

WRI/C/211

FUEL RESEARCH INSTITUTE OF SOUTH AFRICA

ADDENDUM TO REPORT NO. 7 OF 1965

SURVEY REPORT NO. 322

A COMPARISON OF IN SITU RESERVES OF RAW COAL
SUITABLE FOR POWER STATION USE, AND OF
WASHED COAL FOR THE GENERAL MARKET ON THE
FARM BOSCHMANSFONTEIN 12 IS, WITBANK, TRANSVAAL

by

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In Report No. 7 of 1965, in situ reserves of coal suitable for use in a power station on site were calculated for the farm Boschmansfontein 12 I S, in the Witbank district of Transvaal.

If this coal cannot be used for this purpose, it will have to compete with other coal from the Witbank district in the general market. To assess these possibilities, the following basic criteria have been laid down:-

1. A minimum working thickness of 5 feet,
2. A minimum yield of 80 per cent,
3. A minimum calorific value of 12,4 lb/lb,

with some flexibility, particularly in the latter two criteria, where higher yields at slightly reduced calorific values or somewhat reduced yields at higher calorific values have been included.

The reserve figures given below replace the rough data given in the addendum included in Report No. 7 of 1965.

NO. 5 SEAM:

None of the No. 5 Seam occurrences in the boreholes comply with the above three criteria. Borehole 171 comes closest to compliance with criteria 2 and 3, and the two taken together are reasonable, but the seam is only 39" thick. Other boreholes, with calorific values of 12,4 lb/lb or better, have very low yields, and the highest yield obtained in any borehole was 76%. Data in the best overall boreholes are given below:-

Bore-hole	Inches		Raw Coal Ash %	Float		
	Ex-cluded	Sam-pled		Yield %	C. V. lb/lb	Ash %
89	5	56	21.4	62.9	12.8	11.1
141		54	23.7	76.0	12.06	15.6
143		47	23.3	74.6	11.82	17.3
144		42	22.3	74.7	12.02	17.0
155		74	24.8	71.3	12.15	15.1
171		39	21.4	74.9	12.53	13.8

There are, therefore, no reserves in the No. 5 Seam at the postulated criteria.

NO. 4 SEAM:

Borehole 72 in the north-western corner of the property easily complies with the specifications, and would probably still comply if the coal were unaffected by the Ogies dyke. However, this borehole is separated from the rest of the better quality coal by somewhat inferior coal in borehole 79.

In the area south of the railway reserve, only borehole 169 complies with the specifications, so that this area must be ruled out.

Most of the remainder of the boreholes on the eastern portion of the farm contain reasonable quality coal, and a westerly extension of reasonable quality coal is present in boreholes 159, 160 and 91. Selected data for these boreholes are given in Table 1.

Table 1/...

TABLE 1

BETTER QUALITY COAL IN NO. 4 SEAM

Bore-hole No.	Sam- ples	Inches		Raw Coal Ash %	Float		
		Ex- cluded	Sam- pled		Yield %	Cal. Val. lb/lb	Ash %
90	A-C		139½	18.1	79.6	12.20	13.7
141	AB		115	17.8	78.8	12.36	12.9
142	A-D		136	18.8	82.0	12.41	13.6
143	AB		109	19.2	79.9	12.30	14.1
144	AB		136	19.4	77.6	12.36	14.1
145	AB	2	77	16.2	87.7	12.52	12.7
146	A-D		103	19.6	75.8	12.62	12.9
147	A-C	3	95	14.7	90.2	12.42	12.8
148	A-C	5	117	15.9	88.0	12.45	13.3
149	A-C	6	173	17.7	85.5	12.20	14.0
150	A-C		147	18.4	83.0	12.12	14.6
151	AB		110	15.7	88.2	12.39	12.5
152	A-C		125	18.0	80.9	12.50	12.8
162	A-C		124	18.0	83.4	12.41	13.2
166	A-C		131	17.7	86.8	12.15	14.8
58	AB		88	15.8	85.0*	12.33*	12.8*
59	AB		90	13.0	97.0*	12.62*	12.3*
61	A		83	16.0**	97.0	12.3	15.1
<u>Westerly Extension</u>							
91	AB	2½	102	16.1	86.4	12.28	13.3
159	A		60	17.6	82.7	12.32	13.5
160	AB	½	83	18.2	84.3	12.30	14.1

* Assumed values. Raw coal analysed.

** Assumed value. Float sample only received.

Many of the outlying boreholes in the main area are slightly below the specifications, but have been included to give an

overall/...

overall average value close to the limits of the specifications on balance. Reserves and average data for the main area and the westerly extension are as follows:-

	Main Area	Westerly Extension	Total
Area, Acres	1340	700	2040
In Situ Reserves, Millions of short tons*	25.7	9.1	34.8
Exclusions, Inches	$\frac{3}{4}$	1	$\frac{3}{4}$
Sampled, Inches	$120\frac{1}{2}$	$81\frac{3}{4}$	$107\frac{1}{4}$
Raw Coal Ash, %	17.7	17.0	17.5
<u>Floats at 1.58 s. g. on $-1\frac{1}{2}$" Coal</u>			
Yield, %	83.8	84.9	84.1
Cal. Val., lb/lb	12.32	12.30	12.31
Moisture, %	2.9	2.8	2.9
Ash, %	13.7	13.5	13.6
Volatiles, %	27.7	27.5	27.6
Fixed Carbon, %	55.7	56.2	55.9

* 5% deducted for bad ground, boundary pillars, etc.

The data for the westerly extension are based on only three boreholes, and the values in all the surrounding boreholes except borehole 144 are definitely worse, so that the estimates of reserves and quality may both be slightly optimistic.

NO. 2 SEAM:

The reserve area south of the railway line is the same as for the raw coal. However, the cores from boreholes 167 and 168 were washed at lower specific gravities, and estimated values on the floats, assuming 80% float yield, were used in calculations.

In the main area, the reserve area is rather smaller than for the raw coal. In addition, raw coal analyses only are available for boreholes 58 to 61. It is very unlikely that the No. 2 Seam in

boreholes/...

boreholes 58 and 60 would yield 80% of float at a calorific value of 12.4 lb/lb, and these boreholes have not been considered. The following data apply to the other two boreholes and borehole 48 just across the farm boundary in the southern corner of Tweefontein 13 IS:-

<u>Borehole</u>	<u>59</u>	<u>61</u>	<u>48</u>
Coal, Inches	57	68	106
Cal. Val., lb/lb	11.7	12.7	12.7
Ash, %	17.7	12.1	10.7

In general, the 2A Seam is not of good enough quality to be considered as a reserve complying with the required specifications. However, in boreholes 157 and 161 the coal comes reasonably close to the specifications and reserves have been calculated for this area separately. It must be pointed out that, as for the westerly extension of the No. 4 Seam, both the quality and quantity of the reserves as given may be slightly optimistic.

Selected data for the No. 2 and 2A Seams in the various boreholes are given in Table 2.

TABLE 2

BETTER QUALITY COAL IN THE NO. 2 AND NO. 2A SEAMS

Borehole No.	Samples	Inches		Raw Coal Ash %	Float		
		Ex-cluded	Sam-pled		Yield %	Cal. Val. lb/lb	Ash %
<u>South of the Railway Reserve</u>							
168	AB		109	16.7	80.0*	12.36*	13.7*
167	A-C		84	16.7	80.0*	12.47*	12.8*
169	B-D		167	16.6	76.3	12.51	12.0
170	A-D		240	14.9	84.9	12.35	12.1
171	A-D		158	19.2	73.8	12.54	12.4

* Assumed Values.

TABLE 2 (Continued)

BETTER QUALITY COAL IN THE NO. 2 AND NO. 2A SEAMS

Bore-hole No.	Sam- ples	Inches		Raw Coal Ash %	Float		
		Ex- cluded	Sam- pled		Yield %	Cal. Val. lb/lb	Ash %
<u>Main Area</u>							
90	A-D		155	17.6	80.2	12.37	13.2
140	CD		97	16.7	74.9	12.69	11.6
141	A-D		132	17.2	79.9	12.52	12.5
142	A-E		88	17.7	73.7	12.75	11.9
144	BC		93	17.9	77.2	12.24	13.7
145	B-F	3	179	19.5	70.9	12.53	12.4
146	A-C	3	139	16.5	83.1	12.38	13.2
148	B-F		166	16.7	79.5	12.20	13.3
149	A-C		180	17.0	80.4	12.42	13.0
150	A-C		136	15.7	85.3	12.22	13.3
151	A-C		192	14.9	87.0	12.21	12.4
152	A-D		187	14.9	81.6	12.57	11.6
153	B-D		186	14.3	88.4	12.31	12.4
162	EF		112	20.2	74.3	12.48	12.1
164	A-C		118	17.0	78.6	12.48	12.3
165	A-E	13	219	16.4	85.6	12.53	12.6
166	BC		93	18.2	79.6	12.25	14.0
<u>No. 2A Seam</u>							
157	AB	2	109	19.3	82.4	12.16	15.5
161	A-C		120	19.3	70.5	12.60	13.0

The reserves have been calculated for the three areas above, and for the assumed float values for the raw coal analysed in boreholes 59, 61 and 48, the boreholes being weighted for the areas represented. Data are given below:-

Main/...

	Main Area	South of Railway	Estimated Raw Coal Boreholes 48, 59, 61	No. 2 A Seam	Total
Area, Acres	1485	560	230	475	2750
In Situ Reserves, Millions of short tons*	33.3	12.2	2.5	8.7	56.7
Exclusions, Inches	$\frac{3}{4}$			1	$\frac{1}{2}$
Sampled, Inches	142 $\frac{1}{2}$	138	72	114	130 $\frac{3}{4}$
Raw Coal Ash, %	16.3	16.7	13.1	19.3	16.7
<u>Floats at 1.58 s. g. on -1$\frac{1}{2}$" Coal:</u>					
Yield, %	81.8	79.5	95.0	77.0	81.2
Cal. Val., lb/lb	12.39	12.43	12.64	12.35	12.41
Moisture, %	2.8	3.1	2.8	2.5	2.8
Ash, %	12.6	12.7	12.0	14.5	12.9
Volatiles, %	25.7	25.3	24.9	30.2	26.2
Fixed Carbon, %	58.9	58.9	60.3	52.8	58.1

* 5% deducted for bad ground, boundary pillars, etc.

Total reserves for raw coal, as given in Report No. 7 of 1965, are as follows:-

Seam	Area Acres	Reserves (Millions of tons)	Cal. Val. lb/lb	Ash %
No. 5	2090	19.5	10.61	24.3
No. 4(1)	4930	134.8	10.79	22.2
(2)	4930	94.7	11.36	18.8
No. 2(1)	3480	104.9	11.08	20.2
(2)	3300	90.0	11.34	18.7

(1) To 25% ash limit.

(2) To 20% ash limit.

The No. 5 Seam reserves given above include coal down to 3 $\frac{1}{2}$ feet thick. If the thickness were limited to 5 feet, reserves would be rather more than half the above quantity, and the quality would be slightly worse.

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PRETORIA,
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/OvR.