OAKLANDS - COORABIN

COALFIELD

1942/178

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Preliminary Report.

LOCATION

Oaklands is situated about 55 miles north-west of Albury and is about 35 miles from the Murray River. It is 417 miles by rail from Sydney and 200 miles by rail from Melbourne. The New South Wales and Victorian railway systems meet at Oaklands. Coorabin is approximately 5 miles north-north-east of Oaklands.

PREVIOUS REPORTS

J.E.Carne. Ann.Rept.Dept.Mines,N.S.W.,1916, p.198. Reports discovery of coal in Lane's shaft and gives section and analysis of coal.

L.J.Jones. Ann.Rept.Dept.Mines,N.S.W.,1920, p.113, (first report) and p.118 (second report). Describing results of prospecting operations, and giving details of seams with sections and analyses (full and informative report).

L.F.Harper. Ann.Rept.Dept.Mines,1922, p.91. Short statement recording discovery of Glossopteris, thus proving Permian age of coal measures.

L.F.Harper. Ann.Rept.Dept.Mines, 1923,p.84 Describes general geological features of area and their bearing on possible direction of extension of Coorabin coal measures.

L.J.Jones. Ann.Rept.Dept.Mines, 1934,p.77. Summarises operations subsequent to 1920.

S.McKensey. Report tothe Chairman, Commonwealth Coal Commissioner on proposed colliery development.

GENERAL GEOLOGY

Boring and shaft sinking operations, the results of which are set out in the above reports, have revealed a sequence of sands and clays overlying a coal seam. The maximum proved thickness of sediments is 559 feet, but bedrock has not been reached and the depth thereto is not known.

The upper beds of sands and clays are probably Tertiary or younger; the coal seam itself is Permian, but the point of contact between these sediments, though so very different in age, is not known.

COAL

One seam of coal has been proved. Except near the supposed margin of the field the seam has a general thickness of about 25 feet. The following is a detailed section of the seam (after L.J.Jones) as proved in No.2Bore, which was put down very close to the site of the present colliery:-

Section of Coal Seam No.2 Bore
(after L. J. Jones)

		Moisture	Volatile Matter	Fixed Carbon	Ash
1.	13ft. 3 in.coal including two ½-in. and one 2-in.band and several partings.	12.90	26.73	46.37	14.00
2.	14 ft. 11 in.coal including one 4-in. and one 1-in.band.	12.48	24.92	44.22	18.38
3.	6 ft. coal at top of 14 ft.11 in.seam.	10.10	24.99	41.27	23.65
4.	7 ft. 6 in. of coal at base of 14 ft. 11 in. seam.	10.73	25.94	46.97	16.36

According to Mr.McKensey's observations it is the third ply in this seam which is being worked at the present time. The working face of 6 feet 1 inch of coal (which is stated to have 7 feet 8 inches of coal below it and 12 feet of coal above) was sampled by him and analysed by the New South Wales Department of Mines with the following result:-

Moisture	Volatile Matter	Fixed Carbon	Ash
11.42	27.71.	47.41	13.46

The calorific value is 9540 B.T.U (or 5300 calories) per pound of coal. It will be seen that the working face is in coal of considerably better quality than was proved by the bore.

This coal whilst inferior to the harder coals worked in the main coal basin of New South Wales is clearly quite good enough for many purposes including local power generation. It is not as good as Wonthaggi coal but is superior to Collie. Its analysis andcalorific value place it in the lowest rank of bituminous coals in the Parr Classification.

The known coal-bearing land has an area of about 9 square miles which extends from about a mile north of Coorabin to about 1½ miles north of Oaklands, a distance of 4½ miles. Over this distance the proved area is about 2 miles wide.

Little is known of the probable area over which coal occurs. The results of prospecting in the Clear Hill shafts suggest a limit of coal development close to these shafts, and the thinning and deterioration in quality of the seam northwards from Lane's shaft to No.3 Bore, suggest a nearby margin to the coal basin in that direction. However, the seam may be thicker still further north where there are no provings. In all other directions there is no nearby evidence to indicate the limits of the coalfield.

WATER

There is some information available concerning water met with in the course of boring and shaft sinking, but the data is so sketchy generally that it is difficult to give a reliable explanation of its geological occurrence and probable bearing on mining operations.

Near Oaklands there is good quality water at a depth of 250-260 feet from the surface and it is thought probable that this zone is quite extensive.

The Public Works Department of New South Wales advise that the original Oaklands town bore, 246 feet deep, yields a supply of 600 to 900 gallons per hour of good quality water. A new bore just completed for the Army at a site 1900 feet south-westerly of the town bore is 260 feet deep (5 inch casing) and is believed to be capable of yielding 600 gallons per hour with a 3 inch pump. The quality of the water is understood to be good.

Below the zone of good quality water and apparently separated from it by only a small interval are the main water bearing strata of the area.

The lower zone (which may extend downwards over a considerable thickness of sediments) yields a rather large supply of water of high salinity, useless for most purposes. A sample taken from the Oaklands Colliery by Mr.S.McKensey contained 1013 grains of solids per gallon including 762 grains of sodium chloride (salt). Mr.L.J.Jones records that a flow of 53,000 gallons of water per hour was met with in the Carbery shaft.

Before large-scale coal mining operations are undertaken, more should be known about the geological occurrence of the water. Reference to Fig.3 will show that the main water zone may occur under very simple water table conditions, irrespective of the different kinds and ages of sediments in the section. If this is so the presence of a structurally high area in the vicinity of Coorabin railway station offers an explanation of the absence of marked water trouble in this section of the field.

It may be also that the upper surface of the water zone obeys water table conditions and that the lower is confined by impervious layers. If this condition obtains, the explanation of the great trouble which was experienced with water in the Carbery shaft is that the shaft was unfortunately placed to cut the coal within the water-bearing zone and that as Mr.Jones has already suggested deeper in the basin the coal may be found to lie below the water-bearing zone. As he suggests, only careful logging in any future boring will yield the necessary information.

STRUCTURE

Opportunity was taken by a geophysical party from this Branch (whilst en route to Moonta, South Australia) to measure accurate levels on all bores and shafts in the area. The results of this survey taken in conjunction with the topographic maps recently prepared by the Water Conservation and Irrigation Commission have given a very interesting structural picture of the area which has an important bearing on its development as a coalfield. The structure is clearly illustrated in Fig.2, and the section in Fig.3. The outstanding feature is the apparent parallelism between the folding (bending) of the coal measures and the present surface. Having in mind that Coorabin is situated in an area which has been structurally stable for a long time this type of structure suggests compaction folding, that is, differential settling down of the sediments over bedrock irregularities. This condition indicates a problem well suited for the application of the gravimetric method of geophysical survey.

ECONOMIC CONSIDERATIONS

The Coorabin coalfield is very well placed strategically and in relation to the railway systems of New South Wales and Victoria.

Mr. McKensey has reported that probably a 20 feet face of coal could be developed and that the seam is almost ideal for mechanical mining because of "good height", flat gradient, no dust or inflammable gas".

As to coal reserves Mr.McKensey reports:-

" I estimate that there are at least 22 million tons available, after allowing reasonable wastage and providing that the pillars are extractable. Should water or other conditions prevent the extraction of pillars, then this amount should be reduced by half. There are undoubtedly many millions more tons in this field, but it is impossible to say how much on account of the poor prospecting that has been carried out."

I agree with this estimate and stress the necessity for knowing more about the conditions which may effect the economic winning of the coal, especially water, which may be the greatest single handicap to development.

As Mr.McKensey further indicates, the logical place to commence development is at or near the site of the present small colliery where working conditions are known. It may be pointed out, however, that it is not known how far from this point the same conditions persist. It is known that west of the workings somewhere between Coorabin railway station and the Clear Hill shafts the seam thins and deteriorates in quality, and that this also happens north of the workings.

South of the workings it is only 60 chains to the Carbery shaft where shaft sinking was abandoned because of the large quantities of water encountered. Nothing is known of the thickness and quality of the seam east of the proposed site of development.

It would be wise, therefore, to put down at least one bore east of Lane's shaft. This bore should not be placed too far away from the shaft because the objective would be to prove sufficient coal quickly for the immediate purpose in view, if possible, above water level. A second bore should be put down some distance east of Lane's shaft with the object of proving:-

(i) larger reserves of coal;

(ii) the thickness and quality of the seam in an easterly direction;

(iii) the mode of occurrence, volume and quality of the ground water.

Both bores should be closely watched by a geologist, so that an accurate record may be kept of the strata penetrated, and all water horizons should be carefully logged, flow measured and samples taken for analysis.

RECOMMENDATIONS

(1) It is recommended that two bores be put down at the positions shown in Fig.3 namely (A) 34 chains east and (B) 80 chains east-south-east of Lane's shaft.

It is estimated that proposed bore (A) will reach coal at a depth of about 220-250 feet, and that proposed bore (B) will probably reach coal at a depth of about 220-280 feet, though the further the bore is placed from known evidence the greater the probable error in these estimates. Cost of bore (A) should not exceed £170 and bore (B) £200 making a probable total cost of say £400-£500 allowing for any incidentals such as pumping tests which may be necessary.

The cost may be less than this as I am not sure from the data supplied by New South Wales Public Works Department whether the boring contract provides for rebate in the event of casing being recovered when the hole has been completed.

(2) Further geological work should be done. Probably all the necessary geology could be done by the officer allotted to the work of supervising the boring. His job would be to make a reconnaissance of the surrounding country to see what bearing various features noted therein have on the extent and structure of the coalfield. If the boring is approved I would arrange for this to be done.

(3) Depending upon the amount of coal it is desired to prove, geophysical work should also be put in hand. If really large scale development is contemplated this work is almost essential and should be commenced soon. A gravimetric survey would be made, and in all probability this would enable useful deductions to be made as to the probable depth to coal, thus enabling a planned boring and development campaign to be prepared.

Recommendation (1) is of immediate importance: if (1) is approved (2) will be carried out automatically: (3) is perhaps not so urgent but could proceed concurrently with (1) and (2) if a power development project is contemplated in the near future, and there would be some saving in transport costs if geological and geophysical work were to proceed concurrently.

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