Open File Envelope No. 4124

EL 766

MULLAQUANA

PROGRESS AND FINAL REPORTS FOR THE PERIOD 8/12/80 TO 7/12/82

Submitted by

BHP Minerals Ltd
1983

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PRIMARY INDUSTRIES AND RESOURCES SA

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TENEMENT: E.L. 766

TENEMENT HOLDER: B.H.P.

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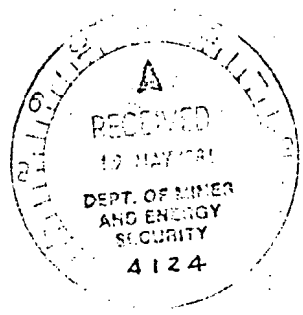
EXPLORATION LICENCE 766

MULLAQUANA, SOUTH AUSTRALIA

REPORT FOR THE QUARTER ENDED 8th MARCH, 1981



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EXPLORATION LICENCE 766

MULLAQUANA, SOUTH AUSTRALIA

REPORT FOR THE QUARTER ENDED 8th MARCH, 1981

1. GENERAL

EL 766 of approximately 1075 square kilometres was granted to Dampier Mining Company Limited on 8th December 1980 for one year (see Figure). The EL was taken up to explore for carbonaceous sediments of Tertiary age possibly preserved on a series of fault blocks in the area. Minor Tertiary sediments outcrop along the edge of several fault blocks and a gravity low in the area may indicate a thickening of Tertiary sedimentation.

2. FIELD INVESTIGATIONS

A programme of 22 holes has been drawn up and approved by the South Australian Department of Mines and Energy. (see Figure).

The landholders concerned have been contacted.

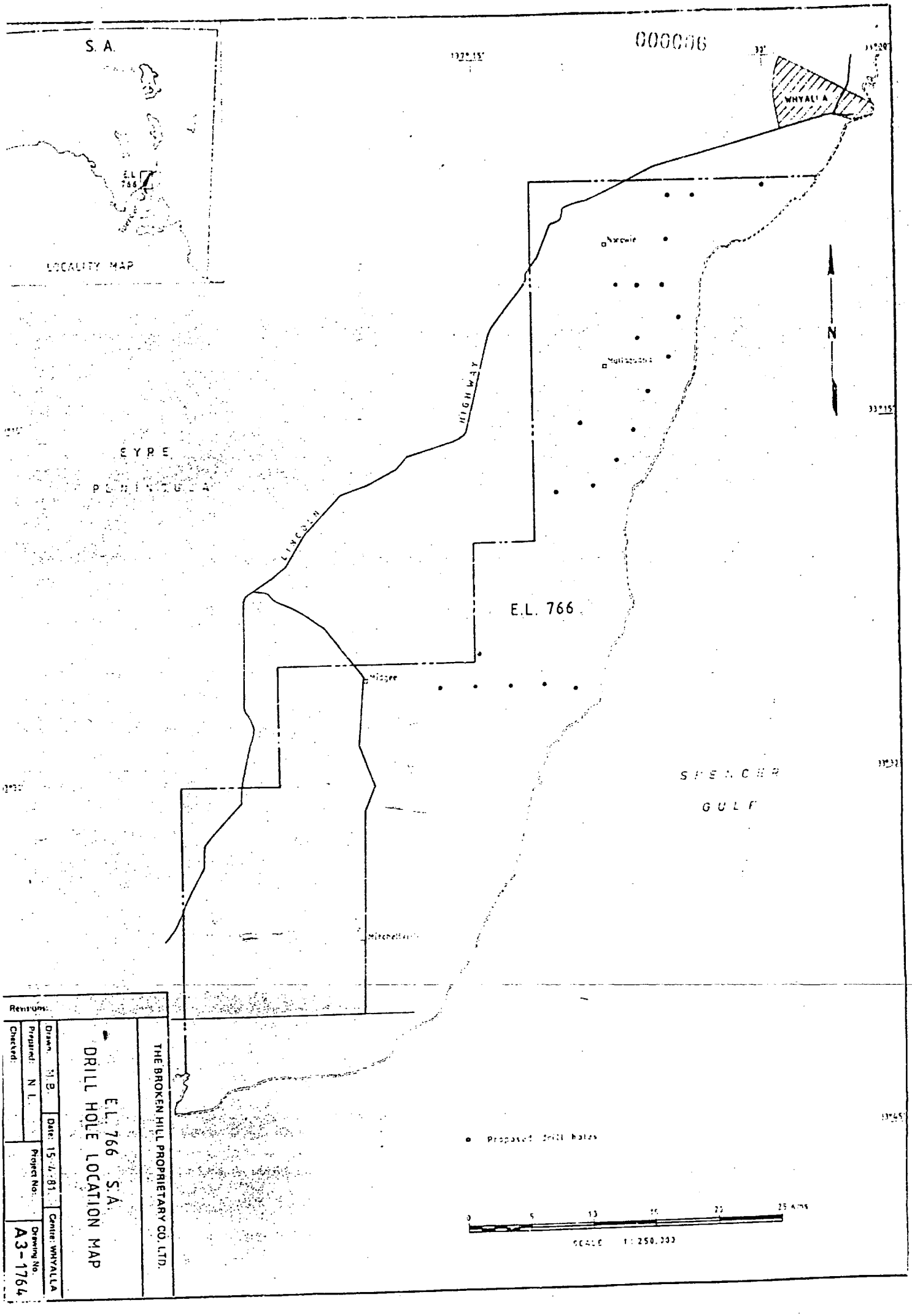
Drilling is expected to commence in the latter half of June 1981.

3. EXPENDITURE

Expenditure debited to EL 766 to 28th February, 1981, was:

Wages and Salaries	$642
Fares and Mobilisation	203
Radio Communications	10
Tenement Fees, Licences etc.	74
	$929

This report is submitted to the Department of Mines and Energy as required by Condition 4 of Exploration Licence 766.



Revisions:

Checked:	Prepared: N. L.	Drawn: M. B.	Date: 15/4/81.
Project No:		Centre: WHYALLA	Drawing No. A3-1764

E.L. 766 S.A.
DRILL HOLE LOCATION MAP

THE BROKEN HILL PROPRIETARY CO. LTD.

000007

EXPLORATION LICENCE 766

MULLAQUANA, SOUTH AUSTRALIA

Report for the Quarter Ended 8th June, 1981

1. General

Exploration Licence 766 of approximately 1075 square kilometres was granted to Dampier Mining Company Limited on 8th December, 1980 for one year. The E.L. was taken up to explore for carbonaceous sediments of Tertiary age possibly preserved on a series of fault blocks in the area. Minor Tertiary sediments outcrop along the edge of several fault blocks and a gravity low in the area may indicate a thickening of Tertiary sedimentation.

2. Field Investigations

The contract drilling crew is expected to begin work on the planned 22 hole drilling programme towards the end of June, 1981.

3. Expenditure

Expenditure debited to EL 766 during March, April and May, 1981, was:

Wages and Salaries	$1,199
Messing and Accommodation	4
Transport	55
	$1,258

Total expenditure to 31st May, 1981, is $2,187.

This report is submitted to the Department of Mines and Energy as required by Condition 4 of Exploration Licence 766.

EXPLORATION LICENCE 766

MULLAQUANA, SOUTH AUSTRALIA

REPORT FOR THE QUARTER ENDED 8TH SEPTEMBER, 1981

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FIGURES

EXPLORATION LICENCE 766

MULLAQUANA, SOUTH AUSTRALIA

REPORT FOR THE QUARTER ENDED 8TH SEPTEMBER, 1981

1. GENERAL

Exploration Licence 766 of approximately 1075 square kilometres was granted to Dampier Mining Company Limited on 8th December, 1980 for one year. (Figure 1) The E.L. was taken up to explore for carbonaceous sediments of Tertiary age possibly preserved on a series of fault blocks in the area. Minor Tertiary outcrops occur along the edge of several fault blocks, and a gravity low in the area may indicate a thickening of Tertiary sedimentation.

2. FIELD INVESTIGATIONS

2.1 Drilling

Twenty-one holes, with three holes needing to be re-done, were drilled in the area during the quarter (Figure 1). A total of 1894 metres were drilled (See Table 1).

A sequence of Tertiary sediments, previously unknown in the area, was intersected.

The base of the sequence is probably of Eocene age and consists of clayey sands and gravels up to 20 metres thick. This is overlain by a generally carbonaceous sequence up to 60 metres thick. This unit is usually carbonaceous clayey sands. There are beds of oil shale and seams of lignite (6m, 2m and 4m) in the thicker parts of the sequence around PP18, PP2 and PP21. In places, this sequence has been oxidized to yellow and orange clayey sands.

The carbonaceous unit is in part overlain by and in part equivalent to a grey-green highly fossiliferous glauconitic sandstone, which in turn interfingers with a fossiliferous glauconitic limestone. This limestone is also probably Eocene in age.

The carbonaceous and glauconitic units are fault bounded and overlain unconformably by a more extensive transgressive yellow clayey bryozoal limestone of probable Miocene age.

Post Miocene faulting with throws up to 100 metres has affected the area, and many of these faults can be seen as prominent fault line scarps.

cont./..

Pleistocene white sandy clays overlie the limestone, and these are overlain in turn by red clayey sandstones, gravels and conglomerates of probable Holocene to Recent age.

3. OTHER INVESTIGATIONS

3.1 Testing

The coal sequence intersected in PP18 was cored in PP18A, and the whole core sent to Central Research Laboratories in Shortland N.S.W. for analysis. The core was radiographed and representative sections sent for proximate analysis.

Water samples taken from the drill holes show there is a salty aquifer in the area, although the stratigraphic position of the aquifer is as yet unknown.

4. EXPENDITURE

Expenditure debited to E.L. 766 during June, July and August, 1981 was:

Wages and Salaries	$ 6,045
Messing and Accommodation	451
Fares and Mobilisation	167
Drilling	20,288
Transport	819
Sample Analysis	1,081
Geophysics/Geochemistry	497
Occupancy/Location Expenses	37
Administration/Overheads	1,469
	$30,854

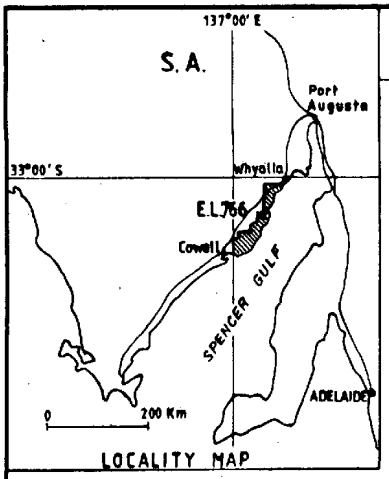
Total expenditure to 31st August, 1981, is $33,041

This report is submitted to the Department of Mines and Energy as required by Condition 4 of Exploration Licence 766.

TABLE 1

DRILL HOLE DETAILS

Hole No.	Depth (Metres)
PP 1	117
PP 2	150
PP 3	150
PP 4	135.5
PP 5	91
PP 6	18
PP 7	61
PP 8	34.5
PP 9	34
PP10	27
PP11	43
PP12	100
PP13	20
PP14	60
PP15	82
PP16	60
PP17	82
PP18	148
PP18A	150
PP19	60
PP20	30
PP20A	68
PP21	53
PP21A	120
TOTAL	1,894 metres



137°00' E

137°30' E

33°00' S

33°30' S

WHYALLA

E.L.766

PP6 PP7 Mt. Young

PP13 Nonawie

PP8

PP9 PP10 PP12 Cowleds Landing

PP11

Fig 3

Mullaquana

PP14 PP15

Deep Creek

PP16

PP20

PP19 PP17

Moonabie

F

LINCOLN HIGHWAY

EYRE PENINSULA

Hurninie Mine

PP18/18A

PP21/21A

Hurninie Beach

Munyaroo C.P.

Midgee

PP1 PP2 PP3 PP4 PP5

Fig 2

Plank Point

Moonabie fault

Charleston Fault

SPENCER GULF

Pondoona

Cowell 6km

Mitchellville

E.L.766

N

LEGEND

PP1 Rotary drill hole and No.

F Fault.

Area to be retained

C.R.A.E. drill hole (R.H.C. prefix)

B.H.P. drill hole (E.E.P. prefix)

0 5 10 15 20 25km

SCALE 1:250 000

Revisions:

Checked:

Prepared: N.L.

Drawn: M.B.

Date: 18 SEP 81

Project No:

Centre: WHYALLA

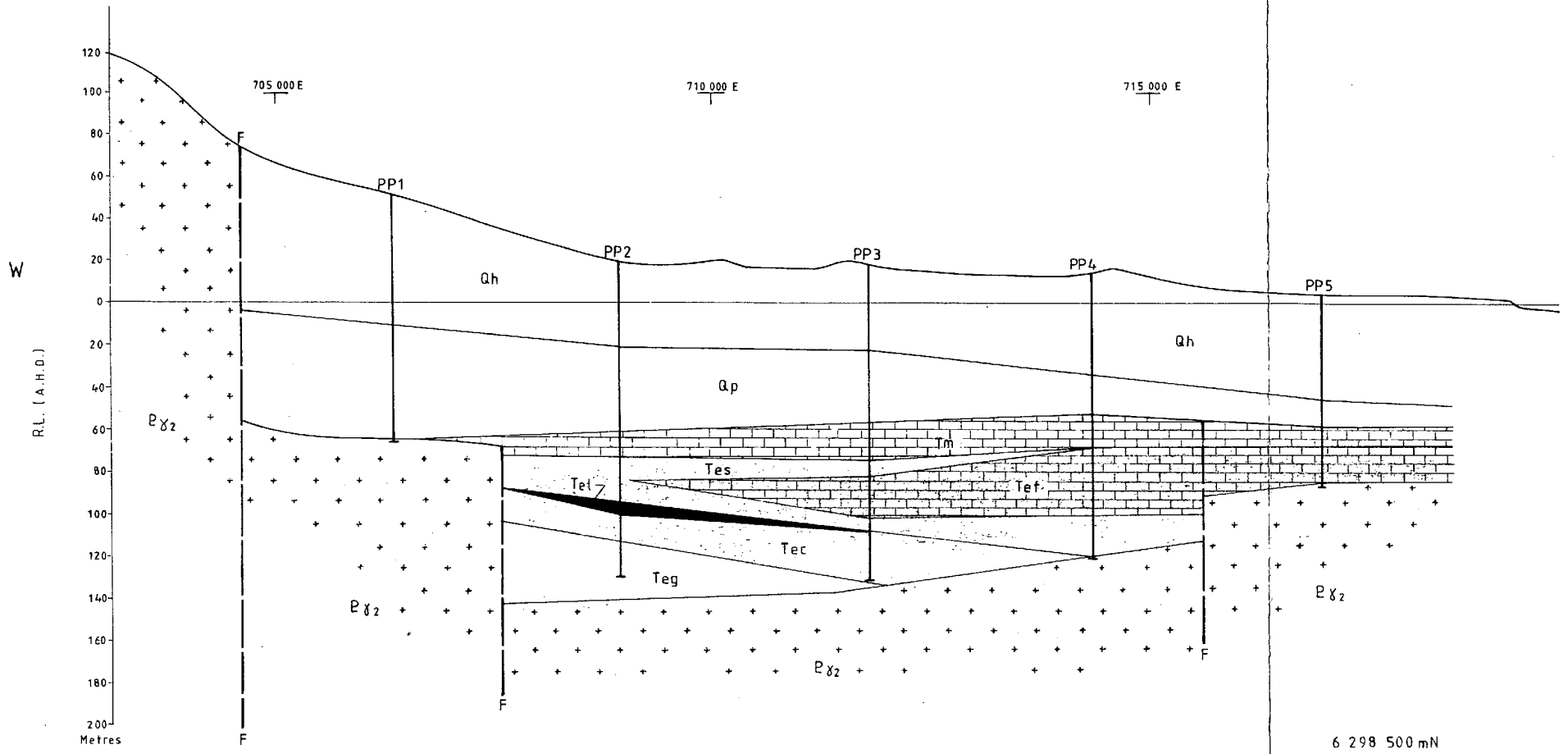
Drawing No: A3-1764

E.L.766 MULLAQUANA S.A.
DRILL HOLE LOCATIONS

THE BROKEN HILL PROPRIETARY CO. LTD.

FIG. 1

FIG. 2



6 298 500 mN

$V/H = 1:2\,000 / 1:50\,000 = 25/1$

0 1 2 3 4 5 km

HORIZONTAL SCALE 1:50.000

001

LEGEND.

Qh	Red clayey sands and gravels.	Tes	Green glauconitic sands.	Tec	Carbonaceous sands and clays.
Qp	White sandy clays.	Tef	Glauconitic sandy fossiliferous limestone.	Teg	Brown and white clayey sands and gravels.
Tm	Yellow fossiliferous limestone.	Tel	Lignite.	Pγ2	Granite.

FOR LOCATION REFER TO DRG. NO. A3 1764

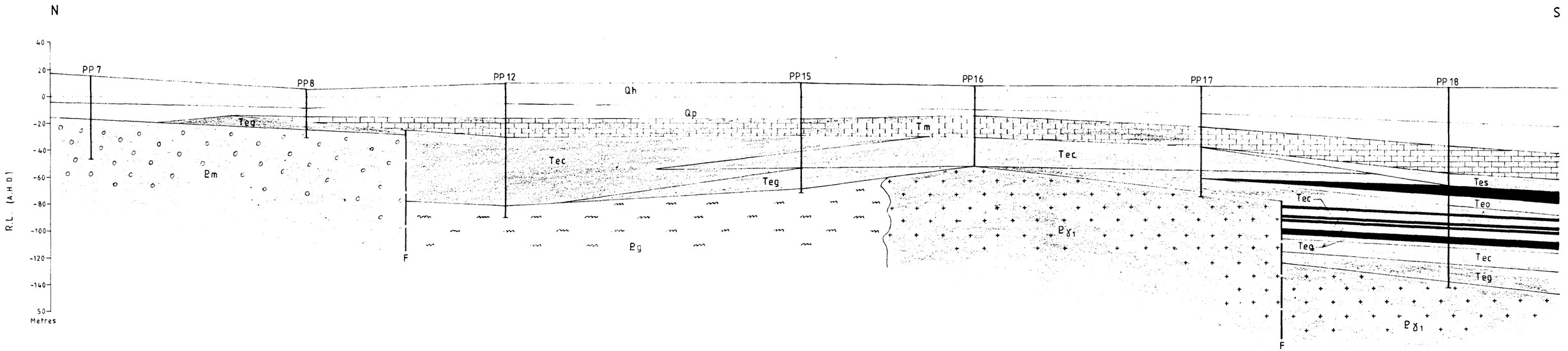
THE BROKEN HILL PROPRIETARY CO. LTD.

E.L. 766 MULLAQUANA S.A.
E-W DRILL SECTION THROUGH BORES PP1 - PP5

Drawn: M.B.	Date: 24 SEP 81	Centre: WHYALLA	
Prepared: N.L.	Project No:	Drawing No: A3-1790	
Checked:			

Revisions:

FIG. 3



0015

$V/H = 1:2\,000/1:50\,000 = 25/1$

0 1 2 3 4 5 km.

HORIZONTAL SCALE 1:50,000

LEGEND

Qh	Red clayey sands and gravels.	Tes	Green glauconitic fossiliferous sands.	Teo	Lignitic shale and oil shale.	Em	Volcaniclastic grit. Moonabie Formation.
Qp	White sandy clays.	Tec	Carbonaceous sands and clays.		Lignite seam.	Pγ1	Granite.
Tm	Yellow fossiliferous limestone.	Tec	Oxidized carbonaceous sands.	Teg	Clayey sands and gravels.	Pg	Granite gneiss.

FOR LOCATION REFER TO DRG. NO. A3 1764

THE BROKEN HILL PROPRIETARY CO. LTD.

E.L.766 MULLAQUANA S.A.
N-S DRILL SECTION THROUGH
BORES PP 7, 8, 12 & PP15-18

Drawn M.B.	Date 24 SEP 81	Centre WHYALLA	
Prepared N.L.	Project No.	Drawing No. A3-1791	
Checked			

Revisions.

C009116

EXPLORATION LICENCE 766

MULLAQUANA, SOUTH AUSTRALIA

REPORT FOR THE QUARTER ENDED 8th DECEMBER, 1981

1. GENERAL

Exploration Licence 766 of approximately 1075 square kilometres was granted to BHP Minerals Limited, formerly Dampier Mining Company Limited, on 8th December, 1980, for one year.

The E.L. was taken up to explore for carbonaceous sediments of Tertiary age possibly preserved on a series of fault blocks in the area. Minor Tertiary outcrops occur along the edge of several fault blocks, and a gravity low in the area may indicate a thickening of Tertiary sedimentation.

2. FIELD INVESTIGATIONS

A further 7 drill holes are planned. These should be drilled in January depending on rig availability.

3. EXPENDITURE

Expenditure debited to EL 766 during September, October and November, 1981, was:

Wages and Salaries	$5,091
Messing and Accommodation	61
Fares and Mobilisation	86
Drilling	11,653
Transport	146
Plant Services	400
Sample Analysis	15
Geophysics/Geochemistry	3
Vehicles	1,463
Administration/Overheads	946
	$19,864

Total expenditure to 30th November, 1981, is $52,905

This report is submitted to the Department of Mines and Energy as required by Condition 4 of Exploration Licence 766.

EXPLORATION LICENCE 766

MULLAQUANA, SOUTH AUSTRALIA

REPORT FOR THE QUARTER ENDED 8TH MARCH, 1982

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EXPLORATION LICENCE 766

MULLAQUANA, SOUTH AUSTRALIA

REPORT FOR THE QUARTER ENDED 8TH MARCH, 1982

1. GENERAL

Exploration Licence 766 of approximately 1075 square kilometres was granted to BHP Minerals Limited, formerly Dampier Mining Company Limited, on 8 December, 1980, for one year. This tenure has now been extended for a further twelve months over a reduced area of approximately 330 square kilometres.

The EL was taken up to explore for carbonaceous sediments of Tertiary age possibly deposited and preserved on a series of fault blocks in the area. Minor Tertiary outcrops occur along the edge of several fault blocks and a gravity low in the area was thought to be indicative of a thickening of Tertiary sedimentation. The first stage of drilling indicated the presence of lignite and oil shale in the area immediately north of the Munyaroo Conservation Park.

2. FIELD INVESTIGATIONS

A programme of seven holes was planned to be drilled in January on the fault block around PP18/18A. This programme was submitted to the South Australian Department of Mines and Energy on 17 December, 1981 and approval was granted on 22 December, 1981.

2.1 Drilling and Sampling

Drilling commenced on 4 January, 1982 using a Company owned Longyear 38 drilling rig. Eight holes (PP (D) 22 - PP (D) 29) totalling 834.85m were drilled during January and February. The holes were rotary drilled to between 50m and 70m, cased, then diamond drilled to basement. Locations are on Figure 1, and graphic logs are on Figures 3-27.

All holes were geophysically logged (Figures 3-27) and selected samples were sent for analysis (Appendix 3).

The core through the lignite and oil shale intervals was quartered. One half was sent to AMDEL for coal analysis (Table 1), a quarter was sent to Australian Laboratory Services in Brisbane for oil shale determinations (Table 2) and a quarter was repacked in the plastic sleeving for retention in the core library.

...2/

A sample of the vein style pyrite mineralisation intersected in the basement in PP(D) 24 was analysed for 14 trace elements (Table 3). The yellow fossiliferous limestone and marl unit intersected in PP (D) 27 was halved and sampled for a standard iron ore assay to determine its potential use as a steelworks flux.

Water samples were collected from most holes to determine groundwater salinities. An interesting waxy translucent clay from PP (D) 25 was sent for X.R.D. analysis to determine the type of clay mineral.

2.2 Geology

The geology of the Tertiary sediments in the area was outlined in the report for the quarter ended 8 September, 1981. The additional drilling confirmed the accuracy of that interpretation with one or two exceptions. Core drilling allowed a more accurate determination of the rock type.

The basal sands of the Tertiary sequence are of far more limited extent and thickness than first thought. Much of what was logged as sediment has proven to be deeply weathered basement.

The green glauconitic sandy marl is unconformable on the carbonaceous sequence and extends further north than originally thought, where it is represented by oxidised weakly glauconitic sand and yellow gravelly sand. Micro-faunal dating by Dr. Barry Cooper of the S.A.D.M.E. suggested a Late Oligocene to Early Miocene age for the glauconitic unit.

The previously described yellow fossiliferous limestone can now more accurately be called a fossiliferous marl with some bands of limestone clay and sands.

The top of the yellow marl unit is a band of yellow and white clays.

The overlying white sandy clays appear to have been deposited after the post Miocene faulting.

The section (Figure 2) was drawn taking into account all the changes in interpretation of the geology mentioned above.

2.3 Geophysics

It is planned to read several lines of gravity in the area to aid in the determination of the positions of

...3/

the faults suggested by drilling and to locate the areas of thickest Tertiary sequence. Lines have been levelled between PP8 and PP15, east-west through PP12 and PP15 from the coast to the first topographic fault and from PP (D) 23 through 24, 26, 18 to PP (D) 25. Gravity readings will be taken every 50m.

3. REPORTING

A verbal summary of the geology of the Mullaquana "deposit" was given on request to officers of the South Australian Department of Mines and Energy. This report was to assist them to assess the coal and lignite reserves of the State. As a result of the meeting, a summary report is being produced which will be handed on to the Electricity Trust of South Australia for their information.

4. EXPENDITURE

Expenditure debited to EL 766 during the three months December 1981 and January and February, 1982, was :-

Wages and Salaries	$9,974
Messing and Accommodation	24
Drilling	24,303
Transport	386
Surveying/Aerial Photographs	59
Sample Analysis	7,741
Geophysics	1,255
Mobilisation of Equipment	75
Tenements Fees, Licences etc.	246
Administration/Overheads	2,203
	$46,266

Total expenditure to 28 February, 1982 is $99,171.

This report is submitted to the Department of Mines and Energy as required by Condition 4 of Exploration Licence 766.

TABLE 1

Hole and Interval	Thickness	AS RECEIVED BASIS			DRY BASIS						Specific Energy MJ/kg	
		Free Moisture	Moisture in Air Dried Coal	Total Moisture	Volatiles	Ash	Fixed C	S	Cl	Na	Gross	Nett Wet
PP18A												
73.00 - 74.40	1.40	34.4		54.7	48.1	19.9		2.62	2.42	1.71	23.48	8.8
74.40 - 75.46	1.06	33.9		57.2	46.0	19.5		2.74	2.95	1.83	22.81	7.9
75.46 - 76.00	0.54			37.7	18.5	67.3		2.18	1.28	-	-	-
76.00 - 77.00	1.00	31.7		53.9	43.3	22.3		2.58	2.44	1.40	21.87	8.4
77.00 - 78.50	1.50	33.7		54.7	50.0	16.3		1.78	2.65	1.64	24.47	9.3
78.50 - 79.10	0.60	40.1		56.0	39.8	26.0		1.40	2.78	1.68	20.83	7.4
PP18A												
111.36 - 112.00	0.64	50.3		54.6	38.2	25.1		0.69	-	1.98	20.31	7.5
112.00 - 112.30	0.30	20.1		43.7	27.8	53.9		0.09	2.64	-	-	-
112.30 - 112.70	0.40	30.2		47.2	32.7	44.2		2.70	-	2.28	14.47	6.1
112.70 - 113.00	0.30	36.1		52.0	38.0	30.9		2.37	2.57	2.01	18.74	7.3
113.00 - 113.50	0.50	41.8		50.2	37.4	34.5		0.39	3.56	1.89	18.13	7.4
113.50 - 115.00	1.50			53.6	40.2	24.4		0.32	3.89	2.24	21.00	8.0
PPD22												
82.60 - 83.60	1.00	43.8	9.8	49.3	37.3	38.4	24.3	6.30	1.49	1.33	17.46	7.30
85.00 - 85.70	0.70	43.8	10.0	49.4	39.8	31.4	28.8	11.7	1.74	1.69	19.00	8.06
86.72 - 87.83	1.11	49.3	13.7	56.2	48.0	17.5	34.5	3.46	2.27	2.18	23.52	8.62
88.45 - 89.30	0.85	47.9	12.6	54.5	50.6	17.7	31.7	3.18	2.39	2.07	23.86	9.16
89.30 - 90.40	1.10	47.1	9.9	52.3	36.1	37.5	26.4	2.75	1.98	1.82	17.07	6.54
PPD24												
83.84 - 85.90	2.06	48.3	9.3	53.1	38.1	29.7	32.2	3.08	2.57	2.77	19.18	
102.40 -105.90	3.50	43.8	6.5	47.5	33.1	44.3	22.6	2.43	2.05	1.65	14.92	

TABLE 2

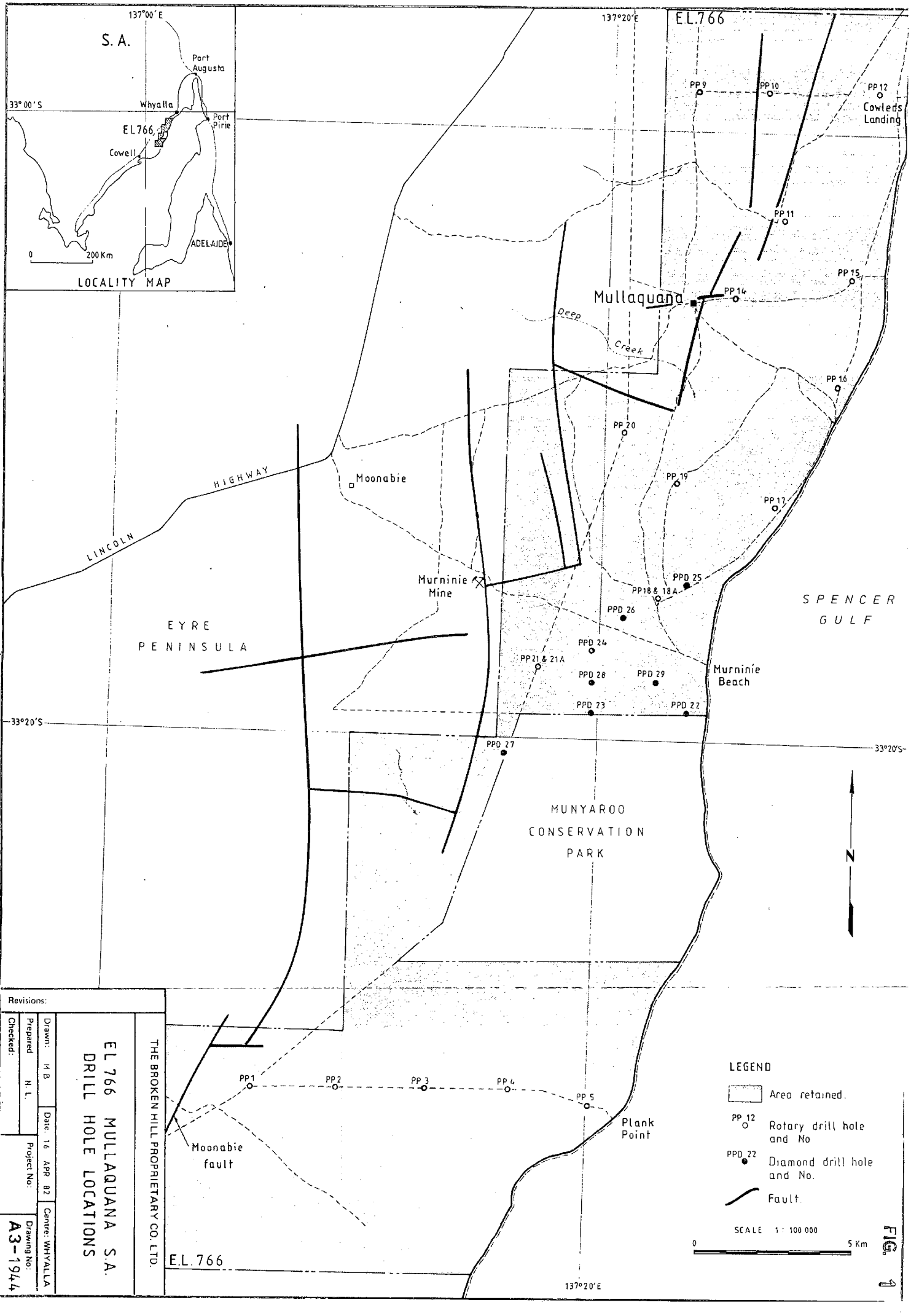
Hole and Interval	Thickness	Oil Yield Litres/Tonne	Oil S.G.	Water Yield Litres/Tonne	Gas + Loss kg/tonne	Residue kg/tonne
PP18A						
81.00-82.00	1.00	76	0.988	125	30	770
82.00-85.00	3.00	49	0.978	85	37	831
85.00-88.00	3.00	24	0.984	66	35	876
109.00-110.00	1.00	65	0.977	205	66	666
110.00-111.00	1.00	49	0.970	175	61	717
115.00-116.00	1.00	26	0.964	118	34	823
116.00-117.00	1.00	44	0.976	150	46	762
PPD22						
81.45-83.60	2.15	69	0.979	250	60	622
85.00-85.70	0.70	88	0.976	260	89	537
86.30-88.00	1.70	72	0.979	305	54	571
88.15-90.40	1.25	80	0.975	316	65	541
91.90-94.00	2.10	21	0.920	51	12	918
PPD24						
73.50-80.00	6.50	54	0.978	120	57	770
80.00-83.84	3.84	32	0.976	98	46	825
83.84-85.90	2.06	68	0.960	204	125	606
85.90-90.05	4.15	35	0.964	80	41	845
99.25-101.48	2.23	40	0.945	74	33	855
101.48-102.40	0.92	20	0.976	33	22	925
102.40-106.05	3.65	75	0.967	200	92	635
106.05-107.70	1.65	128	0.960	176	121	580

ANALYSIS OF SAMPLE WCS 28 - PPD 24 112m - 121m

Sulphide concentration in an epidote altered pyroxene quartz hornfels marginal to a granite intrusion.

Results in ppm

Au	0.10	Aqua regia digestion	AAS
As	19	)	
Sn	32	)	
W	40	) XRF	
Sb	<4	)	
Bi	<4	)	
Cu	55	)	
Pb	15	)	
Co	30	) Perchloric digestion	AAS
Ni	14	)	
Cd	<1		
Ag	1	)	
Mo	7	) Perchloric digestion	AAS
V	20	)	



Revisions:

Checked:	Prepared N. L.	Drawn: M B	Date: 16 APR 82
Project No:		Centre: WHYALLA	Drawing No: A3-1944

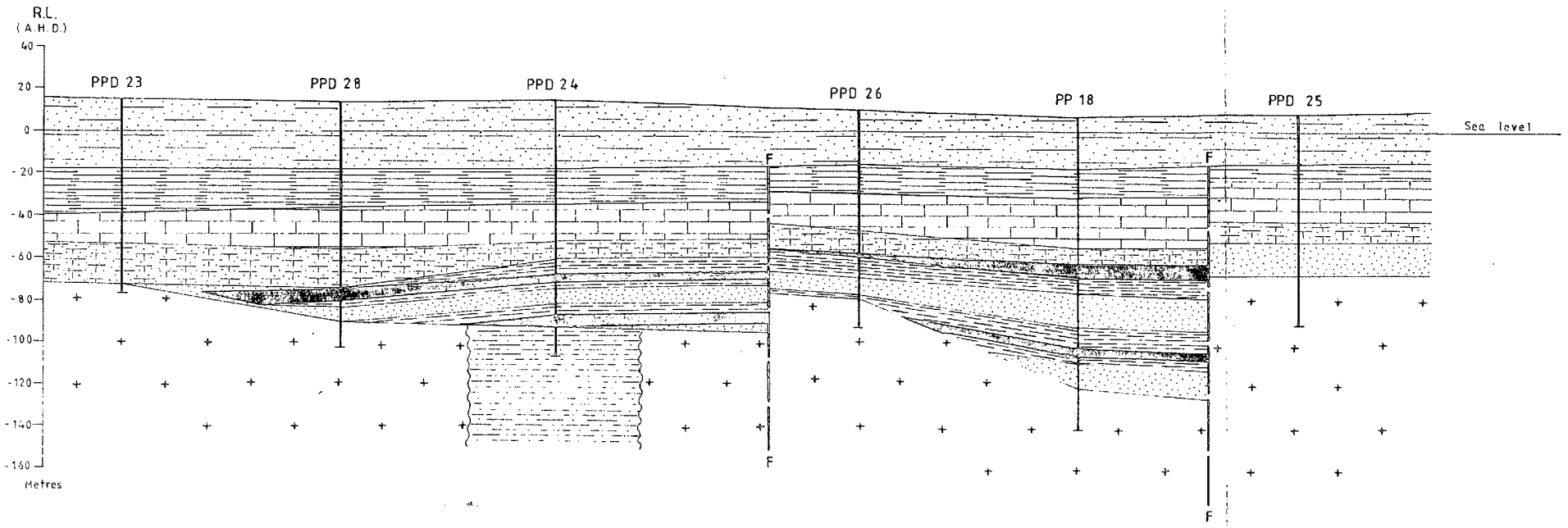
EL 766 MULLAQUANA S.A.
DRILL HOLE LOCATIONS

THE BROKEN HILL PROPRIETARY CO. LTD.

FIG. 1

FIG. 2

S N NE



$\frac{V}{H} = \frac{1:2\,000}{1:20\,000} = \frac{10}{1}$

SCALE 1 : 20 000

0 1000 m

LEGEND

- Red clay, sand and gravel.
- White sandy clays.
- Yellow fossiliferous limestone and marl.
- Green glauconitic sandy marl.
- Lignite.
- Oil shale
- Carbonaceous sand.
- Granite / adamellite.
- Epidote altered material in contact with granite.

FOR LOCATION REFER TO DRG. No. A3. 1944

9206

THE BROKEN HILL PROPRIETARY CO. LTD.

EL 766 MULLAQUANA S.A.
S-N-NE DRILL SECTION THROUGH BORES PPD 23 – 26, 28 & PP 18

Drawn: M.B.	Date: 6 · APR · 82	Centre: WHYALLA	
Prepared: N L.	Project No:	Drawing No: A3-1945	
Checked:			

Revisions:

DRILL HOLE : PP 1

LOCATION :

DRILL TYPE : Mud rig

CASING TYPE : No casing

INCLINATION : Vertical

DEPTH DRILLED:

DEPTH LOGGED : 107·2m

LOGGING UNIT : SIE T450E

DATE : 15-7-81

LEGEND

- Alluvium / soil.
- Clay.
- Silt.
- Very fine - medium sand.
- Coarse - very coarse sand.
- Granule / pebble conglomerate
- Calcareous rock / limestone.
- Marl.
- Lignitic fragments / lignite.
- Glauconitic / carbonaceous rock.
- Shelly fossils / pyrite.
- Granite.
- Gneiss.
- Schist.
- Amphibolite.
- Hornfels.

Geological Log PP 1

metres

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160

Gamma
Winding Speed 4 m/min.

1m

106·5m

T D 117m

100 c.p.s.
T.C. = 5 secs.

Resistivity
Winding Speed 8 m./ min.

107·2m

50 ohm.m. Full scale

Self Potential
Winding Speed 8 m./ min.

107·2m

100 millivolts Full scale

Density
Winding Speed m./min.

T.C.= secs.
Source 50 m. Curies Cs 137

Revisions:

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

E.L.766 MULLAQUANA, S.A.

GEOPHYSICAL DOWN HOLE AND GRAPHIC LOG PP 1

Drawn: D.G.P. | Date: 10-8-81 | Centre: Adelaide
Traced: A.R.V. | Project No.: 6-C640-2 | Drawing No.: A2-115
Checked:

Fig. No.
To accompany
Dated

41241

Fig. 3

DRILL HOLE : PP2	
LOCATION :	
DRILL TYPE : Mud rig	
CASING TYPE : No casing	
INCLINATION : Vertical	
DEPTH DRILLED: 150·0m	
DEPTH LOGGED: 53·0m	
LOGGING UNIT : SIE T450E	
DATE : 15–7–81	

LEGEND

- Alluvium / soil.
- Clay.
- Silt.
- Very fine - medium sand.
- Coarse - very coarse sand.
- Granule / pebble conglomerate.
- Calcareous rock / limestone.
- Marl.
- Lignitic fragments / lignite.
- Glauconitic / carbonaceous rock.
- Shelly fossils / pyrite.
- Granite.
- Gneiss.
- Schist.
- Amphibolite.
- Hornfels.

Geological Log PP 2

Gamma Winding Speed 4 m/min.

Resistivity Winding Speed m./min.

Self Potential Winding Speed m./min.

Density Winding Speed m./min.

metres: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160

1·0m

53·0m

T.D. 150m

0 — c.p.s. — 100

T.C. = 5 secs.

ohm.m. Full scale

millivolts Full scale

T.C. = secs.

Source 50 m Curies Cs 137

Revisions:

Checked:

Traced A.R.V.

Drawn: D.G.P.

Date: 2-12-81

Project No.: 6-C640-3

Centre: Adelaide

Drawing No.: A2-130

E.L. 766 MULLAQUANA, S.A.

GEOPHYSICAL DOWN HOLE AND GRAPHIC LOGS PP2

THE BROKEN HILL PROPRIETARY CO. LTD. EXPLORATION DEPARTMENT

Fig. No.
To accompany
Dated

41243-2

Fig. 4

DRILL HOLE :	PP 3
LOCATION :	
DRILL TYPE :	Mud rig
CASING TYPE :	No casing
INCLINATION :	Vertical
DEPTH DRILLED:	
DEPTH LOGGED :	148·7m
LOGGING UNIT :	SIE T450E
DATE :	15-7-81

LEGEND

- Alluvium / soil.
- Clay.
- Silt
- Very fine - medium sand
- Coarse - very coarse sand
- Granule / pebble conglomerate
- Calcareous rock / limestone
- Marl
- Lignitic fragments / lignite
- Glauconitic / carbonaceous rock
- Shelly fossils / pyrite
- Granite
- Gneiss
- Schist
- Amphibolite
- Hornfels.

Geological Log PP 3

Gamma Winding Speed 4 m/min.

Resistivity Winding Speed 8 m./ min.

Self Potential Winding Speed 8 m./ min.

Density Winding Speed m./min.

metres

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160

1·0m

148·7m

T.D. 150 m

148·5m

148·5m

0 c.p.s. 100

T.C. = 5 secs.

50ohm.m. Full scale

100millivolts Full scale

T.C.= secs.

Source 50 m. Curies Cs 137

Revisions.

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

E.L.766 MULLAQUANA, S.A.

GEOPHYSICAL DOWN HOLE AND GRAPHIC LOGS PP 3

Drawn: D.G.P. | Traced: A.R.V. | Checked:

Date: 10-8-81 | Centre: Adelaide

Project No.: 6-0640-4 | Drawing No: A2-117

Fig. No.
To accompany
Dated

4124-3

Fig. 5

DRILL HOLE	PP4
LOCATION	
DRILL TYPE	Mud rig
CASING TYPE	No casing
INCLINATION	Vertical
DEPTH DRILLED	135·5m
DEPTH LOGGED	45·1m
LOGGING UNIT	SIE T450E
DATE	27–7–81

LEGEND

- Alluvium / soil.
- Clay.
- Silt.
- Very fine - medium sand.
- Coarse - very coarse sand.
- Granule / pebble conglomerate.
- Calcareous rock / limestone.
- Marl.
- Lignitic fragments / lignite.
- Glauconitic / carbonaceous rock.
- Shelly fossils / pyrite.
- Granite.
- Gneiss.
- Schist.
- Amphibolite.
- Hornfels.

Geological Log PP4

Gamma Winding Speed 4 m/min

Resistivity Winding Speed m / min.

Self Potential Winding Speed m / min.

Density Winding Speed m / min

metres

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160

1·0m

45·1m

45·1m

45·1m

T.D. 135·5 m

0 cps 100 T.C. = 5 secs

50 ohm m Full scale

100 millivolts Full scale

T.C = secs
Source 50 m Curies Cs 137

Revisions

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Traced A.R.V.

Drawn D G P

Date 2-12-81

Project No. 6-0640-5

Centre Adelaide

Drawing No A2-129

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E.L.766 MULLAQUANA, S.A.

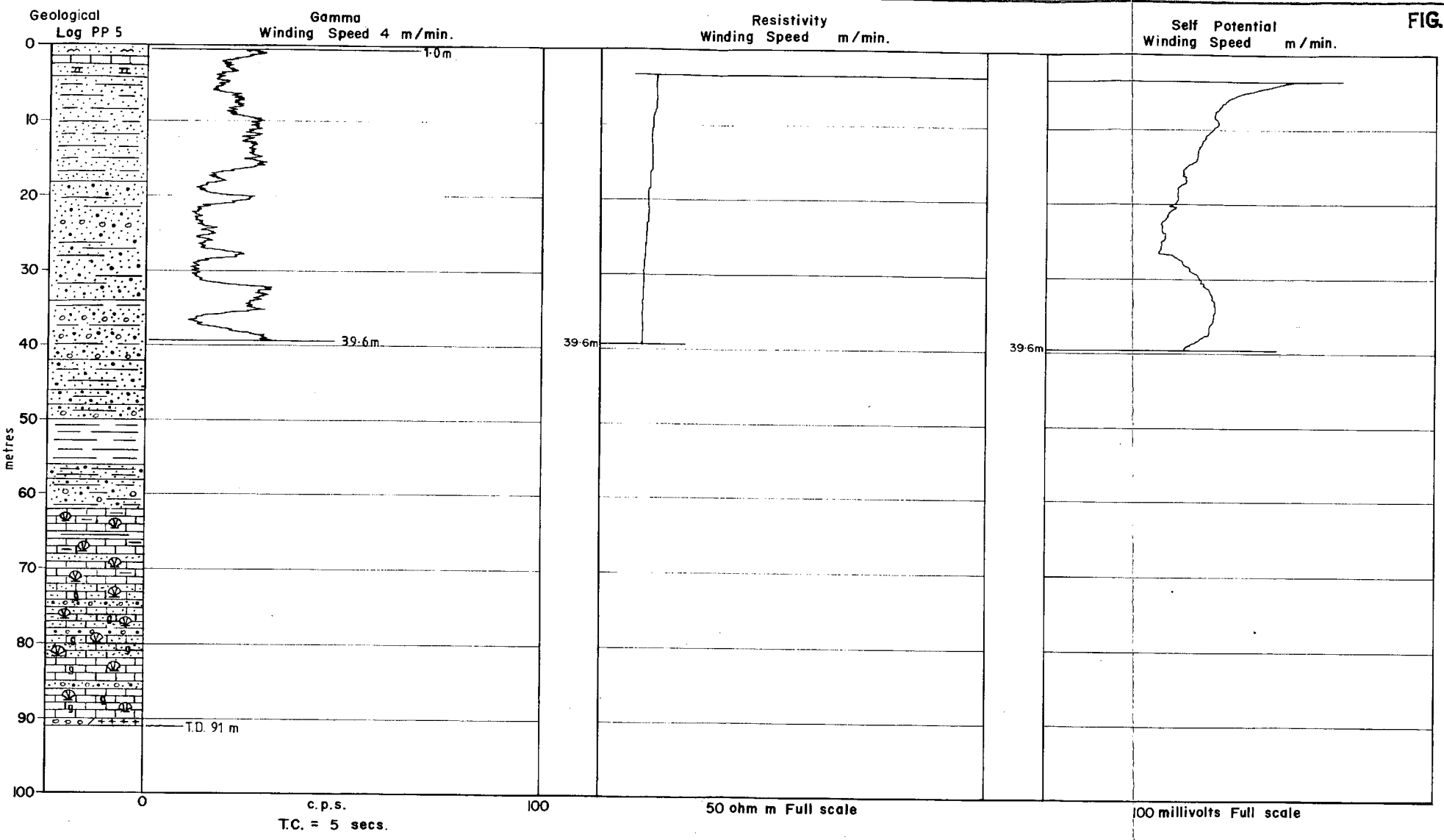
GEOPHYSICAL DOWN HOLE AND GRAPHIC LOGS - PP4

Fig No
To accompany
Dated

4124-4

Fig. 6

FIG. 7.



LEGEND

- Alluvium/soil
- Clay
- Silt
- Very fine - medium
- Coarse/very coarse sand.
- Granule/pebble conglomerate.
- Calcareous rock / limestone
- Marl
- Lignitic fragments/ lignite.
- Glauconitic/ carbonaceous rock
- Shelly fossils/ pyrite.
- Granite
- Gneiss
- Schist
- Amphibolite
- Hornfels

DRILL HOLE: PP 5	DEPTH OF HOLE:
LOCATION:	DEPTH LOGGED: 39·6m
	LOGGING UNIT: SIE T450 E
DRILL TYPE: Mud rig	CASING TYPE: No casing
DATE: 27 7 81	INCLINATION: Vertical

Revisions:

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

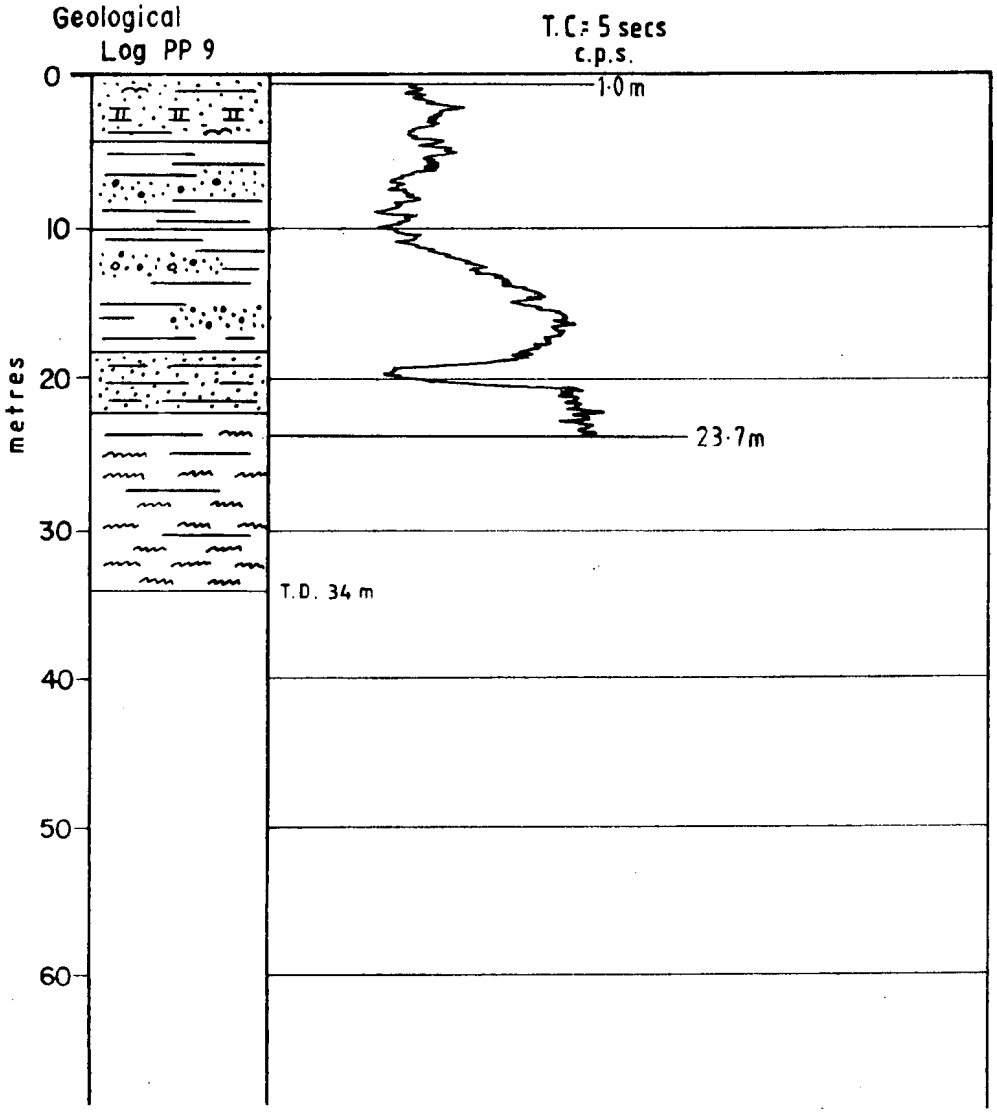
E.L.766 MULLAQUANA, S.A.
GEOPHYSICAL DOWN HOLE AND GRAPHIC LOGS PP 5

Prepared by: D.G.P	Centre: Adelaide	
Date: 17-8-81	Project No.	Drawing No.
Drawn: A.R.V.	6-C640-6	A3-89

FIG. 8

000027

DRILL HOLE: PP 9	DEPTH OF HOLE:
LOCATION:	DEPTH LOGGED: 23·7 m
	LOGGING UNIT: SIE T450E
TYPE OF LOG: Gamma	CASING TYPE: No casing
DATE: 25-7-81	INCLINATION: Vertical



LEGEND

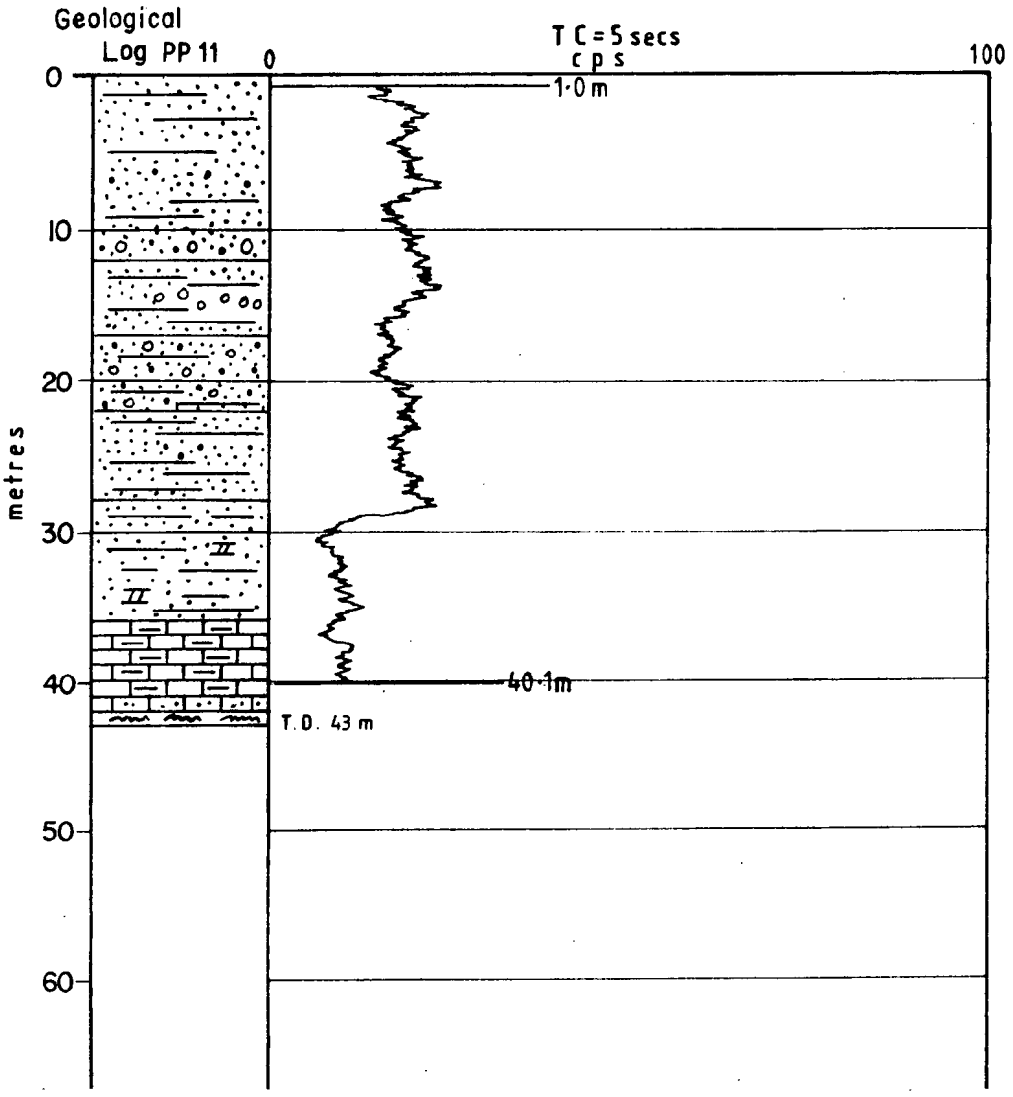
- Alluvium/soil
- Clay
- Silt
- Very fine - medium
- Coarse/very coarse sand.
- Granule/pebble conglomerate.
- Calcareous rock / limestone
- Marl
- Lignitic fragments/ lignite.
- Glauconitic/ carbonaceous rock
- Shelly fossils/ pyrite.
- Granite
- Gneiss
- Schist
- Amphibolite
- Hornfels

Centre: Adelaide	THE BROKEN HILL PROPRIETARY CO. LTD E.L.766 MULLAQUANA, S.A. GRAPHIC AND GAMMA LOG PP 9	Project No: 6-C640-7
Date: 17-8-81		Drawing No: A4-146

FIG. 9

000028

DRILL HOLE : PP 11	DEPTH OF HOLE : 43 m
LOCATION:	DEPTH LOGGED: 40·1 m
	LOGGING UNIT: SIE T450E
TYPE OF LOG: Gamma	CASING TYPE: No casing
DATE: 25-7-81	INCLINATION: Vertical



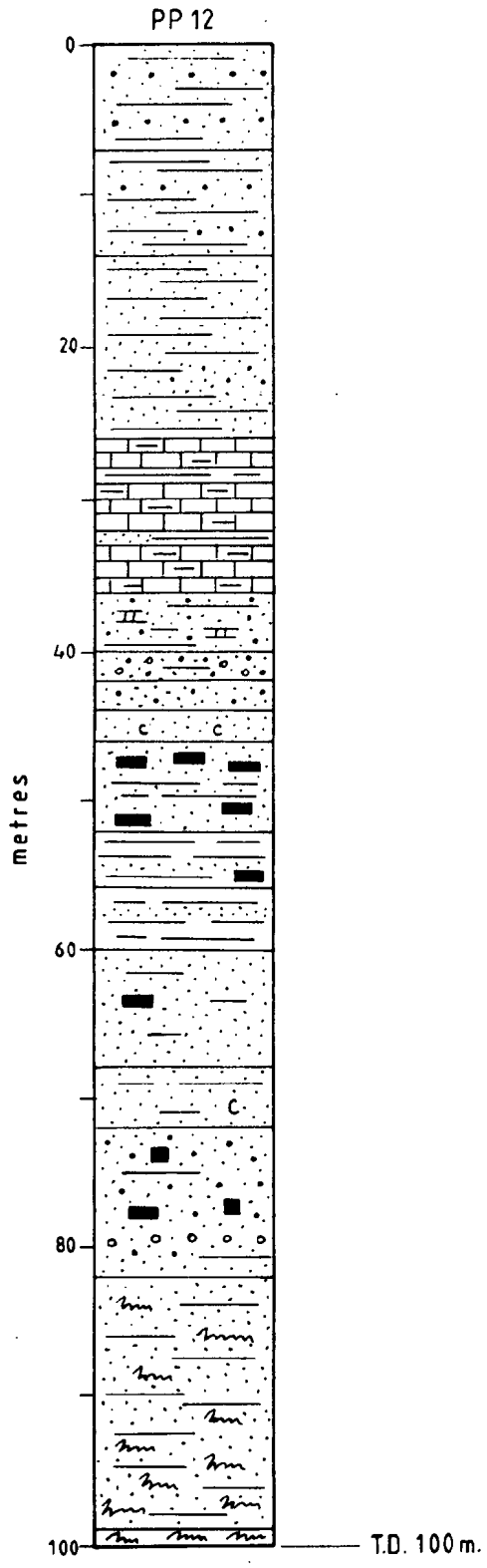
LEGEND

- Alluvium/soil
- Clay
- Silt
- Very fine - medium
- Coarse/very coarse sand.
- Granule/pebble conglomerate.
- Calcareous rock / limestone
- Marl
- Lignitic fragments / lignite.
- Glauconitic / carbonaceous rock
- Shelly fossils / pyrite.
- Granite
- Gneiss
- Schist
- Amphibolite
- Hornfels

Centre: Adelaide	THE BROKEN HILL PROPRIETARY CO. LTD. E.L.766 MULLAQUANA, S.A.	Project No: 6-C640-8
Date: 18-8-81	GRAPHIC AND GAMMA LOG - PP 11	Drawing No: A4-147

FIG. 10

000029

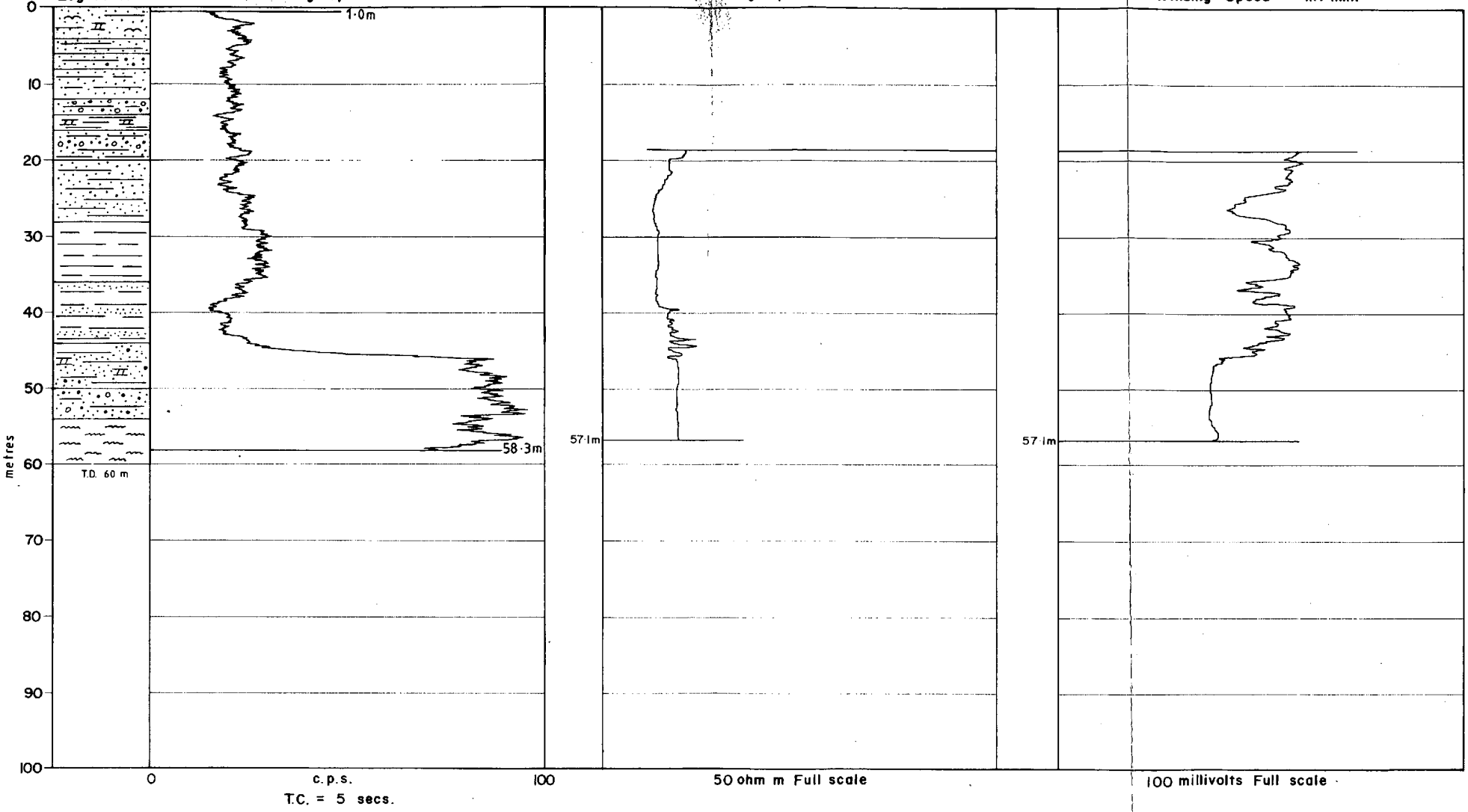


LEGEND

- Clay.
- Silt.
- Very fine – medium sand.
- Coarse – very coarse sand.
- Granule conglomerate.
- Calcareous rock / limestone.
- Lignitic fragments / lignite.
- Carbonaceous rock.
- Pyrite.
- Gneiss

Centre: Whyalla	THE BROKEN HILL PROPRIETARY CO. LTD E.L.766 MULLAQUANA, S.A. GRAPHIC LOG PP 12	Project No
Date: 29 APR 82		Drawing No. A4- 390

FIG. 11



LEGEND

- Alluvium/soil
- Clay
- Silt
- Very fine - medium
- Coarse/very coarse sand.
- Granule/pebble conglomerate.
- Calcareous rock / limestone
- Marl
- Lignitic fragments/ lignite.
- Glauconitic/ carbonaceous rock
- Shelly fossils/ pyrite.
- Granite
- Gneiss
- Schist
- Amphibolite
- Hornfels

DRILL HOLE: PP 14	DEPTH OF HOLE:
LOCATION:	DEPTH LOGGED: 58·3m
	LOGGING UNIT: SIE T450E
DRILL TYPE Mud rig	CASING TYPE: No casing
DATE: 27, 28·7·81	INCLINATION: Vertical

Revisions:

THE BROKEN HILL PROPRIETARY CO. LTD.
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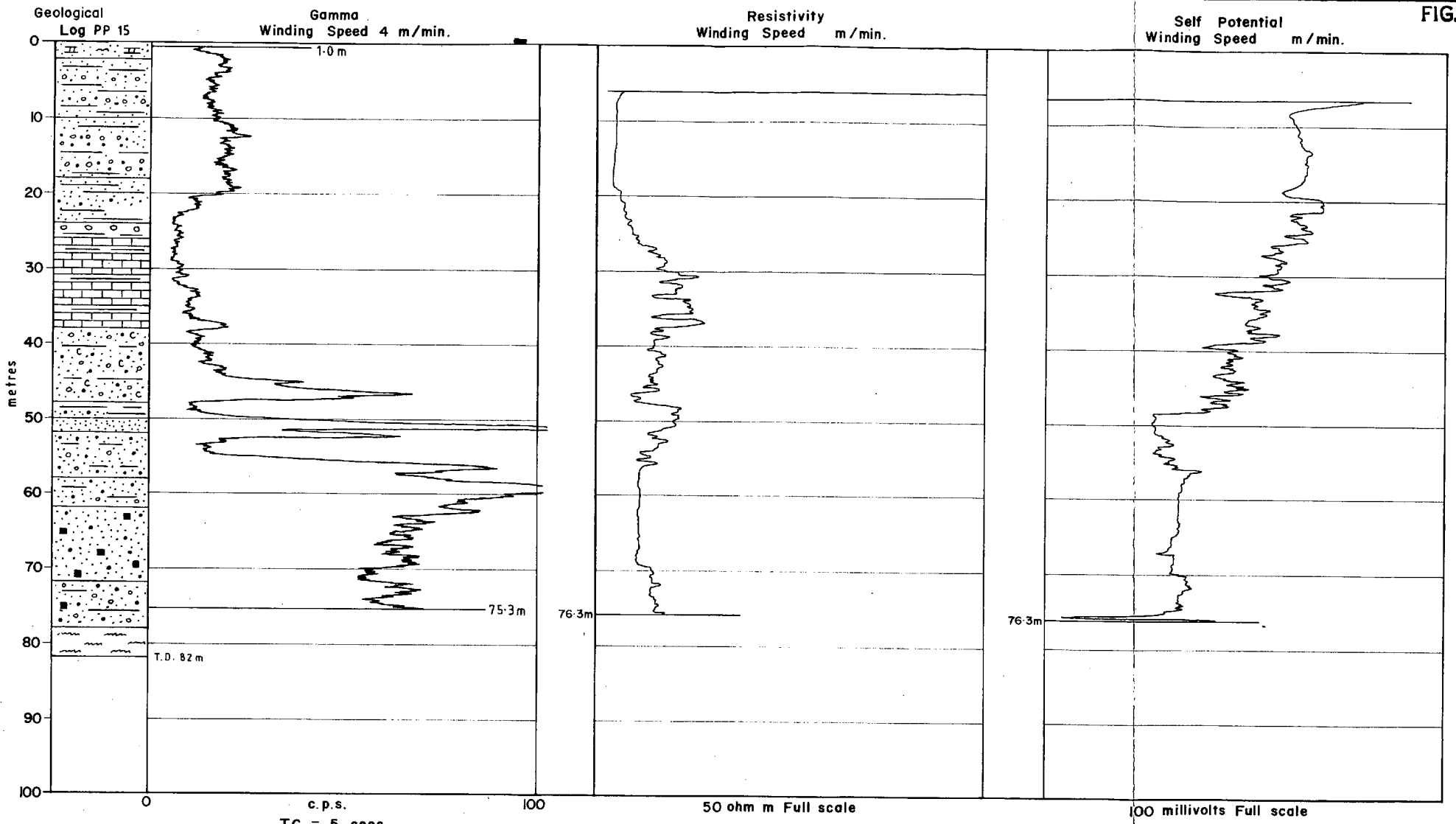
E.L.766 MULLAQUANA, S.A.
GEOPHYSICAL DOWN HOLE AND GRAPHIC LOGS PP 14

Prepared by: D.G.P.	Centre: Adelaide	
Date: 18-8-81	Project No.	Drawing No.
Drawn: A.R.V.	6-C640-10	A3-90

000000

FIG. 12



LEGEND

- Alluvium/soil
- Clay
- Silt
- Very fine - medium
- Coarse/very coarse sand.
- Granule/pebble conglomerate.
- Calcareous rock / limestone
- Marl
- Lignitic fragments/ lignite.
- Glauconitic/ carbonaceous rock
- Shelly fossils/ pyrite.
- Granite
- Gneiss
- Schist
- Amphibolite
- Hornfels

DRILL HOLE: PP 15	DEPTH OF HOLE:
LOCATION:	DEPTH LOGGED: 76·3m
	LOGGING UNIT: SIE T450E
DRILL TYPE: Mud rig	CASING TYPE: No casing
DATE: 28·7·81	INCLINATION: Vertical

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

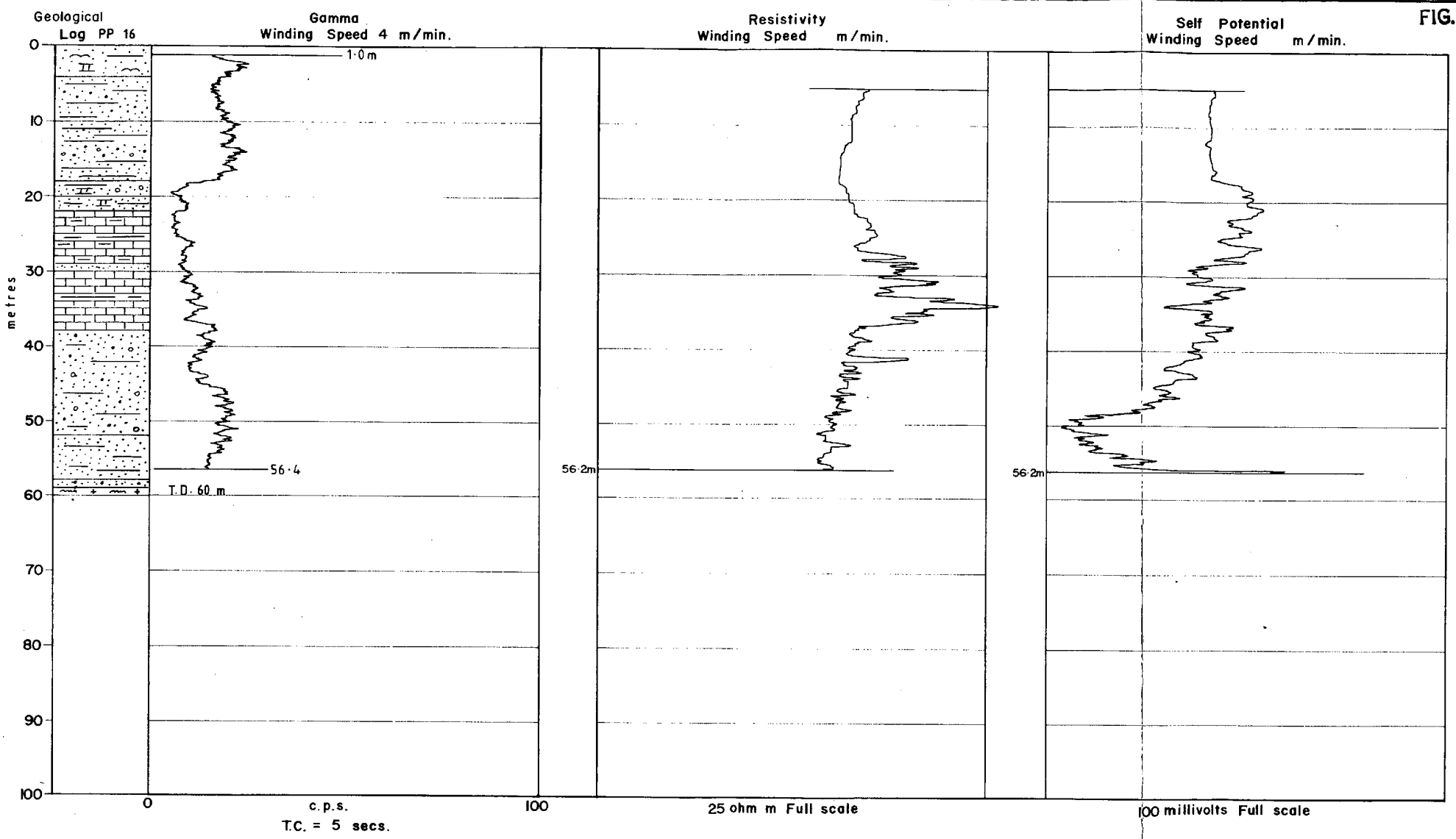
E.L.766 MULLAQUANA, S.A.
GEOPHYSICAL DOWN HOLE AND GRAPHIC LOGS PP 15

Prepared by: D.G.P.	Centre: Adelaide	
Date: 18-8-81	Project No.	Drawing No.
Drawn: A.R.V.	6-C640-11	A3-91

Revisions:

000031

FIG. 13



LEGEND

- Alluvium/soil
- Clay
- Silt
- Very fine - medium
- Coarse/very coarse sand.
- Granule/pebble conglomerate.
- Calcareous rock / limestone
- Marl
- Lignitic fragments/ lignite.
- Glauconitic/ carbonaceous rock
- Shelly fossils/ pyrite.
- Granite
- Gneiss
- Schist
- Amphibolite
- Horntels

DRILL HOLE: PP 16	DEPTH OF HOLE:
LOCATION:	DEPTH LOGGED: 56·4 m
	LOGGING UNIT: SIE T450E
DRILL TYPE: Mud rig	CASING TYPE: No casing
DATE: 30 · 7 · 81	INCLINATION: Vertical

Revisions:

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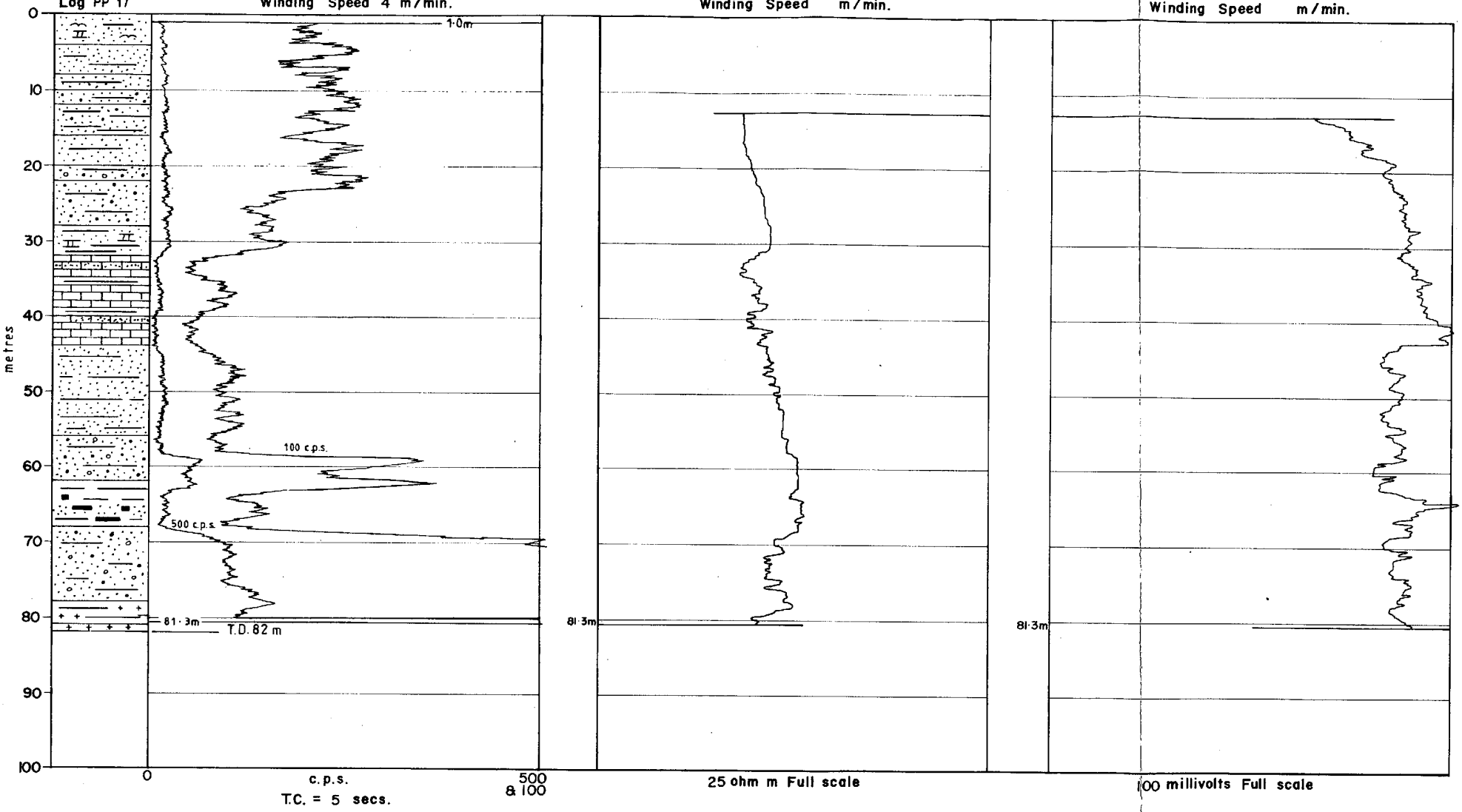
EXPLORATION DEPARTMENT

E.L.766 MULLAQUANA, S.A.
GEOPHYSICAL DOWN HOLE AND GRAPHIC LOGS PP16

Prepared by: D.G.P.	Centre: Adelaide	
Date: 18-8-81	Project No.	Drawing No.
Drawn: A.R.V.	6-C640-12	A3-92

000032

FIG. 14



LEGEND

- Alluvium/soil
- Clay
- Silt
- Very fine - medium
- Coarse/very coarse sand.
- Granule/pebble conglomerate.
- Calcareous rock / limestone
- Marl
- Lignitic fragments/ lignite.
- Glauconitic/ carbonaceous rock
- Shelly fossils/ pyrite.
- Granite
- Gneiss
- Schist
- Amphibolite
- Hornfels

DRILL HOLE: PP 17	DEPTH OF HOLE:
LOCATION:	DEPTH LOGGED: 81·3m
	LOGGING UNIT: SIE T450 E
DRILL TYPE: Mud rig	CASING TYPE: No casing
DATE: 31·7·81	INCLINATION: Vertical

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E.L.766 MULLAQUANA, S.A.
GEOPHYSICAL DOWN HOLE AND GRAPHIC LOGS PP 17

Prepared by: D.G.P	Centre: Adelaide	
Date: 19-8-81	Project No.	Drawing No.
Drawn: A.R.V.	6-C640-13	A3-93

Revisions:

000033

DRILL HOLE : PP 18

LOCATION :

DRILL TYPE : Mud rig

CASING TYPE : No casing

INCLINATION : Vertical

DEPTH DRILLED:

DEPTH LOGGED: 147·2m

LOGGING UNIT : SIE T450E

DATE : 1-8-81

LEGEND

- Alluvium / soil
- Clay
- Silt
- Very fine - medium sand
- Coarse - very coarse sand
- Granule / pebble conglomerate
- Calcareous rock / limestone
- Marl
- Lignitic fragments / lignite
- Glauconitic / carbonaceous rock
- Shelly fossils / pyrite
- Granite
- Gneiss
- Schist
- Amphibolite
- Hornfels

Geological Log PP 18

metres

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160

Gamma
Winding Speed 4 m/min.

1·0m

T.D. 148 m

146·6m

0 100

c.p.s.
T.C. = 5 secs

Resistivity
Winding Speed m./min.

147·2m

25 ohm.m. Full scale

Self Potential
Winding Speed m./min.

147·2m

250 millivolts Full scale

Density
Winding Speed m./min.

T.C.= secs.
Source 50 m. Curies Cs 137

Revisions:

Checked:

Traced A.R.V.

Drawn D.G.P.

Date 9-8-81

Centre: Adelaide

Project No.: 6-C640-14

Drawing No.: A2-118

E.L.766 MULLAQUANA, S.A.

GEOPHYSICAL DOWN HOLE AND GRAPHIC LOGS PP 18

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

Fig. No.
To accompany
Dated

4124-5 Fig. 15

DRILL HOLE : PP 18A

LOCATION :

DRILL TYPE : Mud rig

CASING TYPE : No casing

INCLINATION : Vertical

DEPTH DRILLED: 150 m

DEPTH LOGGED: 149·4m

LOGGING UNIT : SIE T450E

DATE : 3-8-81

LEGEND

- Alluvium / soil.
- Clay.
- Silt
- Very fine - medium sand
- Coarse - very coarse sand
- Granule / pebble conglomerate
- Calcareous rock / limestone
- Marl
- Lignitic fragments / lignite
- Glauconitic / carbonaceous rock
- Shelly fossils / pyrite
- Granite
- Gneiss
- Schist
- Amphibolite
- Hornfels

Geological Log PP 18A

Gamma Winding Speed 4 m/min.

Resistivity Winding Speed m./min.

Self Potential Winding Speed m./min.

Density Winding Speed m./min.

metres

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160

1·0m

CORE RUN

CORE RUN

149·4m

T.D. 150 m

148·4m

148·4m

0 c.p.s. 100
T.C. = 5 secs.

50 ohm.m. Full scale

100 millivolts Full scale

T.C.= secs.
Source 50 m. Curies Cs 137

Revisions:

Checked:

Traced A.R.V.

Drawn: D.G.P.

Date: 20-8-81

Centre: Adelaide

Project No.: 6-0640-15

Drawing No.: A2-119

E.L. 766 MULLAQUANA, S.A.

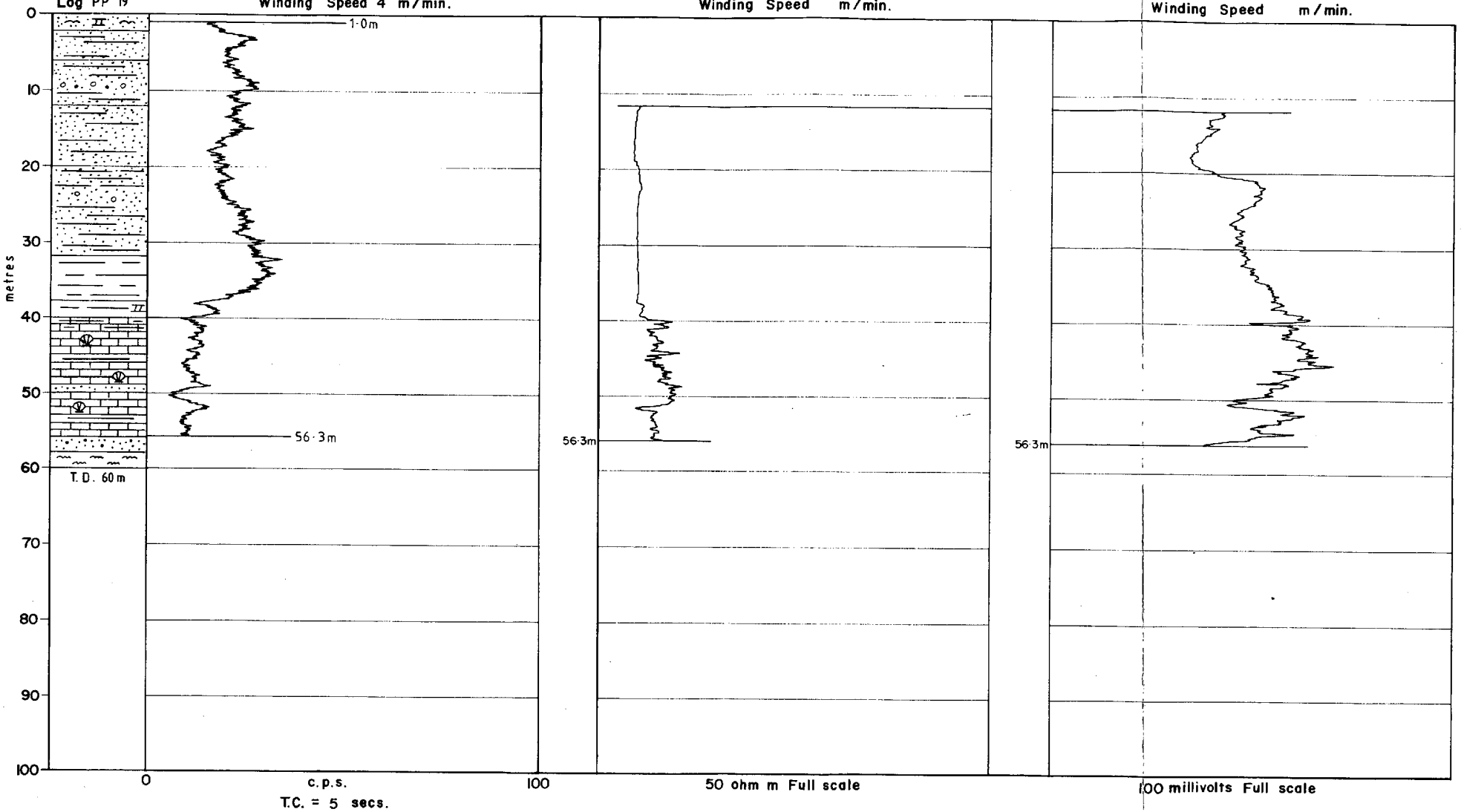
GEOPHYSICAL DOWN HOLE AND GRAPHIC LOGS PP 18A

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

Fig. No.
To accompany
Dated

4124-6 Fig. 16

FIG. 17.



LEGEND

- Alluvium/soil
- Clay
- Silt
- Very fine - medium
- Coarse/very coarse sand.
- Granule/pebble conglomerate.
- Calcareous rock / limestone
- Marl
- Lignitic fragments/ lignite.
- Glauconitic/ carbonaceous rock
- Shelly fossils/ pyrite.
- Granite
- Gneiss
- Schist
- Amphibolite
- Hornfels

DRILL HOLE: PP 19	DEPTH OF HOLE:
LOCATION:	DEPTH LOGGED: 56·3m
	LOGGING UNIT: SIE T450E
DRILL TYPE: Mud rig	CASING TYPE: No casing
DATE: 5·8·81	INCLINATION: Vertical

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EXPLORATION DEPARTMENT

E.L.766 MULLAQUANA, S.A.
GEOPHYSICAL DOWN HOLE AND GRAPHIC LOGS PP 19

Revisions:

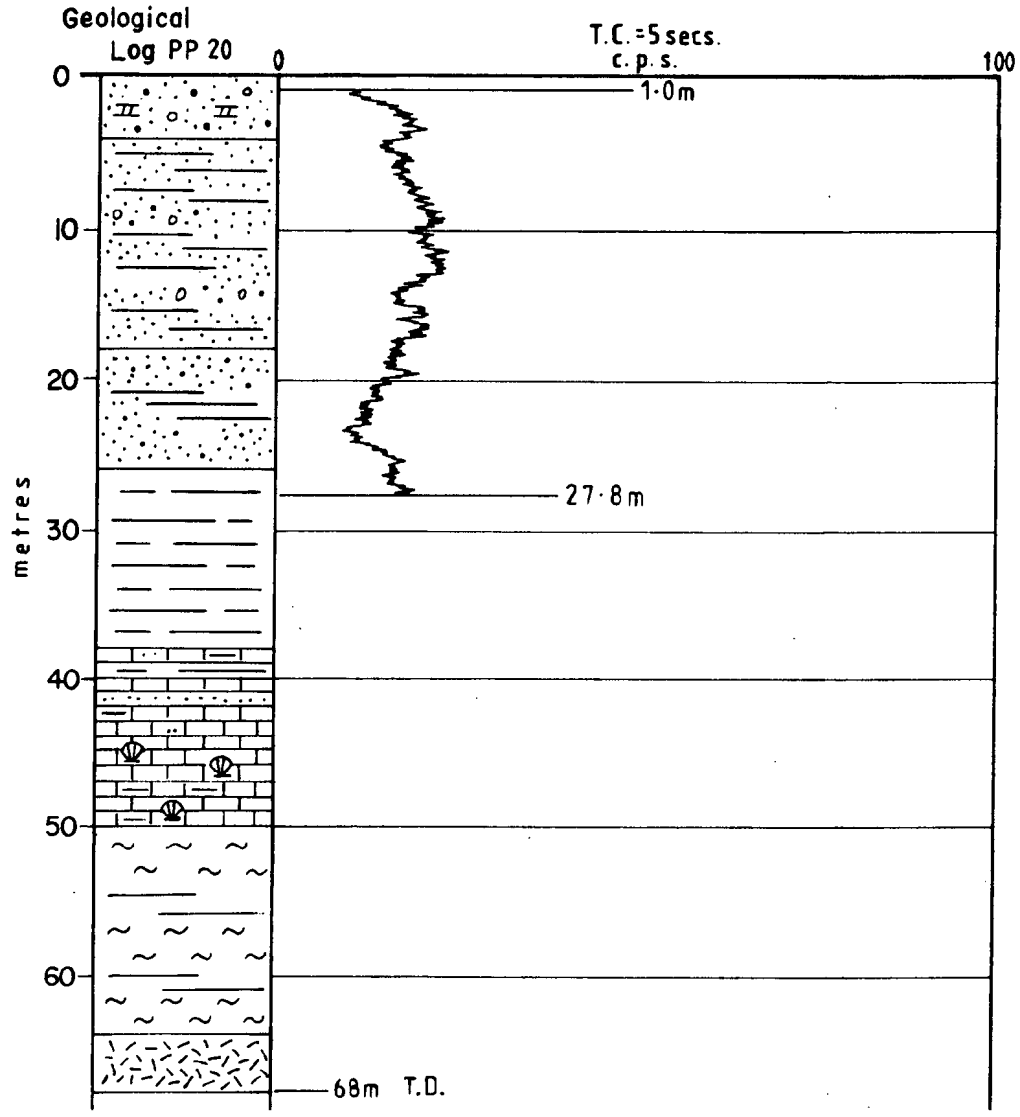
Prepared by: D.G.P.	Centre: Adelaide	
Date: 20-8-81	Project No.	Drawing No.
Drawn: A.R.V.	6-C640-16	A3-94

000034

FIG. 18

000035

DRILL HOLE : PP 20	DEPTH OF HOLE:
LOCATION:	DEPTH LOGGED: 27·8m
	LOGGING UNIT: SIE T450E
TYPE OF LOG: Gamma	CASING TYPE: No casing
DATE: 6-8-81	INCLINATION: Vertical



LEGEND

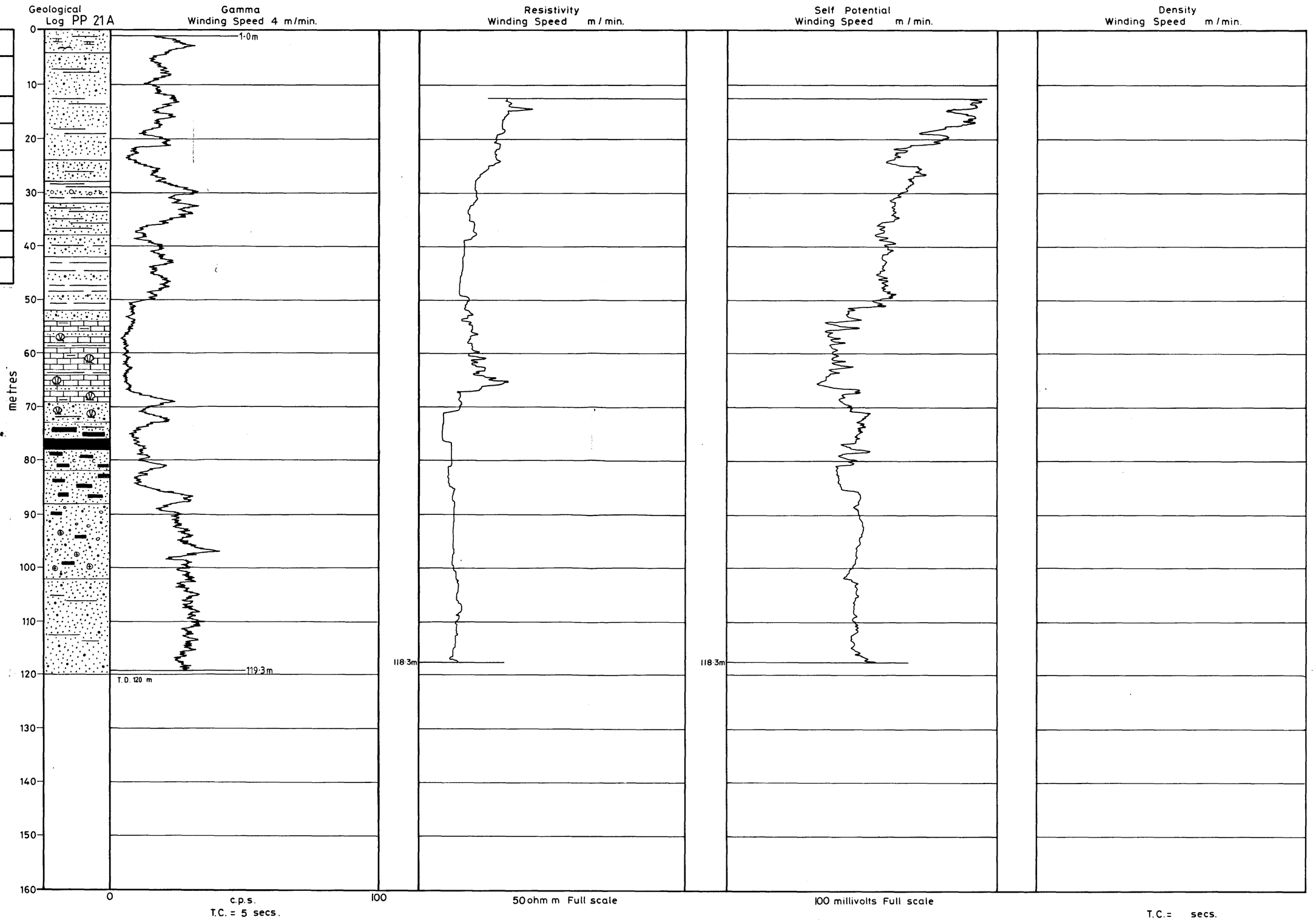
- Alluvium/soil
- Clay
- Silt
- Very fine - medium
- Coarse/very coarse sand.
- Granule/pebble conglomerate.
- Calcareous rock / limestone
- Marl
- Lignitic fragments/ lignite.
- Glauconitic/ carbonaceous rock
- Shelly fossils/ pyrite.
- Granite
- Gneiss
- Schist
- Amphibolite
- Hornfels

Centre: Adelaide	THE BROKEN HILL PROPRIETARY CO. LTD. E.L.766 MULLAQUANA, S.A. GRAPHIC AND GAMMA LOG PP 20	Project No.: 6-C640-17
Date: 20-8-81		Drawing No.: A4-151

DRILL HOLE : PP 21A	
LOCATION :	
DRILL TYPE : Mud rig	
CASING TYPE : No casing	
INCLINATION : Vertical	
DEPTH DRILLED: 120 m	
DEPTH LOGGED: 119·3m	
LOGGING UNIT : SIE T45OE	
DATE : 7-8-81	

LEGEND

- Alluvium / soil.
- Clay.
- Silt.
- Very fine - medium sand.
- Coarse - very coarse sand.
- Granule / pebble conglomerate.
- Calcareous rock / limestone.
- Marl.
- Lignitic fragments / lignite.
- Glauconitic / carbonaceous rock.
- Shelly fossils / pyrite.
- Granite.
- Gneiss.
- Schist.
- Amphibolite.
- Hornfels.



Revisions:

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

E.L.766 MULLAQUANA, S.A.

GEOPHYSICAL DOWN HOLE AND GRAPHIC LOGS - PP 21A

Checked:	Traced: A.R.V.	Drawn: D.G.P.	Date: 20-8-81
Project No.: 6-0640-18		Drawing No.: A2-120	Centre: Adelaide

Fig. No.
To accompany
Dated

4124-7 Fig. 19

DRILL HOLE:	PP D 22
LOCATION:	E.L. 766 MULLAQUANA
DRILL TYPE:	Diamond
CASING TYPE:	NW steel to 54 m
INCLINATION:	Vertical
DEPTH DRILLED:	119·95 metres
DEPTH LOGGED:	100 metres
LOGGING UNIT:	SIE T450E
DATE:	12·1·82

LEGEND

- Alluvium / soil.
- Clay.
- Silt.
- Very fine - medium sand.
- Coarse - very coarse sand.
- Granule / pebble conglomerate.
- Calcareous rock / limestone.
- Marl.
- Lignitic fragments / lignite.
- Glauconitic / carbonaceous rock.
- Shelly fossils / pyrite.
- Granite.
- Gneiss.
- Schist.
- Amphibolite.
- Hornfels.

Geological Log PPD 22

Gamma Winding Speed 4 m/min.

Resistivity Winding Speed m./min.

Self Potential Winding Speed m./min.

Density Winding Speed m./min.

metres: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160

1 m

T.D. 119·95

0 — c.p.s. T.C. = 5 secs. — 100

ohm.m. Full scale

millivolts Full scale

T.C.= secs.
Source 50 m. Curies Cs 137

Revisions:

Checked:

Traced: I.L.

Drawn: D.G.P.

Date: 25.1.82

Centre: Adelaide

Project No.: 6-C640-19

Drawing No.: A2-143

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

E.L. 766 MULLAQUANA, S.A.
GEOPHYSICAL DOWN HOLE AND GRAPHIC LOGS PPD 22

Fig. No.
To accompany
Dated

4124-8 Fig. 20

DRILL HOLE:	PPD 23
LOCATION:	EL 766 MULLAQUANA
DRILL TYPE:	Diamond
CASING TYPE:	Uncased
INCLINATION:	Vertical
DEPTH DRILLED:	91·3 metres
DEPTH LOGGED:	39 metres
LOGGING UNIT:	SIE T450E
DATE:	11-2-82

LEGEND

- Alluvium / soil.
- Clay.
- Silt.
- Very fine - medium sand.
- Coarse - very coarse sand.
- Granule / pebble conglomerate.
- Calcareous rock / limestone.
- Marl.
- Lignitic fragments / lignite.
- Glauconitic / carbonaceous rock.
- Shelly fossils / pyrite.
- Granite.
- Gneiss.
- Schist.
- Amphibolite.
- Hornfels.

Geological Log PPD 23

Gamma Winding Speed 4 m/min.

Resistivity Winding Speed m./min.

Self Potential Winding Speed m./min.

Density Winding Speed m./min.

metres: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160

1m

39m

38m

38m

TD. 91·3m

0 c.p.s. 100
T.C. = 5 secs.

25 ohm.m. Full scale

100 millivolts Full scale

T.C. = secs.
Source 50 m. Curies Cs 137

Revisions:

Fig. No.
To accompany
Dated

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

EL 766 MULLAQUANA S.A.
GEOPHYSICAL DOWN HOLE AND GRAPHIC LOGS PPD 23

Drawn: D.G.P. Date: 23-2-82 Centre: Adelaide
Traced: I.L.
Checked:
Project No.: 6-C640-23
Drawing No.: A2-148

4124-9 Fig. 21

DRILL HOLE:	PPD 24
LOCATION:	EL 766 MULLAQUANA
DRILL TYPE:	Diamond
CASING TYPE:	NW Steel to 63·5m BQ to bottom
INCLINATION:	Vertical
DEPTH DRILLED:	122·0 m
DEPTH LOGGED:	117·5 metres
LOGGING UNIT:	SIE T450E
DATE:	25·1·82

LEGEND

- Alluvium / soil.
- Clay.
- Silt.
- Very fine - medium sand.
- Coarse - very coarse sand.
- Granule / pebble conglomerate.
- Calcareous rock / limestone.
- Marl.
- Lignitic fragments / lignite.
- Glauconitic / carbonaceous rock.
- Shelly fossils / pyrite.
- Granite.
- Gneiss.
- Schist.
- Amphibolite.
- Hornfels.

Geological Log PPD 24

metres: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160

0·5m

OPEN HOLE

CORE

(b) (a)

117·5 m

TD 122·0 m

Gamma
Winding Speed 4 m/min.

0 — 100 (a) / 500 (b)
c.p.s.
T.C. = 5 secs.

Resistivity
Winding Speed m./min.

ohm.m. Full scale

Self Potential
Winding Speed m./min.

millivolts Full scale

logger jammed

18m

Density
Winding Speed 6 m./min.

117·5m

0 — 100
T.C.= 2 secs.
Source 50 m. Curies Cs 137

Revisions:

Checked:

Traced: I. Ley

Drawn: D.G.P.

Date: 28·1·82

Centre: Adelaide

Project No.: 6-C640-20

Drawing No.: A2-145

E.L. 766 MULLAQUANA, S.A
GEOPHYSICAL DOWN HOLE AND GRAPHIC LOG PPD 24

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

Fig. No.
To accompany
Dated

4124-10 Fig. 22

DRILL HOLE:	PPD 25
LOCATION:	EL 766 MULLAQUANA
DRILL TYPE:	Diamond
CASING TYPE:	Uncased
INCLINATION:	Vertical
DEPTH DRILLED:	
DEPTH LOGGED:	28 m
LOGGING UNIT:	SIE T450E
DATE:	5 - 2 - 82

LEGEND

- Alluvium / soil.
- Clay.
- Silt.
- Very fine - medium sand.
- Coarse - very coarse sand.
- Granule / pebble conglomerate.
- Calcareous rock / limestone.
- Marl.
- Lignitic fragments / lignite.
- Glauconitic / carbonaceous rock.
- Shelly fossils / pyrite.
- Granite.
- Gneiss.
- Schist.
- Amphibolite.
- Hornfels.

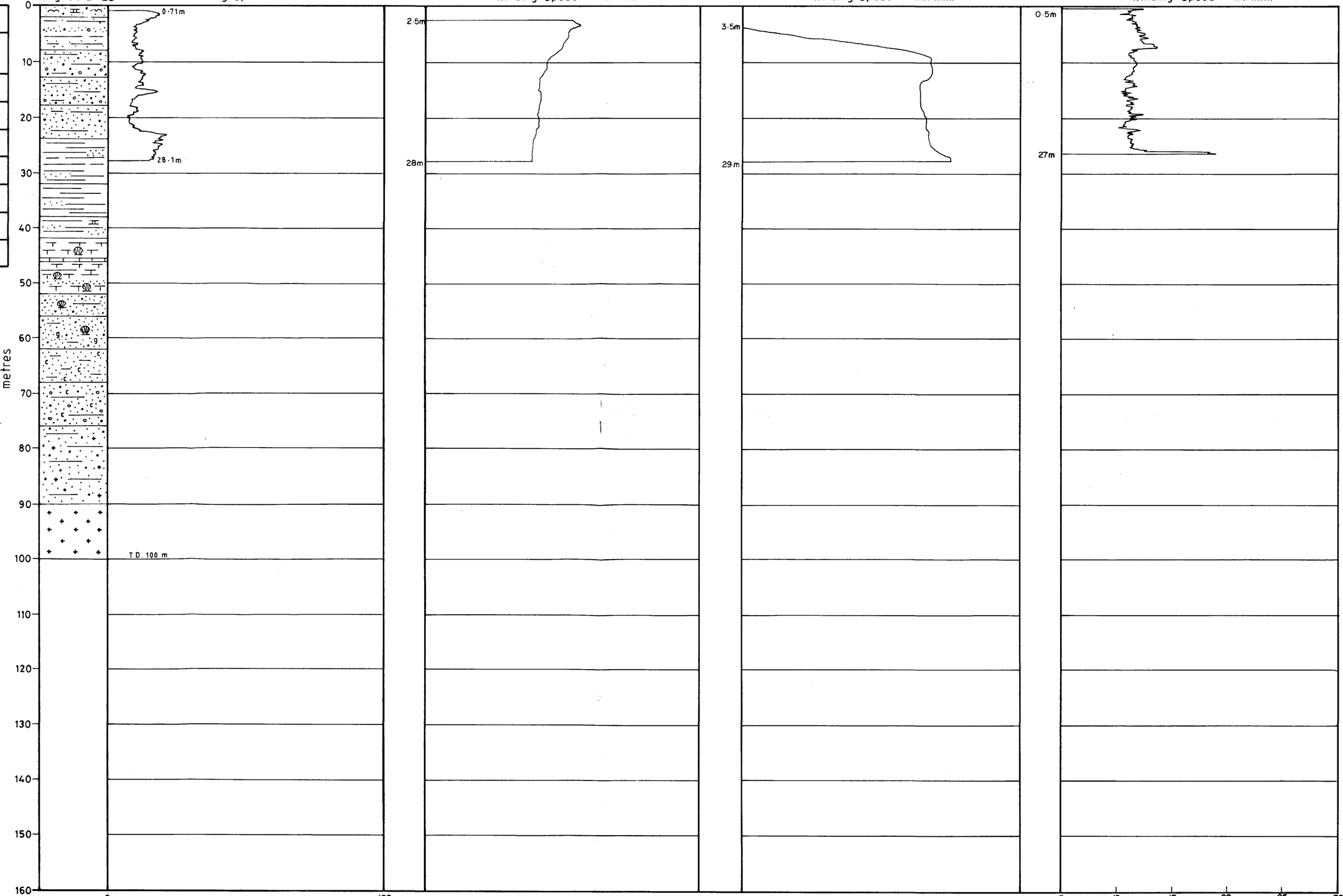
Geological Log PPD 25

Gamma Winding Speed 4 m/min.

Resistivity Winding Speed m./min.

Self Potential Winding Speed m./min.

Caliper Winding Speed m./min.



Revisions:

Checked:	Traced: IL	Drawn: D.G.P.	Date: 15-2-82
Project No.: 6-C640-21		Drawing No.: A2-146	Centre: Adelaide

EL 766 MULLAQUANA, S.A.

GEOPHYSICAL DOWN HOLE AND GRAPHIC LOGS - PPD 25

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

Fig. No.
To accompany
Dated

4124-11

Fig. 23

DRILL HOLE:	PPD26
LOCATION:	EL 766 MULLAQUANA
DRILL TYPE:	Diamond
CASING TYPE:	See note below.
INCLINATION:	Vertical
DEPTH DRILLED:	101·9 metres
DEPTH LOGGED:	87 metres
LOGGING UNIT:	SIE T450E
DATE:	5-2-82

LEGEND

- Alluvium / soil.
- Clay.
- Silt.
- Very fine - medium sand.
- Coarse - very coarse sand.
- Granule / pebble conglomerate.
- Calcareous rock / limestone.
- Marl.
- Lignitic fragments / lignite.
- Glauconitic / carbonaceous rock.
- Shelly fossils / pyrite.
- Granite.
- Gneiss.
- Schist.
- Amphibolite.
- Hornfels.

Geological Log PPD 26

metres: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160

Gamma Winding Speed 4 m/min.

0·5m

87m

T.D. 101·90m

0 c.p.s. 100

T.C. = 5 secs.

Resistivity Winding Speed m./min.

3m

35m

25 ohm.m. Full scale

Self Potential Winding Speed m./min.

3.5m

36m

100 millivolts Full scale

Density Winding Speed 6 m./min.

0.5m

3m

Caliper Log

35.5m

(b)

(a)

85m

10 15 20 25 30 35 cm

Caliper log

0 0 100(a) 500(b)

T.C. = 2 secs.

Source 50 m. Curies Cs 137

Casing:

Gamma & density: N rods to bottom of hole.

Resistivity: S.P. and caliper in uncased hole.

Revisions:

Checked:

Traced: IL

Drawn: D.G.P.

Date: 15-2-82

Centre: Adelaide

Project No.: 6-c640-22

Drawing No.: A2-147

EL 766 MULLAQUANA, S.A.

GEOPHYSICAL DOWN HOLE AND GRAPHIC LOGS PPD 26

THE BROKEN HILL PROPRIETARY CO. LTD.

EXPLORATION DEPARTMENT

Fig. No.

To accompany

Dated

4124-12 Fig. 24

DRILL HOLE:	PPD 27
LOCATION:	EL 766 MULLAQUANA
DRILL TYPE:	Diamond
CASING TYPE:	See below
INCLINATION:	Vertical
DEPTH DRILLED:	97·9 metres
DEPTH LOGGED:	95 metres
LOGGING UNIT:	SIE T450E
DATE:	11-2-82

LEGEND

- Alluvium / soil.
- Clay.
- Silt.
- Very fine - medium sand.
- Coarse - very coarse sand.
- Granule / pebble conglomerate.
- Calcareous rock / limestone.
- Marl.
- Lignitic fragments / lignite.
- Glauconitic / carbonaceous rock.
- Shelly fossils / pyrite.
- Granite.
- Gneiss.
- Schist.
- Amphibolite.
- Hornfels.

Geological Log PPD 27

Gamma Winding Speed m/min.

Resistivity Winding Speed m./min.

Self Potential Winding Speed m./min.

Density Winding Speed m./min.

metres

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160

1m

22m

caved

22m

caved

43·8m (b) hole caved

OPEN HOLE

CORE

(a)

95m

T.D. 979 m

0 c.p.s. 100

T.C. = 5 secs.

50 ohm.m. Full scale

100 millivolts Full scale

T.C.= secs.

Source 50 m. Curies Cs 137

(a) Log was read manually every 10cms - readings then were averaged over 50cms. Steel casing to 66·6m, N rods to 97m.

(b) Hole uncased, no rods

Uncased

Uncased

Revisions:

Checked:

Traced: I.L.

Drawn: D.G.P.

Date: 23-2-82

Centre: Adelaide

Project No.: 6-C640-24

Drawing No.: A2-318

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

EL 766 MULLAQUANA, S.A.

GEOPHYSICAL DOWN HOLE AND GRAPHIC LOGS PPD 27

Fig. No.
To accompany
Dated

4124-13 Fig. 25

DRILL HOLE:	PPD28
LOCATION:	
DRILL TYPE:	Diamond
CASING TYPE:	Steel casing
INCLINATION:	Vertical
DEPTH DRILLED:	115·9 m
DEPTH LOGGED:	Varies
LOGGING UNIT:	SIET450E
DATE:	17·2·82

LEGEND

- Alluvium / soil.
- Clay.
- Silt.
- Very fine - medium sand.
- Coarse - very coarse sand.
- Granule / pebble conglomerate.
- Calcareous rock / limestone.
- Marl.
- Lignitic fragments / lignite.
- Glauconitic / carbonaceous rock.
- Shelly fossils / pyrite.
- Granite.
- Gneiss.
- Schist.
- Amphibolite.
- Hornfels.

Geological Log PPD 28

metres

OPEN HOLE

CORE

T.D. 115·9 m

Gamma
Winding Speed 4 m/min.

0 — 100 c.p.s.
T.C. = 5 secs.

Resistivity
Winding Speed m./min.

25ohm.m. Full scale

Self Potential
Winding Speed m./min.

100 millivolts Full scale

Density and Caliper
Winding Speed 4m./min.

(a)

(b)

0 — 100
0 — 25
T.C. = 5 secs.
Source 50 m. Curies Cs 137
(a) Density : full scale 0-100 cps
(b) Caliper : full scale 0-25 cm

Revisions:

Checked:

Traced: S C F.

Drawn: D.G.P.

Date: 25·2·82

Centre: Adelaide

Project No.: 6-c640-26

Drawing No.: A2-319

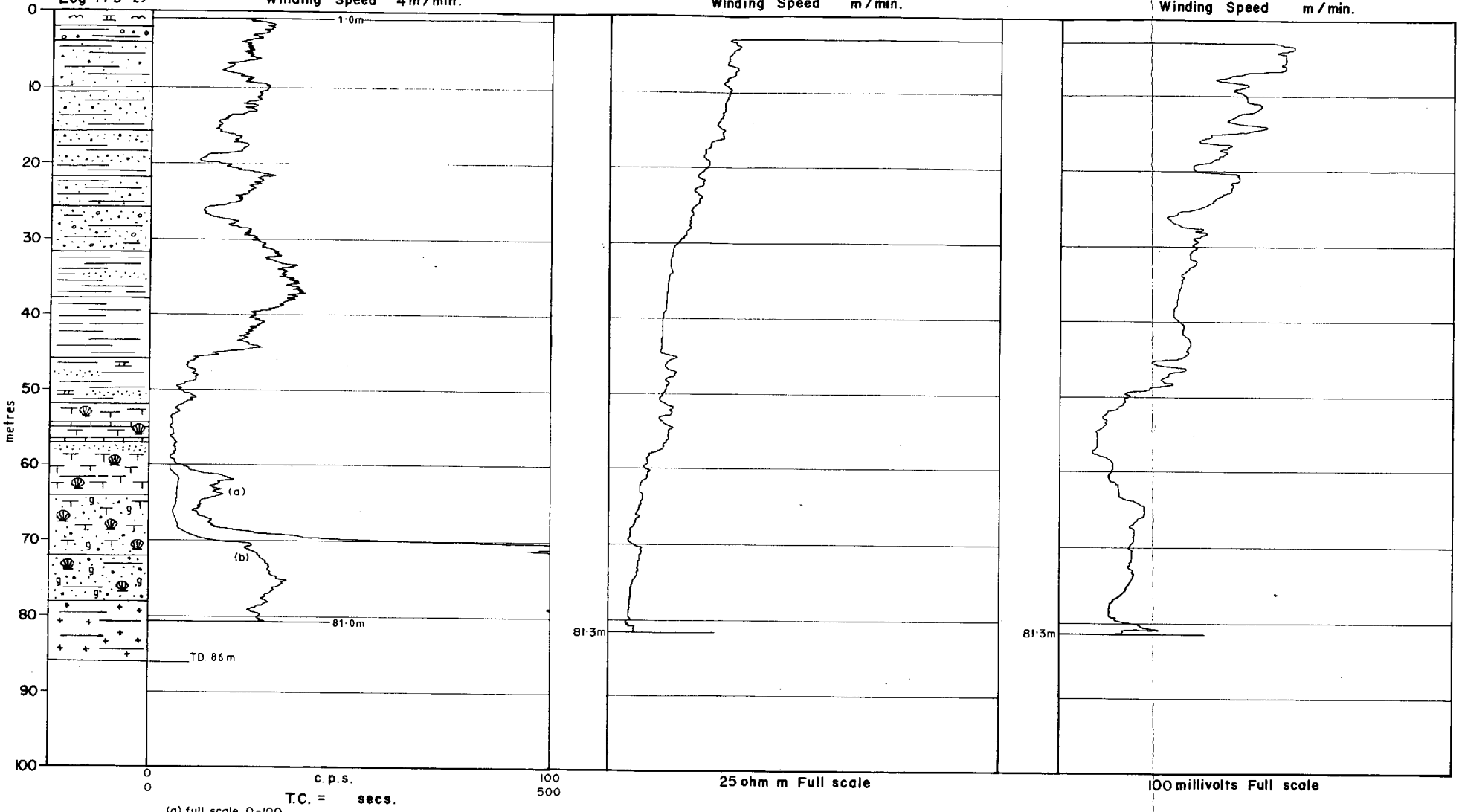
EL766 MULLAQUANA, S.A.
GEOPHYSICAL DOWN HOLE AND GRAPHIC LOGS PPD28

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

Fig. No.
To accompany
Dated

4124-14 Fig.26

FIG. 27



LEGEND

- Alluvium/soil
- Clay
- Silt
- Very fine - medium
- Coarse/very coarse sand.
- Granule/pebble conglomerate.
- Calcareous rock / limestone
- Marl
- Lignitic fragments/ lignite.
- Glauconitic/ carbonaceous rock
- Shelly fossils/ pyrite.
- Granite
- Gneiss
- Schist
- Amphibolite
- Hornfels

DRILL HOLE: PPD 29	DEPTH OF HOLE: 86·0m
LOCATION:	DEPTH LOGGED: 81·3m
	LOGGING UNIT: SIE T450E
DRILL TYPE: Diamond	CASING TYPE: No casing
DATE: 22·2·82	INCLINATION: Vertical

4125-16

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

EL766 MULLAQUANA, S.A.
GEOPHYSICAL DOWN HOLE AND GRAPHIC LOGS PPD29

Prepared by: D.G.P	Centre: Adelaide	
Date: 25·2·82	Project No. 6 - C640 - 25	Drawing No. A3_109
Drawn: S.C.F.		

Revisions:

SUMMARY REPORT

MULLAQUANA LIGNITE PROSPECT

E.L. 766 SOUTH AUSTRALIA

BHP MINERALS LIMITED

N.M. LEMON

APRIL 1982

INTRODUCTION

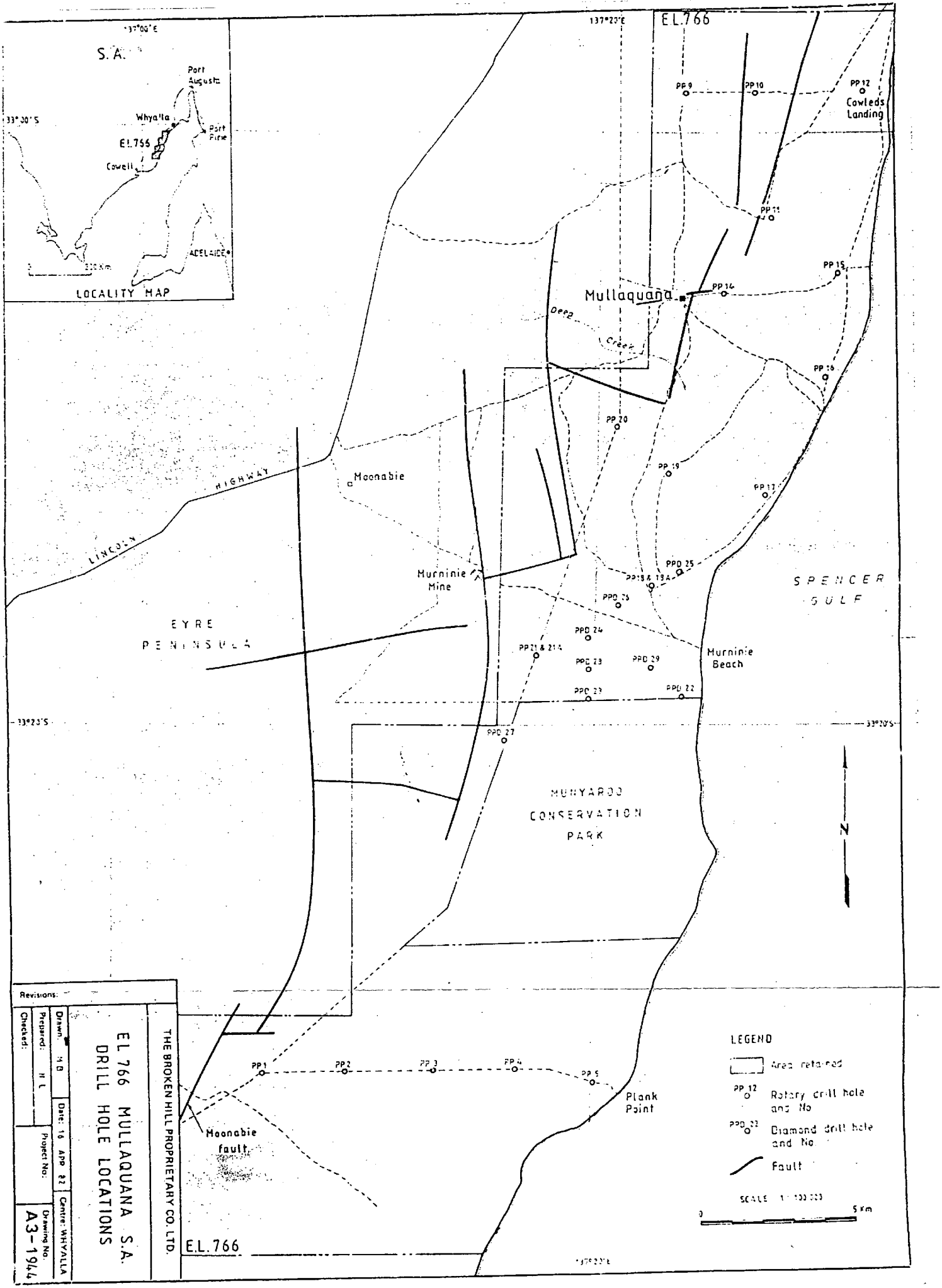
Carbonaceous sequences of Eocene age are known from the area north of Whyalla. Carbonaceous siltstone and minor lignites were intersected in the B.H.P. Saltworks area and by Australian Selection in the paleochannel of Myall Creek north of False Bay in the Tregalana area. Similar sediments were intersected by C.R.A.E. north of Cowell in the Pondooma area. On this basis, it was decided to look for an area where contemporaneous faulting could lead to a thickening of the carbonaceous Eocene sequence and the possible development of lignite seams. The area south of Whyalla along the present day coast of Spencer Gulf towards Cowell shows obvious topographic effects of Miocene faulting and was therefore chosen as a Tertiary lignite prospect.

TITLE

An area of 1075 square kilometres was applied for to cover all the fault blocks between Whyalla and Cowell that did not have positively identified outcropping pre Tertiary rocks. This area was granted to BHP Minerals Limited, then Dampier Mining Company, as E.L.766 on 8th December 1980 for a period of twelve months. Following the drilling of twenty-one holes, E.L.766 was re-applied for over a reduced area of 330 square kilometres for a further period of twelve months.

The Munyaroo Conservation Park covers an area in the middle of E.L.766 and is exempt from exploration. To the west of this park is an area of vacant crown land which has been set aside to be added to the present area of the Munyaroo Conservation Park. It has yet to be dedicated and exploration in this area is possible with the specific approval of the South Australian Department of Mines and Energy. In view of the interesting intersections in the area, this approval has been granted.

...2/



Revisions:

Checked:	Prepared: H L	Drawn: M B	Date: 16 APR 82
Project No:		Drawing No. A3-1944	Centre: WHYALLA

EL 766 MULLAQUANA S.A.
DRILL HOLE LOCATIONS

THE BROKEN HILL PROPRIETARY CO. LTD.

DRILLING PROGRAMMES

An initial programme of twenty-one holes was drawn up to test the stratigraphy on each of the recognizable fault blocks in the area. Two major blocks were not tested. The area around Pondooma was considered to have been sufficiently well drilled by C.R.A.E. as part of investigations on E.L.397 not to warrant further testing. The fault block south of the Charleston Fault and east of the Moonabie Fault, i.e. around Mitchellville, was thought to have too thick a cover sequence to be of economic interest. This block is downthrown across both the faults mentioned above and the C.R.A.E. hole RHC 7 gave some proof of the increased depth of cover.

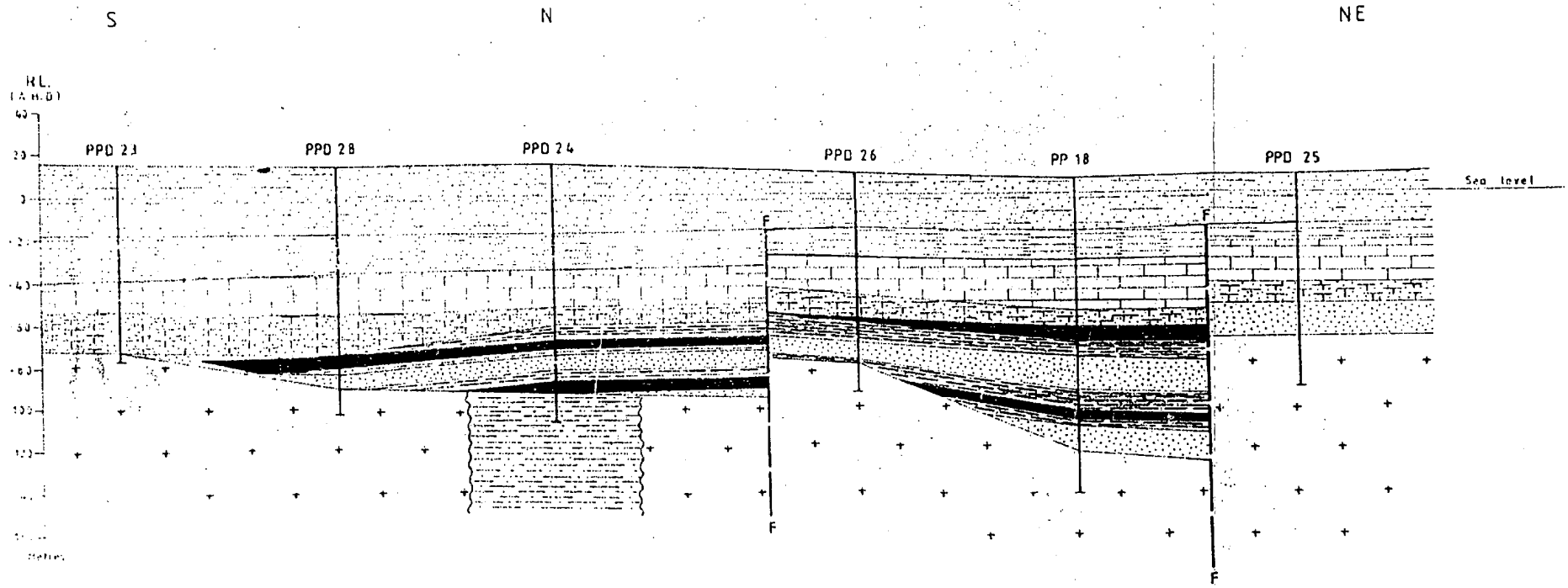
The first twenty-one holes (PP1-21A) together with three redrilled holes due to technical problems and for coring purposes totalled 1894 metres. These holes were drilled using a Mayhew 1000 R. Following the intersection of some lignite and oil shale in PP 18/18A, a further eight holes (PP(D)22 to PP(D)29) totalling 834.85m, were drilled between PP18/18A and the Munyaroo Conservation Park. These holes were drilled with a Longyear 38 in order to obtain cored sections through the seams.

GEOLOGY

The drilling intersected a sequence of Tertiary sediments previous unrecorded in the area.

The base of the sequence is probably of Eocene age and sits directly on Proterozoic basement. The basal sediments consist of clayey sands and gravels, usually derived directly from the underlying basement. There is often a deeply weathered zone of basement rock below the contact. Until the sequence was cored, the highly weathered basement was often incorrectly logged as clayey coarse sands. The correct interpretation is incorporated into the sections in this report. However on and adjacent to paleo-topographic highs, the Tertiary sequence rests on fresh basement.

The nature of the basement varies considerably from a Charleston style granite to granite gneiss, amphibolite, hematite schist and muscovite schist. Volcaniclastic grits and conglomerates of the Moonabie Formation were intersected in the northern part of E.L.76 The basement rock types largely reflect those seen in outcrop on nearby uplifted fault blocks.



$\frac{V}{H} = \frac{1:2\,000}{1:20\,000} = \frac{10}{1}$

SCALE 1:20 000

0 1000 m

LEGEND

- Red clay, sand and gravel.
- White sandy clays.
- Fossiliferous limestone and marl.
- Green glauconitic sandy marl.
- Lignite.
- Oil shale.
- Carbonaceous sand.
- Granite / adamellite.
- Episote altered material in contact with granite.

FOR LOCATION REFER TO DRG. No. A3. 1944.

THE BROKEN HILL PROPRIETARY CO. LTD.

EL 766 MULLAQUANA S.A. S-N-NE DRILL SECTION THROUGH BORES PPD 23 – 26, 28 & PP 18

Drawn: H.B.	Date: 6 · APR · 82	Centre: WHYALLA	
Prepared: N.L.	Project No:	Drawing No: A3-1945	
Checked:			

Revisions:

000040

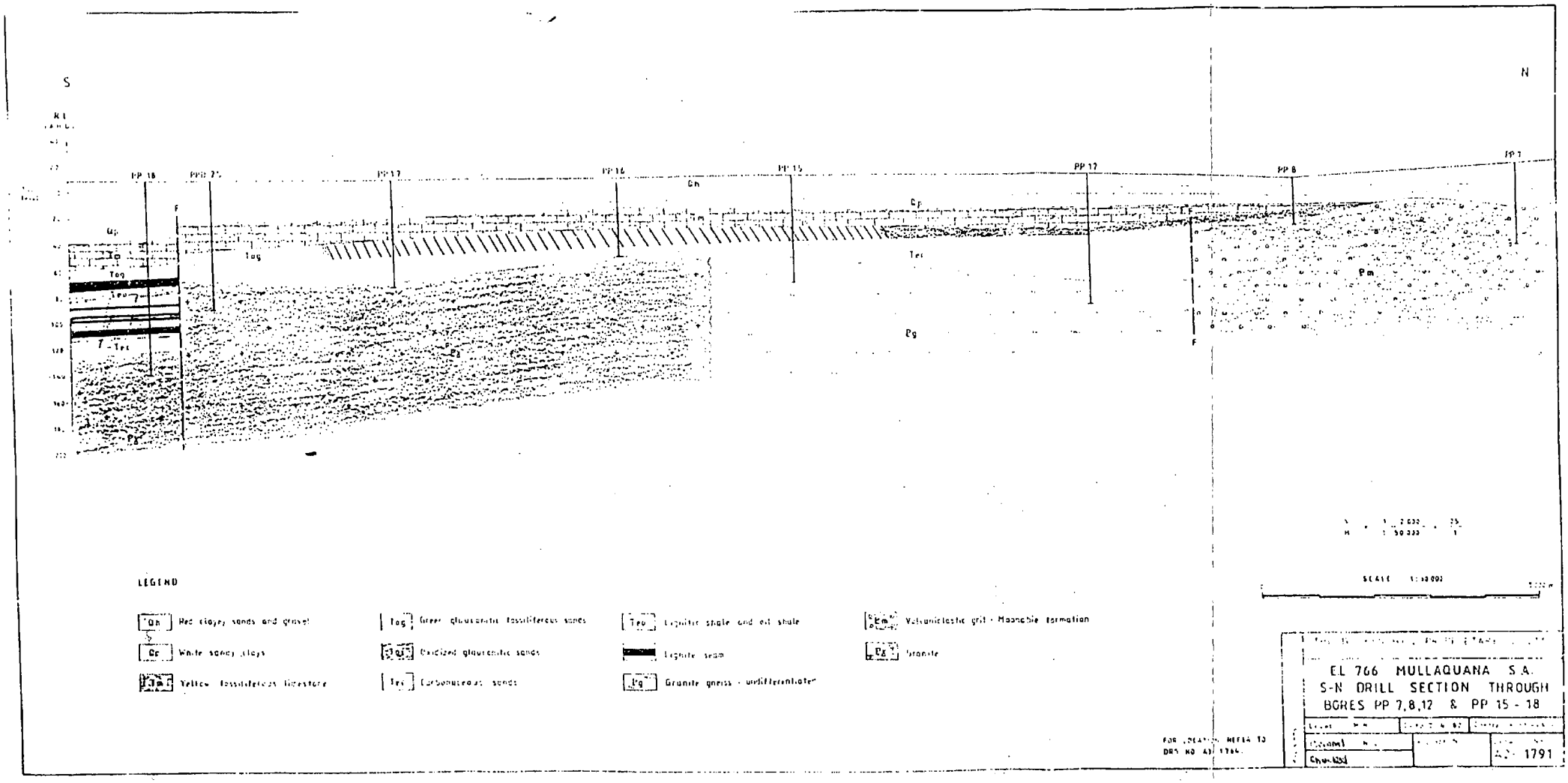
A sequence of carbonaceous sands and grits, lignite, siltstones and oil shale overlies the basal sands. The basal sands have a restricted distribution and the carbonaceous sequence is more widespread. In some places lignite and carbonaceous sand lie directly on weathered basement. Immediately north of the Munyaroo Conservation Park there are two distinct units containing lignite and oil shale separated by carbonaceous sand. The distribution of the carbonaceous unit appears to be affected both by faults and by topographic highs in the basement. The carbonaceous sequence is probably of Middle Eocene age although there are no dates as yet determined from this area.

The carbonaceous sequence is unconformably overlain by a sequence of sands, fossiliferous sands and sandy marl which is usually glauconitic. The most common rock type in this unit is a grey green glauconitic sandy marl with intact fossils of large bivalves, gastropods, numerous echinoid spines and occasional whole echinoderms. North from PP(D)25 this unit becomes sandier with fewer fossils. In PP15 and 16 the unit is represented by an orange-yellow coarse sandstone. Traces of glauconite were only recognized after samples were left exposed to the weather for a few months. The unit has become oxidized in the sandier parts north of PP17. The unit is represented by a coarse sand with no fossils and no glauconite in PP8 and 12. There is some minor carbonaceous content in this unit in PP15. Microfaunal dating has been done on the rotary holes PP3 and 4. A tentative Late Oligocene to Early Miocene age has been given to the glauconitic unit. The unit is obviously the base of the Miocene transgression. Glauconitic sands sit directly on basement in PP4, 5, PP(D)23, 27 and 29. The base of the unit appears to have eroded into the underlying lignite in PP(D)28. Lignite fragments and clasts have been incorporated in the glauconitic fossiliferous sand.

The glauconitic unit is overlain by a yellow fossiliferous limestone and marl. This unit contains sand and clay bands. The fossils are mainly bryozoa but there are some shelly fragments and occasional complete gastropods. The yellow limestone has been dated as Miocene, is transgressive and covers the widest area of the sediments mentioned above. This unit can be seen in outcrop atop several fault blocks; in particular east of the Murninnie Mine and at Deep Creek.

The yellow limestone appears to grade upwards into white and yellow clays although the top of the limestone has been silicified and ferruginized in PP(D)23.

The white and yellow clays are overlain by white sandy clays with occasional pink and red mottles. These are overlain in turn by red and brown fine to very coarse sands and gravels with a clay and silt matrix.


S
N
PP 18
PP 17
PP 16
PP 15
PP 12
PP 8
PP 7
Qh
Tqg
Tpc
Pg
Pm
LEGEND
Red clayey sands and gravel
Green glauconitic fossiliferous sands
Lignitic shale and oil shale
Volcaniclastic grit - Maastrichtian formation
White sandy clays
Oxidized glauconitic sands
Lignite seam
Granite
Yellow fossiliferous limestone
Carbonaceous sands
Granite gneiss - undifferentiated
SCALE
EL 766 MULLAQUANA S.A.
S-N DRILL SECTION THROUGH
BORES PP 7,8,12 & PP 15 - 18
1791

000042

TABLE 1

Hole and Interval	Thickness	AS RECEIVED BASIS			DRY BASIS						Specific Energy MJ/kg	
		Free Moisture	Moisture in Air Dried Coal	Total Moisture	Volatiles	Ash	Fixed C	S	Cl	Na	Gross	Nett Wet
PP18A												
73.00 - 74.40	1.40	34.4		54.7	48.1	19.9		2.62	2.42	1.71	23.48	8.8
74.40 - 75.46	1.06	33.9		57.2	46.0	19.5		2.74	2.95	1.83	22.81	7.9
75.46 - 76.00	0.54			37.7	18.5	67.3		2.18	1.28	-	-	-
76.00 - 77.00	1.00	31.7		53.9	43.3	22.3		2.58	2.44	1.40	21.87	8.4
77.00 - 78.50	1.50	33.7		54.7	50.0	16.3		1.78	2.65	1.64	24.47	9.3
78.50 - 79.10	0.60	40.1		56.0	39.8	26.0		1.40	2.78	1.68	20.83	7.4
PP18A												
111.36 - 112.00	0.64	50.3		54.6	38.2	25.1		0.69	-	1.98	20.31	7.5
112.00 - 112.30	0.30	20.1		43.7	27.8	53.9		0.09	2.64	-	-	-
112.30 - 112.70	0.40	30.2		47.2	32.7	44.2		2.70	-	2.28	14.47	6.1
112.70 - 113.00	0.30	36.1		52.0	38.0	30.9		2.37	2.57	2.01	18.74	7.3
113.00 - 113.50	0.50	41.8		50.2	37.4	34.5		0.39	3.56	1.89	18.13	7.4
113.50 - 115.00	1.50			53.6	40.2	24.4		0.32	3.89	2.24	21.00	8.0
PPD22												
82.60 - 83.60	1.00	43.8	9.8	49.3	37.3	38.4	24.3	6.30	1.49	1.33	17.46	7.30
85.00 - 85.70	0.70	43.8	10.0	49.4	39.8	31.4	28.8	11.7	1.74	1.69	19.00	8.06
86.72 - 87.83	1.11	49.3	13.7	56.2	48.0	17.5	34.5	3.46	2.27	2.18	23.52	8.62
88.45 - 89.30	0.85	47.9	12.6	54.5	50.6	17.7	31.7	3.18	2.39	2.07	23.86	9.16
89.30 - 90.40	1.10	47.1	9.9	52.3	36.1	37.5	26.4	2.75	1.98	1.82	17.07	6.54
PPD24												
83.84 - 85.90	2.06	48.3	9.3	53.1	38.1	29.7	32.2	3.08	2.57	2.77	19.18	
102.40 -105.90	3.50	43.8	6.5	47.5	33.1	44.3	22.6	2.43	2.05	1.65	14.92	

The soil in the area is usually brown sandy clay. There is invariably some kunkar development in the soil horizon but it is usually only incipient. Occasionally nodular kunkar is developed and one or two holes intersected hard sheet like kunkar. Recent brown to yellow sand dunes have blown across the southern half of the E.L. from the north west.

Faults appear to have been active in area throughout the Tertiary. Deposition was probably initiated in the Middle Eocene by movement along some of the faults. The sharp change in the sequence between PP18 and PP(D)25 suggests an active fault between the two holes at the time of deposition - Middle Eocene. The fault scarps which form prominent topographic features in the area are associated with post Miocene faults. The virtually flat lying yellow fossiliferous limestone has a height difference of over 100m between PP19 and the outcrops along the fault scarp to the west. This faulting also affected the white sandy clays overlying the limestone. This stage of faulting is associated with the formation of Spencer Gulf and the uplift of the Flinders Ranges.

COAL TYPE, QUALITY AND ANALYSIS

Only minor petrology has been done on the carbonaceous sequence but that combined with the position of the coal in the stratigraphy and the analyses indicate that the coal is a sapropelic lignite. Radiographs of the core show the distribution of ash through the seams. There is almost a continued gradation from lignite to oil shale as the ash content increases. The upper seam contains lower ash lignite while the lower seam contains more bands of oil shale. The radiographs also show the distribution of pyritic sulphur in the lignite. Most of the pyrite occurs as nodular or infillings of worm burrows but some occurs as patches of finely disseminated pyrite.

Analyses for some of the lignite intersections can be seen in Table 1.

The analyses for PP18A were done by B.H.P.'s Central Research Laboratories in Newcastle. The analyses for PP(D)22 and 24 were done by AMDEL in Adelaide.

TABLE 2

Hole and Interval	Thickness	Oil Yield Litres/Tonne	Oil S.G.	Water Yield Litres/Tonne	Gas + Loss kg/tonne	Residue kg/tonne
PP18A						
81.00-82.00	1.00	76	0.988	125	30	770
82.00-85.00	3.00	49	0.978	85	37	831
85.00-88.00	3.00	24	0.984	66	35	876
109.00-110.00	1.00	65	0.977	205	66	666
110.00-111.00	1.00	49	0.970	175	61	717
115.00-116.00	1.00	26	0.964	118	34	823
116.00-117.00	1.00	44	0.976	150	46	762
PP22						
81.45-83.60	2.15	69	0.979	250	60	622
85.00-86.70	1.70	88	0.976	260	89	537
86.30-88.00	1.70	72	0.979	305	54	571
89.20-90.45	1.25	80	0.975	316	65	541
91.90-94.00	2.10	21	0.926	51	12	918
PP23						
71.50-78.00	6.50	54	0.978	120	57	770
80.00-83.84	3.84	32	0.976	98	46	825
83.84-85.90	2.06	68	0.960	204	125	606
85.90-90.05	4.15	36	0.964	80	41	845
99.25-101.48	2.23	40	0.945	74	33	855
101.48-102.40	0.92	20	0.976	33	22	925
102.40-106.05	3.65	75	0.967	200	92	635
106.05-107.70	1.65	128	0.960	176	121	580

OIL SHALE AND YIELDS

Most of the dark chocolate brown coloured shales interbedded with the lignite smell strongly of hydrocarbons when freshly cut or broken. Both the shales and lignites give good indications of tar in a heated test tube as a bench top test. Oil yields determined by Fischer Assay from both the shales and lignites can be seen in Table 2. Lignites yield slightly more "oil" than the shales. All Fischer assays were done by Australian Laboratory Services in Brisbane.

Petrology was done on shale samples from below the top seam in PP18A. This shale looked to be a seat earth to the overlying seam as it contained numerous rootlets. The shale contained 5% non fluorescent lignitic material. When the sample was examined under fluorescent light the majority of the kerogen material was visible. Most of the kerogen is a combination of several exinite group macerals. Resinite makes up one third of the kerogen with liptodetrinite, cutinite, sporinite and fine grained unidentified material making up the other two thirds. In all, the kerogen content of the sample examined was about 15%.

TONNAGES

The lack of close spaced grid drilling coupled with the apparent rapid changes across the area between the Munyaroo Conservation Park and PP18A make it impossible to calculate any "reserves" for the area. However, by assigning an area of influence to each borehole to fill the supposed area of the "deposit", an order of magnitude tonnage calculation can be made. The holes used in these calculations are PP18 and 21 and PP(D)22, 23, 24, 25, 26, 28 and 29.

Amounts of material

Lignite - 100 million tonnes.
Lignite plus oil shale - 260 million tonnes.

...6/

EXPLORATION LICENCE 766

MULLAQUANA, SOUTH AUSTRALIA

REPORT FOR THE QUARTER ENDED 8TH JUNE, 1982

CONTENTS

FIGURES

EXPLORATION LICENCE 766

MULLAQUANA, SOUTH AUSTRALIA

REPORT FOR THE QUARTER ENDED 8TH JUNE, 1982

1. GENERAL

Exploration Licence 766 of approximately 1075 square kilometres was granted to BHP Minerals Limited, formerly Dampier Mining Company Limited, on 8th December 1980, for one year. This tenure has now been extended for a further twelve months over a reduced area of approximately 330 square kilometres.

The E.L. was taken up to explore for carbonaceous sediments of Tertiary age possibly deposited and preserved on a series of fault blocks in the area. Minor Tertiary outcrops occur along the edge of several fault blocks and a gravity low in the area was thought to be indicative of a thickening of Tertiary sedimentation.

The first stage of drilling indicated the presence of lignite and oil shale in the area immediately north of the Munyaroo Conservation Park.

The second stage of drilling suggested there might be in the order of 100 million tonnes of sapropelic lignite and 260 million tonnes of lignite plus oil shale in that area. The apparent irregular nature of the deposit did not suggest any factors which might control the shape of the deposit.

2. FIELD INVESTIGATIONS

2.1 Geophysics

2.1a Gravity (Figure 3)

17.95 kilometres of gravity have been read in the area between PP15 and PP12. Readings were taken every 50m along 3 optically levelled lines. The gravity programme was designed to determine the position and throw of faults in the area and to pick any areas of possibly thicker Tertiary sedimentation which may be indicative of a minor coal basin. The lignite in the Murninie area occurs in relative topographic lows in the basement rocks and therefore is associated with a thicker Tertiary sequence. Gravity lows should indicate where the Tertiary sequence is thickest, providing, of course, that density contrasts within the basement are not too great.

...2/

2.1b Ground Magnetics (Figure 2)

Readings were taken every 10m along 10 lines totalling 23.03 km in the Murninie area around the lignite deposit which has been partially drilled to date. A hand held UNIMAG proton magnetometer was the instrument used. The area is generally underlain by a somewhat uniform granite which is somewhat flat magnetically. Faults show as small distinct steps in the ground magnetic profile. Within small areas, basement highs show as small magnetic domes. In this way an approximate distribution of the lignite can be determined. The magnetic contour map was produced by graphically smoothing the ground magnetic profiles. This was necessary as gravel and pebbles of magnetite bearing iron formation occur within a few metres of the surface and these give erratic readings. The magnetic profiles suggest one of the controls on the thick intersection of lignite in PP18 is a N-S fault uplifted about 50-100m east of the hole. This fault extends from west of PP19 to west of PPD29.

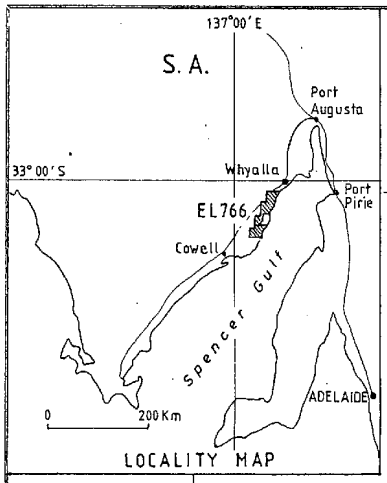
3. EXPENDITURE

Expenditure debited to E.L.766 during March, April and May, 1982 was:

Wages and Salaries	$18 106
Messing and Accommodation	52
Fares and Mobilisation	346
Transport	506
Surveying/Aerial Photographs	82
Sample Analysis	1 591
Geophysics	185
Administration/Overheads	703
Sundries	17
	$21 588

Revised total expenditure to 31st May, 1982 is $113 936.

This report is submitted to the Department of Mines and Energy as required by Condition 4 of Exploration Licence 766.



137°20'E

E.L.766

PP9 PP10 GT 2 PP12 Cowleds Landing

GT 1

PP11

GT 3 PP15

Mullaquana

PP14

Deep Creek

PP16

PP20

MT 1 PP19 PP17

MT 2

MT 3

MT 4

MT 5 PPD 25

MT 8 PPD 26 MT 6

MT 7 PPD 24 MT 9

PP21 & 21A

PPD 28 PPD 29

MT 10

PPD 23 PPD 27

LINCOLN

Murninie Mine

EYRE PENINSULA

SPENCER GULF

Murninie Beach

33°20'S

33°20'S

GULF AROO CONSERVATION PARK

N

PP1 PP2 PP3 PP4 PP5

Plank Point

Moonabie fault

E.L.766

137°20'E

LEGEND

GT 2 — Gravity traverse

MT 2 — Magnetometer traverse

Area retained.

PP 12 — Rotary drill hole and No.

PPD 22 — Diamond drill hole and No.

Fault.

SCALE 1 : 100 000

0 5 Km

Revisions:

Checked:

Prepared: N. L.

Drawn: M.B.

Date: 16 APR 82

Project No:

Centre: WHYALLA

Drawing No: A3-1944

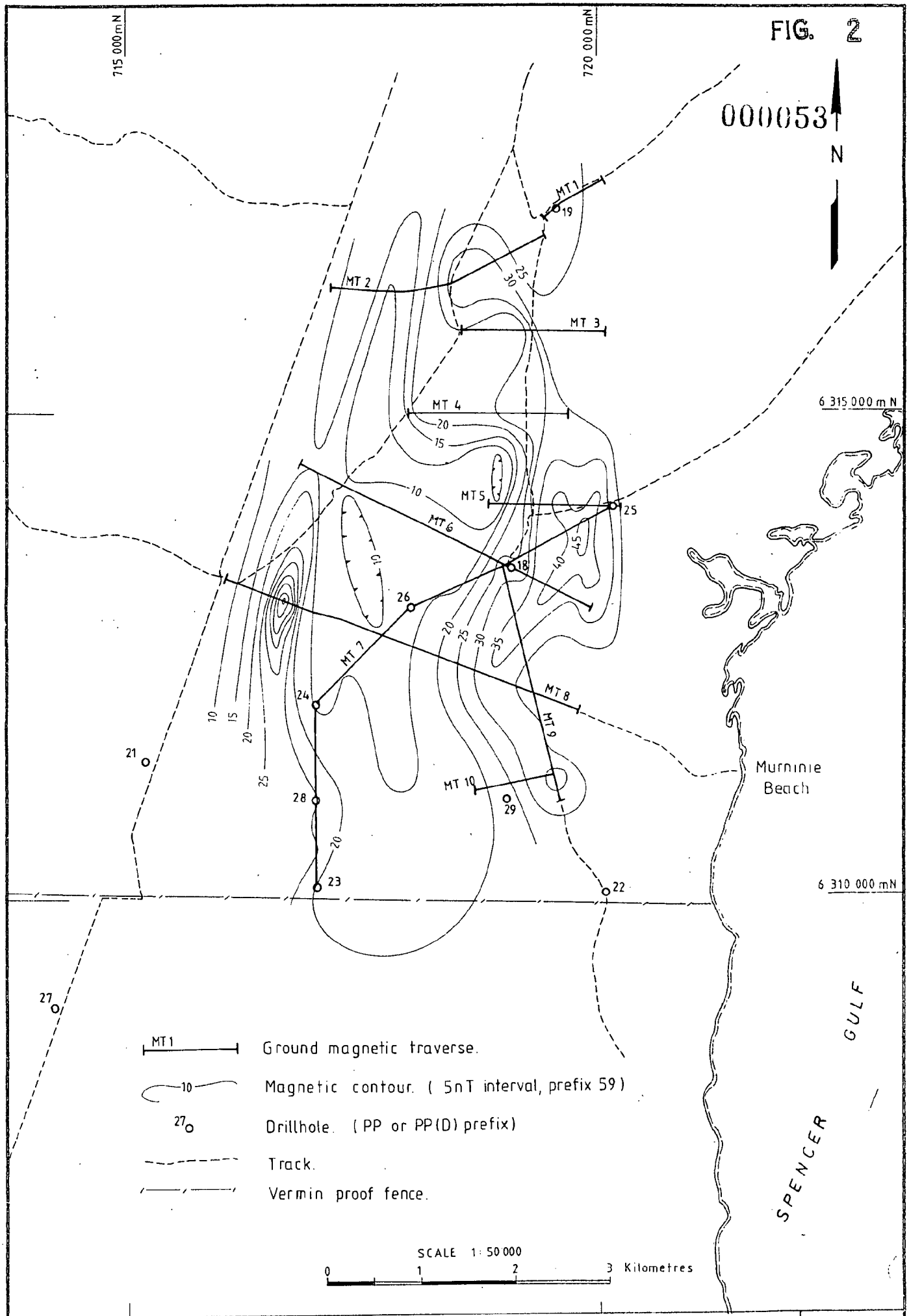
EL 766 MULLAQUANA S.A.
DRILL HOLE LOCATIONS

THE BROKEN HILL PROPRIETARY CO. LTD.

Fig. 1

FIG. 2

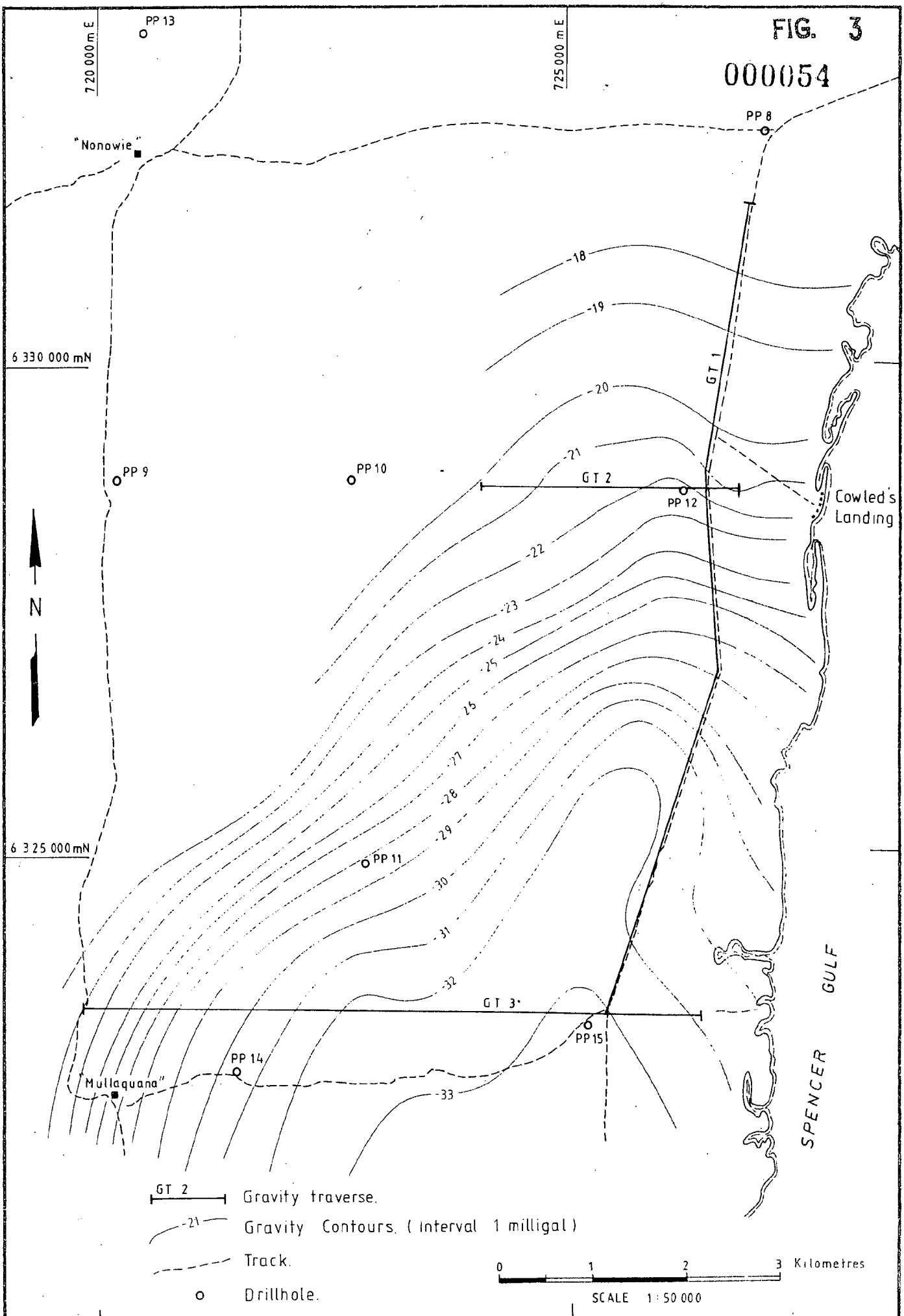
0000531



Centre: Whyalla	THE BROKEN HILL PROPRIETARY CO LTD.	Project No. C 640
Date: RK / June 82	E.L. 766 MULLAQUANA S.A. GROUND MAGNETIC CONTOURS - MURNINIE AREA	Drawing No. A4- 399

FIG. 3

000054



Centre: Whyalla	THE BROKEN HILL PROPRIETARY CO. LTD.	Project No: C 640
R.K./ Date: June '82	E.L. 766 MULLAQUANA S.A. GRAVITY CONTOURS – NONOWIE AREA	Drawing No: A4- 400

000055

BHP Minerals Limited

(Incorporated in WA)
41-47 Currie Street
Adelaide S.A. 5000

26th August, 1982.

The Director General,
Department of Mines and Energy,
P.O. Box 151,
EASTWOOD, S.A. 5063

Attention: I. Faulks

Dear Sir,

Exploration Licence 766

As per your request dated 20th July, 1982 please find enclosed the following data:

(a) Ground magnetic profiles - Murninie area (A1-521)

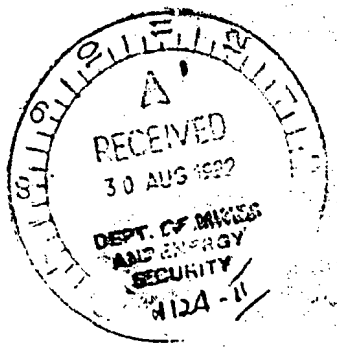
(b) Drift corrected gravity readings and elevations (AHD)

(c) Location of all gravity stations, including two temporary base stations (A2-334)

All gravity readings were tied to the BMR gravity station 6793.0109 at the Whyalla air terminal.

Yours faithfully,

D.G. Price.



Registered Office
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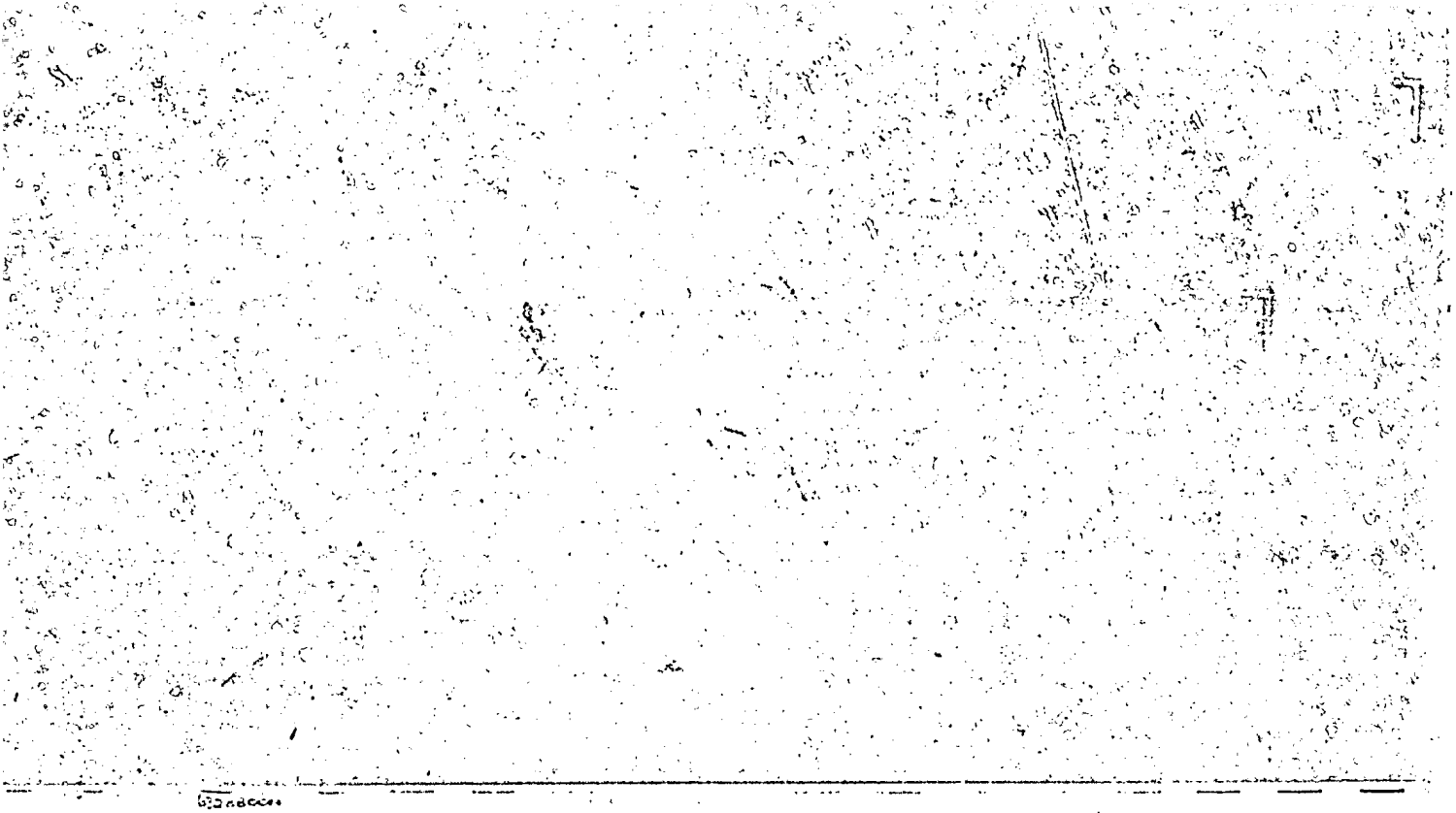
Perth.

Telephone: 212 6700
Telegraphic Address:
"Hematite" Adelaide
Telex 82206

Postal Address
Box 1818, G.P.O.
Adelaide
S.A. 5001

Your Ref:
Our Ref: DGP:SC



000056

DATE 29·3·82 METER NO. 1141 AREA Mullaquana EL 766

READERS C Berridge / M. Lemon / J Foulkes METER CONSTANT ·10778 (Base 1 - 726500E 632 RL 500N)

Coordinates	Reading	Time	Drift Correction	CBG Gravity Uncorrected (Milligals)	Elevation	Corrected Value S.G. =2·0	Corrected Value S.G. =2·2	Bouguer	Latitude	Remarks	Station
726500E	621·10	11·00	621·10	979588·56	7·07449	-21·15	-21·21	-21·27	33°09'21"		173
726550	622·65	11·10	622·75	979588·71	6·91807	-21·00	-21·06	-21·12			174
726600	623·65	11·20	623·85	979588·86	6·84499	-20·93	-21·02	-21·08			175
726650	625·50	11·37	625·68	979587·08	6·85857	-20·95	-20·00	-20·06			176
726700	626·35	11·42	626·78	979586·17	6·12269	-20·26	-20·21	-20·26			177
726750	627·66	11·45	627·86	979587·31	5·97629	-20·16	-20·20	-20·26			178
726800	628·90	11·51	629·12	979587·46	5·47329	-20·11	-20·16	-20·20			179
726850E	630·80	11·59	631·10	979588·86	7·07449	-21·15	-21·21	-21·27			

000057

DATE 5/4/82 METER NO. 141 AREA Mullagrara

READERS J. Foulkes METER CONSTANT 0.10778

Coordinates	Reading	Time	Drift Correction	Abs. Gravity Uncorrected (Milligals)	Elevation	Corrected Value S.G. = 2.0	Corrected Value S.G. = 2.2	S.G. = 2.4	Latitude	Remarks	Station
2?400N 25400E	570.70	15.10		979560.91	6.6469	-32.95	-33.01	-33.06	32°12' 1"		250
25360E	561.55	15.16		979560.81	6.2169	-33.03	-33.04	-33.10			251
25300	567.85	15.20		979560.59	6.9839	-33.19	-33.24	-33.30			252
25250	567.50	15.25		979560.56	7.1759	-33.16	-33.22	-33.28			253
25200	567.30	15.30		979560.50	7.4109	-33.17	-33.23	-33.29			254
25150	567.50	15.33		979560.50	7.2779	-33.20	-33.26	-33.32			255
25100	[illegible]	[illegible]		979560.30	7.6619	-33.31	-33.32	-33.44			
25400E	571.50	15.48		979560.91	6.6469	-32.95	-33.01	-33.06			
72?400N 726450E	566.15	10.26		979518.56	7.0749	-21.15	-21.21	-21.27	33°09' 21"		120
726400E	[illegible]	10.32		979518.46	7.0069	-21.27	-21.32	-21.38			121
726400	[illegible]	10.38		979518.33	7.5269	-21.28	-21.34	-21.40			122
726350	555.55	10.42		979518.24	7.4309	-21.39	-21.45	-21.51			123
726300	561.60	10.47		979518.04	7.8389	-21.50	-21.56	-21.63			124
726250	560.??	11.00		979517.24	7.8779	-21.69	-21.76	-21.82			125
726200	560.10	11.06		979517.53	8.1829	-21.93	-22.00	-22.07			126
726150	565.65	11.14		979517.48	8.2169	-21.9?	-22.01	-22.08			
726400E	[illegible]	11.22		979518.56	7.0749	-21.15	-21.21	-21.27			
72?400N 726400E	566.00	11.22		979518.56	7.0749	-21.15	-21.21	-21.27	33°09' 21"		127
726400E	[illegible]	11.30		979511.26	8.8079	-22.06	-22.13	-22.21			128
726350	[illegible]	11.36		979511.24	8.8809	-22.07	-22.14	-22.22			129
726300	[illegible]	11.37		979517.56	[illegible]	-21.97	-21.98	-22.02			130
726250	[illegible]	[illegible]		979517.20	[illegible]	-21.93	-22.00	-22.08			131
726200	551.80	11.42		979518.2?	7.7849	-21.85	-21.9?	-22.02			
726400E	551.25	11.48		979518.56	7.0749	-21.15	-21.21	-21.27			
726400E	566.?0	12.00									

GEO. 2002

2000058

DATE 12/4/82 METER NO. 111 AREA Mullmyanee

READERS J. Faulkes, B. Dempsey METER CONSTANT 0.10775

Coordinates	Reading	Time	Drift Correction	000 Corrected Uncorrected (Milligals)	Elevation	Corrected Value S.G. =2.0	Corrected Value S.G. =2.2	56 =2.4	Latitude Remarks	Station
[illegible]	[illegible]	12:02		[illegible]	[illegible]	-21.15	-21.21	-21.27	32° 09' 21"	
[illegible]	651.75	12:09		[illegible]	[illegible]	-21.77	-21.85	-21.93		192
[illegible]	652.05	12:15		[illegible]	[illegible]	-21.55	-21.64	-21.72		193
[illegible]	652.60	12:18		[illegible]	[illegible]	-21.56	-21.64	-21.73		194
[illegible]	652.93	12:22		[illegible]	[illegible]	-21.59	-21.68	-21.67		195
[illegible]	653.45	12:27		[illegible]	[illegible]	-21.59	-21.68	-21.78		196
[illegible]	653.90	12:36		[illegible]	[illegible]	-21.60	-21.69	-21.78		197
[illegible]	653.80	12:41		[illegible]	[illegible]	-21.58	-21.68	-21.78		198
[illegible]	653.85	12:45		[illegible]	[illegible]	-21.64	-21.74	-21.84		199
[illegible]	653.60	12:51		[illegible]	[illegible]	-21.15	-21.25	-21.36		200
[illegible]	653.60	12:56		[illegible]	[illegible]	-21.11	-21.21	-21.31		201
[illegible]	653.70	12:58		[illegible]	[illegible]	-21.16	-21.21	-21.27		
[illegible]	653.70	14:02		[illegible]	[illegible]	-21.15	-21.21	-21.27	32° 09' 21"	
[illegible]	653.85	14:11		[illegible]	[illegible]	-21.19	-21.29	-21.39		202
[illegible]	653.60	14:18		[illegible]	[illegible]	-21.26	-21.37	-21.47		203
[illegible]	653.05	14:23		[illegible]	[illegible]	-21.26	-21.36	-21.47		204
[illegible]	652.85	14:28		[illegible]	[illegible]	-21.24	-21.34	-21.45		205
[illegible]	653.10	14:33		[illegible]	[illegible]	-21.30	-21.41	-21.52		206
[illegible]	653.35	14:40		[illegible]	[illegible]	-21.26	-21.37	-21.50		207
[illegible]	653.15	14:43		[illegible]	[illegible]	-21.41	-21.52	-21.62		208
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	-21.27	-21.37	-21.50		209
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	-21.10	-21.28	-21.34		210
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	-21.15	-21.21	-21.27		

GEO. 2002

DATE 14/4/22 METER NO. 141 AREA Mullagiong

READERS J. Foulkes, J. Dempsey METER CONSTANT 0.10778

Coordinates	Reading	Time	Drift Correction	Obs. Gravity ~~Uncorrected~~ (Milligals)	Elevation	Corrected Value S.G. = 2.0	Corrected Value S.G. = 2.2	SG = 2.4	Latitude Remarks
726500 E	656.30	13.18		979568.56	7.0749	-21.15	-21.21	-21.27	23° 09' 21"
724000 E	643.15	13.26		979567.12	14.2079	-20.96	-21.08	-21.20	211
724850	643.35	13.31		979567.14	14.2459	-20.94	-21.06	-21.[illegible]	212
724800	643.60	13.36		979567.15	14.7661	-20.83	-20.96	-21.08	213
724750	643.75	13.40		979567.16	14.7759	-20.82	-20.94	-21.07	214
724700	643.90	13.45		979567.19	15.2279	-20.69	-20.81	-20.94	215
724650	644.05	13.50		979567.17	15.2449	-20.70	-20.83	-20.96	216
724600	644.35	13.56		979567.19	15.6879	-20.58	-20.72	-20.85	217
724550	644.60	14.00		979567.21	15.7[illegible]	-20.55	-20.68	-20.81	218
724500	646.20	14.0[illegible]		979567.37	16.2869	-20.27	-20.41	-20.54	219
724450	646.75	14.11		979567.41	16.3599	-20.21	-20.35	-20.49	220
726500 E	657.60	14.21		979568.56	7.0749	-21.15	-21.21	-21.27	
726500 E	657.60	14.21		979568.56	7.0749	-21.15	-21.21	-21.27	23° 09' 21"
724400	646.70	14.21		979567.41	16.2[illegible]	-20.10	-20.25	-20.39	221
724350	647.30	14.24		979567.48	16.[illegible]	-20.01	-20.15	-20.30	222
724300	647.25	14.37		979567.50	17.4[illegible]29	-19.88	-20.03	-20.17	223
724250	646.85	14.43		979567.45	17.[illegible]	-19.87	-20.02	-20.17	224
724200	646.60	14.50		979567.43	18.2409	-19.77	-19.92	-20.08	225
724150	647.05	14.55		979567.51	18.[illegible]	-19.65	-19.80	-19.96	226
724100	647.40	15.01		979567.56	19.0329	-19.46	-19.62	-19.78	227
724050	646.75	15.05		979567.51	19.3249	-19.43	-19.60	-19.76	228
724000	646.50	15.11		979567.38	20.1529	-19.32	-19.55	-19.72	229
726500 E	[illegible]	15.22		979568.56	7.0749	-21.15	-21.21	-21.27	

GEO. 2002

000080

DATE 5/4/82 METER NO. 141 AREA [illegible]

READERS J. Foulkes / B. Dempsey METER CONSTANT 0.0778

Coordinates	Reading	Time	Drift Correction	Uncorrected (Milligals)	Elevation	Corrected Value S.G. =2.0	Corrected Value S.G. =2.2	56.24 Latitude Remarks	Station
25400 N 25400 E	570.20	13:08		979560.91	6.464	-32.95	-33.01	-33.06 33° 12' 17"	
25400E	571.55	13:14		979561.04	5.464	-33.16	-33.20	-33.24	229
25600	574.00	13:18		979561.30	5.004	-32.71	-32.76	-32.81	228
25650	575.65	13:22		979561.48	5.004	-32.69	-32.73	-32.78	227
25700	576.80	13:26		979561.69	5.004	-32.60	-32.64	-32.67	226
25750	577.65	13:31		979561.82	4.614	-32.68	-32.72	-32.76	225
25800	577.45	13:36		979561.67	4.624	-32.63	-32.66	-32.70	244
25850	578.50	13:41		979561.78	4.234	-32.60	-32.64	-32.67	243
25900	577.05	13:47		979561.83	4.374	-32.62	-32.66	-32.69	242
25950	579.05	13:51		979561.83	4.404	-32.62	-32.66	-32.69	241
26000	580.65	13:56		979562.00	4.434	-32.34	-32.38	-32.41	240
26050	581.60	13:59		979562.10	3.934	-32.35	-32.39	-32.42	239
26000	581.00	14:04		979562.13	4.284	-32.30	-32.33	-32.36	232
25400 E	570.60	14:12		979560.91	6.464	-32.95	-33.01	-33.06	
25400E	570.60	14:12		979560.91	6.464	-32.95	-33.01	-33.06 33° 12' 17"	
26000E	582.00	14:24		979562.11	3.624	-32.38	-32.41	-32.44	237
26000	582.25	14:28		979562.08	3.964	-32.20	-32.24	-32.27	236
26150	584.35	14:33		979562.30	3.434	-32.17	-32.20	-32.23	235
26200	585.35	14:37		979562.50	3.394	-32.08	-32.11	-32.13	234
26250	585.60	14:43		979562.58	2.924	-32.17	-32.19	-32.22	233
26300	584.30	14:48		979562.38	3.004	-32.26	-32.29	-32.31	232
26350	585.40	14:52		979562.37	2.624	-32.35	-32.37	-32.40	231
26400	584.05	14:57		979562.37	2.644	-32.37	-32.39	-32.42	230
25400E	570.70	15:10		979560.91	6.464	-32.95	-33.01	-33.06	

GEO. 2062

000061

DATE 6/11/82 METER NO. 111 AREA Mullaloo

READERS B. Dempsey METER CONSTANT 0.10778

Coordinates	Reading	Time	Drift Correction	Uncorrected (Milligals)	Elevation	Corrected Value S.G. =2.0	Corrected Value S.G. =2.2	S.G. =2.4	Latitude Remarks	Station
33.603 N 28400 E	570.75	9:50		979690.91	6.5109	-32.95	-33.01	-33.06	31°12'17"	Base 2
28050 E	565.10	9:57		979680.34	7.1559	-33.37	-33.33	-33.40		256
28000	564.20	10:06		979680.39	7.7849	-33.20	-33.27	-33.33		257
27950	566.00	10:10		979680.36	7.6994	-33.25	-33.22	-33.32		258
27900	568.00	10:17		979680.96	8.0009	-32.96	-33.02	-33.07		259
27850	568.00	10:22		979680.67	7.9759	-32.97	-33.04	-33.10		260
27800	568.00	10:27		979680.89	7.8259	-33.06	-33.13	-33.19		261
27750	568.40	10:34		979680.82	7.8169	-32.98	-33.05	-33.11		262
27700	568.15	10:37		979680.69	8.0409	-32.83	-32.90	-32.97		263
27650	568.30	10:42		979680.73	8.0259	-32.95	-33.02	-33.09		264
27600 E	567.60	10:51		979680.91	8.0159	-32.95	-33.01	-33.06		
33.603 N 27400 E	567.60	12:53		979680.91	8.0559	-32.95	-33.01	-33.06	31°12'17"	
27600 E	566.65	11:01		979680.96	8.0659	-32.93	-33.01	-33.08		265
27550	567.60	11:07		979680.98	8.0659	-32.93	-33.00	-33.07		266
27500	567.85	11:11		979680.88	8.0959	-32.85	-32.93	-33.00		267
27450	567.80	11:15		979680.97	8.0859	-32.86	-32.94	-33.01		268
27400	567.10	11:20		979680.91	8.0759	-32.86	-32.94	-32.99		269
27350	567.20	11:25		979680.94	8.0559	-32.84	-32.92	-32.99		270
27300	567.10	11:33		979680.90	8.0759	-32.86	-32.93	-33.01		271
27250	566.35	11:37		979680.93	8.0859	-32.79	-32.86	-32.93		272
27200	566.20	11:43		979680.92	8.0859	-32.81	-32.89	-32.96		273
27150	566.15	11:47		979680.93	8.0859	-32.87	-32.94	-33.01		274
27100	566.70	11:52		979680.92	8.0759	-32.82	-32.89	-32.96		275
33.600 N 27000 E	567.05	12:00		979680.91	8.0859	-32.95	-33.01	-33.06		

GEO. 2002

000062

DATE 6/11/82 METER NO. 111 AREA Mallapuram

READERS B. Dempsey METER CONSTANT 0.10772

Coordinates	Reading	Time	Drift Correction	Uncorrected Gravity (Milligals)	Elevation	Corrected Value S.G. =2.0	Corrected Value S.G. =2.2	BG = 2.4	Latitude Remarks	Station
33400 N 25400 E	570.75	9:50		979960.91	6.5609	-32.95	-33.01	-33.06	33°12'17"	Base 2
25600E	565.60	9:57		979960.34	7.1659	-33.87	-33.33	-33.40		256
25800	566.20	10:06		979960.39	7.7649	-33.20	-33.27	-33.33		257
26000	566.00	10:10		979960.36	7.6661	-33.25	-33.32	-33.38		258
26200	568.05	10:17		979960.56	8.0010	-32.96	-33.03	-33.09		259
26400	563.10	10:22		979960.67	7.7059	-32.97	-33.04	-33.10		260
26600	562.40	10:29		979960.58	7.6219	-33.06	-33.13	-33.19		261
26800	562.40	10:34		979960.38	7.8061	-32.98	-33.05	-33.11		262
27000	563.15	10:39		979960.65	8.2029	-32.83	-32.90	-32.97		263
27200	563.20	10:47		979960.54	8.2159	-32.96	-33.03	-33.09		264
27400 E 25400 N	571.20	10:51		979960.91	6.5609	-32.95	-33.01	-33.06		
27400 E 33400 N	571.20	12:53		979960.91	6.5609	-32.95	-33.01	-33.06	33°12'17"	
27600 E	567.25	11:01		979960.96	8.1609	-32.93	-33.01	-33.08		265
27800	567.60	11:07		979960.98	8.5629	-32.93	-33.00	-33.07		266
28000	567.65	11:11		979960.98	8.9629	-32.85	-32.93	-33.00		267
28200	567.60	11:15		979960.97	8.9059	-32.86	-32.94	-33.01		268
28400	567.10	11:20		979960.79	9.1779	-32.86	-32.94	-33.00		269
28600	567.20	11:26		979960.74	9.3629	-32.84	-32.92	-32.99		270
28800	567.10	11:32		979960.80	9.2629	-32.84	-32.92	-32.99		271
29000	566.95	11:37		979960.83	9.2629	-32.81	-32.89	-32.96		272
29200	566.70	11:42		979960.80	9.2629	-32.81	-32.89	-32.96		273
29400	567.85	11:47		979960.82	9.6629	-32.83	-32.91	-32.98		274
29600	567.90	11:52		979960.82	10.0629	-32.83	-32.91	-32.98		275
29800E 25400N	571.95	12:03		979960.91	6.5609	-32.95	-33.01	-33.06		

GEO. 2002

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DATE 6/4/82 METER NO. 141 AREA Mullaguma

READERS E. Donnelly / J. Faulkner METER CONSTANT 0.10778

Coordinates	Reading	Time	Drift Correction	000 Gravity Uncorrected (Milligals)	Elevation	Corrected Value S.G. =2.0	Corrected Value S.G. =2.2	56 =2.4 Latitude Remarks	Station
23400E	571.10	1300		977960.91	6.5609	-32.95	-33.01	-33.06 33°12'17"	
23450E	566.70	1307		977950.43	10.5507	-32.53	-32.62	-32.71	276
23500	561.90	1313		977960.37	10.9419	-32.118	-32.57	-32.67	277
23550	556.80	1319		977961.33	11.0059	-32.63	-32.62	-32.72	278
23600	556.20	1325		977960.22	11.2659	-32.65	-32.66	-32.75	279
23650	565.70	1327		977960.31	11.2859	-32.49	-32.58	-32.68	280
23700	561.70	1334		977960.20	11.7829	-32.49	-32.59	-32.18	281
23750	562.40	1338		977960.06	11.8079	-32.60	-32.72	-32.82	282
23700	563.60	1343		977960.08	12.2659	-32.60	-32.60	-32.71	283
23650	563.40	1347		977960.06	12.3119	-32.62	-32.63	-32.73	284
23600	563.00	1353		977960.01	13.1869	-32.36	-32.47	-32.58	285
23400 E	571.40	1400		977960.91	6.5609	-32.95	-33.01	-33.06	
23400E	571.40	14 05		977960.91	6.5609	-32.95	-33.01	-33.06 33°12'17"	
23450E	565.65	14:11		977959.93	12.7149	-32.06	-32.165	-32.76	286
23500	562.30	14 15		977959.93	13.3019	-32.113	-32.214	-32.65	287
23550	558.60	14:20		977960.05	13.2829	-32.30	-32.41	-32.52	288
23600	555.00	14:24		977960.22	13.7679	-32.02	-32.14	-32.25	289
23650	556.60	14:29		977960.26	12.8179	-31.96	-32.07	-32.18	290
23700	556.05	14:33		977960.18	14.6729	-31.86	-31.98	-32.10	291
23750	556.50	14:38		977960.14	14.7259	-31.88	-32.01	-32.13	292
23800	556.40	14:43		977960.11	15.1259	-31.82	-31.95	-32.08	293
23850	556.90	14:48		977960.02	15.4759	-31.83	-31.96	-32.09	294
23900	560.10	14:53		977960.25	16.1579	-31.85	-31.97	-32.10	295
23400 E	571.00	14:57		977960.91	6.5609	-32.95	-33.01	-33.06	

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DATE 7/4/82 METER NO. 141 AREA Mulloquara

READERS C. Dempsey METER CONSTANT 0.10776

Coordinates	Reading	Time	Drift Correction	obs. Gravity ~~Uncorrected~~ (Milligals)	Elevation	Corrected Value S.G. = 2.0	Corrected Value S.G. = 2.2	SG = 2.4	Latitude Remarks	Station
25400E	571.15	9.23		979560.97	6.569	-32.95	-33.01	-33.06	23°12'17"	
23050E	560.60	9.32		979559.77	16.2787	-31.88	-32.02	-32.16		296
23000	557.45	9.41		979559.64	16.9109	-31.89	-32.03	-32.17		297
22950	558.00	9.46		979559.48	17.0069	-32.03	-32.17	-32.32		298
22900	556.75	9.50		979559.34	17.4529	-32.06	-32.21	-32.36		299
22850	555.10	9.56		979559.16	17.7709	-32.18	-32.33	-32.47		300
22800	554.40	10.02		979559.08	18.3679	-32.13	-32.28	-32.43		301
22750	553.80	10.10		979559.00	18.4829	-32.18	-32.34	-32.49		302
22700	555.60	10.15		979559.19	18.7757	-31.93	-32.08	-32.24		303
22650	555.00	10.19		979559.12	18.6889	-32.01	-32.17	-32.33		304
22600	555.45	10.24		979559.17	19.0009	-31.88	-32.04	-32.20		305
23050E	561.10	10.32		979559.77	[illegible]	-31.88	-32.02	-32.16		
22550E	554.25	10.41		979559.05	18.0839	-31.82	-31.98	-32.14	23°12'17"	306
22500	559.95	10.45		979559.61	17.7319	-31.69	-31.85	-32.02		307
22450	557.50	10.49		979559.38	19.6479	-31.54	-31.70	-31.87		308
22400	558.75	10.56		979559.51	20.3659	-31.25	-31.42	-31.57		309
22350	558.50	11.00		979559.49	20.5089	-31.24	-31.41	-31.58		310
22300	558.95	11.04		979559.54	21.0890	-31.06	-31.24	-31.42		311
22250	558.75	11.07		979559.56	21.1659	-31.01	-31.19	-31.37		312
22200	559.00	11.12		979559.55	21.7429	-30.90	-31.08	-31.26		313
22150	560.60	11.16		979559.61	21.8859	-30.61	-30.79	-31.17		314
22100	560.85	11.21		979559.74	22.3659	-30.57	-30.76	-30.94		315
22050	561.05	11.25		979559.77	22.5709	-30.51	-30.72	-30.91		316
22000	560.60	11.32		979559.72	22.8159	-30.49	-30.68	-30.87		317
21950	561.60	11.38		979559.77	22.8659	-30.43	-30.62	-30.81		318
21900	561.25	11.42		979559.81	23.2469	-30.30	-30.50	-30.67		319
22550E	556.15	11.47		979559.05	18.0839	-31.82	-31.98	-32.14		

GEO. 2002

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DATE 7/4/82 METER NO. 141 AREA Mallapunco

READERS S. Dempsey METER CONSTANT 0.10778

Coordinates	Reading	Time	Drift Correction	Geo. Gravity ~~Uncorrected~~ (Milligals)	Elevation	Corrected Value S.G. = 2.0	Corrected Value S.G. = 2.2	S6 = 2.4	Latitude Remarks	Station
21900E	560.70	13:04		979559.81	23.2449	-30.30	-30.50	-30.67	33°12'17"	
21850	561.00	13:11		979559.84	23.1459	-30.29	-30.45	-30.68		320
21800	562.00	13:13		979559.75	23.2459	-30.05	-30.25	-30.44		321
21750	562.40	13:17		979559.77	23.2459	-29.97	-30.17	-30.37		322
21700	563.40	13:23		979560.07	23.1459	-29.76	-29.97	-30.17		323
21650	563.00	13:28		979560.05	23.1459	-29.74	-29.95	-30.16		324
21600	563.30	13:32		979560.13	23.2459	-29.53	-29.74	-29.95		325
21550	564.55	13:36		979560.21	23.1459	-29.41	-29.62	-29.84		326
21500	563.50	13:40		979560.02	23.2459	-29.41	-29.63	-29.85		327
21450	561.90	13:43		979559.92	23.1459	-29.38	-29.61	-29.83		328
21400	560.30	13:48		979559.76	23.0459	-29.39	-29.62	-29.76		329
21350	559.45	13:52		979559.66	23.1459	-29.22	-29.47	-29.71		330
21300E	560.20	14:01		979559.81	23.2459	-30.30	-30.50	-30.69		
21350E	559.80	14:14		979559.66	23.1459	-29.33	-29.47	-29.71	33°12'17"	
21300	559.10	14:19		979559.64	23.2459	-28.92	-29.23	-29.48		331
21250	559.10	14:24		979559.67	23.2459	-28.91	-29.17	-29.43		332
21200	558.95	14:30		979559.63	23.1459	-29.34	-29.49	-29.73		333
21150	559.05	14:36		979559.62	23.2459	-28.84	-29.11	-29.32		334
21100	559.15	14:40		979559.76	23.2459	-28.63	-28.82	-29.10		335
21050	559.05	14:47		979559.74	23.1459	-28.35	-28.64	-28.95		336
21000	559.55	14:52		979559.69	23.2459	-28.14	-28.46	-28.76		337
20950	559.70	14:59		979559.77	23.2459	-27.90	-28.22	-28.54		338
21300E	560.00	15:05		979559.96	23.2459	-29.23	-29.47	-29.71		

GEO. 2062

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DATE 7/4/82 – 8/4/82 METER NO. 141 AREA Millangara

READERS B. Dennison / J. Foulkes METER CONSTANT 0·10778

Coordinates	Reading	Time	Drift Correction	Gravity Uncorrected (Milligals)	Elevation	Corrected Value S.G. = 2.0	Corrected Value S.G. = 2.2	S.G. = 2.4	Latitude Remarks	Station
20950E	550.60	15.14		979552.77	38.5739	-27.90	-28.22	-28.54	33°12'17"	
20900	551.05	15.18		979552.21	38.9189	-27.78	-28.10	-28.43		339
20850	551.50	15.22		979552.61	40.9059	-27.53	-27.87	-28.20		340
20800	544.30	15.27		979552.33	43.1679	-27.30	-27.66	-28.03		341
20750	545.10	15.33		979552.14	44.2809	-27.24	-27.61	-27.98		342
20700	543.15	15.38		979558.07	46.1209	-26.94	-27.33	-27.71		343
20650	539.65	15.42		979557.54	49.2739	-26.72	-27.13	-27.55		344
20600	540.00	15.47		979557.56	50.9239	-26.33	-26.76	-27.18		345
20550	540.00	15.53		979557.55	51.7979	-26.14	-26.58	-27.01		346
20950E	551.40	15.59		979552.77	38.5739	-27.90	-28.22	-28.54		
25400N 25400E	573.70	9.38		979560.91	6.5609	-32.95	-33.01	-33.06	33°12'17"	
22550E	557.90	9.47		979557.25	12.9239	-31.82	-31.92	-32.14		
25400N 25400E	573.10	9.57		979560.91	6.5609					
22550E	557.10	10.06		979557.25	12.9239					
20550E	540.70	10.21		979557.55	51.7979	-26.14	-26.58	-27.01	33°12'17"	
20500	542.75	10.25		979557.66	52.7689	-25.82	-26.26	-26.70		347
20450	544.05	10.29		979557.87	53.0039	-25.83	[illegible]	-26.49		348
20400	544.15	10.33		979558.02	53.9289	-25.19	-25.64	-26.10		349
20350	544.25	10.37		979558.02	55.7129	-24.79	-25.26	-25.73		350
20300	547.35	10.41		979558.14	56.0589	-24.39	-24.87	-25.35		351
20250	551.05	10.46		979560.07	[illegible]	-24.11	-24.56	-25.02		352
20200	551.75	10.50		979559.24	54.6789	-23.81	-24.26	-24.72		353
20150	553.15	10.56		979558.80	57.8569	-23.53	-24.02	-24.50		354
20550E	540.15	[illegible]		979557.55	51.7979	-26.14	-26.58	-27.01		

GEO. 2062

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DATE 2/4/82 METER NO. 141 AREA Williamina

READERS B. Dempsey METER CONSTANT 0.10778

Coordinates	Reading	Time	Drift Correction	~~Uncorrected~~ (Milligals)	Elevation	Corrected Value S.G. =2.0	Corrected Value S.G. =2.2	56.24	Latitude / Remarks	Station
									33°12'17"	
20150E	554.00	11:13		977568.60	57.8569	-23.63	-24.02	-24.50		
20100	555.10	11:19		977563.18	57.1370	-23.44	-23.93	-24.41		355
20050	556.60	11:23		977557.08	58.3570	-23.16	-23.66	-24.14		356
20000	557.90	11:27		977552.22	58.1170	-23.04	-23.53	-24.01		357
19950	559.45	11:33		977547.39	58.7189	-22.95	-23.24	-23.73		358
19900	561.00	11:37		977542.63	58.7169	-22.51	-23.00	-23.49		359
19850	562.15	11:33		977537.89	58.2069	-22.14	-22.63	-23.13		360
19800	563.05	11:49		977533.10	57.2169	-21.93	-22.42	-22.92		361
20150E	554.00	11:55		977568.20	57.8569	-23.63	-24.02	-24.50		

GEO. 2062

000068

Assumed Value
23400N = 600.0

DATE 20/3/82 METER NO. 141 AREA Mullaquana EL 766

READERS N. Lemon, C. Dermody, J. Foulkes METER CONSTANT 0.10778

Coordinates	Reading	Time	Drift Correction	Uncorrected (Milligals)	Elevation	Corrected Value S.G. = 2.0	Corrected Value S.G. = 2.2	SG = 2.4	Lat / Lde Remarks	Station
23400N	552.10	0945	552.10	179560.91	6.5609	-32.95	-33.01	-33.06	33°12' 17.00"	1
23450N	551.10	0956	552.08	179561.11	5.7257	-32.89	-32.94	-32.99	33°12' 15.46"	2
23500	555.55	1008	555.34	179561.26	5.6619	-32.73	-32.78	-32.83	33°12' 13.92"	3
23550	557.50	1019	557.19	179561.46	4.9279	-32.64	-32.68	-32.72	33°12' 12.38"	4
23600	557.30	1029	557.40	179561.48	5.1249	-32.57	-32.61	-32.65	33°12' 10.84"	5
23650	557.40	1038	556.91	179561.43	4.8909	-32.69	-32.73	-32.77	33°12' 09.3"	6
23400N	552.65	1045	552.10	179560.91	6.5609	-32.95	-33.01	-33.06	33°12' 17"	
23400N	552.65	1045	552.10	179560.91	6.5609	-32.95	-33.01	-33.06	33°12' 17"	
23700	557.00	1057	557.50	179561.45	4.5009	-32.63	-32.67	-32.70	33°12' 07.76"	7
23750	557.25	1107	556.91	179561.43	4.5009	-32.64	-32.68	-32.72	33°12' 06.22"	8
23800	557.45	1116	557.21	179561.46	4.7329	-32.52	-32.56	-32.60	33°12' 04.68"	9
23850	557.30	1124	557.17	179561.67	4.0949	-32.40	-32.44	-32.47	33°12' 03.14"	10
23900	560.60	1135	560.59	179561.83	4.6449	-32.46	-32.50	-32.54	33°12' 01.6"	11
23400N	552.00	1145	552.10	179560.91	6.5609	-32.95	-33.01	-33.06	33°12' 17"	
23400N	552.40	1300	552.10	179560.91	6.5609	-32.95	-33.01	-33.06	33°12' 17"	
23950	560.25	1311	557.71	179561.75	4.1319	-32.27	-32.30	-32.34	33°12' 00.06"	12
24000	557.10	1320	557.39	179561.62	4.1799	-32.18	-32.20	-32.26	33°11' 58.52"	13
24050	558.45	1329	558.26	179561.61	4.7049	-32.21	-32.25	-32.29	33°11' 56.98"	14
24100	559.30	1339	559.16	179561.72	4.8389	-32.03	-32.07	-32.11	33°11' 55.44"	15
24150	557.55	1345	557.71	179561.75	4.8349	-31.96	-32.00	-32.04	33°11' 53.9"	16
23400N	552.20	1356	552.10	179560.91	6.5609	-32.95	-33.01	-33.06	33°12' 17"	

GEO. 2082

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DATE 30/3/82 • 31/3/82 METER NO. --141 AREA Mullaquana EL 766.

N. Larson
C. Dermody

READERS J. Faulkner METER CONSTANT 0.10778

Coordinates	Reading	Time	Drift Correction	Uncorrected (Milligals)	Elevation	Corrected Value S.G. =2.0	Corrected Value S.G. =2.2	EG+2.2	Latitude Remarks	Station
23400N	551.20	13:56	552.10	[illegible]	6.8609	-32.98	-33.01	-33.06	33°12'17"	
23200	560.10	14:11	560.46	[illegible]	5.3137	-31.74	-31.77	-31.83	33°11'52.36"	17
23250	559.25	14:20	559.65	[illegible]	5.4787	-31.90	-31.94	-31.98	33°11'50.22"	18
23300	559.60	14:30	560.04	[illegible]	5.4119	-31.71	-31.75	-31.80	33°11'49.28"	19
23350	562.25	14:37	562.73	[illegible]	5.1369	-31.90	-31.94	-31.98	33°11'47.74"	20
23400	559.00	14:46	559.21	[illegible]	5.2139	-31.89	-31.93	-31.97	33°11'46.2"	21
23400N	551.55	14:56	552.10	[illegible]	6.8609	-32.95	-33.01	-33.06	33°12'17"	
23400N	551.55	14:56	552.10	[illegible]	6.8609	-32.95	-33.01	-33.06	33°12'17"	
23450	556.75	15:10	557.51	[illegible]	5.0317	-31.98	-32.02	-32.07	33°11'44.66"	22
23500	556.55	15:16	557.10	[illegible]	5.0859	-31.82	-31.86	-31.91	33°11'43.10	23
23550	556.70	15:30	557.26	[illegible]	5.0739	-31.78	-31.83	-31.87	33°11'41.68	24
23600	555.90	15:38	557.28	[illegible]	5.2139	-31.75	-31.79	-31.84	33°11'40.04"	25
23650	555.85	15:46	557.16	[illegible]	5.2239	-31.67	-31.71	-31.79	33°11'38.5	26
23400N	550.65	15:56	552.10	[illegible]	6.8609	-32.95	-33.01	-33.06	33°12'17"	
23400N	551.65	9:37	552.10	[illegible]	6.8609	-32.95	-33.01	-33.06	33°12'17"	
23700	555.75	9:58	556.34	[illegible]	6.2259	-31.67	-31.72	-31.77	33°11'26.91"	27
23750	555.00	9:48	555.36	[illegible]	6.4259	-31.74	-31.79	-31.85	33°11'35.42"	28
23800	554.70	9:55	555.23	[illegible]	6.4869	-31.68	-31.73	-31.79	33°11'33.28"	29
23850	553.45	10:03	553.51	[illegible]	7.0279	-31.76	-31.81	-31.85	33°11'32.34"	30
23900	553.50	10:12	553.71	[illegible]	7.2319	-31.62	-31.67	-31.70	33°11'30.80"	31
23400N	551.25	10:24	552.10	[illegible]	6.8609	-32.98	-33.01	-33.06	33°12'17"	

GEO. 2062

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DATE 31/3/82 METER NO. 141 APEA Mulkinya EL 766

READERS N. Lemon, C. Dermody, J. Foulkes METER CONSTANT 0·10778

Coordinates	Reading	Time	Drift Correction	CBS Gravity Uncorrected (Milligals)	Elevation	Corrected Value S.G. = 2·0	Corrected Value S.G. = 2·2	S.G. = 2·4	Latitude	Remarks	Station
23400E 23400N	551·95	1024	552·10	977560·91	6·5609	-32·95	-33·01	-33·06	33°12'17		
24950	553·20	1034	553·36	977561·05	6·7929	-31·66	-31·72	-31·77	33°11'29.26"		32
25000	552·75	1041	552·91	977561·00	7·1209	-31·61	-31·67	-31·73	33°11'27.72"		33
25050	553·30	1049	553·47	977561·06	6·7699	-31·68	-31·64	-31·70	33°11'26.18"		34
25100	553·65	1057	553·83	977561·10	6·7779	-31·52	-31·58	-31·63	33°11'24.64"		35
25150	552·55	1104	552·73	977560·98	6·1449	-31·74	-31·79	-31·84	33°11'23.1"		36
25200	552·35	1111	552·54	977560·96	6·1·09	-31·74	-31·79	-31·84	33°11'21.56"		37
23400N	551·90	1122	552·10	977560·91	6·5609	-32·95	-33·01	-33·06	33°12'17		
23400N	551·90	1122	552·10	977560·91	6·5609	-32·95	-33·01	-33·06	33°12'17		
25250	552·10	1133	552·16	977560·92	5·8719	-31·79	-31·84	-31·89	33°11'20.02"		38
25300	551·50	1140	551·48	977560·84	6·0591	-31·78	-31·83	-31·88	33°11'18.48"		39
23400N	552·35	1148	552·10	977560·91	6·5609	-32·95	-33·01	-33·06	33°12'17		
23400N	550·75	1450	552·10	977560·91	6·5609	-32·95	-33·01	-33·06	33°12'17		
25350	550·20	1458	551·73	977560·87	5·8719	-31·79	-31·84	-31·89	33°11'16.94"		40
25400	549·55	1501	551·00	977560·81	5·9819	-31·78	-31·83	-31·88	33°11'15.40"		41
25450	550·03	1506	551·50	977560·85	5·9819	-31·73	-31·78	-31·83	33°11'13.86"		42
25500	549·10	1510	551·14	977560·81	6·1209	-31·69	-31·74	-31·79	33°11'12.32"		43
25550	548·25	1514	550·43	977560·73	6·1209	-31·74	-31·79	-31·84	33°11'10.78"		44
25600	550·20	1518	551·61	977560·96	6·2269	-31·52	-31·57	-31·62	33°11'09.24"		45
25650	548·25	1523	550·61	977560·74	6·2269	-31·69	-31·65	-31·70	33°11'07.70"		46
25700	548·70	1528	550·41	977560·73	6·2569	-31·47	-31·52	-31·58	33°11'06.16"		47
25750	549·05	1532	550·79	977560·77	6·2069	-31·45	-31·51	-31·56	33°11'04.62"		48
25800	549·40	1535	551·17	977560·81	6·2069	-31·52	-31·58	-31·63	33°11'03.080"		49
25850	549·60	1539	551·41	977560·84	6·1869	-31·40	-31·45	-31·50	33°11'01.540"		50
25900	550·30	1543	552·15	977560·92	6·2069	-31·33	-31·39	-31·44	33°11'00		51
23400N	550·15	1554	552·10	977560·91	6·5609	-32·95	-33·01	-33·06	33°12'17"		

GEO. 2062

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DATE 1/4/82 METER NO. 141 AREA Mullaquana SA

READERS J Foulkes / B Dempsey METER CONSTANT 0.10778 (Base 1 - 7265005E 6528500N)

Coordinates	Reading	Time	Drift Correction	CBB Gravity Uncorrected (Milligals)	Elevation	Corrected Value S.G. = 2.0	Corrected Value S.G. = 2.2	S.G. 2.4	Latitude	Remarks	Station
6500N 7265005E	619.85	9.15	621.10	977618.56	7.0749	-21.15	-21.21	-21.27	33°9'1.21"		Base 1
5600	619.65	9.21	620.61	977582.62	6.8249	-21.19	-21.25	-21.31	33°9'20.541"		114
5550	619.50	9.27	620.58	977578.60	6.7779	-21.25	-21.40	-21.46	33°9'24.095"		113
5500	618.50	9.33	619.49	977565.29	6.9729	-21.46	-21.52	-21.57	33°9'25.642"		112
5450	619.15	9.40	620.02	977582.45	6.6929	-21.48	-21.54	-21.60	33°9'27.190"		111
5400	618.35	9.45	619.16	977578.25	6.9589	-21.57	-21.63	-21.69	33°9'28.737"		110
5350	616.90	9.52	617.61	977563.18	6.6929	-21.22	-21.68	-21.43	33°9'30.285"		109
5300	613.95	9.59	614.66	977567.86	6.7479	-22.18	-22.23	-22.09	33°9'31.832"		108
5250	611.45	10.05	611.97	977567.58	6.4579	-22.54	-22.10	-22.16	33°9'33.380"		107
5200	607.50	10.09	607.97	977567.36	6.6219	-22.77	-22.83	-22.88	33°9'34.927"		106
7265005E	620.75	10.17	621.10	977618.56	7.0749	-21.15	-21.21	-21.27	33°9'1.21"		
7265005E	620.75	10:17	621.10	977618.56	7.0749	-21.15	-21.21	-21.27	33°9'1.21"		
5150	603.45	10:24	603.72	977567.23	6.3459	-22.98	-23.04	-23.09	33°9'36.475"		105
5100	601.30	10:31	601.43	977567.03	6.5209	-23.13	-23.19	-23.24	33°9'38.022"		104
5050	601.65	10:35	601.79	977567.13	6.2109	-23.21	-23.26	-23.31	33°9'39.570"		103
5000	606.45	10:40	606.53	977576.97	6.4239	-23.32	-23.38	-23.43	33°9'41.117"		102
4950	605.70	10:47	605.69	977576.92	6.3259	-23.46	-23.51	-23.57	33°9'42.664"		101
4900	605.00	10:52	604.93	977576.32	6.5819	-23.53	-23.58	-23.64	33°9'44.212"		100
4850	604.50	10:58	604.26	977576.16	6.5009	-23.68	-23.73	-23.79	33°9'45.759"		99
4800	603.50	11:05	603.28	977576.04	6.5569	-23.78	-23.84	-23.89	33°9'47.307"		98
7265005E	621.45	11:16	621.10	977618.56	7.0749	-21.15	-21.21	-21.27	33°9'1.21"		

GEO. 2002

000072

DATE 1/4/82 METER NO. 141 AREA Mullaquore SA

7265005E

READERS J. Faulkes / P. Dempsey METER CONSTANT 0.10778 (Base 1 - 6238000N)

Coordinates	Reading	Time	Drift Correction	Gravity Uncorrected (Milligals)	Elevation	Corrected Value S.G. =2.0	Corrected Value S.G. =2.2	S.G. 2.4	Latitude Remarks	Station
7265005E	621.45	11.16	621.10	979868.56	7.0749	-21.15	-21.21	-21.27	33°09'21"	
4750	602.05	11.27	601.66	979866.46	6.4877	-24.02	-24.08	-24.13	33°9'48.854"	97
4700	600.80	11.32	600.40	979866.33	6.7249	-24.12	-24.18	-24.24	33°9'50.402"	96
4650	598.65	11.38	598.23	979866.10	6.6689	-24.41	-24.47	-24.52	33°9'51.949"	95
4600	597.30	11.42	597.36	979866.00	6.7787	-24.51	-24.57	-24.62	33°9'53.497"	94
4550	596.35	11.49	596.39	979865.90	6.4449	-24.73	-24.8	-24.84	33°9'55.044"	93
4500	595.35	11.54	595.37	979865.71	6.3277	-24.70	-24.75	-24.81	33°9'56.592"	92
7265005E	621.60	12.00	621.10	979868.56	7.0749	-21.15	-21.21	-21.27	33°09'21"	
7265005E	619.65	13.02	621.10	979863.56	7.0749	-21.15	-21.21	-21.27	33°09'21"	
4550	593.00	13.11	594.34	979856.68	6.1279	-25.01	-25.14	-25.19	33°9'58.139"	91
4500	591.30	13.19	592.55	979865.48	6.2169	-25.29	-25.35	-25.40	33°9'59.687"	90
4450	589.50	13.26	590.67	979865.28	5.9309	-25.57	-25.64	-25.69	33°10'01.234"	89
4300	586.70	13.32	587.79	979864.97	6.0059	-25.92	-25.97	-26.02	33°10'02.547"	88
4250	585.75	13.37	586.78	979864.86	6.0149	-26.07	-26.12	-26.17	33°10'04.095"	87
4200	583.30	13.42	584.28	979864.59	6.4137	-26.30	-26.35	-26.41	33°10'05.642"	86
4150	582.75	13.47	583.67	979864.53	6.1037	-26.45	-26.50	-26.55	33°10'07.192"	85
4100	581.10	13.53	581.94	979864.36	6.2817	-26.65	-26.70	-26.76	33°10'08.737"	84
7265005E	620.35	14.01	621.10	979868.56	7.0749	-21.15	-21.21	-21.27	33°09'21"	

GEO. 2062

000073

DATE 1/11/82 METER NO. 141 AREA Mullaquana

READERS N. Lemon, J. Foulkes METER CONSTANT 0.10773

(Base 1 - 7265000E / 732.8800N)

Coordinates	Reading	Time	Drift Correction	Obs. Gravity - Uncorrected (Milligals)	Elevation	Corrected Value S.G. = 2.0	Corrected Value S.G. = 2.2	S.G. 2.4	Latitude	Remarks	Station
7265000E	620.35	14:01	(-21.10)	977568.96	7.0749	-21.15	-21.21	-21.27	33° 07' 21"		
4050	579.25	14:07	520.15	977564.15	6.0159	-26.92	-26.97	-27.02	33°10' 10.285"		83
4000	579.25	14:11	581.25	977564.27	6.0179	-26.84	-26.89	-26.94	33° 10' 11.232"		82
3950	577.90	14:15	579.01	977564.02	6.1289	-27.09	-27.15	-27.20	33°10' 13.320"		81
3900	577.90	14:19	579.11	977564.03	6.2469	-27.10	-27.16	-27.21	33°10' 14.927"		80
3850	577.60	14:23	578.91	977564.01	6.2319	-27.15	-27.20	-27.25	33°10' 16.475"		79
3800	576.70	14:27	577.11	977563.82	6.3659	-27.36	-27.41	-27.46	33°10' 18.022"		78
3750	576.25	14:32	577.74	977563.89	6.2669	-27.35	-27.41	-27.46	33°10' 19.510"		77
3700	576.60	14:35	577.21	977563.83	6.5049	-27.38	-27.44	-27.49	33°10' 21.117"		76
3650	573.75	14:39	574.59	977563.54	6.5189	-27.72	-27.77	-27.83	33°10' 22.664"		75
3600	570.50	14:43	572.47	977563.32	6.7149	-27.92	-27.97	-28.03	33°10' 24.212"		74
3550	570.70	14:47	572.62	977563.33	6.3639	-28.03	-28.08	-28.14	33°10' 25.759"		73
3500	567.25	14:51	571.27	977563.19	6.5639	-28.35	-28.40	-28.46	33°10' 27.307"		72
7265000E	618.30	15:02	621.10	977562.96	7.0749	-21.15	-21.21	-21.27	33° 07' 21"		
7265000E	618.30	15:02	621.10	977562.96	7.0749	-21.15	-21.21	-21.27	33° 07' 21"		
3450	568.05	15:14	570.65	977562.12	6.2649	-28.33	-28.38	-28.44	33°10' 28.854"		71
3400	565.35	15:19	568.07	977562.24	6.5969	-28.56	-28.61	-28.67	33°10' 30.402"		70
3350	563.35	15:23	566.17	977562.64	6.6109	-28.62	-28.68	-28.73	33°10' 31.947"		69
3300	562.95	15:29	565.91	977562.61	6.9639	-28.78	-28.83	-28.89	33°10' 33.497"		68
3250	562.30	15:34	565.39	977562.56	7.0859	-28.85	-28.90	-28.96	33°10' 35.044"		67
3200	561.45	15:40	564.62	977562.48	7.4359	-28.97	-29.02	-29.08	33°10' 36.592"		66
3150	561.05	15:45	564.41	977562.45	7.2119	-28.97	-29.02	-29.08	33°10' 38.139"		65
3100	559.70	15:51	563.20	977562.32	7.2979	-29.15	-29.21	-29.27	33°10' 39.687"		64
7265000E	617.30	16:03	621.10	977562.96	7.0749	-21.15	-21.21	-21.27	33° 07' 21"		

GEO. 2562

000074

DATE 2/4/82 METER NO. 141 AREA Mullaqueena

READERS J. Foulkes METER CONSTANT 0.10778 Base 1 - 6358800N 726500E

Coordinates	Reading	Time	Drift Correction	Uncorrected Gravity (Milligals)	Elevation	Corrected Value S.G. = 2.0	Corrected Value S.G. = 2.2	S.G. 2.4	Latitude	Remarks	Station
726500E	615.50	9:38	621.10	979568.56	7.0749	-21.15	-21.21	-21.27	33°09'21"		
3050	555.30	9:48	560.73	979562.05	7.2259	-29.46	-29.52	-29.58	33°10'41.254"		63
3000	552.75	9:53	558.09	979561.77	7.3989	-29.75	-29.81	-29.87	33°10'42.781"		62
2950	551.10	9:58	556.35	979561.58	6.9889	-30.05	-30.11	-30.17	33°10'44.329"		61
2900	550.15	10:03	555.31	979561.47	6.8299	-30.24	-30.30	-30.36	33°10'45.876"		60
2850	549.35	10:07	554.44	979561.38	6.5289	-30.42	-30.48	-30.53	33°10'47.424"		59
2800	548.05	10:12	553.06	979561.23	6.4519	-30.63	-30.69	-30.75	33°10'48.971"		58
2750	548.25	10:19	553.13	979561.23	5.9329	-30.80	-30.86	-30.90	33°10'50.519"		57
2700	548.10	10:23	553.21	979561.24	6.0229	-30.79	-30.84	-30.89	33°10'52.066"		56
2650	547.20	10:27	552.54	979561.17	5.7439	-30.97	-31.02	-31.07	33°10'53.614"		55
2600	547.10	10:31	552.87	979561.10	6.0259	-30.99	-31.04	-31.09	33°10'55.161"		54
2550	546.75	10:35	552.35	979561.04	5.9929	-31.11	-31.16	-31.21	33°10'56.709"		53
2500	546.05	10:39	550.53	979560.76	6.3049	-31.15	-31.20	-31.25	33°10'58.256"		52
726500E	616.70	10:49	621.06	979568.56	7.0749	-21.15	-21.21	-21.27	33°09'21"		
2534.00N 2540.00E	546.05	11:02	550.13	979560.02	6.5609	-32.94	-33.00	-33.05	33°12'17"		
726500E	617.25	11:18	621.10	979568.56	7.0749	-21.15	-21.21	-21.27	33°09'21"		
726500E	617.25	11:18	621.10	979568.56	7.0749	-21.15	-21.21	-21.27	33°09'21"		
5650	617.75	11:24	621.55	979569.01	6.7629	-21.12	-21.18	-21.24	33°09'19.431"		115
5700	618.70	11:31	622.44	979569.90	6.9329	-20.97	-21.03	-21.09	33°09'17.862"		116
5750	620.65	11:36	623.39	979570.80	6.6459	-20.89	-20.95	-21.00	33°09'16.293"		117
5800	621.90	11:42	625.11	979572.01	6.7759	-20.60	-20.66	-20.71	33°09'14.724"		118
5850	622.90	11:47	626.50	979573.14	6.5009	-20.52	-20.57	-20.62	33°09'13.155"		119
5900	623.30	11:52	626.85	979573.18	6.7159	-20.40	-20.45	-20.51	33°09'11.586"		120
726500E	617.60	11:58	621.10	979568.56	7.0749	-21.15	-21.21	-21.27	33°09'21"		

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DATE 2/4/82 METER NO. 141 AREA Mullengera SA

726500E
READERS J. Faulkes METER CONSTANT. 0.10778 (Base 1 - 6338000N)
B. Dempsey

Coordinates	Reading	Time	Drift Correction	Obs. Grav. Uncorrected (Milligals)	Elevation	Corrected Value S.G. = 2.0	Corrected Value S.G. = 2.2	S.G. = 2.4	Latitude Remarks	Station
726500E	617.75	13.06	621.10	179.868.56	7.0749	-21.15	-21.21	-21.27	33°09'21"	
5950	624.25	13.13	627.50	179.867.25	6.5301	-20.33	-20.38	-20.44	33°9'10.917"	121
6000	624.65	13.17	627.85	179.867.27	6.6531	-20.22	-20.27	-20.33	33°9'08.448"	120
6050	626.10	13.22	629.23	179.868.44	6.4309	-20.09	-20.15	-20.20	33°9'06.879"	103
6100	626.60	13.27	629.66	179.868.43	6.5159	-19.99	-20.04	-20.10	33°9'05.310"	104
6150	628.00	13.31	631.00	179.868.63	6.3009	-19.86	-19.92	-19.97	33°9'03.741"	105
6200	629.55	13.37	632.47	179.868.77	6.4979	-19.61	-19.67	-19.72	33°9'02.172"	106
6250	631.55	13.41	634.41	179.868.89	6.0359	-19.48	-19.54	-19.59	33°9'00.603"	107
6300	633.20	13.48	635.96	179.868.91	6.1629	-19.25	-19.30	-19.35	33°8'59.031"	108
6350	632.75	13.52	635.46	179.868.11	5.9359	-19.31	-19.36	-19.41	33°8'57.446"	109
6400	632.60	13.58	635.23	179.868.28	6.0289	-19.22	-19.33	-19.38	33°8'55.877"	130
6450	631.80	14.02	634.37	179.868.77	5.8769	-19.37	-19.42	-19.47	33°8'54.328"	131
726500E	618.60	14.07	621.10	179.868.56	7.0749	-21.15	-21.21	-21.27	33°09'21"	
726500E	618.60	14.07	621.10	179.868.56	7.0749	-21.15	-21.21	-21.27	33°09'21"	
6500	633.20	14.14	636.76	179.868.03	6.1569	-19.24	-19.30	-19.35	33°8'52.759"	132
6550	632.20	14.19	635.80	179.868.04	6.0627	-19.25	-19.30	-19.34	33°8'51.19"	133
6600	633.40	14.23	636.03	179.868.06	6.0728	-19.16	-19.22	-19.27	33°8'49.621"	134
6650	631.75	14.29	634.43	179.868.04	6.0569	-19.18	-19.23	-19.28	33°8'48.052"	135
6700	632.30	14.35	635.03	179.868.06	6.3629	-19.01	-19.06	-19.11	33°8'46.483"	136
6750	631.20	14.41	634.58	179.868.01	6.1739	-19.08	-19.13	-19.18	33°8'44.914"	137
6800	630.60	14.45	633.42	179.868.02	6.2879	-19.11	-19.17	-19.22	33°8'43.345"	138
6850	631.10	14.50	633.95	179.868.15	6.2509	-19.01	-19.14	-19.19	33°8'41.776"	139
6900	631.15	14.56	632.55	179.868.12	6.1969	-19.18	-19.23	-19.28	33°8'40.207"	140
6950	630.40	15.00	633.53	179.868.15	6.2369	-19.11	-19.16	-19.21	33°8'38.638"	141
726500E	618.10	15.02	621.10	179.868.56	7.0749	-21.15	-21.21	-21.27		

GEO. 2062

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DATE 2/4/82 METER NO. 141 AREA Millaquana SA

READERS J. Foulkes METER CONSTANT 0.10778 (Base 1 - 7265000E / 6328000N)

Coordinates	Reading	Time	Drift Correction	Obs Gravity Uncorrected (Milligals)	Elevation	Corrected Value S.G. = 2.0	Corrected Value S.G. = 2.2	S.G. = 2.4 Latitude	Remarks	Station
7265000E	618.10	15.08	621.10	977568.56	7.0749	-21.15	-21.21	-21.27 33°09'21"		
7000	630.25	15.16	633.07	977589.85	6.2669	-19.03	-19.09	-19.14 33°8'37.069"		142
7050	629.95	15.22	632.63	977589.80	6.4589	-19.02	-19.07	-19.13 33°8'35.5"		143
7100	631.35	15.30	633.85	977587.93	6.5709	-18.22	-18.87	-18.93 33°8'33.9"		144
7150	631.59	15.34	633.96	977587.95	6.4109	-18.79	-18.84	-18.89 33°8'32.2"		145
7200	631.60	15.37	633.89	977587.14	6.6289	-18.72	-18.78	-18.84 33°8'30.7"		146
7250	632.00	15.44	634.18	977587.17	6.2939	-18.72	-18.78	-18.83 33°8'29.224"		147
7300	633.10	15.49	635.16	977570.03	6.4939	-18.65	-18.60	-18.65 33°8'27.655"		148
7350	632.35	15.53	634.82	977577.04	6.4239	-18.55	-18.61	-18.66 33°8'26.086"		149
7400	629.75	15.58	631.61	977587.69	6.7019	-18.82	-18.88	-18.93 33°8'24.517"		150
7265000E	619.45	16.07	621.10	977568.56	7.0749	-21.15	-21.21	-21.27 33°09'21"		

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DATE 5/4/82 METER NO. 141 AREA Mullaguna #1

READERS J. Foulkes METER CONSTANT 0.10778 (Base 1 7263006E 6228800N)

Coordinates	Reading	Time	Drift Correction	Obs. Gravity Uncorrected (Milligals)	Elevation	Corrected Value S.G. =2.0	Corrected Value S.G. =2.2	56 24 Latitude	Remarks	Station
7263006E	629.40	9:36	621.10	977.818.96	7.0749	-21.15	-21.21	-21.27	33°09'21"	Base 1
7460	653.50	9:44	635.00	977.832.06	6.539	-18.44	-18.50	-18.56	33°8'22.948"	151
7500	654.40	9:42	635.20	977.832.14	6.7257	-18.27	-18.33	-18.39	33°8'21.370"	152
7550	654.75	9:54	636.01	977.832.17	6.7179	-18.22	-18.28	-18.34	33°8'19.81"	153
7600	655.45	9:52	636.61	977.832.23	7.0086	-18.05	-18.11	-18.17	33°8'18.241"	154
7650	655.66	10:02	636.71	977.832.24	6.5529	-18.05	-18.11	-18.17	33°8'16.672"	155
7700	655.65	10:05	636.51	977.832.22	7.0757	-17.97	-18.03	-18.09	33°8'15.103"	156
7750	657.20	10:11	638.04	977.832.39	6.8429	-17.84	-17.89	-17.95	33°8'13.534"	157
7800	658.00	10:16	638.72	977.832.46	6.8029	-17.71	-17.77	-17.83	33°8'11.966"	58
7850	657.15	10:20	638.07	977.832.39	6.8029	-17.75	-17.81	-17.87	33°8'10.397"	159
7900	658.00	10:29	638.40	977.832.42	6.9387	-17.66	-17.72	-17.78	33°8'08.828"	160
7263006E	640.90	10:37	621.10	977.832.26	7.0749	-21.15	-21.21	-21.27	33°09'21"	
7263006E	640.90	10:37	621.10	977.832.26	7.0749	-21.15	-21.21	-21.27	33°09'21"	
7950	660.50	10:46	640.62	977.832.66	6.8129	-17.41	-17.47	-17.53	33°8'07.259"	161
8000	662.50	10:51	642.74	977.832.87	7.0309	-17.11	-17.17	-17.23	33°8'05.69"	162
8050	661.25	10:57	642.10	977.832.82	6.8727	-17.17	-17.23	-17.29	33°8'04.121"	163
8100	660.10	11:01	640.96	977.832.71	7.1829	-17.26	-17.32	-17.38	33°8'02.552"	164
8150	657.55	11:06	638.52	977.832.48	6.9379	-17.33	-17.39	-17.44	33°8'00.983"	165
8200	657.60	11:12	639.07	977.832.53	7.2119	-17.21	-17.27	-17.33	33°7'59.414"	166
8250	658.70	11:22	640.20	977.832.64	7.1629	-17.28	-17.34	-17.40	33°7'57.845"	167
8300	658.70	11:25	640.03	977.832.63	7.4039	-17.20	-17.26	-17.32	33°7'56.276"	168
8350	658.40	11:30	639.73	977.832.60	7.2879	-17.23	-17.29	-17.35	33°7'54.707"	169
8400	657.60	11:35	639.05	977.832.53	7.6119	-17.19	-17.26	-17.32	33°7'53.138"	170
8450	656.80	11:41	638.16	977.832.45	7.4289	-17.40	-17.46	-17.52	33°7'51.569"	171
8500	657.20	11:52	638.60	977.832.49	7.8259	-17.33	-17.39	-17.42	33°7'50"	172
7263006E	640.70	11:56	621.10	977.832.26	7.0749	-21.15	-21.21	-21.27	33°09'21"	

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EXPLORATION LICENCE 766

MULLAQUANA, SOUTH AUSTRALIA

REPORT FOR THE QUARTER ENDED 8th SEPTEMBER, 1982

000079

EXPLORATION LICENCE 766

MULLAQUANA, SOUTH AUSTRALIA

REPORT FOR THE QUARTER ENDED 8th SEPTEMBER, 1982

CONTENTS

EXPLORATION LICENCE 766

MULLAQUANA, SOUTH AUSTRALIA

REPORT FOR THE QUARTER ENDED 8th SEPTEMBER, 1982

1. GENERAL

Exploration Licence 766 of 1075 square kilometres was granted to BHP Minerals Limited on 8th December, 1980, for one year, and was renewed for a further year over a reduced area of 330 square kilometres.

The E.L. was taken up to explore for carbonaceous sediments of Tertiary age possibly deposited and preserved on a series of fault blocks in the area. Minor Tertiary outcrops occur along the edge of several fault blocks and a gravity low in the area was thought to be indicative of a thickening of Tertiary sedimentation.

The first stage of drilling indicated the presence of lignite and oil shale in the area immediately north of the Munyaroo Conservation Park.

The second stage of drilling suggested there might be in the order of 100 million tonnes of sapropelic lignite and 260 million tonnes of lignite plus oil shale in that area. The apparent irregular nature of the deposit did not suggest any factors which might control the shape of the deposit.

2. WORK DONE

A reassessment of the faulting was made to determine if there is a liklihood of the lignite's being nearer to the surface.

Reserves were calculated and a summary report written and distributed to E.T.S.A. to aid their future energy planning programme.

Two samples were analysed for crude montan wax/bitumens. Results are in the Appendix.

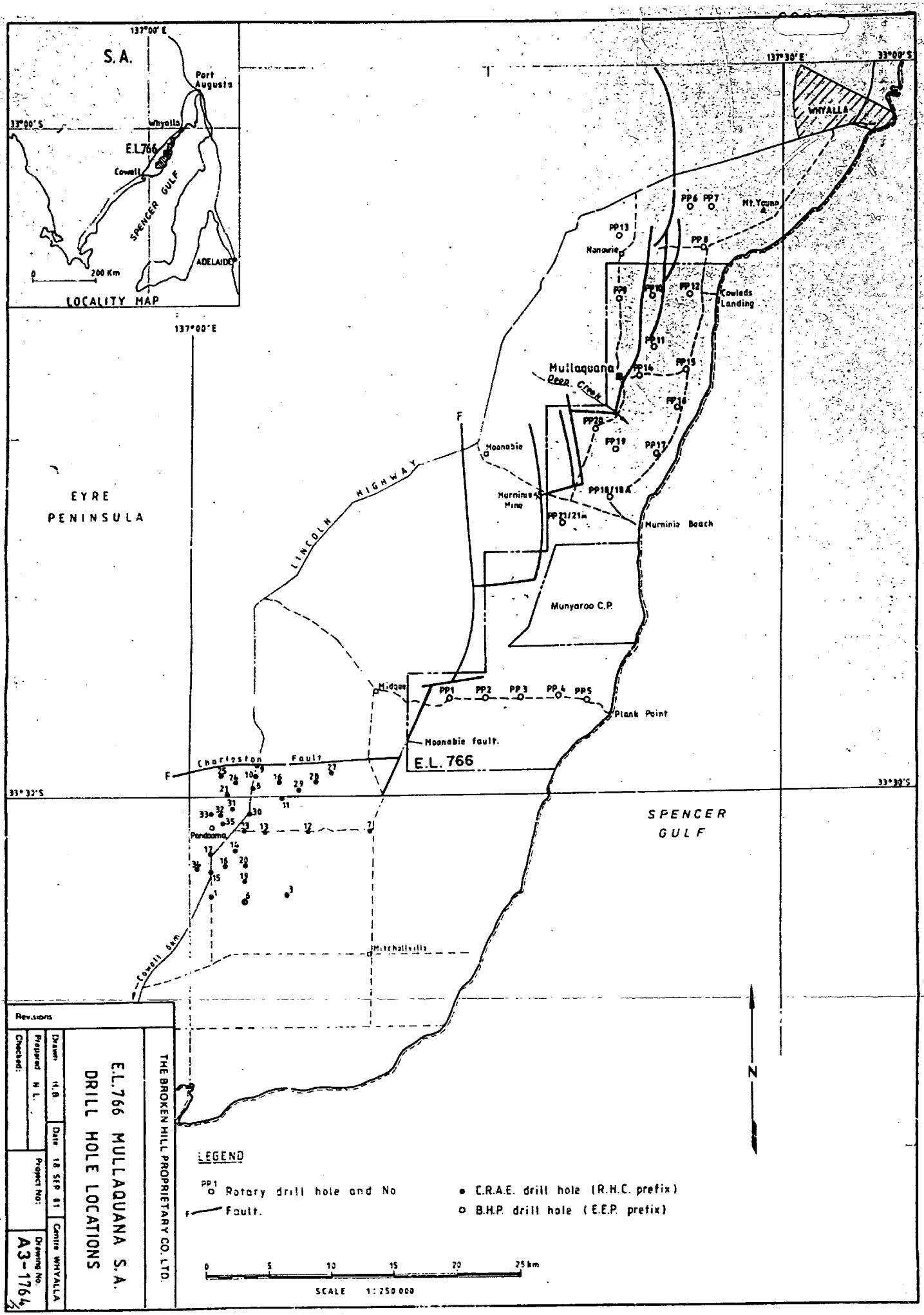
3. EXPENDITURE

Expenditure debited to E.L. 766 during June, July and August, 1982 was:

Wages and Salaries	$ 968
Fares and Mobilisation	379
Transport	116
Sample Analysis	781
Administration/Overheads	225
Sundries	3
	$2,472

Total expenditure to 31st August, 1982 is $116,408

This report is submitted to the Department of Mines and Energy as required by Condition 4 of Exploration Licence 766.


S.A.
Port Augusta
Whyalla
E.L.766
Cowell
SPENCER GULF
ADELAIDE
0 200 Km
LOCALITY MAP
137°00'E
137°30'E
33°00'S
33°30'S
WHYALLA
Hansarie
Mt. Young
Coulads Landing
Mullaquana
Deep Creek
Moonabie
Hurminie Mine
Hurminie Beach
LINCOLN HIGHWAY
EYRE PENINSULA
Munyaroo C.P.
Midgee
Plank Point
Moonabie fault.
E.L. 766
Charleston Fault
Pandooma
Mitchellville
Cowell 6km
SPENCER GULF
N
LEGEND
Rotary drill hole and No
Fault.
C.R.A.E. drill hole (R.H.C. prefix)
B.H.P. drill hole (E.E.P. prefix)
0 5 10 15 20 25 km
SCALE 1:250 000
Revisions
Checked:
Prepared N.L.
Drawn H.B
Date 18 SEP 81
Project No:
Centre WHYALLA
Drawing No. A3-1764
E.L.766 MULLAQUANA S.A.
DRILL HOLE LOCATIONS
THE BROKEN HILL PROPRIETARY CO. LTD.

APPENDIX

Analysis Results Crude Montan Wax/Bitumens

000084

15 SEP 1982

DEPARTMENT OF MINES AND ENERGY

SOUTH AUSTRALIA

191 Greenhill Road, Parkside

TELEPHONE: (08)272-5711
TELEGRAMS: Domex
TELEX: AA88692
PLEASE ADDRESS ALL CORRESPONDENCE TO:
The Director-General
PO Box 151
Eastwood, S.A., 5063

In reply, please quote
DME 242/82 LCB:ZV

TONY
PLEASE COPY AND SEND TO
JOHN COX [illegible]
TOM [illegible]

27th August, 1982.

Mr. S. Bell,
Geological Department,
BHP Whyalla Works,
WHYALLA. S.A. 5600.

Dear Sid,

Please find enclosed a copy of AMDEL report A23/82 giving results of testing two samples for montan wax/bitumen content.

The low montan wax/bitumen content of about 3% is comparable to results obtained several years ago on Moorlands lignite, a typical South Australian lignite.

The samples, and bitumen extracts have been retained by AMDEL in case you require further detailed work.

Yours faithfully,

B.P. WEBB
DIRECTOR-GENERAL

Encl.

The Australian
Mineral Development
Laboratories

Flemington Street, Frewville.
South Australia 5063
Phone Adelaide 79 1662
Telex AA 82520

Please address all
correspondence to
P.O. Box 114 Eastwood
SA 5063
In reply quote:

1/16/0 - AC 828/83

17 August 1982

amdel

DATA CERTIFICATE

The Director General,
S.A. Department of Mines & Energy,
P.O. Box 151,
EASTWOOD S.A. 5063

REPORT AC 828/83 'A' 23/82.

YOUR REFERENCE:	Request dated 3 August 1982
IDENTIFICATION:	As listed
DATE RECEIVED:	3 August 1982

D.K. Powley
Manager
Analytical Chemistry Division

for Norton Jackson
Managing Director

ii

Head Office:
Flemington Street, Frewville
South Australia 5063.
Telephone (08) 79 1662
Telex: Amdel AA82520
Pilot Plant:
Osman Place
Thebarton, S.A.
Telephone (08) 43 8053
Branch Laboratories.
Melbourne, Vic.
Telephone (03) 645 3093
Perth, W.A.
Telephone (09) 325 7311
Townsville
Queensland 4814
Telephone (077) 75 1377

NOTE:

Please note discrepancies in sample numbering.

As received at AMDEL.

Sample (1) was marked A 860/82
PPD28 91.9 - 93.05.

(2) was marked A 859/82
PPD28 93.60 - 95.35.

ANALYSIS

%

SAMPLE MARK	CRUDE MONTAN WAX/ BITUMENS			TOTAL MOISTURE H_2O
	MOISTURE FREE BASIS	AIR DRIED BASIS	AS RECEIVED BASIS	
A859/82	8.2	7.6	3.7	55.5
A860/32	5.8	4.4	2.6	55.7

NOTE: Extracted bitumens are dark brown, solid at room temperature and resemble waxy fuel oil in appearance.

Method: As discussed

EXPLORATION LICENCE 766

MULLAQUANA, SOUTH AUSTRALIA

FINAL REPORT

JANUARY, 1983

CONTENTS

FIGURE

EXPLORATION LICENCE 766

MULLAQUANA, SOUTH AUSTRALIA

FINAL REPORT

1. GENERAL

Exploration Licence 766 of 1075 square kilometres was granted to BHP Minerals Limited on 8th December, 1980, for one year, and was renewed for a further year over a reduced area of 330 square kilometres. The E.L. expired on 7th December, 1982.

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The first stage of drilling indicated the presence of lignite and oil shale in the area immediately north of the Munyaroo Conservation Park.

The second stage of drilling suggested there might be in the order of 100 million tonnes of sapropelic lignite and 260 million tonnes of lignite plus oil shale in that area. The apparent irregular nature of the deposit did not suggest any factors which might control the shape of the deposit.

2. FIELD INVESTIGATIONS

2.1 Drilling

An initial programme of twenty-one holes was drawn up to test the stratigraphy on each of the recognizable fault blocks in the area. Two major blocks were not tested. The area around Pondooma was considered to have been sufficiently well drilled by C.R.A.E. as part of investigations on E.L. 397 not to warrant further testing. The fault block south of the Charleston Fault and east of the Moonabie Fault, i.e. around Mitchellville, was thought to have too thick a cover sequence to be of economic interest. This block is downthrown across both the faults mentioned above and the C.R.A.E. hole RHC 7 gave some proof of the increased depth of cover.

The first twenty-one holes (PP1-21A) together with three redrilled holes due to technical problems and for coring purposes totalled 1894 metres. These holes were drilled using a Mayhew 1000 R. Following the intersection of some lignite and oil shale in PP 18/18A, a further eight holes (PP(D)22 to PP(D)29) totalling 834.85 metres, were drilled between PP18/18A and the Munyaroo Conservation Park. These holes were drilled with a Longyear 38 in order to obtain cored sections through the seams.

cont./..

Details of the drilling programmes including graphic and geophysical logs were given in the reports for the quarters ended 8th September, 1981 and 8th March, 1982.

TONNAGES

The lack of close spaced grid drilling coupled with the apparent rapid changes across the area between the Munyaroo Conservation Park and PP18A make it impossible to calculate any "reserves" for the area. However, by assigning an area of influence to each borehole to fill the supposed area of the "deposit", an order of magnitude tonnage calculation can be made. The holes used in these calculations are PP18 and 21 and PP(D)22, 23, 24, 25, 26, 28 and 29.

Amounts of material

Lignite - 100 million tonnes.
Lignite plus oil shale - 260 million tonnes.

2.2 Geophysics

To determine the position and throw of faults and to locate any areas of possibly thicker Tertiary sedimentation, 17.95 kilometres of gravity were read in the area between PP15 and PP12. Readings were taken every 50 metres along three optically levelled lines. Results are in the report for the quarter ended 8th June, 1982.

To determine the approximate distribution of lignite in the Murninie area, ground magnetic readings were taken every 10 metres along 10 lines totalling 23.3 kilometres. Results are in the report for the quarter ended 8th June, 1982.

3. OTHER INVESTIGATIONS

3.1 Sampling and Analysis

The core through the lignite and oil shale intervals was quartered. One half was sent to AMDEL for coal analysis, a quarter was sent to Australian Laboratory Services in Brisbane for oil shale determinations and a quarter was repacked in the plastic sleeving for retention in the core library. Results are in the report for the quarter ended 8th March, 1982.

Two samples were analysed for crude montan wax/bitumens. Results are in the report for the quarter ended 8th September, 1982.

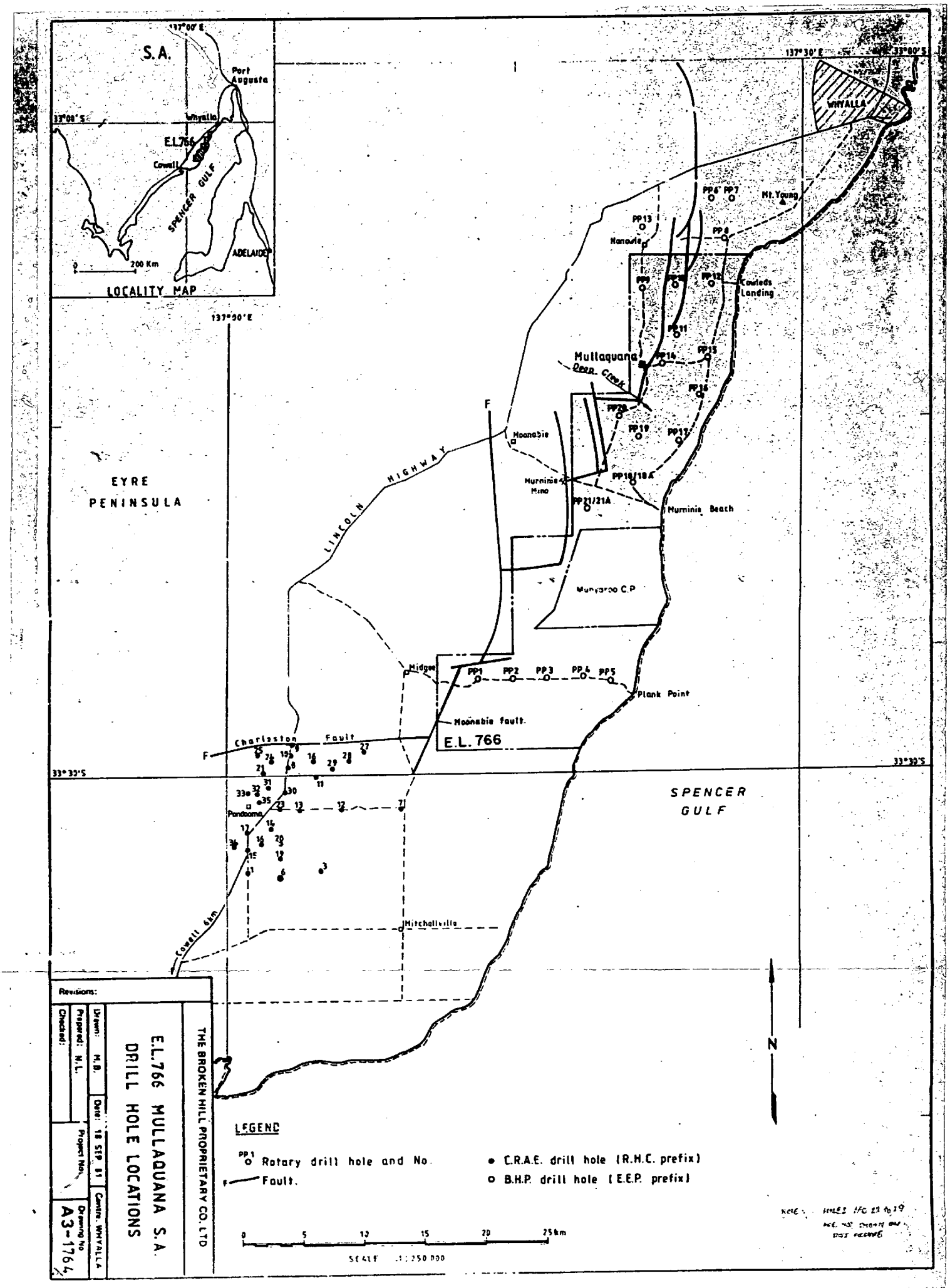
cont./..

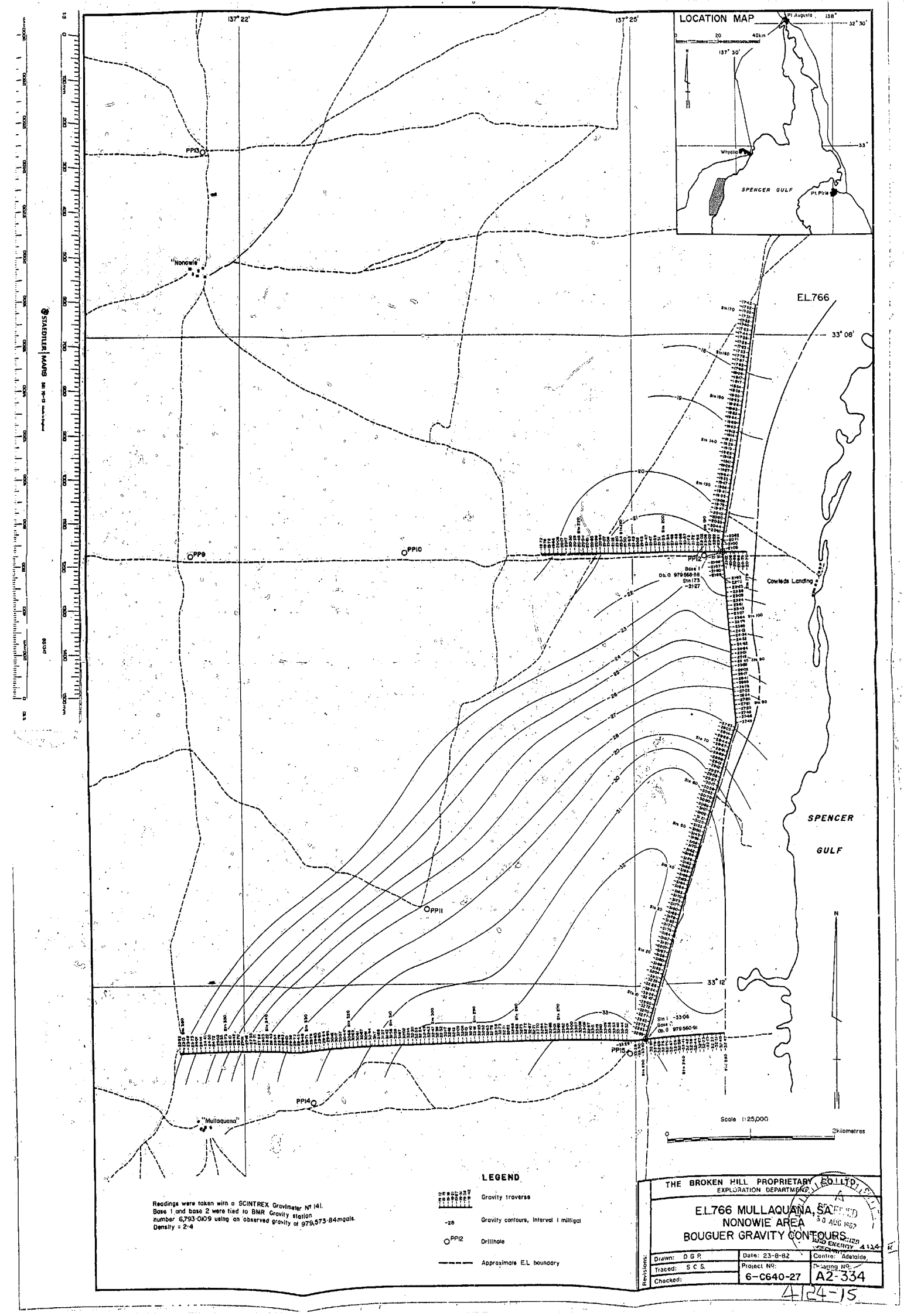
4. EXPENDITURE

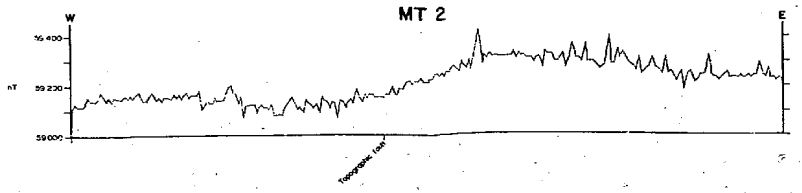
Expenditure debited to E.L. 766 was:

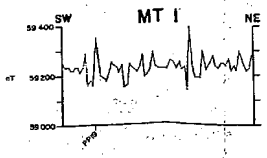
Wages and Salaries	$ 41,835
Messing and Accommodation	592
Fares and Mobilisation	1,181
Drilling	49,386
Transport	2,501
Radio Communications	10
Surveying and Aerial Photographs	145
Plant Hire	400
Mobilisation of Equipment	75
Sample Analysis	11,209
Geophysics	1,940
Tenement Fees, Licences etc.	320
Occupancy and Location Expenses	39
Administration and Overheads	5,483
Other Items	20
	$115,136

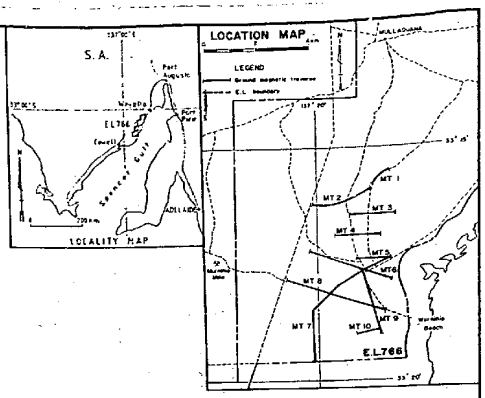
This report is submitted to the Department of Mines and Energy as required by Condition 4 of Exploration Licence 766.

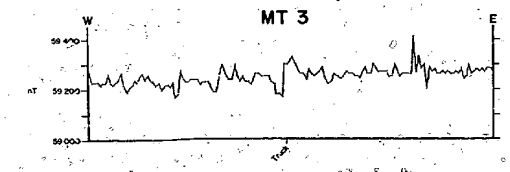

S.A.
Port Augusta
Whyalla
E.L.766
Cowell
SPENCER GULF
ADELAIDE
0 200 Km
LOCALITY MAP
137°00'E
137°30'E
33°00'S
33°30'S
WHYALLA
Mt. Young
PP6 PP7
PP13
Nanowie
PP8
PP9
PP10
PP12
Cowleds Landing
PP11
Mullaquana
PP14
PP15
Deer Creek
PP16
PP20
PP19
PP17
Moonabie
F
EYRE PENINSULA
LINCOLN HIGHWAY
Hurminie Mine
PP18/18A
PP21/21A
Hurminie Beach
Munyaroo C.P
Midgee
PP1
PP2
PP3
PP4
PP5
Plank Point
Moonabie fault.
E.L. 766
Charleston Fault
SPENCER GULF
Pondoona
Cowell 6km
Mitchellville
N
LEGEND
PP1 Rotary drill hole and No.
Fault.
C.R.A.E. drill hole (R.H.C. prefix)
B.H.P. drill hole (E.E.P. prefix)
0 5 10 15 20 25km
SCALE 1:250 000
Revisions:
THE BROKEN HILL PROPRIETARY CO. LTD
E.L.766 MULLAQUANA S.A.
DRILL HOLE LOCATIONS
Drawn: M.B.
Prepared: N.L.
Checked:
Date: 18 SEP 81
Project No.
Centre: WHYALLA
Drawing No A3-1764

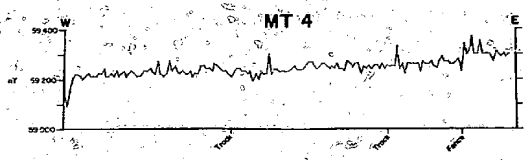

LOCATION MAP
Pt Augusta
138°
32° 30'
20
40km
137° 30'
N
33°
Whyalla
SPENCER GULF
Pt Pirie
137° 22'
137° 25'
E.L.766
33° 08'
33° 12'
"Nonowie"
"Mullaquana"
PP8
PP9
PP10
PP11
PP12
PP14
PP15
Base 1
Ob.G 979560·88
Stn 173
-21·27
Base 1
Ob.G 979560·91
Cowleds Landing
SPENCER
GULF
N
Scale 1:25,000
0
3kilometres
LEGEND
Gravity traverse
-28
Gravity contours, Interval 1 milligal
PP12
Drillhole
Approximate E.L boundary
Readings were taken with a SCINTREX Gravimeter N° 141.
Base 1 and base 2 were tied to BMR Gravity station
number 6,793-0109 using an observed gravity of 979,573·84mgals.
Density = 2·4
THE BROKEN HILL PROPRIETARY CO LTD
EXPLORATION DEPARTMENT
E.L.766 MULLAQUANA, SA
NONOWIE AREA
BOUGUER GRAVITY CONTOURS
Drawn: D G P.
Traced: S C S.
Checked:
Date: 23-8-82
Project N°: 6-C640-27
Centre: Adelaide
Drawing N°: A2-334
Revisions:
RECEIVED
30 AUG 1982
MINES AND ENERGY
4124
4124-15

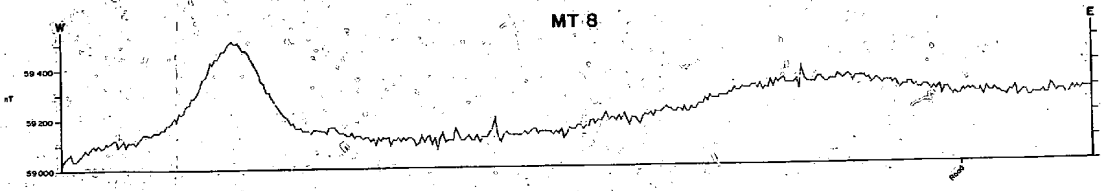


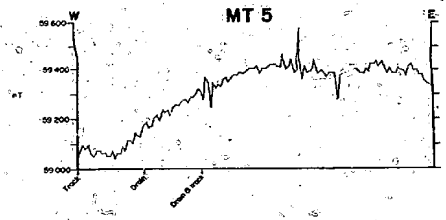


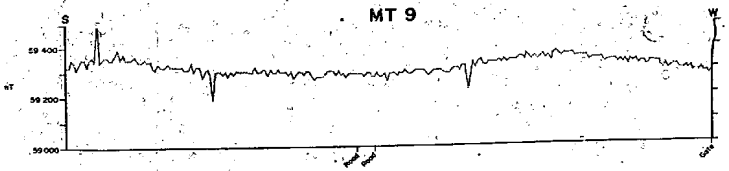


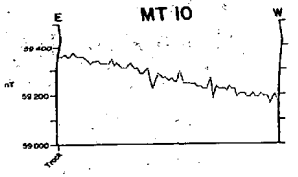


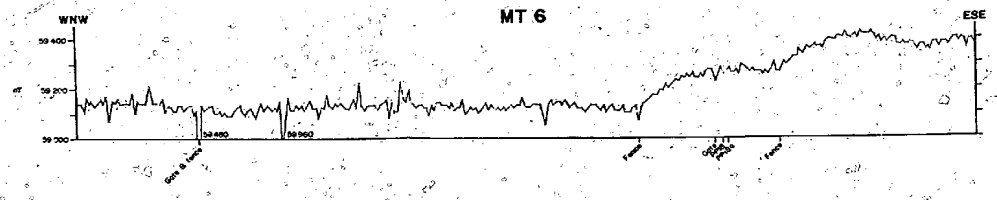


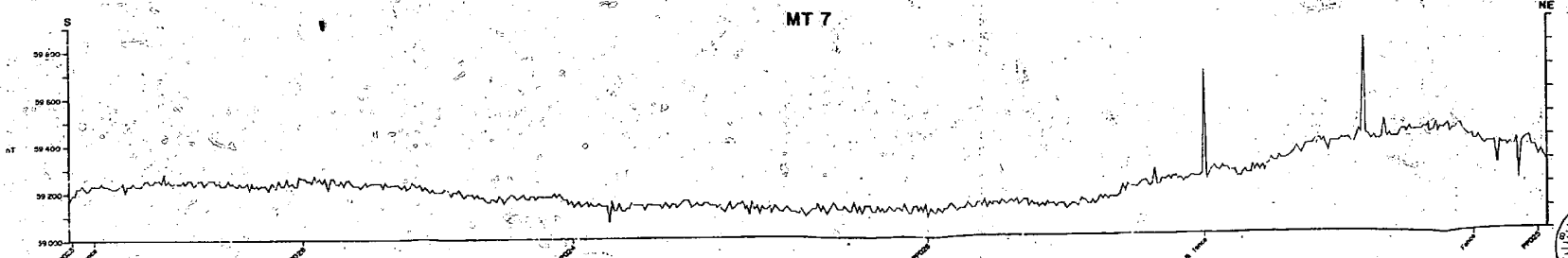












LEGEND

Ground magnetic traverse profile

Survey taken with a UNIMAG proton magnetometer
Readings taken every 10m

Vertical scale 1cm = 100nanoTeslas
Horizontal scale 1 : 10,000

0 200 400 600 800metres

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

E.L.766 MULLAQUANA, S.A.
MURNINIE AREA
GROUND MAGNETIC PROFILES

Drawn: D.G.P.	Date: 26-8-82	Centre: Adelaide
Traced: B.C.S.	Project No.: G-C640-28	Drawing No.: A1-521
Checked:		

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4124-16