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

W. J. FENE,
Mining Engineer.

C O N T E N T S

APPENDIX

REPORT OF EXPLOSION AT DILLTOWN SMOKELESS COAL COMPANY, MINE NO. 1, DILLTOWN, PA., MARCH 20, 1922.

- By -

W. J. Fene.

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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 1½ 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 2½ 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, tipple 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 5½ 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 stoppingsnin 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 Corner'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

the first evidence of disturbance and we continued along the entry to No. 12 room where the condition of the entry indicated that the force of the explosion had come. We then traveled up the room to within 25 feet of the face where explosive gas was encountered. An examination of the coal at the face showed that it had been undercut, blasted down and was in a normal condition.

A short distance from the face an empty car was found, to which a rope from a portable electric hoist located about 50 feet from the face, was attached. One of the bodies was found at the car, another at the electric hoist, both being badly burned, the only two of the five being burned. Evidence of great heat was found in the immediate proximity of the electric hoist, the lines of force radiating from this point out the room and across through a cross cut to No. 11 room where two men were found unconscious.

After completing a thorough examination of the room and noting all conditions set up by the explosion, and taking into consideration that the mine was operated as a gaseous, approved electric cap lamp, permissible power and electric shot firing apparatus being used in all parts of the mine, we are of the unanimous opinion that a body of explosive gas had accumulated at the face of No. 12 room and so displaced by the movement of the car being pulled toward the face that it was ignited by coming in contact with an open type motor on the hoist. Furthermore, we are of the opinion that No. 12 room was not examined by the fireboss prior to the men entering the mine on the morning of the explosion. The same will apply to all the working places in this

immediate section. This opinion was arrived at after a thorough examination accompanied by the fire boss, in which we failed to find, and he was unable to show any evidence of having performed his duties.

In conclusion and in view of the above facts, the commission feels it their duty to make the following demands for the future safety of the workmen and the protection of the property:

1st. That Rule 67, Section 5, of Article 9 be fully complied with. In any gaseous portion of a mine, all motors, unless placed in such rooms as are separately ventilated with intake air, shall have all their current carrying parts, also their starters, terminals and connections, completely enclosed in explosion proof enclosures made of non-inflammable material.

2nd. That this section of the mine be properly examined by a competent and efficient fire boss as required by law.

NOTES OF EVIDENCE OBTAINED BY BUREAU OF MINES.

Personnel:

The investigation of this disaster was conducted by the writer on March 30 and 31, April 1 and 2, 1922. He also attended the cornner's inquest held on March 24. Mr. Charles Harrison, superintendent, assisted in every way possible in giving information and assistance during the investigation.

Extent of the Explosion:

The explosion was entirely local, being confined to the 5th left "A" entry and a portion of 6th Left. Men working in other sections of the mine were not aware that an explosion had occurred until notified. Evidence of flame or heating due to the explosion was confined to rooms 11 and 12 off 5th Left "A" entry.

Rooms 11, 12 and 13 and the main heading were the only places working at the time of the explosion.

Details of Violence:

Going in the 5th Left "A" entry, there is a wooden door, aboutn100 feet from the switch, which was not disturbed. Going on up the entry the first evidence of violence that was observed was a blown out stopping in the first cross cut. All the stoppings along the entry were blown toward the air course.

Opposite room No. 11 there was an empty car off the track, the outby end being blown near the right rib. A few feet further inby were two other cars, connected together, off the track. Just outby room No. 12 a canvas curtain was hung across the entry, This curtain had been removed after the explosion and the writer was told that it was not blown down or burned. Between rooms Nos. 12 and 13 a car was off the track on the left side. The door on the outby end had been blown in but not damaged. Opposite room No. 13 there were two cars off the track. The cars were connected together and the outby end of the first car and the inby end of the second car were thrown toward the right rib. Just inby room No. 13 on the gob was found a shot firing battery and on the floor a firing cable, which did not seem to have been disturbed. Inby room 13 there were eleven empty cars connected together and not disturbed. Inby the last cross cut was found six sticks of powder and detonators in holes in the left rib, which had not been disturbed. A little farther in, to the left of the track was a small electric hoist which was used to pull the cars to the face of the heading, which was not disturbed. A five gallon can partly filled with lubricating oil was nearby in an upright position. A little farther inby a cross cut had been turned but had not yet broken thru to the air course. A partly loaded car was found at the face of this cross cut, and nothing in the place seemed to have been disturbed. Inby this cross cut was a string of six empty cars which had not been disturbed. About 60 feet from the face, on the gob on the left side, was a miner's coat, which had not been disturbed. The face of the entry was cleaned

and had been undercut and the cuttings shoveled back about five feet from the face.

Room No. 11:

The face of this room had been undercut and shot, and seemed to be in a normal condition. The only evidence of violence found was an empty car cross-ways of the track about 25 feet in. It is likely that this car was near the face of the room when the explosion occurred and the force of the explosion started the car down the room to where it jumped the track.

Room No. 12:

This is the room in which the explosion is alleged to have originated. The face had been undercut and two shots had been fired. The machine cuttings had not been loaded out. A line curtain was run from the cross cut to No. 11 room to within 30 feet of the face. This curtain was blown down by the explosion but had been replaced during recovery operations. A small electric hoist is located about 6 feet from the right rib and 50 feet from the face. An empty car, with rope attached, was found about 12 feet from the face.

Room No. 13:

This room had just been turned and was in about 12 feet. No evidence of violence was found and the room seemed to be in a normal condition. The face had been undercut, and the machine cuttings shoveled back. A shot had been fired near the right rib, and had brought down but very little coal. This shot seemed to be badly placed, and was partly on

the solid. The writer was unable to determine the depth of the remaining hole, since it was closed nearly to the surface. This hole had been tamped with coal dirt, and one firing wire was hanging out the hole. One stick of powder with detonator inserted was found on top of the machine cuttings. This powder did not seem to have been disturbed or scorched. One of the miners in this room was in the act of drilling a hole near the left rib when the explosion occurred.

Fourteen stoppings were blown out or partially blown out by the explosion, eight along the 5th Left "A" entry; three on the 5th Left Straight and three on the main entry.

Coke and Coked Dust - Other Evidence of Heat:

Evidence of coking was confined to rooms Nos. 11 and 12 and at one point on the entry.

From the evidence it would seem that the flame from the ignition was confined entirely to room No. 12. The two men who worked in this room were badly burned. One of the men who worked in room No. 12 who had gone down the entry for something, was slightly burned on the hands and his hair singed. He was found on the entry opposite room No. 9. It is not known just where he was when the ignition occurred, but since there is no evidence of flame outside of room No. 12, it is likely that he was near the mouth of the room at the time.

In room No. 12, the origin of the explosion, coke was found on the inby faces of projections at three points along the right rib. Crusts of coke about $\frac{1}{4}$ inch thick were found on the inby faces of two props lo-

cated outby the hoist which was about 50 feet from the face, also on props in the second and third line from the mouth of the room. Rocks on the gob along the right rib were coated over with a fine layer of coked dust over which was deposited a very finely divided, partially burned dust. A heavy coating of coke was found on the inby faces of two props which supported the line curtain, near the cross cut to No. 11 room. Crusted coke was found on the inby face of one tie, outby the hoist.

Going through the cross cut from room 12 to room 11, two props had a heavy crust of coke on the inby faces, and on the right rib of the cross cut coke was found on outby faces of projections.

Room No. 11:

Heavy crusts of coke were found on props opposite the cross cut to room No. 12, and on inby faces of six ties inby the cross cut. Since there is evidence of flame or heating in this room, it seems strange that the two men who worked there were not burned.

The only place that coke was found on the entry was on the right rib opposite room No. 10. Globules of coke had lodged on inby projections of a rock near the roof.

The writer collected a sample of very finely divided, black dust which had settled over everything in this section of the mine. A microscopic study of the dust showed it to be finely divided coke, partially burned coal, ash , shale dust and globules such as are found coming from dust fired furnaces. A chemical analysis of this dust will be found in the appendix.

Location of Bodies and Nature of Injuries:

The number indicates the order in which the men were found. The mens' working places and the location they were found is indicated on the detail map.

1. Paul Carahche, Russian, single, age 26, worked in room 13; was found on the entry opposite room No. 9. He was slightly burned on the hands and hair singed and was bleeding profusely from a wound on the head. He died that morning on the way to the hospital. The wound was probably caused by falling and striking his head against the rail.

2. Sam Pandel, Italian, married, age about 34, worked in room No. 13; was found on the entry at room No. 11, uninjured but overcome from the afterdamp.

3. Julius Sarasana, Italian, married, age 30, worked in room 11, was found about 100 feet up in room No. 11, uninjured but overcome from afterdamp.

4. Angelo Homi, Italian, single, age 30, worked in room No. 11, was found lying close to man No. 3, was uninjured but overcome from afterdamp.

5. John Suzanne, Italian, age 34, worked in room No. 12; was found dead, badly burned about body, face and hands, lying face down across the track in room No. 12.

6. Dominick Colangelo, Italian, married, age 36, worked in room No. 12, was found dead about 10 feet from man No. 5, badly burned about body, face and hands.

7. Joseph Kider, Polish, married, age 38, worked in the 5th

Left "A" heading, was found dead, in a sitting position with his head between his knees in room No. 13. He was not burned or injured.

8. Stanley Kider, brother of Joseph Kider, married, age 36, worked in 5th Left "A" heading, was found dead, lying face down at the mouth of room No. 13. He was not burned or injured.

The writer took occasion to call on two of the men who had been overcome after they had returned from the hospital, and after overcoming their suspicions, they related their experience during the explosion. Notes were taken of the physiological effects in the two cases. By request of the Bureau's Chief Surgeon, Dr. Sayers, more data as to the history of these two cases will be secured from the attending physician.

Summary of Evidence:

All evidence points to the electric hoist in room No. 12 as being the point of origin of the explosion. According to the testimony of Sam Pandel, the miner who works in room No. 13, he was drilling a hole when he heard the men in room No. 12 begin hoisting a car from the entry to the room face, and within a few seconds followed the explosion. It was proven at the inquest that this section of the mine was not examined the morning of the explosion. No gas had been reported in the mine for some months previous to the explosion, but the fact that there was a curtain across the entry just outby room No. 12 and a line curtain running from the cross cut to room No. 11 to near the face of room No. 12, would indicate that the air was bad in this

room and the officials suspected that gas might be liberated.

The coal in room No. 12 raised about four degrees toward the face and about the same degree toward the right rib. With this condition, any gas that might be liberated in room No. 11 or the face of room No. 12 would be swept around to the high side of the room, and over the electric hoist, which is located about 50 feet from the face and six feet from the right rib. Explosive gas was found by the fire boss after the explosion and also by the State Inspector the following day. The electric hoist has an open type motor with the controlling rheostat located at a point above the motor, having exposed contact points. A miner who has had experience in operating a similar hoist at this mine, told the writer that there was considerable sparking from the motor, especially so when the grade was steep and a car happened to stall. The clutch on the hoist was in when examined after the explosion and an empty car with rope attached was about 12 feet from the face. From the evidence and facts it seems that there is little question but that the explosion was caused by an ignition of gas from this electric hoist.

RECOMMENDATIONS.

1. That only "Approved" explosion proof motors be used in operating electric hoists, and that all motor operated machines shall be placed on the intake air.

2. Institute a more rigid inspection system by competent fire bosses. Have a rigid inspection and report made daily on all doors or checks, the disarrangement or opening of which might cause short circuiting of the air.

3. All doors should be so constructed that they will be self-closing.

4. The removal of all accumulations of dry and inflammable coal dust is recommended, to be followed by applications of rock dust or regular and systematic watering methods by which the dry dust will be dislodged from the roof and ribs and from the gobs along the entries. The practice of gobbing rock along the entries is to be condemned because it permits accumulations of inflammable coal dust which cannot thoroughly be removed or efficiently treated.

5. Since the explosion, the company has required machine crews to carry a flame safety lamp to enable them to make examinations for gas before taking the machine into the room. This precaution is to be commended.

6. More rigid discipline should be demanded from the men. It is the duty of the miner when he does not find the fireboss' mark in his place to report the fact to the foreman. If this had been done the morning of Marc h 20, this disaster might have been averted.

7. By referring to the analyses of mine air samples taken during the investigation, it will be noted that all samples showed a CH_4 content and a high CO_2 content. This condition would indicate that the air is going through old workings and that the volume of air is not sufficient to properly dilute the CO_2 that is generated there. It is apparent that with an interruption in ventilation that the quantity of CH_4 liberated would be

sufficient to cause an accumulation that would become explosive. It is therefore recommended that the volume of air passing through the mine be increased.

Respectfully submitted,

W. J. Fene
Asst. Coal Mining Engineer.

APPROVED:

J. W. Paul
Chief of Coal Mining Investigations.

6—261

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

DUST-ANALYSIS REPORT

Test No. _____ Lab. No. 85065

Sample of ROAD dust (through 20-mesh screen). Can No. 06308

Operator Dilltown Smokeless. Mine Dilltown Smokeless No.1.

State Penna. County Indiana. Bed B. or Kitt.

Town Dilltown.

Location in mine On 5th Left "A" entry between rooms 12 & 13.

Method of sampling Standard. Gross weight, lbs. _____ Net weight, gms 21.0

Date of sampling 3/31/22. Date of Lab. sampling 4/5/22. Date of analysis _____

For B. of M. section _____ Collector W.J.Fene.

	Air-dry Loss 2.3	Coal (Air dried)	Coal (As received)	Coal (Moisture free)	Coal (Moisture and ash free)
Proximate Analysis	Moisture	.3	2.5		
	Volatile matter	19.3	18.8	19.3	27.1 (a)
	Fixed carbon	51.8	50.7	52.0	72.9
	Ash	28.6	28.0	28.7	
		100.0	100.0	100.0	100.0
Ultimate Analysis	Hydrogen				
	Carbon		GRAMS	PER CENT.	
	Nitrogen	On 20-mesh.	604.5	45.6	REJECTED.
	Oxygen	Through 20-mesh.	721.0	54.4	ANALYZED.
		Total wt. of sample.	1325.5	100.0	As Received.
	Sulphur				
	Ash				
Calorific value determined	Calories				
	British thermal units				

(a) $\frac{\text{V.M.}}{\text{V.M. + F.C.}} = .271$

	Cumulative per cent.
Screen test, through 20 mesh	100
through 48 mesh	51.2
through 100 mesh	27.3
through 200 mesh	17.0

Area from which sample was taken (sq. ft.) _____

Date, April 10, 1922. (Signed) H. M. Cooper., *Chemist.*

[a] This figure is the ratio of volatile combustible to total combustible.

6—5151

6—261

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

DUST-ANALYSIS REPORT

Test No. _____ Lab. No. [illegible] 85066

Sample of ROAD dust (through 20-mesh screen). Can No. [illegible] 07608

Operator Dilltown Smokeless. Mine Dilltown Smokeless No. 1.

State Penna. County Indiana. Bed B. or Kitt.

Town Dilltown.

Location in mine 5th left "A" entry, between rooms 9 and 10.

Method of sampling Standard. Gross weight, lbs. _____ Net weight, gms. 623.0

Date of sampling 3/31/22. Date of Lab. sampling 4/5/22. Date of analysis _____

For B. of M. section _____ Collector W. J. Fene.

	Air-dry Loss 1.9	Coal (Air dried)	Coal (As received)	Coal (Moisture free)	Coal (Moisture and ash free)
Proximate Analysis	Moisture	.2	2.2		
	Volatile matter	21.8	21.3	21.8	26.6 (a)
	Fixed carbon	60.0	58.8	60.2	73.4
	Ash	18.0	17.7	18.0	
		100.0	100.0	100.0	100.0
Ultimate Analysis	Hydrogen				
	Carbon		GRAMS	PER CENT.	
	Nitrogen	On 20-mesh.	576.0	48.1	REJECTED.
	Oxygen	Through 20-mesh.	623.0	51.9	ANALYZED.
	Sulphur	Total wt. of sample.	1201.00	100.0	As Received.
	Ash				
Calorific value determined	Calories				
	British thermal units				

(a) $\frac{V.M.}{V.M. + F.C.} = .266$

	Cumulative per cent.
Screen test, through 20 mesh	100
through 48 mesh	53.9
through 100 mesh	31.6
through 200 mesh	18.3

Area from which sample was taken (sq. ft.) _____

Date, April 10, 1922. (Signed) H. M. Cooper., *Chemist.*

[a] This figure is the ratio of volatile combustible to total combustible.

6—5151

6—261

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

DUST-ANALYSIS REPORT

Test No. gob and props. Lab. No. 85067

Sample of Dust from rib / dust (through 20-mesh screen). Can No. 03996

Operator _____ Mine Dilltown Smokeless No.1.

State Penna. County Indiana. Bed B. or Kitt.

Town ~~XXXXXXX~~ Dilltown.

Location in mine Room No. 12 - 5th left "A" entry.

Method of sampling Standard. Gross weight, lbs. _____ Net weight, gms. 146.0

Date of sampling 3/31/22. Date of Lab. sampling 4/7/22. Date of analysis _____

For B. of M. section _____ Collector W. J. Fene.

		Air-dry Loss 1.3	Coal (Air dried)	Coal (As received)	Coal (Moisture free)	Coal (Moisture and ash free)
Proximate Analysis	Moisture		1.0	2.3		
	Volatile matter		19.5	19.2	19.7	23.9 (a)
	Fixed carbon		62.1	61.4	62.8	76.1
	Ash		17.4	17.1	17.5	
			100.0	100.0	100.0	100.0
Ultimate Analysis	Hydrogen					
	Carbon			GRAMS	PER CENT.	
	Nitrogen		On 20-mesh.	95.0	39.4 REJECTED.	
	Oxygen		Through 20-mesh.	146.0	60.6 ANALYZED.	
	Sulphur		Total wt. of sample.	241.0	100.0 As Received.	
	Ash					
Calorific value determined	Calories					
	British thermal units					

(a) $\frac{V.M.}{V.M. + F.C.} = .239$

Screen test,	Cumulative per cent.
through 20 mesh	100
through 48 mesh	65.8
through 100 mesh	42.2
through 200 mesh	26.4

Area from which sample was taken (sq. ft.) _____

Date, April 11, 1922. (Signed) H. M. Cooper., *Chemist.*

[a] This figure is the ratio of volatile combustible to total combustible.

6—5151

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Test No. _____ G—COAL-ANALYSIS REPORT Lab. No. 85064

Sample of Dust and Face. Can No. _____

Operator Dilltown Smokeless ~~Coal~~ Coal Co. Mine Dilltown Smokeless No.1.

State Penna. County Indiana. Bed "B" Lower Kittanning.

Town Dilltown.

Location in mine Composite of Lab. Nos. 85061, 62 & 63.

Method of sampling _____ Gross weight, lbs. _____ Net weight, grams _____

Date of sampling _____ Date of Lab. sampling _____ Date of ~~analysis~~ Cal. 4/10/22.

B. of M. or U. S. G. S. section _____ Collector W.J.Fene.

		Air-dry Loss 2.1	Coal (Air dried)	Coal (As received)	Coal (Moisture free)	Coal (Moisture and ash free)
Proximate Analysis	Moisture		.2	2.2		
	Volatile matter		23.6	23.1	23.6	25.8
	Fixed carbon		67.7	66.4	67.9	74.2
	Ash		8.5	8.3	8.5	
			100.0	100.0	100.0	100.0
Ultimate Analysis	Hydrogen		4.7	4.8	4.6	5.1
	Carbon		79.9	78.2	80.0	87.4
	Nitrogen		1.3	1.3	1.3	1.4
	Oxygen		2.2	4.1	2.2	2.4
	Sulphur		3.4	3.3	3.4	3.7
	Ash		8.5	8.3	8.5	
			100.0	100.0	100.0	100.0
Calorific value	Calories		7889	7722	7900	8628
	British thermal units		14200	13900	14220	15530

Softening temperature of ash _____ ° C. _____ ° F.

Date April 20, 1922. (Signed) H. M. Cooper.

Chemist.

6—6089

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Test No. _____ G—COAL-ANALYSIS REPORT Lab. No. 85061

Sample of Face. Can No. 01002

Operator _____ Mine Dilltown Smokeless No.1.

State Penna. County Indiana. Bed "B" of Kittanning.

Town Dilltown.

Location in mine Face of 5th left "A" entry.

Method of sampling Standard. Gross weight, lbs. 30 Net weight, grams 1144.0

Date of sampling 4/1/22. Date of Lab. sampling 4/6/22. Date of analysis Cal. 4/10/22.

B. of M. or U. S. G. S. section _____ Collector W. J. Pope.

		Coal (Air dried)	Coal (As received)	Coal (Moisture free)	Coal (Moisture and ash free)
Air-dry Loss	2.0				
Proximate Analysis	Moisture	.1	2.1		
	Volatile matter	23.8	23.3	23.8	26.0
	Fixed carbon	67.8	66.5	67.9	74.0
	Ash	8.3	8.1	8.3	
		100.0	100.0	100.0	100.0
Ultimate Analysis	Hydrogen				
	Carbon				
	Nitrogen				
	Oxygen				
	Sulphur	3.5	3.4	3.5	3.8
	Ash				
Calorific value	Calories	7917	7761	7922	8644
	British thermal units	14260	13970	14260	15560

Softening temperature of ash _____ ° C. _____ ° F.

Date 6—6089 April 19, 1922. (Signed) H. M. Cooper. *Chemist.*

Form 6—138

U. S. BUREAU OF MINES

F—SAMPLING REPORT

Can No. 01002 Lab. No. 85061

(1) State Penna. (2) County Indiana (3) Town Dilltown. (Post office.) (4) Mine Dilltown Smokeless No.1.

(5) Sample of Face. (6) Analysis desired Prox.

(7) Method of sampling Standard. (Describe if other than standard.)

(8) Location in mine Face of 5th left "A" entry. (Distance and direction from opening. Locate with respect to rib, room, pillar, aircourse, entry, etc.)

(9) Date 4/1/22. (Of sampling.), 19

(10) Coal, dry or moist Dry. (11) Gross wt., lbs. 30 (Sample cut.) (12) Net wt., lbs. 3 (Sample mailed.)

(13) Sample from fresh or weathered coal Fresh.

(14) Roof Slate. (Kind and quality.)

(15) Draw slate or roof coal Draw slate. (Description and thickness.)

(16) Floor Hard, smooth slate. (Kind, soft or hard, smooth or rough.)

(17) Vertical depth from surface to point of sampling, feet

No.	Section of Bed	Ft.	Ins.	No.	Section of Bed	Ft.	Ins.
1	Coal	2	0	10			
2	Slate x		1/2	11			
3	Coal		5	12			
4				13			
5				14			
6				15			
7				16			
8					Total thickness of bed	2	5 1/2
9					Thickness in sample	2	5

(18) Excluded from sample, marked X, section Nos. 2.

(19) Send analysis to W.J.Fene. (20) Collector W.J.Fene. (21) Office Pittsburgh.

Above information copied from B card by Edna Jones. on 4/22/22., 19

6—6098

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Test No. _____ G—COAL-ANALYSIS REPORT Lab. No. 85062

Sample of Face. Can No. 628

Operator _____ Mine Dilltown Smokeless No.1.

State Penna. County Indiana. Bed "B" or Kittanning.

Town Dilltown.

Location in mine Face of Main Heading.

Method of sampling Standard. Gross weight, lbs. 42 Net weight, grams 1217.0 Cal.

Date of sampling 4/1/22. Date of Lab. sampling 4/6/22. Date of analysis 4/19/22.

B. of M. or U. S. G. S. section _____ Collector W.J.Fene.

		Coal (Air dried)	Coal (As received)	Coal (Moisture free)	Coal (Moisture and ash free)
Air-dry Loss 2.0					
Proximate Analysis	Moisture	.2	2.2		
	Volatile matter	23.1	22.6	23.1	25.6
	Fixed carbon	67.1	65.8	67.3	74.4
	Ash	9.6	9.4	9.6	
		100.0	100.0	100.0	100.0
Ultimate Analysis	Hydrogen				
	Carbon				
	Nitrogen				
	Oxygen				
	Sulphur	4.0	3.9	4.0	4.4
	Ash				
Calorific value	Calories	7761	7606	7778	8600
	British thermal units	13970	13690	14000	15480

Softening temperature of ash _____ ° C. _____ ° F.

Date April 19, 1922. (Signed) H. M. Cooper.
Chemist.

6—6089

Form 6—188

U. S. BUREAU OF MINES

Can No. _____ 628 / F—SAMPLING REPORT Lab. No. 85062 /

(1) State Penna. (2) County Indiana. / (3) Town Dilltown. / (Post office.) (4) Mine Dilltown Smokeless No.1.

(5) Sample of Face. / (6) Analysis desired Prox.

(7) Method of sampling Standard. / (Describe if other than standard.)

(8) Location in mine Face of Main Heading. / (Distance and direction from opening. Locate with respect to rib, room, pillar, aircourse, entry, etc.)

(9) Date 4/1/22. / (Of sampling.), 19____

(10) Coal, dry or moist Dry. (11) Gross wt., lbs. 42 / (Sample cut.) (12) Net wt., lbs. 3 (Sample mailed.)

(13) Sample from fresh or weathered coal Fresh. /

(14) Roof Slate. / (Kind and quality.)

(15) Draw slate or roof coal D.S. / (Description and thickness.)

(16) Floor Hard smooth slate. / (Kind, soft or hard, smooth or rough.)

(17) Vertical depth from surface to point of sampling, feet _____

No.	Section of Bed	Ft.	Ins.	No.	Section of Bed	Ft.	Ins.
1	Coal	1	9 /	10			
2	Slate		1/8 /	11			
3	Coal		4½ /	12			
4	Slate		¼ /	13			
5	Coal		10 /	14			
6				15			
7				16			
8					Total thickness of bed	2	11-7/8 /
9					Thickness in sample	2	11-1/2 /

(18) Excluded from sample, marked X, section Nos. 2,4. /

(19) Send analysis to W.J.Fene. / (20) Collector W.J.Fene. / (21) Office Pittsburgh. /

Above information copied from B card by Edna Jones. on 4/22/22., 19____

6—6098

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Test No. _____ G—COAL-ANALYSIS REPORT Lab. No. 85063

Sample of Face. Can No. 04190

Operator _____ Mine Dilltown Smokeless No. 1.

State Penna. County Indiana. Bed "B" or Kittanning.

Town Dilltown.

Location in mine Face of Room No. 1 off "F" heading off 1st. left.

Method of sampling Standard. Gross weight, lbs. 45 Net weight, grams 1252.0

Date of sampling 4/1/22. Date of Lab. sampling 4/6/22. Date of ~~analysis~~ Cal. 4/19/22.

B. of M. or U. S. G. S. section _____ Collector W. J. Fene.

		Coal (Air dried)	Coal (As received)	Coal (Moisture free)	Coal (Moisture and ash free)
Air-dry Loss 2.3					
Proximate Analysis	Moisture	.2	2.5		
	Volatile matter	24.1	23.5	24.1	26.1
	Fixed carbon	68.1	~~XXXX~~ 66.6	~~XXXX~~ 68.3	73.9
	Ash	7.6	7.4	7.6	
		100.0	100.0	100.0	100.0
Ultimate Analysis	Hydrogen				
	Carbon				
	Nitrogen				
	Oxygen				
	Sulphur	2.6	2.5	2.6	2.8
	Ash				
Calorific value	Calories	~~7992~~ 7972	7789	7983	8639
	British thermal units	14350	14020	14370	15550

Softening temperature of ash _____ ° C. _____ ° F.

Date April 19, 1922. (Signed) H. M. Cooper.
Chemist.

6—6089

878

Form 6—138

U. S. BUREAU OF MINES

F—SAMPLING REPORT

Can No. 04190 Lab. No. 85063

(1) State Penna. (2) County Indiana. (3) Town Dilltown. (Post office.) (4) Mine Dilltown Smokeless No. 1.

(5) Sample of Face. (6) Analysis desired Prox.

(7) Method of sampling Standard. (Describe if other than standard.)

(8) Location in mine Face of Room No. 1. off "FW heading off 1st. left. (Distance and direction from opening. Locate with respect to rib, room, pillar, aircourse, entry, etc.)

(9) Date 4/1/22. (Of sampling.), 19

(10) Coal, dry or moist Dry. (11) Gross wt., lbs. 45 (Sample cut.) (12) Net wt., lbs. 3 (Sample mailed.)

(13) Sample from fresh or weathered coal Fresh.

(14) Roof Slate. (Kind and quality.)

(15) Draw slate or roof coal — (Description and thickness.)

(16) Floor Smooth, hard slate. (Kind, soft or hard, smooth or rough.)

(17) Vertical depth from surface to point of sampling, feet —

No.	Section of Bed	Ft.	Ins.	No.	Section of Bed	Ft.	Ins.
1	Coal	2	1½	10			
2	Slate x		¼	11			
3	Coal	1	4	12			
4				13			
5				14			
6				15			
7				16			
8					Total thickness of bed	3	5¾
9					Thickness in sample	3	5½

(18) Excluded from sample, marked X, section Nos. 2.

(19) Send analysis to W. J. Fene. (20) Collector W. J. Fene. (21) Office Pittsburgh.

Above information copied from B card by Edna Jones. on 4/22/22., 19

6—6098

6—213

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

CHEMICAL LABORATORY REPORT

MINE AIR SAMPLE

Received, 4-17-22 (Laboratory Record)

Bottle No. 548 Laboratory No. 16546

Mine, No. 1 Operator, Dilltown Smokeless Coal Co

State, Penna County, Indiana

Township, Buffington Sec. T. R.

Town (Distance and direction from) ¼ Mile North

Name of coal bed, ft. in.

Room, Entry, In air way to fan

Location in same, where sample is taken, vacuum

Are there gas feeders near where sample is taken? Strong or weak?

Are gas feeders from roof, coal, or floor?

Method of sampling, vacuum tube

Velocity, 640 Area, 54.2 Quantity, 34,688

Barometer: Inside, Outside,

Corrected to sea level: Inside, Outside, 28.8

Bulbs: Wet, 50 Dry, 50 Humidity, 100 %

Collector, W. J. Fene Mailed, 4-3-22

Remarks (Note whether sample represents average mine air in locality or localized body of gas):

Sample of return air.

CO_2	.13	H_2	.00
O_2	20.65	H_2S	
CO	.00	C_2H_4	
CH_4	.02		
N	79.20		

Date, 4-24-22 (Signed) G.W.JONES

Chemist.

6—213

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

CHEMICAL LABORATORY REPORT
MINE AIR SAMPLE

Received, 4-17-22 (Laboratory Record)

Bottle No. 550 Laboratory No. 16550

Mine, No. 1 Operator, Dilltown Smokeless Coal Co

State, Penna County, Indiana

Township, Buffington Sec. T. R.

Town (Distance and direction from) ¼ Mile North

Name of coal bed, Lower Kittanning ft. in.

Room, No. 11 Entry, 5th Left "A"

Location in same, where sample is taken, Near right ribb at face

Are there gas feeders near where sample is taken? Strong or weak?

Are gas feeders from roof, coal, or floor?

Method of sampling, vacuum tube.

Velocity, Area, Quantity,

Barometer: Inside, Outside,

Corrected to sea level: Inside, Outside,

Bulbs: Wet, Dry, Humidity, %

Collector, W.J.Fene Mailed, 4-3-22

Remarks (Note whether sample represents average mine air in locality or localized body of gas):

No cap showed on safety lamp.

CO_2	.34	H_2	.00
O_2	19.96	H_2S	
CO	.00	C_2H_4	
CH_4	.37		
N	79.33		

Date, 4-24-22 (Signed) G.W.JONES

6—2410 *Chemist.*

6–213

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

CHEMICAL LABORATORY REPORT
MINE AIR SAMPLE

Received, 4-17-22 (Laboratory Record)

Bottle No. 551 Laboratory No. 16545

Mine, No. 1 Operator, Dilltown Smokeless Coal Company

State, Penna County, Indiana

Township, Buffington Sec. T. R.

Town (Distance and direction from) ½ mile North

Name of coal bed, Lower Kittanning ft. in.

Room, No. 12 Entry, 5th Left "A"

Location in same, where sample is taken, Near right rib at face.

Are there gas feeders near where sample is taken? Strong or weak?

Are gas feeders from roof, coal, or floor?

Method of sampling, vacuum tube.

Velocity, Area, Quantity,

Barometer: Inside, Outside,

Corrected to sea level: Inside, Outside,

Bulbs: Wet, Dry, Humidity, %

Collector, W. J. Fene Mailed, 4-3-22

Remarks (Note whether sample represents average mine air in locality or localized body of gas):

No cap showed on safety lamp.

CO_2	.32	H_2	.00
O_2	19.66	H_2S	
CO	.00	C_2H_4	
CH_4	.59		
N	79.43		

Date, 4-24-22 (Signed) G.W.JONES

6—2410

Chemist.

6—218

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

CHEMICAL LABORATORY REPORT
MINE AIR SAMPLE

Received, 4-17-22 (Laboratory Record)

Bottle No. 546 Laboratory No. 16548

Mine, No 1 Operator, Dilltown Smokeless Coal Co

State, Penna. County, Indiana

Township, Buffington Sec. T. R.

Town (Distance and direction from) ¼ mile North

Name of coal bed, ft. in.

Room, Entry, 3rd Right "A" Air-course

Location in same, where sample is taken,

Are there gas feeders near where sample is taken? Strong or weak?

Are gas feeders from roof, coal, or floor?

Method of sampling, Vaccum tube

Velocity, Area, Quantity,

Barometer: Inside, Outside,

Corrected to sea level: Inside, Outside,

Bulbs: Wet, Dry, Humidity, %

Collector, W.J.Fene Mailed, 4-3-22

Remarks (Note whether sample represents average mine air in locality or localized body of gas):

Sample of return air from right side of mine.

CO_2	.11	H_2	.00
O_2	20.69	H_2S	
CO	.00	C_2H_4	
CH_4	.03		
N	79.17		

Date, 4-24-22 (Signed) G.W.JONES

Chemist.

6—2410

6—213

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

CHEMICAL LABORATORY REPORT
MINE AIR SAMPLE

Received, 4-17-22 (Laboratory Record)

Bottle No. 549 Laboratory No. 16547

Mine, No. 1 Operator, Dilltown Smokeless Coal Co

State, Penna County, Indiana

Township, Buffington Sec. T. R.

Town (Distance and direction from) ¼ Mile North

Name of coal bed, Lower Kittanning ft. in.

Room, Entry, 5th Left "A"

Location in same, where sample is taken, Center of entry at face.

Are there gas feeders near where sample is taken? Strong or weak?

Are gas feeders from roof, coal, or floor?

Method of sampling, Vacuum tube

Velocity, Area, Quantity,

Barometer: Inside, Outside,

Corrected to sea level: Inside, Outside,

Bulbs: Wet, Dry, Humidity, %

Collector, W.J.Fene Mailed, 4-3-22

Remarks (Note whether sample represents average mine air in locality or localized body of gas):

No cap showed on safety lamp.

CO_2	.33	H_2	.00
O_2	19.41	H_2S	
CO	.00	C_2H_4	
CH_4	.81		
N	79.45		

Date, 4 -24-22 (Signed) G.W.JONES

Chemist.

6—213

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

CHEMICAL LABORATORY REPORT
MINE AIR SAMPLE

Received, 4-17-22 (Laboratory Record)

Bottle No. 547 Laboratory No. 16549

Mine, No. 1 Operator, Dilltown Smokeless Coal Co

State, Penna County, Indiana

Township, Buffington Sec. T. R.

Town (Distance and direction from) ¼ Mile North

Name of coal bed, Lower Kittanning ft. in.

Room, Entry, 6th Left Air Course

Location in same, where sample is taken, Near last cross-cut

Are there gas feeders near where sample is taken? Strong or weak?

Are gas feeders from roof, coal, or floor?

Method of sampling, vacuum tube

Velocity, Area, Quantity,

Barometer: Inside, Outside,

Corrected to sea level: Inside, Outside,

Bulbs: Wet, Dry, Humidity, %

Collector, W J Fene Mailed, 4-3-22

Remarks (Note whether sample represents average mine air in locality or localized body of gas):

Sample of return air from left side of mine

CO_2	.20	H_2	.00
O_2	20.43	H_2S	
CO	.00	C_2H_4	
CH_4	.06		
N	79.31		

Date, 4-24-22 (Signed) G.W.JONES

6—340 *Chemist.*