Appendix E
FCT Document Cover Sheet

Name/Title of Deliverable/Milestone: Re-Entry Plan for Mining into the North Experimental Area of WIPP

Work Package Title and Number: DR Salt R&D – LANL FT-13LA081801

Work Package WBS Number: 1.02.08.18

Responsible Work Package Manager: Doug Weaver (Name/Signature)

Date Submitted 7/1/2013

Quality Rigor Level for Deliverable/Milestone ☐ QRL-3 ☐ QRL-2 ☐ QRL-1 ☒ N/A* ☐ Nuclear Data

This deliverable was prepared in accordance with Nuclear Waste Partnership, LLC
(Participant/National Laboratory Name)

QA program which meets the requirements of
☐ DOE Order 414.1 ☐ NQA-1-2000 ☒ Other

This Deliverable was subjected to:

☒ Technical Review ☐ Peer Review

Technical Review (TR)
Review Documentation Provided
☒ Signed TR Report or,
☐ Signed TR Concurrence Sheet or,
☐ Signature of TR Reviewer(s) below

Peer Review (PR)
Review Documentation Provided
☐ Signed PR Report or,
☐ Signed PR Concurrence Sheet or,
☐ Signature of PR Reviewer(s) below

Name and Signature of Reviewers

_____ _____

_____ _____

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***NOTE** *In some cases there may be a milestone where an item is being fabricated, maintenance is being performed on a facility, or a document is being issued through a formal document control process where it specifically calls out a formal review of the document. In these cases, documentation (e.g., inspection report, maintenance request, work planning package documentation or the documented review of the issued document through the document control process) of the completion of the activity along with the Document Cover Sheet is sufficient to demonstrate achieving the milestone. QRL for such milestones may also be marked N/A in the work package provided the work package clearly specifies the requirement to use the Document Cover Sheet and provide supporting documentation.*

NWP
Nuclear Waste Partnership LLC

A URS-led partnership with B&W and AREVA

CO:13:02629
UFC:4250.00

March 27, 2013

Ms. Vicki Diane Snow, Contracting Officer
Office of Business
Carlsbad Field Office
U.S. Department of Energy
P.O. Box 3090
Carlsbad, NM 88221-3090

Subject: SALT DISPOSAL INVESTIGATIONS FUNDING FROM OFFICE OF NUCLEAR ENERGY

Reference: DOE Memorandum CBFO:OOB:VDS:HL:12-1211:UFC 4250.00 (DW:12:01072) from Vicki Diane Snow to Mr. Farok Sharif, dated July 2, 2012, subject: DE-AC30-01AL66444, Salt Disposal Investigations (SDI) Funding from Office of Nuclear Energy

Dear Ms. Snow:

Provided is a test plan developed for a potential future re-entry into the north experimental area to conduct forensic investigations in Experimental Rooms A1 and B. This plan was developed to determine the mining and infrastructure requirements to access the former experimental rooms.

This plan was developed as a planning effort only and did not include actual mining and re-entry or procurement of materials and equipment. Work control documents will be prepared to support the re-entry process as details and specifics of testing requirements become better defined.

If you have any questions or comments, please contact Mr. R. C. Carrasco at Extension 8698.

Sincerely,

M. P. Gonzales, Manager
Contract and Procurement Services

RCC:skc

Attachment

cc: R. Nelson, CBFO

UNIQUE #	DOE UFC	DATE REC'VD	ADDRESSEES
1300616	4250.00	MAR 27 2013	D. Snow R. Nelson

P.O. Box 2078 • Carlsbad, New Mexico USA 88221-2078
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MINING RE-ENTRY PLAN

FOR

FORENSIC INVESTIGATION OF ROOMS B AND A-1

Prepared By

NUCLEAR WASTE PARTNERSHIP LLC

March 2013

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1.0 INTRODUCTION AND BACKGROUND

The Waste Isolation Pilot Plant (WIPP) is a Department of Energy (DOE) facility operated by Nuclear Waste Partnership LLC (NWP) located approximately 32 miles east of Carlsbad, New Mexico. From 1984 through 1995 a variety of experiments were fielded by Sandia National Laboratories in the northern portion of the underground to validate WIPP's transuranic mission as a nuclear waste storage/disposal facility and to provide support to the mission of disposal of defense high-level waste in salt. When the experiments were terminated many of the components were left in place and remain in place today. As a part of the Salt Research and Development work scope funded by the DOE, a study has been initiated to assess what might be learned from a forensic investigation of those components and the affected surrounding salt. Scoping meetings among project participants identified Rooms B and A-1 as providing the greatest informational potential for initial investigations. Access to these areas has been restricted for over 15 years and the associated underground openings have not been maintained. NWP has been tasked with developing a re-entry plan and associated work control documents that would provide safe access to the former experimental areas and accommodate the requirements of the proposed forensic investigations. Based on the aforementioned scoping activities, Figure 1 presents the proposed configuration for access drifts driven from the Salt Disposal Investigation (SDI) area into the pillar between Rooms B and A-1. For the configuration shown in Figure 1, the re-entry plan prescribed in this document will address the following:

- Evaluation of the proposed investigation requirements to determine the mining requirements, e.g., drift size and/or cutouts required, to support the anticipated drilling and testing equipment to be used.
- Assessment of ground conditions and determination of ground control requirements necessary to access the former experimental rooms.
- Evaluation of the ventilation requirements during excavation of the access drifts and during experimental investigation activities following excavation.
- Evaluation of utility needs (power, communications, compressed air, etc.) to support excavation and the forensic investigation of the former experimental area.

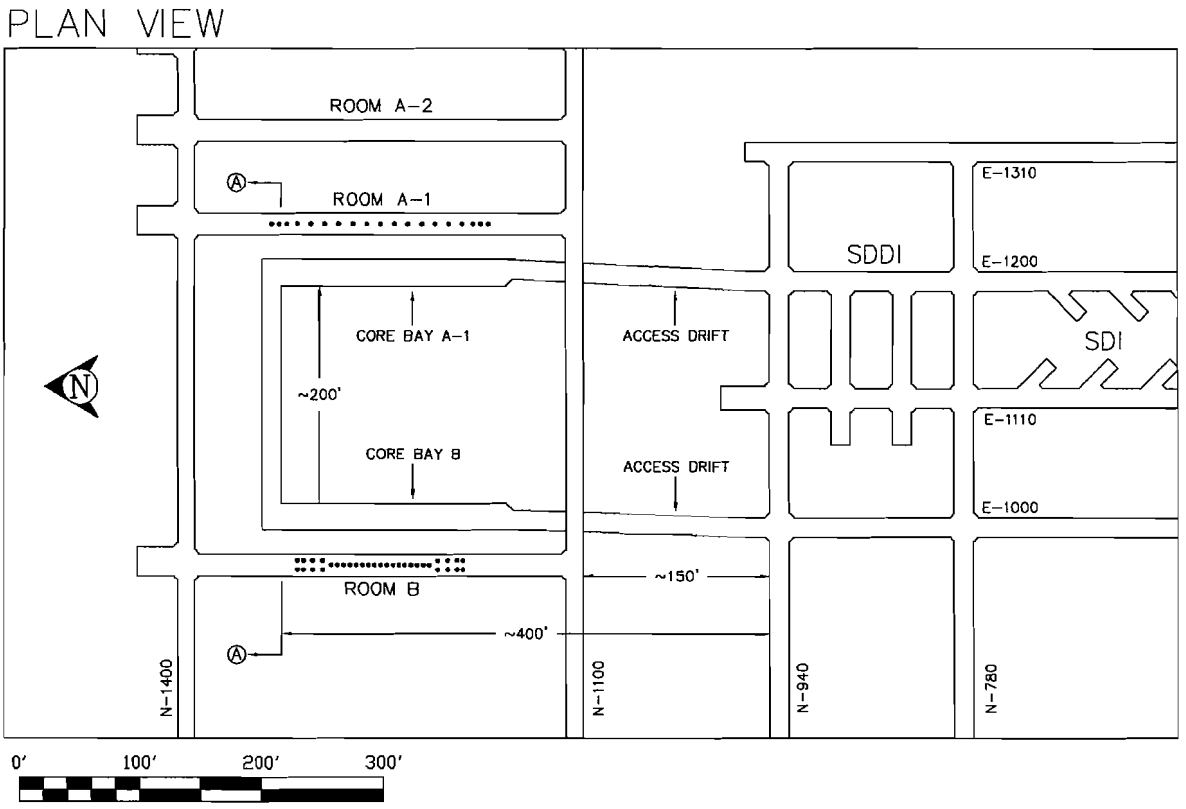

Figure 1 – Plan View of Proposed Experimental Area

The information provided in this document is for preliminary planning purposes. Work control documents will be prepared to support the re-entry process as details and specifics of testing requirements become more defined.

2.0 GROUND CONDITION ASSESSMENT

Access to the experimental area east of E-300 is currently restricted because ground monitoring and ground control are no longer performed in that area. The last time the area was entered was 10 years ago when a team went in to assess the conditions of N-1100, N-1400 and Room D. Temporary approval must be granted to access the N-1100 drift so an evaluation of the existing conditions can be made before excavation of the access drifts begins. Representatives from responsible groups (Geotechnical and Mine Engineering, Mining Operations, Safety, Sandia National Laboratories, Los Alamos National Laboratory, etc.) will perform a visual inspection of accessible areas. The inspection will begin from the nearest currently accessible location to the areas of concern. In this case the intersection of the N-1100 drift and the E-300 drift will be the starting point. On entry into the N-1100 drift, Mine Operations personnel will evaluate the ground conditions and scale down any loose material or may install temporary supports before

other inspection team members are allowed to proceed. Conditions permitting, the team will inspect the N-1100 drift at least to the two locations where the access drifts will cross near the entrances to Rooms B and A-1. The inspection of these areas will determine the ground control measures necessary to make the crossing areas secure.

Access into the N-1100 drift is limited to personnel because of floor heave and roof convergence. In some locations the floor to back clearance was less than 6 feet 10 years ago and can be expected to be less than that now. This limits ground control actions to hand scaling and possibly roof bolting with pneumatic drills. Roof bolters and mechanical scalers cannot access the N-1100 drift without trimming the floor or back to increase floor to back clearance, and that is not planned for this project.

3.0 MINING REQUIREMENTS

To provide access for core drilling and other experimental activities in support of the forensic investigation of Rooms B and A-1, drifts will be driven parallel to each room within the 260 foot wide pillar between the rooms as shown in Figure 1. These drifts will be located at the same elevation as the SDI area that is currently being excavated. This elevation places them below Rooms B and A-1. Figure 2 shows a cross section of the proposed experimental areas (also referred to as Core Bay B and Core Bay A-1 in Figures 1 and 2) and their physical relationship to Rooms B and A-1. Geotechnical and Mine Engineering determined that an offset for these parallel drifts approximately equal to the width of the test rooms (18 feet) would be sufficient to provide structural stability. For the purpose of investigations relative to the damaged rock zone, an offset distance of 20 feet has been proposed and that distance will be used for current planning purposes. The access drifts will proceed north approximately 250 feet past the N-1100 drift. This distance allows for core drilling access perpendicular to the most northern canister located in Room A-1.

The drift to access Room B will proceed north from the intersection of the N-940 and E-1000 drifts. The drift to access Room A-1 will proceed north from the intersection of the N-940 and the E-1200 drifts. These intersections are both located somewhat west of the proposed B and A-1 parallel drifts. This offset requires that each access drift be excavated at a slight northeast orientation to a point somewhat south of the N-1100 drift where they will then turn north to be parallel with Rooms B and A-1.

Approximately, the first 200 feet of the each access drift will be excavated to a nominal dimension of 16 feet wide by 13 feet in height. At a point approximately 50 feet north of the N-1100 drift, the access drifts (now running parallel to Rooms B and A-1), will be widened to 20 feet to accommodate the requirements of the experimental activities. The experimental areas will each be nominally 20 feet wide by 13 feet high by approximately 200 feet in length. Certain

areas in the experimental area may need to be widened, have the floor milled, or have cutouts mined to allow for core hole drill configurations necessary to support the forensic investigations. The access drifts will be connected at their northern ends with an east-west running drift to provide for flow-through ventilation and provide a secondary escape travel way. This drift will have nominal dimensions of 16 feet wide by 13 feet high by 200 feet in length.

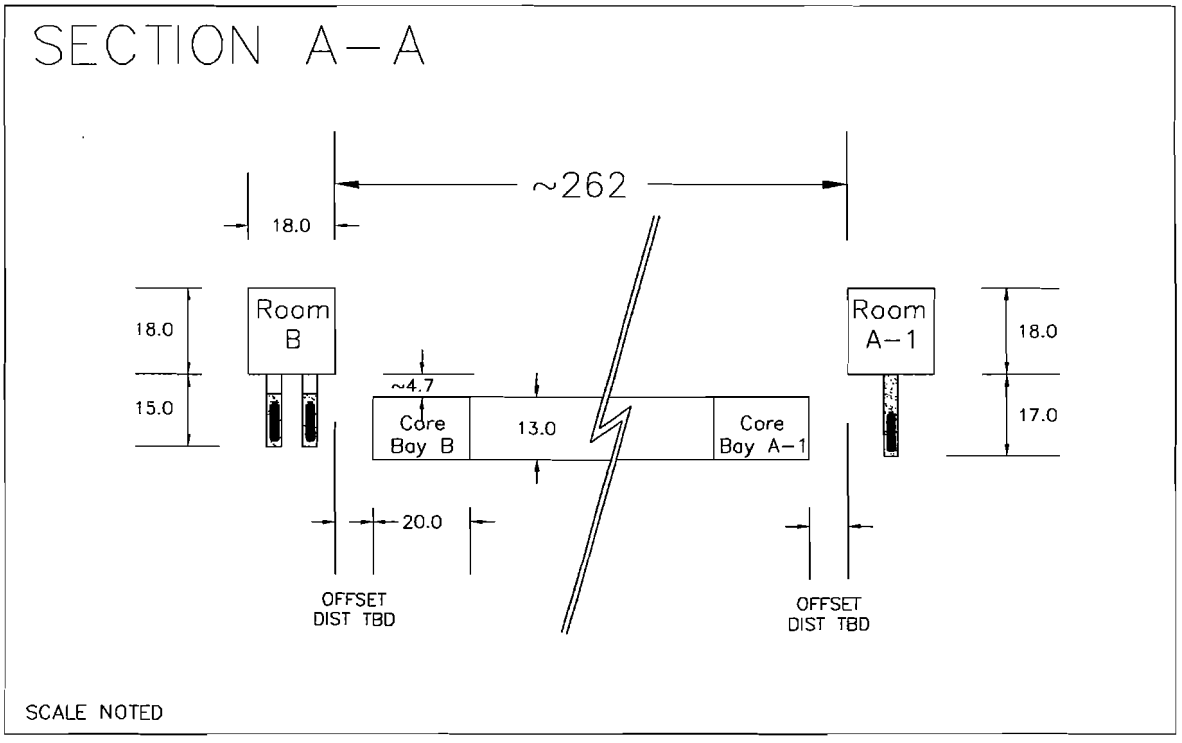

Figure 2 – Cross-Section of Proposed Experimental Area

3.1 N-1100 Drift Crossings

The elevation of the proposed access drifts will have them pass beneath the N-1100 drift leaving a beam approximately 4 to 5 feet thick. Ground control actions required to maintain a beam that thin would be difficult and impractical. The preferred option is to remove the beam. Ground control and ventilation controls associated with removal of the beam will be addressed as soon as the beam is removed.

The inspection of the access drift crossing areas will determine if scaling of loose material is necessary and if the installation of new ground control is required. Until the beam is removed,

the equipment necessary to perform scaling and ground control cannot access the drift crossing areas. The type of ground control installed will be dependent on the evaluation of the conditions in the drifts, but will likely consist of the typical ground control fixtures used at WIPP.

After the beam is removed and ground control completed at each drift crossing area, a ventilation control must be installed at the intersection to restore the ventilation circuit in the N-1100 drift. This will prevent air from short circuiting from the N-1100 drift to the access drift. The control selected for installation will be dependent on conditions at each intersection.

3.2 Mining Schedule

A day-to-day schedule cannot be presented herein, but a reasonable estimate of total time for completion can be made. Mining methods for the experimental program will be the same as those currently being used i.e., continuous drum miner and diesel haul trucks. Dimension and smoothness tolerances for these drifts will be similar to the SDI area currently being excavated. Average tons per shift numbers can be applied to this project for general excavation. A mining rate of about 250 tons per shift would be reasonable to achieve for this project. Based on the excavation dimensions presented in Section 3.0, a total tonnage estimate for the project is approximately 17,000 tons.

Activities being performed throughout the facility will ultimately determine the total time for project completion. For example, mining of the experimental access drifts may only take place one or two shifts per week. More specific schedules will be developed as part of the overall underground planning and work control process.

The removal of the roof beam at the two N-1100 drift intersections and the associated ground control and ventilation actions required will add time that is difficult to estimate until the area has been inspected and evaluated.

4.0 GROUND CONDITION MONITORING AND CONTROL

Ground control plans are area specific and are influenced by operational as well as geotechnical considerations. Because salt is a rock that creeps when subjected to load, once an opening is made a continuous process of deformation and associated fracturing is initiated that is the primary parameter affecting the condition of an excavation. The ground condition in turn is the primary parameter dictating the type of ground control measures that will be used. One of the more difficult aspects of ground control is determining and evaluating the criteria that dictate when ground control actions should be initiated. It is prudent to be as rigorous as possible in determining when to initiate ground control action and what those actions should be. The

process followed at WIPP includes evaluation of general categories of information. These categories include:

- Collection and analysis of geomechanical instrumentation data.
- Evaluation of the performance of installed ground support systems if they exist.
- Evaluation of physical observations.
- WIPP specific experience.

The proposed configuration for the access drifts presents an atypical scenario compared to typical WIPP excavations. The location of the access drifts in relation to Rooms B and A-1 places them in a stress field that is not common to existing openings and may warrant additional ground control monitoring.

The geotechnical monitoring for the access drifts will be similar to monitoring in other areas of WIPP. Geotechnical monitoring will consist of radial convergence monitors, extensometers and observation boreholes. The specific locations will be determined by Geotechnical Engineering as the access drifts are mined.

5.0 VENTILATION REQUIREMENTS

5.1 Ventilation for Mining

A minimum air flow is required during mining operations e.g., excavating with the drum miner or anywhere diesel equipment is being operated. The cubic feet per minute (CFM) requirements for an area are a function of the size (horsepower) and number of diesel equipment units being operated in that area. The auxiliary fans generally used for ventilation at the mining face provide an air flow of approximately 50,000 CFM. This volume of fresh air must be available to the fans or partial recirculation will occur.

It is anticipated that existing auxiliary fans and vent tubing will be employed for ventilation while mining the access drifts. The exact requirements will be evaluated on a day-to-day basis dependent on ongoing underground activities. The removal of the beam as discussed in previous sections will create an opening that will need to be addressed for ventilation reasons. A ventilation control will need to be installed in each drift where the beam is to be removed. The ventilation control could be a bulkhead, an overcast-like structure or simply chain-link and brattice.

5.2 Ventilation for Experimental Activities

During the experimental phase of the project the CFM requirements will also be based on the type of equipment being used in the area. If only personnel or electrically operated equipment will be in the work area, there are no CFM minimum requirements; however monitoring should

be performed to ensure oxygen and carbon monoxide levels are within acceptable levels. Ventilation controls will be installed and used to manage airflow as required during experimental activities.

6.0 UTILITY REQUIREMENTS

As with ventilation in the re-entry area, there will be different utility requirements for mining and for experimental operations. Besides the ventilation requirements mentioned previously it is anticipated that the utility requirements during the mining phase will be the same as they are for current excavation activities. Power is supplied to the continuous miner by a dedicated Portable Power Center (PPC). Communications such as mine phones are placed as required for convenience and safety.

NWP will also be responsible for utility requirements to support the proposed forensic investigation. These include electrical power, lighting, compressed air, communications, and ventilation. Exact requirements have not been defined at this point, however currently proposed tests do not suggest large power requirements. The duration of testing makes permanent or semi-permanent installation of utilities the preferred option in some areas. However, activities can be performed using temporary power such as coring with a PPC and compressors for example. Budget constraints may ultimately determine the extent the experimental areas are outfitted from a utility standpoint.

7.0 RESOURCES

Resources for this project are not included in the current work scope. Department of Energy Carlsbad Field Office direction will be necessary to provide additional resources or to change the mining priorities and schedule in order for underground operations to be able to provide resources (equipment and personnel) to perform the mining, ground control, ventilation and utility work.

Utilities for mining will be installed by Mine Operations and Underground Maintenance. Permanent utilities, if necessary, such as communications, power, compressed air, and ventilation will be installed by Mine Operations, Underground Maintenance or possibly by an outside contractor.

Funding for the activities proposed in this document is different than normal WIPP operations. Labor for mining, ground control and utility installation will use Salt Research and Development funding. Salt Research and Development funding will also be used for equipment and materials necessary to extend utilities such as power, communications, compressed air, ventilation, etc. to the access drifts and experimental areas.