



# Reports

**Mine #1 Dilltown  
03-20-1922**

DEPARTMENT OF THE INTERIOR

BUREAU OF MINES

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REPORT

OF

EXPLOSION

AT

DILLTOWN SMOKELESS COAL COMPANY

MINE NO. 1,

DILLTOWN, PENNA.

March 20, 1922.

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Investigation and Report by

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LESS COAL COMPANY, MINE NO. 1, DILLTOWN, PA.,

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INTRODUCTION.

At about 7:30 A. M. on Monday, March 20, 1922, a local explosion of gas occurred in the Dilltown Smokeless Coal Company Mine No. 1, resulting in the death of five men and the injury of three others.

The explosion was confined to a small section and only the men in that section of the mine were affected. There were about 80 men in the mine when the explosion occurred.

GENERAL INFORMATION.

Location:

The Dilltown Smokeless Mine No. 1 is located at Dilltown, Indiana County, Pennsylvania, on the Cresson Division of the Pennsylvania Railroad and the Buffalo, Rochester & Pittsburgh Railroad.

Ownership:

The mine is operated by the Dilltown Smokeless Coal Company.  
The names of the officials are as follows:

Dr. T. R. Williams - President  
S. S. Henderson - Vice Pres. and Treasurer.  
M. M. Lucas - Secretary  
E. E. Hewitt - Manager  
Charles Harrison - Superintendent

Output and Men Employed:

When operating in full the daily output of the mine averages 700 tons. The maximum day's output for the mine is 1,000 tons.

One hundred and thirty men are employed underground and twenty-four on the surface.

Coal Bed:

The coal seam worked at this mine is the Lower Kittanning seam of the Allegheny formation. It is locally known as the "B" or "Miller" seam and is the most valuable bed in the Johnstown quadrangle. The seam dips irregularly in a northwest direction at an average of four degrees. The coal ranges from 36 to 52 inches in thickness and contains a number of thin bands of shale and sulphur which are of irregular occurrence. The seam is overlain by a sandy shale, which makes a fairly good roof, and the floor is a hard, smooth shale.

The mine was sampled in three places by the writer on April 1, 1922, and a copy of the sections and the results of the analyses of these samples is given in the appendix.

Moisture:

The workings that are dipping are quite wet near the face; there are also a number of swags or swamps throughout the mine in

which water collects. Other than this, the mine workings are very dry.

Gas:

The mine is rated as a gaseous mine, but no large accumulation of gas has ever been found, and no gas had been reported for about a year. Two fire bosses are employed who examine the mine every morning before the men enter for work.

A number of air samples were taken in different parts of the mine, these including samples taken in the total return air and also in the return from the two splits, the results of the analyses of which will be found in the appendix. At the time of the Bureau investigation no gas was detected by a safety lamp.

Ventilation:

The ventilation is produced by a 5-foot Sirocco exhaust fan, motor driven, with an average water gage of  $1\frac{1}{2}$  inches. This fan is located to the right of the main entrance and near the entrance of the return airway. The fan is housed in a tile and steel structure which makes it fire-proof.

The ventilation current is split in two parts, one split ventilating the left side of the mine and the other split ventilating the right side. An additional air shaft has been sunk to a room off the 1st left entry. The system of ventilation is indicated on the map attached to this report.

Development and System of Working:

The mine is opened and developed by a drift of five entries driven in the coal seam from the outcrop. The two entry, room and pillar system of mining is used. Entries are driven 20 feet wide and on 50 foot centers. Rooms are driven 20 to 30 feet wide, 250 feet long, with pillars from 10 to 40 feet thick. Both room and entry pillars are recovered on the retreat.

Mining:

The coal is all undercut with Goodman short wall machines. The coal is of a very soft nature and very little explosive is needed to shoot it down after it has been undercut.

Explosives:

Permissible explosive (tunnelite B) is used for blasting down the coal and for brushing the roof, which is detonated with "Lion" No. 6 detonators. The explosives are carried into the mine by the miner and kept in holes along the rib. The maximum amount one miner can have in his possession underground is  $2\frac{1}{2}$  pounds. The maximum diameter of drill holes is two inches and the maximum amount of charge is one pound. About 200 pounds of powder is used per day, for an output of 700 tons; which would be approximately 0.3 pounds of powder per ton of coal, including powder used for brushing. The shots are fired by the miner, with a battery, at any time during the day. Machine cuttings are not loaded out before shooting.

Clay is sent into the mine and all shots are supposed to be

tamped with clay; however, during the investigation the writer found one shot that had been tamped with fine coal, and it was learned that the miners frequently mix coal dust with the clay. Wooden tamping bars are used.

Timbering:

The roof is generally good and very little timbering is required along the entries. In the rooms, three lines of props are used; two lines on the gob side and one line on the track side.

Electrical Equipment:

All mechanical equipment around the mine is operated by electricity, which is purchased. The current from the main power lines is 2200 volts, alternating current, which is converted to 250 volt, direct current by one Ridgeway and one General Electric Motor-generator sets, having a total capacity of 450 K. W. This current is used for operating fan motor, tippie motor, locomotives, pumps, coal cutting machines, small hoist motors and lighting.

Haulage:

All the haulage is done by four electric locomotives. The cars are delivered to the room switch and the miner pushes them to and from the face, except, in rooms that have an excessive grade, a small electric hoist is used.

The cars are of wood, end-gate type, weigh about 1800 pounds, and have a capacity of 2000 pounds. The track gage is 42 inches and the rails used in entries are 30 and 40 pound, and in rooms, 16 pounds.



Hardwood ties, 5 x 5 $\frac{1}{2}$  inches, are used on the haulage roads. Some steel ties are used in rooms.

Lighting:

Approved Edison electric cap lamps are used by the miners, and the officials carry a flame safety lamp. Since the explosion of March 20, 1922, the cutting-machine crews are required to carry a safety lamp. Electric lamps are located at entry switches along the main haulage ways.

Humidity:

At the present time no humidifying methods are employed, although the mine is quite dry except in swags and dip workings. At one time a pressure sprinkling car was employed for wetting the dust, but for some reason its use has been discontinued.

Drainage:

Since the coal seam dips toward the outcrop, the mine has a natural drainage. Two small electric pumps are used to handle water that collects in local swags.

Dust Conditions:

The coal at this mine is of a soft nature and during the operations of mining, shooting, loading and haulage, considerable fine coal and dust is made. Three samples of road and rib dust were collected during the investigation; and the result of the analyses of these samples will be found in the appendix. The average analyses of the samples as received was: Moisture 2.3 per cent; volatile matter 20.2 per cent; fixed

carbon 54.7 per cent; ash 22.8 per cent. Ratio of volatile combustible to total combustible .268.

A large number of explosion tests on coals of different character have shown that the relative explosibility of one coal as compared with another depends in some degree on this ratio; the higher the ratio the more explosive the coal. The ratio of this coal dust would indicate that it is of an extremely explosive nature when dry and fine. From curves drawn to correlate different coals as to explosibility, the conclusion is drawn that with no gas in the air current an explosion started by a gas ignition or other means, will carry through or propagate in dust from this coal up to and including an ash plus moisture content of 63 per cent, and with one per cent gas in the air current an explosion will propagate through this coal dust when it has an ash plus moisture content up to 65 or 70 per cent.

From the foregoing, the dangers of accumulation of dry dust in working places and on haulage-ways can readily be seen. The probable reason why the explosion of March 20 did not develop into a dust explosion and propagate throughout the mine, is that the source of ignition was at a point where the explosive wave had a chance to expand in all directions, thus the flame was extinguished before the explosion had a chance to stir up the dust. If the explosion had originated at the face of the entry, having no room to expand, it is very likely that a dust explosion would have resulted and propagated throughout the mine. The reason the two men who worked in room No. 11 were not burned, might be explained as follows: There was only a small body of gas in room No.

12 and when ignited, the flame did not extend outside of the room. The dust that was stirred up by the concussion and coked by the flame had cooled sufficiently before reaching room No. 11 that it was not hot enough to burn the men. However, the coke was hot enough to be plastic and form in crusts on the props.

#### STORY OF THE EXPLOSION.

##### Local Conditions:

Monday morning, March 20, was a cool, cloudy morning, and no radical change of temperature had occurred during the previous 24 hours. The mine had started work as usual and nothing out of the ordinary was noticed.

The mine workings had been examined that morning by the two fire-bosses who reported that the mine was in safe condition for the men to enter.

Evidence was presented at the inquest to show that the fire-boss had failed to inspect the section in which the explosion occurred on March 20. It is the rule for a fire-boss after inspecting a working place to leave his mark in chalk showing the day and month. The evidence proved that no mark was found later than March 18. The fire-boss who inspects the section of the mine in which the explosion occurred, has been employed at this mine in such capacity for four years; is an Italian and does not hold a fire-boss' certificate. The fan was idle on Sunday March 19, until 6:00 P. M.

The Disaster:

The explosion occurred at about 7:30 A. M., a short time after the men had begun work. Sam Pandel, one of the men who worked in room No. 13, went to room No. 12 to borrow a shot firing cable. The men in room 12 had two shots prepared, and, as soon as these were fired, they gave Pandel their firing cable and he returned to his room and fired a shot that he had prepared. Pandel's buddy had gone down the entry for something, and he (Pandel) was drilling a hole near the left rib of his room when he heard the men in room 12 hoisting a car up to the face of their room. Immediately afterwards the explosion occurred.

Rescue and Recovery:

The only evidence on the surface that something unusual had occurred inside was indicated by the circuit breaker in the generator room coming out and refusing to stay back.

The motorman had just delivered a trip of cars in the 5th left A entry and had gotten past the door when he heard a rumbling sound and the power went off. He went back to the door and upon opening it observed a thick cloud of smoke and dust. He then threw off the power switch to 5th left A and proceeded to the outside, where he notified the mine foreman and fire boss that something unusual had occurred inside. The foreman, Charles Harrison, Asst. Foreman Oscar Verbouw, and two fire bosses Mitchell and Roseman, attached an empty car to the motor and proceeded as far as the entrance of the 5th left Straight and then proceeded afoot to the 5th left "A" switch where

they met four miners, who accompanied the party into the 5th left A. The party advanced as far as about No. 7 or 8 room when they encountered smoke and dust and were unable to go farther. The foreman then ordered the assistant foreman to go to the main heading and knock out some stoppings in order to short circuit the air. The party then retreated out the entry a short distance when they heard men groaning up the entry. They then advanced as far as room No. 9 where they found Paul Caranche, who worked in room No. 13. He was burned on the hands and had a severe wound on the scalp. He was carried out by the four men who joined the party at the mouth of the entry. (This man died on the way to the hospital).

At this point Foreman Harrison left fire boss Mitchell in charge and went back to the main heading to secure more assistance and to notify the men working in that section. As soon as assistance arrived, the party proceeded as far as room No. 10 when they heard some one whistle. They then advanced as far as No. 11 room where they found Sam Pandel, who worked in room 13. He was not injured but was partially overcome. After this man had been taken out, the party heard men groaning in No. 11 room, to where they proceeded up the room about 100 feet and found two live men who had been overcome. They were immediately carried out by men who had arrived in the meantime.

The party then attempted to enter No. 12 room but found it impossible to do so on account of the afterdamp. A line curtain was then put up across the entry and from the cross-cut from No. 11 room and the room cleared so that the party could enter. The two men who

worked in this room were found dead about 125 feet from the mouth of the room. The party then proceeded up the entry and found two men dead at No. 13 room. These men worked in the heading and were overcome in an attempt to escape. Had they gone through the cross cut and through to the 6th Left (about the same distance from where they worked to where they were found) they would have been saved.

These eight men were the only ones working on this entry, and the last body was brought to the surface about 11:00 A. M. The rescue work was done without the aid of oxygen rescue apparatus. Had rescue apparatus been available at the time it is very probable that the two men found at room No. 13 could have been rescued alive.

Alleged Cause of Explosion:

All theories and evidence point to an ignition of gas by sparks from an electric hoist in room No. 12 off 5th Left "A" entry, as being the source of the explosion.

Coroner's Inquest and State Mine Inspector's Report:

Summary of important facts brought out in the inquest testimony:

The Coroner's inquest on the Dilltown Smokeless No. 1 Mine explosion was held in Dilltown, Pennsylvania on Friday, March 24, 1922. Testimony was given by State Inspectors Crocker and Williams; Charles Harrison, Mine Foreman; Fire Bosses S. T. Mitchell and V. Roseman; Sam Pandel, the motor runner and night watchman. The inquest was conducted by deputy coroner H. R. Dill.

Mr. C. H. Crocker, State Inspector for the 30th District, in which Dilltown Smokeless No. 1 Mine is located, testified as to the general condition of the mine and the evidence found on his inspection after the explosion. Inspector Thomas D. Williams' testimony was also along this line.

Charles Harrison, mine foreman, testified as to the general condition of the mine.

S. T. Mitchell, fire boss, testified as to the course of ventilation, and the occurrences of gas in the mine. He told of being notified of the explosion and the subsequent rescue of the men and recovery of the bodies.

Vincent Roseman, fire boss in the section of the mine in which the explosion occurred, gave some discriminating evidence as to his actions on the morning of the explosion. He testified that he examined the section of the mine in which the explosion occurred that morning. His explanation for his mark not being found was that he was mistaken in the date of the month, and thought it was the 18th instead of the 20th. This part of his testimony was discredited, as the fire bosses make two inspections a day, and if he had marked as he said, there would have been three marks bearing the date of the 18th, and testimony of other witnesses proved that this was not the case. He testified that after discovering his mistake that he did not go back and change his markings, but from there on, marked the places the 20th. He also testified that when he was sent to notify men of the explosion that he, at that time, marked the 20th on some of the places.

The motor runner testified as to his actions during the morning; of how he was made aware that something unusual had occurred, and how he came to the outside and notified the foreman and fire bosses.

The night watchman testified as to the time that fire boss Roseman reported for work that morning. He said the fire bosses usually enter the mine about 3:00 A. M., but on the morning of the 20th, Roseman did not enter until about 3:15 A. M.

Sam Pandel, miner, who works in room No.13 testified as to what he was doing before the explosion occurred, and he related his experience up to the time the rescue party reached him. He said that he was drilling a hole when the explosion occurred, he heard a rumbling sound, and then something hot around his neck and face and was blinded by the dust. He fell to the floor and crawled out of his room and down the entry as far as room No. 11 when, as he expressed it, he run out of steam and could go no further. While lying there in a partially overcome and shocked condition, he heard the other men groaning and called to them to come to him. When he heard the rescue party he got his fingers in his mouth and whistled.

Verdict of Coroner's Jury:

The Coroner's jury rendered the following verdict:

"We, the jurors, find that Stanley Kider, Joseph Kider, Dominick Colangelo, John Suzanne and Paul Caranche, came to their death by an explosion of gas in Room No. 12 five left entry A, of the Dilltown Smokeless Coal Company Mine No. 1, the gas igniting from an electric hoist. We find from the evidence that fire boss Vincent Roseman failed to inspect room No. 12 and other rooms in that section on



March 20, although his report made on that morning showed mine was in safe condition for the men to enter."

State Mine Inspection Report:

The complete report of the mine inspectors as introduced at the inquest follows:

On March 20, 1922, about 7:30 A. M., an explosion occurred in the Dilltown No. 1 Mine, resulting in the death of five persons. The mine is located in Buffington Township, Indiana County, Pa., and is owned and operated by the Dilltown Smokeless Coal Company. The mine is a drift opening from which the "B" or Lower Kittanning seam of coal is being mined.

Upon learning of the accident, two of the undersigned inspectors proceeded to the mine. Arriving on the scene they found that the bodies had already been recovered and the injured cared for. After consulting with the mine management and learning from them where the accident took place they proceeded at once to the affected section and found that the explosion was confined to a small area.

On Tuesday morning, March 21, the undersigned inspectors commenced the examination of the mine to ascertain if possible, the cause of the explosion and to make recommendations to prevent repetitions of such accidents.

We entered the mine through the main haulage-way to a point three thousand feet from the opening known as five left entry, and proceeded up this entry about four hundred feet at which point "A" entry is turned off to the right. Going up "A" entry, we found at No. 4 room

