Allen, Pam, NMENV

ENTERED

From: Maestas, Ricardo, NMENV
Sent: Tuesday, May 08, 2012 2:48 PM
To: Allen, Pam, NMENV
Subject: FW: Surveillance S-12-17, Washington TRU Solutions Mine Ventilation
Attachments: WP 04-VU1608, R17, Underground Vent. and filtration Sys. Operation.pdf; WP 04-VU1612, R7, WIPP Mine Vent. Rate Monitoring.pdf; 00CD-0001, R32, WIPP Mine Ventilation Plan.pdf; ATTACHMENT O.docx; WP 04-AD3001, R29, Facility Mode Compliance.pdf; WP 04-AD3005, R3, Admin. Control of System Lineups.pdf; WP 04-VU1001, R24, Surface Underground Venilation and Filtration System Operations.pdf; WP 04-VU1002, R11, Operablity Testing of Underground Filtration.pdf

Email and Attachments for WIPP File.
A CD with attachments is preferable.
Thanks!

From: Knox, Gregory - CTAC [mailto:gregory.knox@wipp.ws]
Sent: Tuesday, April 10, 2012 9:57 AM
To: Maestas, Ricardo, NMENV
Cc: Farrell, Richard - DOE
Subject: RE: Surveillance S-12-17, Washington TRU Solutions Mine Ventilation

Morning Ricardo,

Attached are the documents you requested for the S-12-17 Mine Ventilation Surveillance.
If you need anything else, please do not hesitate to contact myself or Mr. Farrell.

greg

From: Maestas, Ricardo, NMENV [mailto:Ricardo.Maestas@state.nm.us]
Sent: Tuesday, April 10, 2012 9:31 AM
To: Farrell, Richard - DOE
Cc: Knox, Gregory - CTAC; Hoff, Jon - WTS; Kliphuis, Trais; Holmes, Steve
Subject: Surveillance S-12-17, Washington TRU Solutions Mine Ventilation

Good morning Mr. Farrel,

Could you please send me electronic copies of the current procedures that are listed below.
This list comes out of the S-12-17 CBFO Surveillance Plan that is scheduled to take place next week.

Governing Documents/Requirements:

- WIPP Mine Ventilation Rate Monitoring Plan, January 31, 2012, WIPP Hazardous Waste Facility Permit, Attachment O
- 00CD-0001, *WIPP Mine Ventilation Plan*
- WP 04-VU1612, *WIPP Mine Ventilation Rate Monitoring*
- WP 04-AD3005, *Administrative Control of System Lineups*
- WP 04-AD3001, *Facility Mode Compliance*
- WP 04-VU1002, *Operability Testing of Underground Filtration System*
- WP 04-VU1001, *Surface Underground Ventilation and Filtration System Operations*
- WP 04-VU1608, *Underground Ventilation and Filtration System Operation*

Thank you.

120411

Ricardo Maestas
>><<<>>><<<>>><<<>>><<

Hazardous Waste Bureau
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WP 04-VU1612

Revision 7

WIPP Mine Ventilation Rate Monitoring

Management Control Procedure

EFFECTIVE DATE: 11/11/10

Dale Parrish

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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

INTRODUCTION [1]

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 workers are present. 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 underground, and 20,000 acfm when handling Remote-Handled (RH) in Waste Handling Mode in the underground. 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

BASELINE DOCUMENTS[1,2]

- DOE/WIPP-07-3372*, Waste Isolation Pilot Plant Documented Safety Analysis*
- DOE/WIPP-07-3373*, Waste Isolation Pilot Plant Technical Safety Requirements*
- Hazardous Waste Facility Permit, No. NM4890139088-TSDF

REFERENCED DOCUMENTS

None

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PERFORMANCE

1.0 DATA COMPILATION 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 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.

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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 entry to all personnel. The postings shall state no entry 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. Personnel shall be restricted from access into the active disposal room until the minimum airflow has been established.

- If minimum flow rates cannot be achieved, contact the FSM.

2.5 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.)

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

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

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Attachment 2 - Example Mode Sheet

WEEK ENDING:_____

		FRIDAY	SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	
	DATE								TOTAL
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)								

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

Week Ending: _____

SURFACE

DATE STARTED: 10/22/99

MODE OF OPERATION	WEEKLY RUNTIME (min)	WEEKLY RUNTIME (hours)	WEEKLY FLOW RATE (kscfm)	WEEKLY TOTAL flow rate (kscfmhr)	MONTHLY RUNTIME (min)	MONTHLY RUNTIME (hours)	MONTHLY FLOW RATE (kscfm)	MONTHLY TOTAL flow rate (kscfmhr)	ANNUALLY ** RUNTIME (min)	ANNUALLY ** RUNTIME (hours)	ANNUALLY ** FLOW RATE (kscfm)	ANNUALLY ** 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 (tacfm)	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

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Attachment 4 - Underground Active Disposal Room and Regulator 74-B-308 Ventilation Rate Log Sheet

ROOM NUMBER_____ **PANEL NUMBER**_____

NOTES: **When airflow reading in the active disposal room is below 42,000 ACFM access will be restricted**.
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.

Date	Time	M&TE#	Calibration Due Date	Active Disposal Room			Regulator 74-B-308			Waste Haul Route Ground Control Inspection		Signature	Verified By
				Room Airflow Reading	Was Access Restricted?		Airflow Reading	Is WH Mode Allowed?					
					YES	NO		CH	RH	SAT	UNSAT		

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WP 04-VU1608

Revision 17

Underground Ventilation and Filtration System Operation

Technical Procedure

EFFECTIVE DATE: 12/08/10

Jeff Neatherlin
APPROVED FOR USE

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CHANGE HISTORY SUMMARY

REVISION NUMBER	DATE ISSUED	DESCRIPTION OF CHANGES
17	12/08/10	Minor editorial changes made. Revised to update Control Panel 533 to 607, bulkhead regulator 533 to 607, and their location from S3200 to S2600.

INTRODUCTION [1]

The purpose of this procedure is to provide the instructions necessary for the operation of the Underground Ventilation and Filtration System (UVFS) at the Waste Isolation Pilot Plant (WIPP).

The scope of this procedure includes all UVFS components located in the underground (U/G) at WIPP.

No records are generated by the performance of this procedure.

REFERENCES

BASELINE DOCUMENTS

- Title 30 Code of Federal Regulations (CFR) Part 57, "Safety and Health Standards - Underground Metal and Nonmetal Mines"
- 30 CFR Part 57, Subpart G, "Ventilation"
- DOE/WIPP-07-3372, *Waste Isolation Pilot Plan Documented Safety Analysis*
- DOE/WIPP-07-3373, *Waste Isolation Pilot Plan Technical Safety Requirements*
- Hazardous Waste Facility Permit, issued to Waste Isolation Pilot Plant, Identification No. NM4890139088-TSDF, by the New Mexico Environment Department
- SDD VU00, Underground Ventilation System Design Description
- 00CD-0001, WIPP Mine Ventilation Plan
- 54-W-001-W, Underground Mine Ventilation System
- 54-W-002-W, Underground Ventilation Plan Waste Handling Mode
- 54-W-004-W, Underground Ventilation Plan Filtration Mode
- 54-W-012-W, Underground Mine Plan Bulkhead Locations & Numbers

REFERENCED DOCUMENTS

- WP 04-VU1001, Surface Underground Ventilation and Filtration System Operation

PRECAUTIONS AND LIMITATIONS

- WP 04-VU1001 contains sections corresponding to Sections 1.0 through 10.0. Operation of the UVFS within the parameters of the System Design Description (SDD) requires coordinated operation of the U/G and surface ventilation systems.

- Approval from the Facility Shift Manager (FSM) is required prior to changing ventilation modes.

- To prevent excessive negative pressure in the Waste Hoist Tower, the following safety features are provided:

  - At −2.25 in. w.g. (water gauge) in the Waste Hoist Tower, the Central Monitoring Room (CMR) receives "411 WASTE HOIST TOWER DIFFERENTIAL PRESSURE (D/P) 301" alarm, and the Auxiliary Air Intake Shaft (AAIS) pressure relief louvers open.

  - At −2.5 in. w.g. in the Waste Hoist Tower, one of the main ventilation fans will shut down if two main exhaust fans are running.

  - At −2.75 in. w.g. in the Waste Hoist Tower, the running main exhaust fan(s) will shut down.

- The UVFS is shifted to filtration when an incident has occurred in the U/G that has potential of releasing radioactive contamination.

NOTE

U/G Services coordinates with the Central Monitoring Room Operator (CMRO) prior to adjusting bulkhead doors (BHD) and bulkhead regulators (BHR) that will adversely affect required D/Ps.

- BHDs and BHRs may be adjusted to maintain airflows in active working areas of the mine as required.

- If personnel access is required to the active panel area during filtration mode, BHDs 74-B-415 and 416 may be opened and BHR 74-B-308 may be adjusted to provide airflow to the panel.

- In the event of a **LOSS** of S1300 D/P, refer to Section 11.0.

- The U/G louver control panels have a Manual and Auto setting. In Manual, the louvers can be manually adjusted locally. In Auto, the CMR has control. The control panel for 313 and 607 **SHALL** be kept in Auto.

NOTE

The 42,000 acfm (actual cubic feet per minute) requirement is directed by the WIPP Mine Ventilation Plan and the Hazardous Waste Facility Permit.

- A minimum of 42,000 acfm will be maintained in active waste disposal room(s) when workers are present.

PREREQUISITE ACTIONS

1.0 Configuration of BHDs may be changed to support work activities. If proposed changes will affect waste handling activities, obtain FSM concurrence.

PERFORMANCE

1.0 START-UP OF ALTERNATE VENTILATION

NOTE

Attachment 1, Component Lineup for Normal or Alternate Ventilation, contains the information for desired bulkhead and louver configurations.

1.1 Perform the following at BHR-308:

- Open Louver BHR-308B to 65%.
- Close louver BHR-308A.

1.2 **WHEN** directed by the CMRO,
THEN adjust BHR-308 to obtain −0.3 to −1.8 in. w.g. pressure in the Waste Hoist Tower.

1.3 **IF** Waste Hoist Tower pressure cannot be maintained at −0.3 to −1.8 in. w.g. after BHR-308 has been fully opened,
THEN perform the following:

1.3.1 Establish communications with the CMRO.

1.3.2 Adjust BHR-308B 65% Open.

1.3.3 **IF** an additional 700 fan is not available,
THEN perform the following:

[A] Request CMRO to obtain permission to cover Air Intake Shaft (AIS) from Hoisting Manager or designee.

[B] **IF** permission is granted,
THEN request Hoisting Manager or designee to cover AIS as much as possible.

[C] Adjust BHR-302, BHR-308, BHR-313, BHR-521 and BHR-607 to obtain −0.3 to −1.8 in. w.g. in the Waste Hoist Tower.

[D] **IF** AIS cannot be covered,
THEN establish communications with CMRO and adjust louvers BHR-302, BHR-308, BHR-313, BHR-521, and BHR-607 to obtain −0.3 to −1.8 in. w.g. in the Waste Hoist Tower.

1.4 I**F** Waste Hoist Tower pressure still cannot be maintained at −0.3 to −1.8 in. w.g.,
THEN notify FSM.

2.0 SHIFTING FROM ALTERNATE TO NORMAL VENTILATION

NOTE

Attachment 1 contains the information for desired bulkhead and louver configurations.

2.1 Perform the following at BHR-308:

- Set BHR-308B to 65% Open.
- Close BHR-308A.

2.2 Notify CMRO that the U/G is configured for normal ventilation.

2.3 Verify, in concurrence with AIS Hoist personnel, that second 700 fan will increase air flow in the AIS Shaft and personnel have been notified if applicable.

2.4 **WHEN** directed by the CMRO,
THEN adjust BHR-308 to obtain −0.3 to −1.8 in. w.g. pressure in the Waste Hoist Tower.

3.0 SHIFTING FROM NORMAL TO ALTERNATE VENTILATION

3.1 **WHEN** directed by the CMRO,
THEN adjust BHR-308 to obtain −0.3 to −1.8 in. w.g. pressure in the Waste Hoist Tower.

4.0 SHIFTING FROM NORMAL OR ALTERNATE VENTILATION TO FILTRATION

4.1 Verify with CMRO that AAIS Dampers are closed.

4.2 Verify BHD-336 is closed.

4.3 Verify BHR-607 is closed.

4.4 Verify BHR-313 is closed.

4.5 Notify CMRO that BHD-336, BHR-313, and BHR-607 are closed.

4.6 **WHEN** directed by the CMRO,
THEN adjust BHR-308 to obtain −0.3 to −1.8 in. w.g. pressure in the Waste Hoist Tower.

5.0 START-UP IN FILTRATION

5.1 Verify with CMRO that AAIS Dampers are closed.

5.2 Close BHD-336.

5.3 Close BHR-313.

5.4 Close BHR-607.

5.5 Notify CMRO that BHD-336, BHR-313, and BHR-607 are closed.

5.6 **WHEN** directed by the CMRO,
THEN adjust BHR-308 to obtain −0.3 to −1.8 in. w.g. pressure in the Waste Hoist Tower.

6.0 START-UP OF MINIMUM VENTILATION

6.1 Verify with CMRO that AAIS Dampers are closed.

6.2 Close BHD-336.

6.3 Close BHR-313.

6.4 Close BHR-607.

6.5 Notify CMRO that BHD-336, BHR-313 and BHR-607 are closed.

6.6 **WHEN** directed by the CMRO,
THEN adjust BHR-308 to obtain −0.3 to −1.8 in. w.g. pressure in the Waste Hoist Tower.

7.0 SHIFTING FROM MINIMUM TO REDUCED VENTILATION

7.1 Verify with CMRO that AAIS Damper is closed.

7.2 Align BHR-313 louvers as follows:

- 1 louver - 100% Open
- 3 louvers - Closed

7.3 Notify CMRO that the U/G is configured for reduced ventilation.

7.4 Adjust BHR-308 to obtain −0.3 to −1.8 in. w.g. D/P in the Waste Hoist Tower after ventilation flow has stabilized.

7.5 **IF** pressure can be obtained,
THEN GO TO Section 8.0.

7.6 Adjust BHR-313 to obtain −0.3 to −1.8 in. w.g. D/P in the Waste Hoist Tower.

8.0 SHIFTING FROM REDUCED TO MINIMUM VENTILATION

8.1 Verify with CMRO that AAIS Dampers are closed.

8.2 Close BHD-336.

8.3 Close BHR-313.

8.4 Close BHR-607.

8.5 Adjust BHR-308 to obtain −0.3 to −1.8 in. w.g. D/P in the Waste Hoist Tower after ventilation flow has stabilized.

9.0 SHIFTING FROM REDUCED OR MINIMUM VENTILATION TO FILTRATION

9.1 Verify with CMRO that AAIS Dampers are closed.

9.2 Verify BHD-336 is closed.

9.3 Verify BHR-313 is closed.

9.4 Verify BHR-607 is closed.

9.5 Adjust BHR-308 to obtain −0.3 to −1.8 In. w.g. D/P in the Waste Hoist Tower after the filtration fan has started.

10.0 SHUTDOWN FROM FILTRATION

10.1 **GO TO** Section 1.0.

11.0 LOSS OF S1300 DIFFERENTIAL PRESSURE

NOTE

Alarm set point for S1300 D/P is −0.12 in. w.g.

11.1 **IF** alarm sounds,
THEN CMRO, notify Waste Handling Operations (WHO) to suspend waste handling activities until further notice.

11.2 CMRO, notify the Underground Facility Engineer (UFE) that a LOSS of S1300 D/P has occurred.

11.3 UFE/Underground Roving Watch (UGRW), adjust regulators as required at the following regulator control panels:

- 534-CPO4/521A S80/E300
- 534-CPO4/521B S80/E300
- 534-CPO4/302A&B N150/E80
- 534-CPO4/302C&D N150/E80
- 534-CPO4/313A S1000/E20
- 534-CPO4/313B S1000/E20
- 534-CPO4/313C S1000/E20
- 534-CPO4/313D S1000/E20
- 534-CP04/607 W170/S2600

11.4 CMRO, advise UFE/UGRW when S1300 alarm clears.

11.5 **IF** alarm condition still does not clear,
THEN UFE, request CMRO to start second 700 fan (refer to Section 2.0).

11.6 **WHEN** S1300 alarm clears,
THEN CMRO, notify WHO to resume normal waste handling activities.

NOTE

The following steps **SHALL ONLY** apply if waste handling is in progress in the U/G and **ONLY** while waste is being transported.

NOTE

The Central Monitoring System point number for 534-PDI-160-536A is AG5909. There is **NO** alarm associated with this point.

11.7 **IF** S1300 D/P is out of service for maintenance,
THEN perform the following:

11.7.1 UFE/UGRW, monitor the D/P indicator 534-PDI-160-536A located at S 1000/E100.

11.7.2 UFE/UGRW, monitor continuously (approximately every 15 minutes) and log readings and time taken in the U/G narrative logbook.

11.7.3 UFE/UGRW, notify CMRO to suspend waste handling activities if pressure indication on 534-PDI-160-536A is **MORE POSITIVE** than −0.12 in. w.g.

11.7.4 **IF** pressure is **MORE POSITIVE** than −0.12 in. w.g.,
THEN GO TO Step 11.2.

Attachment 1 - Component Lineup for Normal or Alternate Ventilation

Component	Normal Ventilation Mode	Alternate Ventilation Mode
BHD-303 E140/S230	Closed	Closed
BHD-310 E140/S260	Closed	Closed
BHD-415 E140/S600	Closed	Closed
BHD-416 E140/S650	Closed	Closed
BHD-402 S90/W250	Closed	Closed
BHD-403 S90/W220	Closed	Closed
BHD-305 S90/W80	Closed	Closed
BHD-306 S90/W130	Closed	Closed
BHD-329 N150/W100	Closed	Closed
BHD-330 N150/W60	Closed	Closed
BHD-319 S700/E70	Closed	Closed
BHD-320 S700/E20	Closed	Closed
BHMD-319 S700/E70	Closed	Closed
BHMD-320 S700/E20	Closed	Closed
BHMD-326 W1300/W170	Closed	Closed
BHD-333 S1600/W110	Closed	Closed
BHD-334 S1600/W70	Closed	Closed
BHD-521 E300/S80	Closed	Closed
BHMD-521 E300/S80	Closed	Closed
BHD-527 E140/N150	Closed	Closed
BHD-528 E140/N150	Closed	Closed
BHMD-456 S1000/W155	Closed	Closed
BHMD-315 S700/W150	Closed	Closed
BHMD-320 S700/E20	Closed	Closed
BHMD-324 S1300/E130	Closed	Closed
BHMD-327 S1600/E130	Closed	Closed
BHD-524 S1950/E110	Closed	Closed
BHD-525 S1950/E20	Closed	Closed
BHMD-317 S1300/E280	Closed	Closed
BHMD-308 S400/E300	Closed	Closed
BHMD-312 S700/E280	Closed	Closed
BHMD-323 S1000/E280	Closed	Closed
BHMD-553S1600/E280	Closed	Closed

Attachment 1 - Component Lineup for Normal or Alternate Ventilation

Component	Normal Ventilation Mode	Alternate Ventilation Mode
BHMD-410 S1950/W155	Closed	Closed
BHMD-531 OE/N150	Closed	Closed
BHMD-302 N150/E60	Closed	Closed
BHR-521 Louvers E300/S80 Equipment register: 74-HD-160-521A 74-HD-160-521B	A Louver - 25% Open B Louver - Closed	A Louver - 45% Open B Louver - Closed
BHR-302 Louvers N150/E60 Equipment register: 74-HD-160-302A/B 74-HD-160-302C/D	A/B Louver - 55% Open C/D Louver - Closed	A/B Louver 40% Open C/D Louver 0% Closed
BHR-308 Louvers S400/E300 Equipment register: 74-HD-160-308A 74-HD-160-308B	B Louver 60% Open	A Louver 65% Closed B Louver 65% Open
BHD-336 E300/S350	Open	Open
BHD-401 N300 Air Intake Shaft	Open	Open
BHD-520 N200/E160	Open	Open
BHMD-520 N200/E160	Closed	Closed
BHD-504 0E N. of Salt Handling Shaft	Open	Open
BHD-503 W30 S. of Salt Handling Station	Open	Open
BHMD-313 S1000/E20	Closed	Closed
BHR-313 Louvers S100/E20 Equipment register: 74-HD-160-313A 74-HD-160-313B 74-HD-160-313C 74-HD-160-313D	1 Louver (A) - 100% 1 Louver (B) - 100% 1 Louver (C) - 100% 1 Louver (D) - 100%	1 Louver (A) - 100% 1 Louver (B) - 100% 1 Louver (C) - 100% 1 Louver (D) - 100%
BHD-515 N460/E100	Closed	Closed
BHD-339 E20/N460	Closed	Closed

Attachment 1 - Component Lineup for Normal or Alternate Ventilation

Component	Normal Ventilation Mode	Alternate Ventilation Mode
BHD-430 W125/S2180	Closed	Closed
BHD-431 W75/S2180	Closed	Closed
BHMD-304 E120/S2180	Closed	Closed
BHMD-337 E120/S2520	Closed	Closed
BHMD-338 E280/S2180	Closed	Closed
BH-442, BH-444, and/or BH-445 Exit of Active Disposal Room Where Required	Slider Open 5-1/2'	Slider Open 5-1/2'
BHMD-340 N780/E110	Closed	Closed
BHR-74-HD-160-607	1 Louver (A) - 100%	1 Louver (A) - 100%
BHR-74-HD-160-607	1 Louver (B) - 100%	1 Louver (B) - 100%

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WP 04-VU1002

Revision 11

Operability Testing of Underground Filtration

Technical Procedure

EFFECTIVE DATE: 09/20/10

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CHANGE HISTORY SUMMARY

REVISION NUMBER	ISSUED DATE	DESCRIPTION OF CHANGES
11	09/20/10	Added notification to UFE/UGRW and U/G personnel of filtration testing and no operation of diesel-powered equipment during this time in several locations in document after establishing ventilation mode.

INTRODUCTION [1, 2, 3]

This procedure provides detailed instructions to Facility Operations for performance of operability testing of the shift to filtration function for the Underground Ventilation and Filtration System (UVFS). As required per WP 04-CO.01, this procedure shall be followed step-by-step for the activities and operations addressed herein. This procedure shall be performed under the direct supervision of the Facility Shift Manager (FSM)/Facility Shift Engineer.

No records are generated by the performance of this procedure.

REFERENCES

BASELINE DOCUMENTS

- DOE/WIPP-07-3372, Waste Isolation Pilot Plant Documented Safety Analysis
- DOE/WIPP-07-3373, Waste Isolation Pilot Plant Technical Safety Requirements
- SDD-VU00, Underground Ventilation

REFERENCED DOCUMENTS

- WP 04-CO.01, Conduct of Operations
- WP 04-VU1001, Surface Underground Ventilation and Filtration System Operation

EQUIPMENT

- 41-B-860A (41-B-860B) [41-B-860C] FANS AUTO/MANUAL MODE SWITCHING KEY
- LR/R-7 TEST SWITCH TS-1 KEY
- EXHAUST FANS LOCAL REMOTE SWITCHING KEY

PRECAUTIONS AND LIMITATIONS

- Performance of this procedure requires qualification as Facility Operations Roving Watch, Facility Operations Engineer, or Radiological Control Technician (RCT).
- This procedure may be performed only when the facility **IS NOT** in Waste Handling Mode.

- Any abnormal or out-of-specification conditions must be reported to the FSM.

- Permission must be obtained from the underground (U/G) Facility Engineer (UFE) prior to operating any diesel powered equipment.

PERFORMANCE

NOTE

All steps in this procedure are performed at Exhaust Filter Building (EFB), except where noted otherwise.

NOTE

Shifting to filtration will cause shutdown of NESHAPs (National Emission Standards for Hazardous Air Pollutants) skid (normally skid A3). Radiological Control Superintendent or Radiological Control Manager should be contacted prior to shifting to filtration to allow for data collection and securing/restarting of the primary skid.

1.0 700 FAN SHIFT FROM CENTRAL MONITORING ROOM

1.1 Contact Radiological Control Superintendent or Radiological Control Manager prior to shifting to filtration to allow for data collection and securing/restarting of the primary skid.

1.2 **GO TO** WP 04-VU1001, verify UVFS aligned for automatic shift to filtration, and **RETURN TO** Step 1.3.

1.3 Verify **ALL** High-Efficiency Particulate Air (HEPA) filter differential pressure indicators are within current calibration cycle.

1.4 Establish communications between Central Monitoring Room (CMR), EFB, and U/G.

1.5 Request Central Monitoring Room Operator (CMRO) to verify the following conditions exist U/G:

- Bulkhead Door 336 **OPEN**

- Construction Split Bulkhead Regulator Louver configured for normal operation

- Bulkhead Regulator 313 configured for normal operation

1.6 **GO TO** WP 04-VU1001, establish Normal or Alternate Ventilation Mode, and **RETURN TO** Step 1.7.

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1.7 Notify UFE/Underground Roving Watch (UGRW) and U/G personnel of the following:

- Filtration is being initiated for testing.
- Diesel-powered equipment **MUST NOT** be operated until further notice.

1.8 Request CMRO to **GO TO** WP 04-VU1001, initiate filtration, and **RETURN TO** Step 1.9.

1.9 Verify shift to filtration by observing the following indications:

- Red RUN light for selected 41-B-860 fan is **ON**.
- Green STOP lights are **ON** for 41-B-860 fans **NOT** selected.
- Red FILTRATION light is **ON**.
- White BYPASS light is **OFF**.
- Red OPEN lights are **ON** for the following dampers:

HD-01C	HD-01D	HD-01E	HD-01F	HD-004

- Green CLOSED lights are **ON** for **BOTH** bypass dampers.
- Green STOP lights are **ON** for **ALL** 41-B-700 fans.
- Green CLOSED lights are **ON** for **ALL** 41-B-700 fan isolation dampers.

1.10 CMRO, verify inlet **AND** outlet dampers are open for running 41-B-860 fan.

1.11 Verify the following indications at control panel 413-CP-056-01:

- HEPA Unit 41-B-856 Mod Efficiency Filter <1.0 in. water gauge (wg) differential pressure (DP)
- HEPA Unit 41-B-856 High Efficiency Filter <1.0 in. wg DP
- HEPA Unit 41-B-856 first HEPA Filter 0.5 to 2.5 in. wg DP
- HEPA Unit 41-B-856 second HEPA Filter 0.5 to 2.5 in. wg DP
- HEPA Unit 41-B-857 Mod Efficiency Filter <1.0 in. wg DP
- HEPA Unit 41-B-857 High Efficiency Filter <1.0 in. wg DP

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- HEPA Unit 41-B-857 first HEPA Filter 0.5 to 2.5 in. wg DP
- HEPA Unit 41-B-857 second HEPA Filter 0.5 to 2.5 in. wg DP

1.12 Request CMRO to verify the following conditions exist U/G:

- Bulkhead Door 336 **CLOSED**
- Construction Split Bulkhead Regulator Louver **CLOSED**.
- Bulkhead Regulator 313 Louver **CLOSED**

1.13 Request CMRO, **GO TO** WP 04-VU1001, start bypass (reset filtration), and **RETURN TO** Step 1.14.

1.14 **GO TO** WP 04-VU1001, stop running 41-B-860 fan, and **RETURN TO** Step 1.15.

1.15 Verify the following conditions at control panel 413-CP-056-01:

- Green STOP lights for the following are **ON**:

41-B-860A	41-B-860B	41-B-860C

- White BYPASS light is **ON**.
- Red FILTRATION light is **OFF**.
- Green CLOSED lights are **ON** for the following dampers:

HD-01C	HD-01D	HD-01E	HD-01F	HD-004

- Green CLOSED lights are **ON** for **BOTH** bypass dampers.

1.16 CMRO, verify inlet **AND** outlet dampers are **CLOSED** for the following:

41-B-860A	41-B-860B	41-B-860C

1.17 **GO TO** WP 04-VU1001, start UVFS in an approved mode as directed by FSM.

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NOTE

Shifting to filtration will cause shutdown of NESHAPs skid (normally skid A3). Radiological Control Superintendent or Radiological Control Manager should be contacted prior to shifting to filtration to allow for data collection and securing/restarting of the primary skid.

2.0 860 FAN SHIFT FROM CMR

2.1 Contact Radiological Control Superintendent or Radiological Control Manager prior to shifting to filtration to allow for data collection and securing/restarting of the primary skid.

2.2 **GO TO** WP 04-VU1001, verify UVFS aligned for automatic shift to filtration, and **RETURN TO** Step 2.3.

2.3 Verify **ALL** HEPA filter differential pressure indicators are within current calibration cycle.

2.4 Establish communications between CMR, EFB, and U/G.

2.5 Request CMRO to verify the following conditions exist U/G:

- Bulkhead Door 336 **OPEN**
- Construction Split Bulkhead Regulator Louver configured for normal operation
- Bulkhead Regulator 313 Louver configured for normal operation

NOTE

Configuration of U/G equipment per WP 04-VU1001 is not necessary for the purpose of this test. Bulkhead Door 336 should be open.

2.6 **GO TO** WP 04-VU1001, establish Minimum Ventilation Mode, and **RETURN TO** Step 2.7.

2.7 Notify UFE/UGRW and U/G personnel of the following:

- Filtration is being initiated for testing.
- Diesel-powered equipment **MUST NOT** be operated until further notice.

2.8 Request CMRO, **GO TO** WP 04-VU1001, initiate filtration, and **RETURN TO** Step 2.9.

2.9 Verify shift to filtration by observing the following indications:

- Red RUN light for selected 41-B-860 fan is **ON**.
- Green STOP lights are **ON** for 41-B-860 fans **NOT** selected.
- Red FILTRATION light is **ON**.
- White BYPASS light is **OFF**.
- Red OPEN lights are **ON** for the following dampers:

HD-01C	HD-01D	HD-01E	HD-01F	HD-004

- Green CLOSED lights are **ON** for **BOTH** bypass dampers.
- Green STOP lights are **ON** for **ALL** 41-B-700 fans.
- Green CLOSED lights are **ON** for **ALL** 41-B-700 fan isolation dampers.

2.10 CMRO, verify inlet **AND** outlet dampers are open for running 41-B-860 fan.

2.11 Verify the following indications at control panel 413-CP-056-01:

- HEPA Unit 41-B-856 Mod Efficiency Filter <1.0 in. wg DP
- HEPA Unit 41-B-856 High Efficiency Filter <1.0 in. wg DP
- HEPA Unit 41-B-856 first HEPA Filter 0.5 to 2.5 in. wg DP
- HEPA Unit 41-B-856 second HEPA Filter 0.5 to 2.5 in. wg DP
- HEPA Unit 41-B-857 Mod Efficiency Filter <1.0 in. wg DP
- HEPA Unit 41-B-857 High Efficiency Filter <1.0 in. wg DP
- HEPA Unit 41-B-857 first HEPA Filter 0.5 to 2.5 in. wg DP
- HEPA Unit 41-B-857 second HEPA Filter 0.5 to 2.5 in. wg DP

2.12 Request CMRO to verify the following conditions exist U/G:

- Bulkhead Door 336 **CLOSED**
- Construction Split Bulkhead Regulator Louver **CLOSED**
- Bulkhead Regulator 313 Louver **CLOSED**

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2.13 Request CMRO, **GO TO** WP 04-VU1001, start bypass (reset filtration), and **RETURN TO** Step 2.14.

2.14 **GO TO** WP 04-VU1001, stop running 41-B-860 fan, and **RETURN TO** Step 2.15.

2.15 Verify the following conditions at control panel 413-CP-056-01:

- Green STOP lights for the following are **ON**:

41-B-860A	41-B-860B	41-B-860C

- White BYPASS light is **ON**.
- Red FILTRATION light is **OFF**.
- Green CLOSED lights are **ON** for the following dampers:

HD-01C	HD-01D	HD-01E	HD-01F	HD-004

- Red OPEN lights are **ON** for **BOTH** bypass dampers.

2.16 CMRO, verify inlet **AND** outlet dampers are closed for the following:

41-B-860A	41-B-860B	41-B-860C

2.17 **GO TO** WP 04-VU1001, start UVFS in an approved mode as directed by FSM.

NOTE

Shifting to filtration will cause shutdown of NESHAPs skid (normally skid A3). Radiological Control Superintendent or Radiological Control Manager should be contacted prior to shifting to filtration to allow for data collection and securing/restarting of the primary skid.

3.0 700 FAN SHIFT FROM EFB

3.1 Contact Radiological Control Superintendent or Radiological Control Manager prior to shifting to filtration to allow for data collection and securing/restarting of the primary skid.

3.2 **GO TO** WP 04-VU1001, verify UVFS aligned for automatic shift to filtration, and **RETURN TO** Step 3.3.

3.3 Verify **ALL** HEPA filter differential pressure indicators are within current calibration cycle.

3.4 Establish communications between CMR, EFB, and U/G.

3.5 Request CMRO to verify the following conditions exist U/G:

- Bulkhead Door 336 **OPEN**
- Construction Split Bulkhead Regulator Louver configured for normal operation
- Bulkhead Regulator 313 Louver configured for normal operation

3.6 **GO TO** WP 04-VU1001, establish Normal or Alternate Ventilation Mode, and **RETURN TO** Step 3.7.

3.7 Notify UFE/UGRW and U/G personnel of the following:

- Filtration is being initiated for testing.
- Diesel-powered equipment **MUST NOT** be operated until further notice.

3.8 Position Exhaust Fans Local/Remote Switching keyswitch to **LOCAL**.

3.9 Locally initiate filtration by momentarily positioning Bypass/Filtration switch to **FILTRATION**.

3.10 Verify shift to filtration by observing the following indications:

- Red RUN light for selected 41-B-860 fan is **ON**.
- Green STOP lights are **ON** for 41-B-860 fans **NOT** selected.
- Red FILTRATION light is **ON**.
- White BYPASS light is **OFF**.
- Red OPEN lights are **ON** for the following dampers:

HD-01C	HD-01D	HD-01E	HD-01F	HD-004

- Green CLOSED lights are **ON** for **BOTH** bypass dampers.
- Green STOP lights are **ON** for **ALL** 41-B-700 fans.
- Green CLOSED lights are **ON** for **ALL** 41-B-700 fan isolation dampers.

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3.11 CMRO, verify inlet **AND** outlet dampers are open for running 41-B-860 fan.

3.12 Verify the following indications at control panel 413-CP-056-01:

- HEPA Unit 41-B-856 Mod Efficiency Filter <1.0 in. wg DP
- HEPA Unit 41-B-856 High Efficiency Filter <1.0 in. wg DP
- HEPA Unit 41-B-856 first HEPA Filter 0.5 to 2.5 in. wg DP
- HEPA Unit 41-B-856 second HEPA Filter 0.5 to 2.5 in. wg DP
- HEPA Unit 41-B-857 Mod Efficiency Filter <1.0 in. wg DP
- HEPA Unit 41-B-857 High Efficiency Filter <1.0 in. wg DP
- HEPA Unit 41-B-857 first HEPA Filter 0.5 to 2.5 in. wg DP
- HEPA Unit 41-B-857 second HEPA Filter 0.5 to 2.5 in. wg DP

3.13 Request CMRO to verify the following conditions exist U/G:

- Bulkhead Door 336 **CLOSED**
- Construction Split Bulkhead Regulator Louver **CLOSED**
- Bulkhead Regulator 313 Louver **CLOSED**

3.14 Locally start bypass (reset filtration) by momentarily positioning Bypass/Filtration switch to BYPASS.

3.15 **GO TO** WP 04-VU1001, locally stop running 41-B-860 fan, and **RETURN TO** Step 3.16.

3.16 Verify the following conditions at control panel 413-CP-056-01:

- Green STOP lights for the following are **ON**:

41-B-860A	41-B-860B	41-B-860C

- White BYPASS light is **ON**.
- Red FILTRATION light is **OFF**.

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- Green CLOSED lights are **ON** for the following dampers:

HD-01C	HD-01D	HD-01E	HD-01F	HD-004

- Green CLOSED lights are **ON** for **BOTH** bypass dampers.

3.17 CMRO, verify inlet **AND** outlet dampers are closed for the following:

41-B-860A	41-B-860B	41-B-860C

3.18 **GO TO** WP 04-VU1001, place UVFS in lineup as directed by FSM, and **RETURN TO** Step 3.19.

3.19 Position Exhaust Fans Local/Remote Switching keyswitch to **REMOTE**.

NOTE

Shifting to filtration will cause shutdown of NESHAPs skid (normally skid A3). Radiological Control Superintendent or Radiological Control Manager should be contacted prior to shifting to filtration to allow for data collection and securing/restarting of the primary skid.

4.0 860 FAN SHIFT FROM EFB

4.1 Contact Radiological Control Superintendent or Radiological Control Manager prior to shifting to filtration to allow for data collection and securing/restarting of the primary skid.

4.2 **GO TO** WP 04-VU1001, verify UVFS aligned for automatic shift to filtration, and **RETURN TO** Step 4.3.

4.3 Verify **ALL** HEPA filter differential pressure indicators are within current calibration cycle.

4.4 Establish communications between CMR, EFB, and U/G.

4.5 Request CMRO verify the following conditions exist U/G:

- Bulkhead Door 336 **OPEN**
- Construction Split Bulkhead Regulator Louver configured for normal operation
- Bulkhead Regulator 313 Louver configured for normal operation

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NOTE

Configuration of U/G equipment per WP 04-VU1001 is not necessary for the purpose of this test. Bulkhead Door 336 should be open.

4.6 **GO TO** WP 04-VU1001, establish Minimum Ventilation Mode, and **RETURN TO** Step 4.7.

4.7 Notify UFE/UGRW and U/G personnel of the following:

- Filtration is being initiated for testing.
- Diesel-powered equipment **MUST NOT** be operated until further notice.

4.8 Position Exhaust Fans Local/Remote Switching keyswitch to **LOCAL**.

4.9 Locally initiate filtration by momentarily positioning Bypass/Filtration switch to **FILTRATION**.

4.10 Verify shift to filtration by observing the following indications:

- Red RUN light for selected 41-B-860 fan is **ON**.
- Green STOP lights are **ON** for 41-B-860 fans **NOT** selected.
- Red FILTRATION light is **ON**.
- White BYPASS light is **OFF**.
- Red OPEN lights are **ON** for the following dampers:

HD-01C	HD-01D	HD-01E	HD-01F	HD-004

- Green CLOSED lights are **ON** for **BOTH** bypass dampers.
- Green STOP lights are **ON** for **ALL** 41-B-700 fans.
- Green CLOSED lights are **ON** for **ALL** 41-B-700 fan isolation dampers.

4.11 CMRO, verify inlet **AND** outlet dampers are open for running 41-B-860 fan.

4.12 Verify the following indications at control panel 413-CP-056-01:

- HEPA Unit 41-B-856 Mod Efficiency Filter <1.0 in. wg DP
- HEPA Unit 41-B-856 High Efficiency Filter <1.0 in. wg DP

- HEPA Unit 41-B-856 first HEPA Filter 0.5 to 2.5 in. wg DP
- HEPA Unit 41-B-856 second HEPA Filter 0.5 to 2.5 in. wg DP
- HEPA Unit 41-B-857 Mod Efficiency Filter <1.0 in. wg DP
- HEPA Unit 41-B-857 High Efficiency Filter <1.0 in. wg DP
- HEPA Unit 41-B-857 first HEPA Filter 0.5 to 2.5 in. wg DP
- HEPA Unit 41-B-857 second HEPA Filter 0.5 to 2.5 in. wg DP

4.13 Request CMRO to verify the following conditions exist U/G:

- Bulkhead Door 336 **CLOSED**
- Construction Split Bulkhead Regulator Louver **CLOSED**
- Bulkhead Regulator 313 Louver **CLOSED**

4.14 Locally start bypass (reset filtration) by momentarily positioning Bypass/Filtration switch to **BYPASS**.

4.15 **GO TO** WP 04-VU1001, locally stop running 41-B-860 fan, and **RETURN TO** Step 4.16.

4.16 Verify the following conditions at control panel 413-CP-056-01:

- Green STOP lights for the following are **ON**:

41-B-860A	41-B-860B	41-B-860C

- White BYPASS light is **ON**.
- Red FILTRATION light is **OFF**.
- Green CLOSED lights are **ON** for the following dampers:

HD-01C	HD-01D	HD-01E	HD-01F	HD-004

- Red OPEN lights are **ON** for **BOTH** bypass dampers.

4.17 CMRO, verify inlet **AND** outlet dampers are closed for the following:

41-B-860A	41-B-860B	41-B-860C

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4.18 **GO TO** WP 04-VU1001, place UVFS in lineup as directed by FSM, and **RETURN TO** Step 4.19.

4.19 Position Exhaust Fans Local/Remote Switching keyswitch to **REMOTE**.

NOTE

Shifting to filtration will cause shutdown of NESHAPs skid (normally skid A3). Radiological Control Superintendent or Radiological Control Manager should be contacted prior to shifting to filtration to allow for data collection and securing/restarting of the primary skid.

5.0 AUTOMATIC SHIFT TO FILTRATION FROM ROOM EXIT CAM

5.1 Contact Radiological Control Superintendent or Radiological Control Manager prior to shifting to filtration to allow for data collection and securing/restarting of the primary skid.

5.2 **GO TO** WP 04-VU1001, verify UVFS aligned for automatic shift to filtration, and **RETURN TO** Step 5.3.

5.3 Verify **ALL** HEPA filter differential pressure indicators are within current calibration cycle.

5.4 Establish communications between CMR, EFB, and U/G.

5.5 Request CMRO verify the following conditions exist U/G:

- Bulkhead Door 336 **OPEN**
- Construction Split Bulkhead Regulator Louver configured for normal operation
- Bulkhead Regulator 313 Louver configured for normal operation

5.6 **GO TO** WP 04-VU1001, establish Normal or Alternate Ventilation Mode, and **RETURN TO** Step 5.7.

5.7 Notify UFE/UGRW and U/G personnel of the following:

- Filtration is being initiated for testing.
- Diesel-powered equipment **MUST NOT** be operated until further notice.

5.8 Request RCT to initiate filtration by activating a Continuous Air Monitor (CAM) HI-HI Alarm at room exit CAM (any CAM, or a CAM as directed by FSM).

5.9 Verify shift to filtration by observing the following indications:

- Red RUN light for selected 41-B-860 fan is **ON**.
- Green STOP lights are **ON** for 41-B-860 fans **NOT** selected.
- Red FILTRATION light is **ON**.
- White BYPASS light is **OFF**.
- Red OPEN lights are **ON** for the following dampers:

HD-01C	HD-01D	HD-01E	HD-01F	HD-004

- Green CLOSED lights are **ON** for **BOTH** bypass dampers.
- Green STOP lights are **ON** for **ALL** 41-B-700 fans.
- Green CLOSED lights are **ON** for **ALL** 41-B-700 fan isolation dampers.

5.10 CMRO, verify inlet **AND** outlet dampers are open for running 41-B-860 fan.

5.11 Verify the following indications at control panel 413-CP-056-01:

- HEPA Unit 41-B-856 Mod Efficiency Filter <1.0 in. wg DP
- HEPA Unit 41-B-856 High Efficiency Filter <1.0 in. wg DP
- HEPA Unit 41-B-856 first HEPA Filter 0.5 to 2.5 in. wg DP
- HEPA Unit 41-B-856 second HEPA Filter 0.5 to 2.5 in. wg DP
- HEPA Unit 41-B-857 Mod Efficiency Filter <1.0 in. wg DP
- HEPA Unit 41-B-857 High Efficiency Filter <1.0 in. wg DP
- HEPA Unit 41-B-857 first HEPA Filter 0.5 to 2.5 in. wg DP
- HEPA Unit 41-B-857 second HEPA Filter 0.5 to 2.5 in. wg DP

5.12 Request CMRO to verify the following conditions exist U/G:

- Bulkhead Door 336 **CLOSED**
- Construction Split Bulkhead Regulator Louver **CLOSED**
- Bulkhead Regulator 313 Louver **CLOSED**

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5.13 Request RCT to clear CAM HI-HI Alarm.

5.14 Request CMRO **GO TO** WP 04-VU1001, start bypass (reset filtration), and **RETURN TO** Step 5.15.

5.15 **GO TO** WP 04-VU1001, stop running 41-B-860 fan, and **RETURN TO** Step 5.16.

5.16 Verify the following conditions at control panel 413-CP-056-01:

- Green STOP lights for the following are **ON**:

41-B-860A	41-B-860B	41-B-860C

- White BYPASS light is **ON**.
- Red FILTRATION light is **OFF**.
- Green CLOSED lights are **ON** for the following dampers:

HD-01C	HD-01D	HD-01E	HD-01F	HD-004

- Green CLOSED lights are **ON** for **BOTH** bypass dampers.

5.17 CMRO, verify inlet **AND** outlet dampers are closed for the following:

41-B-860A	41-B-860B	41-B-860C

5.18 **GO TO** WP 04-VU1001, place UVFS in lineup as directed by FSM.

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WP 04-VU1001

Revision 24

Surface Underground Ventilation and Filtration System Operation

Technical Procedure

EFFECTIVE DATE: 09/20/10

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CHANGE HISTORY SUMMARY

REVISION NUMBER	ISSUED DATE	DESCRIPTION OF CHANGES
24	09/20/10	Changed manual operation at damper actuator in Steps 16.1.2 and 16.2.2. Added damper 011A to Steps 19.1 and 19.2.

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INTRODUCTION [1, 3]

This procedure provides instructions for surface operation of the Underground Ventilation and Filtration System (UVFS) and associated components. As required per WP 04-CO.01, this procedure shall be followed step-by-step for the activities and operations addressed herein. Sections 1.0, 2.0, 3.0, 4.0, 11.0, and 17.0 of this procedure shall be performed under the direct supervision of the Facility Shift Manager (FSM)/Facility Shift Engineer (FSE).

No records are generated by performance of this procedure.

REFERENCES

BASELINE DOCUMENTS

- 30 *Code of Federal* Regulations (CFR) Part 57, Subpart G, "Ventilation"
- Hazardous Waste Facility Permit, Waste Isolation Pilot Plant, Permit No. NM4890139088-TSDF, issued by the New Mexico Environment Department
- DOE/WIPP-91-005, *Life Cycle Maintenance of the RCRA Part B Application*
- DOE/WIPP-07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis*
- DOE/WIPP-07-3373, *Waste Isolation Pilot Plant Technical Safety Requirements*
- Drawing, 41-J-007-W, Underground Ventilation System Diagram and Location Plans
- FO-Guide-1, Facility Operations Qualification Guide Book

REFERENCED DOCUMENTS

- WP 04-CO.01, Conduct of Operations
- WP 04-VU1002, Operability Testing of Underground Filtration
- WP 04-VU1608, Underground Ventilation and Filtration System Operation

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PRECAUTIONS AND LIMITATIONS

To prevent excessive negative pressure in the waste hoist tower, the following safety features are provided:

- At -2.25 inches (in.) water gauge (wg) in the waste hoist tower, the Central Monitoring Room (CMR) receives **411 WASTE HOIST TOWER DIFFERENTIAL PRESSURE (DP)** alarm, and the waste handling Auxiliary Air Intake Shaft (AAIS) pressure relief dampers open.

- At -2.5 in. wg in the waste hoist tower, one ventilation fan will shut down if two main exhaust ventilation fans are running.

- At -2.75 in. wg in the waste hoist tower, the running main exhaust ventilation fan will shut down.

- Prior to accessing the AAIS, the DP across the door should be reduced by placing the waste hoist tower DP as close to zero as possible.

- During Waste Handling Mode in the underground (U/G), access to the AAIS should not be allowed.

- The DP can be reduced by coordinating with the U/G for adjustment of Regulator 308 and securing some or all of the U/G ventilation. The DP can also be reduced by opening the AAIS louvers. Normal configuration of the louvers is the East set open and all others closed. Opening the North and/or West set of louvers should lower the DP to an acceptable level. When access is no longer required, the normal configuration must be verified.

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CAUTION

To prevent a loss of the shift-to-filtration function during maintenance evolutions, bypass switches were installed in the U/G ventilation control panel. Initiating these bypass switches will isolate control power, but maintain the shift-to-filtration function. Opening CB-13, CB-15, CB-21 in 41P-DP03/29 removes the control power for the associated fan. If the fan is not secured, it will shut down.

- **WHEN** isolating control power from the 700 fans,
  WHILE maintaining the shift-to-filtration function, the following must be performed:

At Distribution Panel 41P-DP03/29	At Ventilation Control Panel 413-CP-307-1B
IF OPENING CB 13	**THEN** place switch HS-307-003D in bypass position
IF OPENING CB 15	**THEN** place switch HS-307-002D in bypass position
IF OPENING CB 21	**THEN** place switch HS-307-004D in bypass position

PREREQUISITE ACTIONS

NOTE

If ventilation fans shut down while the U/G is unmanned, the FSM may direct restart of ventilation as long as the U/G alignment has not been affected (e.g., initiation of filtration).

1.0 Ensure control panel alarm indicators are operable prior to starting equipment.

2.0 Ensure UVFS is supplied with compressed air.

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PERFORMANCE

NOTE

Due to proximity of control panels (413-CP-056-01, 413-CP-307-01A, 413-CP-307-01B, 413-CP-307-1D, and 413-CP-307-1E, and 413-CP-307-1F), panel numbers are not designated in steps where panel switches, controls, and alarms are used.

NOTE

With FSM authorization, manual operation of system components (Sections 16.0 through 19.0) may be incorporated into any other section to accomplish system operation when automatic functions are undesirable or out of service.

NOTE

The FSM may vary flow levels to support plant conditions. The FSM will take into consideration information such as full-load current on ventilation fans; high vibration due to transient aerodynamic conditions on 41-B-700A, B, and C; and total flow in the U/G at the exhaust shaft.

NOTE

Steps indicate alternate selections with ( ) and [ ].

1.0 ALIGNING SYSTEM FOR AUTOMATIC SHIFT-TO-FILTRATION [2]

NOTE

This section shall be performed under the direct supervision of the FSM/FSE.

1.1 Ensure the following conditions:

- Selected fan vortex is aligned for manual operation and **CLOSED**.
- **IF** system is in alternate ventilation, normal ventilation, or filtration, bypass dampers control is in **CLOSED** position.
- **IF** system is in minimum or reduced ventilation, bypass dampers control is in **AUTO** position.

1.2 Ensure high-efficiency particulate air (HEPA) filter 41-B-856 dampers control is in **AUTO**.

1.3 Ensure HEPA filter 41-B-857 dampers control is in **AUTO**.

1.4 Ensure isolation damper control keyswitch is in **AUTO**.

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1.5 Ensure exhaust fans Local/Remote Control Mode keyswitch is in **REMOTE**.

1.6 Ensure L-R/R7 RELAY PICKED UP blue indicating light is **OFF**.

1.7 Ensure the following are disengaged:

- HEPA filter inlet damper manual handwheel clutches
- HEPA filter outlet damper manual handwheel clutches

1.8 Ensure ISOLATION/DISABLE 120 VAC interlock DG 1 and DG 2 switches are in **ENABLE**.

1.9 Central Monitoring Room Operator (CMRO), ensure filtration mode indicates BYPASS Mode on Central Monitoring System (CMS) GRAPHIC 2530.

1.10 Enable filtration as follows:

1.10.1 From CMR:

[A] Display **EXHAUST FILTER BUILDING FAN/EFB CONTROL (2530)** graphic.

[B] CMRO, ensure L-R/R7 Test SW TS-1 keyswitch is in **FILTRATION ENABLED**.

[C] CMRO, move cursor to "STF" button and click once.

[D] CMRO, click the **ENABLE** button in the pop-up window.

[E] CMRO, ensure that filtration is **ENABLED**.

1.10.2 Locally

[A] Place L-R/R7 Test SW TS-1 keyswitch in **FILTRATION ENABLED**.

[B] CMRO, ensure that filtration is **ENABLED** in the CMS.

[C] Ensure with CMRO that filtration is **ENABLED**.

1.11 **IF** filtration fan to be selected has Auto/Manual Switching keyswitch in **OFF**,
THEN perform the following:

1.11.1 Ensure presence of keyswitch key for the selected fan.

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1.11.2 Place Auto/Manual Mode Switching keyswitch in **AUTO** for selected fan 41-B-860A (41-B-860B) [41-B-860C].

1.12 **IF** filtration fan to be selected is other than the fan presently selected, **THEN** place the Auto/Manual Mode Switching keyswitch in **OFF** (center position) for fan 41-B860A (41-B-860B) [41-B-860C].

2.0 DISABLING SHIFT-TO-FILTRATION

NOTE

This section shall be performed under the direct supervision of the FSM/FSE. Whichever method (CMR or Locally) is used to disable filtration in Step 2.1 shall be the same method used to re-enable filtration in Step 2.2.

2.1 Disable filtration as follows by performing Step 2.1.1 or Step 2.1.2:

2.1.1 From CMR:

[A] Display **EXHAUST FILTER BUILDING FAN/EFB CONTROL (2530)** graphic.

[B] CMRO, move cursor to "STF" button and click once.

[C] CMRO, click the **DISABLE** button in the pop-up window.

[D] CMRO, ensure that filtration is **DISABLED**.

2.1.2 Locally

[A] Place selected filtration fan 41-B-860A (41-B-860B) [41-B-860C] Auto/Manual Mode Switching keyswitch in **OFF** (center position).

[B] Place L-R/R7 Test SW TS-1 keyswitch in **FILTRATION DISABLED**.

[C] Ensure with CMRO that filtration is **DISABLED**.

[D] Ensure AUTO FILTRATION DISABLED amber light is **ON**.

2.2 After filtration was disabled, perform Step 2.2.1 or Step 2.2.2 to realign system for automatic shift-to-filtration,
THEN perform Steps 2.3 and 2.4:

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2.2.1 From CMR:

[A] Display **EXHAUST FILTER BUILDING FAN/EFB CONTROL (2530)** graphic.

[B] CMRO, ensure on GRAPHIC 2530, filtration mode indicates BYPASS Mode. If not, click on **BYPASS** Mode (pop-up window will display "Do you want to Start **BYPASS** Mode, OK or Cancel").

[C] Click once on OK.

[D] Ensure **HEPA FILTRATION** indication changes from **ACTIVATED** to **BYPASSED**.

[E] Display **EXHAUST FILTER BUILDING FAN/EFB CONTROL (2530)** graphic.

[F] CMRO, move cursor to "STF" button and click once.

[G] CMRO, click the **ENABLE** button in the pop-up window.

[H] CMRO, ensure that filtration is **ENABLED**.

2.2.2 Locally

[A] Ensure with CMRO that filtration mode indicates BYPASS Mode. **IF NOT**, CMRO perform Steps 2.2.1[A] through 2.2.1[D],
THEN return to Step 2.2.2[B].

[B] Place L-R/R7 Test SW TS-1 keyswitch in **FILTRATION ENABLED**.

[C] Ensure with CMRO that filtration is **ENABLED**.

2.2.3 **IF** Steps 2.2.1 and 2.2.2 are unsuccessful,
THEN realign system for automatic shift-to-filtration from the local control panel in Building 413:

[A] Place exhaust fans Local/Remote Control Mode Switching keyswitch in **LOCAL**.

[B] Momentarily place exhaust system Filtration/Bypass Mode switching Switch in **BYPASS**.

[C] Ensure white BYPASS light is **ON**.

[D] Place exhaust fan Local/Remote Control Mode Switching keyswitch in **REMOTE**.

[E] CMRO, ensure on GRAPHIC 2530, Latch Relay **NOT ENERGIZED**.

2.3 CMRO, ensure fan 41-B-860A (41-B-860B) [41-B-860C] Auto/Manual Mode Switching keyswitch is in **AUTO**.

2.4 CMRO, ensure L-R/R7 RELAY PICKED UP blue indicating light is **OFF**.

3.0 START-UP OF ALTERNATE VENTILATION [2]

NOTE

Recommended configuration of Auxiliary Air Intake Tunnel (AAIT) dampers is the louver to 50% open on the east wall. The louver on the east wall can be adjusted for conditions of Natural Ventilation Pressure.

NOTE

This section shall be performed under the direct supervision of the FSM/FSE.

3.1 **IF** Underground Facility Engineer/Underground Roving Watch (UFE/UGRW) positions are manned,
THEN direct UFE/UGRW to **GO TO** WP 04-VU1608 and configure U/G for alternate ventilation; **AND RETURN TO** Step 3.2.

3.2 Verify oil levels on ventilation fan to be started are between L (low) and H (high) marks.

3.3 Ensure the following lineup:

- Bypass damper HD-03A is **CLOSED**.
- Bypass damper HD-03B is **CLOSED**.
- Isolation damper HD-004 is **CLOSED**.
- Selected fan vortex is aligned for **MANUAL OPERATION** and **CLOSED**. (41-B-700B) [41-B-700C]

3.4 Ensure U/G configuration is complete.

3.5 Notify U/G personnel that UVFS will be started in alternate ventilation.

3.6 From local control panel in Building 413, momentarily place fan 41-BM-700A (41-BM-700B) [41-BM-700C] Stop/Start switch in **START**.

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3.7 Ensure the following dampers are **OPEN**:

- HD-01A (HD-02A) [HD-04A]
- HD-01B (HD-02B) [HD-04B]

NOTE

In Step 3.8, full load current (FLC) is read in Substation 7 at Motor Protection Relay 25S7-700A (25S7-700B) [25S7-700C].

3.8 Increase fan flow to desired setting for fan (41-B-700B) [41-B-700C] by rotating vortex manual handwheel in counterclockwise (CCW) direction (desired flow rate is 247,000 to 273,000 cubic feet per minute [cfm] and load current is less than or equal to 95% FLC for fan 41-B-700A (41-B-700B) [41-B-700C].

4.0 SHIFTING FROM ALTERNATE TO NORMAL VENTILATION (425K CFM) [2]

NOTE

This section shall be performed under the direct supervision of the FSM/FSE.

4.1 **IF** UFE/UGRW positions are manned,
THEN direct UFE/UGRW to **GO TO** WP 04-VU1608 and configure U/G for normal ventilation; **AND RETURN TO** Step 4.2.

4.2 Ensure air intake shaft is uncovered.

4.3 Obtain concurrence from air intake shaft hoist personnel to run two 700 fans.

4.4 Verify oil levels on ventilation fan to be started are between L and H marks.

4.5 Reduce running ventilation fan flow (if required) to 202,000 to 223,000 cfm by rotating manual handwheel clockwise (CW).

NOTE

Recommended configuration of AAIT dampers is the louver fully open on east wall. The louver on east wall can be adjusted for conditions of Natural Ventilation Pressure.

4.6 Open AAIT louvers as appropriate to maintain waste tower pressure within limits.

4.7 **GO TO** 700 fan **NOT** in service and ensure fan vortex is aligned for manual operation and closed, (41-B-700B) [41-B-700C].

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4.8 Ensure U/G configuration complete.

4.9 If personnel are in the U/G, notify U/G personnel that UVFS will be started in normal ventilation.

4.10 From local control panel in Building 413, momentarily place fan 41-BM-700A (41-BM-700B) [41-B-700C] Stop/Start switch to **START**.

4.11 Ensure the following dampers are **OPEN**:

- HD-01A (HD-02A) [HD-04A]
- HD-01B (HD-02B) [HD-04B]

NOTE

In Step 4.12, FLC is read in Substation 7 at Motor Protection Relay 25S7-700A (25S7-700B) [25S7-700C].

4.12 Increase fan flow to desired setting for fan (41-B-700B) [41-B-700C] by rotating vortex manual handwheel in CCW direction (desired flow is 202,000 to 223,000 cfm, and load current is less than or equal to 95% FLC for fan 41-B-700A (41-B-700B) [41-B-700C].

5.0 START-UP IN NORMAL VENTILATION

5.1 **IF** UFE/UGRW positions are manned,
THEN direct UFE/UGRW to **GO TO** WP 04-VU1608 and configure U/G for normal ventilation; **AND RETURN TO** Step 5.2.

5.2 Ensure air intake shaft is uncovered.

5.3 Obtain concurrence from air intake shaft hoist personnel to run two 700 fans.

5.4 Verify oil levels on ventilation fan to be started are between L and H marks.

NOTE

Recommended configuration of AAIT dampers is the louver fully open on east wall. The louver on east wall can be adjusted for conditions of Natural Ventilation Pressure.

5.5 Open AAIT louvers as appropriate to maintain waste tower pressure within limits.

5.6 Ensure fan vortex is aligned for manual operation and closed, (41-B-700B) [41-B-700C].

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5.7 Ensure U/G configuration complete.

5.8 If personnel are in the U/G, notify U/G personnel that UVFS will be started in normal ventilation.

5.9 From local control panel in Building 413, momentarily place fan 41-BM-700A (41-BM-700B) [41-B-700C] Stop/Start switch to **start**.

5.10 Ensure the following dampers are **OPEN**:

- HD-01A (HD-02A) [HD-04A]
- HD-01B (HD-02B) [HD-04B]

5.11 Ensure the fan completes startup and motor amps are stabilized before starting second 700 fan.

5.12 From local control panel in Building 413, momentarily place second fan 41-BM-700A (41-BM-700B) [41-B-700C] Stop/Start switch to **start**.

5.13 Ensure the following dampers are **OPEN**:

- HD-01A (HD-02A) [HD-04A]
- HD-01B (HD-02B) [HD-04B]

NOTE

In Step 5.12, FLC is read in Substation 7 at Motor Protection Relay 25S7-700A (25S7-700B) [25S7-700C].

5.14 Increase fan flow to desired setting for fan (41-B-700B) [41-B-700C] by rotating vortex manual handwheel in CCW direction (desired flow is 202,000 to 223,000 cfm, and load current is less than or equal to 95% FLC for fan 41-B-700A (41-B-700B) [41-B-700C].

6.0 SHIFTING FROM NORMAL TO ALTERNATE VENTILATION

6.1 If UFE/UGRW and U/G positions are manned, notify UFE/UGRW and U/G personnel of reduction in ventilation.

6.2 Stop fan 41-B-700A (41-B-700B) [41-B-700C] from CMR, **OR** locally as follows:

6.2.1 From CMR:

[A] Display **EXHAUST FILTER BUILDING FAN/EFB CONTROL (2530)** GRAPHIC.

[B] Move cursor to desired fan and ensure white border appears.

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[C] Click once with the left mouse button.

[D] Click the STOP button in the pop-up window and ensure the selected fan stops.

6.2.2 From local control panel in Building 413, momentarily place fan 41-BM-700A (41-BM-700B) [41-B-700C] Stop/Start switch to **STOP**.

6.3 Ensure fan 41-B-700A (41-B-700B) [41-B-700C] stops.

6.4 Ensure the following dampers **CLOSE**:

- HD-01A (HD-02A) [HD-04A]
- HD-01B (HD-02B) [HD-04B]

6.5 **IF** UFE/UGRW positions are manned,
THEN direct UFE/UGRW to **GO TO** WP 04-VU1608 and configure for alternate ventilation; **AND RETURN TO** Step 6.6.

NOTE

In Step 6.6, FLC is read in Substation 7 at Motor Protection Relay 25S7-700A (25S7-700B) [25S7-700C].

6.6 Increase fan flow to desired setting for fan 41-B-700B) [41-B-700C] by rotating vortex manual handwheel CCW (desired flow is 247,000 to 273,000 cfm, and load current is less than or equal to 95% FLC for fan 41-B-700A (41-B-700B) [41-B-700C].

6.7 Close vortex on fan secured.

7.0 SHUTDOWN FROM ALTERNATE VENTILATION

7.1 **IF** UFE/UGRW and U/G positions are manned,
THEN notify UFE/UGRW and U/G personnel of the following:

- All U/G ventilation will be stopped.
- No diesel-powered equipment is to be operated until U/G ventilation restored.

7.2 Stop fan 41-B-700A (41-B-700B) [41-B-700C] from CMR, **OR** locally as follows:

7.2.1 From CMR:

[A] Display **EXHAUST FILTER BUILDING FAN/EFB CONTROL (2530)** GRAPHIC.

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[B] Move cursor to desired fan and ensure white border appears.

[C] Click once with the left mouse button.

[D] Click the STOP button in the pop-up window and ensure the selected fan stops.

7.2.2 From local control panel in Building 413, momentarily place fan 41-BM-700A (41-BM-700B) [41-BM-700C] Stop/Start switch in STOP.

7.3 Ensure fan 41-B-700A (41-B-700B) [41-B-700C] stops.

7.4 Ensure the following dampers **CLOSE**:

- HD-01A (HD-02A) [HD-04A]
- HD-01B (HD-02B) [HD-04B]

7.5 Close vortex on the ventilation fan (41-B700B) [41-B-700C] that was secured.

8.0 SHIFTING FROM NORMAL OR ALTERNATE VENTILATION TO FILTRATION

8.1 **IF** UFE/UGRW and U/G positions are manned,
THEN notify UFE/UGRW and U/G personnel of the following:

- Filtration is being initiated.

- Diesel-powered equipment **MUST NOT** be operated until further notice.

NOTE

Shifting INTO filtration will cause shutdown of NESHAPs (National Emissions Standards for Hazardous Air Pollutants) skid (normally skid A3). Radiological Control on-call personnel must be contacted if skid goes down.

8.2 Initiate filtration from CMR, **OR** locally as follows:

8.2.1 From CMR:

[A] Display **EXHAUST FILTER BUILDING FAN/EFB CONTROL (2530)** GRAPHIC.

[B] Ensure the following in upper corner of main screen:

- CMS CONTROL MODE
- FILTRATION CONTROL NORMAL

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- Fan 41-B-860A (41-B-860B) [41-B-860C] selected

[C] Move cursor to INIT Filtration box (box will be highlighted).

[D] Click once with the left mouse button (pop-up window will display "Do you want to Start HEPA filtration, OK or Cancel").

[E] Click once on OK.

[F] Ensure **HEPA FILTRATION** indication changes from **BYPASSED** to **ACTIVATED**.

[G] Ensure word **ENERGIZED** with red background appears to right of **LATCH RELAY**.

8.2.2 From local control panel in Building 413:

[A] Place exhaust fans Local/Remote Control Mode Switching keyswitch in **LOCAL**.

[B] Momentarily place exhaust system Filtration/Bypass Mode Switching switch in **FILTRATION**.

[C] Place exhaust fans Local/Remote Control Mode Switching keyswitch in **REMOTE**.

8.3 Ensure the following condition indicators:

8.3.1 The following fans are **STOPPED**:

- 41-B-700A
- 41-B-700B
- 41-B-700C

8.3.2 The following dampers are **CLOSED**:

- HD-01A
- HD-01B
- HD-02A
- HD-02B
- HD-04A
- HD-04B

8.3.3 Fan 41-B-860A (41-B-860B) [41-B-860C] selected for **AUTO** is running.

8.3.4 The following HEPA filter dampers are **OPEN**:

- HD-01C
- HD-01D
- HD-01E
- HD-01F

8.3.5 EFB isolation damper HD-004 is **OPEN**.

8.4 Increase running fan 41-B-860A (41-B-860B) [41-B-860C] flow by rotating vortex manual handwheel CCW (desired flow is 57,000 to 63,000 cfm).

8.5 **IF** shift-to-**FILTRATION** occurred without prior notification to U/G personnel, **AND** UFE/UGRW and U/G positions are manned, **THEN** perform the following:

8.5.1 Notify UFE/UGRW and U/G personnel of the following:

- Filtration has been initiated.

- Diesel-powered equipment **MUST NOT** be operated until further notice.

8.5.2 Ensure the following condition indicators:

[A] The following fans are **STOPPED**:

- 41-B-700A
- 41-B-700B
- 41-B-700C

[B] The following dampers are **CLOSED**:

- HD-01A
- HD-01B
- HD-02A
- HD-02B
- HD-04A
- HD-04B

[C] Fan 41-B-860A (41-B-860B] [41-B-860C] selected for **AUTO** is running.

[D] The following HEPA filter dampers are **OPEN**:

- HD-01C
- HD-01D
- HD-01E
- HD-01F

[E] EFB Isolation Damper HD-004 is **OPEN**.

8.5.3 Increase running fan 41-B-860A (41-B-860B) [41-B-860C] flow by rotating vortex manual handwheel CCW (desired flow is 57,000 to 63,000 cfm).

8.6 Contact Radiological Control (Rad Con) on-call personnel and inform them of the shift-to-filtration and the primary skid shutdown.

9.0 START-UP IN FILTRATION [2]

9.1 **IF** UFE/UGRW positions are manned,
THEN direct UFE/UGRW to **GO TO** WP 04-VU1608 and configure U/G for start-up in filtration; **AND RETURN TO** Step 9.2.

9.2 **IF** U/G positions are manned,
THEN notify U/G personnel of the following:

- Filtration is being initiated.
- Diesel-powered equipment **MUST NOT** be operated until further notice.

NOTE

Start-up in filtration will cause shutdown of NESHAPs skid (normally skid A3). Radiological Control on-call personnel must be contacted if skid goes down.

9.3 Start filtration from CMR, **OR** locally as follows:

9.3.1 From CMR:

[A] Display **EXHAUST FILTER BUILDING FAN/EFB CONTROL (2530)** GRAPHIC.

[B] Ensure the following in upper corner of main screen:

- CMS CONTROL MODE
- FILTRATION CONTROL NORMAL
- Fan 41-B-860A (41-B-860B) [41-B-860C] selected

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[C] Move cursor to INIT FILTRATION box (box will be highlighted).

[D] Click once with the left mouse button (pop-up will display "Do you want to start HEPA filtration, OK or Cancel").

[E] Click once on OK.

[F] Ensure **HEPA FILTRATION** indication changes from **BYPASSED** to **ACTIVATED**.

[G] Ensure word **ENERGIZED** with red background appears to right of **LATCH RELAY**.

9.3.2 From local control panel in Building 413:

[A] Place exhaust fans Local/Remote Control Mode Switching keyswitch in **LOCAL**.

[B] Momentarily place exhaust system Filtration/Bypass Mode Switching switch in **FILTRATION**.

[C] Place exhaust fans Local/Remote Control Mode Switching keyswitch in **REMOTE**.

9.4 Ensure the following condition indicators:

9.4.1 Fan 41-B-860A (41-B-860B) [41-B-860C] selected for **AUTO** is running.

9.4.2 The following HEPA filter dampers are **OPEN**:

- HD-01C
- HD-01D
- HD-01E
- HD-01F

9.4.3 EFB isolation damper HD-004 is **OPEN**.

9.5 Increase running fan 41-B-860A (41-B-860B) [41-B-860C] flow by rotating vortex manual handwheel CCW (desired flow is 57,000 to 63,000 cfm).

9.6 Contact Rad Con on-call personnel and inform them of the shift-to-filtration and the primary skid shutdown.

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10.0 START-UP OF MINIMUM VENTILATION

NOTE

In Step 10.1, U/G configuration is not necessary for fan operation if not manned, or if performing testing per WP 04-VU1002.

10.1 **IF** UFE/UGRW positions are manned,
THEN direct UFE/UGRW to **GO TO** WP 04-VU1608 and configure U/G for minimum ventilation; **AND RETURN TO** Step 10.2.

10.2 Ensure fan vortex is aligned for manual operation and closed.

10.3 **IF** U/G positions are manned,
THEN notify U/G personnel of the following:

- Minimum ventilation is to be started.
- No diesel-powered equipment is to be operated.

10.4 Ensure the following fans are **OFF**:

- 41-B-700A
- 41-B-700B
- 41-B-700C

10.5 If U/G positions are manned, ensure U/G configuration complete.

10.6 Ensure the following switch lineup exists on local control panel:

- HEPA filter 41-B-856 dampers control switch in **AUTO**
- HEPA filter 41-B-857 dampers control switch in **AUTO**
- Isolation damper control keyswitch in **AUTO**

10.7 Open bypass dampers by placing bypass dampers control switch in **AUTO**.

10.8 Ensure the following dampers are **OPEN**:

- Bypass damper HD-03A
- Bypass damper HD-03B

10.9 Place fan 41-B-860A (41-B-860B) [41-B-860C] Man/Off/Auto keyswitch in **MAN**.

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10.10 Start fan 41-B-860A (41-B-860B) [41-B-860C] from CMR, **OR** locally as follows:

10.10.1 From CMR:

[A] Display **EXHAUST FILTER BUILDING FAN/EFB CONTROL (2530)** GRAPHIC.

[B] Move cursor to desired fan and ensure white border appears.

[C] Click once with the left mouse button.

[D] Click the START button in the pop-up window and ensure the selected fan starts.

10.10.2 From local control panel in Building 413:

[A] Place exhaust fans Local/Remote Control Mode Switching keyswitch in **LOCAL**.

[B] Start fan 41-B-860A (41-B-860B) [41-B-860C] by momentarily placing fan 41-B-860A (41-B-860B) [41-B-860C] Start/Stop switch in **START**.

[C] Place exhaust fans Local/Remote Control Mode Switching keyswitch in **REMOTE**.

10.11 Ensure fan 41-B-860A (41-B-860B) [41-B-860C] selected for **MAN** is running.

10.12 Increase running fan 41-B-860A (41-B-860B) [41-B-860C] flow by rotating vortex manual handwheel CCW (desired flow is 57,000 to 63,000 cfm).

10.13 **IF** U/G positions are manned,
THEN notify U/G personnel of the following:

- Minimum ventilation has been restored.
- No diesel-powered equipment is to be operated without UFE permission.

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11.0 SHIFTING FROM MINIMUM TO REDUCED VENTILATION (120K CFM)

NOTE

This section shall be performed under the direct supervision of the FSM/FSE.

NOTE

In Step 11.1, U/G configuration is not necessary for fan operation if not manned.

11.1 **IF** UFE/UGRW positions are manned,
THEN direct UFE/UGRW to **GO TO** WP 04-VU1608 and configure U/G for reduced ventilation; **AND RETURN TO** Step 11.2.

11.2 Ensure fan vortex is aligned for manual operation and closed.

11.3 **IF** U/G positions are manned,
THEN notify U/G personnel of the following:

- Ventilation flow is to be raised.
- No diesel-powered equipment is to be operated without UFE permission.

11.4 If U/G positions are manned, ensure U/G configuration complete.

CAUTION

When performing Step 11.5, if U/G is **NOT** manned, **AND** Bulkhead Doors (BHD) 336 and Bulkhead Regulator (BHR) 313 are **CLOSED**, the waste hoist tower DP must be closely monitored to prevent damage to the waste hoist tower.

11.5 Place fan 41-B-860A (41-B-860B) [41-B-860C] Man/Off/Auto keyswitch in **MAN**.

11.6 Start fan 41-B-860A (41-B-860B) [41-B-860C] from CMR, **OR** locally as follows:

11.6.1 From CMR:

[A] Display **EXHAUST FILTER BUILDING FAN/EFB CONTROL (2530)** GRAPHIC.

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[B] Move cursor to desired fan and ensure white border appears.

[C] Click once with the left mouse button.

[D] Click the START button in the pop-up window and ensure selected fans start.

11.6.2 From local control panel in Building 413:

[A] Place exhaust fans Local/Remote Control Mode Switching keyswitch in **LOCAL**.

[B] Momentarily place fan 41-B-860A (41-B-860B) [41-B-860C] Start/Stop switch in **START**.

[C] Place exhaust fans Local/Remote Control Mode Switching keyswitch in **REMOTE**.

11.7 Ensure fan 41-B-860A (41-B-860B) [41-B-860C] selected for MAN is running.

11.8 Increase running fan 41-B-860A (41-B-860B) [41-B-860C] flow by rotating vortex manual handwheel CCW (desired flow is 57,000 to 63,000 cfm).

11.9 **IF** U/G positions are manned,
THEN notify U/G personnel of the following:

- UVFS flow has been raised.
- No diesel-powered equipment is to be operated without UFE permission.

12.0 SHIFTING FROM REDUCED TO MINIMUM VENTILATION

12.1 **IF** UFE/UGRW and U/G positions are manned,
THEN notify UFE/UGRW **AND** U/G personnel of the following:

- Ventilation is to be reduced.
- No diesel-powered equipment is to be operated without UFE permission.

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12.2 Stop fan 41-B-860A (41-B-860B) [41-B-860C] from CMR, **OR** locally as follows:

12.2.1 From CMR:

[A] Display **EXHAUST FILTER BUILDING FAN/EFB CONTROL (2530)** GRAPHIC.

[B] Move cursor to desired fan (icon will be highlighted).

[C] Click once with the left mouse button.

[D] Click the STOP button in the pop-up window and ensure the selected fan stops.

12.2.2 From local control panel in Building 413:

[A] Place exhaust fans Local/Remote Control Mode Switching keyswitch in **LOCAL**.

[B] Momentarily place Fan 41-B-860A (41-B-860B) [41-B-860C] Start/Stop switch in **STOP**.

[C] Place exhaust fans Local/Remote Control Mode Switching keyswitch in **REMOTE**.

12.3 Ensure fan 41-B-860A (41-B-860B) [41-B-860C] is stopped.

12.4 Place Man/Off/Auto keyswitch in **OFF** for filtration fan that was shut down.

12.5 Close the vortex.

12.6 **IF** U/G positions are manned,
THEN notify U/G personnel of the following:

- UVFS flow is to be reduced to minimum ventilation.
- No diesel-powered equipment is to be operated without UFE permission.

12.7 **IF** UFE/UGRW positions are manned,
THEN direct UFE/UGRW to **GO TO** WP 04-VU1608 and configure U/G for minimum ventilation.

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13.0 SHUTDOWN FROM MINIMUM VENTILATION

13.1 **IF** UFE/UGRW and U/G positions are manned,
THEN notify UFE/UGRW and U/G personnel of the following:

- All U/G ventilation is to be stopped.
- No diesel-powered equipment is to be operated.

13.2 Stop fan 41-B-860A (41-B-860B) [41-B-860C] from CMR, **OR** locally as follows:

13.2.1 From CMR:

[A] Display **EXHAUST FILTER BUILDING FAN/EFB CONTROL (2530)** GRAPHIC.

[B] Move cursor to desired fan and ensure white border appears.

[C] Click once with the left mouse button.

[D] Click the STOP button in the pop-up window and ensure the selected fan stops.

13.2.2 From local control panel in Building 413:

[A] Place exhaust fans Local/Remote Control Mode Switching keyswitch in **LOCAL**.

[B] Momentarily place fan 41-B-860A (41-B-860B) [41-B-860C] Start/Stop switch in **STOP**.

[C] Place exhaust fans Local/Remote Control Mode Switching keyswitch in **REMOTE**.

13.3 Ensure fan 41-B-860A (41-B-860B) [41-B-860C] is stopped.

13.4 Place bypass dampers control switch in **CLOSED**.

13.5 Ensure the following bypass dampers are **CLOSED**:

- HD-03A
- HD-03B

13.6 Place Man/Off/Auto keyswitch in **OFF** for ventilation fan that was shut down.

13.7 Close the vortex on ventilation fan that was secured.

13.8 If U/G positions are manned, notify U/G personnel of the following:

- All U/G ventilation is secured.
- No diesel-powered equipment is to be operated.

14.0 SHIFTING FROM REDUCED OR MINIMUM VENTILATION TO FILTRATION [2]

14.1 **IF** UFE/UGRW and U/G positions are manned,
THEN notify UFE/UGRW and U/G personnel of the following:

- Filtration is being initiated.
- No diesel-powered equipment is to be operated.

NOTE

Shifting INTO filtration will cause shutdown of NESHAPs skid (normally skid A3). Radiological Control on-call personnel must be contacted if skid goes down.

14.2 Initiate filtration from CMR, **OR** locally as follows:

14.2.1 From CMR:

[A] Display **EXHAUST FILTER BUILDING FAN/EFB CONTROL (2530)** GRAPHIC.

[B] Ensure the following in upper corner of main screen:

- CMS CONTROL MODE
- FILTRATION CONTROL NORMAL
- Fan 41-B-860A (41-B-860B) [41-B-860C] is selected

[C] Move cursor to INIT FILTRATION box (box will be highlighted).

[D] Click once with the left mouse button (pop-up window will display "Do you want to Start HEPA filtration, OK or Cancel").

[E] Click once on OK.

[F] Ensure **HEPA FILTRATION** indication changes from **BYPASSED** to **ACTIVATED**.

[G] Ensure word **ENERGIZED** with red background appears to right of **LATCH RELAY**.

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14.2.2 From local control panel in Building 413:

[A] Place exhaust fans Local/Remote Control Mode Switching keyswitch in **LOCAL**.

[B] Momentarily place exhaust system Filtration/Bypass Mode Switching switch in **FILTRATION**.

[C] Place exhaust fans Local/Remote Control Mode Switching keyswitch in **REMOTE**.

14.3 Ensure the following condition indicators:

14.3.1 Fan 41-B-860A (41-B-860B) [41-B-860C] selected for **MAN** is stopped.

14.3.2 Fan 41-B-860A (41-B-860B) [41-B-860C] selected for **AUTO** is running.

14.3.3 The following HEPA filter dampers are **OPEN**:

- HD-01C
- HD-01D
- HD-01E
- HD-01F

14.3.4 The following bypass dampers are **CLOSED**:

- HD-03A
- HD-03B

14.3.5 EFB Isolation Damper HD-004 is **OPEN**.

14.4 Increase running fan 41-B-860A (41-B-860B) [41-B-860C] flow by rotating vortex manual handwheel CCW (desired flow is 57,000 to 63,000 cfm).

14.5 **IF** shift-to-filtration occurred without prior notification to U/G personnel, **AND IF** UFE/UGRW and U/G positions are manned, **THEN** perform the following:

14.5.1 Notify UFE/UGRW **AND** U/G personnel of the following:

- Filtration is being initiated.

- Diesel-powered equipment **MUST NOT** be operated until further notice.

14.5.2 Ensure the following condition indicators:

[A] Fan 41-B-860A (41-B-860B) [41-B-860C] selected for MAN is stopped.

[B] Fan 41-B-860A (41-B-860B) [41-B-860C] selected for AUTO is running.

[C] The following HEPA filter dampers are **OPEN**:

- HD-01C
- HD-01D
- HD-01E
- HD-01F

[D] The following bypass dampers are **CLOSED**:

- HD-03A
- HD-03B

[E] EFB isolation damper HD-004 is **OPEN**.

14.5.3 Increase running fan 41-B-860A (41-B-860B) [41-B-860C] flow by rotating vortex manual handwheel CCW (desired flow is 57,000 to 63,000 cfm).

[A] Place Man/Off/Auto keyswitch in **OFF** for ventilation fan selected for MAN.

[B] Ensure fan 41-B-860A (41-B-860B) [41-b-860C] selected for **MAN** is stopped and vortex closed.

14.6 Contact Rad Con on-call personnel and inform them of the shift-to-filtration and the primary skid shutdown.

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15.0 SHUTDOWN FROM FILTRATION

NOTE

If the UVFS system is in filtration mode as a result of an automatic shift-to-filtration because of an underground CAM alarm or malfunction, or is in filtration mode as a result of manual shift-to-filtration in response to a potential radiological release in the underground, the system is to remain in filtration until the FSM and the Radiological Control Manager (or designee) concur filtration can be shut down.

15.1 **IF** UFE/UGRW and U/G positions are manned,
THEN notify UFE/UGRW and U/G personnel of the following:

- All U/G ventilation to be stopped.
- No diesel-powered equipment to be operated.

15.2 Secure from filtration and stop fan 41-B-860A (41-B-860B) [41-B-860C] from CMR, **OR** locally as follows:

15.2.1 From CMR:

[A] Display **EXHAUST FILTER BUILDING FAN/EFB CONTROL (2530)** GRAPHIC.

[B] Click on BYPASS Mode (pop-up window will display "Do you want to Start BYPASS Mode, OK or Cancel").

[C] Click once on OK.

[D] Ensure **HEPA FILTRATION** indication changes from **ACTIVATED** to **BYPASSED**.

[E] Ensure **ENERGIZED** to the right of **LATCH RELAY** disappears.

[F] Move cursor to desired fan and ensure white border appears.

[G] Click once with the left mouse button.

[H] Click the STOP button in the pop-up window and ensure the selected fan stops.

15.2.2 From local control panel in Building 413:

[A] Place exhaust fans Local/Remote Control Mode Switching keyswitch in **LOCAL**.

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[B] Stop filtration by placing exhaust system Filtration/Bypass Mode Switching switch in **BYPASS**.

[C] Momentarily place fan 41-B-860A (41-B-860B) [41-B-860C] Start/Stop switch in **STOP**.

[D] Place exhaust fans Local/Remote Control Mode Switching keyswitch in **REMOTE**.

[E] Place bypass dampers control switch in **CLOSED**.

[F] Ensure white BYPASS light is **ON.**

15.3 Ensure the following condition indicators:

15.3.1 Fan 41-B-860A (41-B-860B) [41-B-860C] stopped and vortex is **CLOSED**.

15.3.2 HEPA filter dampers **CLOSED**:

- HD-01C
- HD-01D
- HD-01E
- HD-01F

15.3.3 EFB isolation damper HD-004 is **CLOSED**.

15.4 **IF** U/G positions are manned,
THEN notify U/G personnel of the following:

- All U/G ventilation is secured.
- No diesel-powered equipment is to be operated.

15.5 Contact Rad Con on-call personnel to restore Station "A" skid (primary skid) that went down due to the shift-to-filtration.

16.0 MANUAL OPERATION OF EXHAUST FILTER BUILDING BYPASS DAMPERS

NOTE

For maintenance purposes, with FSM concurrence, both bypass dampers may be opened with **ONE** or **TWO** ventilation fans 41-B-700A (41-B-700B) [41-B-700C] operating during maintenance ventilation.

16.1 Opening bypass dampers 413-HD-056-003A (413-HD-056-003B)

16.1.1 Perform the following manual operation at control panel:

[A] Place bypass dampers control in **AUTO**.

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[B] Ensure bypass dampers are **OPEN**:

- HD-03A
- HD-03B

NOTE

In Step 16.1.2, manual operation of both bypass dampers at damper actuator precludes automatic and remote shift-to-filtration.

16.1.2 Perform the following manual operation at damper actuator:

[A] Close hydraulic actuator valve on hand pump base.

[B] Pump jack handle until damper position indicates **OPEN**.

16.2 Closing bypass dampers 413 HD-056-003A (413 HD-056-003B)

16.2.1 Perform the following manual operation at control panel:

[A] Place bypass dampers control in **CLOSED**.

[B] Ensure bypass dampers are **CLOSED**:

- HD-03A
- HD-03B

16.2.2 Perform the following manual operation at damper actuator:

[A] Open hydraulic actuator valve on hand pump base.

[B] Ensure damper spring returns to **CLOSED**.

17.0 MANUAL OPERATION OF EFB ISOLATION DAMPER

NOTE

This section shall be performed under the direct supervision of the FSM/FSE.

17.1 Closing Isolation Damper 413 HD-056-004

17.1.1 Perform the following manual operation at control panel:

[A] Place isolation damper control in **AUTO**.

[B] Ensure isolation damper HD-004 is **CLOSED**.

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CAUTION

Special consideration should be observed when performing Step 17.1.2 for maintenance activities. Removing control power at CB-15 in 41PDP03/31, or closing instrument air supply valve IA-413-V-045 prior to placing the damper handwheel in the CLOSED position, will allow this damper to fail OPEN and cause an inadvertent tripping of the U/G ventilation fans.

17.1.2 Perform the following manual operation at damper actuator:

[A] Loosen handwheel shaft lock nut, and turn CCW sufficiently to allow full travel of handwheel jackscrew.

[B] Turn damper handwheel CW until damper position indicates **CLOSED**.

17.2 Opening Isolation Damper 413-HD-056-004:

17.2.1 Perform the following manual operation at control panel:

[A] Place isolation damper control in **OPEN**.

[B] Ensure isolation damper HD-004 is **OPEN**.

17.2.2 Perform the following manual operation at damper actuator:

[A] Ensure manual handwheel in full CCW position.

[B] Close instrument air valve IA-413-V-045.

[C] Bleed off air by opening instrument air bleed valve IA-25-V-095 downstream of supply valve IA-413-V-045.

18.0 MANUAL OPERATION OF EFB HEPA FILTER DAMPERS

18.1 Opening HEPA Filter 41-B-856 (41-B-857) Damper

18.1.1 Perform the following for manual operation at control panel:

[A] Place HEPA filter 41-B-856 (41-B-857) damper control in **OPEN**.

[B] Ensure the following HEPA dampers are **OPEN**:

- HD-01C (HD-01E)

- HD-01D (HD-01F)

18.1.2 Perform the following for manual operation at damper actuator:

[A] Engage handwheel by placing clutch handle in recessed slot in gearbox.

[B] Turn damper handwheel CCW until damper position indicates **OPEN**.

18.2 Closing HEPA Filter 41-B-856 (41-B-857) Damper

18.2.1 Perform the following for manual operation at control panel:

[A] Place HEPA filter 41-B-856 (41-B-857) damper control in **CLOSE**.

[B] Ensure the following HEPA dampers are **CLOSED**:

- HD-01C (HD-01E)
- HD-01D (HD-01F)

18.2.2 Perform the following for manual operation at damper actuator:

[A] Engage handwheel by placing clutch handle in recessed slot in gearbox.

[B] Turn damper handwheel CW until damper position indicates **CLOSED**.

18.3 When required to return HEPA filter damper to normal operation, perform the following:

18.3.1 Manually place damper in AUTOMATIC CONTROL signal position at the control panel.

18.3.2 Remove clutch handle from recessed slot in gearbox at the damper location.

19.0 MANUAL OPERATION OF FILTRATION FAN DAMPERS

19.1 Open filtration fan dampers 413-HD-056-010A, (011A), [012A] at damper actuator in the following manner:

19.1.1 Shut off the Air supply to Inlet Damper Actuator.

19.1.2 Bleed off any residual air pressure by pressing button on side of actuator.

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19.1.3 Momentarily raise knob on top of actuator and turn declutch bar 180 degrees CW to the stop.

19.1.4 Turn Damper Handwheel CW Until Damper position indicates **OPEN**.

19.2 Close filtration fan inlet dampers 413-HD-056-010A, (011A), [012A] at damper actuator in the following manner:

19.2.1 Turn Damper Handwheel CCW Until Damper position indicates **CLOSED**.

19.2.2 Momentarily raise knob on top of actuator and turn declutch bar 180 degrees CCW to the stop.

19.2.3 Restore air supply to Inlet Damper Actuator.

19.3 Open filtration fan outlet dampers 413-HD-056-010B, (011B), [012B] at damper actuator in the following manner:

19.3.1 Engage handwheel by pulling knob on LV1 vent valve to shut off air supply and vent air from actuator.

19.3.2 Momentarily pull the lock pin and rotate the declutch bar CW 180 degrees (towards the actuator) until the lock pin drops down and engages the worm gear.

19.3.3 Turn damper handwheel CCW until damper position indicates **OPEN**.

19.4 Close filtration fan outlet dampers 413-HD-056-010B, (011B), [012B] at damper actuator in the following manner:

19.4.1 Engage handwheel by pulling knob on LV1 vent valve to shut off air supply and vent air from actuator.

19.4.2 Momentarily pull the lock pin and rotate the declutch bar CW 180 degrees (towards the actuator) until the lock pin drops down and engages the worm gear.

19.4.3 Turn damper handwheel CW until damper position indicates **CLOSED**.

19.5 **WHEN** required to return filtration fan dampers 413-HD-056-010B, (011B), [012B] to normal operation,
THEN perform the following:

19.5.1 Rotate handwheel CW until damper position indicates **CLOSED**.

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19.5.2 Momentarily pull the lock pin and rotate the declutch bar CCW 180 degrees until the lock pin engages.

19.5.3 Push in the knob on the LV1 vent valve to reconnect the air supply.

20.0 MANUAL OPERATION OF VENTILATION FAN DAMPERS

NOTE

In Step 20.1, operation of ventilation fan inlet dampers in manual will prevent dampers from closing when filtration is initiated.

20.1 Opening Ventilation Fan Inlet Damper.

20.1.1 Perform the following for manual operation at control panel:

[A] Place ventilation fan inlet damper controls in **OPEN**:

- HD-01A (HD-02A) [HD-04A]
- HD-01B (HD-02B) [HD-04B]

[B] Ensure the ventilation fan inlet dampers are **OPEN**:

- HD-01A (HD-02A) [HD-04A]
- HD-01B (HD-02B) [HD-04B]

20.1.2 Perform the following for manual operation at damper actuator:

[A] Engage handwheel by placing clutch handle in recessed slot in gearbox.

[B] Turn damper handwheel CCW until damper position indicates **OPEN**.

20.2 Closing Ventilation Fan Inlet Damper

20.2.1 Perform the following for manual operation at control panel:

[A] Place ventilation fan inlet damper controls in **CLOSE**:

- HD-01A (HD-02A) [HD-04A]
- HD-01B (HD-02B) [HD-04B]

[B] Ensure ventilation fan inlet dampers are **CLOSED**:

- HD-01A (HD-02A) [HD-04A]
- HD-01B (HD-02B) [HD-04B]

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20.2.2 Perform the following for manual operation at damper actuator:

[A] Engage handwheel by placing clutch handle in recessed slot in gearbox.

[B] Turn damper handwheel CW until damper position indicates **CLOSED**.

20.3 When required to return ventilation fan inlet damper to normal operation, perform the following:

20.3.1 Manually place damper in AUTOMATIC CONTROL signal position at the control panel.

20.3.2 Remove clutch handle from recessed slot in gearbox at the damper location.

21.0 START-UP OF MAINTENANCE VENTILATION WITH ONE OR TWO 860 FANS

21.1 Ensure **ONE** or **TWO** fans 41-B-700A (41-B-700B) [41-B-700C] are operating.

21.2 Reduce flow on **ONE** 700 fan to 100,000 to 200,000 cfm, or **TWO** 700 fans to between 265,000 and 365,000 cfm.

21.3 Ensure 860 fans to be operated are **NOT** running in reverse direction.

21.4 Ensure vortex on 860 fan(s) to be operated are aligned for manual operation, and **CLOSED**.

21.5 Place selected fans 41-B-860A (41-B-860B) [41-B-860C] keyswitch in manual on local control panel.

21.6 Start fans 41-B-860A (41-B-860B) [41-B-860C] from CMR, **OR** locally as follows:

21.6.1 From CMR:

[A] Display **EXHAUST FILTER BUILDING FAN/EFB CONTROL (2530)** GRAPHIC.

[B] Move cursor to desired fan and ensure white border appears.

[C] Click once with the left mouse button.

[D] Click the START button in the pop-up window and ensure the selected fan starts.

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21.6.2 From local control panel in Building 413:

[A] Place exhaust fans Local/Remote Control Mode Switching keyswitch in **LOCAL**.

[B] Start fan 41-B-860A (41-B-860B) [41-B-860C] by momentarily placing fan 41-B-860A (41-B-860B) [41-B-860C] Start/Stop switch in **START**.

[C] Place exhaust fans Local/Remote Control Mode Switching keyswitch in **REMOTE**.

21.7 Place bypass dampers at local control panel in **AUTO**.

21.8 Ensure the following dampers are **OPEN**:

- Bypass damper HD-03A
- Bypass damper HD-03B

21.9 Adjust flow on running 860 fans to desired flow (30,000 to 60,000 cfm) by rotating the vortex manual handwheel in CCW direction.

21.10 Adjust running 860 fans and 700 fan combined flow to what is required for task (200,000 to 275,000 cfm), or between 395,000 and 425,000 cfm for two fans.

22.0 MAINTENANCE VENTILATION WITH SECOND 860 FAN

NOTE

This section is performed when the first 860 fan has been in service for a period of time.

22.1 Reduce flow on **ONE** 700 fan to between 100,000 and 140,000 cfm, **OR** on **TWO** 700 fans to between 265,000 and 305,000 cfm.

22.2 Ensure 860 fan to be operated is **NOT** running in reverse direction.

22.3 Ensure vortex on second 860 fan to be operated is aligned for manual operation.

22.4 Place second selected fan 41-B-860A (41-B-860B) [41-B-860C] keyswitch in manual on local control panel.

22.5 Start fan 41-B-860A (41-B-860B) [41-B-860C] from CMR, **OR** locally as follows:

22.5.1 From CMR:

[A] Display **EXHAUST FILTER BUILDING FAN/EFB CONTROL (2530)** GRAPHIC.

[B] Move cursor to desired fan and ensure white border appears.

[C] Click once with the left mouse button.

[D] Click the START button in the pop-up window and ensure the selected fan starts.

22.5.2 From local control panel in Building 413:

[A] Place exhaust fans Local/Remote Control Mode Switching keyswitch in **LOCAL**.

[B] Start fan 41-B-860A (41-B-860B) [41-B-860C] by momentarily placing fan 41-B-860A (41-B-860B) [41-B-860C] Start/Stop switch in **START**.

[C] Place exhaust fans Local/Remote Control Mode Switching keyswitch in **REMOTE**.

22.6 Adjust flow on second running 860 fan to desired flow (30,000 to 60,000 cfm) by rotating the vortex manual handwheel in CCW direction.

22.7 Adjust running 860 fans and 700 fan combined flow to what is required for task (200,000 to 275,000 cfm), **OR** between 395,000 and 425,000 cfm for **TWO** 700 fans.

23.0 SHUTDOWN MAINTENANCE VENTILATION

23.1 Ensure flow on **ONE** 700 fan is less than 200,000 cfm, **OR** on **TWO** 700 fans is less than 365,000 cfm.

23.2 Stop one, or both, operating filtration fans 41-B-860A (41-B-860B) [41-B-860C] from CMR, **OR** locally as follows:

23.2.1 From CMR:

[A] Display **EXHAUST FILTER BUILDING FAN/EFB CONTROL (2530)** GRAPHIC.

[B] Move cursor to desired fan and ensure white border appears.

[C] Click once with the left mouse button.

[D] Click the STOP button in the pop-up window and ensure the selected fan stops.

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23.2.2 From local control panel in Building 413:

[A] Place exhaust fans Local/Remote Control Mode Switching keyswitch in **LOCAL**.

[B] Momentarily place fan 41-B-860A (41-B-860B) [41-B-860C] Start/Stop switch in **STOP**.

[C] Place exhaust fans Local/Remote Control Mode Switching keyswitch in **REMOTE**.

23.3 Ensure fan 41-B-860A (41-B-860B) [41-B-860C] stopped.

23.4 Place bypass dampers in **CLOSED** at local control panel.

23.5 Place selected fan 41-B-860A (41-B-860B) [41-B-860C] keyswitch in **OFF** on local control panel.

23.6 Ensure the following bypass dampers are **CLOSED**:

- HD-03A
- HD-03B

23.7 Close vortex on stopped fan or fans.

23.8 Increase flow on running 700 fan (or fans) to normal operating flow by rotating the vortex manual handwheel in CCW direction.

Working Copy

WP 04-AD3005

Revision 3

Administrative Control of System Lineups

Management Control Procedure

EFFECTIVE DATE: 08/24/11

Dale Parrish
APPROVED FOR USE

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CHANGE HISTORY SUMMARY

REVISION NUMBER	DATE ISSUED	DESCRIPTION OF CHANGES
3	08/24/11	Changed the DOE Order under Baseline documents from 5480.19 to 422.1

INTRODUCTION [1]

The purpose of this instruction is to provide guidance for implementing the requirements found in DOE 422.1, Chapters VIII and X. These chapters deal with maintaining proper configuration control and providing for independent verification of specific components/systems. The following areas are covered in this instruction:

- Methodology for determining which systems require lineups
- Methodology for determining which systems require Independent Verification
- Instructions for developing system lineups
- Requirements for performing complete or partial system lineups
- Instructions for the performance and review of system lineups
- Documentation requirements for system lineups

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.

- Completed System Lineup Checklists (see Attachment 4 for a sample form)
- Fault Tree Analyses (Attachment 1)

REFERENCES

BASELINE DOCUMENTS

- DOE Order 422.1, Conduct of Operation

REFERENCED DOCUMENTS

- None

PERFORMANCE

1.0 RESPONSIBILITIES

1.1 The Cognizant Operations Manager (COM) is responsible for the following:

1.1.1 Outline 3 Perform a Fault Tree Analysis on each system under the cognizance of the Operations Manager. The Fault Tree to be used is shown as Attachment 2, Objectives for Fault Tree Analysis. Documentation of the analysis shall be retained.

1.1.2 Document the results of this analysis on Attachment 3, System Lineup Index, with the following information:

- The attachment number for the system
- The system title
- If a system lineup will be developed
- If Independent Verification is required
- The periodicity for conducting a full system lineup

1.1.3 Assign personnel to develop system lineups. This will usually be the Subject Matter Expert (SME) or another highly qualified individual.

1.1.4 Maintain a System Lineup Index (Attachment 3) which sets forth the requirements for independent verification.

1.1.5 Ensure that full system lineups are performed within the specified time.

1.2 Facility Shift Managers (FSM)/Cognizant Supervisors (CS) are responsible for the following:

1.2.1 Schedule and direct the performance of full system lineups for periodic performance requirements and partial system lineups for operational requirements.

1.2.2 Determine the following:

- Required position of components prior to performance of system lineups if desired position of component(s) is other than position specified on System Lineup Checklist (Checklist)
- Repositioning of components found to be out of the specified position
- Requirement for performance of a full or partial system lineup based on the level of control that has been maintained over the status of the components
- Components to be checked when performing a partial system lineup

1.2.3 Review completed Checklists for proper completion.

1.2.4 Validate the completion of Checklists by signature and file the completed system lineup in the safe of the cognizant Operations office so that they remain available for review.

1.3 Positioner is responsible for the following:

1.3.1 Initial verification of system component positions.

1.3.2 Positioning components as directed by the FSM/CS to complete the system lineup.

1.4 Independent Verifier is responsible for:

1.4.1 Verification of system component positions, independent of positioner (except throttled components).

2.0 REQUIREMENTS FOR PERFORMING SYSTEM LINEUPS

2.1 A complete system lineup **SHALL** be performed prior to initial operation of a system in accordance with Section 5.0.

2.2 When systems are already in operation, the system lineup **SHALL** be verified when an approved lineup is available in accordance with Section 5.0.

2.3 Periodic full system lineups **SHALL** be performed based on the information recorded in Attachment 3.

2.4 A complete or partial system lineup **SHALL** be performed following maintenance or testing in which valves/switches are not restored to the normal operating position as part of the operating procedure, maintenance/test procedure, or tagout restoration.

2.5 A complete or partial system lineup **SHALL** be performed following a long duration shutdown period or any other time in which the position of components has become suspect.

2.6 The FSM/CS may direct the performance of a partial or complete system lineup when deemed necessary to confirm system configuration.

2.7 System lineups will be performed using only an approved Checklist.

3.0 TECHNIQUES FOR PERFORMING SYSTEM LINEUPS

3.1 General Techniques for Performing System Lineups

3.1.1 If a discrepancy is noted during either initial or subsequent verifications, notify the FSM/CS for resolution.

3.1.2 Verifying throttled valve positions by shutting and reopening the valve is to be avoided. When the operation of a throttled valve is necessary to determine the position, the Independent Verifier shall observe the action of the positioner.

3.1.3 The Component Positioner and Independent Verifier should be physically separated. The Independent Verifier shall not rely upon the observed actions of the Positioner to determine the identification, position, or condition of components (except for throttled valves).

3.1.4 Positioner and Independent Verifier shall be aware of the type of valve being verified for application of the proper verification technique.

3.1.5 If remote position indicators are used for verification of component position, a local verification should also be performed.

3.1.6 Independent verification requirements may be waived by the FSM/CS if excessive radiation exposure could result.

3.1.7 Process parameters (such as flow, pressure, or voltage) may be used to verify a component's position at the discretion of the COM. Care should be exercised when using this technique due to alternate flow paths or other operational factors. Using process parameters as the only indication of a component's position should be avoided.

3.1.8 HVAC systems, due to the relative simplicity and the lack of alternate flow paths will be considered properly aligned if the process parameters are in specification and the system appears to be operating normally.

3.1.9 Process Parameters may also be used to verify a valve position when a specific hazard exists to the operator. If extraordinary measures must be employed to reach a valve that is otherwise inaccessible (i.e., extremely tall ladders, etc.) reading a downstream parameter is acceptable if it can be shown that there is no other source of supply.

3.1.10 When process parameters tests are used to verify component position, the FSM/CS shall note the component checked and the method used on the Checklist.

3.2 Checking Valves

3.2.1 Verify valves that are DANGER tagged to a specific position by noting the position indicated on the tag.

3.2.2 Valves that are key-locked in position, for purposes other than DANGER tags, will be verified in the same manner as unlocked valves. The locking device will be removed by the Positioner and reinstalled by the Verifier.

3.2.3 Gate and globe valves that are to be verified OPEN will be verified by moving the valve in the CLOSED direction only as necessary to remove any slack from the operating mechanism and to verify valve stem movement. The valve shall then be fully opened.

3.2.4 Gate and globe valves that are to be checked CLOSED will be verified by moving the valve in the CLOSED direction only as necessary to verify valve is not binding or difficult to operate.

3.2.5 Verify the position of ball valves by observing that the operating lever corresponds to required position as follows:

- Lever parallel to flow - OPEN against physical stop
- Lever perpendicular to flow - CLOSED against physical stop

3.2.6 Verify position of throttled valves without locking devices as follows:

- Check for valve position indicators, scribe marks, or other officially recognized and designated indications if available.
- If position indicators are not available, manipulate the valve in the CLOSED direction while counting the number of turns required to close the valve fully.
- Reopen the valve the corresponding number of turns (after removing the slack from the operating mechanism).

3.2.7 Verify locked throttled valves by observing indicated position, when provided, or note proper installation of the locking device.

3.2.8 Air operated globe valves used at WIPP are normally in a throttling position and are continuously moving to control process parameters. Since these valves cannot be adequately verified, these valves will not be included on the Checklist.

3.2.9 Solenoid operated air valves are either fully open or fully closed and have no position indicators. These valves will not be included on the Checklist.

3.3 Valve Operator Clutches

3.3.1 Verify position of clutches by observing the position of the clutch control lever as follows:

- Clutch lever in detent - clutch engaged
- Clutch lever pulled out of detent and rotated 90 degrees - clutch disengaged

3.4 Dampers

3.4.1 Verify position of throttled ventilation dampers by observing indicated position, when provided, or by noting installation of locking device.

3.4.2 Throttled ventilation dampers shall not be operated for verification, unless restoring position following maintenance.

3.5 Circuit Breakers/Switches

3.5.1 Verify circuit breaker position by observing local position indicators.

3.5.2 Verify switch position by observing indicated position on the associated switch label plate and, if available, indicator lights.

3.6 Indicator Lights

3.6.1 Verify that the light is ON or OFF as required.

4.0 DEVELOPING SYSTEM LINEUPS

4.1 COM, perform the following:

4.1.1 Using the guidance found in Attachment 2, determine the need for a system lineup.

4.1.2 Using the guidance found in Attachment 2, determine the need for Independent Verification.

4.1.3 Using the guidance found in Attachment 2, define the technique to be used for independent verification in accordance with Section 3.0.

4.1.4 Using the guidance found in Attachment 2, determine the periodicity for full system lineup performance.

4.1.5 Designate a person SME to develop the new system lineup.

4.1.6 Obtain Engineering concurrence for the new system lineup.

4.1.7 Review and approve the newly developed system lineup.

4.2 SME, perform the following:

4.2.1 Checklist shall be developed utilizing the latest Controlled Document print. Using the controlled print as a guide, list those components in the order they would occur in the field during a system walkdown. Only components that if mispositioned could have a detrimental effect on system performance need to be included on a Checklist.

4.2.2 Enter on the Checklist the component equipment number in the COMPONENT NUMBER BLOCK, or enter "NO NUMBER" in the COMPONENT NUMBER BLOCK if the component has no assigned number by the controlled print.

4.2.3 Enter a brief description of the component in the DESCRIPTION BLOCK.

4.2.4 List the position of the component as it would be during normal operation of the system in the NORMAL POSITION BLOCK.

4.2.5 List throttled components as "THROTTLED" or "LOCKED THROTTLED" unless a specific throttled position is required. If the lineup requires checking of the specific position, enter the number of turns or the percentage open.

4.2.6 List the drawings that will assist the positioner and independent verifier in the REFERENCE DRAWINGS block.

5.0 PERFORMING A COMPLETE SYSTEM LINEUP

5.1 FSM/CS, perform the following:

5.1.1 Make a copy of the desired attachment from this instruction.

5.1.2 Indicate "Verified Correct Copy" on the front page with a signature.

5.1.3 Review the Checklist for appropriate component position in regard to the current operating status of the equipment.

5.1.4 If the NORMAL POSITION indicated on the Checklist is not appropriate for the current operating conditions, perform the following:

- Enter the correct position in the DESIRED POSITION block.
- Initial the entry.
- If preparing a partial system lineup, mark N/A at the top of the page for those items not being checked, and draw a straight line down the page, leaving a blank for only those components that will be positioned. Initial each entry.
- If no Independent verifier is required, mark N/A on the first page in the INDEPENDENT VERIFIER block and initial the entry.
- Assign certified operators to perform as Component Positioner and Independent Verifier.

5.2 Positioner, perform the following:

5.2.1 Enter the date the lineup is started on each page of the Checklist, as the Checklist is performed.

5.2.2 Verify the label plate on the component being checked matches that listed in the COMPONENT NUMBER block.

5.2.3 Verify that each component position is as listed on the Checklist by using the techniques listed in Section 3.0.

5.2.4 Indicate verification by initialing POSIT (Positioner) block.

5.2.5 If a component is found out of the expected position, stop the lineup and inform the FSM/CS. **DO NOT** change component position without specific guidance and concurrence from the supervisor.

5.2.6 Print your name on the cover sheet in the POSITIONER block and enter your initials in the INITIALS block.

5.2.7 Enter any comments in the COMMENTS block.

5.3 Independent Verifier, perform the following:

5.3.1 Verify that each component position is as listed on the Checklist by using the techniques listed in Section 3.0.

5.3.2 Indicate verification by initialing VERIF (Verifier) block.

5.3.3 Enter the date on the front page of the Checklist when the last verification is complete.

5.3.4 Print your name on the cover sheet in the VERIFIER block and enter your initials in the INITIALS block.

5.3.5 Enter any comments in the COMMENTS block.

6.0 RECORDS

6.1 COM, validate the Fault Tree Analysis results and turn them over to the RIDS Coordinator for proper disposition.

NOTE

The previous completed full Checklist shall be turned over to the RIDS coordinator for proper disposition. Only the most recently completed full Checklist will be kept on file for review.

6.2 FSM/CS, validate the most recently completed full Checklist and file it in the cognizant Operations office safe.

6.3 If completing a partial Checklist, file it in the safe along with any previously completed partial Checklists. Leave all partial Checklists in the safe until a full system lineup is accomplished and on file.

Attachment 1 – Fault Tree Analysis

SYSTEM _____ Page __1__ of ____

Fault Tree Analysis

The following guidelines will be used by the Surface Operations/Maintenance Manager (SOMM) for determining if a system lineup is required. If a system lineup is required, is there a need for Independent Verification?

1. Could mispositioning components in this system affect the overall process?

2. Could mispositioning components in this system cause a release of a toxic substance to the environment, personnel, or public?

3. Could mispositioning components in this system cause a release of radiation or radiological contamination to the environment, personnel, or public?

4. Could mispositioning components in this system cause problems meeting technical safety requirement objectives?

5. Could mispositioning components in this system cause interruptions of operations or unplanned shutdowns of the process?

6. Could mispositioning components in this system cause shutdown of other systems or components affecting 1, 2, 3, 4, or 5 above?

7. Are component positions in this system strictly controlled by other administrative procedures such as tag-out/lock-out, temporary plant modification etc.?

8. Is Independent Verification required?

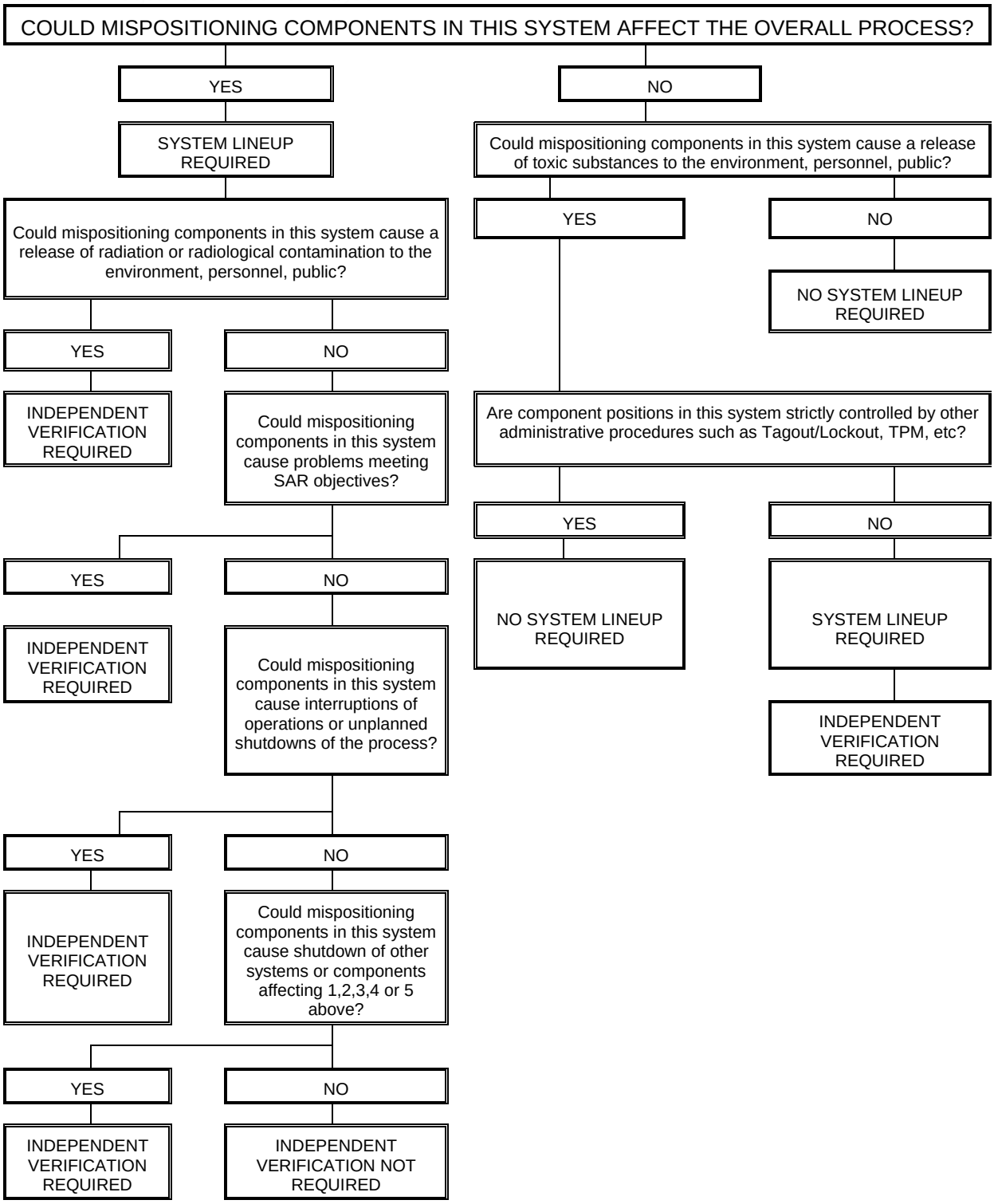
9. Define technique(s) to satisfy Independent Verification.

10. Define periodicy.

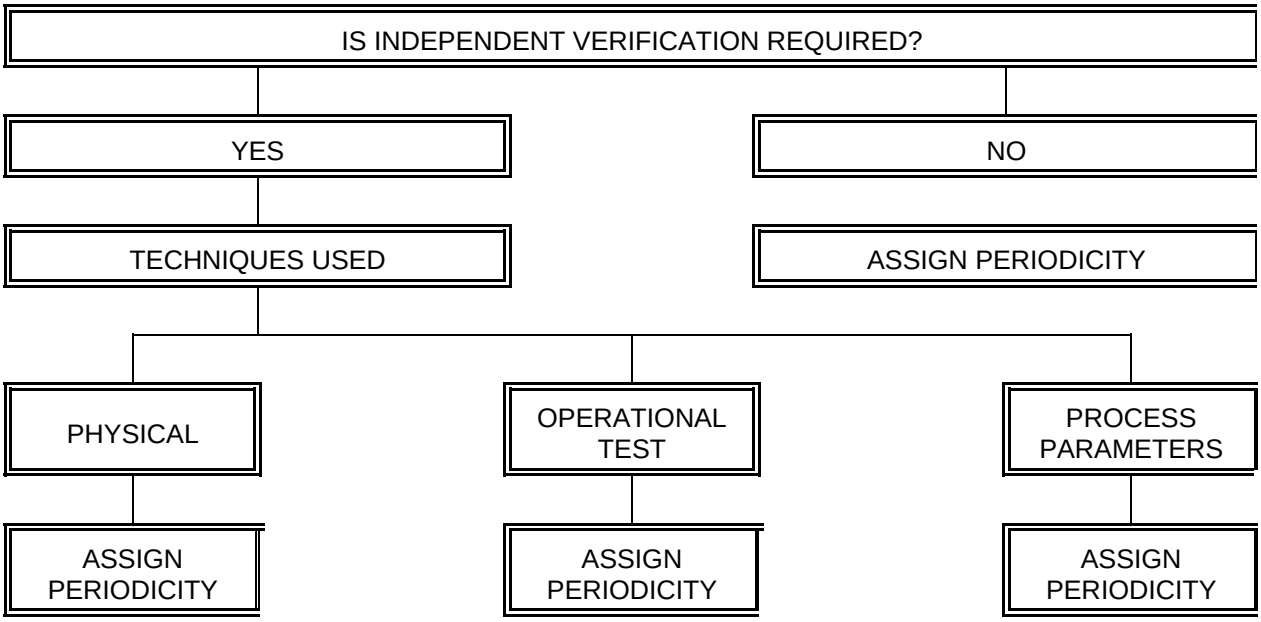
COM VALIDATION _____ **DATE** _____

Attachment 2 –Objectives for Fault Tree Analysis

Attachment 2 –Objectives for Fault Tree Analysis



Attachment 2 –Objectives for Fault Tree Analysis



Attachment 3 –System Lineup Index

Attachment 3 –System Lineup Index

SYSTEM LINEUP INDEX

Attachment Number	System Title	System Lineup Required	Independent Verification Required	Full Lineup Required
X	(CA01) PLANT AIR SYSTEM	NO	NO	NO
3	(CA02) INSTRUMENT AIR SYSTEM	YES	YES	1 YR
3	(CA03) U/G PLANT AIR SYSTEM	YES	YES	1 YR
X	(CM01) CENTRAL MONITORING SYSTEM	NO	NO	NO
X	(CW01) COOLING WATER SYSTEM	NO	NO	NO
X	(CW02 CHILLED WATER SYSTEM	NO	NO	NO
X	(ED04) ELECTRICAL SUBSTATIONS SYSTEM	NO	NO	NO
X	(ED08) MAIN UPS SYSTEM	NO	NO	NO
3	(ED09) DIESEL GENERATOR SYSTEM	YES	YES NOTE 1	MONTHLY NOTE 2
X	(ED10) U/G ELECTRICAL SYSTEM	NO	NO	NO
3	(FP01) FIRE WATER SYSTEM	YES	YES	3 YR
X	(GC03) SEWAGE LAGOON SYSTEM	NO	NO	NO
3	(HV01) BUILDING 411 CH-AREA HVAC SYS	YES	YES	1 YR
3	(HV02) BUILDING 411 RH-AREA HVAC SYS	YES	YES	1 YR
3	(HV03) BUILDING 451 ZONE 6 HVAC SYS	YES	YES	1 YR
3	(HV04) BUILDING 413 HVAC SYSTEM	YES	YES	1 YR
X	(HV05 BUILDINGS 452, 453, 456 SYS	NO	NO	NO
X	(HV06 MISC. OUT BUILDINGS SYS	NO	NO	NO

Attachment 3 –System Lineup Index

SYSTEM LINEUP INDEX

Attachment Number	System Title	System Lineup Required	Independent Verification Required	Full Lineup Required
X	(PV00) PLANT VACUUM SYSTEM	NO	NO	NO
3	(VU01) U/G VENTILATION AND FILTRATION	YES	YES NOTE 3	MONTHLY NOTE 4
X	(VU02) U/G BOOSTER FAN SYSTEM	NO	NO	NO
3	(VU03) VENTILATION CONTROL DEVICES (U/G BULKHEAD DOORS SYSTEM	YES	YES	1 YR
X	(WD01) DOMESTIC/UTILITY WATER SYSTEM	NO	NO	NO
X	(WD02) RAW WATER, TANKS, AND CHLORINE	NO	NO	NO
X	(UH06) WASTE HOIST	YES	YES Note 5	YES Note 6
X	(UH04) SALT HOIST	YES	YES Note 5	YES Note 6
X	(UH02) AIR INTAKE HOIST	YES	YES Note 5	YES Note 6
X	(WH02) TRUDOCK VACUUM/VENTILATION SYSTEM	YES	YES Note 7	NO

NOTES

NOTE 1 - The Independent Verification is satisfied by a monthly Operational Check of the Diesel Generator.

NOTE 2 - The periodic System Lineup is satisfied by the monthly Operational Check of the Diesel Generator.

NOTE 3 - The Independent Verification is satisfied by a monthly Operational check of the Filtration System.

NOTE 4 - The periodic System Lineup is satisfied by the monthly Operational check of the Filtration System.

NOTE 5 - The System Lineup is satisfied by daily Operational check of all Hoisting Systems (Waste Hoist, Salt Hoist, and Air Intake Hoist).

NOTE 6 - The Independent Verification is satisfied by daily Operational check of all Hoisting Systems (Waste Hoist, Salt Hoist, and Air Intake Hoist).

NOTE 7 - The Independent Verification is satisfied by the Preoperational Inspection for the respective system being used.

Attachment 4 –Sample System Lineup Checklist

Attachment 4 –Sample System Lineup Checklist

SYSTEM: _____ PAGE _____ OF _____

DATE STARTED: _____/_____/_____ **DATE COMPLETED:** _____/_____/_____

POSITIONER: _____ **INITIALS:** _____
PRINTED NAME

VERIFIER: _____ **INITIALS:** _____
PRINTED NAME

POSITIONER: _____ **INITIALS:** _____
PRINTED NAME

VERIFIER: _____ **INITIALS:** _____
PRINTED NAME

SYSTEM LINEUP CHECKLIST CONCURRENCE _____
COGNIZANT ENGINEER

COMMENTS:

FSM/COGNIZANT SUPERVISOR VALIDATION: Completion of this step constitutes validation of this record.

_____
PRINT NAME **SIGNATURE** **DATE**

SAMPLE

Attachment 4 –Sample System Lineup Checklist

COMPONENT NUMBER	DESCRIPTION	NORMAL POSITION	DESIRED POSITION/ CS INITIAL	INITIALS	
				7 POSIT.	VERIF.
REFERENCE DRAWINGS: (AS APPLICABLE)					

SAMPLE

Attachment 5 – Definitions

Attachment 5 – Definitions

- SYSTEM LINEUP – The specific and documented configuration of components of a system or piece of equipment in accordance with design specifications and operational requirements.

- VERIFICATION – The act of ensuring a condition (such as a component position) conforms to specified requirements.

- INDEPENDENT VERIFICATION – The act of ensuring a condition (such as a component position) conforms to specified requirements after the initial verification by a different operator.

  - In some situations, a component's position can be determined by observing such process parameters as flow, pressure, or voltage. The observation of process parameters can constitute an independent verification--Instructions will specify where and when process parameters are acceptable indicators of component position.

  - In some cases, surveillance testings may be substituted for normal verification techniques. The test must conclusively prove the position of the component being verified.

- LOCKED THROTTLED – A designation for throttled valves and ventilation dampers in systems that (1) have been mechanically secured in a required position during system flow balancing; and (2) control essential system operating parameters.

Working Copy

WP 04-AD3001

Revision 29

Facility Mode Compliance

Management Control Procedure

TSR COMPLIANCE PROCEDURE

EFFECTIVE DATE: 11/28/11

Dale Parrish
APPROVED FOR USE

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CHANGE HISTORY SUMMARY

REVISION NUMBER	DATE ISSUED	DESCRIPTION OF CHANGES
22	07/19/10	Removed Page 12 of Attachment 4, LCO & SAC Surveillance Performance Requirements, that referenced EA04AD3001-41, EA04AD3001-42, and EA04AD3001-43.
23	04/08/11	Revised Attachment 4 to remove the following Surveillance Requirements (SRs): SR21 SR27 SR32 SR33 SR34 SR35 SR36
24	04/26/11	Revised Attachment 4 to remove SR3.
25	06/17/11	Add Room 108 to Table 3, section 2.0, steps 2.2.1, 2.3.1 and attachment 1 Delete SAC 5.1.1.1 from Precautions and Limitations bullets Added designee to step 3.6 Changed SR30, SR38, and removed SR40 on Attachment 4.
26	06/21/11	Added Page 12 to Attachment 1.
27	06/27/11	Added Surveillance ID to SR38.
28	08/24/11	Added Surveillance ID and requirement to SR26.
29	11/28/11	• Revised References section to include key steps in document. • Revised Surveillance IDs for SR18, 19, 20, 22, and 38.

INTRODUCTION [1, 2]

This procedure establishes Facility Operations policy for implementation of and compliance with Waste Isolation Pilot Plant (WIPP) Technical Safety Requirements (TSRs) for Mode Compliance Equipment and personnel staffing.

WIPP TSRs specify the administrative controls that impose necessary requirements for operation of the facility. These administrative controls impose administrative and operational requirements to support the WIPP Defense-in-Depth concept.

"Defense-in-Depth" contends that although Limiting Conditions of Operation (LCOs), Specific Administrative Controls (SACs), Administrative Controls (AC), and Surveillance Requirements (SRs) exist, the site can further reduce the likelihood of an occurrence, or mitigate the consequences of one, through establishment of supplemental boundaries to a release of contamination to the public or environment. Equipment and system configurations described in this procedure are specifically required by LCOs, SACs, ACs, and SRs as outlined DOE/WIPP-07-3373, *Waste Isolation Pilot Plant Technical Safety Requirements*.

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

- Attachment 1, Facility Operations Mode Approval
- Attachment 2, Facility Mode Approval Continuation Sheet
- EA04AD3001-1-0, *Facility Operations Mode Checklist*
- EA04AD3001-2-0, *Facility TSR Administrative Controls Checklist - CH Waste Handling Mode*
- EA04AD3001-3-0, *Facility Checklist TSR Administrative Controls - RH Waste Handling Mode*
- EA04AD3001-4-0, *Return to Storage, Disposal, or Standby Mode Upon Completion of Waste Handling*
- EA04AD3001-SR series, as applicable

REFERENCES			
DOCUMENT NUMBER AND TITLE	BASELINE DOCUMENT	REFERENCED DOCUMENT	KEY STEP
DOE/WIPP-07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis*	✓		**2**
DOE/WIPP-07-3373, *Waste Isolation Pilot Plant Technical Safety Requirements*	✓		**1**
Hazardous Waste Facility Permit, Waste Isolation Pilot Plant, Permit # NM4890139088 TSDF, Issued by New Mexico Environment Department	✓		
WP 04-AD3027, *TSR Violation Response and Recovery*		✓	
WP 04-HO1003, *Waste Handling Hoist Operation*	✓		
WP 04-VU1001, *Surface Underground Ventilation and Filtration System Operation*		✓	
WP 04-VU1002, *Operability Testing of Underground Filtration*		✓	
WP 04-VU1608, *Underground Ventilation and Filtration System Operation*		✓	
WP 04-VU1612, *WIPP Mine Ventilation Rate Monitoring*		✓	
WP 13-1, *Washington TRU Solutions LLC Quality Assurance Program Description*		✓	
WP 15-RM, *WIPP Records Management Program*		✓	
EA04AD3001-1-0, *Facility Operations Mode Checklist*		✓	
EA04AD3001-2-0, *Facility TSR Administrative Controls Checklist, CH Waste Handling Mode*		✓	
EA04AD3001-4-0, *Return to Storage, Disposal, or Standby Modes Upon Completion of Waste Handling*		✓	
EA04AD3001-*SR Series*		✓	

PRECAUTIONS AND LIMITATIONS

- The Technical Safety Requirements (TSRs) contain LCOs and SACs which provide specific preventative or mitigative limits and required actions for identified accident scenarios. Failure to comply with LCOs, ACs, or SACs may constitute a violation and must be immediately reported to the Facility Shift Manager (FSM). The step affected by the LCO/SAC is followed by the LCO/SAC number in bold brackets (e.g., **[LCO 3.X.X]**). See Attachment 4 for applicable LCO/SAC Surveillance Data Sheets.

- Waste handling operations are allowed only during Waste Handling Mode except as required to safely complete a waste handling evolution interrupted by Systems, Structures, and Components (SSCs) malfunction or unavailability, and in accordance with the applicable procedure. Maintenance, repair activities, and inspections are allowed, provided the SSCs required in Attachment 5, Mode Compliance Equipment Requirements, for Waste Handling and Waste Storage Modes are restored to operation in a timely manner, and required actions are taken when equipment specified in the LCOs is made inoperable. Process area names and descriptions are listed below in Table 1.

Table 1 - Process Area Description

PROCESS AREA NAME	PROCESS AREA DESCRIPTION
CH BAY	Area of the Waste Handling Building (WHB) used for Contact-Handled (CH) WASTE HANDLING ACTIVITIES that includes the large bay area housing the TRUPACT-II Unloading Docks [TRUDOCKS] and the Shielded Storage Room
RH BAY	Area of the WHB used for Remote-Handled (RH) WASTE HANDLING ACTIVITIES that include the large bay area of the WHB, the 140/25-ton crane, and the Cask Preparation Station.
HOT CELL COMPLEX	Area of the WHB that includes the Transfer Cell, Cask Unloading Room, and the Upper Hot Cell.
OUTSIDE AREA	The above-ground areas external to the WHB within the property protection area (PPA).
UNDERGROUND (U/G)	The Waste Hoist conveyance and below-ground areas that include the Waste Shaft Station, Transport Path, and Disposal Room(s).
SHAFT ACCESS AREA	Area of the WHB that includes the Facility Cask Loading Room (FCLR), Conveyance Loading Room, Shaft Entry Room, Waste Tower, and Waste Shaft.
Room 108	Area of the WHB that includes Airlock 107 and Room 108.

- The Modes for the applicable process areas are defined below in Table 2. The WIPP consists of multiple process areas that perform specific independent functions in the accomplishment of its mission. In addition, the applicable Modes vary by process areas as indicated below in Table 3. Each process area can be in a specific mode independent of any other process area. Table 3 provides a matrix of Modes that are available for each process area.

NOTE

Prior to changing Operational Modes, specific approval for the mode change must be granted by the on-duty FSM or designee followed by an approval announcement broadcast over the Public Address system declaring the Mode Change.

Table 2 - Mode Description

MODE	CONDITION
WASTE HANDLING	A mode when WASTE is being handled **OR** moved outside of a closed shipping container.
WASTE STORAGE	A mode that is used when WASTE is outside of a closed shipping container when WASTE is not being handled or moved **AND** site-derived WASTE is in a waste container with the lid secured.
DISPOSAL	A mode when no waste handling activities are being conducted in the U/G.
STANDBY	A mode when WASTE is not present **OR** when WASTE is in a closed shipping container **AND** site-derived WASTE is in a waste container with the lid secured.

Table 3 – Mode and Process Area Matrix

MODE	ROOM 108	CH BAY	RH BAY	HOT CELL COMPLEX	SHAFT ACCESS AREA	UNDERGROUND	OUTSIDE AREA
WASTE HANDLING	X	X	X	X	X	X	
WASTE STORAGE	X	X	X	X	X		
DISPOSAL						X	
STANDBY	X	X	X	X	X		

- If any required Mode Compliance system fails to operate or becomes inoperable during WASTE HANDING MODE or WASTE STORAGE MODE, immediately notify the FSM.

- Attachment 5 provides guidance and requirements for equipment lineups for each plant MODE to satisfy Defense-in-Depth concepts and LCO equipment operability requirements as specified in the WIPP TSR.

- Planned breaks during waste handling operations do not constitute a violation of TSR staffing requirements.

- Prior to and during waste handling activities, ensure airflow is directed towards the waste disposal array as designed and documented in WP 04-VU1612. (This minimizes the potential for releases from U/G events that result in facility worker exposure.)

- Different modes can be in progress for the surface and/or U/G to provide flexibility to exit waste handling mode if activities are complete in one area (surface or U/G). The CMR logbook will serve as a record of mode shift for either surface or U/G.

- Daily preoperational checks of the waste hoist brakes will be complete prior to use.

- Attachment 2, Facility Mode Approval Continuation Sheet, may be used for additional verifications when Attachment 1, Facility Operations Mode Approval, is full.

PREREQUISITE ACTIONS

1.0 Facility Operations, post most current copies of Qualified Watchstander Lists (QWL) for Facility Operations personnel in the CMR.

2.0 FSM shall verify the CMR narrative logs reflects the current plant operating mode and system/equipment configuration related to TSRs prior to approving mode shifts.

3.0 After receiving approval from the FSM, the Central Monitoring Room Operator (CMRO) shall make an entry in the narrative log indicating approval and mode shift.

PERFORMANCE

1.0 MINIMUM OPERATIONS STAFFING REQUIREMENTS

1.1 Minimum operations staffing requirements for Operational Modes are listed in the electronic attachments. Prior to Mode shift, the FSM shall verify minimum operations staffing requirements in accordance for the applicable Mode.

2.0 SHIFT FROM WASTE STORAGE, STANDBY, OR DISPOSAL MODE FOR CH AND ROOM 108 WASTE HANDLING MODE

2.1 Facility Operations (CMRO):

2.1.1 Complete Electronic Attachment EA04AD3001-1-0 to indicate Facility Operations personnel staffing and required systems and equipment meet requirements for CH Waste Handling Mode.

2.1.2 Sign and date the completed EA04AD3001-1-0.

2.2 CH Waste Handling Operations:

2.2.1 For CH Waste Handling Mode in the CH BAY and/or Room 108, sign and date block 1 for CH Bay and/or Block 9 for Room 108 of Electronic Attachment EA04AD3001-2-0.

2.2.2 For CH Waste Handling Mode in the SHAFT ACCESS AREA, sign and date block 8 of Electronic Attachment EA04AD3001-2-0.

2.2.3 For CH Waste Handling Mode in the U/G, sign and date block 5 of Electronic Attachment EA04AD3001-2-0.

2.2.4 Deliver the applicable signed EA04AD3001-2-0 to the CMRO, either by hand or by facsimile (FAX).

2.3 Radiological Controls:

2.3.1 For CH Waste Handling Mode in the CH BAY and/or Room 108, sign and date block 2 for CH Bay and/or Block 10 for Room 108 of Electronic Attachment EA04AD3001-2-0.

2.3.2 For CH Waste Handling Mode in the U/G, sign and date block 6 of Electronic Attachment EA04AD3001-2-0.

2.3.3 Deliver the applicable signed EA04AD3001-2-0 to the CMRO, either by hand or by FAX.

2.4 Underground Services:

2.4.1 For CH Waste Handling Mode in the U/G, sign and date block 3 of Electronic Attachment EA04AD3001-2-0.

2.4.2 Deliver the signed EA04AD3001-2-0 to the CMRO, either by hand or by FAX to 234-6049.

2.5 Hoisting Operations:

2.5.1 For CH Waste Handling Mode in the U/G, sign and date block 4 of Electronic Attachment EA04AD3001-2-0.

2.5.2 For CH Waste Handling Mode in the SHAFT ACCESS AREA, sign and date block 7 of Electronic Attachment EA04AD3001-2-0.

2.5.3 Deliver the applicable signed EA04AD3001-2-0 to the CMRO, either by hand or by FAX.

2.6 FSM:

2.6.1 Review each of the signed forms submitted in steps 2.1 through 2.5 above.

2.6.2 Sign and date the appropriate section of Attachment 1, authorizing the mode shift.

3.0 SHIFT FROM WASTE STORAGE, STANDBY, OR DISPOSAL MODE FOR RH WASTE HANDLING MODE

3.1 Facility Operations(CMRO):

3.1.1 Complete Electronic Attachment EA04AD3001-1-0 to indicate Facility Operations personnel staffing and required systems and equipment meet requirements for RH Waste Handling Mode.

3.1.2 Sign and date the completed EA04AD3001-1-0.

3.2 RH Waste Handling Operations:

3.2.1 For RH Waste Handling Mode in the RH BAY, sign and date block 1 of Electronic Attachment EA04AD3001-3-0.

3.2.2 For RH Waste Handling Mode in the HOT CELL COMPLEX, sign and date block 9 of Electronic Attachment EA04AD3001-3-0.

3.2.3 For RH Waste Handling Mode in the SHAFT ACCESS AREA, sign and date block 8 of Electronic Attachment EA04AD3001-3-0.

3.2.4 For RH Waste Handling Mode in the U/G, sign and date block 5 of Electronic Attachment EA04AD3001-3-0.

3.2.5 Deliver the signed EA04AD3001-3-0 to the CMRO, either by hand or by FAX.

3.3 Radiological Controls:

3.3.1 For RH Waste Handling Mode in the RH BAY, sign and date block 2 of Electronic Attachment EA04AD3001-3-0.

3.3.2 For RH Waste Handling Mode in the U/G, sign and date block 6 of Electronic Attachment EA04AD3001-3-0.

3.3.3 For RH Waste Handling Mode in the SHAFT ACCESS AREA, sign and date block 9 of Electronic Attachment EA04AD3001-3-0.

3.3.4 For RH Waste Handling Mode in the HOT CELL COMPLEX, sign and date block 11 of Electronic Attachment EA04AD3001-3-0.

3.3.5 Deliver the signed EA04AD3001-3-0 to the CMRO, either by hand or by FAX.

3.4 Underground Services:

3.4.1 For RH Waste Handling Mode in the U/G, sign and date block 3 of Electronic Attachment EA04AD3001-3-0.

3.4.2 Deliver the signed EA04AD3001-3-0 to the CMRO, either by hand or by FAX.

3.5 Hoisting Operations:

3.5.1 For RH Waste Handling Mode in the U/G, sign and date block 4 of Electronic Attachment EA04AD3001-3-0.

3.5.2 For RH Waste Handling Mode in the SHAFT ACCESS AREA, sign and date block 7 of Electronic Attachment EA04AD3001-3-0.

3.5.3 Deliver the signed EA04AD3001-3-0 to the CMRO, either by hand or by FAX.

3.6 Facility Shift Manager or Designee:

3.6.1 Review each of the signed forms submitted in steps 3.1 through 3.5 above.

3.6.2 Sign and date the appropriate section of Attachment 1, authorizing the mode shift.

4.0 SHIFT FROM CH OR RH WASTE HANDLING MODE TO STORAGE, DISPOSAL, OR STANDBY MODE

4.1 CH or RH Waste Handling Operations:

4.1.1 Sign and date appropriate block of EA04AD3001-4-0.

4.1.2 Deliver the signed EA04AD3001-4-0 to the CMRO, either by hand or by FAX.

4.2 FSM:

NOTE

Attachment 2 may be used for additional verifications when Attachment 1 is full.

When shifting from a Waste Handling Mode to storage or standby mode, or when waste handling operations are complete in the U/G, the CMRO may review the signed EA04AD3001-4-0, review EA04AD3001-1-0 and ensure the requirements are met for the applicable mode and sign in the appropriate comments section of Attachment 1, and obtain FSM concurrence for the mode shift per telecon. The FSM must review EA04AD3001-1-0 and ensure the requirements are met for the applicable mode and sign Attachment 1 prior to shift change.

4.2.1 Review the signed EA04AD3001-4-0.

4.2.2 Review EA04AD3001-1-0 and ensure the requirements are met for the applicable mode.

4.2.3 Sign and date the appropriate section of Attachment 1, authorizing the mode shift.

Attachment 1 – Facility Operations Mode Approval

FACILITY OPERATIONS MODE APPROVAL CH WASTE HANDLING MODE	
CH BAY	
EA04AD3001-1-0 signed by FACILITY OPERATIONS	[ ]
Block 1 of EA04AD3001-2-0 signed by CH WASTE HANDLING OPERATIONS	[ ]
Block 2 of EA04AD3001-2-0 signed by RADIOLOGICAL CONTROL	[ ]
Comments: _____ _____ _____ Approved for CH Waste Handling Mode in CH BAY By: _____ Facility Shift Manager Date/Time	

Attachment 1 – Facility Operations Mode Approval

FACILITY OPERATIONS MODE APPROVAL CH WASTE HANDLING MODE	
ROOM 108	
EA04AD3001-1-0 signed by FACILITY OPERATIONS	[ ]
Block 9 of EA04AD3001-2-0 signed by CH WASTE HANDLING OPERATIONS	[ ]
Block 10 of EA04AD3001-2-0 signed by RADIOLOGICAL CONTROL	[ ]
Comments: _____ _____ _____ Approved for CH Waste Handling Mode in ROOM 108 By: _____ Facility Shift Manager Date/Time	

Attachment 1 – Facility Operations Mode Approval

FACILITY OPERATIONS MODE APPROVAL CH WASTE HANDLING MODE	
SHAFT ACCESS AREA - CH WASTE HANDLING	
EA04AD3001-1-0 signed by FACILITY OPERATIONS	[ ]
Block 7 of EA04AD3001-2-0 signed by HOISTING OPERATIONS	[ ]
Block 8 of EA04AD3001-2-0 signed by CH WASTE HANDLING OPERATIONS	[ ]
Comments: _____ _____ _____ Approved for CH Waste Handling Mode in SHAFT ACCESS AREA By: _____ Facility Shift Manager Date/Time	

Attachment 1 – Facility Operations Mode Approval

FACILITY OPERATIONS MODE APPROVAL RH WASTE HANDLING MODE	
RH BAY	
EA04AD3001-1-0 signed by FACILITY OPERATIONS	[ ]
Block 1 of EA04AD3001-3-0 signed by RH WASTE HANDLING OPERATIONS	[ ]
Block 2 of EA04AD3001-3-0 signed by RADIOLOGICAL CONTROL	[ ]
Comments: _____ _____ _____ Approved for RH Waste Handling Mode in RH BAY By: _____ Facility Shift Manager Date/Time	

Attachment 1 – Facility Operations Mode Approval

FACILITY OPERATIONS MODE APPROVAL CH WASTE HANDLING MODE	
UNDERGROUND (U/G) - CH WASTE HANDLING	
EA04AD3001-1-0 signed by FACILITY OPERATIONS	[ ]
Block 3 of EA04AD3001-2-0 signed by UNDERGROUND SERVICES	[ ]
Block 4 of EA04AD3001-2-0 signed by HOISTING OPERATIONS	[ ]
Block 5 of EA04AD3001-2-0 signed by CH WASTE HANDLING OPERATIONS	[ ]
Block 6 of EA04AD3001-2-0 signed by RADIOLOGICAL CONTROL	[ ]
Comments: _____ _____ _____ Approved for CH Waste Handling Mode in U/G By: _____ Facility Shift Manager Date/Time	

Attachment 1 – Facility Operations Mode Approval

FACILITY OPERATIONS MODE APPROVAL RH WASTE HANDLING MODE	
SHAFT ACCESS AREA - RH WASTE HANDLING MODE	
EA04AD3001-1-0 signed by FACILITY OPERATIONS	[ ]
Block 7 of EA04AD3001-3-0 signed by HOISTING OPERATIONS	[ ]
Block 8 of EA04AD3001-3-0 signed by RH WASTE HANDLING OPERATIONS	[ ]
Block 9 of EA04AD3001-3-0 signed by RADIOLOGICAL CONTROLS	[ ]
Comments: _____ _____ _____ Approved for RH Waste Handling Mode in SHAFT ACCESS AREA By: _____ Facility Shift Manager Date/Time	

Attachment 1 – Facility Operations Mode Approval

FACILITY OPERATIONS MODE APPROVAL RH WASTE HANDLING MODE	
HOT CELL COMPLEX - RH WASTE HANDLING	
EA04AD3001-1-0 signed by FACILITY OPERATIONS	[ ]
Block 10 of EA04AD3001-3-0 signed by RH WASTE HANDLING OPERATIONS	[ ]
Block 11 of EA04AD3001-3-0 signed by RADIOLOGICAL CONTROLS	[ ]
Comments: _____ _____ _____ Approved for RH Waste Handling Mode in HOT CELL COMPLEX By: _____ Facility Shift Manager Date/Time	

Attachment 1 – Facility Operations Mode Approval

FACILITY OPERATIONS MODE APPROVAL CH STORAGE, STANDBY, OR DISPOSAL MODE	
CH UNDERGROUND - DISPOSAL MODE	
Block 1 of EA04AD3001-4-0 signed by CH Waste Handling Operations	[ ]
Comments: _____ _____ _____ CH Waste Handling complete in Underground. Approved for CH Disposal Mode in Underground. By: _____ Facility Shift Manager Date/Time	

Attachment 1 – Facility Operations Mode Approval

FACILITY OPERATIONS MODE APPROVAL CH STORAGE, STANDBY, OR DISPOSAL MODE	
CH BAY - STORAGE MODE	
Block 2 of EA04AD3001-4-0 signed by CH Waste Handling Operations	[ ]
Comments: _____ _____ _____ Approved for Storage Mode in CH BAY. By: _____ Facility Shift Manager Date/Time	[ ]

Attachment 1 – Facility Operations Mode Approval

FACILITY OPERATIONS MODE APPROVAL CH STORAGE, STANDBY, OR DISPOSAL MODE	
CH BAY - STANDBY MODE	
Block 3 of EA04AD3001-4-0 signed by CH Waste Handling Operations	[ ]
Comments: _____ _____ _____ Approved for Standby Mode in CH BAY. By: _____ Facility Shift Manager Date/Time	[ ]

Attachment 1 – Facility Operations Mode Approval

FACILITY OPERATIONS MODE APPROVAL CH STORAGE, STANDBY, OR DISPOSAL MODE	
ROOM 108 - STANDBY MODE	
Block 3 of EA04AD3001-4-0 signed by CH Waste Handling Operations	[ ]
EA04AD3001-1-0 Complete for ROOM 108 STANDBY MODE Comments: _____ _____ _____ Approved for Standby Mode in ROOM 108. By: _____ Facility Shift Manager Date/Time	[ ]

Attachment 1 – Facility Operations Mode Approval

FACILITY OPERATIONS MODE APPROVAL CH STORAGE, STANDBY, OR DISPOSAL MODE	
ROOM 108 - STORAGE MODE	
Block 2 of EA04AD3001-4-0 signed by CH Waste Handling Operations	[ ]
EA04AD3001-1-0 Complete for ROOM 108 STORAGE MODE Comments: _____ _____ _____ Approved for Storage Mode in ROOM 108. By: _____ Facility Shift Manager Date/Time	[ ]

Attachment 1 – Facility Operations Mode Approval

FACILITY OPERATIONS MODE APPROVAL STORAGE, STANDBY, OR DISPOSAL MODE	
RH SHAFT ACCESS AREA - STANDBY MODE	
Block 3 of EA04AD3001-4-0 signed by RH WASTE HANDLING OPERATIONS	[ ]
EA04AD3001-1-0 Complete for RH SHAFT ACCESS AREA Standby Mode Comments: _____ _____ _____ Approved for Standby Mode in RH SHAFT ACCESS AREA. By: _____ Facility Shift Manager Date/Time	[ ]

Attachment 1 – Facility Operations Mode Approval

FACILITY OPERATIONS MODE APPROVAL RH STORAGE, STANDBY, OR DISPOSAL MODE	
RH UNDERGROUND - DISPOSAL MODE	
Block 1 of EA04AD3001-4-0 signed by RH Waste Handling Operations	[ ]
Comments: _____ _____ _____ RH Waste Handling complete in Underground. Approved for RH Disposal Mode in Underground. By: _____ Facility Shift Manager Date/Time	

Attachment 1 – Facility Operations Mode Approval

FACILITY OPERATIONS MODE APPROVAL RH WASTE HANDLING MODE	
UNDERGROUND (U/G) - RH WASTE HANDLING	
Block 3 of EA04AD3001-3-0 signed by UNDERGROUND SERVICES	[ ]
Block 4 of EA04AD3001-3-0 signed by HOISTING OPERATIONS	[ ]
Block 5 of EA04AD3001-3-0 signed by RH WASTE HANDLING OPERATIONS	[ ]
Block 6 of EA04AD3001-3-0 signed by RADIOLOGICAL CONTROL	[ ]
EA04AD3001-1-0 Complete for RH UNDERGROUND WASTE HANDLING Mode Comments: _____ _____ _____ Approved for RH WASTE HANDLING MODE in the Underground. By: _____ Facility Shift Manager Date/Time	[ ]

Attachment 1 – Facility Operations Mode Approval

FACILITY OPERATIONS MODE APPROVAL RH STORAGE, STANDBY, OR DISPOSAL MODE	
RH BAY - STORAGE MODE	
Block 2 of EA04AD3001-4-0 signed by RH Waste Handling Operations	[ ]
EA04AD3001-1-0 Complete for RH BAY Storage Mode Comments: _____ _____ _____ Approved for Storage Mode in RH BAY. By: _____ Facility Shift Manager Date/Time	[ ]

Attachment 1 – Facility Operations Mode Approval

FACILITY OPERATIONS MODE APPROVAL RH STORAGE, STANDBY, OR DISPOSAL MODE	
RH BAY - STANDBY MODE	
Block 3 of EA04AD3001-4-0 signed by RH Waste Handling Operations	[ ]
EA04AD3001-1-0 Complete for RH BAY Standby Mode Comments: _____ _____ _____ Approved for Standby Mode in RH BAY. By: _____ Facility Shift Manager Date/Time	[ ]

Attachment 1 – Facility Operations Mode Approval

FACILITY OPERATIONS MODE APPROVAL STORAGE, STANDBY, OR DISPOSAL MODE	
RH SHAFT ACCESS AREA - RH STORAGE MODE	
Block 5 of EA04AD3001-4-0 signed by RH WASTE HANDLING OPERATIONS	[ ]
EA04AD3001-1-0 Complete for SHAFT ACCESS AREA - STORAGE MODE Comments: _____ _____ _____ Approved for Storage Mode in RH SHAFT ACCESS AREA. By: _____ Facility Shift Manager Date/Time	[ ]

Attachment 1 – Facility Operations Mode Approval

FACILITY OPERATIONS MODE APPROVAL STORAGE, STANDBY, OR DISPOSAL MODE	
HOT CELL COMPLEX - RH STORAGE MODE	
Block 4 of EA04AD3001-4-0 signed by RH WASTE HANDLING OPERATIONS	[ ]
EA04AD3001-1-0 Complete for HOT CELL COMPLEX - RH STORAGE MODE Comments: _____ _____ _____ Approved for Storage Mode in HOT CELL COMPLEX. By: _____ Facility Shift Manager Date/Time	[ ]

Attachment 1 – Facility Operations Mode Approval

FACILITY OPERATIONS MODE APPROVAL RH STORAGE, STANDBY, OR DISPOSAL MODE	
HOT CELL COMPLEX - RH STANDBY MODE	
Block 3 of EA04AD3001-4-0 signed by RH WASTE HANDLING OPERATIONS	[ ]
EA04AD3001-1-0 Complete for HOT CELL COMPLEX RH Standby Mode Comments: _____ _____ _____ Approved for Standby Mode in HOT CELL COMPLEX. By: _____ Facility Shift Manager Date/Time	[ ]

Attachment 1 – Facility Operations Mode Approval

FACILITY OPERATIONS MODE APPROVAL STORAGE, STANDBY, OR DISPOSAL MODE	
CH SHAFT ACCESS AREA - WASTE HANDLING COMPLETE	
Block 3 of EA04AD3001-4-0 signed by CH WASTE HANDLING OPERATIONS	[ ]
CH WASTE HANDLING complete in SHAFT ACCESS AREA Comments: _____ _____ _____ Note: SHAFT ACCESS AREA Mode is now determined by RH WASTE HANDLING. Approved By: _____ Facility Shift Manager Date/Time	[ ]

Attachment 2 – Facility Mode Approval Continuation Sheet

Attachment 2 – Facility Mode Approval Continuation Sheet

SHIFT CHANGE/WATCH RELIEF VERIFICATION CONTINUATION SHEET

The FSM's signature on this Continuation Sheet certifies that plant operations, conditions, or maintenance in progress have not invalidated mode approval requirements.

Mode Approval verified by: _____
Facility Shift Manager Date/Time

Mode Approval verified by: _____
Facility Shift Manager Date/Time

Mode Approval verified by: _____
Facility Shift Manager Date/Time

Mode Approval verified by: _____
Facility Shift Manager Date/Time

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Mode Approval verified by: _____
Facility Shift Manager Date/Time

Mode Approval verified by: _____
Facility Shift Manager Date/Time

Continued

Attachment 3 – Instructions for Completing LCO and SAC Surveillance Data Sheets

INSTRUCTIONS FOR COMPLETION OF LCOs AND SACs SURVEILLANCE DATA SHEETS

This attachment provides instructions for properly completing LCOs and SACs Surveillance Data Sheets which demonstrate compliance with the TSR listed in DOE/WIPP-07-3373, **Waste Isolation Pilot Plant Technical Safety Requirements**.

The TSRs continue the LCOs and SACs which state the lowest functional capability or performance levels of equipment and the restrictive parameters or conditions required for safe operation of the facility.

LCO AND SAC SURVEILLANCE DATA SHEET COMPLETION

The title block of the Surveillance Data Sheets lists the specific LCO and/or SAC by number and title; the SR number and/or the SAC statement; the required performance frequency; the applicable MODE; the applicable Process Area and the performance procedure(s).

Surveillance Data Sheets SHALL be completed as follows:

- All required data, narrative entries and comments made in **BLACK INK**.
- Surveillance Data Sheets SHALL NOT have any blanks or missing information. Where information is not applicable (e.g., Out-of-Service, Out-of-Commission, Standby, Locked-Out/Tagged-Out, or Not Applicable for current operation), the appropriate indicator will be used on the Surveillance Data Sheet: OOS, OOC, STBY, LO/TO, N/A, etc.
- When readings are taken that are abnormal or outside the minimum or maximum operating limits, the Surveillant will circle in **RED INK** the abnormal reading and immediately notify the FSM and the cognizant manager.
- The Surveillant will note in the comments section on the Surveillance Data Sheet, if known, the reason for the abnormal or out-of-limit condition (i.e., OOS, OOC, STBY, LO/TO, N/A, etc).
- If correction of an entry is necessary, the incorrect entry will have a single line drawn through it. The Surveillant will enter their initials and date in the right-hand margin of the Surveillance Data Sheet to the right of where the incorrect entry occurred.

Attachment 3 – Instructions for Completing LCO and SAC Surveillance Data Sheets

- After completing the surveillance and entering the required information on the applicable Surveillance Data Sheet(s), the Surveillant will print their name, sign, and enter the date and the surveillance completion time.

- After the FSM reviews and approves the Surveillance Data Sheet(s), the LCO Coordinator will collect and retain for records purposes.

- All LCO required surveillances that are performed underground will be faxed to the CMR. The CMRO will then put them in the Surveillance Collection basket.

- Originals must be taken to the CMR at the end of each shift and placed in the Surveillance Collection basket.

- All surveillances performed on the surface must be hand carried to the CMR and placed in the Surveillance Collection basket.

- The FSM will collect the surveillances and update the status board.

- Personnel that will perform the surveillances and fax or carry them to the CMR will be designated by name each shift during turnover.

- A surveillance check sheet will be added to Facility Ops turnover sheet and will be reviewed by both FSMs and CMROs during turnover each shift to verify that all required surveillances have been completed within their assigned periodicity.

Attachment 4 – LCO and SAC Surveillance Performance Requirements

Attachment 4 – LCO and SAC Surveillance Performance Requirements

LCO & SAC SURVEILLANCE PERFORMANCE REQUIREMENTS

EA04AD3001-	LCO/SAC	SYSTEM/EQUIPMENT	SURVEILLANCE IDENTIFIER	SURVEILLANCE REQUIREMENTS	FREQUENCY
SR1	LCO 3.1.1	WHB Fire Suppression System	4.1.1.1	VERIFY the supply water static pressure at each riser listed below is ≥105 psig: Riser — Gauge Number CH Bay — 411-PI-003-001 Room 108 — 411-PI-003-003 RH Bay — 411-PI-003-005	MONTHLY
SR2	LCO 3.1.1	WHB Fire Suppression System	4.1.1.2	VERIFY the isolation valve for each riser listed below is locked open: Riser — Isolation Valve CH BAY — FW-411-V-001 Room 108 — FW-411-V-010 RH BAY — FW-411-V-052	MONTHLY
SR4	LCO 3.1.1	WHB Fire Suppression System	4.1.1.4	VERIFY valve FW-456-V-021 is locked CLOSED.	ANNUALLY

Attachment 4 – LCO and SAC Surveillance Performance Requirements

LCO & SAC SURVEILLANCE PERFORMANCE REQUIREMENTS

EA04AD3001-	LCO/SAC	SYSTEM/EQUIPMENT	SURVEILLANCE IDENTIFIER	SURVEILLANCE REQUIREMENTS	FREQUENCY
SR5	LCO 3.1.1	WHB Fire Suppression System	4.1.1.5	OPEN the Inspectors Test Valve (ITV) associated with each riser as identified below and VERIFY water-flow through the associated riser: Riser — Inspector's Test Valve CH Bay — FW-411-V-023 and FW-412-V-002 Room 108 — FW-411-V-062 RH Bay — FW-411-V-042 and FW-411-V-044	QUARTERLY
SR6	LCO 3.1.1	WHB Fire Suppression System	4.1.1.6	Perform an automatic start test of each fire pump to assure it starts at the setpoint specified below: 45-G-601 (electric) ≥ 110 psig 45-G-602 (diesel) ≥ 100 psig	WEEKLY
SR7	LCO 3.1.1	WHB Fire Suppression System	4.1.1.7	VERIFY fire pumps are capable of supplying ≥ 1500 gpm at ≥ 105 psig net discharge.	ANNUALLY
SR8	LCO 3.1.1	WHB Fire Suppression System	4.1.1.8	VERIFY that the diesel supply tank contains ≥ 3/4 full tank of diesel.	WEEKLY
SR9	LCO 3.1.1	WHB Fire Suppression System	4.1.1.9	VERIFY that there are ≥ 105,000 gallons of fire water available within the water distribution system.	EACH SHIFT

Attachment 4 – LCO and SAC Surveillance Performance Requirements

LCO & SAC SURVEILLANCE PERFORMANCE REQUIREMENTS

EA04AD3001-	LCO/SAC	SYSTEM/EQUIPMENT	SURVEILLANCE IDENTIFIER	SURVEILLANCE REQUIREMENTS	FREQUENCY
SR10	LCO 3.1.2	Waste Handling Equipment	(CH) 4.1.2.1 4.1.2.3 5.1.1.2	CH Waste Handling Equipment Fire Suppression System 1.1 VERIFY that the fire suppression system on the WASTE HANDLING EQUIPMENT selected for underground use has not discharged. 1.2 VERIFY no trouble lights are illuminated on the selected WASTE HANDLING EQUIPMENT. CH Liquid-Fueled Waste Handling Equipment Inspection 1.3 VERIFY that there are no excessive leaks (i.e., battery compartment, hydraulic lines, fuel lines) as indicated by visible flow of fluid under pressure, puddles beneath the equipment, or abnormal loss of hydraulic fluid. 1.4 VERIFY fluid levels (i.e., engine oil, transmission fluid, hydraulic fluid, brake fluid) are within manufacturer specifications. 1.5 VERIFY lights and horn are IN-SERVICE.	EACH SHIFT

Attachment 4 – LCO and SAC Surveillance Performance Requirements

LCO & SAC SURVEILLANCE PERFORMANCE REQUIREMENTS

EA04AD3001-	LCO/SAC	SYSTEM/EQUIPMENT	SURVEILLANCE IDENTIFIER	SURVEILLANCE REQUIREMENTS	FREQUENCY
SR11	LCO 3.1.2	Waste Handling Equipment	(RH) 4.1.2.1 4.1.2.3 5.1.1.2	RH Waste Handling Equipment Fire Suppression System 1.6 VERIFY that the fire suppression system on the WASTE HANDLING EQUIPMENT selected for underground use has not discharged. 1.7 VERIFY no trouble lights are illuminated on the selected WASTE HANDLING EQUIPMENT. RH Liquid-Fueled Waste Handling Equipment Inspection 1.8 VERIFY that there are no excessive leaks (i.e., battery compartment, hydraulic lines, fuel lines) as indicated by visible flow of fluid under pressure, puddles beneath the equipment, or abnormal loss of hydraulic fluid. 1.9 VERIFY fluid levels (i.e., engine oil, transmission fluid, hydraulic fluid, and brake fluid) are within manufacturer specifications. 1.10 VERIFY lights and horn are IN-SERVICE.	EACH SHIFT
SR12	LCO 3.1.2	Waste Handling Equipment Fire Suppression system	(CH) 4.1.2.2	Perform a test of the Fire Suppression System controls.	SEMIANNUALLY

Attachment 4 – LCO and SAC Surveillance Performance Requirements

LCO & SAC SURVEILLANCE PERFORMANCE REQUIREMENTS

EA04AD3001-	LCO/SAC	SYSTEM/EQUIPMENT	SURVEILLANCE IDENTIFIER	SURVEILLANCE REQUIREMENTS	FREQUENCY
SR13	LCO 3.1.2	Waste Handling Equipment Fire Suppression System	(RH) 4.1.2.2	Perform a test of the Fire Suppression System controls.	SEMIANNUALLY
SR14	LCO 3.2.1	CH Active Confinement Ventilation System	4.2.1.1 4.2.1.2	1.11 VERIFY one confinement ventilation system exhaust fan, 41-B-816 **OR** 41-B-817 is IN-SERVICE~~.~~ and 1.12 VERIFY CH BAY exhaust air is flowing from HEPA filter unit to exhaust fan.	DAILY
SR15	LCO 3.2.1	CH BAY Active Confinement Ventilation System	4.2.1.3	VERIFY one stage of HEPA filter in unit 41-B-814 **AND** 41-B-815 has an efficiency of 99%.	ANNUALLY
SR16	LCO 3.2.2	HOT CELL COMPLEX Confinement Ventilation System	4.2.2.1 4.2.2.2	1.13 VERIFY one confinement ventilation system exhaust fan, 41-B-878A **OR** 41-B-878B is IN-SERVICE. 1.14 VERIFY HOT CELL COMPLEX exhaust air is flowing from at least two HEPA filter units to exhaust fan.	DAILY
SR17	LCO 3.2.2	HOT CELL COMPLEX Confinement Ventilation System	4.2.2.3	VERIFY one stage of HEPA filter in units 41-B-877A AND 41-B-877B AND 41-B-877C has an efficiency of ≥ 99%.	ANNUALLY
SR18	LCO 3.3.1	Vehicle Control in the OUTSIDE AREA	4.3.1.1 4.3.1.2	1.15 VERIFY fuel delivery truck has a leading escort. 1.16 VERIFY fuel delivery truck stays on the DESIGNATED ROUTE.	Each Fuel Shipment

Attachment 4 – LCO and SAC Surveillance Performance Requirements

LCO & SAC SURVEILLANCE PERFORMANCE REQUIREMENTS

EA04AD3001-	LCO/SAC	SYSTEM/EQUIPMENT	SURVEILLANCE IDENTIFIER	SURVEILLANCE REQUIREMENTS	FREQUENCY
SR19	LCO 3.3.2	Vehicle/Equipment Control in the CH BAY and Room 108	4.3.2.1	VERIFY that there are no liquid-fueled vehicles in the CH BAY and Room 108.	Each Shift
SR20	LCO 3.3.3	Vehicle/Equipment Control in the SHAFT ACCESS AREA	4.3.3.1	VERIFY that there are no liquid-fueled vehicles in the SHAFT ACCESS AREA.	Prior to Declaring MODE
SR22	LCO 3.3.5	Lube Truck Access Control in the UNDERGROUND	4.3.5.1	VERIFY that the Lube Truck is not in the DISPOSAL ROOM.	EACH SHIFT
SR23	LCO 3.3.6	Liquid-Fueled Vehicle/Equipment Control in the TRANSPORT PATH	4.3.6.1 4.3.6.2	1.17 VERIFY TRANSPORT PATH is established PRIOR to WASTE movement. 1.18 VERIFY VEHICLE EXCLUSION ZONE is established PRIOR to WASTE movement.	Prior to WASTE Movement
SR24	LCO 3.3.7	Liquid-Fueled Vehicle e/Equipment Control at a WASTE FACE	4.3.7.1 4.3.7.3	1.19 VERIFY only one WASTE HANDLING EQUIPMENT is emplacing WASTE. 1.20 VERIFY non-WASTE Handling Equipment ≥ 25 feet from WASTE FACE.	EACH SHIFT
SR25	LCO 3.3.7	Liquid-Fueled Vehicle/Equipment Control at a WASTE FACE	4.3.7.2	VERIFY only one WASTE HANDLING EQUIPMENT **AND** one Liquid-Fueled non-WASTE handling vehicle/equipment is used for retrieval.	EACH SHIFT when retrieval is being conducted

Attachment 4 – LCO and SAC Surveillance Performance Requirements

LCO & SAC SURVEILLANCE PERFORMANCE REQUIREMENTS

EA04AD3001-	LCO/SAC	SYSTEM/EQUIPMENT	SURVEILLANCE IDENTIFIER	SURVEILLANCE REQUIREMENTS	FREQUENCY
SR26	LCO 3.3.8	Liquid-Fueled Vehicle/Equipment Control at a WASTE FACE	4.3.8.1 4.3.8.2	1.21 VERIFY Liquid-Fueled vehicles/equipment ≥ 25 feet from the WASTE FACE. 1.22 VERIFY Liquid-Fueled vehicles/equipment < 25 feet are attended.	EACH SHIFT
SR28	LCO 3.4.2	Fuel Barrier in the UNDERGROUND	4.4.2.1	VERIFY STATIC WASTE FACE is protected.	Within 10 days after no WASTE emplacement
SR30	LCO 3.5.2	WASTE HANDLING in the SHAFT ACCESS AREA	4.5.2.1	VERIFY WASTE hoist conveyance is present prior to moving WASTE into the shaft entry room.	Prior to WASTE entering shaft entry room
SR31	LCO 3.5.3	WASTE HANDLING in the OUTSIDE AREA	4.5.3.1	VERIFY WASTE is in a CLOSED SHIPPING CONTAINER.	DAILY
SR37	LCO 3.3.6	Liquid-Fueled Vehicle/Equipment Control in the TRANSPORT PATH	4.3.6.3	Maintain VEHICLE EXCLUSION ZONE during WASTE movement.	During WASTE movements
SR38	LCO 3.8.1	Waste Hoist Brakes	4.8.1.1	VERIFY WASTE hoist brakes pre-operational test was performed and brakes are in service.	PRIOR TO USE of the WASTE hoist

Attachment 4 – LCO and SAC Surveillance Performance Requirements

LCO & SAC SURVEILLANCE PERFORMANCE REQUIREMENTS

EA04AD3001-	LCO/SAC	SYSTEM/EQUIPMENT	SURVEILLANCE IDENTIFIER	SURVEILLANCE REQUIREMENTS	FREQUENCY
SR39	SAC 5.0	Liquid-Fueled Vehicle/Equipment Inspection Program	GC 5.1.1.2	1.23 VERIFY that there are no excessive leaks (i.e., battery compartment, hydraulic lines, fuel lines) as indicated by visible flow of fluid under pressure, puddles beneath the equipment, or abnormal loss of hydraulic fluid; 1.24 Fluid levels (i.e., engine oil, transmission fluid, hydraulic fluid, brake fluid); 1.25 Lights and horn are IN-SERVICE.	PRIOR TO USE

Attachment 5 – Mode Compliance Equipment Requirements

Attachment 5 – Mode Compliance Equipment Requirements

U/G Ventilation and Filtration System (UVFS) - The UVFS is a Defense-in-Depth system. The UVFS shall be operating in modes to support U/G operations as designated by the FSM in accordance with WP 04-VU1001 and WP 04-VU1608. The UVFS shall be capable of automatic or manual shift-to-filtration. Automatic shift-to-filtration (Quarterly Test) is considered operable if the automatic shift-to-filtration from Room Exit Continuous Air Monitor (CAM) operability test in WP 04-VU1002 has been verified to have been satisfactorily completed within the previous calendar quarter. Manual shift-to-filtration (Monthly Test) is considered operable if one of the shift-to-filtration tests in WP 04-VU1002 has been verified to have been satisfactorily completed within the previous month. Thus, the Quarterly Test is also the Monthly Test.

Central Monitoring System (CMS) - The CMS is considered operable if the equipment required to support U/G shift-to-filtration is operating. This CMS equipment includes LPUs 805, 807, 822, 835, 836, 838, and one operating CMR console. If any of the stated CMS equipment is inoperable, an alternate means of shift-to-filtration may be used (e.g., manual shift-to-filtration).

Radiation Monitoring System (RMS) - The U/G RMS at the active U/G waste room is considered operable if at least one room exit alpha CAM is operating. A CAM is considered operating if Radiological Control has reported to the CMRO within the last Radiological Control working day that operability checks for the CAM are complete and satisfactory.

ATTACHMENT O
WIPP MINE VENTILATION RATE MONITORING PLAN

O-1 Definitions

Compliance with the mine ventilation requirements set forth in Permit Part 4 and Permit Attachment A2 requires the use and definition of the following terms:

Actual cubic feet per minute (**acfm**): The volume of air passing a fixed point in an excavation, normally determined as the product of the cross section of the excavation and the mean velocity of the air.

Standard cubic feet per minute (**scfm**): The actual cubic feet per minute passing a fixed point adjusted to standard conditions. In the Imperial measurement system, the standard condition for pressure is 14.7 pounds per square inch (**psi**) (sea level) and the standard condition for temperature is 492 degrees Rankine (freezing point of water or 32 degrees Fahrenheit). The greatest difference between acfm and scfm occurs in the summer when the pressure at the repository horizon is about 14.2 psi and the temperature is about 560 degrees Rankine (100 degrees Fahrenheit). Then

1 scfm x (560/492) x (14.7/14.2) = 1.2 acfm

A reasonably conservative conversion factor, therefore, is 1.2. Using this factor, 35,000 scfm is very nearly 35,000 x 1.2 or 42,000 acfm.

Restricted Access: If the required ventilation rate in an active room where waste disposal is taking place cannot be achieved or cannot be supported due to operational needs, access is restricted by the use of barriers, signs and postings, or individuals stationed at the entrance to the active disposal room when ventilation rates are below 35,000 scfm. Note: As provided in O-3c(2) entry to restricted access active rooms for the purpose of establishing normal ventilation is allowed.

Shift: Those work shifts when there is normal access to the Waste Isolation Pilot Plant (**WIPP**) underground.

Worker: Anyone who has normal access to the WIPP underground.

O-2 Objective

The objective of this plan is to describe how the ventilation requirements in the Permit will be met. This plan achieves this objective and documents the process by which the Permittees demonstrate compliance with the ventilation requirements by:

- Maintaining an annual running average of 260,000 scfm through the underground repository
- Maintaining a minimum of 35,000 scfm of air through the active rooms where waste disposal is taking place and when workers are present in the rooms

This plan contains the following elements: Objective; Design and Procedures; Equipment Calibration and Maintenance; Reporting and Record Keeping; Quality Assurance.

O-3 Design and Procedures

This section describes the four basic processes that make up the mine ventilation rate monitoring plan:

- Test and Balance, a periodic re-verification of the satisfactory performance of the entire

underground ventilation system and associated components
• Monitoring and calculation of the Running Annual Average of the Total Mine Airflow to verify achievement of the 260,000 scfm minimum requirement
• Monitoring of active room(s) to ensure a minimum flow of 35,000 scfm whenever waste disposal is taking place and workers are present in the room
• Quarterly verification of the total mine airflow

O-3a Test and Balance

O-3a(1) Test and Balance Process

The WIPP ventilation system and the underground ventilation modes of operation are described in Permit Application A2-2a(3). The Permittees shall verify underground ventilation system performance by conducting a periodic Test and Balance. The Test and Balance is a comprehensive series of measurements and adjustments designed to ensure that the system is operating within acceptable design parameters. The Test and Balance is an appropriate method of verifying system flow because it provides consistent results based on good engineering practices. The testing of underground ventilation systems is described in McPherson, 1993. Once completed, the Test and Balance data become the baseline for underground ventilation system operation until the next Test and Balance is performed.

The “Test” portion of the process shall involve measuring the pressure drop and air quantity of every underground entry excluding alcoves or other dead end drifts. In addition, the tests shall verify resistance curves for each of the main regulators, measure shaft resistance, and measure main fan pressure and quantity. This is done at the highest achievable airflow to facilitate

accurate measurements. From these measurements the frictional resistance o f the system is determined.

Pressure shall be measured using the gage and tube method, which measures the pressure drop between two points using a calibrated pressure recording device and pitot tubes. Pressure drops across the shafts shall be measured by either calibrated barometers at the top and bottom of shafts or the gage and tube method. Airflow shall be measured using a calibrated vane anemometer to take a full entry traverse between system junctions. Fan pressure shall be measured using a calibrated pressure recording device and pitot tube to determine both static and velocity pressure components.

Multiple measurements shall be taken at each field location to ensure accurate results. Consecutive field values must fall within ±5% to be acceptable. These data shall be verified during the testing process by checking that:
• the sum of airflows entering and leaving a junction is equal to zero; and,
• the sum of pressure drops around any closed loop is equal to zero.

Once the measurements are taken, data shall be used to calculate the resistance of every underground drift, as well as shafts and regulators using Atkinson’s Square Law

$P=R \times Q^2$

where the pressure drop of an entry (P) is equal to a resistance (R) times the square of the quantity of air flowing (Q) through the circuit.

The “Balance” portion of the process shall involve adjusting the settings of the system fans and regulators to achieve the desired airflow distribution in all parts of the facility for each mode of operation. Particular emphasis shall be given to the active disposal room(s) in the Waste Disposal Circuit to ensure that a minimum airflow of 35,000 scfm is achieved. The system baseline settings for the current Balance shall be established from the previous Test and Balance. Adjustments shall then be made to account for changes in system resistance due to excavation convergence due to salt creep, approved system modifications, or operational changes.

The Permittees shall use a commercially available ventilation simulator to process Test and Balance field data. The simulator uses the Hardy-Cross Iteration Method (McPherson, 1993) to reduce field data into a balanced ventilation network, including the appropriate regulator settings necessary to achieve proper airflow distribution for the various operating modes. Once balanced, the same simulator shall be used to evaluate changes such as future repository development and potential system modification before they are implemented.

The Test and Balance process culminates in a final report which is retained on site. Following receipt of the Test and Balance Report, the Permittees shall revise the WIPP surface and underground ventilation system procedures to incorporate any required changes to the ventilation system configuration. The Test and Balance data shall be used to adjust the operating range of fan controls, waste tower pressure, auxiliary air intake tunnel regulator settings, underground regulator settings, and door configurations. The model data and procedure changes shall be used to establish normal configuration settings to achieve the desired airflow in the underground. These settings shall then be modified by operations

personnel throughout the year to compensate for system fluctuations caused by seasonal changes in psychrometric properties, and to meet specific operations needs. This ensures that the facility is operated at the design airflow rate for each ventilation mode.

O-3a(2) Test and Balance Schedule

The Test and Balance is generally conducted on a 12- to 18-month interval, but in no case shall the interval between consecutive Test and Balance performances exceed 18 months. This interval is sufficient to account for changes in the mine configuration since over this period the ventilated volume changes very little. The quality and maintenance of ventilation control structures (e.g., bulkheads) is excellent, so leakage is small and relatively constant. Historic test and balance results confirm that changes between test and balances fall within anticipated values.

O-3b Running Annual Average of the Total Mine Airflow

O-3b(1) Monitoring Total Mine Airflow

The Permittees shall use the Central Monitoring Room Operator’s (**CMRO**) Log to monitor total mine airflow. Run-times for the various modes of operation shall be entered into the CMRO Log. For example, if the CMRO Log indicates that the ventilation system was configured for Alternate

Mode (one main fan) at 8:00 am, and that this configuration was maintained until 11:30 am, a total of 3.5 hours of run-time in Alternate Mode would be recorded. Run times are recorded to the nearest quarter hour. The CMRO shall record each time when the ventilation system configuration is changed, including periods when there is no ventilation.

O-3b(2) Calculation of the Running Annual Average of Total Mine Airflow

The Permittees shall calculate the running average flow rate on a monthly basis. The Permittees shall use the logged runtime data for various modes of operation (as described in O-3b(1)) and the nominal design flow-rates for the various modes presented in Table O-1 to calculate the average monthly flow rate for the facility.

The average monthly mine flow rate is computed monthly using the following formula:

Monthly Average Flow Rate = {[Normal Mode Run-time (hrs.) x 425,000 scfm]
+ [Alternate Mode Run-time (hrs.) x 260,000 scfm]
+ [Maintenance Bypass Run-time (hrs.) x 260,000 scfm]
+ [Reduced Mode Run-time (hrs.) x 120,000 scfm]
+ [Minimum Mode Run Time (hrs.) x 60,000 scfm]
+ [Filtration Mode Run-time (hrs.) x 60,000 scfm]}
/ 730 Hours per month.

The running annual average of total mine airflow annual average flow rate shall be calculated using the monthly averages and the following formula:

Annual Average Flow Rate = Σ Monthly Average for Previous 12 Months
12

The use of an average value of 730 hours per month in the monthly average calculation is reasonable, given that all the numbers involved are very large and that the final use of the monthly average flow is in an annual calculation.

O-3c Active Room Minimum Airflow

O-3c(1) Verification of Active Room Minimum Airflow

Whenever workers are present, the Permittees shall verify the minimum airflow through active room(s) where waste disposal is taking place of 35,000 scfm at the start of each shift, any time there is an operational mode change, or if there is a change in the ventilation system configuration.

O-3c(2) Measurement and Calculation of the Active Room Airflow

The Permittees shall measure the airflow rate and use the room cross-sectional area to calculate the volume of air flowing through a disposal room. The measurement of airflow shall use a calibrated anemometer and a moving traverse (McPherson, 1993). Airflow measurements shall be collected at an appropriate location, chosen by the operator to minimize airflow disturbances, near the entrance of each active room. The excavation dimensions at the measurement location are taken and the cross-sectional area is calculated. The flow rate is the product of the air velocity and the cross-section area. The value shall be entered on a log sheet (see Table O-3) and compared to the required minimum. The format and content of the log sheet may vary, but will always contain the data and information shown on Table O-3. Working

values are in acfm and the conversion to scfm is described in section O-1 above.
Measurements shall be collected, recorded, and verified by qualified operators.
The operator shall compare the recorded acfm value with the minimum acfm value provided at
the top of the log sheet. The airflow shall be re-checked and recorded whenever there is an
operational mode change or a change in ventilation system configuration. Once the ventilation
rate has been recorded and verified to be at least the required minimum, personnel access to
the room is unrestricted in accordance with normal underground operating procedures. If the
required ventilation rate cannot be achieved, or cannot be supported due to operational needs,
access to the room shall be restricted. Those periods when active disposal room access is
restricted shall be documented on the log sheet for that active disposal room. Entry to restricted
access active rooms for the purpose of establishing normal ventilation is allowed. Such entry
shall be documented on the log sheet including a reference to the SOP used for reentry,
O-3d Quarterly Verification of Total Mine Airflow
The Permittees shall perform a quarterly verification of the total mine airflow to ensure that rates
established by the Test and Balance for various operational modes are reasonably maintained.
These checks are identified in Permit Attachment E, Table E-1, and are performed as indicated
in Table E-1.
O-4 Equipment Calibration and Maintenance
Equipment used for the periodic Test and Balance, quarterly flow verification checks, and daily
verification of active disposal room flow rate shall be calibrated in accordance with appropriate
WIPP calibration and data collection procedures. Work performed by subcontractors shall also

be calibrated to an equivalent standard. Equipment shall be inspected before each use to
ensure that it is functioning properly and that the equipment calibration is current. Maintenance
of equipment shall be completed by qualified individuals or by qualified off-site service vendors.
Equipment used to conduct the Test and Balance, Quarterly Verification of Total Mine Airflow,
and to determine the airflow through the active disposal room(s) are provided in Table O-2.
O-5 Reporting and Recordkeeping
O-5a Reporting
The Permittees shall submit an annual report to NMED presenting the results of the data and
analysis of the Mine Ventilation Rate Monitoring Plan. In the years that the Test and Balance is
performed, the Permittees will provide a summary of the results in the annual report.
The Permittees shall calculate the running annual average mine ventilation rate on a monthly
basis and evaluate compliance with the minimum ventilation rate for an active room specified in
Permit Section 4.5.3.2 on a monthly basis. The Permittees shall report the Secretary in the

annual report specified in Permit Section 4.6.4.2 whenever the evaluation of the mine ventilation monitoring program data identifies that the ventilation rates specified in Permit Section 4.5.3.2 have not been achieved..

O-5b Recordkeeping

The Permittees shall retain the following information in the Operating Record:

- The CMRO Log documenting the ventilation system operating mode.
- The underground facility running annual average mine ventilation rate on a monthly basis.
- Active disposal room ventilation flow rate readings as documented on the Active Disposal Room Ventilation Rate Log Sheet (Table O-3).
- The quarterly flow verification check and associated documentation.

These records will be maintained in the facility Operating Record until closure of the WIPP facility.

O-6 Quality Assurance

Quality assurance associated with the Mine Ventilation Rate Monitoring Plan shall comply with the requirements of the WIPP Quality Assurance Program Description (**QAPD**). The Permittees shall verify the qualification of personnel conducting ventilation flow measurements. The instrumentation used for monitoring both underground and active disposal shall be calibrated in accordance with the applicable provisions of the WIPP procedures. The software used to calculate the monthly and annual running averages and the ventilation simulation software programs shall be controlled in accordance with the WIPP QAPD and WIPP computer software quality assurance plans.

Data generated by this plan, as well as records, and procedures to support this plan shall be maintained and managed in accordance with the WIPP QAPD. Nonconformance or conditions adverse to quality as identified in performance of this plan will be addressed and corrected as necessary in accordance with applicable WIPP Quality Assurance Procedures.

REFERENCES

McPherson, M. J., 1993. *Subsurface Ventilation and Environmental Engineering*, Chapman & Hall, London, First Edition.

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TABLES

Working Copy

Effective Date: 12/06/11

00CD-0001
Revision 32

WIPP Mine Ventilation Plan

Cognizant Section: Mine Engineering

Approved by: Rey Carrasco

WIPP Mine Ventilation Plan Change History			
Date	**Revision Number**	**ECO Number**	**Description of Change**
04/30/00	6	9548, Add 2	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	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	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	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	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	Document reformatted and changes made. Document controlled in QMIS.
07/16/02	12	No ECO	Editorial change to add piece of equipment to Table 2, Underground Diesel equipment.
03/12/03	13	10692	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	Revision to airflow path, routing air through S-2180 instead of S-1600.
12/16/03	15	10836	Removal of U/G booster fans, bulkheads, and vent reversal mode per ECP-1-VU00-009.
01/14/04	16	10935	Correction to manufacturer name, Table 2.
07/29/04	17	11069	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	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	Incorporate drawing revisions
01/11/06	20	11428	Incorporate drawing revisions, update references and Table 2.

WIPP Mine Ventilation Plan Change History			
Date	**Revision Number**	**ECO Number**	**Description of Change**
05/10/06	21	11543	Complete rewrite, incorporate drawing revisions.
12/18/06	22	11687	Incorporate new diesel equipment to the equipment list and update the current and future mine footprint layouts.
07/18/07	23	11820	Updating drawings associated with the plan and updating the diesel equipment list.
09/14/07	24	11858	Correction to description of equipment 52-H-127, Table 2.
04/01/08	25	11992	Addition of Equipment in Table 2 and corrected Eng. Model number on 2 pieces of equipment.
12/17/08	26	12157 Add. 1	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	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	Updated to show current underground diesel equipment, a current mine map, and a map showing the projected mine layout in December 2010.
06/21/10	29	12600	Update to show current footprint and current diesel equipment.
12/31/10	30	12742	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	Updated to show current footprint and current diesel equipment.
12/06/11	32	12962	Updated to show current footprint and current diesel equipment.

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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. They 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:	Washington TRU Solutions LLC (WTS)

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. They 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.

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 cubit feet of air per minute
acfm - actual cubit 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.

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.

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	20,000	NONE
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	20,000	NONE
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	20,000	NONE
52-H-127	TOYOTA	FORKLIFT	7FDU80	STALL 04.6137	80	15,000	NONE
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	7,500	TIER 2
74-GE-001	YANMAR/ HITACHI	SANITATION TRAILER	L6O AE-DE	81L	10	2,500	NONE
74-H-014	PRIME MOVER	SKID STEER	L-1300	QVD	40	5,000	NONE
74-H-026	TOYOTA	FORKLIFT(4T)	02-5FD35	11Z	81	10,000	NONE
74-H-027	TOYOTA	FORKLIFT(4T)	02-5FD35	11Z	81	10,000	NONE
74-H-029	MELROE	SKID-STEER	753-C	V2203E	40	5,000	NONE
74-H-034	TOYOTA	FORKLIFT (6T)	7FDU70	13Z	89	7,500	TIER 2
74-H-035	TOYOTA	FORKLIFT (4-T)	5FD35	13Z	89	7,500	TIER 2
74-H-036	TOYOTA	4-TON FORKLIFT	5FD35	13Z	89	7,500	TIER 2
74-H-039	GENIE	BOOM MAN LIFT	Z34-34/22IC	D-1105	23.5	2,500	TIER 2
74-PE-001	YANMAR	PORT. GEN	6121002	LA SERIES 40544	9	1,000	NONE
74-PE-003	YAMAHA	PORTABLE GENERATOR	EDL65005	ZB600-EGL	13.5	2,500	NONE
74-Q-012	KAWASAKI	AMBULANCE	2510	2510	24	3,000	NONE
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

Table 2 - UNDERGROUND DIESEL EQUIPMENT

WIPP Equip #	Manufacturer	Description	Model	Eng. Model	HP	MSHA CFM	MSHA Cert #
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-020	KUBOTA	TRACTOR	L-245	DH1101-A	25	2,000	24/D108-0
74-U-021	KUBOTA	TRACTOR	L-245	DH1101-A	25	2,000	24/D108-0
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	3,500	TIER 2 EPA
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	2,500	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	9SB3.9	120	6,500	TIER 2
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	6,500	TIER 2
74-U-132	KUBOTA	UTILITY TRACTOR	L4240 HST	V2203	42	3,000	TIER 2
74-U-133	KUBOTA	UTILITY TRACTOR	L4240 HST	V2203	42	3,000	TIER 2
74-U-137	FLETCHER	ROOF BOLTER	3020N-AD	QSB-4.5	130	6,500	TIER 3
74-U-138	SANDVIK	4 YD. LHD	LH307	OM906LA	201	7,500	7E-B083
74-U-139	ATLAS COPCO	CRAWLER DRILL	U4	D2011L03	46	3,500	TIER 4 I
74-U-603	SIMMONS	BOOM LIFT TRUCK	32/216	F2L1011	28	5,000	24/D141-0
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	2,500	TIER 4
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	2,000	TIER 2
74-W-011	MILLER BOBCAT	WELDER/ GENERATOR	250 DIESEL	D722	16.5	3,600	TIER 2

Table 2 - UNDERGROUND DIESEL EQUIPMENT							
WIPP Equip #	**Manufacturer**	**Description**	**Model**	**Eng. Model**	**HP**	**MSHA CFM**	**MSHA Cert #**
74-W-012	KUBOTA	GENERATOR	GL 7000	Z482-EBG	10.9	1,500	TIER 4
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 II
75-H-031	SIMON	MANLIFT	32/21G	F2L1011	28	1,500	7E-B062-0

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)

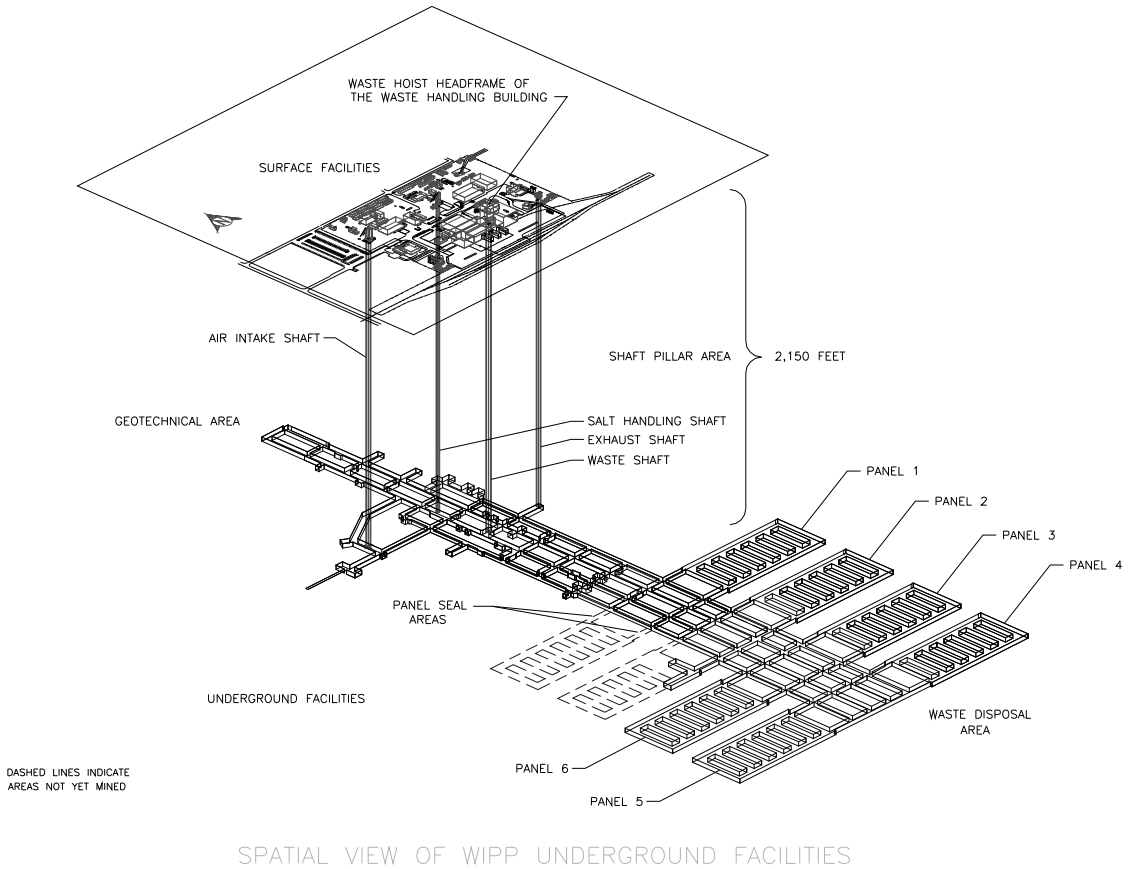


Figure 1, WIPP in Perspective

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. Fresh air entering the repository from the AIS is split in E0 to the north and south. The north air split is used to ventilate the North Area, which includes materials storage, an experimental area, and the underground diesel maintenance shop.

The south air split merges with the air from the SH shaft and travels south through the W30 entry. At S1000 this air is split into two ventilation circuits, the Waste Disposal Circuit and the Construction (mining) Circuit. The air split that goes to E140 (Waste Disposal Circuit) is used to ventilate the Waste Disposal areas.

The air split that stays in W30 is used to ventilate the Construction Circuit (mining) and may be exhausted through either W170 or E300, depending on operational needs.

Air entering through the WS is used to ventilate the WS and the Waste Shaft Station. This air is routed directly to the ES.

8.2 Modes of Operation

8.2.1 Normal Modes of Operation

The WIPP facility has five different fan usage configurations, modes of operation that can be set to supply variable quantities of air to the underground for normal day-to-day operation. The mode of operation is determined by the operational needs of the facility. The five modes are:

Normal Ventilation: Two of the three main 700 exhaust fans operating provide approximately 425,000 scfm unfiltered.

Alternative Ventilation: One of the three main 700 exhaust fans operating provides approximately 260,000 scfm unfiltered.

Maintenance Ventilation: One or two 700 exhaust fan(s) and one or two 860 filtration fan(s) operate in parallel.

Reduced Ventilation: Two 860 filtration fans, operating as unfiltered, provide 60,000 scfm each.

Minimum Ventilation: One 860 filtration fan, operating as unfiltered, provides 60,000 scfm.

8.2.2 Off-Normal Mode of Operation

WIPP has the following mode of operation to deal with "off-normal" conditions, such as a radioactive release:

Filtration Mode: One 860 filtration fan operating in conjunction with a High Efficiency Particulate Air (HEPA) filtration system located in the Exhaust Filter Building. Filtration mode is initiated either automatically (after the system detects a radioactive release) or manually through the Central Monitoring Room (CMR). 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 scfm in this mode.

8.3 Additional Ventilation Control Features

8.3.1 Shaft Isolation Doors

The Salt Shaft, Waste Shaft and Air Intake Shaft are equipped with fire isolation 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 main or 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 provide minimum 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

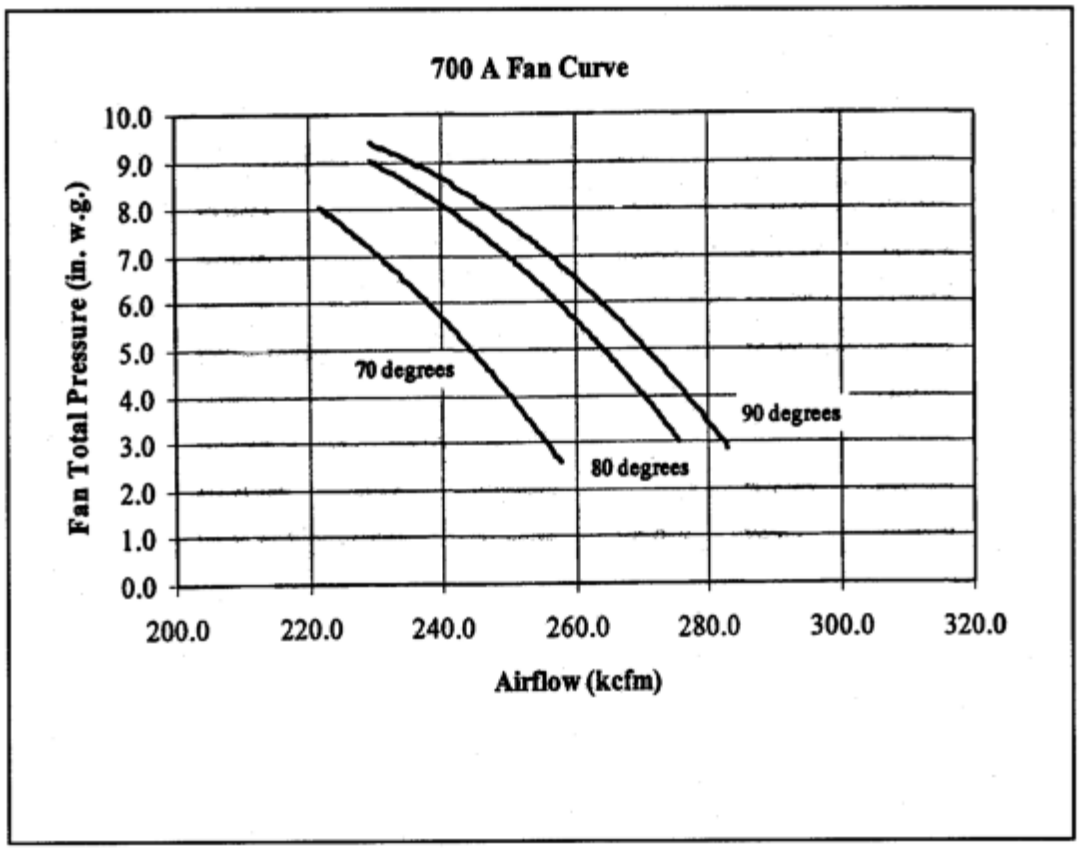
Appendix A – Drawing of Current Underground Mine Ventilation System (Drawing No. 54-W-001-W)

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)

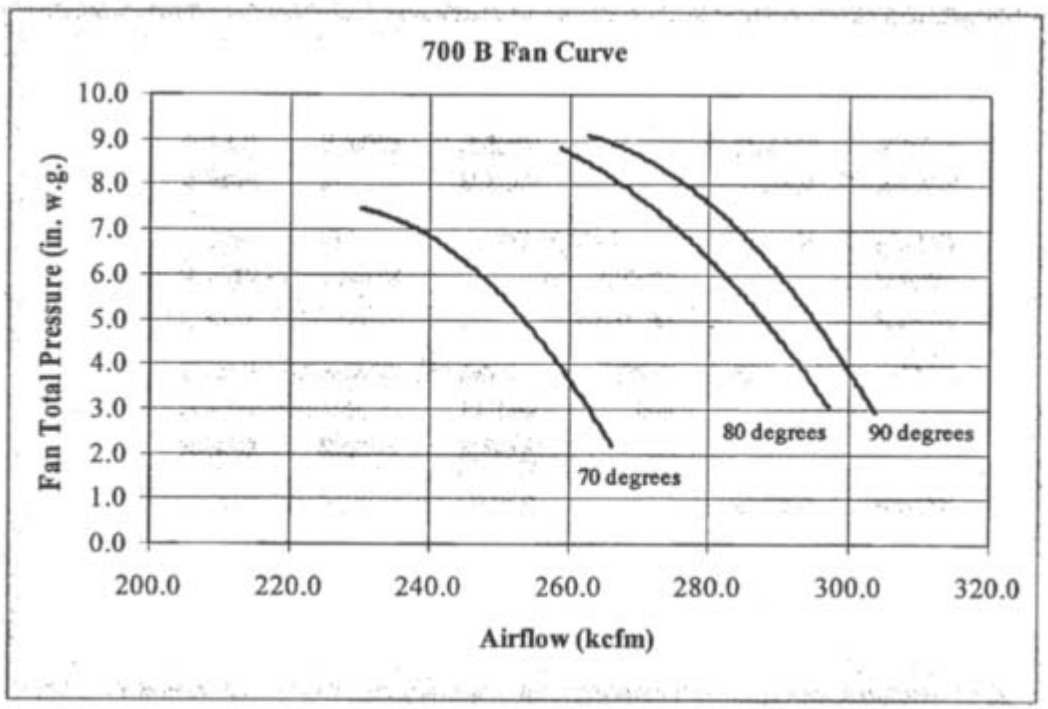
This drawing is available in the Engineering File Room.

Appendix C – Fan Curves



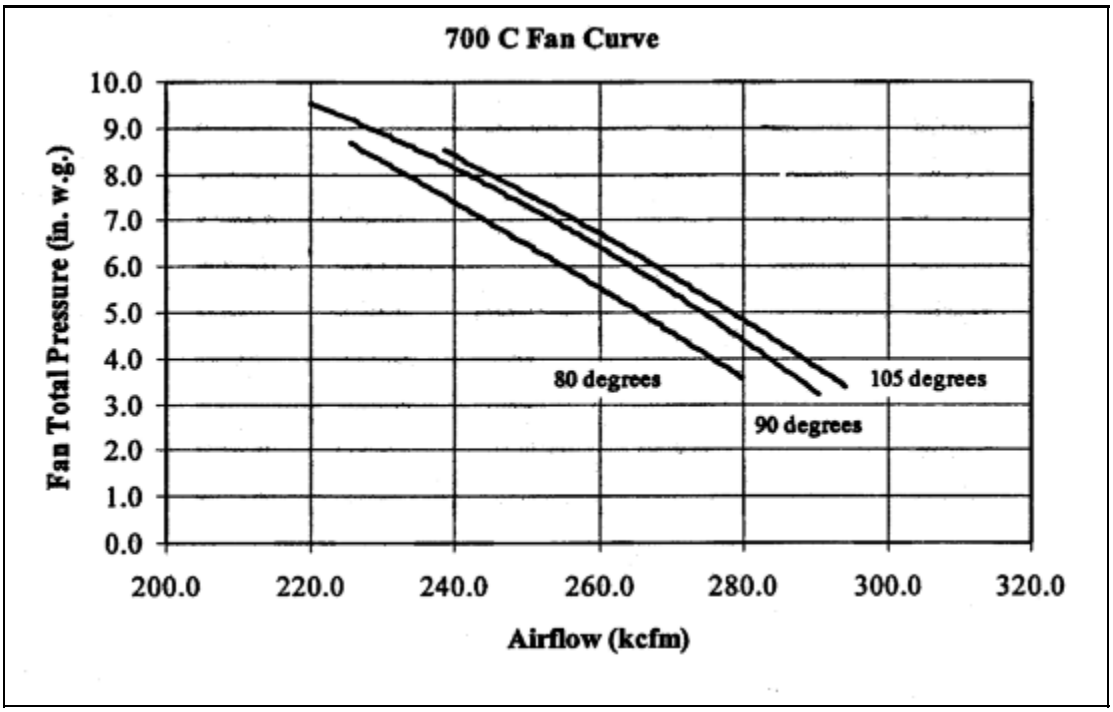
Fan 700A

Appendix C – Fan Curves (continued)



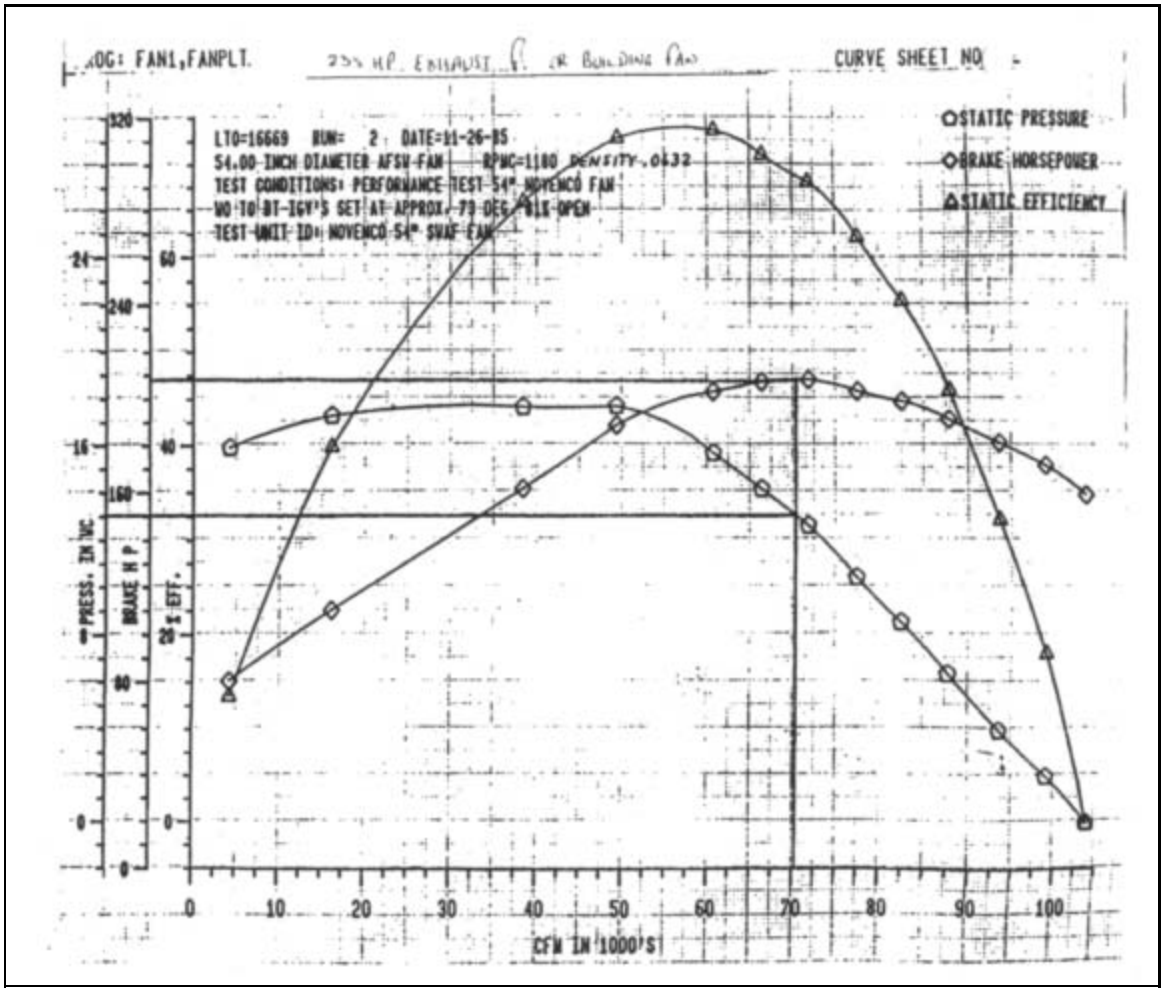
Fan 700B

Appendix C – Fan Curves (continued)



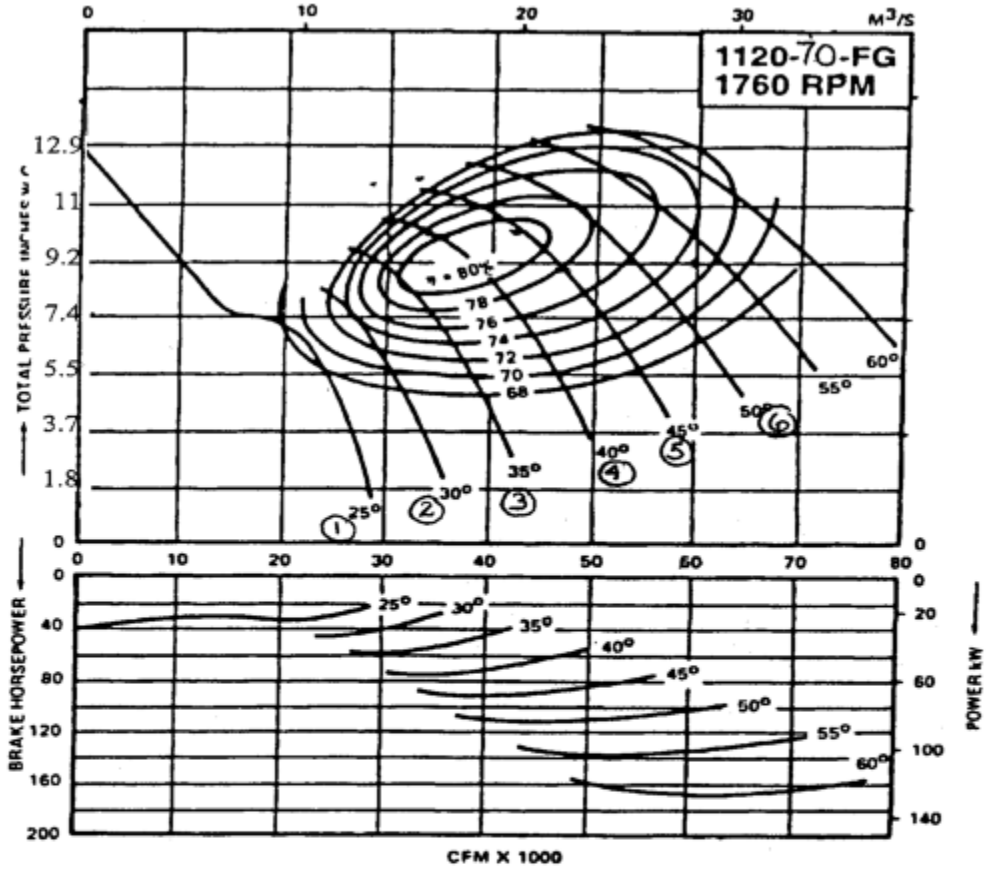
Fan 700C

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

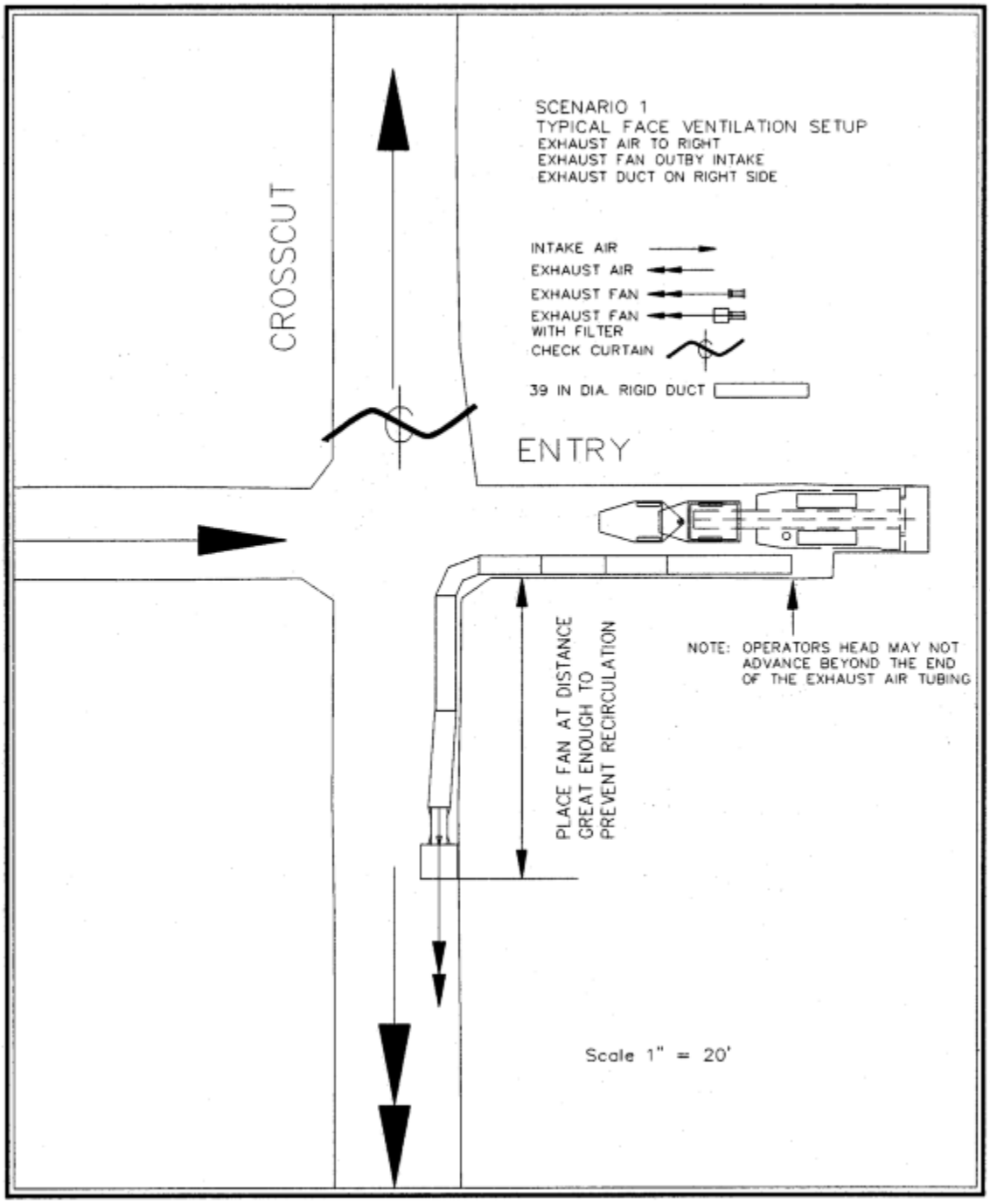
Auxiliary Mine Fan for Mining: Spendrup Model 1120-70

Appendix C – Fan Curves (continued)

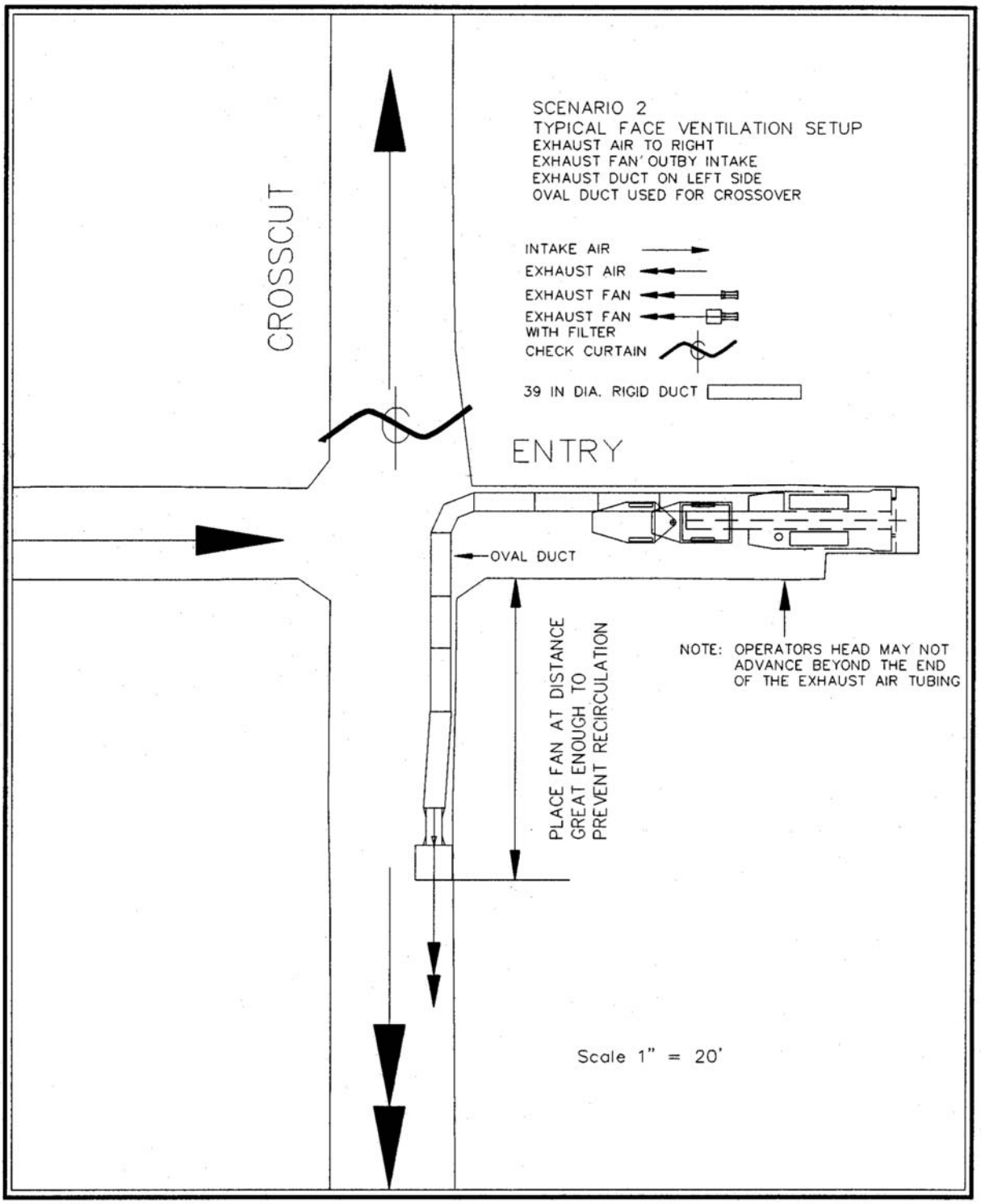
Fan Pressures for a Spendrup 1120-70 FG							
Quantity	Velocity Pressure	Blade Setting 3		Blade Setting 4		Blade Setting 5	
Q (cfm)	H_V (in W.G.)	H_T	H_S	H_T	H_S	H_T	H_S
20000	0.22	Undef.	Undef.	Undef.	Undef.	Undef.	Undef.
25000	0.35	Undef.	Undef.	Undef.	Undef.	Undef.	Undef.
30000	0.50	9.0 ***	8.50	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.**

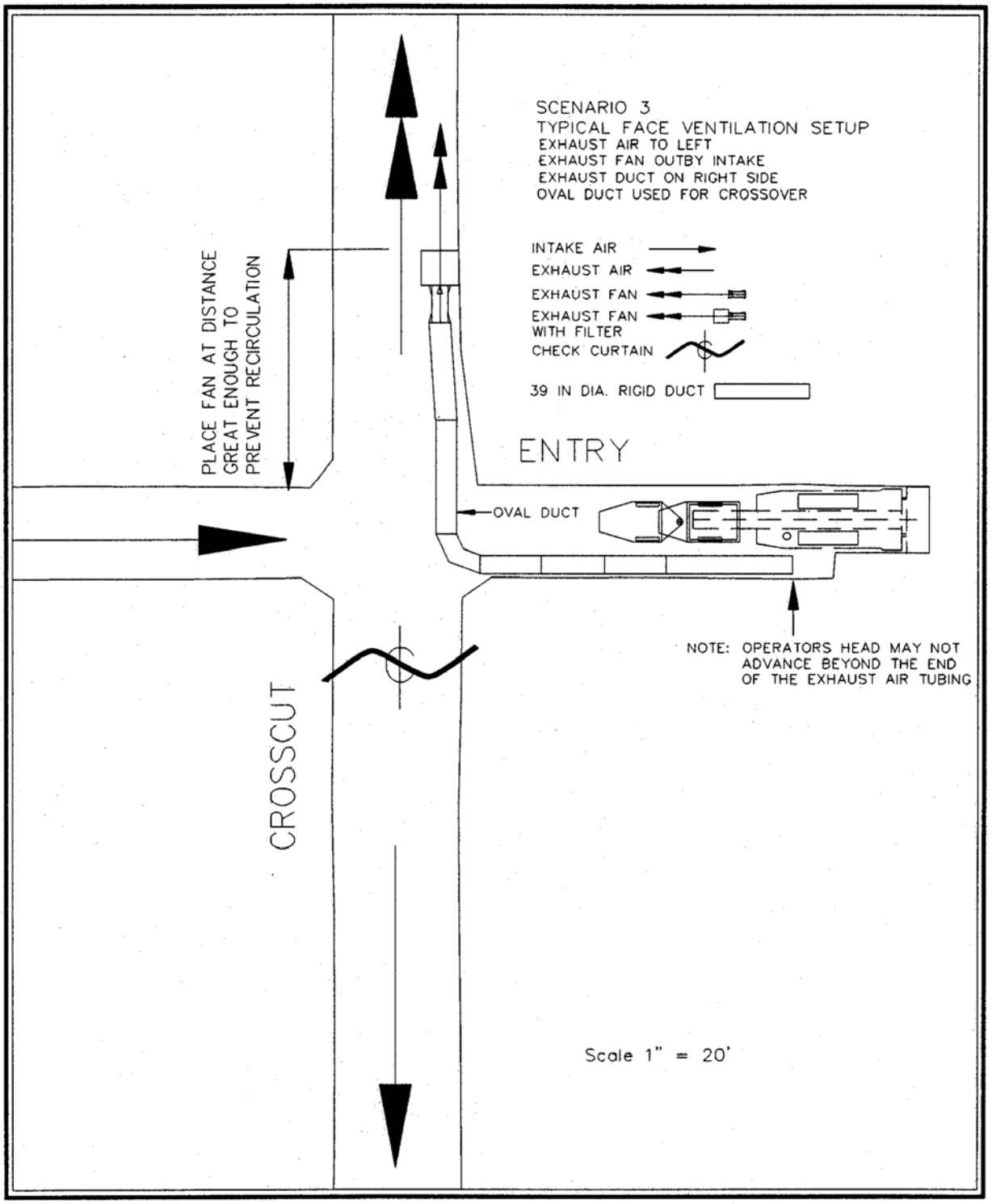
Appendix D – Typical Face Ventilation Scenarios



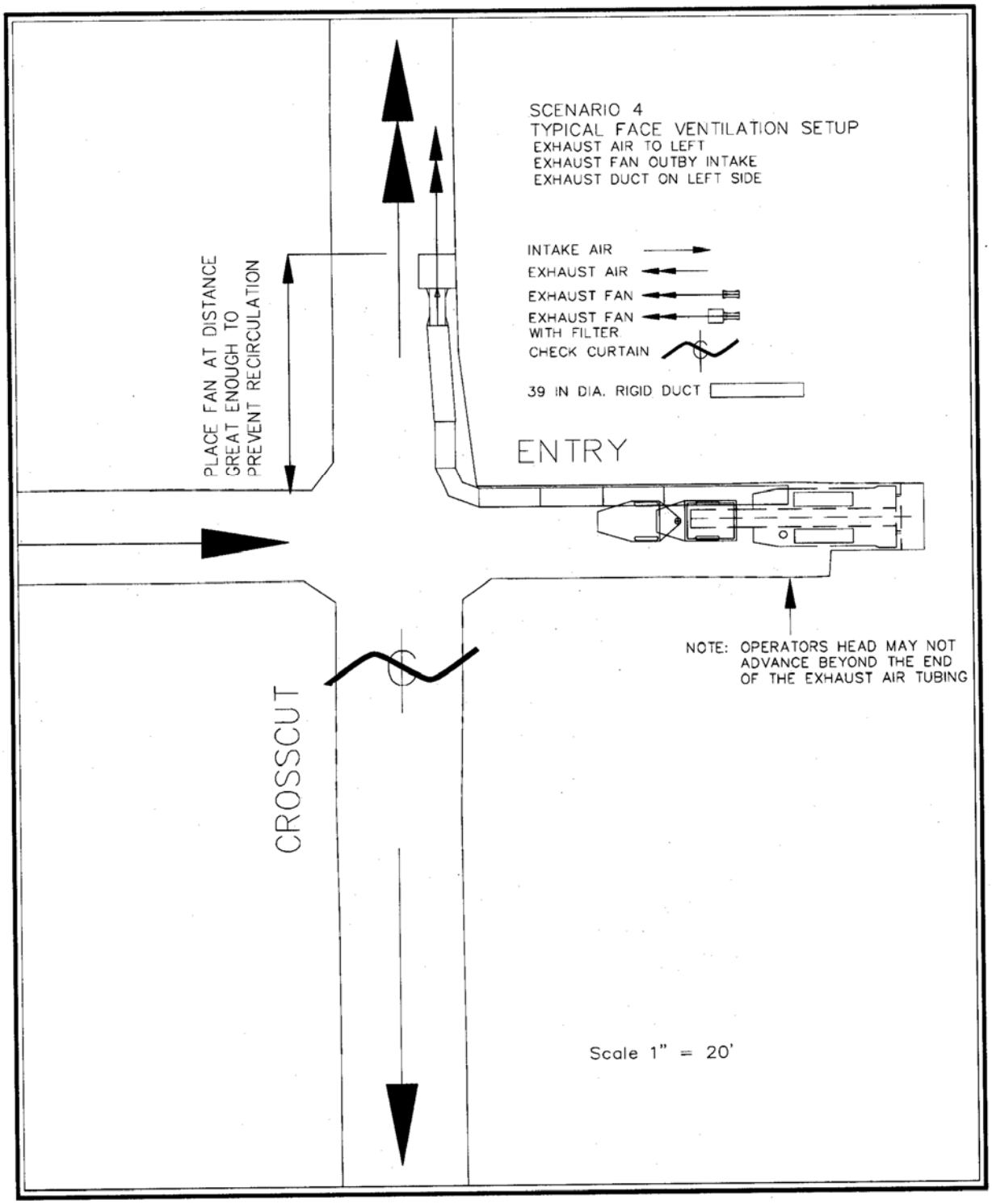
Appendix D – Typical Face Ventilation Scenarios (continued)



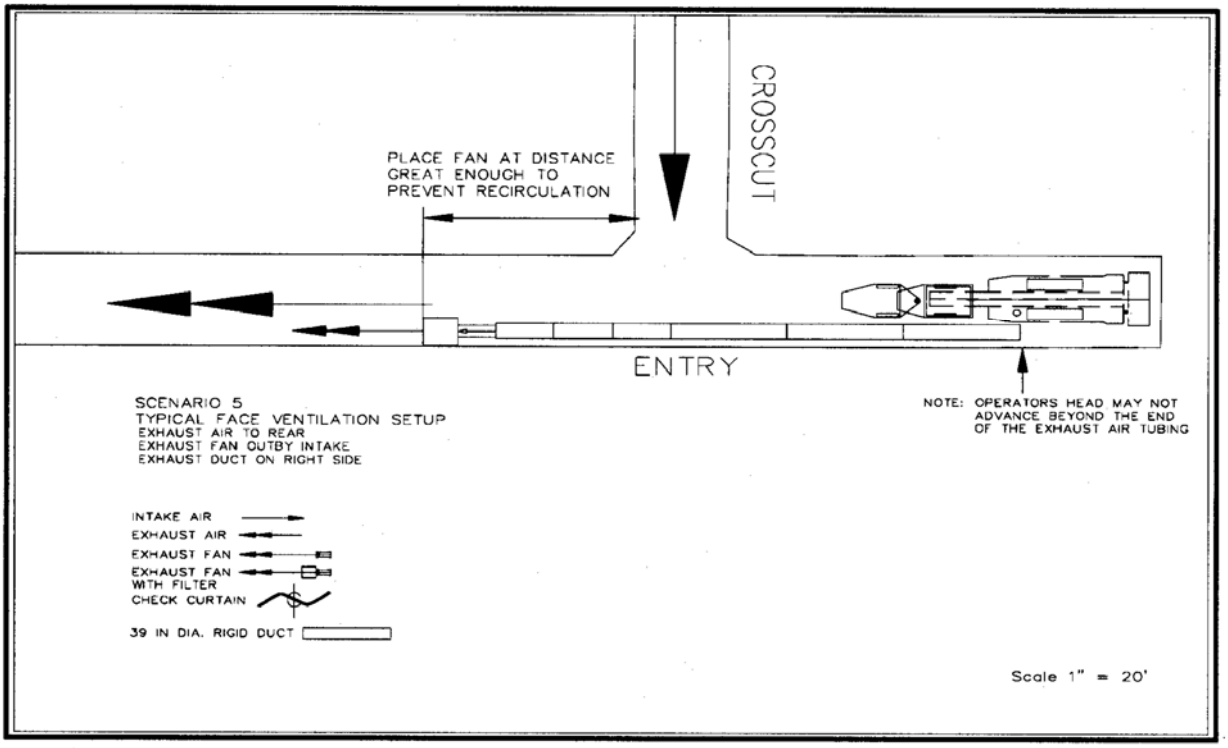
Appendix D – Typical Face Ventilation Scenarios (continued)

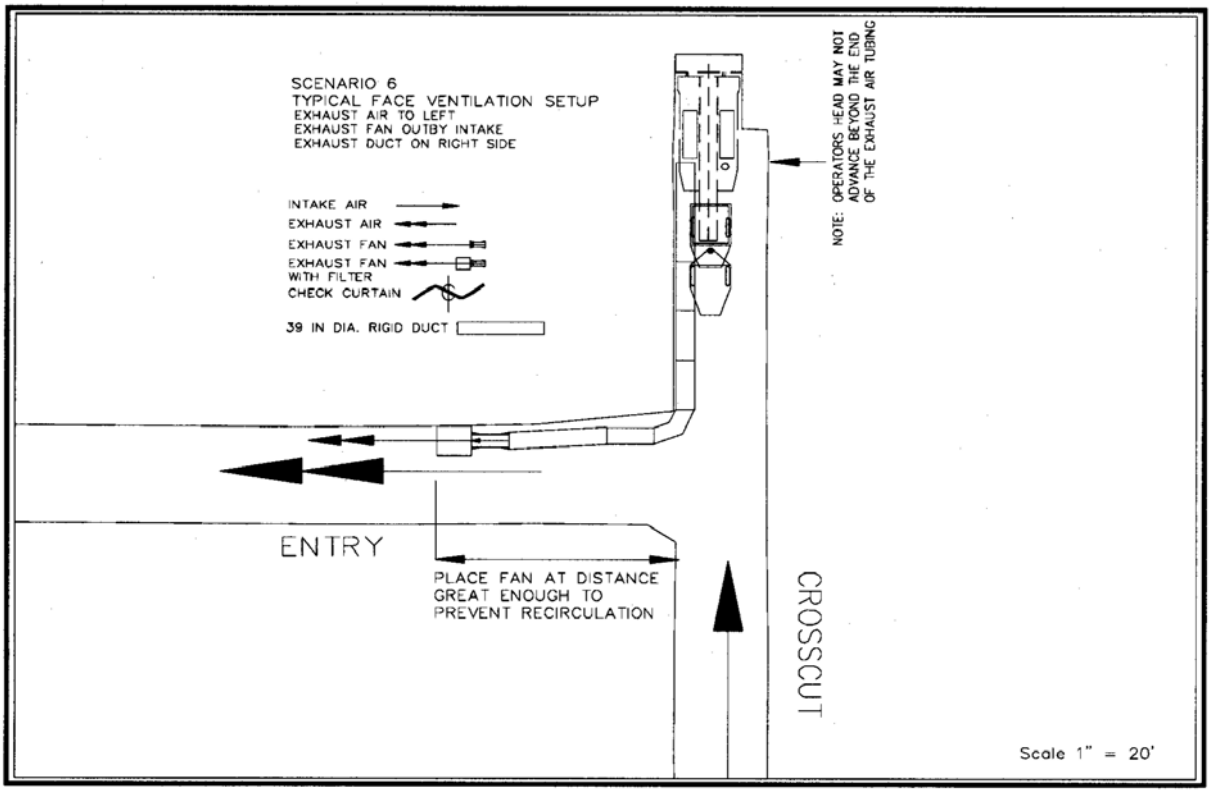


Appendix D – Typical Face Ventilation Scenarios (continued)

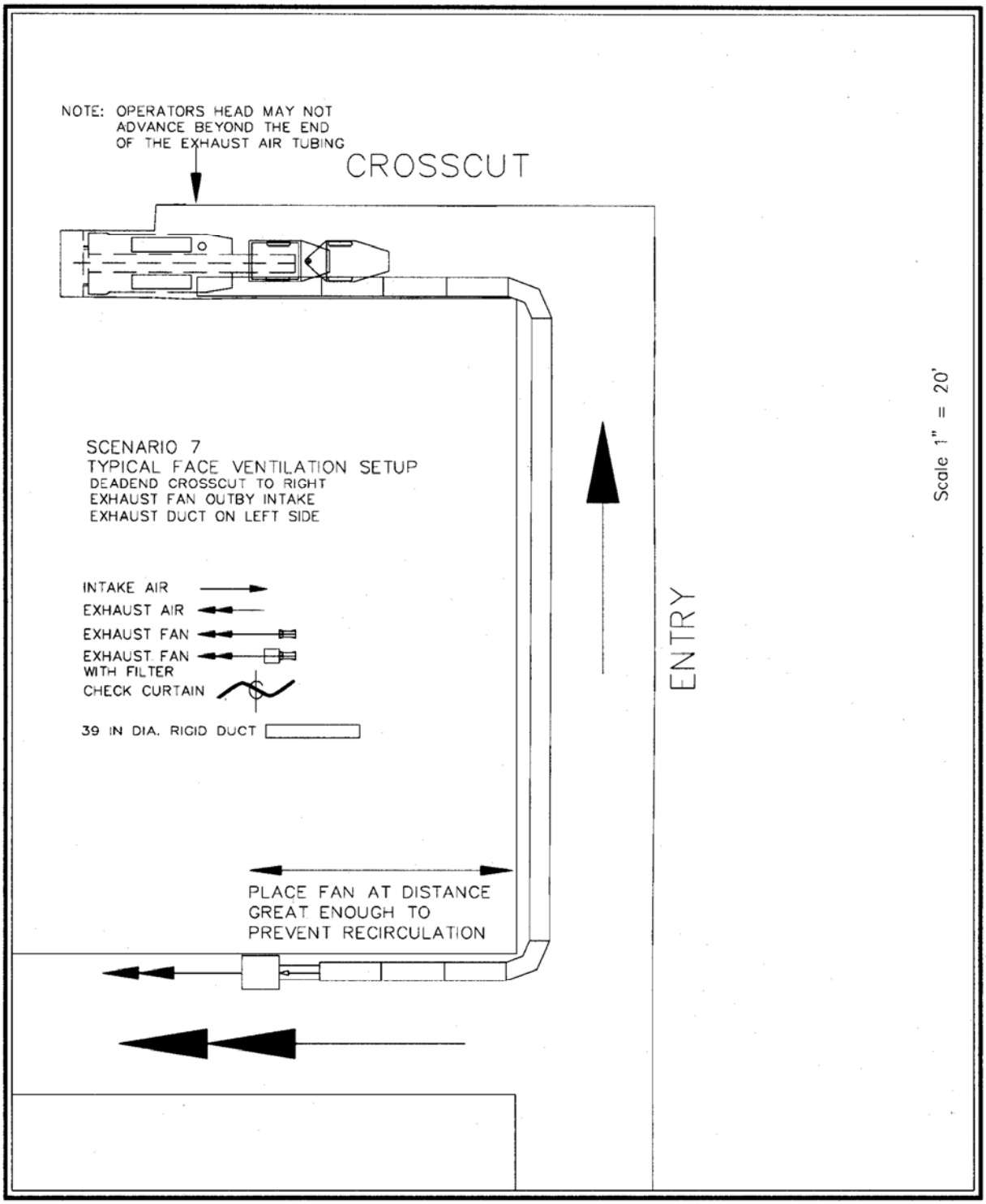


Appendix D – Typical Face Ventilation Scenarios (continued)





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.

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

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

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/ft^3

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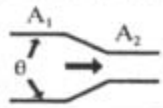
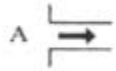
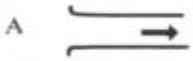
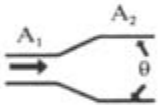
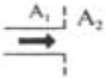
Appendix E – Auxiliary Ventilation System Design/Installation Considerations (cont.)

Loss coefficients for area changes

Type	Illustration	Conditions	Loss Coefficient
Gradual Contraction		θ 30° 45° 60°	C_2 0.02 0.04 0.07
Equal Area Transformation		$A_1 = A_2$ θ ≤ 14°	C 0.15
Flanged Entrance		A = ∞	C 0.34
Duct Entrance		A = ∞	C 0.85
Formed Entrance		A = ∞	C 0.03
Gradual Expansion		θ 5° 7° 10° 20° 30° 40°	C_1 0.17 0.22 0.28 0.45 0.59 0.73
Abrupt Exit		$A_2 = \infty$ $A_1/A_2 = 0.0$	1.00

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

Loss coefficients for elbows

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

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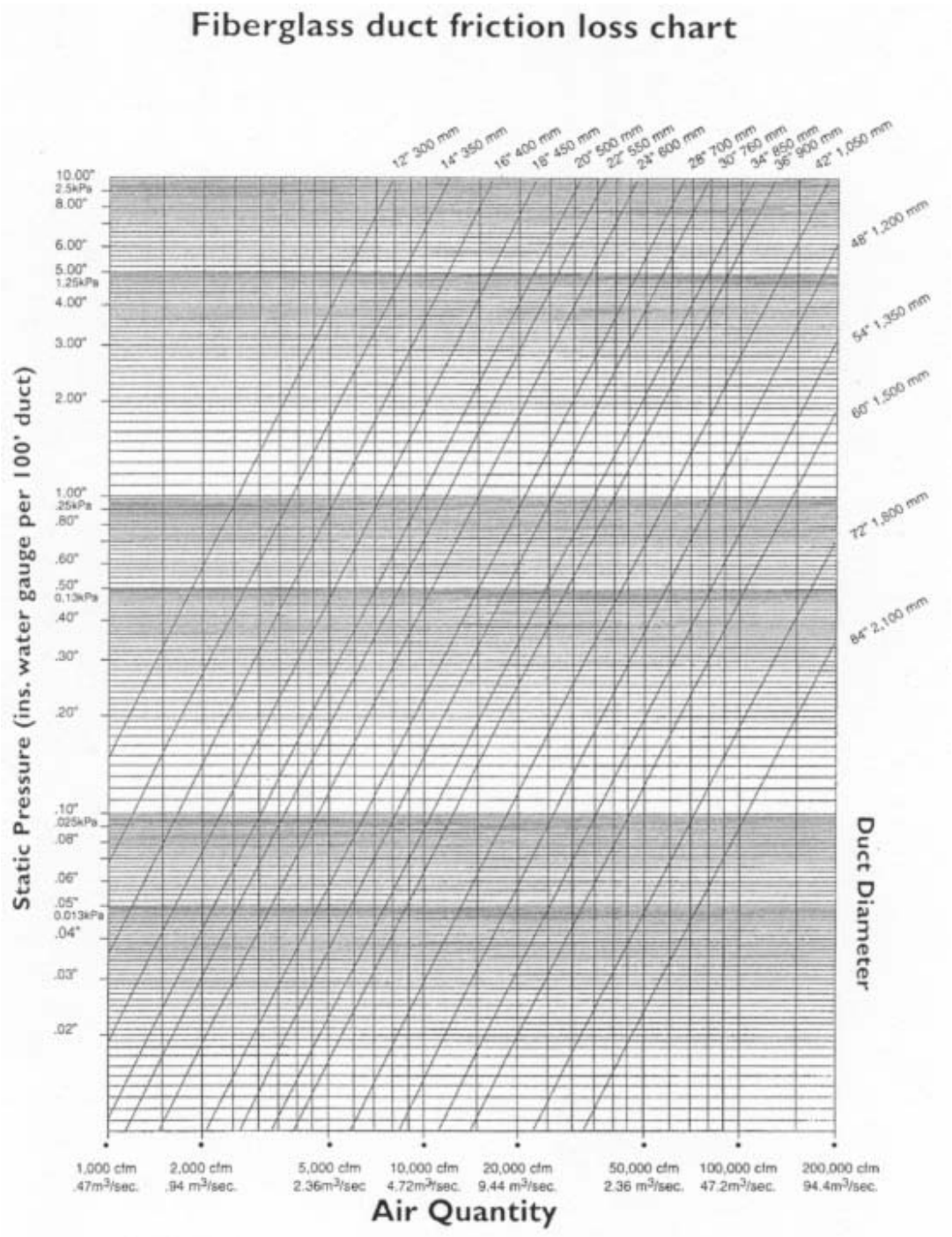
Appendix E – Auxiliary Ventilation System Design/Installation Considerations (cont.)



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