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ACCIDENT ANALYSIS
BRANCH

Supplement Attached

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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
DIVISION OF COAL MINE INSPECTION

DEPARTMENT OF MINES
Accident Analysis Branch
NOV 2 1966

COAL FATAL

3 - Fatal 33-006
Fire

72201-0
33
007

3 fatal

REPORT ON MINE FIRE AND SEALING OPERATIONS
RED TAIL NO. 2 MINE
MORGAN COAL MINING CORP.
BETHESDA, BELMONT COUNTY, OHIO

Code
1701

Sept. 01

September 14, 1966

By

A. J. Fumich
Assistant to Subdistrict Manager

Richard E. Barr
Federal Coal Mine Inspector

Fred A. Williams
Federal Coal Mine Inspector
(Electrical)

Originating Office - Bureau of Mines
239 East Main Street, St. Clairsville, Ohio 43950
T. C. Higgins, Subdistrict Manager
St. Clairsville, Ohio Subdistrict, Health and Safety District A

widow # 1
widow # 2
widow # 3

- Keith H. Spicer, loading mach. ops
- Anthony Terretti, shuttle car ops.
- Billy Joe Adams, roof batter

30-ug.

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INTRODUCTION

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

A mine fire, which resulted in the death of three men, occurred in the Red Tail No. 2 Mine of the Morgan Coal Mining Corp., Bethesda, Ohio, at about 10:30 a.m., Wednesday, September 14, 1966. Reportedly, the fire was initiated by a short circuit in the trailing cable of the mining machine, when the cable was run upon by the left front wheel of the machine. It is believed that the resultant high-intensity arc ignited the rubber tire on the wheel which, in turn, probably caused a hydraulic hose or hoses to rupture. Presumably flammable oil from the hydraulic system added to the intensity of the fire, which subsequently ignited the coal roof and ribs. Efforts to extinguish the fire by direct methods were unsuccessful. The mine was eventually sealed at the surface openings.

There were nine men in the mine when the fire occurred, and all were working in the general area affected by the fire. Six of these men retreated to fresh air at the belt tailpiece, but the other three men were trapped by the fire when they did not respond immediately to the warning given and then later were unable to travel through the smoke and fumes to fresh air.

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

GENERAL INFORMATION

The Red Tail No. 2 mine is off County Route 98, about 2 miles north of Bethesda, Belmont County, Ohio, and is served by autotrucks. The operating officials of the company are:

Bennie E. Morgan	President and Superintendent	137 Newell Avenue St. Clairsville, Ohio
Gloria S. Morgan	Vice President	137 Newell Avenue St. Clairsville, Ohio
Harold Harris	Mine Foreman	Morristown, Ohio

Total employment was 30 men, all of whom worked underground on 3 shifts daily, 5 or 6 days a week. The average daily production was 600 tons of coal, loaded mechanically.

The mine is opened by 4 drifts in the Pittsburgh No. 8 coalbed, which averages 52 inches in thickness in the area being mined. The coal is high-volatile bituminous; therefore, the coal dust is explosive. The coalbed is relatively flat, except for local undulations. The immediate roof, consisted of 8 inches of roof coal, 3 feet of clayey shale, and 3 to 12 inches of "bastard" limestone, overlaid with massive limestone. Fire clay formed the bottom.

The preceding Federal inspection of this mine was completed July 27, 1966.

MINING METHODS, CONDITIONS, AND EQUIPMENT

Mining Methods: A room-and-pillar method of mining was being followed. Entries were driven 12 to 16 feet wide on 50-foot centers, and only one set of 5 entries was being driven. Rooms turned off these entries were 13 to 20 feet wide on 50-foot centers. Crosscuts were generally about 60 feet apart. Some rooms had been driven to a depth of 150 feet off the No. 5 east entry and were stopped. The main working section and area of the fire was in a panel of rooms turned to the left off the No. 1 east entry, the deepest of which had been advanced about 545 feet. These rooms were being driven toward the highwall, and ultimate depth was to be determined by roof conditions as the faces progressed under lower cover.

Minimum standards for systematic roof bolting and conventional timbering had been adopted. Roof supports in addition to the minimum requirements were installed where necessary.

Explosives: Permissible-type explosives and instantaneous electric detonators were used for blasting. Explosives were not stored on the surface at the mine. Explosives and electric detonators were stored underground in section boxes. Coal was undercut by a mining machine, and boreholes were drilled with a hand-held drill. Incombustible material was used for stemming, and the shots were fired immediately after charging. Permissible blasting units were used by the shot firers.

Ventilation and Gases: This mine is classed nongassy. Ventilation was induced continuously by a 4-foot axial-flow fan, which was installed properly in a fireproof structure on the surface and operated exhausting. At the time of the last Federal inspection, 26,200 cubic feet of air a minute was being circulated through the mine.

Permanent stoppings were constructed of incombustible material, and other stoppings and checks were constructed of wood or plastic material. The mine was ventilated by one continuous current of air. The quantity of air reaching the last open crosscut in the east entries at the completion of the last Federal inspection was 14,400 cubic feet a minute.

Preshift, onshift, and weekly examinations of the mine were made, and suitable records were kept. Oil or gas wells were not known to penetrate the coalbed on this property.

During the preceding Federal inspection, the emergency escapeways were in safe condition for travel.

Dust: The mine surfaces varied from wet to dry, including parallel and back entries. During the preceding Federal inspection, it was stated that a systematic program of cleaning loose coal and coal dust in by the tail-piece had been started, and this work was done by machine and by hand as the working places advanced. Dry areas in the Nos. 3, 4, and 5 east entries which had not been rock-dusted for distances up to 400 feet were rock-dusted during the inspection. The incombustible content of three of the four dust samples collected at that time was less than 65 per centum. However, additional and sufficient rock dust was applied to those areas during the inspection, and rock-dusting throughout the mine appeared to be adequate at the completion of the inspection.

Transportation: Coal was transported from the working faces by means of cable-reel shuttle cars to a belt conveyor located in the No. 3 east entry. The coal was then conveyed to a stockpile on the surface from where it was loaded onto trucks by a diesel-powered front-end loader and then hauled to the tippie of another mining company.

Electricity: Electric power was purchased at 13.2 kv. alternating current and was reduced to 440 and 220 volts for use on the surface and underground. Direct-current power was provided by a 300-kilowatt silicon-diode rectifier at a potential of 300 volts. The alternating-current power circuit for the rectifier was provided with a 400-ampere fuse in each phase. The direct-current power was conducted underground by two insulated 4/0 awg. cables about 900 feet in length.

Electric face equipment was of both permissible and nonpermissible types. Trailing cables were of fire-resistant type and were provided with short-circuit protection. Reportedly, the Sullivan 10RU cutting machine involved in the fire was equipped with a two-conductor, size 2/0 awg., Type W trailing cable. Short-circuit protection for the trailing cable, reportedly, was provided by a 300-ampere fuse.

The hydraulic system of the mining machine had a capacity of about 65 gallons. The hydraulic oil used in the mining machine was of the flammable type.

Illumination: Permissible electric cap lamps were used for portable illumination underground.

Mine Rescue: Firefighting equipment included supplies of rock dust in the section, along the belt line, and on the surface. Two chemical-type fire extinguishers were provided, one at the belt tailpiece and one in the office on the surface.

Trained mine-rescue men and equipment were not available at the mine; however, State-trained and equipped mine-rescue teams were maintained at nearby mines in the area. Teams from the following mines were at the fire: Powhatan Nos. 1 and 3 mines and Jensie mine, The North American Coal Corporation, Ohio Division, Powhatan Point, Ohio; Franklin No. 25 mine, Hanna Coal Company, Division of Consolidation Coal Company, Cadiz, Ohio, and Nelms No. 1 mine, The Youghiogheny and Ohio Coal Company, Cadiz, Ohio. All of the teams assisted in the various phases of exploration and fighting the fire.

Self-rescuers were not available at the mine.

STORY OF FIRE AND RECOVERY OPERATIONS

Participating Organizations: Officials and employees of the Morgan Coal Mining Corp., and representatives of the Ohio Division of Mines and the United States Bureau of Mines participated in firefighting and sealing operations.

The coal companies and organizations who rendered assistance or furnished supplies during the fire and sealing operations are as follows: Belmont Electric Co-Operative; Charles Peters Coal Company; Hanna Coal Company; R. and F. Coal Company; The North American Coal Corporation; The Youghiogheny and Ohio Coal Company; Oglebay Norton Company; Fairpoint Coal Company; Home Phone Company; Barnesville Red Cross Chapter, and St. Clairsville, Wolfhurst, Bethesda, West Wheeling and Morristown volunteer fire departments.

Activities of Bureau of Mines Personnel: On Wednesday, September 14, 1966, at 10:55 a.m., the Bureau of Mines office in St. Clairsville, Ohio, was notified of the mine fire by a company official. T. C. Higgins, Subdistrict Manager, W. Dan Walker, Jr., District Manager, Pittsburgh, Pennsylvania, and James Westfield, Assistant Director, Health and Safety, Washington, D. C., were then immediately notified. Other Bureau of Mines personnel were advised of the occurrence and requested that they proceed to the mine promptly. Coal Mine Inspectors Richard E. Barr, John T. Callahan, and Anthony J. Fumich, Assistant to Subdistrict Manager, arrived at the mine at 11:55 a.m., and went underground. Fred A. Williams, Coal Mine Inspector, (Electrical), arrived at 12:50 p.m., and T. C. Higgins, accompanied by John Barry, Coal Mine Inspector, arrived at 3:45 p.m. Coal Mine Inspectors Stanley R. Kretoski, and John S. Eakins reported for duty at 7:00 a.m., on September 15, 1966, and assisted with the sealing operations.

Withdrawal orders covering mine-fire and explosion dangers, were issued under Section 203(a)(1) of the Federal Coal Mine Safety Act on September 14, 1966, requiring all persons, except those referred to in Section 203(a)(2) of the Act, to be withdrawn and debarred from entering the mine.

Evidence of Activities and Story of Fire: The day-shift crew, consisting of 10 men, entered the mine at 8:00 a.m., on Wednesday, September 14, 1966. The men were transported a distance of about 1,000 feet to the working section in a man trip made up of a battery-powered tractor and an open trailer. Work on the section progressed in a normal manner until about 10:30 a.m., when the mining machine was inadvertently trammed upon its trailing cable causing a short-circuit in the cable under the wheel of the machine. The mining machine was being trammed from No. 7 room toward No. 6 room and was turning into a chute between these two rooms when the short-circuit occurred. Apparently, the resultant arc from the short-circuit in the cable ignited the rubber tire on the wheel, and this created dense smoke. Alex Hayes, the mining-machine operator, stated that he called to Walter Nace, his helper, who was walking back of the machine, and told him to go and remove the fused nip at the nipping station and then inform the other workmen in the section that the machine cable was on fire.

The helper stated that he went at once to the nipping station, which was located in a crosscut between Nos. 5 and 6 rooms, and removed the trailing cable nip of the mining machine from the source of power. He then proceeded toward the face of No. 6 room passing Charles Brill, shuttle car operator, who was sitting at the controls of his shuttle car. Brill was waiting for the other shuttle car to return from the loading machine which was located in a crosscut being driven from No. 5 to No. 6 room.

After informing the shuttle-car operator of a burning cable, Nace traveled through the next inby crosscut from No. 6 room to No. 5 room to warn the men working there. After traveling through the crosscut to No. 5 room, Nace was about 150 feet from the face and instead of walking this distance, he decided to shout his warning to the men working there. He stated that he could not see their cap lamps and assumed they were in the crosscut. He stated that he heard Billy Joe Adams, the roof bolter, in the working place talking to the loading-machine operator and the other shuttle car operator, and also that there was no machinery being operated at the time he gave the warning to them. Nace stated he heard Adams repeat his warning to the other men. Nace then retreated through smoke to fresh air at the junction of No. 6 room and No. 2 east entry to rejoin the others of the crew. After Alex Hayes instructed his helper to remove the nip and warn other workmen of the burning cable, he tried to pull the cable from beneath the wheel but was unable to do so. He said the smoke was so dense that he could not get back to the machine, so he went to warn the shotfirer, who was in No. 7 room. However, the shotfirer had charged and tamped the boreholes in the crosscut from No. 7 to No. 8 room and encountered smoke when he came out of the place to get his blasting cable. Not being able to travel outby in No. 7 room, he went inby toward the face through the next crosscut to No. 6 room where he met Hayes coming to warn him. The two men then proceeded through smoke to fresh air at the junction of No. 6 room with No. 2 east entry and joined the other members of the crew.

At this time, they became aware that the three men working in No. 5 room had not retreated to fresh air so Hayes and two other men made an attempt to reach them. They tried to enter No. 6 room but after advancing about 50 feet the smoke became so dense that they were forced to retreat. It was stated by these men that they heard a shuttle car running and thought the men were on their way out of No. 5 room; however, the shuttle car stopped and they did not hear it restart nor did they hear any other sounds. At this time, Charles Brill, shuttle car operator, ran to the surface to inform Harold Harris, mine foreman, of the fire and also to deenergize the underground power wires.

Harris was outside at the time to get a hand-held drill that was being repaired. He was preparing to enter the mine when Brill came out and informed him of the fire. Harris, Brill, and Charles Polinski, mechanic, after pulling the power-control switches, entered the mine on the battery-powered tractor and traveled as far as No. 8 room, but they were unable

to reach the fire because of dense smoke and intense heat. They retreated to fresh air and stopped at the entrance to No. 6 room where a short consultation was held with the section workmen gathered there. Learning that three men were unaccounted for, Harris instructed the men to gather brattice material while he and Polinski returned immediately to inform Bennie Morgan, Company president, who was repairing a belt control switch on the surface. Harris informed Morgan of the fire and advised him to call for assistance as it had made serious headway and appeared to be out of control.

Recovery Operations: Morgan called State and Federal mine-inspection agencies, informing them of the fire and also called the State Highway Patrol Post at St. Clairsville, Ohio, to help control traffic going to the mine. Morgan and Harris then gathered materials for firefighting and went back into the mine to fight the fire. They tried to short-circuit the air outby the fire and course it through No. 6 room to the main-return aircourse. Morgan then returned to the surface to call nearby fire departments for assistance.

Units from Morristown and Bethesda, Ohio, arrived at the mine in a very short time. The Bethesda firemen had fire hose extended into the mine as far as the belt tailpiece in No. 3 east entry and were spraying water into the smoke-filled area inby this point although flames could not be observed.

At this time, Federal and State representatives arrived at the mine. Barr, Callahan, and Fumich studied the map and after being briefed by Bennie Morgan they went underground. They traveled up No. 4 east (supply entry) to the belt tailpiece in No. 3 entry where men were erecting temporary stoppings. After examining the area and acquiring information from Harris as to what had been done, Barr directed the men to build plastic stoppings across Nos. 4 and 5 entries to short circuit the air from the fire area. The ventilation would then be diverted over the belt tailpiece up No. 3 entry and toward the mouth of No. 6 room. The check curtain leading to No. 6 room and the stopping between Nos. 3 and 4 entries had been removed by Harris shortly after the fire started. Barr, Harris, and two workmen were able to advance only to the stopping in the first crosscut inby the tailpiece in No. 3 entry by using a line curtain. The concrete-block stopping contained a two-foot by two-foot opening, covered by several laps of brattice cloth. The stopping was approximately 350 feet outby, the location where the fire originated. Barr pushed the canvas aside and encountered extreme heat and dense black smoke. Roof could be heard falling behind the stoppings, and the roof at the stopping containing the opening showed evidence of weakening from the intense heat.

The group retreated to the next stopping outby the belt tailpiece, and it was hot to the touch. Use of water to curtail the advance of the fire was deemed futile because of dense smoke, heat and falling roof made direct attack upon the fire impossible. However, water in spray form had been used inby the belt tailpiece to assist in keeping the smoke confined while temporary stoppings were being erected across Nos. 4 and 5 entries. The water was turned off for a short period of time at the nozzle and then, when it was decided to turn the water on again, it was discovered that there was no pressure. The water being used at the time was supplied by a local fire-department truck. Barr decided to come to the surface to check on the water supply, and he informed Harris that he could see no reason for him and the men to remain in the mine since there was nothing they could do. Harris then withdrew his men from the mine.

Upon reaching the surface, Barr met J. Lester Zimmerman, Chief, Ohio Division of Mines, who had just arrived on the scene with a mine-rescue truck. Zimmerman asked Barr and Harris if it would be possible for the trapped men to escape from that part of the mine. They stated that it would be practically impossible, because their escape route was being traversed by dense smoke, heat, and falls of roof. Zimmerman then asked that if the men were alive, would they have a better chance for survival if the fan were reversed. Harris stated that ventilationwise it should help them. It was then decided to have a meeting of all interested persons to determine if the fan should be reversed, and all persons attending agreed that this should be done.

Zimmerman requested Fred A. Williams, Federal Coal Mine Inspector (Electrical), and Henry C. Roberts, Deputy Mine Inspector, Ohio Division of Mines, to proceed with the fan reversal, which was accomplished by 1:10 p.m. The main concern was the rerouting of combustible gases back over the fire area, and precautions were taken to keep all persons from the vicinity of the openings.

The first rescue teams arrived at the mine about 3:00 p.m. and went into the old supply entry at 3:55 p.m., with a second team standing by on the surface. As each team progressed underground, they were able to penetrate to the No. 2 east entry, a distance of 530 feet. Falls prevented them from going up the No. 2 east entry. They then retreated and went up No. 1 east entry past two crosscuts where they encountered additional falls. The captain of the mine-rescue team climbed one of the falls between the two entries and saw an active fire. It was then decided to call off the mine-rescue operations because of inaccessibility to the face area and extreme danger to the rescue men. The mine-rescue teams were unable to advance within approximately 1,000 feet of the area where the men were thought to be. The last rescue team arrived on the surface at approximately 9:00 p.m.

INVESTIGATION OF CAUSE OF FIRE

Investigation Committee: A complete investigation will be made after the fire is extinguished and the mine reopened, following which a final report will be issued. A preliminary hearing was held by J. Lester Zimmerman, Chief, Ohio Division of Mines on September 19, 1966, and the following persons were in attendance:

Morgan Coal Mining Corp.

Bennie E. Morgan	President
Harold M. Harris	Mine Foreman
Charles Polinski	Mechanic
Alex Mayes	Mining-machine operator
Walter Nace	Mining-machine operator's helper
George Gallagher	Driller
Elmer Workman	Driller
Isaac Vance	Shot Firer
Charles Brill	Shuttle-car operator

Ohio Division of Mines

J. Lester Zimmerman	Chief
Frederick A. Felix	Deputy Mine Inspector
Charles M. Rowan	Deputy Mine Inspector
Henry C. Roberts	Deputy Mine Inspector
William Bradley	Deputy Mine Inspector
Fred Gaskins	Superintendent of Mine Rescue

United States Bureau of Mines

James Westfield	Assistant Director-Health and Safety
W. Dan Walker, Jr.	District Manager, Health and Safety, District A
T. C. Higgins	Subdistrict Manager, Health and Safety, District A
A. J. Fumich	Assistant to Subdistrict Manager
Richard E. Barr	Federal Coal Mine Inspector
John T. Callahan	Federal Coal Mine Inspector
Fred A. Williams	Federal Coal Mine Inspector (Electrical)

Probable Point of Origin: The fire reportedly started when the mining machine was being trammed into a chute from No. 7 room to No. 6 room, approximately 300 feet from the face area. ✓

Summary of Evidence: Evidence pertaining to this fire is summarized as follows:

1. The mining machine ran onto its trailing cable, causing a short circuit.
2. The resultant fire was probably intensified by rupturing hydraulic hoses containing flammable oil and by the burning of the rubber tires on the machine.
3. The three men in the room face areas did not heed the warning to retreat immediately.

Cause of Fire: Based on available information, it is believed that this fire originated when a short circuit occurred in the trailing cable when it was crushed beneath the rubber tire of a mining machine. It is also believed that the fire was intensified when the flammable hydraulic fluid became involved. ✓

RECOMMENDATIONS

1. Trailing cables should be handled in such manner that they will be protected from mechanical injury.
2. Fire-resistant hydraulic fluid should be used in hydraulic systems of underground equipment.
3. In case of a trailing cable fire, regardless of how slight, persons that may be affected should be withdrawn immediately.
4. A self-rescuer should be provided for each man underground.
5. Check curtains that are accidentally torn down should be replaced.

ACKNOWLEDGMENT

The writers gratefully acknowledge the courtesies, cooperation, and assistance extended by officials and employees of the operating company, and representatives of the Ohio Division of Mines.

Respectfully submitted,

A. J. Fumich

A. J. Fumich
Assistant to Subdistrict Manager

Richard E. Barr

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Federal Coal Mine Inspector

Fred A. Williams

Fred A. Williams
Federal Coal Mine Inspector
(Electrical)

APPROVED:

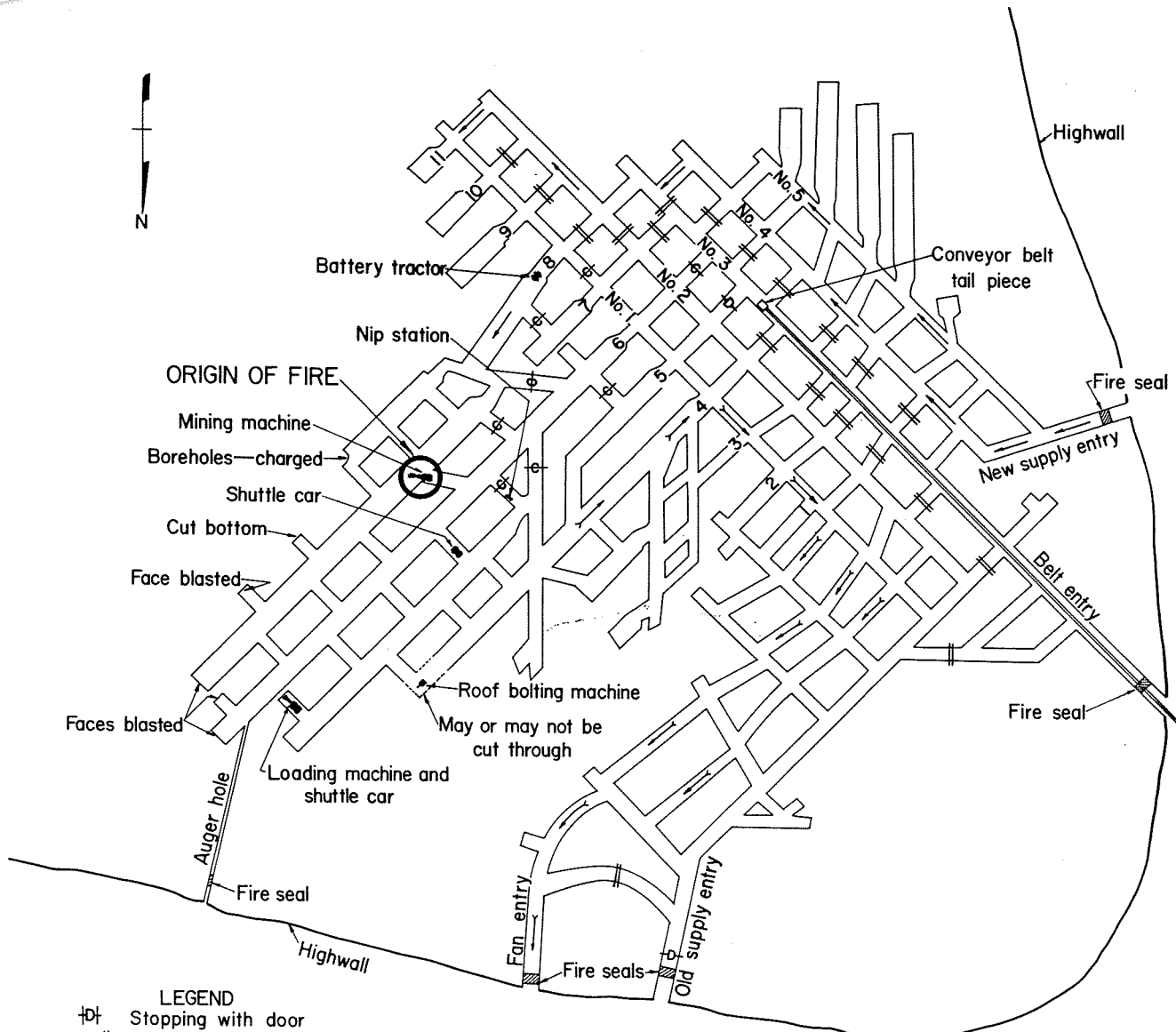
T. C. Higgins

T. C. Higgins
Subdistrict Manager
Health and Safety District A

APPENDIX A

Victims of Mine Fire
 Red Tail No. 2 Mine
 Morgan Coal Mining Corp.
 Bethesda, Belmont County, Ohio
 September 14, 1966

Name	Age	Marital Status	Number of Dependents	Occupation	Experience this Occupation	Experience in Mines
Anthony Terretti	49	Married	3	Shuttle-car operator	3 months	30 years
Keith H. Spicer	22	Married	2	Loading-Machine operator	3 weeks	2 years
Billy Joe Adams	26	Married	4	Roof Bolter	3 months	3 months



LEGEND

- ⊕ Stopping with door
- ⌘ Permanent stoppings
- ⊕ Check curtain
- Intake air
- ← Return air

0 100 200
Scale, feet

MAP OF MINE FIRE
RED TAIL NO. 2 MINE
MORGAN COAL MINING CORPORATION
BETHESDA, BELMONT COUNTY, OHIO
SEPTEMBER 14, 1966