Informational Report of Investigation

Underground Coal Mine Explosion and Fire

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

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

November 20, 1968

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November 20, 1968

by

Division of Safety
Coal Mine Safety and Health
March 1990

Originating Office - Mine Safety and Health Administration
4015 Wilson Boulevard, Arlington, Virginia 22203
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Mine Safety and Health

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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.

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[1]The 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 inby 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 inby 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 inby 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]

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[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

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[3]USBM'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:

Date 1968	Time	Temperature(F)	Barometric Pressure
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	Assistant Inspector at Large
Leslie C. Ryan	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 whomever 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:

Number Borehole	Date 1968	Section Location	Percentage 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	Safety Director
Leonard Pnakovich	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:

Location	Date 1968	Percentage CO2	O2	CO	CH4	N2
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 Borehole 3 Right 7 North	September 8	7.95	0.15	0.0025	86.02	5.49
No. 5 Test Borehole 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

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[4]USBM 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

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[5]A 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 tramming 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.

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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 outby 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 outby the loading point in No. 5 entry and four empty mine cars inby 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.

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 stopping 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 inby 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 inby 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 inby 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.