



Reports

Ernest #2 Mine

Explosion at Ernest Mine No. 2

Ernest, Penna.

by Clarence Hall.

An explosion occurred February 5, 1910 in Ernest mine No. 2, Ernest, Indiana County, Pennsylvania, in which 11 men were killed. This bituminous coal mine is owned and operated by the Jefferson & Clearfield Coal and Iron Company. It is a drift mine and is listed as a gaseous mine in the 1909 report of the State inspector. The coal bed is the Upper Freeport and has an average thickness of 69 inches. The Freeport beds are said to come almost together in this mine, the parting ~~varying~~ from 10 inches to 4 feet. The entire mine is very wet.

Layout and System of Working

The accompanying sketch shows the rooms and double entry plan at the part affected by the explosion. The mine is ventilated by a 16 ft. Capell, ^{fan} ~~from~~, which at 90 r.p.m. forces 146,000 cu. ft. of air per minute into the mine. The intake air is split at various places to distribute fresh air at the working faces. The average number of mine employees underground is about 200, and it is stated that 118 were in the mine at the time of the explosion. Coal punchers are employed and operated by compressed air. The pump at the first breakthrough out from the the twenty-second right entry is also operated by compressed air. The breakthroughs between the east main and air course were ⁹⁰ feet apart, and the rooms were 50 feet apart, center to center. Black blasting powder was used for all dry holes; coalite-No.2-D for wet holes and coalite-No. 1 for all rock work. Coal dust from the machinery was

used for tamping. The entries were driven 20 feet wide and 5 feet 7 inches high.

The Origin and Extent of the Explosion.

The evidence obtained from a thorough examination of the mine indicates that this was a gas explosion augmented by dust, possibly due to an overcharge of black powder. The main course of ~~th~~ the explosion was out of room No. 5 into the eleventh left entry through the ~~wet~~ ^{east} main entry to 50 feet beyond the twelfth left entry, a total distance of 570 feet. According to the automatic graphic water gauge record at ^{the} fan the explosion occurred at 7:45 a.m. The record was continuous indicating that the fan had not stopped.

The men working in the ninth and tenth left entries at the time of the explosion knew nothing about the explosion until they were called to help the rescue party put up brattice cloth. An important observation is that nearly all of the charred dust on the right rib of eleventh left entry was found on exposures facing room No. 5; that directly opposite room No. 5 charred dust was found on exposures facing away from this entry.

Investigation after the Explosion

Messrs. Clarence Hall, W. O. Snelling, A. C. Ramsey, and S. P. Howell of the U. S. Geological Survey accompanied by Messrs. John Read, general manager, and William McClevey, fire boss, entered the mine at 2:05 P. M. February 6, 1910, and proceeded to the face of the east main entry also known as main haulage road. The investigation started from this point at 3:00 P.M.

Mr. Hall and party remained in the mine from 2:05 P. M. to about 7:00 P. M. Dr. J. A. Holmes arrived at Ernest at 5:00 P. M. while the party was in the mine, but could not enter until Mr. Read came out. When they came out he entered the mine at once with Wm. McClevey and one assistant, remaining until 10:30 P. M. He visited room No. 5 on the eleventh entry and other involved portions of the mine

Details of Evidence

This face of the east main entry ahead of the sixteenth left is 20 feet wide, 5 feet 7 inches high, and had been two-thirds undercut with a puncher. Two cars were on the track; one empty, and one one-quarter full of coal dust. There was no evidence of violence or heat. Mr. Hall tested for gas at this face. The Wolf lamp showed no cap. Sample No. 8619 was taken here at 3:20 P. M. by Mr. Hall. There were no drill holes at this face. There was no evidence of heat or violence in the twenty-second right, sixteenth left and fifteenth left entries off the east main entry.

At the face of the thirteenth left entry off east main we found a coal puncher, leather apron, pick, and shovel. There was one drill-hole near center of face. A singing noise was heard as though gas was escaping from the right and left of face. Sample No. 8620 was taken near the face at ^{the} pick hole. Mr. Hall's Wolf lamp showed a cap of 1/4 to 3/8 inch immediately after sample was taken, when held at pick hole. One hundred and ten feet from face two dinner pails and a coat were found. Also one full five-pound powder flask containing FFF black blasting powder.

The only break-through to the fourteenth left entry is

150 feet from face. One empty powder ^{can} marked "Standard powder" ~~ear~~ ^{was} found in the break-through.

Gas was heard escaping from the face of the fourteenth left entry of east ~~mine~~ ^{the main}. Hall tested for gas with a Wolf lamp which gave a slight elongation. A drill was found in a hole near the left rib. The puncher was near the face. Two loaded cars were on the track near the face. One dinner pail and coat were found here. There was ^{no} evidence of heat or violence. Two dinner pails ^{were} found ^{the} at entrance of room No. 2 of this entry. At the face we found an iron needle, and iron tamping bar in a hole near the right rib. ^a Cartridge of black blasting powder 15 inches long by 1-1/2 inches in diameter was found in the center hole. Half of this face was undercut. The room was 40 feet wide. We also found two oil cans, one five-pound powder flask, a miner's pick, and two coats.

The stopping in the first break-through outbye the thirteenth left entry was blown away from ~~East Main~~. It was made of gob and mortar. The second stopping was but little affected. Apparently there was a crack through above it. The third stopping was demolished. The first evidence of charred dust was found 50 feet before reaching the twelfth left entry on the east main. It was found on the left rib coming in on inbye exposure, heavily plastered 1/4 inch thick. There was also some mud on the roof at this place. There ~~was~~ charred dust on the outbye exposure of the rib. At the mouth of the twelfth entry there was evidence of a short circuit between trolley wire and roof. Sublimation products covered the roof. The trolley wire was separated from the roof

by a piece of board. The stopping in the break-through opposite the twelfth left entry was blown away from the east main.

Charred dust was found on the inbye side of trolley wire insulator in the east main. Heavily deposited charred dust was found ^{on} / The inbye side of collar on south side of door between the eleventh and twelfth left entries. No charred dust found on ~~the~~ outbye side. Charred dust was found on inbye exposure on south rib. The door was demolished and said to have been found on the track on inbye side of door frame.

The break-through opposite the eleventh left entry was demolished. Charred dust was found on the collar facing the eleventh left entry.

The insulator opposite room No. 1 in the eleventh left entry had charred dust on the inbye exposure. There was charred dust on inbye exposure of the insulator 30 feet inbye room No. 1 at the end of the line. Opposite room No. ^{there was} 2 one-half inch of charred dust on inbye exposure of the gob. There was also one-half inch of charred dust on inbye exposures opposite room No. 3. A portion was curved over from top as though fused. A smaller amount of charred dust was found on inbye exposures opposite room No. 4. Opposite room No. 5 the inbye exposures on the right rib gob were covered with charred dust. The charred dust was about evenly distributed on the two exposures between rooms Nos. 5 and 6. All right rib outbye exposures were coated with charred dust. Opposite room ^{neck} No. 6 charred dust was found on outbye exposures. Between the room necks Nos. 6 and 7, on right rib, smaller quantities of charred dust were found on both inbye and outbye exposures.

The outbye covering was a little stronger. Beyond room neck No. 7 very little dust was found on outbye side.

The face of the eleventh left entry showed no signs of blistering or charring, but at a small break-through into the twelfth left 10 feet from face a little charred dust was found. It was about 15 feet deep, had been undercut and the puncher was found on the truck on track. The face of this room neck had not been drilled. Room neck No. 6 was about 25 feet deep. The coal had been partly loaded out but no cars were in this neck. There were ^{no} signs of charred dust. Both sides of the room neck showed stalactitic carbon. A very thin layer of soot was found at the upper surface of the face. Soot, and a little stalactitic carbon, was found on left rib between room neck No. 6 and room No. 5.

At the neck of room No. 5 the left rib gob showed small quantities of charred dust on both inbye and outbye exposures. Thirty feet farther in coke was noticed to less extent, on the right rib. A danger board was found here. Mr. Hall's Wolf lamp showed $1/4$ inch cap. The fire boss said that he had been in this room a few minutes before, 60 feet from the entry, and found 6 inches of gas. He stated that the room was 120 feet deep and 30 feet wide. His report showed that at 5:45 A. M. the day before, there was no gas in this room. Sample No. 8663 ^{was} taken by Ramsay 65 feet from the entry. He was accompanied by the fire boss whose Clanny lamp showed $1/4$ -inch cap. Mr. Reed and Mr. Hall entered room No. 5 after exploring room No. 4. Mr. Hall found coal from a center shot not loaded out. He estimated the quantity at 8 or 10 tons. There were large quantities of gas in the room at this

^{ten}time ~~10~~ feet from face, ^{and the} near ^{the} center of ~~face~~, a Wolf lamp showed a 1 inch cap, 3 feet from floor. A miner's open lamp was found 70 feet from mouth of the room. All the coal shot down was in large lumps. There was gob on both sides of room. Small quantities of charred dust were found on both gob and coal. Mr. Reed stated that no one was working in this room on day of explosion.

Small quantities of charred dust were found on both inbye and outbye exposures on west rib between rooms Nos. 5 and 4. Room No. 4 was 30 feet deep, and the work of widening the room had just started from the neck. It was stated that no men were working in this room at the time of the explosion. Charred dust was found in considerable quantities on inbye exposures near room No. 4, and at other places on west rib between rooms Nos. 4 and 3.

Room No. 3 in the eleventh left entry was 50 feet deep. There was no evidence of men having worked there on ^{the} day of ^{the} explosion. From this room there was a small break-through into room No. 2. The only charred dust found was on the left rib of the room neck. No charred dust could be found on west rib between rooms Nos. 3 and 2.

Room No. 2 was 80 feet deep. Charred dust was found on the left rib in about 40 feet on both exposures. Charred dust was found on the left rib of the neck, ^{was also found} a small amount ^{on} the right rib of the neck. A little charred dust ^{was} found on ^{the} inbye side of one lump of bone ^{could} close to ^{the} floor between rooms Nos. 2 and 1.

Room No. 1 was 125 feet deep. There was no evidence of work having been done in this room on the day of the explosion.

Charred dust was found on ^{the} right and left ribs on the inbye exposures only.

The door in the shoo-fly between entry No. 12 and entry No. 11 was blown down toward No. 12 entry. There was no charred dust on west rib at this point. Twenty feet from No. 11 entry a miner's cap was found. Further on another cap and three dinner pails were found. No charred dust or other sign of heat was found. Between No. 11 entry and 100 feet out from it nine bodies were said to have been found. They were not burned in the slightest and are believed to have been overcome by the after-damp.

While the explosion evidently occurred in room No. 5 the face of the room had not been undercut or drilled. The coal from the "buster" shot in room No. 5 was shot the day before. Had the "buster" shot been fired at the time of the explosion, it could have ignited the gas as it was an overcharged shot of black blasting powder.

The two men found at the neck of the room were running the puncher which was found on the truck in room No. 7. These two men were the only ones burned. One theory of the explosion is that the men running the puncher in room neck No. 7 came into room No. 5 ^{with an} and the open light ^{and} of one of them ignited the gas.

~~The evidence indicates that~~ The analyses of the gas samples are as follows:

	Sample No.		
	8619	8620	8663
CO ₂ -----	0.15	0.21	0.09
O ₂ -----	20.00	18.70	18.90
CO -----	-----	-----	-----
CH ₄ -----	0.45	2.07	2.08
N ₂ -----	79.40	79.02	78.93
	100.00	100.00	100.00

REPORT OF INVESTIGATION OF THE MINE EXPLOSION AT ERNEST MINE
No. 2 OF THE JEFFERSON AND CLEARFIELD COAL AND IRON CO.,
ERNEST, INDIANA CO., PENNA.

February 5, 1910.

Messrs. C. Hall, W. O. Snelling, A. C. Ramsay, and S. P. Howell of the U. S. Geological Survey, accompanied by Messrs. John Reed, General Manager, and William McClevey, Fire Boss, entered the mine at 2:05 p. m., February 6, 1910, and proceeded to the face of the East Main, also known as Main Haulage Road. The investigation started from this point at 3:00 p. m.

EAST MAIN AHEAD OF No. 16-L

This face of Main is 20 feet wide, 5 feet 7 inches high, and had been two-thirds undercut with a puncher. Two cars were on the track; one empty, and one one-quarter full of bug-dust. There was no evidence of violence or heat.

Mr. Hall tested for gas at this face. The Wolf lamp showed no cap. Sample #8619 taken here at 3:20 p. m. by Mr. Hall. There were no drill holes at this face.

No. 22-R, OFF EAST MAIN

A drill hole at face near right rib was 3 feet deep. A drill was found in this hole. There were two loaded cars on track. No evidence of heat or violence.

No. 16-L, OFF EAST MAIN.

This was a stub entry. No evidence of heat or violence.

No. 15-L, OFF EAST MAIN

This entry is 20 feet wide and 6 feet 7 inches high. In it was found one empty Standard black blasting powder can. It was new and had been opened with a pick. The entire face was undercut. The puncher was nearby. One empty car was on track. No evidence of heat or violence.

FIRST BREAK*THROUGH OUT FROM 22-R

The pump was here. No evidence of heat or violence.

SECOND BREAK-THROUGH OUT FROM 22-R

There was a door in this stopping. Stopping partially blown down. No evidence of heat.

THIRD BREAK-THROUGH OUT FROM 22-R

This stopping was of bone. Reciprocating air-drill found here. No evidence of heat. This stopping was blown down.

DOOR BETWEEN 12-L AND 14-L, ON EAST MAIN

There was a door in this stopping. The stopping and the door in good condition. No evidence of charred dust could be found. When proceeding to face of East Main, the door in this stopping was left open in error. Some of the gob had fallen onto track.

BREAK-THROUGH BETWEEN 12-L and 14-L INTO AIR COURSE

This was of bone and blown down. Brattice cloth up at time of investigation.

No. 13-L OFF EAST MAIN

At the face found puncher, leather apron, pick, and shovel. There

was one drill-hole near center of face. Singing noise as though gas was escaping from right and left of face. Sample #8620 taken near face of #13-L. at pick hole. Taken slowly and high up by Dr. Snelling. Obtained by removing stopper and tipping slowly for about one minute. Mr. Hall's Wolf lamp showed cap of 1/4 to 3/8 inch immediately after sample was taken when held at pick hole. One hundred and ten feet from face, two dinner pails and a coat were found. Also one full five pound powder flask containing 3F black blasting powder.

The only break-through to #14-L. is 150 feet from face. One empty powder can found in break-through marked Standard powder.

No. 14-L. OFF EAST MAIN

Singing noise as though gas was escaping from face. Hall tested for gas with Wolf lamp which gave a slight elongation. Drill found in hole near left rib. Puncher near face. Present cut said to have been loaded the day before and at this time two loaded cars were near face on track. One dinner pail and one coat were found here. No evidence of heat or violence.

No. 2 Room off No. 14-L.

Two dinner pails found at entrance. At face found iron needle and iron tamping bar in hole near right rib. In the center hole found cartridge of black blasting powder 15 inches long by 1-1/2 inches in diameter. Half of the face was undercut. The room was 40 feet wide. Here was found two oil cans, one five pound powder flask, a miner's pick, and two coats.

FIRST BREAK-THROUGH OUT FROM No. 13-L

This stopping was blown away from East Main. It was made of gob and mortar.

SECOND BREAK-THROUGH OUT FROM No. 13-L

This stopping was little affected. Apparently there was a crack through above it.

THIRD BREAK-THROUGH OUT FROM No. 13-L

This stopping was demolished. Brattice cloth now up.

The first evidence of charred dust was found 50 feet before reaching No. 12 Left Entry on East Main. It was found on the left rib coming in on inbye exposure, heavily plastered 1/4 inch thick. Med on roof at this place. No charred dust on outbye exposure.

At mouth of No. 12-L. was evidence of short circuit between trolley wire and roof. Sublimation products cover roof. Trolley wire separated from roof by piece of board.

BREAK-THROUGH OPPOSITE No. 12-L

This had been blown away from East Main. Brattice cloth now up.

EAST MAIN

Charred dust in inbye side of trolley wire insulator. On inbye side of collar on South side of door between No. 11-L and No. 12 L. heavily deposited charred dust found. No charred dust found on outbye side. Charred dust found on inbye exposure on South rib. The door was hinged on North side. The door was demolished. Said to have been found on the track on inbye side of door frame. At the present time it was thrown to North of track.

BREAK-THROUGH OPPOSITE No. 11-L

This was demolished. Brattice cloth now up. On collar facing #11-L. charred dust found.

No. 11-LEFT

Insulator opposite room No. 1 had charred dust on inbye exposure. There was charred dust on inbye exposure of insulator 30 feet inbye room No. 1 at end of line. Opposite room No. 2 on gob much charred dust on inbye exposures, one-half inch thick. Evidence of much heat. Opposite room No. 3 much more charred dust on inbye exposures one-half inch thick. A portion was curved over from top as though fused. Evidence of much heat. Opposite room No. 4 charred dust on inbye exposures but not so much. Twenty feet further on charred dust on inbye exposures. Opposite room No. 5 charred dust on inbye and outbye exposures, on right rib gob. The charred dust was about evenly distributed on the two exposures. Between rooms Nos. 5 and 6, all right rib outbye exposures accommodated charred dust. Opposite room neck No. 6 charred dust was found on outbye exposures. The outbye was a little stronger. Beyond room neck No. 7 very little charred dust found and that on outbye side.

The face of No. 11-L showed no signs of blistering or charring and at small break-through 10 feet from face into No. 12-L, a little charred dust was found.

ROOM NECK No. 7

It is about 15 feet deep, had been undercut and puncher was found on truck on track. The face of this room neck had not been drilled.

ROOM NECK No. 6

It is about 25 feet deep, the coal had been partly loaded out but no cars in this neck. No signs of charred dust. Both sides of room neck showed stalactitic carbon. At face, upper surface a very thin layer of soot.

BETWEEN ROOM NECK No. 6 and ROOM No. 5

Soot and a little stalactitic carbon was found on left rib.

ROOM No. 5

At neck the left rib gob showed small quantities of charred dust on both inbye and outbye exposures. Thirty feet farther in the same thing was noticed to a less extent on the right rib. Came to a danger board here at 6:10 p. m. Hall's Wolf lamp showed 1/4 inch cap. The fire boss said that he had been in this room a few minutes before, 60 feet from entry, and found 6 inches of gas and as he proceeded farther in, the lamp inflamed. He stated that the room was 120 feet deep. General Manager Reed states that at 5:45 a. m. the day before, there was no gas in this room as the fire boss's report would show. Sample #8663 taken by Ramsay 65 feet from entry. He was accompanied by the fire boss whose Clanny lamp showed cap of 1/4 inch

After the party had passed room No. 4, Mr. Reed took Mr. Hall back and into room No. 5. The room was 30 feet wide. Mr. Hall found coal from a center buster shot not loaded out. He estimated the quantity at from 8 to 10 tons. There were large quantities of gas in the room. At a position 10 feet from face, near center of face, a Wolf lamp showed a 1 inch cap, three feet from floor. A miner's open lamp was found 70 feet from mouth of room. All the coal show down was in large lumps. There was gob on both sides of room. Small quantities of charred dust were found on gob and coal. Mr. Reed stated that no one was working in this room on day of explosion.

BETWEEN ROOMS Nos. 5 and 4

Small quantities of charred dust were found on both inbye and outbye exposures on west rib.

ROOM No. 4

It was 30 feet deep. They had just started to widen the room from neck. It was stated that no men were working in this room at the time of the explosion.

BETWEEN ROOMS Nos. 4 and 3

Charred dust was found in considerable quantities on inbye exposures near room No. 4, and at other places on west rib.

ROOM No. 3

It was 50 feet deep. Dinner pail found in neck. No evidence of men having worked there on day of explosion. From this room there was a small break-through into room No. 2. The only charred dust found was on left rib of room neck.

BETWEEN ROOMS Nos. 3 and 2

No charred dust could be found on west rib.

ROOM No. 2

It was 80 feet deep. Charred dust was found on the left rib in about 40 feet on both exposures. Charred dust found on left rib of neck. Very small quantities found on right rib of neck.

BETWEEN ROOMS Nos. 2 and 1

A little charred dust found on inbye side of one lump of bone close to floor.

ROOM No. 1

This room was 125 feet deep. No evidence of work having been done

in this room on day of explosion. Charred dust found on right and left ribs on inbye exposures only.

SHOO-FLY BETWEEN No. 12 ENTRY AND No. 11 ENTRY

The door in this shoo-fly was blown down toward No. 12 Entry. Brattice cloth now up.

BETWEEN SHOO-FLY AND EAST MAIN ON 11-L

There was no charred dust on west rib.

EAST MAIN OUT FROM No. 11 ENTRY.

Twenty feet from No. 11 entry a miner's cap was found. Further on another cap and three dinner pails were found. No charred dust or other sign of heat found. Between No. 11 Entry and 100 feet out from it, nine bodies were said to have been found. They were not burned in the slightest and are believed to have been overcome by afterdamp.

Out of mine at 8:00 p. m.

-:- N O T E S -:-

According to automatic graphic water gage record at fan, the explosion occurred at 7:45 a. m., February 5, 1910. The record was continuous indicating that the fan had not stopped. As ^{was} the custom, the record was taken off at 8:30 a. m. and a new disc put on.

At various times during the investigation the General Manager made the following statements:

"The Freeport seams come together and are so found in this mine.

They are separated by a parting which varies in thickness from 4 to 10 inches.

"That for rock work Coalite No. 1 is used; for wet holes in coal, Coalite No. 2-D is used; and for all dry holes, black blasting powder is used. Bug dust is used for tamping.

"That the face of room No. 5 had not been undercut or drilled. The two men found at the neck of room No. 5 were running the puncher which was found on truck in room neck No. 7. These two men were the only ones burned.

"That his explanation of the explosion was that the men running the puncher in room neck No. 7 came into room No. 5 and the open light of one of them ignited the gas.

"That the coal from the buster shot in room No. 5 was shot the day before.

"That there were 118 men in the mine at the time of explosion.

At various times during the investigation, the fire boss made the following statements:

"That at the time of the explosion, at least 14 men were working between No. 9-L and face of East Main in rooms and entries.

"That at the time of the explosion, two men were working at the face of East Main; with them was Mike Harrington a boy. The two men escaped out the East Main; the boy was one of the nine found in the East Main.

"That two men were working at the face of No. 22-R. Both escaped through the East Main. Similarly two men working at the face of No. 15-L. and one man working at the face of No. 16-L. escaped.

"That two men working in No. 13-L escaped the same way; as did two men working in No. 2 room off No. 14-L.

"That men in No. 10-L and No. 9-L were working at the time of the explosion and knew nothing about the explosion until they were called to help the rescue party put up brattice cloth. This statement was also made by the General Manager.

"That the break-throughs between the East Main and aircourse were 90 feet apart.

"That the rooms off No. 11-L entry were 50 feet apart center to center."

Ernest No. 2 is a drift mine. Room-and-pillar method of mining was used. Split system of ventilation. Punchers are operated by compressed air. Pump at first break-through out from 22-R is operated by compressed air. A Capell fan was used as a blower. The entire mine was very wet.

The judgment of the U. S. G. S. officials is that the explosion was a gas explosion in room No. 5 off No. 11-L entry, but dust entered into the explosion. The main course of the explosion was out of room No. 5 into 11-L to East Main to 50 feet beyond 12-L., a maximum distance of 570 feet.

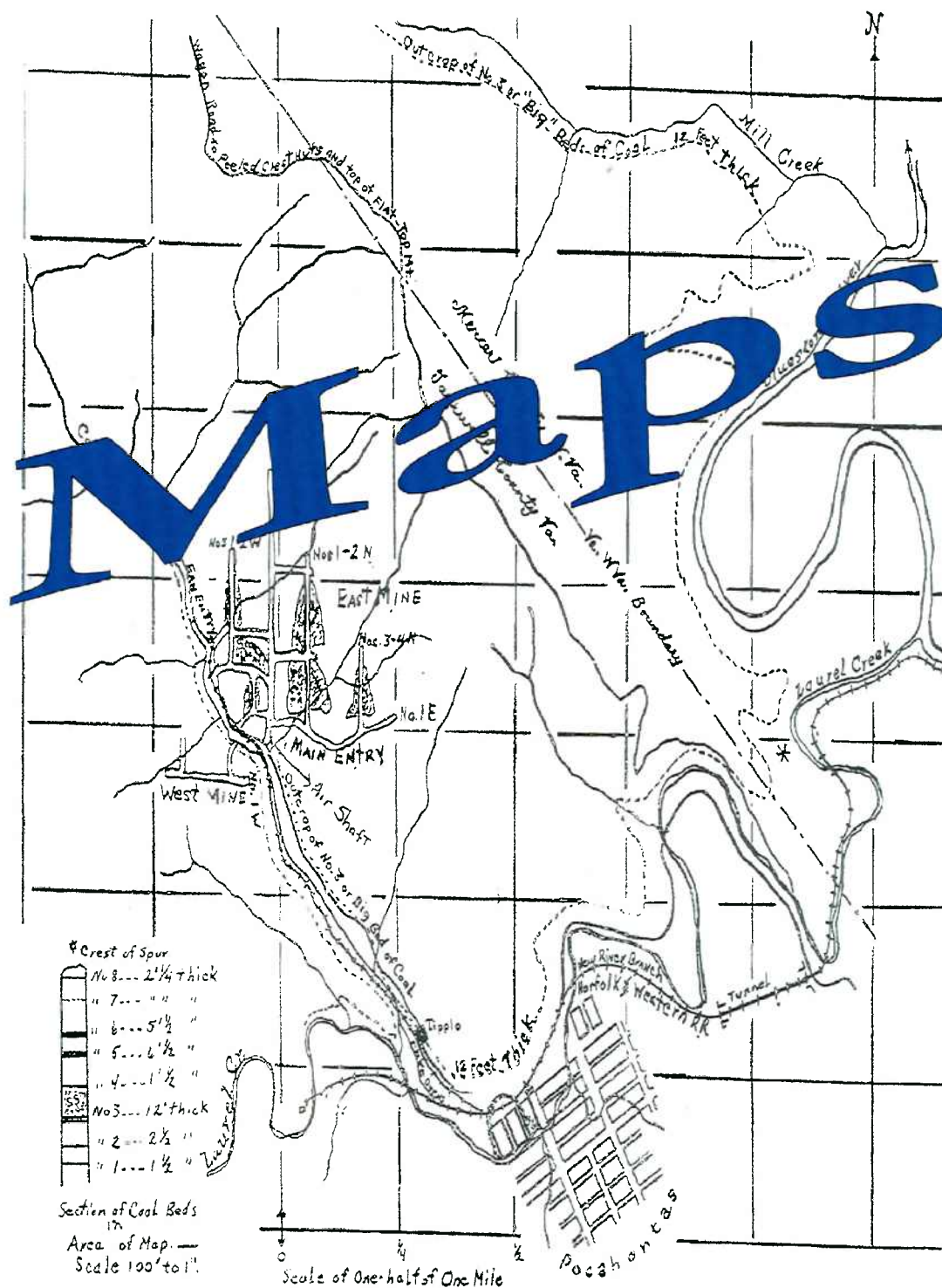
Had the buster shot been fired at the time of the explosion, the evidence is that, as it was an overcharged shot of black blasting powder, it could have caused the explosion of the gas.

An important observation is that nearly all charred dust on the right rib of 11-L entry was found on exposures facing Room No. 5; that directly opposite room No. 5 charred dust was found on both exposures; and that on the East Main, all charred dust was on exposures facing away from 11-L entry.

The analyses of the samples are as follows:

		SAMPLE NUMBERS		
		: 8619	: 8620	: 8623
CO ₂	- - - - -	0.15	0.21	0.09
O ₂	- - - - -	20.00	18.70	18.90
CO	- - - - -	-----	-----	-----
CH ₄	- - - - -	.45	2.07	2.08
N ₂	- - - - -	79.40	79.02	78.93
		100.00	100.00	100.00

The foregoing is a copy of report submitted to Dr. Holmes by Mr.
Clarence Hall on February 11, 1910.



Not Scanned