Mr. Boshoff.

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FUEL RESEARCH INSTITUTE
OF SOUTH AFRICA

SURVEY REPORT NO. 454

ONDERWERP: SUBJECT: REPORT ON SEVEN BOREHOLES DRILLED ON THE FARMS

COUWENBURG 300 IR, STRIJDPAN 243 IR AND

VLAKPLAATS 263 IR, IN THE DELMAS DISTRICT OF THE

TRANSVAAL

AFDELING: DIVISION: SURVEY

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TITLE	:	REPORT ON SEVEN BOREHOLES DRILLED ON THE FARMS COUWENBURG 300 IR, STRIJDPAN 243 IR AND VLAKPLAATS 268 IR, IN THE DELMAS DISTRICT OF THE TRANSVAAL
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FUEL RESEARCH INSTITUTE OF SOUTH AFRICA

REPORT NO. 3 OF 1979

SURVEY REPORT NO. 454

CONFIDENTIAL

REPORT ON SEVEN BOREHOLES DRILLED ON THE FARMS COUWENBURG 300 IR, STRIJDPAN 243 IR AND VLAKPLAATS 268 IR, IN THE DELMAS DISTRICT OF THE TRANSVAAL

1. Introduction

During the years 1962 and 1964, seven boreholes were drilled on three farms situated approximately fifteen kilometres south of Delmas by Delmas Colliery Ltd. Of these boreholes three were drilled on the farm Couwenburg, two on Strijdpan and two on Vlakplaats.

The coal samples were sent to the Fuel Research Institute where they were prepared and analysed.

2. Presentation of Results

The data on which this report is based, are contained in the following tables and figures:-

Table 1	:	Borehole Records
Table 2	:	Description of samples
Table 3	:	Proximate analysis and calorific values
Table 4	:	Average seam analysis
Figure 1	:	Plan showing borehole locations on the farms Couwenburg and Vlakplaats with an inset of the farm Strijdpan on which the borehole locations are not available.
Figure 2	:	Scale drawings of borehole sections corrected for collar elevations.

3. General considerations

The Nos. 5, 4 and 2 Seams of the Witbank Coal Field are present in the prospecting area and show the following variations in thicknesses:-

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	Maximum Ft.	In.	Minimum Ft.	In.	Average Ft.	In.
Overburden	323	0	103	9	197	4
Seam No. 5 (5 boreholes)	5	5	2	0	4	2
Partings	171	5	49	1	85	0
Seam No. 4 (6 boreholes)	28	7	4	5	18	9
Partings	55	9	6	10	32	7
Seam No. 2 (6 boreholes)	68	2	8	7	26	6

The three seams are present in six of the boreholes except Seam No. 5 which is absent in borehole No. S.P.2.

There is a difference in the floor elevations of Seam No. 2 between boreholes Nos. CB1 and CB2 of 44 feet and between boreholes Nos. CB2 and CB3 of 84 feet, and this is probably due to a dip in the basement complex.

There are six unrelated thin seams present in boreholes CB1-3.

Drilling was stopped in six of the boreholes soon after the No. 2 Seam was pierced. In borehole No. VP2 only burnt coal was found and drilling was stopped at a depth of 332 feet.

3.1 Dolerite and its influence on the coal

Dolerite intrusions were encountered in boreholes CB1, CB2, CB3, S.P.1 and V.P. 2 and vary in thickness from 4 feet to 168 feet.

In borehole No. CB1 the No. 5 Seam and in borehole No. VP2 all the seams were so badly burnt that samples were not taken.

The rest of the coal in this area was not noticeably affected by dolerite action.

4. The coal seams

No samples were taken from the boreholes on the farm Vlakplaats 268 IT. In borehole No. VP1 the No. 5 Seam was thin, and the No. 4 and No. 2 Seams though thick, were very inferior. In borehole No. VP2 the coal, which may represent the No. 4 or the No. 4 and No. 2

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Seams, was burnt. There will be no further discussion on these boreholes.

4.1 The No. 5 Seam

In borehole No. SP2 the No. 5 Seam was absent. In borehole No. CB1 the seam consisted of burnt coal and shale, and in borehole No. CB3 the 46 inch seam was also not sampled, possibly due to inferior quality. In boreholes CB2 and SP1, which are 13 kilometres apart, the seams were over 5 feet thick but only 37 and 36 inches (+6 inch parting) were of good quality, and thus sampled. Ash contents were 20,8% and 17,5% and the float yield was high (over 70% in both cases taking the exclusion into account).

4.2 The No. 4 Seam

On the farm Couwenburg 300 IR the No. 4 Seam, in borehole No. CB1, was inferior and no samples were taken. In the other two boreholes better quality coal was present in the lower part of the seams, of which values are being given in Table 4. Averages for the two boreholes are approximately as follows:-

Coal thickness	102½ inches
Raw coal ash	26,8%

Floats of -1" coal at 1,58 r.d.

Yield	Cal.val. MJ/kg	Moisture	Ash	Vol. mat.	Fix. carb.
57,5%	25,1	4,8%	15,9%	27,9%	51,4%

On Strijdpan the seam is very thin in borehole No. SP1 but in borehole No. SP2 the whole seam is of some value, with 105 inches coal, unfortunately marred by a carbonaceous shale parting of 11 inches, at 24,7% ash and a float yield of 65,2% with 26,4 MJ/kg calorific value.

4.3 The No. 2 Seam

On the farm Couwenburg 300 IR, the major part of the seam, in boreholes No. CB3, of 65 inches has about 29% ash, but the float yields are very low. In the other two boreholes 106 inches and 66 inches of

coal have ash contents of 25,2% and 10,5%. Average values for these two boreholes are:-

Coal thickness	86 inches
Raw coal ash	20,0%

Float of -1" coal at 1,58 r.d.

Yield	Cal. val. MJ/kg	Moisture	Ash	Vol. mat.	Fix. Carb.
66,5%	28,0	4,0%	10,6%	31,8%	53,6%

On the farm Strijdpan, 243 IR, the No. 2 Seam is thick but generally inferior. In borehole No. SP 1 only the c sample at 50 inches has less than 35% ash. For this sample the ash content was 30,9%, the float yield 51,5% and the calorific value on the float was 22,9 MJ/kg. In borehole No. SP2 most of the very thick seam is of possible value with 477 inches at 28,5% ash, float yield of 60% and 23,8 MJ/kg calorific value on the float. A thinner, better section at the bottom of this section is 113 inches thick with 24,7% ash and 72,8% float at 24,5 MJ/kg calorific value. At this point the overburden is only 110'6" to the top of the thick coal section and the coal is 39'9" thick, so that stripping would be possible, especially as the No. 4 Seam here is about 9 feet thick.

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TABLE 1

BOREHOLE RECORDS

Thickness Ft.	In.	Description of strata	Depth Ft.	In.
		Borehole No. CB1		
Farm: Couwenburg 300 IR		Collar Elevation: 5327'		
18	2	No core	18	2
31	10	Sandstone, shaly, weathered	50	0
15	0	Shale, sandy, weathered	65	0
73	0	Sandstone and shale	138	0
23	8	Dolerite	161	8
1	10	Shale	163	6
3	10	Dolerite	167	4
2	8	Shale and sandstone, burnt	170	0
4	0	Dolerite	174	0
4	4	Burnt coal and shale No. 5 Seam	178	4
21	8	Sandstone and shale	200	0
40	0	Sandstone	240	0
3	9	Burnt coal	243	9
2	7	Shale, carbonaceous, burnt	246	4
12	8	Sandstone with shale bands	259	0
12	6	Sandstone and shale, laminated	271	6
30	6	Dolerite	302	0
15	8	Sandstone and shale	317	8
27	11	Sandstone	345	7
1	1	Coal	346	8
0	7	Sandstone	347	3
1	5	Shale, carbonaceous	348	8
0	8	Sandstone	349	4
0	5	Shale, carbonaceous	349	9
22	8	Inferior coal and shale, No. 4 Seam	372	5
2	9	Shale, carbonaceous	375	2
6	6	Sandstone	381	8
17	7	Shale, carbonaceous	399	3

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TABLE 1 (Continued)

Thickness Ft.	In.	Description of strata	Depth Ft.	In.
		Borehole No. CB1 (Continued)		
0	4	Grits	399	7
14	5	Shale, sandy	414	0
25	2	Coal and shale, No. 2 Seam	439	2
5	10	Conglomerate in sandstone matrix	445	0
		Borehole No. CB2		
Farm: Couwenburg 300 IR		Collar Elevation:	5294'	
19	5	No core	19	5
5	5	Dolerite	24	10
3	4	No core	28	2
5	1	Sandstone with shale streaks	33	3
4	3	Shale with sandstone streaks	37	6
2	9	Sandstone and shale	40	3
1	9	Sandstone	42	0
63	4	Shale and sandstone	105	4
1	2	Sandstone	106	6
38	1	Shale and sandstone	144	7
8	8	Sandstone	153	3
0	10	Coal	154	1
41	5	Shale and sandstone	195	6
7	6	Shale	203	0
24	0	Alternating sandstone and shale	227	0
47	9	Sandstone	274	9
5	3	Coal, No. 5 Seam	280	0
9	11	Sandstone	289	11
30	11	Sandstone and shale	320	10
19	11	Sandstone	340	9
0	11	Coal	341	8
3	4	Shale	345	0
26	2	Coal, No. 4 Seam	371	2
1	10	Sandstone	373	0
8	8	Shale	381	8

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TABLE 1 (Continued)

Thickness Ft.	In.	Description of strata	Depth Ft.	In.
		Borehole No. CB2 (Continued)		
11	4	Sandstone	393	0
9	6	Sandstone, micaceous	402	6
22	4	Sandstone	424	10
2	1	Shale	426	11
22	7	Coal, No. 2 Seam	449	6
6	6	Conglomerate in sandstone matrix	456	0
		Borehole No. CB3		
Farm: Couwenburg 300 IR			Collar Elevation: 5387'	
6	6	No core	6	6
168	4	Dolerite	174	10
43	7	Shale with sandstone bands	218	5
9	6	Sandstone with shale	227	11
0	11	Sandstone	228	10
0	3	Coal	229	1
17	2	Sandstone and shale	246	3
2	5	Shale, micaceous	248	8
6	9	Shale with sandstone streaks	255	5
5	9	Sandstone, micaceous	261	2
7	1	Shale	268	3
12	5	Shale and sandstone	280	8
42	4	Sandstone	323	0
3	10	Coal, No. 5 Seam	326	10
0	6	Shale	327	4
5	10	Sandstone with shale streaks	333	2
5	7	Sandstone	338	9
1	8	Shale with sandstone bands	340	5
8	4	Sandstone	348	9
4	9	Sandstone and shale	353	6
13	2	Shale with sandstone bands	366	8

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TABLE 1 (Continued)

Thickness Ft.	In.	Description of strata	Depth Ft.	In.
		Borehole No. CB3 (Continued)		
20	10	Sandstone	387	6
2	6	Sandstone shale and coal	390	0
3	6	Shale	393	6
1	11	Sandstone with shale streaks	395	5
0	8	Coal	396	1
2	6	Shale and sandstone	398	7
20	10	Coal, No. 4 Seam	419	5
9	3	Shale with sandstone	428	8
3	6	Shale	432	2
17	10	Shale with sandstone streaks	450	0
9	0	Coal, No. 2 Seam	459	0
11	0	Dwyka	470	0
		Borehole No. SP1		
Farm: Strijdpan 243 IR		Collar Elevation: 5303'		
17	6	Sand	17	6
24	9	Dolerite, weathered	42	3
15	0	Sandstone, weathered	57	3
6	10	Shale, weathered	64	1
24	4	Shale, carbonaceous with sandstone stringers	88	5
1	8	Sandstone	90	1
2	4	Carbonaceous shale	92	5
1	6	Sandstone	93	11
5	3	Carbonaceous shale	99	2
0	9	Calcite	99	11
2	5	Carbonaceous shale	102	4
0	9	Sandstone	103	1
0	4	Carbonaceous sandstone	103	5
0	4	Grit	103	9
5	5	Coal, No. 5 Seam	109	2

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TABLE 1 (Continued)

Thickness Ft.	In.	Description of strata	Depth Ft.	In.
		Borehole No. SP1 (Continued)		
0	2	Carbonaceous shale	109	4
29	11	Sandstone with streaks of carbonaceous shale	139	3
7	1	Carbonaceous shale	146	4
4	3	Sandstone	150	7
7	7	Carbonaceous shale	158	2
0	1	Grit	158	3
4	5	Coal, No. 4 Seam	162	8
18	0	Sandstone	180	8
0	4	Fossiliferous shale	181	0
4	8	Sandstone with shale bands	185	8
4	10	Carbonaceous shale with sandstone bands	190	6
25	8	Coal, No. 2 Seam	216	2
1	4	Dwyka	217	6
17	10	Quartzite and calcite	235	4
		Borehole No. SP2		
Farm: Strijdpan 243 IR		Collar Elevation:		
24	7	Surface	24	7
51	7	Weathered sandstone and clay	76	2
9	10	Sandstone, carbonaceous near bottom	86	0
9	8	Coal, No. 4 Seam	95	8
4	4	Sandstone with bands of carbonaceous shale	100	0
2	6	Carbonaceous shale	102	6
63	2	Coal, No. 2 Seam	170	8
7	6	Dwyka	178	2
		Borehole No. VP1		
Farm: Vlakplaats 268 IR		Collar Elevation: 5253'		
45	7	No core	45	7
16	10	Sandstone, weathered, rusty	62	5
46	4	Sandstone, rusty	108	9

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TABLE 1 (Continued)

Thickness Ft.	In.	Description of strata	Depth Ft.	In.
		Borehole No. VP1 (Continued)		
2	7	Shale with sandstone	111	4
2	0	Coal, No. 5 Seam	113	4
2	5	Shale, carbonaceous	115	9
32	3	Sandstone with shale streaks	148	0
2	9	Shale, carbonaceous	150	9
1	0	Sandstone	151	9
3	6	Shale, carbonaceous	155	3
24	11	Sandstone	180	2
28	7	Shale with bands of inferior coal, No. 4 Seam	208	9
9	5	Sandstone	218	2
6	6	Sandstone and shale, alternating	224	8
5	8	Carbonaceous shale	230	4
2	6	Sandstone	232	10
5	2	Sandstone and shale, laminated	238	0
3	11	Sandstone	241	11
8	7	Coal, No. 2 Seam	250	6
6	5	Shale with sandstone bands	256	11
5	1	Conglomerate in sandstone matrix	262	0
		Borehole No. VP2		
Farm: Vlakplaats 268 IR		Collar Elevation: 5215'		
64	0	No core	64	0
16	2	Sandstone, weathered, rusty	80	2
25	7	Sandstone and shale, laminated	105	9
21	5	Sandstone	127	2
4	10	Burnt coal and shale	132	0
1	0	Sandstone	133	0
15	8	Burnt coal and shale	148	8
2	8	Sandstone with shale	151	4
3	10	Shale, burnt	155	2
2	6	Sandstone	157	8
57	0	Dolerite	214	8
6	4	Sandstone, burnt	221	0
5	0	Grit in dark shaly matrix	226	0
106	0	Grit in pink matrix	332	0

TABLE 2

DESCRIPTION OF SAMPLES

Borehole No.	Sample No.	Thickness Ft.	Thickness In.	Depth Ft.	Depth In.	Description
				No. 5 Seam		
CB2				274	9	Roof: Sandstone
	64/1129A	1	6			Mixed coal with pyrites
		1	7			Bright coal with few dull streaks
		1	1			Shale — Not sampled
		0	1			Sandstone — Not sampled
		0	2			Bright coal — Not sampled
		0	6			Shale — Not sampled
		0	4			Sandstone with shale streaks — Not sampled
				280	0	Floor: Sandstone
SP1				103	9	Roof: Grit
		0	2			Shale coal — Not sampled
		1	2			Shale — Not sampled
		0	7			Carbonaceous shale — Not sampled
		2	6			Mixed coal, mainly bright
	62/1342A	0	6			Carbonaceous shale. Excluded
		0	6			Mixed coal
				109	2	Floor: Carbonaceous shale
				No. 4 Seam		
CB2				345	0	Roof: Shale
		0	10			Bright coal with pyrites
		0	5			Sandy shale — Not sampled
		0	4			Mixed coal — Not sampled
		1	3			Sandy shale — Not sampled
		1	1			Shale — Not sampled
	64/1130D	4	1			Mainly dull coal with some shale bands

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TABLE 2 (CONTINUED)

Borehole No.	Sample No.	Thickness Ft.	Thickness In.	Depth Ft.	Depth In.	Description
			No. 4 Seam (Continued)			
CB2 (Continued)	64/1130C	4	1			Mainly dull coal with some shale bands
		2	6			Shale, carbonaceous with bands of dull coal. Not sampled
	B	4	2			Mixed bright and dull coal with occasional shale bands
	A	5	2			Mixed bright and dull coal with occasional shale bands
		2	3			Carbonaceous shale with a thin band of bright coal at base. Not sampled
				371	2	Floor: Sandstone
CB3				398	7	Roof: Shale and sandstone
		0	7			Shale with some coal. Not sampled
	64/1132D	4	6			Dull coal
		0	3			Sandy shale
		1	1			Shale
		1	9			Dull shaly coal — Not sampled
		1	1			Shale
	C	2	5			Dull coal with some pyrites
	B	3	9			Mixed coal, mainly dull
	A	4	0			Mixed coal, mainly dull
		1	2			Coaly shale — Not sampled
		0	3			Coal with sandstone stringers — Not sampled
				419	5	Floor: Shale with sandstone
SP1				158	3	Roof: Grit
		1	10			Mixed coal, dull at the top, brighter at the bottom
	62/1343A	0	1			Carbonaceous shale. Excluded
		0	9			Mixed coal, mainly bright
		1	1			Carbonaceous shale. Not sampled
		0	8			Shaly coal with impressions of plants. Not sampled
				162	8	Floor: Sandstone

TABLE 2 (CONTINUED)

Borehole No.	Sample No.	Thickness Ft.	Thickness In.	Depth Ft.	Depth In.	Description
				No. 4 Seam (Continued)		
SP2				86	0	Roof: Medium grained sandstone with carbonaceous material near the bottom
	62/1367B	4	4			Mainly mixed coal
		0	10			Carbonaceous shale }
		0	1			Grit } Not sampled
	A	4	5			Mixed coal, mainly dull
				95	8	Floor: Medium grained sandstone with bands of carbonaceous shale
				No. 2 Seam		
CB1				414	0	Roof: Shale, sandy
		1	10			Dull coal }
		1	2			Bright coal
		0	8			Dull coal
		0	5			Shale Not sampled
		3	1			Dull shaly coal
		0	10			Bright coal
		1	0			Dull shaly coal
		1	10			Shale
		1	10			Dull shaly coal }
	64/311 B	6	1			Dull coal
	A	2	9			Mixed coal, mainly dull
		1	9			Dull shaly coal }
		1	11			Shale } Not sampled
				439	2	Floor: Conglomerate in sandstone matrix
CB2				426	11	Roof: Shale
		0	5			Dull lustrous coal }
		0	5			Shale } Not sampled
		0	10			Dull coal
	64/1131E	3	7			Mixed coal
		0	11			Sandy shale

TABLE 2 (CONTINUED)

Borehole No.	Sample No.	Thickness Ft.	Thickness In.	Depth Ft.	Depth In.	Description
			No. 2 Seam (Continued)			
CB2 (Continued	64/1131D	4	6			Mixed coal with some shale bands
	C	1	3			Dull coal and shale
		2	3			Dull shaly coal
	B	2	11			Mixed coal, mainly bright
	A	2	7			Mixed coal, mainly bright
		0	4			Shaly sandstone. Not sampled
		1	0			Mixed bright and dull coal with pyrites. Not sampled
		1	2			Shale. Not sampled
		0	5			Conglomerate in shale and sandstone matrix. Not sampled
				449	6	Floor: Conglomerate in sandstone matrix
CB3				450	0	Roof: Shale with occasional sandstone streaks
	64/1133C	2	11			Mixed coal with some pyrite
	B	2	6			Mixed coal with some pyrite
		0	3			Shaly coal
	A	0	2			Shale
		1	10			Dull shaly coal
		0	11			Shale } Not sampled
		0	2			Coal }
				459	0	Floor: Dwyka
SP1				190	6	Roof: Carbonaceous shale with sandstone bands
		2	3			Shaly coal. Not sampled
		1	9			Fossiliferous shale. Not sampled
		1	3			Impure coal. Not sampled
		0	4			Fossiliferous, shaly coal. Not sampled
		2	2			Shaly coal with bright stringers. Not sampled
		1	5			Carbonaceous shale. Not sampled

TABLE 2 (CONTINUED)

Borehole No.	Sample No.	Thickness Ft.	Thickness In.	Depth Ft.	Depth In.	Description
			No. 2 Seam (Continued)			
SP1 (Continued)	62/1344C	4	2			Dull inferior coal
		3	10			Dull inferior coal
	B	0	5			Coal with sandstone stringers. Not sampled
		1	10			Mixed coal, mainly dull
		0	1			Sandstone. Not sampled
		0	8			Shaly coal
	A	0	9			Coal with sandstone stringers
		4	9			Dull inferior coal, shaly in places
				216	2	Floor: Dwyka
SP2				102	6	Roof: Carbonaceous shale
		1	11			Inferior, dull coal
		0	8			Shale. Excluded
	62/1368L	1	0			Inferior coal
		0	2			Shale. Excluded
		0	3			Inferior coal
	K	4	0			Dull coal, shaly near top
	J	4	10			Mainly dull coal
	H	4	8			Mainly dull coal
	G	4	6			Mainly dull coal
	F	5	2			Dull coal
	E	5	9			Mainly dull coal
	D	4	7			Mainly dull coal
	C	4	5			Dull coal with some mixed coal
	B	5	0			Dull coal with some mixed coal
	A	5	3			Inferior coal, shaly near the top
		16	0			Fossiliferous, shaly coal. Not sampled
				170	8	Floor: Dwyka

TABLE 4

AVERAGE SEAM ANALYSIS

PROXIMATE ANALYSIS AND CALORIFIC VALUES, (AIR-DRY BASIS)

Borehole No.	Sample No.	Thickness In.		Analysis of Raw Coal	Analysis of Floats of -1" coal at 1,58 r.d.					
		Excluded	Sampled	Ash %	Float Yield %	Cal. Val. MJ/kg	H_2O %	Ash	Vol. Mat. %	Fix. Carb. %
No. 4 Seam										
CB2	A B		112	26,3	60,8	24,86	5,1	16,2	28,3	50,4
CB3	A B		93	27,3	53,6	25,36	4,3	15,4	27,3	53,0
SP2	A B	11	105	24,7	65,2	26,40	4,5	14,5	30,4	50,6
No. 2 Seam										
CB1	A B		106	25,2	52,4	26,89	3,7	12,9	28,7	54,7
CB2	A B		66	10,5	92,5	29,16	4,3	8,3	35,0	52,4
SP1	C		50	30,9	51,5	22,93	5,1	19,9	24,1	50,9
SP2	B-J		477	28,5	60,0	23,75	4,9	18,3	23,1	53,7
SP2	B C		113	24,7	72,8	24,45	3,7	19,0	22,5	54,8

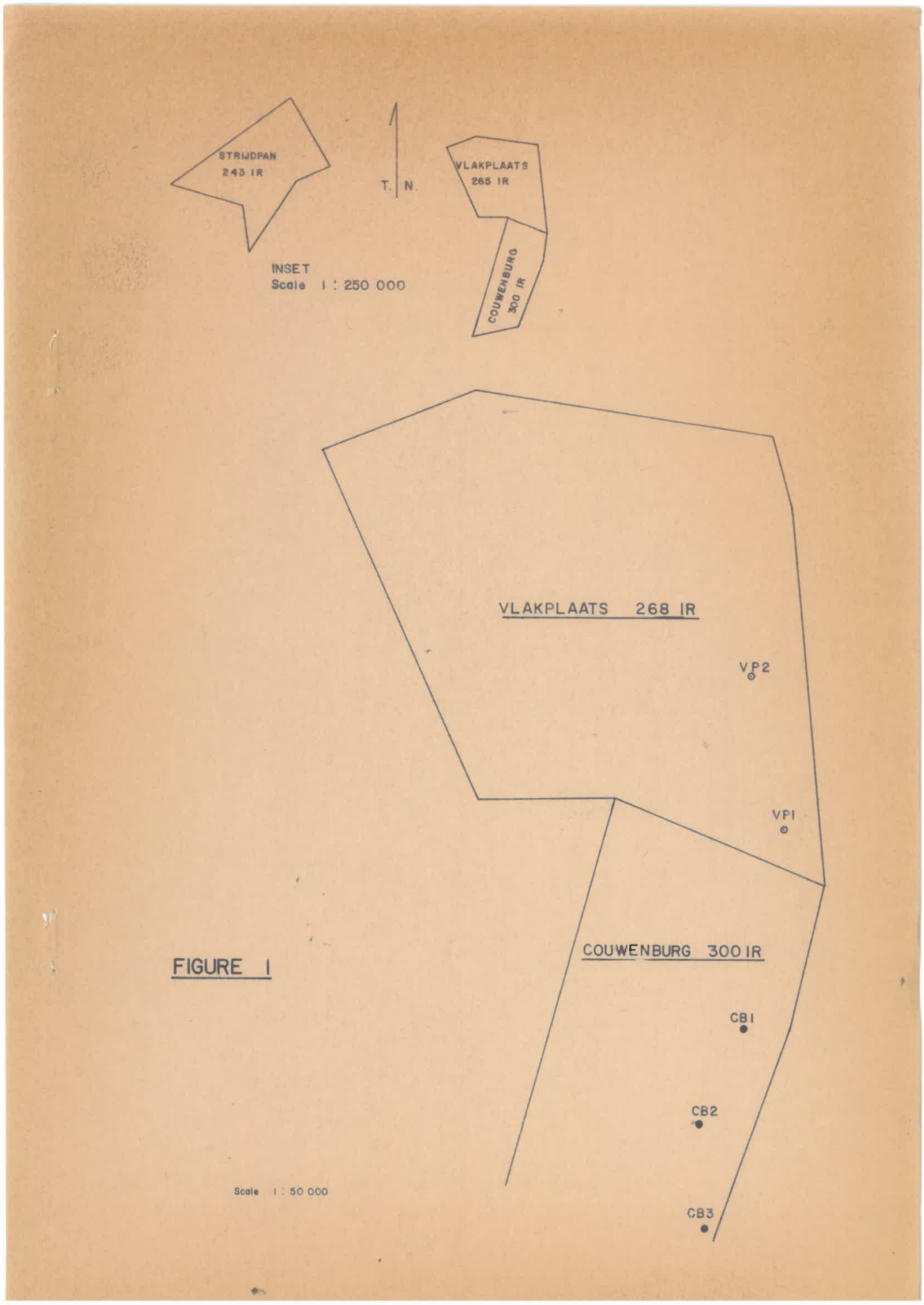
STRIJDPAN
243 IR
T.
N.
VLAKPLAATS
265 IR
COUWENBURG
300 IR
INSET
Scale 1 : 250 000
VLAKPLAATS 268 IR
VP2
VP1
COUWENBURG 300 IR
CB1
CB2
CB3
Scale 1 : 50 000

FIGURE 1