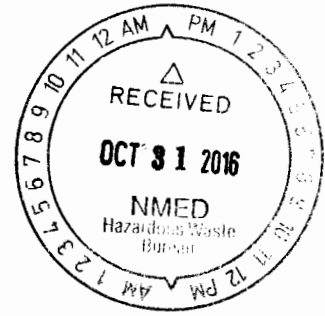




 **ENTERED**

**Department of Energy**  
Carlsbad Field Office  
P. O. Box 3090  
Carlsbad, New Mexico 88221



**OCT 27 2016**

Mr. John E. Kieling, Bureau Chief  
Hazardous Waste Bureau  
New Mexico Environment Department  
2905 Rodeo Park Drive East, Building 1  
Santa Fe, New Mexico 87505-6303

**Subject: Transmittal of the Mine Ventilation Rate Monitoring Annual Report**

Dear Mr. Kieling:

The Mine Ventilation Rate Monitoring Annual Report, required by the Waste Isolation Pilot Plant Hazardous Waste Facility Permit No. NM4890139088—TSDf, is attached. This report satisfies the Permit Part 4, Section 4.6.4.2. and Permit Attachment O, Section O-5a.

The Permit requires that the Test and Balance of the WIPP mine ventilation system be conducted on a 12-18 month interval, not to exceed 18 months. The most recent Test and Balance was conducted in June 2013. The next one was due no later than October 2015. However, due to the inaccessibility of portions of the WIPP underground as a result of the February 14, 2014, radiological event, and the fact that the underground ventilation has been operated in the filtration mode since the event, the Test and Balance of the WIPP mine ventilation system cannot be performed within the required time period for this reporting period. Information regarding the inability to conduct the Test and Balance was previously provided to you in the 2015 Mine Ventilation Rate Monitoring Annual Report, transmitted to you on October 27, 2015 and the Underground Compliance Plan transmitted to you on June 25, 2014, pursuant to New Mexico Administrative Order dated May 12, 2014. The Permittees' inability to conduct the Test and Balance during the reporting period does not pose a threat to human health or the environment since the system continues to be operated in filtration mode and no Permit-related TRU mixed waste handling activities were conducted in the underground. However, a Test and Balance was conducted as a start-up activity for the Interim Ventilation System in September 2016. This Test and Balance will be reported in the next Mine Ventilation Rate Monitoring Annual Report.

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



OCT 27 2016

Mr. John E. Kieling

-2-

Please contact Mr. George T. Basabilvazo at (575) 234-7488 if you have questions regarding this submittal.

Sincerely,



Todd Shrader, Manager  
Carlsbad Field Office



Philip J. Breidenbach, Project Manager  
Nuclear Waste Partnership LLC

cc: w/enclosure

K. Roberts, NMED           \*ED

R. Maestas, NMED         ED

C. Smith, NMED           ED

CBFO M&RC

\*ED denotes electronic distribution

# Mine Ventilation Rate Monitoring Annual Report- EMENDED

United States Department of Energy  
Carlsbad Field Office  
Carlsbad, New Mexico

October 2016



**Mine Ventilation Rate Monitoring Annual Report  
DOE/WIPP-16-3557**

---

This document has been submitted as required to:

U.S. Department of Energy  
Office of Scientific and Technical Information  
PO Box 62  
Oak Ridge, TN 37831  
(865) 576-8401

Additional information about this document may be obtained by calling  
1-800-336-9477.

Unlimited, publicly available full-text scientific and technical reports  
produced since 1991 are available online at Information Bridge  
([www.osti.gov/bridge](http://www.osti.gov/bridge)).

U.S. Department of Energy and its contractors may obtain full-text reports  
produced prior to 1991 in paper form, for a processing fee, from:

U.S. Department of Energy  
Office of Scientific and Technical Information  
P.O. Box 62 Oak Ridge, TN 37831-0062  
Phone: (865) 576-8401  
Fax: (865) 576-5728  
Email: [reports@osti.gov](mailto:reports@osti.gov)

Available for sale to the public from:

U.S. Department of Commerce  
National Technical Information Service  
5301 Shawnee Rd Alexandria, VA 22312  
Phone: (800) 553-6847 or (703) 605-6000  
Fax: (703) 605-6900  
Email: [info@ntis.gov](mailto:info@ntis.gov)

**Mine Ventilation Rate Monitoring Annual Report  
DOE/WIPP-16-3557**

---

**TABLE OF CONTENTS**

ABBREVIATIONS/ACRONYMS..... 4

EXECUTIVE SUMMARY..... 5

1.0 INTRODUCTION..... 6

    1.1 Total Mine Ventilation Rate Monitoring in the U/G Repository ..... 7

    1.2 Ventilation Rate Monitoring in the Active Disposal Room ..... 8

    1.3 Test and Balance ..... 9

    1.4 Quarterly Airflow Verification Checks..... 9

2.0 MINE VENTILATION RATE MONITORING RESULTS ..... 10

    2.1 Total Mine Ventilation Rate..... 10

    2.2 Active Disposal Room Ventilation Rate..... 11

    2.3 Test and Balance ..... 11

    2.4 Quarterly Airflow Verification Checks..... 12

3.0 QUALITY ASSURANCE RESULTS ..... 12

    3.1 Description of Mine Ventilation Rate Monitoring QA Program ..... 12

4.0 SUMMARY OF MINE VENTILATION RATE MONITORING ..... 12

5.0 REFERENCES ..... 13

Attachment 1 – Monthly Summary of Mine Ventilation Rate Monitoring..... 14

**LIST OF TABLES**

Table 1 – Ventilation Operating Modes and Associated Flow Rate..... 7

Table 2 – Ventilation Operating Modes and Associated Flow Rate..... 9

Table 3 – Summary of Total Mine and Active Disposal Room Ventilation Flow Rate  
Monitoring Data ..... 11

**Mine Ventilation Rate Monitoring Annual Report  
DOE/WIPP-16-3557**

---

**ABBREVIATIONS/ACRONYMS**

acfm	actual cubic feet per minute
AO	Administrative Order
CMRO	Central Monitoring Room Operator
hp	horsepower
MOC	Management and Operating Contractor
MVRMP	Mine Ventilation Rate Monitoring Plan
NMED	New Mexico Environment Department
Permit	Waste Isolation Pilot Plant Hazardous Waste Facility Permit
PPE	Personal Protective Equipment
QA	quality assurance
QAPD	Quality Assurance Program Description
RPD	relative percent difference
scfm	standard cubic feet per minute
U/G	underground
WIPP	Waste Isolation Pilot Plant

**Mine Ventilation Rate Monitoring Annual Report  
DOE/WIPP-16-3557**

---

**EXECUTIVE SUMMARY**

The Waste Isolation Pilot Plant (WIPP) Hazardous Waste Facility Permit (Permit) Part 4 requires the WIPP facility Permittees to implement the WIPP Mine Ventilation Flow Rate Monitoring Plan (MVRMP) in Attachment O of the Permit. The MVRMP describes how compliance with the ventilation requirements described in Permit Part 4, Section 4.5.3.2 for airflow rates for the active disposal room are obtained and documented. The MVRMP requires ventilation flow rate measurements for each active disposal room, to document that the airflows meet Permit conditions. In addition, the MVRMP describes the work that was performed regarding the Test and Balance and the quarterly verification of the total mine airflow as described in Permit Attachment O.

Prior to the implementation of a Class 2 Permit Modification Request on February 10, 2016, the Mine Ventilation Rate Monitoring Plan required reporting of the running annual average mine ventilation rate for the underground. The requirement was removed with the implementation of the Class 2 Permit Modification on February 10, 2016. For this reason, this report supplies data and information on the running annual average mine ventilation rate for the time period of July 1, 2015 through February 28, 2016.

Permit Part 4, Section 4.6.4.2 requires that an annual report be submitted every October with the results of the data and analysis of the Mine Ventilation Rate Monitoring Plan. The reporting period for this MVRMP is July 1, 2015 through June 30, 2016. During the reporting period<sup>1</sup>, the lowest monthly annual running average total U/G repository ventilation flow rate was 59,608 standard cubic feet per minute (scfm). As of June 30, 2016, Attachment O, Section O-3, describes three 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 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

The mine ventilation was shifted to Filtration Mode (60,000 standard cubic feet per minute [scfm]) on February 14, 2014 due to a radiation release from Panel 7, Room 7. The low annual running average total U/G repository flow rate of 59,608 scfm is a result of operating in Filtration Mode for the reporting period<sup>1</sup>. A Test and Balance was not performed during the current reporting period due to recovery efforts. The next Test and Balance is scheduled for September, 2016.

A minimum of 42,000 actual cubic feet per minute (acfm) in an active disposal room is required to meet the minimum required ventilation rate of 35,000 scfm stipulated in the Permit. No waste disposal activities were performed during the reporting period. The

---

<sup>1</sup> The end of the reporting period for this data is February 29, 2016 due to the approval of the Class 2 Permit Modification Request (PMR) dated January 8, 2016 (effective February 10, 2016). This PMR removed the requirement for reporting the Running Mine Average Annual Flow Rate.

## Mine Ventilation Rate Monitoring Annual Report DOE/WIPP-16-3557

---

average ventilation flow rates were not calculated for the flow through the active disposal room since waste disposal did not occur during the reporting period.

Quarterly verification of the total mine air flow was not performed on the 700 fans as they did not operate during the reporting period. Flow instruments were installed on the 860 (filtration) fans in September 2015 to allow for quarterly verification of the total mine airflow.

### 1.0 INTRODUCTION

The New Mexico Environment Department (NMED) renewed the Permit on November 30, 2010. Attachment O of the Permit is the MVRMP. The MVRMP contains the methods for documenting compliance with the ventilation requirements described in Permit Part 4, Section 4.5.3.2.

The Permit also specifies that an annual report be submitted every October that describes the implementation of the MVRMP, and presents the results of the monitoring activities. This document was prepared to fulfill the annual reporting requirement for the period from July 1, 2015, to June 30, 2016.

A salt haul truck fire occurred in the U/G on February 5, 2014. Waste emplacement, mining, and U/G support activities were stopped while an investigation was performed. Subsequently, a radiation release from Panel 7, Room 7 occurred on February 14, 2014. The U/G repository has been in Filtration Mode since February 14, 2014. While the U/G remains in Filtration Mode, the Running Mine Average Annual Flow Rate has fallen below the minimum of 260,000 scfm. In addition, no waste disposal has occurred in the U/G therefore the Active Disposal Room ventilation measurements have not been made for the reporting period.

On May 12, 2014, the NMED issued an Administrative Order (AO) addressing permit-required actions that could not be performed in the underground due to the radiological conditions and the limited airflow available in Filtration Mode. The AO required development and submittal of a draft Underground Compliance Plan that described the current compliance status of each underground Permit requirement, a proposed timeline, including dates, for compliance and achieving underground recovery; and plans related to attaining compliance with the Permit; the reason(s) for any Permit noncompliance; and any other pertinent information. The draft Underground Compliance Plan was submitted to the NMED on June 25, 2014. The Plan notified NMED that the Permittees would not be able to meet the following Permit requirements:

- Annual running average ventilation flow of 260,000 scfm.
- The Permittees may not be able to conduct the next Test and Balance on the schedule prescribed in the Permit, however, Test and Balance will be necessary before the facility returns to TRU mixed waste handling operations.



**Mine Ventilation Rate Monitoring Annual Report  
DOE/WIPP-16-3557**

A Class 2 Permit Modification Request was approved by NMED on January 8, 2016, and was effective on February 10, 2016, that removed the requirement to report the Mine Ventilation Running Annual Average.

### 1.1 Total Mine Ventilation Rate Monitoring in the U/G Repository

To comply with Permit Part 4, the running annual average mine ventilation rate is computed on a monthly basis to assure that the minimum flow rate of 260,000 scfm is achieved. This running annual average is calculated based on monthly averages for run-times for the WIPP facility modes of ventilation operation, as tabulated in the Central Monitoring Room Operator (CMRO) Log. This information is recorded each time the ventilation system configuration changes, including periods when there is no ventilation. The operator uses the logged runtime data for various modes of operation, multiplied by the flow-rates for the different modes presented in Table 1, to calculate the average monthly and annual flow rate for the facility.

**Table 1 – Ventilation Operating Modes and Associated Flow Rate**

Mode of Operation	Flow Rate (scfm) – Nominal Values	Test and Balance Summary (June 2013)
Normal (two 600 hp** fans)	425,000	±4.3%
Alternate (one 600 hp fan)	260,000	±4.4%
Maintenance Bypass [parallel operation of 600 hp fan(s) and 235 hp*** fan(s)]	260,000 to 425,000	NA*
Reduced (two 235 hp fans)	120,000	NA*
Minimum (one 235 hp fan)	60,000	NA*
Filtration (one 235 hp fan)	60,000	±4.8%

\* Note: The modes of operations were not modeled in the June 2013 Test and Balance

\*\* Note: The 600 hp fans are also referred to as the 700 fans

\*\*\* Note: The 235 hp fans are also referred to as the 860 fans

The calculation of the running average annual total mine flow rate is computed monthly using the times entered in the CMRO Log in accordance with the following formula:

Monthly Average Flow Rate = [(Normal Mode Run-Time (hours) x 425,000 scfm] + [Alternate Mode Run-Time (hours) x 260,000 scfm] + [Maintenance Bypass Run-Time (hours) x 260,000 scfm] + [(Reduced Mode Run-Time (hours) x 120,000 scfm] + [Minimum Mode Run-Time (hours) x 60,000 scfm] + [Filtration Mode Run-Time (hours) x 60,000 scfm] / 730 hours per month.

The annual average flow rate is calculated using the times entered in the CMRO Log and the following formula:

Annual Average Flow Rate =  $\sum$  Monthly Average for Previous 12 Months

12

**Mine Ventilation Rate Monitoring Annual Report  
DOE/WIPP-16-3557**

---

The running average annual total mine flow rate was computed for the period of July 1, 2015 through February 28, 2016. The requirement to calculate the running average annual total mine flow rate was removed from the permit with the implementation of the Class 2 Permit Modification Request on February 10, 2016.

## **1.2 Ventilation Rate Monitoring in the Active Disposal Room**

The ventilation flow rate in the active waste disposal room is measured at the entrance to the room to demonstrate compliance with Permit Part 4, Section 4.5.3.2 and Attachment A2, Section A2-2a(3), which requires a minimum of 35,000 scfm of airflow through the active room when waste disposal is taking place and workers are present in the room. Permit Part 4, Section 4.6.4.3 requires compliance to be evaluated monthly for the active disposal room.

A calibrated Davis ball-bearing anemometer and full-entry traverse, as described in *Subsurface Ventilation Engineering*, (McPherson 2009), is the standard method for measurement of airflow in the active waste disposal room. Airflow measurements are collected at an established location near the entrance of each active disposal room. The location is chosen by the operator to minimize airflow disturbances caused by system intersections and corners in accordance with McPherson (2009). The operator uses a calibrated anemometer and the completion of a full-entry traverse. These readings are used to verify that a minimum of 35,000 scfm ventilation flow has been achieved through the active room prior to waste disposal taking place with workers present in the room. Multiple measurements are taken at each field location to ensure accurate results and correlated within 10 percent for acceptability. Data are collected and recorded by qualified operators, and the data are verified. The facility operator verifies proper ventilation flow rates when waste disposal is taking place and workers are present in the room, any time there is an operational mode change, or if there is a change in the U/G ventilation system configuration that could affect the ventilation system. A momentary reduction in U/G ventilation caused by the realignment or switching of U/G ventilation fans is not an operational mode change and does not require verification of airflow in the active disposal room.

Once the ventilation flow rate is verified, the operator records the acfm value on the log sheet. The operator compares the recorded acfm value with the minimum acfm value provided at the top of the Active Disposal Room Ventilation Rate Log Sheet. As described in Permit Attachment O, an actual airflow of at least 42,000 acfm is needed to ensure that the 35,000 scfm minimum requirement is met. The operator checks and records the airflow through the active room during the shift whenever there is an operational mode change, or a change in system configuration that could affect the ventilation system. If the required ventilation rate is not achieved, or cannot be supported due to operational needs, access to the room is restricted.

**Mine Ventilation Rate Monitoring Annual Report  
DOE/WIPP-16-3557**

---

### **1.3 Test and Balance**

The Test and Balance is a comprehensive series of measurements and adjustments designed to ensure that the U/G ventilation system is operating within acceptable design parameters. The Test and Balance is an appropriate method of verifying U/G ventilation system flow because it provides consistent results based on good engineering practices. The Test and Balance is conducted at 12-to-18-month intervals, as required by the MVRMP, Permit Attachment O, Section O-3a(2).

Once completed, the Test and Balance data are the baseline for U/G ventilation system operations until the next Test and Balance is performed. Test and Balance results have been used to accommodate varying operational conditions and to provide adequate airflow for recovery efforts in the mine.

The Test and Balance interval is sufficient to account for changes in the mine and verify system performance. Minor system modifications that occur between tests produce small changes to the system resistance to airflow in comparison to the overall system resistance. Historic data indicate airflow changes can be attributed to additional or reduced linear feet of mined passage such as mining new entries, closure of formerly ventilated portions of the mine, or reduction in drift size due to salt creep.

The most recent Test and Balance of the mine ventilation system was performed in June 2013. A summary of the results of the June 2013 Test and Balance is presented in Table 1 in accordance with Permit Attachment O, Section O-5a.

The next Test and Balance is scheduled to be performed in September 2016.

### **1.4 Quarterly Airflow Verification Checks**

Quarterly verification checks of the total mine airflow were not performed in accordance with the inspection schedule identified in the Permit Attachment E, procedure IC041098, U/G Exhaust Mass Flow Measurement System for Fans 700A, B & C. None of the 700 fans (700A, B, & C) were in use during the reporting period.

Airflow sensors were installed in the 860 filtration fans in September 2015. Procedure IC413005 was developed to perform quarterly verification checks of the total mine airflow from the 860 filtration fans. A Class 1 Permit Modification Notification (PMN) is being prepared for submittal to the NMED. This PMN will add the inspection for the filtration fans (860) to Permit Attachment E, Table E-1.

The quarterly verification checks require the measurement of airflow induced by each of the fans during various modes of operation using a standard pitot tube traverse. The flow measurement indicators (e.g., Accutron®) are then compared to the standard pitot traverse. If the relative percent difference (RPD) is greater than  $\pm 5$  percent, sensors are cleaned and calibrated. Another pitot tube traverse is then performed to verify an RPD of less than  $\pm 5$  percent.

## **Mine Ventilation Rate Monitoring Annual Report DOE/WIPP-16-3557**

---

The equipment used to perform the quarterly airflow verification checks is controlled and calibrated through the WIPP Metrology Program. The WIPP Metrology Program ensures that maintenance and test equipment used in the performance of maintenance activities meets the WIPP Quality Assurance Program Description (QAPD) requirements and is traceable to National Institute of Standards and Technology standards. The frequency and method of calibration are governed by the WIPP Metrology Program using the manufacturer's recommendations and the equipment reliability.

### **2.0 MINE VENTILATION RATE MONITORING RESULTS**

This section presents the results of implementing the mine ventilation rate monitoring program. The data presented in this section were collected in accordance with the latest revision of the MVRMP as documented in Permit Attachment O.

#### **2.1 Total Mine Ventilation Rate**

A summary of the monthly total mine ventilation rate flow data is provided in Table 2. This table shows that the running annual average total mine ventilation flow was 59,608 scfm for the reporting period. In addition, it shows that the lowest running annual average mine ventilation flow rate in the U/G repository occurred in February 2016 when the running annual average flow rate was 59,608 scfm. This running annual average for this reporting period was below the 260,000 scfm required in Permit Part 4, Section 4.5.3.2. Table 2 fulfills the notification requirement of Permit Part 4, Section 4.6.4.3 that the minimum running annual average total mine ventilation rate, specified in the Permit, has not been achieved.

The data sheets showing the calculation of the mine ventilation rate monitoring data monthly averages are presented in Attachment 1.

**Mine Ventilation Rate Monitoring Annual Report  
DOE/WIPP-16-3557**

**Table 2 – Summary of Total Mine and Active Disposal Room Ventilation Flow Rate Monitoring Data**

	<b>Total Mine Ventilation Flow Data (avg scfm)</b>	<b>Running Annual Average Total Mine Ventilation Flow Data (avg scfm)*</b>	<b>Active Disposal Room Ventilation Flow Data (avg acfm)†</b>
Jul 15	59,450	59,878	N/A
Aug 15	59,770	59,861	N/A
Sep 15	59,990	59,861	N/A
Oct 15	59,960	59,862	N/A
Nov 15	59,960	59,863	N/A
Dec 15	59,970	59,871	N/A
Jan 16	59,760	59,851	N/A
Feb 16	56,930	59,608	N/A
Mar 16	58,990	N/A	N/A
Apr 16	58,780	N/A	N/A
May 16	59,950	N/A	N/A
Jun 16	59,970	N/A	N/A

\*Note: Running Annual Average is calculated based on the twelve previous months and includes data not presented in this table. The Class 2 PMR, approved by NMED January 8, 2016 (effective February 10, 2016) removed the requirement to report the Running Annual Average Total Mine Ventilation Flow Data.

† Access to the disposal rooms restricted.

N/A – not applicable since no TRU mixed waste handling has occurred in the U/G.

## 2.2 Active Disposal Room Ventilation Rate

No TRU mixed waste handling activities were performed during the reporting period, therefore no active disposal room ventilation monitoring was performed. This information is reflected in Table 2.

## 2.3 Test and Balance

The most recent Test and Balance of the mine ventilation system was performed in June 2013. The next Test and Balance was due no later than October 2014.

As listed in the Underground Compliance Plan, “The Permittees may not be able to conduct the next Test and Balance on the schedule prescribed in the Permit, however, a Test and Balance will be necessary before the facility returns to waste handling operations.”<sup>2</sup>

The next Test and Balance is scheduled to be performed in September 2016.

<sup>2</sup> Underground Compliance Plan Compliance Status and Schedule

**Mine Ventilation Rate Monitoring Annual Report  
DOE/WIPP-16-3557**

---

## **2.4 Quarterly Airflow Verification Checks**

Quarterly airflow verification checks of the total mine airflow will not be performed for the 600 hp fans (700 A, B, &C) while the U/G remains in Filtration Mode because the fans are not in use.

Airflow sensors were installed on the 860 filtration fans in September 2015. The instruments will allow for the implementation of quarterly airflow verification checks of the operating fans.

## **3.0 QUALITY ASSURANCE RESULTS**

This section describes the Quality Assurance Program as it relates to the MVRMP.

### **3.1 Description of Mine Ventilation Rate Monitoring QA Program**

Quality Assurance (QA) associated with the MVRMP consists of several elements. The qualifications of personnel conducting ventilation flow measurements are maintained through a training qualification process. The ventilation simulation software program is controlled in accordance with the Management and Operating Contractor (MOC) QAPD, and WIPP facility computer software QA plans.

Data generated by the MVRMP, as well as records and procedures to support the MVRMP, are maintained and managed in accordance with the MOC QAPD. Nonconformance or conditions adverse to quality are addressed and corrected in accordance with applicable Quality Assurance procedures.

Instrumentation used to implement the MVRMP is of known precision and accuracy. This information is recorded in the instrumentation calibration documentation.

## **4.0 SUMMARY OF MINE VENTILATION RATE MONITORING**

Regular mine ventilation rate monitoring of the U/G repository and active disposal rooms is conducted at the WIPP facility. The following is an analysis of the data from this program:

- Permit requirements related to mine ventilation/active room rate monitoring reporting have been met for the reporting period.
- Data quality is acceptable.
- Access to the WIPP facility U/G for TRU mixed waste management purposes has been restricted since February 14, 2014.
- The Test and Balance was not performed on schedule as prescribed in the Permit. This has been reported to the NMED. A Test and Balance will be necessary before the facility returns to TRU mixed waste handling operations.

**Mine Ventilation Rate Monitoring Annual Report  
DOE/WIPP-16-3557**

---

**5.0 REFERENCES**

DOCUMENT NUMBER AND TITLE
Waste Isolation Pilot Plant Hazardous Waste Facility Permit, EPA Identification No. NM4890139088-TSDF
McPherson, Malcolm J., 2009, Subsurface Ventilation Engineering, Omnipress, Second Edition
DOE Letter CBFO:OESH:GTB:MN:14-1539:UFC 5486.00, Underground Compliance Plan and Underground Derived Waste Storage Plan, as ordered by Items 17a and 17b of the May 12, 2014 NMED Administrative Order, June 25, 2014
IC041098, <i>U/G Exhaust Mass Flow Measurement System for Fans 700A, B &amp; C</i>
IC413005, Calibration of Flow Indicating Transmitters for U/G Exhaust Fans

ISSUED

**Mine Ventilation Rate Monitoring Annual Report  
DOE/WIPP-16-3557**

Attachment 1 – Monthly Summary of Mine Ventilation Rate Monitoring

**WIPP MINE VENTILATION  
RATE MONITORING PLAN**

<b>SURFACE</b>				
<b>MODE OF OPERATION</b>	<b>RUNTIME (min)</b>	<b>RUNTIME (hours)</b>	<b>FLOW RATE (kscfm)</b>	<b>TOTAL FLOW (kscfm-hr)</b>
NORMAL VENTILATION (2-700 FANS)	0	0.00	425	0.00
ALTERNATE VENTILATION (1-700 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (1-700 FAN w/ 1-860 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (1-700 FAN w/ 2-860-FANS)	0	0.00	260	0.00
MAINTENANCE BYPASS (2-700 FANS w/ 1-860 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (2-700 FANS w/ 2-860 FANS)	0	0.00	280	0.00
REDUCED VENTILATION (0-700 FANS w/ 2-860 FANS)	0	0.00	120	0.00
MINIMUM VENTILATION (0-700 FANS w/ 1-860 FAN)	0	0.00	60	0.00
FILTRATION (1-860 FAN thru HEPA)	44466	741.10	60	44466.00
NO VENTILATION	174	2.90	0	0.00
<b>TOTAL</b>		744.00		
<b>SUM OF FLOW(kscfm-hr)</b>				44466.00
<b>MONTHLY AVERAGE FLOW RATE(kscfm)</b>				59.77

**CALENDAR MONTH -AUGUST-2015**

**COMMENTS:**  
No active room status due to fire and radiological events.  
No limited access to the U/G

<b>ACTIVE ROOM</b>		
<b>MONTHLY AVERAGE FLOW (kacfm)</b>	MINIMUM = 35K scfm = 42K acfm	<b>0.000</b>
<b>NUMBER OF DATA POINTS USED IN CALCULATION OF AVERAGE</b>		<b>0.00</b>



ISSUED

**Mine Ventilation Rate Monitoring Annual Report  
DOE/WIPP-16-3557**

Attachment 1 – Monthly Summary of Mine Ventilation Rate Monitoring

**WIPP MINE VENTILATION  
RATE MONITORING PLAN**

<b>SURFACE</b>				
<b>MODE OF OPERATION</b>	<b>RUNTIME (min)</b>	<b>RUNTIME (hours)</b>	<b>FLOW RATE (kscfm)</b>	<b>TOTAL FLOW (kscfm-hr)</b>
NORMAL VENTILATION (2-700 FANS)	0	0.00	425	0.00
ALTERNATE VENTILATION (1-700 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (1-700 FAN w/ 1-860 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (1-700 FAN w/ 2-860-FANS)	0	0.00	260	0.00
MAINTENANCE BYPASS (2-700 FANS w/ 1-860 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (2-700 FANS w/ 2-860 FANS)	0	0.00	260	0.00
REDUCED VENTILATION (0-700 FANS w/ 2-860 FANS)	0	0.00	120	0.00
MINIMUM VENTILATION (0-700 FANS w/ 1-860 FAN)	0	0.00	60	0.00
FILTRATION 1-860 FAN thru HEPA)	43191	719.85	60	43191.00
NO VENTILATION	9	0.15	0	0.00
<b>TOTAL</b>		<b>720.00</b>		
<b>SUM OF FLOW(kscfm-hr)</b>				<b>43191.00</b>
<b>MONTHLY AVERAGE FLOW RATE(kscfm)</b>				<b>59.99</b>

**CALENDAR MONTH -SEPTEMBER-2015**

COMMENTS:  
No active room status due to fire and radiological events  
No limited access to the UIC

<b>ACTIVE ROOM</b>		
<b>MONTHLY AVERAGE FLOW (kacfm)</b>	MINIMUM = 35K scfm = 42K acfm	<b>0.000</b>
<b>NUMBER OF DATA POINTS USED IN CALCULATION OF AVERAGE</b>		<b>0.00</b>

ISSUED

**Mine Ventilation Rate Monitoring Annual Report  
DOE/WIPP-16-3557**

Attachment 1 – Monthly Summary of Mine Ventilation Rate Monitoring

**WIPP MINE VENTILATION  
RATE MONITORING PLAN**

<b>SURFACE</b>				
<b>MODE OF OPERATION</b>	<b>RUNTIME (min)</b>	<b>RUNTIME (hours)</b>	<b>FLOW RATE (kscfm)</b>	<b>TOTAL FLOW (kscfm-hr)</b>
NORMAL VENTILATION (2-700 FANS)	0	0.00	425	0.00
ALTERNATE VENTILATION (1-700 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (1-700 FAN w/ 1-880 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (1-700 FAN w/ 2-860-FANS)	0	0.00	260	0.00
MAINTENANCE BYPASS (2-700 FANS w/ 1-880 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (2-700 FANS w/ 2-860 FANS)	0	0.00	260	0.00
REDUCED VENTILATION (0-700 FANS w/ 2-860 FANS)	0	0.00	120	0.00
MINIMUM VENTILATION (0-700 FANS w/ 1-860 FAN)	0	0.00	60	0.00
FILTRATION 1-880 FAN thru HEPA)	44616	743.60	60	44616.00
NO VENTILATION	26	0.47	0	0.00
<b>TOTAL</b>		744.07		
<b>SUM OF FLOW(kscfm-hr)</b>				44616.00
<b>MONTHLY AVERAGE FLOW RATE(kscfm)</b>				59.96

**CALENDAR MONTH -October-2015**

COMMENTS:  
No active room status due to fire and radiological events.  
No limited access to the U/G

<b>ACTIVE ROOM</b>		
<b>MONTHLY AVERAGE FLOW (kacfm)</b>	MINIMUM = 35K scfm = 42K acfm	0.000
<b>NUMBER OF DATA POINTS USED IN CALCULATION OF AVERAGE</b>		0.00

ISSUED

**Mine Ventilation Rate Monitoring Annual Report  
DOE/WIPP-16-3557**

Attachment 1 – Monthly Summary of Mine Ventilation Rate Monitoring

**WIPP MINE VENTILATION  
RATE MONITORING PLAN**

<b>SURFACE</b>				
<b>MODE OF OPERATION</b>	<b>RUNTIME (min)</b>	<b>RUNTIME (hours)</b>	<b>FLOW RATE (kscfm)</b>	<b>TOTAL FLOW (kscfm-hr)</b>
NORMAL VENTILATION (2-700 FANS)	0	0.00	425	0.00
ALTERNATE VENTILATION (1-700 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (1-700 FAN w/ 1-860 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (1-700 FAN w/ 2-860-FANS)	0	0.00	260	0.00
MAINTENANCE BYPASS (2-700 FANS w/ 1-860 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (2-700 FANS w/ 2-860 FANS)	0	0.00	260	0.00
REDUCED VENTILATION (0-700 FANS w/ 2-860 FANS)	0	0.00	120	0.00
MINIMUM VENTILATION (0-700 FANS w/ 1-860 FAN)	0	0.00	60	0.00
FILTRATION 1-860 FAN thru HEPA}	43200	720.00	60	43200.00
NO VENTILATION	31	0.52	0	0.00
<b>TOTAL</b>		<b>720.52</b>		
<b>SUM OF FLOW(kscfm-hr)</b>				<b>43200.00</b>
<b>MONTHLY AVERAGE FLOW RATE(kscfm)</b>				<b>59.96</b>

**CALENDAR MONTH -November-2015**

COMMENTS:  
No active room status due to fire and radiological events  
No limited access to the U/G

<b>ACTIVE ROOM</b>		
<b>MONTHLY AVERAGE FLOW (kacfm)</b>	MINIMUM = 35K scfm = 42K acfm	<b>0.000</b>
<b>NUMBER OF DATA POINTS USED IN CALCULATION OF AVERAGE</b>		<b>0.00</b>

ISSUED

**Mine Ventilation Rate Monitoring Annual Report  
DOE/WIPP-16-3557**

Attachment 1 – Monthly Summary of Mine Ventilation Rate Monitoring

**WIPP MINE VENTILATION  
RATE MONITORING PLAN**

<b>SURFACE</b>				
<b>MODE OF OPERATION</b>	<b>RUNTIME (min)</b>	<b>RUNTIME (hours)</b>	<b>FLOW RATE (kscfm)</b>	<b>TOTAL FLOW (kscfm-hr)</b>
NORMAL VENTILATION (2-700 FANS)	0	0.00	425	0.00
ALTERNATE VENTILATION (1-700 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (1-700 FAN w/ 1-860 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (1-700 FAN w/ 2-860-FANS)	0	0.00	260	0.00
MAINTENANCE BYPASS (2-700 FANS w/ 1-860 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (2-700 FANS w/ 2-860 FANS)	0	0.00	260	0.00
REDUCED VENTILATION (0-700 FANS w/ 2-860 FANS)	0	0.00	120	0.00
MINIMUM VENTILATION (0-700 FANS w/ 1-860 FAN)	0	0.00	60	0.00
FILTRATION 1-860 FAN thru HEPA)	44626	743.77	60	44626.00
NO VENTILATION	26	0.43	0	0.00
<b>TOTAL</b>		744.20		
<b>SUM OF FLOW(kscfm-hr)</b>				44626.00
<b>MONTHLY AVERAGE FLOW RATE(kscfm)</b>				59.97

**CALENDAR MONTH -December-2015**

COMMENTS:  
No active room status due to fire and radiological events.  
No limited access to the U/G

<b>ACTIVE ROOM</b>		
<b>MONTHLY AVERAGE FLOW (kacfm)</b>	MINIMUM = 35K acfm = 42K acfm	0.000
<b>NUMBER OF DATA POINTS USED IN CALCULATION OF AVERAGE</b>		0.00

ISSUED

**Mine Ventilation Rate Monitoring Annual Report  
DOE/WIPP-16-3557**

Attachment 1 – Monthly Summary of Mine Ventilation Rate Monitoring

**WIPP MINE VENTILATION  
RATE MONITORING PLAN**

<b>SURFACE</b>				
<b>MODE OF OPERATION</b>	<b>RUNTIME (min)</b>	<b>RUNTIME (hours)</b>	<b>FLOW RATE (kscfm)</b>	<b>TOTAL FLOW (kscfmhr)</b>
NORMAL VENTILATION (2-700 FANS)	0	0.00	425	0.00
ALTERNATE VENTILATION (1-700 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (1-700 FAN w/ 1-860 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (1-700 FAN w/ 2-860-FANS)	0	0.00	260	0.00
MAINTENANCE BYPASS (2-700 FANS w/ 1-860 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (2-700 FANS w/ 2-860 FANS)	0	0.00	260	0.00
REDUCED VENTILATION (0-700 FANS w/ 2-860 FANS)	0	0.00	120	0.00
MINIMUM VENTILATION (0-700 FANS w/ 1-860 FAN)	0	0.00	60	0.00
FILTRATION 1-860 FAN thru HEPA)	44462	741.03	60	44462.00
NO VENTILATION	178	2.97	0	0.00
<b>TOTAL</b>		<b>744.00</b>		
<b>SUM OF FLOW(kscfm-hr)</b>				<b>44462.00</b>
<b>MONTHLY AVERAGE FLOW RATE(kscfm)</b>				<b>59.76</b>

**CALENDAR MONTH -January 2016**

COMMENTS:  
No active room status due to fire and radiological events  
No limited access to the U/G

<b>ACTIVE ROOM</b>		
<b>MONTHLY AVERAGE FLOW (kacfm)</b>	MINIMUM = 35K scfm = 42K acfm	<b>0.000</b>
<b>NUMBER OF DATA POINTS USED IN CALCULATION OF AVERAGE</b>		<b>0.00</b>

ISSUED

**Mine Ventilation Rate Monitoring Annual Report  
DOE/WIPP-16-3557**

Attachment 1 – Monthly Summary of Mine Ventilation Rate Monitoring

**WIPP MINE VENTILATION  
RATE MONITORING PLAN**

<b>SURFACE</b>				
<b>MODE OF OPERATION</b>	<b>RUNTIME (min)</b>	<b>RUNTIME (hours)</b>	<b>FLOW RATE (kscfm)</b>	<b>TOTAL FLOW (kscfm-hr)</b>
NORMAL VENTILATION (2-700 FANS)		0	0.00	425
ALTERNATE VENTILATION (1-700 FAN)		0	0.00	260
MAINTENANCE BYPASS (1-700 FAN w/ 1-860 FAN)		0	0.00	260
MAINTENANCE BYPASS (1-700 FAN w/ 2 860-FANS)		0	0.00	260
MAINTENANCE BYPASS (2-700 FANS w/ 1-860 FAN)		0	0.00	260
MAINTENANCE BYPASS (2-700 FANS w/ 2-860 FANS)		0	0.00	260
REDUCED VENTILATION (0-700 FANS w/ 2-860 FANS)		0	0.00	120
MINIMUM VENTILATION (0-700 FANS w/ 1-860 FAN)		0	0.00	60
FILTRATION (1-860 FAN thru HEPA)	43723	728.72	60	43723.00
NO VENTILATION	2357	39.28	0	0.00
<b>TOTAL</b>		768.00		
<b>SUM OF FLOW(kscfm-hr)</b>				43723.00
<b>MONTHLY AVERAGE FLOW RATE(kscfm)</b>				<b>56.93</b>

**CALENDAR MONTH -February 2016**

COMMENTS:  
No active room status due to fire and radiological events  
No limited access to the U/G

<b>ACTIVE ROOM</b>		
<b>MONTHLY AVERAGE FLOW (kacfm)</b>	MINIMUM = 35K scfm = 42K acfm	<b>0.000</b>
<b>NUMBER OF DATA POINTS USED IN CALCULATION OF AVERAGE</b>		<b>0.00</b>

ISSUED

**Mine Ventilation Rate Monitoring Annual Report  
DOE/WIPP-16-3557**

Attachment 1 – Monthly Summary of Mine Ventilation Rate Monitoring

**WIPP MINE VENTILATION  
RATE MONITORING PLAN**

<b>SURFACE</b>				
<b>MODE OF OPERATION</b>	<b>RUNTIME (min)</b>	<b>RUNTIME (hours)</b>	<b>FLOW RATE (kscfm)</b>	<b>TOTAL FLOW (kscfm-hr)</b>
NORMAL VENTILATION (2-700 FANS)	0	0.00	425	0.00
ALTERNATE VENTILATION (1-700 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (1-700 FAN w/ 1-860 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (1-700 FAN w/ 2-860-FANS)	0	0.00	260	0.00
MAINTENANCE BYPASS (2-700 FANS w/ 1-860 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (2-700 FANS w/ 2-860 FANS)	0	0.00	260	0.00
REDUCED VENTILATION (0-700 FANS w/ 2-860 FANS)	0	0.00	120	0.00
MINIMUM VENTILATION (0-700 FANS w/ 1-860 FAN)	0	0.00	60	0.00
FILTRATION 1-860 FAN thru HEPA)	43886	731.43	60	43886.00
NO VENTILATION	754	12.57	0	0.00
<b>TOTAL</b>		744.00		
<b>SUM OF FLOW(kscfm-hr)</b>				43886.00
<b>MONTHLY AVERAGE FLOW RATE(kscfm)</b>				58.99

**CALENDAR MONTH -March 2016**

**COMMENTS:**  
No active room status due to fire and radiological events  
No limited access to the UJG

<b>ACTIVE ROOM</b>		
<b>MONTHLY AVERAGE FLOW (kacfm)</b>	MINIMUM = 35K scfm = 42K acfm	0.000
<b>NUMBER OF DATA POINTS USED IN CALCULATION OF AVERAGE</b>		0.00

ISSUED

**Mine Ventilation Rate Monitoring Annual Report  
DOE/WIPP-16-3557**

Attachment 1 – Monthly Summary of Mine Ventilation Rate Monitoring

**WIPP MINE VENTILATION  
RATE MONITORING PLAN**

<b>SURFACE</b>				
<b>MODE OF OPERATION</b>	<b>RUNTIME (min)</b>	<b>RUNTIME (hours)</b>	<b>FLOW RATE (kscfm)</b>	<b>TOTAL FLOW (kscfm-hr)</b>
NORMAL VENTILATION (2-700 FANS)	0	0.00	425	0.00
ALTERNATE VENTILATION (1-700 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (1-700 FAN w/ 1-880 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (1-700 FAN w/ 2-880-FANS)	0	0.00	260	0.00
MAINTENANCE BYPASS (2-700 FANS w/ 1-880 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (2-700 FANS w/ 2-880 FANS)	0	0.00	260	0.00
REDUCED VENTILATION (0-700 FANS w/ 2-880 FANS)	0	0.00	120	0.00
MINIMUM VENTILATION (0-700 FANS w/ 1-880 FAN)	0	0.00	60	0.00
FILTRATION 1-880 FAN thru HEPA)	43106	718.43	60	43106.00
NO VENTILATION	897	14.95	0	0.00
<b>TOTAL</b>		733.38		
<b>SUM OF FLOW(kscfm-hr)</b>				<b>43106.00</b>
<b>MONTHLY AVERAGE FLOW RATE(kscfm)</b>				<b>58.78</b>

**CALENDAR MONTH -April 2016**

**COMMENTS**  
No active room status due to fire and radiological events  
No limited access to the U/G

<b>ACTIVE ROOM</b>		
<b>MONTHLY AVERAGE FLOW (kacfm)</b>	MINIMUM = 35K scfm = 42K acfm	<b>0.000</b>
<b>NUMBER OF DATA POINTS USED IN CALCULATION OF AVERAGE</b>		<b>0.00</b>



ISSUED

**Mine Ventilation Rate Monitoring Annual Report  
DOE/WIPP-16-3557**

Attachment 1 – Monthly Summary of Mine Ventilation Rate Monitoring

**WIPP MINE VENTILATION  
RATE MONITORING PLAN**

<b>SURFACE</b>				
<b>MODE OF OPERATION</b>	<b>RUNTIME (min)</b>	<b>RUNTIME (hours)</b>	<b>FLOW RATE (kscfm)</b>	<b>TOTAL FLOW (kscfm-hr)</b>
NORMAL VENTILATION (2-700 FANS)	0	0.00	425	0.00
ALTERNATE VENTILATION (1-700 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (1-700 FAN w/ 1-860 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (1-700 FAN w/ 2 860-FANS)	0	0.00	260	0.00
MAINTENANCE BYPASS (2-700 FANS w/ 1-860 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (2-700 FANS w/ 2-860 FANS)	0	0.00	260	0.00
REDUCED VENTILATION (0-700 FANS w/ 2-860 FANS)	0	0.00	120	0.00
MINIMUM VENTILATION (0-700 FANS w/ 1-860 FAN)	0	0.00	60	0.00
FILTRATION (1-860 FAN thru HEPA)	44606	743.43	60	44606.00
NO VENTILATION	34	0.57	0	0.00
<b>TOTAL</b>		<b>744.00</b>		
<b>SUM OF FLOW(kscfm-hr)</b>				<b>44606.00</b>
<b>MONTHLY AVERAGE FLOW RATE(kscfm)</b>				<b>59.95</b>

**CALENDAR MONTH -May 2016**

**COMMENTS:**  
No active room status due to fire and radiological events  
No limited access to the UIG

<b>ACTIVE ROOM</b>		
<b>MONTHLY AVERAGE FLOW (kacfm)</b>	MINIMUM = 35K scfm = 42K acfm	<b>0.000</b>
<b>NUMBER OF DATA POINTS USED IN CALCULATION OF AVERAGE</b>		<b>0.00</b>

ISSUED

**Mine Ventilation Rate Monitoring Annual Report  
DOE/WIPP-16-3557**

Attachment 1 – Monthly Summary of Mine Ventilation Rate Monitoring

**WIPP MINE VENTILATION  
RATE MONITORING PLAN**

<b>SURFACE</b>				
<b>MODE OF OPERATION</b>	<b>RUNTIME (min)</b>	<b>RUNTIME (hours)</b>	<b>FLOW RATE (kscfm)</b>	<b>TOTAL FLOW (kscfm-hr)</b>
NORMAL VENTILATION (2-700 FANS)	0	0.00	425	0.00
ALTERNATE VENTILATION (1-700 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (1-700 FAN w/ 1-860 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (1-700 FAN w/ 2 860-FANS)	0	0.00	260	0.00
MAINTENANCE BYPASS (2-700 FANS w/ 1-860 FAN)	0	0.00	260	0.00
MAINTENANCE BYPASS (2-700 FANS w/ 2-860 FANS)	0	0.00	260	0.00
REDUCED VENTILATION (0-700 FANS w/ 2-860 FANS)	0	0.00	120	0.00
MINIMUM VENTILATION (0-700 FANS w/ 1-860 FAN)	0	0.00	60	0.00
FILTRATION 1-860 FAN thru HEPA)	43178	719.63	60	43178.00
NO VENTILATION	22	0.37	0	0.00
<b>TOTAL</b>		720.00		
<b>SUM OF FLOW(kscfm-hr)</b>				<b>43178.00</b>
<b>MONTHLY AVERAGE FLOW RATE(kscfm)</b>				<b>59.97</b>

**CALENDAR MONTH -June 2016**

**COMMENTS**  
No active room status due to fire and radiological events.  
No limited access to the U/G

<b>ACTIVE ROOM</b>		
<b>MONTHLY AVERAGE FLOW (kacfm)</b>	MINIMUM = 35K acfm = 42K acfm	<b>0.000</b>
<b>NUMBER OF DATA POINTS USED IN CALCULATION OF AVERAGE</b>		<b>0.00</b>