

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

COAL FATAL

REPORT OF INVESTIGATION
(UNDERGROUND COAL MINE)

UNDERGROUND COAL MINE EXPLOSION

No. 2 Slope Mine (ID No. 36-06279)
M. S. W. Coal Company
Carlstown, Schuylkill County, Pennsylvania

December 11, 1985

by

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Mine Safety and Health Administration
4015 Wilson Boulevard
Arlington, Virginia 22203
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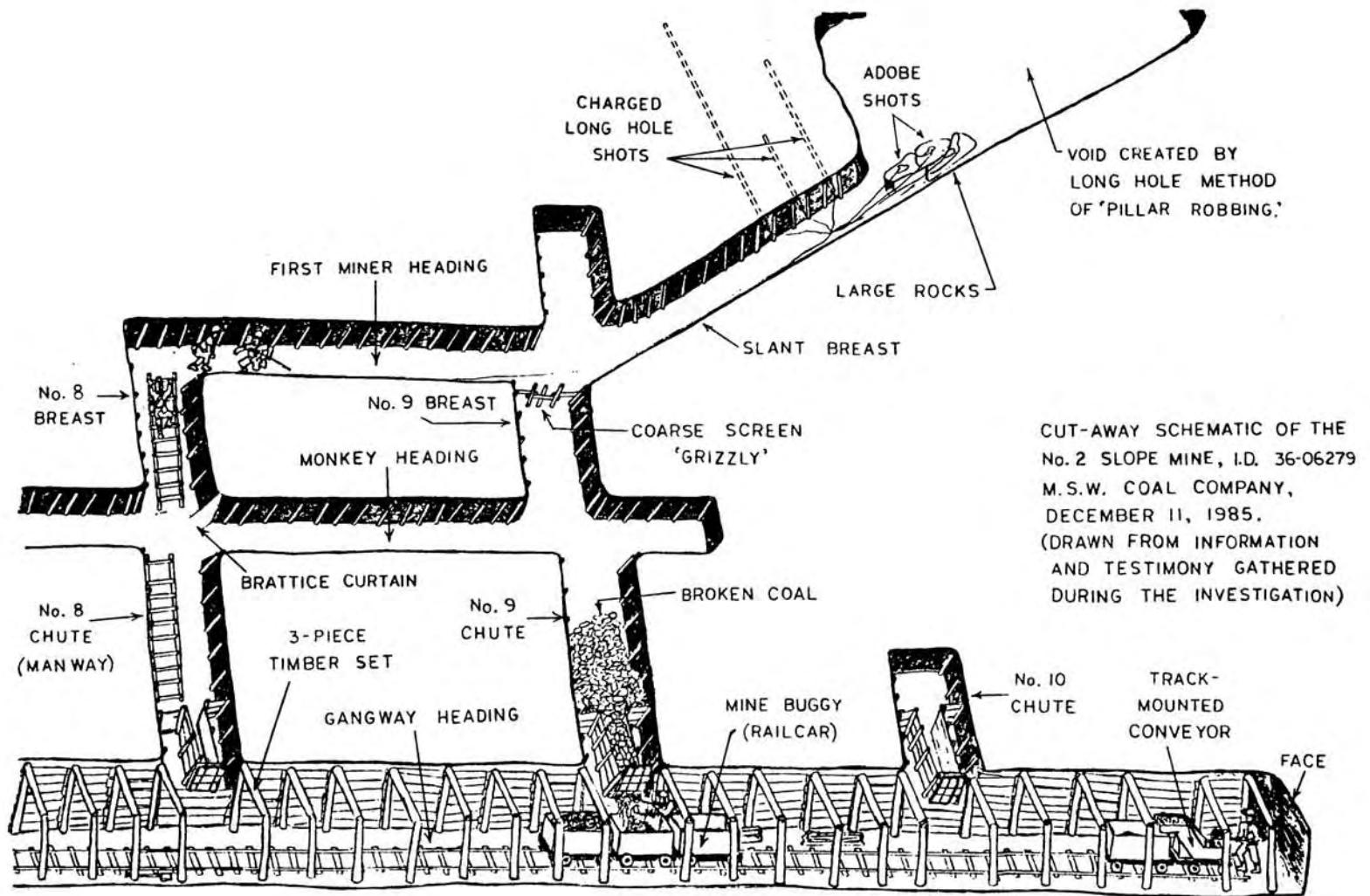
December 11, 1985

TABLE OF CONTENTS

	<u>Page</u>
Part I General Information	2
Part II Explosion and Recovery Operations	6
Part III Investigation, Discussion and Evaluation.	9
Part IV Findings of Fact.	14
Part V Conclusion.	18

APPENDIX

- A Victim Data Sheet
- B Terminology Used in Anthracite Mines
- C Mine Maps
- D Channel Sample Results
- E Mine Rescue Members and Those Who Participated
 in Body Recovery
- F Report on Electrical Equipment
- G Citations and Orders



CUT-AWAY SCHEMATIC OF THE
No. 2 SLOPE MINE, I.D. 36-06279
M.S.W. COAL COMPANY,
DECEMBER 11, 1985.
(DRAWN FROM INFORMATION
AND TESTIMONY GATHERED
DURING THE INVESTIGATION)

Abstract of Investigation

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



Authority—This report is based on an investigation made pursuant to the Federal Mine Safety and Health Act of 1977, Public Law 91-173, as amended by Public Law 95-164.

Section A—Identification Data

1. Title of investigation:	2. Date MSHA investigation started:
Underground Coal Mine Explosion	December 17, 1985
3. Report release date:	4. Mine:
	No. 2 Slope Mine
5. Mine ID number:	6. Company:
36 06279	M. S. W. Coal Company
7. Town, County, State:	8. Author(s):
Carlstown, Schuylkill County, PA	Theodore W. Glusko, Kevin G. Stricklin, Timothy J. Thompson, Edwin P. Brady,
Section B—Mine Information	Richard J. Vasicek, and Joseph M. Denk
9. Daily production:	10. Surface employment:
30 Tons	1
11. Underground employment:	12. Name of coalbed:
5	(Anthracite) Nos. 4 and 5 Lykens Valley Vein
13. Thickness of coalbed:	
No. 4 - 3 to 5 feet, No. 5 - 5 to 10 feet	

Section C—Last Quarter Injury Frequency Rate (HSAC) for:

14. Industry:	15. This operation:
9.03	0.00
16. Training program approved:	17. Mine Profile Rating:
August 9, 1984	DNA

Section D—Originating Office

18. Mine Safety and Health Administration Coal Mine Health and Safety District No. :	Office of the Administrator, Coal	Address: 4015 Wilson Boulevard Arlington, Virginia 22203
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Section E—Abstract

At approximately 2:00 p.m., December 11, 1985, a methane explosion occurred in the slant off of the No. 9 breast of the first miner heading of the No. 2 Slope Mine, M. S. W. Coal Company, Carlstown, Schuylkill County, Pennsylvania. The accident resulted in the death of three miners and serious injuries to a fourth miner. A fifth miner working in this area was uninjured. The names of the victims, their ages, job classifications, and mining experience are listed in Appendix A.

A slant had been developed approximately 150 feet off of the No. 9 breast of the first miner heading. Pillaring was then started, creating about a 75 foot by 75 foot void which was not connected to bleeder entries or a bleeder system to assure positive ventilation in this area. Also, there was no natural means for bleed off to the surface. This condition permitted methane to accumulate in this area. MSHA investigators concluded that the explosive methane/air mixture was ignited when confined and unconfined shots were detonated in the slant.

Section F—Mine Organization

Company officials:	Name	Address
19. President: Owner:	Gene Wolfgang	P.O. Box 507 Valley View, PA 17983
20. Superintendent:	Gene Wolfgang	P.O. Box 507 Valley View, PA 17983
21. Safety Director:	DNA	
22. Principle officer—H&S:	Gene Wolfgang	P.O. Box 507 Valley View, PA 17983
23. Labor Organization:	DNA	
24. Chairman—H&S Committee:	DNA	

PART I

GENERAL INFORMATION

The No. 2 Slope Mine, an anthracite coal mine, was opened on November 24, 1976, and is approximately 6 miles northeast of Hegins, Schuylkill County, Pennsylvania, off Legislative Route 53115. (See Appendix B for terminology used in anthracite mines.)

The M. S. W. Coal Company is a sole proprietorship. The company official was Gene Wolfgang, Owner.

The mine is opened by two slopes into the No. 5 Lykens Valley Vein, which varies in thickness from 5 to 10 feet on an average pitch of 60 degrees. At a point 50 feet from the bottom of the haulage slope, horizontal rock tunnels were driven into the No. 4 Lykens Valley Vein which varies in thickness from 3 to 5 feet on an average pitch of 54 degrees. A gangway and monkey were driven in the No. 4 vein and advanced approximately 1,730 feet. At about this point horizontal rock tunnels were driven back into the No. 5 vein. At the time of the explosion, mining was being conducted in the No. 5 vein.

A total of 6 persons, 5 working underground, produced a daily average of 30 tons of coal on one shift, 5 days a week.

During the investigation, a standard channel sample of coal was taken in the face of the No. 5 gangway approximately 50 feet inby the No. 10 chute. The location of the sample is shown on Map No. 1 in Appendix C. This sample was analyzed by the Industrial Safety Division Laboratory, Bruceton Safety Technology Center, Pittsburgh, Pennsylvania. (See Appendix D) The proximate analysis of channel sample No. ISB 367 was as follows:

	<u>Percent</u>
Moisture	.63
Volatile Matter	7.13
Fixed Carbon	83.22
Ash	9.02

Numerous tests by the Bureau of Mines have established that coal dust having volatile ratio of 0.12 and higher is explosive. The volatile ratio of the sample was calculated to be 0.08 which indicates that it is non-explosive.

The last safety and health inspection of the entire mine was completed on July 29, 1985.

MINING METHODS AND EQUIPMENT

The slant and pillar method of mining was employed in the No. 5 Lykens Valley Vein. A gangway (10 feet average width) was advanced with chutes turned on 30-40 foot centers to the monkey which averaged 6 feet in width. Breast

chutes were developed off the monkey 6 feet in width, up 50 feet to the first miner heading. Slant breasts, limited to 20 feet in width, were advanced off the first miner heading. Drilling was done with a hand-held air-operated auger type drill.

The coal was blasted off of the solid. The pillar skip and/or long hole mining method was employed during the final pillar recovery. The roof was supported by a single prop, two and/or three timber sets with spacing not to exceed 5 foot centers in all advancing areas.

VENTILATION AND EXAMINATIONS

A Jeffrey fan, located on the surface, provided ventilation for the mine. The fan was equipped with a manometer (U-Tube) in lieu of a pressure recording gage and had provisions for pressure relief. A waiver was granted on June 21, 1983, from the requirements of Subsection 75.300-2(a)(3) of the Mandatory Safety Standards for Underground Coal Mines (equip main fan with a pressure-recording gage).

The following data for the fan was obtained from the approved ventilation system and methane and dust control plan:

Fan No.	Type	Blade Setting	Horse-power	Air Quantity (C.F.M.)	Pressure (Inches of Water)
1	6' Dia. Jeffrey	0	25	24,000 (Exhausting)	2.0

A waiver was granted on December 21, 1983, from the requirements of Subsection 75.300-3 of the Mandatory Safety Standards for Underground Coal Mines (continuous operation of the fan).

During the last regular inspection, the fan exhausted a total of 20,300 cubic feet a minute of air from the mine, and the mine liberated 26,000 cubic feet of methane in 24 hours. Untreated hardwood boards were used to provide separation between gangway and monkey. The fan was to ventilate the active working section, and idle and abandoned areas. The No. 1 Level, No. 4 and No. 5 Veins East gangways were to be utilized as intake air courses and the No. 4 and No. 5 Vein monkeys were to be the return.

A 101(c) Petition for Modification of Mandatory Safety Standard for Underground Coal Mines 30 CFR, 75.301 was granted January 16, 1979. This required the minimum quantity of air reaching each working face to be 1,500 cubic feet a minute and the minimum quantity reaching the last open crosscut in any pair or set of developing entries and the last open crosscut in any pair or set of rooms to be 5,000 cubic feet a minute.

The working faces were being ventilated by line brattice and/or air movers (Airjax Model "K", 010 Nozzle, 120 PSI, capability 2,862 CFM) with 12-inch tubing installed at a distance no greater than 20 feet from the area of deepest penetration. A waiver was granted June 21, 1983, from the requirements of Subsection 75.302-1(a) of the Mandatory Safety Standards for Underground Coal Mines (installation of line brattice or other approved devices). During the last safety and health inspection, 0.44 percent of

methane was detected in the face of the No. 1 Level East, No. 5 Vein gangway and 0.42 percent of methane in the face of the No. 9 Chute off of the No. 1 Level East, No. 5 Vein gangway workings.

The most recent ventilation system and methane and dust control plan approved by the District Manager was dated September 30, 1981, and reviewed July 29, 1985, during the last regular inspection. The mine had a certified person to conduct preshift, on-shift, and weekly examinations. Books were provided on the surface for these examinations to be recorded.

COAL DUST

The mine surfaces were generally dry. Dust was to be controlled in all areas of the mine by means of ventilating current and water. Rock dust requirements do not apply to underground anthracite mines.

ELECTRICITY

The mine is supplied 480 volts by a 105KV Caterpillar diesel-powered generator. The 480 volts is taken to the hoist shanty through a 1/0 A.W.G. 3 conductor cable where it enters a Westinghouse 300-amp fused disconnect. The 480 volts is then distributed to three motors on the surface of the mine, and two pump motors and a battery charger underground. The hoist shanty and change room trailer are provided 120/240 volts for lighting and one portable welder.

TRANSPORTATION

Coal is gravity fed from the face through chutes or hand loaded into one-ton coal cars located in the gangway. The coal is then transported to the slope bottom by battery powered locomotives.

The manually operated hoist has an internal combustion engine and is to be equipped with overspeed, overwind, and automatic stop controls. This hoist is used to lift coal, and to transport supplies, equipment, and men into and out of the mine. A 101(c) Petition for Modification of Mandatory Safety Standard for Underground Coal Mines 30 CFR, 75.1400 was granted August 27, 1980, relieving the requirements for safety catches.

COMMUNICATIONS

Communications between the surface and underground active workings were provided by Wheeler Powered Handset Model SPT-125, manufactured by Sound Powered Communication Corporation, Trenton, New Jersey. A responsible person was available on the surface when miners were underground.

FIRE PROTECTION

The firefighting and evacuation plan, submitted to the District Manager, February 15, 1983, includes a program of instructions, location of escapeways, exits and routes of travel, evacuation procedures and fire drills. The weekly escapeway examination results were recorded in a book on the surface. Records indicate escapeway drills were conducted every 90 days and the main escapeways were traveled to the surface. Portable fire extinguishers were provided for electrical installations and battery-powered locomotives.

EXPLOSIVES

Permissible explosives and electric detonators were purchased as needed. Separate containers were available underground for storage. Coal was blasted off the solid. Independent E 1-1/4 x 8 inch cartridges were used for developing chutes and headings, and Herco 330 1-1/4 x 24 inch cartridges were used for long-hole shooting. The detonators used were instantaneous electric blasting caps, separately or in series with 8-foot Acudet delay blasting caps, periods one through five.

TRAINING PROGRAM AND MEDICAL ASSISTANCE PROGRAM

The operator's revised training plan was approved on August 9, 1984. Training was conducted on a cooperative basis with the Schuylkill County Vocational Technical School, which has also received approval from the Mine Safety and Health Administration for training miners as required by Parts 48 and 75, Title 30 CFR. Annual refresher training was conducted at the Schuylkill County Vo-Tech. The most recent annual refresher training was completed September 5, 1985.

The operator's training plan also includes programs for training of miners assigned to new work tasks, hazard training, and training for qualified and certified persons.

In the event of a medical emergency, the Heggies Community Ambulance Association were to be contacted for assistance.

ILLUMINATION AND SMOKING

Wheat permissible cap lamps were used for illumination underground. The operator had submitted a search plan for smoking articles on February 15, 1983.

MINE RESCUE

An application for an alternative means for mine rescue capability had been submitted to the District Manager. The operator had entered into an arrangement for the mine rescue emergency services from Anthracite Underground Rescue, Inc. (AUGR). The teams were equipped with Drager 4-hour self-contained breathing apparatuses. Communication was established by using the mine owned two-way system.

A 101(c) Petition for Modification of a standard requiring self-contained self-rescuers had been filed with the Mine Safety and Health Administration on April 7, 1981, and was pending at the time of the explosion.

A check-in and check-out system was maintained at the mine, using a checkboard and brass checks with a number corresponding to the battery cap lamp number. The hoisting engineer checked the board immediately after the start of each shift.

PART II
EXPLOSION AND RECOVERY OPERATIONS

CONDITIONS IMMEDIATELY PRIOR TO THE EXPLOSION

On December 10 and 11, 1985, the weather in eastern Pennsylvania was seasonable -- temperatures ranged from 35 to 43 degrees Fahrenheit, and there had been only a trace of precipitation. Records of barometric pressure recorded in Wilkes-Barre, Pennsylvania, prior to the explosion were as follows:

December 10, 1985 -	6:00 p.m.	29.200
	9:00 p.m.	29.185
December 11, 1985 -	midnight	29.180
	3:00 a.m.	29.150
	6:00 a.m.	29.120
	9:00 a.m.	29.090
	noon	29.010
	2:00 p.m.	28.965

In the opinion of Mine Safety and Health Administration investigators, this variation of atmospheric pressure had no bearing on the explosion.

ACTIVITIES OF MINE SAFETY AND HEALTH ADMINISTRATION PERSONNEL

At approximately 2:55 p.m., the Pottsville field office received a call from the Independent Miners Association notifying them of a possible entrapment at the M. S. W. Coal Company's No. 2 Slope Mine. Charles Klinger, Coal Mine Safety and Health Inspector, notified the Wilkes-Barre District Manager, John Shutack, who directed Ralph Johnson and Michael Scheib, Coal Mine Safety and Health Inspectors, to go to the mine to investigate the possible entrapment. Over the course of the next couple of hours, other personnel were dispatched to the mine from the Pottsville, Shamokin, and Wilkes-Barre offices.

Johnson and Scheib arrived at the mine at approximately 3:45 p.m., where they met the Hegins Township Police and Jack Smith, hoistman. The Hegins Fire Department Rescue Team had already proceeded underground. At 4:00 p.m., Johnson went underground and Scheib began to monitor the fan.

THE EXPLOSION AND RECOVERY OPERATIONS

Shortly before 7:00 a.m., on December 11, 1985, Gene Wolfgang, Troy Wolfgang, Ricky Wolfgang, Frank Benner, Chester Morgan, and Jack Smith reported for their normal work shift. At 7:00 a.m., five of the workmen proceeded underground being lowered into the mine by Smith, the hoistman. When the men reached the rock tunnel leading from the No. 4 Vein gangway to the No. 5 Vein gangway, Gene Wolfgang traveled ahead of the others apparently to make examinations.

Work progressed normally throughout the morning with Benner and Troy Wolfgang working up the pitch in the miner heading and Morgan and Ricky Wolfgang loading coal out of the No. 9 chute and gangway face. After lunch, work resumed with Troy Wolfgang drilling three long holes in the solid coal near the edge of the void in the slant off of the first miner heading approximately

75 feet inby the No. 9 breast (see Appendix C, Map No. 1). While drilling these holes, he became dizzy and had to leave the area for a short while. He reported this to his father, Gene Wolfgang, and the tubing from the compressed air-operated "bazooka" (air mover) was extended approximately 20 feet. This allowed the drilling operation to resume. Checks for methane were not made. The three long holes (18, 24, and 50 feet) were completed and preparations were made to load and shoot the holes.

The holes were loaded with approximately 50 pounds of 1-1/4 x 16 and 24 inch cartridge explosives and stemmed with four or five bags filled with coal dust. Pieces of 1-1/4 x 8 inch cartridges were placed and charged on top of some big rocks in the slant near the long holes and covered with coal dust.

At approximately 2:00 p.m., Gene Wolfgang, Troy Wolfgang, and Frank Benner positioned themselves approximately 115 feet from and in line with the charged shots. Troy Wolfgang was positioned in the No. 8 breast, one to three feet below the miner heading, and Gene Wolfgang and Benner were located in the miner heading on the right corner. Troy Wolfgang had the blasting unit and asked his father, Gene Wolfgang, if it was all right to shoot. His father told him it was all right and the explosives were detonated. Troy Wolfgang was knocked down in the No. 8 breast by the force of the explosion, got caught in the rungs of the manway ladder, and was covered with coal. He eventually freed himself and worked his way partially down the breast toward the monkey.

When the explosion occurred, Morgan and Ricky Wolfgang were in the gangway loading coal into mine cars. Morgan heard a "crack" which was much louder than what he was accustomed to when explosives were detonated. Heavy dust filled the gangway. They immediately began traveling outby until they reached the No. 6 chute at which point the dust was thin enough that they could see again. They returned to the No. 8 chute (manway) where they found Troy Wolfgang 15 feet above the monkey. They assisted Troy down to the gangway. Morgan went to the phone located near No. 7 chute while Ricky Wolfgang went up the No. 8 chute in search of his father, Gene, and Benner. Morgan talked to Jack Smith and told him what had occurred and to get assistance. Morgan returned to the No. 8 chute and began calling for Ricky Wolfgang. Receiving no response, he climbed up the chute and observed Ricky located near the same location that Troy had been recovered. Unable to continue up the breast, Morgan then returned to the gangway to assist Troy and await help.

Jack Smith, after receiving a call for assistance from Morgan, left the mine property and went to the closest telephone. He contacted the police emergency number, requested assistance, and returned to the mine.

In a short time, the Hegins Fire Department Rescue Team, Hegins Township Police, and volunteer miners from neighboring mines began to arrive. Shutack, MSHA District Manager, after being notified, telephoned the AUGR mine rescue team and requested their assistance. He also contacted MSHA Headquarters in Arlington, Virginia, and asked that Mine Emergency Operations (MEO) be put on alert. At 3:45 p.m., Johnson and Scheib, arrived at the mine to render assistance. Johnson proceeded underground while Scheib monitored the fan. Johnson, while entering the slope, realized the air was reversed. When he arrived at the accident area, Hegins Fire Department personnel were administering first aid to Troy Wolfgang.

Johnson climbed up the pitch in No. 8 chute at which point he had fresh air at his back. As he climbed above the monkey airway, the methane readings, as taken with a hand-held methane detector, rose rapidly from about 1 percent to over 5 percent. From this location he could see Ricky Wolfgang, Gene Wolfgang, and Frank Benner. He could not reach them to assist or examine them, but because of their motionless state, assumed that they were dead. He began to feel dizzy and returned to the fresh air in the monkey. Johnson, Morgan, and others then installed an angle check across the intersection of No. 8 chute and the monkey to try to force fresh air around the block to ventilate the area in which the three men were located. This was unsuccessful. Methane readings in the No. 8 breast, 20 feet above the monkey, were now in excess of 15 percent. However, Ricky Wolfgang's body was recovered and lowered to the gangway. At 5:40 p.m., Troy Wolfgang was transported to the surface and taken to Pottsville Hospital by ambulance.

At 6:00 p.m., the AUGR rescue team, along with Donn Lorenz, Coal Mine Safety and Health Inspector, entered the mine. They arrived at No. 8 chute in the gangway at approximately 6:30 p.m. Lorenz climbed to the monkey and conferred with Johnson and Robert C. Whitmer, Jr., Pennsylvania Department of Environmental Resources, District Mine Inspector, about the locations of the victims and the inability to reventilate.

Lorenz and James Fetterolf, AUGR rescue team member, under oxygen entered the No. 8 breast off of the monkey airway to survey the area and check roof and rib conditions. After making their observations, they returned to the monkey and made preparations to build a battery to control the coal dribbling off the upper rib.

While the battery was being constructed, methane readings taken with a hand-held detector, were over 15 percent and approximately 4 percent oxygen was present.

Over the course of the next two hours, Lorenz and a rescue team member worked to control the loose coal and free the partially coal-covered bodies of Gene Wolfgang and Benner. At about 9:30 p.m., the bodies were recovered and lowered to the gangway. All persons underground, and the three bodies, were transported to the surface.

Mine rescue team members and those who participated in the recovery of the bodies are shown in Appendix E.

ELECTRICAL CIRCUITS AND EQUIPMENT IN THE EXPLOSION AREA

There were no electrical circuits located in the area of the mine in which the explosion occurred. The Scorpion HB-20P Permissible Blasting Unit, flame safety lamp, and the victims battery cap lamps were sent to MSHA's Bruceton Safety Technology Center, Pittsburgh, Pennsylvania. The report of the findings on the equipment is located in Appendix F.

PART III
INVESTIGATION, DISCUSSION, AND EVALUATION

ORGANIZATION AND INTERVIEWS

During the period from December 11 to December 16, 1985, while rescue and recovery work was being performed and the mine conditions were being evaluated, MSHA selected an investigation team and developed plans and procedures for investigating the explosion.

On December 17, 1985, the investigation team began a comprehensive investigation and evaluation of existing conditions in the accessible underground areas. All observed conditions were recorded by the team members on a map or in a notebook. Maps showing the detailed information gathered in the mine are contained in Appendix C.

PERSONS WHO PARTICIPATED IN THE INVESTIGATION

In conjunction with the underground portion of the investigation, interviews of mine workers, state and federal officials who could supply information pertinent to the events occurring before and after the explosion, were conducted.

The investigation into the causes of the explosion began on December 17, 1985. The following persons participated in or contributed to the investigation:

M. S. W. COAL COMPANY

Troy Wolfgang	Laborer
Chester Morgan	Motorman
Jack Smith	Hoistman

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES

Robert C. Whitmer, Jr.	District Mine Inspector
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MINE SAFETY AND HEALTH ADMINISTRATION

Theodore W. Glusko	Supervisory Coal Mine Safety and Health Inspector
Timothy J. Thompson	Mine Safety and Health Specialist
Richard J. Vasicek	Supervisory Coal Mine Safety and Health Specialist
Edwin P. Brady	Mine Safety and Health Specialist
Clifford E. Ellis	Mine Safety and Health Specialist
Kevin G. Stricklin	Mining Engineer, Tech Support
Joseph M. Denk	Mining Engineer, Tech Support
Richard L. Fischer	Physical Scientist
Edward C. Connor	Assistant District Manager
Jerry D. Farmer	Chief, Office of Engineering Services
Vincent J. Yerabeck	Supervisory Mining Engineer
Dean W. Updegrave	Supervisory Coal Mine Safety and Health Inspector
Ralph S. Johnson	Coal Mine Safety and Health Inspector
Michael C. Scheib	Coal Mine Safety and Health Inspector
Donn W. Lorenz	Coal Mine Safety and Health Inspector
Thomas J. Garcia	Coal Mine Safety and Health Inspector

FACTORS AFFECTING THE EXPLOSION

METHANE AND VENTILATION

The mine ventilation and methane and dust control plan had been approved on September 30, 1981, as an exhaust system where intake air entered the mine through the skip slope and traveled through the gangway to the active areas. Brattice cloth curtains erected to within 20 feet from the area of deepest penetration were used to direct the fresh air into the working faces. The return air then traveled through the monkey to the surface mounted exhaust fan.

Through testimony, it was learned that voids created by pillar mining near the No. 5 breast had breached to the surface in May of 1985. This allowed air to enter the mine through the breach and satisfy the exhausting capacity of the mine fan. The amount of air being induced to the working faces was drastically reduced by this change in the ventilation system. Because of the difficulty in ventilating the working places, a decision was made by mine personnel to reverse the fan to create a blowing system. This major ventilation change was made without the prior approval of the MSHA District Manager.

By reversing the mine fan, intake air was blown into the mine through the monkey. Mandoors between the monkey and gangway were opened to allow both entries to be intake airways. A door was installed across the gangway near the skip slope to force the air toward the faces rather than exhausting through the skip slope. Air traveled inby in both the monkey and gangway to the No. 5 chute. At this point the air in the gangway was used to ventilate the face of the gangway and was then directed through the No. 8 chute by line brattice. At the intersection of the No. 8 chute and the monkey a diagonal check curtain was installed to direct the air toward the slant breast. Air movers (bazookas) with tubing and line brattice were used to aid in face ventilation. Return air traveled the first miner heading to the Nos. 8 and 9 breasts, to the monkey, and then to No. 5 chute area where it exhausted to the surface through the breach. During the investigation the mine fan was blowing approximately 13,320 cubic feet of air a minute into the mine. A U-tube had been installed to monitor the fan pressure; however, the fluid within the U-tube was frozen so that changes in pressure could not be detected.

At the time of the accident, mining was being conducted in the slant breast off of the first miner heading at the No. 9 breast in the No. 5 Lykens Valley Vein. The slant breast had been previously mined approximately 150 feet. Retreat pillar mining had begun and a void was created approximately 75 feet by 75 feet. It was past mining practice that such slant breasts were to be connected by back slant entries into previously mined out areas to create a positive bleeder system. This practice had not been continued when mining this particular slant breast. Therefore, the retreat mining was being conducted without provisions for a bleeder system. This area was inaccessible during the investigation; therefore, no air or methane readings could be taken.

The daily methane liberation from the mine as determined by analysis of vacuum bottle samples and air measurements taken in the main return aircourse

immediately inby the main surface fan during an inspection of the entire mine between July 22 and July 29, 1985, was calculated to be 26,000 cubic feet per 24 hours. MSHA records maintained during recovery work shows methane readings in excess of 5 percent in the No. 8 breast.

COAL DUST

The volatile ratio of the channel sample collected in the mine during the investigation was calculated to be 0.08 indicating that the coal dust is non-explosive. Sections 75.401, 75.402, and 75.403 of the Mandatory Safety Standard for Underground Coal Mines 30 CFR, do not apply to underground anthracite mines.

SMOKING

MSHA records kept during the recovery operations showed that a package of unopened cigarettes and a book of matches were found underground in a dinner bucket.

THE EXPLOSION AND PROPAGATION

Because of the existing underground conditions, the investigation team could not enter the immediate area where the explosion occurred. The team was able to travel the gangway in its entirety and gained access into the monkey through the No. 4 chute, although travel was inaccessible inby the No. 4 chute in the monkey.

Based on testimony, observations and evidence, the investigation team concluded that the explosion originated in the slant breast off of the No. 9 breast of the first miner heading. Because of the No. 5 Lykens Valley coal seam having a volatile ratio of lower than 0.12 (non-explosive) and evidence observed underground, coal dust did not enter into the explosion. Flame and forces of the explosion propagated from the origin and were known to travel outby in the monkey to at least the No. 8 chute and into the gangway through the No. 9 chute.

EXTENT OF FLAME AND FORCES

The extent of flame and forces of the explosion has been determined from testimony and underground observations of the investigation. Because of inaccessible travel in the monkey inby the No. 4 chute, evidence of flame could be gained only by the condition of the survivor and autopsy reports of the victims. The flame traveled from the point of origin through the first miner heading to the No. 8 breast to at least the location where Troy Wolfgang was located at the time of the explosion (approximately 1 to 3 feet outby the first miner heading).

The force of the explosion traveled outby in the first miner heading and the monkey to at least the No. 8 chute. It also entered the gangway through the No. 9 chute. The force in the gangway was determined by observations during the investigation.

DISCUSSION OF POTENTIAL IGNITION SOURCES

All equipment and other potential ignition sources in the affected area were examined for evidence of a methane ignition.

The following were located in the No. 5 vein gangway and were not considered as ignition sources because of their location and lack of evidence of an explosion in the gangway:

- 1 - Femco 10-shot firing unit
- 2 - Fidelity 20-shot firing unit
- 3 - Two Wheat permissible cap lamps
- 4 - Two battery operated locomotives
- 5 - Book of matches
- 6 - Gasoline-powered chain saw
- 7 - Explosives and detonators

A Koehler flame safety lamp, Scorpion HB-20P firing unit and three Wheat permissible cap lamps that were found in the affected area above the gangway were removed from the mine and sent to MSHA's Bruceton Safety Technology Center, Pittsburgh, Pennsylvania, for examination. Tests performed on this equipment has shown that they are not the source of the ignition. The report on the findings of the equipment is located in Appendix F.

The only other potential ignition source which was known to exist was the series of charged explosives which had been loaded into three long holes and placed, unconfined, on some large rocks located in the slant breast off the first miner heading inby No. 9 breast.

DISCUSSION OF POINT OF ORIGIN

Based on testimony, the condition of the bodies of the two victims in the first miner heading and the autopsy reports, the investigators conclude that the ignition of methane occurred at either the confined or unconfined shots which were located in the slant breast. The 50 pounds of explosives that had been charged in the three long holes were stemmed with coal dust and the unconfined shots were covered with coal dust. The survivor to the explosion stated that he was knocked down concurrently with the detonation of the explosives. It is the concensus of the investigators that the ignition source was an open flame resulting when the explosives were detonated.

PART IV

FINDINGS OF FACT

1. The volatile ratio of the standard channel sample collected in the face of the No. 5 gangway approximately 50 feet inby the No. 10 chute was calculated to be 0.08 which indicates that the coal dust is non-explosive.
2. During the last regular safety and health inspection, the fan exhausted a total of 20,300 cubic feet a minute of air from the mine, and the mine liberated 26,000 cubic feet of methane in 24 hours.
3. During the last safety and health inspection, 0.44 percent of methane was detected in the face of the No. 1 Level East, No. 5 Vein gangway and 0.42 percent of methane in the face of the No. 9 Chute off of the No. 1 Level East, No. 5 Vein gangway workings.
4. Shortly before 7:00 a.m., on December 11, 1985, Gene Wolfgang, Frank Benner, Troy Wolfgang, Ricky Wolfgang, Chester Morgan, and Jack Smith reported for their normal work shift.
5. At 7:00 a.m., five of the workmen proceeded underground being lowered into the mine by Jack Smith, hoistman.
6. After lunch, work resumed with Troy Wolfgang drilling three long holes in the solid coal near the edge of the void in the slant off of the first miner heading approximately 75 feet inby the No. 9 breast. While drilling these holes, he became dizzy and had to leave this area for a short while. Troy Wolfgang reported this to his father, Gene Wolfgang, and the tubing from the compressed air operated "bazooka" (air mover) was extended approximately 20 feet. Checks for methane were not made.
7. The long holes were loaded with explosives and stemmed with bags of coal dust. Pieces of explosives were placed and charged on top of some big rocks in the slant near the long holes and covered with coal dust.
8. At approximately 2:00 p.m., Gene Wolfgang, Troy Wolfgang, and Frank Benner positioned themselves approximately 115 feet from and in line with the charged shots. At that time, the shots were detonated.
9. Troy Wolfgang was knocked down the No. 8 breast by the force of the explosion. Chester Morgan and Ricky Wolfgang, working in the gangway when the explosion occurred, assisted Troy down to the gangway.
10. Ricky Wolfgang went up the No. 8 breast in search of his father, Gene, and Benner.
11. At approximately 3:45 p.m., Ralph Johnson and Michael Scheib, Coal Mine Safety and Health Inspectors, arrived at the mine to render assistance. Johnson proceeded underground while Scheib monitored the fan. Johnson, while entering the slope, realized the air was reversed.

12. Johnson climbed up the pitch in the No. 8 chute. Methane readings, as taken with a hand-held methane detector, rose rapidly from about 1 percent to over 5 percent.
13. While a battery was being constructed in the No. 8 breast, readings with a hand-held detector showed methane over 15 percent and 4 percent oxygen.
14. At about 9:30 p.m., the bodies were recovered and lowered to the gangway. All persons underground, and the three bodies, were transported to the surface.
15. The mine ventilation system and methane and dust control plan had been approved on September 30, 1981, as an exhaust system.
16. Through testimony, it was learned that voids created by pillar mining near the No. 5 breast had breached to the surface in May of 1985. At that time, the fan was changed from exhaust to blowing. This major ventilation change was made without prior approval of the MSHA District Manager.
17. During the investigation, the fan was blowing approximately 13,200 cubic feet of air a minute into the mine.
18. At the time of the explosion, mining was being conducted in the slant breast off of the first miner heading at the No. 9 breast in the No. 5 Lykens Valley Vein. The slant breast had been previously mined approximately 150 feet. Retreat pillar mining had begun and a void was created approximately 75 feet by 75 feet.
19. Based on testimony, observation and evidence, the investigation team concluded that the explosion originated in the slant breast off of the No. 9 breast of the first miner heading.
20. Because of the No. 5 Lykens Valley coal seam having a volatile ratio of lower than 0.12 (non-explosive) and evidence observed underground, coal dust did not enter into the propagation of the explosion.
21. The flame traveled from the point of origin through the first miner heading to the No. 8 breast to at least the location where Troy Wolfgang was located at the time of the explosion (approximately 1 to 3 feet outby the first miner heading).
22. The force of the explosion traveled outby the first miner heading and the monkey to at least the No. 8 chute. It also entered into the gangway through the No. 9 chute. The force in the gangway was determined by observations during the investigation.
23. Equipment and other potential ignition sources were examined for evidence of a methane ignition.
24. Based on testimony, the condition of the bodies of the two victims in the first miner heading and the autopsy reports, the investigators concluded that the ignition of methane occurred at either the confined or unconfined shots located in the slant breast.

25. It is the concensus of the investigators that the ignition source was an open flame resulting when the explosives were detonated.

The following conditions and practices contributed to the explosion and constituted violations of the mandatory safety standards. They are as follows:

- 75.301 The volume and velocity of air ventilating the slant off of the No. 9 breast of the first miner heading was not sufficient to dilute, render harmless, and carry away flammable gases. This condition permitted methane to accumulate in explosive quantities in this area.
- 75.329 The pillar area in the slant off of the No. 9 breast of the first miner heading was not provided with bleeder entries or by a bleeder system and maintained so as to continuously dilute, render harmless, and carry away methane and other explosive gases within such areas and to protect the active workings of the mine from hazards of such methane and other explosive gases. A slant had been developed approximately 150 feet off of the No. 9 breast. Pillaring was then started, creating approximately a 75-foot by 75-foot void which was not connected to assure positive ventilation in this area. Also, there was no natural means for bleed off to the surface. This condition permitted methane to accumulate in an explosive mixture in this area.
- 75.320 An examination for methane was not made immediately before firing the confined long hole and unconfined shots in the slant off of the No. 9 breast of the first miner heading prior to the explosion. A methane detector approved by the Secretary was not available at the mine.
- 75.1303 The explosives that were fired in the slant off of the No. 9 breast of the first miner heading on December 11, 1985, were not being used in a permissible manner. 30 CFR, Part 15, Article IV, Section 4.b.12. states that, ". . . care shall be taken to ascertain that all persons are in the clear." It was determined from the investigation that Frank Benner, Troy Wolfgang and Gene Wolfgang were not in the clear when the shots were fired.
- 75.1303 The permissible explosives used to charge the three long holes and the unconfined shots in the slant off

of the No. 9 breast of the first miner heading was not being used in a permissible manner. Combustible material (coal dust) was used for stemming of the three long holes and coal dust was used to cover up the unconfined shots placed on pieces of rocks in this area.

A copy of these citations are in Appendix G.

Other violations were found during the investigation which did not contribute either to the cause or severity of the explosion. Appropriate citations and orders were issued to the M.S.W. Coal Company.

PART V
CONCLUSION

The investigators concluded that at approximately 2:00 p.m., on December 11, 1985, the volume and velocity of air required to ventilate the slant off of the No. 9 breast of the first miner heading was not sufficient to dilute, render harmless, and carry away methane. This condition permitted an explosive mixture of methane to accumulate in the slant where there were three charged long holes and unconfined charged shots on top of large pieces of rock. The detonation of these explosives ignited the methane causing the explosion.

The resulting explosion fatally injured Gene Wolfgang and Frank Benner, and seriously injured Troy Wolfgang. All three miners were located at the No. 8 breast of the first miner heading before the explosion. After the explosion, Troy Wolfgang made it down to the intersection of the No. 8 chute and monkey where he was aided by his brother, Ricky Wolfgang, and Chester Morgan. In an attempt to rescue his father and Benner, Ricky went up the No. 8 breast from the monkey towards the first miner heading where he asphyxiated due to an inhalation of smoke, carbon monoxide, and products of combustion and explosion.

The following conditions and/or practices contributed to the cause of the explosion:

1. An examination for methane was not made immediately before firing the confined long hole and unconfined shots in the slant breast. A methane detector approved by the Secretary for such tests was not available at the mine site.
2. The pillar area inby the slant off of the No. 9 breast of the first miner heading was not provided with bleeder entries or by a bleeder system to continuously dilute, render harmless, and carry away methane and explosive gases.
3. Gene Wolfgang, Troy Wolfgang, and Frank Benner were not in the clear when the shots were fired.
4. Combustible material (coal dust) was used for stemming of the three long hole shots and also used to cover up the unconfined shots placed on pieces of rock in this area.

Respectfully submitted,

Theodore W. Glusko

Theodore W. Glusko
Supervisory Coal Mine Safety
and Health Inspector

Timothy J. Thompson

Timothy J. Thompson
Mine Safety and Health
Specialist

Kevin Stricklin

Kevin Stricklin
Mining Engineer

Richard J. Visicek

Richard J. Visicek
Supervisory Coal Mine Safety
and Health Specialist

Edwin P. Brady

Edwin P. Brady
Mine Safety and Health
Specialist

Joseph M. Denk

Joseph M. Denk
Mining Engineer

Approved by:

J A Lamonica

Joseph A. Lamonica
Administrator
for Coal Mine Safety and Health

Release Date: 6/10/86



Section A—Victim Data

1. Name	2. Sex	3. Social Security Number
Frank Benner	<input checked="" type="checkbox"/> Male <input type="checkbox"/> Female	193-42-8296
4. Age	5. Job Classification	
30	Certified Miner	
6. Experience at this Classification	7. Total Mining Experience	
6 years	8 years	
8. What activity was being performed at time of accident?	9. Victim's Experience at this Activity	10. Was victim trained in this task?
Waiting for charges to be blasted.	8 years	Yes
Section B—Victim Data for Health and Safety Courses/Training Received (related to accident)		Date Received
11.		
Annual Refresher Training, Part 48 Subpart A		9-5-85
12.		
13.		
14.		

Section C—Supervisor Data (supervisor of victim)

15. Name	16. Certified
Gene Wolfgang	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
17. Experience as Supervisor	18. Total Mining Experience
6 years	24 years
Section D—Supervisor Data for Health and Safety Courses/Training Received (related to accident)	
19.	Date Received
Annual Retraining for Certified and Qualified Persons	
20.	9-5-85
21.	
22.	

23. When was the supervisor last present at accident scene prior to the accident?
 Supervisor was present

24. What did he do when he was there?
 Waiting for charges to be blasted.

25. When was he last in contact with the victim?

26. Did he issue instructions relative to the accident?

Was standing beside Benner Unknown

27. Was he aware of or did he express an awareness of any unsafe practice or condition?

Unknown

Section I (Coal Only)

MSHA and/or State Certification and/or Qualification

Mine ID 36 06279

Date Training
Plan Approved 8-9-84

Date Training
Received

Date Training
Received

* / Certified Person
(Underground)

/ Dust (Sampling)

* / Certified Person
(Surface)

/ Dust (Calibration)

* / Methane & Oxygen
Deficiency Testing

/ Noise

* / Electrical

* / Impoundments

* / Energized Surface
High Voltage

* / Hoisting Engineer

*Annual Retraining Required

Section II (Metal-Non-Metal and Coal)

MSHA Training Programs Completed

Date of Hire 12/83

Date Training Plan Approved 8/9/84

Required Training
(Victim)

Date Training
Received

/ Required Training
(Victim)

Date Training
Received

/ New Miner (U.G.)

/ Hazard Training (U.G.)

/ New Miner (Sur.)

/ Hazard Training (Sur.)

/ Newly Employed
Experienced (U.G.)

Task Training
Specify Type:

/ Annual Refresher (U.G.) 9/5/85

/ Annual Refresher (Sur.)

Section III

Company Training Program Completed:

Training

OJT/Formal

Instructor

Date
Completed

Section I (Coal Only)

MSHA and/or State Certification and/or Qualification

Mine ID 36 06279

Date Training
Plan Approved 8/9/84

Date Training
Received

Date Training
Received

* / Certified Person
(Underground)

9/5/85

/ / Dust (Sampling)

2/28/83

* / Certified Person
(Surface)

/ / Dust (Calibration)

3/18/83

* / Methane & Oxygen
Deficiency Testing

/ / Noise

* / Electrical

* / Impoundments

* / Energized Surface
High Voltage

* / Hoisting Engineer

*Annual Retraining Required

Section II (Metal-Non-Metal and Coal)

MSHA Training Programs Completed

Date of Hire 1/1/75

Date Training Plan Approved

8/9/84

Required Training
(Victim)

Date Training
Received

/ / Required Training
(Victim)

Date Training
Received

/ / New Miner (U.G.)

/ / Hazard Training (U.G.)

/ / New Miner (Sur.)

/ / Hazard Training (Sur.)

/ / Newly Employed
Experienced (U.G.)

Task Training
Specify Type:

/ / Annual Refresher (U.G.) 9/5/85

/ / Annual Refresher (Sur.)

Section III

Company Training Program Completed:

Training

OJT/Formal

Instructor

Date
Completed

Data Sheet

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

Section A—Victim Data

1. Name	2. Sex	3. Social Security Number
Gene J. Wolfgang	<input checked="" type="checkbox"/> Male <input type="checkbox"/> Female	185-34-4515
4. Age	5. Job Classification	
43	Certified Mine Foreman	
6. Experience at this Classification		7. Total Mining Experience
6 years		24 years
8. What activity was being performed at time of accident?		9. Victim's Experience at this Activity
Waiting for drill round to be detonated.		24 years
		Yes

Section B—Victim Data for Health and Safety Courses/Training Received (related to accident)

11.	Date Received
Annual Retraining for Certified and Qualified Persons	9-5-85
12.	
13.	
14.	

Section C—Supervisor Data (supervisor of victim)

15. Name	16. Certified
Gene Wolfgang - Was the owner and supervisor	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
17. Experience as Supervisor	18. Total Mining Experience

Section D—Supervisor Data for Health and Safety Courses/Training Received (related to accident)	Date Received
19.	
20.	
21.	
22.	

23. When was the supervisor last present at accident scene prior to the accident? Gene Wolfgang was present when accident occurred.	24. What did he do when he was there? Observing and waiting for place to be blasted.
-------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------

25. When was he last in contact with the victim?	26. Did he issue instructions relative to the accident? Told Troy Wolfgang it was ok to blast charged holes.
--------------------------------------------------	--------------------------------------------------------------------------------------------------------------

27. Was he aware of or did he express an awareness of any unsafe practice or condition?

Unknown

U.S. DEPARTMENT OF LABOR
Mine Safety and Health Administration



Section A—Victim Data

1. Name	2. Sex	3. Social Security Number
Ricky A. Wolfgang	<input checked="" type="checkbox"/> Male <input type="checkbox"/> Female	200-58-1008
4. Age	5. Job Classification	
22	Laborer	
6. Experience at this Classification	7. Total Mining Experience	
2 years	2 years	
8. What activity was being performed at time of accident?	9. Victim's Experience at this Activity	10. Was victim trained in this task?
Working in gangway, Loading coal by hand. 2 years		Yes
Section B—Victim Data for Health and Safety Courses/Training Received (related to accident)		Date Received
11.		
Annual Refresher Training, Part 48 Subpart A		9-5-85
12.		
13.		
14.		

Section C—Supervisor Data (supervisor of victim)

15. Name	16. Certified
Gene Wolfgang	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
17. Experience as Supervisor	18. Total Mining Experience
6 years	24 years
Section D—Supervisor Data for Health and Safety Courses/Training Received (related to accident)	
19.	Date Received
Annual Retraining for Certified and Qualified Persons	
20.	9-5-85
21.	
22.	

23. When was the supervisor last present at accident scene prior to the accident?	24. What did he do when he was there?
Supervisor was present prior to blasting	Observing and waiting for place to be blasted.

25. When was he last in contact with the victim?	26. Did he issue instructions relative to the accident?
--------------------------------------------------	---------------------------------------------------------

Unknown

Unknown

27. Was he aware of or did he express an awareness of any unsafe practice or condition?

Unknown

Section I (Coal Only)

MSHA and/or State Certification and/or Qualification

Mine ID 36 06279

Date Training Plan Approved <u>8/9/84</u>	Date Training Received	Date Training Received
<input checked="" type="checkbox"/> Certified Person (Underground)	<input type="checkbox"/> Dust (Sampling)	<input type="checkbox"/>
<input checked="" type="checkbox"/> Certified Person (Surface)	<input type="checkbox"/> Dust (Calibration)	<input type="checkbox"/>
<input checked="" type="checkbox"/> Methane & Oxygen Deficiency Testing	<input type="checkbox"/> Noise	<input type="checkbox"/>
<input checked="" type="checkbox"/> Electrical	<input type="checkbox"/> Impoundments	<input type="checkbox"/>
<input checked="" type="checkbox"/> Energized Surface High Voltage	<input type="checkbox"/> Hoisting Engineer	<input type="checkbox"/>

*Annual Retraining RequiredSection II (Metal-Non-Metal and Coal)

MSHA Training Programs Completed

Date of Hire <u>12/1/83</u>	Date Training Plan Approved <u>8/9/84</u>
Required Training (Victim)	Date Training Received / <input type="checkbox"/> Required Training (Victim) Date Training Received
<input type="checkbox"/> New Miner (U.G.)	<input type="checkbox"/> Hazard Training (U.G.)
<input type="checkbox"/> New Miner (Sur.)	<input type="checkbox"/> Hazard Training (Sur.)
<input type="checkbox"/> Newly Employed Experienced (U.G.)	
<input type="checkbox"/> Newly Employed Experienced (Sur.)	Task Training Specify Type:
<input checked="" type="checkbox"/> Annual Refresher (U.G.) <u>9/5/84</u>	
<input type="checkbox"/> Annual Refresher (Sur.)	

Section III

Company Training Program Completed:

TrainingOJT/FormalInstructorDate Completed

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

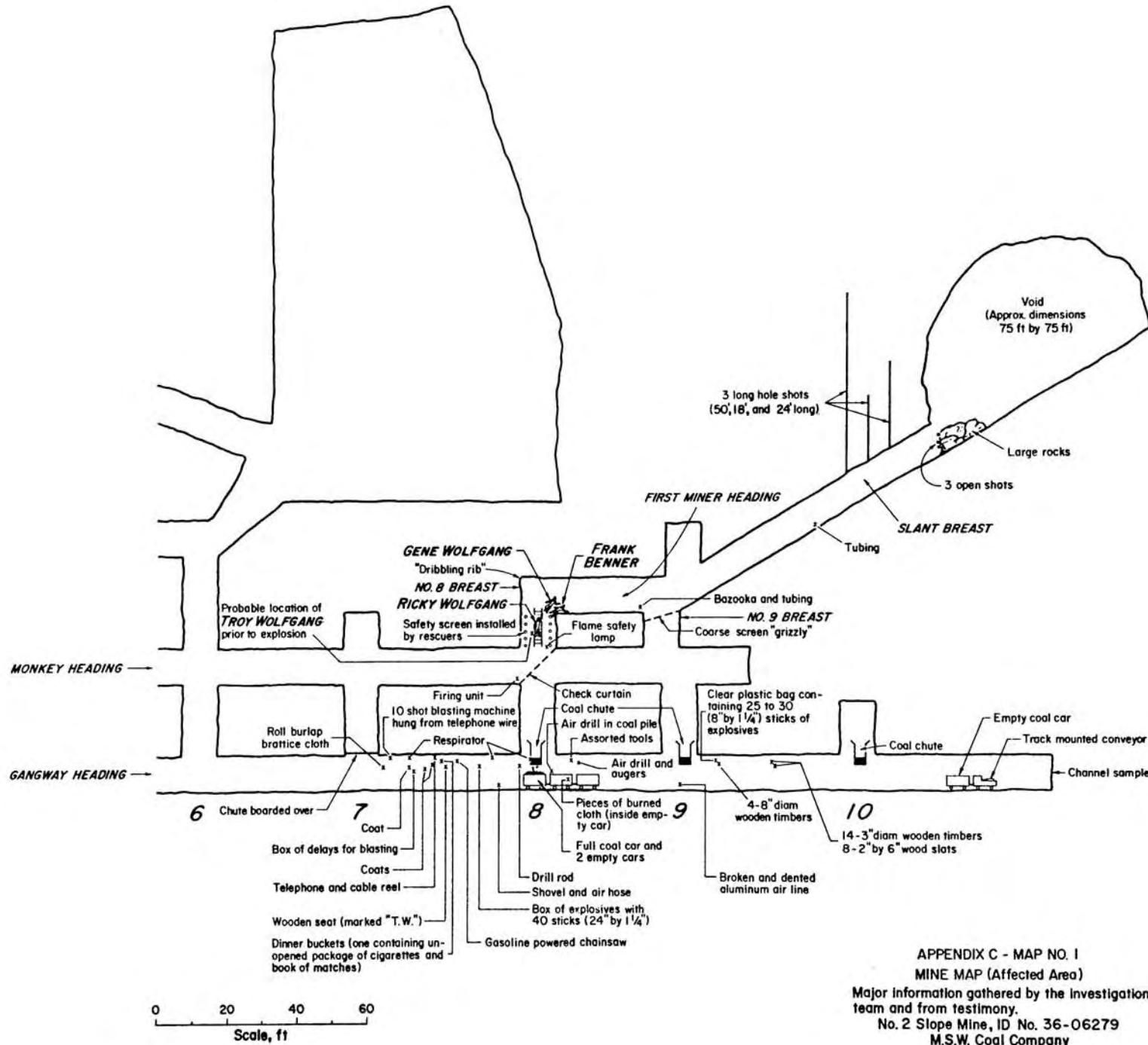
APPENDIX B

TERMINOLOGY USED IN ANTHRACITE MINES

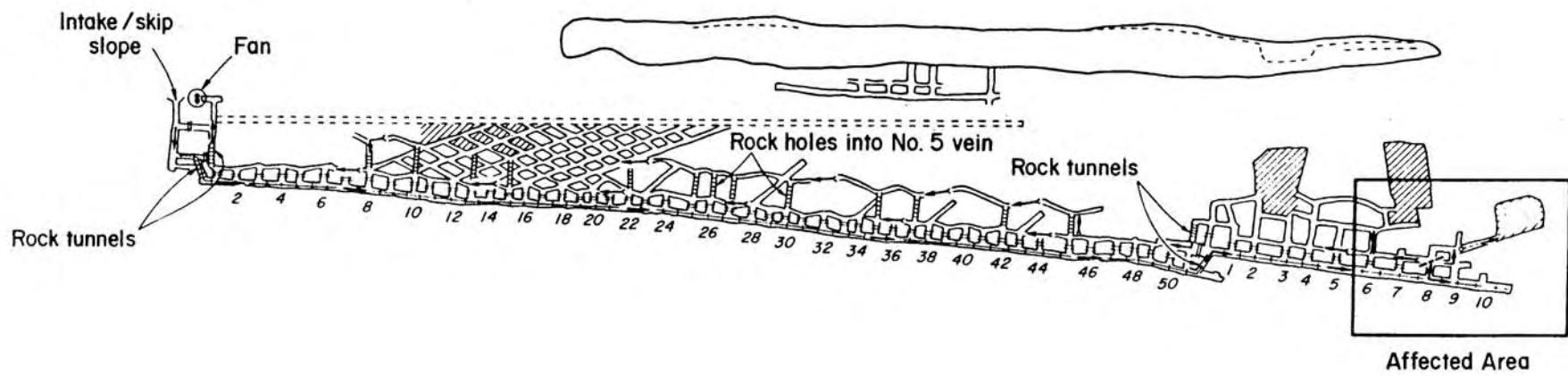
Monkey (airway)	Return aircourse and escapeway from the section.
Chute	Driven from gangway to monkey heading.
Breast	Advanced above the monkey airway.
Miner Headings	Crosscuts driven from breast to breast above the monkey airway.
Pillar Hole	Driven to split the pillars between the breasts.
Half Chute	Driven from the gangway to the monkey airway and utilized as a travelway where chutes are driven on 30-foot centers and breasts are driven on 60-foot centers.
Gangway	Main entry.
Single Prop	One timber post (conventional).
Post and Bar	Two-piece timber set.
Double Set	Three-piece timber set.
Sprag	Bracing between timber sets.
Lagging	Used to support ribs and curtail sluffing of coal on pitch.
Cribbing	Used over two and three piece timber sets to fill voids over timber and secure ribs.
Forepoles	Driven above and in advance of permanent roof supports, on the ribs and over top, to secure coal ribs until permanent supports can be installed.
Relief Timbers	Timbers installed between or in place of timber that is showing signs of stress or has been fractured.
Counter Chute	Chute where coal is stored from a gangway at a higher elevation than the place where it is loaded into mine cars, by gravity flow for transporation to the surface.
Slant Breast	Chute driven across the pitch, usually on about 28 degrees utilizing sheets of steel 8' x 2' x 16 gage permitting coal to flow by gravity.

Head Piece	Drive unit of chain conveyor.
Head Piece	The illuminating portion of the cap lamp (miners).
Tail Piece	That portion of the chain conveyor nearest the face.
Slusher	A double drum winch with a bucket attached is used to drag coal.
Top	Roof.
Accommodation	Man trip into or out of the mine.
Skip Method	A thin slice taken off a breast, pillar, or rib along its entire length or part of its length.
Battery	A bulkhead or structure for keeping coal in place.

APPENDIX C
MINE MAPS



APPENDIX C - MAP NO. I
MINE MAP (Affected Area)
Major information gathered by the investigation team and from testimony.
No. 2 Slope Mine, ID No. 36-06279
M.S.W. Coal Company



APPENDIX C - MAP NO. 2
MINE MAP (Exhaust Ventilation System)
No. 2 Slope Mine, ID No. 36-06279
M.S.W. Coal Company
Carlstown, Schuylkill County, Pa.
Nos. 4 and 5 Lykens Valley Veins

LEGEND

- YY Mine opening
- ① Main fan
- Intake air
- Return air
- Line brattice
- Air mover with tubing
- || Rock tunnel / hole
- ++ Track
- ## Permanent stopping

Permit
5-1276

APPENDIX D

U. S. Department of Labor

Mine Safety and Health Administration
4800 Forbes Avenue
Pittsburgh, Pennsylvania 15213

Bruceton Safety Technology Center



January 16, 1986

MEMORANDUM FOR: KEVIN STRICKLIN
Mining Engineer
Ventilation Division
Pittsburgh Health Technology Center

THROUGH : JAMES L. BANFIELD
Chief, Ventilation Division
Pittsburgh Health Technology Center

STEPHEN G. SAWYER *J.P.*
Chief, Industrial Safety Division

FROM : STEVEN J. LUZIK *S.J.L.*
Supervisory Chemical Engineer

SUBJECT : Proximate analysis of channel sample taken at the MSW Coal
Company's No. 2 Slope Mine (I.D. #36-06279)

As per your request, we have conducted laboratory tests to determine the proximate analysis of the channel sample taken at the above mine.

If we can be of further assistance, please contact us.

Attachment

UNITED STATES DEPARTMENT OF LABOR
Mine Safety and Health Administration

BRUCETON SAFETY TECHNOLOGY CENTER
Industrial Safety Division

LABORATORY REPORT OF MATERIAL(S) SUBMITTED FOR TESTING

Sample Number: ISB 367-010-86

Material : Anthracite Coal

Manufacturer : (or where sample was taken) Submitted by: Requested by:

MSW Coal Company Kevin Stricklin CMS&H--Arlington

No. 2 Slope Mine Mining Engineer

Valley View, PA Ventilation Division

Pittsburgh Health Tech. Ctr.

4800 Forbes Ave.

(I.D. #36-06279) Pittsburgh, PA 15213

Description : Channel sample taken at the face of the gangway at the above mine.

Laboratory Tests : PROXIMATE ANALYSIS

Ash 9.02%

Moisture 0.63%

Volatile

Matter 7.13%

Fixed Carbon 83.22%

Test

Conducted by: R. Brian Murphy, Mining Engineering Technician, ISD

Report

Prepared by: Steven J. Luzik, Supv. Chemical Engineer, ISD

ISB Sample No.: 367-010-86

Date: 1/16/86

APPENDIX E

ANTHRACITE UNDERGROUND RESCUE, INC.

RESCUE TEAM MEMBERS

Carl H. Bowman
James Fetterolf
Gary Merwine
Robert Wenrich
Clair Schwalm
Dennis Mace
Marlin Shade
Frank Neumeister
Ronald Pinchorski
Donald Scheib
Kenneth Witmer
Glen Hoffman

EMPLOYER

Kocher Coal Company
Kocher Coal Company
Mercury Coal Company
Hegins Mining Company
Smeltz Coal Company
K.M.K. Coal Company
Peacock Coal Company
Neumeister Coal Company
International Anthracite Corp.
D & C Coal Company
Renegade Coal Company
Ronald Bush Coal Company

MINE SAFETY AND HEALTH ADMINISTRATION

Ralph S. Johnson
Donn W. Lorenz

Coal Mine Safety and Health Inspector
Coal Mine Safety and Health Inspector

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES

Robert C. Whitmer, Jr.

District Mine Inspector

APPENDIX F

U.S. Department of Labor

Mine Safety and Health Administration
Industrial Park Road
RR1, Box 251
Triadelphia, West Virginia 26059

Approval and Certification Center



March 7, 1986

MEMORANDUM FOR: THEODORE W. GLUSKO
Supervisory Mine Inspector
Johnstown Subdistrict Field Office
Coal Mine Safety and Health, District 2

THROUGH : KENNETH A. SPROUL *Kenneth A. Sproul*
Chief, Intrinsic Safety and Instrumentation Branch

FROM : ARTHUR E. PAGE
Arthur E. Page III
Electrical Engineer, Intrinsic Safety and Instrumentation
Branch

SUBJECT : Evaluation of equipment recovered from the MSW Coal
Company mine explosion

The Intrinsic Safety and Instrumentation Branch of the Mine Safety and Health Administration Approval and Certification Center investigated three cap lamps and one twenty-shot blasting unit recovered from the MSW Coal Company mine explosion. A complete report of this investigation is filed as Special Investigation X-164 at the Approval and Certification Center.

The following is a summary of the findings of this investigation:

EXHIBIT RE-1. This is a twenty-shot blasting unit manufactured by Explosives Instrumentation Technology (EIT) as the Model Scorpion HB-20P, Serial No. P 20167 BA. The design of this blasting unit was granted MSHA Approval No. 16E-15-0 per the requirements of 30 CFR Part 25 on January 15, 1982.

The blasting unit was determined, to the extent possible, to have been built according to the approval documentation in file at the Approval and Certification Center. The electrical terminals used to connect the blasting circuit to the blasting unit were broken off and were not received with the unit. Other damage to the unit was superficial and does not impair the safe use of the unit.

The blasting unit is in compliance with the minimum output energy and cut-off time specified in 30 CFR Part 25 as determined by tests. When used in a permissible manner, the blasting unit is not considered to be a potential source of ignition of a methane-air atmosphere.

EXHIBITS A and B. These are 4-volt electric cap lamps manufactured by Koehler Manufacturing Company. The design of these cap lamps was granted MSHA Approval 6D-30-45 per the requirements of 30 CFR Part 19. These cap lamps were operational as received.

The cap lamps were not maintained according to the approval documentation on file at the Approval and Certification Center. However, none of the discrepancies would cause either cap lamp to be a potential source of ignition of a methane-air atmosphere.

EXHIBIT D. This is a 4-volt battery of the same size and type used in the two Koehler cap lamps evaluated above. This battery has no top, cord, or head-piece and could not be evaluated as a cap lamp per the requirements of 30 CFR Part 19.

A copy of the complete report of this investigation will be forwarded to you upon completion.

Mine Safety and Health Administration
4800 Forbes Avenue
Pittsburgh Pennsylvania 15213

Bruceton Safety Technology Center



February 11, 1986

MEMORANDUM FOR: THEODORE GLUSKO
Supervisor
Johnstown Subdistrict Field Office
District 2, CMS&H

THROUGH *ASW* : STEPHEN G. SAWYER *SJ Lush*
Chief, Industrial Safety Division

FROM : STEVEN J. LUZIK *SJ Lush*
Supervisory Chemical Engineer

SUBJECT : Flame safety lamp taken from MSW Coal Company's No. 2 Slope
Mine (I.D. #36-06279)

A Koehler flame safety lamp taken from the MSW Coal Company's No. 2 Slope Mine, Carlstown, Pennsylvania, was examined for possible defects. The lamp was identified as Exhibit Number RE-5, received from William C. Hughes, special investigator from District 1, CMS&H. There were no particular identification numbers present on the lamp itself.

Mr. Thomas Fircak and I examined the lamp. There were no visible defects present on the body of the lamp. The wick had been lowered so that it was flush with the top of its housing. Attempts to relight the lamp were futile.

The lamp was disassembled after the attempts to relight it were unsuccessful. The inner and outer gauzes were oxidized, but intact. The lower portion of the lamp, including the lower and upper gauze rings and lamp glass, were in good condition. The wick appeared to be very dry, which seemed to indicate that there was no fuel within the fuel font. The expansion ring was discovered to have a crack, which extended clear through from the inside to the outside diameter. It was also very rusty.

Summarizing, the flame safety lamp (marked Exhibit No. RE-5) was examined by Division personnel and was found to be assembled in permissible fashion. The only defect discovered in the lamp was a crack in the expansion ring. Since the ring is external to the burning zone, this defect would not be expected to adversely affect the permissibility requirements of the lamp (as related to the probability of the lamp igniting suspensions of dust and/or flammable gas/air mixtures, external to it).

APPENDIX G
CITATIONS/ORDERS



Section I—Violation Data					
1 Type of issuance (check one)	Order <input checked="" type="checkbox"/>	Safeguard <input type="checkbox"/>	2 Date 1/21/85		
Citation: <input type="checkbox"/>	Order <input checked="" type="checkbox"/>	Safeguard <input type="checkbox"/>	3 Time 124 hr. clock 1700		
5 Served to	6 Operator M. S. W. Coal Company				
7 Mine NO. 2 SLOPE	8 Mine ID 36-06279 (Contractor)				
9. Type of Action 103-K-, - - -					
10. Violation A Health Safety Other <input checked="" type="checkbox"/>	B. Section of Act	C. Part/Section of Title 30 CFR - - - - -			
11a Significant and Substantial (see reverse) <input type="checkbox"/>	11b. Written Notice <input type="checkbox"/>				
12 Condition or Practice THE MINE HAS EXPERIENCED A SERIOUS ACCIDENT IN THE NO. 5 VEIN WEST GANGWAY. THIS ORDER IS ISSUED TO ASSURE THE SAFETY OF ANY PERSONS IN THE COAL MINE UNTIL AN EXAMINATION AND/OR AN INVESTIGATION IS MADE TO DETERMINE THAT THE MINE IS SAFE. ONLY THOSE PERSONS SELECTED FROM THE COMPANY OFFICIALS, STATE OFFICIALS AND OTHER PERSONS WHO ARE DEEMED BY MSHA TO HAVE INFORMATION RELEVANT TO THE INVESTIGATION MAY ENTER OR REMAIN IN THE AFFECTED AREA.					
13. Area or Equipment ENTIRE MINE					
14. Initial Action Citation <input type="checkbox"/> Order <input type="checkbox"/> Safeguard <input type="checkbox"/> Written Notice <input type="checkbox"/> 15 Citation/Order Number				16. Dated	
17. Termination Due: A. Date Da Yr. B. Time (24 hr. clock)	C. Signature Michael P. Adish			D. AR Number 20119 See continuation form (MSHA Form 7000-3a)	
Section II—Termination Action					
18. Action to Terminate					
19. Terminated: A. Date Mo Da Yr. B. Time (24 hr. clock)				C. Signature	D. AR Number
Section III—Inspector's Evaluation					
20. Negligence (check one) A. None <input type="checkbox"/> B. Low <input type="checkbox"/> C. Moderate <input type="checkbox"/> D. High <input type="checkbox"/> E. Reckless Disregard <input type="checkbox"/>					
21. Gravity A. The occurrence of the event against which the cited standard is directed was: No Likelihood <input type="checkbox"/> Unlikely <input type="checkbox"/> Reasonably Likely <input type="checkbox"/> Highly Likely <input type="checkbox"/> Occurred <input type="checkbox"/> B. The injury resulting from or contemplated by the occurrence of the event could reasonably be expected to be: No lost workdays <input type="checkbox"/> Lost workdays or restricted duty <input type="checkbox"/> Permanently disabling <input type="checkbox"/> Fatal <input type="checkbox"/>					
C. Number of persons who would be affected if the event occurred or were to occur: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>					
22. Good Faith A. Failure to abate within the time period given <input type="checkbox"/>				B. Signature Michael P. Adish	C. AR Number 20119
Section IV—Automated System Data					
23 Type of Inspection (activity code) AFB	24 Event Number 2100931	25 Primary or Mill			



Section I- Subsequent Action/Continuation Data

1. Subsequent Action	1a Continuation <input checked="" type="checkbox"/>	2. Dated (Original Issue)	Mo	Da	Yr	3. Citation/Order Number	2	6	9	7	9	0	1				
4. Served To Charles M. Miller, Attorney for Estate				5. Operator M. S. W. Coal Company													
6. Mine No. 2 Slope				7. Mine ID 3 6 - 0 6 2 7 9 -									(Contractor)				

Section II-Justification for Action

30 CFR 75.1303 - The blasting device (Scorpion HB-20P Permissible blasting unit, Approval No. 16E - 15 MSHA) which was used when shots were fired in the slant off of the No. 9 breast of the first miner heading on December 11, 1985, was not being used in a permissible manner.

30 CFR 75.1303 - The permissible explosives used to charge the three long holes and the unconfined shots in the slant off of the No. 9 breast of the first miner heading was not being used in a permissible manner.

See Continuation Form

Section III-Subsequent Action Taken

8. Extended To	A. Date	Mo	Da	Yr	B. Time (24 Hr. Clock)				C. Vacated <input type="checkbox"/>	D. Terminated <input type="checkbox"/>	E. Modified <input type="checkbox"/>
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Section IV-Inspection Data

9. Type of Inspection	A	F	A	10. Event Number	5	3	9	3	5	5	3					
11. Signature	<i>Joseph S. Johnson</i>				AR Number	12. Date	Mo	Da	Yr	13. Time (24 Hr. Clock)			1	5	2	0
					24117	12/08/86										

MSHA Form 7000-3a, Mar 85 (revised)

U.S. DEPARTMENT OF LABOR
Mine Safety and Health Administration

Section I Subsequent Action/Continuation Data

1 Subsequent Action <input checked="" type="checkbox"/>	2 Continuation <input type="checkbox"/>	3 Date (Original issue) 10 4 0 8 8 6	4 Yr 1986	5 Citation/Event Number 2 6 9 7 9 0 1 - 0 1
6 Served to Charles M. Miller, Attorney for Estate of Gene J. Wolfgang		7 Operator M. S. W. Coal Company		
8 Mine No. 2 Slope		9 Mine ID 3 6 - 0 6 2 7 9 -	10 Contractor	

Section II-Justification for Action

107(a) Order No. 2697901 dated 04/08/86 is modified as follows:

The wording, "The blasting device (Scorpion HB-20P Permissible blasting unit, Approval No. 16E-15 MSHA) which was used when shots were fired in the slant off of the No. 9 breast of the first miner heading on December 11, 1985, was not being used in a permissible manner," is deleted and is replaced by the following statement;

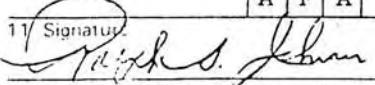
Explosives that were detonated in the slant off of the No. 9 breast of the first miner heading on December 11, 1985, were not being used in a permissible manner in that Frank Benner, Troy Wolfgang and Gene Wolfgang were not in the clear when shots were fired as required by Article IV, Section 4.b.12, Part 15, 30 CFR.

See Continuation Form

Section III Subsequent Action Taken

8. Extended To	A. Date	Mo	Da	Yr	B. Time (24 Hr. Clock)	C. Vacated <input type="checkbox"/>	D. Terminated <input type="checkbox"/>	E. Modified <input checked="" type="checkbox"/>
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Section IV-Inspection Data

9. Type of Inspection	A F A	10. Event Number	5 3 9 3 5 5 3	11. Signature 	AR Number 2 0 1 1 7	12. Date 04 22 86	13. Time (24 Hr. Clock) 11 09
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Section I - Violation Data

1 Date	Mo	Da	Yr	2 Time (24 Hr Clock)	1525	3. Citation/ Order Number	2697902
4. Served To	Charles M. Miller, Attorney for Estate of GEORGE J. WOLFGANG				5 Operator	M. S. W. Coal Company	
6. Mine					7. Mine ID	3 6 - 0 6 2 7 9	(Contractor)
8. Condition or Practice	8a. Written Notice (103g) <input type="checkbox"/>						

The volume and velocity of air ventilating the slant off of the No. 9 breast of the first miner heading was not sufficient to dilute, render harmless and carry away flammable gases. This condition permitted methane to accumulate in explosive quantities in this area. On December 11, 1985, at approximately 2:00 p.m., the methane accumulation was ignited causing an explosion which resulted in the death of three miners and serious injury to another miner in this area. This condition was determined during the investigation of a multiple fatal mine explosion which occurred in the slant off of the No. 9 breast of the first miner heading on December 11, 1985. This citation was one of the factors that contributed to the issuance of Imminent Danger Order No. 2697901 dated ~~04/08/86~~; therefore, no abatement time was set.

See Continuation Form (MSHA Form 7000-3a)

9. Violation	A. Health Safety Other <input checked="" type="checkbox"/> <input type="checkbox"/>	B. Section of Act	-	C. Part/Section of Title 30 CFR	75 • 30 1
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Section II - Inspector's Evaluation

10 Gravity:

A. Injury or Illness (has) (is): No Likelihood Unlikely Reasonably Likely Highly Likely Occurred

B. Injury or Illness could reasonably be expected to be: No Lost Workdays Lost Workdays or Restricted Duty Permanently Disabling Fatal

C. Significant and Substantial (See Reverse): Yes No D. Number of Persons Affected 0 0 3

11. Negligence (check one)

A. None B. Low C. Moderate D. High E. Reckless Disregard

12. Type of Action	1 0 4 - a - , - -	13. Type of Issuance (check one)
		Citation <input checked="" type="checkbox"/> Order <input type="checkbox"/> Safeguard <input type="checkbox"/>

14. Initial Action	A. Citation <input type="checkbox"/> B. Order <input type="checkbox"/> C. Safeguard <input type="checkbox"/> D. Written Notice <input type="checkbox"/>	E. Citation/Order Number	F. Dated	Mo	Da	Yr
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15 Area or Equipment

16 Termination Due	A. Date	Mo	Da	Yr	B. Time (24 Hr. Clock)				
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Section III - Termination Action

17 Action to Terminate

18 Terminated	A. Date	Mo	Da	Yr	B. Time (24 Hr. Clock)				
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Section IV - Automated System Data

19. Type of Inspection (activity code)	A T A	20. Event Number	5 3 9 3 5 5 3	21. Primary or Mill	
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22 Signature

23 AR Number

00117

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



Section I—Violation Data

1 Date	Mo	Da	Yr	2 Time (24 Hr Clock)	1527	3. Citation/ Order Number	2697905
4 Served To	Charles M. Miller, Attorney for Estate of				5 Operator		
6 Mine	GENE J. WOLFGANG				7. Mine ID	3606279	(Contractor)
No. 2 Slope							
8. Condition or Practice	8a. Written Notice (103g) <input type="checkbox"/>						

An examination for methane was not made immediately before firing the confined long hole and unconfined shots in the slant off of the No. 9 breast of the first miner heading prior to the explosion. A methane detector approved by the Secretary was not available at the mine. This condition was determined during the investigation of a multiple fatal mine explosion which occurred in the slant off the No. 9 breast of the first miner heading on December 11, 1985. This citation was one of the factors that contributed to the issuance of Imminent Danger Order No. 2697901 dated 12/11/85; therefore, no abatement time was set.

See Continuation Form (MSHA Form 7000-3a) <input type="checkbox"/>							
9. Violation	A. Health Safety Other <input checked="" type="checkbox"/>	B. Section of Act		C. Part/Section of Title 30 CFR	75	320	

Section II—Inspector's Evaluation

10. Gravity:

- A. Injury or Illness (has) (is): No Likelihood Unlikely Reasonably Likely Highly Likely Occurred
 B. Injury or Illness could reasonably be expected to be: No Lost Workdays Lost Workdays or Restricted Duty Permanently Disabling Fatal
 C. Significant and Substantial (See Reverse) Yes No D. Number of Persons Affected 003

11. Negligence (check one)

- A. None B. Low C. Moderate D. High E. Reckless Disregard

12. Type of Action	104—a,—,,—,—	13. Type of Issuance (check one)
		Citation <input checked="" type="checkbox"/> Order <input type="checkbox"/> Safeguard <input type="checkbox"/>

14. Initial Action

- A. Citation B. Order C. Safeguard D. Written Notice E. Citation/
Order
Number

15. Area or Equipment

16 Termination Due	A. Date	Mo	Da	Yr	B. Time (24 Hr. Clock)			
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Section III—Termination Action

17. Action to Terminate

18 Terminated	A. Date	Mo	Da	Yr	B. Time (24 Hr. Clock)			
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Section IV—Automated System Data

19 Type of Inspection (activity code)	A F A	20. Event Number	5393553	21 Primary or Mill	
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22 Signature

23 AR Number

20117



Section I Subsequent Action/Continuation Data

1. Subsequent Action <input type="checkbox"/>	1a Continuation <input checked="" type="checkbox"/>	2 Date Issued (Original Issue) 04	Mo Da Yr 08 86	3. Citation' Order Number 2697904	-				
4 Served To Charles M. Miller, Attorney for Estate		5 Operator M. S. W. Coal Company							
6 Mine No. 2 Slope		7. Mine ID 36	-	06	279	-			(Contractor)

Section II—Justification for Action

issuance of Imminent Danger Order No. 2697901 dated 04/08/86; therefore, no abatement time was set.

Session III: Subsequent Action Taken

8. Extended To _____ Mo D

A. Date B. Time (24 Hr. Clock) C. Vacated D. Terminated E. Modified

Section IV—Inspection Data

9. Type of Inspection			10. Event Number										
A	F	A	5	3	9	3	5	5					
11. Signature			AR Number			12. Date			Mo	Da	Yr	13. Time (24 Hr. Clock)	
<i>Frank J. Johnson</i>			24117						4	8	86	1525	

Section I—Violation Data

1 Date	Mo	Da	Yr	2 Time (24 Hr. Clock)	1155	12 Citation/ Order Number	2675642
4. Served To Charles M. Miller, Attorney for Estate of Gene J. Wolfgang					5. Operator M. S. W. Coal Company		
6. Mine No. 2 Slope					7. Mine ID	36-06279	(Contractor)
8. Condition or Practice					8a. Written Notice (103g) <input type="checkbox"/>		

The explosives that were fired in the slant off of the No. 9 breast of the first miner heading on December 11, 1985, were not being used in a permissible manner.

30 CFR, Part 15, Article IV, Section 4.b.12, states that, "... care shall be taken to ascertain that all persons are in the clear." It was determined from the investigation that Frank Benner, Troy Wolfgang and Gene Wolfgang were not in the clear when the shots were fired. This condition was determined during the investigation of a multiple fatal mine explosion which occurred in the slant off the No. 9 breast of the first miner heading on December 11, 1985. This citation was one of the factors that contributed to the issuance of Imminent Danger Order No. 2697901 dated 04/08/86; therefore no abatement time was given.

See Continuation Form (MSHA Form 7000-3a)

9. Violation	A. Health Safety Other <input checked="" type="checkbox"/>	B. Section of Act	-	C. Part/Section of Title 30 CFR	7 5 ■ 1 3 0 3
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Section II—Inspector's Evaluation

10. Gravity:

A. Injury or Illness (has) (is): No Likelihood <input type="checkbox"/> Unlikely <input type="checkbox"/> Reasonably Likely <input type="checkbox"/> Highly Likely <input type="checkbox"/> Occurred <input checked="" type="checkbox"/>
B. Injury or Illness could reasonably be expected to be: No Lost Workdays <input type="checkbox"/> Lost Workdays or Restricted Duty <input type="checkbox"/> Permanently Disabling <input type="checkbox"/> Fatal <input checked="" type="checkbox"/>
C. Significant and Substantial (See Reverse): Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> D. Number of Persons Affected 0 0 3

11. Negligence (check one)

A. None B. Low C. Moderate D. High E. Reckless Disregard

12. Type of Action	1 0 4 - a - , - - -	13. Type of Issuance (check one)
		Citation <input checked="" type="checkbox"/> Order <input type="checkbox"/> Safeguard <input type="checkbox"/>

14. Initial Action	A. Citation <input type="checkbox"/> B. Order <input type="checkbox"/> C. Safeguard <input type="checkbox"/> D. Written Notice <input type="checkbox"/> E. Citation/Order Number	F. Dated	Mo	Da	Yr
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15. Area or Equipment

16. Termination Due	A. Date	Mo	Da	Yr	B. Time (24 Hr. Clock)
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Section III—Termination Action

17. Action to Terminate

18. Terminated	A. Date	Mo	Da	Yr	B. Time (24 Hr. Clock)
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Section IV—Automated System Data

19. Type of Inspection (activity code)	A F A	20. Event Number	5 3 9 3 5 5 3	21. Primary or Mill
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22. Signature	<i>Patricia S. Brown</i>			23 AR Number	201117
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U.S. Department of Labor
Mine Safety and Health Administration



Section I - Violation Data

1 Date	Mo	Da	Yr	2 Time (24 Hr. Clock)	1534	3 Citation/ Order Number	2697907
4 Served To					5 Operator		

4 Served To					5 Operator		
Charles M. Miller, Attorney for Estate FOR					M. S. W. Coal Company		
6 Mine	JANE J. WILFGANG				7 Mine ID	36-06279	(Contractor)
No. 2 Slope							

8 Condition or Practice	8a Written Notice (103g) <input type="checkbox"/>
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The permissible explosives used to charge the three long holes and the unconfined shots in the slant off of the No. 9 breast of the first miner heading was not being used in a permissible manner. Combustible material (coal dust) was used for stemming of the three long holes and coal dust was used to cover up the unconfined shots placed on pieces of rocks in this area. This condition was determined during the investigation of a multiple fatal mine explosion which occurred in the slant off of the No. 9 breast of the first miner heading on December 11, 1985. This citation was one of the factors that contributed to the issuance of Imminent Danger Order No. 2697901 dated 04/07/86 ; therefore, no abatement time was set.

See Continuation Form (MSHA Form 7000-3a)

9. Violation	A. Health Safety Other <input checked="" type="checkbox"/>	B. Section of Act	-	C. Part Section of Title 30 CFR	75.1303								
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Section II - Inspector's Evaluation

10. Gravity:

A. Injury or Illness (has) (is): No Likelihood Unlikely Reasonably Likely Highly Likely Occurred

B. Injury or Illness could reasonably be expected to be: No Lost Workdays Lost Workdays or Restricted Duty Permanently Disabling Fatal

C. Significant and Substantial (See Reverse): Yes No D. Number of Persons Affected 003

11. Negligence (check one):

A. None B. Low C. Moderate D. High E. Reckless Disregard

12. Type of Action	104-a-, , - -	13. Type of Issuance (check one)
		Citation <input checked="" type="checkbox"/> Order <input type="checkbox"/> Safeguard <input type="checkbox"/>

14. Initial Action	A. Citation <input type="checkbox"/> B. Order <input type="checkbox"/> C. Safeguard <input type="checkbox"/> D. Written Notice <input type="checkbox"/>	E. Citation/ Order Number	F. Dated	Mo	Da	Yr
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15. Area or Equipment:

16 Termination Due	A. Date	Mo	Da	Yr	B. Time (24 Hr. Clock)							
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Section III - Termination Action

17 Action to Terminate												
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18. Terminated	A. Date	Mo	Da	Yr	B. Time (24 Hr. Clock)							
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Section IV - Automated System Data

19. Type of Inspection (activity code)	A F A	20 Event Number	5 39 355 3	21 Primary or Mill	
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22 Signature	Ralph S. Johnson	23 AR Number	20117
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