

State Department of Geology and Mineral Industries

702 Woodlark Building
Portland, Oregon

STATE OF OREGON - COOS COUNTY COAL SURVEY

Project: Riverton Stripping Coal

Location: SE $\frac{1}{4}$ of sec. 8 and NE $\frac{1}{4}$ of sec. 17, T. 28 S., R. 13 W., W.M.,
Coos County, Oregon. Located one-fourth mile east of the
town of Riverton, which is six miles west of Coquille and twelve miles
east of Bandon on U. S. Highway 101. Nearest railroad at Coquille.

Owners: Walter D. Kight, Riverton; Verne M. Fonner, Tigard; and Beulah Fahy
estate, c/o Webb Fahy, Los Gatos, California; R. E. V. Johnson,
Riverton (coal rights owned by Kight).

Summary and conclusions: A conservative estimate of fifty thousand tons
of coal underlies an area of about 8 acres of
land lying at an elevation of 200 feet half a mile south of the town of
Riverton. The coal averaged a little over 4 feet in thickness, and lies
at an average depth of 19 feet below the surface, giving a stripping ratio
of 4.4 to 1. The coal is of fair sub-bituminous grade, with 12 to 20 percent
ash, 10 to 20 percent moisture, and a heating value of 8500 to 10,300 B.t.u.
It is believed that this area can be economically stripped and the coal sold
for the local trade at a profit, although the deposit is too small for large
scale operation for shipping purposes.

Introduction: Shallow coal of the so-called "Kight bed" has long been known to occur immediately back of the town of Riverton. According to Diller¹:

"The Kight coal overlies the Timon coal (now called the "Riverton vein") by about 200 feet, and the two are separated chiefly by soft sandstones. It is the uppermost of the coals well exposed at Riverton, and has been mined chiefly by Mr. Ferrey, who ran an entry 500 feet upon the strike of the coal. Some water was encountered but the mine drains itself. The bed contains 32 inches of coal, with a parting 8 inches from the top.... The coal is much fractured perpendicular to the bedding, and at intervals is associated with pitch coal..... The occurrence of soft shaly rocks above and below renders it necessary to timber the mine fully. The overlying shale is sometimes composed chiefly of brackish water shells. The Ferrey mine on the Kight coal was operated successfully for some time, but as the mine proceeded the coal bent more to the east, becoming irregular, and was finally pinched out by an extensive landslide which reached the river at the northern edge of Riverton. The landslide covers many acres and fills the little valley that heads three-fourths of a mile south of the town. Kight's coal has been prospected on the surface near the head of this slide, and irregular portions of coal occur at several points in the slide. The road from Riverton to Fat Elk creek crosses the lower part of the slide, where its irregular hummocky surface clearly tells the character of the material beneath. Tunnels have been run into it at several places, in prospecting for coal, but without encouraging results."

¹ Diller, J. S., The Coos Bay coal field, Oregon; U. S. Geol. Survey, Nineteenth Annual Report, 1897-98, Part III, p. 342, 1899.

The coal at the head of the "Landslide" was called to the attention of the department by Mr. William H. Kay, who has done considerable prospecting around Riverton. Two old open cuts exposing 3½ to 4 feet of coal were cleaned out and sampled. An area of about one acre, which had been stripped and mined several years ago was examined, and hand drilling was begun on June 4th, 1943 immediately adjacent to this area where the coal had been proven to be present and of good grade. A topographic map on a scale of 100 feet to the inch and with a contour interval of 10 feet was constructed and kept up to date as the

drill holes, which were located at the intersections of a 100-foot grid-network, were spotted and completed. This map, showing the topography and location of the grid and drill holes, accompanies the report as "Topographic sheet No. 1". As the lines of drill holes were completed along the grid lines, cross-sections were constructed showing the thickness and depth of the coal, and the thickness and type of overburden.

A total of ninety holes were drilled with 3" hand augers, and they vary in depth from 3 to 34 feet, with an average of 19.4 feet deep. Of these holes 37 showed no coal, and in 11 of them the coal found was less than 2 feet in thickness, and the average thickness (omitting six holes with anomalous thicknesses of over 8 feet of coal) was 44 inches. The area drilled with 100-foot centers or closer is about 10 acres, definitely underlain by coal.

Lithology: A composite drill-hole section on the Riverton project (Kight coal) might be as follows:

	<u>Feet</u>	<u>Inches</u>
Soil	2	
Yellow-brown sandstone (sometimes admixed with clay)	17	
Dense dark gray to blue shale or clay.	10	
Carbonaceous shale		4-13
Bone		3
Coal		5
Carbonaceous shale parting		1
Coal	1	6
Bony coal		5
Coal		11
Shale	10	
Dark gray hard sandstone	<u>10 plus</u>	
Total thickness of coal:	3	3

A section of the coal taken at the head of the old stripping pit at the Riverton project is as follows:

	<u>Feet</u>	<u>Inches</u>
Sandstone	10	
Clay, gray	10	
Broken coal	3	
Clay, gray	1	7
Shale, carbonaceous		1
Coal, good		6
Shale, carbonaceous		$\frac{1}{2}$
Coal, good	1	9 $\frac{1}{2}$
Bone		5
Clay, gray	<u>4</u>	<u>5</u>
Total thickness of coal	5	3 $\frac{1}{2}$

According to Diller (1898:338) the Kight coal is the uppermost in the area, lying 200 feet above the "Timon" or Riverton coal which has been most extensively mined. The generalized section given by Diller is as follows:

	<u>Feet</u>	<u>Inches</u>
Shale		
Kight coal	3	
Sandstone and shale	200	
Timon coal	4	9
Sandstone	1	6
Carbonaceous shale (leaf bed)	3	
Sandy shale	12	
Carbonaceous shale	3	
Sandstone and some shales	87	
Rouse coal ("Bunker")	2	
Shale (sandstone at top)	50	
Carbonaceous shale	2	
Sandstone	140	
Urquhart coal	7	1
Sandstone	70	
Carbonaceous shale and coal	1	6
Sandstone		
Total	<u>601</u>	<u>6</u>

The section as described correlates very closely with the section of the coals at the Beaver Hill mine (Diller, 1898:332) if the Urquhart coal is taken to be the Beaver Hill bed. The "Rouse" coal then compares with the 33 inches of coal lying 200 feet above the Beaver Hill; the "leaf bed" correlates with

the bed coal 103 feet further up the section; and the Timon bed correlates with the 3 feet-5 inches of coal (with one parting) which lies 32 feet above this. Correlations with other sections in the southern part of the coal field can be made.

Physiography: The Riverton stripping area lies within a north-facing amphitheater-shaped basin which encloses the headwaters of the two branches of "Johnson Creek". The floor of the "basin" is relatively flat, although it slopes gently to the north, is interrupted here and there by hummocks and swales, and is incised to a depth of from 10 to 25 feet by the two forks of the creek.

The preliminary impression (and one reached by Diller) is that the basin was formed by landsliding, but a more detailed study of the physiography, aided by a knowledge of the structure of the rocks and coal gained by the drilling program, indicate that such is not the case, although there may have been small-scale landsliding in one or two localities.

The elevation of the basin rises from about 200 feet on the northwest to nearly 300 feet on the south. It may be traced northeastward behind a group of small hills to the headwaters of a small creek which flows into the Coquille half a mile above Riverton. This "windgap" is part of the same bench-like flat, and even widens to the northeast. Thick beds of peat have been found at several localities in drill holes near the surface of the flat. It is believed that the Riverton stripping area represents a meander terrace of the Coquille or of a tributary to the Coquille River, formed when the river stood at the 200-300 foot level, a level which may be correlated with the 200-300 foot group of ocean terraces so well preserved along the coast both north and south of Bandon.

In the area which was stripped several years ago, it has been reported that occasionally the coal was absent, that clay appeared in contact with the sandstone

which underlies it. This strongly suggests that the coal in this basin in places eroded by the action of the streams which formed the terraces.

This hypothesis is upheld by the presence of the terrace level on both sides of "Kight Creek"; by its presence in the headwaters of the next creek to the east; as well as by the structural evidence.

Structure: The Riverton stripping area lies in the toe of an asymmetrical flat-bottomed-north-plunging syncline, whose axis strikes N. 35 W., with the east limb east of the edge of the area mapped striking N. 20° E. and dipping 25° northwest and the west limb striking N. 40-60 W. and dipping 10-17° northeast. The relatively flat bottom of the syncline strikes about N. 55° E., and dips an average of 6° to the northwest. The absence of coal in some of the holes immediately east of the west branch of the creek (and the excessive thickness in other holes) cannot be entirely explained by the above structure, which suggests that there has been some bedding-plane landsliding down the dip slope of the west ridge, eliminating the coal in some spots and duplicating it in others. Flexures other than the main one seem to be relatively minor, although a few anomalies and local rolls are present, but not important. The coal does appear to be lacking in some areas under the flat where it is assumed to have been eroded away by the streams which formed the flat.

Such duplication appears to have taken place along the 1700N coordinate between 200 and 300 E; and the coal appears to be largely lacking up the hill west of the 100E line.

Economic conditions: The question as to whether a profitable stripping operation can be postulated on the basis of the "measured" and "indicated" coal tonnage determined by this project rests not only on the figures, but upon a number of other factors of perhaps equal importance. These will be discussed

in more or less detail, under the following headings:

1. Market
2. Transportation
3. Grade, attitude, thickness and uniformity of coal.
4. Kind, depth, and disposal of overburden.
5. Tonnage calculations.
6. Land ownership, water supply, timber removal, pollution, and other miscellaneous factors.

1. Market: An impending fuel shortage in both metropolitan and rural areas assures an adequate demand for a satisfactory grade of coal, both for local consumption on the Coquille and Coos Bay districts, and for shipment to larger centers of population. In addition, a very large fuel demand at the Army cantonments (some 25,000 tons per year) might mean that this could be supplied from Coos Bay coals as well. Possible use of coal for industrial purposes cannot be neglected, although this is still in the future.

2. Transportation: Although not as favorably located as some of the coal mines in the area with regard to nearness to local points of consumption or to the railroad, the Riverton area is within one-quarter of a mile of the paved coast highway 101, at a point 6 miles from Coquille (the nearest railroad loading point) and 24 miles from Marshfield. A partly graveled road to the property could be made an all-year road with the addition of only a small amount of road metal.

3. Grade of coal:

Number Field-Lab.	Location	Thickness		Analysis (As rec'd-Air dried)		
		Bed	Sample	Ash	Moisture	Btu
#1601 1380N-170E	NW $\frac{1}{4}$, sec.17, T. 28 S., R. 13 W.	10"	10"	14.31	22.95 15.8	6678 As Recd. 8667 Airdried
#1602 1380N-270E	NW $\frac{1}{4}$, sec.17, T. 28 S., R. 13 W.	38"	18"	20.83	20.1 7.9	6743 8439
#1603 670N-500E	NW $\frac{1}{4}$, sec.17, T. 28 S., R. 13 W.	13' $\frac{1}{4}$ "	9' $\frac{1}{6}$ "	19.94	10.89 6.2	9161 10281
#1605 1870N-150E	SE $\frac{1}{4}$, sec.8, T. 28 S., R. 13 W.	4' $\frac{1}{2}$ "	4' $\frac{1}{2}$ "	27.2	20.2 8.4	6365 7976
#P-1841 1250N-910E	NW $\frac{1}{4}$, sec.17, T. 28 S., R. 13 W.	4' $\frac{1}{5}$ "	2' $\frac{3}{8}$ "	12.23	21.81 10.9	7988 10216

Tonnage Calculations

(Calculated on the basis of 25 cubic feet of coal to the ton, or 400 tons of coal to the one foot of thickness in a 100 foot square.)

NORTH BLOCK			
Section	Thickness	Depth	Tonnage
2100N	5	15	2000
	4	15	1600
	4	20	1600
2000N	6	5	2400
	1.5	19	600
	4	25	1600
1900N	4	4	1600
	1	24	400
	5	25	2000
	5	35	2000
	2	18	800
1800N	7	5	2000
	8	17	2400
	1.5	31	600
	5	31	2000
1700N	3	5	1200
	6	25	2400
	5	26	1800
	3	29	1200
1600N	5	28	2000
	5	10	1000
	2.5	25	1000
Totals:	(92.5)	(437)	34,200 tons.
Average:	4.2'	19.8'	

SOUTH BLOCK			
Section	Thickness	Depth	Tonnage
1500N	3.6	27.5	1450
	3.2	21.5	1250
	3.	9.0	1200
1400N	5.5	13.5	1700
	3.6	22.7	1450
	4.1	10.7	1600
1300N	6.	16.	2400
	5.7	23.	2300
	6.2	7.7	2500
Totals	(40.9)	(15.6)	15,850
Average:	4.5'	16.7'	tons.

SUMMARY OF TWO MAIN BLOCKS:
Average thickness: 4.3'
Average depth: 19.0'
Stripping ratio: 4.4:1
Tonnage: 50,050 short tons.

Possible tonnage in separate, marginal, or thin areas, an additional 15,200 tons.

MARGINAL AREAS			
Section	Thickness	Depth	Tonnage
SE Block	1	20	400
Block	.5	18	200
	3	7	1500
	4	14	1600
East Block	1	21	400
	5	9	2500
	3	10	300
West Gulch	3	10	600
	2	10	800
	2.5	12	400
Hill-side	1.5	5	1300
#48	2.5	30	1000
#105	6.	11	2400
#128	3.	15	1200
#132	1.5	7	600
Total	(39.5)	(20x9)	15,200
Aver.:	2.6	14.	tons.

Certain portions of the seam, as shown in the sections, may be rather bony. Some of the coal is quite soft and crumbly. The 1000 to 1500 tons of coal that was stripped several years ago for use in the local schoolhouse is said to have been quite satisfactory.

Attitude of the coal: The coal for the most part dips gently (less than 6°) to the north, although the dip is steeper on the west and east side of the basin.

Thickness of the coal: In a rough way, one may divide the ten acres underlain by coal into three divisions as follows:

Thickness less than 24": (and greater than 12")	12 holes; 3 acres.
Thickness 24" to 48" :	15 holes; 4 acres.
Thickness greater than 48":	10 holes (plus: 6 over 100") 3 acres.

In a number of the holes there are two distinct beds of coal, separated by several inches or even feet of clay. In some cases the upper of these beds is soft and crumbly, the lower hard. In six of the holes the thickness was 100 inches or over. These holes were not included in the tonnage estimates, since it is believed the thicknesses were duplicated by landsliding.

Uniformity of the coal: In the area stripped it is said that there were small areas where coal was absent. This seems to be born out by the drill hole records, for there are several barren holes where coal should appear at the depths penetrated. This appears in the cross sections, and can be explained by small local landsliding, which is more pronounced on the steep side hill on the west side of the basin, which has been undercut by the stream at its base. In other areas (as north of the area previously stripped) the absence of the coal may be explained by its erosion by streams which helped to form the basin. All of these local areas where coal is anomalously absent seem to be relatively small and probably would not unduly affect stripping operations. The coal bed itself varies

from place to place within certain limits. Besides varying from a few inches to over ten feet in thickness within the small area drilled, in some portions it appears to be much harder or softer than others; in places it is more bony; in places it is split into two or even more seams. It seems probable that "mine run" from this property would not be of acceptable grade, and that some type of washing plant would be necessary.

4. Kind, depth, and disposal of overburden: The overburden in nearly all the holes is composed of 6 to 10 feet of dark clay shale, overlain by upwards of ten feet of soft clayey sandstone. The consistency of the sandstone is such that it could be removed quite easily by power shovel or dragline; the shale might in some places have to be shot before it could be removed. There is usually a layer of carbonaceous shale overlying the coal, which can act as a stripping floor, and might be hydraulically cleared. The depth of the overburden varies from a few feet up to the maximum depth drilled, of over 35 feet. Only that part of the area with less than this amount of overburden was considered in the tonnage calculations for "measured" ore; although the "indicated" ore includes some coal at greater depth. The area to be mined is incised throughout its length by the two forks of "Johnson Creek" to a depth varying from 10 to nearly 30 feet. The coal, however, underlies the bed of these forks in their upper courses, so that casting of overburden into the creek would only be possible on the north end of the property. The 6° slope of the coal, which roughly corresponds to the surface slope, will probably permit bench stripping and casting to advance southward up the hill.
5. Tonnage calculations are given on the chart forming the next page of this report.

Miscellaneous factors: The ownership in the northwest corner of the area of the surface right by Johnson, whereas the coal rights were retained by Kight, may make it necessary to purchase this portion of the land outright from the former, and pay a royalty to the latter. Title to other parts of the area is less involved. Unlimited water is available in the Coquille River, 2000 feet to the west and 200 feet lower, the two small streams, on the property, which drain into the river, are insufficient for any development or washing needs. Since the Coquille River is navigable at beyond Riverton, the streams on the property would necessitate construction of some form of settling basins, should they be used to carry large amounts of debris which might enter the river and choke its channel. The entire property has been logged off, and only small growth fir and alder remain to be cleaned off before beginning an operation.

Report by: J. E. Allen

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