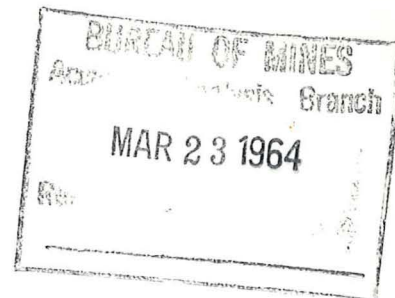


Anthracite

24  
25  
26  
**COAL FATAL**

64-0105



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF MINES  
District A

Joseph A. Bednarczyk  
Teroy F. Bednarczyk  
Victor Hynaschuk

Triple

1208

7mg

Sept. 01

DUPLICATE

36-004

3600000

3 fatalities  
FINAL REPORT OF COAL-MINE GAS EXPLOSION  
BEDNARCZYK NOS. 2 AND 3 SLOPES MINE  
BEDNARCZYK COAL COMPANY  
GOWEN CITY, NORTHUMBERLAND COUNTY, PENNSYLVANIA

February 3, 1964 ✓

By

Harrison F. Wilson  
Federal Coal-Mine Inspector

Theodore F. Deak  
Federal Coal-Mine Inspector

John A. Fulmer  
Federal Coal-Mine Inspector

Originating Office - Bureau of Mines  
Wilkes-Barre, Pennsylvania  
William Rachunis, District Supervisor  
Health and Safety District A

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Table 1 - Composition of Mine-Air Samples Collected after  
Explosion

### Appendix

- A - Victims of explosion and injured
- B - Map of mine workings and ventilation at time of explosion.  
Scale 1 inch equals 100 feet
- C - Sketch showing explosion area, direction of forces and  
details within explosion area (not to scale)

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INTRODUCTION

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

A gas explosion occurred about 2 p.m., Monday, February 3, 1964, in the west slant off No. 3 chute, No. 4 level west gangway, No. 2 slope, Bednarczyk Coal Company, Gowen City, Northumberland County, Pennsylvania. A total of four men was in the mine at the time of the explosion; three perished immediately and one was injured seriously by the forces of the explosion and required hospitalization.

The names of the victims, their ages, marital status, occupations, and number of dependents are listed in appendix A of the report.

Bureau of Mines investigators concur that the explosion originated at the face of a back slant being driven off the west slant off No. 3 chute, No. 4 level west gangway, No. 2 slope section, where an explosive mixture of methane and air, which accumulated owing to inadequate ventilation, was ignited by multiple blasting of three holes at the face of the back slant. The main forces of the explosion traveled outwardly from the face of the west slant off No. 3 chute, throughout the No. 4 level west gangway workings, and dissipated as they reached and traveled the slope and airway.

## GENERAL INFORMATION

The Bednarczyk Nos. 2 and 3 Slopes mine, Bednarczyk Coal Company, is east off State Highway No. 125 about a mile north of Gowen City, Northumberland County, Pennsylvania, and is served by autotruck.

Joseph Bednarczyk, 1603 West Independence Street, Shamokin, Pennsylvania, is the operator, and William Shinskie, a certified official, (injured person), was the mine foreman.

The principal mine openings are the Nos. 2 and 3 slopes, 710 and 600 feet in length, respectively, driven in coal on an average pitch of 57°. Other openings are two breasts driven to the surface for ventilation, one of which was utilized for emergency escape.

The No. 2 Lykens bottom split vein, which averaged 5 feet in thickness and pitched a maximum of 64°, was being mined.

The mine afforded employment on 2 shifts a day 5 to 6 days a week for nine persons, seven of whom worked underground in the average daily production of 60 tons of anthracite, all of which was loaded by gravity flow and by hand. The preceding Federal inspection of the mine was conducted on December 6, 1963.

## MINING METHODS, CONDITIONS, AND EQUIPMENT

### Mining Methods

The slant-chute-and-pillar method of mining was followed and only first mining was in progress. At the time of the explosion, the No. 4 level west gangway had been driven 309 feet in length from the No. 2 haulage slope. The No. 1 chute, 72 feet from the slope, had been driven through to the upper No. 3 level west gangway to provide a return airway and escapeway. The Nos. 2, 3, and 4 chutes were driven up the pitch from the gangway for distances of 30, 45, and 39 feet, respectively. A monkey heading (airway) was not provided parallel to the gangway; consequently, main west slants were driven directly off the straight chutes. The No. 2 chute had been connected to a slant driven from the airway, and the west slant off No. 2 chute, which in reality was a continuation of the No. 1 west slant, had been advanced 60 feet on a pitch ranging from 35° to 40°. After the No. 3 chute holed through to a slant off the No. 2 chute, the No. 3 west slant was advanced on a 27° pitch for a distance of 89 feet beyond this open air connection. A back slant, where the ignition occurred, was started off the No. 3 west slant at a point about midway between the straight chute and the face of the main slant; this back slant was 7 feet in width, 13 feet in depth, and pitched 64° at the face.

The Nos. 2 and 3 west slants were 31 feet wide at the faces, and owing to the steeply pitching coal vein and the widths of the slants, ventilation along the high-side ribs of the places was extremely difficult. The No. 4 chute was started off the gangway 51 feet in by No. 3, and the No. 4 west slant was advanced 30 feet on a 28° pitch before a back slant was started to afford an air connection. The face of the gangway was 21 feet past No. 4 chute, and about 72 feet past the last open air connection (No. 3 chute).

### Explosives and Blasting

Explosives supplies, delivered to the mine as purchased, were transported into the mine in a suitable manner; such supplies were last purchased on Tuesday, January 28, 1964. Surface magazines were not provided and explosives supplies, far in excess of a 1-day's supply, were kept in wooden boxes off the main slope on the No. 3 level gangway and were exposed to freezing temperatures during the winter months. Explosives supplies, for use at the working faces and in excess of a day's supply, were kept at random usually in by the last open air connections either in opened shipping containers or left lying on foot batteries. Permissible explosives, detonated electrically with instantaneous and Nos. 1- to 5-delay detonators from well-installed blasting lines, were used for blasting coal. Some dynamite was used for blasting rock on the gangways. Coal was blasted off the solid on shift, as needed, by the miners who drilled, charged, and fired all holes. When charging holes for blasting, the primed cartridge was placed in or near the middle of the train of explosives used in each hole. The charged holes were stemmed with only 10 to 14 inches of material, and left standing long periods of time while other work was done in the working places. Also, immediately after charging and stemming the blastholes, the leg wires of the detonators were connected ready for blasting. Although stated that tests for gas were made before and after blasting, evidence disclosed that proper tests for gas were not always made in the working places before blasting or as soon as practicable after blasting. In addition, after firing a series of holes at a working face, a thorough examination was not made to determine whether or not unexploded explosives existed in the in by end of any one of the holes fired; some undetonated explosives were discovered in an old blasthole out by the face of the back slant off No. 3 west slant.

### Ventilation and Gases

This mine is classed gassy by the State and is a gassy mine under the provisions of the Federal Mine Safety Code. Ventilation was induced by a Navy-type propeller fan installed suitably on the surface with proper recording devices and operated exhausting. However, the main fan was shut down after the second shift workmen left the mine and was not

started until about an hour before the preshift examiner entered the mine on the following work day. The weekly fan chart on the pressure-recording gage at the time of the explosion had been installed improperly inasmuch as it was registering the time as a.m. for p.m. Furthermore, the undated chart showed an overlap of running time, thus revealing that it had not been changed as required. Approximately 20,000 cubic feet of air a minute was being exhausted to the surface. Adequate volumes of air were provided for each air split and some working places; however, check curtains, line brattices, or other means were not provided from the last open air connections to faces of the Nos. 2 and 3 west slants to ventilate the places adequately. A blower fan, installed with tubing on the gangway outby No. 2 chute, was used to ventilate the No. 4 chute area. Some permanent stoppings of concrete blocks had been installed along the slope between the intake and return airways; however, the opening at No. 3 level west gangway was closed with a poorly constructed cloth stopping. Permissible flame safety lamps were provided each official and miner for use underground. Although the record book indicated that suitable preshift, onshift, and weekly examinations were made of the mine, the detection of gases during the daily mine examinations was not recorded, nor were the examiner's initials and the dates of the examinations marked in the places visited. On the day of the explosion and during the preshift examination, a reportedly small pocket of gas on the high side of the No. 3 west slant at the face was detected and removed by the use of compressed air from the drill hose. Evidence disclosed that gas was detected frequently in working places during preshift examinations and after blasting, and using compressed air from the drill hose to remove the gas was standard practice.

#### Electricity

Electric power at 440 volts alternating current was used underground for the operation of pumps along the slopes and the blower fan on the No. 4 level west gangway. Electric power was not used in the face regions; drilling was done by compressed-air-driven rotary drills.

#### Illumination and Smoking

Permissible electric cap lamps were used for portable illumination underground. Smoking in the mine was prohibited, and no evidence of smoking prior to or at the time of the explosion was disclosed.

### STORY OF EXPLOSION AND RECOVERY OPERATIONS

#### Activities of Bureau of Mines Personnel

The accident was reported by telephone to Federal Inspector Theodore F. Deak at Shamokin, Pennsylvania, about 3:20 p.m., by Clarence Kashner, president, Independent Miners, Breakermen, and Truckers Association. Deak informed the Wilkes-Barre, Pennsylvania, office of the Bureau of Mines immediately

and left shortly afterward for the mine. Harrison F. Wilson and John A. Fulmer, Federal inspectors of the Schuylkill Haven office, were contacted and instructed to proceed to the mine. Federal Inspector Deak arrived at the mine at 3:45 p.m., and assisted in the recovery of the three bodies. Fulmer and Wilson arrived at 4:35 p.m., shortly after the last body was brought to the surface. The Bureau of Mines rescue truck manned by Federal Inspectors Clair S. Sigworth and William T. Cummings arrived at the mine shortly thereafter.

Federal Inspectors Deak, Fulmer, and Wilson participated in all activities pertaining to reestablishment of ventilation and removal of standing gas in the affected area to permit a thorough investigation, and served in an advisory capacity along with State inspectors throughout the project.

Following the explosion and recovery of the victims on Monday, February 3, 1964, Federal Inspector Harrison F. Wilson posted a preliminary report recommending that the operator withhold all persons from entering the mine, except those persons necessary to abate the condition, until such time that ventilation was restored, gases and fumes removed, and investigations by State and Federal inspectors showed that the danger of an explosion or fire was totally abated, and the mine safe for operation.

#### Mine Conditions Immediately Prior to the Explosion

The weather was cold and clear on the day of the explosion. The temperatures ranged from 26°F. at 12 noon to 30°F. at 2 p.m., and the barometric pressures ranged from 29.80 at 12 noon to 29.77 at 2 p.m., with a rise back to 29.80 at 6 p.m. It is the opinion of the Bureau of Mines investigators that the slight change in atmospheric pressure had no bearing on the explosion. Normal mining operations were in progress when the explosion occurred, and the main surface fan was in operation.

#### Evidence of Activities and Story of Explosion

On Monday, February 3, 1964, Joseph A. Bednarczyk, miner, arrived at the mine about 5:30 a.m., and started the main surface fan at 5:45 a.m. William Shinskie, foreman and miner, entered the mine at 6:15 a.m., to begin a preshift examination of the underground workings. Upon arriving in the No. 4 level west gangway, Shinskie started the blower fan located outby No. 2 chute and used to ventilate the No. 4 chute which was worked on the second shift only. During this preshift examination and while examining the No. 3 west slant (disaster place), Shinskie detected a "small pocket" of gas at the high side of the face and removed the gas by using compressed air from the 3/4-inch drill hose.

The other three men (victims) entered the mine shortly after 7 a.m. Shinskie and Victor Hynosky, miner, entered the No. 3 west slant and drilled and charged eleven 6-foot holes in the face of the slant and two short (plug) holes in top coal at the face of the back slant about midway between No. 3 chute and the face of the main slant, see sketch. These 13 holes were connected together and fired at approximately 10 a.m., and the blasted coal was loaded out. The two Bednarczyk brothers, Joseph and Leroy, worked on the gangway loading coal into gangway buggies, tramping them to the slope landing, and dumping the coal into the slope gunboat for transportation to the surface.

After removal of the loose coal from the place, Shinskie and Hynosky ate lunch. At 11:20 a.m., the two men entered the back slant to drill a cut of coal and, as they started into the back slant, Shinskie hung his safety lamp onto a prop at the entrance. They then drilled three 6-foot holes into the face. Each of these holes were charged with four 1-1/8- by 8-inch cartridges of permissible Hercules Red HB explosives and stemmed with only 12 inches of "coal dirt" bags. One instantaneous, one No. 1 delay, and one No. 4 delay electric detonators were used in the third cartridge inserted in each hole as primers. The legs of the detonator wires of these charged holes were connected ready for blasting shortly before noon. The two men then returned to the face of the main slant and worked dressing the face and standing props.

Shortly before 2 p.m., (shift quitting time) Shinskie and Hynosky went to the gangway to fire the three charged holes in the back slant. Hynosky connected the firing lines to their permissible twist-type ten-shot battery at the firing station, which was 4 feet inby the west rib of the No. 2 chute and 151 feet from the charged holes. Shinskie had gone inby the No. 3 chute to see that no person was in the gangway or in the No. 4 chute before blasting. When Shinskie returned to a point outby No. 3 chute and about 15 feet inby the firing station, he told Hynosky to fire the shots.

Shinskie heard two blasts followed by a short interval and the explosion occurred; he was struck and lifted by a terrific force. He was found by rescuers atop the sump screen on the slope about 10 feet below the gangway landing approximately 200 feet from where he was walking along the gangway when the explosion occurred. Hynosky's body was found 33 feet inby the west rib of the slope, a distance of 135 feet from the firing station. The Bednarczyk brothers were on the gangway somewhere between the No. 1 chute and the slope when the explosion occurred. Leroy was blown into a shelter hole on the east side of the slope directly across from the entrance to the No. 4 level west gangway, and Joseph was blown onto the slope sump screen as was Shinskie.



The three victims received multiple injuries such as burns, abrasions, fractured skulls, and numerous other injuries that caused their death instantly. Shinskie, the injured person, received a concussion to the head, broken ribs, punctured lung, and burns to the face and hands; although injured seriously and in critical condition for several days, Shinskie has responded to treatment and as of this writing, hospital authorities report him to be in fair condition and recovering steadily.

#### Recovery Operations

At approximately 1:50 p.m., Monday, February 3, 1964, Reuben Broscius, hoisting engineer, received a signal from underground to hoist the gunboat loaded with coal. The gunboat was hoisted to the surface pocket, dumped, and was being lowered empty into the slope shortly before 2 p.m., for transportation of the underground workmen to the surface. However, when the empty gunboat reached a point about 50 feet above the No. 4 level landing, the signal horn started blowing continuously. Broscius immediately attempted to contact the underground workmen by means of the mine telephone; however, this communication system was rendered inoperative apparently at the same time the signal system was affected. Realizing that something unexpected may have occurred, Bernard Masinos and Francis Kidron, second-shift miners who were on the surface ready to start their shift, entered the mine to investigate. Masinos traveled down the No. 3 slope east of the main haulage slope to the No. 3 level, and Kidron was lowered in the No. 2 slope gunboat to the No. 3 level landing. Upon arrival at that point, Kidron heard moaning from the vicinity of the No. 4 level slope landing, and immediately traveled down the airway to the No. 4 level where he encountered destruction revealing that an explosion had occurred. Masinos, who had traveled the No. 3 level gangway between the two slopes, joined Kidron, and these two men located the three bodies and found Shinskie injured on the slope sump screen about 10 feet below the No. 4 level landing. After repairing the broken telephone lines, Masinos reported their findings to the surface. The occurrence was reported immediately to the district State Mine Inspector Arthur A. Joyce, and to Clarence Kashner, president, Independent Miners, Breakermen, and Truckers Association, who called Federal Inspector Deak.

Masinos and Kidron removed Shinskie to the surface at approximately 3:30 p.m., from where he was taken to the Shamokin State Hospital and later transferred to the Geisinger Medical Center at Danville, Pennsylvania. State Inspectors Arthur A. Joyce and Harold B. Shomper and Federal Inspector Deak entered the mine and assisted Masinos and Kidron in recovering the bodies of the three deceased workmen; the last of which reached the surface at approximately 4:30 p.m.

Because ventilation in the affected area was disrupted seriously and because of the possibility of a fire or fires existing in the area and danger that other gas ignitions may occur, all personnel underground returned to the surface immediately after the last body was recovered, and all persons were withheld from the mine until the following morning, Tuesday, February 4. An overnight guard was kept on duty to prevent anyone from entering the mine.

Exploration of the disaster area, the No. 4 level west gangway workings by State and Federal inspectors on Tuesday morning, February 4, revealed that the trap door at No. 1 chute was blown inward, the loading battery and lower portion of the manway steps in No. 2 chute were blown outward, and the loading chute and manway in No. 3 chute were completely demolished and blown outward. Consequently, the 9,000 cubic feet of air a minute entering the gangway from the slope was traveling directly to the return airway by way of the first two chutes, and the Nos. 2, 3, and 4 west slants were still filled with methane in explosive proportions including carbon monoxide. The analysis of an air sample, bottle No. X-5275, collected near the entrance to the No. 3 west slant showed the atmosphere to contain 2.0 percent carbon dioxide, 12.5 percent oxygen, 11.7 percent methane, 0.3 percent carbon monoxide, and 73.5 percent nitrogen, see table 1.

Because of the heavy concentration of gases and fumes, the slant workings in by the last open air connections could not be explored thoroughly until ventilation was restored; and it was obvious that this work would have to be done slowly for safety reasons.

On Wednesday, February 5, the cloth stopping across the No. 3 level west gangway was reinforced, and the entrances to the Nos. 1 and 2 chutes off the affected gangway were closed with temporary stoppings, thus coursing the air current to and up the No. 3 chute. Manways were then installed in the Nos. 2 and 3 chutes, and a line brattice erected to and along the face of the No. 2 west slant provided sufficient ventilation to remove the gases completely from that place.

On Thursday, February 6, a broken rib along the west side of the No. 3 chute just above the gangway and which created a dangerous fall hazard was timbered and lagged securely. After which, a line brattice was installed from the top of the No. 3 chute to a point about 40 feet into the No. 3 west slant. On the following morning, February 7, although a good current of air was being coursed into the No. 3 west slant by the line brattice, it was necessary to install a large compressed-air-driven blower fan on the gangway outby No. 3 chute and use 12-inch tubing from the fan in conjunction with the line brattice to dilute and start movement of the heavily concentrated

gases in the slant. On Saturday, February 8, the line brattice was extended to and along the face of the No. 3 west slant, back along the high side to the back slant where a wing brattice was erected to within 6 feet of the face. The air current thus provided cleared this main slant and the back slant of gases without further use of the blower-fan tubing.

The compressed-air blower fan and 12-inch tubing were utilized on Monday, February 10, to ventilate and remove gases from the No. 4 west slant, and a thorough investigation of the entire affected area was completed by State and Federal inspectors on Tuesday, February 11.

During the work of removing the standing gases from the area, it was discovered that six holes in the coal and two holes in the bottom rock at the face of the No. 4 level west gangway had been charged, tamped, and the legs of the detonator wires were connected ready for firing. According to Shinskie, injured foreman, no holes were present at the face of the gangway at the time of his preshift examination on the day of the occurrence, and apparently Joseph A. Bednarczyk (victim) drilled and charged the holes sometime during the current shift. One of the two permissible-type flame safety lamps underground at the time of the explosion, believed to be carried by Shinskie, was found demolished on the gangway just outby No. 2 chute, and the other, carried by Joseph Bednarczyk, was found intact on the gangway near the slope landing.

#### INVESTIGATION OF CAUSE OF EXPLOSION

##### Investigating Committee

Persons who took part in the investigation were as follows:

##### Pennsylvania Department of Mines and Mineral Industries

Gordon E. Smith	Deputy Secretary
Arthur A. Joyce	State Mine Inspector
Harold B. Shomper	State Mine Inspector
Gerald F. Kettle	State Mine Inspector

##### Pennsylvania National Casualty

Walter Reb	Investigator
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##### Independent Miners, Breakermen, and Truckers Association

Clarence Kashner	President
Frank Stankiewicz	Member

## United States Bureau of Mines

Harrison F. Wilson  
Theodore F. Deak  
John A. Fulmer

Federal Coal-Mine Inspector  
Federal Coal-Mine Inspector  
Federal Coal-Mine Inspector

Pertinent information relative to the occurrence was furnished by Bernard Masinos and Francis Kidron, miners, Reuben Broscius and Thomas Swartz, hoisting engineers, and William Shinskie, foreman and miner, who was interrogated in the Geisinger Medical Center on Thursday, February 13, 1964.

### Methane as a Factor in the Explosion

Methane liberated from the coal vein accumulated in the No. 3 west slant owing to inadequate ventilation. Methane had been detected on the preshift examination and was removed by compressed air. Methane was also detected during the investigation with a permissible flame safety lamp in the Nos. 2, 3, and 4 west slants. The analytical results of an air sample, bottle No. X-5275, collected near the entrance of No. 3 west slant (affected place) during the investigation disclosed that the atmosphere in the place contained 11.7 percent of methane and 12.5 percent of oxygen. The atmosphere also contained as much as 0.3 per cent of carbon monoxide.

### Flame

Evidence of charred bits of paper, burned insulation on blasting lines, and burned cartridges of loose explosives on foot batteries was found at several places in the affected chute. Burns received by the victims showed that flame reached the entire length of the No. 4 level west gangway.

### Forces

The main forces from the explosion traveled outwardly from the No. 3 west slant chute, down the Nos. 2 and 3 main chutes, out the No. 4 level west gangway, and dissipated as they moved up the slope and the No. 1 chute return airway. The forces demolished the battery at the No. 2 chute, the manway steps, battery, side lagging, and their supporting timbers in the No. 3 main chute, blew the trap door at the No. 1 chute inward, blew planks, vent tubing, and debris inward toward and into the No. 4 chute, and blew the blower fan, vent tubing, gangway buggy, planks, and debris out the gangway with terrific force. The three victims, as well as the injured person, were blown considerable distances out the gangway.

### Probable Point of Origin

The investigators concur that the explosion originated in the back slant being driven off the No. 3 west slant, where evidence disclosed that a cut of coal had been definitely fired in the back slant at the time of the occurrence.

### Factors Preventing Spread of Explosion

Although the explosion was violent, it was curtailed somewhat by the limited amount of oxygen to support combustion in the affected chute.

### Summary of Evidence

Conditions in the mine during recovery operations and the investigation that followed, together with information obtained during interrogation of the injured person as well as company employees and officials, provided evidence as to the cause and origin of the explosion. The evidence from which the conclusions of the Bureau of Mines investigators are drawn is summarized as follows:

1. Main west slants were driven directly off the straight chutes from the gangway; a main airway was not provided parallel to the No. 4 level west gangway.
2. Owing to the steeply pitching coal vein, the 31-foot widths of the Nos. 2 and 3 west slants created a difficult problem of ventilating the high side of the places.
3. Main west slants were started and driven off the straight chutes before a back slant was holed through to the upper slant workings to afford an open air connection.
4. Back slants or air connections were driven off the main west slants at random and on centers from 90 to 115 feet apart.
5. The faces of the west slants were driven as much as 89 feet beyond the last open air connection.
6. Owing to the lack of surface storage magazines, explosives supplies far in excess of a day's supply were kept in wooden boxes off the main slope on the No. 3 level west gangway, and were exposed to freezing temperatures during the winter months.
7. Explosives supplies, for use at the working faces and in excess of a day's supply, were kept at random and in by the last open air connections either in opened shipping containers or left lying on foot batteries.

8. When charging holes for blasting, the primed cartridge was placed in the middle of the train of explosives used in each hole.
9. Holes for blasting were stemmed with only 10 to 14 inches of material.
10. Holes for blasting were charged and left standing for long periods of time while other work was done in the place.
11. The leg wires of the detonators in charged holes were connected together for blasting and left standing for long periods of time before firing.
12. Proper tests for gas were not made of the working faces before blasting or as soon as practicable after blasting.
13. After firing a series of holes at the face of a working place, a thorough examination was not made to determine whether or not unexploded explosives existed in the inby end of any one of the holes fired.
14. The main surface fan was shut down after the second shift left the mine and was not started until about an hour before the preshift examiner entered the mine on the following workday.
15. Line brattices, check curtains, or other means were not provided to course the air current from the last open air connection to the faces of the Nos. 2 and 3 west slants.
16. The opening between the intake and return airway at the No. 3 level west gangway was closed with a cloth stopping.
17. Proper tests for gas were not made of the working places during the work shift by the mine supervisor nor were proper tests for gas made by the miners to assure the safety of all workmen.
18. The preshift and onshift examiner did not mark the date and his initials in the places visited.
19. Detection of gases during the daily mine examinations and actions taken to remove the gases were not entered in the official's record book kept at the mine.
20. Clearing methane from the west slants using compressed air from the drill hoses was standard practice.
21. The explosion resulted at the exact moment when the last of the three charged holes, primed with a No. 4 delay detonator, discharged at the face of the back slant off No. 3 west slant.

### Cause of Explosion

Methane in explosive proportions, which accumulated in the No. 3 west slant owing to inadequate ventilation, was ignited by multiple blasting of three holes at the face of the back slant being driven off the high side of the place. Evidence disclosed that either inadequate stemming or insufficient overburden caused a blown-out shot when the third hole, primed with a No. 4 delay detonator, discharged and the resultant open flame was the ignition source. However, a hangfire from either one of the other two shots may have ignited the gas. Failure to conduct proper tests for gas in the place immediately before blasting was a contributing factor.

### RECOMMENDATIONS

1. Parallel airways should be driven adjacent to gangways so as to provide accessible means to ventilate the working places as soon as possible.
2. In steeply pitching veins, slanted places should be driven as narrow as possible so as to minimize the problem of conducting ventilation to and along the high-side ribs.
3. Back slants or air connections should be driven into upper slants before main slants are started off any chute.
4. Back slants or air connections should be made at intervals not exceeding 60 feet.
5. The faces of main slants or breasts should not be advanced more than 60 feet in by the last open crosscuts.
6. Separate surface magazines, erected according to Article IV, Section 1 of the Federal Mine Safety Code, should be constructed on the surface and used for storing more than a 1-day's supply of explosives.
7. Explosives and detonators for use in the active working places should be kept preferably in separate boxes or magazines nor less than 5 feet apart; if kept in the same box or magazine they should be separated by at least a 4-inch substantially fastened hardwood partition or the equivalent. The supply of explosives or detonators stored in such boxes or magazines should be limited to as nearly a day's supply as possible.
8. The primed cartridge of each blasthole should be placed into the hole so as to point the detonator toward the main charge of explosives.
9. Boreholes for blasting should be stemmed with at least 24 inches of material, or at least one-half of the length of the hole should be stemmed if the hole is less than 4 feet in depth or suitable blasting plugs should be used.

10. Boreholes should not be charged and left standing while any work is being done at the working face.
11. Charged boreholes should be fired as soon as the detonator-leg wires are connected ready for blasting.
12. Proper tests for gas should be made immediately before firing each shot or group of multiple shots and as soon as possible after blasting.
13. A very careful search of the working place should be made after blasting to see if any explosives did not detonate and to recover any undetonated explosives.
14. The main surface fan should be operated continuously except when the mine is shut down with all men out of the mine. After starting, the main surface fan should be operated for a period of at least 2 hours before any man is allowed underground.
15. The fan chart of the pressure-recording gage should be changed as needed to prevent any overlap of running time; installed in a manner to properly register the correct time and current day, and be dated upon installation. Upon removal, each chart should be kept on the surface at the mine.
16. The quantity of air reaching the face of each working face should be at least 200 cubic feet a minute for each man working in the place and as much more as may be required to dilute, render harmless, and sweep away noxious or dangerous gases, smoke, and fumes.
17. All active underground working places in a mine should be ventilated by a current of air containing not less than 19.5 percent of oxygen, not more than 0.5 percent of carbon dioxide, and no harmful quantities of other noxious or dangerous gases.
18. Substantially constructed line brattices and check curtains should be used from the last open crosscut to a working face when necessary to provide adequate ventilation for the workmen and to remove gases and explosives fumes.
19. The opening between the main intake and return airway at the No. 3 level west gangway should be closed with a stopping constructed of substantial, incombustible material.
20. Stoppings should be constructed reasonably airtight.



21. The underground working places in a mine should be examined for hazards by a certified foreman at least once during each coal-producing shift or oftener if necessary for the safety of the workmen. Such examinations should include tests with a permissible flame safety lamp for methane and oxygen deficiency.

22. The person making mine examinations and tests should mark his initials and the date at the places examined, and if dangerous conditions are found, they should be reported promptly.

23. Each day, the mine foreman should enter plainly and sign with ink or indelible pencil in a book provided for that purpose a report of the condition of the mine, which report should state clearly the location and nature of any danger observed by him or reported to him during the day, and the report should state what action, if any, was taken to remedy such danger.

24. Each miner should make all necessary tests for gas in his working place to assure the safety of all persons therein.

25. Compressed air should not be used to remove gases or fumes from working places, conventional methods of conducting the air currents to the working faces should be used.

#### ACKNOWLEDGMENT

The writers gratefully acknowledge the courtesies extended and the help given by the officials and employees of the company, the officials and workmen of the Independent Miners, Breakermen, and Truckers Association, the Insurance company investigator, State mine inspectors, and others during this investigation.

Respectfully submitted,

/s/ Harrison F. Wilson

Harrison F. Wilson  
Federal Coal-Mine Inspector

/s/ Theodore F. Deak

Theodore F. Deak  
Federal Coal-Mine Inspector

/s/ John A. Fulmer

John A. Fulmer  
Federal Coal-Mine Inspector

Approved by:



William Rachunis  
District Supervisor  
Health and Safety District A

Table 1

<u>ANALYSES OF AIR SAMPLES</u>						
<u>Bottle No.</u>	<u>Location in Mine</u>	<u>Carbon Dioxide</u>	<u>Oxygen</u>	<u>Methane</u>	<u>Carbon Monoxide</u>	<u>Nitrogen</u>
X-5275	Entrance of No. 3 West Slant Chute	2.0	12.5	11.7	0.3	73.50
X-5276	Fan return at fan	0.07	20.82	0.05	0.00	79.06

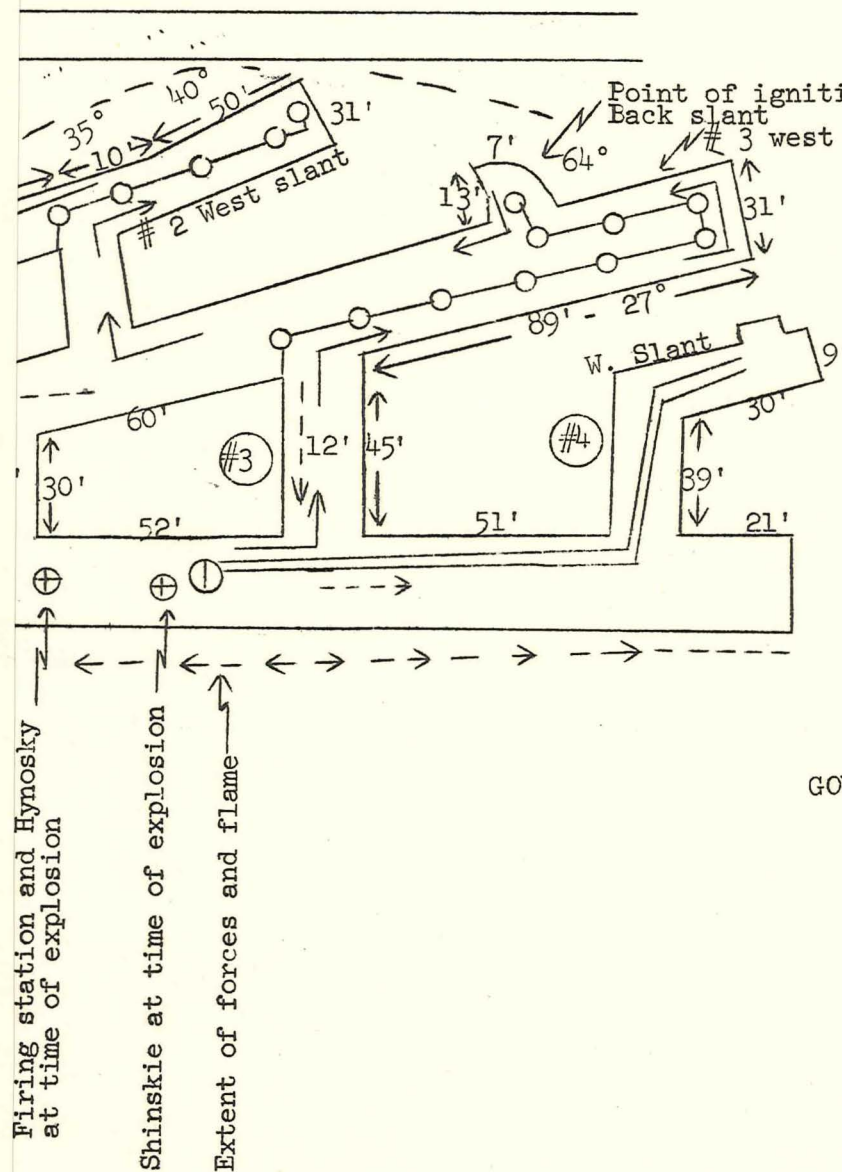
# APPENDIX A

## VICTIMS OF EXPLOSION

Name	Age	Occupation	Years employed at this mine	Marital Status	Dependents (inc. children under 18)
Joseph A. Bednarczyk	25	Miner	5	Married	Wife and two children
Leroy F. Bednarczyk	22	Laborer	2	Married	Wife and one child
Victor Hynosky	46	Miner	7	Married	Wife and one child

## LIST OF INJURED

William Shinskie	41	Mine Foreman - Miner	1	Married	Wife and nine children
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# Legend

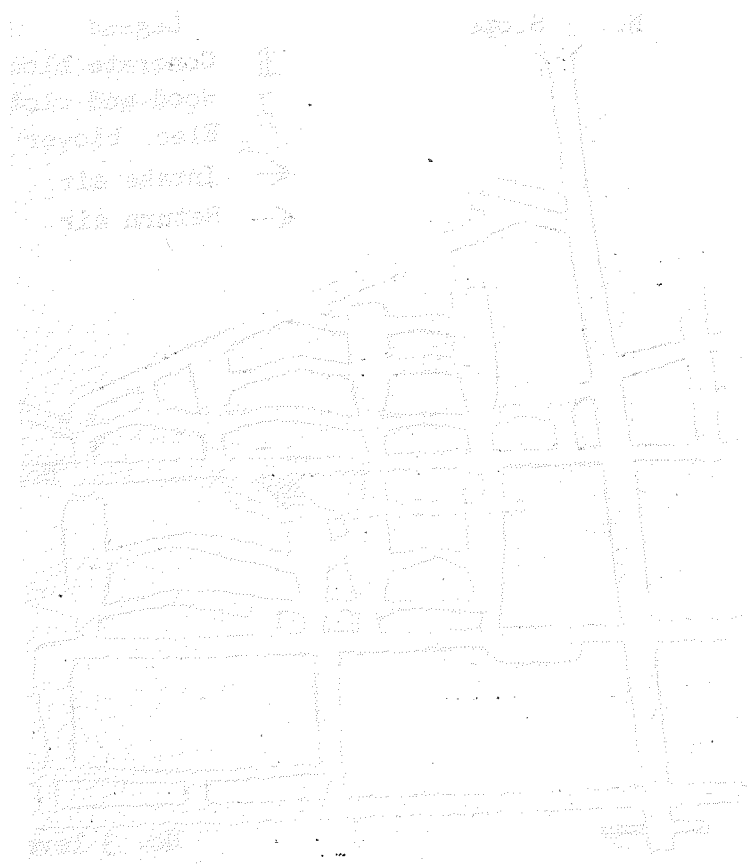
- ○ Line brattice erected after explosion
- ⊕ Compressed air fan and tubing used after explosion
- ← Path of reestablished air current to remove gases
- ← - - - Direction of forces

## APPENDIX C

SKETCH OF DISASTER AREA  
 BEDNARCZYK NOS. 2 AND 3 SLOPES MINE  
 BEDNARCZYK COAL COMPANY  
 GOWEN CITY, NORTHUMBERLAND COUNTY, PENNSYLVANIA

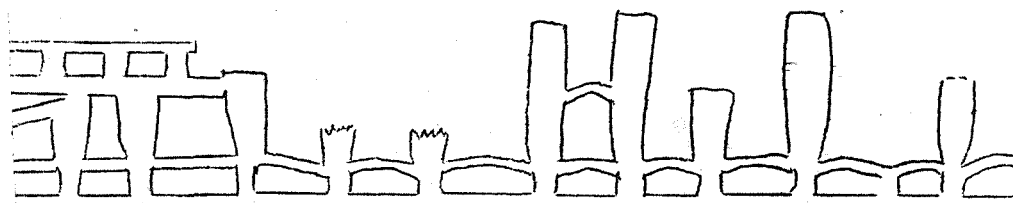
February 3, 1964

Not to scale

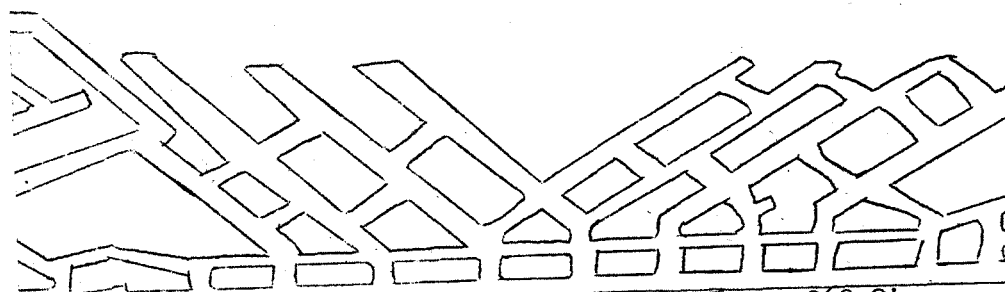


1. 1000 ft. level  
 2. 900 ft. level  
 3. 800 ft. level  
 4. 700 ft. level  
 5. 600 ft. level  
 6. 500 ft. level  
 7. 400 ft. level  
 8. 300 ft. level  
 9. 200 ft. level  
 10. 100 ft. level  
 11. 0 ft. level  
 12. 100 ft. level  
 13. 200 ft. level  
 14. 300 ft. level  
 15. 400 ft. level  
 16. 500 ft. level  
 17. 600 ft. level  
 18. 700 ft. level  
 19. 800 ft. level  
 20. 900 ft. level  
 21. 1000 ft. level

Return airway  
exhaust fan



No. 2 level west gangway elev. 1195.1'



Elev. 963.2'

960.2'

No. 3 level west gwy.  
No. 2 west slant



No. 3 west slant

No. 4 west slant

t gwy. elev. 822.5' to 826.9'