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EL 209

PARALANA HILL

PROGRESS AND TECHNICAL REPORTS TO LICENCE EXPIRY/RENEWAL FOR THE PERIOD 23/9/1975 TO 22/9/1977

Submitted by
BP Minerals Australia Pty Ltd
1977

© 28/3/1983

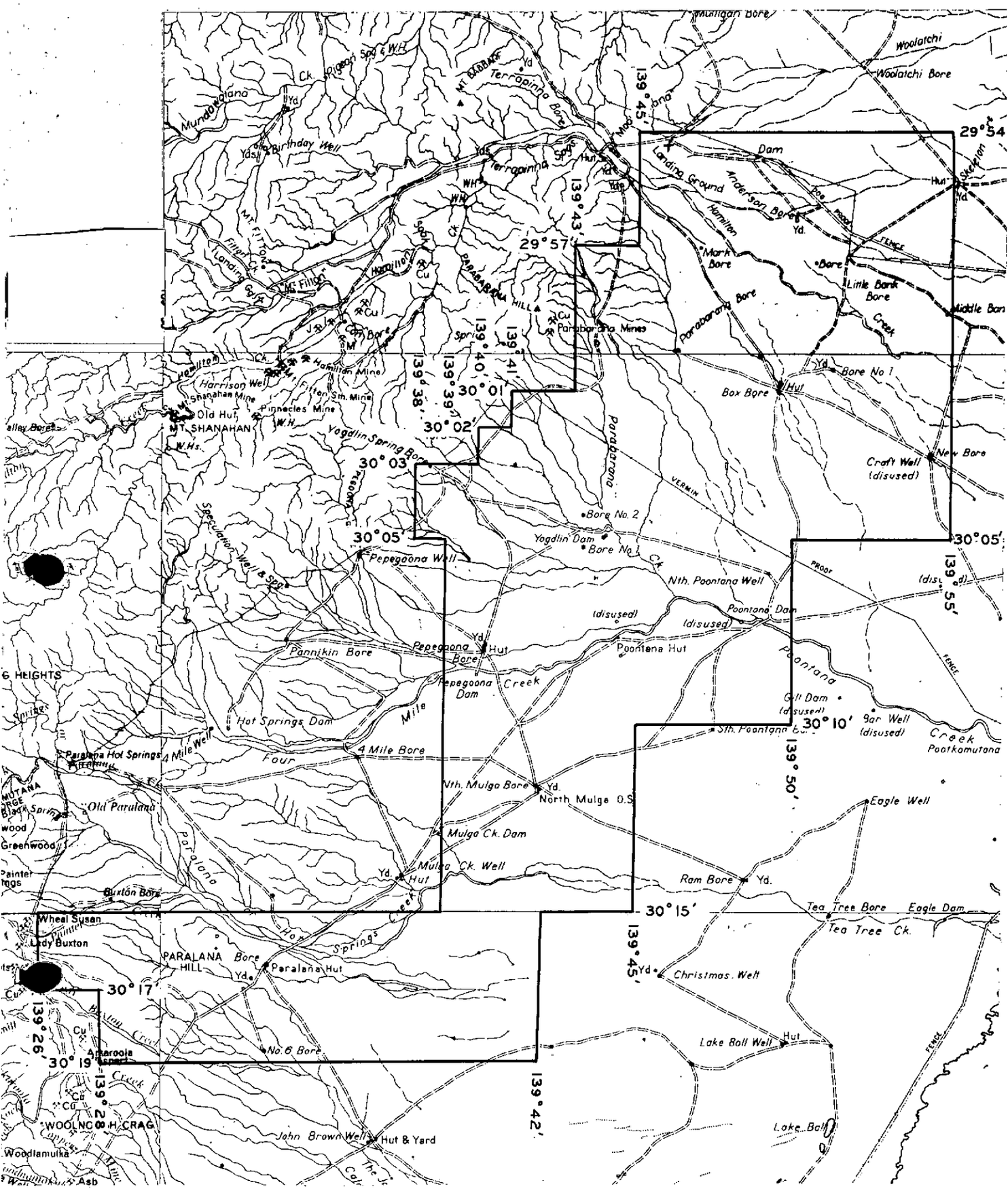
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101 Grenfell Street, Adelaide 5000

Telephone: (08) 8463 3000
Facsimile: (08) 8204 1880

Government of South Australia
Primary Industries and Resources SA

SCHEDULE 'A'


Mundowalana Ck
Pigeon Spg & WH
Yd
Birthday Well
Yds
Mt Fitton
Landing Gully
Mt Fitton
Hamilton
Spg
Ck
Cu
Cu
Cu

CONTENTS ENVELOPE 2608

TENEMENT: Not Related.

TENEMENT HOLDER: Oilmin N.l., Transoil N.L., Petromin N.L., Mines Admin. Pty. Ltd., Teton Expl. Drilling Co., B.P. Minerals Aust. Pty. Ltd.

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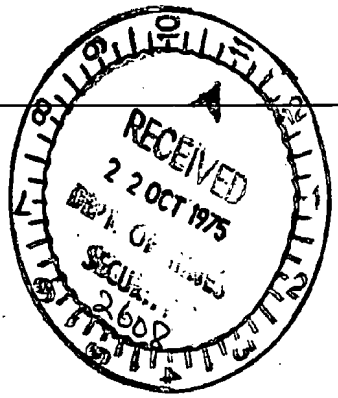
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BP Minerals Australia Proprietary Limited
Incorporated in Victoria

603

1 Albert Road, Melbourne
Postal Address: G.P.O. Box 5222BB, Melbourne, 3001
Telephone: 26-6911 Telex: 30166 Telegraphic Address: "Austbeepee", Melbourne



The Director of Mines,
Department of Mines,
P.O. Box 38,
Rundle Street,
ADELAIDE S.A. 5000

Our Reference	Your Reference	Telephone Ext'n	Date
AG/27/16/14/1 JHH:KMS		642	October 14, 1975.

Dear Sir,

EXPLORATION LICENCE 209 - QUARTERLY REPORT FOR THE PERIOD ENDED SEPTEMBER 1975

GENERAL

Exploration Licence 209, which was previously held as EL 77 has been re-granted by the Honourable the Minister of Mines & Energy for a period of one year from September 23, 1975.

RESISTIVITY SURVEY

A resistivity survey was carried out in the southern section of the Exploration Licence by Murdoch Geology and Geophysics Pty Ltd. Their report has been forwarded to the Department and receipt acknowledged.

DRILLING

A report on the open-hole rotary drilling carried out in April to May 1975 was completed. A copy of the report, by M.S. Bell, is attached.

A total of nineteen holes were drilled, not twenty as erroneously stated in the last quarterly report. Encouraging radioactivity was encountered in drill hole 77-44 between 160 metres and 275 metres with grades, calculated from the gamma log, of the order of 0.021 to 0.048% equivalent U_3O_8.

A follow-on drilling programme, in this area, commenced on September 25. The holes are planned to extend down into the Eyre Formation and test the deeper Tertiary sections in the southern part of EL 209. The drill hole locations will be surveyed in by stadia.

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Director of Mines
2608

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EXPENDITURE

A Quarterly expenditure statement will be forwarded under separate cover as soon as all expenditure to the end of September is available.

REPORTS

Reports completed in period under review are:

Murdoch Geology and Geophysics Pty Ltd. (July 1975) : A resistivity survey on EL 77, Lake Frome, South Australia for BP Minerals Australia Pty Ltd.

BP Minerals Australia Pty Ltd (September (1975) : 1975 Drilling programme No. 1, EL 77, Lake Frome Embayment, South Australia.

Yours faithfully,

Dr J.H. Hills
Senior Geologist (Uranium)

Enc.

CILMIN N.L.

TRANSOIL N.L. 005

PETROMIN N.L.

MINES ADMINISTRATION PTY LTD

TETON EXPLORATION DRILLING COMPANY PTY LTD

BP MINERALS AUSTRALIA PROPRIETARY LIMITED

AG/27/16/14/1

25th. November, 1975.

PRIMARY AGREEMENT

EXPLORATION LICENCES 203, 209 & 210 SOUTH AUSTRALIA

QUARTERLY EXPENDITURE REPORT

In accordance with Clause 8 of the above agreement, BP hereby reports on the expenditure for the quarter ending September, 1975.

The expenditure for quarter July to September.

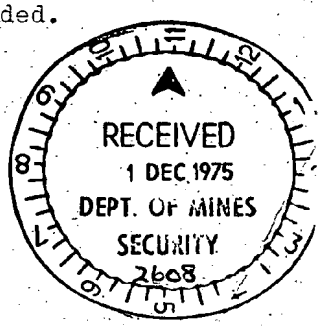
	Total	EL 203	EL 209	EL 210
- Overheads				
Plant and Tools:		-	-	-
- Exploration				
Geological Services		-	1673	-
Geochem. Services		-	-	-
Drilling Services		-	-	-
Drill-hole logging		-	-	-
Resistivity Survey		-	3641	-
Access Roads		-	-	-
Consumable Stores		-	1247	-
Exploration Tenement Fees		-	1366	-
- Operations				
Vehicle Operating		-	844	-
Rental of Equipment		-	1014	-
Aircraft Charter		-	-	-
Freight & Cartage		-	26	-
Travelling Expenses		-	109	-
Personnel Services		-	922	-
- Salary and wages		-	*8838	-
TOTAL		-	19,680	-

Certified Correct

.....

Senior Geologist (Uranium)

* $ 3,576 Late entry relating to salaries and wages of Quarter ended June 1975 is included.



BP Minerals Australia Proprietary Limited
Incorporated in Victoria

606

1 Albert Road, Melbourne
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Telephone: 26-6911 Telex: 30166 Telegraphic Address: "Austbeepee", Melbourne

The Director of Mines
Department of Mines,
P.O. Box 38,
Rundle Street,
ADELAIDE S.A. 5000

Our Reference	Your Reference	Telephone Ext'n	Date
AG/27/16/14/1 MSB/YT			13th January, 1976.

Dear Sir,

EXPLORATION LICENCE 209 - QUARTERLY REPORT FOR THE PERIOD ENDED DECEMBER 1975

Drilling

During this quarter an open-hole rotary drilling programme was completed in the licence area.

There were fourteen holes drilled for an overall total of 4,389,0 metres. The holes varied in depth from 246 metres to 372 metres.

Radioactivity greater than 10 x background was encountered in holes number 77-49 and number 77-53.

Calculated results from the gamma ray analogue indicate 0.057% e U_3O_8 over 0.04 metres in hole number fifty-three.

A complete report on this programme will be sent in as soon as possible.

A summary of the drill results are given in the attached Table I and hole locations are shown on Figure I.

.. 2

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21 JAN 1976
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SECURITY
1608

Future Work Plans

More drilling is planned in the vicinity of holes 77-49 and 77-53.

Expenditure

A Quarterly expenditure statement will be forwarded under separate cover as soon as all expenditure to the end of December is available.

Yours faithfully,

M.S. BELL
Geologist (Uranium)

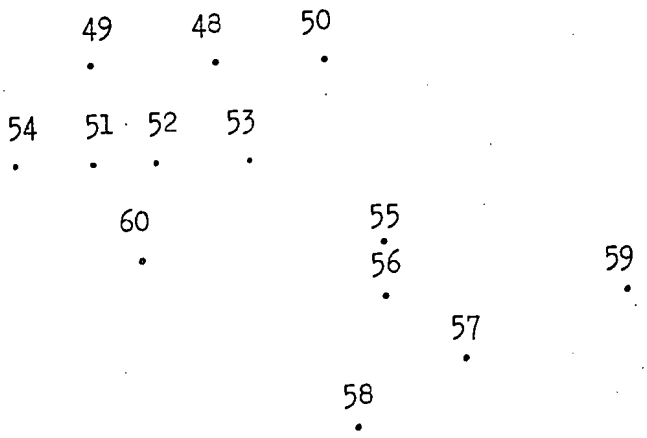
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T A B L E 1

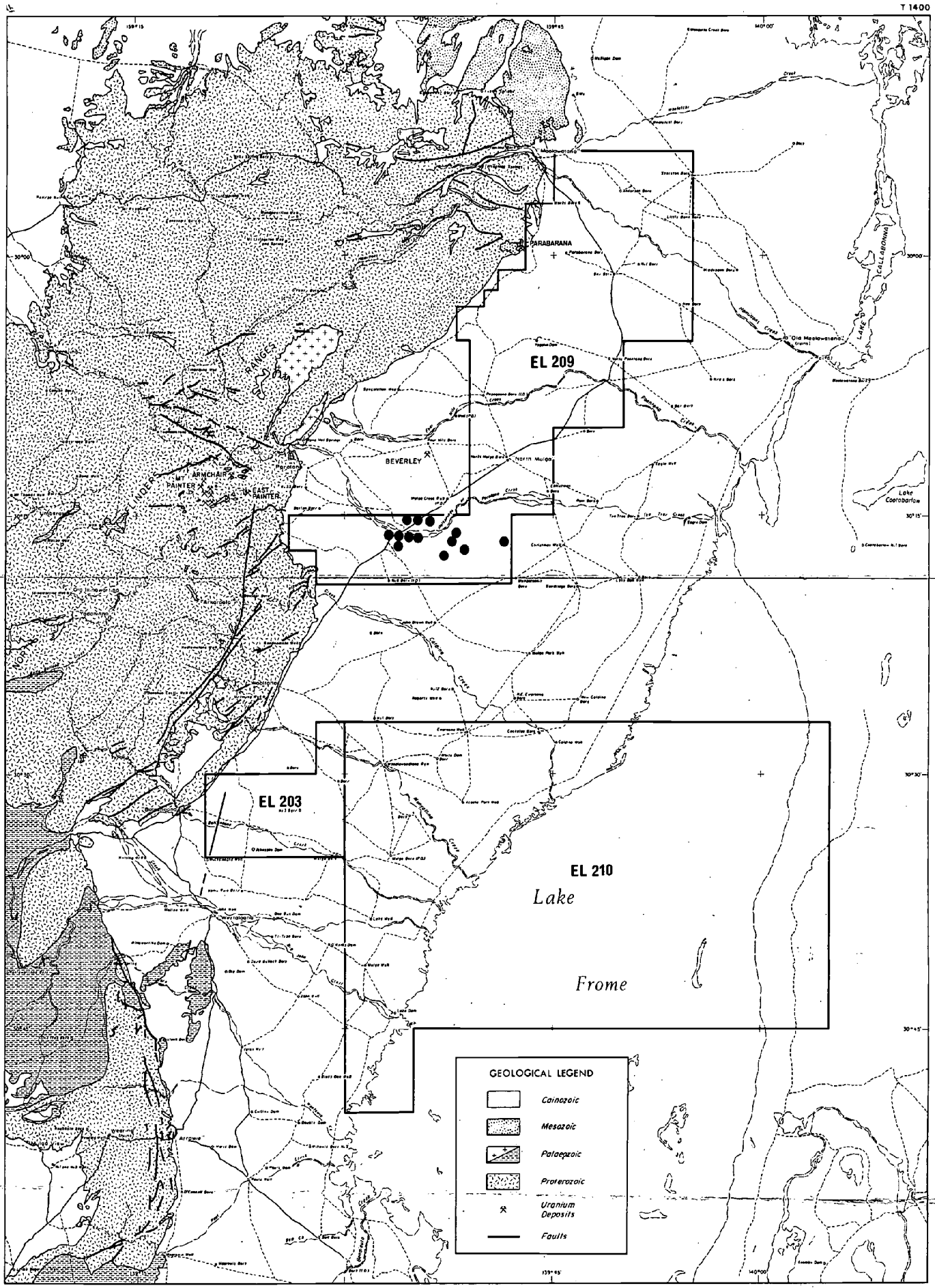
POONTANA DRILLING DATA - PROGRAMME 3, EL 209

Hole No.	DATE STARTED	DATE COMPLETED	DRILLED DEPTH (METRES)	GAMMA ACTIVITY (BACK-GROUND 15-20 cps)
48	25/9/1975	27/9	291.1	106 cps @ 54.5 m. 190 cps @ 62.0 m. 160 cps @ 117.0 m. 125 cps @ 143.5 m.
49	27/9	29/9	251.1	85 cps @ 66.0 m. 81 cps @ 81.3 m. 608 cps @ 143.2 m.
50	29/9	1/10	361.6	175 cps @ 212 m. 120 cps @ 273.5 m.
51	2/10	3/10	332.1	170 cps @ 126.5 m. 85 cps @ 147.0 m.
52	4/10	5/10	269.1	106 cps @ 247.0 m.
53	6/10	6/10	277.6	993 cps @ 212 m.
54	7/10	7/10	241.6	82 cps @ 79.5 m. 130 cps @ 85.0 m. 180 cps @ 168.0 m.
55	7/10	10/10	370.6	-
56	11/10	12/10	349.1	110 cps @ 145.5 m. 160 cps @ 147.0 m. 95 cps @ 149.0 m. 136 cps @ 153.5 m. 103 cps @ 185.5 m.
57	13/10	14/10	350.1	-
58	15/10	16/10	271.1	200 cps @ 151.5 m. 80 cps @ 150.0 m.
59	17/10	18/10	337.6	-
60	19/10	21/10	348.1	-
61	21/11	22/11	262.0	127 cps - 181.7 m.

INDEX TO DRILL HOLES



T 1400



LOCATION DIAGRAM



REFERENCE TO AUSTRALIA STANDARD MAP SERIES

MARREE	CALLABONNA	MELROSE
COOPER	FROME	CORNISH LAKE
PEAKE HILL	CURNAMONA	BROKEN HILL

GEOLOGY OF THE LAKE FROME AREA

AND DRILL HOLE LOCATIONS

SCALE

KILOMETRES 0 5 10 15 20 25 30 KILOMETRES

LEGEND

Road, fair surface all weather, second class

Road, unimproved earth

Lake, river or stream intermittent

Perrifluvian area

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
REF:	
OCT. 1975	J.H. HILLS

FIGURE 1

CILMIN N.L.

TRANSOIL N.L.

PETROMIN N.L.

MINES ADMINISTRATION PTY LTD

TETON EXPLORATION DRILLING COMPANY PTY LTD

BP MINERALS AUSTRALIA PROPRIETARY LIMITED

011

AG/27/16/14/1

17 February, 1976.

PRIMARY AGREEMENT

EXPLORATION LICENCES 68, 77 AND 91 SOUTH AUSTRALIA

QUARTERLY EXPENDITURE REPORT

In accordance with Clause 8 of the above agreement, BP hereby reports on the expenditure for the quarter ending DECEMBER 1976.

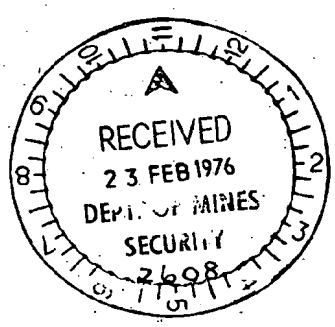
	EL 203	EL 209	EL 210	TOTAL
Plant & Tools	66	67	66	199
Exploration				
Geological Services	171	1,672	1,048	2,891
Drilling Services	4,108	22,121	25,232	51,461
Drill hole logging	1,161	7,979	7,133	16,273
Field Consumable Stores	182	29	1,120	1,331
Exploration Tenement Fees		4		4
Consultant Services	233	233	233	699
Operations				
Vehicle Operating	216	401	1,329	1,946
Rental of Equipment	80		488	568
Freight & Cartage	86	52	526	664
Travelling Expenses	173	202	1,061	1,436
Personnel Services	370	1,395	2,275	4,040
Trade Expenses	7	-	40	47
Salaries and Wages	1,082	2,764	6,644	10,490
Total	7,935	36,919	47,195	92,049

Certified Correct

.....

Minerals Exploration Manager

JHH/YT



BP Minerals Australia Proprietary Limited
Incorporated in Victoria

1 Albert Road, Melbourne
Postal Address: G.P.O. Box 5222BB, Melbourne, 3001
Telephone: 26-6911 Telex: 30166 Telegraphic Address: "Austbeepee", Melbourne

012

The Director of Mines,
Department of Mines,
G.P.O. Box 151
EASTWOOD S.A. 5063

Our Reference	Your Reference	Telephone Extn	Date
U/14/2 MSB/YT		642	2nd. April, 1976.

Dear Sir,

EXPLORATION LICENCE 209 - QUARTERLY REPORT FOR THE PERIOD ENDED MARCH 1976.

Enclosed is a drill report on the drilling carried out in the third and fourth quarter of 1975.

No field work was done during the first quarter of 1976.

A Quarterly Expenditure Statement will be forwarded under separate cover as soon as all the expenditures to the end of March are available.

Yours faithfully,

Dr. J.H. Hills
Minerals Expl. Manager

Encl.



CILMIN N.L.

TRANSOIL N.L.

PETROMIN N.L.

MINES ADMINISTRATION PTY LTD

TETON EXPLORATION DRILLING COMPANY PTY LTD

BP MINERALS AUSTRALIA PROPRIETARY LIMITED

C13

U/14/2

17th. May, 1976.

PRIMARY AGREEMENT

EXPLORATION LICENCES (68, 77 AND 91) SOUTH AUSTRALIA 203, 209 & 210

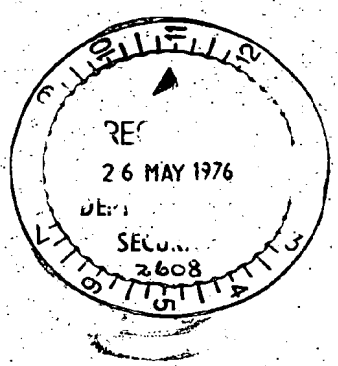
QUARTERLY EXPENDITURE REPORT

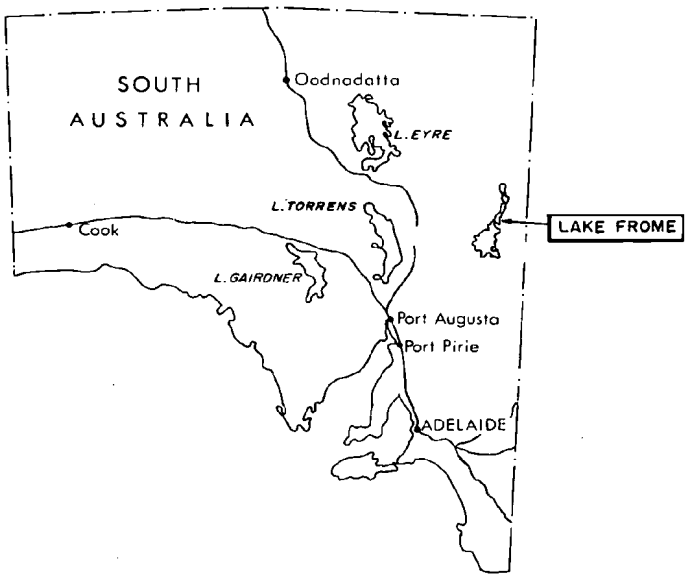
In accordance with Clause 8 of the above agreement, BP hereby reports on the expenditure for the quarter ending..... MARCH 1976 .....

	EL 203	EL 209	EL 210	TOTAL
Exploration				
Geological Services	54		412	466
Field Consumable Stores	17		133	150
Operations				
Vehicle Operating and Maintenance	13		97	110
Rental of Equipment	21		159	180
Travelling Expenses	10		75	85
Salaries and Wages	861	454	3,585	4,900
TOTAL	976	454	4,461	5,891

.....

Minerals Exploration Manager





LOCATION MAP

1975
DRILLING PROGRAMME No. 2

EL 209(77)

LAKE FROME EMBAYMENT

SOUTH AUSTRALIA

RECEIVED
1 4 MAY 1976
DEPT. OF MINES
SECURITY
2608

BP MINERALS AUSTRALIA PROPRIETARY LIMITED

015

1975 DRILLING PROGRAMME No. 2

EL 209 (77)

LAKE FROME EMBAYMENT, SOUTH AUSTRALIA

M.S. BELL
Melbourne - Victoria
March, 1976

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Table IV — Calculated % ^{e} U_3O_8 from Gamma Log

FIGURES

Fig. I — E.L. Location Map (before Page 1)

Fig. IIa — Drill Hole Locations

Fig. IIb — Drill Hole Index and Section Locations

(In back pocket)

Fig. III — Schematic Stratigraphic Column (After page 1)

Fig. IV — Structural Interpretation Showing Possible Faults and Channels (in back pocket)

Fig. V — Section I (Sections in back pocket)

Fig. VI — Section II

Fig. VII — Section III

Fig. VIII — Section IV

SUMMARY

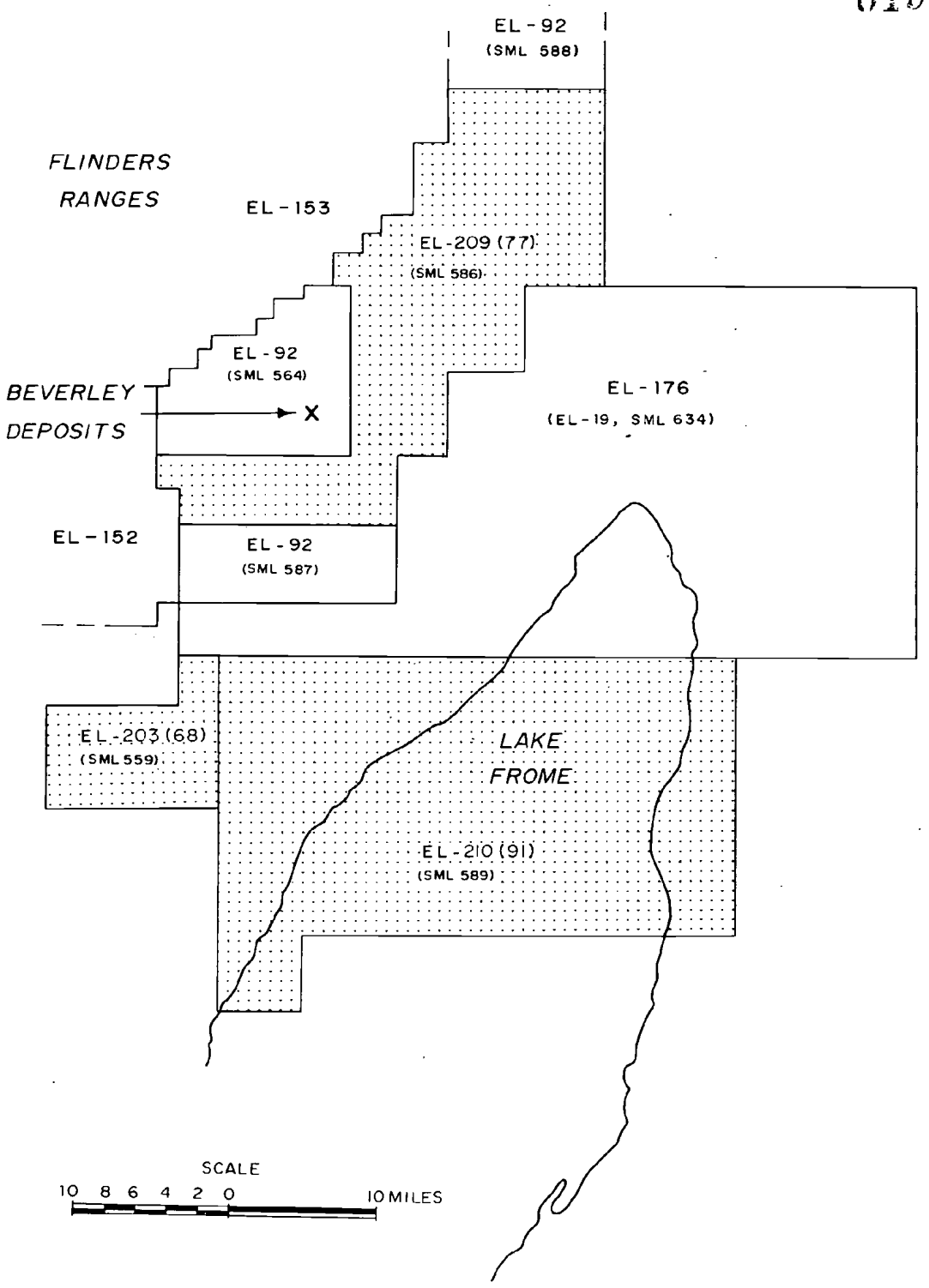
Exploration Licence 209 (77) is located in the Lake Frome Embayment of South Australia, and approximately 400 miles north of Adelaide. The Embayment is an extension of the Great Artesian Basin, and is bounded on the west, south, and east by hills and mountains of Precambrian rocks.

Uranium mineralisation is found in the Proterozoic rocks, and in the Tertiary sediments within the embayment.

This third programme commenced in September and a total of 14 holes were drilled, logged, and sampled. All holes were surveyed, including some holes from programme No. 1, 1975.

Drilling was done in the Paralana Creek area and radioactivity greater than 20X background was encountered in holes 77-49 and 77-53.

Calculated results from the Gamma Ray analogue indicated 0.057% e U_3O_8 over 0.04 metres in hole number fifty three. (Table IV)



EXPLORATION LEASES ON NORTH WEST SIDE OF LAKE FROME EMBAYMENT

25% BP INTEREST

FIGURE 1

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: 2-8-41	
MARCH 1976	M. S. BELL

1. INTRODUCTION

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Exploration Licence 209 (77, S.M.L. 586) was granted to Oilmin-Transoil-Petromin (O.T.P.) on April 30, 1971. On July 14, 1971 final agreement was reached on a farm-in between O.T.P. and Minad-Teton Australia Pty Ltd (M.T.A.). The required work earned M.T.A. a 50% interest in the licence.

On July 4, 1974 a joint-venture between the partners and BP Minerals Australia Pty Ltd was ratified by the Minister of Mines of South Australia.

The Exploration Licence, covering approximately 311 square miles, is located on the alluvial planes of the Flinders Ranges, north west of the north end of Lake Frome. It adjoins EL 92 (S.M.L. 588) to the north; EL 153, EL 152 and another section of EL 92 (S.M.L. 564) to the west; another section of EL 92 (S.M.L. 587) to the south; and EL 176 (EL19, or S.M.L. 634) to the southeast. The ground is open to the northeast towards the south end of Lake Callabonna.

The object of the drill programme was to do reconnaissance drilling in the Paralana Creek area to test the Eyre Formation for radioactivity; and to drill targets indicated on the resistivity survey, which was done by Murdoch Geophysics (Australia) Pty Ltd (Report: 204; July 1975).

2. PREVIOUS EXPLORATION

An account of the previous work done is given in the report on the 1974 drilling programme on EL 77 (Bell, 1975a); and 1975 drilling programme No. 1 on EL 77 (Bell, 1975b).

The 1974 programme included water sampling, resistivity surveying, and rotary drilling. The hole numbers were 77-1 to 77-28. The 1975 programme included just rotary drilling. The hole numbers were 77-29 to 77-47. Radioactivity greater than 20X background was found in hole number 77-44 (Bell, Programme No. 1, 1975b).

3. GEOLOGY

Reference to the general geology is given in an earlier report. (Bell 1975b

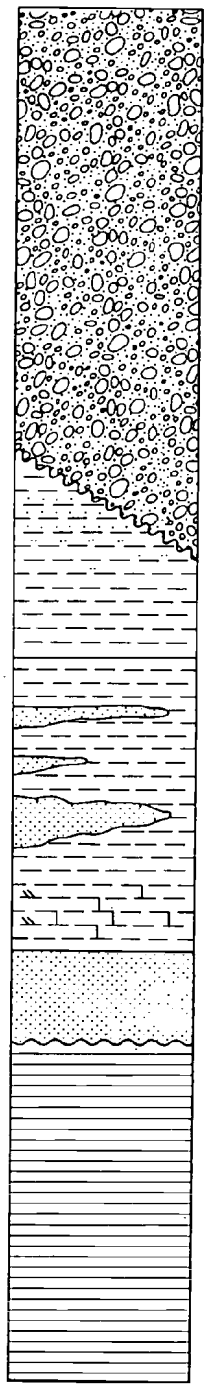
3.1 Stratigraphy (Fig. III)

The stratigraphy in the Poontana Sub-basin is discussed in the report on the 1974 drilling programme EL 77 (Bell, 1975a).

A schematic stratigraphic column is shown in Figure III.

021

SCHEMATIC STRATIGRAPHIC COLUMN



QUATERNARY
—?— —?— —?

60' — 370'+

Oxidised Clastics :—

Piedmont deposits and surface oxidised clays and sands.

TERTIARY

0' — 200'

Upper Clays :—

Greenish grey clays with brown and olive grey clay.

80' — 400'+

Lower Clays :—

Grey to dark grey clays, with interbedded fine sand and silt.

NAMBA FORMATION

30' — 100'

Calcareous Horizon :—

100' — 200'

Basal Clays :—

200' — 300'

Lower Tertiary Sands

(EYRE FORMATION)

LOWER CRETACEOUS

Claystone and Shales

FIGURE III

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: 2-8-41	
MARCH 1976	M. S. BELL

In the last programme eight holes penetrated into the Eyre Formation (Lower Tertiary Sands), and nine holes were stopped in igneous basement.

The Cretaceous was not intersected in any of the holes.

3.2 Structural Interpretation

The major geological features in the licence area is the Poontana Sub-basin. This is a downwarp extending from the Lake Callabonna-Lake Frome lineament in the east, to the Flinders Ranges in the west and southwest, and the Mt. Painter Ridge in the north. This basin is believed to have existed from early Tertiary time to very recent times. (Fig. IV.)

The major structure in the sub-basin is the Poontana Fault-Monocline towards the west side. This feature, with downthrow to the east, passes through Paralana out-station, the Paralana Block and extends in a N-S direction for at least 28 miles. About four miles north of the out-station it passes to the west of the Beverley deposit and eventually is lost in the Flinders Ranges. The southern limit of the Poontana structure is not known though it has been recognized in drilling 12 miles south of Paralana out-station. A geomorphic reflection of the structure can be seen in the linear alignment and sharp truncation of recent gravels extending out from the base of the Flinders Ranges from a line north of the Beverley deposit to the southern margin of the Paralana Block. In the sub-surface the position of the structure is identified by the abrupt drop of Tertiary marker beds to the east, and by the increase in thickness of the oxidized Upper Clastics. West of the Poontana structure the clastics average 180 feet thick, but to the east of the structure thickness increases to approximately 400 feet.

In addition to the major downwarping to the east along the Poontana structure, sagging has also taken place to the west, tending to make the structure a barrier between the groundwater systems of the west and of the east (Bryan 1971).

The latest drilling indicates a late Tertiary fault striking NE-SW and two parallel older faults striking N-S in the Paralana Creek area. A possible E-W fault is indicated between hole 77-56 and 77-58. Other structures indicated (Fig. IV) have been copied or interpreted mainly from topographic and geological maps. The late Tertiary Fault has been named the Wooltana Fault.

4. 1975 EXPLORATION PROGRAMME No. 2

The latest exploration done on the licence included the open hole rotary drilling and logging of 14 holes, and stadia surveying of the hole collars.

The drilling was done by Thompson Drilling Co. Pty Ltd of Millicent, South Australia, and the down-hole logging was done by Geoscience Associates (Aust.) Pty Ltd of Adelaide, South Australia.

4.1 Drilling and Logging

From September 25, 1975 to November 22, 1975, 14 rotary non-coring holes were drilled in the Paralana Creek area on EL 209 (77). A total of 4,389.0 metres was drilled and holes varied from 246.0 metres to 372.0 metres in depth (Table I).

All holes were logged for gamma, self-potential, and resistivity response. Due to delay in receiving the samples from depth, the drill hole logs do not correlate exactly with the geophysical logs and can differ by up to 10-15 metres towards the bottom of deeper holes (Appendix I). No thick sand horizons were found, but radio-activity greater than 20X background was encountered in holes number 77-49 and 77-53.

4.2 Interpretation of Drilling and Logging Results

The locations of the drill holes are indicated on Fig. II and are shown on Fig V-VIII. Drill hole and radiometric data are shown on Table I, II, III and IV and, the logs and sections are in Appendix I.

On Section I (Fig. V) are the holes 77-45, 77-49, 77-48, 77-44 and 77-50.

Hole 77-45 was drilled to a depth of 258 metres and was stopped in igneous basement. The Upper Clastics are about 65.6 metres thick and below these are the "B"-sand, the "D"-sand, the "E"-sand, and the "F"-sand. At the top of the "B"-sand is a gamma high of 20 c/s, and at the top of the "D"-sand is a gamma high of 108 c/s. The presence of a calcareous horizon is doubtful as there was no indication in the drill samples. Between the "F"-sand and the basement are several small sandy bands that were not indicated on the electrical logs.

Gamma highs are found at the top of both the "B"-sands and "D"-sands. Minor hematite and limonite is found from 72.4 - 106.8 metres.

Hole 77-49 was drilled to a depth of 258 metres and was stopped in igneous basement.

The Upper Clastics are about 64 metres thick. Below the clastics are the "B", "D", and "E"-sands, and the Calcareous Horizon. Basement gravels were intersected at 254 metres.

A gamma high of 608 c/s was encountered at the bottom of the "E"-sand at 143.2 metres. Considerable hematite stain and minor limonite stain is found from 50.0 - 100.0 metres.

Hole 77-48 was drilled to a depth of 298 metres and was stopped in igneous basement.

The Upper Clastics are approximately 56 metres thick and below them are the "B", "D", and "E"-sands, and the Calcareous Horizon. A resistivity change is recorded at approximately 210.0 metres with no indication in the samples. The Eyre Formation was intersected from 260.0-294.0 metres; and basement gravels were intersected at 294.0 metres.

Gamma highs are as follows: 106 c/s at 54.5 metres of the bottom of the Upper Clastics; 190 c/s at 62.0 metres at the top of the "B"-sand; 160 c/s at 117.0 metres in carbonaceous clays at the bottom of the "D"-sand; and 125 c/s at 143.5 metres at the bottom of the "E"-sand and the top of the Calcareous Horizon. Hematite staining is found from 44.0-64.0 metres, and limonite staining is found from 116.0 - 186.0 metres. The greater depth to basements is probably due to faulting as indicated by the presence of the Eyre Formation what was up thrust by movement on an older fault. Resistivity surveying by Murdoch Geology and Geophysics Pty Ltd indicates multiple faulting in this area (Murdoch, Report No. 83, July 1, 1974; Murdoch Report 204, July 1975).

Hole 77-44 was drilled to a depth of 306.0 metres and was stopped in the Eyre Formation (?).

The Upper Clastics are approximately 130.0 metres thick and between them and the Calcareous Horizon is the "B"-sand, "C"-sand (?), "D"-sand, "E"-sand, and the "F"-sand. Below the Calcareous Horizon

are interbedded fine sand and clay. Quite possibly the lower part of this section could be the Eyre Formation as it contains some fine pyrite. The Calcareous Horizon was not identified in the drill samples from this hole.

Gamma highs are as follows: 585 c/s at 162.0 metres at the base of the "B"-sand; 550 c/s at 172.0 metres in the "C"-sand; 447 c/s at 216.0 metres at the base of the "E"-sand; 142 c/s at 257.0 metres at the top of the Calcareous Horizon; and 655 c/s at 274.0 metres at the base of the Calcareous Horizon.

Hole 77-50 was drilled to a depth of 372.0 metres and was also stopped in the Eyre Formation, as gravels got coarser.

The Upper Clastics are approximately 132.0 metres thick and below that are the "B", "C", "D", "E", and "F"-sands, and the Calcareous Horizon . The Eyre Formation was intersected at approximately 320.0 metres. Minor hematite staining was found in the "B"-sand.

Gamma highs are as follows: 175 c/s at 212.0 metres at the top of the "E"-sand and 120 c/s at 273.5 metres at the base of the Calcareous Horizon.

This section indicates the Poontana Fault-Monocline between holes 77-48 and 77-49 and the Wooltana Fault to the east. It is likely that the sediments are not faulted off but form a monoclinal structure.

Section II (Fig. VI) shows the holes 77-54, 77-51, 77-52 and 77-53. This section is parallel to Section I and about 800 metres south of it.

Hole 77-54 was drilled to a depth of 246 metres and was stopped in igneous basement.

The Upper Clastics are about 54.0 metres thick, being west of the Poontana Fault-Monocline. Between the Upper Clastics and the Calcareous Horizon are the "B", "D", "E", and "F"-sands. Basement gravels were intersected at about 244.0 metres.

Much hematite staining was found from the base of the Clastics to the base of the "B"-sand, and both minor hematite and minor limonite were found throughout the hole.

Gamma highs are as follows: 130 c/s at 85.0 metres at the base of the "B"-sand, and 180 c/s and 168.0 metres at the base of the Calcareous Horizon.

Hole 77-51 was drilled to a depth of 334.0 metres and was stopped in igneous basement. The Upper Clastics are 126.0 metres thick, being east of the Poontana Fault-Monocline. Below the Clastics are the "B", "D", and "E"-sands. The Eyre Formation was intersected at 288.0 metres and basement gravels at 330.0 metres. The Calcareous Horizon was not recognised in this hole. Hematite staining was found above the gamma high and minor limonite was found below.

The gamma high of 170 c/s was recorded at 126.5 metres at the base of the Upper Clastics, and two smaller ones in the "B" and "F"-sands.

Between 77-52 and 77-51 is the Poontana Fault-Monocline.

Hole 77-52 was drilled to a depth of 272.0 metres, and was stopped in igneous basement.

The Upper Clastics here are approximately 130.0 metres thick, and below them are the "B", "D", and "E"-sands. Below the sands the Calcareous Horizon rests on the basement gravels, which were intersected at 270.0 metres.

Considerable hematite staining is found between the Upper Clastics and the "D"-sand, with the minor limonite from 180.0-230.0 metres.

The gamma high of 106 c/s was recorded at 247.0 metres at the base of the "F"-sand.

The Wooltana Fault is located between hole 77-51 and 77-54.

Hole 77-53 was drilled to a depth of 280.0 metres and was stopped in igneous basement rocks.

The Upper Clastics here are 128.0 metres thick and between them and the Calcareous Horizon are the "B", "D", "E", and "F"-sands, and just beneath the Calcareous Horizon is the igneous basement which was intersected at 278.0 metres.

Hematite and limonite staining is found throughout the hole.

The gamma high of 993 c/s was recorded at 212.0 metres at the base of the "E"-sand.

This section also indicates the Poontana Fault-Monocline between holes 77-52 and 77-51 and the Wooltana fault to the west.

On Section III (Fig. VIII) are the holes 77-55, 77-56, and 77-58. This section is about 3.5 kilometres east of Section I and II and is approximately at right angles to them.

Hole 77-55 was drilled to a depth of 372.0 metres and was stopped in igneous basement rocks. Although the Upper Clastics are about 140.0 metres thick oxide staining penetrates only 114.0 metres. From 114.0 -140.0 metres there is hematite and limonite staining.

Between the clastics and the Calcareous Horizon are the "B", "D", "E", and "F"-sands, and resting on top of the igneous basement is the Eyre Formation. Minor limonite staining is found in the Lower Clays.

Gamma activity is only of a minor nature.

Hole 77-56 was drilled to depth of 348.0 metres and was stopped in igneous basement rocks.

The Upper Clastics are approximately 134.0 metres thick and between the clastics and the Calcareous Horizon are the "B", "D", "E" and, "F"-sands. Resting on the basement is the Eyre Formation.

Although Gamma activity is found in all the sands, only that of the "B" and "D"-sand is significant.

Gamma activity in the "B"-sand is as follows: 110 c/s at 145.5 metres; 160 c/s at 147.0 metres; 95 c/s at 149.0 metres; and 136 c/s at 153.5 metres. In the "D"-sand a gamma high 103 c/s was recorded at 185.5 metres.

There is considerable limonite staining in the Upper Clays and minor staining in the Lower Clays and the Calcareous Horizon.

Hole 77-58 was drilled to a depth of 284.0 metres and was stopped in igneous basement gravels or possibly gravels of the Eyre Formation.

The Upper Clastics are approximately 134.0 metres thick but only oxidized to 106.0 metres.

Below the clastics are the "B", "D", "E" and "F"-sands, and the Calcareous Horizon which rests on the igneous basement.

The gamma high of 200 c/s was recorded at 151.5 metres at the base of the "B"-sand.

Minor hematite and limonite staining is found in the unoxidized Clastics and the Upper Clays and minor limonite staining is found as deep as the Calcareous Horizon.

On this section also there is some evidence of older basement faults or erosional features.

In the resistivity survey of the area, Murdoch interpreted the change in basement level as due to faulting (Murdoch, Report: 204, July 1975).

On Section IV (Fig. VIII) are the holes 77-46, 77-47, and 77-59. This section is parallel to Section III and located 6.0 kilometres to the east, along the gas pipeline.

Hole 77-46 was drilled to a depth of 306.0 metres and was stopped in the Eyre Formation.

The Upper Clastics here are approximately 100.0 metres thick and oxidized to 81.5 metres. The electrical logs indicate the "E" and "F"-sands to be very thin. The existance of the "B" and "D"-sands is very questionable.

Although calcareous material was picked up between 280.0-306.0 metres in the drill samples the correct position of the Calcareous Horizon is probably between 220.0-253.0 metres as indicated by the electrical and radiometric logs.

Gamma activity was very low with only a small high of 85 c/s at 136.0 metres at the base of the Upper Clays.

Considerable hematite stain is found in the light grey clays in the lower part of the Upper Clays, and some limonite staining is found in the unoxidized clastics and at the top of the Lower Clays.

Hole 77-47 was drilled to a depth of 216.0 metres and was stopped in the Lower Clays between the "F"-sand and the Calcareous Horizon.

The Upper Clastics are about 95.0 metres thick but oxidization decreased after about 80.0 metres depth. Below the clastics are "B", "D", "E", and "F"-sands.

One gamma high of 92 c/s was recorded at 131.3 metres at the base of the "B"-sand. Minor hematite and limonite staining is found from the middle of the Upper Clays to the "D"-sand.

Hole 77-59 was drilled to a depth of 342.0 metres and stopped in the Eyre Formation.

The Upper Clastics are about 88.0 metres thick and below the clastics are the "D", "E" and "F"-sand and the Calcareous Horizon.

There is no gamma activity of any interest in this hole, and only occasional limonite staining is found in the Lower Clays.

Interpretation and correlation of the sands from hole to hole is dependant mainly on the electric logs, especially the resistivity. The gamma log is useful in interpreting broad changes in lithology.

In the Upper Clastics both the gamma and resistivity response is quite strong. The activity gradually drops off in the Upper Clays, although sometimes there can be quite an abrupt drop-off in the electrical activity.

Both electrical and gamma activity are generally low, down through the Lower Clays, except for occasional activity in the sands.

In the Calcareous Horizon gamma and electric response is quite good, and numerous abrupt changes are recorded on the resistivity scale.

The Basal Clays are identified by very low gamma background and high electrical background, and the Eyre Formation is usually indicated by an increase in gamma background and a decrease in electrical background in comparison with the Basal Clays.

These characteristics are well illustrated in holes: 77-50, 77-51, 77-55, 77-56 and 77-59.

Holes 77-57, 77-60, AND 77-61, are not found on any section, and information on them is found in the Tables.

4.3 Personnel

BP Minerals Australia Pty Ltd.

Project Geologist	:	M.S. Bell
Prospecting Hands	:	R. Milner
		J.J. Blichfeldt
Cook (Casual)	:	C. Mortimer

Contractors

Thompson Drilling Co. Pty Ltd.

Driller	:	C. Stratford
Assistants	:	R. Brown
		T. Auld

Geoscience Associates (Aust.) Pty Ltd

Logger	:	J. Mortimer

5. CONCLUSIONS AND RECOMMENDATIONS

The latest drilling on the Paralana Creek target located radioactivity equal to or greater than 10X background in six holes, and radioactivity equal to or greater than 20X background in two holes.

Faulting is very complex here and more drilling is recommended on the south-east side of the road in the vicinity of the anomalous holes.

Calculated % $\overset{e}{=}$ U_3O_8 values indicates uranium trending to the south-east towards number 77-56.

More intensive drilling is recommended in the vicinity of holes 77-44 and 77-53 and between 77-53 and 77-56.

6. REFERENCES

BELL, M.S., 1975a:1974 Drilling Programme, EL 77 - Lake Frome Embayment, South Australia, Unpublished Geological Report to Department of Mines, S.A.

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MURDOCH, R., 1974: A Resistivity Survey near Lake Frome, South Australia, for BP Minerals Australia Pty Ltd, Report No. 83 and Addendum.

MURDOCH, R., 1975: A Resistivity Survey on EL 88, Lake Frome, South Australia, for BP Minerals Australia Pty Ltd, Report No. 204.

7. APPENDICES

Appendix I Drill Logs (Geophysics and Lithology) (In back pocket).

Drill Sections (In back pocket).

TABLE I

LITHOLOGICAL DATA

HOLE NUMBER	ELEVATION (m)	DRILLED DEPTH	DEPTH (m) TO BASE UPPER CLASTICS			DEPTH m) TO BASE UPPER CLAYS			DEPTH (m) TO TOP CALCAREOUS HORIZON			DEPTH (m) TO BOTTOM CALCAREOUS HORIZON			DEPTH (m) TO TOP EYRE FORMATION			DEPTH (m) TO BASE EYRE FORMATION			DEPTH (m) TO GRANITIC BASEMENT		
			LITH LOG	GAMMA LOG	ELEC LOG	LITH LOG	GAMMA LOG	ELEC LOG	LITH LOG	GAMMA LOG	ELEC LOG	LITH LOG	GAMMA LOG	ELEC LOG	LITH LOG	GAMMA LOG	ELEC LOG	LITH LOG	GAMMA LOG	ELEC LOG	LITH LOG	GAMMA LOG	ELEC LOG
77-48	95.39	298.0	56.0	?	56.0	?	80.0	?	268.0	262.0	261.0	282.0	275.0	275.0	326.0	325.0	326.0	294.0	?	?	294.0	?	?
49	96.53	258.0	64.0	?	64.0	?	?	85.0	156.0	?	150.0	190.0	160.0	158.0	-	-	-	-	-	-	254.0	?	?
50	63.67	372.0	136.0	?	132.0	164.0	162.0	162.0	262.0	250.0	250.0	276.0	276.0	276.0	328.0	331.0	328.0	372.0+	?	?	-	-	-
51	74.92	334.0	126.0	?	126.0	?	147.0	147.0	-	-	-	-	-	-	288.0	288.0	288.0	330.0	?	?	330.0	?	?
52	71.34	272.0	140.0	129.0	129.0	?	158.0	158.0	256.0	?	256.0	270.0	?	?	-	-	-	-	-	-	270.0	?	?
53	71.84	280.0	138.0	?	128.0	?	?	164.0	258.0	?	258.0	267.0	?	267.0	-	-	-	-	-	-	278.0	?	?
54	92.97	246.0	54.0	54.0	60.0	?	85.0	85.0	152.0	?	156.0	164.0	171.0	172.0	-	-	-	-	-	-	244.0	?	?
55	76.66	374.0	140.0	?	132.0	164.0	166.0	165.0	260.0	260.0	251.0	284.0	286.0	282.0	344.0	336.0	338.0	374.0	?	?	374.0	?	?
56	76.72	348.0	134.0	?	134.0	160.0	160.0	?	256.0	248.0	248.0	280.0	278.0	278.0	326.0	328.0	330.0	346.0	?	347.0	346.0	?	347.0
57	78.05	357.0	118.0	134.0	125.0?	?	163.0	163.0	254.0	254.0	254.0	278.0	281.0	280.0	340.0	333.0	335.0	357.0	?	?	357.0	?	?
58	76.74	284.0	134.0	?	134.0	?	158.0	?	262.0	?	249.0	282.0	?	263.0	-	-	-	-	-	-	282.0	?	?
59	78.49	342.0	92.0	?	90.0	120.0	?	118.0?	228.0	228.0	218.0	252.0	258.0	252.0	310.0	310.0	310.0	342.0+	?	?	-	-	-
60	76.97	352.0	124.0	?	124.0	170.0	163.0	163.0	268.0	262.5	261.0	282.0	275.0	275.0	326.0	325.0	326.0	352.0+	?	?	-	-	-
61	77.52	262.0	120.0	?	130.0	168.0	?	172.0	-	-	-	-	-	-	-	-	-	-	-	-	260.0	?	?

TABLE II

DEPTH OF INTERSECTION AND THICKNESS OF SAND HORIZONS IN THE DRILL HOLES.

HOLE NUMBER	'B' -SAND		'C' -SAND		'D' - SAND		'E' - SAND		'F' - SAND	
	DEPTH TO TOP	THICKNESS (m)	DEPTH TO TOP	THICKNESS (m)	DEPTH TO TOP	THICKNESS (m)	DEPTH TO TOP	THICKNESS (m)	DEPTH TO TOP	THICKNESS (m)
77-48	58.0	15.0	-	-	95.0	14.0	116.0	4.0	129.0	11.0
77-49	68.0	16.0	-	-	106.0	10.0	118.0	3.0	129.0	15.0
50	144.0	18.0	168.0	7.0	191.0	8.0	209.0	16.0	233.5	7.0
51	140.0	7.5	-	-	175.0	16.0	204.0	8.0	?	?
52	150.0	8.0	-	-	174.0	9.0	202.0	4.0	-	-
53	145.0	15.0	-	-	173.0	7.0	206.0	6.0	239.0	5.0
54	74.0	11.0	-	-	105.0	7.0	129.0	10.0	150.0	2.0
55	153.0	11.0	-	-	190.0	4.0	203.5	5.0	237.5	3.0
56	141.0	13.0	-	-	176.0	10.0	206.0	7.5	232.0	3.0
57	155.0	8.0	-	-	176.0	22.0	208.0	4.5	229.0	6.0
58	146.0	11.0	-	-	186.0	4.0	208.0	8.0	230.5	7.5
59	?	?	-	-	153.0	6.0	186.5	4.5	199.0	3.0
60	143.5	19.5	-	-	185.0	5.0	209.5	4.5	225.0	6.0
61	152.0	20.0	-	-	179.0	2.5	198.5	5.0	251.0?	3.5

TABLE III

DRILLING AND LOGGING DATA

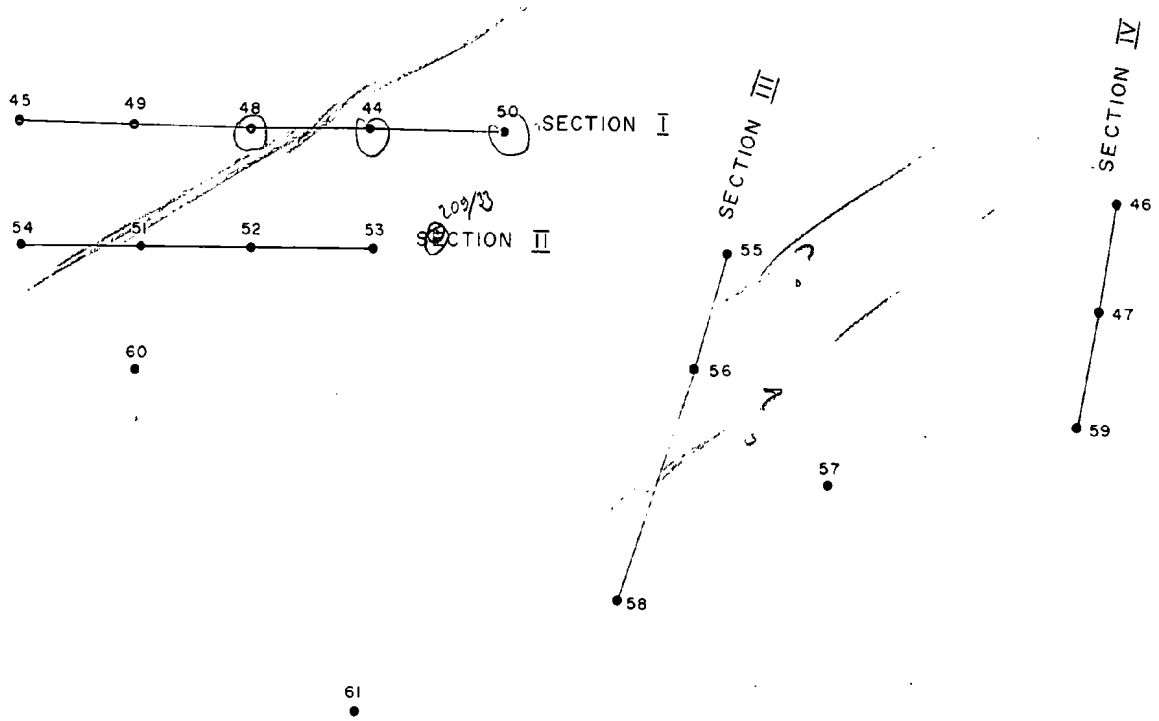
HOLE NUMBER	DATE STARTED	DATE COMPLETED	DRILLED DEPTH(m)	LOGGED DEPTH(m)	GAMMA ACTIVITY	DEPTH(m) OF ACTIVITY	NUMBER OF X BACKGROUND	NUMBER OF ANOMALY	Lithology
77-48	25/9	27/9	298.0	293.5	106 c/s	54.5	3 X	1	'B' - sand
					190.c/s	62.0	6 X	2	'B' - sand
					160 c/s	117.0	11 X	3	'D' - sand
					125 c/s	143.5	16 X	4	'E' - sand
77-49	27/9	29/9	258.0	250.5	608 c/s	143.0	20 X	1	'E' - sand
77-50	29/9	1/10	372.0	361.0	114 c/s	212.0	8 X	1	'E' - sand
					120 c/s	273.5	8 X	2	CALCAREOUS HORIZON
77-51	2/10	3/10	334.0	331.5	170 c/s	126.5	6 X	1	'B' - sand
77-52	4/10	5/10	272.0	268.5	106.c/s	247.0	7 X	1	'F' - sand
77-53	6/10	6/10	280.0	277.0	996 c/s	212.0	33 X	1	'E' - sand
77-54	7/10	7/10	246.0	241.0	130 c/s	85.0	65 X	1	'B' - sand
					180 c/s	168.0	18 X	2	CALCAREOUS HORIZON
77-55	7/10	10/10	374.0	370.0	-	-	-	-	-
77-56	11/10	12/10	348.0	348.5	110 c/s	145.5	55 X	1	'B' - sand
					162 c/s	147.0	7 X	2	'B' - sand
					136 c/s	153.5	7 X	3	'B' - sand
					103 c/s	185.5	10 X	4	'D' - sand

..2

TABLE III (continued)

HOLE NUMBER	DATE STARTED	DATE COMPLETED	DRILLED DEPTH(m)	LOGGED DEPTH(m)	GAMMA ACTIVITY	DEPTH(m) OF ACTIVITY	NUMBER OF X BACKGROUND	NUMBER OF ANOMALY	LITHOLOGY
77-57	13/10	14/10	357.0	349.5	-	-	-	-	-
77-58	15/10	16/10	284.0	270.5	200 c/s	157.5	13 X	1	'B' - sand
77-59	17/10	18/10	342.0	337.0	-	-	-	-	-
77-60	19/10	21/10	352.0	347.5	-	-	-	-	-
77-61	21/10	21-22/11	262.0	261.5	127 c/s	181.7	10 X	1	'D' - sand

037



DRILL HOLE INDEX AND SECTION LOCATIONS

FIGURE II b

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: 2-8-41	
MARCH 1976	M. S. BELL

TABLE IV

CALCULATED % e U_3O_8 FROM GAMMA LOG

HOLE NUMBER	ANOMALY NUMBER	DEPTH (m)	WIDTH (m)	% e U_3O_8	% e U_3O_8 OVER 0.4 m
77-44	1	162.0	0.3	0.044	0.0345
	2	172.0	0.2	0.048	0.028
	3	216.0	0.6	0.030	0.0359
	4	257.0	0.4	0.021	0.021
	5	274.0	0.4	0.043	0.043
77-45	1	70.0	0.7	0.0254	0.034
	2	117.5	0.5	0.0149	0.0168
77-48	1	54.5	0.7	0.010	0.0143
	2	62.0	1.2	0.0199	0.0285
	3	117.0	0.6	0.0178	0.0226
	4	143.5	0.9	0.012	0.0143
77-49	1	143.2	0.4	0.032	0.032
77-50	1	212.0	0.5	0.014	0.0160
	2	273.5	0.7	0.0128	0.0172
77-51	1	126.5	0.7	0.0199	0.0258
77-52	1	247.0	0.7	0.0115	0.0156
77-53	1	212.0	0.4	0.057	0.057
77-54	1	85.0	0.5	0.0154	0.0163
	2	168.0	0.6	0.0194	0.0243
77-56	1	145.5	0.6	0.0128	0.01675
	1 + 2		1.9	0.0118	-
	2	147.0	0.6	0.0105	0.0223
	3	153.5	0.8	0.0140	0.0177
	4	185.5	0.8	0.0110	0.0157
77-58	1	151.5	0.6	0.022	0.0276
77-61	1	181.7	0.5	0.0147	0.0180

T 1294 A

POONTANA PROJECT - 1976
STRUCTURAL INTERPRETATION SHOWING POSSIBLE FAULTS & CHANNELS

POONTANA SUB-BASIN

LOWER TERTIARY CHANNELS

UPPER TERTIARY SANDS

EL 209

EL 203

EL 210

POONTANA SUB-BASIN

"Moolawatana"

"Old Moolawatana" (ruins)

"North Mulga"

"Paralana"

"Mt Fitton"

"Mt Freeling"

"Yerelina"

"Umberatana"

"Old Illinawortina"

"Yadaninna"

"Arkaroola"

"Waclitana"

"Balcanoona"

"Wertaloona"

"Wearing" (ruins)

"Arrowie"

"Mulga View"

Lake Callabonna

Lake Cootabarlow

Lake

Frome

POONTANA AXIS

POONTANA FAULT

WOOLTANA FAULT

FLINDERS RANGES

NORTH

Trinity Well, Village Well, Billy Spring Bore, Tin MacDermott, Pelican Well, Tardlapinna Well, Mandawartina Well, Lonesome Bore, Mt Livingston Well and Spring, Tindlapina Creek, Hamiltons Creek, Valley Bore, Great Gladstone Bore, Tindelpina Well, Canyon Bore, Doly Bore, Yudnamutana Bore, Overland Bore, Bend Well, Mt Thomas Well Bore, Mallee Well, North Well, Illinawortina Well, Boulder Bore, Nudlamutana Well, Woodnamoka Well, Danahue Castle Well, Merinina Well, Belle Bellaine Creek, Netting Well Creek, Mallee Well, Home Rule Bore, John Well, One Gun Dam, Lake Well, T-Tree Bore, O'Reilly Dam, Big John Creek, Dead Bullock Bore, Old Dam, Williawortina Dam, Mora Spring, Mora Creek, Nantawarrinna Bore, One Tree Bore, Ironstone Bore, Yates Well, Rockhole Bore, Wearing Well, No 1 and No 2 Wells, O'Connell Bore, Little Bobmonie Well, Moorowie Well, Moorowie Bore, Bell Creek, Bell Bore, Bore (I.D.), Black Oak Well, Collins Dam, Double Dam, Willowie Bore No 3, Horse Dam, Pauls Dam, Pauls Well, Coombs Dam, Lake Dam, Eagle Dam, Tea Tree Bore, Ram Bore, Christmas Bore, Christmas Well, Eagle Well, Mungaroonie Bore, Sandridge Bore, Mulga Bore (P.D.), Mulga Well, Mulga Park Well, Acacia Park Well, Cockatoo Bore, Caldina Well, Ewaroona Well, No 1 Bore, No 12 Bore, Roberts Well, NE Ewaroona Bore, New Caldina Bore, White Dam Bore, Goodlawoodlana Well, Munyallina Creek, Jarlbrunna Creek, Paralana Creek, Four Mile Creek, Four Mile Bore, Paralana Hot Springs, Hot Springs, Mulga Creek (P.D.), North Mulga Bore, No 35 Bore, Buston Bore, Speculation Well, Yagalin Dam, North Poontana Bore, Poontana Creek, Bar Bore, Marks Bore, Skeleton Bore, Anderson Bore, Little Bank Bore, Middebank Bore, New Bore, Parachilna Bore, Gas Bore, Gas Well, Waalatchi Creek, Waalatch. Bore, Mosquito Creek Bore, Mulligan Dam, Gunpowder Bore, Twelve Springs, Terraginna Bore, Terraginna Springs, Moolawatana Bore 9, Lake Cootabarlow No 1 Bore, Johnsons Dam, Mulga Bore, Mackallaoona Well, Wertaloona Bore, Irrawilla Creek, Netting Well Creek, Bell Creek, Bendleuta Creek, Weeroona Creek, Mora Creek, Big John Creek, Pauls Creek, Munyallina Creek, Jarlbrunna Creek, Poontana Creek, Tea Tree Creek, Hamiltons Creek, Callabonna Creek, Waalatchi Creek, Tindlapina Creek, Yerelina Creek, Arkaroola Creek, Belle Bellaine Creek, Four Mile Creek, Mulga Creek, Paralana Creek, Hot Springs Creek

LOCATION DIAGRAM



REFERENCE TO AUSTRALIA STANDARD MAP SERIES

SH54-5 MARREE	SH54-6 CALLABONNA	SH54-7 MILPARINKA
SH54-9 COPLEY	SH54-10 FROME	SH54-11 COBHAM LAKE
SH54-13 PARACHILNA	SH54-14 CURNAMONA	SH54-15 BROKEN HILL

SCALE 1:250,000

KILOMETRES 5 0 5 10 15 20 25 30 KILOMETRES

LEGEND

- Road, loose surface all weather second class
- Road, unimproved earth
- Lake, river or stream intermittent
- Participation area
- Faults

FIGURE IV

BP MINERALS AUST. PTY LTD	
Area:	LAKE FROME
	EL-209
REF:	2-8-41
MARCH 1976	M.S. BELL

Rept. Drilling Progr. Aug. No 2. 1975

ENV. 2608 Vol I

Vol. 1 2608-1

1:5 0 100mm 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500mm

STAEDTLER MARS 561 70-13 Made in England BS1347

T 1507

ELEV. 100.68 m

S.P | 77-45 | GAMMA | RES

6.1m
12.95m
15.2m
17.5m
19.8m
24.4m
26.7m
29.0m
31.3m
42.7
58.8m
61m
63.2m
65.6m
72.4m
106.8
119m
121m
152
155
171
182m
184m
187m
196m
198m
205
207.5m
209m
213m
223m
226m

DEPTH 258m

ELEV. 96.53 m

S.P | 77-47 | GAMMA | RES

UPPER CLASTICS

54m
56m
62m
64m
68m
74m
86m
100m
104m
106m
108m
110m
'B' - SAND
LOWER CLAYS
'D' - SAND
'E' - SAND
'F' - SAND
154m
CALCAREOUS HORIZON
BASAL CLAYS
186m
190m
254m

DEPTH 258m

IGNEOUS BASEMENT

EYRE FORMATION ?

POONTANA FAULT

ELEV. 95.39 m

S.P | 77-48 | GAMMA | RES

44m
56m
62m
64m
UPPER CLAYS
80m
96m
108m
116m
140m
152m
158m
186m
?
232m
240m
244m
260m
268m
270m
294m

DEPTH 298m

IGNEOUS BASEMENT

'WOOLTANA FAULT

ELEV. 63.85 m

S.P | 77-44 | GAMMA | RES

47m
75m
95.75m
120m
128m
136m
142m
144.5m
145.5m
157m
171m
175m
182.5m
184m
188m
202m
227m
234m
239m
244m
CALCAREOUS HORIZON ?
270m
272.5m
275m
BASAL CLAYS or EYRE FORMATION ?
303m

DEPTH 306m

FAULT ?

ELEV. 63.67 m

S.P | 77-50 | GAMMA | RES

UPPER CLASTICS
UPPER CLAYS
'B' - SAND
LOWER CLAYS
'C' - SAND
184m
188m
'D' - SAND
202m
'E' - SAND
'F' - SAND
CALCAREOUS HORIZON
262m
276m
284m
288m
BASAL CLAYS
328m
342m
EYRE FORMATION
356m

DEPTH 372m

WESTERLY — EASTERLY — DATUM M.S.L.

LEGEND

- MIXED CLASTICS
- GRAVEL
- SAND
- SILT
- CLAY
- CARBONATE
- CARBONACEOUS

1975

POONTANA PROJECT

PROGRAMME II

EL-209

PARALANA CREEK AREA

SECTION I

SCALE

HORIZONTAL : 1cm = 50m

VERTICAL : 1cm = 6m

DRAWN : Cartoscope, Sydney

FIGURE V

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref:	
MARCH 1976	M. S. BELL

Vol, I 2608-2

T 1507

T 1508

ELEV. 92·97m

ELEV. 74·92 m

ELEV. 71·34 m

are there logs to be reversed?

ELEV. 71·84 m

S.P. GAMMA. RES.

77-54 77-51 77-52 77-53

WESTERLY — DATUM M.S.L. — EASTERLY

UPPER CLASTICS

UPPER CLAYS

'B' – SAND

'D' – SAND

'E' – SAND

'F' – SAND

CALCAREOUS HORIZON

BASAL CLAYS

LOWER CLAYS

WOOLTANA FAULT

POONTANA FAULT

EYRE FORMATION

IGNEOUS BASEMENT

DEPTH 246m

DEPTH 334m

DEPTH 272m

DEPTH 280m

?

LEGEND

- MIXED CLASTICS
- GRAVEL
- SAND
- SILT
- CLAY
- CARBONATE
- CARBONACEOUS

1975

POONTANA PROJECT

PROGRAMME II

EL – 209

PARALANA CREEK AREA

SECTION II

SCALE

HORIZONTAL : 1cm = 50 m

VERTICAL : 1cm = 6m

DRAWN : Cartoscope , Sydney

FIGURE VI

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref:	
MARCH 1976	M. S. BELL

W.I. 2608-3

T 1509

ELEV. 76·66m

S.P | 77·55 GAMMA | RES.

ELEV. 76·72m

S.P | 77·56 GAMMA | RES.

ELEV. 76·74 m

S.P | 77·58 GAMMA | RES.

NORTHERLY DATUM M.S.L

SOUTHERLY DATUM M.S.L

UPPER CLASTICS

UPPER CLAYS

'B' - SAND

LOWER CLAYS

'D' - SAND

'E' - SAND

'F' - SAND

CALCAREOUS HORIZON

BASAL CLAYS

EYRE FORMATION

IGNEOUS BASEMENT

DEPTH 374 m

DEPTH 348 m

DEPTH 284m

DRAWN : Cartoscope, Sydney

LEGEND

- MIXED CLASTICS
- GRAVEL
- SAND
- SILT
- CLAY
- CARBONATE
- CARBONACEOUS

1975

POONTANA PROJECT

PROGRAMME II

EL – 209

PARALANA CREEK AREA

SECTION III

SCALE

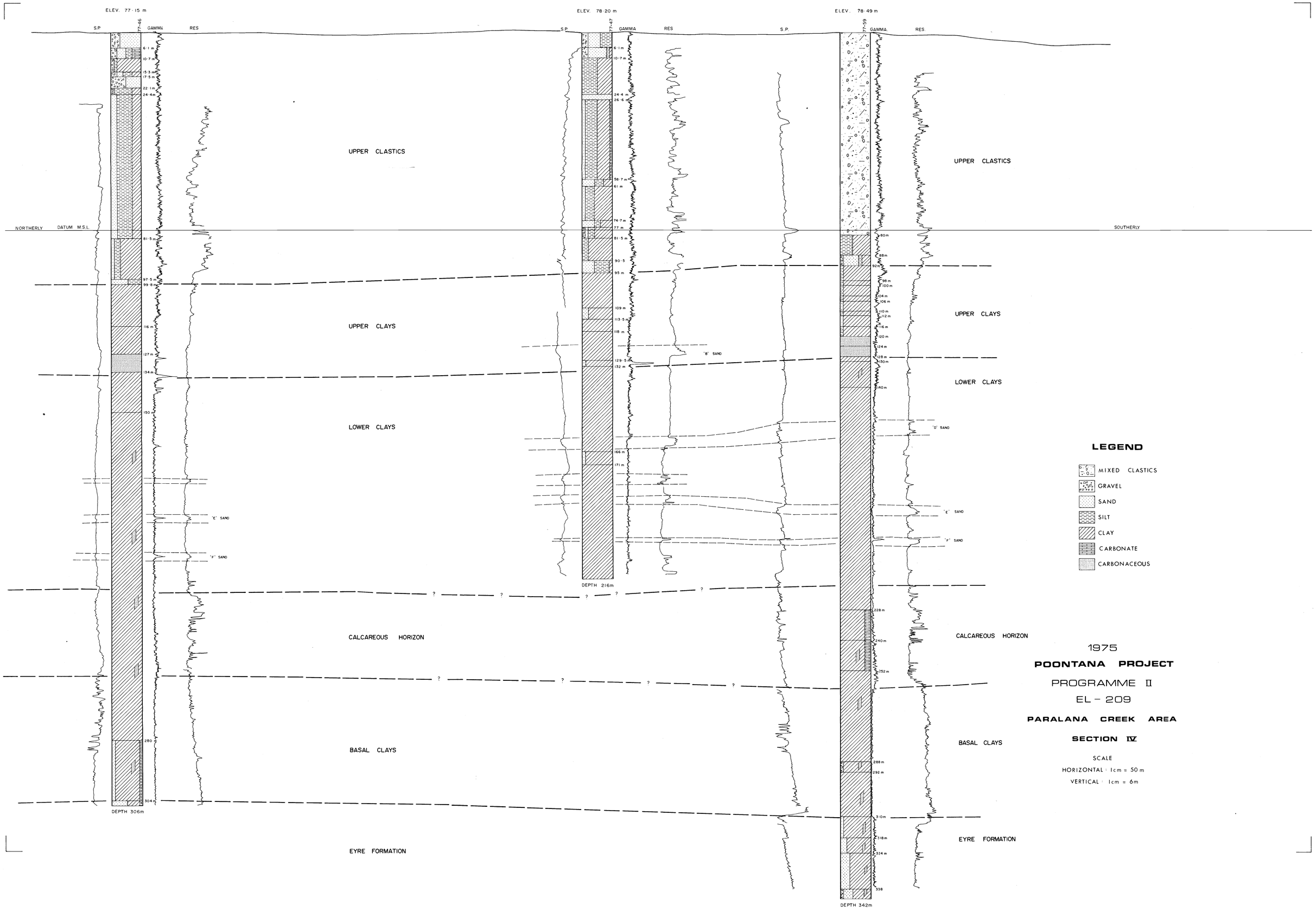
HORIZONTAL : 1cm = 50 m

VERTICAL : 1cm = 6m

FIGURE VII

BP MINERALS AUST. PTY LTD	
Area LAKE FROME	
SOUTH AUSTRALIA	
Ref:	
MARCH 1976	M. S. BELL

Vol F 2608-4



LEGEND

- MIXED CLASTICS
- GRAVEL
- SAND
- SILT
- CLAY
- CARBONATE
- CARBONACEOUS

1975

POONTANA PROJECT

PROGRAMME II

EL – 209

PARALANA CREEK AREA

SECTION IV

SCALE

HORIZONTAL : 1cm = 50 m

VERTICAL : 1cm = 6m

DRAWN : Cartoscope, Sydney

FIGURE VIII

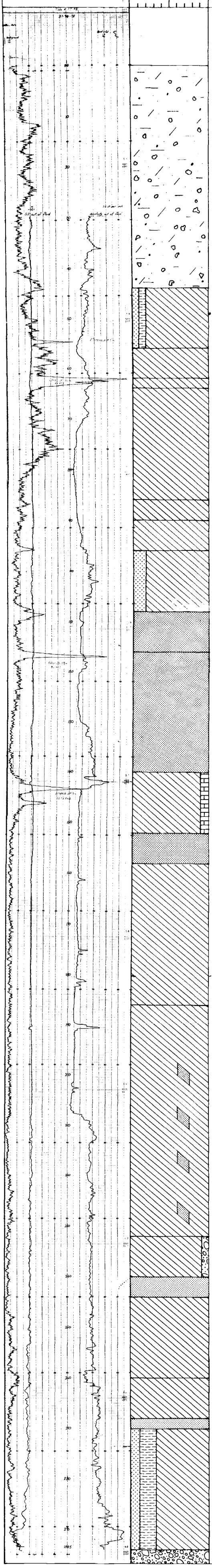
BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref:	
MARCH 1976	M. S. BELL

Vol. I 2608-5

DRILL HOLE LOG Vol.I. 2608-6 1cm rep 5m.

HOLE No.	77-48	DATE DRILLED	25/9/75	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	EL-209	DATE COMPLETED	27/9/75	RANGE	200 c/s	RESIST. SCALE	7.5Ω/in
PROJECT	Poontana	DATE LOGGED	27/9/75	TIME CONSTANT	2 SEC	SP. SCALE	1mv/div
LOCATION	Paralan Ck	DRILLED DEPTH	298m	PAPER SPEED	1cm/m	BIAS	H450/75
STATE	S.A.	LOGGED DEPTH	293.5m	LOGGING SPEED	9m/min	FLUID LEVEL	29m
GEOLOGIST	M. BELL	ELEVATION	89.93 m	BACK GROUND	10 c/s	PROBE No.	3/3
DRILLER	C. Stratford	CO-ORDS		TIME BASE	2 SEC	STANDARD	899 c/s
LOGGER	J. Mortimer			K-FACTOR	2.25×10^{-5}		

LITHOLOGY : Gravel | Sand | Silt | Clay | Carbonate | Carbonaceous

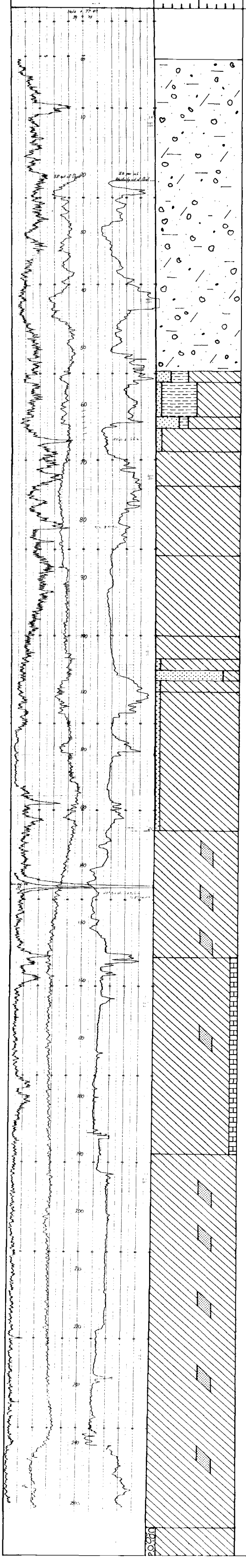


INTERVAL	DESCRIPTION
0 - 44m	MIXED CLASTICS: oxidized reddish-brown with greenish-grey clay.
44 - 56	CLAY: grey clays with red hematite stain and minor yellow limonite stain; quartz sand subrounded to 1mm.
56 - 62	CLAY: medium grey with minor small hematite nodules; minor quartz sand 'as above'.
62 - 64	CLAY: light grey; trace of hematite nodules and quartz sand.
64 - 86	CLAY: medium to dark grey.
86 - 90	CLAY: black lignitic clay.
90 - 96	CLAY: medium to dark grey.
96 - 108	SANDY CLAY: medium to dark grey with coarse subrounded to rounded quartz sand to 1cm 102-104m 100% coarse sand.
108 - 116	CLAY: black lignitic clay with much coarse lignite.
116 - 140	CLAY: mostly black clay with minor bands of light yellow-grey clay (limonite stain); occasional brown bands of clay.
140 - 152	CLAY: medium to dark grey; minor light and black; some brown; much hard calcrete.
152 - 158	CLAY: mainly black lignitic clay with minor light grey clay with yellow limonite stain.
158 - 186	CLAY: yellow grey clay with minor dark grey and black clay; much yellow limonite stain.
186 - 232	CLAY: light to dark grey clays with variegated bands and some lignitic sections.
232 - 240	CLAYS: grey and variegated clays; siliceous pebbles to 2cm.
240 - 244	LIGNITE
244 - 260	CLAY: light to dark grey clay and yellowish-brown clay.
260 - 268	CLAY: mostly light to dark grey with variegated clays; much light pink and light green clay.
268 - 270	LIGNITE
270 - 294	SANDY CLAY: clays 'as above' with fine angular to subrounded sand to 2mm. Trace of pyrite.
294 - 298	GRAVEL: quartz and pink feldspar to 3cm. End of hole.

DRILL HOLE LOG Vol.1 2608-7

HOLE No.	77-49	DATE DRILLED	27/9/75	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	EL-209	DATE COMPLETED	29/9/75	RANGE	200/500	RESIST. SCALE	5"/in
PROJECT	Poontana	DATE LOGGED	29/9/75	TIME CONSTANT	2 SEC	SP. SCALE	
LOCATION	Paralana Ck	DRILLED DEPTH	258m	PAPER SPEED	1cm/m	BIAS	H600/300
STATE	S.A.	LOGGED DEPTH	250-5m	LOGGING SPEED	9m/min/2.5 m/min	FLUID LEVEL	20-5
GEOLOGIST	M. BELL	ELEVATION	91.07m	BACK GROUND	@ C/S	PROBE No.	3/3
ORILLER	C. Stratford	CO-ORDS		TIME BASE	2 SEC	STANDARD	890
LOGGER	J. Mortimer			K-FACTOR	2.25×10^{-5} / 1.15×10^{-5}		

LITHOLOGY : Gravel | Sand | Silt | Clay | Carbonate | Carbonaceous



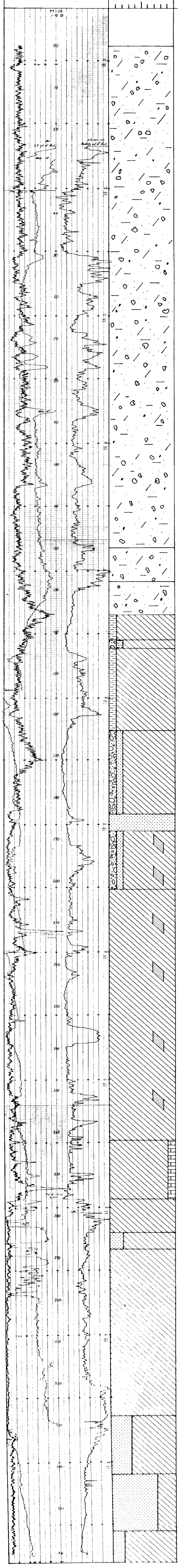
INTERVAL	DESCRIPTION
0 - 54m	MIXED CLASTICS: oxidized reddish-brown in colour; some minor yellowish-grey clay with limonite stain in bottom few metres.
54 - 56	SANDY CLAY: light grey with yellow limonite stain; minor red stain, some hematite nodules to 2mm; subrounded quartz sand to 3mm.
56 - 62	SILTY CLAY: light grey with minor red and yellow staining.
62 - 64	SANDY CLAY: light grey with minor red hematite and yellow limonite stain.
64 - 68	CLAY: medium grey; minor quartz sand, subrounded to 2mm; minor hematite nodules and limonite in last two metres.
68 - 74	CLAY: light grey, waxy; minor limonite stain.
74 - 86	CLAY: medium to dark grey with purplish red hematite stain, and minor limonite stain.
86 - 100	CLAY: dark grey and 'as above'.
100 - 104	CLAY: black carbonaceous.
104 - 106	SANDY CLAY: clay 'as above', with subrounded quartz sand to 1mm.
106 - 108	SAND: fine grey sand to 0.5mm, with black clay.
108 - 110	SANDY CLAY: black; subrounded grey quartz sand to 5mm; occasional subrounded siliceous pebble to 4cm.
110 - 134	SANDY CLAY: grey to black lignitic clays with bands of sub-rounded glassy quartz sand to 1mm.
134 - 156	CLAY: grey to black and variegated; occasional lignite.
156 - 190	CLAY: mostly light grey clay and minor black with one or more bands of calcrete; some light green clay and pink clay.
190 - 254	CLAY: grey to black with some lignitic sections; some variegated clays.
254 - 258	CLAY: 'as above'; and weathered quartz chips to 2cm. End of hole.

Vol I

DRILL HOLE LOG 2608-8 Icen maps. 5m

HOLE No.	77-50	DATE DRILLED	29/9/75	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	EL-209	DATE COMPLETED	1/10/75	RANGE	200 C/S	RESIST. SCALE	5 Ω/in
PROJECT	Poontana	DATE LOGGED	1/10/75	TIME CONSTANT	2 SEC	SP. SCALE	
LOCATION	Paralana Ck	DRILLED DEPTH	372m	PAPER SPEED	1cm/m	BIAS	H/600/300
STATE	S.A.	LOGGED DEPTH	361m	LOGGING SPEED	9m/min	FLUID LEVEL	24m
GEOLOGIST	M. BELL	ELEVATION	63.85m	BACK GROUND	11 C/S	PROBE No.	3/3
DRILLER	C. Stratford	CO-ORDS		TIME BASE	2 SEC	STANDARD	895 C/S
LOGGER	J. Mortimer			K-FACTOR	2.25×10^{-5}		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



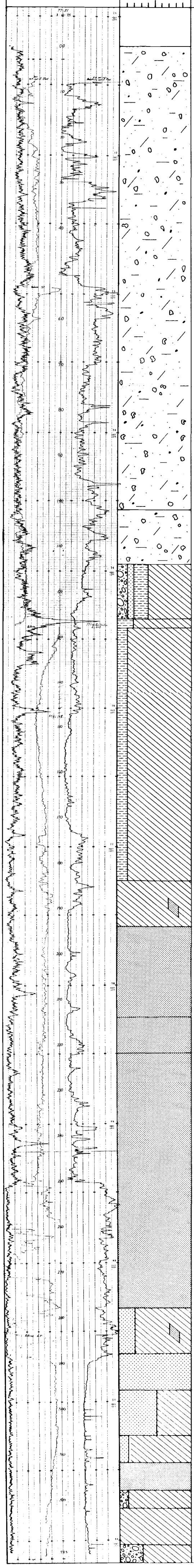
INTERVAL	DESCRIPTION
0 - 120m	MIXED CLASTICS: oxidized reddish-brown in colour.
120 - 128	MIXED CLASTICS: yellowish-brown.
128 - 136	MIXED CLASTICS: yellowish-brown; much greenish-grey clay.
136 - 142	SILTY CLAY: greenish-grey.
142 - 144	SILTY CLAY: greenish-grey; subrounded feldspar and siliceous pebbles to 4cm. (possibly from up-hole).
144 - 164	SILTY CLAY: light grey with some black in first two metres. Minor hematite nodules and sand (possibly up-hole).
164 - 184	SANDY CLAY: medium grey clays with siliceous and feldspathic sand to 2mm and subrounded pebbles to 3cm.
184 - 188	SAND: subrounded, siliceous to 3mm.
188 - 202	SANDY CLAY: medium to black clay; minor variegated clays and lignite; sand and gravel 'as above'.
202 - 262	CLAY: medium grey to black carbonaceous.
262 - 276	CLAY: medium grey; with hard white calcrete.
276 - 284	CLAY: light to medium grey, and variegated clays.
284 - 288	SANDY CLAY: clay 'as above', and subrounded white quartz sand to 2mm.
288 - 328	CLAY: grey and variegated.
328 - 342	SANDY CLAY: 'as above' with traces of pyrite.
342 - 356	SAND: 'as above'
356 - 372	SANDY CLAY: 'as above'
	End of hole.

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DRILL HOLE LOG

HOLE No.	77-51	DATE DRILLED	2/10/75	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	EL-209	DATE COMPLETED	3/10/75	RANGE	200 C/S	RESIST. SCALE	5 Ω/in
PROJECT	Poontana	DATE LOGGED	3/10/75	TIME CONSTANT	2 SEC	SP. SCALE	—
LOCATION	Paralana Ck	DRILLED DEPTH	334m	PAPER SPEED	1 cm/m	BIAS	H600/300
STATE	S.A.	LOGGED DEPTH	331.5m	LOGGING SPEED	9 m/min	FLUID LEVEL	7.5 m
GEOLOGIST	M. BELL	ELEVATION	74.92 m	BACK GROUND	8 c/s	PROBE No.	3/3
DRILLER	C. Stratford	CO-ORDS		TIME BASE	2 SEC	STANDARD	895 C/S
LOGGER	J. Mortimer			K-FACTOR	2.25×10^{-5}		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



INTERVAL	DESCRIPTION
0 - 102m	MIXED CLASTICS: oxidized reddish-brown.
102 - 114	MIXED CLASTICS: reddish-brown with grey clay clasts.
114 - 126	MIXED CLASTICS: mainly yellowish silty clay with limonite and minor hematite stain; angular quartz sand to 3mm; and siliceous pebbles to 1cm.
126 - 128	SILTY CLAY: light greenish grey with purplish hematite stain.
128 - 184	SILTY CLAY: light to medium greenish-grey; minor limonite stain. 182-186 trace of sand.
184 - 194	CLAY: light grey to black clays.
194 - 278	CLAY: mainly black, minor light grey and variegated. 214-222 lignitic.
278 - 288	SANDY CLAY: clay 'as above'; siliceous and feldspathic sand, angular to subrounded to 3mm.
288 - 296	SAND: quartz sand, subrounded to rounded to 2mm.
296 - 306	CLAYEY SAND: 'as above'.
306 - 312	SANDY CLAY: 'as above'.
312 - 318	CLAY: mainly black; minor light grey and variegated.
318 - 322	GRAVELY CLAY: siliceous and feldspathic gravels, subrounded to 1.5cm.
322 - 330	CLAY: 'as above' with occasional pebbles.
330 - 334	CLAYEY GRAVELS: granitic gravels. End of hole.

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DRILL HOLE LOG

HOLE No.	77-52	DATE DRILLED	4/10/75	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	EL-209	DATE COMPLETED	5/10/75	RANGE	200 c/s	RESIST. SCALE	5 Ω/in
PROJECT	Poontana	DATE LOGGED	5/10/75	TIME CONSTANT	2 SEC	SP. SCALE	
LOCATION	Paralana Ck	DRILLED DEPTH	272m	PAPER SPEED	1cm/m	BIAS	H600/300
STATE	S.A.	LOGGED DEPTH	268.5 m	LOGGING SPEED	9m/min	FLUID LEVEL	3m
GEOLOGIST	M. BELL	ELEVATION	71.34m	BACK GROUND	8 C/S	PROBE No.	3/3
DRILLER	C. Stratford	CO-ORDS		TIME BASE	2 SEC	STANDARD	890
LOGGER	J. Mortimer			K-FACTOR	2.25×10^{-5}		

LITHOLOGY : Gravel | Sand | Silt | Clay | Carbonate | Carbonaceous

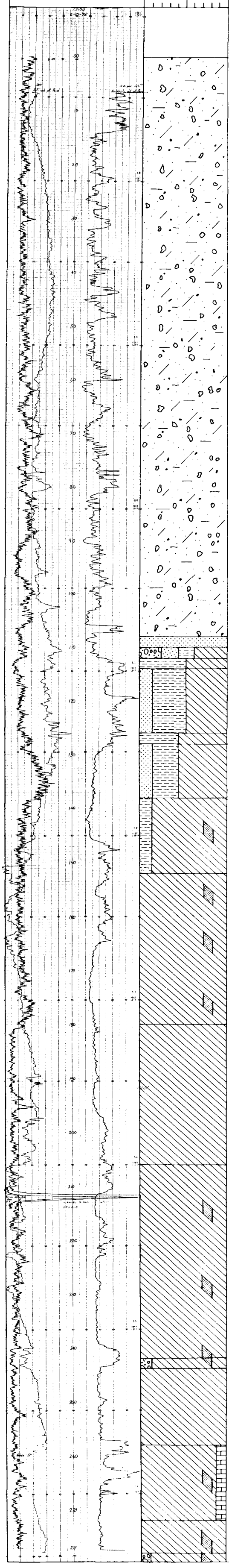
INTERVAL	DESCRIPTION
0 - 30m	MIXED CLASTICS: light brown.
30 - 110	MIXED CLASTICS: oxidized reddish-brown.
110 - 140	MIXED CLASTICS: reddish-brown; silty greenish-grey clay with limonite stain.
140 - 142	SILTY CLAY: medium grey with purplish hematite stain.
142 - 144	SAND: subrounded siliceous and feldspathic sand to 2mm.
144 - 150	SILTY CLAY: 'as above'.
150 - 152	SAND: 'as above'.
152 - 164	CLAY: light grey with hematite stain.
164 - 178	CLAY: light to medium grey; trace of sand and pebbles; some hematite.
178 - 180	SANDY CLAY: light to medium grey; subrounded to angular siliceous and feldspathic sand to 2mm.
180 - 232	CLAY: medium to dark grey; minor variegated; minor limonite and hematite.
232 - 262	CLAY: mainly black; minor grey and variegated.
262 - 270	CLAY: 'as above' with calcrete.
270 - 272	GRAVELS: granitic gravels with calcrete. End of hole.

DRILL HOLE LOG

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HOLE No.	77-53	DATE DRILLED	6/10/75	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	EL-209	DATE COMPLETED	6/10/75	RANGE	200/500 C/S	RESIST. SCALE	5 Ω/in
PROJECT	Poontana	DATE LOGGED	6/10/75	TIME CONSTANT	2 SEC	SP. SCALE	
LOCATION	Paralana Ck	DRILLED DEPTH	280m	PAPER SPEED	1cm/m	BIAS	H600/300
STATE	S.A.	LOGGED DEPTH	277m	LOGGING SPEED	9m/min. 2.5M/MIN	FLUID LEVEL	6-5m
GEOLOGIST	M. BELL	ELEVATION	71.84m	BACK GROUND	8 C/S	PROBE No.	3/3
DRILLER	C. Stratford	CO-ORDS		TIME BASE	2 SEC	STANDARD	890 C/S
LOGGER	J. Mortimer			K-FACTOR	2.25×10^{-5}	1.15×10^{-5}	

LITHOLOGY: Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



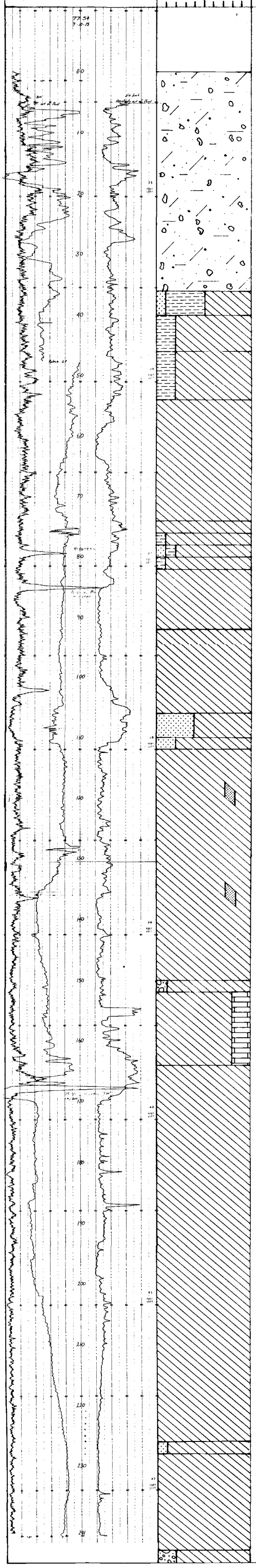
INTERVAL	DESCRIPTION
0 - 108m	MIXED CLASTICS: reddish-brown.
108 - 110	SAND: brownish, subrounded to angular quartz sand to 3mm.
110 - 112	MIXED CLASTICS: sand 'as above' and granitic pebbles sub-rounded to 2cm.
112 - 114	SILTY CLAY: reddish brown and yellow limonite stain in light greenish grey clay.
114 - 126	SILTY CLAY: 'as above'; more limonite stain.
126 - 128	SILTY CLAY: 'as above', but with clasts of hematite.
128 - 138	SILTY CLAY: medium grey clays with red hematite stain; minor limonite.
138 - 152	SILTY CLAY: light to dark grey; some black with hematite stain; minor white clay.
152 - 180	CLAY: medium grey to black; occasionally lignitic; hematite and minor limonite stain.
180 - 206	CLAY: 'as above', but much greenish-grey clay and less hematite stain.
206 - 258	CLAY: greenish-grey to black clays and variegated; minor limonite and hematite stain. 242-244 minor gravel.
258 - 272	CLAY: 'as above' with white calcrete.
272 - 278	CLAY: grey to black and variegated.
278 - 280	GRAVEL: clay 'as above' and siliceous gravels. End of hole.

DRILL HOLE LOG

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HOLE No.	77-54	DATE DRILLED	7/10/75	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	EL-209	DATE COMPLETED	7/10/75	RANGE	200 c/s	RESIST. SCALE	5Ω/in
PROJECT	Poontana	DATE LOGGED	7/10/75	TIME CONSTANT	2 SEC	SP. SCALE	
LOCATION	Paralana Ck	DRILLED DEPTH	246m	PAPER SPEED	1cm/m	BIAS	H600/300
STATE	S.A.	LOGGED DEPTH	241m	LOGGING SPEED	9m/min	FLUID LEVEL	5m
GEOLOGIST	M. BELL	ELEVATION	92.97m	BACK GROUND	8 C/S	PROBE No.	3/3
DRILLER	C. Stratford	CO-ORDS		TIME BASE	2 SEC	STANDARD	890
LOGGER	J. Mortimer			K-FACTOR	2.25×10^{-5}		

LITHOLOGY : Gravel | Sand | Silt | Clay | Carbonate | Carbonaceous



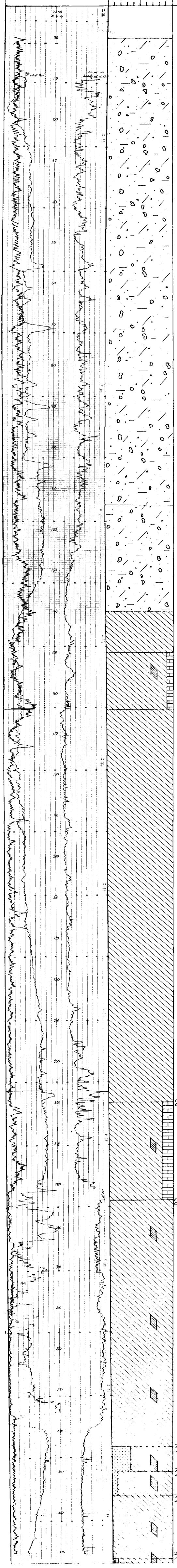
INTERVAL	DESCRIPTION
0 – 36m	MIXED CLASTICS: oxidized reddish-brown.
36 – 40	SILTY CLAY: light greenish- grey clay with reddish-brown stain; minor angular to subrounded quartz and feldspathic sand to 2mm.
40 – 46	SILTY CLAY: light greenish-grey with minor brown stain.
46 – 54	SILTY CLAY: yellowish-grey with limonite stain.
54 – 74	CLAY: light grey with purplish hematite stain, waxy; minor white clay.
74 – 76	CLAY: light purplish grey; minor green clay.
76 – 78	SILTY CLAY: very light grey with minor limonite and hematite stain.
78 – 80	SANDY CLAY: 'as above'; subrounded quartz sand to 2mm.
80 – 82	SILTY CLAY: light grey waxy clay with hematite stain and silty grey clay with limonite stain.
82 – 92	CLAY: light grey, waxy; minor hematite stain.
92 – 106	CLAY: light to medium grey; minor limonite stain. 96-90m trace of gravel and sand.
106 – 110	CLAYEY SAND: clay 'as above'; subrounded siliceous sand and minor feldspathic sand to 3mm; occasional pebble to 3cm.
110 – 112	SANDY CLAY: very fine grey sand in dark grey clays.
112 – 150	CLAY: grey to black and variegated; minor limonite and hematite stain throughout.
150 – 152	CLAY: 'as above' with some sand and gravel.
152 – 164	CLAY: 'as above' with hard white calcrete.
164 – 226	CLAY: light to dark grey and variegated; occasional limonite and hematite.
226 – 228	CLAY: 'as above' with minor quartz sand to 1mm.
228 – 244	CLAY: as 164-226m.
244 – 246	GRAVELY CLAY: clay 'as above' with siliceous gravels. End of hole.

DRILL HOLE LOG

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HOLE No.	77-55	DATE DRILLED	7/10/75	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	EL-209	DATE COMPLETED	10/10/75	RANGE	200 C/S	RESIST. SCALE	5Ω/in
PROJECT	Poontana	DATE LOGGED	10/10/75	TIME CONSTANT	2 SEC	SP. SCALE	
LOCATION	Paralana Ck	DRILLED DEPTH	374m	PAPER SPEED	1cm/m	BIAS	H600/300
STATE	S.A.	LOGGED DEPTH	370m	LOGGING SPEED	9m/min	FLUID LEVEL	9.5m
GEOLOGIST	M. BELL	ELEVATION	76.66m	BACK GROUND	8 C/S	PROBE No.	3/3
DRILLER	C. Stratford	CO-ORDS		TIME BASE	2 SEC	STANDARD	890 C/S
LOGGER	J. Mortimer			K-FACTOR	2.25×10^{-5}		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



INTERVAL	DESCRIPTION
0 – 114m	MIXED CLASTICS: oxidized reddish-brown.
114 – 140	MIXED CLASTICS: mainly silty light greenish-grey clay with limonite and hematite stain.
140 – 150	CLAY: mostly medium grey with minor yellowish-green clay.
150 – 164	CLAY: grey to black lignitic clay; crystaline gypsum; minor white clay. 158-162m lignite.
164 – 260	CLAY: light to dark grey and variegated; minor limonite stain; and traces of quartz sand.
260 – 284	CLAY: grey to black and variegated; hard white calcrete.
284 – 344	CLAY: 'as above'.
344 – 350	SANDY CLAY: clay 'as above'; angular to subrounded quartz sand to 2mm.
350 – 356	SANDY CLAY: 'as above'; sand slightly finer.
356 – 372	CLAY: grey to black and variegated; occasional grains of quartz and feldspar, subrounded to 4mm.
372 – 374	GRAVELY CLAY: clay 'as above'; with chips of siliceous feldspathic pebbles. End of hole.

DRILL HOLE LOG

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HOLE No.	77-56	DATE DRILLED	11/10/75	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	EL-209	DATE COMPLETED	12/10/75	RANGE	200 c/s	RESIST. SCALE	5Ω/in
PROJECT	Poontana	DATE LOGGED	12/10/75	TIME CONSTANT	2 SEC	SP. SCALE	——
LOCATION	Paralana Ck	DRILLED DEPTH	348m	PAPER SPEED	1cm/m	BIAS	H600/200
STATE	S.A.	LOGGED DEPTH	348.5m	LOGGING SPEED	9m/min	FLUID LEVEL	11m
GEOLOGIST	M. BELL	ELEVATION	76.72m	BACK GROUND	8 c/s	PROBE No.	3/3
DRILLER	C. Stratford	CO-ORDS		TIME BASE	2 SEC	STANDARD	890 c/s
LOGGER	J. Mortimer			K-FACTOR	2.25×10^{-5}		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous

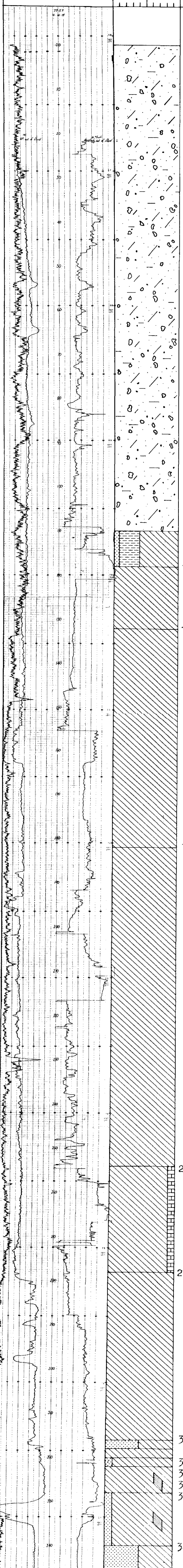
INTERVAL	DESCRIPTION
0 - 134m	MIXED CLASTICS: oxidized reddish-brown; clay in last 6m is grey and silty.
134 - 138	CLAY: light to medium grey.
138 - 146	CLAY: 'as above'; crystaline gypsum; some limonite stain.
146 - 160	CLAY: light grey with limonite stain.
160 - 170	CLAY: medium grey with limonite stain.
170 - 256	CLAY: light to medium grey with some black and variegated; some limonite.
256 - 280	CLAY: 'as above' with hard white calcrete.
280 - 284	CLAY: light to medium grey, minor black, light green and white.
284 - 288	SANDS: subround quartz and feldspathic sand to 2mm; sub-rounded pebbles to 1cm.
288 - 292	CLAY: 'as above'.
292 - 294	SAND: quartz and feldspathic sand to 1mm; clay 'as above'.
294 - 298	CLAY: 'as above'.
298 - 318	SAND: very fine grey sand. Well sorted. Clay 'as above'.
318 - 326	SAND: grey, subrounded to 1mm. Well sorted; clay 'as above'.
326 - 346	SAND: 'as above'.
346 - 348	SANDY GRAVEL: weathered gravels, subrounded and siliceous; sand and clay 'as above'. End of hole.

DRILL HOLE LOG

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HOLE No.	77-57	DATE DRILLED	13/10/75	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	EL-209	DATE COMPLETED	14/10/75	RANGE	200 C/S	RESIST. SCALE	10 /in
PROJECT	Poontana	DATE LOGGED	14/10/75	TIME CONSTANT	2 SEC	SP. SCALE	—
LOCATION	Paralana Ck	DRILLED DEPTH	357m	PAPER SPEED	1cm/m	BIAS	H300/145
STATE	S.A.	LOGGED DEPTH	349.5m	LOGGING SPEED	9cm/min	FLUID LEVEL	22m
GEOLOGIST	M. BELL	ELEVATION	78.05m	BACK GROUND	8 C/S	PROBE No.	3/3
DRILLER	C. Stratford	CO-ORDS		TIME BASE	2 SEC	STANDARD	890 C/S
LOGGER	J. Mortimer			K-FACTOR	2.25×10^{-5}		

LITHOLOGY : Gravel | Sand | Silt | Clay | Carbonate | Carbonaceous



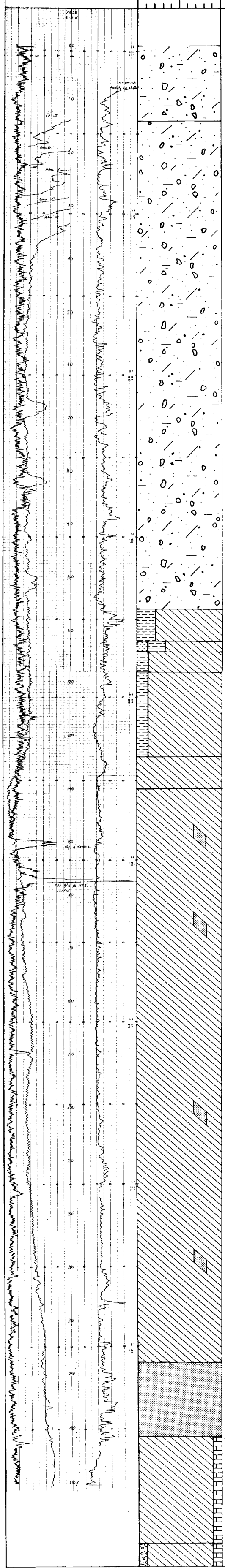
INTERVAL	DESCRIPTION
0 - 110m	MIXED CLASTICS: oxidized reddish-brown.
110 - 118	SILTY CLAY: light greenish-grey clay with limonite and hematite stain.
118 - 132	CLAY: waxy yellow-grey.
132 - 182	CLAY: light to medium grey clays and yellow clay.
182 - 254	CLAY: light grey clay: minor yellow and variegated 240-242m trace of sand.
254 - 278	CLAY: light to medium grey and variegated; hard white calcrete.
278 - 316	CLAY: 'as above'
316 - 318	SAND AND CLAY: clay 'as above'; angular to sub-rounded quartz sand to 1mm.
318 - 320	CLAY: 'as above'
320 - 322	SANDY CLAY: 'as above'
322 - 328	CLAY: mostly grey with some black clay.
328 - 340	SANDY CLAY: clay 'as above' and variegated; sand 'as above'; occasional sub-rounded milky quartz to 5mm; occasional pebbles of quartz to 1cm.
340 - 356	SAND AND CLAY: clay 'as above'; sub-rounded siliceous sand to 1mm.
356 - 357	SANDY CLAY: 'as above' with weathered siliceous pebbles to 1.5cm End of hole.

DRILL HOLE LOG

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HOLE No.	77-58	DATE DRILLED	15/10/75	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	EL-209	DATE COMPLETED	16/10/75	RANGE	200 C/S	RESIST. SCALE	10 /in
PROJECT	Poontana	DATE LOGGED	16/10/75	TIME CONSTANT	2 SEC	SP. SCALE	———
LOCATION •	Paralana Ck	DRILLED DEPTH	284m	PAPER SPEED	1cm/m	BIAS	H300/145
STATE	S.A.	LOGGED DEPTH	270.5m	LOGGING SPEED	9m/min	FLUID LEVEL	7.5m
GEOLOGIST	M. BELL	ELEVATION	76.74 m	BACK GROUND	8 C/S	PROBE No.	3/3
DRILLER	C. Stratford	CO-ORDS		TIME BASE	2 SEC	STANDARD	890 C/S
LOGGER	J. Mortimer			K-FACTOR	2.25×10^{-5}		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



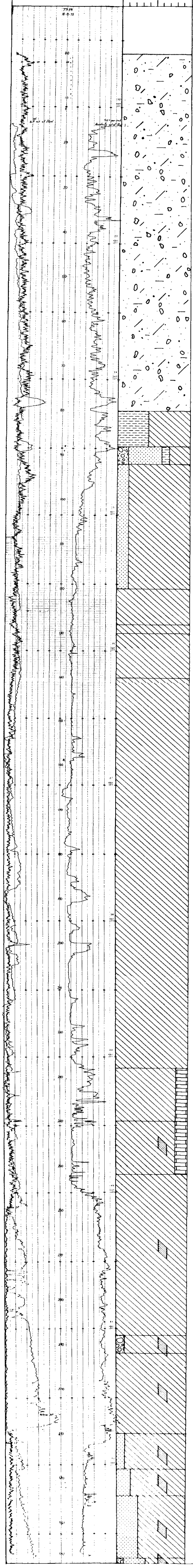
INTERVAL	DESCRIPTION
0 – 14m	MIXED CLASTICS: grey; mainly gravel and sand.
14 – 106	MIXED CLASTICS: oxidized reddish-brown; sand, silt and clay.
106 – 112	SILTY CLAY: Light greenish-grey; yellow limonite stain and minor reddish-brown stain.
112 – 114	SANDY CLAY: light greenish-grey with yellow limonite stain; sub-rounded stained siliceous and feldspathic sands to 1mm; occasional pebble to 5mm.
114 – 118	SILTY CLAY: 'as above'.
118 – 134	SILTY CLAY: yellowish-grey with minor hematite stain.
134 – 140	CLAY: very light grey with minor limonite and hematite stain.
140 – 248	CLAY: light to medium grey; minor black and variegated; minor limonite stain; 188–190 trace of crystaline gypsum 186–189 lignitic
248 – 262	CLAY: mostly black; minor light grey and variegated.
262 – 282	CLAY: light to medium grey and variegated with hard white calcrete.
282 – 284	CLAY: grey to light green; variegated siliceous pebbles sub-rounded to 1cm; and calcrete. End of hole.

DRILL HOLE LOG

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HOLE No.	77-59	DATE DRILLED	17/10/75	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	EL-209	DATE COMPLETED	18/10/75	RANGE	200 C/S	RESIST. SCALE	7.5 /in
PROJECT	Poontana	DATE LOGGED	18/10/75	TIME CONSTANT	2 SEC	SP. SCALE	
LOCATION	Paralana Ck	DRILLED DEPTH	342m	PAPER SPEED	1cm/m	BIAS	H450/145
STATE	S.A.	LOGGED DEPTH	337m	LOGGING SPEED	9m/min	FLUID LEVEL	16M
GEOLOGIST	M. BELL	ELEVATION	78.62	BACK GROUND	10 C/S	PROBE No.	3/3
DRILLER	C. Stratford	CO-ORDS		TIME BASE	2 SEC	STANDARD	899 C/S
LOGGER	J. Mortimer			K-FACTOR	2.25×10^{-5}		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



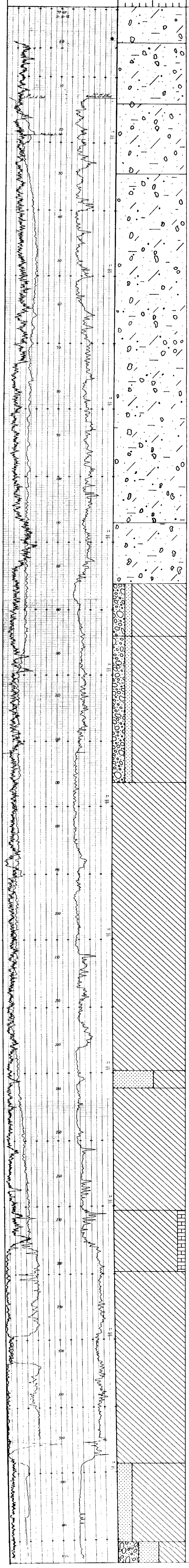
INTERVAL	DESCRIPTION
0 – 80m	MIXED CLASTICS: oxidized brown to reddish-brown.
80 – 88	SILTY CLAY: greenish-grey with some reddish-brown stain.
88 – 92	MIXED CLASTICS: greenish-grey silty clay with yellow limonite stain; sub-rounded quartz and siliceous sand and pebbles to 1.5cm.
92 – 120	SANDY CLAY: yellowish grey; 104-106m minor white clay; 98-110m 10% very fine grey quartz sand; 112-116m 10% fine sand, coloured siliceous and feldspathic to 1mm.
120 – 128	CLAY: black carbonaceous with limonite stain.
128 – 130	CLAY: light grey.
130 – 140	CLAY: medium to dark grey and black.
140 – 228	CLAY: mostly light grey; minor medium grey and variegated; limonite stain. 180-182m light grey.
228 – 240	CLAY: mainly light to dark grey with calcareous white clay and minor variegated.
240 – 252	CLAY: light grey, dark grey, black, and variegated; much hard white calcrete.
252 – 288	CLAY: 'as above'
288 – 292	CLAY: 'as above'; with sub-rounded siliceous pebbles to 1cm.
292 – 310	CLAY: 'as above' with considerable greenish clay.
310 – 318	SANDY CLAY: 'as above'; very fine angular to sub-rounded quartz sand.
318 – 324	SAND: clay 'as above' and sand to 1mm; trace of gravel.
324 – 338	SAND: clay 'as above'; coarser sub-rounded sand to 2mm.
338 – 342	SAND: 'as above' with siliceous pebbles to 2mm. End of hole.

DRILL HOLE LOG

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HOLE No.	77-60	DATE DRILLED	19/10/75	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	EL-209	DATE COMPLETED	21/10/75	RANGE	200 C/S	RESIST. SCALE	10 /in
PROJECT	Poontana	DATE LOGGED	21/10/75	TIME CONSTANT	2 SEC	SP. SCALE	
LOCATION	Paralana Ck	DRILLED DEPTH	352m	PAPER SPEED	1cm/m	BIAS	H300/145
STATE	S.A.	LOGGED DEPTH	347.5m	LOGGING SPEED	9m/min	FLUID LEVEL	13m
GEOLOGIST	M. BELL	ELEVATION	76.27 m	BACK GROUND	9 C/S	PROBE No.	3/3
DRILLER	C. Stratford	CO-ORDS		TIME BASE	2 SEC	STANDARD	894 C/S
LOGGER	J. Mortimer			K-FACTOR	2.24×10^{-5}		

LITHOLOGY : Gravel | Sand | Silt | Clay | Carbonate | Carbonaceous



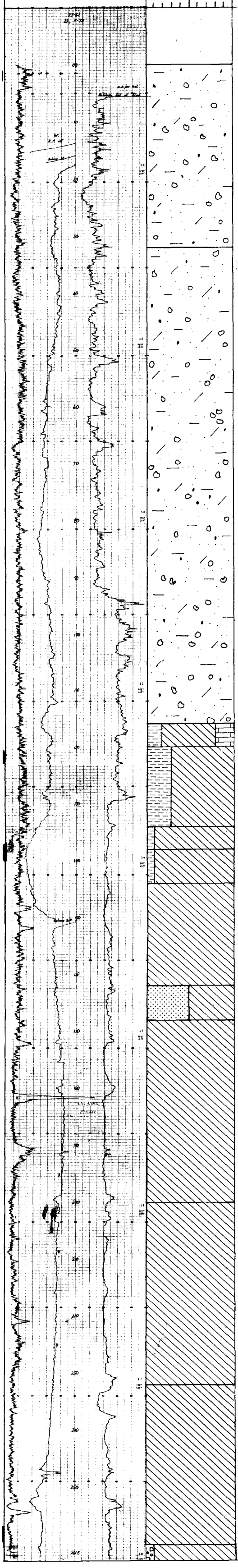
INTERVAL	DESCRIPTION
0 – 14m	MIXED CLASTICS: grey
14 – 30	MIXED CLASTICS: brown to red.
30 – 110	MIXED CLASTICS: reddish-brown; light greenish-grey silty clay.
110 – 124	MIXED CLASTICS: yellowish-brown with limonite stain.
124 – 136	SANDY CLAY: medium grey with hematite stain; mixed siliceous sand and pebbles.
136 – 170	SANDY CLAY: light to medium grey with limonite and hematite stain; coarse sand and gravel sub-rounded to 2cm.
170 – 236	CLAY: light to dark grey and variegated; poor samples with much sand and gravel falling down hole.
236 – 240	CLAYEY SAND: clay 'as above'; sub-rounded grey quartz sand to 1mm.
240 – 268	CLAY: 'as above'
268 – 282	CLAY: 'as above'; with some black clay and hard white calcrete.
282 – 326	CLAY: light grey to black; considerable light green clay, and variegated clays.
326 – 344	SAND: clay 'as above'; angular to sub-rounded quartz sand to 1mm; some rounded milky quartz to 3mm; trace of pyrite.
344 – 352	CLAYEY SAND: clay and sand 'as above'; sub-rounded siliceous pebbles to 2cm. End of hole.

DRILL HOLE LOG

2608-19
Vol. I

HOLE No.	77-61	DATE DRILLED	22/10/75	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	EL-109	DATE COMPLETED	22/11/75	RANGE	200 c/s	RESIST. SCALE	10Ω/in.
PROJECT	Poontana	DATE LOGGED	22/11/75	TIME CONSTANT	2 sec.	SP. SCALE	-
LOCATION	Lake Frome	DRILLED DEPTH	262m	PAPER SPEED	1 cm/m	BIAS	H300/145
STATE	S.A.	LOGGED DEPTH	261.9m	LOGGING SPEED	9m/min	FLUID LEVEL	5.5m
GEOLOGIST	M. Bell	ELEVATION	77.52m	BACK GROUND	9 c/s	PROBE No.	313
DRILLER	C. Stratford	CO-ORDS		TIME BASE	2 sec.	STANDARD	890 c/s
LOGGER	J. Mortimer			K-FACTOR	1.15x 10^{-5}, 225 x 10^{-5}		

LITHOLOGY : Gravel | Sand | Silt | Clay | Carbonate | Mixed Clastics | Carbonaceous



INTERVAL	DESCRIPTION
0-32m	Mixed clastics : Greyish-brown
32-116m	Mixed clastics : Reddish-brown
116-120m	Silty clay : Light grey with brown and yellow stain : Hard light grey calcrete.
120-134m	Silty clay : Light greenish-grey with yellow Limonite stain.
134-138m	Clay : Light grey with Limonite and Hematite stain
138-144m	Clay : Light grey with Hematite stain and minor limonite stain
144-162m	Clay : Light grey with Hematite nodules
162-168m	Sandy clay : Medium grey clay with poorly sorted subrounded siliceous sand to 3mm.
168-200m	Clay : Medium grey to variegated, with minor Hematite nodules.
200-232m	Grey : Medium grey and variegated.
232-260m	Grey : Dark grey with some black.
260-262	Clay : Dark grey with some black, and subrounded siliceous gravels about 1-2cm, some weathered Feldspar and Granitic pebbles.

End of hole

BP Minerals Australia Proprietary Limited
Incorporated in Victoria

W
038

1 Albert Road, Melbourne
Postal Address: G.P.O. Box 5222BB, Melbourne, 3001
Telephone: 26-6911 Telex: 30166 Telegraphic Address: "Austbeepee", Melbourne

The Director of Mines,
Department of Mines,
G.P.O. Box 151,
EASTWOOD S.A. 5063

Our Reference	Your Reference	Telephone Ext'n	Date
U/14/2-DMT:KMS			July 23, 1976.

Dear Sir,

EXPLORATION LICENCE 209/1 - QUARTERLY REPORT FOR THE PERIOD ENDED JUNE 1976

A drilling programme was undertaken over the area covered by this licence during the second quarter of 1976. The programme commenced on May 11 and was completed on July 1. Twenty two holes were drilled for a total of 5850 metres. The depth of the holes ranged from 232m to 352m.

Results obtained indicate that there are, in general terms, three anomalous intersections (160-170m, 210-220m and 270-280m) which can be correlated between adjacent holes. Significant radiometric anomalies (over 500 cps) were recorded in the middle intersection in five holes and in the higher intersection in one hole. Details of these anomalies are attached (Table I).

A report on this programme is being prepared and will be forwarded on completion.

Future work, planned for September-November 1976, will include drilling to further delineate the area underlain by the ore grade material and taking of cores for assay purposes.

A Quarterly Expenditure Statement will be forwarded under separate cover as soon as all the expenditures to the end of June are available.

Yours faithfully,

J.H. Hills
Minerals Exploration Manager

Encl.

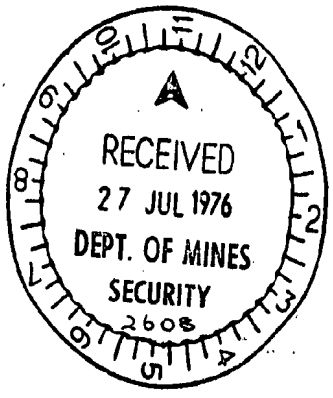


TABLE I

HOLE NO.	INTERVAL (metres)	MAXIMUM COUNT (cps)	lb/TON ($\equiv U_3O_8$)
209-4	160.1-159.8	638	1.5
209-7	214.0-213.7	779	2.2
209-8 *	217.5-212.2	2400	2.6
209-12	214.2-213.5	1709	3.6
209-20 **	213.8-213.6	564	2.4
209-21	212.1-211.6	666	2.3

* Included in hole 209-8 are:-

INTERVAL	MAXIMUM COUNT (cps)	lb/TON ($\equiv U_3O_8$)
216.9-216.0	1150	4.0
215.4-214.8	2400	7.4
212.9-212.2	909	3.2

** Estimated values only as a result of an incomplete digital recording.

BP Minerals Australia Proprietary Limited
Incorporated in Victoria

1 Albert Road, Melbourne
Postal Address: G.P.O. Box 5222BB, Melbourne, 3001
Telephone: 26-6911 Telex: 30166 Telegraphic Address: "Austbeepee", Melbourne

663 N

The Director of Mines,
P.O. Box 151,
EASTWOOD S.A. 5063

Our Reference	Your Reference	Telephone Ext'n	Date
U/14/2-JHH:KMS			July 20, 1976.

Dear Sir,

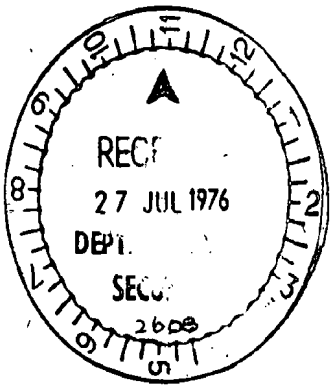
ESTIMATED EXPLORATION EXPENDITURE FOR QUARTER ENDING JUNE 30, 1976

In response to your request, we wish to advise that our estimated exploration expenditure on Exploration Licences 203, 209, 210 for the quarter ending June 30, 1976 is as follows:

	EL203	EL209	EL210
Geological Services		$ 1,400	
Geochemical Services		600	
Drilling		39,500	
Ground Geophysical		16,850	
Field Consumable		3,500	
Vehicle		450	
Rental of Equipment		1,600	
Charter Aircraft		300	
Freight & Cartage		150	
Travelling Expenses		400	
Personnel Service		500	
Salaries & Wages		12,200	
Total	NIL	$77,450	NIL

Yours faithfully,

J.H. Hills
Minerals Exploration Manager



C. 041

Oilmin N.L.
Transoil N.L.
Petromin N.L.
Mines Administration Pty Ltd
Teton Exploration Drilling Co. P/L
BP Minerals Australia P/L.

U/14/1

7th. September, 1976.

PRIMARY AGREEMENT

EXPLORATION LICENCES 203, 209 and 210 SOUTH AUSTRALIA

QUARTERLY EXPENDITURE REPORT

In accordance with Clause 8 of the above agreement, BP hereby reports on the expenditure for the quarter ending June 1976.

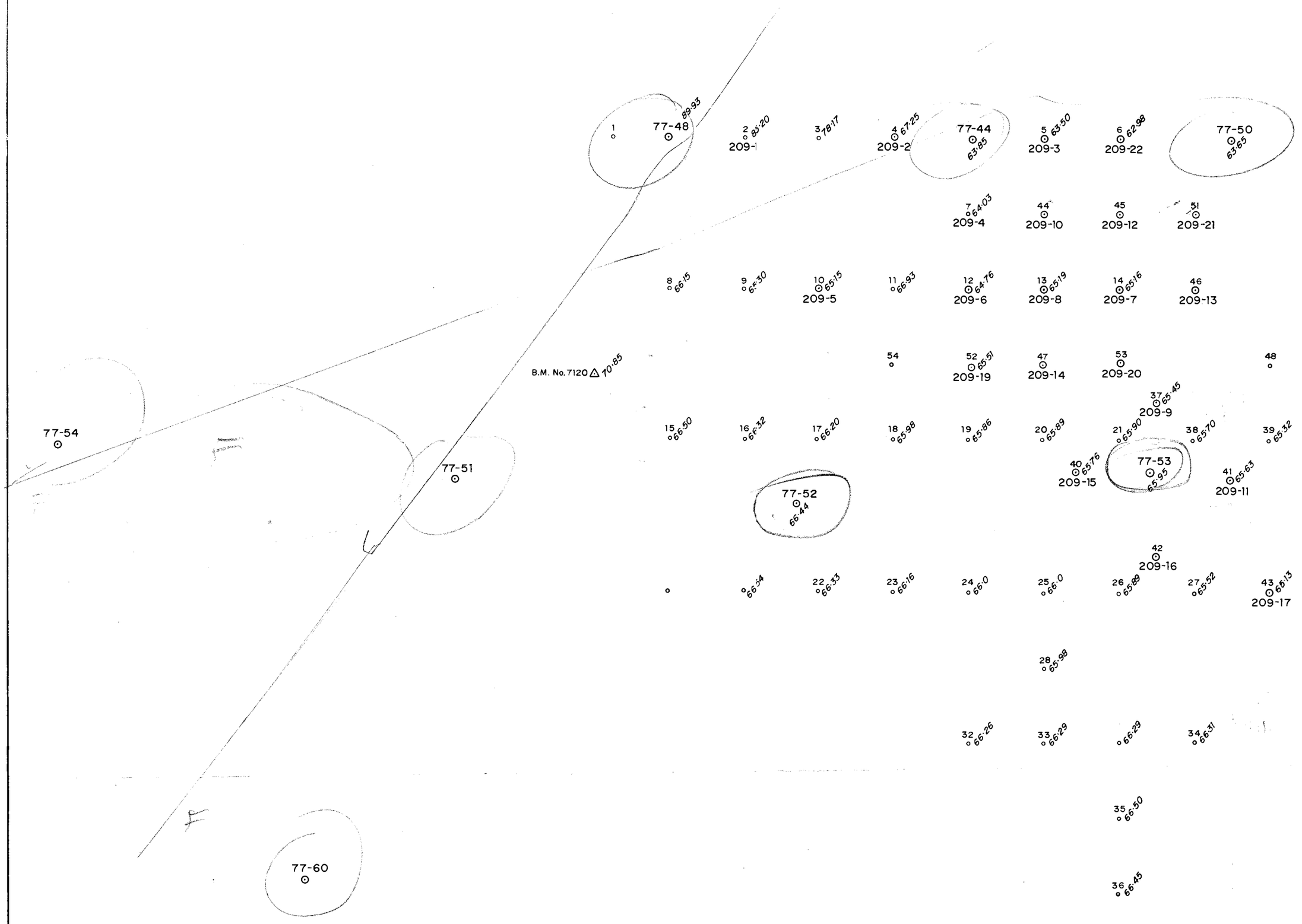
	EL 203	EL 209	EL 210
Exploration			
Geological Services		1,919	
Geochemical Services		774	
Drilling		38,223	
Logging		12,256	
Consumable Field Stores		3,237	
Operations			
Vehicle Operating		860	
Rental of Equipment		1,025	
Charter Aircraft		321	
Freight and Cartage		59	
Travelling		343	
Personnel Services		860	
Salaries and Wages		11,166	
TOTAL	NIL	71,043	NIL

.....

MINERALS EXPLORATION MANAGER

RECEIVED
15 SEP 1976
DEPT. OF MINES
SECURITY
2608

T 1593



N

POONTANA PROJECT, LAKE FROME S.A.

DRILL HOLE LOCATION MAP

(in part of EL 209)

SCALE : 1cm = 100m

metres 100 0 100 200 300 400 500 metres 1 Km

LEGEND

- 77·53 ⊙ Drill hole (1975)
- 209-9 ⊙ Drill hole (1976)
- 25 ° Drill site (1976)
- △ Bench mark
- 78·17 Elevation in metres

RECEIVED
27 JUL 1976
DEPT. OF MINES
SECURITY
2608

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref:	
JUNE 1976	MINERAL BRANCH

10 × reduction

2608-20 Vol. I

BP House, 1 Albert Road, Melbourne 3004
Telephone 26 6911

042

October 5th, 1976.

QUARTER ENDING SEPTEMBER 1976

PROSPECTIVE STATUS OF EL 209

On the basis of drilling presently being undertaken we consider that the area has excellent potential for establishment of commercially viable uranium deposits.

J.H.Hills
Minerals Exploration Manager

The Director of Mines,
Department of Mines,
G.P.O. Box 151,
EASTWOOD S.A. 5063

Postal Address: G.P.O. Box 5222 BB, Melbourne 3001

Envelope 2608

Oilmin N.L.
Transoil N.L.
Petromin N.L.
Mines Administration P/L
Teton Exploration Drilling Co. P/L
BP Minerals Australia P/L

C43

U/14/1

12th. November, 1976.

PRIMARY AGREEMENT

EXPLORATION LICENCE 203, 209 and 210, SOUTH AUSTRALIA

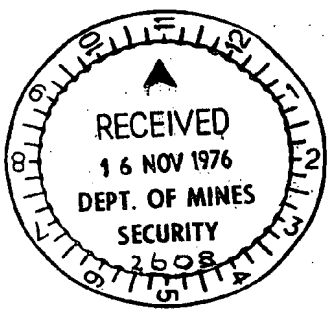
QUARTERLY EXPENDITURE REPORT

In accordance with Clause 8 of the above agreement, BP hereby reports on the expenditure for the quarter ending September 1976.

	EL 203	EL 209	EL 210
Exploration			
Geological Services		196	
Geochemical Services		217	
Drilling		33,780	
Logging		6,802	
Consumable Field Stores		327	
Operations			
Vehicle Operating		199	
Rental of Equipment		1,200	
Freight and Cartage		122	
Travelling Expenses		453	
Personnel Services		1,971	
Trade Expenses		4	
Salaries and Wages		6,394	
TOTAL	NIL	51,665	NIL

.....

MINERALS EXPLORATION MANAGER



BP Minerals Australia Proprietary Limited
Incorporated in Victoria

1 Albert Road, Melbourne
Postal Address: G.P.O. Box 5222BB, Melbourne, 3001
Telephone: 26-6911 Telex: 30166 Telegraphic Address: "Austbeepee", Melbourne

044

The Director of Mines,
Department of Mines,
G.P.O. Box 151
EASTWOOD S.A. 5063

Our Reference	Your Reference	Telephone Ext'n	Date
U/14/2-JHH/YT		642	5th. October, 1976.

Dear Sir,

EXPLORATION LICENCE 209 - QUARTERLY REPORT FOR THE PERIOD ENDED SEPTEMBER 1976

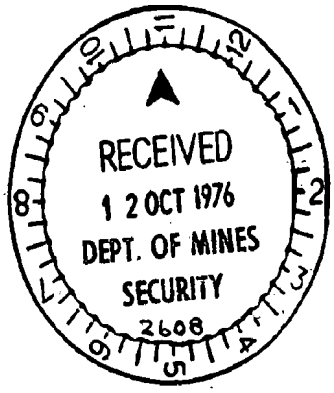
An extention of term of Exploration Licence 209 for a period of 12 months has been granted by the Honorable, The Minister for Mines.

An open hole rotary drilling programme commenced in September on the southern portion of EL 209, where significant uranium mineralization was encountered in the previous drilling programme. Drilling is currently in progress.

The results to date indicated an area of mineralization at least 400 metres long by 200 metres wide at a depth of about 210 metres below surface. Grade calculated from the gamma- logs vary from 1 to 13 lbs/ton e U_3O_8 over thickness of 0.2 to 7.3 metres. A summary of the gamma-log results of mineralized holes are shown in the attached Table 1 and accompanying drill-hole location map.

One hole, 209-31, was cored between 200 and 220 metres. Core recovery was unfortunately poor. Samples will be submitted for chemical analyses for comparison with gamma log data.

..2



Reports on the drilling results will be forwarded on completion to the Department of Mines,

A Quarterly Expenditure Statement will be sent, under separate cover, as soon as expenditures to the end of September are available.

Yours faithfully,

Dr. J. H. Hills
Minerals Exploration Manager.

Encl.

TABLE 1

PARALANA CREEK PROSPECT

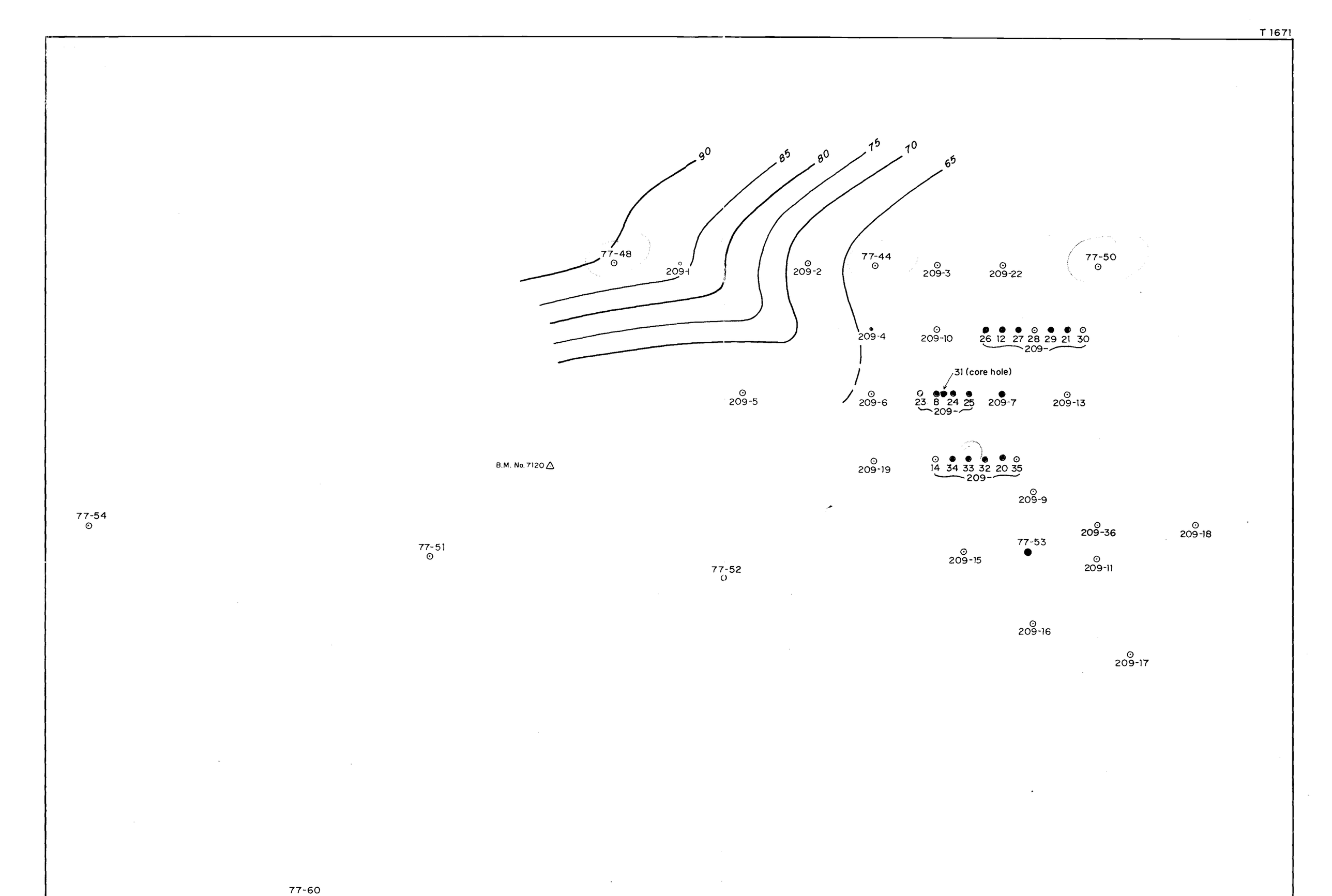
046

GAMMA LOG RADIOMETRIC ASSAYS OF DRILL HOLES.

DRILL HOLE NO.	INTERVAL (METRES)	THICKNESS (METRES)		RADIOMETRIC GRADE e lbs/ton U_3O_8	
77 - 44	161.7 - 162.0	0.3		0.88	
	172 - 172.2	0.2		0.94	
77 - 53	211.8 - 212.2	0.4		1.14	
209 - 4	159.8 - 160.1	0.3		1.5	
209 - 7	213.7 - 214.0	0.3		2.2	
209 - 8	212.2 - 217.5	5.3		2.6	
	212.2 - 212.9	0.7		3.2	
	214.8 - 215.4	0.6		7.4	
	216.0 - 216.9	0.9		4.0	
209 - 12	213.5 - 214.2	0.7		3.6	
209 - 20	213.6 - 213.8	0.2		2.4	
209 - 21	211.6 - 212.1	0.5		2.3	
209 - 24	212.1 - 212.9	0.8	3.4	4.4	3.15
	214.7 - 215.5	0.8		9.0	
209 - 25	214.6 - 215.4	0.8		5.2	
209 - 26	221.7 - 222.0	0.3		1.2	
209 - 27	216.5 - 218.0	1.5	7.3	5.2	1.57
	223.5 - 223.8	0.3		12.2	
209 - 29	209.1 - 210.0	0.9	2.9	0.14	0.63
	211.6 - 212.0	0.4		4.6	
209 - 31	211.6 - 216.9	5.3		6.4	
	211.6 - 213.1	1.5		4.0m	
	214.1 - 216.7	2.6		9.6	
	214.8 - 215.9	1.1		13.0	
209 - 32	155.6 - 155.9	0.3		3.0	
	217.7 - 218.2	0.5		2.6	
209 - 33	214.8 - 215.3	0.5		6.2	
209 - 34	214.6 - 215.2	0.6		4.6	
	225.0 - 225.4	0.4		1.6	

Top Beverley 113 - 128 m

T 1671





POONTANA PROJECT, LAKE FROME S.A.

DRILL HOLE LOCATION MAP

(in part of EL 209)

SCALE : 1cm = 100m

metres 100 0 100 200 300 400 500 metres

LEGEND

77-53 ⊙ Drill hole (1975)

209-9 ⊙ Drill hole (1976)

● % $\underline{e}U_3O_8$ >1 lb/ton

—90 M.S.L. contour (m.)

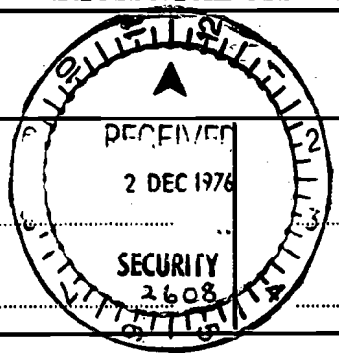
2608-21
Vol. I

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref:	
SEPTEMBER 1976	MINERAL BRANCH

BASED ON T1593

...RTMENTAL MEMORANDUM 047





Date 22/10/76

From : R.A. CALLEN

To : DIRECTOR OF MINES

Subject : URANIUM MINERALIZATION, E.L. 209 CONFIDENTIAL

Docket Reference D.M. Env. 2608 Security File No.

POSITION OF MINERALIZATION IN RELATION TO BEVERLEY URANIUM HORIZON.

To accompany Figs. 1 & 2.

ASSUMPTIONS

To make the following correlation, two basic assumptions are required (1) The Poontana Structure does not pass between the mineralization (209-24, 27, 29) and hole 77-50. (2) Correlation between E20-13 and WC2 bore in Fig. 1 is correct.(3) The drill hole locations are accurately plotted.

The first assumption seems justified from inspection of Fig.V of B.P. Minerals report by M.S. Bell dated March, 1976. This shows a correlation between 77-44 and 77-50 which looks correct, so far as I could determine from a brief inspection. This correlation is important, as there is no doubt that the fault passes somewhere between 77-48 and 77-50. Bell's Fig.V shows it between 77-44 and 77-48, which seems correct when the bores are plotted, and compared with my structure map transparency. see Fig. 1 for locality.

Assumption (2) can only be checked by drilling a hole through the carbonates to intersect the Eyre Formation, in the vicinity of WC2 bore (or at least drilling the complete sequence). If I were to revise my correlation between WC2 and E20-13, I would probably correlate the Beverley horizon with something higher in the E20-13 sequence.

Assumption (3) is partly covered in the discussion of assumption (1), but it would help greatly if companies submitted accurate hole plots showing latitude and longitude with a bearing and distance to the nearest prominent trig point. Most of the plans provided are just dots on a sheet of paper. The holes are shown in relation to a bench mark, but it is a time consuming process to obtain accurate locality plots for these.

CORRELATION

The above assumptions allow comparison of depths of mineralization in 209-27, 29 directly with the log of 77-50. This is reasonable, as correlation parallel to the fault (i.e. N-S) is generally straight forward, whereas E-W correlation is difficult, due to facies changes

..2/

Sup Geol Mun Explor
Env. 2608

and structure. Fig.2 shows the correlation between 77-50 and Central Pacific Minerals E20-13. As you can see, correlation is excellent, even to individual peaks, for the upper part of the hole.

At the position of the presumed Beverley sand, however, there are two alternatives ((1) and (2) of Fig.2) - either X or Y in E20-13 could be equated with Z in 77-50. From Fig.1, Y is seen to be the Beverley Sand equivalent. Accepting the pink lines as correct (alternative (1)), Z becomes an horizon slightly above the Beverley Sand, which lenses out. This alternative is supported by acceptance of a westerly dip for the area east of Poontana Fault (advocated by several companies, and supported in my thesis). The position of the dolomite horizon compared with that in the base of Wooltana 1 bore (Fig.1) supports this dip, assuming no lenticularity, and accepting the dolomite as a time marker. This makes the correlation between E22-20 and Wooltana 1 bore, shown in Fig.1, incorrect.

* Alternative (2) shown with black lines, denies the westerly dip, and correlation of dolomite (which becomes time transgressive), but accepts the fact that a better correlation is obtained beneath Z in Fig.2, between the two holes. My feeling is that this is the better correlation, and that a westerly dip does not necessarily apply so close to the Poontana Structure.

* In either case the uranium horizon located by B.P. Minerals is beneath the Beverley sand equivalent. If assumption (2) is incorrect, the next preferred correlation would place the new horizon even lower in relation to the Beverley Sand.

CONCLUSIONS

The uraniferous sand located by B.P. Minerals is lower in the Miocene sequence than the Beverley sand. Estimates vary according to the possibilities outlined above, and are, in order of decreasing preference.

(1) 55 metres below

(2) 45 metres below the equivalent of the Beverley Sand, which has lensed out.

(3) 76 metres below.

It is of interest, to speculate on the possibility that this deposit is the 'tail end' of higher grade uranium on the upthrow side (west) of the Poontana Structure, equivalent to the Beverley horizon. In addition, lower uranium bearing horizons could be present beneath the Beverley Deposit, or <u>east</u> of the Poontana Structure.

Lastly, the correlation with Wooltana 1 bore could best be resolved by assuming that the Poontana Structure does not die out to the south, to reappear again even further south as suggested by geophysical results (Crusader Oil N.L.). Instead, correlation of the dolomites suggests downfaulting of 77-50 relative to Wooltana 1 bore, which is in keeping with the plotted position of Wooltana 1, west of the Poontana Structure. This has implications for exploration south along the fault.

R.A. Callen

WC2

SP R

E20-13

SP R

F22-20

SP R

SHIFTED BASE LINE

WOOLTANA 1

SP R

70
60
50
40
30
20
+ 10
M.S.L.
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130

M.S.L.

RUN2

RUN1

N

PARALANA
~~WOOLTANA~~
HIGH PLAIN

WC2

77-50

709-33

E20-13

F22-20

WT3

WT4

WT6

BALCANOONA
HIGH PLAIN

WOOLTANA 1

0 20 40 60 80 100 KILOMETRES

1: 500,000

1: 1000 000

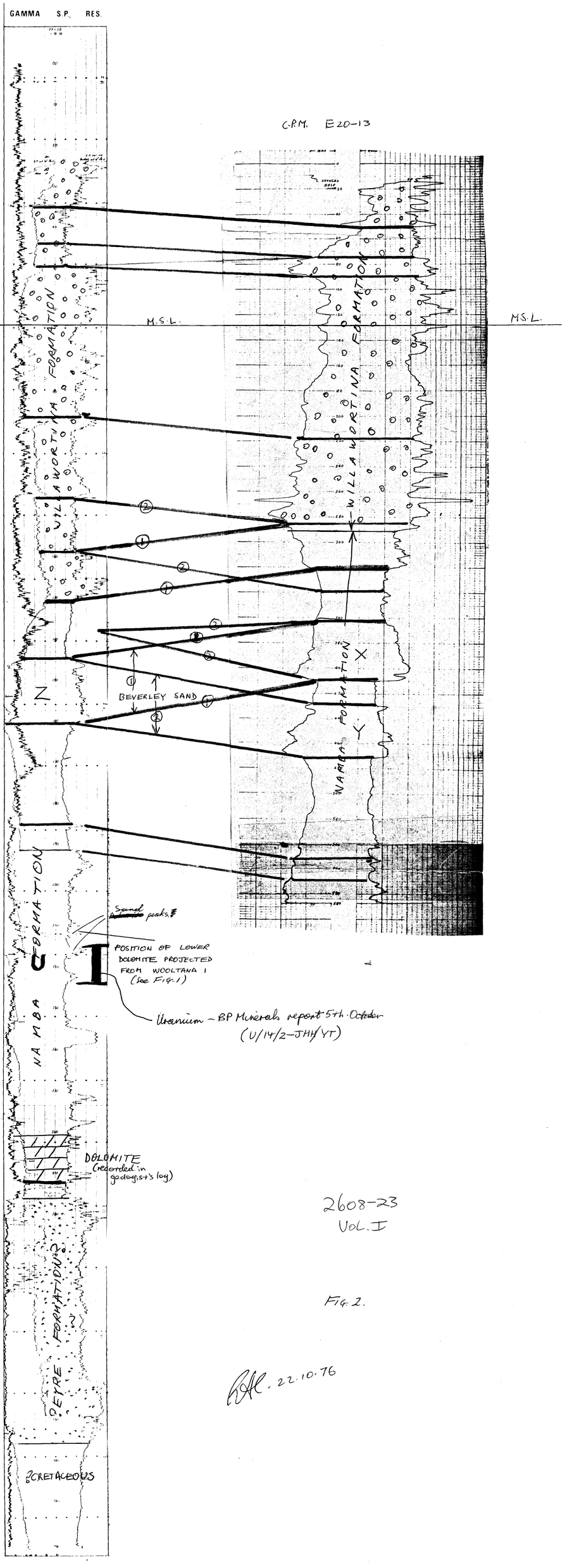
2608-22
VOL. I

22.10.76

FIG. 1.

2608 (1) – 23

BP Minerals 77-50



2608-23
VOL. I

FIG 2.

22.10.76

T 1688

139°38' E

30°16' S

30°17' S

77-55

77-56

53 50 52

51

54

77-58

N

POONTANA PROJECT, LAKE FROME S.A.

DRILL HOLE LOCATION MAP

(in part of EL 209)

SCALE : 1 cm. = 50m.

metres 50 0 50 100 150 200 250 metres

LEGEND

77-56 ⊙ Drill hole (1975)

⊙ 50 Drill hole (209- series, 1976)

EL 209

2608-24

VOL. I

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref:	
NOVEMBER 1976	D. M. TAYLOR

BP Minerals Australia Proprietary Limited
Incorporated in Victoria

049

1 Albert Road, Melbourne
Postal Address: G.P.O. Box 5222BB, Melbourne, 3001
Telephone: 26-6911 Telex: 30166 Telegraphic Address: "Austbeepee", Melbourne

EL 209/1

Director of Mines
Department of Mines,
P.O. Box 151
EASTWOOD S.A. 5063

Our Reference	Your Reference	Telephone Ext'n	Date
		642	16th. November, 1976.

Dear Sir,

In response to your request of October 21st. (E.L. 209 ICG:PAL), I am enclosing a detailed plan of the recent drill hole locations for our drilling programme over E.L. 209.

The latitudes and longitudes of the specific holes mentioned are as follows : -

No.	77 - 48	30° 15' 4.5" S 139° 35' 17.6" E
	77 - 44	30° 15' 4.5" S 139° 35' 48.3" E
	77 - 50	30° 15' 4.5" S 139° 36' 14.3" E
	209 - 15	30° 15' 33.5" S 139° 35' 58.5" E

These co-ordinates have been calculated using the co-ordinates for Bench Mark 7120, as advised by you (DM 3/76 BSG:HR, October 27th, 1976), of :-

30° 15' 25" S
139° 35' 10" E.

Yours faithfully,

Dr. J. H. Hills,
Minerals Exploration Manager

Encl.

RECEIVED
18 NOV 1976
MINES
2608

T 1634

139°35'

139°36'

30°15'

30°16'

77-48 89·93

77-44 65·85

77-50 63·65

77-52 66·44

77-53 65·76

K 247m.

M>294

M>305

B.M. No. 7120 △ 70·85

31 (core hole)

K

N

POONTANA PROJECT, LAKE FROME S.A.

DRILL HOLE LOCATION MAP

(in part of EL 209)

SCALE : 1cm = 50m.

metres 50 0 50 100 150 200 250 metres

1Km.

LEGEND

77·53 ⊙ Drill hole (1975)

⊙ 15 Drill hole (209– series, 1976)

25 ∘ Drill site (1976)

△ Bench mark

66·44 Elevation in metres

+ See letter

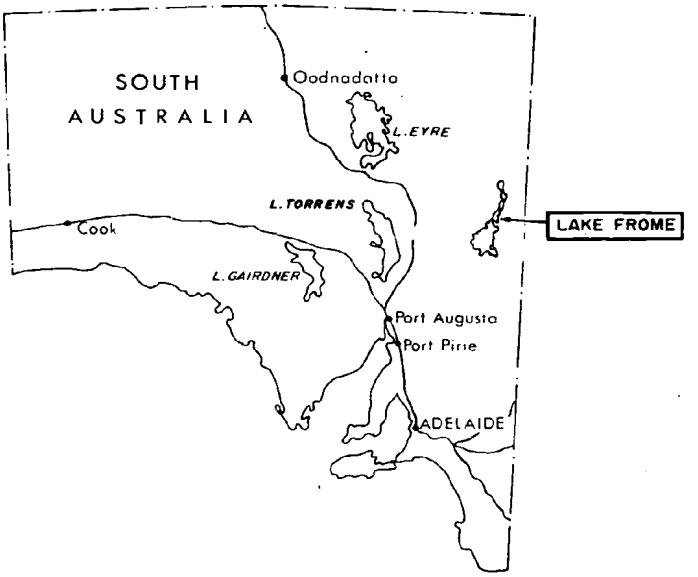
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EL 209.

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref:	
NOVEMBER 1976	D. M. TAYLOR

2608-25
Vol. I

050



LOCATION MAP

1976
DRILLING PROGRAMME No. 1

EL 209

LAKE FROME EMBAYMENT

SOUTH AUSTRALIA

RECEIVED
10 DEC 1976
DEPT. OF MINES
SECURITY
2608-11

651

BP MINERALS AUSTRALIA PROPRIETARY LIMITED

1976 DRILLING PROGRAMME No.1

EL 209

LAKE FROME EMBAYMENT, SOUTH AUSTRALIA

Derek M. TAYLOR
MELBOURNE - VICTORIA
NOVEMBER, 1976.

S U M M A R Y

Exploration Licence 209 covers an area of 805 square kilometers to the northwest of Lake Frome and to the south and east of the Beverley uranium deposits. A drilling programme was undertaken to test the significance of radiometric anomalies detected in holes drilled in the southern portion of this licence in previous programmes.

A total of twenty-two holes were drilled, in the period May/June 1976, to an average depth of 266 m. Five of these holes intersected significant radiometric anomalies at a depth between 210 and 216 m. Radiometric grades (e U_3O_8) of up to 7.4 lb. U_3O_8 / ton were encountered.

It appears possible that the sands containing these anomalies are equivalent to those sand containing the Beverley deposits. Further drilling, including the drilling of a core hole, is recommended.

C O N T E N T S

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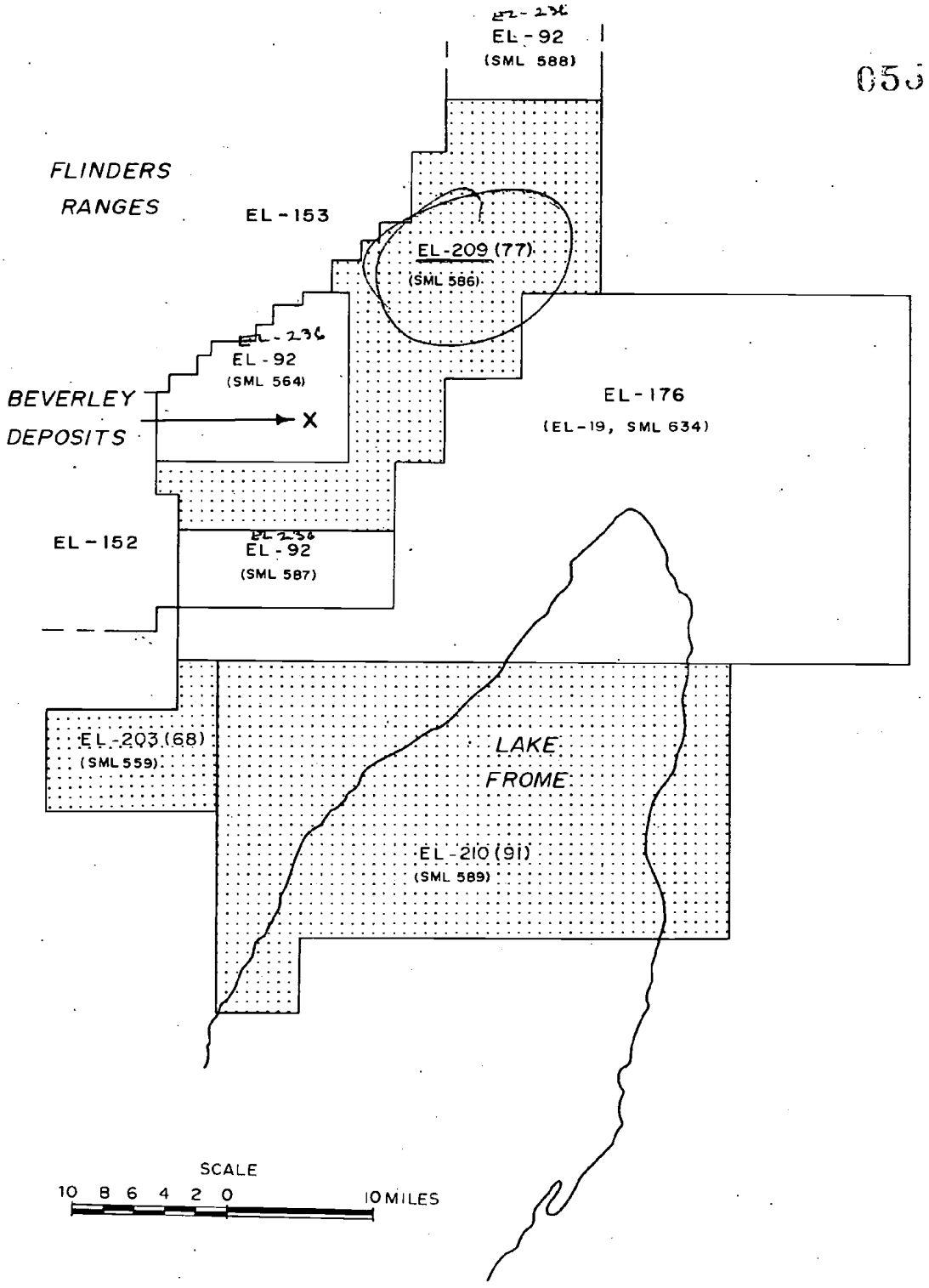
FIGURES

FIGURE 1 - E.L. LOCATION MAP (before Page 1)

FIGURE 2 - DRILL HOLE LOCATION MAP (In Back Pocket)

FIGURE 3 - SUBSURFACE SECTIONS (Nos. 3.1 to 3.8) and SECTION LOCATION MAP (3.9) (In Back Pocket)

FIGURE 4 - SIMPLIFIED COMPOSITE SECTION (Before Page 8)



EXPLORATION LEASES ON NORTH WEST SIDE OF LAKE FROME EMBAYMENT

(AS AT JULY 1976)

25% BP INTEREST

FIGURE 1

BP MINERALS AUST. PTY LTD	
Area:	LAKE FROME
SOUTH AUSTRALIA	
Ref:	
NOVEMBER 1976	MINERAL BRANCH

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1. INTRODUCTION

Exploration Licence 209 covers an area of 805 square kilometres to the northwest of Lake Frome and to the south and east of the Beverley deposits (see Figure 1).

This report details the exploration recently undertaken over this licence during the period May/June 1976. This drilling programme was designed to test the significance of radiometric anomalies detected in two holes drilled in this area during previous programmes (Bell, 1975b and 1976).

2. PREVIOUS EXPLORATION

Exploration undertaken in the area covered by EL 209 prior to 1974 has been described by Bell (1975a). The more recent exploration has also been described by Bell (1975a, 1975b, and 1976).

Significant radiometric anomalies were found in the southern portion of the area, most notably in the area immediately north of Paralana Creek, by both Minad-Teton Australia (Jarre and Brunt, 1971) and by BP Minerals Australia Pty Ltd (Bell op.cit.).

3. GENERAL GEOLOGY

The geology of the Frome Embayment has been described in a variety of papers mainly by Callen (1973, 1975a, 1975b, 1976). Briefly, the area discussed in this report is underlain by Tertiary and Quaternary sands, clays, silts and gravels lying disconformably on Cretaceous silts and shales. The Tertiary sequence has been divided by Callen into the Eyre, Namba and Willawortina Formations. The uranium at the Beverley Deposits is contained within the Namba Formation.

The area is crossed by the Poontana Structure. This generally north-south structure, with a "downthrow" to the east, is of a problematical nature and will be discussed later in this report.

4. PRESENT PROGRAMME

a) General Planning

The present drilling programme was based on the results of Drill Programme No. I, 1975 and Drill Programme No. II, 1975 in particular holes numbered 77-44 and 77-53. Fifteen holes were planned to be

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drilled to depths between 250 and 350 metres with a spacing of 200 or 400 metres, the closer spacing being around the two previously mentioned holes.

Initially a grid containing thirty six drill sites was surveyed in (May 9th - May 12th). During this survey it was noted that a previous hole (77-53) had been incorrectly positioned and this resulted in a slight modification to the programme.

It was originally planned that the fifteen holes would be drilled in a continuous programme lasting for three to four weeks. As a result of problems encountered with both the drilling and logging of the holes (including the loss of two downhole probes), caused by a perched water table washing shallow gravels (16-18 m) into the hole, only eight holes were drilled in three weeks (May 11th to May 31st). A break was taken at this point (June 1st. to June 16th).

During this break the new data was reviewed in the Melbourne office and the programme modified as a result of the radiometric anomalies detected in holes numbered 209-4 and 209-7. An additional fourteen holes (to total twenty two) were planned, drilled and logged in a two week period (June 16th - July 1st). Several of these later holes were surveyed in by compass and chain and, therefore, elevations given for these holes in the accompanying figures are only approximations (Figure 2).

In addition to the down hole logging for gamma activity, self potential and resistivity, the holes were lithologically logged by describing drill cuttings collected every 2 metres. Representative portions of the cuttings were returned to Melbourne for further examination. Copies of the original lithological, gamma and electrical logs are held on file.

Water samples were collected from previously drilled holes and bores over this area and those areas covered by EL 203 and EL 210. These samples are presently being analysed and will be described in a separate report.

b) Technical Detail

A total of twenty two holes were drilled and probed to an average depth of 266 metres. The deepest hole (209-1) was drilled to 354 metres (probe depth 352 m) and the shallowest to 232 metres. Problems were encountered at shallow depth in the drilling of all but the first two holes (209-1 and 209-2). These problems were caused by very coarse gravels which were not only very difficult to penetrate but also continuously fell, or were washed, into the hole. One hole, 209-6, was cemented for the top 26 m once this depth had been achieved after over

eight hours of drilling. The problems of the shallow gravels became worse as Paralana Creek was approached. Once a hole had been started, or drilled beyond 20 m, it was important to complete it that day otherwise re-entering the hole took as long, or even longer, than the initial drilling.

The thick mud used to keep the holes open, together with partial hole collapse, frequently made it difficult to sink the probe to the bottom of the hole. In addition the shallow gravels that caused problems to the drillers tended to collapse over the probe and in this way two probes were lost (in holes 209-7 and 209-11). Attempts to wash out and fish for these probes were unsuccessful. One probe was successfully washed out (from hole 209-8) after being hung in the hole and almost stuck in another hole (209-20) but was wrenched free.

In the event of an anomalous intersection being recorded (values in excess of 200 cps) the anomalous section was relogged for gamma activity and a digital record obtained.

Once the holes had been drilled and logged they were cased, to varying depths, using $2\frac{1}{2}$" diameter plastic casing (slotted). It was initially planned that all holes would be cased to a depth of 36 m but the rapid collapse often prevented this.

c) Personnel

Project Geologist :	Dr. D.M. Taylor
Prospecting Hands :	R.D. Milner
	J.J. Blichfeldt
	M.J. Murphy
Cook :	R. Kemp
Drilling Contractor :	Thompson Drilling Co P/L
Driller :	R. Thompson
	G. Russel
	R. Brown
Assistants :	T. Auld
	R. Taylor
	W. Burdon
Logging Contractors :	Geoscience Associates (Aust) P/L
Operators :	G. Maczkowiack
	J. Mortimer

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5. RESULTS

Lithological descriptions of, and the gamma and electric logs for, each hole are given on the Drill Hole Log sheets in the back pocket.

Table 1 summarises the radiometric anomalies detected during the programme together with details of hole depth (shown as probe depth) and drill site elevation above mean sea level. Peaks less than 70 cps in amplitude have not been noted unless their width at half peak height was equal to or greater than one metre. Peaks below 50 cps have not been noted in this table.

Stratigraphic sections (Figure 3) are presented in this report but are not described in detail here. The subdivisions used in the interpretation of these sections are described in Section 6. The problems encountered in the interpretation are also described in that section.

6. DATA INTERPRETATION

a) Lithological Logs

In general only five distinct lithological divisions have been recognised from the cuttings. A more detailed study of the cuttings, including palaentological determinations, is to be undertaken.

(i) UNIT I

Unit I consists of red or red brown silty or sandy clays, sand and gravel. Towards the base of this unit a greenish-grey clay becomes increasingly common.

(ii) UNIT II

The top of Unit II is defined as the point at which the greenish-grey to red clay ratio exceeds one. This unit commonly is limonite and hematite stained and usually contains a well developed sand near its base. A change in clay colour from greenish-grey to light grey defines the base of this unit.

(iii) UNIT III

This unit consists mainly of mid to dark grey and black clay with lesser olive grey clay and minor white, light grey and yellow clay. A very hard black clay is frequently noted at at least two horizons within the upper half of this unit.

Sandy horizons are common but vary in apparent composition, thickness and stratigraphic position. Limonite and hematite staining varies considerably from hole to hole within this unit. The base of this unit is defined by the appearence of carbonate chips. The majority of holes were terminated in this unit.

(iv) UNIT IV

This unit is rich in carbonate and white clay otherwise it is similar to Unit III with a possible increase in yellow silty clay. Clean quartz sands have been detected within this unit. A bright green clay defines the base of this unit and was used in the deeper holes as an indicator that the deep radiometric anomaly had been reached. The thin carbonates bands are very hard to drill and could have been mistaken for 'Igneous Basement' in previous programmes (see Bell 1976).

(v) UNIT V

Predominantly black, yellow green and grey clay. This unit ccntain a well developed quartz sand. The base of this unit was only penetrated in one hole (209-1) and is defined by an increase in dark grey silty clay with an accompanying decrease in green clay.

Insufficient data are available to define additional units.

b) Electric Logs

Between the base of Unit I and the top of Unit IV five sand horizons are recognisable from the electric logs. To avoid confusion with previous interpretations these sands are designated by lower case letters. The author feels that certain of these sands can be correlated with previously described sands and this is indicated in the text.

Sand a

This sand occurs in the lower part of Unit II and is approximately 10 m thick.

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Sand b

This is a composite sand horizon usually consisting of a thicker upper sand (10 - 15m) and a thin lower sand (2 - 3 m) (Possibly equivalent of B Sand).

Sand d

This is another composite sand horizon made up of a minimum of two and a maximum of four sand units. The composite thickness varies between 10 m and 15 m. (Possible equivalent of D Sand).

Sand e

This is a single sand unit between 2 and 3 m thick and is an excellent marker on the electric logs. (Possible equivalent of E Sand).

Sand f

Another single sand but very variable in thickness (4-18 m). This sand also exhibits a strong electric response. (Possible equivalent of F Sand).

In addition to these five sand horizons two further horizons should be noted.

Sand c

This single sand unit is present in several holes and occurs stratigraphically midway between sand b and sand d. It does not exceed 4 m thick.

Sand d'

This composite sand is present in the easterly drill holes and occurs stratigraphically between the d and e sands. In certain holes (e.g. 209-8) it is difficult to distinguish this sand from the d sand proper. The thickness of this horizon is variable and can occur over an interval of 20 m completely occupying the space between the d and e sand.

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Additional sand horizons do occur between those mentioned above within Units II and III though they are not a well developed as those described here.

The carbonate unit (Unit IV) is very distinct on the electric logs with a very "spikey" resistivity curve. This unit also contains sand horizons but, to date, no attempt has been made at correlating these or naming them.

c) Gamma Logs

(The data obtained from hole 209-1 is omitted from the following description being atypical).

There are three gamma anomalies that can be correlated from hole to hole with only few exceptions. The first of these is a broad, low amplitude, peak that occurs in the clays between the top of Unit III and sand b. The second peak is very similar to this and occurs in the clays between sand b, and, where present, sand c. This second peak is occasionally more pronounced than the first. The third peak is present in all the holes drilled to the base of Unit IV. It occurs just above the base of unit four and may be confined to a carbonate layer.

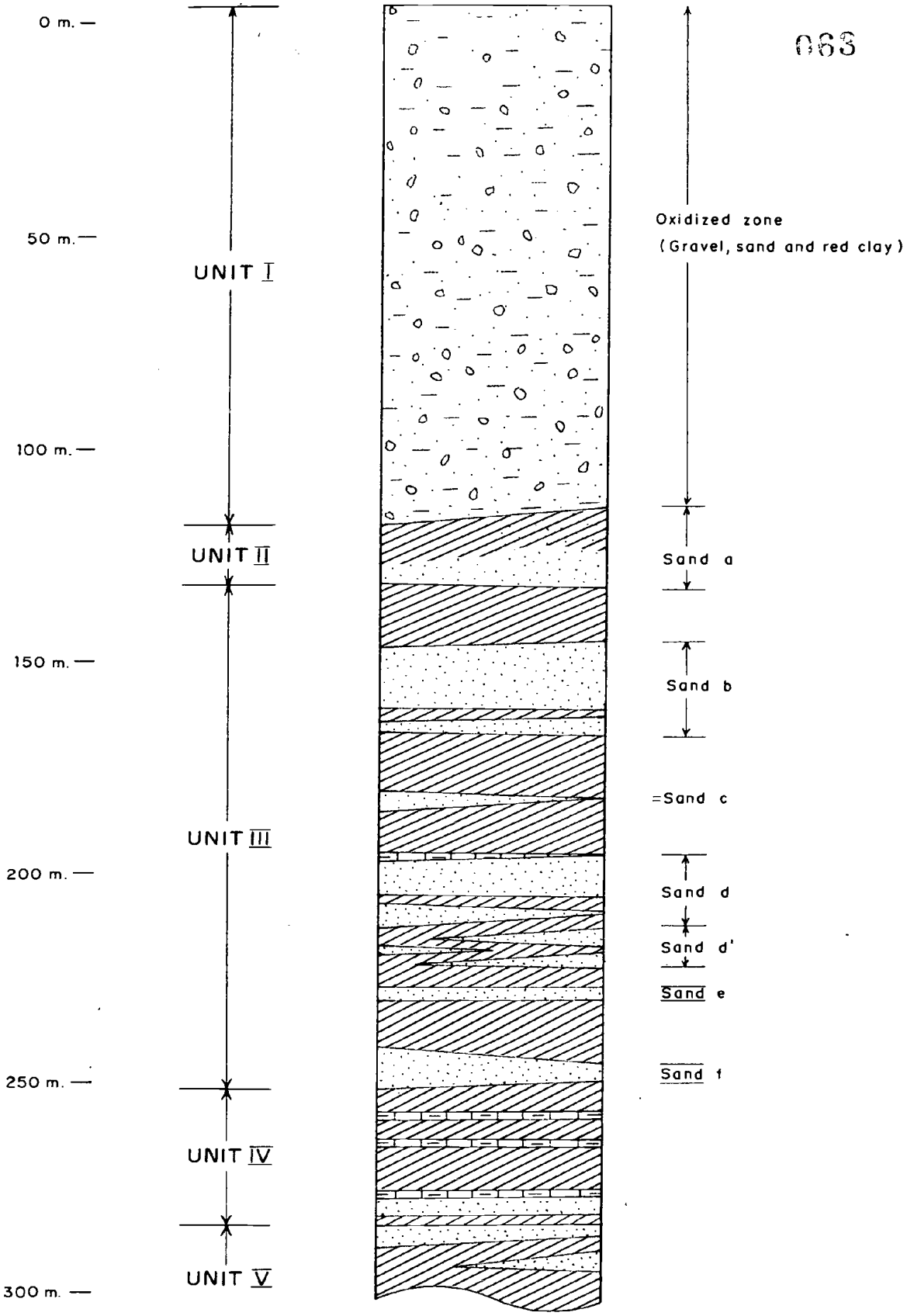
Three other common anomalies occur in the holes. These have been noted in approximately one third of the holes drilled. The upper one occurs associated with the lower unit of sand b and is best developed in 209-4. The remaining two anomalies both occur within sand d. The anomaly in the upper half is the largest anomaly in the area and is best developed in 209-8. The lower of the two is well developed in 209-12. These latter anomalies commonly occur in the same holes but this is not always the case.

Additional anomalies occur at the top of the upper sand b (209-4, 209-14) in a sand developed between sand c and sand d (209-3), in a thin sand between sand e and sand f (209-9) and at the top of Unit IV (209-5).

It was initially believed that three anomalous horizons were significant, shallow (160-165 m), medium (210 - 216 m) and deep (275-280 m), corresponding to lower sand b, upper d' sands and the lower part of Unit IV. The Unit IV anomaly however nowhere has significant width and, after drilling holes to intercept this horizon around the area in which it is best developed, was discounted as a target. In the second part of the drilling programme the major targets were the shallow and medium depth anomalies.

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SIMPLIFIED COMPOSITE SECTION

(EAST OF THE POONTANA STRUCTURE)

LEGEND AS FOR FIGURE 3

FIGURE 4

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref:	
NOVEMBER 1976	D. M. TAYLOR

T 1593

139°35'

139°36'

30°15'

30°16'

77-48 89.93 | 1 | 2 85.20 | 3 78.17 | 4 67.25

209-1

209-2

139°35'40"

139°35'25"

209-3

139°55'

77-44 63.85 | 5 63.50 | 6 62.98 | 77-50 63.65

7 64.03 | 44 64 | 45 | 51

4 | 10 | 12 | 21

8 66.15 | 9 65.30 | 10 65.15 | 11 66.93 | 12 64.76 | 13 66.19 | 14 65.16 | 46 65

5 | 6 | 7 | 13

209-4

B.M. No. 712C △ 10.85

54 | 52 65.51 | 47 65.5 | 53 | 48

19 | 14 | 20

37 65.45

9

77-54

15 66.50 | 16 66.32 | 17 66.20 | 18 65.98 | 19 65.86 | 20 65.89 | 21 65.90 | 38 65.70 | 49 65

18

77-51

40 65.76 | 77-53 65.95 | 41 65.63

15 | 11

77-52 66.44

50

42 66

16

66.54 | 22 65.33 | 23 66.16 | 24 66.0 | 25 66.0 | 26 65.89 | 27 65.52 | 43 65.13

17

28 65.98

32 66.26 | 33 66.29 | 34 66.31

35 66.50

77-60

36 66.45

BASED ON T1593

N

POONTANA PROJECT, LAKE FROME S.A.

DRILL HOLE LOCATION MAP

(in part of EL 209)

SCALE : 1cm = 100m

metres 100 0 100 200 300 400 500 metres

LEGEND

77-53 ⊙ Drill hole (1975)

22 ○ Drill hole (209- series, 1976)

25 ○ Drill site (1976)

△ Bench mark

78·17 Elevation in metres

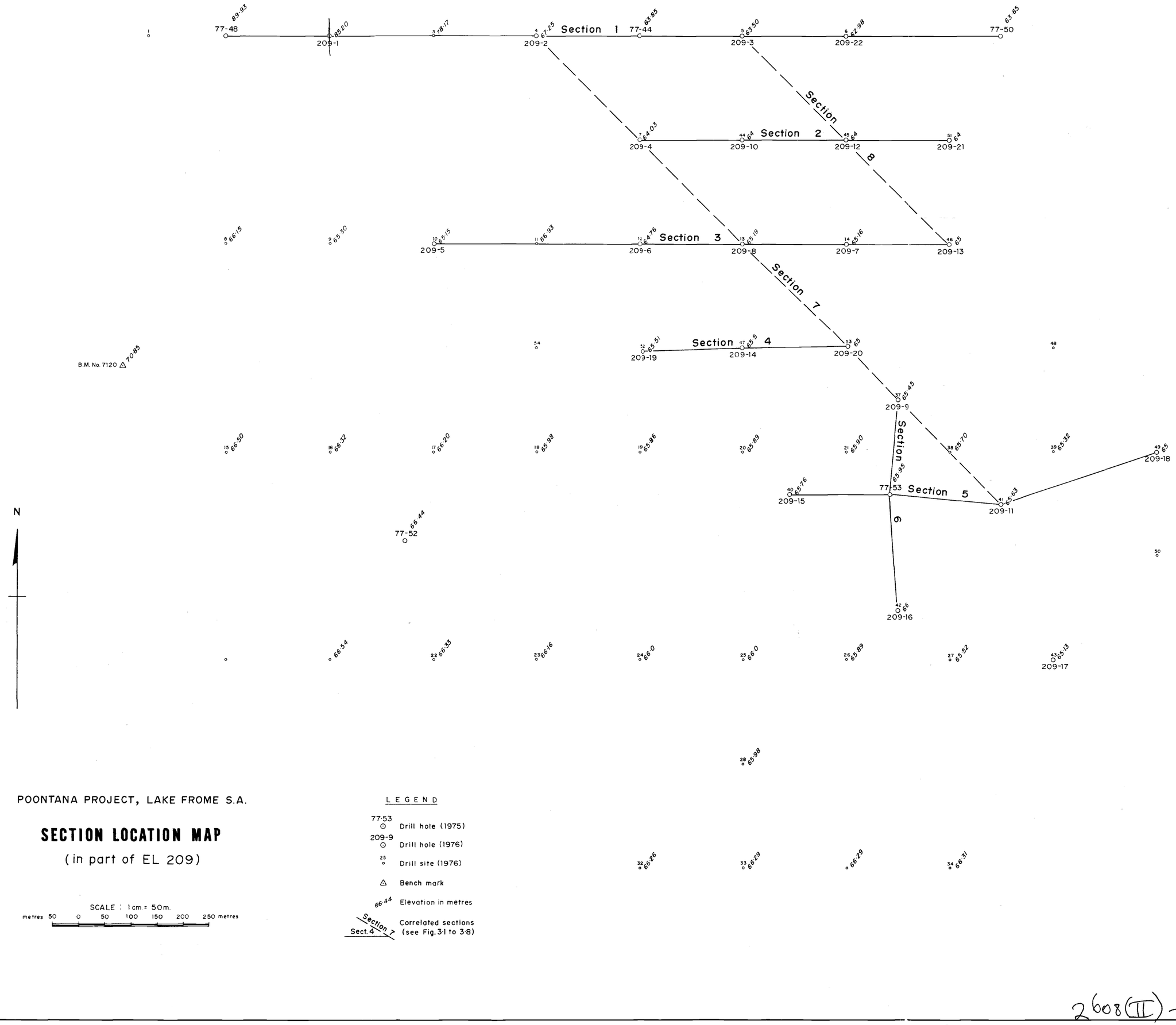
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SECURITY
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FIGURE 2

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref:	
NOVEMBER 1976	MINERAL BRANCH

2608(II)-1

T 1656



POONTANA PROJECT, LAKE FROME S.A.

SECTION LOCATION MAP

(in part of EL 209)

SCALE : 1 cm = 50m.

metres 50 0 50 100 150 200 250 metres

LEGEND

- 77·53 ⊙ Drill hole (1975)
- 209-9 ⊙ Drill hole (1976)
- 25 ∘ Drill site (1976)
- △ Bench mark
- 66·44 Elevation in metres
- Section 7 / Sect. 4 Correlated sections (see Fig. 3·1 to 3·8)

FIGURE 3·9

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref:	
NOVEMBER 1976	D. M. TAYLOR

2608(II)-2

BASED ON T1634

T1689.

77-48
ELEV. 89.93m.

209-1
ELEV. 85.20m.

209-2
ELEV. 67.25m.

77-44
ELEV. 63.85m.

209-3
ELEV. 63.50m.

209-22
ELEV. 62.98m.

77-50
ELEV. 63.65m.

GAMMA
S.P.
RES.

UNIT I
UNIT II
SAND b
WESTERLY
UNIT III
SAND d+d'
SAND e
SAND f
UNIT IV
UNIT V

EASTERLY DATUM M.S.L.

DEPTH 298m
DEPTH 354m
DEPTH 294m
DEPTH 306m
DEPTH 306m
DEPTH 234m
DEPTH 372m

LEGEND

- MIXED CLASTICS [X]
- GRAVEL
- SAND
- SILT
- CLAY
- CARBONATE
- CARBONACEOUS [X]

[X] Used for pre 1976 logs only.

1976
POONTANA PROJECT
PROGRAMME ~~II~~ I
EL-209

PARALANA CREEK AREA
SECTION 1

SCALES
HORIZONTAL: 1 cm. = 20 m.
VERTICAL: 1 cm. = 6m.

FIGURE 3-1
BP MINERALS AUST. PTY LTD
Area: LAKE FROME
SOUTH AUSTRALIA
Ref:
NOVEMBER 1976 D. M. TAYLOR

2608(II)-3

T16893

209-4

ELEV. 64·03 m.

209-10

ELEV. 64 m.

209-12

ELEV. 64m.

209-21

ELEV. 64m.

GAMMA S.P. RES.

UNIT I

WESTERLY

EASTERLY DATUM M.S.L.

UNIT II

UNIT III

UNIT IV

UNIT V

SAND b

SAND c

SAND d + d'

SAND e

DEPTH 306m

DEPTH 288m

DEPTH 234m

DEPTH 234m

LEGEND

- MIXED CLASTICS x
- GRAVEL
- SAND
- SILT
- CLAY
- CARBONATE
- CARBONACEOUS x

x Used for pre 1976 logs only.

1976
POONTANA PROJECT

PROGRAMME ~~II~~ I

EL-209

PARALANA CREEK AREA
SECTION 2

SCALES

HORIZONTAL : 1 cm.= 20 m.

VERTICAL : 1 cm. = 6 m.

FIGURE 3·2

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref:	
NOVEMBER 1976	D. M. TAYLOR

2608(II)-4

T 1689 C

209-5

ELEV. 65·15m.

209-6

ELEV. 64·76m.

209-8

ELEV. 65·19m.

209-7

ELEV. 65·16m.

209-13

ELEV. 65m.

UNIT I

WESTERLY

EASTERLY DATUM M.S.L.

UNIT II

UNIT III

UNIT IV

UNIT V

SAND b

SAND c

SAND d + d'

SAND e

SAND f

DEPTH 306m

DEPTH 288m

DEPTH 288m

DEPTH 288m

DEPTH 240m.

LEGEND

- MIXED CLASTICS [x]
- GRAVEL
- SAND
- SILT
- CLAY
- CARBONATE
- CARBONACEOUS [x]

[x] Used for pre 1976 logs only.

1976

POONTANA PROJECT

PROGRAMME II I

EL-209

PARALANA CREEK AREA

SECTION 3

SCALES

HORIZONTAL : 1 cm. = 20 m.

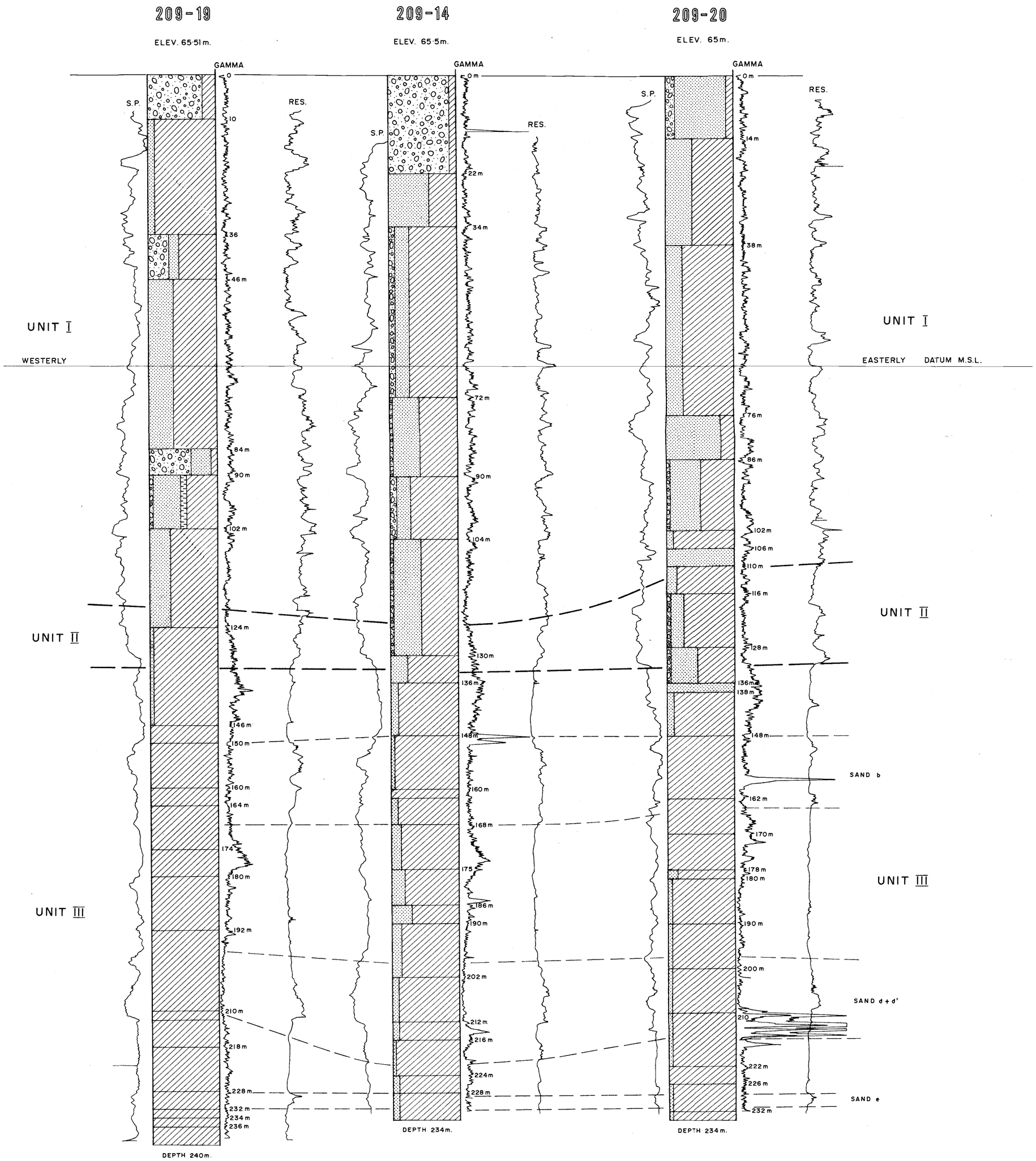
VERTICAL : 1 cm. = 6 m.

FIGURE 3·3

BP MINERALS AUST. PTY LTD	
Area:	LAKE FROME
	SOUTH AUSTRALIA
Ref:	
NOVEMBER 1976	D. M. TAYLOR

2608(II)-5

T1689D



LEGEND

- MIXED CLASTICS ˣ
- GRAVEL
- SAND
- SILT
- CLAY
- CARBONATE
- CARBONACEOUS ˣ

ˣ Used for pre 1976 logs only.

1976
POONTANA PROJECT

PROGRAMME ~~II~~ I

EL-209

PARALANA CREEK AREA
SECTION 4

SCALES

HORIZONTAL : 1 cm. = 20 m.

VERTICAL : 1 cm. = 6m.

FIGURE 3·4

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref:	
NOVEMBER 1976	D. M. TAYLOR

2608(II)-6

T1689E

209-15

ELEV. 65·76m.

77-53

ELEV. 65·95m.

209-11

ELEV. 65·63m.

209-18

ELEV. 65m.

GAMMA

S.P.

RES.

WESTERLY

NORTHEASTERLY DATUM M.S.L.

UNIT I

UNIT II

UNIT III

UNIT IV

SAND b

SAND c

SAND d+d'

SAND e

Sand f

DEPTH 234m.

DEPTH 280m.

DEPTH 288m.

DEPTH 234m.

LEGEND

- MIXED CLASTICS[X]
- GRAVEL
- SAND
- SILT
- CLAY
- CARBONATE
- CARBONACEOUS[X]

[X] Used for pre 1976 logs only.

1976
POONTANA PROJECT

PROGRAMME ~~II~~ I

EL-209

PARALANA CREEK AREA
SECTION 5

SCALES

HORIZONTAL: 1 cm. = 20 m.

VERTICAL: 1 cm. = 6m.

FIGURE 3.5

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref:	
NOVEMBER 1976	D. M. TAYLOR

2608(II)-7

T 16B9 F

209-9

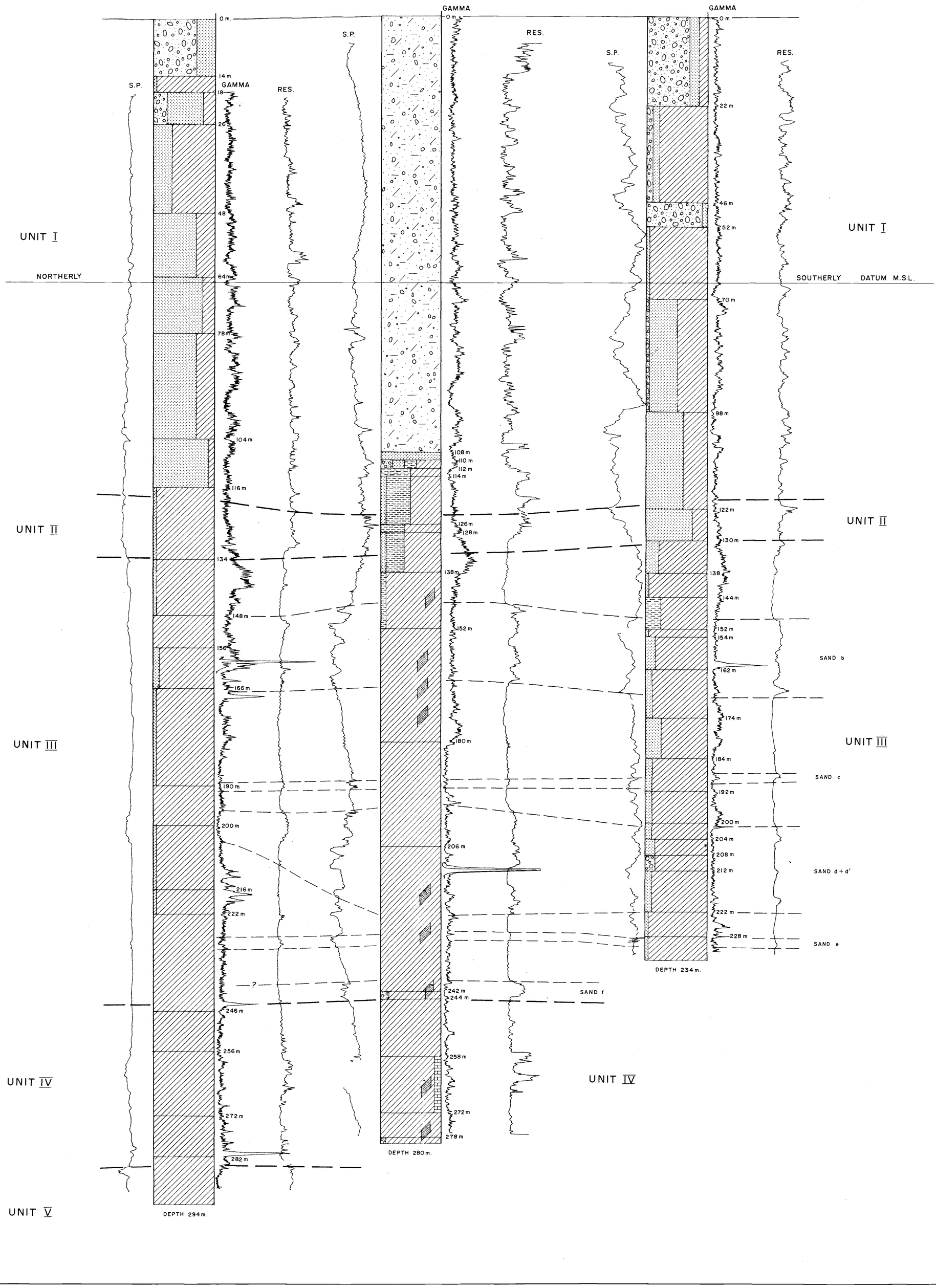
ELEV. 65·45m.

77-53

ELEV. 65·95m.

209-16

ELEV. 66 m.



LEGEND

- MIXED CLASTICS x
- GRAVEL
- SAND
- SILT
- CLAY
- CARBONATE
- CARBONACEOUS x

x Used for pre 1976 logs only.

1976
POONTANA PROJECT

PROGRAMME ~~II~~ I

EL-209

PARALANA CREEK AREA
SECTION 6

SCALES

HORIZONTAL : 1 cm. = 20 m.

VERTICAL : 1 cm. = 6 m.

FIGURE 3·6

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref:	
NOVEMBER 1976	D. M. TAYLOR

2608(II)-8

T 168

209-2

ELEV. 67·25m.

209-4

ELEV. 64·03m.

209-8

ELEV. 65·19m.

209-20

ELEV. 65m.

209-9

ELEV. 65·45m.

209-11

ELEV. 65·65m.

GAMMA

S.P.

RES.

NORTHWESTERLY

SOUTHEASTERLY DATUM M.S.L.

UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V

SAND b

SAND c

SAND d+d'

SAND e

SAND f

DEPTH 294m.

DEPTH 306m.

DEPTH 288m.

DEPTH 234m.

DEPTH 294m.

DEPTH 288m.

LEGEND

- MIXED CLASTICS[X]
- GRAVEL
- SAND
- SILT
- CLAY
- CARBONATE
- CARBONACEOUS[X]

[X] Used for pre 1976 logs only.

1976

POONTANA PROJECT

PROGRAMME ~~II~~ I

EL-209

PARALANA CREEK AREA

SECTION 7

SCALES

HORIZONTAL : 1 cm. = 20 m.

VERTICAL : 1 cm. = 6 m.

FIGURE 3-7

BP MINERALS AUST. PTY LTD	
Area:	LAKE FROME
	SOUTH AUSTRALIA
Ref:	
NOVEMBER 1976	D. M. TAYLOR

2608(II)-9

T1689 H

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COOPERATIVE DIVISION
BLANKSOM

209-3

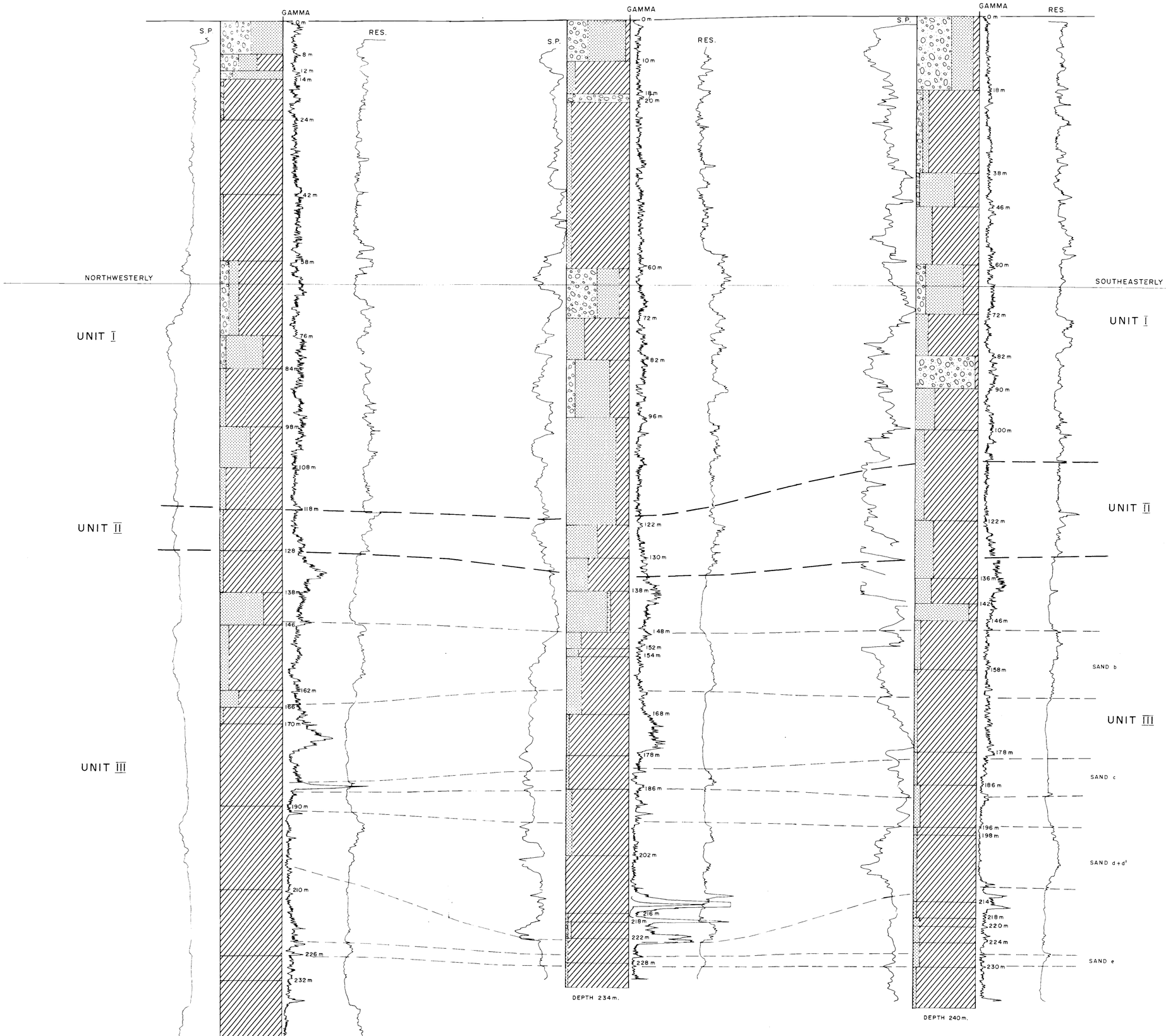
ELEV. 63·50 m.

209-12

ELEV. 64 m.

209-13

ELEV. 65 m.



LEGEND

- MIXED CLASTICS [x]
- GRAVEL
- SAND
- SILT
- CLAY
- CARBONATE
- CARBONACEOUS [x]

[x] Used for pre 1976 logs only.

1976
POONTANA PROJECT

PROGRAMME I

EL-209

RECEIVED
15 FEB 1977
DEPT. OF MINES
SECURITY
2608 (II)

PARALANA CREEK AREA
SECTION 8

SCALES

HORIZONTAL : 1 cm. = 20 m.

VERTICAL : 1 cm. = 6m.

FIGURE 3·8

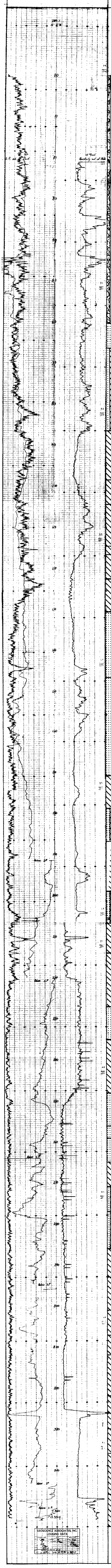
BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref:	
NOVEMBER 1976	D. M. TAYLOR

2608(II)-10

DRILL HOLE LOG 2608(II)-11

HOLE No.	209-1	DATE DRILLED	11.5.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	15.5.76	RANGE	200 cps	RESIST. SCALE	10 Ω /in.
PROJECT	POONTANA	DATE LOGGED	15.5.76	TIME CONSTANT	2 sec.	SP. SCALE	1 mv/div.
LOCATION	PARALANA CK.	DRILLED DEPTH	354 m	PAPER SPEED	1 cm/m	BIAS	300/75
STATE	S.A.	LOGGED DEPTH	351.5 m	LOGGING SPEED	9 m/min.	FLUID LEVEL	21 m
GEOLOGIST	TAYLOR	ELEVATION	85.2 m	BACK GROUND	7 cps	PROBE No.	313
DRILLER	THOMPSON	CO-ORDS		TIME BASE		STANDARD	890 cps
LOGGER	MORTIMER			K-FACTOR	1.24x10⁻⁵		Mixed Clastics

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



INTERVAL	DESCRIPTION
0 - 60	Sand and gravel. Red/brown with minor buff silty clay.
60 - 64	Sand (1-2 mm) and red clay.
66 - 86	Mixture of red/brown and grey clay with minor white clay. Limonite staining. Light grey clay with minor white and black clay in lowest samples.
86 - 98	Mid grey clay with hematite and limonite staining. Minor sand.
98 - 104	Very dark hard grey clay with hematite and minor limonite.
104 - 114	Mid grey clay with stains. Minor silt and rock fragments.
114 - 116	Hard black clay with limonite and minor hematite.
116 - 122	Light to mid grey clay with stains. Minor sand.
122 - 130	Mid to dark grey clay with limonite and some hematite staining. Minor sand and rock fragments.
130 - 146	Sand (1-3 mm). Black limonite stained clay.
146 - 170	Sand (1 mm, quartz). Very dark grey/ black clay with limonite and hematite staining.
170 - 178	Black limonite stained clay. Minor mid grey and white clay.
178 - 186	Sand (1-2 mm, ang. to subrounded). Black limonite stained clay.
186 - 198	Black, stained, clay. Lesser mid grey and minor white clay.
198 - 206	Sand (ang., quartz). Black and dark grey clay. Minor limonite. Minor white clay.
206 - 213	Hard black clay with lesser mid grey clay. Stains. Minor quartz sand.
213 - 226	Mid grey, black and minor green and yellow clays. Limonite very abundant. Minor sand.
226 - 234	Sand (1-2 mm, quartz) with pebbles to 5 mm. Mid grey, black and green clay. Minor carbonate.
234 - 247	Black, yellow, green and grey clays (PU clays). Minor quartz sand.
247 - 255	Sand (1 mm., ang., quartz). Clays as above.
255 - 258	Sand and clays as above.
258 - 264 k	Sand, as above. Clays, as above, with increase in dk. clays.
264 - 270 k	Clays, as above, with further increase in dk. clays. Minor quartz sand (2%).
270 - 276	Sand (1 mm, quartz). Dark grey clays with minor yellow and green clay. Some hematite staining.
276 - 285	Quartz sand. Very dark grey clay and yellow clay. Minor hematite staining. Clay more laminated than previously.
285 - 292	Very dark grey clay with yellow clay and minor black clay. Minor quartz sand (1-3 mm).
292 - 300 k	Clay as above.
300 - 306	Clays, as above, with minor carbonate.
306 - 312	Dark grey laminated clay with minor stains. Minor qz. sand (2%)
312 - 322	Dark and mid grey clay. Yellow clay. Minor sand.
322 - 330 k	Clays as above.
330 - 336	Dark and mid grey clays with yellow and green clays common.
336 - 346	Clays, as above, with decrease in yellow clay. Minor quartz sand.
346 - 354	Clays, as above, with increase in yellow clay. Minor ang. quartz grains and 4 mm rounded quartz pebble.
3504 k	

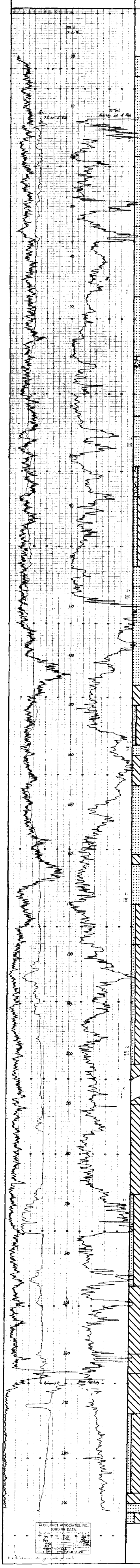
RECEIVED
10 DEC 1976
Secondary
2608-II

DRILL HOLE LOG 2608(II)-12

HOLE No.	209-2	DATE DRILLED	16.5.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	17.5.76	RANGE	200 cps	RESIST. SCALE	7.5 Ω /in.
PROJECT	POONTANA	DATE LOGGED	17.5.76	TIME CONSTANT	2	SP. SCALE	1 mv/div.
LOCATION	PARALANA CK.	DRILLED DEPTH	294 m	PAPER SPEED	1cm/m.	BIAS	450/75
STATE	S.A.	LOGGED DEPTH	292 m	LOGGING SPEED	9 m/min.	FLUID LEVEL	12 m
GEOLOGIST	TAYLOR	ELEVATION	67.25 m	BACK GROUND	8 cps	PROBE No.	313
DRILLER	THOMPSON	CO-ORDS		TIME BASE		STANDARD	890 cps.
LOGGER	MORTIMER			K-FACTOR	1.24 x 10^{-5}		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous · Mixed Clastics

GAMMA S.P. RES | 100 % | INTERVAL m. | DESCRIPTION



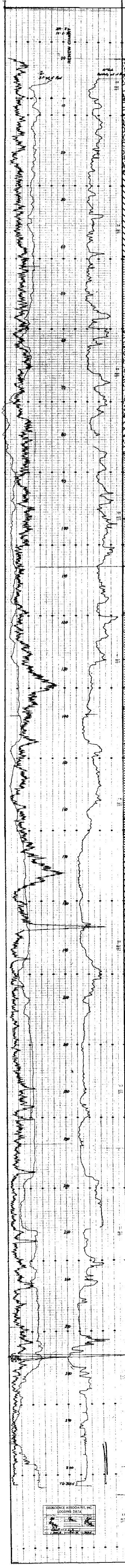
INTERVAL m.	DESCRIPTION
0 - 4	Red clay.
4 - 20	Sand, minor gravel. Red and buff clay. Gypsum crystals.
20 - 34	Coarse sand, red with minor pale grey clay.
34 - 48	Sand with minor gravel. Red and minor light grey clay.
48 - 60	Sand with minor gravel. Red/brown sandy clay. Minor limonite.
60 - 62	Fine gravel with red/brown clay.
62 - 72	Red/brown with minor pale grey clay.
72 - 76	Sand with minor gravel. Red/brown clay.
76 - 82	Red/brown and pale grey silty clay.
82 - 88	Red/brown and minor grey clay.
88 - 102	Red/brown and pale grey clay. Gypsum crystals.
102 - 106	Red/brown and pale grey clay. Minor gravel. Minor carbonate.
106 - 110	Pale grey and yellow/brown clay. Minor carbonate(to 5 % in lowest sample).
110 - 126	Mainly mid to light grey clay. Limonite and hematite stains. 5% carbonate in top sample.
126 - 130	Dark grey/black clay with hematite staining.
130 - 138	Mid grey clay with hematite and limonite stains. Minor white and pink clay.
138 - 140	Sand (1-3mm, quartz plus rock fragments). Mid grey clay.
140 - 146	Mid grey clay with limonite and hematite stain.
146 - 160	Sand (1-2mm, quarts). Light, mid and dark grey clay.
160 - 162	Hard black clay. Minor pebbles.
162 - 170	Sand (1-3mm, quarts). Black and mid grey clays with minor stains.
170 - 178	Quarts sand. Black, grey and brown clays with hematite and minor limonite.
178 - 202	Sand (1-2mm, angular, quarts). Black and grey clays with hematite and limonite. Minor yellow/green clay.
202 - 210	Sample (8m) not collected at, or more probably before, this depth. Data suggests within first 100 m.
210 - 228	Mixed clays with black clay increasingly common. Yellow clay common. Minor quarts sand. Minor stains.
228 - 246	Sand (1-2mm, ang. to subrounded, quarts) mixed clays (grey and black) with minor stains. Minor white clay and minor carbonate.
246 - 260	Sand (2%, as above). Clays, as above, with minor grey/pink clay. Up to 5% carbonate in some samples.
260 - 264	Black and white clay. Lesser dark grey, green, yellow and pink clay. Minor carbonate.
264 - 272 Mibrac	Green, yellow, black, red and grey clay (TC clays). Minor quarts and carbonate.
272 - 288 Mibrac	Sand (2mm, angular, quarts) and minor fine gravel (to 8mm). TC clays with up to 5% white clay and carbonate in 282-286 m interval.
288 - 290	TC clays with minor white clay and minor sand
290 - 292	Sand (1-2mm, angular to subrounded, quarts). TC clays
292 - 294 Mibrac 291	As above with minor carbonate.

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DRILL HOLE LOG 2608(II)-13

HOLE No.	209-3	DATE DRILLED	17/5/76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	19/5/76	RANGE	200 cps	RESIST. SCALE	10 Ω/inch
PROJECT	Poontana	DATE LOGGED	19/5/76	TIME CONSTANT	2	SP. SCALE	1 mv/div
LOCATION	Paralana Ck.	DRILLED DEPTH	305 m	PAPER SPEED	1 cm/m.	BIAS	225/75
STATE	S.A.	LOGGED DEPTH	303.5 m	LOGGING SPEED	9 m/min	FLUID LEVEL	4 m
GEOLOGIST	TAYLOR	ELEVATION	63.5	BACK GROUND	7	PROBE No.	313
DRILLER	RUSSELL	CO-ORDS		TIME BASE		STANDARD	890
LOGGER	MORTIMER			K-FACTOR	1.24 x 10-5		

LITHOLOGY : Gravel | Sand | Silt | Clay | Carbonate | Carbonaceous | Mixed Clastics



INTERVAL m	DESCRIPTION
0-8	Sand and gravel with minor red clay.
8-12	Sand and gravel with red and light grey clay.
12-14	Red and grey clay.
14-24	Fine gravel. Red and grey silty and sandy clay.
24-42	Red sandy and silty clay with minor buff clay. Minor sand and gravel.
42-58	Coarse sand and minor gravel. Red silty clay.
58-76	Fine gravel (3-4 mm). Sand (1-3 mm., angular to subrounded, qz). Red silty and sandy clay.
76-84	Gravel (to 1 cm.). Sand (1-3 mm, angular, mainly quartz). Red and buff clay. Trace gypsum.
84-98	Coarse sand (2 mm). Red and pale grey silty clay.
98-108	Minor gravel. Sand (angular, quartz). Red/brown sandy clay with minor grey clay.
108-118	Red brown and pale grey and yellow/brown sticky clay. Minor sand and gravel. Minor carbonate.
118-128	Brown and pale grey with some buff clay.
128-138	Sand (angular to subrounded, quartz). Light to pale grey with minor red/brown clay. Some limonite. Minor gypsum.
138-146	Sand (subrounded, mainly quartz). Red and grey clay. Dark clays in lowest sample.
146-162	Sand (to 2 mm, angular to subrounded, quartz). Mixed clays, mid grey and black with minor light grey. Limonite and hematite.
162-166	Sand (as above) with minor gravel. Mixed clays. Hematite and limonite.
166-170	Mainly hard black clay with lesser mid grey clay. Hematite and limonite.
170-190	Minor sand (varies from 0 to 10%, average 2%). Black and mid grey clays with very minor pink and white clay. Hematite and limonite abundant.
190-210	Minor sand (2%). Minor carbonate. Clay as above.
210-226	Minor quartz sand and minor carbonate. Mixed clays. Stains less common in lower samples.
226-232	Mixed clays. Minor carbonate. Minor stain.
232-248	Minor quartz sand and carbonate. Mixed clays. Minor stains.
248-256	Coarse sand (to 3 mm) and pebbles. Minor carbonate. Mixed clays. Increase in stains down interval.
256-258	Minor sand and carbonate. Red/brown and mixed clays.
258-272	Minor sand. Mixed clays (black, light and dark grey, yellow). Minor green and pink clay.
272-284	Minor quartz sand and carbonate. Mixed clays (Lt > Dk). Green clay appears at 276 m.
284-288	Sand (2mm, subrounded, qz). Minor carbonate. TC clays.
288-300	Minor sand (2%). Minor carbonate. TC clays (increase in green clay).
300-305	Minor sand (2 mm, quarts) and carbonate. TC clays (increasing green).

303.5 Miocene

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DRILL HOLE LOG

2608 (II) - 14

HOLE No.	209-4	DATE DRILLED	20.5.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	21.5.76	RANGE	200 cps.	RESIST. SCALE	15 Ω /in.
PROJECT	POONTANA	DATE LOGGED	21.5.76	TIME CONSTANT	2	SP. SCALE	1mv/div.
LOCATION	PARALANA CK	DRILLED DEPTH	306 m.	PAPER SPEED	1 cm/m	BIAS	225/75
STATE	S.A.	LOGGED DEPTH	304.5 m.	LOGGING SPEED	9 m/min.	FLUID LEVEL	13 m.
GEOLOGIST	TAYLOR	ELEVATION	64.03 m.	BACK GROUND	8	PROBE No.	313
DRILLER	THOMPSON	CO-ORDS		TIME BASE	1.24 x 10-5	STANDARD	890 cps.
LOGGER	MORTIMER			K-FACTOR			

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous · Mixed Clastics

GAMMA S.P., RES	100%	INTERVAL m.	DESCRIPTION
		0 - 10	Gravel, sand and minor red clay
		10 - 20	Red and buff silty clay
		20 - 22	sand and gravel
		22 - 28	Red and buff silty clay. Gypsum crystals.
		28 - 30	Red sticky clay
		30 - 34	Red silty clay.
		34 - 40	Sand. Red and Buff silty clay.
		40 - 42	Red and pale grey sticky clay
		42 - 46	Red and pale grey silty clay.
		46 - 50	Sand and minor gravel. Red silty clay.
		50 - 74	Sand and minor gravel. Red silty clay
		74 - 94	Sand (1-3mm, angular to subrounded). Red and minor grey silty clay.
		94 - 114	Sand (angular to subrounded, mainly quartz). Minor red silty clay. Very minor grey clay.
		114 - 124	Sand and fine gravel. Red, grey and yellow/brown silty clay
		124 - 132	Coarse gravel. Sand. Red and pale grey silty clay. Limonite stains. Minor carbonate.
		132 - 146	Sand (angular to subangular, mainly quartz). Light grey limonite stained clay. Mid grey clay at base of interval.
		146 - 148	Mid to dark grey clay. Stains.
		148 - 152	Mid, dark and light grey clay. Dark brown clay. Limonite stain.
		152 - 154	Hard black and dark grey clay. Stains.
		154 - 158	Black and dark grey and brown clay. Stains. Minor carbonate
		158 - 162	Black and dark grey clay with stains and white streaks.
		162 - 172	Mixed clays. Minor Hematite stain. Minor carbonate.
		172 - 186	Mixed clays. Stains. Minor carbonate.
		186 - 198	Mixed clays (Dk > Lt). Limonite more abundant
		198 - 210	Quartz sand. Mixed clays. Hematite more abundant. 50% sand in 206-208 m. sample.
		210 - 218	Sand (1-2mm, subrounded, quartz). Clays as above with fewer stains.
		218 - 240	Mixed clays (Lt = Dk). Staining more abundant. Minor carbonate.
		240 - 252	Sand (1mm, angular to subrounded, mixed). Clays as above.
		252 - 262	Mixed clays (Lt > Dk). Including pale green and yellow clay Minor carbonate.
		262 - 270	Mixed clays, as above, with increase in yellow clay. Minor carbonate (to 5% in one sample) and sand.
		270 - 276	Mixed clays (including yellow, pale green and pink). Soft white clay (5%) and carbonate (2%).
		276 - 288	Mixed clays in upper part of interval and TC clays from 282m. minor carbonate and sand.
		288 - 292	TC clays with increase in pink clay.
		292 - 296	TC clays. Predominantly green and yellow/green. Minor carbonate
		296 - 302	TC clays. Increase in darker clays.
		302 - 306	TC clays (Lt = Dk). Minor quartz sand and carbonate.

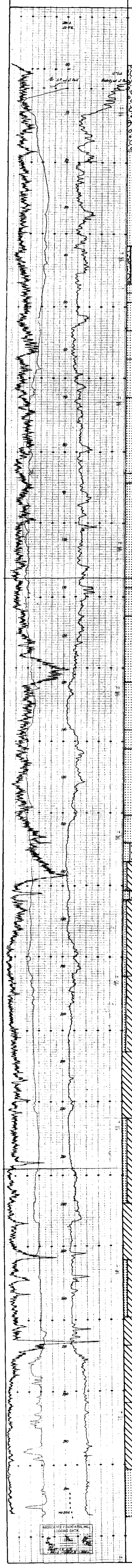
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DRILL HOLE LOG

2608 (II) -15

HOLE No.	209-5	DATE DRILLED	23.5.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	24.5.76	RANGE	200 cps	RESIST. SCALE	15 Ω /in.
PROJECT	POONTANA	DATE LOGGED	24.5.76	TIME CONSTANT	2	SP. SCALE	1 mv/div.
LOCATION	PARALANA CK.	DRILLED DEPTH	306 m	PAPER SPEED	1 cm/m.	BIAS	225/75
STATE	S.A.	LOGGED DEPTH	305 m	LOGGING SPEED	9 m/min.	FLUID LEVEL	4 m.
GEOLOGIST	TAYLOR	ELEVATION	65.15 m	BACK GROUND	9 cps	PROBE No.	313
DRILLER	THOMPSON	CO-ORDS		TIME BASE		STANDARD	890 cps
LOGGER	MORTIMER			K-FACTOR	1.24x10-5		Mixed Clastics

LITHOLOGY : Gravel, Sand, Silt, Clay, Carbonate, Carbonaceous



INTERVAL m.	DESCRIPTION
0 - 12	Gravel, sand and minor red/buff sticky clay.
12 - 18	Red sticky clay
18 - 38	Minor gravel. Sand. Red and buff with minor pale grey silty clay.
38 - 46	Red silty clay.
46 - 48	Red silty clay.
48 - 50	Coarse sand.
50 - 56	Red silty clay.
56 - 62	Sand (1-2mm, angular to rounded). Red silty clay.
62 - 70	Coarse sand. Red sandy or silty clay.
70 - 86	Coarse sand with minor gravel. Red and pale grey silty clay.
86 - 88	Red silty clay
88 - 108	Sand with minor fine gravel. Red sandy clay with red and pale grey sticky clay in lower samples. Minor gypsum.
108 - 110	Red and pale grey silty clay. Minor gravel
110 - 116	Coarse sand with minor gravel. Red/brown and yellow/brown and pale grey sticky clay.
116 - 130	Coarse sand. Pale grey with minor brown clay. Limonite stain.
130 - 140	Pale grey clay with limonite stain. Minor deep red clay (Magenta clay).
140 - 144	Magenta and black hard clay. Stains.
144 - 158	Sand (2mm, angular to sub-angular, mainly quarts). Mainly mid to light grey clay. Stains.
158 - 164	Sand (subangular, poorly sorted). Mid and dark grey clay. Stains
164 - 168	Hard dark grey/black clay. Minor stains
168 - 174	Mixed clays (black, dark and mid grey). Limonite abundant. Hematite common.
174 - 176	Hard black, dark and pale grey clay. Coarse sand and minor gravel
176 - 192	Mixed clays. Limonite and hematite abundant. Clays mainly black, mid and pale grey.
192 - 208	Clays as above.
208 - 222	Clays, as above, with increase in darker clays.
222 - 240	Mixed clays (Dk. » Lt.). Less staining. Minor carbonate in lowest sample.
240 - 252	Clays, as above. Minor quartz sand.
252 - 264	Increase in lighter clays (including pink, white and pale grey) Minor carbonate.
264 - 270	Mixed clays with yellow and pale green clay. Minor green clay in lowest sample. Minor quarts sand and carbonate.
270 - 282	TC clays. Minor quarts sand and carbonate.
282 - 296	Clays, as above, with increase in green clay. Minor quarts sand and very minor carbonate.
296 - 306	Sand (1-2mm, sub-angular to sub-rounded, mainly quarts) up to 60% in 298-300 m. TC clays as above. Minor white clay and carbonate.

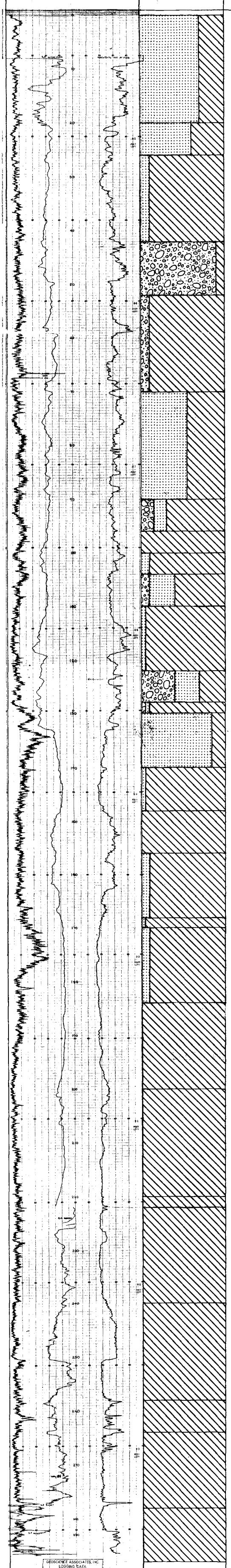
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DRILL HOLE LOG

2608(II)-16

HOLE No.	209-6	DATE DRILLED	16/5/76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	19/5/76	RANGE	200 cps	RESIST. SCALE	10Ω/in
PROJECT	Poontana	DATE LOGGED	19/5/76	TIME CONSTANT	2	SP. SCALE	1 mv/div
LOCATION	Paralana Ck.	DRILLED DEPTH	288 m	PAPER SPEED	1 cm/m	BIAS	270/65
STATE	S.A.	LOGGED DEPTH	287 m	LOGGING SPEED	4 m/min	FLUID LEVEL	2 m
GEOLOGIST	TAYLOR	ELEVATION	64.8 m	BACK GROUND	10 cps	PROBE No.	202
DRILLER	THOMPSON	CO-ORDS		TIME BASE		STANDARD	651 cps
LOGGER	MACZKOWIACK			K-FACTOR	1.61 x 10-5		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous · Mixed Clastics



INTERVAL m	DESCRIPTION
0-20	Minor gravel. Red sticky clay.
20-26	Coarse sand and buff sticky clay.
26-42	Coarse sand and minor gravel. Red silty clay.
42-52	Coarse and fine gravel, coarse sand. Red silty clay.
52-70	Coarse gravel. Minor coarse sand. Red silty or sandy clay.
70-90	Normal with lesser coarse sand. Minor gravel. Red with minor pale grey silty clay.
90-96	Fine gravel. Red and pale grey sandy and silty clay.
96-100	Light brown and pale grey sandy clay. Minor sand and gravel.
100-104	Minor gravel. Red and minor pale grey clay.
104-110	Fine gravel and coarse sand. Red and pale grey silty clay.
110-122	Red and pale grey silty clay.
122-128	Fine gravel and coarse sand. Red and grey silty clay.
128-130	Grey and yellow/brown clay.
130-140	Sand (normal and coarse, angular to subrounded, mainly quartz). Grey and lesser red sticky clay.
140-148	Sand (coarse, angular, quartz). Minor gravel. Pale and light grey sticky clay. Minor mid grey clay. Stains.
148-156	Mainly light and mid grey sticky clay with lesser dark grey and hard black clay. Hematite stains. Minor sand.
156-168	Mid, light and dark grey clay. 10% silt at 158 m. Sand (1-2 mm, subangular, quartz). Limonite and hematite staining.
168-170	Sand (angular, poorly sorted).. Dk. grey and black sticky clay.
170-184	Sand (coarse, angular, quartz). Mixed clays (Dk Lt). Minor pale green clay. Abundant hem. and lim.
	Minor sand. Mixed clays with abundant pale grey, pale green and olive green clay. Minor chocolate brown clay. Very minor pink clay. Abundant limonite.
206-220	Mixed clays (grey, black, pale and olive green, yellow, red). Minor sand. Limonite and hematite abundant.
220-222	Mixed clays and hard black clay and dark grey clay.
222-240	Mixed clays. Minor sand and minor carbonate. Minor light grey and white clay. Decrease in limonite down interval.
240-258	Mixed clays (Dk = Lt). Minor white clay. Minor sand and carbonate. Limonite and hematite common.
258-264	Mixed clays with increase (to 5%) in white clay. Minor quartz. Less staining.
264-278	Mixed clays (Lt> Dk). White and pink sticky clay. Minor carbonate. Very little staining.
278-288	TC clays with green clay increasing down interval. Minor carbonate and very minor quartz.

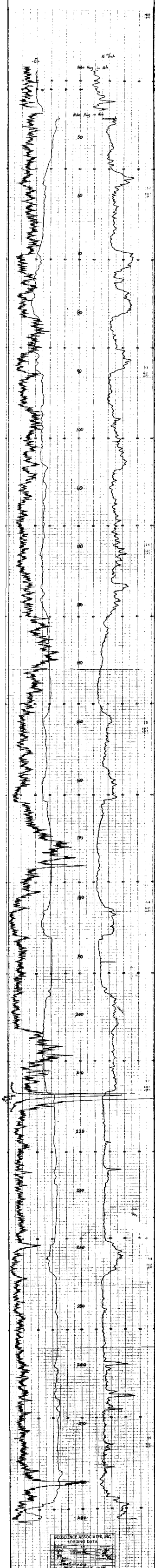
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DRILL HOLE LOG

2608(II)-17

HOLE No.	209-7	DATE DRILLED	25.5.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	26.5.76	RANGE	200 cps	RESIST. SCALE	15 Ω /in.
PROJECT	POONTANA	DATE LOGGED	26.5.76	TIME CONSTANT	2	SP. SCALE	1 mv/div.
LOCATION	PARALANA CK.	DRILLED DEPTH	288 m	PAPER SPEED	1 cm/m	BIAS	225/75
STATE	S.A.	LOGGED DEPTH	286 m	LOGGING SPEED	9 m/min	FLUID LEVEL	
GEOLOGIST	TAYLOR	ELEVATION	65.16 m	BACK GROUND	7 cps	PROBE No	313
DRILLER	RUSSELL	CO-ORDS		TIME BASE		STANDARD	890
LOGGER	MORTIMER			K-FACTOR	1.24x10⁻⁵		Mixed Clastics

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



INTERVAL m.	DESCRIPTION
0 - 2	Sand, minor gravel. Red sticky clay.
2 - 8	As above.
8 - 12	Light grey sticky clay.
12 - 16	Very coarse gravel (to 5 cm.). Clay as above.
16 - 28	Red and pale grey sticky clay.
28 - 38	Minor gravel. Sand (subangular to subrounded). Red and minor light grey sticky clay.
38 - 42	Gravel (1 cm), sand (2 mm). Pale grey and red silty clay
42 - 46	Sand (2mm, subrounded). Red and lesser pale grey silty clay
46 - 48	Sand (1mm, subang. to subrounded). Red clay
48 - 74	Sand (2mm, angular) and minor gravel. Red and minor grey silty clay.
74 - 78	Fine gravel (4-5mm) and coarse sand (1-2mm).
78 - 96	Fine gravel. Coarse sand. Red and lesser pale grey silty and sandy clay.
96 - 102	Fine sand and silt. Red silty or sticky clay. Gypsum crystals.
102 - 116	Fine gravel. Coarse sand. Red and pale grey sticky clay.
116 - 136	Coarse sand and minor gravel. Red and pale grey silty clay. Minor limonite.
136 - 142	Sand with minor silt. Pale grey limonite stained clay with minor red clay.
142 - 150	Sand and minor silt. Mainly pale to mid grey and mid to dark grey clay. Minor black clay.
150 - 156	Sand and minor gravel. Hard black and sticky mid grey clay stains.
156 - 164	Coarse sand (1-3mm). Mid to dark grey clay. Stains. Minor white clay.
164 - 176	Light, mid and dark grey clays. Abundant stains.
176 - 178	Sand (2mm, angular) and minor gravel. Mid grey clay. Stains.
178 - 208	Mixed clays (Dk > Lt). Minor white and pink clay. Minor carbonate at top. Limonite abundant.
208 - 212	Fine sand (0.5-1mm). Clays as above.
212 - 216	Mixed clays (Dk ≫ Lt). Increase in hematite.
216 - 222	Fine sand with minor quartz pebbles. Mixed clays.
222 - 228	Sand (1-2mm, angular, quartz). Mixed clays as above.
228 - 234	Quartz sand (2%). Mixed clays. Less staining. Minor carbonate.
234 - 240	Samples heavily contaminated by near surface material (washing-out hole at beginning of day's drilling).
240 - 252	Sand (up to 30% in lowest sample)(1-2 mm, subangular). Mixed clays including minor yellow clay. Little staining.
252 - 260	Mixed clays (DK ≫ Lt). With minor light grey, pale green, white and pink clay. Minor sand.
260 - 268	Minor sand (2%). Mixed clays with increase in pale green clay. White sticky clay. Minor carbonate (to 1%).
268 - 280	Mixed clays (Lt ≥ Dk) including much white sticky clay. Yellow clay in lowest sample. Minor pink clay. Carbonate (2%+). Minor sand (1%). Little staining.
280 - 288	Minor quartz sand. T.C. clays. Minor carbonate.

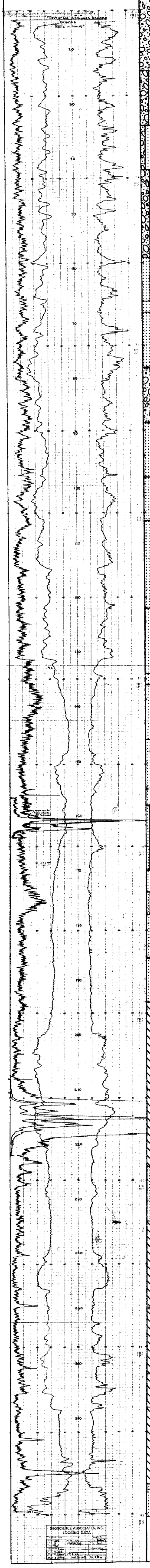
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DRILL HOLE LOG

2608(II)/18

HOLE No.	209-8	DATE DRILLED	19.6.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	20.6.76	RANGE	200 cps	RESIST. SCALE	10 Ω /in.
PROJECT	POONTANA	DATE LOGGED	20.6.76	TIME CONSTANT	2	SP. SCALE	1 mv/div.
LOCATION	PARALANA CK.	DRILLED DEPTH	288 m	PAPER SPEED	1 cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	287 m	LOGGING SPEED	9 m/min.	FLUID LEVEL	
GEOLOGIST	TAYLOR	ELEVATION	65.19 m	BACK GROUND	10 cps	PROBE No.	202
DRILLER	RUSSELL	CO-ORDS		TIME BASE		STANDARD	659 cps.
LOGGER	MACZKOWIACK			K-FACTOR	1.61x10-5		

LITHOLOGY : Gravel; Sand; Silt; Clay; Carbonate; Carbonaceous; Mixed Clastics



GAMMA S.P., RES	100 %	INTERVAL m.	DESCRIPTION
		0 - 10	Sand and gravel with minor buff clay.
		10 - 24	Fine gravel. Coarse sand. Minor white clay.
		24 - 34	Red and minor buff sticky clay.
		34 - 42	Fine gravel. Coarse sand. Red sticky clay.
		42 - 58	Coarse sand. Red silty or sticky clay.
		58 - 66	Red silty clay
		66 - 68	Coarse sand. Minor fine gravel and red clay
		68 - 78	Coarse sand and minor gravel. Red and minor pale grey silty clay
		78 - 88	Sand and fine gravel. Minor silt. Red silty clay.
		88 - 98	Sand and minor gravel. Red and minor pale grey silty clay.
		98 - 106	Coarse sand. Red and lesser pale grey silty clay.
		106 - 122	Coarse sand and minor fine gravel. Red and pale grey silty clay.
		122 - 134	Coarse sand. Pale grey and yellow/brown and minor red clay.
		134 - 136	Sand (2-3mm, angular, poorly sorted).
		136 - 146	Coarse sand. Pale grey clay (at top) and light grey clay(at bottom). Mid grey clay in lowest sample. Limonite and hematite stains.
		146 - 158	Sand (1mm, angular, poorly sorted). Mainly dark grey and black hard clay. Lesser light to midgrey clay. Minor white clay. Minor silt. Stains.
		158 - 170	Mainly dark grey and black clay with magenta clay. Minor mid grey clay and very minor brick red and white clay. Hematite abundant. Some limonite.
		170 - 174	Sand (2mm, angular, poorly sorted). Clays as above.
		174 - 178	Sand and clays as above.
		178 - 186	Sand (1-2mm, subangular, poorly sorted) increasing down interval (to 90%). Clays as above. Abundant limonite from 182 m.
		186 - 194	Sand (1-2mm, subangular, quartz).Mixed clays with pale grey and olive green clay at base.
		194 - 210	Mixed clays. Increase in olive green clay. Minor light grey and pink clay. Limonite very abundant. Minor sand.
		210 - 224	Mixed clays (Dk > Lt). Mainly dark grey, black and olive green clay. Lesser mid and light grey clay. Minor white clay. Limonite abundant. Hematite common. Minor sand.
		224 - 234	Sand (2-3 mm, angular to subrounded, quartz). Mixed clays (Dk = Lt) with sticky mid grey clay. Stains. Minor carbonate.
		234 - 250	Mixed clays (Dk ≥ Lt). Includes minor pinkish grey clay in lower part of interval. Limonite and hematite. Minor quartz sand. Minor carbonate. K — reworked ?
		250 - 262	Mixed clays. Increase in white, pale green and olive green clays down interval. Stains. Minor quartz sand. Minor carbonate.
		262 - 268	Mixed clays (Lt > Dk). Increase in pale grey and white sticky clay.
		268 - 282	Mixed clays (Lt > Dk). Increase in white sticky clay. Very minor green clay in lowest sample. Minor quartz sand.
		282 - 288	Sand (2mm, subangular, clear and milky quartz) with fragment of quartz to 1 cm. TC clays with increase in green clay down interval.

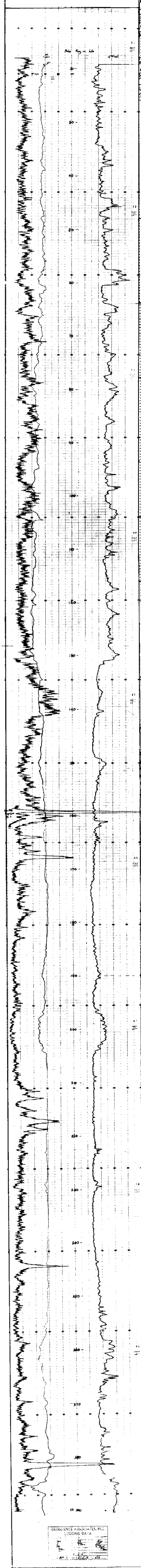
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DRILL HOLE LOG

2668(II)-19

HOLE No.	209-9	DATE DRILLED	26.5.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	27.5.76	RANGE	200 cps	RESIST. SCALE	15 Ω /in.
PROJECT	POONTANA	DATE LOGGED	27.5.76	TIME CONSTANT	2	SP. SCALE	1 mv/div.
LOCATION	PARALANA CK.	DRILLED DEPTH	294 m	PAPER SPEED	1 cm/m	BIAS	225/75
STATE	S.A.	LOGGED DEPTH	290 m	LOGGING SPEED	9m/min	FLUID LEVEL	
GEOLOGIST	TAYLOR THOMPSON	ELEVATION	65.45 m	BACK GROUND	8 cps	PROBE No.	107
DRILLER		CO-ORDS		TIME BASE		STANDARD	
LOGGER	MORTIMER			K-FACTOR			

LITHOLOGY : Gravel | Sand | Silt | Clay | Carbonate | Carbonaceous | Mixed Clastics



INTERVAL	DESCRIPTION
0 - 14	Gravel [illegible] and minor red and buff clay.
14 - 18	Red and minor grey sandy clay
18 - 26	Gravel and coarse sand. Red and minor grey sticky or sandy clay.
26 - 48	Coarse sand with minor gravel. Red and minor light grey silty clay
48 - 64	Sand (1-2mm, angular to subrounded, mainly quartz and minor gravel Red silty clay.
64 - 78	Sand and clay as above
78 - 104	Coarse sand and minor gravel. Red/brown and minor pale grey silty clay.
104 - 116	Coarse sand and minor gravel. Red and minor grey silty clay.
116 - 134	Red/brown, light brown and pale grey silty clay. Minor stains.
134 - 148	Pale grey silty clay (above 136 m) and light grey sticky clay. Minor red clay. Minor mid grey clay in lower samples. Stains. Minor fine gravel.
148 - 156	Mainly black clay with lesser grey clays. Stains.
156 - 166	Sand (1-2 mm, angular to subrounded, mainly quartz). Mid and dark grey clays. Minor stains.
166 - 190	Sand (1-2 mm, angular, quartz). Mixed clays, mainly mid grey with lesser dark grey and black. Stains increase down interval.
190 - 200	Mixed clays (Lt > Dk). Increase in pale greenish grey clay. Increase in sticky grey clay at base. Very minor white and magenta clays.
200 - 216	Mixed clays (Lt > Dk). Increase in pale grey clay down interval. Sand (1mm, angular, quartz). Minor pink clay at base.
216 - 222	Sand (1-3mm, subangular, quartz). Mixed clays (Lt >> Dk), mainly pale green, pale, light and mid grey.
222 - 246	Mixed clays (Lt ≥ Dk). Increase in black clay towards base. Increase in staining. Minor sand. Minor carbonate.
246 - 256	Sand (2%) (1mm, subangular to subrounded, quartz). Mixed clays (Dk ≫ Lt).
256 - 272	Mixed clays, mainly dark grey and black but increase in pale green clay and limonite down interval. Minor white and pink sticky clays. Minor (2%) carbonate. Very minor quartz sand.
272 - 282	Mixed clays with increase in lighter clays especially white sticky clay. Minor quartz sand. Minor carbonate (2%).
282 - 294	Mixed clays. Increase in green clay down interval and increase in yellow clay. Minor sticky pink clay. Minor sand. Minor carbonate. Very minor fine gravel in lowest samples.

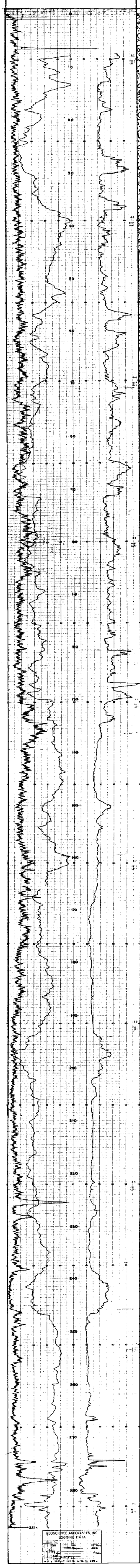
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DRILL HOLE LOG

2608(II)-20

HOLE No.	209-10	DATE DRILLED	21/6/76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	21/6/76	RANGE	200 cps	RESIST. SCALE	10 Ω/inch
PROJECT	Poontana	DATE LOGGED	21/6/76	TIME CONSTANT	2	SP. SCALE	1mv/div
LOCATION	Paralana Ck.	DRILLED DEPTH	288 m	PAPER SPEED	1 cm/m.	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	287 m	LOGGING SPEED	9 m/min.	FLUID LEVEL	8 m
GEOLOGIST	TAYLOR	ELEVATION	64 m	BACK GROUND	10 cps	PROBE No.	202
DRILLER	RUSSELL	CO-ORDS		TIME BASE		STANDARD	644
LOGGER	MACZKOWIACK			K-FACTOR	1.61 x 10^{-5}		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous · Mixed Clastics



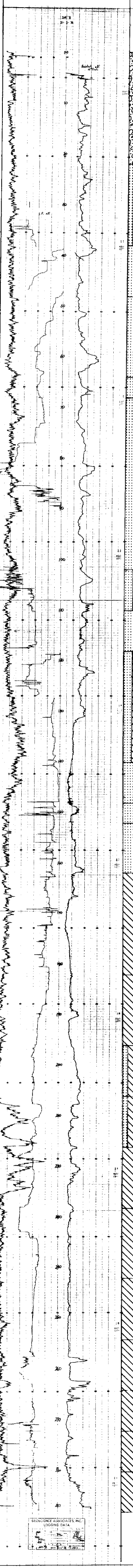
INTERVAL m	DESCRIPTION
0-16	Coarse sand. Pale grey sticky clay.
16-40	Coarse sand. Red silty, sandy or sticky clay.
40-46	Coarse sand. Red silty clay.
46-58	Minor gravel, coarse sand. Red with minor pale grey sandy clay.
58-72	Fine gravel, coarse sand. Red with minor pale grey silty or sandy clay.
72-94	Minor gravel. Coarse and normal sand. Red and pale grey silty clay.
94-114	Fine gravel. Coarse sand. Red and pale grey sticky or silty clay.
114-126	Fine sand with minor silt. Red and pale grey soft clay. Yellow/brown clay in lowest sample.
126-138	Sand (1-3 mm, angular, poorly sorted). Shell fragments. Pale grey with minor yellow/brown clay.
138-144	Light and pale grey clay. Stains.
144-150	Sand (1-2 mm, angular, quartz). Light grey, with increasing darker, clays.
150-160	Dark grey and black clay. Hematite staining. Minor limonite staining. Minor mid grey clay.
160-178	Mid grey plastic clay. Minor dark and light grey and black clay. Minor black shiny clay. Some stains.
178-188	Quartz sand. Mainly mid grey slightly sticky clay. Increase in stains.
188-190	Sand (0.5 mm., ang., qz.). Mixed clays (mid to dk grey).
190-206	Mixed clays (mainly mid to dk grey with yellow, olive and pale grey). Minor brick red clay. Sand as above.
206-216	Sand (1-3 mm., ang. to subround., quartz). Mainly dk grey and dk olive green. Minor white and pinkish grey clay.
216-230	Mixed clays (Dk ≥ Lt). Increase in olive green clay. Minor white sticky clay. Minor sand.
230-232	Sand (1-3 mm., ang. to subround., quartz). Mixed clays (Dk > Lt)
232-246	Sand (2 mm, angular, quartz). Mixed clays (Dk ≥ Lt). Minor mid grey, white and pink clay.
246-262	Sand (1 mm, angular, quartz). Mixed clays (Dk ≥ Lt) with minor sticky yellow clay, increase in black shiny clay and sticky white clay. Minor chocolate brown clay.
262-270	Mixed clays (Dk ≥ Lt). Increase in white clay down interval.
270-282	Mixed clays (Lt > Dk). Increase in sticky white clay (to 10%). Minor sticky pink clay. Minor carbonate.
282-288	TC clays. Minor carbonate and very minor sand. Minor stains.

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DRILL HOLE LOG 2608(II)-21

HOLE No.	209-11	DATE DRILLED	29.5.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	29.5.76	RANGE	200 cps	RESIST. SCALE	15Ω/inch.
PROJECT	POONTANA	DATE LOGGED	31.5.76	TIME CONSTANT	2	SP. SCALE	
LOCATION	PARALANA SK	DRILLED DEPTH	288m	PAPER SPEED	1 cm/m.	BIAS	225/?
STATE	S.A.	LOGGED DEPTH	287m	LOGGING SPEED	9 m/min.	FLUID LEVEL	5m
GEOLOGIST	TAYLOR	ELEVATION	65.63m.	BACK GROUND	14	PROBE No.	202
DRILLER	THOMPSON	CO-ORDS		TIME BASE		STANDARD	674 cps.
LOGGER	MORTIMER			K-FACTOR	?		Mixed Clastics

LITHOLOGY : Gravel; Sand; Silt; Clay; Carbonate; Carbonaceous



INTERVAL	DESCRIPTION
0 - 22	Gravel and coarse sand. Minor red and buff clay.
22 - 38	Coarse sand. Red and minor pale grey silty clay.
38 - 48	Coarse sand. Minor fine gravel. Red silty clay.
48 - 64	Coarse sand. Minor fine gravel. Red silty clay.
64 - 68	Coarse sand (fine gravel). Minor red clay
68 - 102	Coarse sand with minor gravel. Silt mainly in lower samples. Red with minor pale and light grey silty clay.
102 - 110	Sand and minor gravel. Red silty clay.
110 - 118	Sand. Red and pale grey soft silty clay.
118 - 140	Sand (up to 80% at 128 m). Predominantly pale grey with some brown silty clay.
140 - 148	Sand (1-2mm., subangular, quartz). Mid grey soft clay. Minor gravel.
148 - 152	Sand (1-2mm., subangular, mixed). Mid and dark grey and black clay.
152 - 162	Sand (1mm, subangular, quartz) with minor fine gravel. Black and mid grey clay. Limonite abundant in lower samples.
162 - 182	Mixed clays. Mainly mid grey with increase in black clay down interval. Minor magenta clay. Limonite abundant.
182 - 196	Mixed clays (Lt > Dk). Mainly mid grey and pale greenish grey clay. Abundant limonite. Some hematite, minor sand.
196 - 206	Sand (1-3mm, angular to subrounded, poorly sorted). Mixed clays (Lt > Dk) mainly pale greenish grey and some black clay. Minor white and pink clay. Minor carbonate. Limonite common.
206 - 216	Sand (1-2mm, quartz) with minor gravel. Mixed clays (Lt ≫ Dk). Minor white clay.
216 - 228	Mixed clays (Lt ≫ Dk). Mainly pale green, dark grey and black clay. Minor white clay. Minor yellow clay. Staining very common. Minor fine gravel. Trace of carbonate.
228 - 242	Mixed clays including minor dark brown clay. Increase in darker clays down interval. Minor carbonate (2%) and sand (1%) Minor white clay. Limonite common.
242 - 254	Mixed clays. Minor carbonate. Minor sand.
254 - 264	Mixed clays (DK ≥ Lt). Minor white clay. Minor sand. Minor carbonate (1%).
264 - 272	Mixed clays, as above, with increase in white clay. Minor carbonate.
272 - 280	Mixed clays (Lt ≥ Dk) includes white, yellow, pink and green clay in lowest sample. Minor carbonate and sand.
280 - 288	Mixed clays/TC clays. Less yellow clay at this depth than in previous holes. Very minor quartz sand.

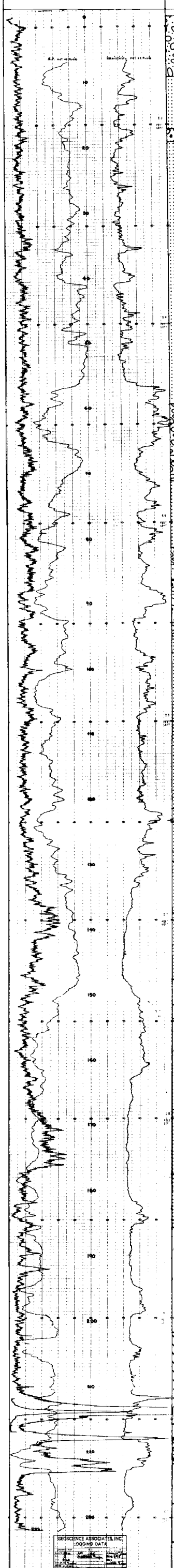
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DRILL HOLE LOG

2608(II)-22

HOLE No.	209-12	DATE DRILLED	22.6.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	22.6.76	RANGE	200 c/s	RESIST. SCALE	10 Ω/in
PROJECT	POONTANA	DATE LOGGED	22.6.76	TIME CONSTANT	2 SEC	SP. SCALE	1 MV/div
LOCATION	PARALANA CK.	DRILLED DEPTH	234 m	PAPER SPEED	1 cm/m	BIAS	295/140
STATE	S.A.	LOGGED DEPTH	232 m	LOGGING SPEED	9 m/min.	FLUID LEVEL	7 m
GEOLOGIST	TAYLOR	ELEVATION	64 m	BACK GROUND	10 cps	PROBE No.	202
DRILLER	RUSSEL	CO-ORDS		TIME BASE		STANDARD	649 c/s
LOGGER	MACZKOWIACK			K-FACTOR	1.61×10^{-5}		Mixed Clastics

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



INTERVAL m	DESCRIPTION
0 - 10	Coarse sand. Red soft clay.
10 - 16	Red and buff silty clay.
16 - 20	Fine gravel (3 - 5 mm), minor red clay.
20 - 60	Red with minor pale grey clay. Course or normal sand.
60 - 72	Fine gravel, coarse sand and red and pale grey silty clay.
72 - 82	Sand and red sandy clay.
82 - 96	Normal and coarse sand, fine and normal gravel, red and pale grey silty clay.
96 - 122	Coarse and normal sand, fine gravel, red and lesser pale grey sandy clay.
122- 130	Sand as above with pale grey, limonite stained clay.
130-138	Pale grey and yellow/brown silty clay.
138- 148	Sand (1mm., angular to subrounded, poorly sorted). Pale and light grey clay. Increase in darker clays down interval. Some limonite stain.
148 - 15	Sand (1-2mm., subangular, mainly quartz). Red and pale grey clay. Much limonite staining.
152 - 154	Hard black clay. Sand as above.
154 - 168	Sand as above, mainly red and dark grey clay. Minor light grey, pale green, brick red and olive green clay. Limonite common.
168 - 178	Sand (2mm, subangular to subrounded quartz). Mainly red to dark grey and black plastic clay. Limonite common.
178 - 186	Sand (1mm., angular, quartz). Mixed clays (Lt ≥ DK) limonite very abundant.
186 - 202	Sand (1mm., angular to subrounded, quartz, increase down interval. Mixed clays (DK = Lt). Increase in pale green clay down interval. Limonite abundant.
202 - 216	Mixed clays (DK ≥ Lt). Limonite very common. Hematite common. Minor sand (coarsest in lower part of interval).
216 - 218	60% dark grey/black clay and 40% mixed clays (DK Lt)
218 - 222	Mixed clays (DK = Lt). Up to 5% sand and gravel.
222 - 228	Mixed clays (DK > Lt). Limonite very common.
228 - 234	Mixed clays (DK > Lt). White clay. Slightly coarser sand and minor rounded pebbles.

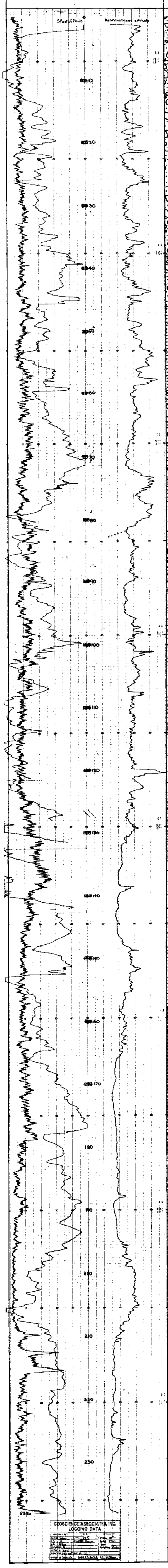
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DRILL HOLE LOG

2608(II)-23

HOLE No.	209-13	DATE DRILLED	23/6/76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	23/6/76	RANGE	200 cps	RESIST. SCALE	10 Ω/inch
PROJECT	POONTANA	DATE LOGGED	23/6/76	TIME CONSTANT	2	SP. SCALE	1 mv/div
LOCATION	PARALANA CK	DRILLED DEPTH	240 m	PAPER SPEED	1 cm/m	BIAS	270 / 125
STATE	S.A.	LOGGED DEPTH	238 m	LOGGING SPEED	9 m/min.	FLUID LEVEL	2 m
GEOLOGIST	TAYLOR	ELEVATION	65 m	BACK GROUND	10 cps	PROBE No.	202
DRILLER	RUSSELL	CO-ORDS		TIME BASE		STANDARD	654 cps
LOGGER	MACZKOWIACK			K-FACTOR	1.61x10⁻⁵		

LITHOLOGY : Gravel, Sand, Silt, Clay, Carbonate, Carbonaceous, Mixed Clastics



INTERVAL m	DESCRIPTION
0 - 18	Coarse gravel (6 cm). Coarse sand. Red and pale grey sticky clay.
18 - 38	Red with lesser light and pale grey sticky clay.
38 - 46	Coarse sand. Red with light grey sticky clay.
46 - 60	Coarse sand. Red and light grey silty clay.
60 - 72	Fine gravel. Coarse and normal sands. Red and minor pale grey silty clay.
72 - 82	Minor gravel. Red and minor pale grey slightly silty clay.
82 - 90	Fine gravel (2 - 6 mm) with red and pale grey silty clay.
90 - 100	Red and lesser mid grey silty clay. Increase in sand in lowest interval.
100 - 122	Fine gravel and sand. Red/brown silty clay with some mid and pale grey.
122 - 136	Fine sand. Minor silt. Pale grey clay with yellow/brown stains. Minor red and light grey clay. Stains.
136 - 142	Sand (1mm, subang. to subrounded) Light and mid grey hard clay. Stains.
142 - 146	Sand (1mm, subang. to subrounded, qz). Mid grey clay. Limonite common.
146 - 158	Sand as above. Mid to dark grey with lesser black clay. Stains.
158 - 178	Sand (2mm, ang. to subang., qz.)in upper half. Sand (1mm., ang., poorly sorted) in lower half. Mid grey soft clay with darker grey in lower half. Stains.
178 - 186	Sand (1-2mm, angular, poorly sorted). Clays as above with some increase in limonite and hematite.
186 - 196	Sand (0.5 - 2 mm, angular, poorly sorted). Minor gravel. Mixed clays (Lt > Dk), mid grey, pale green. Minor black and khaki clay.
196 - 198	Pale green clay and lesser mixed clays (Lt > Dk). Sand as above. Minor carbonate.
198 - 214	Sand (coarse to fine, angular, poorly sorted). Mixed clays (Lt ≫ Dk), mid and pale grey, pale green, light and dark grey. Minor white sticky clay. Minor brick red clay. Limonite common.
214 - 218	Sand (1-3 mm., ang., qz). Mixed clays (Lt ≥ Dk) with lesser light, pale grey and pale green clay. Minor gravel.
218 - 220	Sand (0.5-2mm, ang. to subround.qz). Mixed clays (Lt > Dk). Lim.comm
220 - 224	Sand as above. Minor gravel. Mixed clays (Dk = Lt). Lim.common.
224 - 230	Sand (0.5-5mm, ang. to subang., qz). Minor carbonate. Mixed clays (Lt > Dk). Minor sticky yellow clay.
230 - 240	Sand (0.5 - 5mm, ang. to subang., qz). Minor carbonate. Mixed clay (Lt > Dk). Minor sticky grey and yellow clay. Less limonite.

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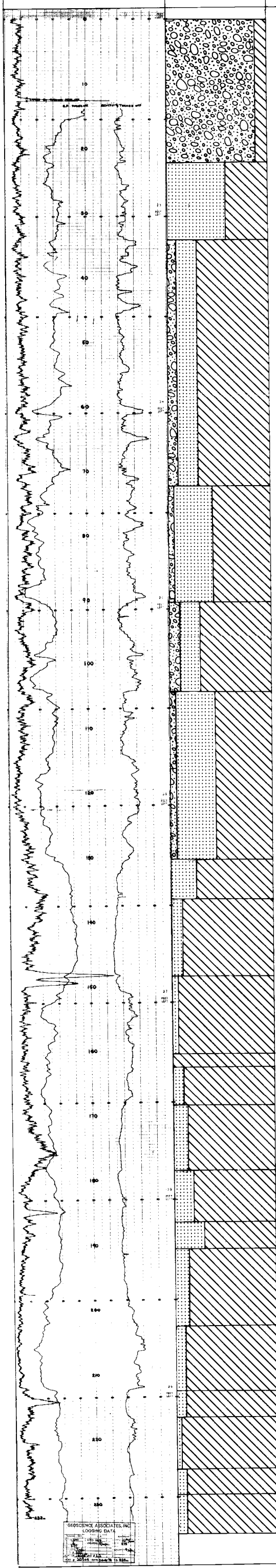
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DRILL HOLE LOG

2608(II)-24

HOLE No.	209-14	DATE DRILLED	24.6.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	24.6.76	RANGE	200 cps	RESIST. SCALE	10 Ω /in.
PROJECT	POONTANA	DATE LOGGED	24.6.76	TIME CONSTANT	2 sec.	SP. SCALE	1 mv/div.
LOCATION	PARALANA CK.	DRILLED DEPTH	234 m	PAPER SPEED	1 cm/m.	BIAS	275 / 100
STATE	S.A.	LOGGED DEPTH	232.1 m	LOGGING SPEED	9 m/min.	FLUID LEVEL	
GEOLOGIST	TAYLOR	ELEVATION	65.5 m.	BACK GROUND	11 cps	PROBE No.	202
DRILLER	RUSSELL	CO-ORDS		TIME BASE		STANDARD	650 cps.
LOGGER	MACZKOWIACK			K-FACTOR	1.61x10⁻⁵		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous · Mixed Clastics



INTERVAL	DESCRIPTION
0 - 22	Gravel and red with light grey soft clay. Minor sand.
22 - 34	Coarse sand with minor gravel. Red soft sticky clay.
34 - 72	Fine and normal gravel. Coarse sand. Red silty and lesser sandy clay. Very minor mid grey clay.
72 - 90	Fine gravel. Normal and coarse sand. Red with very minor pale grey silty clay.
90 - 104	Fine gravel. Coarse sand. Red and lesser pale grey (60/40) silty clay.
104 - 130	Normal and coarse sand. Red and pale grey (50/50) silty, soft plastic and sticky clay.
130 - 136	Sand. Minor silt. Pale grey and yellow/brown clay.
136 - 148	Sand and minor silt. Light grey and pale grey soft plastic (sp) clay with lesser mid grey clay.
148 - 160	Sand (0.5 - 1 mm, ang. to subrounded, quartz). Minor silt. Dark grey, black and mid grey plastic clays. Minor mid grey sp clay. Hematite common. Minor limonite.
160 - 162	Light grey (70%) and mid to dk grey and black (30%)clay.Hem.stain.
162 - 168	Sand (1-2 mm, ang. to subang., quartz) with minor very fine sand. Dark grey and black with minor white and light grey clay.
168 - 178	Sand (1-2mm, ang. to subrounded, poorly sorted). Mid dark grey and black clay. Increase in pale green clay and limonite down interval.
178 - 186	Sand (as above). Mixed clays (30%) and mid to dark grey soft clay (50%). Hematite common. Limonite fairly common.
186 - 190	Sand (as above). Mixed clays (Lt > Dk) with lesser soft dk.clay. Limonite and hematite common.
190 - 202	Sand (as above). Mixed clays (Dk = Lt) with minor soft clay. Increase in olive green clay at bottom. Limonite abundant.
202 - 212	Sand (1-2 mm, angular, poorly sorted). Mixed clays (Dk ≥ Lt). Limonite abundant.
212 - 216	Sand (as above). Mixed clays (Dk ≫ Lt). Limonite common. Minor carbonate.
216 - 224	Sand (as above). Mixed clays (Dk ≥ Lt). White clay. Minor carbonate. Limonite abundant.
224 - 228	Sand (0.5 - 3 mm, ang. to subround., poorly sorted). Mixed clays (Dk > Lt). Minor carbonate. Less limonite.
228 - 234	Sand (as above). Mixed clays (Dk > Lt). Minor carbonate.

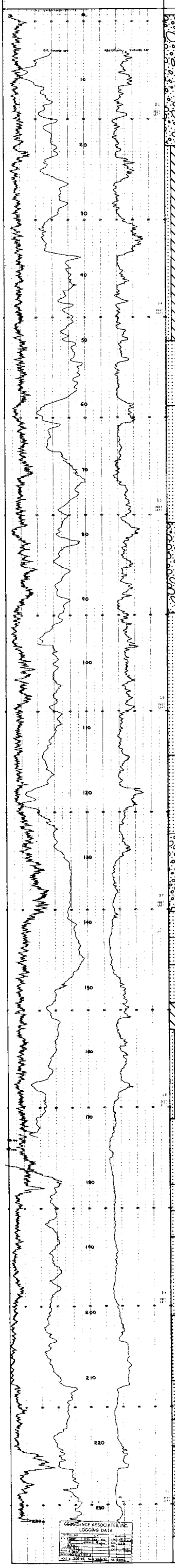
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2608(II)-25

DRILL HOLE LOG

HOLE No.	209-15	DATE DRILLED	25/6/76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	25/6/76	RANGE	200 cps	RESIST. SCALE	10Ω /inc
PROJECT	Poontana	DATE LOGGED	25/6/76	TIME CONSTANT	2	SP. SCALE	1 mv/div.
LOCATION	Paralana Ck.	DRILLED DEPTH	234 m	PAPER SPEED	1 cm/m.	BIAS	270//100/50
STATE	S.A.	LOGGED DEPTH	232 m	LOGGING SPEED	9 m/min	FLUID LEVEL	6 m
GEOLOGIST	TAYLOR	ELEVATION	65.8 m	BACK GROUND	11 cps	PROBE No.	202
DRILLER	BROWN	CO-ORDS		TIME BASE		STANDARD	656 cps
LOGGER	MACZKOWIACK			K-FACTOR	1.61 x 10-5		

LITHOLOGY : Gravel | Sand | Silt | Clay | Carbonate | Carbonaceous | Mixed Clastics



INTERVAL m	DESCRIPTION
0-20	Coarse and fine gravel. Sticky red and lesser grey clay. Minor white clay.
20-50	Minor gravel. Red and lesser pale and light grey sticky or silty clay.
50-60	Sand and minor gravel. Minor red sticky clay.
60-78	Minor gravel. Coarse and normal sand. Red silty or sandy clay.
78-92	Sand and fine gravel. Red with very minor mid grey sandy clay.
92-114	Minor gravel. Normal and coarse sand. Red with minor pale grey silty clay.
114-126	Mainly fine sand. Red/brown and pale grey silty clay.
126-138	Fine gravel. Pale grey clay with yellow and red stains.
138-142	Sand (0.5 - 1 mm, ang. to subround., qz.). Pale grey with lesser light and mid grey clay.
142-146	Sand as above. Mid and dark grey clay. Hematite.
146-152	Sand (1 mm., ang. to subround., mainly qz.). Mainly dark grey and black clays. Minor mid grey clay.
152-156	Minor sand. Mid grey crumbly clay. Hem. and minor lim.
156-170	Minor rounded gravel. Mid, dk. grey and black clay. Minor light grey and brick red clay. Hematite and limonite.
170-180	Sand (coarse at top to fine at bottom, angular to subrounded, poorly sorted). Mid to dark grey and black clay. Abundant hematite. Some limonite.
180-184	Sand (0.25 - 1 mm, angular, quartz). Mixed clays (Lt ≥ Dk). Minor light grey and brick red clay.
184-188	Sand (as above). Dark grey and black clay. Hem. and lim.
188-200	Sand (0.5 - 3 mm., angular to subrounded, poorly sorted). Minor gravel. Mixed clays (Lt ≥ Dk). Limonite and hematite abundant.
200-210	Sand (1 - 2 mm., angular, quartz). Minor gravel. Mixed clays (Lt ≥ Dk). Hematite and limonite common.
210-216	Sand as above (slightly coarser). Mixed clays (Lt > Dk). Mainly pale grey and black clay. Limonite and hematite common.
216-220	Sand (1-3 mm., ang. to subang., poorly sorted). Mixed clays (Lt > Dk). Minor well rounded gravel.
220-228	Sand (1-2 mm, ang. to subang., poorly sorted). Mixed clays (Lt ≥ Dk). Minor fine gravel. Lim. and hem. common.
228-234	Sand as above. Very minor fine gravel. Mixed clays (Dk > Lt). Lim. and hem. fairly common.

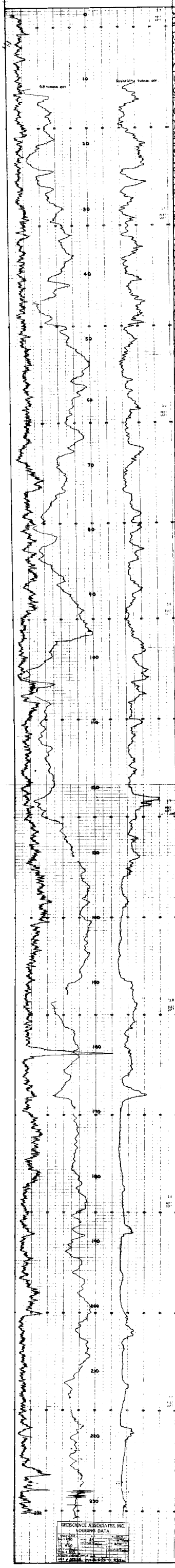
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DRILL HOLE LOG

2608(II)-26

HOLE No.	209-16-	DATE DRILLED	26.6.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	26.6.76	RANGE	200 cps	RESIST. SCALE	10 Ω /inch
PROJECT	POONTANA	DATE LOGGED	26.6.76	TIME CONSTANT	2 sec.	SP. SCALE	1 mv/div.
LOCATION	PARALANA CK	DRILLED DEPTH	234 m	PAPER SPEED	1 cm/m	BIAS	270/85
STATE	S.A.	LOGGED DEPTH	232 m	LOGGING SPEED	9 m/min	FLUID LEVEL	
GEOLOGIST	TAYLOR	ELEVATION	65.9 m	BACK GROUND	10 cps	PROBE No.	202
DRILLER	BROWN	CO-ORDS		TIME BASE		STANDARD	652 cps
LOGGER	MACZKOWIACK			K-FACTOR	1.61x10⁻⁵		Mixed Clastics

LITHOLOGY : Gravel, Sand, Silt, Clay, Carbonate, Carbonaceous



INTERVAL	DESCRIPTION
0 - 22	Gravel and sand. Pale grey sticky clay.
22 - 46	Red with minor pale grey silty clay. Minor silt.
46 - 52	Fine gravel. Red sandy clay.
52 - 70	Sand and minor gravel. Red with minor pale grey silty or sandy clay.
70 - 98	Normal and coarse sand. Red silty or sandy clay. Minor pale grey clay in lower interval.
98 - 122	Fine sand. Red silty clay with minor grey clay in upper half. Red/brown silty clay with lesser pale grey clay in lower half.
122 - 130	Fine sand. Pale grey with yellow/brown and minor red clay.
130 - 138	Pale and light grey clay with limonite and hematite staining.
138 - 144	Light grey clay with hematite abundant and some limonite. Minor mid grey clay.
144 - 152	Mainly mid grey clay with lesser light and dark grey clay. Increase in darker clays and pale green clay down interval.
152 - 154	Hard black clay with lesser midgrey clay.
154 - 162	Sand (0.5- 1 mm, ang. to subang., quartz). Mid and light grey clay. Very minor brick red clay.
162 - 174	Sand (as above, but coarser down interval). Light grey soft clay at top and dark grey/black clay at bottom. Hematite and minor limonite.
174 - 184	Sand (1-2 mm, angular, poorly sorted) to 60% at 176 m. Mid, dark grey and black sp. clays at top with mixed clays (Lt > Dk) at bottom. Hematite common. Minor limonite.
184 - 192	Sand (as above). Mixed clays (as above).
192 - 200	Sand (1 - 2 mm, ang. to subrounded, poorly sorted). Minor fine gravel. Mixed clays (Lt ≥ Dk) with minor white and yellow clay.
200 - 204	Coarse sand with minor fine gravel. Mid to dark grey and black clay. Abundant limonite.
204 - 208	Coarse sand with pebbles. Mixed clays (Dk ≥ Lt) and lesser light grey clay.
208 - 212	Fine gravel. Mixed clays (Dk = Lt). Limonite fairly common.
212 - 222	Sand (1-3 mm, subang. to subrounded, mainly quartz). Minor fine gravel. Mixed clays (Dk = Lt). Minor white clay and carbonate.
222 - 228	Coarse sand with minor fine gravel (as above). Mixed clays with dark brown clay. Limonite common. Minor carbonate.
228 - 234	Sand (1-2 mm, ang., to subrounded, mainly quartz). Very minor fine gravel. Mixed clays (Dk ≥ Lt). White clay common. carbonate common.

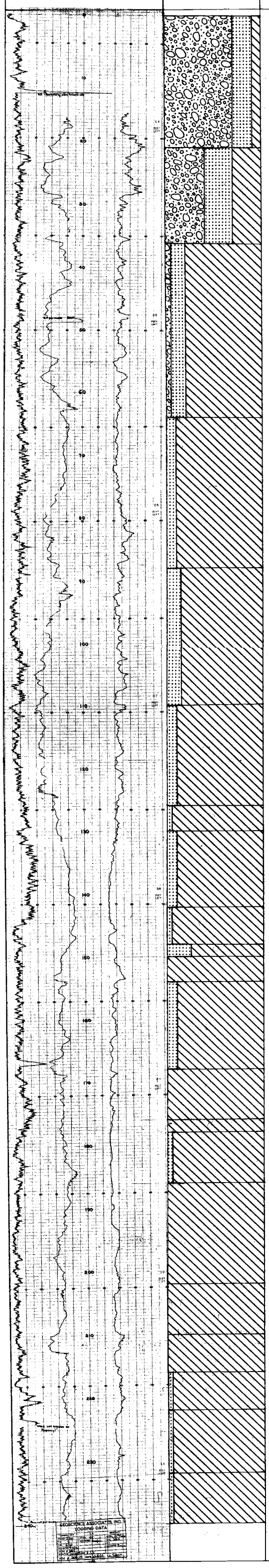
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DRILL HOLE LOG

2608(#)-27

HOLE No.	209-17	DATE DRILLED	27/6/76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	27/6/76	RANGE	200 cps	RESIST. SCALE	10Ω/inch
PROJECT	Poontana	DATE LOGGED	27/6/76	TIME CONSTANT	2	SP. SCALE	1 mv/div
LOCATION	Paralana Ck.	DRILLED DEPTH	24 Om	PAPER SPEED	1 cm/m	BIAS	285/85
STATE	S.A.	LOGGED DEPTH	240 m	LOGGING SPEED	9 m/min	FLUID LEVEL	
GEOLOGIST	TAYLOR	ELEVATION	65.1 m	BACK GROUND	10	PROBE No.	202
DRILLER	BROWN	CO-ORDS		TIME BASE		STANDARD	658 cps
LOGGER	MACZKOWIACK			K-FACTOR	1.61 x 10-5		

LITHOLOGY : Gravel; Sand; Silt; Clay; Carbonate; Carbonaceous; Mixed Clastics



INTERVAL m	DESCRIPTION
0-22	Coarse (8 cm) and minor fine gravel. Coarse sand. Light grey and buff sticky clay.
22-36	Red and minor pale grey sticky clay.
36-64	Fine gravel. Coarse sand. Red silty clay.
64-88	Sand with minor gravel. Red silty clay.
88-110	Sand with minor fine gravel. Red with minor pale grey silty clay.
110-126	Sand with minor gravel. Red/brown with lesser pale grey silty clay.
126-130	Coarse sand. Pale grey with yellow/brown stain and lesser red/brown clay.
130-142	Majority of sand in lower half of interval. Light to mid grey sticky clay. Abundant limonite and hematite.
142-148	Hard black clay with pale to mid grey hard plastic clay. Soft grey clay. Minor pale green clay.
148-150	Sand (1 mm., ang., qz.). Black soft clay. Minor hematite.
150-154	Minor sand. Mainly dark grey/black with lesser light grey crumbly clay.
154-168	Sand (1-2 mm, ang. to subrounded, poorly sorted). Minor gravel. Mixed clays (Lt≥Dk). Hematite abundant. Limonite fairly common.
168-176	Dark grey/black soft clay and mixed clays (Dk>Lt). Minor white sticky clay. Hematite and limonite fairly common.
176-178	Minor sand. Mixed clays (Dk>Lt). Lim. and hem. common.
178-186	Sand (1-2 mm, ang. to subang., qz.). Mixed clays (Lt≥Dk) Trace gypsum. Hematite and limonite.
186-202	Minor sand. Mixed clays (Dk≥Lt), dark grey, black, olive green, pale green, light grey. Minor mid to dark grey soft clay. Abundant limonite.
202-210	Minor sand. Mixed clays (Dk>Lt). Limonite and hematite abundant.
210-216	Minor sand and carbonate. Mixed clays (Lt = Dk). Limonite very abundant.
216-222	Sand (0.5 - 2 mm., ang. to subround., poorly sorted, mainly qz.). Mixed clays (Dk≫Lt). Minor white clay, carbonate and trace gypsum. Lim. common.
222-232	Mixed clays (Dk≫Lt). Minor white clay. Trace gypsum. Limonite common. Little hematite.
232-240	Sand (coarse, angular, poorly sorted). Fine gravel and rounded pebble (1.5 cm, subang., qz). Minor carbonate. Mixed clays (Dk>Lt). Limonite and hematite fairly common.

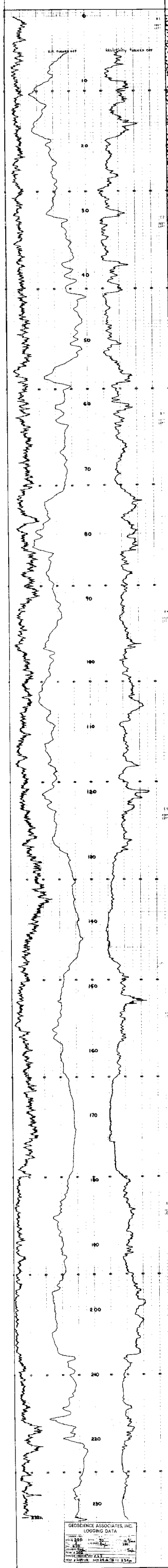
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DRILL HOLE LOG

2608(II)-28

HOLE No.	209-18	DATE DRILLED	27/7/76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	28/7/76	RANGE	200 c/s	RESIST. SCALE	10 Ω/inch
PROJECT	Poontana	DATE LOGGED	28/7/76	TIME CONSTANT	2	SP. SCALE	1 mv/div
LOCATION	PARALANA CK	DRILLED DEPTH	234 m	PAPER SPEED	1 cm/m	BIAS	280 / 70
STATE	S.A.	LOGGED DEPTH	232 m	LOGGING SPEED	9 m/min	FLUID LEVEL	5 m
GEOLOGIST	TAYLOR	ELEVATION	65 m	BACK GROUND	10 cps	PROBE No.	202
DRILLER	THOMPSON	CO-ORDS		TIME BASE		STANDARD	656 ohms
LOGGER	MACZKOWIACK			K-FACTOR	1.61x10⁻⁵		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous · Mixed Clastics



INTERVAL	DESCRIPTION
0 - 20	Gravel, coarse sand, pale grey, red and buff sticky clay.
20 - 38	Red soft sticky clay with minor pale grey clay.
38 - 74	Fine gravel, coarse and normal sand, red sandy or silty clay with minor pale grey clay.
74 - 90	Normal sand, fine gravel and red silty clay.
90 - 114	Red silty clay. Very minor gravel.
114 - 120	Red and pale grey sticky clay.
120 - 130	Pale grey, with lesser red, very soft clay and coarse sand.
130 - 134	Pale grey soft clay with yellow/brown clay. Hematite common.
134 - 142	Pale grey and light grey clay. Minor dark grey clay.
142 - 144	Sand (1 mm, angular, poorly sorted). Light grey stained clay.
144 - 146	80% hard black clay with hem. and 20% light grey clay.
146 - 152	Sand (1 mm, subrounded, quartz). Mid to dark grey or black clay Hematite and limonite stains.
152 - 160	Sand (1 - 3 mm, angular to subrounded, mainly quartz). Light grey soft clay with darker grey clays.
160 - 172	Sand (1 mm, angular quartz), minor fine gravel (3 - 5 mm., subrounded, mainly quartz) and mid to dark grey and black soft hematite stained clay.
172 - 184	Mainly mid grey with lesser light and dark grey clay. Limonite and hematite staining.
184 - 202	Mixed clays (Lt > DK). Limonite abundant. Minor sand.
202 - 216	Mixed clays (Lt > DK) including khaki and pale green clay. Sand (0.5 to 3 mm, subrounded, quartz). Limonite fairly common.
216 - 218	60% mixed clays (Lt > DK) and 40% dark grey/ black clay. Minor sand.
218 - 226	Mixed clays (DK = Lt). Limonite fairly common. Minor sand.
226 - 226	Mixed clays (Lt ≥ DK) and black and light grey soft clay.
226 - 234	Sand as above (1-2 mm, angular, quartz), minor pebbles (1 cm, subrounded, quartz) and mixed clays (Lt > DK). Limonite and hematite fairly common.

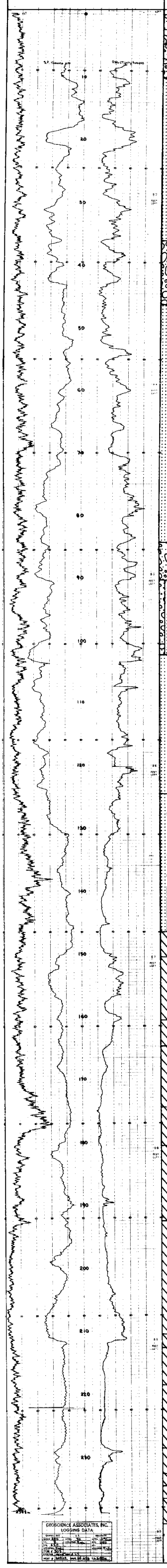
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DRILL HOLE LOG

2608(II)-29

HOLE No.	209-19	DATE DRILLED	28.6.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	28.6.76	RANGE	200 cps	RESIST. SCALE	10 Ω /in.
PROJECT	POONTANA	DATE LOGGED	28.6.76	TIME CONSTANT	2 sec.	SP. SCALE	1 mv/div.
LOCATION	PARALANA CK	DRILLED DEPTH	240 m.	PAPER SPEED	1 cm/m	BIAS	280 / 70
STATE	S.A.	LOGGED DEPTH	238.5 m	LOGGING SPEED	9 m/min.	FLUID LEVEL	
GEOLOGIST	TAYLOR	ELEVATION	65.51 m	BACK GROUND	10 cps	PROBE No.	202
DRILLER	THOMPSON	CO-ORDS		TIME BASE		STANDARD	656 cps.
LOGGER	MACZKOWIACK			K-FACTOR	1.61x10-5		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous · Mixed Clastics



INTERVAL	DESCRIPTION
0 - 10	Coarse and fine gravel with dark brown soft clay.
10 - 36	Coarse sand with minor fine gravel. Red soft sticky clay with light grey clay in upper part.
36 - 46	Fine gravel. Coarse sand. Red sticky clay.
46 - 84	Normal-sand with very minor gravel in upper half. Red silty clay becoming sandy down interval.
84 - 90	Fine gravel. Coarse sand and red silty clay.
90 - 102	Fine gravel. Fine sand and silt. Red silty clay.
102 - 124	Sand becoming finer down interval (80% sand in lowest 4 m). Red and lesser pale grey sticky clay (75/25).
124 - 146	Fine sand and minor gravel. Pale grey clay with yellow/brown stains and minor red clay. Increase in hematite stain in lower half.
146 - 150	Pale grey with minor light grey clay. Stains. Minor sand.
150 - 160	Mainly mid grey with lesser dark grey and black clay. Minor stains. Very minor sand.
160 - 164	Light grey with some mid grey clay. Stains fairly common.
164 - 174	Mid to dark grey clay. Limonite common. Hematite fairly common.
174 - 180	Mid to dark grey, with some black, soft clay and mixed clays (Lt > Dk). Stains abundant.
180 - 192	Mixed clays (Lt > Dk) including mid to pale grey, dark grey and black. Limonite very abundant.
192 - 210	Clays, as above, with increase in darker clays. Limonite abundant. Hematite very common. Very minor sand.
210 - 212	Black, mid grey and khaki clays. Limonite very abundant.
212 - 218	Mixed clays (Dk ≥ Lt). Minor pink sticky clay. (Minor coarse sand (2 mm, subrounded, qs.) and carbonate.
218 - 228	Mixed clays (Lt > Dk). Minor white clay. Limonite abundant. very minor fine gravel.
228 - 232	Mixed clays (Lt ≥ Dk). Minor gravel.
232 - 234	Mixed clays (Dk ≫ Lt). Limonite common. Carbonate common.
234 - 236	Mixed clays (Lt > Dk). Minor gravel and carbonate. Limonite f.com.
236 - 240	Mixed clays (Dk > Lt). Minor coarse sand (2 mm, ang.,poorly sorted)

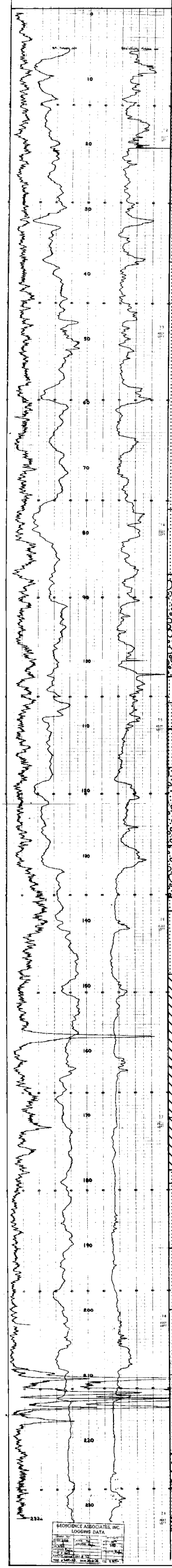
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DRILL HOLE LOG

2608(II)-30

HOLE No.	209 - 20	DATE DRILLED	29.6.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	29.6.76	RANGE	200 cps	RESIST. SCALE	10 Ω /in.
PROJECT	POONTANA	DATE LOGGED	29.6.76	TIME CONSTANT	2 sec.	SP. SCALE	1 mv/div.
LOCATION	PARALANA CK	DRILLED DEPTH	234 m	PAPER SPEED	1 cm/m	BIAS	280 / 70
STATE	S.A.	LOGGED DEPTH	232 m	LOGGING SPEED	9 m/min.	FLUID LEVEL	
GEOLOGIST	TAYLOR	ELEVATION	65.5 m	BACK GROUND	10 cps	PROBE No.	202
DRILLER	BROWN	CO-ORDS		TIME BASE		STANDARD	663 cps
LOGGER	MACZKOWIACK			K-FACTOR	1.61X10-5		Mixed Clastics

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



INTERVAL	DESCRIPTION
0 - 14	Coarse and fine gravel. Coarse sand. Light grey/ buff soft sticky clay.
14 - 38	Coarse sand. Red sticky clay with light grey soft sticky clay at top.
38 - 76	Coarse sand, finer in lower half, with some fine gravel. Red silty, with some sandy clay.
76 - 86	Sand, fine at top and coarser down interval. Minor fine gravel. Red with very minor pale grey silty clay.
86 - 102	Fine gravel. Normal and coarse sand. Red with lesser pale grey (70/30)sticky clay.
102 - 106	Red soft silty clay.
106 - 110	Fine to normal sand with minor red clay.
110 - 116	Coarse sand. Pale grey and red silty clay (60/40).
116 - 128	Fine gravel. Coarse sand. Pale grey clay with yellow/brown staining and minor red clay.
128 - 136	Fine gravel. Very coarse sand. Clay, as above, with minor light grey clay in lower half. Limonite and hematite staining.
136 - 138	Sand (0.5 - 3 mm, ang. to subang., quarts).
138 - 148	Sand (as above). Light grey soft clay with mid to dark grey in lowest sample. Hematite abundant. Limonite abundant from 146 m.
148 - 162	Mainly mid to dark grey and black clays. Magenta clay common. Minor black shiny clay and green clay in lower half. Minor sand (2 mm, angular, poorly sorted).
162 - 170	Mainly mid, with some dark, grey clay. Little staining. Minor sand. (1 mm, angular, quartz).
170 - 178	Light to mid grey soft clay. Minor hematite. Limonite increases down interval. Minor sand (as above).
178 - 180	Sand (1 - 2 mm, ang. to subang., mixed). Clays as above.
180 - 190	Sand (as above) with minor gravel. Pale green, dark grey and lesser black and mid grey clay. Some hard brown clay.and Limonite staining.
190 - 200	Sand (as above). Pale greenish grey clay and mixed clays(Lt > Dk).
200 - 210	Sand (as above). Mixed clays (Lt ≫ Dk) including mid grey, pale green, light grey and khaki. Limonite fairly common.
210 - 222	Sand and clays as above. Minor carbonate.
222 - 226	Mixed clays (Lt > Dk). Increase in black limonite stained clay.
226 - 232	Sand (1 mm., ang. to subang., mixed and mixed clays (Lt ≫ Dk), increase in mid grey clay.
232 - 234	Sand and minor gravel. Mixed clays (as above).Limonite fairly common.

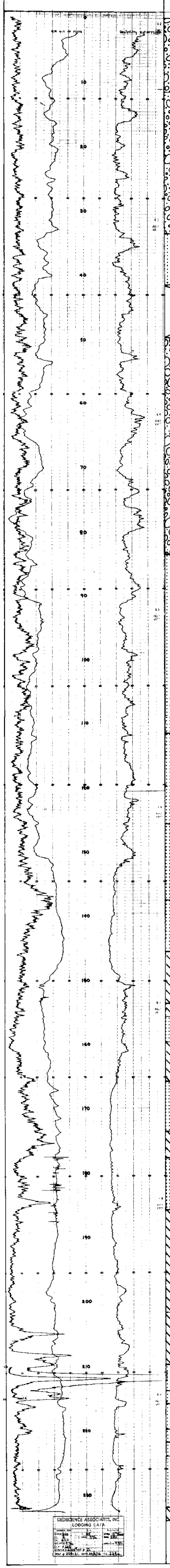
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DRILL HOLE LOG

2608(II)-31

HOLE No.	209-21	DATE DRILLED	30/6/76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	30/6/76	RANGE	200 cps	RESIST. SCALE	10Ω /in.
PROJECT	POONTANA	DATE LOGGED	30/6/76	TIME CONSTANT	2	SP. SCALE	1 mv/div
LOCATION	PARALANA CK.	DRILLED DEPTH	234 m	PAPER SPEED	1 cm/m	BIAS	280/65
STATE	S.A.	LOGGED DEPTH	232 m	LOGGING SPEED	9 m/min	FLUID LEVEL	3 m
GEOLOGIST	TAYLOR	ELEVATION	64 m	BACK GROUND	10 cps	PROBE No.	202
DRILLER	BROWN	CO-ORDS		TIME BASE		STANDARD	653 cps
LOGGER	MACZKOWIACK			K-FACTOR	1.61x10⁻⁵		Mixed Clastics

LITHOLOGY : Gravel | Sand | Silt | Clay | Carbonate | Carbonaceous



INTERVAL	DESCRIPTION
0 - 12	Coarse sand. Light grey soft clay.
12 - 34	Coarse and medium sand. Red with minor light grey sticky clay.
34 - 42	Coarse sand with red and light grey clay.
42 - 50	Samples not collected.
50 - 84	Fine gravel, fine and medium sand. Red with very minor pale grey silty clay.
84 - 122	Fine to very coarse sand. Red with minor pale grey silty clay.
122 - 126	Fine sand and silt. Red/brown and lesser pale grey silty clay.
126 - 138	Mainly pale grey with lesser red and light grey clay. Limonite very abundant.
138 - 146	Sand (1mm., angular, mainly quartz). Mid grey soft stained clay.
146 - 154	Mainly hard black clay. Minor limonite and minor sand.
154 - 156	Mid to dark grey soft clay. Minor stains.
156 - 160	Sand (0.5-1 mm., angular, quartz). Light grey crumbly clay.
160 - 166	Light grey clay with hematite and some limonite. Minor darker grey clay. Minor sand.
166 - 174	Sand (0.5 - 4 mm., angular to subrounded, poorly sorted) Mainly dark grey/black clay. Minor staining.
174 - 178	Mainly black clay with dark grey clay. Minor staining.
178 - 186	Sand (1-3 mm, angular to subrounded, poorly sorted). Mainly mid to dark grey clay with some mixed clays.
186 - 202	Mainly dark grey, black and dark olive green clay. Limonite fairly common. Minor carbonate (188 - 192m). Minor pink sticky clay.
202 - 210	20% Pale green soft clay, 15% mid grey lim. stained soft clay, 65% Mixed clays (Mk >> Lt). Limonite common. Minor coarse sand.
210 - 214	Sand (fine - coarse, angular, quartz). Mixed clays (Lt = Dk). Minor carbonate. Limonite very common.
214 - 216	Sand (1-2mm, ang., qz). Mixed clays (Lt ≥ Mk). Limonite v.common.
216 - 220	Mixed clays (Lt > Mk). Sand as above. Minor carbonate. Lim. v. common.
220 - 222	Mixed clays (Dk = Lt) and light soft clay. Lim. fairly comm. Sand as abv.
222 - 224	Mixed clays (Lt >> Dk) Lim. very abundant. Sand as above.
224 - 232	Mixed clays (Lt > Dk). Sand as above. Minor carbonate.
232 - 234	Mixed clays (Dk = Lt). Minor carbonate. Minor sand. Lim. v. common.

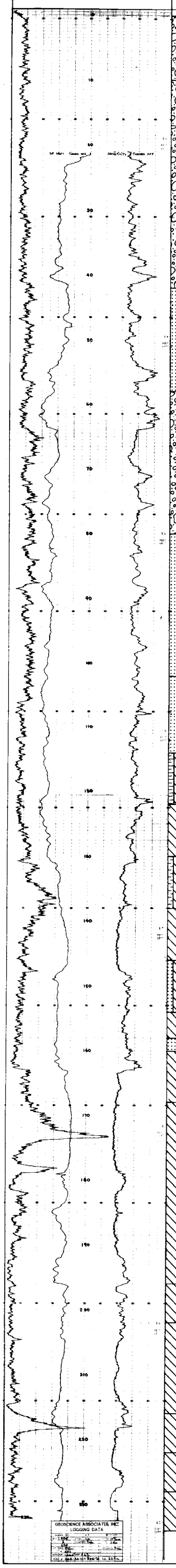
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DRILL HOLE LOG

2608(II)-32

HOLE No.	209 - 22	DATE DRILLED	30.6.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	1.7.76	RANGE	200 cps	RESIST. SCALE	10 Ω /in.
PROJECT	POONTANA	DATE LOGGED	1.7.76	TIME CONSTANT	2 sec.	SP. SCALE	1 mv/div.
LOCATION	PARALANA CK.	DRILLED DEPTH	234 m.	PAPER SPEED	1 cm/m	BIAS	280 / 70
STATE	S.A.	LOGGED DEPTH	233 m.	LOGGING SPEED	9 m/min.	FLUID LEVEL	
GEOLOGIST	TAYLOR	ELEVATION	62.98 m	BACK GROUND	10 cps	PROBE No.	202
DRILLER	RUSSELL	CO-ORDS		TIME BASE		STANDARD	664 cps.
LOGGER	MACZKOWIACK			K-FACTOR	1.61 x 10-5		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous · Mixed Clastics



INTERVAL	DESCRIPTION
0 - 10	Gravel with minor clay.
10 - 42	Fine gravel. Coarse sand. Red with lesser pale grey and minor light grey soft or silty clay.
42 - 58	Normal and fine sand. Red with lesser pale grey silty clay(80/20).
58 - 80	Fine gravel. Sand, coarse at top gradually finer down interval. Red with minor pale grey silty clay.
80 - 102	Minor gravel. Fine sand. Red with minor pale grey silty clay.
102- 114	Minor gravel. Fine or normal sand. Red or red/brown with lesser pale grey (80/20) mainly silty clay.
114 - 122	Red silty clay (soft) with minor pale grey clay. Minor sand and gravel.
122 - 130	Pale grey and red/brown silty clay (55/45). Minor yellow/ brown clay. Minor sand.
130 - 138	Pale greenish grey sp clay with minor red clay. Minor light grey clay. Hematite and limonite increasing down interval minor sand.
138 - 146	Light grey soft clay. Limonite and hematite very common. minor sand.
146 - 154	Dark grey to black clays with magenta clay. Limonite and hematite common.
154 - 158	Mid grey clay. Less staining. Minor sand.
158 - 160	Sand (1-2 mm, ang., qz.) Dark grey soft clay. Limonite fairly common
160 - 168	Minor sand (2%). Mid to light grey sp clay. Hematite and limonite stains.
168 - 196	Dark grey and black sp clays. Brick red clay common in lower half. Minor pink, light grey and pale grey clay. Limonite very abundant from 173 m downwards. Minor sand.
196 - 202	Sand (1 mm, ang., qz.) to 5% in lowest sample. Mainly mid grey clay. Minor white clay and carbonate. Limonite abundant. Hematite fairly abundant.
202 - 216	Mixed clays (Dk = Lt). Black, dark grey, olive green, midgrey, pale grey and khaki clay. Limonite very abundant. Hematite common. Minor sand and carbonate.
216 - 222	Mixed clays (Dk = Lt). Light grey, black, olive green clay. Limonite abundant. Minor sand and carbonate.
222 - 228	Mixed clays (Dk = Lt). Limonite very common to abundant. Minor sand.
228 - 234	Mixed clays (Dk > Lt). Black and mid grey clay. Very minor white clay. Limonite abundant.

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The medium depth anomalies gave the better results (209-8, 209-12, 209-20, 209-21) with calculated uranium oxide values exceeding 2 lb/ton in four holes during the second half of the programme. These anomalies coincided with the development of the sand d', in particular the upper part of d'.

d) Composite Section

A composite section illustrating the lithological sequence east of the Poontana Structure is shown in Figure 4.

e) Comparison with previous Interpretations

Using the Generalised Cainozoic Section of Bryan (1971) it would appear that Unit II (this report) is equivalent to Bryan's Upper Clay Unit, which would therefore suggest that the sand a and B Sand are equivalent. However, correlating the electric logs from holes both East and West of the Poontana Structure would indicate that the sand b and B Sand are equivalent. If the D Sand of Minad is equivalent to the sand d and also equivalent to the ore sand at Beverley then it would only require a southerly dip of 1° to bring the Beverley ore sand to the same depth as sand d at Paralana. This appears possible from a study of Petromin's Gamma Ray Logs (186 series).

The author believes that Sand d and the ore sand at Beverley are equivalent and that it is likely that sand d and the D Sand are equivalents.

Comparison with the Cainozoic stratigraphy described by Callen (1975) would indicate that Unit II belong to the Willawortina Formation and that Units III and IV belong to the Namba Formation (a minor carbonate horizon occasionally developed between sand b and sand d may equate to the upper carbonate sequence). It is possible that the sand developed in Unit V, which shows up well on the electric log in 209-1, and to a lesser extent in the other deep holes, may correspond to the Eyre Formation. If this is the case than hole 209-1 penetrated over 100 m into the Cretaceous. Palaeontological studies would be required to confirm this. Alternative interpretations are however possible. These will be discussed in a later report.

f) Structural Interpretation

Only a very brief study has been made of holes previously drilled in this area and this has not been sufficient to perform a detailed structural interpretation.

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The Poontana Structure appears to have little effect on the thickness of sands b, d, e and f. It also has little effect on the thickness of Unit III (only a thinning of approximately 10 metres in this, generally, 120 m thick unit). Unit II appears to thin over the top of the structure (assumed to be around 77-48) and Unit I thins appreciably (from 100 m to approximately 35m). Correlations of lithologies older than Unit V have not been attempted at this time but from the data reviewed it does appear that significant lithological changes may occur over relatively short horizontal distances.

It would probably be best to regard the Poontana Structure in this area as a hinge line especially since the time of deposition of the base of Unit III with a minor sagging motion to the east during the deposition of Unit III and increase in sag during Unit II and a rapid increase during Unit I. It is possible that the Poontana Structure was an active fault prior to the deposition of Unit V and that Units IV and V are infilling sediments of a basin or lake to the east (downthrown) side of the fault (which passed between 77-48 and 209-1) or, alternatively, the ground to the west of the line was a structural high and the line behaved as a very active hinge line as in Unit I with the majority of sedimentation to the east.

The effect of this hinge line on the location of ore deposits is not clear. It would appear that the Beverley Deposits lie to the east of the hinge line. If the interpretation presented in this report is correct and the target horizon in sand d' is equivalent to the Beverley ore sand then it would appear possible that the ore formation predates the majority of the latest hinge movements. From the data available it appears that composite sand d (d + d') is better developed to the east of the hinge line though this may be purely fortuitous. Sagging along the hinge would give the Unit III sands that slight dip often described as desirable for the formation of sedimentary uranium deposits.

The possibility that both the Beverley Deposits and the anomalous intersections located in this latest programme were formed in a series of sand channels roughly paralleling the hinge line should be considered.

7. CONCLUSION

During the recent drilling programme over the southern portion of EL 209 a total of 22 holes were drilled. Five of these holes intersected significant radiometric anomalies at a depth between 210 and 216 m in

a sands described here as sand d' which may be the equivalent sand horizon to that containing the Beverley Deposits. These sands, which occur within the Namba Formation, appear from electric logs to be channel sands rather than blanket sands and it appears possible that both these sands, and those at Beverley were deposited in a series of channels running parallel to the Poontana Structure (referred to here as a hinge line).

8. RECOMMENDATIONS

a) A number of holes should be drilled in the area around the best hole (209-8) to better determine the shape and direction of the mineralized zone. These holes should be closely spaced (50 m in the first instance).

b) Using the information gained from (a) above a core hole should be drilled between the holes showing the highest radiometric values, and core taken over the mineralized section. This would indicate the nature of the mineralization and confirm the radiometric values calculated.

c) The grid drilled in the last programme should be extended to the east by at least one additional line of holes drilled at two hundred metre spacing. Additional lines could be drilled depending on the results of the first line. This would indicate the degree of development and shape of the sand d' and probably give an indication of the extent of the mineralized zone.

d) A detailed review should be undertaken of all available data in this area from previous drilling programmes. It is possible that the majority (if not all) of the holes drilled, with the exception of those drilled by BP, in the Paralana area, east of the Poontana Structure, have not penetrated the sand d'.

This study could indicate the position of the Poontana Structure and locate further potential targets.

e) The cuttings from the recent drill programme should be studied for any palaeontological evidence of age - especially those holes drilled close to the Poontana Structure.

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T A B L E No. 1

(a) DETAILS OF RADIOMETRIC ANOMALIES

HOLE NUMBER (Probe Depth) (Elevation)	DEPTH m.	PEAK HEIGHT cps.	PEAK WIDTH m. (at half peak height)
209-1	83.0	70	3
(351.5)	91.0	60	9
(85.2)	124.0	80	4
	144.0	60	1
209.2	123.5	100	5
(291)	164.0	90	5
(67.3)	263.5	120	1
209.3	133.5	90	4
(303.5)	173.5	100	4
(63.5)	185.0	170	0.75
	276.5	250	0.5
209-4	133.5	80	5
(304)	146.5	110	0.5
(64.0)	160.0	650	0.5
	173.5	105	5
	279.5	350	0.5
209-5	127.5	110	5
(306)	164.0	80	4
(65.2)	171.0	110	5
	251.5	90	0.75
	269.0	140	0.75
209-6	134.5	60	3
(286)	175.5	60	8
(64.8)	279.5	70	0.75
209.7	138.0	70	9
(286)	174.5	110	5
(65.2)	207.0	90	6
	214.0	780	0.8
	280.0	110	0.75
209-8	138.0	50	7
(287)	161.0	250	0.5
(65.2)	163.0	120	1
	176.0	50	5
	212.0	950	0.75
	213.5	700	1.5
	215.0	2400	0.75
	216.5	1200	1.5
	280.0	130	0.5
209-9	140.0	80	5.5
(290)	159.0	250	0.5
(65.5)	168.0	100	0.5
	217.0	75	1.5
	244.0	90	0.5
	281.5	155	0.75

HOLE NUMBER (Probe Depth) (Elevation)	DEPTH m.	PEAK HEIGHT cps.	PEAK WIDTH m. (at half peak height)
209-10	136.0	60	4.5
(287)	225.0	90	0.75
(64)*	278.0	75	0.5
209-11	211.0	50	1.5
(287)	215.0	70	1.5
(65.6)	219.0	80	1
	220.0	60	1
	224.0	60	1
	279.5	80	0.5
209-12	138.5	60	5
(232)	174.0	70	7
(64)*	214.0	750	0.5
	218.0	190	0.75
	223.0	130	2
209-13	136.5	50	9
(238)	213.0	60	0.75
(65)*	215.0	70	0.75
209-14	148.5	130	0.5
(232)	149.5	80	0.5
(65.5)*	176.0	50	5
209-15	137.0	50	8
(232)	224.0	50	2
(65.8)			
209-16	161.0	120	0.5
(232)			
(66)*			
209-17	No anomalies		
(240)			
(65.1)			
209-18	136.0	50	9
(232)			
(65)*			
209-19	138.0	60	3
(238.5)	177.0	60	5
(65.5)			
209-20	138.0	50	9
(232)	158.0	180	0.5
(65)*	172.0	55	3
	210.5	250	0.3
	213.0	400	0.75
	214.0	500	0.5
	215.0	275	0.5
	217.0	80	0.5
209-21	138.0	60	6
(232)	175.0	60	4
(64)*	205.0	70	0.5
	208.0	80	0.75
	209.0	60	1
	212.0	650	0.75
	215.0	80	1

HOLE NUMBER (Probe Depth) (Elevation)	DEPTH m.	PEAK HEIGHT cps.	PEAK WIDTH m. (at half peak height)
209-22	136.5	60	5
(232)	173.5	130	1.5
(63.0)	178.5	60	1
	218.0	100	1

* Indicates approximate elevation.

(b) DETAILS OF RADIOMETRIC ASSAYS

HOLE NUMBER	INTERVAL m.	THICKNESS m.	RADIOMETRIC GRADE e U_3O_8 lb/ton.
209-4	159.8 -160.1	0.3	1.5
209-7	213.7 -214.0	0.3	2.2
209-8	212.2 -217.5	5.3	2.6
	212.2 -212.9	0.7	3.2
	214.8 -215.4	0.6	7.4
	216.0 -216.9	0.9	4.0
209-12	213.5 -214.2	0.7	3.6
209-20	213.6 -213.8	0.2	2.4
209-21	211.6 -212.1	0.5	2.3

BP Minerals Australia Proprietary Limited
Incorporated in Victoria

1 Albert Road, Melbourne
Postal Address: G.P.O. Box 5222BB, Melbourne, 3001
Telephone: 26-6911 Telex: 30166 Telegraphic Address: "Austbeepee", Melbourne

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W

The Director of Mines,
Department of Mines,
G.P.O. Box 151
EASTWOOD S.A. 5063

Our Reference	Your Reference	Telephone Ext'n	Date
U/14/2		618	11th. January, 1977

Dear Sir,

EXPLORATION LICENCE 209 - QUARTERLY REPORT FOR THE PERIOD ENDED DECEMBER 1976.

The open hole rotary drilling programme which commenced in September on the southern portion of EL 209 was completed on October 12th. A total of 32 holes were drilled to an average (probe) depth of 231.5 m.

Twenty seven of the holes (209-23 to 209-49) were drilled in the Paralana "A" area (Figure 1) and five (209-50 to 209-54) were drilled in an area four kilometres to the east here called Paralana "B" area (Figure 2). Twelve of the holes drilled in the "A" area and one drilled in the "B" area intersected uranium mineralisation, with grades in excess of 1 kg eU_3O_8/tonne, at depths between 205 and 225 metres. A table giving radiometric grades for the mineralisation intersected is attached.

One hole, number 209-31, was cored from 200 to 219.5 m. Thirty six samples taken from the core were analysed by AMDEL using both XRF and radiometric methods. The data indicate that the uranium is not in secular equilibrium with its daughter products with radiometric grades, on average, slightly higher than those determined by XRF techniques. The highest grade material, as determined by XRF, contains 6.9 kg U_3O_8/tonne.

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Sup Geol Mines
Please let me have a report on the significance of these results.
18/1/77

Date: 21.1.77

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A preliminary mineragraphic study of five samples from the core suggests that the uranium impregnates the carbonaceous matter, porous leucoxenes and the cement in some of the pyrite-framboid aggregates. Uraninite was not detected during this study.

Eighteen samples of drill cuttings from four holes drilled during an earlier programme (May/June 1976) were sent to the South Australian Department of Mines for palaeontological investigation. It is expected that the results from this study would indicate the age of the host rocks for the mineralisation and aid in the interpretation of the Poontana Structure.

The report on the drilling programme undertaken during May/June 1976 has been completed and distributed. The first report on the second drilling programme and the report on the coring programme have been completed and will be distributed in the next week.

A Quarterly Expenditure Statement will be sent, under separate cover, as soon as expenditures to the end of December are available.

Yours faithfully,

Derek M. Taylor

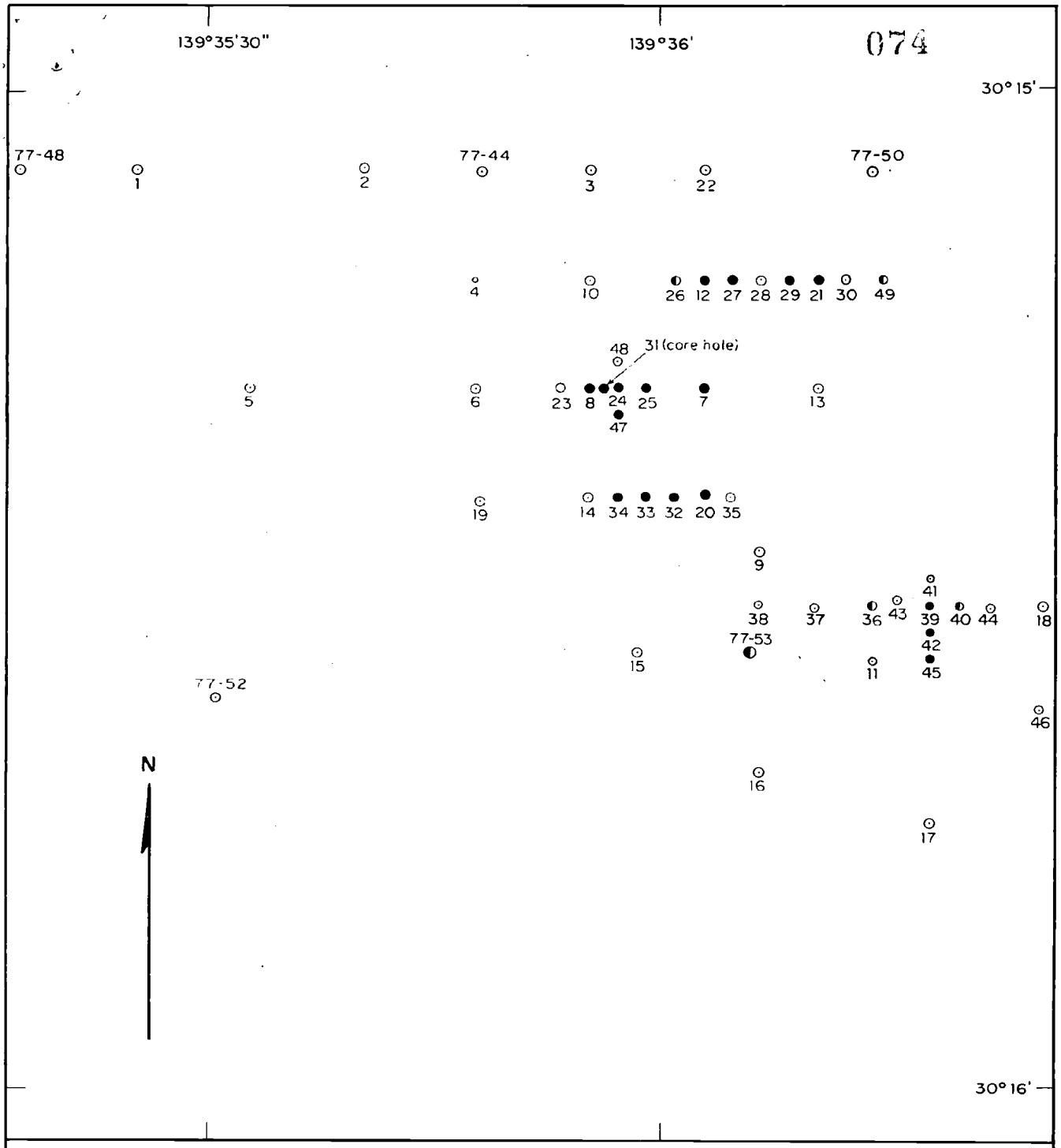
for (J. H. Hills)
Minerals Exploration Manager

Enclosures.

T A B L E I

DETAILS OF RADIOMETRIC GRADES

HOLE NO.	INTERVAL (metres)	THICKNESS (metres)	RADIOMETRIC GRADE eU_3O_8 kg/tonne.
209-24	212.1-212.8	0.7	2.83
	214.8-215.5	0.7	5.58
209-25	214.7-215.4	0.7	3.17
209-27	216.6-217.3	0.7	2.48
	217.3-218.0	0.7	2.25
	223.5-223.8	0.3	4.93
209-29	211.6-211.9	0.3	2.67
209-31	211.7-212.4	0.7	1.95
	212.5-213.1	0.6	1.84
	214.2-214.9	0.7	4.31
	215.0-215.9	0.9	5.74
209-32	155.7-156.0	0.3	1.27
	217.7-218.2	0.5	1.09
209-33	214.9-215.4	0.5	2.56
209-34	214.7-215.2	0.5	2.16
209-39	207.4-207.8	0.4	2.33
	214.4-215.0	0.6	1.02
209-42	208.9-209.4	0.5	1.92
209-45	215.0-215.4	0.4	1.12
209-47	214.8-215.3	0.5	1.05
209-52	154.9-155.3	0.4	1.78



POONTANA PROJECT, LAKE FROME S.A.

DRILL HOLE LOCATION MAP

(in part of EL 209)

SCALE : 1 cm. = 100 m.

m. 100 0 100 200 300 400 500 m.

LEGEND

77-53 ⊙ Drill hole (1975)

⊙ 2 Drill hole (209– series, 1976)

● 8 Drill hole containing radiometric grades exceeding 1 kg eU_3O_8/ tonne

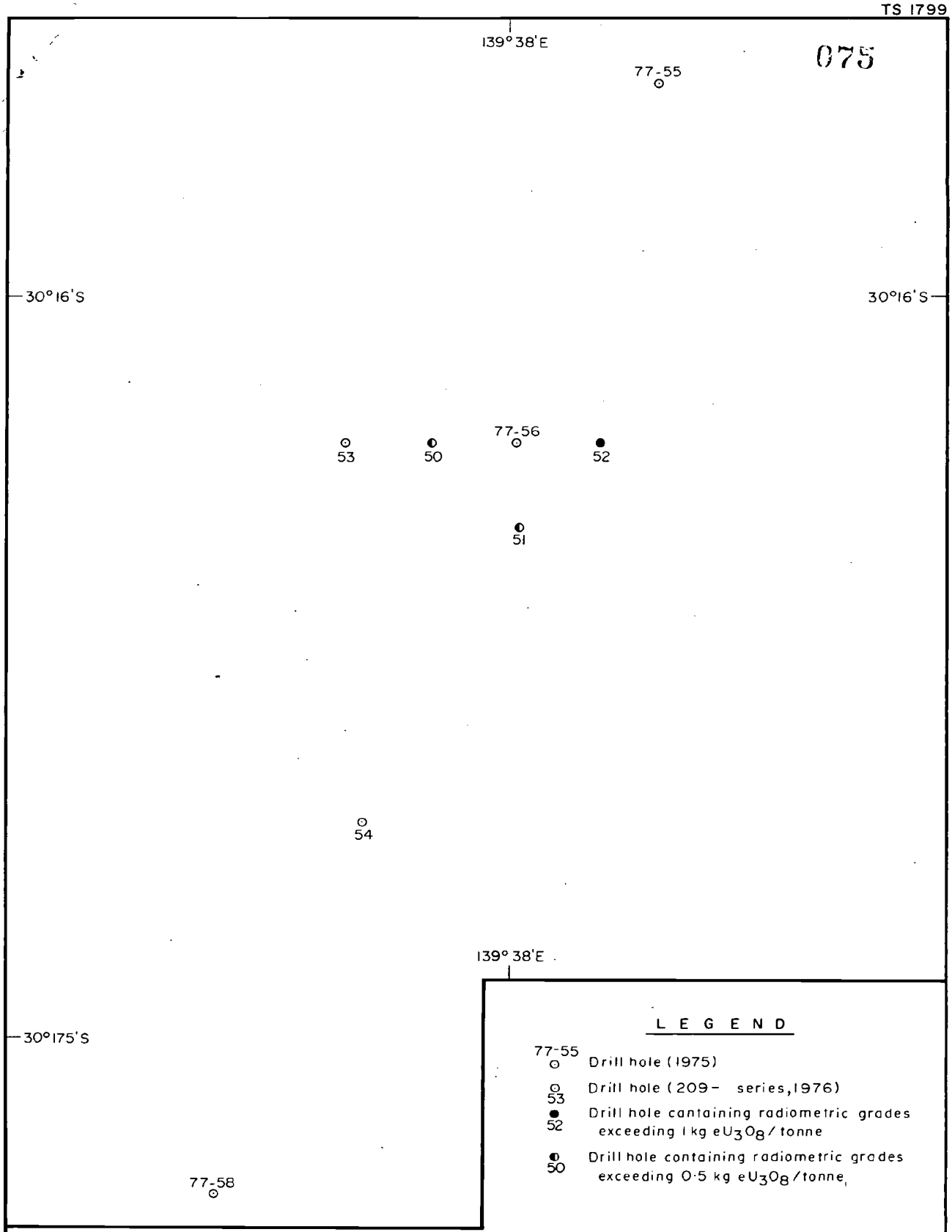
◐ 49 Drill hole containing radiometric grades exceeding 0·5 kg eU_3O_8/tonne

FIGURE 1

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
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L E G E N D

77-55 Drill hole (1975)

53 Drill hole (209- series, 1976)

52 Drill hole containing radiometric grades exceeding 1 kg eU_3O_8 / tonne

50 Drill hole containing radiometric grades exceeding 0·5 kg eU_3O_8 / tonne

POONTANA PROJECT, LAKE FROME S.A.

DRILL HOLE LOCATION MAP

(in part of EL 209)

SCALE: 1cm. = 500 m.

m. 200 0 200 400 600 m.

FIGURE 2

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
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January 12th, 1977.

QUARTER ENDING DECEMBER 1976

PROSPECTIVE STATUS OF EL 209

Drilling over Exploration Licence 209 has intersected an aureole of radioactivity occurring at depths between 205 and 225 m. The horizons containing this anomalous activity are deeper than had previously been anticipated but are considered to be stratigraphically equivalent to the horizons containing the Beverley uranium deposits. Eighteen holes drilled in the southern portion of the licence have intersected uranium mineralisation with radiometric grades exceeding 1 kg eU_3O_8/tonne. Sand bodies appear, from these and other holes in this part of the licence, to be well developed in this area.

The most recent drilling has indicated the possibility of an additional aureole of radioactivity at a shallower depth.

The area covered by Exploration Licence 209, in particular the southern portion, is considered to be very prospective.

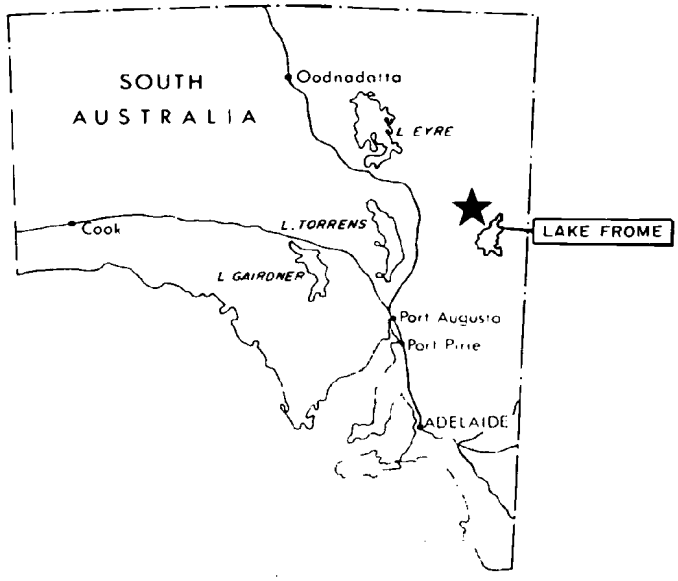
Derek M. Taylor

for (J.H. Hills)
Minerals Exploration Manager.

The Director of Mines,
Department of Mines,
G.P.O. Box 151
EASTWOOD S.A. 5063

Postal Address: G.P.O. Box 5222 BB, Melbourne 3001

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LOCATION MAP

1976

DRILLING PROGRAMME No. 2

(EL 209)

LAKE FROME EMBAYMENT
SOUTH AUSTRALIA

FIRST REPORT

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1976 DRILLING PROGRAMME No. 2 (EL 209), LAKE FROME EMBAYMENT, SOUTH AUSTRALIA. FIRST REPORT.

KEYWORDS

DRILLING

EXPLORATION

FROME

PARALANA

RADIOMETRIC

SOUTH AUSTRALIA

URANIUM

079

BP MINERALS AUSTRALIA PROPRIETARY LIMITED.

1976 DRILLING PROGRAMME NO. 2.

EL 209

LAKE FROME EMBAYMENT, SOUTH AUSTRALIA

- FIRST REPORT -

Derek M. TAYLOR
MELBOURNE - VICTORIA
DECEMBER, 1976

SUMMARY

Exploration Licence 209 covers an area of 805 square kilometers to the northwest of Lake Frome and to the south and east of the Beverley uranium deposits. A drilling programme was undertaken during September/October 1976 to test the significance of uranium mineralisation detected in one area (Paralana "A") and radiometric anomalies in a second area (Paralana "B") during previous programmes.

In the Paralana"A" area a total of twenty seven holes were drilled to an average depth of 231.8 metres. Twelve holes intersected uranium mineralisation, with radiometric grades in excess of 1kg/tonne, at depths between 205 and 225 metres. One hole, 209-31, was cored from 200 to 219.5 metres.

In the Paralana"B" area a total of five holes were drilled to an average depth of 230 metres. One hole intersected uranium mineralisation with a radiometric grade exceeding 1kg/tonne.

The results from the recent drilling programmes indicate an area of significant uranium mineralisation (Paralana "A") and a second area (Paralana "B") of a highly prospective nature. They also emphasise the tremendous potential of the area covered by this exploration licence.

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(b) Details of Radiometric Assays.

FIGURES

FIGURE 1 E.L. LOCATION MAP (before Page 1)

FIGURE 2 (a) Drill Hole Location Map Paralana "A" (In Back Pocket)
(b) Drill Hole Location Map Paralana "B" (In Back Pocket)

1. INTRODUCTION

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Exploration Licence 209 covers an area of 805 square kilometers to the northwest of Lake Frome and to the south and east of the Beverley deposits (see Figure 1).

The exploration recently undertaken over this licence during the period September/October 1976 is summarised in this, the first of two reports. This drilling programme was designed to test the significance of radiometric anomalies detected in two areas, here called Paralana "A" and Paralana "B", during two previous drilling programmes (Taylor, 1976; Bell, 1976).

No attempt is made here to undertake a detailed interpretation of the data as this would have significantly delayed the completion of this report.

2. PREVIOUS EXPLORATION

Exploration undertaken in the area covered by EL 209 prior to 1974 has been described by Bell (1975a). The more recent exploration has also been described by Bell (1975a, 1975b and 1976) and by Taylor (1976)

Significant radiometric anomalies were found in the southern portion of the licence area, most notably in the area immediately north of Paralana Creek, by both Minad-Teton Australia (Jarre and Brunt, 1971) and by BP Minerals Australia Pty Ltd (Bell op. cit). In the period May/June 1976 a total of twenty-two holes were drilled in this area. Five of these holes intersected uranium mineralisation with radiometric grades in excess of 1 kg. $\stackrel{e}{=} U_3O_8$/tonne (Taylor, op. cit.).

3. GENERAL GEOLOGY

The geology of the Frome Embayment has been described in a variety of papers mainly by Callen (1973, 1975a, 1975b, 1976a, and 1976b). Briefly, the areas discussed in this report is underlain by Tertiary and Quaternary sand, clays, silts and gravels lying disconformably on Cretaceous silts and shales. The Tertiary sequence has been divided by Callen into the Eyre, Namba and Willawortina Formations. The uranium at the Beverley Deposits, and in the project area, is contained within the Namba Formation.

The area is crossed by the Poontana Structure, which has been interpreted as a hinge line, with a downward "sag" to the east (Taylor, 1976). All holes drilled during this programme were drilled to the east of this structure.

4. PRESENT PROGRAMME

(a) General Planning

The present drilling programme was based on the results of Drilling Programme No. 1, 1976 and Drilling Programme No. II, 1975.

The drilling in the Paralana "A" area was planned around the previously drilled holes containing ore grade ($>1kg \stackrel{e}{=} U_3O_8$/tonnes) uranium. Follow-up holes were drilled at 50m spacing from these holes with the drill lines extending, in an east-west direction, until the new holes intersected radiometric values indicating less than ore grade mineralisation. North-south lines were to be drilled at 50m spacing when these would be instructive. One hole was to be cored over the mineralised horizon once a suitable location for this hole had been decided.

The drilling in the Paralana "B" area was planned following a review undertaken during August 1976 of data from previous programmes. Two holes (77-56 and 77-58) from Drilling Programme No. II 1975 (Bell, 1976) indicated the potential of two stratigraphic horizons (at 140-155m and at 180-190m) in the area around these holes. Results from Drilling Programme No. I 1976 (Taylor, op. cit.) and a review of the available Petromin drill logs (186 series) had indicated that the anomalies in the two holes could be significant. Drilling around the better of the two holes (77-56), at 200m spacing, and a hole between the two holes, to give stratigraphic control, was planned.

(b) Technical Detail

(i) Paralana "A" Area

A total of twenty seven holes were drilled in the area and probed to an average depth of 231.8 metres. The deepest hole was drilled to a probe depth of 238 metres and the shallowest to 219.5 metres. Problems were encountered at shallow depth in the drilling of all the holes. The shallow gravels, that hampered the drilling, tended to fall into the hole during probing and the probe had to be washed out of four holes (209-25, 209-26, 209-35 and 209-4).

One hole, 209-49, had to be redrilled as the "sub" sheared off the end of the drill stem at 120m resulting in the loss of the drill bit at the bottom of the hole. Attempts to fish for the drill bit were unsuccessful.

Hole number 209-31 was cored from 200 metres to 219.5 metres. Location of holes are shown in Figure 2(a).

(ii) Paralana "B" Area

A total of five holes were drilled and probed in this area to a depth of 230 metres. No problems were encountered with shallow gravels. Location of holes are shown in Figure 2(b).

(iii) General

All holes were surveyed in using a compass and chain and, therefore, elevations given for these holes in the accompanying figures and drill logs are estimated from the elevations of holes previously surveyed in by stadia relative to local bench marks.

In addition to the down-hole logging for gamma activity, self potential and resistivity, the holes were lithologically logged by describing drill cuttings collected every two metres. Representative portions of the cuttings were returned to Melbourne for further examination. Copies of the original lithological, gamma and electrical logs are held on file.

In the event of an anomalous intersection being recorded (values in excess of 200 cps) this section was relogged for gamma activity and a digital record obtained.

Once the holes had been logged they were backfilled to surface.

(c) Personnel

Project Geologist:	Dr D.M. Taylor
Prospecting Hand:	R.D. Milner
Cook:	R. Kemp (8/9/76 to 17/9/76)
Drilling Contractor:	Thompson Drilling Co. Pty Ltd.
Drillers:	R. Brown
	C.S. Stratford
	R. Thompson
Assistants:	T. Auld
	C. Brooks
	K. MacDonald
Logging Contractors:	Geoscience Associates (Aust.) Pty Ltd.
Operator:	J. Mortimer.

5. RESULTS

Lithological descriptions of, and the gamma and electric logs for, each hole are given on the Drill Hole Log sheets in the back pocket.

Table 1 summarises the radiometric anomalies detected during the programme, with details of probe depth and approximate drill site elevations above mean sea level, and calculated radiometric grades. Peaks less than 70 cps in amplitude have not been noted unless their width at half peak height was equal to or greater than one metre. Peaks below 50 cps have not been noted in this table.

Stratigraphic sections will be presented in the second part of this report. A detailed description of the cored interval (hole number 209-31), including mineralogical and geochemical data from this interval, will be contained in a separate report (Taylor, in prep.).

6. CONCLUSIONS

Thirty two holes were drilled within the southern part of the area covered by EL 209. Twenty seven holes were drilled in the Paralana "A" area (or prospect) twelve of which intersected uranium mineralisation with calculated radiometric grades exceeding one kilogram per tonne. Five holes were drilled in the Paralana "B" area approximately four kilometres southeast of area A, of which one intersected mineralisation with a calculated radiometric grade exceeding one kilogram per tonne.

The drilling results indicate an area of significant uranium mineralisation (Paralana "A") and an area of a highly prospective nature (Paralana "B"). They also emphasise the tremendous potential of the area covered by this exploration licence in general and the southern portion of the licence area in particular.

The results from the drilling programme will be discussed and interpreted in more detail in the second of these reports.

7. REFERENCES

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JARRE, G.A., and BRUNT, D.A., 1971: "Summary of Exploration on S.M.L. 586 Lake Frome Area, South Australia". Report to Department of Mines, South Australia by MINAD - TETON Australia.

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TABLE I

(a) DETAILS OF RADIOMETRIC ANOMALIES

Hole Number (Probe Depth m.) (Elevation m.)	Depth (metres)	Peak Height c.p.s.	Peak Width (at ½ pk. height metres.)
(i) PARALANA "A"			
209 - 23	135.5	50	5
(232)	175.0	70	2
(65)			
209 - 24	139.0	65	7
(232.2)	172.0	95	0.75
(65)	212.5	1500	0.5
	213.5	500	1.5
	215.5	3000	0.75
	(213.5	>200	5.5)
209 - 25	140.0	50	6
(232.2)	208.0	130	2.5
(65)	211.5	170	1.5
	212.5	195	0.5
	215.0	1900	0.75
	(215.0	>200	2.5)
	218.0	95	0.5
	227.5	75	1.5
209 - 26	135.0	70	8
(237.5)	170.5	90	6.5
(64)	178.0	100	0.75
	214.5	60	2.0
	219.5	90	2.0
	222.0	350	0.3

089

Hole Number (Probe Depth m.) (Elevation m.)	Depth (metres)	Peak Height c.p.s.	Peak Width (at ½ pk. height metres.)
209 - 27	139.0	95	7.0
(232)	148.5	100	0.5
(64)	166.0	160	1.5
	168.5	80	0.75
	174.5	105	1.0
	176.0	150	2.0
	181.5	75	1.0
	185.0	70	2.0
	192.0	50	1.0
	208.5	190	0.75
	209.5	160	0.75
	210.5	140	1.0
	217.0	2250	0.75
	218.0	1850	0.5
	219.5	650	0.3
	(218.0	>200	4.0)
	223.5	3600	0.25
	(223.5	>200	2.5)
209 - 28	138.5	70	7.0
(238)	167.0	110	0.5
(64)	177.5	135	1.5
	211.5	170	0.75
209 - 29	138.0	90	4.5
(232.1)	166.5	60	1.5
(64)	175.0	155	2.5
	186.0	100	0.75
	209.5	500	0.75
	212.0	1350	0.3
	(210.5	>200	3.5)

Hole Number (Probe Depth m.) (Elevation m.)	Depth (metres)	Peak Height d.p.s.	Peak Width (at ½ pk. height metres.)
209 - 29 (contd.)	216.0	85	0.75
	221.0	75	0.5
209 - 30	137.0	95	5.5
(231.3)	162.5	80	1.0
(64)	168.5	110	1.75
	171.0	95	1.5
	172.0	105	1.0
	175.0	55	1.0
	184.5	95	0.75
	187.5	130	0.5
	205	55	1.0
	206.5	65	1.0
	208.0	90	1.0
	210.0	155	1.0
	214.0	140	0.6
209 - 31	138.5	75	6.5
(219.2)	176.0	80	3.0
(65)	186.5	65	1.3
	212.0	1800	0.8
	212.8	1600	0.6
	214.7	3500	0.7
	215.5	4800	0.9
	216.5	2200	0.5
	(214.0	> 200	6.3)
209 - 32	139.0	75	8.0
(232)	155.8	910	0.25
(65.5)	218.0	870	0.4

Hole Number (Probe Depth m.) (Elevation m.)	Depth (metres)	Peak Height c.p.s.	Peak Width (at ½ pk. height metres.)
209 - 33	137.0	75	5.5
(231.7)	215.0	1950	0.5
(65.5)			
209 - 34	129.0	60	1.0
(231.8)	137.0	70	9.0
(65.5)	170.8	60	3.0
	215.0	1520	0.5
	221.0	60	1.0
	225.2	510	0.3
209 - 35	140.0	70	7.0
(231.9)	212.0	75	1.0
(65.5)	214.8	65	1.0
209 - 36	138.3	75	9.0
(231.7)	160.3	115	0.5
(65.5)	177.5	55	1.0
	178.8	55	1.0
	210.0	600	0.3
	215.0	70	1.2
	217.2	55	1.0
	219.2	80	0.7
209 - 37	139.0	70	4.5
(232.1)	157.1	60	5.0
(65.7)	162.0	130	0.3
	168.5	90	0.7
	213.0	75	1.3
	221.0	50	2.8
209 - 38	137.0	80	5.0
(232)	180.5	95	0.6
(65.8)			
209 - 39	138.0	75	9.0
(232)	207.6	1760	0.4
(65.5)	214.6	820	0.6
	216.5	80	1.5
	218.5	85	1.0
	219.7	160	0.6
	221.2	50	1.5

Hole Number (Probe Depth m.) (Elevation m.)	Depth (metres)	Peak Height c.p.s.	Peak Width (at ½ pk. height metres.)
209 - 40	137.0	75	8.5
(231.3)	174.0	55	4.0
(65.5)	206.5	240	0.5
	207.8	450	0.5
	210.6	500	0.7
	212.8	100	1.5
	214.3	290	0.5
	216.0	85	1.0
	217.3	155	1.5
	218.5	115	1.5
	221.1	70	0.5
209 - 41	137.2	75	7.5
(230.7)	174.2	65	1.0
(65.5)	211.5	300	0.4
	215.0	155	1.0
	216.5	140	1.0
	218.0	130	1.0
209 - 42	137.0	55	12.0
(232)	155.0	200	0.6
(65.5)	155.8	115	0.5
	176.0	90	0.7
	209.0	1440	0.5
	213.7	250	0.7
	218.7	120	3.0
209 - 43	138.0	75	8.0
(232)	155.5	120	1.5
(65.5)	209.5	115	1.0
	210.5	70	1.0
	211.5	70	1.0
	213.5	50	1.0
	216.5	65	1.0
	218.0	95	1.5
	219.5	115	1.0
	222.0	90	0.5

Hole Number (Probe Depth m.) (Elevation m.)	Depth (metres)	Peak Height c.p.s.	Peak Width (at ½ pk. height metres).
209 - 44	137.0	70	5.0
(232.2)	172.0	60	3.0
(65.5)	174.5	115	0.5
	191.0	95	0.5
	216.0	60	1.0
	218.7	100	1.5
	219.5	60	1.0
209 - 45	132	55	2.0
(232.2)	134.5	55	2.0
(65.5)	136.5	60	2.0
	138.5	60	1.0
	140.0	55	1.5
	158.0	100	1.0
	159.0	95	0.7
	175.8	115	0.5
	215.2	740	0.5
	216.5	115	1.0
	219.5	100	2.5
209 - 46			
(232.1)	138.5	55	10.0
(65)	209.5	55	1.0
209 - 47	139.0	75	6.5
(232.2)	144.7	60	3.0
(65)	161.0	460	0.4
	162.5	230	0.4
	163.3	220	0.3
	174.5	80	2.0
	177.0	125	1.5
	215.0	770	0.5
	216.5	130	0.7
	223.0	110	1.3
	226.0	260	0.4

Hole Number (Probe Depth m.) (Elevation m.)	Depth (metres)	Peak Height c.p.s.	Peak Width (at ½ pk. height metres).
209 - 48	137.0	65	5.0
(232.1)	144.0	50	2.0
(65)	160.0	55	6.0
	167.0	75	0.4
	174.5	100	1.0
	187.5	60	0.6
209 - 49	140.0	75	8.0
(230.1)	156.5	50	1.5
(64)	163.0	65	2.5
	167.0	125	0.8
	169.0	140	0.5
	171.0	55	1.0
	173.5	50	2.0
	179.0	70	1.0
	208.0	460	0.6
	212.0	65	0.7
	214.7	95	1.5
(ii) PARALANA "B"			
209 - 50	149.0	120	0.7
(230.1)	157.5	270	0.4
(77)	159.0	125	0.7
	159.5	160	0.7
	160.3	290	0.5
	166.0	500	0.4
	192.0	230	0.5
	209.0	145	0.7
	213.5	200	0.5
	216.5	100	0.9
209 - 51	147.5	70	1.0
(229.5)	156.0	135	0.3
(77)	159.5	110	0.7
	180.0	80	2.5
	183.0	540	0.3
209 - 52	149.5	65	2.0
(230)	155.0	1350	0.3
(77)	171.0	65	1.0

Hole Number (Probe Depth m.) (Elevation m.)	Depth (metres)	Peak Height c.p.s.	Peak Width (at ½ pk. height metres).
209 - 52 contd.	176.5	290	0.4
	178.3	85	0.6
	179.1	95	1.0
	180.0	145	1.0
	181.8	380	0.5
	213.0	60	1.0
209 - 53	149.8	225	0.5
(230.1)	156.2	70	0.5
	157.0	215	0.4
	159.5	155	0.7
209 - 54	150.2	150	0.5
(230.3)	155.0	80	1.0
	160.0	160	0.6

Note : All elevations are approximations.

(b) DETAILS OF RADIOMETRIC ASSAYS

(i) PARALANA "A"

Hole Number	Interval (metres)	Thickness (metres)	Radiometric Grade eU_3O_8 kg/tonne
209 - 24	212.1-212.8	0.7	2.83
	214.8-215.5	0.7	5.58
209 - 25	214.70-215.40	0.7	3.17
209 - 26	221.7-222.0	0.3	0.54
209 - 27	216.6-217.3	0.7	2.48
	217.3-218.0	0.7	2.25
	219.5-219.9	0.4	0.76
	223.5-223.8	0.3	4.93
	224.3-225.0	0.7	0.46
209 - 29	209.1-210.1	1.0	0.56
	211.6-211.9	0.3	2.67

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Hole Number	Interval (metres)	Thickness (metres)	Radiometric Grade eU_3O_8 kg/tonne
209 - 31	211.7-212.4	0.7	1.95
	212.5-213.1	0.6	1.84
	214.2-214.9	0.7	4.31
	215.0-215.9	0.9	5.74
209 - 32	155.7-156.0	0.3	1.27
	217.7-218.2	0.5	1.09
209 - 33	214.9-215.4	0.5	2.56
209 - 34	214.7-215.2	0.5	2.16
	225.1-225.4	0.3	0.84
209 - 36	209.8-210.2	0.4	0.85
209 - 39	207.4-207.8	0.4	2.33
	214.4-215.0	0.6	1.02
209 - 40	207.5-208.1	0.6	0.54
	210.2-211.0	0.8	0.60
	214.0-214.5	0.5	0.35
209 - 41	211.2-211.6	0.4	0.49
209 - 42	208.9-209.4	0.5	1.92
	214.4-215.2	0.8	0.31
209 -45	215.0-215.4	0.4	1.12
209 - 47	160.9-161.3	0.4	0.59
	214.8-215.3	0.5	1.05
	225.8-226.2	0.4	0.38
209 - 49	207.6-208.2	0.6	0.59
(ii) PARALANA "B"			
209 - 50	157.4-157.8	0.4	0.37
	160.1-160.5	0.4	0.43
	165.9-166.33	0.4	0.74

097

Hole Number	Interval (metres)	Thickness (metres)	Radiometric Grad eU_3O_8 kg/tonne
209 - 51	183.1-183.5	0.4	0.73
209 - 52	154.9-155.3	0.4	1.78
	176.3-176.6	0.3	0.44
	181.5-181.9	0.4	0.52
209 - 53	149.5-150.0	0.5	0.30
	157.0-157.3	0.3	0.34

All the above grades were calculated using the deadtime values and K - factors supplied by Geoscience. The following grades have been recalculated using the deadtime value (9 microseconds) and K - factor (1.15×10^{-5}) determined by Minad for Geoscience probe 306.

209 - 27	216.6-217.3	0.7	2.29
	217.3-218.0	0.7	2.08
	219.5-219.9	0.4	0.70
	223.5-223.8	0.3	4.57
	224.3-225.0	0.7	0.42
209 - 31	211.7-212.4	0.7	1.80
	212.5-213.1	0.6	1.70
	214.2-214.9	0.7	3.99
	215.0-215.9	0.9	5.35

T 1593

139°35'

139°36'

30°15'

30°16'

B.M. No. 7120 △ 70·85

77-48 ⊙ 89·93

77-44 ⊙ 63·85

77-50 ⊙ 63·65

77-54 ⊙

77-51 ⊙

77-52 ⊙ 66·14

77-53 ⊙ 65·95

77-60 ⊙

31 (core hole)

POONTANA PROJECT, LAKE FROME S.A.

DRILL HOLE LOCATION MAP

PARALANA 'A' AREA

(in part of EL 209)

N

SCALE : 1cm = 100m

metres 100 0 100 200 300 400 500 metres

LEGEND

77·53 ⊙ Drill hole (1975)

○ Drill hole (209- series, 1976)

25 ○ Drill site (1976)

△ Bench mark

78·17 Elevation in metres

RECEIVED
28 JAN 1977
DEPT. OF MINES
SECURITY
2608.III

FIGURE 2a

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: U1/4-19	
NOVEMBER 1976	MINERAL BRANCH

2608(III)-1

BASED ON T1593

139°38' E

77-55

30°16' S

77-56

53 50 52

51

54

30°17' S

N

77-58

POONTANA PROJECT, LAKE FROME S.A.

DRILL HOLE LOCATION MAP

PARALANA 'B' AREA
(in part of EL 209)

SCALE : 1 cm. = 50 m.

metres 50 0 50 100 150 200 250 metres

LEGEND

77-56 Drill hole (1975)

50 Drill hole (209- series, 1976)

2608(III)-2

FIGURE 2b

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: U1/4-19	
NOVEMBER 1976	D. M. TAYLOR

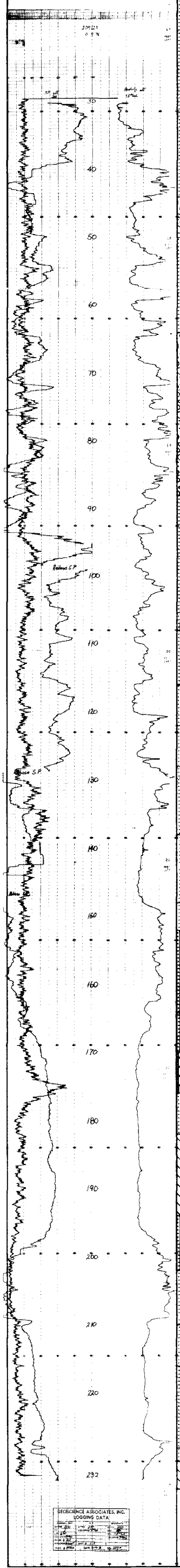
2608(FF)3

MINERALS AUST PTY LTD

DRILL HOLE LOG

HOLE No.	209-23	DATE DRILLED	9.9.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	10.9.76	RANGE	200 cps	RESIST. SCALE	7.5Ω/in
PROJECT	POOLTANA	DATE LOGGED	10.9.76	TIME CONSTANT	2 sec	SP. SCALE	
LOCATION	PARALANA "A"	DRILLED DEPTH	234 m	PAPER SPEED	1 cm/m	BIAS	450/240
STATE	S.A.	LOGGED DEPTH	232 m	LOGGING SPEED	9 m/min.	FLUID LEVEL	
GEOLOGIST	TAYLOR	ELEVATION	65 m	BACK GROUND	6 cps	PROBE No	202
DRILLER	THOMPSON	CO-ORDS		TIME BASE		STANDARD	65/cps
LOGGER	MORTIMER			K-FACTOR	1.52 x 10-5		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Mixed Clastics · Carbonaceous



INTERVAL	DESCRIPTION
0 - 14	Source gravel.
14 - 44	Red soft sticky clay with course sand and minor [illegible] gravel.
44 - 50	Fine gravel, course sand, red with lesser pale grey soft clay.
50 - 64	Sand (normal to coarse), red and minor pale grey silty clay. Minor fine gravel.
64 - 68	Fine gravel. Course sand. Red sticky clay with red sandy clay in lower part.
68 - 102	Fine sand with red and lesser pale grey mainly silty clay. Minor gravel.
102 - 106	Red/brown with minor pale grey silty clay.
106 - 116	Fine sand. Clay as above.
116 - 122	Red/brown and pale grey clay (60/40). Fine sand.
122 - 128	Pale grey clay with yellow/brown and red silty clay. Red sand.
128 - 138	Sand (1-2 mm, ang. to subrounded, mx). Light to pale grey clay. Limonite and hematite stains. Dark grey clay in lowest sample.
138 - 148	Sand (as above or coarser). Black, dk. grey and light grey clays. Stains.
148 - 152	Sand (1-3 mm, ang.,mx). Mainly mid to light grey clay. Hematite common. Some limonite.
152 - 164	Coarse sand (1-4 mm, ang. to subr., qz.). Increase in hard black clay. Limonite and hematite common.
164 - 170	Sand as above. Mainly light to mid grey clay. Hematite and limonite common.
170 - 176	Sand (1-3 mm, ang. to subr., mx.). Mixed clays (Dk ≥ Lt). Limonite and hematite common.
176 - 182	Mixed clays (Lt = Dk). Increase in pale green, olive green and khaki clays. Limonite abundant hematite common. Minor sand.
182 - 194	Sand (1-2 mm, ang., mx). Mixed clays with olive green and khaki very common. Limonite abundant. Hematite common.
194 - 202	Sand (1-3 mm, ang. to subr., qz). Mixed clays (Lt > Dk). Limonite abundant. Hematite fairly common.
202 - 210	Sand variable (0.5 - 2 mm, ang. to subr., qz) grey. (50% in top sample). Mixed clays (Dk ≥ Lt) mainly black and min grey. Limonite abundant. Hematite common.
210 - 216	Sand (1-2 mm, ang./subr., mx). Mixed clays (Dk > Lt) mainly black and khaki. Limonite abundant. Hematite fairly abundant. Minor cc.
216 - 228	Sand (2-3 mm, ang., qz). Mixed clays (Dk ≥ Lt). Black olive green and dk. grey. Limonite abundant.
228 - 230	Clay as above. Limonite common. Minor sand and carbonate.
230 - 234	

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LOGGING DATA

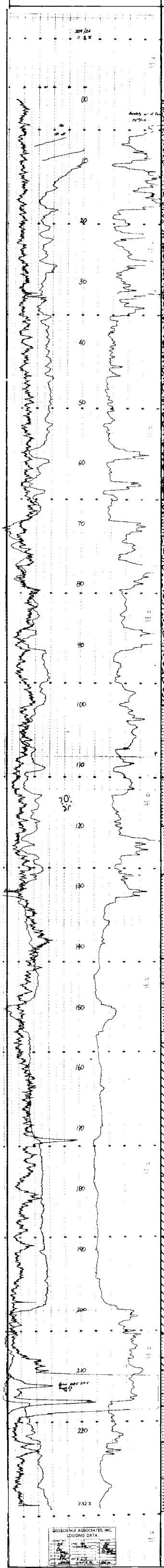
MINERALS AUST. PTY LTD

DRILL HOLE LOG

2608(III)4

HOLE No.	209-24	DATE DRILLED	10.9.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	11.9.76	RANGE	200 cps	RESIST. SCALE	7.5 /in.
PROJECT	POONTANA	DATE LOGGED	11.9.76	TIME CONSTANT	2 sec.	SP. SCALE	
LOCATION	PARALANA CK.	DRILLED DEPTH	234 m	PAPER SPEED	1 cm/m.	BIAS	450/180
STATE	S.A.	LOGGED DEPTH	232.2m	LOGGING SPEED	9 m/min.	FLUID LEVEL	5 m
GEOLOGIST	TAYLOR	ELEVATION	65 m	BACK GROUND	9 cps	PROBE No	202
DRILLER	THOMPSON	CO-ORDS		TIME BASE		STANDARD	651 cps.
LOGGER	MORTIMER			K-FACTOR	1.52 x 10-5		

LITHOLOGY : Gravel, Sand, Silt, Clay, Carbonate, Mixed Clastics, Carbonaceous



INTERVAL	DESCRIPTION
0 - 18	Coarse gravel, sand and red and buff soft clay.
18 - 22	Fine Gravel, coarse sand, red soft stioky clay.
22 - 66	Fine and normal gravel, sand and red soft stioky clay at to and red with minor pale grey silty clay at bottom of interval.
66 - 68	Fine gravel and coarse sand.
68 - 72	Sand with red and minor pale grey sandy clay.
72 - 100	Fine gravel, fine to normal sand (0.5-1mm) and red/brown silty clay.
100 - 106	Fine sand. Red/brown silty clay.
106 - 112	Fine sand. Red/brown with minor pale grey (mpg) silty clay. Minor fine gravel.
112 - 120	Fine sand. Red with lesser pale grey (l pg) silty clay.
120 - 128	Fine red sand. Red with lesser pale grey clay. Limonite in lowest sample.
128 - 142	Sand, fine at top grading to coarse at bottom (1-4mm, a/subr., quartz+). Pale grey clay with yellow/brown and minor red clay. Minor mid grey clay in lowest sample.
142 - 146	Sand (0.25 - 0.5 mm, mixed). Hard mid to dark grey clay with magenta clay and minor limonite.
146 - 150	Sand (1-2 mm, angular/sub rounded, mainly quarts). Mid grey soft sticky clay with magenta clay.
150 - 154	Sand (as above). Light to mid grey clay. Some hard black clay. Stains.
154 - 156	Fine sand (0.5 mm, qz). Grey silt.
156 - 178	Mid to dark grey and black clay, with limonite and hematite stains. Minor sand (1 mm, ang. qz) and silt.
178 - 188	Mid grey soft clay. Darker clays increase down interval. Limonite very abundant. Minor brick red clay. Minor coarse sand.
188 - 204	Khaki, dark grey/black and olive green clay most common. Limonite very abundant. Hematite common. Slight increase in sand down interval.
204 - 208	Sand (1-4 mm, angular/subrounded, quartz+) Clays (as above).
208 - 210	Clays (as above). Minor sand (as above).
210 - 214	Sand (1 mm, minor 4 mm), angular, quartz). Clays(as above).
214 - 216	Very fine sand. Very fragmented clays (assumed as above).
216 - 222	Sand (0.25- 1mm, angular, quartz). Mixed clays, mainly mid grey. Minor pale pink soft stioky clay. Limonite abundant. Hematite comm.
222 - 228	Sand (1-4 mm, angular/subrounded, quarts) finer down interval. Clays as above.
228 - 234	Mixed clays (mid to dark grey and black). Sand (1-2 mm, angular to subrounded, quartz). Limonite less common in this interval.

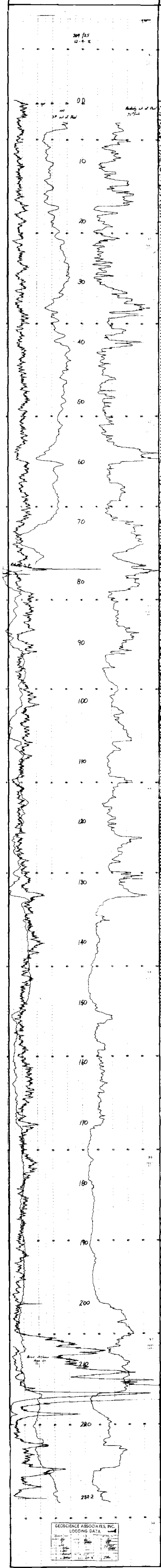
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DRILL HOLE LOG

2608(III)-5

HOLE No.	209-25	DATE DRILLED	11.9.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	12.9.76	RANGE	200 cps	RESIST. SCALE	7.5 Ω /in
PROJECT	POONTANA	DATE LOGGED	12.9.76	TIME CONSTANT	2 sec.	SP SCALE	
LOCATION	PARALANA "A"	DRILLED DEPTH	234 m	PAPER SPEED	1 cm/m	BIAS	450/100
STATE	S.A.	LOGGED DEPTH	232.2 m	LOGGING SPEED	9 m/min	FLUID LEVEL	3 m
GEOLOGIST	TAYLOR	ELEVATION	65 m	BACK GROUND	10 cps	PROBE No	202
DRILLER	THOMPSON	CO-ORDS		TIME BASE		STANDARD	651 cps
LOGGER	MORTIMER			K-FACTOR	1.52×10^{-5}		

LITHOLOGY : Gravel, Sand, Silt, Clay, Carbonate, Carbonaceous, Mixed Clastics



INTERVAL	DESCRIPTION
0 - 14	Coarse and fine gravel. Coarse sand. Red and buff very soft sticky clay.
14 - 20	Fine gravel. Coarse sand. Red and buff very soft sticky clay.
20 - 36	Fine sand. Red very soft sticky clay.
36 - 48	Fine to coarse sand. Red with minor light grey soft sticky clay.
48 - 60	Mainly fine sand (coarse at bottom). Red soft silty clay.
60 - 70	Fine gravel. Coarse sand. Red silty clay.
70 - 74	Fine sand. Red and minor pale grey silty clay.
74 - 82	Fine gravel (5 - 12 mm). Coarse (1-4 mm) and fine red (0.5 - 1mm) sand. Minor red silty clay.
82 - 92	Fine gravel. Coarse sand (1-4mm) and minor red silty clay.
92 - 106	Fine gravel and sand. Red with lesser pale grey silty clay.
106 - 116	Fine sand. Red with lesser pale grey (70/30) silty clay.
116 - 128	Fine sand. Red/brown with lesser pale grey (60/40) silty clay.
128 - 140	Fine (red) sand (0.5-1 mm). Pale grey soft clay (harder at bottom) with yellow/brown and minor red silty clay. Limonite. Minor light to mid grey clay in lowest sample.
140- 146	Fine sand. Mainly light to mid grey clay. Limonite common in lowest sample.
146- 154	Very fine to fine sand (silty). Mid grey silty clay. Limonite and hematite fairly common.
154- 166	Sand (1-3mm, ang. mixed). Mainly mid to dark grey and khaki clay. More light grey clay in lower samples. Limonite and hematite common.
166 -186	Sand (1-3 mm, ang./subrounded, quartz+). Mainly mid grey clay. Increase in dark grey/black and khaki clay lower in interval. Limonite common. Hematite common to very common.
186 -202	Mixed clays (Dk ≥ Lt). Increase in dark grey and olive green clay. Limonite and hematite very common. Minor pink/grey clay in lowest sample.
202 -210	Mainly mid to light grey soft clay. Minor hard black stained lumps of clay (2-3 mm) Limonite common. Minor sand.
210 -212	Sand (2-3 mm, subangular/subrounded/quartz). Mixed clays (Lt > Dk).
212 -216	Minor brick red clay with mica.
216 -218	Clay as above. Silty but unable to estimate silt content. Earthy brown (goethite but darker) clay. Very minor sand.
218 -222	Mx.clays (Dk ≥ Lt). Dk grey, khaki and black. Limonite and hematite common. Minor sand and carbonate.
222-226	Sd. (2-3mm, subang/subr.,qz.) Silt and Mixed clays (as above). Mx.of fine and coarse sand (ang.,mx). Mixed clays (Dk > Lt).
226-234	Mixed clays (Dk > Lt) with minor pink and white mottled clay, brick red clay and yellow/white and red mottled clay. Limonite common to fairly abundant. Minor sand (1-3 mm, subang./subrounded,qz).

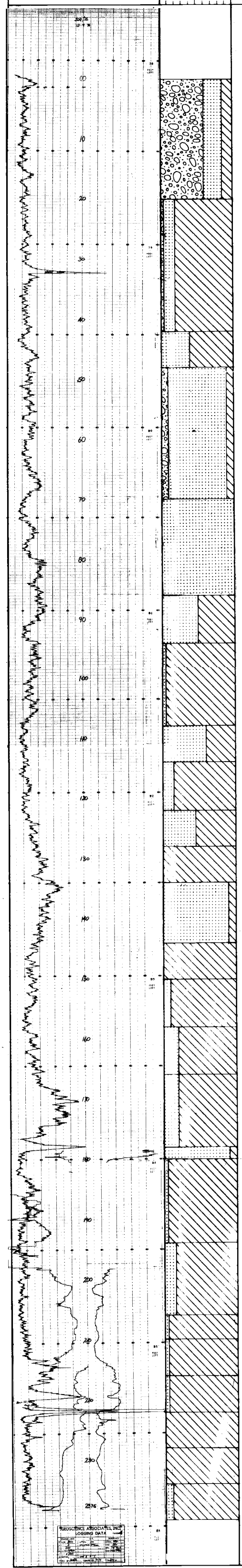
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DRILL HOLE LOG

2608(III)-6

HOLE No.	209-26	DATE DRILLED	12.9.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	13.9.76	RANGE	200 cps	RESIST. SCALE	7.5 Ω/in
PROJECT	POONTANA	DATE LOGGED	13.9.76	TIME CONSTANT	2 sec	SP. SCALE	
LOCATION	PARALANA "A"	DRILLED DEPTH	240 m	PAPER SPEED	1 cm/m	BIAS	450/100
STATE	S.A.	LOGGED DEPTH	237.5 m	LOGGING SPEED	9m/min	FLUID LEVEL	
GEOLOGIST	TAYLOR	ELEVATION	64 m	BACK GROUND	8	PROBE No	306
DRILLER	BROWN/THOMPSON	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	MORTIMER			K-FACTOR	1.25×10^{-5}		

LITHOLOGY : Gravel, Sand, Silt, Clay, Carbonate, Carbonaceous, Mixed Clastics



INTERVAL	DESCRIPTION
0 - 20	Coarse and fine gravel. Coarse sand. Red and buff soft clay
20 - 42	Fine and normal gravel. Normal and coarse sand. Red silty clay.
42 - 48	Sand or fine sand. Red soft clay. Minor gravel.
48 - 70	Fine gravel. Sand. Red soft clay.
70 - 86	Sand (1 - 2 mm, angular to subrounded, quartz +).
86 - 94	Coarse and fine sand. Red with minor pale grey (mpg) sandy clay.
94 - 108	Coarse sand (with minor fine gravel). Red and mpg or lesser pale grey (lpg) silty clay.
108 - 114	Normal and coarse sand. Red/brown and lpg silty clay.
114-122	Sand with minor gravel. Red/brown and lpg silty clay.
122 - 128	Fine sand. Pale grey and brown/red soft clay.
128 - 134	Pale grey soft clay and yellow/brown clay. Minor sand.
134 - 144	Fine sand (0.5 - 1 mm, subangular/subround, quartz +) to coarse (1 - 2 mm, subangular/subround, mixed) at bottom. Clay as above.
144 - 150	Pale and light grey clay. Stains common. Minor mid/dark grey clay.
150 - 158	Sand (1 mm, subangular/subround quartz +). Mid/dark grey and to black clay. Stains common.
158 - 166	Sand (1 - 3 mm, angular/subround quartz). Mid grey, dark grey and black clay. Stains common.
166 - 178	Sand (1 - 3 mm, angular/subround quartz +). Mainly dark grey/black clay. Limonite common.
178 - 180	Sand (1 - 3 mm, angular/subround quartz +). Mid/dark grey and black clay.
180 - 194	Sand (1 - 5 mm, subangular/subround, poorly sorted). Mainly black and mid grey clay. Some mixed clays. Limonite very common. Hematite common.
194 - 206	Sand (1 - 2 mm, angular/subrounded, mixed). Mixed clays (Lt = Dk). Grey, olive green and kharki clay included. Limonite fairly abundant.
206 - 210	Sand (1 - 2 mm, angular/subrounded, quartz +). Mixed clays (Dk ≥ Lt). Limonite fairly abundant.
210 - 216	Sand (1 - 2 mm, angular/subrounded, poorly sorted). Mixed clays (as above). Limonite abundant.
216 - 222	Sand (1 mm, subangular/subrounded, mixed). Mixed clays (Dk > Lt). Limonite abundant.
222 - 228	Minor sand (5% in top sample). Mixed clays as above. Limonite fairly abundant. Minor carbonate.
228 - 234	Minor coarse sand. Mixed clays as above. Limonite fairly abundant.
234 - 240	Sand (2 - 3 mm, angular/subrounded quartz). Mixed clays (Dk ≥ Lt) mainly black and mid grey. Limonite very common.

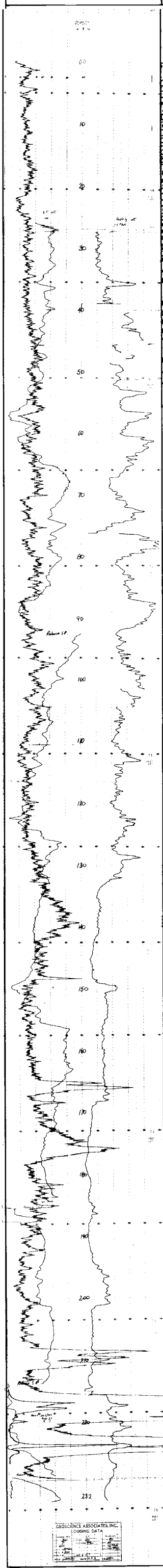
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DRILL HOLE LOG

2608(III)-7

HOLE No.	209-27	DATE DRILLED	13/9/76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	14/9/76	RANGE	2000 cps	RESIST. SCALE	7.5Ω/in.
PROJECT	POONTANA	DATE LOGGED	14/9/76	TIME CONSTANT	2	SP. SCALE	-
LOCATION	PARALANA"A"	DRILLED DEPTH	234m	PAPER SPEED	1cm/m	BIAS	450/100
STATE	S.A.	LOGGED DEPTH	232m	LOGGING SPEED	9m/min	FLUID LEVEL	26m
GEOLOGIST	TAYLOR	ELEVATION	64m	BACK GROUND	9	PROBE No	306
ORILLER	STRATFORD	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	MORTIMER			K-FACTOR	1.25x10-5		

LITHOLOGY: Gravel, Sand, Silt, Clay, Carbonate, Carbonaceous, Mixed Clastics



INTERVAL	DESCRIPTION
0 - 16	Normal and fine gravel. Coarse sand. Minor light grey clay.
16 - 50	Sand and fine gravel. Red soft or silty clay.
50 - 82	Fine gravel. Coarse sand. Red silty or sandy clay.
82 - 86	Fine gravel. Very coarse sand. Red silty clay.
86 - 94	Coarse sand. Red/brown and lpg silty clay.
94 - 106	Coarse sand and minor fine gravel. Red/brown and mpg silty clay.
106 - 122	Sand (1-3mm, a/sr, mx) at bottom. Red/brown and lesser pale grey silty clay.
122 - 138	Coarse sand. Pale grey, yellow/brown and min. red clay. Minor light grey clay from 134m.
138 - 140	Very coarse sand (1-5mm, sa/sr,mx). Min. clay.
140 - 148	Sand (1-2mm, a/sa, poorly sorted). Clays as above. Increase in dark grey clay and stains.
148 - 152	Sand (1-3mm, a/sr, p.s.). Black and dk grey clay. Stains.
152 - 160	Mainly mid grey with light and dark grey clay. Hematite common. Min. sand.
160 - 164	Light to mid grey clay. Stains common.
164 - 178	Mid, dark and light grey clay. Limonite common. Min. sand.
178 - 194	Sand (1-4mm., a/sr, mixed). Mainly dk grey/black clay. Limonite abund. Hematite V. common. Min. brick red clay at 188m. Minor gravel in lower samples.
194 - 204	Sand (as above). Clays as above, with increase in black clay. Limonite very common.
204 - 210	Mainly dark clays. Lim. V. com. to abund. Min. sand (1-2%).
210 - 216	Dk grey clay. Min. lt. grey, brick red clay. Stains com. Min. sand.
216 - 222	Dk grey clay. Some black clay. Lim. abund.
222 - 228	Clays (as above). Stains common. Min. carbonate.
228 - 234	Clays (as above) increase in mid grey clay. Min. stains. Min.sand

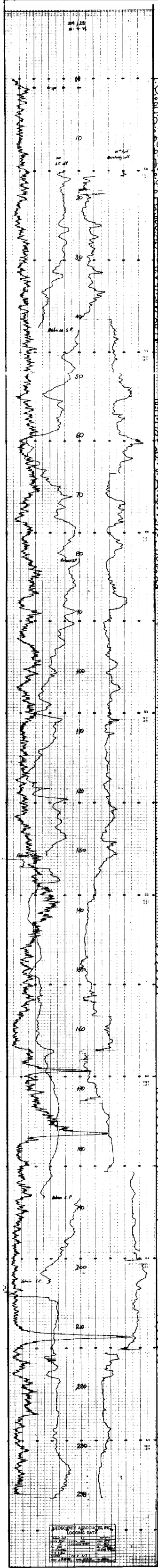
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DRILL HOLE LOG

2608(III)-8

HOLE No.	209-28	DATE DRILLED	14/9/76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	14/9/76	RANGE	200 cps	RESIST. SCALE	10Ω/in.
PROJECT	POONTANA	DATE LOGGED	14/9/76	TIME CONSTANT	2	SP. SCALE	-
LOCATION	PARALANA "A"	DRILLED DEPTH	240m	PAPER SPEED	1cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	238m	LOGGING SPEED	9m/min	FLUID LEVEL	15m
GEOLOGIST	TAYLOR	ELEVATION	64m	BACK GROUND	7 cps	PROBE No	306
DRILLER	THOMPSON	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	MORTIMER			K-FACTOR	1.25×10^{-5}		Mixed Clastics

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



INTERVAL	DESCRIPTION
0 - 10	Red and buff soft clay.
10 - 20	Fine gravel sand. Red and pale green soft clay.
20 - 44	Fine gravel. Fine and normal sand. Red and minor pale green soft clay.
44 - 54	Coarse sand. Red silty clay.
54 - 86	Fine gravel. Normal and coarse sand. Red silty clay and mpg clay.
86 - 92	Fine sand. Red/brown and pale grey (50/50) silty clay.
92 - 98	Normal sand. Red/brown and pale grey (60/40) silty clay.
98 - 106	Red and lesser pale grey (lpg) silty clay (70/30)
106 - 114	Normal to coarse sand. Red and mpg clay.
114 - 122	Fine sand. Red and lpg (70/30) silty clay.
122 - 128	Fine sand. Red/brown and pale grey soft clay (50/50)
128 - 142	Fine to normal sand. Pale grey, yellow/brown and min. red clay. Light grey clay in lowest sample.
142 - 146	Fine sand (0.5 - 1mm, ang., mx). Clays as above.
146 - 154	Mid to dark grey and hard black clay. Limonite fairly common. Minor sand (1-2mm, a/sr, qy+)
154 - 170	Sand (1-4mm, a/sr, qy+). Mid grey clay. Magenta clay. Stains com.
170 - 184	Black and dark grey clay. Stains common.
184 - 192	Sand (0.5 - 2mm, a/sr., qy+). Mid grey clay. Stains common.
192 - 208	Sand as above at top, coarser at base of interval. Olive green, mid grey and khaki clay. Stains common.
208 - 216	Clays as above. Limonite fairly common. Min. sand.
216 - 228	Sand (2-4mm, subrounded, qy). Clays as above. Limonite fairly common. Minor carbonate.
228 - 240	Mid to dark grey clay.. Some black and olive green clay. Limonite fairly common. Sand (5% at 234m) (0.25 - 0.5mm, a/sr, qy+). Very minor carbonate.

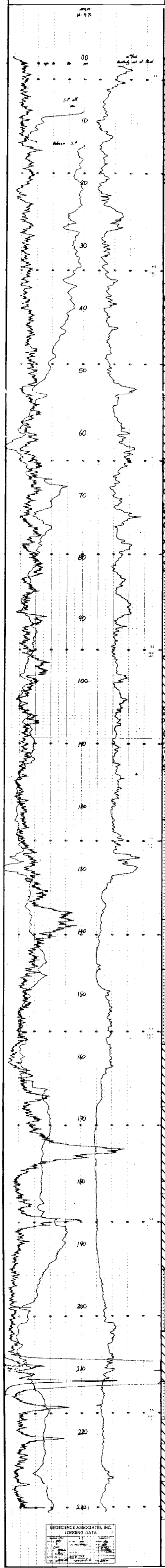
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DRILL HOLE LOG

2608(III)-9

HOLE No.	209-29	DATE DRILLED	14/9/76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	14/9/76	RANGE	200 cps	RESIST SCALE	10Ω/in.
PROJECT	POONTANA	DATE LOGGED	14/9/76	TIME CONSTANT	2 sec.	SP SCALE	-
LOCATION	PARALANA "A"	DRILLED DEPTH	234m	PAPER SPEED	1cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	232.1m	LOGGING SPEED	9m/min	FLUID LEVEL	1m
GEOLOGIST	TAYLOR	ELEVATION	64m	BACK GROUND	9	PROBE No	306
DRILLER	THOMPSON/STRATFORD	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	MORTIMER			K-FACTOR	1.25×10^{-5}		Mixed Clastics

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



INTERVAL	DESCRIPTION
0 - 20	Fine and coarse gravel. Coarse sand. Red and buff soft clay.
20 - 36	Coarse sand. Red with minor buff soft clay.
36 - 44	Fine gravel. Red silty clay.
44 - 50	Red silty clay. Minor sand.
50 - 54	Normal sand. Red silty clay.
54 - 64	Red sandy clay. Minor sand.
64 - 82	Fine gravel. Coarse sand. Red and mpg silty clay.
82 - 96	Coarse sand. Red and lesser pale grey silty clay.
96 - 104	Red/brown and minor pale grey silty clay. Minor sand.
104 - 114	Fine gravel. Coarse sand. Red/brown and mpg silty clay.
114 - 122	Fine sand. Red/brown and pale grey (50/50) soft clay.
122 - 138	Fine sand, coarser down interval. Pale grey and yellow/brown, with minor red, silty clay. Minor white clay in lowest sample.
138 - 146	Normal to coarse sand. Pale and light grey clay with some mid grey clay
146 - 158	Sand (1-2mm, ang., qz+). Mainly black and mid to dark grey clay. Stains common.
158 - 168	Light to mid grey clay. Stains common. Minor sand (5% at 164m).
168 - 180	Mainly mid to dark grey and black clay. Limonite abundant in lowest sample only. Min. sand.
180 - 182	Mid to dark grey clay. Brown clay. Lim. abundant.
182 - 194	Mainly mid to dark grey clay. Min. black clay. Limonite very common to abundant. Olive green clay in lower samples. Min. sand.
194 - 204	Sand (2mm., ang., qz+) decreasing down interval. Mixed clays (Dk = Lt). Limonite very common. Minor brick red clay.
204 - 212	Mixed clays (Lt = Dk). Limonite common. Minor sand.
212 - 218	Sand (1-2mm., ang., qz) and coarse sand (3-4mm, sa/sr,qz+). Clays as above. Limonite V. common.
218 - 222	Mixed clays (Dk=Lt). Lim. V. com. Min. sand.
222 - 228	Mixed clays (Dk=Lt). Lim. com. Min. sand.
228 - 234	Mixed clays (Dk≥Lt). Lim. F. com. Min. sand.

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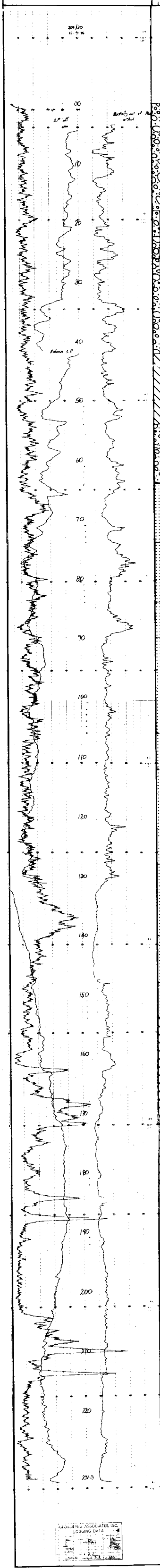
DRILL HOLE LOG

2608(III)-10

HOLE No.	209-30	DATE DRILLED	15/9/76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	15/9/76	RANGE	200 cps	RESIST. SCALE	10Ω/in.
PROJECT	POONTANA	DATE LOGGED	15/9/76	TIME CONSTANT	2	SP. SCALE	-
LOCATION	PARALANA "A"	DRILLED DEPTH	234m	PAPER SPEED	1cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	231-3m	LOGGING SPEED	9m/min.	FLUID LEVEL	4m
GEOLOGIST	TAYLOR	ELEVATION	64m	BACK GROUND	8	PROBE No	306
DRILLER	STRATFORD	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	MORTIMER			K-FACTOR	1.25x10⁵		Mixed Clastics

LITHOLOGY: Gravel; Sand; Silt; Clay; Carbonate; Carbonaceous

GAMMA S.P. RES | 100% | INTERVAL | DESCRIPTION



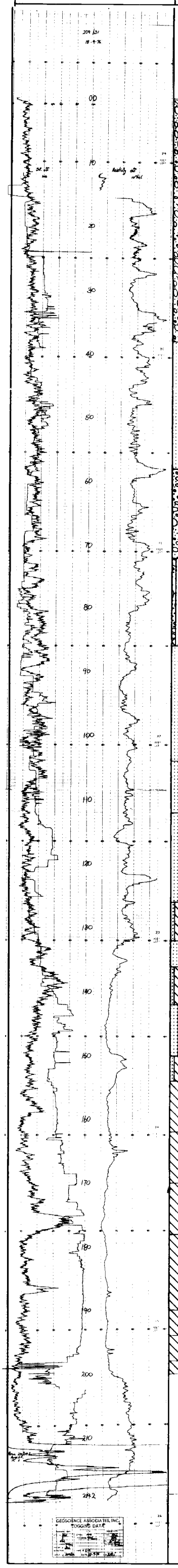
INTERVAL	DESCRIPTION
0 - 18	Gravel. Coarse sand. Red and buff soft clay.
18 - 26	Gravel. Fine and normal sand. Red soft clay.
26 - 42	Fine gravel. Sand. Red soft clay.
42 - 54	Red with very minor pale grey silty clay. Minor sand (20% at 54 m)
54 - 64	Fine gravel. Sand (1-2mm., a/sr, qz+). Red and minor pale grey silty clay.
64 - 74	Coarse sand. Red/brown and pale grey (50/50) silty clay.
74 - 84	Coarse sand and minor fine gravel. Red silty clay.
84 - 90	Coarse sand. Red with mpg silty clay.
90 - 106	Sand (fine and coarse) with minor fine gravel. Red/brown and lpg silty clay.
106 - 112	Sand. Red and mpg soft clay.
112 - 128	Fine sand. Red/brown and lpg soft clay.
128 - 140	Coarse sand. Pale grey and yellow/brown with minor red clay.
140 - 148	Coarse sand. Light, mid and pale grey clay. Lim V. common. Minor dark grey clay in lowest sample.
148 - 154	Sand (0.5 - 2mm, a/sr, qzt). Mainly mid to dark grey and black clay. Stains.
154 - 168	Light to mid grey clay. Stains common. Limonite abundant 158 - 162m. Minor brick red clay.
168 - 182	Mid to dark grey clay. Stains common at top, decreasing down interval. Minor fine gravel (5% at 182m).
182 - 194	Sand (1-6mm, a/sr, poorly sorted) at top changing to (1-2mm, ang., ps). Dark grey with mid grey and black clays. Stains minor
194 - 204	Sand (2-3mm, sa/sr, qz+). Clays as above. Limonite very common. Minor brick red clay.
204-210	Sand (as above). Mixed clays. Limonite very common. Min.carbonate
210 - 216	Mixed clays (as above) with increase in light grey. Minor sand and brick red clay.
216 - 218	Sand (2-4mm, sq/sr,mx). Claus as above. Lim. com.
218 - 226	Mixed clays (Dk > Lt). Lim. V. com. Min. sand. Min. carbonate.
226 - 228	Sand (1-3mm, a/sr, ps). Mixed clays (Dk > Lt). Stains com.
228 - 234	Dark grey/black clay. Stains f. com. Min. sand and brick red clay

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DRILL HOLE LOG 2608(III)-11

HOLE No.	209-31	DATE DRILLED	15.9.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	18.9.76	RANGE	200 cps	RESIST. SCALE	10 Ω/in.
PROJECT	Poontana	DATE LOGGED	18.9.76	TIME CONSTANT	2	SP. SCALE	
LOCATION	Paralana'A'	DRILLED DEPTH	219.5 m	PAPER SPEED	1 cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	219.2 m	LOGGING SPEED	9m/min.	FLUID LEVEL	12m
GEOLOGIST	Taylor	ELEVATION		BACK GROUND	9 cps	PROBE No	306
DRILLER	Thompson/Stratford	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	Mortimer			K-FACTOR			

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous · Mixed Clastics



INTERVAL	DESCRIPTION
0–18	Gravel. Coarse and normal sand. Minor clay.
18–38	Red with very minor pale grey silty clay.
38–58	Coarse and normal sand. Red soft silty clay.
58–72	Fine gravel. Coarse sand. Red soft silty clay.
72–8[illegible]	Fine gravel. Coarse sand. Red soft silty clay.
8[illegible]–104	Mainly fine sand. Red/brown and lesser pale grey silty clay.
104–112	Fine sand. Red/brown and minor pale grey silty clay.
112–12[illegible]	Mainly fine sand but coarser (1mm, angular, quartz+)in lowest samples. Pale grey clay with red/brown clay in upper half and yellow/brown clay in lower.
12[illegible]–132	Sand (1mm, angular, quartz +). Pale grey and yellow/brown soft silty clay.
132–13[illegible]	Sand (1-2mm, angular/subangular, quartz). Clays as above.
13[illegible]–142	Sand as above. Pale and light grey clay with stains. Very minor mid grey clay.
142–150	Sand (0.25 - 0.5 mm, angular/subrounded, quartz). Mainly mid grey clay. Stains common to abundant.
150–154	Sand (1-2 mm, angular/subrounded, poorly sorted). Hard black clay. Stains common.
154–16[illegible]	Mainly dark grey and black clay. Stains very common.
16[illegible]–170	Mid to dark grey clay. Stains common. 5% sand in lowest sample.
170–178	Dark grey clay. Stains common. Minor sand.
178–190	Mid to dark grey with some black clay. Limonite abundant. Hematite very common. Minor sand.
190–194	Mid dark grey and olive green clay. Minor black clay. Limonite very abundant.
194–198	Mid dark grey and black clay. Stains very common. Minor sand.
198–200	Clays (as above). Min. carbonate and sand. Limonite abundant.
200–219.5	Cored interval.

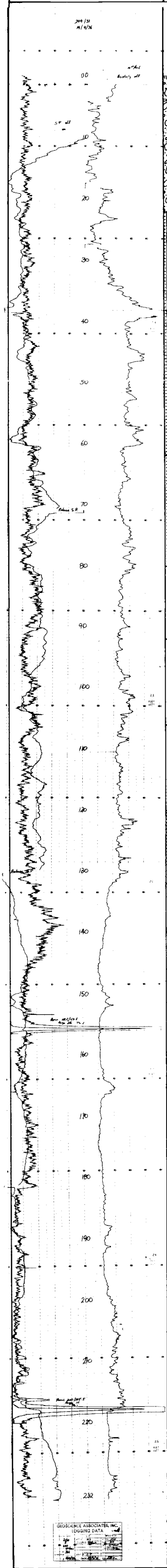
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DRILL HOLE LOG

2608(III)-12

HOLE No.	209.32	DATE DRILLED	19.9.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	19.9.76	RANGE	200 cps	RESIST. SCALE	10 Ω /in
PROJECT	Poontana	DATE LOGGED	19.9.76	TIME CONSTANT	2 sec	SP. SCALE	-
LOCATION	Paralana "A"	DRILLED DEPTH	234m	PAPER SPEED	1 cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	232m	LOGGING SPEED	9 m/min	FLUID LEVEL	2m
GEOLOGIST	Taylor	ELEVATION	65.5m	BACK GROUND	9	PROBE No	306
DRILLER	Brown	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	Mortimer			K-FACTOR	1.25 x 20-5		Mixed Clastics

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



INTERVAL	DESCRIPTION
0-22	Gravel. Coarse sand. Red and buff soft clay.
22-62	Sand. and minor gravel. Red silty clay.
62-80	Sand. and minor gravel. Red silty clay.
82-92	Sand. Red silty clay.
92-106	Sand. Red silty clay.
106-120	Sand. Red and minor pale grey silty clay.
120-132	Fine sand. Red/brown and pale grey (50/50) silty clay.
132-140	Coarse sand. Pale grey and yellow/brown clay. Minor light grey clay in lowest sample.
140-146	Coarse sand. Pale grey, light grey and mid grey clay.
146-162	Sand. (0-5 - mm, angular subrounded quartz +). Mid to dark grey and black clay. Stains.
162-186	Mid to dark grey and hard black clay. Hematite common. Limonite common or very common.
186-198	Light to mid grey clay. Limonite (very) abundant. Hematite fairly common.
198-208	Mid grey, pale green and dark grey clay. Minor Kharki clay. Limonite abund. Minor sand. (1-3 mm, angular, quartz +).
208-216	Mixed clays (Dk Lt). Limonite common to abund. Hematite common.
216-222	Mixed clays (Lt Dk). Stains common. Minor carbonate.
222-226	Sand (1-2 mm, angular subrounded quartz), silt. Clays as above Increase in hematite.
226-234	Mixed clays (Dk = It). Minor sand. Limonite common. Hematite fairly common.

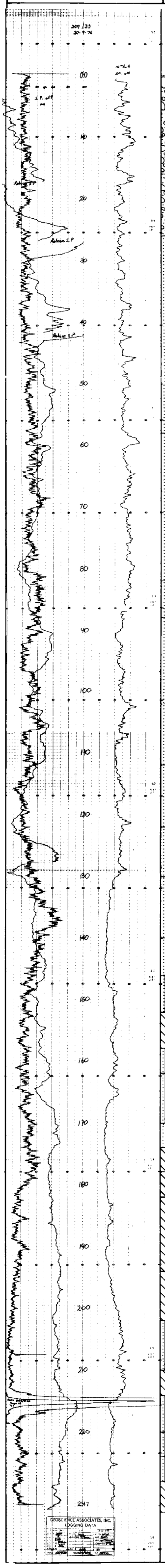
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DRILL HOLE LOG

2608(III)-13

HOLE No.	209-33	DATE DRILLED	20.9.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	20.9.76	RANGE	200 cps	RESIST. SCALE	10 Ω /in
PROJECT	POONTANA	DATE LOGGED	20.9.76	TIME CONSTANT	2 sec	SP. SCALE	
LOCATION	PARALANA "A"	DRILLED DEPTH	234 m	PAPER SPEED	1 cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	231.7 m	LOGGING SPEED	9m/min	FLUID LEVEL	1 m
GEOLOGIST	TAYLOR	ELEVATION	65.5 m	BACK GROUND	8 cps	PROBE No	306
DRILLER	BROWN	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	MORTIMER			K-FACTOR	1.25×10^{-5}		Mixed Clastics

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



INTERVAL	DESCRIPTION
0 - 16	Gravel. Coarse sand. Red and buff clay.
16 - 26	Gravel. Coarse sand. Red and buff soft clay.
26 - 50	Coarse sand. Red soft silty clay.
50 - 58	Coarse sand. Red silty clay.
58 - 82	Coarse sand. Red silty clay.
82 - 88	Sand. Red silty clay.
88 - 102	Fine sand. Red silty clay.
102 - 112	Fine sand. Red silty clay.
112 - 122	Sand. Red/brown and lpg silty clay.
122 - 130	Fine sand. Red/brown and pale grey soft silty clay.
130 - 140	Sand. Pale grey and yellow/brown soft silty clay.
140 - 146	Sand. Light, pale and minor mid grey clay. Stains.
146 - 152	Sand (1 - 3 mm, angular/subrounded quartz +). Dark grey/black clay. Stains very common.
152 - 158	Mid to dark grey and black clay. Stains fairly common.
158 - 162	Sand (as above). Lt., mid and dark grey clay. Limonite common.
162 - 170	Sand (0.5 - 1 mm, angular, mixed). Dark grey clay, some black clay. Hematite abundant. Limonite very common.
170 - 174	Sand (1 - 3 mm, subangular/subrounded, quartz +). Mid to dark grey clay. Stains very common.
174 - 178	Light, mid and dark grey clay. Limonite abundant. Minor sand.
178 - 182	Black and dark grey clay. Limonite very abundant. Brick red clay.
182 - 194	Black and light to mid grey clay. Minor pale and olive green clay. Limonite very abundant. Minor sand.
194 - 202	Light grey and Light greenish grey clay. Limonite abundant. Minor sand.
202 - 210	Sand (1 - 2 mm, angular/subrounded quartz). Mixed clays (lt.> dk.). Limonite very common. Minor carbonate.
210 - 214	Clays as above. Limonite fairly common. Minor sand.
214 - 220	Sand (1 - 3 mm, angular/subrounded, poorly sorted). Clays as above. Minor carbonate.
220 - 224	Sand as above. Silt. Clays as above.
224 - 228	Sand (1 - 3 mm, subangular/subrounded, mixed). Clays as above. Limonite common.
228 - 234	Mixed clays (pale green, light and mid grey and black). Limonite common. Minor carbonate. (5% at 232 m). Minor sand.

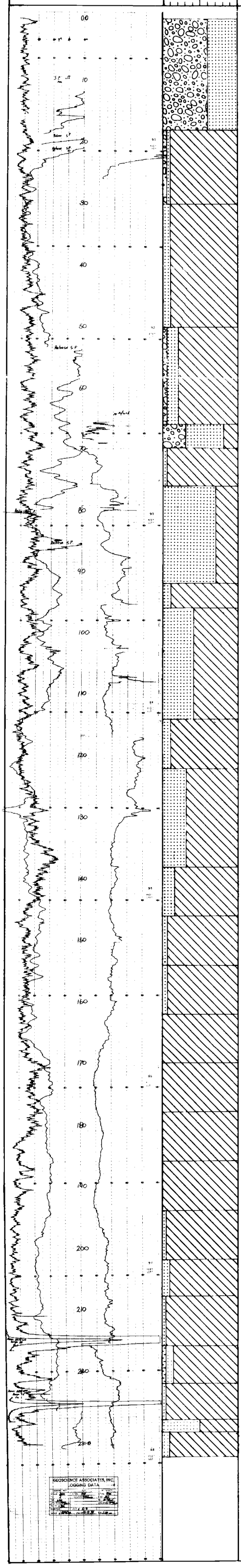
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DRILL HOLE LOG

2608(III)—14

HOLE No.	209-34	DATE DRILLED	21.9.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	21.9.76	RANGE	200 cps	RESIST. SCALE	10 Ω/in
PROJECT	POONTANA	DATE LOGGED	21.9.76	TIME CONSTANT	2 sec	SP. SCALE	
LOCATION	PARALANA "A"	DRILLED DEPTH	234 m	PAPER SPEED	1 cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	231.8 m	LOGGING SPEED	9 m/min	FLUID LEVEL	1 m
GEOLOGIST	TAYLOR	ELEVATION	65.5 m	BACK GROUND	8 cps	PROBE No	306
DRILLER	.BROWN	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	MORTIMER			K-FACTOR	1.25 x 10^{-5}		Mixed Clastics

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



INTERVAL	DESCRIPTION
0 - 18	Gravel. Coarse sand.
18 - 30	Gravel. Sand. Red soft clay.
30 - 50	Red silty clay.
50 - 66	Fine gravel. Sand. Red silty clay.
66 - 70	Fine gravel. Coarse sand. Red silty clay.
70 - 76	Coarse sand. Red silty clay.
76 - 92	Coarse sand. Red and lpg silty clay.
92 - 96	Coarse sand. Red and lpg (70/30) silty clay.
96 - 114	Sand. Red and minor pale grey soft silty clay.
114 - 122	Coarse sand. Red/brown and pale grey silty clay.
122 - 138	Coarse sand. Pale grey and yellow/brown clay. Light grey clay in lowest sample. Stains.
138 - 146	Sand. (1 - 2 mm, angular/subrounded, quartz +). Pale, light and mid grey clay. Stains.
146 - 154	Sand. (1 - 2 mm, angular/subrounded, quartz +). Light to mid and pale grey and black clay. Stains.
154 - 162	Sand. (1 - 2 mm, angular/subrounded, poorly sorted). Light, mid and dark grey clay. Hematite common.
162 - 170	Dark grey and black clay. Hematite very common. Minor sand. (to 5%, 166-168 m).
170 - 178	Dark grey and black clay. Some mid grey clay. Stains fairly common. Minor sand. (5% 172 - 174 m).
178 - 186	Dark grey and pale greenish grey (or pale green) soft clay. Stains common.
186 - 194	Light green/green soft clay. Stains fairly common.
194 - 202	Sand (1 - 3 mm, angular, quartz +). Clays as above.
202 - 208	Sand. (1 - 3 mm, angular/subrounded, quartz +). Green, greenish-grey and mid grey clay. Minor stains.
208 - 216	Sand as above. Clays as above with increase in darker clays. Minor stains.
216 - 222	Sand. (0.5 - 2 mm, angular/subrounded, quartz). Silt. Clays as above. Limonite common.
222 - 228	Sand. as above. Minor silt (5% at 226 m). Clays as above. Limonite fairly common.
228 - 230	Sand. (1 mm, angular, quartz). Clays as above.
230 - 234	Sand. (1 mm - 2 mm, angular/subrounded, quartz +). Clays as above. Increase in darker clay. Limonite common.

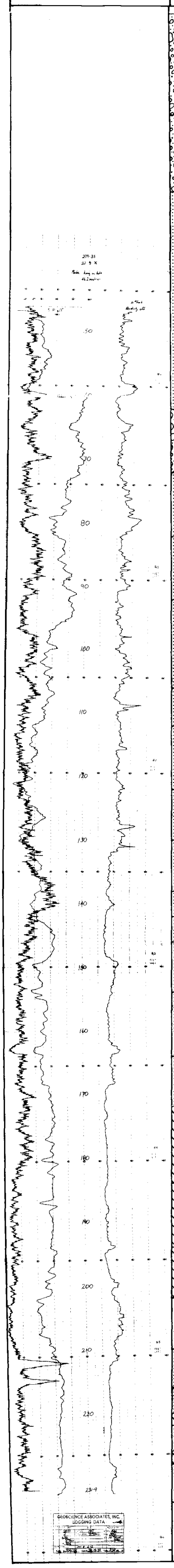
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DRILL HOLE LOG

2608(III)-15

HOLE No.	209.35	DATE DRILLED	21.9.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	22.9.76	RANGE	200 cps	RESIST. SCALE	10 Ω /in
PROJECT	POONTANA	DATE LOGGED	22.9.76	TIME CONSTANT	2 sec	SP. SCALE	
LOCATION	PARALANA "A"	DRILLED DEPTH	234 m	PAPER SPEED	1 cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	231.9 m	LOGGING SPEED	9 m/min	FLUID LEVEL	
GEOLOGIST	TAYLOR	ELEVATION	65.5 m	BACK GROUND	8 cps	PROBE No	306
DRILLER	BROWN	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	MORTIMER			K-FACTOR	$1 \times 25 \times 10^{-5}$		Mixed Clastics

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



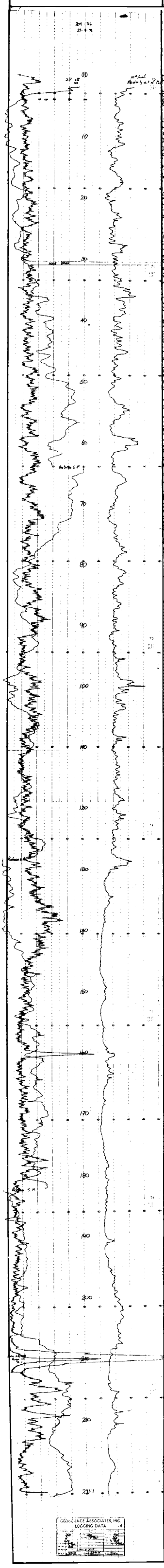
INTERVAL	DESCRIPTION
0 - 16	Gravel. Coarse sand. Red and buff shaly clay.
16 - 28	Gravel. Coarse sand. Red and buff clay.
28 - 62	Coarse sand and minor gravel. Red silty clay.
62 - 72	Gravel. Coarse sand. Red silty clay.
72 - 82	Coarse sand. Red silty clay.
82 - 92	Coarse sand. Red silty clay.
92 - 106	Sand. Red silty clay.
106 - 112	Sand. Red and minor pale grey silty clay.
112 - 122	Sand. Red and lesser pale grey silty clay.
122 - 130	Fine sand. Red/brown and pale grey silty clay.
130 - 138	Fine sand. Pale grey and yellow/brown clay.
138 - 142	Fine sand. Clay as above.
142 - 146	Coarse sand. Light grey soft clay. Stains very common. Minor mid grey clay.
146 - 154	Sand (0.5 - 3 mm, angular/subrounded, quartz +). Mid to dark grey and black clay. Stains very common.
154 - 164	Sand (1 - 3 mm, subangular/subrounded, mixed). Mid to dark grey clay. Hematite very common. Limonite fairly common.
164 - 172	Sand. (1 mm, angular, quartz). Mid grey clay. Stains common.
172 - 184	Mid grey and some darker clays. Hematite common. Limonite abundant from 180 m. Minor sand. (5% at 178 m).
184 - 194	Light to pale grey clay. Limonite very common to abundant.
194 - 202	Pale green soft clay. Limonite very common.
202 - 210	Sand (1 - 3 mm, angular/subrounded, quartz). Mixed clays (Lt.> Dk.). Fragmented. Limonite very common.
210 - 216	Sand (0.25 - 2 mm, angular, mixed). Silty clays as above. Limonite fairly abundant.
216 - 220	Sand. (0.5 - 3 mm, angular/subrounded, poorly sorted). Silty clays as above. Limonite common.
220 - 222	Mid grey and greenish grey. Limonite very common.
222 - 226	Sand. (0.25 - 1 mm, angular, mixed). Clays as above.
226 - 228	Mid grey, pale green, dark grey clay. Limonite common.
228 - 234	Sand (0.5 - 3 mm, angular/subrounded, poorly sorted). Dark grey, mid grey and pale green clay. Limonite common.

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DRILL HOLE LOG 2608(III)-16

HOLE No.	209-36	DATE DRILLED	22.9.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	23.9.76	RANGE	200 cps	RESIST. SCALE	10 Ω/in
PROJECT	Poontana	DATE LOGGED	23.9.76	TIME CONSTANT	2 sec	SP. SCALE	
LOCATION	Paralana "A"	DRILLED DEPTH	234m	PAPER SPEED	1 cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	231.7m	LOGGING SPEED	9 m/min	FLUID LEVEL	2m
GEOLOGIST	Taylor	ELEVATION	65.5m	BACK GROUND	10 cps	PROBE No	306
DRILLER	Brown	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	Mortimer			K-FACTOR	1.25 x 10^{-5}		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous · Mixed Clastics



INTERVAL	DESCRIPTION
0–20	Gravel. Coarse sand. Minor buff clay.
20–40	Gravel. Coarse sand. Red soft silty clay.
40–48	Fine gravel. Coarse sand. Red soft silty clay.
48–58	Fine gravel. Coarse sand. Red soft silty clay.
58–78	Fine gravel. Sand. Red silty clay.
78–82	Coarse sand. Red and mpg silty clay.
82–86	Fine gravel. Red and mpg silty clay.
86–106	Sand. Red silty clay.
106–110	Red and lesser pale grey silty clay. Minor sand.
110–114	Sand. Clay as above.
114–122	Sand. Red/brown and lpg silty clay.
122–128	Fine sand. Red/brown and pale grey silty clay.
128–130	Fine sand. Pale grey and minor red silty clay.
130–138	Fine sand. Pale grey and yellow/brown and minor light grey clay. Stains.
138–146	Fine gravel. Sand (1-3 mm, angular subrounded quartz). Light to mid grey clay. Stains.
146–148	Sand (as above). Mid to Dk Grey clay. Minor stains.
148–152	Sand (as above). Hard black and Dk Grey clay.
152–154	Sand (0.25- 2mm, angular subrounded quartz). Mid grey to black clay.
154–158	Sand (as above). Dk grey to black clay. Minor stains.
158–160	Sand and clay as above.
160–170	Sand (as above) and minor fine gravel. Clays as above. Slight increase in stains.
170–178	Mid to dk grey and black clay. Stains common. Minor sand (1-2 mm, angular subrounded, mx).
178–186	Fine gravel and minor sand (1-3 mm, angular subrounded quartz). Clays as above. Limonite very common to abund.
186–194	Sand (2-4mm, angular subrounded, mx) and 2% fine gravel. Clays as above (mainly mid grey). Limonite in abund.
194–200	Sand (as above). Mid to dark grey clay. Stains common.
200–202	Sand (0.5 - 1 mm, angular subrounded quartz). Clays as above.
202–210	Sand (2-4 mm, angular subrounded quartz). Mid grey clay. Limonite common.
210–212	Sand (10%) (1-2 mm, angular quartz) and fine sand (15%). Clays as above.
212–216	Fine sand and minor sand as above. Mid grey, kharki and black clay.
216–220	Fine and normal sand. (50/50). Clays as above. Minor stains.
220–226	Mid to Dk grey clay and olive green clay. Minor stains. Minor sand.
226–230	Fine sand (15%) and sand (1-4 mm, angular subrounded mx). Clays as above, minor stains.
230–232	Sand (1-3 mm, angular subrounded ps). Clays as above.
232–234	Sand (2-3 mm, angular sub-angular, quartz). Clays as above. Minor stains.

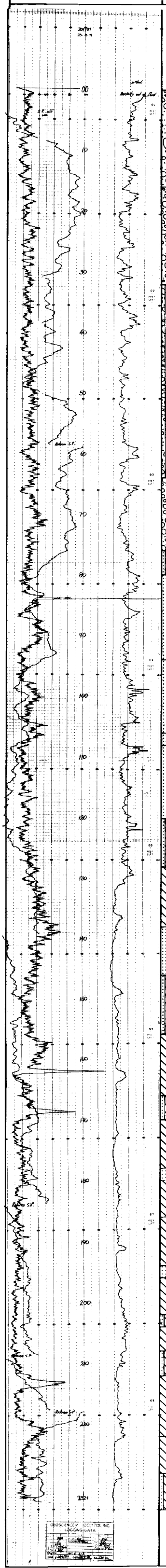
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DRILL HOLE LOG

2608(III)-17

HOLE No.	209-37	DATE DRILLED	23.9.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	23.9.76	RANGE	200 cps	RESIST. SCALE	10 Ω /in
PROJECT	POONTANA	DATE LOGGED	23.9.76	TIME CONSTANT	2 sec	SP. SCALE	
LOCATION	PARALANA "A"	DRILLED DEPTH	234 m	PAPER SPEED	1 cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	232.1 m	LOGGING SPEED	9 m/min	FLUID LEVEL	1 m
GEOLOGIST	TAYLOR	ELEVATION	65.7 m	BACK GROUND	9 cps	PROBE No	306
DRILLER	BROWN	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	MORTIMER			K-FACTOR	1.25×10^{-5}		Mixed Clastics

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



INTERVAL	DESCRIPTION
0 - 16	Coarse sand. Red and buff clay.
16 - 32	Fine gravel. Sand. Red and buff soft clay.
32 - 64	Fine gravel. Sand. Red silty clay.
64 - 76	Fine gravel. Sand. Red and mpg silty clay.
76 - 80	Sand. Red silty clay.
80 - 94	Sand. Red silty clay.
94 - 106	Coarse sand. Red/brown and mpg silty clay.
106 - 108	Coarse sand. Clays as above.
108 - 120	Coarse sand. Red and lpg silty clay.
120 - 128	Fine sand. Red/brown and pale grey silky clay.
128 - 138	Pale grey and yellow/brown clay. Light grey clay in lowest sample. Stains.
138 - 146	Light to mid grey clay. Stains abundant.
146 - 156	Mid to dark grey clay. Black clay increasing. Stains common.
156 - 166	Mid grey clay. Hematite common. Limonite very common. Minor sand.
166 - 170	Very fine sand. Clays as above.
170 - 178	Clays as above. Limonite common. Minor sand.
178 - 180	Very fine sand. Dark grey clay. Limonite common.
180 - 186	Dark grey and olive green clay. Limonite very common. Minor sand (0.5 - 1 mm, angular/subangular, mixed).
186 - 194	Light to mid grey and green clay. Limonite abundant.
194 - 196	Very fine sand. Dark grey clay. Limonite very common.
196 - 202	Mid grey clay. Limonite very common. Minor sand.
202 - 204	Sand. (1-2 mm, angular/subrounded, quartz +). Grey and kharki clay Limonite common.
204 - 208	Mid grey clay. Stains very common. Minor carbonate.
208 - 212	Very fine sand. Clays as above. Hematite abundant. Limonite very common.
212 - 222	Minor sand. Minor stains. Very mixed clays. Fragmented.
222 - 228	Mixed clays (mid to dark grey, green, black and kharki). Stains fairly common.
228 - 234	Very fine sand. Clays as above. Hematite very common. Limonite minor.

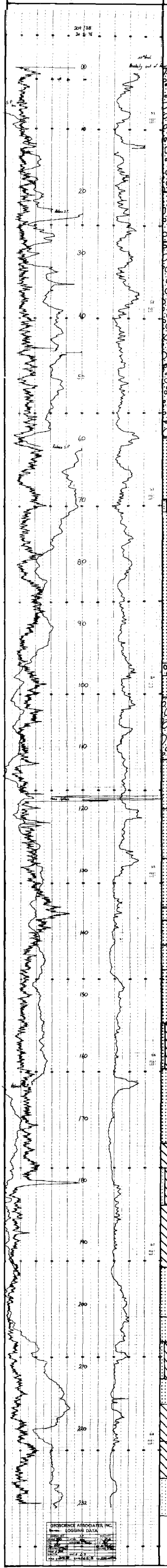
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DRILL HOLE LOG

2608 (III) -18

HOLE No.	209-38	DATE DRILLED	24.9.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	24.9.76	RANGE	200 cps	RESIST. SCALE	10 Ω /in
PROJECT	Poontana	DATE LOGGED	24.9.76	TIME CONSTANT	2 sec	SP. SCALE	
LOCATION	PARALANA "A"	DRILLED DEPTH	234m	PAPER SPEED	1 cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	232m	LOGGING SPEED	9 m/min	FLUID LEVEL	1 m
GEOLOGIST	TAYLOR	ELEVATION	65.8m	BACK GROUND	9 cps	PROBE No	306
DRILLER	BROWN	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	MORTIMER			K-FACTOR	1.25×10^{-5}		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous · Mixed Clastics



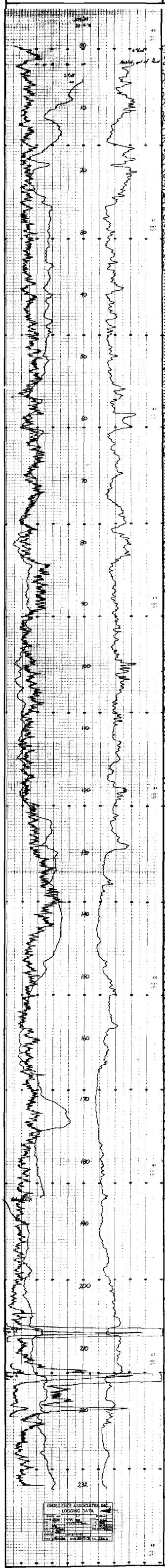
INTERVAL	DESCRIPTION
0-20	Gravel. Coarse sand. Red/buff soft clay.
20-28	Gravel. Coarse sand. Red soft clay.
28-48	Fine gravel. Coarse to normal sand. Red soft clay.
48-60	Fine gravel. Coarse sand. Red silty clay.
60-70	Sand. Red silty clay.
70-72	Sand. Red silty clay.
72-96	Sand. Red soft silty clay.
96-98	Fine gravel. Red silty clay.
98-102	Sand. Red soft silty clay.
102-112	Fine gravel. Coarse sand. Red and mpg silty clay.
112-120	Sand. Red/brown and lpg silty clay.
120-128	Sand (0.5 - 2mm, angular mixed). Pale grey and red/brown. Very soft clay.
128-136	Fine sand. Pale grey and yellow/brown soft clay.
136-138	Sand (1-2 mm, angular, quartz +).
138-142	Sand (as above). Pale, light and minor mid-grey clay. Stains very common.
142-146	Sand (1-2 mm, angular/sub-angular quartz +). Light to mid and pale grey clay. Stains.
146-154	Sand (1-4 mm, angular/rounded, quartz+). Mid to dk.grey clay. Hematite common.
154-162	Sand (1-2 mm, angular/subrounded, quartz +). Mid grey clay. Hameatite.
162-174	Sand (0.5 - 2mm, angular/subrounded). Mid grey clay. Stains. Minor carbonate.
174-178	Mid grey clay. Limonite common.
178-184	Fine sand. Clays as above.
184-194	Mid, dark grey and black clay. Limonite very common. to abund. Hematite common.
194-202	Sand (0.5 - 1 mm, angular subrounded, quartz+). Clays as above, with olive green. Limonite fairly common.
202-206	Sand (0.5-3 mm, angular/subrounded quartz+). Silt. Clays as above. Minor stain.
206-212	Sand (as above). Mid to dark grey clay. Limonite common.
212-216	Sand (as above). Clay (as above). Limonite fairly common.
216-222	Lt. mid and dk. grey clay. Limonite common. Hematite f.common.
222-228	Clays as above. Minor black clay. Stains common.
228-234	Sand (1-2 mm, angular subrounded quartz). Dk grey, black and olive green clay. Carbonate.

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DRILL HOLE LOG 2608(III)-19

HOLE No.	209-39	DATE DRILLED	25.9.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	25.9.76	RANGE	200 cps	RESIST. SCALE	10 Ω /in
PROJECT	POONTANA	DATE LOGGED	25.9.76	TIME CONSTANT	2 sec	SP. SCALE	
LOCATION	PARALANA "A"	DRILLED DEPTH	234 m	PAPER SPEED	1 cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	232 m	LOGGING SPEED	9 m/min	FLUID LEVEL	4 m
GEOLOGIST	TAYLOR	ELEVATION	65.5 m	BACK GROUND	10 cps	PROBE No	306 m
DRILLER	BROWN	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	MORTIMER			K-FACTOR	1.25×10^{-5}		Mixed Clastics

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



INTERVAL	DESCRIPTION
0.- 26	Gravel. Coarse sand. Red and buff soft clay.
26 - 36	Gravel. Sand. Red and buff soft clay.
36 - 52	Sand. Red silty clay.
52 - 58	Sand. Red silty clay.
58 - 66	Fine gravel. Coarse sand. Red silty clay.
66 - 80	Sand. Red silty clay.
80 - 88	Fine gravel. Coarse sand. Red silty clay.
88 - 98	Sand. Red silty clay.
98 - 112	Fine gravel. Fine sand. Red/brown and mpg silty clay.
112 - 118	Fine sand. Red/brown and lpg silty clay.
118 - 120	Fine sand.
120 - 130	Fine sand. Red/brown and pale grey silty clay.
130 - 138	Coarse sand. Pale grey and yellow/brown and minor red silty clay.
138 - 140	Pale grey, light grey and minor mid grey clay.
140 - 144	Coarse sand. Clays as above. Inc. in light grey.
144 - 152	Mand black and dark grey clay. Minor sand. Minor stains.
152 - 164	Mid and dark grey clay. Limonite common. Hematite common. Minor sand.
164 - 178	Dark grey and black clay. Hematite very common. Limonite fairly common. Minor sand.
178 - 186	Sand (1 - 3 mm, angular/subrounded, poorly sorted), Mid to dark grey clay. Limonite abundant.
186 - 202	Sand (as above) Mid and dark grey clay. Minor green clay. Minor kharki clay. Limonite abundant.
202 - 210	Very fine sand (10%) and sand. (5%) (1 - 2 mm, angular, quartz ++). Clays as above. Limonite very common.
210 - 214	Very fine sand (quartz, angular). Mid and dark grey, kharki, green and black clays. Limonite common.
214 - 218	Fine sand (as above) and sand (2 mm, angular/subrounded quartz). Clays as above.
218 - 222	Sand as above. Clays as above.
222 - 228	Very fine sand (10%) and sand (1 - 2 mm, angular/subrounded, quartz). Dark grey, mid grey, black and kharki clay. Minor carbonate.
228 - 234	Sand as above. Black, dark grey clay. Limonite fairly common. Minor carbonate.

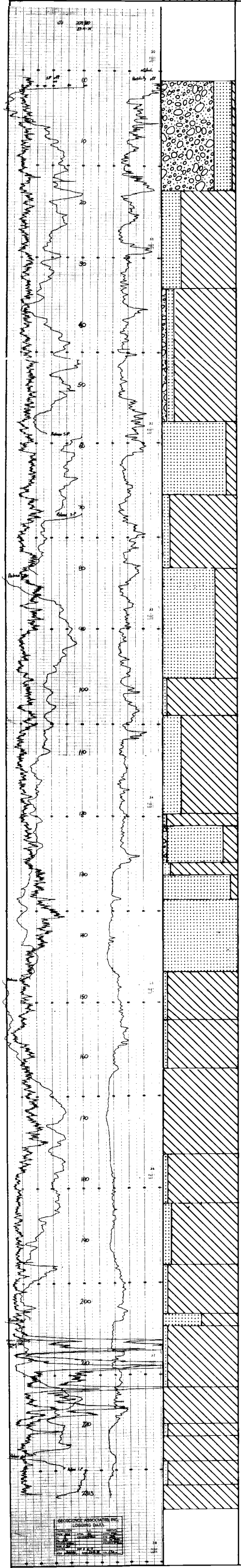
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DRILL HOLE LOG

2608(III)-20

HOLE No.	209-40	DATE DRILLED	26-9-76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	26-9-76	RANGE	200 cps	RESIST. SCALE	10 Ω/in
PROJECT	POONTANA	DATE LOGGED	26-9-76	TIME CONSTANT	2 sec	SP. SCALE	
LOCATION	PARALANA "A"	DRILLED DEPTH	234 m	PAPER SPEED	1 cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	231.3 m	LOGGING SPEED	9 m/min	FLUID LEVEL	2 m
GEOLOGIST	TAYLOR	ELEVATION	65.5 m	BACK GROUND	10 cps	PROBE No	306
DRILLER	BROWN	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	MORTIMER			K-FACTOR	1.25 x 10-5		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous · Mixed Clastics



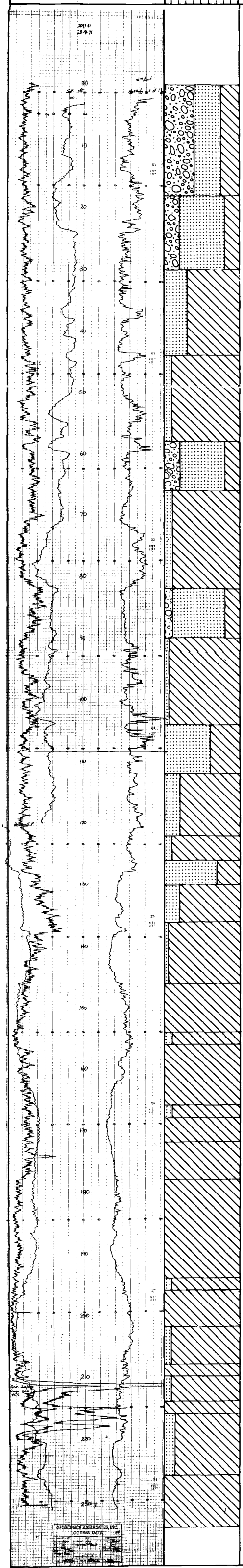
INTERVAL	DESCRIPTION
0 - 18	Gravel. Coarse sand. Red/buff clay.
18 - 34	Sand. Red soft clay.
34 - 56	Fine gravel. Sand. Red silty clay.
56 - 68	Coarse sand. Red silty clay.
68 - 80	Coarse sand. Red silty clay.
80 - 98	Coarse sand. Red and mpg silty clay.
98 - 104	Sand. Red and lpg silty clay.
104 - 120	Coarse sand. Red/brown and lpg silty clay. (60/40).
120 - 122	Sand coarse. Red/brown and pale grey silty clay (50/50). Limonite stain.
122 - 128	Gravel. Coarse sand. Red and pale grey soft clay.
128 - 130	Coarse sand. Clays as above.
130 - 134	Sand (1 - 2 mm, angular/subrounded, poorly sorted). Pale grey and yellow/brown clay.
134 - 146	Sand (0.25 - 2 mm). Very minor light grey clay in lower samples.
146 - 154	Sand (1 - 3 mm, angular/subrounded, quartz). Mid to dark grey clay. Hematite common. Limonite fairly common.
154 - 162	Sand (1 - 2 mm, angular/subrounded, poorly sorted). Clays as above. Stains very common.
162 - 176	Mid grey and lesser dark grey clay. Stains minor to fairly common.
176 - 184	Sand (1 - 2 mm, angular/subangular quartz). Mid grey, olive green clay. Limonite fairly common.
184 - 194	Sand (1 - 2 mm, angular/subangular, quartz). Clays as above. Limonite fairly common.
194 - 202	Fine sand (0.25 - 1 mm, quartz). Clays as above. Minor carbonate.
202 - 204	Fine sand. Clays as above.
204 - 214	Fine sand. Clays as above with some dark grey and black. Minor carbonate. Minor stains.
214 - 220	Clays as above with increase in black and kharki clay.
220 - 222	Sand (0.5 - 2 mm, angular/subrounded, quartz). Clay as above.
222 - 226	Mid grey, green, light grey, black and kharki clay. Minor carbonate
226 - 230	Sand (0.25 - 1 mm, angular/subrounded, quartz). Clays as above.
230 - 234	Sand and carbonate minor. Clays as above.

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DRILL HOLE LOG 2608(III)-21

HOLE No.	209-41	DATE DRILLED	27.9.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	28.9.76	RANGE	200 cps	RESIST. SCALE	10 Ω/in
PROJECT	Poontana	DATE LOGGED	28.9.76	TIME CONSTANT	2 sec.	SP. SCALE	
LOCATION	Paralana 'A'	DRILLED DEPTH	234m	PAPER SPEED	2 cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	230.7m	LOGGING SPEED	9 m/min	FLUID LEVEL	3m
GEOLOGIST	Taylor	ELEVATION	65.5m	BACK GROUND	10 cps	PROBE No	306
DRILLER	Brown	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	Mortimer			K-FACTOR	1.25×10^{-5}		Mixed Clastics

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



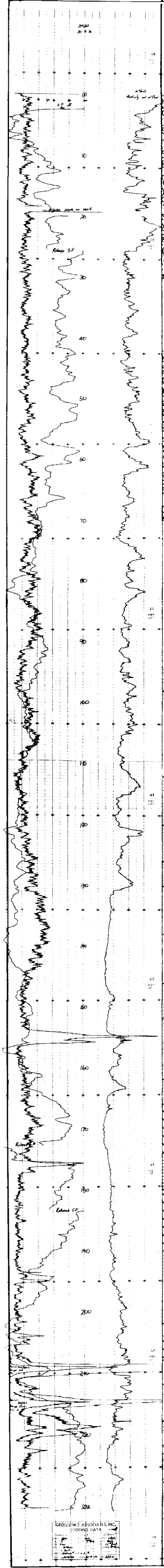
INTERVAL	DESCRIPTION
0-18	Gravel. Coarse sand. Red/buff soft clay.
18-30	Fine gravel. Coarse sand. Red/buff soft clay..
30-34	Sand. Red soft clay.
44-58	Coarse sand. Red silty clay.
58-66	Fine gravel. Sand. Red silty clay.
66-82	Sand. Red silty clay.
82-90	Fine gravel. Sand. Red silty clay.
90-104	Sand. Red silty clay.
104-112	Sand. Red/brown and mpg silty clay.
112-122	Sand. Red/brown and lpg (60/40) silty clay.
122-126	Sand. Red/brown and pale grey silty clay.
126-130	Fine sand. Pale grey and yellow/brown clay.
130-136	Fine sand. Clay as above. Stains.
136-146	Coarse sand. Light and lesser mid grey clay. Stains v. common to abund.
146-154	Dk. grey. black and mid grey clay. Stains common. Minor sand (10% at 148m).
154-156	Sand (0.25 - 1 mm, angular subangular,p.s) Light to mid grey clay.
156-166	Mid grey clay. Minor brick red and white clay. Stains common.
166-168	Fine and normal (1-2 mm, angular subrounded,p.s) sand. Clays as above.
168-172	Black and dk grey clay. Minor fine sand. Stains fairly common.
172-178	Hard black clay. Minor olive green clay. Stains fairly common.
178-194	Mid grey and some light grey clay. Minor yellow/green clay. Limonite very common. Hematite common.
194-196	Very fine and normal (1-2 mm, angular quartz) sand. Clays as above.
196-202	Pale greenish and mid grey clays. Stains common.
202-208	Very fine and normal sand. Clays as above.
208-210	Light green and grey, black and olive green. Stains common.
210-214	Very fine sand. Clays as above.
214-216	Clays as above. Minor fine sand.
216-226	Very fine sand. Light to mid grey and some black and kharki clays. Limonite common. Minor carbonate.
226-234	Mid to dark grey and some black clay. Minor very fine sand. Minor carbonate. Minor limonite.

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DRILL HOLE LOG 2608(III)-22

HOLE No.	209-42	DATE DRILLED	28.9.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	30.9.76	RANGE	200 cps	RESIST. SCALE	10 Ω/in
PROJECT	POONTANA	DATE LOGGED	30.9.76	TIME CONSTANT	2 sec	SP. SCALE	
LOCATION	PARALANA "A"	DRILLED DEPTH	234 m	PAPER SPEED	1 cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	232 m	LOGGING SPEED	9 m/min	FLUID LEVEL	1 m
GEOLOGIST	TAYLOR	ELEVATION	65.5 m	BACK GROUND	10 cps	PROBE No	306
DRILLER	BROWN	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	MORTIMER			K-FACTOR	1.25 x 10^{-5}		

LITHOLOGY: Gravel, Sand, Silt, Clay, Carbonate, Carbonaceous, Mixed Clastics



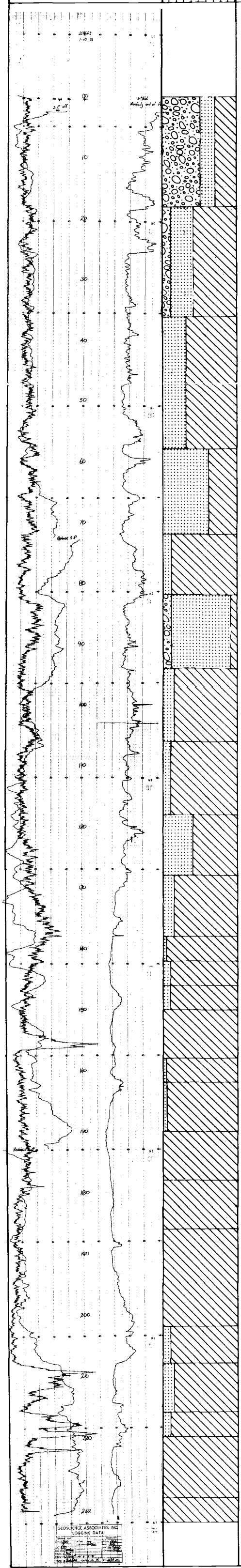
INTERVAL	DESCRIPTION
0 - 24	Gravel. Coarse sand. Red/buff soft clay.
24 - 30	Gravel. Coarse sand. Red soft clay.
30 - 42	Coarse sand. Red and minor grey silty clay.
42 - 70	Fine gravel. Sand. Red soft clay.
70 - 84	Coarse sand. Red soft silty clay.
84 - 94	Coarse sand. Red soft clay.
94 - 98	Coarse sand. Red silty clay.
98 - 112	Coarse sand. Red soft silty clay.
112 - 120	Coarse sand. Red and lpg silty clay.
120 - 126	Sand. Pale grey and red/brown soft silty clay.
126 - 130	Fine sand. Pale grey and brown soft silty clay.
130 - 138	Fine sand. Pale grey and yellow/brown silty clay.
138 - 146	Sand (1 - 2 mm, angular/subrounded, poorly sorted). Light to mid and pale grey. Stains.
146 - 152	Sand as above. Black, mid and dark grey clay. Minor stains.
152 - 162	Sand as above. Dark grey and black clay. Hematite common. Limonite fairly common.
162 - 166	Sand as above. Mid to dark grey clay. Stains common.
166 - 174	Mid to dark grey and increasing black clay. Limonite fairly common. Hematite common.
174 - 180	Sand (0.5 - 1 mm, angular, poorly sorted). Black, grey and light green clay. Limonite common.
180 - 190	Dark grey, black, green and kharki clays.
190 - 202	Sand (1 - 2 mm, angular/subangular, poorly sorted). Pale green, soft clay and mixed clays. Minor stains.
202 - 204	Contaminated sample (Wash out after break down).
204 - 208	Kharki, dark grey and black. Limonite fairly common.
208 - 212	Sand (0.5 - 1 mm, angular/subrounded, poorly sorted). Clays as above.
212 - 218	Sand (0.5 - 2 mm, angular/subrounded, mixed). Black, olive green and kharki clay. Minor stains.
218 - 222	Very fine and normal sand. Clays as above.
222 - 228	Sand (1 - 2 mm, angular/subrounded, mixed). Clays as above with more darker clays.
228 - 234	Sand as above. Mid to dark grey and black clays. Minor carbonate. Minor stains.

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DRILL HOLE LOG 2608(III)-23

HOLE No.	209-43	DATE DRILLED	1.10.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	1.10.76	RANGE	200 cps	RESIST. SCALE	10 Ω /in
PROJECT	POONTANA	DATE LOGGED	1.10.76	TIME CONSTANT	2 sec	SP. SCALE	
LOCATION	PARALANA "A"	DRILLED DEPTH	234 m	PAPER SPEED	1 cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	232 m	LOGGING SPEED	9 m/min	FLUID LEVEL	3 m
GEOLOGIST	TAYLOR	ELEVATION	65.5 m	BACK GROUND	10 cps	PROBE No	306
DRILLER	BROWN	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	MORTIMER			K-FACTOR	1.25×10^{-5}		

LITHOLOGY: Gravel; Sand; Silt; Clay; Carbonate; Mixed Clastics; Carbonaceous



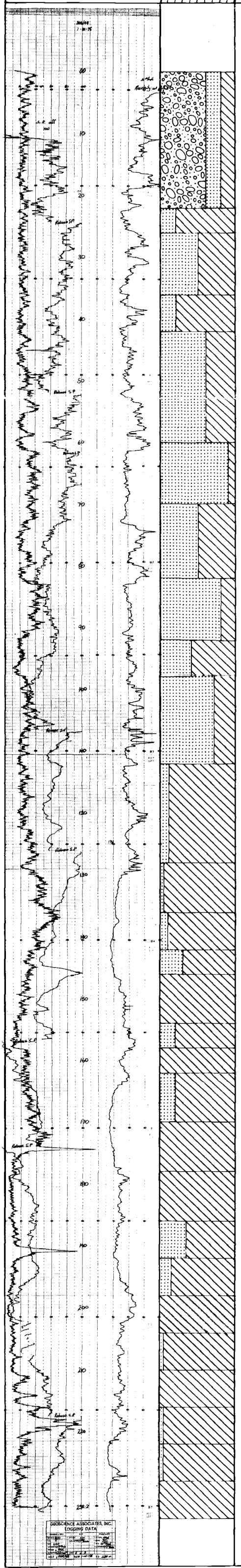
INTERVAL	DESCRIPTION
0 - 18	Gravel. Coarse sand. Red/buff soft clay.
18 - 36	Gravel. Coarse sand. Red soft silty clay.
36 - 58	Sand. Red soft silty clay.
58 - 72	Sand. Red silty clay.
72 - 82	Sand. Red silty clay.
82 - 94	Fine gravel. Coarse sand. Red silty clay.
94 - 106	Sand. Red silty clay.
106 - 118	Coarse sand. Red/brown and mpg silty clay.
118 - 128	Fine sand. Red/brown and lpg (60/40). Soft silty clay.
128 - 138	Coarse sand. Pale grey and yellow/brown and minor red clay. Stains.
138 - 142	Fine sand. Pale, light and minor mid grey clay. Stains very common.
142 - 146	Fine and coarse sand. Light to mid grey clay. Stains very common
146 - 150	Very fine sand. Hard black clay. Minor limonite.
150 - 158	Dark grey and black clay. Hematite common. Minor sand.
158 - 162	Fine sand. Black and dark grey clay.
162 - 170	Sand (0.5 - 2 mm, angular/subrounded, poorly sorted). Black, dark and mid grey clay.
170 - 178	Hard black clay and magenta clay. Minor limonite.
178 - 186	Black, grey and greenish clay. Stains common.to very common.
186 - 202	Pale olive green clay with light and dark grey and black clay. Stains very common.
202 - 208	Sand (0.5 - 1 mm, angular, quartz) and some fine. Mid grey clay. Stains very common.
208 - 216	Sand as above. Mid and dark grey clays. Limonite fairly common. Minor carbonate.
216 - 220	Sand (0.25 - 1 mm, angular/subangular quartz). Clays as above. Limonite common. Minor carbonate.
220 - 230	Clays as above. Minor sand. Minor carbonate. Limonite common
230 - 234	Clays as above but darker. Minor limonite. Carbonate.

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DRILL HOLE LOG 2608(III)-24

HOLE No.	209-44	DATE DRILLED	1.10.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	1.10.76	RANGE	200 cps	RESIST. SCALE	10 Ω/in
PROJECT	Poontana	DATE LOGGED	1.10.76	TIME CONSTANT	2 sec	SP. SCALE	
LOCATION	Paralana 'A'	DRILLED DEPTH	234m	PAPER SPEED	1 cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	232.2m	LOGGING SPEED	9 m/min	FLUID LEVEL	4m
GEOLOGIST	Taylor	ELEVATION	65.5m	BACK GROUND	10 cps	PROBE No	306
DRILLER	Brown	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	Mortimer			K-FACTOR	1.15×10^{-5}		

LITHOLOGY : Gravel, Sand, Silt, Clay, Carbonate, Carbonaceous, Mixed Clastics



INTERVAL	DESCRIPTION
0-22	Gravel. Coarse sand. Red/buff silty clay.
22-26	Coarse sand. Red and pale grey silty clay.
26-36	Coarse sand. Red soft clay.
36-42	Coarse sand. Red soft clay.
42-60	Coarse sand. Red soft clay.
60-70	Coarse sand. Red soft clay.
70-82	Coarse sand. Red silty clay.
82-92	Coarse sand. Red silty clay.
92-98	Fine sand. Red and mpg silty clay.
98-112	Fine sand. Red/brown and lpg (70/30) silty clay.
112-128	Fine sand. Red brown and pale grey silty clay.
128-136	Fine sand. Pale grey and yellow brown clay. Light grey clay in lower half.
136-142	Sand. Mid and light grey clay. Stains.
142-148	Fine sand. (0.25 - 0.5 mm, quartz). Light grey clay. Stains v.com.
148-154	Black and some dark grey clay. Magenta clay. Limonite fairly common.
154-158	Sand (0.25 -1 mm, angular, sub-angular, quartz+). Clays as above.
158-162	Black and dark grey clay. Hematite v. common. Limonite f. common.
162-170	Sand (0.25 - 2 mm, angular subrounded, quartz +). Light to mid grey clay. Stains fairly common.
170-178	Black and dark grey clay. Magenta clay.
178-186	Pale green and greenish mid grey clay. Limonite abund.
186-192	Sand (0.25 - 1mm, angular, sub-angular, quartz +). Greenish grey and bluish green clays. Limonite abund.
192-198	Sand (0.5 - 2mm, angular, sub-angular, quartz +). Mid grey and greenish grey clay. Stains v. common.
198-204	Clays as above. Minor sand.
204-210	Very fine sand. Clays as above.
210-216	Mid grey clay. Minor fine sand (2%). Minor limonite.
216-222	Fine sand. Clays as above (mainly mid grey). Limonite f. common.
222-228	Fine sand. Clays as above. Minor carbonate.
228-234	Black, dark and mid grey and pale green clay. Minor sand and carbonate.

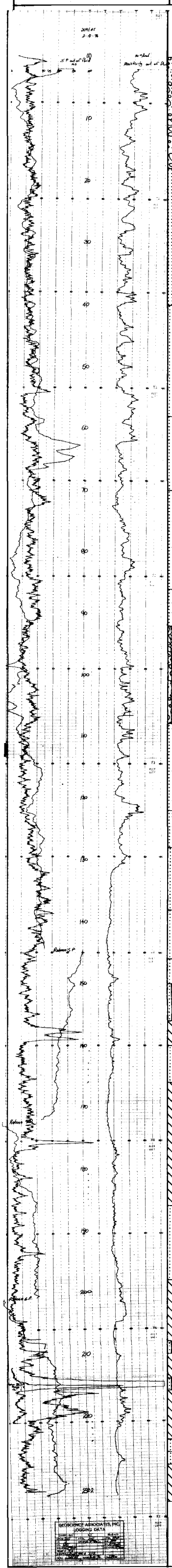
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DRILL HOLE LOG 2608(III)-25

HOLE No.	209-45	DATE DRILLED	2.10.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	2.10.76	RANGE	200 cps	RESIST. SCALE	10 Ω/in
PROJECT	Poontana	DATE LOGGED	2.10.76	TIME CONSTANT	2 sec	SP. SCALE	
LOCATION	Paralana 'A'	DRILLED DEPTH	234m	PAPER SPEED	1 cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	232.2m	LOGGING SPEED	9 m/min	FLUID LEVEL	2 m
GEOLOGIST	Taylor	ELEVATION	65.5m	BACK GROUND	10 cps	PROBE No	30
DRILLER	Brown	CO-ORDS		TIME BASE		STANDARD	(58)
LOGGER	Mortimer			K-FACTOR	1.25×10^{-5}		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous · Mixed Clastics



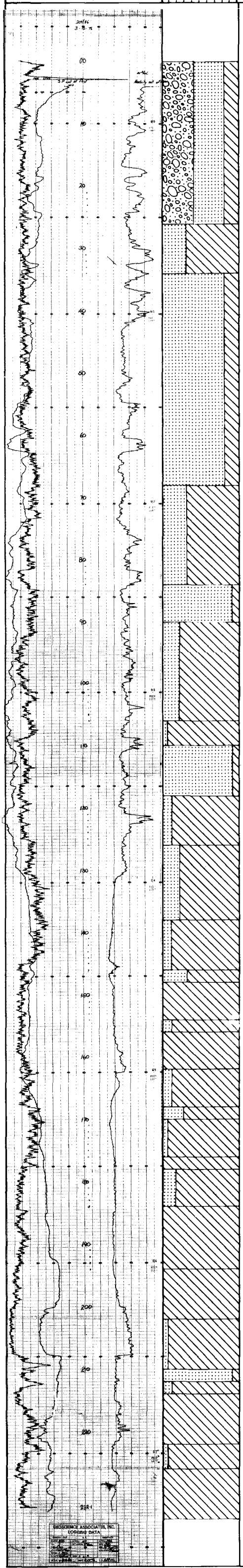
INTERVAL	DESCRIPTION
0–10	Very coarse gravel.
10–18	Gravel. Coarse sand. Red and buff soft clay.
18–40	Sand. Red soft clay .
40–58	Sand. Red silty clay.
58–70	Coarse sand. Red silty clay.
70–86	Coarse sand. Red silty clay.
86–92	Coarse sand. Red silty clay.
92–108	Fine gravel. Sand. Red silty clay.
108–122	Fine sand. Minor red and 1 pg silty clay.
122–128	Fine sand. Red/brown and pale grey (10/40) silty clay.
128–138	Fine sand. Pale grey and red/brown (10/40) silty clay.
138–146	Normal to coarse sand. Light mid and pale grey clay. Stains.
146–150	Sand (0.5 -1mm, angular, sub-angular quartz+). Dk grey and black clay.
150–156	Sand (as above). Mid to dk grey clay. Hematite common.
156–170	Mid to dk grey and black clay. Min. stains.
170–176	Sand (0.25-1mm, angular subrounded quartz+). Clays as above.
176–186	Very dark grey and black clay. Some mid grey clay. Min. limonite. Hematite common.
186–198	Sand (0.25 -1mm, angular, sub-angular, quartz +). Clays as above and minor pale green clay. Limonite fairly common.
198–208	Clays as above but increase in mid grey and light greenish grey. Limonite common.
208–210	Very find sand. Clays as above.
210–214	Clays as above, increase in light grey. Stains very common.
214–216	Very fine sand. Clays as above.
216–224	Mid to dark grey and some light grey clay. Stains fairly common.
224–226	Very fine sand. Mid, dark grey and black clay. Minor stains. Minor carbonate.
226–228	Sands as above. Dark grey and black clay. Carbonate.
228–234	Mid to dark grey clay. Some light grey clay. Limonite fairly common. Carbonate.

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DRILL HOLE LOG 2608(III)-26

HOLE No.	209-46	DATE DRILLED	3.10.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	3.10.76	RANGE	200 cps	RESIST. SCALE	10 Ω/in
PROJECT	Poontana	DATE LOGGED	3.10.76	TIME CONSTANT	2 sec.	SP. SCALE	
LOCATION	Paralana 'A'	DRILLED DEPTH	234m	PAPER SPEED	1 cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	232.1m	LOGGING SPEED	9 m/min	FLUID LEVEL	4m
GEOLOGIST	Taylor	ELEVATION	65m	BACK GROUND	10 cps	PROBE No	30
DRILLER	Brown	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	Mortimer			K-FACTOR	1.25×10^{-5}		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous · Mixed Clastics



INTERVAL	DESCRIPTION
0.2-	Gravel. Coarse sand. Red/buff soft clay.
2-34	Sand. Red soft clay.
34-68	Sand. Red soft clay at top. Red silty clay below 5m.
8-84	Sand. Red silty clay.
84-90	Sand and minor fine sand. Red silty clay.
90-10	Sand. Red silty clay with mpg clay in lowest samples.
10 -110	Sand. Red/brown and mpg silty clay.
110-118	Sand. Red/brown and mpg silty clay.
118-12	Fine sand. Red/brown and lpg (0/40) soft silty clay.
12 -138	Fine to normal sand. Pale grey and yellow/brown soft silty clay. Stains. Some light grey clay in lower samples.
138-14	Coarse sand. Light grey with minor pale and mid grey clay. Stains very common.
14 -148	Sand (0.25 - 1mm, angular, subrounded, quartz+). Mid to dark grey clay.
148-154	Mid to dark grey clay. Minor stains.
154-15	Sand (0.5 - 1mm, angular subrounded, ps). Clays as above.
156-16 2	Mid. dark grey, black, magenta and pale greenish grey clay. Minor limonite.
1 2-1 8	Sand (0.25-1 mm, angular subrounded, quartz+). Light to mid grey clay. Minor stains.
168-170	Sand as above. Clays as above. Stains common.
170-17	Sand (0.25 - 2mm, angular subrounded p.s). Mid to dark grey clay. Minor stains.
17 -178	Dark grey and black clay. Stains fairly common.
178-184	Very fine sand. Clays as above. Limonite very common.
184-194	Light greenish grey clay with clays as above. Limonite abundant.
194-202	Dark, mid grey, black clay. Stains common.
202-210	Sand (0.5-1 mm, angular subrounded, p.s.). Mid to dark grey clay. Limonite very common.
210-212	Sand (0.25 mm, angular, sub-angular, quartz). Clay as above. Lim.f. common.
212-214	As above.
214-222	Mid to dark grey and black clay. Minor limonite. Minor carbonate.
222-22	Sand (1-3 mm, angular subrounded, mix). Mid grey clay. Min. stains.
22 -234	Mid grey and some olive green clay. Limonite common. Minor sand.

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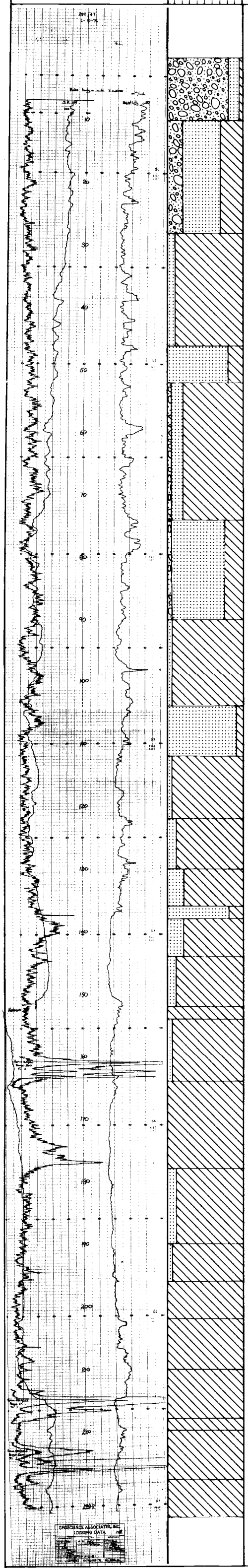
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DRILL HOLE LOG

2608(III)-27

HOLE No.	209-47	DATE DRILLED	3.10.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	6.10.76	RANGE	200 cps	RESIST. SCALE	10 Ω /in
PROJECT	Poontana	DATE LOGGED	6.10.76	TIME CONSTANT	2 sec.	SP. SCALE	
LOCATION	Paralana'A'	DRILLED DEPTH	234m	PAPER SPEED	1 cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	232.2m	LOGGING SPEED	9 m/min	FLUID LEVEL	
GEOLOGIST	Taylor	ELEVATION	65m	BACK GROUND	11	PROBE No	306
DRILLER	Brown	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	Mortimer			K-FACTOR	1.25×10^{-5}		Mixed Clastics

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



INTERVAL	DESCRIPTION
0–10	Coarse gravel. Coarse sand. Red and buff soft clay.
10–28	Fine gravel. Coarse sand. Clay as above.
28–46	Coarse sand. Red silty clay.
46–52	Coarse sand. Red silty clay.
52–74	Fine gravel. Sand. Red silty clay.
74–90	Fine gravel. Sand. Red soft sily clay.
90–104	Sand. Red and minor pale grey silty clay.
104–112	Coarse and normal sand. Red/brown silty clay.
112–122	Red/brown and lpg (70/30) silty clay..
122–130	Red/brown and lpg (60/40) silty clay.
130–136	Coarse sand. Pale grey and yellow/brown soft silty clay.
136–138	Sand (1-2 mm, sub-angular/rounded, quartz+). Clay as above.
138–144	Sand (0.5- 1mm, angular, sub-rounded, quartz+). Light grey and lpg clay. Stains.
144–152	Sand as above. Light to mid grey clay. Stains. Minor black clay in lowest sample.
152–154	Black clay with hematite stain.
154–164	Sand (0.5-2 mm, angular, subrounded, **poorly sorted**). Mid to dark grey and black clay. Minor stains.
164–178	Black and lesser dark grey clay. Magenta clay. Minor sand.
178–190	Sand (0.25-3 mm, angular/subrounded, quartz). Clays as above. Increase in olive green clay. Limonite abundant. Hematite common.
190–196	Sand (1-3 mm, sub-angular/sub-rounded, quartz +). Dark grey and olive green clay. Limonite abundant.
196–202	Olive green, dark grey, black, mid grey clay. Limonite abundant.
202–210	Light to mid grey clay. Limonite common. Minor pink clay.
210–218	Light to mid grey clay. Minor v. fine sand. Minor carbonate.
218–220	Mid to dark grey clay. Limonite common. Minor sand.
220–228	Light to mid grey and green clay. Limonite fairly common. Minor pinkish/grey clay.
228–234	Dark grey and black clay. Limonite common. Minor carbonate.

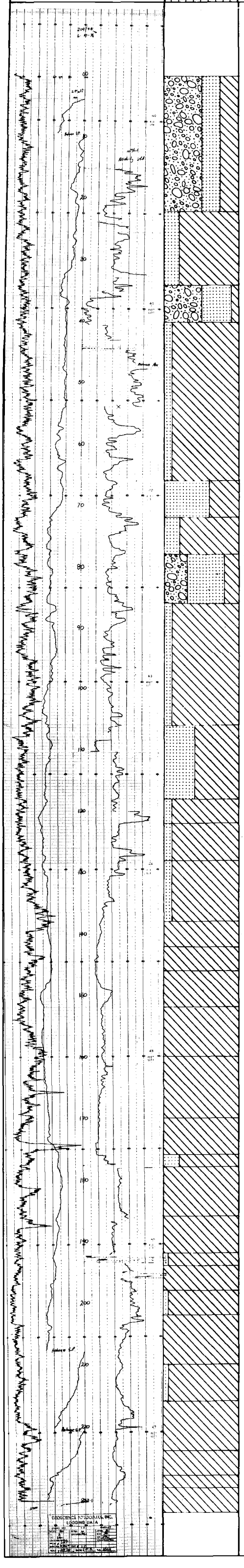
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DRILL HOLE LOG

2608(III)-28

HOLE No.	209-48	DATE DRILLED	6.10.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	.10.76	RANGE	200 cps	RESIST. SCALE	10 Ω /in
PROJECT	Poontana	DATE LOGGED	6.10.76	TIME CONSTANT	2	SP. SCALE	
LOCATION	Paralana 'A'	DRILLED DEPTH	234m	PAPER SPEED	1 cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	232.1m	LOGGING SPEED	9 m/min	FLUID LEVEL	4m
GEOLOGIST	Taylor	ELEVATION	65m	BACK GROUND	-	PROBE No	API
DRILLER	Brown	CO-ORDS		TIME BASE		STANDARD	52 cps
LOGGER	Mortimer			K-FACTOR	1.37 x 10-5		Mixed Clastics

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



INTERVAL	DESCRIPTION
0-22	Gravel. Coarse sand. Red and buff soft clay.
22-34	Red soft clay.
34-40	Fine gravel. Coarse sand. Red soft clay.
40-66	Red silty clay.
66-72	Red silty clay.
72-78	Red silty clay.
78-86	Fine gravel. Coarse sand. Red silty clay.
86-106	Red silty clay.
106-118	Red and minor pale grey silty clay.
118-122	Fine sand. Red/brown and lpg silty clay. (40/40).
122-128	Red/brown and pale grey (40/40) silty clay.
128-138	Pale grey and yellow/brown clay. Stains.
138-142	Light, pale and minor mid grey clay. Stains very common.
142-146	Light and mid grey clay. Stains common to abundant.
146-152	Dark grey and Magenta clay. Limonite common.
152-160	Dark grey and black clay. Minor white specks. Decrease in stains down interval.
160-170	Mid grey clay. Limonite very common. Hematite common.
170-176	Mid grey clay with minor stains.
176-178	Sand (0.25 -1 mm, angular/subrounded, quartz +). Mid grey clay.
178-186	Mid grey clay. Limonite common.
186-192	Dark grey and mid grey clay. Limonite fairly common.
192-194	Sand (2-4mm, angular/subrounded p.s.). Clays as above.
194-198	Dark grey and black clay. Minor sand. Minor stains.
198-202	Sand (1-3 mm, angular/subrounded quartz+). Clays as above. Minor carbonate.
202-210	Mixed clays (Dk Lt). Mid, dark and light grey, black and olive green clay. Minor stains.
210-216	Sand (0.25 -2 mm, angular/subrounded, Quartz+). Dark grey and black frag. clay. Limonite common.
216-224	Dark grey and black clay. Limonite fairly common.
224-228	Clays as above. Limonite common.
228-230	Clay, as above, increase in mid grey. Limonite fairly common.
230-234	Dark grey and black clay. Limonite decreases to minor.

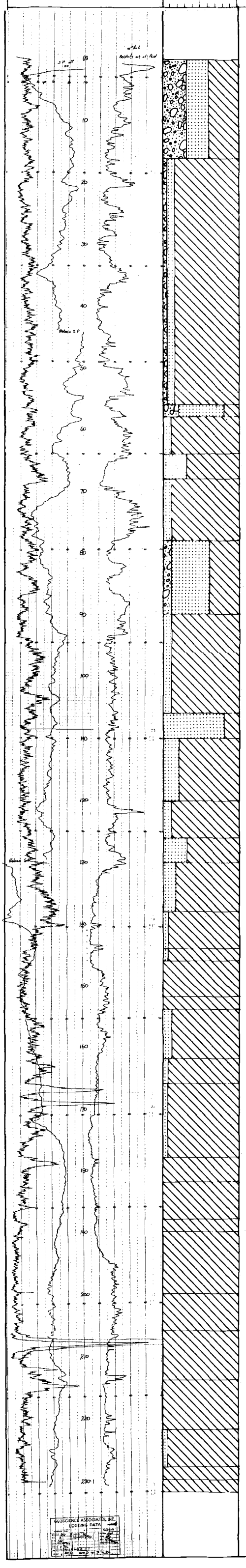
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DRILL HOLE LOG

2608(III)-29

HOLE No.	209-49	DATE DRILLED	8/10/76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No	209	DATE COMPLETED	8/10/76	RANGE	200 cps	RESIST. SCALE	10Ω/in.
PROJECT	POONTANA	DATE LOGGED	8/10/76	TIME CONSTANT	2	SP. SCALE	-
LOCATION	PARALANA "A"	DRILLED DEPTH	232m	PAPER SPEED	1cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	230.1m	LOGGING SPEED	9m/min	FLUID LEVEL	2m
GEOLOGIST	TAYLOR	ELEVATION	64m	BACK GROUND	11 cps	PROBE No	306
DRILLER	BROWN	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	MORTIMER			K-FACTOR	1.25×10^{-5}		Mixed Clastics

LITHOLOGY : Gravel | Sand | Silt | Clay | Carbonate | Carbonaceous



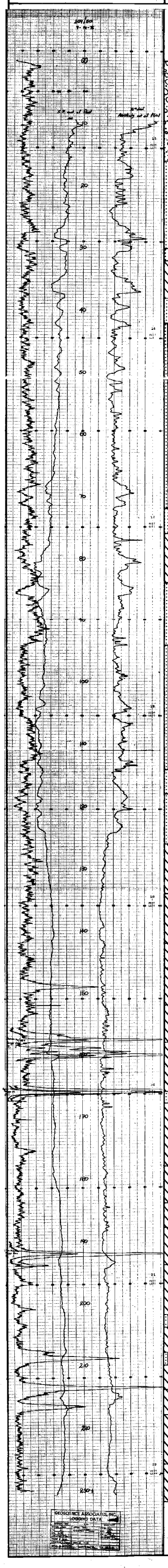
INTERVAL	DESCRIPTION
0 - 16	Gravel. Coarse sand. Red and buff soft clay.
16 - 56	Gravel. Coarse sand. Red soft silty clay.
56 - 58	Gravel. Coarse sand. Red silty clay.
58 - 64	Sand. Red and mid grey silty clay.
64 - 68	Coarse sand. Clays as above.
68 - 78	Coarse sand. Red and minor mid grey silty clay.
78 - 90	Fine gravel. Coarse sand. Red silty clay.
90 - 106	Red and minor pale grey silty clay.
106 - 110	Sand and clay as above.
110 - 120	Sand. Red/brown and lesser pale grey (70/30) clay.
120 - 126	Fine sand. Clay as above.
126 - 130	Fine sand and minor gravel. Pale grey and red (60/40) silty clay.
130 - 138	Fine sand. Pale grey and yellow/brown clay. Stains.
138 - 144	Fine sand. Light to mid grey clay. Stains common.
144 - 146	As above but with MM dk. grey clay.
146 - 152	Mid, dk. grey and black clay. Stains f. com.
152 - 154	Mid to dk. grey clay. Min. stains. White specks.
154 - 162	Sand (0.5 - 2mm, a/sr, qz). Light, mid and dk grey clay. Min. stains
162 - 166	Sand (1-2mm, a/sr, qz+). Mid grey clay. Stains f. com.
166 - 178	Clays as above. Less staining. Minor sand.
178 - 182	Mid bluish grey clay with olive green clay. Lim. f. com.
182 - 188	Mid grey clay. Stains com. Min. dk. clay.
188 - 190	Very dk. grey/black. Lim. V. com.
190 - 200	Mid. to dk grey clay. Min. olive green clay. Lim. f. common.
200 - 206	Mid to dk. grey clay. Stains f. com. Min. carbonate.
206 - 214	Light to mid grey soft clay. Some clays as above. Lim. f. com.
214 - 222	Fragment. mid/dk grey, black and olive green clays. Min. carbonate. Min. stains.
222 - 228	Sand (up to 5%) (1mm, a/sr, qz+). Clays as above. Min. stains and carbonate.
228 - 230	Clays as above. Min. carbonate.
230 - 232	Black and v.dk. grey clay. Min. carb. Min. stain.

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DRILL HOLE LOG 2608(III)-30

HOLE No.	209-50	DATE DRILLED	9.10.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	9.10.76	RANGE	200 cps	RESIST. SCALE	10 Ω /in
PROJECT	Poontana	DATE LOGGED	9.10.76	TIME CONSTANT	2 sec.	SP. SCALE	
LOCATION	Paralana 'B'	DRILLED DEPTH	232m	PAPER SPEED	1 cm/m	BIAS	200/100
STATE	S.A.	LOGGED DEPTH		LOGGING SPEED	9 m/min	FLUID LEVEL	9m
GEOLOGIST	Taylor	ELEVATION		BACK GROUND	9 cps	PROBE No	306
DRILLER	Brown	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	Mortimer			K-FACTOR	1.25×10^{-5}		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous · Mixed Clastics



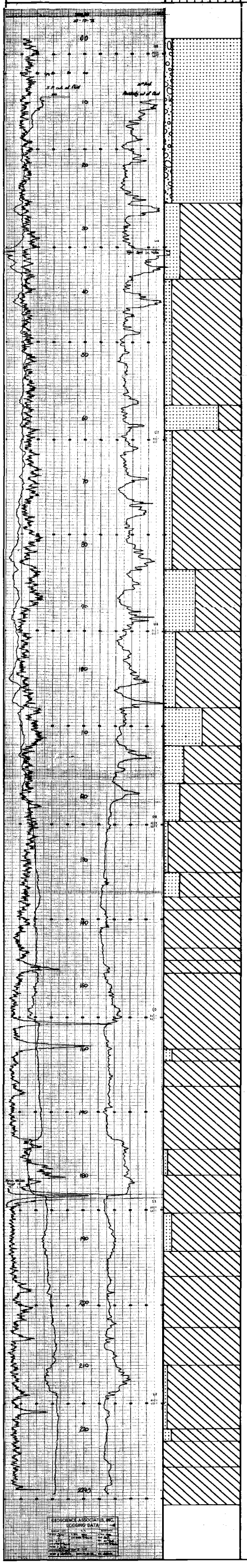
INTERVAL	DESCRIPTION
0–16	Gravel. Coarse sand. Red and light grey soft clay.
16–30	Sand. Red soft cilty clay.
30–32	Coarse sand.
32–38	Red and mpg and yellow/brown soft silty clay.
38–42	Coarse sand. Red soft silty clay.
42–72	Coarse sand. Red silty clay.
72–76	Coarse sand. Red silty clay.
76–84	Red/brown and very mpg silty clay.
84–94	Normal to coarse sand. Red/brown silty clay.
94–114	Coarse sand. Red/brown and mpg silty clay.
114–118	Coarse sand. Red/brown and lpg (60/40) silty clay.
118–126	Sand (1-2 mm, angular/subrounded p.s.). Pale grey and yellow/brown soft clay.
126–134	Pale grey and light grey soft clay.. Stains.
134–142	Light grey and some light to mid grey clay. Stains very common. Minor sand.
142–146	Mid to dark grey and lesser black clay. Minor limonite.
146–152	Dark grey and black clay. Hematite fairly common. Minor limonite Gypsum crystals.
152–158	Mid dark grey and black clay. Stains fairly common. Gypsum.
158–166	Mid to dark grey and black clay. Stains fairly common.
166–168	Sand (1-2 mm, angular, quartz +). Clays as above.
168–178	Clays as above. Stains common to very common.
178–184	Mid and dark grey clay. Limonite very common.
184–188	Dark grey and black clay. Limonite fairly common.
188–194	Dark mid grey and black clay. Limonite fairly common.
194–202	Mid to dark grey clay. Minor pale green clay. Stains f. common.
202–204	Sand (0.25 - 2mm, angular/subrounded,mix).Mixed frag.clay. Minor stains.
204–208	Light, mid and dark grey clay. Minor stains.
208–210	Sand as above. Clays as above. Limonite fairly common.
210–214	Mid to dark grey clay. Limonite common. Minor sand.
214–218	Dark grey clay. Minor stains.
218–226	Mid to dark grey clay. Minor stains.
226–232	Black and dark grey clay. Minor stains.

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DRILL HOLE LOG 2608(III)-31

HOLE No.	209-51	DATE DRILLED	10.10.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	10.10.76	RANGE	200 cps	RESIST. SCALE	10 Ω/in
PROJECT	Poontana	DATE LOGGED	10.10.76	TIME CONSTANT	2 sec.	SP. SCALE	
LOCATION	Paralana'B'	DRILLED DEPTH	232m	PAPER SPEED	1 cm/m	BIAS	200/100
STATE	S.A.	LOGGED DEPTH	229.5m	LOGGING SPEED	9 m/min	FLUID LEVEL	9m
GEOLOGIST	Taylor	ELEVATION	77m	BACK GROUND	13 cps	PROBE No	306
DRILLER	Brown	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	Mortimer			K-FACTOR	1.25 x 10^{-5}		Mixed Clastics

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



INTERVAL	DESCRIPTION
0-26	Gravel. Sand. Minor clay.
26-38	Fine sand. Red and light grey soft silty clay.
38-58	Coarse sand. Red silty clay.
58-62	Sand. Red silty clay.
62-84	Sand. Red silty clay.
84-94	Sand. Red silty clay.
94-106	Sand. Red silty clay.
106-112	Fine sand. Red and mpg silty clay.
112-118	Fine sand. Red and lpg (70/30) soft silty clay.
118-124	Fine sand. Pale grey and yellow/brown soft clay. Stains.
124-132	Sand. Light, pale grey clay. stains. Minor mid grey in lowest sample.
132-136	Fine sand. Light to mid grey clay. Stains common.
136-138	Clays as above.
138-144	Light greenish grey clay. Stains fairly common.
144-146	Light mid and dark grey clay. Minor Limonite.
146-148	Dark grey and black clay.. Minor stains.
148-160	Mid grey, with minor black, clay. Minor stains.
160-162	Sand (0.25 - 1 mm, angular/subrounded ps). Clays as above.
162-166	Mid to dark grey and black fragmented clays. Minor stains.
166-176	Mid grey clay. Limonite fairly common. Hematite fairly common.
176-180	Sand (0.25 - 1mm, angular/subrounded, p.s). Mid grey clay. Stains fairly common.
180-186	Light to mid grey clay. Limonite common.
186-192	Sand (0.25 - 0.5, angular, quartz+). Mid grey clay. Limonite fairly common.
192-196	Light to mid grey clay. Limonite fairly common. Minor sand (0.25 mm. quarts).
196-204	Mid grey with some dark grey, clay. Hematite common. Limonite fairly common to common.
204-210	Mid to dark grey clay. Hematite common. Limonite fairly common.
210-220	Very fine sand. Clays as above. Stains fairly common.
220-222	Very fine sand. Clays as above.
222-226	Clays as above. Minor sand. Stains fairly common.
226-232	Mid grey, black and dark grey clay. Limonite fairly common. Minor sand.

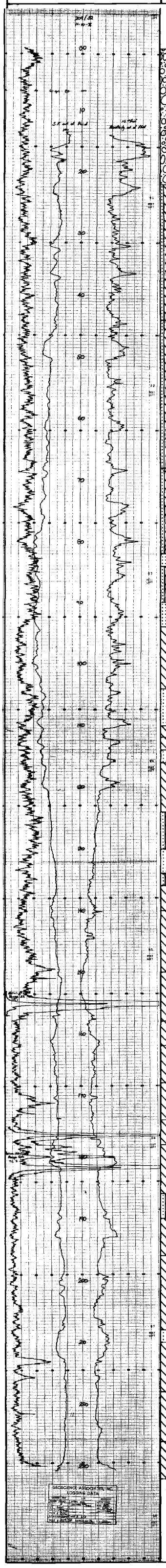
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DRILL HOLE LOG

2608(III)-32

HOLE No.	209-52	DATE DRILLED	10.9.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	11.9.76	RANGE	200 cps	RESIST. SCALE	10Ω/in
PROJECT	Poontana	DATE LOGGED	11.9.76	TIME CONSTANT	2 sec.	SP. SCALE	-
LOCATION	Paralana 'B'	DRILLED DEPTH	232m	PAPER SPEED	1 cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	230m	LOGGING SPEED	9/m/min	FLUID LEVEL	14m
GEOLOGIST	Taylor	ELEVATION	77m	BACK GROUND		PROBE No	306
DRILLER	Brown	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	Mortimer			K-FACTOR			

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous · Mixed Clastics



INTERVAL	DESCRIPTION
0-22	Gravel. Coarse sand. Red and mpg clay.
22-44	Sand. Red and lpg slight silty clay.
44-68	Coarse sand. Red silty clay.
68-82	Coarse sand. Red/brown + lpg silty clay (90/10)
82-84	Coarse sand. Red silty clay.
84-90	Coarse sand. Red/brown and mpg silty clay .
90-94	Fine sand. Red softy silty clay.
94-104	Red silty clay, min. white clay. Minor sand.
104-110	Coarse sand. Red/brown and mpg silty clay.
110-112	Red/brown, dark grey and black silty clay.
112-114	Clays as above. Carbonate.
114-116	Sand. Red and lpg softy silty clay.
116-124	Pale grey and lesser red silty clay.
124-130	Sand. Pale grey and light grey silty clay. Stains abund.
130-134	Sand. Clays as above.
134-136	Sand. Mid grey clay. Limonite very common.
136-140	Mid grey clay. Limonite very common. Hematite common.
140-150	Dark mid grey and black clay. Gypsum. Minor stains.
150-158	Very dark grey and black clay. Gypsum.
158-162	Mid to dark grey clay. Stains fairly common.
162-168	Mid grey clay. Stains common.
168-174	Clays as above. Minor hematite. Limonite fairly common.
174-178	Clays as above. Limonite very common. Fragmented.
178-186	Clays as above. Minor brick red clay. Limonite common.
186-190	Sand (0.25mm, angular quartz). Mid to dark grey clay. Limonite fairly common.
190-196	Mid grey clay. Limonite fairly common.
196-208	Light to mid grey clay. Minor kharki clay. Limonite fairly common.
208-210	Very fine sand. Clays as above. Limonite fairly common.
210-218	Mid to dark grey and kharki clay. Stains fairly common.
218-226	Dark grey, black and mid grey clay. Stains fairly common.
226-232	Dark grey clay. Limonite fairly comm n to minor.

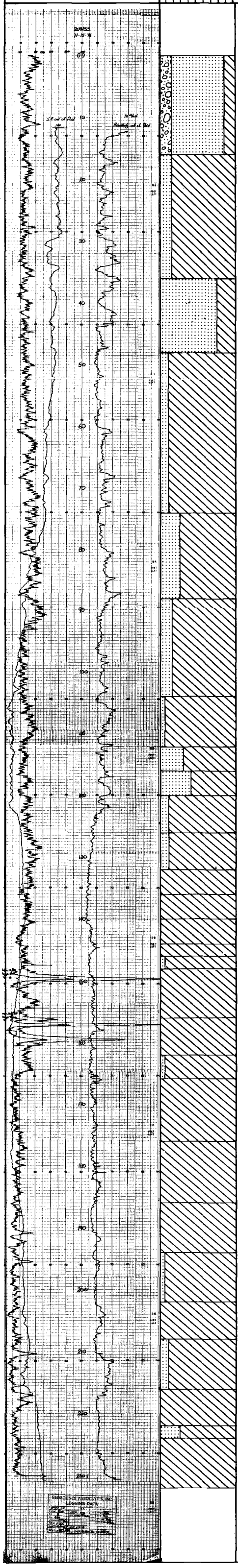
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DRILL HOLE LOG

2608(III)-33

HOLE No.	209-53	DATE DRILLED	11.10.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	11.10.76	RANGE	200 cps	RESIST. SCALE	10Ω/in
PROJECT	Poontana	DATE LOGGED	11.10.76	TIME CONSTANT	2 sec	SP. SCALE	
LOCATION	Paralana 'B'	DRILLED DEPTH	232m	PAPER SPEED	1 cm/m	BIAS	200/100
STATE	S.A.	LOGGED DEPTH	130.1m	LOGGING SPEED	9 m/min	FLUID LEVEL	12m
GEOLOGIST	Taylor	ELEVATION	77m	BACK GROUND	15	PROBE No	306
DRILLER	Brown	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	Mortimer			K-FACTOR	1.25×10^{-5}		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous · Mixed Clastics



INTERVAL	DESCRIPTION
0-16	Gravel. Coarse sand. Red/light grey soft clay.
16-36	Sand. Red soft clay.
36-48	Coarse sand. Red soft clay.
48-74	Coarse sand. Red silty clay.
74-88	Sand. Red silty clay.
88-104	Coarse sand. Red and mpg silty clay.
104-112	Sand. Red/brown and mpg silty clay.
112-116	Coarse sand. Red/brown and lpg (70/30) silty clay.
116-120	Sand. Red/brown and lpg (60/40) silty clay.
120-126	Sand. Pale grey, yellow/brown stained clay.
126-132	Sand. Pale grey, light grey and yellow/brown stained clay.
132-136	Clays, as above, with mid grey clay.
136-140	Mid to dark grey unstained clay.
140-144	Hard black clay.
144-146	Black and mid grey clay.
146-148	Sand (1-2 mm, angulard, quartz). Clays as above.
148-156	Very dark grey clay. Stains.
156-162	Mid grey clay. Minor stains.
162-166	Sand (1mm, angular, quartz). Fragmented clays as above.
166-176	Mid to dark grey clay. Stains minor to fairly common. Minor sand.
176-186	Dark grey to black clay. Minor gypsum. Minor stains.
186-194	Dark grey clay. Limonite fairly common to common. Gypsum.
194-202	Sand (0.25 - 1mm, angular, quartz). Clays as above. Minor limonite.
202-208	Mid to dark grey and lesser black clay. Minor stains.
208-216	Very fine sand. Light to mid grey and mixed clay. Stains fairly common.
216-222	Mid grey, light grey clay. Stains fairly common. Minor carbonate. Minor fine sand. (5% at 222m).
222-224	Sand (0.25 - 0.5mm, angular, quartz). Clays as above.
224-232	Dark grey and black clay. Minor stains. Minor sand. Carbonate.

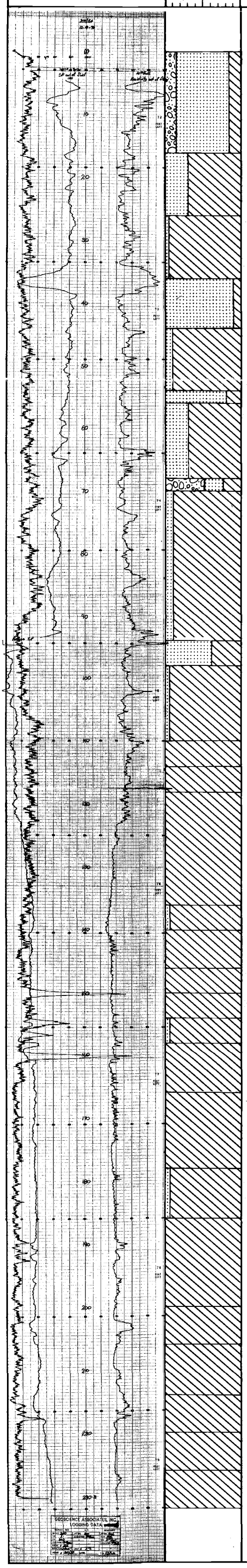
MINERALS AUST. PTY LTD

DRILL HOLE LOG

2608 (III)-34

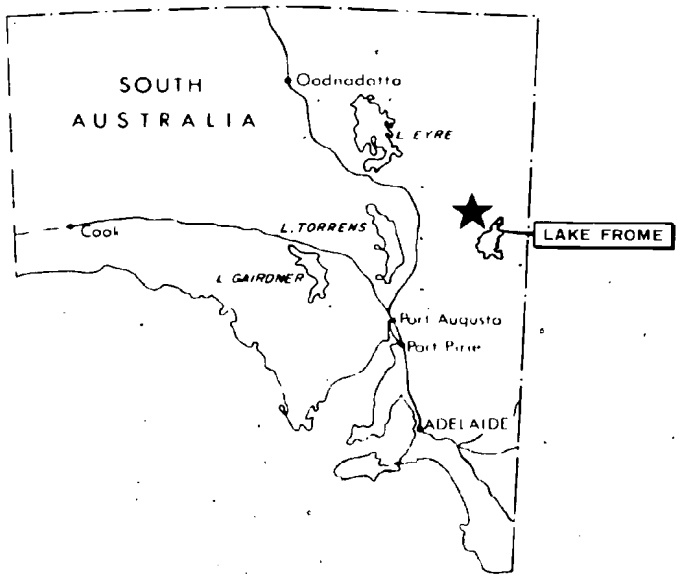
HOLE No.	209-54	DATE DRILLED	12.10.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	12.10.76	RANGE	200 cps	RESIST. SCALE	10 Ω /in
PROJECT	Poontana	DATE LOGGED	12.10.76	TIME CONSTANT	2 sec	SP. SCALE	
LOCATION	Paralana 'B'	DRILLED DEPTH	232m	PAPER SPEED	1 cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	230.3m	LOGGING SPEED	9 m/min	FLUID LEVEL	4m
GEOLOGIST	Taylor	ELEVATION	77m	BACK GROUND		PROBE No	306
DRILLER	Brown	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	Mortimer			K-FACTOR	1.25×10^{-5}		Mixed Clastics

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



INTERVAL	DESCRIPTION
0-16	Gravel. Coarse sand. Red soft clay.
16-26	Sand. Red soft clay.
26-36	Sand. Red soft silty clay.
36-44	Coarse sand. Red soft clay.
44-54	Coarse sand. Red silty clay.
54-56	Very coarse sand. Red silty clay.
56-68	Sand. Red silty clay.
68-70	Fine gravel. Coarse sand. Red silty clay.
70-94	Sand. Red silty clay.
96-98	Very coarse sand, (40%), normal sand (20%). Red soft clay.
98-110	Sand. Red silty clay.
110-114	Red/brown and mpg silty clay.
114-118	Red/brown and lpg silty clay.
118-136	Pale grey and yellow/brown and minor red clay. Limonite very common from 128m.
136-140	Sand. Pale grey and mid grey clay. Hematite abund. Limonite common.
140-146	Mid to dark grey clay. Minor stains.
146-150	Black clay. Gypsum. Minor stains.
150-154	Mid and light grey clay. Limonite common.
154-158	Sand (1-2mm, angular, quartz). Clays as above.
158-166	Mid grey and mid greenish grey clay. Minor stains.
166-178	Mid to dark grey and black clay. Stains fairly common. Minor carbonate. Minor gypsum.
178-186	Sand (1mm, angular, quartz) or very fine. Clays as above. Limonite common.
186-200	Light to mid grey clay. Minor stains. Minor sand.
200-206	Clays as above. Limonite fairly common.
206-214	Light, mid and dark grey clay. Limonite fairly common. Minor sand.
214-220	Black clay. Minor stains.
220-226	Mid to dark grey. Minor greenish grey and black clay. Minor stain. Minor carbonate.
226-232	Dark and mid grey clay. Minor stains. Minor carbonate. Minor fine sand.

038



LOCATION MAP

1976

CORING PROGRAMME

(EL 209)

LAKE FROME EMBAYMENT
SOUTH AUSTRALIA

RECEIVED
28 JAN 1977
DEPT. OF MINES
SECURITY
2608-III

099

1976 CORING PROGRAMME (EL 209), LAKE FROME EMBAYMENT, SOUTH AUSTRALIA.

KEYWORDS

CORING

DISEQUILIBRIUM

DRILLING

EXPLORATION

FROME

PARALANA

RADIOMETRIC

SOUTH AUSTRALIA

URANIUM

BP MINERALS AUSTRALIA PROPRIETARY LIMITED

CORING PROGRAMME

EL 209

LAKE FROME EMBAYMENT,

SOUTH AUSTRALIA.

Derek M. TAYLOR

Melbourne - Victoria

December, 1976

S U M M A R Y

Exploration Licence 209 covers an area of 805 square kilometres to the northwest of Lake Frome and to the south and east of the Beverley uranium deposits. Two drilling programmes, undertaken in the period May/June and September/October 1976, intersected ore grade mineralisation at depths between 205 and 225 m in the southern portion of the licence. One hole, drilled during the second programme in the Paralana "A" area was cored from 200 to 219.5 m. The drilling cost for this hole exceeded $ 5,500.

Thirty-six samples taken from the core were analysed using both XRF and radiometric methods. The data indicate that the uranium is not in secular equilibrium with its daughter products with radiometric grades, on average, slightly higher than those determined by XRF techniques. The highest grade material, as determined by XRF, contains 6.9 kg U_3O_8/ tonne.

Difficulties are encountered in calculating average ore grades and thicknesses as a result of the poor core recovery (48%), especially from the upper part of the mineralized horizon. Radiometric grades, calculated from the downhole gamma log, indicated that 5.3 metres of the cored interval contain 2.7 kg eU_3O_8/tonne compared with the 1.84 kg U_3O_8/tonne for a similar interval calculated from the XRF data.

A preliminary mineragraphic study of five samples from the core suggests that the uranium impregnates the carbonaceous matter, porous leucoxenes and the cement in some of the common pyrite - framboid aggregates.

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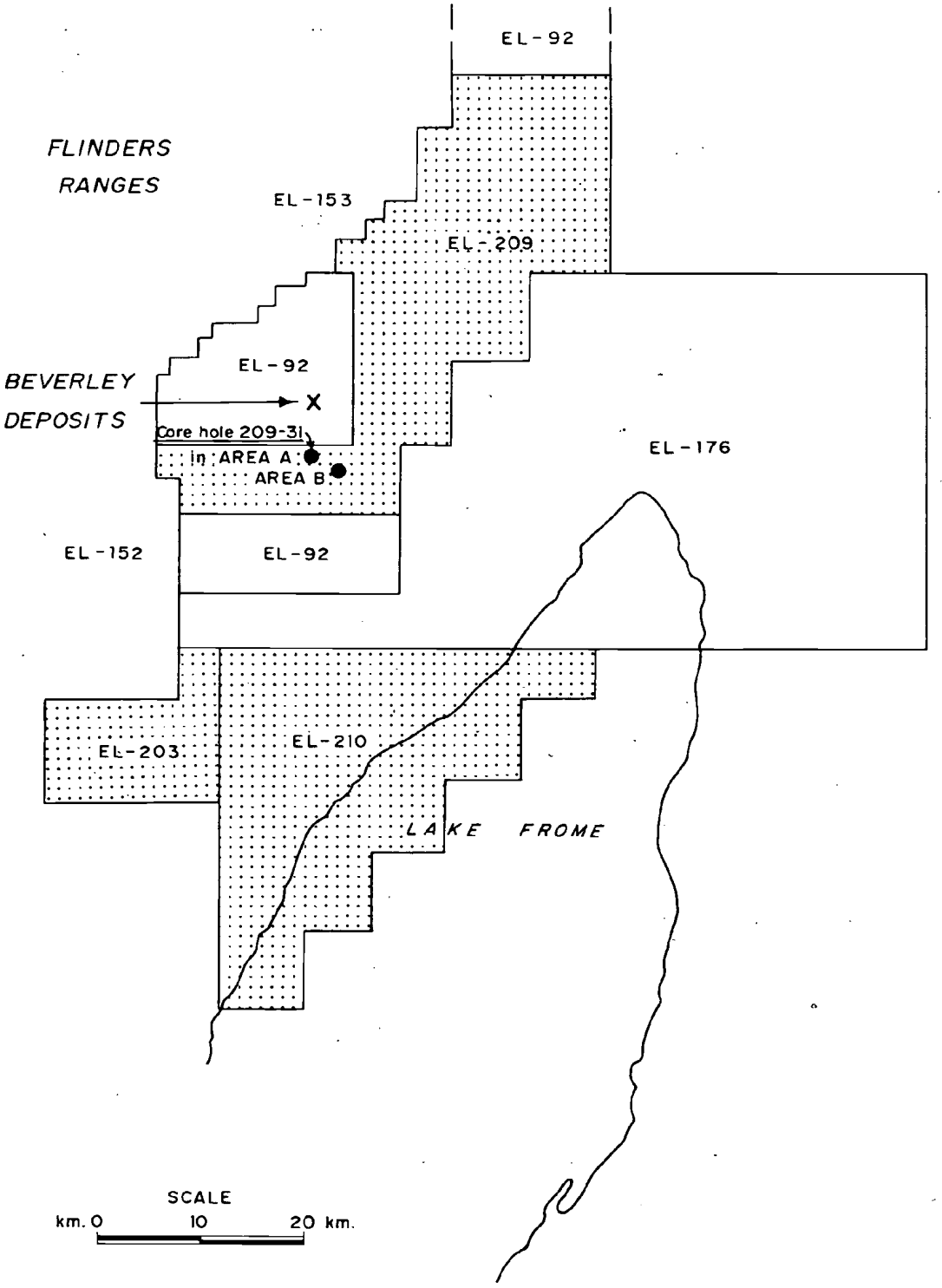
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EXPLORATION LEASES ON NORTH WEST SIDE OF LAKE FROME EMBAYMENT.

(AS AT DEC. 1976)

25% BP INTEREST.

FIGURE 1

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref:	
DECEMBER 1976	MIN. BRANCH

1. INTRODUCTION

Exploration Licence 209 covers an area of 805 square kilometres to the northwest of Lake Frome and to the south and east of the Beverley deposits (see Figure 1).

A drilling programme, undertaken during May/June 1976, intersected ore grade mineralisation in the southern portion of EL 209 at a depth of 210 m to 215 m (Taylor, 1976 (a)). A further drilling programme was undertaken during September/October 1976 to further delineate the area of mineralisation (Taylor, 1976 (b)).

A core hole was drilled during the second of these two programmes in an attempt to indicate the nature of the mineralisation and to confirm the calculated radiometric grades. This report describes the drilling of the core hole, the drilling cost for this hole and the results obtained.

2. LOCATION

The very rapid change in radiometric grades encountered in adjacent holes drilled 50 m apart (see, for example, holes 209-8 and 209-23 described in Taylor (1976 (b)) placed severe restrictions on the choice of the location for the drilling of the core hole. It was decided to drill the hole between two adjacent holes showing consistently high radiometric grade mineralisation as opposed to drilling at an offset of 50 m from one such hole.

The core hole was, therefore, located halfway between hole number 209-8 and hole number 209-24 (see Figure 2). A stratigraphic section for the three holes is enclosed (Figure 3).

3. TECHNICAL DETAIL

(a) Equipment

The equipment used in the drilling of the core hole was Thompson Drilling Company's Mayhew 1000 drilling rig and their Longyear triple tube HQ wire line unit. Normally, using this unit, there is no necessity for pulling out of the holes as the inner tubes are pulled out through the drill pipe. In this instance, however, only 150 m of HQ drill pipe were available and 50 m or

more of normal drill pipe were required to reach core depth. This meant that the drill pipe had to be pulled back at least 50 m before the inner barrels could be recovered.

(b) Method

Initially an eight inch diameter hole was drilled to 15 m and 6" casing run to prevent the near surface gravels from falling into the hole. The hole was then drilled, using 5-1/8" regular bits, to 200 m. The normal drill pipe was then pulled out and the core barrel and the HQ pipe together with 50 m of normal drill pipe were run.

Coring then commenced and after an interval determined by the driller had been completed the core barrel was recovered by pulling out the normal drill pipe and using the wireline recovery method. The core was blown out of the innermost tube using compressed air.

After coring was completed, at 219.5 m, the hole was logged for gamma, spontaneous potential and resistivity. The poor electric log resulted from the shorting of the probe cable onto the 6" casing, the majority of which could not be removed from the top of the hole.

The hole was backfilled to surface.

A time-table of events is given in Table 1.

(c) Recovery

Seventeen core runs were made over the 19.5 metre interval. A total of 9.53 metres of core was recovered for a recovery rate of 48.8%. Details of interval lengths and individual recovery rates are given in Table 2.

The poor recovery could be caused by a variety of factors including the poorly consolidated nature of the clastics, incorrect setting of the tungsten carbide chips on the drill bit, incorrect mud pressures and by the need to pull back the 50 m or so of normal pipe before recovery of the inner barrels. The best recovery was of those parts of the interval containing clay, especially where the clay was intersected at the end of a core run when it effectively plugged the end of the core barrel.

Core recoveries in excess of 100 per cent have been attributed to a variety of reasons including swelling clays (Gatehouse, 1973).

TABLE 1

TIMETABLE OF EVENTS

START	FINISH	WORK DESCRIPTION	TIME (HOURS)
11.45 am (15/9/76)	8.45 pm (15/9/76)	Set up. Drill and run 6" casing to 15 m	9.00
8.45 pm (15/9/76)	6.30 am (16/9/76)	Drilling hole to 200 m	9.75
7.30 am (16/9/76)	12.00(noon)(16/9/76)	Pull out and run 150 m of H.Q. pipe	4.50
12.00(noon)(16/9/76)	4.00 pm (16/9/76)	Circulate and run 50 m of drill pipe	4.00
4.00 pm (16/9/76)	6.30 pm (16/9/76)	Three coring runs (4.75 m)	2.50
7.30 pm (16/9/76)	7.00 am (17/9/76)	Six coring runs (6.25 m)	11.50
7.30 am (17/9/76)	7.00 pm (17/9/76)	Six coring runs (5.5 m)	11.50
8.00 am (18/9/76)	10.00 am (18/9/76)	One coring run (3 m)	2.00
10.00 am (18/9/76)	5.30 pm (18/9/76)	Pulling, clearing and packing pipe	7.50

T A B L E 2

DETAILS OF CORE RECOVERY

Run Number	From (metres)	To (metres)	Run Length (m)	Core Recovered (m)	%
1	200.0	200.5	0.5	0.5	100
2	200.5	202.5	2.0	1.27	63.5
3	202.5	204.75	2.25	0.36	16
4	204.75	205.5	0.75	0.72	96
5	205.5	206.5	1.00	0.77	77
6	206.5	207.75	1.25	0.90	72
7	207.75	208.25	0.50	0.55	110
8	208.25	210.0	1.75	0.25	14.3
9	210.0	211.0	1.00	0.36	36
10	211.0	211.5	0.50	0	0
11	211.5	212.08	0.58	0	0
12	212.08	213.0	0.92	Trace*	<1
13	213.0	214.0	1.00	0.47	47
14	214.0	216.0	2.00	1.22	61
15	216.0	216.5	0.50	0.70	140
16	216.5	219.5	3.00	3.15	105

* Two small plastic vials (each 20 ml) were filled with sediment scraped from the inside of the core barrel.

(d) Core Transport

The core was placed, immediately after recovery, in plastic core trays and allowed to dry. Those parts of the core that had broken during recovery were briefly described and placed in numbered polythene bags or, if small, in numbered plastic vials. The remainder of the core was measured, briefly described and then wrapped in polycarbide film ("Gladwrap") and repacked in the core boxes for surface transport to Melbourne.

(e) Personnel

Geologist	:	Dr D.M. Taylor
Prospecting Hand	:	R.D. Milner
Drilling Contractor	:	Thompson Drilling Co. P/L
Drillers	:	C.S. Stratford
		R. Thompson
Assistants	:	T. Auld
		C. Brooks
		R. Brown
		K. MacDonald
Logging Contractor	:	Geoscience Associates (Aust) P/L
Operator	:	J. Mortimer

4. DRILLING COSTS

The drilling of the core hole was charged at an hourly rate plus charges for muds, bits and casing.

Details of charges are shown in Table 3.

TABLE 3

Drilling Costs For Hole 209.31

Description	Cost
62.25 hours at $85 per hour	5,291.25
33-1/3% of 7-3/8" rock bit	93.83
2 sets of 5-1/8" regular bits	90.70
Volclay (4 x 100 lb)	74.00
Supergel (1 bag)	9.50
Hydropol (10 lb)	13.70
TOTAL	$ 5,562.98

Only the actual drilling cost is shown and excludes logging and project overheads.

5. RESULTS

(a) Description of core interval

The core was transported to Melbourne where it was split or broken up and described. The gamma activity of each interval was determined using a Nutmaq-Harwell Gamma Ratemeter (Type 95/0593-1/6). The colour of the sediments was described using Munsell Soil Colour Charts.

Details of the core lithology and office-determined gamma activity are contained in Figure 4. Where available the gamma activity was determined on solid core samples. When this was not the case it is indicated in the figure. Background gamma activity ranged from 65 to 70 counts per second.

(b) Downhole Log

A digital printout of gamma values was obtained over the core interval at 0.1 m spacing. These values, each of which were accumulated over a period of 2 seconds, are given in Figure 4. Radiometric ore grades calculated using these values are as follows:-

Interval	eU_3O_8 kg/tonne
211.7 m to 212.4 m	1.95
212.5 m to 213.1 m	1.84
214.2 m to 214.9 m	4.31
215.0 m to 215.9 m	5.75

The drill log (Figure 5 (a)) and a copy of the original downhole electric and gamma logs for the cored interval (Figure 5b) are enclosed.

(c) Comparison between Surface and Downhole Logs

There are marked differences between both the surface and downhole lithological and radiometric logs. It is difficult to resolve these differences as a result of the poor core recovery, especially over parts of the ore horizons.

The anomalous gamma activity occurs within the interval 211.1 m to 218.3m in the downhole log with a maximum value at 215.5 m with additional peaks at 212.3 m, 212.8 and 214.6 m. In the core samples the anomalous activity occurs within the interval 210.0 m to 216.5 m

or 217.0 m with maxima at 210.6 m, 213.5 m and 214.3m and smaller "peaks" at 210.8 m, 213.2 m, 213.8 m and 214.9 m with a probable high (gamma on small vial only) around 212.5 m.

The downhole electric logs (mainly resistivity) indicate sand from around 200.7 m to 215.2 m (with some thin clay horizons), clay from 216 m to 218.2 m (with sand or silt and clay from 215.2 m to 216 m) and silt from 218.2 m to 219.1 m. The core shows that the sand interval is from 201.15 m to 213.0 m with sand/clay from 213 m - 214 m, clay from 214.0 - 217.4 m and silt from 217.4 m to 218.25 m.

It would appear that, for the lower half of the core interval, that the depths for the core samples are approximately 1.2 m shallower than the corresponding section from the down hole logs. This is most obvious by comparing the maximum gamma from the downhole log (at 215.5 m at the sand/clay boundary) and the maximum gamma from the surface log (at 214.3 m just below the sand/clay boundary) with the next major peak between 0.8 and 0.9 m shallower in both cases.

(d) Mineragraphic Studies

Five core samples were sent to Central Mineralogical Services Pty Ltd for mineragraphic studies. These samples were :-

1. Sand from 212 m to 213 m.
2. Carbonaceous matter from 213.10 m - 213.35 m.
3. Sand from 213.10 m to 213.75 m.
4. Sand from 213.10 m to 213.75 m.
5. Clay from 214.38 m to 214.58 m.

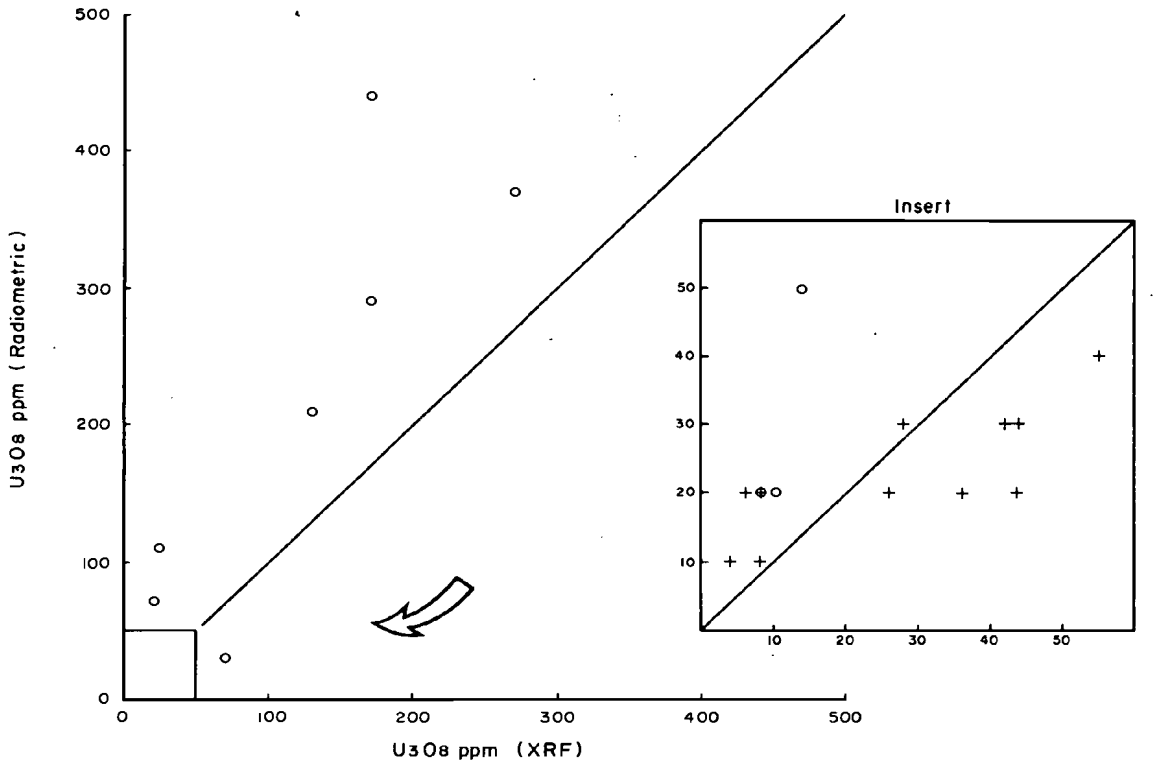
Details of the procedures and results from these studies are contained in the copy of the report, by H.W. Fander, in Appendix A. Copies of the photomicrograph referred to in the report are held on file.

Further work, including electron proble microanalysis, is planned.

(e) Analytical Data

Thirty-six samples were selected from the core and sent to Amdel for analysis. Details of the intervals covered by these samples are shown in Figure 4 (PAC samples). The samples were analysed for uranium by both XRF spectrometry and by a radiometric method. The results are given in Figure 4 and Table 4.

COMPARISON BETWEEN XRF AND RADIOMETRIC VALUES



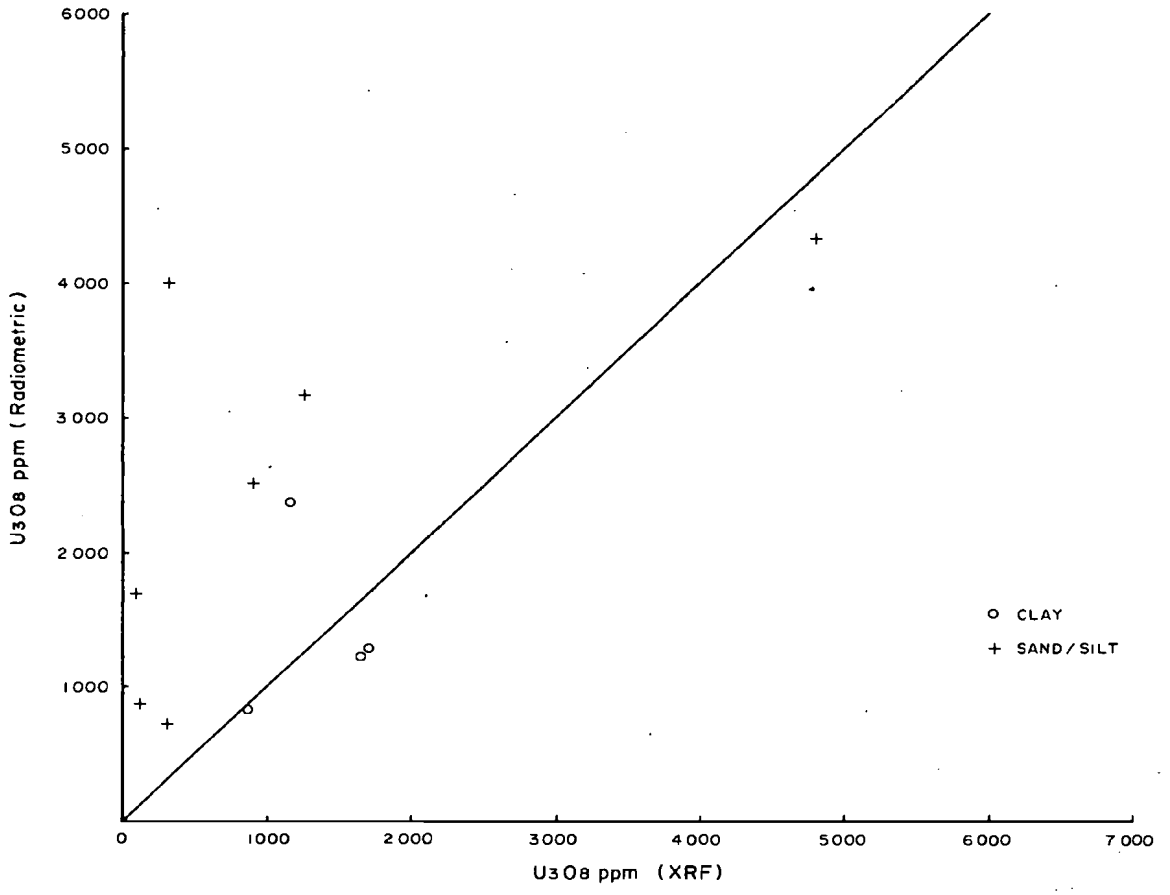


FIGURE 6

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: U1/4-18	
DECEMBER 1976	D. M. TAYLOR

T A B L E 4

DETAILS OF ANALYSED CORE SAMPLES

Sample No.	Sample Type	Unit Thickness (m)	U_3O_8 ppm (XRF)	eU_3O_8 ppm (Radiometric)	$\frac{U_3O_8}{eU_3O_8}$
PAC 1	Sand	1.00	6	< 10	> 0.60
2	"	1.00	4	10	0.40
3	"	0.50	4	< 10	> 0.40
4	"	1.00	6	20	0.30
5	"	1.00	12	< 10	> 1.20
6	"	1.00	26	20	1.30
7	"	0.90	42	30	1.40
8	"	0.21	44	30	1.47
9	"	0.14	55	40	1.38
10	"	0.75	36	20	1.80
11	"	1.00	44	20	2.20
12	"	0.50	300	730	0.41
13	"	0.25	1250	3150	0.40
14	"	0.25	210	860	0.24
15	Clay	0.10	22	70	0.31
16	"	0.10	70	30	2.33
17	Sand	0.15	4800	4320	1.11
18	"	0.35	900	2520	0.36
19	"	0.30	100	1690	0.06
20	"	0.38	310	4020	0.08
21	Clay	0.20	1700	1300	1.31
22	"	0.27	1650	1200	1.35
23	"	0.18	1150	2380	0.48
24	"	0.20	860	860	1.00
25	"	0.42	170	440	0.39
26	"	0.35	270	370	0.73
27	"	0.20	170	290	0.59
28	"	0.20	130	210	0.62
29	"	0.10	24	110	0.22
30	"	0.60	14	50	0.28
31	Silt	0.30	8	10	0.80
32	"	0.35	8	20	0.40
33	"	0.18	28	30	0.93
34	Clay	0.77	8	20	0.40
35	"	0.50	10	20	0.50
36	Sand/silt	0.92	6900	3960	1.74

The uranium is not in secular equilibrium with its daughter products. This is clearly illustrated by plotting the radiometric values against the XRF values (Figure 6). The values of the ratio U_3O_8 (XRF)/U_3O_8 (radiometric) vary from 0.06 to 2.33. The variation between the two values appears, in general, to be greater in the sand samples.

Three calculations were made to find average ratios between the results obtained by the two analytical methods. The first calculation involved a grade x thickness (G x T) summation for the full sample population for each set of results followed by dividing the XRF Σ(G x T) by the radiometric Σ(G x T). The second calculation used only those samples with a U_3O_8 content, determined by XRF, greater than 100 ppm and the third by using the sand samples with greater than 100 ppm. The results are summarized in Table 5.

TABLE 5

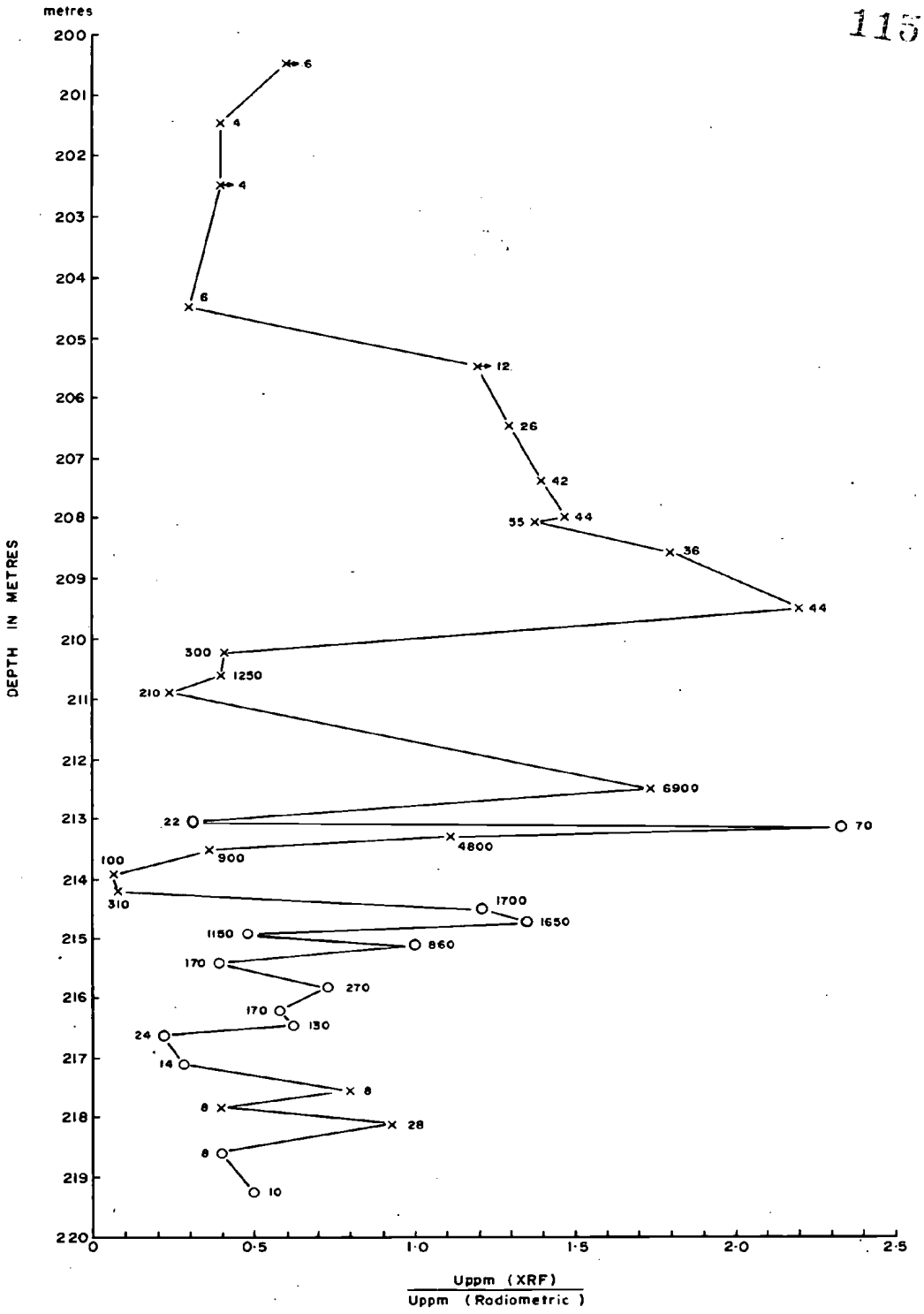
U_3O_8 (XRF): U_3O_8 (Radiometric)

Calculation	No. of Samples	Total Thickness (m)	Average Grade (XRF)	Average Grade (Radiometric)	U_3O_8 (XRF) / U_3O_8 (Rad.)
1	36	16.42	590ppm	634 ppm	0.930
2	16	5.12	1843ppm	1988 ppm	0.926
3	8	3.1	2595ppm	2766 ppm	0.938

The figures in Table 5 are heavily influenced by sample number PAC 36 with the high XRF value over 0.92 m. Unfortunately the return for the interval represented by this sample was very low (approximately 50 g) and the G x T value therefore suspect.

Figure 7 shows the change in the U_3O_8 (XRF) : U_3O_8 (Radiometric) ratio with depth. No simple relationship is observed.

Differential leaching could be a major cause of the disequilibrium. The present day aquifers in the area are rich in sulphate ions which assist in the transport of uranyl ions but fix radium (Dodds, 1972). Oxygenated waters encourage precipitation of radium and movement of uranium. Ratios greater than one could be caused by flushing of radon from the system or insufficient time for accumulation of daughter products. If these two processes (leaching and flushing) have operated (or are operating) then the major variations would be expected in the more porous horizons. This is, to a limited extent, the case with the more extreme variations (in terms of ppm) being noted in the sands.



VARIATIONS IN THE CHEMICAL/RADIOMETRIC RATIO WITH DEPTH

KEY

× Sand or silt sample

○ Clay sample

×← Indicates possibly higher ratio.

○70 Clay sample containing 70ppm uranium (Determined by XRF).

FIGURE 7

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: U1/4-18	
DECEMBER 1976	D.M. TAYLOR

T 1593

139°35'

139°36'

30°15'

30°16'

77-48 89·93

77-44 63·85

77-50 63·65

77-54

77-51

77-52 66·44

77-53 65·95

77-60

B.M. No. 7120 △ 70.85

31 (core hole)

POONTANA PROJECT, LAKE FROME S.A.

DRILL HOLE LOCATION MAP

PARALANA 'A' AREA

(in part of EL 209)

N

SCALE : 1cm = 100m

metres 100 0 100 200 300 400 500 metres

LEGEND

- 77-53 ⊙ Drill hole (1975)
- ○ Drill hole (209– series, 1976)
- 25 ○ Drill site (1976)
- △ Bench mark
- 78·17 Elevation in metres

RECE
28 JAN 1977
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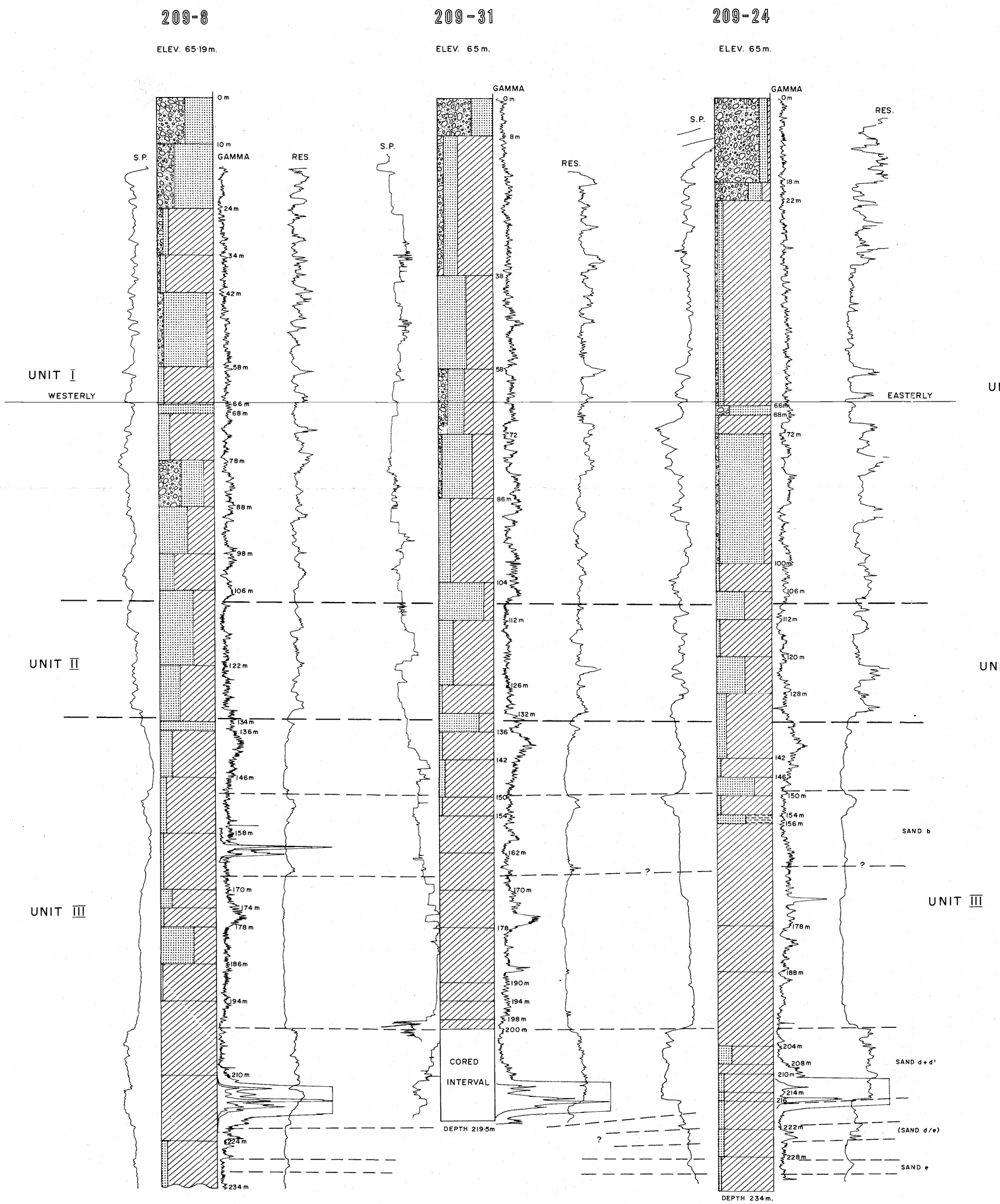
FIGURE 2

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: U1/4-18	
NOVEMBER 1976	MINERAL BRANCH

2608(III)-35

BASED ON T1593

T 1699



UNIT I

- MIXED CLASTICS x
- GRAVEL
- SAND
- SILT
- CLAY
- CARBONATE
- CARBONACEOUS x

x Used for pre 1976 logs only.

1976
POONTANA PROJECT

PROGRAMME II, (PART)
EL-209

PARALANA CREEK, AREA 'A'
STRATIGRAPHIC SECTION

(INCLUDING CORED HOLE)

SCALES
HORIZONTAL : 1 cm. = 2·5m.
VERTICAL : 1 cm. = 6m.

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FIGURE 3

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: U1/4-18	
DECEMBER 1976	D. M. TAYLOR

2608(III)-36

Comparisons between the analytical results and the radiometric grades calculated using the downhole gamma log is very difficult because of the differences in measured depths. The 5.3 metres between 211.6 m and 216.9 m contain, from the downhole log, an average grade of 2.7 kg/tonne compared with the 5.12 metres of material contained within the interval 210.0 m to 216.5 m which gave an average (XRF) grade of 1.84 kg/tonne. The highest radiometric grade calculated from the downhole logs is 5.4 kg/tonne as opposed to 6.9 kg/tonne for the XRF grades.

Additional cored holes will be required to further investigate the disequilibrium problems encountered in this ore zone.

Three samples were sent to a separate laboratory (ACS Laboratories) for XRF analysis for uranium. These "grab" samples from the core gave the following results 170 ppm (210.9 m), 0.74% (212.08m - 213 m) and 0.14% (214.5 m) U_3O_8. These samples correspond to the PAC samples numbered 14 (part) 36 and 21 (part) which gave values of 210 ppm, 0.69% and 0.17% respectively.

The core samples are to be analysed for other elements and the data presented in a later report.

6. CONCLUSIONS

Hole number 209-31 drilled in the Paralana "A" area was cored between 200 m and 219.5 m. The drilling costs for the hole exceeded $5,500. The core recovery was poor (48%) as a result of several factors many of which could, in future, be corrected.

Radiometric grades, calculated from downhole logs, indicated at least 5 m of ore grade material (greater than 1 kg/tonne) with a maximum grade of 5.75 kg U_3O_8/tonne. Mineragraphic studies "suggest that the radioactivity is related to ad-or absorbed uraniferous material of supergene origin, impregnating carbonaceous matter, porous leucoxene and a type of cement in some pyrite-framboid aggregates" (Fander, 1976). Uraninite was not detected during this preliminary study.

Thirty-six samples of the core were analysed by Amdel using XRF and radiometric methods. The data indicates that the uranium and its daughter products are not in secular equilibrium but calculation

shows that the average radiometric grade (laboratory determined) is only slightly higher (by approximately 7%) than the true (XRF) grade. The highest grade determined by XRF is 6.9 kg U_3O_8/tonne (re-analysed to 7.4 kg U_3O_8/tonne) but the grades are, in general lower than those calculated from the downhole digital gamma log (by a very approximate factor of 1/3).

7. REFERENCES

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GATEHOUSE, C.G., 1973 : "Lake Frome Area, SML 586, Coring Programme Results". Afmeco Pty Ltd Report No. SA-71F.

TAYLOR, D.M., 1976 (a) :"Drilling Programme No. 1, EL 209, Lake Frome Embayment, South Australia ". BP Minerals Australia Pty Ltd.

TAYLOR, D.M., 1976 (b) : " Drilling Programme No. 2, EL 209, Lake Frome Embayment, South Australia". First Report. BP Minerals Australia Pty Ltd.

A P P E N D I X "A"

MINERAGRAPHIC REPORT ON SAMPLES

FROM DRILL HOLE 209-31

by

H.W. FANDER - Central Mineralogical

Services Pty Ltd.

Central Mineralogical Services Pty. Ltd.

231 Magill Road
Maylands, S.A. 5069
Telephone 42 5659

15th October 1976

Dr. J.H. Hills,
Minerals Exploration Manager,
B.P. Minerals Proprietary Limited,
G.P.O. Box 5222BB,
MELBOURNE. VICTORIA. 3001

REPORT CMS 76/9/36

YOUR REFERENCE:	U/12/1, 28.9.76
DATE RECEIVED:	29.9.76
SAMPLE NOS.:	Five sediment samples (No. 31)
SUBMITTED BY:	Dr. J.H. Hills
WORK REQUESTED:	Mineralogy

H.W. Fander, M.Sc.

REPORT CMS 76/9/36

Introduction

Five sediment samples from a drill hole (212 - 214.5m) were investigated to determine the cause(s) of radioactivity and general mineralogy.

Whilst the investigation was restricted due to the nature of the samples and their small size, nevertheless a number of interesting and new observations were made; these may require further investigation.

Procedure and Results

All samples were examined under the stereobinocular microscope, and two (Nos. 1 and 3) were selected for heavy-liquid separation with examination of the heavy fractions. Three autbradiographs were also prepared; one was of No. 5 as requested, the other two were of the heavy fractions from Nos. 1 and 3.

Brief descriptions of the samples, from stereobinocular examination, are as follows :

1. Grey clayey friable sand. Heavy fraction contains small aggregates of pyrite framboids with kaolinitic matrix/cement, grains of zircon, ilmenite, anatase, and abundant leucoxene.

2. Friable carbonaceous matter of organic (plant) origin, with extremely fine pyrite patches and films.

3. Pale clayey sand with muscovite flakes, and intercalated dark grey clay galls. Carbonaceous films (plant remains). The heavy fraction consists mainly of leucoxene grains and aggregates of small pyrite framboids, with goethite, zircon, rutile, ilmenite and others.

4. Grey clayey sand with fragments and films of striated carbonaceous material (plant remains).

5. Dark grey plastic silty clay with chips of black carbonaceous matter and pyrite framboids.

The heavy fractions from Nos. 1 and 3 were very small, and only a limited amount of mineralogy was possible, thus, not all phases were identified.

Autoradiography

Autoradiography

The autoradiographs of the heavy fractions of Nos. 1 and 3, gave very clear indications of specific radioactive sources which were relatively active. The polished sections of these fractions were compared in the normal way with orientated autoradiographs and the sources were thus pinpointed.

In sample 1, the radioactive sources were exclusively leucoxene grains. These were mostly uniformly fine-grained and porous, with no identifiable interstitial material or other phases. The grains seldom show relict textures and these are not distinctive or diagnostic; they are thought to represent oxidised ilmenite, though the possibility of a mineral such as brannerite cannot be excluded at this stage. No uraninite/pitchblende was detected.

In sample 3, there are two distinct sources of activity. One is the same type of leucoxene as in No. 1. The other source consists of a ?silicate phase cementing fine pyrite framboids; this phase is transparent and with relatively low refractive index. Further work is needed to identify this material but there is no question of its radioactivity. An obvious possibility is coffinite but requires confirmation.

A further radioactive phase is the carbonaceous material representing carbonised plant fragments; there was a clear correlation between Geiger readings and concentration of carbonaceous matter. The uranium may be present as an adsorbed/absorbed phase of indeterminate composition and not as a discrete mineral.

The autoradiograph of No. 5 was prepared by dry-grinding the (dried) clay and placing this flat surface in contact with X-ray film. Only some of the radioactive spots indicated on the film could be correlated with material in the specimen, and included carbonaceous matter, leucoxene and material surrounding some pyrite framboids.

Discussion

The results suggest that the radioactivity is related to ad- or absorbed uraniferous material of supergene origin, impregnating carbonaceous matter, porous leucoxene and a type of cement in some pyrite-framboid aggregates.

It is not known at this stage whether the uranium originated from within the rocks themselves, being re-distributed to phases with an affinity for uranium, or whether the source was outside the lithological unit. The prevalence of reducing conditions, as indicated by the presence of carbon and pyrite, is of some significance.

Uraninite has been recorded from similar deposits, at Beverley (S.A.) (see Monograph 5, Aus.I.M.M., 1975, pp 806-813), but has so far not been detected here.

However, the investigation is only of a preliminary nature, and if warranted, should be followed up by further mineralogy and electron-probe microanalyses. Further samples would be needed, preferably of minimum 50 grams, from these intersections.

H.W. Fander, M.Sc.

PHOTOMICROGRAPHS

Note: All the grains shown are markedly radioactive.

1. Sample 1. Heavy Fraction, Polished Section 200x

Grain of microcrystalline leucoxene (rutile), uniformly radioactive. Upper right grain is much coarser rutile + ?quartz, non-radioactive.

2. Sample 3 Heavy Fraction Polished Section 500x

Leucoxene grain, markedly radioactive (Relatively poor definition due to high magnification, internal reflections, fuzzy texture).

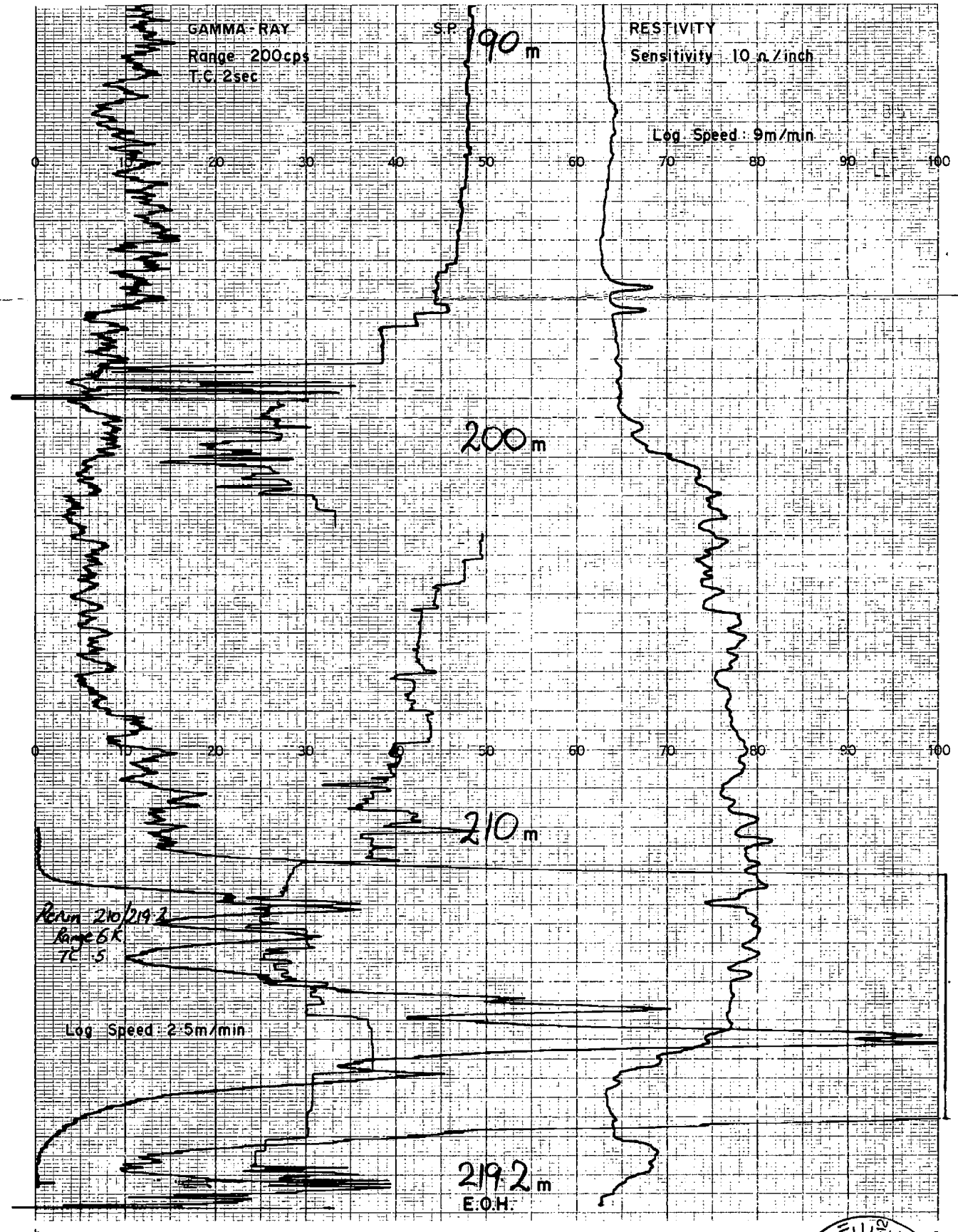
3. Sample 3 200x

Aggregate of small, well-defined pyrite framboids, with outer zone of transparent cement which is radioactive (due to low reflectivity, oil immersion, this material is shadowy and almost invisible here - bebulous dark grey).

4. Sample 3 200x

Tiny pyrite framboids cemented by radioactive material. Angular detrital quartz inclusions.

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GAMMA AND ELECTRIC LOGS

(COVERING CORED INTERVAL)

(ORIGINAL SCALE)

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FIGURE 5(b)

BP MINERALS AUST. PTY LTD	
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SOUTH AUSTRALIA	
Ref: U1/4-18	
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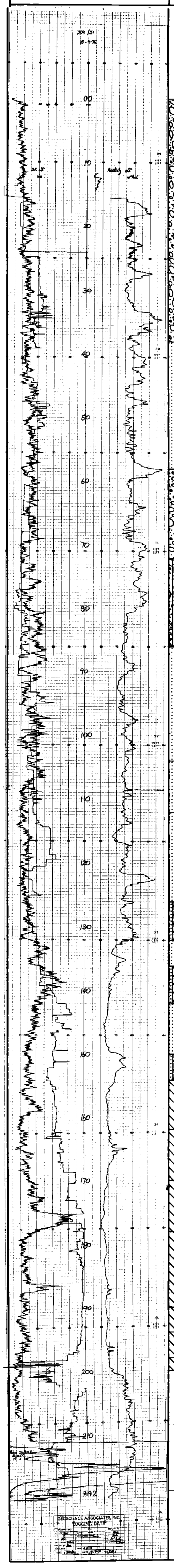
MINERALS AUST. PTY LTD

DRILL HOLE LOG

2608(III)-37

HOLE No.	209-31	DATE DRILLED	15.9.76	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	18.9.76	RANGE	200 cps	RESIST. SCALE	10 Ω/in.
PROJECT	Poontana	DATE LOGGED	18.9.76	TIME CONSTANT	2	SP. SCALE	
LOCATION	Paralana 'A'	DRILLED DEPTH	219.5 m	PAPER SPEED	1 cm/m	BIAS	300/100
STATE	S.A.	LOGGED DEPTH	219.2 m	LOGGING SPEED	9m/min.	FLUID LEVEL	12m
GEOLOGIST	Taylor	ELEVATION		BACK GROUND	9 cps	PROBE No	306
DRILLER	Thompson/Stratford	CO-ORDS		TIME BASE		STANDARD	(658)
LOGGER	Mortimer			K-FACTOR			

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous · Mixed Clastics



INTERVAL	DESCRIPTION
0–18	Gravel. Coarse and normal sand. Minor clay.
18–38	Red with very minor pale grey silty clay.
38–58	Coarse and normal sand. Red soft silty clay.
58–72	Fine gravel. Coarse sand. Red soft silty clay.
72–86	Fine gravel. Coarse sand. Red soft silty clay.
86–104	Mainly fine sand. Red/brown and lesser pale grey silty clay.
104–112	Fine sand. Red/brown and minor pale grey silty clay.
112–126	Mainly fine sand but coarser (1mm, angular, quartz+)in lowest samples. Pale grey clay with red/brown clay in upper half and yellow/brown clay in lower.
126–132	Sand (1mm, angular, quartz +). Pale grey and yellow/brown soft silty clay.
132–136	Sand (1-2mm, angular/subangular, quartz). Clays as above.
136–142	Sand as above. Pale and light grey clay with stains. Very minor mid grey clay.
142–150	Sand (0.25 - 0.5 mm, angular/subrounded, quartz). Mainly mid grey clay. Stains common to abundant.
150–154	Sand (1-2 mm, angular/subrounded, poorly sorted). Hard black clay. Stains common.
154–162	Mainly dark grey and black clay. Stains very common.
162–170	Mid to dark grey clay. Stains common. 5% sand in lowest sample.
170–178	Dark grey clay. Stains common. Minor sand.
178–190	Mid to dark grey with some black clay. Limonite abundant. Hematite very common. Minor sand.
190–194	Mid dark grey and olive green clay. Minor black clay. Limonite very abundant.
194–198	Mid dark grey and black clay. Stains very common. Minor sand.
198–200	Clays (as above). Min. carbonate and sand. Limonite abundant.
200–219.5	Cored interval.

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FIGURE 5A

HOLE NUMBER : 209 - 31 DEPTH : 200m - 219·5m LOCATION : PARALANA CREEK, S.A.

T. 1708

% RECOVERY	DEPTH (m)	LITHOLOGY	RADIOMETRICS (a)	RADIOMETRICS (b)	DESCRIPTION	SAMPLE INTERVAL	ANALYSES (a)	ANALYSES (b)
			28		200 - 200·07. Mid grey clay (2·5YR, 5/0) with limanite (5Y, 8/8) and hemantite stain.			
			30		200·07 - 200·36. Very fine sand. Light grey (10YR, 7/1 - 7/2).			
			27					
			26		200·36 - 200·5. Fine sand, Light grey (5Y, 7/1 - 7/2).			
			23					
			28		200·5 - 200·71. Very fine sand. Light grey (10YR, 7/1 and 2·5Y, 7/2).	PAC 1	6	10
			21					
			23		200·71 - 201·15. Mainly mid grey (7·5YR, 6/0) but many stains.			
			11					
	201		14					
			21					
			18		201·15 - 201·18. White carbonate.			
			22		201·18 - 201·8. Very fine sand. Light grey (10YR, 7/1). Limanite (10YR, 4/4) and hematite (10R, 4/6) stain.			
			22					
			17			PAC 2	4	10
			13					
			23					
			14		201·8 - 202·35. Very fine sand. Light grey (10YR, 7/2). Minor Limanite stain			
			22					
	202		18					
			18					
			22			PAC 3	4	10
			24					
			15		202·35 - 202·5. Very fine sand. Very light grey (5Y, 8/2). Very minor stain.			
			17		202·5 - 203·75. Mainly mid grey (5Y, 6/1) but several other colours (possibly from up hole).			
			22					
			24					
			24					
			15					
	203		22					
			21					
			18					
			21					
			26					
			37					
			26					
			22					
			11		203·75 - 204·75 Very fine sand. Light grey (10 YR, 6/3). Very minor stain			
			18					
	204		20					
			23					
			19					
			19			PAC 4	6	20
			18					
			21					
			19					
			18					
			22		204·75 - 204·83. Mid grey clay (10YR, 6/1). Very fine light grey (10YR, 7/2) sand. Minor stains.			
			24		204·83 - 207·12. Very fine grained sand. Light grey (10YR, 7/2).			
	205		19	70 — 75				
			17					
			35					
			21					
			18			PAC 5	12	10
			15					
			22					
			26					
			25					
			24					
	206		19					
			19					
			27					
			29					
			27					
			26			PAC 6	26	20
			21					
			37					
			26					
			34					
	207		41					
			23					
			29		207·12 - 207·75. Very fine sand. Very light grey (5Y, 7/1).			
			33					
			31			PAC 7	42	30
			36					
			35					
			38					
			36		207·75 - 208·12. Very fine sand. Light grey (10YR, 7/2).			
			53					
	208		54			PAC 8	44	30
			38		208·12 - 208·25. Very fine sand. Light grey (10YR, 7/1).	PAC 9	55	40
			54		208·25 - 210. Very fine sand. Light grey (10YR, 7/2).			
			51					
			50					
			50			PAC 10	36	20
			50					
			44					
			52					
			29					
	209		36					
			55					
			65					
			66					
			61			PAC 11	44	20
			56					
			41					
			52					
			43					
			61					
	210		44		210· - 210·5 Fine sand. Greyish-brown (10YR, 6/2 or 10YR, 5/2). Minor blebs of mid grey clay. Minor limonite.			
			59					
			62	106		PAC 12	300	730
			61					
			65					
			57					
			36	540	210·5 - 211. Fine to very fine sand. Colour changes slightly (from 10YR, 6/2 to 2·5Y, 7/2) at top of interval.	PAC 13	1250	3150
			64					
			53	370		PAC 14	210	860
			55					
	211		63		211 - 212·08. No Recovery			
			98					
			137					
			216					
			427					
			900	N.R.				
			1557					
			2145					
			2087					
			2230					
	212		3208					
			3303		212·08 - 213. Extremely fine grained sand or silt. Grey to dark grey (5Y, 5/1 or 5Y, 4/1)			
			2246					
			1680					
			1429					
			1512	(180)		PAC 36	6900	3960
			2170					
			2912					
			2965					
			2229					
	213		1724	75	213 - 213·1 Light grey (5YR, 7/1) clay. Minor hemantite and very minor limanite.	PAC 15	22	70
			1344	300	213·1 - 213·35 Mid grey clay, with hematite very common, at top. Dark grey to black fine sand, with lignite in lower parts.	PAC 16	70	30
			1204	220		PAC 17	4800	4320
			998		213·35 - 213·7 Grey sand (10YR, 6/1 or 6/2) with lesser dark grey sand (10YR, 4/1).			
			1099					
			1273	440		PAC 18	900	2520
			1717					
			2173		213·7 - 214. Sand as above with pellets of dark grey (2·5Y, 4/0) and white clay. Minor pyrite.			
			2473	350		PAC 19	100	1690
			2607					
	214		2608		214 - 214·18 Light grey clay (5YR, 7/2). Limanite (2·5Y, 6/8) common.			
			3184	70 *	214·18 - 214·38 Oark grey clay (2·5Y, 4/0) with 25% very fine sand (2·5Y, 6/2). Minor limanite stain.	PAC 20	310	4020
			3451					
			4722	500	214·38 - 214·58 Dark grey (2·5Y, 4/0) clay. Minor fine sand.			
			5065			PAC 21	1700	1300
			5335	180	214·58 - 214·85 Grey clay (10YR, 6/1 or 5/1). Very minor limanite.			
			6640			PAC 22	1650	1220
			6350	190				
			4507		214·85 - 215·23 Dark grey clay (2·5YR, 5/1 - 4/1)	PAC 23	1150	2380
			4204	300				
	215		4944			PAC 24	860	860
			5914	190				
			8002		215·23 - 216 Grey clay (10YR, 6/1 or 5/1). Minor white streaks.			
			9393					
			9135	185		PAC 25	170	440
			9397					
			8705					
			5836					
			4687	110 *		PAC 26	270	370
			4115					
	216		3574	80	216 - 216·1. Probably cuttings.			
			3348		216·1 - 216·5. Grey clay (10YR, 6/1).			
			3556	120		PAC 27	170	290
			4267	100		PAC 28	130	210
			3925					
			3414	80	216·5 - 216·6. Cuttings.			
			2914		216·6 - 217·3. Grey clay (10YR, 6/1 or 5/1) with limanite (10YR, 5/6) decreasing down interval. Minor grey silt (10YR, 7/1).	PAC 29	24	110
			2275	75				
			1831					
			1429	85				
	217		1144					
			1046			PAC 30	14	50
			845					
			732		217·3 - 218·25. Very fine silt, mid to dark brownish grey (2·5YR, 6/2 - 5/2) with some lighter grey (2·5YR, 7/2) at top. Limanite (10YR, 4/5 or 2·5Y, 5/6) common to 218m. Minor mid to dark grey clay. Silt laminated in lowest 10cm.			
			579			PAC 31	8	10
			476					
			479					
			360			PAC 32	8	20
			311					
			263					
	218		205					
			164			PAC 33	28	30
			149	70 — 75	218·25 - 218·65. Very dark grey or black clay. Shiny fracture surfaces. Limanite (2·5Y, 6/6) common. Minor pellets of light grey/white clay.			
			104					
			73					
			64			PAC 34	8	20
			71		218·65 - 219·13. Clay, as above, with trace of limanite only.			
			38					
			39					
			37					
	219		53					
			48		219·13 - 219·5 Very dark grey (7·5YR, 3/0) to black clay. Dull fracture surfaces. Unstained.	PAC 35	10	20

RADIOMETRICS (a) Down hole gama digital readout data. Time base: 2 seconds

(b) Gamma activity determined by hand held ratemeter

[x indicates determined on bag of sample

( ) indicates determined on plastic vial of sample]

ANALYSES (a) U_3O_8 in ppm determined by XRF (Amdel).

(b) U_3O_8 in ppm determined by radiometric methods (Amdel)

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DESCRIPTION OF CORED INTERVAL

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FIGURE 4

BP MINERALS AUST. PTY LTD	
Area: PARALANA CREEK	
SOUTH AUSTRALIA	
Ref: U1/4-18	
DECEMBER 1976	D.M. TAYLOR

OILMIN N.L.
TRANSOIL N.L.
PETROMIN N.L.
MINES ADMINISTRATION PTY LTD
TETON EXPLORATION DRILLING CO. PTY LTD
BP MINERALS AUSTRALIA PROPRIETARY LTD

U/14/1

3rd. February, 1977.

PRIMARY AGREEMENT

EXPLORATION LICENCES 203, 209 & 210 (68, 77 & 91)- SOUTH AUSTRALIA

QUARTERLY EXPENDITURE REPORT

In accordance with Clause 8 of the above agreement, BP hereby reports on the operations and results for the quarter ending December 1976.

	EL 203	EL 209	EL 210
PLANT AND TOOLS		(1,500)*	
EXPLORATION			
Geological Services		549	
Geochemical Services		289	
Drilling		15,783	
Logging		3,745	
Consumable Field Stores		74	
OPERATIONS			
Vehicle Operating		1,298	
Rental of Equipment		800	
Charter Aircraft		315	
Freight and Cartage		3	
Travelling Expenses		14	
Personnel Services		780	
Salaries and Wages		7,312	
TOTAL	NIL	29,462	NIL

* Credit. Recouped from insurance on stolen generator.

.....
Dr. J. H. Hills
MINERALS EXPLORATION MANAGER.



DEPARTMENT OF MINES
SOUTH AUSTRALIA

120

BIOSTRATIGRAPHY DIVISION

PALYNOLOGY OF SELECTED SAMPLES FROM THE POONTANA STRUCTURE, FROME EMBAYMENT E.L. 209

- BP Minerals Proprietary Limited -

by

WAYNE K. HARRIS

802
Rept.Bk.No. ~~7737~~
G.S. No. 5865
EL. 209

23rd March, 1977

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SECURITY
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Rept.Bk.No. 77/37
G.S. No. 5865
EL. 209

PALYNOLOGY OF SELECTED SAMPLES FROM THE POONTANA STRUCTURE, FROME EMBAYMENT E.L. 209

Location: Drill Hole 209-1 Lat. 30°15.3'S Long. 139°42.2'E
209-2 Lat. 30°15.3'S Long. 139°35'E
209-3 Lat. 30°15.2'S Long. 139°35.9'E
209-8 Lat. 30°15.6'S Long. 139°36.2'E

FROME Sheet (SH54-10)

Province: Frome Embayment, Eromanga Basin.

Samples Examined: 18 cuttings samples from four drill holes as tabulated below.

Results:

Drill Hole	Depth in metres	Sample No.	Age
209-1	198-206	S4090	Barren
209-1	234-247.5	S4091	"
209-1	258-264	S4092	Cretaceous
209-1	264-270	S4093	"
209-1	288-294	S4094	"
209-1	324-330	S4095	"
209-1	351.05	S4096	"
209-2	228-246	S4097	Barren
209-2	246-260	S4098	"
209-2	264-272	S4099	Miocene
209-2	272-288	S4100	"
209-2	291.00	S4101	"
209-3	248-256	S4102	Barren
209-3	260-272	S4103	"
209-3	290-300	S4104	Miocene
209-3	303.50	S4105	"
209-8	194-210	S4106	Barren
209-8	234-250	S4107	Cretaceous

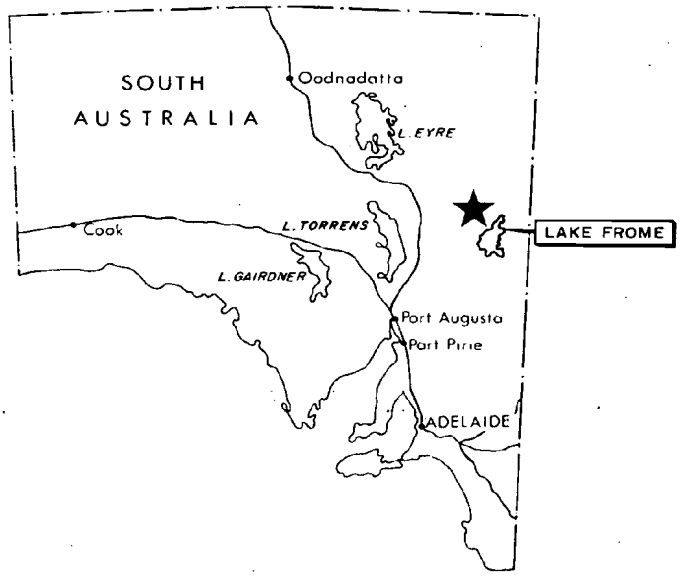
Remarks: All of the Miocene samples yielded abundant colonies of the freshwater alga, Pediastrum which dominates assemblages at the base of the Namba or Etadunna Formation. Thus, the age of these assemblages is Middle Miocene.

All of the Cretaceous samples are marine and of Early Cretaceous aspect.

There is no palynological indication of age of the samples labelled "barren".

WKH:FdeA
23/3/77

WAYNE K. HARRIS
SENIOR GEOLOGIST



LOCATION MAP

1976

DRILLING PROGRAMME No. 2

(EL 209)

LAKE FROME EMBAYMENT
SOUTH AUSTRALIA

SECOND REPORT

RECEIVED
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KEYWORDS

DRILLING

EXPLORATION

FROME

LOGGING

RADIOMETRICS

TERTIARY

URANIUM

BP MINERALS AUSTRALIA PROPRIETARY LIMITED

1976 DRILLING PROGRAMME No.2
EL 209
LAKE FROME EMBAYMENT, SOUTH AUSTRALIA
SECOND REPORT

Derek M. TAYLOR
MELBOURNE - VICTORIA
March, 1977.

S U M M A R Y

Exploration Licence 209 covers an area of 805 square kilometres to the northwest of Lake Frome and to the south and east of the Beverley deposits. A drilling programme was undertaken during September/ October 1976 to test the significance of uranium mineralisation detected in one area (Paralana Creek Area "A") and radiometric anomalies in a second area (Paralana Creek Area "B") during previous programmes. The data obtained during this programme are interpreted in this, the second of two reports.

The mineralisation in Area "A" is contained in sands within the lowest two sub-members of Sand d. The positions of the palaeo-channels in which these sands developed have been described and their possible extensions predicted.

The mineralisation in Area "B" is contained in a sand which forms part of a sand member equivalent to Sand b of Area "A". The most significant radiometric anomaly in this area is, however, the one developed in a channel sand in the Sand c equivalent.

A drilling programme to test the predicted extensions of the palaeo-channels in both Area "A" and Area "B" is proposed. Further drilling on a regional scale should be undertaken after a review of all available data.

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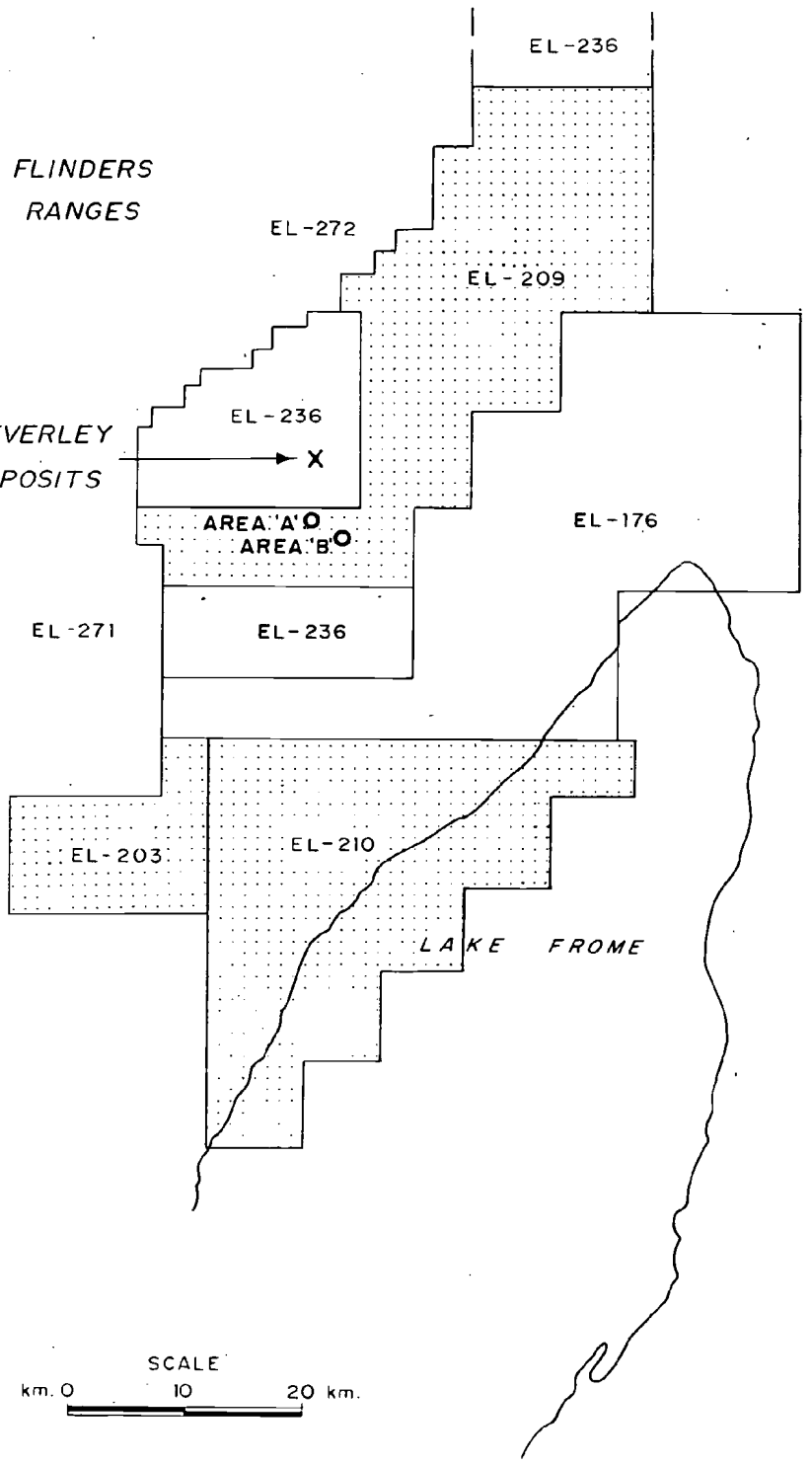
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EXPLORATION LEASES ON NORTH WEST SIDE OF LAKE FROME EMBAYMENT.

(AS AT FEB. 1977)

25% BP INTEREST

FIGURE 1

BP MINERALS AUST. PTY LTD	
Area:	LAKE FROME
SOUTH AUSTRALIA	
Ref:	U1/4-21
MARCH 1977	MIN. BRANCH

BASED ON TS1380

1. INTRODUCTION

Exploration licence 209 covers an area of 805 square kilometres to the northwest of Lake Frome and to the south and east of the Beverley deposits (see Figure 1).

The exploration recently undertaken over this licence during the period September / October 1976 was summarised in a previous report (Taylor 1976 (b)) and the data are interpreted here.

The following sections are divided into two parts, one dealing with data from Paralana Creek Area "A" and the other with data from Paralana Creek Area "B".

2. DATA INTERPRETATION

Lithological descriptions of each hole, together with the down-hole logs and a summary of radiometric anomalies detected during this programme, were presented in the first report (Taylor 1976 (b)).

Stratigraphic sections (Figure 2) accompany this report. The subdivisions used in the interpretation are described later in this section.

I. PARALANA CREEK AREA "A"

(a) Lithological Logs

Only three of the five lithological units previously described by Taylor (1976 (a)) were intersected during this drilling programme. These units are as follows :-

(i) Unit I

Unit I consists of red or brown silty or sandy clays, sand and gravel. The upper 20 m of this unit often consists predominantly of very coarse gravel. A greenish-grey clay becomes increasingly common towards the base of the unit. The thickness of the unit varies between 118 m (hole 209-31) and 132 m (hole 209-32).

..

(ii) Unit II

The top of Unit II is defined as the point at which the greenish-grey clay to red clay ratio exceeds one. This occurs at a depth between 118 and 132 m . The unit is commonly limonite and hematite stained and usually contains a well developed sand near its base. A change in clay colour from greenish-grey to light grey defines the base of this unit (between 132 m and 146 m below surface). The unit varies in thickness from 6 m to 20 m in the holes drilled during this programme.

(iii) Unit III

This unit consists mainly of mid to dark grey and black clay with lesser olive and light grey clay and minor white and yellow clay. A hard black clay is frequently noted in at least two horizons within the upper part of the unit. A light greenish or bluish grey, usually soft, clay has been noted in several holes (209-32/35, 209-40/42 and 209-44/46) at depths between 180 and 210 m.

The degree of limonite and hematite staining varies considerably from hole to hole. In general limonite is more common than hematite except near the top of the unit. Limonite usually becomes very common or abundant at a depth of approximately 180 m in all but the eight holes numbered 209-28, 30, 34, 40, 42, 45, 48 and 49. Variations in the degrees of staining in the intervals 200-210 m, 210-220 m and 220-230 m are given in Table 1. (It should be mentioned here that the variations are, at the best,only described in a semi-quantitative fashion and that a strongly stained clay intersected in the interval 190 to 200 could influence the amount of stain in all samples within the next 20 m or more).

Sand bodies are common but vary in apparent composition, thickness and stratigraphic position. Sand collected between 150 and 170 m (corresponding to the interval occupied by Sand b) is generally medium to coarse grained (1-3 mm), angular to subrounded and poorly sorted , consisting of quartz grains and a variety of rock fragments.

....

Sand collected between 200 m and 230 m (corresponding to the interval occupied by Sand d) is usually a mixture of medium sized (0-5 - 2 mm), angular to subrounded quartz grains and very fine sand or silt. Pyrite has not been recognised in the cuttings from this unit.

Minor carbonate occurs in several holes below 210 m and at 200 m in the core hole. The base of this unit was not intersected.

(b) Electric Logs

The sands penetrated by the holes drilled during this programme have been described previously (Taylor 1976 (a)). These sands have, however, been reclassified as "Sand Members". Composite Sand d becomes Sand Member d but is simply referred to as Sand d. Subdivisions of these sand members are therefore described as sub-members.

A study of Sand d has indicated that the interval could be subdivided into three sub-members here called d_0, d_1 and d_2. The presence of a particular sub-member, especially d_1, does not necessarily indicate that a sand is present.

The vertical distances from the top of the Sand e to the base of the lowest sand within each horizon are shown in Table 2 together with indications of sand (or silt) development within each horizon and a description of the associated gamma activity. Sand e was chosen as a base line as it is recognised in all holes, varies very little in thickness and is assumed to have had been flat lying at time of deposition of Sand d. Measurement were made, from the electric logs, of distances to the base sand in each sub-member as opposed to the lines drawn between the sub-members on the sections as the positions of these lines cannot be fixed with any accuracy.

Figure 3 indicates the distribution of these sub-members. Determination of the sand to clay ratios for the interval 200 - 230 m were undertaken and the values are given in Table 1. Plotting these values gave very similar patterns to these shown in Figure 3 and are not reproduced here.

....

Sub-member d_0.

This sub-member, commonly intersected between 195 m and 210 m, has an average thickness of approximately 10 metres. It contains the best developed sands which frequently grade to silt towards the top of the horizon. Data from the cored hole would indicate that this is a clean sand (Taylor, 1976 (c)). No significant anomalies are detected in this horizon.

Sub-member d_1.

This sub-member, commonly intersected between 205 m and 220 m, has an average thickness of 8.5 m. It contains a maximum of two distinct sand bodies which, from core hole data, appear to be darker than those sands of horizon d_0. The majority of the mineralisation is encountered in this sub-member in particular at the base of the lower sand or where this sand pinches out. The highest radiometric values occur where the sand pinches out rapidly.

Sub-member d_2

This sub-member, where present, is intersected between 216 m and 227 m and has an average thickness of 7.5 m. It is the most variable and the least well developed of the three sub-members. Where it is well developed (e.g. hole number 209-27) it contains at least one sand of significant thickness (over 3 m). No lithological data are available as to the exact nature of these sands but it appears likely that they are similar to those of horizon d_1. Significant radiometric anomalies occur within this horizon. The positions of these anomalies appear to be determined by the variations in the thickness of the sand bodies containing them.

(c) Gamma Logs

Details of the radiometric anomalies detected during this programme were given in a previous report (Taylor, 1976 (b), Table 1) and may be summarised as follows :-

(i) A broad, low amplitude (maximum 90 cps), anomaly occurs between 135 and 145 m in all holes. This anomaly lies just above Sand b.

....

(ii) A second broad, low amplitude, anomaly occurs between 165 and 175 m in the holes drilled in the northern part of the area. This anomaly which occurs immediately below Sand b and is more variable in intensity than that described in (i) above (compare holes 209-12 and 209-27).

(iii) In several holes a medium to strong anomaly is developed around 160 m (in particular hole number 209-47). This anomaly, occuring within Sand b, corresponds to similar anomalies detected in previous programmes (holes numbered 77-44, 209-4, 209-8, 209-20 etc).

(iv) Strong anomalies (exceeding 200 cps) were intersected in sixteen holes within the d, sub-member of Sand d. Similar anomalies have been intersected in six holes drilled during previous programmes.

(v) Strong anomalies were intersected in five holes within the d_2 sub-member of Sand d. Two previously drilled holes contained similar anomalies (77-44, 209-20).

The distribution of the anomalies described in (iv) and (v) above are shown in Figure 3. Details of radiometric grades were given in the previous report (Taylor 1976 (b)).

(d) Composite Section

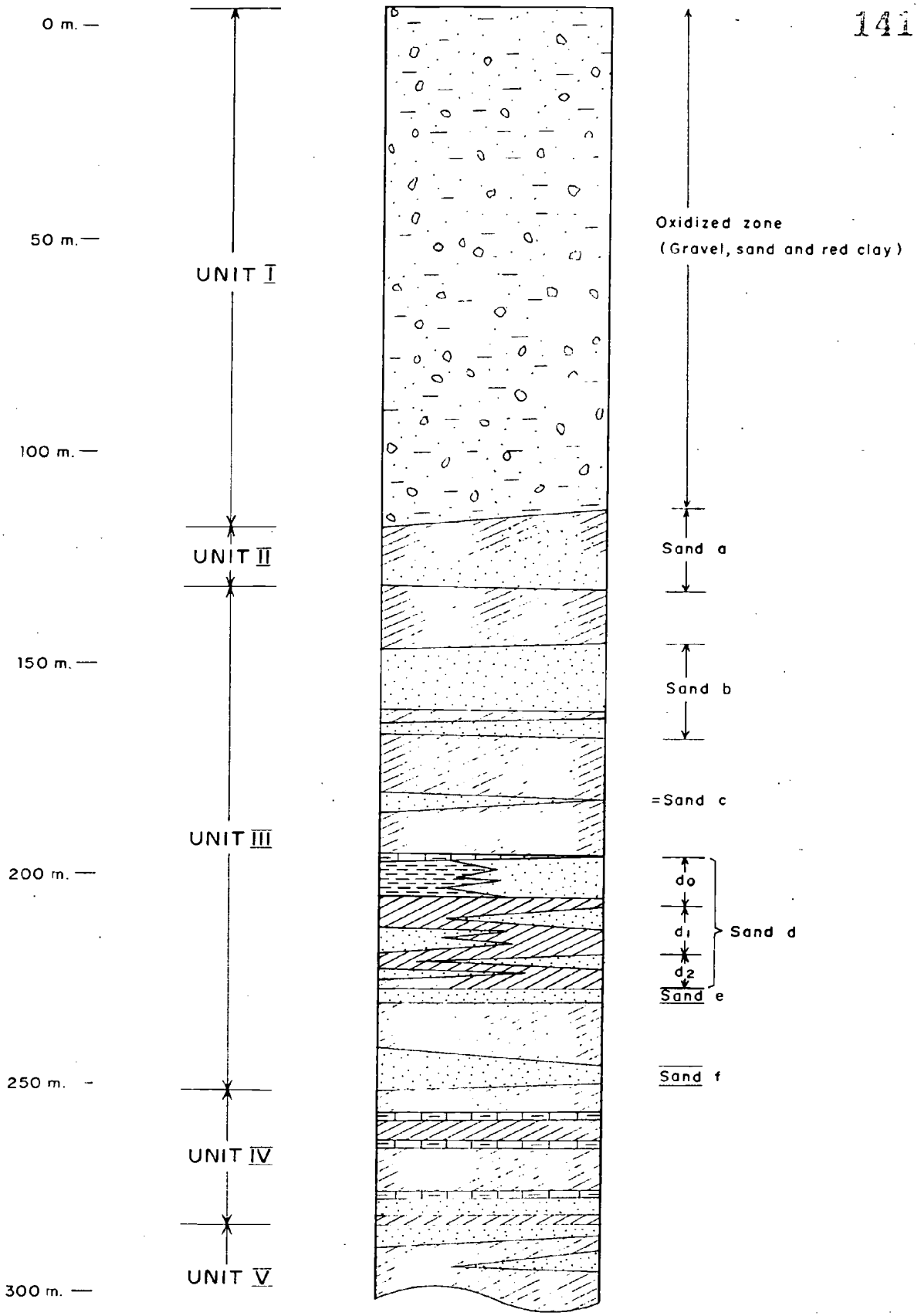
A composite section, illustrating the lithological sequence east of the Poontana Structure, was presented in a previous report (Taylor, 1976 (a)) and is repeated here in a modified form (Figure 4).

(e) Stratigraphic Interpretation

Area "A" lies very close to the eastern edge of the Poontana Structure which here coincides with the eastern edge of the Poontana Sub-Basin. The depositional environment for the Namba Formation described by Callen (1975) to be non-marine or marginal marine and is summarised in Drawing Number 75-522 (Callen, op.cit).

According to Callen the lowest part of the Namba Formation was deposited in a deep stratified lake and this was followed by sediments deposited in a shallow lake. These sediments possibly correspond with those described as Unit IV (Taylor 1976 (a)).

....



SIMPLIFIED COMPOSITE SECTION

(PARALANA AREA 'A')

LEGEND AS FOR FIGURE 2

FIGURE 4

BP MINERALS AUST PTY LTD	
Area LAKE FROME	
SOUTH AUSTRALIA	
Ref U1/4 - 21	
MARCH 1977	D. M. TAYLOR

BASED ON TS1748

The nature of the sedimentation then changed with the depositional environment becoming "Lacustrine and bar or beach, swamp or marsh, regressive cycles and/or slow deep rivers with flood, swamps and lakes" (Callen, 1975). These environments were irregularly distributed.

The sands equivalent to those containing the Beverley uranium prospect were deposited as bars or beaches or from a deep slow moving stream (Callen, op.cit) and can be seen to be cutting into underlying black clays in areas were they outcrop (Callen, 1973). These sands are overlain by further lacustrine deposits to the top of the Namba Formation which probably coincides with the top of Unit III.

There are two periods of sand deposition, equivalent to those for the Beverley host sands, in Area "A". During these periods the Sands b and d were deposited. In this area Sand d contains the more significant radiometric anomalies.

Sand d has been subdivided into three sub-members. Comparison of Figure 3 (a) and Figure 3 (b) indicate that the sands of sub-members d_2 and d_1 were deposited in channels (or series of channels) which occupied geographically similar positions or are possibly the same channels. Comparison between the stratigraphic sections (Figure 2) and Figure 5 (after McGowen and Garner, 1970), which is a cross profile showing various units of a point bar of coarse-grained sediments, could explain the observed geometry of the channels. The mineralisation appears to be preferentially concentrated where the infilling sands pinch out rapidly as they would at a concave bank or at a rapid changes in slope. Sub-member d_0 would probably have been deposited during a transgression prior to a return to swamp or marsh conditions.

Data from the cored hole indicate that the sands developed in d_1 in this hole are rich in organic trash. This, together with the fine grain size, would indicate a very low energy environment at time of deposition. It appears likely that this would also be the case for d_2. On the other hand the sands of d_0 are very clean and are therefore poor hosts rocks for mineralisation. It could, however, be most important in providing a passage way for the mineralising fluids provided that it is connected with the lower sands at some point(s).

....

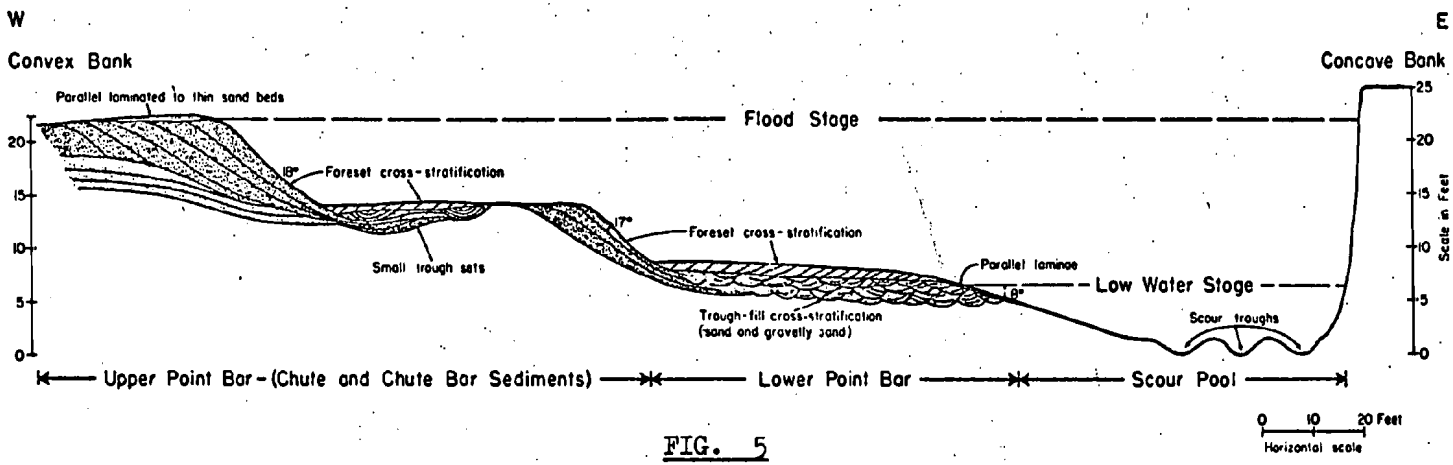


FIG. 5

A cross-profile showing various units of a point bar of coarse-grained sediment. (After McGOWEN and GARNER, 1970).

The effect of the Poontana Structure on the location of the channels is not known. It is possible that the Poontana Structure acted as a hinge line and that the transgression ending the period of deposition of Sand d was caused by sagging along this line. The Poontana Structure could also effect the localisation of the mineralisation by the fact that the sediments which dip sharply immediately to the east of the structure show a marked reduction in dip in Area "A" (less than 1 kilometre to the east of the structure). This change in slope could influence the precipitation of the uranium from solution.

II. PARALANA CREEK AREA "B"

(a) Lithological Logs

The three units recognised in the Paralana "A" area were also recognised in this area with only minor differences.

(i) Unit I

The coarse gravel that made drilling difficult in the "A" area was not encountered in the unit here. The unit is also, on average, somewhat thinner (116 m - 120 m) in this area.

(ii) Unit II

In hole 209-54 the light grey clay which usually indicates the end of this unit was not noted and the unit appears to be 18 m thick. In all other holes the unit varied in thickness from 6 m - 8 m.

(iii) Unit III

This unit commences, at the top, with light grey clay (except in 209-54) changing to mid grey and then to dark grey and black clay before a depth of 150 m is reached (approx. 70 m below sea level). Below this the clays exhibit all shades of grey with the lighter grey clay being common between a depth of 180 and 210 m. Black clays also occur, in particular around 180 m and 225 m.

....

Staining is common in the interval 120-140 m (top of unit) in all holes except 209-53. Staining also frequently occurs in the interval 165-185 m (209-52; 54) and especially between 180 m and 185 m (all holes). Staining also occurs at 150 - 154 m (209-54), 196 - 204 m (209-51) and 210 - 214 m (209-50).

Significant quantities of sand were recovered from only a few levels. The sand developed around 180 m (corresponding to the interval occupied by Sand c) is generally fine (0.25-1 mm) or very fine, angular and commonly mainly quartz though some subrounded, poorly sorted, sand was collected from the top of this interval in hole 209-51. A very fine sand was collected from three holes around 210 m.

(b) Electric Logs

The sand horizons intersected during the drilling in Area "B" have been described here as equivalents to those intersected in Area "A". This only indicates that they occur at stratigraphically similar horizons to those in Area "A" (on evidence of vertical distances below Unit II and above Unit IV). In the sections the position of the top of Unit IV and, therefore, the position of the Sand f are tentative and could be moved down-section by approximately 10 m.

(i) Sand b equivalent

This composite sand interval occurs between 140 and 160 metres and is only well developed in hole 77-56 and moderately developed in 209-51. In other holes it consists of minor, thin, sands or silt with a very low sand to clay ratio.

(ii) Sand c equivalent

This sand interval occurs between 165 and 185 m and is again only well developed in 77-56. It also shows moderate to good development in 209-51 and in 209-52, minor development in 209-53 and consists of clay with minor silt in 209-50 and 209-54. The best sands appear to be developed at the base of the interval.

....

(iii) Sand d equivalent

This sand member, intersected at depths between 190 and 220 m usually contains at least three distinct sand bodies (see 209-52). It is developed to varying degrees in all the holes drilled with the poorest development in 209-50, where only two thin sands, one at the top and one at the bottom of the unit, occur.

(iv) Sand e equivalent

A thin sand which does not show up very well on the electric logs compared with the Sand e in Area "A".

(c) Gamma Logs

Radiometric anomalies in Area "B" can be divided into three groups each associated with a sand unit.

(i) The anomalies associated with the Sand b equivalent may be further subdivided into two groups. The upper anomaly occurs in all holes at the centre of Sand b with values ranging from 50-200 cps. The lower anomaly, at the base of the sand, also occurs in all holes with values ranging from 100 to 1350 cps.

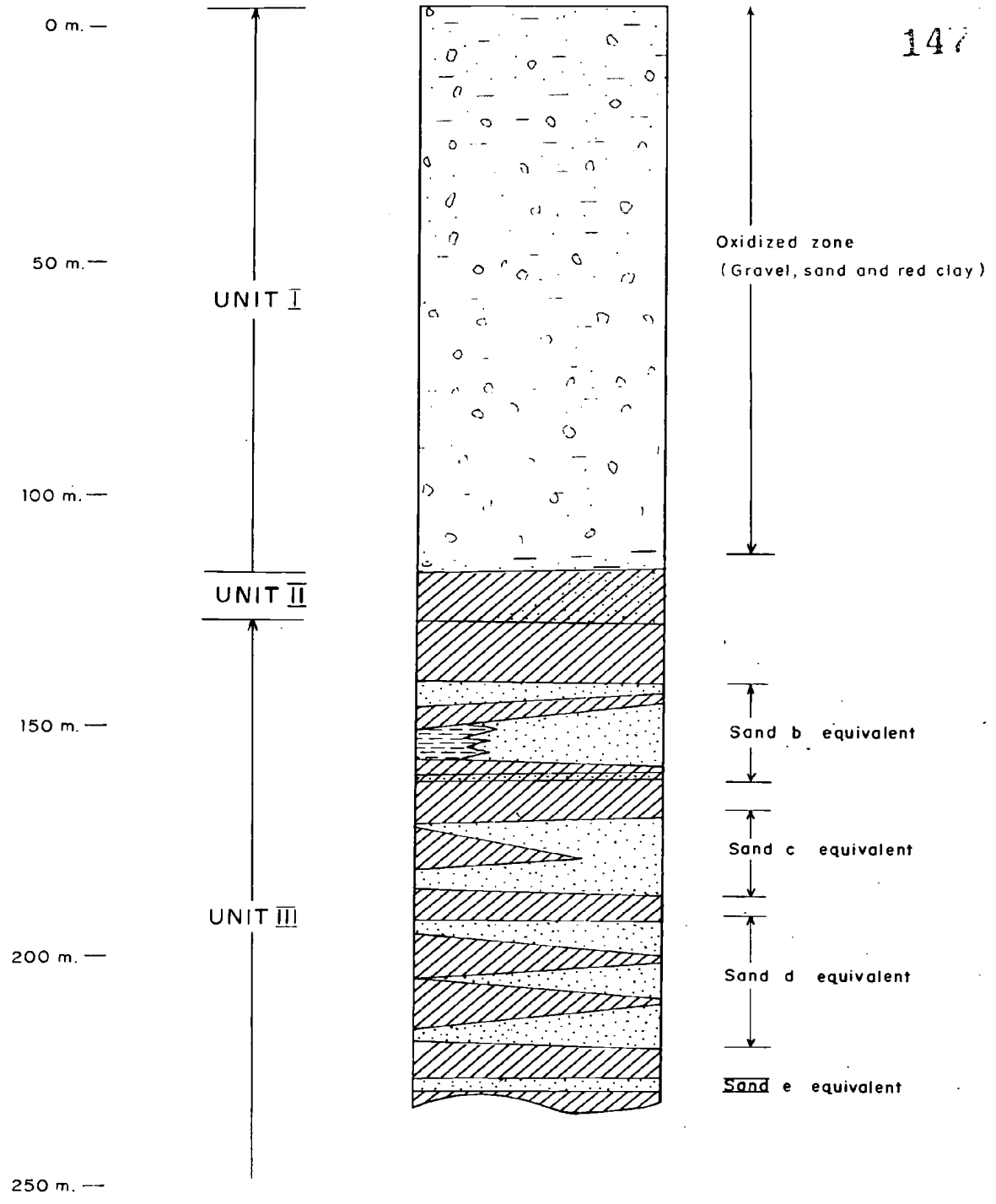
(ii) The anomalies within Sand c could also be subdivided into two with a single anomaly (500 cps) occurring at the top of the member (hole 209-50) and a moderate to strong anomaly (150-540 cps) in the basal sand in holes 77-56, 209-51 and 209-52. The lower of these two anomalies is the more interesting one in Area "B" occurring, as it does, within a well developed sand.

(iii) Medium to strong anomalies are developed in the thin sands at the top and bottom of Sand d in hole 209-50. Very minor anomalies are also developed in the lower part of this member in other holes in the area.

(d) Composite Section

A composite section, illustrating the lithological sequence in Area "B" is shown in Figure 6.

....



SIMPLIFIED COMPOSITE SECTION

(PARALANA AREA 'B')

LEGEND AS FOR FIGURE 2

FIGURE 6

BP MINERALS AUST PTY LTD	
Area LAKE FROME	
SOUTH AUSTRALIA	
Ref. U1/4-21	
MARCH 1977	D. M. TAYLOR

BASED ON TS 1748

(e) Stratigraphic Interpretation

The depositional environments described in the earlier part of this section (2.1 (e)) are, in general, similar to those postulated for Area "B". One major difference is that the sands in the Sand d equivalent do not, from the data to hand, appear to be channel sands of the type containing the mineralisation in Area "A". They appear to be rather uniform over the areas investigated (except in hole 209-50). A second difference is the increased development of Sand c. This member, which appears in three holes to contain good channel sands, exhibits marked radioactivity.

Further drilling will be required in this area before a more detailed interpretation is made. Such an interpretation could also be assisted by palaeontological studies on the drill cuttings.

3. CONCLUSIONS

I. Paralana Creek Area "A"

Twenty-seven holes were drilled in Area "A" during Drilling Programme II, 1976. Twelve of these holes intersected uranium mineralisation with radiometric grades exceeding 1 kg eU_3O_8/tonne within Sand d. This sand member has been subdivided into three sub-members d_0, d_1 and d_2. The best radiometric anomalies occur within d_1 (in sixteen holes) and d_2 (in five holes).

The depositional environment has been interpreted to be non-marine or marginal marine with channels, in which the sands of d_1 and d_2 were deposited, being incised into clays previously deposited in swamps or marches at the edge of a lake or sea. The sands of sub-member d_1 appear, from the evidence of the cored hole, to be very fine grained, rich in organic matter and deposited in a very low energy environment. It is expected that the sands of sub-member d_2 are similar. These sands are equivalent to those sands which host the Beverley deposits.

It appears possible that the Poontana Structure may have influenced the development of the sands and also the localisation of the uranium mineralisation.

....

II. Paralana Creek Area "B"

Five holes were drilled in Area "B" during Drilling Programme II, 1976. One hole intersected mineralisation with a radiometric grade exceeding 1 kg eU_3O_8/ tonne within the Sand b equivalent. Three additional holes intersected strong radiometric anomalies with counts greater than 200 cps. The most significant of these anomalies are probably those developed in a channel sand in the lower part of the Sand c equivalent though it should also be noted that the anomalies within the Sand b equivalent could form part of an aureol similar to that outlined by Haynes (1975) for the Beverley deposits.

4. RECOMMENDATIONS

Significant mineralisation has been located by holes drilled in both the Paralana Creek areas. A great deal of further work, mainly closed spaced drilling, will be required in both areas to outline the style and extent of the mineralisation. In addition the discovery of the mineralisation has upgraded the potential of Exploration Licence 209, in particular the southern portion, and further drilling on a regional scale is justified.

The mineralisation in the area occurs within, or very close to, sand filled palaeochannels. Two different drill patterns could be used to trace the position of these channels. One method is based, in the first instance, on a closely spaced grid (for example 50 metre) centred around and stepping out from the proven mineralisation. The alternative method would be to drill along lines whose positions are determined by predicting the location of the channel sands from known data.

The advantage of the first method is that the density of the holes is such that reliable ore reserve estimations could be made and the style of the mineralisation examined in detail. The disadvantage is that only small areas of ground are covered by a relatively large number of holes. The second method, on the other hand, can roughly outline the mineralisation using fewer holes but the spacing is too wide for ore reserve estimation and there is of course, a higher probability of drilling barren holes.

....

At this stage of the programme a combination of the two methods is recommended. This would involve drilling along lines spaced at least 200 m apart but drilling at 100 m spacing, or even 50 m spacing in areas of good mineralisation, along these lines.

I. Paralana Creek Area "A"

The drilling in this area should be initially aimed at proving the existance of a south western extention to Channel 1. Lower priority should be given to extending Channel 1 to the north east and also extending Channel 2.

This would be performed by drilling along Line A (Figure 7). A hole drilled at DS-6 should intersect both the d_1 and d_2 horizon. The second hole, regardless of the results from DS-6 would be drilled at DS-8. If both these holes intersected or failed to intersect mineralisation then the next hole would be a DS-10. Alternatively is DS-6 intersected mineralisation and DS-8 failed to then the next hole would be drilled at DS-7 and the following one at DS-4 etc. Providing mineralisation was intersected along Line A then drilling would be undertaken along Line B.

The northerly extension could be tested by a hole at DS-29 and, if this is barren, at DS-30. The north east extension of Channel 2 could be tested by holes drilled along Line C or Line D depending on the results from a hole drilled at DS-35. The south west extension could be briefly tested by a hole at DS-15.

II. Paralana Creek Area "B"

The priority target in Area "B" is the anomaly developed at the base of Sand c equivalent. The best way to initially appraise this anomaly would be to drill, at 100 m spacing, along lines to the east of holes 209-51 and 209-52 (see Fig.8) with closing up of the spacing if necessary.

The Sand d equivalent cannot be discounted as a potential host in this area and all holes at this stage should be drilled to intersect this member.

The persistant anomaly developed in the Sand b equivalent will require further investigation, probably of a regional nature, at a latter date.

....

III. Regional Studies

A review of all the data available from this part of the Lake Frome Embayment, in particular for the southern portion of the Exploration Licence and including the results from the drilling outlined in (i) and (ii) above, should be undertaken before any further drilling on a regional scale is planned.

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TABLE I

SUMMARY OF DATA FOR INTERVAL 200m - 230 m

	200 - 210 m				210 - 220 m				220 - 230 m				200 - 230 m	
HOLE No.	a	b	c	d	a	b	c	d	a	b	c	d	c	d
209-2*	5	3	1.0	25	2	0	0.4	30	3	0	0.7	30	0.7	30
209-3	5	5	0.3	20	4	3	0	50	4	3	0.3	45	0.2	50
209-4	5	5	0.3	20	2	1	0	40	2	5	0.3	30	0.2	40
209-5*	4	4	0.8	30	4	4	0.1	30	4	4	0.3	45	0.3	45
209-6	5	3	0.8	20	5	0	0	20	5	0	0.3	25	0.3	25
209-7	5	5	>9	90	5	5	0.5	750	4	4	0.3	30	1.1	750
209-8	5	4	5.7	20	5	4	2.3	2400	5	4	0.3	50	1.4	2400
209-9	0	0	0.7	20	0	0	0	75	4	3	0.2	30	0.2	75
209-10	4	3	0.5	15	4	2	0	20	4	3	0.3	90	0.3	90
209-11	5	1	3.0	40	5	1	0.4	80	5	1	0.4	60	0.8	80
209-12	5	1	0.7	15	5	2	0.8	1500	5	1	1.0	130	0.8	1500
209-13	4	3	1.5	10	4	1	0.4	70	4	0	0.4	30	0.7	70
209-14	5	3	1.5	15	5	3	0.8	55	5	1	0.1	30	0.6	55
209-15	4	4	5.7	15	2	2	0.3	20	3	4	0.8	55	1.1	55
209-16	3	1	0.7	35	2	0	0.3	20	3	0	0.1	45	0.3	45
209-17	5	5	0.4	15	5	1	0.5	25	4	0	0.4	40	0.5	40
209-18	3	1	4.0	10	2	1	0.3	30	2	1	0.4	30	0.8	30
209-19	5	4	1.5	10	5	4	0.2	20	5	0	0.1	25	0.4	25
209-20	2	0	1.2	60	2	0	0.3	500	2	0	0.3	20	0.5	500

Table I (Cont'd)

HOLE No.	200 - 210 m				210 - 220 m				220 - 230 m				200 - 230 m	
	a	b	c	d	a	b	c	d	a	b	c	d	c	d
209-21	4	3	0.7	80	5	1	0.5	650	2	0	0.3	30	0.5	650
209-22	5	5	0.7	20	5	4	0.7	100	5	0	0.4	20	0.6	100
209-23	5	4	9.0	10	5	4	0	20	5	5	0.2	25	0.5	25
209-24	5	4	> 9	50	5	4	1.0	3000	4	4	1.0	40	2.0	3000
209-25	4	4	9.0	130	4	4	2.3	1900	4	3	4.0	75	4.0	1900
209-26	5	3	1.0	20	5	3	1.5	90	5	2	0.5	350	0.9	350
209-27	5	5	0.3	185	5	4	0.3	2100	5	4	1.5	3600	0.5	3600
209-28	4	4	0.3	20	2	2	0.4	170	2	2	0.3	40	0.3	170
209-29	4	1	1.0	500	5	0	0.3	1450	5	0	0.3	75	0.4	1450
209-30	5	4	0.1	155'	5	4	0.4	140[2]	5	4	0.4	30	0.3	155
209-31	5	2	> 9	40	N.D.		3.5	4850	-	-	N.D.	-	N.D.	4850
209-32	5	2	0.8	15	5	4	1.0	875	2	4	0.3	35	0.6	875
209-33	5	2	0.4	10	2.	0	1.5	1950	4	0	0.4	30	0.7	1950
209-34	0	0	0.8	20	0	0	0.7	1500	2	0	1.5	500	0.9	1500
209-35	5	0	1.9	10	5	0	0.3	75	4	0	0.3	30	0.6	75
209-36	4	2	1.5	600'	2	0	0.4	550[2]	0	0	0.3	50	0.6	600
209-37	5	5	0.4	15	2	3	0.1	75	2	2	0.7	50	0.4	75
209-38	2	1	1.5	15	2	1	0.3	25	4	2	0.4	40	0.6	40
209-39	5	0	4.0	1750	4	0	1.9	825	2	0	0.5	50	1.5	1750
209-40	1	0	0.4	450	0	0	1.5	500	0	0	0.3	70	0.6	500
209-41	5	5	5.7	25	4	4	1.0	300	2	0	0.3	40	1.1	300
209-42	2	0	4.0	1450	1	0	1.0	255	0	0	0.7	50	1.3	1450
209-43	5	5	4.0	115	3	0	0.7	115	4	0	0.4	90	1.0	115

Table I
(Cont'd)

HOLE No.	200 - 210 m a	b	c	d	210 - 220 m a	b	c	d	220 - 230 m a	b	c	d	200 - 230 m c	d
209-44	4	4	0.7	20	0	0	0.4	95	2	0	0.4	35	0.5	95
209-45	3	0	0.4	50	5	2	0.3	750	2	2	0.3	50	0.3	750
209-46	4	3	4.6	55	1	0	0.3	50	0	0	0.4	50	0.8	55
209-47	5	1	0.7	35	4	0	1.0	775	4	0	0.7	280	0.8	775
209-48	2	1	0.7	20	2	0	0.4	30	2	0	0.3	40	0.4	40
209-49	2	2	0.4	460	0	0	0.2	95	1	0	0.4	30	0.3	460
77-44	-	N.D.	-	0.3	30	-	N.D.	-	0.4	235	-	N.D.	-	0.8	25	0.5	235
50	-	N.D.	-	0.7	50	-	N.D.	-	0.5	114	-	N.D.	-	0.4	25	0.5	114
52*	-	N.D.	-	0.7	25	-	N.D.	-	0.4	30	-	N.D.	-	0.4	35	0.5	35
53	-	N.D.	-	1.0	20	-	N.D.	-	0.8	500	-	N.D.	-	0.7	35	0.8	500

KEY

(a) Limonite staining
- 0 Minor or absent
- 1 Minor to fairly common
- 2 Fairly common
- 3 Fairly common to common
- 4 Common
- 5 Very common or abundant

(b) Hematite staining
(as above)

(c) Value of $\frac{\text{Sand thickness}}{\text{Clay thickness}}$

(d) Maximum counts per second for interval.

$_{1}$ Indicates at base of interval

$_{2}$ Indicates at top of interval

* Indicates that depths have been adjusted for these holes.

T A B L E II

DETAILS OF SUBDIVISIONS OF SAND d

HOLE NO.	SUB-MEMBER d_o		SUB-MEMBER d_1		SUB-MEMBER d_2	
	tm	ɣ	tm	ɣ	tm	ɣ
209 - 2	20	0	14	0	-	0
3	20	0	-	0	-	0
4	20	0	-	0	-	0
5	(20)*	0	-	0	(3)	0
6	19	0	-	0	(4)	0
7	(20)*	1	12	3	(4)	0
8	19	0	7	3	(4)	1
9	23	0	-	1	(4)	0
10	20	0	-	0	(4)	0
11	20	0	(15)	1	4	1
12	21	0	13	3	4	3
13	22	0	16	1	(2)	1
14	(23)*	0	17	0	8	1
15	22	0	18	0	5	1
16	24	0	(16)	0	(8)	0
17	23	0	16	0	(4)*	1
18	19	0	(16)	0	4	1
19	(24)*	0	17	0	-	0
20	19	0	(14)*	3	-	0
21	22	0	13	3	(4)	0
22	(20)*	0	-	0	6	2
23	23	0	17	0	(5)	0
24	20	0	13	3	4	1
25	23	1	16	3	2	1
26	22	0	-	0	4	3
27	25	0	14	3	2	3
28	20	0	14	3	(8)	0
29	20	0	14	3	(11)	1
30	(19)*	0	(11)*	1	(4)	0
32	(18)*	0	11	3	(6)	0
33	(21)*	0	13	3	(3)	0
34	(22)*	0	14	3	3	3
35	20	0	16	1	-	1
36	18	0	-	3	4	1
37	17	0	-	1	4	1
38	19	0	(13)	0	5	0
39	(19)*	0	11	3	4	2
40	22	0	11	3	4	2

HOLE NO.	SUB-MEMBER d_0		SUB-MEMBER d_1		SUB-MEMBER d_2	
	tm	ɣ	tm	ɣ	tm	ɣ
209 - 41	(19)*	0	(11)*	3	4	2
209 - 42	18	0	12	3	5	1
43	19	0	-	2	4	2
44	23	0	(11)*	0	4	1
45	22	0	(16)	0	(4)*	3
46	19	0	-	1	5	1
47	20	0	14	3	3	3
48	(20)*	0	-	0	6	1
49	(20)*	0	(11)	3	(2)	0
77 - 44	20	0	(14)*	0	4	3
77 - (50)	20	0	(9)	2	4	1
77 - 52	23	0	(14)*	0	(8)*	0
77 - 53	20	0	16	3	4	0

KEY :

tm = thickness from base of lowest sand within the horizon to the top of sand e.
(Values in brackets indicate poor sand development)
(* Indicates silt development)

ɣ = gamma anomalies

0 : no anomaly
1 : above background ($\leq$ 100 cps)
2 : $>$ 100 - 200 cps
3 : $>$ 200 cps.

158

139°38'E

77-55

30°16'S

30°16'S

77-56

53 50 52 DS-5 6 7 DS-8

51 DS-1 2 3 DS-4

54

139°38'E

30°17' S

77-58

L E G E N D

77-55 Drill hole (1975)

53 Drill hole (209- series, 1976)

DS-1 Proposed drill site

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SECTION
2608-W

POONTANA PROJECT, LAKE FROME S.A.

DRILL SITE LOCATION MAP

(in part of EL 209)

(PARALANA AREA 'A')

m. 200 0 200 400 600 m.

FIGURE 8

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: U1/4 - 21	
MARCH 1977	D. M. TAYLOR

BASED ON TS 1799

T 1739

139°35'

139°36'

30°15'

30°16'

77-48 ⊙

77-44 ⊙

77-50 ⊙

77-52 ⊙

77-53 ⊙

DS-29 ⊙

DS-30 ⊙

DS-31 ⊙

DS-37 ⊙

DS-39 ⊙

DS-14 ⊙

DS-27 ⊙

DS-1 ⊙

DS-15 ⊙

1 2 3 22 4 10 26 12 27 28 29 21 30 49 48 5 6 23 8 31 24 25 7 13 47 19 14 34 33 32 20 35 9 38 37 36 43 39 40 44 18 41 42 15 11 45 46 16 17

LINE A

LINE B

LINE C

LINE D

B.M. No. 7120 △

N

POONTANA PROJECT, LAKE FROME S.A.

DRILL SITE LOCATION MAP

Part of EL 209 (Paralana Area 'A')

SCALE : 1 cm. = 50 m.

metres 50 0 50 100 150 200 250 metres

LEGEND

77-53 ⊙ Drill hole (1975)

15 ⊙ Drill hole (209– series, 1976)

DS-31 ⊙ Proposed Drill Site

∘ Previously surveyed drill site

△ Bench mark

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DEPT. OF MINES
SECURITY
2608(V)

2608(V)-1

FIGURE 7

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: U 1/4 - 21	
NOVEMBER 1976	D. M. TAYLOR

T 1742

139°35'

139°36'

30°15'

30°16'

B.M. No 7120 △

77-48 ⊙ 1 | ⊙ 2 | 20 77-44 ⊙ | 20 ⊙ 3 | (20)* ⊙ 22 | 20 77-50 ⊙

20 ⊙ 4 | 20 ⊙ 10 | 22 ⊙ 26 | 21 ⊙ 12 | 25 ⊙ 27 | 20 ⊙ 28 | 20 ⊙ 29 | 22 ⊙ 21 | (19)* ⊙ 30 | (20)* ⊙ 49 | ?

(20)* ⊙ 5 | 19 ⊙ 6 | 23 ⊙ 23 | 19 ⊙ 8 | ⊙ 48 | ⊙ 20 | 31 (core hole) | 23 ● 25 | (20)* ● 7 | 22 ⊙ 13 | ⊙ 24 | 20 ⊙ 47

?

(24)* ⊙ 19 | (23)* ⊙ 14 | (22)* ⊙ 34 | (21)* ⊙ 33 | (18)* ⊙ 32 | 19 ⊙ 20 | 20 ⊙ 35

23 ⊙ 9 | ?

(19)* ⊙ 41 | (19)* ⊙ 39 | 22 ⊙ 40 | 23 ⊙ 44 | 19 ⊙ 18 | 18 ⊙ 42

19 ⊙ 38 | 17 ⊙ 37 | 18 ⊙ 36 | 19 ⊙ 43 | 20 77-53 ⊙ | 22 ⊙ 15 | 20 ⊙ 11 | 22 ⊙ 45

23 77-52 ⊙ | 19 ⊙ 46

24 ⊙ 16

23 ⊙ 17

N

LEGEND

77-53 ⊙	Drill hole (1975)
⊙ 15	Drill hole (209- series, 1976)
21 ⊙	Vertical distance (metres) above sand
	( ) indicates poor sand development
	* indicates silt developed
⊙	No radiometric anomaly
●	Radiometric anomaly (<100 cps)
▲	Radiometric anomaly (100-200 cps)
■	Radiometric anomaly (>200 cps)
— —	Sand/silt boundary
△	Bench mark

POONTANA PROJECT, LAKE FROME S.A.

LOCATION OF SANDS (HORIZON do)

Part of EL 209 (Paralana Area 'A')

SCALE : 1 cm = 50 m.

metres 50 0 50 100 150 200 250 metres

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30 MAR 1977
DEPT. OF MINES
SECURITY
2608

FIGURE 3(c)

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: U1/4-21	
MARCH 1977	D. M. TAYLOR

2608(IV)-2

T 1741

139°35'

139°36'

30°15'

30°16'

B.M. No 7120 △

(CHANNEL 3)

15m

channel edge

sand / silt limit

77-48

77-44 (14)*

77-50 (9)

77-52 (14)*

77-53

CHANNEL 1

CHANNEL 2

?

N

LEGEND

77-53 ⊙	Drill hole (1975)
⊙ 15	Drill hole (209 - series, 1976)
14 ⊙	Vertical distance (metres) above sand ( ) indicates poor sand development * indicates silt developed
⊙	No radiometric anomaly
●	Radiometric anomaly (<100cps)
▲	Radiometric anomaly (100-200cps)
■	Radiometric anomaly (>200cps)
	Channel edge
	15m contour (within channel)
	Sand / silt limit
△	Bench mark

POONTANA PROJECT, LAKE FROME S.A.

LOCATION OF CHANNEL SANDS (SUB-MEMBER d1)

Part of EL 209 (Paralana Area 'A')

SCALE : 1cm. = 50m.

metres 50 0 50 100 150 200 250 metres

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DEPT. OF MINES
SECURITY
2608

FIGURE 3(b)

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: U1/4-21	
MARCH 1977	D. M. TAYLOR

2608 (IV)-3

T 1740

139°35'

139°36'

30°15'

30°16'

B.M. No. 7120 △

channel edge
sand/silt limit
(CHANNEL 3)
sand/silt limit
sand/silt limit
CHANNEL 1
5m
channel edge
sand/silt limit
5m
CHANNEL 2
5m
channel edge
channel edge
?

77-48 ⊙ 1 | 2 | 77-44 ■ 4 | 3 | 4 ⊙ | (4) ⊙ 10 | 6 ■ 22 | 77-50 ● 4 | 5m channel edge

4 ■ 26 | 4 ■ 12 | 2 ■ 27 | (8) ⊙ 28 | (11) ● 29 | (4) ⊙ 21 | (4) ⊙ 30 | (2) ⊙ 49

(3) ⊙ 5 | (4) ⊙ 6 | (5) ⊙ 23 | (4) ● 8 | 6 ● 48 | 4 ● 24 | 2 ● 25 | (4) ⊙ 7 | (2) ● 13

3 ■ 47

8 ● 14 | 3 ■ 34 | (3) ⊙ 33 | (6) ⊙ 32 | ⊙ 20 | ● 35

19 ⊙

(4) 37 ⊙ 9

5m

4 ▲ 41

5 ⊙ 38 | 4 ● 37 | 4 ● 36 | 4 ▲ 43 | 4 ▲ 39 | 4 ▲ 40 | 4 ● 44 | 4 ● 18

5 ● 15 | 4 77-53 ⊙ | 5 ● 42 | (4)* ■ 45 | 4 ● 11 | 5 ● 46

(8)* 77-52 ⊙

(8) ⊙ 16

(4)* ● 17

N

LEGEND

77-53 ⊙	Drill hole (1975)
⊙ 15	Drill hole (209- series, 1976)
4 ⊙	Vertical distance (metres) above sand ( ) indicates poor sand development * indicates silt developed
⊙	No radiometric anomaly
●	Radiometric anomaly (<100 cps)
▲	Radiometric anomaly (100-200 cps)
■	Radiometric anomaly (>200 cps)
	Channel edge
	5m contour (within channel)
	Sand/silt limit
△	Bench mark

POONTANA PROJECT, LAKE FROME S.A.

LOCATION OF CHANNEL SANDS (SUB-MEMBER d_2)

Part of EL 209 (Paralana Area 'A')

SCALE : 1 cm. = 50 m.

metres 50 0 50 100 150 200 250 metres

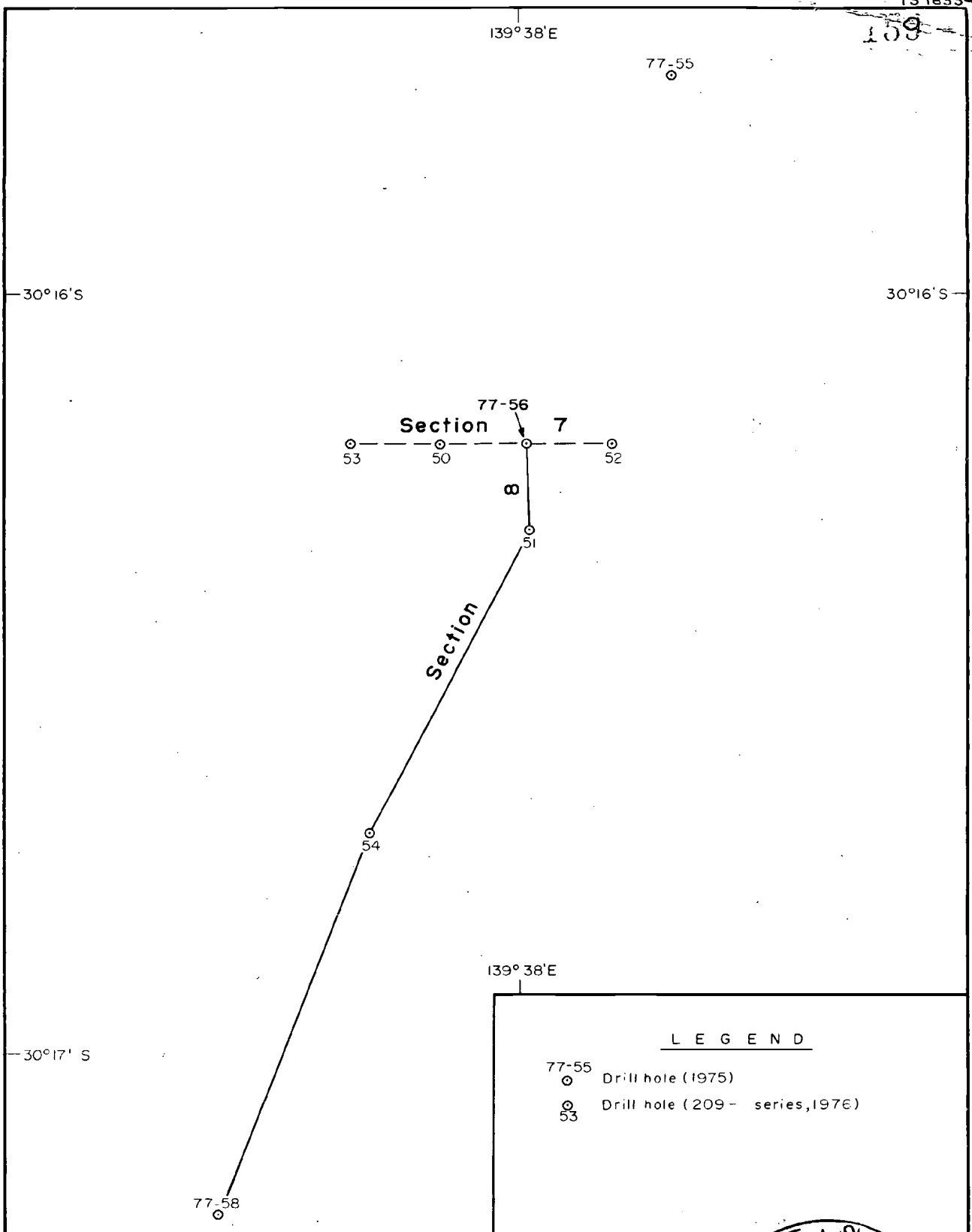
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SECURITY
2608-IV

FIGURE 3(a)

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: U1/4 - 21	
MARCH 1977	D. M. TAYLOR

2608(IV)-4

TS 1833



POONTANA PROJECT, LAKE FROME S.A.

SECTION LOCATION MAP

(in part of EL 209)

(PARALANA AREA 'B')

m 200 0 200 400 600 m

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FIGURE 2·10

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref. U1/4-21	
MARCH 1977	D. M. TAYLOR

BASED ON TS1799

T1724

139°35'

139°36'

30°15'

30°16'

77-48 89·93

1 85·20

2 67·25

3 78·17

77-44 67·85

3 63·50

22 62·99

77-50 63·65

4 64·03

10 64

Section 1

26 64 12 64 27 64 28 64 29 64 21 64 30 64 49 64

5 65·15

6 64·76

Section 2

23 65 8 65·19 48 65 31 (core hole) 24 65 25 65 7 65·16

Section 5

47 65

13 65

B.M. No. 7120 △ 70·85

19 65·51

Section 3

14 65·5 34 65·5 33 65·5 32 65·5 20 65 35 65·5

9 65·45

Section 4

38 65·8 37 65·70 36 65·5 43 65·5 39 65·32 40 65·5 44 65·5

41 65·5 42 65·5 45 65·5

Section 6

77-53 65·95

15 65·76

11 65·65

18 65

46 65

N

77-52 66·44

15 66·50

16 66·32

17 66·20

18 65·98

19 65·86

20 65·89

21 65·90

16 66

22 66·54

22 66·33

23 66·16

24 66·0

25 66·0

26 65·89

27 65·52

17 65·13

28 65·98

35 66·26

33 66·29

34 66·31

LEGEND

77·53 ○ Drill hole (1975)

○ 15 Drill hole (209– series, 1976)

25 ° Drill site (1976)

△ Bench mark

66·44 Elevation in metres

Sect. 1 2 5 Correlated sections (see Figs. 2·1 – 2·8)

POONTANA PROJECT, LAKE FROME S.A.

SECTION LOCATION MAP

Part of EL 209 (Paralana Area 'A')

PROGRAMME II

SCALE : 1 cm. = 50 m.

metres 50 0 50 100 150 200 250 metres

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DEPT. OF MINES
SECTION
2608-IV

FIGURE 2·9

BP MINERALS AUST. PTY LTD	
Area LAKE FROME	
SOUTH AUSTRALIA	
Ref U1/4-21	
FEBRUARY 1977	D. M. TAYLOR

2608(IV)-5

BASED ON T1634

T 1706

209-53

ELEV. 77m.

209-50

ELEV. 77m.

77-56

ELEV. 77m.

209-52

ELEV. 77m.

GAMMA

RES.

S.P.

UNIT I

WESTERLY

EASTERLY

DATUM M.S.L.

UNIT II

UNIT III

UNIT IV

UNIT V

SAND b equivalent

SAND c equivalent

SAND d equivalent

SAND e equivalent

? SAND f equivalent

DEPTH 232m.

DEPTH 232 m

DEPTH 232m.

DEPTH 348m.

LEGEND

- MIXED CLASTICS [x]
- GRAVEL
- SAND
- SILT
- CLAY
- CARBONATE
- CARBONACEOUS [x]

[x] Used for pre 1976 logs only.

1976
POONTANA PROJECT

PROGRAMME II

EL-209

PARALANA CREEK AREA 'B'
SECTION 7

SCALES

HORIZONTAL: 1 cm. = 20 m.

VERTICAL: 1 cm. = 6 m.

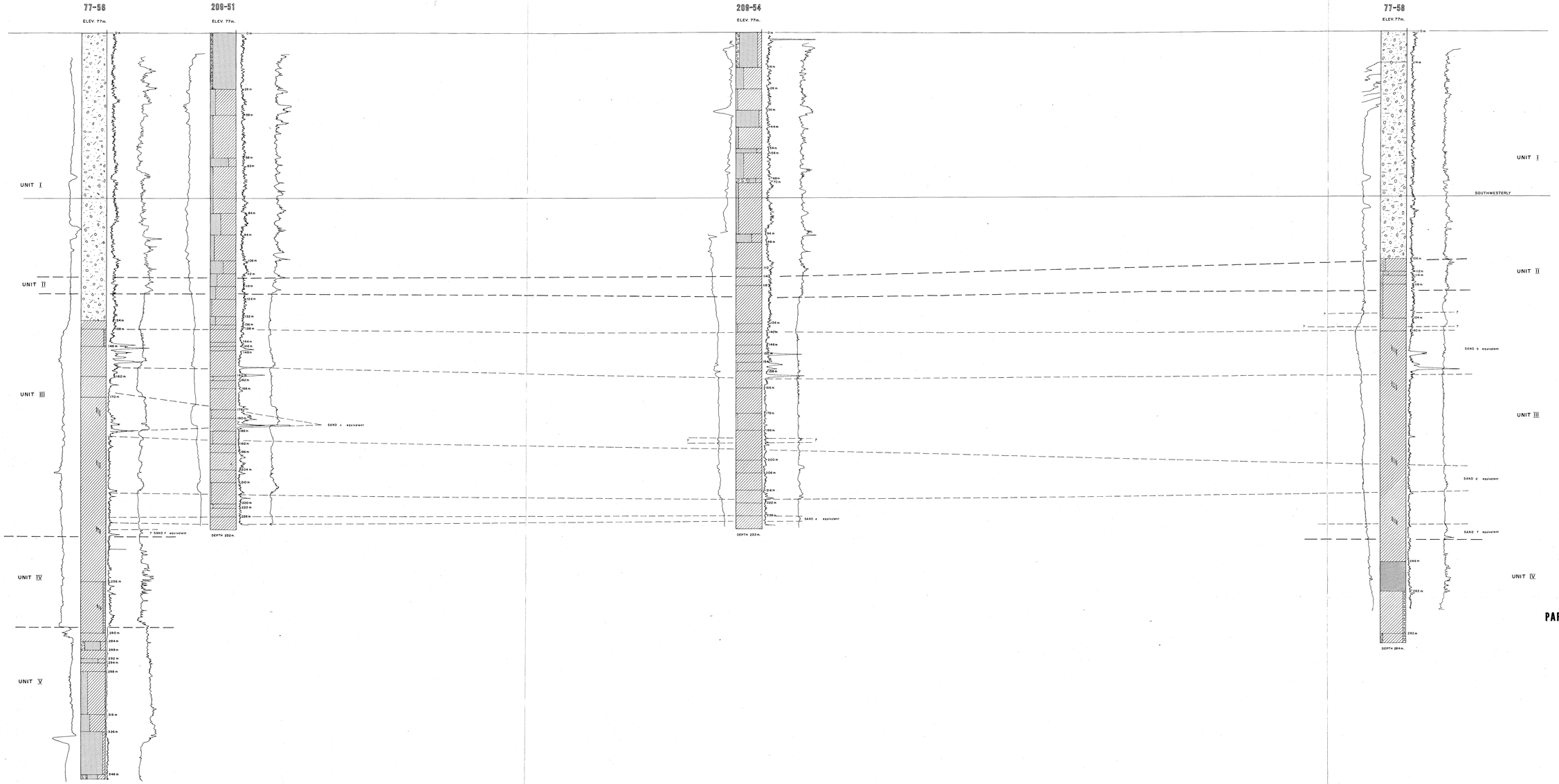
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30 MAR 1977
DEPT. OF MINES
SECURITY
2608-IV

FIGURE 2-7

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: U1/4-21	
FEBRUARY 1977	D. M. TAYLOR

2608 (IV)-6

T 1707



LEGEND

- MIXED CLASTICS *
- GRAVEL
- SAND
- SILT
- CLAY
- CARBONATE
- CARBONACEOUS *

* Used for pre 1976 logs only.

1976
POONTANA PROJECT
PROGRAMME II
EL-208

PARALANA CREEK AREA 'B'
SECTION 8

SCALES
HORIZONTAL : 1cm.= 20m.
VERTICAL : 1cm.=8m.

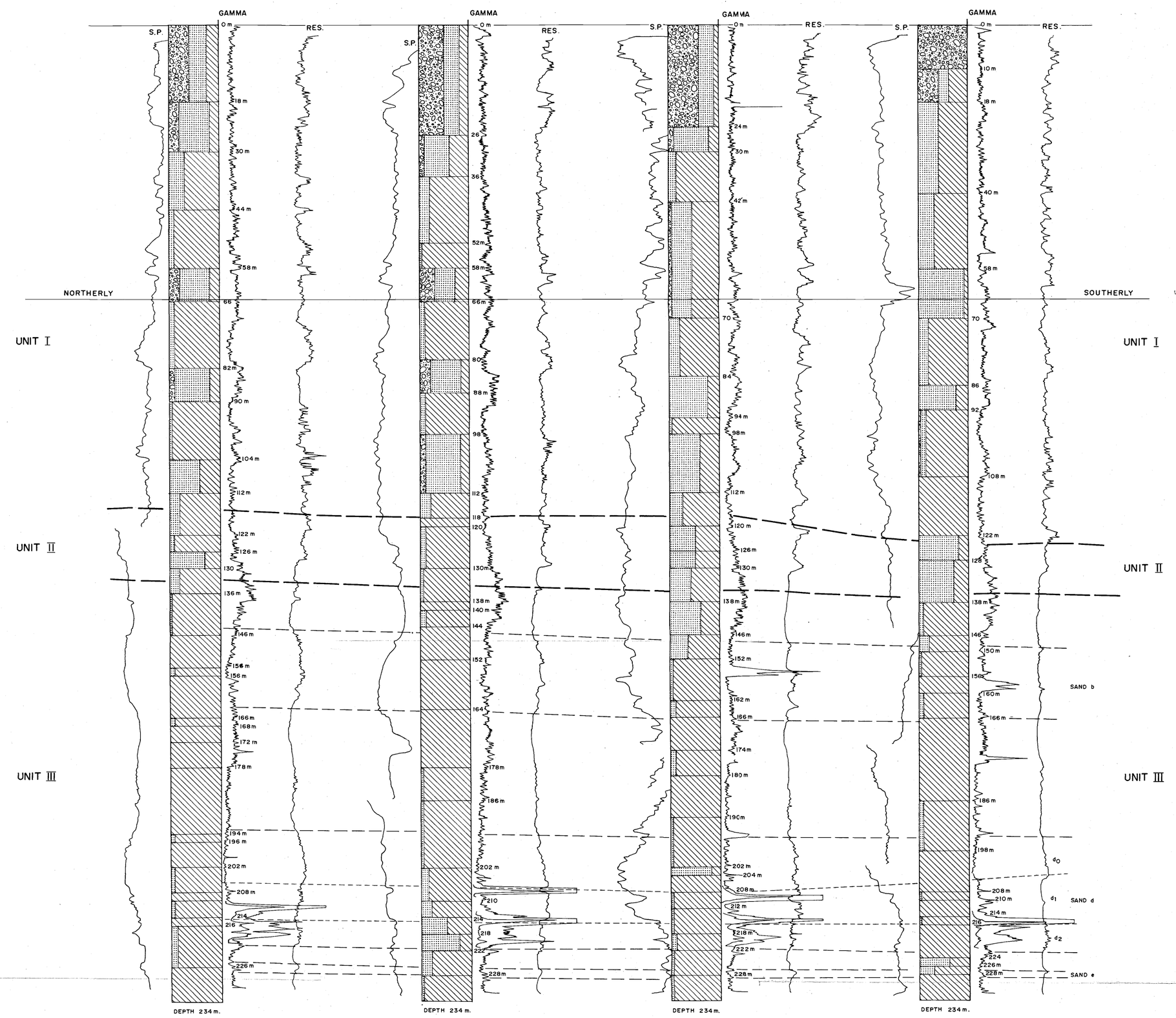
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3 0 MAR 1977
DEPT. C
SECL

FIGURE 2-8

BP MINERALS AUST. PTY LTD	
Area:	LAKE FROME
	SOUTH AUSTRALIA
Ref:	1976-21
FEBRUARY 1977	D. W. TAYLOR

2608(IV)-7

T 1705



1976
POONTANA PROJECT

PROGRAMME II
EL-209

PARALANA CREEK AREA 'A'
SECTION 6

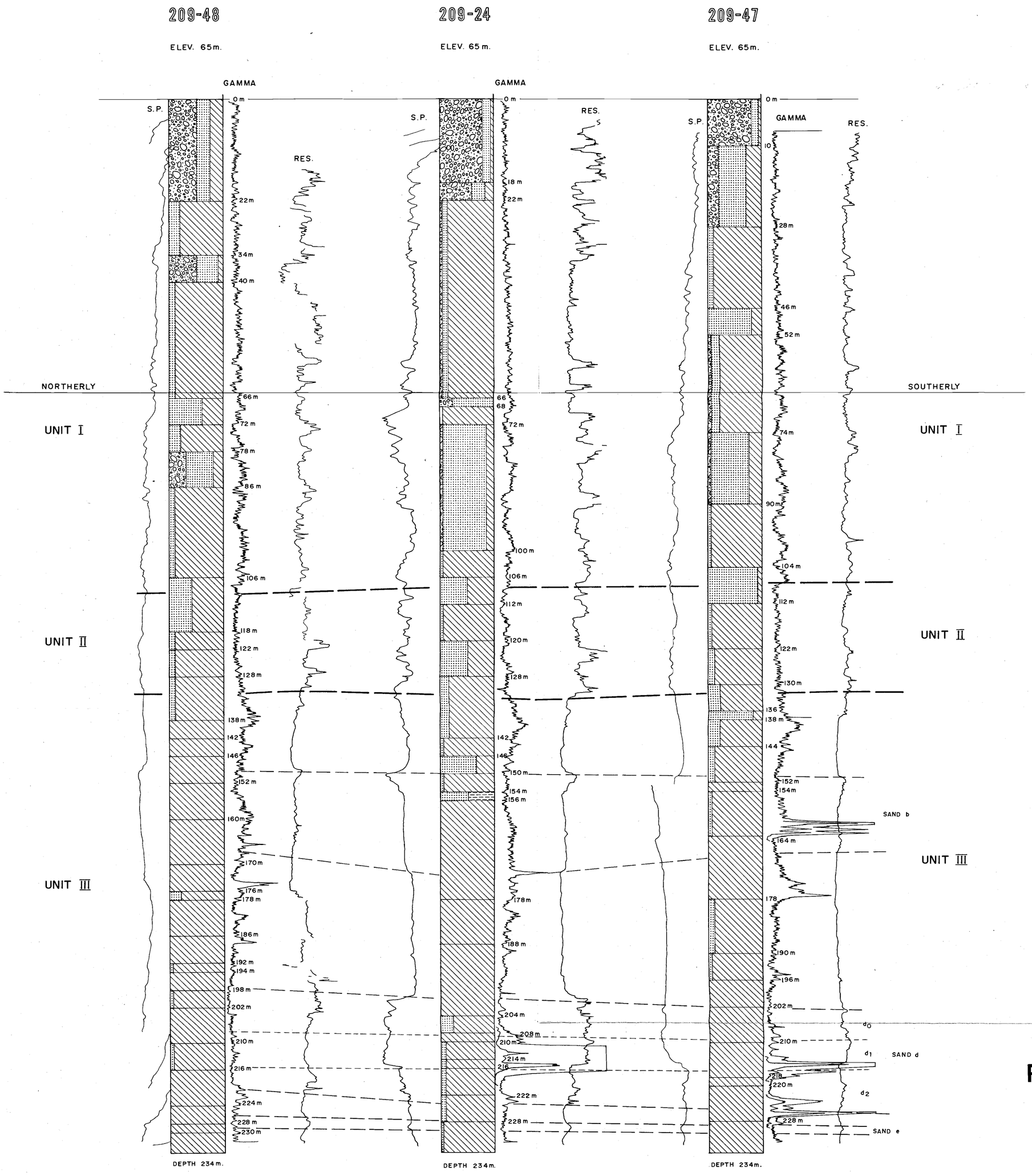
SCALES
HORIZONTAL : 1 cm. = 5 m.
VERTICAL : 1 cm. = 6 m.

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DEPT. OF MINES
SECURITY
2608(II)

2608 (II) - 8

FIGURE 2·6

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME SOUTH AUSTRALIA	
Ref: U1/4-21	
DECEMBER 1976	D. M. TAYLOR



LEGEND

- GRAVEL
- SAND
- SILT
- CLAY
- CARBONATE

1976
POONTANA PROJECT

PROGRAMME II
EL-209

PARALANA CREEK AREA 'A'
SECTION 5

SCALES

HORIZONTAL : 1 cm. = 5 m.

VERTICAL : 1cm. = 6m.

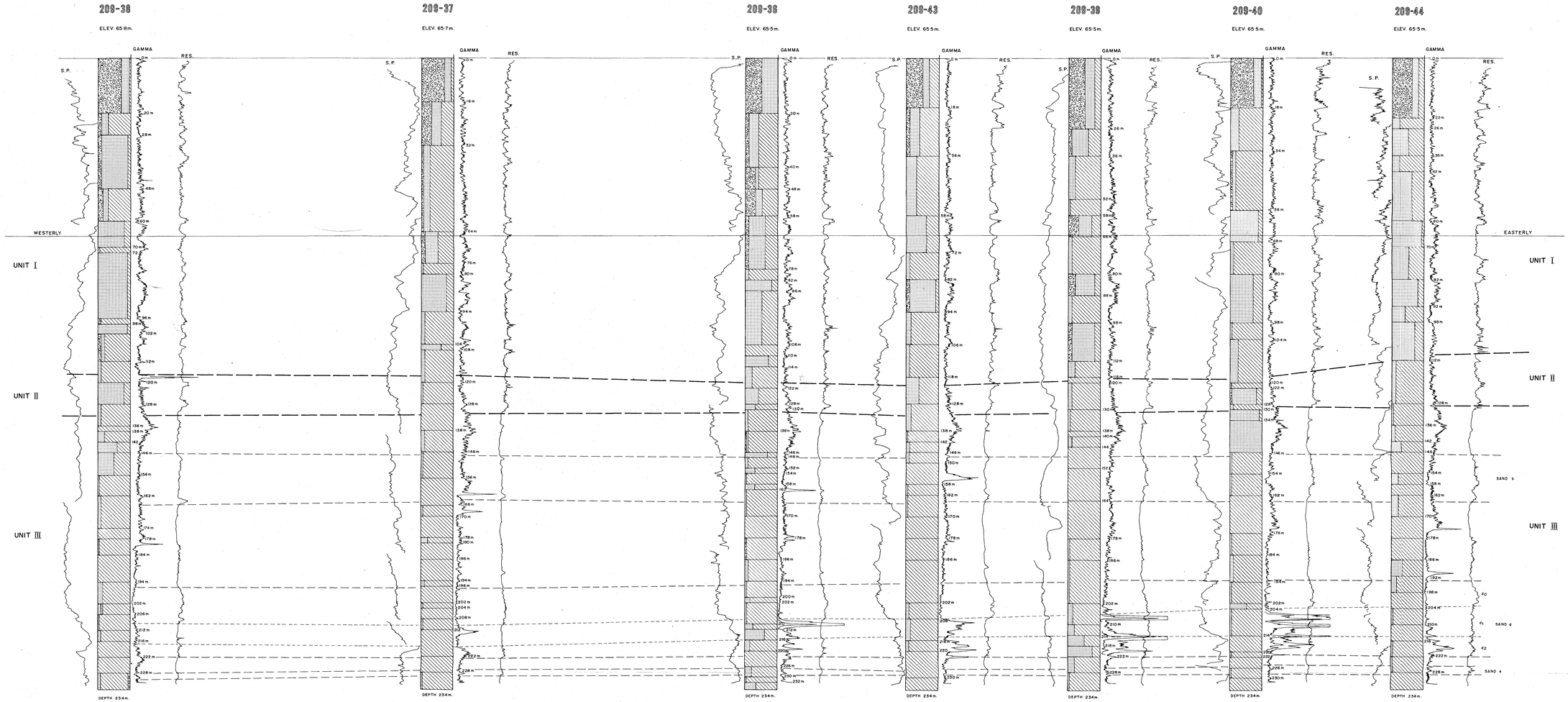
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DEPT. OF MINES
SECURITY
2608-IV

2608 (IV)-9

FIGURE 2·5

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: U1/4-21	
DECEMBER 1976	D. M. TAYLOR

T 1703



LEGEND

GRAVEL
SAND
SILT
CLAY
CARBONATE

1976
POONTANA PROJECT

PROGRAMME II
EL-209

PARALANA CREEK AREA 'A'
SECTION 4

SCALES
HORIZONTAL : 1 cm. = 5 m.
VERTICAL : 1 cm. = 6 m.

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DEPT. OF MINES
SECURITY

2608(IV))-10

FIGURE 2-4	
BP MINERALS AUST. PTY LTD	
Area:	LAKE FROME
	SOUTH AUSTRALIA
Ref:	UHA-21
DECEMBER 1976	D. M. TAYLOR

T 1702

209-14

ELEV. 65·5m.

209-34

ELEV. 65·5m.

209-33

ELEV. 65·5m.

209-32

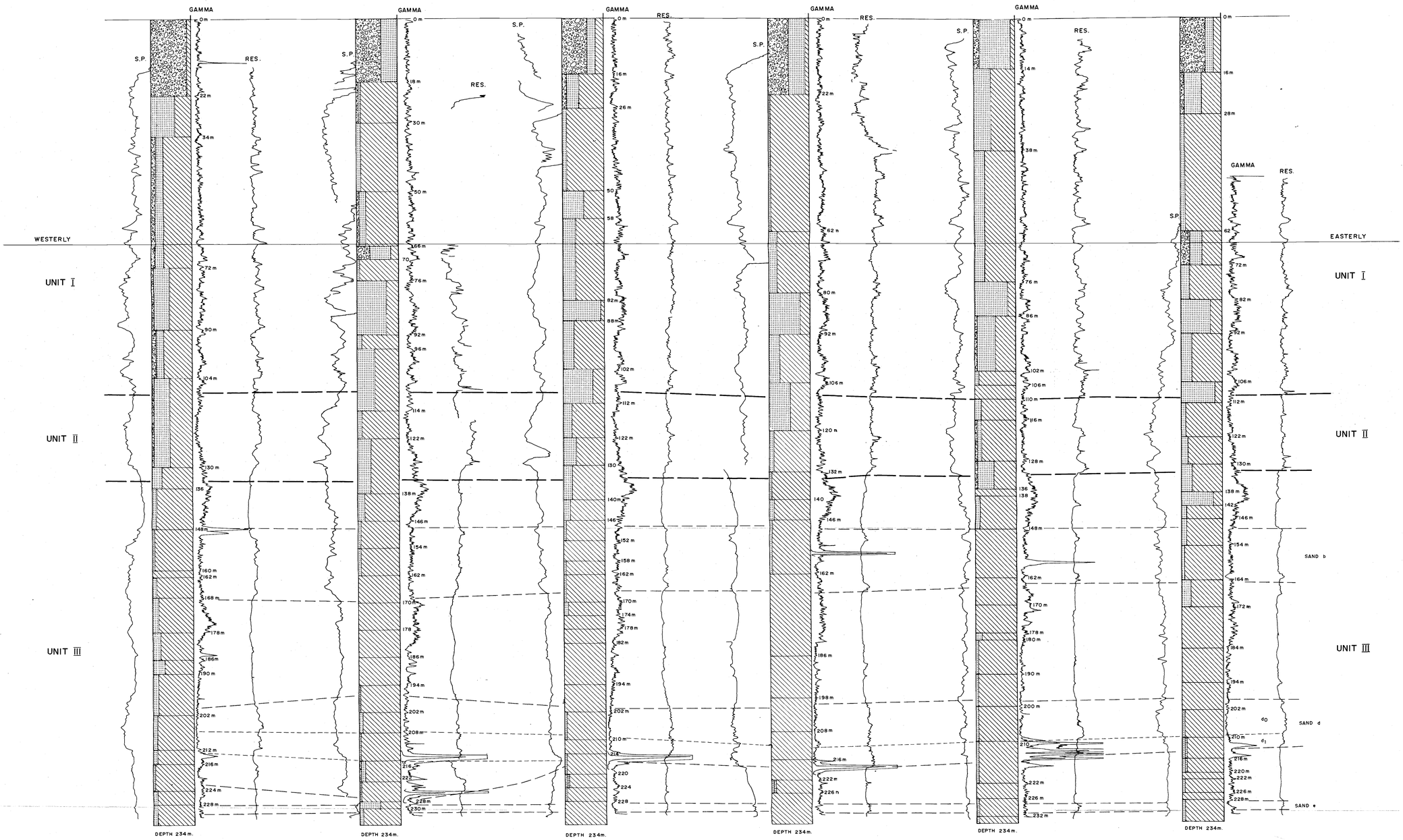
ELEV. 65·5m.

209-20

ELEV. 65m.

209-35

ELEV. 65·5m.



LEGEND

- GRAVEL
- SAND
- SILT
- CLAY
- CARBONATE

1976

POONTANA PROJECT

PROGRAMME II

EL-209

PARALANA CREEK AREA 'A'

SECTION 3

SCALES

HORIZONTAL : 1 cm. = 5 m.

VERTICAL : 1cm.=6m.

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30 MAR 1977
DEPT. OF MINES
SECURITY

2608 (IV)-11

FIGURE 2·3

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: U1/4-21	
DECEMBER 1976	D. M. TAYLOR

T 1701

209-23

ELEV. 65m.

209-8

ELEV. 65·19m.

209-24

ELEV. 65 m.

209-25

ELEV. 65 m.

209-7

ELEV. 65·16 m.

S.P. GAMMA RES.

WESTERLY

EASTERLY

UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V

SAND b

SAND c

SAND d

SAND e

SAND f

DEPTH 234m.

DEPTH 288m.

LEGEND

GRAVEL

SAND

SILT

CLAY

CARBONATE

1976
POONTANA PROJECT

PROGRAMME II

EL-209

PARALANA CREEK AREA 'A'
SECTION 2

SCALES

HORIZONTAL : 1 cm. = 5 m.

VERTICAL : 1cm. = 6m.

3 0 MAR 1977
D.
2608-IV

FIGURE 2·2

BP MINERALS AUST. PTY LTD	
Area:	LAKE FROME
	SOUTH AUSTRALIA
Ref:	U1/4-21
DECEMBER 1976	D. M. TAYLOR

2608(IV)-12

T 1700

209-26 | 209-12 | 209-27 | 209-28 | 209-29 | 209-21 | 209-30 | 209-49

ELEV. 64 m.

GAMMA · S.P. · RES.

WESTERLY — EASTERLY

UNIT I

UNIT II

UNIT III

DEPTH 240m. | DEPTH 234m. | DEPTH 234m. | DEPTH 240m. | DEPTH 234m. | DEPTH 234m. | DEPTH 234m. | DEPTH 232 m.

SAND b · SAND d · SAND e

LEGEND

- GRAVEL
- SAND
- SILT
- CLAY
- CARBONATE

1976
POONTANA PROJECT

PROGRAMME II
EL-209

PARALANA CREEK AREA 'A'
SECTION 1

SCALES
HORIZONTAL : 1 cm. = 5 m.
VERTICAL: 1 cm = 6m.

RECEIVED
3 0 MAR 1977
DEPARTMENT OF MINES

FIGURE 2-1

BP MINERALS AUST. PTY LTD	
Area:	LAKE FROME
	SOUTH AUSTRALIA
Ref:	U1/4-21
DECEMBER 1976	D. M. TAYLOR

2608(IV)-13

BP House, 1 Albert Road, Melbourne 3004
Telephone 26 6911

April, 13th., 1977.

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QUARTER ENDING MARCH 1977

PROSPECTIVE STATUS OF EL 209

Drilling over Exploration Licence 209 has intersected an aureole of radioactivity occurring at depths between 205 and 225 m. Nineteen holes drilled in the southern portion of the licence have intersected uranium mineralisation with radiometric grades exceeding 1 kg e U_3O_8/tonne.

Additional mineralisation has been intersected at a shallower depth, at 155 m and 178 m, in holes drilled approximately four kilometers to the east of the area containing the aureole described above.

Electric logs from the holes drilled in these areas indicate that sand bodies are frequently well developed here. These sands occur within a sequence which is very similar, or even stratigraphically equivalent, to that containing the Beverley uranium deposits.

The area covered by Exploration Licence 209, in particular the southern portion, is considered to be very prospective and further drilling recommended.

Dr. J. H. Hills,
Minerals Exploration Manager.

The Director of Mines,
Department of Mines,
G.P.O. Bo x 151
EASTWOOD S.A. 5063

RECEIVED
19 APR 1977
DEPT. OF MINES
SECURITY
2608-V

Postal Address: G.P.O. Box 5222 BB, Melbourne 3001

BP Minerals Australia Proprietary Limited
Incorporated in Victoria

1 Albert Road, Melbourne
Postal Address: G.P.O. Box 5222BB, Melbourne, 3001
Telephone: 26-6911 Telex: 30166 Telegraphic Address: "Austbeepee", Melbourne

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W

The Director of Mines,
Department of Mines,
G.P.O. Box 151,
EASTWOOD S.A. 5063

Our Reference	Your Reference	Telephone Ext'n	Date
U/14/2		343	6th. April, 1977.

Dear Sir,

EXPLORATION LICENCE 209 - QUARTERLY REPORT FOR THE PERIOD ENDED MARCH 1977.

The request for an amalgamation of expenditure commitments covering Exploration Licences 203, 209 and 210 was agreed to by the Honorable, The Minister for Mines.

An open hole rotary drilling programme commenced on March 20th, over the southern portion of the licence, and was completed on April 1st. A total of thirteen holes were drilled and logged to an average (probe) depth of 235.8 metres. Eleven of the holes were drilled in the Paralana Creek "A" Area (Nos. 209-55 to 209-65) and two in the Paralana Creek "B" Area (Nos. 209-66 and 209-67). The locations of the holes are shown in the accompanying figures. A summary of the radiometric grades intersected are given in Table 1.

The drilling failed to extend, significantly, the mineralisation previously intercepted at depths between 200 m and 230 m. There are, however, some indications that mineralisation at this depth may occur to the east of the existing drill holes in Area "A". The mineralisation intercepted at 160 m in hole 209-62 appears to occur within a silt/clay sequence (from electric logs) and that at 137 m in hole 209-63 within a clay band.

..2

The results from the two holes drilled in Area "B" are encouraging with the larger of the two anomalies (at 177 m in hole 209-66) occurring within well defined sands.

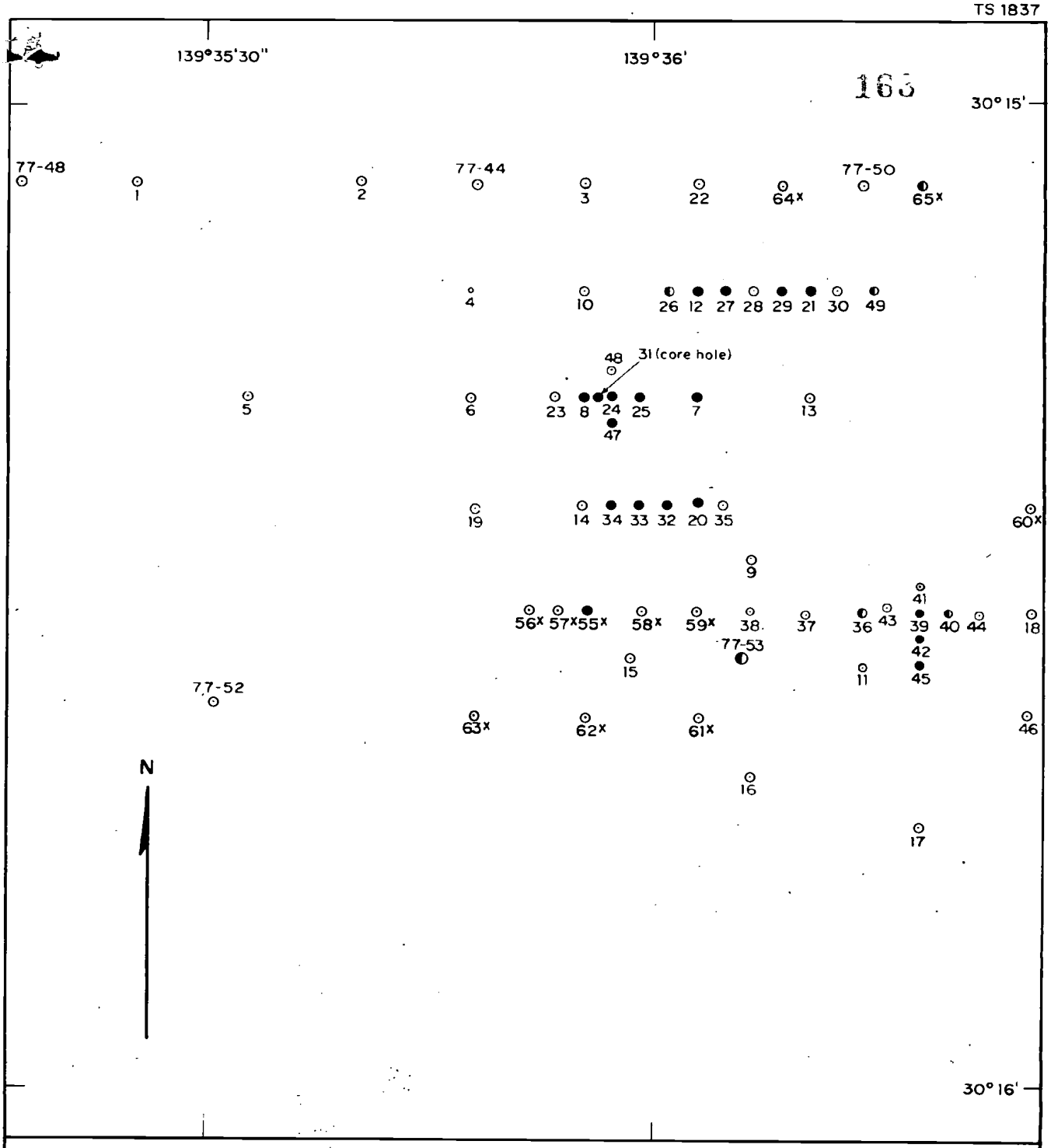
A preliminary report on the drilling will be forwarded, under separate cover, on completion.

A Quarterly Expenditure Statement will be forwarded under separate cover, as soon as all the expenditures to the end of March are available.

Yours faithfully,

Dr. J. H. Hills,
Minerals Exploration Manager.

Encl.



POONTANA PROJECT, LAKE FROME S.A.

DRILL HOLE LOCATION MAP

(in part of EL 209)

SCALE : 1 cm. = 100m.

m. 100 0 100 200 300 400 500 m.

LEGEND

77-53 ⊙ Drill hole (1975)

⊙ 2 Drill hole (209- series, 1976)

● 8 Drill hole containing radiometric grades exceeding 1 kg eU_3O_8/tonne (200m. - 230m.)

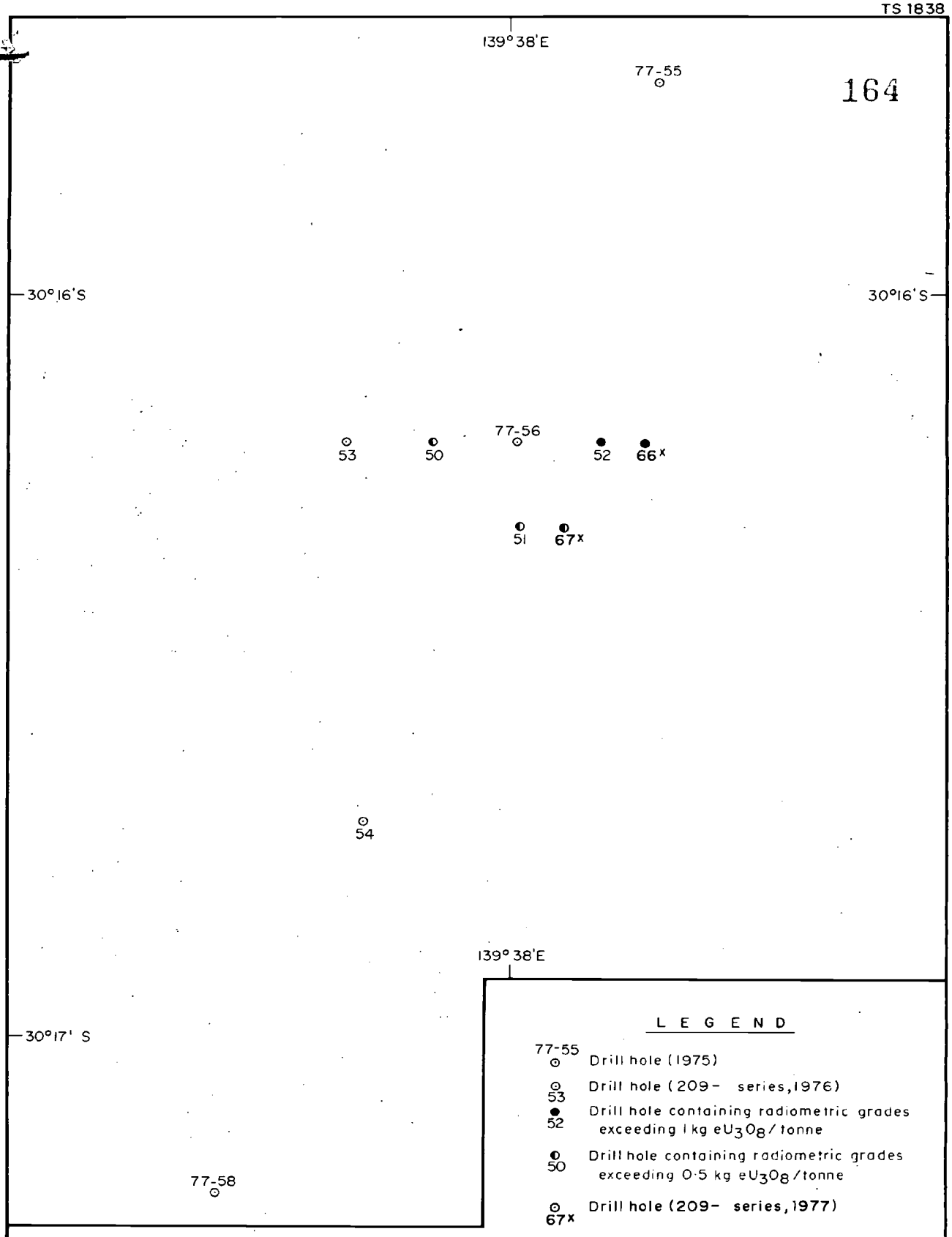
◐ 49 Drill hole containing radiometric grades exceeding 0·5 kg eU_3O_8/tonne (200m. - 230m.)

⊙ 62x Drill hole (209- series, 1977)

FIGURE 1

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref:	
APRIL 1977	MINERAL BRANCH

BASED ON TI593



L E G E N D

77-55 Drill hole (1975)

53 Drill hole (209- series, 1976)

52 Drill hole containing radiometric grades exceeding 1 kg eU_3O_8 / tonne

50 Drill hole containing radiometric grades exceeding 0·5 kg eU_3O_8 / tonne

67x Drill hole (209- series, 1977)

POONTANA PROJECT, LAKE FROME S.A.

DRILL HOLE LOCATION MAP

(in part of EL 209)

(PARALANA AREA 'B')

m. 200 0 200 400 600 m.

FIGURE 2

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref:	
APRIL 1977.	MINERAL BRANCH

BASED ON TS 1799

T A B L E 1

DETAILS OF RADIOMETRIC GRADES

HOLE NO.	INTERVAL (metres)	THICKNESS (metres)	RADIOMETRIC GRADE eU_3O_8 kg/tonne.
"A" AREA			
209-55	147.8-148.4	0.6	0.31
	216.8-217.2	0.4	2.60
209-57	141.3-142.1	0.8	0.32
209-58	214.0-214.7	0.7	0.24
	215.6-216.1	0.5	0.31
209-60	207.4-208.3	0.9	0.38
209-62	160.0-160.4	0.4	1.28
209-63	137.3-137.9	0.6	0.53
209-65	207.4-207.9	0.5	0.97
"B" AREA			
209-66	177.0-178.2	1.2	1.30
	178.4-178.7	0.3	1.27
209-67	156.2-156.5	0.3	0.29
	159.6-160.1	0.5	0.56

DMT/YT

6/4/1977.

OILMIN N.L.
TRANSOIL N.L.
PETROMIN N.L.
MINES ADMINISTRATION PTY LTD
TETON EXPLORATION DRILLING CO. PTY LTD
BP MINERALS AUSTRALIA PROPRIETARY LTD

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U/14/1

13th. May, 1977.

PRIMARY AGREEMENT

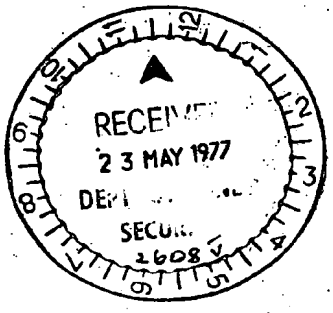
EXPLORATION LICENCES 203, 209 & 210 (68, 77 & 91)- SOUTH AUSTRALIA

QUARTERLY EXPENDITURE REPORT

In accordance with Clause 8 of the above agreement, BP hereby reports on the operations and results for the quarter ending March 1977.

	EL 203	EL 209	EL 210
EXPLORATION			
Geological Services		4,326	
Geochemical Services		627	
Drilling Services		20,283	
Consumable Field Stores		82	
OPERATIONS			
Vehicle Operating		346	
Rental of Equipment		147	
Travelling Expenses		9	
Personnel Services		603	
Salaries and Wages		6,977	
TOTAL		33,400	

.....
Dr. J.H. Hills
MINERALS EXPLORATION MANAGER.



BP MINERALS AUSTRALIA PROPRIETARY LIMITED

PALYNOLOGY OF SELECTED DRILL CUTTINGS

EL 209

LAKE FROME EMBAYMENT, SOUTH AUSTRALIA



Dr. Derek M. TAYLOR

MELBOURNE - VICTORIA

APRIL, 1977.

S U M M A R Y

Exploration Licence 209 covers an area of 805 square kilometres to the northwest of Lake Frome and to the south and east of the Beverley uranium deposits. Samples of drill cuttings collected during a drilling programme over the southern portion of this licence during May/June 1976 were sent for palynological studies to the South Australian Department of Mines.

The results of the study indicates that mineralisation in the Paralana Creek "A" area is of Early or Middle Miocene age. In addition the results indicate that several holes drilled by BP MA in this area have penetrated the Tertiary/Cretaceous boundary. There is no evidence for the existence of sediments of the Eyre Formation in this area from the samples studied.

Additional palynological studies, to further delineate the ages of mineralisation intersected in both Paralana Creek Area "A" and Area "B", are recommended.

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	REINTERPRETATION OF DATA	APPENDIX II

KEYWORDS

BEVERLEY
CRETACEOUS
DRILLING
FROME
MIOCENE
MINERALISATION
NAMBA
PALYNOLOGY
PARALANA
PEDIASTRUM
POONTANA
TERTIARY
URANIUM

L I S T O F I L L U S T R A T I O N

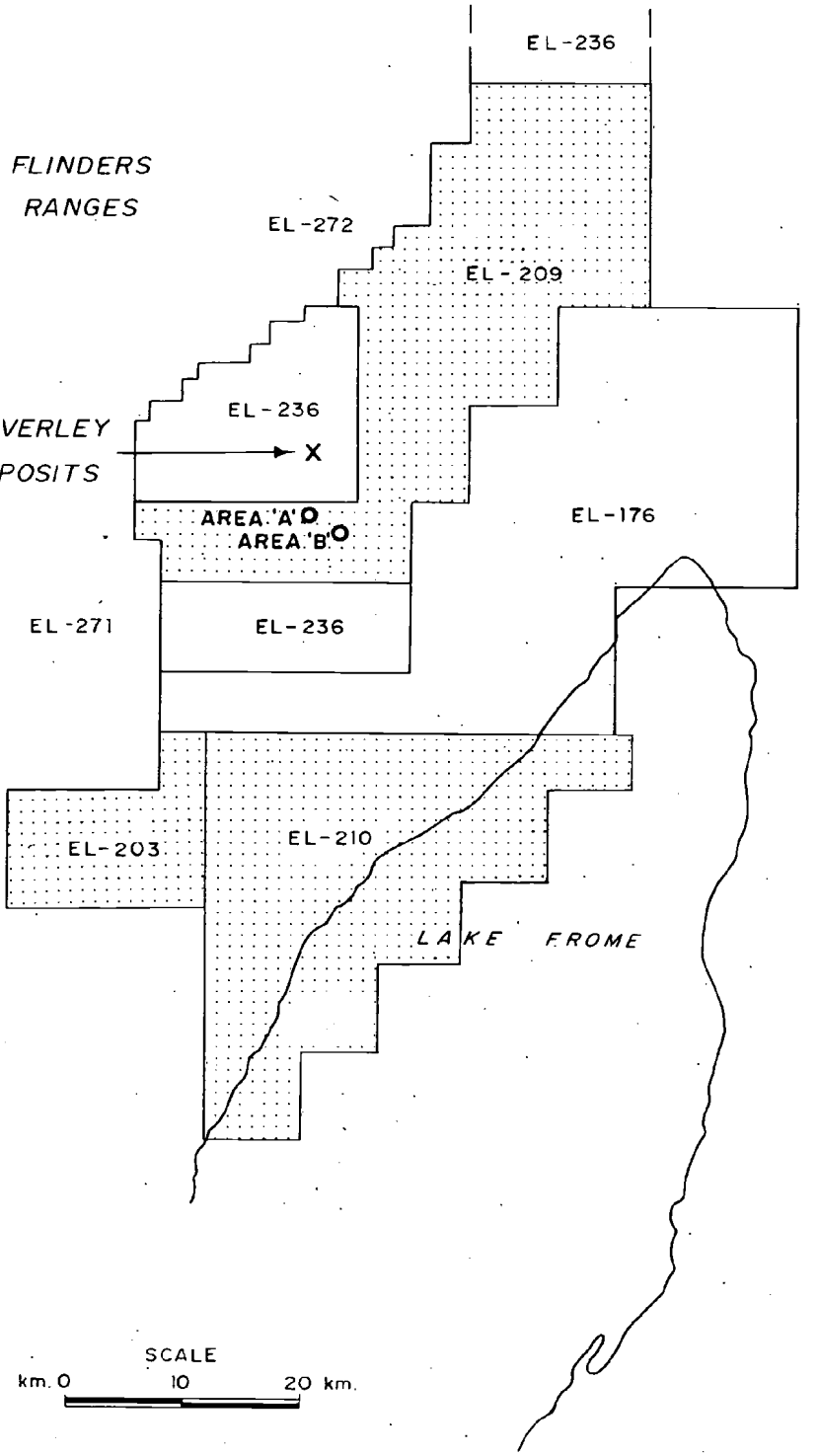
TABLES

TABLE 1 - DESCRIPTION OF SAMPLES

FIGURES

FIGURE 1 - E.L. LOCATION MAP (BEFORE PAGE 1)
FIGURE 2 - DRILL HOLE LOCATION MAP (IN BACK POCKET)
FIGURE 3 - SUBSURFACE SECTION. (IN BACK POCKET)

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EXPLORATION LEASES ON NORTH WEST SIDE OF LAKE FROME EMBAYMENT.

(AS AT FEB. 1977)

25% BP INTEREST.

FIGURE 1

BP MINERALS AUST. PTY LTD	
Area:	LAKE FROME
SOUTH AUSTRALIA	
Ref:	U1/4-24
APRIL 1977	MIN. BRANCH

BASED ON TS1380

T 1634

139°35'

139°36'

30°15'

30°16'

77-48 89.93 — 1 85.20 — 78.17 — 2 67.25 — 77-44 63.85 — 3 63.50 — 22 42.98 — 64 — 77-50 63.65 — 65

LINE OF SECTION

4 64.03 — 10 64 — 26 64 — 12 64 — 27 64 — 28 64 — 29 64 — 21 64 — 30 64 — 49 64

66.15 — 65.30 — 5 65.15 — 66.93 — 6 64.76 — 23 65 — 8 65.13 — 24 65 — 25 65 — 48 65 — 31 (core hole) — 47 65 — 7 65.16 — 13 65

B M No 7120 △ 70.85 — 19 65.51 — 14 65.5 — 34 65.5 — 33 65.5 — 32 65.5 — 20 65 — 35 65.5 — 60

9 65.45 — 66.50 — 66.32 — 66.20 — 65.43 — 65.86 — 56 — 57 — 55 65.89 — 58 — 59 65.80 — 38 65.8 — 37 65.70 — 36 65.5 — 43 65.5 — 39 65.32 — 47 65.5 — 40 65.5 — 44 65.5 — 18 65

15 65.76 — 77-53 65.93 — 42 65.5 — 11 65.63 — 45 65.5

77-52 66.44 — 63 — 62 — 61 — 46 65

16 66

66.54 — 66.33 — 66.10 — 66.0 — 66.0 — 63.89 — 65.52 — 17 65.13

65.98

66.26 — 66.29 — 66.29 — 66.31

N

POONTANA PROJECT, LAKE FROME S.A.

DRILL HOLE LOCATION MAP

Part of EL 209 (Paralana Area 'A')

SCALE : 1cm. = 50m.

metres 50 0 50 100 150 200 250 metres

LEGEND

- 77.53 — Drill hole (1975)
- 15 — Drill hole (209-1 to 209-49, 1976)
- 60 — Drill hole (209-55 to 209-65, 1977)
- △ — Bench mark
- 66.44 — Elevation in metres
- ∘ — Drill site (1976-1977)
- ✱ — Polynological studies on samples from these holes
- ⊢⊣ — Line of section (see Fig. 3)

FIGURE 2

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: U1/4-24	
APRIL 1977	D. M. TAYLOR

2608(IV)-1

T1689A

77-48
ELEV. 89·93m.

209-1
ELEV. 85·20m.

209-2
ELEV. 67·25m.

77-44
ELEV. 63·85m.

209-3
ELEV. 63·50m.

209-22
ELEV. 62·98m.

77-50
ELEV. 63·65m.

UNIT I
UNIT II
SAND b
WESTERLY
UNIT III
SAND d+d'
SAND e
SAND f
UNIT IV
UNIT V

EASTERLY DATUM M.S.L.

UNIT I
UNIT II
SAND b
UNIT III
SAND d+d'
SAND e
SAND f
UNIT IV
UNIT V

DEPTH 298m
DEPTH 354m
DEPTH 294m
DEPTH 306m
DEPTH 306m
DEPTH 234m
DEPTH 372m

LEGEND

- MIXED CLASTICS *
- GRAVEL
- SAND
- SILT
- CLAY
- CARBONATE
- CARBONACEOUS *

* Used for pre 1976 logs only.

* Interval selected for palynological study.

POONTANA PROJECT

EL-209

PARALANA CREEK AREA 'A'

SUB-SURFACE SECTION

SCALES
HORIZONTAL: 1 cm. = 20 m.
VERTICAL: 1 cm. = 6m.

FIGURE 3

BP MINERALS AUST. PTY LTD	
Area:	LAKE FROME
	SOUTH AUSTRALIA
Ref:	UI/4-24
APRIL 1977	D. M. TAYLOR

2608(IV)-2

1. INTRODUCTION

Exploration Licence 209 covers an area of 805 square kilometres to the northwest of Lake Frome and to the south and east of the Beverley deposits (see Figure 1).

Samples of drill cuttings collected during Drilling Programme No.1 1976 were sent for palynological studies to the South Australian Department of Mines. This report examines the results of the studies (W.K. Harris, 1977) a copy of which is enclosed.

2. AIMS OF STUDY

The aims of the study were threefold:-

(i) Holes 209-1, 209-2 and 209-3 were drilled across the Poontana Structure (Taylor, 1976(a)). Correlation of the lithological and electric logs over the structure is difficult and it was envisaged that a palynological study could be of assistance in such correlations and in the interpretation of the structure.

(ii) Studies of the 'end of hole" samples from the three holes would indicate the age of the oldest interval penetrated which in turn could indicate the thickness of the Eyre Formation, if intersected, in the area.

(iii) Studies of the samples from hole 209-8 (Taylor op.cit.) could indicate the age of the host rocks for the mineralisation encountered in this area.

3. DETAILS OF SAMPLES

A total of eighteen samples collected from four drill holes (see Figure 2) were submitted for the investigation. These samples had been selected, where possible, for their lithological favourability regarding the preservation of microfossils (after discussions with W.K. Harris, S.A. Department of Mines). The samples are described in Table 1.

4. RESULTS OF STUDY

The results of the palynological study are given in the report by Harris which is enclosed (Appendix I).

..2

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5. DISCUSSION

Five samples from hole 209-1 contained Cretaceous microfossils. These samples were all collected from depths below 258 m (163 m B.S.L.). It appears possible that the lithological change indicated by the electric logs at 250 m (see Figure 3) could correspond to the upper limit of the Cretaceous. The remaining two samples studied from this hole were barren and there is, therefore, no conclusive evidence here that some part of the sediments above 258 m are not also Cretaceous.

Cretaceous microfossils were identified in one sample from hole 209-8 but further work by Harris and Callen (see Appendix II) suggests that these Cretaceous spores were from a reworked assemblage.

The oldest sediments intersected in hole 209-2 and 209-3 contain Middle Miocene microfossils. These sediments have been correlated, using the geophysical logs, with those occurring below 220 m in hole 209-1 (high resistivity, low gamma activity). If this correlation is correct, and the age of the sediments is Middle Miocene, then there is no evidence for the existence of Lower Tertiary (Palaeogene) sediments in this area. This does not of course mean that such sediments do not exist. The Middle Miocene age would be a minimum age for the sediments which could be caused, for example, by contamination of barren Eocene samples by up-hole Miocene clays. Alternatively the Palaeogene sediments could be relatively thin, possibly occurring in hole 209-1 between 240 and 250 m and in holes 209-2 and 209-3 below 300 m (and above 330 m), and be lithologically similar to the sediments immediately overlying them.

The sample collected from above the mineralised zone in hole 209-8 did not contain any microfossils and the sample below the ore zone contained both Tertiary and Cretaceous spores. Harris and Callen (Appendix II) suggest that the age is Tertiary (Early Miocene).

6. CONCLUSIONS

The study has partly met with the aims outlined in Section 2 as follows:-

(i) The correlation of units over the Poontana Structure, as proposed by Taylor (1976 (a) and Figure 3) has been neither proved nor disproved by this study. There is undoubtably a minimum vertical displacement of the Mesozoic Tertiary boundary by over 50 m between holes 209-1 and 209-2.

(ii) There is no palynological evidence for the existence of sediments of the Eyre Formation in this area. This does not mean that it does not exist in this area.

(iii) The evidence suggest that the host rocks for the mineralisation in this area are not older than Middle Miocene and are possibly Early Miocene in age.

In addition the study has indicated that several of the holes drilled by BP MA in this area during 1975 (Bell, 1976) were terminated not in the Eyre Formation but in the Cretaceous. If this is correct then the Eyre Formation, if it occurs here, has been tested by several holes, found to contain no radiometric anomalies and should not be regarded as a prospective host rock in this part of the licence area.

7. RECOMMENDATIONS

Further palynological studies should be undertaken on samples collected from this area. Samples should be selected that could :-

(a) provide ages for the sediments containing the mineralisation in both Paralana Creek Area "A" and Paralana Creek Area "B" (Taylor 1976 (b)). This would include samples from the cored interval of hole 209-31 (Taylor 1976 (c)).

(b) indicate the existence of Palaeogene sediments (in particular sediments of the Eyre Formation).

(c) prove that several of the previously drilled holes penetrated the Tertiary/Cretaceous boundary.

In addition a wider range of samples collected from holes drilled over the Poontana Structure should be studied in an attempt to prove or disprove the proposed correlations previously suggested.

8. REFERENCES

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TAYLOR, D.M., 1976 (a): "1976 Drilling Programme No. 1, EL 209, Lake Frome Embayment, South Australia " - BP Minerals Australia Pty Ltd.

TAYLOR, D.M., 1976 (b): "1976 Drilling Programme No. 2, EL 209, Lake Frome Embayment, South Australia. First Report". BP Minerals Australia Pty Ltd.

TAYLOR, D.M., 1976 (c): "1976 Coring Programme, EL 209, Lake Frome Embayment, South Australia" - BP Minerals Australia Pty Ltd.

TABLE 1

DESCRIPTION OF DRILL CUTTING SAMPLES

Sample No. (BP MA No.)	Hole No.	Depth (metres)	D E S C R I P T I O N .
S 4090 (P1)	209-1	198-206	5% Sand (Angular, quartz) 95% Clay (Black and dark grey. Minor white. Minor limonite.
S 4091 (P2)	209-1	234-247.5	Clay (Black, yellow, green and grey clay). Minor sand.
S 4092 (P3)	209-1	258-264	10% Sand (1mm,angular,quartz) 90% Clay (As for S4091 with increased dark grey).
S 4093 (P4)	209-1	264-270	2% Sand (quartz) 98% Clay (Further increase in dark grey)
S 4094 (P5)	209-1	288-294	Clay (Very dark grey with lesser yellow and minor black). Minor sand.
S 4095 (P6)	209-1	324-330	Clay (Dark and mid grey, some yellow) Minor sand.
S 4096 (P7)	209-1	351 (End of Hole)	Clay (As for S 4095) Minor sand (Angular,quartz).
S 4097 (P8)	209-2	228-246	5% Sand (1-2 mm, angular to subrounded, quartz) 95% Clay (Grey and black, minor white, minor stains). Minor carbonate.
S 4098 (P9)	209-2	246-260	2% Sand (As above) 98% Clay (As above) Minor carbonate.
S 4099 (P 10)	209-2	264-272	Clay (lithologically similar to S 4091) Minor sand and carbonate.
S 4100 (P11)	209-2	272-288	5% Sand (2mm, angular, quartz) 95% Clay (As above with white clay common). Minor carbonate.
S 4101 (P12)	209-2	291-0 (End of Hole)	10% Sand (1-2 mm angular to subrounded, quartz) 90% clays (As above) Minor carbonate.
S 4102 (P 13)	209-3	248-256	20% Sand (Coarse sand, to 3mm, with pebbles). 80% Clay (Black and grey) Minor carbonate.

Sample No. (BP MA No.)	Hole No..	Depth (metres)	D E S C R I P T I O N .
S 4103 (P14)	209-3	260-272	95% Clay (Black, grey and yellow, minor green and pink - similar to S 4091) 5% Carbonate.
S 4104 (P15)	209-3	290-300	2% Sand 98% Clays (As above) Minor carbonate.
S 4105 (P 16)	209-3	303.5 (End of Hole)	Clays (As above - increase in green clay). Minor sand. Minor carbonate.
S 4106 (P 17)	209-8	194-210	Clay (Black, grey and olive green, minor light grey and pink. Limonite abundant) Minor sand.
S 4107 (P 18)	209-8	234-250	Clay (Black, grey and minor pinkish grey clay. Stained.) Minor sand Minor carbonate

A P P E N D I X I

PALYNOLOGY OF SELECTED SAMPLES FROM THE POONTANA STRUCTURE, FROME EMBAYMENT EL 209.

by

W.K. HARRIS
DEPARTMENT OF MINES
SOUTH AUSTRALIA

DEPARTMENT OF MINES
SOUTH AUSTRALIA

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BIOSTRATIGRAPHY DIVISION

PALYNOLOGY OF SELECTED SAMPLES FROM THE POONTANA STRUCTURE, FROME EMBAYMENT E.L. 209

- BP Minerals Proprietary Limited -

by

WAYNE K. HARRIS

Rept.Bk.No. 77/37
G.S. No. 5865
EL. 209

23rd March, 1977

DEPARTMENT OF MINES
SOUTH AUSTRALIA

Rept.Bk.No. 77/37
G.S. No. 5865
EL. 209

PALYNOLOGY OF SELECTED SAMPLES FROM THE POONTANA STRUCTURE, FROME EMBAYMENT E.L. 209

Location: Drill Hole 209-1 Lat. 30°15.3'S Long. 139°42.2'E
209-2 Lat. 30°15.3'S Long. 139°35'E
209-3 Lat. 30°15.2'S Long. 139°35.9'E
209-8 Lat. 30°15.6'S Long. 139°36.2'E

FROME Sheet (SH54-10)

Province: Frome Embayment, Eromanga Basin.

Samples Examined: 18 cuttings samples from four drill holes as tabulated below.

Results:

Drill Hole	Depth in metres	Sample No.	Age
209-1	198-206	S4090	Barren
209-1	234-247.5	S4091	"
209-1	258-264	S4092	Cretaceous
209-1	264-270	S4093	"
209-1	288-294	S4094	"
209-1	324-330	S4095	"
209-1	351.05	S4096	"
209-2	228-246	S4097	Barren
209-2	246-260	S4098	"
209-2	264-272	S4099	Miocene
209-2	272-288	S4100	"
209-2	291.00	S4101	"
209-3	248-256	S4102	Barren
209-3	260-272	S4103	"
209-3	290-300	S4104	Miocene
209-3	303.50	S4105	"
209-8	194-210	S4106	Barren
209-8	234-250	S4107	Cretaceous

Remarks: All of the Miocene samples yielded abundant colonies of the freshwater alga, Pediastrum which dominates assemblages at the base of the Namba or Etadunna Formation. Thus, the age of these assemblages is Middle Miocene.

All of the Cretaceous samples are marine and of Early Cretaceous aspect.

There is no palynological indication of age of the samples labelled "barren".

WKH:FdeA
23/3/77

WAYNE K. HARRIS
SENIOR GEOLOGIST

A P P E N D I X II

REINTERPRETATION OF PALYNOLOGICAL DATA FOR DRILL HOLE 209-8

by

W.K. HARRIS AND R.A. CALLEN

DEPARTMENT OF MINES

SOUTH AUSTRALIA

183

Telephone: 272 5711
Telegrams: Domex

Your reference.....
In reply, please quote
E.L. 209/1 WKH:JS

PLEASE ADDRESS ALL CORRESPONDENCE TO:

The Director of Mines,
P.O. Box 151,
Eastwood, S.A. 5063

DEPARTMENT OF MINES • SOUTH AUSTRALIA

191 GREENHILL ROAD, PARKSIDE (CORNER OF GLEN OSMOND ROAD)

BP
13 APR 1977
RECEIVED

7th April, 1977.

Dr. Derek M. Taylor,
BP Minerals Australia Pty. Ltd.,
GPO Box 5222BB,
MELBOURNE. 3001.

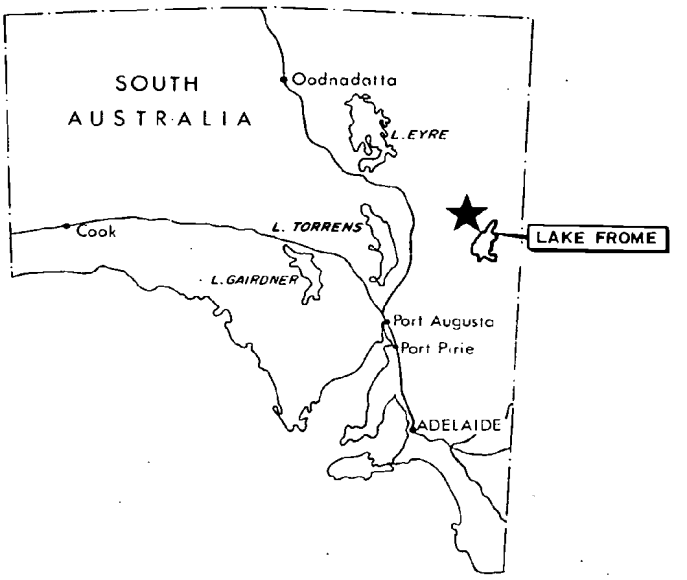
Dear Dr. Taylor,

In a report by Mr. W.K. Harris on samples from the Poontana structure forwarded to you recently, reference was made to the identification of Cretaceous sediments in bore 209-8. Mr. Harris has re-examined this sample and discussed the problem with Mr. Callen of this Department. The sample in fact contains both Cretaceous and Tertiary spores, the latter being thought previously to be downhole contaminants and a reinterpretation based on the geophysical logs would favour a Tertiary (Early Miocene) age. The Cretaceous spores are now regarded to be from a reworked assemblage.

Yours sincerely,

B P Webb/cab

DIRECTOR OF MINES



LOCATION MAP

GEOCHEMICAL SURVEY DATA

(1976)

EL 203, 209 AND 210

LAKE FROME EMBAYMENT
SOUTH AUSTRALIA

- A REVIEW -

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GEOCHEMICAL SURVEY DATA
(1976)
EL 203, 209 AND 210
LAKE FROME EMBAYMENT,
SOUTH AUSTRALIA.
- A REVIEW -

Derek M. TAYLOR
MELBOURNE - VICTORIA

APRIL, 1977.

S U M M A R Y

Samples of drill cuttings, drill core and water from existing drill holes and bores were collected from three exploration licences (EL 203, 209 and 210), in the Frome Embayment, during 1976. These samples were analysed for several elements by a variety of techniques.

Analysis of the drill cuttings indicated that the sediments in the area tested (the southern portion of EL 209) contain above average uranium outside of the mineralised horizons. This feature could be useful as a prospecting guide.

The data from the drill core exhibit similar variations to those shown by the roll type uranium deposits in the U.S.A. It is possible that the reducing conditions required to precipitate the uranium in the Paralana area were maintained by hydrogen sulphide generated within the black clays underlying the mineralisation.

A great deal of the variation observed when plotting the results from the water sample analyses could be explained by differences in the chemistry of the catchment areas. Geographical grouping of the samples, followed by comparisons between and within the groups, simplified this hydro-geochemical study and indicated that care should be taken when using absolute element concentrations in describing "anomalous" samples.

Further studies should be undertaken on these data and other geochemical data from this area.

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TABLE	II	DETAILS OF ANALYSED CORE SAMPLES	" "
TABLE	III	ELEMENT CONCENTRATIONS BY SAMPLE TYPE	" "
TABLE	IV	DETAILS OF ANALYSED WATERS	" "
TABLE	V	ELEMENT CONCENTRATIONS BY SAMPLE GROUP	" "
TABLE	VI	URANIUM/ ION CONCENTRATION RATIOS	" "

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FIGURE	2	ELEMENT VARIATIONS WITHIN CORE SAMPLES	(" " 4)
FIGURE	3	VARIATION IN SULPHUR AND IRON CONTENTS OF CORE SAMPLES	(" " 4)
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FIGURE	5	VARIATION OF URANIUM WITH SALT CONTENT	(Before Page 5)
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FIGURE	8	VARIATION OF URANIUM WITH BICARBONATE CONTENT	(" " 6)

C O N T E N T S

PAGE NO.

SUMMARY

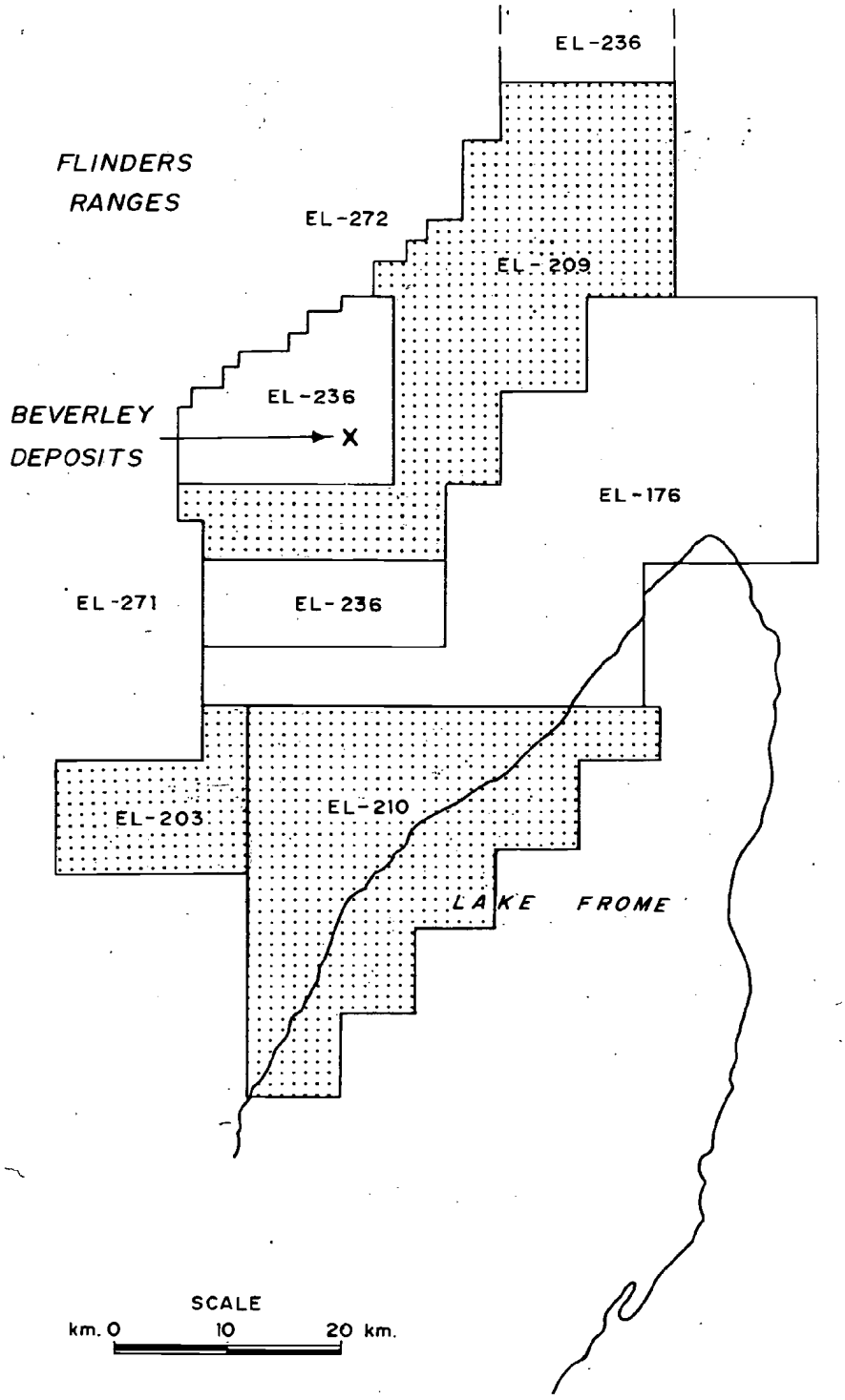
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KEYWORDS

ANALYSIS
CORING
DRILLING
FROME
GEOCHEMISTRY
HYDROGEOCHEMISTRY
MINERALISATION
PARALANA
SAMPLING
URANIUM

189



EXPLORATION LEASES ON NORTH WEST SIDE OF LAKE FROME EMBAYMENT.

(AS AT DEC. 1976)

25% BP INTEREST.

FIGURE 1

BP MINERALS AUST. PTY LTD	
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MARCH 1976	MIN. BRANCH

BASED ON TS1380

1. INTRODUCTION

Exploration by BP MA in the Lake Frome Embayment during the past twelve months has been centred around the southern portion of Exploration Licence (EL) 209 (Figure 1). During the drilling programmes over this licence (Taylor 1976 (a), (b)) a variety of samples were collected and chemically analysed. These samples consisted of drill cutting taken from three drill holes, portions of the core from hole 209-31 (Taylor; 1976 (c)) and water samples collected from existing drill holes and water bores in parts of ELs 203, 209 and 210.

This report details the results of these analyses and briefly reviews their significance.

2. ANALYTICAL METHODS

2.1 Drill Cutting and Drill Core Samples

All the drill cutting and drill core samples were analysed by A.C.S. Laboratories, with the exception of the uranium determinations on the drill core which were performed by Amdel (Taylor 1976 (c)), using the following techniques:-

Copper, Lead, Zinc, Total Iron : - by atomic absorption spectrometry (AAS) following a hydrofluoric acid/perchloric acid digestion.

Arsenic : - by the modified Gutzeit colorimetric method.

Sulphur, Selenium : - by X-ray fluorescence spectrometry (XRFS).

Vanadium, Beryllium, Molybdenum, Cobalt : - by emmission spectrography (semi-quantitative).

Carbonate Carbon , Total Carbon - by gravimetry following ignition in a Leco furnace in an oxygenated atmosphere (for Total Carbon) and an oxygen-free nitrogen atmosphere (for Carbonate Carbon).

Uranium : - by fluorimetry following a nitric acid/perchloric acid attack with higher values confirmed by XRF.

..2

Ferrous Iron : by potassium dichromate titration following hydrofluoric acid/sulphuric acid/ ammonium vanadate digestion of samples. Problems were encountered here as a result of oxidisable materials, other than ferrous iron, being present in the sample (notably organic carbon and sulphide minerals). This problem is outlined in more detail in Appendix I.

2.2 Water Samples

The Eh and pH determinations were made by BP MA personnel on-site at time of sample collection. Sediment in the samples was allowed to settle and the water decanted into new containers prior to shipping for analysis. One large (600 ml) and one small (30 ml) water sample were collected from each sample site. The small samples were sent to Aldermaston, England, to be analysed by delayed neutron activation for uranium. The large samples were sent to A.C.S. Laboratories for analysis of magnesium, calcium, sodium and potassium by AAS, for chlorine by titrimetry and for sulphate by gravimetry.

3. GEOCHEMICAL DATA

3.1 Drill Cutting Data

Samples were taken from drill cuttings from three drill holes. One hole (209-8) intersected ore grade uranium, one hole (209-7) intersected a strong (750 c.p.s. plus) radiometric anomaly and the third hole (209-6) exhibited a very low radiometric background. These holes, spaced 200 m apart are described in Taylor (1976 (a)). The samples were not collected specifically for chemical analysis and, are representative of horizons of different depth and varying thicknesses. In addition the samples were not homogeneous prior to crushing, containing a variable mixture of sand and clay. The results, which are given in Table 1, should not be relied on to be typical of samples from holes in or close to mineralisation. In spite of the low quality of the samples it is interesting to compare the data from the different holes to the average element concentrations.

The samples from hole 209-8 contain above average uranium, sulphur and ferrous iron and below average vanadium and total iron. (The ferrous iron data may however be affected by the higher sulphur content as discussed in Section 2).

There are no significant differences between the data for the samples from the other two holes. One interesting fact is that the uranium concentrations in all the samples are significantly higher than would be expected from these types of samples collected from outside this area.

3.2 Drill Core Data

Thirty-six samples from the cored interval of hole 209-31 (PAC-1 to PAC-36 inclusive) were analysed for uranium by Amdel (Taylor 1976 (c)). Twenty one of these samples were selected as being representative of the interval and sent to A.C.S. Laboratories for further analysis. The results of these analyses are given in Table II. Averages were calculated for four different sample types; unmineralised sand ($<$100 ppm U_3O_8), mineralised sand, clay and silt. These averages are given in Table III.

Figure 2 illustrates the changes in element concentrations with depth. The most noticeable feature is the sympathetic variation of iron and sulphur. The sulphur and iron both increase upwards towards the clay/sand boundary as does the uranium and, to a lesser extent, the U_3O_8/ eU_3O_8 ratio. The sample immediately above the boundary contains the highest concentrations of both sulphur and iron but suprisingly little uranium (310 ppm) and the increase in uranium up through the sand is associated with some decrease in both iron and sulphur.

These variations are further shown in Figure 3. At first glance there appears to be little correlation between the two elements in this figure until the population is divided into different sample types when it can be seen that the clay samples plot on a near straight line. The uneven distribution shown by the sand samples almost obscures a similar trend which parallels that of the clay samples and exhibits a lower iron content for a fixed sulphur value.

Lead, arsenic and zinc all exhibit higher values in, and immediately above, the clays than in the sands. Zinc also shows a very similar behaviour to iron, especially in the sands.

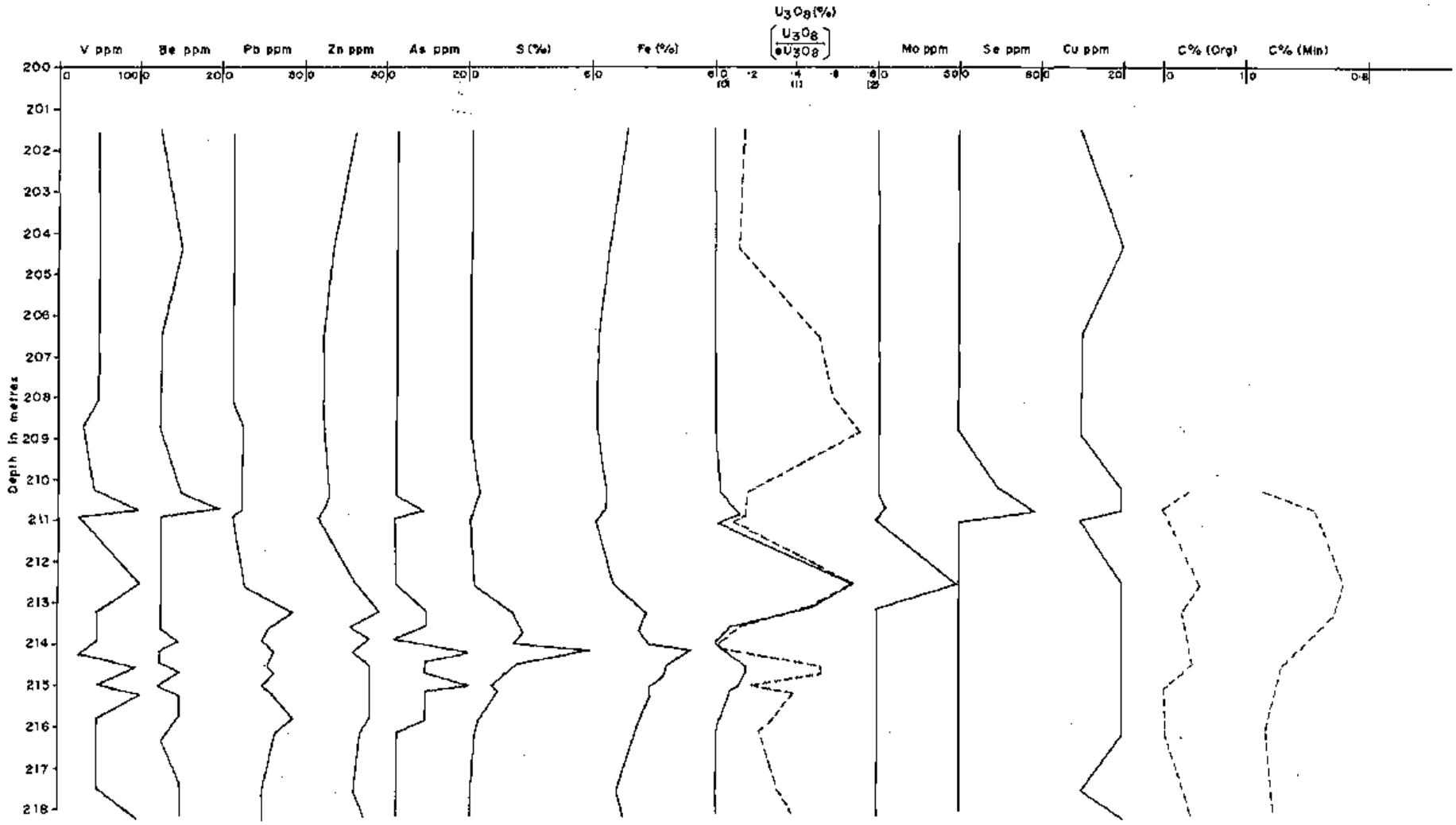
Only two samples contain above background selenium and molybdenum and little can be interpreted from the variations shown by vanadium, beryllium and organic carbon (though the highest uranium value is contained in the same sample as the highest carbon).

The carbonate carbon shows a peak in the ore zone (somewhat broader and flatter than the uranium curve) but the data are insufficient to determine if this is significant.

..4

TS 1845

TS1845



Element variations within core samples

1793

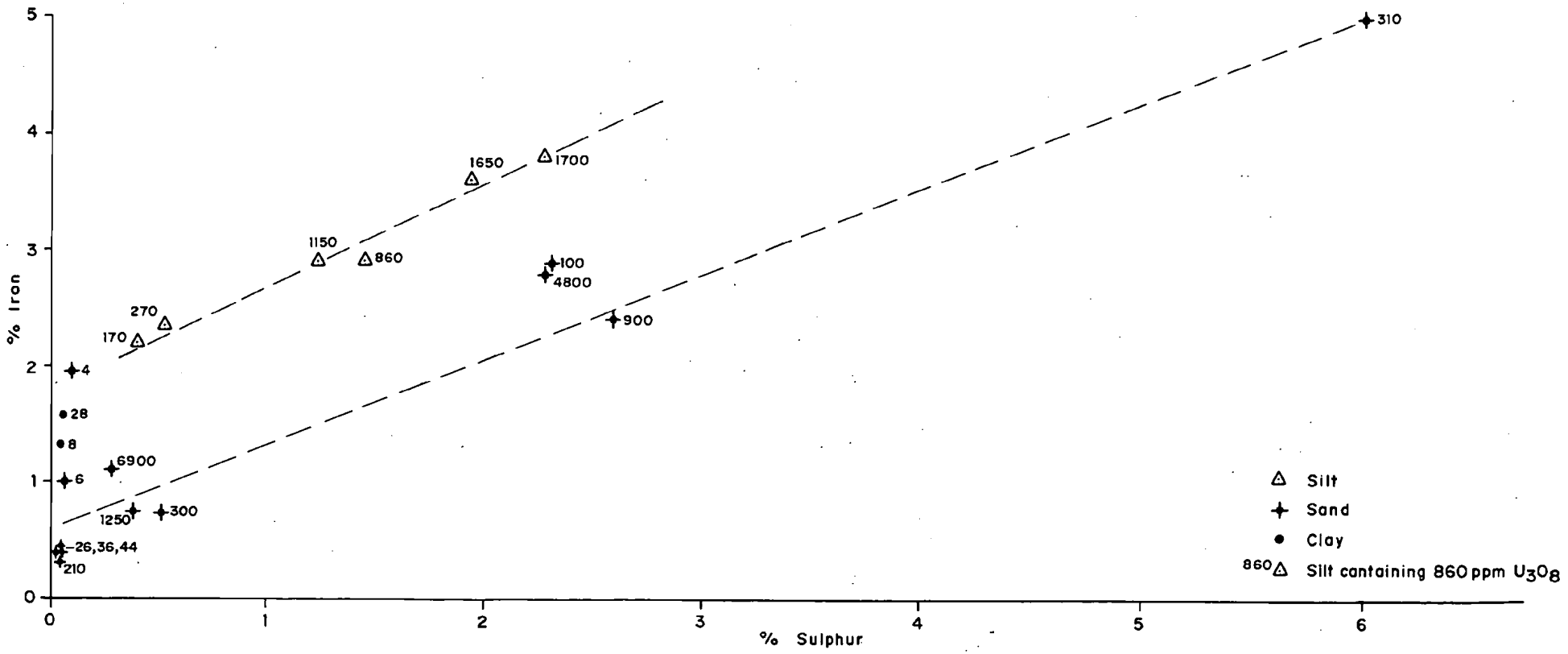
FIGURE 2

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SOUTH AUSTRALIA	
Ref: U1/4-20	
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BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: U1/4-25	
APRIL 1977	D. M. TAYLOR

FIGURE 3

Variation in Sulphur and Iron contents of core samples



The effect of the thin clay, described from the core between 213.0 and 213.2 m, which occurs above PAC 17 and below PAC 36 could have an influence on the element variations shown in Figure 2.

3.3 Water Sample Data

Fifty-seven water samples (PU 150 to PU 206) were collected from old drill holes (52 samples) and bores or wells (5 samples) in parts of all three exploration licences (Figure 4). Whenever possible Eh and pH determinations were made on site at time of collection. The results of the analyses, together with details of the locations of the sample sites, are given in Table 4.

Plotting the uranium concentrations against the sum of the other ions determined (Figure 5), shows what appears to be a very poor correlation. A more detailed examination however revealed, as would be expected, that much of the scatter was caused by compositional difference between samples from different geographical areas.

The samples were initially divided into six sets as shown in Figure 5 and averages calculated for each grouping (Table 5). The four bore/well samples (PU-156/7/8/9) were treated as one group (V) more because of the type of sample than their geographical location. To quantify the variation shown in Figure 5 the ratio of uranium (ppb) to the sum of other ions (ppm) was calculated together with the ratios for uranium against individual anions (Table 6). Comparison of the ratios for individual groups with those for the average (modified) water sample indicates the following:-

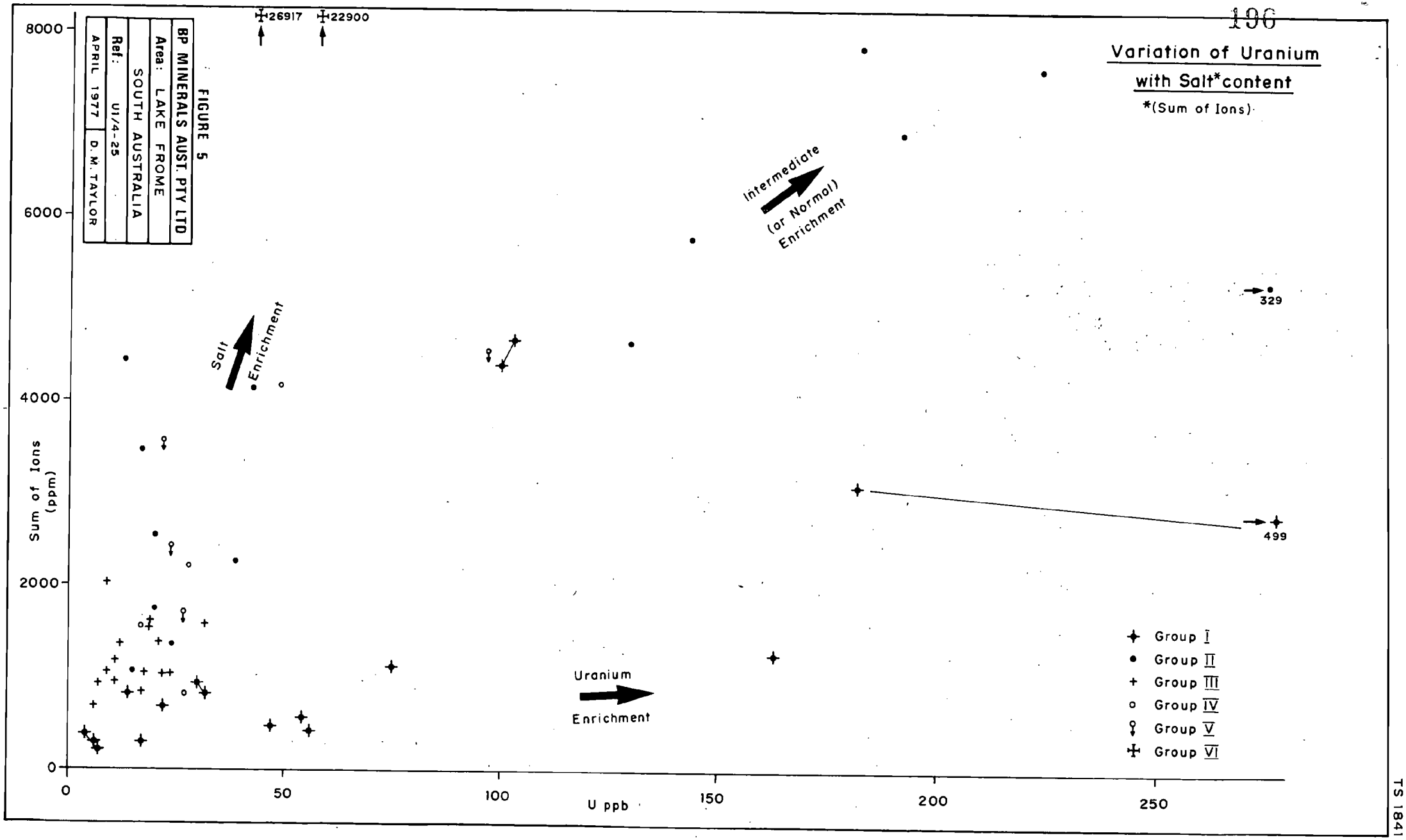
(a) The samples of Group I are enriched in uranium relative to all anions.

(b) The samples of Group II are enriched in uranium relative to bicarbonate and chlorine but not to sulphate

(c) In the other groups the uranium is depleted relative to all the anions especially in the case of Group VI. The samples of Group V, however, show only a relatively small uranium depletion.

The samples could be described as following one of three trends - the uranium enrichment trend (as shown by Group I), the salt enrichment trend (Groups III, IV and VI) or an intermediate or "normal" trend (Group II and possibly Group V) as illustrated in Figure 5.

..5


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FIGURE 5
Variation of Uranium
with Salt* content
*(Sum of Ions)
26917
22900
329
499
Intermediate
(or Normal)
Enrichment
Salt
Enrichment
Uranium
Enrichment
Group I
Group II
Group III
Group IV
Group V
Group VI
Sum of Ions
(ppm)
U ppb
0
2000
4000
6000
8000
50
100
150
200
250

TS 1841

There is a strong correlation between the sulphate and calcium ion concentrations (Figure 6). Only four samples contain less calcium than would be predicted from their sulphate contents. (PU-159, 163, 197 and 203). There is also a marked correlation between Ca and Mg (Figure 7) but here the correlation is between these elements within individual groups.

Plotting bicarbonate against uranium concentrations (Figure 8) indicates that the samples of Group II show an increase in uranium with increased bicarbonate content. There are three exceptions to this (PU-189, 190 and 193) and each of these samples contained foreign matter. There is also the suggestion of a slight increase in uranium with increasing bicarbonate from the data for samples in Group III, IV and V. The samples from Group I show no correlation between uranium and bicarbonate.

Comparison of the data for the four duplicated samples shows that, with two exceptions, the differences are relatively small. The two exceptions are in PU-151/164 where the uranium contents are 182 ppb and 499 ppb respectively and in PU-152/199 where the bicarbonate contents are 127 ppm and 215 ppm. The fact that these samples contained appreciable quantities of sediment when collected could have caused these variations.

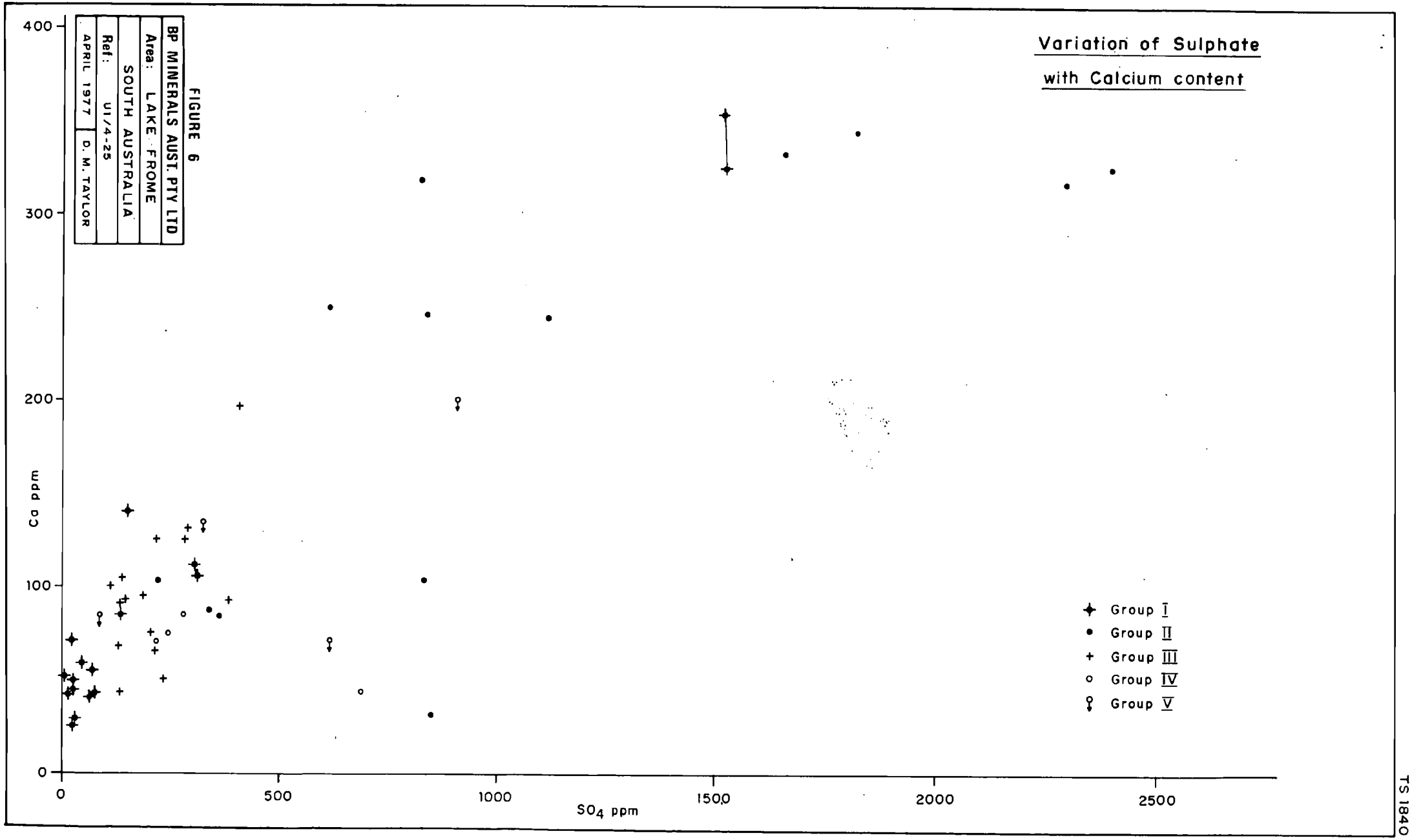
4. DISCUSSION

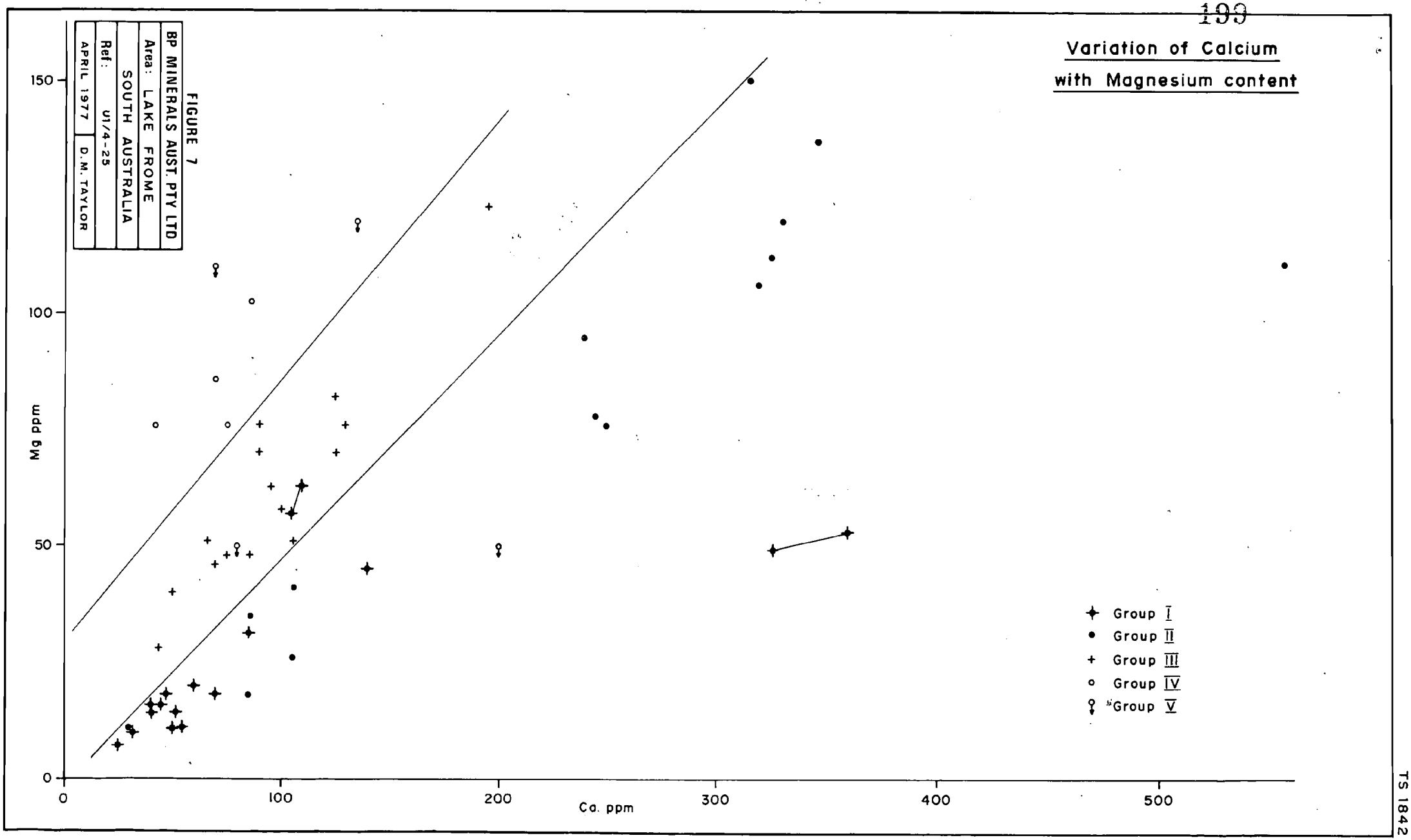
4.1 Drill Cuttings

The above average uranium shown by the samples from hole 209-8 is to be expected as this hole contained significant mineralisation. It is, in fact, suprising that the uranium values are not higher. The high sulphur (and ferrous iron) could be explained by above average pyrite concentrations in or around the ore zone. The low total iron is difficult to explain unless it is a reflection of initial compositional differences in the clays. This could also explain the low vanadium content.

The high uranium content of these samples will probably be a result of the uranium rich nature of the sediment source area or an indication that the sediments have been in contact with uranium rich waters. Whichever is the case the analysis of drill cuttings for uranium should be investigated further as a potential prospecting guide.

..6


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FIGURE 6
Variation of Sulphate
with Calcium content
Ca ppm
SO4 ppm
0
100
200
300
400
500
1000
1500
2000
2500
Group I
Group II
Group III
Group IV
Group V
TS 1840


Variation of Calcium
with Magnesium content
BP MINERALS AUST. PTY LTD
Area: LAKE FROME
SOUTH AUSTRALIA
Ref: U1/4-25
APRIL 1977
D.M. TAYLOR
FIGURE 7
Mg ppm
Ca. ppm
0
50
100
150
200
300
400
500
Group I
Group II
Group III
Group IV
Group V
TS 1842

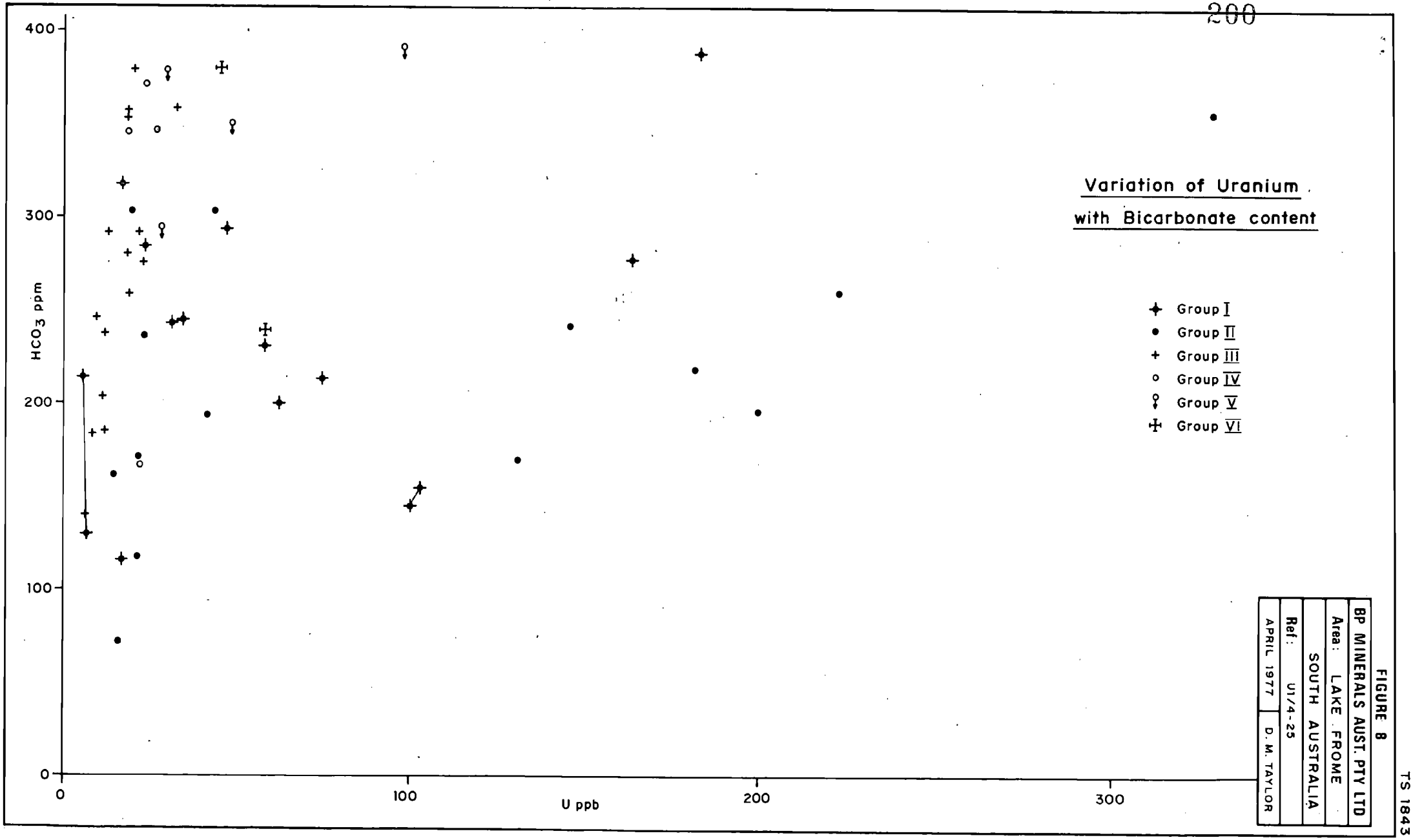


FIGURE 8

TS 1843

T 1743

LOCATION OF WATER SAMPLES

(COLLECTED : MAY 1976)

SCALE 1:250,000

KILOMETRES 5 0 5 10 15 20 25 30 KILOMETRES

EL 209

EL 203

EL 210

GROUP I

GROUP II

GROUP III

GROUP IV

GROUP V

GROUP VI

RANGES

FLINDERS

NORTH

Lake Frome

Lake Cootabarlow

LAKE CALLABONNA

"Moolawatana"

"Old Moolawatana" (ruins)

"Mt Freeling"

"Mt Fitton"

"Yerelina"

"Old Illinawortina"

"Arkaroola"

"Yadanina"

"Paralana"

"Umberatana"

"Wooltana"

"Balcanoona"

"Wertaloona"

"Arrowie"

"Wearing" (ruins)

"Mulga View"

"North Mulga"

"Old Moolawatana" (ruins)

Trinity Well
Village Well
Pelican Well
Billy Spring Bore
Tardlapinna Well
Lonesome Bore
Mt Livingston Well and Spring
Tindelpina Creek
Great Gladstone Bore
Tindelpina Well
Canyon Bore
Daly Bore
Yudnamutana Bore
Overland Bore
Bend Well
Mt Thomas Well Bore
North Well
Mallee Well
Illinawortina Well
Boulder Bore
Woodnamoka Wells
Bore
Yudamutana Well
Bella Bellana Creek
O'Donohue Gate Well
Merrijina Well
Bore
Bore
Bore

4.2 Drill Core

The variations between uranium, iron and sulphur observed in these samples can be explained, assuming that the iron and sulphur are mainly combined as pyrite, in terms of a uranium ore roll. The high pyrite values in the sands immediately above the clay could be part of the ore-stage pyrite (Granger and Warren, 1974) which extends further into the unmineralised sandstone than the uranium does. The highest uranium concentration (sample PAC-36) is not associated with a high pyrite concentration but the values of greater than 0.25% sulphur and 1.00% iron are very similar to those shown at the edge of the alteration envelope in deposits in the Shirley Basin (Harshmann, 1974).

The abrupt decrease in sulphur and iron above 213.2 m could be explained by the presence of the thin clay immediately above this depth. It is possible that the sulphur has migrated from within the clays (below 214.3 m) as hydrogen sulphide formed by the decay of organic matter. The clay at 213.2 m would have formed a partial barrier to prevent significant migration above this depth. Much of the iron would appear to have been introduced with the thin sand (213.2 - 214.3 m) acting as an aquifer. The iron would have formed pyrite where the sulphur was most abundant and the reducing conditions strongest (presumably at the clay/sand interface).

Zinc, lead and arsenic are also noticeably higher below the thin clay barrier and appear to be related to the pyrite. This was noted by Harshmann for arsenic in the Gas Hills and to some extent in the Shirley Basin.

The variation of mineral carbon could be explained by the presence of calcite cement in the ore zone.

According to Harshmann selenium was present, in all the ore bodies he studied, in "narrow zones at the outer edges of the altered tongues, astride the edges, or in reduced sandstone close to the edges".(p.175). Vanadium also had "been deposited in a narrow zone of reduced sandstone at or very close to the edge of the altered sandstone tongue" but "the zones of vanadium deposition are independent of the zones of deposition for uranium, selenium and pyrite". Two samples (PAC-12 and PAC-13) contain above average selenium. One of these, PAC-13, also contains relatively high vanadium and beryllium and above background uranium (1250 ppm U_3O_8). These samples may, therefore, correspond to the edge of the altered tongue.

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The reason for the change in the geochemical nature, and physical appearance, of the sands above the ore horizon is not immediately apparent until the electric log for the hole is examined. This shows that the upper limit of the mineralisation coincides with the base of a thin clay band which was not collected by the coring (see Taylor 1976 (c), Figure 5 (b) and allows for 1.5 m difference between core and log depths as detailed in text).

The model envisaged is one containing three distinct sand horizons. The upper sand, being isolated from underlying black or dark grey hydrogen sulphide producing clays by two clay barriers and two sand bodies, has been thoroughly washed by moving groundwaters and any reducing agents initially present oxidised and destroyed. The lower sands are thinner, more restricted in extent and isolated from much of the more rapidly moving groundwater. They were infiltrated by hydrogen sulphide from the clays below and formed a suitable host for uranium deposition. This model is similar in certain aspects to that used to describe the uranium deposits of the Powder River Basin, Wyoming, by Dahl and Hagmaier (1974).

4.3 Water Samples

A full discussion of data from the analysis of water samples should be undertaken only when all the data from all the samples collected over the last two years has been compiled and studied. A few comments on the observations made in the previous section may however be useful at this stage.

The chemistry of the waters sampled depends on a variety of factors. These factors include the initial chemistry of the waters on entering the tested environments (reflecting the chemistry of the source area) the mineralogical and chemical make up of the containing sediments, the length of time within an aquifer, rates of flow and "contamination" by waters from other sources. It is not suprising, therefore, that the data described in this report shows such variation on interelement plots as the factors described above vary greatly within the survey area.

Geographical grouping of the samples followed by examination of variations within each group in addition to variations between groups will yield more useful information than simple plotting of absolute values for the full sample population.

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This is demonstrated by the variation diagram of uranium against total ion concentration. The three trends recognised here could be caused by the following factors:-

(i) The uranium enrichment trend by waters low in both salt and uranium flowing through an aquifer whose sediments exhibit an "above average" uranium content. An alternative explanation is the mixing of uranium rich waters with waters containing low uranium and low salt.

(ii) The salt enrichment trend by the same water flowing through sediments containing very little uranium or, as is most likely in the extreme case of Group VI sample, mixing with high salt waters (note the proximity of these latter samples to the lake).

(iii) The normal or intermediate trend may be caused by increased time spent in the aquifer (in the case of Group II samples the increase in bicarbonate may also have effected the uranium concentrations) by loss of water, as a result of evaporation, with resulting increase in concentrations of all ions or the mixing of a high uranium/high salt water with a low uranium/medium to low salt water.

It may be significant that the samples rich in gypsum exhibiting the uranium enrichment (low salt) and intermediate trends were collected from holes relatively close to major drainage systems. The aquifers samples, which were in most instances closer to the surface in these areas, would have been partially recharged directly from above by surface waters.

.The relationship observed between calcium and sulphate could be a result of variations in the gypsum content of the sediments in the aquifers. Gypsum has been observed in drill cuttings from several stratigraphic horizons in this area. Variable gypsum contents could also explain the variations in the Ca/Mg ratios for the different groups and the above average sulphate contents, with correspondingly low U/SO_4 values, in the Group II samples.

All samples collected were of waters in contact with upper clastic (Unit I) sediments which have very low potential for sedimentary uranium ore formation. It is unlikely that the holes are open below the base of the upper clastics unless casing had been inserted to below the Unit I/ Unit II boundary (this is not thought to have been the case) as the holes usually collapse

immediately below the casing (36 m below surface in most instances). In only one instance, hole 77-48, the casing would be close to the boundary and the high uranium content here may reflect the high gamma activity recorded near the boundary (see Bell, 1976).

It was noted during the last drilling programme that the gamma activity at the surface was higher than average close to the Paralana Creek Area. This is in agreement with the fact that airborne anomalies, from surveys flown by other companies, were mainly concentrated in or close to certain streams (Bell, 1976, pers. com.). This results from the mechnaical movement of radioactive material from the source area, in the Flinders Ranges, by surface waters. It is envisaged that the samples collected from shallow aquifers close to these stream systems would contain above average uranium for one or more of the following reasons:-

(i) A significant percentage of the subsurface water would have spent some time in contact with the uranium rich rocks of the source area.

(ii) The aquifers containing the waters would, like the surface sediments, show above average uranium contents.

(iii) Water added to the aquifer by downward percolation from the surface would contain above average uranium as a result of leaching from the near surface sediments.

This hypothesis, if it is correct, suggests that the data from the water samples is useful for evaluating the sedimentary uranium ore potential of this area by showing that the certain catchment areas are, at the present time, good sources of uranium. If uranium deposits are still being formed in this area then the best place to search for them would be where the waters (surface or subsurface) contained anomalous uranium concentrations. The term anomalous uranium in this instance does not relate specifically to above average absolute values but to samples falling on a uranium enrichment trend (as in Figure 5) and/or showing "above average" uranium/ anion ratios as is the case with the samples from Group I.

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5. CONCLUSIONS

5.1 Drill Cuttings

Eight samples of drill cuttings, collected from three drill holes, were analysed for ten elements. The study showed that the samples from the hole intersecting ore grade uranium mineralisation contained above average uranium, ferrous iron and sulphur. The most signficant result, however, were the consistently high uranium values shown by these samples. This feature should be further investigated as a potential prospecting guide.

5.2 Drill Core

Twenty-one samples from the drill core (from hole 209-31) were analysed for twelve elements. Eight of the samples were also analysed for organic and mineral carbon. Studying this data together with the electric, radiometric and lithological logs and comparing the results with those described by various authors for the sedimentary uranium deposits in the U.S.A. indicates that the chemical variations observed are those to be expected from a roll type uranium deposit. It is further postulated that the reducing environment required for the precipitation of the uranium was protected from destruction, by oxygenated waters in an overlying aquifer, by thin clay bands which also prevented the hydrogen sulphide generated in the underlying black clays from dissipating upwards into the same aquifer.

The similarities to the uranium deposits of the Powder River Basin, Wyoming, should be kept in mind when further work is planned.

5.3 Water Samples

This study has shown that :-

(i) Grouping samples by geographical areas and investigating variation both within each group and between groups is more meaningful than simply comparing absolute values.

(ii) The chemistry of the water samples collected during this survey are a reflection of the chemistry and mineralogy of the source area. In most instances the sediments of the aquifer are very recent in origin and from the same source area as the waters they contain. The samples are, therefore, useful to indicate areas of good potential for uranium ore formation if either deposits are still forming or the hydrological system has not changed significantly in recent years.

(iii) Comparing the changes in uranium concentrations relative to the concentrations of other ions, in particular the anions, within and between groups is a better guide to "anomalous" uranium concentrations than comparison of absolute values. Top priority areas would be those whose samples plot on a uranium enrichment trend or show above average values for uranium/total salt or uranium / anion ratios. This is the case with the samples collected from the southern portion of EL 209 (Group I).

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6. REFERENCES

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TABLE I

DETAILS OF ANALYSED DRILL CUTTINGS

Sample Number	Hole Number	Depth (m)	Sample Type	U_3O_8	V	Se	S%	Cu	Pb	Zn	Fe %	As	Fe^{2+} %
PCS-1	209-8	210-224	Clay	40	60	< 10	0.12	40	60	70	3.5	< 5	0.68
PCS-2	209-8	226-234	10% Sand/90% Clay	60	90	< 10	0.21	20	60	60	2.8	< 5	0.91
PCS-3	209-7	214-216	Clay	30	100	< 10	0.17	40	60	75	4.2	< 5	0.49
PCS-4	209-7	216-222	40% Sand/60% Clay	30	110	< 10	0.10	30	50	55	2.7	< 5	< 0.10
PCS-5	209-7	222-228	10% Sand/90% Clay	35	150	< 10	0.09	40	70	75	4.1	< 5	0.15
PCS-6	209-6	206-220	Clay	40	100	< 10	0.08	40	70	65	4.1	< 5	0.49
PCS-7	209-6	220-222	Clay	25	120	< 10	0.10	40	70	65	4.0	< 5	0.47
PCS-8	209-6	222-230	Clay	15	100	< 10	0.08	30	60	60	3.3	10	< 0.10

Note : - All values in ppm unless otherwise indicated.

TABLE II

DETAILS OF ANALYSED CORE SAMPLES.

SAMPLE No.	SAMPLE TYPE	MEAN DEPTH (m)	U_3O_8	V	Be	Mo	Co	Se	S	Cu	Pb	Zn	Fe%	As	Apparent Fe 2^+%	C% (Carbonate)	C% (Total)
PAC-2	Sand	201.6	4	50	5	< 3	< 5	< 10	850	10	< 20	50	1.95	< 5	0.19		
PAC-4	Sand	204.4	6	50	10	< 3	< 5	< 10	660	20	< 20	30	1.00	< 5	0.47		
PAC-6	Sand	206.5	26	50	5	< 3	< 5	< 10	250	10	< 20	20	0.37	< 5	0.51		
PAC-8	Sand	208.1	44	50	5	< 3	< 5	< 10	320	10	< 20	20	0.38	< 5	0.15		
PAC-10	Sand	208.7	36	30	5	< 3	< 5	< 10	300	10	20	20	0.40	< 5	0.30		
PAC-12	Sand	210.3	300	50	10	< 3	< 5	40	0.51%	20	20	25	0.73	< 5	3.05	0.09	0.41
PAC-13	Sand	210.7	1250	100	20	5	< 5	75	0.38%	20	20	20	0.73	10	3.3	0.34	0.34
PAC-14	Sand	210.9	210	30	5	< 3	< 5	< 10	320	10	< 20	15	0.29	< 5	0.45		
PAC-17	Sand	213.2	4800	50	5	< 3	< 5	< 10	2.32%	20	70	75	2.8	10	6.3	0.45	0.71
PAC-18	Sand	213.6	900	50	5	< 3	< 5	< 10	2.59%	20	45	45	2.4	10	6.6		
PAC-19	Sand	213.9	100	50	10	< 3	< 5	< 10	2.26%	20	40	65	2.9	< 5	7.0		
PAC-20	Sand	214.2	310	30	5	< 3	< 5	< 10	6.04%	20	50	50	5.0	20	6.7		
PAC-21	Clay	214.5	1700	100	5	< 3	< 5	< 10	2.30%	20	45	65	3.8	10	6.6	0.19	0.54
PAC-22	Clay	214.7	1650	50	10	< 3	< 5	< 10	1.95%	20	50	65	3.6	10	6.3		
PAC-23	Clay	215.0	1150	50	5	< 3	< 5	< 10	1.24%	20	40	65	2.9	20	6.4	0.17	0.18
PAC-24	Clay	215.2	860	100	10	< 3	< 5	< 10	1.42%	20	50	65	2.9	10	6.5		
PAC-26	Clay	215.8	270	50	10	< 3	< 5	< 10	0.53%	20	70	65	2.4	10	5.1		
PAC-27	Clay	216.2	170	50	5	< 3	< 5	< 10	0.39%	20	50	55	2.2	< 5	3.9	0.11	0.14
PAC-31	Silt	217.5	8	50	10	< 3	< 5	< 10	330	10	40	50	1.33	< 5	1.0		
PAC-33	Silt	218.2	28	100	10	< 3	< 5	< 10	390	20	40	60	1.58	< 5	0.6	0.15	0.52
PAC-36	Sand/Silt	212.6	6900	100	5	50	< 5	< 10	0.26%	20	20	50	1.10	< 5	2.2	0.48	0.92

NOTE : All values in ppm unless otherwise indicated.

TABLE III

ELEMENT CONCENTRATIONS BY SAMPLE TYPE

Element	Unmineralised Sand	Mineralised Sand	Clay	Silt
U_3O_8	23	1846	967	19
V	46	58	67	75
Be	6	8	8	10
Mo	<3	8	<3	<3
Co	<5	<5	<5	<5
Se	<10	18	<10	<10
S	476	1.8%	1.3%	360
Cu	12	19	20	15
Pb	<20	36	51	40
Zn	28	43	63	55
Fe	0.8%	2.0%	3.0%	1.5%
As	<5	8	10	<5
C(min)	N.D.	0.34%	0.16%	(0.15)
C(total)	N.D.	0.60%	0.29%	(0.52)
n	5	8	6	2(1)

NOTE: All values in ppm unless otherwise indicated.

TABLE IV

DETAILS OF ANALYSED WATERS

Sample Number	Sample Type/ Location	Depth(m)	Elevation(m) (approx.)	Uppb	HCO_3 *	CO_2 *	Cl *	SO_4 *	Na *	K *	Ca *	Mg *	Eh	pH	Comments
PU-150	DH77-44	16	64	100	146	< 2	1140	1536	1200	6	325	49	N.D.	N.D.	Cloudy water
-151	DH77-40	40	90	182	368	< 2	1090	308	1125	27	105	57	N.D.	N.D.	Muddy water
-152	DH77-49	35	91	6	127	< 2	20	8	60	9	52	14	N.D.	N.D.	Muddy water
-153	DH77-51	52	75	30	244	< 2	240	63	230	5	40	14	N.D.	N.D.	Cloudy water
-154	DH210-22	5	18	58	235	< 2	9910	2783	9000	130	425	417	+ 98	8.25	
-155	DH210-18	4	6	44	380	< 2	13720	2572	9000	70	650	525	-67	7.8	
-156	Cockatoo Bore	-	N.D.	97	390	< 2	1540	903	1200	20	200	50	+ 313	6.9	T.D. 24m P
-157	Evaroona Well	9	N.D.	27	297	< 2	155	88	136	16	80	50	+ 343	7.7	T.D. 27m
-158	Brooks Bore	-	N.D.	28	378	< 2	770	333	440	25	135	120	+ 358	7.6	
-159	Acacia Park Well	-	N.D.	49	350	< 2	1640	619	1350	21	70	110	+ 343	7.5	T.D. 18m
-160	DH210-17	14	18	24	373	< 2	896	281	660	17	85	103	-17	7.3	
-161	DH210-16	16	22	27	348	< 2	504	245	460	17	75	76	-77	7.8	
-162	DH210-15	16	26	17	348	< 2	460	214	335	19	70	86	-97	7.6	
-163	DH210-14	18	30	22	171	< 2	1230	695	1350	23	42	76	+123	7.6	
-164	DH77-48	40	90	499	386	< 2	1094	307	800	40	110	63	+233	7.6	Very muddy water
-165	DH77-44	10	64	103	154	< 2	1218	1531	1350	9	360	53	+48	7.8	
-166	DH77-50	3	64	22	282	< 2	67	70	176	4	55	11	-42	7.3	
-167	DH77-53	2	72	56	200	< 2	50	28	60	9	50	11	+413	7.15	
-168	DH77-52	6	71	17	114	< 2	51	30	70	9	32	10	+403	7.3	
-169	DH77-51	53	75	32	244	< 2	189	76	250	6	40	16	+363	7.3	
-170	DH77-55	35	77	54	230	< 2	85	49	120	4	60	20	+453	7.9	
-171	DH245-25	36	N.D.	75	212	< 2	372	135	275	5	85	31	+373	8.3	
-172	DH91-3	21	38	18	260	< 2	328	112	180	16	100	58	+423	7.65	
-173	DH210-2	26	49	24	275	< 2	394	283	270	21	125	70	+383	7.2	ph determined following day.
-174	DH210-3	26	52	21	378	< 2	336	188	320	12	95	63	+383	7.3	" " " "
-175	DH210-4	29	54	12	290	< 2	450	148	290	16	90	70	-67	7.35	" " " "
-176	DH203-1	39	60	11	236	< 2	316	218	270	15	65	51	+213	7.4	" " " "
-177	DH203-2	43	60	9	183	< 2	274	238	245	12	50	45	+288	7.4	" " " "
-178	DH210-6	30	51	19	360	< 2	434	385	240	18	90	76	+253	7.3	" " " "
-179	DH210-7	23	48	6	136	< 2	148	133	160	5	42	28	+363	7.0	" " " "
-180	DH210-8	25	45	11	202	< 2	300	134	180	8	70	46	+383	7.2	" " " "
-181	DH210-9	25	45	7	182	< 2	220	203	165	8	75	48	+383	7.8	
-182	No.1 Bore	-	N.D.	9	246	< 2	704	406	335	16	195	123	-383	8.3	
-183	DH210-11	22	36	17	280	< 2	308	136	180	15	105	51	+403	7.8	
-184	DH210-12	24	39	19	354	< 2	442	220	300	18	125	82	+64	7.8	
-185	DH210-13	24	42	32	358	< 2	418	288	290	17	130	76	+84	7.7	
-186	DH210-10	21	33	22	292	< 2	262	140	220	19	85	48	+343	7.85	
-187	DH 77-61	5	78	47	292	< 2	38	14	50	8	70	18	+353	7.2	
-188	DH 77-59	30	79	14	318	< 2	183	21	210	7	47	18	+33	7.6	
-189	DH 77-37	8	28	17	306	< 2	1308	613	850	29	250	76	-37	7.2	Contained feathers
-190	DH 77-36	7	28	43	308	< 2	1480	840	1150	13	245	78	-37	7.2	Contained feathers
-191	DH77-38	10	29	13	164	< 2	1796	830	1200	14	320	106	+273	7.2	Contained a few feathers
-192	DH 77-40	11	31	329	352	< 2	1940	1017	1300	5	550	110	+303	7.1	
-193	DH 77-41	15	30	24	237	<2	404	211	400	8	105	26	+273	7.3	Contained ants.
-194	DH 77-39	10	30	144	242	<2	1860	1654	1550	16	330	120	+333	7.1	
-195	DH 77-33	14	30	20	119	<2	618	345	530	11	85	35	+333	6.9	
-196	DH 77-35	11	31	192	200	<2	2400	1826	2000	21	345	137	+333	6.9	
-197	DH 77-34	12	31	20	173	<2	606	838	750	12	105	41	+113	7.1	
-198	DH 77-46	26	77	163	276	<2	388	150	220	9	140	45	+313	7.0	
-199	DH 77-49	35	91	4	215	<2	25	12	47	9	45	16	+323	7.4	Very muddy water
-200	DH245-4	4	N.D.	7	50	<2	67	23	40	6	25	7	+303	7.9	
-201	DH 77-26	17	31	15	73	<2	266	350	275	8	85	18	+263	7.6	
-202	DH 77-13	21	33	130	170	<2	1254	1109	1750	16	240	95	+358	7.1	
-203	DH 77-32	16	31	39	190	<2	522	646	850	5	30	11	+348	8.0	
-204	DH 77-30	13	31	183	216	<2	2304	2474	2400	19	325	113	+373	7.6	
-205	DH 77-29	16	32	224	266	<2	2609	1938	2300	35	315	150	+333	7.2	
-206	Steel Cased DH	25	N.D.	8	144	<2	71	84	140	8	50	16	+363	7.2	

Note : Sample Nos. PU-160 to PU-206, Eh determinations made "up-hole"

* indicates values in ppm.

N.D. Not determined

T.D. Total depth

D.H. Drill Hole

TABLE V

ELEMENT CONCENTRATIONS BY SAMPLE GROUP

ION \ GROUP	I	II	III	IV	V	VI	$\bar{x}$	$\bar{x}$(2)
U	57(1)	100	16	23	50	51	60	53
HCO_3	227	215	269	310	354	308	251	249
CO_3	<2	<2	<2	<2	<2	<2	<2	<2
Cl	372	1383	556	773	1026	11815	1248	863
SO_4	257	1050	215	359	486	2677	546	468
Na	393	1236	243	701	683	9000	900	612
K	10	15	14	19	21	100	17	14
Ca	97	238	89	68	121	538	146	131
Mg	27	80	62	85	83	471	73	58
Eh	+274	+254	+285	-17	+339	+ 16	+247	+255
pH	7.5	7.25	7.5	7.6	7.4	8.0	7.5	7.4
Σ Salt	1154	4002	980	2005	2419	24600	2928	2146
n	17	14	15	4	4	2	57	54

(1) Excludes value of 499 ppb for PU-164

(2) Excludes PU-154, PU-155 and PU-164.

All ion concentrations in ppm except for uranium (ppb).

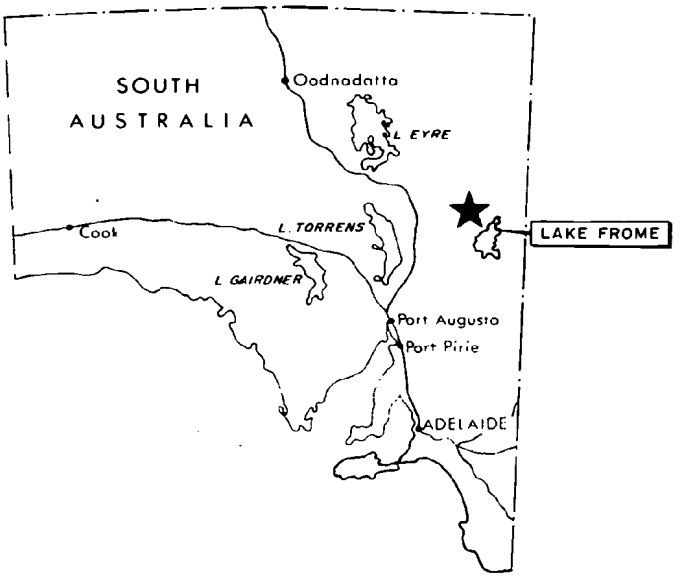
T A B L E VI

URANIUM/ION CONCENTRATION RATIOS

(X 1000)

RATIO \ GROUP	I	II	III	IV	V	VI	$\bar{x}$ (2)
U/HCO_3	0.251	0.465	0.059	0.074	0.141	0.038	0.212
U/SO_4	0.221	0.095	0.074	0.064	0.102	0.019	0.113
U/Cl	0.153	0.072	0.028	0.029	0.048	0.004	0.061
U/Σ ion	0.049	0.024	0.016	0.011	0.020	0.002	0.024

(2) Values calculated using modified average from Table 5.



LOCATION MAP

1977

DRILLING PROGRAMME No. 1

(EL 209)

LAKE FROME EMBAYMENT
SOUTH AUSTRALIA

FIRST REPORT

RECEIVED
1 JUN 1977
DEPT. OF MINES
SECURITY

BP MINERALS AUSTRALIA PROPRIETARY LIMITED

1977 DRILLING PROGRAMME No.1

EL 209

LAKE FROME EMBAYMENT, SOUTH AUSTRALIA

- FIRST REPORT -

Dr. DEREK M. TAYLOR

MELBOURNE - VICTORIA

April, 1977.

S U M M A R Y

Exploration Licence 209 covers an area of 805 square kilometres to the northwest of Lake Frome and to the south and east of the Beverley uranium deposits. A drilling programme was undertaken during March 1977 to further test the significance of radiometric anomalies and ore grade mineralisation detected in two areas, Paralana Creek Areas "A" and "B", during previous programmes.

Eleven holes were drilled in Paralana Creek Area "A" to an average depth of 235.7 metres. One hole intersected uranium mineralisation within Sand-Member d, with a radiometric grade exceeding 1 kg eU_3O_8/tonne, at a depth of 217 m. The drilling proved the extension of the palaeochannels containing this sand member to the south and lent support to the theory that they extend to the northeast.

Two holes were drilled in Paralana Creek Area "B" to an average depth of 236 m. One hole intersected ore grade uranium mineralisation within a sand filled palaeochannel at a depth of 178 m.

The drilling failed to significantly extend the area of known ore grade mineralisation in the one area (Paralana "A") but upgraded the potential of the second area (Paralana "B"). Further drilling in both areas, both on a close-spaced grid and on a more regional scale, is strongly recommended.

Large areas of the licence remain untested and it is recommended that, following a review of all available data, a regional survey should be undertaken to locate additional mineralised palaeochannels.

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KEYWORDS

BEVERLEY
DRILLING
FROME
LOGGING
MINERALISATION
PARALANA
POONTANA
RADIOMETRICS
URANIUM

LIST OF ILLUSTRATIONS

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FIGURES

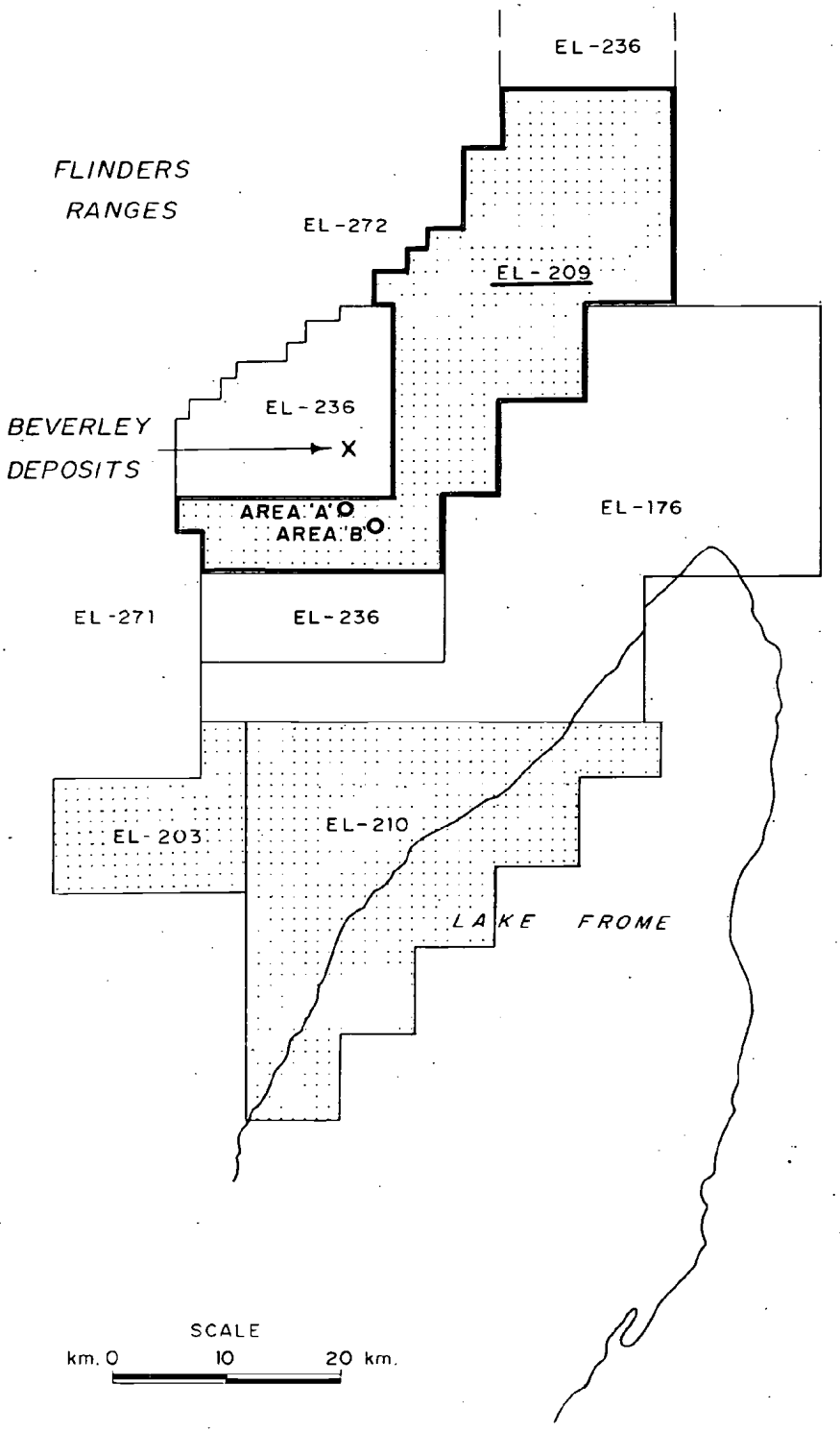
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FIGURE 2 - DRILL HOLE LOCATION MAP PARALANA "A" (IN BACK POCKET)

FIGURE 3 - DRILL HOLE LOCATION MAP PARALANA "B" (IN BACK POCKET)

COPIES OF ELECTRIC AND RADIOMETRIC LOGS (IN BACK POCKET)

220



EXPLORATION LEASES ON NORTH WEST SIDE OF LAKE FROME EMBAYMENT.

(AS AT FEB. 1977)

25% BP INTEREST.

FIGURE 1

BP MINERALS AUST. PTY LTD	
Area:	LAKE FROME
SOUTH AUSTRALIA	
Ref:	U1/4-23
APRIL 1977	MIN. BRANCH

BASED ON TS1380

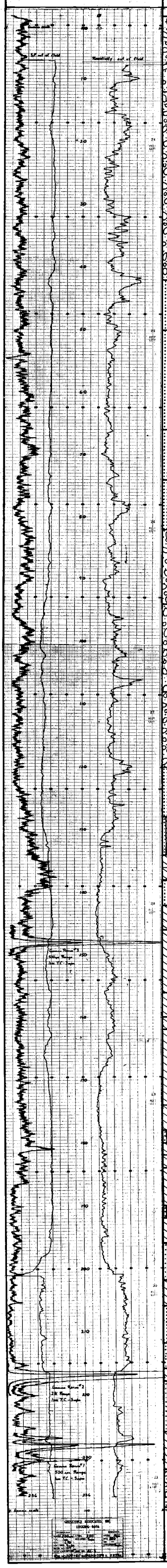
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DRILL HOLE LOG

2608(IV)-4

HOLE No.	209-55	DATE DRILLED	21.3.1977	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	21.3.1977	RANGE	200	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	21.3.1977	TIME CONSTANT	2 sec.	SP. SCALE	250
LOCATION	PARALANA "A"	DRILLED DEPTH	238 m	PAPER SPEED	1 cm/m	BIAS	880/-
STATE	S.A.	LOGGED DEPTH	236 m	LOGGING SPEED	9 m/min	FLUID LEVEL	7 m
GEOLOGIST	TAYLOR	ELEVATION		BACK GROUND	19 cps	PROBE No	109
DRILLER	AULD	CO-ORDS		TIME BASE	1 sec.	STANDARD	64/cps
LOGGER	HART			K-FACTOR	1.33x10-5		Mixed Clastics

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



INTERVAL	DESCRIPTION
0 - 12	Gravel. Coarse sand. Minor red clay.
12 - 42	Gravel. Coarse sand. Red clay.
42 - 50	Coarse sand. Red clay.
50 - 66	Coarse sand. Red silty clay.
66 - 74	Fine sand. Red silty clay.
74 - 82	Fine sand. Red/brown silty clay.
82 - 94	Fine gravel. Red/brown silty clay.
94 - 108	Fine gravel. Red and minor pale grey (mpg) silty clay.
108 - 120	Fine gravel. Red and lesser pale grey (lpg) soft silty clay.
120 - 128	Coarse sand. Pale grey and minor red soft clay.
128— 134	Coarse sand. Pale grey clay. Hematite (Hem.)
134 - 136	Pale and light grey clay. Stains.
136 - 138	Light to mid grey clay. Hematite common.
138 - 142	Coarse sand. Clays as above. Stains fairly common.
142 - 146	Clays as above. Minor coarse sand.
146 - 156	Dark grey/black clay. Stains f. common/ common (com.)
156 - 160	Mid to dark grey clay. Stains minor. Minor coarse sand.
160 - 162	Light grey, hard, clay. Hematite f. common.
162 - 174	Dark grey/ black clay. Stains decrease down interval.
174 - 178	Light, mid and dark grey clay. Hem. com. Limonite f. com.
178 - 180	Sand (2-5mm, rounded (r), quartz (qz)). Clay as above
180 - 182	Clay as above. Minor stains and sand.
182 - 184	Olive green, green, black and grey clay.
184 - 190	Mid grey clay. Limonite (Lim.) abundant (abund.)
190 - 192	Sand (0.5-2 mm., angular (a), qz)) Clay as above.
192 - 196	Light to mid grey clay. Lim. v. com.
196 - 202	Sand (2mm., a/subrounded (sr.), qz+). Clays as above. Lim. com.
202 - 206	Mid grey and khaki clay. Lim. com. Min. coarse sand.
206 - 212	Sand or fine gravel (0.5 -10 mm, a/r, mixed (mx). Mid grey clay. Min. stains
212 - 216	Sand (as above) and very fine sand. Clays as above.
216 - 218	Mid to dark grey clay. Lim. f. com.
218 - 226	Sand (0.5-2 mm, a/sr, qz+). Clays as above. Lim.f.com.
226 - 232	Mid to dark grey clay. Minor sand. Lim. f. com.
232 - 238	Gravel (2-10 mm, sq/r, qz+) Clays as above. Lim.f.com.

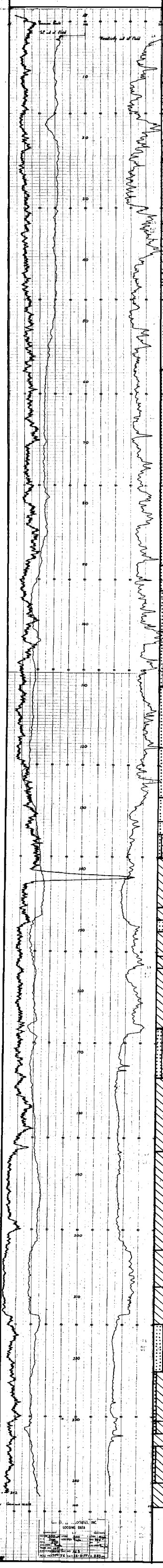
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DRILL HOLE LOG

2608(II)-5

HOLE No.	209-56	DATE DRILLED	22.3.77	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	22.3.77	RANGE	200 cps	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	23.3.77	TIME CONSTANT	2 sec.	SP. SCALE	300
LOCATION	PARALANA "A"	DRILLED DEPTH	244 m	PAPER SPEED	1 cm/m	BIAS	900/-
STATE	S.A.	LOGGED DEPTH	242 m	LOGGING SPEED	9 m/min.	FLUID LEVEL	3 m
GEOLOGIST	TAYLOR	ELEVATION		BACK GROUND	18 cps.	PROBE No	109
DRILLER	BROWN	CO-ORDS		TIME BASE	1 sec.	STANDARD	656 cps.
LOGGER	HART			K-FACTOR	1.33x10^{-5}		

LITHOLOGY : Gravel | Sand | Silt | Clay | Carbonate | Carbonaceous | Mixed Clastics



INTERVAL	DESCRIPTION
0 - 16	Gravel. Coarse sand. White clay.
16 - 24	Fine gravel. Coarse sand. Red clay.
24 - 34	Sand. Red with minor white clay.
34 - 42	Fine sand (75%) and coarse sand.
42 - 44	Gravel. Coarse sand. Red clay.
44 - 58	Coarse sand. Red silty clay.
58 - 90	Coarse sand. Red/brown with minor pale grey clay in lower part.
90 - 94	Coarse sand and clay as above.
94 - 110	Coarse sand. Clay as above.
110 - 120	Coarse sand. Clay as above.
120 - 128	Coarse sand. Brown and pale grey soft clay.
128 - 132	Coarse sand. Pale grey and yellow/brown clay.
132 - 134	Coarse sand. Clay as above.
134 - 138	Coarse sand. Pale and light grey clay. Stains.
138 - 146	Mid grey clay. Hem. abund. Lim.f.com. Min. coarse sand.
146 - 148	Dark grey and black clay. Hem. ~. com. Lim.f.com.
148 - 150	Sand (0.5-/mm., sq/r, qz+). Clay as above.
150 - 154	Dark grey and black clay. Hem. v. com.
154 - 156	Mid grey clay. Hematite common.
156 - 166	Light to mid grey clay. Min.white clay.Stains,esp. hematite, f.common.
166 - 174	Sand (0.25 - 0.5 mm.,a/sr, qz). Dark grey soft clay. Min. light grey clay.
174 - 186	Black and dark grey clay. Hematite common. Limonite fairly common.
186 - 202	Olive green and dark grey clay. Limonite abundant. Minor red and yellow mottled clay.
202 - 208	Dark olive green and dark grey clay. Limonite (goethite) very common.
208 - 214	Clay (as above) (50%) and mixed clays. (M.C.) (Dark = Light)
214 - 222	Very fine sand (10%) and sand (1 mm, sa, qz) Mixed Clays (Dk ≥ Lt).
222 - 230	Sand (1-2mm, a/sr, qz+). Dark grey/black clay. Minor red/yellow mottled clay.
230 - 232	Very fine sand. Black clay. Min. lim.
232 - 234	Black clay. Lim. f. common.
234 - 240	Sand (1-3mm, a/sr, qz+). Clay as above.
240 - 244	Clays as above. Minor sand.

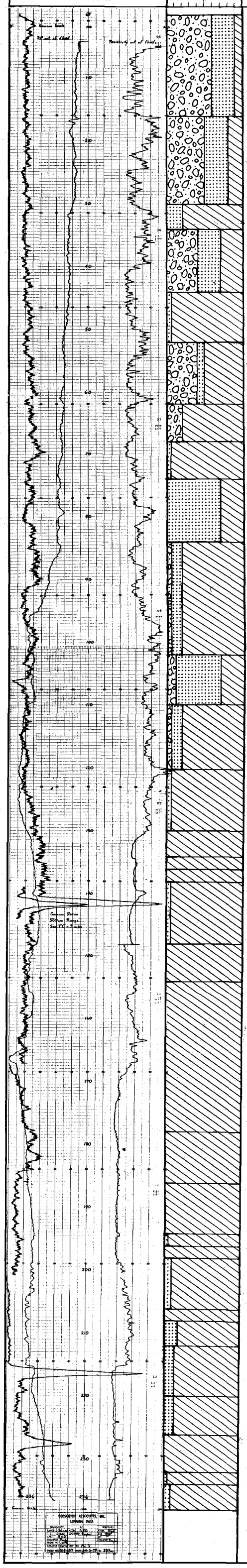
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DRILL HOLE LOG

2608(II)-6

HOLE No.	209-57	DATE DRILLED	24.3.77	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	24.3.77	RANGE	200 cps	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	24.3.77	TIME CONSTANT	2 sec.	SP. SCALE	350
LOCATION	PARALANA"A"	DRILLED DEPTH	238 m	PAPER SPEED	1 cm/m	BIAS	900
STATE	S.A.	LOGGED DEPTH	236 m	LOGGING SPEED	9 m/min	FLUID LEVEL	5 m
GEOLOGIST	TAYLOR	ELEVATION		BACK GROUND	18 cps	PROBE No	109
DRILLER	BROWN	CO-ORDS		TIME BASE	1 sec.	STANDARD	647 cps.
LOGGER	HART			K-FACTOR	1.33x10^{-2}		Mixed Clastics

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



INTERVAL	DESCRIPTION
0 - 16	Gravel. Coarse sand. Red and white clay.
16 - 30	Fine Gravel. Sand. Red clay.
30 - 34	Sand. Red clay.
34 - 44	Fine gravel. Sand. Red clay.
44 - 52	Coarse sand. Red silty clay.
52 - 62	Fine gravel. Coarse sand. Red silty clay.
62 - 68	Fine gravel. Red silty clay.
68 - 74	Coarse sand. Red/brown silty clay.
74 - 84	Coarse sand (20%) fine sand (50%) and red/brown silty clay.
84 - 102	Fine gravel. Coarse sand. Red and mpg silty clay.
102 - 110	Fine gravel. Sand. Clays as above.
110 - 120	Fine gravel coarse sand. Red and minor dark grey clay.
120 - 130	Coarse sand. Red and pale grey soft clay.
130 - 134	Pale grey and yellow/brown (y/b) and min. red clay.
134 - 136	Clay as above with light grey stained clay.
136 - 138	Clay as above with mid grey clay.
138 - 148	Coarse sand. Light to mid grey clay. Hem. abund. Lim. v. common.
148 - 154	Black and mid grey clay. Lim. and hem. common.
154 - 178	Dark and mid grey clay. Hem.f. common. Minor limonite. Minor coarse sand.
178 - 186	Black and dk.grey with minor mid grey and khaki clay. Stains common/ very common.
186 - 194	Mid to dark grey clay. Stains very common.
194 - 196	Sand (1-2mm, a/sr, mixed). Mixed clays (Lt > Dk)
196 - 198	Mid grey clay. Lim. v.com. Hem. com.
198 - 206	Fine sand (5%) and sand (0.5- 1 mm, a/sr, mx) (5%). M.C. (as above) Stains common.
206 - 208	Olive grey and mid/dark grey clay. Stains.
208 - 212	Very fine sand (10%) and sand (0.25-1mm, a/sr, qz+) (10%). M.C. (Dk = Lt).
212 - 220	Very fine sand (10%) and 5% sand as above. Clays as above. Lim. v.com. Hem.com.
220 - 226	Sands as above (slightly coarser) and clays as above. Lim.com.
226 - 232	Mid to dark grey and black clay. Carbonate (5%) in lowest sample. Lim.f. com.
232 - 234	Very fine sand. Clay as above. Lim. f. com.
234 - 238	Very fine sand (5%) and sand (1-3 mm, a/sr, qz+) (5%). Clays as above. Lim. com.

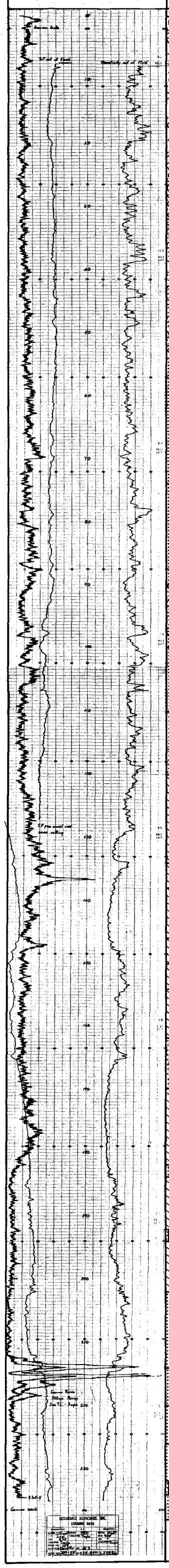
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DRILL HOLE LOG

2608(V)-7

HOLE No.	209-58	DATE DRILLED	24.3.77	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	25.3.77	RANGE	200 cps	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	25.3.77	TIME CONSTANT	2 sec.	SP. SCALE	350
LOCATION	PARALANA"A"	DRILLED DEPTH	238 m	PAPER SPEED	1 cm/m	BIAS	900/-
STATE	S.A.	LOGGED DEPTH	235 m	LOGGING SPEED	9 m/min	FLUID LEVEL	8 m
GEOLOGIST	TAYLOR	ELEVATION		BACK GROUND	19 cps.	PROBE No	109
DRILLER	AULD	CO-ORDS		TIME BASE	1 sec.	STANDARD	657 cps
LOGGER	HART			K-FACTOR	1.33×10^{-5}		Mixed Clastics

LITHOLOGY : Gravel, Sand, Silt, Clay, Carbonate, Carbonaceous



INTERVAL	DESCRIPTION
0 - 26	Gravel. Sand. Red and white clay.
26 - 32	Gravel. Sand. Red clay.
32 - 52	Fine gravel. Coarse sand. Red silty clay.
52 - 54	Fine gravel. Red silty clay.
54 - 74	Coarse sand. Red silty clay.
74 - 90	Sand. Red silty clay.
90 - 98	Fine gravel. Coarse sand. Red/brown silty clay.
98 - 100	Fine sand.
100 - 110	Coarse sand (70%). Fine sand (20%). Red/brown clay.
110 - 116	Coarse sand. Red/brown and mpg clay.
116 - 120	Sand. Red/brown and l pg silty clay.
120 - 134	Pale grey and y/b and minor red clay. Stained.
134 - 138	Pale and light grey clay. Hem. abund. Lim. com.
138 - 146	Light/mid grey clay. Stains v.common.
146 - 150	Black, dk. grey and min. mid grey clay. Min. stains.
150 - 154	Mid to dk. grey and min. black clay. Hem. f. com.
154 - 162	Light, mid and dk grey clay. Hem. f.com. Min. lim.
162 - 170	Sand (1mm, a/sr,qz+). Dk and mid grey clay. Hem. v.com. Lim.com/
170 - 182	Dark grey/black clay. Hem. v.com. Lim.f.com. Minor mottled stain.
182 - 184	Sand (0.25-1mm, a/sr, mixed (mx). Clay as above.
184 - 192	Mid to dark grey clay. Lim. abund. Hem. v.com.
192 - 194	Sand (0.25-1mm, a/sr, mx). Clay as above.
194 - 202	Mid to dark grey clay and olive green clay. Limonite v.common. Hem.f.common.
202 - 214	Sand (0.25-1mm, a/sq, qz+) with some very fine sand. Mixed clays (Dk = Lt). Limonite v.common.
214 - 220	Very fine sand (< 0.25 mm, qz). Mixed clays (Lt ≥ Dk). Lim.v.common.
220 - 226	Very fine sand as above. Mixed clays (as above). Limonite common.
226 - 232	Very fine sand and clays as above. Limonite f.common.
232 - 234	Sand (0.25-2mm, a/sr, qz+). M.C. (Dk > Lt).
234 - 238	Very fine sand and sand (as above) Mixed clays (as above). Lim.f.common.

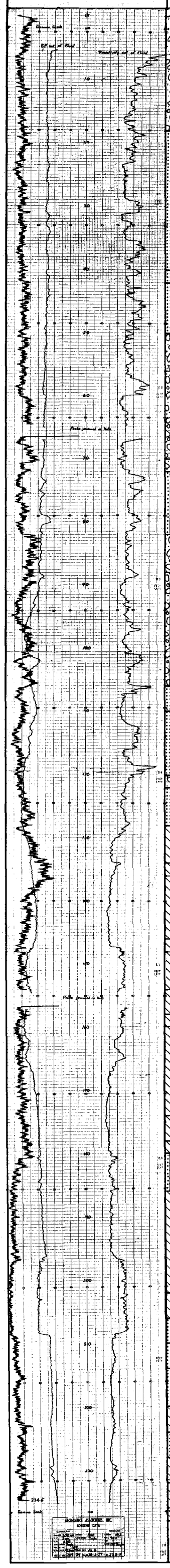
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DRILL HOLE LOG

2608(II)-8

HOLE No.	209-59	DATE DRILLED	25.3.77	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	26.3.77	RANGE	200 cps	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	26.3.77	TIME CONSTANT	2 sec.	SP. SCALE	300
LOCATION	PARALANA"A"	DRILLED DEPTH	238 m	PAPER SPEED	1 cm/m	BIAS	900/-
STATE	S.A.	LOGGED DEPTH	234.5m	LOGGING SPEED	9 m/min	FLUID LEVEL	6 m
GEOLOGIST	TAYLOR	ELEVATION		BACK GROUND	18 cps	PROBE No	109
DRILLER	AULD	CO-ORDS		TIME BASE	1 sec.	STANDARD	660 cps
LOGGER	HART			K-FACTOR	1.33×10^{-5}		Mixed Clastics

LITHOLOGY : Gravel | Sand | Silt | Clay | Carbonate | Carbonaceous



INTERVAL	DESCRIPTION
0 - 18	Gravel. Coarse sand. White and red clay.
18 - 40	Coarse sand. Red silty clay.
40 - 42	Fine gravel. Coarse sand.
42 - 50	Coarse sand. Red silty clay.
50 - 56	Fine gravel. Coarse sand. Red silty clay.
56 - 70	Fine gravel. Coarse sand. Red silty clay.
70 - 72	Fine gravel. Coarse sand. Red/brown clay.
72 - 82	Coarse sand. Red/brown silty clay.
82 - 88	Gravel. Sand. Clay as above.
88 - 106	Gravel. Coarse sand. Red/brown and mpg silty clay.
106 - 110	Coarse (40%) and normal (40%) sand. Red soft clay.
110 - 120	Coarse sand. Red/brown and lpg soft silty clay.
120 - 122	Fine gravel. Coarse sand. Clay as above.
122 - 128	Sand. Red/brown and pale grey soft clay.
128 - 134	Pale grey, yellow/brown and min.red clay stains.
134 - 136	Light and pale grey clay. Stains v.com.
136 - 146	Mid grey with min. light grey clay. Stains abund. Min. coarse sand.
146 - 148	Mid to dk grey clay. Stains abund.
148 - 154	Black and dk grey clay. Stains min. to com.
154 - 158	Mid to dk grey clay. Stains f.com.
158 - 160	Light grey clay. Hem.f.com. Min.Lim.
160 - 174	Dark grey clay. Hematite common or very common. Minor limonite.
174 - 178	Black and dk grey clay. Hem.f.com.
178 - 180	Dark grey soft clay. Hem. f. com. Min.lim.
180 - 186	Sand (0.5-2mm., a/sr, mx). Mid to dk. grey clay. Stains f.com.
186 - 202	Mid grey clay. Limonite abundant. Minor sand. Minor khaki clay in lowest sample.
202 - 206	Mixed clays (Lt > Dk) Lim.v.com. Min. fine sand.
206 - 210	Fine sand (< 0.25 mm, qz).Mixed clays (Lt > Dk).
210 - 214	Fine sand. Mixed clays as above. Lim.v.com.
214 - 220	Silt (or v.fine sand). Fine sand. Mixed clays. Lim.com.
220 - 224	Mid to dk grey clay. Min.stains and sand.
224 - 228	Sand (1-3mm, sa/sr,qz+). Mixed clays. (Dk > Lt). Lim.f.com.
228 - 232	Mixed clays (DK ≥ Lt) Min.sand. Lim.f.com.
232 - 238	Mixed clays (Dk > Lt). Minor Carbonate. Limonite f.common.

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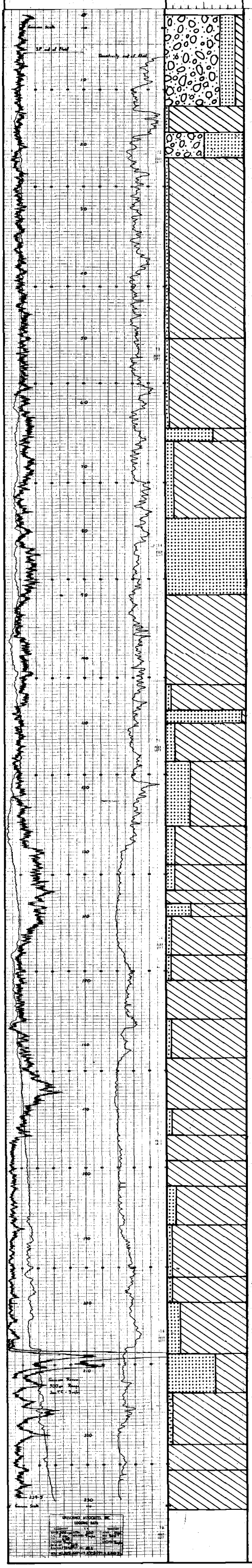
DRILL HOLE LOG

2608(V)-9

HOLE No.	209-60	DATE DRILLED	26.3.77	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	27.3.77	RANGE	200 cps	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	27.3.77	TIME CONSTANT	2 sec.	SP. SCALE	300
LOCATION	PARALANA"A"	DRILLED DEPTH	232 m	PAPER SPEED	1 cm/m	BIAS	900/-
STATE	S.A.	LOGGED DEPTH	229.5 m	LOGGING SPEED	9 m/min	FLUID LEVEL	6 m
GEOLOGIST	TAYLOR	ELEVATION		BACK GROUND	16 cps	PROBE No	109
DRILLER	AULD	CO-ORDS		TIME BASE	,1 sec	STANDARD	669 cps.
LOGGER	HART			K-FACTOR	1.33x10-5		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous · Mixed Clastics

GAMMA S.P. RES | 100% | INTERVAL | DESCRIPTION



INTERVAL	DESCRIPTION
0 - 14	Coarse gravel. Sand. White/buff clay.
14 - 18	Coarse sand. Red andmin. white clay.
18 - 22	Fine gravel. Coarse sand.
22 - 50	Sand. Red silty clay.
50 - 64	Coarse sand. Red/brown silty clay.
64 - 66	Sand. Clay as above.
66 - 78	Sand and clay as above.
78 - 90	Coarse red sand. Minor fine gravel.
90 - 104	Brown silty clay. Minor coarse sand.
104 - 108	Coarse sand. Brown and lpg silty clay.
108 - 110	Coarse sand. Red/bbown and pale grey clay.
110 - 116	Coarse sand. Pale grey and brown clay (60:40).
116 - 126	Coarse sand. Pale grey and brown clay (50:50).
126 - 132	Coarse sand. Pale grey and yellow/brown clay.
132 - 136	Coarse sand. Pale and light grey clay. Hem.v.com. Lim.f.com.
136 - 138	Mid to dark grey hard clay. Hem.abund. Lim.com.
138 - 140	Sand (0.25-2mm, a/sr,ps). Dk. grey soft clay.
140 - 146	Sand as above. Mid grey clay. Stains v.com. to abund.
146 - 150	Sand as above. Hard black and mid grey clay.
150 - 156	Mid grey and lesser black clay. Stains v.com.
156 - 162	Sand (0.5-3mm, a/sr, ps). Clays as above. Min.carbonate.
162 - 170	Mid grey stained clay and black clay (with mottled red/yellow/white stains).
170 - 174	Sand (0.25-0.5 mm, a/sr, mx). Clays as above.
174 - 178	Dark grey/black clay. Lim.v.com. Hem.com.
178 - 182	Mid greenish grey clay. Lim.v.com. Min.brick red clay.
182 - 188	Sand (1-3mm, a/sa,ps). Greenish grey clay. Lim.common.
188 - 196	Sand as above. Clays as above. Lim.f.com.
196 - 200	Sand (1-5mm, a/sr,ps). Clays as above.
208 - 208	Sand (as above)(5%) and very fine sand (10%). Clays as above.
208 - 214	Very fine sand (< 0.25,qz). Clays as above. Lim.com.
214 - 222	Silt. Clays as above. Lim.f.com. Min. carb.
222 - 226	Clays as above. Minor carbonate (2%).
226 - 232	Clays as above with increase in black clay down interval. Lim. f.com. Min.carb.

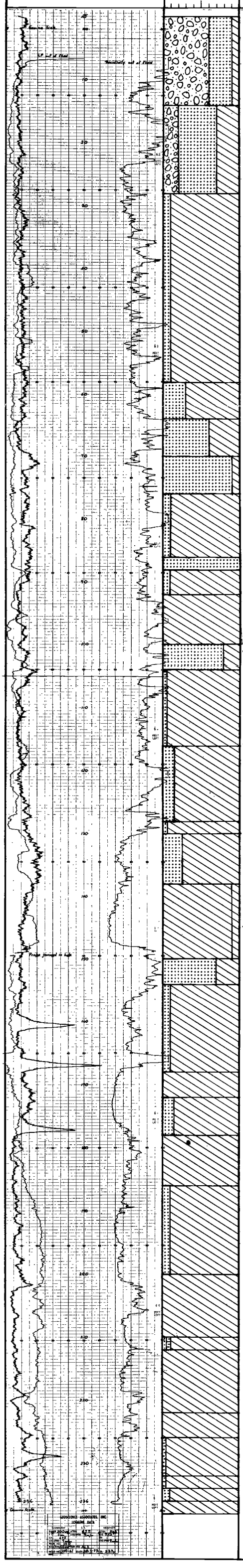
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DRILL HOLE LOG

2608(II)-10

HOLE No.	209-61	DATE DRILLED	28.3.77	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	28.3.77	RANGE	200 cps	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	28.3.77	TIME CONSTANT	2 sec.	SP. SCALE	425
LOCATION	PARALANA"A"	DRILLED DEPTH	238 m	PAPER SPEED	1 cm/m	BIAS	750/-
STATE	S.A.	LOGGED DEPTH		LOGGING SPEED	9 m/min	FLUID LEVEL	7 m
GEOLOGIST	TAYLOR	ELEVATION		BACK GROUND	16 cps	PROBE No	109
DRILLER	AULD	CO-ORDS		TIME BASE	1 sec	STANDARD	669 cps
LOGGER	HART			K-FACTOR	1.33×10^{-5}		Mixed Clastics

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



INTERVAL	DESCRIPTION
0 - 14	Gravel. Coarse sand. Buff clay.
14 - 28	Fine gravel. Coarse sand. Red clay.
28 - 58	Coarse sand. Red soft clay.
58 - 64	Sand. Red silty clay.
64 - 70	Sand. Red silty clay.
70 - 76	Coarse sand. Red silty clay.
76 - 86	Coarse sand. Red/brown and mpg clay.
86 - 88	Coarse sand.
88 - 92	Coarse sand. Red/brown and mpg silty clay.
92 - 100	Clay as above.
100 - 104	Coarse sand. Clay as above
104 - 116	Coarse sand. Red/brown silty clay.
116 - 128	Sand. Red/brown and pale grey soft clay.
128 - 130	Coarse sand. Pale grey and y/b clay
130 - 138	Sand (1-2 mm, a/sr, p.s.). Pale and light grey soft clay. Stains common.
138 - 150	Sand (1-3 mm, a/sr p.s.). Light to mid grey clay. Limonite f.com. Min carbonate?
150 - 154	Sand as above. Mid grey clay.
154 - 168	Sand (as above). Mid Grey clay. Minor limonite. Hem.f.com. Min.black clay.
164 - 172	Mid to dk. grey and black clay. Min. stain.
172 - 178	Sand (1-3 mm, a/sr, mx). Dark grey/black clay. Min stain.
178 - 186	Hard black and min. dk. grey clay. Stains f.com.
186 - 200	Sand (0.5-2 mm, a/sa/sr, p.s.) and some coarser (1-5 mm) at top. Dark grey to black clay. Stains fairly common.
200 - 210	Mixed clays (black and mid grey) (Dk > Lt). Limonite f.common. Minor coarse sand. Min. light grey clay at bottom.
210 - 212	Sand (1 mm, a/sr,mx). Silt. M.C. (Dk > Lt).
212 - 222	M.C. (Dk > Lt). Min. sand and silt. Limonite f. common.
222 - 226	Mixed clays (Dk = Lt). Lim. f.com/com.
226 - 232	Silt. Mixed clays (Dk > Lt). Min. lim. Min. carbonate.
232 - 234	Sand (1-2mm, a/sr, mx). M.C. (Dk > Lt). Min.lim. Min.carb.
234 - 236	Sand (as above) and v.fine sand. Clays as above
236 - 238	Mixed clays (DK > Lt). Min.lim. Min. coarse sand. Min carb.

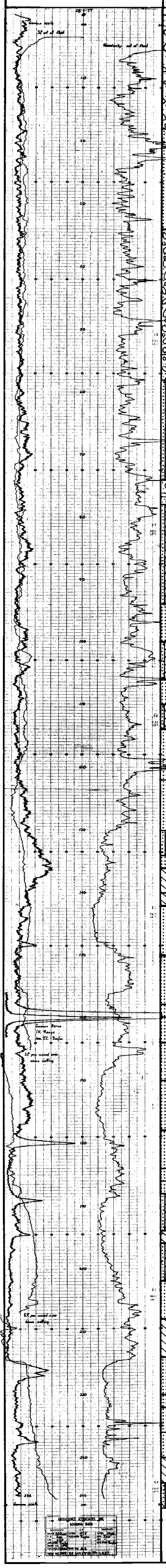
MINERALS AUST. PTY LTD

DRILL HOLE LOG

2608(II)-11

HOLE No.	209-62	DATE DRILLED	28.3.77	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	29.3.77	RANGE	200 cps	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	29.3.77	TIME CONSTANT	2 sec.	SP. SCALE	425
LOCATION	PARALANA"A"	DRILLED DEPTH	238 m	PAPER SPEED	1 cm/m.	BIAS	750/-
STATE	S.A.	LOGGED DEPTH	236 m	LOGGING SPEED	9 m/min.	FLUID LEVEL	3 m
GEOLOGIST	TAYLOR	ELEVATION		BACK GROUND	18 cps	PROBE No	109
DRILLER	BROWN	CO-ORDS		TIME BASE	1 sec.	STANDARD	659 cps.
LOGGER	HART			K-FACTOR	1.33x10-5		Mixed Clastics

LITHOLOGY : Gravel | Sand | Silt | Clay | Carbonate | Carbonaceous



INTERVAL	DESCRIPTION
0 - 18	Fine and coarse gravel. Coarse sand. Red soft clay.
18 - 34	Coarse sand. Red soft clay.
34 - 54	Fine gravel coarse sand. Red clay.
54 - 58	Fine gravel. Coarse sand. Red clay.
58 - 74	Coarse sand. Red silty clay.
74 - 78	Gravel. Coarse sand. Red silty clay.
78 - 94	Coarse sand. red silty clay.
94 - 100	Coarse sand. Red silty clay.
100 - 106	Coarse sand. Red soft clay.
106 - 110	Coarse sand. Red soft clay.
110 - 114	Coarse sand. Red/brown and mpg silty clay.
114 - 122	Sand. Red/brown and lpg soft clay.
122 - 130	Sand. Red/brown and pale grey clay.
130 - 134	Very coarse sand. Pale grey with lesser red silty clay.
134 - 136	Sand. Pale grey, yellow/brown and min. red clay.
136 - 140	Clays as above.
140 - 142	Clays as above plus light grey clay
142 - 150	Sand (0.5-2 mm, a/sa,ps). Light, mid and dk grey clay. Hem.com. Lim f.com.
150 - 158	Sand as above. Mid and dk grey/black clay. Min. stain.
158 - 160	Sand (<0.25-1mm., a/sr, mx). Mixed clays (Lt > Dk).
160 - 164	Sand (1-2mm, a/sr, mx). Mid grey clay. No stains.
164 - 170	Sand (0.5-3mm, a/sr, ps.). Mid and dk grey clay. Min.lim.
170 - 178	Sand (as above). Dk grey and lesser mid grey clay. Min lim.
178 - 184	Sand (0.5-2mm, a/sr, ps.). Mid to dk grey clay.
184 - 186	Sand (2-4mm, a/sr, qz+). Mixed clays (Dk > Lt).
186 - 188	Sand (0.5-2mm, a/sr, ps.). Clays as above.
188 - 194	Sand (0.5-3mm, a/sr, ps.). Greenish grey clay. Lim.com.
194 - 196	Greenish grey and black-clay. Lim. v.com.
196 - 202	Fine sand. Dk grey/black and greenish grey clay. Lim. f. com.
202 - 208	Fine to v.fine sand (<0.25mm, ps.). Dk grey/black clay. Min.lim.
208 - 214	M.C. (Lt ≥ Dk). Min. sand. Min.Lim.
214 - 220	V.fine sand (10%) and sand (0.5-2mm, a/sr, ps.) (5%). M.C. (Dk > Lt).
220 - 222	V.fine sand (10%) and fine sand (0.25mm). M.C. (Dk ≫ Lt).
222 - 226	Sand (1-2mm, a/sr, ps.). M.C. (Dk = Lt). Min.lim.
226 - 230	Sand (1mm, a/sq,qz+). M.C. (Dk ≥ Lt). Min carbonate. Min.lim.
230 - 234	Mixed clays (Dk > Lt). Carbonate.
234 - 238	Fine sand. Mixed clays (Dk,≫ Lt). Carbonate.

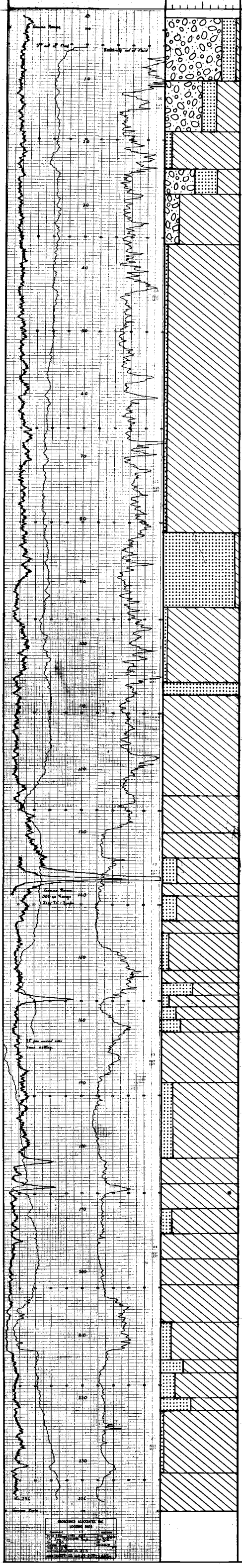
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DRILL HOLE LOG

2608(V)-12

HDLE No.	209-63	DATE DRILLED	29.3.77	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	29.3.77	RANGE	200 cps	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	29.3.77	TIME CONSTANT	2 sec.	SP. SCALE	425
LOCATION	PARALANA"A"	DRILLED DEPTH	238 m	PAPER SPEED	1cm/m	BIAS	700/-
STATE	S.A.	LOGGED DEPTH	236 m	LOGGING SPEED	9 m/min.	FLUID LEVEL	5 m
GEOLOGIST	TAYLOR	ELEVATION		BACK GROUND	18 cps	PROBE No	109
DRILLER	AULD	CO-ORDS		TIME BASE	1 sec	STANDARD	659 cps
LOGGER	HART			K-FACTOR	1.33×10^{-5}		

LITHOLOGY : Gravel, Sand, Silt, Clay, Carbonate, Carbonaceous, Mixed Clastics



INTERVAL	DESCRIPTION
0 - 10	Coarse gravel. Coarse sand. White clay.
10 - 18	Fine gravel. Coarse sand. Red/buff clay
18 - 24	Coarse sand. Red silty clay.
24 - 28	Fine gravel. Coarse sand. Red clay.
28 - 36	Gravel. Red clay.
36 - 82	Sand. Red. Silty clay.
82 - 94	Coarse (20%) and normal (75%) sand. Red silty clay.
94 - 106	Coarse sand. Red/brown and mpg silty clay.
106 - 108	Fine sand.
108 - 124	Red/brown and mpg silty clay. Minor coarse sand.
124 - 130	Red/brown and lpg silty clay (60:40).
130 - 134	Pale grey and yellow/brown and min.red clay.
134 - 138	Sand (0.25-3mm, a/sr, ps). Pale and light grey clays. Stains com.
138 - 140	Light to mid grey clay. Hem.v.com.Lim.f.com.
140 - 144	Sand (0.25-0.5mm, a/sa,qz+). Clays as above. Lim. com.
144 - 146	Dk grey/black clay. Hem.v.com. Lim.f.com.
146 - 152	Very fine red sand. Clays as above - mainly black.
152 - 154	Black and lesser dark grey clay. Stains com.
154 - 156	Sand (<0.25 - 1 mm, a/sa, mx). Clays as above.
156 - 158	Sand (0.5-2mm, a/sr, ps). Clays as above.
158 - 160	Sand (<0.25- 1 mm, a/sa, mx). Light to mid grey clay.
160 - 162	Sand (0.5-2mm, a/sa,qz). Clays as above.
162 - 170	Light, mid and dark grey clays. Hem. com. Lim.f.com. Minor sand.
170 - 182	Sand (0.25-2mm, a/sr, ps). Clays as above. Hem.com. Lim.f.com.
182 - 186	Clays as above, Lim. and hem. f.com.
186 - 190	Mid grey clay (greenish). Lim.v.com.
190 - 194	Sand (0.5-2mm, a/sr, ps). Clays as above and M.C. (Lt > Dk).
194 - 198	Mid to dk grey clay. Lim.f.com. Min.sand.
198 - 202	Mid grey clay. Limonite common.
202 - 208	Mid greenish grey clay. Lim. com.
208 - 214	Sand (0.25 - 1 mm, a/sr, ps). M.C. (Lt > Dk). Lim.f.com.
214 - 216	Sand (<0.25, ang,qz). M.C. (Lt > Dk). Lim.f.com.
216 - 220	Sand as above. M.C. (Mid and dk grey).
220 - 222	Sand (as above). Clays as above. Lim.com.
222 - 232	Sand (as above). Mid to dk grey clay. Limonite common.
232 - 238	Mixed clays (Lt = Dk). (Mid, dk grey and black). Min. stains.

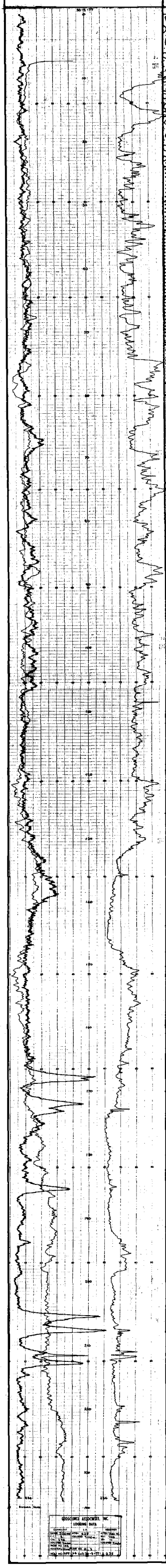
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DRILL HOLE LOG

2608(IV) 13

HOLE No.	209-64	DATE DRILLED	30.3.77	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	30.3.77	RANGE	200 cps	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	30.3.77	TIME CONSTANT	2 sec.	SP. SCALE	425
LOCATION	PARALANA "A"	DRILLED DEPTH	238 m	PAPER SPEED	1 cm/m.	BIAS	700/-
STATE	S.A.	LOGGED DEPTH	236 m	LOGGING SPEED	9 m/min	FLUID LEVEL	8 m
GEOLOGIST	TAYLOR	ELEVATION		BACK GROUND	8 cps	PROBE No	109
DRILLER	BROWN	CO-ORDS		TIME BASE	1 sec.	STANDARD	664 cps
LOGGER	HART			K-FACTOR	1.33×10^{-5}		Mixed Clastics

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



INTERVAL	DESCRIPTION
0 - 12	Gravel. Coarse sand. Red/buff clay.
12 - 16	Gravel. Coarse sand. Red clay.
16 - 24	Fine gravel. Coarse sand. Red clay.
24 - 34	Coarse sand. Red silty clay.
34 - 50	Sand. Red silty clay.
50 - 52	Fine gravel. Red silty clay.
52 - 58	Sand. Red silty clay.
58 - 70	Coarse sand.
70 - 74	Coarse sand. Red silty clay.
74 - 84	Sand. Red silty clay
84 - 90	Coarse sand. Red silty clay.
90 - 114	Coarse sand. Red/brown and mpg silty clay.
114 - 126	Coarse sand. Brown and lpg silty clay.
126 - 130	Brown and pale grey (50:50) silty clay.
130 - 136	Pale grey and yellow/brown clay.
136 - 138	Light grey and mpg clay. Hem.com.Lim/f/com.
138 - 144	Fine sand (< 0.25). Mid to dk grey clay. Hem.com.Lim.f.com.
144 - 146	Mid to dk grey clay. Hem abund. Lim.com.
146 - 154	Dk grey/black clay. Hem. com.Lim.f.com.
154 - 162	Light to mid grey clay. Hem.com. Lim.f.com.
162 - 170	Mid and lesser light grey clay. Stains com.
170 - 178	Mid to dark grey clay. Stains f.com.
178 - 180	Sand (2-3mm, sa/r, mx). Clays as above. Lim. v.com.
180 - 190	Dark grey to black hard clay. Stains common to very common.
190 - 196	Mid to dk grey clay. Stains com/v.com.
196 - 200	Mixed clays (dk = Lt). Lim.com. Min.sand.
200 - 208	Mixed clays (Lt > Dk). Minor carbonate.
208 - 210	Sand (0.25-2mm, a/sr, mx). M.C. (Lt Dk). Lim.com.
210 - 214	Mid and dk. grey clay. Lim.com. Min.sand.
214 - 220	Sand (0.25,qs) and (1-2mm, a/sa, qz). Clays as above.
220 - 226	Dk grey/black clay. Lim.com. Min.carbonate.
226 - 238	Mixed clays (Dk > Lt) (Black and dark grey). Limonite common. Minor carbonate.

TS 1846 K

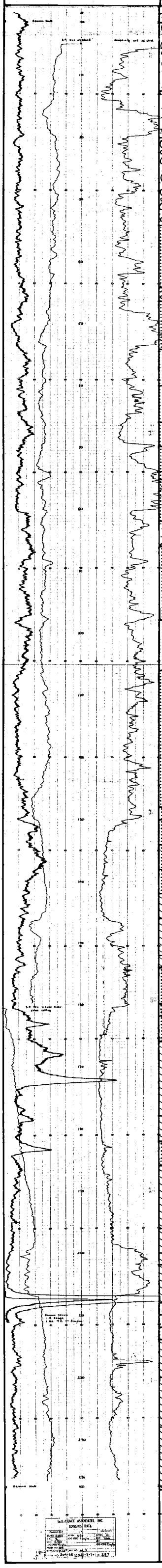
2608(II)-14

MINERALS AUST. PTY LTD

DRILL HOLE LOG

HOLE No.	209-65	DATE DRILLED	30.3.77	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	31.3.77	RANGE	200 cps	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	31.3.77	TIME CONSTANT	2 sec.	SP. SCALE	450
LOCATION	PARALANA"A"	DRILLED DEPTH	238 m	PAPER SPEED	1 cm/m	BIAS	700/-
STATE	S.A.	LOGGED DEPTH	236 m	LOGGING SPEED	9 m/min	FLUID LEVEL	5 m
GEOLOGIST	TAYLOR	ELEVATION		BACK GROUND	11 cps	PROBE No	109
DRILLER	AULD	CO-ORDS		TIME BASE	1 sec	STANDARD	653 cps.
LOGGER	HART			K-FACTOR	1.33x10-5		Mixed Clastics

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



INTERVAL	DESCRIPTION
0 - 20	Gravel. Coarse sand. Red/buff clay.
20 - 34	Gravel. Coarse sand. Red/brown and white clay.
34 - 44	Sand. Red sticky clay.
44 - 46	Fine gravel. Minor clay.
46 - 54	Coarse sand. Red silty clay.
54 - 60	Coarse sand. Red silty clay.
60 - 66	Coarse sand. Red/brown and mpg silty clay.
66 - 70	Coarse sand. Red/brown and mpg silty clay.
70 - 82	Coarse sand. Clays as above.
82 - 86	Fine gravel. Coarse sand. Clays as above.
86 - 98	Coarse sand. Clays as above.
98 - 106	Coarse sand. Red/brown soft clay.
106 - 128	Sand. Red/brown and lpg soft clay.
128 - 130	Sand. Clays as above.
130 - 134	Fine sand. Pale grey lim.stained clay.
134 - 138	Coarse sand (1-2mm, a/sa,qz). Clays as above.
138 - 142	Sand (0.5-2mm, a/sr,qz+). Midgrey clay. Lim.v.com.
142 - 146	Light, mid and dk grey clay. Stains com.
146 - 152	Dk. grey/black clay. Stains f.com.
152 - 154	Mid/dk grey clay. Hem.f.com.Min.lim.
154 - 160	Sand (1mm,a/sr,mx). Mid to dk grey clay.
160 - 162	Sand (as above). Lt/mid grey clay. Lim.abund.
162 - 166	Sand (0.5-3mm,a/sr,qz+). Mid/dk grey clay. Stains f.com/
166 - 178	Dk grey to black clay. Lim.min.to f.com.Min.hem. Gypsum in lowest sample.
178 - 182	Clays as above. Min. gypsum. Lim.v.com/abund.
182 - 186	Sand (1-2mm, a/sr,mx). Clays as above.
186 - 196	Dark grey, black and olive green clay. Lim.v.com.Min.coarse sand.
196 - 200	Mixed clays (Dk > Lt). Lim. v. com.
200 - 202	Mid grey hard clay. Stains f.com.
202 - 208	Mixed clays (Lt ≥ Dk). Limonite f.com.
208 - 210	Sand (0.25-0.5, a/sa,qz). M.C. (Dk = Lt). Lim.com.
210 - 212	Sand (0.25-1mm,a/sa,qz). M.C. (Lt > Dk). Lim.com.
212 - 214	Sand as above (20%) and v.f.sand (20%). Clays as above.
214 - 220	Mixed clays (Dk > Lt).(mainly black). Lim.f.com. Min.sand.
220 - 228	Mixed clays (Dk > Lt). Lim.f.com. Carbonate.
228 - 238	Mixed clays (Dk > Lt).(mainly black) Increase in mid grey down interval. Min. carbonate. Lim. f.com.

TS 1846 L

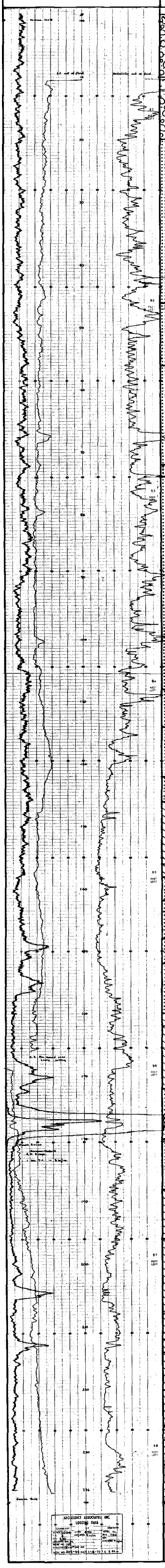
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DRILL HOLE LOG

2608(V)-15

HOLE No.	209-66	DATE DRILLED	31.3.77	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	1.4.77	RANGE	200 cps	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	1.4.77	TIME CONSTANT	2 sec.	SP. SCALE	450
LOCATION	PARALANA"B"	DRILLED DEPTH	238 m	PAPER SPEED	1 cm/m	BIAS	750/-
STATE	S.A.	LOGGED DEPTH	236 m	LOGGING SPEED	9 m/min.	FLUID LEVEL	10 m
GEOLOGIST	TAYLOR	ELEVATION		BACK GROUND	13 cps	PROBE No	109
DRILLER	AULD	CO-ORDS		TIME BASE	1 sec.	STANDARD	665 cps.
LOGGER	HART			K-FACTOR	1.33x10-5		

LITHOLOGY : Gravel | Sand | Silt | Clay | Carbonate | Carbonaceous | Mixed Clastics



INTERVAL	DESCRIPTION
0 - 10	Fine Gravel. Red sand.
10 - 20	Gravel. Coarse sand. Red/buff clay.
20 - 2	Sand. Red and buff clay at top. Red clay at bottom.
46 - 56	Coarse sand. Red silty clay.
56 - 72	Coarse sand. Red silty clay.
72 - 74	Coarse sand.
74 - 108	Coarse sand. Red/brown and minor pale grey silty clay.
108 - 114	Coarse sand. Red/brown and mpg silty clay.
114 - 122	Fine sand. Red and lpg silty clay.
122 - 126	Sand. Pale grey clay with limonite.
126 - 136	Pale grey and light grey clay. Stains common.
136 - 138	Clays as above with minor mid grey clay.
138 - 142	Fine sand. Clays as above plus dk. grey clay. Stains com.
142 - 148	Fine sand. Mid grey and black hard clays. Min.gypsum. Lim.f.com.
148 - 152	Sand (0.5-1mm, a/sa,mx). Clays as above.
152 - 160	Sand as above. Black clay. Min.stains.
160 - 162	Mid grey and black soft clay. Stains com.
162 - 172	Light,mid and lesser dark grey clays. Limonite v.com. Min.coarse sand.
172 - 178	Very fine sand (< 0.25mm, qz). Mixed clays (Lt > Dk). Lim.f.com.
178 - 180	Clays as above. Min.sand.
180 - 188	Very fine sand. Mid grey and some black clay. Lim.f.com.
188 - 196	Light to mid grey clay (slightly blue). Min.black clay. Lim.f.com. Min. very fine sand.
196 - 208	Mixed clays (Lt > Dk). Mainly light/mid grey,black and green clays. Lim. min/f.com.
208 - 212	Mixed clays (Dk ≥ Lt). Min.lim.
212 - 214	Mid/dk grey and lesser black clay . Lim.f.com.
214 - 220	M.C. (Lt > Dk). Lim. f.com.
220 - 226	M.C. (Dk. > Lt). Stains f.com.
226 - 228	Sand (1-2mm, a/sr,mx). Clays as above
228 - 232	Mixed clays (Dk > Lt). Lim.f.com. Min.sand.
232 - 238	Mixed clays (Lt = Dk) (increase in mid grey). Min.lim. Min.sand.

TS 1846 M

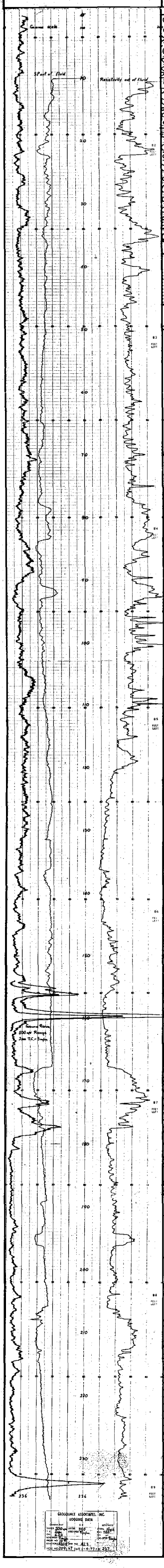
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DRILL HOLE LOG

2608(II) - 16

HOLE No.	209-67	DATE DRILLED	1.4.77	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	1.4.77	RANGE	200 cps	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	1.4.77	TIME CONSTANT	2 sec.	SP. SCALE	500
LOCATION	PARALANA"B"	DRILLED DEPTH	238 m	PAPER SPEED	1 cm/m.	BIAS	700/-
STATE	S.A.	LOGGED DEPTH	236m	LOGGING SPEED	9 m/min.	FLUID LEVEL	10 m
GEOLOGIST	TAYLOR	ELEVATION		BACK GROUND	13 cps	PROBE No	109
DRILLER	AULD	CO-ORDS		TIME BASE	1 sec.	STANDARD	665 cps.
LOGGER	HART			K-FACTOR	1.33x10-5		Mixed Clastics

LITHOLOGY : Gravel, Sand, Silt, Clay, Carbonate, Carbonaceous



INTERVAL	DESCRIPTION
0 - 10	Fine gravel. Fine (50%) and coarse (25%). Sand.
10 - 18	Fine gravel. Sand. Red/buff clay.
18 - 36	Gravel. Sand. Red soft clay.
36 - 38	Coarse yellow sand. Min.fine gravel.
38 - 46	Coarse sand. Red soft clay.
46 - 50	Sand. Clay as above.
50 - 70	Sand. Red silty clay.
70 - 86	Coarse sand. Red/brown and mpg silty clay.
86 - 90	Coarse sand. Clays as above.
90 - 98	Coarse sand. Red and mpg silty clay.
98 - 106	Fine, very angular, gravel. Red and lesser mid grey soft clay.
106 - 114	Reddish brown and mid grey clay (50/50). Minor ? silcrete.
114 - 116	Sand (0.5-3mm, a/sr,mx). Red/brown and pale grey clay.
116 - 122	Sand (as above). Pale grey and lesser red clay.
122 - 126	Pale grey and yellow/brown stained clay.
126 - 136	Pale grey, light grey,mid/dk grey clay. Limonite very common.
136 - 138	Black, dk. grey and pale greenish grey clay. Stains com.
138 - 144	Pale greenish grey clay. Stains very common.
144 - 148	Sand (1-3mm, a/sr,qz). Light, mid and dk grey clay. Lim. com. Gypsum.
148 - 154	Light/mid grey clay. Lim.v.com./abundant.
154 - 156	Light and mid grey clay. Min.lim.
156 - 164	Sand (0.25-2mm, a/sr,ps). Mainly mid grey clay. Lim.min./f.com.
164 - 170	Mdd to dk. grey clay. Min.lim.
170 - 178	Mid to dk. grey hard clay. Min.lim. Min. coarse sand and fine gravel.
178 - 180	Sand (0.5-1mm, a/sa,mx). Silt. Clays as above.
180 - 182	Sand (<0.25mm, a/sa, qz). Dk grey/black clay. Min. carbonate.
182 - 186	Sand (30%) as above and (5%) (0.5-1mm, a/sr, qz+). Clays as above.
186 - 188	Mid to dk. grey clay. Min. stain.
188 - 198	Sand (1-2mm, a/sa, ps). Clays as above. Lim.f.com.
198 - 208	Sand as above. Clays as above. Lim.min./f.com. Min.sand.
208 - 212	Clays as above (M.C. (Lt > Dk)). Min. stains.
212 - 214	Dk. grey clay. Min. stains.
214 - 226	Mixed clays (Lt = Dk) (Mid and dk grey, olive green, black clay). Minor limonite.
226 - 234	Mixed clays (Dk > Lt). Lim.min./f.com. Min.carbonate.
234 - 238	Mixed clays (Lt > Dk). Lim.min./f.com. Min.carbonate.

1. INTRODUCTION

Exploration Licence 209 covers an area of 805 square kilometres to the northwest of Lake Frome and to the south and east of the Beverley uranium deposits (see Figure 1).

The exploration recently undertaken over this licence during the period March 20th to April 1st. 1977 is summarised in this report. This drilling programme was designed to further test the significance of radiometric anomalies and ore grade mineralisation detected in two areas, Paralana Creek Areas "A" and "B", during previous programmes (Bell, 1976; Taylor 1976 (a),(b)).

Full details of the drilling results, including lithological logs and stratigraphic sections, together with an interpretation of the data will be the subjects of a later report.

2. PREVIOUS EXPLORATION

Exploration undertaken in the area covered by EL 209 prior to 1974 has been described by Bell (1975 (a)). The more recent exploration has also been described by Bell (1975 (a), 1975 (b) and 1976) and by Taylor (1976 (a), (b), (c) and 1977).

Significant radiometric anomalies were found in the southern portion of the licence area, most notably in the area immediately north of Paralana Creek, by both Minad - Teton Australia (Jarre and Brunt,1971) and by BP MA. In the period May/October 1976 a total of fifty-four holes were drilled in this area. Nineteen of these holes intersected uranium mineralisation with radiometric grades in excess of 1 kg eU_3O_8/ tonne.

3. GENERAL GEOLOGY

The geology of the Frome Embayment has been described in a variety of papers mainly by Callen (1973, 1975 (a), (b), 1976 (a), (b)). Briefly, the area discussed in this report is underlain by Tertiary and Quaternary sands, clays, silts and gravels lying disconformably on Cretaceous silts and shales. The Tertiary sequence has been divided by Callen into the Eyre, Namba and Willawortina Formations. The uranium at the Beverley Deposits, and in the project area, is contained within the Namba Formation (Callen, op.cit.; Harris, 1977).

..2

The area is crossed by the Poontana Structure, which has been interpreted as a hinge line, with a downward "sag" to the east (Taylor, 1976 (a)). All holes drilled during this programme were drilled to the east of this structure.

4. PRESENT PROGRAMME

(a) General Planning

The present drilling programme was based on the results of Drilling Programmes Nos. I and II, 1976 and was outlined in a previous report (Taylor, 1977).

The limited budget funds available prevented the full recommended programme from being undertaken. Emphasis was therefore put on testing the predicted extension, to the south-west, of Channel 1 (Taylor, 1977, Fig. 3). The remaining holes were used to test the northeast extension of this channel (2 holes), the north-east extension of Channel 2 (1 hole) and to examine further the good anomalies in Area "B" (2 holes).

(b) Technical Detail

All drill sites were surveyed in by stadia relative to local bench marks. This includes the sites in Area "B".

A total of thirteen holes were drilled in the two areas and probed to an average depth of 235.8 m. The deepest hole was drilled to a probe depth of 242 m and the shallowest to 229.5 m. Eleven of the holes (209-55 to 209-65 inclusive) were drilled in Area "A" (Figure 2) and two (209-66 and 209-67) in Area "B" (Figure 3).

Problems were again encountered with shallow gravels and two holes had to be washed out after drilling as the probe would not pass down the hole. On three occasions the probe jammed in the hole during the logging but was freed each time by the operator.

In addition to the down-hole logging for gamma activity, self potential and resistivity, the holes were lithologically logged by describing drill cuttings collected every two metres. Representative portions of the cuttings were returned to Melbourne for further examination. Copies of the original lithological, gamma and electrical logs are held on file.

..3

In the event of an anomalous intersection being recorded (values in excess of 200 c.p.s.) the interval was relogged for gamma activity and a digital record obtained.

Once the holes had been logged they were backfilled to surface.

(c) Personnel

Project Geologist	:	Dr. D.M. TAYLOR
Prospecting Hand/Cook	:	R.M. MILNER
Prospecting Hand	:	M.J. MURPHY (10/3/77 - 20/3/77)
Drilling Contractor	:	THOMPSON DRILLING CO. PTY LTD.
Drillers	:	T. AULD
		R. BROWN
Assistants	:	K. MACDONALD
		D. WATTS
Logging Contractors	:	GEOSCIENCE ASSOCIATES (AUST) P/L
Operator	:	I. HART
Assistant	:	J. J. BLICHFELDT

5. RESULTS

Table 1 summarises the radiometric anomalies detected during the programme, with details of probe depth and drill site elevations above mean sea level, and calculated radiometric grades. Peaks less than 70 c.p.s. in amplitude have not been noted unless their width, at half peak height, was equal to or greater than one metre. Peaks below 50 c.p.s. have not been noted in this table.

Copies of the down-hole logs, at a reduced scale, are enclosed. Lithological descriptions and stratigraphic sections will be contained in a later report.

6. DISCUSSION

(i) Paralana Creek Area "A"

The first hole drilled during this programme (Number 209-55) intersected mineralisation within both sub-member d_1 and sub-member d_2 as had been predicted (Taylor, 1977). Drilling to both the west and east of this hole failed to intersect any ore grade material though significant radiometric anomalies were located.

The line of holes drilled 200 m to the south of the first drill line (holes numbered 209-61,62 and 63) also failed to intersect ore grade material at the target depth (200 - 230 m) though slightly anomalous activity was recorded over this interval in two of the holes. Several interesting anomalies also occurred within these holes at shallower depths.

The two holes drilled along the northern boundary line both contained anomalously radioactive horizons. In one hole (209-65) the radiometrics indicated that near ore grade material was contained in a silt or clay immediately below a sand body.

The one hole drilled on the eastern edge of the area (209-60) contained a significant radiometric anomaly together with an interval over which the background was anomalously high.

All but two of the holes (209-60 and 209-61) drilled in this area were located to investigate the possible extensions of the main channel (Channel 1). A brief survey of the data indicates that this channel does extend to the south with sands of sub-member d_1 being intersected in at least three holes (209-55, 57, 58) along the first line and one hole (209-62) along the second line. Two holes (209-55 and 209-61) intersected sands of sub-member d_2 but it is not known if these sands occur within the same channel. The sands in hole 209-61 could occur in Channel 2, or, alternatively, the two channels are joined between the two holes.

The two holes drilled on the northern boundary line failed to prove conclusively the existence of a northern extension of the main channel. The anomaly in 209-65, which occurs approximately 15 m above Sand e may occur at the base of sub-member d_1 or sub-member d_o. It is possible that the main channel passes to the east of this hole a possibility supported by the fact that it is only in this hole, along this drill line, that well developed sands occur at the top of sand member d.

The holes located to test the predicted extensions of Channel 2 indicated that the channel may extend at the d_1 and d_2 level to the north-east, with hole 209-60 being drilled near a channel edge, and at the d_2 level to the south-west (as discussed earlier in this section).

..5

It was pointed out in a previous report that the best ore intersections occured where sand bodies within sub-members d_1 and d_2 pinched out rapidly. This situation has not been encountered within the holes drilled in this area during this programme. The possibility that it does happen along the drill lines, for example, between 209-58 and 209-59 or between 209-62 and 209-61, cannot be discounted.

(ii) Paralana Creek Area "B"

The two holes drilled in this area were located to test, primarily, the anomalies developed within sands at depths around 180 m in three holes (77-56, 209-51 and 209-52). These sands appear to pinch out rapidly between holes 209-52 and 209-66 resulting in the accumulation of ore grade uranium in the latter hole. This does not appear to be the case between 209-51 and 209-67 but here the top and base of the sands appear to have been displaced, relative to other horizons, by three or four metres (up to 6 m actual below surface depth). There is a possibility here that the top part of the sand member in 209-51 is equivalent to the lower part of the sand member in 209-67.

The anomalies detected between 150 m and 160 m may form part of an aureole as described in a previous report (Taylor, 1977).

7. CONCLUSIONS

Thirteen holes were drilled in the southern portion of Exploration Licence 209, during the period March 20th to April 1st. 1977, to an average probe depth of 235.8 m.

Eleven of these holes were drilled in Paralana Creek Area "A", one of which intersected uranium mineralisation with a radiometric grade exceeding 1 kg eU_3O_8/tonne within Sand Member d. An additional hole intersected mineralisation at a shallower depth (160 m). The drilling in this area proved that the main channel extends to the south and also indicated that this channel could also extend to the north east. The data on Channel 2 is not conclusive but indicates the possibility of a north-east extension.

Two holes were drilled in Paralana Creek Area "B". One hole intersected uranium mineralisation with a radiometric grade exceeding 1 kg eU_3O_8/tonne. Insufficient drilling has been performed in this area to predict the direction of the palaeo channel that hosts the mineralisation in this area.

..6

8. RECOMMENDATIONS

(i) Paralana Creek Area "A"

While the drilling in this area failed to significantly extend the known area of mineralisation it indicated that the palaeo-channels outlined in a previous report extend outside of the area tested so far. Wherever these channels occur there is a good chance of finding uranium mineralisation. Future work in this area should be undertaken with two aims:-

(a) The "pod(s)" of uranium ore around holes 209-8, 24, 29, 31 etc. should be outlined in detail by close-spaced drilling. This would enable a reserve figure to be calculated and would give some indication of the geometry that could be expected for such bodies. It would also indicate the true trend of the ore in the event that it passes between two of the more widely spaced holes, for example between 209-6 and 209-14, with no expression in their logs.

(b) Drilling should be extended to the south and also to the east to locate the palaeochannels and test them for mineralisation. A line of holes could be drilled between this area and Area "B" as it is highly probable that other anomalous areas would be located. (A line of drill sites has already been surveyed in between these two areas).

(ii) Paralana Creek Area "B"

The two holes drilled in this area during this programme upgraded the potential of the area. Further drilling should initially be undertaken on a close spaced grid around holes 209-52 and 209-66 to outline the style and extent of the mineralisation intercepted around 180 m. This would be followed by a series of more widely spaced holes to test the significance of the many anomalies detected in the few holes drilled in this area, in particular those occurring between 150 m and 160 m that appear in all holes.

(iii) General

Large areas of Exploration Licence 209 remain to be tested, especially to the depth at which mineralisation has been intersected during the 1976/1977 drilling programmes. It has been illustrated that the area covered by this licence is one of great potential and, following a review of all available data, a regional survey should be undertaken to locate additional mineralised palaeochannels.

9. REFERENCES

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..8

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TAYLOR, D.M., 1976 (b) : "1976 Drilling Programme No. 2, EL 209, Lake Frome Embayment, South Australia. First Report" BP Minerals Australia Pty Ltd.

TAYLOR, D.M., 1976 (c) : "1976 Coring Programme, EL 209, Lake Frome Embayment, South Australia". BP Minerals Australia Pty Ltd.

TAYLOR, D.M., 1977 : "1976 Drilling Programme No. 2,EL 209, Lake Frome Embayment, South Australia. Second Report ". BP Minerals Australia Pty Ltd.

TABLE I

(a) DETAILS OF RADIOMETRIC ANOMALIES

HOLE NUMBER (Probe Depth m.) (Elevation m.)	DEPTH (metres)	PEAK HEIGHT c.p.s.	PEAK WIDTH (at ½ pk. height, metres).
(i) PARALANA "A"			
209-55	137.5	65	6
(236)	148.0	250	0.5
(64.06)	181.0	60	0.75
	217.0	1600	0.5
	227.0	70	0.5
	228.0	200	0.5
	230.5	100	0.5
209-56	141.5	170	1.0
(242)			
(64.29)			
209-57	141.5	250	0.75
(236)	216.5	170	0.75
(64.25)	227.5	85	1.00
209-58	134.0	60	2.0
(234.5)	136.5	110	0.6
(63.63)	147.0	50	1.0
	214.0	170	0.6
	215.5	185	0.7
	216.5	65	1.0
209-59	136.5	60	5.0
(234.5)			
(63.47)			
209-60	136.0	65	5.0
(229.5)	167.0	70	3.5
(60.60)	208.0	275	1.0
	209.0	120	1.0
	216.0	65	2.0

..2

HOLE NUMBER (Probe Depth m.) (Elevation m.)	DEPTH (metres)	PEAK HEIGHT c.p.s.	PEAK WIDTH (at ½ pk. height metres).
209-61	160.5	90	0.8
(236)	167.0	120	0.7
(61.83)	177.0	90	0.8
	229.0	70	0.8
209-62	136.0	60	8.5
(236)	160.0	800	0.5
(62.05)	180.0	90	0.6
	216.0	55	2.5
209-63	137.5	400	0.5
(236)	156.5	90	0.7
(63.72)	182.5	65	1.0
	186.5	65	1.0
209-64	139.0	60	9.0
(236)	168.0	110	1.3
(63.66)	172.0	90	2.2
	185.5	75	1.0
	205.5	115	1.0
	207.5	120	1.0
	213.0	95	0.8
209-65	137.0	55	11.0
(236)	163.0	60	1.0
(62.21)	168.0	75	3.5
	172.0	145	1.2
	183.5	60	1.2
	207.5	700	0.5
(ii) PARALANA "B"			
209-66	149.0	55	1.0
(236)	170.0	60	1.5
(60.58)	177.0	1200	1.0
	178.5	650	0.5
	204.5	60	1.2
	213.0	55	1.0

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..3

Table I (cont'd)

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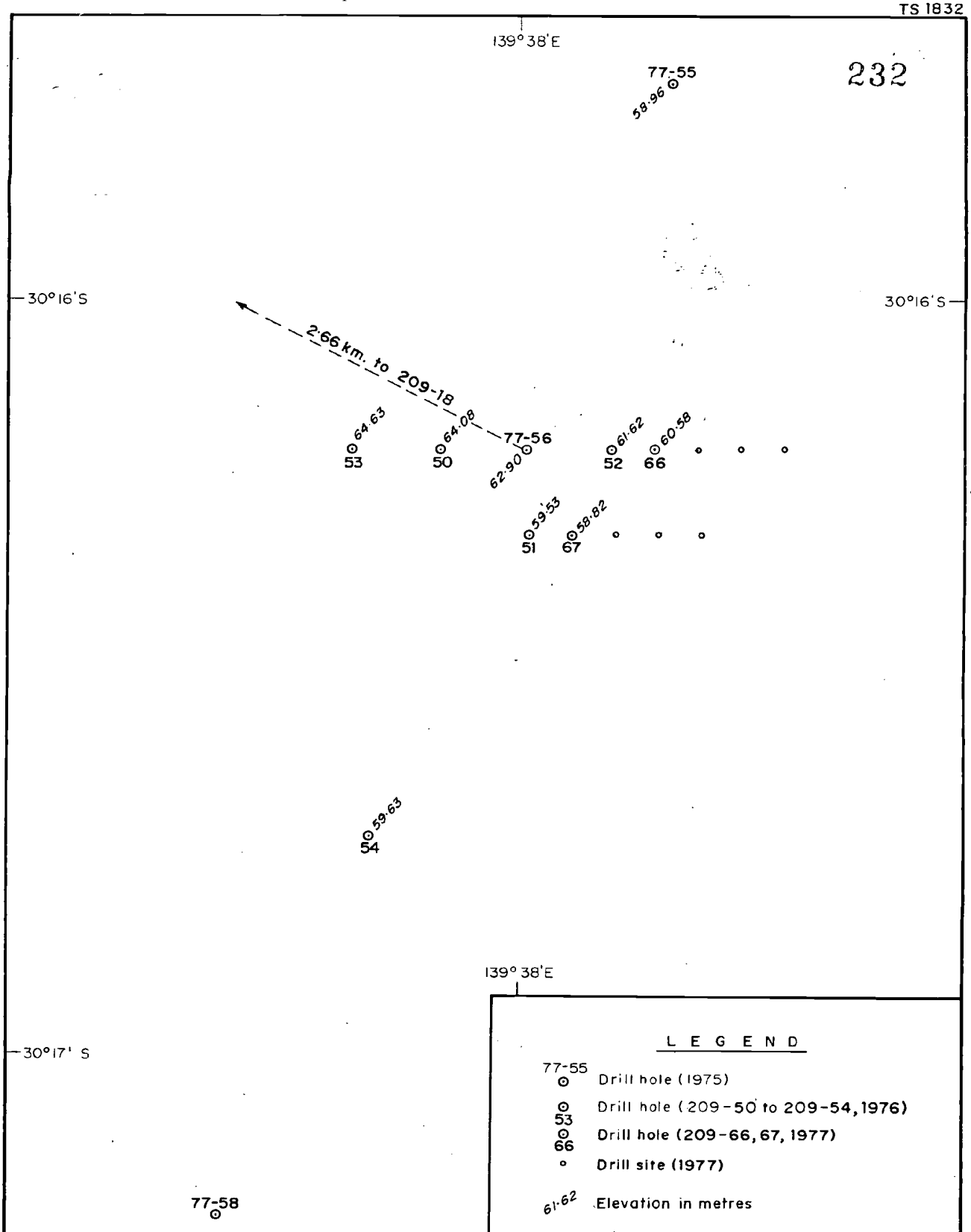
HOLE NUMBER (Probe Depth m.) (Elevation m.)	DEPTH (metres)	PEAK HEIGHT c.p.s.	PEAK WIDTH (at ½ pk. height metres).
209-67	156.0	90	1.5
(236)	159.5	370	0.4
(60.58)	173.5	55	1.5
	177.5	70	1.5
	234.0	130	0.8

(b) DETAILS OF RADIOMETRIC ASSAYS

HOLE NUMBER	INTERVAL (metres)	THICKNESS (metres)	RADIOMETRIC GRADE eU_3O_8 kg/tonne
(i) PARALANA "A"			
209-55	147.8-148.4	0.6	0.31
	216.8-217.2	0.4	2.60
209-57	141.3-142.1	0.8	0.32
209-58	214.0-214.7	0.7	0.24
	215.6-216.1	0.5	0.31
209-60	207.4-208.3	0.9	0.38
209-62	160.0-160.4	0.4	1.28
209-63	137.3-137.9	0.6	0.53
209-65	207.4-207.9	0.5	0.97
(ii) PARALANA "B"			
209-66	177.0-178.2	1.2	1.30
	178.4-178.7	0.3	1.27
209-67	156.2-156.5	0.3	0.29
	159.6-160.1	0.5	0.56

TS 1832

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POONTANA PROJECT, LAKE FROME S.A.

DRILL HOLE LOCATION MAP

(in part of EL 209)

(PARALANA AREA 'B')

m 200 0 200 400 600 m

FIGURE 3

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: U1/4-23	
APRIL 1977	D. M. TAYLOR

BASED ON TS 1799

T 1751

139°35'

139°36'

30°15'

30°16'

B.M. No. 7120 △ 70.85

77-48 ⊙ 89.93

1 ⊙ 85.20

2 ⊙ 67.25

77-44 ⊙ 64.93

3 ⊙ 63.71

22 ⊙ 63.31

64 ⊙ 63.66

77-50 ⊙ 62.73

65 ⊙ 62.21

4 ⊙ 66.47

10 ⊙ 65.74

26 ⊙ 65.13

12 ⊙ 65.13

27 ⊙ 64.91

28 ⊙ 64.61

29 ⊙ 64.70

21 ⊙ 64.51

30 ⊙ 64.23

49 ⊙ 63.98

5 ⊙ 65.16

6 ⊙ 65.50

23 ⊙ 66.26

48 ⊙ 64.55

8 ⊙ 65.19

31 (core hole)

64.84 ⊙ 64.81 ⊙ 24

65.05 ⊙ 25

64.55 ⊙ 47

7 ⊙ 64.44

13 ⊙ 63.34

19 ⊙ 65.04

14 ⊙ 64.71

34 ⊙ 64.21

33 ⊙ 64.28

32 ⊙ 63.91

20 ⊙ 63.53

35 ⊙ 63.18

60 ⊙ 60.60

9 ⊙ 63.18

56 ⊙ 64.29

57 ⊙ 64.25

55 ⊙ 64.06

58 ⊙ 63.63

59 ⊙ 63.47

38 ⊙ 63.18

37 ⊙ 62.89

36 ⊙ 62.54

43 ⊙ 62.77

41 ⊙ 62.04

39 ⊙ 62.40

40 ⊙ 62.33

44 ⊙ 61.80

18 ⊙ 61.01

42 ⊙ 62.40

15 ⊙ 63.44

77-53 ⊙ 63.06

11 ⊙ 63.63

45 ⊙ 62.25

77-52 ⊙ 66.19

63 ⊙ 63.72

62 ⊙ 62.05

61 ⊙ 61.83

46 ⊙ 61.50

16 ⊙ 60.53

17 ⊙ 61.79

N

POONTANA PROJECT, LAKE FROME S.A.

DRILL HOLE LOCATION MAP

Part of EL 209 (Paralana Area 'A')

SCALE : 1 cm. = 50 m.

metres 50 0 50 100 150 200 250 metres

LEGEND

77-53 ⊙ Drill hole (1975)

⊙ 15 Drill hole (209-1 to 209-49, 1976)

⊙ 60 Drill hole (209-55 to 209-65, 1977)

△ Bench mark

66.44 Elevation in metres

∘ Drill site (1976-1977)

FIGURE 2

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: U1/4-23	
MAY 1977	D. M. TAYLOR

2608(VI)-17

BASED ON T1634

BP Minerals Australia Proprietary Limited
Incorporated in Victoria

1 Albert Road, Melbourne
Postal Address: G.P.O. Box 5222BB, Melbourne, 3001
Telephone: 26-6911 Telex: 30166 Telegraphic Address: "Austbeepee", Melbourne

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The Director of Mines,
Department of Mines,
G.P.O. Box 151,
EASTWOOD. S.A. 5063

Our Reference	Your Reference	Telephone Ext'n	Date
U/14/2			6th July, 1977

Dear Sir,

EXPLORATION LICENCE 209 - QUARTERLY REPORT
FOR THE PERIOD ENDED 30TH JUNE 1977

No field work was carried out on the area covered by Exploration Licence 209 during the quarter.

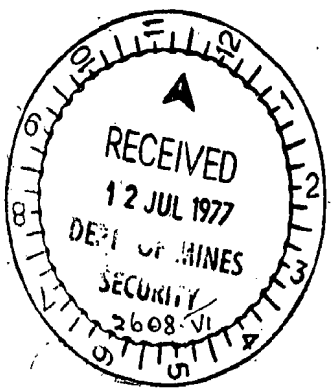
Three technical reports were completed and submitted to the Mines Department during May:

- "Palynology of Selected Drill Cuttings, EL 209, Lake Frome Embayment, South Australia, by D.M. Taylor".
- "Geochemical Survey Data (1976) EL203, 209 and 210 Lake Frome Embayment, South Australia - a review by D.M. Taylor.
- "1977 Drilling Programme No. 1 (EL 209) Lake Frome, Embayment, South Australia - First Report, by D.M. Taylor".

A statement of expenditure incurred during the quarter is attached.

Yours faithfully,

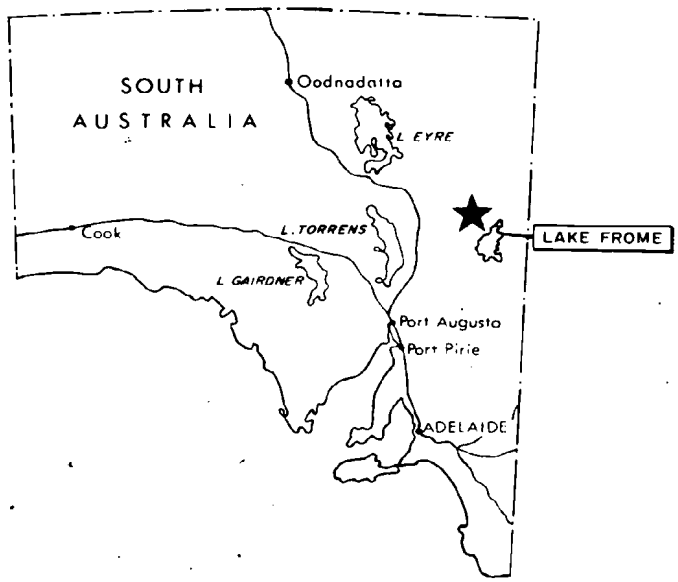
J.H. Hills,
Minerals Exploration Manager



EXPLORATION LICENCE 209

QUARTERLY EXPENDITURE REPORT FOR THE PERIOD ENDING 30TH JUNE 1977.

	A$
Exploration	
Field Consumable Stores	175
Operations	
Vehicle Operating and Maintenance	237
Rental of Equipment	183
Travelling Expenses	150
Salaries and Wages	3 343
TOTAL	4 088



LOCATION MAP

1977

DRILLING PROGRAMME No. 1

(EL 209)

LAKE FROME EMBAYMENT
SOUTH AUSTRALIA

SECOND REPORT

RECEIVED
20 DEC 1977
DEPT. OF MINES
SECURITY
2608-VI

BP MINERALS AUSTRALIA PROPRIETARY LIMITED

1977
DRILLING PROGRAMME No. 1
(EL 209)
LAKE FROME EMBAYMENT
SOUTH AUSTRALIA

SECOND REPORT.

Dr. D.M. TAYLOR
MELBOURNE - VIC.
SEPTEMBER , 1977.

C O N T E N T S

Page No.

SUMMARY

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II. PARALANA CREEK AREA "B" 4
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Keywords

Drilling
Exploration
Frome
Logging
Mineralisation
Paralana
Radiometrics
Uranium

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Table 1 - Details of Sub-Divisions of Sand Member d.

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Figure 1 - E.L. Location Map of EL - 209. (Before page 1)

Paralana Area 'A', Subsurface Sections

Figure 2.1 Section 1 (In back pocket)
2.2 Section 2
2.3 Section 3
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2.5 Sections Location Map

Paralana Area 'A', Location of Channel Sands

Figure 3(a) Sub-Member d_2 (In back pocket)
3(b) Sub-Member d_1
3(c) Sub-Member d_0

Figure 4 Simplified Composite Section (Area 'A')
(Before page 4)

Figure 5 Simplified Composite Section (Area 'B')
(Before page 6)

Figure 6 Drill Hole Location Map, Paralana Area 'B'
(Before page 5)

Drill Hole Logs 209 - 55 to 209 - 67 (In back pocket)

S U M M A R Y

Exploration Licence 209 covers an area of 805 square kilometres to the northwest of Lake Frome and to the south and east of the Beverley uranium deposits. A drilling programme was undertaken during March 1977 to further test the significance of radiometric anomalies and ore grade mineralisation detected in two areas, Paralana Creek Areas "A" and "B", during previous programmes. The data obtained during this programme are interpreted in this, the second of two reports.

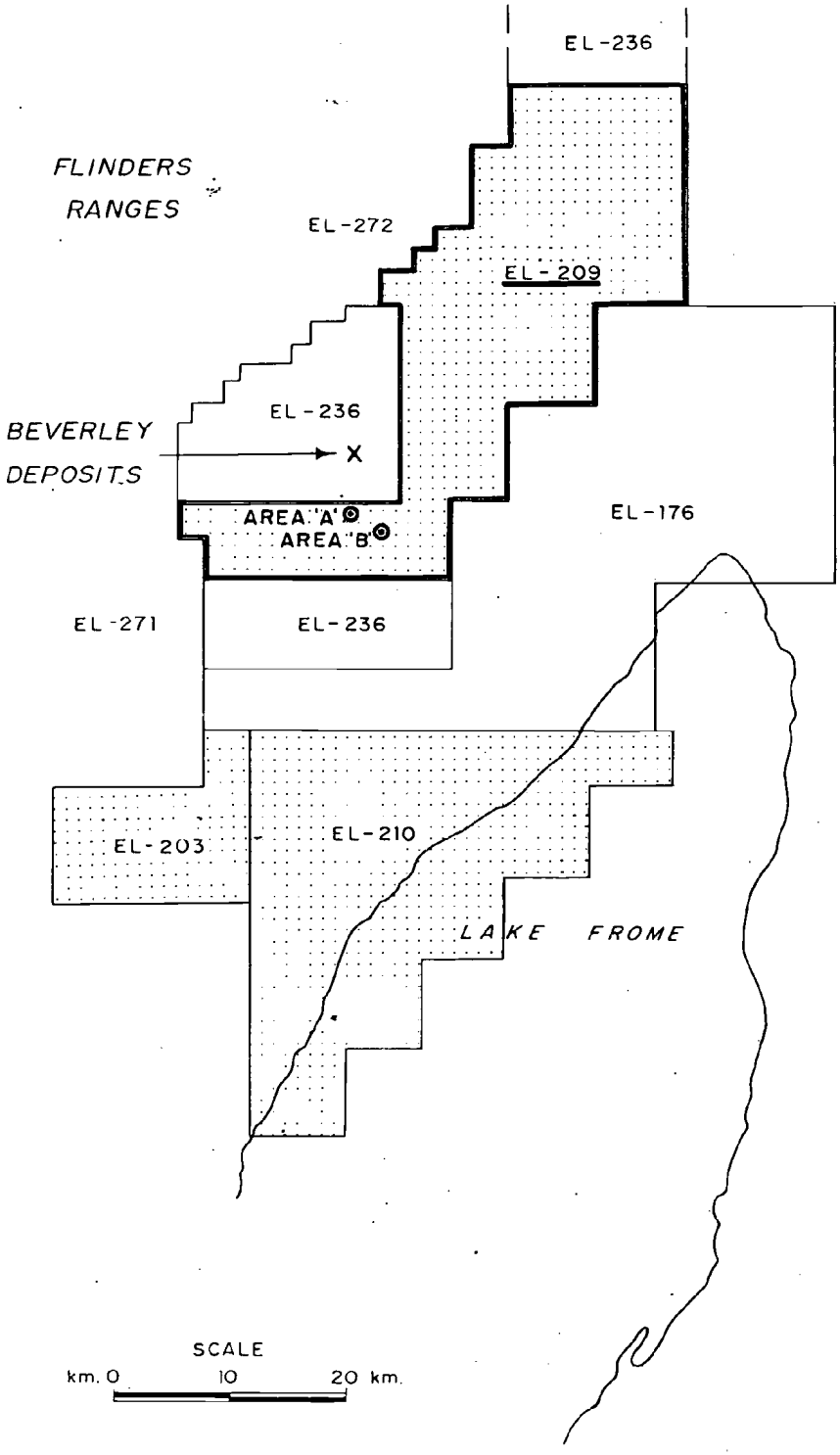
The eleven holes drilled in Paralana Creek Area "A" failed to significantly extend the area of known ore grade mineralisation but did confirm that the palaeo-channel sands which act as a host for the uranium do extend, as predicted, to the east. A total of eighteen holes have intersected mineralisation, with radiometric grades in all cases exceeding 1 kg eU_3O_8/tonne within the Sand Member 'd' in this area.

Two holes were drilled in Paralana Creek Area "B". One hole intersected ore grade mineralisation, at a depth of 178 m, where the channel sands pinched out. These channel sands are well developed in other holes in the area and frequently exhibit significant radioactivity. The limited drilling performed in this area has now located good mineralisation in two different horizons.

Several other holes drilled in these areas have located significant radioactivity at various depths. Further drilling in the two areas, both on a close spaced grid and on a more regional scale, is strongly recommended.

Large portions of the licence remain untested and, as the area has a tremendous potential for the location of uranium ore deposits, it is recommended that a regional survey should be undertaken to locate additional mineralised palaeo-channels.

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EXPLORATION LEASES ON NORTH WEST SIDE OF LAKE FROME EMBAYMENT.

(AS AT FEB. 1977)

25% BP INTEREST.

FIGURE 1

BP MINERALS AUST. PTY LTD	
Area:	LAKE FROME
SOUTH AUSTRALIA	
Ref:	01/4-26
SEPTEMBER 1977	MIN. BRANCH

BASED ON TS1380

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1. INTRODUCTION

Exploration Licence 209 covers an area of 805 square kilometres to the northwest of Lake Frome and to the south and east of the Beverley uranium deposits (see Figure 1).

The most recent exploration undertaken over this licence, during the period March 20th to April 1st, 1977, is summarised in a previous report (Taylor 1977 (b)) and the data are interpreted here.

The following sections are divided into two parts, one dealing with data from Paralana Creek Area "A" and the other with data from Paralana Creek Area "B".

2. DATA INTERPRETATION

Details of the radiometric anomalies detected during this programme were presented in the first report (Taylor 1977 (b)).

Lithological descriptions of each hole, together with the down hole logs and stratigraphic sections (Figure 2), accompany this report. The subdivisions used in the interpretation have been described previously (Taylor, 1977 (a)).

I. PARALANA CREEK AREA "A"

(a) Lithological Logs

Three lithological units were intersected during this drilling programme. These units may be described as follows: -

(i) Unit I

Unit I consists of red or brown silty or sandy clays, sand and gravel. The upper 20 m of this unit often consists predominantly of coarse gravel. A greenish-grey clay becomes increasingly common towards the base of the unit which occurs between 115 m and 122 m.

(ii) Unit II

The top of Unit II is defined as the point at which the greenish-grey clay to red clay ratio exceeds one. This occurs at a depth, in these holes, between 115 m and 122 m. The unit is commonly limonite and hematite stained and frequently contains a well developed sand (see hole 209-55). The base of this unit is defined by the first appearance of light grey clay. In the recent drilling it appears that holes drilled in the central portion of Area "A" contained the greater thicknesses of this unit (approx.

16 m as opposed to 10 m or less elsewhere). The interpretation of this unit which in the sections is made using both electric and lithological logs, should be regarded as tentative. The unit is considered to be a transition zone between the red (oxidised) and grey (relatively unoxidised) portions of the section.

(iii) Unit III

This unit consists mainly of mid to dark grey and black clay with lesser olive and light grey clay and occasionally a light greenish or bluish grey soft clay. A hard black clay is frequently noted in at least two horizons within the upper part of the unit.

The degree of staining varies from hole to hole. Hematite is generally more common in the upper part of the unit especially between 136 m and 146 m. Limonite is more common, and often abundant, between 180 m and 200 m except in hole 209-61 and to a certain extent in hole 209-62.

Sand bodies frequently occur within this unit but are usually poorly represented in the samples collected. This could be caused to some extent by the technique of the sample collector. The fine or very fine sand collected in holes 209-58, 59 and 65 from depths between 205 and 220 m could be considered to be representative of the sands of Sand Member d on comparison with those of the cored hole (Taylor 1976, 1977 (a)).

Minor carbonate was intersected in several holes below 210 m. The base of the unit was not intersected.

(b) Electric Logs

The sands penetrated by the holes drilled during this programme have been described in a previous report (Taylor 1977 (a)).

A study of Sand Member d indicated that this interval could be subdivided into three sub-members (do, d, and d_2) and distributions of each of these sub-members predicted (Taylor 1977 (a)), Fig.3). The expected distributions have been modified as a result of the recent drilling and these are shown in Figure 3.

(c) Gamma Logs

Details of the radiometric anomalies detected during this programme were given in a previous report (Taylor, 1977 (b)) and may be summarised as follows :

(i) A broad, generally low amplitude (maximum 65 cps) anomaly between 135m and 145m in all holes with, in holes 209-56, -57 and -63, a medium to strong anomaly superimposed on it. These anomalies occur near the top of unit III. The larger anomalies appear to occur immediately below a thin silt/sand interval.

(ii) The broad, low amplitude, anomaly previously noted to occur between 165 m and 175 m in the northern part of the area (Taylor, 1977 (a)) also appeared in holes 209-64 and 209-65.

(iii) A strong anomaly (here 800 cps) was intersected in hole 209-62 at 160 m. This anomaly, which occurs within Sand b, corresponds to the ones detected in previous programmes (holes numbered 77-44, 209-4,8,20,47).

(iv) Medium (100 - 200 cps) to strong (greater than 200 cps) anomalies were intersected in submember d_1 in six of the eleven holes drilled in this area. Strong anomalies have been detected in twenty-two holes drilled through this horizon, in this area, during previous programmes.

(v) A strong anomaly was intersected in hole 209-55 within the d_2 sub-member of Sand d. Seven previously drilled holes contained similar anomalies (Taylor, 1977 (a)). In three other holes radiation significantly above background was noted.

The distribution of the anomalies described in (iv) and (v) above are shown in Figure 3. Details of radiometric grade were given in a previous report (Taylor, 1977 (b)).

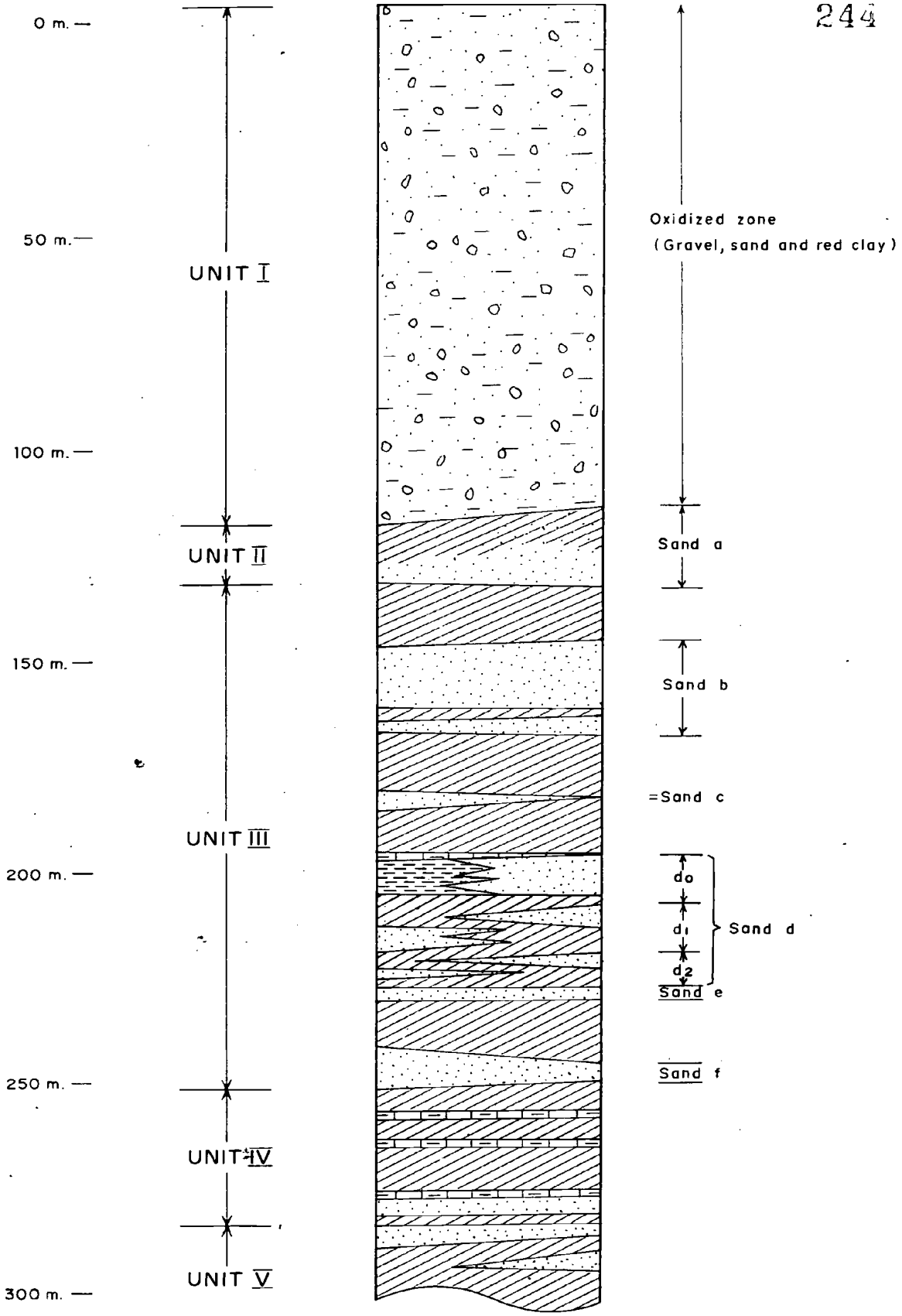
(d) Composite Section

A composite section, illustrating the lithological sequence east of the Poontana Structure, was presented in a previous report (Taylor, 1977 (a)) and is repeated here (Figure 4).

(e) Stratigraphic Interpretation

The data obtained during the recent drilling programme does nothing to change the stratigraphic interpretation put forward in a previous report (Taylor, 1977 (a)). It may be noted that the additional data assists in the more accurate location of the channel sands of sub-members d_1 and d_2 and reinforces the view that these sands were deposited in geographically similar positions.

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SIMPLIFIED COMPOSITE SECTION

(PARALANA AREA 'A')

LEGEND AS FOR FIGURE 2

FIGURE 4

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: U1/4 - 26	
SEPTEMBER 1977	D. M. TAYLOR

BASED ON TS1748

II PARALANA CREEK AREA "B"

(a) Lithological Logs

The three units recognised in Area "A" were also recognised in this area with the minor differences encountered previously (Taylor, 1977 (a)).

It is interesting here to note the strong similarity between the electric logs for the two holes (209-66 and 209-67) between 90 m and 120 m as compared with the markedly different lithological logs for the same interval.

Staining occurs in both holes between 120 m and 140 m, between 140 m and 154 m in 209-67 and between 160 m and 172 m in 209-66.

A very fine sand was collected between 180 m and 188 m in hole 209-66. This sand, probably part of the mineralised horizon, is very similar to some samples obtained from the mineralised horizons in Area "A". This is also true of the sand collected from this horizon in hole 209-67. The slight difference in grain size, with the mineralisation occurring within the finer sand, may be significant.

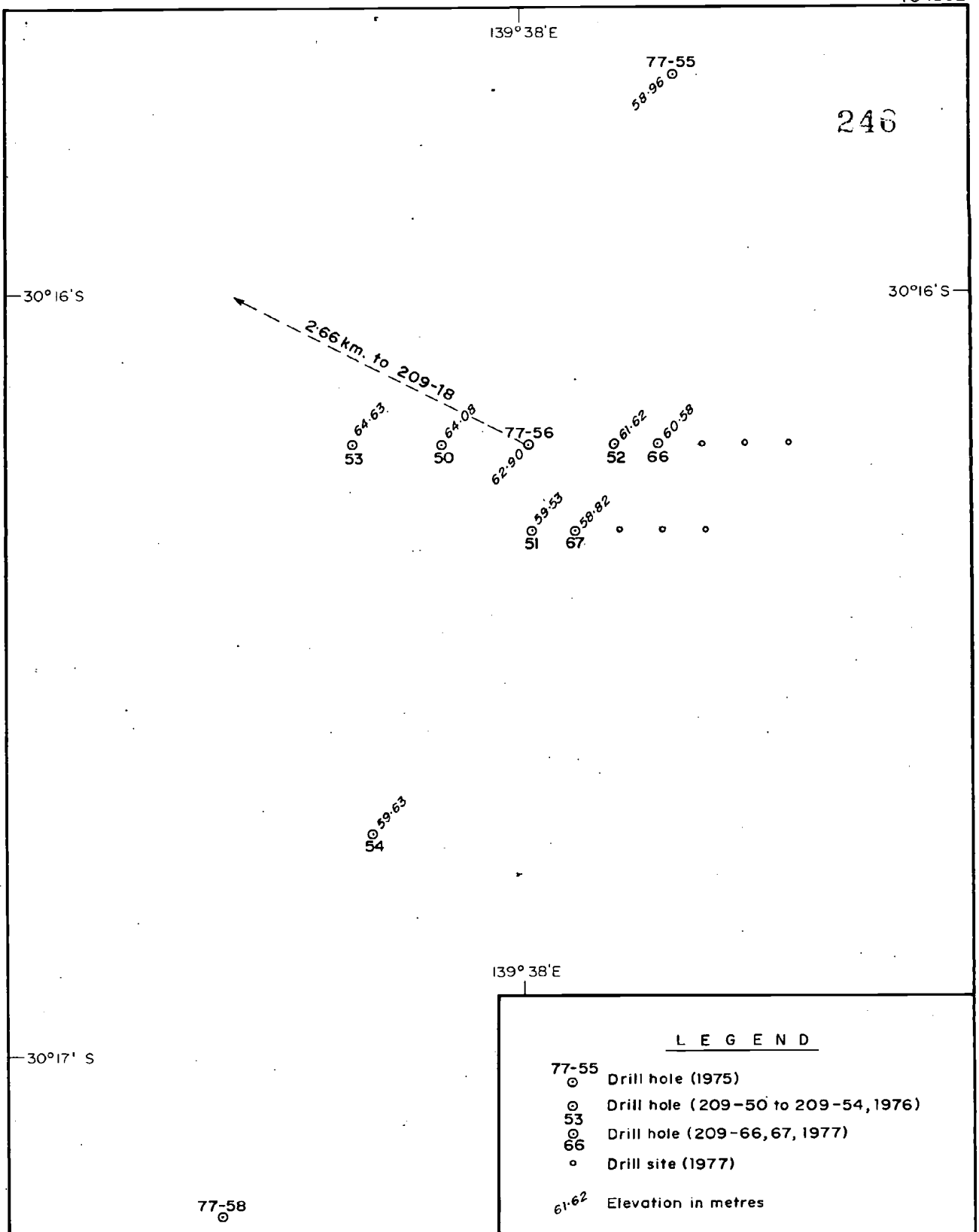
(b) Electric Logs

The sand horizons intersected during the drilling in Area "B" have been described as equivalents to those intersected in Area "A" (Taylor, 1977 (a)).

This nomenclature is retained for this report but it is probable that, as more data are accumulated from this area, it will soon become impossible to use. The presence of two well defined sands in hole 209-66 between the Sand b and Sand c equivalents and the apparent displacement of the sands of the Sand c equivalent between holes 209-51 and 209-67 (Taylor, 1977 (b)), exposes the limitations of this system.

Each new hole drilled here significantly upgrades the potential of this area. Many sand bodies occur within Unit III and several of these bodies show good development (often from 10 to 20 m thick) and rapid pinch-outs favouring ore deposition.

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L E G E N D

77-55 ⊙ Drill hole (1975)

⊙ 53 Drill hole (209-50 to 209-54, 1976)

⊙ 66 Drill hole (209-66, 67, 1977)

∘ Drill site (1977)

61·62 Elevation in metres

POONTANA PROJECT, LAKE FROME S.A.

DRILL HOLE LOCATION MAP

(in part of EL 209)

(PARALANA AREA 'B')

m 200 0 200 400 600 m.

FIGURE 6

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: U1/4-26	
SEPTEMBER 1977	D. M. TAYLOR

BASED ON TS 1799

(c) Gamma Logs

The radiometric anomalies detected in two holes drilled in this area were described in a previous report (Taylor, 1977 (b)). The strongest anomaly occurred within the Sand c equivalent in hole 209-66 with material showing a radiometric grade in excess of 1 kg/tonne over 1.5 m. Other significant anomalies occur within the same sub-member in hole 209-67, at and below the base of Sand b in this hole and within the Sand c equivalent. Two small anomalies also occur in sands of Sand d equivalent in hole 209-66.

(d) Composite Section

A composite section, illustrating the lithological sequence in Area "B" is shown in Figure 5.

(e) Stratigraphic Interpretation

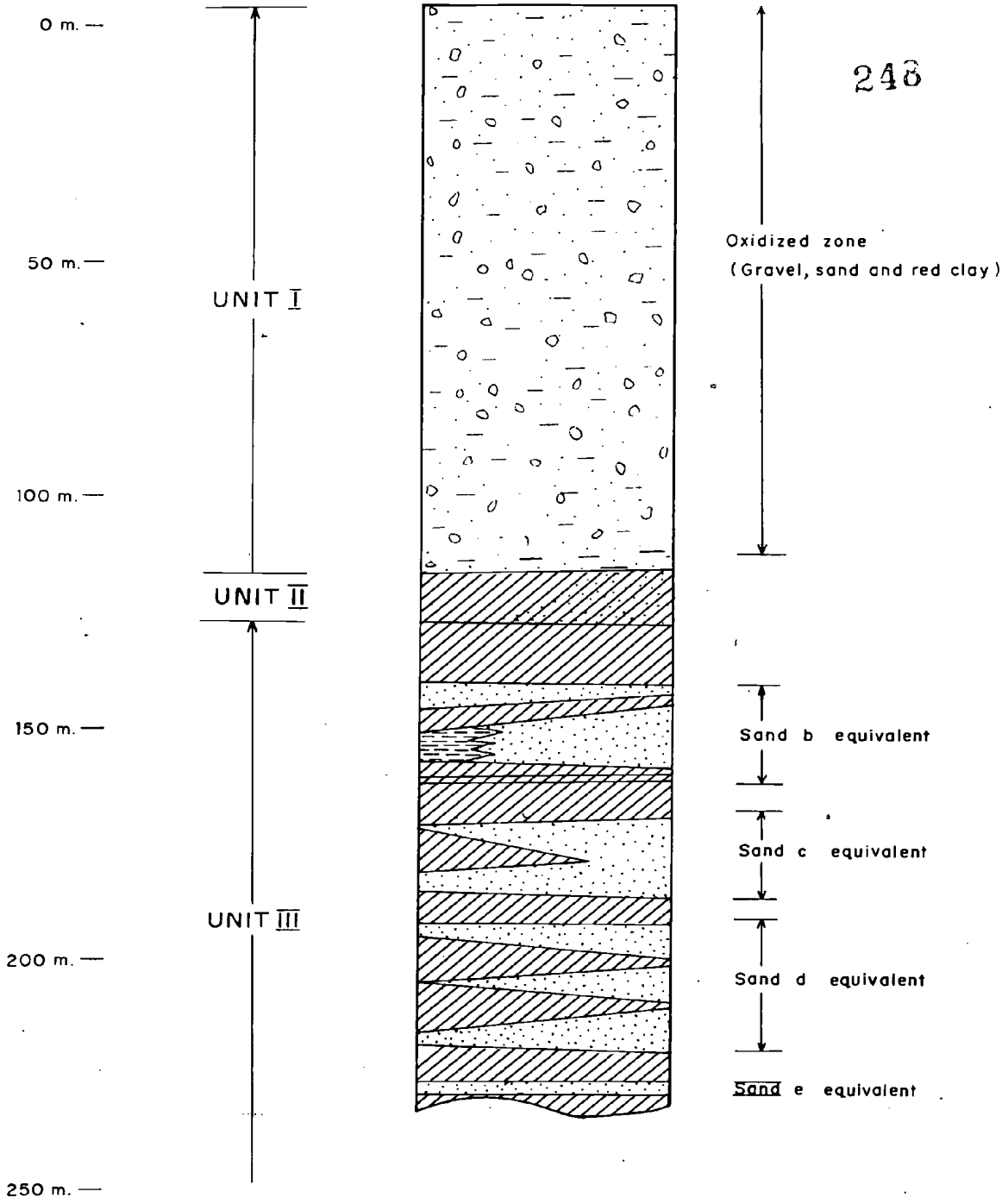
There are insufficient new data to significantly modify the stratigraphic interpretation detailed in a previous report (Taylor, 1977 (a)). The pinch out of the sands of the Sand c equivalent between holes 209-52 and 209-66 with the resulting mineralisation, together with the development of these sands elsewhere, is extremely encouraging

3. CONCLUSIONS

Thirteen holes were drilled in the southern portion of Exploration Licence 209 during the period March 20th to April 1st. 1977.

Eleven of these holes were drilled in the Paralana Creek Area "A" one of which intersected uranium mineralisation with a radiometric grade exceeding 1 kg eU_3O_8/ tonne within Sand Member d. The results from the drilling do not significantly change the previously proposed stratigraphic interpretations for the area. The predicted location of the channel sands, of sub-members d_1 and d_2 which contain the mineralisation in this area, have to a large extent been confirmed by the drilling with only minor changes.

Two holes were drilled in Paralana Creek Area "B". One hole intersected uranium mineralisation with a radiometric grade exceeding 1 kg eU_3O_8/tonne within the sands of Sand c equivalent close to where these sands pinch out. There appear to be several paleochannel sand bodies in this area but insufficient drilling has been performed in this area to accurately predict their locations.



SIMPLIFIED COMPOSITE SECTION

(PARALANA AREA '8')

LEGEND AS FOR FIGURE 2

FIGURE 5

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: U1/4-26	
SEPTEMBER 1977	D. M. TAYLOR

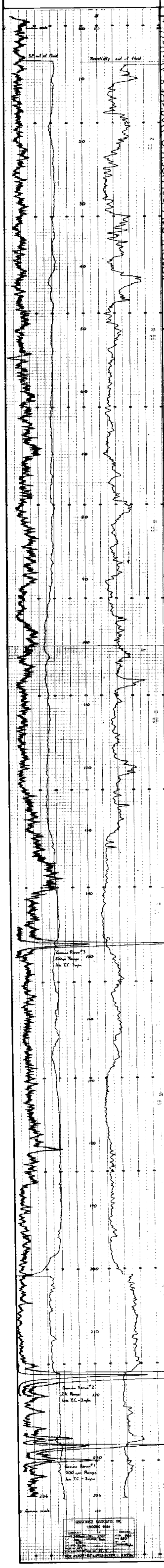
BASED ON TS 1748

MINERALS AUST. PTY LTD

DRILL HOLE LOG 2608(III)-1

HOLE No.	209-55	DATE DRILLED	21.3.1977	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	21.3.1977	RANGE	200	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	21.3.1977	TIME CONSTANT	2 sec.	SP. SCALE	250
LOCATION	PARALANA "A"	DRILLED DEPTH	238 m	PAPER SPEED	1 cm/m	BIAS	880/-
STATE	S.A.	LOGGED DEPTH	236 m	LOGGING SPEED	9 m/min	FLUID LEVEL	7 m
GEOLOGIST	TAYLOR	ELEVATION	64.06 m	BACK GROUND	19 cps	PROBE No	109
DRILLER	AULD	CO-ORDS		TIME BASE	1 sec.	STANDARD	64/cps
LOGGER	HART			K-FACTOR	1.33x10-5		

LITHOLOGY : Gravel, Sand, Silt, Clay, Carbonate, Carbonaceous, Mixed Clastics



INTERVAL	DESCRIPTION
0 - 12	Gravel. Coarse sand. Minor red clay.
12 - 42	Gravel. Coarse sand. Red clay.
42 - 50	Coarse sand. Red clay.
50 - 66	Coarse sand. Red silty clay.
66 - 74	Fine sand. Red silty clay.
74 - 82	Fine sand. Red/brown silty clay.
82 - 94	Fine gravel. Red/brown silty clay.
94 - 108	Fine gravel. Red and minor pale grey (mpg) silty clay.
108 - 120	Fine gravel. Red and lesser pale grey (lpg) soft silty clay.
120 - 128	Coarse sand. Pale grey and minor red soft clay.
128 - 134	Coarse sand. Pale grey clay. Hematite (Hem.)
134 - 136	Pale and light grey clay. Stains.
136 - 138	Light to mid grey clay. Hematite common.
138 - 142	Coarse sand. Clays as above. Stains fairly common.
142 - 146	Clays as above. Minor coarse sand.
146 - 156	Dark grey/black clay. Stains f. common/ common (com.)
156 - 160	Mid to dark grey clay. Stains minor. Minor coarse sand.
160 - 162	Light grey, hard, clay. Hematite f. common.
162 - 174	Dark grey/ black clay. Stains decrease down interval.
174 - 178	Light, mid and dark grey clay. Hem. com. Limonite f. com.
178 - 180	Sand (2-5mm, rounded (r), quartz (qz)). Clay as above
180 - 182	Clay as above. Minor stains and sand.
182 - 184	Olive green, green, black and grey clay.
184 - 190	Mid grey clay. Limonite (Lim.) abundant (abund.)
190 - 192	Sand (0.5-2 mm., angular (a), qz) Clay as above.
192 - 196	Light to mid grey clay. Lim. v. com.
196 - 202	Sand (2mm., a/subrounded (sr.), qz+). Clays as above. Lim. com.
202 - 206	Mid grey and khaki clay. Lim. com. Min. coarse sand.
206 - 212	Sand or fine gravel (0.5 -10 mm, a/r, mixed (mx)). Mid grey clay. Min. stains
212 - 216	Sand (as above) and very fine sand. Clays as above.
216 - 218	Mid to dark grey clay. Lim. f. com.
218 - 226	Sand (0.5-2 mm, a/sr, qz+). Clays as above. Lim.f.com.
226 - 232	Mid to dark grey clay. Minor sand. Lim. f. com.
232 - 238	Gravel (2-10 mm, sa/r, qz+) Clays as above. Lim.f.com.

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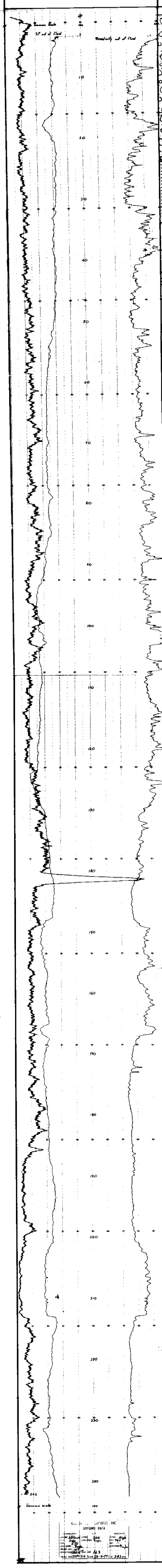
MINERALS AUST. PTY LTO

DRILL HOLE LOG

2608(VI)-2

HOLE No.	209-56	DATE DRILLED	22.3.77	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	22.3.77	RANGE	200 cps	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	23.3.77	TIME CONSTANT	2 sec.	SP. SCALE	300
LOCATION	PARALANA "A"	DRILLED DEPTH	244 m	PAPER SPEED	1 cm/m	BIAS	900/-
STATE	S.A.	LOGGED DEPTH	242 m	LOGGING SPEED	9 m/min.	FLUID LEVEL	3 m
GEOLOGIST	TAYLOR	ELEVATION	64.29 m	BACK GROUND	18 cps.	PROBE No	109
DRILLER	BROWN	CO-ORDS		TIME BASE	1 sec.	STANDARD	656 cps.
LOGGER	HART			K-FACTOR	1.33x10-5		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous · Mixed Clastics



INTERVAL	DESCRIPTION
0 - 16	Gravel. Coarse sand. White clay.
16 - 24	Fine gravel. Coarse sand. Red clay.
24 - 34	Sand. Red with minor white clay.
34 - 42	Fine sand (75%) and coarse sand.
42 - 44	Gravel. Coarse sand. Red clay.
44 - 58	Coarse sand. Red silty clay.
58 - 90	Coarse sand. Red/brown with minor pale grey clay in lower part.
90 - 94	Coarse sand and clay as above.
94 - 110	Coarse sand. Clay as above.
110 - 120	Coarse sand. Clay as above.
120 - 128	Coarse sand. Brown and pale grey soft clay.
128 - 132	Coarse sand. Pale grey and yellow/brown clay.
132 - 134	Coarse sand. Clay as above.
134 - 138	Coarse sand. Pale and light grey clay. Stains.
138 - 146	Mid grey clay. Hem. abund. Lim.f.com. Min. coarse sand.
146 - 148	Dark grey and black clay. Hem. v. com. Lim.f.com.
148 - 150	Sand (0.5-1mm., sa/r, qz+). Clay as above.
150 - 154	Dark grey and black clay. Hem. v. com.
154 - 156	Mid grey clay. Hematite common.
156 - 166	Light to mid grey clay. Min.white clay.Stains,esp. hematite, f.common.
166 - 174	Sand (0.25 - 0.5 mm.,a/sr, qz). Dark grey soft clay. Min. light grey clay.
174 - 186	Black and dark grey clay. Hematite common. Limonite fairly common.
186 - 202	Olive green and dark grey clay. Limonite abundant. Minor red and yellow mottled clay.
202 - 208	Dark olive green and dark grey clay. Limonite (goethite) very common.
208 - 214	Clay (as above) (50%) and mixed clays. (M.C.) (Dark = Light)
214 - 222	Very fine sand (10%) and sand (1 mm, sa, qz) Mixed Clays (Dk ≥ Lt).
222 - 230	Sand (1-2mm, a/sr, qz+). Dark grey/black clay. Minor red/yellow mottled clay.
230 - 232	Very fine sand. Black clay. Min. lim.
232 - 234	Black clay. Lim. f. common.
234 - 240	Sand (1-3mm, a/sr, qz+). Clay as above.
240 - 244	Clays as above. Minor sand.

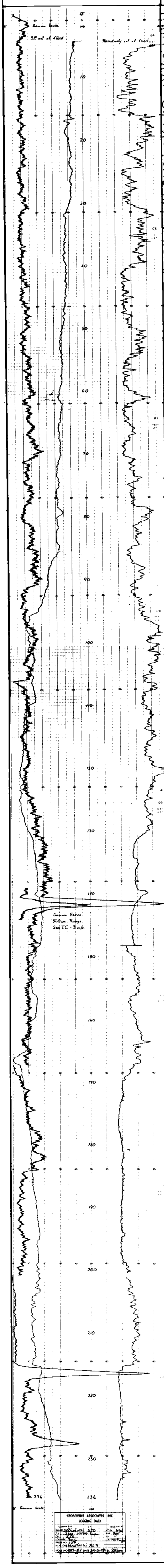
MINERALS AUST PTY LTD

DRILL HOLE LOG

2608(VI)-3

HOLE No.	209-57	DATE DRILLED	24.3.77	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	24.3.77	RANGE	200 cps	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	24.3.77	TIME CONSTANT	2 sec.	SP. SCALE	350
LOCATION	PARALANA"A"	DRILLED DEPTH	238 m	PAPER SPEED	1 cm/m	BIAS	900
STATE	S.A.	LOGGED DEPTH	236 m	LOGGING SPEED	9 m/min	FLUID LEVEL	5 m
GEOLOGIST	TAYLOR	ELEVATION	64.25 m	BACK GROUND	18 cps	PROBE No	109
DRILLER	BROWN	CO-ORDS		TIME BASE	1 sec.	STANDARD	647 cps.
LOGGER	HART			K-FACTOR	1.33×10^{-5}		Mixed Clastics

LITHOLOGY : Gravel, Sand, Silt, Clay, Carbonate, Carbonaceous



INTERVAL	DESCRIPTION
0 - 16	Gravel. Coarse sand. Red and white clay.
16 - 30	Fine Gravel. Sand. Red clay.
30 - 34	Sand. Red clay.
34 - 44	Fine gravel. Sand. Red clay.
44 - 52	Coarse sand. Red silty clay.
52 - 62	Fine gravel. Coarse sand. Red silty clay.
62 - 68	Fine gravel. Red silty clay.
68 - 74	Coarse sand. Red/brown silty clay.
74 - 84	Coarse sand (20%) fine sand (50%) and red/brown silty clay.
84 - 102	Fine gravel. Coarse sand. Red and mpg silty clay.
102 - 110	Fine gravel. Sand. Clays as above.
110 - 120	Fine gravel coarse sand. Red and minor dark grey clay.
120 - 130	Coarse sand. Red and pale grey soft clay.
130 - 134	Pale grey and yellow/brown (y/b) and min. red clay.
134 - 136	Clay as above with light grey stained clay.
136 - 138	Clay as above with mid grey clay.
138 - 148	Coarse sand. Light to mid grey clay. Hem. abund. Lim. v. common.
148 - 154	Black and mid grey clay. Lim. and hem. common.
154 - 178	Dark and mid grey clay. Hem.f. common. Minor limonite. Minor coarse sand.
178 - 186	Black and dk.grey with minor mid grey and khaki clay. Stains common/ very common.
186 - 194	Mid to dark grey clay. Stains very common.
194 - 196	Sand (1-2mm, a/sr, mixed). Mixed clays (Lt > Dk)
196 - 198	Mid grey clay. Lim. v.com. Hem. com.
198 - 206	Fine sand (5%) and sand (0.5- 1 mm, a/sr, mx) (5%). M.C. (as above) Stains common.
206 - 208	Olive grey and mid/dark grey clay. Stains.
208 - 212	Very fine sand (10%) and sand (0.25-1mm, a/sr, qz+) (10%). M.C. (Dk = Lt).
212 - 220	Very fine sand (10%) and 5% sand as above. Clays as above. Lim. v.com. Hem.com.
220 - 226	Sands as above (slightly coarser) and clays as above. Lim.com.
226 - 232	Mid to dark grey and black clay. Carbonate (5%) in lowest sample. Lim.f. com.
232 - 234	Very fine sand. Clay as above. Lim. f. com.
234 - 238	Very fine sand (5%) and sand (1-3 mm, a/sr, qz+) (5%). Clays as above. Lim. com.

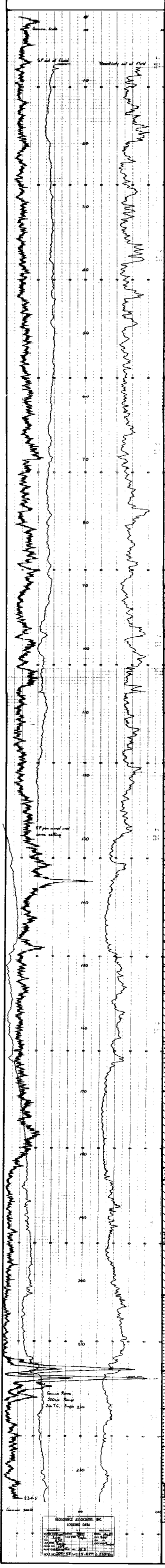
MINERALS AUST. PTY LTD

DRILL HOLE LOG

2608(VII)-4

HOLE No.	209-58	DATE DRILLED	24.3.77	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	25.3.77	RANGE	200 cps	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	25.3.77	TIME CONSTANT	2 sec.	SP. SCALE	350
LOCATION	PARALANA"A"	DRILLED DEPTH	238 m	PAPER SPEED	1 cm/m	BIAS	900/-
STATE	S.A.	LOGGED DEPTH	235 m	LOGGING SPEED	9 m/min	FLUID LEVEL	8 m
GEOLOGIST	TAYLOR	ELEVATION	63.63 m	BACK GROUND	19 cps.	PROBE No	109
DRILLER	AULD	CO-ORDS		TIME BASE	1 sec.	STANDARD	657 cps
LOGGER	HART			K-FACTOR	1.33×10^{-5}		

LITHOLOGY : Gravel, Sand, Silt, Clay, Carbonate, Carbonaceous, Mixed Clastics



INTERVAL	DESCRIPTION
0 - 26	Gravel. Sand. Red and white clay.
26 - 32	Gravel. Sand. Red clay.
32 - 52	Fine gravel. Coarse sand. Red silty clay.
52 - 54	Fine gravel. Red silty clay.
54 - 74	Coarse sand. Red silty clay.
74 - 90	Sand. Red silty clay.
90 - 98	Fine gravel. Coarse sand. Red/brown silty clay.
98 - 100	Fine sand.
100 - 110	Coarse sand (70%). Fine sand (20%). Red/brown clay.
110 - 116	Coarse sand. Red/brown and mpg clay.
116 - 120	Sand. Red/brown and l pg silty clay.
120 - 134	Pale grey and y/b and minor red clay. Stained.
134 - 138	Pale and light grey clay. Hem. abund. Lim. com.
138 - 146	Light/mid grey clay. Stains v.common.
146 - 150	Black, dk. grey and min. mid grey clay. Min. stains.
150 - 154	Mid to dk. grey and min. black clay. Hem. f. com.
154 - 162	Light, mid and dk grey clay. Hem. f.com. Min. lim.
162 - 170	Sand (1mm, a/sr,qz+). Dk and mid grey clay. Hem. v.com. Lim.com/
170 - 182	Dark grey/black clay. Hem. v.com. Lim.f.com. Minor mottled stain.
182 - 184	Sand (0.25-1mm, a/sr, mixed (mx)). Clay as above.
184 - 192	Mid to dark grey clay. Lim. abund. Hem. v.com.
192 - 194	Sand (0.25-1mm, a/sr, mx). Clay as above.
194 - 202	Mid to dark grey clay and olive green clay. Limonite v.common. Hem.f.common.
202 - 214	Sand (0.25-1mm, a/sq, qz+) with some very fine sand. Mixed clays (Dk = Lt). Limonite v.common.
214 - 220	Very fine sand (< 0.25 mm, qz). Mixed clays (Lt ≥ Dk). Lim.v.common.
220 - 226	Very fine sand as above. Mixed clays (as above). Limonite common.
226 - 232	Very fine sand and clays as above. Limonite f.common.
232 - 234	Sand (0.25-2mm, a/sr, qz+). M.C. (Dk > Lt).
234 - 238	Very fine sand and sand (as above) Mixed clays (as above). Lim.f.common.

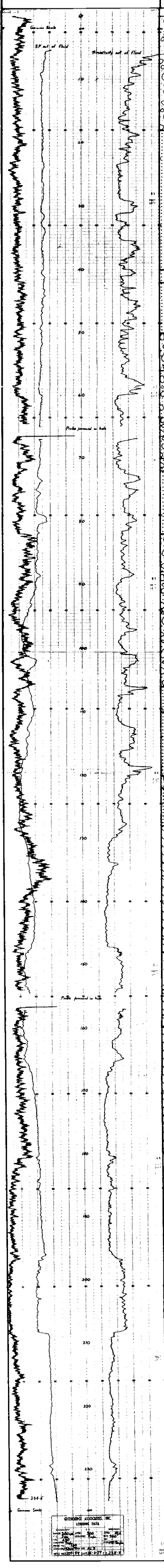
MINERALS AUST. PTY LTD

DRILL HOLE LOG

2608(III)-5

HOLE No.	209-59	DATE DRILLED	25.3.77	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	26.3.77	RANGE	200 cps	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	26.3.77	TIME CONSTANT	2 sec.	SP. SCALE	300
LOCATION	PARALANA"A"	DRILLED DEPTH	238 m	PAPER SPEED	1 cm/m	BIAS	900/-
STATE	S.A.	LOGGED DEPTH	234.5m	LOGGING SPEED	9 m/min	FLUID LEVEL	6 m
GEOLOGIST	TAYLOR	ELEVATION	63.47 m	BACK GROUND	18 cps	PROBE No	109
DRILLER	AULD	CO-ORDS		TIME BASE	1 sec.	STANDARD	660 cps
LOGGER	HART			K-FACTOR	1.33×10^{-5}		Mixed Clastics

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous



INTERVAL	DESCRIPTION
0 - 18	Gravel. Coarse sand. White and red clay.
18 - 40	Coarse sand. Red silty clay.
40 - 42	Fine gravel. Coarse sand.
42 - 50	Coarse sand. Red silty clay.
50 - 56	Fine gravel. Coarse sand. Red silty clay.
56 - 70	Fine gravel. Coarse sand. Red silty clay.
70 - 72	Fine gravel. Coarse sand. Red/brown clay.
72 - 82	Coarse sand. Red/brown silty clay.
82 - 88	Gravel. Sand. Clay as above.
88 - 106	Gravel. Coarse sand. Red/brown and mpg silty clay.
106 - 110	Coarse (40%) and normal (40%) sand. Red soft clay.
110 - 120	Coarse sand. Red/brown and lpg soft silty clay.
120 - 122	Fine gravel. Coarse sand. Clay as above.
122 - 128	Sand. Red/brown and pale grey soft clay.
128 - 134	Pale grey, yellow/brown and min.red clay stains.
134 - 136	Light and pale grey clay. Stains v.com.
136 - 146	Mid grey with min. light grey clay. Stains abund. Min. coarse sand.
146 - 148	Mid to dk grey clay. Stains abund.
148 - 154	Black and dk grey clay. Stains min. to com.
154 - 158	Mid to dk grey clay. Stains f.com.
158 - 160	Light grey clay. Hem.f.com. Min.Lim.
160 - 174	Dark grey clay. Hematite common or very common. Minor limonite.
174 - 178	Black and dk grey clay. Hem.f.com.
178 - 180	Dark grey soft clay. Hem. f. com. Min.lim.
180 - 186	Sand (0.5-2mm., a/sr, mx). Mid to dk. grey clay. Stains f.com.
186 - 202	Mid grey clay. Limonite abundant. Minor sand. Minor khaki clay in lowest sample.
202 - 206	Mixed clays (Lt > Dk) Lim.v.com. Min. fine sand.
206 - 210	Fine sand (< 0.25 mm, qz).Mixed clays (Lt > Dk).
210 - 214	Fine sand. Mixed clays as above. Lim.v.com.
214 - 220	Silt (or v.fine sand). Fine sand. Mixed clays. Lim.com.
220 - 224	Mid to dk grey clay. Min.stains and sand.
224 - 228	Sand (1-3mm, sa/sr,qz+). Mixed clays. (Dk > Lt). Lim.f.com.
228 - 232	Mixed clays (DK ≥ Lt) Min.sand. Lim.f.com.
232 - 238	Mixed clays (Dk > Lt). Minor Carbonate. Limonite f.common.

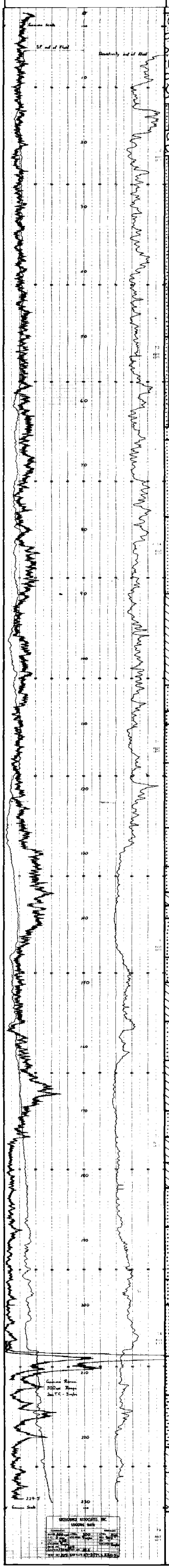
MINERALS AUST PTY LTD

DRILL HOLE LOG

2608(VI)-6

HOLE No.	209-60	DATE DRILLED	26.3.77	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	27.3.77	RANGE	200 cps	RESIST SCALE	High
PROJECT	POONTANA	DATE LOGGED	27.3.77	TIME CONSTANT	2 sec.	SP. SCALE	300
LOCATION	PARALANA"A"	DRILLED DEPTH	232 m	PAPER SPEED	1 cm/m	BIAS	900/-
STATE	S.A.	LOGGED DEPTH	229.5 m	LOGGING SPEED	9 m/min	FLUID LEVEL	6 m
GEOLOGIST	TAYLOR	ELEVATION	60.60m	BACK GROUND	16 cps	PROBE No	109
DRILLER	AULD	CO-ORDS		TIME BASE	.1 sec	STANDARD	669 cps.
LOGGER	HART			K-FACTOR	1.33x10-5		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous · Mixed Clastics



INTERVAL	DESCRIPTION
0 - 14	Coarse gravel. Sand. White/buff clay.
14 - 18	Coarse sand. Red and min. white clay.
18 - 22	Fine gravel. Coarse sand.
22 - 50	Sand. Red silty clay.
50 - 64	Coarse sand. Red/brown silty clay.
64 - 66	Sand. Clay as above.
66 - 78	Sand and clay as above.
78 - 90	Coarse red sand. Minor fine gravel.
90 - 104	Brown silty clay. Minor coarse sand.
104 - 108	Coarse sand. Brown and lpg silty clay.
108 - 110	Coarse sand. Red/brown and pale grey clay.
110 - 116	Coarse sand. Pale grey and brown clay (60:40).
116 - 126	Coarse sand. Pale grey and brown clay (50:50).
126 - 132	Coarse sand. Pale grey and yellow/brown clay.
132 - 136	Coarse sand. Pale and light grey clay. Hem.v.com. Lim.f.com.
136 - 138	Mid to dark grey hard clay. Hem.abund. Lim.com.
138 - 140	Sand (0.25-2mm, a/sr,ps). Dk. grey soft clay.
140 - 146	Sand as above. Mid grey clay. Stains v.com. to abund.
146 - 150	Sand as above. Hard black and mid grey clay.
150 - 156	Mid grey and lesser black clay. Stains v.com.
156 - 162	Sand (0.5-3mm, a/sr, ps). Clays as above. Min.carbonate.
162 - 170	Mid grey stained clay and black clay (with mottled red/yellow/white stains).
170 - 174	Sand (0.25-0.5 mm, a/sr, mx). Clays as above.
174 - 178	Dark grey/black clay. Lim.v.com. Hem.com.
178 - 182	Mid greenish grey clay. Lim.v.com. Min.brick red clay.
182 - 188	Sand (1-3mm, a/sa,ps). Greenish grey clay. Lim.common.
188 - 196	Sand as above. Clays as above. Lim.f.com.
196 - 200	Sand (1-5mm, a/sr,ps). Clays as above.
200 - 208	Sand (as above)(5%) and very fine sand (10%). Clays as above.
208 - 214	Very fine sand (< 0.25,qz). Clays as above. Lim.com.
214 - 222	Silt. Clays as above. Lim.f.com. Min. carb.
222 - 226	Clays as above. Minor carbonate (2%).
226 - 232	Clays as above with increase in black clay down interval. Lim. f.com. Min.carb.

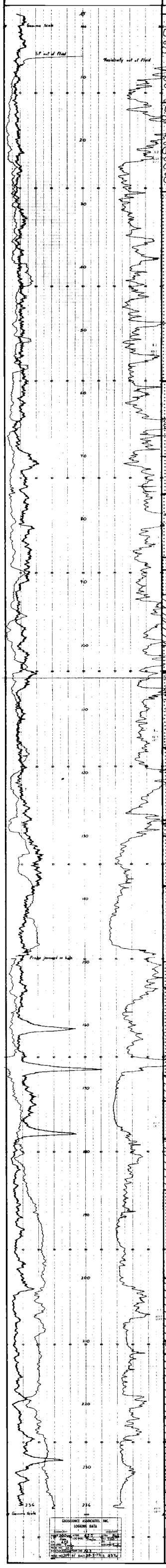
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DRILL HOLE LOG

2608(VII)-7

HOLE No.	209-61	DATE DRILLED	28.3.77	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	28.3.77	RANGE	200 cps	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	28.3.77	TIME CONSTANT	2 sec.	SP. SCALE	425
LOCATION	PARALANA "A"	DRILLED DEPTH	238 m	PAPER SPEED	1 cm/m	BIAS	750/-
STATE	S.A.	LOGGED DEPTH	236 m	LOGGING SPEED	9 m/min	FLUID LEVEL	7 m
GEOLOGIST	TAYLOR	ELEVATION	61.83 m	BACK GROUND	16 cps	PROBE No	109
DRILLER	AULD	CO-ORDS		TIME BASE	1 sec	STANDARD	669 cps
LOGGER	HART			K-FACTOR	1.33×10^{-3}		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous · Mixed Clastics



INTERVAL	DESCRIPTION
0 - 14	Gravel. Coarse sand. Buff clay.
14 - 28	Fine gravel. Coarse sand. Red clay.
28 - 58	Coarse sand. Red soft clay.
58 - 64	Sand. Red silty clay.
64 - 70	Sand. Red silty clay.
70 - 76	Coarse sand. Red silty clay.
76 - 86	Coarse sand. Red/brown and mpg clay.
86 - 88	Coarse sand.
88 - 92	Coarse sand. Red/brown and mpg silty clay.
92 - 100	Clay as above.
100 - 104	Coarse sand. Clay as above
104 - 116	Coarse sand. Red/brown silty clay.
116 - 128	Sand. Red/brown and pale grey soft clay.
128 - 130	Coarse sand. Pale grey and y/b clay
130 - 138	Sand (1-2 mm, a/sr, p.s.). Pale and light grey soft clay. Stains common.
138 - 150	Sand (1-3 mm, a/sr p.s.). Light to mid grey clay. Limonite f.com. Min carbonate?
150 - 154	Sand as above. Mid grey clay.
154 - 168	Sand (as above). Mid Grey clay. Minor limonite. Hem.f.com. Min.black clay.
164 - 172	Mid to dk. grey and black clay. Min. stain.
172 - 178	Sand (1-3 mm, a/sr, mx). Dark grey/black clay. Min stain.
178 - 186	Hard black and min. dk. grey clay. Stains f.com.
186 - 200	Sand (0.5-2 mm, a/sa/sr, p.s.) and some coarser (1-5 mm) at top. Dark grey to black clay. Stains fairly common.
200 - 210	Mixed clays (black and mid grey) (Dk > Lt). Limonite f.common. Minor coarse sand. Min. light grey clay at bottom.
210 - 212	Sand (1 mm, a/sr,mx). Silt. M.C. (Dk > Lt).
212 - 222	M.C. (Dk > Lt). Min. sand and silt. Limonite f. common.
222 - 226	Mixed clays (Dk = Lt). Lim. f.com/com.
226 - 232	Silt. Mixed clays (Dk > Lt). Min. lim. Min. carbonate.
232 - 234	Sand (1-2mm, a/sr, mx). M.C. (Dk > Lt). Min.lim. Min.carb.
234 - 236	Sand (as above) and v.fine sand. Clays as above
236 - 238	Mixed clays (DK > Lt). Min.lim. Min. coarse sand. Min carb.

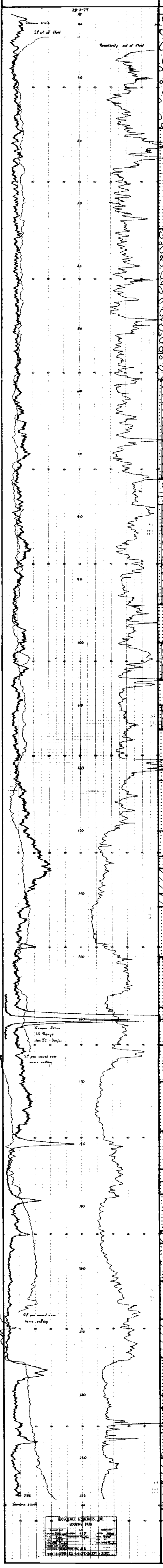
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DRILL HOLE LOG

2608(VI)-8

HOLE No.	209-62	DATE DRILLED	28.3.77	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	29.3.77	RANGE	200 cps	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	29.3.77	TIME CONSTANT	2 sec.	SP. SCALE	425
LOCATION	PARALANA"A"	DRILLED DEPTH	238 m	PAPER SPEED	1 cm/m.	BIAS	750/-
STATE	S.A.	LOGGED DEPTH	236 m	LOGGING SPEED	9 m/min.	FLUID LEVEL	3 m
GEOLOGIST	TAYLOR	ELEVATION	62.05 m	BACK GROUND	18 cps	PROBE No	109
DRILLER	BROWN	CO-ORDS		TIME BASE	1 sec.	STANDARD	659 cps.
LOGGER	HART			K-FACTOR	1.33x10-5		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous · Mixed Clastics



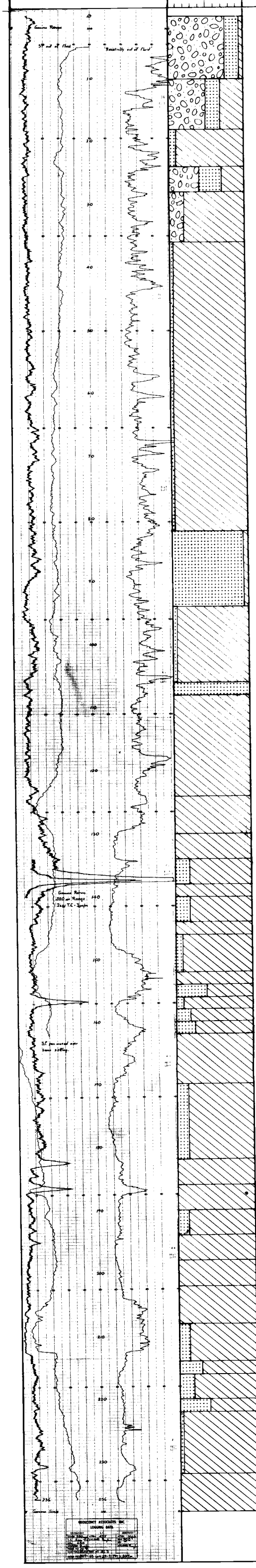
INTERVAL	DESCRIPTION
0 - 18	Fine and coarse gravel. Coarse sand. Red soft clay.
18 - 34	Coarse sand. Red soft clay.
34 - 54	Fine gravel coarse sand. Red clay.
54 - 58	Fine gravel. Coarse sand. Red clay.
58 - 74	Coarse sand. Red silty clay.
74 - 78	Gravel. Coarse sand. Red silty clay.
78 - 94	Coarse sand. red silty clay.
94 - 100	Coarse sand. Red silty clay.
100 - 106	Coarse sand. Red soft clay.
106 - 110	Coarse sand. Red soft clay.
110 - 114	Coarse sand. Red/brown and mpg silty clay.
114 - 122	Sand. Red/brown and lpg soft clay.
122 - 130	Sand. Red/brown and pale grey clay.
130 - 134	Very coarse sand. Pale grey with lesser red silty clay.
134 - 136	Sand. Pale grey, yellow/brown and min. red clay.
136 - 140	Clays as above.
140 - 142	Clays as above plus light grey clay
142 - 150	Sand (0.5-2 mm, a/sa,ps). Light, mid and dk grey clay. Hem.com. Lim f.com.
150 - 158	Sand as above. Mid and dk grey/black clay. Min. stain.
158 - 160	Sand (< 0.25-1mm., a/sr, mx). Mixed clays (Lt > Dk).
160 - 164	Sand (1-2mm, a/sr, mx). Mid grey clay. No stains.
164 - 170	Sand (0.5-3mm, a/sr, ps.). Mid and dk grey clay. Min.lim.
170 - 178	Sand (as above). Dk grey and lesser mid grey clay. Min lim.
178 - 184	Sand (0.5-2mm, a/sr, ps.). Mid to dk grey clay.
184 - 186	Sand (2-4mm, a/sr, qz+). Mixed clays (Dk > Lt).
186 - 188	Sand (0.5-2mm, a/sr, ps.). Clays as above.
188 - 194	Sand (0.5-3mm, a/sr, ps.). Greenish grey clay. Lim.com.
194 - 196	Greenish grey and black-clay. Lim. v.com.
196 - 202	Fine sand. Dk grey/black and greenish grey clay. Lim. f. com.
202 - 208	Fine to v.fine sand (< 0.25mm, ps.). Dk grey/black clay. Min.lim.
208 - 214	M.C. (Lt ≥ Dk). Min. sand. Min.Lim.
214 - 220	V.fine sand (10%) and sand (0.5-2mm, a/sr, ps.) (5%). M.C. (Dk > Lt).
220 - 222	V.fine sand (10%) and fine sand (0.25mm). M.C. (Dk ≫ Lt).
222 - 226	Sand (1-2mm, a/sr, ps.). M.C. (Dk = Lt). Min.lim.
226 - 230	Sand (1mm, a/sq,qz+). M.C. (Dk ≥ Lt). Min carbonate. Min.lim.
230 - 234	Mixed clays (Dk > Lt). Carbonate.
234 - 238	Fine sand. Mixed clays (Dk,≫ Lt). Carbonate.

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DRILL HOLE LOG 2608(VI)-9

HOLE No.	209-63	DATE DRILLED	29.3.77	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	29.3.77	RANGE	200 cps	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	29.3.77	TIME CONSTANT	2 sec.	SP. SCALE	425
LOCATION	PARALANA"A"	DRILLED DEPTH	238 m	PAPER SPEED	1cm/m	BIAS	700/-
STATE	S.A.	LOGGED DEPTH	236 m	LOGGING SPEED	9 m/min.	FLUID LEVEL	5 m
GEOLOGIST	TAYLOR	ELEVATION	63.72 m	BACK GROUND	18 cps	PROBE No	109
DRILLER	AULD	CO-ORDS		TIME BASE	1 sec	STANDARD	659 cps
LOGGER	HART			K-FACTOR	1.33×10^{-5}		

LITHOLOGY : Gravel, Sand, Silt, Clay, Carbonate, Carbonaceous, Mixed Clastics



INTERVAL	DESCRIPTION
0 - 10	Coarse gravel. Coarse sand. White clay.
10 - 18	Fine gravel. Coarse sand. Red/buff clay
18 - 24	Coarse sand. Red silty clay.
24 - 28	Fine gravel. Coarse sand. Red clay.
28 - 36	Gravel. Red clay.
36 - 82	Sand. Red. Silty clay.
82 - 94	Coarse (20%) and normal (75%) sand. Red silty clay.
94 - 106	Coarse sand. Red/brown and mpg silty clay.
106 - 108	Fine sand.
108 - 124	Red/brown and mpg silty clay. Minor coarse sand.
124 - 130	Red/brown and lpg silty clay (60:40).
130 - 134	Pale grey and yellow/brown and min.red clay.
134 - 138	Sand (0.25-3mm, a/sr, ps). Pale and light grey clays. Stains com.
138 - 140	Light to mid grey clay. Hem.v.com.Lim.f.com.
140 - 144	Sand (0.25-0.5mm, a/sa,qz+). Clays as above. Lim. com.
144 - 146	Dk grey/black clay. Hem.v.com. Lim.f.com.
146 - 152	Very fine red sand. Clays as above - mainly black.
152 - 154	Black and lesser dark grey clay. Stains com.
154 - 156	Sand (<0.25 - 1 mm, a/sa, mx). Clays as above.
156 - 158	Sand (0.5-2mm, a/sr, ps). Clays as above.
158 - 160	Sand (<0.25- 1 mm, a/sa, mx). Light to mid grey clay.
160 - 162	Sand (0.5-2mm, a/sa,qz). Clays as above.
162 - 170	Light, mid and dark grey clays. Hem. com. Lim.f.com. Minor sand.
170 - 182	Sand (0.25-2mm, a/sr, ps). Clays as above. Hem.com. Lim.f.com.
182 - 186	Clays as above, Lim. and hem. f.com.
186 - 190	Mid grey clay (greenish). Lim.v.com.
190 - 194	Sand (0.5-2mm, a/sr, ps). Clays as above and M.C. (Lt > Dk).
194 - 198	Mid to dk grey clay. Lim.f.com. Min.sand.
198 - 202	Mid grey clay. Limonite common.
202 - 208	Mid greenish grey clay. Lim. com.
208 - 214	Sand (0.25 - 1 mm, a/sr, ps). M.C. (Lt > Dk). Lim.f.com.
214 - 216	Sand (<0.25, ang,qz). M.C. (Lt > Dk). Lim.f.com.
216 - 220	Sand as above. M.C. (Mid and dk grey).
220 - 222	Sand (as above). Clays as above. Lim.com.
222 - 232	Sand (as above). Mid to dk grey clay. Limonite common.
232 - 238	Mixed clays (Lt = Dk). (Mid, dk grey and black). Min. stains.

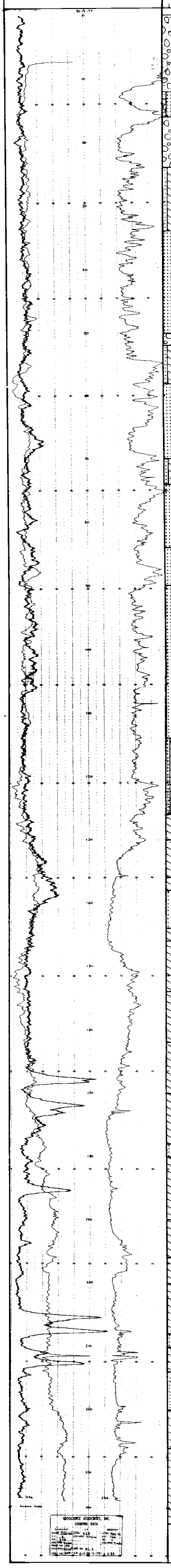
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DRILL HOLE LOG

2608(III)-10

HOLE No.	209-64	DATE DRILLED	30.3.77	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	30.3.77	RANGE	200 cps	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	30.3.77	TIME CONSTANT	2 sec.	SP. SCALE	425
LOCATION	PARALANA "A"	DRILLED DEPTH	238 m	PAPER SPEED	1 cm/m.	BIAS	700/-
STATE	S.A.	LOGGED DEPTH	236 m	LOGGING SPEED	9 m/min	FLUID LEVEL	8 m
GEOLOGIST	TAYLOR	ELEVATION	63.66 m	BACK GROUND	8 cps	PROBE No	109
DRILLER	BROWN	CO-ORDS		TIME BASE	1 sec.	STANDARD	664 cps
LOGGER	HART			K-FACTOR	1.33×10^{-5}		

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous · Mixed Clastics



INTERVAL	DESCRIPTION
0 - 12	Gravel. Coarse sand. Red/buff clay.
12 - 16	Gravel. Coarse sand. Red clay.
16 - 24	Fine gravel. Coarse sand. Red clay.
24 - 34	Coarse sand. Red silty clay.
34 - 50	Sand. Red silty clay.
50 - 52	Fine gravel. Red silty clay.
52 - 58	Sand. Red silty clay.
58 - 70	Coarse sand.
70 - 74	Coarse sand. Red silty clay.
74 - 84	Sand. Red silty clay
84 - 90	Coarse sand. Red silty clay.
90 - 114	Coarse sand. Red/brown and mpg silty clay.
114 - 126	Coarse sand. Brown and lpg silty clay.
126 - 130	Brown and pale grey (50:50) silty clay.
130 - 136	Pale grey and yellow/brown clay.
136 - 138	Light grey and mpg clay. Hem.com.Lim.f.com.
138 - 144	Fine sand (<0.25). Mid to dk grey clay. Hem.com.Lim.f.com.
144 - 146	Mid to dk grey clay. Hem abund. Lim.com.
146 - 154	Dk grey/black clay. Hem. com.Lim.f.com.
154 - 162	Light to mid grey clay. Hem.com. Lim.f.com.
162 - 170	Mid and lesser light grey clay. Stains com.
170 - 178	Mid to dark grey clay. Stains f.com.
178 - 180	Sand (2-3mm, sa/r, mx). Clays as above. Lim. v.com.
180 - 190	Dark grey to black hard clay. Stains common to very common.
190 - 196	Mid to dk grey clay. Stains com/v.com.
196 - 200	Mixed clays (dk = Lt). Lim.com. Min.sand.
200 - 208	Mixed clays (Lt > Dk). Minor carbonate.
208 - 210	Sand (0.25-2mm, a/sr, mx). M.C. (Lt Dk). Lim.com.
210 - 214	Mid and dk. grey clay. Lim.com. Min.sand.
214 - 220	Sand (0.25,qz) and (1-2mm, a/sa, qz). Clays as above.
220 - 226	Dk grey/black clay. Lim.com. Min.carbonate.
226 - 238	Mixed clays (Dk > Lt) (Black and dark grey). Limonite common. Minor carbonate.

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DRILL HOLE LOG 2608(IV)-11

HOLE No.	209-65	DATE DRILLED	30.3.77	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	31.3.77	RANGE	200 cps	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	31.3.77	TIME CONSTANT	2 sec.	SP. SCALE	450
LOCATION	PARALANA"A"	DRILLED DEPTH	238 m	PAPER SPEED	1 cm/m	BIAS	700/-
STATE	S.A.	LOGGED DEPTH	236 m	LOGGING SPEED	9 m/min	FLUID LEVEL	5 m
GEOLOGIST	TAYLOR	ELEVATION	62.21 m	BACK GROUND	11 cps	PROBE No	109
DRILLER	AULD	CO-ORDS		TIME BASE	1 sec	STANDARD	653 cps.
LOGGER	HART			K-FACTOR	1.33x10^{-5}		Mixed Clastics

LITHOLOGY : Gravel · Sand · Silt · Clay · Carbonate · Carbonaceous

GAMMA S.P. RES	100%	INTERVAL	DESCRIPTION
		0 - 20	Gravel. Coarse sand. Red/buff clay.
		20 - 34	Gravel. Coarse sand. Red/brown and white clay.
		34 - 44	Sand. Red sticky clay.
		44 - 46	Fine gravel. Minor clay.
		46 - 54	Coarse sand. Red silty clay.
		54 - 60	Coarse sand. Red silty clay.
		60 - 66	Coarse sand. Red/brown and mpg silty clay.
		66 - 70	Coarse sand. Red/brown and mpg silty clay.
		70 - 82	Coarse sand. Clays as above.
		82 - 86	Fine gravel. Coarse sand. Clays as above.
		86 - 98	Coarse sand. Clays as above.
		98 - 106	Coarse sand. Red/brown soft clay.
		106 - 128	Sand. Red/brown and lpg soft clay.
		128 - 130	Sand. Clays as above.
		130 - 134	Fine sand. Pale grey lim.stained clay.
		134 - 138	Coarse sand (1-2mm, a/sa,qz). Clays as above.
		138 - 142	Sand (0.5-2mm, a/sr,qz+). Midgrey clay. Lim.v.com.
		142 - 146	Light, mid and dk grey clay. Stains com.
		146 - 152	Dk. grey/black clay. Stains f.com.
		152 - 154	Mid/dk grey clay. Hem.f.com.Min.lim.
		154 - 160	Sand (1mm,a/sr,mx). Mid to dk grey clay.
		160 - 162	Sand (as above). Lt/mid grey clay. Lim.abund.
		162 - 166	Sand (0.5-3mm,a/sr,qz+). Mid/dk grey clay. Stains f.com/
		166 - 178	Dk grey to black clay. Lim.min.to f.com.Min.hem. Gypsum in lowest sample.
		178 - 182	Clays as above. Min. gypsum. Lim.v.com/abund.
		182 - 186	Sand (1-2mm, a/sr,mx). Clays as above.
		186 - 196	Dark grey, black and olive green clay. Lim.v.com.Min.coarse sand.
		196 - 200	Mixed clays (Dk > Lt). Lim. v. com.
		200 - 202	Mid grey hard clay. Stains f.com.
		202 - 208	Mixed clays (Lt ≥ Dk). Limonite f.com.
		208 - 210	Sand (0.25-0.5, a/sa,qz). M.C. (Dk = Lt). Lim.com.
		210 - 212	Sand (0.25-1mm,a/sa,qz). M.C. (Lt > Dk). Lim.com.
		212 - 214	Sand as above (20%) and v.f.sand (20%). Clays as above.
		214 - 220	Mixed clays (Dk > Lt).(mainly black). Lim.f.com. Min.sand.
		220 - 228	Mixed clays (Dk > Lt). Lim.f.com. Carbonate.
		228 - 238	Mixed clays (Dk > Lt).(mainly black) Increase in mid grey down interval. Min. carbonate. Lim. f.com.

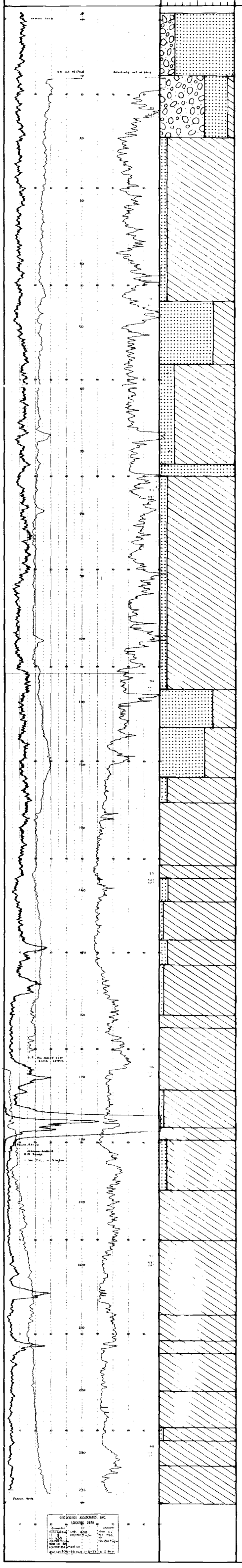
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DRILL HOLE LOG

2608(VI)-12

HOLE No.	209-66	DATE DRILLED	31.3.77	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	1.4.77	RANGE	200 cps	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	1.4.77	TIME CONSTANT	2 sec.	SP. SCALE	450
LOCATION	PARALANA"B"	DRILLED DEPTH	238 m	PAPER SPEED	1 cm/m	BIAS	750/-
STATE	S.A.	LOGGED DEPTH	236 m	LOGGING SPEED	9 m/min.	FLUID LEVEL	10 m
GEOLOGIST	TAYLOR	ELEVATION	60.58 m	BACK GROUND	13 cps	PROBE No	109
DRILLER	AULD	CO-ORDS		TIME BASE	1 sec.	STANDARD	665 cps.
LOGGER	HART			K-FACTOR	1.33x10-5		

LITHOLOGY : Gravel | Sand | Silt | Clay | Carbonate | Carbonaceous | Mixed Clastics



INTERVAL	DESCRIPTION
0 - 10	Fine Gravel. Red sand.
10 - 20	Gravel. Coarse sand. Red/buff clay.
20 - 2	Sand. Red and buff clay at top. Red clay at bottom.
46 - 56	Coarse sand. Red silty clay.
56 - 72	Coarse sand. Red silty clay.
72 - 74	Coarse sand.
74 - 108	Coarse sand. Red/brown and minor pale grey silty clay.
108 - 114	Coarse sand. Red/brown and mpg silty clay.
114 - 122	Fine sand. Red and lpg silty clay.
122 - 126	Sand. Pale grey clay with limonite.
126 - 136	Pale grey and light grey clay. Stains common.
136 - 138	Clays as above with minor mid grey clay.
138 - 142	Fine sand. Clays as above plus dk. grey clay. Stains com.
142 - 148	Fine sand. Mid grey and black hard clays. Min.gypsum. Lim.f.com.
148 - 152	Sand (0.5-1mm, a/sa,mx). Clays as above.
152 - 160	Sand as above. Black clay. Min.stains.
160 - 162	Mid grey and black soft clay. Stains com.
162 - 172	Light,mid and lesser dark grey clays. Limonite v.com. Min.coarse sand.
172 - 178	Very fine sand (< 0.25mm, qz). Mixed clays (Lt > Dk). Lim.f.com.
178 - 180	Clays as above. Min.sand.
180 - 188	Very fine sand. Mid grey and some black clay. Lim.f.com.
188 - 196	Light to mid grey clay (slightly blue). Min.black clay. Lim.f.com. Min. very fine sand.
196 - 208	Mixed clays (Lt > Dk). Mainly light/mid grey,black and green clays. Lim. min/f.com.
208 - 212	Mixed clays (Dk ≥ Lt). Min.lim.
212 - 214	Mid/dk grey and lesser black clay . Lim.f.com.
214 - 220	M.C. (Lt > Dk). Lim. f.com.
220 - 226	M.C. (Dk. > Lt). Stains f.com.
226 - 228	Sand (1-2mm, a/sr,mx). Clays as above
228 - 232	Mixed clays (Dk > Lt). Lim.f.com. Min.sand.
232 - 238	Mixed clays (Lt = Dk) (increase in mid grey). Min.lim. Min.sand.

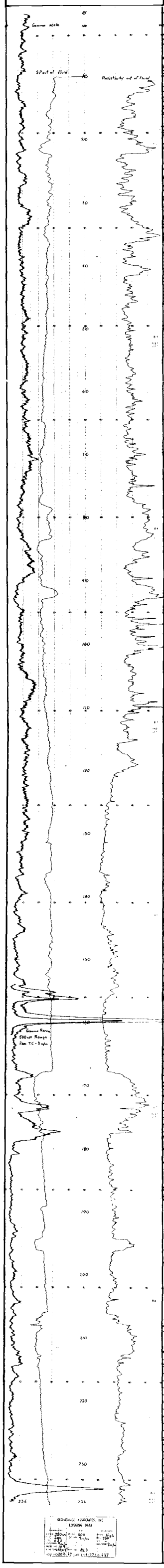
MINERALS AUST PTY LTD

DRILL HOLE LOG

2608(VI)-13

HOLE No.	209-67	DATE DRILLED	1.4.77	GAMMA LOG		ELECTRIC LOG	
EXPL. LICENCE No.	209	DATE COMPLETED	1.4.77	RANGE	200 cps	RESIST. SCALE	High
PROJECT	POONTANA	DATE LOGGED	1.4.77	TIME CONSTANT	2 sec.	SP. SCALE	500
LOCATION	PARALANA"B"	DRILLED DEPTH	238 m	PAPER SPEED	1 cm/m.	BIAS	700/-
STATE	S.A.	LOGGED DEPTH	236m	LOGGING SPEED	9 m/min.	FLUID LEVEL	10 m
GEOLOGIST	TAYLOR	ELEVATION	58.82 m	BACK GROUND	13 cps	PROBE No	109
DRILLER	AULD	CO-ORDS		TIME BASE	1 sec.	STANDARD	665 cps.
LOGGER	HART			K-FACTOR	1.33x10-5		

LITHOLOGY : Gravel, Sand, Silt, Clay, Carbonate, Carbonaceous, Mixed Clastics



INTERVAL	DESCRIPTION
0 - 10	Fine gravel. Fine (50%) and coarse (25%). Sand.
10 - 18	Fine gravel. Sand. Red/buff clay.
18 - 36	Gravel. Sand. Red soft clay.
36 - 38	Coarse yellow sand. Min.fine gravel.
38 - 46	Coarse sand. Red soft clay.
46 - 50	Sand. Clay as above.
50 - 70	Sand. Red silty clay.
70 - 86	Coarse sand. Red/brown and mpg silty clay.
86 - 90	Coarse sand. Clays as above.
90 - 98	Coarse sand. Red and mpg silty clay.
98 - 106	Fine, very angular, gravel. Red and lesser mid grey soft clay.
106 - 114	Reddish brown and mid grey clay (50/50). Minor ? silcrete.
114 - 116	Sand (0.5-3mm, a/sr,mx). Red/brown and pale grey clay.
116 - 122	Sand (as above). Pale grey and lesser red clay.
122 - 126	Pale grey and yellow/brown stained clay.
126 - 136	Pale grey, light grey,mid/dk grey clay. Limonite very common.
136 - 138	Black, dk. grey and pale greenish grey clay. Stains com.
138 - 144	Pale greenish grey clay. Stains very common.
144 - 148	Sand (1-3mm, a/sr,qz). Light, mid and dk grey clay. Lim. com. Gypsum.
148 - 154	Light/mid grey clay. Lim.v.com./abundant.
154 - 156	Light and mid grey clay. Min.lim.
156 - 164	Sand (0.25-2mm, a/sr,ps). Mainly mid grey clay. Lim.min./f.com.
164 - 170	Mdd to dk. grey clay. Min.lim.
170 - 178	Mid to dk. grey hard clay. Min.lim. Min. coarse sand and fine gravel.
178 - 180	Sand (0.5-1mm, a/sa,mx). Silt. Clays as above.
180 - 182	Sand (<0.25mm, a/sa, qz). Dk grey/black clay. Min. carbonate.
182 - 186	Sand (30%) as above and (5%) (0.5-1mm, a/sr, qz+). Clays as above.
186 - 188	Mid to dk. grey clay. Min. stain.
188 - 198	Sand (1-2mm, a/sa, ps). Clays as above. Lim.f.com.
198 - 208	Sand as above. Clays as above. Lim.min./f.com. Min.sand.
208 - 212	Clays as above (M.C. (Lt > Dk)). Min. stains.
212 - 214	Dk. grey clay. Min. stains.
214 - 226	Mixed clays (Lt = Dk) (Mid and dk grey, olive green, black clay). Minor limonite.
226 - 234	Mixed clays (Dk > Lt). Lim.min./f.com. Min.carbonate.
234 - 238	Mixed clays (Lt > Dk). Lim.min./f.com. Min.carbonate.

139°35'

139°36'

30°15'

30°15'

77-48 89.93

1 85.20

2 67.25

77-44 64.93

3 63.71

22 63.31 — 64 63.66 — 77-50 62.73 — 65 62.21

Section 1

4 66.47

10 65.74

26 65.13

12 65.13

27 64.91

28 64.61

29 64.70

21 64.51

30 64.23

49 63.98

5 65.15

6 65.50

23 66.26

8 65.19

64.84

64.87

24 65.05

25 64.55

48

31 (core hole)

64.55

47

7 64.44

13 63.34

B.M. No. 7120 △ 70.85

19 65.04

14 64.71

34 64.21

33 64.28

32 63.91

20 63.53

35 63.18

9 63.18

60 60.60

Section 4

56 64.29 — 57 64.25 — 55 64.06 — 58 63.63 — 59 63.47 — 38 63.18

Section 2

37 62.89

36 62.54

43 62.77

41 62.04

39 62.40

40 62.33

44 61.80

18 61.01

42 62.40

45 62.25

11 65.63

15 63.44

77-53 63.06

77-52 66.19

63 63.12 — 62 62.05 — 61 61.83

Section 3

46 61.50

16 60.53

17 61.79

N

POONTANA PROJECT, LAKE FROME S.A.

SECTIONS LOCATION MAP

Part of EL 209 (Paralana Area 'A')

SCALE : 1 cm. = 50 m.

metres 50 0 50 100 150 200 250 metres

LEGEND

77·53 ⊙ Drill hole (1975)

⊙ 15 Drill hole (209-1 to 209-49, 1976)

⊙ 60 Drill hole (209-55 to 209-65, 1977)

△ Bench mark

66·44 Elevation in metres

∘ Drill site (1976-1977)

30°16'

30°16'

139°35'

139°36'

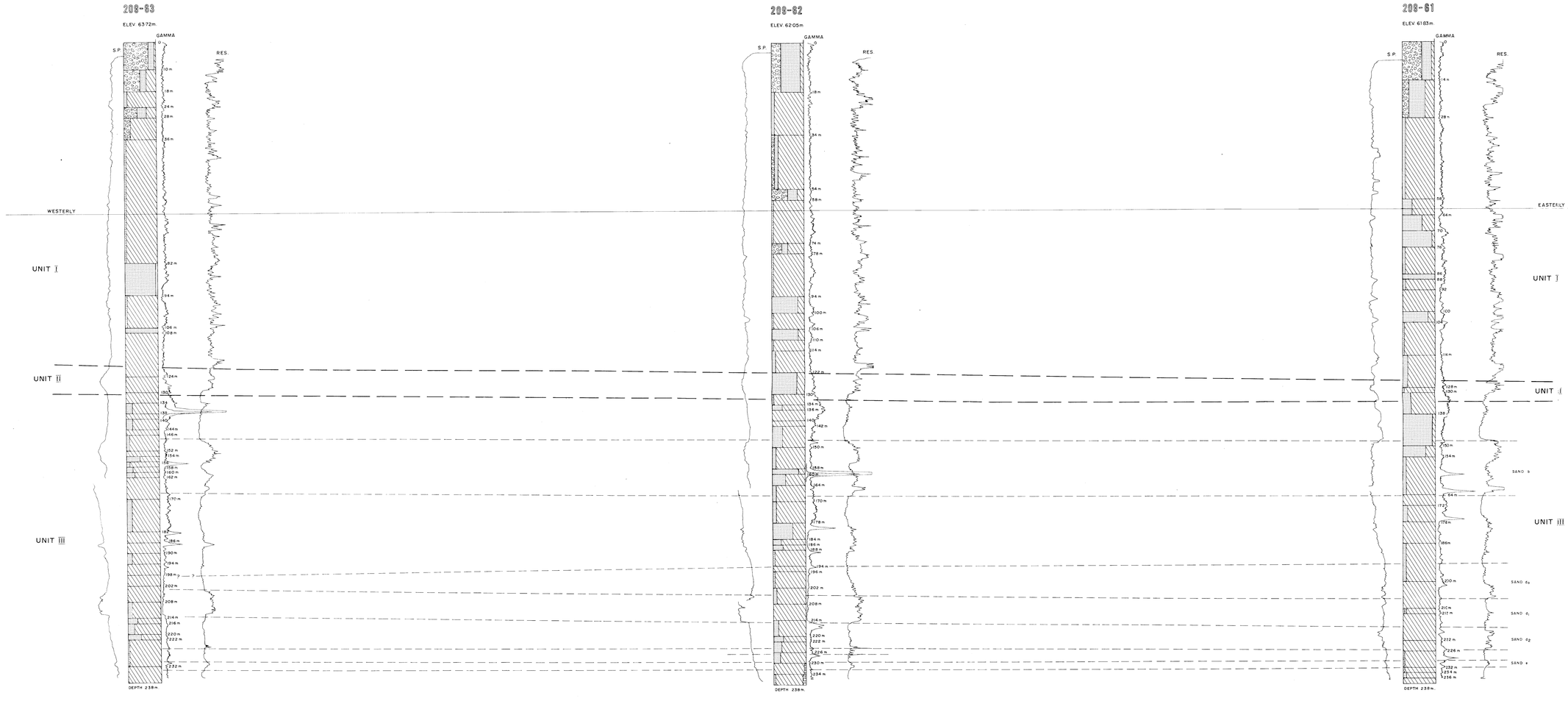
BASED ON T1634

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SECURITY
2608-VI

2608(VI)-14

FIGURE 2·5

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: U1/4-26	
SEPTEMBER 1977	D. M. TAYLOR



LEGEND

- GRAVEL
- SAND
- SILT
- CLAY
- CARBONATE

1977
POONTANA PROJECT

PROGRAMME I
EL-209

PARALANA CREEK AREA A
SECTION 3

SCALES
HORIZONTAL : 1 cm = 5 m.
VERTICAL : 1 cm = 6 m.

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SECURITY
140m

FIGURE 2.3

BP MINERALS AUST PTY LTD	
Area	LAKE FROME
	SOUTH AUSTRALIA
Ref.	U1/4-26
SEPTEMBER 1977	D. M. TAYLOR

2603(VI)-15

T1742

139°35'

139°36'

30°15'

30°15'

77-48 ⊙ 1

•20 ⊙ 2

•20 77-44 ⊙

•20 ⊙ 3

•(20)* ⊙ 22

•27 ⊙ 64

•20 77-50 ⊙

•(25) ⊙ 65

•20 ⊙ 4

•20 ⊙ 10

•22 ⊙ 26

•21 ⊙ 12

•25 ⊙ 27

•20 ⊙ 28

•20 ⊙ 29

•22 ⊙ 21

•(19)* ⊙ 30

•(20)* ⊙ 49

⊙ 48

•(20)* ⊙ 5

•19 ⊙ 6

•23 ⊙ 23

•19 ⊙ 8

•20 ⊙ 24 — 31 (core hole)

•23 25

•(20)* ● 7

•22 ⊙ 13

•20 ⊙ 47

•(24)* ⊙ 19

•(23)* ⊙ 14

•(22)* ⊙ 34

•(21)* ⊙ 33

•(18)* ⊙ 32

•19 ⊙ 20

•20 ⊙ 35

•(22)* ⊙ 60

B.M. No 7120 △

•23 ⊙ 9

•(19)* ⊙ 41

•18 ⊙ 56

•19 ⊙ 57

•21 ⊙ 55

•19 ⊙ 58

•21 ⊙ 59

•19 ⊙ 38

•17 ⊙ 37

•18 ⊙ 36

•19 ⊙ 43

•(19)* ⊙ 39

•22 ⊙ 40

•23 ⊙ 44

•19 ⊙ 18

•18 ⊙ 42

•22 ⊙ 15

•20 77-53 ⊙

•20 ⊙ 11

•22 ⊙ 45

N

•23 77-52 ⊙

⊙ 63

•(26)* ⊙ 62

•24 ⊙ 61

•19 ⊙ 46

•24 ⊙ 16

•23 ⊙ 17

LEGEND

77-53 ⊙ Drill hole (1975)

⊙ 15 Drill hole (209- series, 1976)

•21 ⊙ Vertical distance (metres) above sand
( ) indicates poor sand development
* indicates silt developed

⊙ No radiometric anomaly

● Radiometric anomaly (<100 cps)

▲ Radiometric anomaly (100-200 cps)

■ Radiometric anomaly (>200 cps)

Edge of sand development

? island edge

△ Bench mark

POONTANA PROJECT, LAKE FROME S.A.

LOCATION OF SANDS (HORIZON do)

Part of EL 209 (Paralana Area 'A')

SCALE : 1 cm = 50 m.

metres 50 0 50 100 150 200 250 metres

30°16'

30°16'

139°35'

139°36'

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DEPT. OF MINES
SECURITY
2608

2608(VI)-16

FIGURE 3(c)

BP MINERALS AUST PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: U1/4-26	
SEPTEMBER 1977	D. M. TAYLOR

T 1741

139°35'

139°36'

30°15'

30°16'

77-48

(CHANNEL 3)

channel edge

15m

•(14)*
77-44

sand/silt limit

•(13)*
64

•(9)
77-50

•16
65

15 m

channel edge

•14
2

1

3

22

4

10

26

•13
12

•14
27

•14
28

•14
29

•13
21

•(11)*
30

•(11)
49

48

15m

•17
23

•7
8

•13
24

•16
25

•12
7

•16
13

•14
47

CHANNEL 1

5

6

sand/silt limit

•17
19

•17
14

•14
34

•13
33

•11
32

•(14)*
20

•16
35

9

•(11)*
41

•15
57

•14
55

•16
58

•(13)
38

37

36

43

•11
39

•11
40

•(11)*
44

•(16)*
18

? island

56

59

•16
77-53

•18
15

CHANNEL 2

•(15)
11

•(16)
45

sand/silt limit

46

•(14)*
77-52

•18
63

•15
62

•(13)
61

channel edge

•(16)
16

•16
17

N

B.M. No 7120

POONTANA PROJECT, LAKE FROME S.A.

LOCATION OF CHANNEL SANDS (SUB-MEMBER d1)

Part of EL 209 (Paralana Area 'A')

SCALE : 1cm = 50m.

metres 50 0 50 100 150 200 250 metres

LEGEND

77-53 ⊙	Drill hole (1975)
⊙ 15	Drill hole (209 - series, 1976)
•14 ⊙	Vertical distance (metres) above sand ( ) indicates poor sand development * indicates silt developed
⊙	No radiometric anomaly
●	Radiometric anomaly (<100cps)
▲	Radiometric anomaly (100-200cps)
■	Radiometric anomaly (>200cps)
	Channel edge
	15m contour (within channel)
	Sand/silt limit
△	Bench mark

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SECURITY
2608-VI

2608(VI)-17

FIGURE 3(b)

BP MINERALS AUST PTY LTD	
Area LAKE FROME	
SOUTH AUSTRALIA	
Ref. U1/4-26	
SEPTEMBER 1977	D. M. TAYLOR

T174

139°35'

139°36'

30°15'

30°16'

channel edge
sand/silt limit
(CHANNEL 3)
77-44
77-48
77-50
77-52
77-53
B.M. No. 7120 △
sand/silt limit
5m
channel edge
CHANNEL 1
CHANNEL 2
sand/silt limit
channel edge
5m
channel edge

N

LEGEND

- 77-53 ⊙ — Drill hole (1975)
- ⊙ 15 — Drill hole (209- series, 1976)
- 4 ⊙ — Vertical distance (metres) above sand
  - ( ) indicates poor sand development
  - * indicates silt developed
- ⊙ — No radiometric anomaly
- ● — Radiometric anomaly (<100 cps)
- ▲ — Radiometric anomaly (100-200 cps)
- ■ — Radiometric anomaly (>200 cps)
- Channel edge
- 5m contour (within channel)
- Sand/silt limit
- △ — Bench mark

POONTANA PROJECT, LAKE FROME S.A.

LOCATION OF CHANNEL SANDS (SUB-MEMBER d_2)

Part of EL 209 (Paralana Area 'A')

SCALE : 1 cm = 50 m.

metres 50 0 50 100 150 200 250 metres

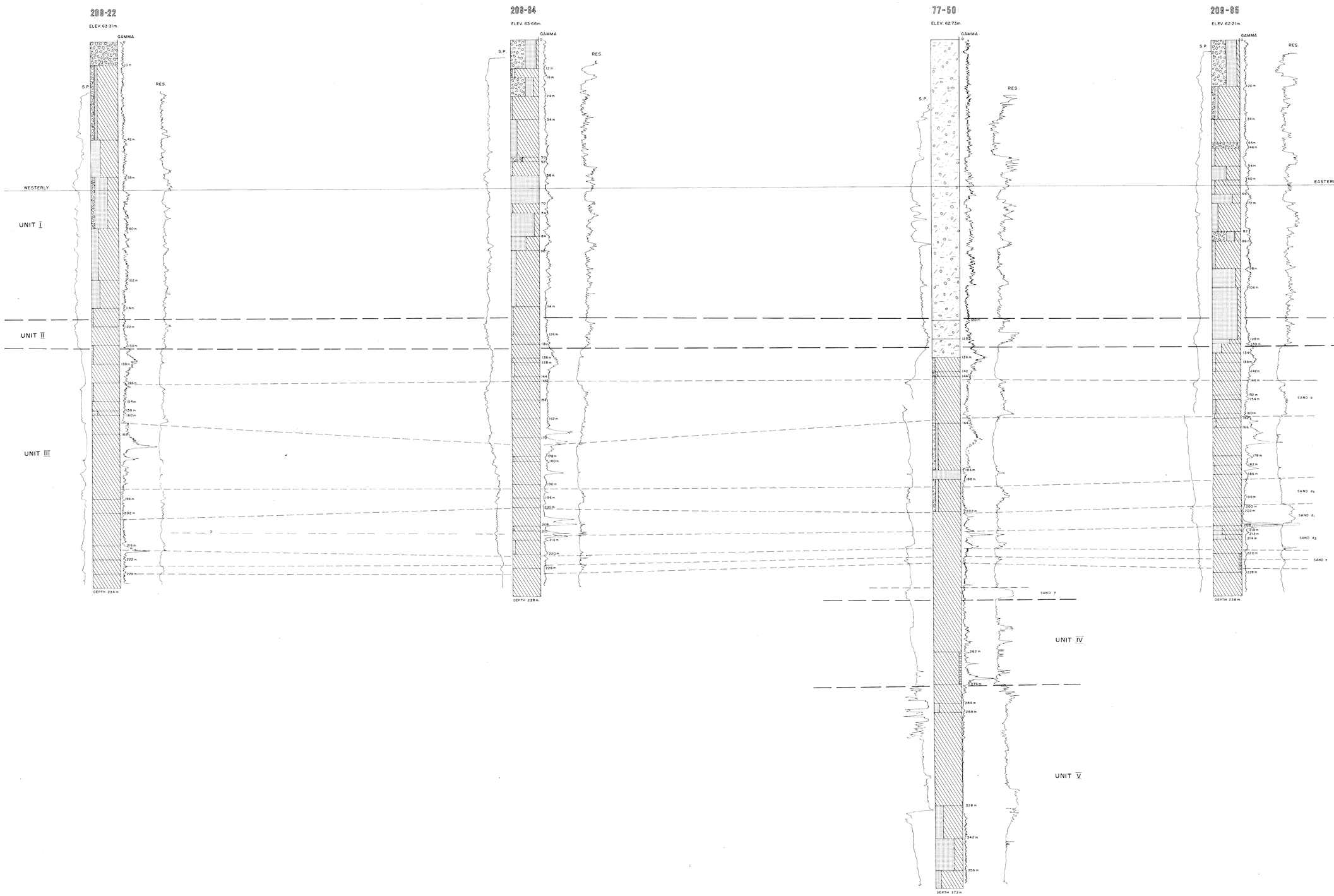
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DEPT. OF MINES
SECURITY
2608-VI

2608(VI)-17A

FIGURE 3(a)

BP MINERALS AUST. PTY LTD	
Area: LAKE FROME	
SOUTH AUSTRALIA	
Ref: U1/4-26	
SEPTEMBER 1977	D. M. TAYLOR

T.1795



LEGEND

- MIXED CLASTICS *
- GRAVEL
- SAND
- SILT
- CLAY
- CARBONATE

* Used for pre 1976 logs only.

1977
POONTANA PROJECT

PROGRAMME I
EL-209

PARALANA CREEK AREA A
SECTION 1

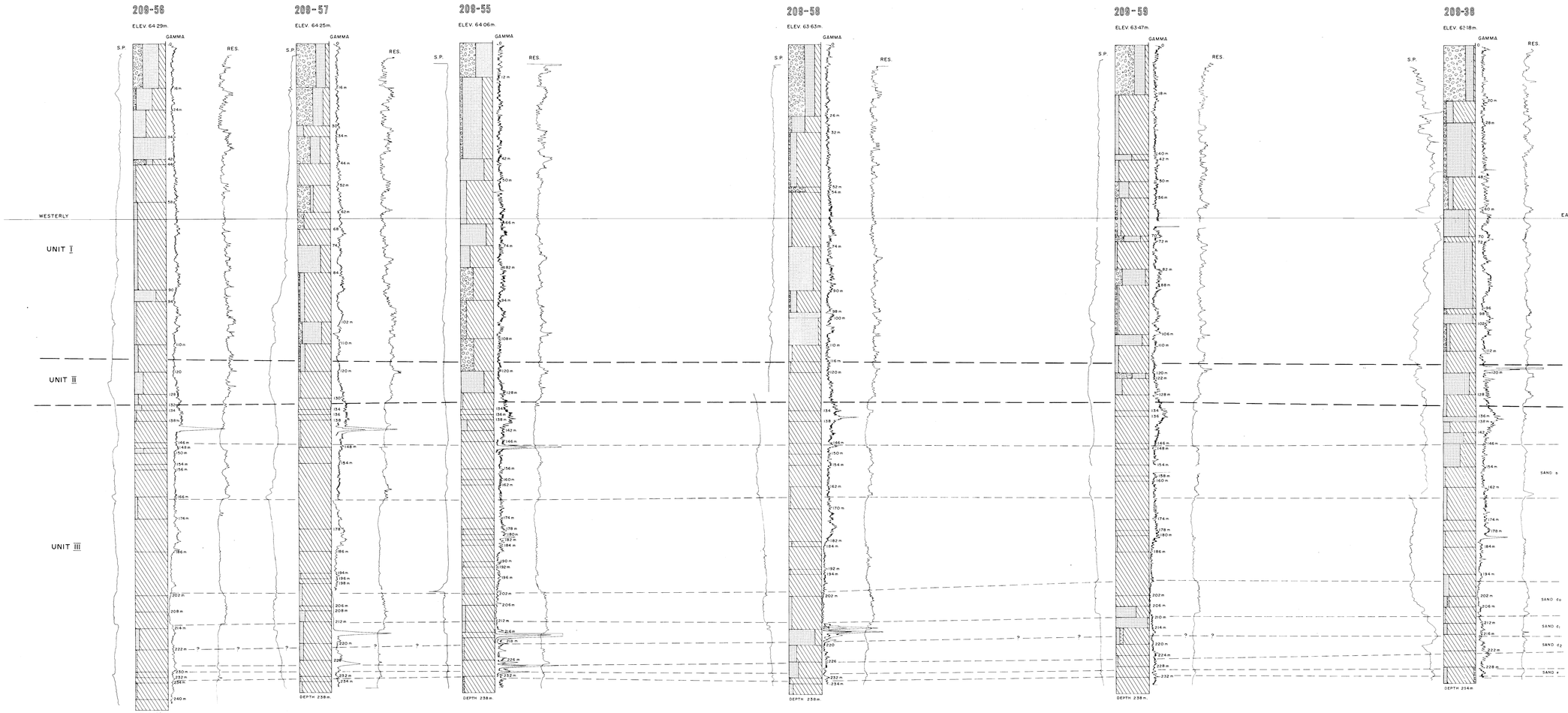
SCALES
HORIZONTAL : 1 cm = 5 m.
VERTICAL : 1 cm = 6m.

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DEPT. OF MINES
SECURITY
SADME

FIGURE 2.1

BP MINERALS AUST. PTY LTD	
Area	LAKE FROME SOUTH AUSTRALIA
Ref.	WHA-26
SEPTEMBER 1977	D. M. TAYLOR

2608(WH)-18



LEGEND

- GRAVEL
- SAND
- SILT
- CLAY
- CARBONATE

1977
POONTANA PROJECT

PROGRAMME I
EL-209

PARALANA CREEK AREA A
SECTION 2

SCALES
HORIZONTAL : 1 cm.= 5 m.
VERTICAL : 1 cm.= 6 m.

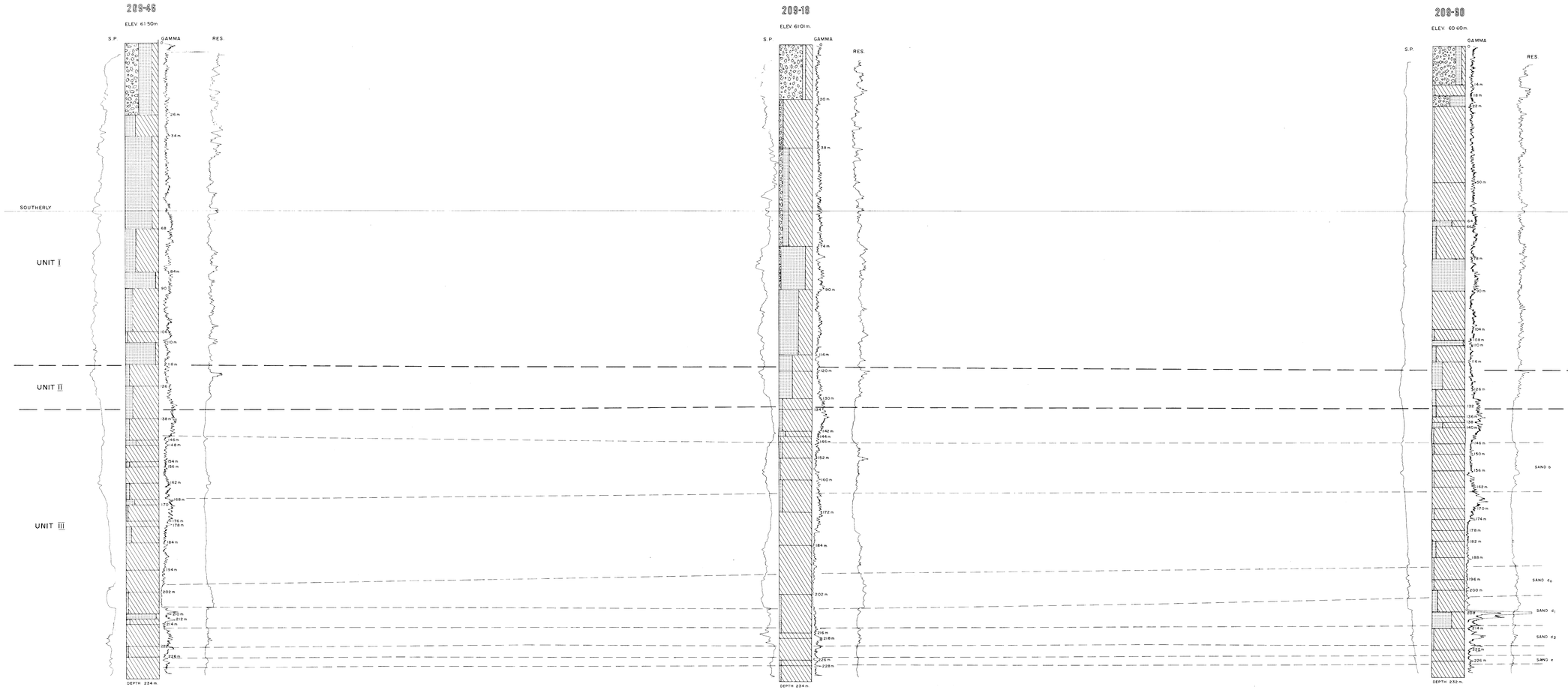
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20 DEC 1977
DEPT. OF MINES
SECURITY

FIGURE 2·2

BP MINERALS AUST PTY LTD	
Area	LAKE FROME
	SOUTH AUSTRALIA
Ref.	1174·26
SEPTEMBER 1977	D. W. TAYLOR

2608(VII)-19

T 1796



LEGEND

- GRAVEL
- SAND
- SILT
- CLAY
- CARBONATE

1977

POONTANA PROJECT

PROGRAMME I

EL-208

PARALANA CREEK AREA A

SECTION 4

SCALES

HORIZONTAL : 1 cm = 5 m.

VERTICAL : 1 cm = 6 m.

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SECURITY
ADELAIDE

FIGURE 2·4

BP MINERALS AUST PTY LTD	
Area	LAKE FROME
	SOUTH AUSTRALIA
Ref.	1/74 - 26
SEPTEMBER 1977	D. M. TAYLOR

2608(III)-20

A total of eighteen holes have now located uranium mineralisation, with radiometric grades exceeding 1 kg eU_3O_8/tonne, within Sand Member d in Area "A" and two holes drilled in Area "B" have located similar mineralisation within two different horizons (Sand Member b and c equivalents). This drilling confirms that the area underlain by EL 209 is one of excellent potential for the location of sedimentary uranium ore deposits.

4. RECOMMENDATIONS

The recommendations made in a previous report (Taylor, 1977 (b)) for additional drilling are reproduced here with minor changes.

I. Paralana Creek Area "A"

While the drilling in this area failed to significantly extend the known area of mineralisation it indicated that the palaeo-channels outlined in a previous report extend outside of the area tested so far. Wherever these channels occur there is a good chance of finding uranium mineralisation. Future work in this area should be undertaken as follows:-

(a) The "pod(s)" of uranium ore around holes 209-8, 24, 29, 31 etc. should be outlined in detail by close-spaced drilling. This would enable a reserve figure to be calculated and would give some indication of the geometry that could be expected for such bodies. It would also indicate the true trend of the ore in the event that it passes between two of the more widely spaced holes, for example between 209-6 and 209-14 with no expression in their logs.
~~with no expression in their logs.~~

(b) Drilling should be extended to the east with holes drilled to follow the predicted north-easterly extensions of channels 1 and 2 of Figure 3 (b) with a limited "in fill" drilling in the area between these two channels. A small number of holes could be drilled immediately to the south of the area (possibly at 200 m spacing due south of 209-61) to test the possibility of an extension of the paleo-channels in this direction and the significance of the radiometric anomalies detected at shallower depths in the southern line of drill holes.

(c) A line of holes should be drilled between Area "A" and Area "B" possibly at 400 m spacing. The ground between the two areas has not yet been tested and it is highly probable that other mineralised areas would be located.

II.) Paralana Creek Area "B"

The two holes drilled in this area during this programme upgraded the potential of the area. Further drilling should initially be undertaken on a close spaced grid around holes 209-52 and 209-66 to outline the style and extent of the mineralisation intercepted around 180 m. This would be followed by a series of more widely spaced holes to test the significance of the many anomalies detected in the few holes drilled in this area, in particular those anomalies occurring between 150 m and 160 m that appear in all holes.

III.) General

Large areas of Exploration Licence 209 remain to be tested, especially to the depth at which mineralisation has been intersected during the 1976/1977 drilling programmes. It has been illustrated that the area covered by this licence is one of great potential and, following a review of all available data, a regional survey should be undertaken to locate additional mineralised palaeo-channels.

REFERENCES

TAYLOR, D.M., 1976 : " 1976 Coring Programme, E.L. 209, Lake Frome Embayment, South Australia " - BP Minerals Australia Pty Ltd.

TAYLOR, D.M., 1977(a) : " 1976 Drilling Programme No. 2, EL 209, Lake Frome Embayment, South Australia.'- Second Report".- BP Minerals Australia Pty Ltd.

TAYLOR, D.M., 1977(b) : " 1977 Drilling Programme No. 1, EL 209, Lake Frome Embayment, South Australia. - First Report".- BP Minerals Australia Pty Ltd.

T A B L E I

DETAILS OF SUBDIVISIONS OF SAND MEMBER d

HOLE NO.	SUB-MEMBER do		SUB-MEMBER d_1		SUB-MEMBER d_2	
	tm	γ	tm	γ	tm	γ
209-55	21	0	14	3	3	3
209-56	18	0	-	0	-	0
209-57	19	0	15	2	(3)	1
209-58	19	0	16	3	-	0
209-59	21	0	-	0	(5)*	0
209-60	(22)*	0	17	3	(4)*	1
209-61	24	0	(13)	0	4	0
209-62	(26)*	0	15	0	(3)	1
209-63	-	0	18	0	(6)	0
209-64	27	0	(13)*	2	(4)	0
209-65	(25)	0	16	3	(4)	0

KEY :

tm = thickness from base of lowest sand within the horizon to the top of sand e.
(Values in brackets indicate poor sand development)
(* Indicates silt development)

γ = gamma anomalies

0 : no anomaly
1 : above background (<100 cps)
2 : > 100 - 200 cps
3 : > 200 cps.