REPORT

on

EXPLOSION

in the

PANAMA MINE

of the

BEN FRANKLIN COAL COMPANY

near

MOUNDSVILLE, W.VA.

July 11,1912.

reported
by

Geo. H. Deike,
J. T. Ryan,

Mining Engineers.

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Pittsburgh, Pa.
May 26, 1913.

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On Thursday, July 11, 1912, at about 9 a.m., an explosion occurred in the Panama Mine, causing the death of eight men. There were ten men in the mine at the time of the explosion. Seven of these ten died almost instantly from burns and suffocation; two others, badly burned, made their way to the shaft bottom and were hoisted to the surface; one of these two died on July 13, at 10:00 p.m. The tenth man was found by a rescue party and brought out alive about 2¢ hours after the explosion occurred.

LOCATION: The Panama mine is located at the southern outskirts of the town of Moundsville, Marshall County, West Virginia, on the banks of Big Grave Creek about 1000 feet from its junction with the Ohio River. Shipping is done on the B. & O. R.R. The nearest railroad station is at Moundsville, about three-quarters of a mile from the mine.

OWNERSHIP: The Panama mine was opened about eight years ago by the Panama Coal Mining Co. About two years ago the mine was purchased by the Ben Franklin Coal Co., said company operating mines in the vicinity of Freeport, Pa., and their main office is at Freeport, M. J. McQuade being General Manager.

GEOLOGY AND CHARACTER OF COAL: The mine develops the Pittsburgh #8 seam, known locally by the same name. This seam was the only one affected by this explosion and will therefore be the only one referred to in this report. This seam is the lowest member of the Monongahela series of the Upper Carboniferous age. It is in the Northwestern Appalachian coal field. The seam

averages five feet six inches in thickness, but varies from four to six feet. It has three characteristic bands of black slate from one-half to one inch in thickness about the center of the seam, and a sulphur band one-quarter inch thick about a foot from the bottom. The coal cleavage is well marked, the workings being laid out with reference to butts and faces.

The immediate roof is a clay shale which ranges from an inch to two feet in thickness, but usually averages a foot in thickness. This portion of the roof disintegrates and comes down after the coal has been removed, crumbles up in fine pieces and becomes mixed with the dust, and the writers think it is quite a factor in rendering the coal dust inert. Immediately over this gray-colored shale is a roof coal of pure quality ranging from two inches to two feet in thickness. Over this is a shale ranging in thickness from two to six feet, and this is capped by the main roof, which is of hard, tough limestone. The coal is bituminous and is sold in the market as a steam coal. Sections of seam and copies of analyses are in addenda.

FLOOR: The immediate floor is a poor quality of coal about three inches in thickness; under this is the main floor, which consists of a hard, blue limestone.

MOISTURE: The coal and roof are naturally moist and most of the working places on the left of the mains are considered damp. The workings off Nos. 1,2,3,4, West are dry and require watering, under the instructions of the State Mine Inspector.

Gas: The mine makes quite a little gas. In all the left face workings the gas is given off mostly from the roof coal, though some of it is given off from the main coal as occluded gas. Feeders were found in several sections. The results of analyses of samples of mine air are in addenda.

DESCRIPTION OF MINE AND METHOD OF OPERATION:

The mine is operated by two shafts known as the main shaft and the air shaft. The main shaft is 188 feet deep and is divided into three compartments; two compartments, each 10½ by 6½' are used for hoisting and return airway; the third compartment, 10½ by 6½', is the intake airway. The other shaft, known as the air shaft, is about 190 feet deep, 10 by 10 feet in size. It is the main upcast and also contains the water and steam lines. It is equipped with a wooden cage operated by a steam hoist, but is never used except in case of emergency. The mine has been developed almost entirely to the south of the main shaft, there having been little development north of the shaft on account of water.

The mine is worked on the room and pillar system with double and triple entries. The rooms are driven from both sides of the butt entries and worked on the faces. All the entries are driven 9 feet wide with a 50 foot pillar between the main entries, and a 45 foot pillar between the butt entries. Rooms are 24 feet wide and from 250 to 300 feet in depth; the room pillar width varies from 6 to 18 feet, depending on the character of the roof. The room pillars are not pulled, and only 65 to 70% of coal is recovered.

The coal is all undercut by electric chain-breast machines, four Goodman machines being in use, operating under 250 volts. The coal is shot down entirely with black powder, the miners themselves doing the shooting. There is no set time for firing, as the men can shoot whenever they please. There are no shot-firers employed. The usual method in the rooms is to bore three holes 1½ inches by 6 feet, one in the center and one at each rib. The holes are started about 1½ feet from the roof at such an angle that the end of the hole will reach the roof; the middle hole is charged with 12 inches of powder; the two rib holes are charged with 16 or 18 inches, coal dust being used for tamping; the middle hole is fired first. The coal is hard and blocky and breaks out in large lumps, making but little fine coal dust.

Burton's "FFF" black powder is used exclusively, the miners taking it in the mine in canisters and storing it near the face in wooden boxes. Very often cans are found unprotected.

The electrical equipment in use consists of one 100 kw Goodman generator and another 150 kw. General Electric Generator is being installed. The generator in use is rated at 250-275 voltage and 364 amperes. The circuit breaker was set at 500 amperes and the rated capacity of the circuit breaker under continuous load is 400 amperes.

The electric cable enters the mine through a two inch cast iron pipe in the down-cast compartment of the main shaft; the voltage carried is 250. The electric switches used underground are all single pole, single throw knife switches.

The hauling is done entirely by electric locomotives, one large General Electric and two small Goodman's being in use. The men push the cars in and out of the rooms. Wooden cars which weigh 1800 lbs. and have a capacity of about two tons are used. Little attention is paid to tightness in constructing the cars. 40 lb. rails are used on the main entries, and 20 lb. ones used in the rooms and butt entries.

The shaft bottom and main entries are lighted by incandescent lights of 250 volts, which are connected in parallel across the power lines. The miners use open oil lamps exclusively, burning sunshine and cottonseed oil. The fire-boss uses a Wolf safety lamp.

Ventilation: Ventilation is secured by means of a Robinson 20 x 20' force fan operating at from 55 to 60 revolutions per minute. No water guage or recording device of any kind is attached to the fan. The fan is located 17 feet back from the down-cast shaft and is not set up properly, as 4½ feet of the outlet is choked off. The air is forced down the down-cast shaft onto #3 main entry. The regulator on this entry, about ten feet North of the shaft, allows a small portion of the air to flow into the workings North of the shaft. The main current goes up #3 main, and at #1 right there is a regulator which permits some of the air to enter #1 right to ventilate these workings. At #2 main the air is split and part of it flows through the regulator to ventilate Nos. 1,2,3,4, west entries, and returns through #2 main face to the upcast. The main current goes

over the overcast and up #2 main butt, which is the middle one of the triple entries. At #2 north face it is again split and by means of a regulator part of it is deflected into the north face workings, returning through #1 north face and #1 main butt to the upcast. The other secondary split goes in #1 main butt and returns out the #2 main butt, and by means of two doors is deflected up #2 south, ventilating the south headings and all their workings and returns by #1 south, #3 main butt and #2 main face to the upcast. A number of air samples and measurements of the air were taken from the different splits, results of which are found in a table in the addenda.

The mine makes very little water, one small pump with a 4 in. discharge line, pumping for two hours a day, removes all the water from the workings. The drainage is all natural to the sump.

There is no equipment for fire fighting and few precautions taken for protection against fire. There are no trained corps for rescue, fire fighting, or first-aid.

STORY OF THE EXPLOSION:

On July 1, 1912, the Panama mine closed down indefinitely. At that time about 75 men were employed underground. The fan was kept running night and day, as required by the mine law of West Virginia, until the evening of July 8, when the night engineer was laid off, and from that time on the fan was only in operation during the day. On July 1, the fire-boss made the last report of the examination of the mine in the fire-boss record book which was in part as follows:

"Entered the mine at 4:10 a.m., and came out at 6:30 a.m. Examined all working places in the mine; did not examine old workings. Wrote on the bulletin board at entrance of shaft, mine safe. Detected gas in the first left butt, first left face, first and second right face, 6,7,8,9,10, rooms on right butt and #3 third west; found door standing open between first and second left. Signed, W. F. Hupp, Fire-boss, C.E. McCabe, Foreman.

On July 10, the foreman received instructions from the management to employ enough men to load about 50 tons of coal a day. That same evening the foreman made arrangements for working 9 men on the following day. He also arranged with the fire-boss to go to the mine at midnight and start the fan. On this same date about 30 or 40 men, according to the engineer's story, entered the mine and brought their tools out, though the mine had not been inspected by the fire-boss that morning.

The weather conditions on the day of the explosion and for three days previous were as follows:

Note: In the following table the weather observations were obtained at the State Penitentiary, Moundsville. As they had no barometric records, these were obtained from the Pittsburgh Weather Bureau, the nearest station, and corrected to the elevation at Moundsville.

Corrected to 650' elevation at Moundsville.

Date	Time	Barometer	Weather conditions	Winds	High	Low
July 8	8 a.m.	29.50	highest: Clear	South	94	66
July 8	6 p.m.	29.41	lowest : Clear	South		
July 9	9 a.m.	29.45	highest: Partly cloudy,	S.E.	93	67
July 9	3:15 pm	29.32	lowest : Rain .10". Thunder			
July 10	7 a.m.	29.39	highest: Partly cloudy,	S.W.	90	68
			Thunder, rain, trace			
July 10	6 p.m.	29.26	lowest :			
July 11	11:30 pm	29.31	highest: Clear	S.W.	89	69
July 11	7.a.m.	29.26	Clear			
July 11	3 p.m.	29.22	lowest :			
July 12	11 pm.	29.35	highest: Clear	S.W.	88	65
July 12	12 am	29.27	lowest : Rain .09 trace	S.W.		

On the morning of July 11, the engineer Mr. Rader, reported at the mine about 6:40 and found that the fire-boss, Mr. Hupp, had steam up and the fan running. At 6:50 the mine foreman Mr. McCabe, arrived at the mine, and as he neared the shaft he saw the fire-boss, Hupp, with a safety lamp, being lowered on the cage. The report on the blackboard at the top of the shaft and signed by Hupp stated that he had entered at 7 a.m. During the morning the following men reported for work: G. W. Wilson, employed as bottom cager; Alva Hurley, employed as motorman; Mike Rodema, employed as loader; Joe Minalis, employed as a machine man; John Marschalski, employed as loader; Andy Cheskie, employed as loader; Wm. Cheskie, employed as motorman; David Brooks, employed as loader. These men were going to load coal which had been out before July 1, on #1 and #2 left off north face entries. Shortly after 8:00 o'clock Hupp came out of the mine and went to the office where foreman McCabe was engaged in conversation with Mr. Frieze, an engineer who was there for the purpose of making an inspection of the property, and who intended going into the mine with Mr. McCabe. When Hupp appeared in the doorway McCabe asked "How is it"? and he replied "All right". Hupp had not signed the blackboard or the fire-boss record book as was the custom. Between 8:20 a.m. and 8:30 a.m. Hupp, with a safety lamp, and nine other men with open lights, were lowered into the mine. McCabe had arranged for Hupp to do the caging that day and McCabe was to run the motor, but as as McCabe was busy he instructed Hupp to run the motor until he could relieve him. The other men were to go to Nos. 1 and 2 left workings, but as some of them had

previously worked in the south entries they wanted to go there first for their tools. When the men landed at the shaft-bottom Hupp informed them that he had not examined any of the south workings and there might be an accumulation of gas there, so he gave his safety lamp to William Hurley and instructed him to go ahead and for the other men to follow and keep their open lights near the bottom when going in the south entries. David Brooks and Joe Minalis went up to #3 west entry and got their tools, came back and went in #3 main to the mouth of #1 south face, where they sat down to await the return of the men who had gone up the south entries for their tools. They had only been sitting there a few minutes when the explosion occurred, which was about 9 or 9:15 a.m. Hupp, coming in with the motor trip, had reached a point about 600 feet from outby where Brooks and Minalis were sitting when the explosion struck them. It is supposed that the other 7 men, when they left Brooks and Minalis at the bottom of the shaft, went up to the mouth of #1 south face, left their dinner buckets there and went up #1 south to get their tools, although only two of them had worked up there previously.

Current Theory: That the door just inside the mouth of #2 right off #1 south was left open either by the men on the last working day, July 1, or by some of the men who had entered the mine a day or two previous to secure their tools. This is a very possible for the reason that the door would not always close automatically, though it was supposed to, and the fire-boss had several times in the past reported finding it open. If this door was opened it would short circuit the air beyond this point; cut-off

the ventilation from Nos. 1 & 2 south, and gas, which was given off quite freely in this entry, would accumulate. From the location of the bodies it would appear that when the explosion occurred the advance man of the party, with an open light, had reached a point on #1 south a few feet beyond the mouth of #2 right, while the man with the safety lamp had not yet reached the mouth of #2 right. It is the accepted opinion that Rodema, with an open light, was in advance and ignited the gas which had accumulated in these entries in such quantity as to form an explosive mixture.

Indications of explosion on the surface: According to the story of Mr. Rader, the engineer, at about 9:15 a.m., he stepped on the cover of the down-cast shaft compartment and leaned over to adjust the valves of the steam lines, when he felt a sudden puff and a quantity of dust was blown up in his face; the fan made a slight rattling noise, but only for a moment. He called to foreman McCabe, who was in the office, and then went to look at the switchboard as he had noticed before coming out that the motor was pulling and there was a load of 100 amperes on the line. He found the circuit breaker all right, but only the lighting load of 15 amperes on the line. McCabe had heard a slight noise also, but did not suspect anything was wrong until a few minutes later, when a slight cloud of smoke and dust appeared at the hoisting shaft. About ten minutes later the smoke became very dense at the upcast shaft. This attracted the attention of many people in Moundsville and caused them to rush to the scene. When McCabe and Mr. Friese saw the first smoke they realized that something had happened.

and they immediately called for assistance from the other mines and from the hospital. Mr. Frieze called up the Bureau of Mines in Pittsburgh and notified them of the accident and asked for help. About 9:27 the engineer received the signal to hoist, and when the cage reached the surface the body of Joe Minalis was found lying across the cage, burned almost beyond recognition. The doctors had not yet arrived and others on the surface poured linseed oil upon the burns and relieved his sufferings. About 10:00 a.m., the engineer again received the signal to hoist; this time Hupp was raised to the surface and though badly burned, he refused assistance and insisted upon walking home. He stated that he was taking the motor trip in #3 main butt when the flames struck him and that he had spent some time looking for the other men but could not find them. He further stated that the men were either in the north or south workings. Steps were then taken to organize a rescue party, but no safety lamps could be found except one which was out of condition, although the mine inspector reports that he had examined three of them on his last inspection and found them in good condition. The rescue work was consequently delayed until the arrival of men with safety lamps from other mines. The first party, consisting of four men under the leadership of John Guthrie and equipped with safety lamps, was lowered into the mine. No one in the party was familiar with the workings of the mine and they did not have a map. Shortly after, a second party of eleven men, including foreman McCabe, were lowered in the cage and reached the bottom before the other party had left

that point. They found that the current was still on the power lines and the electric lights were burning along the main entry, so they immediately pulled the switch cutting off all electric current in the mine. The entire party traveled as far as the overcast along #2 main, which is the return. In the absence of a map, McCabe took a board and made a sketch of the workings. They knew from Hupp's story that the men were in either the north or south entries, so them entire party went through a manhole in the wall of the overcast and went up #2 main butt on the intake air to #10 crosscut. The stopping in this crosscut between #2 and #3 main butt was an old door and had been blown down by the force of the explosion. One of the party went through the break-through to #3 main to ascertain the condition of the return air. He returned shortly and reported that he heard someone groaning, the sound coming from inbye. The entire party then went over into the return entry and proceeded inbye this entry to the next cross-cut, where they found Brooks. He was leaning against the rib and badly burned about the face and hands. He had traveled outbye 75 feet from where he had been sitting when the explosion occurred. The rescue party improvised a stretcher and placed Brooks upon it and he was taken to the outside. McCabe, who had been taken sickm accomapnied them. They traveled out the return airway. The rest of the party then proceeded in a body to mouth of #2 north face. At this point the rescue party divided and one section explored the north face and main butt workings. They found no trace of the men, and the evidence convincing them that the explosion had not come from these sections they returned to the mouth of the

#2 south face, where they met the rest of the party and informed them that the men must be in the south workings. One of the men in the second party stated that, because of the afterdamp, it was impossible to get up there, as he had tried it. Mr. Berry and one other man started up #2 south, which is the intake. They found the stoppings blown out and the after-damp very thick. At the last cross-cut below #1 right they crossed over to #1 south and found two bodies at the outbye end of a cutting machine. Mr. Berry attempted to get over the machine, but the air was very hot and he was forced to turn. In doing so he bumped his head and fell off the machine and had to be assisted out to where they met the rest of the party. They informed them of what they had found and stated that it was impossible for anyone to be alive. A crew was then sent up, before the brattices were restored, to remove these two bodies. After the bodies had been removed the entire party came out. Later a party went in to restore the brattices and they located and removed the other five bodies, the last one being brought to the surface at 5:00 p.m. During the rescue work several men were taken sick and partially overcome. This was due to the fact that they made no attempt to restore the ventilation, and all the parties except the first one traveled along the return airway. Although there was a map of the mine tacked up in the office, the rescue parties failed to use it until the arrival of Mr. Brown, Superintendent of Mound Coal Co., at about 12:30 p.m. Mr. Brown took the map with him when he entered the mine.

There were no breathing apparatus on hand at the mine.

A Vagen Bader apparatus belonging to the Hinchman Coal Co. was sent over, but the writers were informed that it was not in working condition and was not used.

The Survivors Stories: The three men who came out of the mine alive after the explosion were William Hupp, fire-boss; Joe Minalis, and David Brooks. Hupp was going in on the motor trip when the force of the explosion and flame struck him. He was badly burned about the face, neck and hands and had inhaled some flame. He died about 10:00 p.m., July 13. His story, as told to the doctor and newspaper men shortly after he got out, was as follows: "I went into the mine at 7:20 a.m., and came out and put the men down at 8:20. Hurley and three other men were going over to the first and second right sections for tools, so I gave Hurley my safety lamp and warned them to be careful as I had not examined that part, but had examined the left entry. I stopped at the bottom and oiled my motor and started in with the trip, and was somewhere along #3 Main when the explosion struck me. It was terribly hot and lasted about a minute and a half. When I saw it I put my hand up to my mouth, and after it had passed over I hunted for half an hour for the rest of the men. The brattices were down and in about half an hour the after-damp got so thick I had to come to the shaft bottom. I knew that the fan had not been running all the time and that was bad and mmx should not be, and I told them about it several times.

The other two men, Brooks and Minalis, were at the mouth of #1 south face. Minalis came out without assistance and Brooks

was found and brought out by the rescue party. They are both in the Glendale hospital and Brooks will probably recover, but Minalis will probably die. He was not able to make a statement. Brooks told the following story to the coroner and jury in the presence of the writers, on July 18. "I worked in #3 room off #3 west, loading coal. I went to the mine on the morning of the explosion about 5:00 a.m. Hupp was there and the fan was running. Hupp came out of the mine about 8:00 a.m., and said in the presence of me and the other men that he had inspected no place but the first and second left. When we reached the shaft bottom Hupp told Hurley to take his safety lamp and go up after the tools and for the other men to be careful and keep their lamps down. Minalis and I went up to #3 west and got our tools and came back and went into the mouth of #1 south, where we found the dinner buckets belonging to the other men and we sat down and waited for them. We did not hear a thing until the explosion was right on us; it filled the whole entry."

Confidential. State Mine Inspector's Report. July 13,1912.

Hon. John Laing,
Chief, Department of Mines,
Charleston, W. Va.

Dear Sir:

We, the undersigned, hereby submit the following report of the mine explosion which occurred at the Panama shaft mine at 8:30 o'clock a.m., July 11, 1912, wherein eight men lost their lives and two others were seriously injured.

This mine is located in Marshall County, West Virginia, one-half mile s.w. of the city of Moundsville, and operated by the Ben Franklin Coal Co.

It is a shaft opening 188 feet in depth, and the developments are on the triple and double entry system, ventilated by a 20 ft. fan after the J. R. Robinson type, which furnishes sufficient air when properly distributed.

The Pittsburgh #8 seam of coal is operated, which has a thickness of 5 ft. 8 in. Roof is slate and in some sections is bad, having a draw slate in some sections varying in thickness from 6 to 18 inches.

The coal is all mined by electric chain machines and black powder is used for blasting. The coal is gathered and hauled to the shaft bottom by means of electric motors.

Upon receiving notice from your office of the explosion, we went to the mine as soon as possible, but upon our arrival we found that all the dead bodies had been removed from the mine and the injured persons had been sent to the hospital.

On July 13, 1912, we made a thorough examination of all parts of the mine for the purpose of ascertaining the causes of the explosion and the points of ignition, and in our judgment this was a typical gas explosion caused by a miner entering a heading with an open light where there was an accumulation of fire-damp, and the point of origin as on the second south face heading, near the entrance to the second butt heading off of same. From the conditions observed and the information obtainable, this explosion was caused by neglect of the fire-boss, W. C. Hupp, and mine foreman C. E. McCabe, to comply with the Mining Laws of the State, and former instructions of the District Mine Inspector relative to the operation of gaseous mines.

Upon investigation we find that the mine has been idle since July 1, 1912, and that during such suspension the fan had been operated only during the day, while the engineer was pumping water from the mine.

On the evening of July 10, the day preceding the date of the explosion, the mine officials had arranged to have eight miners go to work on the following day (Thursday, July 11) for the purpose of loading the coal which had been previously cut on the first left heading, so that a settlement could be made with the machine cutters. The regular working place of some of these men was on the second east and second south face section.

On the morning of Thursday, July 11, 1912, the fire-boss started the fan at 6:30 a.m., and shortly thereafter entered the mine, and returning to the surface about 8 o'clock a.m., he informed the mine foreman that conditions were all right on first left, as it was the intention for the eight men to load coal in that section. As before stated, the regular working place of some of these men was on the second east and second south face sections, and when informed that they were to work on the first left section they told the firebess that before they could go to the first left section to work it would be necessary for them to go to their former working place in the second east and second south face section to get their tools. In reply thereto the fire-boss told them that the second south face and second east butt headings had not been examined that morning, and as he (the fire-boss) was going to run the motor for a few trips he gave Alva Hurley, one of the miners, a safety lamp and told him to go with the men to the second south face and second east

butt heading to get their tools. In compliance with such instructions seven of the men had traveled up the second south face to a point where the second east room heading had been turned off, at which point they came in contact with an accumulation of fire-damp which had collected in the main south heading and extending back a distance of about 400 feet from the face of the heading, at which point a door had been left open, thus short-circuiting the air. At or near this point on the main south heading the seven bodies were found, this being the place where they met death from burns and suffocation.

It is an evident fact that these men traveled this section with open lights, as five miner's caps and open lamps were found near the bodies.

The fire-boss, who has since died, was running a motor attached to a trip of six empty mine cars and was on his way to the main east haulageway, which is the return airway, and came in contact with the flame at a point about 1600 feet distant from the place where the gas was first ignited.

Upon further investigation of the mine we were unable to find any visible evidence that the fire-boss had visited or examined any parts of the mine, nor had he, on his return to the surface, left any evidence on the bulletin-board of the conditions of the mine, nor did the record book of the fire-boss contain any reports of any examination having been made since July 1, 1912, that being the date upon which the mine was last operated. In our judgment, from the findings as herein reported, gross negligence was the cause of the explosion, and had the fan been operated the night before, as required by law, and the fire-boss made a proper and legal

examination of the mine, and had he done or caused to have been done what was necessary to place the mine in a safe condition as required by law, and which he failed to do, this explosion could not have occurred, and had the mine foreman given proper and prompt attention to the oral report of the fire-boss that the second south face and second east butt heading, which were known to liberate gas, had not been examined that morning, he (the mine foreman) would not have permitted the men to enter the mine for the purpose of working therein until the mine had been properly examined, as the mine, with the exception of gas existing therein, was in excellent condition as regards dampness and therefore coal dust could not have been a factor in this explosion. In making this examination and investigation we were accompanied by the following names persons; all of whom are practical and theoretical mine men: J. T. RYAN, M.M., and H. D. Mason of the Bureau of Mines; Wilson Young, Mine Supt; S. W. Brown, Mine Supt; J. P. Leonard, Mine Supt; R. H. Wilson, Mine Supt; Mike Freeman, Mine Foreman; and D. McCombs, Peter Brown and Peter Kurr, Miners.

Finding of Jury: An inquisition, taken at Moundsville, Washington District, in the County of Marshall, on the 12th, 18th and 19th days of July, 1912, before J. T. McCombs, Coroner of said county, upon the view of the bodies of Mike Rodema, Alva Hurley, Wesley Wilson, Joe Manachalsky, Andrew Cheskie, William Cheskie, Joe Caralunas, there lying dead.

The jurors sworn to inquire when, how, and by what means the said, above named, deceased persons came to their death, upon their oaths do say that the said above named persons came to their

death on the 11th day of July, 1912, in the Panama Coal Co. Mine, located just south of the City of Moundsville, West Virginia, by an explosion of gas or firedamp existing in said mine on account of the criminal negligence of the officials operating said Panama mine, not observing the laws of the State of West Virginia and the regulations and instructions of the Department of Mines regulating the mining business. The said officials being Willis Hupp, the fire-boss, and Charles E. McCabe, the mine foreman and superintendent.

In testimony whereof the said Coroner and Jurors hereto set their hands, this, the 19th day of July, 1912. J. T. McCombs, Coroner. T. S. Bonar, Foreman; S. A. Walton, R. M. Smith, W. W. Echols, A. R. Pickard, J. W. Alexander, Jurors.

Notes of Evidence obtained by Bureau of Mines Engineers':

On the morning of July 11, about 10:00 a.m., a telephone message was received from Moundsville by Mr. Paul stating that an explosion had occurred in the Panama Mine and that they desired help immediately. A few minutes later the Associated Press and several of the Pittsburgh newspapers called up confirming the reported explosion and saying that 100 men were in the mine. Mr. Paul immediately communicated with the Washington Office, and upon advice from there steps were immediately taken to have Car #6, which was located at ~~Pittsburgh~~ Pitcairn shops, transferred to the scene of the disaster. Part of the lamp equipment and apparatus were taken from Bldg. 17 to the Union Station to be placed on the car. Car #6 with J. W. Paul, J. T. Ryan, H. D. Mason, A. J. Strane, Wm. Raudenbush and J. T. Reynolds, were to leave the Union Station at 12:55. A few minutes before the time for leaving, Mr. Paul received a communication from the mine that it would not be necessary to bring the car as all the

bodies had been located, but they would like to have one or two of the engineers come down and make an examination. Mr. Mason and Mr. Ryan left on the 1:45 train and reached the mine about 5:00 p.m., a few minutes after the last body had been removed. The following day these two, accompanied by mine inspector Carl Schoew, and Mr. McQuade, one of the owners, entered the mine for the purpose of making an investigation. No one had been in the mine since the removal of the last body and none of the stoppings had been repaired except those between No. 1-2 south up to where the bodies had been found. Samples were taken of air in #2 right and #1 south, and also from the return air, results of which are found in the addenda. Samples of coke dust were taken at the point where Brooks and Minalis were sitting; also a sample of the road dust along #3 main butt where the explosion died out. Results of these are also in the addenda. The party came out of the mine at 4:00 p.m. As the mine could not be completely inspected until ventilation had been restored, and that would not be until the following week, the writers decided to return to Pittsburgh and wait until the mine was restored completely before investigating. At the train the men from the Bureau were met by Mr. Earl Henry, inspector of the Fifth District, under whose supervision the Panama Mine rested. He requested that the men from the Bureau remain over and aid him in making an examination of the mine on the following day; this they decided to do..

The following party, under Mr. Henry's direction, entered the mine at 10:00 a.m. on July 13: E. A. Henry, L. D. Vaughn, F. E. Parsons, H. K. Schoew, Deputy Mine Inspectors; Mike Freeman, Mine Foreman Mound Shaft; L. W. Brown, Supt. Mound Coal Co.; William Young, Supt. Mound Shaft; D. McCombs, Mine Supt.; J. P. Leonard,

Supt. Mound Coal Co.; R. H. Wilson, D. A. Wilson; Peter Kerr, Machine Man; J. T. Ryan and H. D. Mason, Bureau of Mines. The party traveled the haulage road up to the mouth of #2 right, which was as far as the ventilation had been restored. First and second south had an accumulation of gas a few feet inside of the mouth of #2 right, and the cap could be detected, and 50 feet inbye there was an explosive mixture. On the right entry gas was detected inside the second corss-cut. Inspector Parsons, with a Wolf safety lamp, and Ryan with a flashlight, inspected #2 right. From about the 6th room inbye an explosive mixture could be detected near the roof, and inside the last crossout the entry was filled with an explosive mixture. Parsons, while making a test, lost his light and returned about 100 feet and attempted to relight it with his friction igniter, but his lamp filled with flame, so the party then returned to the mouth of #2 right. An attempt was made by Henry and Vaughn to inspect #1 south, but they could go only a short distance on account of the afterdamp. The entire party then inspected the rest of the mine and came out about 4:30 p.m.

George H. Deike and J. T. Ryan, the writers, returned and made a thorough investigation of the mine on July 17, 20 and 22, and on July 18 and 19 they attended the Coroner's inquest conducted by Prosecuting Attorney, Mr. Carrigan and Chief of Depts of Mines, John Laing. On July 17 the writers were accompanied into the mine by Chief Mine Inspector John Laing; Deputy Inspectors Henry, Schoew, Parsons, and Mr. Hulett, Chief Chemist of the Bureau of Mines, and George A. Burrell of the Bureau of Mines.

Details of Evidence:

Going inbye from the shaft bottom the first evidence of the explosion was found in #3 main butt at the second breakthrough, and this breakthrough was slightly damaged.

No. 3 Main Butt: This entry is the haulage road and return airway. As stated before, the stopping of the second crosscut was slightly damaged. There was no evidence of heat or force found from that point to the motor trip which stood opposite #7 crosscut. This trip consisted of a motor and six cars, all on the track and not damaged. The trolley pole was off the wire and rested against the roof. Hupp's open lamp was found on the front end of the motor. There was no evidence of heat or force near #10 crosscut. There were three incandescent lights between #10 and #11 crosscuts with the bulbs broken off close to the socket and the wires blown outbye. Small globules of charred dust were found on the inbye and outbye faces of the timbers near this point. The stopping of #12 crosscut, which was an old door, was blown down. Small particles of coke were found on the inbye and outbye faces. This and #2 stoppings were the only ones on this entry that were damaged. From this point, inbye the mouth of #1 south, charred dust and globules of coke were found; the coking was found mostly on the inbye faces. A few feet inbye #13 crosscut Brooks had been found along the left rib in a sitting posture. At the mouth of #1 north face, which is just opposite #1 south face, six dinner buckets, some tools and two open lamps, a miner's cap, a 5 lb. can of "FFF" black blasting powder were found. This is the point where Brooks and Minalis were sitting at the time of the explosion. Brooks was holding the can of powder in his hands

when the explosion occurred, and he stated later that the powder had gone off and had burned them. The powder, however, had not been disturbed, and an open lamp hooked to the handle of the can was found undisturbed. The stopping at the mouth of #1 north was blown down and inbye. At this point on the entry several props were standing on which a deposit of coke dust was found. These deposits were heaviest on the sides facing outbye and facing #1 south, being an inch thick near the roof and near the bottom. See analysis No. 14352.

Continuing on #1 and #2 Main Butts: The door on #2 main between 1st and 2nd south was not damaged, but the frame stopping outside the post was blown off and inbye. These two entries beyond #2 south were not working and the track was covered with debris, principally disintegrated draw slate. The door in the first crosscut which opened outbye was damaged, having been blown inbye through the frame and the top hinge blown off. The stopping on the second crosscut was not damaged. There was no further evidence of force or flame in these entries.

No. 1 South Face Entry: Going inbye this entry, the stopping in the first crosscut was damaged, the top being blown off and towards #2 entry. From this point inbye to #2 right all the stoppings between #1 and #2 south were blown down and towards #2 entry. These entries were moist and no coking was observed, but heavy deposits of fine dust were found on the timbers and ribs. The trolley wire was in place on this entry to a point 40 feet beyond the 6th crosscut. A few feet outbye the mouth of #1 right a wrecked Goodman

chain machine was found which was thrown across the track. The cable reel was thrown three feet to the side and the cable partly unreeled and tangled in a heap. The bodies of Kalimmas and Marshalsky were found at the outbye end of the machine. Kalimmas was lying on a coil of wire. He was badly burned about the face and h hands and had a bad burn on the right side and one on back under the arm; he was also injured bodily, having a cut on the left side of face, left leg almost severed above the ankle and left elbow dislocated. The supposition was that the current was on the wire, from which he received the burn on the side. This was not possible, for had the current been on this wire at the time of the explosion there would have been a short circuit which would have thrown out the circuit breaker. Also, the trolley switch inside the mouth of #1 south was found open by the rescuing party when they entered this entry. The writers opinion is that the copper wire became hot enough to cause these body burns. This is the only man who was injured bodily to any extent.

The body of C. W. Wilson was found at the inbye end of the machine along the right rib facing outbye. He was badly burned about the face and had inhaled some flame, his tongue and lips being badly burned. Forty feet inbye the machine the body of William Cheskie was found lying along the right rib facing outbye and face down. He was badly burned. Six feet further inbye the body of his father, Andy Cheskie was found, along the rib, facing outbye and face up. Five feet inbye this body there was an upright switch which had been struck by some object and blown off and outbye. Ten feet inbye body of Andy Cheskie and three feet outbye the mouth of #2 right the body

of Alva Hurley was found lying along the rib facedown and facing outbye. The body of Rodema was found a few feet inbye mouth of #2 right. He was blown against the right rib and was facing inbye. A miner's cap was found at this point; another cap was found a few feet outbye the body of Rodema. Four caps and four lamps and two oil flasks were found just at the mouth of #2 right. Another cap and lamp was found about ten feet outbye the machine.

The cutting machine, which was wrecked, had been left standing on the last working day at a point 100 feet inbye the place where it was found. The machine toolbox and wrench were found scattered along the road between where the machine had been left and where it was found after the explosion. On #1 south just inbye mouth of #2 right Rodema's body was found just inside the point where the machine had been left.

The trolley wire from the mouth of #2 right back to where the machine was found was blown down and coiled around the machine. The stopping at the mouth of #1 right, with the exception of the bottom board, was blown down and inbye. The door on #2 right between first and second south, which opened inbye, was blown through the frame and standing open outbye but was not injured very much. At the mouth of #2 right there was a pool of water which extended in #1 south about 50 feet and also in #2 right, and up #2 south about 100 feet. The ribs and timbers in this vicinity were covered with a deposit of wet plastic dust on the inbye faces. Continuing in the south entries inbye #2 right, the stoppings were all blown down and a line of brattice cloth in #2 south from the last breakthrough to the face was blown down and scattered about the entry.

Inbye the #2 right to the faces of these entries the ribs presented a pronounced grayish appearance, evidence of heat of considerable duration. Inbye the water where the entry was dry the bottom and timbers were covered with a heavy deposit of fine dust and soot. A sample of road dust was collected in this section; see analysis #14731-F. Air samples were also taken on #1 south on successive days after ventilation had been restored in order to determine the amount of methane given off in these entries. See results in addenda. On #1, which had just been truned off #1 south, two empty cars were found blown off the track outbye, both end-gates blown outbye, and debris swept toward the outbye side of the car. Charred dust was found on both outbye and inbye faces of ribs, mostly outbye. Audible gas feeders were given off at the faces of both #1 and #2 off #1 south. At the face of #1 south an empty car was standing, blown inbye off end of track and gate blown inbye. Small globules of coke and charred dust were found at the face. A small pool of water, two or three inches deep, stood at the face. A line of brattice cloth had been strung from the last open crosscut to within 45 feet of the face. Audible gas feeders were found at the face and a small cap was detected on the Wolf lamp. In #2 south a line of brattice cloth had been carried to the face previous to the explosion; this had been blown down and carried outbye, but had been replaced at the time of this investigation. A small cap could still be detected at the face. At the face and 60 feet back there was no evidence of heat or flame. In #2 south near the last crosscut the track was pulled apart and pushed towards the crosscut, being about three feet out of alignment. A prop which had stood near the mouth

of the crosscut was blown outbye and across the entry. In the breakthrough there were heavy deposits of soot and fine dust in the recesses. A face coal sample was taken at the face of #2 south. See sample in addenda.

No. 1 and 2 Right Entries: Going in these entries the stoppings in the first crosscut was found blown down and towards #2 entry; the door in the second crosscut was standing open but was not damaged, and from that point inbye to the faces of these entries none of the stoppings were damaged. Just inside the second crosscut, on both the intake and return air, measurements and air samples were taken on three different days to determine the amount of methane given off from the workings in this section. See gas samples.

Going inbye #2 right no evidence of heat or force was found until #3 room was reached. At this point the outbye faces of props and ribs were covered with plastic road dirt. There was no water closer than the mouth of the entry so that it must have been carried in to this point. On the entry between rooms 4 and 5 there was a wooden door which was not disturbed, but the canvas frame was blown down and outbye. Inbye the door and at the mouth of #5 room a heavy deposit of coke dust on the outbye faces was found. A loaded car stood at the mouth of #5 room. About 120 feet in this room there was a heavy fall. The outbye faces of the props up to this fall were covered with a deposit of charred dust. Samples of coke dust were taken near the mouth of this room. See sample No. 14490. Inbye 50 feet on the entry from the mouth of the room a sample of road dust was taken. See sample No. 14489.

Between rooms six and seven a curtain was hung across the

entry, but this was not disturbed. The entry was moist in this vicinity. A loaded car stood at the mouth of #7 room. This had charred dust and small coke globules on the outbye end. There was no evidence of heat in the room. There was a pond of water about 50 feet in the room. A loaded car stood at the mouth of #8 room on which no evidence of heat was apparent except charring on the outbye end. The room was wet and the floor moist at this point. Just inbye #9 room three cars were standing on the entry and on the outbye car there was a heavy deposit of granulated coke on top of outbye bumper. This deposit was about 1½ inches thick. The roof was moist but the floor was dry. Inbye to the face there was no evidence of heat or disturbance of any kind, while the floor was very wet and contained many pools of water. A curtain was hung from the last open crosscut to within 30 feet of the face. This had not been disturbed by the explosion. A small cap was observed at the face. Samples of air were taken at this point. See analysis No.

No. 1 Right: On this entry no evidence of force was observed beyond the first corsscut and no evidence of heat was observed at any place on this entry. Inbye #3 room there was a fall on the entry. A loaded coal car stood between rooms five and six, but showed no evidence of the explosion. A car partly loaded was found in #4 room and a kit of tools was found in #5.

No. 1 and 2 North Faces: Going in #2 north face entry the door between #1 and 2 faces was blown down and inbye about ten feet. The stopping on #1 main butt just outbye #2 north face was partly blown inbye. The stoppings in the 1st, 2nd and 3rd crosscuts on #1 north face were all blown outbye. The stopping in the 4th

crosscut was but slightly damaged and from this point inbye to the faces of these entries all stoppings and doors remained undisturbed. Air measurements and air samples were taken just inside the open crosscut between #1 and #2 north. See analysis No.

No. 1 and 2 Left off North Face: On examination, all doors and stoppings on the entries; also all materials and tools in the working places were found in an undisturbed condition. Coal face samples were taken in the face of #3 room off #2 left. For sample see addenda.

Main Entry: No. 1, 2, 3, main face entries were found in an undisturbed condition. From the foot of the shaft to the intersection with the main butt entries and along the continuation of No. 2,3, main face entries from this point to the face of same there was no evidence of an explosion. Air measurements were taken on #3 main entry intake and 60 feet from downcast shaft, also at overcast on #2 main butt over #2 main face and at regulator at the intersection of #2 main butt and #3 main face. Air measurements were also taken in the main returns, No. 1 and 2 main face[illegible] entries 400 feet from shaft bottom, giving the total return air current from the various splits. Gas samples were taken at the first and last named points. For results of analysis see addenda.

Nos. 1, 2, 3, 4, West Entries: Nos. 1, 2, 3, 4, West Entries off the main face entries were examined and found to be in an undistrubed condition.

Summary of Evidence:

From evidence obtained in our investigation of the mine and from the stories of the survivors there is no question in the minds of the writers but that the explosion originated from the ignition by an open light of a body of gas which had been allowed to accumulate at the faces of #1 and #2 south face entries, a door between these entries at #2 right having been left open.

The body of gas was sufficient in itself to cause an explosion of considerable violence and it was further propagated on #2 right butt, #1 south, and the main butt entries by coal dust thrown in suspension. This is evidenced by the coking which was apparent on the ribs, floor and ends of cars in these entries. The explosion died out before reaching the face of #2 right entry on account of an accumulation of water which covered the floor of this entry to a distance of 250 feet back from the face. It is to be noted that the explosion in this section was confined entirely to #2 right, and the parallel entry #1 right, which is the intake, was not in any way affected.

Sample #14352 of coked dust was taken from the props at the junction of #3 main butt and #1 south entries at about the point where Brooks and Minalis were sitting when the explosion occurred, and 700 feet outbye the point of origin.

Sample #14490, of coked dust, was taken from the ribs and outbye ends of pit cars in #2 right entry from #4 to #7 rooms, from 250 to 750 feet distant from the point of origin.

Going outbye the flame died out on #3 main butt about the point where Mr. Hupp and the motor trip was encountered.

The road dust along #3 main butt was rendered inert by

the mixture of shale from the overlying draw-slate, and this, accompanied by the resistance met with in the incoming motor trip at this point, prevented further propogation outbye.

Conclusions and Lessons:

The fire-boss was directly responsible for this accident in knowingly permitting these men to enter any section of the mine not previously examined by him in compliance with the law. The mine foreman should not have permitted the men to enter the mine until it had been entirely examined and reported upon by the fireboss.

On the other hand, this mine was a gaseous one in which gas was liable to be encountered at any time. Open lights should not have been permitted. Double doors should have been provided to control the main ventilating currents so that the failure of one door to close could not have caused the % accumulation in any section of the mine.

With the exclusive use of locked safety lamps and a system of operating which did not require the use of doors in controlling main air currents, the negligence of the workmen which brought about this accident would not have proved disastrous.

On the other hand, the company was to a certain extent morally responsible, as the dangerous conditions which existed were due in a measure to their plan of economy, the fire-boss not being employed during the time that the mine was not in operation and the fan not in operation, even though men were allowed to enter and leave the mine at will, as shown by the testimony that men had entered the mine on the previous day to get their tools.

On the day that the mine did resume operations, the fire-boss was requested to go to the mine at midnight to start the fan and remain with it until the day engineer arrived, and then to make his examination before the men entered. After that he and the Foreman, who was also acting in the capacity of Superintendent, were to perform the duties of cager and motorman for the rest of the shift. One might say that the foreman was responsible for permitting this, as an efficient management would see to it that no such conditions prevailed.

The writers wish to express their appreciation for the courteous treatment accorded them by the management, and especially by the Chief of the West Virginia Department of Mines and Deputy Inspectors present.

Signed: J. T. Ryan,
Geo. H. Deike.

TABLE No. 7.

GAS SAMPLES AFTER EXPLOSION, PANAMA MINE.

Sample No.	Laboratory No.	CO_2	O_2	CO	CH_4	N	Bar.	Rel. Hum.	Vel.	Cu.Ft. Air Per Min.
1	2787	.07	20.85	.00	.15	78.95	29.37		0	0
2	2788	.14	20.72	.00	.50	78.64	29.37		0	0
3	2789	.16	20.71	.00	.10	79.03	29.37		377'	17,719
4	2790	.12	20.72	.00	.12	79.04	29.37		340'	20,160
5	2802	.14	20.76	.00	.52	78.58	29.20	89%	0	0
6	2813	.07	20.85	.00	.39	78.69	29.20	89%	86'	4,515
7	2814	.07	20.85	.00	.21	78.87	29.20	89%	89'	4,675
8	2815	.17	20.45	.00	1.28	78.10	29.20	89%	0	0
9	2816	.20	19.26	.00	3.48	77.06	29.20	89%	0	0
10	2817	.19	20.77	.00	.32	78.81	29.20	89%	92'	4,830
11	2818	.22	20.50	.00	1.29	77.99	29.20	89%	0	0
12	2819	.70	19.08	.00	5.14	75.08	29.20	92%	0	0
13	2821	.57	19.85	.00	4.51	75.27	29.20	89%	0	0
14	2823	.34	19.46	.00	5.79	74.41	29.20	92%	0	0
15	2824	.35	18.81	.00	7.25	73.59	29.20	92%	0	0
16	2825	.36	20.25	.00	2.49	76.00	29.20	92%	0	0
17	2826	.05	20.82	.00	.06	79.07	29.20	100%	82'	4,800
18	2827	.29	20.37	.00	.23	79.11	29.43	95%	325'	13,325
19	2829	.10	20.84	.00	.16	78.88	29.37	89%	45'	1,809
20	2830	.05	20.85	.00	.19	78.95	29.37	89%	45'	1,809
21	2831	.09	20.49	.00	.13	79.29	29.37	94%	40'	2,350
22	2832	.07	20.81	.00	.25	78.87	29.37	94%	55'	2,624
23	2833	.15	20.77	.00	.18	78.90	29.50	97%	48'	1,980
24	2834	.25	20.65	.00	.25	78.85	29.50	97%	55'	2,874
25	2835	.14	20.71	.00	.52	78.63	29.50	97%	0	0
26	2836	6.66	18.92	.00	.00	74.42	29.50	94%	406'	22,330

INDEX TO TABLE #1.

Sample No.	Location in Mine	Methane Content cu.ft.per hr.	Explosive Gas at Low Limit of 5.6% Methane cu.ft. per hr.	Section Affected
1	On No.1 Se. Face 30' inbye #2 right	4.7	85.4	July 12, 1912. Accumulating gas in stub ends of #1 and #2 south. Ventilation not restored.
2	On #2 right 30' inbye #1 south.	18.0	327	do. Also accumulating gas in #1 and #2 right. Ventilation not restored.
3	30' inside of entry leading to air shaft.	1063.0	19327.	July 12, 1912. Part of main return.
4	120' from main shaft bottom.	1451.5	26391.	do.
3 & 4	Combine to give main return air.		45718.	This gives a total return air current of 37,879 cu.ft. on July 12.
5	On 2nd Se. 60' from face.	18.7	340.	Accumulating gas in stub ends of #1 and #2 south entry on July 17th. Ventilation not restored.
6	Return in 2nd right	1056.	27381.	1st and 2nd right.
7	do.	588.	10690.	do.
8	70' from face 1st south.	46.	Still air	1st and 2nd south.
9	At face 2nd south.	126.	"	do.
10	Return in 2nd right.	927.	16854.	1st and 2nd right.
11	75' from face 2nd south.	46.	Still air	1st and 2nd south.
12	6' from face 1st south.	135.	"	do.
13	70' from face 1st south.	162.	"	do.
14	Face of 1st south.	208.	"	do.
15	do.	261.	"	do.
16	70' from face 1st south.	100.	"	do.
17	Intake in #1 right.	173.	3145.	1st and 2nd mains and right.
18	Return from south side.	1839.	33418.	South side.
19	North main return.	195.	3545.	North side.
20	do.	197.	3549.	do.
21	Intake #1 right.	183.	3200.	1st and 2nd right.
22	Return #2 right.	394.	7163.	do.
23	Return 2nd north.	214.	3890.	1st and 2nd north.
24	Return #2 right.	431.	7836.	1st and 2nd right.
25	At face #2 right.	19.	Still air	do.

TABLE No. 2.

Proximate Analysis of Coal, Road Dust and Coked Dust from the Panama Mine.

Sample No.	Lab. No.	Moisture	Volatile Matter	Fixed Carbon	Ash	Sulphur	Designation	
1	14486	3.35	41.35	48.29	7.01	3.19	Face coal sample	(as received)
1	14486	1.78	42.02	49.08	7.12	3.24	do.	(air dried)
2	14487	3.52	41.08	48.34	7.06	3.24	Face coal sample	(as received)
2	14487	1.75	41.83	49.23	7.19	3.30	do.	(air dried)
3	14488F	3.39	41.58	48.01	7.02	3.25	Composite sample of Nos. 1 and 2	(as received)
3	14488F	1.72	42.30	48.84	7.14	3.31	do.	(air dried)
				ROAD DUST.				
4	14732F	3.26	30.15	33.25	33.34	3.06	Road dust	(as received)
4	14732F	2.38	30.42	33.56	33.64	3.09	do.	(air dried)
5	14731F	2.92	30.27	42.19	24.62	3.71	Road dust	(as received)
5	14731F	2.04	30.54	42.58	24.84	3.74	do.	(air dried)
6	14489	9.66	31.68	35.75	22.91	3.10	Road dust	(as received)
6	14489	2.12	34.32	38.74	24.82	3.36	do.	(air dried)
				COKED DUST.				
7	14352	3.14	24.51	43.64	28.71	3.17	Coked dust	(as received)
7	14352	1.66	24.88	44.31	29.15	3.22	do.	(air dried)
8	14490	4.35	25.69	38337	31.09	3.50	Coked dust	(as received)
8	14490	1.81	26.51	39.60	32.08	3.61	do.	(air dried)

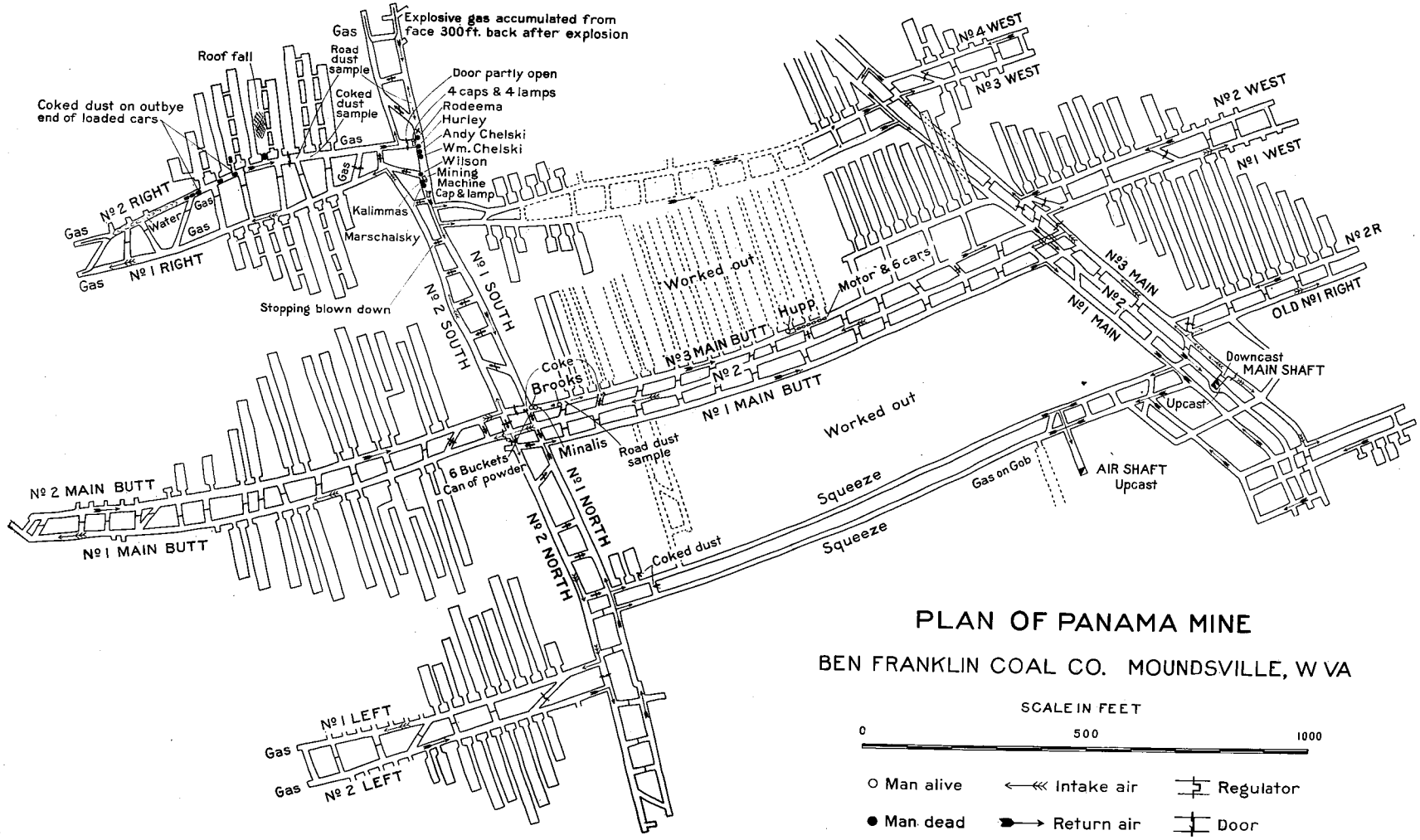
Index to Table No. 2.

Sample No.	Laboratory No.	Designation.
1	14486	Face of 2nd south air course.
2	14487	Face sample #3 room off 2nd right off #2 north.
3	14488F	Composite sample #14486 and #14487.
4	14732F	Road dust taken from #3 main butt cutting #1 south.
5	14731F	Road dust on 1st south main near 2nd right.
6	14489	Road dust along #2 east between rooms #4 and #7.
7	14352	Coked dust at junction of #3 main butt and #1 south, taken from props.
8	14490	Coked dust along #2 right between rooms #4 and #7.

TABLE No. 3.

Ultimate Analysis of Coal and Road Dust.

	Composite Face Sample #5 Lab. No. 14488 F.		Road Dust Sample #6 Lab. No. 14489	
	As Rec'd	Air Dried	As Rec'd	Air Dried
Hydrogen	5.38	5.28	4.77	4.24
Carbon	72.86	74.14	54.37	58.91
Nitrogen	1.32	1.34	0.99	1.07
Oxygen	10.17	8.81	13.86	7.60
Sulphur	5.25	3.31	3.10	3.36
Ash	7.02	7.14	22.91	24.82
Calories	7577	7524	5510	5898
B.t.u.	13379	13543	9918	10616



PLAN OF PANAMA MINE

BEN FRANKLIN COAL CO. MOUNDSVILLE, W VA

SCALE IN FEET

0 500 1000

O Man alive ⟵ Intake air Regulator

● Man dead ⟶ Return air Door

7/11/1912
Panama Mine
Ben Franklin Coal
Victim Names – (Partial List)

1. Mike Rodema
2. Alva Hurley
3. Wesley Williams
4. Joe Manachalsky
5. Andrew Cheskie
6. William Cheskie
7. Joe Caralunas