anthracite
ug
Stephen Halcovich
Lawrence D. Erdman
Joseph C. Dersba
1309
332 ug
Dept. 01

3 fatals

36-006

64-0116

3600000

COAL FATAL

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

District A

REPORT OF MULTIPLE FATAL EXPLOSIVES ACCIDENT
GLEN BURN COLLIERY
GAP-ANTHRACITE COMPANY
SHAMOKIN, NORTHUMBERLAND COUNTY, PENNSYLVANIA

3 fatals

February 26, 1964

By

Harrison F. Wilson
Federal Coal-Mine Inspector

Theodore F. Deak
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John A. Fulmer
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Originating Office - Bureau of Mines
Wilkes-Barre, Pennsylvania
William Rachunis, District Supervisor
Health and Safety District A

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INTRODUCTION

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

The accidental discharge of improperly stored explosives and detonators at the Glen Burn Colliery, Gap-Anthracite Company, Shamokin, Northumberland County, Pennsylvania, at approximately 11 a.m., Wednesday, February 26, 1964, resulted in the instantaneous death of three persons and injury to one person not hospitalized. The accident occurred in the west 7½ and 8 veins conveyor heading south dip, No. 226 tunnel, No. 2 lift, No. 14 slope. The names of the deceased, who were the only workmen in the affected place at that time, their ages, marital status, occupations, and number of dependents are listed in appendix A.

The accident was reported to the Schuylkill Haven office of the Bureau of Mines at 12:15 p.m., the day of the occurrence, by Michael F. Farrell, colliery superintendent. After reporting the occurrence to William Rachunis, district supervisor, Harrison F. Wilson and Theodore F. Deak, Federal coal-mine inspectors, proceeded to the mine immediately and started an investigation which was completed on Friday, March 13, 1964, after a portion of the affected heading closed by the blast was reopened for study. John A. Fulmer, Federal coal-mine inspector, joined the investigation on Monday, March 2, 1964.

Information contained in this report was obtained by visits to the scene, continual Federal representation and observation during work to reopen the closed portion of the affected heading, and by interrogation of officials and workmen.

GENERAL INFORMATION

Underground workings of the Glen Burn colliery, Gap-Anthracite Company, along U. S. Highway 61 at Shamokin, Northumberland County, Pennsylvania, are opened by a water-level tunnel, numerous openings to the surface maintained as airways and escapeways, and two underground slopes.

Mining is accomplished in the Nos. 4, 7½, 8, 9, 9¼, 10, 10½, and 11 coal veins which range from 3 to 25 feet in thickness and pitch from 45° to 90°. However, in the area where the accident occurred, the Nos. 7½ and 8 veins, 5 and 12 feet in thickness on a 58° pitch, respectively, and separated by a 10- to 12-inch rock divider, were mined simultaneously.

Employment was furnished for 421 persons, 332 of whom worked underground in the average daily production of 925 tons of anthracite, 90 percent of which was loaded by gravity flow onto chain conveyors and by drag loaders. The colliery worked 2 shifts a day 5 days a week; however, some loading of coal from draw batteries and maintenance work was accomplished on the third shift.

The west Nos. 7½ and 8 vein conveyor heading off No. 226 tunnel (disaster place), as well as chutes on 35-foot centers and the parallel monkey airway, were developed to the property line a distance of approximately 800 feet. Recovery of the coal (Nos. 7½ and 8 veins) between the monkey airway and the upper worked-out level had been completed by the long-hole method of mining, and recovery of stump pillars between the heading and the monkey airway was in progress. This work was accomplished by the long-hole method using the ring-type hole pattern for blasting. The stump pillars were blasted using three 5-hole rings spaced about 6 feet apart. Each ring pattern consisted of three holes drilled from the heading into the No. 7½ vein and two holes in the overlying No. 8 vein. The holes, ranging from 14 to 42 feet in lengths, were drilled by means of compressed-air-driven post-mounted drills. Pillars were recovered during retreat and this final stage of mining in the affected heading was completed to a point just inby No. 2 chute, a distance of 98 feet from the tunnel. Owing to the heavy pitching veins, coal formed the immediate roof along the heading, and double timber sets with lagging were used for roof and rib support. The flow of vein material after blasting the stump pillars was controlled by draw batteries erected at or near the center of the timber collars. A chain conveyor was used to transport the vein material from the batteries to mine cars on the tunnel.

Explosives and detonators were stored in suitable magazines on the surface and transported into the mine separately in specially constructed explosives-delivery cars. Such supplies were kept in separate wooden boxes provided along the tunnels, gangway, and main conveyor headings from where they were obtained as needed by the miners. Individual two-compartment wooden boxes,

known locally as "starter" boxes, were provided at the working places. In the affected place, the large wooden explosives-storage box, the wooden two-compartment "starter" box, and a wooden Primacord-storage box were only about 45 feet from and in line with the active draw battery.

Permissible explosives consisting of Hercules Red HC in 1½- by 24-inch cartridges, 50 pounds to the box, and Hercogel A, 1¼- by 8-inch cartridges, 25 pounds to the box, were used for long-hole blasting and battery starting, respectively. Dynamite was used only for blasting rock during development of tunnels, gangways, and main headings. All explosives were discharged electrically using instantaneous and delay detonators of proper strength. Firing lines for conventional blasting, including blasting at draw batteries, consisted of permanently installed annunciator wires, and permissible touch-type single-shot firing batteries were employed. The firing line in the affected heading was only 75 feet in length and the firing station was in direct line to the draw battery where confined and unconfined shots were fired for starting purposes. In long-hole blasting, Primacord was used to assure complete detonation of explosives. Long holes were charged by miners specially trained in this work and fired by means of well-insulated blasting cables of suitable lengths and 50-shot plunger-type batteries; firing cables were kept rolled on reels when not in use. Tests for gas were made immediately before and as soon as possible after blasting.

Electric power in the affected section consisted of direct current at 250 volts for use of trolley locomotives and for lighting along the tunnel, and alternating current at 440 volts for operation of a permissible-type chain conveyor unit in the heading. In conjunction with the main starting switch at the drive unit, a permissible Westinghouse Pushbutton Station was provided near the inby end of the conveyor line for starting and stopping purposes. The heavily insulated four-conductor power cable between the starting stations was of the flame-resistant type and was supported on suitable insulators attached to timber collars directly above the pan line. The conveyor unit and its metallic switch-control boxes were frame-grounded adequately.

The investigating party consisted of the following persons:

Gap-Anthracite Company

Michael F. Farrell	Colliery Superintendent
Henry Heiser	Mine Foreman
Charles Weimer	Second-shift Mine Foreman
Leonard Regevitz	Section Foreman
Larry Lebo	Chief Colliery Engineer
William Buggy	Electrical Foreman
Charles Cragle	Assistant Electrical Foreman

Pennsylvania Department of Mines and Mineral Industries

Gordon E. Smith	Deputy Secretary
Harold B. Shomper	Mine Inspector
John P. Brophy	Mine Inspector
George P. Gallagher	Mine Inspector
Michael Polinko	Electrical Inspector

United States Bureau of Mines

Harrison F. Wilson	Coal-Mine Inspector
Theodore F. Deak	Coal-Mine Inspector
John A. Fulmer	Coal-Mine Inspector

Pertinent information relative to the occurrence was provided by Daniel Gidaro, injured loader, Thomas McAnnaney, motorman, and Steve Royack, Martin Pikar, and William Janaskie, miners. The last three men were cross-shift workmen in the affected place.

The last prior Federal inspection of the colliery was completed on November 13, 1963.

A sketch of the disaster area is included as part of this report.

DESCRIPTION OF ACCIDENT

Work in the affected conveyor heading was confined to the last stages of running material from the draw battery just inby No. 2 chute 98 feet from No. 226 tunnel, and to drilling long holes into the stump pillar outby the battery. This work was accomplished on 2 shifts a day. In accordance with plans to blast another outby section of the stump pillar as soon as drilling was completed, two hundred pounds of long-hole explosives in four cardboard shipping containers were delivered to the place and placed in the large wooden storage box on Tuesday, February 25.

On Wednesday, February 26, 1964, Stephen Halcovich and Lawrence D. Erdman, drillers, and Joseph C. Deroba, starter, all certified miners, entered the mine on the man-trip with other day-shift workmen at 6:10 a.m., reached their working place, the west Nos. 7½ and 8 vein conveyor heading, No. 226 tunnel, shortly before 7 a.m., and waited on the tunnel while Leonard Regevitz, section foreman, conducted a preshift examination of their place. Regevitz found conditions in the place to be normal and free of hazards, and Halcovich, Erdman, and Deroba started work procedures about 7:15 a.m.

The locomotive crew, Thomas McAnnaney, motorman, and Daniel Gidaro, loader, loaded three 5-car trips from the place until about 10 a.m. Reportedly, the workmen in the heading fired from 3 to 4 times at the draw battery during the loading of each car of the third trip. Shortly before 10 a.m.

Leonard Regevitz, section foreman, visited the place and discussed conditions with the workmen. During this visit Regevitz repeated instructions issued to the workmen on the last three preceding work days, Friday, Monday, and Tuesday, February 21, 24, and 25, respectively, to remove the explosives-storage boxes from the heading to the tunnel. When Regevitz left the place at 10:15 a.m., the workmen were drilling the last hole of the third 5-ring set of long holes into the stump pillar and it was understood that the holes were to be charged when drilling was completed.

The locomotive crew reached the place with the fourth 5-car trip at 10:30 a.m. When Gidaro started to load the first car of this trip, coal and rock known to be from the draw battery was flowing steadily from the conveyor for a short time and then only in small quantities intermittently. When the car was less than half loaded, the flow of material ceased and the heading workmen stopped the conveyor. Gidaro then sat down along the east side of the tunnel about 10 feet inby the loading point. About 5 minutes later, a terrific blast occurred within the heading. Smoke, flame, and debris emerged from the heading into the tunnel, and existing forces knocked Gidaro into the tunnel ditch. McAnnaney, who was on the locomotive coupled to the partially loaded car, and who heard the blast but was not otherwise affected, called to Gidaro who answered that he was alright. These two men went to the nearby foreman's shanty and McAnnaney called the footman at the No. 14 slope landing by telephone and reported the occurrence. McAnnaney then took Gidaro to the slope landing for transportation out of the mine. Upon reaching the surface, Gidaro reported to the company physician unassisted, received treatment for shock and bruises of the right shoulder and right side of the face near the eye, and then went to his home.

Henry Heiser, mine foreman, who had conducted routine duties in another section on the same level, met McAnnaney returning to the scene on the locomotive and was informed of the occurrence. Heiser proceeded to the scene, found the bodies of the victims, checked conditions in the affected area for gases, fumes, and other dangers, and then supervised the recovery of the bodies. Harold B. Shomper, State mine inspector, who was conducting a routine inspection at the mine arrived on the scene and assisted in the recovery work. The bodies of Deroba, Erdman, and Halcovich, found along the heading 3, 14, and 42 feet from the tunnel, respectively, were removed to the surface at approximately 1 p.m., where a physician pronounced the victims dead due to multiple fractures and wounds and internal injuries.

The heading was closed completely by dislodged timbers, coal, and other debris at the east rib of No. 1 chute, a distance of 47 feet from the tunnel. The manner in which the heading was closed, the starting box and the switchbox for the electrically driven conveyor blown from their mountings and broken, badly damaged heavy metallic conveyor pans, and other destruction in the affected place, as well as statements given by

Gidaro and McAnnaney that the smoke and fumes immediately following the blast smelled strongly of explosives odors, revealed definitely that a violent blast of explosives had occurred. Although the heading was closed at the No. 1 chute, approximately 1,350 cubic feet of intake air a minute from the tunnel was traveling through the fallen material to surface breaches by way of the upper mined-out area, and tests and observations made during the investigation on the day of the occurrence failed to disclose any evidence of a gas explosion.

Work to reopen the closed portion of the heading in an attempt to uncover evidence regarding the cause of the occurrence was started on Thursday morning, February 27, 1964. This work, accomplished under the supervision of colliery officials and in the presence of State and Federal inspectors, was completed on Thursday, March 12, 1964. In the meantime, information obtained by interrogation of officials and the second-shift workmen revealed that the explosives-storage boxes were positioned along the south side of the heading at a point almost directly across from No. 1 chute. According to Steve Royack, miner, the supply box contained four 50-pound boxes and seven extra cartridges of long-hole explosives, and four 25-pound boxes of Hercogel A at the end of the second shift on Tuesday, February 25. At that time, the two-compartment "starter" box contained about 18 pounds of Hercogel A and an undetermined quantity of detonators; a spool containing about 750 feet of Primacord was in another small wooden box outby the main supply box. At least 30 shots, mostly unconfined, were fired at the draw battery by a starter on the third shift on Tuesday, February 25.

Information during and immediately after reopening the closed portion of the heading revealed that the wooden storage boxes were demolished; however, the most violent blast occurred at a point 6 feet inby the original location of the storage boxes, the spool of Primacord was found in a hole along the right side of the heading near the farthest inby ring of long holes, and part of the long-hole tamping stick was also found in that locality. This evidence indicated that the workmen had started to make preparations for charging the long holes after Regevitz left the place at 10:15 a.m., and had removed the explosives from the storage box before the fourth trip of cars arrived for loading. Reportedly, Deroba always called out a warning before blasting but neither Gidaro nor McAnnaney heard such a warning given just prior to the occurrence. Nevertheless, the location of the three bodies showed that the men had retreated in position for blasting. Except for the Primacord, the only explosives supplies found in the heading during clean-up procedures were six half cartridges of Hercogel A, and one instantaneous and one delay detonator in the entrance to No. 2 chute, and one instantaneous detonator along the conveyor line outby No. 1 chute.

Tests conducted during the investigation by Michael Polinko, State electrical inspector, and by colliery electricians in the presence of State and Federal mine inspectors did not disclose the presence of stray electric current or other evidence that electricity may have been the source of detonating the explosives.

CAUSE OF ACCIDENT

This accident was caused by improper storage and handling of explosives. Owing to the lack of a witness and to destruction of the affected area, the exact detonation source was difficult to determine; however, evidence indicated that at least two hundred pounds of explosives and an undetermined quantity of detonators, removed from wooden storage boxes and placed along the heading within 40 feet of the draw battery, were detonated by an unconfined shot fired at the battery.

RECOMMENDATIONS

Compliance with the following recommendations may prevent an accident of a similar nature in the future:

1. Explosives-storage boxes should be kept safe distances from and not in a direct line with points of blasting.

2. During final stages of stump-pillar recovery in a gangway or heading, explosives-storage boxes should be removed to the tunnel or other safe location.

3. Explosives supplies should be kept in the wooden boxes provided for their safekeeping until immediately before use at working faces.

4. Work started to charge and fire long holes should be completed before any other work is done in the immediate area.

5. Firing lines should be as long as may be necessary to provide maximum safety to persons firing the shots.

6. Firing stations should be around at least one 90° turn from the point of blasting.

7. Officials should insist upon immediate compliance of safety instructions issued to workmen.

8. Workmen should carry out officials instructions promptly.

ACKNOWLEDGMENT

The writers gratefully acknowledge the courtesies extended and help given by officials and workmen of the company and by representatives of the State mining agency 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

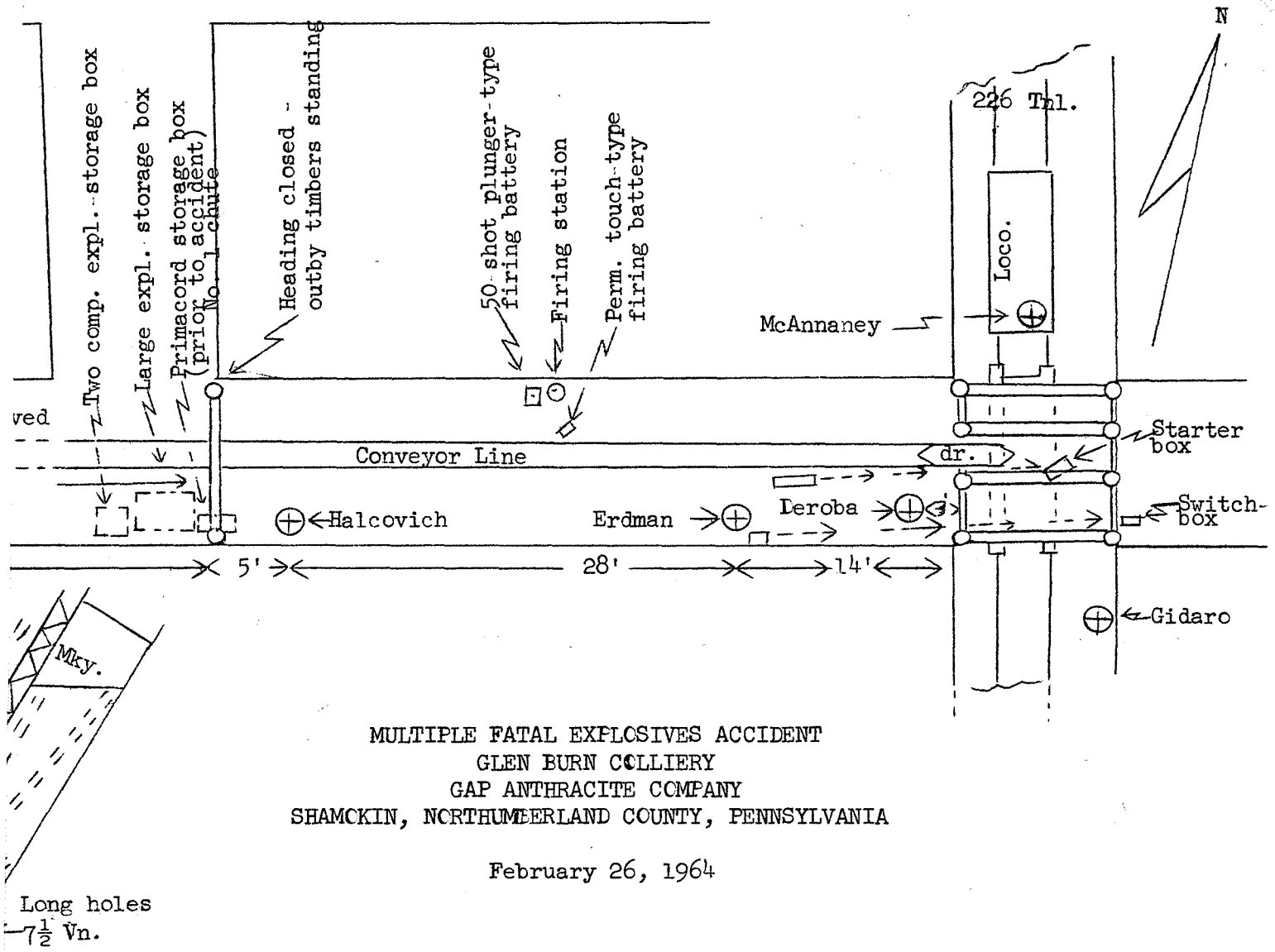
John A. Fulmer
Federal Coal-Mine Inspector

W. R.

APPENDIX A

Victims of Accident

Name	Age	Occupation	Years Experience		Marital Status	Dependents, including children under 18
			This occupation	Total mining experience		
Stephen Halcovich	53	Miner	17	26	Married	1 (Wife)
Lawrence D. Erdman	50	Miner	10	20	Married	2 (Wife and 1 child)
Joseph C. Deroba	46	Miner	9	19	Married	4 (Wife and 3 children)



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Scale 1 inch = 10 feet