ENTERED

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From: Maestas, Ricardo, NMENV
Sent: Wednesday, August 13, 2014 11:10 AM
To: Allen, Pam, NMENV
Subject: FW: Work plan for entry tomorrow
Attachments: WCD 1404045 ESTABLISH SAFE OPERATING BASE UG FOR REENTRY PHASE 3 Activity 5 4 29 14 1213.docx

April

From: Oba Vincent [mailto:oba.vincent@cbfo.doe.gov]
Sent: Tuesday, April 29, 2014 2:08 PM
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Subject: Work plan for entry tomorrow

Please see attached.

Thanks

Oba

1404149

W.O.# 1404045 C

PHASE 3 (Activity 5)

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1.0 INTRODUCTION

1.1 PURPOSE

This Work Control Document (WCD) provides instructions to specific tasks that are stand alone or use a combination of operation procedures and other WCDs to traverse from SH Shaft Station to E-140/S-2520 area transition point, stage the transition areas, and request the Team 2 to document Panel 7, Room 7 waste stack conditions. This work is essential in order to provide a means for locating and identifying the source term to investigate the cause(s) of the February 14, 2014 radiological event in the underground.

1.2 SCOPE

This WCD will instruct Personnel to:

- Perform air-quality checks
- Perform visual ground control assessments in all areas occupied or travelled
- Perform radiological surveys into Panel 7 to characterize the radiological conditions and identify the source term
- Areas traversed and surveyed may include:
    - Panel 7 intake (S-2520)
    - Room 7 Panel 7 and Waste Face
- Document conditions in the Room 7 Panel 7 waste stack (photo, video and air sampling)
- Sample/survey the S-2180 Room 6 intersection from Room 6
- Collect filters from the Panel 7 RADOS CAM 151
- Collect filter from the Panel 7 Fixed Air Sampler 118

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2.0 REFERENCES

BASELINE (DEVELOPMENTAL)

WP 04-AD3030	Pre-Job and Post-Job Reviews
WP 12-HP3600	Radiological Work Permits
WP 12-HP1100	Radiological Surveys
WP 12-HP1500	Radiological Posting and Access Control
WP 12-HP3400	Contamination Control
WP 12-HP3500	Airborne Activity
WP 12-HP1321	Bladewerx SabreAlert Alpha Continuous Air Monitor
WP 12-HP1318	Rados Continuous Air Monitor
WP 12-HP1305	Air Sampling Equipment
WP 12-IH1828	MSHA Air Quality Monitoring
PROD-439	General Hazard Analysis
ESS-2014-01	WIPP Habitability Evaluation of the Safety of the Situation
ESS-2014-02	Underground (U/G) Re-Entry Evaluation of the Safety of the Situation – Phase 2B
ESS-2014-03	Underground Re-Entry Evaluation of the Safety of the Situation – Phase 3
RWP 14-028	

REFERENCED (REQUIRED ON-HAND)

Attachment 1, CMRO Monitoring
Attachment 2, Reentry Escape Route Map
Attachment 3, Phase 3 Underground Map
Attachment 4, Geotechnical Engineering Ground Control Guidance Information

3.0 MATERIAL LIST

ITEM	MATERIAL DESCRIPTION	QTY	UNIT	PR/WH #
1	*Mine Phone Batteries	**Min. 6**	**EA.**	**X-08-01779**

*Required Material, all other as needed.

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4.0 EQUIPMENT LIST

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Description
HARD HAT
SAFETY GLASSES W/ SIDE SHIELDS (Support personnel at collar)
HARD TOE SHOES
W65 SELF RESCUER RESPIRATOR
POWERED AIR PURIFYING RESPIRATOR (PAPR)
ORGANIC HEPA COMBINATION PAPR CARTRIDGES
NEGATIVE PRESSURE RESPIRATORS (Emergency Use Only)
RADIOLOGICAL PROTECTIVE CLOTHING / EQUIPMENT LISTED IN RWP AS APPROVED BY INDUSTRIAL SAFETY & HYGIENE

Items identified in the Checklists below are required; note that some equipment and supplies may be currently staged underground. Use the checklists as a self-check to ensure items are available and loaded onto wagons or carts.

EQUIPMENT CHECKLIST

Description	
Platform ladder	
Camera/video: Go-Pro / hand-held / iPad	
Telescopic boom	
Multi-gas Detectors	
Handheld radios (min. of 4)	
UG Map (Map man)	
Extension cords (w/ GFCI's)	
Spare head lamps	
Spare PAPR batteries	
High Lumen Flashlight	
Hand-Held ABC Fire extinguishers	
Wagon(s)	
Spare wagon wheel(s)	
MiniRae 3000 Photo Ionization Detector (PID)	
WIBGET Heat Stress Monitor	
Smoke tubes/powder gun	
Medical bag	
Anemometer	
Inactivation Tags	
Tubing for air sampling	

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RADIOLOGICAL EQUIPMENT & SUPPLY CHECKLIST

Description	
Bladewerx SaberAlert CAMs	
Workplace Air Samplers	
F&J Air Sampler	
High Volume Air Sampler	
Lapel Samplers (4) *TBD	
Hand-e-counts (2)	
Portable Survey Instruments	
Decontamination Supplies (2) Sets	
Radiological rope	
Radiological sample bags	
Placards	
Radiological bags	
Shoe covers & Gloves	
Grease pencils	
Scissors	
Sprayer	
Primer (fixative) w /opener	
Brattice	
Towels	
Hand-Held Clean Agent Fire Extinguisher (transition area)	

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5.0 PRECAUTIONS

5.1 AIRBORNE & CONTAMINATION HAZARD

- The underground atmosphere within the AIS and the Salt Handling Shaft has been determined to be non-detectable of airborne or transferable radiological contamination based on air sampling and radiological surveys performed in reentry Phases 1 & 2A. In Phases 2B and 3A the underground atmosphere has been determined to be non-detectable of airborne or transferrable radiological contamination based on air sampling and radiological surveys performed from the SH Shaft Station to W-30 S1950, in S-1950 to E-140 and in E-140 to S-2520. In Phase 3B the underground atmosphere was determined to be non-detectable of airborne or transferrable radiological contamination based on air sampling and radiological surveys performed up to E-140/S-2520. Detectable activity (e.g., radon and Am-241 contamination) was located near the intersection of W-170/S-2520 and into Panel 7 up to Room 7 Waste Face. Personal protective equipment (PPE) as documented in the Radiological Work Permit (RWP) will be used to ensure personnel protection should air quality issues (e.g., radioactivity, vapors) or transferable contamination be encountered during the execution of this phase.
- Radiological conditions of the shaft stations and the underground from the SH Shaft station to E-140/S-2520 have been characterized. Radiological Control (RadCon) will survey and assess facilities in a step-wise sequence to avoid the spread of contamination to personnel and facilities.
- For Phase 3 activities, RCTs will retain media (e.g., smears, swipes, air monitoring filters, etc.) for future analysis.

5.2 GROUND CONTROL HAZARD

- Ground conditions must be evaluated upon entry into the underground as personnel traverse and perform radiological surveys using Attachment 4, Geotechnical Engineering Ground Control Guidance Information
- Should potentially unsafe ground be encountered, necessary actions shall be taken to avoid exposure to the hazard, including use of alternate routes.

5.3 PINCH POINT HAZARD

- Personnel be aware of pressure differentials across bulkheads and between air locks, use caution opening and closing mandoors.
- Request additional personnel when opening, closing or holding mandoors open when traveling through them.
- Keep body, feet, hands and fingers out of pinch point areas.

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5.4 COMMUNICATION HAZARD

- Use clear concise 3-way communication when communicating with team members and when reporting information to the CMR.
- To enhance communications, radios will be used in line of sight application. Additionally, a reentry team member will be designated the responsibility to ensure frequent communication with the CMR.

5.5 ERGONOMIC HAZARD

- PPE (e.g., Protective clothing, respirators) and surveying equipment may cause ergonomic strains to body, stretch and return body to normal posture.
- Rotate tasks with other team members.

5.6 THERMAL STRESS (HEAT)

- Ensure you pre-hydrate with cool clear liquids.
- Wear under garments (e.g., modesty clothing) and protective clothing (e.g., OREX coveralls,) that are unrestrictive and lightweight providing breathability.
- Use the buddy system and perform frequent checks to ensure team members are "OK".
- Obtain physiological monitoring prior to and after use of respiratory protection.

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5.7 ORGANIC VAPOR HAZARD

- Certain areas of the mine are known to contain airborne organic vapors, to include Carbon Tetrachloride, Trichloroethylene, and 1,1,1-Trichloroethane.
- Although concentrations are expected to be low, use of combination cartridges (OV/P100) are required to protect personnel from potential organic vapor exposure.
- Organic vapor concentrations will be measured with a MiniRae 3000 PID.

5.8 FIRE HAZARD

- Carry and be familiar with current Reentry Escape Route Map.
- Each individual carry W65 self-rescuer and don at the first sign of fire .
- Each team (Base Team/Team 1 & Team 2) ensure at least one hand-held ABC fire extinguisher is available in the immediate work area. Each team be familiar with self-contained self-rescuer cache locations in the mine; and don if SCSRs are retrieved.
- Personnel will perform visual inspection of condition of receptacle, plugs and grounds of power cords, and ensure Ground Fault Circuit Interrupters (GFCI) and power cords with built-in GFCI's have been tested and are satisfactory for use.
- Minimize combustibles being taken into the UG, and ensure Fire Protection Engineer (FPE) has evaluated supplies being used.

5.9 All other hazards and required precautions will be addressed / mitigated in the listed procedures and WCDs.

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6.0 LIMITATIONS

6.1 Facility Shift Manager (FSM) shall concur with and monitor execution of this plan.

6.2 The operational restrictions and interim controls of ESS-2014-01, *WIPP Habitability Evaluation of the Safety of the Situation* and ESS-2014-02, Rev. 1, Re-Entry Evaluation of the Safety of the Situation (ESS) remain in effect and are applicable for this phase of reentry. In addition ESS-2014-03 is applicable to this phase of reentry. The controls of this U/G Re-entry ESS are applicable upon the first member of the Re-entry Team receiving U/G access (brassing-in) and are no longer applicable upon the last team member exiting the access process (brassing-out) for each U/G re-entry. The following Operational Restrictions apply:

[ ] 6.2.1 Do not enter WASTE HANDLING MODE in the UNDERGROUND.

[ ] 6.2.2 Do not operate any U/G liquid fueled vehicles.

[ ] 6.2.3 Continue to operate the Mine Ventilation System in Filtration Mode. Do not operate the system in any other mode.

[ ] 6.2.4 Do not enter the U/G ventilation exhaust drift. For these activities, this is defined as:

- Drifts south of S-3080
- E-300 to the exhaust shaft
- Panel 6, S-3080 to E-300
- Panel 7, Room 7, S-2180 to E-300

[ ] 6.2.5 If any of the differential pressure readings identified below reach the alarm value, the CMR will notify the Re-entry Team to exit the U/G. **[ESS-2014-02-01]**

- PDAH-056-002/006 MOD EFF. FILTER HEPA UNIT 41-B-856/857 CLOGGED
- PDAH-056-003/007 HIGH EFF. FILTER HEPA UNIT 41-B-856/857 CLOGGED
- PDAH-056-004/008 1st HEPA FILTER HEPA UNIT 41-B-856/857 CLOGGED
- PDAH-056-005/009 2nd HEPA FILTER HEPA UNIT 41-B-856/857 CLOGGED
- 413 UVFS MOD FLTR 856/857 CLOG (CMS Point # CH5602/5610)
- 413 UVFS HI FLTR 856/857 CLOG (CMS Point # CH5604/5612)
- 413 UVFS 1ST HEPA 856/857 CLOG (CMS Point # CH5606/5614)
- 413 UVFS 2ND HEPA 856/857 CLOG (CMS Point # CH5608/5616)

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[ ] 6.2.6 The differential pressure for the Waste Hoist Tower will be monitored in the CMR. If this alarms, the CMR will notify the Re-entry Team to exit the U/G. **[ESS-2014-02-02]**

[ ] 6.2.7 If any of the two differential pressures identified below are other than negative, the CMR will notify the Re-entry Team to exit the U/G. **[ESS-2014-02-03]**

- DP Station – dp6: 313 Bulkhead – negative d/p
- DP Station – dp12: 707 Bulkhead – negative d/p

[ ] 6.2.8 If the U/G Ventilation System shuts down for any reason, the CMR will notify the Re-entry Team to exit the U/G. **[ESS-2014-02-04]**

[ ] 6.2.9 A direct frisk of the filter will be performed at Station A every hour while personnel are in the U/G. If the results indicate activity > 2000 dpm/100cm^2 alpha or > 10000 dpm/100cm^2 beta, the CMR will notify the Re-entry Team to exit the U/G. **[ESS-2014-02-05]**

[ ] 6.2.10 Visual Ground Control inspections will be performed by the Re-entry Team as they progress through the U/G. If the results of these visual inspections reveal an unsafe condition in the U/G as prescribed in the WCD, the U/G Re-entry Team Lead will take actions to re-route the Re-entry Team or instruct them to exit the U/G. **[ESS-2014-02-06]**

6.3 Physical ground control actions (e.g., scaling, barring down bad ground, etc.) will not be performed under this WCD.

6.4 The Reentry Team Leader(s) (RTL) will ensure the Reentry team members are physically fit and properly trained to perform this phase, checking the teams' condition approximately every 15 minutes or as conditions warrant.

[ ] 6.4.1 Should any member's breathing apparatus malfunction or member(s) feel unable to continue this phase **STOP WORK**, and return to a safe area with a known safe atmosphere before replacing or repairing the unit.

[ ] 6.4.2 If a Reentry Team member or members feel unable to continue this phase **STOP WORK**, return to the SH Shaft station and request Hoist Operator to hoist the member(s) to the surface.

[ ] 6.4.3 Reentry Team members may be replaced and **WORK RESUMED** using designated alternate personnel meeting the technical and physical qualifications to perform necessary work on the team.

6.5 RTL will be the center point of communication and will maintain the master working copy of this document. Each RTL in the UG (e.g., RTL-1, RTL-2) will maintain direct control of their respective steps/sections during performance, and report status of such to the RTL.

6.6 Personnel responsible for monitoring radiological and ground conditions will be present during all phases of this reentry.

6.7 Personnel traveling through bulkheads will use mandoors instead of vehicle doors to minimize possible disruption of the underground ventilation flow. Ensuring only one mandoor is open at time.

6.8 Evidence related to the underground haul truck fire incident and the fire scene shall not be disturbed.

6.9 Evidence related to the UG rad event shall not be disturbed. Activities performed under this work instruction including those associated with radiological surveys, collection of atmospheric data, filter media, salt samples and performing video/photo documentation will be coordinated with the AIB Chair.

6.10 U/G access will be as normally directed in WP 04-AD3013. Personnel shall obtain an approved Underground Access Pass (UAP) issued by the Underground Controller for this activity.

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6.11 Radiological - This WCD is to be performed in accordance with the requirements and limitations of the applicable Radiological Work Permit.

Should airborne radioactivity and/or transferable contamination be encountered above prescribed RWP suspension limits during the execution of this work, personnel will perform the following:

[ ] 6.11.1 Suspend work activities

[ ] 6.11.2 Mark the location and annotate activity levels

[ ] 6.11.3 RCT monitor/control the spread of contamination, including establishment of transition area(s) and radiological boundaries

[ ] 6.11.4 Configure the facilities/area in a safe condition

[ ] 6.11.5 Notify both reentry teams/FSM via the Mine Pager Phone

[ ] 6.11.6 Return to the SH Station

IF at any point during this Phase the SabreAlert CAM alarms

THEN RETREAT 100 feet and evaluate the CAM Alarm. If the alarm is confirmed to be above the suspension criteria, notify both reentry teams via the Mine Pager Phone and return to the SH Shaft Station immediately.

IF The T-2 SabreAlert CAM reaches 2,000 DAC-hour,

THEN Contact the Radiological Control Manager before proceeding.

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6.12 Air Quality – This WCD includes monitoring capabilities for air quality, If at any point air quality parameters are measured at indicated Action Levels, notify both reentry teams via the Mine Pager Phone and return to the SH Shaft Station immediately.

Parameter Measured	Action Level*	Instrument
Carbon Monoxide	25 ppm or greater	Multi-gas detector** (e.g., ITX or MX-6)
LEL or % methane	5% LEL or 0.25% Methane or greater	
Oxygen	Less than 19.5%	
Volatile Organic Compounds*	100 ppm or greater	MiniRae 3000 (PID)

*If sustained VOC levels are greater than 20 PPM, Contact IS&H for an evaluation of the reading and the location found.

**Resetting the multi-gas detector unit may be required due to pressure differentials at different depths within the shafts. If at any point during this evolution the multi-gas detector or PID alarms, confirm the reading (e.g. pressure differential vs. actual alarm). Based on a confirmed alarm reading, notify the RTL, and retreat to the SH Shaft Station.

6.13 Thermal Stress – This WCD includes monitoring for heat stress with the WIBGET. If at any point WBGT temperatures are measured at the indicated Action Levels, notify the RTL immediately.

WBGT Temp (°C)	Work / Rest Regimen
<22.0	Continuous work
22.0 – 23.0	Work 45 min / rest 15 min
23.0 – 24.0	Work 30 min / rest 30 min
>24.0	Contact IS&H

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6.14 Electric Cart Use – Use of carts in the U/G for Reentry evolutions are permitted. Team-1 will perform pre-operational checks for all carts to be used during this evolution and stage cart(s) as necessary for use by Team-2.

The following pre-operational checks listed below must be satisfactory:

- Tires inflated and lug nuts in-place
- Headlights / tail lights, operational and face plates not cracked or missing
- Accelerator pedal, for smooth and non-binding movement
- Speed and directional controls
    - Brakes, both the service and parking brake
    - Steering mechanism, check the play in the steering wheel
- Fire extinguisher (charged and status indicator in the green)
- Horn
- Battery status indicator
- Data plate
- Visible structural damage to cart

IF any of the above pre-operational checks are unsatisfactory,

THEN the cart may not be used and will be tagged out-of-service.

The speed of travel will be kept to a minimum (i.e., pace of person walking) to ensure significant quantities of dust are not generated.

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6.15 REQUIRED QUALIFICATIONS AND TRAINING

- Facility Shift Manager (FSM)
- Facility Operations Shift Engineer (FOSE)
- Central Monitoring Room Operator (CMRO)
- AIS Hoist Operator (HO)
- SH Hoist Operator (HO)
- Industrial Safety & Hygiene (IS&H)
- PAPR/Respirator Qualified Personnel:
    - AIS Shaft Tender (Toplander)
    - SH Shaft Tender (Toplander)
    - SH Shaft Tender (Bottomlander)
    - Radiological Control Technicians (RCTs)
    - Underground Facilities Engineer (UFE)
    - Mine Rescue Team Member (MRT)
    - Reentry Team Lead (RTL)

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6.16 OVERSIGHT STAFFING

The following organizations may participate in this evolution to perform oversight functions. Participation requires verification of training & qualification commensurate with their physical location in which the oversight is being performed (e.g., RWT-II, PAPR, etc.); and involvement with planning activities, dry-runs, physiological monitoring and pre-job briefs.

- Carlsbad Field Office (CBFO)
- Defense Nuclear Facilities Safety Board (DNFSB)
- Mine Safety & Health Administration (MSHA)

6.17 FEDERAL INVESTIGATION STAFFING

The following organizations may participate in this evolution to perform oversight functions. Participation requires verification of training & qualification commensurate with their physical location in which the oversight is being performed (e.g., RWT-II, PAPR, etc.); and involvement with planning activities, dry-runs, physiological monitoring and pre-job briefs.

- Department of Energy (DOE) Accident Investigation Board (AIB)

6.18 CONTINGENCY RESPONSE STAFFING

- Emergency Service Technicians (EST)
- Site Medical Nurse
- Facility Operations

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NOTE

Steps in this section may be performed in any order.

7.0 PREREQUISITES

7.1 **RTL CONDUCT** a formal, documented pre-job brief per WP 04-AD3030.

_____/_____
RTL DATE

7.2 **RTL ENSURE** all personnel have read, understand and have signed the applicable RWP.

_____/_____
RTL DATE

7.3 **RTL ENSURE** items shown in Section 3.0, Material List and Section 4.0, Equipment List are staged and ready for use.

_____/_____
RTL DATE

7.4 **RTL ENSURE** the required Preventative Maintenance (PMs) for the Hoists and Shafts are complete.

_____/_____
RTL DATE

7.5 **RTL ENSURE** personnel performing this activity understand the following:

[ ] 7.5.1 Due to the current configuration and controls associated with areas in the underground, it is not feasible to complete a walk-down and Hazard Identification Summary at the actual work location.

[ ] 7.5.2 Personnel must maintain awareness for unforeseen hazards and/or unanticipated conditions. Should these be encountered during performance of work, personnel must understand their responsibility to **STOP WORK,** and ensure an adequate resolution prior to proceeding.

_____/_____
RTL DATE

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7.6 RadCon personnel are notified of the work being performed and on-standby should a decontamination response be required. This includes ensuring operability of the decontamination trailer and capability to transport worker(s) to the decontamination trailer.

_____/_____
RTL DATE

[ ] 7.6.1 Should a Shelter-in-Place protective action be required following a rad event during performance of this evolution, personnel conducting support functions at the shaft collar (e.g., Shaft Tender /Toplander, RadCon, etc.) will remain on post and don respiratory protection as directed by the designated RadCon Job Supervisor in order to assist workers as they exit the conveyance.

_____/_____
RTL DATE

7.7 **RTL ENSURE** Site Medical Nurse or Emergency Services Technicians perform vitals and assessment of Re-entry team members and documents results.

_____/_____
RTL DATE

7.8 **RTL ENSURE** Team-1 and Team-2 understand the preferred routes to travel for reentry, as well as Escape Map routes in the event of an emergency egress and are knowledgeable with the process of donning both the W65 Self-Rescuer and the SCSR should a fire occur in the U/G.

_____/_____
RTL DATE

7.9 **RTL DESIGNATE** a Senior Management Oversight person to be present during the performance of the WCD.

_____/_____
DESIGNATED OVERSIGHT DATE

_____/_____
RTL DATE

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8.0 PERFORMANCE

8.1 PHASE 3 (Activity 5) TRANSPORT REENTRY TEAM-1 TO THE UNDERGROUND

[ ] 8.1.1 **T-1 RTL ENSURE REENTRY TEAM** members **BRASS IN** and make the following notifications:

- CMRO initiation of ESS
- Initiate baseline probe of Station A

_____/_____

T-1RTL DATE

[ ] 8.1.2 **T-1 RTL ENSURE** prior to entering the underground the following is performed:

- Donning of appropriate layers of PPE
- Powered on equipment
  - PAPRs
  - CAMs
  - Multi-gas detectors
  - PID
  - WBGT

_____/_____

T-1 RTL DATE

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[ ] 8.1.3 **HO INITIATE** transport of T-1 and support materials to the Station level.

_____/_____
T-1 RTL DATE

[ ] 8.1.4 **T-1 PERFORM** the following:

- Air quality, thermal stress readings
- Communication to CMR
- Background check with μ Rem 2350
- Configuration of CAMs Wi-Fi
- Radiological survey and configuration of Operation Base (SH Station)
- Team Check
- Pre-operational checks on carts

_____/_____
T-1 RTL DATE

[ ] 8.1.5 **IF** T-1 determines contamination is below suspension limits

AND T-1 is prepared to traverse to the E-140/S-2520 transition area

THEN N/A Step [ ] 8.1.6 and Proceed to Section 8.2.

_____/_____
T-1 RTL DATE

[ ] 8.1.6 **IF** any contamination is above the suspension limits is found at the SH Shaft Station

THEN T-1 notify Surface RCT support of contamination levels/

[ ] 8.1.6.1 **HO TRANSPORT** T-1 and support materials to the Collar level.

[ ] 8.1.6.2 **RTL ENSURE** Reentry teams **BRASS OUT**.

[ ] 8.1.6.3 **RTL NOTIFY** CMRO that personnel are brassed out and terminated performance of this portion of Phase 3 (Activity 5).

[ ] 8.1.6.4 **EXIT** this WCD.

_____/_____
T-1 RTL DATE

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NOTE

Team 1 will perform identified tasks concurrently and will remain together (e.g., line of sight) at all times, with the exception of the HO T-1 Bottomlander and RCTs who will remain at the SH Shaft Station and those members assigned to retrieve filter papers from RADOS CAM151. Team-2 will perform identified tasks concurrently and will remain together (e.g., line of sight) at all times. The travel routes will be used as shown in Attachment 3, Phase 3 Underground Map. Sections 8.2 and 8.3 may be performed concurrently.

8.2 PHASE 3 (Activity 5) TEAM 1 TRAVERSE TO EAST 140 SOUTH 2520

[ ] 8.2.1 **T-1 TRAVERSE** to E-140/S-2520 area while **PERFORMING** the following:

- A Ground control assessment by visually inspecting the ground and by using Attachment 4, Geotechnical Engineering Ground Control Guidance
- Radiological surveys <u>and</u> observing the postings and barriers marking the limits of the surveys
  - Verifying suspension criteria is not exceeded
- Air quality checks
  - Verifying action limits are not exceeded
- Heat stress (WBGT) readings
  - Verifying action limits are not exceeded
- Periodically record ground control, radiological, heat stress <u>and</u> air quality data on the appropriate area map
- Communicating status to CMR via mine pager phones along the travel route. A status of "SAT" may be used to indicate the criteria above (e.g., ground control, rad, air quality, and heat stress) has been satisfied.
- Change batteries on mine pager phones as needed
- Turn on CAMs and Workplace Air Samplers
- Pre-operational checks have been performed on cart(s)

_____/_____

T-1 RTL DATE

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[ ] 8.2.2 **T-1 RTL** **IF** traverse to E-140/S-2520 is successful

THEN perform the following:

- Communicate via mine pager phone the traverse to E-140/S-2520 is complete.
- Stage the transition area in preparation for Team 2.

[ ] 8.2.2.1 N/A Step [ ] 8.2.3 and **PROCEED** to Section 8.3.

_____/_____

T-1 RTL DATE

[ ] 8.2.3 **T-1 RTL** **IF** suspension limits are exceeded

OR based on changing conditions, (e.g., unforeseen activity readings) requiring the team to retreat

THEN

[ ] 8.2.3.1 **RCT MARK** the location and/or annotate the levels of activity detected.

[ ] 8.2.3.2 **RCT PERFORM** hand and feet survey.

[ ] 8.2.3.3 **RCT DIRECT** team members upwind previous surveyed area, establish a radiological boundary and perform whole body frisk.

[ ] 8.2.3.4 **RCT SEGREGRATE** contaminated workers from non-contaminated workers.

[ ] 8.2.3.5 **RCT ASSIST** contaminated workers with doffing PPE / donning of clean PPE as determined by RCT for egress to the SH Shaft Station.

[ ] 8.2.3.6 **COMMUNICATE** via mine pager phone the exact location.

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[ ] 8.2.3.7 **T-1 RETURN** to SH Shaft Station and exit the underground.

[ ] 8.2.3.8 **RTL ENSURE** Reentry teams **BRASS OUT**.

[ ] 8.2.3.9 **RTL NOTIFY** CMRO that personnel are brassed out and terminated performance of this portion of Phase 3 (Activity 5).

[ ] 8.2.3.10 **EXIT** this WCD.

_____/_____
T-1 RTL DATE

NOTE

Sections 8.3 and 8.4 may be performed concurrently.

8.3 PHASE 3 (Activity 5) T-2 TEAM MEMBERS TRAVERSE ROOM 7 PANEL 7.

[ ] 8.3.1 **T-2 RTL ENSURE** prior to entering the underground the following is performed:

- Personnel have donned the appropriate layers
- Powered on equipment
  - PAPRs

_____/_____
T-2 RTL DATE

[ ] 8.3.2 **HO INITIATE TRANSPORT** of T-2 to the Station level.

[ ] 8.3.3 **T-2 TRAVERSE** to Room 7 Panel 7 while **PERFORMING** the following:

- A ground control assessment by visually inspecting the ground and by using Attachment 4, Geotechnical Engineering Ground Control Guidance
- Radiological surveys
  - Verifying suspension criteria is not exceeded
- Periodically record ground control and radiological data on the appropriate area map

DRAFT

- Obtain equipment at the transition area
- Communicating status to T-1 or the CMR along the travel route. A status of "SAT" may be used to indicate the criteria above (e.g., ground control, rad, air quality, and heat stress) has been satisfied

_____/_____

T-2 RTL DATE

WARNING

Gathering of data and air sampling qualities exposes personnel to falling from an elevated work area.

[ ] 8.3.4 **T-2 SECURE** ladder to prevent tipping, or request a member to hold ladder. The member climbing the ladder shall use both hands while climbing the ladder and request video equipment and/or air sampling equipment be handed to them.

NOTE

Use of the telescopic boom will be determined by the RTL, team members should use extreme caution to avoid contact with Waste Containers.

[ ] 8.3.5 **T-2 IF** traverse to Room 7 Panel 7 is successful

THEN N/A Step [ ] 8.3.6 AND **PERFORM** the following:

- Communicate to T-1 or the CMR via the two-way radio or mine pager phone the traverse to Room 7 Panel 7
- Set up lighting and ladder
- Gather photographs / video / air sampling data

_____/_____

T-2 RTL DATE

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[ ] 8.3.6 **T-2 IF** suspension limits are exceeded

OR based on changing conditions, (e.g., unforeseen activity readings) requiring the team to retreat

THEN

[ ] 8.3.6.1 **RCT MARK** the location and/or annotate the levels of activity detected.

[ ] 8.3.6.2 **T-2 TRAVERSE** back to transition area.

[ ] 8.3.6.3 **T-1 ASSIST** contaminated workers with doffing PPE / donning of clean PPE as determined by RCT for egress to the SH Shaft Station.

[ ] 8.3.6.4 **COMMUNICATE** to CMR the status of T-1 & T-2.

[ ] 8.3.6.5 **T-2 RETURN** to SH Shaft Station.

[ ] 8.3.6.6 **T-2 RTL COMMUNICATE** to CMR upon arrival at the SH Shaft Station.

[ ] 8.3.6.7 **HO TRANSPORT** Team 2 to the surface.

[ ] 8.3.6.8 **RTL ENSURE T 2 BRASS OUT** through the underground controller.

_____/_____

T-2 RTL DATE

NOTE

At no point shall any team member break the plane of the bulkhead (e.g., reach through the bulkhead).

[ ] 8.3.7 **T-2 OBTAIN** the following from the bulkhead at Room 6 Panel 7:

- Radiological survey data
- Air sampling data
- Photographs / videos as necessary

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NOTE

A T-2 member will remain at S-2520/W-170 to maintain two-way radio communication with T-1 for performance of Section 8.4.

[ ] 8.3.8 **T-2 TRAVERSE** towards transition area and perform the following:

- Doff one outer pair of shoe covers and one outer pair of gloves.
- Collect Fixed Air Sampler (FAS) filter media
- Ensure communication to CMR T-2's return to transition area
- Process through transition area with assistance from T-1
- Ensure contaminated materials are bagged and labeled
- Debrief and document all team members findings/thoughts

_____/_____

T-2 RTL DATE

DRAFT

NOTE

Sections 8.3 and 8.4 may be performed concurrently. An identified Subset of T-1 will Traverse to the Panel 7 RADOS connex to retrieve filters.

8.4 PHASE 3 (Activity 5) T-1 TRAVERSE TO PANEL 7 RADOS CONNEX

[ ] 8.4.1 **T-1 TRAVERSE** to Panel 7 RADOS connex while performing the following:

- A Ground control assessment by visually inspecting the ground and by using Attachment 4, Geotechnical Engineering Ground Control Guidance
- Radiological surveys (i.e., Rados connex, travel route toward the Panel 7 Rados connex) and observing the postings and barriers marking the limits of the surveys
  - Verifying suspension criteria is not exceeded
- Air quality checks
  - Verifying action limits are not exceeded
- Heat Stress (WBGT) readings
  - Verifying action limits are not exceeded
- Periodically record ground control, radiological, heat stress and air quality data on the appropriate area map
- Communicating status to T-1/T-2 or CMR A status of "SAT" may be used to indicate the criteria above (e.g., ground control, rad, air quality, and heat stress) has been satisfied
- Change batteries on mine pager phones as needed

_____/_____
T-1 RTL DATE

[ ] 8.4.2 **T-1 ENSURE** radiological survey of connex (e.g., inside and out) is performed prior to entering and F&J Air Samplers are taken into RADOS connex.

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[ ] 8.4.3 **T-1 NOTIFY** CMR prior to collecting filters.

[ ] 8.4.4 **T-1 COLLECT** filters in accordance with WP 12-HP1318, Section 4.3.

[ ] 8.4.5 **T-2 TRAVERSE** towards transition area and perform the following:

- Doff one outer pair of shoe covers and one outer pair of gloves.
- Ensure communication to CMR T-1's return to transition area
- Process through transition area with assistance from T-1/T-2
- Ensure contaminated materials are bagged and labeled
- Debrief and document all team members findings/thoughts

_____/_____

T-1 RTL DATE

[ ] 8.4.6 **T-1 RTL CONFIRM** whether installed CAMs are connected to the Wi-Fi and if workplace air samplers may remain in operation

IF CAMs or workplace air samplers need to be secured,

THEN RETURN to the SH Salt Shaft Station, **SECURING** CAMs and workplace air samplers along route.

_____/_____

T-1 RTL DATE

[ ] 8.4.7 **HO INITATE TRANSPORT** of Reentry teams to the surface.

_____/_____

RTL DATE

[ ] 8.4.8 **RTL ENSURE** Reentry teams have **BRASSED OUT** through the underground controller.

_____/_____

RTL DATE

[ ] 8.4.9 **RTL NOTIFY** CMRO that personnel are brassed out and completion of this portion of Phase 3 (Activity 5).

_____/_____

RTL DATE

DRAFT

[ ] 8.4.10 **RTL ENSURE** a Request for Disposal (RFD) is documented for this evolution and contact Site Environmental Compliance (SEC) for disposal of generated waste.

[ ] 8.4.10.1 **RTL ENSURE** that the Container Inventory / Activity Log (Attachment 1 of WP 02-RC3110) is filled out with activities of each bag of waste in the UG R/hr range and the weight of each bag is complete. Attach this Container Inventory/Activity Log to the RFD.

_____/_____

RTL DATE

8.5 OPERATIONAL ACCEPTANCE

[ ] 8.5.1 **RTL DECLARE** Phase 3 (Activity 5) complete with the successful gathering of photographs / video / sample data.

_____/_____

RTL DATE

8.6 POST-JOB REVIEW

[ ] 8.6.1 **RTL CONDUCT** post-job review per WP 04-AD3030.

_____/_____

RTL DATE

DRAFT

8.7 COMMENTS

[ ] 8.7.1 **DOCUMENT** additional action or other data below:

FSM / RTL DATE

[ ] 8.7.2 All personnel affixing initials to these work instructions **PROVIDE** the information listed in the PERSONNEL DATA table below:

PERSONNEL DATA

PRINTED NAME	SIGNATURE	INITIALS	DATE

DRAFT

Attachment 1 Page 1 of 2

CMR Monitoring
[ESS-2014-03]

To ensure compliance with ESS-2014-03, Re-Entry Evaluation of the Safety of the Situation, the following items will be monitored by a CMRO:

- **IF** any of the differential pressure readings identified below reach the alarm value,

  THEN NOTIFY the Re-entry Team to exit the U/G. **[ESS-2014-02-01]**
  - PDAH-056-002/006 MOD EFF. FILTER HEPA UNIT 41-B-856/857 CLOGGED
  - PDAH-056-003/007 HIGH EFF. FILTER HEPA UNIT 41-B-856/857 CLOGGED
  - PDAH-056-004/008 1st HEPA FILTER HEPA UNIT 41-B-856/857 CLOGGED
  - PDAH-056-005/009 2nd HEPA FILTER HEPA UNIT 41-B-856/857 CLOGGED
  - 413 UVFS MOD FLTR 856/857 CLOG (CMS Point # CH5602/5610)
  - 413 UVFS HI FLTR 856/857 CLOG (CMS Point # CH5604/5612)
  - 413 UVFS 1ST HEPA 856/857 CLOG (CMS Point # CH5606/5614)
  - 413 UVFS 2ND HEPA 856/857 CLOG (CMS Point # CH5608/5616)

- **IF** the differential pressure for the Waste Hoist Tower alarms,

  THEN NOTIFY the Re-entry Team to exit the U/G. **[ESS-2014-02-02]**
- **IF** any of the two differential pressures identified below are other than negative,

  THEN NOTIFY the Re-entry Team to exit the U/G. **[ESS-2014-02-03]**
  - DP Station – dp6: 313 Bulkhead – negative d/p
  - DP Station – dp12 707 Bulkhead – negative d/p
- **IF** the U/G Ventilation System shuts down for any reason,

  THEN NOTIFY the Re-entry Team to exit the U/G. **[ESS-2014-02-04]**

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Attachment 1

- A direct frisk of the filter will be performed at Station A every hour while personnel are in the U/G.

  IF the reported results indicate activity > 2000 dpm/100cm^2 alpha or > 10000 dpm/100cm^2 beta,

  THEN NOTIFY the Re-entry Team to exit the U/G. **[ESS-2014-02-05]**

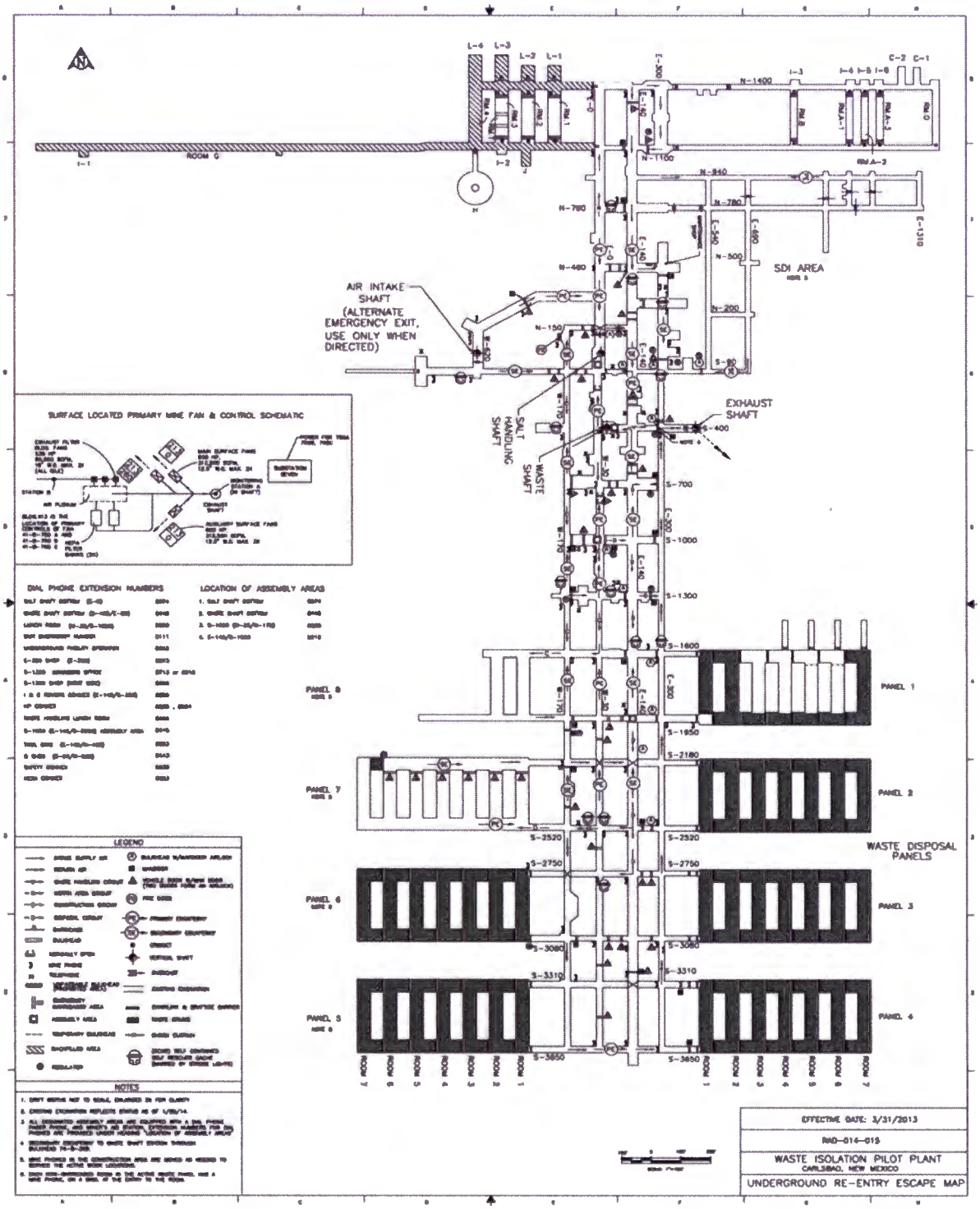
_____/_____

CMRO DATE

DRAFT

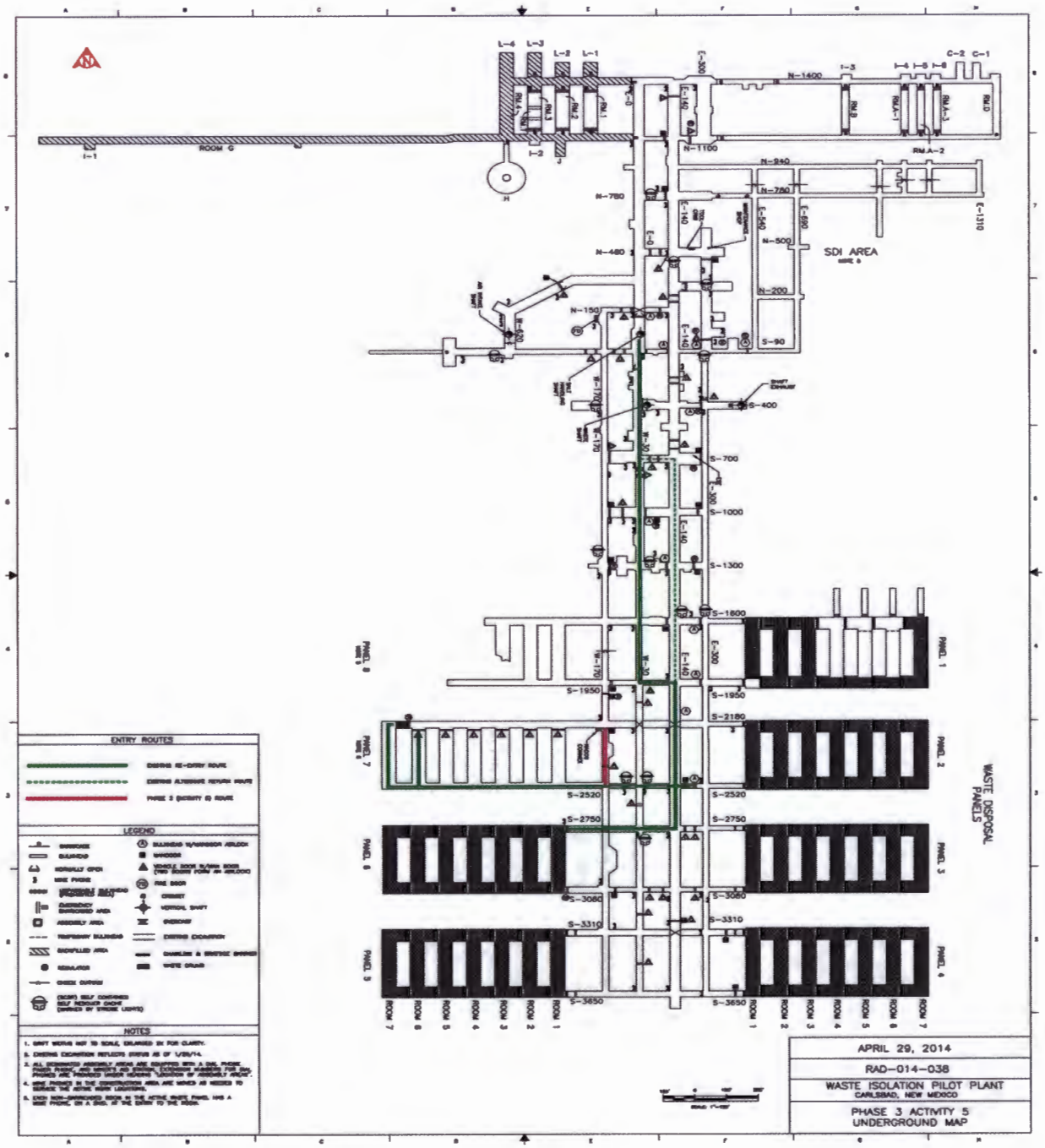
Attachment 2

Reentry Escape Route Map



Attachment 3

Phase 3 Underground Map



Attachment 4

Geotechnical Engineering Ground Control Guidance Information

Geotechnical Engineering Ground Control Guidance Information

Investigation Route	Roof Bolt Pattern	Bolt Loss History Feb-March 2010-2013 Maximum[1], Average[2]	Geotechnical Instrumentation Rates	Maintain a Safety Factor of 1.5 Max Acceptable Bolt Loss in Newest Roof Bolt Pattern (Broken Dywidag Roof Bolts per 25 linear feet of drift)	Comments
E0 Drift					
N0 (Salt Shaft) to N150	4,6, 10-ft Mechanical	1, 1	Slightly Increasing	N/A	Single roof bolt pattern installed
N150 to N300	14-ft Dywidag	1, 1	Steady	10	Single roof bolt pattern installed
E140 Drift					
N150 to S90	12-ft Dywidag	1, 1	No Data	10	Single roof bolt pattern installed
S90 to S400	12-ft Dywidag	1, 1	Slightly Increasing	10	Single roof bolt pattern installed
S400 to S700	12-ft Dywidag	1, 1	Slightly Increasing	10	Single roof bolt pattern installed
S700 to S1000	12 and 14-ft Dywidag	7, 5	Steady	10	Multiple roof bolt patterns installed.
S1000 to S1300	12 and 14-ft Dywidag	11, 6	Steady	10	Multiple roof bolt patterns installed.
S1300 to S1600	12 and 14-ft Dywidag	12, 7	Steady	10	Multiple roof bolt patterns installed.
S1600 to S1950	12 and 14-ft Dywidag	14, 11	Steady	10	Multiple roof bolt patterns installed.
S1950 to S2180	12 and 14-ft Dywidag	16, 11	Increasing	10	Multiple roof bolt patterns installed.
S2180 to S2520	12 and 18-ft Dywidag	21, 17	Decreasing	10	Multiple roof bolt patterns installed.
S2520 to S2750	12 and 14-ft Dywidag	18, 12	Steady	10	Multiple roof bolt patterns installed.
W30 Drift					
Salt Shaft to S700	4,6, 10-ft Mechanical	1, 1	Decreasing	N/A	Multiple roof bolt patterns installed.
S700 to S1000	12-ft Dywidag	1, 1	Steady	8	Single roof bolt pattern installed
S1000 to S1300	12-ft Dywidag	2, 1	Steady	8	Single roof bolt pattern installed
S1300 to S1600	12-ft Dywidag	0, 0	Decreasing	8	Single roof bolt pattern installed
S1600 to S1950	12-ft Dywidag	0, 0	Decreasing	8	Single roof bolt pattern installed
S1950 to S2180	12-ft Dywidag	1, 1	Slightly Increasing	8	Single roof bolt pattern installed
S2180 to S2520	12-ft Dywidag	2, 1	Steady	8	Single roof bolt pattern installed
S2520 to S2750	12 and 14-ft Dywidag	1,1	Steady	8	Multiple roof bolt patterns installed.
W170 Drift					
S90 to S400	4,6 and 10-ft Mechancial	0, 0	Steady	N/A	Single roof bolt pattern installed
S400 to S700	4,6 and 10-ft Mechancial	0, 0	Steady	N/A	Single roof bolt pattern installed
S700 to S1000	4,6 and 10-ft Mechancial	0, 0	Steady	N/A	Single roof bolt pattern installed
S1000 to S1300	4,6 and 10-ft Mechancial	2, 1	Slight Increase	N/A	Single roof bolt pattern installed
S1300 to S1600	4,6 and 10-ft Mechancial	0, 0	Increasing	N/A	Single roof bolt pattern installed
S1600 to S1950	14-ft Dywidag	0, 0	Increasing	6	Multiple roof bolt patterns installed.
S1950 to S2180	14-ft Dywidag	3, 1	Increasing	6	Multiple roof bolt patterns installed.
S2180 to S2520	14-ft Dywidag	1, 1	Steady	6	Multiple roof bolt patterns installed.
N150 Drift					
E140 to E0	4,6 and 10-ft Mechancial	0, 0	Decreasing	N/A	Single roof bolt pattern installed
S90 Drift					
Salt to S90	4,6 and 10-ft Mechancial	1, 1	No Data	N/A	Single roof bolt pattern installed
E0 to E140	4,6 and 10-ft Mechancial	0, 0	No Data	N/A	Single roof bolt pattern installed
W30-W170	4,6 and 10-ft Mechancial	0, 0	Steady	N/A	Single roof bolt pattern installed
W170-W620	4,6 and 10-ft Mechancial	0, 0	Steady	N/A	Single roof bolt pattern installed

Attachment 4

Geotechnical Engineering Ground Control Guidance Information

Geotechnical Engineering Ground Control Guidance Information

S400 Drift					
E140 to E300	4,6 and 10-ft Mechancial	1, 1	No Data	N/A	Single roof bolt pattern installed
S700 Drift					
E140 to W30	14-ft Dywidag	1, 1	Steady	8	Single roof bolt pattern installed
S1600 Drift					
W30 to W170	12 and 14-ft Dywidag	0, 0	No Data	8	Single roof bolt pattern installed
S1950 Drift					
W30 to E140	14-ft Dywidag	1, 1	Decreasing	6	Single roof bolt pattern installed
W30 to W170	12-ft Dywidag	0, 0	No Data	6	Single roof bolt pattern installed
S2520 Drift					
E140 to W30	14-ft Dywidag	0, 0	Steady	8	Single roof bolt pattern installed
W30 to W170	14-ft Dywidag	0, 0	Decreasing	8	Single roof bolt pattern installed
W170 to Room 7 Waste Stack	12-ft Dywidag	N/A	Steady	N/A	Spot Bolted Only
S2750 Drift					
E140 to W30	12 and 14-ft Dywidag	2, 1	Decreasing	8	Multiple roof bolt patterns installed.
W30 to W170	12 and 14-ft Dywidag	2, 1	Steady	8	Multiple roof bolt patterns installed.
W170 to Room 1	12 and 14-ft Dywidag	0, 0	Increasing	8	Multiple roof bolt patterns installed.
AIS Access Drift					
E0-N300 to N135	12 and 14-ft Dywidag	3, 2	Steady	10	Multiple roof bolt patterns installed.
N135-W620 to AIS	12 and 14-ft Dywidag	1, 1	Steady	10	Multiple roof bolt patterns installed.

Note:

Avoid walking under clusters of broken roof bolts.

Avoid walking under segmented blocks of ground that are not supported.

Failed roof bolt plates will be numerous.

Roof bolt failures near the ribline are not as critical as those located in the center of the drift or those supporting a sagging roof beam.

The S2750 drift and ramp areas (S2520 to S2750) are the most active. Preferred route is E140 drift ramp.

Rule of Thumb: A minimum of 1 Dywidag (threaded bar) roof bolt per 45 square feet in older workings.

Newly mined areas require little heavy ground support. Most concerns are with drummy ground and shallow separations along the back/rib.

The roof bolt losses are calculated on the newest Dywidag roof bolt pattern.

[1] Largest number of February through March broken bolts in any of the 4 years.

[2] The yearly February through March broken bolt values were averaged and the average values were rounded up.

The numbers of broken bolts are based on the Latest Generation of Bolts installed and a safety factor of 1.5.

There will likely be more roof bolts broken (exceeding our go/ no go decision point) but they will be of the previous generations for which we do not take any credit for.