DEPARTMENT OF MINES

SOUTH AUSTRALIA

LEIGH CREEK COALFIELD

NORTH FIELD - LOBE "C"

by

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NORTH FIELD - LODE "C".

SUMMARY

Coal has been proved at Lobe "C" to a depth of 220ft. of overburden in an arcuate area along the southern and western margins of the basin. Within the suggested open cut area the coal seam averages 35ft. in thickness, has a weighted average ash content of 26.94%, with a calorific value of 6,956 B.T.U/lb and sulphur content 3.73% (the above figures are all referred to a standard 12% moisture basis).

The suggested open cut has a length of 8,000ft. and down to a depth of 110ft. of overburden 7,040,000 tons of coal will be recoverable, with an overall ratio of overburden to coal 1.94:1.

An additional 4,850,000 tons of coal will be recoverable in open cut mining beyond this to a maximum (arbitrarily imposed) limit of 220ft. of overburden. The ratio of overburden to coal to this depth is 5.15:1.

Extensions to such a cut in northerly or easterly directions is unlikely.

INTRODUCTION.

Lobe "C", situated 3-4 miles north of Telford Siding on the Alice Springs railway line, constitutes the southern lobe of the North Field Triassic coal measures, and is separated by a narrow neck of shales from Lobe "D".

Eight scout boreholes (N.E. 1 to N.E. 8 inclusive) were drilled in Lobe "C" in 1942-3 and the results obtained from these suggested the existence of a considerable tonnage of shallow high-ash coal. Because of the relatively high ash content of the coal further exploration of this field was deferred until 1951 when 41 bores of the C.L. series and 16 bores on the E-grid were drilled during the period January-June. This boring indicated termination points to a thick and extensive coal seam and that further boring at more closely spaced intervals was justified. A drilling programme with bores sited on a grid pattern at 200ft. centres was initiated in April 1952 and completed in February, 1953.

PREVIOUS REPORTS.

Mining Review No. 76 Drilling p. 12, 13, 19, 20

" 79 Drilling p. 38, 39.

Report (Dickinson) pp. 95-104

Mining Review No. 80 Drilling p. 51, 52, 54

Bull. Geol. Surv. of S. Aust. No. 31 "The Leigh Creek Coalfield"

(Parkin et al) p. 24

PLANS ACCOMPANYING REPORT.

1. Locality Plan
2. Geological plan of Lobe "C" (400ft. to an inch)
3. Topographic plan (200 ft. to an inch) with surface contours drawn at 2ft. intervals, and showing boreholes and suggested open-cut limits.
4. Structural plan (200ft. to an inch) with contours of the floor of the coal seam drawn at 10ft. intervals.
5. Plan (200ft. to an inch) showing overburden isopachytes at 10ft. intervals.
6. A full suite of cross sections, some north-south and other west-east, drawn at 200ft. intervals on a scale of 50 ft. to an inch.

GEOLOGY.

Down folded Triassic coal bearing sediments have been preserved at Lobe "C" in a saucer shapped depression in pre-Cambrian basement rocks which outcrop along all but the westerly margins of the basin. The Triassic sediments consist of coarse grits and sandstones at the base, and these are overlain by shales with one major coal seam and minor sandy beds, the whole having a probable thickness of 600ft. in the deepest part of the field.

The basal grits and sandstones are ferruginous and are strongly cemented at the surface, but where intersected in boreholes they are unconsolidated. Thin sand beds occur within the coal seam as partings, especially towards the northern extremity of the basin, but they are absent above the coal. The shales which make up the greatest part of the Triassic sedimentation are grey, mostly carbonaceous, and similar to those of the Leigh Creek area generally. The ironstones, derived from the weathering of ferruginous bands within the shales, at the surface stand out in relief on the otherwise flat terrain and outline the structure of the basin.

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A thin cover of Recent sandy clays with minor unconsolidated gravels occurs as a veneer 15-20 ft. thick over most of the area drilled.

Folding:

The "pound" structure of Lobe "C" is clearly defined by outcropping ironstones and sandstones over the greater part of the field. Within the basin the Triassic sediments dip radially towards the central part except in the northernmost sector.

Along the north eastern and eastern margins the beds dip fairly steeply (35° - 70°) but they flatten out along the southern margin to 10° - 20° and to about 5° along the western side - all dips being directed to the structural centre of the basin. In the northernmost part of the basin there is a pitch change from 5° south to a flat (3° - 5°) northerly one towards Lobe "D".

Reference to the coal contour plan shows that minor folding has been imposed on the major fold structure of the coal series.

Faulting:

East-west directed faults in the basement rocks have also affected to some degree the younger Triassic sediments though only one such movement has displaced the coal seam within the area proved by drilling. Two faults are located in the extreme northern part of the basin while another traverses the central part and has displaced the coal seam on the western side of the field. This fault, presumably in the bedrock, is reflected in the overlying more plastic beds as a monoclinal flexure without actual rupture of the coal seam and has a net vertical movement of 120ft.

The Coal Seam:

Because of the basin structure, coal occurs close to the surface at the margins of the field and dips towards the structural centre. Within the proved area the seam dips at 16° in the eastern sector, at 4° along the south western margin and at 7° in the northern part, except where it has been dragged up steeply against the line of faulting in a monocline. In several places coal "smut" and gypsum indicate coal sub-outcrop but in general the seam wedges out at the margins to an erosion level and is covered by a thickness of 15-20ft. of Recent clays and gravels.

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The coal seam has an average thickness of 35ft. (excluding partings) and ranges in thickness from 50ft. to less than 5ft. within the area tested by scout boring. The limits of boring were determined by thinning of the coal seam and splitting of the seam by partings with a consequent increase in ash content in both northerly and easterly directions. Boring was discontinued elsewhere as the depth to coal exceeded 220ft.

Partings within the seam consist mainly of shale, or of high-ash coal, sand, or of sand and coal. Though several such partings are up to 10ft. in thickness they are mostly thin (1-2ft) and lenticular.

The coal within the suggested open cut area has a weighted average ash content of 26.94% with a calorific value of 6,956 B.T.U/lb. and a sulphur content of 3.73% (12% moisture basis). The sulphur determinations were made on samples taken from eleven bores fairly evenly spaced over the field and indicate that the sulphur content is high and ~~fairly~~ uniform. The presence of pyrite, occasionally occurring in rounded nodules up to an inch in diameter, was frequently noted when logging borehole cores.

1. North of "Fault":

Average thickness of coal seam which ranges from 15ft. to 45ft. thick is 33ft. The coal has a weighted average ash content of 27.88%, a calorific value of 7,278 B.T.U/lb. and an average sulphur content of 4.01% (seven intersections).

A typical proximate analysis is as follows:

MOISTURE % UNDRIED	12% MOISTURE BASIS			
	MOISTURE%	VOLATILE MATTER %	FIXED CARBON %	ASH %
26.60	12.00	25.59	34.54	27.87

2. South of "Fault":

The seam varies from 30 to 50ft. in thickness and has an average thickness of 36ft. The weighted average ash content of all intersections within the accepted mining limits is 26.34%. It has a calorific value of 6,652 B.T.U/lb. and a sulphur content of 3.47% (eight determinations).

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A typical proximate analysis is as follows:

MOISTURE % UNDRIED	12% MOISTURE BASIS			
	MOISTURE %	VOLATILE MATTER %	FIXED CARBON	ASH %
30.15	12.00	25.65	36.00	26.35

RESERVES OF COAL AND OVERBURDEN ESTIMATES

The coal bearing area is divided by a fault into two portions, the northerly one being the smaller with an arbitrary northern limit based on increasing ash content of the coal and decreasing coal thickness. The southern area extends south and east from the fault towards the eastern margin of Lobe "C" where it is again terminated by a similar arbitrary limit.

The low-wall of the suggested open cut on each cross section has been fixed at the point where the upper surface of the coal meets the erosion surface, except in cases where bores outside of such a limit have intersected about 20ft. of coal having an ash content of less than 35%. The high wall limits have been fixed from overburden isopachytes with slight modifications.

The 3450 east-west line is taken as the "fault" and quantities lying to the north up to 5500 line and those occurring south and eastwards from the fault. to the north-south 10400 line have been calculated separately.

The volumes of coal and overburden were calculated by multiplication of the sums of the means of successive cross sections by the interval between each section. The areas were measured by use of planimeter from cross sections 200ft. apart which were drawn on a scale of 50ft. to an inch.

The volumes south of the fault were computed from west-east sections below the 3450 line across to the 6000 north-south line and from north-south sections east of the 6000 line. Those north of the fault were computed from west-east sections between lines 3450 and 5500.

The area of partings in each section were measured and these were subtracted from the coal estimates and added to those of the overburden.

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1. South of Fault:

a. From north-south sections (east of 6000 line)

Line of section	Area (sq. ins)			
	To 110ft. depth of overburden		To 220ft. depth of overburden	
	Overburden	Coal	Overburden	Coal
6000	22.97	12.17	30.60	4.88
6200	26.35	14.94	18.21	3.54
6400	26.99	13.60	22.90	5.16
6600	22.27	13.47	27.95	5.69
6800	22.05	12.85	29.87	6.46
7000	24.42	13.40	34.94	7.45
7200	26.23	14.08	35.98	7.36
7400	24.53	12.64	39.41	7.40
7600	23.18	12.28	40.82	8.03
7800	14.16	8.51	46.23	9.69
8000	15.86	8.35	44.04	7.78
8200	13.70	7.20	44.89	8.04
8400	13.12	6.46	44.69	8.30
8600	12.23	6.04	44.16	9.61
8800	11.45	5.19	42.63	8.11
9000	11.02	5.80	38.91	7.15
9200	11.50	5.19	37.86	6.56
9400	13.86	5.76	34.70	6.33
9600	12.84	6.55	39.59	6.76
9800	14.25	5.68	49.20	8.20
10000	15.14	6.10	17.10	3.06
10200	8.70	5.71	-	-
10400	-	-	-	-
Sum of Means (sq. ins)	375.33	195.89	749.38	143.12
Sum of Means (sq. ft)	938,325	489,725	1,873,450	357,800
(Multiply by 50 x 50)				
Volume (cub.Yds)	6,950,555	3,627,592	13,877,407	2,650,370
(Multiply by $\frac{200}{27}$)				

b. From West-east sections (west of 6000 line)

Line of Section	Area (sq. ins)			
	To 110ft. depth of overburden		To 220ft. depth of overburden	
	Overburden	Coal	Overburden	Coal
3400	22.66	11.56	9.63	5.11
3200	14.86	11.53	(neglected)	
3000	12.40	8.85		
2800	5.73	5.60		
2600	2.05	2.63		
2400	0.10	-		
Sum of means (Sq. ins)	46.42	33.07		
Sum of means (sq. ft.)	116,050	82,675		
Volume (cub. yds)	859,630	612,407		
To these must be added volumes between lines 3400 and 3450 (the "fault")				
3600	41.62	21.40	81.42	18.72
3400	22.66	11.56	9.63	5.11
Mean area (sq. ins)	32.14	16.48	45.52	11.91
Mean area (sq. ft)	80,350	41,200	113,800	29,775
Volume (c.yds)	595,185	305,185	842,963	220,555
Volumes (c.yds) to fault. (Divide by 4)	148,796	76,296	210,741	55,139

2. North of Fault.

From West-east sections

Line of Section	Area (sq. ins.)			
	To 110ft. depth of overburden		To 220ft. depth of overburden	
	Overburden	Coal	Overburden	Coal
5400	18.96	5.43	79.64	11.10
5200	21.64	6.46	75.64	11.34
5000	26.71	8.47	64.64	10.70
4800	32.94	10.86	55.72	11.41
4600	29.49	14.33	42.91	8.08
4400	31.28	12.33	47.27	8.82
4200	26.27	15.66	43.28	9.17
4000	29.59	23.78	46.21	10.61
3800	45.88	27.16	67.67	16.57
3600	41.62	21.40	81.42	18.72
Sum of means (sq. ins)	274.09	132.46	523.87	101.61
Sum of means (sq. ft)	685,225	331,150	1,309,675	254,025
Volume (c.yds)	5,075,740	2,452,963	9,701,296	1,881,666
Plus the volumes between 3600 and 345^0 (fault)	444,444	228,889	632,222	165,416
Plus the volumes 5400 and 5500	175,500	50,200	737,700	102,700

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3. Summary of Estimates.

(1) South of Fault - Volumes (cub. yds)

	To 110ft. overburden		To 220ft. overburden	
	Overburden	Coal	Overburden	Coal
North-south sections.	6,950,555	3,627,592	13,877,407	2,650,370
West-east sections up to 3,400.	859,630	612,407	-	-
Adjustment to fault	148,796	76,296	210,741	55,139
Totals	7,958,981	4,316,295	14,088,148	2,705,509

(ii) North of Fault - Volumes (cub. yds)

West-east sections to 5,400.	5,075,740	2,452,963	9,701,296	1,881,666
Adjustment to fault	444,444	228,889	632,222	165,416
Adjustment to 5500	175,500	50,200	737,700	102,700
Totals	5,695,684	2,732,052	11,071,218	2,149,782

(iii) Total quantities.

(a) Overburden to 110ft. depth = 13,654,665 cub. yds.

coal to this limit = 7,048, 347 cub. yds.

(Assuming 1 cub. yd. coal/ton) 7,048,347 tons

(b) Overburden to220ft. depth = 25,159,366 cub. yds

coal to this limit = 4,855,291 cub. yds.

(Assuming 1 cub. yd .coal/ton) = 4,855,291 tons

26.10.53.