

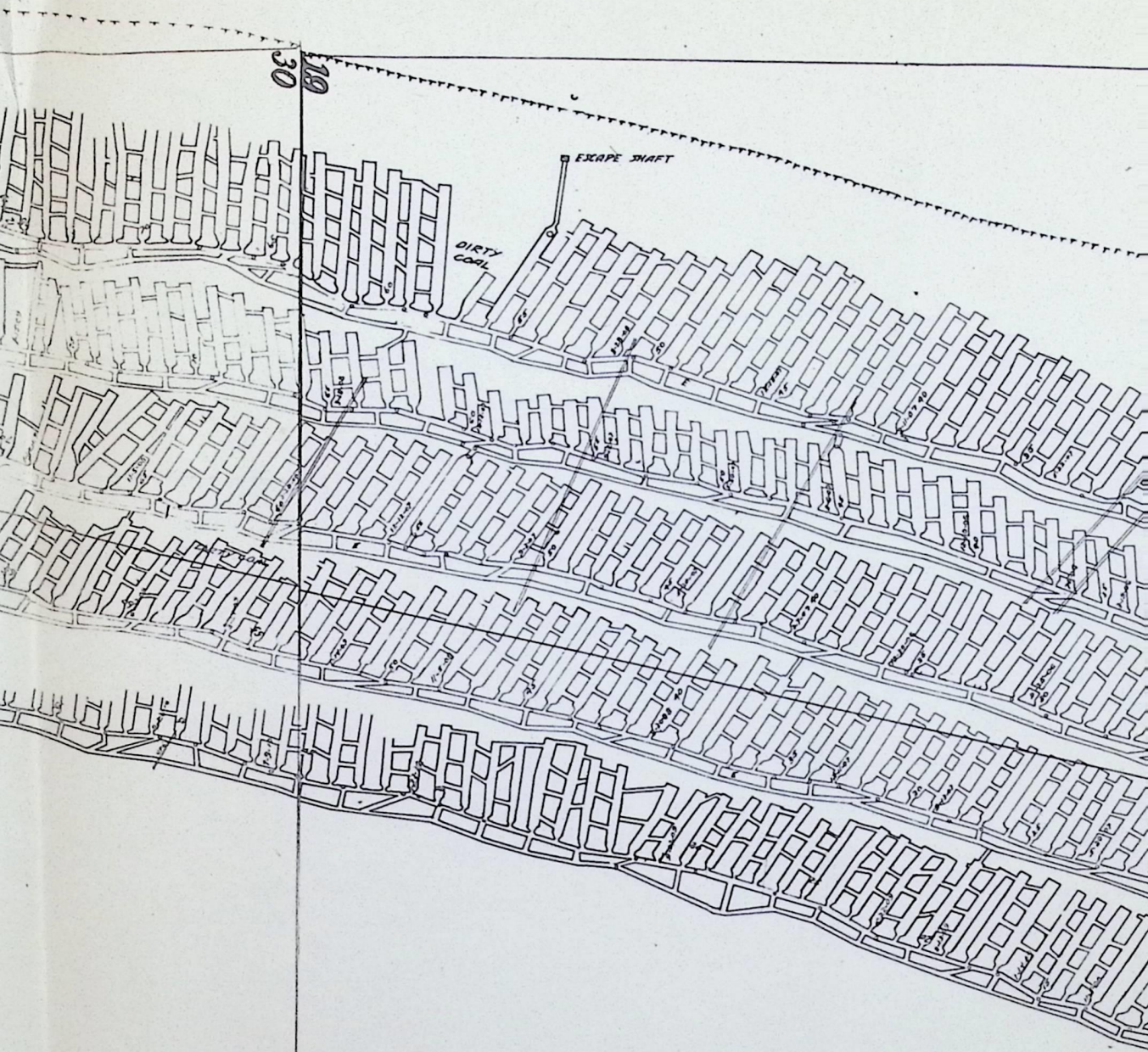
PLAN  
SHOWING APPROXIMATELY  
THE MODE OF WORKING COAL  
BY  
THE "PANEL" SYSTEM

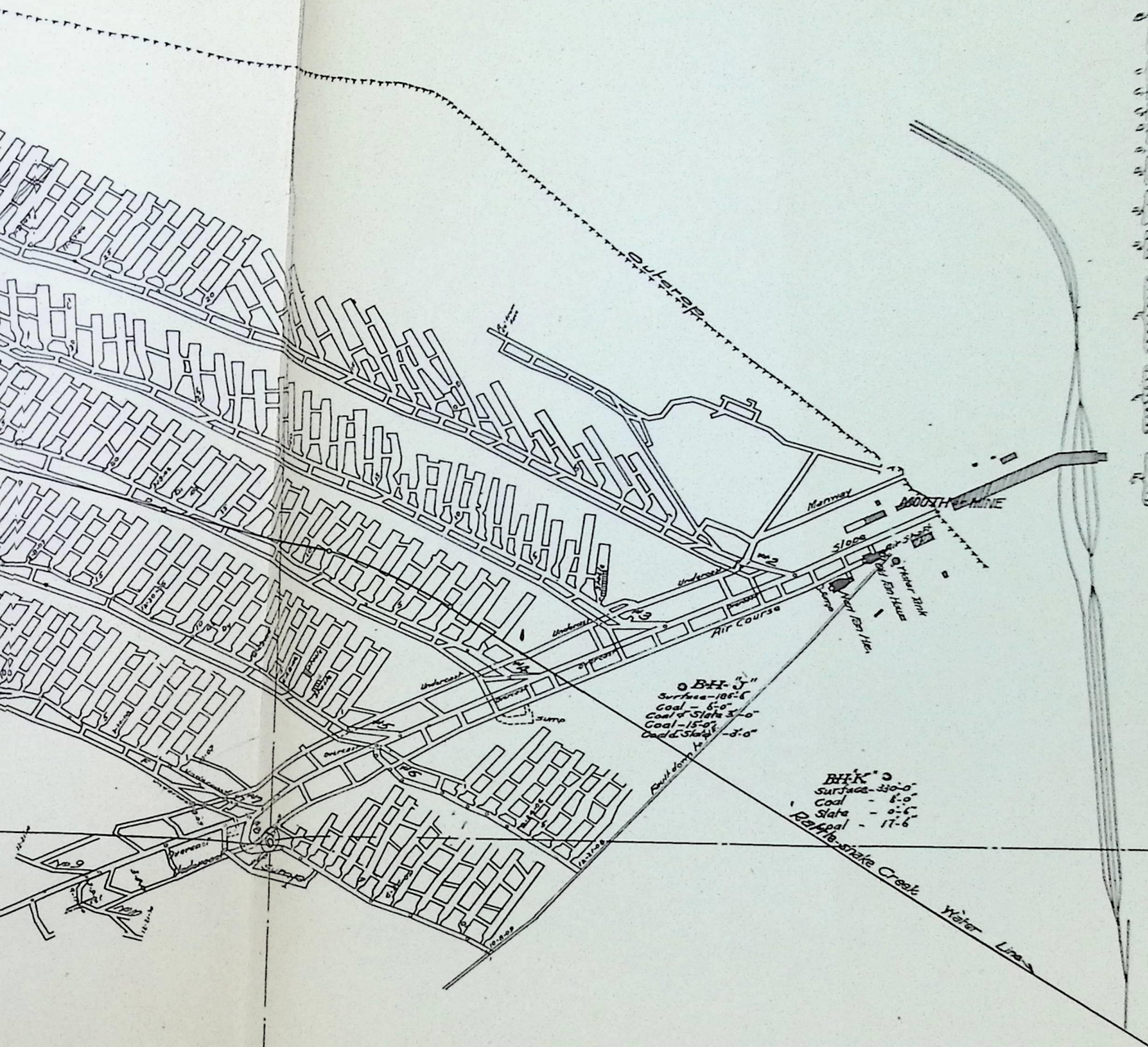
LEGEND

- "A" Planes or slopes
- "B" Levels
- "C" Rooms
- "D" Cross cuts

PLANES OR SLOPES ARE DRIVEN TO THE RAISE AND DIP OF THE COAL SEAM  
LEVELS AND ROOMS ARE DRIVEN ON THE STRIKE (LEVEL) OF THE SEAM

*To illustrate Report of John McNeil*





42-34.  
**No 2 MINE**  
**HANNA, WYO.**  
 T.22 N., R.81 W.  
 SCALE: 1 INCH = 200 FEET.

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John McNeil, M. E.  
Consulting Engineer  
EQUITABLE BUILDING.  
DENVER, COLO.

ON WORK, EXAMINING AND REPORTING ON  
MINERAL PROPERTIES A SPECIALTY.

TWENTY-FIVE YEARS EXPERIENCE IN COLORADO.  
TEN YEARS AS STATE INSPECTOR OF COAL MINES.  
CLASS 1884.

R E P O R T

On

THE WORKING CONDITIONS

And

SAFETY OF EMPLOYEES,

In

N O. 3 M I N E,

Of

THE UNION PACIFIC COAL COMPANY,

At

H A N N A, W Y O M I N G.

By

JOHN MCNEIL, M. E.,  
Consulting Engineer,  
Equitable Building,  
Denver, Colorado.  
MARCH, 1911.

To: D. O. CLARK, ESQ.,  
Vice-President & General Manager,  
Union Pacific Coal Company,  
Omaha, Nebraska.

Dear Sir:

I n t r o d u c t o r y:

In accordance with your instructions, I made an examination of No. 3 Mine at Hanna, Wyoming, and, as directed in your letter of February 6th, I added to my general examination, a careful inspection of the coal seam throughout

the underground workings to find localities where coal of an inferior quality was being mined, of which I shall write you later on in this report.

The Coal Seam Forms A Semi-Synclinal Basin, outcropping to the north, the east and west, and cut off by a downthrow fault adjoining No. 1 Mine on the south. See map attached at end of the report.

In all my mining experience, I have never seen (in part) a more characteristically formed coal basin confined to such a limited area.

The axis of the basin passes through approximately in proximity to room 31 on No. 1 Entry, No. 19 room on 3rd Entry, and No. 10 room on the 5th Entry. See map at end of this report.

The Mine Consists Of A Slope Opening, entering from the western "rim" of the synclinal, and is driven in a southeasterly direction towards the center of the basin, crosses the "trough" and continues on its course to the raise towards the outcrop on the eastern "rim" of the synclinal, and at the time of my visit, it lacked only a few feet of being through to the surface, thus, from "rim to rim" of the basin, the line of the slope forms the shape of a bow.

Entries Nos. 1, 3 and 5 are turned from the northerly side of the slope on the "strike" of the coal seam, and to maintain a level course for mule haulage, they necessarily extend in a direction forming a semi-circle around the "bowl" of the basin, back towards the slope. See attached map.

The Thickness Of The Coal Seam, is about 18 to 20 feet, uniformly throughout the mine, and is divided by a "parting" of slate about six feet from the top.

At a point about six to seven feet under the "parting", above mentioned, there is a stratum of carbonaceous shale from two to four inches in thickness, and this, with six feet of coal, is left on the floor under the tracks, in entries.

The Quality Of The Coal, is a lignite of a fairly good grade, as the following analysis will show:

Moisture,-----	9.47%
Volatile Matter,-----	42.51
Fixed Carbon,-----	44.14
Ash,-----	<u>3.88</u>
	100.00%

Specific gravity, 1.288.

Remarks: No. 3 Mine is operated on No. 1 Seam, i. e. on the same horizon as No. 1 Mine coal bed.

A Good Deal Of "Crop" Coal Was Being Mined, at the time of my visit and was perceptibly "earthy" and quite inferior in quality.

In No. 1 Entry, near the face, the coal was very soft and soggy, like "peat", and the same was more-or-less true throughout 20 rooms back from the face of the entry. See map and note their close proximity to the line of outcrop.

A fall of roof had taken place at the face of the entry, which showed a covering of surface clay over the coal seam of only 12 to 15 feet in thickness, and in a number of the rooms, the cover is about the same thickness.

I have no doubt but much of the complaints made to you about "poor" coal came from this source.

A Gob Fire From Spontaneous Combustion, occurred in No. 3 room of No. 1 Entry about nine months ago, resulting from a cave-in of the roof and from the fact, no doubt, that a mixture of clay, debris and fine coal heated under this fall.

The fire was successfully walled off with stone stoppings for a distance of six rooms, and at the time of my visit, the temperature in their vicinity was found to be normal. But, as the fire will get air through the caved strata to support combustion, it is doubtful if it has been entirely extinguished, and yet, carbonic acid gas C. O.<sup>2</sup> may have formed to such an extent as to arrest the progress of combustion,

though we have no means of determining this. In future, when stoppings are put in, to wall off fires, I would recommend that a pipe with a valve be built into the wall of the stopping so that the character of gases formed, if any, could be determined from time to time.

Marsh Gas ("Fire Damp")  $C.H^4$ ., has never been detected in this mine, from the fact, no doubt, that the workings have been approximately near the outcropping of the coal seam and the covering of strata (over the coal) being comparatively shallow, and now that the strata is more-or-less broken, it is not likely that explosive gas will ever be met with in this mine.

I found, however, that the precaution of having gas watchmen to examine the underground workings was being observed and a daily record book kept and examinations inscribed therein with the same regularity as if gas were present and expected.

But in making a search through this book, there was not an instance in which the presence of gas had been recorded.

While I think it doubtful that gas will be met with there, yet I was pleased, not a little, to see that a careful daily search with safety lamps was being made before the workmen entered their working places.

I recommend a faithful continuance of such inspections.

The Underground Stables of 16 Stalls, are partitioned off with iron pipes, the mangers, or feeding troughs are principally made of sheet iron, and the grain chest is covered with iron and all doors in connection with the stables are carefully covered with sheet iron.

There is a "fire plug" at each end of the stable and a good supply of water in pipes continually under pressure, if ever required.

The stable is well lighted up with electric lights, and naked miner's lamps, etc., are strictly forbidden, and must be left outside of the stable gateway.

A sufficient volume of air is in circulation, clean water troughs were in evidence, and altogether, good, sanitary conditions, conducive to the health and comfort of the mules, were observed; and the precautions taken against the possibility of fire were very good.

Evidences Of A "Creep" or Squeeze Of The Strata, were observed in several localities in Entries Nos. 3 and 5. In Entry No. 3, Room No. 19, where seven rooms are turned from it to work out the coal in the vicinity of where the line of the synclinal axis passes, a "squeeze" on the pillars of the over-lying strata, is in evidence.

Also, embracing Rooms 21 to 25 in No. 3 Entry, another squeeze of considerable magnitude, was quite perceptible.

It is my opinion that these two localities now crushing, will form into one general squeeze.

In No. 5 Entry at room No. 5, where seven rooms are turned at right angles from it, there is another "creep" and crushing of the coal pillars going on.

Now if the reader will carefully examine the map, it will be noticed that the series of "creeps" mentioned, have occurred on a line with the axis of the synclinal, already referred to.

Such a squeeze and crushing condition is the natural sequence wherever rooms are worked in the usual way along the axis of a coal basin, for, upon such a line, the compressive force of the superincumbent strata is always much more severe in pressure than on a level or continuously inclined plane.

In the case at point, there are three inclinatory sides (from the east, west and north) pressing their downward flexure to a common line.

Such a condition in a coal mine, especially where mammoth seams are in operation, as at Hanna (20 feet or more), is indeed an abnormal one. With thin seams of coal, the consequences of a squeeze would not be so serious. In a metalliferous mine, it would be less severe. But the pillars of thick coal seams crush easily when the compressive force of a creep or settling of the overlying strata comes upon them, and no system of timbering can arrest such a squeeze,

You will recall that an abnormal pressure came upon pillars in the vicinity of the basin of the synclinal in No. 1 Mine. In that case, we advised going to the boundary in the solid and working back. In the present case, I can advise no better plan than to drive a few places out to destination laid out for rooms to reach, and from there work back and thus recover as much coal from the crushed ground as possible.

In the future, when the axis of a synclinal is reached, I would advise that no rooms be turned, and that entries be driven out to the boundary or destination, and from there work the coal seam out "retreating".

It is not only the expense and loss of coal met with in a "squeeze" we have to consider, it is the unknown quantity of a gob fire, from spontaneous combustion we dread most, as a "squeeze" is a prolific cause of such fires in lignite mines.

The Ventilation Of The Mine, is produced by a fan 20 feet in diameter, of the Guibal type.

The total intake air current in cubic feet per minute,----- 56,750.

The total volume of air at the outlet, in cubic feet per minute,----- 62,370

Volume of air in cu. ft. per minute, Entry #1	12,090
" " " " " " " "	3 14,490
" " " " " " " "	6 6,600

The number of men employed in the mine night and day shifts,----- 158

Number of mules and horses,----- 14

There was present a fair degree of natural moisture throughout the mine, but lines of pipe are in place and where dust is present, sprinkling is followed.

The Number Of Tons Of Coal Mined Per Keg of Powder Used, in this mine, notwithstanding the abnormal thickness of the coal seam (18 to 20 feet) is but 36 tons. Altogether too much powder is being used.

The Daily Production Of The Mine, is about 1,000 tons, or more, of run-of-mine coal.

The System Of Mining, is that of "blasting from the solid", no mining or shearing is done to lessen the binding resistance of the coal seam lying in place, but is ruthlessly blasted from its solidity of bed. I condemn this vicious and dangerous mode of mining.

As I have fully covered this very important matter in my report to you of No. 2 Mine, Hanna, it would be superfluous to repeat such further comment here.

The Active Producing Life Of This Mine, we are aware, cannot be over a couple of years or so at most, and to change

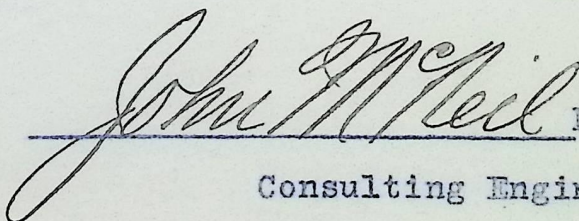
the method of mining to that of mining machines, as recommended in No. 2 Mine, would, of course, be an unreasonable expenditure of money (in No. 3). But, I see no reason why the system should not be changed at once to pick mining. You are now paying the pick mining scale. Change it. The risk that lies in "solid shooting" is too great not to do it.

To undertake regulating blasting and sprinkling coal dust, carries with it a good deal of "bluff", where we permit the greatest known danger to us, blasting off the solid.

It is most likely that you will open a new mine in the Hanna District soon, to take the place of No. 3 Mine, and if so, I would be pleased to assist you in the pre-arrangement of a plan of working that would entirely obviate the danger, expense, annoyance, and loss of coal from a "creep" or squeeze of the overlying strata upon insufficient pillars.

Trusting this report will meet with your approval, I am,

Sincerely yours,

 M. E.  
Consulting Engineer.