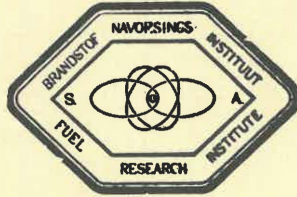


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REPORT No. 11

VAN

OF 1961

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BRANDSTOFNAVORSINGSINSTITUUT

VAN SUID-AFRIKA

FUEL RESEARCH INSTITUTE

OF SOUTH AFRICA

SURVEY REPORT NO. 287

ONDERWERP:

SUBJECT: REPORT ON 3 BOREHOLES DRILLED ON THE FARMS

DRIEFONTEIN 70 AND ROLFFONTEIN 40 IN THE AMERSFOORT DISTRICT

AND NOOITGEDACHT 105 IN THE ERMELO DISTRICT OF TRANSVAAL.

AFDELING:

DIVISION: SURVEY

NAAM VAN AMPTENAAR:

NAME OF OFFICER: H. P. BOSHOFF

FUEL RESEARCH INSTITUTE OF SOUTH AFRICA.

REPORT NO. 11 OF 1961.

SURVEY REPORT NO. 287

REPORT ON 3 BOREHOLES DRILLED ON THE FARMS DRIEFONTEIN 70 AND ROLFONTAIN 40 IN THE AMERSFOORT DISTRICT AND NOOITGEDACHT 105 IN THE ERMELO DISTRICT OF TRANSVAAL.

INTRODUCTION.

During the year 1959 Messrs. New Union Goldfields Ltd. drilled 3 boreholes, one on each of the farms Rolfontein 40, Nooitgedacht 105 and Driefontein 70. The farms Rolfontein 40 and Driefontein 70 (Amersfoort district) are situated approximately 6 miles to the north-east and 10 miles to the east of Amersfoort respectively. Nooitgedacht 105 (Ermelelo district) is situated approximately 6 miles south of Sheepmoor. The boreholes were numbered N1 on Nooitgedacht 105, R1 on Rolfontein 40 and D1 on Driefontein 70.

Coal cores were sampled by an officer of the Institute at the Institute. The sample taken from the Lower C seam in borehole N1 was crushed to pass a 1" screen and was subjected to float and sink tests at a specific gravity of 1.58.

PRESENTATION OF RESULTS.

The data on which this report is based are contained in tables and figures at the end of the report. Table 1 contains the borehole records, Table 2 the details of sampling and Table 3 the analysis of the samples taken. Table 4 gives the constitution of composite samples for further analysis and Table 5 gives the total sulphur and ash fusion temperatures of the composite samples. Figure 1 is a plan showing the positions of the boreholes and Figure 2 gives borehole sections showing coal seams, dolerite intrusions and dwyka. In the appendix is given a brief description of the analytical methods used and their significance.

GENERAL CONSIDERATIONS.

No collar elevations are available for boreholes D1 and R1 but a contour map was supplied for the area where borehole N1 is situated. The collar elevation given for borehole N1 was calculated from this map.

Some differences/.....

Some differences occurred in the thicknesses and depths of the coal seams given in the borehole records and those supplied during sampling the cores. In the discussion that follows, the measurements supplied when sampling the cores will be taken as correct.

Several dolerite sills, thicknesses ranging from 6" to 120', were encountered in the three boreholes. In borehole N1 the B seam and possibly the Upper C seam have been slightly affected by the overlying dolerite, as can be seen from the lower moisture contents of the coal compared with the lower seams.

The diameter of the core from borehole N1 was 2" but after intersecting the B seam it was altered to $1\frac{5}{8}$ ".

No coal was encountered in borehole D1 and only a few thin seams of $\frac{3}{4}$ " to 9" were present in borehole R1 but were not sampled. In this borehole the thin coal seam of $\frac{3}{4}$ " just below 75' of dolerite, was described as anthracitic coal in the borehole record.

Dwyka (18' 0") was present in borehole R1.

THE COAL SEAMS.

The only coal seams sampled were those encountered in borehole N1.

The B seam. This seam had a thickness of 2' 2" but 1' 3" of the seam consisted of carbonaceous shale. Only 8" was sampled having an ash content of 24.0% and volatile matter content 24.2%.

The Upper C seam. The upper section of this seam, thickness 28", consisted actually of carbonaceous shale and was not sampled. The lower section had a thickness of 1' 4" with 4" carbonaceous shale at top. The lower 12" of coal had an ash content of 21.1% and a volatile matter content of 30.9%.

The Lower C seam. According to the thickness of the seam (62") it is the only seam of any value. With the exclusion of 2" shale at the bottom of the seam, the section sampled gave a float yield of 83.5% (-1" coal at 1.58 s.g.). Raw coal ash content was 22.0%, ash content on the floats 17.7% and calorific value on the floats 11.3 lb/lb. Volatile matter content was 28.8%

The D seam /.....

The D seam. This seam consisted of $\frac{1}{2}$ " carbonaceous shale at the top of the seam which was not sampled and 17 $\frac{1}{2}$ " mixed coal at the bottom with ash content 18.2% and calorific value 11.3 lb/lb.

ULTIMATES.

Sulphur and ash fusion temperatures were determined on two samples (raw coal and floats) representing the Lower C seam. Sulphur contents were 1.05% and 0.97% for the raw coal and float samples respectively with corresponding ash fusion temperatures of +1400°C and 1400°C.

SUMMARY.

Three boreholes were drilled on the farms Rolfontein 40, Nooitgedacht 105 and Driefontein 70. These farms are situated to the north-east and south-east of Amersfoort, Transvaal.

Dolerite sills with various thicknesses were present in all three these boreholes, but the coal seams in borehole N1 were not appreciably affected (the B seam and possibly the Upper C seam to a lesser extent). A $\frac{3}{4}$ " coal seam in borehole R1 just below a dolerite sill was described as anthracitic coal.

Borehole D1 penetrated no coal and in borehole R1 a few thin seams of $\frac{3}{4}$ " to 9" were present but were not sampled.

The B, Upper C and D seams encountered in borehole N1 are thin and consisted of rather inferior coal and are of no economic importance. The Lower C seam had a reasonable thickness (62") but the coal was also rather inferior with ash content and calorific values on the floats 17.7% and 11.3 lb/lb respectively over 60" sampled. Float yield of -1" coal at 1.58 s.g. was 83.5%.

H.P. BOSHOFF

ASSISTANT TECHNICAL OFFICER.

PRETORIA.

7th December, 1961.

TABLE 1
BOREHOLE RECORDS

Thickness		Description of Strata.	Depth	
ft.	ins.		Ft.	ins.
<u>BOREHOLE NO. R1.</u>		<u>FARM : ROLFONTEIN 40</u>		
+ 18	0	Overburden	+ 18	0
+ 52	4	Dolerite	- 70	4
- 4	3	Shale	74	7
23	9	Sandstone, coarse, white	98	4
5	11	Carbonaceous sandstone	104	3
51	9	Shale and sandstone	156	0
19	2	Dolerite	175	2
35	10	Sandstone, laminated dark shale	211	0
29	6	Coarse to very coarse sandstone	240	6
36	11	Grey sandstone	277	5
12	7	Dark grey to black shale and fine sandstone	290	0
26	4	Sandstone with shale partings	316	4
	6	Carbonaceous shale with <u>2½" bright coal</u>	316	10
26	10	Sandstone	343	8
30	1	Coarse white sandstone	373	9
3	9	Black micaceous shale with <u>1½" bright coal</u>	377	6
62	1	Coarse white sandstone	439	7
17	11	Fine grained sandstone with black shale laminated	457	6
5	0	Black carbonaceous shale	462	6
52	3	Coarse to gritty sandstone with a few shale partings	514	9
	3	<u>Bright laminated coal</u>	515	0
12	2½	<u>1" dull coal in shale</u>	527	2½
45	9½	Coarse to gritty sandstone with a few shale partings	573	0
5	2	Carbonaceous shale including <u>1½" bright coal, 9" shaly coal and 7" dull coal</u>	578	2
55	11	Fine micaceous sandstone with shale	634	1
3	8	Coarse sandstone, <u>8" bright laminated coal, burnt</u>	637	9
22	11	Sandstone	660	8
75	5½	Dolerite	736	1½
+ 9	10½	<u>¾" Anthracitic coal in carbonaceous shale</u>	+ 746	0
+200	3	Greyish white sandstone and sandy shale	946	3
119	9	Coarse speckled dolerite	1066	0
33	0	Sandstone ?	1099	0
6	0	Fine sandstone	1105	0
27	6	Shaly sandstone grading down to black carbonaceous shale	1132	6
47	6	Black carbonaceous shale	1180	0
11	6	Coarse grit	1191	6
18	0	Dwyka	1209	6
16	0	Granite schist.	1225	6

TABLE 1 (continued)

Thickness		Description of Strata	Depth	
ft.	ins.		ft.	ins.
<u>BOREHOLE NO. N1</u>		<u>FARM: NOOITGEDACHT 105</u>		
		<u>COLLAR ELEVATION: ± 5580'</u>		
40	0	Overburden	40	0
6	0	Shales, grits and sandstone	46	0
6	0	Dolerite	52	0
18	0	Sandstone and shale	70	0
	6	Dolerite	70	6
43	6	Shales, grits and sandstone	114	0
3	0	Dolerite	117	0
17	0	Sandstone	134	0
27	0	Dolerite	161	0
36	0	Shale and sandstone	197	0
	6	Dolerite	197	6
4	6	Black carbonaceous shale	202	0
5	0	Sandstone	207	0
59	0	Sandstone and shale	266	0
10	0	Micaceous sandstone	276	0
5	0	Carbonaceous shale and sandstone	281	0
19	6	Dolerite	300	6
54	6	Shale and sandstone	355	0
3	0	Dolerite	358	0
2	0	Sandstone and shale	360	0
22	0	Dolerite	382	0
1	0	Grey sandstone	383	0
33	0	Dolerite	416	0
74	0	Shale, sandstone and grits	490	0
15	0	Black carbonaceous shale	505	0
4	0	Grits and shale	509	0
13	0	Dolerite	522	0
2	0	Sandstone and carbonaceous shale	524	0
47	6	Dolerite with pebble band at 541' 3"	571	6
43	6	Shale and sandstone	615	0
2	6	Black carbonaceous shale	617	6
10	4	Shale and sandstone	627	10
2	1	<u>Coal</u> and carbonaceous shale. <u>B seam</u>	629	11
4	9	<u>Sandstone</u>	634	8
1	8	Black carbonaceous shale	636	4
31	0	Shale and sandstone <u>1" coal at 664' 3"</u> } <u>Upper C seam</u>	667	4
1	1	<u>Coal</u> } <u>seam</u>	668	5
28	5	<u>Sandstone</u> with shale bands	696	10
5	2	<u>Bright coal</u> and shale. <u>Lower C seam</u>	702	0
83	0	<u>Sandstone</u> and shale	785	0
1	6	<u>Coal. D seam</u>	786	6
61	6	Alternating shale and sandstone	848	0

TABLE 1 (continued)

Thickness		Description of Strata	Depth	
ft.	ins.		ft.	ins.
<u>BOREHOLE NO. D1</u>		<u>FARM: DRIEFONTEIN 70</u>		
6	0	Overburden. No core	6	0
4	0	Weathered sandy shale	10	0
25	0	Dark blueish grey shale	35	0
	4	Fine sandstone	35	4
61	8	Dark blueish grey shale	97	0
1	6	Grey argillaceous sandstone	98	6
123	6	Alternating bands of grey shale, sandy shale, etc.	222	0
80	6	Dark grey to black shales	302	6
39	6	Dark grey shale	342	0
4	9	Hard grey and dark grey shale with grit stringer	346	9
37	9	Dark grey to black carbonaceous shales, somewhat banded	384	6
4	4	Shale with grit stringer	388	10
30	6	Dolerite	419	4
3	0	Light grey shale with grit stringer	422	4
13	8	Varied grained grits and shale stringers	436	0
60	0	Dark grey to black carbonaceous shale with occasional grit bands	496	0
13	0	Coarse grits, dolerite and shales	509	0
24	9	Coarse sandstone with carbonaceous stringers	533	9
3	3	Micaceous, argillaceous sandstone	537	0
87	0	Coarse sandstone with occasional car- bonaceous stringers.	624	0

TABLE 2

DESCRIPTION OF SAMPLES.

B.H. No.	Sample No.	Thickness ins.	Depth ft. ins.	Description.
<u>B SEAM</u>				
N1			627 10	ROOF: Shale and sandstone Dull to bright coal
		3		} <u>Not Sampled</u>
		6		
	59/396 B	8		Mainly bright coal, pyritic and calcitic, with occasional thin carbonaceous shale bands
		9		Carbonaceous shale with a few 1" bright coal bands. <u>Not sampled.</u>
			630 0	<u>FLOOR:</u> Sandstone.

<u>UPPER C SEAM</u>				
N1			663 4	ROOF: Shale and sandstone Carbonaceous shale with occasional bright coal stringers. <u>Not sampled.</u>
		28		
			665 8	<u>FLOOR:</u> Shale and sandstone
			667 0	ROOF: Shale and sandstone Shale and coal. <u>Not sampled</u>
	59/396 A	4		Mixed mainly bright coal. Pyritic and calcitic.
		12		
			668 4	<u>FLOOR:</u> Sandstone with shale bands.

<u>LOWER C SEAM</u>				
N1			696 10	ROOF: Sandstone with shale bands
	59/397 A	60		Banded bright coal with occasional thin dull coal and carbonaceous shale bands, calcitic.
		2		Shale. <u>Not sampled</u>
			702 0	<u>FLOOR:</u> Sandstone and shale.

<u>D SEAM</u>				
N1			784 9	ROOF: Sandstone and shale Carbonaceous shale. <u>Not sampled</u>
		$\frac{1}{2}$		Mixed coal, duller at top, brighter at bottom, $\frac{1}{2}$ " carbonaceous shale in middle.
	59/416 A	17 $\frac{1}{2}$		
			786 3	<u>FLOOR:</u> Alternating shale and sandstone.

TABLE 3

PROXIMATE ANALYSIS AND CALORIFIC VALUES
(AIR-DRY BASIS)

Bore-hole No.	Sample No.	Thickness ins.	Cal. Val. lb/lb	H ₂ O %	Ash %	Volatiles %	F.C. %			
			<u>ANALYSIS OF RAW COAL.</u>							
N1	<u>B SEAM</u> 59/396 B	8	-	2.0	24.0	24.2	49.8			
			<u>UPPER C SEAM</u>							
N1	59/396 A	12	-	2.6	21.1	30.9	45.4			
			<u>D SEAM</u>							
N1	59/416 A	17½	11.3	4.1	18.2	28.7	49.0			
			<u>ANALYSIS OF FLOATS (-1" coal at 1.58 s.g.)</u>							
			<u>LOWER C SEAM</u>							
N1	59/397 A	60	11.3	3.6	17.7	28.8	49.9	83.5	43.8	22.0

TABLE 4

COMPOSITION OF SAMPLES FOR FURTHER ANALYSIS.

Sample No.	Components	Parts	Description
<u>LOWER C SEAM</u>			
60/153	59/397 A ₁		Floats of -1" coal at 1.58 s.g. Bright coal over the whole Lower C seam in borehole N1. Thickness: 60" Float yield: 83.5%
60/154	59/397 A ₁ A ₂	501 99	Raw coal. Bright coal over the whole Lower C seam in borehole N1. Thickness: 60"

TABLE 5

TOTAL SULPHUR AND ASH FUSION TEMPERATURES.

Sample No.	Seam	Total S (%)	A.F.T. (°C)
60/153	Lower C	0.97	1400
60/154	Lower C	1.05	+1400

FIGURE 1
MAP SHOWING BOREHOLE POSITIONS

SCALE : 1 : 250,000

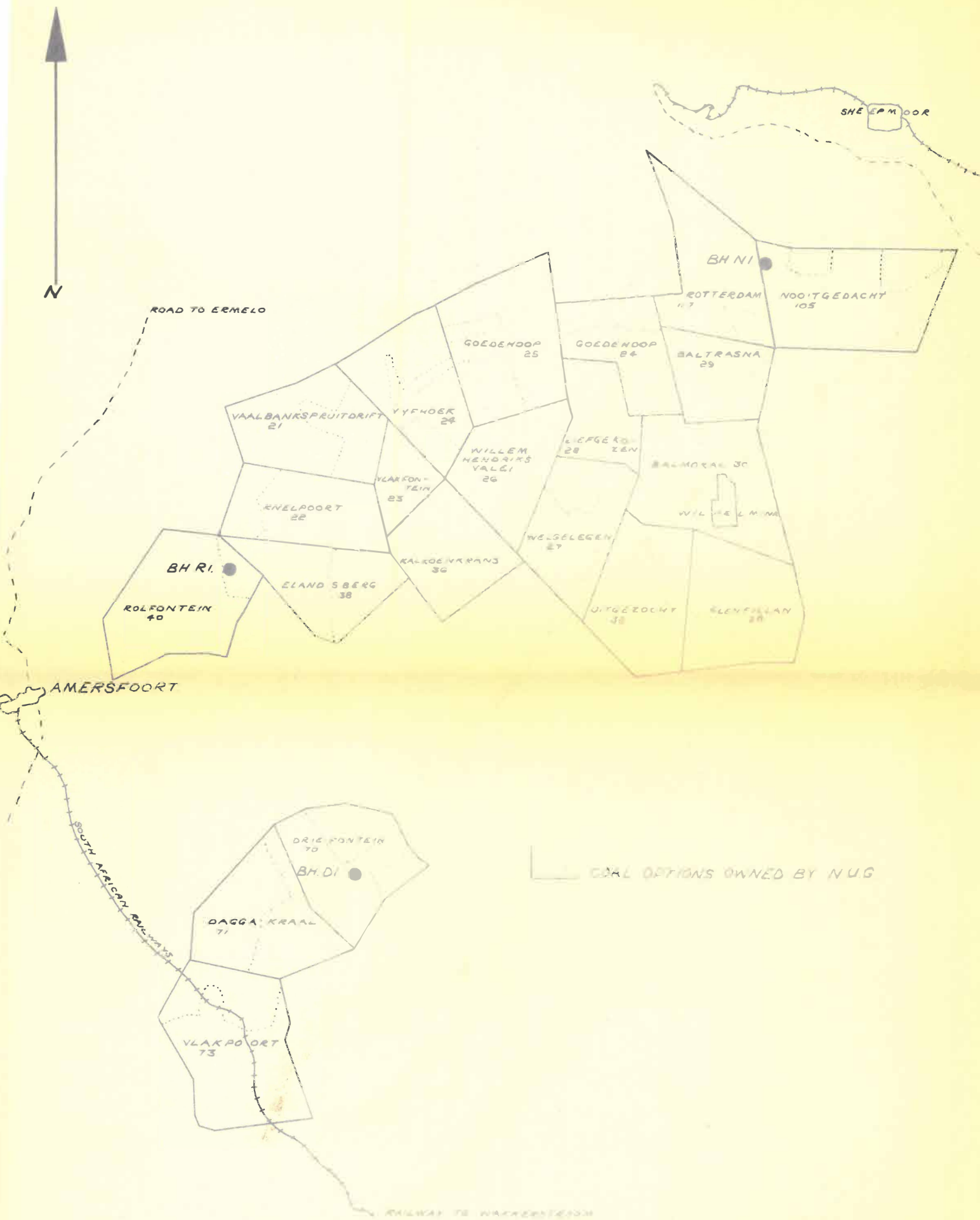


FIGURE 2
BOREHOLE SECTIONS

SCALE: 1MM = 5FT.

B B SEAM.
UC UPPER C SEAM.
LC LOWER C SEAM.
D. D SEAM.

■ COAL

⊕⊕⊕ DOLERITE

△△ DUYKA

