Reports

Siltix Mine
July 23, 1966

COAL FATAL

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

DISTRICT B

FINAL REPORT OF MAJOR MINE-EXPLOSION DISASTER

SILTIX MINE
THE NEW RIVER COMPANY
MOUNT HOPE, FAYETTE COUNTY, WEST VIRGINIA

July 23, 1966

By

W. R. Park
District Manager

J. D. Micheal
Technical Assistant

J. W. Crawford
Mining Health and Safety Engineer

Originating Office - Bureau of Mines
Mount Hope, West Virginia 25880
W. R. Park, District Manager
Health and Safety District B

CONTENTS

	PAGE
Introduction	1
General Information	2
Mining Methods, Conditions, and Equipment	3
Mining Methods	3
Explosives	3
Ventilation and Mine Gases	3
Dust	5
Transportation	6
Electricity	7
Illumination and Smoking	9
Mine Rescue and Fire-Fighting Facilities	9
Story of Explosion and Recovery Operations	10
Participating Organizations	10
Activities of Bureau of Mines Personnel	10
Mining Conditions Immediately Prior to the Explosion	10
Evidence of Activities and Story of Explosion	11
Recovery Operations	15
Investigation of Cause of Explosion	17
Investigation Committee	17
Methane as a Factor in the Explosion	18
Flame	19
Forces	19
Point of Origin	19
Factors Preventing Spread of Explosion	19
Summary of Evidence	20
Cause of the Explosion	21
Recommendations	22
Acknowledgment	24
Table 1 - Analyses of Air Samples	
Table 2 - Analyses of Dust Samples	
Appendix	
A - Victims of Explosion	
B - 2 Left Mains Entries	
C - 2 Left Mains Section	

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INTRODUCTION

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

A gas explosion occurred in the Siltix mine of The New River Company, Mount Hope, West Virginia, about 8:45 a.m., Saturday, July 23, 1966. Seven men were killed by the explosion; all died from burns and/or forces. Two of the other 41 men in the mine at the time of the explosion were injured, one only slightly. Eleven men in the 6 left section heard the explosion, but they were unaware of what actually happened, and they erected a barricade in the return entries about 250 feet from the entrance to the 6 left section when they encountered smoke and fumes in the return entries. The men remained behind the barricade until they were rescued about 10:30 a.m., July 23. The men were in good physical condition when they were rescued. After leaving the barricade, seven of these men assisted in recovery operations in the 2 left mains section; two of these seven employees and three additional men were overcome by smoke and fumes and were removed from the mine.

The names of the victims, their ages, occupations, experience, and the number of their dependents are listed in Appendix A of this report.

Bureau of Mines investigators believe that the explosion originated in the shuttle-car haulway about 100 feet outby the face of No. 4 room off No. 1 entry, 2 left mains, where an explosive mixture of methane and air was ignited by electric arcs and sparks from a

shuttle car. Forces of the explosion extended throughout the 2 left mains section into 6 left and 6 right off 2 left mains and were dissipated after traveling about 1,700 feet outby in 2 left mains.

GENERAL INFORMATION

The Siltix mine at Mount Hope, Fayette County, West Virginia, is served by the Chesapeake and Ohio Railway Company. The operating officials of the company are:

W. A. Haslam	President	Mount Hope, West Virginia
E. V. Bowman	Vice President, Operations	Tams, West Virginia
James Page	Manager of Mines	Mount Hope, West Virginia
E. E. Varney	General Superintendent	Carlisle, West Virginia
Ronald Keaton	Superintendent	Bradley, West Virginia
Maxwell Wallace	Mine Foreman	Carlisle, West Virginia

A total of 115 men is employed; 113 worked underground on 1 maintenance and 2 coal-producing shifts a day, 5 and 6 days a week. The average daily production, 1,600 tons of coal, is loaded mechanically. The mine is opened by 2 drifts, 1 slope, and 1 shaft into the Sewell coal bed, which averages 60 inches in thickness in this area. The slope is about 100 feet in length, and the shaft is about 60 feet in depth.

The immediate roof is firm laminated shale, ranging from 1 to 15 feet in thickness. A rider coal bed, about 12 inches in thickness, is present in the immediate roof at varying elevations above the coal bed. The main roof is sandstone. A coal bed, 6 to 10 inches in thickness, is encountered often at varying distances under the Sewell coal bed.

The analysis of a coal sample taken from the coal bed in this mine, as obtained from Technical Paper No. 405, "Analysis of West Virginia Coals," published by the United States Bureau of Mines, is as follows:

	Percent
Moisture	2.7
Volatile Matter	21.9
Fixed Carbon	70.7
Ash	4.7
	100.0

Numerous tests by the Bureau of Mines have shown that coal dust having a volatile ratio of 0.12 and higher is explosive. The volatile ratio of the coal in this mine as determined from the foregoing analysis is 0.23, indicating that the coal dust is explosive.

The last Federal inspection of the Siltix mine was completed June 3, 1966.

MINING METHODS, CONDITIONS, AND EQUIPMENT

Mining Methods: An entry-and-block system of mining was followed. Multiple entries, generally in sets of 5 to 8, were driven about 18 feet wide on 60-foot centers. Crosscuts were about 80 feet apart. Rooms were driven on 35- to 50-foot centers. Pillars were extracted by splitting and recovering wings left and right as the continuous miner retreated from the block.

Three working sections were producing coal on July 23; two sections, 6 left off 2 left mains and 1 right butts, were being developed with conventional loading equipment. A Lee-Norse continuous miner was being used to extract pillars in the third working section, 2 left mains. An additional section was in the process of being readied for development with conventional loading equipment.

Roof bolts were installed in all sections in compliance with the plan approved by a roof-control representative of the Bureau of Mines. Wooden timbers were used to supplement roof bolts on all sections. Roof-bolt operations in face areas were performed with rotary-hydraulic equipment; compressed-air activated equipment was used for spot-bolting outby face areas. Conventional timbering was done in pillar lifts.

Explosives: Permissible-type explosives and instantaneous electric detonators were used for blasting and were stored properly in well-constructed magazines on the surface. They were transported into the mine in a specially constructed explosives car and stored safely underground in specially constructed section-storage magazines.

Coal in the conventional loading sections was bottom cut, then blasted on shift with permissible explosives. Incombustible material was used for stemming, and the shots were fired immediately after charging with permissible blasting units. Blasting cables were in good condition and of adequate lengths. Gas tests were made immediately before and after firing the shots at the time of the June 1966 Federal inspection.

Ventilation and Mine Gases: Ventilation of the mine was induced by an axial-flow fan properly installed on the surface and equipped with all necessary safety devices. The fan operated continuously and exhausting

developed a negative pressure of 4.6 inches of water gage. The volume of air measured in the main return at the fan during the June 1966 Federal inspection was about 116,900 cubic feet a minute. Methane liberation in the return air was calculated to be 236,000 cubic feet in 24 hours.

The two active drifts were used for intake air openings. Overcasts and permanent stoppings were constructed of incombustible material. Temporary plastic stoppings were used in some instances to conduct the air flow into face areas. Line brattices were used on some sections to direct air to the faces. The quantities of air passing through the last open crosscuts in developing entries and being delivered to the intake ends of pillar lines during the June 1966 Federal inspection were more than 6,000 cubic feet a minute.

The following air measurements and methane determinations were made during the June 1966 Federal inspection:

Location	Volume of Air c.f.m.	Methane, Percent	Cubic Feet of Methane in 24 Hours
Immediate return, 1 right butts	21,500	0.15	46,000
Immediate return, 6 left section	9,200	0.10	13,000
Main return, 1 mains	30,100	0.34	147,000
Immediate return, 6 right	20,800	0.12	36,000
Main return at fan	116,900	0.14	236,000

The mine is classed gassy by the West Virginia Department of Mines and the Bureau of Mines. Preshift examinations for gas and other hazards were made by certified officials before the first operating shift each day, and preshift examinations for succeeding shifts were made by the on-shift officials during their regular tours of duty.

On-shift examinations for gas and other hazards were made by foremen, shot firers, and operators of face electrical equipment during the June 1966 Federal inspection; however, after the explosion, only the section foreman in 2 left mains had a flame safety lamp in his possession. Officials and employees testified during the official hearing that enough safety lamps were not available at the mine and that equipment operators were either double-shifting the available safety lamps or were not taking lamps underground.

At the time the 2 left main entries were being driven, the section was ventilated by a current of intake air directed through Nos. 3 and 4 entries, split right and left at the last open crosscuts and

returned through Nos. 1, 2, 5, and 6 entries. At the time of the explosion, the Nos. 1, 2, 3, and 4 entries of 2 left mains inby 6 left off 2 left mains were used for intake airways and Nos. 5 and 6 entries were used as returns. Six rooms turned left off No. 1 entry of 2 left mains were ventilated by means of intake air directed by check curtains erected across Nos. 2, 3, and 4 entries in the line of pillars at the 2 left mains belt conveyor tailpiece. Officials and employees stated that generally line curtain was not used in the continuous miner sections. Intake air for the 6 left off 2 left mains and the 2 left mains pillar section was coursed through the same entries to 6 left entries, and a regulator was not provided at any location to control the quantity of air reaching either section (See Appendix B).

No provisions had been made to provide a system of bleeder entries in 2 left mains; however, testimony of officials disclosed that bleeder entries used in other parts of the mine had been successful.

Permanent, incombustible stoppings had been erected between the intake and return air courses to within three crosscuts of the pillar line in 2 left mains entries. Temporary stoppings were erected between the intake and return air courses from the last permanent stopping to the last open crosscut, and temporary stoppings were erected between Nos. 1 and 2 entries from 6 left off 2 left mains to No. 6 room off No. 1 entry in 2 left mains section.

Dust: During the June 1966 Federal inspection, the mine surfaces varied from dry to wet. Water was used to allay dust at the faces in the continuous miner section and at several belt conveyor discharge points; dust produced during other mining operations was not considered excessive.

During the June 1966 inspection, coal dust and loose coal were not accumulated in dangerous quantities in the active underground workings. Rock dust was applied to within 40 feet of the faces of the active working places, including the open crosscuts nearest the faces. The haulageways, open parallel entries, and back entries appeared to be rock-dusted adequately.

Rock dust in the active sections was applied by hand during the coal-producing shifts, and generalized rock-dusting of the face areas by machine was done on each section every second workday at the time of the June 1966 Federal inspection. However, rock dust had not been applied in the six rooms driven off No. 1 entry in the 2 left mains section.

Rock-dust surveys were made in the 1 main entries and 6 left section during the June 1966 inspection. Dust samples were collected on

pattern in each entry. The incombustible content of 8 of the 37 samples collected was substandard; however, additional rock dust in ample quantity was applied promptly. The incombustible content of each of the 14 samples collected at spot locations in other areas of the mine was more than 65 percent.

During the underground investigation of the explosion, it was evident that coal dust had entered into and helped propagate the explosion. However, evidence of extremely violent pressure and/or forces was not found at any location, and evidence of burning coal dust, such as soot streamers and heavy coke deposits, was found only at a few scattered locations.

The floor of the entire 2 left mains section (explosion area) ranged from damp to extremely wet, with standing water at several locations. The roof and ribs ranged from damp to dry. It was apparent that the section had been rock-dusted, except that rock dust had not been applied in the recently driven rooms. In addition, the routes traversed by the shuttle cars contained accumulations of coal dust and coal spillage, and in proximity to the belt tailpiece and surge bin belt feeder, the dust accumulations were excessive. The 2 left mains belt was empty except for about a shuttle car of material just outby the tailpiece.

Following the explosion, 139 samples of the mine dust were collected in areas affected by the explosion forces (See Table 2). About 71 percent (99) of the samples collected contained less than 65 percent incombustibles. Of the 106 samples collected in 2 left mains entries, 78, or 75 percent, contained less than 65 percent incombustibles and 57 of these samples, or 53 percent, contained less than 50 percent incombustibles. Of the 33 samples collected in the 6 left entries, 21, or 63 percent, contained less than 65 percent incombustibles, and 13, or 39 percent, of these samples, contained less than 50 percent incombustibles. Dust samples collected after the explosion in 2 left mains entries and 6 left entries were not necessarily representative of mine dust conditions prior to the explosion, as coal dust thrown into suspension and deposited on rock-dusted surfaces decreased the incombustible content.

Transportation: Coal was hauled in permissible-type cable-reel shuttle cars from the face regions to well-installed belt conveyors, which transported the coal to the surface. Beltmen were employed to travel along and regularly inspect assigned belts for spillage, defective or stuck rollers, the belt drives, and the slippage and sequence controls. The track and rolling stock, used primarily for man trip and supply haulage purposes, were in reasonably good condition. Men were transported underground in mine cars, and the man trips were operated under the supervision of certified officials.

Electricity: Electric power at 13,200 volts alternating current was reduced to 6,900, 2,300, 440, 220, and 110 volts alternating current and 275 volts direct current for use on the surface and 4,160, 440, and 220 volts alternating current and 275 volts direct current were used underground. The 4,160 volts alternating current was conducted underground through a borehole by a three-conductor, 2/0 shielded type, nonmetallic armored, high-voltage cable. The high-voltage circuit was protected against overloads by an oil circuit breaker, equipped with time overcurrent relays, unbalanced phase relays, and ground-fault tripping. The ground-trip relays were adjusted to open the main power circuit on a fault exceeding 16 amperes. A current-limiting resistor was installed in the neutral circuit to limit the amount of current flow under fault conditions. Lightning arresters were installed in the high-voltage circuit at the top of the borehole, and disconnecting switches were installed at the bottom of the borehole and at the beginning of all branch lines. The high-voltage cable was installed in the track entry and supported by spool-type porcelain insulators or insulated J hooks. However, the belt-conveyor remote control cable and the direct-current insulated feeder were in contact with the high-voltage cable in the main and 2 left main entries.

A portable 3-phase, air-cooled, 150-kv.-a. power center located in No. 5 entry 2 left mains section, reduced the 4,160 volts to 440 volts alternating current for operation of a permissible-type CM32 Lee-Norse continuous miner.

The power conversion equipment consisted of three rectifiers, a 500 kw unit on the surface and a 400 kw and a 300 kw installed underground. The direct-current circuit breakers were adjusted to open the 275-volt direct current circuit above 3,200, 3,000, and 1,500 amperes, respectively. The rectifiers were properly ventilated and suitably installed in fireproof enclosures. Number 9 section trolley wire paralleled by 500 MCM and 1,000 MCM feeders in the positive circuit and bonded 60-pound track rails paralleled with 500 MCM feeder in the negative circuit conducted 275 volts direct current from the rectifiers throughout the track system and to the coal-producing sections. The trolley wire was installed on bell-type insulators, and the feeder cables were installed on porcelain insulators. However, the bare feeder was in contact with a wooden crib between the track and conveyor belt in 2 left mains. Cutout switches were not installed at suitable intervals in the direct-current system. The frames of the off-track direct-current electric face equipment were not grounded. The ground-fault trip circuit for the continuous miner was not in operating condition, in that the grounding conductor was not connected to the current-limiting resistor in the neutral of the 440-volt secondary at the 150-kv.-a. power center.

During the June 1966 Federal inspection, suitable tests for gas were made before the electric face equipment was taken to the working faces and at suitable intervals while equipment was being operated at the faces. However, on the day of the explosion, neither the continuous miner operator nor the roof bolter had a flame safety lamp in his possession. Sufficient safety lamps were not available for the electric face equipment operators.

At the time of the explosion, the permissible-type face equipment in 2 left mains section consisted of a CM32 Lee-Norse continuous miner, three MT66 Jeffrey shuttle cars, and one Galis roof bolter. A 2-inch Gorman Rupp pump was installed in the first crosscut outby the loading point between Nos. 5 and 6 entries. This electric face equipment was examined thoroughly during the investigation, and the following permissibility violations and other defects were found:

The CM32 Lee-Norse miner had one bolt missing, two loose bolts, a damaged packing gland tube, and insufficient packing in the left headlight; one lockwasher missing from a bolt on the inspection cover of the left cutting motor; a loose packing gland and damaged conduit hose on the safety switch; an opening in excess of .004-inch and one lockwasher missing from the inspection cover on the pump motor; one bolt missing from the rear cover and two bolts missing from the front cover of the contactor compartment; the undervoltage release was blocked in with wood in the pump motor circuit breaker, a control circuit fuse was bridged with bond wire, and the overload heater elements were bridged in circuit breakers of the pump and cutting motors; one bolt was missing from the cover of the control station; one bolt missing from the right headlight cover; and one bolt was missing from the inspection cover of the right cutting motor.

The No. 1 standard drive MT66 Jeffrey shuttle car located immediately outby the continuous miner had openings in excess of .004-inch in the forward and reverse tram switches; a splice in the rear headlight cable and a broken headlight globe; a hole burnt through the trailing cable reel into the collector ring assembly; and six temporary splices in the trailing cable, exposed conductors were present in two splices.

The No. 2 standard drive MT66 Jeffrey shuttle car at the entrance of No. 4 room in No. 1 entry had three bolts missing and an opening in excess of .004-inch between the rear contactor compartment and cover; damaged conduit hose on the resistance cable; nine bolts missing and an opening in excess of .004-inch in the resistance compartment; and a hole burnt through the trailing cable reel into the collector ring assembly.

The off-standard drive MT66 Jeffrey shuttle car in the second crosscut inby the loading point between Nos. 3 and 4 entries contained an opening in excess of .004-inch in the rear contactor compartment; an opening in excess of .004-inch, four bolts missing, and an improper length bolt in the front contactor compartment; one bolt and lock washer missing from the contactor compartment; a broken packing gland, damaged motor cable and conduit hose, an opening in excess of .004-inch, and four loose bolts in the inspection cover of the front traction motor; an opening in excess of .006-inch and a bolt missing from the front headlight.

The Galis roof bolter had several lock washers missing from the control switch, one lock washer missing from the contactor compartment, and six temporary splices in the trailing cable.

The 2-inch Gorman Rupp pump installed in the return air course and one crosscut outby the loading point between Nos. 5 and 6 entries was not provided with overload protection, twisted-type telephone lines were used as power conductors, and the choke resistor was lying on the mine floor with exposed conductors.

An examination of the permissible-type electric face equipment in the other active sections of the mine revealed permissibility violations similar to those found in the 2 left mains equipment.

Illumination and Smoking: Permissible electric cap lamps were used for portable illumination underground. Smoking was prohibited underground, and searches for smokers' articles were conducted frequently.

Mine Rescue and Fire-Fighting Facilities: Trained mine rescue men and equipment were not available at the mine; however, trained and equipped mine rescue teams were available at Slab Fork, Tralee, and Itmann, West Virginia. These teams were maintained by the Slab Fork Coal Company; Semet-Solvay Division, Allied Chemical Corporation; and the Pocahontas Fuel Company, respectively. These teams were placed on a stand-by basis following the explosion, although it did not become necessary to utilize them.

Less than 50 percent of the underground employees were provided with self-rescuers; however, self-rescuers for each employee were on order.

Fire-fighting facilities included a 2-inch water line installed along the belt conveyors with outlets at varying intervals. Dry-type chemical fire extinguishers were provided at each section loading point and at other necessary places underground. A steel water-tank car, equipped with a high-pressure pump and hose, was also available.

STORY OF EXPLOSION AND RECOVERY OPERATIONS

Participating Organizations: Officials and employees of The New River Company and representatives of the West Virginia Department of Mines, United Mine Workers of America, and United States Bureau of Mines participated in the recovery operations and underground investigation.

Activities of Bureau of Mines Personnel: District Manager W. R. Park was informed by James Page, manager of mines for The New River Company, during a telephone call shortly after 9 a.m., July 23, 1966, that an explosion had likely occurred in the Siltix mine. Immediately thereafter, Park instructed Inspectors R. J. Penman and Loraine Wotring to proceed to the mine promptly, ascertain what had occurred if possible, and thereafter, travel underground immediately if necessary. Penman and Wotring arrived at the mine about 9:40 a.m.; they were briefed by company officials with all available details, and then they proceeded underground to assist with recovery operations. Park, after directing Inspectors Wotring and Penman to the mine, telephoned Washington and local representatives of the Bureau of Mines of the occurrence. Park, J. D. Micheal, T. A. Allamon, F. H. Ryan, and J. W. Crawford arrived at the mine about 10:15 a.m. After briefing, Park, Allamon, and Ryan entered the mine and assisted with the restoration of ventilation in the affected areas and the recovery of the bodies. Director Walter Hibbard and Assistant Director James Westfield arrived at the mine about 4 p.m., July 23, and they participated in the underground investigation of the disaster. The following additional Bureau of Mines personnel arrived at the mine at various times July 23, and they assisted with recovery operations and the investigation: M. S. Childers, J. W. Weekly, C. E. Adams, C. E. Lester, J. W. Collier, G. S. Vargo, C. E. Phillips, J. W. Rutherford, and R. M. Cain.

On July 23, 1966, a Withdrawal Order was issued under Section 203(a)(1) of the Federal Coal Mine Safety Act, debarring all persons from the Siltix mine, except those needed for exploratory and recovery work. Before the Order was issued, management had withdrawn all men except those mentioned above from the mine.

Mining Conditions Immediately Prior to the Explosion: The weather was warm, humid, and partly cloudy on July 23, 1966. Records of barometric pressure recorded at the United States Weather Bureau at the Raleigh County Airport, Beckley, West Virginia, from 12 noon, July 22, to 12 noon, July 23, 1966, are as follows:

12 noon	July 22, 1966	27.59
12 midnight	July 22, 1966	27.59
7 a.m.	July 23, 1966	27.63
12 noon	July 23, 1966	27.65

It is the opinion of the Bureau investigators that the slight variation in atmospheric pressure had no bearing on the explosion.

The report of the examinations of the fire boss who made the preshift examinations for the 7:30 a.m. to 3:30 p.m. production shift, July 23, 1966, indicated that conditions on each section were normal, and gas was not found at any location.

Evidence of Activities and Story of Explosion: The day-shift crew (7:30 a.m. to 3:30 p.m.) consisting of 48 men, entered the mine about 7:30 a.m., July 23, 1966, and they were transported in mine cars to their respective sections without incident. Employees of the 6 left and 1 right butts conventional loading sections reached their working faces promptly and were loading coal when the explosion occurred.

The continuous miner and shuttle cars in the 2 left mains section had been moved back from the faces of the rooms at the end of the shift near midnight July 22 to clean up fallen roof rock in the pillar split (shuttle-car roadway) between Nos. 3 and 4 entries. The continuous miner and shuttle cars were left at this location to be trammed back to the room faces by the day-shift crew.

Two electricians worked their entire shift, 12 midnight to 8 a.m., repairing electric face equipment in the 2 left mains section. The electricians stated that only two other men visited the section during their shift, a roof-bolter and the fire boss. They stated further that neither they nor the roof-bolter traveled to any of the working faces and that they worked their entire shift in the vicinity of the belt tailpiece.

The day-shift crew in 2 left mains, consisting of a foreman, continuous miner operator and helper, electrician, roof-bolt machine operator, and three shuttle-car operators, arrived on the section about 8:20 a.m. Company rules require that the section foremen notify the superintendent or the tipple foreman on the surface of the condition of the section and/or that coal-producing operations have been started. Dallas Ayers, 2 left mains section foreman, called to the surface about 8:30 a.m. and informed the superintendent that they were "loading." This was the last verbal contact the 2 left mains employees had with other mine employees prior to the explosion.

Before entering the mine on July 23, Ayers was instructed to finish driving a crosscut right off No. 4 room into the gob and then begin extracting the room pillars between Nos. 4, 5, and 6 rooms.

Lloyd Marcum, beltman, was shoveling coal splillage onto the belt conveyor at 6 left off 2 left mains when the explosion occurred. Marcum stated that prior to the occurrence, about two shuttle cars

of coal and material passed by him on the 2 left mains belt conveyor. He stated further that the material appeared to be coal and dust from the roadways rather than fresh coal. Marcum stated that while he was shoveling, a terrific blast of air tossed him about 60 feet outby along the belt conveyor. He said that smoke and dust suspended in the air prevented him from seeing for some time, although he did not see any flame. Marcum moved along the timberline adjacent to the conveyor belt until he reached the 6 left telephone and notified Superintendent Keaton of the occurrence. Keaton instructed Marcum to remain at 6 left until he received assistance.

On the morning of July 23, the mine foreman, Maxwell Wallace, rode underground in the 6 left man trip with the section foreman and a crew of 10 men. The 6 left section crew began producing coal promptly, and coal was being loaded when the explosion occurred. Wallace and Wiley Cullop, section foreman, were near the 6 left belt tailpiece when they felt an unusually strong blast of wind. Immediately thereafter, they observed dense dust suspended in the air. Neither Wallace nor Cullop were aware of what had occurred or had any idea of where the occurrence might have originated. Wallace instructed Cullop to assemble his crew near the telephone at the 6 left tailpiece and to keep the crew there until he received further instructions. Immediately thereafter, Wallace began traveling outby along the 6 left belt in an attempt to learn what had occurred.

Cullop assembled the crew at the telephone, and he then began calling the surface buildings on the telephone. The general superintendent answered Cullop's call, and after Cullop had explained what had occurred, the general superintendent suggested that possibly a roof fall had occurred in an intake air course and he (Cullop) was to ascertain if a fall had occurred. Thereafter, Cullop ordered the crew to remain at the telephone while he traveled outby. Cullop traveled about 1,000 feet in the belt entry toward the mouth of the section, and after observing nothing unusual, he returned to the telephone and began calling on the phone. The general superintendent again answered, informed Cullop that an explosion had likely occurred in the 2 left mains section and that he was to take his crew to fresh air at the entrance to 6 left. The 6 left crew immediately proceeded along the belt entry toward the entrance to the section; the crew traveled about 1,000 feet when they encountered thick black smoke moving inby in the intake entry. To circumvent the smoke, the crew traveled through a man door in a permanent stopping between Nos. 2 and 3 entries and then traveled in No. 2 entry, a return air course, toward the entrance to the 6 left section. Upon reaching No. 1 entry, 2 left mains, dense smoke was again encountered, blocking the escape route. When it appeared that all escape routes were blocked by the dense smoke, the section foreman and the crew decided to locate a suitable place in No. 2 entry, 6 left and construct a barricade. Members of the crew began