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Report On

CRATER COAL COMPANY PROPERTY

by D. Ford Mc Cormick Dec. 1938.

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Report of Examination and rough study of possibilities at Crater Coal Company Property, Jackson County, Oregon.
Made for: Crater Coal Company - Medford, Oregon.

Name of Properties as indicated by Mr. W. M. Awbrey.

200	acres	Crater Coal Co.	- under	lease
40	"	Furry	- "	Option
40	"	Graffis	- "	"
40	"	R. Baker	- "	"
160	"	Drake, Anderson	- "	"
110	"	CulverFurry	- "	"

Location - These properties all lie within Sections 36, T37S, R1W, approximately 5½ miles East, Southeast of Medford, Oregon, on the West slopes of the Cascade Range, at an elevation of about 2,000 feet above sea level, and 600 feet above the city of Medford, in the Jacksonville District.

Roads & Towns - To reach the Crater Coal Co. property one turns East off the pavement about one-half mile South of Medford onto a good gravel road from Highway #99 to the end of Barnett Road, thence South about one mile and East onto an improved dirt road for about one and a half miles to the mine.

Medford, population about 12,000; and Phoenix, population about 450, are the nearest towns and both are railroad stations on the Southern Pacific Railroad, the latter being about two miles nearer the mine. Other nearby towns are Ashland, population 5,000, about eight miles to the South; and Grants Pass, population 5,000, about 35 miles to the North; Gold Hill, population 500, and Central Point, population 850, and Jacksonville, population 700, all are about ten miles distant on paved roads.

General Description. - A spur of the Cascade Range reaches out from Grizzly Peak (elevation 6000') to Roxy Ann Peak (elevation 3,600') and extends in a Northwesterly direction towards the Rogue River Valley. Bear Creek Valley borders the Western slope of this spur and Bear Creek flows Northwestward on the West side, and Antelope Creek flows Northwestward parallel to it, but at a higher elevation, on the East side of this spur, both tributaries of the Rogue River. The Crater Coal Company property lies on the Western slope of the spur, over-looking Bear Creek Valley. The drainage West towards Bear Creek drops approximately 600 feet in three miles from the mine portal, but towards the East from the portal the hill rises rather abruptly, some 2,500 feet in less than three miles and it is under this overburden that the coal seams lie, the outcrops of the coal seams parallel Bear Creek more or less from Emigrant Creek above Ashland on the North to Roxy Ann Peak beyond Medford to the North.

The California Oregon Power Company High Tension line traverses the country in a North and South direction only a few hundred feet above the portal and a main irrigation canal out of Emigrant Cr. Reservoir flows a few hundred feet below the portal. Most of the area below the canal is under cultivation, and there are some pear orchards above the canal, but the country around the mine is grazing land and has scatterings of oak trees up to the lava cappings. There is a bountiful supply of timber to the South towards Ashland, but little or none on the Crater Coal lands; however, mine timbers are plentiful in the district and cheap (see attached contour map and kodak pictures).

The climate is generally mild, with no extremes of temperature. The annual precipitation amounts to about 15 inches, occuring mostly in the Winter months. There are occassional snow flurrys but seldom does the snow last for several days at a time.

History.- These sub-bituminous coal seams have been known, and shallow workings made in them since before the eighties, but no recorded production of any consequence has been noted from any of the several so called "mines" within this area. Small quantities of coal have been produced for local consumption in Medford, Ashland, Jacksonville and other neighboring towns.

Prior to 1909 the Southern Pacific Railroad Company did some exploration work on the lower and thinner coal seam at the Sunnyside coal mine, but abandoned the project. The upper seam, known as the Sunnyside coal mine, was visited by the eminent Geologist, J.S. Dillar and was described by him in the U.S. Geological Survey Bulletin #341 issued in 1909, on pages 401-403. It is this Sunnyside Mine which now constitutes the present Crater Coal Company's Main Level Entry. The old entrance has been cleared out and track laid; the face extended a short distance and other work done during the past few months.

Other mines, where several hundred feet of exploration work has been done in the past are; the Cascade, 5 miles Northeast of Medford, elevation 1470 feet; the Hansen, elevation 1650 feet, and less than a mile North of the Cascade; and, in the Ashland District (which comprises the central portion of say 20 miles of coal seams, extending in a more or less continuous series, stretching for some 50 miles from Evan Creek in Jackson County, Oregon, in the North, to Ager, in California in the South) we have mines on Emigrant Creek, elevation 5000 feet, and at Pilot Knob, elevation 4,300, near Lithia Springs, and Van Dyke's prospect, elevation 2,600, about 3 miles Northeast of Talent, and others. One remarkable occurrence in this neighborhood is mentioned by A. N. Winchell in his Report on The Mineral Resources of Oregon, Vol.1 Number 5, August, 1914. "Outside of

the main area of coal-bearing rocks a seam of lignite outcrops below a cliff in section 13, town 38 N., range 2E. at an elevation of about 5000 feet above sea level. A very remarkable fact in regard to this outcrop is that a lava flow of basalt lies within two feet of its upper surface, and yet the coal seems to have been not only not burned out, but not even noticeably modified in texture or composition by the heat of the lava. This would seem to be an example of the remarkably good heat-insulation accomplished at times by rather loosely compacted sedimentary rocks. Since the lava almost certainly crossed the outcrop of the coal seam along a line not far from this exposure it suggests further that a basalt flow may act like a blanket in excluding all air and therefore preventing combustion of underlying materials?

Geology.- Quoting further from Winchell's Report we read;" The town of Ashland is located on the border of the intrusive igneous mass which forms the heart of the Siskiyou mountains. To the North and East of Ashland, Bear Creek Valley is eroded in Cretaceous and Tertiary sediments which lie in beds dipping to the Northeast away from the igneous intrusion?

"After the intrusion of these igneous rocks there was a long period of erosion during which the surface was gradually lowered hundreds and perhaps thousands of feet, just as it is being slowly worn away today. The materials removed by erosion were carried away by the streams and deposited in quiet water at some distance. For a long time the region of deposition included the area now occupied by Bear Creek Valley. At the beginning of this time the rocks formed were conglomerates, which were succeeded by sandstones, in large part containing abundant fragments of feldspars and called feldpathic sandstone or arkose. Some of these rocks contain fossils which give silent testimony that they were formed in Cretaceous times. Later the material deposited included finer sands and even clays. At one time the region was swampy or controlled by other conditions favorable to the development of luxuriant vegetation, which accumulated under water (without weathering) and gradually formed thick beds of peat which finally turned into coal. Near the close of this period of deposition the formation of ordinary sediments was interrupted one or more times by volcanic activity in the mountains to the east, which produced great quantities of volcanic ash that was brought by winds (and water) into beds resembling the finer sedimentary rocks derived from erosion. Fossil leaves found in the coal and in the adjoining rocks show that these deposits were formed in the Tertiary period.

At the close of this period the sedimentary beds were somewhat tilted by elevation of the Siskiyou range or depression of the Cascades so that they dipped at an angle of 10degrees to 25degrees toward the northeast. At about the same time the great lava flows from the volcanic vents of the Cascade range covered the sediments which then filled the present site of Bear Creek Valley, and flowed westward to the slopes of the Siskiyou mountains. These lavas are commonly

called basalts, but for the most part they are auganites, andesites, and rhyolites, that is, they contain more silica and alkalies and less iron and magnesia and lime than do the basalts. All of these rocks furnish excellent road materials. In some places the rhyolite has been much altered to a clay which may be of value.

After the cessation of volcanic activity there followed a long period of erosion during which the lava flows were slowly worn away. Along the margin of the flows they were somewhat less compact and were therefore removed a little more rapidly. Thus Bear Creek Valley originated, and was gradually deepened and widened to its present size, not only cutting through the lavas but also through about a thousand feet of the underlying sedimentary rocks. As an incident of this erosion there are shallow temporary deposits of river gravel and silt of recent formation in various places near water level in the valley. These stream deposits are the most recent formations in the region; indeed, they are still in process of deposition more or less irregularly.

MINERAL RESOURCES

The mineral resources of the Ashland district include building stone, road metal, clay, mineral paint, mineral water, iodine, coal, gold, and some silver, copper, lead, zinc, mercury and molybdenum?

Coal.

"The largest supply of fuel provided by nature in the Jacksonville, district is to be found in the deposits of coal interbedded with Tertiary sediments, probably of Eocene age. There are several seams of coal in the district and some of them have been opened by incline adits or slopes of notable length."

"The Sunnyside coal mine is in section 36, township 37 south, range 1 west, about 5 miles east-southeast of Medford. Two entries have been made; the entry to the northwest is an incline equipped with a boiler and steam hoist. It was not inspected, being full of water. The other is horizontal and accessible; it is at an elevation of 1970 feet, as measured by aneroid barometer, and extends S. 34degrees E. about 650 feet. In places the roof has caved, but the entry is nowhere caved shut. Nearly the entire length of this adit the coal bed extends from the floor to the roof without showing its entire thickness, which was found to be about 12 feet at one point where caving permitted measurement. At the face of the adit the coal seam is 8 feet 3 inches thick, and in a branch passage to the south it is 15 feet thick. The quantity of coal in the seam varies remarkably so that a section at one point may show much more coal than at another. The maximum amount of coal in the seam is about 75 percent and the minimum in the main entry is about 30 to 40 percent. the coal bed has a strike of N. 72degrees W. and a dip of 13degrees N.E. The coal is brittle and slacks to small fragments upon exposure to the weather.

"About 130 feet from the face of the adit, branch tunnels leave the main entry on both sides. Those extending to the northeast follow down the dip of the coal and are therefore full of water and inaccessible. On the other side one branch extends S. 84degrees W. about 500 feet; from this laterals extend northwardto a parallel tunnel and other workings whose extent was not determined. Following the main branch to the west the coal seams in the coal-bearing bed become thinner and the shale bands thicker until at the face the bed contains only a little pure coal.

"There are several faults disclosed in these workings, but

but they are not important as the displacement is only 1 to 4 feet."

J.S. Diller of the U.S. Geological Survey described explorations for coal, probably at this mine, in 1909 as follows:

"The coal 6 miles east of Medford lies along the steeper slope, which rises from the edge of the valley, 600 feet above the town, to the bold front of the Cascade range. Some years ago the Southern Pacific Company prospected a coal bed at this point, and the size of the dump indicates that the trial drifts must have been about 100 feet in length. Since then R.P. Little has discovered a number of other coal beds a short distance farther up on the same hillside and opened two of them by slopes, tunnels, and drifts aggregating nearly 900 feet, in length."

"The principal bed prospected is about 12 feet thick, and the striking feature at the entrance of the gentle slope is the large number of clay and sand partings with very little coal between them. The partings weathering whitish are strongly contrasted with the darker bands. As the slope is descended along the bed there appears a decided increase in the quantity and improvement in the quality of the coal toward the northeast. The bands of black lustrous coal, generally not over 6 to 8 inches thick locally swell to more than a foot and furnish the source of supply for the local demand. The intermediate shaly coal and coaly shale is abundant and requires much picking to obtain satisfactory results. Several faults striking N. 40degrees E. and dipping 26degrees to 42degrees S. E. have been encountered in the tunnels.The direction of movement and the amount of displacement could not be definitely determined. No lavas were seen in the mine but they appear higher up, covering the whole succession of coal beds. The decided improvement in the coal down the dip suggested that the most favorable direction in which to prospect."

"Since the examination on which the foregoing statement is based was made, the Pacific Coal Company has purchased this mine and has developed the openings to the northeast along the dip of the coal bed for more than 1000 feet. The prediction that the coal would be found of better quality and in larger quantity has been confirmed. A few small faults have been encountered, but these are all of the normal type and easily overcome. The mine is now (1907) producing coal and supplies the local market. The development of this mine has greatly stimulated prospecting in other parts of the field.

J.A. Holmes of the Geological Survey collected a sample of coal at this locality last summer (1907) and has kindly furnished the following results of an analysis made in the laboratory of the Survey fuel-testing plant.

ANALYSIS OF COAL OBTAINED NEAR MEDFORD, OREGON
(F.M. Stanton, chemist in charge.)

	As received	Air dried
Laboratory No.	5346	5346
Loss of moisture on air drying	-----	2.00
Moisture	11.30	9.49
Volatile matter	23.39	23.87
Fixed carbon	31.89	32.54
Ash	33.42	34.10
Sulphur	1.16	1.18
Calories	4183	4268
British thermal units	7529	7683

The sample taken is a complete section of the coal bed exposed and represents what has to be removed in working the coal. It contains not only the good coal but all the shaly partings. The high percentage of ash indicates that the bed contains much that would have to be thrown away in mining. The ash is about four times as great as that of the bed mined at Libby in the Coos Bay Region."

Note that the sample analized was of the whole seam from roof to floor. The description of the workings and coal occurrence are accurately described, and are visible at this writing. There has been some work done since the above report was written and the long entry of the old Sunnyside is now open and has been extended as shown on the accompanying rough sketch of the workings as exposed now. At present coal is being mined from the upper six feet only of the 12 foot seam from a room turned off to the south just back of the present face, as shown on the blue print. The seam is over 12 feet in thickness at this point. Hand sorting into lump coal produced about 100 tons of coal from a room 6 feet by 30 feet by 30 feet. All of the fines was wasted and at this location over 70% of the face is coal. This indicates that hand methods of mining and sorting are not profitable and if the coal measures exist in sufficient area of this grade then mechanical methods must be adopted to win the coal and to prepare it for marketing.

The attached State of Oregon Department of Geology and Mineral Industries Bulletin No.2 entitled, Progress, Report on Coos Bay Coal Field by F.W. Libby, 1938, shows that 1,000,000,000 tons of sub bituminous coals are estimated to exist in the Coos Bay Basin (see page 9,P. 3 of the bulletins) This is a coal very similar to the Crater Coal Company coal located in the Jacksonville District only loo miles to the southeast, judging from the analysis shown, except for the fact that the Crater Coal is not so free of bone and ash, and has to be beneficiated to eliminate the waste.

Crater Coal Processing and Outlets -The Sink and Float Process will accomplish the cleaning and make a coal suitable for the greatly increasing need for a fuel product excellent for domestic purposes, usable in the modern stokers so much improved in recent years, and in demand because of their automatic features, cleanliness, and cheapness. I quote from The Mineral Industry During 1936., Vol. 45 by G.A. Roush, McGraw-Hill Publishing Co., pages 75-76 "Coalmen, however, derived, much satisfaction from a material increase in the sales of stoker and pulverized-coal firing units in 1936. Small stokers were in the van of the upsurge, installations of Class 1 and 2 units (domestic and small commercial heating services) increasing 82.8 per cent from 44,288 units in 1935 by 108 manufacturers producing approximately 91 per cent of value of the industry output in 1933 to 80,924 units in 1936. As compared with 1933, when 15,418 such stokers were sold, the 1936 sales represented an increase of 425 per cent. Among the factors responsible for this rise were increasing appreciation by consumers of the possibilities of coal-burning equipment of this type, a closer approach to automatic operation in late-type models, many of them equipped with bin feeders, automatic air controllers and fire-holding devices, and greater activity on the part of individual coal producers and associations in promoting the equipment."

"Reflecting the importance in which the small stoker is held in the coal industry today, certain problems in application of coals to stokers was selected as one of the first tasks of Bituminous Coal

Research, Inc., and an engineering department was established by the National Coal Association late in the yeaf to promote coal utilization." To prepare Crater Coal for small stoker use it is proposed to investigate the Du Pont Sink and Float process which is thought to be applicable to a high degree of effeciency and a cheap method for not only to prepare this coal for domestic use in stokers or for briquetting, but what is all important, to prepare this coal so that it can be used by the Beaver Portland Cement Co. Plant at Gold Hill in the manufacture of their cement to such an advantage that it will displace their present fuel oil system. A thorough study of this possibility should be made with the cooperation of the Cement Company and if this use proves to be as economical and practical as it promises on the surface, then this factor alone would provide for an outlet of 10,000 tons of washed coal annually, the minimum amount that would be required to produce the present output of this cement plant running on about 33 1/3 percent of its annual capacity. The use of the coal as a much cheaper fuel than the oil now being used (and with every indication of higher prices for oil) may reduce the manufacturing cost of their cement to such an extent that Beaver Company can compete in more distant fields than is now possible and this in turn increase their ouput and thereby require more coal. It is estimated that the coal will reduce their fuel costs by one half. The cement plant is a 2,000 bbl unit and it can supply its present demand for this territory in about 100 days operating time each year.

Another outlet for this prepared coal is as a briquetted product. In 1912 there were only 53,000 tons of briquetts used in the Pacific Coast States, in 1925 some 140,000 tons was used and the business was rapidly increasing until fuel oil, wood and natural gas came into use. All are natural resouces fast being depleted and with the exception of wood, not available in Bear Creek Valley except at high cost. Even the wood supply is fast being depleted and with the forests receding and saw-mills shutting down, wood and sawdust will increase in cost noticeably. Artificial gas is supplied at present and competes with electricty. A central gas plant near the mine could supply gas for Medford, Ashland, Grants Pass and the valley and have as a by-product tar and possibly other commercially valuable materials derived from coal.

Even liquid oils might be made in the future - quoting from the Minerals Year Book '32 - '33 U.S. Department of Commerce Bureau of Mines Pages 441 and 439, - "At the plant of the Lehigh Briquetting Co. near Dickinson, N. Dakota, after being closed for some time, is again in operation. Raw lignite of about 6,400 B.t.u. is carbonized by the Lurgi Process, forming a char which is pulverized and briquetted with pitch binder, making a fuel of about 13,000 B.t.u." ----"Low-temperature carbonization of coal may be defined as the heat treatment of coal in the absence of air at 450degrees to 700 degrees C. to prevent decompositon of the primary tar. This gives the maximum yield of liquid products, at the same time producing a reactive easily ignitable, smokeless, solid fuel for domestic use.

Although low-temperature carbonization of coal for the production of smokeless domestic fuel dates back almost 30 years to the pioneering work of Parker in England and Parr in the United States, there was no general interest in the subject until the World War focused the attention of England and the European powers on their lack of petroleum and their needs for home.

sources of liquid fuels. Low temperature carbonization, which yielded 20 to 30 gallons of tar oils per ton of coal, was given serious consideration as a source of motor fuels. This interest increased progressively in the 10 years after the war, due partly to the fear that gasoline from petroleum would not be able to keep pace with the mounting needs of the fast-multiplying numbers of automobiles and partly to the tremendous industrial expansion which sought to capitalize without delay every possible new application of the results of scientific research. The climax was reached about 1928, when, at the Second International Conference on Bituminous Coal, at Pittsburgh, more papers were read on low-temperature carbonization than on any other subject."

"The technical process for hydrogenating and liquefying coal is now available and may be put to use when and if a failing petroleum supply requires oil from coal. The process is too costly for use under present conditions."

In the case of briquets the production in U.S. according to reports furnished the U.S. Bureau of Mines, totaled 1,124,973 tons in 1936 whereas in 1935 it was only 860,707 tons. The total of 1,066,570 tons of raw fuel was briquetted in 1936, which included as semibituminous, bituminous, and sub-bituminous slack, 449,570 tons. It is likely that paper-wrapped briquets marketed as "packaged fuel" would find sales in the Bay Region in California and in Portland. It has its appeal to certain customers.

General Information -Approximate areas of the principal coal fields in the U.S.A., as taken from Economic Geology by Ries - pp 31 - 35.

1. Appalachian District	71,291 Sq. Mi.		
2. Rhode Island "	very small		
3. Atlantic Coast "	1,070 Sq. Mi.		
4. Eastern Interior"	58,000 " "		
5. Northern " "	11,300 " "		
6. Western " "	66,200 " "		
7. Southwestern "	27,876 " "		
8. Rocky Mt. "	43,610 " "		
9. Pacific Coast "	1,050 " "	-	Includes parts of Wash.,Ore.,Ca
10. Alaska "	------		Not yet explored

The above does not include the areas of lignite-bearing formation in Montana, the Dakotas, Wyoming; Alabama, Mississippi, Louisianna, Arkansas, and Texas, which cover approximately 103,000 sq. mi.

Aside from the competitive feature we are not interested in the coal fields in general excepting to show the comparative sizes of the groups, and their relation to this district. Of course, in competition we also have imported coals by water-transportation to this coast. Ries says regarding the Pacific Coast fields, "Tertiary coals, partly bituminous, though mainly lignitic, occur scattered over a wide area in the states of California, Washington and Oregon. The separate fields are limited in extent, widely separated, and with small output. Both California and Oregon produce small quantities of lignitic coal

of Tertiary age, and show little promise of becoming important producers. But the Pacific coast coal-trade conditions are unique. The local supply is not equal to the demand, and the Rocky Mountain fields are too far off to supply the Pacific Coast with cheap fuel. Therefore much coal is imported, bringing about in San Francisco competition from many countries, including England, Wales, Scotland, Australia, Japan, and British Columbia. These coals are all better quality than Pacific coast coals, and they can be imported with low frieght rate as ballast in wheat-carrying vessels that come to San Francisco for cargoes. Since 1895 there has been a steady decrease in the importation of coal and an increase in the Pacific Coast production to 1905 after which the production began to fall off due chiefly to competition from oil, gas and wood fuels. In 1901 the Pacific Coast production was 2,799,607 short tons, in 1903, 3,389,837 short tons,- in 1903, 3,389,837 short tons. In 1903 the U.S.A. produced 357,356,416 about 100,000,000 more tons than Great Britain, the next largest producer. In 1913 the U.S.A. produced 478,435,297 tons and 1929, 534,958,593, and in 1935 - 372,373,122 - in 1936, 431,950,000 tons. The value of this coal at the mine has increased approximately 60¢ per ton between the years 1913 and 1936, an increase of roughly 50% at the mine. It is interesting to compare this low figure of $1.77 as compared with $3 to $4 per ton, the value at Pacific Coast Mines, and the retail value being from $6 to $9 for Pacific Coast coal.

Local Information. The coal seams of the Jacksonville District have not been explored to any great extent. The deepest workings are not 1000 feet, whereas, in the Coos Bay District 3,000 feet and more are common depths. Diller and others claimed that with depth the coals of the Jacksonville District would become better because of the increased pressures, and this is true as shown by the deeper explorations, and exposures that can be seen today at the Crater Coal Company Mine.

Locally we have already seen the rise in the price of oil for fuel, we can see the end of sawdust fuel as the forest recede and the saw-mills shutdown, and many who prefer the gas would welcome the use of this product, which could be manufactured cheaply and sold from one central plant to Ashland, Grants Pass, Gold Hill, Central Point, as well as Medford. The Gas Company might be interested and coaxed to expand their activities if gas could be manufactured cheaply.

So we see the potential value of, and the possibilities of a proven coal field, in the Jacksonville District.

In order to develope the above mentioned industries all depend on an abundant supply of coal, and, to assure such a supply it would first be necessary to develope the coal seams now exposed in Bear Creek Valley sufficiently to prove beyond a doubt a tonnage of coal in quantity and quality to meet the requirements for years to come. This would be necessary in order to induce the Cement Co. to change from oil to coal and to build up a demand for an unfailing domestic and commercial supply and use. To do this it would be necessary to drive entries into the coal at several places, to block out tonnage and assure production at a rate of better than 200 tons per day over a period of years.

Figuring an extraction of 70% recovery from an average 10 foot

seam that would yield at least 60% coal of the type found at Crater Coal Co. requires roughly a depletion of 6 acres per year to yield only 30,000 tons of marketable coal.

Quoting from the Coal Miners Pocket Book, Eleventh Edition, a definition (pp.372-73) of Sub-bituminous Coal follows -"The very convenient term subbituminous coals, which originated with Dr. M.R. Campbell of the United States Geological Survey, is given to that large and valuable group of coals, that possesses some of the undesirable features of the true lignites or brown coals together with many of the desirable features of the true bituminous coals. They are sometimes called black lignites from their color, which is often highly lustrous and not to be distinguished from that of bituminous coal proper. They have a brown streak and a specific gravity of 1.22 to 1.25. They burn with a long, bright flame, with a considerable smoke like bituminous coals but do not coke. In composition and calorific power, they closely resemble and are, in some cases, even superior to the true bituminous coals of the Central Basin.

The distinction between the two groups lies in their different behavior on weathering. True bituminous coals break down under atmosperic action into smaller and smaller cubes or prisms, the faces of which are more or less parallel to the cleavage planes.

On the other hand, subbituminous coal, on weathering, breaks up into irregularly shaped fragments, and, in particular, separates along the bedding planes into plates. This latter peculiarity is the sole distintion between the two groups of coals. To quote further from Doctor Campbell: "In applying these criteria (weathering etc.) some coals will be classed as bituminous which have a brown streak, are young geologically, and generally have been regarded, as lignites or lignitic coals; but they resist the weather, stand shipment well, and have a high calorific value, which makes them to all intents and purposes bituminous coal.

Primarily, the distinction between subbituminous coal and lignite is one of color alone; the former is black and the latter brown. As the subbituminous coals have been segregated from the lignites and given a distinctive name the original term is now confined to the typical lignite, or brown coal. Lignites are generally inferior as fuels, compared to the subbituminous coals, are usually higher in moisture and volatile matter and lower in fixed carbon, usually show their vegetable origin more plainly, weather more rapidly, and are less well adapted to transportation. It should be noted that many subbituminous coals and lignites, even in the dry climate of the Rocky Mountains region where they are largely mined, will completely disintegrate into slack within 2 to 4 months.

Bituminous coals, for trade purposes, are subdivided into many groups with distinctive names, depending on the use to which they are put or to which they are best adapted, or depending on some peculiarity of structure or composition"

Summary. - Summarizing, we find that the Crater Coal Company has a seam of subbituminous coal (impregnated or banded with bone or waste) that measures from 12 to 14 feet in thickness which shows for several hundred feet along a prospect

entry driven slightly off the horizontal (for drainage purposes) into the steeply rising hillside. This coal has a strike of approximately N 72 degrees W and a dip varying from 8 to 14° toward the N.E. The coal is being hand mined and sorted at the present date (Dec. 1938), and sold for $6 per ton at the mine. Commercially this is unprofitable and impractical, but recent developments in the ore dressing sciences have produced a practical and economic method for treating this coal as described in the attached pamphlet issued by The E.I. Du Pont De Nemours & Co. Inc., Wilmington, Del., titled, "Sink and Float Process for Benefication of Mineral and Coal". It is suggested that this treatise be carefully read to know about the method and its cost. (Copy attached).

Recommendations. - It is my recommendation that representative samples of the coal now exposed be sent to the laboratory or testing plant of the Du Pont Co.. That a test be made for the purpose of determining the practicability of the method and a report be made by them showing the results obtained, the estimated costs for treatment and the estimated cost for the installation of a plant capable of treating 200 tons of mine run coal in 8 hours time at the Crater Coal Company property.

That the resulting products from this test be saved for further tests of 1st, -the coal, (a) for use in the Beaver Cement Plant at Gold Hil (b) for use in domestic type stokers, (c) for briquetting, and (d) for gas-making; and, 2nd,- the waste, for use as a by-product in whatever line it may be feasible t use it; road metal, insulating material, roofing slabs etc. etc.

If these tests prove the soundness of such a plant installation as a business proposition, then it is my recommendation that a systematic development campaign be planned and followed to prove the coal deposits merits and the necessity of the installation of such a plant.

We know the coal exists as shown by the work already done, but we do not know in what amount, not even so that an estimate can be made which would be of any value incalculating future possibilities. The 50 mile extent of the outcrop is significant. The exposure of 12 to 14 feet of good, although dirty coal, is very encouraging, but in order to warrant the establishment of mine and plant operations considerable development work must be done, and based on this fact leases and royalty agreements should be arranged so that sufficient time is allowed for the proper development of the property and proper financing arranged so this work can be accomplished before returns from operations are expected.

The writer knows that a representative sample of this coal was recently taken by Mr.J.E. Morrison of the State Dept. of Geology & Mineral Industries, and sent to the U.S. Bureau of Mines for testing along the same lines as those sent in from the Coos Bay District, and suggests that a perusal of said Coos Bay Report herewith attached will be enlightening to persons interested in the Jacksonville District Coals.

It is the writers understanding that sufficient water can be developed from near-by springs to supply a washing plant, but if this is not the case, unquestionably, suitable arrangements can be made with the Irrigation District to use water from their canal.

In conclusion it would seem to me that the Coal measures of the Jacksonville District in general; more especially the mine of the Crater Coal Company, because it now has exposed the best face of coal in the district and is in one of the most favorable locations along the exposed outcrops, therefore seems to be the most promising of the properties in the district; offer one of the best opportunities for developing a new industry in Southwestern Oregon. It lies in a district that needs a cheap fuel, can support the enterprise, and has unlimited possibilities for such an enterprise, if the field is proven.

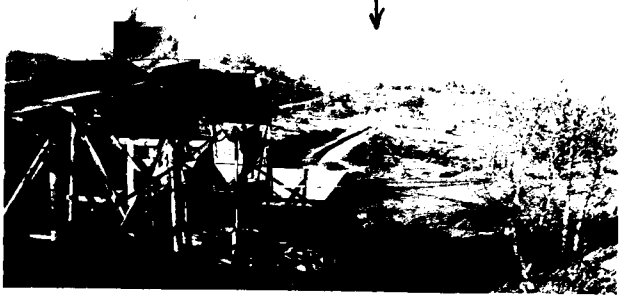
Respectfully submitted,

D. Ford McCormick

D. Ford McCormick

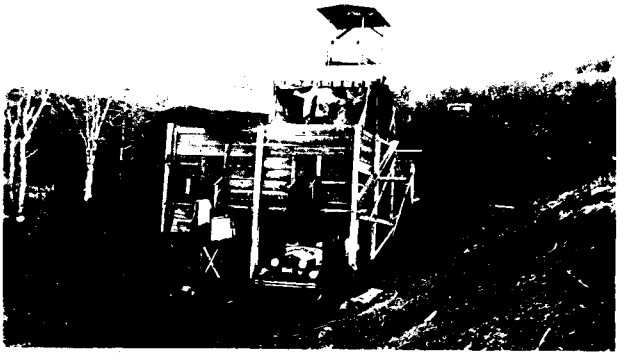
CRATER COAL COMPANY, Dec. 1938.

Jacksonville District, Oregon.



Looking West Across Bear Creek Valley from Mine Tipple.

Looking East towards Entry #1 at the Tipple.

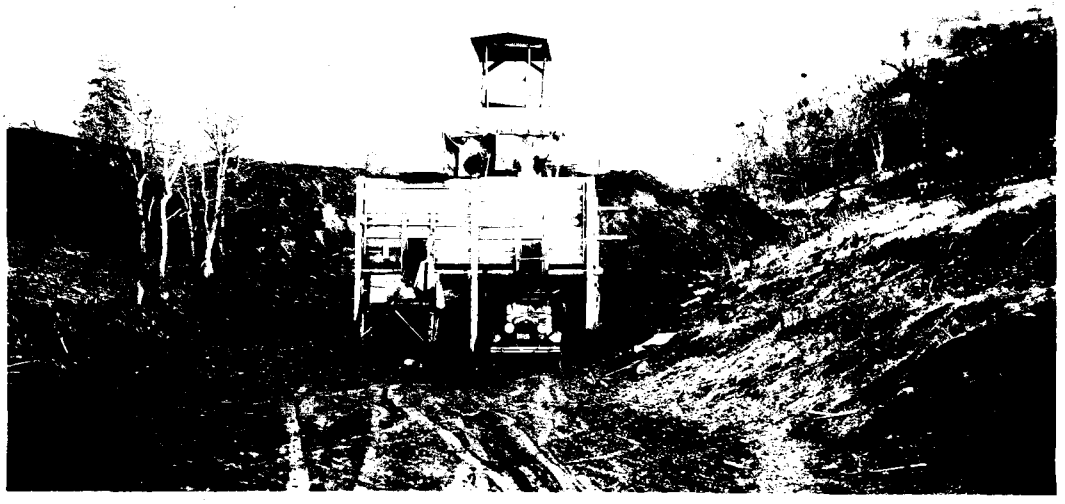


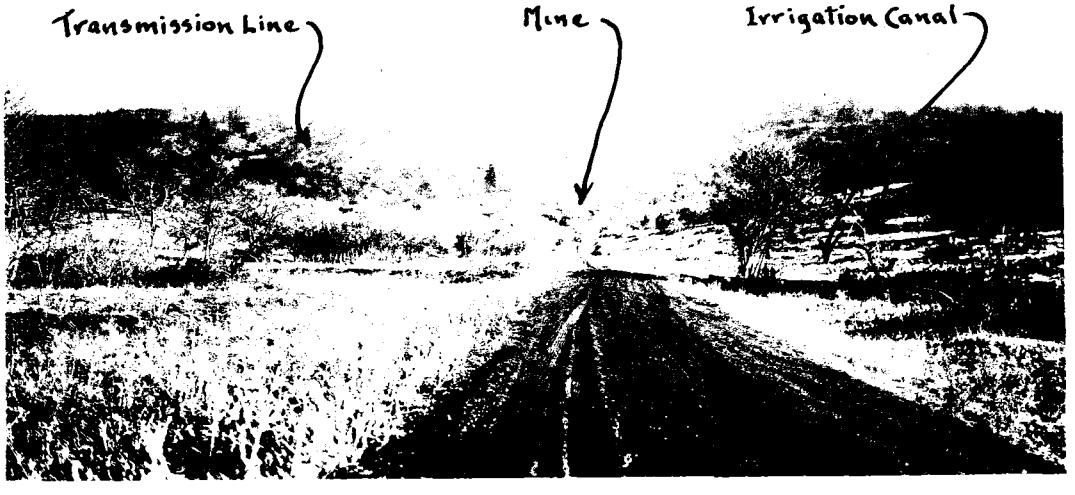
CRATER COAL COMPANY

Dec. 1938

Entry #1.

Tipple at Entry #1.





View of Mine looking east. Fog obscures the higher lava capped hills in background.