

REPORT ON AN EXPLOSION OF GAS
IN THE
INMAN SHAFT, BUTTONWOOD COLLIERY
GLEN ALDEN COAL COMPANY

Inman Shaft.

On March 29, 1951

MEMBERS OF COMMISSION

John D. Edwards
Mine Inspector, 13th District

Andrew Wilson
Mine Inspector, 7th District

David W. Cosslett
Mine Inspector, 9th District

April 25, 1951

Honorable Richard Maize
Secretary of Mines
Harrisburg, Pennsylvania

Dear Mr. Maize:

On March 29, 1951, at 10:30 A.M., an explosion of gas occurred at the Inman Shaft, Buttonwood Colliery, Glen Alden Coal Company, Hanover Township, Luzerne County, Pennsylvania, resulting in the death of five workmen and injuries to four others. The explosion occurred in #33 Tunnel East, Abbott seam, which averages 6 feet 4 inches in height. First mining is in progress and the chambers are driven 2 1/2 feet wide, on 55 foot centers. The average pitch of the seam is 45 degrees and coal from the face area flows to the car on the gangway by gravity. The workings at the location of the accident underlie the surface at a depth of 657 feet. Seventeen workmen were in this section at the time of the accident.

The active working places consisted of the gangway, airway and eight chambers, designated as chambers number 7 to 14, inclusive. The gangway, airway and chambers number 8 and 10 were not working on the day of the explosion.

The section is ventilated by two fans, one electric and one steam driven, located on the surface. The total quantity of air entering the section on March 30 was 14,400 c. f. m. This current travels directly to the face of the gangway, thence through the airway and chambers to the return. Crosscuts between the intake and return are closed with concrete walls. Small openings in the walls to permit the passing of workmen and coal are closed with canvas. Board stoppings are used to close the crosscuts between chambers. The pressure recording charts indicated the fans were in continuous operation on the day of the accident.

Permissible electric cap lamps are used by all the workmen and all miners are furnished with permissible flame safety lamps. Compressed air-driven jackhammers are used for blasting.

An electric locomotive, equipped with trolley and reel cable is used for transportation. Operation of this locomotive is

confined to the gangway, and in intake air.

Property damage was slight, and consisted of the destruction of several board stoppings and dislodgment of brattices and props in several of the chambers. Rescue and recovery operations were started at once by workmen and officials in the section. Victims and survivors were removed to the surface by 12 noon.

Our investigation consisted of an examination of the affected section and the equipment used therein, examination of legal records, testing of the flame safety lamps used in this area, and after the restoration of the ventilation, a thorough search for the cause of the accumulation and the source of the ignition. A test was made in chamber 11, where, we are of the opinion, the gas was ignited, to determine the cause of its accumulation.

The ventilation was short circuited to permit gas to accumulate in the face. It was determined that it required two hours and 15 minutes to completely fill the chamber area from the face to the upper rib of the crosscut, a distance of 18 lineal feet. It is possible that some gas had accumulated in the face of chamber 10, as the line brattice in this chamber had not been extended beyond the lower rib of the face crosscut. The accumulation, when ignited, expanded to the extent that the flame reached #9 chamber, a distance of 110 feet.

It was determined from the testimony that the miners and laborers, upon arrival at the foot of their places at the start of the shift, drew two cars each from the chutes before they proceeded to the faces of their chambers. Approximately one hour elapsed while this work was being done.

On the morning of the accident, the fire boss, Anthony Soldon, was assigned by the section foreman, to measure yardage, props, etc., for the semi-monthly payment for these items. To complete this work, he took with him a mason. It appears that they started at the gangway face and worked out to chamber 11, where they were measuring the length of the crosscut to chamber 10, when the gas was ignited. The fire boss's notebook was found in this crosscut, and according to entries made in this book, he had credited the miner in chamber 11 with the erection of two check brattices for this pay period.

Of the eight working chambers located in this area, included in the numbers 7 to 14, chamber 8 had been stopped temporarily and chamber 10 was worked on the afternoon shift only. On the day previous to the accident, the miner employed in chamber 11 had tapped the crosscut through to chamber 10. When the miner in chamber 10 arrived at his place on the afternoon shift, the day prior to the accident, he worked in the crosscut, enlarging the opening. He and his laborer then closed the next crosscut below with brattice boards. Because of the closing of this crosscut, the logical thing for the miner in chamber 11 to do on the following day would be to erect a check brattice partly across this chamber at the lower rib of the new crosscut, thence from this check brattice extend the line brattice toward the face, which was 18 feet beyond the upper rib of the face crosscut. We are of the opinion that to do this some of the original brattice was removed, permitting the air to travel diagonally across chamber 11 to the crosscut, bypassing the face area in chamber 11 entirely. We believe that gas was present in the face of chamber 11 when the fire boss arrived, and that it continued to accumulate while the measurements were being completed.

It is our opinion that the work of erecting the two brattices

for which the miner had been given credit was only partly completed, and that the fire boss and the mason, leaving the miner to complete this work and remove the gas, were preparing to leave chamber 11 by way of the crosscut to chamber 10 when the explosion occurred.

The miner in chamber 11 made the statement several times on his way out of the mine after the explosion that, "the safety lamp had exploded." He also repeated this statement in the hospital before his death. Following the accident his safety lamp was found on the floor of the chamber near the lower rib of the face crosscut. At the upper rib of the crosscut is a prop, with two nails three inches from the roof, where the lamp was evidently hung. Numerous tests were made with the lamp in a testing cabinet, under the most severe conditions, ranging from the lowest to the highest explosive limits, using propane gas, and under no conditions were we able to produce an ignition within the cabinet. Exhaustive tests were also made with this lamp at the Bureau of Mines laboratory in Pittsburgh, and we were unable to cause an explosion.

The flame area resulting from the ignition extended downward in chamber 11 and across the faces of chambers 10 and 9. The miner and laborer from chamber 11, the fire boss and the mason in the crosscut between chambers 11 and 10, and the miner and the laborer in chamber 9 were badly burned, and with the exception of the laborer in chamber 9, have died as a result. The force of the explosion, which we believe not to have been severe, caused slight injuries to the miner and the laborer in chamber 7 and to the bratticeman, who was on the gangway.

After the ventilation was re-established, a methane reading of .3% was obtained in the return air from this section. A feeder in the blind crosscut on the left side of chamber 11, near the face, was liberating methane freely, as was the face of the chamber.

The cause of the ignition could not be positively determined. There was no indication or evidence that smoking had taken place in this section. No blasting of coal or rock in the area had been done for a period of three hours prior to the ignition. Ignition from electrical sources seems remote. No electrical equipment, tracks or power lines were used in the chambers. Trolley wire and electrical locomotives are confined to the gangway on intake air. The track was well laid and bonded.

On our preliminary examination of this area on the day of the accident, and the complete examination on the following day, the fire boss's dates for the 29th of March were observed from the gangway out to and including chamber 11. No dates were found in chambers 10, 9, 8, or 7. On subsequent examinations on April 3 and 4, four days later, at the suggestion of the Secretary of Mines, dates were found for the 29th of March in chambers 7 and 8. However, the initials in these instances were not such as to prove conclusively to be those of the fire boss. On the report book for this date entry had been made and signed by the fire boss, noting examinations of this area prior to the entry of the workmen. Some of the workmen employed in the working chambers inside chamber 11 stated that the official had a flame safety lamp with him and tested for gas in their places when he visited them. However, the flame safety lamp furnished the fire boss was found, after the explosion, hanging on a prop underneath his jacket, at a point near the outside end of #33 tunnel, a distance of 900 feet from chamber 11.

SUMMARY OF FINDINGS

1. Permissible flame safety lamps and electric cap lamps are used in the mine.
2. Compressed air-driven jackhammers are used for drilling purposes.
3. Permissible powder is used for blasting coal.
4. An open-type electric trolley and reel cable locomotive was used on the gangway in intake air, and was not near the affected area at the time of the explosion.
5. The flame safety lamp furnished the fire boss was not in his possession when the explosion occurred. It was found at a location 900 feet outside of chamber 11.
6. The flame safety lamp used by the miner in chamber 11 was subjected to exhaustive tests in gaseous mixtures, without a failure.

CONCLUSIONS

1. The source of the methane was a feeder in the blind crosscut on the left of chamber 11, and others in the face of this chamber.
2. The cause of the accumulation was the failure to conduct the ventilating current to the face of chamber 11 by means of brattice.
3. The source of the ignition was undetermined. No indications of smoking were found. No blasts were fired. Electricity is not used in the chambers. The flame safety lamp was subjected to numerous and exhaustive tests, without failure.

RECOMMENDATIONS

1. That officials carry their flame safety lamps at all times while in the mine.
2. That when accumulations of gas are found, all workmen except those necessary to remove the danger be immediately withdrawn from the section.
3. That brattice be maintained and ventilation so conducted at all times in such manner as to prevent the accumulation of a dangerous body of gas.
4. That the faces of chambers or breasts, especially those on heavy pitch, be not advanced beyond the upper rib of the face crosscut until the crosscut is completed.
5. That officials whose duty it is to examine places in a mine prior to the entrance of the workmen, make a

careful and thorough examination of all such places and mark plainly the date at the face of each place examined.

6. That officials whose duty it is to examine places while the men are at work, complete their examination and supervise the removal of all dangers before performing any other work.

While conducting our investigation and during the interrogation of the local colliery officials and workmen, which required several days, three representatives of the United States Bureau of Mines were present.

Yours very truly,

(Signed) John D. Edwards
Mine Inspector, 13th District

(Signed) Andrew Wilson
Mine Inspector, 7th District

(Signed) David W. Cosslett
Mine Inspector, 9th District