

THE HANNA, WYOMING, MINE DISASTER

An Account of the Two Explosions, the Probable Causes and the Conditions
Leading Up to Them

(Written for "Mines and Minerals," by R.L. Herrick)

Hanna, the scene of a double mine tragedy on Saturday, March 28, is situated, as shown in Fig. 3, 134 miles west of Cheyenne, on the main line of the Union Pacific Railroad. It is one of the most important of Wyoming's coal camps and is said to have an annual output of about 450,000 tons. The Union Pacific Coal Company here operates three mines, No. 1, No. 2, and No. 3, respectively. No. 1 was opened about 18 years ago, No. 2 in 1904, and No. 3 in 1906.

No. 1 mine has been the scene of three separate disasters, the first, a minor one, occurring the year it was opened, the second on June 30, 1903, when 169 lives were lost, and the last, the one described below. No.'s 2 and 3 mines have thus far had no disasters.

The Hanna coal seams form a basin or synclinal trough. The coal outcropping on the surface may be likened to the rim of an oval-shaped bowl, as it dips at angles varying from 14 to 22 degrees toward a central axis, running approximately northwest to southeast. All three mines are opened on the western side of this oval outcrop; mine No. 2 occupying the extreme western position, mine No. 1 located a mile east of it, while mine No. 3 is nearly 3 miles east of No. 1. The coal basin then, is roughly some 6 miles along its longest dimension (in east to west) extent and about 2 miles wide from outcrop to outcrop. Mine No. 1 was first opened on the west side by a slope from the outcrop in the seam at an inclination of about 14 degrees. In the first 14 years

of operation an extensive territory was opened up from this side reaching to the bottom of the basin and starting to ascend the eastern side, which was found to rise approximately 22 degrees. To facilitate the working of the coal on this side, the east side slope was started to connect in a straight line with the west slope. At the time of the 1903 disaster, the two slope headings were separated by an intervening 400 feet of coal. This east slope was provided on the surface with merely a hoist and fan, as no coal was pulled to the surface except enough to supply the boilers. The mine output was pulled up the west slope to the tippie located at this place on account of proximity to the railroad. The coal mined in the entries driven on the east slope of the basin was lowered to the bottom where the trips were made up and pulled to the west side tippie.

The coal seam worked by mine No. 1 varies from 12 to 15 feet in thickness and averages about 12 feet of workable coal. The coal is commonly known as a lignite, although classed by the United States Geological Survey as a semibituminous. It is high in volatile matter and rather friable. The following analysis of this coal is given: Moisture, 6.38; Volatile Combustible, 48.43; Fixed Carbon, 36.37; Ash, 8.82; Total 100.00. Coking Properties, Slightly; Total Sulphur, 0.66 per cent.; Ash Sulphur, 0.33 per cent.; Volatile Sulphur, 0.33 per cent.; B. T. U's, 11399.4.

Mine No. 1 has always been gaseous, feeders being frequently broken into. A series of small mine fires resulting chiefly from spontaneous combustion of gob constitutes an important part of this mine's history. Coal dust, it is claimed, has not been responsible for the fires, as the mine is decidedly damp in all sections and all the entries have

pipe lines in them for wetting down.

For some years preceding the disaster of 1903 a section of the mine is said to have smoldered behind air-tight bulkheads. The explosion resulting in the loss of 169 miners is said to have been caused by the breaking out of gas and its ignition by a blown-out shot, while coal dust raised by the gas explosion, likewise resulted in a series of local explosions. The mine was opened up shortly after this disaster and operated continuously up to the present time. Recently but three comparatively limited sections of the mine have been operated, one on No. 9 entry west side, one delivering its coal through No. 23 rock cut, and last the east side.

Referring to the mine map, Fig. 4, it will be noted that entries No. 8 and No. 10 extend south from the east slope for a distance of about 1,600 feet. No rooms had as yet been started from these entries, when on Friday, March 20, the face of the upper entry of No. 10 (the haulage way) was set on fire, probably by a shot. The true cause of this fire will probably never be known, as no witnesses are now left.

Fires of this sort had become such a frequent occurrence that no especial apprehension was felt, however, and entry No. 10 was promptly walled up with stoppings placed just inside of the first slant at (a) and (b), Fig. 4. On Thursday, the 26th, the haulage-way stop-ping (a) was advanced 200 feet to a point (c) just beyond the first cross-cut. The mine force of 200 odd miners was idle on the following Tuesday, the 24th; Thursday the 26th; and Saturday, the 28th, the day of the disaster. The demand for coal this winter has been light and as a result the mines have usually been idle on Tuesdays and Thursdays

for several months past. The reports of the various investigating committees will doubtless show what proportion of the total force of six fire bosses was employed on these idle days.

Taking advantage of the idleness on Saturday, the 28th, Superintendent Briggs with a picked force of 17 men proceeded to attack the fire smoldering behind the stoppings in the No. 10 entry. This force comprised besides Joseph Burton, Alfred Dodds, and James Knox, foremen of Mines No. 1, No. 2, and No. 3, respectively, five gas watchmen and nine others, noted for their skill, nerve, and experience in fire fighting. It thus constituted the flower of the camp of Hanna contributed by all three of the company's mines. Just what method of attack on the fire was adopted will probably never be known.

Mr. E. O. Christiansen, the mining engineer, and a survivor of the disaster through a fortunate circumstance, has supplied the writer with the detailed map, Fig. 4. The return air-course terminates in an upcast shaft leading to a 20-foot diameter fan on the surface. The east slope, from which entry No. 10 was turned, is thus a down-cast. The return airway of entry No. 10 connects with the air-course to the fan which passes under the haulage way of entry No. 10 by an undercast; entry No. 10 had the cross-cuts and slants as shown spaced at 200-foot intervals for the first 300 feet in from the slope. Beyond that point cross-cuts were spaced at 100-foot intervals for the remaining 300 feet of the entry.

Mr. Christiansen thinks the following method was adopted, basing his opinion on the discussion of plans the night before the disaster, when Messrs. Briggs, Dodds, and Burton were present.

The stopping (c) in the haulage way was probably first taken out and advanced to (d) just beyond the second slant, then the slant stopping (e) was removed and the air-course stopping (b) removed to a point (f) beyond the slant, allowing the fresh air to clear out the gases between (d) and (f) and the slope. In this way it is probable that the fire fighters had advanced to just beyond the second slant, 800 feet in from the slope, when the catastrophe, whatever it was, occurred. Possibly in the process of carrying the stopping (d) forward the majority of the party were overcome with whitedamp allowing the air to come in contact with the gas in too great a quantity and thus forming an explosive mixture. It seems probable, however, that at least four of the party, Monson, Warburton, and Parry, gas men at the three mines, and Rainey, the rope runner, had some little warning, for their bodies were found at point (g) on the No. 10 entry parting. It seems probable that they were just going in to join the others, when feeling the air blast accompanying the explosion, they threw themselves face downward.

Low rumbling sounds accompanied by a jarring of the earth that shook the town announced the explosion at 3:05 P.M. Investigation showed the west slope completely wrecked and hopelessly caved in. While the wooden top of the air-shaft was blown off, the fan itself was uninjured and the shaft was quickly repaired with brattice cloth. Evidence seems to show that the fan was stopped, however, and not started until suggested by Inspector Elias, upon his arrival.

Some idea of the force of the explosion on the west side is gained from the finding of the slope timbers blown out of the pit mouth toward the tibble. Several 12-foot timbers, a foot in diameter,

were blown against the tippie at distances of from 300 to 400 feet, and one 15 inches in diameter fell close to the boiler plant, after a flight of more than 500 feet. The east slope was little injured by this first explosion, although the mouth of the wrecked west slope is 6,200 feet distant from entry No. 10, while the mouth of the east slope is but 2,000 feet distant. Doubtless the reports of the investigating committees will furnish data in explanation of this point. In the mean time with every competent witness either dead, or in no condition to clearly reason, it seems idle to theorize. At this writing data on the mine ventilation are not available, but will be secured later.

The roof of the east air-shaft sloping to the fan house was blown off in a manner similar to that at the west side, but neither the fan nor the slope was materially damaged. The shock felt on this side was slight. As soon as these facts became known to the rescuers congregated about the wrecked west slope, they rushed across the hill to the east slope, $1\frac{1}{2}$ miles distant, where their first efforts were expended in repairing the fan.

Inspector David M. Elias was on train No. 3 going to Rock Springs at the time of the explosion and was handed a telegram announcing it, shortly after it occurred. He arrived at Hanna shortly after 4 P.M. hardly an hour after the first disaster. Every person of authority in the camp had been wiped out by the first explosion and up to the time of the arrival of Inspector Elias, there seems to have been no leader. Previous to his arrival, however, it seems that Joseph Woods, the sole surviving fire boss out of six, attempted some organization of the willing

but excited rescuers. Leaving a man at the first entry to prevent others from following behind till conditions were ascertained, Woods accompanied by several others penetrated as far as the 10th entry. At this point, however, he was overcome by afterdamp and carried out. The guard left by Woods at the first entry, however, evidently was not equal to the occasion, for he himself went below and was killed by the second explosion.

When he arrived at the mouth of the east slope every one looked to Inspector Elias as the leader of the rescuers. His task was made doubly difficult by the loss of all persons of authority known to the men, who could have assisted his leadership and compelled the strict carrying out of his orders. Superintendent Briggs, the foreman of the three mines, and five of the six fire bosses were dead, while the sixth had just been carried out raving from the effects of the gas encountered below. Inspector Elias evidently needed a man who would enforce his orders with a club if necessary, but the man he picked not only failed him, but lost his own life through disobedience of orders. After starting the repaired west slope fan, the east slope fan having been run continuously, Inspector Elias with a party of ten men started down the east slope probably about 5:30 P.M.

The man referred to above was left behind on the surface at the head of the slope, with strict instructions from Inspector Elias to allow no one else to go below. The party could not have been gone long, however, before the guard yielded to the pressure of excited would-be rescuers and went below with them. After that, it seems that any one and every one passed at will, up and down the slope into the mine. It is now

apparent that more than 50 men must have followed the inspector's party into the mine streaming along down the slope in groups of three or more, without a leader, without organization and without a plan of concerted action. In the ensuing confusion each group seems to have taken such precautions as seemed best to it, without knowing what was being done by others. From what has been thus far said, it will be seen that it is natural to expect conflicting statements from the few who went down the slope and narrowly escaped death in the ensuing second explosion. The statement of an engineer, trained to observe and talk accurately is therefore of especial value at this time.

In the first party of ten men with Inspector Elias was E. O. Christiansen, the company's mining engineer, who furnished the writer with the following statement:

"As this party went down the slope, it bratticed up the entries on both sides and was engaged in this work on the third entry when joined by me about 6 P.M. Inspector Elias here was afraid too much air was coming in and sent me to the west slope fan to slow it down to about 20 revolutions per minute about half its usual speed. Returning to the slope I joined the inspector's party at the 8th entry about 8:40 P.M. and proceeded with it to the 10th entry, where the bodies of the three gas men and the rope runner, were found in the parting at (g). Owing to the steepness of the slope each body required at least six men to carry it out, so that from 24 to 30 men must have started back from this point with the bodies. With Inspector Elias we went back to the 8th entry and here rested a few minutes and then went further up to entry No. 5 as the air at the 10th and 8th had been bad and weakening.

"Mr. Morgan Griffiths, general foreman of the company, was expected to arrive from Rock Springs, at about 8:30 P.M. and take charge of the work. Inspector Elias therefore awaited his arrival at the 5th entry for some time, momentarily expecting to be relieved. Up to this time all the entries except No. 8 had been bratticed up. The air at No. 5 was fast becoming worse and feeling its effects, I tried to persuade the Inspector to accompany me to the surface. Failing in this, I started out. Inspector Elias was last seen at the point marked (H).

"General Foreman Griffiths did not arrive at Hanna till about 2:30 A.M., after the second explosion shortly after 10 P.M. The party, carrying the body of the rope runner, Rainoy, was resting at a point near the first entry when I passed it. Just above this point I was met by Mat. Huhtala coming down the slope, and was assisted out by him, when he again turned back. He could hardly have reached the first entry 400 feet down when the terrific second explosion occurred at 10:25 P.M., blowing his body up to a point opposite the knuckle."

Huhtala must have been following close behind Tennant, for the body of the latter was picked up at (i) near the mouth of the slope the next morning. These two bodies in addition to those of the three gas men carried out just before the second explosion were the only ones recovered up to this writing (April 2). The east slope was hopelessly caved by the last disaster, entombing all who were below.

A house-to-house canvass by the company officials next morning established the fact that 41 men were missing in addition to the 18 lost in the first explosion, making a total of 59 fatalities.

Although the bodies had not been recovered at the time these

data were secured it is probable that in addition to the four bodies already found at (g) and the two at (i), the 14 bodies of the original party will be found between (g) and stopping (d) and that 48 more are scattered along the slope.

While the cause of the second explosion cannot be determined until an examination can be made of the workings below, and probably not then, it seems probable that the statement of a miner, who escaped up the slope just before the explosion, and immediately after Christiansen, will be found correct. He states that three men were just starting to brattice up entry No. 8 as he started for the surface. As Christiansen left Inspector Elias at the 5th entry, it must remain for evidence carefully collected from witnesses to show whether this bratticing was done by his orders or not. In any event it now seems likely that the bratticing of entry No. 8 had the effect of forcing an increased air-current into entry No. 10 driving a body of gas on to the fire there raging, with sufficient air to provide an explosive mixture. It would take some 15 minutes for a man to walk from entry No. 8 to the surface. Allowing 10 minutes for the placing of the brattice after the witness started for the surface and 5 minutes for the increased air-current in No. 10 to penetrate the fire zone, say 1,000 feet in, it is seen why it is probable that the explosion from this cause took place just after the witness got out of the mine. This point will probably be definitely determined and reported upon by the various commissions now investigating. Their reports will be published at a later date.

All attempts at rescue work were abandoned shortly after the

second explosion, which wrecked and caved the east slope. General Foreman Morgan Griffiths and General Superintendent G. L. Black arrived at Hanna from Rock Springs at 2:30 Sunday morning. Other prominent company officials soon on hand were the following: D. O. Clark, vice-president and general manager, and J. J. Hart, assistant to the vice-president, from Omaha; Assistant General Manager A. E. Bradbury, from Cheyenne; Superintendent James Needham and Foreman John Mates, from Cumberland, Wyo., and David G. Jones, Mat. Madill, and John Dykes, foremen at Rock Springs, Wyo.

General Manager D. O. Clark arrived at Hanna from Omaha on Monday. With these officials was a picked force of nearly 30 men, noted for their skill, nerve, and experience in coal mine disasters. Under the supervision of these officials, the men attacked the debris at the mouth of the wrecked east slope and drove a tunnel through the cave-in for a distance of 20 feet. At this point afterdamp drove them back; feeling sure that all within had met their death, the opening was sealed with timbers overlaid with dirt. Not till Wednesday, April 1, was another attempt made to reopen the east slope. Afterdamp prevented penetration to a point more than 35 feet in, several men being overcome in the attempt to go further. A stopping was therefore put up 30 feet in and the mine again sealed. The debris in front of the stopping was then excavated. It is proposed to slowly advance stoppings down the slope in this manner, clearing up as progress is made. Every precaution is being taken to prevent a further loss of life.

Contrary to the course sometimes pursued at similar disasters

by other companies, the Union Pacific Coal Co. officials have allowed the writer every privilege of inspection and greatly assisted in the collaboration of this article. At the present writing, it is too soon after the disaster to attempt adequate descriptions and gather accurate data.

Immediately after the disaster, Governor Brooks appointed Inspector Noah Young, of the Northern District, assisted by M. Finnan, mine foreman at the Sheridan Coal Co., Dietz, Wyo., and Joseph Lythgo, assistant foreman of Glenrock, Wyo., to investigate and report on the disaster. This report, together with those of the various other commissions, will be published at a later date.