UNITED STATES DEPARTMENT OF THE INTERIOR
Harold L. Ickes, Secretary

BUREAU OF MINES
R. R. Sayers, Director

War Minerals Report 163

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POSSIBILITIES OF COAL PRODUCTION IN THE COOS BAY FIELD, OREGON

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MINERAL INDUSTRIES.

WASHINGTON: 1943

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The War Minerals Reports of the Bureau of Mines are issued by the United States Department of the Interior to give official expression to the conclusions reached on various investigations relating to domestic minerals. These reports are based upon the field work of the Bureau of Mines and upon data made available to the Department from other sources. The primary purpose of these reports is to provide essential information to the war agencies of the United States Government and to assist owners and operators of mining properties in the production of minerals vital to the prosecution of the war.

WAR MINERALS REPORT

UNITED STATES DEPARTMENT OF THE INTERIOR — BUREAU OF MINES

W.M.R. 163 — Coal March 1943

POSSIBILITIES OF COAL PRODUCTION IN THE COOS BAY FIELD, OREGON

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SUMMARY

A survey of the Coos Bay field was made by the Bureau of Mines* in August 1942 to determine whether 150,000 tons of coal could be produced annually for the Army camps in Oregon. Those at Albany and Medford, Oreg., could use 60,000 of the required 150,000 tons on spreader stokers. Subbituminous coal crushed to pass a 1-1/2-inch screen is suitable for this purpose.

The coal from this field can be used in both industrial and domestic stokers. Because of its high moisture content, there is danger of fire from spontaneous combustion in storage piles of this coal. However, a similar coal is now being stored at Fort Lewis, Wash.; therefore, it would appear that with proper regulation and supervision of storage piles, enough of this coal could be stored to insure an adequate supply of fuel for the Army camps.

The Coos Bay field covers an area of about 250 square miles, with many outcrops, but dense underbrush covering the area has limited this survey to only a small portion of the known out-

* George Watkins Evans, one of the Bureau of Mines' consulting engineers, assisted by Dr. H. F. Yancey, senior chemist, and M. R. Geer, assistant mining engineer.

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crops within the area. There may be more favorably situated outcrops, but it is reasonable to assume that the thickest and best coal that can be mined readily has been selected by the coal-mining men who have been in this field many years.

Four mines are now operating in the Coos Bay field, but because of their character and location, maximum production of each is limited to about 5,000 tons a year, or a total of 20,000 tons a year for the group.

Some coal might be recoverable by strip mining in small areas where the rocks are relatively flat-lying and are covered by thin overburden, but no specific localities are known where these conditions exist. Furthermore, at least one season of preliminary clearing and drilling would be necessary before proceeding with actual removal of the coal, if a more detailed survey indicated a favorable location.

Because of the small tonnage to be handled, the economical limit of ratio of overburden to coal would be 4 or 5 to 1. Operating costs resulting from the use of the relatively small-size equipment such operations would require would be high.

Miners' wages are lower in the existing Coos Bay field mines than in the State of Washington, and increase of operations in this field, especially if it involved importation of miners, undoubtedly would result in agitation for higher wages. With such wages and with existing mine conditions, it is improbable that coal could be mined profitably even at as much as $3.50 a ton.

However, if short-haul mines utilizing mechanical equipment could be opened, coal could be mined in this area at a cost of $3 a ton on the basis of an annual production of 50,000 tons. Opening such new mines would require money, time, and equipment, but existing mines cannot be adapted to such a program.

It is estimated that by very intensive work a mine could be opened for production in about 8 months on the Southport property. If equipment, material, and labor could be obtained, an initial production rate of 50,000 tons of coal a year could be expected, and each succeeding 6 months it should be possible to increase this rate by 25,000 to 50,000 tons a year.

Expenditure of approximately $100,000 would be required to open a mine on the Southport property having a capacity of 50,000 tons of coal a year. This should provide necessary mining and hauling equipment, electric power, building and storage facilities, and a reasonable amount for working capital, assuming prompt payment for coal delivered.

INTRODUCTION

The Coos Bay coal field is about 30 miles in length, north and south, and 12 to 14 miles in width at its widest part. There are about 250 square miles of coal area, or a little more than half the area of the anthracite fields of Pennsylvania. The Federal Geological Survey has estimated the original coal supply of the Coos Bay field as one billion tons. Figure 1 shows the relative locations of this field and of Corvalis and Medford, Oreg., near which the Army camps are situated.

The coal area was covered at one time with a dense growth of Port Orford cedar, spruce, and fir, but most of the district has been cut over, and there is now a second growth of trees and brush that makes the entire countryside a veritable jungle, comparatively few rock outcrops being visible. It is very difficult, therefore, to trace the outcrops of the coal beds, and as a rule drillings should be made.

As described by the Geological Survey, the general geologic structure of the field is that of a basin containing a number of subordinate folds. The principal fold, the Westport

arch, divides the field into two subordinate basins, the Beaver Slough and South Slough. Other smaller basins include the Newport, Flanagan, Empire, and North Bend.

Five coal properties have been developed in the Coos Bay field, and mines are now being operated on four of them. The Glasgow property, approximately 6 miles north of Marshfield,

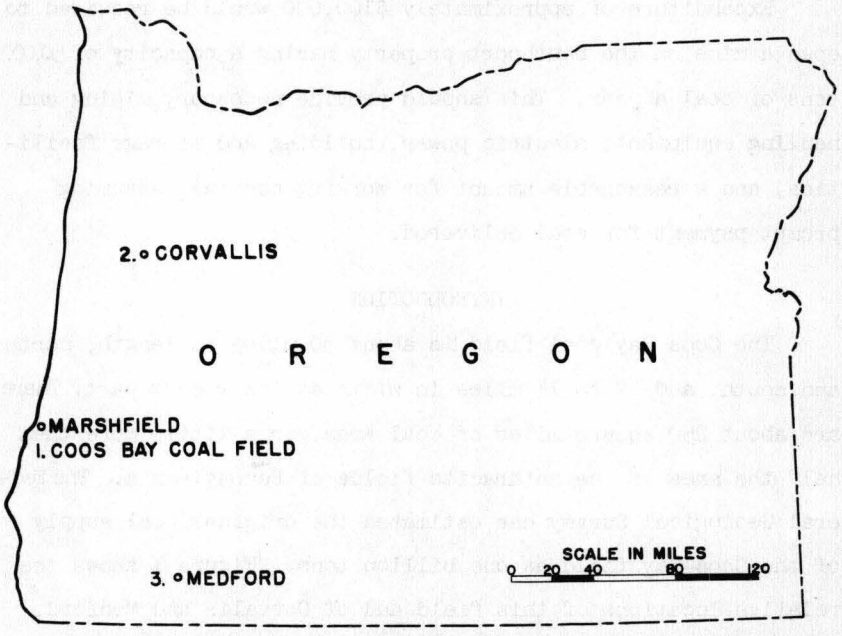


FIGURE 1. MAP SHOWING COOS BAY COAL FIELD AND ARMY CAMPS NEAR CORVALLIS AND MEDFORD

was developed many years ago but was not being mined when the survey was made. The Southport mine, in production on a small scale since 1920, is approximately 5 miles south of Marshfield; the Overland mine is approximately 10 miles south of Marshfield, and nearby, to the south, is the Beaver Coal Co.'s mine. The Lampa Coal Co.'s mine is still farther south, on the Coquille River.

Table 1 gives analyses and other properties of coals from Coos County, Oreg.

TABLE 1. - Analyses and other properties of coals, Coos County, Oreg. 1/

Location, town	Mine	Bed	Location in mine	Sample: Condition 2/	Sample: Laboratory No.	Proximate percent: Moisture	Proximate percent: Volatile matter	Proximate percent: Fixed Carbon	Proximate percent: Ash	Ultimate percent: Sulfur	Ultimate percent: Hydrogen	Ultimate percent: Carbon	Ultimate percent: Nitrogen	Ultimate percent: Oxygen	Air-dry loss, percent	B.t.u.	Ash-softening temperature, °F.	Agglomerating index	Subbituminous rank
Coquille, 2-1/2 miles west of	Gilbert	Unnamed	1 south entry, 40 feet south of slope.	1	B-40026	16.4	35.0	36.9	11.7	0.6	6.0	52.7	1.2	27.8	8.1	9,260	2,370	NAa	B
				2		--	41.9	44.1	14.0	.7	5.0	63.1	1.4	15.8	--	11,080			
				3		--	48.7	51.3	--	.8	5.8	73.3	1.7	18.4	--	12,880			
Marshfield, 6 miles south of	Southport	Southport	Morrisoul room, upper works, 2,300 feet north of portal.	1	A-90058	17.2	33.6	40.8	8.4	.6	6.2	56.1	1.2	27.5	3.3	9,880	2,080	---	B
				2		--	40.6	49.2	10.2	.8	5.1	67.8	1.5	14.6	--	11,940			
				3		--	45.2	54.8	--	.8	5.7	75.4	1.6	16.5	--	13,290			
Do.	Do.	Do.	9 room pillar, 1 north entry, 2,400 feet north of portal.	1	B-40027	16.7	33.4	40.4	4.5	.5	6.0	55.6	1.3	27.1	7.7	9,720	2,100	NAa	B
				2		--	40.2	48.3	11.5	.6	4.9	66.8	1.6	14.6	--	11,670			
				3		--	45.3	54.7	--	.7	5.5	75.5	1.8	16.5	--	13,180			
10 miles south of	Thomas	Beaver Hill	13 room, 60 feet above entry, 600 feet north of portal.	1	B-40028	16.9	34.6	42.8	5.7	.5	6.2	57.5	1.4	28.7	9.1	10,080	2,340	NAa	B
				2		--	41.7	51.5	6.8	.6	5.2	69.3	1.6	16.5	--	12,140			
				3		--	44.8	55.2	--	.7	5.6	74.3	1.8	17.6	--	13,030			
11 miles south of	Overland	Do.	1 room, 100 feet above 1 south entry, 95 feet south of slope.	1	B-40064	16.7	35.7	42.2	5.4	.7	--	--	--	--	6.4	10,150	2,330	NAa	B
				2		--	42.8	50.7	6.5	.9	--	--	--	--	--	12,190			
				3		--	45.8	54.2	--	.9	--	--	--	--	--	13,030			
Do.	Do.	Do.	4 room neck, 1 south entry 250 feet south of slope.	1	B-40065	18.5	33.4	41.2	6.9	.7	--	--	--	--	7.6	9,760	1,990	NAa	B
				2		--	41.0	50.6	8.4	.8	--	--	--	--	--	11,970			
				3		--	44.8	55.2	--	.9	--	--	--	--	--	13,070			
Do.	Do.	Do.	Composite of B-40064 and B-40065.	1	B-40066	17.9	34.4	41.5	6.2	.7	6.3	57.0	1.3	28.5	7.0	9,960		NAa	B
				2		--	41.8	50.7	7.5	.9	5.2	69.4	1.5	15.5	--	12,130			
				3		--	45.2	54.8	--	.9	5.6	75.1	1.7	16.7	--	13,120			
Riverton, 1/2 mile west of	Alpine	Riverton	Crosscut off slope between 4 and 5 south entries.	1	B-40029	19.3	32.8	40.3	7.6	.7	--	--	--	--	9.4	9,250	2,320	NAa	B
				2		--	40.6	50.0	9.4	.8	--	--	--	--	--	11,460			
				3		--	44.8	55.2	--	.9	--	--	--	--	--	12,650			
Do.	Do.	Do.	Face of slope, 750 feet from portal.	1	B-40030	19.6	32.6	40.9	6.9	.6	--	--	--	--	10.1	9,310	2,340	NAa	B
				2		--	40.5	50.9	8.6	.7	--	--	--	--	--	11,560			
				3		--	44.3	55.7	--	.8	--	--	--	--	--	12,670			
Do.	Do.	Do.	Composite of B-40029 and B-40030.	1	B-40031	19.3	32.6	40.9	7.2	.6	6.1	53.8	1.4	30.9	9.8	9,280		NAa	B
				2		--	40.4	50.6	9.0	.7	4.8	66.7	1.7	17.1	--	11,500			
				3		--	44.4	55.6	--	.8	5.3	73.3	1.9	18.7	--	12,640			
2 miles west of	Riverton prospect	Unnamed	Face of drift, 50 feet south of portal.	1	B-43482	10.1	36.1	37.8	16.0	4.3	5.5	55.1	.9	18.2	3.5	10,080	2,070	NAb	A
				2		--	40.1	42.1	17.8	4.8	4.9	61.3	1.0	10.2	--	11,220			
				3		--	48.8	51.2	--	5.9	5.9	74.6	1.2	12.4	--	13,650			

1/ Yancy, H.G., and Geer, M. R., Analyses and Other Properties of Oregon Coals as Related to Their Utilization; Oregon Dept. of Geol. and Min. Indust. Bull. 20, 1940.

2/ 1, sample as received; 2, dried at 105°C.; 3, moisture and ash free.

GLASGOW PROPERTY

Figure 4 shows a coal area approximately 6 miles north of Marshfield, known as the Glasgow coal property, partly in Ts.24 and 25 S., Rs.12 and 13 W., and in portions of secs. 1, 35, and 36, as shown on the map.

A rock tunnel was driven many years ago from A to B to intersect the Hardy bed; a gangway was driven from B to C and an

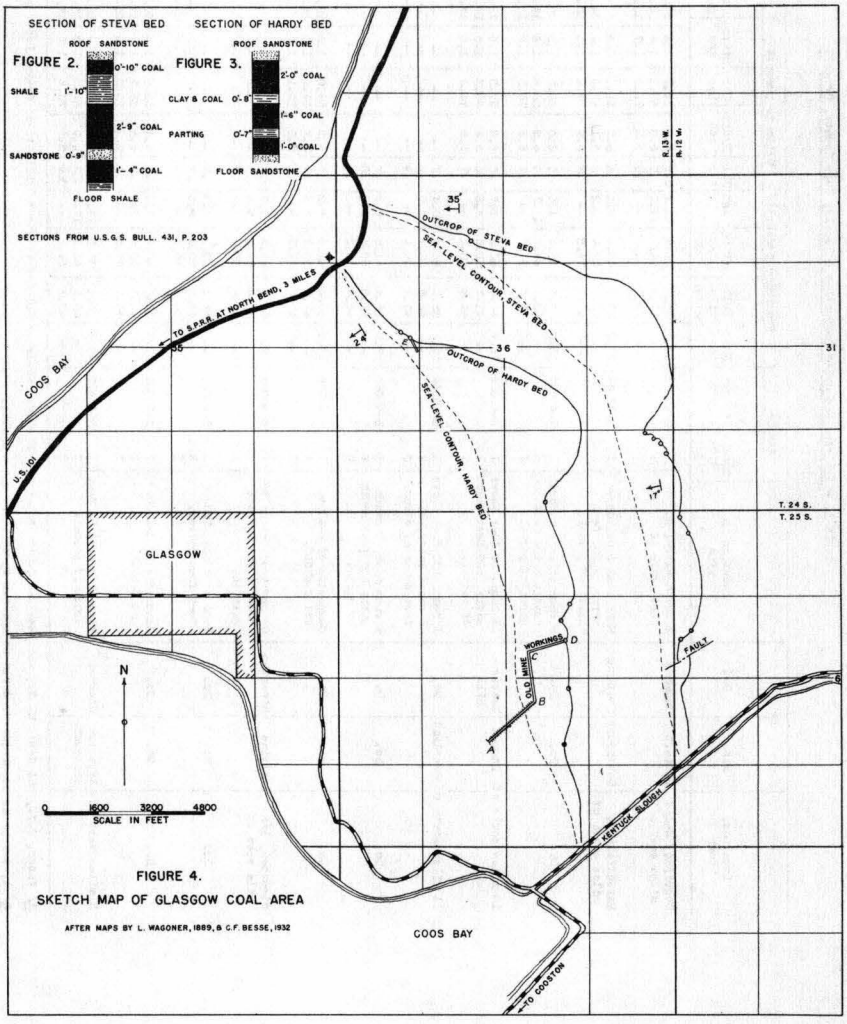


FIGURE 4.
SKETCH MAP OF GLASGOW COAL AREA
AFTER MAPS BY L. WAGONER, 1889, & C.F. BESSE, 1932

airchute from C to D. At D the chute reached the surface. Prospecting work was also done on a lower bed known as the Steva bed in secs. 6 and 31, as indicated. In addition to that done on the eastern portion of the property, some work also was done along the western margin of the property on both the Steva and the Hardy beds, and at E a short drift was driven in on the Hardy bed. Time would not permit complete examination of this property. It was not practicable to examine the outcrop of the coal along the western limits of the property, and as representative cross sections of either bed along the eastern part of the property could not be obtained, reliance must be placed for the time being on these sketch maps, which are supposed to represent the outcrops of the two beds. Figure 2 is a section of the Steva bed as reproduced from Geological Survey Bulletin 431, and figure 3 is a section of the Hardy bed, from the same publication.

There is much similarity between the cross section of the Hardy bed, on this property, and sections of the Beaver Hill bed in the area lying between the Southport property and the old Beaver Hill mine. These two beds appear to dip at angles ranging from 14° or 15° to nearly 30°. It is probable that portions of this property contain coal beds dipping at angles low enough to permit the use of undercutters, conveyors, and duckbills; but this cannot be determined until the beds have been made accessible for examination to permit a study of their walls and details of the dips.

There appears to be a considerable tonnage of coal above water level in this property. No doubt the coal is of about the same grade as that in the other portions of the Coos Bay field. Fortunately, these outcrops are close to the main highway traversing this part of the Coos Bay field, and a mine opened at

this point would be within 3 miles of the Southern Pacific Railroad operating between Marshfield and the main line at Eugene. This property should be studied further after it has been opened for proper examination.

SOUTHPORT MINE

This property, controlled by James Flannagan of Marshfield, is approximately 5 miles south of Marshfield and was opened about 1876 in what appears to be the Beaver Hill coal bed.

The mine was inactive for a number of years after a long period of operation, exact data on which are not available now. It was reopened in 1920 and has since produced a small amount of coal each year.

Figures 5 to 7 show the general features of this property. At present there are two openings not far from the east quarter corner of sec. 22, T.26 S., R.13 W. The main entry, as developed by the original coal company, started at A and was driven through the hill a distance of over 2,200 feet. The entry was driven on a rather steep grade; at places the slope of the track is greater than 6 percent.

Most of the area west of the entry along A-B has been worked out for reasonable distances from the entry, but there are doubtless large tonnages of coal in the outcrop above the old workings. The area has not been prospected, nor has it been drilled. The bed lies at an angle of about 8°, and the hill to the west rises much faster, indicating that there probably is an area of virgin coal that would yield a large tonnage.

An outcrop of the bed is indicated at I on figure 6, and there is reason to believe that it extends a considerable distance to the southwest.

The slope along the line A-C, figure 6, is at present filled with water and was not accessible at the time of the survey. The

slope extended at a dip of 8° for a distance of about 280 feet, and the gangway was driven northerly from the bottom of the slope. The area A-D-E has been developed and the greater portion of the coal removed.

Recently a gangway was started from F (fig. 6) and was driven along the coal until a fault was encountered at G. In August 1942, a trace of coal was found along the fault line, and it was believed that the fault zone had been crossed. The present plan is to explore the area along the line G-H in an endeavor to develop a tonnage of coal above that line; it is expected that coal can be obtained immediately from this area.

The gangway and rock tunnel, F-G, need to be enlarged, and it will be necessary to "brush" the top to make necessary headroom.

A new opening could be made at point I, and a new mine might be developed within the area along an extension of the line through I-J and to the westward along the outcrop area in virgin ground.

The character of coal in the Southport mine is similar to that in the Beaver Hill bed in this part of the Coos Bay area.

A cross section of this bed (fig. 7) indicates a total of 3 feet 8 inches of good coal with an 8-inch parting of clay. The roof in most places is desirable sandstone, but in the area marked "heavy roof" there is a cap rock that may cause trouble by breaking loose from the main roof.

This property has apparent possibilities of development to produce 25,000 or 30,000 tons of coal during this emergency, if worked aggressively. Mr. Flannagan, however, had planned to develop the new body of coal along F-G-H to produce only about 5,000 tons of coal during the next 12 months.

FIGURE 5.
LOCATION OF PROPERTY

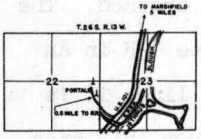


FIGURE 6.
SKETCH MAP OF MINE
FROM MAP BY D. L. BUCKINGHAM, 1920

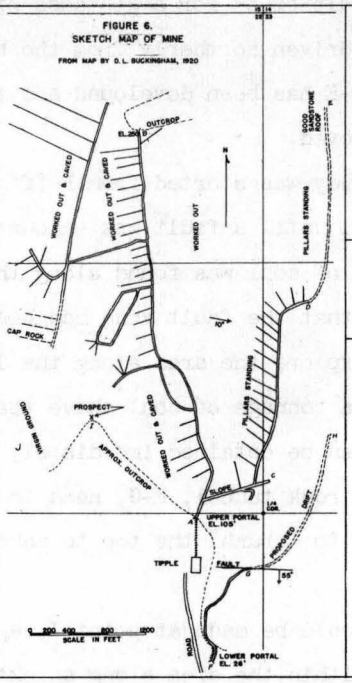
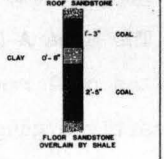


FIGURE 7.
SECTION OF BED
MEASURED 2400' NORTHWEST OF PORTAL



ANALYSIS
B-40027

	%
MOISTURE	16.7
VOL.	33.4
F.C.	40.4
ASH	9.5
SULFUR	0.5
B.T.U.	9720
A.S.T., °F	2100

SOUTHPORT COAL CO.

MARSHFIELD, ORE.
OPERATED BY J. H. FLANAGAN

NOTES

AMOUNT OF COAL IN PILLARS NOT KNOWN. LOWER DRIFT NOW BEING DRIVEN WOULD DEVELOP 50000 TONS OF COAL IF DRIVEN 2000' WITH AVERAGE LIFT OF 200'.
EQUIPMENT:- 8 MINE CARS, 10000' RAIL, POST DRILLS, ANVIL, FORGE, VISE, AND HAND TOOLS.

FIGURE 8.
LOCATION OF PROPERTY

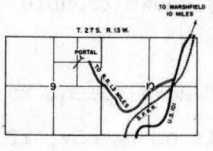


FIGURE 9.
SKETCH MAP OF MINE
0 100 200 400 800
SCALE IN FEET

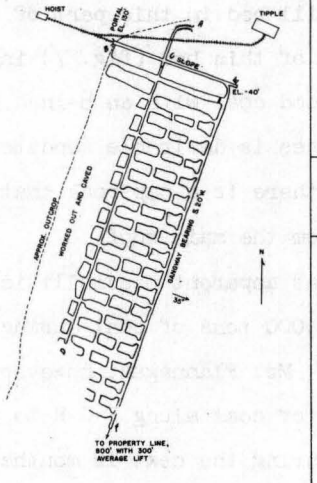
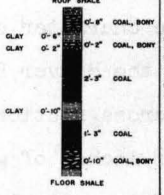


FIGURE 10.
SECTION OF BED
MEASURED 350' SOUTH OF SLOPE



ANALYSIS
B-40068

	%
MOISTURE	1.73
VOL.	34.4
F.C.	41.5
ASH	6.2
SULFUR	0.6
B.T.U.	9960
A.S.T., °F	2160

OVERLAND COAL CO.

MARSHFIELD, ORE.
OPERATED BY EVOR & ADOLPH RUDBERG, GEORGE CHARD, & JOHN ANDERSON

NOTES

PRODUCTION IN 1941, 2300 TONS.
COAL IN PILLARS, 12000 TONS. COAL THAT WOULD BE DEVELOPED BY DRIVING PRESENT GANGWAY 800' TO PROPERTY LINE WITH AVERAG LIFT OF 300', 28000 TONS.
EQUIPMENT:- 6 MINE CARS, 3000' RAIL, 3 RECIPROCATING PUMPS OF 5" X 2-1/2", & 1-1/2" SIZE WITH MOTORS, 800' OF 3" PIPE, 6 POST DRILLS, 30" DOUBLE-ROLL CRUSHER, 12-TON TRUCK SCALES, FORGE, ANVIL, DRILL PRESS, AND HAND TOOLS.
HOIST IS POWERED BY AUTOMOBILE ENGINE.
POWER LINE 600' FROM PORTAL; PRESENT POWER DEVELOPED BY DIESEL-ELECTRIC GENERATOR.

It is probable, however, that if plans were perfected to finance this coal program with government funds, an arrangement could be made with Mr. Flannagan and the owners of the property to take over the area west of point I and to develop a mine that would produce a substantial tonnage of coal. Before a program is initiated at this point, however, the area should be prospected by some method requiring a minimum of time and expense to prove definitely the character of the coal seam.

Conditions in the Beaver Hill bed at this mine are somewhat similar to those in the Harris coal bed at the Harris mine near Issaquah, King County, Wash. The two beds are of about the same thickness, and whereas the Harris bed does not have clay partings that have to be "gobbed," the flatness of the dip and the distance the coal has to be "bucked" down the dip just about compensate for the labor expended in removing the clay parting at the Flannagan mine.

It is difficult to determine precisely the number of tons of coal produced per man per day at the Flannagan mine under the present system of working because of the inadequacy of the method of accounting, but it is estimated that it is not very far from 2 tons per man shift. At the Harris mine tons per man shift is 2.18.

Because the 8° pitch at the Flannagan mine will permit the use of undercutters and shaking conveyors with duckbills at the front end, it is believed that as much as 17 tons per man shift can be produced for each man on the undercutting and conveyor units.

OVERLAND COAL MINE

The Overland coal mine has been opened by means of a slope on the full dip of a coal bed that has many of the characteristics of the Beaver Hill coal bed at the Beaver Hill mine.

Figure 8 shows the location of the mine, roadway, and the Southern Pacific Railroad, and figure 9 shows the extent of the mine. It will be observed that a rock tunnel was driven a short distance from the surface at point A until the coal bed was crossed. A gangway was then driven along the strike of the bed to point D, a slope was sunk from C to E, and a gangway was driven about 950 feet to point F. A Dodge automobile engine furnishes the power to hoist the coal up the slope from the lower level, and the cars are then dropped down from the portal to the tipple, where the coal passes through the screening plant. The screening plant consists of a 1-3/4-inch-spaced bar screen and 1-1/4- and 7/8-inch square-hole screens, which separate the coal into the market sizes of lump, nut, pea, and slack.

Equipment of the mine is listed in the notes accompanying figures 8 to 10.

The Rudberg brothers, operators of this small mine, are among the best coal miners in the Coos Bay region at this time, and both their surface and underground operations are in good condition.

When asked how much coal his group would mine from July 1942 to July 1943, Evor Rudberg stated that they did not desire to mine a large amount of coal or to develop a large tonnage; that if he and his associates mined 5,000 tons of coal he would be satisfied. If any one had a plan whereby a much greater amount of coal could be mined, however, he stated he would gladly make arrangements to turn his property over to such a person or group of persons. The road into his mine and his slope and general arrangements are the best in the Coos Bay field at present; it is one of the few places where coal in any considerably larger quantity could be mined if additional mining equipment were installed. There are about 60 acres of coal in this prop-

erty, and on the basis of 5,000 tons per acre for this pitch the property would yield 300,000 tons. The strike to the southwest continues into the Beaver Hill property of the Southern Pacific Co., and probably arrangements could be made to continue toward the Beaver Hill mine and so to develop a mine with still greater tonnage.

BEAVER COAL CO.'S MINE

This mine is in the S½ sec. 9, T.27 S., R.13 W. and is on a coal bed strikingly similar to the Beaver Hill or Newport coal bed, which was worked at the Beaver Hill mine.

There is a mile of road from the main highway, near Coaledo, to the coal mine. This road crosses the Southern Pacific Railroad track a short distance from Coaledo, and there are other obstructions along it that, if not corrected, will make hauling of coal from the mine to the main highway or to the Southern Pacific track slow and expensive. (See fig. 11 for relative location of mine, road, railroad, and highway.)

Figure 13 shows a section of the coal bed. Total thickness of the bed is 6 feet, 1 inch, and thickness of good coal is 3 feet, 5 inches. The bed strikes northeasterly and dips to the southeast at angles of 30° to 36°. The 8 inches of bony coal above the 6 inches of clay is held up as the roof, and the 10 inches of bony coal at the bottom is lifted in the gangway to make head room.

When the property was examined early in August 1942, the gangway had been driven about 900 feet from the portal into the coal bed. It was estimated that a drive of about 800 feet would reach the boundary of the property, but permission had been granted to drive 200 feet farther to mine some coal above the reach of the Overland mine, which is farther to the northeast and on the continuity of the same coal bed.

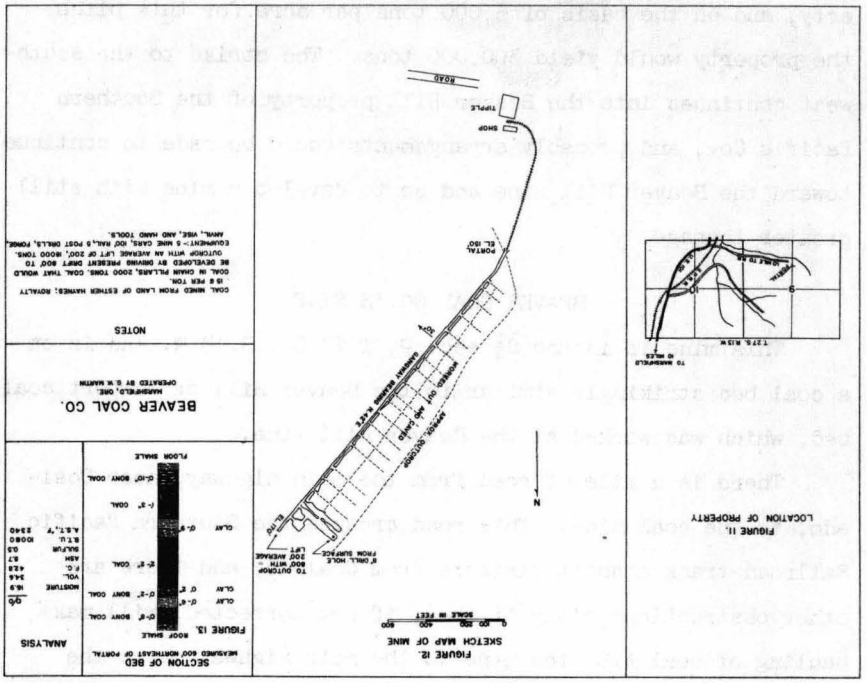


FIGURE 11.
LOCATION OF PROPERTY

FIGURE 12.
SKETCH MAP OF MINE

FIGURE 13.

SECTION OF BED
MEASURED 600' NORTHEAST OF PORTAL.

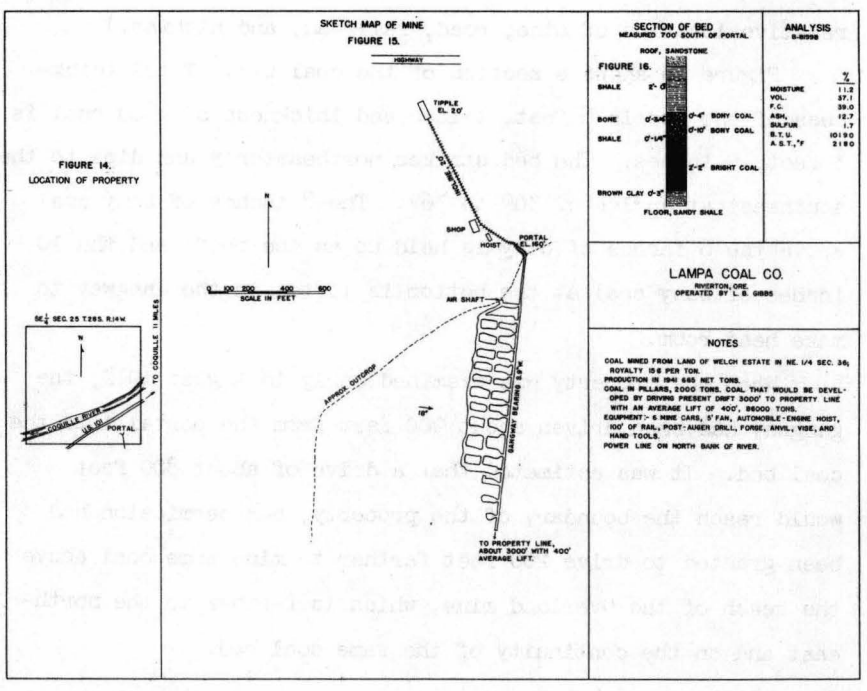
		ROOF SHALE
O.W.	0'-6"	SONY COAL
O.W.	0'-2"	SONY COAL
C.W.	0' 8"	
	2'-8"	COAL
	1'- 2"	COAL
O.W.	0'-9"	
	0'-10"	SONY COAL
		FLOOR SHALE

ANALYSIS

	%
MOISTURE	16.9
VOL.	34.6
F.C.	42.8
ASH	6.7
SULFUR	0.3
B.T.U.	10080
A.S.T.,°F	2340

NOTES

COAL MINED FROM LAND OF ESTHER HAMES; ROYALTY 15 ¢ PER TON.
COAL IN CHAIN PILLARS, 2000 TONS. COAL THAT WOULD BE DEVELOPED BY DRIVING PRESENT DRIFT 600' TO OUTCROP WITH AN AVERAGE LIFT OF 200', 40000 TONS.
EQUIPMENT:- 5 MINE CARS, 50' FAN, GASOLINE HOIST, 600' OF RAIL, POST AUGER DRILL, FORGE, ANVIL, VISE, AND HAND TOOLS.



LAMPA COAL CO.'S MINE

Some of the details of the Lampa Coal Co.'s mine are shown in figures 14 to 16, inclusive. The mine is not far from U. S. Highway 101, which traverses the area lying between Coquille and Bandon. It is close to the south bank of the Coquille River, and in former years coal was mined in this neighborhood and transported down the Coquille in boats.

Coal on this property appears to be from some other bed than the Beaver Hill, for it does not have the characteristic clay partings of the latter.

There appears to be only about 2 feet, 2 inches of good coal in this bed, and that from the best part of the bed has an ash content of nearly 13 percent. The moisture content of the bed is lower than that of the Beaver Hill bed.

Because of the 18° pitch of this bed, which might be a little too steep for undercutters and conveyors, and the fact that it is so thin, it is doubtful whether it will lend itself to the program under consideration in the Coos Bay field. The relatively high ash and the 11-mile haul to the railroad at Coquille discourage the use of coal from this mine for the Army camps. It is believed that this property can serve best to supply coal for general use within the Coquille-Bandon coal-consuming area.

AVAILABLE LABOR IN THE COOS BAY FIELD

There is a real question as to where local coal-mine operators can find competent mine labor, as production of coal in the Coos Bay field has been drastically reduced in the past 10 years. More than 20 years ago, this field produced as much as 111,000 tons of coal a year, but in some recent years the amount of coal mined has been less than 5,000 tons.

It is evident, therefore, that if 60,000 or 80,000 tons of coal is to be mined, it will be necessary to import coal miners or the raw recruits from which competent coal miners can be developed.

Three of the four coal mines now operating in the field have beds dipping 30° or more, and it is a well-known fact among coal miners that it is much more difficult to train a man to work on pitch coal than on flat coal. This is a phase of the problem that can not be overcome quickly, for it is known that experienced coal miners, who have worked in "flat" coal beds try to work in 40° beds and quit immediately to go elsewhere to find employment. It will be a great advantage, therefore, to concentrate on comparatively flat-pitch beds such as that in the Southport area, where the coal is flat enough to permit a man to move about without danger, and where undercutters and conveyors can be set up and used to advantage.

FUTURE WAGE SCALE AND SAFETY STANDARDS IN THE COOS BAY FIELD

At present, wages paid coal-mining employees in this area are considerably lower than those paid coal-mine workers in the State of Washington. So far they have been able to work on a lower wage scale in Coos Bay; but it is believed that if any considerable tonnage of coal is to be mined, it will be necessary to adopt the Washington wage scale and also to institute the safety methods of the Federal Bureau of Mines, with a safety code comparable to the code now in use in the State of Washington.

At present the small mines of the Coos Bay field generate but little if any explosive mine gases. It was the experience at the Beaver Hill mine, however, that when depth was reached, exposing a considerable area of coal, the mine did produce explosive gases. Therefore, in planning any work on an extensive

scale in this field, raising the standard of mine inspection and safety as well as increasing the scale of wages must be anticipated.

At present, men who work as miners in the Coos Bay field are being paid 75 cents an hour, or $6 a day for 8 hours. Below is the present scale of wages paid in Washington coal mines. It will be seen that miners are paid $7.40 a day for 7 hours' work at the working face. It will also be noted that duckbill operators are paid $8.80 a shift, and that the scale ranges as high as $9.20 for machine runners. These factors make it evident, therefore, that unless mechanization is applied to coal mining in the Coos Bay field, especially in view of a possible increase in wages, the cost of mining will be relatively high.

Washington Wage Scale

Inside Mine

Miners	$7.40
Timbermen	7.40
Timbermen helpers	6.70
Trackmen	7.40
Drillers	7.80
Trackmen helpers	6.70
Motormen	7.00
Switchers	7.00
Drivers	7.00
Parting boys (18 to 21 years old)	5.13
Trappers (18 to 21 years old)	5.13
Rope riders	7.00
Main hoist engineers	7.30
Other hoistmen, slope, development, etc.	6.80
Cagers	7.00
Cagers helpers	6.70
Pumpmen	6.70
Pipemen, 1st class	7.40
Pipemen, 2d class	6.90
Pipemen helpers	6.70
Chute starter	6.70
Spotter	6.70
Chute leader	6.70
Timber packers	6.70
Inside labor, not classified	6.70

Machine Rates

Machine runners	$9.20
Machine runners helpers	8.40
Conveyor operator	8.40
Loaders on conveyors	8.40
Duckbill operators	8.80
Facemen and duckbill	8.40
Drillers, following conveyors of mechanical loading devices	9.20
Mechanical slope-sinking facemen	8.40
Mechanical mucker facemen	8.40

Except as specified, regular scale to apply

Outside Mine

Main hoisting engineer	7.30
Power-plant and compressor engineers	6.90
Development engineer	6.70
Electrician, 1st class, in and around mines	7.40
Electrician, 2d class, in and around mines	6.90
Machinist, 1st class, in and around mines	7.40
Millwright	7.40
Motorman	7.00
Machinist, 2d class, in and around mines	6.90
Electrician and machinist helpers, in and around mines	6.50
Firemen	6.70
Cagers	6.70
Cagers helpers	6.50
Teamsters	6.50
Truck drivers, local and 2-ton capacity	6.50
Truck drivers, 2-1/2-ton to 4-ton capacity	6.54
Truck drivers, over 4-ton to 8-ton capacity	6.86
Greasers and couplers (men)	5.05
Greasers and couplers (boys)	4.80
Dumpers	6.50
Railway-car dropper loader	6.50
Tugger operator	6.10
Railway-car loaders	6.10
Blacksmith, 1st class	6.90
Blacksmith, 2d class	6.50
Blacksmith helpers	6.50
Carpenter, 1st class	7.60
Carpenter, 2d class	6.80
Carpenter helpers	6.10
Car repairers	6.60
Choppers	6.50
Picking-table men	6.10
Picking-table boys	5.00
Lampmen, 1st class	6.70
Lampmen, 2d class	6.30
Outside labor, not classified	6.10
Bunker machinery tenders	6.70
Washeryman, 1st class	6.70
Washeryman, 2d class	6.50
Jig and table tenders	6.30
Head picking-table man	6.50
Coke-machine operator	6.50

Strip-Mining Operations

Bulldozer operator (for 20 7-hour days per month)	$208.00
Shovel operator	8.80
Driller	8.60
Truck drivers	7.60

SUGGESTED CONVEYOR MINE AT SOUTHPORT

The outlines of some of the workings of the old Southport mine in secs. 22 and 23, T.26 S., R.13 W., are shown in figure 6. This survey included inspection of the accessible portions of this old mine, and it is believed that to attempt to mine coal from the old workings would require too great an investment in money and would involve too great a risk of not being able to block out any substantial tonnage of coal.

A prospect has been found, about as indicated, in the S1/2NE1/4 sec. 22, but further prospecting will have to be done to determine the true character of the coal bed in this part of the Southport property.

One of the first things to be done, if an appreciable portion of the annual requirement of 150,000 tons of coal is to be produced in the Coos Bay field, would be some prospecting at a very early date somewhere within the area shown in figure 6, near the words "virgin ground." The object would be to prove the nature of the coal bed at this point and to locate a strategic place where a gangway could be driven into the area farther up the pitch of the coal bed than the old workings of this mine.

The main haulageway from A to B was driven through the hill 50 or 60 years ago and did not encounter any faults within that area. It is reasonable to suppose, therefore, that an opening up the pitch from this old opening might be driven for a considerable distance without encountering heavy ground.

If it is decided to open any portion of the Coos Bay field for the purpose of supplying the Army camps at Medford and Corvallis, it is recommended that the first mine be opened within the area outlined above, provided proper arrangements can be made with the owners of this property.

POSSIBLE COSTS OF OPENING SOUTHPORT MINE

To any mining man who has been over the Southport property it is evident that only an approximation can be made at this time of the probable cost of opening a mine and mining the coal, because of the dense scrub growth covering the property. At present there are two unknown factors, the more important of which is knowledge of the attitude of the coal bed within the area under consideration, the other being the difficulty of securing competent, efficient labor.

Following is the best estimate that can be made at this time of the cost of opening a 100-ton-a-day mine:

Prospecting along the outcrop	$ 2,000
Improvement of road	3,000
Power line to property	1,500
Undercutter, conveyor, drive, duckbill, etc.	15,000
Overstrom table for cleaning small sizes, and including bins	5,000
Water system for cleaning plant	3,000
20 mine cars, at $150 each	3,000
2 mules	400
Machine shop and blacksmith shop combined	2,000
Ramp at railroad loading plant	1,000
Buildings at mine	2,000
Storage bins for 500 tons of coal	10,000
Driving gangway, 1,000 feet, including ditches, rails, ties, and some gravel between ties	10,000
Incidentals and margin of safety to compensate for faults, reduced labor efficiency, etc.	12,000
	69,900

This plant should produce 25,000 tons of coal a year with one-shift operation, or, with the expenditure of an additional $10,000 to provide two-shift operation, 50,000 tons of coal a year. With additional cleaning equipment and more haulage facilities, production could readily be increased to 75,000 tons a year.

PROBABLE COST OF MINING

Estimates of mining, such as are under consideration, must be used with the understanding that complete knowledge of the character of the walls or of the regularity of the coal bed within the area in which it is proposed to open the coal mine is not available. A further handicap is lack of knowledge as to just what type of labor can be obtained for the operations. Therefore, the estimate given below is little better than an intelligent guess.

Inside, mechanical unit:	Cost per shift	
1 machine runner	$9.20	
1 machine runner's helper	8.40	
1 conveyor operator	8.40	
2 loaders onto conveyor	16.80	
1 duckbill operator	8.80	
1 face man	8.40	
1 driller	8.60	
8		$68.60
General inside:		
2 miners	14.80	
1 timberman	7.40	
1 timberman's helper	6.70	
1 car spotter	6.70	
3 pickers on conveyor line (boys)	15.39	
1 driver	7.00	
1 track man	7.40	
10		65.39
Outside:		
1 blacksmith, 1st class	7.60	
1 dumper	6.50	
1 washery man, 1st class	6.70	
2 picking-table boys	10.00	
1 table tender	6.30	
6		37.10
1 foreman		10.00
23		181.09

General expenses:	Cost per day	
Explosives, ties, rails, mine timber, repairs, lubricants	$40.00	
Power for machines, conveyors, underground lighting, surface lighting, cleaning plant, etc.	20.00	
Insurance, industrial, compensation, fire, etc.	30.00	
Depreciation on $70,000 at 10% (20 days' operation per month)	29.00	
		119.00
		300.09

On the basis of 100 tons a day, the cost of mining coal, according to the figures given, would be approximately $3 a ton. After the men have become accustomed to the operation of mechanical equipment, and during early mining of this property before haulageways and mine workings become extensive, it is estimated that the cost of mining on a basis of 100 tons a day should be reasonably close to $3 a ton. By doubling production, the cost of mining should be reduced, and still further increases in production should give further reductions. Such items as insurance, depreciation, power, supervision, haulage, and cleaning, as well as other items, would take their relative proportion of cost reductions.

FREIGHT RATES FROM THE COOS BAY COAL FIELD

Following is a tabulation that appears on page 10, Bulletin 2, Oregon State Department of Geology and Mineral Industries, in which distances in miles, rates per ton, and the rates per ton-mile are given as applied to coals moved from Marshfield, in the Coos Bay area, to several cities in western Oregon, and from three points in the State of Washington to Portland, Oreg.

		Distance, miles	Rate per ton	Rate per ton-mile
Marshfield	Portland	245	$2.50	$0.0102
Do.	Salem	192	3.00	.0156
Do.	Eugene	121	2.50	.0207
Do.	Roseberg	196	3.10	.0158
Do.	Grants Pass	295	3.75	.0127
Do.	Medford	327	3.85	.0118
Do.	Klamath Falls	315	5.00	.0159
Seattle	Portland	183	2.00	.0109
Tacoma	Do.	143	1.71	.0120
Centralia	Do.	94	1.22	.0130

The figures in this tabulation show that freight rates from the Coos Bay field are not properly balanced and that they should be readjusted to make them more equitable. If this were done, Coos Bay coals would be better able to move into what is logically the Coos Bay coal-distributing and marketing area.

An impartial study also should be made of the freight rates now applying in western Oregon to haulage from the coal fields of Montana, Wyoming, and Utah. With proper readjustment of rates, the over-all cost of delivery of Coos Bay coals to Army camps and industrial centers in all parts of western Oregon will be more favorable than at present.

CONCLUSIONS

1. The Army camps near Albany and Medford, Oreg., will require approximately 150,000 tons of coal annually. Of this amount, about 60,000 tons will be used annually on spreader stokers, for which purpose Coos Bay field subbituminous coal crushed to pass a 1-1/2-inch screen is suitable.

2. While the Coos Bay coal is suitable for use in both industrial and domestic stokers, there is danger of fire from spontaneous combustion in storage piles of this coal because of its high moisture content. Similar coal is being stored at Fort Lewis, Wash.; therefore, it would appear that it can be stored in adequate quantities if storage piles are properly regulated and supervised.

3. Dense underbrush has limited this survey to only a small portion of the known coal outcrops in the 250-square-mile Coos Bay, but it appears reasonable to assume that the thickest and best coal that can be mined readily has been selected by the coal operators, who have been in this field many years.

4. The four mines now operating in the Coos Bay field are expected to produce a total of not more than 20,000 tons annually. Their character and location is such that this rate of production cannot readily be increased greatly.

5. Geological Survey reports indicate that there are several locations in this field that might meet the requirements for strip mining, but owing to dense underbrush, no suitable

area was observed. A more extensive survey would be needed to locate a suitable area for stripping operations, after which at least one season of preliminary clearing and drilling would be necessary before coal could be removed.

6. Because of the small tonnage to be handled, relatively small-sized equipment would be used for stripping, which would make operating costs high.

7. Wages are lower in the Coos Bay field than in the State of Washington. Any effort to increase production substantially would appear to require importation of miners, establishment of Washington State wage scales, and increasing safety practices in the mines; under such conditions profitable operation of the present mines does not appear possible, even at a cost as high as $3.50 per ton.

8. If new short-haul mines suitable for utilization of mechanical equipment can be opened, coal can be mined at a cost of approximately $3 a ton; however, money, time, labor, and equipment will be required to open such mines.

9. If equipment, material, and labor could be obtained, a mine could be opened on the Southport property after 8 months of very intensive work. Initial expected production would be 50,000 tons of coal per year, and in each succeeding 6 months it should be possible to increase this 25,000 to 50,000 tons a year.

10. Expenditure of approximately $100,000 would be required to open a mine of 50,000 tons annual capacity and to provide necessary mining and hauling equipment, electric power, building and storage facilities, and a reasonable sum for working capital.

11. Freight rates on coal from the Coos Bay field to various points in Oregon are not properly balanced. An impartial study should be made of freight rates on coal from this field, as well as from the coal fields of Montana, Wyoming, and Utah to various points in Oregon.

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