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TAS/20/80/711

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SIX MONTHLY REPORT

FOR THE PERIOD ENDING

22nd AUGUST, 1981.

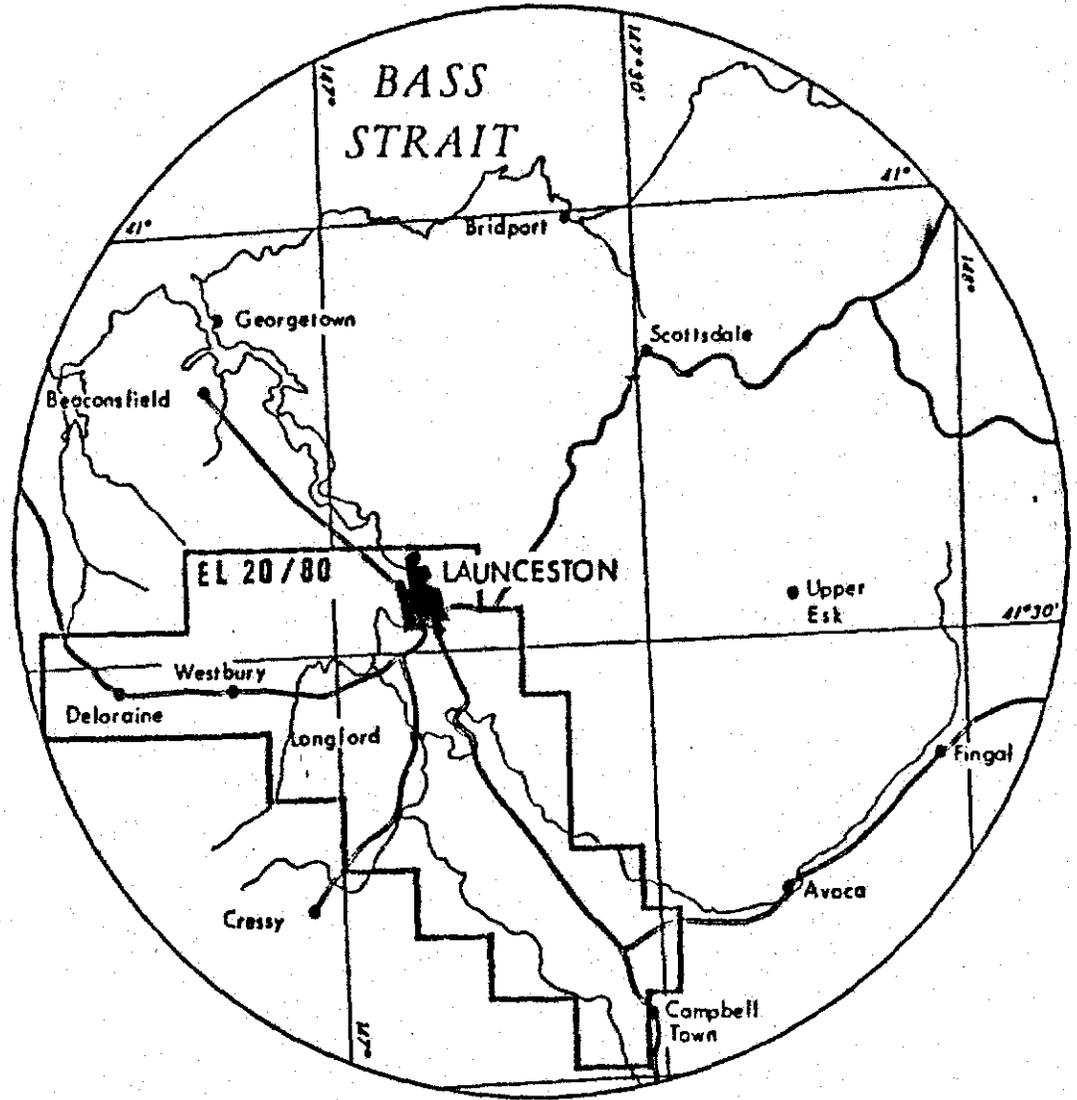
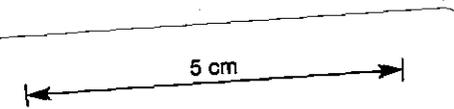
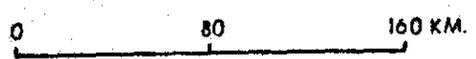
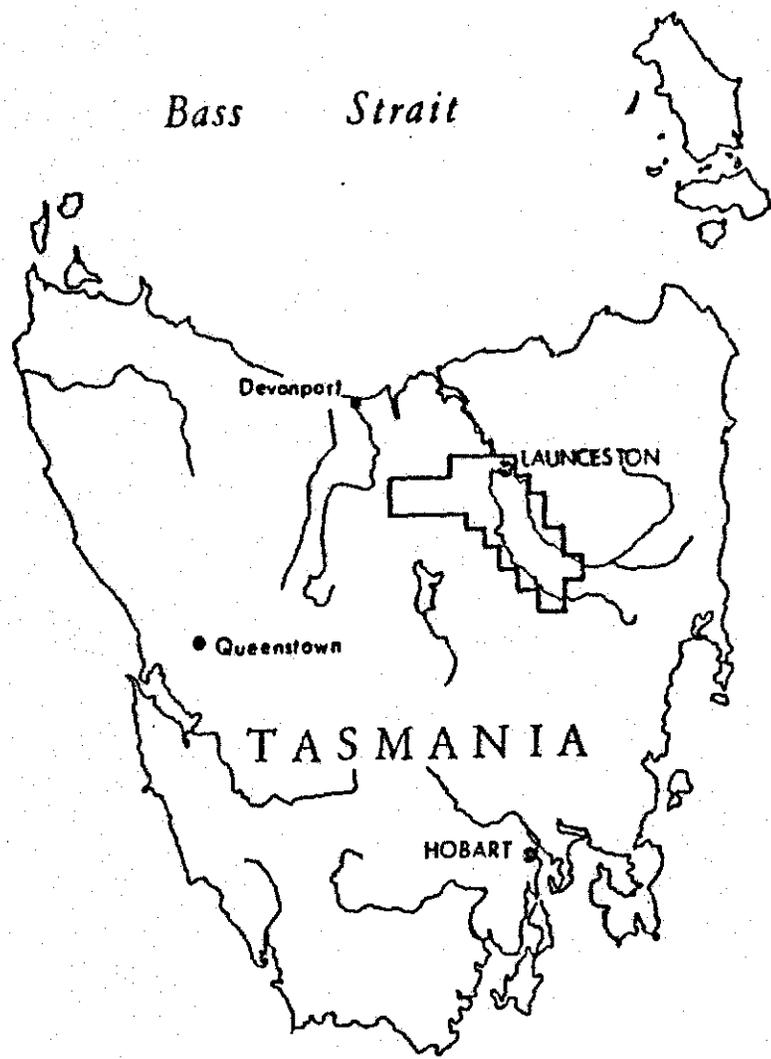
EXPLORATION LICENCE 20/80

LAUNCESTON, TASMANIA.

AAR LIMITED

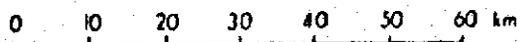
R.OSBOURNE

JULY, 1981.



Oil Shale Prospect

E.L. 20/80



SCALE 1:1000 000

Figure 1

952002

C O N T E N T S

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1:50,000

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INTRODUCTION

During this six month period, initial geological investigations on EL 20/80 Launceston were completed. EL 20/80 covers an area of 2339 Km² in the Launceston-Cambell Town-Deloraine area as shown on Figure 1.

Investigations consisted of the following:

1. Drilling, geological logging and sampling.
2. Downhole geophysical logging.
3. The selection of samples for palynological studies of the Tertiary sediments.
4. Water sampling for Mines Department hydrological studies.

1. DRILLING

Exploration Drilling Co. West Australia was awarded the drilling contract and an Ingersol Rand T60 rig was used. Drilling commenced on 14.3.81 and was completed on the 15.4.81.

A total of 1568 m of open hole blade drilling and 54.5m of HMLC core drilling was completed from 25 holes. Plate 1 shows borehole locations and Table A Drilling Statistics.

The drilling rig proved unsuitable for core drilling the Tertiary sediments and the original proposed programme of approximately 900m open hole drilling and 600m of core drilling had to be amended.

1.1 LOGGING AND SAMPLING

During the open hole drilling, samples were taken over each 2m interval, geologically logged and bagged. Numerous samples were tested in the field for oil indications. All core was split, geologically logged and boxed. Borehole logs are shown in Appendix 1. (All samples are at present stored on 'Meadowvale Farm' Longford, owner L. Phillips).

A total of eighty-seven (87) samples were selected and bagged for laboratory analysis by the Fischer Assay method. These samples were sent to S.G.S. Laboratories, Sydney, for assay. Results are shown in the borehole logs Appendix 1, and in Appendix 2 - Laboratory Analysis - Fischer Assay.

A further twenty-three (23) samples were collected for 'Proximate'

TABLE A

BOREHOLE STATISTICS

BH No.	Location (AMG co-ords)		Total Depth (m)	HMLC Coring (m)	Rotary Open Hole (m)	Geophysics	
	North	East				Gamma	Resistivity + SP
1	53924	5097	60	21	39	✓	✓
2	53914	5093	91	3	88	✓	-
3	53904	5100	74	-	74	✓	✓
4	53894	5098	42	-	42	✓	✓
5	53911	5075	56	-	56	✓	✓
6	53928	5079	52	-	52	✓	✓
7	53965	5098	64	-	64	✓	✓
8	53968	5087	339	-	39	-	-
9	53962	5076	60	-	60	✓	✓
10	53953	5066	60	-	60	-	-
11	53923	5037	65	-	55	✓	✓
12	53980	5068	60	-	60	✓	✓
13	53971	5062	60	-	60	✓	✓
14	53976	6014	65	-	65	✓	✓
15	53993	4953	102	15.5	88	✓	✓
16	54003	4976	70	-	70	✓	✓
17	53948	5040	62	-	62	✓	✓
18	54025	4963	52	15	52	✓	✓
19	54035	4975	70	-	70	✓	✓
20	54037	4994	22	-	22	-	-
21	54103	4967	90	-	70	✓	✓
22	54077	4961	38	-	38	✓	✓
23	54119	4963	76	-	76	✓	✓
24	54120	4954	98	-	98	✓	✓
25	54106	4952	98	-	98	✓	✓

analysis on lignitic samples mainly from the Rosevale - Westwood area boreholes. These samples were assayed by Thiess Bros. Pty. Ltd. Mining Division Laboratory in Brisbane. Samples taken and results are shown in Appendix 3.

2. GEOPHYSICAL LOGGING

A portable SIE logging unit model T-450 was used to log holes for Resistivity, Self Potential, and Gamma responses. Downhole geophysical logs are attached to borehole logs in Appendix I.

Reasonable resolution between sandy, silty, clayey and lignitic units was obtained using this instrument and helped in correlating between boreholes.

3. PALYNOLOGICAL STUDIES

A suite of ten (10) samples was collected from the Tertiary sediments drilled for palynological studies. Results of these analyses are not yet available and will be forwarded on completion.

4. WATER SAMPLES

Water samples were collected where possible at the request of Mr. L. Mathews, Mines Department Hydrologist and were submitted to the Mines Department Laboratory in Launceston for analysis. Results are shown in Appendix 4.

5. DISCUSSION OF RESULTS

The Tertiary sediments drilled in EL 20/80 to date have been divided into three areas:

Area 1	Longford-Toiberry	Boreholes 1-13 and 17
Area 2	Whitemore-Carrick	Boreholes 15-16, 18-20
Area 3	Rosevale-Westwood	Boreholes 21-25

5.1 AREA 1 LONGFORD-TOIBERRY

Figure 2, a cross section through boreholes 1-4 shows a relatively conformable sequence of clays and sands dipping shallowly to the south. The general sequence from the surface to the deepest zone drilled is as follows:-

- Zone 1 Oxidized blue grey and red brown clays
- Zone 2 Dark grey brown plastic clays
- Zone 3 Partially oxidized interbedded dark grey brown, light brown silty clays and clayey silts
- Zone 4 Grey silts and sands
- Zone 5 Coarse sands and gravels
- Zone 6 Grey brown clays and lignitic bands

Figure 3 cross section SW-NE boreholes 17-10-9-8 shows a thickening of Zone 6 onlapping onto the basement in the north and pinching out of Zone 2. To the SW, Zone 5 thickens and in borehole 11 near the centre portion of the basin is 35m thick compared to 6m in Borehole 9.

Jurassic Dolerite basement was intersected in Borehole 8.

5.2 AREA 2 WHITEMORE-CARRICK

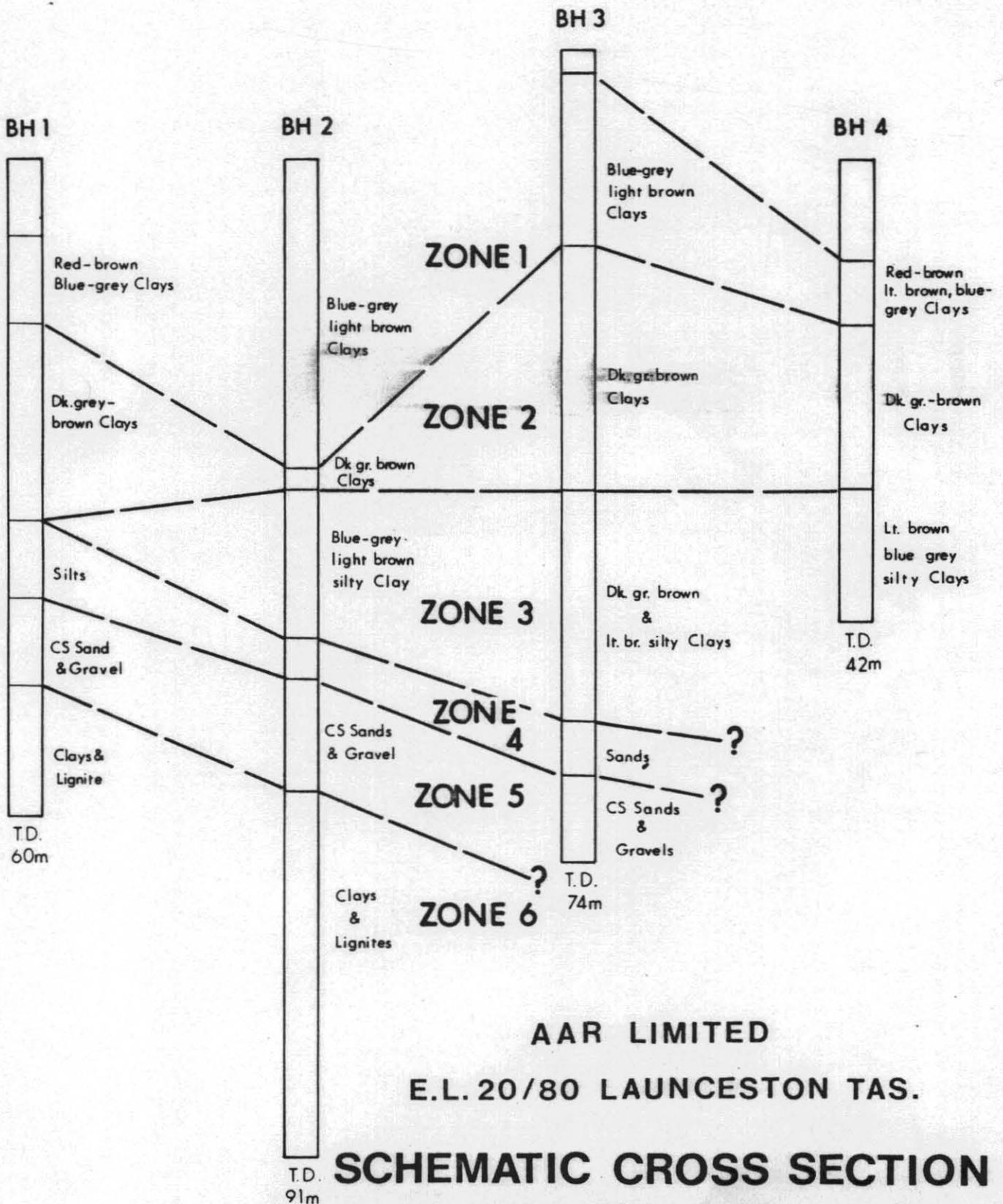
In this area three broad lithological zones have been interpreted from the geological and geophysical logs and are shown on Figure 4 cross section between boreholes 15-18-19.

- Zone 1 - an upper clay and silt zone
- Zone 2 - a middle zone of thinly bedded cyclic sequence of clay, silt, lignite, oil shale.
- Zone 3 - a lower clayey silty zone.

Apparently faulting between boreholes 18 and 19 has downthrown the sequence in Borehole 19 by at least 20m. General dip is shallow to the SW. Zone 2 thickens to the south and individual beds become slightly more massive in the cyclic sequence.

5.3 AREA 3 ROSEVALE-WESTWOOD

In boreholes 21-25 the Tertiary sediments consist of clays, silty clays, lignite and thin siderite bands. The clays are relatively soft and unindurated, generally dark grey or brown grey, often containing numerous woody inclusions. The silts are a lighter grey colour and also contain wood fragments. The lignites intersected display some fibrous nature, appear clayey in zones and possibly contain a fine sand component although this is not obvious due to the type of drilling. A few fragments of hard vitrinitic sub-bituminous coal (altered wood) were observed in some of the lignite samples.



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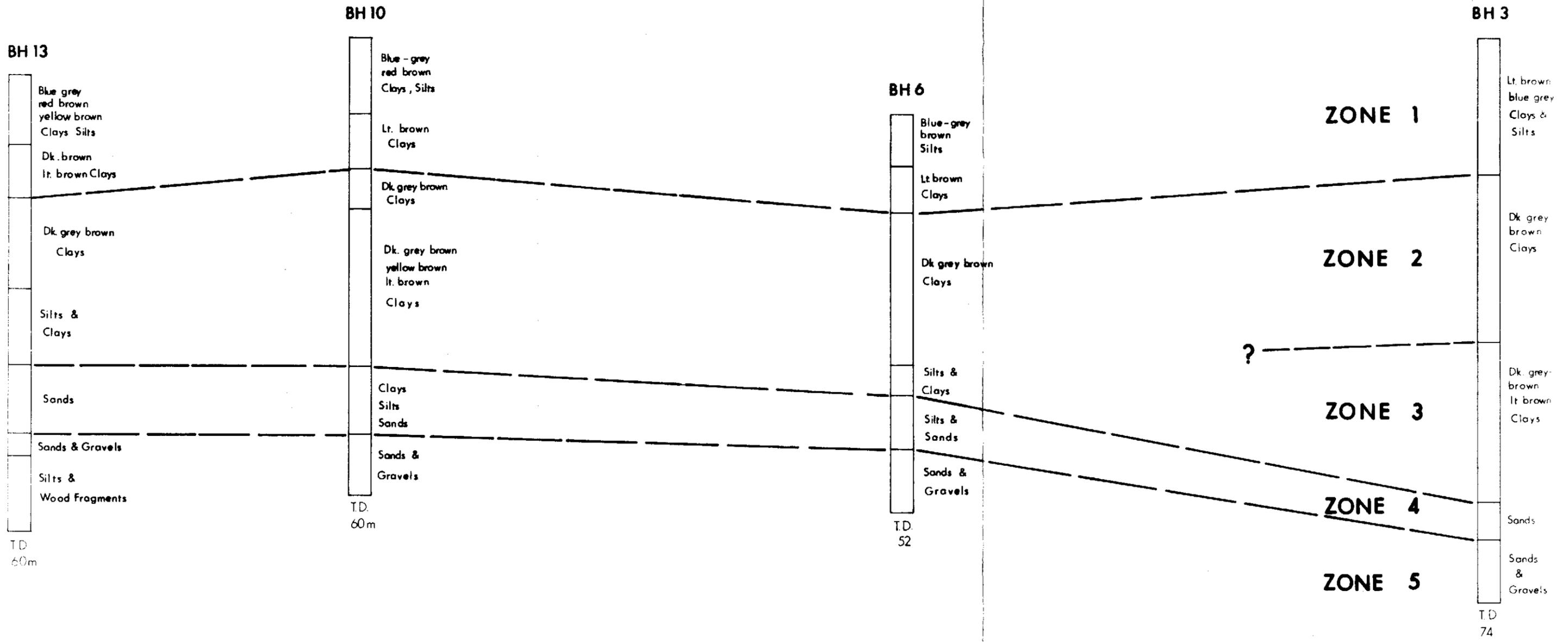
**SCHEMATIC CROSS SECTION
BOREHOLES 1 - 4**

SCALE VERTICAL 1:500
HORIZONTAL 1:20000

PREPARED : B.H & R.O.
DATE : JULY 1981

5 cm

FIGURE 2



T.D. 60m

T.D. 60m

T.D. 52

T.D. 74

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SCHEMATIC CROSS SECTION BOREHOLES 13 - 3

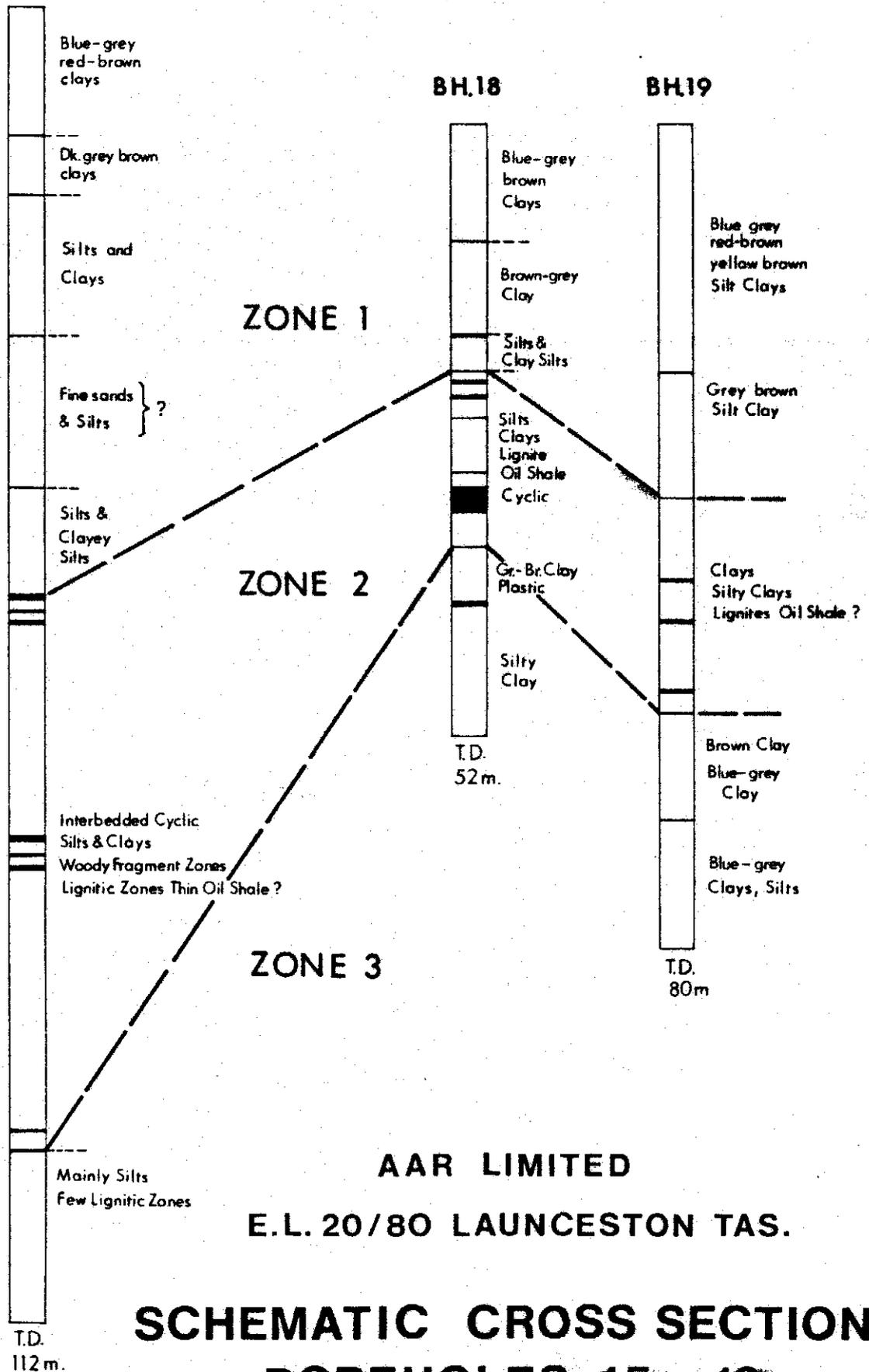
SCALE VERTICAL 1:500 HORIZONTAL 1:20 000
 PREPARED : B.H. & R.O. DATE JULY 1981

5 cm

BH. 15

BH. 18

BH. 19



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E.L. 20/80 LAUNCESTON TAS.

SCHEMATIC CROSS SECTION BOREHOLES 15 - 19

SCALE VERTICAL 1:500 HORIZONTAL 1:20 000

PREPARED : B.H. & R.O. DATE JULY 1981

5 cm

Proximate analysis of bulk lignite samples (Appendix 4) indicates a high ash low quality type coal. Core samples will be needed for truer estimates of the lignite quality as rotary open hole drilling tends to give high ash results due to loss of carbonaceous fines in the drilling process.

Basement to the Tertiary sediments in this area consists of Jurassic Dolerite and Permian sediments.

Borehole 22 bottomed in a hard highly carbonaceous black shale which may correlate to an upper Permian unit (Pct.). Borehole 23 was stopped in Jurassic Dolerite. Block faulting would be expected along the basin margins in this area as all major faults to the north and north-west trend NNW parallelling the basin margins.

6. TERTIARY OIL SHALE POTENTIAL

Investigations to date indicate that thin low grade oil shale bands intimately associated with lignitic zones occur in Zone 2 of the Whitmore-Carrick area. Further core drilling in this area which is faulted, will be needed to establish the relationship between the lignite/oil shale and to delineate the areas potential.

At this stage of the investigations Area 1, Longford-Toiberry, appears unprospective for oil shale however further work planned in EL 20/80 will contribute to the overall understanding of the Tertiary sequence and this information may delineate further prospective zones.

7. TERTIARY LIGNITE POTENTIAL

Rotary holes drilled to date indicate potentially significant thicknesses of lignite occurring at shallow depth in the Rosevale-Westwood area of EL 20/80.

The potential for shallow lignite reserves in this area is based on the following information:

- (a) AAR drilling, boreholes 21-25.
- (b) Shallow auger drilling (10'?) which intersected lignite along the Rosevale-Westwood road by the Mines Department.
- (c) Mines Department records which state that a four foot lignite seam was opened up by shafts in the Rosevale District pre 1922, and several tons of lignite were extracted. The following is an assay report from

*
PTD

this occurrence:

	%
Moisture	15.1
Volatile combustible matter	39.1
Fixed carbon	29.1
Ash	16.6

* This record states that the Rosevale lignite grade compares favourably with that of the Norwell basin coal in Victoria.

Further exploration rotary drilling and detailed core drilling in this area will be needed to fully evaluate the lignite potential.

reference?

Comment : S.M. Forsyth : Oil Shale Prospect : A.A.R.

E.L. 20/80 : Deloraine - Launceston - Campbell Town

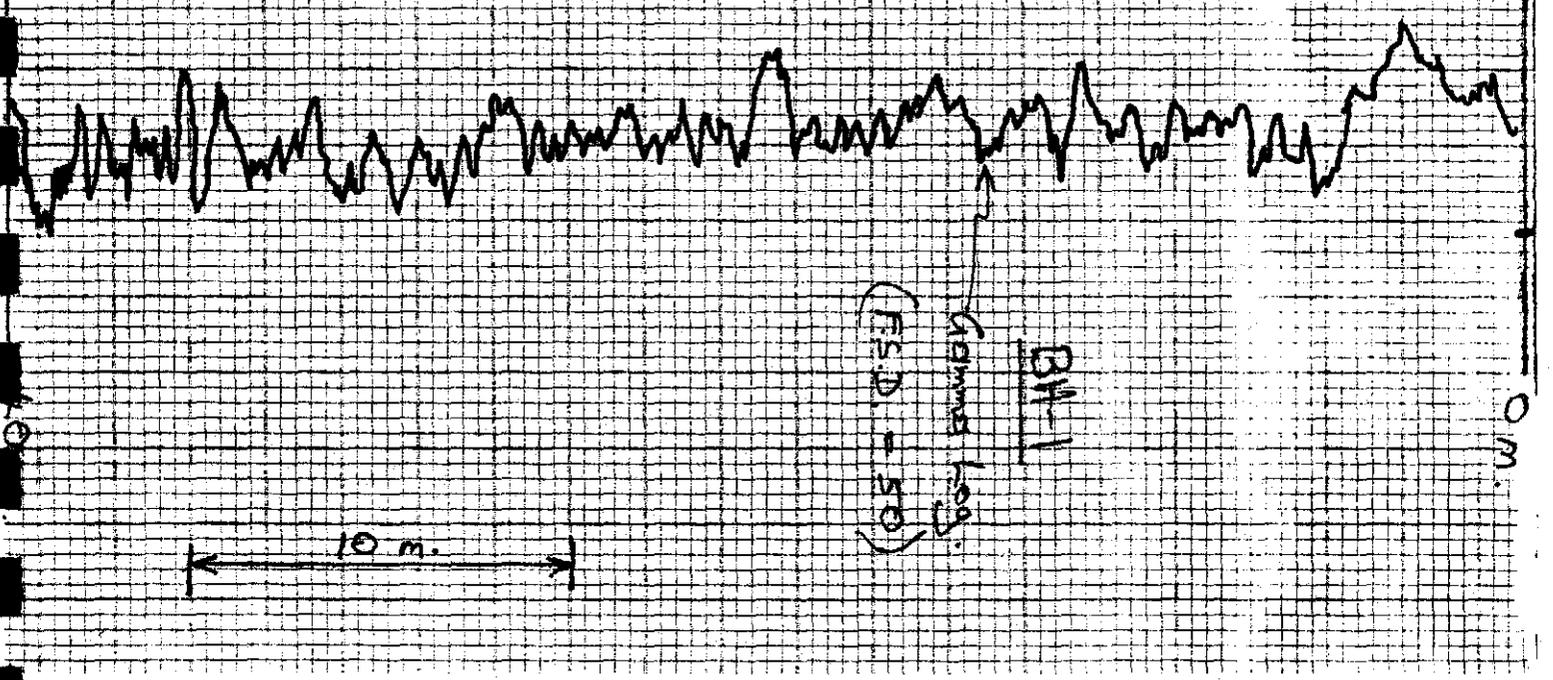
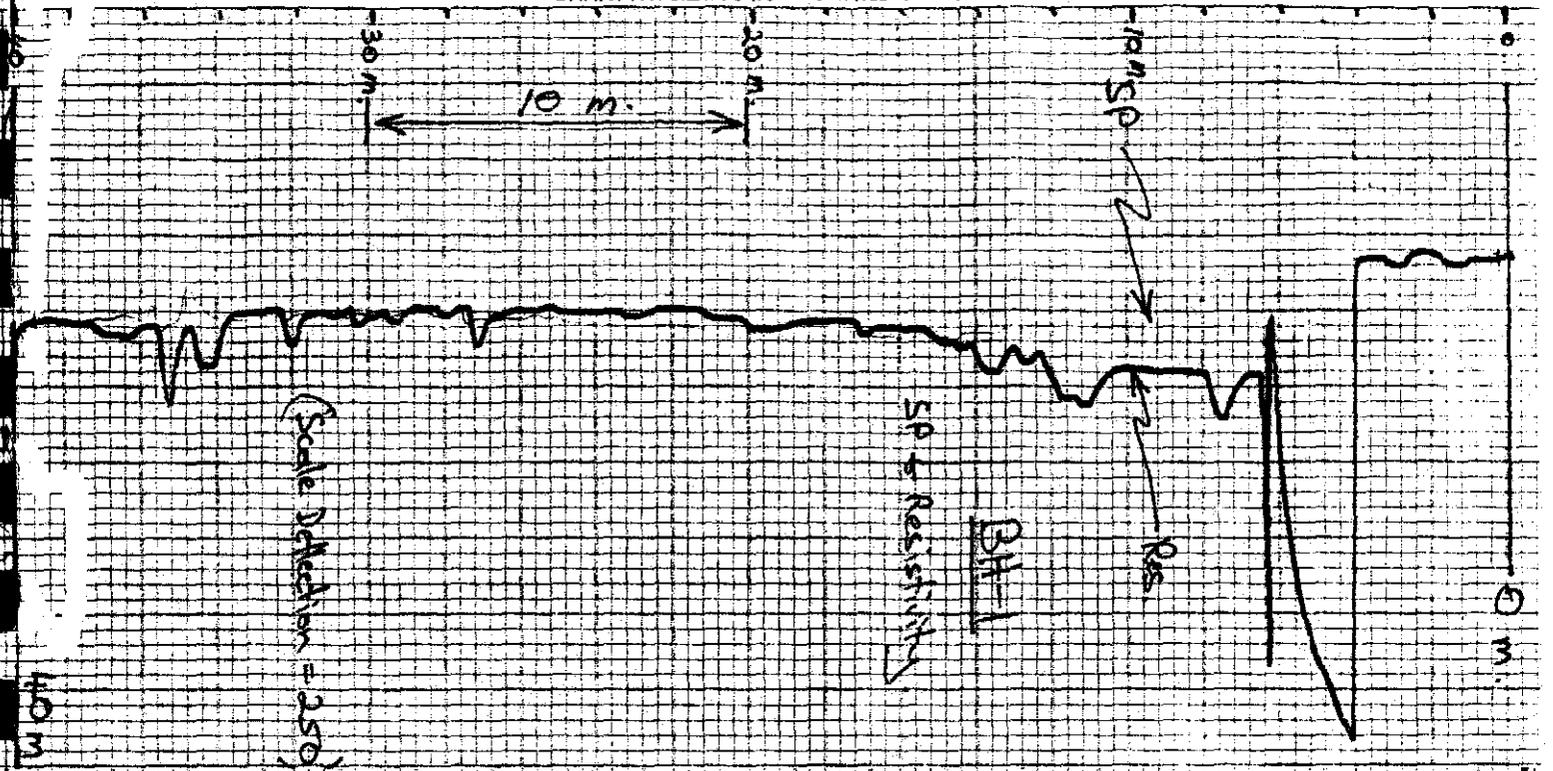
Palynological studies on previous drilling in the Whitemore, Hagley, Cressy area have detected assemblages indicating assignment to the Lower and Middle *Nothofagidites asperus* Zones (of Middle-Late Eocene age). These assemblages occur down to about 80 m above sea level or approximately 80 m depth. These assemblages contain abundant specimens of oil producing algae *Botryococcus braunii*. It is possible that the deeper drilling undertaken by A.A.R., e.g. BH15 may have reached the *Proteacidites asperopolus* Zone (Middle-Early Eocene). A.A.R.'s own palynology may indicate if this is so and whether the lignite and shale oil occurrences are confined to the *Nothofagidites asperus* Zones.

Major lignite occurrences in South Australia occur in the Middle Eocene and Latest Eocene and coincide with eustatic high sea level stands.

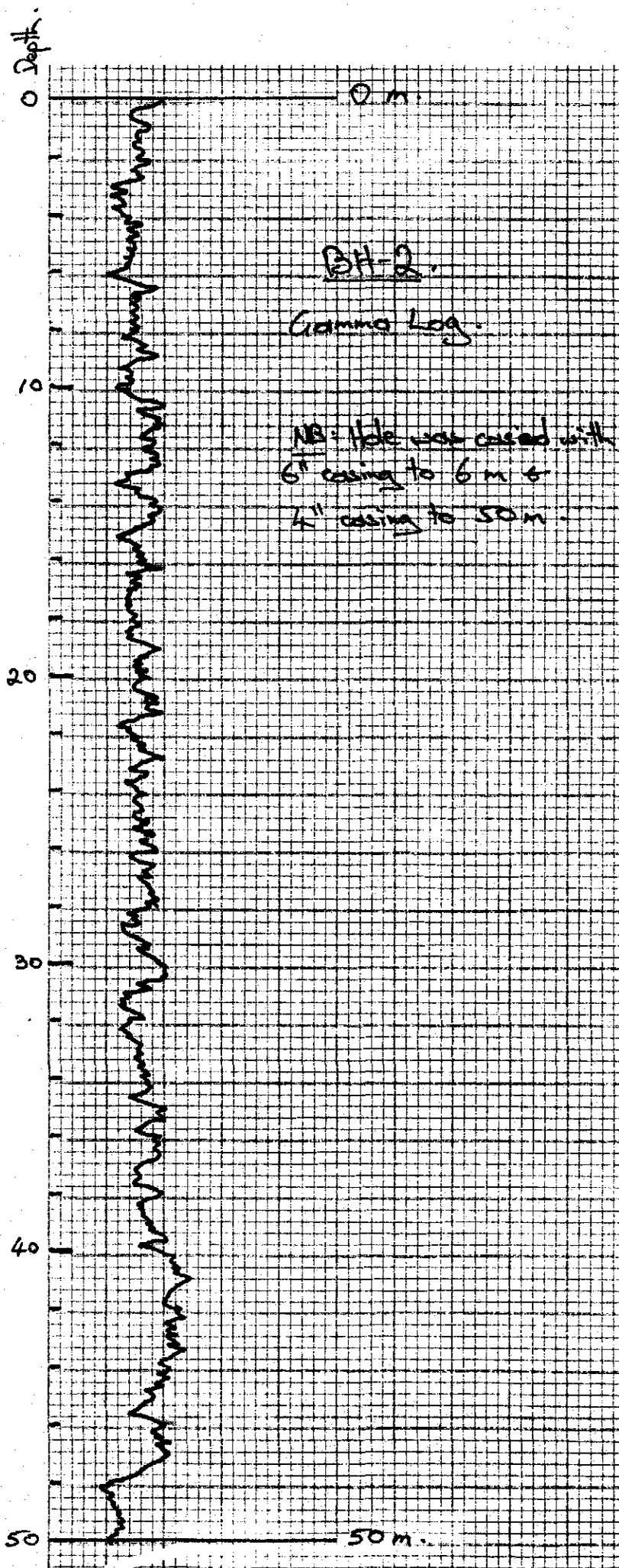
Oil yields are low compared to Permian oil shale at Latrobe.

APPENDIX 1

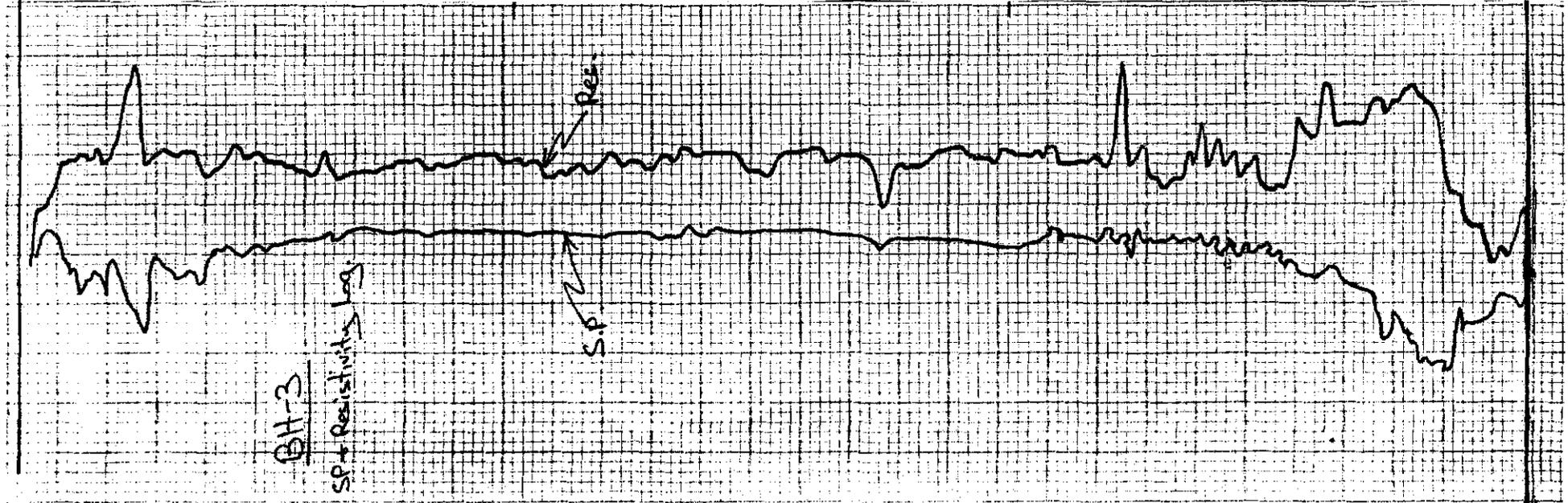
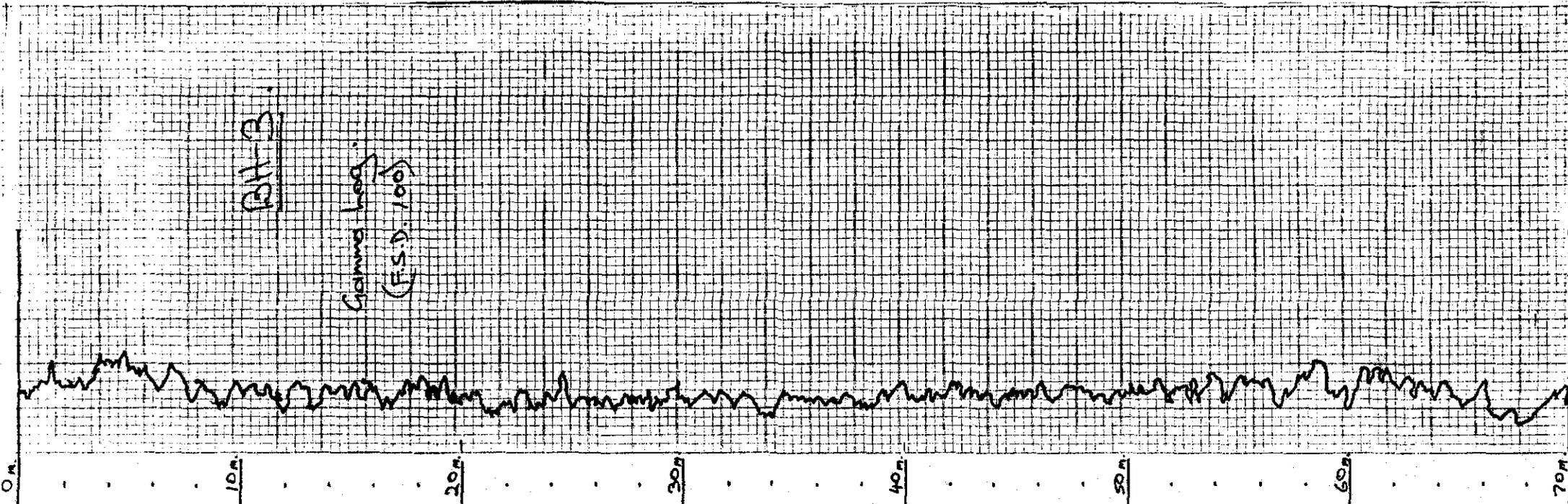
BOREHOLE + GEOPHYSICAL LOGS



5 cm



5 cm

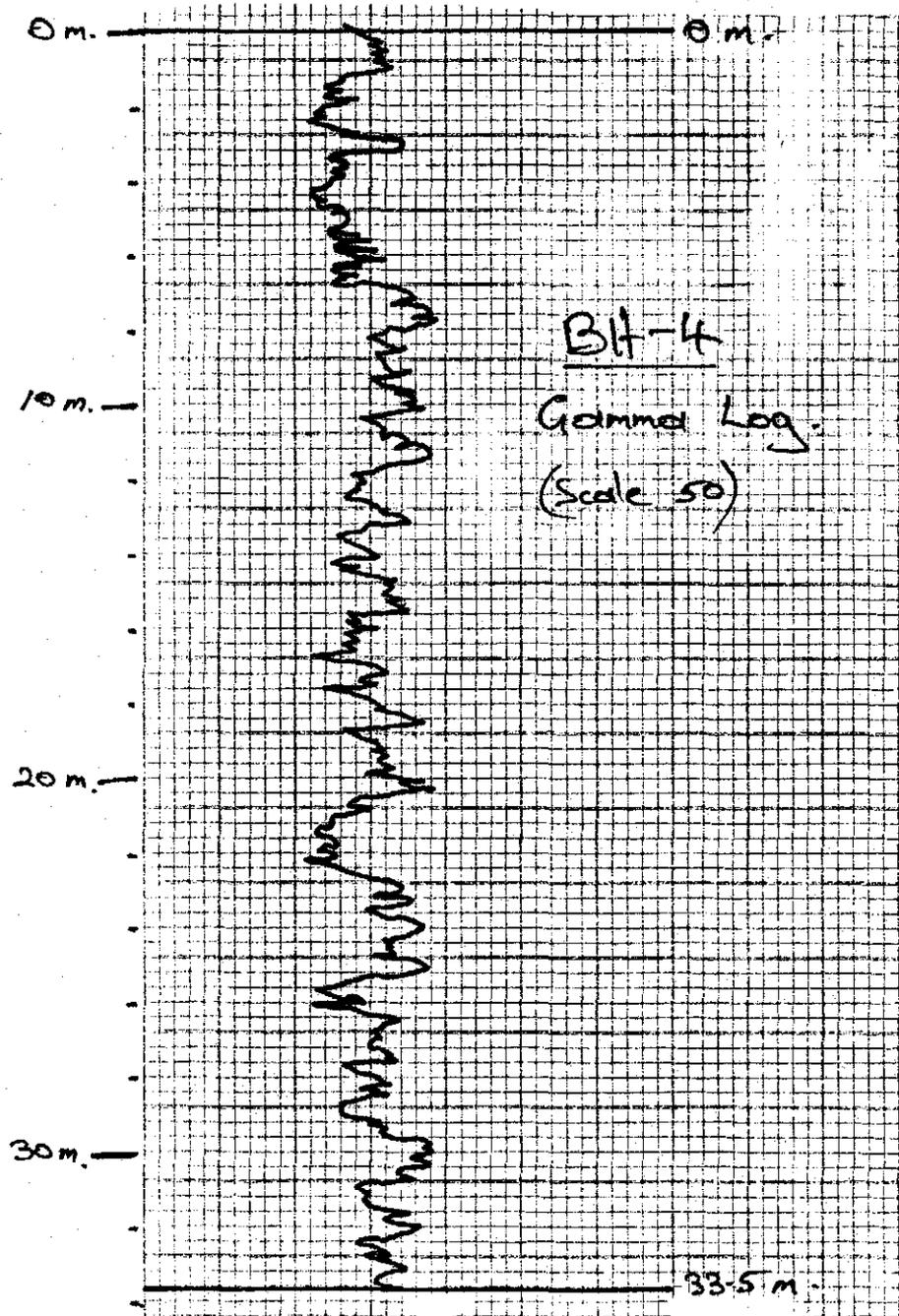


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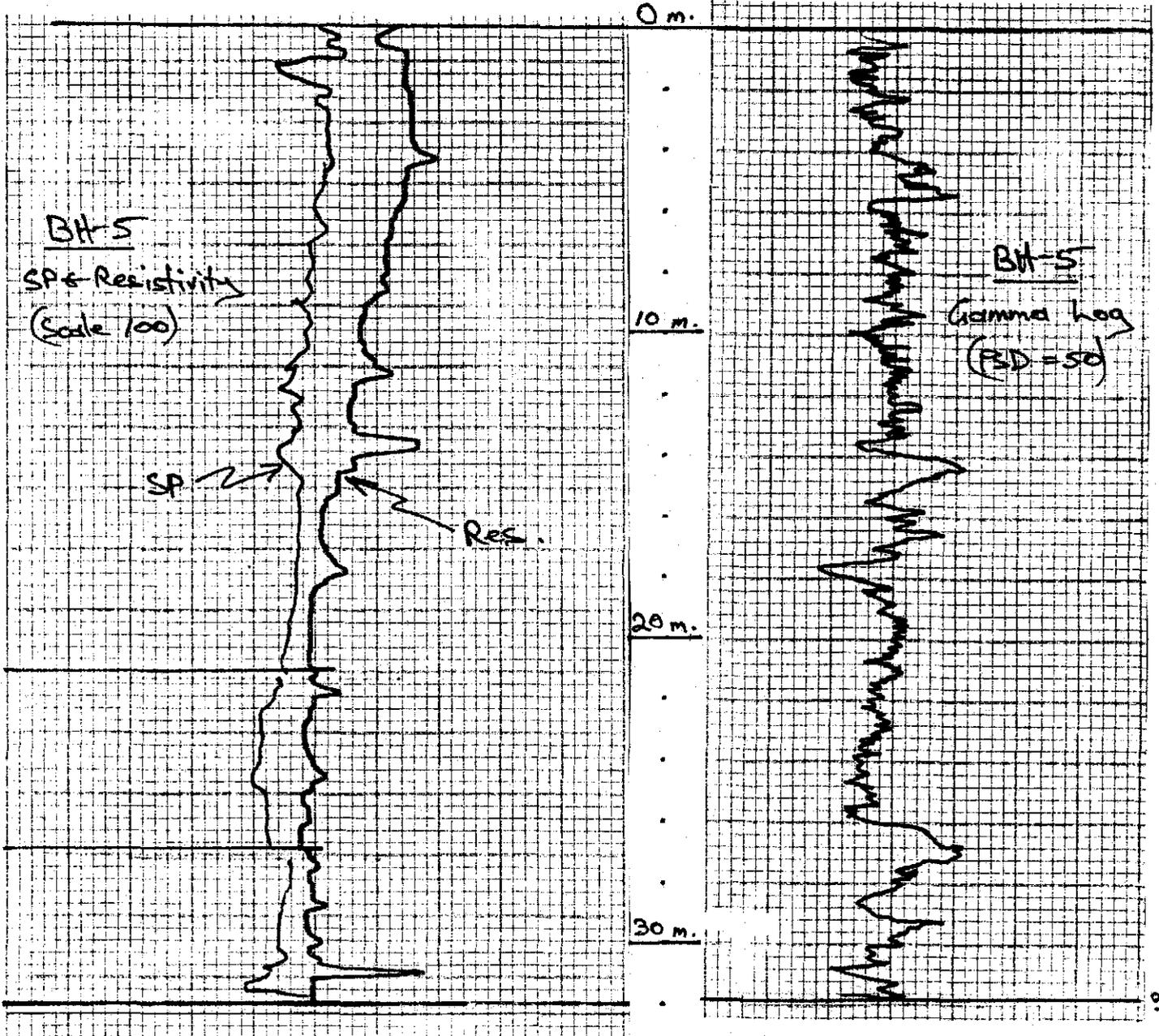
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 SPUNNED: 18.3.81 COMPLETED: 19.3.81
 LOCATION: 4 km SOUTH OF LAUNCESTON CO-ORDS: X: 5098 E. 53894 N
 ELEVATION: 150m ASL DIRECTION: INCLINATION: -90 TOTAL DEPTH: 42m
 HOLE TYPE: O/H TO 42m DRILLING CONTRACTOR: EXM. BELL. WA. DRILLER: A. JAMES
 LOGGED BY: BR/RQ DATE: 19.3.81 BIT SIZE: O/H 45mm TO 42m. TO TO

CORE RECOVERY	METRE	DESCRIPTION	Core bedd'g angle and joint spacing	LOG SCALE: 1:	SAMPLE No.	Assayed length	ASSAY VALUE		
		0-9m. CLAY SALT + gravel Red-brown, Rosmar. Blue grey Plastic silt, inter-mixed Aluminic Fe stained quartz gravel to 10mm rounded Humic material top 2m.							
	10	9-16m CLAY: mostly red-brown (non plastic), light brown (plastic) and blue grey (highly plastic) soft CLAY + silt CLAY		CASING TO 12m					
	20	16-30m CLAY: dark grey brown plastic soft clay with fine very soft black organic particles disseminated throughout							
	30								
		30-42m CLAY: interbedded light brown and soft blue grey plastic CLAY with numerous thin dark brown intercalated siltstone laminae							
	40	(HOLE ABANDONED due to split casing + hole top blowout.) (Scintillation Response 60-65 cps)							



PROJECT AREA: LAUNCESTON PROJECT No. 32852
 SPUDED: 19.3.81 COMPLETED: 19.3.81
 LOCATION: SW Longford CO-ORDS: X: 5075 E. 53911 N
 ELEVATION: 150m ASL DIRECTION: INCLINATION: -90° TOTAL DEPTH: 56m
 HOLE TYPE: O/H 125mm TO 56m DRILLING CONTRACTOR: E.Z.H. DML. W.A. DRILLER: A. FANLIG
 LOGGED BY: DATE: BIT SIZE: O/H 45mm TO 56m TO TO

CORE RECOVERY	METRE	DESCRIPTION	Core bed'd'g angle and joint spacing	LOG SCALE:	SAMPLE No.	Assayed length	ASSAY VALUE							
							OIL WT	Water WT	OIL S.G.	Residual Moisture	Moisture	Moisture (dry)		
		0-15m CLAY: mostly red brown (non plastic) blue-grey (plastic) + light brown (plastic) clay + silty clay minor unconsolidated material. Fe. inclusions in top 6m.		CASING TO 6m										
	10	(8-15m) occasional thin red brown laminations with interbedded well cemented												
	20	15-41m CLAY: dark grey brownish soft plastic with fine very soft black organic inclusions throughout												
	30	(31-41) minor interbedded irregular thin silty grey brown lamina occur.												
	40	41-56m SANDS see over												
				28-30	2	2	NIL	118	-	72	810	8.8		

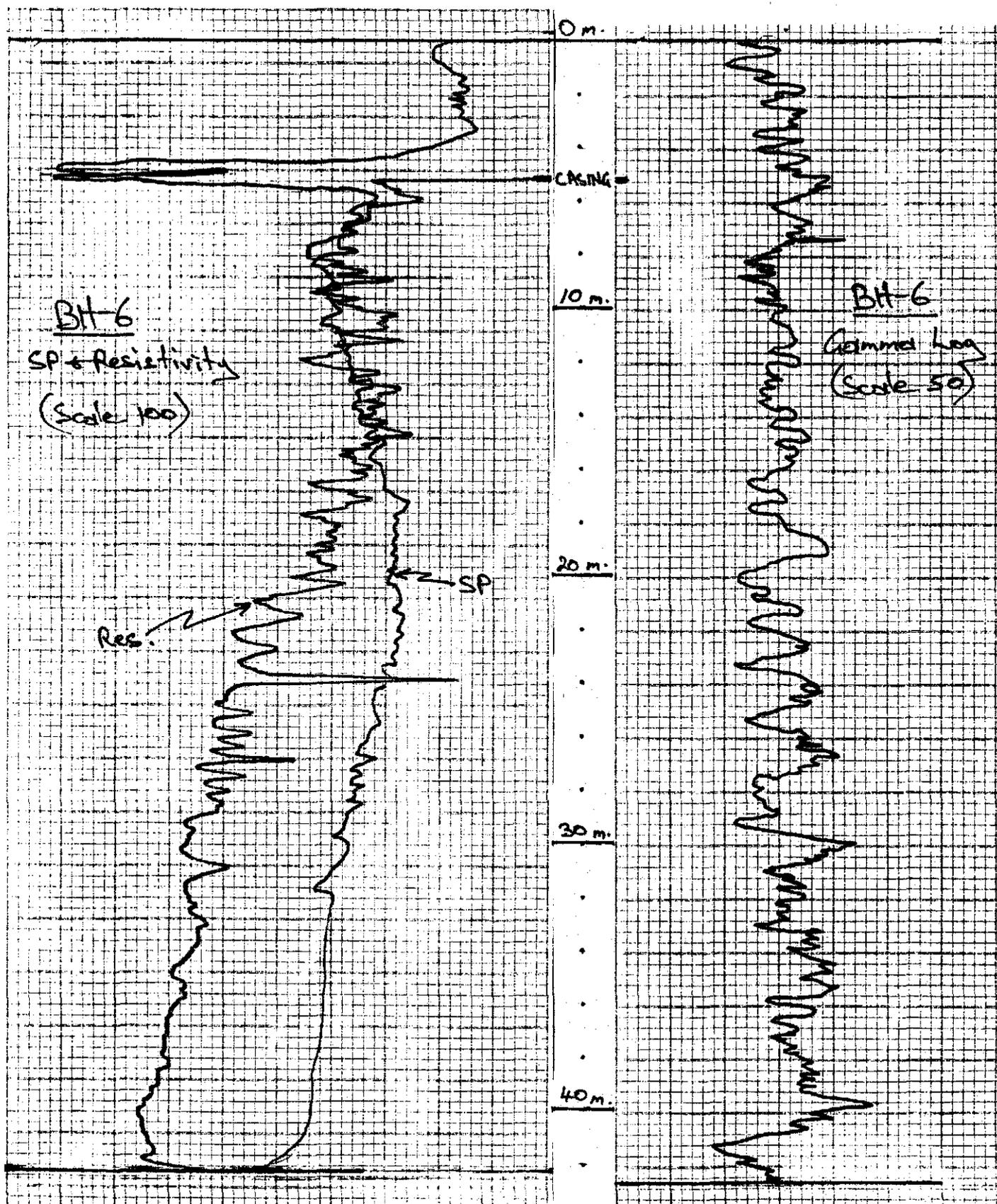


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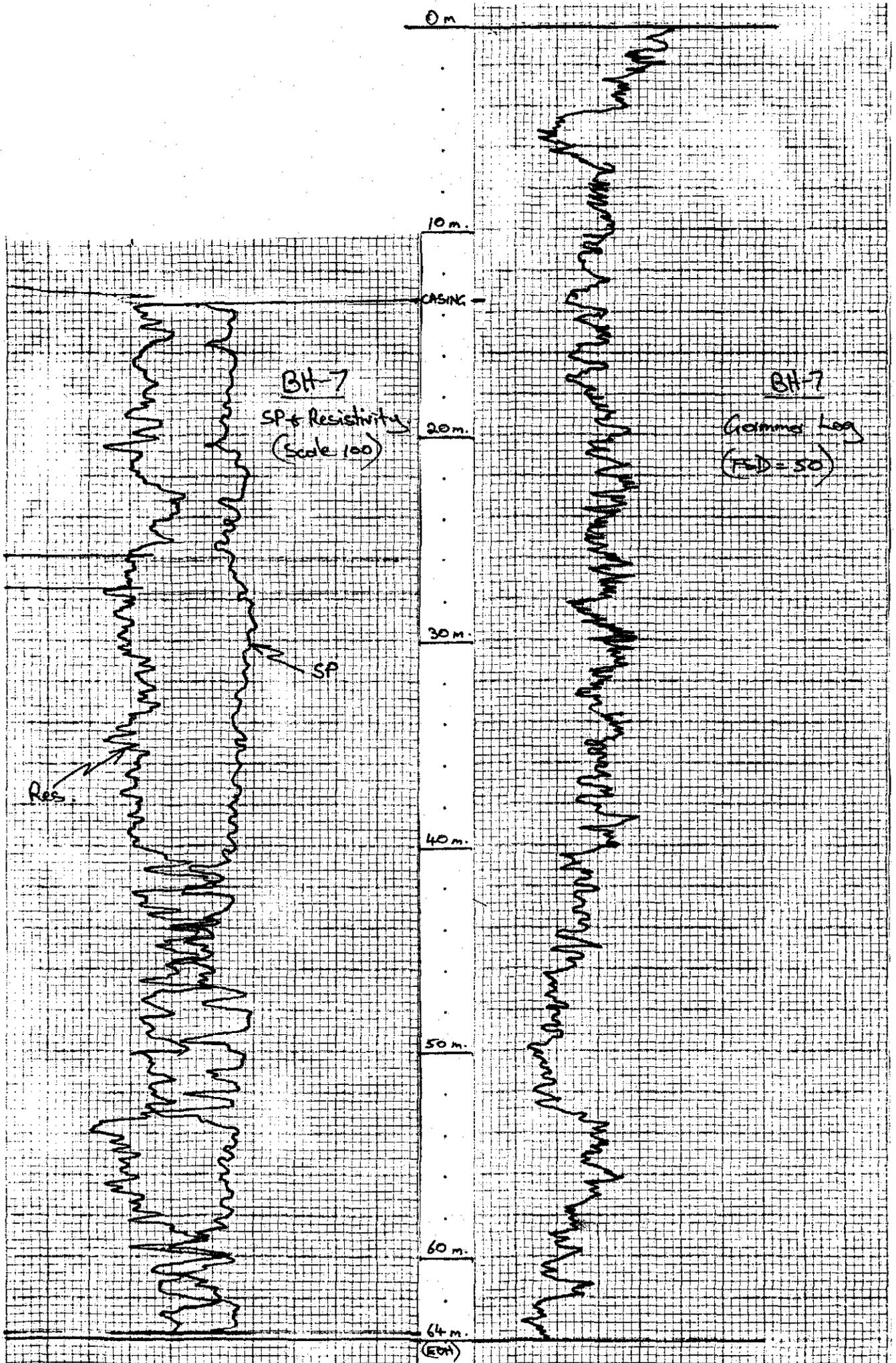
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PROJECT AREA: LAUNCESTON PROJECT No. 32852
 SPUNNED: 20/3/81 COMPLETED: 20/3/81
 LOCATION: 2 km. SE Longford CO-ORDS: X: 5079 E. 53928 N
 ELEVATION: 150 m a.s.l. DIRECTION: INCLINATION: -90° TOTAL DEPTH: 52m
 HOLE TYPE: O/H DRILLING CONTRACTOR: W.A. JACKSON & CO. DRILLER: A. FANSHO
 LOGGED BY: B.H. & A.G. DATE: 20/3/81 BIT SIZE: 125mm TO 52mm TO TO

CORE RECOVERY	METRAGE	DESCRIPTION	Core bed's angle and joint spacing	LOG SCALE: 1:	SAMPLE No.	Assayed length	ASSAY VALUE						
							SGS GLO463						
							(Zero Moist.)	OIL	Water	OIL	Gravimetric	Moisture	Moisture
							lit	lit	lit	lit	lit	lit	lit
		0-7m SILTS + CLAY: SILTS AND NON PLASTIC SOFT BROWN CLAY WITH MINOR INTERCALATED BLUE GRAY SOFT PLASTIC CLAY BANDS SOME MINOR MATERIAL TOP 2m MINOR GRAVEL ALSO PRESENT.	22-40°										
	10	7-13 CLAY: LIGHT BROWN SOFT PLASTIC CLAY + LIGHT BROWN NON PLASTIC SILT CLAY: FEW WOOD FRAGMENTS THROUGHOUT.											
	20	13-33m CLAY: DARK GRAY BROWN SOFT PLASTIC CLAY WITH FINE SOFT BLACK WOODY PARTICLES DISSEMINATED THROUGHOUT FEW SILICATE BANDS											
		(24-25m) THIN SILICATE BAND											
		(26-27m) THIN SILICATE BAND											
	30												
		33-37m CLAY + SILTS: INTER-BEDED DARK GRAY BROWN SOFT PLASTIC CLAY AND LIGHT GRAY SILT ABUNDANT WOODY FRAGMENTS.											
	40	37-44m SILTS + SANDS: BANNED SOFT LIGHT GRAY SILT + FINE LOOK QUARTZ SAND ABUNDANT WOODY FRAGMENTS											
					18-20	L0601	2	NIL	114	-	67	819	8.6
					38-40	L0602	2	NIL	62	-	56	882	4.4



CORE RECOVERY	METRAGE	DESCRIPTION	Core bedd'g angle and joint spacing	LOG SCALE: 1:	SAMPLE No.	Assayed length	ASSAY VALUE		
	58	DIP TO GR, SILTS, CLAY, SAND + SILT, CLAY ALTERNATING, WOODY FRAGMENT THROUGHOUT							
	60	FROM 55m WOODY FRAGMENT ABOVE ABUNDANT							
		END OF HOLE AT 64m							



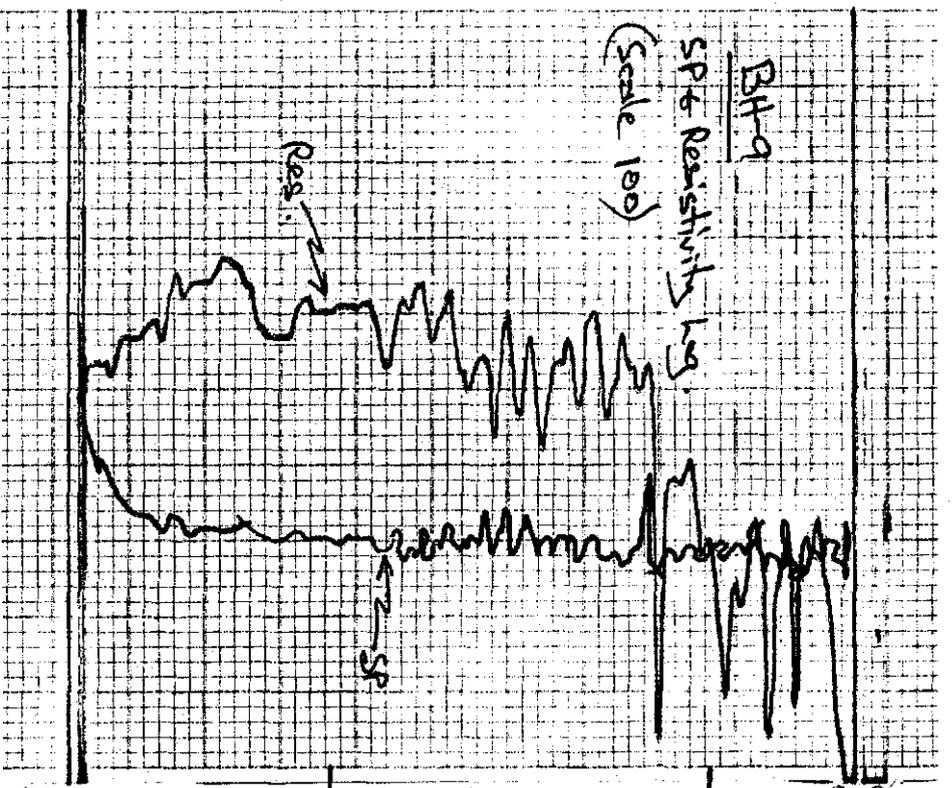
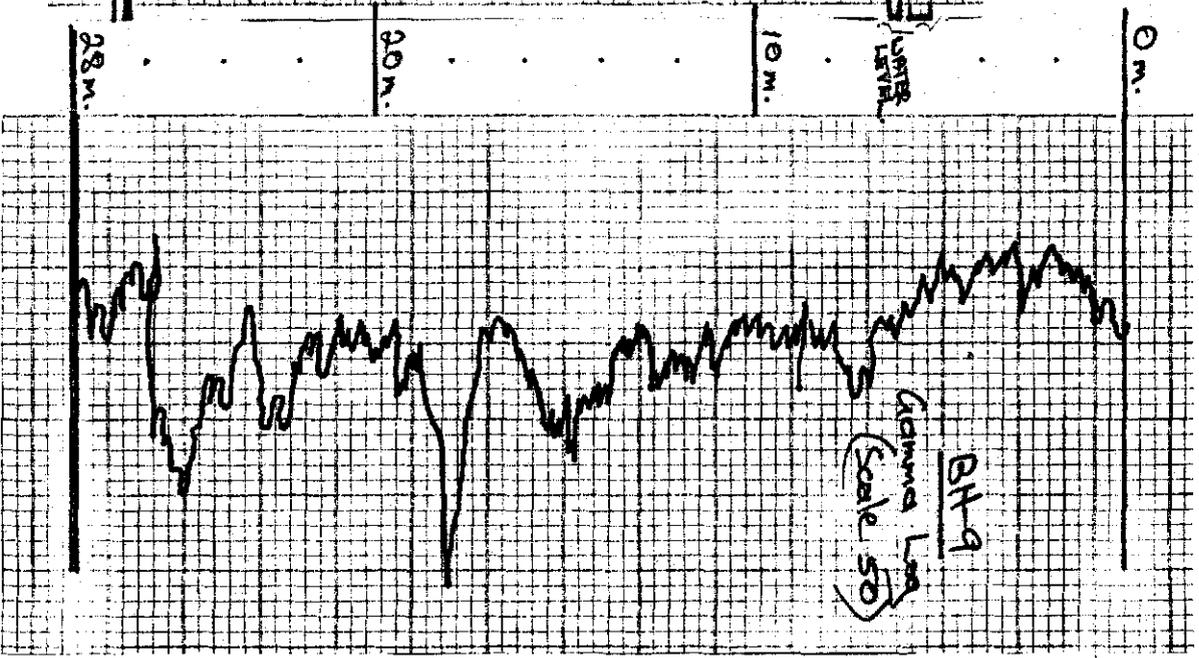
AAR LIMITED



HOLE No. 9
PAGE 1 OF 2

PROJECT AREA: LAUNCESTON PROJECT No. 32852
 SPUNNED: 24/8/81 COMPLETED: 24/3/81
 LOCATION: 3 km. NW of Longford. CO-ORDS: X: 5076 E. 53962 N
 ELEVATION: 145m ASL DIRECTION: _____ INCLINATION: -90° TOTAL DEPTH: 60m
 HOLE TYPE: OH TO 60m DRILLING CONTRACTOR: WA. PELLING CO DRILLER: A. FRANKO
 LOGGED BY: _____ DATE: _____ BIT SIZE: 4.5" TO 60m TO _____ TO _____

CORE RECOVERY	METRAGE	DESCRIPTION	Core bed's angle and joint spacing	LOG SCALE: 1:	SAMPLE No.	Assayed length	ASSAY VALUE		
		0-5m SILT + CLAYEY SILT LIGHT + DARK BROWN - HUMID MATERIAL Fe covers pebbles							
		5-11m GRAVELS + pebbles QUANT QUANTITATIVE SILT AND WELL ROUNDED Fe STAINING SILT SANDY MATRIX							
	10	11-13m CLAY: mottled light brown/dark BROWN SOFT PLASTIC CLAY							
		13-20m CLAY: DARK grey brown SOFT PLASTIC CLAY WITH ABUNDANT SOFT WOOD FRAGMENTS FEW THIN HARD SILT LAMINAE							
	20	18-20 NUMEROUS WOOD FRAGMENTS							
		22-28m SILT + CLAYEY SILT - light grey silt AND MINOR CLAYEY SILT + FINE SANDY LENTEL ABUNDANT WOOD FRAGMENTS							
	30	28-56m SANDS grey QUANTITATIVE LOOSE GRAINED GENERALLY (28-32) FINE GRAINED WOOD FRAGMENTS (32-38) FINE-MEDIUM GRAINED							
	40	(38-44m) UNBLENDED FINE-MEDIUM-COARSE							



0 m.
10 m.
20 m.
30 m.
40 m.
50 m.

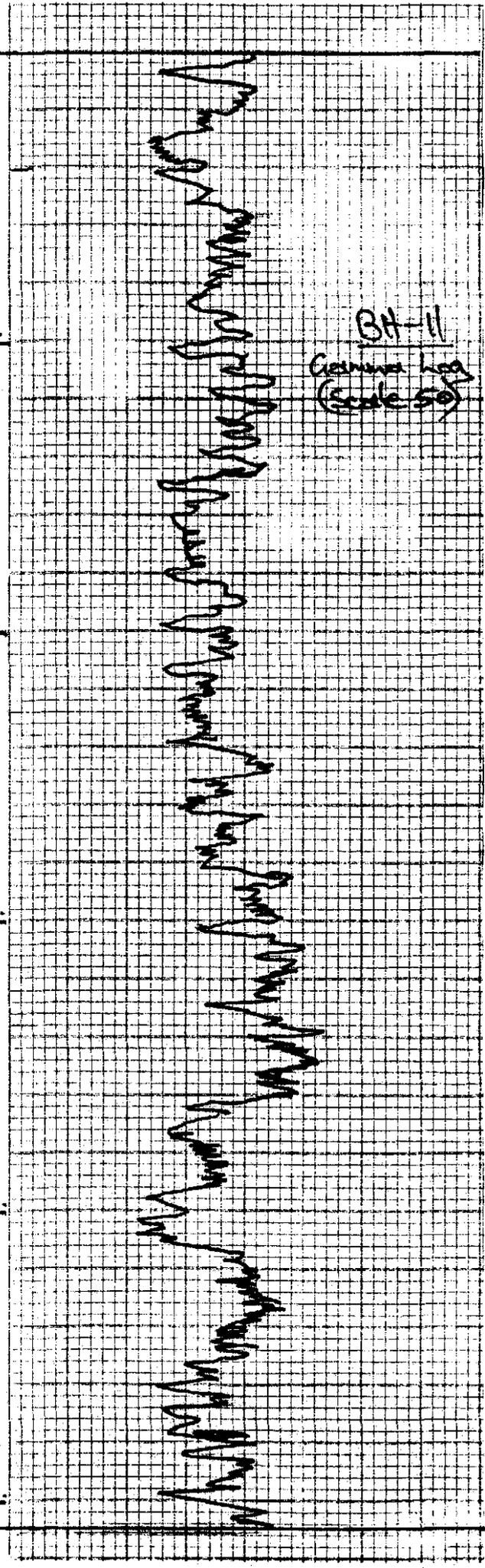
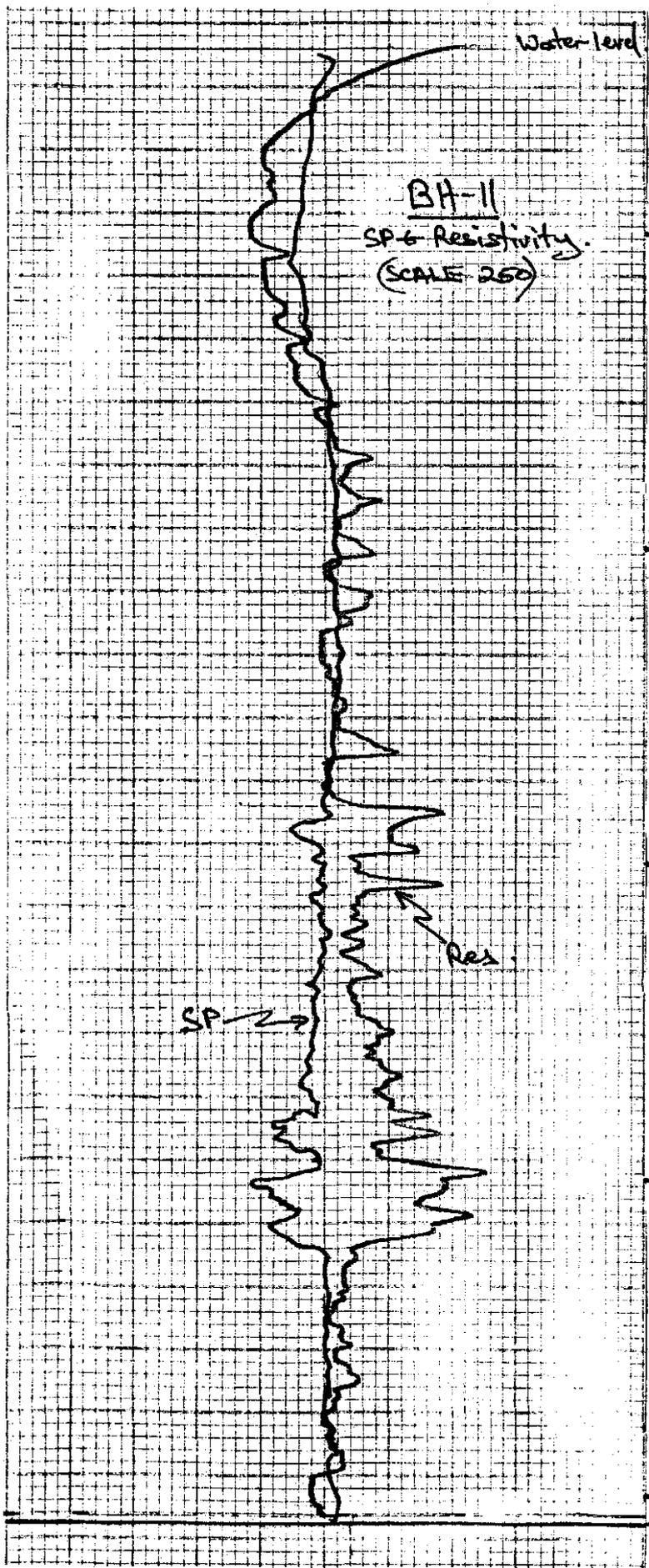
Water level

BH-II
SP-Resistivity.
(SCALE 250)

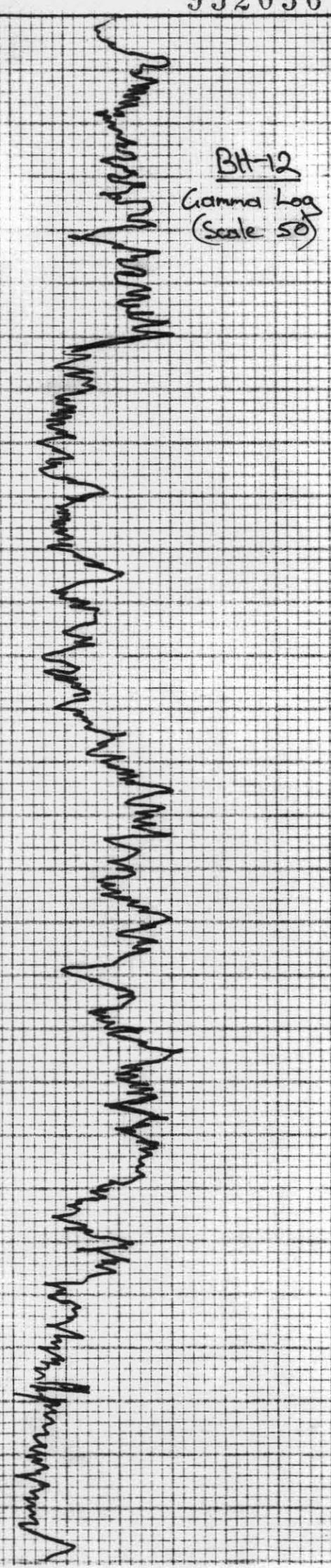
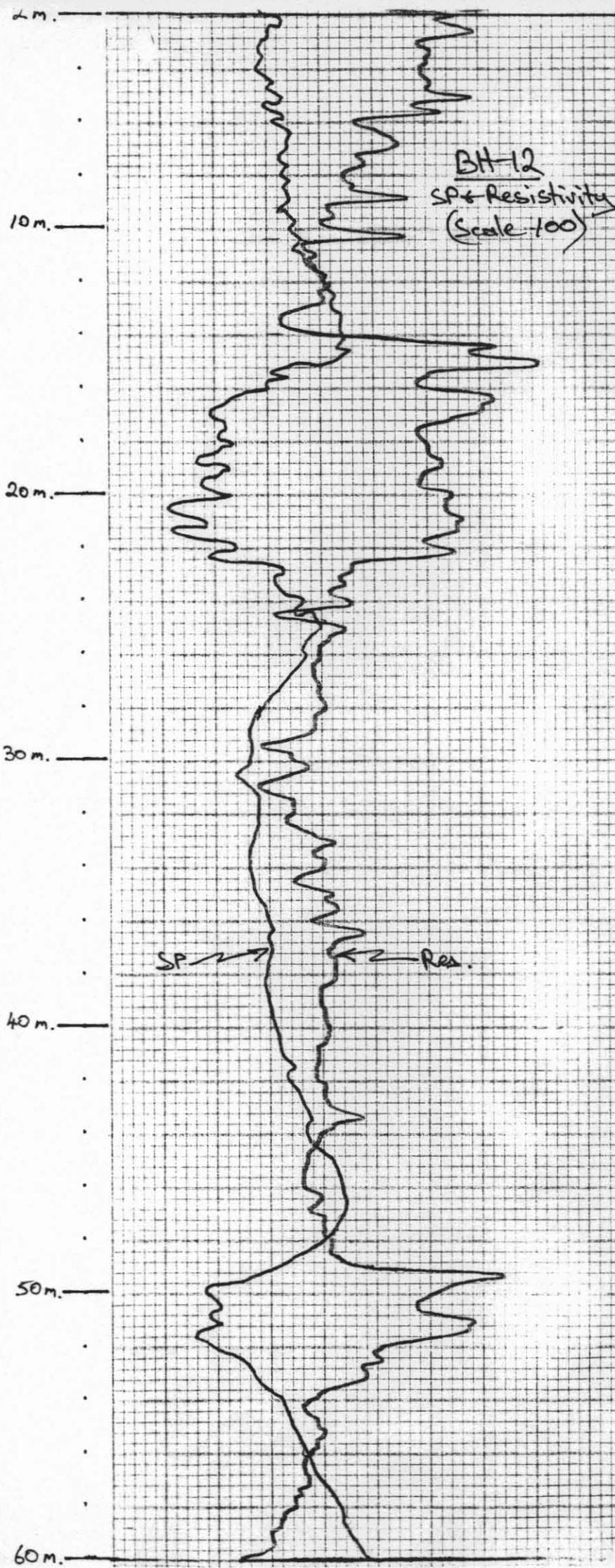
SP-250

Res.

BH-II
Gamma Log
(Scale 50)

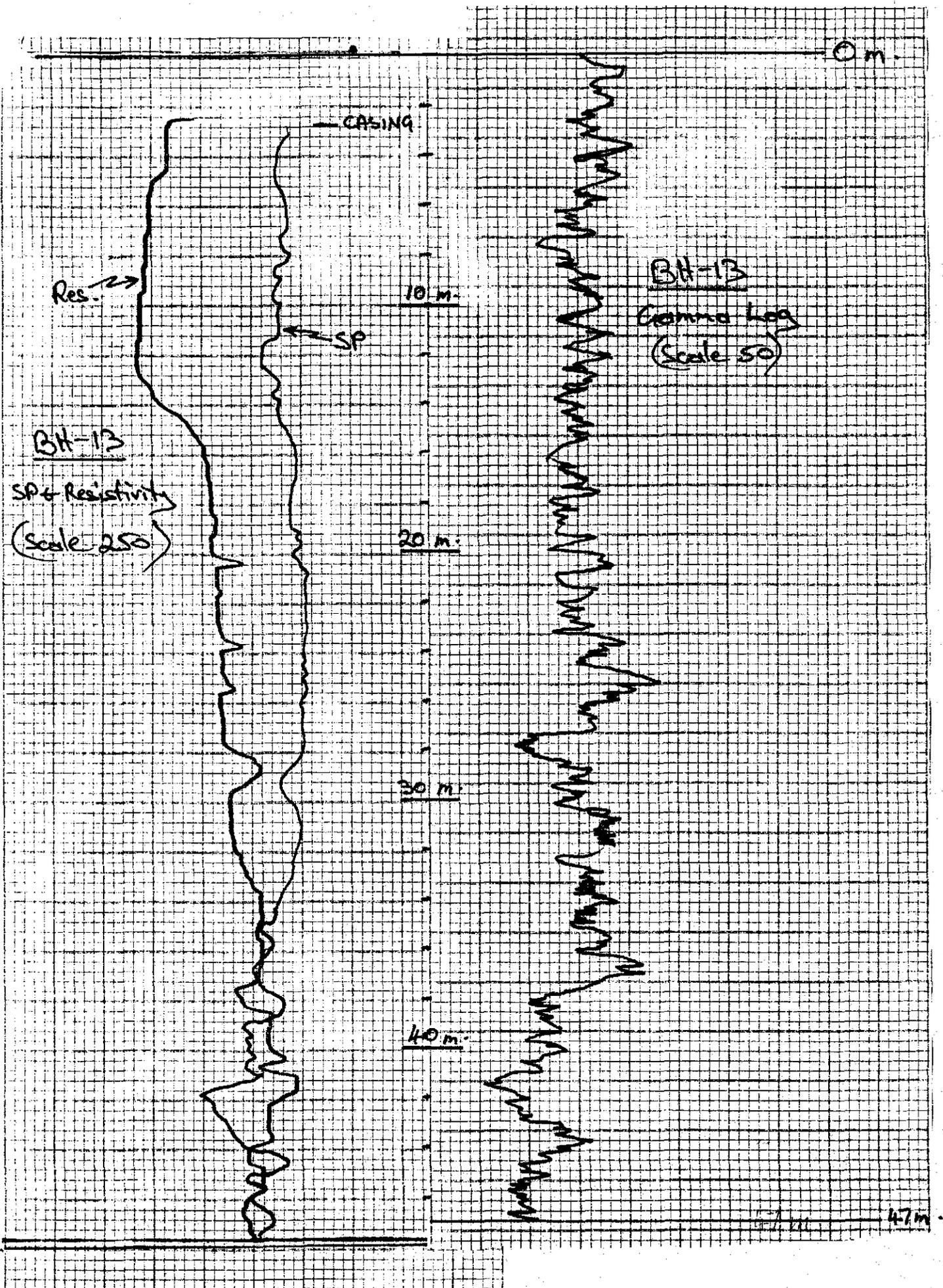


CORE RECOVERY	METRAGE	DESCRIPTION	Core bedd'g angle and joint spacing	LOG SCALE: 1:	SAMPLE No.	Assayed length	ASSAY VALUE		
		<p>50</p> <p>Thinly bedded grey sand with minor brown clay interbeds.</p> <p>(POOR SAMPLE RETURN) BETWEEN 42-60m.</p> <p>60</p> <p>END OF HOLE AT 60m</p> <p>SEMILLONETON Response 60-70CPs</p>							



PROJECT AREA: LAUNCESTON PROJECT No. 32852
 SPUDDED: 26-3-81 COMPLETED: 26-3-81
 LOCATION: 5 km NW of Longford CO-ORDS: X: 5062 E. 53971 N
 ELEVATION: 155m asl DIRECTION: INCLINATION: -90° TOTAL DEPTH: 60m
 HOLE TYPE: OH DRILLING CONTRACTOR: WA Drill. Co. DRILLER: A FANSHO
 LOGGED BY: BH DATE: 26-3-81 BIT SIZE: 25mm TO 60m TO TO

CORE RECOVERY	METRAGE	DESCRIPTION	Core bedd'g angle and joint spacing	LOG SCALE: 1:	SAMPLE No.	Assayed length	ASSAY VALUE SGS 610463									
							(Zero Moist)	OIL Net	Water Net	Oil S.G.	Grav. Mass	Moisture	Moisture % (moist)			
	0-3m	Red Brown silty clay lean	45°													
	3-9m	CLAY: mottled blue grey plastic clay with red brown + yellow silt clay few Fe stained pebbles														
10	9-16m	CLAY: interbedded dark brown + light brown soft plastic clay with abundant soft black wood inclusions disseminated throughout														
20	16-28m	CLAY: dark grey brown high plastic soft clay with soft black wood inclusions disseminated occasional very thin hard silt laminae (sandy?)														
	18-20				L1301	2	NIL	118	-	58	824	8.1				
	24-26				L1302	2	NIL	93	-	55	852	6.3				
30	28-38m	SILT + CLAY thin bedded cyclic light grey silt + dark grey brown soft plastic clay minor fine sand interbedded wood material present														
40	38-47	SAND - UNSORTED FINE - medium - coarse with hard fragments of soil bituminous wood present grey quartz														
	40-42				L1303	2	15	60	-	20	906	4.6				

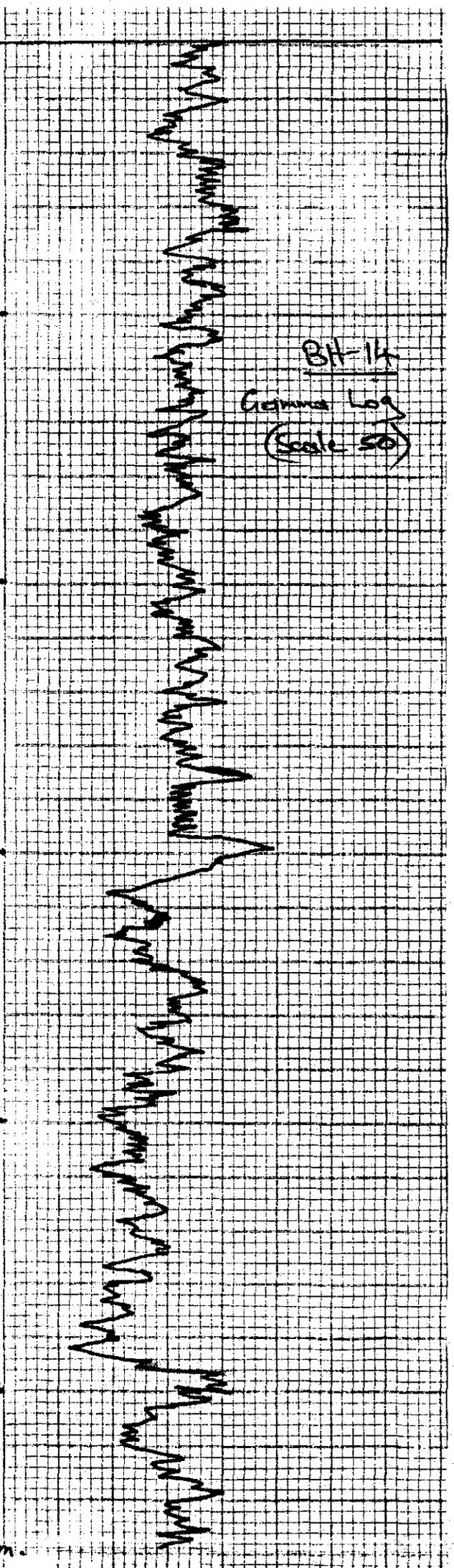
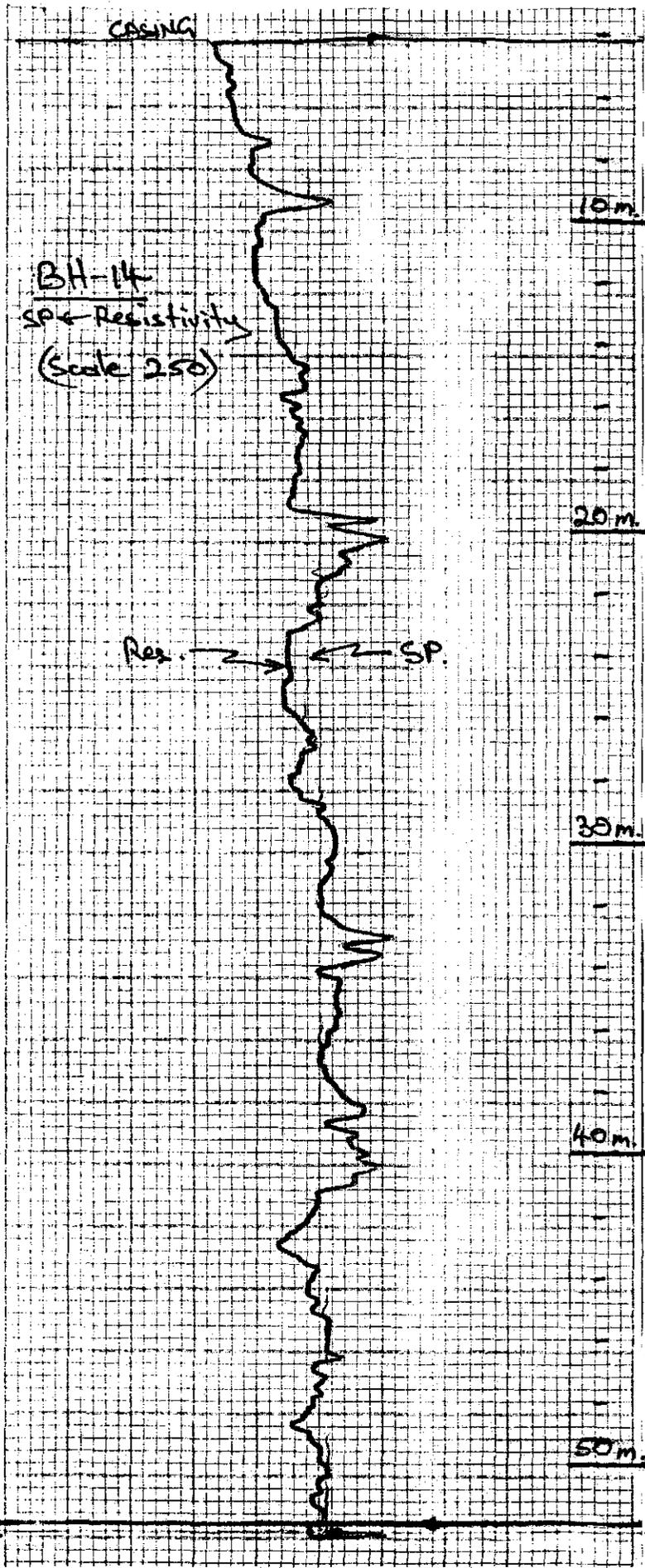


PROJECT AREA: LAUNCESTON PROJECT No. 32852
 SPUDED: 26-3-81 COMPLETED: 27-3-81
 LOCATION: 4 km South of Carrick. CO-ORDS: X: 5014 E. 53976 N
 ELEVATION: 165m a.s.l. DIRECTION: INCLINATION: -90° TOTAL DEPTH: 65m
 HOLE TYPE: O/H TO 65m DRILLING CONTRACTOR: WA. DRILLING CO. DRILLER: A. FRANZIO
 LOGGED BY: DATE: BIT SIZE: 4.5" TO 65m TO TO

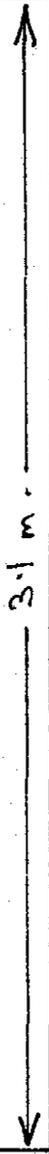
CORE RECOVERY	METRAGE	DESCRIPTION	Core bedd'g angle and joint spacing	LOG SCALE: 1:	SAMPLE No.	Assayed length	ASSAY VALUE						
							Zero Moist.	Oil	Water	Oil	Gravimetric	Moisture	
							Oil	Water	Oil	Gravimetric	Moisture		
	0-4m	Red-brown silty clayey humic soil	" "	" "									
	4-14m	Mottled + banded red-brown, yellow brown, light brown, + blue grey clay + silty clay	" "	" "									
	14-30m	CLAY + SILT mainly soft plastic dark grey brown clay with soft black woody specks disseminated. Interbeds of light grey silt occasional	" "	" "									
	(20-24)	light grey silt / beds	" "	" "									
			" "	" "	24-26	L1401	2	<1	90	-	46	864	6.2
	30-40m	SILT - light grey soft silt with woody inclusions. occasional hard thin silt laminae (silt - 32-34m)	" "	" "									
	40-42	lignite - dark brown-black with silty inclusions	" "	" "	40-42	L1402	2	33	161	-	37	774	13.1

952062

0 m.



CORE RECOVERY	METRAGE	DESCRIPTION	Core bedd'g angle and joint spacing	LOG SCALE: 1:	SAMPLE No.	Assayed length	ASSAY VALUE SGS GLO463								
							Oil wt	Water wt	Oil S.G.	Loss wt%	Residue wt%	Moisture wt%			
		[42-50] SILT. Light grey-brown silt + clayey silt with minor woody fragments. (40-44) minor coarse sand.													
	50	[50-50.68] LIGNITE. Dark brown-black lignite. Minor sandy inclusions.													
	51	[50.68-51.3] SILT. Brown, organic slightly clayey silt with thin lignitic laminae (to 2 mm.) & occasional lignitic fragments.		50.68 - 51.30	L1501	0.62	16	93	0.949	15	877	65			
		[51.3-51.44] LIGNITE. Dark brown-black lignite with few fine clay layers.													
	52	[51.44-52.1] SILT. Dark brown slightly clayey silt with numerous thin black lignitic laminae. Core has finely fissile appearance.													
		[52.1-52.75] Finally fissile black lignitic (oil shale?) laminae with silty lenses. Laminae < 1 mm.		52.10 - 52.75	L1502	0.65	48	157	0.964	65	736	11.2			
	53	[52.75-53.10] SILT. Grey finely sandy silt with numerous medium soft black lignitic fragments.		52.75 - 53.10	L1503	0.35	NIL	53	-	7	940	3.9			
		[53.10-56] Recovery Nil.													
	54														



CORE RECOVERY	METRAGE	DESCRIPTION	Core bedd'g angle and joint spacing	LOG SCALE: 1:	SAMPLE No.	Assayed length	ASSAY VALUE												
							Zero Moist	Oil	Water	Oil	S.G.	Other	Other	Other					
	86	[77-86] SILTS, CLAYS, LIGNITES Interbedded light grey-brown silts clayey silts, clays & lignitic bands. Numerous woody fragments. Rare pebbles.																	
		[40 cm] Dark brown organic silty laminated clay.																	
		[35 cm] Brown-black clayey lignite.																	
	87																		
	88																		
	89	[89-89.35] CLAY. Brown-grey clay with disseminated wood particles. Occasional lignitic laminae to 2 mm. Rare pebbles.																	
	90	[89.35-90.55] CLAYEY SILT. (Grades into above). Minor brown silt clasts. Trace fossils (worm burrows?).																	

0.75 m.



ASSAY VALUE					
SGS 620463					
Zero Moist	Oil	Water	Oil	S.G.	Other
11.2	11.2	11.2	11.2	11.2	11.2

86-89 L1508 0.75 34.153 0.966 28 79011.9

CORE RECOVERY	METRAGE	DESCRIPTION	Core bedd'g angle and joint spacing	LOG SCALE: 1:	SAMPLE No.	Assayed length	ASSAY VALUE		
3.1 m.	90	[90.55-91.45] SILT. (grades into above). Light grey silt. Finely sandy at base.							
	91	[91.45-91.55] Tough, hard silty rock. (siderite?).							
		[91.55-92.20] SILT. Light grey slightly sandy silt.							
	92	[92.20-92.48] SILT. Light grey clayey silt.							
		[92.48-92.89] CLAY. Light grey slightly silty clay.							
	93	[92.89-92.97] Tough, hard silty rock (siderite?).							
		[92.97-94.20] CLAY. Light grey slightly silty clay.							
	94	[94.20-95.30] CLAY. Light grey silty clay.							

102071

0 m.

0 m.

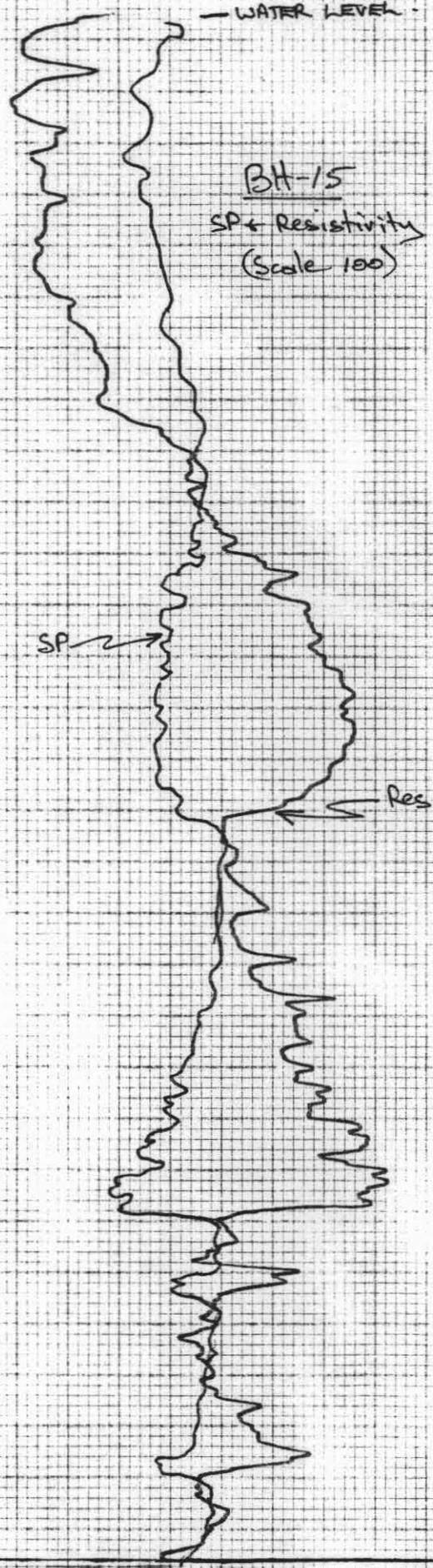
— WATER LEVEL —

BH-15

SP & Resistivity
(Scale 100)

BH-15

Gamma Log
(Scale 50)



10 m.

20 m.

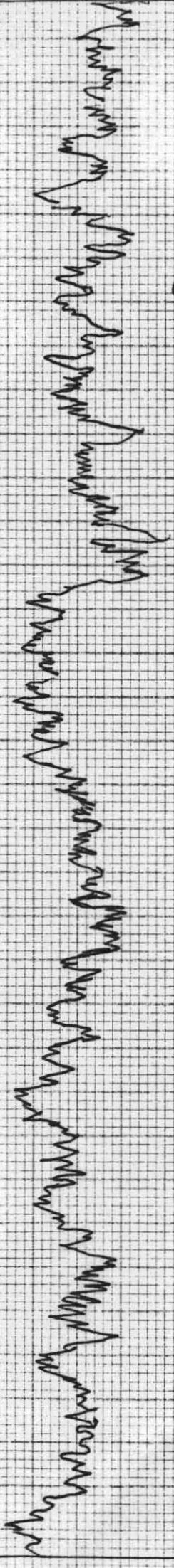
30 m.

40 m.

50 m.

60 m.

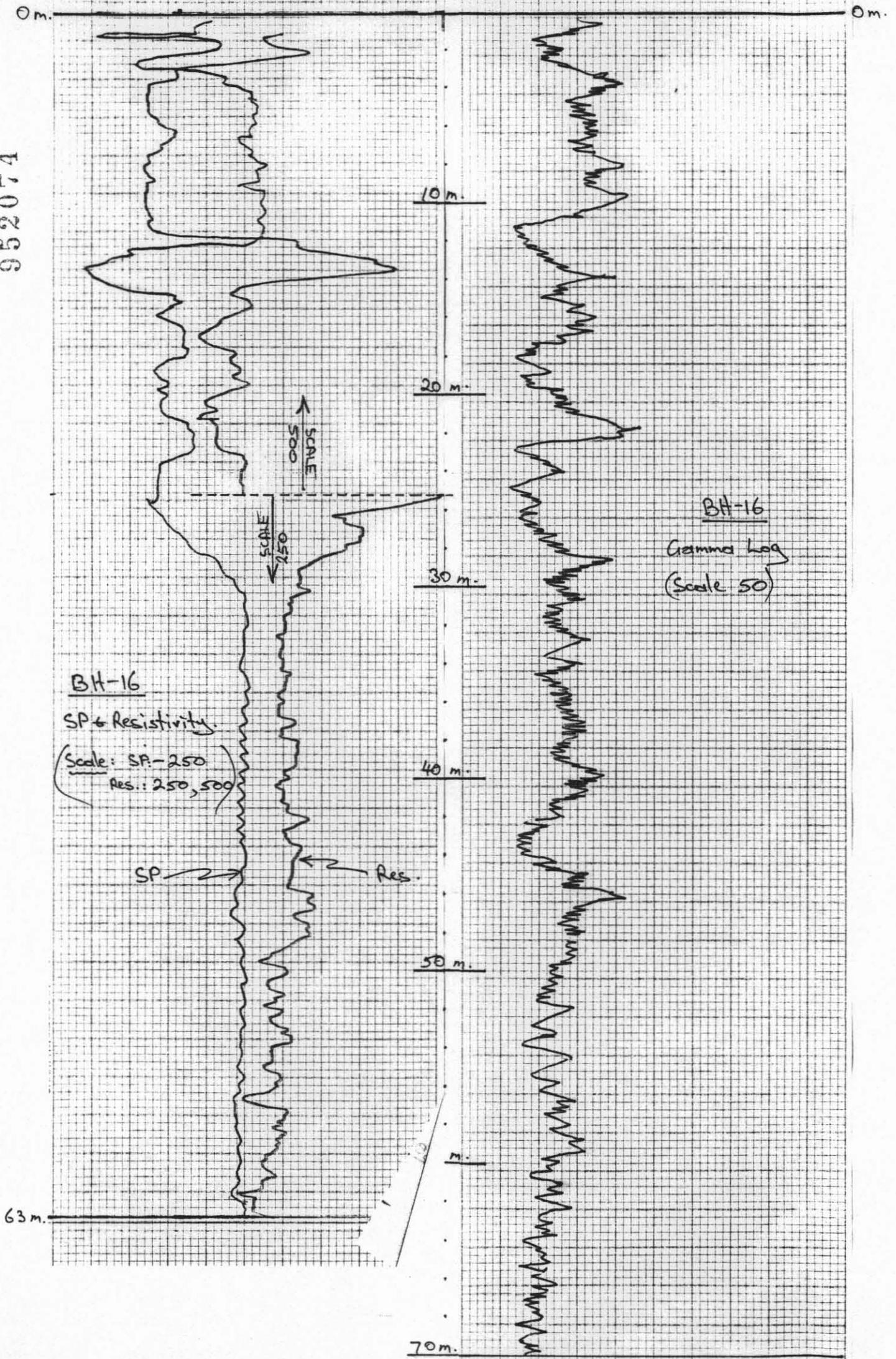
70 m.



65 m.

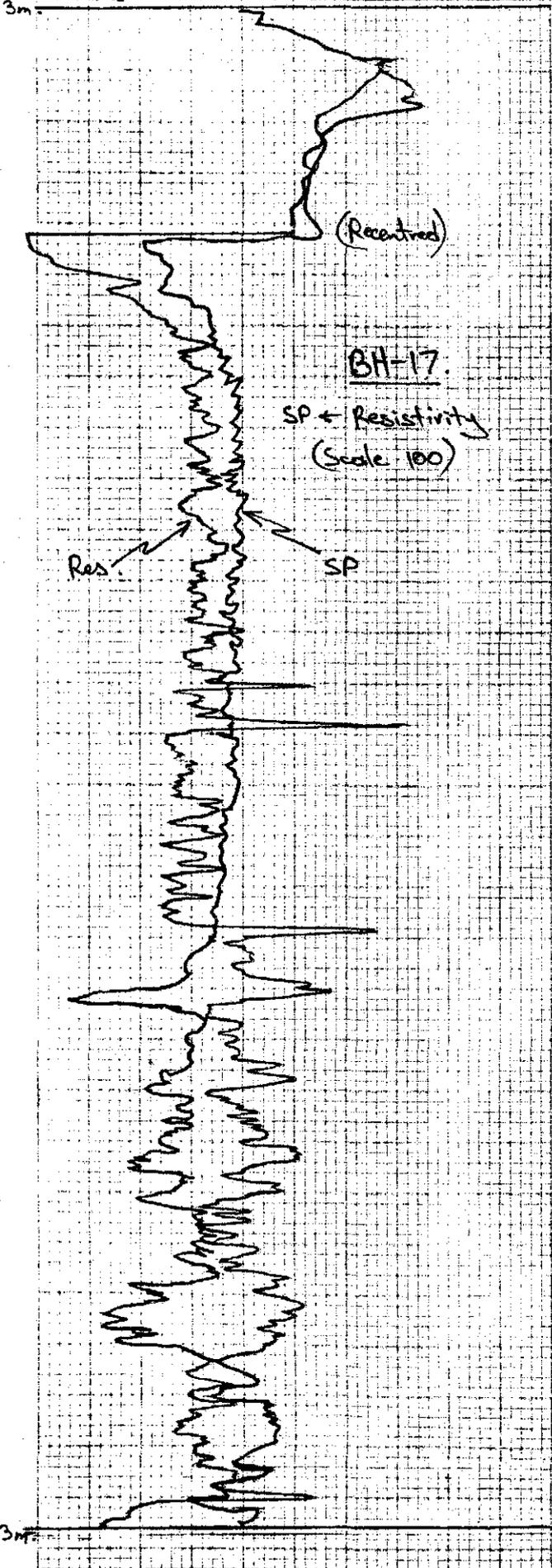
71 m.

952074



0 m.

0 m.



10 m.

20 m.

30 m.

40 m.

50 m.

60 m.

BH-17
Gamma Log
(Scale 50)

62 m.

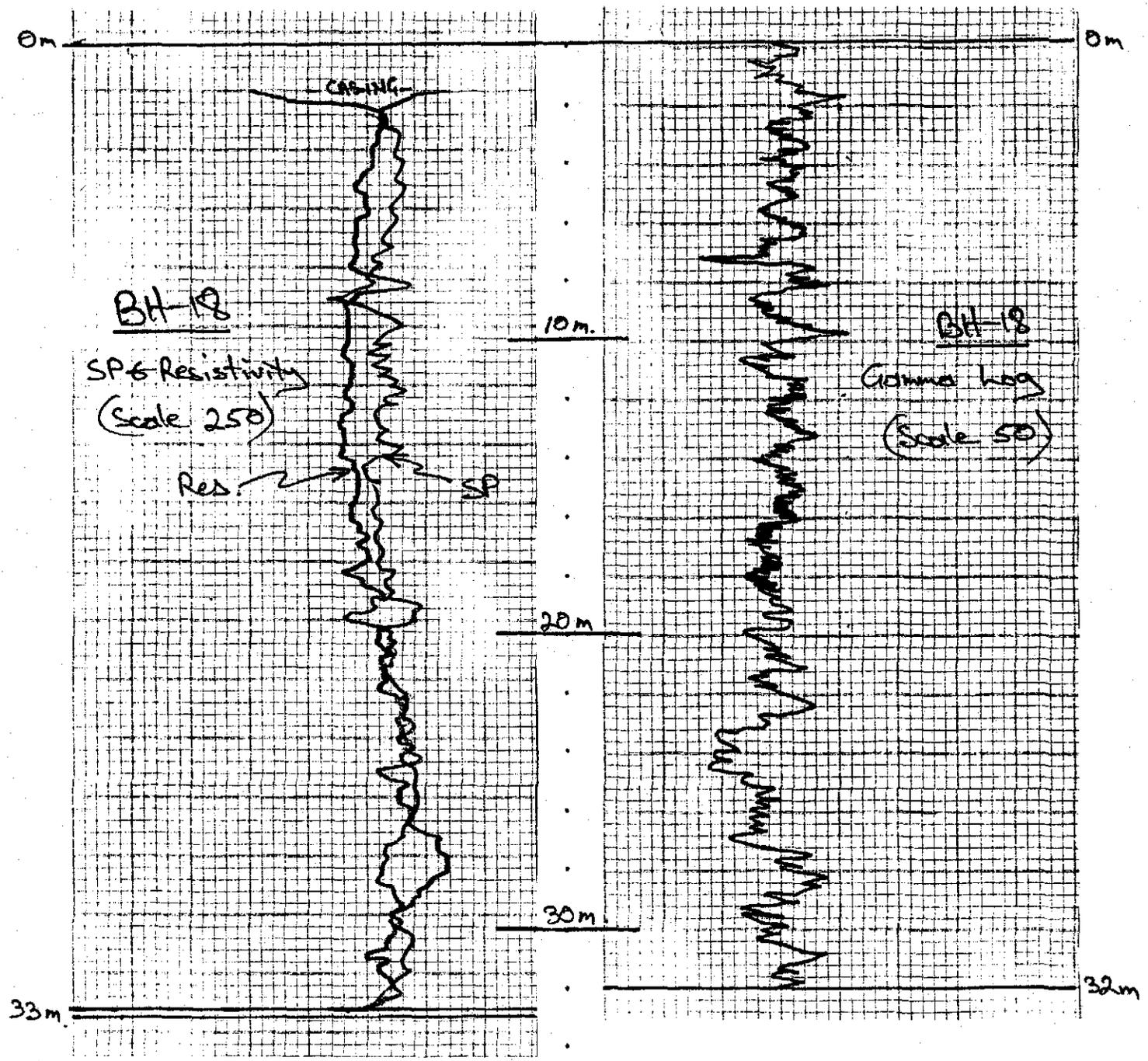
PROJECT AREA: LAUNCESTON PROJECT No. 32852
 SPUNDED: 4/4/80 COMPLETED: 5/8/80
 LOCATION: 4.5 km West of Carrick CO-ORDS: X: 4963 E. 54025 N
 ELEVATION: 156m ASL DIRECTION: INCLINATION: -90° TOTAL DEPTH: 52m
 HOLE TYPE: Off 0-52 Reconn - Core 2H (DRILLING CONTRACTOR: W.A. DRILLING CO DRILLER: A. FRANCO)
 LOGGED BY: DATE: BIT SIZE: 125 mm TO 52 m TO TO

CORE RECOVERY	METRAGE	DESCRIPTION	Core bedd'g angle and joint spacing	LOG SCALE: 1:	SAMPLE No.	Assayed length	ASSAY VALUE		
		0-3m BROWN (SILT) CLAYey loam HUMIC MATERIAL FEW PEBBLES							
		3-10m CLAY mottled blue-grey PLASTIC CLAY + brown soft (SILT) CLAY FEW PEBBLES HIGHLY PLASTIC 7-9m LIGNITE STAINING							
	10	10-18m CLAY - soft brown-grey WITH FINE SOFT WOOD INCLUSIONS DISSEMINATED THROUGHOUT FEW THIN VERY SOFT BLACK LIGNITE BANDS							
	24	18-21m SILT + SILT CLAY (INTERBEDDED grey brown FEW THIN LIGNITE BANDS)							
		21-28m INTERBEDDED grey brown CLAY, SILT CLAY + LIGNITE							
	30	28-30m SILT: light grey with minor wood fragments							
		30-36m CLAY, LIGNITE, soft brown CLAY WITH DISSEMINATED WOOD PARTICLES AND soft black LIGNITE BANDS							
	40	36-42m CLAY - grey brown soft plastic CLAY							

CORE RECOVERY	METRAGE	DESCRIPTION	Core bedd'g angle and joint spacing	LOG SCALE: 1:	SAMPLE No.	Assayed length	ASSAY VALUE SAS 910463								
							Oil wt	Water wt	Oil S.G.	Moisture	Hydrogen	Carbon			
		THE HOLE WAS REDRILLED & THE INTERVAL 21-36.10 m. WAS CORED.													
	21	[21-21.2] LIGNITE. Finely laminated brown-black lignite. Fissile. (Oil shale?)			L1801	0.2	52	273	0.944	60	629	22.9			
		[21.2-21.65] CLAY. Brown clay with woody particles & fragments. Occasional thin lignitic laminae.													
	22	[21.65-22.12] LIGNITE. Brown-black laminated. Contains thin clayey bands & possibly finely laminated oil shale.			L1802	0.47	60	228	0.948	44	681	19.5			
		[22.12-22.4] CLAY. Dark brown organic clay with thin (<2mm) black organic laminae.													
		[22.4-22.53] LIGNITE. As for 21.65-22.12.													
	23	[22.53-23.3] CLAY. Brown-gray organic clay with numerous woody fragments.			L1803	1.18	3	84	-	4	909	4.5			
		[23.3-23.68] LIGNITE. As for 21.65-22.12.													
		[23.68-23.88] CLAY. Brown-gray organic with numerous woody inclusions (roots?) & occasional thin black organic laminae.													
	24	[25 cm] CLAY. Very soft brown clay with lignitic fragments.													
		[10 cm] LIGNITE. Thinly laminated soft dark brown lignite.													
		[40 cm] CLAY. Brown organic clay with woody fragments. Firm clay.													
	25	[23 cm] LIGNITE. Laminated, very			L1805	2	13	191	0.977	30	768	14.5			

2.88 m

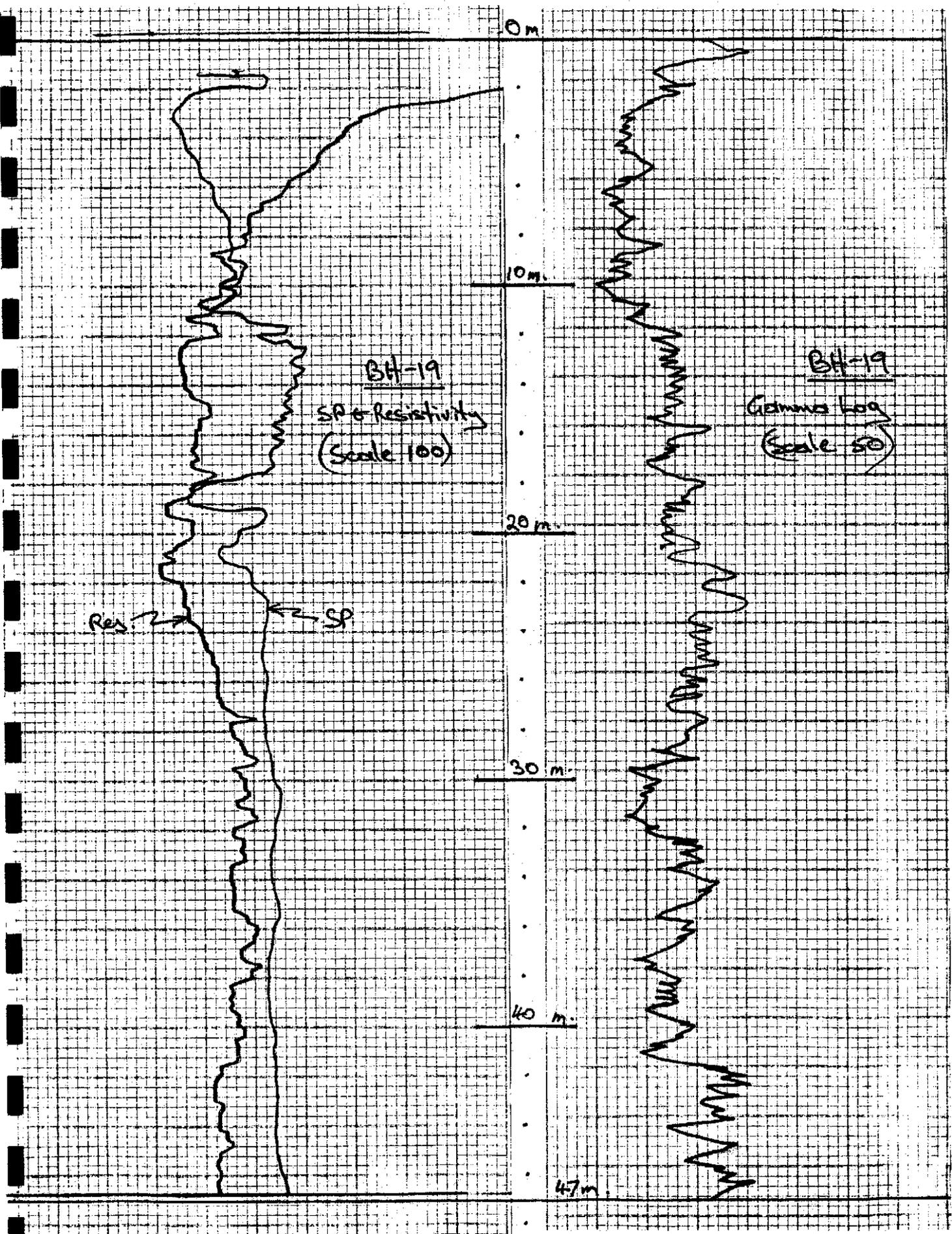
CORE RECOVERY	METRAGE	DESCRIPTION	Core bedd'g angle and joint spacing	LOG SCALE: 1:	SAMPLE No.	Assayed length	ASSAY VALUE		
2.00 m.	26	friable, dark brown lignite with numerous thin clay laminae.							
		[2 cm] SILT. Green-grey clayey silt with woody laminae.							
3.0 m.	27	[27-29.27] CLAY. Very soft brown-grey clay with woody fragments.	" "						
			" "						
			" "						
			" "						
			" "						
			" "						
			" "						
			" "						
			" "						
			" "						
30	28	[29.27-29.79] CLAY, CLAYEY SILT. Thinly bedded alternating sequence of green-grey clayey silts & brown-grey clays. Occasional thin (to 1mm) lignitic laminae.	" "						
		[29.79-29.89] LIGNITE. Soft brown-black lignite with occasional thin hard laminae.	" "						
		[29.89-30.76] CLAY. Dark brown organic clay with woody fragments.	" "						
			" "						



PROJECT AREA: LAUNCESTON PROJECT No. 32852
 SPUDED: 5/4/81 COMPLETED: 6/4/81
 LOCATION: 3.5 km WNW of Carrick CO-ORDS: X: 4975 E. 54035 N
 ELEVATION: 155 m asl DIRECTION: INCLINATION: -90° TOTAL DEPTH: 70M
 HOLE TYPE: OH TO 70 m. DRILLING CONTRACTOR: WA DRILLING CO DRILLER: A FANSA
 LOGGED BY: R + DA DATE: 6/4/81 BIT SIZE: 125mm TO 70mm TO TO

CORE RECOVERY	METRAGE	DESCRIPTION	Core bedd'g angle and joint spacing	LOG SCALE: 1:	SAMPLE No.	Assayed length	ASSAY VALUE SGS QLO463										
							Oil Moist	Water Moist	Oil SG	SG	Moisture	Moisture					
	0-2m	Red brown humic clays lit															
	2-21m	Silty clays: interbedded and mottled blue-grey, red-brown + yellow brown - slightly plastic silty clays															
	10	(10-21) Few Fe oxide coated pebbles, discrete.															
	20	(16-21) mainly red-grey slightly plastic silty clays with lesser yellow brown color bands															
		21-31m silty clay: grey brown with minor wood fragments + soft black disseminated woody particles															
	30-50	31-50m clays, silty clays, lignites: interbedded brown organic clays, grey brown silty clays + soft brown black lignites few zones thin with hard wood fragments			30-32	L1901	2	64	213	57.0	63	674	15.0				
	50-70				32-34	L1902	2	52	219	57.0	57	684	18.0				
	20-50				34-36	L1903	2	38	184	196.0	36	749	15.0				
	10-40				36-38	L1904	2	27	151	159.0	39	787	11.0				
	10-50				38-40	L1905	2	53	171	96.0	48	736	13.5				
	10-50																

27.5% / 24%



PROJECT AREA: LAUNCESTON RESERVE PROJECT No. 32852
 SPUNNED: 9/4/81 COMPLETED: 10/4/81
 LOCATION: NS4103 E 4967 (M.M.C.) CO-ORDS: X:
 ELEVATION: 160m a.s.l. DIRECTION: INCLINATION: -90° TOTAL DEPTH: 90m
 HOLE TYPE: O/H DRILLING CONTRACTOR: WA Drilling Co DRILLER:
 LOGGED BY: R.O. RK DATE: 10/4/81 BIT SIZE: 125mm TO 90m TO

CORE RECOVERY	METRAGE	DESCRIPTION	Core bedd'g angle and joint spacing	LOG SCALE: 1:	SAMPLE No.	Assayed length	ASSAY VALUE SGS GLO463										
							(Zero Moist)	OIL wt	Water wt	Oil S.G.	Proximate ash	Proximate moist	Moisture % (a.s.l.)				
		0-3m CLAY mottled blue grey plastic clay Red Brown + yellow Brown clay															
		3-6m CLAY mottled blue grey - Red grey soft plastic clay															
		6-8m SILT CLAY mottled light grey + orange brown															
		8-10m CLAY Brown with disseminated wood particles lignite bands															
	10	10-20m LIGNITE soft brown- black with some hard wood particles generally fibrous, minor lignitic clay bands			12-14	L2102	2	73	114	0.952	83	662	12.9				
	20	20-20m CLAY brown very fine wood, mainly disseminated throughout interbeds of brown grey plastic clay soft.			18-20	L2105	2	71	116	0.927	57	798	7.9				
					20-22	L2106	2	23	85	0.950	35	860	7.0				
					22-24	L2107	2	26	114	0.980	44	818	6.9				
		(25-27m) LIGNITE brown slightly clayey			24-26	L2108	2	22	100	0.920	54	827	8.1				
					26-28	L2109	2	53	257	0.960	56	650	19.2				
	30	28-30m LIGNITE brown - black few hard wood particles generally fibrous, minor lignitic clay bands			28-30	L2110	2	34	185	0.970	32	754	14.6				
	40	(40-47) ~ 50% lignite soil clay - brown wood			32-34	L2112	2	53	185	0.970	64	707	12.1				

952090

5.5 m.

0 m.

10 m.

20 m.

30 m.

40 m.

50 m.

60 m.

70 m.

BH-21

SP ← Resistivity
(Scale 100)

BH-21

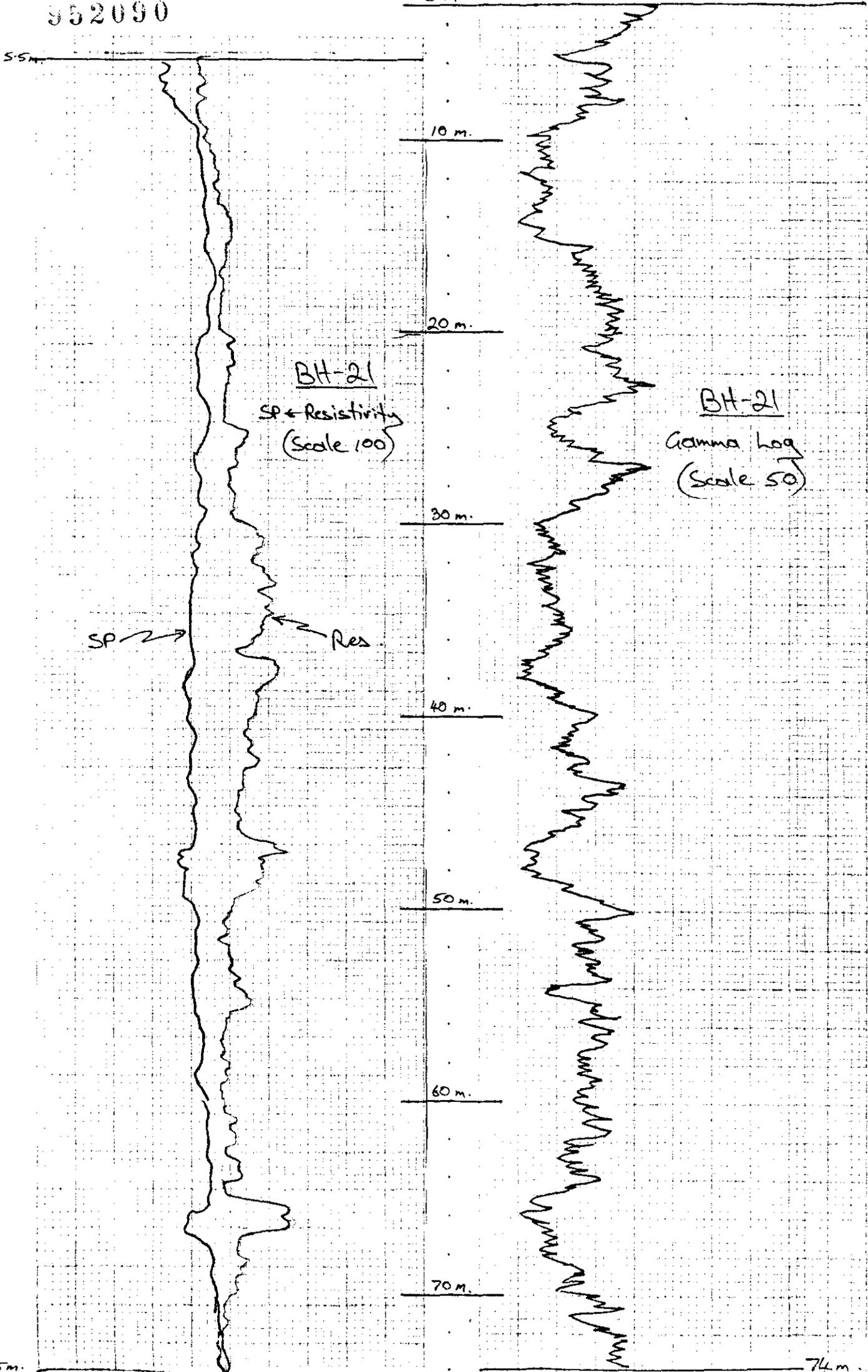
Gamma Log
(Scale 50)

SP →

← Res

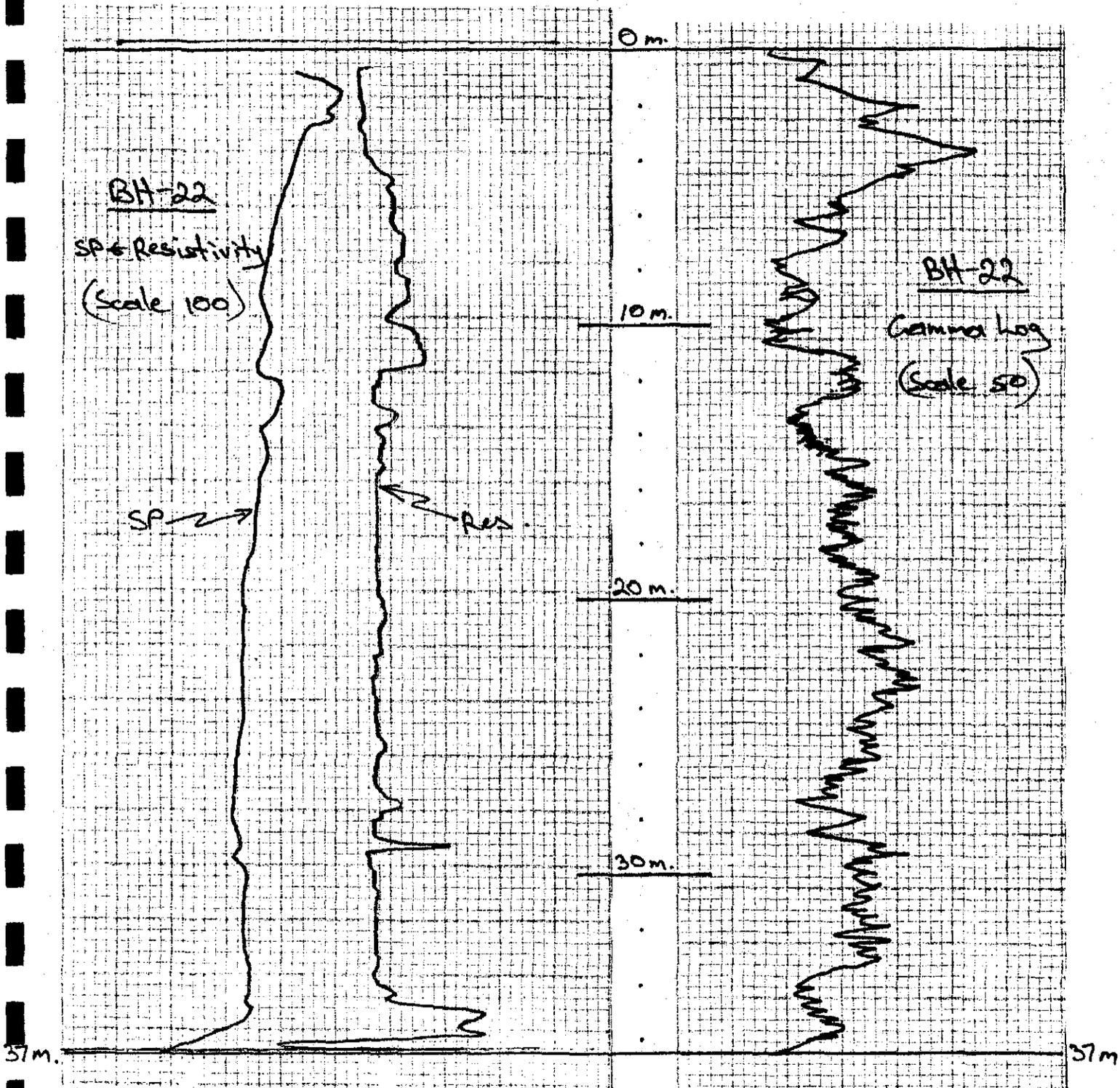
74.5 m.

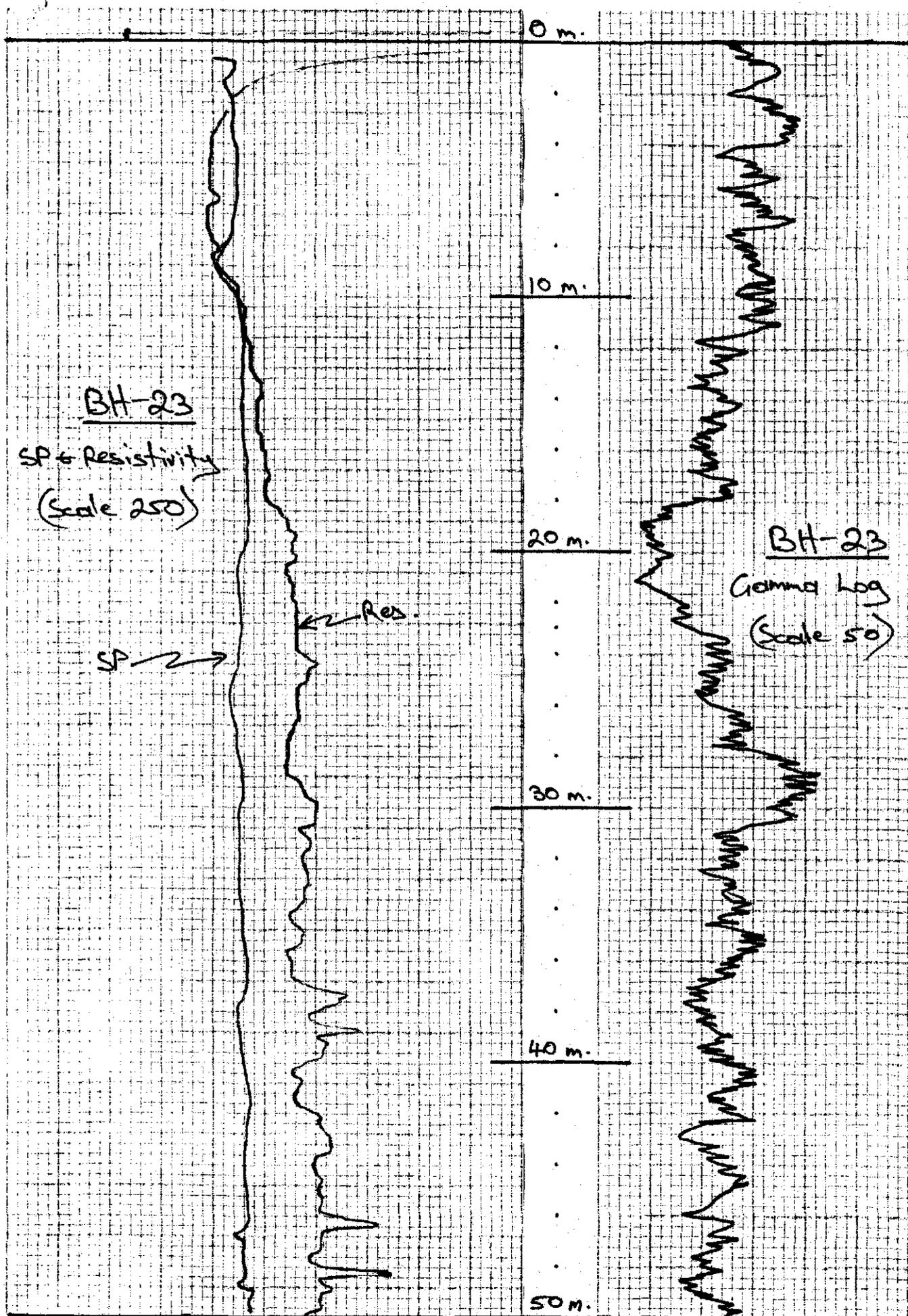
74 m.



PROJECT AREA: LAUNCESTON PROJECT No. 22852
 SPUDED: 10/4/80 COMPLETED: 10/4/80
 LOCATION: N. 54077. E 4961 (Amc) CO-ORDS: X:
 ELEVATION: 175m ASL DIRECTION: INCLINATION: - 90 TOTAL DEPTH: 38m
 HOLE TYPE: O/H TO 38m DRILLING CONTRACTOR: WA DRILLING CO DRILLER: A FRANKLIN
 LOGGED BY: ROY BH DATE: 10/4/81 BIT SIZE: 125mm TO 38m TO TO

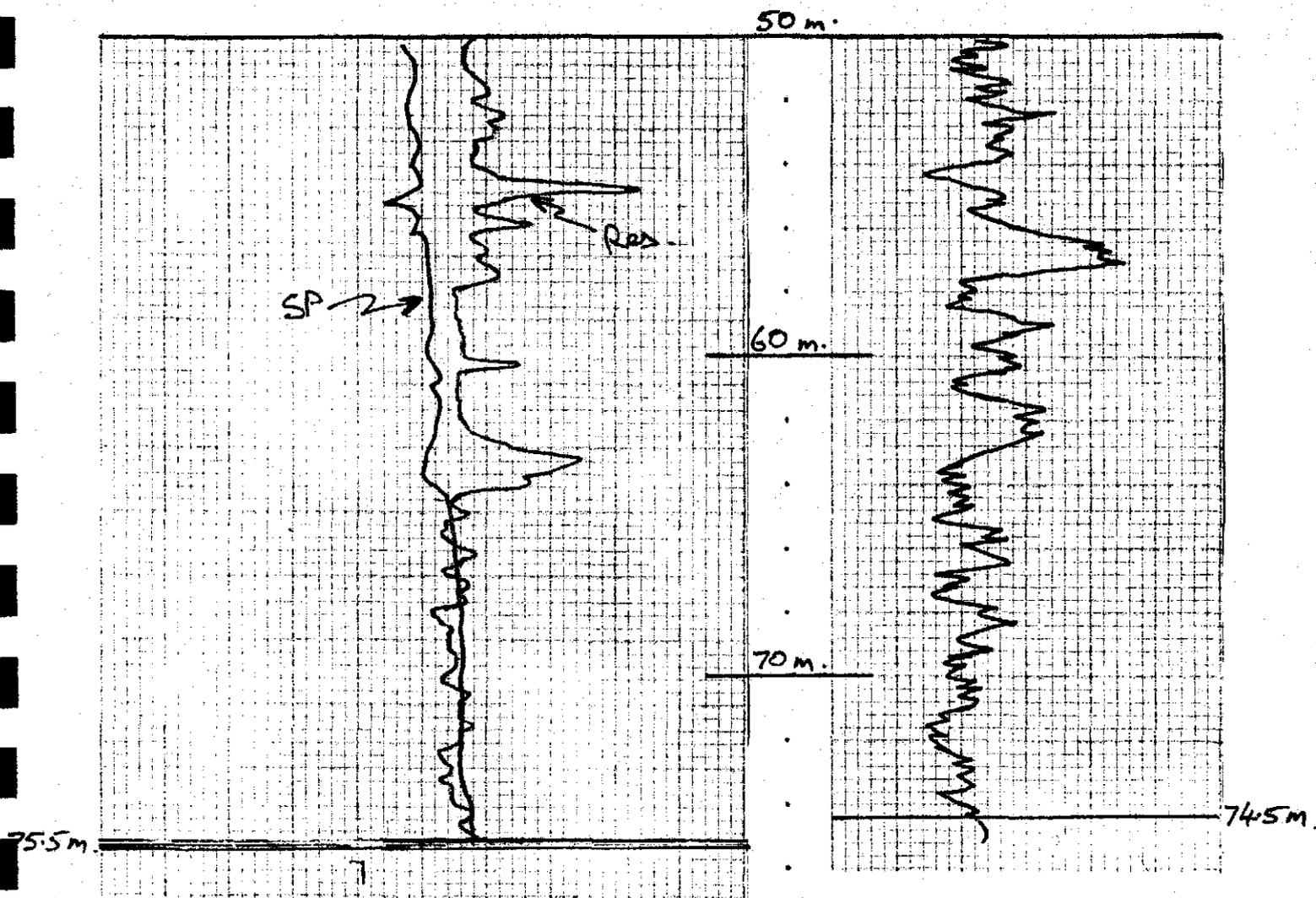
CORE RECOVERY	METRAGE	DESCRIPTION	Core bedd'g angle and joint spacing	LOG SCALE: 1:	SAMPLE No.	Assayed length	ASSAY VALUE		
		0-2 CLAY + HUMIC MATERIAL BROWN	22						
		2-9 SILT FINELY SANDY SOFT BROWN FEW THIN BARE grey SOFT PLASTIC CLAY BANDS	22						
	10	9-12m SAND limonitic - brown UNIFORM, FINE-MEDIUM-COARSE SLIGHT GRAVEL							
		12-14 SILT brown FINELY SANDY							
		14-18 CLAYED lignite SOFT BROWN							
	20	18-34 CLAY SLIGHTLY SILTY brown grey FINE WOOLY MATERIAL DISCONTINUOUS THROUGHOUT OCCASIONAL THIN lignite BANDS							
	30	(25-29) .5m brown lignite BAND							
		(20-34) lignite interbeds in clay							
		34-37 lignite black - brown CLAY BANDS							
	30	37m-? STRATIGRAPHIC CARBONACEOUS SHINY lenticles BLACK, THIN light grey color BANDS		Permanent					





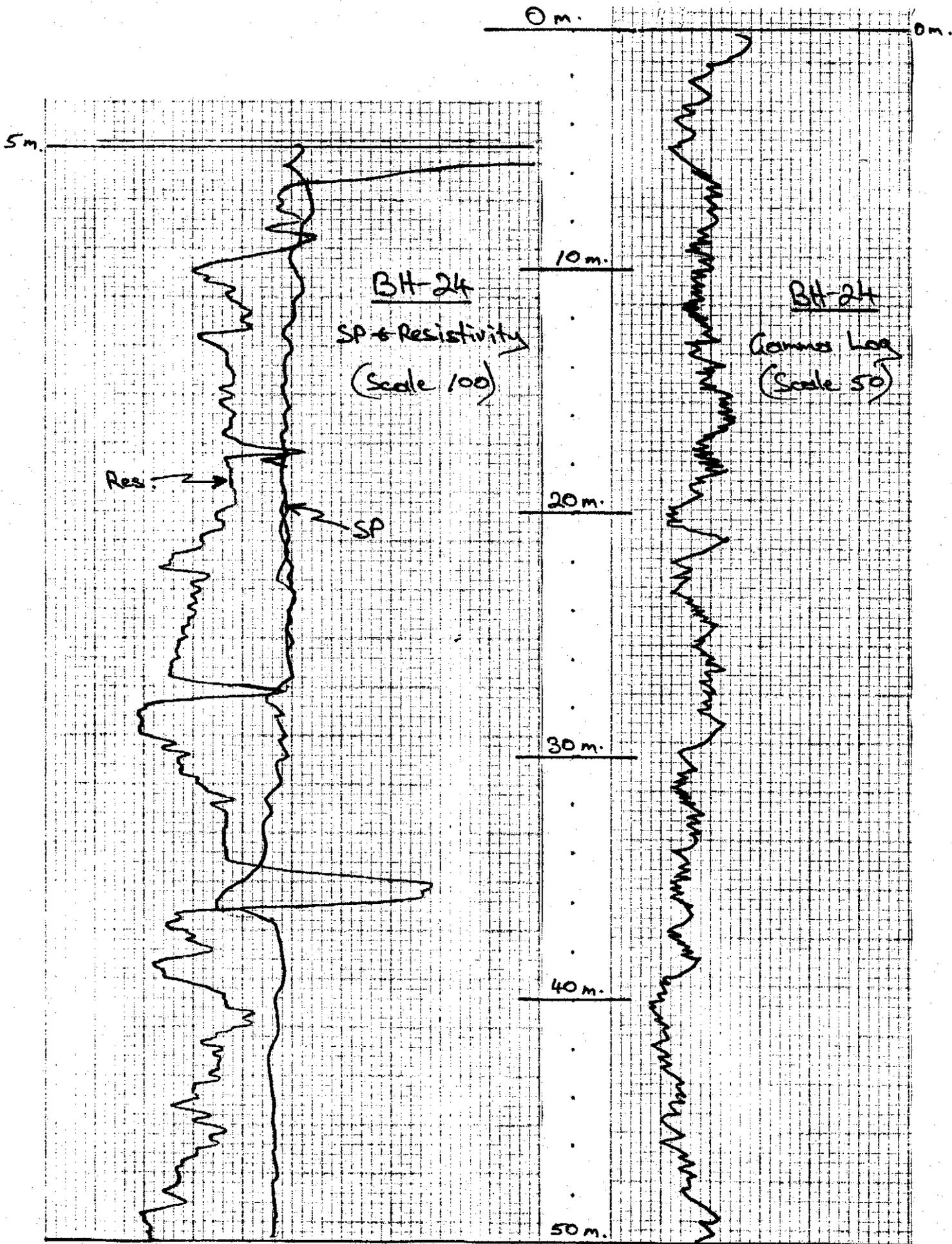
Hole continued on next page.

BH-23 (Continued).



PROJECT AREA: LAUNCESTON - ROSCARE PROJECT No. 32852
 SPUNNED: 13/6/81 COMPLETED: 14/8/81
 LOCATION: N 54120 E 4954 (AMC) CO-ORDS: X:
 ELEVATION: 135m 251 DIRECTION: INCLINATION: -90° TOTAL DEPTH: 98m
 HOLE TYPE: OH DRILLING CONTRACTOR: WA. OAKLAND CO. DRILLER: A. FANSHO
 LOGGED BY: B.H. 20 DATE: 14/4/81 BIT SIZE: 125mm TO 98mm TO TO

CORE RECOVERY	METRAGE	DESCRIPTION	Core bedd'g angle and joint spacing	LOG SCALE: 1:	SAMPLE No.	Assayed length	ASSAY VALUE SGS GLO463								
							(Zero Moist) Oil %	Moisture %	Oil %	Gravimetric %	Proximate %	Ultimate %			
		0-3m SAND FINE-SILT) grey brown HUMID MARL													
		3-6m SILT) CLAY rather light blue-grey-red brown, few lignitic nodules													
		6-8m CLAY - lignitic dark brown													
	10	8-11m CLAY SILT) very soft grey FEW WOOD FRAGMENTS													
		(12-14) WOOD FRAGMENTS													
		14-20m CLAY SILT) very finely sandy light grey OCCASIONAL WOOD FRAGMENTS													
	20	20-31m DARK grey brown SILT) CLAY WITH blocky MARL INTERBEDDED WITH LIGHT grey SILT) CLAY CONTAINING THIN LIGNITE BANDS													
		(24-26m) 2 soil lignite BLACK FIBROUS CLAY BANDS													
	30	(28-34) minor lignite BANDS													
	40	37-49m LIGNITE DARK BROWN-BLACK FIBROUS FEW HARD WOOD PARTICLES CLAY) IN THIN ZONES			36-38	L2401	2	60	288	0.150	32	638	24.8		
					40-42	L2403	2	64	210	0.160	45	692	17.0		

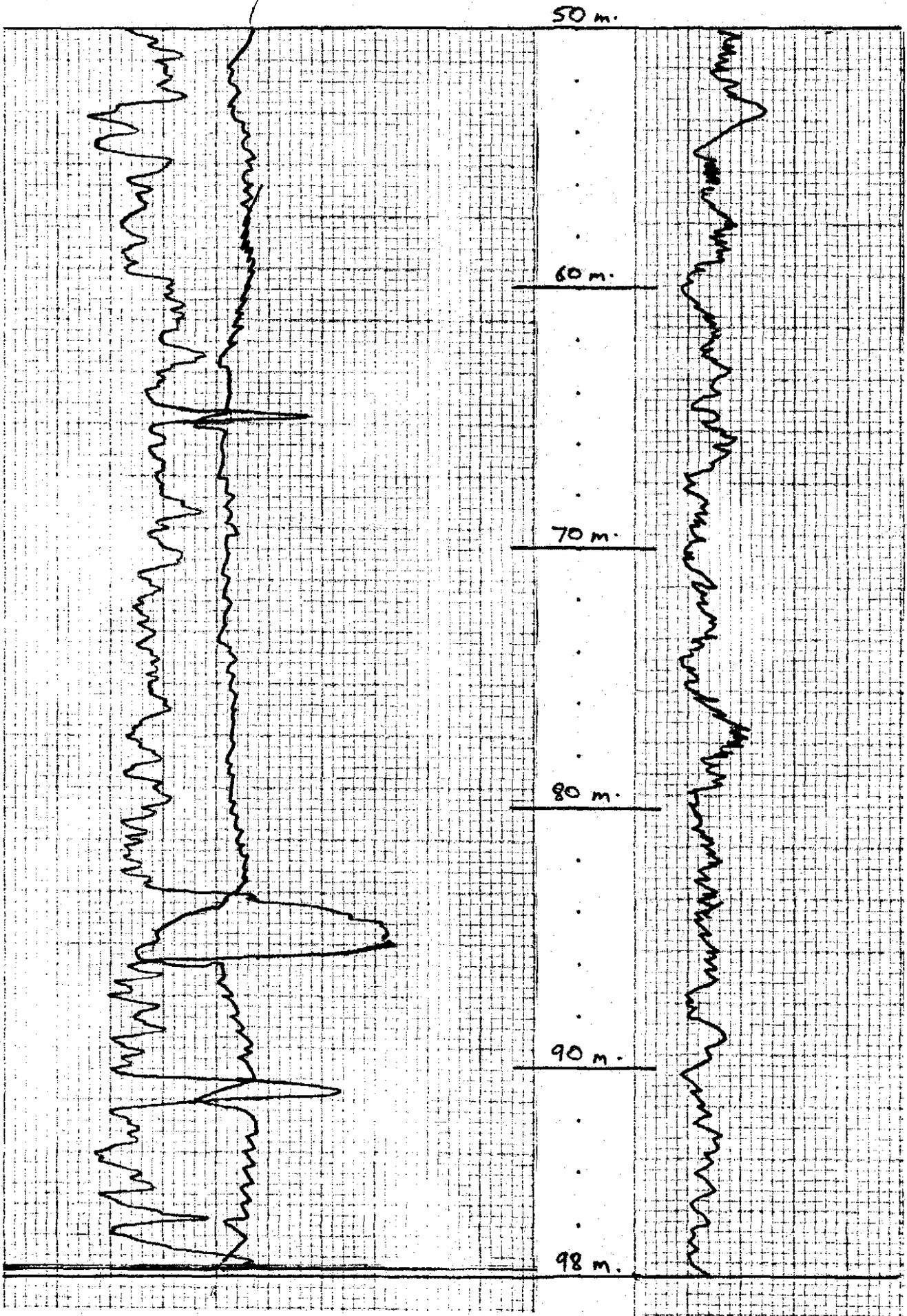


Hole continued on next page.

BH-24

(Continued)

952101

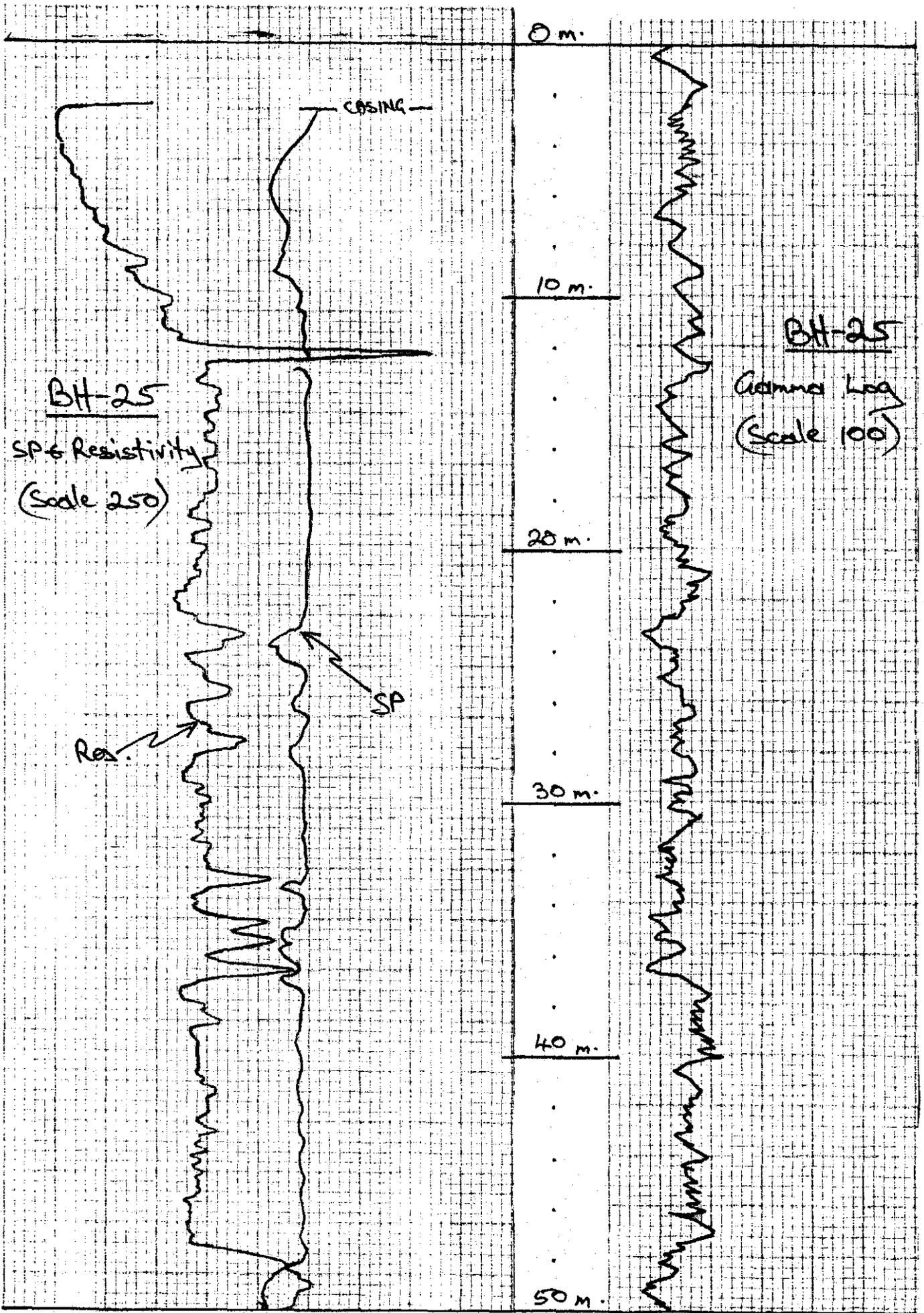


CORE RECOVERY	METRAGE	DESCRIPTION	Core bedd'g angle and joint spacing	LOG SCALE: 1:	SAMPLE No.	Assayed length	ASSAY VALUE								
							Zero Moist	OIL %	Water %	Oil S.G.	Gas loss %	Residue %	Moisture %		
	50	48-73m SILT grey clayey FINELY LAMINATED IN THIN ZONES MINOR WOOD FRAGMENTS													
		(54-59) SLIGHTLY INDURATED FINE SANDY LENS + CLASTIC FC cement?													
	60	(59-60) SIOCALITE BAND													
		(63-64) SIOCALITE BAND													
	70	(70-72) SIOCALITE BAND SLIGHTLY													
		73-98m CLAY SLIGHTLY SILTY DARK grey brown MUCH DISCONTINUOUS WOODY FRAGMENTS OCCASIONAL SUB BITUMINOUS WOOD FRAGMENT, FINELY SANDY IN THIN ZONES													
	80	(82-84) THIN SIOCALITE BANDS													
		(86-88) ≈ 30' LIGNITE CLAYEY + FIBROUS													
	90	FROM 90m BELOW SHTICK													

30' 8" LENS

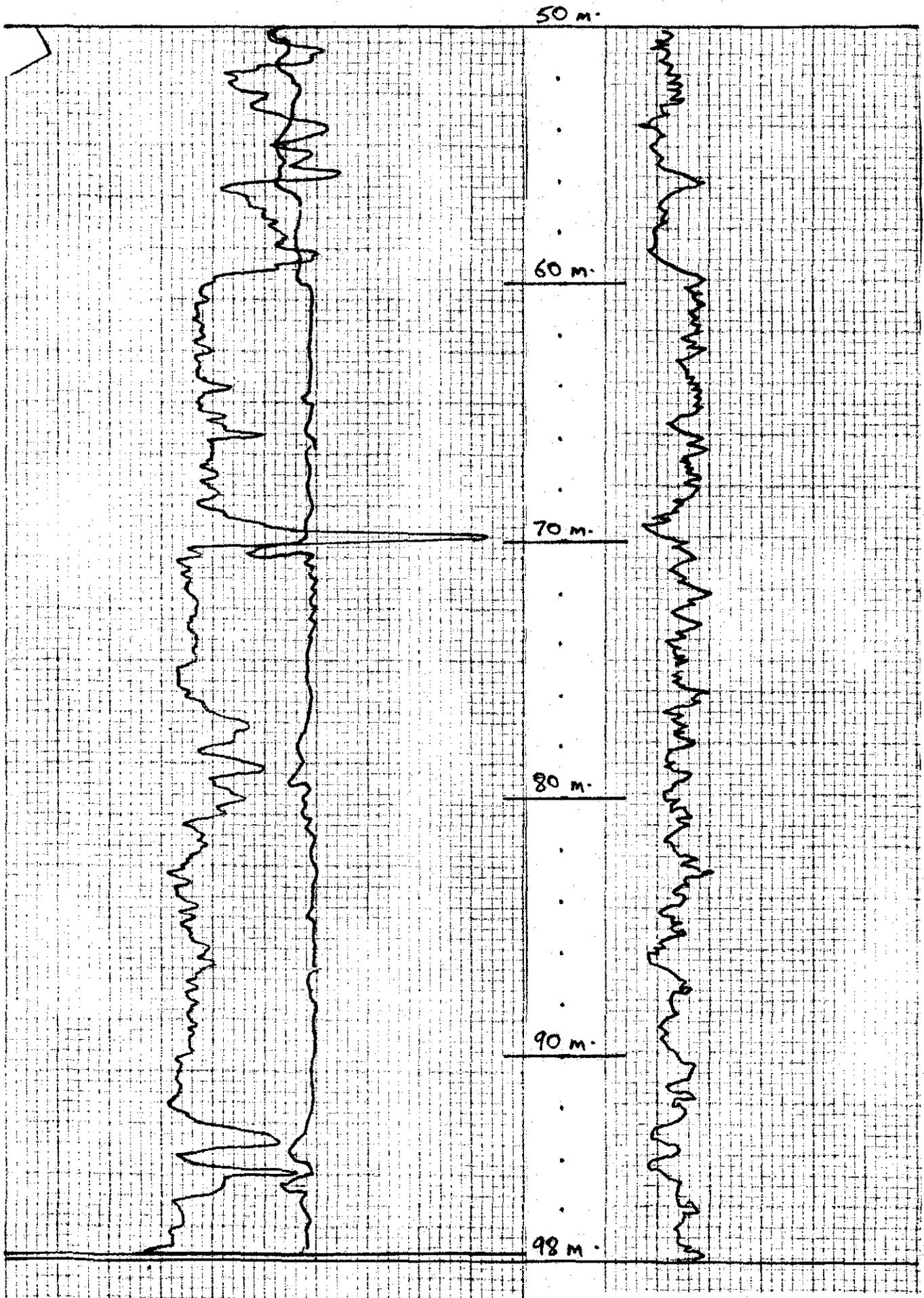
SGS GLO463
Zero Moist
OIL %
Water %
OIL S.G.
Gas loss %
Residue %
Moisture %

86-88 L2504 2 73206 0.937 70 66817.4



Hole continued on next page.

BH-25 (Continued)



APPENDIX 2

LABORATORY ANALYSES - FISCHER ASSAY



SGS Australia Pty. Ltd.

Formerly General Superintendence Company Pty. Ltd.

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Laboratories Division

REPORT No.: GLO463 DATE IN: 5/5/81 DATE OUT: 15/5/81
 CLIENT: A.A.R. LIMITED CLIENT REFERENCE: Purchase Order
 ADDRESS: G.P.O. BOX 880, BRISBANE 4001 14887
 RESULTS TO: Mr R. OSBORNE COPY TO:
 SAMPLE REFERENCE: CHIP SAMPLES

FISCHER RETORT ASSAY OF OIL SHALE

(Determined in accordance with US Bureau of Mines Methods)

Results Reported on an air-dried basis

Sample	BH 3 42 - 44	BH 5 28 - 30	BH 6 18 - 20	BH 6 38 - 40	BH 7 18 - 20
Oil yield, litres of oil/tonne of shale	nil	nil	nil	nil	nil
Water content, litres of water/tonne of shale	131	118	114	62	86
Oil Yield %	nil	nil	nil	nil	nil
Retort Water %	13.1	11.8	11.4	6.2	8.6
Spent Shale %	82.9	81.0	81.9	88.2	86.6
Gas - plus - loss %	4.0	7.2	6.7	5.6	4.8
Specific gravity of oil at 15.6 / 15.6 °C	-	-	-	-	-
Moisture % (air dried basis)	10.1	8.8	8.6	4.4	5.9
As Received Mass (kg)	0.25	0.24	0.13	0.20	0.20

COMMENTS:

BH 3 42 - 44 Shale is grey in colour, product is water only
 BH 5 28 - 30 Shale is grey in colour, product is water only
 BH 6 18 - 20 Shale is grey in colour, product is water only
 BH 6 38 - 40 Shale is beige in colour, product is water only
 BH 7 18 - 20 Shale is grey in colour, product is water only

Handwritten signature or initials



SGS Australia Pty. Ltd.

Formerly General Superintendence Company Pty. Ltd.

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Laboratories Division

REPORT No.: GL0463

DATE IN: 5/5/81

DATE OUT: 15/5/81

CLIENT: A.A.R. LIMITED

CLIENT REFERENCE: Purchase Order

ADDRESS: G.P.O. BOX 880, BRISBANE 4001

14887

RESULTS TO: Mr R. OSBORNE

COPY TO:

SAMPLE REFERENCE: CHIP SAMPLES

FISCHER RETORT ASSAY OF OIL SHALE

(Determined in accordance with US Bureau of Mines Methods)

Results Reported on an air-dried basis

Sample	BH 8 6 - 8	BH 10 20 - 22	BH 10 50 - 52	BH 10 52 - 54	BH 10 54 - 56
Oil yield, litres of oil/tonne of shale	nil	nil	nil	42	11
Water content, litres of water/tonne of shale	110	103	89	143	123
Oil Yield %	nil	nil	nil	4.0	1.1
Retort Water %	11.0	10.3	8.9	14.3	12.3
Spent Shale %	88.8	82.1	83.1	75.2	81.1
Gas - plus - loss %	0.2	7.6	8.0	6.5	4.5
Specific gravity of oil at 15.6 / 15.6 °C	-	-	-	0.960	I.S.
Moisture % (air dried basis)	8.2	7.8	6.5	11.5	10.6
As Received Mass (kg)	0.15	0.22	0.24	0.19	0.25

COMMENTS:

- BH 8 6 - 8 Shale is beige in colour, product is water only
- BH 10 20 - 22 Shale is grey in colour, product is water only
- BH 10 50 - 52 Shale is grey in colour, product is water only
- BH 10 52 - 54 Shale is dark grey in colour, with specks, product is a dark brown waxy solid
- BH 10 54 - 56 Shale is grey in colour with specks, product is a dark brown liquid

I.S. Insufficient Sample

ln DI



SGS Australia Pty. Ltd.

Formerly General Superintendence Company Pty. Ltd. Page 4 of 18

Laboratories Division

REPORT No.: GL0463 DATE IN: 5/5/81 DATE OUT: 15/5/81
 CLIENT: A.A.R. LIMITED CLIENT REFERENCE: Purchase Order
 ADDRESS: G.P.O. BOX 880, BRISBANE 4001 14887
 RESULTS TO: Mr R. OSBORNE COPY TO:
 SAMPLE REFERENCE: CHIP SAMPLES

FISCHER RETORT ASSAY OF OIL SHALE

(Determined in accordance with US Bureau of Mines Methods)

Results reported on an air-dried basis

Sample	BH 11 36 - 38	BH 11 38 - 40	BH 11 60 - 62	BH 12 10 - 12	BH 12 14 - 16
Oil yield, litres of oil/tonne of shale	nil	nil	nil	nil	nil
Water content, litres of water/tonne of shale	61	51	52	102	85
Oil Yield %	nil	nil	nil	nil	nil
Retort Water %	6.1	5.1	5.2	10.2	8.5
Spent Shale %	92.5	93.8	91.3	86.8	85.3
Gas - plus - loss %	1.4	1.1	3.5	3.0	6.2
Specific gravity of oil at 15.6 / 15.6 °C	-	-	-	-	-
Moisture % (air dried basis)	4.2	3.6	4.8	6.7	6.0
As Received Mass (kg)	0.21	0.26	0.26	0.21	0.22

COMMENTS:

BH 11 36 - 38 Shale is beige in colour, product is water only
 BH 11 38 - 40 Shale is light grey in colour, product is water only
 BH 11 60 - 62 Shale is grey in colour, product is water only
 BH 12 10 - 12 Shale is grey in colour, product is water only
 BH 12 14 - 16 Shale is grey in colour, product is water only



SGS Australia Pty. Ltd.

Formerly General Superintendence Company Pty. Ltd.

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Laboratories Division

REPORT No.: GL0463

DATE IN: 5/5/81

DATE OUT: 15/5/81

CLIENT: A.A.R. LIMITED

CLIENT REFERENCE: Purchase Order

ADDRESS: G.P.O. BOX 880, BRISBANE 4001

14887

RESULTS TO: Mr R. OSBORNE

COPY TO:

SAMPLE REFERENCE: CHIP SAMPLES

FISCHER RETORT ASSAY OF OIL SHALE

(Determined in accordance with US Bureau of Mines Methods)

Results Reported on an air-dried basis

Sample	BH 15 60 - 62	BH 15 62 - 64	BH 15 64 - 66	BH 15 50.68 - 51.3	BH 15 52.1 - 52.75
Oil yield, litres of oil/tonne of shale	< 1	26	19	15	43
Water content, litres of water/tonne of shale	63	59	59	93	157
Oil Yield %	< 0.1	2.5	1.8	1.5	4.2
Retort Water %	6.3	5.9	5.9	9.3	15.7
Spent Shale %	87.9	87.1	88.9	87.7	73.6
Gas - plus - loss %	5.8	4.5	3.4	1.5	6.5
Specific gravity of oil at 15.6 / 15.6 °C	-	0.960	0.958	0.949	0.964
Moisture % (air dried basis)	3.6	4.6	4.7	6.7	11.2
As Received Mass (kg)	0.14	0.12	0.16	0.21	0.16

COMMENTS:

- BH 15 60 - 62 Shale is grey in colour, product is mainly water with a slight trace of oil
- BH 15 62 - 64 Shale is grey in colour, product is a dark brown liquid
- BH 15 64 - 66 Shale is grey in colour, product is a dark brown liquid
- BH 15 50.68-51.3 Shale is grey in colour, product is a dark brown liquid
- BH 15 52.1-52.75 Shale is grey in colour, product is a dark brown liquid



SGS Australia Pty. Ltd.

Formerly General Superintendence Company Pty. Ltd.

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Laboratories Division

REPORT No.: GLO463 DATE IN: 5/5/81 DATE OUT: 15/5/81

CLIENT: A.A.R. LIMITED CLIENT REFERENCE: Purchase Order
14887

ADDRESS: G.P.O. BOX 880, BRISBANE 4001

RESULTS TO: Mr R. OSBORNE COPY TO:

SAMPLE REFERENCE: CHIP SAMPLES

FISCHER RETORT ASSAY OF OIL SHALE

(Determined in accordance with US Bureau of Mines Methods)

Results Reported on an air-dried basis

Sample	BH 15 52.75 - 53.1	BH 15 73.35 - 73.50	BH 15 86 - 89	BH 15 95 - 97.26	BH 15 97.26 - 97.44
Oil yield, litres of oil/tonne of shale	nil	45	30	1	40
Water content, litres of water/tonne of shale	53	97	153	133	166
Oil Yield %	nil	4.3	2.9	0.1	3.9
Retort Water %	5.3	9.7	15.3	13.3	16.6
Spent Shale %	94.0	83.3	79.0	85.2	73.0
Gas - plus - loss %	0.7	2.7	2.8	1.4	6.5
Specific gravity of oil at 15.6 / 15.6 °C	-	0.942	0.966	-	0.954
Moisture % (air dried basis)	3.9	9.3	11.9	10.1	11.7
As Received Mass (kg)	0.24	0.20	0.27	0.17	0.08

COMMENTS:

- BH 15 52.75 - 53.1 Shale is light grey in colour, product is water only
- BH 15 73.35 - 73.50 Shale is grey in colour, product is a dark brown liquid
- BH 15 86 - 89 Shale is dark grey in colour, product is a dark brown liquid
- BH 15 95 - 97.26 Shale is light grey with blackw specks, product is mainly
water with a trace of oil
- BH 15 97.26 - 97.44 Shale is dark grey in colour, product is a dark brown liquid



SGS Australia Pty. Ltd.

Formerly General Superintendence Company Pty. Ltd.

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Laboratories Division

REPORT No.: GL0463

DATE IN: 5/5/81

DATE OUT: 15/5/81

CLIENT: A.A.R. LIMITED

CLIENT REFERENCE: Purchase Order
14887

ADDRESS: G.P.O. BOX 880, BRISBANE 4001

RESULTS TO: Mr R. OSBORNE

COPY TO:

SAMPLE REFERENCE: CHIP SAMPLES

FISCHER RETORT ASSAY OF OIL SHALE

(Determined in accordance with US Bureau of Mines Methods)

Results Reported on an air-dried basis

Sample	BH 16 54 - 56	BH 16 58 - 60	BH 17 24 - 26	BH 17 38 - 40	BH 18 21 - 21.20
Oil yield, litres of oil/tonne of shale	19	17	nil	< 1	40
Water content, litres of water/tonne of shale	73	90	121	127	273
Oil Yield %	1.8	1.6	nil	< 0.1	3.8
Retort Water %	7.3	9.0	12.1	12.7	27.3
Spent Shale %	87.0	86.1	80.0	83.7	62.9
Gas - plus - loss %	3.9	3.3	7.9	3.6	6.0
Specific gravity of oil at 15.6 / 15.6 °C	0.956	0.958	-	-	0.949
Moisture % (air dried basis)	5.2	7.5	9.6	9.3	22.9
As Received Mass (kg)	0.13	0.19	0.19	0.18	0.17

COMMENTS:

- BH 16 54 - 56 Shale is grey in colour, product is a dark brown liquid
- BH 16 56 - 60 Shale is grey in colour, product is a dark brown liquid
- BH 17 24 - 26 Shale is grey-brown in colour, product is water only
- BH 17 38 - 40 Shale is grey in colour, product is water with a slight trace
of oil
- BH 18 21 - 21.20 Shale is dark grey - black in colour, product is a dark brown
liquid



SGS Australia Pty. Ltd.

Formerly General Superintendence Company Pty. Ltd.

Laboratories Division

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REPORT No.: GL0463 DATE IN: 5/5/81 DATE OUT: 15/5/81
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FISCHER RETORT ASSAY OF OIL SHALE

(Determined in accordance with US Bureau of Mines Methods)

Results Reported on an air-dried basis

Sample	BH 18 32 - 33	BH 18 33 - 36	BH 19 30 - 32	BH 19 32 - 34	BH 19 34 - 36
Oil yield, litres of oil/tonne of shale	20	39	54	42	32
Water content, litres of water/tonne of shale	148	185	213	219	184
Oil Yield %	1.9	3.6	5.0	4.0	3.1
Retort Water %	14.8	18.5	21.3	21.9	18.4
Spent Shale %	79.5	73.0	67.4	68.4	74.9
Gas - plus - loss %	4.1	4.9	6.3	5.7	3.6
Specific gravity of oil at 15.6 / 15.6 °C	0.926	0.930	0.925	0.945	0.967
Moisture % (air dried basis)	10.6	14.7	15.5	18.7	15.1
As Received Mass (kg)	0.20	0.19	0.18	0.22	0.24

COMMENTS:

BH 18 32 - 33 Shale is grey in colour, product is a dark brown liquid
 BH 18 33 - 36 Shale is grey in colour, product is a dark brown liquid
 BH 19 30 - 32 Shale is dark grey in colour, product is a dark brown liquid
 BH 19 32 - 34 Shale is dark grey in colour, product is a dark brown liquid
 BH 19 34 - 36 Shale is grey in colour, product is a dark brown liquid

Bankman



SGS Australia Pty. Ltd.

Formerly General Superintendence Company Pty. Ltd.

Laboratories Division

952121

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REPORT No.: GLO463 DATE IN: 5/5/81 DATE OUT: 15/5/81
CLIENT: A.A.R. LIMITED CLIENT REFERENCE: Purchase Order
ADDRESS: G.P.O. BOX 880, BRISBANE 4001 14887
RESULTS TO: Mr R. OSBORNE COPY TO:
SAMPLE REFERENCE: CHIP SAMPLES

FISCHER RETORT ASSAY OF OIL SHALE

(Determined in accordance with US Bureau of Mines Methods)

Results reported on an air-dried basis

Sample	BH 21 32 - 34	BH 21 44 - 46	BH 21 50 - 52	BH 21 52 - 54	BH 21 56 - 58
Oil yield, litres of oil/tonne of shale	47	13	23	8	20
Water content, litres of water/tonne of shale	185	115	135	121	103
Oil Yield %	4.4	1.2	2.3	0.8	1.9
Retort Water %	18.5	11.5	13.5	12.1	10.3
Spent Shale %	70.7	81.4	82.1	83.3	84.0
Gas - plus - loss %	6.4	5.9	2.1	3.8	3.8
Specific gravity of oil at 15.6 / 15.6 °C	0.940	0.950	0.975	I.S.	I.S.
Moisture % (air dried basis)	12.1	9.2	11.0	9.0	9.0
As Received Mass (kg)	0.12	0.16	0.19	0.20	0.20

COMMENTS:

BH 21 32 - 34 Shale is dark grey in colour, product is a dark brown liquid
BH 21 44 - 46 Shale is grey in colour, product is a dark brown liquid
BH 21 50 - 52 Shale is grey in colour, product is a dark brown liquid
BH 21 52 - 54 Shale is grey in colour, product is a dark brown liquid
BH 21 56 - 58 Shale is grey in colour, product is a dark brown liquid

I.S. Insufficient product for R.D. determination



SGS Australia Pty. Ltd.

Formerly General Superintendence Company Pty. Ltd.

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Laboratories Division

REPORT No.: GL0463 DATE IN: 5/5/81 DATE OUT: 15/5/81
 CLIENT: A.A.R. LIMITED CLIENT REFERENCE: Purchase Order
 ADDRESS: G.P.O. BOX 880, BRISBANE 4001 14887
 RESULTS TO: Mr R. OSBORNE COPY TO:
 SAMPLE REFERENCE: CHIP SAMPLES

FISCHER RETORT ASSAY OF OIL SHALE

(Determined in accordance with US Bureau of Mines Methods)

Results Reported on an air-dried basis

Sample	BH 21 70 - 72	BH 21 72 - 74	BH 23 14 - 16	BH 23 16 - 18	BH 23 18 - 20
Oil yield, litres of oil/tonne of shale	16	33	34	27	27
Water content, litres of water/tonne of shale	150	143	114	142	121
Oil Yield %	1.5	3.1	3.4	2.7	2.7
Retort Water %	15.0	14.3	11.4	14.2	12.1
Spent Shale %	79.3	79.6	81.7	78.7	81.9
Gas - plus - loss %	4.2	3.0	3.5	4.4	3.3
Specific gravity of oil at 15.6 / 15.6 °C	I.S.	0.950	0.996	0.987	0.979
Moisture % (air dried basis)	11.6	11.3	7.8	11.6	9.7
As Received Mass (kg)	0.32	0.29	0.15	0.18	0.13

COMMENTS:

BH 21 70 - 72 Shale is grey in colour, product is a dark brown liquid
 BH 21 72 - 74 Shale is grey in colour, product is a dark brown liquid
 BH 23 14 - 16 Shale is grey in colour, product is a dark brown liquid
 BH 23 16 - 18 Shale is dary grey in colour, product is a dark brown liquid
 BH 23 18 - 20 Shale is grey in colour, product is a dark brown liquid

I.S. Insufficient Product for R.D. Determination



SGS Australia Pty. Ltd.

Formerly General Superintendence Company Pty. Ltd.

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Laboratories Division

REPORT No.: GL0463

DATE IN: 5/5/81

DATE OUT: 15/5/81

CLIENT: A.A.R. LIMITED

CLIENT REFERENCE: Purchase Order

ADDRESS: G.P.O. BOX 880, BRISBANE 4001

14887

RESULTS TO: Mr R. OSBORNE

COPY TO:

SAMPLE REFERENCE:

CHIP SAMPLES

FISCHER RETORT ASSAY OF OIL SHALE

(Determined in accordance with US Bureau of Mines Methods)

Results Reported on an air-dried basis

12401

12403

Sample	BH 23 22 - 24	BH 23 26 - 28	BH 23 60 - 62	BH 24 36 - 38	BH 24 40 - 42
Oil yield, litres of oil/tonne of shale	62	nil	< 1	45	53
Water content, litres of water/tonne of shale	236	96	144	288	210
Oil Yield %	6.0	nil	< 0.1	4.2	5.2
Retort Water %	23.6	9.6	14.4	28.8	21.1
Spent Shale %	64.0	85.5	80.0	63.8	69.2
Gas - plus - loss %	6.4	4.9	5.6	3.2	4.5
Specific gravity of oil at 15.6 / 15.6 °C	0.960	-	-	0.950	0.960
Moisture % (air dried basis)	20.5	8.3	9.4	24.8	17.0
As Received Mass (kg)	0.10	0.26	0.24	0.21	0.12

COMMENTS:

- BH 23 22 - 24 Shale is dark grey in colour, product is a dark brown waxy solid
- BH 23 26 - 28 Shale is light grey in colour, product is water only
- BH 23 60 - 62 Shale is grey in colour, product is water with a slight trace of oil
- BH 24 36 - 38 Shale is dark grey in colour, product is a dark brown liquid
- BH 24 40 - 42 Shale is dark grey in colour, product is a dark brown waxy solid

Handwritten signature or initials



SGS Australia Pty. Ltd.

Formerly General Superintendence Company Pty. Ltd.

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Laboratories Division

REPORT No.: GL0463

DATE IN: 5/5/81

DATE OUT: 15/5/81

CLIENT: A.A.R. LIMITED

CLIENT REFERENCE: Purchase Order
14887

ADDRESS: G.P.O. BOX 880, BRISBANE 4001

RESULTS TO: Mr R. OSBORNE

COPY TO:

SAMPLE REFERENCE: CHIP SAMPLES

FISCHER RETORT ASSAY OF OIL SHALE

(Determined in accordance with US Bureau of Mines Methods)

Results Reported on an air-dried basis

Sample	BH 25 32 - 34	BH 25 86 - 88			
Oil yield, litres of oil/tonne of shale	37	60			
Water content, litres of water/tonne of shale	179	206			
Oil Yield %	3.5	5.6			
Retort Water %	17.9	20.6			
Spent Shale %	73.0	66.8			
Gas - plus - loss %	5.6	7.0			
Specific gravity of oil at 15.6 / 15.6 °C	0.942	0.937			
Moisture % (air dried basis)	14.2	17.8			
As Received Mass (kg)	0.25	0.21			

COMMENTS:

BH 25 32 - 34 Shale is grey in colour, product is a dark brown liquid

BH 25 86 - 88 Shale is dark grey in colour, product is a dark brown liquid

Handwritten signature

APPENDIX 3

PROXIMATE ANALYSES LIGNITE SAMPLES

PROXIMATE ANALYSIS LIGNITE SAMPLES

952127

BH No.	Sample Interval (m)	Interent % Moisture	Volatile % Matter	Ash %	Fixed % Carbon
2	69 - 71	15.4	24.1	46.2	14.3
15	97.26-97.44	18.0	21.3	48.2	12.5
18	24 - 27	32.4	19.6	34.6	13.4
21	10 - 12	19.8	23.2	44.7	12.3
	12 - 14	20.3	23.9	44.2	11.6
	14 - 16	22.4	24.1	39.9	13.6
	16 - 18	22.2	25.6	37.3	14.9
	18 - 20	9.4	16.6	68.0	6.0
	30 - 32	21.4	21.2	46.6	10.8
	32 - 34	18.2	21.6	48.9	11.3
	34 - 36	16.2	22.0	50.6	11.2
	36 - 38	14.9	17.3	60.2	7.6
23	38 - 40	14.1	25.0	42.7	18.2
	18 - 20	17.6	15.8	61.4	5.2
	20 - 22	24.4	28.2	27.0	20.4
	22 - 24	36.1	23.6	26.0	14.3
24	24 - 26	20.5	23.3	46.6	9.6
	38 - 40	20.8	19.8	51.7	7.7
	40 - 42	31.2	20.0	40.0	8.8
	42 - 44	31.1	22.9	32.2	13.8
	44 - 46	26.4	20.4	43.8	9.4
	46 - 48	34.7	19.3	36.5	9.5
	48 - 50	18.0	19.2	54.7	8.1

(Results on air dried basis on fraction)

APPENDIX 4

BORE WATER ANALYSES

11 MAY 1981

M 1588



DEPARTMENT OF MINES—TASMANIA

LAUNCESTON OFFICES
287 WELLINGTON STREET
SOUTH LAUNCESTON 7250

TELEPHONES:

Metallurgical Research	} 44 2431-2 (2 lines)
Laboratory	
Mines Inspection	
Explosives & Inflammable Liquids	

7th May 1981

**Memo to: Director of Mines
From: Chief Chemist & Metallurgist.**

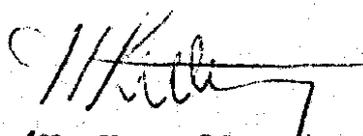
Attent. Mr. Cowie

c.c. to A.A.R.
Mines Administration
G.P.O. Box 880,
Brisbane,
Queensland

Water Analyses Reg. No 811627-33

Please find attached results of samples submitted to this laboratory on the 30th Mar'81 and stated to be from the Longford area.

<u>Hole</u>	<u>S.W.L. (m)</u>	<u>Bottle No.</u>	<u>Co-ordinates</u> <u>Meander 8214</u> <u>South Esk 8314</u>	<u>Reg. Nos.</u>
1	2.4	54	101927	811627
2	7	403	100916	811628
3	1.8	208	101904	811629
4	Flowing	210	098893	811630
5	Flowing	209	079919	811631
6	Flowing	68	082941	811632
7	Hole fell in.	No water	098961	
8	2.7	213	084969	811833
9	Flowing	205	077962	811976
10	2.3	162	068956	811975
11	4.6	591	041926	811977
12	1.4	88	066978	811974
13	2.4	40	053969	811969
14	2.7	23	017970	811968
15	4.9	41	954992	811970
16	15.6	593	974003	811978
17	2.4	46	040945	811971
18	1.5	86	963023	811973


 (H. K. Wellington)
Chief Chemist & Metallurgist.

Department of Mines Water Analyses Reg. Nos 811968-71, 811073-8 A.A.R.- Longford.

<u>Reg. Nos</u>	<u>811968</u>	<u>811969</u>	<u>811970</u>	<u>811971</u>	<u>811973</u>
<u>Items</u>					
pH	3.5	3.7	3.6	5.0	5.8
Cond. uS/cm	2150	2250	1030	2300	1350
CO ₃ mg/l	Nil	Nil	Nil	Nil	Nil
HCO ₃ "	Nil	Nil	Nil	9.6	19
Cl "	800	780	350	820	490
SO ₄ "	19	15	15	44	12
SiO ₂ "	15	42	82	29	12
Ca "	15	6.6	4.2	22	24
Mg "	52	82	19	65	39
Fe "	11	0.2	0.2	<0.1	<0.1
Al "	0.9	2.5	0.4	0.5	<0.2
K "	2.6	2.0	0.9	5.8	5.7
Na "	380	320	180	360	220
TDS "	1410	1380	710	1320	870
Hardness Perm.	275	370	91	315	205
Hardness Temp.	Nil	Nil	Nil	7.9	16
Alk. as CaCO ₃	Nil	Nil	Nil	7.9	16

Date: 16th Apr'81

Geologist: A.A.R.

Locality: Longford.

Btl. 23

Btl. 40

Btl. 41

Btl. 46

Btl. 86

cont.... P2....

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Department of Mines Water Analyses Reg. Nos 811627-33 - A.A.R.) Longford

<u>Reg. No.</u>	<u>811627</u>	<u>811628</u>	<u>811629</u>	<u>811630</u>	<u>811631</u>	<u>811632</u>	<u>811833*</u>
<u>Item</u>							
pH	5.7	6.4	5.9	6.7	5.3	7.3	6.9
Cond. uS/cm	450	490	50	850	1170	1480	480
CO ₃ mg/l	Nil						
HCO ₃ "	51	120	14	215	16	305	165
Cl "	110	120	3	190	425	510	58
SO ₄ "	32	17	< 5	59	< 5	< 5	27
SiO ₂ "	23	7.4	< 5	13	13	10	21
Ca "	4.4	5.9	3.0	16	15	37	8.3
Mg "	7.2	5.7	1.2	14	21	61	3.5
Fe "	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2
Al "	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.7
K "	3.2	5.7	0.7	6.0	1.0	15	2.8
Na "	100	115	5.9	205	250	265	130
TDS "	370	350	50	620	800	1080	500
Hardness Perm.	Nil	Nil	1	Nil	110	94	Nil
Hardness Temp	41	38	11	98	13	250	39
Alk. as CaCO ₃	42	97	11	180	13	250	135

Date: 30.3.81

Geologist: A.A.R.

Locality: Btl. 54 Btl. 403 Btl. 208 Btl. 210 Btl. 209 Btl. 68 Btl. 213

Analyses by... *RG*... See attached location sheet.
 Rest of analyses to follow.

[Signature]
 (H. K. Wellington)
Chief Chemist & Metallurgist.

* Severe paraffin contamination.

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<u>Reg. Nos</u>	<u>811974</u>	<u>811975</u>	<u>811976</u>	<u>811977</u>	<u>811978</u>
<u>Items</u>					
pH	5.3	4.4	6.3	5.7	6.2
Cond. uS/cm	720	3700	890	960	440
CO ₃ mg/l	Nil	Nil	Nil	Nil	Nil
HCO ₃ "	18	Nil	140	49	140
Cl "	210	1320	245	305	55
SO ₄ "	27	70	25	10	37
SiO ₂ "	12	42	32	34	11
Ca "	13	16	20	14	4.8
Mg "	14	87	28	12	2.8
Fe "	<0.1	4.1	<0.1	<0.1	0.2
Al "	<0.2	1.1	<0.2	0.6	1.4
K "	2.0	2.2	6.7	0.9	3.2
Na "	115	675	135	175	95
TDS "	470	2210	560	620	370
Hardness Perm.	67	410	50	48	Nil
Hardness Temp.	23	Nil	115	40	32
Alk. as CaCO ₃	23	Nil	115	40	115

Date: 16.4.81

Geologist: A.A.R.

Locality: Longford.

Btl. 88

Btl 162

Btl. 205

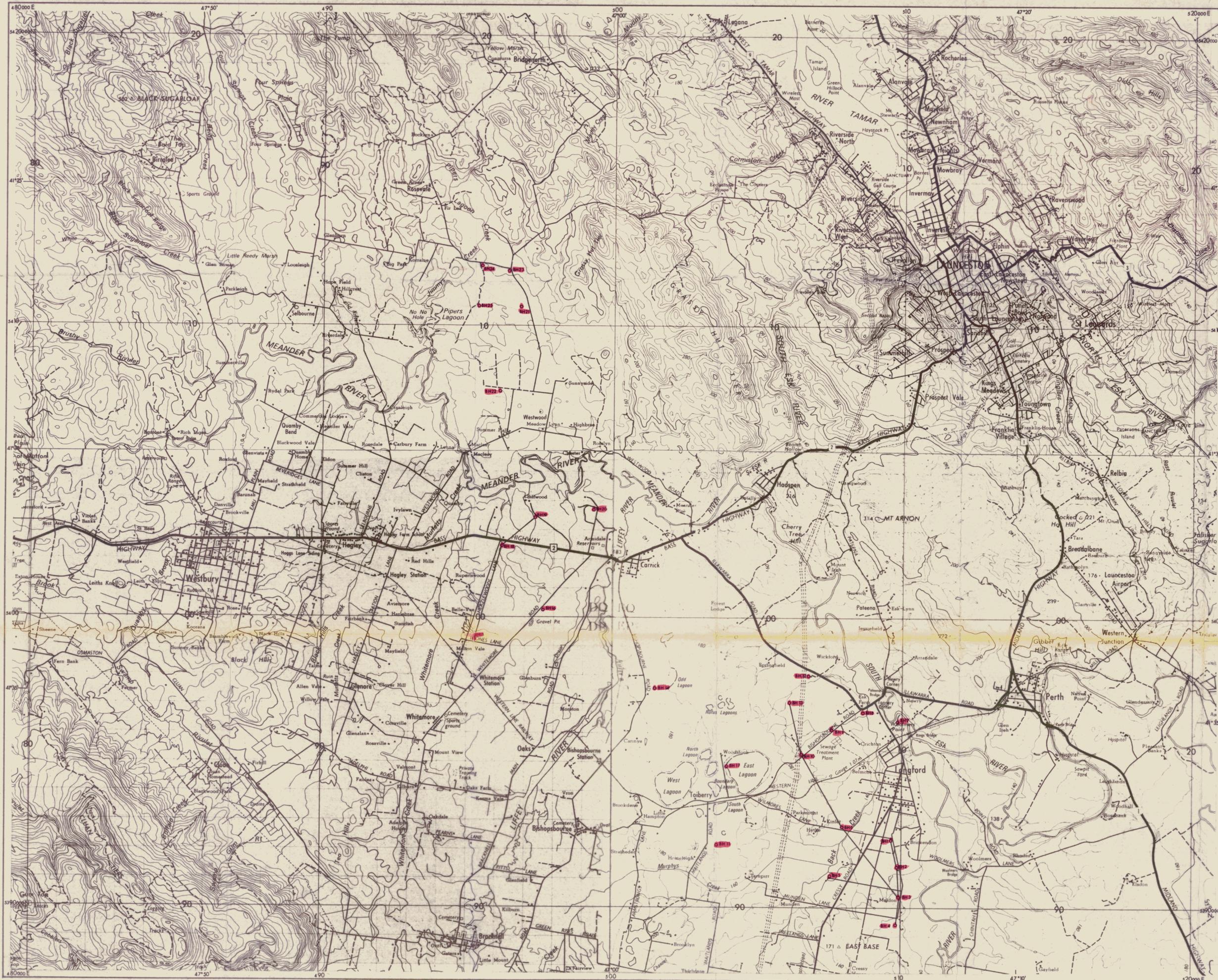
Btl. 591

Btl. 593

Analyses by...*RG*.....

H. K. Wellington for
 (H. K. Wellington)
Chief Chemist & Metallurgist.

952132

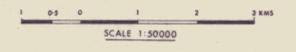


● BH 18 Boreholes drilled April - May 1981

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AAR LIMITED
E.L. 20/80 LAUNCESTON TAS.

BOREHOLE LOCATIONS



AUTHOR
DATE JULY 1981

PLATE No. 1