



Kinloch Mine

02-20-1928

REPORT ON GAS AND JUST EXPLOSION AT THE KINLOCH MINE, VALLEY CAME COAL COMPANY, PARNATSUS, PENNSYLVANIA. February 20, 1928.

By

G. S. McCaa and H. C. Howarth.

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REPORT ON GAS AND DUST EXPLOSION AT THE KINLOCH MINE, VALLEY CAMP COAL COMPANY, PARNASSUS, PENNSYLVANIA.

February 20, 1928

By

G. S. McCaa and H. C. Howarth.

Introduction.

A gas and dust explosion occurred at 9:30 p.m. February 20. 1928 at the Minloch mine of the Valley Camp Coal Company. Parnassus, Pennsylvania. Ten men were killed in Kirloch mine and two suffocated in the Boyd mine which holes into the Velley Camp No. 1 mine, which is directly connected to the Vinloch mine. Of the ten men killed in the Kinloch mine, five met instant death, 2 traveled a distance of about 450 feet before they were overcome by afterdamp and three traveled about 100 feet before they were overcome by afterdamp. One of the two men suffocated in the Boyd mine had traveled outby a distance of about 400 feet after realizing that something was wrong. Nine as assand without assistance from the Kinloch mine. Two escaped without assistance from the Boyd mine. Two escaped without assistance from the Valley Camp No. 1 mine. One man was rescued from Valley Camp No. 1 mine by a gas mask crew furniching him with a self-rescuer and then directing him through the return airway up the shaft. One man in the Boyd mine was rescued by two others making their way out of the mine.

The origin of the explosion was at Ho. 16 room 17 N.E. off 11 face. The explosion was started when a cutting machine ignited

an accumulation of explosive gas. Machine men were moving a Goodman closed type non-permissible outting machine towards the face under its own power and obtaining the same from the trolley wire by sliding one terminal of the cable along the trolley wire. when sparks from the trolley wire ignited gas which had accumulated. This gas tailed back from the face of the entry a distance of 260 feet to No. 16 room. The face of the butts 17 and 18 N.E. was in a clay vein that was generating mothane. The complete explosion forces were confined to the Kinloch mine except a short distance through connecting openings of the Valley Camp No. 1 mine. All flame was confined to the Kinloch mine. The explosion traveled over an area of approximately one by one and a quarter miles. The vast area for expansion with the damp basin relieved the pressure and helped to prevent propagation through the mine. Propagation was due to coal dust and an atmosphere more or less charged with methane. The mine was not systematically rock-dusted. About a year prior to the explosion the haulageroads were rock-dusted but no attempt was made to maintain the incombustible contents of the dust at any definite standard. There were a mumber of local depressions in the coal bed and as a general rule the mine was wet at such places but water was not used on the cutter bars of the coal cutting machines. or for sprinkling the readways to allay the dust.

Notice of the explosion and request for aid was made by Mr. J. F. Bryson of the Mine Safety Appliances Company who lives at Parmassus and was called immediately after the explosion to render assistance. After investigating the inside conditions and returning

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to the surface Mr. Bryson, at the request of the Valley Camp Coal Company, called Mr. McCas at 1:15 a.m. giving information regarding the explosion and requested that he come to the disaster bringing a few men and five sets of rescue apparatus. The following party left the Bureau of Mines building at 3:30 a.m. - G. S. McCaa, H. C. Rowarth, Russell Whornburg, L. P. Culp and George Deike of the Mine Safety Appliances Company. The party arrived at the Minloch mine about 4:30 a.m. Tuesday, February 21, 1928. Mr. H. Burdelsky of the Bureau of Mines was also present during the recovery work having arrived about noon on February 21st. After a conference with the officials on the surface the situation was sized up at once regarding the return ventilation on the close that was being used for a traveling way by the rescue workers. The mine superintendent, Mr. Schweinburg, who was in the mine, upon being called on the phone and informed regarding the slope situation, stated that he would return to the surface with all mon. Mr. Stephon Arkwright, general superintendent of the Morgantown Division, and other officials after a conference decided to stop the Kinloch force fan thus making the slope an intake for the exhaust fan at No. 1 mine. The Kinloch fan was stopped from about 5:00 a.m. to 4:30 p.m. during which time an attempt was made to recover the mine with air produced by the Valley Camp No. 1 mine exhaust fan. It was finally decided after ponetrating into the affected area that the quantity of air was insufficient and doors and stoppings were arranged at the bottom of the slope in order to convert the haulageroads from normal

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return airways into intake airways. The Kinloch fan was started and the increased ventilation made the recovery work more rapid and all ten bodies were taken out and the mine recovered about 6:00 a.m. Thursday. February 23, 1928.

Boyd Mine.

The following morning about 5:00 a.m. after the explosion, two miners not knowing an explosion had occurred in the Kinloch mine, entered the Boyd mine and had traveled over 3,000 feet towards their working place when they lost their lives from the effects of afterdamp. This loss of life occurred seven to eight hours after the explosion, and three other con and a mule had a very narrow escape from death from the same source. One man had started into the mine shead of the two with a mule and car. The two men when they encountered the afterdamy started back out of the mine and on the way out they discovered the third man unconscious, lying slong the roadway. They placed him in the car and continued on the way out of the mine. All three mon were affected but quickly revived after reaching the fresh air. About 10130 Mr. Boyd and Wa. Jarret, company inspector of the Valley Camp mine, entered the mine wearing gas masks and located one of the miners reporting that the man was dead. On Thursday morning about 8:30 a.m. a rescue party carrying gas masks for protection entered the Boyd mine and recovered the bodies of the two miners.

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Location of Mine.

Kinloch mine is located at Kinloch about one mile from Parnaseus, Ponasylvania. The Pennsylvania Mailroad is the only railroad having connection with this mine.

The principal officers of the company are:- J. A. Paisley, president, B. of R. T. Building, 820 West Superior Avenue, Cleveland, Ohio; J. Arkwright, general manager, Morgantown, V. Va.; J. H. Schweinsburg, mine superintendent, Parnassus, Pa.

Total number of employees 360, inside 325, outside 36. Average daily output 1600 tons.

Surface Openings.

The Kinloch mine was opened in 1916; the surface openings are a shaft and slope. The mine is connected direct by haulage road and several face openings into the Valley Camp No. 1 mine. These openings are closed by heavy double doors.

Valley Camp No. 1 mine, 3 shafts and numerous crop openings also holes directly into the Boyd mine.

The Boyd mine, drift openings, mumerous crop openings holes direct into the Valley Camp No. 1 mine.

The Kinloch mine shaft intake opening has a force fan over it and is not equipped with cage or stairway for escapeway.

The Zinloch mine slope is on the return air and is used for haulage; also has coal conveyor line with coal dump at bottom of slope.

Description of Coal Bed.

The mine is operating the double Freeport seam which at this mine has an average thickness of 84 inches. The coal is a high volatile bituminous coal and is very friable. Methods of Mining.

A map of the mine showing the general plan of the workings will be found in the Appendix. The system of mining is room and pillar laid out with double entry panel system. The coal is undercut by enclosed non-permissible coal cutting machines after which it is shot down and loaded out by the minors.

Machinery Underground.

The machinery underground is most all of the nonpermissible type. The electric wiring, where it had not been torn down by the explosion, was well installed. Most of the trolley and power lines were in air currents returning from workings which liberated methane. The electric machines are as follows: 18 Sullivans Ironclad and 10 Goodman Shortwall. Three of the Sullivans are supposed to be of the approved type.

Haulare.

The coal is houled and gathered by electric trolley and cable reel locomotives. The cars are the wooden end type and hold approximately 3 tons. The clearance between cars and rib is 2 to 3 feet in most parts of the mine. The bottom of the slope has an inside coal dump with conveyor line haulsge to the

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tipple on the surface.

Lighting.

The mine is worked exclusively with permissible electric cap lamps. The foreman, assistant foreman, firebosses and face bosses are equipped with permissible flame safety lamps. Each machine crew is provided with a magnetically locked flame safety lamp. Fixed incandescent electric lights are installed at pumps, principal switches along the haulage and road near the bettom of the slope.

Explosives.

The permissible explosives used at this mine are Grasselli 7 L.F. and one type of the Union Permissible explosives. The size of the cartridges are 1-1/2 by 8 inches. Drainage.

Owing to muserous local depressions or dips in the coal bed, there are many places in the mine that are naturally wet but the high places between these low spots are dry and dusty. The water is carried by ditches to the local pumping station and conveyed to the surface by control pumping stations.

Dust:

The mine was rock-dusted only on the haulage roads about 12 to 18 months previous to the explosion. No attempt was made to maintain the incombustible material in the mine dust at any definite standard and the rock-dusting was not extended as the entries and rooms advanced.

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Mine Conditions.

The mine condition immediately prior to the explosion was normal. The firebosses 'report for the day did not show any unusual conditions nor unusual accumulations of gas. Property damage was extensive. While the explosion was confined to the inside workings of the Kinloch mine, there were many stoppings, doors and overcasts blown out. Long stretches of trolley and power lines were torn down and a number of empty cars were badly damaged. There were many long and large fails both on the haulage road and in the air courses that will require some time to clean timber and put in safe condition for working.

In the opinion of the writers, the explosion originated by the ignition of a body of gas at No. 16 room on 17 N.E. off 11 and 12 face, and was propagated by coal dust. The flame of the explosion extended into rooms, entries and worked out areas covering a section of the mine about a mile wide and a little more than a mile long. The greatest distance that flame traveled as measured by the shortest route along the entries is about 7500 feet to a point on 11 butt between No. 4 face and No. 5 face. The explosion although covering so extensive a territory should be classed as moderately violent. Empty mine cars were demolished, stoppings and overcasts blown out and a 10-ton trolley type locomotive, which was directly in the path of one branch of the explosion, was slightly damaged.

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There were 19 men in the Einloch mine and 3 men in the Valley Camp No. 1 mine at the time of the explosion; 5 of these were killed outright and 5 died immediately after the explosion from afterdamp. Three were burned and two showed no signs of burning. Three men escaped by way of a shaft at Eo. 1 Valley Camp mine; one was rescued and brought out using a selfrescuer to travel through air polluted with afterdamp and the other 5 were rescued or came out of the mine without the use of gas masks or other breathing apparatus. About 8 or 10 hours after the explosion 2 men lost their lives in an adjoining mine and 3 men had narrow escapes from death by afterdamp which was forced into the mine in which they were going to work. Two supply men working on No. 1 butt just below 6 face on the Valley Camp side of the mine heard the concussion and went out of the mine by way of Valley Camp shaft.

The pumper at the top of 5 N.E. off No. 1 face Kinloch did not know that there had been an explosion until rescuers went to him.

The man attending pumps and a motor generator set on 1 face at 17 and 18 N.E. heard the concussion.

A man at Valley Comp shaft did not know that there had been an explosion until he entered the return and detected the odor of smoke. He started out shaft by stairs and had about reached the third landing, became weak, retreated to bottom of shaft, then down to fresh air and communicated with persons out-

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side of the mine by telephone and was rescued by a crew of men wearing gas masks and supplying him with a self-rescuer.

Men who were working in the machine shop at the bottom of Kinloch slope did not know that there had been an explosion until they were told of it.

The shortest distance from the point at which the explosion originated to the Valley Camp shaft is 16,500 feet; to Kinloch slope 7,500 feet.

The first evidence of force was found on 11 N.E. about 400 feet from No. 1 face; soot about 600 feet from No. 1 face and coked dust 1400 feet from No. 1 face on the same entry.

No. 1 body was found on 11 N.E. between 5 face and 6 face between the track and the north rib, face down, head outby and badly burned. No. 2 body was found in the middle of the track in the chute from 11 N.E. to 6 face, face down, head outby and badly burned. No. 3 body was found between the track and the rib at the Southwestern corner of 6 face and 12 N.E. face down, head outby and badly burned. There was found a Baby Wolf safety lamp in the pocket of the jacket on No. 2 body. A trolley locomotive and sand car were found on 6 face 100 feet inby 12 N.E. brake set tight, controller lever in the off position, reverse lever set for advancing inby and trolley on the wire for advancing in the same direction. It is supposed that the 3 men referred to above were traveling inby on this locomotive and sand car when they felt the first disturbance due to the explosion.

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It appears that they ran along 6 face toward 11 N.E. and met the flame of the explosion at the points where their bodies were found. Two Edison cap lamps and 2 miner's caps were found on the floor between the locomotive and the sand car. However, the force traveling inby on 6 face was sufficient to carry their dinner pails 125 feet inby beyond the locomotive. There was no evidence of force on 5 and 6 face beyond a point 400 inby 11 N.E. There were deposits of coked dust on the loaded cars in 5 face and on the sand car on 6 face at points 100 feet inby 12 N.E. The first rescue party to enter the mine after the explosion traveled to the junction of 5 face and 11 N.E. by way of back entries carrying fresh air and found that telephone service between this point and the outside was intact. They also located one of the 3 bodies referred to above.

At the intersections of 7 face and 8 face with 11 N.E. and 12 N.E., the direction of forces was outby and toward the slope. A telephone at 7 face was blown across 11 N.E. toward 10 N.E. An overcast at 8 face and 11 N.E. was blown toward 10 N.E.

At 8 face and 11 N.E. there was a division of forces; the doors on 11 N.E. and 12 N.E. inby 8 face were blown inby toward 9 face.

A long train of empty mine cars, possibly 60, on 7 face side track between 12 N.E. and 15 N.E. were demolished; one of these cars was blown into 13 left off 7 face.

The top was blown out of the overcast at 8 face and 15 N.E. chute. Most of the brick fell into the chute indicating that

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the force was greatest on 8 face. However, the force in the chute may have been sufficient to lift the brick enough to loosen them and allow them to drop back onto the chute.

In 9 face right off 15 N.E. there were heavy deposits of coked dust and the deposits of light debris indicated that the force of the explosion traveled from 15 N.E. toward 14 N.E. on 9 face for a distance of at least 200 feet.

At the intersection of 15 N.E. and 11 face, lodgment of debris indicated that the direction of forces were to the right and left of 11 face on 15 and 16 N.E. and toward 14 and 13 N.E. along 11 and 12 faces. At No. 9 room on 16 N.E. off 11 face, an empty car was blown inby. In both 15 and 16 N.E. pieces of broken ties and prope were carried into the gob beyond the entry stumps. Heavy deposits of coked dust were found in the rooms on both of these entries, also along both entries. Gas samples No. 1 and 2 taken on the gob 42 feet and 32 feet respectively beyond No. 13 room on 16 N.E. showed 24.5 per cent methane and there is every reason to believe that this gob, 300 feet by 1500 feet, is full of gas.

The direction of forces appears to be over the gob and through the rooms from 15 N.E. to 14 N.E., then out 14 N.E. and 13 N.E. across 12 and 11 faces toward 10 face. An empty car on 11 face at 13 N.E. was demolished by force traveling out of 13 N.E. However, empty cars on 14 N.E. at No. 7 room were turned over as by a force traveling inby on 14 N.E. There were heavy

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deposits of coked dust all the way in along both these entries.

At the intersection of 11 and 12 N.R. and 11 and 12 face the greatest force was down 11 and 12 N.E. toward 10 face. Two stoppings between 11 and 12 N.J. on the Southwest side of 11 face were blown toward 12 N.E. The first 4 cars of a train of 17 emptice on 12 N.E. on the Southwest side of 11 face were lifted off the track but were not damaged. Body No. 4 and body No. 5 were found in the 45 degree chute of 12 N.E. between 12 face and No. 1 room off 12 N.E. No. 4 body was found face down. head outby, and No. 5 body was found face down, head inby: both were between the track and the R.E. rib. There was a distance of 12 feet between the feet of these 2 bodies and they were about 35 feet inby the first angle of the chute. It is supposed that these men were cutting the chain pillar between 11 and 12 N.E. at 13 room when the explosion occurred, that they left the machine and ran out 12 N.E. to the chute where they were overcome by afterdamp. The machine was found with the controller lever in the on position and the undercut almost completed. The reflector of an Edison cap lamp was found about 40 feet outby from the machine. The trolley locomotive which these men used to ride to their working places was parked at No. 6 room on 12 N.E. The oil fount and ring gauge of a safety lamp were found in No. 6 room neck indicating that these machine men had left their safety lamp on the locomotive. The magnetic lock on this lamp was locked as it should be. The force traveling inby on this section of 12

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N.E. deposited dust and broke the headlight on the outby end of the locomotive parked at No. 6 room; also a large oil can near the cutting machine showed some evidence of force. There were deposits of coked dust on the outby exposures on the ribs in 12 N.E. to No. 9 room indicating that the extension of flame had been to this point if not farther.

Body No. 6 was found on 17 N.E. off 11 face opposite No. 15 room, between the track and rib hidden under brattice cloth, face down, head outby, and bedly burned. Body No. 7 was found on the same entry, 12 feet inby No. 16 room lying on its left side between the track and the north rib face outby, knees bent at right angles around a post, body at a right angle to the center line of the entry. This body was very badly burned and appeared to have been rolled some by the force of the explosion. A mining machine was on the track opposite No. 16 room and apparently was in motion at the time the explosion occurred. The controller lever was in the on position and the reverse lever set for advancing inby.

The trailing wire cable was wound on the reel and one terminal of the cable was hooked to the frame of the truck, the other was lying on the truck where it may have been dropped hurriedly. It appears that these men were moving their machine inby on 17 N.E. under its own power by sliding one terminal of the cable along the trolley wire when sparks from the trolley ignited gas which had accumulated, tailing back from the face of the entry a distance of 260 feet to No. 16 room. Light debris

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on 17 N.E. was blown toward the face of the entry and toward the mouth of the entry from No. 16 room. Doors and stoppings between 17 N.2. and 18 N.E. were blown into 18 N.E. Long strings of soot were hanging from roof and ribe inby the last out through on both 17 N.S. and 18 N.E. The face of 17 butt is 55 feet beyond the last cutthrough. The breathing apparatus crew which explored these entries found a small box of explosives at the face of 17 N.E. which had been on fire. A gas sample (Bottle No. 3) was taken at the face of 17 N.E. A gas sample (Bottle No. 4) was taken at the face of 18 N.E. where gas was issuing from a clay vein in the north corner near the roof. No. 19 N.E. was not newly cut but there was gas at the face. No. 20 N.E. was newly ent, also 12 face. Both of these entries were giving off gas at the face. No. 11 face was cut through to No. 22 N.S. This was a new cut, and the opening after the explosion was 12 inches high and 3 feet wide. The mine foreman stated that these 3 places were cut that night by the machine crew whose bodies were found at No. 16 room on 17 N.E. It is supposed that after cutting these 3 places they were on the way to the face of 17 N.E. when they encountered gas and ignited it with sparks from their trolley. Cutting the hole through at the face of No. 11 face may have short circuited part of the air that should have gone to 17 N.E. This hele also may have admitted more air into the split on 17 N.E. The hole at that time, however, would have been not more

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than 6 inches high and probably less than 3 feet wide; it may also have been partly filled with bug dust. The blowing out of stoppings and movement of light debris in 11 face and 12 face inby 18 N.E. for a distance of about 300 feet indicated that the explosion traveled inby on 11 and 12 face. Beyond this point there were extensive roof falls which had occurred after the explosion covering up the evidence of force. Deposite of coke at the face of 19 and 20 N.E. and 11 and 12 face showed that the flame of the explosion had extended to these places.

The force of the explosion traveled into 18 N.E. to the left of 11 face and also into 17 and 18 N.E. from No. 9 and 10 face. There were coke deposits on the inby exposures in 17 and 18 N.E. off 9 face.

The force of the explosion traveled into 20 N.S. from 11 face straight through 20 and 19 N.S. past 10 and 9 face, and 8 and 7 face toward 1 and 2 face. Deposits of coked dust on 20 N.E. 300 feet toward 1 face from 5 face gave evidence of flame to or beyond this point. At No. 10 room 20 N.E. off 7 face a trolley locomotive with a truck load of T iron rails showed comsiderable evidence of force. No. 10 body was found lying across the north rail of the track, head against the north rib, about 80 feet inby the locomotive. No. 9 body was about 30 feet inby the locomotive, head inby. Both of these bodies had been relied considerably by the force of the explosion. The locomotive and trucks loaded with T iron rails appeared to have been moved outby

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by the force of the explosion doing some damage to the locomotive.

Body No. 8 which was badly mutilated was found on 6 face 275 feet inby 20 N.S., the exact point being at the corner of Valley Camp 13 butt. At this point there was evidence of force toward Valley Camp mine but there was no coked dust or other evidence of heat or flame.

Very heavy deposits of coke were found on 7 face at a point about 200 feet outby 19 N.E. It appeared that the coal ribs were coked in place at this point from the roof to the floor for a distance of about 50 feet. It is probable that a fire may have started at this point had there been sufficient oxygen to support combustion.

Hajor forces were inby from 9 face into 21, 22, 23, 24, 25 and 26 N.E. off 9 face. Deposits of coke gave evidence of fleme to the face of all of these entries. The face of 23 N.E. was undercut. The cover plate was off the resistance box on the machine in this entry; also all other machines observed in the mins. The machines were enclosed motor Goodman types but no approval plates were found on any of them. No. 11 and 12 face are turned both right and left off 23 and 24 N.E. Gas was found in all six of these places. A gas sample (Bottle No. 5) was taken inby the last chute on 24 N.E. The face of 24 N.E. was newly undercut and gas was bubbling through water which had risen above the kerf. The gas in the above named places had a peculiar odor, somewhat resembling that of natural gas. A gas sample (Bottle No. 6) was taken in 11 face off 24 N.E. (analysis shown in the appendix).

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There was no evidence of force or flame in 27 and 28 N.E. off 10 face. There was no evidence of force beyond 29 and 30 N.E. on 10 face. The last evidence of flame on 10 face was found at 25 N.E. in the form of coked dust deposits on the ribs. Force in 25 N.E. to the left of 9 face was traced for a distance of about 500 feet and there was evidence of force inby in 25 N.E. to the right of 7 and 6 face. There was no positive evidence of flame in this entry.

23 and 24 N.E. between 8 and 9 face, direction of force inby from both ends to about the middle. Deposits of coked dust were found all the way through.

A half inch gas cap was obtained on a safety lamp on the gob at 21 room, 21 N.E. off 7 face.

Burned paper was found in the first aid station at 21 N.E. on 7 face.

The mine officials stated that there was no evidence of force on 7 and 8 face beyond 29 and 30 N.S.

The quantity of air in circulation in the entries where the explosion originated was insufficient to remove the gas given off at the time of the last inspection of this mine by the State Mine Inspector, when he recommended that more air be supplied in that split. There were 13 doors controlling the flow of air in this split, one of which if left open would cut the air off from the whole split; any of the other 12 doors would effect the entries where the gas was ignited. It is reported that one of these doors

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was damaged late in the afternoon of the day on which the explo-

The following tables show the results of air analysis of the air samples and road and rib dust samples taken during the investigation. The ventilation was not completely restored when the air samples were obtained. In many sections of the mine there were a great number of falls and many places were covered with water so that it was impossible to collect samples of road and rib dust at these points.

TABLE 10. 1 ALLIGES OF DUST SAMPLES MELIOCH MIN

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MALYSIS OF AIR	1431.X NO.
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47836	*	82/2	Mole in reof at fuce of 18 butt	•	19.2		F.2	72.3		8111 alr		
oue Lin	UR.	62/2	At rolf laby last divite 24 right inby 12 face	.08	20.90		8	79.2	-	Still air		
14841	6	5/39	11 face off 24 right	• 3 3	19.77		3.61	76.29		Still air		
19867	5 46	3/8	26 pt about 200 ft. from face	h *	36.4	.01	17.4	65.79				
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47892	545	3/7	16 rt 11 fact	.z3	20.05		.6 9	79.00	0006	8	69,269	
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17891	ž	3/9	26 right 7 face	IJ	34.05		Øł	78.9k	5400	X	37,100	
47895	ĿŞ.	3/9	11 right fact	.24	20.50		. 14	79.12	00ifi	n	15,840	
47905	ljk	3/10	26 right 9 face returns 26, 25, 24, 23, 21 Rt. 7 face	. 10	20.5¥		.28	79.08	5400	15	21,600	
47906	135	3/10	15 Mt. 7 face return of 11 face	.17	20 . 41		. 21	79.21	10800	22	31.680	
47907	136	3/10	Wain Friurn in slope	. 16	20 . J R		. 31	79-15	362 00	112	161,220	
17908	137	3/10	9 return 7 face	• 19	20 . 36		titi .	79.01	15120	. 6	040,56	
60644	138	3/10	20 right 7 face	.10	20.5h		.20	79.16	15210	yo	43,200	
17910	139	3/10	24 right 7 face	.11	20.71		.2	78.97	oćí	.¢9	977	
								The second	and the second se			and the second second difference of the second se

Probable Cause of the Explosion.

In the judgment of the Bureau investigators, the cause of the explosion was a failure or interruption of the ventilation allowing mothane to accumulate in the face of 17 butt off 11 face and tailing outby a distance of 260 feet. This accumulation of methane was ignited by sparks or arcs from a non-permissible coal cutting machine. The machine men were trolleying the machine towards the face of 17 butt by means of a hook terminal sliding along the trolley wire. The above method of moving the cutting machine would cause sparks or arcs to be made between the hook and the trolley wire.

The supposed interruption of ventilation may have been due to a short circuiting of air by a fall in the air course, a damaged door, or a door being left open, as there were thirteen single doors controlling the air current split to the affected area.

Recommendations.

The purpose of the investigations of mine explosions by the engineers of the Bureau of Mines is to provide a means whereby the Bureau's staff may study in detail the contributing factors, that they may formulate recommendations that will tend to reduce, if not entirely prevent, less of life and damage to property by such explosions. To ward off the possibilities of such disasters the following recommendations are offered: 1. The outstanding recommendation for this particular case is that adequate and dependable ventilation be provided by circulating air through the mine in such quantities that there will be no persibility of gas accumulating and in such a manner there will be no interruption of the normal flow of air at the working face.

2. The ventilating current should have enough splits so arranged as to give each pair or set of headings in gassy portions of the mine a strong fresh current which has not traversed old workings or gob sections.

3. The main fan should be operating exhausting so that all haulage roads will be on the intake air current.

4. It is recommended that sufficient substantial concrete or masonry overcasts be used instead of doors for directing the main ventilating current.

5. It is recommended that substantial concrete or masonry stoppings be used throughout the mine.

6. At all points where doors are necessary they should be in pairs or so arranged that there will be no interruption of the normal flow of air while men or trips of cars are passing through. Provisions should also be made for keeping the doors closed and for promptly taking cars of the ventilation in case of damage to any door.

7. When electric trolleys or non-permissible locomotives, or cutting machines of non-permissible type, are employed, they

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should be used only on strictly fresh intake air.

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placed in return air or take permissible condition at all lines. Power lines permanent stoppings. receive frequent inspections in return all snould be (beyond breakthrough to insure its maintenance in a ble type, d not be eed with

lock disastrous explosion may originate from a very m lamps be capable men who are aware of and fully : that the persons entrusted with and directed to a tion of methane. d are required for testing for gas or any o 9. When permissibl flame safety lamps : a flame safety er purpose, ll accumulailize that a tioslly-

machine toward the face, and that the machine men be instructed working. to keep and use the flame safety lamp frequently while they are be thoroughly tested for methane before moving electric cutting 10. It is recommended that the face of a working place

11. Sorbaon are provided with permise 110 electric cap

ups and their continued se is recommanded.

12. The management is commended for a plying permissible

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ŧ 22 13. The use of water on the sutter bar of all coalcutting machines to allay dust is recommended. Water should be used to wet down the coal before it is loaded and at frequent intervals during loading. Loaded cars should also be sprayed before leaving the working face.

14. In order to localize the flame of gas ignition er blown out shots, it is recommended that all readways, airways and working places be thoroughly rock-dusted. The rock-dusting should be repeated at such intervals of time that the percentage of noncombustible matter (ash plus moisture) in the mine dust will be greater than 65 per cent. When the non-combustible content of the dust in any some or section falls to or below 55 per cent, that some should be re-dusted immediately. Hock-dusting to be most effective should be maintained to within a short distance of the working faces, preferably less than 40 feet.

15. Any motor read, in which trolley or other nonpermissible electric locomotives are used, should be kept especially well rock-dusted, both as to timbers and ribs, as well as floor.

16. The effective installation of rock-dust barriers in this mine are limited in regard to localizing the flame of gas ignition. However, approved types may be used as an auxiliary to generalized rock-dusting. Some of the suitable locations for rockdust barriers are along the haulage roads, to make up the deficiency in generalized rock-dusting, where there are unusual spillage of coal, and at entrance to such sections of the mine where only

- 23 -

2 or 3 barriers will be required to effectively isolate the section from other parts of the mine.

17. It is recommended that an examination be made by a firebose and a record report made of said examination before each shift enters the mine. That before places are undersut or before firing a shot a test be made for gas by a competent person. Acknowledgmont.

The writers wish to acknowledge the hearty cooperation of all persons who assisted with the preparation of this report; also the cooperation of the officials of the Valley Camp Coal Company and the officials and inspectors of the Pennsylvania State Department of Mines. The officials of doth the company and the Department of Mines offered every facility and opportunity for observing and studying the conditions as related to this explosion. Respectfully submitted,

SSMC. Caa G. S. McCaa, District Engineer.

Howarth, Coal Mine Superintendent.

APPROVED:

INSPECTION AND SET OF FLAME SAFETY LASP FOUND IN KINLOCH MINE, VALLEY CAMP COAL CO.

Wolf Flame Safety Lamp No.701 magnet type that U. S. Bureau of Mines Approval Stamp on Shield between two standards pushed inward against gauge. The inner gauge pushed in about 1/8 to 1/4 of an inch at base over glass chimney, but no wires broken. Lamp full of dust. The glass chimney was tight against the gaskets. Lamp, top and bottom marked in position found then open and wick cleaned and lighted with match; enough gasoline in lamp to burn freely.

Lamp tested in E section small testing gallery in 6.1% CH4 and flame went up in gauge but did not ignite outside mixture of gas. Tested twice in above mixture and three times in mixtures of lower per cent of gas, $3\frac{1}{2}$ to 4 per cent. Lamp being so dirty would burn then go out.

Lamp tight on the sfreen when opening, dinged in several places. The dogs of the magnetic lock upon being opened by magnet and upon un6 ewing, dirt became lodged back of lock so that lamp could be opened without magnet, (dirt from dust after explosion).

Upon examination lamp was found to be assembled in proper manner, having all gaskets in place and gauge free from holes and no broken wires. The lamp is to be turned over to the Electric Section for futher testing.

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G. S. MCCA ., District Engineer.

Howarth

⁷ H. C. HOWARTH, Coal Mine Superintendent.



Altoona Mírror.

ALTOONA, PA., THURSDAY EVENING, FEBRUARY 23, 1928.

LAST OF BODIES OF MINERS FOUND

Remains of Ten Victims of Explosion In Kinloch and Boyd Workings Are Removed by Rescuers,

STATE INSPECTORS SAY THAT ELEVEN PERISHED

No Indication of Cause of Dis. aster Yet Officially Given. Fifteen Children Are Made. Fatherless,

(By United Press.) NEW KENSINGTON, Pa., Feb. 23. -The last bodies of the ten miners killed in an explosion in the Kinloch mine of the Valley Camp Coal company at Pernaesus Monday Eight, were recovered today. Soven to be were brought to the

Seven to be were brought 19 the surface in the last twolve hours. Three bodies had been brought out of the mine workings Tuesday. Mine broeders and resule trajects noon siter curspitting their work at Kinloch entered the Boyd mine of the Yulley Brick company, a fuw mines from where the explosion occurred, to recover the bodies of Newton Fierk and Louis Wentzel. Book and Wentzel were killed by gas which asegue through under-ground passages from the Kinloch workings into the Boyd mine. Disarce ay Number.

Disagree on Number.

Disagree on Number. Although state reliant inspectors de-chared last night they thought eleven men had perished in the Kinioch work-ings, mine company officials said for-day their directively shored only ten-making the total deaths from the dis-state tweive. The company gave the following list of dead in the Kinioch mine: "Purley Bell, John Ciseta, William Yoors, West Blackburn, Andrew Stroter, All angross; John Pool, Charles William Casey. "All the budies were bength to New Kensington undertaking rooms." A blockup showed that fitteen offi-free were made failterless by the ex-pose. Neither company officials nor state

Neither company officials nor state impectors have given any indication of the cause of the explosion.

Pharos-Gribune A NEWSPAPER FOR PUBLIC SERVICE

LOGANSPORT, INDIANA. TUESDAY, FEBRUARY 21, 1928

Audit Bureau Circulation

14 ARE ENTOMBED IN Pennsylvania mine

TWO BODIES Removed; one rescued alive

Miners Trapped by Explosion_Two Mine Rescue Teams Are Working to Save Others Imprisoned.

(By international News Service) NEW KENSINGTON, Pa., Feb. 21.—Two mine rescue teams early today rescued one man alive and removed two bodies from the Kinloch mine of the Valley Camp Coal company near here, where 14 men were entombed in an explosion last night.

Five men were reported to have escaped uninjured. Eleven men were said to still be entombed a mile and a half from the entrance to the shaft.

One of the dead men was identified as John Pool, miner. The other body and the man rescued alive had not been identified early today. The trapped miners, with the

The trapped miners, with the five who reached safety, went into the workings, a drift mine, shortly after 3 o'clock yesterday afternoon. According to company officials the 16 comprise the entire crew at work during the night hours. They were due to leave the mine about midnight. Shortly after 10 o'clock the five men rushed to the surface and, reported that their companions had been trapped. The story of the five gave little information to mine officials, excepting that something had happened and the others had been trapped. A short time later when a call was sent to the Bureau of Mines, company officials said that fire was spreading through the workings. It was reported that heavy smoke was pouring from the entrance to the shaft and that all attempts they had made to enter the mine had proved futile.

When the rescue teams were preparing to enter there was nothing to show that there was fire in the mine. Two of the teams were immediately sent below and another held in readiness on the surface to prepare for any emergency or to rolieve their fellow workers.

The Kinlock mine, one of the largest in the New Konsington district, has been operating on a non-union basis since before Christmas.