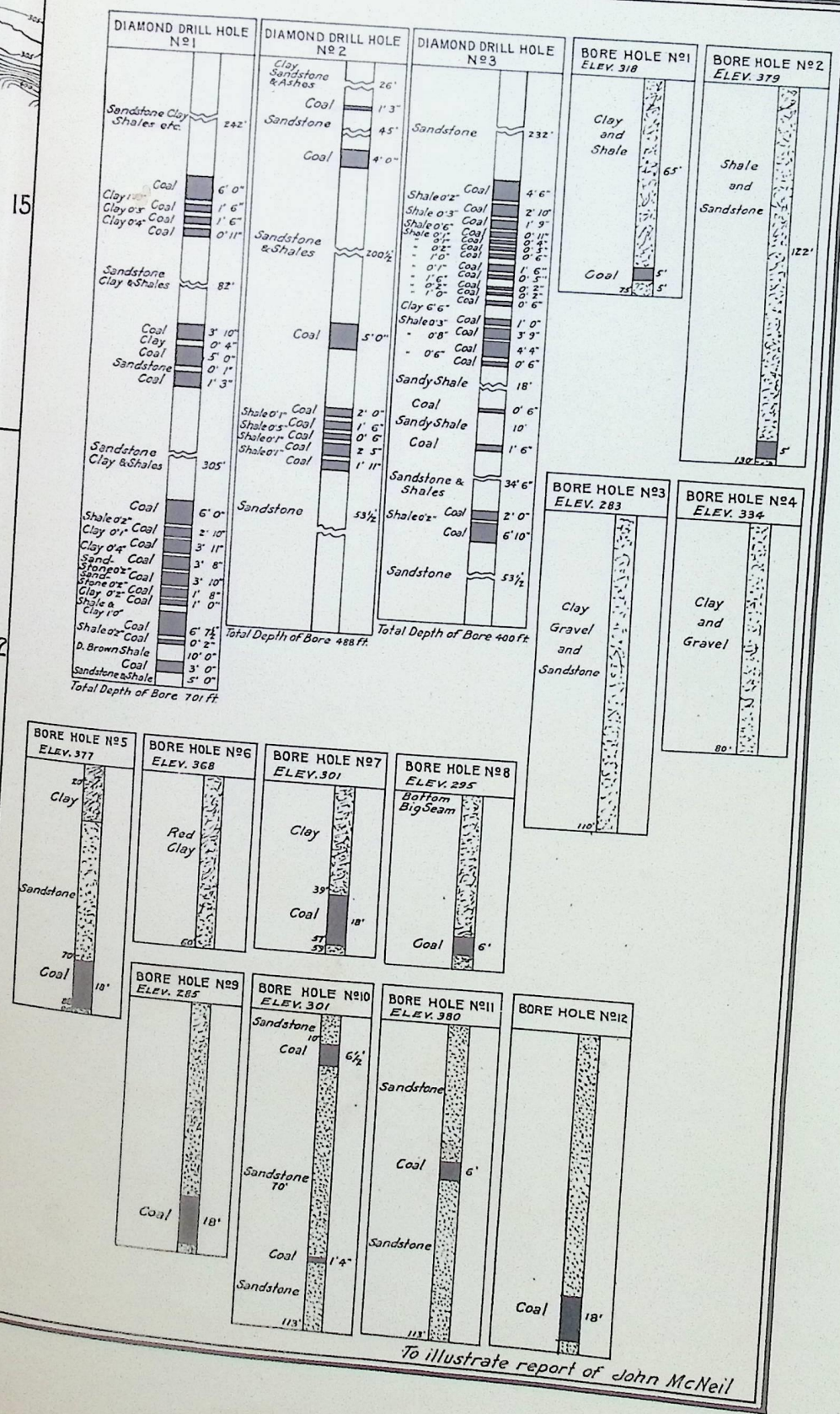
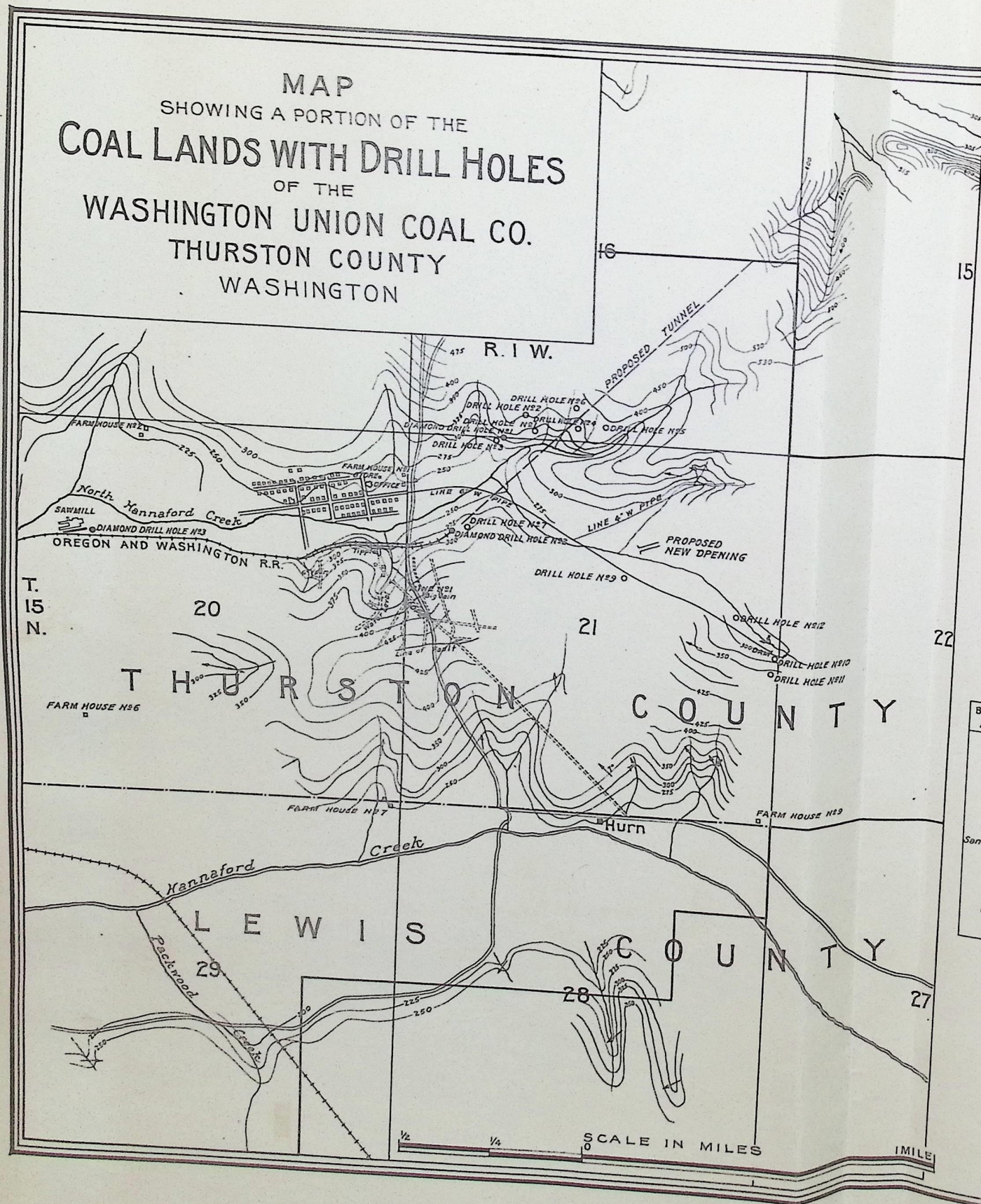


Washington Union Coal Company.

MAP
SHOWING A PORTION OF THE
COAL LANDS WITH DRILL HOLES
OF THE
WASHINGTON UNION COAL CO.
THURSTON COUNTY
WASHINGTON



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

SECTION WORK, EXAMINING AND REPORTING ON
COAL 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

COAL PROPERTIES

Of The

WASHINGTON UNION COAL COMPANY,

Situated at Tono in the Hannaford Valley,

Thurston County,

WASHINGTON.

With

Recommendations Relating To The

Safety of Employees Engaged in its Mining Operations.

By

JOHN McNEIL, M. E.,
Consulting Engineer,
Equitable Building,
Denver, Colorado,
JANUARY, 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:

Acting upon your instructions, I made an examination
of The Washington Union Coal Company's colliery, situated at
Tono, in the Hannaford Valley, lying chiefly within Sections

20 and 21, Township 15 North, Range 1 West of the Willamette Meridian, Thurston Co., Washington, and herewith, I have the pleasure of presenting to you my report on the same.

As advised, I shall give prominence, in this report, to the special features suggested for my examination, viz., a strict observance to the prevention of accidents and general safety to life and limb of employees, and advice for the best preservation and welfare of The Washington Union Coal Co's property.

I was accompanied throughout the property by your Superintendent, Mr. James Needham, who was especially kind, and rendered valuable assistance in expediting the work of my examination.

An Examination of The Underground Workings, extended throughout the ramifications of the mine, including what is known as the "water level", the entrance to which is situated about 300 feet south of the main opening.

Note: If the reader will please unfold and examine the attached maps from the first and last pages of this report, a better understanding of the same will be obtained.

The Mine Consists Of A Slope Opening, which, at the present time, has been driven to a distance of about 1900

feet in a south-easterly direction.

About 1300 feet from the entrance of the slope, a "down-throw fault" was intersected, which displaced the plane of the coal seam 32 feet (see map to the right).

This displacement, however, has been admirably graded out so that the original course of the slope and general system of haulage remain unchanged.

The True Dip of The Coal Seam, trends in an easterly course, thus the main slope crosses the dip towards the south, which necessitates the turning of entries on an oblique angle from the slope to put them on their required course (the "strike" or level of the coal seam). This is the reason for the displeasing appearance of the map as compared, geometrically, with the right angular workings of your maps generally.

It is obvious to you, of course, that all things being equal, a slope should be on the true dip and the entries at right angles from it (on the "strike" or level of the coal seam), and ultimately, such will approximately be the case at Tono as the face of the slope is now reaching the "basin"; and again, you will note on the map, that Mr. Needham has turned a slope marked "north slope" but running in an easterly course, almost on the true dip.

The reason, no doubt, in planning the direction of the main slope as it is, was the idea of mining through on a

straight line to the southern outcrop of the seam (to day-light) in the vicinity of the original site of Hurn Post Office, so that coal might be mined along the southern outcrop and hauled to the railway and tipple at Tono with electric motors--not a badly pre-arranged plan, and the feasibility of it for future production will appear later on in this report.

The Aggregate Thickness Of The Coal Seam, is 16 feet, divided by two thin streaks of argillaceous shale.

The Roof and Floor, consist of soft arenaceous and clay shales, which disintegrate readily on being exposed to air and water.

The Percentage of The Dip, ranges from 9 degrees on the "rim" or outcrop of the "basin" to probably almost flat in the center of the basin.

The Mode of Working Out The Coal, is that known as Room-and-Pillar. Seven feet of the lower bench (of the 16-ft. seam) is worked out in advancing the workings. The top bench, with the pillar coal, should be extracted by "retreating", after the entries have reached their boundary or destination. It is difficult, at this time, to determine just

what percentage of the top coal and pillars may be available in practical work, but I think the yield should not be less than 60%. I make this estimate from experience in mining out coal from a lignite seam of similar physical conditions at Lafayette, Colorado.

An Excellent Coal Roof, is in evidence throughout the mine, and owing to the material thickness and tenaceous character of the top coal, left up in advancing the workings, no timber is required in the entries, air-courses, cross-cuts or other "narrow work". In the rooms, prop timber is used.

The falling of top coal is of rare occurrence, thus the most prolific cause of accidents in most coal mines is almost entirely obviated in your colliery at Tono, which is certainly a great redeeming feature for safety to the employees.

The Quality Of The Coal, consists of a fair grade of Lignite. It is free burning and does not produce a hard clinker as most Washington Lignites do.

The following is an average analysis of three samples of coal taken by me in former examinations from the 16-ft. seam now in operation, selected at different locations on the property:

Analysis:

Moisture,-----	15.50%
Volatile Matter,-----	32.11
Fixed Carbon,-----	45.75
Ash,-----	<u>6.64</u>
	100.00%

(Signed) Von Schulz & Low, Chemists,
Denver, Colorado.

The above analysis average favorably with, if not surpassing the average quality of the lignite coals from Sheridan, Wyoming, which are so successfully used as a locomotive fuel by the Burlington Railway.

The following is a copy of an analysis made from a sample of coal taken, by the writer, from the coal seam of a Sheridan Mine:

Analysis:

Moisture,-----	15.90%
Volatile Matter,-----	34.80
Fixed Carbon,-----	42.50
Ash,-----	<u>6.80</u>
	100.00%

(Signed) Von Schulz & Low, Chemists,
Denver, Colorado, March 7th, 1903.

The coal from the Washington Union Coal Co's property at Tono averages well with the lignite coals from Boulder and Weld Counties, Colorado, as will be noted by the following average analyses also made from numerous coal samples, taken by me, from the Lafayette, Louisville and Erie Districts:

Lafayette Dist., Boulder Co.

Moisture,-----	17.11%
Volatile Matter,-----	32.29
Fixed Carbon,-----	45.55
Ash,-----	<u>5.05</u>
	100.00%

(Signed) Von Schulz & Low, Chemists,
Denver, Colorado.

Louisville Dist., Boulder Co.

Moisture,-----	13.71%
Volatile Matter,-----	36.29
Fixed Carbon,-----	44.27
Ash,-----	<u>5.73</u>
	100.00%

(Signed) Von Schulz & Low, Chemists,
Denver, Colorado.

Erie Dist., Weld Co.

Moisture,-----	15.82
Volatile Matter,-----	34.76
Fixed Carbon,-----	44.09
Ash,-----	<u>5.33</u>
	100.00%

(Signed) Von Schulz & Low, Chemists,
Denver, Colorado.

Remarks On Uses Of Coal From Tono: While in Portland,

I called at the office of Mr. Graham, Supt., Motive Power of the O. R. & N. Co., and while I did not meet him personally (he was at home sick), I gleaned, of course, in his office, gratifying information regarding the successful firing of Tono coal on the "Mikado" locomotive.

I also called on the General Manager, Mr. O'Brien, who talked enthusiastically on the subject, and in a most gentlemanly manner expressed his regrets that necessity compelled him, in the past, to speak so discouragingly of the coal as a locomotive fuel when fired on the common type of engine. But now, Mr. O'Brien is quite decided upon the fact that the great "burning" question is at last admirably solved, and from all information I could glean, the appearance of the Mikado

locomotives is anxiously awaited at Portland by all interested parties, from the General Manager down to the firemen.

As your Consulting Engineer and purchaser of the Hannaford Valley coal lands, you can appreciate the ecstasy of my feelings towards the "Mikado" in bringing about such a great "change of heart" on the O. R. & N., and now that success is assured, I wish to extend to you my sincere thanks for never once intimating to me any dissatisfaction.

I called on your Mr. Gillespie and talked over the coal with him, as a domestic fuel. I asked him: 'Providing you had Tono coal prepared over bar screens with apertures of eight inches between bars, what figure would it cut in the domestic trade of the North-west'. He replied: 'With such a preparation of Tono lump coal, I could control the domestic market to a very large extent'.

Lignite lump coal prepared over one and one-quarter inch bar screens has never been favorably received in any market, and is readily out-sold, as you know, wherever six or eight inch coal comes in competition with it.

There is no doubt but that the Mikado locomotives will burn 8" mine-run coal, and while any domestic fuel "shot from the solid" will deteriorate in transit more than when machine mined, yet, even with "powder mined coal" I am inclined to believe Mr. Gillespie's statement is correct. With coal undermined by machines, his chances to "take" the market would be better.

Machine Mining Of The Coal At Tono, under such an excellent coal roof and favorable dip of the seam, would meet with success, not altogether on the reduction of cost of mining, but also will insure your company an output of coal when required.

Wherever Unionism and labor difficulties prevail and skilled wielders of the pick are scarce (which is now practically true everywhere) and conditions are applicable, I never hesitate in suggesting a mining machine plant; and I certainly have no hesitancy whatever in recommending you to put in such a plant for the Washington Union Coal Co. at Tono.

I can foresee confidently, that the expenditure of money in this connection cannot fail to bring good results, both financially and otherwise.

Ultimately, I estimate a reduction in your cost of mining of about ten cents per ton in the aggregate.

The cost item of undermining a coal seam of such abnormal thickness, with other conditions so favorable, should not exceed ten cents per ton (run-of-mine coal), and the shooting and loading would be well paid at 30 to 32 cents per ton. You are now paying, for hand mining, 52 cents per ton.

With electric chain cutting machines of the Jeffrey type, myself and sons are now mining and loading coal from a six-ft. seam for 40 cents per ton (run-of-mine coal).

Before putting in the machines, we paid 50 cents per ton for hand mining. With the machines, we get a better grade of coal for our domestic trade; we eliminate the danger of "windy" shots (our mine is quite dusty) and we get an output when we require it. Loaders of coal can be secured at almost any time, but good pick men are hard to get.

When "drawing" back pillars with top coal (9 feet) in your mine at Tono, there will be but little undermining to do, and you should then get some very cheap coal.

The Present Capacity of The Mine, we may place safely at 600 to 700 tons per day, including the "Water level" entry. But, with trade to gain development work, the output can be increased in 90 days or four months to 1,000 tons or more.

The Ventilating Air-Current Throughout The Mine, is produced by the mechanical means of a fan, twelve feet in diameter, of the Crawford & McCrimmon type, with a maximum capacity of about 30,000 cubic feet of air per minute entering the in-take air-way, and about 6,000 cu. feet reaching the interior of the workings.

While such a volume of air is adequate for present needs and probably for a year to come, it is never-the-less evident that when the daily production reaches or exceeds 1,000 tons,

the fan will be found inadequate to maintain a hygienic condition throughout the interior workings of the mine, for the preservation of bodily health of miners and mules therein.

We must not lose sight of the fact that the universal mode of extracting the coal seam from its bed in that colliery, is that of shooting entirely from the solid, thus an abnormal quantity of black powder is used, which not only produces deleterious fumes, but may generate dangerous explosive gases. In fact, a colliery explosion occurred some years ago in an Iowa mine (wet at that), which, it is said, resulted wholly from gases produced by the combustion of common black powder.

I know just how the above statement will jar on the ear of the average practical miner, should he be a layman in technical knowledge; but, upon reflection of the fact that about 40 per cent of the gases formed by the combustion of common black powder are indeed explosive, the semblance of truth is seen, and with modern "permissible" powders, the percentage of inflammable gases is higher.

In view of the fact that the Tono mine may soon be called upon for a large tonnage of coal for use on Mikado locomotives, I would recommend that the erection of a second fan, or one larger with a maximum capacity of at least 100,000 cubic feet per minute, be given your consideration.

In the event of opening the proposed new mine (referred to later on in this report), I would advise you to also install

a fan there with a maximum capacity of not less than 100,000 cubic feet of air per minute.

In case of "falls" where pillars may be drawn, the strata is of such a nature as will give off black damp (C.O.₂), the diffusion of which demands liberal currents of air.

Fire Damp, C. H.⁴, has never been detected in this mine, and while there is no absolute assurance that its presence never will be met with, yet, judging from the physical conditions and composite nature of the measures, we do not believe them characteristic to generate carbureted hydrogen gas; thus, from our observations in our examination, we do not anticipate any danger in this connection.

Coal Dust Is Non-Existent Throughout The Mine, owing to the liberal wetness of the coal seam and the over and underlying strata. The humidity of the air current, too, is nearly always up to full saturation, depositing moisture, perceptibly, at times, on ones clothing, hence danger is entirely eliminated from the operation of the mine in this connection. Even any fine attenuated coal dust that might get in suspension with the air, must soon become moist and re-deposit itself on the damp floor or sides of the roadways. This is an all-important and great redeeming feature for safety

to the employees in the mine, for there is no doubt that in coal dust lurks one of the greatest dangers which we have to contend with in coal mining. It is on account of this fact alone that blasting entirely from the solid can be safely tolerated.

In The Probable Occurrence of Spontaneous Combustion or "Gob-fires", we foresee, from our past experience in mines of such lignitic quality of coal and argillaceous character of strata, the most likely menacing danger, against which the management should ever guard with suspicious care.

Fortunately, however, this impending menace in a practically new mine like Tono, may be successfully guarded against by pre-arranged plans to prevent conditions which invite the susceptibility of spontaneous combustion either in the crushed abandoned workings of the distant future or those now in operation, by faithfully carrying out the following (and other known) salient precautions:

First: Allow no slack coal to be left in the underground workings, nor "gob" any "coaly" or clay debris into cross-cuts.

Second: If at all possible (and I believe it is), do not commence to mine out pillars in any entry until it has reached the boundary line

or destination, and then begin to mine from the interior only, "drawing" but a few pillars at a time, and take out as large a percentage of the pillar and top coal as is practicable to do.

Third: Watch for any rise of temperature or odor from the "gobs" or where "falls" of roof and top coal have taken place.

If an odor or an abnormal temperature be detected, remove or turn over the heating debris, or, with water, if convenient, bring temperature down to normal. Use a thermometer for such determinations.

If, however, spontaneous combustion has progressed and is at a point which cannot be practicably reached and treated as above, or has reached such a stage that it cannot be removed, then we must lose some coal and retreat to an advantageous point and erect stoppings in the main and back entries and in cross-cut through the pillar in the room next to the "gob", so as to isolate the fire from air; and as the nature of the strata is such as will give

off black damp (Carbonic acid gas $C. O_2$), it will, in the absence of oxygen, extinguish the fire.

The Pumping Of Water From The Mine, at the present time, is of little moment, being an immaterial quantity--probably not to exceed 50 gallons per minute. But this volume will increase in its proportions as additional areas upon the coal seam are opened up, owing to the overlying strata being more-or-less saturated with water, and especially so under ravines, low ground or flat wooded areas.

I would strongly advise that the top coal and pillars lying directly under, or in proximity to all such surface drainage courses, be left undisturbed (unworked) until at least the prospective abandonment of the mine is in evidence.

The working out of pillars promiscuously in almost any of Washington's coal fields having a light vertical covering of strata, is attended with more-or-less danger from inundation.

With proper attention given to underground and surface surveys, however, and due precautions taken in the extraction of pillars, it is not likely that any very serious volumes of water, requiring abnormal pumping, will be encountered.

A Site For A New Slope Opening, was selected, after carefully going over the maps and drill hole locations with Mr. Needham, in the North-east quarter of the North-east quarter of Section 21, see land map.

In recent borings, the 16-ft. coal bed was found in drill holes Nos. 5, 7, 9 and 12, and judging from their locations and the profile of the rising ground forming the overlying strata of adjoining lands, the indications are that the big seam underlies the N. E. 1/4 of Section 21, and very probably extends underneath portions of the N. W. 1/4 of Section 22, the S. W. 1/4 of Section 15 and the S. E. 1/4 of Section 16. Thus, such an area with its known and prospective indications for coal, justifies the opening of the proposed mine.

I Recommend The Driving Of No. 1 Slope On To The Southern Outcrop, of the coal seam, on its present course, with night and day shifts to reach, as soon as possible, the southern outcrop of the coal seam on the south side of the hill at "Hurn" or in the vicinity of farm house No. 8. See land map, and note course of No. 1 Slope.

With the southern outcrop of the big coal seam reached, by an extension of the present slope, a vast tonnage of coal from its vicinity would become available to the Tono Mines,

as considerable known areas of coal there could be mined from entries along the southern "rim" of the "basin" by the "Retreating System" and the haulage of coal therefrom be successfully operated by electric motors through the underground haulage-way to the bottom of the Tono Slope in the center of the basin.

The maximum haulage distance to the Tono tipplers, including the probable length of the entries along the southern "rim of the coal basin", might not exceed 7,000 feet. But if we are fortunate enough to follow the big seam to a much greater distance, we should certainly have no difficulty in hauling the coal, as the haulage-ways would be protected with a good coal roof; and with permanently laid tracks of 40-lb. steel rails, the coal could be hauled at a comparatively low cost.

The Maximum Tonnage Of Coal Available, to the locations of No. 1 and the proposed site of No. 2 Mines, is, at this time, more-or-less an unknown quantity. But, that we may safely estimate a minimum of 8,000,000 tons tributary to them from the big seam alone, we have no reason to doubt, and future developments will, in all probability prove such an estimate altogether too conservatively given.

As there lie three other large workable coal seams at lower horizons (see drill hole records on Land Map to left),

it will be seen that "Mikado" locomotives may draw liberally upon Tono for their fuel supply for many decades to come.

I feel gratified indeed that the estimate I made in my report to you June, 1907, of 40,000,000 tons of coal being available within the Cherry Hill Lands, has, in my opinion, since been verified by your drilling of these lands.

There Are No Dykes Or Intrusions Of Igneous Rocks,
in the coal field, to our knowledge, but developments have disclosed the fact that minor "faults" and dislocations of the strata occur, displacing the plane or level of the coal seams by up or down-throw faults, but not their general continuity. Such dislocations of the measures, and the fact that the surface ground is covered with dense vegetation and alluvial deposits, renders the field a difficult one to prospect or follow the course of the outcrop of the coal seams.

In this connection, however, I would advise the following of the coal seams by actual operations of mining the coal from inexpensive drift or slope openings, with power from your general plant, to open up unknown areas of the field, believing this would be more successful and less expensive than drilling.

The Tono Mines Enjoy Unusual Conditions Of Safety,
compared with coal mines generally, for the following reasons,

which I shall again briefly mention:
The workings are universally and naturally moist.
The air-current carries a natural saturation of
moisture.
The temperature of the mine is low.
Coal dust is nowhere in evidence.
The presence of "fire damp" has never been detected.
The underground workings advancing have a safe coal
roof.
The above are all redeeming features of safety which
will undoubtedly reduce the inevitable risks of coal mining
to a minimum.

Remarks: It is said, the inevitable risks in
American coal mines exact in their toll of accidents 34%,
and 66% due to the negligence of employees and employer.

In 1908, 2,450 fatal and 6,772 non-fatal accidents occurred in the mines of the United States. It seems that many deaths occurred from risks taken to save labor, being in too much of a hurry, and ignorance or non-observance of companies special rules.

I would advise that general instructions be frequently given to employees regarding the proper and safe conduct of their work by those in charge at the mines. See to it that all employees understand the company's rules, and demand an uncompromising obedience to the same.

I recommend that on all slopes or other haulage ways on which persons are permitted to travel, that specially prepared places of a width of not less than four feet from the rail be made at intervals not to exceed 50 feet, and that the same be white-washed with lime so that persons can be within easy reach of and readily observe such places of refuge in case of an emergency from run-away or rapid transit of pit cars.

I would suggest that wherever trap doors or brattice are necessary, that they be constructed of non-combustible materials, as far as practicable.

Further, that no wooden or other inflammable tool houses, stables or boxes be permitted in the underground workings.

The Organization Of A Class For American Red Cross First Aid Instruction, at each of your collieries, could not fail in its humane object of rendering, at times, incalculable good in the skillfull handling and ministering timely aid to injured workmen, in the absence of a doctor.

Such a class might well include the superintendent, pit-boss and clerks at the mine, adding a few conscientious workmen of terperate habits and humane feelings who would find their reward for services in alleviating the sufferings of their injured fellows. The class could be instructed, from time to time by your regularly appointed physician.

There would, of course, be a necessary expenditure of money connected with the class, the maintenance of supplies, medicine, stretchers and other paraphernalia, but there might also be created, ways and means by which the general public would gladly contribute to the aid of such a humane cause, and should a tax to your companies reach a mill per ton, it would be a legitimate, as well as a humanitarian charge to the cost of coal.

The opportunity and pleasure was mine to meet 1st. Lt. M. J. Shields, Medical Reserve Corps, U. S. Army, but now among coal miners in the interest of the American Red Cross as Medical Director to members of coal mine rescue cars and life saving stations.

In my talk with Doctor Shields, I was deeply impressed with the humane nobleness and vital importance of coal mining rescue work. This generously good and able gentleman kindly presented me with a copy of The American "Red Cross Abridged Text Book on First Aid", of which he is author, jointly with Major Charles Lynch, Medical Corps, United States Army.

Faithful to the request of Dr. Shields, I have carefully read his manual of instruction, with the result that I herewith enthusiastically recommend to your personal and mature consideration, the adoption of "First Aid" work at the mines of your several coal companies.

Dr. Shields related to me in part, the life saving value which these classes and organizations of "First Aid" have already proved in the coal mining districts of Pennsylvania.

Allow me, for your information, to herein copy the following brief remarks from the pages of the manual of First Aid:

"To gain the first-aid certificate of the Red Cross, it is of course necessary for students in associations to pass the same examination required from those in classes.

"The following course of instruction is recommended:

1. Structure and mechanism of the body.
2. First-aid materials.
3. General directions for rendering first aid.

Shock.

4. Injuries without the skin being pierced or broken.
5. Injuries in which the skin is pierced or broken.
6. Local injuries from heat, cold, and electricity.
7. Unconsciousness and poisoning.
8. Handling and carrying of the injured.
9. Special injuries of mine or railroad, etc.
10. Lecture by an expert on means for preventing accidents.
11. General review.
12. Sanitary matters, prevention of contagious diseases, such as tuberculosis, typhoid, scarlet fever, etc.

"The lectures should be shorn of all technical terms and half an hour is quite enough for them. Then the medical director or teacher should ask questions and superintend practical work by the class for half an hour. Practical work should be increased as much as possible just as soon as the men can do anything in this direction. After this, if possible have the men discuss the subject among themselves, telling about recent injuries they have seen, how they have dressed them, etc.

"All the men should, if practical, have date cards for the year with numbers on the margin which are to be punched out at each meeting.....

"Contests in different classes or associations and between such organizations have been found to be one of the best ways to stimulate study of first aid as well as to arouse public interest in this important subject.

"The events in such contests should naturally be those having to do with first-aid problems of special interest to the particular organizations concerned. As a sample of such contests, the following is taken from a program of an actual contest in the Pennsylvania mines.

Event No. 1.--Man insensible from gas, totally helpless. One man to pick him up, carry him fifty feet to good air, lay him down and perform artificial respiration for one minute.

Event No. 2.--Man injured in lower part of body. Two men to form four-handed seat and carry him fifty feet.

Event No. 3.--Man injured; leg broken. Three men to splint his leg with a mine sprag and some straw or hay; make temporary stretcher out of two mine drills and two coats, and carry fifty feet.

Event. No. 4.--Man injured; wound right side of temple; one man to open packet and dress wound.

Event No. 5.--General contest of eight teams. Man unconscious; wounds, simple fracture of right arm between elbow and shoulder; crushed foot with severe hemorrhage; apply tourniquet for bleeding, splints for fracture, perform artificial respiration for one minute, place on stretcher, carry fifty feet over car loaded with coal, pile of mine rock, then over fence and place in ambulance.

"An officer in charge, judges, a time-keeper and a starter will be required for such contests.

"The First Aid Department of the Red Cross will arrange such contests when desired and will award medals to successful contestants.

Red Cross Examination and Certificate.

"The Red Cross stands ready to arrange an examination for its certificate for any class of twenty persons on the conclusion of a course of instruction in first aid."

In Conclusion, It must not be construed that my enthusiasm for "First Aid" inspires me to the extent that such a class at a coal mine should necessarily have to deal with the prevention of contagious diseases or become students in anatomy, but I do think that such a class should be taught to handle and care for, in a practical manner, injured workmen in and around coal mines.

I have personally known of cases where men, becoming insensible from "after damp" gas, die for lack of medical aid, when, if the principles of "First Aid" had only been known to their fellow workmen, their lives might have been saved.

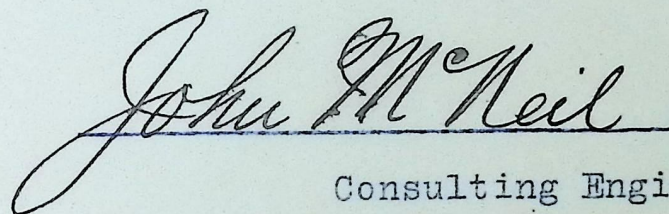
Again, I have witnessed injured men suffering much unnecessary pain, which could have been alleviated by more skillful handling.

It remains for well-regulated coal companies, such as yours, to be leaders in this humane and most worthy cause.

You will note in the foregoing report that I have not covered the mine equipment, miners' dwellings, boarding-house, store and other buildings, neither have I mentioned the saw mill, timber and farming lands of the coal company, which, of course, are all of considerable intrinsic value, but believing that you already possess as correct an account of these interests as I could possibly give, I assumed you would not require from me here, such detailed information.

It will also be understood that I have, in compiling this report, drawn upon knowledge obtained from past examinations of the property, as well as from my recent inspection, all of which I trust will meet with your approval. I am, sir,

Yours sincerely,

 John M. Neil M. E.
Consulting Engineer.

MAP OF HANNAFORD MINE No. 1

SECTIONS 20 AND 21 T. 15 N. R. 1 W.
THURSTON COUNTY WASHINGTON
WASHINGTON UNION COAL CO.

SCALE IN FEET
100 75 50 25 0 100 200 300 400 500

