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

June 10, 2002

Mr. Steve Zappe, Project Leader (WIPP)
Hazardous Waste Permits Program
Hazardous Waste Bureau
New Mexico Environment Department
2909 E. Rodeo Dr. Bldg 1
Santa Fe, New Mexico 87502-6303

RE: Class 1* Permit Modification Request to the Hazardous Waste Facility Permit for Removal of Underground Booster Fans, Permit Number: NM4890139088-TSDF

Dear Mr. Zappe:

The purpose of this letter is to submit this Class 1* modification request to the Waste Isolation Pilot Plant Hazardous Waste Facility Permit, Number: NM4890139088-TSDF. The proposed changes do not compromise worker safety, human health, or the environment. The subject of this permit modification request is removal of underground booster fans.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my 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 my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If you have any questions regarding this permit modification, please contact Mr. Jody Plum at (505) 234-7462.

Sincerely,

Dr. Inés R. Triay, CBFO Manager
U. S. Department of Energy

J. L. Lee, General Manager
Westinghouse TRU Solutions

Enclosure

cc: w/enclosure
C. Walker, Techlaw

cc: w/o enclosure
J. Bearzi, NMED
J. Kieling, NMED

CBFO:ORC:HLP:VW:02-1128:UFC:5486

020606

Class 1* Permit Modification Request

Removal of Underground Booster Fans

Waste Isolation Pilot Plant
Carlsbad, New Mexico

WIPP HWFP #NM4890139088-TSDF

Transmittal Letter

Table of Contents

Acronyms and Abbreviations

CFR	Code of Federal Regulations
DOT	Department of Transportation
EST/FPT	Emergency Services Technician/Fire Protection Technician
HEPA	High Efficiency Particulate Air
HWFP	Hazardous Waste Facility Permit
MOU	Memoranda of Understanding
MSHA	Mine Safety and Health Administration
PMR	Permit Modification Request
PPE	Personal Protective Equipment
RCRA	Resource Conservation and Recovery Act
TRU	Transuranic
TSDF	Treatment, Storage and Disposal Facility
VOC	Volatile Organic Compound
WHB	Waste Handling Building
WIPP	Waste Isolation Pilot Plant

Overview of the Permit Modification Request

This document contains a Class 1* Permit Modification Request (**PMR**) to the Hazardous Waste Facility Permit (**HWFP**) at the Waste Isolation Pilot Plant (**WIPP**), Permit Number NM4890139088-TSDF hereinafter referred to as the WIPP HWFP.

This PMR is being submitted by the U.S. Department of Energy Carlsbad Field Office and Westinghouse TRU Solutions LLC, collectively referred to as the Permittees, in accordance with the WIPP HWFP, Condition I.B.1 (20.4.1.900 New Mexico Administrative Code incorporating 40 Code of Federal Regulations (**CFR**) §270.42(a)). The PMR in this document is necessary to allow the removal of three booster fans from the WIPP underground ventilation system. This change does not reduce the ability of the Permittees to provide continued protection to human health and the environment.

The requested modification to the WIPP HWFP and related supporting documents are provided in this PMR. The proposed modification to the text of the WIPP HWFP has been identified using a double underline and revision bar in the right hand margin for added information, and a ~~strikeout~~ font for deleted information. All direct quotations are indicated by italicized text.

Attachment A

Description of the Class 1* Permit Modification Request

Table 1. Class 1* Hazardous Waste Facility Permit Modification Request

No.	Affected Permit Section	Item	Category	Attachment A Page #
1	a.1. Permit Attachment F b.1. Permit Attachment M2	Remove three booster fans from the WIPP underground ventilation system.	A.8	A-3

Item 1

Description:

This permit modification requests removal of three booster fans from the WIPP underground ventilation system.

Basis:

The booster fans allow for reversal of airflow in the mining area in case of a fire. Mine safety regulations codified at 30 CFR §57.4760(a) outline ventilation control measures specific to shaft mines as follows:

> *"Shaft mines shall be provided with at least one of the following means to control the spread of fire, smoke, and toxic gases underground in the event of a fire: control doors, reversal of mechanical ventilation, or effective evacuation procedures."*

WIPP also has control doors and evacuation procedures. Consequently, removal of the booster fans would maintain compliance with these Mine Safety and Health Administration (**MSHA**) requirements.

Discussion:

The booster fans were originally installed in order to maintain sufficient airflow in accordance with 30 CFR §57.5015 during construction of the facility when only the Exhaust Filter Building fans were available to provide ventilation. They no longer served this purpose after installation of the main ventilation fans, but were retained to allow for mechanical reversal of ventilation in the case of a fire.

This permit modification requests removal of the three ventilation booster fans that allow for reversal of air flow in the mining area. Reversal of ventilation is only one method available for controlling ventilation in the event of an underground fire. WIPP currently complies with the MSHA requirement by providing control doors as well as evacuation procedures. Removal of the booster fans was approved by the U.S. Department of Labor MSHA Mine Ventilation Investigation conducted March 6-7, 2001 (a copy of the resulting report is found in Attachment B.) The change was also supported by the New Mexico Bureau of Mine Inspection (a copy of the letter is found in Attachment C).

Revised Permit Text:

a. 1. Permit Attachment F, Section F-4d, Fire

Fire

The incident level emergency response identified in Section F-3 includes fire/explosion potential. WIPP fire response includes incipient, exterior structure fires, and internal structure fires. The RCRA Emergency Coordinator can implement the Memoranda of Understanding (**MOU**) for additional support.

~~The first option in~~ In the event of a mine fire, the response will be to apply mechanical methods to stop fires (e.g., cut electrical power). The spread of fires may also be controlled through the use of control doors. ~~The last option in mine fire response will be to reconfigure ventilation.~~ The following actions are implemented in the event of a fire:

1. All emergency response personnel at an incident will wear appropriate PPE.

2. Only fire extinguishing materials that are compatible with the materials involved in the fire will be used to extinguish fires. Compatibility with materials involved in a fire are determined by pre-fire plans, Emergency Response Guide Book (DOT, 1993), DOT labeling, and site-specific knowledge of the emergency response personnel. Water and dry chemical materials have been determined to be compatible with all components of the TRU mixed waste. Pre-fire plans for the WHB are included in Figures F-10 and F-11.

   Fires in areas of the WHB Unit should not propagate, due to limited amount of combustibles, and the concrete and steel construction of the structures. Administrative controls, such as landlord inspections and EST/FPT inspections, help to insure good housekeeping is maintained. Combustible material and TRU mixed waste will be isolated, if possible. Firewater drain trenches collect the water and channel it into a sump. In areas not adjacent to the trenches, portable absorbent dikes (pigs) will be used to retain as much as possible, until it can be transferred to containers or sampled and analyzed for hazardous constituents.

   ~~In a mine fire, if reconfiguring ventilation is necessary, a set of three booster fans will allow selective reversal of airflow in the mining area, the Air Intake Shaft and its associated station, and the Salt Handling Shaft and its associated station. In these modes, airflow can be reversed by opening and closing certain ventilation doors and air regulators and by operating the underground booster fans (in either the forward or the reverse direction). These fans will normally be turned off and will be isolated, with air bypassing the fans and flowing through the air lock. The surface fans will be stopped before attempting any underground air reversals. These modes of ventilation will only be implemented under manual control for off-normal conditions (such as a fire).~~

b.1. Permit Attachment M2, Section M2-2a(3), Underground Ventilation Modes of Operation

Overall, there are six ~~seven~~ possible modes of exhaust fan operation:

- 2 main fans in operation
- 1 main fan in operation
- 1 filtration fan in filtered operation
- ~~Reversal~~
- 1 filtration fan in unfiltered operation
- 2 filtration fans in unfiltered operation
- 1 main and 1 filtration fan (unfiltered) in operation

Under some circumstances (such as power outages and maintenance activities, etc.), all mine ventilation may be discontinued for short periods of time.

In the normal mode, two main surface exhaust fans, located near the Exhaust Shaft, will provide continuous ventilation of the underground areas. All underground flows join at the bottom of the Exhaust Shaft before discharge to the atmosphere.

Outside air will be supplied to the mining areas and the waste disposal areas through the Air Intake Shaft, the Salt Handling Shaft, and access entries. A small quantity of outside air will flow down the Waste Shaft to ventilate the Waste Shaft station. The ventilation system is designed to operate with the Air Intake Shaft as the primary source of fresh air. Under these circumstances, sufficient air will be available to simultaneously conduct all underground operations (e.g., waste handling, mining, experimentation, and support). Ventilation may be supplied by operating one main exhaust fan, or one or two filtration exhaust fans, or an combination of the three.

If the nominal flow of 425,000 cfm (12,028 m^3/min) is not available (i.e., only one of the main ventilation fans is available) underground operations may proceed, but the number of activities that can be performed in parallel may be limited depending on the quantity of air available. Ventilation may be supplied by operating one or two of the filtration exhaust fans. To accomplish this, the isolation dampers will be opened, which will permit air to flow from the main exhaust duct to the filter outlet plenum. The filtration fans may also be operated to bypass the HEPA plenum. The isolation dampers of the filtration exhaust fan(s) to be employed will be opened, and the selected fan(s) will be switched on. In this mode, underground operations will be limited, because filtration exhaust fans cannot provide sufficient airflow to support the use of diesel equipment.

In the filtration mode, the exhaust air will pass through two identical filter assemblies, with only one of the three Exhaust Filter Building filtration fans operating (all other fans are stopped). This system provides a means for removing the airborne particulates that may contain radioactive and hazardous waste contaminants in the reduced exhaust flow before they are discharged through the exhaust stack to the atmosphere. The filtration mode is activated manually or automatically if the radiation monitoring system detects abnormally high concentrations of airborne radioactive particulates (an alarm is received from the continuous air monitor in the exhaust drift of the active waste panel) or a waste

handling incident with the potential for a waste container breach is observed. The filtration mode is not initiated by the release of gases such as VOCs.

~~A set of three booster fans will allow selective reversal of airflow in the mining area, the Air Intake Shaft and its associated station, and the Salt Handling Shaft and its associated station. In these modes, airflow can be reversed by opening and closing certain ventilation doors and air regulators and by operating the underground booster fans (in either the forward or the reverse direction). These fans will normally be turned off and will be isolated, with air bypassing the fans and flowing through the air lock. The surface fans will be stopped before attempting any underground air reversals. These modes of ventilation will only be implemented under manual control for off-normal conditions (such as a fire).~~

Attachment B

Mine Safety and Health Administration Mine Ventilation Inspection Report

U.S. Department of Labor

Mine Safety and Health Administration
Pittsburgh Safety & Health Technology Center
P.O. Box 18233
Pittsburgh, PA 15236

VENTILATION DIVISION

June 12, 2001

MEMORANDUM FOR DOYLE D. FINK
District Manager, M&NMS&H, South Central District
Dallas, Texas

THROUGH: EDWARD J. MILLER
Chief, Pittsburgh Safety and Health Technology Center

FROM: JOHN E. UROSEK
Chief, Ventilation Division

SUBJECT: Report of Investigation - Waste Isolation Pilot Plant

Attached is the final report of the investigation conducted at the Waste Isolation Pilot Plant (WIPP) from March 6-7, 2001. Please replace the text previously released. The operator has requested clarification to some minor inaccuracies in the description of operation portion of the report.

An additional copy of the report is attached for distribution to the plant operator. If you have any questions concerning the report, please contact this office at 412-386-6936.

Attachments

cc: Westinghouse True Solutions(Kirk McDaniel)

bcc: VENT(W. Francart)
(G. Aul)
(D. Beiter)
Vent. Files SUB-D75
MSHA:TS:WFrancart:05/29/01:Rm 205:B38:412-386-6913:T\Vent\-ghwipp2

UNITED STATES DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION
TECHNICAL SUPPORT

MINE VENTILATION INVESTIGATION

Investigative Report No. P434-V339-Revised

Waste Isolation Pilot Plant (WIPP)

March 6-7, 2001

William J. Francart, P.E.
Mining Engineer

and

George N. Aul
Mining Engineer

Originating Office

Pittsburgh Safety and Health Technology Center
Ventilation Division
John E. Urosek, Chief
Cochrans Mill Road, P.O. Box 18233
Pittsburgh, Pennsylvania 15236

MINE VENTILATION INVESTIGATION

Investigative Report No. P434-V339

Waste Isolation Pilot Plant (WIPP)
Carlsbad, Lea County, New Mexico

March 6-7, 2001

by

William J. Francart[1] and George N. Aul[1]

INTRODUCTION

On March 6-7, 2001, an investigation was conducted at the Waste Isolation Pilot Plant (WIPP), requested through the Assistant District Manager, Metal and Nonmetal Mine Safety and Health, South Central District. The operator of the facility requested to remove three 50-horsepower (hp) fans installed in a underground bulkhead. These fans were previously used as booster fans, but were no longer used for ventilation of the mine. At the time of the study, the fans provided the capability to reverse airflow in the shafts. The objective of the study was to evaluate the proposed change to the ventilation system with regard to the Code of Federal Regulations, Title 30.

DESCRIPTION OF OPERATION

The operation was designed and operated to permanently isolate transuranic waste produced by the United States defense programs. This waste consists of rags, tools, clothing, and other such articles, which contain trace amounts of radioactive isotopes with atomic numbers higher than uranium. The underground mine, plant, and storage area was developed in the Salado Formation. The storage areas and associated mine areas were developed using continuous mining methods. Waste was concurrently being stowed in the previously developed rooms as mining development advanced. The mining operation was classified as a Category VI mine under 30 CFR, 57.22003. The facility operated two shifts per day.

The use of three intake shafts and one return shaft accomplished ventilation of the underground operation. The Waste Shaft is isolated from the remainder of the mine by bulkheads. A portion of the air entering the mine through the Air Intake Shaft ventilates the North (Experimental) Area of the mine. The remainder of the airflow joins the air coming down the Salt Handling Shaft and subsequently ventilates the waste storage and development (mining) areas of the facility. A variety of ventilation "modes" can be provided to support underground activities depending on day-to-day needs. The desired mode is achieved by running the surface fans in various parallel

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[1] Mining Engineer, Pittsburgh Safety and Health Technology Center, Ventilation Division

combinations. The underground airflow achieved in these modes ranges from approximately 66,000 cubic feet per minute (cfm) (termed Minimum Mode) to approximately 460,000 cfm (termed Normal Mode).

Prior to 1988, ventilation was achieved through the use of three 260-hp centrifugal fans located on the surface. At this time, normal airflow capacity underground was limited to approximately 190,000 cfm and entered the mine through either the Salt Shaft or the Waste Handling Shaft. In addition to providing normal daily ventilation requirements, these fans could also be arranged to provide Filtration Mode. In the event of an accidental radiological release, the exhaust airflow would be reduced to 66,000 cfm induced by a single 260-hp fan, which is routed through a series of High Efficiency Particulate Air (HEPA) filters prior to release into the environment.

The ventilation configurations achievable with the three 260-hp fans would limit the underground activity to either development or waste emplacement (although waste was not being received at this time). In addition, three 50-hp axial fans were installed underground as booster fans to support the mine development activities. They were installed in a bulkhead in the mine entry at the location shown on Figure 1. A set of bulkhead doors was used to close the entry beneath the fan installation when booster fan operation was required as shown in Figure 2.

In 1988, two 600-hp centrifugal fans were installed in parallel with the 260-hp fans and the Air Intake Shaft was installed. This increased the ventilation capacity of the mine to approximately 460,000 cfm. The 600-hp fans became the primary ventilating fans and the 260-hp fan use became secondary for daily ventilation needs as well as providing for the Filtration Mode. This increased airflow allowed for simultaneous development and waste disposal activities. It also eliminated the need to operate the booster fans since adequate airflow could be achieved in all areas of the mine without them. However, the booster fans were retained so that mechanical reversal of the Air Intake and Salt Handling Shafts could be achieved in the event of a shaft fire. Air reversal is not permitted in the Waste Disposal area due to the radiological considerations.

In 1998, a third 600-hp main fan was installed. While it did not increase overall ventilating capacity of the mine, it did improve the operational readiness and availability of the main fans. The main fans are electrically interlocked such that only two of the three 600-hp fans can be operated at any given time.

REVIEW OF VENTILATION SYSTEM DATA

The pressure loss across the underground axial fans bulkhead on March 6, 2001, was measurable with tubing and a magnehelic gauge. A pressure loss of 0.03 to 0.04 inches of water was measured. The pressure differential for a length of open entry with the same air quantity was not measurable. Although the bulkhead does increase pressure losses in the ventilation system slightly, it is negligible as compared to 4.28 inches water in the Exhaust Shaft, 0.84 inches in the Intake Shaft, and 1.45 inches in the Salt Handling Shaft as measured in a previous ventilation survey.

Ventilation measurements were made at a number of locations underground. They are included in the schematic depicted in Figure 3. These readings were obtained using a calibrated vane anemometer by traversing the surveyed cross-sectional areas. Additional data was obtained from velocity sensors installed at specific locations underground. A comparison between the velocity sensors and anemometer traverses showed the sensors to be very accurate, with differences between the readings within the margin of error for vane anemometer traverse measurements.

DISCUSSION

Title 30 Section 57.4760 states that shaft mines shall be provided with at least one of the following means to control the spread of fire, smoke and toxic gases underground in the event of a fire: control doors, reversal of mechanical ventilation, or effective evacuation procedures.

Evacuation Procedures

If evacuation is used as an alternative for compliance with Section 57.4760(a), effective evacuation shall be demonstrated by actual evacuation of all persons underground to the surface in 10 minutes or less through routes that will not expose persons to heat, smoke, or toxic fumes in the event of a fire.

The last recorded evacuation drill, which complied with Section 57.4361, was held on January 22, 2001. According to the records maintained on site, evacuation was demonstrated on the two operating shifts. Evacuation was completed to the surface in 20 and 27 minutes. Exit from the mining unit was through the use of the salt shaft hoist. The length of time required for evacuation was greater than that allowed for use of evacuation as an alternative for compliance with Section 57.4760(a).

Mechanical Ventilation Reversal

If mechanical ventilation reversal is used as an alternative, Title 30 CFR requires that reversal of mechanical ventilation shall (i) provide at all times at least the same degree of protection to persons underground as would be afforded by the installation of control doors; (ii) be accomplished by a main fan; (iii) provide rapid air reversal that allows persons underground time to exit in fresh air by the second escapeway or find a place of refuge; (iv) be done according to pre-determined conditions and procedures.

Three modes of air reversal using the axial fans were identified. These modes reverse the airflow in either the Salt Handling Shaft or the Air Intake Shaft. These air reversal modes using the axial fans were intended to prevent air reversal in the waste disposal air split. The reversal modes included the operation of the axial fans in combination with the opening and closing isolation doors in the entries and crosscuts and shutting down the main fans. It is reported that some areas underground are unventilated in the reversal mode.

The reversal modes have been physically tested, however they have not been implemented due to any emergency. Reportedly, implementation of the individual reversal modes could require approximately one hour to complete.

The main fans on the surface cannot be reversed. Air reversals underground can be accomplished by a series of bulkhead changes (opening and closing bulkhead doors). Air reversal in the shaft is not possible using this method.

Control Doors

If control doors are used as the alternative for compliance with 57.4760(a). These requirements are: (i) they must be installed at or near shaft stations of intake shafts and any other shaft designated as an escapeway under 57.11053, or at other locations that provide equivalent protection;(ii) constructed and maintained according to Table C-3; (iii) provided with means of remote closure at landings of timbered intake shafts unless a person specifically designated to close each door in the event of a fire can reach the door within 3 minutes; (iv) closed or open only according to pre-determined conditions and procedures; (v) constructed so that once closed they will not reopen as a result of differential air pressure; (vi) constructed so that they can be opened from either side by one person or be provided with a personnel door that can be opened from either side; (vii) clear of obstructions.

The control doors are constructed as defined by the above criteria and could be used as an alternative to comply with 57.4760(a). They are in proximity of each of the shafts and are operated either remotely or can be reached within the 3 minute requirement. Doors are operated pneumatically and can be opened and closed from either side of the door by one person.

CONCLUSION

The purpose of this investigation was to evaluate the proposed change to remove the three 50-hp axial fans formerly used as booster fans. These fans are no longer needed to meet ventilation requirements for either mine development or waste isolation air splits and therefore are not normally operated.

While the axial fans can be used to reverse airflow in the intake shafts, the practical implementation of this action seems unlikely. MSHA regulations do not require the use of the air reversal fans if control doors are provided in accordance with 57.4760(a)(1). The intake shafts can be isolated by closing doors at underground locations in an event of fire in the mine.

APPENDIX

List of persons participating in the investigation:

Westinghouse True Solutions

Kirk McDaniel, Ventilation Engineer
David Loring, Ventilation Engineer
AJ Hill, Safety, Engineer

Department of Energy

Don Galbraith, Facility Representative

Mine Safety and Health Administration

William J. Francart, Mining Engineer, P.E.
George N. Aul, Mining Engineer

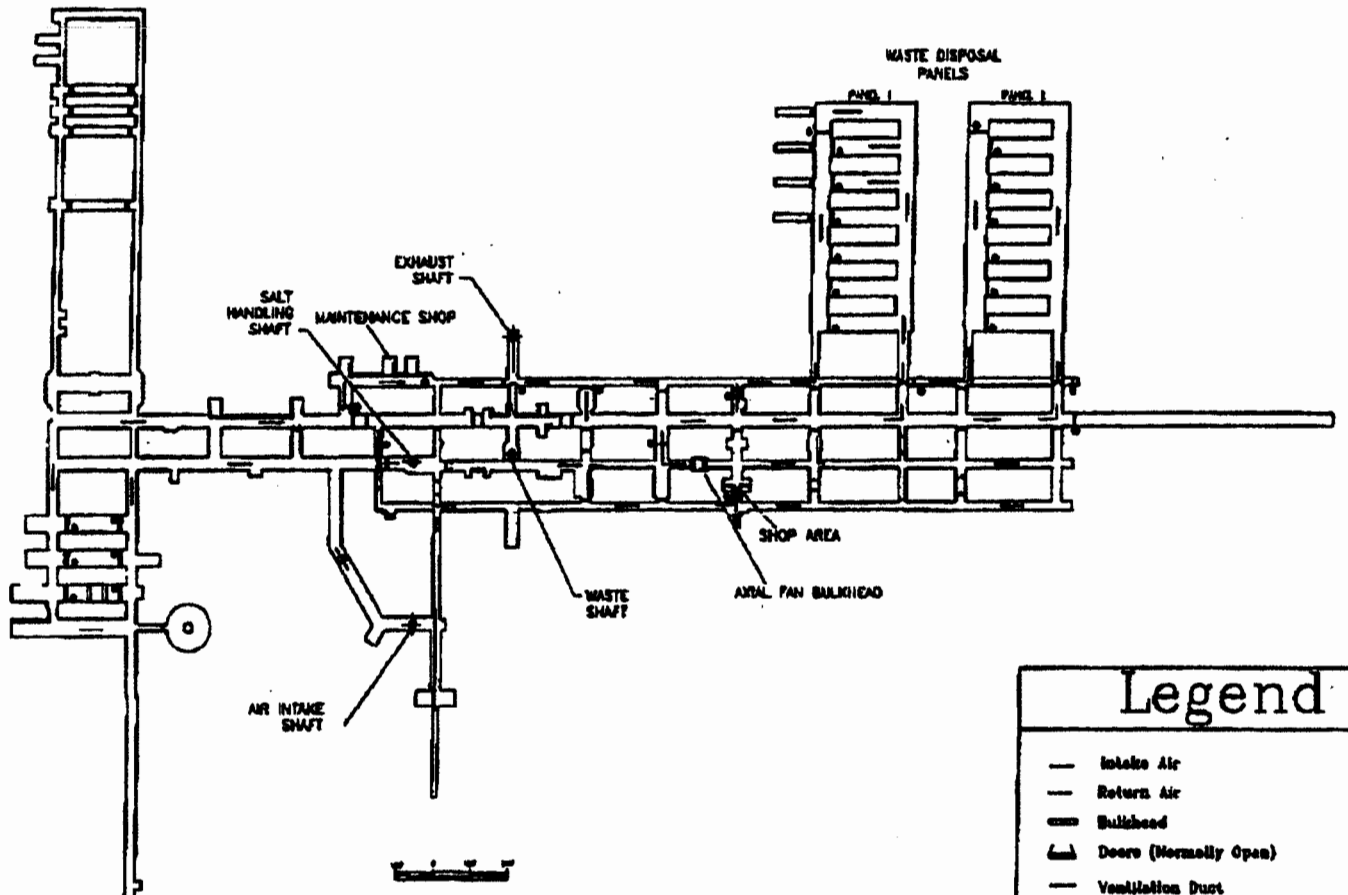
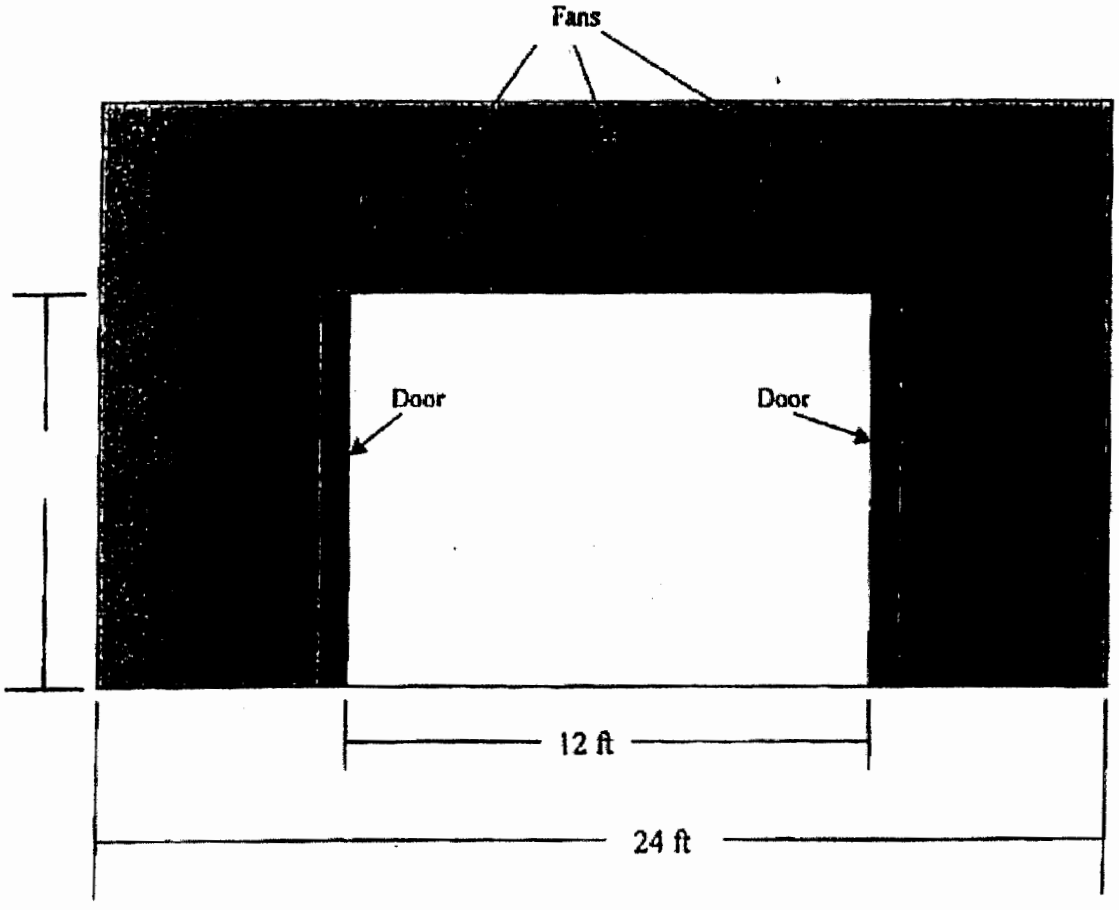
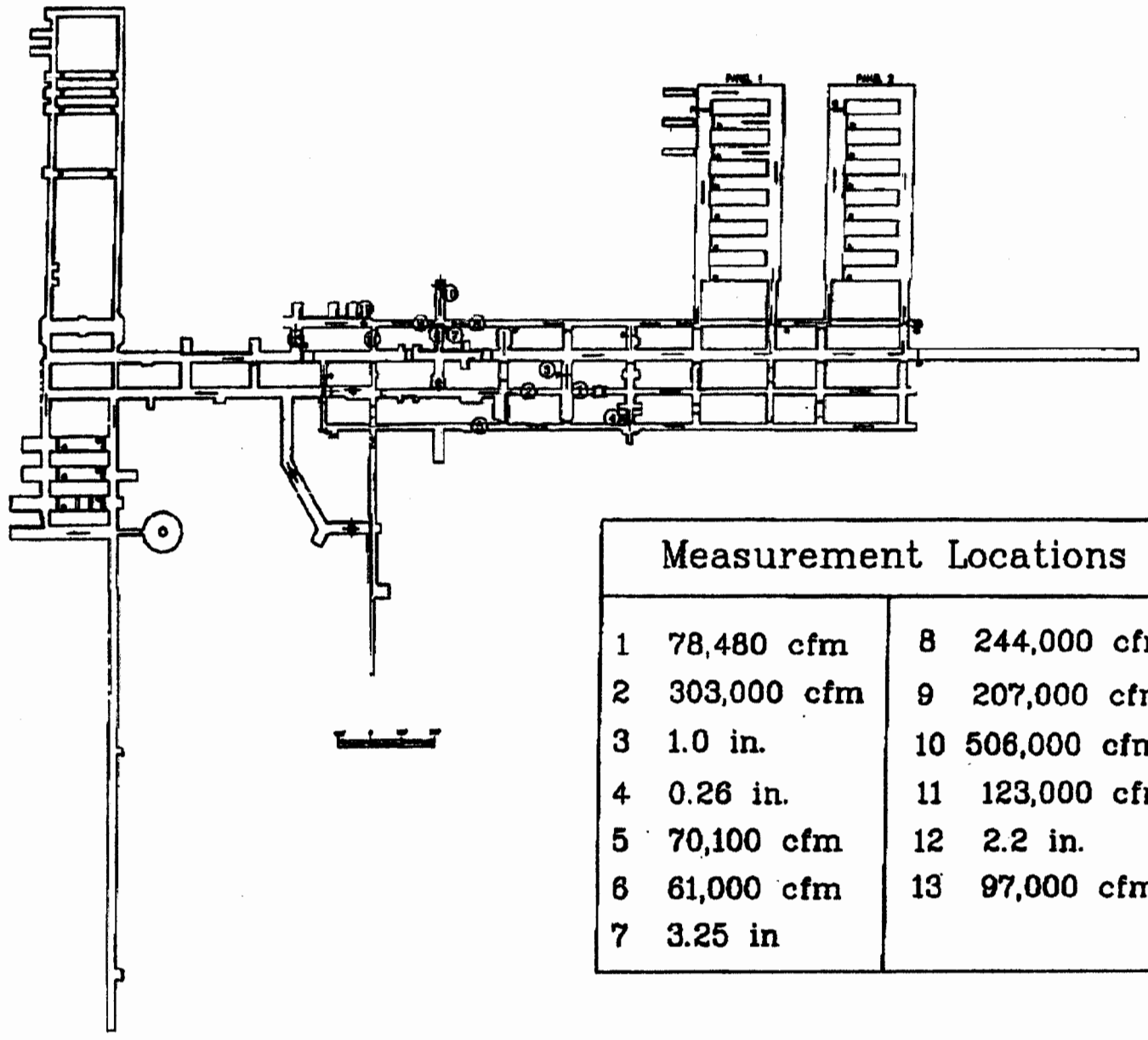


Figure 1. WIPP Mine Layout Schematic



F gure Ax al Fan Bulkhead Insta a on End V ew



Measurement Locations			
1	78,480 cfm	8	244,000 cfm
2	303,000 cfm	9	207,000 cfm
3	1.0 in.	10	506,000 cfm
4	0.26 in.	11	123,000 cfm
5	70,100 cfm	12	2.2 in.
6	61,000 cfm	13	97,000 cfm
7	3.25 in		

Figure 3. WIPP Mine Ventilation Scematic

Attachment C

New Mexico Bureau of Mine Inspection Letter

NM Bureau of Mine Inspection
801 Leroy Place
Socorro, New Mexico 87801

New Mexico Tech

(505) 835-5460
fax: (505) 835-5430
email: bmi@nmt.edu

January 17, 2001

Mr. Bruce Lilly
Assistant Manager of Office of Safety and Operation
Department of Energy – Carlsbad Field Office
P.O. Box 3090
Carlsbad, NM 88221

Dear Mr. Lilly,

I have reviewed the attachments sent to my office in Socorro, New Mexico that addresses the removal of the underground booster fans and I also visited the WIPP underground facility on October 31, 2000. The intent of adequate ventilation in an underground mine is to provide a safe and healthy work environment for the persons working underground. It has been my experience after visiting the WIPP site for the last twelve (12) years that this project has always met and exceeded the mandated ventilation and safety regulations for an underground mine.

Treatment of fires: The one shaft of the total three shafts is equipped with wooden shaft guides. These guides are treated with fire retarding substance. The other two shafts have steel cable guides. These shafts are inspected weekly and deficiencies, if any, are corrected immediately.

Ventilation Controls: All three shafts are equipped with doors. Ventilation can be directed and controlled with the use of these doors, providing state required ventilation for employees and diesel equipment used.

Evacuation Procedures: Holding periodic evacuation drills tests the effectiveness of the personnel evacuation procedures. WIPP has in place an effective, documented evacuation program.

The change proposed by the U.S. Department of Energy and Westinghouse Governmental Environmental Service, in my opinion as a mine safety professional with over 30 years of experience in underground operation, will not in any way limit or impede the operators from providing a safe and healthy environment for their employees, nor would it affect their ability to effectively evacuate underground personnel in the event of an emergency.

Sincerely,

G. E. Miera
New Mexico State Mine Inspector