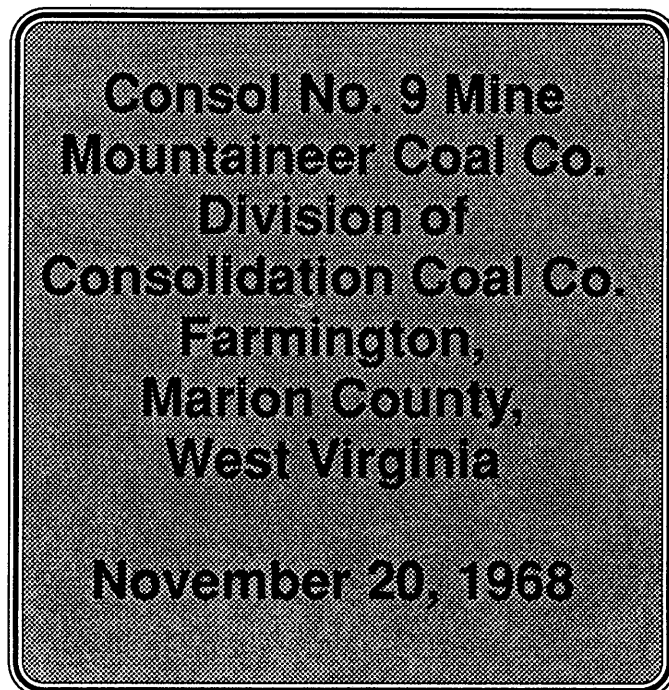


Informational Report of Investigation



Underground Coal Mine Explosion and Fire

U.S. Department of Labor
Mine Safety and Health Administration
1989



INFORMATIONAL REPORT OF INVESTIGATION
UNDERGROUND COAL MINE EXPLOSION AND FIRE

Consol No. 9 Mine
Mountaineer Coal Company
Division of Consolidation Coal Company
Farmington, Marion County, West Virginia

November 20, 1968

by

Division of Safety
Coal Mine Safety and Health
March 1990

Originating Office - Mine Safety and Health Administration
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TABLE OF CONTENTS

	<u>Page</u>
Abstract.....	i
EXPLOSIONS, MINE FIRES, AND SEALING OPERATIONS	
General Information.....	1
Mine Conditions Prior to the Explosion.....	1
Mine Development.....	1
Ventilation.....	2
Rock Dust and Coal Dust.....	3
Weather Conditions.....	5
The Explosion and Recovery Operations.....	5
Participating Organizations.....	6
U.S. Bureau of Mines Activities, Description of Events.	7
Boreholes and Sampling.....	12
Flame and Forces.....	14
Flame.....	14
Forces.....	14
Sealing of Mine.....	15
UNSEALING OF MINE, RECOVERY OPERATIONS, AND RESEALING OF MINE	
Monitoring of Mine Atmosphere and Plan Approval.....	17
Unsealing of Mine.....	19
Recovery Operations.....	20
1969.....	20
1970.....	25
1971.....	32
1972.....	40
1973.....	49
1974.....	53
1975.....	59
1976.....	60
1977.....	62
1978.....	63
INVESTIGATION, DISCUSSION, AND EVALUATION	
Public Hearings.....	67
Factors Affecting the Explosion.....	69
Ventilation.....	69
Bleeder System.....	74
Methane.....	76
Coal and Rock Dust.....	79
Electric Equipment.....	84
Explosives.....	84

Roof Falls.....	85
Forces and flame.....	85
Forces.....	86
Flame.....	87
Point of Origin and Ignition Source.....	88

FINDINGS

Summary of Evidence.....	90
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CONCLUSION

Conclusions.....	99
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APPENDICES

- A - Victims of Explosions
- B - General Information
- C - List of Persons Who Took Part in Recovery Operations
- D - Orders Issued During Investigation and Copy of Federal Coal Mine Inspection Report, August 1968
- E - Photographs, Nos. 1 through 20
- F - Company's Phase 1 Plan for Unsealing and Recovery Operations
- G - Analysis of Dust Survey Samples Collected During Recovery Operations
- H - Report - Test of Explosives
- I - Mine Maps, Figures 1 through 8

ABSTRACT

This report is based on an investigation made pursuant to the Federal Coal Mine Health and Safety Act of 1969 (83 Stat. 742, as amended by 91 Stat. 1290).¹ This report is issued as a factual account of events and occurrences before and after the original explosion, and includes a narrative of recovery operation.

At approximately 5:30 a.m. on Wednesday, November 20, 1968, an explosion occurred in the Consol No. 9 Mine, Mountaineer Coal Company, Division of Consolidation Coal Company, Farmington, Marion County, West Virginia. There were 99 miners in the mine when the explosion occurred, 78 of whom died as a result of the explosion. The other 21 miners survived the explosion and escaped to the surface; seven miners working in A Face Section, four miners working near the slope bottom, and two miners working near the Athas Shaft (areas not affected by the explosion) escaped unassisted to the surface. Eight miners working near the newly constructed Mahan Shaft when the explosion occurred were rescued via the shaft by a mobile crane equipped with a steel cable and a bucket large enough to accommodate three miners. All of the eight miners were on the surface by 10:40 a.m. of the same day. The names of the victims, their ages, occupations, and mining experience are listed in Appendix A.

The forces of the explosion extended throughout the west side of the mine inby Plum Run overcast which included nine active working sections. Generally, the ventilating controls, such as stoppings, overcasts, and regulators inby the Plum Run overcast, were damaged or completely destroyed. The Nos. 3 and 4 fans (Mods Run and Llewellyn) ventilating the west side of the mine, the hoisting equipment in and above the Llewellyn Shaft, and part of the combination lamp house, bathhouse, and supply house located near the Llewellyn Shaft on the surface were also destroyed. (See Appendix E, Photo No. 1).

Mine fires along with several additional major and minor underground explosions interfered with and eventually prevented rescue and recovery efforts. The mine was sealed at its surface openings on November 30, 1968.

¹The US Bureau of Mines (USBM), Department of the Interior, was the enforcement agency at the time of the explosion on November 20, 1968. In May 1973, the enforcement agency was removed from the Bureau of Mines and became the Mining Enforcement and Safety Administration (MESA), Department of the Interior. The Federal Mine Safety and Health Amendments Act of 1977, effective March 9, 1978, redesignated the enforcement agency as the Mine Safety and Health Administration (MSHA) and placed the agency under the Department of Labor.

In September 1969, the mine was reopened and operations to recover the remains of the 78 miners were begun and continued until April 1978. Damage to the mine in the explosion area was extensive, requiring loading of rock falls, replacement of ventilation and transportation facilities, and in some cases new mine entries to bypass extensively caved areas. Investigative activities were continued, in cooperation with the Company, State, and United Mine Workers of America (UMWA) organizations, as mine areas were recovered. Between 1969 and 1978, the bodies of 59 victims were recovered and brought to the surface.

Recovery operations ceased and all entrances to the mine were permanently sealed in November 1978, leaving 19 victims buried in the mine and leaving some areas of the mine unexplored. The recovery and investigation lasted 10 years during which time organizational changes occurred in the four organizations involved in the recovery. Continuity of knowledge was therefore difficult, especially when considering the scope of the recovery. Lessons learned during early evaluation of this disaster were incorporated into the Federal Coal Mine Safety and Health Act of 1969 (P.L. 91-173). However, the investigation was not completed and the actual cause of the explosion could not be determined. Specific recommendations have therefore not been made in this report.

Despite the fact that the investigation could not be completed due to the extent of the damage to the mine, MSHA has received a number of requests for a report on the accident. This report is issued to accommodate those requests, and to make information available which may be of help in preventing future mining accidents.

EXPLOSIONS, MINE FIRES, AND SEALING OPERATIONS

General Information

The Consol No. 9 Mine, Mountaineer Coal Company, Farmington, Marion County, WV, was opened by eight shafts, ranging from 334 to 578 feet in depth, and a 16-degree slope, 1,468 feet in length, into the high-volatile Pittsburgh coalbed, averaging 96 inches in thickness in the areas being mined. At the time of the explosion, corporate and supervisory officials were as follows:

Consolidation Coal Company

John Corcoran	President
Charles R. Nailler	Vice-President, Operations
William N. Poundstone	Executive Vice-President
C. William Parisi	Chief Inspector

Mountaineer Coal Company

D.H. Davis	President
K.K. Kincell	Manager of Mines
Lawrence H. Riggs	General Superintendent
Foster Turner	Superintendent
Fay Casseday	Mine Foreman
Jesse G. Bowers	Safety Director
Eugene S. Lieving	Safety Inspector

The Consol No. 9 Mine was opened in 1910 by the Jamison Coal and Coke Company and was acquired by the Consolidation Coal Company, Division of Pittsburgh Consolidation Coal Company, in October 1954. On May 1, 1958, the Company name was changed to the Mountaineer Coal Company. The mine was purchased September 15, 1966, by the Continental Oil Company of New York City, New York; however, the names of the mine and Company remained the same. The Company name was changed to Consolidation Coal Company, Fairmont Operations, in February 1976; the mine name remained the same.

Mine Conditions Prior to the Explosion

Mine Development

The Main West headings were developed approximately 21,000 feet in by Plum Run overcast and had approached close to the projected boundary line. The Nos. 3, 4, 5, 6, 7, and 8 North entries were developed off the Main West headings approximately 2,250 feet apart and had been driven to the projected distance of approximately 3,800 feet. Retreat mining had been completed in the Nos. 3, 4, 5, and 6 North entries, except that additional airways were being driven in the barrier pillar between 5 and 6 North entries. Retreat mining was about one-half completed in the 7 North

entries and about one-third completed in the 8 North entries. The pillared area between 3 North and 8 North averaged approximately 8,000 feet in length and 2,500 feet in width. The 9 North entries were turned approximately 2,900 feet in by 8 North and had been developed approximately 2,700 feet. The 7 South entries were turned opposite 7 North entries and had been developed 10,000 feet and had intersected the newly constructed Mahan shaft in October 1968. Approximately 1,750 feet in by the junction of 7 South and Main West, the 7 South Parallel entries were turned off the west side of the 7 South entries and were developed approximately 2,400 feet. Three panels of entries which were developed west off the 7 South Parallels had intersected the bleeder entries that were connected to the Main West return airways. Retreat mining had been completed in two of these panels and had recently started in the third panel. Also, 6 Right panel driven west off of 7 South had been developed approximately 2,000 feet. The area south of the Main West entries between 1 South and 7 South was not developed and bordered a solid coal rib of virgin coal approximately 10,500 feet in length, part of which was on intake air that was used to ventilate active areas of the mine. Also, the south side of the Main West headings between 7 South and the Main West faces, except for four bleeder entries, a distance of approximately 8,700 feet in length, and the east side of the 7 South entries, a distance of approximately 10,000 feet in length, were solid coal ribs of virgin coal. However, these coal ribs were on return air which was directed to the fan. (See Appendix I, Figure 1).

Ventilation

Even though blocks of coal were left along the perimeter of the mined out area in the north side of the Main West heading, as well as in the 7 South Parallel area to serve as bleeder entries, such bleeder entries were not travelable due to roof falls and/or water. According to testimony of Fay Casseday, mine foreman, given at the official hearing, the bleeder entries were not travelable, and only the edge of pillar lines was being ventilated. He also stated that he thought the gob areas contained a lot of gas.²

² At the time of the explosion, November 20, 1968, the Federal Coal Mine Safety Act (66 Stat. 692; 30 U.S.C., Sections 451-483), as amended by Public Law 89-376 (80 Stat. 84) March 26, 1966, was in force. Section 209(d)(11) of the Mine Safety Provisions of this Act stated, "In a gassy mine, all workings which are abandoned after the effective date of this section or the date such mine became a gassy mine, whichever is later, shall be sealed or ventilated."

According to the inspection report of the last Federal inspection of the mine completed August 30, 1968, 80 days before the explosion, the Nos. 3 and 4 fans (Mods Run and Llewellyn), which ventilated the west side of the mine that was affected by the explosion, were exhausting a total of 669,000 cubic feet of air per minute (cfm of air). Analysis of air samples collected at the main returns at the bottom of these shafts during this inspection showed the west side of the mine was liberating a total of 7,527,000 cubic feet of methane in a 24-hour period. Records taken from Federal inspection reports showed that the total mine methane liberation in a 24-hour period was 6,671,000 cubic feet in April 1967, 6,147,000 cubic feet in April 1968, and 7,918,000 cubic feet in August 1968.

A review of the last 10 Federal inspection reports of this mine showed that face ventilation was adequate in each active working section at the close of each inspection and that methane in the amount of 1 percent or more was not detected at any time during these inspections. Auxiliary exhaust fans with tubing were used in all but one of the developing sections to provide face ventilation. Also, these inspection reports contained no record of observed violations pertaining to mine ventilation.

According to his testimony given at the official hearing, George Wilson, section foreman, 4 p.m. to midnight shift, 7 South section, detected methane accumulations on the right split of air near the face where the continuous mining machine was operating on November 19, 1968. He stated that power was removed from the section and production stopped for about 2-1/2 hours while ventilation was improved by installing and/or repairing several stoppings and the methane accumulations were removed.

Zack Springer, loading machine operator, 4 p.m. to midnight shift, Main West section, stated at the official hearing that he had to shut down twice during the shift of November 19, 1968, to remove methane build-up in the working place. He stated that it was not unusual for methane to build up in the faces while advancing the Nos. 1 and 8 outside entries. Air quantities and methane content of each split of air in developing sections are listed in the Federal Coal Mine Inspection Report in Appendix D.

Rock Dust and Coal Dust

During each of the last 10 complete Federal inspections made at the mine before the explosion, inadequate rock dusting was observed and/or indicated by analysis of dust samples at several locations. During these 10 inspections of the mine, a total of 1,983 dust samples were collected. The incombustible content of 96 percent of these dust samples ranged from 65 percent to 100 percent. During five of these inspections, dangerous accumulations of loose coal and coal dust were observed along

track haulage roads, shuttle car roadways, and belt conveyor lines. Spot dust samples were not collected during any of these 10 inspections.³ According to the last 10 inspection reports, dangerous accumulations of loose coal and coal dust were not apparent underground, and rock dust applications throughout the mine appeared adequate at the close of each of the 10 inspections. (See Appendix D for a copy of the last Federal Coal Mine Inspection Report dated August 1968).

According to testimony given at the official hearing, Lewis L. Lake, mining machine operator, 4 p.m. to midnight shift, 7 South, stated at the hearing that too much of the float coal dust that was picked up in the face areas during mining operations by the auxiliary exhaust fans was deposited in return airways. He stated that the "trickle-duster," which was designed to operate in conjunction with the auxiliary fan and distribute rock dust in the air current during mining operations, had not operated properly since he had worked in the 7 South section. Lake stated that the water pressure in the 7 South section at the time of the explosion was too low to control the coal dust at the face during mining operations and the coal dust was picked up by the auxiliary fan and deposited in the return airways. He also stated that, for the last two to three weeks before the explosion, he had to change filters in his respirator two or three times a shift, whereas normally one filter would last a whole shift.

Walter Slovekosky, motorman, stated at the official hearing that he had complained to the Safety Committee that the open crosscuts and parallel entries along the main haulage road at many locations looked black and needed additional rock dust. George K. Glover, fire boss, stated at the official hearing that the rock dust in back entries was "in fair shape except for a little float dust." Uncle Morris, mechanic, testified that he had complained to the Safety Committee about loose coal and coal dust accumulations along the belt conveyor line in the 6 Right 7 South section.

Stanley Plachta, mechanic and safety committeeman, testified that he had received complaints from several miners regarding float coal dust in return airways and accumulations of loose coal and coal dust along belt conveyor lines.

Jess G. Bowers, safety director, Mountaineer Coal Company, stated at the official hearing that float coal dust was a problem on

³USBM's policy required Federal Coal Mine Inspectors to make a rock dust survey in each developing section of a mine during each inspection and spot dust samples were required to be collected in other areas of the mine where the rock dust applications appeared to be inadequate.

belt conveyors and in return airways. He stated that if the proper amount of water to control the dust was not maintained, the return airways outby the working section would become black with fine float coal dust for a distance of 200 to 300 feet.

Weather Conditions

The weather on November 20, 1968, was cloudy with occasional snow showers, and the temperature at 5:56 a.m. was 34 Fahrenheit. The temperature and barometric pressures for November 13-20, 1968, recorded at the U.S. Department of Commerce, FAA station, Morgantown, WV, which is about 17 air miles from the Consol No. 9 Mine, were as follows:

<u>Date 1968</u>	<u>Time</u>	<u>Temperature(F)</u>	<u>Barometric Pressure</u>
November 13	11:57a.m.	36	28.72
November 14	11:57a.m.	40	28.86
November 15	11:58a.m.	61	28.63
November 16	11:55a.m.	54	28.49
November 17	11:57a.m.	57	28.63
November 18	8:57a.m.	58	28.27
November 19	12:57a.m.	34	28.37
November 20	12:56a.m.	35	28.41
November 20	5:56a.m.	34	28.38

During recovery operations in November and December 1971, and January 1972, the barometric pressure, as recorded at the Consol No. 9 Mine, ranged from 29.6 to 30.80 inches.

The Explosion and Recovery Operations

The explosion occurred at approximately 5:30 a.m., Wednesday, November 20, 1968. According to Company records, there were 99 miners in the mine when the explosion occurred. Production crews, consisting of six to eight miners each, were working in the following sections of the mine: 1 Right off 6 North, 3 Right off 7 North, 4 Right off 8 North, Main West, 3 Right off 7 South Parallels and 7 South, 6 Right off 7 South, and a crew of nine miners was recovering a continuous mining machine from under a roof fall in the 5 Right 8 North section. Also, several mechanics were repairing two continuous mining machines in the 9 North section.

These nine sections in the west side of the mine were all affected by the explosion. Also, a production crew of seven miners was working in the A Face section which was not affected by the explosion. This crew continued to mine coal after the explosion occurred until they were contacted from the surface by telephone and ordered to leave the mine immediately and return to the surface via the slope. Seventy-eight of the 99 miners who were in the mine when the explosion occurred were killed by or

died from the results of the explosion. The other 21 miners escaped to the surface as follows: two miners working in the underground shop near Athas shaft escaped via the elevator in Athas shaft; four miners working near the slope bottom and seven miners working in the A Face section walked to the surface via the slope. These 13 miners arrived on the surface unassisted about 7 a.m. of the same day. The other eight miners that escaped were located in the 7 South section which was near the newly constructed Mahan shaft. A portable crane was dispatched from the Company's Loveridge Mine to the Mahan Shaft, and a metal bucket used as a part of the escape facilities at the Mods Run intake shaft was transported to the Mahan shaft. While the crane and bucket were in transit, contact was made with the eight miners who had gathered at the bottom of the shaft by a telephone that was lowered in the shaft. Also, six all-service gas masks were lowered into the shaft. By 9:50 a.m., the crane and bucket had arrived and the bucket was lowered in the shaft. The first two miners were hoisted to the surface at 10:08 a.m. By 10:40 a.m., the last three miners were hoisted to the surface. A physician and an ambulance were waiting at the top of the shaft when the miners were hoisted to the surface. Two miners received medical treatment for shock and were transported to the Fairmont Hospital for observation.

The explosive forces destroyed the Nos. 3 and 4 fans which ventilated the west side of the mine, and the hoisting equipment in and above the Llewellyn shaft. The combination lamp house, bathhouse, and supply house on the surface near the Llewellyn shaft was partly destroyed. The Nos. 1 and 2 fans which ventilated the east side of the mine were not affected by the explosion and continued to operate.

Participating Organizations

Officials of the several organizations who assisted in directing the recovery operations and sealing of the mine on November 30, 1968, included:

Consolidation Coal Company

John Corcoran	President
Charles R. Nailler	Vice-President, Operations
William N. Poundstone	Executive Vice-President

Mountaineer Coal Company

D.H. Davis	President
K.K. Kincell	Manager of Mines
L.H. Riggs	General Superintendent

West Virginia Department of Mines

John I. Ashcraft
Leslie C. Ryan

Assistant Inspector at Large
Inspector at Large

U.S. Bureau of Mines

Frank C. Memmott

Associate Director, Health &
Safety

James Westfield

Consultant

W.R. Park

District Manager

Maurice S. Childers

Subdistrict Manager

Joseph Marshalek

Supervising Inspector

United Mine Workers of America

Lewis E. Evans

Safety Director

Leonard Pnakovich

District 31

Mine rescue teams from the Williams Mine and the Robinson Run No. 95 Mine of the same Company participated in the limited recovery operations that took place from November 20-30, 1968. Names of other persons who participated in the investigation and recovery operations are listed in Appendix C.

U.S. Bureau of Mines Activities - Description of Events

The U.S. Bureau of Mines (USBM) in Morgantown, WV, was notified of the explosion about 6 a.m., November 20, 1968, by Matthew I. Duncan, Federal coal mine inspector, Fairmont, WV. Duncan had been notified of the occurrence by the County Sheriff's office in Fairmont. Duncan notified Childers, who then notified Marshalek and instructed him to contact Federal inspectors stationed in the area and have them report to the Consol No. 9 Mine. Childers also notified W.R. Park in Mount Hope, WV, who in turn notified USBM officials in Washington, D.C.

Inspector Duncan was the first USBM representative to arrive at the mine, about 6:30 a.m., November 20, 1968. He immediately issued two Form 203(a) Imminent Danger Closure Orders, citing mine explosion and mine fire dangers which prohibited any person from entering the mine except those persons engaged in recovery operations. (See Appendix D for copies of the Closure Orders).

Childers and Marshalek arrived at the mine at about 8 a.m. the same day. Childers assumed direction of USBM activities. Park arrived at the mine about 2 p.m. the same day and assumed direction of USBM activities. Memmott and Westfield, arrived at the mine about noon, November 21, 1968. The control center for recovery operations was located in an office near the slope entrance to the mine. USBM representatives were assigned duties to monitor the air quantity and quality (carbon monoxide and

methane) at each of the intake and return air shafts each shift, and a USBM representative was assigned each shift at the control center to make written records of all recovery activities.

According to testimony given at the official hearing, when Isaac P. Kuhn, Company engineer, arrived at the lower end of the parking lot at the Llewellyn shaft portal about 5:25 a.m., November 20, 1968, the lights in the parking lot were on. However, before he got to the upper end of the parking lot and before he got out of his truck, the lights in the parking lot and in the surface buildings near the shaft went out. Kuhn stated that from the headlights on his truck, he could see dust and/or smoke coming from the Llewellyn shaft. Kuhn stated that he immediately turned his truck around, drove about a mile from the parking lot to the home of Darrell Tootham to call Riggs at his home, and told him that an explosion had occurred at the mine. Kuhn stated that only a few minutes had elapsed from the time the explosion occurred until he contacted Riggs. Riggs stated that he immediately called Kincell. Kincell instructed Riggs to get to the mine as fast as he could and told Riggs that he would make all necessary calls to notify interested parties, including Company officials. Riggs stated that before he left home, he called Foster Turner, mine superintendent, reported what had happened, and instructed him to proceed to the mine. He also called the slope bottom and contacted Lewis Parker, car dumper. Parker advised Riggs that he was "dumping coal" and that everything was normal at the slope bottom. Upon instructions from Riggs, Parker attempted to make contact with persons in other parts of the mine by mine telephone and radiophone, but was unsuccessful. Riggs then instructed Parker to get his "buddy" who was nearby and to come to the surface as soon as possible. Riggs stated that he called the County Sheriff's office at Fairmont and requested police escort to the mine. Riggs arrived at the slope entrance to the mine shortly before 7 a.m. and talked to the four miners (two car dumpers and two motormen) who had walked out of the mine from the slope bottom. Riggs, using police radio, notified Kincell, who had arrived at the Llewellyn shaft with police escort, that "everything" on the east side of the mine was all right, and that the Nos. 1 and 2 fans were operating.

Jimmie Herron, section foreman, A Face section, on the midnight to 8 a.m. shift, stated that he started his fire-boss run about 6 a.m. on the morning of November 20, 1968. He stated that he had completed inspecting part of the gob line and had taken part of his air readings when he discovered the conveyor belt had stopped. On his way to investigate the trouble with the belt, he met Roy Wilson, mechanic, A Face section. Wilson told Herron that he attempted to call Charles Lee Moody, dispatcher, as previously instructed, to report that 45 cars of coal had been loaded. Wilson stated that when he made the call someone other than Moody answered the phone and instructed him to go to the

face, get the A Face crew of miners, and come out to the slope as quickly as they could. Herron stated that he got his crew together, cut the power off from the section, and attempted to ride a jeep out of the section with the crew. However, the jeep would only operate in one direction. The crew proceeded on foot to the mouth of the section and attempted to operate a locomotive that was coupled to a trip of empty mine cars which they planned to use as transportation to the slope bottom. They discovered that the DC power was off, so they walked to the slope bottom and were hoisted up the slope and arrived on the surface about 7 a.m. Herron then learned that Riggs had received Wilson's call and gave the instruction for him and the production crew to leave the mine. Herron stated that he did not know that an explosion had occurred in the mine until he reached the surface.

Riggs stated that, shortly after he had received the phone call from Wilson, the "bell" phone rang again and Robert Mullins, mechanic, advised Riggs that he and Henry Conway, mechanic, were at the bottom of the Athas elevator shaft. Riggs advised Mullins to push the cage button of the elevator, to stay on the telephone until the man cage reached the bottom and the doors to the man cage opened, and to call him as soon as they reached the surface. Riggs stated that Mullins, Conway, two motormen, two car dumpers, and the seven-man crew from A Face section reached the surface about the same time. At this time, about 7 a.m. on the morning of the explosion, 13 miners had come out of the mine unassisted after the explosion had occurred.

According to his testimony given at the official hearing, Alex M. Kovarich, shop mechanic, received a telephone call at his home, about 3:30 a.m., November 20, 1968, from Russell Foster, lampman at Llewellyn shaft, who stated that the DC power at the slope bottom was weak. Kovarich arrived at the substation near the slope entrance, about 3:45 a.m., and reset the circuit breaker which restored the power to the slope bottom. He checked the No. 1 mine fan and, after changing to work clothes in the bathhouse, went to the nearby shop and began to work on a shuttle car. He had been working in the shop about an hour (time could not be established) when there was a tremble and then the lights dimmed down; "They didn't go entirely out." He immediately drove to the slope telephone and tried to call Llewellyn shaft to find out if there was any trouble there, but no one answered his call. Kovarich then called Cecil Selders, chief maintenance supervisor, at his home in Fairmont, WV, and told Selders that he thought something was wrong in the mine because he could not reach anyone at Llewellyn. Kovarich opened the oil switch, which disconnected the AC power from the slope, and opened the circuit breaker in the substation, which disconnected the DC power from the slope. He then left immediately to check the No. 3 fan (Mods Run). When he arrived at the fan, he found the explosion doors to the fan had been blown open and "smoke was pouring out" of the shaft. He

attempted to call the slope from a nearby house occupied by the Simons family, but was unable to reach anyone. He requested Mrs. Simons to place the call for him, and advised her to tell whom-ever she talked to of his presence, and that he was on his way to the Llewellyn shaft. He took Riggs and Selders a short distance from the Llewellyn shaft. Riggs instructed Selders and Kovarich to return to the Mods Run shafts. Selders was to inspect the damage to the No. 3 fan and Kovarich, with the help of other persons who were on their way there, was to remove the metal bucket from the Mods Run intake shaft and transport the bucket to the Mahan shaft. The bucket was used as part of the emergency escape facilities to hoist miners up the shaft. Selders found the No. 3 fan "demolished". The fan blades were stripped from the hub; some of the fan blades were lying on the floor in the fan house, and some had been blown through the metal structure of the fan house. The bucket was loaded onto a truck and transported to the Mahan shaft.

Joe Dobis, USBM representative, John Ashcraft, West Virginia Department of Mines (WVDM), and Company officials arrived at the Mahan shaft, about 7:45 a.m., and made contact with the miners at the bottom of the shaft by lowering a telephone into the shaft. Several all-service gas masks were also lowered into the shaft. About 8:45 a.m., Dobis learned, from talking to Gary Morton at the bottom of the shaft, that there were eight miners waiting to be rescued. The crane which had been transported from the Loveridge Mine of the same Company, about 15 miles away, arrived at the Mahan shaft about 8:50 a.m. A thousand (1,000) feet of new steel cable and the bucket were installed on the crane and the bucket was lowered into the shaft at 9:50 a.m. The first two miners were hoisted to the surface at 10:08 a.m. At 10:22 a.m., three more miners were hoisted to the surface, and at 10:40 a.m., the remaining three miners were brought to the surface. The first two miners, who were rescued from the Mahan shaft, received medical treatment and were transported by ambulance to the Fairmont Hospital for further observation. By 10:40 a.m., November 20, 1968, 21 of the 99 miners who were in the mine when the explosion occurred had survived the explosion and were safely on the surface.

According to testimony given by Wilson at the official hearing, nothing unusual had happened and everything was normal in the 7 South section during the midnight to 8 a.m. shift on November 20, until the explosion occurred at approximately 5:30 a.m. He stated that he was near the continuous mining machine, observing mining operations, when the power went off. He looked at his watch, it was 5:30. He started to go to the telephone to report the power outage and took two or three steps "when this thing came in on us. It just sounded like whoosh-whoosh, just like that through the air, and there was flying debris, rock dust, coal dust and everything so dense you couldn't see. "Wilson stated that by talking to one another, the crew of miners stayed

together and crawled along the coal rib down to the power center, a distance of about 300 feet. By this time, visibility had improved. The crew went to the first-aid station where the self-rescuers and all-service gas masks were kept. Each member of the crew put on a self-rescuer (later, several gas masks were used), gathered up their coats and lunch kits, and proceeded to the bottom of the recently constructed Mahan intake shaft. Wilson also stated that they found the overcast located in the No. 5 entry, seven crosscuts outby the 7 South faces, destroyed.

He then knew that their only chance of survival would be by way of the Mahan shaft. The crew reached the shaft bottom at about 6:30 a.m. Wilson sent two miners down to the mine car loading point, about 1,200 feet outby, to search for Paul Henderson, who was working at the loading point when the explosion occurred. The two miners returned without finding Henderson and told Wilson that the stoppings near the loading point were blown out. Another crew member, Gary Martin, shuttle car operator, stated that he made another unsuccessful trip to the loading point and searched for Henderson around and outby the loading point. At about 8 a.m., while the crew was waiting to be rescued, another explosion occurred in the mine. Lake stated, "There wasn't much concussion, just like a large pillar fall, just a lot of force." Smoke was backing up near the shaft; several miners became sick and some became unconscious. The crew waited at the bottom of the shaft for approximately 4 hours before they were rescued, about 10:40 a.m., November 20, 1968.

Large amounts of smoke, which varied in color from black, grey and white to yellow, continued to exhaust from the Llewellyn and Mod Run intake and return shafts after the 5:30 a.m. explosion. Also, smoke started exhausting from the Mahan shaft early in the evening of the same day. This was evidence that a raging mine fire existed underground and was being sustained by air from the shaft openings, which alternated from exhausting to intaking. At approximately 9:30 p.m. on the day of the explosion, flame came out of the Llewellyn shaft to a height of approximately 75 feet above the shaft, and the flame continued until 11:10 p.m. On November 21 at 5:15 p.m., flame again came out of the Llewellyn shaft about the same height, but for a shorter period of time. On November 23 at 3:15 a.m., flame along with hot coals and debris came out of the same shaft to a height of approximately 75 feet above the shaft. The Llewellyn shaft continued to release large amounts of black, grey, and white smoke; and, on November 29 at 1:16 a.m., a major explosion came out of the shaft, and flame reached a height of over 100 feet in the air. (See Appendix E, Photo No. 1).

The Mods Run intake and return shafts also continued to release a large amount of black, grey, and/or white smoke. A small explosion came out of the intake shaft at 6:40 p.m., and an explosion came out both intake and return shafts at 10 p.m. on

the day of the original explosion. On November 21, a decision was made to place a concrete cap on both of the Mods Run intake and return shafts. Both shafts were capped by 6:40 p.m. the same day. On November 22 at 2:48 a.m., an explosion occurred in the Mods Run intake shaft and blew the cap off the shaft opening. The blast was heard and the concussion was felt by persons in the slope office control center about, 17,000 feet away.

Approximately 2 hours later, explosions came out both intake and return shafts which blew the cap off the return shaft, and debris from the return shaft was blown about 2,000 feet from the shaft opening. A 1,000-gallon capacity steel tank was blown from near the bottom of the Mods Run intake shaft up the 600-foot shaft and landed on the surface a few feet from the opening. (See Appendix E, Photo No. 15).

On November 22, the decision was made by the officials directing the recovery operations to dump crushed limestone in the Mods Run shafts in an effort to reduce the amount of intake air that was sustaining the mine fire. By 12:30 p.m., November 23, both shafts had been filled with limestone to a height of 60-70 feet above the coal seam which sealed the shafts and stopped them from exhausting and intaking.

The Mahan shaft continued to intake air until 6:35 p.m. on the day of the original explosion when a "pop" occurred in the shaft which discharged some white smoke. The shaft then started intaking air and continued to intake air until November 22, when black and white smoke started to emit from the shaft. The shaft continued smoking until November 26, when another minor explosion occurred at 12:55 p.m. which blew debris up the shaft. On November 28 at 2:28 a.m., a major explosion occurred in the Mahan shaft, and flame, followed by large amounts of black smoke, came out of the shaft. The shaft continued to discharge white and grey smoke until it was sealed. (See Appendix E, Photo No. 2).

Because of the unstable condition of the mine following the original explosion, officials directing the recovery operations considered the mine unsafe to permit any further attempts.

Boreholes and Sampling

A decision was made by the officials directing the recovery operations on November 21 to collect air samples from several of the boreholes, located in various areas of the mine, which had been used to take power and rock dust into the mine. The USBM installed a portable Orsat analyzer in the office at the slope; samples were collected every 2 to 3 hours at these boreholes, and chemical analysis of those air samples was started November 22. The analysis of one of the air samples collected at the Main West power borehole on November 22 contained 4.2 percent carbon dioxide, 12.8 percent oxygen, 0.6 percent carbon monoxide and 8.6

percent methane. The analysis of one of the air samples collected at the Llewellyn rock dust borehole on the same day contained 2.0 percent carbon dioxide, 8.2 percent oxygen, 0.2 percent carbon monoxide and 17.7 percent methane. These analyses showed that life could not exist in these areas of the mine. The air sample collected at Plum Run power borehole showed normal air.

In an effort to try to establish contact with the entrapped miners, the decision was made on November 21 that 6-inch diameter boreholes would be drilled from the surface which would penetrate the areas of the mine where miners were known to have been working when the explosion occurred. The first of the eight boreholes was started November 22 at 9 a.m., and the last borehole was completed at 2:45 a.m. on November 30, 1968. Each borehole, ranging from 200 to 619 feet in depth, was cased and penetrated each active working section about 200 feet outby the faces of 6 Right 7 South, 3 Right 7 South Parallels, Main West, 9 North, 4 and 5 Right 8 North, 3 Right 7 North, and 1 Right 6 North. Listening devices, telephones, and flashlights were lowered in each borehole and monitored for several hours with negative results, after which each borehole was equipped with tubing and valves for sampling purposes and then sealed. (See Appendix I, Figure 1 for locations of test boreholes).

The following chart gives data on the first air samples collected from the eight boreholes:

<u>Number</u> Borehole	<u>Date</u> 1968	<u>Section</u> Location	<u>Percentage</u>			
			CO2	O2	CO	CH4
1	November 25	6 Right 7 South	5.2	9.6	1.0	5.2
2	November 27	4 Right 8 North	6.8	7.0	0.8	26.0
3	November 25	3 Right 7 South	4.2	6.2	0.8	3.4
4	November 26	3 Right 7 North	2.6	13.0	0.2	11.8
5	November 28	9 North	8.6	5.0	1.0	26.4
6	November 30	1 Right 6 North	7.4	4.2	1.2	40.2
7	November 26	Main West	6.6	5.8	0.8	27.4
8	November 28	5 Right 8 North	4.2	8.0	0.4	14.8

The analysis of the first air samples collected at each of the boreholes showed that the atmosphere in each of the eight sections of the mine where miners were working when the original explosion occurred could not support life.

On November 24, 1968, the officials directing the recovery operations decided to send two mine rescue teams underground for exploration. At 5:22 p.m., November 24, the Robinson Run No. 95 mine rescue team accompanied by Walter Miller, inspector, WVDM, and M.W. McManus, Federal coal mine inspector, and the Williams

mine rescue team accompanied by John Ashcraft, WVDM, and Joe Marshalek, entered the Athas shaft portal.

The Robinson Run No. 95 mine rescue team traveled the main haulage road open-faced, from the Athas shaft to the slope, a distance of approximately 12,000 feet, and returned to the surface via the slope at 6 p.m. The team reported that all conditions were normal except about 8 inches of water at C Face switch. The Williams mine rescue team traveled the main haulage road open-faced, toward the west side of the mine. The team traveled to No. 61 crosscut near Plum Run borehole, a distance of approximately 7,000 feet from the Athas portal. Carbon monoxide was detected at the No. 61 crosscut, and the team returned to the surface at 5:55 p.m. The team reported that the mine surfaces inby E Face switch were black, that ventilation controls from Athas shaft to the Plum Run borehole were intact, and that the ventilation was normal. The team stated that the haulage road inby No. 61 crosscut was free of roof falls as far as they could see by the light from their cap lamps, and that the forces of the explosion coming from the west side of the mine had dissipated near the Plum Run borehole.

Flame and Forces

The full extent of the flame and forces of the original explosion of November 20, 1968, cannot be determined; following the original explosion, several minor and major explosions and mine fires occurred underground between November 20 to November 29, 1968, when sealing of the mine began.

Flame

The flame of the first explosion extended through the Main West areas of the mine between the Llewellyn and Mods Run shafts as determined by smoke and flame that were seen coming out the shafts at the time of, or shortly after, the explosion. These shafts were approximately 8,000 feet apart. Information collected during the extended investigation and recovery operations following the unsealing of the mine revealed evidence of heat or flame in all explored areas of the mine inby Plum Run overcast in the form of soot, coke, ashes, partly burned paper, melted plastic brattice material, melted conveyor belt, and burned and/or charred rubber tires and cable insulation.

Forces

The forces of the first explosion destroyed both the Nos. 3 and 4 fans, located at the Mods Run and Llewellyn shafts, which were used to ventilate the west side of the mine. The hoisting equipment in and above the Llewellyn shaft was destroyed, and the combination lamp house, bathhouse, and supply house near the Llewellyn shaft was partly destroyed. The forces extended in a

southerly direction from the Llewellyn shaft in 7 South entries for a distance of approximately 10,000 feet and dissipated at the 7 South overcast, located near the Mahan shaft. The forces dissipated in an easterly direction at the Plum Run borehole. The investigation and recovery operations following the unsealing of the mine revealed that most of the ventilation controls, such as stoppings, overcasts, and regulators in the explored areas in the west side of the mine inby the Plum Run overcast, were damaged or completely destroyed.

Sealing of Mine

On the morning of November 29, 1968, a meeting was held in the control center near the slope for the purpose of discussing the progress of the recovery operations and to decide what actions should be taken in view of the unstable conditions in the mine which prevented any further attempts to reach the entrapped miners. Persons attending this meeting were:

Consolidation Coal Company

John Corcoran	President
C.R. Nailer	Vice-President, Operations
William Poundstone	Executive Vice President
Harold Suter	Vice-President

Mountaineer Coal Company

D.H. Davis	President
K.K. Kincell	Manager of Mines
Lawrence H. Riggs	General Superintendent

West Virginia Department of Mines

Elmer C. Workman	Director
John M. Ashcraft	Assistant Inspector at Large
Leslie C. Ryan	Inspector at Large
Walter N. Miller	Inspector

U.S. Bureau of Mines

Frank C. Memmott	Associate Director, Health & Safety
James Westfield	Consultant
W.R. Park	District Manager
Maurice S. Childers	Subdistrict Manager
Joseph Marshalek	Coal Mine Inspection Supervisor

United Mine Workers of America

Lewis E. Evans
Leonard Pnakovich

Safety Director
District 31

The consensus of these officials was that: all efforts to reach the entrapped miners were unsuccessful; the analyses of the air samples, collected from the boreholes near each working section of the mine, indicated that the atmosphere could not support life; because of the uncontrollable fire in the mine, further explosion dangers were imminent, and entrance into the mine from any location was not possible; and the only other alternative was to seal the mine and extinguish the fire.

After the decision was made to seal the surface openings of the mine, and several hours before actual sealing operations started, the next of kin of the explosion victims were notified by telephone of such plans, fulfilling a promise made to the next of kin by Corcoran. Thereafter, Peter P. Ferretti, official of Consolidation Coal Company, served as public relations representative to advise the victims' families and the news media on progress in recovery operations.

Sealing of the surface openings to the mine, which consisted of eight shafts and a slope, started about 7:35 p.m., November 29, 1968. All openings were sealed and the Nos. 1 and 2 fans shut down by 4:25 a.m., November 30, 1968. The Llewellyn shaft was sealed with approximately 1,000 tons of crushed limestone dumped into the shaft by auto trucks. The Mods Run shafts had been sealed by crushed limestone on November 23, 1968, to reduce the amount of air getting to the fire area.

The Mahan intake shaft, Athas intake and return shafts, and the intake and return shafts near the slope were capped with 8 to 10 inches of concrete. After a waiting period of more than 72 hours, the Llewellyn and Mods Run shafts which were partially sealed with crushed limestone were capped with 8 to 10 inches of concrete. Each shaft was equipped with a 6-inch pipe and valve for pressure relief and tubing for sampling purposes.

UNSEALING OF MINE, RECOVERY OPERATIONS, AND RESEALING OF MINE

Monitoring of Mine Atmosphere and Plan Approval

During the time the mine was sealed in 1968, USBM representatives collected air samples on a weekly basis, at each of the shafts and slope seals, and from the strategically located boreholes. The samples were analyzed at the USBM's Mount Hope, WV laboratory. The analyses of several of the first air samples collected after the mine was sealed are as follows:

<u>Location</u>	<u>Date</u> 1968	CO ₂	O ₂	<u>Percentage</u>		
				CO	CH ₄	N ₂
Main West Borehole	December 1	8.34	2.84	0.60	28.52	59.57
Athas Portal	December 4	0.39	19.25	0.03	0.70	70.63
Llewellyn Rockdust Borehole	December 1	6.49	5.76	0.46	21.12	66.07
Plum Run Borehole	December 1	0.09	20.86	0.00	0.04	79.01
Mods Run Power Borehole	December 4	4.39	3.18	0.45	49.96	40.82
Mods Run Shaft	December 5	6.81	0.10	0.62	46.70	45.41
Mods Run Slope	December 4	0.26	20.60	0.00	0.23	78.91

The analyses of the air samples collected closest to the opening of the mine target date of September 12, 1969, from the sealed areas of the mine are as follows: ⁴

Location	Date 1969	Percentage				
		CO2	O2	CO	CH4	N2
Main West Power						
Borehole	September 8	12.35	0.15	0.0017	85.57	1.74
Athas						
Portal	September 8	7.43	0.27	0.0025	69.86	25.19
Llewellyn Rockdust						
Borehole	September 8	9.63	0.15	0.0024	88.07	1.59
Plum Run						
Borehole	September 8	7.39	0.15	0.0029	69.31	22.92
Mods Run Power						
Borehole	September 8	5.89	0.12	0.0032	86.24	7.43
Mahan Shaft	September 8	2.80	0.21	0.0017	96.83	0.12
Mahan Slope	September 8	7.45	0.18	0.0030	67.63	24.54
No. 4 Test Bore-						
hole 3 Right						
7 North	September 8	7.95	0.15	0.0025	86.02	5.49
No. 5 Test Bore-						
hole 9 North	September 10	7.89	0.12	0.0009	90.44	1.39

During the time the mine was sealed, several official meetings were held at the Company's Monongah, WV office, to discuss and develop plans for unsealing and recovering the mine.

The Company submitted the Phase I Plan for unsealing and recovering the mine to key representatives from the USBM, the WVDM, and the UMWA. After a review of the analytical results from the many air samples collected from the sealed areas of the

⁴USBM and industry experience show that sealed mines, or parts thereof can be opened and reventilated with reasonable assurance that fire areas will not rekindle when the atmosphere in the sealed area is low in oxygen content and free of carbon monoxide, or at least below 35 parts per million. Such experience has shown further that with each day the fire area remains sealed after the area is free of carbon monoxide, the possibility of hot materials rekindling is reduced accordingly.

mine during the previous 9 months, these representatives approved the Phase I Plan on August 12, 1969. The target date of September 12, 1969, for unsealing the mine was agreed to by all interested parties. (See Appendix F, copy of Consolidation Coal Company's Phase I Plan for unsealing the mine).

The Phase I Plan outlined several major objectives which included only general work procedures and recovery activities. The actual detailed methods, job procedures, and work assignments of unsealing and recovery operations were developed by the Company with the advice and consent of the officials who assisted in directing the recovery operations. Names of the mine rescue teams and other persons who participated in the recovery operations are listed in Appendix C.

The approved plan called for ventilation of the east side of the mine through the Athas intake and return shafts because of its remote location from surface buildings and dwellings. Forces of the explosion of November 20, 1968, and the many explosions that followed had caused no damage to the east side of the mine. The plan called for entering the Athas shaft and sealing off the west side of the mine from the east side at locations where the forces from the explosions had dissipated. After the east side of the mine had been recovered, advancing toward the west side of the mine would begin using the air lock method of advance and controlled ventilation. Experience dictated that this method, although more time consuming, provided a higher degree of safety for the recovery crews and also minimized the possibility of "hot spots" rekindling.

Unsealing of Mine

Unsealing of the mine began on September 12, 1969. At 8:10 a.m., work crews started chipping the concrete from the Athas return shaft using air jackhammers equipped with beryllium points which produce little or no sparking. The concrete slab (seal) was removed from the shaft by a crane, and the air duct to the fan was reinstalled. Arrangements to start the fan by remote control were completed. The fan house was pressurized with fresh air by an auxiliary fan and tubing, and the belts were grounded against static electricity. The Athas No. 2 fan was started at approximately 10:55 a.m. on the same day. The pressure relief valves in the Athas intake seal were opened, and the emergency doors at the bottom of the slope were opened by a mine rescue team; the east side of the mine was now being ventilated by the No. 2 fan. At the end of the 8 a.m. to 4 p.m. shift on September 12, 1969, the return at the No. 2 fan, which had been in operation for over 4 hours, contained 44 percent methane.

The concrete seals were removed from the Athas intake shaft and from the intake and return shafts at the slope on September 13, and the No. 1 fan was put in operation at 11:10 a.m., September

14, 1969. The east side of the mine was now being ventilated in the same manner that it was ventilated before the explosion on November 20, 1968.

Recovery Operations

1969

While the elevator in the Athas intake shaft was being restored to operating condition, Ryan, Childers, and Raymond Comer, representatives from the WVDM, USBM, and the coal Company, were lowered by bucket to the bottom of the Athas intake shaft and explored the area around the shaft bottom. In the meantime, two crews entered the east side of the mine on foot from the slope and explored and examined the area between the Athas shafts and the slope. The east side of the mine was not affected by the forces of the explosions, and the exploration crews found the conditions in this area of the mine normal except for accumulations of water at several locations.

On September 15, 1969, two Mountaineer Coal Company mine rescue teams equipped with self-contained oxygen breathing equipment, gas detecting equipment, a communication system, and a push-cart loaded with brattice material, accompanied by Miller, Ashcraft, Park, and Marshalek, entered the mine via the Athas intake shaft elevator to explore and examine the mine in a westerly direction. The rescue teams and officials traveled the main haulage road on intake air from the shaft bottom to No. 94 crosscut inby 3 North. Ventilation at this location was depleted and the advance was stopped by roof falls, water, 28 percent methane, and oxygen deficiency. The teams returned to the surface at 1:25 p.m. and reported that the first signs of the explosion (blackened mine surfaces) were observed at E face, and the first sign of damage was the Plum Run overcast which had three slabs blown off its top. Also, several supports of yieldable arches near the mouth of old and new 3 North were blown outby toward Athas shaft, several stoppings between the Plum Run overcast and 3 North track switch were damaged by the forces, and the stoppings inby 3 North switch were blown out.

During the period from September 16 to October 20, 1969, the west side of the mine had been sealed from the east side by wooden stoppings plastered on the intake side and located one crosscut inby 3 North. The first fresh-air base was established at the 3 North switch. Adequate ventilation had been established throughout the explored areas, and several damaged stoppings outby 3 North were repaired and/or replaced including the Plum Run overcast. An escapeway was provided from the fresh-air base to the Athas intake shaft bottom.

Roof falls in Nos. 5 and 6 Main West headings outby the sealed area were leveled off to permit air passage. A 20-foot section

of track was removed from the haulage tracks outby the fresh-air base, and all power wires and pipelines were cut at the same location. After the east side of the mine and the explored areas in the west side of the mine were examined by key officials, electric power was restored to the mine power circuits in the east side of the mine and to within 600 feet of the fresh-air base in the west side. Several pumps and discharge water lines were required to dewater both sides of the mine. A portable air compressor installed outby the fresh-air base provided air which operated several air pumps inby the sealed area. The roof along the haulage road at several locations between Athas shaft and the fresh-air base required additional roof support, such as cribs and concrete block piers. The damaged yieldable arches between Plum Run and 3 North were repaired. Rock dust survey samples were collected in the open areas in the east side and west side of the mine after which such areas were rock dusted with a high pressure rock-dusting machine. The recovery work was conducted on each shift around-the-clock by Company mine rescue teams and 15 to 20 miners under the supervision of certified Company officials. One or more USBM, WVDM, and UMWA officials were on duty underground and on the surface on each shift.

Exploration was stopped for several shifts while water was being pumped and roof falls were being leveled in the sealed area inby No. 92 crosscut. During exploration by a mine rescue team on October 23, the first body was found near a derailed 30-ton locomotive on the Main West haulage road at No. 98 crosscut. The second body was found at 11:20 p.m. the same day in the deck of a 30-ton locomotive at the No. 108 crosscut. (See Appendix E, Photo No. 17). After the fresh-air base had been advanced to the No. 106 crosscut, the bodies were recovered by the mine rescue teams and were later identified as Lester Willard and Charles T. Hardman, both locomotive operators. Hardman's wristwatch had stopped at 5:27. The empty trip of 31 mine cars with a locomotive on each end was known to have been traveling toward the west side of the mine when the explosion occurred. The empty cars were derailed and some were "jackknifed" by the forces of the explosion. An inspection of the lead (30-ton) locomotive by USBM electrical inspectors and Company personnel revealed that the locomotive controller was in the off position, the reverse lever was in the forward position, and the airbrake lever was about half applied. According to experienced Company personnel, this would compose a normal operating position of the front-end locomotive on this part of the haulage road. (See Appendix E, Photo Nos. 6, 8, 17, and 18).

During the period from October 24 to November 6, 1969, recovery work continued in the Main West entries inby No. 29 crosscut. Mine rescue teams, following the air lock method of recovery and controlled ventilation, recovered the entries in increments of 1,000 feet and reached the entrance of 4 North on October 31. Seals were built inby 4 North and a new fresh-air base was estab-

lished in the Main West headings at the No. 116 crosscut. Mine rescue teams entered 4 North and installed 11 seals which sealed off 4 North from the Main West return airways. The four Main West airways between 4 North and Mods Run return shaft were explored in fresh air by installing a total of 22 plastic checks in the crosscuts between the Nos. 1 and 2 entries and removing the gas as the teams advanced. Eight seals were installed in the openings around the bottom of the Mods Run shaft which sealed the shaft off from the underground areas. Seals were erected in the Nos. 1, 2, 3, and 4 Main West return airways inby the Mods Run return shaft.

From November 7 to December 4, 1969, the Main West headings from 3 North to the fresh-air base at 4 North were renovated. Roof falls, some of which were 20 feet high, were encountered at several locations in most of the entries and were generally in the intersections, but also were between crosscuts. The roof along the Nos. 5 and 6 entries (track entries) was roof bolted from atop the fall, then the falls were loaded out by a loading machine which loaded the rock into mine cars. The track rails which had been disconnected at each fresh-air base had to be repaired after the roadbeds were graded. Yieldable arches and cribs were installed at many locations and at most intersections to supplement the roof supports (roof bolts). The 50-ton locomotive and 30 empty mine cars, some of which were under roof falls, were recovered. The 30-ton locomotive and one mine car were left to be recovered at a later date.

Methane accumulations ranging from 3 to 10 percent in the high areas at Nos. 102, 106, 108, 110, and 116 crosscuts outby the fresh-air base were a constant source of danger and required constant attention and frequent gas testing, particularly when the barometric pressure was falling. A rock-dust survey was made in the Main West headings between 3 and 4 North after which the area was rock dusted with high pressure rock-dusting machines.

On November 17, mine rescue teams accompanied by USBM, WVDM, and Company officials traveled and examined the six Main West return airways from 4 North to 3 North, a distance of approximately 2,000 feet; two percent methane was found throughout the area. Roof falls in these entries next to the junction of 3 North were restricting the airflow.

In preparation for recovery of the Mods Run return shaft, a submersible pump inside an 8-inch casing was installed in the shaft, and dewatering of the shaft was completed by December 4. Recovery work during this period (October 7 to December 4, 1969) was conducted on three shifts per day, five days per week.

The ventilation controls, such as stoppings, overcasts, and regulators in the travelable areas in the Main West headings from 3 to 4 North, in 4 North, and in the Main West return airways

outby the Mods Run return shaft, were destroyed by explosion forces. Heavy coke deposits, 6 inches in depth, were observed in the No. 2 entry 4 North and in the first crosscut between Nos. 2 and 3 entries 4 North, and ashes 10 inches deep were observed in the No. 2 Main West headings at 4 North.

On December 4, 1969, a meeting was held at the Athas portal to discuss and develop plans to recover the Mods Run return shaft and procedures for placing the No. 3 fan in operation. Persons attending this meeting were:

Consolidation Coal Company

Harold Suter
W.C. Parisi

Mountaineer Coal Company

D.H. Davis
K.K. Kincell
L.H. Riggs
Ray Henderson
Eugene S. Lieving

West Virginia Department of Mines

Leslie C. Ryan
Walter N. Miller

U.S. Bureau of Mines

James Westfield
W.R. Park
Joseph Marshalek

United Mine Workers of America

Leonard Pnakovich
Donald Poland
Charles Tarasuk
Stanley Plachta
John Brock
G. Scott
C. Whitlach
William B. Hoffman

It was agreed by all present that the concrete seal would be removed from the Mods Run return shaft after the 8 a.m. to 4 p.m. shift was out of the mine on December 4, and no work would be done in the mine except fire bossing and pumping while the limestone gravel was being removed from the shaft. Procedures for ventilating and inspecting the shaft during mucking

operations, ways and means of removing the muck from the shaft, and procedures for placing the No. 3 fan in operation were developed and approved by all parties present.

The Johnson Shaft Construction Company was contracted by the Company to remove the material from the shaft. The cap (seal) was removed from the Mods Run return shaft, and the ventilating system, consisting of an auxiliary fan and 14-inch tubing, was installed. The fan provided approximately 4,000 cfm of air at the working area in the shaft (at the top of the crushed limestone gravel). Mucking operations with a large bucket and clam began at 4 p.m., December 4, and continued for two 10-hour shifts per day until most of the material was removed from the shaft by December 10. An air-operated mucking machine was lowered to the bottom of the shaft and the remainder of the crushed limestone and rock falls at the four underground approaches to the shaft was loaded out and hoisted up the shaft. After mucking operations were completed at the return shaft, the construction Company moved its equipment to the Mods Run intake shaft. The wood seals at the approaches to the return shaft started leaking badly which permitted approximately 37,000 cfm of air to intake through the Mods Run shaft and to the return airways. This change in the ventilation system reduced the amount of intake air for ventilating the recovered area in the Main West headings and resulted in a methane build-up in the Main West headings from the fresh-air base at the No. 143 crosscut outby to the D Face derail ranging from 2 to 5 percent. However, all power and telephone communications were cut off from the entire mine when the normal methane content of the return air at the No. 2 fan (Athas) started to increase.

During the period of December 10-22, 1969, additional wood seals were installed at the bottom approaches to the Mods Run return shaft and regulators were installed to control the amount of intake air from the shaft. This increased the amount of intake air in the Main West headings at the Plum Run overcast to normal air flow of approximately 50,000 cfm of air and removed the methane accumulations in these headings from D Face to the fresh-air base at the No. 116 crosscut. The roof at all the approaches to the shaft bottom was supported by roof bolts. After an air lock (wood stoppings with doors) was installed near the south approach, mine rescue teams entered the Main West headings at a point inby the fresh-air base and erected and plastered wood seals across the eight Main West headings outby No. 144 crosscut. After establishing ventilation to the seals, mine rescue teams explored the Main West headings back to and including the Mods Run intake shaft. Mine rescue teams removed the seals at the old fresh-air base at No. 116 crosscut, removed the air lock near the south approach to the shaft, and returned to the surface via the Mods Run shaft. On Saturday, December 20, 1969, with all persons out of the mine and all power disconnected from the mine, the Mods Run (No. 3) fan was placed in operation

at 5:30 p.m. On December 22, certified Company officials and USBM officials entered the Athas shaft at 12:30 a.m. and inspected the Main West headings (on foot) from the Athas shaft to the bottom of the Mods Run return shaft. No methane accumulations were found and ground temperatures, as measured with radiation thermometers, at the many areas tested ranged from 65 to 67 degrees. The electric power and communication systems were restored to the mine. The only work performed in the mine from December 22, 1969, to January 5, 1970, was fire-bossing and pumping.

1970

From January 5 through May 3, the recovery work was conducted on three shifts a day, five or six days per week, by 15 to 20 miners and several certified Company foremen on each shift. Mine rescue teams were not used or needed during this period. Such work consisted of renovating the Main West intake and return headings outby the old fresh-air base at the No. 143 crosscut.

The No. 3 fan (Mods Run) was exhausting approximately 160,000 cfm of air at 3.6-inch water gauge. The methane content in the return air from this fan varied with the barometric pressure and ranged from 0.7 percent during normal pressure to 3.5 percent during low barometric pressure (less than 30 inches). Several times during this period, all work underground was discontinued due to high methane content (more than 2 percent) in the return air at the No. 3 fan, resulting from falling barometric pressure. The wood seals in Main West inby No. 143 crosscut were ventilated with more than 20,000 cfm of air. The methane content in the air on the return side of these seals was generally about 5 percent during normal barometric pressure. However, when the pressure fell below 30 inches, the seals would become positive and leaked methane from the sealed area which increased the methane content in the air ventilating the seals to more than 10 percent. Also, the 14 wooden seals at 4 North reacted in the same manner to pressure change and contributed to high methane content in the return air at No. 3 fan. These seals were replaced with concrete block seals. The blocks had to be hauled by wheelbarrow for distances ranging from 800 to 1,000 feet. The wood seals at the Mods Run return shaft bottom were also replaced with concrete block seals. On January 9, ice started forming on the blades of the No. 3 fan. The miners were withdrawn from the mine, the electric power was cut off from the mine, and the fan was shut down and repaired. The air lock doors to the fan housing which were blocked partly open were closed. During the extremely cold period from January 7 to 18, ice formed in the Athas elevator shaft and miners and material had to enter the mine through the slope.

The Mods Run intake shaft was dewatered and "mucked" (the crushed limestone removed) in the same manner as was Mods Run return

shaft. The intake shaft was placed in operation on January 26. The intake air from this shaft decreased the amount of air intaking from the Athas shaft and resulted in methane accumulating in the high places ranging from 1.5 to 5 percent along the Main West haulage road and parallel headings at the Nos. 115, 116, 117, and 118 crosscuts. The Mods Run intake air was regulated, deflecting checks were installed in the high areas, and the methane removed. Two 21-inch boreholes which penetrated the coalbed along the main haulage road at the Nos. 118 and 149 crosscuts aided in the ventilation during recovery of these areas. Portable high pressure fans were available to be installed at these holes on the surface. However, these fans were not used or needed.

All except four of the intersections along the Main West Nos. 5 and 6 headings from the old fresh-air base at No. 117 crosscut to the new fresh-air base at No. 143 crosscut (a total of 25 intersections) were caved. Some of the roof falls were 25 feet high. The roof falls were loaded into shuttle cars by two loading machines and dumped into mine cars at No. 116 crosscut loading point. The roof of the caved areas was roof bolted from atop the fall, and the roof bolting was always kept in advance of the loading area. At several high caved areas, the fallen material was loaded out in two levels which permitted part of the ribs to be bolted as the first layer of rock was loaded which provided better protection for the loading machine operator. Yieldable steel arches covered with boards were installed at each intersection. A total of 147 arches were installed along No. 6 track heading between the Nos. 117 and 132 crosscuts.

The track between the old and new fresh-air bases was taken out, the roadbed was graded, and the track relaid. All open areas in the Main West intake and return airway between the Nos. 117 and 143 crosscuts were rock dusted with a high pressure rock-dusting machine. The Mods Run intake shaft, designated as the emergency escapeway, was provided with emergency escape facilities.

The USBM continued collecting air samples on a weekly basis from the several sampling areas, and the Company collected air samples daily at the critical areas (areas nearest to the recovery activities).

During the period of time from May 6 to October 22, 1970, recovery of the mine continued on three shifts per day, five or six days per week. Work crews on each shift consisted of 15 to 20 miners and several certified Company foremen. Mine rescue teams, three teams on each shift, were used about 50 percent of the work time during this period. The Main West headings were explored by mine rescue teams, utilizing the air lock method and controlled ventilation, from the No. 143 crosscut to the No. 215 crosscut, a distance of approximately 7,100 feet.

Efforts by the mine rescue teams to reach the active 1 Right section off 6 North, where seven victims were known to be located, were unsuccessful due to impassable roof falls in all entries on both the east and west side of the section.

Officials directing the recovery operations agreed to continue recovery of the Main West headings and to seal off 7 South, 7 North, and the Main West headings inby 7 South from the rest of the mine. However, due to impassable roof falls in the Nos. 1 through 8 headings between Nos. 206 and 214 crosscuts, this objective could not be accomplished. Therefore, temporary wooden seals were erected in all nine of the Main West headings between the Nos. 205 and 206 crosscuts, which sealed off the Main West headings from the rest of the mine. The recovery work during August, September and October 1970, consisted of renovating the Main West headings outby No. 206 crosscut. During this entire period, crews continued to load out roof falls from the Nos. 1, 2, 3, 4, and 5 parallel Main West headings between Nos. 113 and 132 crosscuts, including the Mods Run intake entries. The number of roof falls along the Main West headings between 5 and 6 North were considerably less than those encountered outby 5 North and inby 6 North. Loading out roof falls for haulageways, airways, and escapeways, and roof bolting the areas were the most time consuming and costly of all the recovery operations; this was due to the height of the roof falls and the manner in which the falls were loaded out, as previously explained. As of July 16, 1970, a total of 1,919 cars of rock had been loaded out of the Main West headings since the recovery work began November 12, 1969.

Breakdowns in the mine ventilating system during June, July, August and September 1970, resulted in many days of work stoppage. During this period, one or more of the three ventilating fans were down 11 times; each time resulted in work stoppage of one or more shifts to two days. The fan outages were attributed to electric storms, high-voltage power outages, fan motor bearings, and the blades having been ripped off the hub of the No. 1 fan. During this period, low air velocity and sometimes neutral zones along the intake airways between 3 and 4 North resulted in methane accumulations in one or more of these areas in the Nos. 1, 2, 3, 4, and 5 Main West headings between the Nos. 113 and 119 crosscuts. These methane accumulations were detected a total of 14 times in the high places on top of roof falls. All recovery work was discontinued on each occasion until the methane was removed, which resulted in considerable loss of work time.

During the period mentioned above, the ventilation system was providing only 37,000 to 45,000 cfm of air to ventilate the seals across the Main West headings. This amount of air was adequate during normal atmospheric conditions. However, during the period of falling barometric pressure, the temporary (wood-plastered) seals would leak methane from the sealed area, which ranged in

concentrations from 50 to 90 percent, and would increase the methane content of the return air at the No. 3 fan to more than 2 percent. When this occurred, the power was disconnected from the mine and all the workers were withdrawn to the surface. Each occurrence interrupted one to three shifts of recovery work. Also, due to the limited amount of available air (44,000 cfm), the ventilating procedure for advancing each fresh-air base in the Main West headings inby 5 North was unnecessarily prolonged. The hazards involved in these procedures were also aggravated by the increased concentrations of methane in the return airways and at the No. 3 fan, which occasionally reached the explosive limits.

At a meeting on September 9, 1970, the difficulties encountered with the ventilation system during June, July, August, and September 1970, were discussed. It was decided that the USBM personnel would conduct a ventilation survey as soon as possible and also conduct two experiments with the mine ventilation to determine:

- 1) if air could be pulled in through the vents on the Mahan shaft and return to the No. 3 fan; and,
- 2) if air could be pulled from the Main West headings through the 7 South entries and out of the Mahan shaft by installing a small exhaust fan on top of the Mahan shaft.⁵

A ventilation survey was conducted September 14-18, 1970, by USBM personnel, in cooperation with Company and WVDM officials. After discussing the analysis of the data collected during the survey, all agreed that the needed additional air could be obtained by changing blade positions on the No. 3 fan and regulating Mods Run intake airflow.

On October 14, 1970, with all persons out of the mine and the power disconnected from the mine, the blade position on the No. 3 fan was changed from the No. 4 to the No. 3 position. This change increased the quantity of air intaking from Mods Run shaft from 164,000 to 242,000 cfm of air which increased the quantity

⁵A meeting was held in the United Methodist Church, Farmington, WV, on September 28, 1970, with the next of kin of the explosion victims and some of the officials directing the recovery operations. Those officials present were: Ferretti, Consolidation Coal Company; Ashcraft, WVDM; Michael and Marshalek, USBM. The purpose of the meeting was to advise the next of kin of the approximate areas of the mine the victims were in when the explosion occurred and to discuss the progress and future plans of the recovery operations.

of air available to ventilate the Main West seals from 44,000 to 99,000 cfm of air. This improvement in the ventilation system also eliminated the neutral areas along the Main West headings at previously troubled areas between Plum Run overcast and 4 North which prevented further methane accumulations. The high area atop a roof fall between Nos. 5 and 6 Main West heading at No. 79 crosscut was ventilated with an auxiliary exhaust fan and tubing vented to the return airway.

On October 16, 1970, the No. 1 experiment was conducted. The results showed that the positive pressure at the vents on the Mahan shaft could not be reversed (negative) by the No. 3 fan. On October 20, 1970, the No. 2 experiment was conducted which showed that the small capacity (9,000 cfm) exhaust fan, installed in an opening on top of the Mahan shaft, had no effect on the pressure in an opening in No. 1 seal located in Main West No. 1 entry between the Nos. 205 and 206 crosscuts. All persons were out of the mine except two, who were required to take pressure readings and air quantity measurements. The power was disconnected from the mine during both experiments.

On October 21, 1970, a meeting was held in Monongah, WV, for the purpose of reviewing the progress made in the recovery operations and to develop future recovery plans. Officials attending this meeting were:

Consolidation Coal Company

Harold Suter
Peter P. Ferretti

Mountaineer Coal Company

D.H. Davis
K.K. Kincell
L.H. Riggs
Ray Henderson

West Virginia Department of Mines

John M. Ashcraft
Leslie C. Ryan
Walter N. Miller

U.S. Bureau of Mines

James Westfield
W.R. Park
James D. Michael
Joseph O. Cook
Jack Stevenson
Joseph Marshalek
William Cordray

United Mine Workers of America

Leonard Pnakovich
Donald Poland
Charles Tarasuk
James Bennett
Stanley Plachta

Company officials stated that extensive roof falls in all entries leading into the active 1 Right off 6 North section had prevented a timely recovery of the seven bodies known to be in this area.

Also, extensive roof falls in the Nos. 1 through 8 Main West headings inby crosscut No. 206 had stopped the westerly advance of recovery operations. The Company officials offered a plan that consisted of penetrating the active working area of the 1 Right off 6 North section by driving two entries through the coal barrier between the Main West headings and the 1 Right section. All present agreed with this plan and judged that it would expedite the recovery of the victims in this area of the mine. It was also agreed that the temporary seals in the Main West entries between the Nos. 205 and 206 crosscuts should be reinforced with permanent incombustible seals and that the necessary work preparatory to developing entries north or south off the Main West entries outby the No. 206 crosscut should proceed.

During October 22 through December 31, 1970, recovery operations continued according to plan. The temporary wooden seals in Main West were "backed-up" with concrete block seals. These permanent concrete block seals were built in 5 and 6 North and between intake and return airways in Main West up to No. 205 crosscut. Work was in progress for establishing permanent ventilation controls and preparing a mine car loading point preparatory to driving entries outby and parallel to the 7 North entries. Also, the necessary work, such as establishing permanent ventilation and a mine car loading point and moving mining equipment into the area, was completed at No. 164 crosscut Main West, and driving of the two entries through the 325-foot barrier to reach the active 1 Right 6 North section was started November 2, 1970.

The conventional equipment (cutting and loading machines) was replaced by a boring machine after the first week of developing the two barrier entries. On November 17, both entries cut through into caved areas in the No. 1 entry, 1 Right 6 North between the Nos. 14 and 15 crosscuts. The loading point was advanced from the No. 164 crosscut Main West to the No. 3 crosscut between the Nos. 1 and 2 barrier entries. The No. 1 barrier entry was advanced across the section by splitting the blocks of coal and loading out the rock from the entries at each cut-through point.

On December 1, 1970, the pillar split between the Nos. 14 and 15 crosscuts cut through into the No. 2 entry, 1 Right 6 North section. Three bodies were found in the No. 2 entry between the Nos. 14 and 15 crosscuts and between the 11 BU Joy loading machine and the Goodman boring machine. The names and occupations of the victims were: Dennis McDonald, foreman; James Efaw, mechanic; and Steve Horvath, utility man. The bodies were recovered and transported to the surface the same day.

An examination of the area indicated that the only activity in the section at the time of the explosion was that the boring machine was being trammed out of the right crosscut in No. 2 entry and had reached the face of the No. 2 entry when the explosion occurred. The head of the loading machine was about 10 feet outby the boom of the boring machine. An examination and inspection of the equipment by a USBM electrical inspector revealed the trammig controls on the boring machine were in the reverse position which would move the machine in an outby direction from the face. The controls on the loading machine were in the off position, indicating that the loading machine was not moving when the explosion occurred. The boring machine was covered by a large roof fall from the controls inby and extending through the No. 15 crosscut between the Nos. 1 and 2 entries. There were no openings in the explosion-proof compartments of the boring and loading machines, and the power circuits and conduits on this equipment showed severe heat damage. The 74-gallon capacity hydraulic oil tank on the boring machine contained 10 gallons of flammable oil, and the 12-gallon capacity hydraulic oil tank on the loading machine contained approximately 5 gallons of flammable oil. Also, two 20-gallon drums of flammable oil were found at the end of the supply track in No. 4 entry.

Extensive roof falls, as much as 30 feet in height, existed in all entries in most observable areas in the 1 Right 6 North section. (See Appendix E, Photo No. 10). In the open areas, soot streamers were present on the roof and heavy deposits of soot covered the mine floor, indicative of methane burning. Evidence of coke and soot were also present on the floor in the Nos. 2 and 4 entries between Nos. 11 and 14 crosscuts. (See Appendix I, Figure 5).

During the remainder of December 1970, after the loading machine and the 430 Goodman boring machine were recovered, work in the 1 Right 6 North section consisted of loading out the large roof falls in the Nos. 2 and 4 entries in an effort to locate the remaining victims that were thought to be in this area. Also, the necessary construction work of preparing to develop entries parallel to the 7 North entries continued.

During 1970, the Main West headings were recovered and renovated from the No. 143 crosscut to the No. 205 crosscut, a total distance of about 5,600 linear feet. The 1 Right 6 North active

section was penetrated by driving two entries through the coal barrier at the No. 164 crosscut Main West headings. Three victims recovered from this section made a total of five victims recovered from the mine as of December 31, 1970. Maintaining the haulageways, travelways, airways, and escapeways in a safe condition to and from the working area required constant attention from the beginning of recovery operations; and during 1970, five or more workmen and a foreman worked full time on this maintenance work.

1971

Recovery operations resumed on January 5 in the 1 Right 6 North section by loading out of the 25-foot high roof falls contained in the No. 2 (belt) entry and the No. 4 (track) entry. Because of the excessive height, the roof falls were loaded out in three separate layers.

On January 7, the body of George Kovar, Jr., shuttle car operator, was recovered from No. 4 entry, 19 feet inby No. 12 crosscut. The seventh body, that of Gorman Trimble, shuttle car operator, was recovered from No. 4 entry between the Nos. 11 and 12 crosscuts. The body of Hartzell Mayle, loading machine operator, was found January 12 and recovered from No. 4 entry at the No. 13 crosscut. None of the seven victims recovered from the 1 Right 6 North section were wearing a self-rescuer.

The DC and AC power units found at the No. 11 crosscut in No. 4 entry were badly damaged by what appeared to be incoming forces of the explosion. Evidence of heavy coking was present on the floor in the No. 12 crosscut between the Nos. 3 and 4 entries and at many other areas throughout the section. The personnel carrier (jeep), recovered 45 feet inby crosscut No. 11 and in the No. 4 track entry, was damaged by the forces of the explosion; the drive motion and seat were blown off and the trolley pole was broken. Two shuttle cars were recovered while loading out the bottom layer of rock from the No. 2 entry between the belt tailpiece and the No. 14 crosscut. One shuttle car was located at the belt tailpiece, and the other one was located between the Nos. 13 and 14 crosscuts. Three of the rubber tires on the shuttle car were completely burned. The hydraulic hoses and the insulation on the trailing cables to both shuttle cars were also burned. (See Appendix I, Figure 5).

On February 12, 1971, a meeting was held at the Company's main office in Monongah, WV. The purpose of this meeting was to discuss the progress in recovery operations and to discuss and develop future recovery plans. The officials attending this meeting were:

Consolidation Coal Company

William Poundstone
Charles R. Nailler
Harold Suter
Peter P. Ferretti
C. William Parisi

Mountaineer Coal Company

D.H. Davis

West Virginia Department of Mines

John M. Ashcraft
Leslie C. Ryan
Walter N. Miller

U.S. Bureau of Mines

James Westfield
W.R. Park
James D. Michael

United Mine Workers of America

Lewis E. Evans
Leonard Pnakovich
Donald Poland
Charles Tarasuk
James Bennett
Stanley Plachta
W.R. Hofferd
John Brock

At this meeting, Company officials presented a three-step recovery plan to be undertaken upon the completion of the recovery work in the 1 Right 6 North area. The plan included the following proposals:

1. Drive entries north off the Main West headings, 150 feet from and paralleling 7 North entries, to reach the active 3 Right 7 North section.
2. Drive entries south off the Main West headings starting near the Mods Run intake shaft, and cut into the 7 South entries near the Mahan shaft.
3. The operator should be permitted to mine coal in the east side of the mine that was unaffected by the explosions and mine fires.

After considerable discussion of these proposals, the officials of the USBM, the WVDM, and the UMWA agreed only to Step No. 1 of the plan. Step No. 1 was considered to be most directly related to recovery operations.

The loading of rock in the 1 Right 6 North section was discontinued February 16, 1971. The large roof falls were loaded out of the belt entry between the Nos. 7 and 14 crosscuts, from the track entry between the Nos. 10 and 14 crosscuts, and from several crosscuts between these entries. The mining equipment was moved back from the working areas to the junction of the No. 1 entry and the barrier entries. Angle entries were driven off the Nos. 1 and 2 barrier entries and cut into No. 1 entry, 1 Right 6 North sections to provide additional return airways before abandoning the section on March 4, 1971.

The evidence of flame and forces from the explosions were present throughout the explored areas in the 1 Right 6 North section. Ventilation controls in all observable areas were destroyed. Due to the extensive roof falls through most of the section, loose coal and coal dust accumulations, rock-dust applications could not be evaluated.

All construction work necessary to accommodate the driving of entries through the solid coal between 6 and 7 North in efforts to recover bodies from the 3 Right 7 North section more quickly was completed. The development of six entries (7 North Parallel) off the Main West heading between the Nos. 199 and 204 crosscuts began on May 5, 1971. The six entries provided for a split system of ventilation, intake escapeway, and a track haulage loop system that permitted advancing the loading point every 200 feet. The entries were driven on 60- to 109-foot centers and crosscuts were 80 to 100 feet apart. A total of 75,000 cfm of air was available for the two air splits, and auxiliary exhaust fans and tubing were used for face ventilation. Thirty thousand cfm of air was available to ventilate the inby Main West seals. Mining was accomplished by a 430 Goodman boring machine, an 11 BU Joy loading machine, two shuttle cars (Torcar), and a Galis roof-bolting machine, all permissible-type equipment.

On May 5, 1971, at the Company's request, a meeting was held at the Monongah, WV office with the following officials in attendance:

Consolidation Coal Company

William Poundstone
Charles R. Nailler
Harold Suter

Mountaineer Coal Company

D.H. Davis

U.S. Bureau of Mines

W.R. Park
Joseph O. Cook
James D. Michael

Davis stated that plans had been developed to reopen the Consol No. 9 Mine for coal production and that such plans, which included mining ventilation, roof control, etc., would be completed soon after the detailed discussions at this meeting and would thereafter be submitted to the USBM for consideration. All agreed that the ventilation plan was the most important plan that must be approved by the USBM.

Company officials contended that nearly all of the pillared and abandoned parts of the mine could be ventilated sufficiently to comply with the Federal Coal Mine Health and Safety Act of 1969. The Company officials also contended that it would be almost physically impossible to seal such pillared and abandoned areas. Park stated that before any decision could be made concerning this matter, a ventilation survey of the mine would have to be made. Engineers and technicians from the USBM, accompanied by State and Company officials, conducted a ventilation survey at the mine from May 14 through 27, 1971. The analysis of the data collected during this survey showed that the pillared and abandoned areas of the mine, referred to by Company officials during the meeting of May 5, 1971, were not being and could not be ventilated sufficiently to comply with the Federal Coal Mine Health and Safety Act of 1969. Therefore, the Company's request to produce coal in the east side of the mine was denied.

While the 7 North parallel section was being developed, during May and June 1971, fire drills were conducted on each shift, and all face workers walked the escapeways from the section to the emergency escape facilities at the Mods Run shaft. USBM representatives made a roof control survey in the working section while electrical engineers inspected the Femco fan-monitoring and power cut-off systems, and the respirable dust and noise level inspection programs were initiated. Methane liberation from the faces during this period of development of the 7 North Parallel entries was negligible and the Main West seals remained under a negative pressure throughout May and June 1971.

On June 22, 1971, a meeting was held in the Company's main office at Monongah, WV. Officials attending this meeting were:

Consolidation Coal Company

Charles R. Nailler
Harold Suter
C. William Parisi

Mountaineer Coal Company

D.H. Davis
K.K. Kincell
L.H. Riggs
E.S. Lieving
Patrick D. Callebs

West Virginia Department of Mines

Leslie C. Ryan
Walter N. Miller

U.S. Bureau of Mines

W.R. Park
Joseph O. Cook
James D. Michael
A.J. Fumich

United Mine Workers of America

Leonard Pnakovich
Donald Poland
James Bennett
Charley Tarasuk
William B. Hoffman
Stanley Plachta
Norman Willard
Wilmer W. Steward
John Brock

The purpose of the meeting was to discuss the progress made in the recovery operations and to develop future recovery plans. Davis discussed the procedures that would be followed when holing into the 7 North sealed area from the 7 North Parallel entries. He also proposed a plan consisting of driving a set of entries from 7 North (a continuation of the 7 North Parallel entries) to 8 North. All present agreed that this plan would permit the working sections in 7 and 8 North and the adjacent gob areas to be ventilated and cleared of standing methane. Also, the plan would expedite the recovery of the victims and would expose those performing the recovery work to fewer hazards.

By June 25, 1971, the 7 North Parallel entries had been driven to No. 13 cross cut and were "butted-off." Three entries were turned

left off No. 4 entry at Nos. 10, 11, and 12 crosscuts and were driven to within 3 feet of the No. 8 entry 7 North sealed area. Test boreholes, drilled in advance of the faces of these entries, were drilled through into the No. 8 entry 7 North. Air was being pulled into the boreholes toward the sealed area; therefore, the boreholes were plugged. Air locks were built in the Nos. 1 and 3 entries to permit entry into the sealed area by the mine rescue teams.

On June 25, 1971, mine rescue teams entered the air locks in the Nos. 1 and 3 left entries 7 North Parallel and, using nonsparking picks, dug through the 3-foot pillar of coal which separated the 7 North parallel from the sealed area in 7 North. Mine rescue teams, alternating every 90 minutes, explored all eight of the 7 North entries between the Nos. 5 and 11 crosscuts. Five victims were found during these explorations, but were not recovered until the following shift. On the 4 p.m. to midnight shift of the same day, mine rescue teams entered the sealed area and recovered the bodies. The body of Raymond Parson, continuous mining machine operator, Check No. 210, was found in the No. 3 entry 7 North between the Nos. 11 and 12 crosscuts. The body of Dennis Toler, shuttle car operator, cap lamp No. 172, was found in the No. 9 crosscut between the Nos. 3 and 4 entries. The bodies of David Cartwright, mechanic, and Jerry Stoneking, timberman, were found close together in No. 11 crosscut between the Nos. 3 and 4 entries. The body of Frank Tate, shuttle car operator, was found in No. 5 entry, 20 feet inby No. 11 crosscut; this body did not contain any identification. These five bodies were transported to the surface and turned over to the WV State Police who made positive identification of the victims.

On June 29, 1971, mine rescue teams again entered the sealed area in 7 North through the air lock doors in the Nos. 1 and 3 entries and continued the exploration of the 7 North entries between the Nos. 11 and 22 crosscuts. The body of David Minella, foreman, was found in the No. 3 entry (track) between the Nos. 13 and 14 crosscuts. The body of Coy Taylor, utility man, was found in the No. 15 crosscut between the Nos. 2 and 3 entries. An all-service gas mask canister was found within 4 feet of this body, and the face piece of the gas mask was found about 20 feet from the body. These victims were transported to the surface and turned over to the WV State Police who made positive identification. All of these victims were found in intake airways and had traveled a distance of about 2,500 feet from the faces of the 3 Right 7 North section where they were working when the explosion occurred.

During the exploration trips in the sealed area, mine rescue teams built temporary plastic seals across all eight 7 North entries inby No. 16 crosscut and outby No. 10 crosscut. Based on the analysis of an air sample collected from the No. 4 test hole at 5:30 a.m. on June 30, 1971, which showed 19 percent methane

and 14.6 percent oxygen, a decision was made to discontinue recovery operations in the sealed area of 7 North. Concrete block stoppings with "doors" were built out by the air locks (cut-through points) in the Nos. 1 and 3 entries. These stoppings helped prevent the diluting affect of fresh air entering the sealed area through the air locks and would allow the atmosphere in the sealed area to stabilize.

The explored area in 7 North contained a thin layer of soot and coke present on the floor at several locations along No. 3 entry between Nos. 18 and 22 crosscuts. There were 11 loaded mine cars on the track loop out by the loading point in No. 5 entry and four empty mine cars in by the loading point. Three of the 11 loaded mine cars located in the Nos. 17 to 19 crosscuts were wrecked, probably by forces coming through the crosscut from the No. 4 entry. Generally, the entries in the explored area in 7 North were open; however, roof falls had occurred at several intersections. The conveyor belt drive for 3 Right section, located in the No. 5 entry at the No. 20 crosscut in 7 North, was wrecked and badly damaged by the forces of the explosion; part of the conveyor belt was wrapped around the front end of the first loaded mine car at No. 17 crosscut.

The recovered area in 7 North was situated between two sealed areas. The seals on the south side were normally positive and the seals on the north side were normally negative. During falling barometric pressure (less than 30 inches), the south seals in 7 North would become more positive and leak methane which increased the methane in the return air to more than 1 percent. The methane content would decrease and the oxygen content would increase to unsatisfactory levels in the sealed area in the north side. Recovery operations were discontinued July 6-12, 1971, due to methane which ranged from 15 to 20 percent and oxygen which ranged from 12 to 18 percent on the north side of the sealed area.

At a meeting on July 6, 1971, it was agreed that: the north and south seals in 7 North would be sprayed with rigid-foam; large quantities of rock dust would be distributed on the floor in front of each seal; ditches would be dug in front of the south seals and the ditches filled with concrete; the quantity of air in 7 North Parallel would be increased by a ventilation change which would make 6 North entries main return airways; persons would be withdrawn from the mine when the methane content and the oxygen content in the sealed area reached levels of 20 percent or less, and 12 percent or more, respectively, as determined by air analysis; and a 6-inch plastic pipe with valves would be installed between the south and north seals which would connect the sealed areas together and serve as a stabilizer. The valves would be open only when the atmosphere in the sealed areas became unsatisfactory, as stipulated in the agreement.

After the above improvements were accomplished, the atmosphere in the sealed areas stabilized and the recovery operations resumed on July 12. During the remainder of July and August, the 7 North Parallel entries were advanced from No. 13 to No. 16 crosscut which permitted additional entries (a total of seven) to be driven and connected to No. 8 entry of 7 North. The recovered area in 7 North between the Nos. 9 and 15 crosscuts were cleaned up and rock dusted. Permanent ventilation controls were installed across the 7 North entries which provided 85,000 cfm of air for two splits. The improved ventilation also provided 35,000 cfm of air to ventilate the Main West seals. A porta-feeder, which had been removed from A Face section and repaired in the underground shop, was taken to 7 North Parallel and installed in the No. 3 entry at the No. 14 crosscut. A belt conveyor haulage system was installed across the 7 North entries to serve the new 1 Left 7 North section.

By August 28, 1971, all construction work was completed and development of the 1 Left 7 North entries was started and continued through September 30. On October 1, 1971, the miners did not report for work because their Wage Agreement with coal operators had expired. However, the miners received permission and agreed to continue the recovery operation during the contract negotiations. Interruptions continued, however, and from October 1 through November 15, 1971, the only work performed in the mine was fire bossing, collecting air samples, patrolling, and inspecting seals, haulage roads, travelways, airways, and taking air measurements by USBM inspectors, the Company foreman, and a union fire boss.

On November 16, 1971, the normal crew of miners reported for duty and entered the mine at 8 a.m. About 10:30 a.m., a motorman was crushed and killed instantly, resulting from a runaway loaded trip of mine cars that derailed near 3 North. A copy of the Fatal Accident Report is on file at the MSHA office in Morgantown, WV.

From November 16 through December 1971, the recovery operations were discontinued for a total of 14-1/3 days due to unsatisfactory atmospheric conditions in the sealed area.

During 1971, the recovery operations were completed in 1 Right 6 North, and the 7 North Parallel entries were started and developed to No. 16 crosscut and were connected to the No. 8 entry 7 North (sealed area). The 7 North area, between the Nos. 5 and 20 crosscuts, was explored and recovered, and the 1 Left 7 North entries were started and developed toward the 8 North entries to the No. 10 crosscut. In 1971, a total of 11 victims were recovered; three from 1 Right 6 North, and seven from the 7 North area. A total of 16 victims had been recovered since the recovery operations began on September 12, 1969.

1972

During January 1972, Company engineers determined from a power borehole, located in the Main West headings approximately 1,700 feet inby 9 North, that the 8 North entries were inundated by water inby the No. 8 crosscut in the No. 1 entry and inby the No. 19 crosscut in the No. 8 entry. On January 13, a contractor hired by the Company started drilling a borehole in the north boundary of the 8 North entries. By March 30, the borehole was completed and a 300 gallon-per-minute capacity submersible pump was installed. On the same day, a second borehole was started about 50 feet from the first borehole. The second borehole was completed and another submersible pump was installed on April 13, 1972; however, this pump was not started at this time.

During January, February and March 1-14, 1972, the recovery operations, which consisted mainly of driving the 1 Left 7 North entries, were discontinued for a total of 14 days due to unsatisfactory atmospheric conditions (less than 20 percent methane and more than 12 percent oxygen) in the south side of the 7 North sealed area. By March 13, the Nos. 1 and 5 entries of 1 Left 7 North had advanced to within 2 feet of the No. 8 entry of 8 North sealed area, and the No. 2 entry of the two entries driven left off the 1 Left 7 North entries had advanced to within 2 feet of the No. 4 Main West return airway sealed area. Air locks were built at the proposed cut-through points.

During March 14-31, 1972, mine rescue teams dug through into the No. 8 entry 8 North and into the No. 4 entry Main West return airway, explored the four Main West airways to near the Llewellyn shaft and found large roof falls outby the shaft, explored the 8 North entries toward Main West headings and found impassable roof falls near the mouth of 8 North, and explored the 8 North entries along the water level at No. 8 crosscut in No. 1 entry to the No. 19 crosscut in the No. 8 entry. Plastic seals were built by the mine rescue teams during their exploration which sealed the unrecovered areas of the mine from the recovered areas. After the newly recovered areas of the mine were ventilated, the plastic seals were backed-up with wooden, plastered seals. The recovered areas were then rock dusted.

A meeting of the officials directing the recovery operations was conducted on March 21, 1972. Officials agreed that, since the present areas of the recovery operations were blocked with roof falls and water, a new set of entries, designated 7 North Parallel, should be driven North off the 1 Left 7 North entries and headed toward the 4 Right section off 8 North. It was also agreed that projections should be prepared for the development of a set of entries to be driven south off of the Main West headings toward the Mahan shaft and that such plans should be presented at the next meeting.

The necessary preparatory construction work was completed and the mining equipment was moved to the location, and driving of the new 7 North Parallel entries was started April 6, 1972. On April 17, 1972, the water level in the 8 North entries had dropped 39 inches, but the atmospheric conditions in the north side of the 7 North sealed area had become unsatisfactory and therefore recovery operations were discontinued. Company officials believed that the water level in 8 North had dropped sufficiently to break the seal and permit fresh air to enter the sealed area. The deep well submersible pump was shut down on April 17, 1972, and the water level was permitted to rise. However, the atmospheric conditions in the 7 North sealed area did not improve and recovery operations were again halted on April 17-25, 1972.

On April 25, 1972, the Company had requested a meeting which was held at Monongah, WV, with the following personnel attending:

Consolidation Coal Company

Harold Suter
C.W. Parisi

Mountaineer Coal Company

D.H. Davis
R.H. Dulaney
Eugene Mauck
K.K. Kincell
Lawrence Riggs
E.S. Lieving

West Virginia Department of Mines

Leslie C. Ryan
Walter N. Miller

U.S. Bureau of Mines

W.R. Park
Joseph Marshalek
John Sommers

United Mine Workers of America

Donald F. Poland
Charles Tarasuk
James Bennett
John Amos
Wilmer Stewart
Stanley Plachta
Charles Biafora

The purpose of the meeting was to discuss what action should be taken so that the recovery operations could continue and to develop future recovery plans. The following procedures and plans were agreed to:

1. Both deep-well pumps would be started immediately to dewater 8 North.
2. The north side of the sealed area in 7 North and the sealed area in 6 North should be ventilated, cleared of methane, and the unexplored areas in 7 North, including 3 Right, would be explored and inspected and the areas rock dusted.
3. The plans to develop the new 7 South Parallel entries off Main West headings would be instituted immediately.

On April 26, 1972, both deep-well pumps were started to dewater 8 North. All persons were out of the mine except those necessary to make the ventilation change while the power was disconnected at 3 North. The door in No. 11 seal in 6 North was opened. Five minutes later, the door in the No. 2 seal on the north side of 7 North was opened. This change permitted approximately 22,000 cfm of air to enter the sealed area in 7 North and return through the No. 11 seal in 6 North. On April 27, a USBM official, three Company foremen, two WVDM inspectors, one UMWA representative and six miners entered the 7 North area, installed the necessary plastic checks, and ventilated and explored the 3 Right 7 North section.

The conveyor belt drive at the mouth of 3 Right 7 North was wrecked, and the belt rope structure in the No. 3 entry 3 Right from the mouth to the No. 4 crosscut was blown out by the forces of the explosion. The remainder of the belt from the No. 4 crosscut to the No. 17 crosscut was not damaged and was partly loaded with coal. All of the stoppings (metal) between the Nos. 1 and 2 entries and between the Nos. 4 and 5 entries were blown out. The stoppings were all blown toward the belt entry. The last five stoppings between the Nos. 4 and 5 entries were not damaged but just blown down. Two brattice cloth stoppings next to the face of 3 Right between the Nos. 4 and 5 entries in the Nos. 19 and 20 crosscuts were intact. A personnel carrier located in No. 4 entry 3 Right between the Nos. 7 and 8 crosscuts was wrecked and the trolley pole was broken. The trolley wire, 4,160-volt AC power cable, and telephone line outby No. 6 crosscut were blown down.

Two coats and one lunch box were hanging from spads in the coal roof in the dinner hole in No. 19 crosscut. Also, two metal boxes used for storing all-service gas masks and 12 self-rescuers were open and empty. The stretcher board, first-aid equipment, and the telephone suspended from the roof at the No. 15 crosscut

were undisturbed. The 430 Goodman boring machine was located in a new pillar lift turned left, off the No. 3 entry on the inby end of No. 19 block. The machine was partly covered with a fall of roof and a flame safety lamp was hanging from the controls. The 14 BU Joy loading machine was located near the boom of the boring machine with the conveyor and pump motor switches in the on position. A shuttle car, partly loaded with coal, was located close to the loading machine. The second shuttle car, loaded with coal, was located at the belt tailpiece, and the belt feeder was loaded with coal. The power center was located in the No. 4 entry at the No. 17 crosscut. The circuit breaker handles on the power center were in the center position which indicated that there had been a disruption of the power coming into the 3 Right 7 North section. (See Appendix I, Figure 6).

On April 27, 1972, USBM electrical inspectors accompanied by two State inspectors and two Company foremen inspected the electric face equipment in the 3 Right section. The only defect found in the electric equipment was a loose headlight lens on one shuttle car.

There was no visible evidence of fire having been in the 3 Right section. Paper rock-dust bags, paper sandwich wrappers, and paper tags used by engineers and installed on spads at each intersection were not burned. A thin layer of dust and soot had settled on the entire 3 Right area, but the rock-dust applications on the mined surface near the faces were visible. The flushing of methane from the 6 and 7 North areas was time consuming due to the limited amount of air (8,000 cfm) that could be forced through the pillared area, which resulted in high concentrations of methane flowing into the 6 North airways. While this condition existed, power was not permitted in the mine inby 3 North. Therefore, the mine was idle from April 27 to May 16, 1972. The only work permitted underground during this period was patrolling and inspecting the seals, attending pumps, and necessary work to remove the methane in 7 North and maintaining the ventilation in 8 North as the water receded.

On May 11, 1972, the water in 8 North had receded sufficiently to permit access into the 4 Right section. Ventilation had been established up to the mouth of 4 Right, and 32,000 cfm of air was available to ventilate and remove the methane and permit exploration of the 4 Right section. The exploration party consisted of Park, Michael, John Weekly and M.I. Duncan, from the USBM; Kincell, Parisi, Casseday, and Powell, from the Company; Ashcraft, Ryan, Miller and Clayton Hamrick, from the WVDM; and Bennett and Tarasuk, from the UMWA; as well as eight other miners who entered the 4 Right 8 North section to explore the area and search for bodies of victims. Ventilation crews, working ahead of the exploration party, installed plastic checks in the crosscuts between the Nos. 3 and 4 entries. The Nos. 4 and 5 entries were intake airways, and the Nos. 1, 2, and 3 entries

were return airways. The Nos. 4 and 5 entries were explored on the advance into the section, and persons were not permitted in the Nos. 1, 2, and 3 entries until the entire 4 Right section was clear of methane. Five victims, fully clothed with belts and cap lamps, were found in the No. 2 crosscut between the Nos. 4 and 5 entries. Identification checks were attached to each belt and the caplamp batteries had corresponding numbers. The bodies were found approximately 1,000 feet outby the face area. Three of the victims were found lying on top of the concrete blocks which indicated that they had gone into the crosscut after the concrete block stoppings had been blown down. The sixth victim, found at 10 p.m. of the same day, was partly under a roof fall in No. 31 crosscut between the Nos. 5 and 6 entries in 8 North. Two of the recovered victims were wearing all-service masks and three of the victims had self-rescuers lying near their faces. The cap lamp, No. 802, belonging to the sixth victim, was found in the No. 3 entry at the No. 1 crosscut which was approximately 225 feet from where his body was found. The six victims were taken to the surface and then to the Jones Funeral Home in Morgantown, WV, where positive identification was made as follows:

Thomas Ashcraft	Utility Man
Homer Tichenor	Continuous Mining Machine Operator
Adron Morris	Loading Machine Operator
Simon P. Hayes	Shuttle Car Operator
Wayne Minor	Shuttle Car Operator
Dale Davis	Section Foreman

All of the ventilation controls such as stoppings, overcasts and regulators in 8 North in areas thus far explored, all of the metal stoppings between the Nos. 1 and 2 entries, and the concrete block stoppings (stacked and plastered) between the Nos. 4 and 5 entries in 4 Right were destroyed by the explosion forces. The 42-inch conveyor belt located in the No. 4 entry 8 North, which serviced the 4 and 5 Right sections, was wrecked and was covered with large roof falls at several locations. The porta-feeder at the mine car loading point, located outby the track loop in the No. 23 crosscut in 8 North, was blown into the side of a loaded, 16-ton capacity, steel mine car, bending the side of the car and knocking it off the track. This indicated that the explosion forces came into 8 North. The 36-inch conveyor belt and structures in the 4 Right section were wrecked from the belt head to the tailpiece, a distance of approximately 1,200 feet. The supply track in the No. 3 entry 4 Right was twisted and pushed toward the No. 2 entry at the Nos. 5 and 6 crosscuts. A Fletcher roof-bolting machine located in the No. 4 entry 4 Right was blown against the coal rib at No. 15 crosscut. The 427 Goodman boring machine was located in the No. 3 entry at the No. 16 crosscut; the tramming chain on the machine was broken. The face of the No. 3 entry was approximately 30 feet inby the crosscut. The auxiliary fan and 14-inch flexible vent tubing was blown from the No. 16 crosscut in No. 2 entry into No.

3 entry. The fan was blown into the side of the continuous mining machine, ripping off the controller to the machine. The vent tubing was blown into the face of the No. 3 entry. A flame safety lamp, No. 802, belonging to the section foreman, was found on the floor about 10 feet outby the face in the No. 3 entry. The bonnet of another safety lamp was found hanging on the boring machine, and the font and gauze of this safety lamp were found 10 feet outby the boom of the loading machine, which was located in the No. 3 entry outby the continuous mining machine. The AC power car and the DC transformer were blown inby the end of the track at No. 13 crosscut No. 3 entry. Four lunch buckets, two jackets, four empty self-rescuer boxes, one empty metal box used for storing two all-service gas masks, and an empty metal box used for storing self-rescuers were found in the "dinner hole" at the No. 12 crosscut between the Nos. 3 and 4 entries. First-aid equipment was strewn outby from the No. 2 to the No. 10 crosscut in No. 3 entry. The personnel carrier was found partly turned around and wrecked in the No. 3 entry at the No. 11 crosscut. Nine 15-gallon drums of oil were found in the No. 10 crosscut between the Nos. 2 and 3 entries. The 4,160-volt AC power cable, trolley wire, and telephone cable installed in the No. 3 entry were blown down at many locations. Considerable amounts of soot and dust were present on the mine surfaces throughout the 4 Right section. However, the rock dust was visible on the mine floor in the face areas after brushing away the top layer of dust.

An inspection and examination of the electric face equipment in the 4 Right section on May 12, 1972, by USBM electrical inspectors accompanied by Company and State officials did not reveal any permissibility defects in the equipment. The inspection of the power center and rectifier supplying power to the equipment indicated that the circuit breakers were opened by undervoltage coming into the 4 Right section. Access to the 5 Right section from 8 North entries was not possible due to many large and impassable roof falls. (See Appendix I, Figure 7).

The development of the new 7 South Parallel entries was started on May 16, 1972, and continued until May 25. During this period, rock-dust surveys were made in the 3 Right 7 North and in 4 Right 8 North. The recently recovered areas in 7 North and in 3 Right 7 North were rock dusted by May 24, 1972. The 7 North Parallel section driving toward 4 Right 8 North, which had been idle since April 17, 1972, was reactivated May 25, 1972.

During May 25 through September 11, 1972, the main thrust of the recovery activities was developing the 7 North Parallel entries. Except for construction work and six shifts of producing coal, the new 7 South Parallel section remained idle during this period. The 7 North Parallel section cut through into the No. 5 entry of the 4 Right 8 North section on September 1, 1972. While the remaining four entries of the 4 Right section were being

connected to the 7 North Parallel entries, the 4 Right section was rock dusted.

Two entries were driven off the No. 1 entry 4 Right section toward the 5 Right 8 North section. After the boreholes, which were drilled in advance of the faces, drilled through into 5 Right, and it was determined that the air would pull from 4 Right to 5 Right, the two entries were driven through into the 5 Right section on September 12, 1972. On the same day, an exploration party consisting of Kincell, Casseday, Lieving, Andy Shuster and Raymond Comer, from the Coal Company; Park, Michael, Weekly and Duncan, from the USBM; Ashcraft, Miller, Ryan, Lester Wolf, from the WVDM; and Bennett and Tarasuk, from the UMWA explored the 5 Right section on intake air. The Joy twin borer continuous mining machine and one shuttle car located in a pillar split being driven from the No. 2 entry toward the No. 1 entry were covered by a roof fall. A roof fall had occurred on the continuous mining machine on the 4 p.m. to 12 p.m. shift on November 19, 1968, and the 5 Right crew were engaged in recovering the machine when the explosion occurred. The Fletcher roof-bolting machine, partly covered by a roof fall, was located in the No. 16 crosscut between the Nos. 2 and 3 entries. A 14 BU Joy loading machine and a shuttle car located in the No. 15 crosscut between Nos. 2 and 3 entries were also covered by a roof fall. A 11 BU Joy loading machine, an AC power center, and a DC rectifier were located in the No. 3 entry between the Nos. 13 and 14 cross cuts. The ratio-feeder at the belt conveyor tailpiece in No. 2 entry at the No. 11 crosscut was partly covered by a roof fall.

There were four personnel carriers (jeeps) found in the 5 Right 8 North section, all of which were blown inby and off the end of the track. A flame safety lamp, No. 568, was found in the second outby jeep. A flame safety lamp with initials A.T., a Riken methane detector, and a jacket containing a note book, maps, and a copy of the West Virginia Mining Laws were found in the third outby jeep. A lunch bucket was found in the last outby jeep. Three lunch buckets were found in the No. 11 crosscut between the Nos. 3 and 4 entries, a fifth lunch bucket was found in the No. 3 entry near the power center, and four additional lunch buckets were found in the "dinner hole". Metal boxes containing two all-service gas masks and four self-rescuers, the first-aid canister and a backboard suspended from the roof with wire were also stored there. A 20-gallon liquid fire extinguisher mounted on wheels was found in the No. 3 entry at the No. 15 crosscut. One 20-pound dry chemical fire extinguisher was found in the second outby jeep.

The conveyor belt rope-type structures located in the No. 2 entry were wrecked and twisted. The stoppings between the Nos. 1 and 2 entries 5 Right were metal and the stoppings between the Nos. 3 and 4 entries were constructed of concrete blocks stacked dry and

plastered on the intake side. All of the stoppings in 5 Right were destroyed and were blown toward the center entries. The 4,160-volt AC power cable and telephone cable along the supply track in the No. 3 entry were blown down. The trolley wire was not damaged. The telephone that had been installed at the No. 11 crosscut in the No. 3 entry was blown in by to the No. 12 crosscut.

The damaged all-service gas mask boxes, canister, and face pieces thought to be those carried on the shift foreman's jeep, were found scattered along the track entry in by the jeeps. One of the canisters was beside the shift foreman's body; however, the caps on the canisters had not been removed. Considering the locations where the jeeps and telephone were found, it would indicate that the forces of the explosion traveled into the 5 Right section. Eight victims were found along the No. 3 supply track entry between the Nos. 11 and 14 crosscuts. Another victim with a self-rescuer fastened around his neck was found in the No. 2 entry at No. 16 crosscut and was partly covered by a roof fall. One victim was wearing a dust respirator and had a safety lamp hooked on his belt. Cap lamps (battery) were on seven of the victims. The nine victims listed below were removed from the mine the same day and taken to the Jones Funeral Home in Morgantown, WV, where positive identification was made by the WV State Police, a Company official, and the Marion County Coroner, Dr. Charles H. Koon.

The names of the victims and their occupations, recovered from the 5 Right section 8 North on September 12, 1972, were as follows:

Henry Skarzinski	Section Foreman
Russell Snyder	Roof Bolter Operator
John Toothman	Mechanic
Walter Martin	Trackman
Forrest Goff	Continuous Mining Machine Operator
Albert Takacs	Assistant Mine Foreman
James Kniceley	Wireman
Robert Glover	Mechanic
Robert Sigley	Shuttle Car Operator

There was no evidence of an extensive fire in the 5 Right section; however, coke deposits were found at several locations in the No. 3 entry and connecting crosscuts between the Nos. 12 and 16 crosscuts. The cardboard tags used by the engineers and tied to station spads in the roof, sandwich wrappers, and empty rock-dust bags scattered in the area showed no signs of heat or burning. Rock-dust applications were visible on some parts of the coal ribs and floor, but considerable amounts of soot and coal dust had settled on the ribs and floor throughout the 5 Right section. Rock-dust applications on the floor were checked

at several locations, and rock dust from 1 to 2 inches in depth was visible after the top layer of dust was removed.

USBM electrical inspectors inspected all accessible electric face equipment in the 5 Right section on September 13, 1972, and no permissibility defects were found in the equipment. After the fallen roof had been removed from the remainder of the electric face equipment, the equipment was inspected by USBM electrical inspectors on September 27, 1972. The only defect found was a damaged conduit hose on a shuttle car. A set of mechanic's tools, socket wrenches, crescent wrenches, a hammer, punch, and a screwdriver were found on the mine floor to the right side of the continuous mining machine located in a pillar split in by the No. 16 crosscut in the No. 3 entry. The right axle cover plate had been removed which revealed that the axle was broken. (See Appendix I, Figure 7).

From September 13 through December 31, 1972, the mining equipment, power centers, rectifiers, personnel carriers, belt conveyor structures and accessory equipment, power cables, trolley wire, and track were recovered from the 4 and 5 Right sections in 8 North and the accessible areas in these sections were rock dusted. Several large roof falls had to be loaded out, and the area was then roof bolted to recover some of the equipment in the 5 Right section. During this period of time, the development of the 7 South Parallel entries continued three shifts per day, five or six days per week, except for holidays; several shifts were lost due to absenteeism. These entries had advanced to No. 17 crosscut or approximately 1,500 feet from the Main West headings. Efforts were made to penetrate the 7 South sealed area at five locations by driving chutes in the barrier pillar and drilling boreholes into the No. 1 entry 7 South. However, roof falls were encountered at each of the five locations.

On December 28, 1972, a chute was driven into the barrier at the No. 17 crosscut and, after the boreholes that were drilled in advance of the face had holed through into a void in the No. 1 entry 7 South sealed area, the chute was advanced to within 3 feet of the sealed area. Air locks were installed in the chute in preparation for mine rescue teams who would dig and remove the remaining three feet of coal by hand.

During 1972, the 1 Left entries between 7 North and 8 North were advanced for a distance of approximately 1,200 feet, the 7 North Parallel entries were advanced approximately 1,700 feet, and the new 7 South Parallel entries were advanced 1,500 feet in an effort to reach the active sections. Also, the 4 and 5 Right sections in 8 North were explored and 16 victims were recovered, making a total of 31 victims recovered since the recovery operations began September 12, 1969.

1973

Recovery operations resumed on January 2, 1973. The development of the 7 South Parallel entries continued and by January 15, all entries had been advanced and "butted off" at the No. 17 crosscut. On January 15, mine rescue teams entered the air lock in the chute that had been driven in the barrier at the No. 14 crosscut to within 2 feet of the No. 1 entry 7 South sealed area. Mine rescue teams dug through the remaining 2 feet of coal that separated the sealed areas from the open areas of the mine and began exploring the sealed areas in 7 South at 11:15 a.m. of the same day.

The objectives of the mine rescue teams were to explore across the nine 7 South entries just south of the cut-through point, explore across the mouth of the old 7 South Parallel entries, and select locations where seals could be built which would seal off these areas from the rest of the mine. By 4 p.m. of the same day, the objectives were accomplished, and 19 locations were selected where seals could be constructed. On the following shift, mine rescue teams entered the 7 South sealed area and built 19 plastic seals at the selected locations.

The 7 South sealed area between the Nos. 5 and 14 crosscuts were ventilated by opening the air locks in the Nos. 6 and 14 cut-through points, and plastic checks were installed to conduct fresh air to each of the 19 plastic seals. After the methane had been removed from the newly recovered area, the 19 plastic seals were "backed up" with wooden seals plastered on the intake side. The wooden seals were completed January 17, 1973, and the 7 South area between the Nos. 5 and 14 crosscuts were examined by USBM, the Company, WVDM, and UMWA officials. Coke was present at many locations throughout the recovered area and 1 to 4 inches of soot covered the entire explored area. Many large roof falls existed in each of the nine entries, and impassable roof falls at the No. 5 crosscut prevented further exploration toward the Main West headings. (See Appendix I, Figure 8).

During the first two weeks of January 1973, a Company-employed contractor drilled two boreholes from the surface into open areas of the mine. One borehole penetrated the mine near and outby the No. 9 seal in 8 North, and the other borehole penetrated the mine outby and near the No. 2 Main West seal. Concrete block stoppings equipped with 3-1/2- by 6-foot steel doors were constructed near each borehole. A steel cable was installed through each bore hole and attached to the steel doors in such a manner that the doors could be opened or closed from the surface. The remotely operated steel doors could be an effective means of quickly resealing the Main West headings between 7 and 8 North, including the Llewellyn shaft bottom area, in the event fire areas rekindled while these areas were being ventilated.

On January 18, 1973, with both steel doors opened from the surface, mine rescue teams removed the No. 9 seal in 8 North and No. 2 seal in Main West which permitted air to flow through the Main West headings and return at the No. 9 seal in 8 North. While this area was being ventilated, the return air at the No. 9 seal was monitored closely for carbon monoxide, and air samples were collected daily during the critical period. The analysis of an air sample collected at the No. 9 seal 8 North on January 20, 1973, showed .001 percent carbon monoxide.

On January 25, 1973, the Nos. 1, 6, and 9 Main West seals were removed which increased the amount of air ventilating the Main West headings between 7 North and 8 North to 25,000 cfm of air, and the recovery of the Main West headings inby the No. 206 crosscut was started.

Recovery operations during February, March, April, and May 1973, consisted of loading roof fall debris from the Nos. 5 and 6 Main West headings and connecting crosscuts inby the No. 205 crosscut and installing roof supports (roof bolts, cribs, and yieldable arches) in these entries; building concrete block seals in the 7 South and old 7 South Parallel entries which replaced the previously built wooden seals; recovering and transporting to the surface all of the mining equipment, conveyor belt and structures, power centers, rectifier, trolley wires, power cables, track, and other supplies from the 7 North 3 Right section; and rock dusting the recovered area in 7 South between the Nos. 5 and 14 crosscuts.

On May 31, 1973, an exploration party explored the Main West headings inby the working area at the No. 222 crosscut and found the body of Charles Moody, dispatcher, located in the No. 224 crosscut between the Nos. 5 and 6 entries (dispatcher's station). The body was removed to the surface at 3:55 p.m. of the same day.

On June 11, 1973, a meeting was held at the Consol No. 9 Mine with the following in attendance:

Mountaineer Coal Company

K.K. Kincell
Eugene Mauck
Lawrence H. Riggs

West Virginia Department of Mines

Walter N. Miller

U.S. Bureau of Mines

James D. Michael
Joseph Marshalek
M.W. McManus

United Mine Workers of America

Donald F. Poland
James Bennett
Stanley Plachta
Steve Fulayter

The purpose of the meeting was to discuss the opening of the Llewellyn shaft. It was agreed that the cap would be removed from the top of the shaft on June 13, 1973, and mucking of the shaft would begin on June 23 and continue on one shift per day (8 a.m. to 4 p.m.) until all the debris and muck were removed from the shaft. It was also agreed that recovery operations in the mine would not be conducted while mucking operations were being done and that power in the mine would not be permitted inby 6 North. The cap was removed from the top of the Llewellyn shaft on June 13, 1973, and shaft contractor started removing the debris and muck from the shaft on June 28, 1973. The only work performed at the mine during the miners' vacation period of June 23 - July 8, 1973, was mucking the Llewellyn shaft. A USBM representative was on duty throughout this period. An agreement was reached at a meeting at the Consol No. 9 Mine on July 6, 1973, to permit recovery operations to continue underground on all three shifts and the mucking of the Llewellyn shaft would continue on one shift per day. The recovery operations resumed in the Main West headings on July 9, 1973, and continued on three shifts until July 24, 1973. A decision was made during a meeting on July 24, 1973, to discontinue recovery operations in the mine while mucking the Llewellyn shaft, until the approaches to the bottom of the shaft were exposed. The only work performed at the mine from July 24 to August 6, 1973, was removing debris and muck from the Llewellyn shaft. A meeting was held August 1, 1973, and all representatives agreed that the following ventilation changes should be made which would permit recovery operations underground to continue while mucking of the Llewellyn shaft was being performed:

1. Open the door in the No. 3 seal in the 8 North return to clear the atmosphere between the shaft and 8 North.
2. Open the door in the 7 North seals to ensure clearing the atmosphere between 7 North and the shaft.
3. Open the Nos. 5 and 6 seals in 8 North to increase the air flow over the recovery crews working in the Nos. 5 and 6 Main West headings.
4. Reduce the intake at the Llewellyn shaft from 6,400 to 3,000 cubic feet a minute.

5. Ventilate the slate loading areas in the Nos. 5 and 6 Main West headings with an exhaust fan and tubing.
6. Use extensions on methane detectors to test high places in the working areas.

These improvements were made on August 2, 1973, and the recovery operations in the Main West headings resumed the following day.

On September 11, 1973, the body of Floyd Wilson, mechanic, was found in the No. 224 crosscut between the Nos. 6 and 7 Main West headings. While loading out roof fall debris in the No. 224 crosscut between the Nos. 7 and 8 Main West headings on September 20, 1973, a personnel carrier was discovered under the roof fall. The personnel carrier was pulled from under the fall and the body of Robert Kern, mechanic, was found lying inside the carrier compartment. At 11 a.m. on the same day, the body of Fred Rogers, mechanic, was found 11 feet inby where Robert Kern's body had been found.

On September 21, 1973, the body of William Walker, mechanic, was found in front of the inside shop door in the No. 8 Main West heading at No. 224 crosscut. On September 24, 1973, while loading slate in the No. 8 entry Main West heading at the No. 224 crosscut, two other victims were found. The body of Harold Butt, supply man, was found 3 feet inby the track frog, and the body of Harry Strait, supply man, was found 14 feet inby the track frog. On September 25, 1973, these last loading operations had progressed from the No. 224 crosscut into the No. 9 chute, where two more victims were found. The body of Joseph Muto, mechanic, was found lying on the track rails in the No. 9 chute, 31 feet inby the track frog and the body of Charles King, mechanic, was found in the first crosscut between the Nos. 9 and 10 chutes. (See Appendix I, Figure 8).

The muck and debris were removed from the Llewellyn shaft, the bottom approaches to the shaft were roof bolted, and the cap replaced on top of the shaft by October 3, 1973. Loading roof fall debris (slate) from the Nos. 5 and 6 Main West headings and from several of the chutes off the No. 8 Main West heading that were connected to the Llewellyn shaft continued through the remainder of 1973.

At a meeting on November 9, 1973, it was agreed that the Llewellyn shaft be designated as the intake escapeway and that the mine would be idle on November 13 for the purpose of making a ventilation survey. A part of the cap on top of the Llewellyn shaft was removed on November 13, permitting air to intake through the shaft. Air quality measurements taken underground showed that the air at the working area in the Main West headings outby the No. 224 crosscut had reversed its direction and that the intake air at the Plum Run overcast decreased to zero. The

cap was replaced on the Llewellyn shaft and the air currents returned to normal at 11:45 a.m. the same day. On December 6, 1973, Truman Wheeler became ill while working in the mine. He was immediately transported to the surface where he expired at approximately 1:30 p.m. The investigation report revealed that death resulted from natural causes.

During 1973, the Nos. 1 through 9 entries, 7 South between the Nos. 5 and 14 crosscuts were recovered; the unrecovered areas of 7 South and 7 South Parallel were sealed off with permanent concrete block seals, the recovered areas in 7 South were ventilated and rock dusted, and the Main West headings were recovered from the No. 206 crosscut to the No. 225 crosscut. Coke deposits were present at many locations in all nine 7 South entries and from 1 to 4 inches of soot was present on the floor throughout the recovered area. Large coke deposits, ashes and "red dog" were present in several areas in the Main West headings inby the No. 215 crosscut and in the chutes near the Llewellyn shaft bottom. The dust samples collected in 7 South and Main West areas during the recovery operations contained coke particles which ranged from a trace to large quantities. (See Appendix G for analysis of dust samples).

In 1973, the bodies of nine victims of the explosion were recovered which made a total of 40 bodies recovered since the recovery operations started on September 12, 1969.

1974

The recovery operations resumed January 2, 1974, and continued three shifts per day, five to six days per week. Seven to 15 miners, three foremen and one fire boss worked on each shift. At least one Federal inspector and two UMWA representatives were on duty each shift and, occasionally, a WVDM official was also on duty. During January and February 1974, the underground activities consisted primarily of recovering the Nos. 9, 10, and 11 chutes which were connected to the bottom of the Llewellyn shaft. Miners not needed in this area performed numerous jobs in maintaining the active areas of the mine.

On February 13, while loading slate in the No. 10 chute off the No. 225 crosscut, the body of John F. Gouzd, roof bolter, was found in the No. 10 chute intersection. On February 14, the body of Arthur A. Anderson, Jr., rock duster, was found in the No. 11 chute, 80 feet inby the intersection. Both bodies were found while the bottom layer of the large roof falls was being loaded. Three track-mounted welders, one mechanic work car, and one oil car were recovered from the No. 9 chute and a 15-ton locomotive was recovered from the No. 11 chute.

A meeting was held on March 6, 1974. Detailed plans formulated by the Company to ventilate and explore the sealed areas of 7

South entries and the 7 South Parallel entries were discussed and the plans were approved by all present. On March 11, 1974, Federal, Company, State, UMWA officials, and a fire boss entered the mine and made the following ventilation changes:

1. A 6- by 8-foot opening was made in the No. 6 seal in 7 South;
2. Three doors were opened in stoppings between intake and return airways in 7 South Parallel and the regulator was removed in the No. 7 entry; and
3. The doors in stoppings separating the Llewellyn shaft bottom were opened.

The officials left the area, deenergized the mine power circuits at 2 North, and arrived on the surface at 1:50 a.m. A 6- by 6-foot opening was made in the cap on top of the Llewellyn shaft and the high pressure fan which had been installed at the Mahan shaft was started. The fan was exhausting 54,000 cfm of air in the return. Methane at the Mahan shaft had decreased from 54 percent to 10 percent.

On March 12, 1974, after a fire boss examination was made (on foot) of the Llewellyn shaft bottom and the seals in Main West, 7 South and 8 North, an investigation team consisting of Federal, Company, State, and UMWA officials entered the 7 South area at the opening in the No. 6 seal and explored inby to the No. 39 crosscut. The team explored the No. 6 entry off 6 Right 7 South to the No. 3 crosscut where methane and low oxygen content forced the team to retreat. Following the approved plan, the investigation team opened the doors in the Nos. 13 and 17 seals located across the mouth of the old 7 South Parallel entries. Air quantity measurements showed that a total of 11,000 cfm of air was entering through the doors into the 7 South Parallel section. The investigators returned to the surface.

On March 13, 1974, an investigation team consisting of W.R. Park, Jack Tisdale, Joseph Marshalek, and Charles J. Thomas, Federal officials; Thomas Ashcraft, Walter N. Miller, and Carl Kinty, WVDM officials; Eugene Mauck, John Rozance, W.T. Simon, C.W. Parisi, and Fay Casseday, Company officials, entered the No. 13 seal at old 7 South Parallel and began exploring inby. The body of Roy F. Henderson, assistant mine foreman, was found beside a de-railed personnel carrier located on the supply track in the No. 2 crosscut between the Nos. 6 and 7 entries. This location was approximately 4,000 feet from the 3 Right working faces, which indicated that the miner had left the working section before the explosion occurred. Exploration continued up to the No. 10 crosscut where 13 loaded mine cars were found which extended to the No. 5 crosscut where the loading point was located. Three of the loaded cars were de-railed toward the 3

Right 7 South Parallel section. Due to large roof falls, it could not be determined how many empty cars were on the loop track. Plastic checks were installed across the 7 South Parallel entries at the No. 10 crosscut to direct the air current into the 3 Right section. Plastic checks were also installed in the 3 Right section in the crosscuts between the Nos. 3 and 4 entries ahead of the exploration team which permitted the entire 3 Right section to be explored on intake air. The body of James H. Walter, section foreman, and the body of Thomas Roggess, continuous mining machine operator, were found in the No. 1 entry at the No. 1 crosscut. Six additional bodies were found close together in the No. 4 entry 3 Right just inby the No. 1 crosscut.

These victims were identified as:

William D. Sheme	Shuttle car operator
Lee E. Carpenter	Mechanic
George O. Decker	Continuous mining machine operator
Paul O. Moran	Loading machine operator
Dewey Tarley	Utility man
Jimmy Barr	Shuttle car operator

The location of these bodies shows that the victims had left the working area in the 3 Right section and traveled approximately 2,000 feet after the explosion occurred. These nine bodies were brought to the surface at 6:40 p.m., March 13, 1974.

The permanent block stoppings between the Nos. 3 and 4 entries 3 Right from the No. 1 crosscut through the No. 7 crosscut were blown down by the forces of the explosion. The block stoppings from the No. 8 to the No. 19 crosscut were intact, but the block stopping in the No. 19 crosscut was blown out. A brattice cloth check was found installed in the No. 20 crosscut. Metal stoppings had been used between the Nos. 1 and 2 entries, and they were all blown down by the forces of the explosion. Two empty gas mask boxes, seven self-rescuer boxes, and two vacuum covers to a self-rescuer were found on the mine floor in the "dinner hole" located in the No. 19 crosscut between the Nos. 3 and 4 entries. The section personnel carrier (jeep) was found 18 feet inby the end of the supply track in the No. 3 entry. An undamaged 150-pound wheel-mounted fire extinguisher was found in the No. 21 crosscut between the Nos. 3 and 4 entries.

The standard drive shuttle car was found in the No. 2 entry at the No. 20 crosscut, and the other shuttle car was found in the No. 1 entry, 20 feet inby the No. 20 crosscut. The continuous mining machine was located at the face in the first pillar lift which was 90 feet in depth off the No. 1 entry at the No. 21 crosscut. The 8-foot right wing of the pillar lift had holed through into the gob area 35 feet from the mouth of the pillar lift. A large pile of loose coal was on the mine floor outby the

continuous mining machine. An 11 BU Joy loading machine was located 30 feet inby the mouth of the pillar lift, and a roof-bolting machine was found partially covered by a large roof fall in the No. 2 entry at the No. 21 crosscut. The pillar lift and the outby areas in the No. 1 entry inby the No. 21 crosscut appeared to have been machine rock dusted; however, a rock-dusting machine was not found in the 3 Right section. It is conceivable that forces of the explosion picked up the rock-dust applications from the No. 1 entry (return airway) and deposited them in these areas.

On March 14, 1974, the investigation team entered the 7 South area and explored the No. 1 through 6 entries 6 Right section up to the No. 4 crosscut where the advancement was stopped by water accumulations. While exploring the Nos. 2 and 3 entries in 6 Right, the bodies of Jerry R. Yanero, trackman, and Joe Petro, trackman, were found on the track in the No. 2 entry at the No. 2 crosscut and two other victims, Randall R. Parsons, trackman, and Joe Feris, trackman, were found on the track in the No. 3 entry at the No. 2 crosscut. Two personnel carriers, four locomotives, one empty rail car, and a tool car were located in the area where the bodies were found. The four bodies were brought to the surface by 8:05 p.m. of the same day. The investigation team explored the 7 South entries from the mouth of 6 Right to the No. 46 crosscut where advancement was stopped by large impassable roof falls. The 13 bodies recovered from the 3 Right sections were taken to the Jones Funeral Home in Morgantown, WV, where positive identification of the victims was made by the WV State Police, a Company official, and the Marion County Coroner, Dr. Charles H. Koon.

The 7 South Parallel entries contained a layer of soot from 1 to 4 inches in thickness which decreased in thickness toward the 3 Right section. A thin layer of soot was present in the 3 Right entries. From the location of the personnel carrier, which had been blown 18 feet inby the end of the supply track, and the concrete blocks from the 7 South Parallel regulator, which were blown and scattered 100 feet inby (toward 3 Right), show that the forces entered the 7 South Parallel and the 3 Right section. All of the metal stoppings and 50 percent of the concrete block stoppings in 3 Right, the permanent block stoppings and regulators in 7 South Parallel, and the overcast at the mouth of 7 South Parallel were destroyed by the forces of the explosion. The conveyor belt and structures in 3 Right were also destroyed by the forces of the explosion. The conveyor belt and structures in 3 Right were not damaged by the explosion forces. The bonnet and font of the flame safety lamp found on the continuous mining machine in the 3 Right section had a blue color which indicated that the lamp had been exposed to excessive heat. The rock-dust applications under the layer of soot in the 7 South Parallel entries and in the 3 Right section were visible. Due to

resealing of these areas soon after the victims were recovered, dust samples were not collected.

On March 15, 1974, C.D. McMaster, Federal electrical inspector, accompanied by Clayton Hamrick, WVDM electrical inspector, and Robert Johnson, Company maintenance foreman, inspected the electric face equipment and the electrical installations in the 3 Right 7 South Parallel section, and no permissibility defects were found. After the electrical inspection party returned to the surface, a meeting was held. All representatives present agreed that the 7 South and 7 South Parallel should be resealed immediately and the mine ventilation system be reconverted to its original state as it was prior to unsealing these areas except that the 6- by 6-foot opening in the cap on top of the Llewellyn shaft would remain open. By 3:15 p.m. the same day, these areas were resealed, the changes in the ventilation system were completed, and all persons were out of the mine. (See Appendix I, Figure 8).

Construction work began in March 1974 to establish a mine car loading point in the 7 North Parallel entries so that a set of five entries, which were needed for return airways, could be driven from 7 North Parallel to 6 North. The necessary construction work was complete and mining equipment was moved into the area, and developing of the 1 Right entries off 7 North Parallel was started on June 4, 1974. The 1 Right entries cut through into 6 North on December 9, 1974.

The underground recovery operations were discontinued during the week of May 13 through 18, 1974, while attempts were made to explore the 7 South area via the Mahan shaft. On May 13 and 15, 1974, Company and State officials were lowered into the intake and return side of the Mahan shaft in a bucket by a portable crane. Large impassable roof falls were encountered at both the intake and return approaches near the bottom of the shaft which prevented further explorations from this point. All recovery work was suspended during the miners' vacation period of June 22 through July 7, 1974.

During the first 2 weeks of July 1974, a borehole was drilled from the surface which penetrated open workings between the Nos. 17 and 18 crosscuts in the No. 5 entry 6 Right off 7 South. A submersible pump installed in the borehole dewatered the 6 Right section. On July 14, the ventilation controls were changed and the Mahan fan was started in preparation to exploring the 6 Right section. On July 15 and 16, 1974, the investigation team, consisting of Company, Federal, State, and UMWA officials explored the No. 5 entry 6 Right up to the No. 12 crosscut where an impassable roof fall was encountered. The investigation team then explored the Nos. 1 and 2 entries up to the No. 18 crosscut. Many roof falls were encountered in these entries and impassable roof falls prevented exploring the Nos. 3 and 4 entries in by the

No. 10 crosscut and the No. 5 entry in by the No. 12 crosscut. All of the belt conveyor and supporting structures located in the No. 4 entry 6 Right section, which had been installed up to the No. 15 crosscut, were blown out by a distance of about 700 feet and were found in a pile at the loading point at the No. 7 crosscut. The belt head had been blown out by and off its supporting structure. A concrete block stopping, which had been installed across the No. 5 entry between the Nos. 7 and 8 crosscuts, was blown out by and the blocks were blown into a nearby roof fall. Two parts of a flame safety lamp (bonnet and font) were found near an empty mine car between the Nos. 2 and 3 crosscuts in the No. 3 entry. Identification Check No. 821 was found on the bonnet. This check belonged to Emilo Megna, midnight to 8 a.m. shift section foreman on the 9 North section. Megna's body was never found. The drill head was blown off the Fletcher roof-bolting machine located in the No. 2 entry at the mouth of the No. 8 crosscut. All of the ventilation controls including stoppings, regulators, and overcasts in observable areas in 6 Right 7 South section were destroyed by the forces of the explosion, and evidence indicated that the forces traveled from the faces toward the mouth of the section. (See Appendix I, Figure 7).

From July 17 through the remainder of 1974, recovery operations in the Main West headings and the development of the 1 Right return airways off 7 North Parallel continued. With the exception of the period from November 12 to December 6, when labor contract negotiations were in progress, the recovery operations were conducted three shifts per day, five or six days per week.

At the close of 1974, the Main West headings had been recovered from the No. 225 crosscut to the No. 240 crosscut and the 8 North entries had been recovered to the No. 5 crosscut. The 7 South Parallel entries, 3 Right off 7 South Parallel, 6 Right off 7 South and the 7 South entries from the No. 14 crosscut to the No. 46 crosscut were explored by mine rescue teams and investigation teams. The 1 Right return airways were developed which connected 7 North Parallel to 6 North and the mining equipment moved out of the section and into 7 South. The Llewellyn shaft was cleaned out, became an intake airway, and was designated as an intake escapeway.

During 1974, the bodies of 15 victims of the explosion were recovered from the mine; two bodies were recovered from near the Llewellyn shaft bottom, nine from the 7 South Parallel and the 3 Right section, and four from the 6 Right section. A total of 55 victims had been recovered since the recovery operations were started on September 12, 1969.

1975

The recovery operations during the first several days of January 1975 were halted while changes were made in the ventilation system. After the necessary ventilation controls were installed, the 1 Right section, developed in December between 7 North Parallel and 6 North became main return airways. Air quantity measurements taken in all working areas of the mine, including former troublesome areas along the intake airway outby 4 North, showed that this ventilation change had improved the air volumes in all areas of the mine.

On January 8, 1975, a meeting was held at the Consol No. 9 Mine to formulate future recovery plans. All representatives present agreed to the following:

1. Resume and continue the development of the 7 South Parallel entries for an additional 2,250 feet.
2. Cross the 7 South entries, and develop a set of entries parallel to the 6 Right section in order to penetrate the face areas of the 6 Right section.
3. Continue the rehabilitation of the 8 North entries to the No. 16 crosscut so that a set of entries could be developed westward toward the 9 North section.

The rehabilitation of the 8 North entries resumed the second week of January and continued through April 1975. Due to a shortage of manpower, very little work was done in the 8 North entries from May through November 1975. Development of the 7 South Parallel entries resumed January 22 and continued on three shifts per day, five or six days per week through December 1975, except during the miners' vacation period of June 28 through July 14, 1975. A total of 8,273 mine cars of rock had been loaded and removed from the mine by July 1, 1975.

A meeting requested by the International Safety Division of the UMWA was held on November 18, 1975, at the Consol No. 9 Mine. After a visit to the underground recovery areas, the meeting was convened on the surface at the Athas Portal. The purpose of the meeting was to discuss and formulate future recovery plans which would speed up the recovery operations. All present agreed that the Company would hire additional miners so that the recovery operations could be resumed in the 8 North entries which had been idle for the greater part of 1975.

The recovery operations during 1975 consisted of rehabilitating the 8 North entries and developing the 7 South Parallel entries. At the end of December, the 8 North entries had been rehabilitated to the No. 10 crosscut, and the 7 South Parallel entries had been developed to the No. 44 crosscut. No victims were recovered during 1975.

1976

During 1976, the recovery operations were conducted on three shifts a day, five days a week, by crews ranging from eight to 16 workmen, three foremen, one fire boss, and at least one Federal inspector on each shift. Occasionally, a representative of the WVDM and the UMWA would be on duty.

The development of the 1 Left entries toward the 9 North section was started in early January 1976, and continued through the remainder of the year. The 7 South Parallel entries were driven from the No. 44 crosscut to the No. 48 crosscut and "butted off." On February 12, 1976, a meeting was held at the Consol No. 9 Mine to discuss the procedures that would be followed when cutting into the 7 South sealed area. The plan called for the opening of the No. 1 seal in 7 South and the No. 13 seal in old 7 South Parallel and the starting of the Mahan fan. These ventilation changes were performed on Saturday, February 21, 1976, while the mine was idle and the electric power circuits inby 5 North were deenergized. The reason for these ventilation changes was to ventilate the 7 South sealed area during the weekend and remove the methane from the area so that mining through into 7 South area could be accomplished on the first shift on Monday, February 23, 1976.

On February 25, after the examination of the 7 South area near the proposed cut-through points revealed no methane, the first place was mined through into the 7 South area and the ventilation in this area was begun. The same day, representatives went underground and reexplored the old 7 South Parallel entries and the 3 Right section. After these representatives returned to the surface, a meeting was held at the Athas Portal with the following in attendance:

Consolidation Coal Company

H.E. Mauck
M.J. Hudak
L.H. Riggs
R.R. Johnson
W.T. Simon
Fay Casseday

West Virginia Department of Mines

Walter N. Miller
Carl Kinty
Dale Morgan

Mining Enforcement and Safety Administration

Jack E. Tisdale
Joseph Marshalek
M.W. McManus
Harold Hennen

United Mine Workers of America

Donald Poland
Stanley Plachta

The purpose of the underground exploration and the subsequent meeting was to evaluate the ventilation system in the area and to discuss and formulate future recovery plans and to develop an improved ventilation system in the underground working areas. The evaluation of the ventilation system of the old 7 South Parallel revealed that a small amount of air was intaking from the Main West headings through the bleeder entries and entering the air current near the face areas of the 3 Right section. While this situation did not present an immediate hazard to the underground workmen in the present working areas, it was considered to be undesirable and would require some changes in the ventilation system in the near future. After a discussion of the ventilation system and future recovery plans, the following was agreed to by all representatives present:

1. The present ventilation system for the underground working areas was adequate.
2. Increased surveillance of critical areas of the ventilation system would be initiated immediately.
3. A ventilation survey would be made by MESA engineers of the entire mine from the Mods Run intake and return shafts inby.
4. The 7 South entries at the cut-through areas would be cleaned up and rock dusted, and the areas north and south of the cut-through areas would be rock dusted to the limits of the rock-dusting machine.
5. Permanent ventilation controls, which would provide two splits of air, would be installed.
6. Five entries would be driven off of the No. 8 entry 7 South which would parallel the 6 Right section and would eventually cut into the face areas of 6 Right.

As the recovery work progressed, the items agreed to were put into force by the Company.

MESA engineers, accompanied by Company and State officials, conducted a ventilation survey of the 7 South and old 7 South Parallel areas on March 25, 1976. The results of this survey were discussed at a meeting held at the Consol No. 9 Mine on March 26, 1976. MESA officials stated that the results of the recent ventilation survey indicated that the air currents in some critical areas underground could possibly reverse directions in the event of a fan outage which could move methane from gob areas into working areas. Because of this possibility, MESA officials recommended that:

1. The old 7 South Parallel be resealed.
2. Three overcasts be built in the proposed development of the new 6 Right entries which would provide an air passage from the sealed area in 7 South Parallel to the Mahan fan; and
3. The Mahan fan remain in operation.

The representatives present agreed with these recommendations and Company officials stated that they would comply with them.

On March 29, 1976, the old 7 South Parallel was sealed by closing the mandoor in the No. 13 seal and by building a seal in an opening between the old 5 Right and 6 Right sections. The rehabilitation of the 7 South entries where the new 7 South Parallel entries crossed the 7 South entries was completed by the end of June 1976. After the miners' vacation period, June 28 through July 13, 1976, the development of the new 6 Right section off 7 South was started.

From the middle of July through December 1976, the recovery operations consisted of developing the 1 Left entries off 8 North toward the 9 North section and the development of the new 6 Right section off 7 South which would eventually cut into the faces of the old 6 Right section. At the close of December 1976, the 1 Left entries off 8 North had advanced to the No. 15 crosscut and the new 6 Right entries had been advanced to the No. 12 crosscut. Three overcasts that were recommended by MESA at the March 26, 1976, meeting were installed in the Nos. 2, 3, and 4 entries, 6 Right at the No. 3 crosscut. There were no victims recovered from the mine during 1976. In February 1976, the name of the Company was changed to Fairmont Operations, Consolidation Coal Company. The mine name remained the same.

1977

The recovery operations during 1977 consisted of developing the 1 Left entries off 8 North and the new 6 Right entries off 7 South. The 1 Left entries were driven to the No. 28 crosscut and "butted off". Five entries were turned right off the 1 Left entries and

parallel to the 9 North entries and advanced to the No. 6 crosscut at the close of 1977. The new 6 Right entries were advanced to the No. 23 crosscut, turned right 90 degrees and driven to the No. 6 crosscut and "butted off". Two places were turned right off of these entries and cut into the face areas of the Nos. 1, 3, 4, and 5 entries of the old 6 Right section where a crew of miners were thought to be working when the explosion occurred. Roof falls were encountered in the No. 5 entry and in the No. 18 crosscut between the Nos. 3 and 5 entries. While loading out the roof fall in the No. 18 crosscuts, three victims were recovered. The victims were identified as follows:

Hoy B. Taylor	Utility Man
Roscoe M. Triplet	Loading Machine Operator
Elbert E. Hartzell	Roof Bolter

During October 1977, four entries were turned Left off the No. 1 entry 6 Right and advanced three crosscuts for the purpose of providing space to dispose of the rock which was loaded from the old 6 Right section while searching for additional bodies.

In November 1977, the mining equipment was moved outby from the old 6 Right section to the No. 16 crosscut of the new 6 Right entries. Two entries were driven through the coal barrier between the new and old 6 Right entries at the Nos. 16 and 17 crosscuts. Both places cut through the chain pillars between the Nos. 1 and 2 entries, the Nos. 2 and 3 entries, and between the Nos. 3 and 4 entries. Roof falls were encountered in each of the old 6 Right entries at the cut-through points. On December 2, 1977, when the outby entry cut through into the No. 4 entry of old 6 Right, a victim was found near the left rib. The victim was identified as James Jones, shuttle car operator. His body was positioned at a 45-degree angle to the coal rib and facing outby.

The continuous mining machine was located in the face of the No. 3 entry, the machine controls were in the "off" position. The loading machine was located under a roof fall in the No. 18 crosscut with the head of the machine near the boom of the continuous mining machine. (See Appendix I, Figure 2).

Due to the extensive roof falls throughout most of the area in the 6 Right section, the rock-dust applications and loose coal and coal dust could not be evaluated. The four victims recovered during 1977 made a total of 59 recovered from the mine since the recovery operations started on September 12, 1969. (See Appendix I, Figure 8).

1978

During January, February and through March 26, 1978, recovery operations were not conducted at the Consol No. 9 Mine due to a

work stoppage during labor contract negotiations. Recovery operations resumed on March 27, 1978, and consisted of developing the set of entries paralleling the 9 North section, and loading slate in the old 6 Right section in search of bodies and equipment. By April 20, 1978, the developing entries had advanced to the No. 7 crosscut. A shuttle car was recovered from under a roof fall in the 6 Right section. The other shuttle car on this section was located under a roof fall in the No. 17 crosscut between the Nos. 3 and 4 entries.

MSHA was notified by letter dated April 19, 1978, from Ralph W. Hatch, Vice-President of Safety, Consolidation Coal Company, that Consolidation Coal Company was ceasing further recovery operations and was permanently closing its Consol No. 9 Mine.⁶ On April 20, 1978, recovery operations ceased and the process of removing the mining equipment and other materials from the mine was started. On April 27, 1978, a meeting was held at the MSHA District Office in Morgantown, WV. Among others, the meeting was attended by the following persons:

Consolidation Coal Company

Ralph W. Hatch
John L. Rozance
H.E. Mauck
W.T. Simon
Ray Henderson
J.T. Hemphill
Eugene S. Lieving

West Virginia Department of Mines

Edward Jarvis
Grant King
Carl Kinty

Mine Safety and Health Administration

Joseph O. Cook
Ronald Keaton
M.W. McManus
Michael J. Lawless
Pam Crank

⁶The mine was permanently abandoned on July 28, 1978.

United Mine Workers of America

E.W. Gilbert
Arron B. Justice
Stephen Webber
Mitchell Napalo, Sr.
A. Neil Murphys
Mary L. Jordan
Jonathan Williams
John Darcus
Stanley Plachta
Sidney Mills
Steven Opyoke

Others

S.L. Kaznoski - Widow of Explosion Victim
Mary Matish - Widow of Explosion Victim
Marcella Williamson - THE DOMINION POST

The purpose of the meeting was for Company officials to discuss and explain their reasons for ceasing recovery operations and planning to seal the Consol No. 9 Mine, as announced by the Company on April 19, 1978. The Company officials gave the following reasons for closing and sealing the mine:

1. The chance of ever recovering all the bodies was extremely remote.
2. It was not likely that the cause of the explosion would ever be determined.
3. The Company's 1974 agreement with the families of the victims called for recovery efforts to continue only so long as it was safe, reasonable, feasible, and practical to do so. A Company official stated that recovery efforts had long since gone beyond that point, and further exposure of miners to the hazardous work of recovery was unwarranted.

A Company official stated that Consolidation Coal Company had agreed with the widows of the explosion victims to do the following:

1. Consol would seal off and dedicate an underground area or areas of the mine to the memory of the miners whose remains could not be disinterred. This area or areas would be where the remaining victims were believed to be located.
2. Consol would designate on its mining maps and drawings the underground area or areas mentioned above,

excluding them in perpetuity from all direct or related mining operations.

3. Consol would designate a suitable area on the surface above the underground area or areas as a memorial site with a suitable monument. The memorial site would be adjacent to an existing public road.
4. Consol would maintain the memorial site and monument in proper condition. (See Appendix I, Figure 4, for the dedicated underground area. See Appendix E, Photo No. 20, for the memorial site and monument).

The process of removing the mining equipment from the mine which began April 20, 1978, was completed, and the electric power was disconnected from the mine by July 28, 1978. The mining equipment, including the electric face equipment, power conversion equipment (rectifiers), switchhouses, high-voltage cables, feeder cables, trolley wire, electric pumps, air compressors, conveyor belt and associated equipment, and mine cars, were removed from the underground areas, except for the equipment located in 7 South inby No. 46 crosscut, 7 South Parallels, 3 Right off 7 South Parallels, 9 North and the Main West headings. Most of the track remained in the mine.

During August 1978, all mine fans were shut down and all of the shafts (eight) were totally or partially filled with fly ash, stone, and clay. A double concrete block seal was installed about 200 feet down the slope and the slope entry was filled from the seal to the surface with fly ash and clay. An inspection by an MSHA inspector on November 1, 1978, revealed that all of the shafts and the boreholes that penetrated the mine had been capped with concrete and effectively sealed.

The forces of the explosions and the mine fires which immediately followed the original explosion resulted in and added to the numerous large roof falls that were encountered throughout many areas of the mine. Massive roof falls and/or water blocked the entrance to each of the nine working sections in the west side of the mine. In efforts to expedite the recovery of the victims, entries were driven through solid coal barriers and into the working areas of six of the nine sections. Three sections, namely, 7 South, 9 North, and Main West, were not recovered or explored because of roof falls and/or water accumulations. The final sealing of the Consol No. 9 Mine on November 1, 1978, brought the recovery operations to a conclusion. A total of 59 victims were recovered from the mine. Nineteen victims were unaccounted for, and remain in the underground areas of the mine. During the underground recovery operations, a locomotive operator was killed, one workman died of natural causes shortly after being transported to the surface from the underground area where he had become ill, and three lost-time injuries were sustained by a foreman and two miners. (See Appendix I, Figure 2).

INVESTIGATION, DISCUSSION AND EVALUATION

Public Hearings

On December 5-7, 1968, the WVDM, in cooperation with the USBM, Consolidation Coal Company, Mountaineer Coal Company, and the UMWA, conducted Public Hearings on the explosion that occurred on November 20, 1968, at the Consol No. 9 Mine, Mountaineer Coal Company, Farmington, Marion County, WV. Elmer C. Workman, Director, WVDM, appointed a board to hear testimony relevant to the disaster and to question witnesses. The names and titles of the board members were as follows:

Mountaineer Coal Company

Thomas J. Whyte Legal Assistant and Vice-President

West Virginia Department of Mines

Leslie C. Ryan Inspector at Large
John Ashcraft Assistant Inspector

U.S. Bureau of Mines

Frank C. Memmott Associate Director, Health and Safety
W.R. Park, District Manager, Health and Safety,
District B

United Mine Workers of America

Lewis E. Evans Safety Director
Cecil J. Urbaniak President, District 31
Leonard Pnakovich Field Organizer, District 31

Other officials in attendance were:

Consolidation Coal Company and Mountaineer Coal Company

William N. Poundstone Executive Vice-President
C.R. Nailler Vice-President
D.H. Davis President
K.K. Kincell Manager of Mines

West Virginia Department of Mines

Elmer C. Workman Director
Walter N. Miller Inspector

U.S. Bureau of Mines

James Westfield Consultant
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All surface openings into the mine were sealed on November 30, 1968, before an investigation of the explosion could be conducted. The original explosion resulted in several major and minor explosions that were detectable from the surface and occurred intermittently during the 10-day period prior to the sealing of the mine. There is no doubt that several other local explosions also occurred during this period of time, the forces of which did not reach the surface. Due to the unstable conditions in the mine during this period, underground recovery efforts were limited to brief underground explorations through the Athas shaft to the east side of the mine and to the No. 61 crosscut toward the west side of the mine, by mine rescue teams and accompanying officials. The explored areas were not affected by the explosion and were being ventilated by the Nos. 1 and 2 fans.

On September 12, 1969, the seal was removed from the Athas return shaft, and the long and hazardous recovery of the mine by the air lock method began. (See Appendix I, Photo No. 7). The subsequent recovery operations continued for almost 10 years until the final sealing of the mine was completed in November 1978. The extensive roof falls, hazardous roof conditions, high concentrations of methane, and water encountered by the recovery crews in many areas of the mine adversely affected the progress of the recovery operations and made it impossible to conduct a normal investigation. Instead, the investigation into the cause(s) of the disaster was conducted simultaneously with the recovery operations as they progressed and continued until the final sealing of the mine.

Many persons participated in the recovery operations, as well as in the investigation during this extended period of time. Some of these people left the mining industry for personal reasons, some retired, and some died. Also, each of the concerned groups underwent changes in organizational structure during this period. These changes affected some top management personnel, resulting in new officials who also became involved in the recovery operations and the investigations. The following key officials participated in most or all of the investigation into the cause(s) of the explosion:

Consolidation Coal Company

William Poundstone
Charles R. Nailler
Harold Suter

Executive Vice-President
Vice-President, Operations
Vice-President

Mountaineer Coal Company

D.H. Davis	President
H.E. Mauck	President
K.K. Kincell	Manager of Mines
L.H. Riggs	General Superintendent

West Virginia Department of Mines

Leslie C. Ryan	Inspector at Large
Walter N. Miller	Inspector
John M. Ashcraft	Assistant Inspector at Large

U.S. Bureau of Mines

James Westfield	Associate Director
W.R. Park	District Manager
James D. Michael	District Manager
Joseph Marshalek	Assistant District Manager

United Mine Workers of America

Lewis E. Evans	Safety Director
Leonard Pnakovich	District 31 Representative
Stanley Plachta	Chairman, Mine Safety Committee

The names of other officials who participated in some parts of the investigation are listed in Appendix C.

The day-to-day routine activities of the recovery operations and the conditions encountered were recorded by USBM representatives who were on duty. After each advance of the fresh-air base by the recovery crews and the outby areas had been secured, ventilated, and otherwise made safe, the key investigators would enter that area and inspect and record all observed conditions, including sketches and locations of all pertinent information. The records of the daily routine activities of the recovery operations and the records compiled by the key investigators were consolidated into a composite record of all recovery activities and findings. The USBM supervising inspector was responsible for making this composite record.

Factors Affecting the Explosion

Ventilation

According to the last Federal inspection of the mine completed on August 30, 1968, the Nos. 3 and 4 fans, which ventilated the west side of the mine that was affected by the explosion, were exhausting a total of 700,000 cfm of air. Analysis of air samples collected in the main return airways at the bottom of these fan shafts during this inspection showed that the west side of the mine was liberating a total of 7,507,000 cubic feet of methane in a 24-hour period. The No. 4 fan was exhausting a

total of 491,000 cfm of air and the methane liberation in a 24-hour period was 5,116,000 cubic feet. Records taken from Federal inspection reports showed that the total mine methane liberation in a 24-hour period was 6,671,400 cubic feet in September 1967, 6,147,000 cubic feet in April 1968, and 7,987,000 cubic feet in August 1968.

During the August 1968 Federal inspection, the four fans which ventilated the entire mine, were exhausting a total of 1,182,000 cfm of air. Each working section was ventilated with two splits of air. The Company required the face areas in developing sections to be ventilated with an auxiliary exhaust fan and tubing 12 to 14 inches in diameter. In some developing sections, two exhaust fans were used simultaneously during loading operations at the face to dilute methane. Also to aid face ventilation, diffuser fans were installed on the continuous mining machines in the 7 South and Main West sections. Exhaust fans or line brattice were not normally used to ventilate face areas of pillar lifts on retreating sections. Line brattice was installed in those face areas only when methane was detected. According to the testimony of James Herron, section foreman, A Face section, exhaust fans were not used to ventilate the face during development of the A Face section, although Company procedures required it. He stated that ventilation was not provided in face areas, except when methane was detected. According to the testimony of Arthur Cook, a former continuous mining machine operator in the 7 South section, and Zack Springer, loading machine operator in the Main West section, loading operations were occasionally conducted in the faces of these developing sections without using exhaust fans, contrary to Company procedures.

According to the August 1968 Federal inspection report, the four developing sections, namely 9 North, Main West, 7 South, and 6 Right off 7 South were ventilated with 57,000, 49,000, 45,000, and 31,000 cfm of air, respectively. These four sections, with the exception of the left side of the 7 South section, were ventilated by the No. 4 fan. An evaluation of these air quantity measurements and the analysis of the air samples taken in the immediate returns on these sections during the August 1968 Federal inspection showed that these sections were liberating a total of 458,000 cubic feet of methane in a 24-hour period. The 7 South Parallel sections, the 4 and 5 Right sections off 8 North, and part of 7 North, all retreat mining sections except 4 Right, were also ventilated by the No. 4 fan. However, these sections, according to the April 1968 Federal inspection report, were not liberating any methane. Therefore, the evaluation indicates that a considerable amount of methane was liberated from the solid ribs of virgin coal in the Main West headings, 9 North, and 7 South, which equaled a total linear distance of approximately 15,000 feet. The right side of the Main West headings inby 9 North was ventilated with only 17,000 cfm of air which also ventilated 2,400 feet of solid coal rib before mixing with another air current. The right side of 7 South was ventilated with only 13,600 cfm of air which also ventilated

approximately 4,800 feet of solid coal rib before mixing with another air current.

Fay Casseday, general mine foreman, stated at the official hearing that the 8 North entries, including the 4 and 5 Right producing sections, were ventilated with approximately 70,000 cfm of air and was regulated near the mouth of 8 North. This 70,000 cfm provided a separate split of air for each of the 4 and 5 Right sections. These two splits of air were further split right and left near the faces of each section with regulation for each split of air installed near the mouth of both the 4 and 5 Right sections. Multiple splitting (4) of this 70,000 cfm of air cast doubts as to the adequacy of the ventilation of the 8 North area, including the 4 Right section and particularly the pillared area in the 5 Right section.

According to the information on a map of the mine prepared by Company officials, which showed the mine ventilation system, and also from the testimony of Casseday, the Main West headings, including the track haulage road between 4 North and D face, were situated between the Nos. 2 and 3 fans and were being ventilated with intake air from the Mods Run intake shaft which returned to the Athas fan. Casseday stated there was no great amount of air in this area of the mine and that the Main West headings between 3 and 4 North "actually could be considered a dead space". He also stated that the intake airways in this area on both sides of the track haulage road were squeezed and hooved.

During the recovery operations and the investigation in December 1969, the recovery areas of the Main West headings between 3 and 4 North were being ventilated with approximately 40,000 cfm of air, and methane ranging from 3 to 10 percent accumulated in the high areas above roof falls in the Nos. 5 and 6 headings at the Nos. 102, 106, 108, 110 and 116 crosscuts. During the recovery operations and the investigations in June through September 1970, after the Mods Run fan was placed in operation, methane ranging from 3 to 5 percent was detected for a total of 14 times in the high places between 3 and 4 North in the Nos. 1, 2, 3, 4, and 5 Main West headings at the Nos. 113 to 119 crosscuts.

As the recovery operations advanced westward and more areas were opened up and ventilated, neutral areas (no movement of air) occurred in the Main West headings outby 3 North. More than 5 percent methane accumulated in the high places in these neutral areas along the track haulage road at the Nos. 75, 76, and 79 crosscuts. These neutral areas were eliminated by loading out many roof falls in the intake airway, by changing the fan blade position on the Mods Run fan (No. 3), and by regulating the amount of air intaking through the Mods Run intake shaft. Also, to prevent methane from accumulating in the high places along the track haulage road at the No. 70 crosscut, a rigid 12-inch metal pipe was installed from the high place on the intake air side to the return airway. This pipe remained in service throughout the remainder of the long recovery operations.

It was found during the recovery operations that methane would accumulate in the high places atop roof falls and in the high areas where the roof falls had been loaded out particularly along the Main West headings outby 4 North, if a movement of air was not directed through these high places. This was particularly true during periods of falling barometric pressure. The fact that the Main West headings (intake airways) between 4 North and 1 South, a distance of approximately 4,000 feet, bordered a solid coal rib of virgin coal that normally liberates methane, probably accounted for the frequency of methane detections in this area during recovery operation.

Considering the testimony of the Company official concerning how the Main West headings outby 4 North were being ventilated at the time of the explosion and investigation, Federal investigators believe that overall the ventilation in this area of the mine was inadequate, and most probably nonexistent in some places. Federal investigators also believe that this lack of adequate ventilation along the Main West headings outby the 4 North could have permitted methane from the nearby gob area and liberating from the strata and/or the solid coal rib, to accumulate unnoticed to the explosive limits in the high places along the track haulage road. The ignition sources that existed along the track haulage road at the time of the explosion were:

1. Energized trolley and trolley feeder wires installed along the track haulage road that could have become grounded or short circuited.
2. Open-type electric pumps located along the track haulage road at the No. 76 crosscut, at 3 and 4 North, and between 3 and 4 North.
3. A rectifier located between the Nos. 5 and 6 Main West heading at the No. 92 crosscut.
4. Two haulage locomotives that were operating in the area between 3 and 4 North at the time the explosion occurred.

The two-compartment Mahan shaft penetrated the coal seam near the 7 South section in August 1968. The underground connection to the shaft was made in October 1968. According to the testimony of Raymond Comer, the underground connection to the shaft was made on day shift on a Saturday. He stated that he was not involved in the cut-through operation but he was with a crew of miners laying track in the Main West headings on the same shift that the underground connection to the shaft was made.

According to the testimony given at the official hearing by Fay Casseday, the underground connections and approaches to the Mahan shaft were completed, the areas around the bottom of the shaft were cleaned up, and the areas rock dusted on Sunday, November 16, 1968. Casseday stated that the shaft was designed for and would eventually become main intake and return airways, and the

plans called for erecting a main fan installation at the return side of the shaft. He stated that at the time of the explosion on November 20, 1968, the Mahan shaft was "checked off" at the bottom and that only a small amount of air, sufficient to keep the area around the bottom of the shaft clear of methane, was permitted to intake through this shaft. The Mahan shaft, according to Casseday's testimony, was not contributing to the mine ventilation system at the time of the explosion. The shaft did, however, provide an escape route for the eight miners working in the 7 South section who otherwise would have perished along with the other 78 victims of the explosion.

A Femco Supervisory Control System, which was designed to provide continuous monitoring of the four fans, was located in the lamp house at the Llewellyn shaft portal where a responsible person was always on duty while the mine was operating. The Femco System was also designed to deenergize the entire mine power system, in a predetermined time period of 18 minutes, in the event of an outage of either fan. However, the investigation revealed that the mine power cutoff system was inoperative at the time of the explosion, as well as at several other times prior to the explosion. Jimmie Herron stated at the official hearing that on the morning of the explosion neither he, nor any member of his crew, knew that an explosion occurred underground until he and his crew arrived on the surface at approximately 7:00 a.m. He stated that they continued to mine coal in the A Face section until they received orders by telephone to leave the section and come to the surface immediately. He also stated that he then disconnected the power from the electric equipment and the section and left the section on foot.

According to testimony of Dana E. Harris, Sr., shuttle car operator, retired, and Joseph Duda, continuous mining machine operator, it was a practice to load out the loose coal from behind the continuous mining machine and move the machine from the face area after the crew had received word that a main fan was down. Harris also stated that 2 or 3 months before his retirement on March 7, 1968, one of the main fans went down on the 4 p.m. to midnight shift and the miners were withdrawn from the mine. The following two shifts (midnight to 8 a.m. and 8 a.m. to 4 p.m. shift) did not work because of the fan outage. He stated that his shift (4 p.m. to midnight) reported for work the next day but the miners refused to enter the mine to work because a signaling device (blinking lights indicating fan operations) located in the lamp house showed that two fans were not in operation. Harris stated that he brought this matter to the attention of Foster Turner, superintendent, and K.K. Kincell, who were in the lamp house at that time. He stated that Turner advised him that only one fan was down and that the monitoring system on the other fan was blocked out, but the fan was actually operating. Harris stated that the 8 a.m. to 4 p.m. and 4 p.m. to midnight shifts worked the following day with one of the main fans not in operation.

Bleeder System

The Nos. 3, 4, 5, 6, 7, and 8 North sections off the Main West headings were mined during 1955 through 1968. At the time of the explosion, retreat mining had been completed in the Nos. 3, 4, 5 and 6 North sections, approximately one-half completed in the 7 North section and one-quarter completed in the 8 North section. The approximate size of the total pillared and abandoned area of these sections of the mine were 2,500 feet wide and 8,400 feet long or a total area of 21,000,000 square feet. Two chain pillars of coal, each approximately 34 feet thick and 70 feet long, were left across the top end of the entire length of the abandoned area between the 3 North and 8 North sections. Also, two or more pillars of coal, approximately of the same dimensions, were left between each retreating section. The only pillared and abandoned area in the south side of the mine in by 1 South was the 4 and 5 Right sections off 7 South. The 3 Right section had recently started retreat mining prior to the explosion and similar size chain pillars of coal were left along the south side of the abandoned area. The top end of the abandoned area was connected to a set of four entries which were connected to the Main West left return airways and served as bleeder entries for the abandoned area. (See Appendix I, Figure 8).

The purpose of leaving the pillars of coal around the perimeter of the abandoned areas was to provide a bleeder system for the pillared and abandoned areas which would permit such areas to be ventilated and kept free of methane accumulations.

According to testimony of two Company officials given at the official hearing, the bleeder entries were impassable due to roof falls and were considered generally ineffective. Fay Casseday stated that he was never able to get a movement of air in the bleeder entries across the top end of the pillared and abandoned area between 3 North and 8 North; and that the only way the left corner in the top end of 8 North could be ventilated was by installing a line curtain from the left return airway up to the edge of the caved area. At the hearing, Casseday was asked, "Were these facts positive evidence that the air was not going through the gob and into the open returns but was actually ventilating only the very edge of the gob?" He replied, "I would have to say yes". Casseday also stated that the mine did not have an adequate bleeder system that could be traveled and that "there was a lot of gas on the gobs in any of these gassy mines".

Jesse Bowers stated that he was concerned about the bleeder system in this mine, "because after you pull back several panels that way, the bleeders would just close up on you. When you first start your panels, you pull them back for a ways and then you do have they're effective up to a point and then they just become squeezed closed and they just won't come, your air won't travel through here," the area described being the gob area pointed to on the mine map.

A ventilation survey was conducted on May 14, 17-21, and 23-27, 1971, in the areas of the mine that were not affected by the explosions. This survey was performed by USBM engineers, accompanied by Company and State officials. Pressure and air quantity measurements were taken in accessible areas from 3 North to the slope bottom for the purpose of determining the effectiveness of the bleeder system in this area of the mine. An evaluation of the collected data showed that only the fringe of the pillared and abandoned areas on the east side of the mine were being ventilated. The bleeder system on the east side of the mine was similar to the bleeder system on the west side of the mine.

During the advance of the crews and the recovery operations, the pillared abandoned areas in the north side of the mine inby the Plum Run overcast were sealed off promptly from the rest of the mine by installing concrete block stoppings. Because of the ineffective bleeder system and high concentration of methane in these abandoned areas, no attempt was made to ventilate these abandoned areas, except on one occasion. In April 1972, after the recovery operations had been discontinued for a total of 77 days because of unsatisfactory atmospheric conditions (more than 12 percent of oxygen and less than 20 percent of methane), in the north side sealed area, officials decided to ventilate and remove the methane from the 3 Right 7 North section so that the recovery operations could resume. Approximately 37,000 cfm of air was delivered to the 3 Right 7 North section. An opening was made in the No. 11 seal in 6 North which permitted approximately 12,000 cfm of air to enter the gob area between the 3 Right section and 6 North. The methane content at the No. 11 seal 6 North was 30 percent and remained so for several days. The recovery operations were permitted to resume on May 11, 1972, only after the methane content in the air at the No. 11 seal dropped to a safe level.

On November 13, 1954, an accumulation of gas in the No. 7 pillar place in 4 left off 2 North in this mine was ignited and resulted in a widespread explosion which extended throughout most areas of the mine killing 16 men. The No. 11 recommendation of the final report of the investigation of this disaster by the USBM states:

"A system of bleeder openings and air courses providing for positive movement of air through and/or around abandoned or caved areas, sufficient to prevent a dangerous accumulations of gas in such areas and to minimize the effect of variations in atmospheric pressure, should be included in all future pillaring plans."

Mining industry experiences, studies conducted by the USBM⁷ and information obtained during the recovery operations at this mine,

⁷US Bureau of Mines, RI No. 6786, Effects of Bleeder Entries During Atmospheric Pressure Changes.

as well as similar and routine activities at other mines, clearly show that mine methane liberation from unventilated gob areas increases during periods of falling barometric pressure. This increase is due to the expansion of the volume of gas in the gob, in accordance with Boyle's law.⁸

During the recovery operation, methane accumulations were detected (usually in high places) many times at many locations along the Main West headings during periods when the barometric pressure dropped below 30 inches of mercury, which is normal pressure for this geographic area. Methane was seldom detected in these same locations of the mine during periods of normal atmospheric pressure.

The vast, unventilated, abandoned gob areas, approximately 21,000,000 square feet, between 3 North and 8 North provided a reservoir for methane accumulations. During the recovery of the mine, the activities had to be discontinued on several occasions because of the high concentration of methane in the areas during periods of low barometric pressure. The atmosphere in the gob areas expanded during these low pressure periods which forced the methane out from the gob area and into the open areas of the mine, including intake and return airways. When the atmospheric pressure returned to normal, the methane liberation would also return to normal and permitted recovery operations to continue.

According to the U.S. Department of Commerce, F.A.A. Station, Morgantown, WV, which is about 17 air miles from the Consol No. 9 Mine, low atmospheric pressure (below 29 inches mercury) existed for several days prior to the explosion. On November 18, 1968, two days before the explosion, the barometric pressure was 28.27 inches.

A barometer was maintained at the Company's main office at Monongah, WV. However, the investigation did not establish whether or not the Company officials were aware of the low pressure periods that existed prior to the explosion.

Methane

The mine was liberating a total of 7,987,000 cfm in a 24-hour period at the close of the August 1968 Federal inspection, most of which (5,116,00 cubic feet) was being exhausted from the mine by the No. 4 fan. The analysis of air samples collected in November 1968 after the explosion and before the mine was sealed, at the eight boreholes that were drilled in efforts to make contact with the entrapped miners, showed methane ranging from 3.4 to 27.4 percent. After the mine was sealed, an analysis of the first air samples collected in December 1968 at several boreholes on the west side of the mine showed methane ranging

⁸Boyle's Law states that the volume of a perfect gas varies inversely with the absolute pressure.

from 21.12 to 46.70 percent, while an analysis of air samples collected in September 1969 at several shafts and boreholes located throughout the mine just prior to unsealing, showed methane ranging from 67.63 to 90.44 percent.

The fact that numerous gas wells penetrated the coal seam in active areas, pillared areas, and in virgin areas throughout the mine property, gave rise to the theory that gas may have entered the mine workings through leaky gas wells and contributed to the cause of the explosions and fires. However, the mine map indicated that blocks of coal measuring more than 200 square feet were left around the gas wells for protection. Visual inspection of all observable gas well blocks during the investigation showed that the gas well blocks of coal were all intact and of sufficient size to adequately protect the wells. This indicated that gas from these wells most likely did not contribute to the explosions and fires.

According to the testimony of several Company officials and employees, methane was detected frequently in the active sections of the west side and less frequently on the east side of the mine. Wilson and Casseday stated that on the day before the explosion, production of coal was stopped for 2 to 4 hours in the 7 South section because of methane accumulation on the right side of the section ranged to 4 percent and extended for approximately 1,000 linear feet. This accumulation occurred because ventilation controls (stoppings) had not been installed in four of the last five open crosscuts outby the face area, and only 12,000 cfm of air was available to ventilate the right side of the section. After installing the necessary ventilation controls, the regulator was adjusted to increase the amount of air on the right split and remove the methane accumulations. Zack Springer, loading machine operator, 4 p.m. to midnight shift, Main West section, stated that on the day before the explosion, loading operations were stopped twice on his section because of methane accumulations in the working places. He stated that removal of the accumulations from the face areas was aided by spraying water on the mine surfaces and the mining equipment.

Harris stated that during development of the 6 North entries when methane accumulated in the face areas and could not be removed by the exhaust fan and tubing, the continuous mining machine would be left running (cutting chains running -- not cutting coal) while line brattice was installed in the place and the methane accumulations were removed.

According to the testimony of several Company officials and employees, tests for methane were made in face areas where electric equipment was being operated. The frequency of such tests varied considerably from 15-20 minute intervals to only several times per day. Wilson stated that tests for methane were made after loading one to two shuttle cars of coal. Mike Verbonic, section foreman, stated that such tests were made at 15-20 minute intervals. Charles Beafore, continuous mining

machine operator, stated that he made such tests for methane after loading three to five shuttle cars of coal. Lake stated that he made such methane tests at intervals of 15-20 minutes. Thomas stated that he made such methane tests seven times a day, and Duda stated he did not know what the law required, but that he made such methane tests "sometimes about every 30 minutes and sometimes less often". Tests for methane were generally made with a flame safety lamp using a nonluminous flame.

According to the testimony of Casseday, methane ignitions had occurred in face areas of the mine which were caused by the cutting bits of continuous mining machines striking hard substances in the coal, floor, or roof strata during mining operations. On October 1, 1974, during recovery operations, a methane or coal dust ignition occurred in the face of the No. 3 entry 1 Right 7 North airways. The investigation of the incident revealed that the ignition was caused by the cutting bits of the continuous mining machine striking hard inclusions in the coal. The ignition was a flash of short duration and no injuries or property damage resulted.

A permissible type Riken methane detector was provided for the Main West and 7 South sections to improve the methane detection ability on those sections, and because of the amount of methane that was liberated during mining operations in these sections. The Riken detector for the Main West section was not provided two days prior to the explosion.

Methane monitors had been installed on the continuous mining machines in the Main West and 7 South sections and used on an experimental basis prior to the explosion. Several Company officials and continuous mining machine operators stated that these methane monitors, when operating properly, provided a great safety advantage in detecting methane at the faces during mining operations. However, these methane monitors were inoperative more than 50 percent of the time, and both monitors had been out of service for several weeks prior to the explosion.

Glover and Company officials stated that following an idle period (weekend/holiday), the preshift examinations of the mine were made by two certified Union fire bosses who examined and made tests for methane in all active sections of the mine. Certified Company officials completed the preshift examinations along active roadways and travelways and at other areas which were required to be preshift examined. During the regular work week, the preshift examinations of the mine were conducted by certified section foremen in conjunction with their regular tour of duty during the production shift. Weekly examinations and tests for methane were conducted by certified Company officials assisted by a fire boss. The adequacy of these examinations was a question of dispute during the hearing and the question was never fully resolved. The mine record books were not available to provide further information. The location of these books is unknown.

In summary, the mine liberated large quantities of methane from the solid coal ribs and at the coal face during loading operations. Methane would accumulate in almost any area of the mine if adequate ventilation was not provided. Tests for methane were not always frequent enough during loading operations at the face. Working faces in retreat mining sections were not ventilated, except when methane was detected. Company rules requiring the working faces in developing sections to be ventilated with exhaust fans and tubing were not always followed. A regulator was adjusted to provide additional air in order for a large body of methane nearing the explosive range to be removed from near the face areas of the 7 South section during a normal operating shift while other miners were in the mine, and some methods of removing methane accumulations did not require face machinery to be deenergized. The gob areas in the mine were not adequately ventilated.

Coal and Rock Dust

During five of the last 10 Federal inspections of the mine completed from 1965 through August 1968, dangerous accumulations of loose coal and coal dust were observed along the haulage roads, shuttle car roadways, and belt conveyor lines; however, these hazards were corrected by the close of each inspection. According to sworn testimony, many employees had complained for several months prior to the explosion to Company officials and/or the Mine Safety Committee about the loose coal and coal dust along the belt conveyor lines and along main haulage roads, coal dust in open crosscuts and entries paralleling main haulage roads, and float coal dust in return airways. Also, some employees had complained to their supervisors that insufficient water pressure on their section created excessive dust during loading operations to the extent that breathing was difficult, visibility impaired, and resulted in excessive amounts of fine coal dust being deposited in return airways. Bowers testified that if adequate water pressure was not maintained to help allay the coal dust at its source, the coal dust would accumulate for several hundred feet in return air ways outby the working section. He stated that when float coal dust accumulated in the return airways, pieces of brattice were used to drag over the material on the mine floor which mixed the float coal dust with the rock-dust applications. However, this remedy did nothing to take care of the float coal dust which had settled on the mine roof and ribs.

The investigation revealed that the mine surfaces in all of the open and explored areas in the west side of the mine inby E Face were covered with a layer of soot. The layer of soot on the mine floor ranged from a thin layer to more than 1 inch in depth in the Main West headings and airways, in 6 North 1 Right section, in 7 North 3 Right section, in 8 North 4 and 5 Right sections, and in the 3 Right 7 South Parallel section. The layer of soot in 7 South and 7 South Parallel entries ranged from one to 4 inches in depth. Also, all areas of the mine west of the Plum Run overcast contained from a trace to large coke deposits as was

determined by dust analysis. Soot and coke are evidence of the burning of coal dust. Although all but two of the dust survey samples collected along the Main West headings between D Face and E Face contained coke, it is believed that these coke deposits were blown there by forces of the explosion. (See Appendix G for analysis of dust samples).

During the investigation, fine coal and coal dust were observed underneath the layer of soot on the floor and generally along the rib lines at many locations in the Main West headings and airways, in 7 North entries and the 3 Right section, in 4 and 5 Right sections off 8 North, in 7 South and in the 7 South Parallel entries.

According to Turner's testimony, Company policy required the working places inby the loading point on each working section to be wet rock dusted during the advance. Shuttle car roadways inby the loading point were required to be wetted down. Turner stated that rock dust was sometimes applied to the roof and ribs of working places up to the boom of the continuous mining machine as the place advanced. At other times, the working place would not be rock dusted until noon when some members of the crew took their lunch period, and that sometimes the working place would be "driven-up" and a crosscut driven through (more than 100 feet distance) before rock dusting the area. Herron stated that working places were rock dusted either during periods of breakdowns or at the end of the shift. He also stated that during an average shift, a working place would be advanced a total distance of approximately 150 feet. Thomas stated that rock dust was not applied in working places that were driven through blocks of coal (pillar lifts). Most pillar lifts were 70 feet or more in depth. Duda stated that sometimes the shuttle car roadways would be dry when they arrived on the section and most of the time the roadways would be dry before the end of the shift. According to the testimony of other employees, the shuttle car roadways were wetted down at the start of the shift.

Trickle dusters were provided for each working section to minimize the hazard of the fine coal dust that was generated at the working face during mining operations and deposited in return airways near the working section. Turner and Lake testified that the trickle dusters were not successful and had never worked properly. Turner stated that immediately after the loading point was advanced in a section, the area between the old loading point and the new loading point were rock dusted with a high pressure rock-dusting machine. In addition to the machine rock dusting, the floor of return airways immediately outby the loading points on all advancing sections were blanket rock dusted; i.e., covered with a layer of rock dust of 1 to several inches in depth. He also stated that areas of the mine outby the loading point, including haulage roads, were rock dusted when needed by two rock-dust crews (total of 4) using high pressure track-mounted rock-dusting machines. He stated that the main haulage roads were rock dusted twice a year and that the haulage roads inby 4 North had not been rock dusted within the last 6

months prior to the explosion. He also stated he did not remember when the old airways outby the working sections had been rock dusted.

During the last 10 Federal inspections of the mine conducted from 1965 through August 1968, a total of 1,983 dust survey samples were collected. The analysis of these dust samples showed that the incombustible content of 78 of these samples was less than 65 percent and the incombustible content of the remainder of these samples ranged from 65 to 100 percent. Additional rock dust was applied in the rock-dust deficient areas before the close of each inspection. During the last Federal inspection made prior to the explosion and completed August 30, 1968, a total of 125 rock-dust survey samples were collected in the Main West, 9 North, 5 Right, 8 North, and 7 South sections. The incombustible content of 122 of these samples ranged from 65 to 100 percent which indicated that the rock-dust applications in the sampled areas were adequate at the close of the inspection. According to the August 1968 Federal inspection report, the rock-dust applications in other areas of the mine which were not sampled appeared to be adequate. (See Appendix D for copy of August 1968 inspection report).

During the investigation, rock-dust applications were discernable under the layer of soot in most of the open and explored areas of the mine. During the investigation, dust surveys were conducted in open and explored areas of the mine except in 3 Right 7 South Parallel. Standard "band" dust samples were collected where possible in each entry at approximately 200-foot intervals. A total of 795 rock-dust samples were collected, 225 of which were collected in the east side of the mine which was not affected by the explosions. In addition, a total of 356 "skim" dust samples were collected in the east side in an effort to help determine the percent of float coal dust. Dust samples collected in areas affected by the explosion may not be representative of conditions prior to the explosion. The analysis of the dust samples showed that 51 percent of the standard samples, and 17 percent of the "skim" samples, had incombustible contents below 65 percent. The following chart is a break down of the standard dust survey samples:

<u>Mine Area</u>	<u>No. of Samples Collected</u>	<u>No. of Samples below 65% Incombustibles</u>
	<u>Main East</u>	
Intake airways	103	12
Track entries	34	2
Return airways	88	11
	<u>Main West Headings and Airways</u>	
Intake airways	235	120
Track entries	64	28
Return airways	123	102

	<u>7 South</u>	
Intake airways	29	29
Track airways	8	8
Return airways	21	21
	<u>4 Right 8 North</u>	
Intake airways	6	6
Track entries	6	6
Return airways	17	17
	<u>5 Right 8 North</u>	
Intake airways	3	2
Track entries	5	2
Return airways	6	6
	<u>3 Right 7 North</u>	
Intake airways	12	9
Track entries	13	11
Return airways	32	20

All of the standard dust survey samples collected in the west side of the mine inby E Face, except 35, contained from a trace to large deposits of coke. (See Appendix G for analysis of dust samples). The dust survey samples collected in the west side of the mine inby E Face (area affected by the explosion) are not truly representative of the mine dust conditions prior to the explosion, as burning coal dust in suspension during the explosion increased the incombustible content. It is evident, however, that sufficient inert matter was not present on all mine surfaces in the west side to prevent propagation of the explosion. The fact that the haulage road in the east side outby 4 North had been cleaned and recently rock dusted probably helped in preventing the spread of the explosion into the east side. The incombustible content of all 20 dust survey samples collected along the track haulage road from E Face to Main North (recently rock-dusted area) ranged from 65 to 100 percent, and most of the samples contained more than 90 percent incombustibles. Thirty-two of the 34 dust survey samples collected along the track haulage road in the east side outby Main North contained incombustibles ranging from 70 to 99 percent. However, more than 10 percent of the dust samples collected in the intake and return airways in the east side of the mine contained less than 65 percent incombustibles.

Observations during the investigation and testimony of Company officials and employees indicate that:

1. Rock-dust applications were not always kept to within 40 feet of the face of working places as required by Federal and State law.

2. Company policy requiring active shuttle car roadways to be "wetted down" in lieu of rock dust⁹ was not always followed.
3. Shuttle car roadways often became dry before the end of the shift and therefore did not provide adequate protection against propagation of an explosion.
4. Fine float coal dust that settled on the roof and ribs of return airways outby the working sections was not always neutralized by adequate rock-dust applications.
5. Federal inspectors had required removal of accumulations of loose coal and coal dust observed during Federal inspections along belt conveyor lines and at belt heads and belt tailpieces, and employees had complained about similar conditions including float coal dust in open crosscuts and in entries paralleling the main haulage road prior to the explosion.
6. During the investigation, loose coal and coal dust accumulations, some of which were covered by rock-dust applications, were observed in many of the underground areas in the west side of the mine.
7. Pillar lifts were not rock dusted and some of the fine coal dust which was generated during mining operations settled on the outward edges of gob areas in the retreating sections.
8. Reliance on blanket rock dusting on the floor in return airways for protection against the propagation of an explosion provided inadequate protection since tests conducted at the USBM experimental mine have shown that heavy rock-dust applications on the mine floor will not compensate for a lack of rock dust and/or the presence of float coal dust on the roof and ribs.¹⁰

In addition to the above-described conditions and practices, the fine coal that was stored in many mine cars, shuttle cars, and on belt conveyors at the time of the explosion provided fuel which probably aided propagation of the explosion. Thirty 15-ton

⁹Coal dust too wet to require rock dust. Section 209(e)(3), exempts from rock dusting those mines or areas of mines in which the dust is too wet to propagate an explosion. The term "too wet" means wet enough to exude water if a ball of the finely divided material is squeezed in the hands. (Federal Register, October 12, 1956).

¹⁰Bureau of Mines, IC No. 8150 (1963), Float Dust Deposits in Return Airways in American Coal Mines.

capacity mine cars of coal were located at side tracks in the Main West headings outby 7 North. From 7 to 13 mine cars of coal were located at the loading points in 7 North, 8 North, 7 South Parallel, and 6 Right 7 South, and both shuttle cars, belt feeder, and several hundred feet of the conveyor belt in 3 Right 7 North were loaded with fine coal. Many more mine cars, shuttle cars, and belt conveyors loaded with fine coal may be located in the unexplored and unrecovered areas in 7 South, Main West, and 9 North, which also could have contributed to flame propagation.

Electric Equipment

The inspection of the electric face equipment by Federal electrical inspectors, in the working sections that were explored in the west side of the mine, did not reveal any opening into the explosion-proof compartments of the mining equipment. The only defects found in the equipment were a loose headlight lens and a damaged conduit hose.

All of the electric face equipment in 6 Right off 7 South, 1 Right off 6 North, and 5 Right off 8 North, except the roof bolting machine, loading machine, and power center in 6 Right, were damaged by the forces of the explosion. The shuttle cars, continuous mining machine, and the loading machine in 1 Right were damaged by heat and flame from the explosion. Federal investigators are of the opinion that defective electric equipment did not cause or contribute to the explosion.

Explosives

The continuous mining machine in the No. 2 pillar lift 5 Right off 8 North was covered by a large roof fall which occurred the day before the explosion. At the end of the second shift prior to the explosion, a large piece of rock remaining on the left side of the machine prevented the machine from being recovered. At the time of the explosion, nine miners, including a foreman, were engaged in recovering the machine. When the 5 Right section was recovered, eight victims were found along the track in the No. 3 entry between the Nos. 11 and 14 crosscuts at distances ranging from 250 to 575 feet outby the No. 2 pillar lift, and the other victim was found in the last open crosscut between the Nos. 2 and 3 entries and approximately 50 feet outby the continuous mining machine. (See Appendix I, Figure 7).

The location and position of the victims raises the possibility that explosives may have been fired to blast the rock and expedite the recovery of the continuous mining machine. A drill, with which to drill holes in the large piece of rock for blasting purposes, was not found. If an open shot of explosives had been fired in the No. 2 pillar lift, which had been cut through into the gob area, a methane-air mixture and/or coal dust could have ignited and precipitated the explosion. Evidence to indicate that an open shot of explosives had been fired in this place was not conclusive.

A sample of the permissible explosives used in the mine was sent to the USBM Explosives Research Center, Pittsburgh, PA, for testing. A report of the tests is in Appendix H.

Roof Falls

Roof falls ranging from a few feet to 30 feet in height existed at many locations in the haulageways and airways throughout the explored area in the west side of the mine inby 3 North. The roof falls were more numerous in the main West headings between 3 North and 5 North, between 7 and 8 North, and in the 8 North and 7 South entries. The large number of high roof falls in most of these areas were attributed to the extensive mine fires that existed for several days before the mine was sealed which destroyed the coal roof left for roof support during development. (See Roof Control System in Appendix B).

Large roof falls existed in most of the entries in the 1 Right 6 North and 6 Right 7 South working sections and most of the mining equipment in these sections was covered by roof falls. Large roof falls also blocked the entrances to both sections. To expedite the recovery of the victims, new entries were driven through the coal into the face areas of four working sections. (See Appendix I, Figures 5, 6, 7, and 8).

Information on a map of the mine and evidence obtained during the investigation showed that many of the roof falls in the intake and return airways had occurred prior to the explosion. These roof falls restricted ventilation and could have created "dead-spaces" (no air movement) in the airways and permitted methane to accumulate which added to the propagation of the explosion.

Many of the roof falls had to be loaded out to recover bodies and mining equipment and to provide haulageways, airways and escapeways. Loading out roof falls and supporting the roof and ribs in the high places proved to be the most hazardous and time consuming phases of the recovery operations. (See Appendix E, Photo Nos. 10-12).

Forces and Flame

A formal investigation of the first explosion on November 20, 1968, was not and could not have been made prior to the subsequent mine fires and explosions which immediately followed the first explosion. Therefore, the extent of the underground flame and forces of the first explosion can only be partly established from statements of witnesses who were in the mine when the first explosion occurred. Although many roof falls and water accumulation prevented the recovery of the Main West headings and the 9 North sections inby 8 North, evidence suggested that the flame and forces of the explosion also reached these areas.

Forces

The forces of the first explosion extended throughout all open accessible mine workings and into the worked out abandoned areas in the west side inby the Plum Run overcast and reached the surface through both intake and return Mods Run shafts and the Llewellyn shaft. The forces of the subsequent major explosions also reached the surface through the Mahan shaft. (See Appendix E, Photo Nos. 1-2). The forces of the first explosion destroyed the Nos. 3 and 4 fans and the manhoist in and the head frame above the Llewellyn shaft. Surface buildings and parked automobiles near the Llewellyn shaft were damaged by the forces and by flying debris that came out of the shaft. A subsequent explosion on November 22 damaged the coping to the Mods Run intake shaft, and a 1,000-gallon capacity steel tank, located near the bottom of this 600-foot deep shaft, was blown up the shaft to the surface. (See Appendix E, Photo Nos. 14-15). The length and breadth of the forces of the explosion were approximately 23,000 feet in an east/west direction, 5,700 feet north and 10,000 feet south, and included nine working sections, assuming the forces reached the Main West and 9 North sections. The directions traveled by the forces of the first explosion were not distinguishable from those of the many minor and several major explosions that occurred during the 10-day period prior to the sealing of the mine. The direction of forces were generally mixed and conflicting, particularly along the Main West headings and airways inby 3 North and in 7 South from the mouth to 6 Right. It appears that the explosion force traveled as follows:

The explosion entered the 1 Right 6 North section and traveled toward the faces, entered 7 North and traveled to the faces of 3 Right; entered 8 North and traveled to the faces of the 4 and 5 Right sections; and entered 7 South Parallels and traveled to the faces of the 3 Right section; the forces came out of the 6 Right 7 South section. In the 6 Right section, the conveyor belt and part of its supporting structures were blown outby from the No. 17 crosscut to the mine car loading point, a distance of approximately 700 feet. Also, the regulator, constructed of concrete blocks, located across the No. 5 entry near the mouth of the 6 Right section, was blown outby.

The underground destruction caused by the forces of the explosions was considerable. The ventilation throughout the west side of the mine inby the Plum Run overcast was completely destroyed, as more than 90 percent of the ventilation controls, including stoppings, overcasts, and regulators, were blown out by the forces. The Nos. 3 and 4 fans were destroyed. Most of the trolley wire, trolley feeder wires, power cables, and telephones cables were blown down in the Main West, 7 North, 8 North, 7 South, 1 Right 6 North, 4 and 5 Right 8 North track haulage roads.

The rectifiers along the Main West and 7 South track haulage roads were damaged by the explosion forces and by flying debris.

A trip of 31 empty 15-ton steel mine cars "jack-knifed" and were blown off the track by the explosion forces. Some of the cars were blown over on their sides and some were blown from their tracks. (See Appendix E, Photo Nos. 6, 8, and 18). Many loaded mine cars located in a side track along the Main West track haulage road were blown off the track. Also several of the loaded and empty mine cars located at the section loading points in 6, 7, and 8 North, and 7 South Parallel sections were wrecked by the explosion forces. A car spotter at the 8 North loading point was blown into the side of a steel mine car, bending and wrecking the car.

Many steel arch supports along the Main West and 7 South track haulage roads were blown out and/or twisted by the explosion forces. The belt conveyor lines in all of the recovered working sections, except 3 Right 7 South Parallel, were destroyed. The forces appeared to be the most violent in the 1 Right 6 North, 5 Right 8 North, and the 6 Right 7 South sections. (See Appendix E, Photo No. 13).

As previously stated, the evidence of forces, indicating the direction the explosions traveled, was generally mixed and conflicting in the individual sets of entries because of the many explosions. The junctions of the principal entries of 7 and 8 North and 7 South were obstructed by large and extensive roof falls which obscured the evidence of forces and made it impossible for the investigators to determine the direction the explosion forces traveled at these junctions. Stoppings across entries directly in the path of the explosion at principal junctions were the primary direction indicators.

Flame

The flame of the first explosion reached the surface through the Llewellyn shaft and both intake and return Mods Run shafts. The Llewellyn and Mods Run shafts were situated along the Main West headings and were approximately 8,000 feet apart. The distances that the flames of the first explosion traveled beyond the areas of these shafts will never be known, except that the flames did not reach the 7 South working section where eight miners were working when the explosion occurred, and who were later rescued. It is also believed that the flames of the major subsequent explosions traveled these same areas of the mine, including the 7 South section.

Visible evidence of heat and flame in the form of "red-dog", ashes, coke, soot and soot streamers, partly burned paper, melted plastic material and rubber conveyor belting, charred insulation on power cables, trailing cables and electric circuits on mining equipment, and burned rubber tires and conduit hoses on mining equipment were observed, in one form or another, in many locations throughout the west side of the mine in by 3 North. Also, 547 of the 580 mine dust survey samples collected in recovered areas in the west side, except in 3 Right 7 South Parallel, contained various amounts of coke. The presence of

coke in the mine dust samples is one of the criteria by which the extent of flame area was fixed. However, it is quite possible that such coke in some areas of the mine may have been blown there by an explosion other than the one by which it was formed. It is believed that the coke found in mine dust samples collected in the Main West headings between E Face and D Face was blown there. The analytical results of mine dust surveys samples are shown in Appendix G.

A layer of soot, ranging in depth from a fraction of an inch to four inches, was present on the mine surfaces in all explored areas in the west side inby 3 North. The heaviest concentrations of soot were observed in the 7 South entries outby 6 Right and in the 7 South Parallel entries outby 3 Right.

Coke deposits from light to heavy, were observed at many locations in the Main West headings between 3 North and 8 North, in 4, 5, 6, 7, and 8 North, in the 7 South entries, and at some locations in all of the recovered working sections, except 3 Right 7 South. The heaviest deposits of coke were present along the Main West headings and in the 7 South entries outby the 6 Right.

Ashes from 10 to 24 inches deep and "red-dog" were observed at many locations in the Main West headings between 4 North and 8 North, in the Main West airways between 7 and 8 North, and in the chutes at the bottom of the Llewellyn shaft. The heavy deposits of ashes and "red-dog" are the result of extensive mine fires which are believed to have been the origins of many of the subsequent explosions.

The evidence of heat or flame was present in all of the recovered working sections in the west side of the mine. The heat appeared to be the most intense in the 1 Right 6 North section. In this section, seven of the rubber tires on the two shuttle cars were completely burned, insulation on trailing cables and power cables were charred, and electric circuits and conduit hoses on electric face equipment were burned. Also, long soot streamers hanging from the roof were present in the faces of the working places.

Point of Origin and Ignition Source

The point of origin and the igniting agent of the first explosion of November 20, 1968, could not be definitely determined because of the subsequent explosions, massive roof falls, and water accumulations.

The subsequent explosions, some of which appeared to be more violent than the first, destroyed and altered the evidence. The mixed and conflicting evidence made it impossible to correlate such evidence with a particular explosion. The evidence was further altered and/or obscured by massive roof falls and water accumulations.

The massive roof falls, particularly at the junctions of the principal entries (7 and 8 North and 7 South), obscured the evidence, such as stoppings, which were directly in the path of the explosion and considered critical in determining the direction of explosion forces.

The water accumulations in the Main West headings inby 8 North prevented the exploration and recovery of the 9 North and Main West sections before the mine was permanently sealed. Whether the recovery of these areas of the mine would have produced more positive evidence as to the origin and causes of the first explosion is unknown.

FINDINGS

Summary of Evidence

The findings set out below are derived from the following sources: Conditions observed in the mine by Federal personnel during the recovery operations and the investigation following the explosions; information obtained from mine rescue teams and other persons taking part in the recovery operations and the investigation; information obtained from previous Federal mine inspection reports; and information received from Company officials and miners in the form of sworn statements at official hearings. After analysis of all available evidence, Federal investigators have summarized their findings below.

1. The first explosion occurred at approximately 5:30 a.m, Wednesday, November 20, 1968. Underground mine fires developed immediately and the second major explosion occurred approximately two-and-one half hours later. Many minor and several major explosions occurred during the subsequent 10-day period before the decision was made to seal the mine.
2. There were 99 miners in the mine when the first explosion occurred. Twenty-one of these 99 miners escaped and/or were rescued uninjured. The remaining 78 miners died in the explosion. Eleven of the 21 miners who escaped left the mine via the slope, two miners who were working in the underground shop left the mine via the elevator in the Athas shaft portal, and eight miners who were working in 7 South section when the first explosion occurred were rescued via the recently constructed Mahan shaft by a portable crane and bucket.
3. All active working sections in the west side of the mine inby 3 North were affected by the explosions. The A Face active section located in the east side of the mine was not affected by the explosion and the production crew working in this section continued to mine coal for approximately one hour after the explosion.
4. At the time the first explosion occurred, a crew of miners was engaged in recovering the section continuous mining machine from under a roof fall in the No. 2 pillar place in the 5 Right section off 8 North.
5. Drilling of 6-inch diameter boreholes was started on November 22 from the surface into each of the eight working sections in the west side of the mine where miners were known to have been working when the explosion occurred. The boreholes ranged from 618 feet to 990 feet in depth and penetrated open areas approximately 200 feet outby the face in each section.

Listening devices and lights were inserted in each borehole and monitored for several hours with negative results. Tubing was also inserted in each borehole for air sampling purposes.

6. The analysis of the first air samples collected from the eight boreholes and from other boreholes between November 22-28, 1968, showed that the underground atmosphere in the west side of the mine could not support life.
7. The only underground rescue attempt made before the mine was sealed on November 30, 1968, was made November 24, 1968. Two groups, each consisting of a mine rescue team and Federal and State officials, explored the east side of the mine and advanced toward the west side. The conditions in the east side of the mine were found to be normal and unaffected by the explosions. Toward the west side of the mine, signs of the explosions (soot) were visible at E Face and carbon monoxide was detected in by No. 61 crosscut. Both rescue parties returned to the surface without making contact with any entrapped miners.
8. On November 29, 1968, a consensus decision of Company, Federal, State, and UMWA officials was made to seal the mine. Sealing operations were started immediately, and by 4:25 a.m. the following day, all openings to the mine were sealed.
9. The August 1968 Federal inspection report shows that the four mine fans were exhausting a total of approximately 1,200,000 cubic feet of air from the mine and the mine was liberating a total of 7,914,000 cubic feet of methane in a 24-hour period, most of which (7,527,000 cubic feet) was liberating from the west side of the mine.
10. Federal inspection reports show that the total mine methane liberation in a 24-hour period was 6,671,000 cubic feet in September, 1967; 6,147,000 cubic feet in April 1968; and to 7,914,000 cubic feet in August 1968.
11. Forces of the first explosion on November 20, 1968, destroyed the Nos. 3 and 4 mine fans which ventilated the west side of the mine. The manhoist in and above the Llewellyn shaft was destroyed and surface buildings near the shaft were badly damaged by the explosion forces. The Nos. 1 and 2 mine fans which ventilated the east side of the mine were not affected by the explosion and continued to operate normally.
12. Federal investigators believe, based on testimony, that the ventilation along the Main West headings was

inadequate overall, and most probably non-existent in some areas between 1 South and 4 North.

13. On the day before the explosion, according to testimony, methane accumulated to about 4 percent on the right side of the 7 South section for a distance of approximately 1,000 feet outby the working section because of inadequate ventilation and the lack of sufficient ventilation controls. Only 12,000 cfm of air was available to ventilate the right side of the 7 South section.
14. Line brattice or auxiliary fans with tubing were not used at the faces of the working places during mining operations in retreat mining sections except when methane was detected.
15. Testimony indicated that auxiliary fans with tubing were required to be used by Company standards for face ventilation in development sections, but the tubing or line brattice was not used sometimes during development work.
16. The Femco Supervisory Control (fan monitoring and mine power cutoff system) was not operating properly at the time the explosion occurred, as mining operations continued at a face after the explosion. According to testimony, on occasions prior to the explosion, during mine fan outages, the underground employees were not withdrawn from the mine in a timely manner and underground mining operations were permitted to continue after the employees in the affected areas had been notified that a mine fan was down. Testimony also indicated that on one occasion, the mine was permitted to produce coal while one of the mine fans was not operating.
17. While a major ventilation change was being made, which consisted of connecting the newly constructed Mahan shaft (intake) to the mine ventilation system, a construction crew was permitted to work in the Main West headings of the mine, according to testimony.
18. According to testimony, on the day prior to the explosion during a coal-producing shift, a ventilation control (regulator) was readjusted in the 7 South section to increase the amount of air and remove a large body of methane that had accumulated on the right side of the section.
19. Testimony indicated that when methane was detected in the face area while developing the 6 North section, the continuous mining machine was left energized with the cutter chains rotating while line brattice was

installed in the place and the methane was being removed.

20. Various testimony indicated that gas testing practices in the working sections varied widely among the supervisors and employees, some of which were not consistent with Federal regulations.
21. Management provided permissible-type Riken methane detectors for use on the 7 South and Main West developing sections, to supplement the flame safety lamp for gas testing purposes. Also, newly developed methane monitors were installed on the continuous mining machines in these two sections. Although neither the methane detector nor the methane monitors were required by State or Federal law, the safety margin which they provided in detecting methane accumulations during mining operations at the faces was recognized to be more efficient than flame safety lamps by both management and employees. However, the Riken methane detector was not available on the Main West section two days prior to the explosion and both methane monitors had been out of service weeks before the explosion occurred.
22. After the Company's plan to reopen the mine was approved by the USBM and agreed to by the other participating agencies, the mine was reopened on September 12, 1969.
23. The west side of the mine from 3 North to 7 North was recovered by Company mine rescue teams using the air lock method and controlled ventilation. Other recovered areas of the mine were ventilated and then explored by the investigating committee. Due to numerous and extensive roof falls, new entries were driven into the 6, 7, and 8 North, and 6 Right 7 South sections to expedite the recovery of the victims. (See Appendix I, Figure 2).
24. The recovery operation and investigation lasted 10 years. During this period, 59 of the 78 explosion victims were recovered. The bodies of the remaining 19 victims were never found. The first two victims were recovered October 23, 1969, and the last victim was recovered December 2, 1977. The mine was permanently sealed on November 1, 1978. The areas of the mine where the remaining victims are believed to be located have been designated as a cemetery by the Company. The Company also erected a monument on the surface above the designated cemetery as a memorial to those miners who lost their lives in the disaster. (See Appendix E, Photo Nos. 19-20).

25. Recovery operations were conducted on three shifts per day, 5 to 7 days per week. Operations were halted on holidays, vacations, and during labor contract negotiations. Also, considerable recovery work time was lost due to unsafe atmospheric conditions in sealed mine areas and unsafe limits of methane liberations from sealed areas during periods of low barometric pressure. A total of approximately 75 miners were employed during the recovery period. In addition, several Company mine rescue teams were utilized in approximately 50 percent of the recovery operations between September 1969 and December 1972 and were used thereafter as needed.
26. Due to extensive roof falls and/or water accumulations, several underground areas were never explored or recovered which included the 7 South, 9 North, and Main West working section.
27. The entire ventilation system in the west side of the mine inby 3 North was destroyed by the forces of the explosions. This included the Nos. 3 and 4 fans and most of the ventilation controls such as stoppings, overcasts, and regulators.

Most of the trolley wires, trolley feeder wires, power cables, and telephone cables in the west side of the mine were blown down and badly damaged by the forces. Rectifiers along the Main West headings and in 7 South were badly damaged by forces and flying debris. Many loaded and empty mine cars in the affected areas were blown off the tracks.

Most of the mining equipment in the 1 Right 6 North section was badly damaged by the flame and forces of the explosion. The drill head was blown from the roof-bolting machine in the 6 Right 7 South section, and the control box was blown off the continuous mining machine in 4 Right 8 North. Most of the mining equipment in the 1 Right 6 North, 7 South, and 5 Right 8 North sections was badly damaged by large roof falls that occurred after the explosion.

28. Visible evidence as well as evidence of coke in dust samples show that the flame and forces of the explosion penetrated all explored and recovered areas in the west side of the mine inby the Plum Run overcast. Therefore, it may be assumed that the flame and forces penetrated the unexplored areas as well.
29. The bleeder entries for the abandoned gob area between 3 North and 8 North were caved tight and air could not be forced through and around the gob area by the mine ventilating system. Except for the small gob area (approximately 180 feet) between 3 Right 7 North and 6

North, only a small portion of the outer edges of this vast abandoned gob area was being ventilated. These unventilated areas became a reservoir of fuel for propagation of the explosions.

30. Low barometric pressure existed for several days prior to the explosion and bottomed out on November 18, 1968, at 28.27 inches, then started to rise again. On November 20, 1968, the day of the explosion, the barometric pressure was 28.36 inches. Average barometric pressure for the mine area is 30 inches of mercury. The expansion of the volume of gas during this period of low barometric pressure in the abandoned gob area between 3 North and 8 North, which was not provided with an effective bleeder system, could have forced methane from the gob area into open mine workings and contributed to the explosion.
31. Accumulations of loose coal and coal dust were observed at several locations along the haulage roads, shuttle car roadways, and belt conveyor entries during five of the last 10 Federal inspections.

During the investigation, fine coal and coal dust, underneath a layer of soot and/or rock dust, were observed on the mine floor, generally along the rib line, at many locations in the Main West headings and airways, in the 7 North entries and the 3 Right section, in the 4 and 5 Right sections off 8 North in the 7 South entries, and in the 7 South Parallel entries.

32. Prior to the explosion, many employees had made complaints to Company officials and/or the Mine Safety Committee about accumulations of loose coal and coal dust along belt conveyor entries, along main haulage roads, in open crosscuts, and in entries paralleling main haulage roads. Some employees had made complaints to their supervisors about float coal dust deposits in return airways and about insufficient water pressure to reduce the fine coal dust generated during mining operations.
33. Sworn testimony of Company officials and employees indicates that: (1) rock dust was not always maintained to within 40 feet of the faces of working places; (2) the "trickle" rock dusters used to help neutralize the fine coal dust generated during mining operations were generally not sufficient to be effective; and (3) the Company did not require the shuttle car roadways inby loading points to be rock dusted. Instead, such roadways were to have been kept "wetted down". These practices could have resulted in accumulations of fine coal and coal dust in the mine workings that were neither wet enough nor high enough

in incombustible content to prevent the propagation of an explosion. The fact that the main haulage roads between 4 North and Main East had recently been cleaned and rock dusted prior to the explosion probably helped in preventing the propagation of the explosion into the east side of the mine.

34. During the investigation, a total of 805 rock dust survey samples were collected throughout the explored areas of the mine; 225 were collected in the east side of the mine that was not affected by the explosion and the remaining 580 samples were collected in the west side. The incombustible content of 25 (12 percent) of the samples collected in the east side, and 547 (69 percent) of the samples collected in the west side was below 65 percent, the minimum required by law. Also during the investigation, a total of 356 skim dust samples were collected in the east side, 17 percent of which contained incombustibles below 65 percent. However, dust samples collected in areas affected by the explosion may not be representative of conditions prior to the explosion.
35. The analysis of the dust survey samples show that 547 of the 580 samples collected in the west side contained coke deposits ranging from a trace to large amounts. The evidence of coke in dust samples is one criterion used to determine the extent of flame of the explosion. (See dust analysis in Appendix G).
36. At the time the explosion occurred, many mine cars loaded with fine coal were located in side tracks along the main haulage roads and on the loaded tracks at each of the section's mine car loading points. Also, fine coal was being transported on belt conveyors from some of the working areas to the mine car loading points. This fine coal may have aided in the propagation of the explosion.
37. The return airways of the Main West headings and of the 7 South entries bordered solid virgin coal for many thousand feet. These airways contained numerous roof falls, many of which occurred prior to the explosion. The methane liberated from the solid coal ribs could have accumulated between the roof falls and in high areas above the falls and contributed to the propagation of the explosion.
38. The investigation revealed that, at the time of the first explosion, activities were being conducted in the following sections, all located in the west side of the mine:

1 Right Section 6 North

No mining activities were being conducted, except that a continuous mining machine was being trammed. (See Appendix I, Figure 5).

3 Right Section 7 North

Normal mining operations were being conducted. Coal was being mined in the No. 2 pillar lift. (See Appendix I, Figure 6).

4 Right Section 8 North

No mining activities were being conducted, the continuous mining machine was found outby the face areas with a broken tram chain. (See Appendix I, Figure 7).

5 Right Section 8 North

No mining activities were being conducted. Nine miners were engaged in recovering the section continuous mining machine from under a roof fall which fell on the machine the day prior to the explosion. Considering the positions and locations where the bodies of the victims were found, it is possible that explosives were used to free the machine. (See Appendix I, Figure 7). However, evidence that an unconfined shot was fired was inconclusive.

3 Right Section 7 South Parallel

A large pile of loose coal was found on the mine floor outby the continuous mining machine which indicates that the machine might have been cutting and stockpiling coal. However, both shuttle cars were empty and located outby the face area. (See Appendix I, Figure 8).

6 Right Section 7 South

The pile of loose coal behind the continuous mining machine in the face of the No. 3 entry indicates that the machine could have been operating when the explosion occurred. (See Appendix I, Figure 8).

7 South Section

The eight miners who were rescued from this section testified that they were mining coal when the dust and debris, caused by the explosion, came in on them. The above evidence eliminates the 1

Right 6 North and 7 South sections as possible ignition areas of the first explosion.

39. Twenty-one of the 59 bodies of the victims that were recovered, showed evidence that they died from the aftermath of the explosions rather than from the flame and forces. These 21 victims had been working the face areas of the 3 Right 7 North, 3 Right 7 South Parallels, and the 4 Right 8 North sections at the time of the first explosion. The evidence showed that each victim had traveled on foot from 1,800 to 2,600 feet outby the face areas after the explosion. Evidence also showed that these 21 victims had used or were wearing 30-minute self-rescuers or all-service gas masks. This evidence eliminates the 3 Right 7 North, 3 Right 7 South Parallel, and the 4 Right 8 North sections of the mine as possible ignition areas of the first explosion.
40. The inspections and examinations of the electric face equipment during the investigation revealed that such equipment was generally in permissible condition and therefore was not considered to have contributed to the explosion.
41. According to the testimony of Company officials and the fire boss relating to conducting the preshift examinations, when considering the size and extent of the mine workings that were required by law to be preshift examined, it is believed that adequate preshift examinations of the mine as required by Section 209(d)(7) of the Federal Coal Mine Health and Safety Act of 1969 may not have been made.

CONCLUSION

An explosion in extensive mine workings, such as the west side of the Consol No. 9 Mine, is a complex phenomenon which cannot be totally comprehended or explained. The point of origin and the igniting agent of the first explosion on November 20, 1968, could not be determined because of the subsequent explosions, massive roof falls, water accumulations, and areas not explored. The subsequent explosions and fires were a result of the first explosion.

Federal investigators believe that the first explosion resulted from inadequate ventilation and/or an ineffective bleeder system. Low barometric pressure, inadequate rock-dust applications, inadequate methods of controlling fine coal dust created during mining operations, accumulations of loose coal, coal dust, and float coal dust, and insufficient testing for methane were contributing factors.

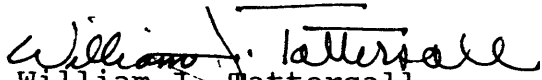
The explosion was propagated throughout the north side of the mine between 3 North and 8 North by coal dust and methane from the abandoned gob area. Propagation throughout the greater part of the west side of the mine was by coal dust. Propagation was possibly aided by methane that may have accumulated over the extensive roof falls in the airways.

Some areas, 3 Right 7 North, 4 Right 8 North, 3 Right 7 South Parallel, 1 Right 6 North, and 7 South sections were eliminated as possible ignition sources of the first explosion for the following reasons:

1. The miners working in the 3 Right 7 North, 4 Right 8 North, and 3 Right 7 South Parallel sections traveled outby from the working faces to distances ranging from 1,800 to 2,600 feet after the explosion occurred.
2. Little evidence of flame was observed in the 3 Right 7 South Parallel section, and no mining activities were being conducted in the 4 Right 8 North section at the time the explosion occurred as the continuous mining machine was found in a crosscut outby the face with a broken tram chain.
3. Coal was not being mined in the 1 Right 6 North section at the time the explosion occurred as the continuous mining machine was found in the No. 2 entry outby the last open crosscut.
4. Testimony of eyewitnesses verified that the first explosion did not originate in the 7 South section.

The Consol No. 9 Mine, Mountaineer Coal Company, Division of Consolidation Coal Company, Farmington, Marion County, WV, was permanently sealed on November 1, 1978. The Closure Orders issued on the entire mine on November 20, 1968, remain in effect.

Approved:

A handwritten signature in cursive script that reads "William J. Tattersall". The signature is written in dark ink and is positioned above the typed name.

William J. Tattersall
Assistant Secretary for
Mine Safety and Health

APPENDIX A
Victims of Mine Explosion, Consol No. 9 Mine
Mountaineer Coal Company
November 20, 1968

Sequence of Recovery	Name	Occupation	Age	Experience	Date Recovered
<u>Main West Haulage Road Between 3 North and 4 North</u>					
1.	Lester B. Willard	Motorman	49	19	October 23, 1969
2.	Charles F. Hardman	Motorman	43	16	October 24, 1969
<u>1 Right 6 North</u>					
3.	James E. Efaw	Mechanic	46	6	December 1, 1970
4.	Steve Horvath	Roof Bolter	42	17	December 1, 1970
5.	Dennis N. McDonald	Utility Man	42	3	December 1, 1970
6.	George R. Kovar	Shuttle Car Operator	31	2	January 7, 1971
7.	Gorman H. Trimble	Shuttle Car Operator	55	31	January 7, 1971
8.	Hartzell L. Mayle	Loading Machine Operator	51	28	January 11, 1971
9.	Albert R. Deberry	Continuous Mining Machine Operator	44	16	January 12, 1971
<u>3 Right 7 North</u>					
10.	Raymond R. Parson	Continuous Mining Machine Operator	50	30	June 28, 1971
11.	Dennis L. Toler	Trackman	25	6	June 28, 1971
12.	David V. Cartwright	Mechanic	35	2	June 29, 1971
13.	Jerry L. Stoneking	Rockduster	24	1 1/2	June 29, 1971
14.	Frank Tate, Jr.	Shuttle Car Operator	44	21	June 30, 1971
15.	David Mainella	Section Foreman	62	30	June 30, 1971
16.	Goy A. Taylor	Roof Bolter	47	19	June 30, 1971
<u>4 Right 8 North</u>					
17.	Simon P. Hayes	Shuttle Car Operator	43	17	May 11, 1972
18.	Adron W. Morris	Loading Machine Operator	59	33	May 11, 1972
19.	Homer E. Tichenor	Continuous Mining Machine Operator	53	23	May 11, 1972
20.	Wayne R. Minor	Shuttle Car Operator	39	18	May 11, 1972
21.	Thomas D. Ashcraft	Roof Bolter	31	1	May 11, 1972
22.	Dale E. Davis	Section Foreman	40	21	May 11, 1972

APPENDIX A (Cont.)

Sequence of Recovery	Name	Occupation	Age	Experience	Date Recovered
<u>5 Right 8 North</u>					
23.	Henry J. Skarzinski	Utility Man	58	34	September 12, 1972
24.	Russell D. Snyder	Roof Bolter	58	36	September 12, 1972
25.	John W. Toothman	Mechanic	36	1 1/2	September 12, 1972
26.	Walter R. Martin	Trackman	57	8	September 12, 1972
27.	Forrest B. Goff	Continuous Mining Machine Operator	53	25	September 12, 1972
28.	Albert Takacs	Assistant Mine Foreman	49	31	September 12, 1972
29.	James R. Kniceley	Wireman	43	21	September 12, 1972
30.	Robert L. Glover	Mechanic	40	12	September 12, 1972
31.	Robert J. Sigley	Conveyor Man	22	3	September 12, 1972
<u>Llewellyn Shaft Area</u>					
32.	Charles E. Moody	Dispatcher	46	25	May 31, 1973
33.	Lloyd W. Wilson	Mechanic	46	23	September 11, 1973
34.	Robert D. Kerns	Mechanic	33	4	September 20, 1973
35.	Fred B. Rogers	Mechanic	58	15	September 20, 1973
36.	William T. Walker	Assistant Mine Foreman	45	2 1/2	September 21, 1973
37.	Harold W. Butts	Supply Motorman	42	20	September 24, 1973
38.	Harry L. Strait	Supply Motorman	49	23	September 24, 1973
39.	Joseph Muto	Mechanic	48	14	September 25, 1973
40.	Charles E. King	Mechanic	36	2	September 25, 1973
41.	John F. Gouzd	Roof Bolter	32	1/2	February 13, 1974
42.	Arthur A. Anderson, Jr.	Motorman - Rock Duster	51	30 1/2	February 14, 1974
<u>3 Right 7 South Parallel</u>					
43.	Roy F. Henderson	Assistant Mine Foreman	61	34	March 13, 1974
44.	James H. Walter	Utility Man	53	28	March 13, 1974
45.	Thomas Boggess	Utility Man	48	29	March 13, 1974
46.	William D. Sheme	Shuttle Car Operator	30	2	March 13, 1974
47.	Lee E. Carpenter	Mechanic	37	2	March 13, 1974
48.	George O. Decker	Continuous Mining Machine Operator	42	24	March 13, 1974
49.	Paul O. Moran	Loading Machine Operator	60	40	March 13, 1974
50.	Dewey Tarley	Roof Bolter	28	2	March 13, 1974
51.	Jimmy Barr	Shuttle Car Operator	31	3	March 13, 1974

APPENDIX A (Cont.)

Sequence of Recovery	Name	Occupation	Age	Experience	Date Recovered
<u>6 Right 7 South</u>					
52.	Jerry R. Yanero, Jr.	Conveyor Man	20	1/6	March 14, 1974
53.	Nicholas Petro	Trackman	28	1	March 14, 1974
54.	Randall R. Parsons	Trackman	19	8 days	March 14, 1974
55.	Joe Feris	Trackman	40	4	March 14, 1974
56.	Hoy B. Taylor	Conveyor Man	40	16	September 26, 1977
57.	Roscoe M. Triplett	Loading Machine Operator	54	10	September 28, 1977
58.	Elbert E. Hartzell	Roof Bolter	27	3	September 28, 1977
59.	James Jones	Shuttle Car Operator	42	11	December 2, 1977

Victims Not Recovered

Oswald J. Armstrong	Roof Bolter	51	30 1/2
Orval D. Beam	Shuttle Car Operator	52	20
John J. Bingamon	Motorman	53	31
Louis S. Boros	Loading Machine Operator	38	20
William E. Currence	Motorman	49	2
Howard A. Deel	Conveyor Man	30	9 1/2
Virgil A. Forte	Roof Bolter	45	15 1/2
Hilery W. Foster	Roof Bolter	50	17 1/2
Aulda G. Freeman, Jr.	Motorman	30	3
Paul F. Henderson, Jr.	Utility Man	24	2
Junior M. Jenkins	Shuttle Car Operator	42	6
Pete J. Kaznoski, Sr.	Shuttle Car Operator	59	42
Frank Matish	Loading Machine Operator	57	35
Emilio D. Megna	Section Foreman	48	31
Jack D. Michael	Mechanic	44	1 1/2
John Sopuch	Continuous Mining Machine Operator	42	21
William L. Takacs	Roof Bolter	22	2
Edwin A. Tennant	Shuttle Car Operator	45	
Edward A. Williams	Mechanic	49	19

APPENDIX B

General Information

The No. 9 Mine, located near Farmington, Marion County, WV, was opened in 1910 by the Jamison Coal and Coke Company and was acquired by the Consolidation Coal Company in October 1954. The mine and company names were changed in May 1958 to the Consol No. 9 Mine, Mountaineer Coal Company, Division of Consolidation Coal Company. The Consolidation Coal Company was purchased September 15, 1966, by the Continental Oil Company of New York City, New York; however, the names of the mine and company, as well as the management structure, remained the same. Before recovery operations were stopped and the mine was sealed, the name of the company was changed to Consolidation Coal Company, Fairmont Operations.

The Consol No. 9 Mine was serviced by the Baltimore and Ohio Railroad. The mine was opened by 8 shafts ranging in depth from 334 to 578 feet and a 16-degree combination supply track and belt conveyor slope 1,468 feet in length.

Mining was being done in the high-volatile Pittsburgh coalbed which averaged 96 inches in thickness in this area. At the time of the last federal inspection, August 1-30, 1968, 380 men were employed; 320 worked underground, 3 shifts per day, 5 days per week, and produced an average of 9,500 tons of coal daily.

Mining Methods, Conditions, and Equipment

Mining Methods: The mine was developed by a block system of mining. Multiple entries in sets of 4 to 8 were 13 to 16 feet wide. Crosscuts were generally 90 feet apart. Ten borer-type continuous mining machine sections were being operated; however, only nine were being worked when the explosion occurred. Main West, 4 Right off 8 North, 6 Right off 7 South, and 7 South were development sections. Pillars were being extracted in 5 Right off 8 North, 3 Right off 7 North, 3 Right off 7 South Parallels, and in A Face off Main East.

The immediate roof was approximately 12 inches of roof coal left to help support 10 to 30 inches of draw rock. The main roof was shale and sandstone. Occasional slips, rolls, horsebacks, and clay veins were encountered. The overburden ranged from 300 to 900 feet. A roof support plan was adopted and, according to inspection reports, was generally well followed. Roof bolting was done along entries used as haulageways, at all four-way intersections where roof rock was exposed, and when slips, rolls, horsebacks, or clay veins were encountered. Conventional timbers, or breaker posts were used during pillar mining. Although an approved roof control plan was adopted and followed, many of the main entries, except haulageways and travelways, were impassable due to roof falls.

Ventilation and Mine Gases: Ventilation was induced by four axial-flow fans operated exhausting. The fans were installed on the surface in fireproof structures, properly offset from the mine openings, and provided with fan signals.

APPENDIX B

The No. 1 fan, a Jeffrey 8 HU-72 mine fan, was exhausting approximately 115,000 cfm of air from a 12 x 16-foot shaft 325 feet deep. The fan was belt-driven at 720 rpm by a 150-horsepower electric motor. The areas ventilated by the No. 1 fan were the slope bottom and mine car dump area, the main haulage entries to Main East where intake air was supplemented with intake air from the Athas portal, Main East, a portion of A Face, and all gob areas outby Main East. A fan (U.S. Navy axial) at the slope bottom was blowing approximately 6,000 cfm of air up the slope to the surface from the underground intake air.

The No. 2 fan (Athas Run), a Joy H 96-58V Axivane mine fan, was exhausting approximately 368,500 cfm of air from a 13-foot diameter shaft 615 feet deep. The fan was belt-driven at 577 rpm by a 300-horsepower electric motor. The areas ventilated by the No. 2 fan were the Athas portal bottom area, the main haulage entries to Main East, a portion of the A Face area, the gob area north and south of the haulage track entry inby Main East, the haulage track entry from Mods Run intake to the Athas portal bottom, and gob areas north and south of the haulage track entry including the 4 North gob area.

The No. 3 fan (Mods Run), a Jeffrey 8 HU-96 Aerodyne fan, was exhausting approximately 269,400 cfm of air from a 13-foot diameter shaft 646 feet deep. The fan was belt-driven at 885 rpm by a 350-horsepower electric motor. The areas ventilated by the No. 3 fan were the main haulage track entries to 7 South, the left split of 7 South, 6 North, the right split of 7 North, and gob areas of 5, 6, and 7 North.

The No. 4 fan (Llewellyn), a Jeffrey 8H-96 Aerodyne fan, was exhausting approximately 491,000 cfm of air from a two-compartment shaft 579 feet deep. The fan was belt-driven at 880 rpm by a 300-horsepower electric motor. The areas ventilated by the No. 4 fan were the Llewellyn portal bottom and repair shop, the main haulage entries from 7 South to Main West, Main West, 8 and 9 North areas, the left split of 7 North and gob areas of 8 North, the right split in 7 South, the 7 South Parallel area, and 6 Right off 7 South. The 7 South entries had been mined into the Mahan Run Shaft during the later part of October 1968, where a fifth fan was to be installed.

Bleeder entries were developed at the north end of the 3 North to 8 North entries and at the top end of panels off 7 South Parallel. Blocks of coal were left to provide bleeder entries; however, the entries were not travelable due to roof falls and/or water and were ineffective. A ventilation survey of the mine was conducted in 1971 in all accessible gob areas. The data obtained, observations made during the survey, and a study of the ventilation system indicated only the fringes of the gob areas in the north panels were being ventilated. A ventilation survey made in 7 South Parallel during recovery operations indicated that these bleeders could have been functioning effectively in the top of the 3 Right off 7 South Parallel only.

The methane liberation, as determined from the analysis of bottle samples collected in the approaches to the bottom of the return (exhaust) air shafts during a Federal inspection completed August 30, 1968, were: No. 1 fan 132,000 cubic feet of methane in 24 hours; No. 2 fan 255,000 cubic feet in 24 hours; No. 3 fan 2,411,000 cubic feet in 24 hours; and No. 4 fan 5,116,000

cubic feet in 24 hours. The total mine methane liberation was 7,924,000 cubic feet in 24 hours. The No. 4 fan ventilated areas being developed into virgin territory where methane liberations were greatest. All employees received training in testing for methane periodically. According to the Federal inspection reports, flame safety lamps were maintained in permissible condition. The company was experimenting with two continuous methane monitors which were mounted on the continuous mining machines and were electrically interlocked into the electrical system of the machine. When the methane concentration reached a predetermined value, as indicated by the methane monitor, the electric power was automatically removed from the machine.

Multiple entry panels were developed using a split system of ventilation. An auxiliary fan, and in some sections two, were needed to maintain the methane content below one percent in the face area. The fans were powered with permissible driving units and were used for face ventilation in development entries. The fans, operated exhausting, were in or outby the last open cross-cut on the return side of the air current ventilating the working place with 12- or 14-inch tubing installed along the entry rib into the face area. A diffuser fan mounted on the continuous mining machines and operated blowing was used in conjunction with the auxiliary fans in two of the developing sections. Face areas in retreat mining sections were not ventilated except where methane was detected. According to several previous Federal inspection reports, ventilation deficiencies were not observed.

The shaft lining and partitions were concrete. Permanent stoppings between main intake and return airways and overcasts were constructed of concrete blocks. Prefabricated metal stoppings were used to separate intake and return airways in some short-life panel entries.

Preshift examinations were made by certified examiners before each operating shift. On-shift and weekly examinations for methane and other hazards were made by certified on-shift examiners. Records of the preshift, on-shift, and weekly examinations were no longer available at the time of this report.

There are numerous gas wells penetrating the coalbed; however, the map of the mine indicated that suitable blocks of coal were left around the wells for protection.

Transportation: The coal, loaded into shuttle cars with loading machines, was transported to a belt conveyor which carried the coal to mine car loading points. The mine cars were hauled to the rotary dump at the slope bottom by trolley locomotives and from the rotary dump to the preparation plant on the surface by belt conveyor. At the time of the last inspection, the tracks and rolling stock were being maintained in good condition. Clearance and shelter holes were satisfactory. Miners entered the mine via elevators in the Athas and Llewellyn shafts and were transported underground in personnel carriers. Each carrier was supervised by a company official. A dispatcher controlled the movement of all rolling track equipment via two-way radio and telephone.

Combustible Materials and Rock dusting: The mine surfaces varied from dry to definitely wet. Rock dust had been applied throughout the mine including the haulageways and parallel and back entries. During Federal inspections, uniform rock-dusting surveys were made in developing sections. During the inspection of August 1968, the Federal inspector collected 129 samples, 9 of which indicated inadequate rock dusting. In the 10 inspections made prior to the explosion, Federal inspectors collected 1,983 dust samples. The incombustible content of 96 percent of the samples ranged from 65 to 100 percent. Watersprays were used on continuous mining machines to control dust produced during mining and along belt conveyors. Active shuttle car roadways were wetted down with water before production shifts. The auxiliary fans were equipped with "trickle dusters" so designed to disperse rock dust into the fan exhaust air current. Line brattice was used to ventilate the faces during second mining and dust produced during mining could be carried into gob areas. The gob areas were to be rock dusted as the panel was retreated.

Dust respirators were provided by management and worn by miners exposed to dusty atmospheres and dust collectors were used during drilling operations for roof bolting.

Electricity: Electric power at 110, 220, 440, 2,300, 4,160 and 23,000 volts alternating current was used on the surface; and 275 volts direct current and 220, 440, 2,300 and 4,160 volts alternating current were used underground. High potential and secondary power cables entered the mine via boreholes and were provided with overload protection and disconnecting switches near the bottom of the boreholes. The substations on the surface were in fireproof structures, and underground rectifier stations were in well-ventilated, fireproof enclosures. Portable transformer cars, in fireproof enclosures, were installed on intake air near the face areas. Power and trolley wires were installed on insulators and guarded where persons were required to work or pass under. Cut-out switches were installed at required intervals along the power and trolley lines, and automatic sectionalizing circuit breakers were provided along the trolley system. The frames of all electric equipment were grounded or equipped with fault devices. The electric face equipment was of a permissible type and generally maintained in permissible condition. Trailing cables were fire resistant and were provided with short-circuit protection.

Fire Protection: Fire extinguishers, foam-generating machines, water, and rock dust were provided underground and on the surface for firefighting purposes. Mine management had also developed a water suppression fire protection system for shuttle cars. Fire-resistant hydraulic fluids were being used in the underground mining car spotters.

Communications and First-Aid Equipment: A telephone communications system was provided underground. The underground system was directly connected to the surface commercial telephone system in the area. Locomotives and personnel carriers were equipped with two-way radios and all rail traffic was controlled by a dispatcher stationed underground. First-aid equipment was available on each section.

Escapeways: According to information from Federal inspection reports, escapeways from each section to the surface were adequate and open. Direction signs were posted to indicate the route of travel to the nearest escape facility.

Mine Rescue: Trained mine rescue teams fully equipped with self-contained oxygen breathing apparatuses were maintained at the mine. Trained and fully equipped teams were also available at other nearby company mines. Self-rescuers were provided for all underground face employees. Also, two all-service gas masks were provided near the working face in each section. During recovery operations, it was observed that some of the miners had used the self-rescuers and all-service gas masks. A check-in and check-out system was in use at the mine.

APPENDIX C

Persons who participated in some of the recovery operations and investigation.

Mine Rescue Teams

Consolidation Coal Company
Fairmont Operations

Williams No. 98 Mine

Shirley Kittle - Captain
Jim Minear
Joe Baldwin
John Kendall
Steve Dukish
Charlie Hall
Delbert Stalknaker

Consol No. 9 Mine

Stanley Plachta - Captain
John Brock
Danny Kuhn
Matt Menas
Robert Parrish
Joseph Seccurro

Consol No. 20 Mine

Rudy Banick - Captain
Joe Tarley
Donald Ford - Co-captain
Kenneth Bradley
Jim Minardi
Dave Stanley

Pursglove No. 15 Mine

Johnis Pysh - Captain
Donald Hoskinson
Donald McCabe
Wilbur Simpson
Fred Meyers
Louis Krushansky

Robinson Run No. 95 Mine

Charlie Swiger - Captain
Lowell Payne - Co-captain
Jim Minnik
James Satterfield
Elmer Tenney
Jim Newton
Gearold Carpenter

Osage No. 3 Mine

William Riffle - Captain
Oscar Himer
Robert Fox
Olin Brinnager
Charles Jimmie

Loveridge Mine

Sam Lopez - Co-captain
Richard Turner - Co-captain
Phil Wolfe
John Floyd
Drexel Swiger

No. 93 Mine

Jimmy Keffer - Captain
Bill Kuzniar
Harley Slaughter
Andy Dolog
Charlie Daft
Lynn Harvey

Humphrey No. 7 Mine

No. 1 Team

William Reeder - Captain
Robert Feathers
Harry Wise
Harold Brand
William Lewis
James Turner
Joseph Migaiolo

No. 2 Team

Charles Wilkens
George Wilfong
Francis Spencer
William Malone
George Krynicki
Edward Davis
Earl McCabe

Eastern Gas & Fuel Assoc.
Federal No. 1 Mine
Granttown, WV

No. 1 Team

Albert Horab - Captain
Herb Clelland
Tom Lake - Co-captain
Carl Paulson
James Robinett

No. 4 Team

David Workman - Captain
John Wyoehic - Co-captain
Richard Vasicek
Sam Erwin
Robert Bell
Franklin Swisher
Lawrence Tucker

Consolidation Coal Company

Peter P. Ferretti Public Relations Officer
C. William Parisi Chief Inspector

Fairmont Operations

Fay Casseday Mine Foreman
Ray M. Henderson Chief Engineer
W. T. Simon Safety Department
Eugene S. Lieving Safety Department
R. H. Dulaney Vice-President
John L. Rozance Vice-President

West Virginia Department of Mines

Grant King Inspector
Carl Kinty Inspector
Clifford Ellis Inspector
Frank Rutledge Inspector
Herman Everson Inspector
Clayton Hamrick Inspector
Joseph Amendolea Inspector

George Hiser	Inspector
Ewell Snuffer	Inspector
Lester Wolfe	Inspector
Lorin Bomar	Inspector
Joe Pastorial	Inspector
Ronald Petrucci	Inspector
Arthur Price	Inspector
Frank A. Lachiara	Inspector
Carl Holyman	Inspector
Dave Camp	Inspector
John Bell	Inspector
John Squires	Inspector
Steve Provoznik	Inspector
Anderson Adams	Electrical Inspector
Dave Hardey	Inspector

Mine Safety and Health Administration
Formerly Mining Enforcement and Safety Administration
and the United States Bureau of Mines

John W. Crawford	Technical Assistant
Maurice S. Childers	Subdistrict Manager
Jack E. Tisdale	District Manager
Ronald Keaton	District Manager
Carl Shaffer	Coal Mine Inspector
Peter Fanok	Coal Mine Inspector
M. I. Duncan	Coal Mine Inspector
Joseph Norwich	Coal Mine Inspector
Paul Componation	Ventilation and Roof Control Specialist
Thomas Kabulski	Coal Mine Inspector
Anthony I. Fumich	Roof Control Specialist
Michael Condray	Technical Assistant
Paul Phillips	Coal Mine Inspector, Electrical
Tony Borda	Coal Mine Inspector
M. W. McManus	Coal Mine Inspector
Harry Pigott	Coal Mine Inspector
L. L. Layne	Coal Mine Inspector
William H. Reid	Coal Mine Inspector
Raymond A. Ash	Coal Mine Inspector
Joseph Amendolea	Coal Mine Inspector
C. D. McMasters	Coal Mine Inspector, Electrical
Michael J. Lawless	Mining Engineer
Clifford Ellis	Coal Mine Inspector
Charles J. Thomas	Coal Mine Inspector
F. D. Bowers	Coal Mine Inspector
L. W. Gibson	Coal Mine Inspector
Edgar J. Huggins	Coal Mine Inspector
David Workman	Coal Mine Inspector
Stephan Kuretza	Coal Mine Inspector
Billy J. Hess	Coal Mine Inspector

APPENDIX C

Raymond A. Strahin	Coal Mine Inspector
Charles E. Bane	Coal Mine Inspector
Ellis Mitchell	Coal Mine Inspector
Domenick Poster	Coal Mine Inspector
Donald J. Morgan	Coal Mine Inspector
Joseph Freme	Coal Mine Inspector
Harold Hennen	Coal Mine Inspector
Joe Richards	Coal Mine Inspector
Homer W. Delowich	Coal Mine Inspector
Fay Miller, Jr.	Coal Mine Inspector
Arthur Cross	Coal Mine Inspector
Michael Dorazio	Coal Mine Inspection Supervisor

United Mine Workers of America

Donald Poland	District 31 Representative
Charles Tarasuk	District 31 Representative
James Bennett	District 31 Representative
C. J. Urbaniak	President, District 31

6-290
(April 1966)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
DISTRICT B
NOTICE

A

MINE EXPLOSION

COPY

Morgantown, West Virginia
(Originating Office)

November 20, 1968
(Date of issue)

To the operator of the Consol No. 9 mine
(Mine)

Mountaineer Coal Company, Division of Consolidation Coal Company
(Company)

Farmington, Marion County, West Virginia P. O. Box 1632, Fairmont, W. Va. 26534
(Location of mine) (P.O. address of operator)

Notice is hereby given that the undersigned duly authorized representative of the United States Bureau of Mines upon making an inspection of this mine on the 20th day of November, 1968, finds, in accordance with sec. 203(a)(1) of the Federal Coal Mine Safety Act, as amended, (30 U.S.C. 471-483) that a mine explosion, mine fire, mine inundation, man-trip accident, man-hoist accident will occur in this mine immediately or before the imminence of such danger can be eliminated.

Description of conditions causing and constituting such danger:

A mine explosion occurred about 5:15 a.m., Wednesday, November 20, 1968, in the main west area. Thirteen men escaped uninjured; remainder of men on 12:01 a.m. to 8 a.m. shift trapped underground.

Extent and description of area of mine throughout which danger exists and from which persons must be withdrawn and debarred:

Entire mine.

ORDER

In accordance with sec. 203(a)(1) of the Federal Coal Mine Safety Act, as amended, you are hereby ordered to cause all persons, except persons referred to in sec. 203(a)(2) of the Act, to be withdrawn from and to be debarred from entering the area described above.

Signed /s/ Matthew I. Duncan

NOTE.—Application may be made for annulment or revision of this Order pursuant to the Federal Coal Mine Safety Act, as amended (30 U.S.C. 471-483).

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
DISTRICT E
NOTICE

A
MINE FIRE

COPY

Morgantown, West Virginia
(Originating Office)

November 20, 1968
(Date of issue)

To the operator of the Consol No. 9 mine
(Mine)

Mountaineer Coal Company, Division of Consolidation Coal Company
(Company)

Farmington, Marion County, West Virginia P. O. Box 1632, Fairmont, W. Va. 26034
(Location of mine) (P.O. address of operator)

Notice is hereby given that the undersigned duly authorized representative of the United States Bureau of Mines upon making an inspection of this mine on the 20th day of November, 1968, finds, in accordance with sec. 203(a) (1) of the Federal Coal Mine Safety Act, as amended, (30 U.S.C. 471-483) that a mine explosion, mine fire, mine inundation, man-trip accident, man-hoist accident will occur in this mine immediately or before the imminence of such danger can be eliminated.

Description of conditions causing and constituting such danger:

Mine fire followed explosion in main west area about 5:15 a.m., Wednesday, November 20, 1968. Thirteen men escaped uninjured; remainder of men on 12:01 a.m. to 8 a.m. shift trapped underground.

Extent and description of area of mine throughout which danger exists and from which persons must be withdrawn and debarred:

Entire mine.

ORDER

In accordance with sec. 203(a) (1) of the Federal Coal Mine Safety Act, as amended, you are hereby ordered to cause all persons, except persons referred to in sec. 203(a) (2) of the Act, to be withdrawn from and to be debarred from entering the area described above.

Signed /s/ Matthew I. Duncan

NOTE.—Application may be made for annulment or revision of this Order pursuant to the Federal Coal Mine Safety Act, as amended (30 U.S.C. 471-483).

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Health and Safety Activity

Subdistrict B

Post Office Box 880
Morgantown, West Virginia 26505

September 9, 1968

Mr. D. H. Davis, President
Mountaineer Coal Company
Division of Consolidation Coal Company
P. O. Box 1632
Fairmont, West Virginia 26554

Dear Mr. Davis:

Subject: Coal Mine Inspection Report
A59, Consol No. 9 mine
Mountaineer Coal Company
Division of Consolidation Coal Company
Farmington, Marion County, West Virginia
August 1-2, 5-9, 12-16, 19-23, and 26-30, 1968
by M. W. McManus

The enclosed report covers a Federal inspection of the above-named mine made pursuant to provisions of the Federal Coal Mine Safety Act (66 Stat. 692; 30 U.S.C. Secs. 451-483) as amended.

Sincerely yours,



Maurice S. Childers
Acting Subdistrict Manager

Enclosure

cc:

K. K. Kincell, Manager of Mines
L. H. Riggs, General Superintendent
Foster Turner, Superintendent
Jesse G. Bowers, Safety Director
Eugene Lieving, Safety Inspector
Charles R. Nailler, Vice President-Operations
Consolidation Coal Company

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
DIVISION OF COAL MINE INSPECTION

COAL MINE INSPECTION REPORT
CONSOL NO. 9 MINE
MOUNTAINEER COAL COMPANY
DIVISION OF CONSOLIDATION COAL COMPANY
FARMINGTON, MARION COUNTY, WEST VIRGINIA

August 1-2, 5-9, 12-16, 19-23, and 26-30, 1968

by

M. W. McManus
Federal Coal Mine Inspector

Originating Office - Bureau of Mines
Morgantown, West Virginia 26505
Maurice S. Childers, Acting Subdistrict Manager
Morgantown, West Virginia, Subdistrict, Health and Safety District B

A59

COAL MINE INSPECTION REPORT
CONSOL NO. 9 MINE
MOUNTAINEER COAL COMPANY
DIVISION OF CONSOLIDATION COAL COMPANY
FARMINGTON, MARION COUNTY, WEST VIRGINIA

August 1-2, 5-9, 12-16, 19-23, and 26-30, 1968

by

M. W. McManus
Federal Coal Mine Inspector

INTRODUCTION

This report is based on an inspection made in accordance with provisions of the Federal Coal Mine Safety Act (66 Stat. 692; 30 U.S.C. Secs. 451-483) as amended.

The operator and mine workers are parties to the National Bituminous Coal Wage Agreement which requires prompt compliance with recommendations to correct violations of the Federal Mine Safety Code.

GENERAL INFORMATION

The Consol No. 9 mine is located at Farmington, Marion County, West Virginia.

The mine is opened by seven shafts ranging from 334 to 578 feet in depth and a 16-degree slope 1,468 feet in length into the high-volatile Pittsburgh coalbed, which averages 96 inches in thickness in the areas being mined. A total of 380 men was employed; 320 worked underground, 3 shifts a day, 5 days a week, and produced an average of 9,500 tons of coal daily. All coal was mined with continuous-mining machines and loaded into shuttle cars by loading machines. The last previous Federal inspection of this mine was completed April 25, 1968.

Construction work was in progress at the new Mahans Run shaft for the Consol No. 9 mine by the R. G. Johnson Company, Washington, Pennsylvania. A total of 25 men was employed, 2 shifts a day, 5 days a week. The shaft has been sunk to the projected depth of 513 feet, and construction work was nearly completed on the four approaches to the shaft; it will be used as an intake and return air shaft. The underground workings were within about 300 feet of the shaft bottom.

A roof-support plan had been adopted and was well followed. Roof bolting was done along most of the entries used as haulageways and at all four-way intersections. At least two breaker posts were required to be set at the open end of all pillar splits. Roof bolts were being installed in full compliance with recommendations of the Bureau's roof-control representative and State permit No. 619 after an inoperative dust collector was repaired. As far as could be determined, the roof-control system was adequate.

The mine is classed gassy in accordance with the laws of the State. Preshift, on-shift, and weekly examinations were made. More than 13,000 cubic feet of air a minute was being delivered to the intake ends of all pillar lines and passing through the last open crosscuts of advancing entries; face ventilation was adequate. Tests made with a permissible flame safety lamp and a permissible methane detector indicated the air to be of satisfactory quality. Auxiliary fans, powered with permissible driving units, were used with each of the continuous-mining machines that were in development entries; the fans, operated exhausting, were installed in or outby the last open crosscut on the return side of the air current with tubing extended into the face region. The analytical results of 21 air samples collected in the immediate and main returns during the inspection are listed in table 1. The mine was liberating 7,918,000 cubic feet of methane in a 24-hour period.

The mine surfaces varied from dry to definitely wet. Dangerous accumulations of loose coal and coal dust were not apparent underground. Dust produced during mining operations was allayed by water from sprays mounted on the machines, and sprays installed along the belt conveyors. Active shuttle car roadways were wetted down at least once each shift. Rock dust had been applied throughout the mine, including the haulageways and parallel and back entries to within 40 feet of the faces of all working places. Additional rock dust was applied for a distance of 200 feet in each of the Nos. 3, 4, 5, and 6 entries in main west where the rock-dust applications were visibly inadequate, and to the areas where the analyses of three dust samples indicated the incombustible content to be substandard. All of the rock-dust applications then appeared to be adequate. During the inspection, uniform rock-dusting surveys were made in four sections, and with the exception of samples collected in crosscuts inby each third designated station, the samples were collected at 300-foot intervals. The analyses of 125 dust samples are listed in table 3.

Permissible electric face equipment was used; deficiencies found during the inspection were promptly corrected.

The auxiliary fans used underground were being operated in full compliance with recommendations made under Appeal Docket No. A-463, granted by the Joint Industry Safety Committee June 6, 1964.

The Joint Industry Safety Committee, in Appeal Docket No. A-299, decided on October 16, 1956, granted an exemption from provisions of shelter holes along the slope from the surface to the Pittsburgh coalbed, provided the rule prohibiting men on the slope while supplies are being dropped in the mine is rigidly enforced.

Permissible-type continuous methane monitors were installed on two continuous-mining machines. These monitors are automatic and are electrically operated and interlocked into the electrical systems so that when the methane content reaches a predetermined concentration, the power will be cut off automatically from the machine.

A new type fire protection system for shuttle cars has been developed by this operating company. This system basically consists of a water storage tank made of 1/2-inch plate located under the boom. The tank has a capacity of 70 gallons of water, and can be pressurized by either of two valves located one at each end of the car on opposite sides.

Pressure to completely empty the tank is provided by a 18 cu. ft. nitrogen cylinder at 2000# pressure reduced to 65# w.p. by means of a pressure regulator.

Sprays are located over each tire, cable reel, hydraulic pit, transmission, and the converter area. This amounts to seven sprays. Spraying systems incorporated 1/8 GG-4.3 water sprays are used. These sprays have a discharge rate of .99 g.p.m. at 60 p.s.i. which allows approximately eight minutes of spraying time.

All connections and hose are JIC high pressure type. The system is not under pressure until the valve releasing the nitrogen is open. All lines and sprays remain dry until pressurized. The water is filtered at the discharge port of the tank by a stainless steel CUNO filter. Two gallons of foam concentrate is added to the water to provide better coverage of sprayed area by breaking down surface tension of water.

Escapeways were adequate and travelable; direction signs were posted to indicate the route of travel. Self-rescuers were provided underground for all face employees.

Fire-resistant hydraulic fluids were being used in the underground car spotters.

PART I - FEDERAL COAL MINE SAFETY ACT

All violations of the Mine Safety Provisions of the Federal Coal Mine Safety Act observed during this inspection were totally abated promptly.

PART II - FEDERAL MINE SAFETY CODE

Code hazards observed during this inspection were corrected promptly.

PART IV - DANGERS ELIMINATED DURING INSPECTION

Violations of the Act

1. Section 209(c). Unsafe roof along the parallel supply track was bolted and made safe.
2. Section 209(e)(5). Additional rock dust was applied for a distance of 200 feet in each of the Nos. 3, 4, 5, and 6 entries main west where the applications were visibly inadequate, and to the areas where the analyses of three dust samples indicated sub-standard rock-dusting; the applications appeared to be adequate.
3. Section 209(f)(1). Three continuous-mining machines, five shuttle cars, two loading machines, and three roof-bolting machines were restored to permissible condition by reducing three openings into electric compartments to less than 0.004 inch, reducing the number of temporary splices in two trailing cables from six and seven to four in each trailing cable, making tight one loose headlight lens, replacing two missing bolts from cover plates, replacing a missing inspection cover on the main motor of a loading machine, freeing three stuck cable sheaves, and making tight three loose packing glands.
4. Section 209(g)(1). Fire extinguishers were provided on No. 25 locomotive and one personnel carrier.

Code hazards

1. Article VII, Section 4a. Adequate clearance was provided at one location near the main west empty track switch.
2. Article VII, Section 5a. Two damaged rollers in the 6 north conveyor belt, one stuck roller in the 7 north belt, and two stuck rollers in the 8 north belt were replaced.
3. Article VIII, Section 4g2. The 7 south supply track which was not completely bonded for a distance of 200 feet was bonded properly.

4. Article VIII, Section 4m. The trolley feeder wire was freed from contacting combustible material at two locations by installing additional insulators.

5. Article VIII, Section 5b. The frames of three electric pumps were equipped with suitable grounds.

6. Article VIII, Section 10c. The exposed wires in the outer portions of three trailing cables were insulated adequately.

7. Article IX, Section 1b. The dust collector on the roof-bolting machine in 7 south which was inoperative was repaired.

8. Article X, Section 1j. Excessive accumulations of fine coal and spilled oil were removed from around the pump drive assembly of a continuous-mining machine, and from the frame of a roof-bolting machine.

(signed) M. W. McManus
M. W. McManus
M. W. McManus
Federal Coal Mine Inspector

ANALYSES OF AIR SAMPLES

Sheet No. 1

TABLE 1

DATE COLLECTED August 9, 12, 15-16, and 19-20, 1968

Consolidation Coal Company

MINE Consol No. 9 COMPANY Mountaineer Coal Company, Division of COLLECTED BY M. W. McManus

BOTTLE NO.	LABORATORY NO.	LOCATION IN MINE	PERCENT IN VOLUME					CUBIC FEET AIR PER MINUTE	CUBIC FEET METHANE IN 24 HOURS
			CARBON DIOXIDE	OXYGEN	METHANE	CARBON MONOXIDE	NITROGEN		
H9533	92767	immediate return right side main west	0.11	20.62	0.34		78.93	17,000	83,000
H9532	92768	immediate return left side main west	0.07	20.70	0.14		79.09	32,000	65,000
H9545	92769	immediate return right side 9 north	0.09	20.43	0.25		79.23	28,000	101,000
H9544	92770	immediate return left side 9 north	0.08	20.73	0.24		78.95	29,600	102,000
H9628	92771	immediate return right side 7 south	0.06	20.74	0.40		78.80	13,600	78,000
H9626	92772	immediate return left side 7 south	0.06	20.69	0.31		78.94	32,000	143,000
I2638	92773	immediate return right side 6 right off 7 south	0.05	20.86	0.05		79.04	16,000	12,000
I2639	92774	immediate return left side 6 right off 7 south	0.05	20.89	0.08		78.98	15,000	17,000
I2637	92775	immediate return A face	0.04	20.91	0.00		79.05	20,000	
I2636	92776	face No. 1 entry A face	0.49	20.35	0.89		78.27		
H9655	92777	main return No. 1 fan	0.21	20.62	0.08		79.09	115,000	132,000
H9801	92778	main return south approach No. 2 fan	0.05	20.87	0.00		79.08	92,600	
H9802	92779	main return west approach No. 2 fan	0.05	20.90	0.00		79.05	80,200	
H9793	92780	main return north approach No. 2 fan	0.10	20.79	0.10		79.01	133,000	192,000
H9792	92781	main return east approach No. 2 fan	0.11	20.75	0.07		79.07	62,700	63,000
H9783	92782	main return north approach No. 3 fan	0.14	20.47	0.65		78.74	84,700	793,000
H9627	92783	main return west approach No. 3 fan	0.09	20.59	0.53		78.79	6,700	51,000

ANALYSES OF AIR SAMPLES

Sheet No. 2

TABLE 1

DATE COLLECTED August 9, 12, 15-16, and 19-20, 1968

Consolidation Coal Company

MINE Consol No. 9

COMPANY Mountaineer Coal Company, Division of

COLLECTED BY M. W. McManus

BOTTLE NO.	LABORATORY NO.	LOCATION IN MINE	PERCENT IN VOLUME					CUBIC FEET AIR PER MINUTE	CUBIC FEET METHANE IN 24 HOURS
			CARBON DIOXIDE	OXYGEN	METHANE	CARBON MONOXIDE	NITROGEN		
H9654	92784	main return south approach No. 3 fan	0.08	20.31	0.60		79.01	79,000	683,000
H9784	92785	main return east approach No. 3 fan	0.18	20.49	0.62		78.71	99,000	884,000
H9742	92786	main return east approach No. 4 fan	0.12	20.56	0.58		78.74	256,000	2,138,000
H9743	92787	main return west approach No. 4 fan	0.12	20.33	0.88		78.67	235,000	2,978,000

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED

August 21, 1968

MINE Consol No. 9

COMPANY Mountaineer Coal Company, Division of

COLLECTED BY

M. W. McManus

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE
DUST SURVEY SAMPLES				
survey No. 1				
sampling area = main west				
zero = centerline No. 1 entry station No. 4594 - 100'				
No. 1 entry (back)				
	1A1		0 + 0 no sample, wet	
276743	1A2	band	0 + 300'	19.0*
276744	1A3	"	0 + 600'	82.0*
276745	1A3X	"	0 + 600' crosscut inby station No. 1A3	82.0*
276746	1A4	floor	0 + 900'	90.0*
No. 2 entry (back)				
276747	1B1	band		85.0*
276748	1B2	"		85.0*
276749	1B3	"		85.0*
276750	1B3X	"	crosscut inby station No. 1B3	87.0*
276751	1B4	floor		81.0*
No. 3 entry (track)				
276752	1C1	band		87.0*
276753	1C2	"		72.0*
276754	1C3	"		66.0*
276755	1C3X	"	crosscut inby station No. 1C3	73.0*
276756	1C4	"		88.0*
No. 4 entry (parallel)				
276757	1D1	"		80.0*
276758	1D2	"		85.0*
276759	1D3	"		90.0*
276760	1D3X	"	crosscut inby station No. 1D3	75.0*
276761	1D4	"		82.0*
No. 5 entry (parallel)				
276762	1E1	"		89.0*
276763	1E2	"		91.0*

LAB. NOS. 276743-276775

Sheet No. 2

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED August 21, 1968

Consolidation Coal Company

MINE Consol No. 9COMPANY Mountaineer Coal Company, Division ofCOLLECTED BY M. W. McManus

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE
276764	1E3	band		89.0*
276765	1E3X	"	crosscut inby station 1E3	82.0*
276766	1E4	"	No. 6 entry (track)	86.0*
276767	1F1	"		95.0*
276768	1F2	"		100.0*
276769	1F3	"		95.0*
276770	1F3X	floor	crosscut inby station No. 1F3	67.0*
276771	1F4	band	No. 7 entry (back)	90.0*
	1G1		no sample, wet	
	1G2		same	
276772	1G3	floor		93.0*
276773	1G3X	"	crosscut inby station No. 1G3	82.0*
276774	1G4	"	No. 8 entry (back)	67.5*
	1H1		no sample, wet	
	1H2		same	
276775	1H3	"		93.0*
	1H4		no sample, wet	

*By Volumeter

LAB. NOS. 276776-276813

Sheet No. 1

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED

August 22, 1968

Consolidation Coal Company

MINE Consol No. 9

COMPANY

Mountaineer Coal Company, Division of

COLLECTED BY

M. W. McManus

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE
DUST SURVEY SAMPLES				
survey No. 2				
sampling area = 9 north				
zero = centerline No. 1 entry station No. 4534 + 50'				
No. 1 entry (back)				
276776	2A1	floor	0 + 0	81.5*
276777	2A2	"	0 + 300'	90.0*
276778	2A3	"	0 + 600'	78.0*
276779	2A3X	"	0 + 600' crosscut inby station No. 2A3	82.5*
	2A4		0 + 900' no sample, wet	
	2A5		0 + 1,200' same	
No. 2 entry (back)				
276780	2B1	band		68.0*
276781	2B2	"		77.5*
276782	2E3	"		83.5*
276783	2B3X	"	crosscut inby station No. 2B3	87.0*
276784	2B4	"		69.5*
276785	2B5	floor		91.0*
No. 3 entry (track)				
276786	2C1	band		82.5*
276787	2C2	"		87.0*
276788	2C3	"		81.5*
276789	2C3X	"	crosscut inby station No. 2C3	74.0*
276790	2C4	"		94.5*
276791	2C5	floor		76.5*
No. 4 entry (belt)				
276792	2D1	band		75.0*
276793	2D2	"		65.5*
276794	2D3	"		79.0*
276795	2D3X	"	crosscut inby station No. 2D3	69.5*
276796	2D4	"		89.0*
276797	2D5	"		72.0*

APPENDIX D

LAB. NOS. 276776-276813

Sheet No. 2

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED

August 22, 1968

Consolidation Coal Company

MINE Consol No. 9COMPANY Mountaineer Coal Company, Division of

COLLECTED BY

M. W. McManus

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE
			No. 5 entry (track)	
276798	2E1	band		90.0*
276799	2E2	"		100.0*
276800	2E3	"		97.5*
276801	2E3X	"	crosscut inby station No. 2E3	71.0*
276802	2E4	"		84.5*
276803	2E5	floor		76.5*
			No. 6 entry (parallel)	
276804	2F1	band		81.0*
276805	2F2	"		78.0*
276806	2F3	"		73.5*
276807	2F3X	"	crosscut inby station No. 2F3	78.0*
276808	2F4	"		84.5*
276809	2F5	"		91.0*
			No. 7 entry (back)	
	2G1		no sample, not driven	
	2G2		same	
	2G3		no sample, fall	
	2G3X		crosscut inby station No. 2G3 - no sample, wet	
276810	2G4	"		74.0*
276811	2G5	"		77.5*
			No. 8 entry (back)	
	2H1		no sample, not driven	
	2H2		same	
	2H3		no sample, wet	
276812	2H4			76.0*
276813	2H5			81.0*

*By Volumeter

LAB. NOS. 277017-277036

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED August 23, 1968

Consolidation Coal Company

MINE Consol No. 9

COMPANY Mountaineer Coal Company, Division of

COLLECTED BY M. W. McManus

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE
DUST SURVEY SAMPLES				
survey No. 3 sampling area = 5 right 8 north zero = No. 1 crosscut - 50 feet				
			No. 1 entry (back)	
277017	3A1	floor	0 + 0	90.0*
277018	3A2	"	0 + 300'	80.0*
277019	3A3	"	0 + 600'	83.0*
277020	3A3X	"	0 + 600' crosscut inby station 3A3	63.0
277021	3A4	"	0 + 900'	79.5*
277022	3A5	"	0 + 1,200'	88.5*
			No. 2 entry (belt)	
277023	3B1	band		86.0*
277024	3B2	"		84.5*
			no sample, wet	
277025	3B3X	"	crosscut inby station 3B3	79.0*
277026	3B4	"		80.5*
277027	3B5	"		61.9
			No. 3 entry (track)	
277028	3C1	"		89.0*
277029	3C2	"		77.0*
277030	3C3	"		85.0*
277031	3C3X	"	crosscut inby station 3C3	87.0*
277032	3C4	"		91.0*
277033	3C5	floor		88.0*
			No. 4 entry (back)	
277034	3D1	"		88.5*
			no sample, wet	
277035	3D3	"		87.0*
277036	3D4	"		77.0*
			no sample, wet	

*By Volumeter

APPENDIX D

LAB. NOS. 277037-277070

Sheet No. 1

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED

August 26, 1968

Consolidation Coal Company

MINE Consol No. 9

COMPANY

Mountaineer Coal Company, Division of

COLLECTED BY

M. W. McManus

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE
			DUST SURVEY SAMPLES	
			survey No. 4	
			sampling area = 7 south	
			zero = centerline No. 1 entry station No. 4574 + 100'	
			No. 1 entry (back)	
	4A1		0 + 0 no sample, wet	
277037	4A2	floor	0 + 300'	87.0*
277038	4A3	"	0 + 600'	85.0*
277039	4A3X	"	0 + 600' crosscut inby station 4A3	85.5*
277040	4A4	band	0 + 900'	76.5*
277041	4A5	floor	0 + 1,200'	85.5*
			No. 2 entry (back)	
277042	4B1	"		82.5*
277043	4B2	"		93.0*
277044	4B3	"		81.0*
277045	4B3X	"	crosscut inby station 4B3	85.0*
	4B4		no sample, not driven	
	4B5		same	
			No. 3 entry (track)	
277046	4C1			86.0*
277047	4C2	"		82.5*
277048	4C3	band		86.5*
277049	4C3X	floor	crosscut inby station 4C3	85.0*
277050	4C4	"		77.0*
	4C5		no sample, wet	
			No. 4 entry (parallel)	
277051	4D1			82.0*
277052	4D2			91.5*
277053	4D3	"		88.0*
277054	4D3X	"	crosscut inby station 4D3	88.5*
277055	4D4	band		75.5*
277056	4D5	floor		77.0*

LAB. NOS. 277037-277070

Sheet No. 2

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED

August 26, 1968

Consolidation Coal Company

MINE Consol No. 9

COMPANY

Mountaineer Coal Company, Division of

COLLECTED BY

M. W. McManus

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE
			No. 5 entry (parallel)	
277057	4E1			85.5*
277058	4E2	floor		87.0*
277059	4E3	"		93.5*
277060	4E3X	"	crosscut inby station 4E3	96.5*
277061	4E4	"		85.0*
	4E5		no sample, wet	
			No. 6 entry (track)	
277062	4F1	band		100.0*
277063	4F2	"		94.0*
277064	4F3	floor		95.0*
277065	4F3X	"	crosscut inby station 4F3	78.0*
277066	4F4	band		95.0*
	4F5		no sample, wet	
			No. 7 entry (back)	
277067	4G1	floor		81.0*
277068	4G2	"		84.0*
277069	4G3	"		78.0*
	4G3X		crosscut inby station 4G3 - no sample, wet	
277070	4G4	"		95.0*
	4G5		no sample, not driven	
			No. 8 entry (back) too wet to sample	

*By Volumeter

APPENDIX D

6-377 (Revised 9/62)

Division of Coal Mine Inspection
Rm. 4526 - Interior Building
Washington, D.C. 20240

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES - HEALTH AND SAFETY ACTIVITY

Distribution-Data Sheet

Originating office: Morgantown, West Virginia

<u>This inspection</u>	<u>Previous inspection</u>
Mine: Consol No. 9	Mine: Same
Company: Mountaineer Coal Company Division of Consolidation Coal Company	Company: Same
Location: Farmington, Marion Co., W. Va.	Date: April 2-5, 8-12, 15-19, 22, and 24-25, 1968
Symbol ----- A59	
Daily production ----- 9,500 tons	
Daily employment ----- 380	
Underground employment ----- 320	
Life of mine ----- 30 years	
Date of inspection ----- August 1-2, 5-9, 12-16, 19-23, and 26-30, 1968	
Date final report transmitted ----- September 9, 1968	
Hours to write final report ----- 6	

	<u>Name</u>	<u>Address</u>
President	D. H. Davis	P. O. Box 1632, Fairmont, W. Va. 26554
Superintendent	Foster Turner	P. O. Box 1632, Fairmont, W. Va. 26554
Safety Director	Jesse G. Bowers	P. O. Box 1632, Fairmont, W. Va. 26554

Recording Secretary **Steve Opyoke** **Route 1, Farmington, W. Va. 26571**

U.M.W.A. District No. 31 Local Union No. 4042
 Union affiliation previous inspection Same

Safety Committee

Is a Safety Committee maintained? ¹	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Is the Safety Committee active?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Was the Safety Committee informed that the inspection was started?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Did a representative of the Safety Committee participate in all or part of the inspection?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Was the Safety Committee informed as to when the conference would be held?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Did a representative of the Safety Committee attend the conference?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Type of conference:	Joint <input checked="" type="checkbox"/> Separate <input type="checkbox"/>

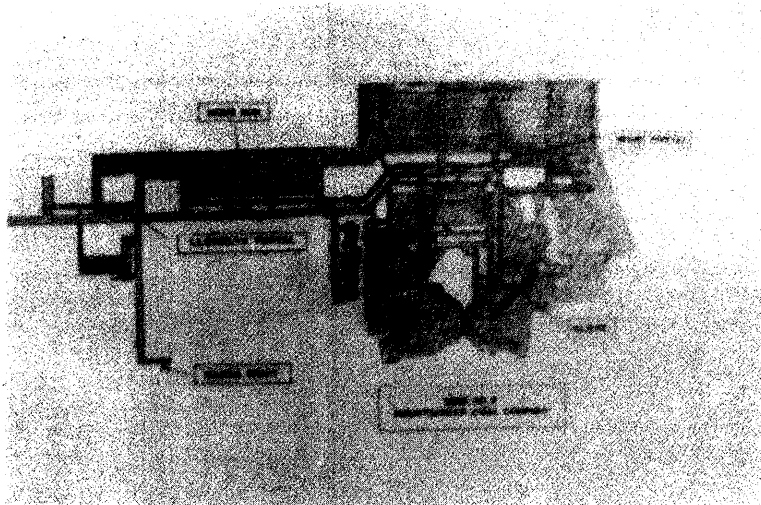
¹ If "Yes," answer the following questions.



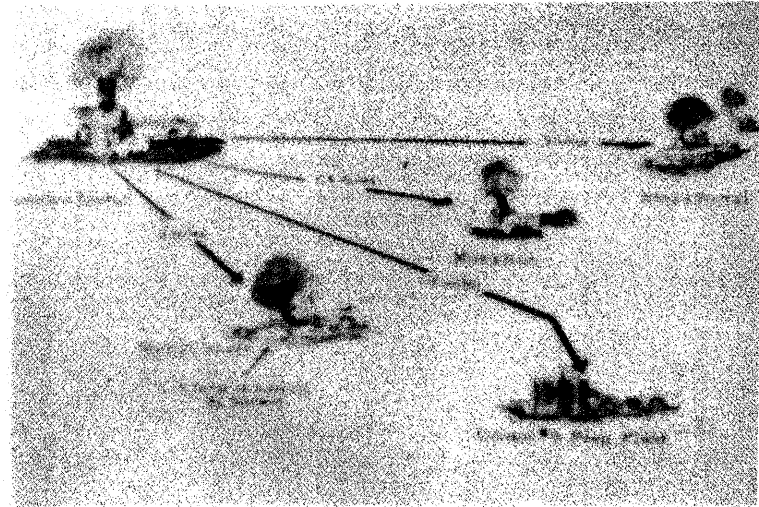
No. 1 Llewellyn Shaft after explosion



No. 2 Mahan Shaft after explosion



No. 3 Underground area of Consol No. 9 Mine



No. 4 Surface structural distances



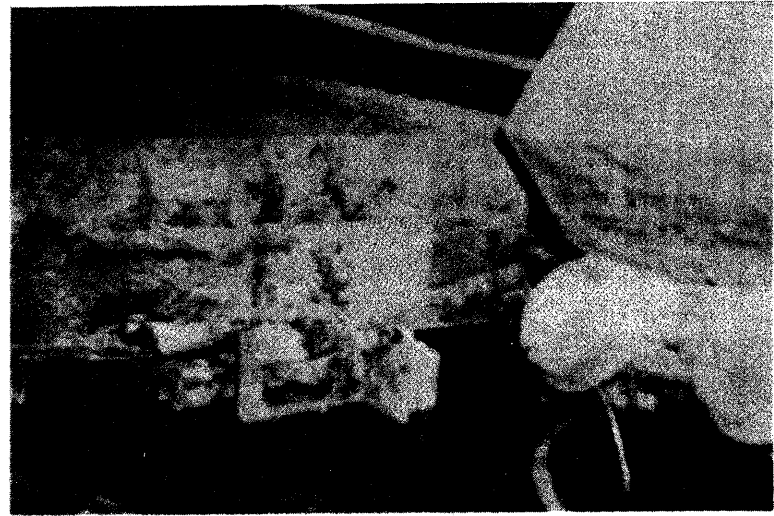
No. 5 Damage near Llewellyn Shaft



No. 6 Wrecked mine cars between 3 North and 4 North



No. 7 Removing concrete cap Athas Shaft



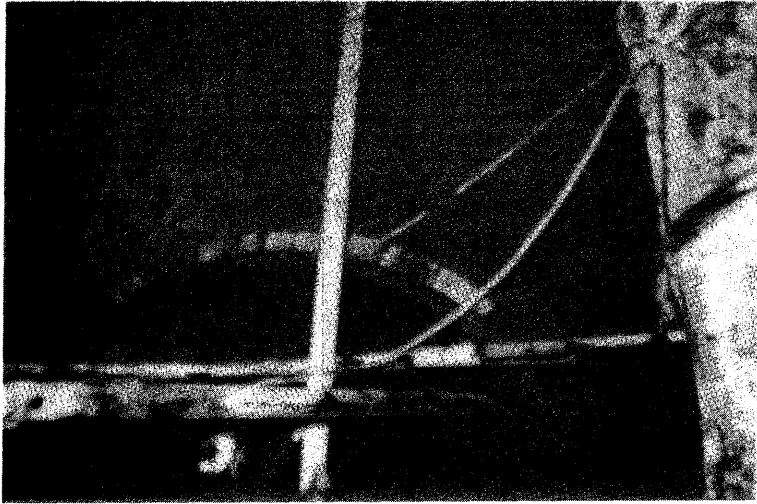
No. 8 Wrecked mine cars inby 3 North



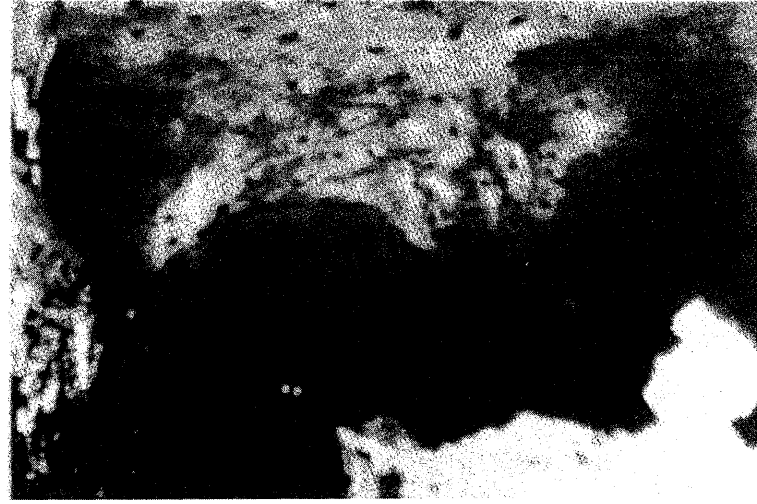
No. 9 Damaged power center 6 Right North



No. 10 1 Right 6 North after fall was loaded out



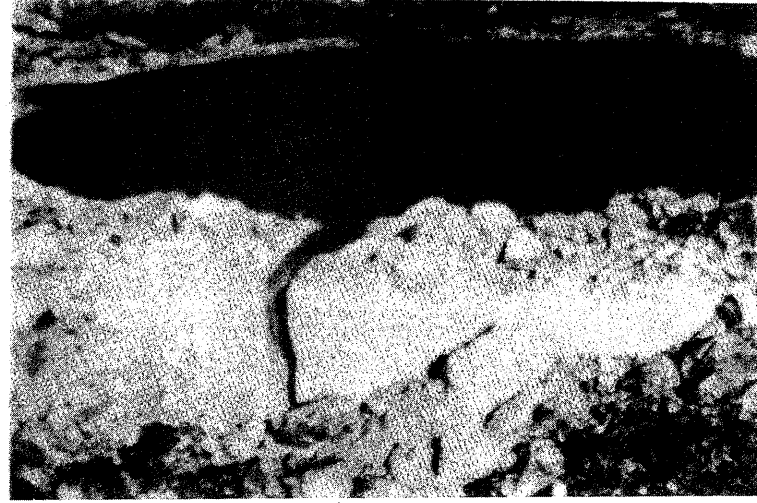
No. 11 Outby 4 North after fall was removed



No. 12 Outby 4 North after fall was removed



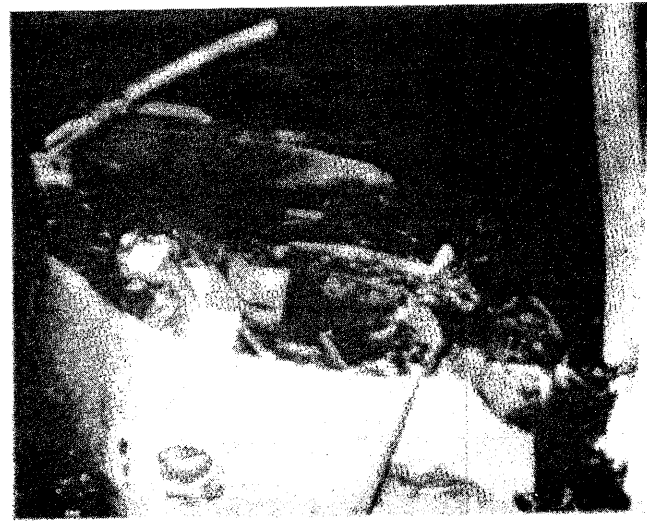
No. 13 Belt damage 1 Right 6 North



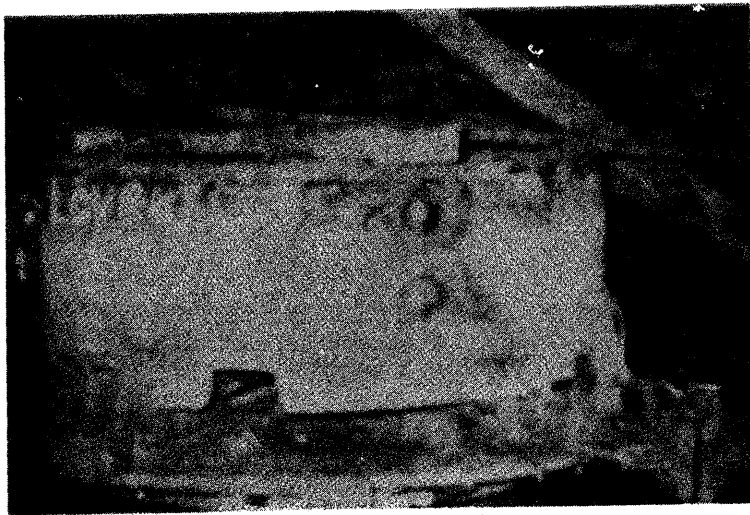
No. 14 Damage Mod's Run Intake Shaft



No. 15 Tank blown out of Mod's Run Intake Shaft



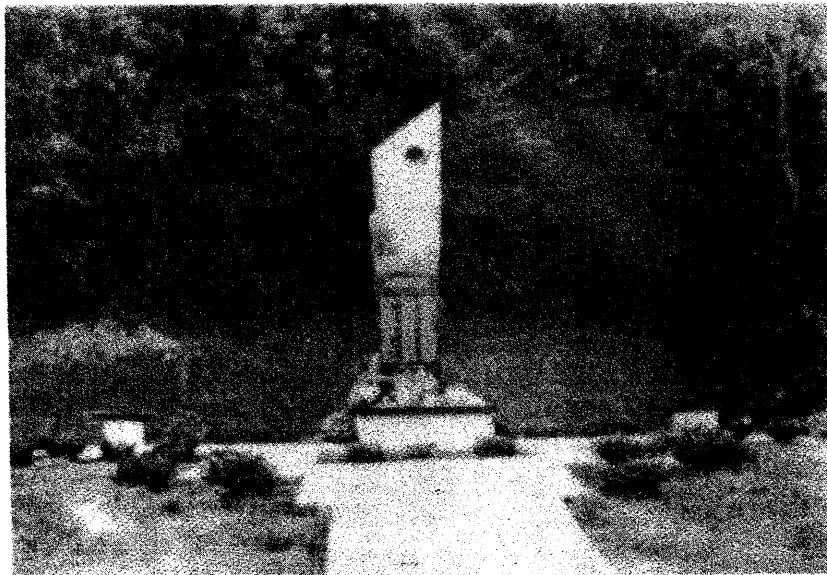
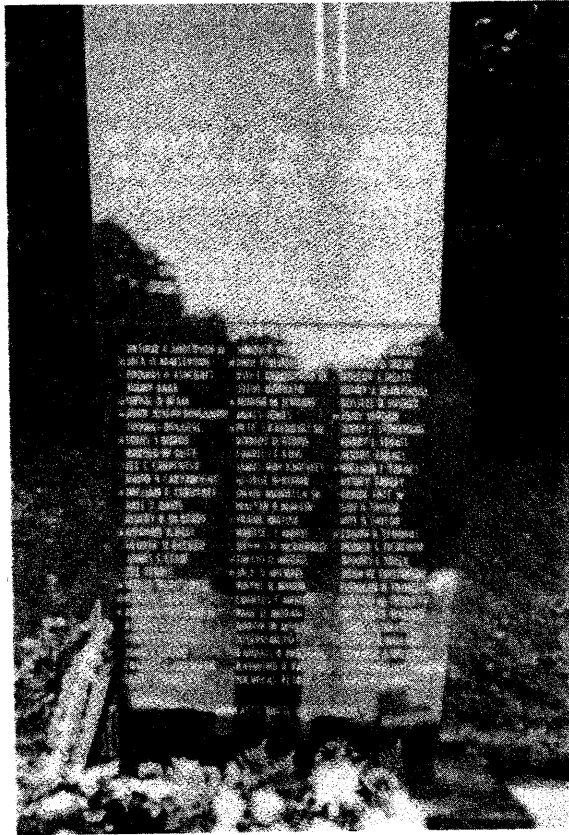
No. 16 Personnel carrier 1 Right 6 North



No. 17 Locomotive on inby end of trip of empty mine cars between 3 North and 4 North



No. 18 Mine car blown from trucks between 3 North and 4 North



Nos. 19 & 20 Monument erected at the No. 9 Mine, Consolidation Coal Company in memorial to those men who died in the mine explosion November 20, 1968

APPENDIX F

PHASE I

Unsealing and Initial Recovery Operations,
Consol No. 9 Mine,
Mountaineer Coal Company,
Farmington, Marion County, West Virginia

In the first steps toward recovering the mine, the essential problem is to restore ventilation, which will dilute the potentially explosive methane and replace it with fresh air. Restoring mine ventilation will reduce the methane content of the underground atmosphere from its present 60 to 97 percent, but that means it will have to pass through the highly explosive concentration range of 5 to 15 percent methane in air. Whenever the mine atmosphere is a mixture of these proportions, a spark could set off another explosion. While the gas is being liberated to the atmosphere, there will be a constant threat of explosion in the immediate vicinity of the mine for several days at least.

How readily the recovery work can be accomplished will depend primarily on the ease with which the mine's ventilation system can be restored. From the little that is known, this is not expected to be a simple task, especially in the western half of the mine.

Plans for starting recovery operations at the mine call for restoring ventilation to remove the high concentrations of potentially explosive methane gas from the eastern part of the mine, the area least damaged by last November's explosions. Not until this has been accomplished will it be possible for recovery workers to begin exploring the underground mine workings or start any repairs to machinery and haulage equipment underground which will be needed in subsequent phases of the recovery operation.

Although the kinds of work involved in the recovery operation are described as individual "steps," the actual work, when it gets underway, may differ considerably from the sequence below, which is described primarily to illustrate the complexity and magnitude of the job ahead. A general plan has been drawn up, but at any stage the plan may be altered, if need be, to fit the unforeseen. Any step may have to be revised, if conditions dictate, to deal with unexpected developments that could occur.

STEP 1: Remove seal from No. 2 Fan Shaft at Atha's Run. Jackhammers will be used to break through the concrete blocking off the shaft. A remote-controlled fan will be used to speed dispersal of methane, which can be expected to start escaping as soon as there are any cracks in the seal. To minimize the risk of a methane ignition, the workmen will use jackhammers with beryllium points, which produce little or no sparking.

STEP 2: Install elbow from shaft to No. 2 Fan. A crane will position a massive metal elbow over the shaft so it can be bolted to the steel housing of the exhaust fan.

STEP 3: Start No. 2 Fan. This will be done by remote control. Precautions against the chance ignition of methane include grounding the fan belts against static electricity and pressurizing the fanhouse with fresh air. No. 2 was picked as the first of the mine's fans to start up because it is remote from dwellings, equipment, and mine buildings that could be damaged if the methane should ignite.

STEP 4: Open valves at Atha's Run Elevator Shaft. With No. 2 Fan still running, valves in two vent pipes six inches in diameter will be opened. This will help in clearing out the methane laden air from the Atha's Run Elevator Shaft so the work of removing the seal from that shaft can get underway.

STEP 5: Regulate air flow. Doors in the elbow between the fan and the shaft control the current of air.

STEP 6: Remove plate from fan housing at No. 1 Fan. Intake air can enter the No. 1 Fan Shaft when this step is completed. Fresh air from this source can then ventilate the underground workings between the Slope area and the Atha's Run area, and then be exhausted to the surface by the No. 2 Fan.

STEP 7: Open valves at the Slope and at the No. 1 Intake Shaft. With the valves open, fresh air can begin clearing away methane from the Slope and the No. 1 Intake Shaft.

STEP 8: Remove seal from Slope.

STEP 9: Open doors at the bottom of the Slope. This is the first step that will require men to go below the surface. Opening the doors will permit fresh air to enter the mine through the Slope. The Slope is a 16 degree incline about 1,600 feet long from the surface to the underground workings of Consol No. 9. Performing this task will be a 5-man crew of mine workers specially trained in mine rescue techniques. They will return to the surface as soon as the doors have been opened. Such teams will also handle all other underground steps of the recovery effort. Several of these teams have volunteered and been accepted for recovery work at Consol No. 9.

STEP 10: Remove Seal from No. 1 Intake Shaft. This job is similar to Step 1, and will incorporate the same safeguards against a possible methane ignition.

STEP 11: Start No. 1 Fan. This will be done after air samples taken through the "A" Face Borehole (see map) indicate the methane level is sufficiently low. As in Step 3, precautions against anything that could initiate a gas explosion will be rigorously enforced. Unlike No. 2 Fan, which is remote, the No. 1 Fan is near the main highway and close to the large complex of buildings and equipment which make up the mine's coal cleaning and processing plant. No. 1 Fan will be run by remote control, its drive belts grounded against static spark, and the fanhouse pressurized with fresh air. These measures are safety precautions.

STEP 12: Continue running No. 2 Fan. This will continue diluting and removing methane in the mine atmosphere. Exhaust from the No. 2 Fan will carry millions of cubic feet daily of flammable methane into the surface atmosphere.

STEP 13: Unseal Atha's run Elevator Shaft. This will be slow, tedious work, with a lot of material to remove under difficult working conditions around the elevator cage and lift structure. Beryllium-pointed jackhammers will be used, as they were in Step 1 and Step 10.

STEP 14: Sample mine atmosphere through boreholes. This checks progress in diluting and removing methane from the underground workings. (See map for location of boreholes and sampling stations, especially Plum Run Power Borehole, "A" Face No. 1, and Test Hole No. 12.) No underground work can proceed until the methane content in the eastern part of Consol No. 9 is judged safe. Only then can rescue teams descend the shaft at Atha's Run and begin underground recovery work.

(Once ventilation is restored in the eastern part of the mine, the second half of Phase I will aim at sealing off the east from the western part of the mine. This will establish the east as a fresh-air base which recovery workers can gradually extend westward in subsequent phases of the project.)

STEP 15: Make emergency hoist ready at Atha's Run Shaft. The hoist, a bucket-type arrangement parallel to the out-of-commission elevator shaft, will serve as the sole means of access to the underground workings for both men and supplies during this phase of the work. Descending at Atha's Run, instead of the Slope, will shorten traveling distance underground. (See map.)

STEP 16: Team #1 descends Atha's Run Shaft. Their first job below will include exploring the mine workings immediately adjoining the shaft bottom, checking conditions in both shafts (air and elevator), the machine shop, and the haulage road. The team will measure the air current and make on-the-spot measurements of gas content in the mine air. If repairs or corrections are necessary for proper ventilation at the shaft bottom, Team #1 will make the required adjustments and then stand-by.

STEP 17: Team #2 descends Atha's Run Shaft. Their job is to follow the ventilation circuit as far west as possible underground, and determine where to build the airtight barriers that will seal off east from west. The original (pre-explosion) ventilation circuit will be used unchanged as much as possible.

STEP 18: Determine course and volume of ventilation at Plum Run. Plum Run is 6,000 feet west of Atha's Run, and it is hoped that the ventilation system will provide for fresh air at least that far. Ventilation readings taken underground there are essential in deciding where to erect airtight stoppings.

STEP 19: Determine where to locate seals. Team #2 at this point will have gone as far west as conditions permit. They will erect temporary barriers with plastic curtains and non-sparking spikes. For communication with the surface, they can use a telephone. (See map for points where seals might be located.)

STEP 20: Send supplies underground. Pushcarts and necessary supplies will be lowered via the bucket at Atha's Run while the recovery teams are exploring as far west as they can.

STEP 21: Repair Elevator. When the cage-type elevator is back in operation transport between the surface and the underground will be much easier and safer. Supplies can be lowered underground more quickly, since the elevator

cage can handle far more than the temporary bucket arrangement. The repaired Atha's Run elevator will serve as the main access to the mine for most recovery operations. Eventually, track haulage via the Slope may be used for removing rock and debris in clean-up operations underground.

STEP 22: Seal off the west from the east. Airtight seals will represent the westernmost limits of the eastern fresh-air base, from which, in subsequent phases of recovery, workers will advance carefully toward the west.

STEP 23: Clean up the eastern part of the mine. Check and re-check for adequate ventilation. Reactivate the electric power supply. Explore. Spread rock dust as an anti-explosion measure. Pump out accumulations of water. Get track and rolling stock back in condition for hauling. And prepare for Phase II.

Estimates for reaching this stage of the recovery operation range from several days to several weeks. However, even these wide-ranging estimates are subject to revision, depending on conditions in the mine and progress in performing the work while maintaining safety.

The next phase will be to extend the fresh-air base westward, step by step, to a point just west of Mod's Run. (See map.) New airtight seals will be placed farther and farther west in successive steps. The new areas thus opened up will be ventilated, using high-pressure fans on the surface, installed on large diameter (21-inch) boreholes. For safety, each step in this process will be taken cautiously.

When this operation reaches Mod's Run, there will be a considerable delay while the shafts are cleared of 1,000 tons of limestone with which they were sealed last November.

All parties are agreed that the Mod's Run Intake and Fan Shafts must be reopened, and the exhaust fan there put back in operation, before exploration can proceed any further west, where it is believed most of the disaster victims' bodies will be found. Only after the fresh-air base has been extended to Mod's Run, the Mod's Run Fan turned on, and necessary repair work completed can conditions be evaluated and a determination made as to the safest and most effective procedures to adopt for exploring and recovering the part of the mine that is west of Mod's Run.

LAB. NOS. 315820-315901

Sheet No. 1

TABLE 3 ANALYSES OF DUST SAMPLES DATE COLLECTED September 18-19, 22, and 24-25, 1969
 MINE Consol No. 9 COMPANY Mountaineer Coal Company, Division of Consolidation Coal Company COLLECTED BY Thomas E. Kabulski and Carl J. Shaffer

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE
DUST SURVEY SAMPLES				
			survey No. 1	
			survey area = main east	
			0 + 00 = 45 feet inby station No. 3010 No. 6 entry	
			No. 1 entry	
			0 + 00' roof fall	
315820	1A1	band	0 + 290'	83.0
315821	1A2	"	0 + 290' in right crosscut	78.0
315822	1A3	"	0 + 570'	81.5
315823	1A4	"	0 + 860'	92.5
315824	1A4X	"	0 + 860' in right crosscut	69.0
315825	1A5	"	0 + 1,150'	88.0
	1A6		0 + 1,440' gas well block	
	1A6X		0 + 1,440' same	
	1A7		0 + 1,725' same	
315826	1A8	"	0 + 2,005' A entry offset to left two entries inby A face junction	49.0
			No. 2 entry (back)	
315827	1B1	"		87.0
315828	1B2	"		87.0
315829	1B2X	"	in right crosscut	68.5
315830	1B3	"		67.5
315831	1B4	"		87.0
315832	1B4X	"	in right crosscut	70.0
315833	1B5	"		59.5
315834	1B6	"		82.5
315835	1B6X	"	in right crosscut	66.0
315836	1B7	"		78.0
			No. 3 entry (parallel)	
315837	1C1	"		70.0
315838	1C2	"		81.0

APPENDIX G

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED September 18-19, 22, and 24-25, 1969

Consolidation Coal Company

Carl J. Shaffer

MINE Consol No. 9

COMPANY Mountaineer Coal Company, Division of

COLLECTED BY Thomas E. Kabulski and

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE
315839	1C2X	band	in right crosscut	71.0
315840	1C3	"	"	81.0
315841	1C4	"	"	83.0
315842	1C4X	"	in right crosscut	68.5
315843	1C5	"	"	56.2
315844	1C6	"	"	57.7
315845	1C6X	"	in right crosscut	82.0
315846	1C7	"	"	96.5
			No. 4 entry (parallel)	
315847	1D1	"	"	69.0
	1D2	"	no sample received	
315848	1D2X	"	in right crosscut	85.0
315849	1D3	"	"	72.5
315850	1D4	"	"	67.0
315851	1D4X	"	in right crosscut	83.0
315852	1D5	"	"	82.5
315853	1D6	"	"	59.4
315854	1D6X	"	in right crosscut	72.0
315855	1D7	"	"	73.5
315856	1D8	"	"	76.5
			No. 5 entry (track)	
315857	1E1	"	"	94.0
315858	1E2	"	"	86.0
315859	1E2X	"	in right crosscut	77.0
315860	1E3	floor and ribs	"	90.0
315861	1E4	band	"	98.0
315862	1E4X	"	in right crosscut	96.5
315863	1E5	"	"	79.0
315864	1E6	"	"	76.5
315865	1E6X	"	in right crosscut	74.5
315866	1E7	"	"	93.0
315867	1E8	"	"	88.5

TABLE 3 ANALYSES OF DUST SAMPLES DATE COLLECTED September 18-19, 22, and 24-25, 1969

Consolidation Coal Company

Carl J. Shaffer

MINE Consol No. 9COMPANY Mountaineer Coal Company, Division ofCOLLECTED BY Thomas E. Kabulski and

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE
			No. 6 entry (parallel)	
315868	1F1	band		67.0
315869	1F2	"		71.5
315870	1F2X	"	in right crosscut	74.5
315871	1F3	"		81.5
315872	1F4	"		92.5
315873	1F4X	"	in right crosscut	97.0
315874	1F5	"		66.0
315875	1F6	"		54.1
315876	1F6X	"	in right crosscut	55.3
315877	1F7	"		74.0
315878	1F8	"		87.5
			No. 7 entry (back)	
	1G1		no sample received	
315879	1G2	"		75.0
315880	1G2X	"	in right crosscut	78.5
315881	1G3	"		70.0
315882	1G4	"		78.0
315883	1G4X	"	in right crosscut	84.0
315884	1G5	"		78.0
315885	1G6	"		90.5
315886	1G6X	"	in right crosscut	65.5
315887	1G7	"		74.0
315888	1G8	"	now track entry	79.0
315889	1G8X	"	in right crosscut	41.0
			No. 8 entry (back)	
315890	1H1	"		95.0
315891	1H2	"		60.2
315892	1H3	"		85.5
315893	1H4	"		69.0
315894	1H5	"		58.2

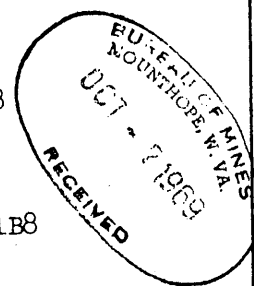
TABLE 3 ANALYSES OF DUST SAMPLES DATE COLLECTED September 18-19, 22, and 24-25, 1969
 Consolidation Coal Company Carl J. Shaffer
 MINE Consol No. 9 COMPANY Mountaineer Coal Company, Division of COLLECTED BY Thomas E. Kabulski and

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE
315895	LH6	band		61.8
315896	LH7	"		71.5
315897	LH8	"		41.0
315898	LH8X	"	in right crosscut No. 9 entry (back)	48.5
315899	1I8	"		54.5
315900	1I8X	"	in right crosscut No. 10 entry (back)	59.9
315901	1J8	"		60.1

LAB. NOS. 316133-316161

TABLE 3 ANALYSES OF DUST SAMPLES DATE COLLECTED September 26-27, 1969
 Consolidation Coal Company Arthur Cross
 MINE Consol No. 9 COMPANY Mountaineer Coal Company, Division of COLLECTED BY Carl J. Shaffer and

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE
DUST SURVEY SAMPLES				
			survey No. 1	
			main east entries continued	
			No. 1 back entry	
316133	1A8X	band	crosscut right inby sampling point 1A8	92.0
316134	1A9	"	0 + 2,275'	92.0
			No. 2 back entry	
316135	1B8	"	crosscut inby (right) sampling point 1B8	88.5
316136	1B8X	"		99.0
316137	1B9	"		99.0
			No. 3 back entry	
316138	1C8	"	crosscut right inby sampling point 1C8	95.5
316139	1C8X	"		95.0
316140	1C9	"		90.0
			No. 4 parallel entry	
	1D8X	"	no sample, roof fall	76.0
316141	1D9	"		78.5
316142	1D10	"		
			No. 5 parallel entry	
316143	1E8X	"	crosscut right inby sampling point 1E8	63.8
316144	1E9	"		84.5
316145	1E10	"		68.5
316146	1E10X	"	crosscut right inby sampling point 1E10	80.5
			No. 6 parallel entry	
316147	1F8X	"	crosscut right inby sampling point 1F8	62.9
316148	1F9	"		77.0
316149	1F10	"		75.5
316150	1F10X	"	crosscut right inby sampling point 1F10	69.0
			No. 7 track entry	
316151	1G9	"		84.0
316152	1G10	"		86.0
316153	1G10X	"	crosscut right inby sampling point 1G10	62.3



APPENDIX C

LAB. NOS. 316133-316161

Sheet No. 2

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED September 26-27, 1969

Consolidation Coal Company

Arthur Cross

MINE Consol No. 9

COMPANY Mountaineer Coal Company, Division of

COLLECTED BY Carl J. Shaffer and

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE
			No. 8 parallel entry	81.0
316154	LH9	band		79.5
316155	LH10	"		80.5
316156	LH10X	"	crosscut right inby sampling point LH10	
		"	No. 9 back entry	80.5
316157	LI9	"		75.5
316158	LI10	"		57.3
316159	LI10X	"	crosscut right inby sampling point LI10	
		"	No. 10 back entry	67.5
316160	LJ9	"		83.0
316161	LJ10	"		

LAB. NOS. 316162-316176

TABLE 3 ANALYSES OF DUST SAMPLES DATE COLLECTED September 28, 1969
 MINE Consol No. 9 COMPANY Mountaineer Coal Company, Division of Consolidation Coal Company COLLECTED BY Carl J. Shaffer and Arthur Cross

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE
DUST SURVEY SAMPLES				
rock dust survey continued				
main east entries				
			No. 1 back entry	
316162	1A10	band	0 + 2,565 feet	85.5
316163	1A10X	"	crosscut right inby sampling point 1A10	84.0
316164	1A11	"	0 + 2,855 feet	89.0
			No. 2 back entry	
316165	1B10	"		94.0
316166	1B10X	"	crosscut right inby sampling point 1B10	86.5
316167	1B11	"		77.0
			No. 3 back entry	
316168	1C10	"		94.5
316169	1C10X	"	crosscut right inby sampling point 1C10	77.0
316170	1C11	"		96.0
			No. 4 parallel entry	
316171	1D10X	"	crosscut right inby sampling point 1D10	74.0
316172	1D11	"		59.7
			No. 5 parallel entry	
	1E11		no sample, gas well barrier block	
			No. 6 parallel entry	
	1F11		no sample, gas well barrier block	
			No. 7 track entry	
316173	1G11	"		93.0
			No. 8 parallel entry	
316174	1H11	"		95.0
			No. 9 back entry	
316175	1I11	"		93.0
			No. 10 back entry	
316176	1J11	"		72.0

LAB. NOS. 316416-316430

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED

September 29, 1969

Consolidation Coal Company

Arthur Cross

MINE Consol No. 9

COMPANY

Mountaineer Coal Company, Division of

COLLECTED BY

Carl J. Shaffer and

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE
			DUST SURVEY SAMPLES	
			rock dust survey continued	
			main east entries	
			No. 1 back entry	
	1A12		0 + 3,125 feet wet, no sample	
	1A12		crosscut right inby 1A12 same	
			No. 2 back entry	
316416	1B12		wet, no sample	
	1B12X	band	crosscut right inby sampling point 1B12	77.5
			No. 3 back entry	
316417	1C12	"		95.0
316418	1C12X	"	crosscut right inby sampling point 1C12	51.3
			No. 4 parallel entry	
316419	1D12	"		55.7
316420	1D12X	"	crosscut right inby sampling point 1D12	66.5
			No. 5 parallel entry	
316421	1E12	"		74.0
316422	1E12X	"	crosscut right inby sampling point 1E12	71.0
			No. 6 parallel entry	
316423	1F12	"		53.4
316424	1F12X	"	crosscut right inby sampling point 1F12	81.0
			No. 7 track entry	
316425	1G12	"	wet, no sample	
	1G12X	"	crosscut right inby sampling point 1G12	86.0
			No. 8 parallel entry	
316426	1H12	"		80.0
316427	1H12X	"	crosscut right inby sampling point 1H12	92.5
			No. 9 back entry	
316428	1I12	"		83.0
316429	1I12X	"	crosscut right inby sampling point 1I12	49.0
			No. 10 back entry	
316430	1J12	"		84.0

TABLE 3 ANALYSES OF DUST SAMPLES DATE COLLECTED September 25-26, 1969
 Consolidation Coal Company Anthony Fumich

MINE Consol No. 9 COMPANY Mountaineer Coal Company, Division of COLLECTED BY Joseph Norwich and

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
DUST SURVEY SAMPLES					
No. 3 survey main west entries zero = No. 1 entry of E face - 45 feet No. 1 back entry					
315976	3A1	band	0 + 0'	trace	97.0
315977	3A2	"	0 + 270'	small	82.9
315978	3A2X	"	0 + 270' inby crosscut	small	90.6
315979	3A3	"	0 + 540'	trace	99.0
315980	3A4	"	0 + 810'	trace	100.0
315981	3A4X	"	0 + 810' inby crosscut	trace	100.0
315982	3A5	"	0 + 1,080'	trace	99.5
315983	3A6	"	0 + 1,350'	trace	99.5
	3A6X		0 + 1,350' inby crosscut	fall	
	3A7		0 + 1,620'	"	
	3A8		0 + 1,890'	"	
	3A8X		0 + 1,890' inby crosscut	"	
	3A9		0 + 2,160'	falls	
	3A10		0 + 2,430'	"	
	3A10X		0 + 2,430' inby crosscut	"	
	3A11		0 + 2,700'	"	
	3A12		0 + 2,970'	"	
	3A12X		0 + 2,970' inby crosscut	"	
	3A13		0 + 3,240'	"	
	3A14		0 + 3,510'	"	
	3A14X		0 + 3,510' inby crosscut	"	
	3A15		0 + 3,780'	"	
	3A16		0 + 4,050'	"	
No. 2 back entry					
315984	3B1	"		trace	98.0
315985	3B2	"		trace	90.0

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED

September 25-26, 1969

Consolidation Coal Company

Anthony Fumich

MINE Consol No. 9

COMPANY

Mountaineer Coal Company, Division of

COLLECTED BY Joseph Norwich and

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
315986	3B2X	band	inby crosscut	small	89.8
315987	3B3	"		trace	100.0
315988	3B4	"		trace	98.5
315989	3B4X	"	inby crosscut	trace	100.0
315990	3B5	"		trace	96.0
	3B6		fall		
315991	3B6X	ribs	inby crosscut	trace	75.0
	3B7		fall		
	3B8		"		
315992	3B8X	roof and ribs	inby crosscut	trace	68.3
	3B9		fall		
	3B10		"		
	3B10X		inby crosscut	"	
	3B11		"	"	
	3B12		"	"	
	3B12X		inby crosscut	"	
	3B13		"	"	
	3B14		"	"	
	3B14X		inby crosscut	"	
	3B15		"	"	
	3B16		"	"	
			No. 3 parallel entry		
315993	3C1	band		trace	84.5
315994	3C2	"		trace	71.5
315995	3C2X	"	inby crosscut	trace	89.5
315996	3C3	"		trace	90.0
315997	3C4	roof and rib		small	82.6
315998	3C4X	band	inby crosscut	trace	97.5
315999	3C5	"		trace	95.5
	3C6	"	no sample received		

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED

September 25-26, 1969

Consolidation Coal Company

Anthony Fumich

MINE Consol No. 9

COMPANY

Mountaineer Coal Company, Division of

COLLECTED BY Joseph Norwich and

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
316000	3C6X	band	inby crosscut	trace	89.0
316001	3C7	"	"	trace	90.5
316002	3C8	"	"	trace	78.5
	3C8X		inby crosscut		
	3C9		sealed off		
	3C10		fall		
	3C10X		"		
316003	3C10X	"	inby crosscut	trace	71.0
316004	3C11	"	"	trace	70.0
316005	3C12	"	"	trace	87.5
316006	3C12X	"	inby crosscut	trace	71.5
	3C13		fall		
	3C14		"		
	3C14X		inby crosscut		
	3C15		"		
	3C16		"		
			No. 4 track (haulage) entry		
316007	3D1	roof and rib		trace	98.5
316008	3D2	same		trace	98.5
316009	3D2X	same	inby crosscut	small	85.3
316010	3D3	same		trace	95.5
316011	3D4	same		trace	95.0
316012	3D4X	band	inby crosscut	trace	91.0
316013	3D5	roof and rib		trace	92.0
316014	3D6	same		none	92.0
316015	3D6X	band	inby crosscut	trace	85.5
316016	3D7	roof and rib		trace	95.5
316017	3D8	band		trace	83.0
	3D8X		inby crosscut		
			sealed off		
316018	3D9	roof and rib		none	80.0
316019	3D10	same		none	81.0

TABLE 3 ANALYSES OF DUST SAMPLES DATE COLLECTED September 25-26, 1969

Consolidation Coal Company

Anthony Fumich

MINE Consol No. 9

COMPANY Mountaineer Coal Company, Division of

COLLECTED BY Joseph Norwich and

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
316020	3D10X		inby crosscut fall		
	3D11	roof and rib		trace	76.0
316021	3D12	same		trace	74.5
316022	3D12X	band	inby crosscut	trace	96.5
316023	3D13	roof and rib		trace	60.0
316024	3D14	same		trace	73.5
	3D14X		inby crosscut fall		
316025	3D15	same		small	59.8
316026	3D16	same		trace	65.5
			No. 5 parallel entry		
316027	3E1	band		small	77.6
316028	3E2	roof and rib		trace	93.5
316029	3E2X	same	inby crosscut	small	88.4
316030	3E3	same		trace	86.5
316031	3E4	same		trace	81.0
	3E4X		inby crosscut fall		
316032	3E5	same		trace	92.0
316033	3E6	same		trace	81.0
316034	3E6X	same	inby crosscut	trace	87.5
	3E7		fall		
	3E8		"		
	3E8X		inby crosscut sealed off		
	3E9		fall		
	3E10		"		
	3E10X		inby crosscut		
	3E11		"		
	3E12		"		
	3E12X		inby crosscut		
	3E13		"		
	3E14		"		
	3E14X		inby crosscut		

LAB. NOS. 315976-316044

Sheet No. 5

TABLE 3 ANALYSES OF DUST SAMPLES DATE COLLECTED September 25-26, 1969
 MINE Consol No. 9 COMPANY Mountaineer Coal Company, Division of Consolidation Coal Company COLLECTED BY Anthony Fumich Joseph Norwich and

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
	3E15		fall		
	3E16		"		
			No. 6 parallel entry		
316035	3F1	band		small	63.6
316036	3F2	roof and rib		trace	85.0
316037	3F2X	rib	inby crosscut	small	74.6
316038	3F3	roof and rib		small	86.5
316039	3F4	ribs		small	85.8
316040	3F4X	roof and ribs	inby crosscut	trace	89.5
316041	3F5	ribs		trace	84.5
	3F6		fall		
	3F6X		"		
	3F7		"		
	3F8		"		
	3F8X		inby crosscut		
	3F9		"		
	3F10		"		
	3F10X		inby crosscut		
	3F11		"		
	3F12		"		
	3F12X		inby crosscut		
	3F13		"		
	3F14		"		
	3F14X		inby crosscut		
	3F15		"		
	3F16		"		
			No. 7 parallel entry		
			fall		
			"		
316042	3G1				
	3G2				
	3G3	roof and ribs		small	88.5

LAB. NOS. 315976-316044

Sheet No. 6

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED

September 25-26, 1969

Consolidation Coal Company

Anthony Fumich

MINE

Consol No. 9

COMPANY

Mountaineer Coal Company, Division of

COLLECTED BY

Joseph Norwich and

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
316043	3G4	roof and ribs		trace	92.0
316044	3G5	ribs		trace	95.5
	3G6		falls		
	3G7		"		
	3G8		"		
	3G9		"		
	3G10		"		
	3G11		"		
	3G12		"		
	3G13		"		
	3G14		"		
	3G15		"		
	3G16		"		

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED

September 26, 1969

Consolidation Coal Company

Anthony Fumich, and Joseph Norwich

MINE Consol No. 9

COMPANY Mountaineer Coal Company, Division of

COLLECTED BY Peter N. Fanok, W. M. Cordray,

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
			Survey No. 4 DUST SURVEY SAMPLES sampling area = main west headings zero = 39 feet inby station No. 297 at crosscut No. 8 No. 1 heading (intake)		
	4A1		0 + 00 fall		
315904	4A2	band	0 + 270'	large	79.2
315905	4A2X	"	0 + 270' inby crosscut	trace	79.0
315906	4A3	"	0 + 540'	trace	91.0
315907	4A4	"	0 + 810'	trace	93.5
315908	4A4X	roof and ribs	0 + 810' inby crosscut floor wet	small	79.4
315909	4A5	band	0 + 1,080'	trace	99.0
315910	4A6	"	0 + 1,350'	trace	100.0
	4A6X		0 + 1,350' inby crosscut fall		
	4A7		0 + 1,620' "		
	4A8		0 + 1,890' "		
	4A8X		0 + 1,890' inby crosscut "		
315911	4A9	"	0 + 2,160' (return)	trace	100.0
315912	4A10	"	0 + 2,430' "	trace	99.0
315913	4A10X	"	0 + 2,430' inby crosscut "	trace	100.0
315914	4A11	"	0 + 2,700' "	trace	100.0
			No. 2 heading (intake)		
315915	4B1	"	0 + 00	trace	98.0
315916	4B2	ribs	0 + 270' fall on floor	small	83.6
315917	4B2X	band	0 + 270' inby crosscut	trace	74.5
315918	4B3	roof and ribs	0 + 540' floor wet	trace	81.5
315919	4B4	same	0 + 810' same	trace	93.0
315920	4B4X	same	0 + 810' inby crosscut same	small	78.9
315921	4B5	band	0 + 1,080'	trace	87.5
315922	4B6	"	0 + 1,350'	trace	87.5
	4B6X		0 + 1,350' inby crosscut fall		

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED

September 26, 1969

Consolidation Coal Company

Anthony Fumich, and Joseph Norwich

MINE Consol No. 9

COMPANY Mountaineer Coal Company, Division of

COLLECTED BY Peter N. Fanok, W. M. Cordray,

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
	4B7		0 + 1,620' fall		
	4B8		0 + 1,890' "		
	4B8X		0 + 1,890' inby crosscut "		
315923	4B9	band	0 + 2,160' (return)	none	100.0
315924	4B10	"	0 + 2,430' "	trace	96.5
315925	4B10X	"	0 + 2,430' inby crosscut "	small	88.0
315926	4B11	"	0 + 2,700' "	trace	100.0
			No. 3 heading (intake)		
315927	4C1	"	0 + 00	none	90.0
315928	4C2	"	0 + 270'	trace	88.0
315929	4C2X	"	0 + 270' inby crosscut	trace	87.5
315930	4C3	"	0 + 540'	trace	87.0
315931	4C4	"	0 + 810'	small	84.0
315932	4C4X	"	0 + 810' inby crosscut	small	79.3
315933	4C5	"	0 + 1,080'	trace	91.0
315934	4C6	"	0 + 1,350'	trace	96.0
	4C6X		0 + 1,350' inby crosscut fall		
	4C7		0 + 1,620' "		
	4C8		0 + 1,890' "		
	4C8X		0 + 1,890' inby crosscut "		
315935	4C9	"	0 + 2,160'	small	86.7
315936	4C10	"	0 + 2,430'	small	89.5
315937	4C10X	"	0 + 2,430' inby crosscut	trace	97.0
315938	4C11	"	0 + 2,700'	small	88.2
			No. 4 heading (intake)		
315939	4D1	roof and ribs	0 + 00 floor wet	trace	100.0
315940	4D2	ribs	0 + 270' roof 8 feet - floor wet	trace	100.0
315941	4D2X	band	0 + 270' inby crosscut	small	91.2
315942	4D3	ribs	0 + 540' roof 8 feet - floor wet	trace	97.0
315943	4D4	"	0 + 810' same	small	95.1

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED

September 26, 1969

Consolidation Coal Company

Anthony Fumich, and Joseph Norwich

MINE Consol No. 9

COMPANY Mountaineer Coal Company, Division of

COLLECTED BY Peter N. Fanok, W. M. Cordray,

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
315944	4D4X	roof and ribs	0 + 810' inby crosscut	floor wet	large 69.1
315945	4D5	ribs	0 + 1,080'	roof 8 feet - floor wet	trace 100.0
315946	4D6	"	0 + 1,350'	same	trace 100.0
	4D6X		0 + 1,350' inby crosscut	fall	
315947	4D7	band	0 + 1,620'		trace 99.0
315948	4D8	roof and ribs	0 + 1,890'	floor wet	trace 100.0
	4D8X		0 + 1,890' inby crosscut	fall	
315949	4D9	same	0 + 2,160'	floor wet	trace 100.0
315950	4D10	same	0 + 2,430'	same	trace 97.0
315951	4D10X	band	0 + 2,430' inby crosscut		small 83.9
315952	4D11	roof and ribs	0 + 2,700'	floor wet	trace 100.0
			No. 5 heading (intake)		
315953	4E1	band	0 + 00'		trace 83.0
315954	4E2	"	0 + 270'		small 80.6
315955	4E2X	"	0 + 270' inby crosscut		small 98.3
315956	4E3	"	0 + 540'		trace 97.5
315957	4E4	roof and ribs	0 + 810'	floor wet	small 64.8
315958	4E4X	band	0 + 810' inby crosscut		trace 99.0
	4E5		0 + 1,080'	fall	
315959	4E6	"	0 + 1,350'		trace 79.0
	4E6X		0 + 1,350' inby crosscut	fall	
	4E7		0 + 1,620'	"	
	4E8		0 + 1,890'	"	
	4E8X		0 + 1,890' inby crosscut	"	
	4E9		0 + 2,160'		
315960	4E10	"	0 + 2,430'		trace 95.5
315961	4E10X	"	0 + 2,430' inby crosscut		small 96.7
315962	4E11	"	0 + 2,700'		trace 66.1

TABLE 3 ANALYSES OF DUST SAMPLES DATE COLLECTED September 26, 1969
 MINE Consol No. 9 COMPANY Mountaineer Coal Company, Division of Consolidation Coal Company COLLECTED BY Peter N. Fanok, W. M. Cordray, Anthony Fumich, and Joseph Norwich

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
No. 6 heading (intake)					
315963	4F1	roof and ribs	0 + 00 floor wet	small	91.8
315964	4F2	same	0 + 270' same	small	96.7
315965	4F2X	same	0 + 270' inby crosscut	small	94.3
315966	4F3	same	0 + 540' same	trace	91.5
315967	4F4	same	0 + 810' same	large	80.2
315968	4F4X	band	0 + 810' inby crosscut	trace	94.0
	4F5		0 + 1,080' fall		
	4F6		0 + 1,350' "		
	4F6X		0 + 1,350' inby crosscut		
	4F7		0 + 1,620' "		
	4F8		0 + 1,890' "		
	4F8X		0 + 1,890' inby crosscut		
315969	4F9	roof and ribs	0 + 2,160' floor wet	small	88.5
315970	4F10	band	0 + 2,430' "	small	93.8
315971	4F10X	roof and ribs	0 + 2,430' inby crosscut	small	93.6
	4F11		0 + 2,700' fall		
No. 7 heading (intake)					
315972	4G1	band	0 + 00	small	91.5
315973	4G2	"	0 + 270'	large	90.9
315974	4G3	roof and ribs	0 + 540' floor wet	small	93.0
315975	4G4	band	0 + 810'	small	76.2
	4G5		0 + 1,080' fall		
	4G6		0 + 1,350' "		
	4G7		0 + 1,620' "		
	4G8		0 + 1,890' "		
	4G9		0 + 2,160' "		
	4G10		0 + 2,430' "		
	4G11		0 + 2,700' "		

LAB. NOS. 316461-316514

Sheet No. 1

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED

September 26-29, 1969

Consolidation Coal Company

Harry T. Pigott

MINE Consol No. 9

COMPANY

Mountaineer Coal Company, Division ofCOLLECTED BY Thomas E. Kabulski and

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE
DUST SURVEY SAMPLES				
survey No. 5				
survey area = A face headings				
zero = 40 feet inby station No. 3240 No. 8 entry				
No. 1 entry (back)				
316461	5A1	band	0 + 00'	80.0
316462	5A2	"	0 + 250'	88.5
316463	5A2X	"	0 + 250' 15 feet right crosscut	92.0
316464	5A3	"	0 + 500'	81.5
316465	5A4	"	0 + 750'	97.5
316466	5A4X	"	0 + 750' 15 feet right crosscut	82.5
316467	5A5	"	0 + 1,000'	100.0
No. 2 entry (back)				
316468	5B1	"		76.5
316469	5B2	"		92.0
316470	5B2X	"	15 feet right crosscut	77.5
316471	5B3	"		85.5
316472	5B4	"		70.0
316473	5B4X	"	15 feet right crosscut	89.5
316474	5B5	"		94.0
No. 3 entry (track)				
316475	5C1	"		97.0
316476	5C2	"		94.0
316477	5C2X	"		77.5
316478	5C3	"		95.0
316479	5C4	"		98.0
316480	5C4X	"	15 feet right crosscut	89.5
316481	5C5	"		95.0
No. 4 entry (parallel)				
316482	5D1	"		78.0
316483	5D2	"		75.5

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED

September 26-29, 1969

Consolidation Coal Company

Harry T. Pigott

MINE Consol No. 9

COMPANY Mountaineer Coal Company, Division of

COLLECTED BY Thomas E. Kabulski and

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE
316484	5D2X	band	15 feet right crosscut	76.5
316485	5D3	"		84.0
316486	5D4	"		97.5
316487	5D4X	"		88.5
316488	5D5	"		99.5
			No. 5 entry (parallel)	
316489	5E1	"		59.0
316490	5E2	"		82.0
316491	5E2X	"	15 feet right crosscut	79.5
316492	5E3	"		86.0
316493	5E4	"		87.0
316494	5E4X	"	15 feet right crosscut	76.0
316495	5E5	"		92.0
			No. 6 entry (parallel)	
316496	5F1	"		94.0
316497	5F2	"		86.0
316498	5F2X	"	15 feet right crosscut	87.5
316499	5F3	"		92.5
316500	5F4	"		84.5
316501	5F4X	"	25 feet right crosscut	92.0
316502	5F5	roof and ribs	floor wet	74.0
			No. 7 entry (parallel)	
316503	5G1	band		66.0
316504	5G2	"		86.5
316505	5G2X	"	15 feet right crosscut	89.0
316506	5G3	"		92.0
316507	5G4	"		99.5
316508	5G4X	roof and ribs	15 feet right crosscut - floor wet	100.0
316509	5G5	same	floor wet	90.0

LAB. NOS. 316461-316514

Sheet No. 3

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED September 26-29, 1969

Consolidation Coal Company

Harry T. Pigott

MINE Consol No. 9

COMPANY Mountaineer Coal Company, Division of

COLLECTED BY Thomas E. Kabulski and

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE
			No. 8 entry (parallel)	
316510	5H1	band		87.0
316511	5H2	"		87.5
316512	5H3	"		73.0
316513	5H4	roof and ribs	floor wet	86.5
316514	5H5	same	floor wet	76.0

LAB. NOS. 316880-316918

Sheet No. 1

TABLE 3 ANALYSES OF DUST SAMPLES DATE COLLECTED September 30 and October 1, 1969

Consolidation Coal Company Harry T. Pigott, and Arthur L. Cross

MINE Consol No. 9

COMPANY Mountaineer Coal Company, Division of

COLLECTED BY Thomas E. Kabulski,

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE
			DUST SURVEY SAMPLES	
			survey No. 7	
			sampling area = main west entries	
			zero = borehole + 40 feet No. 2 entry	
			No. 1 entry (parallel)	
	7A1		0 + 00	sump
	7A2		0 + 340	fall
316880	7A2X	band	0 + 340 15 feet right crosscut	90.0
	7A3		0 + 590	fall
	7A4		0 + 925	wet
316881	7A4X	"	0 + 925 15 feet right crosscut	65.5
	7A5		0 + 1,225	fall
	7A6		0 + 1,515	"
	7A6X		0 + 1,515	"
	7A7		0 + 1,815	"
	7A8		0 + 2,105	"
	7A8X		0 + 2,105	"
	7A9		0 + 2,355	"
	7A10		0 + 3,645	"
316882	7A10X	"	0 + 3,645 15 feet right crosscut	71.0
	7A11		0 + 3,925	fall
	7A12		0 + 4,265	"
	7A12X		0 + 4,265	"
			No. 2 entry (parallel)	
	7B1			fall
	7B2			"
316883	7B2X	"	15 feet right crosscut	74.0
	7B3		fall	
	7B4		wet	
316884	7B4X	floor and ribs	15 feet right crosscut	56.0

TABLE 3 ANALYSES OF DUST SAMPLES DATE COLLECTED September 30 and October 1, 1969
 MINE Consol No. 9 COMPANY Mountaineer Coal Company, Division of Consolidation Coal Company COLLECTED BY Harry T. Pigott, and Arthur L. Cross
Thomas E. Kabulski,

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE	
316885	7B5	band	fall	60.9	
	7B6		"		
	7B6X		"		
	7B7		"		
	7B8		"		
	7B8X		"		
	7B9		"		
	7B10		fall and bad top		
	7B10X		15 feet right crosscut		
	7B11		fall		
	7B12		fall and bad top		
	7B12X		fall		
316886	7C1	"	No. 3 entry (parallel)	69.0	
	7C2		not developed		
	7C2X		same		
316887	7C3	"	fall	54.0	
	7C4				
316888	7C4X	floor and ribs		65.5	
	7C5		fall		
	7C6		"		
	7C6X		"		
	7C7		"		
	7C8		"		
	7C8X		"		
	7C9		"		
	7C10		band		
	7C10X		"		15 feet right crosscut
	7C11				fall
	7C12				"
7C12X		"			
316889				85.5	
316890				82.5	

LAB. NOS. 316880-316918

Sheet No. 3

TABLE 3 ANALYSES OF DUST SAMPLES DATE COLLECTED September 30 and October 1, 1969

Consolidation Coal Company Harry T. Pigott, and Arthur L. Cross

MINE Consol No. 9 COMPANY Mountaineer Coal Company, Division of COLLECTED BY Thomas E. Kabulski,

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE
			No. 4 entry (track)	
316891	7D1	band		99.0
316892	7D2	"		95.0
316893	7D2X	"	15 feet right crosscut	80.0
316894	7D3	ribs	floor wet	88.5
316895	7D4	floor and ribs		88.5
	7D4X		15 feet right crosscut - no sample received	
316896	7D5	same		95.0
316897	7D6	same		99.0
316898	7D6X	same	15 feet right crosscut	97.5
316899	7D7	same		99.0
316900	7D8	band		93.5
316901	7D8X	"	15 feet right crosscut	99.0
316902	7D9	"		97.5
316903	7D10	"		100.0
316904	7D10X	"	15 feet right crosscut	79.0
316905	7D11	"		99.5
316906	7D12	"		65.5
	7D12X		fall	
			No. 5 entry (parallel)	
316907	7E1	"		98.0
	7E2		not developed	
	7E2X		same	
	7E3		fall	
	7E4		"	
	7E4X		"	
316908	7E5	"		83.5
316909	7E6	"		76.5
	7E6X		fall	
316910	7E7	"		82.5

LAB. NOS. 316880-316918

Sheet No. 4

TABLE 3 ANALYSES OF DUST SAMPLES DATE COLLECTED September 30 and October 1, 1969

Consolidation Coal Company Harry T. Pigott, and Arthur L. Cross

MINE Consol No. 9 COMPANY Mountaineer Coal Company, Division of COLLECTED BY Thomas E. Kabulski,

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE			
316911	7E8	band	fall	86.0			
	7E8X		"				
316912	7E9	"	"	84.0			
	7E10						
316913	7E10X	"	fall	80.0			
	7E11						
	7E12						
	7E12X						
316914	7F1	"	No. 6 entry (parallel)	100.0			
	7F2						
316915	7F2X	"	fall	69.0			
	7F3						
	7F4						
	7F4X						
	7F5						
	7F6						
	7F6X						
	7F7						
	7F8						
	7F8X						
	316916		7F9		"	"	70.0
			7F10				
7F10X							
7F11							
7F12							
7F12X							
316917	7G1	"	No. 7 entry (parallel)	100.0			
	7G2						
			25				

LAB. NOS. 316880-316918

Sheet No. 5

TABLE 3 ANALYSES OF DUST SAMPLES DATE COLLECTED September 30 and October 1, 1969
 MINE Consol No. 9 COMPANY Mountaineer Coal Company, Division of Consolidation Coal Company COLLECTED BY Harry T. Pigott, and Arthur L. Cross
Thomas E. Kabulski,

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE
316918	7G3	band	fall	92.5
	7G4		"	
	7G5		"	
	7G6		"	
	7G7		"	
	7G8		"	
	7G9		fall	
	7G10		"	
	7G11		"	
	7G12		"	

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED

September 30, 1969

Consolidation Coal Company

Arthur Cross

MINE Consol No. 9

COMPANY Mountaineer Coal Company, Division of

COLLECTED BY

Carl J. Shaffer and

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE
			DUST SURVEY SAMPLES	
			survey No. 9	
			sampling area = main haulageways - starting at 45-degree entries at main west toward main north entries	
			station No. 3175 + 45 feet = 0 + 00	
			No. 1 parallel entry	
316675	9A1	band	0 + 00	76.5
316676	9A2	"	0 + 270'	69.5
316677	9A3	"	0 + 540'	85.0
316678	9A3X	"	crosscut right inby sampling point 9A3	45.0
316679	9A4	"	0 + 710'	75.0
316680	9A5	"	0 + 980'	83.0
	9A6		0 + 1,150' no sample, entry discontinued at intersection of north mains	
	9A7		0 + 1,410' no sample	
	9A8		0 + 1,680' same	
	9A9		0 + 1,950' same	
	9A10		0 + 2,220' same	
	9A11		0 + 2,470' same	
			No. 2 track entry	
316681	9B1	"		93.0
316682	9B2	"		93.0
316683	9B3	"		92.0
316684	9B3X	"	crosscut right inby sampling point 9B3	89.0
316685	9B4	"		92.0
316686	9B5	"		94.5
316687	9B6	"		91.5
	9B6X		no sample, crosscut not developed	
316688	9B7	"		85.0

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED

September 30, 1969

Consolidation Coal Company

Arthur Cross

MINE Consol No. 9

COMPANY Mountaineer Coal Company, Division of

COLLECTED BY

Carl J. Shaffer and

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	AS-RECEIVED PERCENT INCOMBUSTIBLE
316689	9B8	band		77.0
316690	9B9	"		94.0
316691	9B9X	"	crosscut right inby sampling point 9B9	74.0
316692	9B10	"		80.0
316693	9B11	"		81.5
			No. 3 parallel entry	
316694	9C1	"		82.5
316695	9C2	"		76.0
316696	9C3	"		83.0
316697	9C4	"		87.5
316698	9C5	"		80.0
316699	9C6	"		93.0
316700	9C7	"	station 9C7 - became track entry at this location	81.5
316701	9C8	"		87.5
316702	9C9	"		88.0
316703	9C10	"		89.0
316704	9C11	"		97.0

TABLE 3 ANALYSES OF DUST SAMPLES DATE COLLECTED November 14, 1969
 MINE Consol No. 9 COMPANY Mountaineer Coal Company, Division of Consolidation Coal Company COLLECTED BY P. M. Shay, and J. Norwich
C. J. Shaffer, P. N. Fanok,

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
			DUST SURVEY SAMPLES		
			survey No. 11		
			sampling area = main west entries		
			zero = No. 5 entry station No. 730 + 40 feet		
			(starting at 3 north)		
			No. 1 entry (back)		
			0 + 00' no sample, roof fall		
			0 + 280' same		
			0 + 560' same		
321223	11A1 11A2 11A3 11A3X 11A4	roof and ribs	0 + 560' inby crosscut floor wet	trace	32.0
			0 + 840' no sample, roof fall		
			0 + 1,120' same		
321224	11A5 11A6	band	0 + 1,400'	large	38.2
321225	11A6X	"	0 + 1,400' inby crosscut	large	66.0
			0 + 1,680' no sample, inaccessible		
321226	11A7 11A8 11A9 11A9X 11A10	"	0 + 1,960'	none	19.8
			0 + 2,240' no sample, inaccessible		
			0 + 2,240' inby crosscut same		
			0 + 2,520' same		
			No. 2 entry (back)		
321227	11B1 11B2	"	no sample, roof fall	trace	48.0
				none	45.5
321228	11B3	"		trace	28.5
321229	11B3X	roof and ribs	floor wet	trace	41.3
321230	11B4	same	same	small	38.7
321231	11B5 11B6	band			
			no sample, roof fall	small	38.1
321232	11B6X	"			
			no sample, inaccessible	trace	12.5
321233	11B7 11B8 11B9	"			
			no sample, inaccessible		

TABLE 3 ANALYSES OF DUST SAMPLES DATE COLLECTED November 14, 1969

Consolidation Coal Company

P. M. Shay, and J. Norwich

MINE Consol No. 9

COMPANY Mountaineer Coal Company, Division of

COLLECTED BY C. J. Shaffer, P. N. Fanok,

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
	11B9X 11B10		no sample, inaccessible same		
			No. 3 entry (parallel)		
321234	11C1		no sample, roof fall		
	11C2	band		small	44.2
321235	11C3	roof and ribs	floor wet	trace	44.3
321236	11C3X	same	same	large	46.9
321237	11C4	same	same	small	45.0
321238	11C5	same	same	trace	34.2
321239	11C6	same	same	trace	45.2
321240	11C6X	band		large	31.0
	11C7		no sample, inaccessible		
321241	11C8	"		trace	19.9
	11C9		no sample, inaccessible		
	11C9X		same		
	11C10		same		
			No. 4 entry (parallel)		
321242	11D1	roof and ribs	floor wet	trace	86.0
321243	11D2	same	same	trace	43.0
321244	11D3	same	same	large	48.8
321245	11D3X	same	same	small	32.7
	11D4		no sample, wet		
321246	11D5	same	floor wet	small	34.2
321247	11D6	same	same	small	37.5
321248	11D6X	band		large	26.7
	11D7		no sample, inaccessible		
321249	11D8	"		small	16.3
	11D9		no sample, inaccessible		
	11D9X		same		
	11D10		same		
			30		

LAB. NOS. 321223-321280

Sheet No. 3

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED November 14, 1969

Consolidation Coal Company

P. M. Shay, and J. Norwich

MINE Consol No. 9COMPANY Mountaineer Coal Company, Division ofCOLLECTED BY C. J. Shaffer, P. N. Fanok,

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
			No. 5 entry (parallel)		
321250	11E1	band		trace	77.0
321251	11E2	"		large	39.0
321252	11E3	roof and ribs	floor wet	trace	41.0
321253	11E3X	same	same	small	29.7
321254	11E4	same	same	trace	30.5
321255	11E5	band		small	32.4
321256	11E6	"		trace	23.6
321257	11E6X	"		small	28.3
321258	11E7	"		small	31.0
321259	11E8	"		large	27.1
321260	11E9	"		trace	21.3
321261	11E9X	"		small	27.4
321262	11E10	"		small	25.9
			No. 6 entry (track)		
	11F1		no sample, inaccessible		
	11F2		same		
321263	11F3	roof and ribs	floor wet	trace	37.0
321264	11F3X	same	same	trace	32.5
	11F4		no sample, roof fall		
321265	11F5	same	floor wet	trace	42.5
321266	11F6	band		small	52.8
321267	11F6X	"		small	59.0
321268	11F7	roof and ribs	floor wet	small	40.1
321269	11F8	same	same	trace	12.0
321270	11F9	same	same	trace	5.0
321271	11F9X	band		large	34.1
321272	11F10	roof and ribs	floor wet	large	22.0
			No. 7 entry (back)		
	11G1		no sample, inaccessible		
	11G2		same		

LAB. NOS. 321223-321260

Sheet No. 4

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED

November 14, 1969

Consolidation Coal Company

P. M. Shay, and J. Norwich

MINE Consol No. 9

COMPANY Mountaineer Coal Company, Division of

COLLECTED BY C. J. Shaffer, P. N. Fanok,

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
321273	11G3	roof and ribs	no sample, wet	large	37.8
	11G4		no sample, roof fall		
	11G5		no sample, wet		
	11G6		floor wet		
	11G7		no sample, roof fall		
321274	11G8	band	large	32.5	
321275	11G9	"	large	29.9	
321276	11G9X	"	large	31.7	
321277	11G10	"	large	26.2	
			No. 8 entry		
	11H1		no sample, inaccessible		
	11H2		same		
	11H3		same		
	11H3X		same		
	11H4		same		
	11H5		same		
	11H6		same		
	11H6X		same		
	11H7		no sample, fall		
321278	11H8	"		small	29.6
321279	11H9	roof and ribs	floor wet	trace	31.8
	11H9X		no sample received		
321280	11H10	same	floor wet	small	25.4
			No. 9 entry		
	11I1		not developed		
	11I2		same		
	11I3		same		
	11I4		same		
	11I5		same		
	11I6		same		
	11I7		no sample, fall		
			I entry not developed		
			two additional entries developed at survey station No. 7		

LAB. NOS. 334947-334975

Sheet No. 1

TABLE 3 ANALYSES OF DUST SAMPLES DATE COLLECTED May 11, 1970

Consolidation Coal Company

MINE Consol No. 9 COMPANY Mountaineer Coal Company, Division of COLLECTED BY Peter N. Fanok

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
DUST SURVEY SAMPLES					
survey No. 12					
sampling area = main west entries					
zero = No. 1 entry station No. 2983 + 140 feet					
No. 1 entry					
334947	12A1	band	0 + 0	extra large	53.6
334948	12A2	"	0 + 270'	extra large	38.3
334949	12A3	"	0 + 540'	extra large	43.2
	12A3X		0 + 540' inby crosscut	fall, no sample	
334950	12A4	"	0 + 780'	extra large	42.5
No. 2 entry					
334951	12B1	"	0 + 0	extra large	43.9
334952	12B2	"	0 + 270'	extra large	65.9
334953	12B3	"	0 + 540'	extra large	46.8
334954	12B3X	"	0 + 540' inby crosscut	extra large	37.0
334955	12B4	"	0 + 780'	extra large	38.4
No. 3 entry					
334956	12C1	"	0 + 0	extra large	37.3
334957	12C2	"	0 + 270'	extra large	40.5
334958	12C3	"	0 + 540'	extra large	37.5
334959	12C3X	"	0 + 540' inby crosscut	extra large	33.8
334960	12C4	"	0 + 780'	extra large	35.7
No. 4 entry					
	12D1		0 + 0	fall, no sample	
	12D2		0 + 270'	same	
334961	12D3	"	0 + 540'	extra large	38.0
	12D3X		0 + 540' inby crosscut	fall, no sample	
334962	12D4	"	0 + 780'	extra large	45.9

TABLE 3 ANALYSES OF DUST SAMPLES DATE COLLECTED May 11, 1970

Consolidation Coal Company

MINE Consol No. 9 COMPANY Mountaineer Coal Company, Division of COLLECTED BY Peter N. Fanok

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
			No. 5 entry		
334963	12E1	roof and ribs	0 + 0 floor wet	extra large	42.2
334964	12E2	band	0 + 270'	extra large	45.7
334965	12E3	"	0 + 540'	extra large	39.8
	12E3X		0 + 540' inby crosscut fall, no sample		
334966	12E4	"	0 + 780'	extra large	46.7
			No. 6 entry		
334967	12F1	roof and ribs	0 + 0 floor wet	extra large	34.0
	12F2		0 + 270' fall, no sample		
334968	12F3	ribs	0 + 540' floor wet	extra large	42.2
	12F3X		0 + 540' inby crosscut fall, no sample		
	12F4		0 + 780' wet, no sample		
			No. 7 entry		
334969	12G1	band	0 + 0	extra large	35.6
334970	12G2	roof and ribs	0 + 270' floor wet	extra large	28.8
334971	12G3	band	0 + 540'	extra large	36.7
334972	12G3X	"	0 + 540' inby crosscut	extra large	38.0
334973	12G4	"	0 + 780'	extra large	33.4
			No. 8 entry		
	12H1		0 + 0 wet, no sample		
	12H2		0 + 270' same		
334974	12H3	"	0 + 540'	extra large	36.1
	12H3X		0 + 540' inby crosscut wet, no sample		
334975	12H4	"	0 + 780'	extra large	32.4
			No. 9 entry		
	12I1		0 + 0 fall, no sample		
	12I2		0 + 270' same		
	12I3		0 + 540' wet, no sample		
	12I3X		0 + 540' inby crosscut same		
	12I4		0 + 780' not driven, no sample		

LAB. NOS. 334947-334975

Sheet No. 3

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED

May 11, 1970

Consolidation Coal Company

MINE Consol No. 9

COMPANY Mountaineer Coal Company, Division of

COLLECTED BY

Peter N. Fanok

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
			No. 10 entry		
	12J1		0 + 0		
	12J2		0 + 270'		
	12J3		0 + 540'		
	12J3X		0 + 540' inby crosscut		
	12J4		0 + 780'		

LAB. NOS. 334976-334981

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED May 12, 1970

Consolidation Coal Company

MINE Consol No. 9

COMPANY Mountaineer Coal Company, Division of

COLLECTED BY Peter N. Fanok

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
			DUST SURVEY SAMPLES		
			survey No. 13 sampling area = main west parallels zero = No. 4 entry station No. 3353 + 230 feet		
			No. 1 entry		
334976	13A1	band	0 + 0	large	52.3
	13A2	"	0 + 270' wet, no sample		
334977	13A3	"	0 + 540'	extra large	41.5
334978	13A3X	"	0 + 540' inby crosscut	extra large	42.4
			No. 2 entry		
	13B1		0 + 0 inaccessible, no sample		
	13B2		0 + 270' wet, no sample		
334979	13B3	"	0 + 540'	extra large	33.8
334980	13B3X	"	0 + 540' inby crosscut	extra large	38.7
			No. 3 entry		
	13C1	"	0 + 0 wet, no sample		
334981	13C2	"	0 + 270'	extra large	35.9
	13C3	"	0 + 540' inaccessible, no sample		
	13C3X		0 + 540' inby crosscut same		
			No. 4 entry		
	13D1		0 + 0 wet, no sample		
	13D2		0 + 270' same		
	13D3		0 + 540' inaccessible, no sample		
	13D3X		0 + 540' inby crosscut same		

LAB. NOS. 335440-335467

Sheet No. 1

TABLE 3 ANALYSES OF DUST SAMPLES DATE COLLECTED May 28, 1970

Consolidation Coal Company

MINE Consol No. 9 COMPANY Mountaineer Coal Company, Division of COLLECTED BY Peter N. Fanok

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
DUST SURVEY SAMPLES					
survey No. 14					
sampling area = main west entries					
zero = No. 1 entry station No. 4044 +					
45 feet at 300-foot intervals					
No. 1 entry					
335440	14A1	band	0 + 0	extra large	41.2
335441	14A2	"	0 + 300'	extra large	38.4
335442	14A3	"	0 + 600'	extra large	33.8
335443	14A3X	"	0 + 600' inby crosscut	extra large	43.2
No. 2 entry					
335444	14B1	"	0 + 0	extra large	27.3
335445	14B2	"	0 + 300'	extra large	31.0
335446	14B3	"	0 + 600'	extra large	29.1
335447	14B3X	"	0 + 600' inby crosscut	extra large	24.5
No. 3 entry					
335448	14C1	"	0 + 0	extra large	24.4
335449	14C2	"	0 + 300'	extra large	24.0
335450	14C3	"	0 + 600'	extra large	25.9
335451	14C3X	"	0 + 600' inby crosscut	extra large	25.1
No. 4 entry					
not driven, no sample					
335452	14D1	"	0 + 0	extra large	26.8
	14D2	"	0 + 300'	extra large	
	14D3	"	0 + 600'	extra large	
335453	14D3X	"	0 + 600' inby crosscut	extra large	27.8
No. 5 entry					
not driven, no sample					
335454	14E1	"	0 + 0	extra large	31.2
335455	14E2	"	0 + 300'	extra large	26.7
335456	14E3	"	0 + 600'	extra large	23.5
	14E3X	"	0 + 600' inby crosscut	extra large	

LAB. NOS. 335440-335467

Sheet No. 2

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED May 28, 1970

Consolidation Coal Company

MINE Consol No. 9

COMPANY Mountaineer Coal Company, Division of

COLLECTED BY Peter N. Fanok

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
335457	14F1	band	0 + 0 No. 6 entry	extra large	22.3
	14F2		0 + 300' wet, no sample		
	14F3		0 + 600' same		
335458	14F3X	"	0 + 600' inby crosscut	extra large	20.8
			No. 7 entry		
335459	14G1	"	0 + 0	extra large	20.0
335460	14G2	"	0 + 300'	extra large	20.3
335461	14G3	"	0 + 600'	extra large	19.9
335462	14G3X	"	0 + 600' inby crosscut	extra large	24.6
			No. 8 entry		
335463	14H1	"	0 + 0	extra large	21.6
	14H2		0 + 300' wet, no sample		
335464	14H3	"	0 + 600'	extra large	22.7
335465	14H3X	"	0 + 600' inby crosscut	extra large	29.1
			No. 9 entry		
335466	14I1	"	0 + 0	extra large	28.2
	14I2		0 + 300' wet, no sample		
335467	14I3	"	0 + 600'	extra large	41.0

LAB. NOS. 335759-335810

Sheet No. 1

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED June 15, 1970

Consolidation Coal Company

MINE Consol No. 9COMPANY Mountaineer Coal Company, Division ofCOLLECTED BY Peter N. Fanok

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
			DUST SURVEY SAMPLES		
			survey No. 15		
			300-foot centers		
			sampling area = main west entries		
			zero = No. 1 entry station No. 4056 -		
			100 feet		
			No. 1 entry		
335759	15A1	band	0 + 0	large	37.0
335760	15A2	"	0 + 300'	large	32.7
335761	15A3	"	0 + 600'	large	47.1
335762	15A3X	"	0 + 600' inby crosscut	large	33.7
335763	15A4	"	0 + 900'	large	33.8
335764	15A5	"	0 + 1,200'	large	35.0
			No. 2 entry		
335765	15B1	"	0 + 0	large	23.8
335766	15B2	"	0 + 300'	large	26.3
335767	15B3	"	0 + 600'	large	36.5
335768	15B3X	"	0 + 600' inby crosscut	large	23.0
335769	15B4	"	0 + 900'	large	22.5
335770	15B5	"	0 + 1,200'	large	22.8
			No. 3 entry		
335771	15C1	"	0 + 0	large	25.6
335772	15C2	"	0 + 300'	large	23.6
335773	15C3	"	0 + 600'	large	22.2
335774	15C3X	"	0 + 600' inby crosscut	large	20.4
335775	15C4	"	0 + 900'	large	24.9
335776	15C5	"	0 + 1,200'	extra large	20.9
			No. 4 entry		
335777	15D1	"	0 + 0	extra large	20.7
335778	15D2	"	0 + 300'	large	18.8
335779	15D3	"	0 + 600'	large	23.7
335780	15D3X	"	0 + 600' inby crosscut	large	23.2

TABLE 3 ANALYSES OF DUST SAMPLES DATE COLLECTED June 15, 1970

Consolidation Coal Company

MINE Consol. No. 9 COMPANY Mountaineer Coal Company, Division of COLLECTED BY Peter N. Fanok

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
335781	15D4 15D5	band	0 + 900' fall, no sample 0 + 1,200'	large	23.5
335782	15E1	"	0 + 0 No. 5 entry	large	21.2
335783	15E2	"	0 + 300'	large	21.1
335784	15E3	"	0 + 600'	large	30.5
335785	15E3X	"	0 + 600' inby crosscut	large	25.5
335786	15E4	"	0 + 900'	large	27.0
335787	15E5	"	0 + 1,200'	large	27.6
335788	15F1	"	0 + 0 No. 6 entry	large	21.3
335789	15F2	"	0 + 300'	large	20.1
335790	15F3	"	0 + 600'	large	22.0
335791	15F3X	"	0 + 600' inby crosscut	large	25.0
335792	15F4	"	0 + 900'	large	26.0
335793	15F5	"	0 + 1,200'	large	23.8
335794	15G1	"	0 + 0 No. 7 entry	large	17.1
335795	15G2	"	0 + 300'	large	18.6
335796	15G3	"	0 + 600'	large	25.9
335797	15G3X	"	0 + 600' inby crosscut	large	21.4
335798	15G4	"	0 + 900'	large	22.6
335799	15G5	"	0 + 1,200'	large	25.3
335800	15H1	"	0 + 0 No. 8 entry	large	18.8
335801	15H2	"	0 + 300'	large	18.3
335802	15H3	"	0 + 600'	large	19.4
335803	15H3X	"	0 + 600' inby crosscut	large	22.4
335804	15H4	"	0 + 900'	large	28.5
335805	15H5	"	0 + 1,200'	large	28.2

LAB. NOS. 335759-335810

Sheet No. 3

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED

June 15, 1970

Consolidation Coal Company

MINE Consol. No. 9

COMPANY Mountaineer Coal Company, Division of

COLLECTED BY

Peter M. Fanck

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	APPROX. COKE BEAN	AS-RECEIVED PERCENT INCOMBUSTIBLE
			no. 9 entry		
335806	1511	band	0 + 0	large	24.5
335807	1512	"	0 + 300'	large	32.1
335808	1513	"	0 + 600'	large	35.3
335809	1514	"	0 + 900'	large	25.7
335810	1515	"	0 + 1,200'	large	27.2

TABLE 3 ANALYSES OF DUST SAMPLES DATE COLLECTED August 6-7, 1970

MINE Consol No. 9 COMPANY Mountaineer Coal Company, Division of Consolidation Coal Company COLLECTED BY Peter N. Fanck

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
DUST SURVEY SAMPLES					
survey No. 16					
sampling area = west main entries					
zero = No. 1 entry station No. 4089					
No. 1 entry					
336847	16A1	band	0 + 0	large	45.4
336848	16A2	"	0 + 300'	large	34.7
336849	16A3	"	0 + 600'	large	37.8
336850	16A3X	"	0 + 600' inby crosscut	large	31.6
336851	16A4	"	0 + 900'	large	36.7
336852	16A5	"	0 + 1,200'	large	31.1
336853	16A6	"	0 + 1,500'	large	26.7
336854	16A6X	"	0 + 1,500' inby crosscut	large	28.3
336855	16A7	"	0 + 1,800'	large	21.3
No. 2 entry					
336856	16B1	"	0 + 0	large	20.7
336857	16B2	"	0 + 300'	large	21.9
336858	16B3	"	0 + 600'	large	25.7
336859	16B3X	"	0 + 600' inby crosscut	large	25.1
336860	16B4	"	0 + 900'	large	30.3
336861	16B5	"	0 + 1,200'	large	29.1
336862	16B6	"	0 + 1,500'	large	27.1
336863	16B6X	"	0 + 1,500' inby crosscut	large	23.8
336864	16B7	"	0 + 1,800'	large	28.1
No. 3 entry					
336865	16C1	"	0 + 0	large	21.2
336866	16C2	"	0 + 300'	large	26.2
336867	16C3	"	0 + 600'	large	27.8
336868	16C3X	"	0 + 600' inby crosscut	large	26.1
	16C4	"	0 + 900' no sample, not driven		
336869	16C5	"	0 + 1,200'	large	24.5
336870	16C6	"	0 + 1,500'	large	27.4

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED

August 6-7, 1970

Consolidation Coal Company

MINE Consol. No. 9COMPANY Mountaineer Coal Company, Division ofCOLLECTED BY Peter N. Fanck

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
336871	16C6X	band	0 + 1,500' inby crosscut	large	23.6
336872	16C7	"	0 + 1,800'	small	27.9
			No. 4 entry		
336873	16D1	"	0 + 0	large	26.3
336874	16D2	"	0 + 300'	large	33.7
336875	16D3	"	0 + 600'	large	26.7
336876	16D3X	"	0 + 600' inby crosscut	large	26.2
336877	16D4	"	0 + 900'	large	33.3
336878	16D5	"	0 + 1,200'	large	30.1
336879	16D6	"	0 + 1,500'	large	22.5
336880	16D6X	"	0 + 1,500' inby crosscut	large	25.6
336881	16D7	"	0 + 1,800'	large	29.6
			No. 5 entry		
336882	16E1	"	0 + 0	large	25.5
336883	16E2	"	0 + 300'	large	27.4
336884	16E3	"	0 + 600'	large	24.8
336885	16E3X	"	0 + 600' inby crosscut	large	28.0
336886	16E4	"	0 + 900'	large	25.7
336887	16E5	"	0 + 1,200'	large	37.4
336888	16E6	"	0 + 1,500'	large	25.8
336889	16E6X	"	0 + 1,500' inby crosscut	large	26.3
336890	16E7	"	0 + 1,800'	large	31.4
			No. 6 entry		
336891	16F1	"	0 + 0	large	26.1
336892	16F2	"	0 + 300'	large	25.6
336893	16F3	"	0 + 600'	large	25.0
336894	16F3X	"	0 + 600' inby crosscut	large	29.3
336895	16F4	"	0 + 900'	large	33.0
336896	16F5	"	0 + 1,200'	large	33.2
336897	16F6	"	0 + 1,500'	large	27.7
			0 + 1,500' inby crosscut - no sample, fall		
336898	16F7	"	0 + 1,800'	small	26.7

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED

August 6-7, 1970

Consolidation Coal Company

MINE Consol No. 9

COMPANY Mountaineer Coal Company, Division of

COLLECTED BY

Peter N. Fanok

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
			No. 7 entry		
336899	16G1	band	0 + 0	large	31.1
336900	16G2	"	0 + 300'	large	25.3
336901	16G3	"	0 + 600'	large	26.3
336902	16G3X	"	0 + 600' inby crosscut	extra large	28.4
336903	16G4	"	0 + 900'	large	25.8
336904	16G5	"	0 + 1,200'	large	27.2
336905	16G6	"	0 + 1,500'	large	25.2
336906	16G6X	"	0 + 1,500' inby crosscut	large	26.8
336907	16G7	"	0 + 1,800'	large	29.5
			No. 8 entry		
336908	16H1	"	0 + 0	large	25.4
336909	16H2	"	0 + 300'	large	24.9
336910	16H3	"	0 + 600'	large	28.0
336911	16H3X	"	0 + 600' inby crosscut	extra large	35.8
336912	16H4	"	0 + 900'	large	34.1
336913	16H5	"	0 + 1,200'	large	31.6
336914	16H6	"	0 + 1,500'	large	28.1
336915	16H6X	"	0 + 1,500' inby crosscut	large	30.7
336916	16H7	"	0 + 1,800'	large	32.0
			No. 9 entry		
336917	16I1	"	0 + 0	large	21.4
336918	16I2	"	0 + 300'	large	29.0
	16I3		0 + 600'		
	16I4		0 + 900'		
336919	16I5	"	0 + 1,200'	large	34.6
336920	16I6	"	0 + 1,500'	large	33.1
336921	16I7	"	0 + 1,800'	large	30.1

TABLE 3 - ANALYSES OF DUST SAMPLES COLLECTED

January 19 and 20, 1973

Page 1 of 4

MINE

Consol No. 9

COMPANY Mountaineer Coal Company, Division of Consolidation Coal Company

COLLECTED BY

Domenick Poster and Charles J. Thomas

CAN NUMBER	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	PERCENT INCOMBUSTIBLE
		*Survey No. 17 DUST SURVEY SAMPLES sampling area = 7 south mains zero = No. 4 crosscut + 40 feet No. 3 entry		
		No. 1 entry (return)		
A1		0 + 00 fall		
A1X		0 + 60 right crosscut fall		
A2		0 + 200 fall		
A2X		0 + 260 right crosscut no sample received		
A3	band	0 + 400	small	43.7
A3X	do	0 + 460 right crosscut	small	35.6
A4	do	0 + 600	small	53.2
A4X	do	0 + 660 right crosscut	large	50.2
A5	do	0 + 800	small	32.4
A5X	do	0 + 860 right crosscut	small	31.1
		No. 2 entry (return)		
B1		0 + 00 fall		
B1X	do	0 + 60 right crosscut (intake)	small	25.2
B2	do	0 + 200	small	19.6
B2X	do	0 + 260 right crosscut	small	33.9
B3	do	0 + 400 (intake)	small	24
B3X		0 + 460 right crosscut fall		
B4	do	0 + 600	trace	16.7
B4X	do	0 + 660 right crosscut	extra large	30
B5	do	0 + 800	large	37.2
B5X	do	0 + 860 right crosscut	trace	26.7

MINE Consol No. 9 COMPANY Mountaineer Coal Company, Division of Consolidation Coal CompanyCOLLECTED BY Domenick Poster and Charles J. Thomas

CAN NUMBER	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	PERCENT INCOMBUSTIBLE
No. 3 entry (intake)				
C1	band	0 + 00	small	23.5
C1X	do	0 + 60 right crosscut	small	39.5
C2	do	0 + 200	large	35.4
C2X	do	0 + 260 right crosscut	large	35.2
C3	do	0 + 400	large	18.4
C3X	do	0 + 460 right crosscut	large	27.7
C4	do	0 + 600	large	32.8
C4X	do	0 + 660 right crosscut fall		
C5	do	0 + 800	small	19.3
C5X	do	0 + 860 right crosscut	extra large	36.9
No. 4 entry (intake)				
D1	do	0 + 00	large	29.4
D1X	do	0 + 60 right crosscut	large	30.2
D2	do	0 + 200	large	43.9
D2X	do	0 + 260 right crosscut	large	40.1
D3	do	0 + 400	small	32.1
D3X	do	0 + 460 right crosscut	large	37
D4	do	0 + 600 fall		
D4X	do	0 + 660 right crosscut (return)	large	29.8
D5	do	0 + 800	trace	28.6
D5X	do	0 + 860 right crosscut	large	29.4
No. 5 entry (intake)				
E1	do	0 + 00	small	23.9
E1X	do	0 + 60 right crosscut	small	19.2

MINE Consol No. 9 COMPANY Mountaineer Coal Company, Division of Consolidation Coal Company
 COLLECTED BY Domenick Poster and Charles J. Thomas

CAN NUMBER	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	PERCENT INCOMBUSTIBLE
E2	band	0 + 200	small	18.6
E2X	do	0 + 260 right crosscut	small	18.4
E3	do	0 + 400	large	24.4
E3X	do	0 + 460 right crosscut	large	38.2
E4	do	0 + 600	large	42.4
E4X	do	0 + 660 right crosscut	large	39.9
E5	do	0 + 800	large	40.9
E5X	do	0 + 860 right crosscut	large	43.3
No. 6 entry (intake)				
F1	do	0 + 00	large	29.7
F1X	do	0 + 60 right crosscut	large	29.6
F2	do	0 + 200	large	27.5
F2X	do	0 + 260 right crosscut fall		
F3	do	0 + 400	small	21.1
F3X	do	0 + 460 right crosscut	small	28.5
F4	do	0 + 600	small	21.3
F4X	do	0 + 660 right crosscut	large	21.7
F5	do	0 + 800	small	23
F5X	do	0 + 860 right crosscut fall		
No. 7 entry (intake)				
G1		0 + 00 fall		
G1X		0 + 60 right crosscut fall		
G2		0 + 200 fall		
G2X		0 + 260 right crosscut fall		
G3		0 + 400 fall		
G3X		0 + 460 right crosscut fall		

TABLE 3 - ANALYSES OF DUST SAMPLES COLLECTED January 19 and 20, 1973

MINE Consol No. 9 COMPANY Mountaineer Coal Company, Division of Consolidation Coal Company

COLLECTED BY Domenick Poster and Charles J. Thomas

APPENDIX H

CAN NUMBER	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	PERCENT INCOMBUSTIBLE
G4	band	0 + 600 fall	large	29.7
G4X		0 + 660 right crosscut		
G5		0 + 800 fall		
G5X		0 + 860 right crosscut fall		
No. 8 entry (return)				
H1	do	0 + 00 fall	large	27.2
H1X		0 + 60 right crosscut fall		
H2		0 + 200 fall		
H2X		0 + 260 right crosscut fall		
H3		0 + 400		
H3X		0 + 460 right crosscut fall		
H4		0 + 600 (intake)		
H4X		0 + 660 right crosscut		
H5		0 + 800		
H5X		0 + 860 right crosscut fall		
No. 9 entry (return)				
I1	do	0 + 00 fall	large	38.4
I1X		0 + 60 right crosscut fall		
I2		0 + 200 fall		
I2X		0 + 260 right crosscut fall		
I3		0 + 400		
I3X		0 + 460 right crosscut fall		
I4		0 + 600		
I4X		0 + 660 right crosscut fall		
I5		0 + 800		
I5X		0 + 860 right crosscut fall		
		48	48	

APPENDIX G

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED

May 17, 1972

MINE Consol No. 9

COMPANY Mountaineer Coal Company,
Division of Consolidation Coal Company

COLLECTED BY Thomas E. Rabulski and
William Reid

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
DUST SURVEY SAMPLES					
survey No. 2 sampling area = 4 right off 8 north zero = 45 feet inby No. 8 entry 8 north					
No. 1 entry (return)					
403575	2A1	roof and ribs	0 + 00	small	40
576	2A2	do	0 + 200	small	61
577	2A3	band	0 + 400	small	42
578	2A3X	do	0 + 400	large	60.2
579	2A4	do	0 + 600	large	55.8
580	2A5	do	0 + 800	large	70
No. 2 belt entry					
581	2B1	roof and ribs	0 + 00	trace	55.2
582	2B2	do	0 + 200	small	57.5
583	2B3	band	0 + 400	large	53.9
584	2B3X	do	0 + 400	large	58.2
585	2B4	do	0 + 600	small	35
586	2B5	do	0 + 800	small	39.3
No. 3 track entry					
587	2C1	roof and ribs	0 + 00	large	58.8
588	2C2	band	0 + 200	large	38
589	2C3	do	0 + 400	large	40
49					

TABLE 3 ANALYSES OF DUST SAMPLES DATE COLLECTED May 17, 1972MINE Consol No. 9 COMPANY Mountaineer Coal Company, COLLECTED BY Thomas E. Rabulski and
Division of Consolidation Coal Company William Reid

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
403590	2C3X	do	0 + 400	extra large	60.1
591	2C4	do	0 + 600	small	45
592	2C5	do	0 + 800	large	18
No. 4 entry (return)					
593	2D1	roof and ribs	0 + 00	large	54.2
594	2D2	band	0 + 200	small	34
595	2D3	do	0 + 400	small	31
596	2D3X	do	0 + 400	large	43.2
597	2D4	do	0 + 600	trace	48
598	2D5	do	0 + 800	large	28.8
No. 5 entry (return)					
599	2E1	roof and ribs	0 + 00	small	59
600	2E2	band	0 + 200	trace	44
601	2E3	do	0 + 400	small	45.9
602	2E4	do	0 + 600	large	31.7
603	2E5	do	0 + 800	large	57.1
			50		

TABLE 3 ANALYSES OF DUST SAMPLESDATE COLLECTED May 16, 1972MINE Consol No. 9 COMPANY Mountaineer Coal Company, COLLECTED BY William Reid and
Division of Consolidation Coal Company Charles Bane

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
			DUST SURVEY SAMPLES survey No. 1 sampling area = 3 right 7 north zero = 45 feet in by No. 8 entry in 7 north		
			No. 1 entry (return)		
403518	1A1	band	0 + 00	extra large	48.5
519	1A2	do	0 + 200	large	50
520	1A3	do	0 + 400	large	54
521	1A3X	do	0 + 400	trace	43.5
522	1A4	do	0 + 600	trace	44.5
523	1A5	do	0 + 800	trace	63.5
524	1A6	do	0 + 1000	none	63
525	1A6X	do	0 + 1000	none	87.5
526	1A7	do	0 + 1200	none	61
527	1A8	do	0 + 1400	none	72.2
528	1A9	do	0 + 1600	none	80.5
	1A10		0 + 1800		
			pillared area		
			No. 2 entry (return)		
529	1B1	do	0 + 00	large	54
530	1B2	do	0 + 200	extra large	52.1
531	1B3	do	0 + 400	small	58.5
532	1B3X	do	0 + 400	trace	58
533	1B4	do	0 + 600	none	45
534	1B5	do	0 + 800	none	47
			51		

TABLE 3 ANALYSES OF DUST SAMPLES DATE COLLECTED May 16, 1972

MINE Consol No. 9 COMPANY Mountaineer Coal Company, COLLECTED BY William Reid and
Division of Consolidation Coal Company Charles Bane

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
403535	1B6	do	0 + 1000	none	46
536	1B6X	do	0 + 1000	none	48
537	1B7	do	0 + 1200	none	66
538	1B8	do	0 + 1400	none	69
539	1B9	do	0 + 1600	none	34
	1B10		0 + 1800		
			pillared area		
			No. 3 belt entry		
540	1C1	do	0 + 00	extra large	39.9
541	1C2	do	0 + 200	extra large	37.7
542	1C3	do	0 + 400	trace	44
543	1C3X	do	0 + 400	trace	43.5
544	1C4	do	0 + 600	trace	46
545	1C5	do	0 + 800	none	80.5
546	1C6	do	0 + 1000	none	82
547	1C6X	do	0 + 1000	none	81.5
548	1C7	do	0 + 1200	none	60
549	1C8	do	0 + 1400	none	61
550	1C9	do	0 + 1600	none	62
	1C9X		0 + 1600		
551	1C10	do	0 + 1800	trace	27
			No. 4 track entry		
552	1D1	do	0 + 00	extra large	38.1
553	1D2	do	0 + 200	large	39.2
554	1D3	do	0 + 400	large	42
555	1D3X	do	0 + 400	large	56.1

TABLE 3

ANALYSES OF DUST SAMPLES

DATE COLLECTED

May 16, 1972

MINE Consol No. 9

COMPANY Mountaineer Coal Company,

COLLECTED BY William Reid and

Division of Consolidation Coal Company

Charles Bane

LAB. NO.	CAN NO.	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	AS-RECEIVED PERCENT INCOMBUSTIBLE
403556	1D4	do	0 + 600	trace	49
557	1D5	do	0 + 800	none	60
558	1D6	do	0 + 1000	trace	63
559	1D6X	do	0 + 1000	none	73.3
560	1D7	do	0 + 1200	none	54
561	1D8	do	0 + 1400	none	70.6
562	1D9	do	0 + 1600	none	39
563	1D9X	do	0 + 1600	none	48.5
564	1D10	do	0 + 1800	none	39
No. 5 entry (return.)					
565	1E1	do	0 + 00	small	49
566	1E2	do	0 + 200	extra large	52.1
567	1E3	do	0 + 400	small	65.8
568	1E4	do	0 + 600	small	58.1
569	1E5	do	0 + 800	trace	65
570	1E6	do	0 + 1000	none	69
571	1E7	do	0 + 1200	none	67
572	1E8	do	0 + 1400	none	76.2
573	1E9	do	0 + 1600	none	75.2
574	1E10	do	0 + 1800	none	86

MINE Consol No.9 COMPANY Mountaineer Coal Company, Division of Consolidation Coal Company

COLLECTED BY Charles J. Thomas

CAN NUMBER	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	PERCENT INCOMBUSTIBLE
EXPLOSION SAMPLES				
sampling area = 5 right section off 8 north mains				
zero = 50 feet inby No. 8 entry of 8 north mains No. 1 entry of 5 right				
No. 1 entry (return)				
1A1-1A4	band	0 + 00 - 0 + 600	large	38.7
1A5		0 + 800		
1A6-1A7		0 + 1000 - 0 + 1200		
No. 2 belt entry (intake)				
1B1-1B3	band	0 + 00 - 0 + 400	large	74.7
1B3X		0 + 400		
1B4		0 + 600		
1B5	band	0 + 800	large	60.4
1B6		0 + 1000		
1B6X	band	0 + 1000	large	42.2
1B7	band	0 + 1200	large	

MINE Consol No. 9 COMPANY Mountaineer Coal Company, Division of Consolidation Coal Company

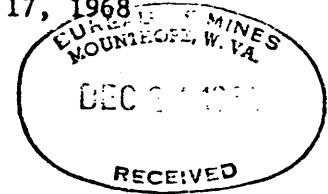
COLLECTED BY Charles J. Thomas

CAN NUMBER	SAMPLE OF DUST FROM	LOCATION IN MINE	ALCOHOL COKE TEST	PERCENT INCOMBUSTIBLE
		No. 3 track entry (intake)		
1C1-1C2		0 + 00 - 0 + 200		
1C3-1C3X		0 + 400		
1C4	band	0 + 600	large	45.3
1C5	band	0 + 800	large	66.2
1C6	band	0 + 1000	large	66.4
1C6X	band	0 + 1000	large	66.4
1C7	band	0 + 1200	large	48.9
		No. 4 entry (return)		
1D1		0 + 00		
1D2		0 + 200		
1D3	band	0 + 400	large	41.2
1D4	band	0 + 600	large	46.6
1D5	band	0 + 800	large	36.6
1D6	band	0 + 1000	large	49.1
1D7	band	0 + 1200	large	47.3



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
4800 FORBES AVENUE
PITTSBURGH, PENNSYLVANIA 15213

December 17, 1968



Memorandum

To: Frank C. Memmott, Associate Director
Health and Safety, Washington, D. C.
Through: Harry C. Allen, Jr., Assistant Director
Minerals Research, Washington, D. C.
Through: William L. Crentz, Director
Coal Research, Washington, D. C.

From: Robert W. Van Dolah, Research Director
Explosives Research Center, Pittsburgh, Pa.

Subject: Tests of field sample American A
(Bureau of Mines' Key No. P-1124)

This is to inform you that we have examined a sample of permissible explosive, American A, delivered to our laboratory on December 4, 1968 by the U. S. Division of Coal Mine Inspection following a coal mine explosion at the Consol No. 9 Mine, Mountaineer Coal Company, Farmington, Marion County, West Virginia.

Sample P-1124, Lot No. N-4426, consisted of two 50-pound boxes. The sample was subjected to regular field sample tests and was found to meet all requirements for permissibility.

Robert W. Van Dolah

Robert W. Van Dolah

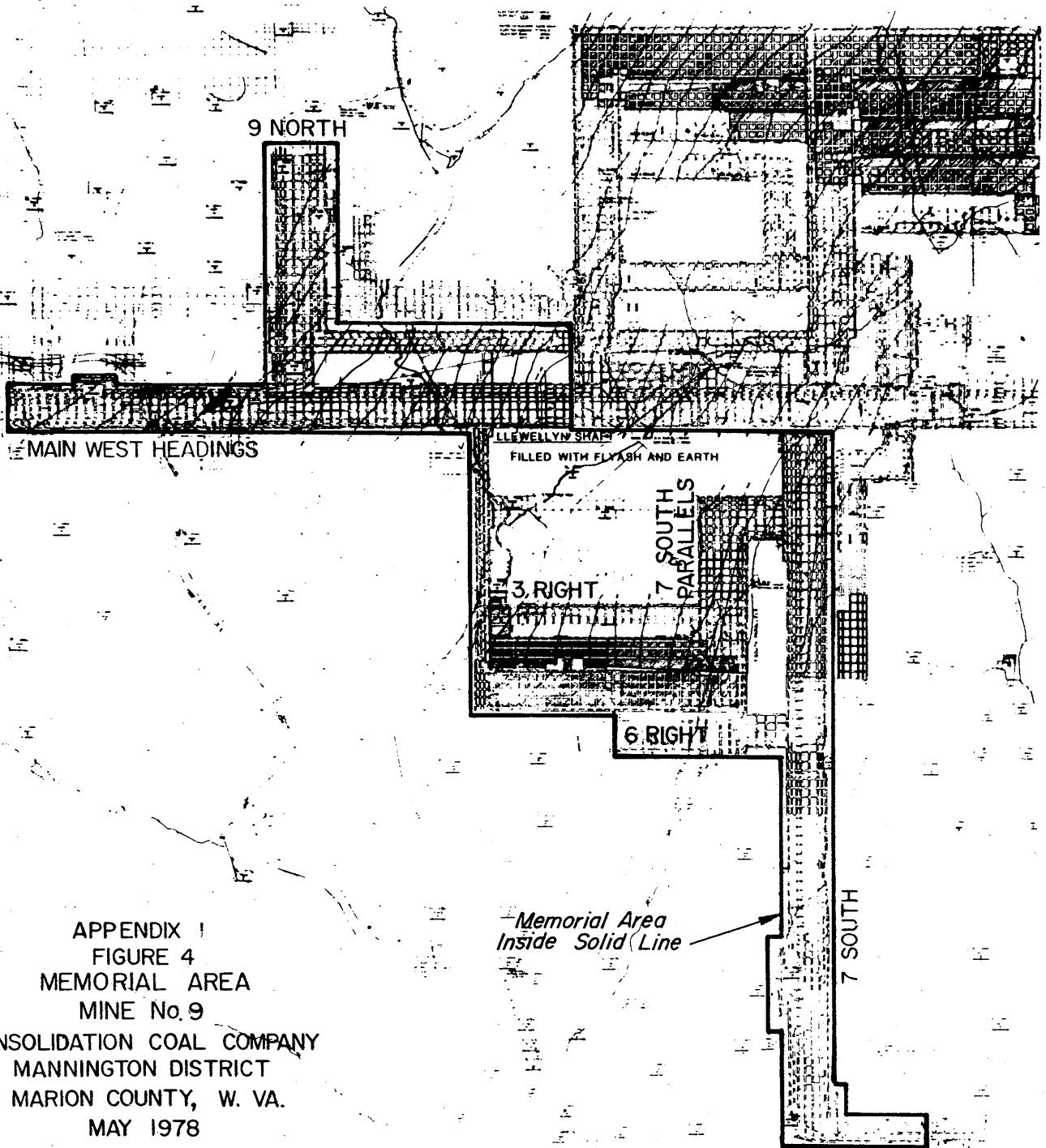
CMason:gms

cc:

Dr. Allen, W.O.
Mr. Crentz, W.O.
✓ Mr. Park, Mt. Hope, W. Va.
ERC Files
Dr. Mason

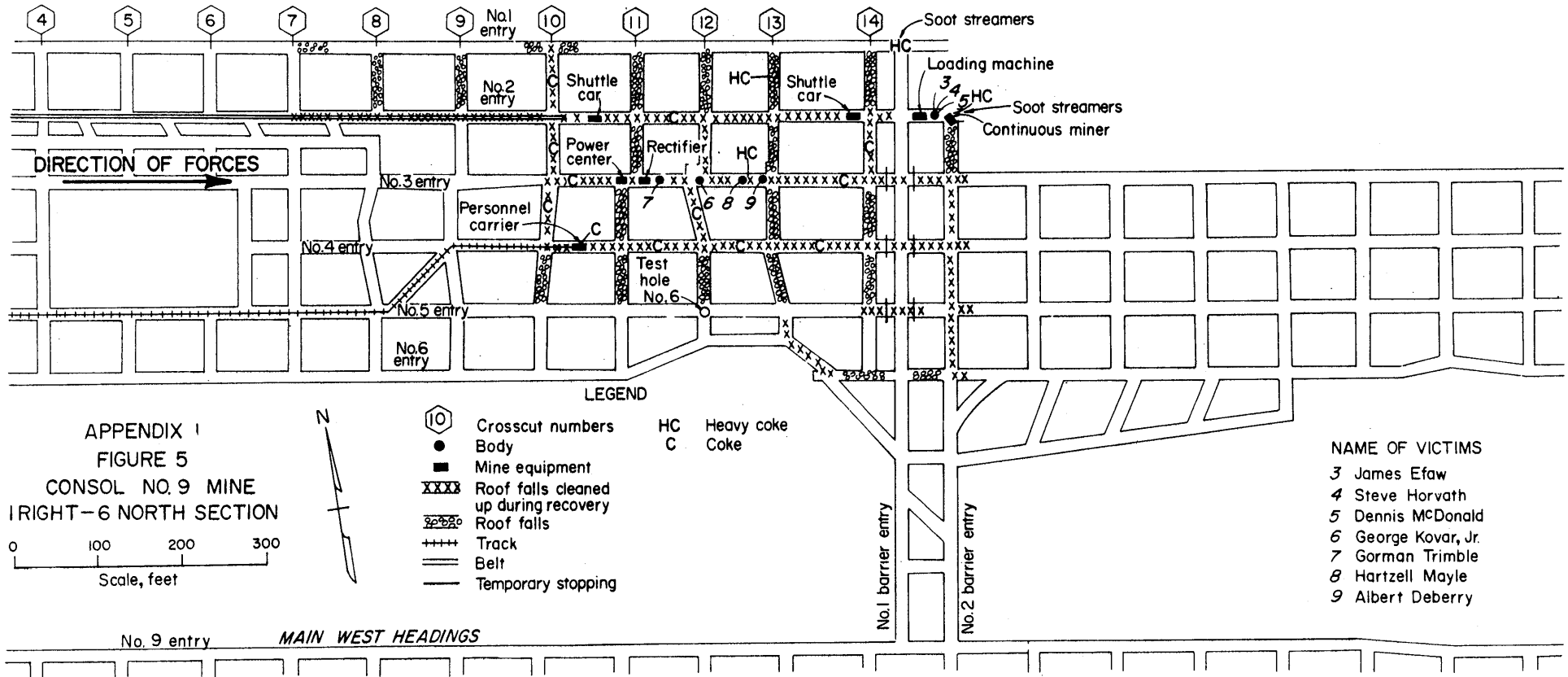
APPENDIX I

(Maps 1 throu 8)



APPENDIX I
 FIGURE 4
 MEMORIAL AREA
 MINE No. 9
 CONSOLIDATION COAL COMPANY
 MANNINGTON DISTRICT
 MARION COUNTY, W. VA.
 MAY 1978

0 1,000 2,000
 SCALE, FEET



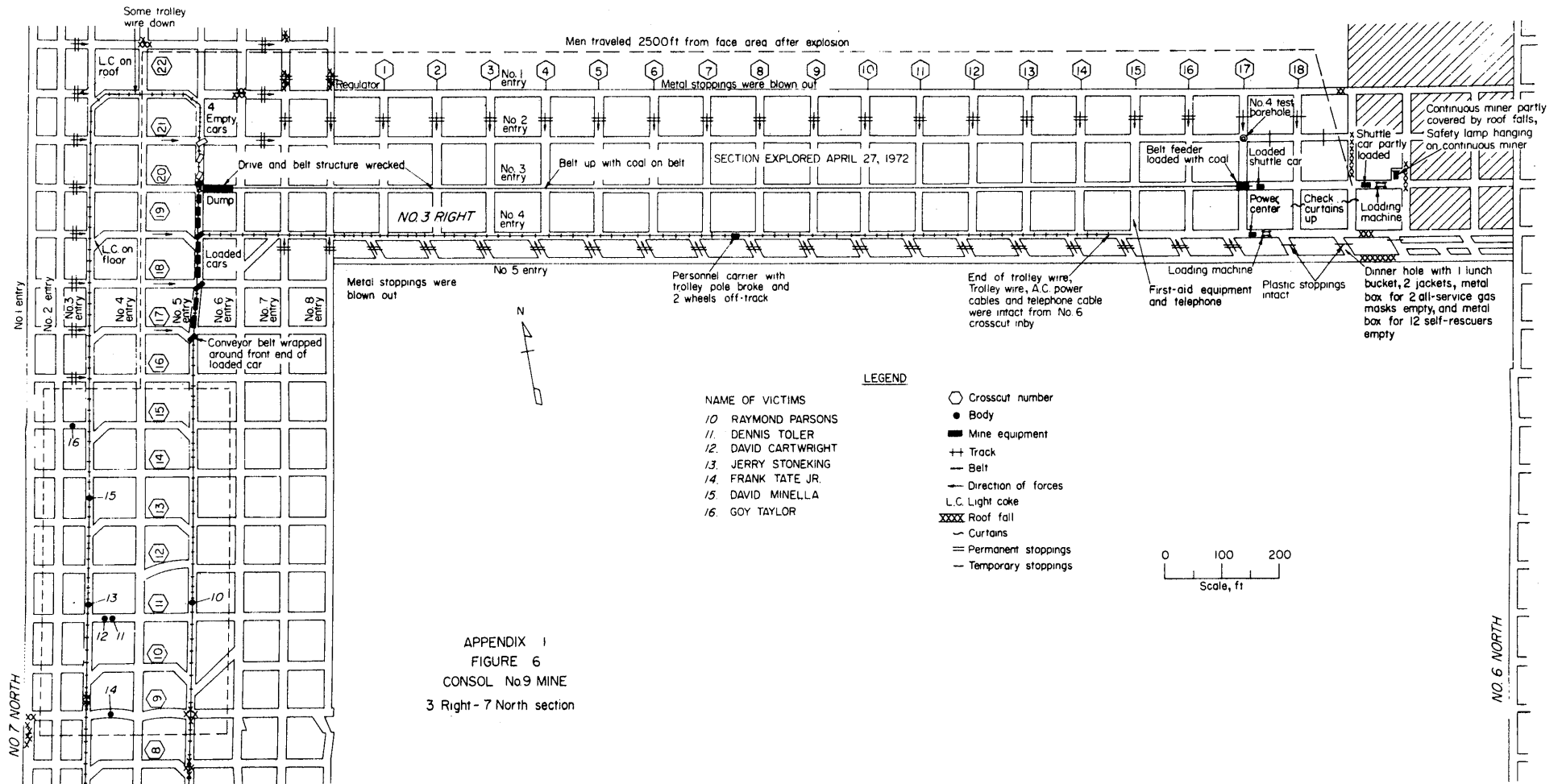
APPENDIX I
 FIGURE 5
 CONSOL NO. 9 MINE
 RIGHT-6 NORTH SECTION

0 100 200 300
 Scale, feet



- LEGEND
- ⑩ Crosscut numbers
 - Body
 - Mine equipment
 - XXXX Roof falls cleaned up during recovery
 - Roof falls
 - ++++ Track
 - ==== Belt
 - Temporary stopping
 - HC Heavy coke
 - C Coke

- NAME OF VICTIMS
- 3 James Efaw
 - 4 Steve Horvath
 - 5 Dennis McDonald
 - 6 George Kovar, Jr.
 - 7 Gorman Trimble
 - 8 Hartzell Mayle
 - 9 Albert Deberry



APPENDIX I
 FIGURE 6
 CONSOL No.9 MINE
 3 Right - 7 North section

- NAME OF VICTIMS
- 10 RAYMOND PARSONS
 - 11 DENNIS TOLER
 - 12 DAVID CARTWRIGHT
 - 13 JERRY STONEKING
 - 14 FRANK TATE JR.
 - 15 DAVID MINELLA
 - 16 GOY TAYLOR

- LEGEND
- Crosscut number
 - Body
 - Mine equipment
 - ++ Track
 - Belt
 - Direction of forces
 - L.C. Light coke
 - XXXX Roof fall
 - ∩ Curtains
 - Permanent stoppings
 - Temporary stoppings

0 100 200
 Scale, ft