

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON

CONFIDENTIAL MEMORANDUM
(Not for Publication)

C. M. 1831

September 15, 1943.

TO MEMBERS OF THE HEALTH AND SAFETY SERVICE:

SUBJECT: Gas explosion in upcast fan shaft and
air duct at the No. 15 mine of the
Pursglove Coal Mining Company,
Pursglove, West Virginia.

A gas explosion occurred in the upcast airshaft and steel air duct at the Wade's Run fan of the No. 15 mine of the Pursglove Coal Mining Company, at Pursglove, West Virginia, about 2:00 p.m. on June 9, 1943. One man was fatally injured by the force of the explosion while three other men, working around the outside of the airshaft and fan housing, were not injured.

The force of the explosion lifted the air duct and concrete foundation off the ground, and a unit of four sections on the top of the air duct was blown a distance of 120 feet. This top section of the air duct was designed to act as explosion doors, and was attached to the side walls of the fan housing with copper rivets and bolted together at the top joints. The air duct was destroyed and some parts of the fan building and fan installations were damaged.

On January 8, 1943, a fire occurred in this mine causing the death of 13 men. The mine was sealed and partially flooded to extinguish the fire. On April 12, 1943, the seals were opened and two fans (one main fan and an auxiliary fan) were used to ventilate the sections of the mine not under water. Some sections of the mine are being dewatered by pumps being installed in the mine and one pump on the surface.

Prior to the fire, the mine was opened by four airshafts, three drifts, and two slopes. It was ventilated by two exhausting fans installed on the surface. An auxiliary fan is maintained at one of the shaft openings in addition to the main fans.

The Wade's Run fan, where the explosion occurred, was not put into operation when the seals were opened as water had risen 17 feet in the shaft thus sealing the bottom. This shaft is 12 feet in diameter and 317 feet deep, and is concrete lined from the collar to the shaft bottom. The fan is installed 10 feet from the shaft opening.

The Company decided to dewater the shaft by installing two deep well pumps at the top of the shaft. The pumps were to be installed on a platform built over top of the air duct which covered the shaft opening and the pipe columns were to be lowered through holes cut in the top of the air duct.

When construction was started on June 1, 1943, the fan was put into operation, to ventilate the air duct. The air-lock doors were opened before the fan was started. The air-lock doors are on the same side of the shaft collar as the fan, with the result that the air passed through the fan without passing over the top of the shaft or ventilating the inside of the air duct; however, the fan created a partial vacuum which caused a turbulence of the air around the top of the shaft.

A section of the air duct casing over the shaft was removed so two holes could be cut for the pipe columns. This was replaced, but the joints were not bolted together; a wide board had been placed over the top of the unbolted joint to prevent any sparks or hot metal from entering the air duct while welding. Metal covers, held in place by the suction of the fan, were placed over the holes cut in the casing for the pipe columns. Mud was placed around the plates to prevent any sparks from entering the air duct during the cutting and welding operations on the platform above the air duct.

An electric-arc welding unit and an acetylene cutting torch were used in constructing the steel scaffold and attaching it to the fan housing. The return circuit of the electric welding machine, which was kept in the fan motor house, was attached to the metal casing of the fan evase chimney.

The explosion occurred while spot-welding cross members of the steel platform. The inside edge of the platform was just above the top joint of the section of the casing which had been left unbolted and which was covered over with a board. The welder was the only person on the platform at the time of the explosion.

The definite source of ignition which caused the explosion was not determined. A spark could have been drawn in or fallen through the unbolted joint while welding or an electric arc could have been formed in the return circuit of the electric welding unit.

The investigation revealed that the company engineer had just completed making a test for gas with a methane-indicating detector at the exhaust end of the fan when the explosion occurred. He stated that 0.20 percent of methane was present; however, that reading meant little or nothing as only a small amount of methane was being pulled away from the shaft. Frequent tests for gas were made daily at the fan chimney, but no tests were made in the air duct or near the points where welding and cutting was being done.

A test for gas made after the explosion with a methane detector revealed 5 percent of gas 2 feet below the collar of the shaft.

Among the recommendations made were:

1. Electric-arc welding and acetylene torches should not be used where sparking or arc from their use may be a source of ignition.
2. The accumulation of gas in the shaft should be removed and ventilation established before any work is done around the top of a shaft of a mine known to give off methane in considerable quantities. The air in the shaft should not contain more than 0.5 percent of methane.

Lessons to be learned:

1. To use electric welding and a acetylene cutting torch in the presence of gas or where gas might occur invites disaster.

2. More consideration should have been given to the removal of gas from the shaft before work was started on the platform.

3. The fan was not removing gas from the shaft, and the tests for gas at the fan chimney were essentially worthless.

4. A hole cut in the air duct and tubing running from the outside through the duct down the shaft would have helped greatly to remove the gas from the shaft as the fan was exhausting.

This information is from a memorandum report by Coal Mine Inspectors A. K. Bloom and W. D. Walker, Jr. It is confidential and must not be published.

R. G. WARNCKE

Approved:

D. HARRINGTON

REPORT OF A FIRE AT NO. 15 MINE
PURSGLOVE, WEST VIRGINIA
JANUARY 8, 1943 - 13 KILLED

(From Bureau of Mines report by F.E. Griffith,
W.D. Walker, Jr., A.K. Bloom, and E.E. Quenon)

A mine fire occurred in the mine, in which 13 men died. The fire started at approximately 2:55 a.m., January 8, 1943, when a main-line locomotive hauling a train of 23 loaded cars toward the entrance of the mine stopped between No. 2 and 3 north headings on 1 west haulage road. The brakeman, who was riding the rear of the trip, walked outby along the mine cars and saw electric arcing and flashing and a fire burning in the vicinity of the locomotive.

There were 78 men underground at the time the fire started; 65, some of whom were affected by carbon monoxide, escaped from the mine; twelve men died from smoke and carbon monoxide gas; and one man died, probably from burns, smoke, and carbon monoxide gas.

So far as is known, the men did not attempt to protect themselves with barricades.

Unsuccessful attempts were made to fight the fire direct with rock dust and water, then it was decided to seal the fire area underground. Some work had been done on preparations for sealing the fire when it was discovered that the fire had traveled about 3,000 feet from its origin. About midnight January 11, a decision was made to seal the fire by sealing all the surface openings. The last seal was completed at 10:15 a.m. on January 14.

The mine is opened by four shafts, three drifts, and two slopes. Seven of these openings were used for intake air and two shaft openings were used as return airways. One slope opening has a coal conveying belt and the other slope was used as a manway and for repair material. Two drift openings were used for the haulage of refuse, supplies, and man-trips; the third drift opening was abandoned.

The mine ventilation was accomplished by two fans operated exhausting; one of the fans is an electrically driven 8-foot multiblade propeller type that was stated to be circulating about 137,000 cubic feet of air per minute. The second fan is a centrifugal type and was stated to be circulating 100,000 cubic feet of air per minute.

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A mine locomotive, en route to the slope bottom with a train of 23 loaded coal cars, stopped on 1 west haulage entry near the intersection of 3 north. The brakeman, who was riding on the rear of the trip, walked outby along the mine cars and saw electric arcing and flashing and a fire burning in the vicinity of the locomotive. Being unable to proceed farther because of the lack of clearness between the cars and rib, he retreated inby over 3 north entry to a telephone at 8 west intersection and called the dispatcher at the slope bottom. He informed the dispatcher that the locomotive was on fire, and instructed him to pull the trolley-wire switch at the junction of 1 west and 2 north. The brakeman then started back toward the locomotive and cars and encountered dense smoke at about the intersection of 3 west. He then retreated inby over 3 north haulage road and reported the fire to the night foreman, who was in the 16 west working section.

The foreman, accompanied by three men, obtained a fire extinguisher and proceeded, on a trolley locomotive, toward the fire. A short distance inby 12 west the locomotive ran through an insulated trolley-wire block that separated the 250 volts and 550 volts direct current. The 550-volt circuit had been opened at 2:55 a.m. by an automatic circuit breaker on the surface. The four men proceeded on foot and when they encountered dense smoke the foreman sent one man back with instructions to get help and notify the men in the three working sections and to proceed through the 17 right entry to fresh air and escape through the No. 1 mine to the surface.

All the employees in 16 west and 17 right sections were notified and escaped. The employees in 15 west section were not notified because the man who had been instructed to notify these men stated that because of previous exposure to the smoke he felt that he was not physically fit to make this long trip. Further, that he had written a note with chalk on a door across the haulage road located in 15 west, a short distance inby the 3 north haulage road, to the effect that the employees in this section should escape to the surface through 17 right and the No. 1 mine. (The company designation of No. 15 mine is a combination of two mines formerly designated as No. 1 and 5 mines).

The foreman accompanied by the other two men proceeded by foot to the 8 right intersection on 3 north. They could not advance farther on the 3 north haulage road because of dense smoke and proceeded to the fire area through 8 right and 2 north entries to the 1 west haulage way. At the junction of 2 north and 1 west, they were joined by three other workmen. After obtaining fire extinguishers and charged Cardox blasting devices, they proceeded toward the fire in 1 west using self-rescuers. The smoke became so dense that travel was difficult and they returned to the 2 north haulage road.

The foreman proceeded alone from the 1 west intersection to find out whether or not the men in the working sections had escaped. This trip was made partly by locomotive through the No. 1 mine and on foot to the 17 right section. On arrival at 17 right, about 5 a.m., he was informed that the men in the 15 west section had not been notified. Accompanied by two employees, the foreman started toward the 15 west section on a locomotive to find the missing men. The locomotive was derailed outby 3 north entries on 17 right, and the remainder of the journey was made on foot. The foreman instructed the two men to go into the 15 west section and locate the men, stating that he would go to 14 west off 3 north and open doors in that entry, thus short-circuit the ventilation.

The 15 west section was explored but the workmen had already left. The two men who had been sent into 15 west to notify the employees on that section returned to 3 north entry on a locomotive that was in the 15 west section. Arriving at the intersection, they encountered dense smoke and proceeded by foot several hundred feet inby on the 3 north entry to where they found the foreman in a state of collapse. The two men assisted the foreman until he could not longer help himself. The foreman instructed the men to abandon him, go to fresh air, and secure help. Later, three men from 17 right attempted to rescue the foreman but were unable to do so because of smoke. The body of the foreman was rescued later and taken to fresh air, where unsuccessful resuscitation was administered for 4 1/2 hours.

The last of the employees who escaped from the affected area of the mine arrived on the surface about 7 a.m., January 8.

The general mine foreman accompanied by four other employees descended the intake airshaft at about 6 a.m. This party proceeded to 1 west and 2 north junction through a section of the mine on the outby side of the fire. The party met the state mine inspector and others at the junction of 1 west and 2 north. They were informed that the men in 15 west section were missing.

A rescue party was organized, consisting of State mine inspectors, company officials, two rescue teams, and several other workmen, to explore the affected area.

The rescue party entered the inby end of the 3 north working section through the NO. 1 side of the mine, and conducted fresh air to 3 north entries. A Bureau of Mines representative arrived in the 3 north section and met the rescue party, at 15 west, who were on their way to the surface. The State mine inspector reported that all the working sections had been explored to the 14 west entry, and that none of the missing men had been located.

A second rescue party arrived at 14 west about 5 p.m. and rescue operations were resumed. The ventilation was established to 13 west entries, on 3 north.

While exploring in the vicinity of 14 west, three bodies were located on the No. 4 parallel return air course at the third breakthrough outby 14 west on 3 north. The three victims were within 100 feet of fresh air, and it was evident that attempts had been made by these men to reach an overcast nearby which was part of the return from a section of the No. 1 side of the mine. The three bodies were brought to the surface about 3 p.m., Saturday, January 9.

It was later decided to explore the 3 north entries through 8 right. The rescue party left 12 west on 3 north shortly after midnight and proceeded to the intersection of 8 right and 3 north by 2 north. Five additional bodies were located at the junction of the 8 right side-track on the 3 north haulage entry. These bodies were recovered and brought to the surface along with the two bodies that had been located by the previous rescue party. All persons were out of the mine at 6 a.m., January 10, except the body of the motorman in 1 west entry.

While recovery operations were being conducted on 3 north entries, attempts were being made by company officials and laborers to reach the fire area in 1 west and recover the body of the missing motorman.

An inspection was made of the outby end of the fire and it was observed that the roof coal had fallen on the haulage locomotive and had completely covered it, with the exception of the outby bumper. A recent cave of roof coal covered the locomotive to within 14 inches of the roof on the inby end, and all of the material beneath this layer was a mass of red coals.

Two rescue teams arrived at 1 west about 1:20 a.m. Further attempts to fight the fire directly with hand methods of applying rock dust were futile; the heat was so intense that the main roof was caving.

At about 5:30 a.m., January 9, after applying water to the fire for a short time, the men were driven out of the section by a stream and carbon monoxide that had worked its way back through the parallel entries along the left side of 1 west haulage road. Several persons who were near the fire area were in a state of collapse before they could reach fresh air. Carbon monoxide was detected about 300 feet outby the fire.

A later decision by company officials was made to seal the fire area inside the mine. Preparation for the sealing of the area were under way at the time an exploration trip was made through the Bustun Run intake airshaft to find suitable locations for seals and ascertain the extent of the fire on the 3 north entries. It was found that the fire had traveled about 1,500 feet from its origin, which made it decidedly dangerous to seal the fire underground. All the men were withdrawn from the mine at 10 p.m., January 11. The decision to seal the mine at the surface was made about midnight, January 11.

After the mine had been sealed for 7 days and the oxygen had not been consistently reduced in value, the management decided to flood the mine. Water was let into the mine by gravity flow from the surface, through four 8-inch drillhole casings. It had been decided that these flooding operations should continue until the water level in the Bustun Run airshaft reached a height of 16 feet, at which time dewatering operations will begin.

From statements made by employees and other evidence, it appears obvious that much delayed action, confusion, and disorganization followed the outbreak of fire. This is borne out by statements made by the brakeman riding the rear of the trip of cars to the effect that because of inadequate clearance around or over the trip of cars, he was unable to reach the fire in its incipient stage. The general mine foreman corroborated the statement that the night foreman did not take immediate steps to notify and endeavor to get the men in the affected area to a place of safety. Further, that from the location and position of the bodies of the men from 15 west section, it is evident that they were badly disorganized. (Had these men turned north on 3 north entry (inby) to 17 right, they could have traveled to the surface in fresh air by the same route taken by the others who escaped.)

The seals were broken and the mine was officially opened April 12, 1943. Exploration trips were made into the mine by numerous Federal, State, and company officials on April 15, 16, 17, 19, and 20, for the purpose of determining the condition of the mine and to ascertain that the fire area had been effectively sealed by the water. Poor ventilation and high water prevented exploration crews from examining the immediate fire area; however, the information gathered at this time was favorable as there were no indications of an active fire.

The slow progress made in the unwatering of the mine resulted in several month's delay in the search for the 13th victim, the missing motorman, and placing the mine back in operation. Some of the delays encountered in unwatering the mine may be charged to the difficulty experienced by the company in obtaining materials.

At about 1 p.m., on May 20, 1944, the body of the motorman was found by the clean-up crew approximately 6 feet outby the front of the locomotive on the clearance side in a ditch. The crew notified company official that they had found the body before any attempts were made to remove it from its location. Company officials notified the State mine inspector, and the body was brought to the surface about 5 p.m. that evening.

After the locomotive was brought to the surface, the controller was found to be in the off position and the reversing lever was in the direction of the outgoing trip. The melting of parts of the controller and holes burned through the controller shield indicated that an electrical failure occurred inside the controller case.

To state definitely the exact way in which the motorman met his death would be conjecture; however, in the opinion of most of those investigating the cause of the fire, an electrical failure occurred in the controller of the locomotive and the motorman was mortally wounded when he attempted to leave the cab of the locomotive. His body remained in the cab of the locomotive until it came to a stop, and then the body fell out of the cab as the cars and locomotive drifted backward down the grade.