



Department of Energy

Carlsbad Field Office
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JAN 06 2015

Mr. John E. Kieling, Bureau Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87508-6303

Mr. Butch Tongate
Deputy Secretary and Acting Division Director
Environmental Health Division
New Mexico Environment Department
Harold Runnels Building
1190 Saint Francis Drive, Room 4050
Santa Fe, NM 87502-5469

Subject: Information Regarding the Underground Derived Waste Storage Plan

Dear Mr. Kieling and Mr. Tongate:

The purpose of this letter is to provide the information requested in your December 2, 2014, letter regarding the *Underground Derived Waste Storage Plan*. The following are enclosed with the letter:

- *Underground Derived Waste Storage Plan*, Revision 1;
- Responses to the New Mexico Environment Department's December 2, 2014, Comments on the *Underground Derived Waste Storage Plan*; and
- Supporting documentation, procedures, and plans

We certify under penalty of law that this document and all attachments were prepared under our direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on our inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of our knowledge and belief, true, accurate, and complete. We are aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If you have any questions, please contact Mr. George T. Basabilvazo at (575) 234-7488.

Sincerely,

Original Signatures on File

Jose R. Franco, Manager
Carlsbad Field Office

Robert L. McQuinn, Project Manager
Nuclear Waste Partnership LLC

Enclosures (3)

cc: w/enclosures
T. Kliphuis, NMED
R. Maestas, NMED
C. Smith, NMED
S. Holmes, NMED
J. Sales, EPA
CBFO M&RC

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*ED denotes electronic distribution

Enclosure 1

Underground Derived Waste Storage Plan, Revision 1

- Overview – 8 pages
- Attachment 1 – 2 pages

10 Total Pages

Underground Derived Waste Storage Plan

Revision 1

1.0 INTRODUCTION

The purpose of this document is to provide the plan required by the New Mexico Environment Department (NMED) Administrative Order (Order) issued on May 12, 2014, to the U.S. Department of Energy (DOE) and Nuclear Waste Partnership LLC (NWP), collectively referred to as the Permittees. The Order, at paragraph 17(b), requires the Permittees to submit an *Underground Derived Waste Storage Plan* (Plan) for the Waste Isolation Pilot Plant (WIPP) underground disposal facility. The Order requires that the Plan include; “i. A detailed description of the planned derived waste storage areas to be created and/or used in the underground; ii. The volumetric flow rate for ventilation in each storage area, a description of how the volumetric flow rate is protective of human health and the environment and a description of how it will be achieved; iii. For the derived waste stored in the WIPP underground, a description of how the requirements found in 40 CFR 264 Subpart I will be met and how the storage area(s) will meet Permit Part 2, Section 2.3.3 – Treatment, Storage, and Disposal Facility Waste Acceptance Criteria (‘TSDF-WAC’); and iv. For the derived waste stored in the WIPP underground, a description of how all other applicable Resource Conservation and Recovery Act (RCRA) and Permit requirements will be complied with.”

The NMED issued their approval of the Plan on December 2, 2014. The NMED approval also required the Permittees to respond to NMED comments on the Plan that were included as part of the approval. Language addressing the comments is incorporated, as applicable, into Revision 1 of the Plan.

Any further revisions and updates to this Plan will be submitted to the NMED for approval before the changes are implemented pursuant to the Order paragraph 17(c).

2.0 BACKGROUND

At 11:14 P.M. on February 14, 2014, a Continuous Air Monitor (CAM) detected airborne radiation in the WIPP underground facility. When the CAM alarmed, underground ventilation exhaust air automatically shifted to flow through high efficiency particulate air (HEPA) filters to remove radioactive particulates. Since that time underground exhaust air has continued to be routed through HEPA filtration.

The radiological release contaminated portions of the underground facility. The Permittees are currently in the process of determining the extent of such contamination. Because of the contamination, activities in the underground must be carefully planned and performed to assure workers are not exposed to harmful doses of radioactivity. Throughout this Plan there are references to numerous documentation steps associated

with this planning such as preparing work packages, classifying radiation areas, and preparing and approving safety basis documents. These are important steps in assuring the required WIPP Hazardous Waste Facility Permit (Permit) activities occur within the boundaries of safe radiological operations.

Some portions of the underground facility will have to be decontaminated to achieve a safe workplace for employees to enter and perform work activities. Some of the waste that will be generated as a result of these decontamination activities will be characterized using the derived waste process in the Permit and will subsequently be managed, stored, and disposed as contact-handled transuranic (CH TRU) mixed waste. Storage of this CH TRU mixed waste in the underground is required to facilitate decontamination of underground equipment and contaminated areas. The Permit authorizes the management, storage, and disposal of CH TRU mixed waste. However, storage of derived waste in the underground prior to its disposal is not specifically addressed in the Permit. This Plan is, therefore, required pursuant to the Order to specifically authorize the storage of CH TRU mixed waste generated through the derived waste process in the underground prior to its disposal.

Every effort will be made to minimize the generation of derived waste pursuant to Permit Attachment D, Section D-4d(6). In order to minimize the amount of derived waste and to facilitate storage prior to disposal, the Permittees may manage some of the waste generated from decontamination activities as low-level waste. Low-level waste will be shipped to an off-site low-level hazardous waste disposal facility. Prior to transferring low-level waste to the surface for shipment offsite, it will be stored in the same areas in the underground as derived waste. The Permittees will manage the separation of low-level waste from non-low level waste in the derived waste storage areas by appropriately labeling respective containers. This Plan only addresses the management of derived waste in the underground. The waste expected to be generated during recovery operations is described in Permit Attachment D, Section D-4d(6). It is anticipated by the Permittees that derived waste will include contaminated salt, equipment, and personnel protective equipment.

3.0 INFORMATION REQUIRED BY THE ORDER

The following sections describe the Plan required under the Order.

3.1 Paragraph 17, Section (b) i

The Order requires the Permittees to provide a detailed description of the planned derived waste storage areas to be created and/or used in the underground.

3.1.1 Derived Waste Storage Areas

A map delineating the planned derived waste storage areas can be found in Attachment 1, *Derived Waste Storage Areas*. The location descriptions refer to underground access drifts (e.g. S-700 is the underground S-700 drift). The Permittees have identified two areas for storage of derived waste based on the current understanding of the

conditions in the underground. These areas may have to be changed as new information becomes available. Changes to locations will be submitted to the NMED for approval and the Plan will be updated.

3.1.1.1 Location 1

The area previously designated as Location 1 is no longer being considered for the storage of derived waste in the underground.

3.1.1.2 Location 2

Location 2 is situated south of S-1600 which places it inside the regulated HWMU in the transition area between Panels 9 and 10 and is located at E-140 between S-2520 and S-2750. This location was selected based on access to the south end of E-300 (through vehicle doors) and provides a short travel distance from E-300.

Nominal Dimensions: Length 230 ft, Width: 25 ft, Height: 15 ft

3.1.1.3 Location 3

Location 3 is situated south of S-1600 which places it inside the regulated HWMU in Panel 7, Room 2. This area was selected based on access in the Panel 7 area, and provides a short travel distance from all areas of the Panel where decontamination activities will be taking place.

Nominal Dimensions: Length 300 ft, Width: 33 ft, Height: 13 ft

3.2 Paragraph 17, Section (b) ii

The Order requires the Permittees to provide the volumetric flow rate for ventilation in each storage area, a description of how the volumetric flow rate is protective of human health and the environment and a description of how it will be achieved.

3.2.1 Derived Waste Storage Areas Ventilation

The post-radiological release operation of the WIPP facility incorporates continuous HEPA filtration as the primary method of protecting human health and the environment. Ventilation air passes through and by waste disposal areas and is circulated through filtration units before being discharged to the atmosphere. This assures that no air from the disposal area is discharged from the mine unfiltered. The filtration system has been operating since February 14, 2014. This mitigates the public exposure hazards associated with a potential release of particulate contaminants from waste containers and provides protection to human health and the environment. Note that the following ventilation discussion only addresses derived waste storage during recovery operations and is not intended to replace the ventilation requirements in the Permit for normal waste disposal operations.

Air is circulated into the underground repository through three shafts (Air Intake, Waste, and Salt Handling) and exits through a common shaft (Exhaust). The overall ventilation design and operation assures that the air that flows through the waste disposal areas are separated from the air that flows through the mining and experimental area. This is accomplished with an appropriate alignment of underground bulkheads and flow regulators which provide adequate ventilation flows to select work areas (including derived waste storage areas when workers are present) and to direct the air flow to the exhaust shaft. Pressure differentials are maintained between flow paths to ensure that air flow is always from areas of lower to higher contamination potential.

Underground ventilation is established in accordance with the U.S. Department of Labor, Mine Safety and Health Administration (MSHA) requirements to protect underground workers and is related to the type and number of internal combustion engines being used for work activities and providing breathable air. Sufficient ventilation air is defined by the MSHA regulations (30 CFR 57 Subpart G) promulgated for mines such as the WIPP facility. Because the mine is being ventilated in filtration mode, approximately 60,000 standard cubic feet per minute (scfm) of ventilation air is available to support activities in the underground. A portion of this ventilation is dedicated to Panel 7. Ventilation air passes through and by waste disposal areas, including Panel 7, and is circulated through filtration units, thus assuring that air follows the ventilation pathway and not into other portions of the mine or is discharged to the atmosphere unfiltered. The limited amount of ventilation air dictates the types and number of activities that can be performed at any given time in the underground. Until the Permittees install additional filtration devices, the amount of air will remain limited to its current capacity. The volumetric flow rate for ventilation in each storage area will be managed to meet the MSHA requirements. In addition, for compounds not addressed by MSHA, such as volatile organic compounds (VOCs) which are known to be present in the underground, industrial hygiene monitoring will be used to assure the storage areas are safe for workers to enter. Standards established by DOE Order and the American Conference of Governmental Industrial Hygienists (ACGIH) will be enforced to protect workers entering storage areas. Additional ventilation will be diverted to the areas to remove VOCs, if necessary, to allow entry, or workers will be required to wear appropriate personnel protective equipment (PPE). Emissions of VOCs from derived waste containers are expected to be minimal since the containers will be used to hold salt and non-waste debris that have become radiologically contaminated. There has been no indication of VOC chemical contamination associated with the release.

3.3 Paragraph 17, Section (b) iii

The Order requires the Permittees to provide a description of how the requirements found in 40 CFR 264, Subpart I will be met and how the storage areas will meet Permit Part 2, Section 2.3.3., *Treatment, Storage, and Disposal Facility Waste Acceptance Criteria* ("TSDF-WAC").

3.3.1 40 CFR 264, Subpart I Requirements

Implementation of container management requirements in this Plan for the derived waste storage areas will be controlled by written standard operating procedures (SOPs) and will be conducted by individuals trained in the management of derived waste.

3.3.1.1 Condition of Containers (40 CFR 264.171)

Only containers specified in Permit Part 4, Section 4.3.1, *Acceptable Disposal Containers*, will be used to collect, store, and dispose of derived waste. These containers will include standard 55-gallon drums, 85-gallon drums, 100-gallon drums, Standard Waste Boxes, Standard Large Boxes, and Ten Drum Overpacks (TDOPs). The containers will be standard DOT Type 7A, or equivalent, containers. These waste containers will be new (not previously used) and, therefore, in good condition. Pursuant to Permit Attachment A1-1b(1), one or more filtered vents (as described in Permit Attachment A, Section A1-1d(1)) will be installed on the container to prevent the escape of any radioactive particulates and to eliminate any pressurization within the container due to gas build-up.

If a derived waste container is not in good condition (e.g., severe rusting, apparent structural defects) or if it begins to leak, the Permittees will transfer the waste to a container that is in good condition, overpack the container, or repair/patch the container, as described in Permit Attachment A1, Section A1-1c(1).

3.3.1.2 Compatibility of Waste with Containers (40 CFR 164.172)

The Permittees will use containers made of or lined with materials which will not react with, and are otherwise compatible with, the derived waste to be stored, so that the ability of the container to contain the waste is not compromised, as required by 20.4.1.500 NMAC (incorporating 40 CFR 264.172).

Items delivered to waste containers will be inspected in accordance with applicable SOPs to ensure the absence of prohibited items. Prohibited items include chemicals that are not compatible with TRU mixed waste, the containers, the salt, or the backfill.

3.3.1.3 Management of Containers (40 CFR 264.173)

The Permittees SOPs will require that derived waste containers be closed during storage, except when it is necessary to add waste to or remove waste from the containers.

Containers may be filled and stored with derived waste in various areas of the underground as decontamination activities progress. Multiple containers may be used simultaneously, as needed, for derived waste. Once a container is filled and sealed, it will be relocated to a derived waste storage area within 72 hours or as otherwise specified in work control documents. Derived waste not relocated within 72 hours will

be documented in the Operating Record. Derived waste containers will be properly identified and marked prior to removing them from the location where they are filled.

The Permittees SOPs and training will assure that the Permittees will not open, handle, or store containers in a manner which may rupture the container or cause it to leak, as required by 20.4.1.500 NMAC (incorporating 40 CFR 264.173).

3.3.1.4 Inspection Schedules and Procedures (40 CFR 264.174)

The Permittees will inspect the underground derived waste storage area at least weekly (as access is permitted) to look for leaking containers and for deterioration of containers, as required by 20.4.1.500 NMAC (incorporating 40 CFR 264.174). If derived waste areas are not accessible due to maintenance activities (e.g., HEPA filter replacement) or work conditions (e.g., minimum ventilation is not available), then inspections will be completed once access to the area becomes available. These situations will be noted in the inspection records. In addition, the Permittees will notify NMED in the monthly report (as required by the Administrative Order) if an inspection of the underground derived waste storage area has not occurred for two or more consecutive weeks.

3.3.1.5 Containment Systems (40 CFR 264.175)

Because derived waste will not contain free liquids, there are no liquids resulting from precipitation in the underground, and there is no accumulated liquid in the underground, a containment system is not necessary pursuant with 20.4.1.500 NMAC (incorporating 40 CFR 264.175[c]).

Liquid waste may be generated as a result of decontamination activities (e.g. brine from collection system boreholes). If the Permittees intend to manage this liquid waste as derived waste, it will be solidified in accordance with SOPs prior to placement into the derived waste storage areas.

3.3.1.6 Special Requirements for Ignitable, Reactive, and Incompatible Waste (40 CFR 264.176 – 40 CFR 264.177)

No ignitable, reactive and incompatible wastes will be stored in derived waste storage areas. Items delivered to waste containers will be inspected in accordance with SOPs to ensure the absence of prohibited items including ignitable, corrosive, or reactive waste. Only derived waste or waste compatible with derived waste will be stored in designated derived waste storage areas.

3.3.1.7 Closure (40 CFR 264.178)

Because the WIPP underground repository is a miscellaneous unit, the conditions of 20.4.1.500 NMAC (incorporating 40 CFR 264.178) do not apply to derived waste storage areas. Closure of the derived waste storage areas will be conducted in accordance with Permit Attachment G, *Closure Plan*. Derived waste managed in the derived waste storage areas will not be disposed of until NMED has inspected and

released the Facility for receipt of waste and has reviewed the derived waste container information submitted under the Administrative Order dated February 27, 2014, Paragraph 14(i) and the Administrative Order dated May 12, 2014, Paragraph 18(d).

3.3.2 TSDF-Waste Acceptance Requirements

The derived waste will comply with the TSDF-WAC specified in Permit Section 2.3.3.

These criteria are met by controlling materials that will be used during decontamination and clean-up activities. Items delivered to waste containers will be inspected to ensure the absence of prohibited items, and the controls described in Section 3.3.1 above and in this section will be controlled by SOPs. Applicable procedures will be provided to the NMED.

3.4 Paragraph 17, Section (b) iv

The Order requires the Permittees to describe other applicable RCRA and Permit requirements.

3.4.1 Other RCRA and Permit Requirements Applicable to Storage of Derived Waste in the Underground

Because the Permit does not address storage of waste in the underground facility, except as authorized by the RCRA Contingency Plan, no other Permit requirements specifically apply. However, there are other RCRA requirements that apply (e.g., 40 CFR 264.35, Preparedness and Prevention). These other requirements are discussed below.

3.4.1.1 Container Locations (Paragraph 18[d] of the Order)

The location of underground derived waste containers will be reported in the monthly report. Containers of derived waste will not be stacked any higher than one high in the storage areas. The location of each container and the quantity (volume of waste container) of each hazardous waste will be recorded and maintained in the operating record as required by 20.4.1.500 NMAC incorporating 40 CFR 264.73(b)(2).

3.4.1.2 Minimum Aisle Space (40 CFR 264.35)

The Permittees will maintain a minimum aisle space that will ensure the containers can be inspected in accordance with the container storage requirements in 40 CFR 264 Subpart I. The minimum aisle space will be maintained to allow the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of the storage locations in an emergency. The minimum aisle space for derived waste containers is 44 inches.

3.4.1.3 Operating Record (40 CFR 264.73)

The Permittees shall use inspection logbooks and/or forms for the inspection of the underground derived waste containers. Original copies of these completed forms will be kept in the Operating Record in accordance with 20.4.1.500 NMAC (incorporating 40 CFR 264.73[b][5]).

3.4.1.4 Polychlorinated Biphenyls (U.S. Environmental Protection Agency Region 6 Conditions of Approval, May 21, 2013)

The *Conditions of Approval for the Disposal of PCB/TRU and PCB/TRU Mixed Waste at the WIPP Facility* authorizes the DOE to store PCB/TRU waste in the Parking Area Container Storage Unit and the Waste Handling Building Container Storage Unit. However, there is no indication that waste released in the February 14, 2014 incident was contaminated with polychlorinated biphenyls (PCBs). Therefore, PCB management requirements do not apply to the underground derived waste storage areas. If it is found that the waste is contaminated with PCBs, the Permittees will notify the EPA in writing and wait until the EPA submits a written approval authorizing the new storage area. Moreover, the storage of waste contaminated with PCBs will comply with the additional storage requirements in accordance with the conditions of approval.

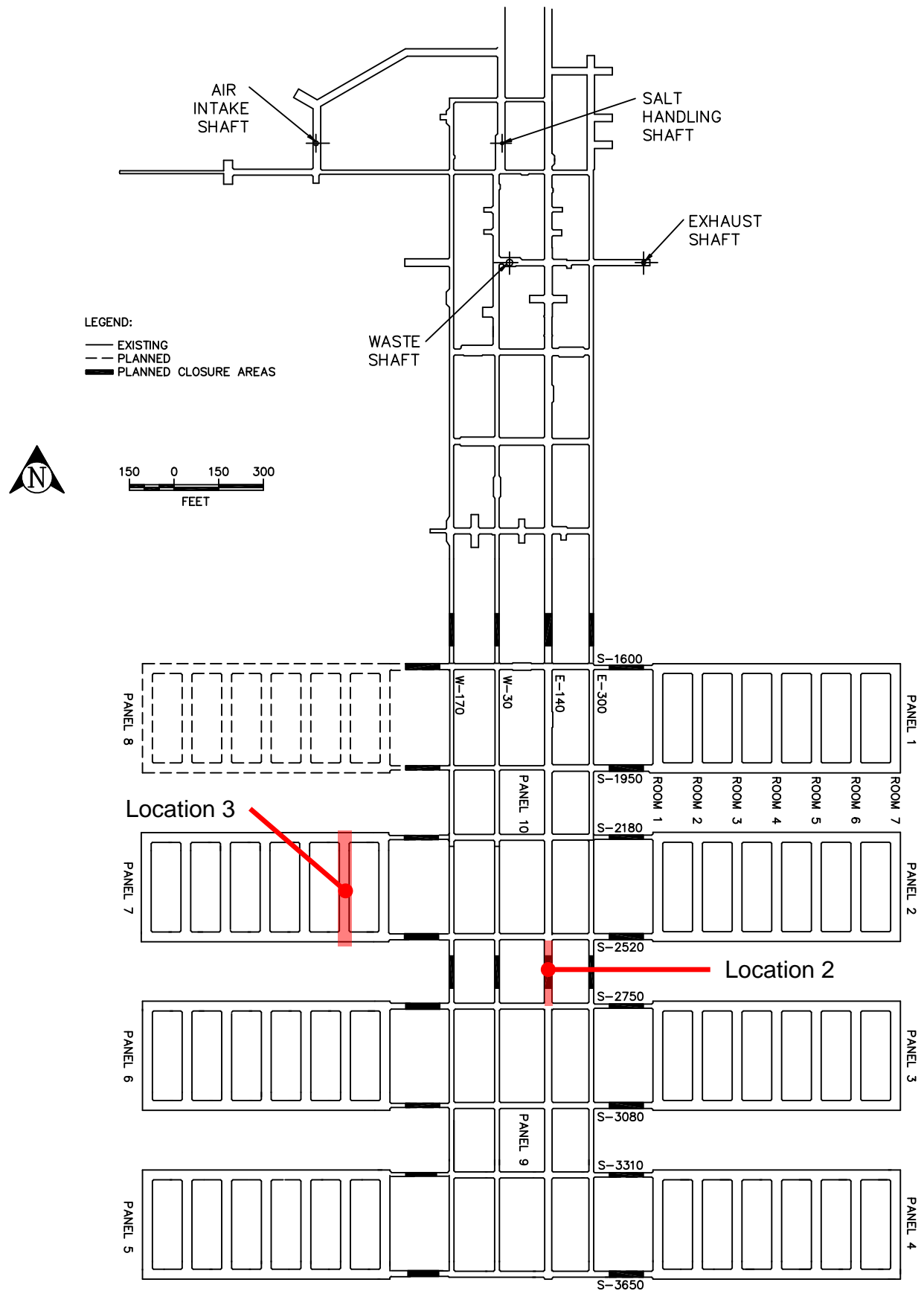
3.4.1.5 Traffic Pattern for Underground Derived Waste (Part 4, Section 4.5.3.1)

The flow of traffic in the underground during recovery will be managed to prevent the spread of radioactive contamination. Traffic routes will be specified in work control documents to achieve this goal. Records of traffic routes will be available at the facility for inspection.

4.0 PARAGRAPH 26

The Order requires the Permittees to post the final report and submissions to NMED related to this Order in the Information Repository within five (5) working days of submission to NMED. The Permittees will create a folder in the information repository specifically for these submissions.

ATTACHMENT 1
DERIVED WASTE STORAGE AREAS



Enclosure 2

Responses to the New Mexico Environment Department
December 2, 2014, Comments on the Underground
Derived Waste Storage Plan

8 Total Pages

RESPONSES TO THE NEW MEXICO ENVIRONMENT DEPARTMENT DECEMBER 2, 2014, COMMENTS ON THE UNDERGROUND DERIVED WASTE STORAGE PLAN

NMED Comment 1: *Section 2 states, “[i]n order to minimize the amount of derived waste and to facilitate storage prior to disposal, the Permittees may manage some of the waste generated from decontamination activities as low-level waste. Low-level waste will be shipped to an off-site low-level hazardous waste disposal facility. Prior to transferring low-level waste to the surface for shipment off-site, it will be stored in the same areas in the underground as derived waste.” Indicate how the Permittees will manage the separation of low-level waste from non-low level waste and how will the waste be identified.*

Response: The management of underground site-derived waste is delineated in standard operating procedures (SOPs) WP 05-WH1836, *Underground Site-Derived Mixed Waste Handling* and WP 05-WH1811, *Underground Site-Derived Mixed Waste Storage Area Inspections*. The management of low-level waste is described in SOP WP 02-RC3110, *Low-Level and Mixed Low-Level Waste Characterization for Off-Site Release for Disposal*. Copies of SOPs WP 05-WH1836 and WP 05-WH1811 issued on December 2, 2014 are attached to this submittal. After the SOPs have been revised and finalized to incorporate comments addressed in this submittal, the revised SOPs will be posted on the Information Repository and sent by electronic mail to the NMED within 30 days of issuance. A brief description of each SOP is provided in the next paragraph.

The Permittees manage the separation of low-level waste from non-low level waste by labeling respective containers. The Radiological Control department surveys waste generated in the underground. WP 02-RC3110 lists the limits used by the Radiological Control department to determine if the waste is low-level or transuranic (TRU). If the radiological characterization determines that it meets the requirements for TRU waste, then Waste Handling personnel perform the applicable steps of WP 05-WH1836. Section 5.0 of this SOP requires Waste Handling personnel to print bar code labels and designate a container number for site-derived waste. The storage containers for site-derived waste are labeled with these unique identifiers for tracking the waste. Low-level waste stored in derived waste areas is labeled in accordance with WP 02-RC3110 and WP 12-HP1500 *Radiological Posting and Access Control*.

NMED Comment 2: *Section 3.1.1.1 states that “[l]ocation 1 is outside the regulated HWMU and is located at S-700 between E-140 and E-300. This location was selected based on access to the north end of E-300 (through vehicle doors) and provides a short travel distance from E-300.” There is concern about having a storage area outside the regulated HWMU.” Proposed Location 1 is also the storage area nearest the waste shaft. The Permittees should consider using Location 1 as a storage area for low-level waste only as the Permittees prepare the waste to be shipped off site. An alternative option is to designate another location further north than proposed Location 2 but still within the regulated HWMU.*

Response: The Permittees removed Location 1 from the Underground Derived Waste Storage Plan. The revised Underground Derived Waste Storage Plan is attached to this submittal. In addition, Location 1 will be removed from SOPs WP 05-WH1836 and WP 05-WH1811. After these SOPs have been revised

and finalized by the Permittees to incorporate this response and other comments addressed in this submittal, the revised SOPs will be posted on the Information Repository and sent by electronic mail to the NMED.

NMED Comment 3: *Section 3.2.1 describes how sufficient ventilation flow will be achieved in select work areas in accordance with MSHA requirements, and how workers will be protected when entering storage areas by enforcing standards set forth by DOE Order and the American Conference of Governmental Industrial Hygienists (“ACGIH”). The Permittees shall submit copies of the SOPs that will be used to measure storage area ventilation flow rates when workers are present, and copies of procedures used to test the underground air for compliance with ACGIH VOC exposure limits, and other chemical compounds required to be monitored by MSHA.*

Response: The Permittees implement the Mine Safety and Health Administration (MSHA) ventilation requirements in the Waste Isolation Pilot Plant (WIPP) Mine Ventilation Plan. Table 2 of the WIPP Mine Ventilation Plan describes the minimum ventilation requirements for certain underground diesel equipment at the WIPP facility. Standard operating procedure WP 12-IH1828 *MSHA Air Quality Monitoring* is used to implement these requirements and is attached to this submittal. In addition, the Permittees use WP 04-VU1612 *WIPP Mine Ventilation Rate Monitoring* to document the process that demonstrates compliance with the ventilation requirements of the WIPP Hazardous Waste Facility Permit (HWFP). Copies of these documents (WIPP Mine Ventilation Plan, WP 12-IH1828 and WP 04-VU1612) are attached to this submittal.

Underground Services personnel are trained on the use of air monitoring equipment used to verify air flow in the underground. Before entering an area where waste is stored, Underground Services personnel check air flow rates. In accordance with work control document MWO00534 *Underground Entry/Exit*, personnel check work areas for air quality prior to entry. A copy of MWO00534 is attached to this submittal.

NMED Comment 4: *Section 3.2.1 states that “[e]missions of VOC from derived waste containers are expected to be minimal since the containers will be used to hold salt and non-waste debris that have become radiologically contaminated. There has been no indication of VOC chemical contamination associated with the release.” The Permittees shall provide data that supports their claim above.*

Response: Derived waste accumulated in the underground will be the result of airborne particulate contamination that was deposited throughout the mine and equipment downstream of the release event. As described in the Waste Isolation Pilot Plant Nitrate Salt Bearing Waste Container Isolation Plan evidence obtained from the radiological event indicates that an exothermic reaction occurred in the drum causing the release of airborne particulate from the container. Volatile organic compounds (VOCs) are not in particulate form and therefore would not be deposited as particulate. Therefore, it is anticipated that little or no VOCs will be present in derived waste.

NMED Comment 5: *Section 3.3.1 states that “[i]mplementation of container management requirements in this Plan for the derived waste storage areas will be controlled by written standard operating procedures (SOPs) and will be conducted by individuals trained in the management of derived waste.”*

The Permittees shall submit copies of the SOPs and training materials involved in the control of the derived waste storage areas.

Response: The only changes that will be made in order to implement the container management requirements in Section 3.3.1 of the plan involve the waste handling procedures and associated training requirements listed below.

- WP 05-WH1836, Precautions and Limitations, describes that “Only personnel qualified as Waste Handling Technician/Engineer/Radiological Control Technician (WHT/WHE/RCT), or trainees operating under direct supervision of qualified WHT/WHE/RCT, are authorized to perform waste handling activities specified in this procedure.”
- WP 05-WH1811, Precautions and Limitations, describes that “Only personnel qualified as a CH Floor, Yard and Emplacement Technician/CH Waste Handling Technician/Engineer (FY&E/WHT/WHE) or trainees operating under direct supervision of a qualified CH FY&E/WHT/WHE are authorized to perform CH Waste Handling activities specified in this procedure.”

Because the individuals who perform these procedures are already required to obtain qualifications in accordance with the Permit, no changes to their qualification cards are necessary; however, the individuals will be required to read the revised procedures. These training materials (qualification cards) are described in Permit Attachment F2 and are available in the operating record and available for NMED inspection.

Copies of the SOPs (WP 05-WH1836 and WP 05-WH1811) are attached to this submittal. Revisions to these SOPs to incorporate comments addressed in this submittal will be posted on the Information Repository and sent by electronic mail to the NMED within 30 days of issuance.

NMED Comment 6: *Section 3.3.1.2 states that “[i]tems delivered to waste containers will be inspected in accordance with applicable SOPs [standard operating procedures] to ensure the absence of prohibited items. Prohibited items include chemicals that are not compatible with TRU mixed waste, the containers, the salt, or the backfill.” The Permittees shall submit copies of the SOPs that will be used in this process.*

Response: A copy of the SOP WP 05-WH1836 is attached to this submittal. A revision to incorporate comments addressed in this submittal will be posted on the Information Repository and sent by electronic mail to the NMED within 30 days of issuance.

NMED Comment 7: *Section 3.3.1.3 mentions training and SOPs. The Permittees shall submit copies of these documents.*

Response: See the response to Comment 5.

NMED Comment 8: *Section 3.3.1.3 states that “[o]nce a container is filled and sealed, it will be [relocated] to a derived waste storage area within 72 hours or as otherwise specified in work control*

documents.” The site Operating Record shall contain an entry describing circumstances whenever the relocation time is greater than 72 hours.

Response: The Permittees will document in the operating record whenever relocation time is greater than 72 hours. The Permittees included this requirement in the Underground Derived Waste Storage Plan, Revision 1, and will document it in accordance with SOP WP 05-WH1836. The revised Underground Derived Waste Storage Plan is attached to this submittal. In addition, this requirement will be added in the next revision of the SOP WP 05-WH1836. Once the SOP has been revised and finalized by the Permittees to incorporate comments addressed in this submittal, it will be posted on the Information Repository and sent by electronic mail to the NMED.

NMED Comment 9: *Section 3.3.1.4 states that “[i]f derived waste areas are not accessible due to maintenance activities (e.g., HEPA filter replacement) or work conditions (e.g., minimum ventilation is not available), the inspections will be completed once access to the area becomes available.” NMED shall be informed if any derived waste storage area is not inspected for two or more consecutive weeks.*

Response: The Permittees will inform the NMED if any derived waste storage area is not inspected for two or more consecutive weeks in the monthly report as required by the

- February 27, 2014 Administrative Order,
- May 12, 2014 Administrative Order, and
- August 29, 2014 Amendment to Reporting Requirements Pertaining to Administrative Orders Dated February 27, 2014 and May 12, 2014.

The Permittees included this requirement in the revised Underground Derived Waste Storage Plan. The revised Underground Derived Waste Storage Plan is attached to this submittal. In addition, this requirement will be included in the revised the SOP WH 05-WH1811. Once the SOP has been revised and finalized by the Permittees to incorporate comments addressed in this submittal, it will be posted on the Information Repository and sent by electronic mail to the NMED.

NMED Comment 10: *Section 3.3.1.5 states that “[l]iquid waste that may be generated as a result of decontamination activities (e.g., brine from collection system boreholes) will be solidified in accordance with SOPs.” The Permittees shall submit copies of the SOPs that will be used in this process.*

Response: A copy of the SOP WP 05-WH1836 is attached to this submittal. A revision to incorporate comments addressed in this submittal will be posted on the Information Repository and sent by electronic mail to the NMED within 30 days of issuance.

NMED Comment 11: *Section 3.3.1.6 states that “[i]tems delivered to waste containers will be inspected in accordance with SOPs to ensure the absence of prohibited items including ignitable, corrosive, or reactive waste.” The Permittees shall submit copies of the SOPs related to these inspections.*

Response: A copy of the SOP WP 05-WH1836 is attached to this submittal. A revision to incorporate comments addressed in this submittal will be posted on the Information Repository and sent by electronic mail to the NMED within 30 days of issuance.

NMED Comment 12: *Section 3.3.1.7 states that “[d]erived waste stored in an area that is not an approved disposal panel will be moved to an approved disposal panel when the storage area is no longer needed.” Disposal of derived waste is not allowed until NMED has inspected and released the Facility for receipt of waste and has reviewed the derived waste container information submitted under the Administrative Order dated February 27, 2014, Paragraph 14(i) and the Administrative Order dated May 12, 2014, Paragraph 18(d).*

Response: The Permittees will not move waste that is in the underground derived waste storage areas to a disposal panel for final emplacement until NMED has inspected and released the facility for receipt of waste and has reviewed the derived waste container information. This is assured in SOP WP 05-WH1836 *Underground Site-Derived Mixed Waste Handling*, section 6.0, Note. Once the SOP has been revised and finalized by the Permittees to incorporate comments addressed in this submittal, it will be posted on the Information Repository and sent by electronic mail to the NMED. In addition, the Permittees will add this requirement to Revision 1 of the Underground Derived Waste Storage Plan. A revised Underground Derived Waste Storage Plan is attached to this submittal.

NMED Comment 13: *Section 3.3.2 states that “[i]tems delivered to waste containers will be inspected to ensure the absence of prohibited items.” The Permittees shall submit copies of the SOPs related to such inspections shall.*

Response: See the response to Comment 11.

NMED Comment 14: *Section 3.4.1.1 states that “[c]ontainers will not be stacked any higher than three high in the storage areas.” The Permittees shall submit copies of the SOPs related to derived waste handling.*

Response: A copy of the SOP WP 05-WH1836 will be posted on the Information Repository and sent by electronic mail to the NMED once it has been revised and finalized to incorporate comments addressed in this submittal. Also, the Permittees have updated the Underground Derived Waste Storage Plan to be consistent with this procedure. Containers in the underground derived waste storage area will be stacked only one high. This limitation is included the revised Underground Derived Waste Storage Plan and will be included in the next revised WP 05-WH1836.

NMED Comment 15: *Section 3.4.1.5 states that “[t]he flow of traffic in the underground during recovery will be managed to prevent the spread of radioactive contamination. Traffic routes will be specified in work control documents to achieve this goal.” The Permittees shall submit copies of the SOPs used to establish vehicle contamination minimization areas (e.g.: transition areas).*

Response: Traffic routes in the underground are specific to the location in which personnel are present. These requirements will be reflected in the work package as a Radiological Work Permit (RWP). The

RWP specifies areas that cannot be accessed. In addition, the RWP specifies requirements for entering and exiting different radiological areas. Presently, the Permittees are not using vehicles in contaminated areas, so these steps are not reflected in current work packages. When situations requiring an RWP arise, the requirements will be written into the appropriate work package and will be available for NMED inspection.

NMED Comment 16: *Attachment 1: Derived Waste Storage Areas. The Permittees shall provide nominal dimensions for these areas.*

Response: The nominal dimensions are as follows:

- Location 2: Length: 230 ft, Width: 25 ft, Height: 15 ft
- Location 3: Length: 300 ft, Width: 33 ft, Height: 13 ft

These nominal dimensions are included in the revised Underground Derived Waste Storage Plan.

NMED Comment 17: *The Permittees shall indicate how the derived waste storage and disposal data will be entered in WDS and WWIS.*

Response: The underground site-derived waste data will be entered into the WDS and WWIS by following the steps in SOP WP 05-WH1836, *Underground Site-Derived Mixed Waste Handling*. Attachment 3 of SOP WP 05-WH1836 lists the information required by the data administrator.

The location, container identification number, and volume of the waste will be tracked using SOP WP 05-WH1811 *Underground Site-Derived Mixed Waste Storage Area Inspections*, Attachments 4 and 5. The completed checklist will be maintained in the operating record, which is available for NMED inspection.

A copy of the SOP (WP 05-WH1836) is attached to this submittal. A revision to incorporate comments addressed in this submittal will be posted on the Information Repository and sent by electronic mail to the NMED within 30 days of issuance.

NMED Comment 18: *The Permittees shall indicate how the waste stream(s) will be determined (e.g.: Hazardous waste codes will be assigned to the waste and the codes by justified for assignment).*

Response: Pursuant to the Permit Part 2, Section 2.3.5, the Permittees will use the generator's characterization and knowledge of the process at the WIPP facility to characterize waste using the derived waste process. Because visual investigations are not complete in Room 7, Panel 7, the Permittees will apply the U.S. Environmental Protection Agency (EPA) hazardous waste numbers associated with the approved waste stream profile forms for all of the waste/waste streams disposed in Panel 7, Room 7. Note that D001 will not be applied because process knowledge indicates that a thermal reaction occurred in a container in Room 7, Panel 7. Because of this, the nitrate salts present would have decomposed and would no longer be present in significant quantities (see the Waste Isolation Pilot Plant Nitrate Salt Bearing Waste Container Isolation Plan, Rev. 1).

Other Clarifications

The Permittees have clarified text and made editorial changes in the Underground Derived Waste Storage Plan:

Section 2.0 Background: The Permittees revised the text in this section to clarify two points. First, the text was changed to clarify that not all portions of the underground that are contaminated will be decontaminated. However, those areas that will be decontaminated may generate CH TRU mixed waste that will be characterized using the derived-waste process. Second, the text was clarified to indicate that the request is specifically to store CH TRU mixed waste that is identified using the derived waste process because such storage is currently not addressed in the Permit.

Section 3.1.1.2: The Permittees revised the text in this section to clarify that Location 2 derived waste storage unit is in the regulated unit which begins at S-1600. This information is important when it comes to closure of the derived waste storage units because the units are in areas already designated in the Permit Closure Plan.

Section 3.1.1.3: The Permittees revised the text in this section to clarify that Location 3 derived waste storage unit is in the regulated unit which begins at S-1600. This information is important when it comes to closure of the derived waste storage units because the units are in areas already designated in the Permit Closure Plan.

Section 3.2.1: The Permittees revised the text in this section to clarify the location and function of the filtration units and that they are designed for particulates which include radionuclides. Also, the Permittees clarified that this section of the derived waste storage plan is a discussion of the ventilation of the derived waste storage areas and not a ventilation plan. The underground ventilation plan is a formal document (which is enclosed with the submittal) that covers a much broader scope, including the derived waste storage areas.

Section 3.3.1.1: The Permittees corrected a typographical error in this section.

Section 3.3.1.5: The Permittees revised the text in this section to clarify that liquid derived waste will be solidified and managed in accordance with SOPs. Other liquid waste may not need to be solidified to be managed since it will not be disposed in the WIPP repository.

Section 3.3.1.6: The Permittees made an editorial change to clarify that the requirement applies to the storage of derived waste in storage areas.

Section 3.3.1.7: The Permittees made an editorial change to clarify that the requirement for closure is in Permit Attachment G.

Section 3.3.2: The Permittees revised the text in this section to clarify that the actions apply to meeting the Treatment Storage and Disposal Facility Waste Acceptance Criteria.

Section 3.4.1.1: The Permittees corrected a typographical error in this section. Also, the Permittees revised the text to clarify that the stacking requirements only apply to derived waste. There may be two kinds of waste in the storage areas (derived and LLW). This restriction only applies to derived waste because it is the only waste included in the Permit.

Enclosure 3

Underground Derived Waste Storage Plan, Revision 1 Supporting Documentation Procedures and Plans

- **MWO00534 Revision 2** Underground Entry/Exit
 - 20 Pages
- **00CD-0001 Revision 37** WIPP Mine Ventilation Plan
 - 31 Pages
- **WP 02-RC3110 Revision 6** Low-Level and Mixed Low-Level Waste Characterization for Off-Site Release for Disposal
 - 17 Pages
- **WP 04-VU1612 Revision 8** WIPP Mine Ventilation Rate Monitoring
 - 10 Pages
- **WP 05-WH1811 Revision 0** Underground Site-Derived Mixed Waste Storage Area Inspections
 - 18 Pages
- **WP 05-WH1836 Revision 0** Underground Site-Derived Mixed Waste Handling
 - 25 Pages
- **WP 12-HP1500 Revision 18** Radiological Posting and Access Control
 - 24 Pages
- **WP 12-IH1828 Revision 5** MSHA Air Quality Monitoring
 - 9 Pages

154 Total Pages

MWO00534

Revision 2

Underground Entry/Exit

CONTINUOUS USE

[534]

APPROVED FOR USE

CHANGE HISTORY SUMMARY

Revision Number	Date Issued	Description of Changes
0	08/28/2014	New Procedure for Entry into the U/G.
1	09/04/2014	Added notes to Clarify multiple tasks to be worked concurrently. Added note to be able to perform Section 3.1 in any order.
2	11/25/2014	Removed 313/707 dP monitoring. Bulkhead 308/WHT added for monitoring. Increased personnel U/G to 74. Updated CMRO Attachment 2 with actions if 308 or WHT are in alarm or inoperable.

1.0 PURPOSE/SCOPE

This Work Control Document (WCD) implements the operational restrictions and interim controls of ESS-2014-01, Rev. 1 *WIPP Habitability Evaluation of the Safety of the Situation* and ESS-2014-03, Rev. 5a, *Re-Entry Evaluation of the Safety of the Situation (ESS)* for daily entries into the underground. The scope includes the following:

- Initial Entry into the underground
- Underground Ventilation Filtration System (UVFS) monitoring
- Perform authorized WCD(s), and/or Type 4 work with associated job hazard analysis
- Visual inspections and walkdowns
- Final Exit from the underground

2.0 PRECAUTIONS AND LIMITATIONS**2.1 PRECAUTIONS**

- Radiological conditions exist in the underground.
- Potentially unsafe ground may be encountered.
- Pinch points exist around the conveyance doors when entering/exiting the conveyance.
- Tripping hazards are present when entering/exiting the conveyance.
- Personnel may be subject to heat stress.
- Potential Organic Vapor Hazard in the vicinity of the disposal panels.
- Potential fire hazard exists underground.

2.2 LIMITATIONS

- [] 2.2.1 The controls of this Underground (U/G) Entry/Exit procedure are applicable upon the first person receiving U/G access (brassing-in) and are no longer applicable upon the last person exiting the access process (brassing-out) for each U/G entry. The following Operational Restrictions below apply unless specifically authorized by another Safety Basis Document:
 - [] 2.2.1.1 Entering WASTE HANDLING MODE in the UNDERGROUND is prohibited.
 - [] 2.2.1.2 Operation of any U/G liquid fueled vehicles is prohibited.
 - [] 2.2.1.3 Continue to operate the Mine Ventilation System in Filtration Mode.
- [] 2.2.2 The following U/G ventilation exhaust drifts are restricted access, for these activities, this is defined as:
 - [] 2.2.2.1 Panel 7, Room 7, S-2180 to E-300
 - [] 2.2.2.2 For Panel 6, South in W-170, from S-2750/W-170 to S-3650 and East in S-3650 from S-3650/W-170 to E-300
 - [] 2.2.2.3 South of S-3080
 - [] 2.2.2.4 E-300 to the Exhaust Shaft

- [] 2.2.3 Personnel MUST exit the U/G if the following differential pressure readings reach an alarm value:
- 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)
- [] 2.2.4 The following differential pressure will be monitored in the CMR:
- Bulkhead 308 Regulator
- [] 2.2.4.1 IF the differential pressure indication for Bulkhead 308 Regulator is in alarm condition OR inoperable, THEN the differential pressure for the Waste Hoist Tower (WHT) MUST be monitored in the CMR.
- [] 2.2.4.1.1 IF both the Bulkhead 308 Regulator and the WHT differential pressure instruments/indications are either in an alarm condition or inoperable, THEN timely actions described in Attachment 2 MUST be taken and maintained until either condition is corrected.
- [] 2.2.5 Radiological monitoring in accordance with WP 12-5 Waste Isolation Pilot Plant Radiation Safety Manual MUST be established near clean/contaminated area boundaries in the U/G while personnel are in the U/G.
- [] 2.2.6 Personnel MUST exit the U/G if the UVFS shuts down.
- [] 2.2.7 Performance of a direct frisk of the filter at Station A every hour is required while personnel are in the U/G.
- [] 2.2.7.1 Personnel MUST exit if results indicating activity > 2000 dpm/100cm² alpha or > 10000 dpm/100cm² beta.

- [] 2.2.8 Visual Ground Control inspections will be performed and evaluated upon entry into the underground as personnel traverse using Attachment 4, Geotechnical Engineering Ground Control Guidance Information.
- [] 2.2.9 ONLY open one door at a time when traveling through airlocks, unless authorized by U/G Services.
- [] 2.2.10 Evidence related to the underground haul truck fire incident and the fire scene shall not be disturbed.
- [] 2.2.11 Evidence related to the U/G Radiological Event shall not be disturbed.
 - [] 2.2.11.1 Entrance into Panel 7 Room 7 requires authorization from the Carlsbad Field Office (CBFO) Wes Mouser or designee and the AIB Ted Wyka or designee.
- [] 2.2.12 U/G access will be directed in WP 04-AD3013. Personnel shall obtain an approved Underground Access Pass (UAP) issued by the Underground Controller.
- [] 2.2.13 U/G access is limited to 74 personnel on the condition the Waste Hoist is In-Service, otherwise access is limited to 24 personnel.
- [] 2.2.14 Radiological – Entry will be performed in accordance with the requirements and limitations of the applicable Radiological Work Permit.
 - [] 2.2.14.1 Radiological surveys are performed on the floor and up to eight feet high on the ribs, should any work be performed above eight feet, Radcon will determine if an additional survey is required.

- [] 2.2.15 Air Quality – Underground Services personnel will perform air quality checks in work areas. The tables below are to reference for action levels and alarm levels.

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%	

Respiratory Protection	Protection Factor	Alarm Level
No respirator	0	5 ppm
Full Face, negative pressure with Organic Vapor Cartridges**	50	50 ppm*
PAPR with Organic Vapor Cartridges**	1000	50 ppm*
* Upon instrument alarm, personnel must retreat to a safe area and consult with Industrial Safety / Industrial Hygiene. ** Respirator cartridges must protect against Organic Vapors (OV) or Organic Vapors/Acid Gas (OVAG)		

- [] 2.2.16 Combustible loading to be minimized in the U/G, only materials required to execute the planned work will be taken into the U/G. Unused materials unless properly stored or controlled will be removed from the U/G at the end of the work evolution and/or shift.
- [] 2.2.17 Personnel will be directed to evacuate and exit the U/G if there is an indication of fire.

3.0 PREREQUISITES

NOTE

Steps [] 3.1.1 through [] 3.1.12 may be performed in any order.

3.1 ADMINISTRATIVE

- [] 3.1.1 **FIELD WORK SUPERVISOR (FWS) CONDUCT** pre-job brief per WP 04-AD3030.
- [] 3.1.2 **FWS ENSURE** all personnel have read, understand and have signed the applicable RWP.
- [] 3.1.3 **FWS ENSURE** the Hoists to be used are In-Service.
- [] 3.1.4 **FWS ENSURE** operability of a decontamination facility.
- [] 3.1.5 **FWS ENSURE** Toplander & Radcon understand the requirement to remain available to perform duties by donning respiratory protection should a Shelter-in-Place protective action be required following an event during performance of this evolution.
- [] 3.1.6 **FWS ENSURE** Site Medical Nurse or Emergency Services Technicians perform vitals and assessment of personnel entering the U/G that are required to wear respirators AND document results.
- [] 3.1.7 **FWS ENSURE** Facility Operations has confirmed the availability of both standby diesel generators during the performance of this WCD.
- [] 3.1.8 **FWS ENSURE** personnel understand the preferred routes to travel, as well as Escape Map routes in the event of an emergency egress AND are knowledgeable with the process of donning and using both the W65 Self-Rescuer and the SCSR should a fire occur in the U/G reference Attachment 3.
- [] 3.1.9 **FWS ENSURE** a Senior Supervisory Watch (SSW) has been designated to be present during the performance of the WCD.
- [] 3.1.10 **FWS ENSURE** personnel understand the requirement to have at least one hand-held ABC Fire Extinguisher for each work activity and/or work location.

- [] 3.1.11 **FWS ENSURE** a qualified live fire (FWT-101) trained member is assigned to each work activity and/or work location.
- [] 3.1.12 **FWS ENSURE** contingency staffing requirements are met and the personnel understand the requirements described in Section 5.1.
- [] 3.1.13 **FWS ENSURE** all Administrative Prerequisites are complete.

SIGN-OFF FWS**3.2 TASK PREPARATION**

- [] 3.2.1 **FWS ENSURE** items shown in Section 6.0, Special Tools/Equipment are staged and ready for use.

4.0 SPECIAL TRAINING/MEDICAL REQUIREMENTS**4.1 Fire Watch Training (FWT-101)**

5.0 CONTINGENCY STAFFING

5.1 The following contingency staffing is required to be on-call; Individual activities that are high impact/high risk requiring staffing to be on-site and remain on-site for the duration of such activities will specify this requirement.

- Emergency Response Team (ERT)
- Mine Rescue Team (MRT)
- Emergency Services Technicians (EST)
- Site Medical Nurse
- Facility Operations
- Emergency Operations Center personnel

6.0 EQUIPMENT

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Description
Hard Hat
Cap Lamp
Safety glasses with side shields
Hard Toe Shoes
W65 Self Rescuer Respirator
Radiological Protective Clothing / Equipment listed as required by RWP

TOOLS AND EQUIPMENT

Description
*Multi-Gas Detector(s)
MiniRae 3000 Photo Ionization Detector(s) (PID)
WBGTi Heat Stress Monitor(s)
*Bladewerx SaberAlert Cam(s)
*Fire Extinguisher(s)

* - Required Item, all other as required.

7.0 WORK INSTRUCTIONS

NOTE

Section 7.1 is performed for the initial entry of the day. Steps [] 7.1.1.3 and [] 7.1.3 may be performed at any time AFTER the initial U/G entry allowing personnel to enter the U/G to perform authorized work.

7.1 INITIATION OF ENTRY

[] 7.1.1 **FWS ENSURE** the following:

[] 7.1.1.1 Radcon **COMPLETE** initial hourly direct frisk of filter on STATION A AND THEN report completion time to the CMRO.

[] 7.1.1.2 Central Monitoring Room Operator (CMRO) **INITIATE** monitoring limitations in Attachment 2.

[] 7.1.1.3 **AUTHORIZE** U/G Controller to commence personnel brass-in.

SIGN-OFF FWS

SIGN-OFF CMRO

[] 7.1.2 **IF** Shaft Inspections are due,

THEN FWS REQUEST the Shaft Inspection PMs be performed.

[] 7.1.2.1 **IF** Shaft Inspections are performed and no other work is authorized,

[] 7.1.2.2 **THEN** Proceed to Section 7.4.

[] 7.1.3 **FWS AUTHORIZE** Hoist Operations to transport personnel and support materials to the underground.

SIGN-OFF FWS

[] 7.1.4 **REENTRY PERSONNEL PERFORM** the following at the Operating Base and Radiological Buffer Area (RBA):

- Air monitoring readings
- Personnel checks
- Verify radiological conditions
- Inspect Ground conditions

[] 7.1.5 **FWS COMMUNICATE** status to CMR. A status of “SAT” may be used to indicate the criteria above (e.g., air quality, heat stress, ground control, and radiological conditions) has been satisfied.

NOTE

Multiple WCDs or visual inspections/walkdowns may be authorized for each day's entry and be performed concurrently.

7.2 PERFORM AUTHORIZED WORK

[] 7.2.1 **TRAVERSE** to identified work location performing the following:

- Visual ground control assessment using Attachment 4
- Radiological surveys as required and observing the established postings
- Air monitoring readings

[] 7.2.1.1 **COMMUNICATE** to the FWS upon initial arrival at work location AND THEN periodically communicate status/location to FWS (e.g., 30, 45, 60 minutes).

[] 7.2.1.2 **FWS MAINTAIN** Log Book of time and location of periodic communication.

[] 7.2.2 **PERFORM** the following:

- Authorized WCD(s)
- Type 4 work with associated job hazard analysis
- Visual inspections and walkdowns

NOTE

Authorized work may complete at different times, Section 7.3 may be performed multiple times allowing personnel to exit the U/G after performing work.

7.3 COMPLETION ACTIVITIES

- [] 7.3.1 **TRAVERSE** to Operating Base.
 - [] 7.3.1.1 **COMMUNICATE** location to FWS.
 - [] 7.3.1.2 **HOIST OPERATIONS TRANSPORT** personnel and support materials to the surface.
 - [] 7.3.1.3 Personnel **BRASS-OUT**.
-

NOTE

Termination of entry is for the last mantrip of the day.

7.4 TERMINATION OF ENTRY

- [] 7.4.1 **FWS VERIFY** with the U/G Controller head count for last mantrip.
- [] 7.4.2 **FWS ENSURE** the following:
 - [] 7.4.2.1 The last person brassing-out.
 - [] 7.4.2.2 CMRO **TERMINATE** monitoring Attachment 2.
 - [] 7.4.2.3 Radcon **COMPLETE** final probe of filter on STATION A AND THEN report completion time to the CMRO.

SIGN-OFF FWS
SIGN-OFF CMRO

7.5 WASTE DISPOSITION

NOTE

Step [] 7.5.1 may be completed as a post action step if radiological waste remains in the U/G or is staged for processing during a later work shift. The waste may remain U/G or be placed by the Top Lander, Radcon, or other approved staff in a radiological storage area (i.e. connex or radiological waste storage structure/area) awaiting final data collection and processing.

[] 7.5.1 **IF** Radiological Waste is processed,

THEN FWS ENSURE RCTs affix the radiological survey label containing contact and 30 cm dose rates measured in $\mu\text{R/hr}$ scale range to the bag / container.

[] 7.5.1.1 **RCT ENSURE** the Radiological Survey Number is recorded on the radiological survey label.

ATTACHMENT 1 – SIGN-OFF SHEET**PREREQUISITES**

Section	Action	Initials
[] 3.1.12	Administrative Prerequisites complete	FWS _____ DATE _____ TIME _____

PERFORMANCE

Section	Action	Initials
[] 7.1.1.1	STATION A Initial hourly direct frisk Complete	FWS _____ CMRO _____
[] 7.1.1.2	CMRO Monitor limitations on Attachment 2	
[] 7.1.1.3	Personnel authorized to brass-in	
[] 7.1.3	Hoist Operations authorized to transport personnel	FWS _____
[] 7.4.2.1	Last person brass-out	FWS _____ CMRO _____
[] 7.4.2.2	CMRO Terminate Monitoring limitations on Attachment 2	
[] 7.4.2.3	Final probe of STATION A	

PERSONNEL DATA

Printed Name	Signature	Initials	Date

CMR Monitoring [ESS-2014-03]

To ensure compliance with ESS-2014-03, Rev. 5a, Re-Entry Evaluation of the Safety of the Situation, the following items will be monitored by a CMRO:

- 1) **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-2014-03 Rev.5a]
 - 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)

- 2) **CMRO MONITOR** Bulkhead 308 Regulator
IF the differential pressure for Bulkhead 308 Regulator is in alarm or inoperable,
THEN CMRO MONITOR the dp for the WHT. [ESS-2014-03 Rev.5a]

- 3) **IF** both Bulkhead 308 Regulator and WHT are in alarm or inoperable,
THEN CMRO PERFORM the following: [ESS-2014-03 Rev.5a]
 - **OPEN** the WHT doors to either the WHB CH or RH Confinement Ventilation Systems
 - **ENSURE** CAMs are installed, operable and monitored at the following locations:
 - Waste Hoist Collar area
 - Second floor of the WHT
 - CH Conveyance Loading Room
 - RH Facility Cask Loading Room
 - Auxiliary Air Intake
 - **DETERMINE** actions with FSM that are required to restore either Bulkhead 308 Regulator or WHT d/p monitoring

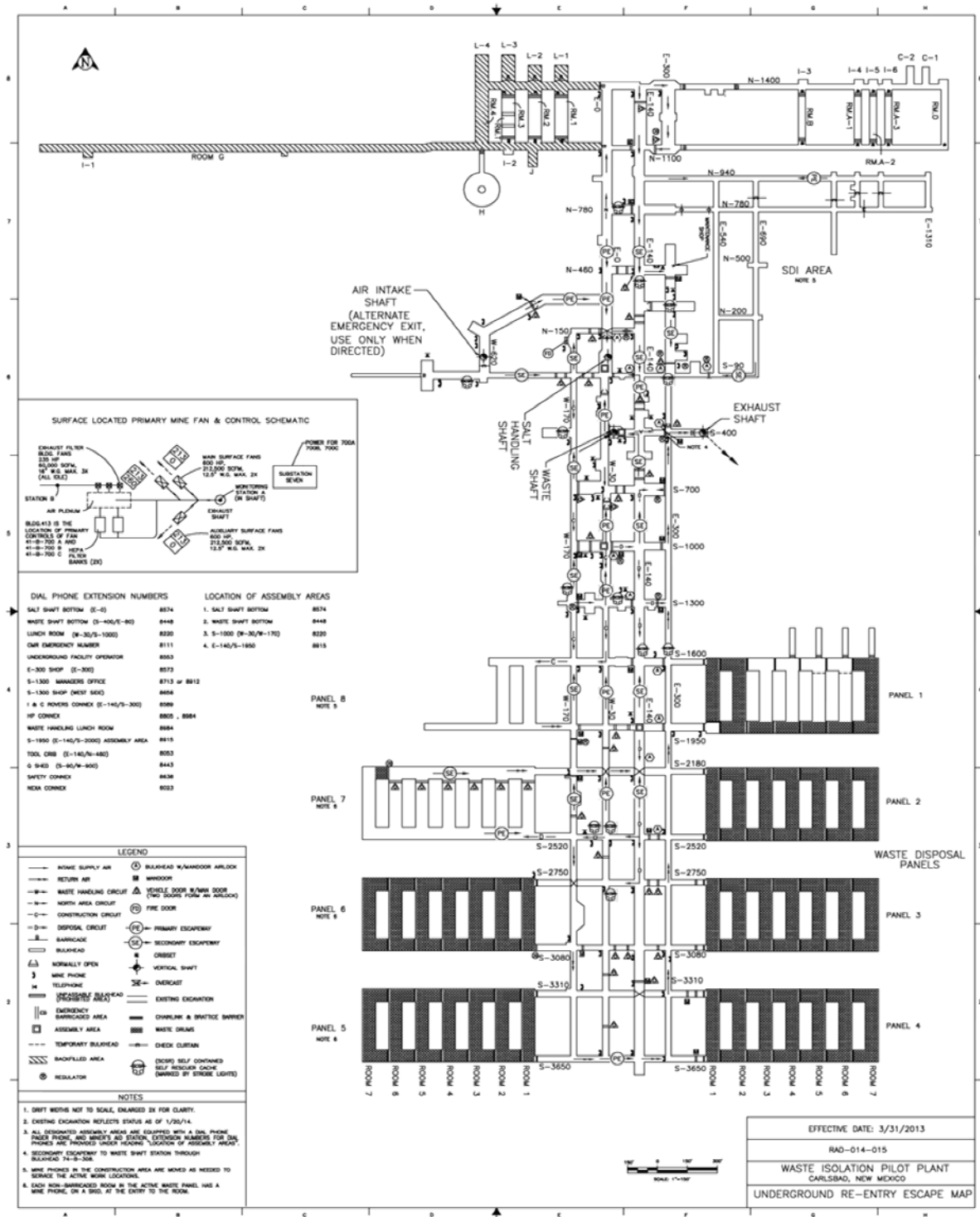
**CMR Monitoring
[ESS-2014-03]**

4) **IF** the U/G Ventilation System shuts down for any reason,
THEN CMRO NOTIFY the Re-entry Team to exit the U/G. [ESS-2014-03 Rev.5a]

5) 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/100cm² alpha or > 10000 dpm/100cm² beta,

THEN CMRO NOTIFY the Re-entry Team to exit the U/G. [ESS-2014-03 Rev.5a]



Geotechnical Engineering Ground Control Guidance Information

					Resin-anchored rock bolts per 25 linear feet of drift to maintain safety factor of 1.5	
	<u>Drift Width</u>	<u>Roof Beam Thickness</u>	<u>Pattern(s)</u>	<u>Weight of Roof Beam</u>	<u>Min. Intact</u>	<u>Max. Failed</u>
	(ft)	(ft)		(lb/linear-foot)		
<u>E0 Drift</u>						
NO (Salt Shaft) to N150	24	N/A		N/A	N/A	
N150 to N300	25	8.3	6x5	28013	23	13
N300 to N460	25	7.3	6x5	24638	21	15
N460 to N780	25	6.5	6x5	21938	18	18
N780 to N1100	25	6.5	6x5	21938	18	18
N1100 to N1400	25	6.5	6x5	21938	18	18
<u>E140 Drift</u>						
N1400 to N1100	25	6.4	6x5	21600	18	18
N1100 to N780	25	8.1	6x5	27338	23	13
N780 to N460	25	8.0	6x5	27000	23	14
N460 to N150	25	8.0	6x5	27000	23	14
N150 to N460	25	8.0	6x5, 5x5	27000	23	39
N150 to S90	25	8.3	6x5, 5x5	28013	23	38
S90 to S400	25	8.3	6x5, 5x5	28013	23	38
S400 to S700	25	6.0	6x6, 6x6	20250	17	44
S700 to S1000	25	4.2	5x5 *	14175	12	18
S1000 to S1300	25	5.8	5x5, 5x5	19575	16	34
S1300 to S1600	25	5.9	5x6, 5x5	19913	17	44
S1600 to S1950	25	5.9	5x6, 5x5	19913	17	44
S1950 to S2180	25	5.7	5x6, 5x5	19238	16	45
S2180 to S2520	25	6.0	6x5, 6x5	20250	17	49
S2520 to S2750	25	5.4	6x5, 6x5	18225	15	51
S2750 to S3080	25	5.7	6x5, 6x5	19238	16	50
<u>W30 Drift</u>						
S90 to S700	20	8.6	5x5	23220	19	11
S700 to S1000	20	8.6	5x5, 6x5	23220	19	42
S1000 to S1300	20	7.7	5x5, 6x5	20790	17	44
S1300 to S1600	20	8.3	5x5, 6x5	22410	19	42
S1600 to S1950	20	8.1	5x5, 6x5	21870	18	43
S1950 to S2180	20	7.9	5x5, 6x5	21330	18	43
S2180 to S2520	20	7.5	5x5, 6x5	20250	17	44
S2520 to S2750	20	6.9	5x5, 6x5	18495	15	46
S2750 to S3080	20	6.1	5x5, 6x5	16538	14	47

Geotechnical Engineering Ground Control Guidance Information

	Drift Width (ft)	Roof Beam Thickness (ft)	Pattern(s)	Weight of Roof Beam (lb/linear-foot)	Resin-anchored rock bolts per 25 linear feet of drift to maintain safety factor of 1.5	
					Min. Intact	Max. Failed
W170 Drift						
N150 to S90	14	8.0	Mechanical			10
S90 to S400	14	7.0	5x5	13230	11	19
S400 to S700	14	5.5	5x5	10395	9	21
S700 to S1000	14	6.6	5x5	12474	10	20
S1000 to S1300	14	8.9	5x5	16821	14	16
S1300 to S1600	14	8.5	5x5	16065	13	17
S1600 to S1950	14	8.8	5x5	16632	14	16
S1950 to S2180	14	8.0	5x5	15120	13	17
S2180 to S2520	14	7.9	5x5	14931	12	18
S2520 to S2750	14	7.9	5x5	14931	12	18
S2750 to S3080	14	5.7	5x5	10679	9	21
North Cross Drifts						
N460 from E140 to E0	25	7.8	5x5*	26325	22	8
N780 from E140 to E0	14		Mechanical			10
N1100 from E140 to E0	14		Mechanical			10
N1400 from E140 to E0	14		Mechanical			10
N1100 from E300 to E140	14		Mechanical			10
N1400 from E300 to E140	14		Mechanical			10
E300 Drift						
N1400 to N1100	25	6.1	5x5	20588	17	13
N460 to N250	25	8.0	4x5	27000	23	3
N250 to S90	25	8.0	5x5	27000	23	8
N150 Drift						
E140 to E0	14	8.0	Mechanical	15120	13	
S90 Drift						
Salt to S90	32	8.0	n/a	34560	29	10
E0 to E140	12	8.0	n/a	12960	11	10
W30-W170	14	8.0	n/a	15120	13	10
W170-W620	14	9.0	Mechanical	17010	14	10
S400 Drift						
E140 to E300	21	8.0	5x5*	22680	19	11
S700 Drift						
E140 to W30	20	8.0	6x5*	21600	18	18

Geotechnical Engineering Ground Control Guidance Information

					Resin-anchored rock bolts per 25 linear feet of drift to maintain safety factor of 1.5	
	Drift Width	Roof Beam Thickness	Pattern(s)	Weight of Roof Beam	Min. Intact	Max. Failed
	(ft)	(ft)		(lb/linear-foot)		
<u>\$1600 Drift</u>						
W30 to W170	20	8.0	5x5*	21600	18	12
<u>\$1950 Drift</u>						
W30 to E140	20	8.0	5x5*	21600	18	12
W30 to W170	20	8.0	5x5*	21600	18	12
<u>\$2520 Drift</u>						
E140 to W30	20	8.0	5x5*	21600	18	12
W30 to W170	20	8.0	5x5*	21600	18	12
W170 to Room 7 Waste Stack	20	8.0		21600	N/A	n/a
<u>\$2750 Drift</u>						
E140 to W30	20	8.0	5x5*	21600	18	12
W30 to W170	20	8.0	5x5*	21600	18	12
W170 to Room 1	20	8.0		21600	18	n/a
<u>AIS Access Drift</u>						
E0-N300 to N135	25	8.0	5x5	27000	23	8
N135-W620 to AIS	25	8.0	6x5	27000	23	14
<u>\$3080 Drift</u>						
E140 to W30	20	5.4	5x5*	14580	12	18
Note:						
Avoid walking under clusters of broken roof bolts.						
Avoid walking under segmented blocks of ground that are not supported.						
Failed rock bolt plates are to be counted as failed rock bolts.						
Roof bolt failures near the ribline are less critical as those located in the center of the drift or supporting a sagging roof beam.						
"n/a" and "*" designate uncertainty about the number of installed rock bolts. This will be refined as information is gathered.						
A conservative roof beam thickness of 8.0 is used when the actual thickness of the roof beam is unknown.						
Rule of Thumb: A minimum of 1 intact Dywidag (thread bar) roof bolt per 30 square feet in older workings.						

00CD-0001
Revision 37

WIPP Mine Ventilation Plan

Cognizant Section: Mine Engineering

Approved by: Rey Carrasco



A URS-led partnership with B&W and AREVA

WIPP Mine Ventilation Plan
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WIPP Mine Ventilation Plan Change History			
Date	Revision Number	ECO Number	Description of Change
04/30/00	6	9548, Add 2	<ul style="list-style-type: none"> Additional description added to Working Face Ventilation section to differentiate between an advancing section and a retreating one. Operating limits set in the Safety Considerations section pertaining to the Spendrup 1120-70 fans uses on the working section. Appendix E added to provide auxiliary ventilation design information.
08/03/00	7	9548, Add 3	<ul style="list-style-type: none"> Minor Clarifications, update of Table 2 for Diesel Equipment, Revision of all system drawings to depict completion of Panel 2 and installation of all necessary ventilation control devices.
03/08/01	8	10028	<ul style="list-style-type: none"> Removal of 100-75-50 Rule and disallow excessive idling of Diesel Equipment in preparation of new ruling on Diesel Particulate Matter regulations under 30 CFR §57.5060 through §57.5075. Update operator information to reflect new WTS staff. Changes are highlighted
8/22/01	9	10238	<ul style="list-style-type: none"> Clarification as to the use of brattice cloth during the waste emplacement process in the Disposal Area. Minor changes to Table 2 for Diesel Equipment. Changes to project personnel.
12/10/01	10	10330	<ul style="list-style-type: none"> Removal of the 60 foot per minute rule. Changes to project personnel. Changes to requirements for use of ducting.
06/19/02	11	No ECO	<ul style="list-style-type: none"> Document reformatted and changes made. Document controlled in QMIS.
07/16/02	12	No ECO	<ul style="list-style-type: none"> Editorial change to add piece of equipment to Table 2, Underground Diesel equipment.
03/12/03	13	10692	<ul style="list-style-type: none"> Revision to underground diesel equipment list. Updates to 54-W-001-W and 54-Z-001-W drawings. Change Westinghouse to Washington. Add a reference. Minor editorial changes.
07/08/03	14	10756	<ul style="list-style-type: none"> Revision to airflow path, routing air through S-2180 instead of S-1600.

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WIPP Mine Ventilation Plan Change History			
Date	Revision Number	ECO Number	Description of Change
12/16/03	15	10836	<ul style="list-style-type: none"> Removal of U/G booster fans, bulkheads, and vent reversal mode per ECP-1-VU00-009.
01/14/04	16	10935	<ul style="list-style-type: none"> Correction to manufacturer name, Table 2.
07/29/04	17	11069	<ul style="list-style-type: none"> Editorial change to page 1, page 15, and Table 2 and references on page 18. Replaced maps 54-W-001-W, 54-Z-001-W, and 54-W-013-W.
01/27/05	18	11198	<ul style="list-style-type: none"> Panel 3 has been added to the waste disposal ventilation circuit. This change was incorporated into the semiannual update of the MVP.
06/28/05	19	11319	<ul style="list-style-type: none"> Incorporate drawing revisions
01/11/06	20	11428	<ul style="list-style-type: none"> Incorporate drawing revisions, update references and Table 2.
05/10/06	21	11543	<ul style="list-style-type: none"> Complete rewrite, incorporate drawing revisions.
12/18/06	22	11687	<ul style="list-style-type: none"> Incorporate new diesel equipment to the equipment list and update the current and future mine footprint layouts.
07/18/07	23	11820	<ul style="list-style-type: none"> Updating drawings associated with the plan and updating the diesel equipment list.
09/14/07	24	11858	<ul style="list-style-type: none"> Correction to description of equipment 52-H-127, Table 2.
04/01/08	25	11992	<ul style="list-style-type: none"> Addition of Equipment in Table 2 and corrected Eng. Model number on 2 pieces of equipment.
12/17/08	26	12157 Add. 1	<ul style="list-style-type: none"> Addition of new diesel equipment and update current and planned maps of the U/G. Correct 74-U-129 cfm
06/10/09	27	12334	<ul style="list-style-type: none"> Remove 5 pieces of equipment and add in one new piece of equipment to Table 2 – Underground Diesel Equipment list.
12/17/09	28	12470	<ul style="list-style-type: none"> Updated to show current underground diesel equipment, a current mine map, and a map showing the projected mine layout in December 2010.

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WIPP Mine Ventilation Plan Change History			
Date	Revision Number	ECO Number	Description of Change
06/21/10	29	12600	<ul style="list-style-type: none"> Update to show current footprint and current diesel equipment.
12/31/10	30	12742	<ul style="list-style-type: none"> Updated drawings, no change to document text. Updated 54-W-001-W (Appendix A) and 54-Z-001-W (Appendix B) are available in the EFR.
06/13/11	31	12858	<ul style="list-style-type: none"> Updated to show current footprint and current diesel equipment.
12/06/11	32	12962	<ul style="list-style-type: none"> Updated to show current footprint and current diesel equipment.
07/02/12	33	13058	<ul style="list-style-type: none"> Updated to removed a "1" from Equipment #74-U-139 on Table 2 and in Step 8.3.1 change isolation doors to control doors
11/19/12	34	No ECO	<ul style="list-style-type: none"> Editorial changes in accordance with MD 1.1.
03/12/13	35	13179	<ul style="list-style-type: none"> Updated Figure 1.
11/15/13	36	13326	<ul style="list-style-type: none"> Updated Table 2 – Underground Diesel Equipment.
12/02/14	37	13494	<ul style="list-style-type: none"> Updated to address changes to current and projected ventilation configurations related to February 2014 fire and radiation release events.

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1.0 INTRODUCTION

The Waste Isolation Pilot Plant (WIPP) was authorized by Congress (Department of Energy National Security and Military Applications of Nuclear Energy Act of 1980 [Public Law 96-164]) to provide "a research and development facility to demonstrate the safe disposal of radioactive wastes resulting from the defense activities and programs of the United States exempted from regulation by the Nuclear Regulatory Commission."

To fulfill this mission, the U.S. Department of Energy (DOE) constructed a full-scale facility to demonstrate both technical and operational principles for the permanent isolation of transuranic waste. The WIPP disposal facility horizon, which includes construction (mining) and experimental and waste disposal areas, is located approximately 2,150 feet below the surface in the Salado Formation, a thick sequence of evaporites that are predominantly halite.

The WIPP underground ventilation system consists of three intake vertical shafts, interconnecting drifts and cross-cuts. Bulkheads, airlocks, and salt pillars separate the drifts. The drifts are connected to an exhaust shaft that connects to the main surface fans.

2.0 PURPOSE STATEMENT

This plan satisfies the requirements for a mine ventilation plan as required by Title 30 Code of Federal Regulations (CFR) §57.8520, "Ventilation Plan," and the "New Mexico Safety Code for All Mines." It is based on current plans, conditions, and assumptions concerning the operation of WIPP. This document will be revised at least annually to reflect any ventilation system changes.

3.0 THE MINE NAME AND OPERATOR

Name:	Waste Isolation Pilot Plant
Address:	P.O. Box 2078 Carlsbad, NM 88221-2078
Telephone Number:	(575) 234-7200
Emergency Number:	(575) 234-8111
Name of Owner:	U.S. Department of Energy
Name of Operator:	Nuclear Waste Partnership LLC (NWP)

4.0 CURRENT MINE MAP

See Appendix A for a current mine map showing the following:

- 1) Direction and quantity of principal air flows.
- 2) Locations of seals used to isolate abandoned workings.
- 3) Locations of areas withdrawn from the ventilation system.
- 4) Locations of all main, booster and auxiliary fans not shown on the Typical Face Ventilation Drawings.
- 5) Locations of air regulators and stoppings and ventilation doors not shown on the Typical Face Ventilation Drawings.
- 6) Locations of overcasts, undercasts and other airway crossover devices not shown on the Typical Face Ventilation Drawings.
- 7) Locations of known oil or gas wells.
- 8) Locations of known underground mine openings adjacent to the mine.
- 9) Locations of permanent underground shops, diesel fuel storage depots, oil fuel storage depots, hoist rooms, compressors, battery charging stations and explosive storage facilities. Permanent facilities are defined in 30 CFR Part 57.8520 as those facilities intended to exist for one year or more.

5.0 ONE-YEAR PROJECTION MINE MAP

See Appendix B for a mine map showing significant changes in the ventilation system projected for one year.

6.0 MINE VENTILATION FANS

6.1 Mine Fans and Exhaust Filter Building (EFB) Fans

A total of six surface ventilation fans (e.g., three main fans and three filtration fans) supply airflow to the underground. The main fans are 700A, 700B, and 700C. The filtration fans are 860A, 860B, and 860C. The main fans and filtration fans are located on the surface of the WIPP facility atop the Exhaust Shaft (ES), and are operated in various configurations to provide the necessary airflow to the underground. Table 1, Fan Specifications, lists the physical and operating data of these fans. The fan curves are located in Appendix C.

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Due to a radioactive particulate release in February, 2014, the main fans (700A, B, and C) have been locked out and will remain inoperable indefinitely. The WIPP underground is currently being operated in Filtration Mode. Filtration Mode consists of one 860 fan operating at a nominal 60,000 cubic feet per minute (cfm). The exhaust air from the underground is pulled by the fan through the exhaust shaft to duct on the surface. The air flows through the duct to two parallel HEPA filter assemblies located in the Exhaust Filter Building (EFB) on surface where the radioactive particles are removed from the air stream. The filtered air is then exhausted through the fan and the exhaust duct to atmosphere.

Table 1 - Fan Specifications

	MAIN VENTILATION FANS		EFB FANS
Equipment No.	41-B-700A 41-B-700B	41-B-700C	41-B860A 41-B860B 41-B860C
Manufacturer	Chicago Blower	TLT Babcock	Novenco
Model	D/1910A	14144AC/1665/0 CW (Rbr=117)	BC/542
Type	Centrifugal	Centrifugal	Centrifugal
Size (diameter - inches)	94.375	94.5	56 1/8
Speed (rpm*)	710	710	1180
Static Pressure (in. w.g.*)	12.5	9.65	13
Air Quantity (scfm*)	212,500	212,500	70400 (acfm*)
Efficiency (percent)	N/A	TBD	83.3
Blade Type	Airfoil	Airfoil	Airfoil
Motor HP	600	600	235
Voltage (v)	4160	4160	460
Inlet Vanes/range	Yes - 0-90 Deg.	Yes - 0-105	Yes - 0-90
Wheel Blade Setting	Fixed	Fixed	Fixed

* Abbreviations

rpm - revolutions per minute
in. w.g. - inches water gauge
scfm - standard cubic feet of air per minute
acfm - actual cubic feet of air per minute

6.2 Face Ventilation Fans

Diagrams showing the typical working face ventilation are found in Appendix D. One or two 100-HP Spendrup 1120-70 fans (in series as necessary) are used with ventilation ducting to exhaust the dead-end working faces. The fan curve and a fan pressure table are located in Appendix C. The face ventilation fans generally exhaust 50,000 cfm from the working area.

7.0 NUMBER AND TYPE OF INTERNAL COMBUSTION ENGINES USED UNDERGROUND

Table 2 lists the internal combustion engines used underground, along with the make and model of the unit, type of engine, make and model of the engine, brake horsepower rating of the engine, and the approval number.

Ventilation requirements for engines that do not have an MSHA Certificate number are calculated based on the VU00 System Design Description requirement of 125 cfm per brake-horsepower.

Table 2 - UNDERGROUND DIESEL EQUIPMENT							
WIPP Equip #	Manufacturer	Description	Model	Eng. Model	HP	MSHA CFM	MSHA Cert #
52-H-005A	TAYLOR	FORKLIFT (41T)	TY-820L	F10L413FW	231	20,000	24/D92-0
52-H-007C	TOYOTA	FORKLIFT (6T)	5FD70	14Z	94	11,800	Pre 7/5/2001
52-H-008A	GETMAN	CH TRANSPORTER	A-64	F5L413FW	128	10,000	24/D116-0
52-H-008B	GETMAN	CH TRANSPORTER	A-64	F5L413FW	128	10,000	24/D116-0
52-H-008C	GETMAN	CH TRANSPORTER	A-64	BF4M2012C	138	6,500	07-ENA04003
52-H-033	TOYOTA	FORKLIFT (6T)	5FD70	14Z	94	11,800	TIER 1
52-H-035	HOIST LIFT TRUCK	FORKLIFT (13T)	P260	QSB6.7	160	6,500	07-ENA060010-1
52-H-125	TAYLOR	FORKLIFT (20T)	TYO-400S	F8L413FW	185	16,000	24/D92-0
52-H-126	TOYOTA	FORKLIFT (7.5T)	5FD70	12Z	94	11,800	Pre 7/5/2001
52-H-127	TOYOTA	FORKLIFT	7FDU80	STALL 04.6137	80	10,000	TIER 2
74-G-089	IR	AIR COMPRESSOR	250 CFM	F5L912W	68	6,500	24/D115-0
74-G-147	IR	PORTABLE AIR COMPRESSOR	P260WIR/2005/A	41R18T	86	11,000	TIER 2
74-GE-001	YANMAR/HITACHI	SANITATION TRAILER	L60 AE-DE	81L	10	1,500	Pre 7/5/2001
74-H-014	PRIME MOVER	SKID STEER	L-1300	QVD	40	5,000	Pre 7/5/2001
74-H-026	TOYOTA	FORKLIFT(4T)	02-5FD35	11Z	81	10,000	Pre 7/5/2001
74-H-027	TOYOTA	FORKLIFT(4T)	02-5FD35	11Z	81	10,000	Pre 7/5/2001
74-H-034	TOYOTA	FORKLIFT (6T)	7FDU70	13Z	89	11,200	TIER 2

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Table 2 - UNDERGROUND DIESEL EQUIPMENT							
WIPP Equip #	Manufacturer	Description	Model	Eng. Model	HP	MSHA CFM	MSHA Cert #
74-H-035	TOYOTA	FORKLIFT (4-T)	5FD35	13Z	89	11,200	TIER 2
74-H-036	TOYOTA	4-TON FORKLIFT	5FD35	13Z	89	11,200	TIER 2
74-H-039	GENIE	BOOM MAN LIFT	Z34-34/22IC	D-1105	23.5	3,000	TIER 2
74-PE-001	YANMAR	PORT. GEN	6121002	LA SERIES 40544	9	1,200	Pre 7/5/2001
74-PE-003	YAMAHA	PORTABLE GENERATOR	EDL65005	ZB600-EGL	13.5	1,700	TIER 1
74-Q-014	SCAT/I.E.S.	FIRE/RESCUE TRUCK	K-60B	F3L912W	34	4,000	24/D100-0
74-U-002-A	EIMCO	LHD	913	3304NA	110	10,700	24/D88-0
74-U-002-C	Sandvik EJC	LOADER LHD	145	N0635H32	190	12,000	7E-B080-0
74-U-003	GETMAN	LUBE TRUCK	A-64	F6L912W	82	7,500	24/D102-0
74-U-004	GETMAN	LUBE TRUCK	A-64	BF4M2012C	138	6,500	07-ENA04003
74-U-006-A	EIMCO	HAUL TRUCK	985-T15	F8L413FW	185	16,000	24/D92-0
74-U-006-B	EIMCO	HAUL TRUCK	985-T15	F8L413FW	185	16,000	24/D92-0
74-U-008	GETMAN	SCISSOR LIFT	A-64	F6L912W	82	7,500	24/D102-0
74-U-023	KUBOTA	TRACTOR	L-245DT	DH1101-A	25	2,000	24/D108-0
74-U-039	EIMCO	LHD	913	F6L413FW	139	12,000	24/D92-0
74-U-040	BOBCAT	SKID STEER LOADER	17S160	V2003M-DI-T	56	3,000	07-ENA060001
74-U-114	GETMAN	SCISSOR LIFT	A-64	F6L912W	82	7,500	24/D102-0
74-U-115	FLETCHER	SCALER	SV-4D	F6L912W	82	7,500	24/D102-0
74-U-116	JLG	MANLIFT	34HA	F2L1101	28	2,500	24/D107-0
74-U-117	EIMCO	LHD	EJC-130	3304PCT	165	33,000	24/D54-56
74-U-123	ATLAS COPCO	CRAWLER DRILL	264-DC	F3L1011F	44	3,000	7E-13014-0
74-U-127	FLETCHER	SEAL CUTTER	5V-40	D-BF6MI0 13CP	255	12,000	7E-B007-0
74-U-128	FLETCHER	ROOF BOLTER	3024AD	QSB3.9	120	6,500	7E-B084
74-U-129	GETMAN	HAUL TRUCK	1248	OM904LA	174	7,500	7E-B098
74-U-130	GETMAN	HAUL TRUCK	1248	OM904LA	174	7,500	7E-B098
74-U-131	FLETCHER	ROOF BOLTER	3124AD	QSB 4.5	130	6,000	07-ENA070016
74-U-132	KUBOTA	UTILITY TRACTOR	L4240 HST	V2203	42	2,500	7E-B071
74-U-133	KUBOTA	UTILITY TRACTOR	L4240 HST	V2203	42	2,500	7E-B071
74-U-137	FLETCHER	ROOF BOLTER	3020N-AD	QSB-4.5	130	6,000	TIER 3
74-U-138	SANDVIK	4 YD. LHD	LH307	OM906LA	201	6,000	7E-B083
74-U-139	ATLAS COPCO	CRAWLER DRILL	U4	D2011L03	46	5,800	TIER 3
74-U-603	SIMMONS	BOOM LIFT TRUCK	32/216	F2L1011	28	1,500	7E-B062
74-U-606	GETMAN	SCISSOR LIFT	A-64	OM904LA	174	7,500	7E-B098
74-U-608	GENIE	BOOM MAN LIFT	Z-34/22IC	D1105-E3B	24.8	1,000	07-ENA110011
74-U-611	GENIE	SCISSOR LIFT	GS2669RT	D1105	24.5	1,000	07-ENA110011

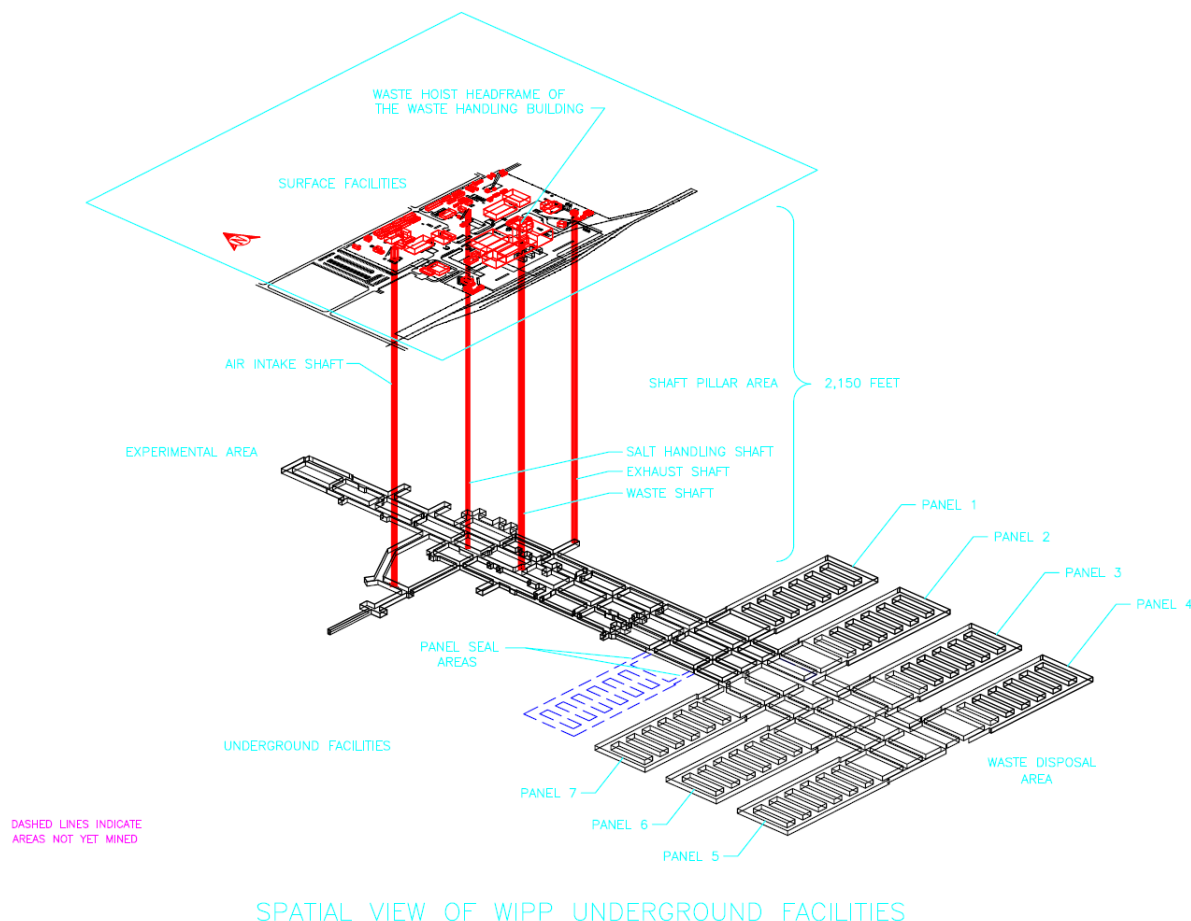
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Table 2 - UNDERGROUND DIESEL EQUIPMENT							
WIPP Equip #	Manufacturer	Description	Model	Eng. Model	HP	MSHA CFM	MSHA Cert #
74-UE-042	GETMAN	HAUL TRUCK	1248-13	F6L413FW	139	12,000	24/D92-0
74-UE-043	GETMAN	HAUL TRUCK	1248-13	F6L413FW	139	12,000	24/D92-0
74-UE-045	GETMAN	HAUL TRUCK	1248-13	OM904LA	174	7,500	7E-B098
74-UE-060	GETMAN	CRANE TRUCK	A-64	F6L912W	82	7,500	24/D102-0
74-UE-067	NEVADA	GENERATOR	NGSDZM190	BF12L413PW	316	50,000	24/D120-0
74-W-009	MILLER	WELDER	250	D622	16.5	2,100	TIER 2
74-W-011	MILLER BOBCAT	WELDER/ GENERATOR	250 DIESEL	D722	16.5	2,100	TIER 2
74-W-012	KUBOTA	GENERATOR	GL 7000	Z482-EBG	10.9	2,200	07-ENA110017
74-W-013	LINE POWER	GENERATOR	300KWGEN	CURSOR 13TE3X	371	20,000	TIER 3
74-W-014	WACKER	TAMPING MACHINE	VP2050Y	L48V6-VWK	4.4	1,000	TIER 2
75-H-031	SIMON	MANLIFT	32/21G	F2L1011	28	1,500	7E-B062-0
74-U-144	CATEPILLAR	COMPRESSOR FOR SODA BLASTER	Sullair 200H	S4S-DTDPB	74	9,250	TIER 4

8.0 VENTILATION SYSTEM DESCRIPTION

The WIPP underground ventilation system consists of three vertical intake shafts, interconnecting drifts and cross-cuts. Bulkheads, airlocks, and salt pillars separate the drifts. They are connected to a common exhaust, which connects to the main surface fans. Figure 1, WIPP in Perspective, shows the relationship between the surface, shafts, and the underground repository. The airflow patterns and ventilation control devices are shown on Appendix A, Drawing No. 54-W-001-W (current revision). The four shafts are:

- Air Intake Shaft (AIS)
- Salt handling Shaft (SHS)
- Waste Shaft (WS)
- Exhaust Shaft (ES)



SPATIAL VIEW OF WIPP UNDERGROUND FACILITIES

Figure 1, WIPP in Perspective

8.1 Ventilation System Description and Configurations

The three intake shafts supply air to the repository level, consisting of four separate air splits, and it is discharged through a common exhaust shaft.

- The North Ventilation Circuit receives intake air from the Air Intake Shaft (AIS) and is used to ventilate the North Area, which includes materials storage, an experimental area, and the underground diesel maintenance shop.
- The Construction Ventilation Circuit receives intake air from both the AIS and the Salt Shaft (SS). The air travels south in W30 to the construction (mining) panel where it is used to ventilate the mining face.
- The Waste Handling Ventilation Circuit receives intake air that is split off the Construction Ventilation Circuit through a regulator at S1000/E20. The air travels south in E140 to the disposal panel.

- The Waste Shaft Station Ventilation Circuit receives intake air from the Waste Shaft. The air ventilates the waste shaft station area, then is exhausted to the east in S400, directly to the Exhaust Shaft (ES).

8.2 Filtration Mode Ventilation

The WIPP site experienced a radioactive particulate release in February 2014. The ventilation system shifted to Filtration Mode at that time. The ventilation system has remained and will continue to remain in Filtration Mode for the foreseeable future.

Filtration Mode consists of the following:

- One 860 filtration fan operating in conjunction with a High Efficiency Particulate Air (HEPA) filtration system located in the Exhaust Filter Building. The main fans and bypass plenum to the 860 fans are isolated. Two HEPA filters at 100 percent capacity each work with one 860 fan to provide 60,000 cfm in this mode.
- The 74-B-336 bulkhead door (E300/S350) is closed. This closes off the exhaust path for the North Ventilation Circuit. Any air movement in the North Ventilation Circuit is via leakage through bulkheads.
- The 74-B-313 regulators (S1000/E20) are closed. This prevents air from splitting off of the Construction Ventilation Circuit to ventilate the Waste Handling Ventilation Circuit. Any air movement in the Waste Handling Ventilation Circuit is via leakage through bulkheads from W30 to E140.
- The construction split regulator (74-B-707 at W170/S2000) is closed. This closes off the exhaust path for the Construction Ventilation Circuit. Any air movement in the Construction Circuit is via leakage through bulkheads to the Waste Handling Ventilation Circuit.
- The 74-B-308 regulator (S400/E280) remains open, allowing intake air from the Waste Handling Shaft to traverse across the waste shaft station and exhaust directly to the Exhaust Shaft.

Limited air flow in the underground limits the number of pieces of diesel equipment that may be operated at any one time. When diesel equipment is used for recovery work in the underground, regulators and bulkheads may be opened or closed as needed to move the limited air flow in the underground to specific work areas and/or ventilation circuits.

8.3 Additional Ventilation Control Features

8.3.1 Shaft Control Doors

The Salt Shaft, Waste Shaft and Air Intake Shaft are equipped with control doors. These doors may be closed as a means of controlling the spread of fire, smoke, or toxic gases.

8.3.2 Diesel Generator Operation

In the event of either a total or isolated power loss to WIPP which affects the filtration fans, WIPP is equipped with two backup diesel generators. One of these generators may be brought on-line within approximately 30 minutes of a power failure to restore filtration ventilation to the underground.

9.0 REFERENCES

Public Law 96-164, *Department of Energy National Security and Military Applications of Nuclear Energy Act of 1980*

Title 30 CFR Part 57, "Safety and Health Standards Underground Metal and Nonmetal Mines"

WIPP System Design Description, *VU00 Underground Ventilation* (current revision)

New Mexico Mine Safety Code for All Mines

"An Overview of Diesel Particulate Exposures and Control Technology in the U.S. Mining Industry," Robert A. Haney and George P. Saseen, Mine Safety and Health Administration along with Robert W. Waytulonis, U.S. Bureau of Mines, Proceedings of the 2nd International Conference on Health of Miners, Pittsburgh, PA, November, 1995

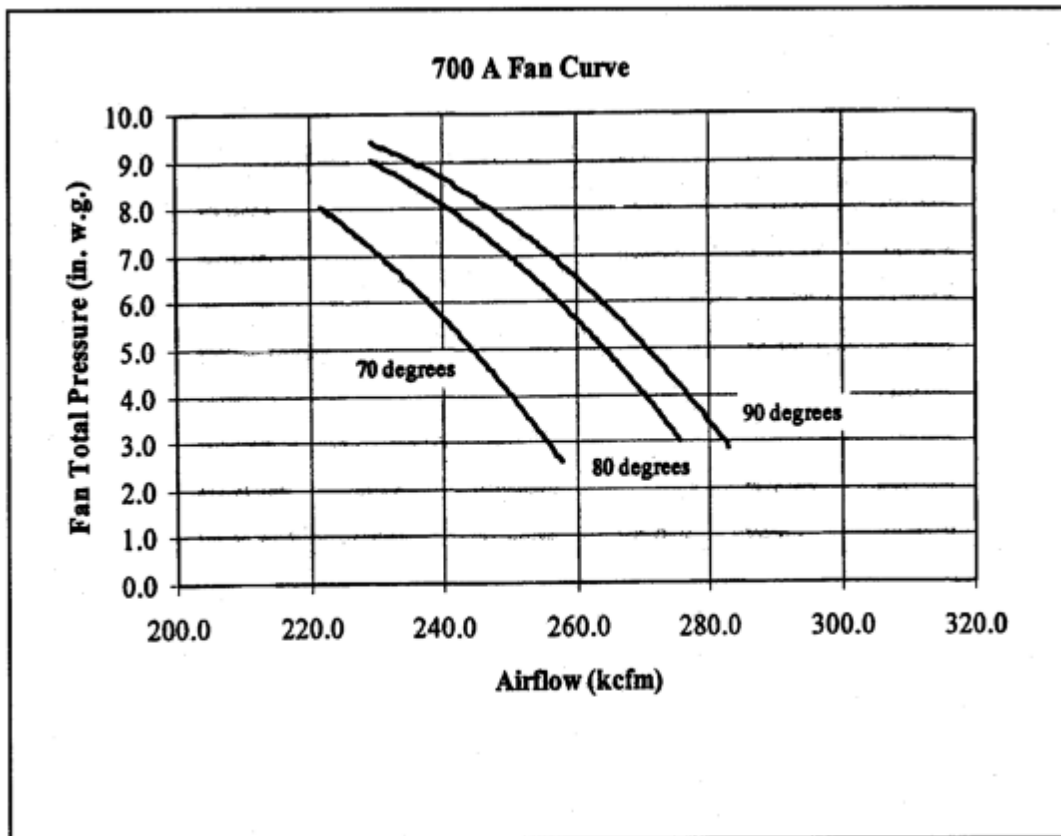
Appendix A – Drawing of Current Underground Mine Ventilation System (Drawing No. 54-W-001-W)

This drawing is available in the Engineering File Room.

Appendix B – Drawing of Proposed Changes to Underground Ventilation System
(Drawing No. 54-Z-001-W)

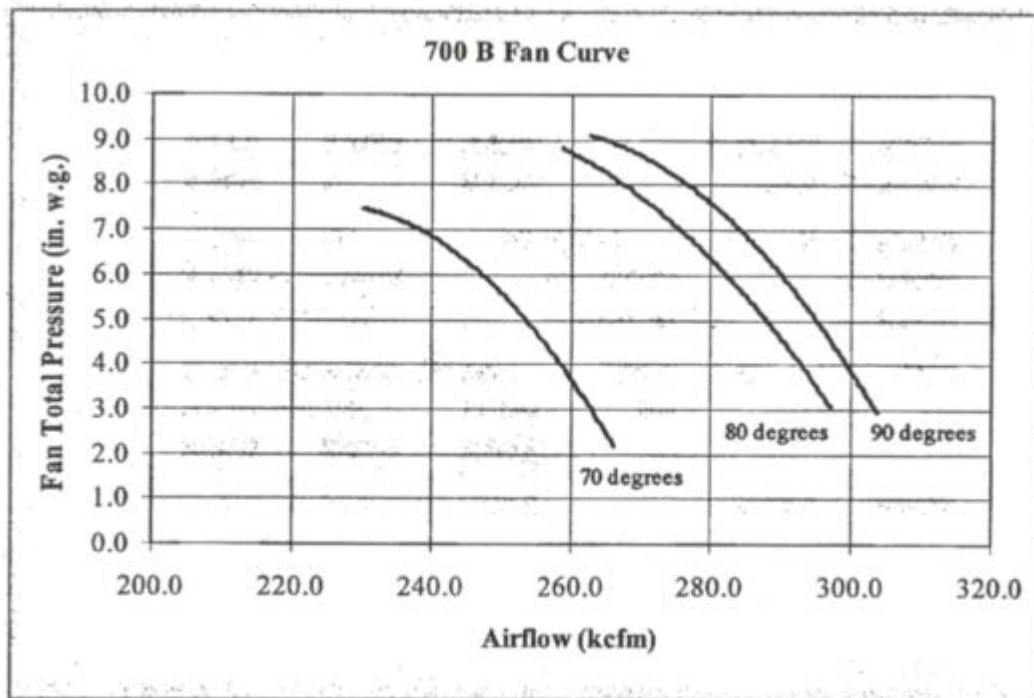
This drawing is available in the Engineering File Room.

Appendix C – Fan Curves



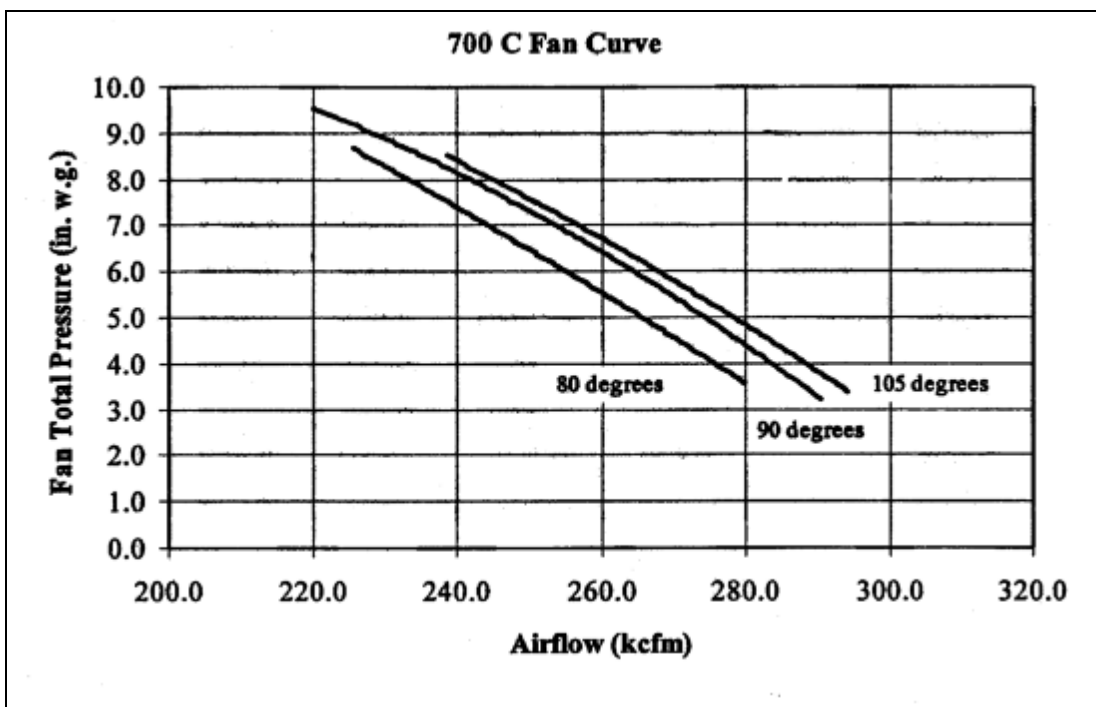
Fan 700A

Appendix C – Fan Curves (continued)



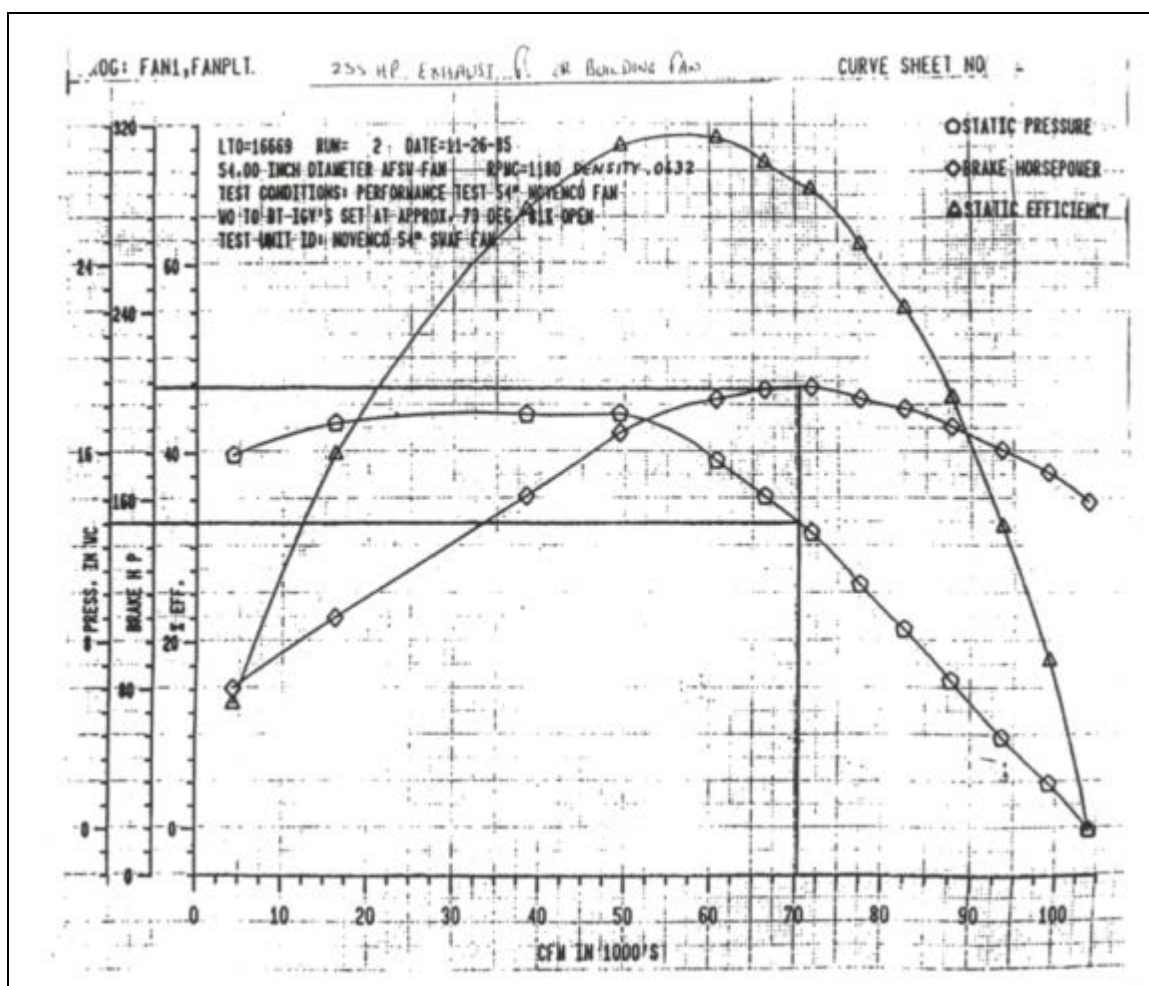
Fan 700B

Appendix C – Fan Curves (continued)



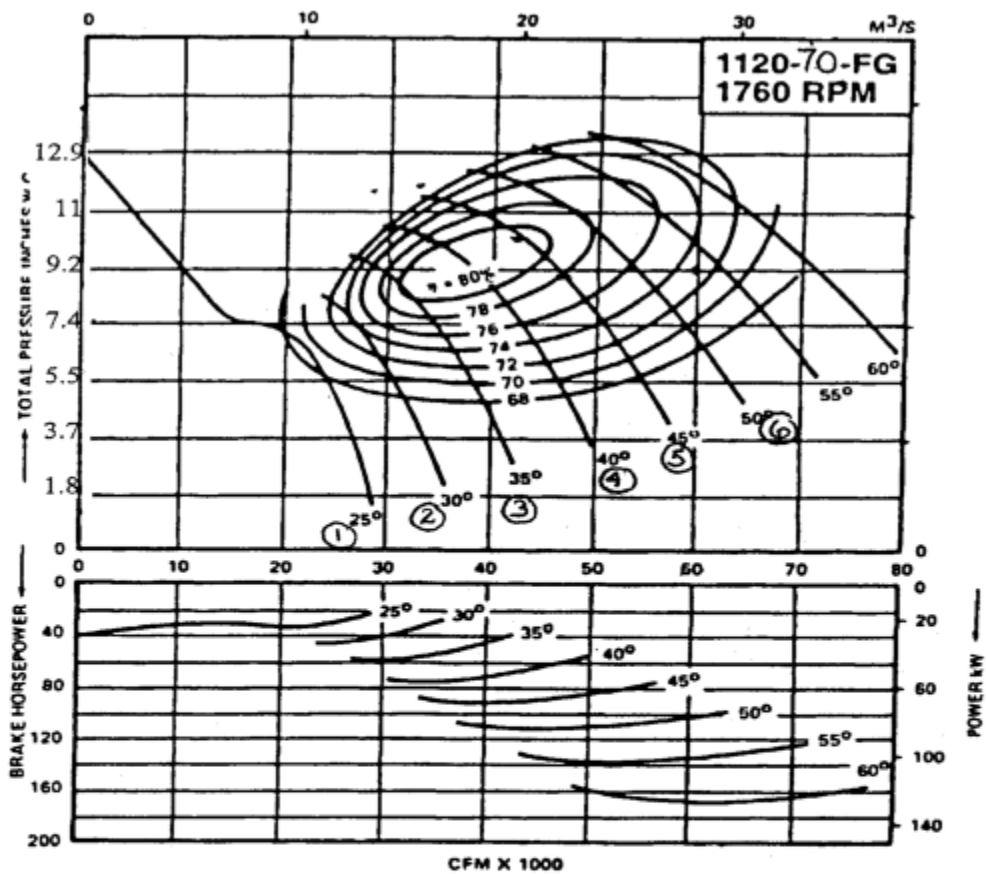
Fan 700C

Appendix C – Fan Curves (continued)



Filtration Fan(s) Curve

Appendix C – Fan Curves (continued)



Ⓢ - BLADE Setting

PERFORMANCE AT DENSITY OF 0.069 LB./FT.³



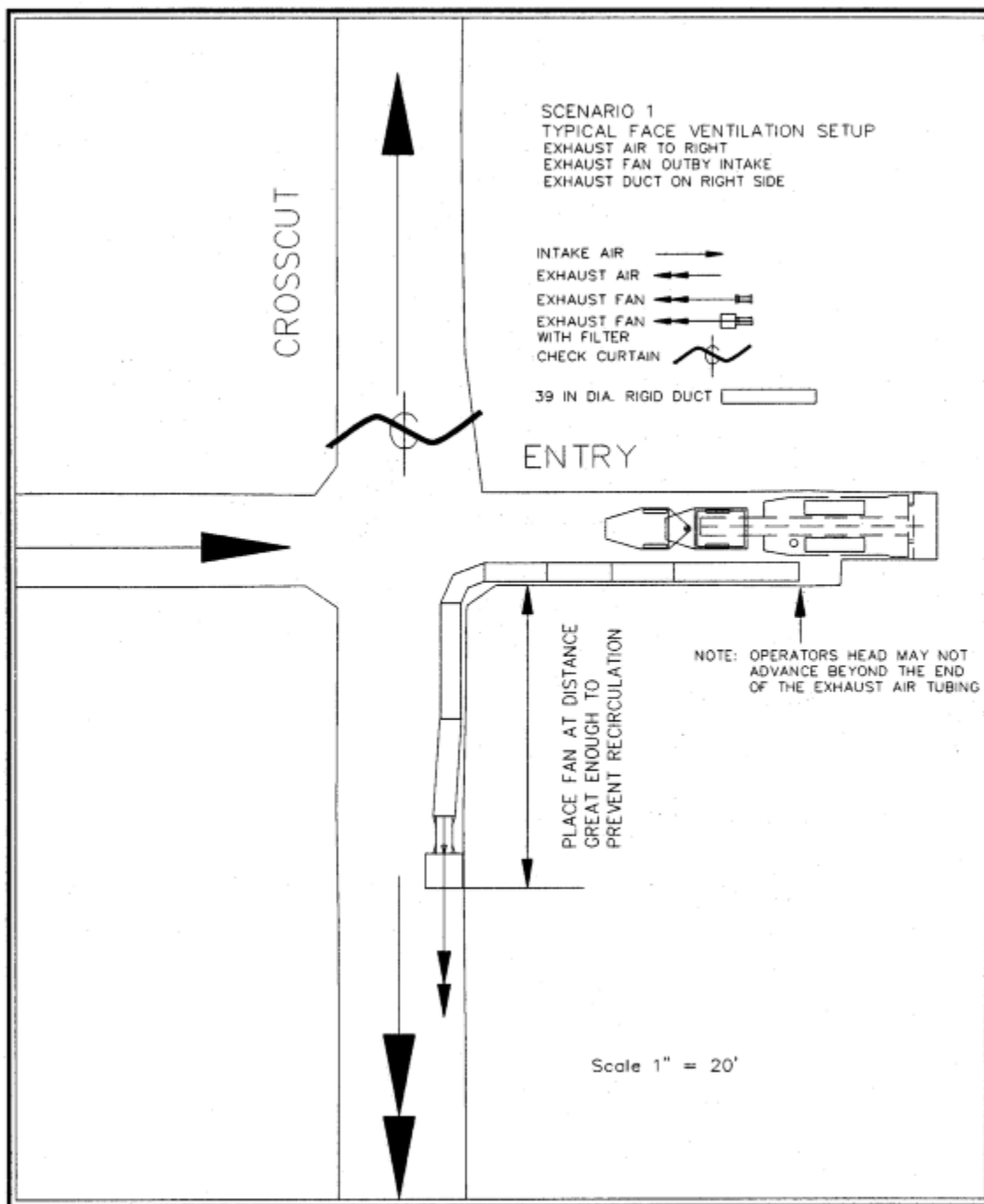
Auxiliary Mine Fan for Mining: Spendrup Model 1120-70

Appendix C – Fan Curves (continued)

Fan Pressures for a Spendrup 1120-70 FG							
Quantity	Velocity Pressure	Blade Setting 3		Blade Setting 4		Blade Setting 5	
Q (cfm)	H _v (in W.G.)	H _T	H _s	H _T	H _s	H _T	H _s
20000	0.22	Undef.	Undef.	Undef.	Undef.	Undef.	Undef.
25000	0.35	Undef.	Undef.	Undef.	Undef.	Undef.	Undef.
30000	0.50	9.0 ***	8.50	10.55	10.05	Undef.	Undef.
35000	0.68	7.00	6.32	10.0 ***	9.32	11.48	10.80
39000	0.84	4.96	4.12	9.1	9.16	11.0 ***	10.16
40000	0.89	4.46	3.57	8.66	7.77	10.73	9.84
45000	1.12	Undef.	Undef.	6.04	4.92	9.65	8.53
50000	1.39	Undef.	Undef.	3.5	2.11	7.76	6.37
55000	1.68	Undef.	Undef.	Undef.	Undef.	5.40	3.72
58000	1.87	Undef.	Undef.	Undef.	Undef.	4.15	2.28

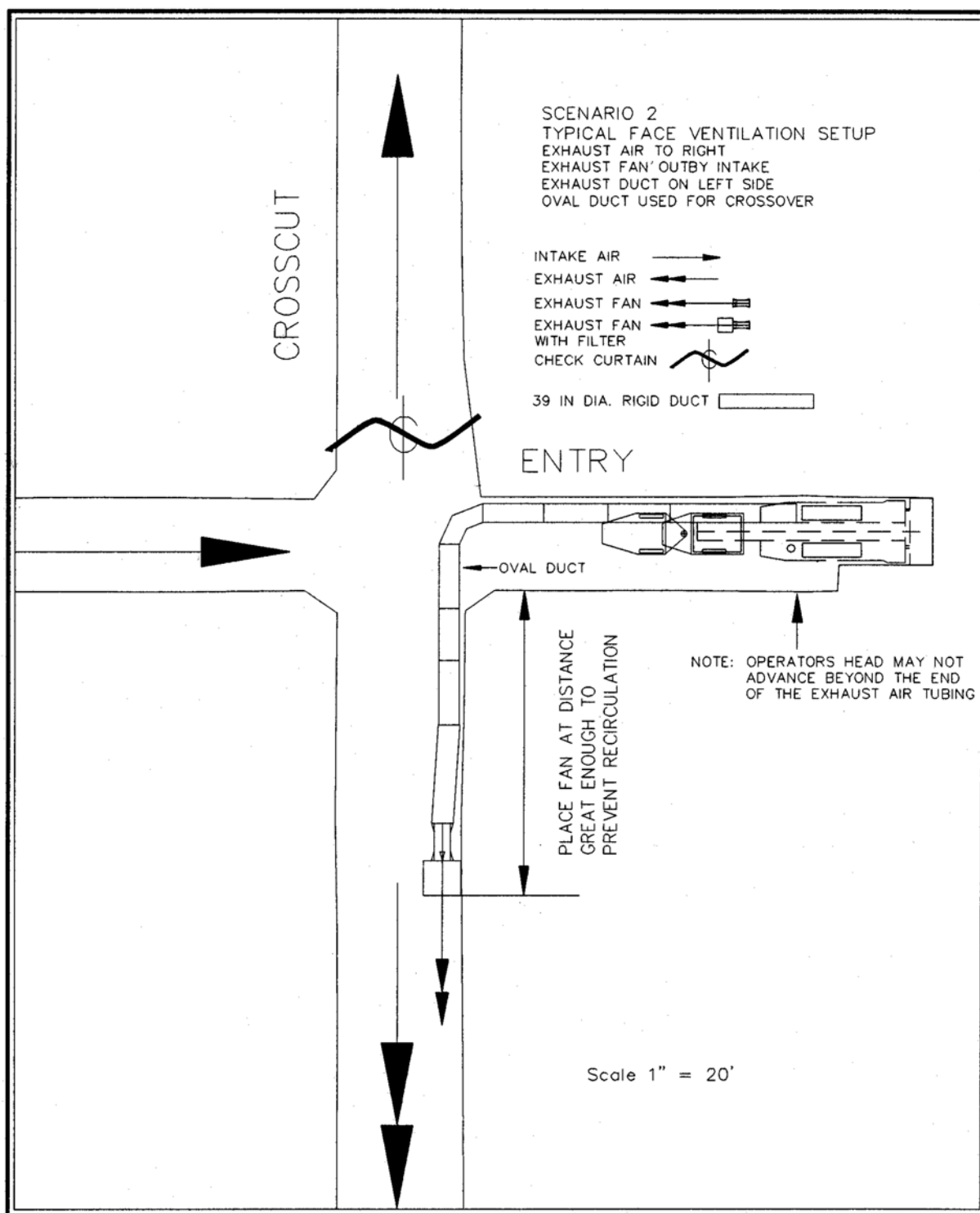
*** Do not exceed these Total Pressure values.

Appendix D – Typical Face Ventilation Scenarios



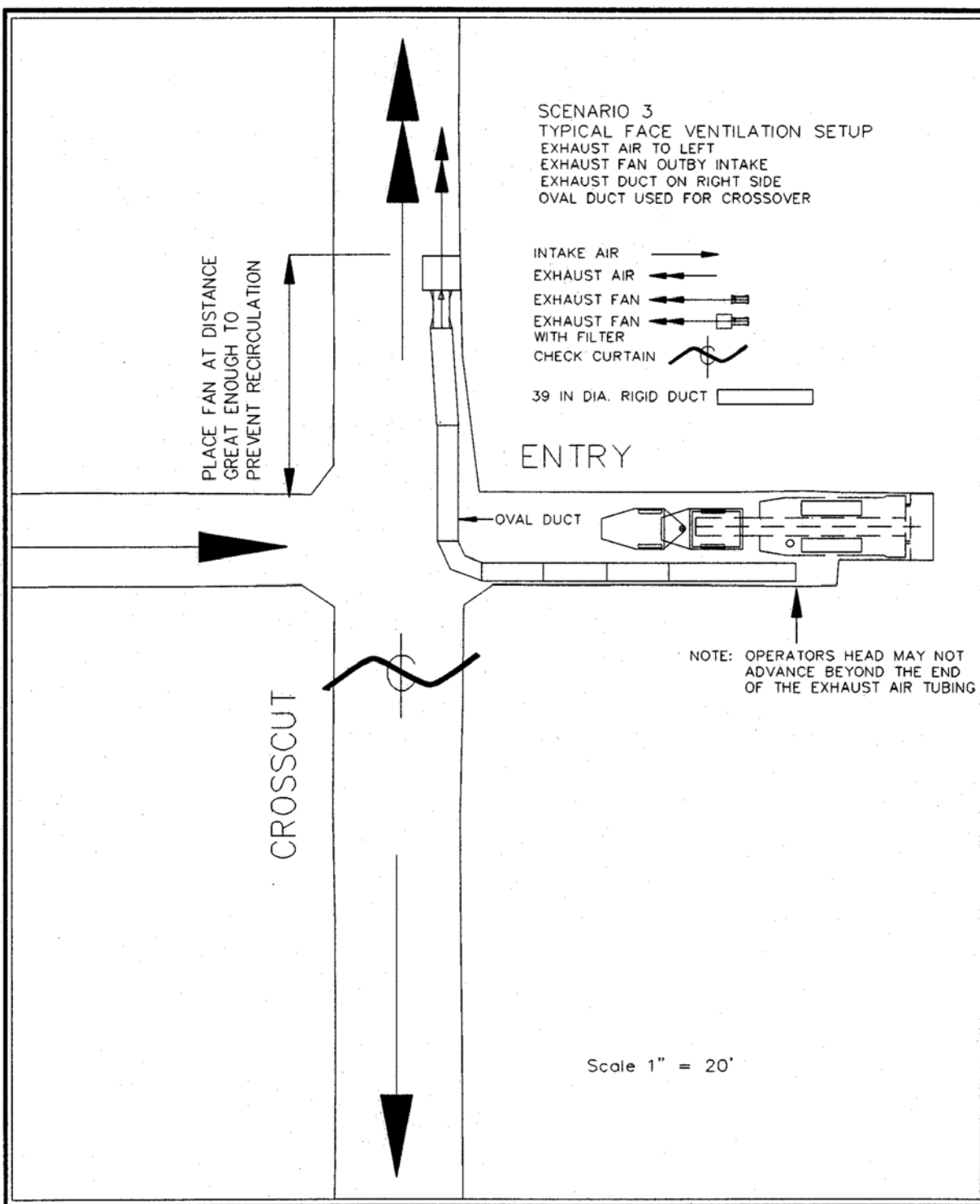
WIPP Mine Ventilation Plan
00CD-0001, Rev. 37

Appendix D – Typical Face Ventilation Scenarios (continued)



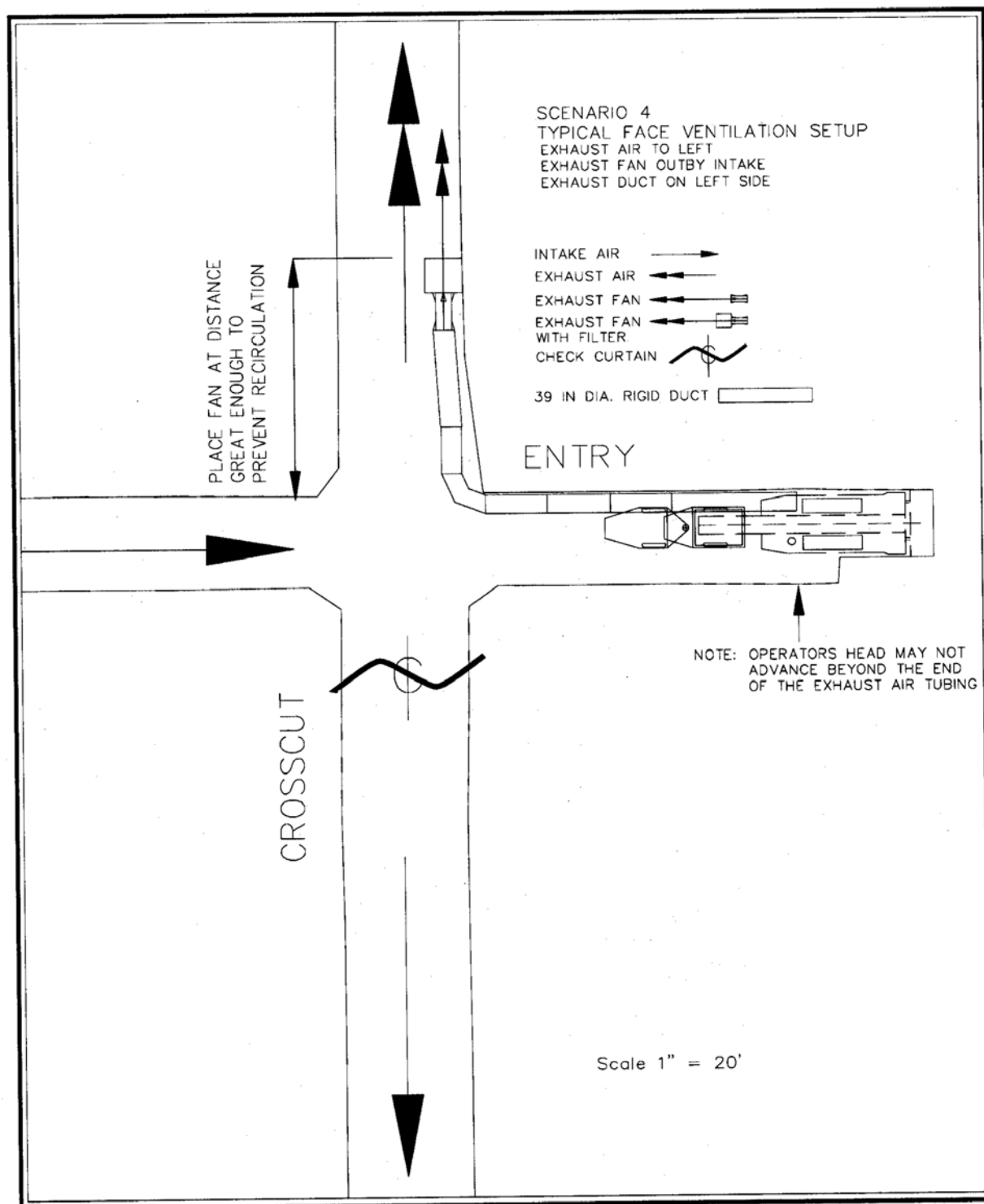
WIPP Mine Ventilation Plan
00CD-0001, Rev. 37

Appendix D – Typical Face Ventilation Scenarios (continued)



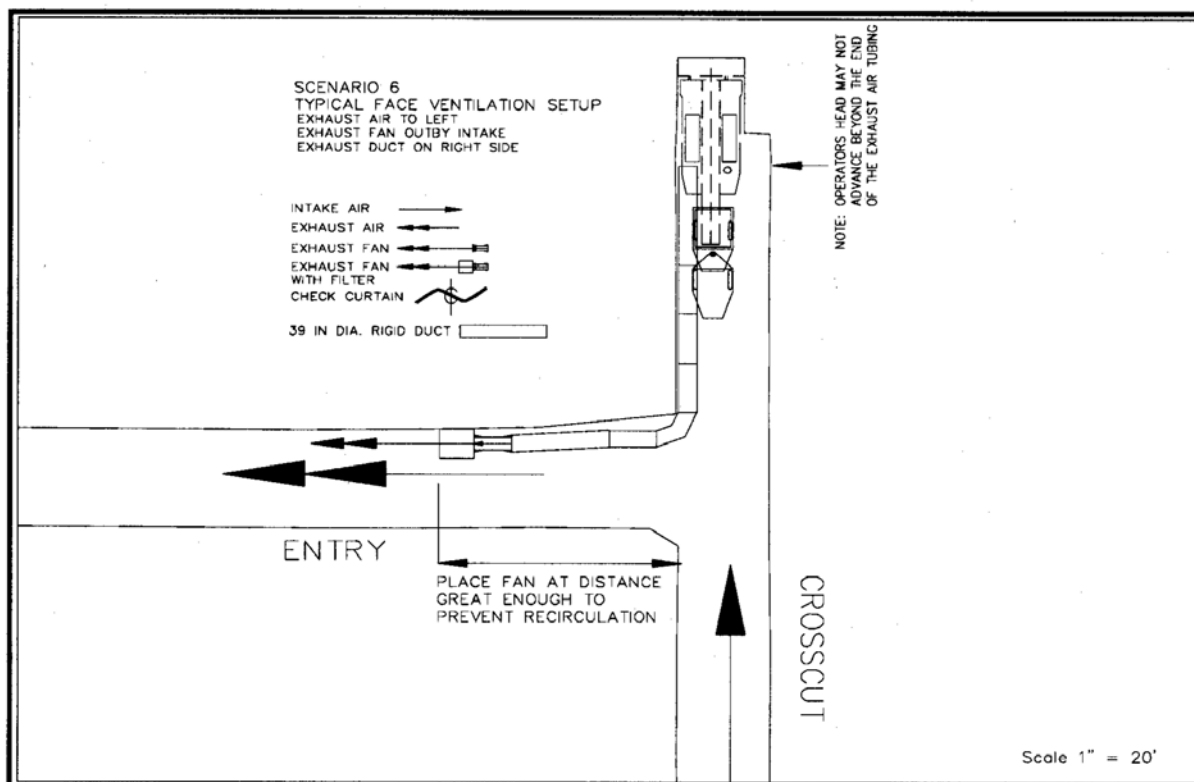
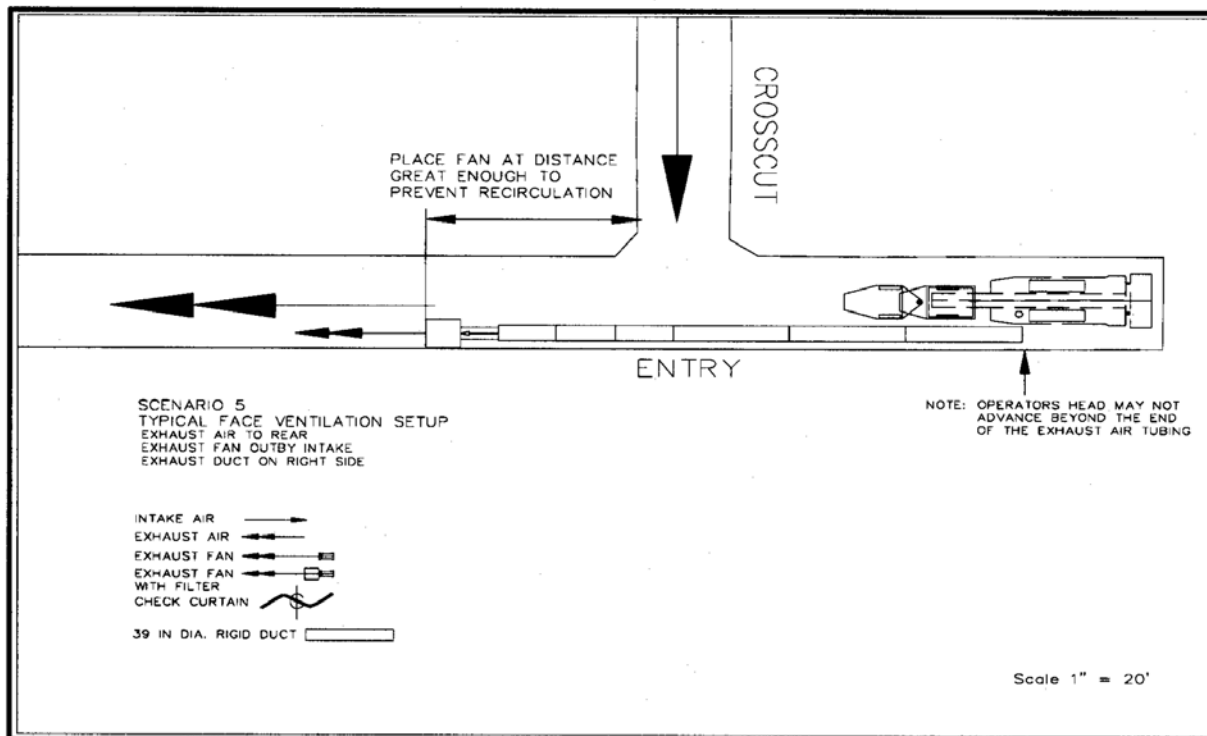
WIPP Mine Ventilation Plan
00CD-0001, Rev. 37

Appendix D – Typical Face Ventilation Scenarios (continued)

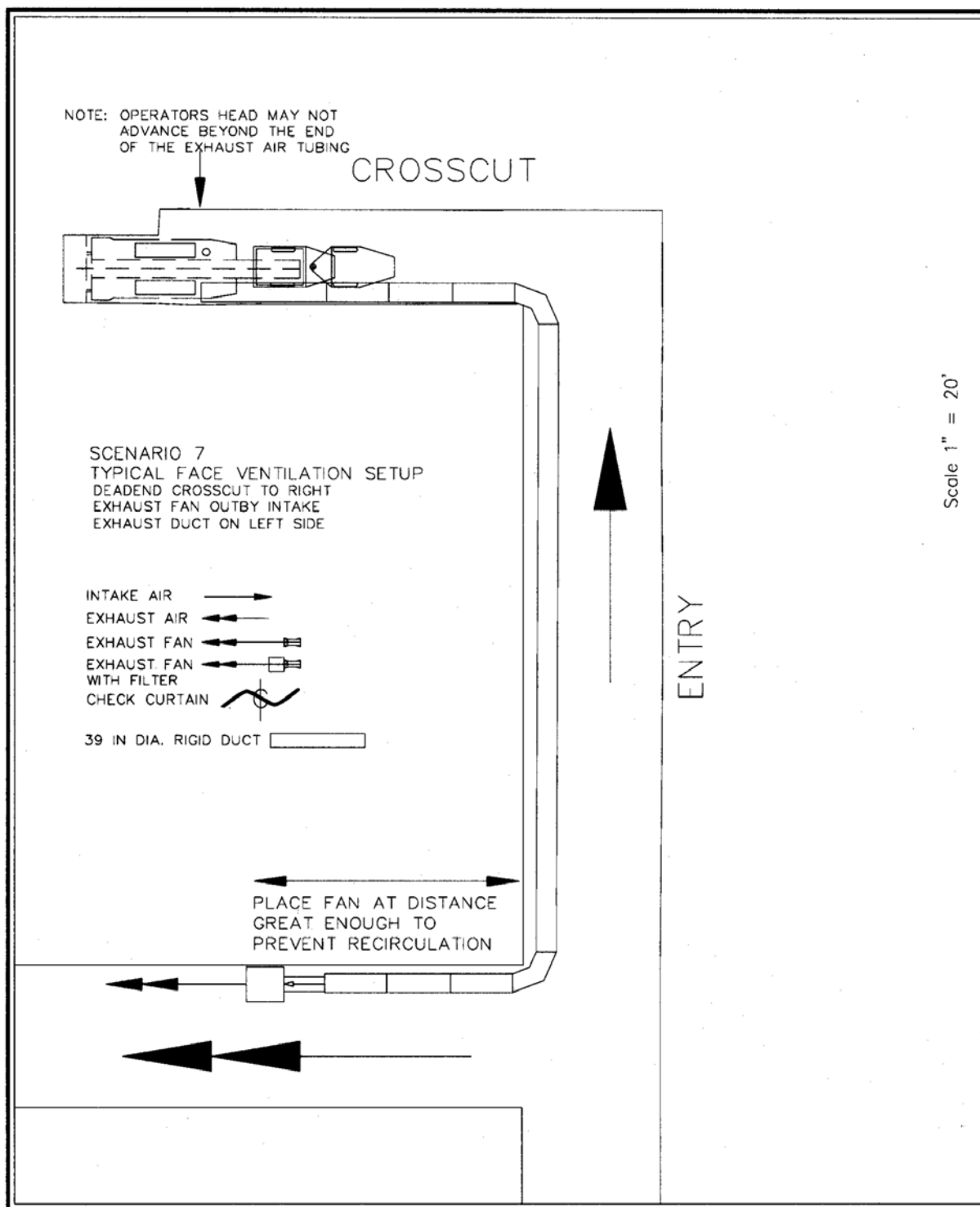


WIPP Mine Ventilation Plan
00CD-0001, Rev. 37

Appendix D – Typical Face Ventilation Scenarios (continued)



Appendix D – Typical Face Ventilation Scenarios (continued)



Appendix E – Auxiliary Ventilation System Design/Installation Considerations

Calculating Losses

Dynamic Losses

The pressure loss in each fitting, inlet and outlet must be calculated separately and is based on the velocity pressure of air at that point in the system.

$$\text{Velocity pressure } P_v = \left(\frac{V}{4005} \right)^2$$

$$\Delta H = C \left(\frac{V}{4005} \right)^2 \left(\frac{\rho}{.075} \right)$$

Friction Losses

Friction loss curves, which are provided in this brochure, are designed to give the pressure loss due to friction in the duct. The curves are based on the following formula:

$$\Delta H = \left(\frac{K L O Q^2}{5.2 A^3} \right) \left(\frac{\rho}{.075} \right)$$

For all equations, the definitions are:

ΔH = pressure loss in in. w.g.

C = loss coefficient

V = air velocity in feet/minute

L = length in feet

O = perimeter in feet

Q = air quantity in 100,000 cfm
(60,000 cfm would be .60)

ρ = air density (.075 for standard air) in lb/ft³

A = area of duct in square feet

K = the friction factor for the material

(Fiberglass duct is 11.7;

Steel duct is 12;

Cassette duct is 15;

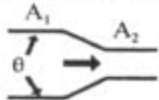


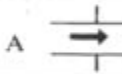

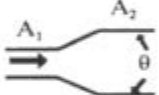
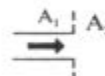
Lay flat duct is 18;

Flexible suction duct is 27)

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Appendix E – Auxiliary Ventilation System Design/Installation Considerations (cont.)

Loss coefficients for area changes

Type	Illustration	Conditions	Loss Coefficient
Gradual Contraction		θ	C_2
		30°	0.02
		45°	0.04
		60°	0.07
Equal Area Transformation		$A_1 = A_2$	C
		$\theta \leq 14^\circ$	0.15
Flanged Entrance		$A = \infty$	C
			0.34
Duct Entrance		$A = \infty$	C
			0.85
Formed Entrance		$A = \infty$	C
			0.03
Gradual Expansion		θ	C_1
		5°	0.17
		7°	0.22
		10°	0.28
		20°	0.45
		30°	0.59
Abrupt Exit		$A_2 = \infty$	1.00
		$A_1/A_2 = 0.0$	

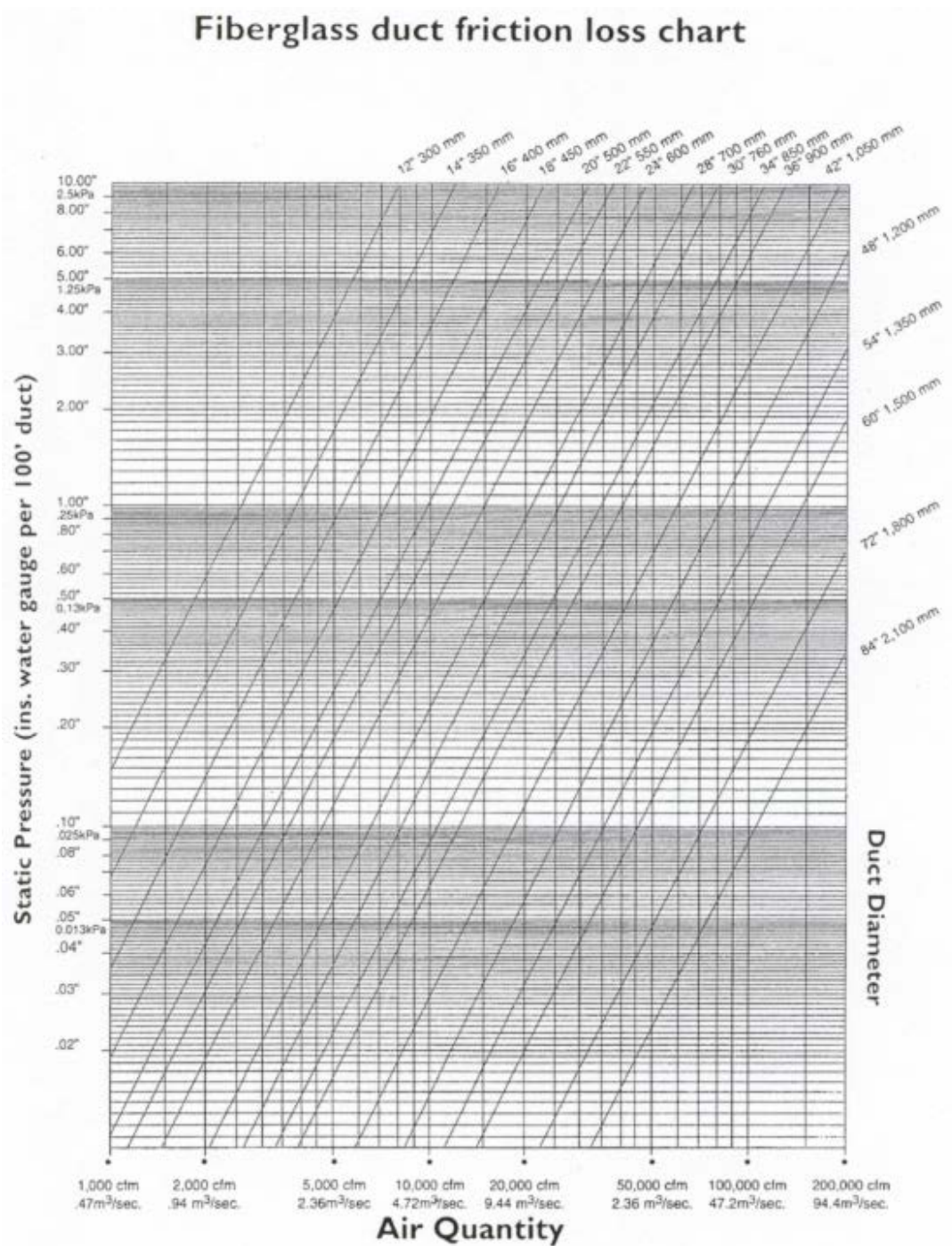
Note: A "C" with a subscript indicates the cross-section at which velocity is calculated.

Loss coefficients for elbows

Type	Illustration	Condition	Loss Coefficient	
N°		Rectangular or round, with or without vanes	(N/90) times value for similar 90° elbow	
90° Round Section		Miter	1.30	65
		R/D = 0.5	0.90	
		0.75	0.45	23
		1.0	0.33	17
		1.5	0.24	12
		2.0	0.19	10

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Appendix E – Auxiliary Ventilation System Design/Installation Considerations (cont.)



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WP 02-RC3110

Revision 6

Low-Level and Mixed Low-Level Waste Characterization for Off-Site Release for Disposal

Technical Procedure

EFFECTIVE DATE: 11/26/14

Stewart Jones
APPROVED FOR USE

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CHANGE HISTORY SUMMARY

REVISION NUMBER	DATE ISSUED	DESCRIPTION OF CHANGES
4	03/21/12	<ul style="list-style-type: none"> • Added WP 12-RE3003 to References table. • Added new bullet to Precautions stating that Radiological Engineers or designees are to perform calculations. • Performance section: Modified wording and content for clarity throughout; added bulleted list of inventory categories in step 1.1.2; split section 1.0 into two sections. • Deleted Attachment 1, Process Knowledge.
5	05/30/14	<ul style="list-style-type: none"> • Modified title, replacing “and Certification” with “for Off-Site Release for Disposal.” • Modified the Introduction concerning the LLW and MLLW for offsite shipment for disposal, waste handling managing all on-site TRU waste and TRU-contaminated materials, as well as radiological waste characterization. • Updated References Table. • Added in first bullet in Precautions and Limitations, the wording “with SEC support, if applicable.” • Added Note above section 1.0 pertaining to the completion of attachment 1. • Revised section 1.0 to describe the completion of the revised attachment 1, including notes above step 1.2 and substep 1.4.2. • Changed section 2.0 title from “Characterization of Waste” to “Waste Evaluation.” • Added new substeps 2.1.2 through 2.1.2.7. • Added Section 3.0, Analytical Sampling. • Added Section 4.0, Isotopic Activity Calculation and Lab Packaging. • Added below substep 5.1.3, bullets concerning the LLW location for viewing ease to determine container integrity, and management of a 90-day hazardous waste storage area for MLLW per WP 02-RC3109. • Revised Attachment 1, Container Inventory/Survey Log. • Created Attachment 2, Nuclide Activity Log.
6	11/26/14	<ul style="list-style-type: none"> • Updated References table to include PROD-593. • Revised Introduction to include groups other than SEC to use this procedure. <ul style="list-style-type: none"> — Excluded TRU waste from this procedure.

6 (cont.)		<ul style="list-style-type: none">• Deleted section 1.0 notes.• Added new sections 1.0, and 2.0 directing Radiological Control, Waste Generators and SEC on managing LLW.• Added in substep 1.5.3 verifying correct scale readings and the use of certified test weights.• Added in section 3.0 directions for SEC to gather more information on the waste characterization.• Added in section 5.0 directions for Radiological Engineering to give SEC all calculations and documentation.• Added new Attachment 1, Request for Disposal of Radiological Waste.• Added in attachment 2 instructions for the renumbered Container Inventory/Survey Log.• Added renumbered Attachment 3, Nuclide Activity Log.
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INTRODUCTION ¹

This procedure provides Site Environmental Compliance (SEC), Radiological Control (RadCon), and anyone involved in a possible radiological area with instruction for the handling, managing, characterization and certification of Low-Level Waste (LLW) and Mixed Low-Level Waste (MLLW) generated during Waste Isolation Pilot Plant (WIPP) site activities. This procedure provides the information necessary for the management of the LLW and MLLW to be released for offsite shipment for disposal.

To comply with U.S. Department of Energy (DOE) Manual 435.1-1 (IV), LLW shall be characterized using direct methods (sampling, swiping, surveying, and/or analysis) or indirect methods (acceptable knowledge of the generating process). The characterization shall be documented in sufficient detail to ensure safe management and compliance with the acceptance requirements of the facility receiving the waste.

LLW is radioactive waste that is not designated as high-level radioactive waste, spent nuclear fuel, transuranic (TRU) waste, byproduct material, or Naturally Occurring Radioactive Material.

MLLW is LLW that also contains at least one hazardous component subject to the Resource Conservation and Recovery Act (RCRA). MLLW shall be managed in accordance with the requirements of RCRA and DOE Order 435.1.

The WIPP facility is authorized to dispose of TRU waste in the underground repository. All on-site TRU waste and TRU-contaminated materials shall be managed by the waste handling department according to their specific procedures. TRU waste is not managed by this procedure.

MLLW or LLW can be disposed of at an off-site facility approved for this type of waste for disposal and/or treatment and disposal. If LLW or MLLW is to be disposed of at a non-DOE facility, an exclusion must be authorized by the Carlsbad Field Office (CBFO) prior to shipment of the waste.

Waste generated from clean-up/decontamination of a spill of waste received for disposal at the WIPP facility does not typically need to be re-characterized for underground disposal.

Radiological wastes must be surveyed for gross alpha, gross beta/gamma, and dose rate in microREM per hour (uR/hr) activity, and weighed. These measurements can then be converted to nanoCuries per gram (nCi/g) to allow the wastes to be managed according to the following categories:

1. Low-Level Class A: less than 10 nCi/g of alpha emitting radionuclides.
2. Low-Level Class C: between 10 nCi/g and 100 nCi/g of alpha emitting radionuclides.
3. TRU waste – greater than 100 nCi/g of alpha emitting TRU radionuclides.

Additionally, some LLW may also require isotopic characterization to ensure proper disposal, either through process knowledge or by sampling.

Performance of this procedure generates the following record(s), as applicable. Any records generated are handled in accordance with departmental Records Inventory and Disposition Schedules.

- Attachment 1, *Request for Disposal of Radiological Waste*
- Attachment 2, *Container Inventory/Survey Log*
- Attachment 3, *Nuclide Activity Log*
- Waste characterization data, container information, and associated documentation

In addition, the user may be directed to other procedures which may result in additional records generation.

REFERENCES			
DOCUMENT NUMBER AND TITLE	BASELINE DOCUMENT	REFERENCED DOCUMENT	KEY STEP
29 CFR §1910.120, "Hazardous Waste Operations and Emergency Response"		✓	
40 CFR §264.16, "Personnel Training"		✓	
DOE Manual 435.1-1, <i>Radioactive Waste Management Manual</i>		✓	
DOE Order 435.1, <i>Radioactive Waste Management</i>	✓	✓	1
WP 02-EC.06, <i>WIPP Site Effluent and Hazardous Materials Sampling Plan</i>		✓	
WP 02-EC1001, <i>Characterization Sampling, Shipping, and Documentation</i>		✓	
WP 02-RC.05, <i>Low-Level and Mixed Low-Level Waste Management Plan</i>	✓	✓	
WP 02-RC3109, <i>Waste Accumulation Area Inspections</i>		✓	
WP 05-WH1036, <i>Site-Derived Mixed Waste Handling</i>		✓	
WP 12-HP1100, <i>Radiological Surveys</i>		✓	
WP 12-RE3003, <i>Radiological Release of Potentially Contaminated Materials, Waste, and Items</i>		✓	
PROD-593, <i>Hazardous/Nonhazardous Waste/Material Handling, Packaging and Loading</i>		✓	

PRECAUTIONS AND LIMITATIONS

- Characterization of LLW and MLLW shall be performed by a Radiological Engineer and/or a designee with SEC support, if applicable. It shall be performed in accordance with applicable WIPP procedures and policies. Radiological Engineer or designee must have completed the RE-06 Qualification Card.
- This procedure does not deal with TRU Waste. TRU waste is managed in accordance with WP 05-WH1036.
- Calculations and clearance determinations will be performed by the Radiological Engineer and/or a designee.
- Employees handling LLW are required to have current Radiological Worker (RAD-101) training class prior to handling radioactive materials.
- Employees handling MLLW are also required to complete the Hazardous Waste Worker (HWW-101) training class and are not permitted to perform

their work duties unsupervised until this training is completed. In addition, there is an annual eight-hour refresher class required. This training implements applicable Treatment Storage and Disposal Facility personnel training requirements found in 40 *Code of Federal Regulations* (CFR) §264.16 and 29 CFR §1910.120.

- Site-derived waste should be handled in accordance with WP 05-WH1036.

PERFORMANCE

1.0 MANAGING WASTE FROM RADIOLOGICAL WORK REQUIRING A RADIOLOGICAL WORK PERMIT OR WORK CONTROL DOCUMENT

- 1.1 Waste Generator, separate waste in the following categories and place them in separate bags/containers:
 - Personal Protective Equipment (PPE), cartridges
 - Used respirators, respirator equipment
 - Waste Batteries (Ni-Cad, Lithium, Ni-Metal hydride; alkaline batteries may be disposed in bag(s)/container(s) with PPE)
 - Waste Tools
 - Cans (paint cans, aerosol cans, etc.)
- 1.2 If a waste item is not listed, contact SEC for advice.
- 1.3 **IF** there are any free liquids in bags of solid wastes, **THEN ADD** absorbents to solidify the liquids in order to meet disposal facilities requirements to have no free liquids in solid waste containers.
- 1.4 Radiological Control Technician (RCT) perform the following:
 - 1.4.1 Seal the bag/container per RadCon procedures or radiological work permit (RWP).
 - 1.4.2 Survey the bag/container. Write highest gross alpha (dpm), gross beta (dpm), uR/hr measurements, and the date on the bag/container or label.
- 1.5 Hoisting Staff (e.g. Top Lander) or designee, place the bag(s)/container(s) of waste in the Sealand/Connex or other holding area designated by SEC for holding the bag(s)/container(s) of radiological waste.

1.6 SEC perform the following at the next available shift:

- 1.6.1 Verify the scales are reading correctly using the certified test weights according to the manufacturer's instructions in the Owner's Manual.
- 1.6.2 Weigh each bag/container.
- 1.6.3 Complete Container Inventory/Survey Log (attachment 2) per instructions in the attachment.
- 1.6.4 Place MLLW in a U.S. Department of Transportation (DOT) approved container (55-gallon drum, bucket, etc.).
- 1.6.5 Place all LLW in a Sealand/Connex.
- 1.6.6 Go to section 3.0 for Waste Evaluation.

2.0 MANAGING WASTE WITH KNOWN ACTIVITIES

2.1 Waste Generator or RCT, perform the following:

- 2.1.1 Record on Nuclide Activity log (attachment 3) the inventory of sources that need disposing and related information.

NOTE

Examples of appropriate containers include a SWB, or a B-25 Box that will contain some shielding such as a pig, lead blankets or safe.

- 2.1.2 Consult with the Radiological Engineers, Transportation, SEC, and RadCon Manager(s) to determine the proper shipping container and with SEC to determine the staging area.
- 2.1.3 Package the sources in the proper container for shipping.
- 2.1.4 Secure the lid of the shipping container and transport it to the waste staging area to await transport. For all PPE and equipment needing to be disposed of, follow steps 1.1 – 1.2, and 1.4 as applicable.

3.0 WASTE EVALUATION

3.1 SEC, perform the following:

3.1.1 Review the documentation provided by the waste generator and ensure the information is adequate to continue characterizing the waste, taking into consideration the following:

- The physical composition of the waste (size, shape, material)
- The waste acceptance criteria of the intended disposal facility
- The availability of process knowledge of the waste generation

3.1.2 **IF** a container requires re-opening to perform additional surveying of the waste for characterization and disposal purposes, **THEN** perform the following:

- [A] Contact the RadCon department to schedule a time for an RCT to survey the waste.
- [B] Ensure that the RCT determines the requirements for PPE, dosimetry, survey requirements, and creation of a RadCon area around the waste container(s), as necessary.
- [C] **IF** the selected waste container is a SWB, **THEN** contact the waste handling department to schedule a waste handler to open and close the SWB lid in accordance with established waste handling practices.
- [D] After RCT has performed the necessary preparations, open the container (or allow the waste handler to open the SWB).
- [E] Remove the waste items and collect the necessary information (e.g., weight, description) and ensure RCT surveys the items with the proper assay instruments to obtain the needed radiological units (typically uR/hr).
- [F] Complete attachment 2 of this procedure as needed to complete the waste characterization.
- [G] After surveying, return the contents to the container and ensure it is properly closed.

[H] When doffing PPE, follow steps 1.1, 1.4 and as applicable 1.3 of this procedure.

3.1.3 Complete sections 1 and 2 of the Request for Disposal of Radiological Waste (RFD) (Attachment 1) and manage the waste in accordance with steps 3.1.4 or 3.1.5.

3.1.4 **IF** analytical sampling is required,
THEN GO TO section 4.0.

3.1.5 **IF** analytical sampling is **NOT** required,
THEN GO TO section 5.0.

4.0 ANALYTICAL SAMPLING

4.1 SEC, perform the following for isotopic analysis:

4.1.1 Add Container # and RFD # from attachment 1 to the top part of attachment 2.

4.1.2 Determine sampling parameters necessary for isotopic characterization, and if necessary consult Radiological Engineers for the parameters needed (see WP 12-RE3003).

4.1.3 Sample the contents of the selected containers of waste and transport the samples to the analytical laboratory in accordance with WP 02-EC.06 and WP 02-EC1001.

4.1.4 Validate the analytical data per WP 02-EC1001 and attach the analytical data to the RFD associated with the container(s).

5.0 ISOTOPIC ACTIVITY CALCULATION AND LAB PACKAGING

5.1 **SEC, IF** the total activity of each isotope (for wastes with known activities) has not been determined,
THEN have Radiological Engineer or designee calculate activity per radionuclide based on process knowledge, RadCon survey data, decision point tables, or the analytical data.

5.1.1 Record activity per radionuclide of each container on attachment 3.

5.1.2 Have Radiological Engineer or designee calculate the total container activity by adding the activity per radionuclide values of each radionuclide together.

5.1.3 Have Radiological Engineer or designee submit the calculations for an independent review by a qualified radiological engineer or other individual as designated by management.

- 5.1.4 Record container total activity on attachment 3.
 - 5.1.5 Record the date of characterization on attachment 3.
 - 5.1.6 Attach analytical data, if applicable, and attachment 3 to attachment 1 corresponding to each container associated with the attachment 1.
 - 5.1.7 Transfer the analytical data to the waste profile form as required for waste acceptance and approval by the offsite LLW disposal facility per WP 02-RC.05.
- 5.2 Radiological Engineer or designee, perform the following for small containers to be packed with other wastes in one larger container (e.g., a lab pack) for shipping:

NOTE

Depending on the number of radionuclides to be accounted for, it may be necessary to complete a nuclide activity log for each individual container.

- 5.2.1 Calculate the activity of individual containers, such as liquid scintillation vials and micro-filtered samples mounted on planchets, by referring to the certification of each vial or planchet or laboratory process knowledge "maximum activity values" for each corresponding waste stream, to determine the activity per radionuclide for each container.
 - 5.2.2 Calculate the activity of expired or otherwise unusable calibration standards, unused portions of laboratory intercomparison samples, or expired liquid standard reference solutions, by referring to known values for intercomparison samples, and certificates of assay for calibration standards and reference solutions. (These values can be obtained from cognizant personnel.)
 - 5.2.3 Submit the calculations for an independent review by a qualified Radiological Engineer or other individual as designated by management.
 - 5.2.4 Complete and sign section 3 of attachment 1.
 - 5.2.5 Provide SEC with signed copy of attachment 1 and copies of all calculations and measurements.
- 5.3 SEC or designee, place the container(s) in a shipping container, and package in accordance with the waste acceptance criteria of the receiving facility, and in a manner that provides containment and protection for the duration of the anticipated storage period.

6.0 WASTE CERTIFICATION

NOTE

LLW and MLLW must be certified as meeting the waste acceptance requirements before it is transferred to the facility receiving the waste. Waste shall not be transferred to a treatment storage, or disposal (TSD) facility until responsible TSD personnel authorize the transfer.

6.1 SEC, perform the following:

- 6.1.1 Verify that the waste container meets the waste acceptance criteria of the receiving facility in accordance with the waste's radiological and hazardous waste characterization.
- 6.1.2 Certify the acceptance requirements are met by providing a signature and date on the applicable waste profile form in accordance with WP 02-RC.05 and the receiving facility's waste acceptance criteria.
- 6.1.3 Ensure certified waste is stored and managed in a manner that will maintain its certification. Each container of waste must be controlled once it is certified to ensure no additional waste is added to the container.
 - LLW may be staged in a location for ease of viewing to determine container integrity per WP 02-RC3109.
 - MLLW shall be placed in a 90-day hazardous waste storage area and managed per WP 02-RC3109.
- 6.1.4 Retain waste characterization data, container information, and associated documentation as records.
 - [A] Transfer a copy of this information with the waste and/or ensure the information is traceable to the waste as it is transferred to the disposal facility.

Attachment 1 – Request for Disposal of Radiological Waste

This form must accompany LLW and MLLW waste to be disposed of by the WIPP site.
Fill out completely.

SECTION 1 – TO BE COMPLETED BY REQUESTOR OR SEC

RFD No: _____ Container No: _____

Description of Waste: _____

Waste generation location (e.g., U/G, WHB, Filter Building, etc.): _____

Process generating the waste: (e.g., spill cleanup, maintenance): _____

Physical State: ☐ Solid ☐ Liquid

Total Weight of Waste in the Container(s): _____

Generation/Accumulation Start Date: _____

Number of Containers: _____ Container Size: _____

Container Type: ☐ Metal Drum ☐ Plastic Bucket ☐ Sealand/Connex ☐ Carboy ☐ Other (specify): _____

Additional Comments: _____

Requestor: _____

Printed Name Signature Date Phone

SECTION II – TO BE COMPLETED BY SEC

Date RFD received by SEC: _____ Assigned Storage Location: _____

Sampling Required? ☐ No ☐ Yes Date Sampled: _____ Sample ID(s): _____

This waste is: ☐ LLW ☐ MLLW

Specify EPA Codes, if applicable _____

Basis of Determination:

☐ Analytical Data ☐ Process Knowledge ☐ MSDS ☐ Other (specify): _____

Vendor or Disposal Location: _____ WIPP Waste Profile #: _____

Shipping Containers - Number, Size, and Type: _____

Comments/ Special Instructions: _____

SEC Representative: _____

Printed Name Signature Date

SECTION III – TO BE COMPLETED BY RADIOLOGICAL ENGINEERING

☐ Material may be released without radiological controls.

☐ Material may be released for reuse or disposal but not for metal recycle.

☐ Material may not be released as non-radioactive materials.

E&TS Radiological Engineer: _____

Printed Name Signature Date Phone

Attachment 2 – Container Inventory/Survey Log

INSTRUCTIONS:

RFD # – Enter the Request for Disposal number for this shipping container. Obtain the number from the MLDR log and use the next sequential number.

Container # – Enter the container number of the shipping container (drum, Sealand/Connex, etc.) in which bags of waste are placed for shipping.

Page ____ of ____ – Enter the page number of the total page numbers for this Container Inventory/Survey Log.

Date – Enter the date of the Inventory/Survey.

Shipping Container Size and/or Type – e.g. 20' Sealand/Connex; 55-gal Drum.

Radiological Survey Number – enter the Radiological Survey Number (from RCT)

Date of the last Verification of the Scale's Reading – enter the date when the scales were last checked according to the manufacturer's recommendations.

Item # – Enter the number of the bag/container being surveyed/inventoried. The number will be a sequential number that only this bag/container will have. Place this number on the bag/container as well.

Description – Enter a brief description of the waste in the bag/container. Example: PPE; Ni-Cad Batteries; etc.

(L)iquid or (S)olid – Enter a "L" if the waste is a liquid or "S" if the waste is a solid.

LLW or MLLW – Enter LLW if the waste is low level waste with no hazardous waste constituents or MLLW if the waste is low level waste with hazardous waste constituents.

Weight – Enter the weight in pounds attained from the SEC scales. Verify read-out is reading pounds and not Kg.

Gross Alpha – Enter the gross alpha reading in dpm/100 cm² attained by RCT.

Gross Beta – Enter the gross beta reading in dpm/100 cm² attained by RCT.

Dose Rate – Enter the dose rate in uR/hr obtained by the RCT at contact of the bag/container and at a distance of 30 cm.

Signatures – SEC sign the bottom of each page stating the form is complete.

Attachment 2 – Container Inventory/Survey Log

RFD # _____ (from Attachment 1) Container # _____ Page ____ of ____

Date: _____ Shipping Container Size and/or Type _____

Radiological Survey Number (from WP 12-HP1100): _____

Date of the last Verification of the Scale's Reading: _____

Item #	Description	(L)iquid or (S)olid	(L)LW or (M)LLW	Weight (lbs)	Gross Alpha (dpm/100cm ²)	Gross Beta (dpm/100cm ²)	Dose Rate (uR/hr)
							Contact:
							30 CM:
							Contact:
							30 CM:
							Contact:
							30 CM:
							Contact:
							30 CM:
							Contact:
							30 CM:
							Contact:
							30 CM:
							Contact:
							30 CM:

Name and Signature of SEC

_____/_____/_____

Printed Name Signature Date

Attachment 3 – Nuclide Activity Log

RFD # _____ Container # _____ (Container # and RFD # assigned by SEC) Page ____ of ____

Generation Date: _____ Shipping Container Size and/or Type _____

Radiological Survey Number (from WP 12-HP1100): _____

Item #	Item Description	(L)iquid or (S)olid	(L)LW or (M)LLW	Weight (lbs)	Nuclide(s) (list one per space)	Activity per Nuclide	Total Item Activity per Nuclide

Name and Signature of RCT/Designee:

_____/_____/_____
 Printed Name Signature Date

Name and Signature of SEC:

_____/_____/_____
 Printed Name Signature Date

WP 04-VU1612

Revision 8

WIPP Mine Ventilation Rate Monitoring

Management Control Procedure

EFFECTIVE DATE: 04/16/12

Randy Britain
APPROVED FOR USE

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CHANGE HISTORY SUMMARY

REVISION NUMBER	DATE ISSUED	DESCRIPTION OF CHANGES
7	11/11/10	Took Attachment Q off of reference to the HWFP.
8	04/16/12	Added in several locations "when waste disposal is taking place and workers present," where applicable.

INTRODUCTION ^{1, 2}

This procedure documents the process that demonstrates compliance with the ventilation requirements of the Waste Isolation Pilot Plant (WIPP) Hazardous Waste Facility Permit. The underground (U/G) ventilation system is configured to support waste emplacement, mining, and other operational activities. These activities are supported by the U/G ventilation system running in Normal, Alternate, or Maintenance Bypass modes to allow adequate flow required to maintain a running annual average of at least 260,000 standard cubic feet of air per minute (scfm) through the underground repository and a minimum of 42,000 acfm (actual cubic feet per minute) of air through the active disposal room(s) when waste disposal is taking place and when workers are present in the room. A minimum of 12,000 acfm of airflow at the waste shaft side of Regulator 74-B-308 when handling Contact-Handled (CH) in Waste Handling Mode in the U/G, and 20,000 acfm when handling Remote-Handled (RH) in Waste Handling Mode in the U/G. If minimum flow rates cannot be achieved, contact the Facility Shift Manager (FSM).

This procedure also provides a mechanism in attachment 4 to document ground control inspections of the waste transport route prior to establishing Waste Handling Mode in the U/G.

Performance of this procedure generates the following record(s), as applicable. Any records generated are handled in accordance with departmental Records Inventory and Disposition Schedules.

- U/G Facility Flow ventilation maintained by the Central Monitoring Room (CMR) Log
- Attachment 4, Active Disposal Room and Regulator 74-B-308 Ventilation Rate Log Sheet

REFERENCES			
DOCUMENT NUMBER AND TITLE	BASELINE DOCUMENT	REFERENCED DOCUMENT	KEY STEP
30 CFR 57, "Underground Ventilation for Metal and Nonmetal Mines"	✓		1
Hazardous Waste Facility Permit, EPA Identification No. NM4890139088	✓	✓	2
DOE/WIPP-07-3372, <i>Waste Isolation Pilot Plant Documented Safety Analysis</i>	✓		
DOE/WIPP-07-3373, <i>Waste Isolation Pilot Plant Technical Safety Requirements</i>	✓		

PERFORMANCE**1.0 DATA COMPLIATION OF TOTAL MINE FLOW RATES**

NOTE

Runtimes are tabulated in minutes and recorded to the nearest quarter hour.

- 1.1 Calculate a running annual average using data summarized from the CMR Log as follows:

- 1.1.1 Daily, record ventilation information in the CMR Log on attachment 2 for the following:

- Any time there is an operational mode change to the U/G ventilation
- Any time there is no ventilation

- 1.1.2 Monthly, calculate the average flow rate using the formula on attachment 1 and document it on Attachment 3, *Example WIPP Mine Ventilation Rate Monitoring Plan*.

- 1.1.3 Annually, calculate the previous 12 months of data using the formula on attachment 1 and obtain the running annual average each month in accordance with the WIPP Hazardous Waste Facility Permit. Document the average rate on attachment 3.

- 1.1.4 If the annual average rate is less than 260 kscfm, notify the Site Environmental Compliance Manager.

2.0 MONITORING AIRFLOW THROUGH ACTIVE WASTE DISPOSAL ROOM(S)

- 2.1 When waste disposal is taking place and when workers are present in the room, measure airflow in the active disposal room(s) when the active disposal room(s) are open to entry by workers and record information on Attachment 4 for the following conditions:

- At the start of each shift.
- When there is an operational mode change.
- There is a change in the ventilation system configuration that could affect flow rates.

- 2.2 If the active disposal room(s) is restricted to entry by workers, verify barriers and/or posting are in place at the beginning of each shift and record information on attachment 4.
- 2.3 If measured airflow is greater than or equal to 42,000 acfm, no access restrictions are required based on ventilation.
- 2.4 If measured airflow is less than 42,000 acfm, the following actions must be taken:
- Install barriers and/or postings in the active disposal room(s) to restrict disposal activities in the room. The postings shall state no waste disposal is allowed and the phone number of the cognizant manager or organization to contact regarding the posting.

OR

- Initiate changes to the U/G ventilation configuration to increase the airflow to a minimum of 42,000 acfm into the active disposal room. Waste disposal shall not be allowed in the active disposal room until the minimum airflow has been established.
- If minimum flow rates cannot be achieved, contact the FSM.
- Measure airflow at the waste shaft side of Regulator 74-B-308 and record information on attachment 4 for the following conditions:

NOTE

If measured airflow is less than 12,000 acfm, CH waste handling is not allowed in the U/G. If measured airflow is less than 20,000 acfm, RH waste handling is not allowed in the U/G. If minimum flow rates cannot be achieved, contact the FSM.

- Prior to establishing Waste Handling Mode in the U/G.
- There is a change in the ventilation system configuration during waste handling that could affect flow rates.

Attachment 1 – Example Data Sheet

1. LOG SHEET ENTRIES STANDARD FORMAT:

- Started/Stopped _____ Fan(s) – Placed UVFS in _____ Mode.
(With the exception of Maintenance Bypass Mode, the log will also include the different fan configurations.)

Examples

- Started 860B – Placed UVFS in Maintenance Bypass Mode (1-700 fan with 1-860 fan)
- Started 860C – Placed UVFS in Maintenance Bypass Mode (1-700 fan with 2-860 fans)
- Started 700A – Placed UVFS in Normal Mode
- Secured 700A – No U/G ventilation in service

2. NOMINAL FLOW RATES

MODE OF OPERATION	FLOW RATE (kscfm) - Nominal Values
Normal	425
Alternate	260
Maintenance Bypass	260 to 425
Reduced	120
Minimum	60
Filtration	60

** (Average total mine flow rate is calculated on a monthly basis. After one year, the calculation will encompass the previous 12 month's worth of data and become a running average. Hours are calculated to the nearest quarter hour. All hours are calculated from times entered in the CMR Log.)

$$\text{Average Flow Rate} = \frac{\text{NRT}(425\text{k}) + \text{ART}(260\text{k}) + \text{MBRT}(260\text{k}) + \text{RRT}(120\text{k}) + \text{MRT}(60\text{k}) + \text{FRT}(60\text{k})}{(\# \text{ of months tabulation began}^{**}) (730 \text{ hr/mo})}$$

Where:

NRT = Normal Run Time
 ART = Alternate Run Time
 MBRT = Maintenance Bypass Run Time
 RRT = Reduced Run Time
 MRT = Minimum Run Time
 FRT = Filtration Run Time

Attachment 2 – Example Mode Sheet

WEEK ENDING:

		FRIDAY	SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	TOTAL
DATE									
NORMAL VENTILATION	TIME(min)								
	FLOW (kscfm)	425	425	425	425	425	425	425	425
ALTERNATE VENTILATION	TIME (min)								
	FLOW (kscfm)	260	260	260	260	260	260	260	260
MAINTENANCE BYPASS (1-700 FAN w/1-860 FAN)	TIME (min)								
	** FLOW (kscfm)	260	260	260	260	260	260	260	260
MAINTENANCE BYPASS (1-700 FAN w/2-860 FANS)	TIME (min)								
	** FLOW (kscfm)	260	260	260	260	260	260	260	260
MAINTENANCE BYPASS (2-700 FANS w/1-860 FAN)	TIME (min)								
	** FLOW (kscfm)	260	260	260	260	260	260	260	260
MAINTENANCE BYPASS (2-700 FANS w/2-860 FANS)	TIME (min)								
	** FLOW (kscfm)	260	260	260	260	260	260	260	260
REDUCED VENTILATION	TIME (min)								
	FLOW (kscfm)	120	120	120	120	120	120	120	120
MINIMUM VENTILATION	TIME (min)								
	FLOW (kscfm)	60	60	60	60	60	60	60	60
FILTRATION	TIME (min)								
	FLOW (kscfm)	60	60	60	60	60	60	60	60
NO VENTILATION	TIME (min)								

Attachment 3 – Example WIPP Mine Ventilation Rate Monitoring Plan Summary Sheet

Week Ending: _____

SURFACE												
DATE STARTED: 10/22/99	WEEKLY				MONTHLY				ANNUALLY **			
MODE OF OPERATION	RUNTIME (min)	RUNTIME (hours)	FLOW RATE (kscfm)	TOTAL flow rate (kscfmhr)	RUNTIME (min)	RUNTIME (hours)	FLOW RATE (kscfm)	TOTAL flow rate (kscfmhr)	RUNTIME (min)	RUNTIME (hours)	FLOW RATE (kscfm)	TOTAL flow rate (kscfmhr)
NORMAL VENTILATION												
ALTERNATE VENTILATION												
MAINTENANCE BYPASS (1-700 FAN W/ 1-860 FAN)												
MAINTENANCE BYPASS (1-700 FAN w/ 2-860 FANS)												
MAINTENANCE BYPASS 2-700 FANS w/ 1-860 FAN)												
MAINTENANCE BYPASS (2-700 FANS w/ 2-860 FANS)												
REDUCED VENTILATION												
MINIMUM VENTILATION												
FILTRATION												
NO VENTILATION												
TOTAL												
SUM of TOTAL (kscfm-hr)												
AVERAGE FLOW RATE												

UNDERGROUND				
DATE STARTED: 5/17/00	DATE	RUNTIME (min)	AIRFLOW (tacf)	AIRFLOW X RUNTIME
ACTIVE DISPOSAL ROOM FLOW {MINIMUM=35KSCFM/42KACFM}				
TOTAL TIME (min)				
WEEKLY AVERAGE FLOW (kscfm)				

MONTH	AVERAGE FLOW (kacfm)
WK1	
WK2	
WK3	
WK4	
WK5	

TOTAL	AVERAGE FLOW (kacfm)
MONTHLY	
CUMULATIVE	

(**) Note: Cumulative until 10/21/00

ROOM NUMBER _____ PANEL NUMBER _____

When airflow reading at the waste shaft side of Regulator 74-B-308 is below 12,000 acfm, U/G CH waste handling is prohibited. When airflow reading at the waste shaft side of Regulator 74-B-308 is below 20,000 acfm, U/G RH waste handling is prohibited. If minimum flow rates cannot be achieved, contact the FSM.

[illegible]

WP 05-WH1811

Revision 0

Underground Site-Derived Mixed Waste Storage Area Inspections

Technical Procedure

EFFECTIVE DATE: 12/02/14

Craig Suggs
APPROVED FOR USE

CONTINUOUS USE PROCEDURE

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CHANGE HISTORY SUMMARY

REVISION NUMBER	DATE ISSUED	DESCRIPTION OF CHANGES
0	12/02/14	<ul style="list-style-type: none">• New document.

INTRODUCTION ^{1,2}

This procedure provides guidance for performing inspections of Underground (U/G) Site-Derived Mixed Waste Storage Areas.

Performance of this procedure generates the following record(s), as applicable. Any records generated are handled in accordance with departmental Records Inventory and Disposition Schedules.

- Attachment 1, Preoperational Underground Site-Derived Mixed Waste Storage Area Inspections
- Attachment 2, Weekly Underground Site-Derived Mixed Waste Storage Area Inspections
- Attachment 3, Waste Volume Tracking Checklist for Site-Derived Storage Area, S-700 between E-140 and E-300
- Attachment 4, Waste Volume Tracking Checklist for Site-Derived Storage Area, E-140 between S-2520 and S-2750
- Attachment 5, Waste Volume Tracking Checklist for Site-Derived Storage Area, Panel 7 Room 2

REFERENCES			
DOCUMENT NUMBER AND TITLE	BASELINE DOCUMENT	REFERENCED DOCUMENT	KEY STEP
Title 40 Code of Federal Regulations (CFR) Part 264, Subpart I, "Use and Management of Containers"	✓		
40 CFR §264.15, "General Inspection Requirements"	✓		1
40 CFR Part 761, Subpart C, "Marking of PCBs and PCB Items"	✓		
DOE/WIPP-07-3372, <i>Waste Isolation Pilot Plant Documented Safety Analysis</i>	✓		
DOE/WIPP-07-3373, <i>Waste Isolation Pilot Plant Technical Safety Requirements</i>	✓		
Hazardous Waste Facility Permit, EPA Identification Number NM4890139088-TSDF	✓		
00CD-0001, <i>WIPP Mine Ventilation Plan</i>	✓		2
WP 04-AU1007, <i>Underground Openings Inspections</i>		✓	
WP 13-1, <i>Nuclear Waste Partnership LLC Quality Assurance Program Description</i>	✓		

REFERENCES			
DOCUMENT NUMBER AND TITLE	BASELINE DOCUMENT	REFERENCED DOCUMENT	KEY STEP
WP15-GM1002, <i>Issues Management Processing of WIPP Forms</i>		✓	
JHA PROD-825, <i>CH Underground Area Inspections</i>	✓		
Underground Derived Waste Storage Plan	✓		

PRECAUTIONS AND LIMITATIONS

- Only personnel qualified as a CH Floor, Yard and Emplacement Technician/CH Waste Handling Technician/Engineer (FY&E/WHT/WHE) or trainees operating under direct supervision of a qualified CH FY&E/WHT/WHE are authorized to perform CH Waste Handling activities specified in this procedure.

PREREQUISITE ACTIONS

- 1.0 Review previous inspection results for outstanding Action Requests (ARs) and outstanding deficiencies.
- 2.0 If a required inspection goes delinquent, perform the following:
 - 2.1 Immediately notify Site Environmental Compliance (SEC) of the delinquent inspection.
 - 2.2 Schedule and complete the inspection.
 - 2.3 Document the following in a letter to SEC within five working days:
 - The schedule for inspection
 - The reason(s) why inspection was not performed
 - Any measures taken to offset negative impacts resulting from not performing the inspection
 - Actions to prevent further delinquencies
 - 2.4 WHE, **GO TO** WP 15-GM1002, and initiate a WIPP Form.

PERFORMANCE**1.0 PREOPERATIONAL UNDERGROUND SITE-DERIVED MIXED WASTE STORAGE AREA INSPECTIONS (ATTACHMENT 1)**

1.1 IF personnel are to be working in active Underground Site Derived Waste Storage Areas 1, 2, and/or 3,
THEN, at start of shift, inspect areas per attachment 1, as follows:

1.1.1 Enter date and time of inspection in appropriate blocks.

1.1.2 Inspect the applicable item/condition listed on attachment 1 **AND** enter check (✓) for satisfactory items/conditions, **U** for any unsatisfactory items/conditions, **N/A** for not inspected, **OR** actual value required.

1.1.3 Initial applicable block.

1.1.4 **IF** any item/condition is unsatisfactory,
THEN perform the following:

- Describe exact location and nature of deficiency in Remarks section.
- Notify WHE.
- Initiate and record AR for corrective action, as applicable.

1.1.5 Enter printed name, signature, and initials on attachment 1 when inspection completed.

1.1.6 Mark "N/A" for any unused block on attachment 1.

1.2 Submit inspection sheet to Reviewer upon completion of Preoperational Inspection.

2.0 REVIEW

2.1 Reviewer, perform the following:

2.1.1 Review attachment 1 for unsatisfactory conditions, corrective actions taken, and outstanding or newly generated ARs.

2.1.2 Enter initials in block provided for specific day.

2.1.3 Upon completion of last inspection documented, forward attachment 1 to WHE for validation.

3.0 WEEKLY SITE-DERIVED MIXED WASTE STORAGE AREA INSPECTIONS (ATTACHMENT 2)

NOTE

Weekly inspections are not required if waste is not stored in applicable areas or if area is inaccessible.

3.1 **IF** waste is stored, in active Underground Site-Derived Waste Storage Areas 1, 2, and/or 3,

THEN at least once every seven days or per WHM direction, inspect applicable areas per attachment 2 and perform the following:

3.1.1 Enter date and time of inspection in appropriate blocks.

3.1.2 Inspect the applicable items/conditions listed on attachment 2 and enter **✓** for satisfactory items/conditions, **U** for any unsatisfactory items/conditions, **N/A** for not applicable.

3.1.3 Enter initials in block provided.

3.1.4 **IF** any inspection result is **NOT** satisfactory,
THEN perform the following:

- Describe exact location and nature of deficiency in Remarks section.
- Notify WHE.
- Initiate and record ARs for corrective action, as applicable.

3.1.5 Inspector, print name, sign, and enter initials when inspection is completed.

3.1.6 Submit inspection sheet to reviewer upon completion of Weekly Inspection.

3.1.7 Reviewer, proceed to section 2.0.

4.0 VALIDATION

4.1 WHE, perform the following:

4.1.1 Upon completion of last inspection on attachments 1 and 2, verify correctness of form. Validate inspection(s) by printing name, signing, and dating inspection sheet in spaces provided.

4.1.2 Review attachments 1 and 2 weekly and forward completed attachments to Records Coordinator.

5.0 WASTE VOLUME TRACKING (ATTACHMENTS 3, 4, 5)

- 5.1 WH, when a new container is placed into an underground Site-Derived Waste Storage Area, inform WHE of container ID number as it is introduced into the Site Derived Waste Storage Area.
- 5.2 WHE, update Waste Volume Tracking Checklist (attachments 3, 4, and/or 5), on next available row, with the following:
 - Enter initials and date when container was introduced into Site-Derived Waste Storage Area, on Initial/Date block for applicable storage area.
 - Enter container ID number in Container ID block.
 - Enter container type in Container Type block. (SWB, 55 gallon or 85 gallon drum).
- 5.3 Performer, enter printed name, signature, and initials on attachment(s) 3, 4, and/or 5.

Attachment 1 – Preoperational Underground Site-Derived Mixed Waste Storage Area Inspections

PREOPERATIONAL U/G SITE-DERIVED MIXED WASTE STORAGE AREA INSPECTION								
	DATE							
	TIME							
U/G Work Area Ground Control Inspection satisfactory in accordance with WP 04-AU1007	√/U*							
No evidence of adverse health/safety conditions	√/U*							
Unobstructed access to exposed face of containers	√/U*							
Area free of debris	√/U*							
No evidence of spills/leaks from containers	√/U*							
Adjacent mine pager phones operational	√/U*							
U/G phone system operational	√/U*							
Warning signs posted	√/U*							
PCB warning signs posted (as applicable)	√/U*							
44 - inch minimum aisle space for Site-Derived Waste containers	√/U*							
Site-Derived Location 1 S-700 between E-140 and E-300	√/U*							
Site-Derived Location 2 E140 between S-2520 and S-2750	√/U*							
Site-Derived Location 3 Panel 7 Room 2	√/U*							
PERFORMER INITIALS	xxxxxx							
REVIEWER INITIALS	xxxxxx							

* √ = Satisfactory U = Unsatisfactory N/A = Not Inspected

Performers enter Printed Name, Signature, and Initials:

Printed Name

Signature

Initials

Attachment 1 – Preoperational Underground Site-Derived Mixed Waste Storage Area
Inspections

REMARKS: _____

VALIDATION: _____ / _____ / _____
WHE (Print Name) Signature Date

Attachment 2 – Weekly Underground Site-Derived Mixed Waste Storage Area Inspections

WEEKLY U/G SITE-DERIVED MIXED WASTE STORAGE AREA INSPECTION								
	DATE							
	TIME							
U/G Work Area Ground Control Inspection satisfactory in accordance with WP 04-AU1007	√/U*							
No evidence of adverse health/safety conditions	√/U*							
Unobstructed access to exposed face of containers	√/U*							
Area free of debris	√/U*							
No evidence of spills/leaks from containers	√/U*							
Adjacent mine pager phones operational	√/U*							
U/G phone system operational	√/U*							
Warning signs posted	√/U*							
PCB warning signs posted (as applicable)	√/U*							
44 - inch minimum aisle space for Site-Derived Waste containers	√/U*							
Site-Derived Location 1 S-700 between E-140 and E-300	√/U*							
Site-Derived Location 2 E140 between S-2520 and S-2750	√/U*							
Site-Derived Location 3 Panel 7 Room 2	√/U*							
PERFORMER INITIALS	xxxxxx							
REVIEWER INITIALS	xxxxxx							

* √ = Satisfactory U = Unsatisfactory N/A = Not Inspected

Performers enter Printed Name, Signature, and Initials:

Printed Name

Signature

Initials

Attachment 2 – Weekly Underground Site-Derived Mixed Waste Storage Area
Inspections

REMARKS: _____

VALIDATION: _____ / _____ / _____

WHE (Print Name) Signature Date

Attachment 3 – Waste Volume Tracking Checklist for Site-Derived Storage Area, S-700
between E-140 and E-300

Waste Volume Tracking

[illegible]

VALIDATION:			
WHE Name (print)	Signature	Date	

Attachment 4 – Waste Volume Tracking Checklist for Site-Derived Storage Area, E-140
between S-2520 and S-2750

Waste Volume Tracking

[illegible]

VALIDATION:			
WHE Name (print)	Signature	Date	

Attachment 5 – Waste Volume Tracking Checklist for Site-Derived Storage Area,
Panel 7 Room 2

Waste Volume Tracking

[illegible]

VALIDATION: _____

WHE Name (print)	Signature	Date
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WP 05-WH1836

Revision 0

Underground Site-Derived Mixed Waste Handling

Technical Procedure

EFFECTIVE DATE: 12/02/14

Craig Suggs
APPROVED FOR USE

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CHANGE HISTORY SUMMARY

REVISION NUMBER	DATE ISSUED	DESCRIPTION OF CHANGES
0	12/02/14	• New document.

INTRODUCTION ^{1, 2, 3}

This procedure provides instructions for managing underground site-derived transuranic (TRU) waste (liquid and/or solid) at the Waste Isolation Pilot Plant (WIPP). Entry into this procedure is as described in Hazardous Waste Facility Permit (the Permit) Attachment A, section A-5, which states that the resulting waste that may be classified as underground site-derived waste. Underground site-derived waste may include, but is not limited to, the following materials contaminated with TRU Waste characterized for disposal at WIPP in accordance with the Waste Analysis Plan (WAP).

- Decontaminating liquids
- Water
- Salt
- High-Efficiency Particulate Air (HEPA) filters
- Swipes
- Protective Clothing (PC) and Personal Protective Equipment (PPE)
- Soil
- Wastes from spill response, sampling and decontamination activities
- Rags, wipes

If the underground site-derived waste has been determined to be from a waste stream containing Polychlorinated Biphenyls (PCBs), refer to the Underground Derived Waste Storage Plan for regulatory notifications and compliance with the Polychlorinated Biphenyls Condition of Approval waste storage areas requirements.

Performance of this procedure generates the following record(s), as applicable. Any records generated are handled in accordance with departmental Records Inventory and Disposition Schedules.

- Container Data Report
- Copy of “emplacement complete” notification email
- Attachment 1, Waste Container Log Sheet
- Attachment 2, Underground Site-Derived Waste Criteria Compliance Tag
- Attachment 3, WDS/WWIS Input Data Sheet, Underground Site-Derived Waste

REFERENCES			
DOCUMENT NUMBER AND TITLE	BASELINE DOCUMENT	REFERENCED DOCUMENT	KEY STEP
Title 40 <i>Code of Federal Regulations</i> (CFR) Part 761, “Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions”	✓		2
Hazardous Waste Facility Permit, EPA Identification Number NM4890139088-TSDF	✓		4

REFERENCES			
DOCUMENT NUMBER AND TITLE	BASELINE DOCUMENT	REFERENCED DOCUMENT	KEY STEP
DOE/WIPP-02-3122, <i>Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant</i>		✓	3
DOE/WIPP-07-3372, <i>Waste Isolation Pilot Plant Documented Safety Analysis</i>	✓		
DOE/WIPP-07-3373, <i>Waste Isolation Pilot Plant Technical Safety Requirements</i>	✓		1
WP 02-RC3110, <i>Low-Level and Mixed Low-Level Waste Characterization for Off-Site Release for Disposal</i>	✓		
WP 05-WH.02, <i>WIPP Waste Handling Operations WDS User's Manual</i>	✓	✓	
WP 05-WH1025, <i>CH Waste Downloading and Emplacement</i>		✓	
WP 05-WH1810, <i>Underground Transuranic Mixed Waste Disposal Area Inspections</i>	✓		
WP 05-WH1811, <i>Underground Site-Derived Mixed Waste Storage Area Inspections</i>		✓	
WP 05-WH4401, <i>Waste Handling Operator Event Response</i>		✓	
WP 08-PT.01, <i>Standard Waste Box Handling and Operation Manual</i>	✓		
WP 12-ER4903, <i>Surface Radiological Event Response</i>	✓		
WP 12-HP1100, <i>Radiological Surveys</i>	✓		
WP 12-HP3600, <i>Radiological Work Permits</i>	✓		
WP 12-HP4000, <i>Emergency Radiological Control Responses</i>		✓	
WP 13-1, <i>Nuclear Waste Partnership LLC Quality Assurance Program Description</i>	✓		
JHA PROD-439, <i>General Hazard Analysis</i>	✓		
JHA PROD-783, <i>SWB, TDOP Operations</i>	✓		
JHA PROD-816, <i>Solidification of Site-Derived Liquid Waste</i>	✓		
Underground Derived Waste Storage Plan	✓		

EQUIPMENT

- For Waste Collection:
 - Containers that meet U.S. Department of Transportation (DOT) Type 7A, or equivalent, packaging requirements may be used for TRU waste generator underground site-derived waste collection. Container types and equipment used for the collection of derived waste are:
 - 55-gallon drums
 - 85-gallon drums
 - Standard Waste Boxes (SWBs)
 - Drum and SWB filters that meet the applicable acceptance criteria and specifications of DOE/WIPP-02-3122
 - Poly liners/bags
 - Tape
 - Bench scale (as needed)
 - Floor scale (as needed)
 - Permanent marker
 - In-line load cell (as needed)
 - Sockets and wrenches for drums
 - Allen head sockets for SWB
 - Ratchet
 - Torque wrenches (as needed)
 - Calculator
- For Solidification:
 - PPE as per Industrial Safety/Industrial Hygiene (IS/IH)
 - Measure of acidity and alkalinity (pH) meter with pH seven buffer or litmus paper

- Trisodium phosphate and monosodium phosphate (for pH control)
- 150 to 300 lb AQUASET/drum
- Stirrer paddle
- Bags/Tape

PRECAUTIONS AND LIMITATIONS

- Liquids shall be collected and solidified in 55/85-gallon drums.
- If stored, underground site-derived waste containers shall be stored on spill tray, or equivalent.⁴
- Only personnel qualified as Waste Handling Technician/Engineer/Radiological Control Technician (WHT/WHE/RCT), or trainees operating under direct supervision of qualified WHT/WHE/RCT, are authorized to perform waste handling activities specified in this procedure.
- Abnormal events that require cessation of this procedure are to be performed in accordance with WP 12-HP4000.
- All containers used for storing underground site-derived waste must be new.
- Containers storing underground site-derived waste must be kept closed except when adding, removing, or sampling waste.
- All weight measurements must be recorded in kilograms (kg).
- Radiological Work Permits (RWPs) and other administrative controls provide protective measures to help ensure new hazardous constituents will not be added during decontamination activities. Site Environmental Compliance (SEC) must be consulted to ensure hazardous waste numbers are appropriately applied to the derived waste.
- Radiological control personnel and the WHE shall be contacted prior to opening an underground site-derived waste collection container for adding, removing, or sampling waste.
- Each drum must have at least one filter installed. Each SWB must have at least two filters installed, and vacant ports must be plugged.³
- Shielding **MUST NOT** be used to meet the 200 millirem per hour (mR/h) limit.

- The following radiological values **MUST NOT** be exceeded:¹
 - Contact dose rate of 200 mR/h at any point on underground site-derived waste containers.
 - 20 disintegrations per minute (dpm)/100 cm² alpha loose surface contamination on exterior of waste container.
 - 200 dpm/100 cm² beta/gamma loose surface contamination on exterior of waste container.
- A gross weight of 1,000 lb (454 kg) per 55/85-gallon drum **MUST NOT** be exceeded.
- A gross weight of 4,000 lb (1,814 kg) per SWB **MUST NOT** be exceeded.
- Fire extinguisher charging cartridges will be removed, **OR** verified fully discharged and clearly punctured, prior to inclusion in underground site-derived mixed waste.
- The following items are prohibited in underground site-derived waste containers destined for emplacement underground:⁴
 - Compressed gasses
 - Corrosives
 - Explosives
 - Ignitable and Reactive Waste
 - Pyrophorics
 - Pressurized containers
 - Free liquids
 - Noncompatible materials
 - Hazardous waste having U. S. Environmental Protection Agency (EPA) hazardous waste numbers other than those listed in Part A of the Permit
- If the cumulative Pu-239 FGE of the combined original waste containers exceeds 200 grams, Nuclear Safety must be contacted.
- Liquid transfer shall not exceed 40 gallons per 55-gallon drum.

- Liquid transfer shall not exceed 60 gallons per 85-gallon drum.
- Under no circumstances should containers be left open while personnel are not present.
- Efforts shall be taken to reduce the amount and toxicity (e.g., efforts to minimize the introduction of additional hazardous substances) of underground site-derived waste that is generated.
- All N/As (Not Applicable) on attachments 1, 2, and 3 must be initialed by the person performing the step.

PREREQUISITE ACTIONS

NOTE

If upon inspection, a derived waste container is not in good condition (e.g., severe rusting, apparent structural defects) or if it begins to leak, transfer the waste to a container in good condition, overpack the container, or repair/patch the container in accordance with the Permit, Attachment A2.

- 1.0 WHE, obtain RWP prior to handling (pumping, pouring, transferring, etc.) radiologically contaminated waste.
- 2.0 WHE, verify adequate waste handling operations staff and others from organizations designated to support planned activities as specified in the procedure.
- 3.0 WHE, ensure the underground site-derived waste storage area inspections have been completed per WP 05-WH1811, as needed.

PERFORMANCE

NOTE

Sections of this procedure do not have to be performed in the order written if deemed necessary by WHE. Attachments are required to be completed as the applicable step is completed.

1.0 UNDERGROUND SITE-DERIVED WASTE CONTAINER PREPARATION

NOTE

Adequate aisle space for passage of emergency equipment, emergency response actions, and/or container inspections must be maintained when placing containers in area (44 inches minimum).

1.1 Prepare waste containers as follows:

- 1.1.1 Stage approved waste containers on spill tray, or equivalent, in designated underground site-derived storage location(s).
- 1.1.2 Remove lid from drum.
- 1.1.3 Line waste container with poly bag to bottom and extending beyond top of container and record liner type (poly bag **AND/OR** rigid liner) on attachment 3.
- 1.1.4 Fold bag back over top of receptacle and down the outside.
- 1.1.5 N/A shipment number on attachments 1, 2, and 3.
- 1.1.6 N/A Container ID (as received) on attachments 1, 2, and 3.
- 1.1.7 WHE, assign Waste Data System/WIPP Waste Information System (WDS/WWIS) waste container ID number by appending "WI" (the two-digit ID code for WIPP) and "SD" (the two-digit ID code for site-derived) to next sequential number from the WDS, and record on "Container ID (to be emplaced)" or "WIPP Site ID" line on attachments 1, 2, and 3

NOTE

More than one Waste Stream Profile (WSPF) number may be applied to the site-derived waste container.

- 1.1.8 If necessary, WHE, contact WDS Data Administrator and SEC to create new WSPF number(s), for derived waste containers in the WDS, record new waste stream profile number(s), hazardous waste numbers, on attachments 1, 2, and 3.

- 1.1.9 Ensure appropriate plug(s) are removed prior to installing filters.
- 1.1.10 Vent underground site-derived waste container using appropriate filters.
- 1.1.11 Record Torque Wrench serial number and calibration due date on attachment 1.
- 1.1.12 Torque filter to 10 ft-lb (\pm 5 ft-lb).
- 1.1.13 Record filter model number(s) and serial number on attachment 3.
- 1.1.14 Record filter(s) installation date on attachment 3.
- 1.1.15 Using the values from Table 1 below, enter empty container weight (kg) as the tare weight on attachment 3.

Table 1 Container Weight (kg)

Type Code	Description	CNTR WGT (kg)
1	55 Gallon Drum	28.6
2	SWB	290
21	85 Gallon Drum Tall	37.0

- 1.1.16 RCT, obtain and record radiological survey number on attachment 2.
- 1.1.17 **IF** collecting solid waste, **GO TO** section 2.0.

OR

IF collecting liquid waste, **GO TO** section 3.0.

2.0 UNDERGROUND SITE-DERIVED WASTE ITEM INSPECTION AND CONTAINERIZATION

WARNING

To prevent unnecessary exposure to radioactive, and/or hazardous materials, a sealed bag or container **MUST NOT** be opened for inspection unless there is reason to believe it contains prohibited items or contents cannot be otherwise identified.

NOTE

The lid to the underground site-derived waste container may be installed and removed, as necessary, for adding, removing, or sampling waste.

- 2.1 If necessary, relocate the underground site-derived container to work location.
- 2.2 Inspect all items delivered to waste container, and ensure absence of prohibited items.
- 2.3 **IF** prohibited items are identified upon inspection, **THEN** notify Site Environmental Compliance.
- 2.4 Record the following on the applicable attachment:
 - N/A Origin, attachment 1.
 - Document the **CONTENTS** of the bagged material as it is placed in the derived waste container, attachment 1.

NOTE

The sum of the figures provided for documenting waste material parameters are estimates only and should equal the gross bag weight (e.g., 5 kg of cellulose, 2 kg of rubber, 3 kg of plastics equal 10 kg gross bag weight) on attachment 3.

- 2.5 Estimate the weight of each type of waste material parameter in each bag before placing the bag into the waste container.
- 2.6 Weigh each bag containing waste materials on a calibrated scale and record the weight on "Individual Bag Weights" line on attachment 1 (if applicable).
- 2.7 RCT, ensure appropriate radiological labeling is affixed to exterior of waste container.

2.8 Place waste bag into solid waste container.

NOTE

Waste containers are only sealed after being placed in approved underground site-derived storage location.

2.9 **WHEN** waste container is to be sealed,
THEN WHE, ensure the following:

- Container does not contain free liquids.
- If waste does contain free liquids, **GO TO** section 3.0 before proceeding.

2.10 Fold-and-tape or twist-and-tape (J-seal) inner plastic bag.

2.11 WHE, estimate volume of waste material (fill factor) in drum and record on attachment 3 (e.g., 20%, 30%, 95%).

2.12 Secure lid on container.

- For a drum:
 - If container is outside of a site-derived storage area, tighten retaining bolt to approximately 40 ft lbs.
 - If container is already in a site-derived storage area, tighten retaining bolt to approximately 20 ft lbs.
- For an SWB, ensure lid is in place and install four bolts hand tight.

2.13 RCT, perform contamination and dose rate surveys of waste container exterior and record results on attachment 2.

SIGN-OFF RCT, attachment 2

2.14 **GO TO** section 5.0.

3.0 LIQUID WASTE COLLECTION

3.1 **GO TO** section 1.0 for waste container preparation, and
RETURN TO step 3.2.

3.2 If required to reduce the amount of material handling, relocate underground site-derived waste container to the work location.

NOTE

The lid to the underground site-derived waste container may be installed and removed, as necessary, for adding, removing, or sampling waste.

- 3.3 If using absorbent pellets, perform the following:
- 3.3.1 Spread absorbent pellets over liquid to absorb all liquid present.
 - 3.3.2 Allow 30 minutes for liquid to be absorbed.
 - 3.3.3 If necessary, reapply additional absorbent pellets over liquid.
 - 3.3.4 Shovel (or scoop) material and transfer to solid waste poly bag using flat shovel or scoop.
 - 3.3.5 Wipe surfaces with absorbent pads.
 - 3.3.6 Place used pads in solid waste poly bag.
 - 3.3.7 Close bag by fold-and-seal or twist-and-tape (J-seal) method.
- 3.4 If using pump for large volume of liquid, perform the following:
- 3.4.1 Record the following on attachment 1:
 - N/A gross weight of bagged material
 - Origin (source of waste)
 - Description of liquid waste in contents section
 - Hazardous waste numbers
 - 3.4.2 Transfer liquid to liquid waste containers.
 - [A] Ensuring that liquid transfer does not exceed 40 gallons per 55-gallon drum (approximately 24 inches).
 - [B] Ensuring that liquid transfer does not exceed 60 gallons per 85-gallon drum (approximately 27 inches).
 - 3.4.3 Wipe surface with absorbent pads.
 - 3.4.4 Place used pads in solid waste poly bag.
 - 3.4.5 Close bag by fold-and-seal or twist-and-tape (J-seal) method.

- 3.5 **GO TO** section 2.0 for underground site-derived waste item inspection and containerization,
AND RETURN TO section 4.0, as applicable.

NOTE

It may be necessary to stir contents with a stir stick after adding AQUASET to ensure adequate absorption.

4.0 SOLIDIFICATION OF LIQUID WASTE

4.1 For liquid levels:

- Ensure 55 gallon drum contents **DO NOT** exceed 40 gallons (24 inches) of liquid.
- Ensure 85 gallon drum contents **DO NOT** exceed 60 gallons (27 inches) of liquid.

4.2 Contact IS/IH to determine pH using pH meter or litmus paper and record on attachment 1 as initial pH level.

4.3 Obtain neutralization instructions and compatibility information from IS/IH.

4.4 If pH is greater than 2.0 and less than 5.0, add about 1/4 teaspoon of trisodium phosphate and stir liquid.

4.5 If pH is greater than 9.0 and less than 12.5, add about 1/4 teaspoon of monosodium phosphate and stir liquid.

4.6 Repeat step 4.4 or step 4.5 until pH is between 5.0 and 9.0.

4.7 **WHEN** pH is between 5.0 and 9.0,
THEN wipe contaminated stirrer as it is removed from drum.

4.8 Place used litmus paper, stirrer, and absorbent pad in solid waste poly bag for disposition.

4.9 If liquid is present in solid waste bag, add one part AQUASET to three parts standing liquids.

4.10 Close solid waste bag by fold-and-seal or twist-and-tape (J-seal) method.

4.11 Record pH level on attachment 1 at pH after neutralization.

4.12 Spread entire contents of a 50 lb bag of AQUASET over surface of liquid as evenly as possible.

- 4.13 Place empty AQUASET bag into a solid waste container or solid waste bag.
- 4.14 Wait approximately 30 minutes.
- 4.15 Repeat steps 4.12 and 4.13 two more times for a 55-gallon drum and four more times for an 85-gallon drum.
- 4.16 Place lid on drum and secure with drum ring.
- 4.17 Tighten retaining bolt to the appropriate torque:
 - If container is outside of a site-derived storage area, tighten retaining bolt to approximately 40 ft lbs.
 - If container is already in a site-derived storage area, tighten retaining bolt to approximately 20 ft lbs.
- 4.18 Record the following on the applicable attachment:
 - Origin (source) of waste, attachment 1
 - Description of CONTENTS of the bagged material from the list of material parameters, attachment 1
 - The estimated weight of each type of waste material parameter (the sum of the figures should equal the gross bag weight [e.g., 5 kg of cellulose, 2 kg of rubber, 3 kg of plastics equal 10 kg gross bag weight]), attachment 3
 - Hazardous waste numbers, attachment 1
- 4.19 Let stand for more than 24 hours.
- 4.20 Remove lid and inspect surface for any free-standing liquid.
- 4.21 If any free-standing liquid remains, add one part AQUASET to three parts standing water, by volume, to complete solidification process.
- 4.22 WHE, ensure there are no free liquids in container.
- 4.23 Close bag by fold-and-seal or twist-and-tape (J-seal) method.

4.24 WHE, perform the following for solidification of liquid waste:

- Record on attachment 1 date waste was solidified.
- Estimate volume of waste material (fill factor) in drum and record on attachment 3 (e.g., 20%, 30%, 95%).
- Record on attachment 3 description of solidified waste from the list of material parameters found on attachment 3.

4.25 Place lid on drum and seal drum ring, as per step 7.2.

SIGN-OFF WHE, attachment 2

4.26 RCT, perform contamination and dose rate surveys of waste container exterior and record results on attachment 2.

SIGN-OFF RCT, attachment 2

4.27 RCT, ensure appropriate radiological labeling is affixed to exterior of waste container.

4.28 Record the following on attachment 3:

- Waste Type Code
- Handling Code
- Container Type Code
- Liner Type (poly bag **AND/OR** rigid liner)

4.29 Weigh sealed waste container.

4.30 Record gross weight on waste container and on attachment 3.

4.31 Subtract tare weight from the gross weight of waste container or attachment 3 and record as waste weight on attachment 3.

4.32 If waste container was moved to the work site, move the waste container to the Underground Site-Derived Waste Storage Area.

4.33 **GO TO** section 2.0 for underground site-derived waste item inspection and containerization, as applicable.

SIGN-OFF WHE, attachment 2

- 4.34 Ensure applicable steps for preoperational inspections per WP 05-WH1811 have been completed.

5.0 CONTAINER IDENTIFICATION REQUIREMENTS

- 5.1 Record the following on attachment 3:

- Waste Type Code
- Handling Code
- Container Type Code

- 5.2 Weigh sealed waste container.

- 5.3 Record gross weight (kg) of waste container on attachment 1.

- 5.4 Subtract tare weight (kg) marked on waste container and/or attachment 3 from gross weight of waste container and record as waste weight on attachment 3.

- 5.5 **IF** waste container contains no liquid wastes, **THEN** N/A the following on attachment 1:

- Initial pH Level
- pH level after neutralization
- Date liquid waste solidified

NOTE

Bar code labels may be transmitted from the Data Administrator (DA) to the WHE via email.

- 5.6 WHE, refer to WP 05-WH.02 to create bar code labels.

- 5.7 WHE, print the labels and apply container WDS/WWIS ID number bar code labels, or hand-write container ID numbers as follows:

- Drums - place three labels on side, near bottom, and spaced about 120 degrees apart.
- SWBs - place labels on flat sides near top.

- 5.8 WHE, obtain and apply hazardous material/waste decals on container(s), if applicable.

6.0 COMPLETION OF RECORD PACKAGE

- 6.1 All performers responsible for step completion on attachments 1 and 2 enter printed name, signature, initials, and date on applicable attachments.
- 6.2 Combine attachments 1, 2, and 3 to form record package.

NOTE

A container should be sealed when no more waste, as determined by WHE or WHM, will be placed in the container.

Containers that are sealed in section 7.0 will remain in temporary approved storage location(s) until approved for disposal in waste panels or shipped off-site as low-level waste.

7.0 SEALING CONTAINERS

- 7.1 Record torque wrench number and calibration due date on attachment 1.
- 7.2 For drums:
 - 7.2.1 Ensure lock ring is on drum.
 - 7.2.2 Ensure retaining bolt is installed and torque to 55-60 ft lbs.
- 7.3 For SWBs:
 - 7.3.1 Ensure lid is on SWB.
 - 7.3.2 Install and torque all bolts per WP 08-PT.01.

8.0 VERIFICATION OF RECORD PACKAGE

- 8.1 WHE, review attachments 1, 2, and 3 for completion.
- 8.2 WHE, ensure container is properly labeled (bar code, hazardous waste, radiological).
- 8.3 WHE, enter printed name, signature, and date on attachments 1, 2, and 3.
- 8.4 Waste Handling Manager (WHM), perform the following:
 - 8.4.1 Verify waste meets waste form and packaging requirements.
 - 8.4.2 Enter printed name, signature, and date on attachments 1, 2, and 3.

- 8.4.3 Scan the record package to a .pdf file and forward a copy of the record package via email to WDS/WWIS DA and Regulatory Environmental Services (RES) Point of Contact (POC).

- 8.5 WDS/WWIS DA, perform the following:

NOTE

The completeness check will verify that all waste streams associated with the original waste container are recorded on attachments 2 and 3.

- 8.5.1 Using the WDS Test Instance, use the information provided by Waste Handling to create a new waste steam profile to facilitate successful container data entry and to perform a completeness check of data on all attachments.
- 8.5.2 If the data on the attachments have missing or incomplete information or if container data cannot be successfully inserted in to the WDS, contact the WHM.

NOTE

The WDS data comparison will verify that data is sufficient for successful submittal to the database. The data comparison will verify that ALL hazardous waste numbers assigned to the original waste container will be assigned to the underground site-derived waste container when the data are entered into the WDS production instance.

- 8.5.3 Perform a data comparison of WP 05-WH1836 criteria with the information that was recorded on each attachment.
- 8.5.4 If issues are identified during the data comparison, contact the WHM via email.
- 8.5.5 If no issues are identified or issues are adequately addressed during the data comparison, notify the RES Manager via email that data comparison is complete.

NOTE

Container data for underground site-derived waste does not undergo the automated edit/limit checks. Data verification by RES will include an evaluation that the container meets the WIPP Waste Acceptance Criteria and Hazardous Waste Facility Permit requirements. Prior to notification to the data base administrator (DBA) to input the container data to the WDS production instance, data verification by RES and notification to WHM is required.

- 8.6 DA, input container data in the WDS production instance and notify the DBA.

- 8.7 DBA, notify DA and WHM and RES manager when container data is available for emplacement.
- 8.8 DA, generate a Container Data Report for the waste container and forward to WHM and RES Manager or designee via email.
- 8.9 WHE, print a copy of the Container Data Report from the WDS/WWIS dashboard.
- 8.10 WHE, forward attachments 1, 2, and 3 and WDS/WWIS Container Data Report to Waste Handling Records Coordinator.
- 8.11 WHE, coordinate with DBA to electronically emplace container in the WDS.

Attachment 1 – Waste Container Log Sheet

WASTE CONTAINER LOG SHEET			Page ____ of ____
Shipment Number ^(1.1.5) :			
Container ID (as received) ^(1.1.6) :			
Container ID (to be emplaced) ^(1.1.7) :			
Waste Stream Profile (WSPF) # ^(1.1.8) :			
Gross Weight of Bagged Material (if applicable) ^(3.4.1) :			
Individual Bag Weights ^(2.6) :			
Origin ^(2.4, 3.4.1, 4.18) :			
Contents ^(2.4, 3.4.1, 4.18) :			
Hazardous Waste Numbers (if applicable) ^(3.4.1, 4.18) :			
Initial pH Level (if applicable) ^(4.2, 5.5) :			
pH Level After Neutralization (if applicable) ^(4.11, 5.5) :			
Date Liquid Waste Solidified (if applicable) ^(4.24, 5.5) :			
Container Filter Torque Wrench Serial Number/Calibration Due Date ^(1.1.11) :			
Container Locking Ring Bolt/Lid Bolts Torque Wrench Serial Number/Calibration Due Date ^(7.1) :			
Date Container was Sealed:			
Comments:			
Performers responsible for each step completion, enter printed name, signature, initials, and date below:			
Print Name	Signature	Initials	Date
REVIEW			
WHE (Print Name)	Signature	Date	
VALIDATION			
WHM (Print Name)	Signature		

Attachment 2 – Underground Site-Derived Waste Criteria Compliance Tag

WIPP UNDERGROUND SITE-DERIVED WASTE CRITERIA COMPLIANCE TAG		Page ____ of ____	
Shipment Number ^(1.1.5) :			
Container ID (as received) ^(1.1.6) :			
Container ID (to be emplaced) ^(1.1.7) :			
WSPF # ^(1.1.8) :			
Radiological Survey Number ^(1.1.16) :			
Date Sealed:		CONTAINS NO PROHIBITED MATERIAL	
WHE (Print Name)	Signature	Date	
MAXIMUM CONTACT DOSE RATE		MAXIMUM SURFACE REMOVABLE CONTAMINATION	
β-γ _____ mR/h	a _____	dpm/100cm ²	
η _____ mR/h	β-γ _____	dpm/100cm ²	
RCT (Printed Name)	Signature	Date	
Performers responsible for each step completion enter printed name, signature, initials, and date below:			
Print Name	Signature	Initials	Date
REVIEW:			
WHE (Print Name)	Signature	Date	
VALIDATION			
WHM (Print Name)	Signature	Date	

Attachment 3 – WDS/WWIS Input Data Sheet, Site-Derived Waste

WDS/WWIS INPUT DATA SHEET, UNDERGROUND SITE-DERIVED WASTE		Page ____ of ____
FIELDS APPLICABLE TO DERIVED WASTE		
Shipment Number ^(1.1.5)		
Container ID ^(1.1.6)	Container ID as received ID #	Data will be input to waste container comments in the WDS/WWIS
WIPP Site ID ^(1.1.7)	Two-digit identification code assigned to WIPP (WI) plus container ID number as received ID #	WI Data will be input to CNTR-NUM in the WDS/WWIS
WSPF Number ^(1.1.8)	WSPF for original shipment ID #	Data will be input to waste container comments in the WDS/WWIS
Filter Model Number ^(1.1.13)	Vendor model number of filter(s) used to vent container	
Filter Installation Date ^(1.1.14)	Date filter was installed in waste container	
Fill Factor ^(2.11, 4.24)	Estimated percentage of waste container volume occupied by the waste	
Date Sealed	Date waste container was closed	
Waste Type Code ^(4.28, 5.1)	Code is "TRU" for nonmixed waste and "MTRU" for mixed waste	
Handling Code ^(4.28, 5.1)	Code is "CH" for contact-handled TRU waste	
Container Type Code ^(4.28, 5.1)	3-digit container type code: 1 - 55-gallon drum; 2 – SWB; 21 – 85-gallon drum	
Liner Type ^(1.1.3, 4.28)	Identifies type of container liner, if applicable	
Gross Weight ^(4.30)	Gross Weight of a container	
Tare Weight ^(1.1.15)	Tare Weight of empty container	
Waste Weight ^(4.31)	Weight of waste inside container	

Attachment 3 – WDS/WWIS Input Data Sheet, Site-Derived Waste

List of Material Parameters ^{3,4}		Page ____ of ____
WDS/WWIS Data Entry Code	Waste Material Parameter	Material Parameter Weight (kg)
1	Iron-based metals/alloys	
2	Aluminum-based metals/alloys	
3	Other metals	
4	Other inorganic materials	
5	Cellulosics	
6	Rubber	
7	Plastic	
8	inorganic matrix	
9	organic matrix	
10	Soils/gravel	
11	Steel (packaging materials)	
12	Plastics (packaging materials)	
13	Cellulosic packaging material	
14	Magnesium oxide	
15	Steel emplacement material	
16	Cellulosic emplacement material	
17	Rubber emplacement material	
18	Plastic emplacement material	

Description of Solidified Waste ^(4.24)

REVIEW

WHE (Print Name)

Signature

Date

VALIDATION

WHM (Print Name)

Signature

Date

WP 12-HP1500

Revision 18

Radiological Posting and Access Control

Technical Procedure

EFFECTIVE DATE: 06/03/14

Walter MacMillan
APPROVED FOR USE

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CHANGE HISTORY SUMMARY

REVISION NUMBER	DATE ISSUED	DESCRIPTION OF CHANGES
13	4/4/11	<ul style="list-style-type: none"> Deleted steps 17.2 and 18.2, no longer performed. Section 19.0 added information to Note and in steps 19.2 and 19.3 for Escort for nonradiological worker in RBA, RMA, Radiation Areas, or Contamination Areas.
14	07/29/11	<ul style="list-style-type: none"> Added wording about unattended exempt sources to Note above step 1.1 Deleted Note above step 2.1
15	12/05/12	<ul style="list-style-type: none"> Updated Reference table. Added to bullet 7 in Precautions and Limitations statement that RW trained individuals may assist RCT in erecting or modifying boundaries. Added two new bullets at the end of the Precautions and Limitations section. Deleted attachment 1 and changed all references in document to WP 12-HP1100 attachment 9. Added a Note after step 19.1. Deleted attachment 4. Removed section 3.0 Note – last four sentences “The boundary for the RBA ...”. Replaced in section 3.1 – “0.5” with “2”.
16	02/06/13	<ul style="list-style-type: none"> Editorial revision in accordance with MD 1.1.
17	04/22/14	<ul style="list-style-type: none"> Updated References table. Deleted multiple steps and notes in section 1.0 and replaced with updated requirements. Revised Note above step 3.1 regarding RBA postings. Deleted bullet under step 3.3, concerning “NO EATING, DRINKING, OR SMOKING” signs. Added step 3.4 regarding established contamination control areas and corresponding boundary signs. Added to bullet under step 13.1, “if applicable.”

REVISION NUMBER	DATE ISSUED	DESCRIPTION OF CHANGES
18	06/03/14	<ul style="list-style-type: none">Deleted Precautions and Limitations bullets, note above section 1.0, step 3.1, and verbiage in step 3.2 regarding controlled area criteria/boundaries/postings.Deleted Prerequisite Actions header and moved bullets to Precautions and Limitations section.Deleted step 3.4 and verbiage in note above step 3.1 regarding contamination control criteria.Added in steps 8.3 and 8.4 and attachment 1 “at 30 cm from the source” to qualification of a High Radiation Area.Deleted step 19.3 regarding nonradiological worker entry into contamination area.

INTRODUCTION

This procedure provides instructions for the following activities:

- Posting and access requirements for Controlled Areas, Radioactive Material Areas (RMAs), Radiological Buffer Areas (RBAs), and radiological areas (Radiation, High Radiation, and Very High Radiation Areas, Contamination and High Contamination Areas, and Airborne Radioactivity Areas)
- Labeling radioactive items and containers of radioactive materials

Performance of this procedure generates the following record(s), as applicable. Any records generated are handled in accordance with departmental Records Inventory and Disposition Schedules.

- Visitor orientation documents
- Entry in Radiological Control (RC) Logbook
- Attachment 2, Electronic Personnel Dosimeter Log Sheet

REFERENCES			
DOCUMENT NUMBER AND TITLE	BASELINE DOCUMENT	REFERENCED DOCUMENT	KEY STEP
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart F 835.501(a)	✓		1
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart F 835.501(b)	✓		2
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart F 835.501(c)	✓		3
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart F 835.501(d)	✓		4
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart F 835.501(e)	✓		5
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart F 835.502(a)	✓		6

REFERENCES			
DOCUMENT NUMBER AND TITLE	BASELINE DOCUMENT	REFERENCED DOCUMENT	KEY STEP
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart F 835.502 (b)	✓		7
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart F 835.502(d)	✓		8
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart G 835.601(a)	✓		9
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart G 835.601(b)	✓		10
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart G 835.602 (a)	✓		11
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart G 835.602 (b)	✓		12
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart G 835.603 (a)	✓		13
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart G 835.603 (b)	✓		14
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart G 835.603 (c)	✓		16
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart G 835.603 (d)	✓		15
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart G 835.603 (e)	✓		17
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart G 835.603 (f)	✓		18
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart G 835.604 (a)	✓		19
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart G 835.604 (b)	✓		20

REFERENCES			
DOCUMENT NUMBER AND TITLE	BASELINE DOCUMENT	REFERENCED DOCUMENT	KEY STEP
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart G 835.604 (c)	✓		21
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart G 835.606 (a)	✓		22
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart J 835.901 (a)	✓		23
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart F 835.901 (d)	✓		24
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart L 835.1102 (a)	✓		25
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart F 835.502 (c)	✓		26
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart G 835.605	✓		27
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart L 835.1102 (b)	✓		28
Title 10 Code of Federal Regulations (CFR) Part 835, "U.S. Department of Energy, Occupational Radiation Protection", Subpart L 835.1102 (e)	✓		29
DOE STD-1098-99, <i>Radiological Control</i>	✓		
ANSI N2.1-1971 (R1989), <i>Radiation Symbol</i>		✓	
Hazardous Waste Facility Permit, EPA Identification Number NM4890139088	✓		30
WP 05-WH1724, <i>RH Hot Cell Complex Key Control</i>		✓	
WP 12-DS3326, <i>TLD Assignment, Issue and Retrieval</i>		✓	
WP 12-HP1100, <i>Radiological Surveys</i>		✓	
WP 12-HP3200, <i>Radioactive Material Control</i>		✓	
WP 12-HP3400, <i>Contamination Control</i>	✓		
WP 12-HP3600, <i>Radiological Work Permits</i>	✓		

EQUIPMENT

- Signs and inserts as specified in this procedure
- Yellow and magenta radiological tape and rope
- Stanchions

PRECAUTIONS AND LIMITATIONS [2, 3, 5, 8, 9, 10, 12, 19](#)

- Signs are used to meet ANSI (American National Standards Institute) N2.1-1971 radiation symbol specifications. The signs have a yellow background with magenta or black radiation symbol. The signs avoid conflicts with security requirements, and are approved by the Radiological Control Manager (RCM)/Radiological Control Superintendent (RCS).
- Radiological Control Technicians (RCT) must verify the effectiveness and operability of barricades, devices, alarms, and/or locks for High Radiation Areas (that are $>1,000$ mrem/hr [millirems per hour] at 30 cm [centimeters] from the source or from any surface that the radiation penetrates or where an individual could receive a whole body dose of 1,000 mrem in one hour) and Very High Radiation Areas. Physical access control will be verified on a weekly basis and logged in the RC Logbook.
- Signs used for training or demonstration purposes are to be clearly and conspicuously marked as such to clearly distinguish them from signs used to indicate actual conditions.
- No personnel access control, such as radiological rope or tape placed across door(s) to radiological areas, is to be installed in a manner that will prevent rapid evacuation of personnel during emergency conditions.
- The degree of personnel entry control is to be commensurate with existing and potential radiological hazards within radiological areas.
- If multiple radiological conditions exist in one location (e.g., Contamination Area **AND** High Radiation Area), every radiological condition must be clearly identified for that location. This can be accomplished by placing all information on one or more signs with the greatest hazard normally listed on top, the next hazard listed below that one, and so on.
- Only RCTs are authorized to modify radiological boundaries in any way (e.g., remove or change radiological signs, alter the size of radiological areas, RMAs, RBAs, or Controlled Areas by moving boundaries), Radiological Worker (RW) trained individuals may assist the RCT in erecting or modifying boundaries under the direct supervision of an RCT during normal operations.

- Boundary ropes, man doors, roll-up doors, etc., should be returned to normal configuration immediately after entering or exiting posted areas.
- Areas may be exempted from posting requirements for periods of less than eight continuous hours when placed under continuous observation and control of an individual knowledgeable of and empowered to implement required access and exposure control requirements.
- Precautionary pre-posting of **HIGH RISK** areas shall be used to anticipate elevated radiological conditions. Some examples are:
 - Posting RBAs, Radiation Areas, and High Radiation Areas in the contact-handled (CH) Bay or remote-handled (RH) Bay before unloading TRUPACTs or Casks based on radiological survey data from the generator sites, the Waste Isolation Pilot Plant (WIPP) Waste Information System/Waste Data System (WWIS/WDS), or as determined by the RCT.
- Controlled Area signs used for radiological purposes should be selected to avoid conflict with Controlled Area signs used to comply with local security requirements.
- Individuals not qualified as Radworker I or II may enter RMAs and RBAs with a qualified escort after they have met the applicable requirements of section 19.0 of this procedure.
- During an abnormal event or emergency response, an RCT or the RCM/RCS may direct RW to erect or act as a radiological boundary.
- Radiological posting and labeling shall be securely affixed and located such that signs and labels can be expected to remain in place when subjected to adverse conditions and environments.
- Boundary identifiers and physical barriers shall be clearly visible to prevent inadvertent access to areas (e.g., barriers cannot be readily walked over or under). For example, rope barriers should be approximately 3 ft to 5 ft in height. The anticipation of radiological conditions or the actual results of radiological monitoring should be used to determine the adequacy of boundary placement.
- Postings of doors are to remain visible when doors are open or closed. To accomplish this, a sign may be placed next to the doorway in addition to the sign on the door.
- Signs that include radiological conditions are to be maintained current and reflect the results of the most recent documented radiological surveys of the posted area performed in accordance with WP 12-HP1100.

PERFORMANCE

1.0 CONTROLLED AREAS ^{11, 30}

1.1 RCT, post controlled area boundary with signs containing the following:

- CAUTION, CONTROLLED AREA
- GENERAL EMPLOYEE TRAINING OR VISITOR ORIENTATION REQUIRED FOR ENTRY

1.2 RCT, post each entry to Controlled Area.

1.3 RCT, update radiological boundary operator aids, as applicable.

2.0 POSTING RADIOACTIVE MATERIAL AREAS ^{18, 20, 21, 25}

2.1 RCT, perform the following:

2.1.1 Determine areas that are accessible to individuals in which items or containers of radioactive material exist and the total activity of radioactive materials exceeds the values on attachment 1, Values for Establishing Sealed Radioactive Source Accountability and Posting and Labeling Requirements, of WP 12-HP3200.

2.1.2 Determine if area meets any of following criteria for an exemption from posting as an RMA:

- Areas containing only packages received from radioactive materials transportation, labeled and in nondegraded condition, until the packages are monitored in accordance with WP 12-HP3200.
- The radioactive materials in the area consists solely of structures or installed components which have been activated (e.g., by being exposed to neutron radiation or particles produced by an accelerator).
- Each item or container of radioactive material in the area is labeled in accordance with section 10.0 such that individuals entering the area are made aware of the hazard.
- Area is posted as a radiological area in accordance with sections 4.0 through 9.0.

NOTE

RMA boundaries may be contiguous with RBA boundaries and/or Controlled Area boundaries, but not outside of Controlled Areas.

2.1.3 **IF** area meets the criteria in step 2.1.1, **AND DOES NOT** meet any of the exemption criteria in step 2.1.2, **THEN** post boundary of RMA with signs containing the following:

- CAUTION, RADIOACTIVE MATERIAL
- RADWORKER I TRAINING REQUIRED FOR ENTRY
- RWP REQUIRED FOR WASTE HANDLING (post if waste handling activities are to be conducted within the RMA)

2.1.4 Update radiological boundary operator aids, as applicable.

2.2 **WHEN** the criteria for an RMA no longer exists **OR** the radioactive material is no longer present, **THEN** RCT, remove the RMA postings after performing radiological surveys, as applicable.

3.0 POSTING RADIOLOGICAL BUFFER AREAS ²⁵,

NOTE

The size of the RBA established for contamination control should include the area adjacent to any exit from and entrance to Contamination, High Contamination, and Airborne Radioactivity Areas.

3.1 RCT, determine if area meets any of following criteria for an exemption from posting as an RBA:

- High Contamination or Airborne Radioactivity Areas that are completely within Contamination Areas
- Inactive Contamination, High Contamination, or Airborne Radioactivity Areas (i.e., areas to which entry has been prohibited by posting or barricades)

- 3.2 RCT, **IF** the area does not meet any of the exemption criteria in step 3.1, **THEN** post boundary with signs containing the following:
- CAUTION, RADIOLOGICAL BUFFER AREA
 - NO EATING, DRINKING, OR SMOKING
 - HAND and FOOT monitoring required prior to exit
- 3.3 RCT, update radiological boundary operator aids, as applicable.
- 3.4 **WHEN** the criteria for an RBA no longer exists, **OR** the radioactive material is no longer present, **THEN** RCT, perform radiological surveys as necessary and remove the RBA postings.

4.0 POSTING RADIATION AREAS^{3, 4, 13}

NOTE

An area through which radiation sources are being transported may not require posting as a Radiation Area, even though radiation levels >5 mrem/hr at 30 cm exist, as long as no individual will receive >5 mrem in an hour during transport.

- 4.1 RCT, determine areas that are accessible to individuals where the radiation dose rate is > 2 mrem/hr but < 100 mrem/hr at a distance of 30 cm from source of radiation **OR** from any surface through which radiation penetrates.
-

NOTE

Dose rates may be indicated on Radiation Area signs by RCT, as applicable.

- 4.2 RCT, post boundary of any area having radiation dose rate(s) specified in step 4.1 with signs containing the following:
- CAUTION, RADIATION AREA
 - THERMOLUMINESCENT DOSIMETER REQUIRED
 - RWP REQUIRED
- 4.3 **WHEN** the criteria for a Radiation Area no longer exist **OR** the radioactive material is no longer present, **THEN** RCT, remove the Radiation Area postings.

5.0 POSTING CONTAMINATION AREAS ^{3, 4, 17, 25, 28, 29}

5.1 RCT, perform the following:

- 5.1.1 Determine area(s) where contamination levels are >1, but <100 times removable contamination limits listed on attachment 9 of WP 12-HP1100, Surface Contamination Limits.
- 5.1.2 Post the boundary of the area meeting the criteria in substep 5.1.1 with signs containing the following:
 - CAUTION, CONTAMINATION AREA
 - RWP REQUIRED
- 5.1.3 Notify RCM/RCS of the contamination levels (when known) and boundaries present.
- 5.1.4 Update radiological boundary operator aids, as applicable.
- 5.1.5 **WHEN** the contamination levels in the area are <1 times the removable contamination limits listed on attachment 9 of WP 12-HP1100, including all items and equipment in the area, **THEN** remove the Contamination Area postings.

6.0 POSTING HIGH CONTAMINATION AREAS ^{3, 4, 18, 25, 28, 29}

6.1 RCT, perform the following:

- 6.1.1 Determine area(s) where contamination levels are >100 times the removable contamination limits listed on attachment 9 of WP 12-HP1100.
 - 6.1.2 Post boundary of the area meeting the criteria in substep 6.1.1 with signs containing the following:
 - DANGER (or CAUTION), HIGH CONTAMINATION AREA
 - RWP REQUIRED
 - 6.1.3 Notify RCM/RCS of the contamination levels (when known) and boundaries present.
- 6.2 RCM/RCS, ensure the control measures are commensurate with the physical and chemical characteristics of the radioactive contamination present.
- 6.3 RCT, update radiological boundary operator aids, as applicable.

- 6.4 **WHEN** the contamination levels are >1 but <100 times the removable contamination limits on attachment 9 of WP 12-HP1100
THEN RCT, **GO TO** section 5.0, and post area as a Contamination Area
OR remove the High Contamination Area postings, as applicable.

7.0 POSTING AIRBORNE RADIOACTIVITY AREAS ^{3, 4, 15, 25, 28, 29}

- 7.1 RCT, **WHEN** airborne radioactivity levels are suspected or known to be > 0.3 derived air concentration (DAC) **OR** where a continuous air monitor (CAM), used to monitor for airborne radioactivity, alarm occurred,
THEN post boundary of the area meeting the criteria with signs containing the following:
- CAUTION (or DANGER), AIRBORNE RADIOACTIVITY AREA
 - RWP REQUIRED
- 7.2 RCT, notify RCM/RCS of the airborne concentrations (when known) and boundaries present.
- 7.3 RCT, update radiological boundary operator aids, as applicable.
- 7.4 RCT, **WHEN** the airborne radioactivity levels are <0.3 DAC **OR** CAM alarm has proven to be false,
THEN, remove the Airborne Radioactivity Area postings.

8.0 POSTING HIGH RADIATION AREAS ^{3, 4, 6, 7, 8, 14}

NOTE

An area through which radiation sources are being transported may not require posting as a High Radiation Area, even though radiation levels are >100 mrem/hr at 30 cm, as long as no individual will receive >100 mrem in an hour during transport.

- 8.1 RCT, determine if radiation dose rate in any accessible area is >100 mrem/hr at 30 cm but ≤ 500 rad per hour at a distance of 1 meter from the source of radiation or from any surface through which radiation penetrates.

CAUTION

Physical controls shall be required when an individual could exceed a deep dose equivalent of 1,000 mrem in any one hour at a distance of 30 cm from the source, or from any surface that the radiation penetrates.

NOTE

Dose rates may be indicated on High Radiation Area signs by RCT, as applicable.

- 8.2 RCT, post boundary of the area meeting the criteria in step 8.1 with signs containing the following, **AND** contact RCM/RCS.
- DANGER (or CAUTION), HIGH RADIATION AREA
 - THERMOLUMINESCENT DOSIMETER REQUIRED
 - SUPPLEMENTAL DOSIMETER REQUIRED
 - RWP REQUIRED

WARNING

To avoid harm to personnel, physical access control for High Radiation Areas shall **NOT** be established that would prevent or impede personnel from leaving the area!

- 8.3 RCM/RCS and Facility Shift Manager (FSM), approve and implement one or more of the physical access controls for the High Radiation Area using attachment 1, Control Devices for High Radiation Areas (when >1,000 mrem in One Hour at 30 cm from the source).
- 8.4 RCM/RCS, perform walk through of areas prior to implementation of key control for High Radiation Areas (when >1,000 mrem in One Hour at 30 cm from the source).
- 8.5 RCT, verify an approved physical access control is in place.
- 8.6 RCT, update radiological boundary operator aids, as applicable.

- 8.7 **WHEN** the criteria for a High Radiation Area no longer exists, **OR** the radioactive material is no longer present, **THEN** RCT, remove the High Radiation Area postings **AND** verify physical access and key controls have been removed as approved by the FSM and RCM/RCS.

9.0 POSTING VERY HIGH RADIATION AREAS^{3, 4, 8, 14, 16, 26}

- 9.1 RCT, determine if radiation dose rate in any accessible area is >500 rad per hour at a distance of 1 meter from the source of radiation or from any surface through which radiation penetrates.

NOTE

Dose rates may be indicated on Very High Radiation Area signs by RCT, as applicable.

- 9.2 RCT, post boundary of the area meeting the criteria in step 9.1 with signs containing the following, **AND** contact RCM/RCS:
- GRAVE DANGER, VERY HIGH RADIATION AREA
 - SPECIAL CONTROLS REQUIRED FOR ENTRY

WARNING

To avoid harm to personnel, physical access for Very High Radiation Areas shall **NOT** be established that would prevent personnel from leaving the area!

- 9.3 RCM/RCS and FSM, approve and implement one or more of the physical access controls for the Very High Radiation Area listed in attachment 1.
- 9.4 RCM/RCS, perform walk-through of areas prior to implementation of key control for Very High Radiation Areas.
- 9.5 RCT, verify an approved physical access control is in place.
- 9.6 RCT, update the radiological boundary operator aids, as applicable.
- 9.7 **WHEN** the criteria for a Very High Radiation Area no longer exists, **OR** the radioactive material is no longer present, **THEN** RCT, remove the Very High Radiation Area postings **AND** verify physical access and key controls have been removed as approved by the FSM and RCM/RCS.

10.0 LABELING RADIOACTIVE MATERIALS ^{9, 22, 25, 27}

- 10.1 RCT, determine items or containers of radioactive material with activities > 10% of the values on attachment 1 of WP 12-HP3200, or greater than 0.1 Curie.
- 10.2 RCT, determine if the item or container of radioactive material meets any of the following criteria for an exemption from labeling requirement:
- Used, handled, or stored in areas posted in accordance with sections 2.0 through 9.0, controlled in accordance with WP 12-HP3200, and sufficient information is provided to permit individuals to take precautions to avoid or control exposures.
 - Packaged, labeled, and marked in accordance with the regulations of the U.S. Department of Transportation or U.S. Department of Energy Orders governing radioactive material transport.
 - Inaccessible, or accessible only to individuals authorized to handle or use them, or to work in the vicinity.
 - Installed in manufacturing process, or other equipment, such as reactor components, piping, and tanks.
 - The radioactive material consists solely of nuclear weapons or their components.
 - Radioactive material labels applied to sealed radioactive source may be exempted from color specifications (yellow, and magenta or black).
- 10.3 **IF** item or container meets the criteria in step 10.1 **AND DOES NOT** meet the criteria in step 10.2,
THEN RCT, place on the item or container a durable, clearly visible label bearing the standard radiation warning trefoil and the words "CAUTION (OR DANGER) RADIOACTIVE MATERIAL" with sufficient information to permit individuals handling, using, or working in the vicinity of the item or container to take precautions to avoid or control exposures.

11.0 LABELING HOT SPOTS⁹

NOTE

Labeling of Hot Spots is not required in areas with general area dose rates >1 rem/hr. However, the locations of such hot spots should be noted on area surveys and discussed in pre-job briefings when applicable.

- 11.1 RCT, determine if there is a spot on a source of radiation or on a surface, through which radiation penetrates, that is >100 mrem/hr on contact **AND** is five times greater than the general area dose rate.
- 11.2 RCT, place on (or as near the spot as possible) a durable, clearly visible label bearing the standard radiation warning trefoil and the words "CAUTION, HOT SPOT."
- 11.3 RCT, notify the RCM/RCS.
- 11.4 **WHEN** the criteria for a Hot Spot no longer exists, **OR** the radioactive material is no longer present, **THEN** RCT, remove the Hot Spot label (if possible) and notify RCM/RCS.

12.0 CONTROLLED AREA ACCESS²³

- 12.1 Cognizant Individual (CI), obtain and maintain current General Employee Radiological Training (GERT) to enter Controlled Areas unescorted.

NOTE

Any employee requiring access into an area defined in this procedure, other than the Controlled Area, must perform the actions as stated in the applicable sections (sections 13.0 through 18.0) or be escorted as a nonradiological worker into RBAs or RMAs only, in accordance with section 19.0.

13.0 RADIOLOGICAL BUFFER AREA ACCESS²³

- 13.1 CI, perform the following to obtain authorized, unescorted access into RBAs:
 - Obtain and maintain current RW-I, RW-II, or RCT training/qualification.
- 13.2 CI, obey all area radiological postings and controls prescribed by the RCT.

14.0 RADIOACTIVE MATERIAL AREA ACCESS ²³

14.1 CI, obtain and maintain current RW-I, RW-II, or RCT training/qualification.

14.2 CI, obey area radiological postings and controls prescribed by the RCT.

15.0 RADIATION AREA ACCESS ^{1, 3, 4, 23}

15.1 CI, perform the following to obtain authorized, unescorted access into Radiation Areas:

- Obtain and maintain current RW-I, RW-II, or RCT training/qualification.
- Obtain assigned TLD from Dosimetry.
- Obtain supplemental dosimeter as prescribed by the RWP or RCT, if applicable.
- Obtain assignment to RWP authorizing access to Radiation Area.

15.2 **IF** supplemental dosimeter is prescribed for entry into the Radiation Area, **THEN** CI, **GO TO** section 20.0, check in to the Radiation Area, **AND RETURN TO** step 15.3.

15.3 CI, obey area radiological postings and controls prescribed by the RWP and the RCT.

16.0 HIGH/VERY HIGH RADIATION AREA ACCESS ^{1, 3, 4, 6, 7, 23, 26}

16.1 CI, perform the following to obtain authorized, unescorted access into High Radiation Areas:

- Obtain and maintain current RW-II or RCT training/qualification.
- Ensure one person entering the area is qualified to use **AND** has a dose rate meter that has a valid operational check.
- Obtain assigned TLD from Dosimetry.
- Obtain assignment to RWP authorizing access to a High Radiation Area.
- Obtain supplemental dosimeter as prescribed by the RWP or RCT.

16.2 **GO TO** section 20.0, check in to the High Radiation Area, **AND RETURN TO** step 16.3.

16.3 CI, obey area radiological controls prescribed by the RWP and the RCT.

17.0 CONTAMINATION AREA ACCESS ^{1, 3, 4, 23, 28, 29}

17.1 CI, perform following to obtain authorized, unescorted access into Contamination Areas:

- Obtain and maintain current RW-II or RCT training/qualification.
- Obtain assigned TLD from Dosimetry, if applicable.
- Obtain assignment to RWP authorizing access to Contamination Area.
- Obtain protective clothing and dosimetry as prescribed by the RWP.

17.2 CI, obey area radiological postings and controls prescribed by the RWP and the RCT.

18.0 HIGH CONTAMINATION/AIRBORNE RADIOACTIVITY AREA ACCESS ^{1, 3, 4, 23}

18.1 CI, perform the following to obtain authorized, unescorted access into High Contamination and/or Airborne Radioactivity Areas:

- Obtain and maintain current RW-II or RCT training/qualification.
- Obtain assigned TLD from Dosimetry, if applicable.
- Obtain assignment to RWP authorizing access to High Contamination and/or Airborne Radioactivity Areas.
- Obtain protective clothing, respiratory protection, and dosimetry as prescribed by the RWP.

18.2 CI, obey area radiological controls prescribed by the RWP and the RCT.

19.0 NONRADIOLOGICAL WORKER OR ESCORTED ACCESS CONTROL ^{23, 24}

NOTE

Nonradiological workers (i.e., general employees, visitors, vendors, etc.) are **NOT** to enter Radiological Areas described in sections 5.0 to 9.0.

Nonradiological workers may be escorted into RBAs, RMAs, or Radiation Areas by a qualified radiological worker.

- 19.1 Escort, if a nonradiological worker is scheduled to enter a Controlled Area, verify that nonradiological worker has completed Radiological Visitor Briefing (orientation) prior to allowing entry into Controlled Area.
-

NOTE

Nonradiological workers entering a Radiation Area as part of a facility tour will not be issued individual TLDs. The escort will carry an additional TLD which will be used to provide the dose or record for each individual being escorted.

Nonradiological workers entering a Radiation Area to perform work will be issued an individual TLD.

- 19.2 Escort, if nonradiological worker is scheduled to enter an RBA, RMA, or Radiation Area perform following:
- Obtain permission from the Radiological Control & Dosimetry (RC&D) Manager in writing.
 - If entering a Radiation area, obtain assigned TLD from Dosimetry for the nonradiological worker being escorted.
 - Complete and sign escort form as required by Dosimetry Team Leader.
-

NOTE

When escorting a nonradiological worker into an RMA, RBA, or Radiation Area, the escort is not allowed to perform hands-on work. The nonradiological worker **SHALL NOT** receive >100 mrem in a year. A nonradiological worker performing work (preventative maintenance, corrective maintenance, or plant modification) in an RMA, RBA, or Radiation Area must have a dedicated escort (one-on-one).

- 19.3 Provide continuous escort for visitor while inside the RMA, RBA, or Radiation Area.

20.0 RADIOLOGICAL AREA ACCESS CONTROL ^{1, 3}

- 20.1 Worker, if Computerized Access Control system is available and operable, log in to Computerized Access Control system; if Computerized Access Control system is not available or is inoperable, log in on attachment 2.
- 20.2 Worker, perform work in compliance with RWP.
- 20.3 Worker, log out of the Computerized Access Control system, **OR** on attachment 2, as applicable.
- 20.4 RCT, when the binder containing attachment 2 documents is not being used frequently for access control, place the binder in a fireproof cabinet near the access point for easy access if needed.

NOTE

Either an RCT or the as low as reasonably achievable (ALARA) Coordinator, can obtain the attachment 2 form from sign-in locations.

- 20.5 ALARA Coordinator, perform a monthly update of the electronic personnel dosimeter (EPD) database using attachment 2, as applicable, **THEN** forward the completed attachment 2 to RCM/RCS.
- 20.6 RCM/RCS, review completed attachment 2 and forward it to the Records Coordinator for filing and disposition.

Attachment 1 – Control Devices for High Radiation Areas (When >1,000 mrem in One Hour at 30 cm from the Source) or Very High Radiation Areas ^{1, 2, 3, 8}

1. A control device that prevents entry to the area when high radiation levels exist (>1,000 mrem [millirem] in one hour at 30 cm from the source), or upon entry, causes the radiation level to be reduced below that level.
2. A device that functions automatically to prevent use or operation of the radiation source or field while personnel are in the area.
3. A control device that energizes a conspicuous visible or audible alarm signal so that a person entering the High Radiation Area (>1,000 mrem in one hour) or Very High Radiation Area, and the supervisor of the activity, are made aware of the entry.
4. Entryways that are locked, except during periods when access to the area is required, with positive control over each entry.
5. Continuous direct or electronic surveillance that is capable of preventing unauthorized entry.
6. A control device that automatically generates audible and visual alarm signals to alert personnel in the area before use or operation of the radiation source and in sufficient time to permit evacuation of the area or activation of a secondary control device that will prevent use or operation of the source.

Attachment 2 – Electronic Personnel Dosimeter Log Sheet

Printed Name Last, First, MI	TLD#	Entry					Exit		Net EPD Reading	
		Date	RWP#	EPD#	EPD Calib. Due Date	EPD Reading	Date	EPD Reading		
		Time					Time			

RWP - Radiological Work Permit

EPD - electronic personnel dosimeter

EPD Database Updated by: [] N/A

ALARA Coordinator

Printed Name

Signature

Date

Reviewed by:

RCM/RCS

Printed Name

Signature

Date

WP 12-IH1828

Revision 5

MSHA Air Quality Monitoring

Technical Procedure

EFFECTIVE DATE: 04/04/13

Tom Ferguson
APPROVED FOR USE

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CHANGE HISTORY SUMMARY

REVISION NUMBER	DATE ISSUED	DESCRIPTION OF CHANGES
4	12/02/10	<p>Changed Title to add MSHA and take out Permit Mandated and Sampling</p> <p>In the Introduction:</p> <ul style="list-style-type: none">• Removed wording related to the HWFP permit in paragraph one• Removed paragraphs 2 and 3 <p>Under Records:</p> <ul style="list-style-type: none">• Removed wording related to daily O₂/CO/LEL air checks• Added statement on maintaining records• Added wording related to MSHA required air monitoring• Removed paragraphs 2 and 3 <p>Replaced wording O₂/CO/LEL with MSHA and removed word daily in Responsibilities, Underground Services</p> <p>Removed Industrial Safety & Hygiene from Responsibilities</p> <p>Removed HWFP references</p> <p>Changed Monitoring Equipment from O₂/CO/LEL Monitoring to Real Time Instruments</p> <p>Changed Functional Check Equipment to Docking Station and O₂/CO/LEL Monitoring to Real Time Instruments</p>

		<p>Replaced bullet under Docking station from calibration by manufacturer to bump checked and calibrated by automated docking station</p> <p>Removed Hazard Driven from Sampling Equipment</p> <p>Under last bullet of Sampling Equipment removed chlorine, hydrogen sulfide and sulfur dioxide and added carbon tetrachloride</p> <p>Changed wording in 2nd bullet under Precautions and Limitations from evenly distribute gases to may or may not stratify</p> <p>Added last entry under 2nd bullet under Precautions and Limitations</p> <p>In Step 1.0 changed O₂/CO/LEL to MSHA Required</p> <p>Added to Step 1.1 to sign and keep as a record</p> <p>Removed Notes above Step 1.1 and 1.2</p> <p>Added wording about posting area against entry to Step 1.4</p> <p>Changed Step 1.5 to proceed to next drift</p> <p>Changed Step 1.6 to upon completion return instrument to Underground Services</p> <p>Deleted Section 2.0 and Attachment 1</p> <p>Added carbon Tetrachloride to Attachment 1(formerly Attachment 2)</p>
5	04/04/13	<ul style="list-style-type: none"> • Changed Hydrogen Sulfide level in attachment 1 from 10 ppm to 1 ppm. • Editorial changes in accordance with MD 1.1.

INTRODUCTION ^{1, 2, 3}

This procedure specifies the methods for monitoring and testing the air in the underground in accordance with the conditions of the Waste Isolation Pilot Plant (WIPP) Hazardous Waste Facility Permit (HWFP) and the Mine Safety and Health Administration (MSHA) requirement to check for oxygen deficiency (30 CFR §57.5015, "Oxygen Deficiency").

RECORDS

Data generated by MSHA Required Air Monitoring is recorded in Daily Log Sheets that are retained by Facilities Site Operations and Infrastructure and archived in conformance with Records Inventory and Disposition Schedule (RIDS) requirements. Monitoring data and instrument calibration data are hazardous waste facility permit operating records and are maintained until closure.

RESPONSIBILITIES

Underground Services

Underground Services (Underground Facility Operations) is responsible for performing daily MSHA monitoring as described above. Underground Services personnel performing monitoring shall hold current WIPP Ops-08 gas monitoring qualification cards.

Technical Training

Technical Training is responsible for providing administrative support for development and implementation of qualification cards for instruments used for this work.

REFERENCES			
DOCUMENT NUMBER AND TITLE	BASELINE DOCUMENT	REFERENCED DOCUMENT	KEY STEP
29 CFR Part 1910, Subpart Z, "Toxic and Hazardous Substances"	✓		3
30 CFR §57.5001, "Exposure Limits for Airborne Contaminants"	✓		1
30 CFR §57.5015, "Oxygen Deficiency"	✓		
30 CFR §57.8518, "Main and Booster Fans"	✓		
30 CFR §57.8534, "Shutdown or Failure of Auxiliary Fans"	✓		
30 CFR Part 57, Subpart D, "Air Quality, Radiation, Physical Agents, and Diesel Particulate Matter"	✓		
30 CFR Part 57, Subpart T, "Safety Standards for Methane in Metal and Non-Metal Mines"	✓		

REFERENCES			
DOCUMENT NUMBER AND TITLE	BASELINE DOCUMENT	REFERENCED DOCUMENT	KEY STEP
" <i>OSHA Analytical Methods</i> ," U.S. Department of Labor Occupational Safety and Health Administration, Directorate of Technical Support, OSHA Technical Center, Salt Lake City, Utah (http://www.osha-slc.gov/dts/sltc/methods/index.html)	✓		
" <i>Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices</i> ," American Conference of Governmental Industrial Hygienists	✓		
WP 12-IH.02, <i>WIPP Industrial Hygiene Program Manual</i>		✓	2
The operation and maintenance manual for the instrumentation in use		✓	

EQUIPMENT

MONITORING EQUIPMENT – Real Time Instruments

- Real time O₂/CO/LEL instrument as identified in WIPP Ops-08 gas monitoring qualification cards. Instruments are kept on charge in the Instrumentation & Control Shop (Bldg. 459).

DOCKING STATION – Real Time Instruments

- O₂/CO/LEL instrumentation used for this work is bump checked and calibrated by an automated docking station located in the calibration laboratory

SAMPLING EQUIPMENT – Colorimetric Tubes

- Draeger bellows-style pump, Draeger Accuro 2000 automatic pump, or other pump approved by Draeger for use with Draeger grab sample tubes

NOTE

Should Draeger brand colorimetric tubes not be reasonably available, generic equivalent colorimetric tube systems (e.g., Matheson/Kitagawa) may be substituted. Tubes and pumps are a system, and must be from the same manufacturer.

- Draeger grab sample colorimetric indicating tubes sensitive to the following concentrations:
 - Carbon monoxide to 2 parts per million (ppm)
 - Carbon Tetrachloride to 0.1 ppm
 - Nitrogen dioxide to 0.5 ppm

PRECAUTIONS AND LIMITATIONS

- Hearing protection is required in areas where the eight-hour average noise exposure could be expected to exceed 85 decibels (dB), or where required by site administrative controls, such as signs.
- Gases in high concentrations that have a specific gravity greater than 1 will accumulate at low levels, while those with a specific gravity of less than 1 will accumulate at the top of an enclosure. For low concentrations such as those which are usually being measured for safety reasons, the gases in question may or may not stratify. The following conditions may cause a false reading:
 - Low battery
 - Equipment out of calibration
 - Temperature and humidity extremes (reference the manufacturer's documentation)
 - Faulty equipment (e.g., equipment that has been dropped)
 - Use of a non hydrogen-nulled carbon monoxide sensor (battery charging and radiological decay can generate ppm level hydrogen concentrations. Non-nulled carbon monoxide sensors will falsely indicate carbon monoxide in the presence of hydrogen)
- Adequate ventilation is required to prevent accumulation of gas or vapors.

- Smoking is prohibited in the area where the functional check is performed, since this can affect the measurements of the instruments.
- Should any instrumentation fail the functional test or operate improperly in the field, do not use the instrument. If available, the user may functional test a replacement instrument, and continue with this procedure.
- Personnel performing this procedure shall be familiar with the Job Hazard Analysis PROD-237.

PERFORMANCE

1.0 DAILY MSHA REQUIRED UNDERGROUND AIR QUALITY MONITORING

NOTE

The automated docking stations used to calibrate the instruments used for this work automatically generate calibration record printouts, which are not user modifiable. Should the printout not have a signature/date line, the printout may be signed and dated in any location where the signature and date will be legible.

- 1.1 Perform functional check/calibration if required per the applicable qualification card. Sign, date and retain printout as a record.
- 1.2 Proceed to each appropriate open drift.
- 1.3 If air quality readings are normal, enter a checkmark (✓) on the Underground Services Rounds Sheet, form UGLSx4.
- 1.4 **IF** air quality instrument alarms (Attachment 1, Action Levels), **THEN** immediately move away from area and notify Central Monitoring Room Operator (CMRO) and post area against entry.
- 1.5 Proceed to the next drift.
- 1.6 Upon completion of survey, return instrument to underground services.

Attachment 1 – Action Levels

Attachment 1 – Action Levels

Oxygen	Low Alarm 19.5%	High Alarm 23%
Explosivity (LEL)	5% LEL	
Carbon Monoxide	25 ppm	
Carbon Tetrachloride	5 ppm	
Hydrogen Sulfide	1 ppm	
Nitrogen Dioxide	1 ppm	
Sulfur Dioxide	2 ppm	