclear Power School, Prototype training, and Engineering Laboratory Technician (ELT) training before assignment to the USS Henry L. Stimson. In 1981, he was selected for assignment as a prototype instructor at NPTU Idaho Falls. He served as a leading ELT and quality assurance inspector in addition to Engineering Officer of the Watch and Engineering Watch Supervisor duties.

In 1985, Mr. Holmes received an honorable discharge from the US Navy and began a career in health physics at EG&G Idaho. His assignments included the Power Burst Facility for severe fuel damage testing, the Advanced Test Reactor (ATR) for a core internals change (CIC). His non-reactor assignments included the Radioactive Waste Management Complex where he supports transuranic waste handling operations and subsurface investigation activities and radiological engineering. In 1988, Mr. Holmes was asked to take over implementation of the emergency preparedness program implementation efforts for EG&G Idaho. Since that time, he

has participated in several internal the Idaho National Laboratory (INL) facility readiness reviews and several facility readiness reviews for non-INL facilities. He participated in supporting the Federal Emergency Management Agency in evaluating emergency management programs at several state and local agencies in support of the radiological emergency preparedness program.

Following his FEMA assignments, Mr. Holmes was assigned to the ATR as the lead emergency management planner for the ATR. In addition to his duties at the INL, he also serves on the steering committee for the Department of Energy (DOE) Emergency Management Issues Special Interest Group (EMISIG). During his tenure at the INL, Mr. Holmes has completed university courses in environment safety & health and emergency management related areas of study. He also supports the current INL contractor as a resource in completing evaluations of emergency management activities at other non-INL facilities, most recently the Waste Isolation Pilot Plant in 2014 and 2016.

RUSSELL HULVEY (MANAGEMENT / PROCEDURES MANAGEMENT)

Mr. Hulvey is the Facility Readiness Manager and Lead for the Hanford Waste Treatment Plant's Analytical Laboratory. He has effectively and safely managed and led operations and maintenance programs at various DOE and US Navy nuclear facilities including reactors, processing plants, and fuel fabrication facilities. He has been responsible for coordinating corrective action management programs and for leading large corrective action implementation plans; he has maintained and managed changes to FSARs, DSA, TSRs and ABs. Mr. Hulvey has experience in facilitating and assessing the implementation of federal and corporate policies and procedures and operations related activities at nuclear facilities within the DOE Complex.

Mr. Hulvey is versed in providing verbal and written reports, along with formal presentations on a regular basis to all levels of management and stakeholders. He has experience in and is adept at leading, conducting, and coordinating meetings, along with performing management observations and assessments as scheduled.

Mr. Hulvey's technical training and operational experience began in the US Navy's Nuclear Power Program (nine years) and has continued for more than 30 years with added technical and professional experience and training in the nuclear industry.

Mr. Hulvey is fully experienced in and capable to provide technical support on nuclear projects and operations, providing the needed field presence and leadership to complete assigned tasks on schedule and on budget in a safe manner. His background and qualifications include:

- Progressive experience in the nuclear industry (mainly at Hanford), including 20-plus years of DOE nuclear facility (Hazard Category 2 and 3) experience at Hanford involving operations, surveillance and maintenance, project management and planning, and health physics.
- Mid- to senior-level project management, operations, and maintenance—including 4 years of project management on a large remediation and soil and groundwater projects—along with working-level involvement in engineering, construction, safety and radiological controls, and risk management.

- More than 20 years of experience in project management and management assessment programs, including Price-Anderson Amendments Act, corrective action management, and performance monitoring.
- A significant number of years' experience in the nuclear field (military, commercial, or government) with extensive and detailed knowledge in all aspects of site facilities activities including conduct of operations, radiological controls, nuclear safety, training, and maintenance support.
- Extensive knowledge and experience in the planning, leading, and conducting readiness activities at DOE sites. Most recently the startup of decommissioning and demolition of laboratories and support facilities at the LBNL, Berkeley, CA Old Town site.
- In-depth knowledge and experience with DOE regulations, orders, and standards related to nuclear operations, health, and safety.
- Nine years of experience in the U.S. Navy Nuclear Power Program. Qualified Engineering Watch Supervisor and Lead Engineering Laboratory Technician.

MICHAEL HUYCK (MAINTENANCE / OPERATIONS)

Mr. Huyck is a Waste Treatment Plant (Hanford) Facility Readiness Manager who has over thirty years of experience operating and managing high risk nuclear and non-nuclear facilities and activities in the United States and Canada, including line management of multiple nuclear, radiological, and non-nuclear facilities such as the Advanced Test Reactor (ATR), two mothballed reactors, "brownfield" construction of a tritium research facility, radiochemical/nuclear laboratories, hot cell facilities, dry storage of irradiated fuels and specimens, utilities, and several canals of spent fuel. His certifications and qualifications have included fissile material handler supervisor, senior reactor operator, shift manager, nuclear facility manager, independent safety review committee (ISRC) chairman, ALARA chairman, senior supervisory watch, and multiple emergency response organization positions (including operations manager and emergency action manager). He served as the last ATR Core Internals Change-out Manager; the production manager for the Idaho Cleanup Project's (ICP) spent nuclear fuels organization; and the chair of the ISRC for ICP's Waste Management group. He has served as a SME for readiness assurance and human performance. Huyck served over eight years in the military as a radar technician on F-4 Phantom fighter planes and in the Naval Nuclear Propulsion Program as an Electrician's Mate. He has a BS in industrial and computer electronics and an MS in human performance and accident investigation.

JERRY KURTZ (RADIATION PROTECTION)

Mr. Kurtz is currently the Radiological Engineering Manager for Washington River Protection Solutions and holds a BS in Technology from Excelsior college. Mr. Kurtz has 34 years of combined experience in operations and radiological control. Over the years, Mr. Kurtz has held positions in Navy reactor operations, DOE Radiological Control operations, radiological control training, dosimetry, radiological instrumentation, and various management positions. Mr. Kurtz maintains Diplomate status with the American Academy of Health Physics (CHP), certified Associate Safety Professional (ASP) through the Board of Certified Safety Professionals, and registration with the National Registry of Radiation Protection Technologists (NRRPT).

CHERYL LUCAS (ES&H / HAZARDOUS MATERIAL PROTECTION / INDUSTRIAL HYGIENE)

Ms. Lucas is certified by the American Board of Industrial Hygiene as a Certified Industrial Hygienist, and has over thirty years of experience in Occupational Safety and Health including operational support, assessments, regulatory compliance, causal analysis, and program development and implementation. Ms. Lucas has worked as a consultant; in private industry; at Sandia National Laboratory (SNL), and most recently at Los Alamos National Laboratory (LANL).

Early in her career, Ms. Lucas planned and conducted industrial hygiene/epidemiologic investigations in various industries through-out the United States (US) which included the preparation of over 20 U.S. Public Health Service, Health Hazard Evaluation Reports. In private industry, she developed and managed a variety of Plant Occupational Safety and Health Programs for General Electrical Company. As a consultant, Ms. Lucas served as the Health and Safety Officer for a large superfund contract involving the clean-up of several hazardous waste sites in the Northeastern part of the US. While at SNL, Ms. Lucas served as a field industrial hygienist with program development and implementation responsibilities.

During her 15 plus year career at LANL, Ms. Lucas served in a variety of roles that included; (1) providing Environmental, Safety, and Health support to line organizations; (2) developing and implementing LANL assessment policy and procedures; (3) leading and conducted institutional Lab-wide assessments in several functional areas (e.g., safety, integrated work management, occupational medicine, chemical management, environmental management, quality, radiation protection, conduct of operations, exposure assessment, subcontractor safety) including Facility Center Assessments and Extent-of -Condition Reviews; (4) identifying, reporting, and assisting with the correction of PAAA noncompliances to quality, safety basis, and worker safety and health (WSH) regulations; (5) interfacing with the Department of Energy Office of Enforcement to provide information and coordinate PAAA enforcement actions and investigations; (6) managing and tracking Noncompliance Tracking System (NTS) corrective actions; (7) performing causal analyses and corrective action development for assessment findings across several functional areas (e.g., safety basis, engineering, fire protection, Quality); and (8) serving as a worker safety and health team member on several contractor readiness assessments (CRAs) at the WIPP Nuclear Facility.

MICHAEL MONTINI (ES&H / QUALITY ASSURANCE)

Mr. Montini has over 35 years as a professional and manager with experience in Occupational Safety, Quality Assurance, Integrated Safety Management (ISM), Conduct of Operations, Operational Readiness Reviews, engineering, project management, operations, environmental, facility startup, and nuclear and chemical safety documentation development and implementation and is currently the URS Professional Solutions (PS) ESH&Q Director and the AECOM Nuclear & Environment Business Group Quality Assurance Functional Area Coordination Team Chairman.

Mr. Montini has extensive experience in programmatic assessments and program implementation in customer pursuit of Integrated Safety Management Verification and OSHA Voluntary

Protection Program recognition. He has participated on Independent External Evaluation efforts for Savannah River Remediation in the maintenance and performance assurance functional areas, and facilitated several creative problem solving sessions for Savannah River Remediation (SRR) in the nuclear safety documentation and waste removal areas.

He participated on numerous Readiness Reviews for facilities and projects such as the Waste Examination Facility CORR at the Nevada Test Site and six Lab Readiness Assessments at the Los Alamos National Lab, including as the OSH and maintenance program reviewer for the Dual Axis Radiographic Hydrodynamic Test (DARHT) Facility, the Containment Vessel Disposition (CVD) project, and most recently the red team review of the WIPP SMPs. He assisted in evaluating the international safety program for Samsung Construction and Trading, and presented the findings and recommendations to the President of Samsung C&T in Seoul, South Korea. He led the URS Partner, Assess, Innovate, Sustain (PAIS) assessment of the Safety Analysis and Review System program at the DOE National Energy Technology Lab, and led the PAIS Safety Case Team for a similar corporate review of the safety case program at the Sellafield site in the UK, and was the backup for the Occupational Safety and Health PAIS review team lead. He participated as lead or team member for numerous incident reviews, including events at the Separations Process Research Unit D&D project at KAPL and several incidents that occurred at the Sellafield site in the UK.

He was program manager for a series of projects to introduce ISM at Navy, Marine, Air Force, and Defense Commissary Agency facilities in preparation for pursuing OSHA VPP recognition at various facilities. He participated on numerous ISM readiness assessments such as the Washington Closure Hanford ISMS Phase II independent verification, the Nevada Test Site contractor ISM assessment, the WSRC ISM re-verification at the Savannah River Site, and the Bechtel Energy Alliance ISM Phase II Contractor ISM assessment at INL, and was the team lead for the corporate ISM verification at the Hanford Waste Treatment Plant Project. He assisted Lockheed Martin in developing and implementing Integrated SMPs at the Y-12 Site, both for nuclear and non-nuclear facilities, including integration if OSH reviews into work planning processes.

He was involved in construction, testing and startup of several major Savannah River Site (SRS) projects (M-area Automated Plating Line, Replacement Tritium Facility, Defense Waste Processing Facility, and In-Tank Precipitation Facility) and restart of the Savannah River Site reactors, in engineering management, safety documentation development, QA management, readiness review and SMP implementation roles. He developed and implemented conduct of technical programs for the Replacement Tritium Facility and Defense Waste Processing Facility, and managed an operating crew at the SRS Tritium facility. He performed Process Hazard Reviews at operating facilities and established the environmental program in the tritium facilities in the early 1980s. He also managed nuclear safety document efforts for the F and H Area tank farms at the Savannah River Site.

BRIAN TRAWINSKI (TRAINING & QUALIFICATION)

Mr. Trawinski is a licensed Professional Engineer in the State of South Carolina with 27 years of technical and operational experience primarily at DOE/NNSA national laboratories and nuclear facilities. He is an experienced leader with 16 years of management experience who is currently the Training, Procedures, and Emergency Preparedness Manager for Savannah River

Remediation. He holds a Bachelor of Science degree in Mechanical Engineering from the Massachusetts Institute of Technology.

Recent review activities have included reviewing Safety Basis for the LANL PF-4 Furnaces/Casting/ARIES CORR, conducting a Nuclear Safety Program Review for the Fluor Paducah Deactivation Project, reviewing Training & Qualification and Restart Plan for the LANL PF-4 Fit Flow Sheet CORR, reviewing Training & Qualification as part of the LANL PF-4 Red Team SMP Review, reviewing Training & Qualification for the WRPS 242-A Evaporator CORR, serving as the Senior Advisor on the WCH 618-10 Burial Ground RA, participating in the WRPS TSR Implementation Assessment, reviewing Safety Basis as a member of the LANL CMR Facility Confinement Vessel Disposition CORR Team, reviewing Conduct of Operations as a member of the NNSS JASPER CORR Team; reviewing Conduct of Operations, Training, Waste Management, and requirements flow-down as a member of the ITG AMWTP ISMS Phase I Assist Team; and reviewing Training as a member of the ICP IWTU CORR Team. Earlier review activities included leading the contractor ISMS Phase 1 Review of the Hanford Tank Operations Contractor, and participating on ISMS Phase 1 / Phase 2 reviews / assist visits for Idaho National Laboratory, Idaho Completion Project, and Washington Closure Hanford. At LANL, he was a member of the Pu-238 Aqueous Scrap Process LRA Team, and led the Neutron Tube Target Loading LRA Team. In March 2011, Mr. Trawinski completed NTC Courses SAF-290, Readiness Review Team Member, and SAF-291, Readiness Review Team Leader.

Over a period of five years, Mr. Trawinski also provided near-continuous support to several nuclear and hazardous non-nuclear facility startups at Sandia as a Startup Lead, Project Coordinator, and Nuclear Operations Mentor. He supported the Auxiliary Hot Cell Facility startup and the Aerial Cable Facility restart. He was instrumental in previous successful startup/restart efforts, including: Rocket Sled Track Facility, Tonopah Test Range, Hazard Category 3 Onsite Transportation, and Logistics Nuclear Operations. For the LNO startup, he developed and implemented a DOE O 5480.20A-compliant Training & Qualification Program.

Mr. Trawinski provided direct support to the Sandia Safety Basis Department as a safety analyst, conducting reviews of facility hazard classifications and safety basis documents, and participating on department self-assessments and the update of corporate procedures. Previously, Mr. Trawinski was assigned as a safety analyst for LANL's tritium facilities, performing reviews of documents and activities, as a DSA Project Manager for SRS Spent Fuel Programs, responsible for developing the safety basis documents for an experimental HEU melt-dilute facility and an HEU storage facility, and as the team lead for simultaneous implementation of four sets of nuclear safety requirements at the three Hanford Spent Nuclear Fuel Project facilities plus the associated transportation operations. He started his career in the Liquid Waste facilities at the Savannah River Site, where his responsibilities included developing and maintaining for a number of years, a comprehensive Linking Document Database of Tank Farms nuclear safety requirements, and serving as a Shift Technical Engineer in the Tank Farms.

JOE UPTERGROVE (MANAGEMENT / WASTE ACCEPTANCE CRITERIA COMPLIANCE)

Mr. Uptergrove has 45 years of nuclear operations and technical support experience which includes 20 years Nuclear Navy, the last 6 years as a Naval Reactors Representative at a Navy

Prototype reactor site and 25 years at various DOE sites. Mr. Uptergrove led the Operations Department at WIPP in preparation for and the conduct of a successful Operational Readiness Review (ORR) for waste disposal. He was instrumental in the achievement of ISMS certification for the nine (9) Site Areas at the INL; revamped the Operational Readiness program for the site; was a team member for various readiness activities including the ATR Reactor and TRA Hot Cell Startup; and was the lead or a team member for over sixty (60) other readiness activities at the INL. He has been the Facility/Operations Manager at various Nuclear Facilities across the DOE Complex and was a Site Area Operations Director for the Balance of INL Site Cleanup (D&D operations). Mr. Uptergrove started working for Corporate B&W Technical Services Group in 2006 and performed various temporary assignments associated with facility operations, operational readiness, and safety basis IVRs.

At Los Alamos National Laboratory (LANL), he was a team member for two readiness activities for removal of buried nuclear waste. He led the startup preparations at Argonne National Laboratory (ANL) for waste removal from the Alpha Gamma Hot Cell and the shipment of RH TRU Waste to WIPP. He developed the Readiness Certification Assurance concept at Y-12 National Security Site and used the concept to prepare for the Highly Enriched Uranium Materials Facility (HEUMF) startup. Following a successful DOE Operational Readiness Review, the ORR Team Leader commented that the preparations were the best he had seen in his 20 years of performing readiness activities. At the Nevada National Security Site (NNSS), he assisted in the readiness preparations for re-doing a failed DOE-ORR. He served as Operations Programs Manager responsible for Conduct of Operations and Work Planning and Control programs and was the Operational Readiness Manager for Fluor-B&W Portsmouth (PORTS) where he prepared for and/or led various readiness activities associated with D&D activities. He was the Nuclear Operations/Readiness Manager at the Advanced Mixed Waste Treatment Project (AWMTP) during which he revamped the operational readiness process and prepared for/led (5) readiness activities, the last being a Readiness Assessment to allow the Treatment Facility to process radioactive waste containing a higher fissile gram content. Mr. Uptergrove recently retired from BWXT, but came back as a subcontractor to assist in the DUF6 restart in Paducah, KY.

WILLIAM WEBB (MINE SAFETY / WASTE MANAGEMENT)

Mr. Webb is a degreed Mining Engineer currently serving as the corporate Performance Assurance Director for KeyLogic Systems, Inc. He has charge over performance management services including; strategic improvement initiative planning and execution, performance assurance, readiness reviews, independent assessment program development and training, root-cause analysis, issues management, corrective action planning, effectiveness reviews, lean and six sigma analysis, agile and scrum management, business and management process re-engineering, and QA audits and surveillances.

Previously, Mr. Webb was a senior consultant for URS – Professional Solutions. He has over 35 years combined government and industry management-level experience including over 25 years DOE and Nuclear Navy. DOE positions include DOE Operations Manager, DOE Engineering Manager, Contractor Program Director, Contractor Independent Assessment Lead, Contractor Readiness Manager, and Contractor Readiness Mentor. His nuclear operations experience spans

over 25 years, and includes facility/plant management, independent assessments, senior management consulting and mentoring and coaching. Operations and engineering experience includes Conduct of Operations, maintenance, training, procedures, system engineering and nuclear safety documentation. Additional program experiences also include risk management, facility projects, asset management, system health monitoring, and work planning and control. Additional experience includes the mining and construction industries. Mr. Webb was a certified mine foreman and served as a mining engineer conducting mining operations and ventilation studies, mining equipment maintenance program development and performance, and mining system design and setup for longwall operations. He also served as longwall mine superintendent in charge of multiple operations in two states. His mining experience has also been extended to mining R&D where he served as a contractor in the position of Coal Program Director at the National Energy Technology Laboratory, the national's fossil energy national laboratory.

Independent assessment and readiness review experience includes Team Leader and Member assignments covering most DOE sites and various functional areas including; maintenance, work planning and control, operations, engineering, safety documentation, management, project management and quality assurance. DOE sites include SRS, Y-12, Pantex, LANL, NTS, AMWTP, LLNL, and BNL. Recent assignments include SRR SDU 3&5 Startup Readiness Manager and Readiness Mentor, SRR DWPF Purge Modifications Readiness Mentor, DWPF Facility Performance Improvement Plan Lead, SRR Asset Management Review Lead, SDU design input to design output gap analysis Lead, NETL project management lessons learned and case study Lead, and SRR Readiness Assurance Lead. Recent work planning and control experience includes; URS WP&C FACT team member, SRR WP&C Lean Management Team member, SRR WP&C Assessment Team Member, AMWTP and RCC ISMS Verification team member, SRS Tank 12 Readiness Assessment Team Leader, SRS Tank Farms Integrated Independent Evaluation Team Leader, and SRS Site-Wide Procurement Assessment.

Mr. Webb has recently (2013) completed DOE Readiness Review training (SAF-290 and SAF-29) for team member and team leader and Readiness Review Assessor Training at Savannah River Remediation (SRR). He also qualified as an NQA-1 Lead Auditor at SRR.

Appendix 3: Issue Classification Criteria

1. Does the issue meet the definition of a Finding as defined in DOE-STD-3006-2010?

   Finding: **Nonconformance with a stated requirement that represents either**:
   a) A systematic failure to establish or implement an adequate program or control; or
   b) A significant failure that could result in unacceptable impact on the safety of personnel, the facility, the general public, or the environment during nuclear operations.

If the is answer is YES, the issue meets the definition of a Finding; proceed to step 2.

If the answer is NO, the issue will be discussed in the Report Form 1 results section.

2. Is the Finding Pre-start or Post-start?

   A. Initial Screening

   1. Does this issue negatively impact on the operability of a credited safety system?
   2. Does this issue negatively impact on processes, functions or components identified in the TSRs, Safety Requirements or nuclear safety control procedures?
   3. Does this issue have a direct adverse environmental impact that exceeds regulatory or site specific release limits?
   4. Does this issue impact non-SSCs that SSCs that could adversely impact safety related SSCs?
   5. Is this issue in noncompliance with WIPP or Department of Energy (DOE)-approved startup documents (e.g.) Plan of Action, Justification for Continued Operation or Conditions of Approval?
   6. Does this issue indicate inadequate procedures or safety related administrative systems?
   7. Does this issue indicate operational or administrative noncompliance with safety related procedures or policy?
   8. Has this operational issue occurred with a frequency that indicates a pattern of past corrective actions that have been ineffective?
   9. Is this a training issue that would call into question the ability of operators to safely conduct nuclear operations?
   10. Does the issue involve a previously unknown risk to worker or public safety and health or a previously unknown threat of environmental insult or release?

If the response to any of the above is **YES**, further evaluation in accordance with the Issue Impact criteria below is required. If the answer is **NO** to all of the above questions, the issue is considered a post-start Finding; however, based on its significance and with approval by the Team Leader, the issue may still be classified as a pre-start Finding.

B. Issue Impact

1. Does the loss of operability of the item prevent a safe shutdown, or cause the loss of essential monitoring?
2. Does the loss of operability of the item require operator action to prevent or mitigate the consequences of events described in the Safety Analysis?
3. Does the loss of operability of the item cause operation to be outside the TSRs or Safety Analysis?
4. Does the loss of operability of the item result in a reduction of the margin of safety as described in the Safety Analysis?
5. Does the issue have a potential 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?

If the response to any of the above questions is **YES**, the item should be considered a pre-start Finding. If the response all of the above questions is **NO**, the item should be considered to be a post-start Finding; however, based on its significance and with approval by the Team Leader, the issue may still be classified as a pre-start Finding.