DEPARTMENT OF MINES AND ENERGY

SOUTH AUSTRALIA

REPORT BOOK NO. 79/82

GEOLOGICAL RESULTS FROM THE 1977/78 DRILLING PROGRAMME, WAKEFIELD AND CLINTON COAL DEPOSITS.

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Fossil Fuels Section

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G M Meyer

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GEOLOGICAL RESULTS FROM THE 1977/78 DRILLING PROGRAMME, WAKEFIELD AND CLINTON COAL DEPOSITS

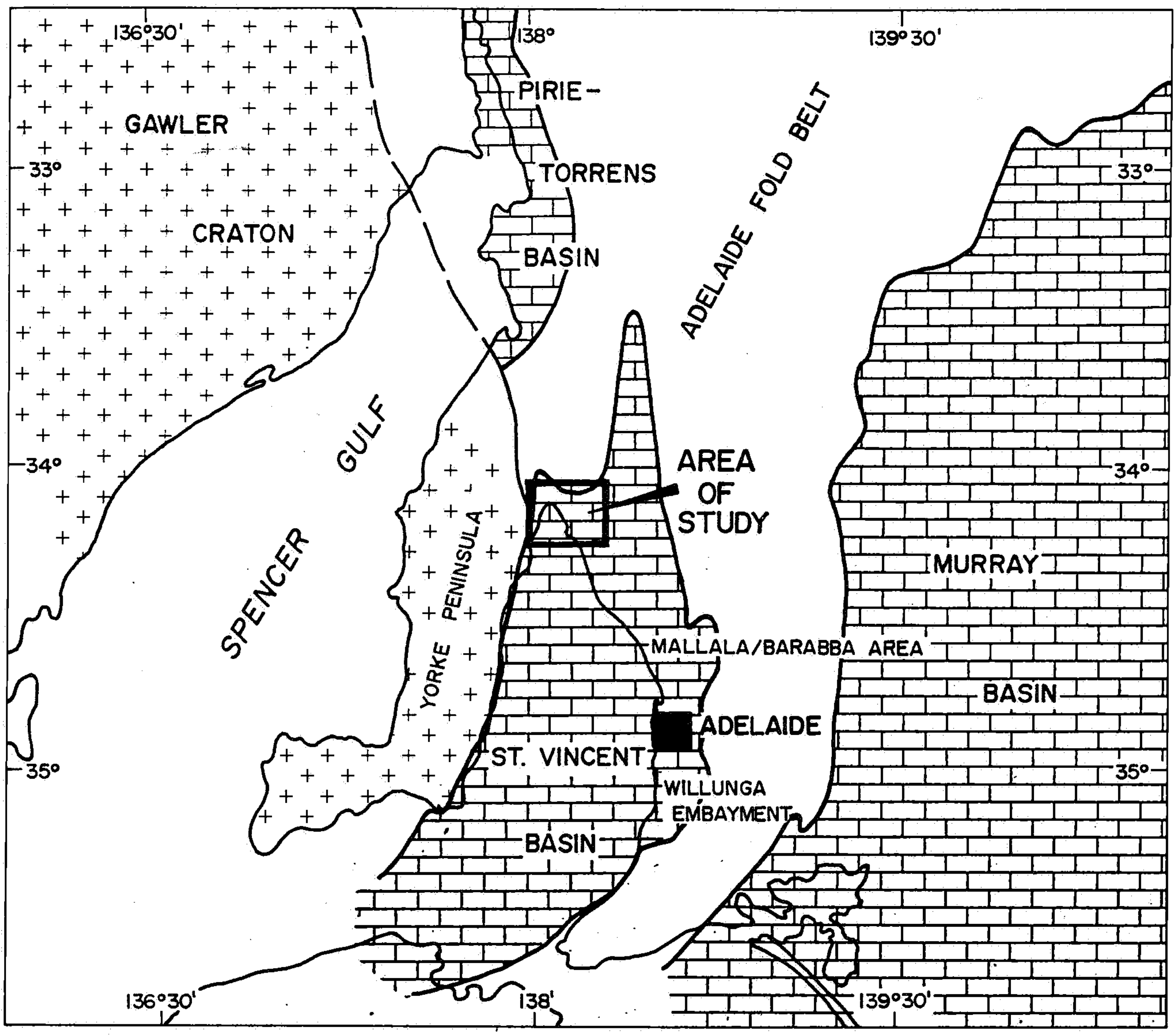
INTRODUCTION

Between December 1977 and February 1978, 103 coal exploration and development holes were drilled in the Wakefield and Clinton coal deposits, 100 kilometres north of Adelaide (Fig. 1). These Tertiary deposits, in the northern extremity of the St. Vincent Basin, contain low-rank brown coal seams.

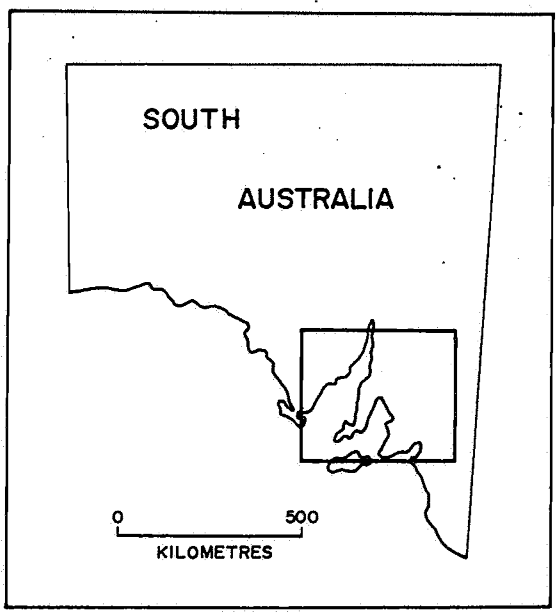
Drilling was financed and controlled by the Electricity Trust of South Australia (ETSA) while the South Australian Department of Mines and Energy (SADME) was involved in planning and co-ordinating field activities and in assessing the geology of the area.

The object of the programme was to determine suitability of the area for possible open cut mining. Brown coal in this area had not been fully delineated by previous work, and the programme also attempted to define coal limits, particularly toward the north (Meyer, 1976).

Previous investigations (Meyer, 1976) had shown that the coal had a high sodium/ash ratio and sulphur content, and might therefore cause major boiler fouling and pollution problems. A site was to be selected in the most prospective area indicated by new drilling, to take a large (over 500 tonnes) bulk sample for combustion tests. Shipment of such a bulk sample to the US and West Germany, for tests in pilot scale furnaces, was under consideration.



0 50 100 150
KILOMETRES



TERTIARY BASINS..........

CRYSTALLINE BASEMENT
BENEATH THIN COVER.....

FIG. 1

		DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE 1:250 000
COMPILED: GMM		WAKEFIELD COAL DRILLING PROGRAMME 1977/78 LOCALITY PLAN	DATE 26-10-79
DRN M.B.	CKD:		PLAN NUMBER S 14395

1726

FIG. 2

DEPARTMENT OF MINES AND ENERGY – SOUTH AUSTRALIA

WAKEFIELD COAL DEPOSIT

REFERENCE CORRELATIONS

ORIGINAL PLAN	COMPILED G.M.M.	DRN N.R.S.	SCALE as shown	PLAN NUMBER
DIRECTOR GENERAL	8 · 2 · 82	CKD	DATE 22.11.79	79-796

REFERENCE

BOREHOLE AND NUMBER ....

FAULT ....

BEDROCK SUBCROP ELEVATION CONTOUR .... -60
(interval 10 metres, datum AHD)

— NOTE —

Borehole location data supplied by E.T.S.A.

SCALE - 1:50 000

KILOMETRES 2 1 0 2 4 8 KILOMETRES

FIG. 3

DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA

NORTHERN ST VINCENT BASIN COAL DEPOSITS

PRE-TERTIARY BEDROCK SUBCROP

ORIGINAL	C.G.G	N.R.S	1:50 000	79-427
	7.2.82		DATE 11.2.80	

The drilling had two main aims:

(1) exploration in areas north and east of known deposits. Well spacing was generally greater than one kilometre;

(2) development drilling in the previously-defined area of economic interest. This type of drilling was of an infill nature to define coal seam limits, and to establish correlations and structure. Well spacing varied from ¼ to ½ kilometre.

This report presents the geological results of drilling and outlines areas of coal with low strip ratio. Coal seams and overburden sediments are correlated as part of an assessment of the geology of the deposit. The quality, mineability and reserves of coal are not subjects of this report.

PREVIOUS INVESTIGATIONS

Between 1920 and the start of the 1977/78 programme the South Australian Department of Mines (in conjunction with ETSA since 1974) drilled 164 holes in programmes assessing coal distribution and quality in the subject area. Meyer (1976) summarized the state of knowledge on the coal deposits prior to the recent programme.

Cooper (1977a) updated Tertiary stratigraphy of the area and showed that lithologies within the coal deposits were more closely related to those that crop out along the western side of St. Vincent Gulf (Stuart, 1970) than to those that crop out near Adelaide (Reynolds, 1953).

Two hydrological pump tests performed in the Wakefield Coal Deposit are reported in Dixon and Barnett (1975) and Bowering (1976).

OPERATIONS

Drilling

A total of 103 holes were drilled of which 15 cored the coal measures. Two Mayhew 1000 drilling rigs were used during December 1977 and one Mayhew 1000 rig was used during January and February 1978.

The drilling contractor was:

Thompson Drilling Co. Pty. Ltd.,
37 North Terrace,
Millicent. S.A. 5280.

Drilling statistics are presented in Table 1.

Sampling, Logging and Assaying

Ditch cuttings were collected and logged for every three metre interval, except in coal seams where one metre interval bulk samples were taken, and in cored sections. Three-metre samples were collected by shovel, and one-metre samples by a wire basket placed across the mud discharge to get maximum sample recovery. The one-metre samples are stored at:

ETSA Central Depot,
Grand Junction Road,
Angle Park. S.A. 5010.

Three-metre samples from the following holes:
V-165, 166, 180, 181, 184, 185, 191, 192, 194, 195, 201, 208, 212, 217, 223, 226, 227, 231, 232, 240, 241, 242, 243, 248, 249, 250, 255, 258, 259, 267
are stored at:

Glenside Core Library,
Conyngham Street,
Glenside. S.A. 5065.

Bore lithologs for holes V-165 to 267 are held by ETSA and will be reported to SADME under normal Exploration Licence (EL 422) requirements.

Coal measures were cored using HQ triple tube wireline core barrels. Core intervals are listed in Table 2.

TABLE 1

DRILLING STATISTICS, 1977/78 PROGRAMME

Hole No.	A.M.G. Co-ordinates Zone 54 E.	N.	Drilling Dates	Total Depth (m) Driller	Logger	Elevation (m) A.H.D.
165	240599	6214698	12.12.77	108.0	108.0	10.5
166	247255	6215163	12-13.12.77	97.2	88.3	23.3
167	238984	6214952	13.12.77	79.6	-	6.7
168	248630	6215313	"	20.6	-	25.2
169	239278	6211689	"	74.4	-	6.8
170	249013	6213097	"	67.5	-	24.0
171	248973	6210337	"	111.5	82.0	21.8
172	245064	6204307	"	104.0	-	9.5
173	245791	6213191	13-14.12.77	92.5	91.0	17.6
174	248388	6204467	13.12.77	36.6	-	16.4
175	248274	6204904	13-14.12.77	21.3	-	8.1
176	246130	6215067	14.12.77	120.5	116.5	23.2
177	260605	6207040	"	58.0	54.2	50.1
178	247250	6217798	"	47.0	46.4	25.9
179	260515	6209765	"	56.0	52.6	55.5
180	246475	6214205	15-17.12.77	127.5	125.2	21.1
181	240946	6205957	14-15.12.77	111.3	109.2	19.9
182	248387	6204448	15-16.12.77	47.2	-	16.6
183	241370	6209871	16.12.77	117.3	113.9	11.4
184	245046	6215014	17-18.12.77	117.8	94.1	19.6
185	228322	6218078	16.12.77	110.0	96.6	14.9
186	230042	6219781	17.12.77	86.0	83.4	2.7
187	229995	6221353	"	74.7	72.8	3.5
188	231158	6224326	"	56.4	54.6	12.4
189	239112	6221078	18.12.77	106.4	97.0	10.7
190	237233	6218018	"	94.5	85.2	7.5
191	243351	6217955	"	124.9	121.5	19.9
192	244049	6214973	18-19.12.77	84.8	80.3	18.7
193	236464	6223445	18.12.77	83.2	79.8	4.7
194	241195	6223997	"	64.9	58.5	14.3
195	246087	6209064	19-20.12.77	85.0	81.8	8.1
196	243015	6221181	19.12.77	57.9	57.3	16.5

Table 1 Continued

Hole No.	A.M.G. Co-ordinates Zone 54 E.	N.	Drilling Dates	Total Depth (m) Driller	Logger	Elevation (m) A.H.D.
197	247236	6215872	19.12.77	51.8	-	24.5
198	245155	6213026	"	88.4	85.7	18.4
199	245148	6216023	19-20.12.77	126.5	121.2	20.6
200	244965	6217076	20.12.77	123.4	-	22.5
201	239960	6221104	20-21.12.77	91.5	86.7	11.4
202	245040	6214130	20.12.77	100.6	86.0	18.5
203	240908	6219498	21.12.77	118.9	115.5	15.1
204	239920	6222737	"	47.3	44.5	11.8
205	234038	6222948	"	47.3	-	2.5
206	236549	6221007	"	74.7	69.4	5.8
207	240996	6221134	21-22.12.77	111.2	91.4	14.7
208	242004	6221151	22.12.77	96.3	90.6	16.6
209	231638	6221137	21-22.12.77	48.0	46.0	2.0
210	230884	6222876	22.12.77	56.0	53.1	2.2
211	248338	6203051	5.01.78	106.5	104.0	12.6
212	244997	6202773	5-06.01.78	113.5	109.4	4.6
213	245036	6206121	6.01.78	123.5	120.8	9.6
214	244576	6209004	6-09.01.78	93.5	84.8	12.6
215	242958	6209986	9.01.78	102.0	99.5	15.8
216	244909	6211973	"	96.0	95.2	12.7
217	245960	6211972	9-10.01.78	88.6	85.8	18.2
218	247764	6212082	10-11.01.78	98.0	-	21.5
219	246961	6213905	11.01.78	120.0	118.4	25.2
220	248347	6214053	"	39.7	35.8	26.2
221	246816	6214978	"	118.0	116.4	21.6
222	248070	6214999	"	20.0	17.2	25.6
223	250786	6215293	12.01.78	55.8	48.5	32.1
224	246020	6217005	"	84.0	82.1	26.0
225	245873	6215972	"	111.0	81.6	22.8
226	244088	6216927	13-14.01.78	79.5	75.6	21.2
227	228936	6218927	14-15.01.78	107.0	105.7	10.3
228	229090	6218211	15.01.78	100.5	100.0	4.9
229	227935	6217707	"	97.0	96.8	20.1
230	227256	6218622	16-17.01.78	79.0	74.7	37.8
231	229297	6220527	17.01.78	100.0	98.5	9.2
232	230076	6222033	"	70.0	69.2	4.0

Table 1 Continued

Hole No.	A.M.G. Co-ordinates Zone 54 E.	N.	Drilling Dates	Total Depth (m) Driller	Logger	Elevation (m) A.H.D.
233	244062	6216029	17.01.78	115.0	114.3	19.0
234	244521	6215044	18.01.78	116.0	105.5	19.5
235	242939	6214851	"	84.5	-	14.9
236	247764	6212082	"	92.0	87.6	21.4
237	245095	6218197	"	79.0	69.3	21.3
238	243117	6219561	19.01.78	88.5	81.8	19.1
239	238968	6219432	19.01.78	93.0	81.0	11.5
240	237928	6221036	"	106.0	91.5	9.2
241	238194	6222686	"	71.5	68.5	8.0
242	245501	6216002	20.01.78	118.0	99.6	23.0
243	246727	6213251	21-22.01.78	129.0	121.0	24.2
244	246029	6213985	23.01.78	114.0	109.5	16.0
245	247179	6211924	24.01.78	110.0	101.5	17.7
246	247080	6210415	"	46.0	-	19.4
247	245850	6210997	"	96.0	91.5	15.9
248	246869	6210234	25.01.78	104.0	102.6	15.3
249	243787	6212047	"	97.0	93.8	11.7
250	239800	6210208	"	82.0	80.5	3.3
251	236476	6222691	26.01.78	87.0	86.2	4.6
252	236424	6224471	"	54.0	53.6	5.7
253	241549	6224967	"	40.5	38.5	19.2
254	241023	6222755	"	77.0	74.6	13.8
255	245133	6215560	4-05.02.78	112.5	110.3	20.4
256	245000	6214505	5-06.02.78	88.0	83.2	19.7
257	245735	6215076	6-07.02.78	112.0	104.2	21.5
258	245913	6214617	7-08.02.78	115.8	113.5	20.2
259	246405	6215083	8-09.02.78	118.0	114.2	21.5
260	246189	6215420	9.02.78	121.0	118.3	22.2
261	246982	6214191	9-10.02.78	121.0	120.3	24.0
262	246004	6212566	10.02.78	98.0	95.2	16.0
263	244979	6216613	10-11.02.78	120.0	118.2	22.9
264	244578	6216010	11.02.78	114.0	113.7	20.0
265	244277	6214998	"	124.0	121.8	18.8
266	245492	6214142	"	97.0	93.8	20.2
267	245885	6214805	12-13.02.78	111.1	108.5	20.5

TABLE 2

CORE INTERVALS, 1977/78 PROGRAMME

Hole No.	Core Interval (m)
180	66.0-73.6; 74.4-104.1
184	66.8-95.2
192	66.1-84.8
195	78.7-87.7
201	49.6-63.3
217	58.8-88.6
226	48.1-79.5
227	57.0-89.9
242	50.7-88.3
243	70.0-83.3; 83.4-121.5
255	52.7-93.9
257	62.5-94.3
258	65.0-115.8
259	59.6-94.3
267	61.7-111.1

Coal and carbonaceous sediments were sampled from all core for destructive chemical analyses. All samples were analysed by:

The Australian Mineral Development Laboratories,
Flemington Street,
Frewville. S.A. 5063.

All results of chemical analysis are held by:

ETSA Coal Production Planning Department,
Greenhill Road,
Eastwood. S.A. 5063.

and reported to the SADME under normal Exploration Licence requirements.

Geophysical logging

Geophysical logging contractors were:

Geoex Pty. Ltd.,
50 Mary Street,
Unley. S.A. 5061.

All logs are held by ETSA, Coal Production Planning Department. Table 3 lists all holes without a complete set of gamma, neutron, point resistivity, caliper, and short-spaced and long-spaced density logs.

TABLE 3

DRILL HOLES WITH INCOMPLETE SETS OF LOGS

Hole No.	Logs available	Remarks
167	none	Hole collapsed.
168	"	" "
169	"	" "
171	"	" "
172	"	" "
174	"	Hole abandoned at shallow depth.
175	"	" " " " "
182	"	" " " " "
193	G,N,PR	" collapsed while logging.
194	"	" " " "
197	none	Hole collapsed.
200	"	" "
205	"	" "
218	"	" " redrilled 5 metres west (V-236).
221	C,D	Hole collapsed after running C, D probe.
226	G,N,PR	C, D probes being repaired.
233	C,D	Hole collapsed after running C, D probe.
235	none	Hole collapsed.
236	G,N,PR	Fishing for C,D probes in holeV-23
237	"	" " " " " " "
238	"	" " " " " " "
239	"	" " " " " " "
240	"	" " " " " " "
241	"	" " " " " " "
244	"	" " " " " " "
245	"	" " " " " " "
246	none	Hole abandoned at shallow depth.
247	G,N,PR	Hole collapsed while running C,D probe.
248	"	" " " " "
249	"	" " " " "

Note: G = Gamma
N = Neutron
PR = Point Resistivity
C = Caliper
D = Density (long & short spaced)

STRATIGRAPHY

Introduction

The Cainozoic geology of the coal deposits area has been studied from subsurface drilling information by Hillwood (1961), Harris (1970), Meyer (1976) and Cooper (1977a). The area lies to the northeast of the region studied by Stuart (1970) and to the northwest of the region studied by Lindsay (1965, 1967b, 1969) as part of the groundwater investigation of the North Adelaide Plains and by Cockshell et al. (1978) as part of the North Adelaide Plains gas storage study.

Stratigraphic nomenclature in the St. Vincent Basin derives from both the Willunga Embayment to the southeast of the coal deposits area (Reynolds, 1953; Lindsay, 1967a; Cooper, 1977b) and Yorke Peninsula to the southwest (Harris, 1966; Stuart, 1970).

Stratigraphic nomenclature in the Port Wakefield area is:

Hindmarsh Clay (Early Pleistocene)
Carisbrooke Sand (?Plio-Pleistocene)
Port Willunga Formation (Early-Middle Miocene)
Rogue Formation (Late Eocene-Oligocene)
    Port Julia Greensand Member
Clinton Coal Measures (Middle-Late Eocene)
"Bedrock" (?Cambrian-Precambrian)

This nomenclature follows Cooper (1977a), except that the term Port Willunga Formation (Reynolds, 1953) is used here instead of "Port Vincent Limestone and its equivalents" as originally derived from Stuart (1970) and used by Cooper (1977a). Miocene rocks in the Port Wakefield area correlate with the upper part of the Port Willunga Beds in the Adelaide Plains area (Lindsay, 1969) and with the entire Port Willunga Beds as mapped by Cockshell et al. (1978) in the North Adelaide Plains.

To further complicate stratigraphic nomenclature, Tertiary rocks show marked facies changes between the southern (deeper) part and the northern (shallower) part of the coal deposits area. Oligo-Miocene rocks that are fossiliferous, calcareous, glauconitic and siliceous in the south become less so towards the north. Rock units that can be differentiated in the south on the basis of lithology and fossil content grade into and intertongue with relatively uniform non-fossiliferous sands and clayey-sands in the north.

Exceptions are the Clinton Coal Measures, Carisbrooke Sand, and the Hindmarsh Clay, which are relatively uniform in lithology throughout the study area.

Description of Stratigraphic Units

1. Pre-Tertiary Bedrock

Three types of "bedrock" occur below Tertiary sediments in the study area. These are:

(a) weathered shales, which underlie most of the coal deposits. Near the "bedrock" surface the shales are stiff, white grading downwards to a bluish grey colour. Fresh "bedrock" intersected in boreholes V-50, V-117, and V-122 is comprised of micaceous, pyritic, siliceous hard shales.

(b) quartzite, hard, white to pale yellow, commonly subcropping in the northern part of the Wakefield and Clinton coal deposits. They may be equivalents of Adelaidean quartzites of the Wilpena Group that extensively outcrop in the Nantawarra Highlands Block immediately north of the Wakefield and Clinton coal deposits.

(c) dolomitic shales and limestones of ?Cambrian age. These subcrop and outcrop near the western edge of the Clinton Coal Deposit and are generally hard, red, and grey.

2. Clinton Coal Measures

The Clinton Coal Measures, overlying Pre-Tertiary "bedrock", contain up to 80 metres of carbonaceous sandstones, mudstones and brown coal seams. The sandstones are generally soft, medium to coarse grained and well sorted. The mudstones are micaceous, pyritic, with fine sand laminae and often grade vertically into brown coal.

The top of the Clinton Coal Measures generally is defined by the first appearance of glauconite up-section (Cooper, 1977a), although in areas marginal to the northern part of the basin the overlying rock unit is a non-glauconitic, non-carbonaceous sandstone of uncertain age. The top of the Clinton Coal Measures in these areas is picked at the topmost occurrence of carbonaceous material. In some areas, the top of the coal measures is picked at a coal seam or carbonaceous mudstone band that causes a large peak on the gamma log.

3. Rogue Formation

The name Rogue Formation was originally applied by Stuart (1970) to a succession of glauconitic sands, siliceous sandstones and lesser amounts of limestone and mudstone that crops out on the eastern side of Yorke Peninsula. Sediments overlying the Clinton Coal Measures in the Wakefield coal deposit area have been shown (Cooper, 1977a) to closely resemble the Rogue Formation as defined by Stuart (1970).

In the southern part of the Wakefield coal deposit the Rogue Formation is divisible into two units. The lower, Unit I, consists of grey, black, and green, soft, glauconitic, carbonaceous and pyritic sandstones and lesser mudstones that are often ferruginous near the top. The upper, Unit II, consists of interbedded green, soft, glauconitic fine grained silty and clayey sandstones and dark green to black, hard cherts. The cherts often contain moulds of high spired gastropods and abundant sponge spicules (Meyer, 1976). A thin (up to 0.5 m) band of bright green, very glauconitic, soft sandstone originally mapped by Steel (1961) as the Port Julia Greensand Member occurs within Unit II of the Rogue Formation.

The two units of the Rogue Formation can be differentiated by Gamma and Neutron logs. Unit II is more hydrogen-rich due to the greater abundance of mudstones, glauconite and finer sandstones, and therefore registers a lower neutron count (Fig. 2) and a higher gamma count than does Unit I. A sharp decrease in neutron counts at the base of Unit II can be correlated across most of the area but not near the northern margin thereof.

Toward the northern part of the coal deposits, sandstones of Unit I become less glauconitic and carbonaceous and grade into pale brown and yellow sandstones. Unit II also becomes less glauconitic, and chert bands are absent in the north. Unit II grades northward into brown and yellow clayey fine grained sandstones that appear to interfinger with the less clayey sandstones of Unit I.

In the southern part of the area the top of the Rogue Formation is picked at the topmost occurrence of chert within the sequence. In the north this criterion is difficult to apply and the formation top has been chosen at the top of sandstones that are markedly more clayey than those overlying.

4. Port Willunga Formation

The Port Willunga Formation in the southern part of the coal deposits area can be divided into two lithological units. The lower, Unit I, consists of brown, yellow, and green, soft, fine to medium grained calcareous, glauconitic sandstones and siltstones and thin interbeds of dark grey siliceous dolomite. The top of Unit I is picked at the topmost dolomite occurrence. The overlying Unit II consists of yellow and green soft, calcareous, glauconitic very fine grained sandstones and mudstones with minor interbedded thin, yellow, soft bryozoal limestone bands. Unit II contains generally finer-grained sandstones and a higher proportion of mudstones than Unit I.

The Port Willunga Formation is differentiated from formations above and below by the presence of calcareous sediments and carbonate interbeds. These limestone and dolomite beds thin and become absent toward the northern part of the coal deposits, where the clastic sediments are non-calcareous and non-glauconitic and it is difficult to differentiate this formation within the rock sequence.

5. Carisbrooke Sand

The Carisbrooke Sand is a widespread sequence of pale brown and yellow, unfossiliferous, soft, poorly sorted sandstones and conglomerates. They show lower gamma and higher neutron log signatures than the enclosing rocks.

6. Hindmarsh Clay

The Hindmarsh Clay consists of red, grey, mottled, moderately hard sandy and silty clays with lesser interbeds of red, grey, fine to coarse, soft sands. This formation was encountered in all bores drilled in the area.

GEOLOGICAL STRUCTURE

The main structural features of the Tertiary sedimentary basin are shown on the "bedrock" structure-contour plan (Fig. 3).

The Clinton Trough is a north-south half-graben-like structural depression, bounded by the Ardrossan Fault to the west and gradually shallowing to a "bedrock high" in the east. The "bedrock" between this "high" and the Whitwarta Fault shallows northward and crops out about the Nantawarra Highlands Block. A local "bedrock trough" (Bowmans Trough) forms an arcuate depression roughly normal to the Clinton Trough axis. To the east of the Whitwarta Fault "bedrock" is generally flat to undulating at depths suggesting that the Whitwarta Fault is a scissors fault exhibiting movements east-side-down in the north and west-side-down in the south.

COAL GEOLOGY

Ash-density relationships

Coal intersections were determined from geophysical logs by correlation with cored holes where core was analysed for moisture, volatile matter and ash content. Core from six selected holes was examined to determine relationships between analysed ash content and the long-spaced density log reading in counts per second.

Because two different density probes were used in the logging programme, two such ash-density plots were drawn (Figs 4 and 5). For coal, defined here as containing less than 45% ash (on a dry-coal basis), the density-log counts per second were determined to be:

for holes V-180, 201, 227 - 183 cps

and for holes V-243, 255, 258 - 298 cps

Using these "cut-off" values, the depths and thicknesses of coal were determined for all drill holes wherein density logs were run. These determinations are listed in Appendix C, together with all coal intersections in holes drilled previous to the 1977/78 programme.

Coal intersections in each drill hole were summed to construct total-coal isopachs (Fig. 6).

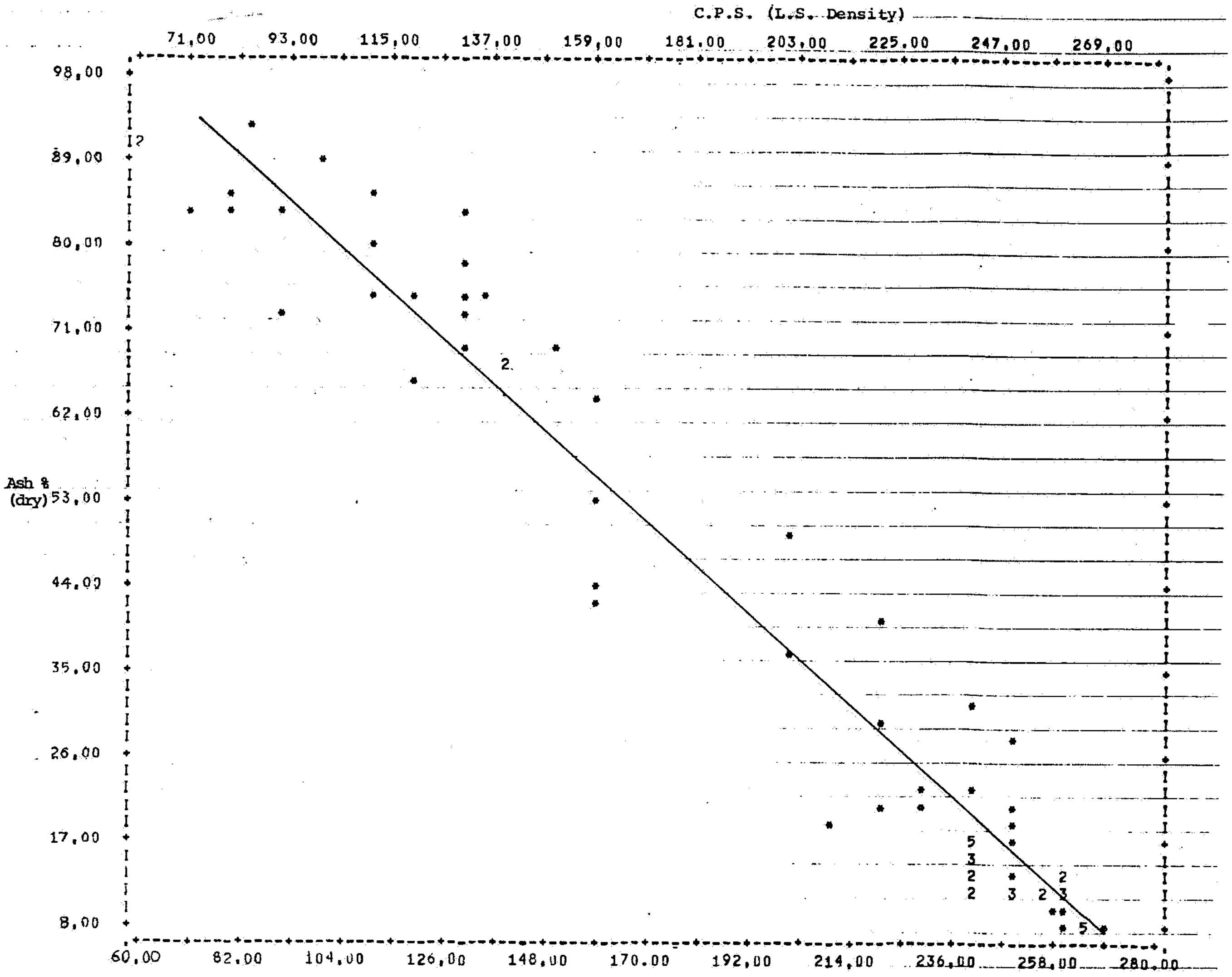
A total-coal strip ratio map (Fig. 7) was drawn using the following formula:

strip ratio $(m^3.t^{-1})$

$$= \frac{\text{depth to base of lowest seam(m)} - \text{cumulative seam thickness(m)}}{\text{cumulative seam thickness (m)} \times \text{S.G. } (gm\ .cm^{-3})}$$

where S.G. was determined using an ash-S.G. plot (Fig. 8) and the average ash content of each coal deposit (Table 4).

Fig. 4 Ash - Counts per Second Plot (V-180, V-201, V-227)



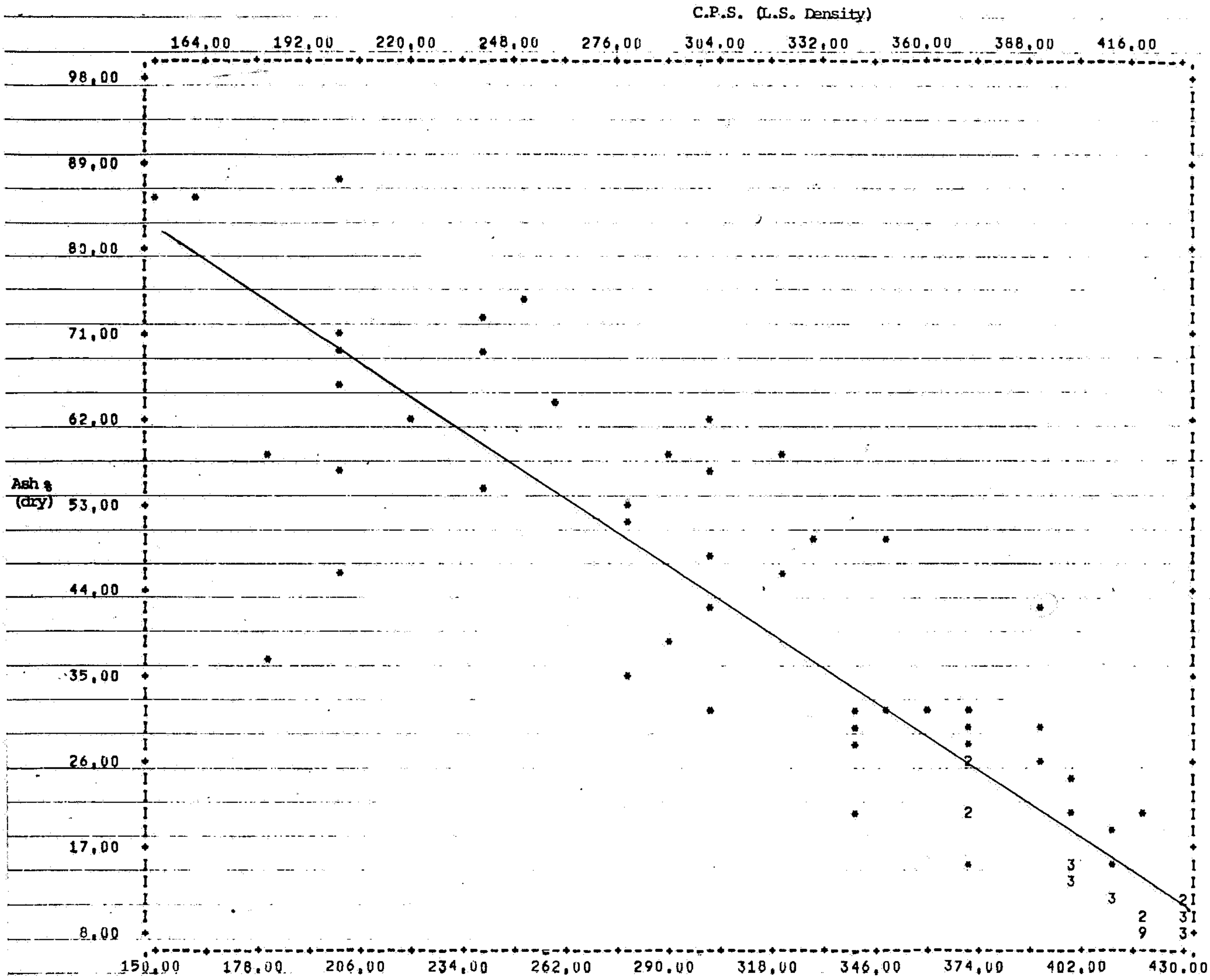
STATISTICS..

CORRELATION (B)-	-,97694	R SQUARED -	,95442	SIGNIFICANCE R -	,00001
STD ERR OF EST -	6,45536	INTERCEPT (A) -	125,76951	STD ERROR OF A -	2,37669
SIGNIFICANCE A -	,00001	SLOPE (B) -	-,44007	STD ERROR OF B -	,01141
SIGNIFICANCE B -	,00001				
PLOTTED VALUES -	73	EXCLUDED VALUES-	0	MISSING VALUES -	0

FIG. 4

ORIGINAL PLAN	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE —
COMPILED G. Meyer	WAKEFIELD COALFIELDS ST VINCENT BASIN	DATE 15-11-79
DRN N.S. | CKD		PLAN NUMBER
1726 MC 7 2 82	ASH - C.P.S. (V-180, V-201, V-227)	S 14453

Fig. 5 Ash - Counts Per Second Plot (V-243, V-255, V-258)



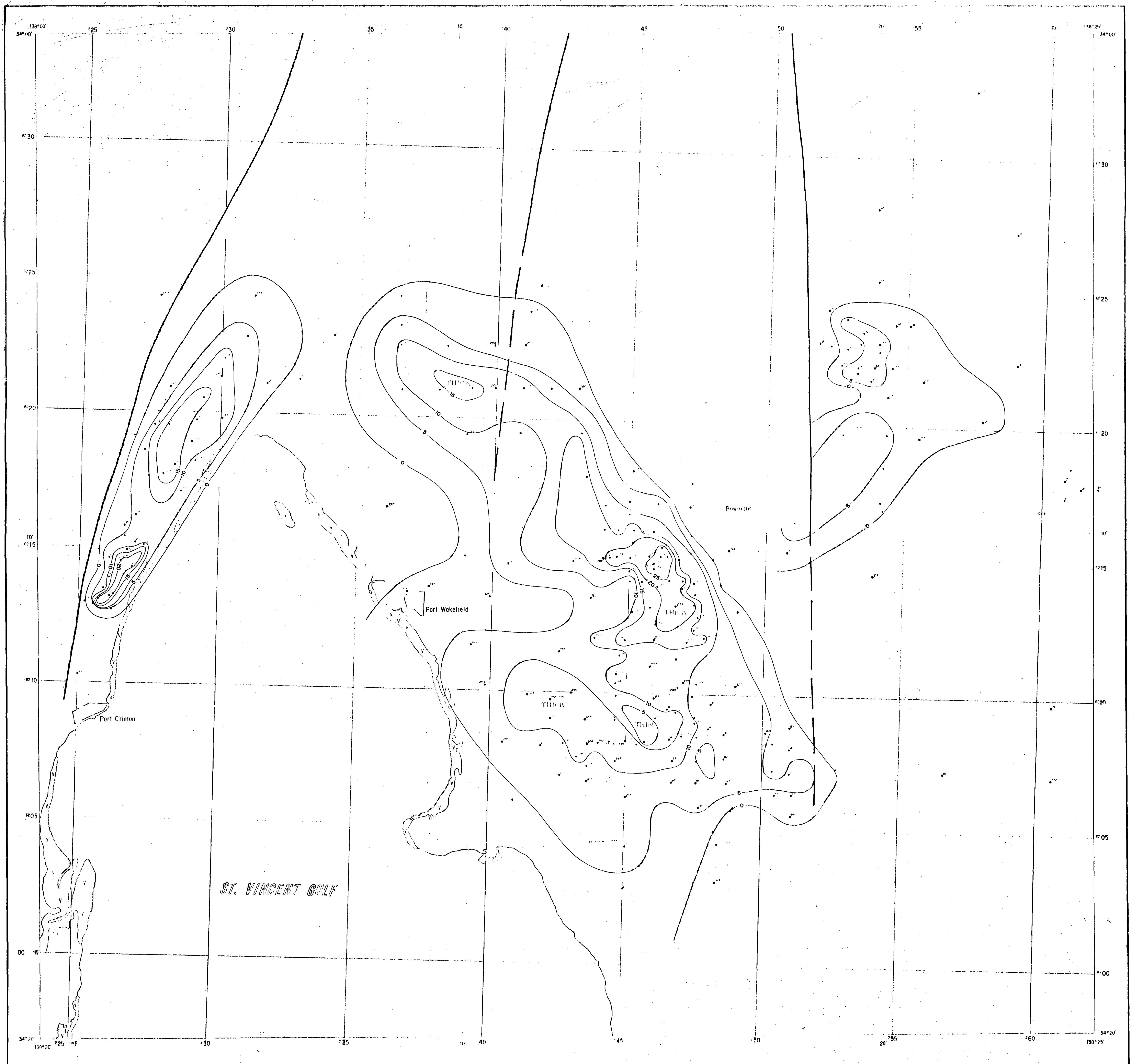
STATISTICS..

CORRELATION (R)-	-.91114	R SQUARED -	.83017	SIGNIFICANCE R -	.00001
STD ERR OF EST -	9.50187	INTERCEPT (A) -	120.94973	STD ERROR OF A -	4.59570
SIGNIFICANCE A -	.00001	SLOPE (B) -	-.25509	STD ERROR OF B -	.01298
SIGNIFICANCE B -	.00001				
PLOTTED VALUES -	81	EXCLUDED VALUES-	0	MISSING VALUES -	0

FIG. 5

ORIGINAL PLAN	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE —
COMPILED G. Meyer	WAKEFIELD COALFIELDS ST VINCENT BASIN	DATE 15-11-79
DRN N.S. / CKD		PLAN NUMBER
WR 7·2·92	ASH - C.P.S. (V-243, V-255, V-258)	S 14454

1726



REFERENCE

BOREHOLE AND NUMBER

FAULT

TOTAL COAL ISOPACH (interval 5 metres) —10—

Borehole location data supplied by E T S A

SCALE - 1 50000

0 2 4 6 KILOMETRES

FIG. 6

DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA

NORTHERN ST VINCENT BASIN COAL DEPOSITS

TOTAL COAL ISOPACH

ORIGINAL	COMPILED C.G.G.	DRN N.R.S.	SCALE 1:50000	PLAN NUMBER
	7.2.92	CKD	DATE 11-2-80	79-426

REFERENCE

BORFHOLE AND NUMBER

FAULT

STRIP RATIO CONTOUR (interval 5 cubic metres/tonne)

SCALE - 1:50000

KILOMETRES 2 1 0 2 4 6 KILOMETRES

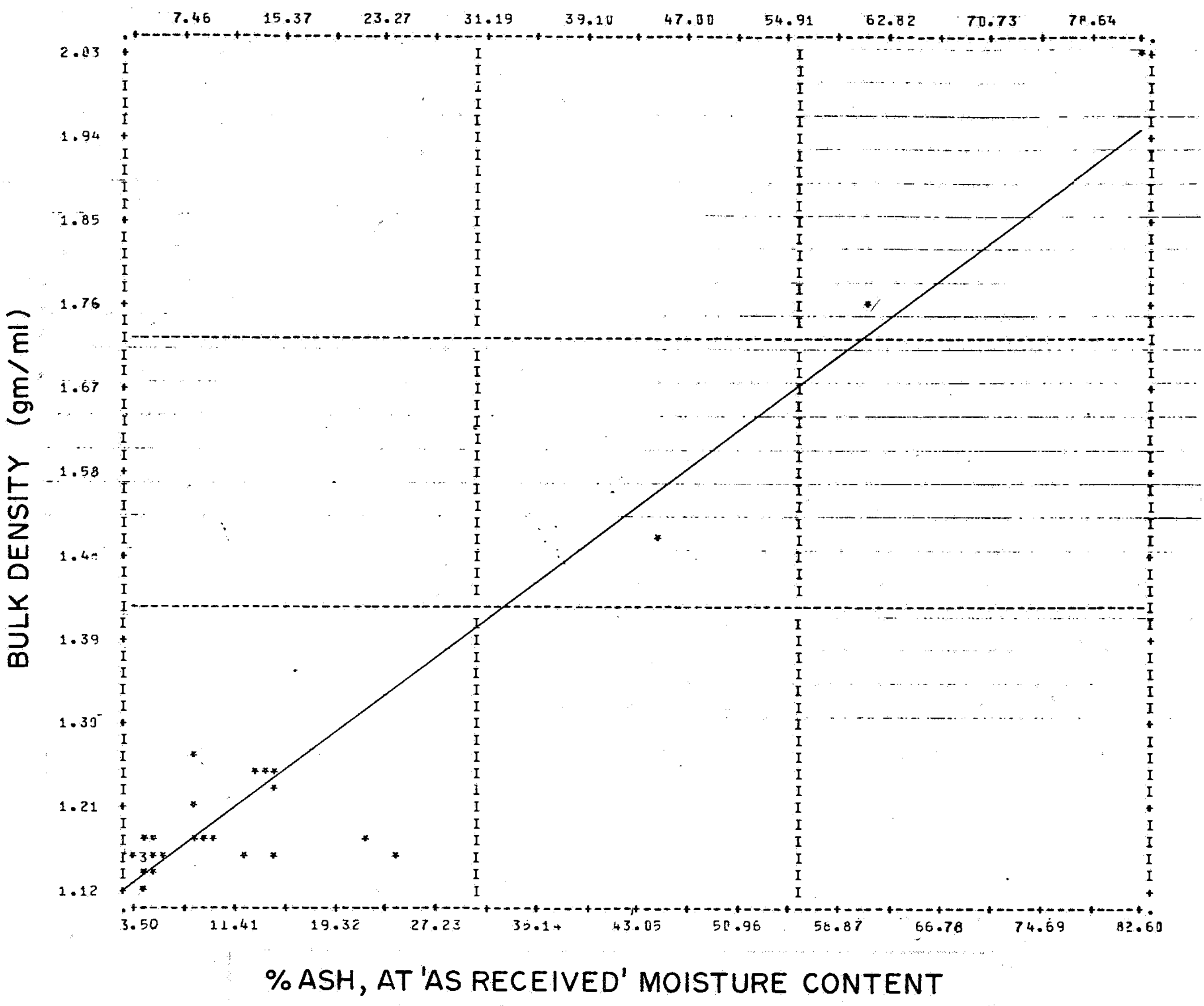
FIG. 7

DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA

NORTHERN ST VINCENT BASIN COAL DEPOSITS

TOTAL COAL STRIP RATIO

ORIGINAL | C.G.G. | N.P.S. | 1:50000 | 11-2-80 | 79-428



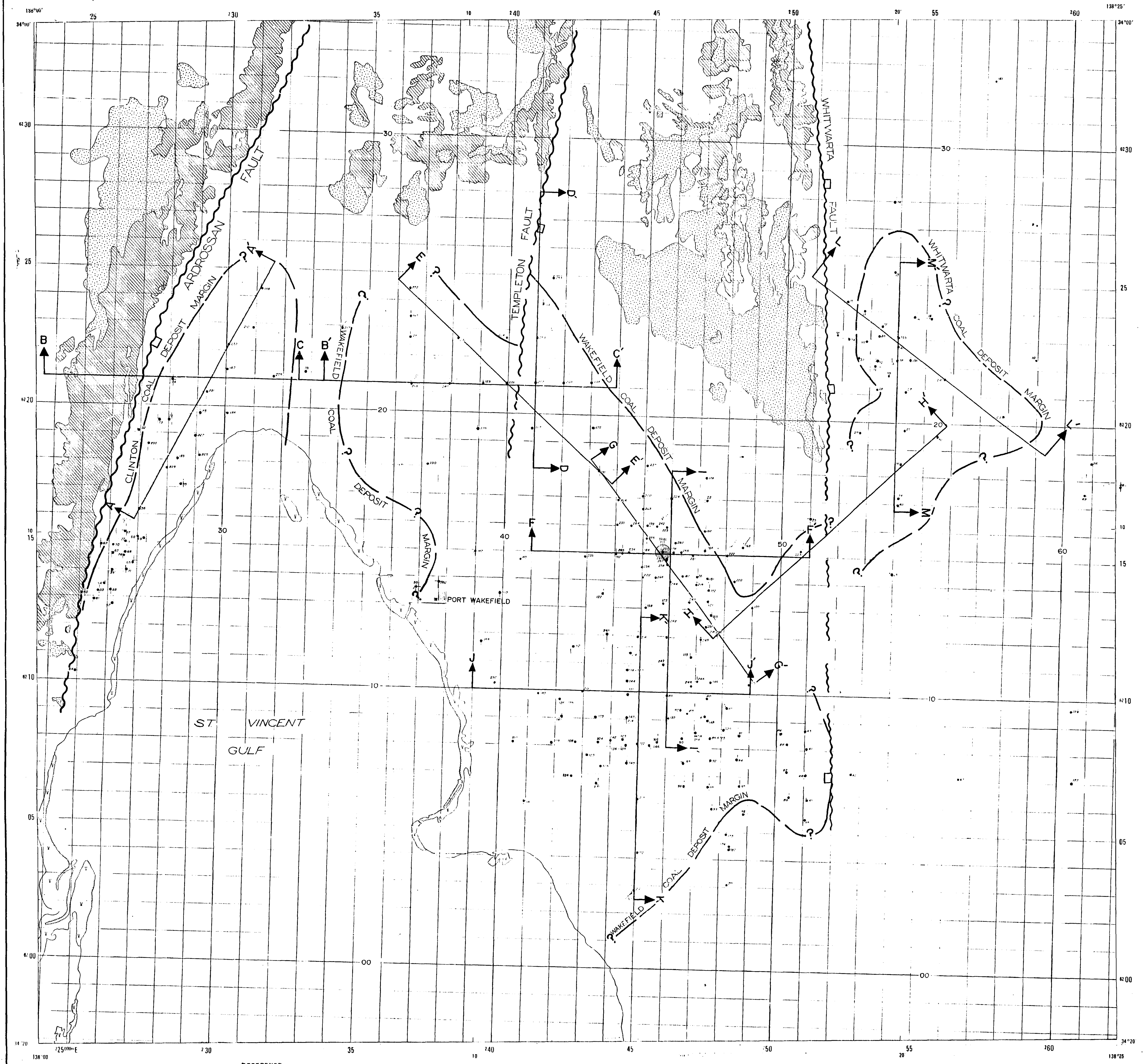
STATISTICS..

CORRELATION (R) -	.95693	R SQUARED -	.91572	SIGNIFICANCE R -	.00001
STD ERR OF EST -	.06007	INTERCEPT (A) -	1.09499	STD ERROR OF A -	.01496
SIGNIFICANCE A -	.00001	SLOPE (B) -	.01034	STD ERROR OF B -	.00063
SIGNIFICANCE B -	.00001				
PLOTTED VALUES -	27	EXCLUDED VALUES -	0	MISSING VALUES -	0

FIG. 8

ORIGINAL PLAN	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE —
COMPILED G. Meyer	WAKEFIELD COALFIELDS ST VINCENT BASIN	DATE 15-11-79
DRN N S. CKD		PLAN NUMBER
WC 7·2·92	% ASH (AS RECEIVED) - BULK DENSITY PLOT	S14455

1726



REFERENCE

TERTIARY OUTCROP

PRE-TERTIARY OUTCROP

BORE HOLE AND NUMBER

FAULT — DOWN

SECTION — A

SCALE - 1 : 50 000

KILOMETRES 2 1 0 2 4 6 KILOMETRES

FIG. 9

DEPARTMENT OF MINES-SOUTH AUSTRALIA				
NORTHERN ST. VINCENT BASIN COAL DEPOSITS SECTION LOCATIONS				
ORIGINAL	COMPILED G Meyer	DRN WM	SCALE 1 50000	PLAN NUMBER
DIRECTOR OF MINES	7 · 2 · 82	CKD	DATE 14-11-79	79-795

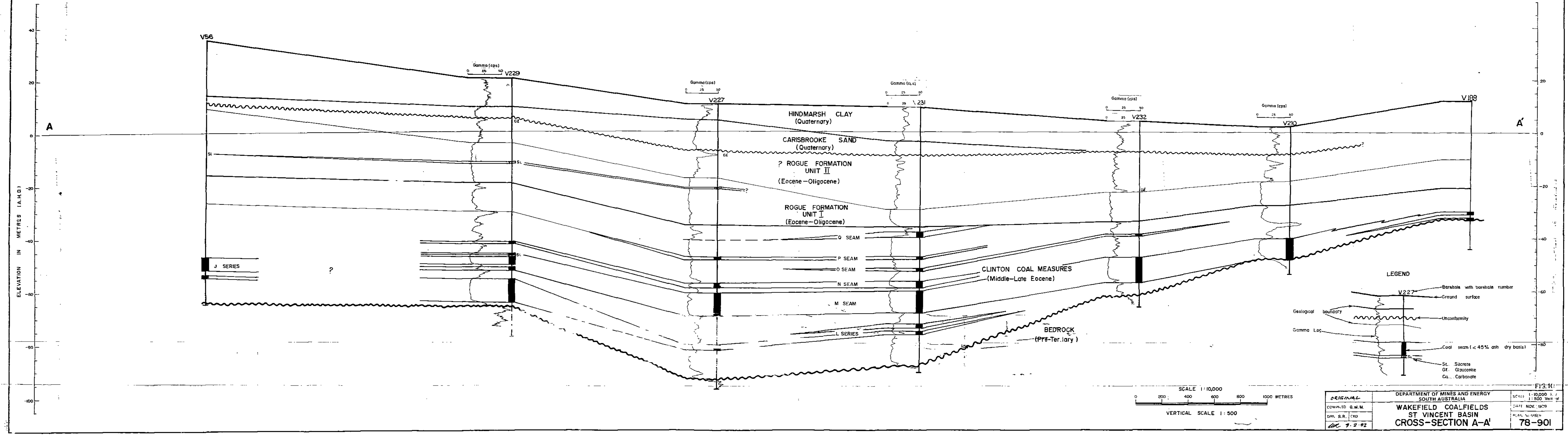


FIG.10

ORIGINAL	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE 1:10,000 Hor 1:500 Vertical
COMPILED G.M.M.	WAKEFIELD COALFIELDS ST VINCENT BASIN CROSS-SECTION A-A'	DATE NOV. 1979
DRN. S.R. CKD		PLAN NUMBER 78-901
9.2.92		

FIG. 11

ORIGINAL	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE 1:10,000 Hor. 1:500 Vert.
COMPILED G.M.M.	WAKEFIELD COALFIELDS ST VINCENT BASIN CROSS-SECTION B-B'	DATE NOV 1979
DRN S.R. CKD		PLAN NUMBER 78-902
7·2·52		

FIG 12

ORIGINAL	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	10,000 Hor 500 Vertical
G.M.M	WAKEFIELD COALFIELDS	NOV 1979
S.R.	ST VINCENT BASIN	
7·2·92	CROSS–SECTION C–C'	78–903

FIG. 13

ORIGINAL	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE 1:10,000 Hor 1:500 Vertical
COMPILED G.M.H.	WAKEFIELD COALFIELDS	DATE NOV 1979
DRN S.R.	ST VINCENT BASIN	PLAN NUMBER
7.2.12	CROSS-SECTION D–D'	78–904

FIG. 14

ORIGINAL	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE 1 : 10,000 Hor. 1 : 500 Vertical
COMPILED G.M.M.	WAKEFIELD COALFIELDS	DATE NOV 1979
DRN S.R. | CKD	ST VINCENT BASIN	PLAN NUMBER
WR 7 · 2 · 92	CROSS-SECTION E–E'	78-905

F
F'
V165
V235
V192
V265
V234
V184
V257
V176
V259
V221
V166
V222
V168
V223
Gamma (cps)
0 25 50
HINDMARSH CLAY
(Quaternary)
ROGUE FM. UNIT II
(Eocene-Oligocene)
ROGUE FM. UNIT I
(Eocene-Oligocene)
CLINTON COAL MEASURES
(Middle-Late Eocene)
? CARISBROOKE SAND
(Quaternary)
PT WILLUNGA FM
(Miocene)
UN-NAMED SANDSTONE
(? Tertiary)
C SERIES
B SERIES
A SERIES
BEDROCK
(Pre-Tertiary)
ELEVATION IN METRES (AHD)
40
20
0
-20
-40
-60
-80
-100
LEGEND
V227 Borehole with borehole number
Ground surface
Geological boundary
Unconformity
Gamma Log
Coal seam (< 45% ash dry basis)
Si Silcrete
Gl Glauconite
Ca Carbonate
SCALE 1:10,000
0 200 400 600 800 1000 METRES
VERTICAL SCALE 1:500
ORIGINAL
DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA
1:10,000 Hor
1:500 Vertical
G.M.M.
NOV 1979
WAKEFIELD COALFIELDS
ST VINCENT BASIN
CROSS-SECTION F-F'
FIG. 15
78-906
7-2-92

FIG. 16

ORIGINAL	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE 1:10,000 Hor 1:500 Vertical
G.M.M.	WAKEFIELD COALFIELDS ST VINCENT BASIN CROSS-SECTION G-G'	DATE NOV 1979
S.R.		PLAN NUMBER 78-907
7·2·92		

ORIGINAL
G.M.M.
S.R.
7.2.92

WAKEFIELD COALFIELDS
ST VINCENT BASIN
CROSS-SECTION H-H'

FIG. 17
NOV. 1979
79-393

FIG. 18

ORIGINAL	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	1:10,000 Hor 1:500 Vertical
G M M	WAKEFIELD COALFIELDS	NOV 1979
N S	ST VINCENT BASIN	
7·2·82	CROSS-SECTION I-I'	78-909

FIG. 19

ORIGINAL	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE 1:10,000 Hor 1:500 Vertical
COMPILED GMM	WAKEFIELD COALFIELDS ST VINCENT BASIN CROSS-SECTION J-J'	DATE NOV. 1979
DRN SR / CKD		PLAN NUMBER 78-910
7·2·92		

FIG. 20

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

WAKEFIELD COALFIELDS
ST VINCENT BASIN
CROSS-SECTION K-K'

SCALE 1:10,000 Hor. 1:500 Vertical
DATE NOV 1979
78-911

FIG. 21

ORIGINAL	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE 1:10,000 Hor 1:500 Vertical
COMPILED GMM	WAKEFIELD COALFIELDS	DATE NOV 1979
DRN SR CKD	ST VINCENT BASIN	PLAN NUMBER
ac 7·2·92	CROSS-SECTION L-L'	78-912

FIG. 22

ORIGINAL	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE 1:10,000 Hor. 1:500 Vertical
COMPILED GMM	WAKEFIELD COALFIELDS ST VINCENT BASIN CROSS-SECTION M-M'	DATE NOV 1979
DRN. SR		PLAN NUMBER 78-913
UC 7·2·92		

TABLE 4

COAL S.G.

Coalfield	Average ash % ("in place")	S.G. ($gms.cm^{-3}$)
Wakefield	6.2	1.16
Clinton	7.9	1.18
Whitwarta	10.2	1.20

Correlations

All coal seams of interest were correlated using gamma logs, as shown in Figures 9 to 22.

Seams in the southern part of the Clinton coal deposit, drilled previous to this programme, could not be correlated reliably with seams in the northern part. In the southern part, symbols J and K were used to designate the "lower" and "upper series" of Johnson (1964). In the northern part, six separate seams are recognised, designated L, M, N, O, P, and Q from oldest to youngest (Figs 10 and 11).

In the Wakefield coal deposit, three series of seams are recognised, designated A, B and C from oldest to youngest (Figs 12 to 20).

In the Whitwarta coal deposit only one seam, designated S, is recognised (Figs 21 and 22).

Tentative correlations between these coal deposits, based on matching gamma-log shapes, are shown in Table 5.

TABLE 5

TENTATIVE CORRELATIONS OF SEAMS

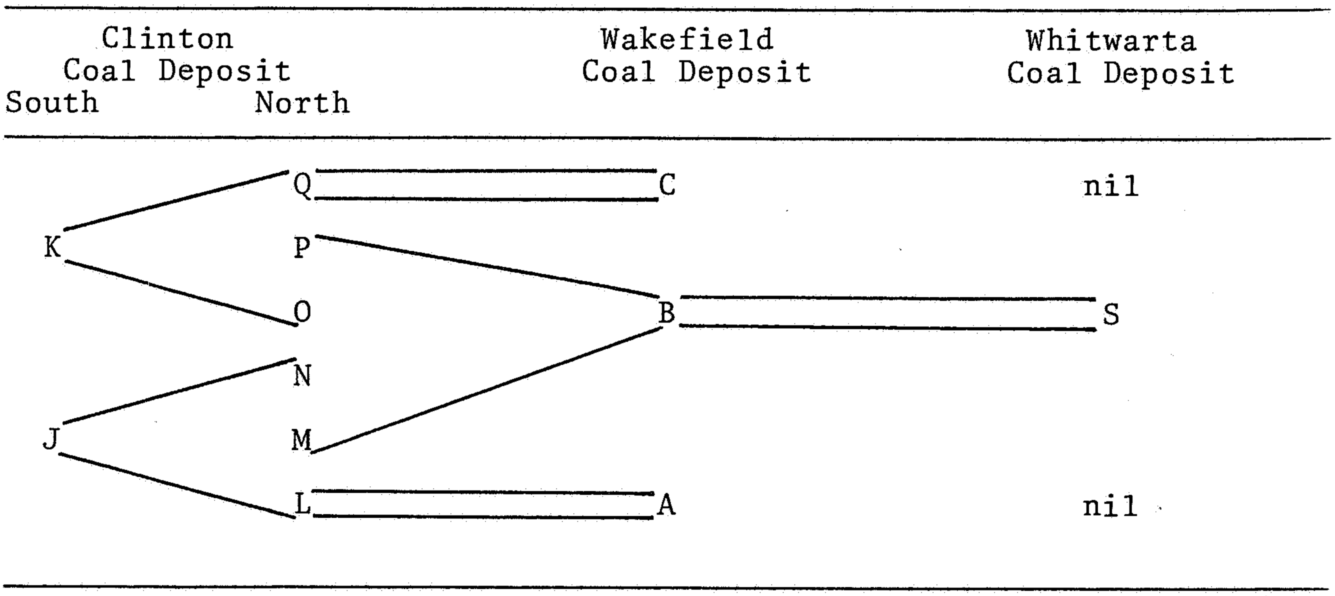


Figure 17 shows possible continuity of seams between the Wakefield and Whitwarta coal deposits.

CONCLUSIONS

The 1977/78 drilling programme has significantly increased the size of the Clinton and Wakefield coal deposits relative to that assessed by Meyer (1976). The "economic margins" of coal accumulation have been defined on the north of the Clinton and Wakefield coal deposits and on the south of the Wakefield coal deposit.

Two holes (V-177 and V-179) were drilled approximately nine kilometres east of the Wakefield Coal Deposit to test for economic accumulations of coal in a formerly undrilled area. No coal seams were intersected in either hole.

The thickest cumulative intersection of coal (27.6 metres) was in drillhole V-258 located in the Bowmans Trough. Depth to the top of the main coal seam in that area (series B) is 63 metres.

Five areas with total-coal strip ratio of less than 5 $m^3.t^{-1}$ were recognised (Fig. 7):

(1) Bowmans Trough and areas southwest of the trough;

(2) south of the Bowmans Trough;

(3) southern part of the Clinton Coal Deposit;

(4) northern part of the Clinton Coal Deposit;

(5) central part of the Whitwarta Coal Deposit.

The highest strip ratio was 2.5 $m^3.t^{-1}$, calculated from drillhole V-267 located in the Bowmans Trough.

RECOMMENDATIONS

Further drilling is recommended in the following four areas (Figure 6):

(1) Area A. Northwestern part of the Bowmans Trough where drilling has not defined an economic limit;

(2) Area B. Southwestern end of the Bowmans Trough where drilling has not defined an economic limit;

(3) Area C. East of the Bowmans Trough between the Wakefield and Whitwarta coal deposits;

(4) Area D. West of the Whitwarta Coal Deposit where an economic limit is not defined.

GMM:ZV

G.M. MEYER

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APPENDIX A

TABLE A-1. LOCATIONS AND ELEVATIONS OF PRE - 1977 DRILLHOLES

HOLE NO.		LOCATION					ELEV
NEW	OLD	AMG ZONE 54 (a)		HUNDRED	SEC.	NO.	GROUND (datum)
		EASTING	NORTHING				
V1	BOUCAUT 1	NA.	NA.	BOUCAUT	417	(1)	? 90
V2	" 2	"	"	"	201	(1)	?107
V3	" 3	"	"	"	117	(1)	? 98
V4	" 4	"	"	"	69	(1)	No.4
V5	BARINGA 1	"	"	BARINGA	117	(1)	"
V6	" 2	"	"	"	TOWNSHIP	(1)	"
V7	" 3	"	"	"	166	(1)	"
V8	" 4	"	"	"	680	(1)	"
V9	un-named	258900	6227300	STOW	125	(1)	76
V10	"	259000	6227400	"	192	(3)	58
V11	Whitwarta 1	253200	6222000	"	27	(1)	40
V12	" 2	253400	6223500	"	15	(1)	46
V13	" 3	253900	6225400	"	13	(1)	49
V14	" 4	253800	6228100	"	52	(1)	46
V15	" 5	252100	6224300	"	10	(1)	41
V16	" 6	254600	6223800	"	2146	(1)	49
V17	" 7	252800	6224000	"	14	(1)	47
V18	" 8	255100	6223800	"	258	(1)	46
V19	" 9	254100	6217200	BALAKLAVA	166	(1)	41
V20	" 10	257800	6220300	"	293	(1)	56
V21	" 11	254300	6219700	"	315	(1)	46
V22	" 12	247200	6216900	INKERMAN	426	(1)	29
V23	" 13	253900	6214500	BALAKLAVA	519	(1)	46
V24	" 14	255600	6221700	"	270	(1)	46
V25	" 15	251000	6216400	"	395	(1)	35
V26	" 16	261000	6218600	"	217	(1)	66
V27	" 17	254300	6221100	"	306	(1)	44
V28	" 18	253300	6221200	"	304	(1)	44
V29	" 19	252700	6219700	"	28	(2)	43
V30	" 20	255500	6219600	"	317	(1)	49
V31	" 21	254200	6218500	"	335	(1)	44
V32	" 22	253200	6222200	STOW	27	(2)	44
V33	" 23	252700	6222900	STOW	20	(1)	44
V34	" 24	252200	6223000	"	21	(1)	44
V35	" 25	251800	6223100	"	21	(2)	46
V36	" 26	253300	6223100	"	26	(1)	46
V37	" 27	252600	6222300	"	27	(3)	44
V38	" 28	253800	6222200	BALAKLAVA	2150	(1)	46
V39	" 29	253700	6221700	"	286	(1)	40
V40	" 30	254000	6222800	"	2148	(1)	46
V41	BALAKLAVA 1	251000	6208000	"	81	(1)	29
V42	" 2	252700	6207300	"	81	(2)	29
V43	" 3	251000	6208300	"	81	(3)	25
V44	" 4	251000	6207100	"	82	(4)	22

V45	BALAKLAVA	5	251100	6206300	BALAKLAVA	83	(1)	21
V46	"	6	251100	6205500	"	94	(1)	30
V47	"	7	256600	6207200	"	87	(1)	46
V48	un-named		262000	6217900	"	104	(1)	69
V49	"		260800	6217500	"	473	(1)	64
V50	Wakefield Pty Yard		236900	6213600	INKERMAN	431	(1)	4
V51	un-named		254200	6216900	BALAKLAVA	411	(3)	41
V52	"		226900	6219100	CLINTON	324	(1)	49
V53	Clinton	1	225700	6213100	"	352	(1)	32
V54	"	2	225900	6213500	"	347	(1)	29
V55	"	3	228600	6217100	"	49	(1)	4
V56	"	4	227000	6216200	"	337	(1)	35
V57	"	5	226200	6212700	"	45	(1)	5
V58	"	6	226100	6213200	"	45	(2)	18
V59	"	7	226100	6213900	"	347	(2)	30
V60	"	8	225200	6213000	"	351	(2)	54
V61	"	9	225500	6212900	"	351	(1)	37
V62	"	10	225700	6214900	"	346	(3)	49
V63	"	11	226100	6214600	"	346	(2)	39
V64	"	12	225000	6210300	"	41	(1)	19
V65	"	13	226900	6214300	"	47	(1)	10
V66	"	14	226600	6214600	"	346	(1)	28
V67	"	15	226600	6215400	"	340	(1)	32
V68	"	16	227000	6215200	"	339	(1)	25
V69	"	17	227300	6215100	"	47	(2)	5
V70	"	18	226700	6214900	"	339	(2)	29
V71	"	19	226600	6214000	"	46	(1)	23
V72	"	20	228100	6219500	"	310	(1)	27
V73	"	21	227600	6219500	"	138	(1)	38
V74	"	22	228100	6220900	"	135	(1)	37
V75	"	23	229100	6219700	"	134	(1)	13
V76	"	24	226500	6214500	"	346	(4)	24
V77	"	Strat.	226600	6215800	"	336	(1)	37
V78	WAKEFIELD OIL SHALE CO		232800	6221300	"	161	(1)	8
V79	INKERMAN	1	247500	6209100	INKERMAN	365	(1)	15
V80	"	2	247400	6209900	"	365	(2)	16
V81	"	3	248100	6209600	"	366	(1)	16
V82	"	4	246500	6209400	"	365	(3)	17
V83	"	5	246000	6209800	"	364	(1)	16
V84	"	6	250100	6208600	"	421	(1)	22
V85	"	7	246800	5209300	"	365	(4)	17
V86	"	8	250500	6206300	"	278	(1)	22
V87	"	9	250400	6207200	"	377	(1)	23
V88	"	10	250400	6208200	"	368	(1)	22
V89	"	11	247600	6208400	"	374	(1)	18
V90	"	12	246600	6208300	"	374	(2)	15
V91	"	13	246600	6208300	"	369	(1)	21
V92	"	14	247600	6207500	"	375	(1)	18
V93	"	15	246700	6207500	"	375	(2)	16
V94	"	16	248600	6207600	"	376	(1)	18
V95	"	17	247600	6206700	"	375	(3)	11
V96	"	18	246700	6206700	"	380	(1)	17
V97	"	19	248700	6206700	"	379	(1)	17
V98	"	20	248900	6205700	"	379	(2)	16
V99	"	21	247700	6205700	"	380	(2)	18

V100	INKERMAN	22	248000	6208700	INKERMAN	366	(2)	19
V101	"	23	245700	6208200	"	371	(1)	15
V102	"	24	245000	6208200	"	371	(2)	10
V103	"	25	244400	6208200	"	323	(1)	11
V104	"	26	243600	6208100	"	323	(2)	10
V105	"	26B	243500	6209100	"	411	(2)	5
V106	"	26C	243600	6207300	"	322	(1)	3
V107	"	26D	243600	6206700	"	316	(1)	7
V108	"	27	242700	6208100	"	313	(1)	11
V109	"	28	241900	6208000	"	313	(2)	4
V110	"	30	240500	6208100	"	96	(1)	11
V111	"	31	244600	6209900	"	363	(1)	14
V112	"	32	242500	6211500	"	332	(1)	8
V113	"	33	239900	6213500	"	36	(1)	6
V114	"	34	244700	6211400	"	411	(1)	11
V115	"	35	246800	6211800	"	362	(1)	15
V116	"	36	244600	6210700	"	411	(3)	13
V117	"	36A	"	"	"	363	(2)	12
V118	"	36B	"	"	"	"	(3)	"
V119	"	36C	"	"	"	"	(4)	"
V120	"	36D	"	"	"	"	(5)	"
V121	"	37	247400	6213300	"	435	(1)	25
V122	"	38	243600	6213500	"	342	(1)	12
V123	"	39	243200	6207600	"	322	(2)	5
V124	"	40A	247600	6206900	"	375	(4)	16
V125	"	40B	247600	6208400	"	374	(3)	19
V126	"	41	242200	6209700	"	324	(10)	6
V127	"	41A	"	"	"	"	(1)	6
V128	"	41B	"	"	"	"	(2)	6
V129	"	41C	"	"	"	"	(3)	6
V130	"	41D	"	"	"	"	(4)	6
V131	"	41E	"	"	"	"	(5)	6
V132	"	41F	"	"	"	"	(6)	6
V133	"	41G	"	"	"	"	(7)	6
V134	"	41H	"	"	"	"	(8)	6
V135	"	41I	"	"	"	"	(9)	6
V136	"	42A	244400	6208200	"	322	(3)	10
V137	"	42B	"	"	"	"	(4)	10
V138	"	42C	"	"	"	"	(5)	10
V139	"	42D	"	"	"	"	(6)	10
V140	SHELL RD HOUSE		237700	6213800	"	2128	(1)	5
V141	B/H	1	242235	6209000				8
V142	"	2	244000	6208147	"			10
V143	"	4	244574	6209000	"			12
V144	"	5	244564	6210353	"			14
V145	"	6	244624	6207848	"			10
V146	"	7	245425	6208099				16
V147	"	8	247042	6208458				16
V148	"	9	247508	6208944				18
V149	"	10	245732	6210380				16
V150	"	11	247402	6212395				19
V151	"	12	247383	6214093				25
V152	"	13	247435	6213686				26
V153	"	14	247539	6212936				21
V154	"	15	247031	6208547				16
V155	W1	-	253976	6223128				45
V156	W2		254472	6222250				45
V157	BL	1	249651	6263267				99
V158	"	2	249584	6268404				105
V159	"	3	252335	6257610				87

V160	BL	4	253209	6247065				73
V161	"	5	257332	6232539				60
V162	"	6	252405	6263505				112
V163	"	7	247218	6262992				94
V164	ENGINEER IN CHIEF'S BORE		N.A.	N.A.	DUBLIN	97	(1)	N.A.

APPENDIX B

TABLE B-1 BEDROCK DEPTHS

Hole No.	Lithology	Depth (m) Subsurface	Sub-A.H.D.
1		> 73.1	> 16.9
2		> 68.9	> 38.1
3		> 91.4	> 6.6
4	Slaty sandstone	68.3	(?)
5	(?) hard rock	50.0	(?)
6		> 91.1	(?)
7		> 45.7	(?)
8		> 82.3	(?)
9	(?) White pipe clay	(?) 76.2	(?) -0.2
10	(?) pale grey clay	(?) 56.4 (to 72.2)	(?) 1.6
11		> 58.5	-18.5
12	Purple, grey, pink shales	88.4	-42.4
13		> 64.6	> -15.6
14	(?)	(?)	(?)
15	Grey Quartzite	44.5	- 3.5
16	(?) ("sampled")	(?) > 42.4	(?) > 6.6
17		> 40.5	> 6.5
18	(?) white & brown sand	(?) > 45.3	(?) > 0.7
19		> 50.3	> 9.3
20		> 43.0	> 13.0
21		> 44.8	> 1.2
22	(?) (Sand & Quartzite frags)	> 65.8	> (?) > -36.6
23	(?) (light grey sandstone)	(?) > 31.4	(?) > 14.6
24		> 49.1	> - 3.1
25		> 37.2	> - 2.2
26		> 47.9	> 18.1
27		> 49.4	> - 5.4
28	Quartzite	41.0	3.0
29		> 54.9	> -11.9
30		> 42.2	> - 6.8
31		> 49.4	> - 5.4
32		> 45.7	> - 1.7
33		> 54.0	> -10.0
34		> 33.5	> 10.5
35		> 34.1	> 11.9
36		> 50.3	> - 4.3
37		> 40.5	> 3.5
38		> 50.0	> - 4.0
39		> 50.6	> -10.6
40		> 53.3	> - 7.3
41	White Clay	97.8	-72.9
42	Quartzite	56.5	-27.1
43	White Clay	85.0	-61.3
44	White Clay	93.6	-71.6
45	White Clay	95.7	-74.2
46	White Clay	93.9	-63.6
47		83.8	-37.8
48	green, blue shales & slates	86.6	-17.6

49	Quartz, & grey slate	68.6	- 4.6
50	blue slate	92.1	-88.1
51	(?)	(?)	(?)
52	(?)	(?)	(?)
53	reddish sandstone	104.6	-72.6
54		> 86.6	>-57.6
55	green, grey slate	102.7	-98.7
56	grey dolomitic limestone	99.1	-64.1
57		> 120.7	> - 115.7
58	hard rock	146.0	-128.0
59	hard rock	125.9	- 95.9
60	purple slate	21.3	32.7
61	bluish-green clay	60.4	- 23.4
62	white to bluish green clay	< 31.4	17.6
63	Chalcedonic Quartz	83.5	- 44.5
64	(?) light buff coloured limestone	(?) 27.1	(?) - 8.1
65	dolomitic limestone	120.4	-110.4
66	(?) hard rock	(?) 120.1	(?) - 92.1
67	Q/zite/ pale grey dolomitic limestone	101.8	- 69.8
68	(?) hard country	(?) 110.3	(?) - 85.3
69		140.5	-135.5
70	light buff to white clay	94.2	- 65.2
71	(?) hard rock	(?) 139.0	(?) -116.0
72		< 91.7	- 64.7
73	(?) (grey clay)	(?) 73.8	(?) - 35.4
74	Grey shale	97.5	- 60.3
75		< 96.9	- 83.9
76	Quartzite	134.8	-111.0
77	limestone	85.0	- 48.0
78	hard blue gry sandstone	36.6	> -29.0
79	bluish grey shale	88.4	> -73.5
80	greenish blue clay	88.4	-72.5
81	white clay	89.4	-73.5
82	white to blue clay	97.5	-80.1
83	white clay	95.1	-78.9
84	(?) white clay	(?) 106.7	(?) -84.4
85	light bluff clay	89.0	-72.3
86	white clay	89.3	-67.7
87	buff coloured clay	77.7	-54.3
88	white clay	98.5	-76.5
89	white micaceous clay	105.5	-87.6
90	white clay	95.1	-80.3
91	white sandy clay merging into bedrock	97.5	-76.7
92	coarse white sand merging into bed-rock	93.3	-75.5
93	white sand merging into bedrock	84.7	-68.9
94	" " " " "	95.1	-76.9
95	" " " " "	91.6	-80.2
96	" " " " "	88.7	-71.2
97		< 100.6	< -83.5
98	white clay merging into bedrock	90.5	-74.9
99		< 93.9	< -75.7
100	greenish shale	119.8	-101.1
101	-	< 86.3	< -70.9
102	-	< 83.8	< -73.8
103	-	< 93.0	< -82.0
104	-	< 39.7	< -90.1
	-		

105	-	> 87.5	>-82.4
106	-	> 86.9	>-83.5
107	-	> 90.2	>-83.1
108	-	> 93.6	>-82.3
109	-	> 97.5	>-93.6
110	-	> 116.1	>-105.3
111	-	97.5	-83.3
112	(?) (Mid brown and greyish silty clay)	(?)89.6	(?)-81.8
113	(?) (off white to grey micaceous clay)	(?)85.7	(?)-79.6
114	-	> 96.3	> -84.9
115	(?) (grey micaceous clay)	(?)96.0	(?)-80.5
117	blue-grey, silicified, pyritic shale	88.3	-76.7
118	-	> 78.0	> -66.4
119	-	> 47.0	> -35.4
120	-	> 29.0	> -17.4
121	-	>129.3	>-104.5
122	bluish grey shale	>100.4	-88.9
123	-	>108.0	>-103.1
124	-	> 24.0	> -8.3
125	bluish grey clay	109.2	-90.5
127	quartzite	108.2	-101.8
136	-	> 86.2	> -76.2
140	-	> 54.0	> -49.0 ?
141	(?)	(?)	(?)
142	(?)	(?)	(?)
143	-	> 28.7	> -17.1
144	(?) white clay	(?)84.5	(?)-70.5
145	-	> 98.0	> -87.6
146	-	> 89.5	> -73.2
147	-	> 92.0	> -75.6
148	-	> 85.0	> -66.8
149	-	> 99.0	> -82.7
150	(?) white clay	(?)85.7	(?)-66.7
151	-	> 115	> -89.8
152	-	> 90.5	> -64.6
153	(?)	(?)	(?)
154	-	> 83	> -66.6
155	-	> 53.6	> - 9.0
156	-	> 55.6	> -11.0
157	bluish grey shales	121.9	-22.6
158	" " "	150.0	-44.7
159	" " "	125.5	-38.8
160	" " "	76.3	-3.2
161	" " "	51.7	8.4
162	" " "	119.8	- 7.0
163	" " "	101.0	-7.1
164	light bluish clay grading to calc. slate	102.1	-67
165	(?) (grey pyritic clay)	97.8	-87.3
166	quartzite	97.2	-73.9
167	(?) grey pyritic clay)	(?)80	(?)~73
168	quartzite	14.6	10.6
169	(?) (Clay)	(?)80	(?)-73
170	quartzite	~ 61	~ -37
171	(?) (white clay)	(?)108.5	(?)-86.7
172	(?) (white pyritic clay)	(?)104.0	(?)-94.5
173	white clay	83.1	-65.5
174	-	~ 40.0	~-23.6
175	-	~ 31.0	~-22.9

176	White Clay	119	- 96
177	(?) (White pyritic clay)	(?) 54.0	(?)- 3.9
178	Quartzite	35.0	- 9.1
179	(?) (White Pyritic clay)	(?) 46.1	(?)- 9.4
180	(?) light grey clay	(?) 123	(?) -103
181	(?) white clay	(?) 115.2	(?) - 95.3
182	-	> 50.0	> - 33.4
183	(?) white clay	(?) 106.8	(?) - 95.4
184	bluish grey silty clay	99.2	- 79.6
185	(?) (White clay)	(?) 102.0	(?) - 87.1
186	(?) (White grey clay)	(?) 79.8	(?) - 77.1
187	(?) White clay	(?) 72.9	(?) - 69.4
188	(?) (White grey Clay)	(?) 48.8	(?) - 36.1
189	Quartzite	96.0	- 85.3
190	(?) (White Clay)	(?) 95	(?) - 87
191	(?) (White Clay)	(?) 122	(?) -102.1
192	-	> 85.0	> - 66.3
193	(?) (white clay)	(?) 82	(?) - 77
194	(?) (white pyritic clay	(?) 62	(?) - 48
195	-	> 87.7	> - 79.6
196	Quartzite	60	- 44
197	white fine gr sandstone	52	- 27
198	(?)	(?)	(?)
199	(?) Quartzite	(?) 126	(?) -105
200	Quartzite	110	> - 88
201	Quartzite	86.7	- 75.5
202	(?) (white clay)	(?) 94	(?) - 76
203	(?) (White clay)	(?) 111.8	(?) - 96.7
204	Quartzite	38	- 26
205	Quartzite	46	- 4
206	(?) (White Clay)	(?) 68.0	(?) - 62.2
207	Quartzite	105	- 90
208	Quartzite	96	- 79
209	(?) (White & grey clay)	(?) 40.7	(?) - 38.7
210	blue-white clay	52.0	- 49.8
211	white & blue clays	96	- 83
212	(?) (white clay/gravels)	(?) 102	(?) - 97
213	blue-white clay	120.2	-110.6
214	green-white clays	91	- 78
215	bluish white clays	92.8	- 77.0
216	" " "	87.6	- 74.9
217	-	> 88.6	> - 70.4
219	-	> 120.0	> - 94.8
220	Quartzite	38.5	- 12.3
221	Quartzite	118	- 96
222	Quartzite	19.5	6.1
223	Quartzite	55.4	- 23.3
224	Quartzite	82.5	- 56.5
225	white-grey clay	101	- 78
226	Quartzite	79.5	- 58.3
227	bluish-white clay	103.0	- 92.7
228	blue clay	98	- 93
229	bluish white clay	80.2	- 68.1
230	(?) (hard bar)	(?) 72	(?) - 34
231	bluish white clay	96.9	- 87.7
232	blue white clay	66	- 62
233	Quartzite	114.0	- 95.0
234	bluish-white clays	112	- 92.5
235	-	> 84.5	>- 69.6
236	(?) (greyish sandy clay)	(?) 93	(?) - 72
237	Quartzite	78.5	- 57.2
238	Quartzite	86.0	- 66.9

239	bluish-white clay	91	- 79
240	bluish-white clay	102	- 93
241	Quartzite	71.0	- 63.0
242	bluish-white clay	115	- 92
243	" " "	127	-103
244	" " "	114	- 98
245	" " "	106	- 88
246	" " "	≥ 46.0	> - 26.6
247	" " "	94	- 78
248	" " "	98	- 82
249	' ' '	95	- 83
250	' ' '	79	- 76
251	White-grey sticky clays	87	- 82
252	Bluish-white clays	52	- 46
253	bluish/quartzite	40	- 21
254	"solid bedrock:"	77	- 63
255	bluish-white clay	111	- 91
256	bluish white clay	82.6	- 63.9
257	Quartzite	111	- 90
258	bluish grey clay & quartzite fragments	115.2	- 95.0
259	bluish white clay	112	- 91
260	bluish white clay	120	- 98
261	bluish white clay	118	- 94
262	bluish white clay	96	-80
263	bluish white clay	115	- 92
264	bluish white clay	112	- 92
265	bluish white clay	118	- 99
266	bluish white clay	95	- 75
267	blue-white clay/quartzite	106.0	- 85.5

APPENDIX C

TABLE C-1: COAL SEAM DATA

Hole No.	Seam or Series No.	Data Type *	Depth to Top of Seam (m)	Seam thick (m)	Total Coal Thick (m)	Strip Ratio (m^3-t^{-1}) **
V - 1)		CN	~73	?	?	?
2)		"	48.8	3.4	3.4	16.9
3)		"	?	?	?	?
4) (b)		"	~53	Minor	Minor	-
5)		"	?	?	?	?
6)		"	?	?	?	?
7)		"	?	?	?	?
8)		CA	~65	Minor	Minor	-
9	S	CN	?76	?Minor	?Minor	-
10	-	CA	-	0	0	-
11	S	"	38.4	7.9	7.9	5.8
12	S	"	36.3	8.1	8.1	5.4
13	?	CN	?	?	?	?
14	-	"	-	0	0	-
15	-	"	-	0	0	-
16	S	CA	38.1	1.1	1.1	41.6
17	S	"	32.6	5.2	5.2	7.5
18	S	"	39.0	1.1	1.1	42.5
19	S	"	41.5	1.6		
	"	"	45.7	1.4	3.0	12.3
20	S	"	36.7	2.7	2.7	16.3
21	S	"	36.6	0.5	0.5	
	"	"	37.5	4.7	5.2	8.7
22	-	CN	-	0	0	-
23	-	"	-	0	0	-
24	S	CA	39.5	3.2		
	"	"	44.2	1.2	4.4	11.2
25	-	"	-	?0	?0	-
26	-	CN	-	?0	?0	-
27	S	CA	39.9	3.7	3.7	12.9
28	-	CN	-	0	0	-
29	S	CA	38.9	2.0		
	"	"	42.8	3.7	5.7	8.6
30	S	"	37.4	1.8	1.8	24.9
31	S	"	39.9	1.8		
	"	"	43.0	2.0		
	"	"	45.6	0.9	4.7	10.7
32	S	"	37.6	6.9	6.9	6.5
33	S	"	35.4	3.6	3.6	11.8
34	-	CN	-	?0	?0	-
35	-	"	-	?0	?0	-
36	S	"	?41.8	?1.2		
	"	"	?43.3	?1.5		
	"	"	?45.1	?2.1	?4.8	?20.6
37	S	"	?33.5	?3.0	?3.0	?13.4
38	S	CA	40.5	7.1	7.1	6.8
39	S	"	38.4	2.3		
	"	"	44.6	3.7	6.0	5.9
40	S	CN	?42.1	?10.1	?10.1	?5.0
41		CA	65.2	1.5	1.5	50.4
42	-	CN	-	0	0	-

43	B	CA	56.1	1.1		
	"	"	66.8	0.6	1.7	44.8
44	B	"	61.6	3.4		
	"	"	89.6	1.8	5.2	19.2
45	B	"	65.8	4.6	4.6	16.6
46	B	"	85.0	0.9	0.9	109.6
47	-	"	-	0	0	-
48	-	"	-	0	0	-
49	?	"	?	?	?	?
50	-	"	?	?0	?0	?
51	?	"	?	?	?	?
52	-	"	-	0	0	-
53	J	CA	67.7	7.9		
	"	"	80.6	3.3		
	"	"	84.7	5.8		
	"	"	95.1	3.7	20.7	4.5
54	J	"	77.7	8.8	8.8	10.4
55	P	"	78.0	1.2		
	M	"	92.5	4.7		
	"	"	98.1	0.9	6.8	16.0
56	?J	"	82.0	5.0		
	""	"	88.8	1.1	6.1	16.2
57	K	"	60.4	0.9		
	"	"	65.2	1.5		
	J	"	99.1	0.9		
	"	"	100.6	7.3		
	"	EN	111.7	2.9		
	"	"	117.0	3.1		
	"	ND	?120	?4	?20	?4.4
58	K	CA	63.4	2.6		
	J	"	107.6	6.1		
	"	"	114.0	1.5		
	"	"	119.2	3.2		
	"	"	125.6	2.7		
	"	"	129.6	6.5	22.6	5.9
59	J	"	91.7	5.8		
	"	"	99.5	7.2	13.0	8.5
60	-	CN	-	0	0	-
61	?K	CA	59.1	1.2	1.2	58.1
62	-	CN	-	0	0	-
63	J	CA	58.5	4.1		
	"	"	63.1	5.1	9.2	7.6
64	-	CN	-	0	0	-
65	K	CA	56.0	3.7		
	"	"	61.6	1.7		
	J	"	92.6	8.0		
	"	"	104.1	3.5		
	"	"	109.6	3.7		
	"	"	114.8	1.4	21.9	5.1
66	"	"	91.1	7.0		
	"	"	103.6	1.8		
	"	"	110.0	1.8	10.6	11.3
67	?J	"	68.0	1.5		
	""	"	71.0	3.8	5.3	15.5
68	?J	"	93.0	1.3		
	""	"	95.5	4.5	5.8	19.2
69	K	"	62.8	1.2		
	"	"	71.6	1.5		
	J	"	107.6	3.7		
	"	"	111.6	4.6	11.0	11.3
70	J	"	71.3	1.2		

	J	CA	74.7	2.4		
	"	"	81.4	8.4	12.0	7.7
71	K	"	71.0	2.1		
	J	"	106.6	8.2		
	"	"	117.6	3.5		
	"	"	123.1	4.4	18.2	7.1
72	?N	"	67.1	0.6		
	"	"	68.6	2.7		
	?M	"	72.5	8.8		
	"	"	81.7	0.6		
	?L	"	83.8	3.0	15.7	5.3
73	?N	"	62.5	2.7		
	?M	"	68.9	4.9	7.6	10.3
74	"	"	80.2	3.9	3.9	24.3
75	?N	"	69.2	7.6		
	?M	"	77.1	0.6		
	?L	"	87.5	2.1	10.3	9.1
76	K	"	69.8	2.1		
	"	"	85.0	1.0		
	J	"	104.0	8.6		
	"	"	113.0	4.0		
	"	"	120.0	5.1		
	"	"	126.6	2.0	22.8	5.5
77	?J	"	64.6	3.7	3.7	20.6
78	-	CN	-	0	0	-
79	C	CA	33.3	1.2		
	B	"	68.0	5.9	7.1	8.1
80	C	"	57.0	2.1		
	B	"	71.8	7.6	9.7	6.2
81	B	"	73.4	6.9	6.9	9.2
82	C	"	64.3	1.5		
	"	"	68.9	1.1		
	B	"	77.6	6.2		
	"	"	84.9	2.0	10.8	6.1
83	C	"	61.0	3.4		
	B	"	75.9	8.8	12.2	5.1
84	B	"	76.2	3.7		
	"	"	88.4	1.8	5.5	13.3
85	C	"	60.4	0.9		
	B	"	73.8	7.2	8.1	7.8
86	B	"	58.5	4.6	4.6	10.9
87	B	"	58.5	2.6	2.6	19.4
88	B	"	59.4	1.8	1.8	28.4
89	B	"	72.2	8.4	8.4	7.4
90	B	"	76.8	6.1	6.1	10.9
91	B	"	80.5	6.4	6.4	10.8
92	B	"	71.3	5.0	5.0	12.3
93	C	"	54.3	3.7		
	B	"	67.7	8.1	11.8	4.7
94	B	"	79.9	6.6	6.6	10.4
95	B	"	74.7	7.6	7.6	8.5
96	B	"	71.3	6.7	6.7	9.2
97	B	"	82.4	7.3	7.3	9.7
98	B	CN	-	0	0	-
99	B	CA	74.4	5.5	5.5	11.7
100	B	"	78.9	5.8	5.8	11.7
101	B	CN	79.2	4.1	4.1	16.7
102	C	"	∿59	∿1		
	B	"	72.8	10.3	∿11	∿5.7
103	C	CA	57.3	0.9		
	B	"	73.5	13.1	14.0	4.5
104	C	"	68.4	0.9		
	B	"	76.7	11.4	12.3	5.3

105	B	CA	68.3	11.7	11.7	5.0
106	B	"	73.2	6.9	6.9	9.1
107	C	"	68.0	1.1		
	B	"	76.8	7.6	8.7	7.5
108	C	"	68.9	1.0		
	B	"	76.5	0.7		
	B	"	77.7	7.9	9.6	6.9
109	B	"	75.6	8.3	8.3	7.9
110	?	CN	?74	?		
	B	CA	85.0	8.5	∿9	∿8
111	C	"	55.8	0.6		
	"	"	63.7	0.6		
	B	"	74.7	7.7	8.9	7.1
112	C	"	48.8	0.6		
	"	"	52.1	1.5		
	?B	"	63.7	2.4		
	B	"	75.6	3.7		
	"	"	80.8	0.9	9.1	6.8
113	C	"	43.6	1.2		
	B	"	71.0	0.6		
	"	"	74.1	2.1	3.9	16.0
114	C	"	60.4	0.9		
	B	CN	71.9	0.9		
	"	CA	75.6	2.4		
	"	"	78.3	3.7	8.1	7.7
115	C	"	41.1	0.6		
	"	"	58.2	0.6		
	?B	"	61.0	1.8		
	B	"	71.0	0.9		
	"	"	72.5	0.6		
	"	"	73.5	5.8		
	"	"	82.0	0.9	11.2	5.5
116	C	"	56.0	2.6		
	B	"	72.3	9.0	11.6	5.2
121	B	"	78.6	5.2		
	"	"	86.8	11.1		
	A	"	105.0	3.8	20.1	4.0
122	B	CN	56.8	0.5		
	"	CA	65.6	1.8		
	"	"	72.3	1.0		
	"	"	74.8	2.2	5.5	11.2
123	B	"	69.8	0.9		
	"	"	71.5	9.2		
	"	"	84.5	0.6		
	"	"	88.7	0.7	11.4	5.9
125	C	"	67.7	1.3		
	B	"	74.4	7.7	9.0	7.0
127	C	"	54.1	0.8		
	B	"	68.1	3.0		
	"	"	75.5	9.4	13.2	4.7
136	C	CN	∿68	∿ 2		
	"	"	72.4	9.4		
	"	"	82.2	2.0	∿13.4	∿ 4.6
140	?B	"	∿40	∿ 2	∿ 2	∿17.2
141	""	"	63.0	1.0		
	B	"	73.7	11.2	12.2	5.1
142	C	"	65.9	1.3		
	"	"	67.7	0.6		
	B	CA	72.3	1.2		
	"	"	73.8	8.6	11.7	5.2
144	C	CN	50.6	0.7		
	"	"	56.9	2.1		

	C	CN	68.6	0.5		
	B	CA	71.5	8.4	11.7	5.0
145	C	CN	71.1	2.2		
	B	CA	78.3	0.8		
	"	"	79.3	9.1		
	"	CN	90.9	1.2	11.1	6.1
146	C	"	63.4	2.6		
	B	"	73.0	0.5		
	"	"	78.2	3.0		
	"	"	81.3	6.3	12.4	5.2
147	C	"	62.2	1.6		
	B	"	66.4	1.1		
	"	"	71.8	9.2	11.9	5.0
148	C	"	58.4	0.9		
	B	"	65.5	1.3		
	"	"	72.3	10.1	12.3	4.9
149	C	"	52.0	0.7		
	"	"	55.5	1.2		
	B	"	66.9	8.0	9.2	6.1
150	B	RD	56.8	1.7		
	"	"	70.2	0.8		
	"	"	71.5	3.7		
	"	"	76.5	7.1		
	"	"	84.2	1.5	14.8	4.1
151	B	"	63.5	9.1		
	"	"	73.0	1.2		
	A	"	105.6	2.8	13.1	6.3
152	B	"	71.4	1.4		
	"	"	73.1	5.6		
	"	"	78.9	4.5		
	A	ND	~105	~ 2	~13.5	6.0
153	C	RD	57.3	1.3		
	"	"	63.1	0.6		
	B	RC	69.7	0.6		
	"	"	70.6	4.3		
	"	"	77.5	9.1	15.3	4.9
154	?C	"	62.2	1.5		
	?B	"	66.2	1.0		
	B	"	71.5	9.2	11.7	5.1
155	S	"	39.2	8.4	8.4	3.9
156	S	"	47.9	1.0		
	"	"	49.4	1.6	2.6	15.5
164	-	CN	-	0	0	-
165	C	RD	49.8	1.8		
	B	"	67.2	0.8		
	"	"	79.6	1.0		
	"	"	81.6	3.6	7.2	9.3
166	B	"	55.2	0.6		
	"	"	58.4	0.5		
	"	"	59.4	0.5		
	"	"	60.4	1.1		
	"	"	63.4	2.0		
	"	"	65.8	3.9		
	A	"	78.7	0.9		
	"	"	84.8	0.8	10.3	6.3
167	?B	"	37.0	0.5	0.5	63.8
168	-	"	-	0	0	-
169	?B	R	~72	~ 6m	~6	~10.3
170	?B	R	~58	2	~2	~26
171	B	RG	72.0	6.5	6.5	9.5
172	?B	R	~ 60	~ 8	8	~ 7
173	C	RD	58.1	2.2		

	C	RD	61.6	1.1		
	B	"	67.4	1.2		
	"	"	69.8	5.4		
	"	"	76.2	6.9	16.8	3.4
176	C	"	54.9	0.8		
	B	"	69.4	16.2		
	"	"	88.4	1.7		
	"	"	90.5	4.7		
	A	"	110.5	1.9	25.3	3.0
177	-	"	-	0	0	-
178	-	"	-	0	0	-
179	-	"	-	0	0	-
180	B	RC	73.4	10.5		
	"	"	84.6	10.6		
	A	"	106.9	1.4		
	"	"	108.7	1.0	23.5	3.2
181	?B	RD	86.6	0.5		
	"	"	97.4	1.6		
	"	"	99.4	0.8		
	"	"	103.0	0.6	3.5	24.7
183	B	"	70.2	4.0		
	"	"	79.4	8.2	12.2	5.3
184	B	RC	62.2	11.1		
	"	"	74.5	6.6		
	"	"	82.8	1.2		
	"	"	87.5	3.7	22.6	2.6
185	P	RD	55.6	0.7		
	N	"	67.3	0.9		
	M	"	70.1	1.1		
	"	"	72.2	6.5		
	L	"	81.6	9.0	18.2	3.4
186	Q	"	39.5	1.3		
	P	"	47.1	1.2		
	O	"	56.4	0.5		
	N	"	58.0	1.2		
	M	"	62.0	5.4		
	"	"	68.0	0.8		
	L	"	72.8	4.0	14.4	3.7
187	Q	"	38.0	0.8		
	P	"	46.4	1.6		
	M	"	55.4	8.4		
	L	"	67.2	2.8	13.6	3.5
188	M	"	42.2	1.1		
	"	"	44.3	0.5	1.6	22.9
189	B	"	52.2	0.7		
	"	"	59.6	0.5		
	"	"	62.2	2.0		
	"	"	65.7	2.0		
	"	"	68.2	1.7		
	"	"	73.9	2.3		
	"	"	77.5	0.5		
	"	"	78.2	0.8		
	A	"	85.0	1.5		
	"	"	87.6	4.8	16.8	3.9
190	B	"	64.3	0.7		
	"	"	66.6	2.0	2.7	21.0
191	C	"	49.8	0.8		
	"	"	53.0	1.4		
	B	"	70.9	0.7		
	"	"	77.7	0.5		
	"	"	80.9	0.7		
	"	"	82.0	2.2		

	B	RD	84.8	1.4		
	"	"	88.0	5.1		
	"	"	93.8	0.6		
	A	"	106.1	2.3		
	"	"	111.9	1.7	17.4	4.8
192	C	RC	56.0	0.6		
	"	"	56.9	0.7		
	B	"	64.0	6.7		
	"	ND	∿ 85	∿ 8		
	A	"	∿ 110	∿ 3	∿ 19	∿ 4
193	B	RD	49.2	6.4		
	"	"	56.4	0.8		
	"	"	58.4	2.0	9.2	4.8
194	?B	RG	50.0	1.8	1.8	23.9
195	C	RC	55.2	3.0		
	B	"	77.2	2.4	5.4	11.8
196	B	RD	53.8	1.2	1.2	38.6
197	-	"	-	0	0	-
198	B	"	70.8	2.8		
	"	"	75.1	2.0		
	"	"	78.6	2.7		
	"	"	82.4	2.7	10.2	6.3
199	C	"	48.0	1.4		
	"	"	51.6	1.5		
	"	"	60.4	1.7		
	B	"	62.2	7.5		
	"	"	74.8	2.3		
	"	"	79.5	1.1		
	"	"	82.7	1.6		
	"	"	88.0	0.6		
	A	"	104.6	0.7		
	"	"	107.5	0.8	19.2	4.0
200	B	R	61	∿ 5		
	"	"	68	∿ 2	∿ 7	∿ 8
201	B	RC	48.0	0.5		
	"	"	54.4	0.6		
	"	"	57.4	2.0		
	"	"	59.7	2.1		
	"	"	65.6	1.2		
	"	"	70.3	1.6		
	A	"	78.1	1.1		
	"	"	79.8	3.2	12.3	5.0
202	C	RD	55.7	0.4		
	B	"	66.2	0.7		
	"	"	68.2	5.0		
	"	"	74.2	0.6	6.7	8.8
203	B	"	70.4	0.8		
	"	"	74.8	1.3		
	"	"	81.5	0.7		
	"	"	84.2	1.5		
	"	"	86.2	3.3		
	"	"	91.0	0.8		
	"	"	95.4	0.8	9.2	8.2
204	-	"	-	0	0	-
205	-	"	-	0	0	-
206	B	"	44.4	0.6		
	"	"	51.7	0.7		
	"	"	55.1	2.4		
	"	"	58.0	2.9		
	"	"	63.4	0.8		
	"	"	64.6	0.5		
	"	"	67.1	1.1	9.0	5.7
207	C	"	41.0	3.9		

	C	RD	45.7	0.9		
	"	"	46.9	1.2		
	"	"	48.4	0.5		
	B	"	67.1	0.5		
	"	"	70.7	1.5		
	"	"	74.7	1.3		
	"	"	77.9	2.0		
	"	"	80.6	1.0		
	"	"	83.1	0.9	13.7	4.4
208	C	"	43.6	2.6		
	"	"	46.7	0.6		
	B	"	62.7	0.5		
	"	"	65.6	1.2		
	"	"	69.5	0.8		
	"	"	80.1	0.9	6.6	9.7
209	?M	"	37.8	0.6	0.6	53.4
210	M	"	42.5	7.8	7.8	4.6
211	-	"	-	0	0	-
212	B	"	80.1	2.5		
	"	"	86.1	1.0	3.5	20.6
213	B	"	75.5	0.7		
	"	"	76.6	6.5	7.2	9.1
214	C	"	60.5	1.8		
	B	"	72.1	8.7	10.5	5.8
215	C	"	50.3	0.9		
	"	"	56.6	1.2		
	B	"	68.8	0.8		
	"	"	71.3	0.7		
	"	"	72.6	9.1		
	"	"	83.8	1.0	13.7	4.5
216	C	"	51.2	2.0		
	"	"	55.3	2.6		
	B	"	68.4	2.4		
	"	"	71.7	1.5		
	"	"	74.5	7.7	16.2	3.5
217	C	RC	55.2	0.7		
	"	"	57.7	2.5		
	B	"	69.6	0.8		
	"	"	71.0	3.5		
	"	"	75.4	8.4	15.9	3.6
218	-	see hole 236				
219	B	RD	81.1	8.5		
	"	"	90.0	6.3		
	"	"	97.6	3.2		
	C	"	109.8	2.4	19.4	4.1
220	-	"	-	0	0	-
221	B	"	60.0	13.4		
	"	"	75.2	1.6	15.0	3.6
222	-	"	-	0	0	-
223	?	"	37.4	4.4	4.4	7.3
224	B	"	57.6	3.1		
	"	"	61.2	0.8		
	"	"	70.2	0.7		
	"	"	71.5	1.4	6.0	9.6
225	C	"	49.2	2.1		
	B	"	63.0	4.2		
	"	"	67.5	0.6		
	"	"	68.8	2.7		
	"	"	74.0	1.3		
	"	"	~88	~ 1	13	~ 5
226	C	RC	57.2	0.8		
	"	"	54.8	3.1		

	B	RC	61.3	2.6		
	"	ND	∿80	∿ 1	∿11	∿ 6
	"	"	∿84	∿ 2		
	"	"	∿87	∿ 1.5		
227	P	RC	56.8	1.0		
	N	"	66.8	2.0		
	M	"	70.6	8.8		
	L	"	90.0	2.0	13.8	4.9
228	P	RD	54.0	0.6		
	N	"	65.4	1.4		
	M	"	71.1	0.6		
	"	"	72.1	3.6		
	L	"	89.6	3.2	8.8	8.2
229	N	RD	61.3	0.8		
	M	"	65.5	0.5		
	"	"	66.6	5.8		
	"	"	72.9	1.4		
	L	"	77.4	9.1		
	"	"	87.2	0.8	18.4	3.3
230	?M	"	55.8	8.3	8.3	5.8
231	Q	"	47.0	1.9		
	P	"	56.0	0.8		
	O	"	60.2	1.0		
	N	"	65.3	2.5		
	M	"	68.8	8.7		
	L	"	81.5	1.5		
	"	"	83.8	1.2	17.6	3.3
232	O	"	42.4	0.8		
	M	"	50.3	9.8	10.6	4.0
233	?C	"	53.3	0.7		
	B	"	60.0	7.0		
	"	"	68.0	0.7		
	"	"	74.7	0.7		
	"	"	75.8	0.8		
	"	"	81.8	0.5		
	"	"	84.6	3.0		
	"	"	88.6	1.0		
	C	"	100.9	0.9		
	"	"	103.0	0.8		
	"	"	111.7	0.8	16.9	4.9
234	B	"	64.6	10.1		
	"	"	82.4	3.0		
	"	"	86.0	0.6		
	"	"	88.0	0.8		
	"	"	90.6	4.4		
	"	"	97.8	1.9	20.8	3.3
235	C	R	∿56	∿ 2		
	B	"	∿64	∿ 2		
	"	"	∿68	∿ 0.5		
	"	"	∿79	∿ 5		
	"	ND	∿85	∿ 2.5	∿12	∿5
236	C	RG	64.5	∿ 1.0		
	"	"	66.1	1.0		
	B	"	75.0	4.9		
	"	RG & R	80.4	∿ 9	∿ 16	∿ 4
237	B	RG	47.0	0.8		
	"	"	54.6	1.3	2.1	22.1
238	C	"	42.0	0.8		
	"	"	45.8	1.8		
	B	"	62.8	0.5		
	"	"	67.0	0.6		
	"	"	71.4	2.6		

	B	RG	74.9	2.0		
	"	"	77.6	2.2		
	C	R	∿ 80	∿ 4	∿14.5	∿ 4.1
239	B	RG	52.2	?0.5		
	"	"	59.8	?4.2		
	?C	"	72.6	?0.8		
	?"	"	76.1	?2.3		
	?"	R	78.9	∿ 2	∿ 9.8	∿ 6.3
240	B	RG	51.8	0.6		
	"	"	56.7	0.6		
	"	"	59.4	1.0		
	"	"	63.5	1.8		
	"	"	66.2	1.9		
	"	"	69.4	1.0		
	"	"	74.5	4.1		
	"	"	82.2	0.8		
	"	"	85.2	0.8		
	A	"	87.6	0.8		
	"	R	93	1	∿14.4	4.8
241	B	RG	40.2	0.6		
	"	"	48.7	5.6	6.2	6.7
242	C	RC	55.2	0.8		
	B	"	64.0	7.8		
	"	"	76.6	2.2		
	C	"	90.4	1.0	12.8	5.3
243	C	"	70.2	2.0		
	"	"	76.4	1.2		
	B	"	83.0	5.6		
	"	"	88.6	11.8		
	A	"	113.4	0.6		
	"	"	115.8	1.2		
	"	"	117.6	1.0	23.4	3.5
244	C	RG	53.9	0.6		
	B	"	68.0	1.5		
	"	"	70.1	8.0		
	"	"	79.5	9.8		
	A	"	?103.2	?1.6	∿21.5	∿ 3.3
245	B	"	73.8	1.8		
	"	"	75.7	15.6	17.4	3.7
247	C	"	54.6	1.2		
	"	"	56.9	2.6		
	B	"	72.4	9.8	13.6	4.3
248	C	"	50.8	0.9		
	"	"	53.4	1.9		
	"	"	58.8	0.8		
	B	"	70.8	6.5		
	"	"	90.8	1.2	11.3	6.2
249	C	"	52.3	0.7		
	"	"	59.0	1.3		
	B	"	67.6	2.3		
	"	"	77.6	6.0	10.3	6.1
250	B	RD	58.9	5.6		
	"	"	66.0	1.2	6.8	7.7
251	B	"	42.2	0.8		
	"	"	48.6	0.6		
	"	"	51.2	1.8		
	"	"	54.8	3.7		
	"	"	61.4	3.6	10.5	4.5
252	B	"	32.4	2.0	2.0	14.0
253	-	"	-	0	0	-
254	B	"	60.4	1.6	1.6	32.5
255	C	RC	47.6	2.6		
	B	"	60.6	8.7		

	B	RC	70.2	0.6		
	"	"	75.5	1.9		
	"	"	79.3	0.8		
	"	"	81.2	1.2		
	"	"	83.6	3.0		
	A	"	105.8	1.0	19.8	3.8
256	B	RD	62.8	1.4		
	"	"	64.8	1.2		
	"	"	67.4	6.0		
	"	"	74.0	0.8		
	"	"	78.6	3.3	12.7	4.7
157	B	"	61.0	8.6		
	"	"	69.8	11.2		
	"	"	82.8	1.3		
	"	"	86.6	3.2		
	A	"	108.6	∿ 1.5	∿ 24.8	∿ 3.0
258	B	"	63.5	17.5		
	"	"	84.6	2.2		
	"	"	87.5	2.2		
	"	"	91.8	0.8		
	"	"	93.0	0.6		
	"	"	93.9	1.0		
	"	"	95.4	1.5		
	A	"	108.1	1.8	27.6	2.6
259	C	"	49.3	2.0		
	B	"	66.9	15.5		
	"	"	84.7	4.8		
	A	RD	101.5	1.2		
	"	"	106.2	3.2		
	"	"	110.7	0.8	27.5	2.6
260	C	"	56.1	1.6		
	B	"	66.7	0.8		
	"	"	68.2	15.0		
	"	"	83.6	1.0		
	"	"	85.4	1.4		
	"	"	87.4	4.0		
	A	"	107.7	2.2		
	"	"	110.4	1.0	27.0	3.5
261	B	"	81.0	9.2		
	"	"	90.4	6.8		
	"	"	98.6	1.2		
	A	"	100.5	2.5		
	"	"	116.5	3.6	23.3	6.9
262	C	"	54.0	1.0		
	B	"	59.0	1.9		
	"	"	67.5	7.4		
	"	"	75.8	9.8	20.1	2.8
263	C	"	52.0	2.1		
	"	"	56.8	1.2		
	B	"	62.2	4.8		
	"	"	67.6	0.6		
	"	"	80.8	0.5		
	"	"	83.0	0.7		
	"	"	86.0	1.1	11.0	6.0
264	B	"	57.3	6.9		
	"	"	81.2	0.6		
	"	"	83.7	2.6		
	"	"	87.3	0.6		
	"	"	88.6	0.8	11.5	5.8
265	B	RD	62.4	11.8		
	"	"	76.4	0.6		
	"	"	83.6	2.0		

	B	RD	87.0	0.7		
	"	"	88.8	0.6		
	"	"	91.4	1.1		
	"	"	92.8	3.0		
	"	"	99.0	1.1		
	A	"	100.7	0.8		
	"	"	113.8	2.4	24.1	3.3
266	C	"	57.7	0.5		
	B	"	64.6	12.9		
	"	"	80.8	6.2	18.6	3.2
267	B	RC	64.5	16.8		
	"	"	81.8	0.7		
	"	"	84.6	2.3		
	"	"	87.3	3.9		
	"	"	92.0	1.5		
	A	"	104.6	2.2	27.4	2.5

Note: * CA: Cable tool hole with chemical analyses.
CN: " " " " no " "
R: Rotary open hole - cuttings description only.
RD: " " " - density logs used.
RG: " " " - gamma-neutron logs used.
RC: " cored " with chemical analysis.
ND: Not drilled - estimate only.

** Strip ratio = $\frac{\text{depth to base of lowest seam (m) - cumulative seam thickness (m)}}{\text{cumulative seam thickness (m) X S.G. (gm. cm}^{-3})}$

where S.G. = 1.16 gm . cm^{-3} - Wakefield
1.18 " " - Clinton
1.20 " " - Whitwarta
1.18 " " - Blyth

(b) Blyth coal deposit