GFE Resources Ltd

WELL COMPLETION REPORT

LANGLEY-1

PPL 1

OTWAY BASIN, VICTORIA

compiled by

Kevin Lanigan

January, 1996

VOLUME 1

TEXT & APPENDICES 1-4

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GFE RESOURCES LTD

PPL1

OTWAY BASIN, VICTORIA

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submitted

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VOLUME 4

WELL SEISMIC PROCESSING REPORT

SUMMARY

WELL DATA SUMMARY

LANGLEY-1

Permit:	PPL1 Otway Basin, Victoria
Lat./Long.:	38° 35' 51.089"S / 142° 56' 10.625"E
AMG:	668619.8mE 5726092.3mN
Seismic:	Waarre 3-D In-line 7875 Cross-line 4660
Elevation:	Ground Level: 64.0m AHD
	Kelly Bushing (well datum): 69.7m AHD
Total Depth:	Driller 2006.0mKB
	Logger 2007.0mKB
Rig:	Century Rig 11

Pre-drill Status:	**Exploration Well**
Post-drill Status:	**Plugged and Abandoned**
Participants:	**GFE Resources Ltd (Operator)** **100%**
Spud Date:	**1330hrs, 12 May, 1994**
TD Reached:	**2100hrs, 2 June, 1994**
Rig Released:	**0830hrs, 9 June, 1994**

Engineering

Hole Size

12¼" to 340mKB
8½" to 2006mKB

Casing

16" Conductor to 12mGL (pre spud)
$9^5/_8$" 36lb/ft STC K55 R3 to 334.43mKB

Plugs

1. 1880-1820m (not tested)
2. 1760-1700m (not tested)
3. 940-880m (not tested)
4. 366-306m (tagged at 309m)
5. Surface (≈30 sacks)

Stratigraphy

Group	Formation/Unit	Depth (mKB)	Depth (mSS)	Thickness (m)	Two-Way Time (milliseconds)	High/Low to Prognosis: Depth	High/Low to Prognosis: Time
Heytesbury	Port Campbell Limestone	5.7	+64.0	103.3			
	Gellibrand Marl	109.0	-39.3	301.0	*43*		
	Clifton Formation	410.0	-340.3	10.8	*368.9*	24m Low	
Nirranda	Narrawaturk Marl	420.8	-351.1	84.2	*376.7*	7.2m High	
	Mepunga Formation	505.0	-435.3	50.0	*458.4*	18m High	*6.6ms High*
Wangerrip	Dilwyn Formation	555.0	-485.3	235.4	*504.6*	16m High	*5.6ms Low*
	Pember Mudstone	790.4	-720.7	51.6	*682.3*	12.6m High	
	Pebble Point Formation	842.0	-772.3	55.2	*720.0*	3m High	*11ms Low*
?	"K-T" Shale	897.2	-827.5	19.8	*755.5*		
Sherbrook	Paaratte Formation	917.0	-847.3	427.0	*769.2*	14m High	*9.2ms Low*
	Skull Creek Mudstone	1344.0	-1274.3	173.0	*1063.0*	50m High	*19ms High*
	Nullawarre Greensand (equiv.)	1517.0	-1447.3	38.8	*1174.2*	26m Low	*42.2ms Low*
	Belfast Mudstone	1555.8	-1486.1	160.0	*1198.5*	9.2m High	*15.5ms Low*
	Waarre Formation Unit D	1715.8	-1646.1	14.6	*1304.7*		
	Unit C	1730.4	-1660.7	40.4	*1312.8*	9.4m Low	*34.8ms Low*
	Unit B	1770.8	-1701.1	31.7	*1337.5*		
	Unit A	1802.5	-1732.8	23.5	*1353.5*		
Otway	Eumeralla Formation	1826.0	-1756.3	181.0+	*1366.1*	17m Low	*14.1ms Low*
	Total Depth (logger)	2007.0	-1937.3				

Key Hydrocarbon Indications

Nullawarre Greensand: gas (C_1-C_2) readings of 2 - 3 units, very patchy pinpoint very dull white fluorescence in SWC.

Waarre Formation Unit C: gas (C_1-C_4) readings up to 20.5 units, patchy to common dull white and yellow-orange fluorescence in SWC's.

Waarre Formation Units A & B: gas (C_1-C_4) readings up to 21 units, trace to sparse pinpoint dull yellow fluorescence in SWC's.

Eumeralla Formation: gas (C_1-C_4) readings mostly 2 - 5 units with peaks up to 87 units (especially from 1887 to 1907m), trace to sparse pinpoint dull yellow fluorescence in two SWC's.

Logging

DLL-MSFL-GR-SP-Cal: 2002.5 - 312.0m (GR to surface)
BHC-GR-Cal: 2002.5 - 312.0m
LDL-CNL-GR-Cal: 2006.0 - 1360.0m
SHDT-GR (Dipmeter): 2006.5 - 1432.0m
RFT-GR: 1920 - 1731.5m (27 pre-tests - 13 good, no samples taken)
WST-A (Checkshots): 2005.0 - 350.0m (20 levels)
CST-GR (Sidewall cores): 1990 - 836 (Shot 60, Recovered 53)
Processed: Array Sonic 1340 - 2000m Mean Square Dip 1430 - 2003m

Coring

Core #1

Cut: 19m (1745 - 1764m driller)
Recovered: 15.94m (83.9%)

Formation Tests

DST-1: 1715.22-1745m — Conventional bottom-hole test. Total flow time 67 minutes. GTS in 3½ minutes into Main Flow. Final Flow 4.7 mmcfd (two thirds CO_2). Recovered 1.2 bbls mud.

DST-2: 1875-1910m — Closed chamber bottom-hole test. Misrun. Tool did not open properly on Pre-Flow and packer seat failed on Main Flow opening. Recovered 10 bbls mud, partly gas cut.

DST-3: 1883.07-1909.13m — Closed chamber inflate straddle test. Closed-in surface pressure rose 16.4 psig in Pre-Flow (7 mins.) and 24.8 psig in Main Flow (80 mins.). Final flow rate estimated 8 - 10 mcfd (no CO_2). Recovered 2.2 bbls mud.

INTRODUCTION

1. INTRODUCTION

The Langley-1 exploration well is located in the south of Petroleum Production Licence One (PPL1), approximately 7.5 kilometres northwest of Port Campbell and 1.8 kilometres southwest of the Grumby-1 gas discovery (Figure 1). The prospect was delineated and the well location pin-pointed as a result of the 1993 Waarre 3D Seismic Survey, the first onshore 3D seismic survey acquired in Victoria.

Commercial gas was first discovered in the Port Campbell area in 1979 (North Paaratte-1) and subsequent drilling has resulted in delineation of the the North Paaratte field and discovery of the Wallaby Creek and Grumby gas fields in what is now PPL1 and the Iona gas field in the adjacent PPL2.

The Langley structure is an elongate tilted fault block (ENE-WSW) with crests at either end. The western crest, the site of Langley-1, is fault bounded to the southeast and southwest with no fault independent closure. The main objective, the Waarre Formation, is interpreted to be juxtaposed against the Belfast Mudstone in hanging wall block and, therefore, laterally sealed to the south. The eastern crest is down thrown relative to the northern bounding fault and therefore perceived as having a higher associated lateral seal risk.

A bright amplitude anomaly is apparent on seismic data associated with the Waarre Formation over the western crest, possibly indicating the presence of gas. The main risk associated with this prospect was the presence of CO_2. Hydrocarbon charge was not considered a high risk due to the abundant intersections of both gas and oil in the region. Reservoir quality was also considered low risk based on the intersection at Grumby-1, where the Waarre Formation is at a similar depth and thickness. The Belfast Mudstone was interpreted to provide an excellent seal, as indicated by nearby discoveries reservoired in the Waarre Formation.

In the pre-drill interpretation the closing contour for the Langley structure at top Waarre Formation Unit C level was interpreted to be in the range 1680 - 1690 metres SubSea, with areal closure ranging 0.46 - 1.68 square kilometres, and possible recoverable reserves of between 6.3 and 23 BCF.

PE906683

This is an enclosure indicator page.
The enclosure PE906683 is enclosed within the container PE900949 at this location in this document.

The enclosure PE906683 has the following characteristics:

ITEM_BARCODE	= PE906683
CONTAINER_BARCODE	= PE900949
NAME	= Location Map
BASIN	= OTWAY
PERMIT	= PPL1
TYPE	= GENERAL
SUBTYPE	= MAP
DESCRIPTION	= Location Map, Figure 1(enclosure from WCR vol.1) showing Langley-1
REMARKS	=
DATE_CREATED	=
DATE_RECEIVED	= 31/01/96
W_NO	= W1099
WELL_NAME	= LANGLEY-1
CONTRACTOR	=
CLIENT_OP_CO	= GFE RESOURCES LTD

(Inserted by DNRE - Vic Govt Mines Dept)

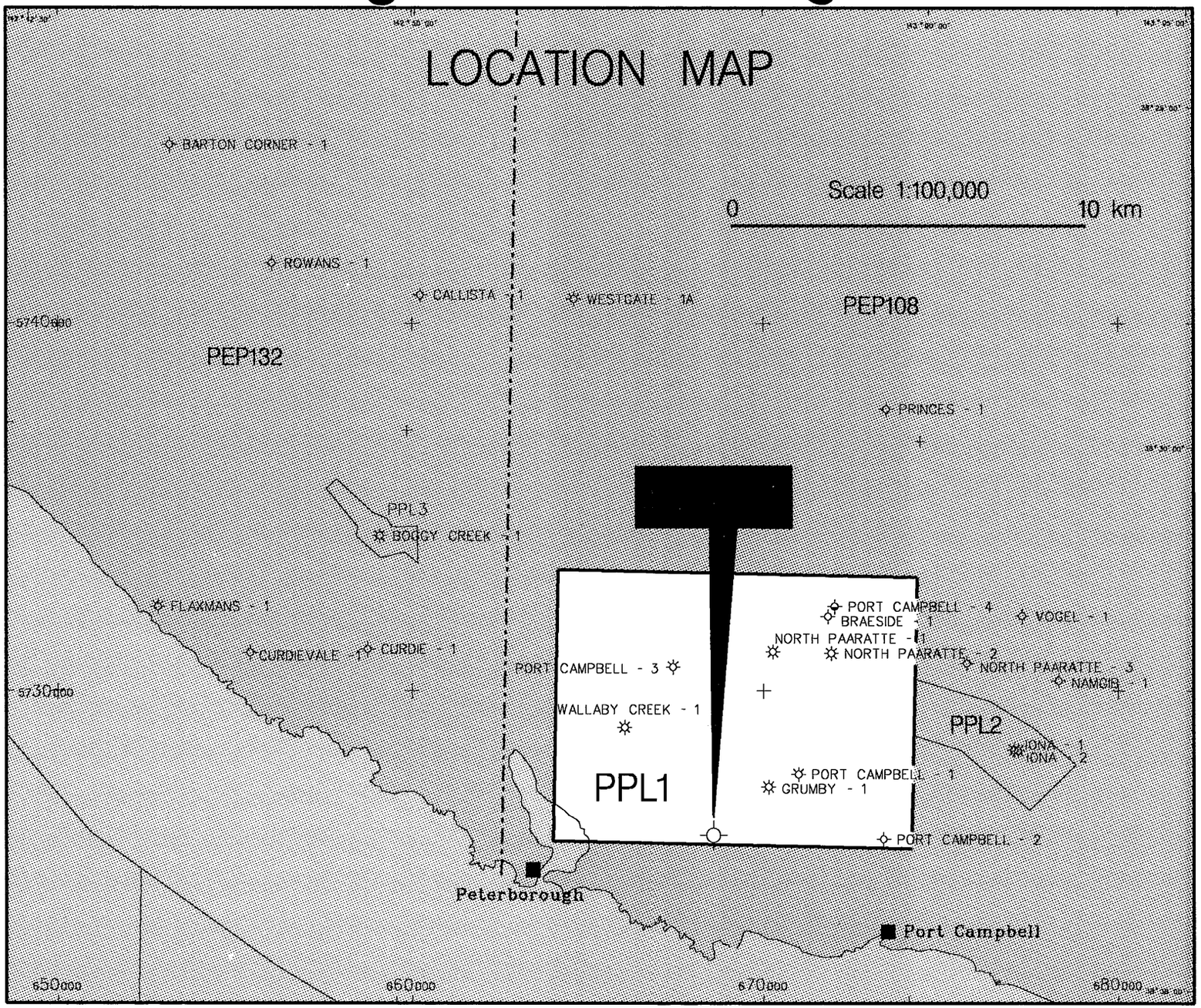

FIGURE 1

WELL HISTORY

WELL HISTORY

2. WELL HISTORY

2.1 LOCATION

Surface Location:	Latitude:	38° 35' 51.089"S
	Longitude:	142° 56' 10.625"E
	AMG:	668619.8mE
		5726092.3mN
Seismic:	Waarre 3D	In-line 7875
		Cross-line 4660
Property Title:	County:	Heytesbury
	Parish:	Paaratte
	Section:	6
	Allotment:	15
Property Owner:	M.J. & T.M. Smith	

2.2. GENERAL DATA

Well Name:	Langley-1
Permit:	PPL1 Otway Basin, Victoria
Operator:	GFE Resources Ltd Level 6, 6 Riverside Quay South Melbourne Victoria 3205
Participants:	GFE Resources Ltd 100%
Elevation:	Ground Level (GL): 64m AHD* Kelly Bushing (KB): 69.7m AHD* *(datum)* * AHD = Australian Height Datum *(All depths are Drilled/Measured Depths relative to KB unless otherwise stated)*
Total Depth:	Driller: 2006.0mKB Logger: 2007.0mKB

Drilling Commenced:	1330 hours, 12 May, 1994
Total Depth Reached:	2100 hours, 2 June, 1994
Rig Released:	0830 hours, 9 June, 1994
Well Status:	Plugged and Abandoned

2.3. DRILLING DATA

2.3.1 Drilling Contractor

Century Drilling Limited

2.3.2 Drilling Rig

Century Rig 11 (see Appendix 1)

2.3.3 Casing and Cementing Details

A 16" Conductor pipe was cemented at 12mGL prior to rig up.

Surface Casing

Size:	$9^5/_8$"
Weight & Grade:	36 lb/ft STC K55 R3 (29 Joints)
Centralizers:	331m, 311m, 299m and 288m
Float Collar:	322.6m
Shoe:	334.43m
Hole Depth:	340m
Cement:	520 sacks Class "A" neat cement
Method:	Single plug displacement (top plug only)
Equipment:	Dowell Schlumberger

Cement plugs

Plug No.1	Interval:	1880-1820m
	Cement:	84 sacks class "A" cement
	Method:	Balanced
	Tested:	No
Plug No.2	Interval:	1760-1700m
	Cement:	87 sacks class "A" cement
	Method:	Balanced
	Tested:	No
Plug No.3	Interval:	940-880m
	Cement:	84 sacks class "A" cement
	Method:	Balanced
	Tested:	No
Plug No.4	Interval:	366-306m
	Cement:	84 sacks class "A" cement
	Method:	Balanced
	Tested:	Yes (tagged at 309m)
Surface Plug	30 sacks class "A" cement	

2.3.4 Drilling Fluid

The drilling fluid program was designed and recommended by Baroid after consultation with GFE representatives. Details of the mud system and assessment of its performance is contained in the Drilling Fluid Recap (Appendix 2).

2.3.5 Drilling Bits

Six drilling bits were used during the drilling of Langley-1, and a record of their pertinent details is shown in Table 1.

2.3.6 Water Supply

Water for the drilling operations was obtained from an existing dam down hill from the lease and stored in a pit dug near the wellsite.

TABLE 1

BIT RECORD

Contractor: Century Drilling **GFE Representative:** Ken Smith **Rig:** # 11
State: Victoria **Permit:** PPL1 **Well:** Langley-1
Spud: 12/5/94 **Reached T.D.:** 2/6/94

No.	Size	Make	Type	IADC Code	Serial	Depth Out (m)	Metres Drilled	Hours	Av. Rate (m/hr)	Accum Drlg Hours	Wt. on 000 lbs	RPM	Vert Dev. (°)	Pump Press. (psi)	Jets	GPM	Mud			Dull. Cond.			Remarks
																	WT	VIS	WL	T	B	G	
1RR	12¼"	Sec.	S33SF	1.1.6	629176	340	340	12.5	27.2	12.5	10-15	110	0.75	450	3x20	450	8.7	45	N/C	2	2	<1/8	12¼ T.D.
2	8½"	Varel	ETD417	4.1.7	88737	1257	917	47	19.5	69.5	5-20	90-110	1.25	1000	1x11 2x13	300	8.9	40	12	1	1	<1/16	Retrieve survey & bit check
	One insert missing in heel or gauge row of lead and third cone - missing, not broken.																						
2RR	8½"	Varel	ETD417	4.1.7	88737	1363	106 **1023***	19 **66***	5.5	88.5	5-20	90-120	2	-	2x13 1x11	300	9.0	38	8.5	2	6	<1/16	
	All bearings indicated wear of around 7 although seal "drag" still appears to be evident. Lead cone: 3 inserts missing in second row and 1 missing in heel or gauge row. Second cone: 1 insert chipped in nose row, 1 chipped in second row and 4 missing. Third cone: 1 insert chipped in nose row, 1 missing in gauge row and 1 missing in middle row. Several inserts have turned up to 90° in cone shells. T.B.G. grading disregards missing inserts.																						
3	8½"	Sec.	S82F	4.3.7	630591	1438	75	14.5	5.1	103	5-25	80-100	-	1100	2x13 1x11	300	9.0	46	7.5	1	1	In	
	Bit pulled after being stuck in hole. Bit was changed because down-jarring had been done on it and it was not possible to say of this would have had an effect on its future life.																						
4	8½"	Sec.	S82F	4.3.7	627533	1732	394	57	6.9	160	15-20	90-110	1.5	1150-850	2x13 1x11	300-250	9.3	40	-	2	3	In	String torque at top Waarre
5	8½"	Sec.	S86F	5.3.7	385911	1745	13	1.5	9	161.5	15-20	85	1.75	850	2x13 1x11	250	9.3	50	6.8	1	1	In	DST #1
5RR	8½"	Sec.	S86F	5.3.7	385911	1910	146 **159***	41.5 **43***	3.6	203	25	60-100	0.75	1125	2x13 1x11	300	9.3	46	7.0	2	2	In	DST #2
6	8½"	Varel	ETD417	4.1.7	88735	2006	96 **478***	20.5 **52***	4.68	223.5	18	60-100	1.0	1100	3x13	300	9.3			2	4	<1/16	T.D.
	* *Totals for run and re-run of same bit*																						

2.3.7 Drilling History

A detailed account of the drilling of Langley-1 is provided by the compilation of daily drilling operations reports in Appendix 3, which is also summarized graphically in Figure 2.

2.4 FORMATION SAMPLING AND TESTING

2.4.1 Cuttings

No cutting samples were collected from surface to 110 metres. Cutting samples were then collected at ten-metre intervals from 110 to 340 metres ($9^5/_8$" casing depth) and thereafter at 2.5-metre intervals to total depth. Each sample was washed and air dried and divided into four splits, three of which were stored in labelled plastic bags and the fourth in "Samplex" trays.

Additionally, one set of 500 gram unwashed samples were collected at ten-metre intervals from 340 metres to total depth and stored in labelled cloth bags. All samples were retained by the operator, except for one set of washed and dried cuttings which were sent to the DEM (Petroleum Division) core store.

Lithological descriptions of cuttings by the wellsite geologist during the drilling of Langley-1 are compiled in Appendix 4A, along with a compilation of the lithological descriptions from daily reports issued during the drilling of the well in Appendix 4B.

2.4.2 Cores

2.4.2.1 Conventional Core

One conventional core was cut in Langley-1 (by Australian DST Co.) over the interval 1745-1760m (driller's depth) within the Waarre Formation Unit C following a drill stem test (DST-1).

The core was cut without a sleeve and the barrel was emptied on the

GFE Resources Ltd

LANGLEY-1 DRILLING CURVE

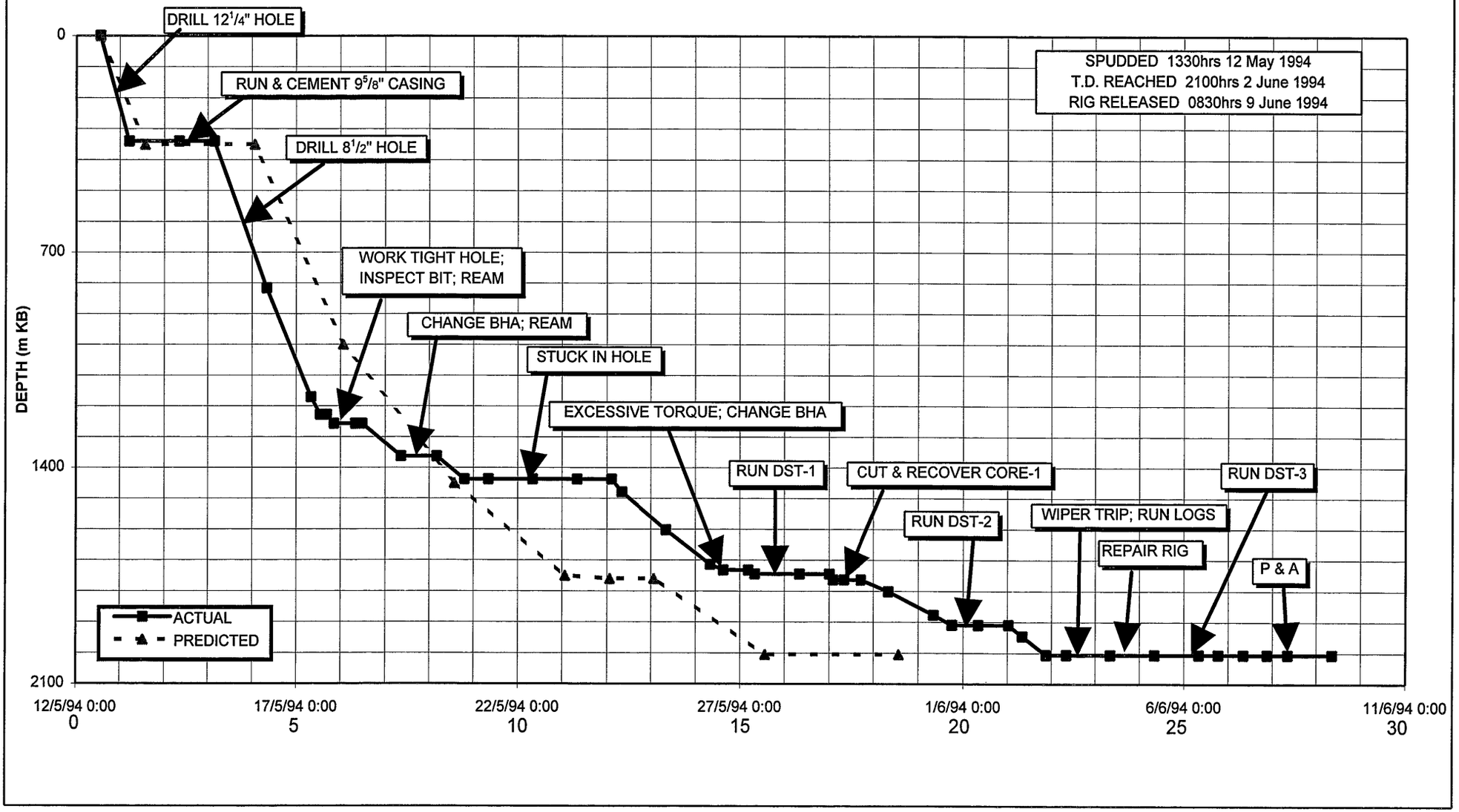

FIGURE 2

drilling floor, with the recovered core then laid out on the pipe racks where it was cleaned, measured, examined and briefly described (Appendix 5A) before being packaged and despatched to the laboratory. Of the 19.0 metres cut 15.94 metres (83.9%) was recovered. No scent or trace of hydrocarbons was detected in the core, despite chips being taken at regular intervals and inspected under UV light. As a routine measure selected samples were wrapped in foil and 'seal peeled' to help preserve them for possible future work.

Upon arrival at ACS Laboratories (Adelaide) the core was reassembled, a core gamma log was recorded and plugs were cut for porosity/permeabililty analyses (Appendix 5C). The core was then slabbed $^1/_3$-$^2/_3$ for photography (Appendix 5B). The $^1/_3$ portion was sent to the DEM (Petroleum Division) core store and the $^2/_3$ portion was retained by the GFE Resources Ltd.

Subsequent comparison of the core gamma log, core photographs and the down-hole wireline gamma ray log suggests a depth correction is necessary to match the observed sharp sandstone-mudstone contacts, such that a given point on the core log is about 0.25m higher than on the core photos, and about 1.85m higher than on the down-hole log. Thus, to match core plugs to their equivalent position on down-hole logs it is recommended that 1.6m be added to the depths reported from the laboratory.

Selected core plugs were subsequently sent for special core analysis (SCAL) a report of which is contained in Appendix 5D.

2.4.2.2 Sidewall Cores

A total of 60 sidewall cores were attempted (Enclosure 9), of which 53 were recovered.

All recovered sidewall core samples were checked for lithology and hydrocarbon shows and then stored in sealed glass jars. Descriptions of the sidewall cores are contained in Appendix 6 and a summary of subsequent analyses is given in Section 2.4.4.

2.4.3 Testing

2.4.3.1 Drill Stem Testing

Three Drill Stem Tests (DSTs) were run in Langley-1 using Australian DST Co. Data for these tests is included in Appendix 7.

DST-1 1717.22 - 1745 mKB

DST-1 (Appendix 7A) was a conventional bottom-hole test conducted to evaluate the top of the Waarre Formation Unit C, in which a 5-10 fold drilling break and mud gas readings of up to 19 units were recorded (over a background of 1.5-2 units). After an eight-minute Pre-Flow and 47-minute Initial Shut-In, the well was flowed for an hour and achieved a stabilised flow of non-combustible gas (dominantly CO_2) at an estimated rate of 4.7mmcfd through a $^3/_4$" down-hole choke and ½" surface choke. Subsequent analyses of the gas sampled during this test (Table 2) indicated that it was two-thirds carbon dioxide.

DST-2 1875 - 1910 mKB

DST-2 (Appendix 7B) was a conventional bottom-hole test conducted to evaluate gas shows at the top of an intra-Eumeralla Formation sand interval in which ROP and mud gas readings increased substantially. After a nearly seven-minute Pre-Flow and 63-minute Initial Shut-In, the well was flowed for just over 14 minutes in the Main Flow before the packer seat failed and the test was aborted.

DST-3 1883.07 - 1909.13 mKB

DST-3 (Appendix 7C) was an inflate straddle test conducted after wireline logging to evaluate the intra-Eumeralla Formation sand interval which DST-2 had sought to test. Due to the expectation that the interval would comprise tight formation this test was conducted as a Closed Chamber DST.

TABLE 2

DRILL STEM TEST GAS ANALYSES

	DST-1		*DST-3*
	amdel	*GFCV*	*GFCV*
Component	***Mole Percent Concentration***	***Mole Percent Concentration***	***Mole Percent Concentration***
Methane	**31.26**	**30.6**	**87.1**
Ethane	**0.98**	**0.907**	**4.18**
Propane	**0.35**	**0.313**	**1.73**
Iso-Butane	**0.06**	**0.061**	**0.405**
Normal-Butane	**0.08**	**0.073**	**0.472**
Neo-Pentane	-	**0.001**	**0.009**
Iso-Pentane	**0.03**	**0.027**	**0.179**
Normal-Pentane	**0.02**	**0.022**	**0.147**
Hexanes	**0.04**	**0.056**	**0.215**
Heptanes+	**0.08**	**0.116**	**0.241**
Carbon Dioxide	**66.05**	**66.7**	**0.245**
Oxygen + Argon	-	**0.010**	} **5.1**
Nitrogen	**1.05**	**1.08**	
Helium	-	**0.023**	**0.017**
Total	**100.00**	**99.989**	**100.040**

Calculated Properties for the dry gas at M.S.C.			
Gross Heating Value	**13.25 MJ/m^3**	**13.0 MJ/m^3**	**39.75 MJ/m^3**
Wobbe Index	**11.95 MJ/m^3**	**11.8 MJ/m^3**	**49.40 MJ/m^3**
Relative Density	**1.211**	**1.22**	**0.647**

full reports in Appendix 7

After a seven-minute Pre-Flow (in which the closed-in surface pressure rose by 16.4psi) and a 72-minute Initial Shut-In, the well was flowed for 80 minutes and achieved a closed-in surface pressure increase of 24.8psi. This rise was due to an influx of gas at an estimated rate of 8-10mcfd through a $^3/_4$" down-hole choke.

Subsequent analysis of the gas sampled during this test (Table 2) indicated that it was relatively dry hydrocarbon gas, devoid of carbon dioxide. (Note: the CO_2, N_2 and O_2 detected is attributed to air in the pipe at the start of the test).

The Main Flow was stopped due to the gradually declining rate of gas influx and, after a 157-minute Final Shut-In, the test was terminated and the tool pulled from the hole. Liquid recovery above the shut-in tool comprised 2.2bbls of mud with no indication of liquid hydrocarbons.

2.4.3.2 Wireline Formation Testing

Repeat Formation Tester (RFT) pressure readings were carried out at 27 points spanning the Waarre and Eumeralla Formations (Enclosure 7). Thirteen good tests were obtained, all within the Waarre Formation, and a plot of pressures recorded at these points (Figure 3) indicates a Gas/Water Contact around 1755.7mKB. Sample chambers were run on the RFT tool, but no samples were attempted.

2.4.4 Sample Analyses

Laboratory work on Core #1 comprised a core gamma log and colour white-light photography. All plugs cut from Core #1 were subjected to routine core analysis (porosity, permeability and grain density) and a subset of these were then selected for special core analysis (formation factor, resistivity index and trapped gas saturation).

In addition to the above, analysis of selected cuttings, sidewall core and core samples from Langley-1 comprised organic geochemistry, palynology and petrography. Table 3 lists the analyses performed on each sample (excluding work on the core plugs), details of which can be found in the appropriate Section/Appendix.

Core Analysis	see Section 2.4.2.1	and Appendix 5
Petrography	see Section 3.2	and Appendix 9
Geochemistry	see Section 3.4	and Appendix 10
Palynology	see Section 3.5	and Appendix 11

LANGLEY #1 RFT PRESSURES

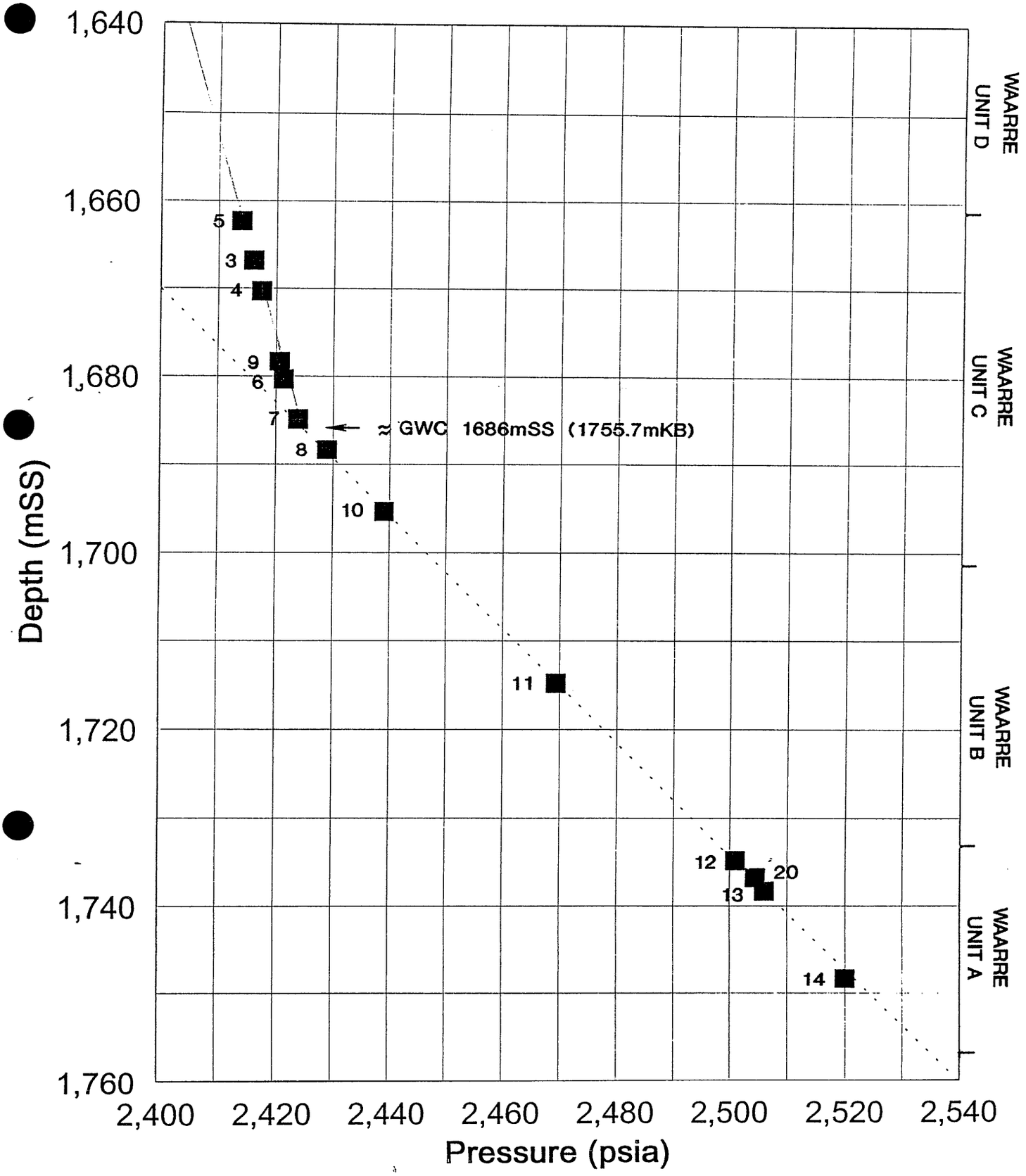

FIGURE 3

TABLE 3

SIDEWALL CORES AND CUTTINGS ANALYSES

Sample	Depth (mKB)	SWC Recovery (mm)	Palynology	Geochemistry	TOC	Rock-Eval	Petrography
SWC#59	895.0	40	✓				
SWC#58	916.0	50	✓				
SWC#56	1291.0	15	✓	✓			
SWC#55	1325.0	45	✓				
SWC#52	1516.0	35	✓				
SWC#51	1518.5	12		✓			
SWC#50	1522.0	25					✓
SWC#49	1541.0	30	✓				
SWC#48	1579.0	50	✓				
SWC#47	1634.0	30	✓				
SWC#46	1677.0	35	✓				
SWC#45	1692.0	50	✓				
SWC#44	1701.0	47	✓				
SWC#43	1712.5	40	✓				
SWC#42	1718.0	35	✓				
SWC#41	1728.0	40	✓				
SWC#40	1729.5	45	✓				
SWC#39	1732.0	25		✓			
SWC#38	1733.5	35	✓				
Core sample	1745.4	plug end					✓
Core sample	1746.3	plug end					✓
Core sample	1748.6	plug end					✓
Core sample	1749.6	plug end					✓
Core sample	1750.2	-	✓				
Core sample	1754.15	plug end					✓
Core sample	1758.8	-	✓				
SWC#37	1768.2	30	✓				
SWC#36	1770.0	30		✓			
SWC#35	1772.0	30	✓				
SWC#34	1776.5	30	✓				
SWC#33	1778.5	40	✓				
SWC#32	1781.0	30	✓				
SWC#31	1783.0	25					
SWC#30	1784.0	25					✓
SWC#29	1789.0	25	✓				
SWC#28	1795.0	30	✓				
SWC#27	1798.0	30	✓				
SWC#26	1799.5	32	✓				
SWC#25	1802.0	25	✓				
SWC#24	1803.5	45		✓			
SWC#23	1804.5	30					
SWC#22	1808.0	30					✓
SWC#21	1810.5	40					
SWC#20	1814.5	30					
SWC#19	1818.5	30					✓
SWC#18	1821.0	35	✓				
SWC#17	1822.5	15	✓				
SWC#16	1824.0	35	✓				
SWC#15	1825.5	20	✓		✓	✓	
SWC#14	1827.0	30	✓				
SWC#13	1836.5	40					✓
SWC#12	1853.0	30					
SWC#11	1855.5	35	✓		✓		
SWC#10	1870.0	30					
SWC#8	1878.5	40					
SWC#6	1884.0	35		✓			✓
SWC#5	1924.5	40			✓		
Cuttings	1936			✓			
Cuttings	1945			✓			
SWC#4	1957.0	30					
SWC#3	1969.0	45					
SWC#2	1989.0	20	✓				

Note: core analyses on plugs cut from Core #1 not listed here - see Appendix 5

2.5 LOGGING AND SURVEYS

2.5.1 Mud Logging

A standard skid-mounted unit supplied by Baker Hughes-Inteq (BHI) and equipped for continuous recording of depth, penetration rate (ROP), mud gas, pump rate and mud volume data, as well as intermittent mud and cuttings gas (blender) analysis was operative from 110 metres until the well was plugged and abandoned. The lithological, gas and engineering data collated by the BHI crew is presented on the 1:500 scale Formation Evaluation Log (i.e. "Mud Log") in Enclosure 2. A tabulated listing of the gas data is provided in Appendix 8 and the ROP and gas data are also included on the 1:1000 scale Composite Log (Enclosure 1).

2.5.2 Wireline Logging

Wireline logging was performed by Schlumberger Seaco using a standard truck-mounted unit. Only one logging suite was conducted (at Total Depth) comprising six separate runs into the hole (with a wiper trip after the first three) between 0830 hours on June 3 and 1400 hours on June 5. These runs are listed in Table 4 in the sequence in which they were acquired.

From the array sonic tool run in Langley-1 a standard Bore Hole Compensated (BHC) sonic curve was produced at the time of logging (Enclosure 4). The full array sonic waveforms data (which includes Stoneley, Shear and Compressional curves) was subsequently processed at Schlumberger's Melbourne processing centre and the report and logs produced from this work are contained in Enclosure 11.

Similarly, the raw checkshot data (Enclosure 8) was submitted to the processing centre and a Well Seismic Processing Report was produced (Volume 4).

The raw dipmeter data (Enclosure 6) was also subsequently sent to Schlumberger's Melbourne processing centre and a Mean Square Dip plot was produced (Enclosure 10).

TABLE 4

WIRELINE LOGS RUN IN LANGLEY-1

Log	*Interval (mKB)*	*Enclosure Number*
Dual Laterolog - Micro-Spherically Focussed Log - Gamma Ray - Caliper (DLL-MSFL-GR-SP-Cals)[1]	2002.5 - 312 (GR T.D. - Surface)	3
Sonic - Gamma Ray - Spontaneous Potential - Caliper (AS^2/BHC-GR-Cals)[1]	2002.5 - 312 (GR T.D. - Surface)	4
Lithodensity Log - Compensated Neutron Log - Gamma Ray - Caliper (LDL-CNL-GR-Cali)	2006.0 - 1360	5
Checkshot Survey[3] (WST-A)	2005.0 - 350.0	8
Repeat Formation Tester (RFT - GR)	1920.0 - 1731.5	7
Dipmeter Log[4] (SHDT - GR)	2006.5 - 1432	6
Sidewall Core Sampler (CST)	1990.0 - 836.0	9

Notes:

1 *Provided as separate logs but recorded on the same logging run.*

2 *BHC sonic was produced from data collected by array sonic tool. Processed array sonic data is provided in Enclosure 11.*

3 *Raw checkshot survey data was subsequently processed and presented in a Well Seismic Processing report which is provided in Volume 4.*

4 *Raw dipmeter data was subsequently processed to produce a Mean Square Dip plot, which is provided in Enclosure 10.*

2.5.3 Bottom Hole Temperature

In order to obtain an estimate of true formation temperature, a Horner-type method using temperatures and times from the first three wireline log runs was adopted, with the following input data;

Time when drilling stopped (reached T.D.) 2100hrs on 2/6/94
Time when circulation ended 0230hrs on 3/6/94

$\Rightarrow$ $\therefore$ **Circulation Time (t_c) = 5.5 hours**

Maximum temperatures recorded during the first three wireline logging runs were as follows:

Log	Depth (mKB)	Temperature [T] (°C)	Time since end of circulation [Δt] (hours)	log $\frac{tc+\Delta t}{\Delta t}$
Resistivity / Sonic	**2002.5**	**65.6**	**7.9**	**0.2295**
Density / Neutron	**2006.0**	**70.0**	**16.7**	**0.1236**
Checkshots	**2005.0**	**73.3**	**20.7**	**0.1023**

Note: after these first three logging runs a wiper trip was run, so temperature data from the last three runs were not used in the true BHT estimate.

Running a linear regression on the temperature versus $\log(t_c+\Delta t)/\Delta t$ data to find the intercept (or, equivalently, by plotting these on linear axes and extrapolating a straight line back to the Temperature axis) yields an estimated stabilized bottom hole temperature of 77.9°C. Assuming a mean surface temperature of 18°C, this stabilized bottom hole temperature indicates a temperature gradient of about 3.0°C per 100 metres.

2.5.4 Deviation Surveys

Totco surveys were conducted frequently during the drilling of Langley-1 to monitor well bore deviation. Using this deviation data maximum horizontal and vertical distances from the initial location were obtained by summing the components of horizontal distance [*interval length* × sine(*deviation angle*)] and vertical distance [*interval length* × cosine(*deviation angle*)] for each interval (Table 5). The results of this are;

- at the depth of the primary target (1730 metres) the hole location was within a 34-metre radius of the surface location and the true vertical depth was less than half a metre short of the measured (drilled) depth.

TABLE 5

TOTCO Deviation Surveys in Langley-1

Depth (m)	Interval (m)	Deviation Angle (°)	Horizontal Distance (m)	Cumulative Horizontal (m)	Vertical Distance (m)	Cumulative Vertical (m)
30	30	0.75	0.39	0.39	30.00	30.00
67	37	0.25	0.16	0.55	37.00	67.00
128	61	0.5	0.53	1.09	61.00	127.99
191	63	0.5	0.55	1.64	63.00	190.99
248	57	0.25	0.25	1.88	57.00	247.99
335	87	0.75	1.14	3.02	86.99	334.98
391	56	1	0.98	4.00	55.99	390.98
468	77	0.75	1.01	5.01	76.99	467.97
525	57	0.5	0.50	5.51	57.00	524.97
660	135	1	2.36	7.86	134.98	659.95
708	48	1	0.84	8.70	47.99	707.94
870	162	0.5	1.41	10.11	161.99	869.93
1004	134	1.5	3.51	13.62	133.95	1003.89
1033	29	2	1.01	14.63	28.98	1032.87
1062	29	1.75	0.89	15.52	28.99	1061.86
1091	29	1.5	0.76	16.28	28.99	1090.85
1129	38	1.5	0.99	17.27	37.99	1128.83
1158	29	0.5	0.25	17.53	29.00	1157.83
1196	38	1	0.66	18.19	37.99	1195.83
1228	32	1.5	0.84	19.03	31.99	1227.82
1244	16	1.25	0.35	19.38	16.00	1243.81
1273	29	1	0.51	19.88	29.00	1272.81
1305	32	1.75	0.98	20.86	31.99	1304.79
1331	26	1.75	0.79	21.65	25.99	1330.78
1360	29	1.75	0.89	22.54	28.99	1359.77
1390	30	1.25	0.65	23.19	29.99	1389.76
1524	134	2	4.68	27.87	133.92	1523.68
1610	86	1.5	2.25	30.12	85.97	1609.65
1706	96	1.75	2.93	33.05	95.96	1705.60
1808	102	0.75	1.34	34.39	101.99	1807.59
2000	192	1	3.35	37.74	191.97	1999.57
		Total	37.74	*Total*	1999.57	

- the bottom hole location was within a 38-metre radius of the surface location and the true vertical total depth was about half a metre short of the measured (drilled) total depth.

2.5.5 Velocity Surveys

A Checkshot survey was carried out by Schlumberger Seaco during the wireline logging program. The field data for the checkshots is included as Enclosure 8 and a Well Seismic Processing Report (including a Drift Corrected Sonic Log, Seismic Calibration Log and Synthetic Seismograms) is included as Volume 4.

GEOLOGY

3. GEOLOGY

3.1 STRATIGRAPHY

The section penetrated in Langley-1 is interpreted to have formation tops as shown in Table 6 based on consideration of rate of penetration, cuttings descriptions, palynological analyses and wireline logs. A schematic comparison of the predicted and actual formation tops is shown in Figure 4.

No samples above 110 metres were collected or described. Based on the gamma ray curve the contact between the Port Campbell Limestone and the Gellibrand Marl is inferred to be at 109 metres.

Selection of formation tops from the Clifton Formation down to the Belfast Mudstone involved a relatively straightforward comparison of wireline logs with other wells in the Port Campbell region, with palynology providing supporting data where it is available.

The contact between the Tertiary Pebble Point Formation and the Cretaceous Paaratte Formation is consistently marked by a shaly interval, which is 19.8 metres thick in Langley-1. In previous wells the Cretaceous-Tertiary boundary has been placed at either the top or bottom of this shaly interval, apparently dependent on whether it was preferred to have a sandy top to the Paaratte Formation or a sandy base to the Pebble Point Formation.

Palynological data points through this interval are rare, but the few datings of sidewall cores which are available (e.g. Iona-1, Boggy Creek-1, Langley-1) suggest that this shale is partly Maastrichtian and partly Palaeocene in age. Therefore, in Langley-1 this shaly interval is (for the first time in the Otway Basin) proposed as a separate and distinct stratigraphic entity (see palynology report in Appendix 11), herein referred to informally as the "K-T Shale". Given its ubiquity in wells across much of the Otway Basin, it may eventually be formally recognised as a separate stratigraphic entity.

The cuttings and log character over the Nullawarre Greensand equivalent in Langley-1 do not differ markedly from sandy intervals in the overlying Skull Creek Mudstone, but it has been differentiated with the aid of palynology from sidewall cores.

TABLE 6

LANGLEY-1 FORMATION TOPS AND THICKNESSES

Stratigraphic Unit	Depth		Thickness
	(mKB)	(mSS)	(m)
Heytesbury Group	5.7	+64.0	414.3
Port Campbell Limestone	5.7	+64.0	103.3
Gellibrand Marl	109.0	-39.3	301.0
Clifton Formation	410.0	-340.3	10.8
Nirranda Group	420.8	-351.1	134.2
Narrawaturk Marl	420.8	-351.1	84.2
Mepunga Formation	505.0	-435.3	50.0
Wangerrip Group	555.0	-485.3	362.0
Dilwyn Formation	555.0	-485.3	235.4
Pember Mudstone	790.4	-720.7	51.6
Pebble Point Formation	842.0	-772.3	55.2
"K-T Shale"	897.2	-827.5	19.8
Sherbrook Group	917.0	-847.3	909.0
Paaratte Formation	917.0	-847.3	427.0
Skull Creek Mudstone	1344.0	-1274.3	173.0
Nullawarre Greensand (equiv.)	1517.0	-1447.3	38.8
Belfast Mudstone	1555.8	-1486.1	160.0
Waarre Formation	1715.8	-1646.1	110.2
Unit D †	1715.8	-1646.1	14.6
Unit C	1730.4	-1660.7	40.4
Unit B	1770.8	-1701.1	31.7
Unit A	1802.5	-1732.8	23.5
Otway Group	1826.0	-1756.3	180.0+
Eumeralla Formation	1826.0	-1756.3	180.0+
Total Depth (Driller)	2006.0	-1936.3	
Total Depth (Logger)	2007.0	-1937.3	

† *Also known as the Flaxman Formation*

PE906684

This is an enclosure indicator page.
The enclosure PE906684 is enclosed within the container PE900949 at this location in this document.

The enclosure PE906684 has the following characteristics:

ITEM_BARCODE	= PE906684
CONTAINER_BARCODE	= PE900949
NAME	= Formation Tops Table
BASIN	= OTWAY
PERMIT	= PPL1
TYPE	= WELL
SUBTYPE	= STRAT_COLUMN
DESCRIPTION	= Formation Top Depth and Times for Langley-1
REMARKS	=
DATE_CREATED	=
DATE_RECEIVED	= 31/01/96
W_NO	= W1099
WELL_NAME	= LANGLEY-1
CONTRACTOR	=
CLIENT_OP_CO	= GFE RESOURCES LTD

(Inserted by DNRE - Vic Govt Mines Dept)

GFE Resources Ltd

LANGLEY-1

FORMATION TOP DEPTHS AND TIMES

Predicted (mss)	Predicted Two-Way Time (milliseconds)	Predicted (mKB)		Actual (mss)	Actual Two-Way Time (milliseconds)	Actual (mKB)	
			PORT CAMPBELL LST	+64.0		5.7	
			GELLIBRAND MARL	-39.3	43	109.0	
-322		386	CLIFTON FM.	-340.3	368.9	410.0	24m LOW
		428	NARRAWATURK MARL	-351.1	376.7	420.8	7.2m HIGH
-453	465	523	MEPUNGA FM.	-435.3	458.4	505.0	18m HIGH (6.6ms HIGH)
-501	499	571	DILWYN FM.	-485.3	504.6	555.0	16m HIGH (5.6ms LOW)
-733		803	PEMBER MDST.	-720.7	682.3	790.4	12.6m HIGH
-775	709	845	PEBBLE POINT FM.	-772.3	720	842.0	3m HIGH (11ms LOW)
			"K-T SHALE"	-827.5	755.5	897.2	
-861	760	931	PAARATTE FM.	-847.3	769.2	917.0	14m HIGH (9.2ms LOW)
-1324	1082	1394	SKULL CREEK MDST.	-1274.3	1063.0	1344.0	50m HIGH (19ms HIGH)
-1421	1132	1491	NULLAWARRE GNSD (equiv)	-1447.3	1174.2	1517.0	26m LOW (42.2ms LOW)
-1495	1183	1565	BELFAST MDST.	-1486.1	1198.5	1555.8	9.2m HIGH (15.5ms LOW)
-1651	1278	1721	WAARRE FM. UNIT D	-1646.1	1304.7	1715.8	9.4m LOW (34.8ms LOW)
			UNIT C	-1660.7	1312.8	1730.4	
			UNIT B	-1701.1	1337.5	1770.8	
			UNIT A	-1732.8	1353.5	1802.5	
-1739	1352	1809	EUMERALLA FM.	-1756.3	1366.1	1826.0	17m LOW (14.1ms LOW)

TOTAL DEPTH 2005mKB

TOTAL DEPTH 2007.0mKB (Logger)

LANGTOPS

FIGURE 4

The nomenclature used by GFE Resources for the sub-Belfast Mudstone Late Cretaceous section follows the Beach Petroleum scheme outlined by Buffin (1989)[1], in which the otherwise named Flaxman Formation and Waarre Sandstone are subdivided into the Waarre Formation Units A, B, C and D (with Unit D = Flaxman Formation). This subdivision is largely based on log character, as Buffin (1987)[2] "defined" with a "General Type Section" from an unidentified well and then exemplified in 26 wells from the Port Campbell region. The top of the Waarre Formation (i.e. top of Unit D) is taken to be where a sharp jump in the resistivity curve occurs. Beneath this marker Unit D can be of variable character (mostly shaly), Unit C comprises well developed orthoquartzites, Unit B is dominantly shaly/silty with occasional "medial" sands, and Unit A is dominated by lithic sandstones in a commonly upward fining sequence.

Application of this subdivision can be somewhat subjective and problematic, especially in wells where the Waarre Formation is not completely developed or preserved. Also, its utility in conjunction with biostratigraphic data remains unclear. That notwithstanding, the subdivision was successfully applied to a reasonably complete Waarre Formation section in the well preceding this one (Iona-2 in PPL2) and appears to be applicable in Langley-1 also.

The relatively detailed palynological sampling in Langley-1 has allowed a far more useful correlation between the lithostratigraphy and biostratigraphy in the lower Sherbrook Group section than has been undertaken in any other recent wells in this region, which is likely to make this well an important reference or correlation point for future wells.

3.2 LITHOLOGY

The following is a summary of the lithological units observed in Langley-1. More detailed descriptions are included in Appendix 4, as well as on the Mud Log (Enclosure 2). Additional lithological information can be found in the Sidewall Core Descriptions (Appendix 6) and the associated Petrography Report (Appendix 9).

1 APEA Journal, 1989, p.299-311.

2 A Depositional Model and Facies Analysis of the Waarre Formation, Port Campbell Embayment (Unpublished report, Beach Petroleum NL).

3.2.1 Heytesbury Group (Surface - 420.8 metres)

3.2.1.1 Port Campbell Limestone (Surface - 109.0 metres)

This unit could not be described in Langley-1 because no cuttings samples were collected above 110 metres. Based on the gamma ray log response the base of this formation is interpreted to be at 109 metres.

3.2.1.2 Gellibrand Marl (109.0 - 410.0 metres)

Marl: medium grey to medium brown grey to medium green grey, very soft, sticky, abundant fossil fragments including foraminifera, bivalves and gastropods, trace pyrite, slightly silty in part, occasionally common very fine quartz sand grains, occasional carbonaceous specks, non-fissile.

3.2.1.3 Clifton Formation (410.0 - 420.8 metres)

Marl: medium to dark brown, soft to firm, trace very fine sand in part, occasional sucrosic texture, common glauconite, trace pyrite, non-fissile, interbedded with and grading to
Coquina: white, buff, cream, becoming red brown with depth, oxidised shell, skeletal and fossil remains, abundant glauconite in part, trace pyrite, friable to moderately hard, non-fissile.

3.2.2 Nirranda Group (420.8 - 555.0 metres)

3.2.2.1 Narrawaturk Marl (420.8 - 505.0 metres)

Marl: medium to dark brown grey, occasionally medium to dark grey, trace glauconite, trace to common dispersed silt and quartz sand grains, very argillaceous in part grading to claystone, trace disseminated pyrite, common coquina, non-fissile, in part grading to
Siltstone: medium brown grey, very argillaceous, moderately calcareous, often very finely arenaceous, trace white fossil specks, firm, non-fissile.

3.2.2.2 Mepunga Formation (505.0 - 555.0m)

Sandstone: light to medium dark brown; occasionally red brown grey, medium to coarse, occasionally very coarse, dominantly medium, poorly sorted, subangular to rounded, common iron oxide cement and staining, trace to common silt and argillaceous matrix, common glauconite, common pyrite, unconsolidated, poor visual porosity.

3.2.3 Wangerrip Group (555.0 - 897.2m)

3.2.3.1 Dilwyn Formation (555.0 - 790.4m)

Sandstone: light to medium brown grey, dominantly light grey, becomes dominantly very light grey with depth, medium to coarse grained, dominantly coarse, becomes fine to medium grained with depth, subangular to subrounded, poor to moderately sorted, weak silica cement, trace to occasionally abundant light brown silt matrix, trace altered feldspars, trace black coaly detritus, common pyrite, friable to unconsolidated, poor to fair visual porosity, interbedded with and in part grading to

Siltstone: light to dark brown grey, moderately argillaceous, common carbonaceous flecks, common glauconite in part, slightly calcareous, soft to firm, non to slightly subfissile.

3.2.3.2 Pember Mudstone (790.4 - 842.0m)

Claystone: medium to dark brown grey, medium to dark olive grey, very silty in part grading to siltstone, common black carbonaceous flakes, common dark green glauconite, common micromica, moderately dispersive, moderately sticky, soft, non-fissile with minor interbedded

Sandstone: very light grey, common very light brown staining, fine to coarse grained, dominantly fine, angular to subrounded, moderately sorted, weak silica cement, common light brown silt matrix, common glauconite, common pyrite, friable, poor visual porosity.

3.2.3.3 Pebble Point Formation (842.0 - 897.2m)

Sandstone: light brown grey, very light red brown, medium to coarse grained, subangular to rounded, poor to occasionally moderate sorting, weak silica cement, common weak iron oxide cement, trace argillaceous and silt matrix, common iron oxide staining on quartz grains, trace pyrite, occasional dark grey silty carbonaceous lithics, unconsolidated, poor to dominantly fair visual porosity, interbedded with minor

Claystone: medium to dark brown, medium to dark olive grey, moderately to very sticky, soft to firm, moderately to very dispersive, common black carbonaceous flecks, very silty often grading to siltstone, common dark green glauconite, common micromica, nonfissile.

3.2.4 "K-T Shale" (897.2 - 917.0m)

Claystone: medium to dark brown grey, medium to dark olive grey, very sticky, soft to firm, moderately dispersive, trace to common black carbonaceous flecks, very silty often grading to siltstone, common dispersed very fine quartz sand grains, common micromica, trace to common pyrite, non-fissile, with minor interlaminated

Sandstone: light brown grey, very light red brown, medium to coarse grained, subangular to rounded, poor to occasionally moderate sorting, weak silica cement, common weak iron oxide cement, trace argillaceous and silt matrix, common iron oxide staining on quartz grains, trace pyrite, occasional dark grey silty carbonaceous lithics, unconsolidated, poor visual porosity.

3.2.5 Sherbrook Group (917.0 - 1826.0m)

3.2.5.1 Paaratte Formation (917.0 - 1344.0m)

Sandstone: light grey to off white, clear to colourless quartz grains, very fine to very coarse, dominantly medium grained, subangular to subrounded, poor to moderately sorted, weak silica cement, nil to trace light brown grey argillaceous and silt matrix, trace nodular and disseminated pyrite, occasional dark grey carbonaceous lithics, abundant coal detritus in part, trace grey green lithics, trace orange

volcanic lithics in part, trace amber, unconsolidated to moderately hard, poor to good dominantly fair visual porosity, interbedded with
Claystone: medium to dark olive grey, soft to occasionally firm, very silty grading to siltstone in part, common very fine sand grains in part, non to slightly calcareous, occasionally micromicaceous, common very fine to fine black coal flecks, very dispersive, non-fissile, and minor detrital
Coal: dark brown to dominantly black, firm to brittle, subconchoidal fracture, moderately silty, trace pyrite.

3.2.5.2 Skull Creek Mudstone (1344.0 - 1517.0m)

Claystone: medium to dark grey, occasionally medium brown grey, common carbonaceous lithics and laminae, common to abundant micromica, trace pyrite, moderately to occasionally very silty and grading to siltstone in part, very dispersive, sticky, firm, non-fissile, interbedded with thin
Sandstone: very light grey, off white, occasionally medium grey, very fine to fine gained, angular to subrounded, moderately to dominantly well sorted, moderate dolomite cement, trace to common carbonaceous lithics, trace micromica, trace pyrite, friable to hard, poor visual porosity.

3.2.5.3 Nullawarre Greensand (equiv.) (1517.0 - 1555.8m)

Sandstone: very light to medium grey, occasionally medium olive grey, very fine to fine grained becoming fine to very coarse with depth, dominantly fine grained, subangular to subrounded, poor to well sorted, common calcareous and dolomite cements at top otherwise weak silica cement, trace to common off white to light brown grey to medium grey argillaceous and silt matrix, common pyrite in part, trace glauconite, trace black carbonaceous flecks, friable to occasionally hard, very poor to fair visual porosity, with minor finely interbedded
Claystone: medium to dark olive grey, often very finely arenaceous, common very fine black carbonaceous flecks, trace dolomite, non calcareous, trace pyrite, trace glauconite, common micromica, soft to firm, slightly subfissile, with (especially at top)

Dolomite: medium brown, tan, moderately argillaceous, common very fine black to dark brown flecks, firm to dominantly hard.

3.2.5.4 Belfast Mudstone (1555.8 - 1715.8m)

Claystone: medium to dark grey, medium to dark olive grey, occasionally light to medium brown grey, moderately to very silty, very finely arenaceous in part, common to abundant glauconite in general increasing with depth, trace to common carbonaceous flecks, trace medium brown cryptocrystalline dolomite, trace to common pyrite, trace micromica, trace *Inoceramus*, soft to firm, slightly subfissile.

3.2.5.5 Waarre Formation (1715.8 - 1826.0m)

3.2.5.5.1 Unit D (1715.8 - 1730.4m)

Claystone: medium grey to medium brown, moderately silty, carbonaceous, abundant glauconite, rare to common pyrite, trace fossil fragments, soft, subfissile.

3.2.5.5.2 Unit C (1730.4 - 1770.8m)

Sandstone: very light grey, colourless to occasionally pale yellow quartz grains, fine to coarse, dominantly medium, angular to occasionally subrounded, moderate to strong silica cement in part, trace pyrite cement, no visible matrix, occasional carbonaceous staining and specks, common red brown amber, rare shell fragments, friable, fair to good inferred porosity, interbedded with minor

Claystone: medium grey to medium brown, moderately silty, carbonaceous, abundant glauconite, rare to common pyrite, trace fossil fragments, soft, subfissile, with minor detrital

Coal: black, often very argillaceous, subconchoidal to platy fracture, common pyrite inclusions, subvitreous to earthy texture, brittle.

3.2.5.5.3 Unit B (1770.8 - 1802.5m)

Claystone: light to medium olive grey, occasionally light brown grey, common to abundant carbonaceous lithics and laminae, often very silty and grading to siltstone in part, trace to common disseminated pyrite, moderately dispersive, moderately hard, subfissile, interbedded with thin

Sandstone: very light grey, clear quartz grains, fine to very coarse, subangular to occasionally subrounded, very poorly sorted, moderate to strong silica cement, common moderately strong to strong calcareous cement, occasional dolomite cement, occasional pyrite cement, trace off white to light grey argillaceous matrix, trace carbonaceous lithics, friable to hard, poor visual porosity, fair inferred porosity.

3.2.5.5.4 Unit A (1802.5 - 1826.0m)

Sandstone: off white, light brown, fine to dominantly medium, subangular to subrounded, dominantly subangular, quartzose, well sorted, weak calcareous cement, abundant argillaceous matrix, friable to moderately hard, no visual porosity, with minor interbedded

Claystone: light to medium olive grey, occasionally light brown grey, common to abundant carbonaceous lithics and laminae, often very silty and grading to siltstone in part, trace to common disseminated pyrite, moderately dispersive, moderately hard, subfissile.

3.2.6 Otway Group (1826.0 - 2007.0+m)

3.2.6.1 Eumeralla Formation (1826.0 - 2007.0+m)

Sandstone: light to medium green grey, off white to medium blue grey, very fine to medium, dominantly fine to medium, moderately sorted, subangular to subrounded, weak to occasionally moderate silica cement, common to abundant green grey argillaceous and silt

matrix, common green and orange red lithics, trace amber, common carbonaceous lithics, trace to common pyrite, trace micromica, friable, poor visual porosity, interbedded with

Claystone: very light green grey, very light blue green grey, slightly silty, rarely very finely arenaceous, occasional carbonaceous laminae, trace pyrite, trace micromica where silty, moderately dispersive, firm to moderately hard, slightly subfissile.

3.3 HYDROCARBON INDICATIONS

3.3.1 Mud Gas Readings

The mud gas detection equipment was operational from a hole depth of 110 metres until the cement plug at the casing shoe was tested. Gas levels detected during drilling are plotted on the Composite Log (Enclosure 1) and the Mud Log (Enclosure 2) as well as being tabulated in Appendix 8 and summarised as follows:

- Down to 500 metres no gas was detected.

- Over the interval 500 - 1344 metres (top Mepunga Formation to base Paaratte Formation) mud gas readings ranged;

Total Gas	:	Trace - 0.2 units
C_1	:	1 - 30 ppm
C_2	:	BDL*

* *Note: BDL denotes Below Detection Limit.*

- From 1344 metres down to 1555.8 metres (Skull Creek Mudstone and Nullawarre Greensand equivalent) mud gas readings ranged;

Total Gas	:	0.1 - 5.5 units
C_1	:	6 - 1037 ppm
C_2	:	BDL - 11 ppm
C_3	:	BDL

3.3 HYDROCARBON INDICATIONS

3.3.1 Mud Gas Readings

The mud gas detection equipment was operational from a hole depth of 110 metres until the cement plug at the casing shoe was tested. Gas levels detected during drilling are plotted on the Composite Log (Enclosure 1) and the Mud Log (Enclosure 2) as well as being tabulated in Appendix 8 and summarised as follows:

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- Over the interval 500 - 1344 metres (top Mepunga Formation to base Paaratte Formation) mud gas readings ranged;

Total Gas	:	Trace - 0.2 units
C_1	:	1 - 30 ppm
C_2	:	BDL*

* *Note: BDL denotes Below Detection Limit.*

- From 1344 metres down to 1555.8 metres (Skull Creek Mudstone and Nullawarre Greensand equivalent) mud gas readings ranged;

Total Gas	:	0.1 - 5.5 units
C_1	:	6 - 1037 ppm
C_2	:	BDL - 11 ppm
C_3	:	BDL

- From 1555.8 metres down to 1715.8 metres (Belfast Mudstone) mud gas readings ranged;

Total Gas	:	1.0 - 3.9 units
C_1	:	183 - 705 ppm
C_2	:	6 - 24 ppm
C_3	:	BDL - 6 ppm
C_4	:	BDL

- From 1715.8 metres down to 1730.4 metres corresponding to the Warre Formation Unit D gas readings remained low and ranged;

Total Gas	:	1.3 - 1.6 units
C_1	:	231 - 302 ppm
C_2	:	8 - 12 ppm
C_3	:	1 - 2 ppm
C_4	:	BDL

- From 1730.4 metres down to 1771 metres (corresponding to the Waarre Formation Unit C) mud gas rose and throughout the interval remained in the range;

Total Gas	:	3 - 20.5 units
C_1	:	519 - 3477 ppm
C_2	:	14 - 96 ppm
C_3	:	1 -44 ppm
C_4	:	1 - 35 ppm
C_5	:	BDL

- Across the interval 1771 - 1802 metres (corresponding to the Waarre Formation Unit B) gas readings ranged;

Total Gas	:	1 - 5.5 units
C_1	:	162 - 793 ppm
C_2	:	7 - 125 ppm
C_3	:	1 - 16 ppm
C_4	:	BDL - 1 ppm
C_5	:	BDL

- Through the interval 1802 - 1826.0 metres (corresponding to Waarre Formation Unit A) gas readings mostly ranged;

Total Gas	:	2.8 - 8.3 units
C_1	:	421 - 1464 ppm
C_2	:	10 - 72 ppm
C_3	:	4 - 22 ppm
C_4	:	BDL - 1 ppm
C_5	:	BDL

with a peak at 1802 metres of;

Total Gas	:	21 units
C_1	:	3111 ppm
C_2	:	262 ppm
C_3	:	104 ppm
C_4	:	38 ppm
C_5	:	BDL

- Gas readings across the interval 1826 - 1890 metres (corresponding to the upper portion of the Eumeralla Formation) ranged;

Total Gas	:	2 - 16.3 units
C_1	:	366 -2928 ppm
C_2	:	12 - 101 ppm
C_3	:	BDL - 21 ppm
C_4	:	BDL - 20 ppm

- Gas reading across the interval 1890 metres to 1907 metres (intra-Eumeralla Formation sandstones) rose sharply and ranged;

Total Gas	:	7 - 87 units
C_1	:	1345 - 14030 ppm
C_2	:	32 - 513 ppm
C_3	:	7 - 130 ppm
C_4	:	1 - 192 ppm
C_5	:	BDL

- Below 1907 metres until T.D. at 2006 metres (driller) mud gas readings ranged;

Total Gas	:	1.3 - 15 units
C_1	:	238 - 2623 ppm
C_2	:	6 - 53 ppm
C_3	:	2 - 53 ppm
C_4	:	BDL - 20 ppm
C_5	:	BDL

with a peak at 1976.7 metres (corresponding to a tight sandstone unit) of;

Total Gas	:	48 units
C_1	:	6405 ppm
C_2	:	240 ppm
C_3	:	53 ppm
C_4	:	52 ppm
C_5	:	BDL

3.3.2 Fluorescence

Cuttings samples and sidewall cores were routinely inspected for shows with the following results;

3.3.2.1 Cuttings

No oil fluorescence or oil staining was observed in any cuttings from Langley-1.

3.3.2.2 Core

No fluorescence was observed in Core #1 (1745 - 1764m).

3.3.2.3 Sidewall Cores

Small amounts of fluorescence were observed in 21 sidewall cores from Langley-1, mostly from the Waarre Formation. At least some of this fluorescence, especially in the sidewall cores above the

Waarre Formation, is suspected to be contamination. Descriptions of the observed fluorescence are included with the lithological descriptions of the sidewall cores in Appendix 6.

3.3.3 Drill Stem Test Gas Samples

Gas samples were collected and analysed for DST's 1 and 3, which tested the Waarre Formation Unit C and intra-Eumeralla Formation sandstones, respectively. Laboratory reports for these analyses are included in Appendix 7 and summarized in Table 2. The most significant difference between the gas produced from these two intervals is that the sample from the Waarre Formation Unit C is two thirds carbon dioxide while the intra-Eumeralla Formation sample contains little or no CO_2 (the small amount reported is thought to be part of the air "contamination" in the test string due to this being a low flow-rate test which was kept closed at surface).

The hydrocarbon components of the two sampled intervals have similar relative proportions, suggesting (among other things) that the hydrocarbon gas may have generated and migrated into the Waarre and Eumeralla Formation sands at around the same time and that CO_2 subsequently migrated into the Waarre Formation, but not into the Eumeralla Formation interval (posibly due to the lower permeability of the latter).

The DST-3 gas sample was also submitted for carbon isotope analysis of the light hydrocarbons and the results are provided in Appendix 7C.

3.4 GEOCHEMISTRY

3.4.1 Analyses

A total of 11 samples (9 sidewall cores and 2 cuttings) from Langley-1 were submitted for various geochemical analyses.

The two cuttings samples were submitted during drilling of the well for thermal extract GC analysis. Three sidewall cores were analysed for Total Organic Carbon (TOC) content to determine their suitability for Rock-Eval pyrolysis. The other six sidewall cores were selected from those which

reported fluorescence and were submitted for extraction to identify and characterise their hydrocarbon content.

3.4.2 Results

Thermal extraction on the two cuttings samples (1936 and 1945 metres) yielded nothing. Of the three sidewall cores submitted for TOC only one (1825.5 metres) had enough to perform Rock-Eval pyrolysis. This sample produced reasonably good S1 and S2 results, the latter of which prompted Pyrolysis GC anlysis which indicated only very poor oil source potential.

Of the six extracted sidewall cores, the two deepest (1803.5 and 1884.0 metres) produced too small a yield to analyse adequately, so no further work was attempted on them. For the other four a saturates fraction was separated and analysed by gas chromatography. The resulting GC traces suggest that the samples from 1291.0 and 1518.5 metres (and possibly also 1732.0 metres) are probably diesel contamination, based on their lack of C_{22+} compounds. The sample at 1770.0 metres appears to be a very waxy terrestrial/coaly sample depleted in light ends.

3.5 PALYNOLOGY

Thirty-three sidewall cores and two core samples were submitted to Biostrata (Alan Partridge) for palynological analysis and the resulting report comprises Appendix 11. The samples ranged from 895.0 metres (basal Pebble Point Formation) down to 1989.0 metres (Eumeralla Formation) and were determined to span from the basal Paleocene to the Late Albian.

This number of samples is unprecedented in an exploration well in this region and has consequently provided a relatively closely sampled interval which will provide an important tie to future wells in the region, particularly over the Waarre Formation where additional subzones within the *P. infusorioides* Zone have been recognised.

The oldest zone penetrated in Langley-1 is the *P. pannosus* Zone, which conforms to the youngest age known from the Eumeralla Formation. As in the nearby Iona-2 development well (which preceded Langley-1), the *A. distocarinatus* zone (and thus the Cenomanian) is not present in Langley-1, its absence comprising part of the mid-Cretaceous unconformity between the Eumeralla and Waarre Formations. The base of

the Waarre Formation (and hence base of the Sherbrook Group) is clearly identified by the first indications of marine microplankton and all of the Sherbrook Group samples analysed are considered to be marine. Above 1516 metres sample density is insufficient to distinguish all the zones known to occur in this part of the sequence.

The distinctive shale unit spanning 897.2 - 917.0 metres appears to be a local equivalent of the Cretaceous/Tertiary boundary shale observed widely in the Gippsland Basin and supporting evidence for this correlation is provided by samples in Langley-1 and some earlier wells. Therefore, this unit is herein proposed as a separate entity (provisionally labelled the "K-T Shale") with the recognition that much more work needs to be done before it can become a formal stratigraphic entity. On wireline logs this unit is evident in many previous wells in this region, but (presumably due to a lack of appropriate sampling and dating) its chronostratigraphic significance has not been previously identified and it has been placed either at the top of the Paaratte Formation or the base of the Pebble Point Formation.

3.6 STRUCTURE

Within PPL1 two regional structural grains are evident in the interpretation of the Waarre 3D Seismic Survey. The dominant WNW-ESE trend of generally Late Cretaceous age (with occasional Tertiary reactivation) overprints a more subtle older ENE-WSW trend, probably no younger than mid-Cretaceous in age. Similar to other structures in the area, the Langley prospect is formed by the intersection of these two fault trends.

As shown on the pre-drill maps and seismic sections in Figures 5-8, the Langley structure at Waarre Formation level is an elongate (ENE-WSW) tilted (north-westerly dipping) fault block with crests at either end. The western crest, the site of Langley-1, is fault bounded to the southeast and southwest with no fault-independent closure. The eastern crest is down thrown relative to the northern bounding fault and, therefore, perceived as having a higher associated lateral seal risk.

Langley-1 constitutes the first test of the interpretation of 3D seismic data in this moderately to intensely structured area.

The drilling of Langley-1 has not necessitated any significant modification of the pre-drill interpretation. Most of the differences between the prognosed and actual

TOP WAARRE FORMATION
TIME MAP

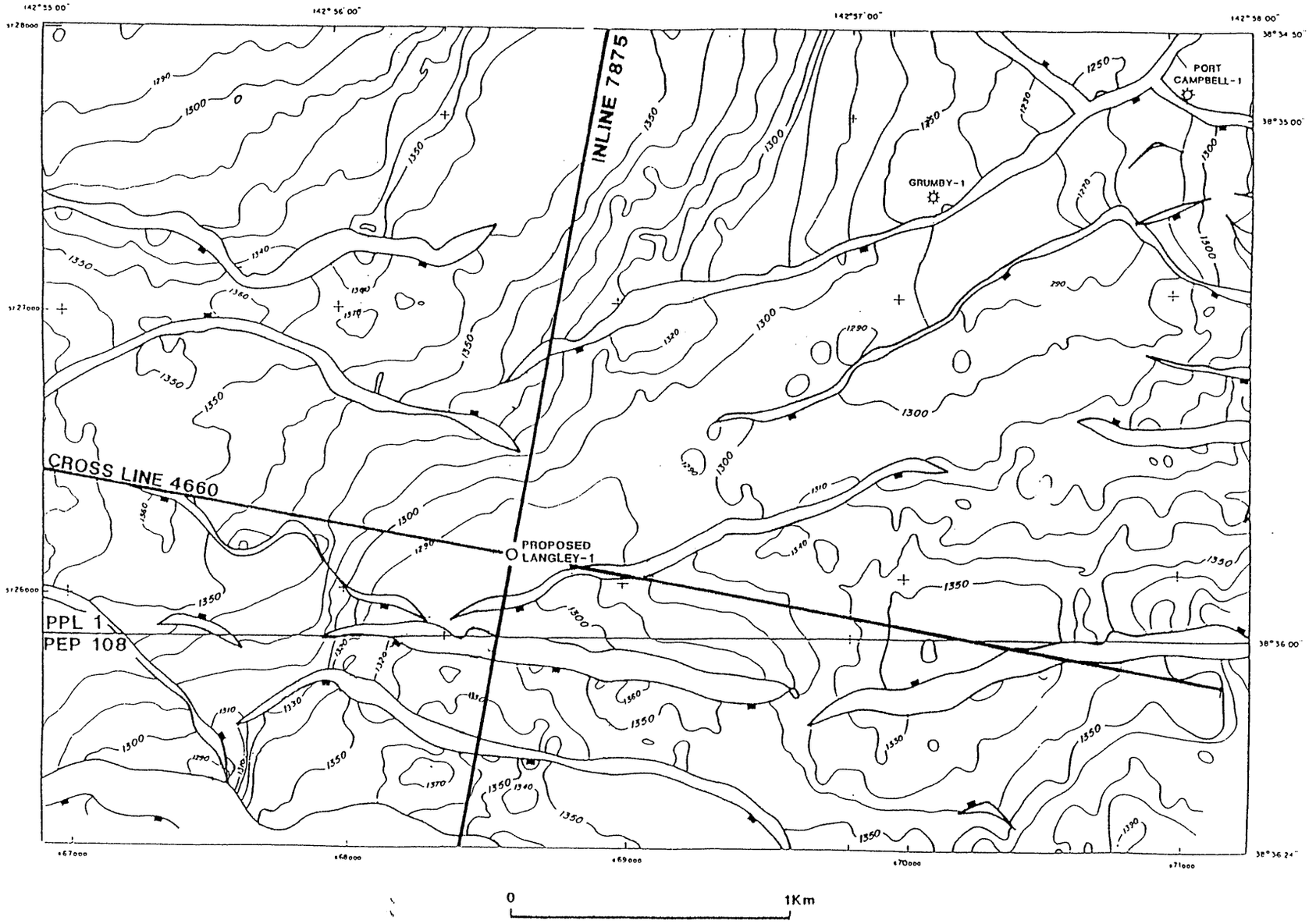

FIGURE 5

TOP WAARRE FORMATION
DEPTH MAP
(metres subsea)

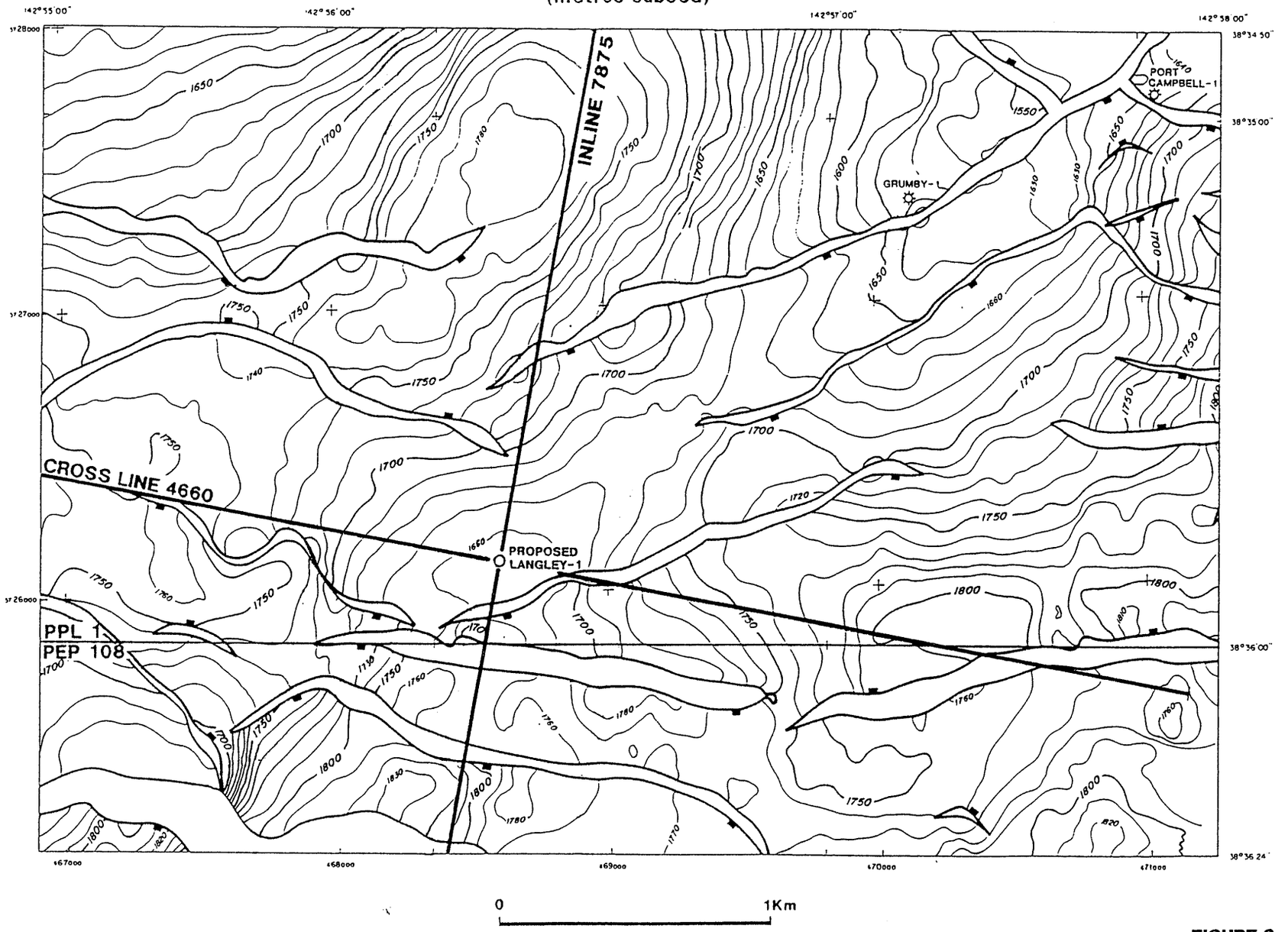

FIGURE 6

OT.4713

PE906685

This is an enclosure indicator page.
The enclosure PE906685 is enclosed within the container PE900949 at this location in this document.

The enclosure PE906685 has the following characteristics:

ITEM_BARCODE	= PE906685
CONTAINER_BARCODE	= PE900949
NAME	= Seismic Section Inline 7875
BASIN	= OTWAY
PERMIT	= PPL1
TYPE	= SEISMIC
SUBTYPE	= SECTION
DESCRIPTION	= Seismic Section Inline 7875, showing Langley-1
REMARKS	=
DATE_CREATED	=
DATE_RECEIVED	= 31/01/96
W_NO	= W1099
WELL_NAME	= LANGLEY-1
CONTRACTOR	=
CLIENT_OP_CO	= GFE RESOURCES LTD

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PE906686

This is an enclosure indicator page.
The enclosure PE906686 is enclosed within the container PE900949 at this location in this document.

The enclosure PE906686 has the following characteristics:

ITEM_BARCODE	= PE906686
CONTAINER_BARCODE	= PE900949
NAME	= Seismic Section Crossline 4660
BASIN	= OTWAY
PERMIT	= PPL1
TYPE	= SEISMIC
SUBTYPE	= SECTION
DESCRIPTION	= Seismic Section Crossline 4660, showing Langley-1
REMARKS	=
DATE_CREATED	=
DATE_RECEIVED	= 31/01/96
W_NO	= W1099
WELL_NAME	= LANGLEY-1
CONTRACTOR	=
CLIENT_OP_CO	= GFE RESOURCES LTD

(Inserted by DNRE - Vic Govt Mines Dept)

formation tops (Figure 4) are within the resolution of the data, and many of the variations in depth are due to differences between the regional velocity model used for depth conversion and the actual velocities at Langley-1. The biggest differences between actual and prognosed horizons occur beneath the Paaratte Formation. Apart from the Skull Creek Mudstone top, which came in 19 milliseconds high, all of the sub-Paaratte horizons came in between 14 and 42 milliseconds low to prognosis, which equates to around half to one and a half cycles. With regard to the top of the Waarre Formation in particular this discrepancy appears difficult to improve on, since the top of the marked change in seismic character which had been taken to be the top of the Warre Formation Unit C occurs well up into the Belfast Mudstone (around 1675 mKB). This change may equate to sonic and density changes in the basal Belfast Mudstone (below 1685 metres) and/or the Waarre Formation Unit D top.

3.7 LOG ANALYSIS

Log analysis was undertaken on the Langley-1 wireline logs using Crocker Data Processing's PETROLOG software. The Waarre Formation was divided into five zones, one each for Units A, B and D and two for Unit C (above and below the gas/water contact). (A lack of sand in the zone spanning Unit D precludes it from the following discussion and summary). The Eumeralla Formation was only analysed as a single zone.

For each of the sand-bearing zones basic input parameters are given in Table 7 and a summary of the results is provided in Table 8. A listing of input parameters, environmental corrections and complex lithology results can be found in Appendix 12 and a 1:500 scale analysis log is provided as Enclosure 12.

The overall quality of the logs in the zones analysed is regarded as good to very good.

As shown in Table 8, Zones 2 - 6 all contained significant proportions of sand, with Units C and A having the highest net-to-gross and best reservoir properties (as expected). After running the wireline logs a cursory look at the neutron-density curves suggested that the only interval containing significant gas pay was the upper part of the Waarre Formation Unit C sand (Zone 2), over most of which DST-1 was conducted. This was confirmed by the log analysis, in which Zone 2 was estimated to comprise about 88% net sand with an average V_{clay} of around 10-11%, average effective porosity

around 18-19%, and average water saturation around 28-30%, yielding 18.7 metres of net pay.

The sands in the lower part of Unit C, as well as those in Units B and A, do all seem to contain gas, but in lower proportions (water saturations range 63-71%).

The Eumeralla Formation section analysed (Zone 6) also reports as being entirely water wet, with an average water saturation in the sands of around 87%. This result is somewhat contradicted by DST-3 (1883.07-1909.13mKB driller) which flowed very low-rate gas without co-producing water. While a more lengthy and detailed analysis of the logs over the Eumeralla Formation might ultimately be able to reconcile this difference, it is well recognized that this formation is notoriously difficult to analyse confidently with standard petrophysical logging tools, especially in tight sands.

Based on the log analysis results, a Gas/Water Contact (GWC) in Langley-1 would be inferred to occur close to (or within) the shale band at 1751.8-1752.3mKB (logger).

TABLE 7

LANGLEY-1

BASIC INPUT PARAMETERS FOR LOG ANALYSIS

ZONE #	2	3	4	5	6
FORMATION	Waarre C	Waarre C	Waarre B	Waarre A	Eumeralla
From (m)	1730.0	1752.9	1772.0	1798.9	1826.5
To (m)	1752.9	1772.0	1798.9	1826.5	1985.0
Interval (m)	22.9	19.0	27.0	27.6	158.5
Average Zone Temperature (°C)	64.1	64.6	65.1	65.7	67.8
Rw at Av. Zone Temp. (ohm.m)	0.225	0.224	0.223	0.221	0.442
Rw at 23.9 °C (ohm.m)	0.425	0.425	0.425	0.425	0.870
Salinity (Kppm)	14.0	14.0	14.0	14.0	6.5
Mud Filtrate Salinity (Kppm)	22.8	22.8	22.8	22.8	22.8
Assumed Matrix Density (g/cc)	2.65	2.65	2.65	2.65	2.67
GRclean (API units)	20	20	25	35	40
GRclay (API units)	115	115	115	115	126
Rclay (ohm.m)	8.0	8.0	9.0	9.0	14.9
Saturation Equation	Indonesian	Indonesian	Indonesian	Indonesian	Indonesian
Tortuosity (a)	1.0	1.0	1.0	1.0	0.62
Cementation Exponent (m)	1.7	1.7	1.7	1.7	2.15
Saturation Exponent (n)	2.0	2.0	2.0	2.0	2.0

TABLE 8

LANGLEY-1

LOG ANALYSIS RESULTS SUMMARY

ZONE #	2	3	4	5	6
FORMATION	Waarre C	Waarre C	Waarre B	Waarre A	Eumeralla
From (m)	1730.0	1752.9	1772.0	1798.9	1826.5
To (m)	1752.9	1772.0	1798.9	1826.5	1985.0
Interval (m)	22.9	19.0	27.0	27.6	158.5
Net Sand† (m)	20.1	16.2	6.7	21.3	38.1
Net/Gross (%)	87.8	85.3	24.8	77.2	24.0
Sand Average $\varnothing_{eff.}$† (%)	18.2	22.0	18.3	23.2	16.1
Sand Average S_w† (%)	29.8	71.3	65.1	63.3	86.8
Sand Average V_{clay}† (%)	10.8	5.7	14.5	14.1	27.5
For net pay:					
Average $\varnothing_{eff.}$ Cut off	0.05	0.05	0.05	0.05	0.05
S_w Cut off	0.50	0.50	0.50	0.50	0.50
V_{clay} Cut off	0.40	0.40	0.40	0.40	0.40
Net Pay (m)	18.7	0.6	1.1	0.2	0.0
Pay Average $\varnothing_{eff}$ (%)	18.7	17.1	19.3	19.1	n/a
Pay Average S_w (%)	27.5	45.5	39.0	49.8	n/a
Pay Average V_{clay} (%)	10.2	23.6	16.0	15.3	n/a

†Obtained using cut offs of S_w = 100%; $\varnothing_{eff.}$ = 5%; V_{clay} = 40%

CONCLUSION

4. CONCLUSIONS

4.1 OBJECTIVES VERSUS PERFORMANCE

The main objective in drilling Langley-1 was to evaluate the hydrocarbon potential of the structure mapped at the top Waarre Formation level and the section beneath it into the Eumeralla Formation. Since Langley-1 was the first well drilled on a prospect identified from the Waarre 3D Seismic Survey it was also the first test of the worth of 3D seismic data in this region.

The top Waarre Formation sandstone (Unit C) was evaluated by DST-1, wireline logs and RFTs, and shown to contain a trapped gas column of very similar extent the minimum predicted case (ie. prognosed minimum closing contour at 1680mSS, actual GWC appears to be around 1683mSS) indicating that the structure is probably filled to its spill point. In addition to this, DST-3 established the presence of a gas zone (which could not be identified on wireline logs or RFT data) within a tight Eumeralla Formation sandstone interval. Thus, Langley-1 can be said to have at least adequately fulfilled its intended purpose, and to be a "technical" success in terms of the ability of the 3D seismic to improve the delineation of prospects in this area.

However, Langley-1 was plugged and abandoned because the 23-metre gas column encountered at the top of the Waarre Formation Unit C was found to contain a mix of one-third dry hydrocarbon gas and two-thirds carbon dioxide (CO_2), making it uncommercial for exploitation of either commodity. Prior to drilling, the possibility of the reservoir containing CO_2 had been identified as the greatest risk associated with the Langley prospect due to the presence of CO_2 in variable proportions in nearby wells, most notably Grumby-1. Previous work had suggested that proximity to major north-east trending faults increased the likelihood for a structure to contain significant CO_2 and the result in Langley-1 appears to support this.

With regard to the Eumeralla Formation, obtaining a gas flow (albeit low-rate) without co-producing water was a positive (but also uncommercial) result for the Langley-1 well. Not being able to better define this gas column with RFTs or wireline logs leaves this result somewhat intangible, but may also indicate that the occurrence of low-rate gas sands in the Eumeralla Formation is more common than previously thought.

Assessment of performance in terms of time (and thus cost) is less favourable. As shown in Figure 2, Langley-1 took about ten days longer than the prognosed 18 days to drill, due to a variety of causes, including;

- drilling assembly differentially stuck in hole (just over three days lost)
- tight hole problems requiring wiper trips, BHA changes and reaming (total of about two and a half days lost)
- two extra (unanticipated) drill stem tests (DSTs 2 and 3) were conducted to evaluate shows in the intra-Eumeralla sandstone unit (two and a half days extra)
- longer time to prepare for and run wireline logs, partly due to running more logs than anticipated (about one and a half days extra)
- unexpected repairs to rig clutch and draw-works sub-frame (about half a day lost).

Another parameter which pertains to performance during drilling of the well is hole deviation. As outlined in Section 2.5.4, the horizontal component of hole deviation was kept within a 34-metre radius of the proposed location at the primary target (top Waarre Formation sandstone, 1730 metres) level, which equates to a maximum overall deviation of just over one degree.

With regard to the prognosis of geological and geophysical parameters the results obtained in Langley-1 were generally in line with expectations. Formation tops were mostly within 20 milliseconds two-way time of prognosis, with the two exceptions being the Nullawarre Greensand equivalent and Waarre Formation Unit C tops, which came in low by 42.2 and 34.8 milliseconds, respectively. In terms of depth, most horizons were within 20 metres of prognosis, except the Clifton Formation (24m low), the Skull Creek Mudstone (50m high) and the Nullawarre Greensand equivalent (26m low). Thus, the time-depth relationship observed in Langley-1 indicates that the actual velocity profile is broadly similar to the pre-drill regional velocity model used.

4.2 CONTRIBUTION TO GEOLOGICAL KNOWLEDGE AND HYDROCARBON PROSPECTIVITY

In addition to the basic information that drilling a petroleum exploration well adds to the geological knowledge and hydrocarbon prospectivity of an area (eg. depth to formation tops, cuttings samples, sidewall cores, wireline logs, etc.) the drilling of Langley-1 and analysis of the technical data from it has;

- confirmed the technical worth of using 3D seismic data in this moderately to intensely structured area to improve the delineation of structural features (the commercial worth has yet to be proven).

- provided (by virtue of relatively closely spaced sidewall cores) a higher density of biostratigraphic sample points over the lower Sherbrook Group (especially the Waarre Formation) and the upper part of the Eumeralla Formation than has been available in previous exploration wells in this area. This has enabled an unprecedented level of biostratigraphic resolution within this interval, which has resulted in some new subzones being recognized and provided further confirmation (c.f. Iona-2 WCR) of the absence of Cenomanian strata in this area. Thus, Langley-1 has provided a better understanding of the juxtaposition of the biostratigraphy with the lithostratigraphy and will be a very useful well for correlation work over this interval into the future.

- provided (again by biostratigraphic work on sidewall cores) sufficient biostratigraphic evidence to propose the establishment of a new entity in Otway Basin stratigraphy, provisionally labelled the "K-T Shale", which is equivalent to the Cretaceous/Tertiary boundary shale observed in the Gippsland Basin.

- confirmed the migration of hydrocarbons and carbon dioxide into sands of the Waarre Formation in the Langley structure. (The presence of such a high proportion of carbon dioxide in this structure might be construed as supporting the proposed relationship between the occurrence of that gas in structures which are proximal to north-east bounding faults).

- identified tight (but hydrocarbon gas-bearing) potential reservoir sandstones within the Eumeralla Formation. It is also of interest to note that this hydrocarbon gas is very similar to that encountered in the Waarre Formation, but has no carbon dioxide reservoired along with it. To what extent this difference may be controlled by factors such as timing of generation/migration and/or relative permeability remains unclear.

Additional items acquired in Langley-1 which provide a contribution to geological knowledge of the area include the core cut in the Waarre Formation Unit C, the routine and special core analysis done on plugs from this core, the dipmeter data and the array sonic data, all of which are relatively sparse in wells in this region.

APPENDIX 1

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APPENDIX 1

RIG SPECIFICATIONS

LANGLEY-1

INVENTORY - RIG #11

CARRIER	Cooper LTO 750 Carrier with triple front and rear axles 54000lb front and 70000lb rear. All necessary highway equipment. Unit levelled with hydraulic jacks when stationary.
SUBSTRUCTURE	17' floor height - 14' below table beams with plates in base.
DRAWWORKS	Cooper 750 H.P. Drawworks. 42" x 12" main drum with Fawick 28VC 1000 clutch and 3000 metres $^{9}/_{16}$" sandline. Driven by 2 each Cat D3406TA Diesel Engines.
ROTARY TABLE	National Rotary Table Model C-175.
DERRICK	Cooper Derrick Model 118-365. Ground height 118'. Maximum rated static hook load 350000 lbs with 10 lines. Mast raised, lowered and telescoped hydraulically.
CROWN BLOCK	Cooper Crown Block with 4 working sheaves. Fast line sheave and dead line sheave. All grooved for 1- $^{1}/_{8}$" line. Sandline sheave grooved for $^{9}/_{16}$" line.
HOOK BLOCK	National Hook Block Model 435 G-175. 175 ton capacity. 4-35" sheaves grooved for 1-$^{1}/_{8}$" line.
SWIVEL	P-200 National.
KELLY SPINNER	Foster Model K-77
SLUSH PUMPS	No. 1: National 8-P-80 Slush Pump. $6^{1}/_{4}$" x $8^{1}/_{2}$" Triplex single acting driven by Cat. D398TA Diesel Engine. No. 2: National 7-P-50 Slush Pump driven by Cat D379TA Diesel Engine.
PULSATION DAMPENER	1 each Hydril Pulsation Dampener type K20-3000.
MUD SYSTEM	2 x 300 bbl tanks incorporating 80 bbl pill tank and 40 bbl trip tank.
SHAKERS	Triton NNF Screening Machine (Linear Motion).
DEGASSER	Drilco Atmosheric Degasser Standard Pit. $7^{1}/_{2}$ H.P. 60 Hz 230v.
DESANDER	Demco Model 122. Two, 12" cone with Warman 6" x 4" Centrifugal pump driven by 50 H.P. Electric Motor.

DESILTER	Pioneer Economaster Model T12-E4. 12 x 4" cones with Warman 6" x 4" Centrifugal pump, driven by a 50 H.P. Electric Motor.
MUD MIXING PUMP	Warman 6" x 4" Centrifugal pump driven by a 50 H.P. Electric Motor.
MUD AGITATORS	4 only Brandt Mud Agitator Model MA 7.5.
B.O.P'S & ACCUMULATOR	10" x 3000 P.S.I. Shaffer Double Gate B.O.P. with $2^{3}/_{8}$", $2^{7}/_{8}$", $3^{1}/_{2}$", $4^{1}/_{2}$", $5^{1}/_{2}$", 7" and Blind. 10" x 3000 P.S.I. Hydril GK Annular B.O.P. Koomey B.O.P. Control Unit. Accumulator Unit Model 100-11S.
CHOKE MANIFOLD	Cameron 5000 psi.
SPOOL	10" x 3000 x 10" x 3000 Flanged Drilling Spool with 3" x 3000 flanged choke and kill outlets.
INSTRUMENTATION	Martin-Decker 6 pen Record-O-Graph Martin-Decker Weight Indicator Type F.S. Martin-Decker Mud Pressure Gauge Martin-Decker Rotary R.P.M. Indicator Martin-Decker Stroke Indicator (2 off) Martin-Decker Rota Torque Indicator Martin-Decker Tong Torque Indicator Martin-Decker Mud Flow Sensor Martin-Decker Mud Flow Fill System Martin-Decker Mud Volume Totaliser (M.V.T.)
AUTOMATIC DRILLER	Satellite Automatic Driller Model SA100-50-1500.
WIRELINE STRIPPER	Guiberson Oil Saver Type H-4.
SURVEY UNIT	Totco 8 Deg Recorder.
MUD LAB	Baroid Rig Laboratory Model 821.
KELLY	$5^{1}/_{4}$" HEX Kelly. $2^{13}/_{16}$" I.D. x 40' long with $6^{5}/_{8}$" API Reg. L.H. Box up 4" I.F. Pin down.
UPPER KELLY VALVE	Upper Kelly Cock. 10000 test $6^{5}/_{8}$" API Reg. L.H. Connections.
LOWER KELLY VALVE	Hydril Kelly Guard. $4^{1}/_{4}$" - 10000 P.S.I. 4" I.F. Pin and Box.
KELLY DRIVE BUSHING	Varco Type 4 KRS Kelly Drive Bushing.
DRILL PIPE	7000' Drill Pipe $4^{1}/_{2}$" O.D. 16.60 lb. Grade E Range 2 with 4" I.F. x 18 degree taper tool joints.
DRILL COLLARS	20 each Drill Collars $6^{1}/_{4}$" O.D. slick $2^{13}/_{16}$" I.D. x 30' long with $4^{1}/_{2}$" XH pin and box connections.

FISHING TOOLS	To suit pipe, collars and tubing.
SUBSTITUTES	To suit drill string.
HANDLING TOOLS	Farr Hydraulic Power Tongs, $13^{3}/_{8}$" Varco SSW-10 spinning wrench. Manual tongs, elevators and slips to handle pipe, collars, casing and tubing.
WELDING EQUIPMENT	Lincoln Electric Welder Model 400AS.
AIR COMPRESSORS	Sullair compressor Package Model 10-30.
AC GENERATOR	2 each Caterpillar 3408TA AC Generator model SR-4. 1800 rpm 60 hz 275 kw.
FUEL TANKS	2 each 10,000 litre - Skid Mounted.
WATER TANK	400 bbl tank with two Warman 3 x 2 pumps driven by 24 hp electric motors.
PIPE RACKS	5 sets 30 feet in length.
CATWALKS	2 piece Catwalk drill pipe construction 42" height.
RADIO	Codan Mobile Transceiver.
TRANSPORTATION	International 530 Payloader. Toyota 4 x 4 Pickup. Toyota 4 x 4 Crew Vehicle.
RIG ACCOMMODATION	2 Skid Mounted Toolpusher/Company Man Units.

CAMP

1- Camp Generator House 31' long x 10' wide skid mounted complete with 2 -3304 T 80 Kw, 50 Hz, 200 - 400 volt generators, camp distribution panel. 6,794 litres fuel storage, 12,000 litres fresh water storage and 24,000 litres shower water storage.

1 Kitchen/Dining Room	40' x 10' x 10'
1 Recreation Room	40' x 10' x 10'
1 Ablution/Laundry	40' x 10' x 10'
3 12 Man Bunkhouses	40' x 10' x 10'
1 Cooler/Freezer	20' x 8' x 8'

APPENDIX 2

GFE RESOURCES LTD

APPENDIX 2

DRILLING FLUID RECAP

LANGLEY-1

GFE RESOURCES LTD
DRILLING FLUID RECAP
LANGLEY-1
OTWAY BASIN
VICTORIA

Prepared by : M. Olejniczak, C. DaSilva
Date : June 1994

TABLE OF CONTENTS

WELL SUMMARY

Operator	:	GFE Resources Ltd
Well Name	:	Langley-1
Average Angle & Direction	:	Vertical
Location	:	Onshore Otway Basin, Victoria
Contractor/Rig	:	Century, Rig 11
Start Date	:	12 May 1994
RKB Elevation	:	5.2 m
Total Depth	:	2006 m MD
Date Reached T.D	:	2 June 1994
Total Days Drilling	:	22 Days
Rig Released	:	8 June 1994
Total Days On Well	:	28 Days

Drilling Fluid Type	**Interval**	**Hole Size**	**Cost (A$)**
Flocculated Native Clay	5 m - 340 m	12-1/4"	658.00
FW/AQUAGEL/CMC	340 m - 1400 m	8-1/2"	6,394.28
KCl/Polymer	1400 m - 2006 m	8-1/2"	23,621.05

Mud Materials Charged To Drilling	**TOTAL**	**A$**	**30,673.33**
Engineer On Location From :	12 May 94 to 7 June 94 (27 days)		
Drilling Fluid Engineering :	27 Days @ $ 530/Day		14,310.00
Total Cost Of Drilling Materials & Engineering		**A$**	**44,983.33**
Mud Materials Not Charged To Drilling		A$	Nil

Casing Program : 9-5/8" @ 334.4 m

Drilling Supervisors : Ken Smith

Baroid Engineers : M. Olejniczak, C. DaSilva

GFE RESOURCES LTD
LANGLEY-1
PPL-1, OTWAY BASIN, VICTORIA

INTRODUCTION-SUMMARY

Langley-1 was spudded on 12 May using Century rig 11.

The 12-1/4" hole was drilled through the surface limestone to 50 m with water only. 1% KCl was then added to inhibit dispersion through the Gellibrand Marl and reduce water consumption. The system was then maintained as a Flocculated Native Clay to the 340 m casing point. There were some problems with unexpected caving of the Gellibrand Marl and minor mud rings during the wiper trip at 340 m. The 9-5/8" casing was run and cemented to 334.4 m, but a surface top up cement job was required.

The same Flocculated Native Clay was used to drill out the casing shoe and continue in 8-1/2" hole through to the top of the Dilwyn Formation at 560 m. The mud system was then converted to an AQUAGEL/CMC to provide improved hole stability and reduced filtration control through the sands of the Dilwyn and Paaratte Formations.

From 1400 m the mud system was again converted to a 3%KCl/Polymer system to provide increased inhibition and improved log separation through the lower part of the Sherbrook Group and into the Eumeralla Formation to the TD of 2006 m.

There were some problems with increasing deviation and tight hole on trips while drilling through the Paaratte Formation. The major problem of the well also occurred in the lower part of the Paaratte Formation. The pipe was differentially stuck pipe at 1438 m, with 3 days lost before drilling resumed. This was a direct result of a draw-works clutch failure while drilling with intermittent high torque.

The well was then drilled to the 2006 m TD, reached on the 2nd June, without any more hole or mud problems. Three drill stem tests, one core and the wireline logs were successfully run. The final caliper log showed the 8-1/2" hole to be in very good gauge with only a few washouts.

The final cost of $30,673.33 for materials used for drilling, (not including cementing and completion) was only 7.5% higher than programmed, despite the stuck pipe problem and the slower than expected drilling.

GFE RESOURCES LTD
LANGLEY-1
PPL-1, OTWAY BASIN, VICTORIA

DISCUSSION BY INTERVAL

12 1/4" Hole : 5 m - 340 m (335 m Drilled - 2 Days)
Formations : Port Campbell Lst, Gellibrand Marl

DRILLING FLUID : Water to Flocculated Native Clay

As the surface limestone appeared to be quite competent and the Gellibrand Marl was expected very close to surface the hole was spudded in using water only.

The limestone was thicker than expected with the first thin bands of marl only occurring from about 50 m. Forty sacks of Potassium Chloride were immediately added to give a KCl content of close to 1%. This was done to inhibit the hydration of the Gellibrand Marl and reduce water dilution and dumping requirements.

Drilling continued steadily through the marl to the 340 m casing point. No more KCl was added with the KCl content allowed to gradually reduce by dilution to 0.3%. Lime was regularly added to maintain flocculation of the system and provide additional inhibition. Dilution with water was used to control viscosity and mud weight.

TYPICAL MUD PROPERTIES

Weight	:	8.5 to 8.9	ppg
Viscosity	:	28 to 42	seconds/qt
Yield Point	:	0 to 25	lb/100 ft^2
API Filtrate	:	No Control	ml
Chlorides	:	4,500 to 2,000	mg/L
KCL Content	:	0.8 to 0.3	% by wt soln.

HOLE CONDITIONS

There were no hole problems during actual drilling of the section. A large amount of cuttings was returned at the shakers during drilling. The proportion of cavings appeared to increase with depth.

After circulating the hole clean for a half hour, the wiper trip at casing point was run without problems, but mud ring problems after circulation resumed blocked the flowline. The shaker had to be bypassed and returns dumped temporarily, with water dilution used to control the problem. A large amount of marl cavings up to 2-1/2" in size was returned at the shakers.

The 9-5/8" casing was run to 334.4 m, with the last joint requiring washing to bottom. While circulating the casing a large amount of cavings was again returned. The casing was cemented, using about 80% excess, but no cement returns were observed. The cement was later measured at 9 m below surface, and was topped up by hand.

SOLIDS CONTROL

The single Triton shaker was run with a combination of 80/50/50 mesh screens. The desander and desilter were run continuously. Almost no volume was dumped during drilling. However, a severe weight and viscosity increase after the wiper trip, at casing point, had to be controlled by temporarily dumping returns and diluting with water.

CONCLUSIONS AND RECOMMENDATIONS

- The use of the KCl and Lime inhibited the marl sufficiently so that there was no need for dumping during drilling, with a controlled viscosity obtained. This would have been impossible with a fresh water mud.

- Concerns for minimising dumping to the small sump led to the viscosity of the system being run in the 40 to 42 second range. In retrospect this was too high. Mud ring problems on the wiper trip would have been reduced with a much lower 34 to 36 second viscosity.

- The large amount of cavings and lack of cement returns indicated the hole was significantly enlarged. This caving of the Gellibrand Marl is unusual and has not been observed on previous wells in the area. There was no significant difference in the drilling fluid or hydraulics. It may be the result of a localised geological variation.

- There is scope for extending inhibition of the Gellibrand Marl to reduce viscosity and potential mud ring problems and dilution requirements. This is becoming more important as there is more pressure to reduce sump clean-up costs. Below are several low cost options depending on the mud system to be used for the next hole section.

  1) Maintain a 1% KCl content through to casing point. The system could then be continued as a KCl/Polymer for the next section.
  2) Continue with increased Lime additions and control viscosity using a lignosulphonate such as QB II, ENVIROTHIN or POLYNOX. The system could then be continued as a Lime/Polymer for the next section.
  3) "Clear Water" drill the section using a PHPA flocculant. Lime, $CaCl_2$ or KCl can be used as the required ionic component. This cannot be used if there is any potential for washing out the surface conductor. A significant amount of water can be recycled from the sump. As basically water is left in the pits this is compatible with continuing with any water based mud for the next section.

GFE RESOURCES LTD
LANGLEY-1
PPL-1, OTWAY BASIN, VICTORIA

DISCUSSION BY INTERVAL

8 1/2" Hole : 340 m - 1400 m (1060 m Drilled - 6.5 Days)
Formations : Gellibrand Marl to Skull Creek Mudstone

DRILLING FLUID : Fresh Water AQUAGEL/CMC EHV

The 9-5/8" casing shoe was drilled out using old Lime-Flocculated mud from the previous section, diluted with water. The cement contamination was left untreated.

Drilling then continued through the Gellibrand Marl diluting with water. The dilution rate was controlled to minimise dumping to the small sump, and conserve volume for the higher dilution rates expected in the Dilwyn and Paaratte Formations. The high pH from the earlier cement contamination steadily reduced.

From the top of the Dilwyn Sandstone at 560 m, CMC-EHV was steadily added to a concentration of about 1ppb. Pre-hydrated AQUAGEL was added to maintain the mud viscosity above 40 seconds. This reduced the API filtrate of the mud to the 8.5-9.0 ml range.

There were noticeable downhole seepage losses of 2-3 bbl/hr while drilling through the sands of the Paaratte formation. The clay content, (MBT) of the mud was allowed to steadily decrease to 9 ppb towards the base of the Paaratte to minimise problems converting to a KCl/Polymer system. This began at 1400 m after drilling into the Skull Creek Mudstone.

TYPICAL MUD PROPERTIES

Weight	:	8.8 to 9.0	ppg
Viscosity	:	40 to 42	seconds/qt
Yield Point	:	10 to 14	lb/100 ft^2
API Filtrate	:	Reducing to 8.5	ml
Chlorides	:	1,000 to 1,500	mg/L
KCL Content	:	Nil	% by wt soln.
MBT	:	8 to 10	ppb

HOLE CONDITIONS

A 25 stand wiper trip was run at 832 m, without problems. On the next wiper trip at 1228 m, the pipe pulled tight from near bottom and was temporarily stuck at 1076 m. It was worked free through tight hole up to 1035 m over 1 hour and was then run back in with only 2 m of fill.

A full trip was run at 1257 m for a BHA change. There were no problems pulling out, but 2 hrs were required to ream back in from 1062-1075 m and 1177-1257 m. Another trip was run

assembly because of continuing problems with increasing hole deviation. It took 13-1/2 hrs to ream this assembly back to bottom from 947 m.

SOLIDS CONTROL

The single Triton shaker was run with a combination of 80/50/50 mesh screens. The desander and desilter were run continuously. The mud weight was easily controlled at 8.9-9.0 ppg without any dumping required, due to the low clay content of the formations.

CONCLUSIONS AND RECOMMENDATIONS

- There were no mud problems through this section with mud properties closely following the program.

- The caliper log at TD showed this section to be mostly close to gauge at 8 1/2" to 9". This indicates that the reduced hydraulics run were successful in reducing hole washout in the loose sand sections.

- The tight hole and reaming problems during tripping through the Paaratte formation would have been due to :
  1) Filter cake build up across the very permeable sandstone.
  2) Near gauge hole. (caliper log showed 8 3/4" for this section at TD.)
  3) Variations in the deviation which finally resulted in the stiff assembly being run.

- Suggestions to reduce the tight hole and reaming problems would include :
  1) Reduce the programmed API filtrate through the Paaratte Formation.
  2) Run more frequent short wiper trips to wipe the hole of filter cake buildup.
  3) Consider the addition of BARACARB, (ground to size Limestone), to the system to act as a pore throat plugging agent, reducing permeability.

GFE RESOURCES LTD
LANGLEY-1
PPL-1, OTWAY BASIN, VICTORIA

DISCUSSION BY INTERVAL

8-1/2" Hole : 1400 m to 2006 m (606 m Drilled, 18.5 Days)
Formations : Skull Creek Mudstone to TD in Eumeralla.

DRILLING FLUID : KCl/Polymer.

Conversion of the previous fresh water AQUAGEL/CMC mud to a KCl/Polymer began at 1400 m. This had barely begun when the rig clutch broke down at 1438 m and the pipe became differentially stuck. The completion of the conversion had to be delayed until after the pipe was freed.

The KCL content was then increased to 3 %, with PAC R and PAC L used for viscosity and filtration control. The system was simply maintained by added all chemicals as pre-mixed mud from the reserve pit. No more pre-hydrated AQUAGEL was used for the remainder of the well.

Through the Nullawaare and Belfast Formations the mud rheology increased due to the large amount of clay solids incorporated into the system. The viscosity rose to the 50-55 seconds range with yield points of 18-20 lb/100ft^2. The sandtrap was dumped regularly to control the mud weight and viscosity. The mud weight was allowed to increase to the required 9.3 ppg by the top of the Waare Formation target without any barite being added.

From the Waare Formation through to TD, the lower clay content of the formations resulted in a lower mud rheology being more easily maintained, with viscosities of 42-48 seconds and yield points of 15-20 lb/100 ft^2.

TYPICAL MUD PROPERTIES.

Weight	:	9.0 to 9.3+	ppg
Viscosity	:	42 to 50	seconds/qt
Yield Point	:	16 to 20	lb/100 ft^2
API Filtrate	:	7.0 to 8.0	ml
Chlorides	:	15,000 to 18,000	mg/L
KCl Content	:	3.0	% by wt soln.
MBT	:	10 to 12	ppb

HOLE CONDITIONS.

At 1438 m while drilling with the new stiff assembly and intermittent high torque, the rig clutch broke down. The drill pipe, which was on bottom and could not be rotated or moved for several hours, became differentially stuck while the clutch was being repaired. The pipe was worked and the hole displaced to water twice, before it was freed using a 32 bbl EZ SPOT pill.

There were no major hole problems during drilling and tripping for the rest of the well. Trips were run at 1638 m, 1732 m, 1745 m, 1764 m, 1897 m, 1910 m, and the 2006 m TD with only minor tight hole experienced. Wireline logs were run at TD with no problems. Two drill stem tests were run during drilling at 1745 m and 1910 m, with no problems running in or pulling out. DST 1 successfully flowed gas, but DST 2 was a misrun. This interval was successfully straddle tested after wireline logging, (DST 3), with only a weak blow recorded.

The hole continued to take an average of 2-1/2 bbls of mud per hour during wireline logging.

There were still problems with the draw-works clutch slipping, particularly after reaching TD, which caused further delays.

SOLIDS CONTROL.

The shaker was run with 1x80 and 2x50 mesh screens. The desander and desilter were run continuously. All the solids control equipment worked well, with the mud weight kept to 9.3 ppg as programmed. There was no centrifuge available on this well, nor was one required.

CONCLUSIONS AND RECOMMENDATIONS.

- The primary cause of the stuck pipe at 1438 m was the clutch failure. The drill string was on bottom and could not be rotated or moved for several hours, becoming differentially stuck.

- Except for the stuck pipe incident, hole conditions were very good. The end of well caliper log showed the section to be a very uniform 9" gauge, except for the zone where the pipe had been stuck, which was up to 20". This would have resulted from the jarring, working of pipe and displacing to water done at that depth.

- The fact that the stuck pipe occurred as the mud system was beginning to be converted does not mean that this was a contributing factor. There had already been tight hole and one instance of temporarily stuck pipe with the fresh water/AQUAGEL/CMC used previously. In addition the continuing downhole losses of 2-1/2 bbl/hr measured while logging shows there was still potential for differential sticking with the KCl/Polymer system. For recommendations to reduce the potential for differential sticking, see the recommendations for the previous section.

- There were no major problems with the KCL/Polymer mud system. It is recommended the same mud system be used in future wells in this area through this section.

GFE RESOURCES LTD
LANGLEY-1
PPL-1, OTWAY BASIN, VICTORIA

APPENDIX - A

FORMATION TOPS

Formation	Measured Depth (m)
Mepunga	510
Dilwyn Sandstone	560
Pember Mudstone	778
Pebble Point	836
Paaratte	917
Skull Creek Mudstone	1348
Nullawaare	1427
Belfast Mudstone	1545
Waarre	1716
Eumeralla	1826
T.D.	2006

GFE RESOURCES LTD
LANGLEY-1
PPL-1, OTWAY BASIN, VICTORIA

APPENDIX - B

8 1/2" HOLE CALIPER DATA (averaged)

Measured Depth (m)	Hole Size (ins)	
340 - 400	9.0	
400 - 440	9.0	
450 - 475	9.0	
475 - 510	8.5 - 16.0	(off scale)
510 - 550	9.0	
550 - 600	9.0	
600 - 650	10.5	
650 - 700	9.0	
700 - 778	9.0	
778 - 825	8.5 - 20.0	(off scale)
825 - 875	9.0	
875 - 917	9.0	
917 - 950	8.75	
950 - 1000	8.75	
1000 - 1050	8.75	
1050 - 1100	8.75	
1100 - 1150	8.75	
1150 - 1200	8.75	
1200 - 1250	8.75	
1250 - 1275	12.5	
1275 - 1300	9.0	
1300 - 1325	12.5	
1325 - 1350	8.75	
1350 - 1375	8.5 - 20.0	(off scale)
1375 - 1425	8.5 - 20.0	(off scale)
1425 - 1525	9.0	
1525 - 1625	9.0	
1625 - 1725	9.0	
1725 - 1825	9.0	
1825 - 1870	9.0	
1870 - 1910	9.0	
1910 - 2006	9.0	

Baroid Australia Pty Ltd

COMPANY GFE Resources Ltd
WELL Langley – 1
LOCATION Otway Basin, Victoria
CONT/RIG Century Rig 11

DAILY ACTIVITY SUMMARY

1994	ACTIVITY
12 – May	Spud in with water at 13:30 hrs after pre – spud meeting. Drilled 12 1/4" hole through limestone and marl at 20 to 30 m/hr.
13 – May	Drilled to 340 m casing point at 05:00 hrs. Circulated hole clean for 1/2 hr. Ran wiper trip, then circulated hole clean for another hour. POH and ran 9 5/8" casding, washing last joint to bottom. Circulated casing for 1 hr. Cemented xcasing with 15.6 ppg neat slurrey. WOC.
14 – May	Wait on cement. Used 14 sxs cement to do top up on surface casing. Nippled up BOP and pressure tested. Began making up 8 1/2" BHA.
15 – May	RIH and tagged cement at 318 m. Drilled out cement and shoe with mud, then drilled 6m new hole to 346 m. Ran PIT test giving 22.6 ppg EMW. Continued drilling through marl. Had to clear flowline of mud ring at 395 m for 1 hour. Continued drilling taking regular surveys.
16 – May	Drilled to 832 m. Circulated out for 1/2 hr then ran 25 stand wiper trip to casing shoe. Ran back in without problems and no fill. Continued drilling from 12:30 hrs. Reduced bit weight and taking more surveys as deviation increased.
17 – May	Drilled to 1228 m. Circulated out 1/2 hr, then POH for wiper trip. Pipe pulled tight from near bottom. Temporarily stuck at 1076 m. Worked free, and worked pipe through tight hole to 1035 m over 1 hr. Continued POH to 823 m. Ran back in without problems. Had 2 m fill. Resumed drilling but survey line broke during survey at 1257 m. POH to recover line and survey barrel.
18 – May	Continued POH. Checked bit, changed BHA and slipped line. Ran back into hole. Had to ream in from 1062 to 1075 m over 1/2 hr and from 1177 to 1257 m over 1 1/2 hrs. resumed drilling from 11:30 hrs.
19 – May	Drilled to 1363 m at 08:30 hrs. Circ out 1/2 hr, then POH for bit and BHA change. Had to work tight hole from 1302 to 1158 m pulling out. Changed bit and added 2 stabilisers to BHA to stiffen BHA. RIH to 947 m. Had to ream in the rest of the way. Reached 1240 m.
20 – May	Reamed to bottom and continued drilling ahead. At 1438m incountered some torque. Pulled up and clutch went down. Could not move the pipe for several hours while repairing clutch. After fixing the clutch tried to pull pipe. The pipe was stuck, work pipe. Working pipe and activating jars.
21 – May	Worked stuck pipe. Displaced annulas with 258bbls of water and work pipe. Hold tension and torque on pipe for one hour, then work pipe again. Reverse circulate with mud to water at shakers and work pipe. Continued to work pipe while waiting on Schlumberger,not circulating. Circulated and displaced water with active mud, dump water in sump. Running wireline free point indicator.
22 – May	Completed free point. Circulated hole clean, then displaced the hole to water. Work stuck pipe. Mix and pump 32 bbls EZ Spot around collars and HWDP, Work pipe straight away. Rig up and run another free point. Pipe came free while running free point. Circulated and displaced water and EZ Spot Diesel with mud. Circulated and conditioned mud.
23 – May	Pulled out of the hole and changed bit. Tight hole from 1361 to1226m on the way out. Ran in the hole to 1238m washed to bottom.

1994 ACTIVITY

24 – May Continue drilling 8.5" hole, survey at 1527m.

25 – May Drilling ahead 8.5" hole to 1623m. Made 10 stand wiper trip OK. Continued drilling ahead , at 1628m circvlated up a sample.

26 – May Continued drilling ahead without any hole problems to 1729m, there was a drilling break at this point. Drilled to 1731m and circulated up a sample. Tried to drill 3m extra but only managed 1m, because the bit was torqueing up. POH.

27 – May Ran in the hole to 1713m wash to bottom at 1732m. Circulated bottoms up prior to drilling to 1734m, circulated up sample. Drilled to 1745m Circulated up sample. It was decided to do a test at this depth, made a wpier trip to the shoe. Ran back to bottom and circulated hole clean prior to POH for DST # 1.

28 – May Ran in the hole and perform DST # 1. Interval 1715m to 1745m, Recovered CO2 gas. Pulled out of the hole and laid out test tool. Made up core barrel and ran in the hole. Wash and ream last 15m to bottom.

29 – May Core from 1745m to 1764m. POH with core barrel and lay out core. Ran in the hole with 8.5" bit, Drilling ahead.

30 – May Continued drilling through Waare and Eumeralla formations at 2 – 3 m/hr.

31 – May Drilled to 1897m, circulated up sample for Geologist as gas increased to 70 units. Then made a wiper trip (10 stands), tight from 1802 – 1742m. Drilled on to 1910m, circulated up sample for Geologist. (Gas 87units) Decided to test, POOH for DST # 2.

01 – Jun Ran in the hole with test tool, and perform DST # 2. Interval 1875m to 1910m. Did not flow, pulled out of the hole. Ran back in with bit to 1890m, washed to bottom and circulated for thirty five minutes prior to drilling ahead 8.5" hole.

02 – Jun Continued drilling ahead 8.5" hole to 2006m. (T.D.) circulated bottoms up prior to making a 42 stand wiper trip, no hole problems on trip. Circulated the hole clean, and POOH to log.

03 – Jun Running wire line logs. Logging tool got to bottom without any problems.

04 – Jun After WRT log , Ran in the hole for a wiper trip. Circulated the hole clean. Draw works clutch silpping, repair clutch and POOH to log. Continued logging.

05 – Jun Completed logging and ran in the hole for a wiper trip. Circulated bottoms up at 2000m, could not get to bottom as had problems with the clutch slipping. POOH to the shoe and repair clutch.

06 – Jun Ran in the hole, clutch slipping so POOH to the shoe. Work on clutch, then ran in the hole with 25 stands. Clutch slipping so POOH to the shoe again and repair clutch. Ran in the hole clutch OK. Wash last 20m to bottom, and circulated the hole clean prior to POOH to test . Made up test tools.

07 – Jun Ran in the hole and performed DST # 3, interval 1882.9 – 1909.1m POOH with test tool. Layed out test tools and layed down BHA. Ran in the hole open ended to set four cement plugs.

BLANK

Baroid Australia Pty Ltd

MATERIAL RECAP

COMPANY GFE Resources Ltd
WELL Langley–1
LOCATION Otway Basin, Victoria

HOLE SIZE 12 1/4"
CONTRACTOR/RIG Century Rig 11
MUD TYPE Flocculated Native Clay

INTERVAL TO (m)	340	DRILLING DAYS	2	COST/DAY	A$329.00
FROM (m)	5	ROTATING HRS	12.5	COST/m	A$1.96
DRILLED (m)	335			COST/bbl	A$0.79
DATE	13–May–94			CONSUMPTION FACTOR (bbl/m)	2.47

MATERIAL	UNIT SIZE	UNIT COST	QUANTITY EST	QUANTITY ACT	CONC (lb/bbl) EST	CONC (lb/bbl) ACT	TOTAL COSTS ESTIMATE	TOTAL COSTS ACTUAL
KCL,Tech(sx)	25 kg	14.44	35	40	2.0	2.7	505.40	577.60
Lime	25 kg	8.04	10	10	0.6	0.7	80.40	80.40

				COST LESS BARITE :	A$585.80	A$658.00
VOLUMES				COST WITH BARITE :	A$585.80	A$658.00
Sea W.	bbl					
Drill W.	bbl		957.6	825		
other	bbl					
other	bbl					
Chemical	bbl		3.4	4		
Salvaged Mud	bbl					
TOTAL MUD USED	bbl		961	829		

COMMENTS
Spud in with water. KCl and Lime used to inhibit Gellibrand Marl and flocculate incorporated clays.

Baroid Australia Pty Ltd

MATERIAL RECAP

COMPANY GFE Resources Ltd
WELL Langley–1
LOCATION Otway Basin, Victoria

HOLE SIZE 8 1/2"
CONTRACTOR/RIG Century Rig 11
MUD TYPE FW/AQUAGEL/CMC

INTERVAL TO (m)	1400	DRILLING DAYS	6.5	COST/DAY	A$983.74
FROM (m)	340	ROTATING HRS	67	COST/m	A$6.03
DRILLED (m)	1060			COST/bbl	A$3.26
DATE	20–May–94			CONSUMPTION FACTOR (bbl/m)	1.85

MATERIAL	UNIT SIZE	UNIT COST	QUANTITY EST	QUANTITY ACT	CONC (lb/bbl) EST	CONC (lb/bbl) ACT	TOTAL COSTS ESTIMATE	TOTAL COSTS ACTUAL
AQUAGEL,sx	25 kg	14.33	336	126	7.0	3.5	4,814.88	1,805.58
Caustic Soda	25 kg	32.43	13	10	0.3	0.3	421.59	324.30
CMC EHV	25 kg	106.61	32	40	0.7	1.1	3,411.52	4,264.40
Soda Ash	25 kg	16.15	4		0.1		64.60	

COST LESS BARITE :	A$8,712.59	A$6,394.28
COST WITH BARITE :	A$8,712.59	A$6,394.28

VOLUMES			
Sea W.	bbl		
Drill W.	bbl	2307.5	1610
other	bbl		
other	bbl		
Chemical	bbl	25.5	13
Salvaged Mud	bbl	300	336
TOTAL MUD USED	bbl	2633	1959

COMMENTS
Retained 336 bbl of old mud from 12 1/4" section. Prehydrated AQUAGEL and CMC–EHV used to maintain viscosity and filtration through sands of Dilwyn and Paraatte Formations.

Baroid Australia Pty Ltd

MATERIAL RECAP

COMPANY GFE Resources Ltd
WELL Langley–1
LOCATION Otway Basin, Victoria

HOLE SIZE 8 1/2"
CONTRACTOR/RIG Century Rig 11
MUD TYPE KCl/Polymer

INTERVAL TO (m)	2006	DRILLING DAYS	18.5	COST/DAY	A$1,276.81
FROM (m)	1400	ROTATING HRS	140.5	COST/m	A$38.98
DRILLED (m)	606			COST/bbl	A$24.25
DATE	7–Jun–94			CONSUMPTION FACTOR (bbl/m)	1.61

MATERIAL	UNIT SIZE	UNIT COST	QUANTITY EST	QUANTITY ACT	CONC (lb/bbl) EST	CONC (lb/bbl) ACT	TOTAL COSTS ESTIMATE	TOTAL COSTS ACTUAL
BARACIDE	25 kg	549.92	1	1	0.0	0.1	549.92	549.92
BARACOR 129	25 kg	64.96	3	5	0.1	0.3	194.88	324.80
Barite,sx	50 kg	15.96	81		5.0		1,292.76	
Caustic Soda	25 kg	32.43	14	18	0.4	1.0	454.02	583.74
CMC EHV	25 kg	106.61		9		0.5		959.49
EZ SPOT	208 lt	761.18		2		0.9		1,522.36
KCL,Tech(sx)	25 kg	14.44	300	335	9.3	19.0	4,332.00	4,837.40
PAC–R	50 lb	170.74	36	46	1.0	2.4	6,146.64	7,854.04
PAC–L	50 lb	170.74	36	40	1.0	2.1	6,146.64	6,829.60
Soda Ash	25 kg	16.15	5		0.2		80.75	
BARAFILM	25 lt	159.7		1		0.1		159.70

				COST LESS BARITE :	A$17,904.85	A$23,621.05
				COST WITH BARITE :	A$19,197.61	A$23,621.05

VOLUMES			
Sea W.	bbl		
Drill W.	bbl	1241.2	935
other	bbl		
other	bbl		
Chemical	bbl	37.8	39
Salvaged Mud	bbl	500	
TOTAL MUD USED	bbl	1779	974

COMMENTS
500 bbl old mud converted to KCl/Polymer from 1400 m. KCl/Polymer maintained to TD.
1 x 25 L can BARAFILM used for drill pipe coating while pulling out sideways at end of well.

Baroid Australia Pty Ltd

MATERIAL SUMMARY

COMPANY GFE Resources Ltd
WELL Langley–1

LOCATION Otway Basin, Victoria
CONTRACTOR/RIG Century Rig 11

INTERVAL MUD TYPES	SIZE	m	DAYS	HOURS
Flocculated Native Clay	12 1/4"	335	2	12.5
FW/AQUAGEL/CMC	8 1/2"	1060	6.5	67
KCl/Polymer	8 1/2"	606	18.5	140.5
TOTALS		2001	27	220

WELL DURATION
FROM : 12–May–94
TO : 07–Jun–94

COST/DAY A$1,136.05
COST/m A$15.33
COST/bbl A$8.95
CONSUMPTION FACTOR (bbl/m) 1.71

RECAP BY M. Olejniczak, C. Da Silva.

MATERIAL	UNIT SIZE	UNIT COST	QUANTITY ESTIMATE	QUANTITY ACTUAL	TOTAL COSTS ESTIMATE	TOTAL COSTS ACTUAL
AQUAGEL,sx	25 kg	14.33	336	126	4,814.88	1,805.58
BARACIDE	25 kg	549.92	1	1	549.92	549.92
BARACOR 129	25 kg	64.96	3	5	194.88	324.80
Barite,sx	50 kg	15.96	81		1,292.76	
Caustic Soda	25 kg	32.43	27	28	875.61	908.04
CMC EHV	25 kg	106.61	32	49	3,411.52	5,223.89
EZ SPOT	208 lt	761.18		2		1,522.36
KCL,Tech(sx)	25 kg	14.44	335	375	4,837.40	5,415.00
Lime	25 kg	8.04	10	10	80.40	80.40
PAC–R	50 lb	170.74	36	46	6,146.64	7,854.04
PAC–L	50 lb	170.74	36	40	6,146.64	6,829.60
Soda Ash	25 kg	16.15	9		145.35	
BARAFILM	25 lt	159.7		1		159.70

COST LESS BARITE : A$27,203.24 A$30,673.33
COST WITH BARITE : A$28,496.00 A$30,673.33

VOLUMES			
Sea W.	bbl		
Drill W.	bbl	4506.3	3370
other	bbl		
other	bbl		
Chemical	bbl	66.7	56
Salvaged Mud	bbl		
TOTAL MUD USED	bbl	4573	3426

COMMENTS

Baroid Australia Pty Ltd

WEEKLY INVENTORY

COMPANY GFE Resources Ltd

WELL Langley-1

YEAR 1994

MATERIAL	DATE / Size	12/05			13/05			14/05			15/05			16/05			17/05			18/05		
		Used	Rec	Bal	Used	Rec	Bal	Used	Rec	Bal	Used	Rec	Bal	Used	Rec	Bal	Used	Rec	Bal	Used	Rec	Bal
AQUAGEL,sx	25 kg		432	432			432			432	68		364	58		306			306			306
BARACIDE	25 kg		1	1			1			1			1			1			1			1
BARACOR 129	25 kg		8	8			8			8			8			8			8			8
Barite,sx	50 kg		200	200			200			200			200			200			200			200
Barite,sx	25 kg		400	400			400			400			400			400			400			400
Caustic Soda	25 kg		40	40			40			40	2		38	3		35	2		33	2		31
CMC EHV	25 kg		49	49			49			49	5		44	5		39	6		33	10		23
EZ SPOT	208 lt		2	2			2			2			2			2			2			2
KCL,Tech(sx)	25 kg	40	360	320			320			320			320			320			320			320
Lime	25 kg	10	10																			
PAC-R	50 lb		40	40			40			40			40			40			40			40
PAC-L	50 lb		40	40			40			40			40			40			40			40
Soda Ash	25 kg		20	20			20			20			20			20			20			20

Baroid Australia Pty Ltd

WEEKLY INVENTORY

COMPANY GFE Resources Ltd

WELL Langley-1

YEAR 1994

MATERIAL	DATE	19/05			20/05			21/05			22/05			23/05			24/05			25/05		
	Size	Used	Rec	Bal	Used	Rec	Bal	Used	Rec	Bal	Used	Rec	Bal	Used	Rec	Bal	Used	Rec	Bal	Used	Rec	Bal
AQUAGEL,sx	25 kg			306			306			306			306			306			306			306
BARACIDE	25 kg			1			1			1			1			1			1			1
BARACOR 129	25 kg			8			8			8			8			8	4		4	1		3
Barite,sx	50 kg			200			200			200			200			200			200			200
Barite,sx	25 kg			400			400			400			400			400			400			400
Caustic Soda	25 kg	1		30	1		29			29			29	1		28	4		24	2		22
CMC EHV	25 kg	11		12	5		7			7			7			7			7	3		4
EZ SPOT	208 lt			2			2			2	2											
KCL,Tech(sx)	25 kg			320	20		300			300	10		290	50		240	90		150	30		120
Lime	25 kg																					
PAC-R	50 lb			40	2		38			38	1		37			37	7		30	10		20
PAC-L	50 lb			40	4		36	4		32	1		31	10		21	8		13	3		10
Soda Ash	25 kg			20			20			20			20			20			20			20

Baroid Australia Pty Ltd

WEEKLY INVENTORY

COMPANY GFE Resources Ltd

WELL Langley-1

YEAR 1994

MATERIAL	DATE / Size	26/05			27/05			28/05			29/05			30/05			31/05			01/06		
		Used	Rec	Bal	Used	Rec	Bal	Used	Rec	Bal	Used	Rec	Bal	Used	Rec	Bal	Used	Rec	Bal	Used	Rec	Bal
AQUAGEL,sx	25 kg			306			306			306			306			306			306			306
BARACIDE	25 kg			1			1			1			1			1			1			1
BARACOR 129	25 kg			3			3			3			3			3			3			3
Barite,sx	50 kg			200			200			200			200			200			200			200
Barite,sx	25 kg			400			400			400			400			400			400			400
Caustic Soda	25 kg	1		21	1		20	1		19	2		17	1		16	1		15			15
CMC EHV	25 kg	4																				
EZ SPOT	208 lt																	1	1			1
KCL,Tech(sx)	25 kg	40		80	30		50			50	10		40			40		80	120			120
Lime	25 kg																					
PAC-R	50 lb	6		14			14			14	4		10	4		6	2	40	44			44
PAC-L	50 lb			10			10			10	3		7	2		5	5	40	40			40
Soda Ash	25 kg			20			20			20			20			20			20			20

Baroid Australia Pty Ltd

WEEKLY INVENTORY

COMPANY GFE Resources Ltd

WELL Langley-1

YEAR 1994

MATERIAL	DATE Size	02/06			03/06			04/06			05/06			06/06			07/06					
		Used	Rec	Bal	Used	Rec	Bal	Used	Rec	Bal	Used	Rec	Bal	Used	Rec	Bal	Used	Rec	Bal			
AQUAGEL,sx	25 kg			306			306			306			306			306			306			
BARACIDE	25 kg	1																				
BARACOR 129	25 kg			3			3			3			3			3			3			
Barite,sx	50 kg			200			200			200			200			200			200			
Barite,sx	25 kg			400			400			400			400			400			400			
Caustic Soda	25 kg	2		13			13	1		12			12			12			12			
CMC EHV	25 kg																					
EZ SPOT	208 lt			1			1			1			1			1			1			
KCL,Tech(sx)	25 kg	40		80			80			80	15		65			65			65			
Lime	25 kg																					
PAC-R	50 lb	8		36			36			36	2		34			34			34			
PAC-L	50 lb			40			40			40			40			40			40			
Soda Ash	25 kg			20			20			20			20			20			20			
BARAFILM	25 lt																1	2	1			

Baroid Australia Pty Ltd

MATERIAL RECONCILIATION

COMPANY GFE Resources Ltd
WELL Langley-1
LOCATION Otway Basin, Victoria
CONT/RIG Century Rig 11
DATES : FROM 12-May-94
TO 07-Jun-94

MATERIAL	UNIT SIZE	ON SITE PRICE (A$)	DELIVERIES BY DT No. DT 337077 5/5/94	DT 337186 5/5/94	DT 337092 26/5/94	GFE stock 5/5/94	TOTAL	VALUE (A$)	INTERVAL USEAGE (1) 12 1/4"	(2) 8 1/2"	(3) 8 1/2"	TOTAL	VALUE (A$)	FINAL INVENTORY	VALUE (A$)	COMMENTS
AQUAGEL,sx	25 kg	14.33	423				423	6061.59		126		126	1805.58	306	4384.98	Balance to Mylor-1
BARACIDE	25 kg	549.92	1				1	549.92			1	1	549.92			
BARACOR 129	25 kg	64.96		8			8	519.68			5	5	324.8	3	194.88	Balance to Cobden
Barite,sx	50 kg	15.96		200			200	3192						200	3192	Balance to Mylor-1
Barite,sx	25 kg	7.98		400			400	3192						400	3192	Balance to Mylor-1
Caustic Soda	25 kg	32.43	40				40	1297.2		10	18	28	908.04	12	389.16	Balance to Mylor-1
CMC EHV	25 kg	106.61		49			49	5223.89		40	9	49	5223.89			
EZ SPOT	208 lt	761.18				3	3	2283.54			2	2	1522.36	1	761.18	Balance to Mylor-1
KCL,Tech(sx)	25 kg	14.44	360		120		480	6931.2	40		335	375	5415	65	938.6	Balance to Cobden
Lime	25 kg	8.04		10			10	80.4	10			10	80.4			
PAC-R	50 lb	170.74	40		40		80	13659.2			46	46	7854.04	34	5805.16	Balance to Mylor-1
PAC-L	50 lb	170.74	40		40		80	13659.2			40	40	6829.6	40	6829.6	Balance to Mylor-1
Soda Ash	25 kg	16.15		20			20	323						20	323	Balance to Mylor-1
BARAFILM	25 lt	159.7		2			2	319.4			1	1	159.7	1	159.7	Balance to Mylor-1
TOTALS A$								57292.22					30673.33		26170.26	

Baroid Australia Pty Ltd

SOLIDS CONTROL and MUD VOLUME ANALYSIS

COMPANY GFE Resources Ltd
WELL Langley–1
LOCATION Otway Basin, Victoria
CONT/RIG Century Rig 11

1994

SOLIDS CONTROL		12–May	13–May	14–May	15–May	16–May	17–May	18–May	19–May	20–May	21–May
Shaker 1	Screens	50,50'80	50,50,80	50,50,80	50,50,80	50,50,80	50,50,80	50,50,80	50,50,80	50x50x80	50x50x80
	Hrs	10.5	7.5		21	21	17	15	16.5	17	18
Shaker 2	Screens										
	Hrs										
Shaker 3	Screens										
	Hrs										
Shaker 4	Screens										
	Hrs										
Desander	U/F ppg	10.4	10.5		11.6	11.5	11.4	11.1	11.2	11.3	
	bbl/hr	3.5	3.5		4.5	2.5	4	3	1.5	1.3	
	Hrs	1	1		12	21	17	11	15	12	
	bbl	4	4		54	53	68	33	23	16	
Desilter 1.	U/F ppg	10.8	11.2		11.4	11.4	11.1	11	11	10.7	
	bbl/hr	10	5		5	7	6	6	4	3	
	Hrs	6.5	5		20	21	17	15	12	12	
	bbl	65	25		100	147	102	90	48	36	
Desilter 2.	U/F ppg										
	bbl/hr										
	Hrs										
	bbl										
Centrifuge 1	Feed ppg										
	O/F ppg										
	U/F ppg										
	bbl/hr										
	Hrs										
	bbl										
Centrifuge 2	Feed ppg										
	O/F ppg										
	U/F ppg										
	bbl/hr										
	Hrs										
	bbl										

VOLUMES bbl		12–May	13–May	14–May	15–May	16–May	17–May	18–May	19–May	20–May	21–May
Downhole Volume		128	84	84	145	228	272	288	296	312	312
Initial Reserve						74	74	74	34	14	14
Added:	Act Mud										
	Seawater										
	Drill–Water				135	130	60	220	200		
	other										
	other										
	Chemical				5	4	1	1	1		
Final Reserve					74	74	74	34	14	14	14
Initial Active			220	336	336	450	450	350	374	374	389
Added:	Res Mud				66	134	61	261	221		
	Seawater										
	Drill–Water	425	400		435	250	120			80	
	other										
	other										
	Chemical	4								3	
Losses:	Solids Control	69	29		154	200	170	123	71	52	
	Lost/Dumped	12	299		172	51	47	63	82		60
	DownHole					50	20	35	60		18
Final Active		220	336	336	450	450	350	374	374	389	311
Total Final Volume		220	336	336	524	524	424	408	388	403	325

DILUTION										
Interval Type	Sect 1.	Sect 1.	Sect 2.	Sect 2.	Sect 2.	Sect 2.	Sect 2.	Sect 2.	Sect 2.	Sect 2.
Depth m	223	340	340	690	1062	1257	1321	1363	1438	1438
Daily drilled m	218	117		350	372	195	64	42	75	
Daily Dilution bbl	81	328		326	301	237	221	213	52	78
Daily Consumption bbl	429	400		575	384	181	221	201	83	
Interval Drilled m	218	335		350	722	917	981	1023	1098	1098
Interval Dilution bbl	81	409		326	627	864	1085	1298	1350	1428
Rate bbl/m	0.37	1.22		0.93	0.87	0.94	1.11	1.27	1.23	1.3
Interval Consumption bbl	429	829		575	959	1140	1361	1562	1645	1645
Rate bbl/m	1.97	2.47		1.64	1.33	1.24	1.39	1.53	1.5	1.5

Baroid Australia Pty Ltd

SOLIDS CONTROL and MUD VOLUME ANALYSIS

COMPANY GFE Resources Ltd
WELL Langley–1
LOCATION Otway Basin, Victoria
CONT/RIG Century Rig 11

1994

SOLIDS CONTROL		22–May	23–May	24–May	25–May	26–May	27–May	28–May	29–May	30–May	31–May
Shaker 1	Screens	50x50x80	50x50x80	50x50x80	50x50x80	50x50x80	50x50x80	50x50x80	50x50x80	50x50x80	50x50x80
	Hrs	6	8	24	24	15	12	2	9	24	18
Shaker 2	Screens										
	Hrs										
Shaker 3	Screens										
	Hrs										
Shaker 4	Screens										
	Hrs										
Desander	U/F ppg			11.3	11.1	11	10.7	10.7	10.9	11	10.5
	bbl/hr			1	1.25	1.25	1.2	1.25	1.2	1.2	1.2
	Hrs			22	22	15	12	2	9	24	18
	bbl			22	28	19	14	3	11	29	22
Desilter 1.	U/F ppg			10.7	10.5	10.3	10.1	10	10.1	10.3	10
	bbl/hr			2	2	2	2	1.75	1.5	1.5	1.5
	Hrs			12	22	15	12	2	9	24	18
	bbl			24	44	30	24	4	14	36	27
Desilter 2.	U/F ppg										
	bbl/hr										
	Hrs										
	bbl										
Centrifuge 1	Feed ppg										
	O/F ppg										
	U/F ppg										
	bbl/hr										
	Hrs										
	bbl										
Centrifuge 2	Feed ppg										
	O/F ppg										
	U/F ppg										
	bbl/hr										
	Hrs										
	bbl										

VOLUMES bbl		22–May	23–May	24–May	25–May	26–May	27–May	28–May	29–May	30–May	31–May
Downhole Volume		312	312	339	364	379	382	382	389	383	395
Initial Reserve		14	14	14	14	14	14	14	14	14	14
Added:	Act Mud										
	Seawater										
	Drill–Water										
	other										
	other										
	Chemical										
Final Reserve		14	14	14	14	14	14	14	14	14	14
Initial Active		311	308	308	419	371	437	419	389	419	419
Added:	Res Mud										
	Seawater										
	Drill–Water			205	75	126	40		90	83	48
	other										
	other										
	Chemical	4	5	9	4	4	3		2	1	1
Losses:	Solids Control			46	72	49	38	7	25	65	49
	Lost/Dumped	7	5	30	30		20	23	30	25	36
	DownHole										
Final Active		308	308	419	371	437	419	389	419	419	371
Total Final Volume		322	322	433	385	451	433	403	433	433	385

DILUTION										
Interval Type	Sect 2.	Sect 2.	Sect 2.	Sect 2.	Sect 2.	Sect 2.	Sect 2.	Sect 2.	Sect 2.	Sect 2.
Depth m	1438	1438	1557	1666	1732	1745	1745	1779	1853	1910
Daily drilled m			119	109	66	13		34	74	57
Daily Dilution bbl	7	5	76	102	49	58	30	55	90	85
Daily Consumption bbl	4	5	214	79	130	43		92	84	49
Interval Drilled m	1098	1098	1217	1326	1392	1405	1405	1439	1513	1570
Interval Dilution bbl	1435	1440	1516	1618	1667	1725	1755	1810	1900	1985
Rate bbl/m	1.31	1.31	1.25	1.22	1.2	1.23	1.25	1.26	1.26	1.26
Interval Consumption bbl	1649	1654	1868	1947	2077	2120	2120	2212	2296	2345
Rate bbl/m	1.5	1.51	1.53	1.47	1.49	1.51	1.51	1.54	1.52	1.49

Baroid Australia Pty Ltd

SOLIDS CONTROL and MUD VOLUME ANALYSIS

COMPANY GFE Resources Ltd
WELL Langley–1
LOCATION Otway Basin, Victoria
CONT/RIG Century Rig 11

1994

SOLIDS CONTROL		01–Jun	02–Jun	03–Jun	04–Jun	05–Jun	06–Jun	07–Jun			TOTALS
Shaker 1	Screens	50x50x80	50x50x80	50x50x80	50x50x80	50x50x80	50x50x80	50x50x80			
	Hrs	2	24	1.5	3	2	1.5				319.5
Shaker 2	Screens										
	Hrs										
Shaker 3	Screens										
	Hrs										
Shaker 4	Screens										
	Hrs										
Desander	U/F ppg	10.7	10.9	10.7	10.5	10.5	10.5				
	bbl/hr	1.2	1.2	1.2	1.2	1.2	1				
	Hrs	2	24	1.5	3	1	1				246.5
	bbl	2	29	2	4	1	1				442
Desilter 1.	U/F ppg	10	10.3	10.1	10	10	10				
	bbl/hr	1.5	1.5	1.5	1.5	1.5	1.25				
	Hrs	2	24	1.5	3	1	1				255
	bbl	3	36	2	5	2	1				865
Desilter 2.	U/F ppg										
	bbl/hr										
	Hrs										
	bbl										
Centrifuge 1	Feed ppg										
	O/F ppg										
	U/F ppg										
	bbl/hr										
	Hrs										
	bbl										
Centrifuge 2	Feed ppg										
	O/F ppg										
	U/F ppg										
	bbl/hr										
	Hrs										
	bbl										

VOLUMES bbl		01–Jun	02–Jun	03–Jun	04–Jun	05–Jun	06–Jun	07–Jun			
Downhole Volume		396	416	416	416	416	416	416			
Initial Reserve		14	14	14	14	14	14	14			
Added:	Act Mud										
	Seawater										
	Drill–Water										745
	other										
	other										
	Chemical										12
Final Reserve		14	14	14	14	14	14	14			
Initial Active		371	385	419	405	370	368	339			
Added:	Res Mud										743
	Seawater										
	Drill–Water	40	135			70	3				2625
	other										
	other										
	Chemical		4			1					45
Losses:	Solids Control	5	65	4	9	3	2				1307
	Lost/Dumped	20	20	10	3	5		4			1054
	DownHole				23	65	30	10			311
Final Active		385	419	405	370	368	339	325			
Total Final Volume		399	433	419	384	382	353	339			

DILUTION										
Interval Type	Sect 2.	Sect 2.	Sect 2.	Sect 2.	Sect 2.	Sect 2.	Sect 2.			
Depth m	1915	2006	2006	2006	2006	2006	2006			
Daily drilled m	5	91								2001
Daily Dilution bbl	25	85	14	35	73	32	14			2672
Daily Consumption bbl	40	139			71	3				3427
Interval Drilled m	1575	1666	1666	1666	1666	1666	1666			
Interval Dilution bbl	2010	2095	2109	2144	2217	2249	2263			
Rate bbl/m	1.28	1.26	1.27	1.29	1.33	1.35	1.36			
Interval Consumption bbl	2385	2524	2524	2524	2595	2598	2598			
Rate bbl/m	1.51	1.52	1.52	1.52	1.56	1.56	1.56			

Baroid Australia Pty Ltd

COMPANY GFE Resources Ltd

WELL Langley-1

WATER BASE MUD PROPERTIES

YEAR 1994

		12/05		13/05		14/05		15/05		16/05		17/05		18/05		19/05		20/05		21/05		22/05		23/05	
Sample Location	IN or OUT	IN	IN	OUT	IN			IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN		IN		IN		IN
Time Sample Taken	hrs	16:00	24:00	05:00	20:00			12:40	24:00	12:00	24:00	12:00	24:00	11:30	24:00	12:00	24:00	12:15	21:30		17:30		04:35		24:00
Depth	m	53	223	340	340			481	690	832	1062	1219	1257	1257	1321	1363	1363	1401	1438		1438		1438		1438
Hole Size	ins	12.2	12.2	12.2	12.2			8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5		8.5		8.5		8.5
Flowline Temp	°C																37	38	38		37		38		38
Weight	ppg	8.5	8.8	8.9	8.9			8.9	8.8	9	8.8	8.9	8.9	8.9	9	9	9	8.9	9		9		9		9
Funnel Viscosity	sec/qt	28	40	40	42			40	36	44	42	40	40	41	38	40	38	38	45		45		46		46
600 rpm	lb/100 ft²		44	38	39			44	30	28	28	26	26	33	29	30	25	24	34		35		37		40
300 rpm	lb/100 ft²		36	31	32			38	25	20	20	19	19	23	20	21	18	17	24		25		26		29
200 rpm	lb/100 ft²																								
100 rpm	lb/100 ft²																								
6 rpm	lb/100 ft²																								
3 rpm	lb/100 ft²																								
Plastic Viscosity	cP		8	7	7			6	5	8	8	7	7	10	9	9	7	7	10		10		11		11
Yield Point	lb/100 ft²		28	24	25			32	20	12	12	12	12	13	11	12	11	10	14		15		15		18
Gel – 10 sec	lb/100 ft²		12	10	10			15	18	12	12	13	12	12	10	9	7	8	9		7		6		6
Gel – 10 min	lb/100 ft²		14	11	11			17	24	20	20	23	22	23	19	20	17	18	20		17		16		15
Gel – 30 min	lb/100 ft²		15	11	11			20	30	30	30	30	30	30	29	30	26	27	30		25		24		24
API Filtrate	ml/30min		NC	NC	NC			NC	22	20	15	12	12	10	8.5	8.5	8.5	8.5	9		9		7.1		7.5
API Filter Cake	32nd ins								4	4	3	2	2	2	2	2	2	2	2		2		2		2
HPHT Filtrate	ml/30min																								
HPHT Filter Cake	32nd ins																								
HPHT Temp	°F																								
Solids	% Vol		3.1	3.8	3.8			3.8	3.4	4.6	3.4	3.9	3.9	3.9	4.6	4.9	4.9	4.8	4.5		4.5		4.4		4
Oil Content	0.84% Vol																								
Water	% Vol		96.5	96	96			96	96.5	95.3	96.5	96	96	96	95.3	95	95	95	95		95		95		95
Sand	% Vol		0.1	0.1	0.2			0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1		0.1		0.1		0.1
Methylene Blue cap	ppb		10	10	10			10	10	10	10	10	10	9	8	8	7	8	9		9		8		10
pH	meter		11.5	9	9.8			10.5	9.5	9	9	9	9	9	9	9	9.8	9.6	9.8		9.8		8.5		9.8
Alk. Mud Pm	ml		2.6	0.5	0.4			1.6	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.45		0.45		0.4		0.4
Alk. Filtrate Pf	ml		1.3	0.05	0.05			0.15	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.1		0.1		0.1		0.1
Alk. Mf	ml		1.35	0.07	0.07			0.17	0.12	0.07	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2		0.2		0.2		0.2
Chlorides	mg/Lx10³		4.5	2.3	2			2	1.3	1.3	1.5	1	1	1	1	1.2	1.5	2.8	5.7		5.5		6.5		11.3
Total Hardness	mg/L		700	200	200			100	40	40	50	50	40	40	40	50	60	80	80		80		60		60
Calcium	mg/L		700	200	200			100	40	40	50	50	40	40	40	50	60	80	80		80		60		60
KCL	% Wt Soln		0.75	0.3	0.3													0.4	0.8		0.7		1		1.8
ASG of Solids	g/cc							2.7	2.6	2.7	2.6	2.7	2.7	2.7	2.7	2.6	2.6	2.4	2.6		2.6		2.7		2.7
n & K								0.21/1	0.26/4	0.49/0	0.49/0	0.45/1	0.45/1	0.52/0	0.54/0	0.51/0	0.47/0	0.50/0	0.50/1		0.49/1		0.51/1		0.46/1
K+ Ion Conc	mg/Lx10³																	2.3	4.6		4		5.7		10.3

Baroid Australia Pty Ltd

COMPANY GFE Resources Ltd

WELL Langley-1

WATER BASE MUD PROPERTIES

YEAR 1994

		24/05		25/05		26/05		27/05		28/05		29/05		30/05		31/05		01/06		02/06		03/06		04/06	
Sample Location	IN or OUT	IN	IN	IN	IN	IN	IN	IN	IN		IN		IN	IN	IN	IN	IN		IN	IN	IN		IN		IN
Time Sample Taken	hrs	12:15	24:00	13:00	22:35	09:30	15:35	08:30	18:00		24:00		23:25	10:45	23:45	11:15	17:10		24:00	12:45	02:30		19:00		11:00
Depth	m	1505	1557	1623	1666	1719	1732	1745	1745		1745		1779	1821	1853	1897	1910		1915	1965	2006		2006		2006
Hole Size	ins	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5		8.5		8.5	8.5	8.5	8.5	8.5		8.5	8.5	8.5		8.5		8.5
Flowline Temp	°C	39	39	39	40	40	40	40	40		40		40	40	41	41	41		41	41	41				
Weight	ppg	8.95	9.15	9.25	9.2	9.25	9.3	9.28	9.3		9.3		9.35	9.3	9.3	9.3	9.3		9.3	9.35	9.35		9.3		9.3
Funnel Viscosity	sec/qt	48	42	55	55	50	51	51	50		49		48	48	44	45	46		48	51	48		48		48
600 rpm	lb/100 ft²	42	38	46	48	45	48	50	48		46		48	46	42	44	48		50	54	50		49		48
300 rpm	lb/100 ft²	30	27	33	35	31	33	35	33		32		33	32	29	30	33		35	37	34		34		33
200 rpm	lb/100 ft²																								
100 rpm	lb/100 ft²																								
6 rpm	lb/100 ft²																								
3 rpm	lb/100 ft²																								
Plastic Viscosity	cP	12	11	13	13	14	15	15	15		14		15	14	13	14	15		15	17	16		15		15
Yield Point	lb/100 ft²	18	16	20	22	17	18	20	18		18		18	18	16	16	18		20	20	18		19		18
Gel – 10 sec	lb/100 ft²	5	5	7	8	5	6	6	5		5		5	4	4	4	5		7	7	6		6		6
Gel – 10 min	lb/100 ft²	14	13	18	19	15	17	17	13		12		10	9	8	9	9		12	12	10		11		10
Gel – 30 min	lb/100 ft²	23	22	29	31	24	26	26	20		19		15	13	11	12	14		17	18	15		16		16
API Filtrate	ml/30min	8	7	8.9	8	6.8	7	6.5	6.8		7		7.8	8	7.3	7.2	7		7.1	8	7.5		7.5		7.5
API Filter Cake	32nd ins	2	2	2	2	2	2	2	2		2		2	2	2	2	2		2	2	2		2		2
HPHT Filtrate	ml/30min																								
HPHT Filter Cake	32nd ins																								
HPHT Temp	°F																								
Solids	% Vol	3.3	3.8	4.3	4.3	4.5	4.5	4.5	4.5		4.9		4.9	4.9	5	5	5.1		5.1	5.5	5.5		5.5		5.5
Oil Content	0.84% Vol																								
Water	% Vol	95	94.5	94	94	94	94	94	94		93.5		93.5	93.5	93.5	93.5	93.5		93.5	93	93		93		93
Sand	% Vol	0.15	0.15	0.15	0.15	0.15	0.15	0.2	0.2		0.2		0.2	0.2	0.2	0.2	0.1		0.1	0.2	0.2		0.1		0.1
Methylene Blue cap	ppb	10	9	12	12	10	13	13	12		12		11	11	9	9	10		10	12	10		10		10
pH	meter	9	9.3	9	9.3	9.3	9.5	9	9		9		9	9	9	9.3	9.2		9	9	9.3		9		9
Alk. Mud Pm	ml	0.45	0.4	0.4	0.4	0.4	0.4	0.35	0.35		0.3		0.3	0.3	0.35	0.3	0.35		0.3	0.3	0.35		0.3		0.3
Alk. Filtrate Pf	ml	0.12	0.12	0.1	0.1	0.1	0.1	0.1	0.1		0.2		0.2	0.2	0.25	0.2	0.25		0.2	0.25	0.25		0.2		0.2
Alk. Mf	ml	0.25	0.25	0.3	0.3	0.3	0.3	0.3	0.25		0.35		0.4	0.4	0.4	0.35	0.35		0.45	0.5	0.5		0.5		0.5
Chlorides	mg/Lx10³	20.1	20.2	19.5	19.5	19	19	19	19		19.5		19	19.5	19	19	16.5		16.5	17.5	17.7		17.5		17.5
Total Hardness	mg/L	60	60	60	60	60	60	50	50		50		50	50	50	50	50		50	50	50		50		50
Calcium	mg/L	60	60	60	60	60	60	50	50		50		50	50	50	50	50		50	50	50		50		50
KCL	% Wt Soln	3.2	3.2	3.1	3.1	3	3	3	3		3		3.1	3	3	3	2.8		2.8	3	3		3		3
ASG of Solids	g/cc	2.6	3	3.1	2.9	3	3.2	3.1	3.2		3		3.1	3	3	3	2.9		2.9	2.9	2.9		2.8		2.8
n & K		0.49/1	0.49/1	0.48/1	0.46/1	0.54/1	0.54/1	0.51/1	0.54/1		0.52/1		0.54/1	0.52/1	0.53/1	0.55/0	0.54/1		0.51/1	0.55/1	0.56/1		0.53/1		0.54/1
K+ Ion Conc	mg/Lx10³	18.4	18.4	17.8	17.8	17.2	17.2	17.2	17.2		17.2		17.8	17.2	17.2	17.2	16.1		16.1	17.2	17.2		17.2		17.2

Baroid Australia Pty Ltd

COMPANY GFE Resources Ltd

WELL Langley-1

WATER BASE MUD PROPERTIES

YEAR 1994

		05/06	06/06	07/06
Sample Location	IN or OUT	IN	IN	IN
Time Sample Taken	hrs	20:15	18:35	19:00
Depth	m	2006	2006	2006
Hole Size	ins	8.5	8.5	8.5
Flowline Temp	°C	41	41	
Weight	ppg	9.3	9.3	9.3
Funnel Viscosity	sec/qt	48	48	48
600 rpm	lb/100 ft²	50	48	50
300 rpm	lb/100 ft²	34	33	35
200 rpm	lb/100 ft²			
100 rpm	lb/100 ft²			
6 rpm	lb/100 ft²			
3 rpm	lb/100 ft²			
Plastic Viscosity	cP	16	15	15
Yield Point	lb/100 ft²	18	18	20
Gel – 10 sec	lb/100 ft²	6	6	6
Gel – 10 min	lb/100 ft²	9	9	10
Gel – 30 min	lb/100 ft²	14	13	15
API Filtrate	ml/30min	8	8	8
API Filter Cake	32nd ins	2	2	2
HPHT Filtrate	ml/30min			
HPHT Filter Cake	32nd ins			
HPHT Temp	°F			
Solids	% Vol	5.7	5.7	5.7
Oil Content	0.84% Vol			
Water	% Vol	93	93	93
Sand	% Vol	0.1	0.1	0.1
Methylene Blue cap	ppb	10	11	12
pH	meter	9	8.7	8.6
Alk. Mud Pm	ml	0.3	0.3	0.3
Alk. Filtrate Pf	ml	0.25	0.2	0.2
Alk. Mf	ml	0.55	0.6	0.5
Chlorides	mg/Lx10³	15	15	15
Total Hardness	mg/L	50	50	50
Calcium	mg/L	50	50	50
KCL	% Wt Soln	2.6	2.6	2.6
ASG of Solids	g/cc	2.8	2.8	2.8
n & K		0.56/1	0.54/1	0.51/1
K+ Ion Conc	mg/Lx10³	14.9	14.9	14.9

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Baroid Australia Pty Ltd

BIT RECORD

COMPANY GFE Resources Ltd
WELL Langley-1
LOCATION Otway Basin, Victoria
CONT/RIG Century Rig 11

DATES : **FROM** 12-May-94
TO 07-Jun-94

BIT NO.	BIT SIZE ins	MAKE	TYPE	JETS	DPTH IN m	DPTH OUT m	DRLD m	HRS ON BIT	RATE m/hr	ACC DRLG HRS	WOB x1000 lb	RPM	VERT DEV. deg.	PUMP PRES psi	PUMP RATE bbl/min	MUD WT ppg	MUD VIS sec	CONDITION & REMARKS
RR# 1	12.25	SEC	S33SF	3x20		340	340	12.5	27.2	12.5	15-20	120	0.75	575	10.6	8.9	42	T2/B2/G 1/16
2	8.5	VAREL	ETD-417	1x11 2x13	340	1257	917	47	19.5	59.5	20	110	1.5	750	5.47	8.9	40	T1/B1/G1/16
RR# 2	8.5	VAREL	EDT-417	1x11 2x13	1257	1363	106	19.5	5.4	79	10	120	1.5	1025	7.33	8.9	40	T2/B7/G1/16
3	8.5	SEC	S82F	1x11 2x13	1363	1438	75	14.5	5.2	93.5	15	110	1.75	600	5.67	9	40	T1/B1/IN
4	8.5	SEC	S82F	1x11 2x13	1438	1732	294	57	5.2	150.5	15	100	1.5	900	5.82	9.3	51	T2/B2/IN
5	8.5	SEC	S82F	1x11 2x13	1732	1745	13	2.5	5.2	153	20	90	1.5	850	5.82	9.3	50	T1/B1/IN Trip for DST # 1.
6	8.5	D.B.	CD502	CORE BIT	1745	1764	19	2	9.5	155	13	90	1.5	625	6.46	9.3	49	20 % Core.
RR # 5	8.5	SEC	S82F	1x11 2x13	1764	1910	146	44	3.3	199	25	100	0.75	1100	6.93	9.3	46	T2/B2/IN Trip for DST # 2.
RR# 7	8.5	VAREL	ETD-517	3x13	1910	2006	96	21	4.6	220	20	100	1	1100	6.93	9.35	48	T2/B4/1 1/16 T.D.
RR # 7	8.5	VAREL	ETD-517	3x13	2006	2006						100	1	1125	6.93	9.3	48	Circulate / Wiper Trip

Baroid Australia Pty Ltd

DIRECTIONAL SURVEYS

COMPANY GFE Resources Ltd
WELL Langley–1
LOCATION Otway Basin, Victoria
CONT/RIG Century Rig 11

MD m	TVD m	INCL°	DIR °	DISP m
248		0.25		
335		0.75		
391		1		
468		0.75		
515		0.5		
660		1		
708		1		
870		0.5		
1004		1.5		
1033		2		
1091		1.5		
1158		0.5		
1196		1		
1228		1.5		
1244		1.25		
1276		1		
1305		1.75		
1331		1.75		
1363		1.75		
1527	1527	2		
1610	1610	1.5		
1808	1808	0.75		
2000	2000	1		

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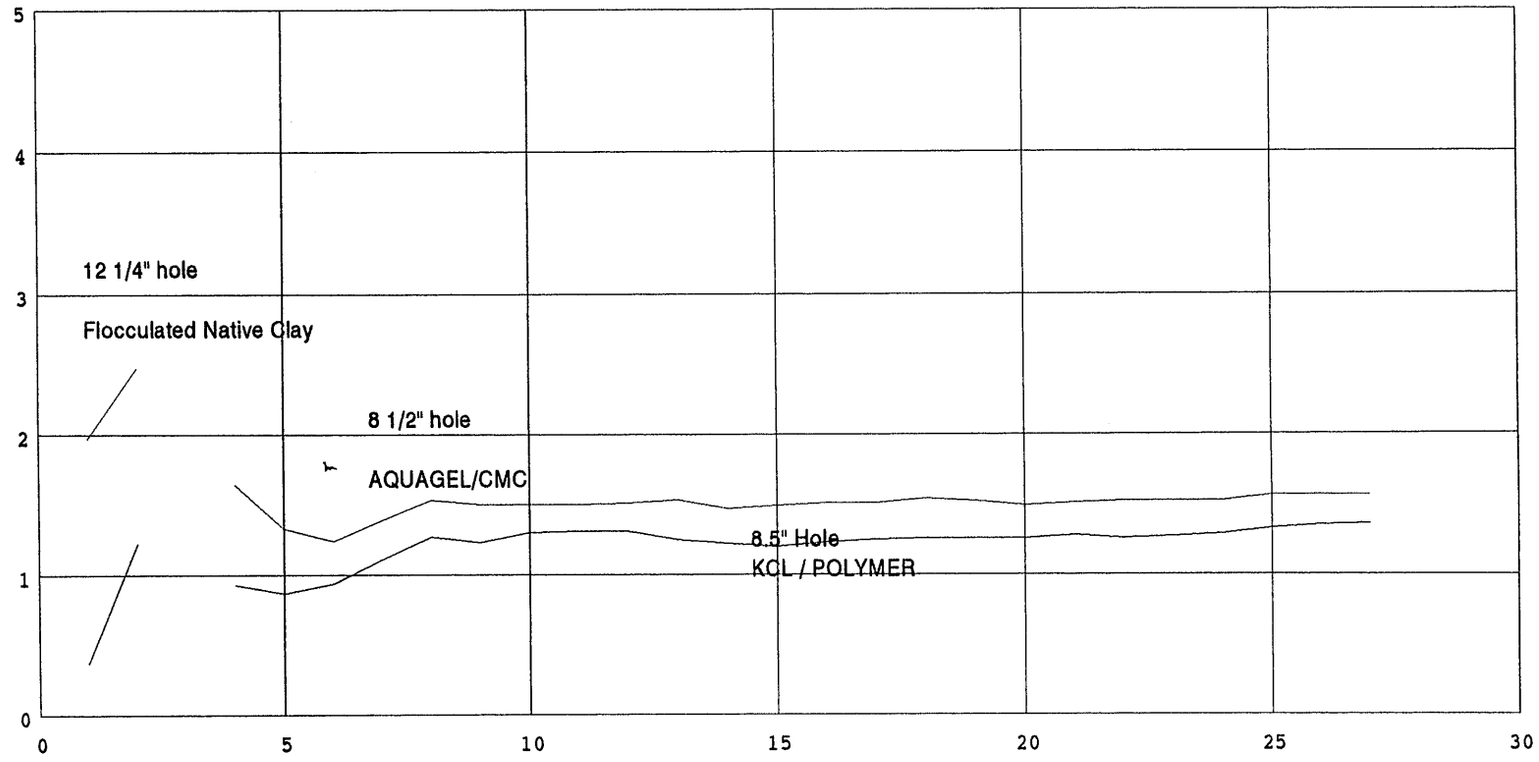
Baroid Australia Pty Ltd

GRAPH – 1

COMPANY GFE Resources Ltd
WELL Langley–1
LOCATION Otway Basin, Victoria
CONT/RIG Century Rig 11

INTERVAL CUMULATIVE DILUTION AND CONSUMPTION RATES



Dilution Rate = $\frac{\text{Initial Active} - \text{Final Active} + \text{Additions} - \text{Transfers}}{\text{Metres Drilled}}$

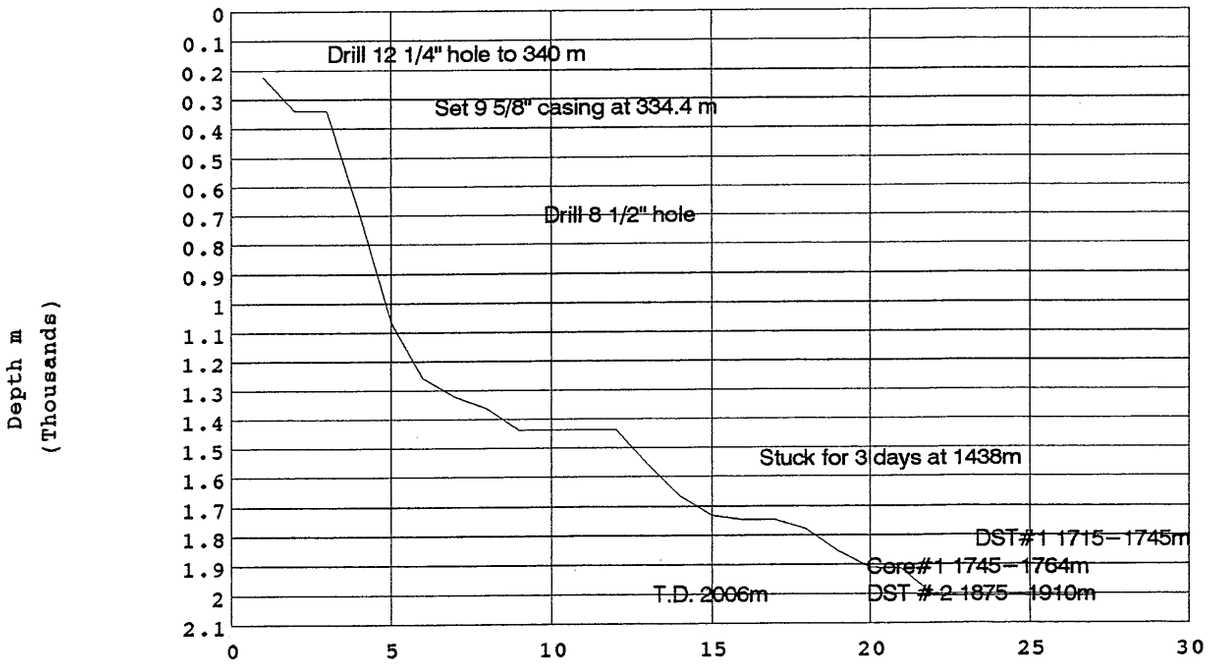
Consumption Rate = $\frac{\text{Mud Made}}{\text{Metres Drilled}}$

Baroid Australia Pty Ltd

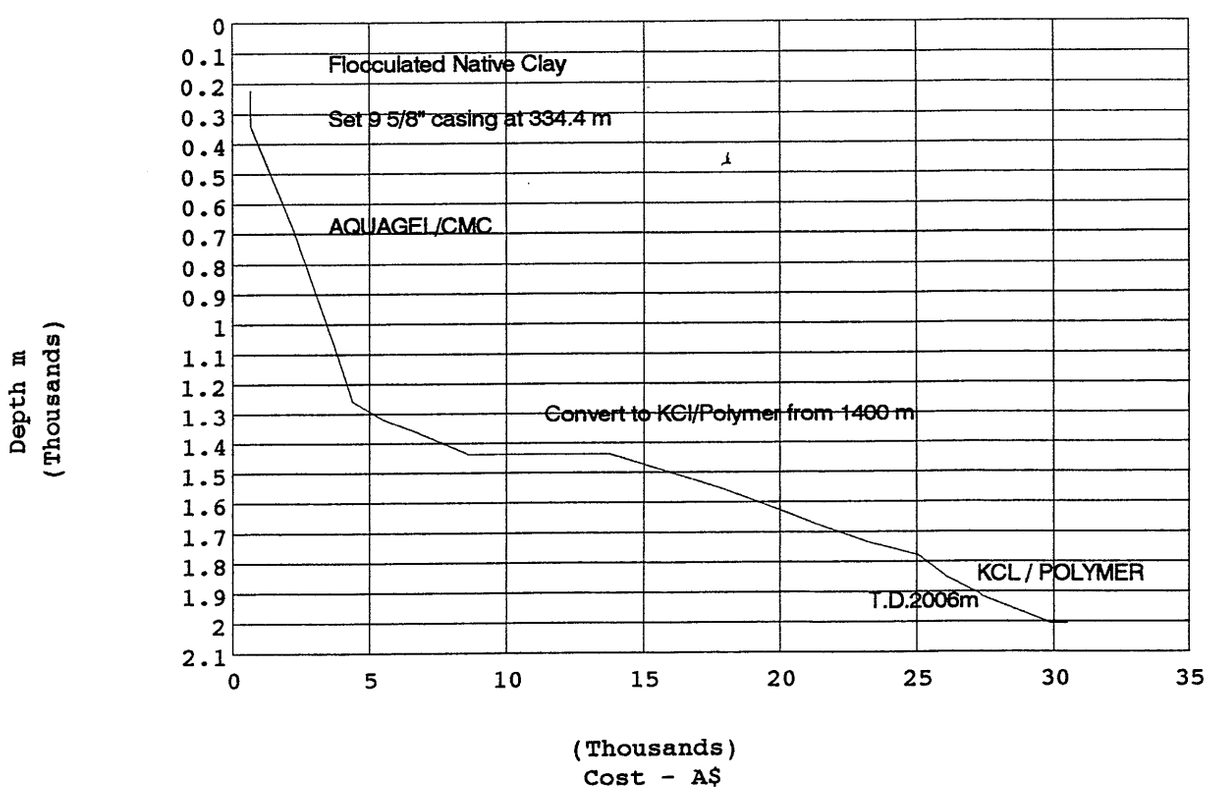
COMPANY GFE Resources Ltd
WELL Langley–1
LOCATION Otway Basin, Victoria
CONT/RIG Century Rig 11

GRAPH – 2

DEPTH vs DAYS



DEPTH vs COST

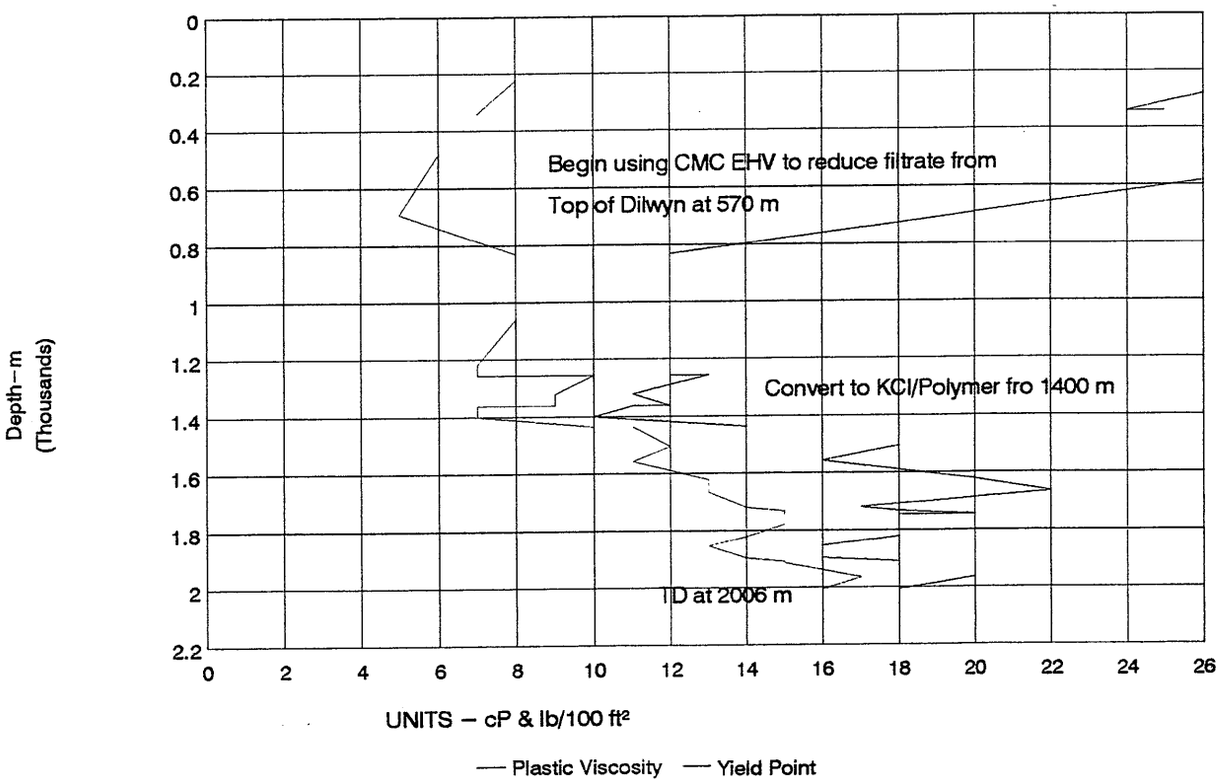


Baroid Australia Pty Ltd

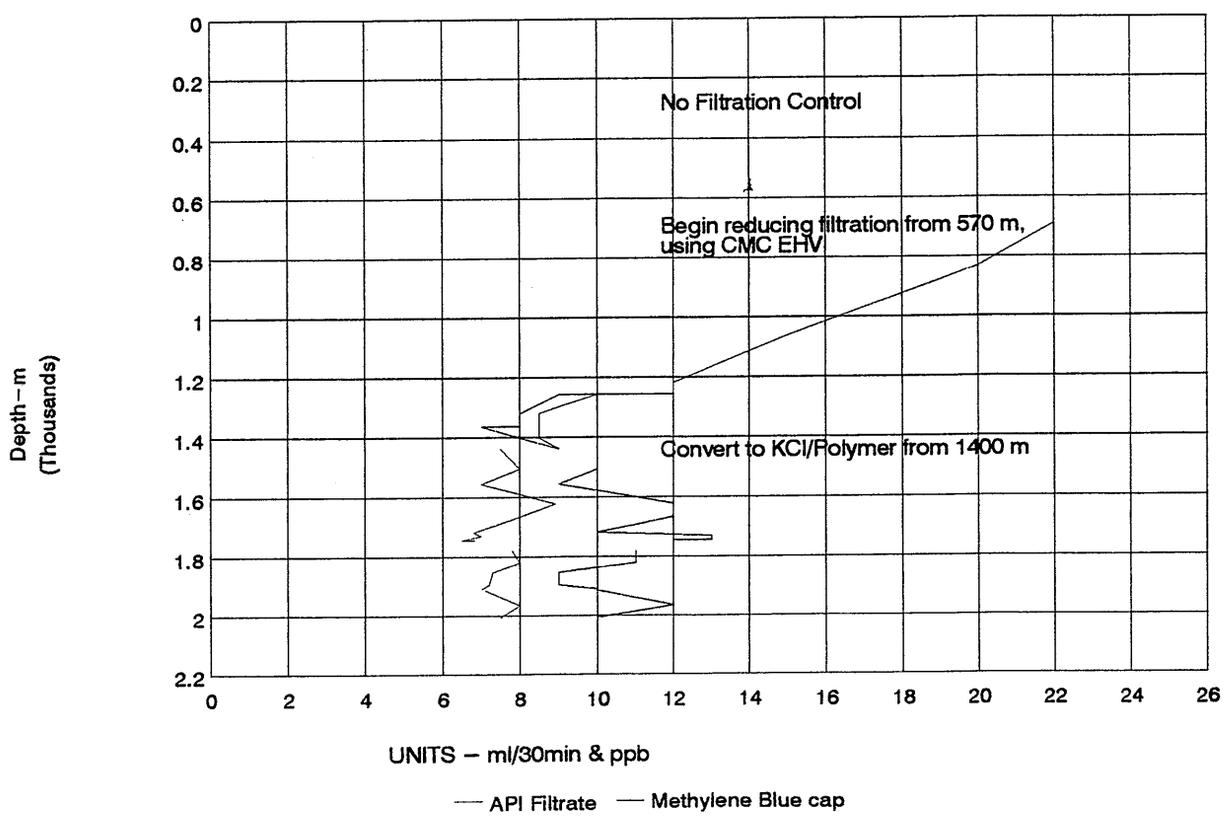
COMPANY GFE Resources Ltd
WELL Langley–1

GRAPH – 3

Depth vs Plastic Viscosity & Yield Point



Depth vs API Filtrate & Methylene Blue cap

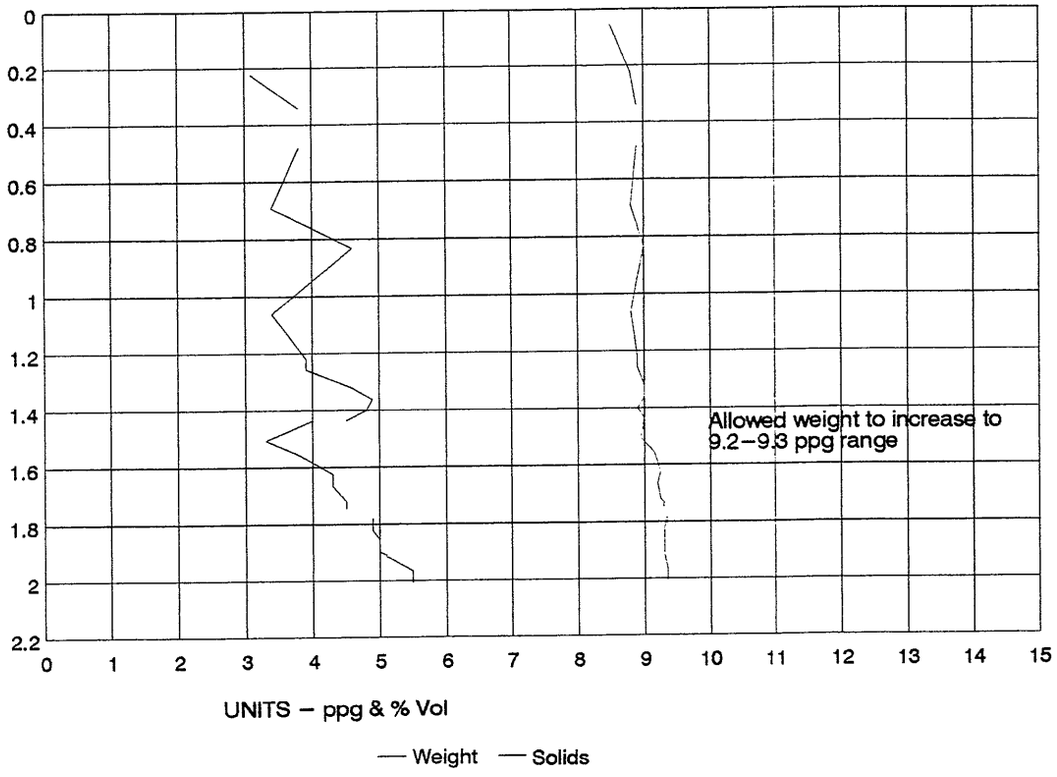


Baroid Australia Pty Ltd

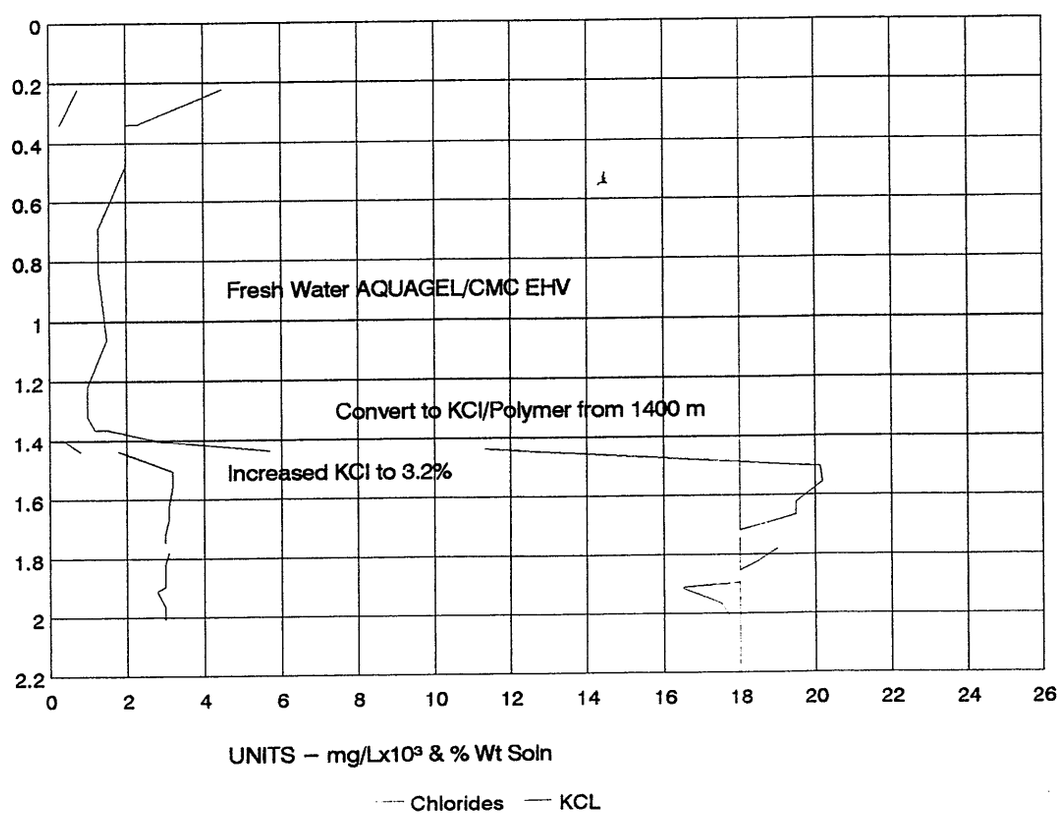
COMPANY GFE Resources Ltd
WELL Langley–1

GRAPH – 4

Depth vs Weight & Solids



Depth vs Chlorides & KCL



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Baroid Australia Pty Ltd

MUD REPORT NO.	1	up to 24:00 hrs,	12/5/94
DATE	13/5/94	**DEPTH–m** MD 223	TVD 223
START DATE	12–May–94	**ACTIVITY**	Drilling

OPERATOR	**CONTRACTOR / RIG**	**COUNTRY**
GFE Resources Ltd	Century Rig 11	Australia
REPORT FOR	**REPORT FOR**	**TOWNSHIP**
Ken Smith	S. Kelly	Port Campbell
WELL NAME AND NO.	**FIELD OR BLOCK NO.**	**LOCATION**
Langley–1	PPL 1	Otway Basin, Victoria

BIT DATA

Size 12.250 ins
Type S33 SF
Nozzles 32nds

20	20	20

Noz Area 0.35 ins²
TFA ins²
NV m/sec 82.9
Impact lb f 379

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	4.367	12.1
Pipe 2	4.5	2.875	55.78
Pipe 3			
Col 1	6.25	2.875	155.1
Col 2			

OPEN HOLE SECTIONS

Sect 1			
Sect 2			
Current	12.25	223	

CASINGS

Size ins		Depth m
Riser	Set @	
	Set @	
	Set @	
	Set @	
	Set @	
	Set @	
	Set @	
Liner	Set @	
	Top @	

PUMP DATA

Pump Make	ins	x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	7.75	95	0.0654	84	4.752
Nat 8P80	6	8.5	95	0.0705	84	5.922

Pump Press 450 psi — TOTAL bbl/min 10.674

MUD VOL	bbl	CIRCULATING DATA		AV m/min
Downhole	128	Total circ 36 mins		DP 43
Active	259	Bottoms up 14 mins		DC 67.4
Total Circ	387	Surface–bit 4 mins		Riser
Reserve		ECD ppg	9.1	

MUD PROPERTIES

Sample Location	IN or OUT	IN		IN	
Time Sample Taken	hrs	16:00		24:00	
Depth	m	53		223	
Flowline Temp	°C				
Weight	ppg	8.50		8.80	
Funnel Viscosity	sec/qt	28		40	
Plastic Viscosity	cP			8	
Yield Point	lb/100 ft²			28	
Gels 10 sec/10min/30 min	lb/100 ft²			12/14/15	
API Filtrate	ml/30min			NC	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins				
Solids	% Vol			3.1	
Dissolved Salts	% Vol			0.4	
Oil Content/Water Content	% Vol			–/96.5	
Sand	% Vol			0.1	
Methylene Blue cap	ppb			10	
pH	meter			11.5	
Alk. Mud Pm	ml			2.60	
Alk. Filtrate, Pf/Mf	ml			1.30/1.35	
Chlorides	mg/Lx10³			4.5	
Total Hardness/Calcium	mg/L			700/700	
KCL	% Wt Soln			0.8	
Rheometer	600 rpm/300 rpm			44/36	
lb/100 ft²	200 rpm/100 rpm				
	6 rpm/3 rpm				

MUD PROPERTY SPECIFICATIONS

WEIGHT	ppg	VIS	sec	YP	lb/100 ft²
API Filt	ml	HTHP	ml	KCL	%

BY AUTHORITY

REMARKS

Attended GFE pre–spud and safety meeting.

Spudded in with water only. Drilled surface limestone to top of marl at about 50 m. Added 40 sxs KCl as drilling of marl began, then continued drilling marl, diluting periodically with water and adding Lime to maintain highly flocculated system.
No downhole losses during drilling of limestone. Viscosity of mud while drilling marl maintained in 40 to 45 second range. This was higher than anticipated but mud weight and solids content was still low. Large amounts of discrete firm to slightly soft marl cuttings were returned at the shakers.
There was no actual dumping of mud to the sump, but large amounts water were used to hose and jet the large pile of marl cuttings continually forming on the grating in front of the shaker.

ACTIVITY

Spud in with water at 13:30 hrs after pre–spud meeting. Drilled 12 1/4" hole through limestone and marl at 20 to 30 m/hr.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
AQUAGEL,sx	25 kg		432	432	
BARACIDE	25 kg		1	1	
BARACOR 129	25 kg		8	8	
Barite,sx	50 kg		200	200	
Barite,sx	25 kg		400	400	
Caustic Soda	25 kg		40	40	
CMC EHV	25 kg		49	49	
EZ SPOT	208 lt		2	2	
KCL,Tech(sx)	25 kg	40	360	320	577.6
Lime	25 kg	10	10		80.4
PAC–R	50 lb		40	40	
PAC–L	50 lb		40	40	
Soda Ash	25 kg		20	20	

MUD TYPE Flocculated Native Clay

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		50,50'80	10.5
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander	10.4	3.5	1	4
Desilter 1.	10.8	10	6.5	65
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	425
other	
other	
Barite	
Chemicals	4
Losses	**bbl**
Sol. Con.	69
Lost/Dumped	12
Down Hole	
Newhole	104
NET GAIN	348
Discharged	81

BAROID Engineer	OFFICE	WAREHOUSE
M. Olejniczak	Melbourne	Adelaide
Tel. 059–787103	03–6213311	08–477433

DAILY COST A$ 658.00

CUMULATIVE COST A$ 658.00

RESERVE PITS

NO	TYPE	bbl
	Pill	

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	2.9
Low Grav. Solids	ppb	26.4
High Grav. Solids	% Vol	0.2
High Grav. Solids	ppb	2.9
ASG of Solids	g/cc	2.70
Cuttings Volume	bbl	104.0
Interval Dilution	bbl/m	0.4
Interval Consumption	bbl/m	2.0

TIME BREAKDOWN

	hrs
Drilling	10.5
Circulating	
Reaming In	
Reaming out	
Tripping	
AVE ROP m/hr	20.76

Baroid Australia Pty Ltd

MUD REPORT NO. 2 up to 24:00 hrs, 13/5/94	
DATE 14/5/94	**DEPTH–m** MD 340 TVD 340
START DATE 12–May–94	**ACTIVITY** WOC

OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia
REPORT FOR Ken Smith	**REPORT FOR** S. Kelly	**TOWNSHIP** Port Campbell
WELL NAME AND NO. Langley–1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria

BIT DATA

Size 12.250 ins
Type S33 SF
Nozzles 32nds
20 20 20
Noz Area 0.92 ins²
TFA ins²
NV m/sec
Impact lb f

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	4.367	
Pipe 2	4.5	2.875	
Pipe 3			
Col 1	6.25	2.875	
Col 2			

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	12.25	5.6

CASINGS

Size ins		Depth m
Riser	Set @	
9 5/8"	Set @	334.43
	Set @	
	Set @	
	Set @	
	Set @	
	Set @	
Liner	Set @	
	Top @	

PUMP DATA

Pump Make	ins x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5 7.75	95	0.054		
Nat 8P80	6 8.5	95	0.0705		

Pump Press 600 psi TOTAL bbl/min

MUD VOL	bbl
Downhole	84
Active	336
Total Circ	420
Reserve	

CIRCULATING DATA

Total circ – mins	AV m/min
Bottoms up – mins	DP
Surface–bit – mins	DC
ECD ppg 8.9	Riser

MUD PROPERTIES

		OUT		IN	
Sample Location	IN or OUT				
Time Sample Taken	hrs	05:00		20:00	
Depth	m	340		340	
Flowline Temp	°C				
Weight	ppg	8.90		8.90	
Funnel Viscosity	sec/qt	40		42	
Plastic Viscosity	cP	7		7	
Yield Point	lb/100 ft²	24		25	
Gels 10 sec/10min/30 min	lb/100 ft²	10/11/11		10/11/11	
API Filtrate	ml/30min	NC		NC	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins				
Solids	% Vol	3.8		3.8	
Dissolved Salts	% Vol	0.2		0.2	
Oil Content/Water Content	% Vol	–/96.0		–/96.0	
Sand	% Vol	0.1		0.2	
Methylene Blue cap	ppb	10		10	
pH	meter	9.0		8.8	
Alk. Mud Pm	ml	0.50		0.40	
Alk. Filtrate, Pf/Mf	ml	0.05/0.07		0.05/0.07	
Chlorides	mg/Lx10³	2.3		2.0	
Total Hardness/Calcium	mg/L	200/200		200/200	
KCL	% Wt Soln	0.3		0.3	
Rheometer	600 rpm/300 rpm	38/31		39/32	
lb/100 ft²	200 rpm/100 rpm				
	6 rpm/3 rpm				

MUD PROPERTY SPECIFICATIONS

WEIGHT	ppg	VIS	sec	YP	lb/100 ft²
API Filt	ml	HTHP	ml	KCL	%

BY AUTHORITY

REMARKS

Maintained mud during last section of hole by water dilution only, to allow active volume to increase. After wiper trip had large amount of cavings returned to surface. (up to 2.5" in size) These temporarily blocked the flowline, but it was quickly cleared by bypassing the shaker possum belly, and dumping till the worst had past. While circulating the casing a large amount of cavings was again returned at the shakers, but there was no problem with the flowline. 100% excess cement was pumped, but no cement returns were observed at the shakers. High pH of returning mud suggested the cement was close. (later measured at 31' below surface) Hole obviously significantly over guage.

ACTIVITY

Drilled to 340 m casing point at 05:00 hrs. Circulated hole clean for 1/2 hr. Ran wiper trip, then circulated hole clean for another hour. POH and ran 9 5/8" casding, washing last joint to bottom. Circulated casing for 1 hr. Cemented xcasing with 15.6 ppg neat slurrey. WOC.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION	USED	REC	BAL	COST

MUD TYPE Flocculated Native Clay

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		50,50,80	7.5
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander	10.5	3.5	1	4
Desilter 1.	11.2	5	5	25
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	400
other	
other	
Barite	
Chemicals	

Losses	bbl
Sol. Con.	29
Lost/Dumped	299
Down Hole	
Newhole	56
NET GAIN	72
Discharged	328

BAROID Engineer	OFFICE	WAREHOUSE
M. Olejniczak	Melbourne	Adelaide
Tel. 059–787103	03–6213311	08–477433

DAILY COST A$ 0.00

CUMULATIVE COST A$ 658.00

RESERVE PITS

NO	TYPE	bbl
	Pill	

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m
248		0.25		
335		0.75		

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	3.6
Low Grav. Solids	ppb	32.8
High Grav. Solids	% Vol	0.2
High Grav. Solids	ppb	2.9
ASG of Solids	g/cc	2.70
Cuttings Volume	bbl	56.0
Interval Dilution	bbl/m	1.2
Interval Consumption	bbl/m	2.5

TIME BREAKDOWN hrs

Drilling	5
Circulating	2.5
Reaming In	
Reaming out	
Tripping	7.5
Other	13.5
AVE ROP m/hr	23.4

Baroid Australia Pty Ltd

MUD REPORT NO. 3	up to 24:00 hrs, 14/5/94		
DATE 15/5/94	**DEPTH–m** MD 340	TVD 340	
START DATE 12–May–94	**ACTIVITY** Making up BHA		

OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia
REPORT FOR Ken Smith	**REPORT FOR** S. Kelly	**TOWNSHIP** Port Campbell
WELL NAME AND NO. Langley–1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria

BIT DATA

Size 8.500 ins
Type ETD 417
Nozzles 32nds

11	13	13

Noz Area 0.35 ins²
TFA ins²
NV m/sec
Impact lb f

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	4.367	340
Pipe 2	4.5	2.875	
Pipe 3			
Col 1	6.25	2.875	
Col 2			

OPEN HOLE SECTIONS

Sect 1	
Sect 2	
Current	12.25 5.6

CASINGS

Size ins	Depth m
Riser	Set @
9 5/8"	Set @ 334.43
	Set @
	Set @
	Set @
	Set @
	Set @
Liner	Set @
	Top @

PUMP DATA

Pump Make	ins	x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	7.75	95	0.054		
Nat 8P80	6	8.5	95	0.0705		

Pump Press – psi TOTAL bbl/min

MUD VOL bbl

Downhole	83
Active	336
Total Circ	419
Reserve	

CIRCULATING DATA

Total circ – mins	AV m/min
Bottoms up – mins	DP
Surface–bit – mins	DC
ECD ppg	Riser

MUD PROPERTIES

Sample Location	IN or OUT				
Time Sample Taken	hrs				
Depth	m				
Flowline Temp	°C				
Weight	ppg				
Funnel Viscosity	sec/qt				
Plastic Viscosity	cP				
Yield Point	lb/100 ft²				
Gels 10 sec/10min/30 min	lb/100 ft²				
API Filtrate	ml/30min				
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins				
Solids	% Vol				
Dissolved Salts	% Vol				
Oil Content/Water Content	% Vol				
Sand	% Vol				
Methylene Blue cap	ppb				
pH	meter				
Alk. Mud Pm	ml				
Alk. Filtrate, Pf/Mf	ml				
Chlorides	mg/Lx10³				
Total Hardness/Calcium	mg/L				
KCL	% Wt Soln				
Rheometer	600 rpm/300 rpm				
lb/100 ft²	200 rpm/100 rpm				
	6 rpm/3 rpm				

MUD PROPERTY SPECIFICATIONS

WEIGHT	ppg	VIS	sec	YP	lb/100 ft²
API Filt	ml	HTHP	ml	KCL	%

BY AUTHORITY

REMARKS

2x13, 1x11 nozzles selected for 8 1/2" bit to give following hydraulics, at 300 gpm. (maximum anticipated pump rate)

Nozzle Velocity – 272 ft/sec
Impact – 379 lb
AV (collars) – 221 ft/min
AV (drill pipe) – 141 ft/min

Relatively low nozzle velocity should reduce hole wshout in loose sands, while annular velocities will easily clean hole.

ACTIVITY

Wait on cement. Used 14 sxs cement to do top up on surface casing. Nippled up BOP and pressure tested. Began making up 8 1/2" BHA.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION	USED	REC	BAL	COST

MUD TYPE Flocculated Native Clay

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		50,50,80	
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander				
Desilter 1.				
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	
other	
other	
Barite	
Chemicals	
Losses	**bbl**
Sol. Con.	
Lost/Dumped	
Down Hole	
Newhole	
NET GAIN	
Discharged	

BAROID Engineer	OFFICE	WAREHOUSE
M. Olejniczak	Melbourne	Adelaide
Tel. 059–787103	03–6213311	08–477433

DAILY COST	CUMULATIVE COST
A$ 0.00	A$ 658.00

RESERVE PITS

NO	TYPE	bbl
	Pill	

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m

SOLIDS ANALYSIS

Low Grav. Solids	% Vol
Low Grav. Solids	ppb
High Grav. Solids	% Vol
High Grav. Solids	ppb
ASG of Solids	g/cc
Cuttings Volume	bbl
Interval Dilution	bbl/m
Interval Consumption	bbl/m

TIME BREAKDOWN hrs

Drilling	
Circulating	
Reaming In	
Reaming out	
Tripping	
Other	24
AVE ROP m/hr	

Baroid Australia Pty Ltd

MUD REPORT NO. 4	up to 24:00 hrs,	15/5/94	
DATE 16/5/94	**DEPTH–m** MD 690	TVD 690	
START DATE 12–May–94	**ACTIVITY** Drilling		

OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia
REPORT FOR Ken Smith	**REPORT FOR** S. Kelly	**TOWNSHIP** Port Campbell
WELL NAME AND NO. Langley–1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria

BIT DATA

Size 8.500 ins
Type ETD 417
Nozzles 32nds

11	13	13

Noz Area 0.35 ins²
TFA ins²
NV m/sec 82.9
Impact lb f 370

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	4.367	480.5
Pipe 2	4.5	2.875	55.28
Pipe 3			
Col 1	6.25	2.875	154.22
Col 2			

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	8.5	355.6

CASINGS

Size ins		Depth m
Riser	Set @	
9 5/8"	Set @	334.43
	Set @	
	Set @	
	Set @	
	Set @	
	Set @	
Liner	Set @	
	Top @	

PUMP DATA

Pump Make	ins	x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	7.75	95	0.054		
Nat 8P80	6	8.5	95	0.0705	101	7.121

Pump Press 850 psi — TOTAL bbl/min 7.121

MUD VOL bbl

Downhole	145
Active	450
Total Circ	595
Reserve	74

CIRCULATING DATA

	AV m/min
Total circ 84 mins	DP 43
Bottoms up 15 mins	DC 67.3
Surface–bit 5 mins	Riser
ECD ppg 8.91	

MUD PROPERTIES

Sample Location	IN or OUT	IN		IN	
Time Sample Taken	hrs	12:40		24:00	
Depth	m	481		690	
Flowline Temp	°C				
Weight	ppg	8.90		8.80	
Funnel Viscosity	sec/qt	40		36	
Plastic Viscosity	cP	6		5	
Yield Point	lb/100 ft²	32		20	
Gels 10 sec/10min/30 min	lb/100 ft²	15/17/20		18/24/30	
API Filtrate	ml/30min	NC		22.0	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins			4/–	
Solids	% Vol	3.8		3.4	
Dissolved Salts	% Vol	0.2		0.1	
Oil Content/Water Content	% Vol	–/96.0		–/96.5	
Sand	% Vol	0.1		0.2	
Methylene Blue cap	ppb	10		10	
pH	meter	10.5		9.5	
Alk. Mud Pm	ml	1.60		0.70	
Alk. Filtrate, Pf/Mf	ml	0.15/0.17		0.10/0.12	
Chlorides	mg/Lx10³	2.0		1.3	
Total Hardness/Calcium	mg/L	100/100		40/40	
KCL	% Wt Soln				
ASG of Solids	g/cc	2.7		2.6	
n & K		0.21/10.2		0.26/4.94	
Rheometer	600 rpm/300 rpm	44/38		30/25	
lb/100 ft²	200 rpm/100 rpm				
	6 rpm/3 rpm				

MUD PROPERTY SPECIFICATIONS

WEIGHT	ppg	VIS	sec	YP	lb/100 ft²
API Filt	ml	HTHP	ml	KCL	%

BY AUTHORITY

REMARKS

Unable to dilute heavily through Gellibrand Marl due to small sump. Marl making mud causing mud ring problems. Into Dilwyn sands from about 570 m. Beginning to reduce filtrate while maintaining viscosity with additional AQUAGEL and CMC–EHV.

ACTIVITY

RIH and tagged cement at 318 m. Drilled out cement and shoe with mud, then drilled 6m new hole to 346 m. Ran PIT test giving 22.6 ppg EMW. Continued drilling through marl. Had to clear flowline of mud ring at 395 m for 1 hour. Continued drilling taking regular surveys

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
AQUAGEL,sx	25 kg	68		364	974.44
Caustic Soda	25 kg	2		38	64.86
CMC EHV	25 kg	5		44	533.05

MUD TYPE FW/AQUAGEL/CMC

SOLIDS CONTROL EQUIPMENT

Make	screen size	hrs
Shaker 1	50,50,80	21
Shaker 2		
Shaker 3		
Shaker 4		

	ppg	bbl/hr	hrs	bbl
Desander	11.6	4.5	12	54
Desilter 1.	11.4	5	20	100
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	570
other	
other	
Barite	
Chemicals	5

Losses	bbl
Sol. Con.	154
Lost/Dumped	172
Down Hole	
Newhole	80
NET GAIN	249
Discharged	326

BAROID Engineer	OFFICE	WAREHOUSE
M. Olejniczak	Melbourne	Adelaide
Tel. 059–787103	03–6213311	08–477433

DAILY COST A$ 1572.35

CUMULATIVE COST A$ 2230.35

RESERVE PITS

NO	TYPE	bbl
	Pill	74

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m
391		1		
468		0.75		
515		0.5		
660		1		

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	3.4
Low Grav. Solids	ppb	30.9
High Grav. Solids	% Vol	0.2
High Grav. Solids	ppb	2.9
ASG of Solids	g/cc	2.60
Cuttings Volume	bbl	80.0
Interval Dilution	bbl/m	0.9
Interval Consumption	bbl/m	1.6

TIME BREAKDOWN hrs

Drilling	18
Circulating	2.5
Reaming In	
Reaming out	
Tripping	2.5
Other	1
AVE ROP m/hr	19.44

Baroid Australia Pty Ltd

MUD REPORT NO.	5	up to 24:00 hrs,	16/5/94
DATE 17/5/94		**DEPTH–m** MD 1062	TVD 1062
START DATE 12–May–94		**ACTIVITY** Drilling	

OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia
REPORT FOR Ken Smith	**REPORT FOR** S. Kelly	**TOWNSHIP** Port Campbell
WELL NAME AND NO. Langley–1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria

BIT DATA

Size 8.500 ins
Type ETD 417
Nozzles 32nds

11	13	13

Noz Area 0.35 ins²
TFA ins²
NV m/sec 82.9
Impact lb f 370

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	4.367	841.4
Pipe 2	4.5	2.875	55.28
Pipe 3			
Col 1	6.25	2.875	165.29
Col 2			

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	8.5	727.6

CASINGS

Size ins		Depth m
Riser	Set @	
9 5/8"	Set @	334.43
	Set @	
	Set @	
	Set @	
	Set @	
	Set @	
Liner	Set @	
	Top @	

PUMP DATA

Pump Make	ins	x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	7.75	95	0.054		
Nat 8P80	6	8.5	95	0.0705	101	7.121

Pump Press 890 psi — TOTAL bbl/min 7.121

MUD VOL bbl

Downhole	228
Active	450
Total Circ	678
Reserve	74

CIRCULATING DATA

Total circ 95 mins		AV	m/min
Bottoms up 24 mins		DP	43
Surface–bit 8 mins		DC	67.3
ECD ppg	8.86	Riser	

MUD PROPERTIES

Sample Location	IN or OUT	IN		IN	
Time Sample Taken	hrs	12:00		24:00	
Depth	m	832		1062	
Flowline Temp	°C				
Weight	ppg	9.00		8.80	
Funnel Viscosity	sec/qt	44		42	
Plastic Viscosity	cP	8		8	
Yield Point	lb/100 ft²	12		12	
Gels 10 sec/10min/30 min	lb/100 ft²	12/20/30		12/20/30	
API Filtrate	ml/30min	20.0		15.0	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	4/–		3/–	
Solids	% Vol	4.6		3.4	
Dissolved Salts	% Vol	0.1		0.1	
Oil Content/Water Content	% Vol	–/95.3		–/96.5	
Sand	% Vol	0.1		0.1	
Methylene Blue cap	ppb	10		10	
pH	meter	9.0		9.0	
Alk. Mud Pm	ml	0.50		0.50	
Alk. Filtrate, Pf/Mf	ml	0.05/0.07		0.05/0.10	
Chlorides	mg/Lx10³	1.3		1.5	
Total Hardness/Calcium	mg/L	40/40		50/50	
KCL	% Wt Soln				
ASG of Solids	g/cc	2.7		2.6	
n & K		0.49/0.94		0.49/0.94	
Rheometer	600 rpm/300 rpm	28/20		28/20	
lb/100 ft²	200 rpm/100 rpm				
	6 rpm/3 rpm				

MUD PROPERTY SPECIFICATIONS

WEIGHT	<9.2 ppg	VIS	42–47 sec	YP	15–20 lb/100 ft²
API Filt	<15 ml	HTHP	ml	KCL	%

BY AUTHORITY Mud Program

REMARKS

Continued maintaining 40+ viscosity using pre–hydrated AQUAGEL and CMC–EHV to minimise hole washout.
No problems with sands on shakers, indicating hole stable.

ACTIVITY

Drilled to 832 m. Circulated out for 1/2 hr then ran 25 stand wiper trip to casing shoe. Ran back in without problems and no fill. Continued drilling from 12:30 hrs. Reduced bit weight and taking more surveys as deviation increased.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
AQUAGEL,sx	25 kg	58		306	831.14
Caustic Soda	25 kg	3		35	97.29
CMC EHV	25 kg	5		39	533.05

MUD TYPE FW/AQUAGEL/CMC

SOLIDS CONTROL EQUIPMENT

Make	screen size	hrs
Shaker 1	50,50,80	21
Shaker 2		
Shaker 3		
Shaker 4		

	ppg	bbl/hr	hrs	bbl
Desander	11.5	2.5	21	53
Desilter 1.	11.4	7	21	147
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	380
other	
other	
Barite	
Chemicals	4
Losses	**bbl**
Sol. Con.	200
Lost/Dumped	51
Down Hole	50
Newhole	86
NET GAIN	83
Discharged	251

BAROID Engineer	OFFICE	WAREHOUSE
M. Olejniczak	Melbourne	Adelaide
Tel. 059–787103	03–6213311	08–477433

DAILY COST A$ 1461.48

CUMULATIVE COST A$ 3691.83

RESERVE PITS

NO	TYPE	bbl
6	Pre–Gel	74

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m
708		1		
870		0.5		
1004		1.5		
1033		2		

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	3.4
Low Grav. Solids	ppb	30.9
High Grav. Solids	% Vol	0.3
High Grav. Solids	ppb	4.4
ASG of Solids	g/cc	2.60
Cuttings Volume	bbl	86.0
Interval Dilution	bbl/m	0.9
Interval Consumption	bbl/m	1.3

TIME BREAKDOWN hrs

Drilling	20.5
Circulating	0.5
Reaming In	
Reaming out	
Tripping	3
Other	
AVE ROP m/hr	18.15

Baroid Australia Pty Ltd

MUD REPORT NO. 6 up to 24:00 hrs, 17/5/94			
DATE 18/5/94	**DEPTH–m** MD 1257 TVD 1257		
START DATE 12–May–94	**ACTIVITY** Drilling		
OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia	
REPORT FOR Ken Smith	**REPORT FOR** S. Kelly	**TOWNSHIP** Port Campbell	
WELL NAME AND NO. Langley–1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria	

BIT DATA

Size 8.500 ins
Type ETD 417
Nozzles 32nds

11	13	13

Noz Area 0.35 ins²
TFA ins²
NV m/sec 85.5
Impact lb f 398

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	4.367	1036.4
Pipe 2	4.5	2.875	55.28
Pipe 3			
Col 1	6.25	2.875	165.29
Col 2			

OPEN HOLE SECTIONS

Sect 1
Sect 2
Current 8.5 922.6

CASINGS

Size ins		Depth m
Riser	Set @	
9 5/8"	Set @	334.43
	Set @	
	Set @	
	Set @	
	Set @	
	Set @	
Liner	Set @	
	Top @	

PUMP DATA

Pump Make	ins x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5 7.75	95	0.054	136	7.344
Nat 8P80	6 8.5	95	0.0705		

Pump Press 1000 psi TOTAL bbl/min 7.344

MUD VOL bbl

Downhole	272
Active	350
Total Circ	622
Reserve	74

CIRCULATING DATA

Total circ 85 mins	AV m/min
Bottoms up 28 mins	DP 44.3
Surface–bit 9 mins	DC 69.4
ECD ppg 8.96	Riser

MUD PROPERTIES

Sample Location	IN or OUT	IN		IN	
Time Sample Taken	hrs	12:00		24:00	
Depth	m	1219		1257	
Flowline Temp	°C				
Weight	ppg	8.90		8.90	
Funnel Viscosity	sec/qt	40		40	
Plastic Viscosity	cP	7		7	
Yield Point	lb/100 ft²	12		12	
Gels 10 sec/10min/30 min	lb/100 ft²	13/23/30		12/22/30	
API Filtrate	ml/30min	12.0		12.0	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	2/–		2/–	
Solids	% Vol	3.9		3.9	
Dissolved Salts	% Vol	0.1		0.1	
Oil Content/Water Content	% Vol	–/96.0		–/96.0	
Sand	% Vol	0.1		0.1	
Methylene Blue cap	ppb	10		10	
pH	meter	9.0		9.0	
Alk. Mud Pm	ml	0.50		0.50	
Alk. Filtrate, Pf/Mf	ml	0.05/0.10		0.05/0.10	
Chlorides	mg/Lx10³	1.0		1.0	
Total Hardness/Calcium	mg/L	50/50		40/40	
KCL	% Wt Soln				
ASG of Solids	g/cc	2.7		2.7	
n & K		0.45/1.15		0.45/1.15	
Rheometer	600 rpm/300 rpm	26/19		26/19	
lb/100 ft²	200 rpm/100 rpm				
	6 rpm/3 rpm				

MUD PROPERTY SPECIFICATIONS

WEIGHT	<9.2 ppg	VIS	40–45 sec	YP	15–20 lb/100 ft²
API Filt	<15 ml	HTHP	ml	KCL	%
BY AUTHORITY		Mud Program			

REMARKS

Allowing bentonite content and mud volume to reduce, with aim of beginning conversion to KCl/Polymer from 1400 m.

ACTIVITY

Drilled to 1228 m. Circulated out 1/2 hr, then POH for wiper trip.
Pipe pulled tight from near bottom. Temporarily stuck at 1076 m.
Worked free, and worked pipe through tight hole to 1035 m over 1 hr.
Continued POH to 823 m. Ran back in without problems. Had 2 m fill.
Resumed drilling but survey line broke during survey at 1257 m.
POH to recover line and survey barrel.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Caustic Soda	25 kg	2		33	64.86
CMC EHV	25 kg	6		33	639.66

MUD TYRE FW/AQUAGEL/CMC

SOLIDS CONTROL EQUIPMENT

Make	screen size	hrs
Shaker 1	50,50,80	17
Shaker 2		
Shaker 3		
Shaker 4		

	ppg	bbl/hr	hrs	bbl
Desander	11.4	4	17	68
Desilter 1.	11.1	6	17	102
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	180
other	
other	
Barite	
Chemicals	1
Losses	**bbl**
Sol. Con.	170
Lost/Dumped	47
Down Hole	20
Newhole	45
NET LOSS	56
Discharged	217

BAROID Engineer	OFFICE	WAREHOUSE
M. Olejniczak	Melbourne	Adelaide
Tel. 059–787103	03–6213311	08–477433

DAILY COST A$ 704.52

CUMULATIVE COST A$ 4396.35

RESERVE PITS

NO	TYPE	bbl
6	Pre–Gel	74

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m
1091		1.5		
1158		0.5		
1196		1		
1228		1.5		
1244		1.25		

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	3.7
Low Grav. Solids	ppb	33.7
High Grav. Solids	% Vol	0.2
High Grav. Solids	ppb	2.9
ASG of Solids	g/cc	2.70
Cuttings Volume	bbl	45.0
Interval Dilution	bbl/m	0.9
Interval Consumption	bbl/m	1.2

TIME BREAKDOWN hrs

Drilling	16
Circulating	1
Reaming In	
Reaming out	1
Tripping	6
Other	
AVE ROP m/hr	12.19

Baroid Australia Pty Ltd

MUD REPORT NO. 7 up to 24:00 hrs, 18/5/94	
DATE 19/5/94	**DEPTH—m** MD 1321 TVD 1321
START DATE 12—May—94	**ACTIVITY** Drilling

OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia
REPORT FOR Ken Smith	**REPORT FOR** S. Kelly	**TOWNSHIP** Port Campbell
WELL NAME AND NO. Langley—1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria

BIT DATA

Size 8.500 ins
Type ETD 417
Nozzles 32nds

11	13	13

Noz Area 0.35 ins²
TFA ins²
NV m/sec 85.5
Impact lb f 403

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	4.367	1111.4
Pipe 2	4.5	2.875	55.28
Pipe 3			
Col 1	6.25	2.875	154.33
Col 2			

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	8.5	986.6

CASINGS

Size ins	Depth m	
Riser	Set @	
9 5/8"	Set @	334.43
	Set @	
	Set @	
	Set @	
	Set @	
Liner	Set @	
	Top @	

PUMP DATA

Pump Make	ins	x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	7.75	95	0.054	136	7.344
Nat 8P80	6	8.5	95	0.0705		

Pump Press 1000 psi — TOTAL bbl/min 7.344

MUD VOL	**bbl**
Downhole	288
Active	374
Total Circ	662
Reserve	34

CIRCULATING DATA

	AV m/min
Total circ 90 mins	DP 44.3
Bottoms up 29 mins	DC 69.4
Surface—bit 10 mins	Riser
ECD ppg 9.05	

MUD PROPERTIES

Sample Location	IN or OUT	IN		IN	
Time Sample Taken	hrs	11:30		24:00	
Depth	m	1257		1321	
Flowline Temp	°C				
Weight	ppg	8.90		9.00	
Funnel Viscosity	sec/qt	41		38	
Plastic Viscosity	cP	10		9	
Yield Point	lb/100 ft²	13		11	
Gels 10 sec/10min/30 min	lb/100 ft²	12/23/30		10/19/29	
API Filtrate	ml/30min	10.0		8.5	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	2/—		2/—	
Solids	% Vol	3.9		4.6	
Dissolved Salts	% Vol	0.1		0.1	
Oil Content/Water Content	% Vol	—/96.0		—/95.3	
Sand	% Vol	0.1		0.1	
Methylene Blue cap	ppb	9		8	
pH	meter	9.0		9.0	
Alk. Mud Pm	ml	0.50		0.50	
Alk. Filtrate, Pf/Mf	ml	0.05/0.10		0.05/0.10	
Chlorides	mg/Lx10³	1.0		1.0	
Total Hardness/Calcium	mg/L	40/40		40/40	
KCL	% Wt Soln				
ASG of Solids	g/cc	2.7		2.7	
n & K		0.52/0.90		0.54/0.69	
Rheometer	600 rpm/300 rpm	33/23		29/20	
lb/100 ft²	200 rpm/100 rpm				
	6 rpm/3 rpm				

MUD PROPERTY SPECIFICATIONS

WEIGHT	<9.2 ppg	VIS	40—45 sec	YP	10—15 lb/100 ft²
API Filt	<12 ml	HTHP	ml	KCL	%
BY AUTHORITY		Mud Program			

REMARKS

Continued maintaining viscosity and filtration control using CMC—EHV additions only. Keeping mud MBT (clay content) low to prepare for conversion to KCl/Polymer.

ACTIVITY

Continued POH. Checked bit, changed BHA and slipped line. Ran back into hole. Had to ream in from 1062 to 1075 m over 1/2 hr and from 1177 to 1257 m over 1 1/2 hrs. resumed drilling from 11:30 hrs.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Caustic Soda	25 kg	2		31	64.86
CMC EHV	25 kg	10		23	1066.1

MUD TYPE FW/AQUAGEL/CMC

SOLIDS CONTROL EQUIPMENT

Make	screen size	hrs
Shaker 1	50,50,80	15
Shaker 2		
Shaker 3		
Shaker 4		

	ppg	bbl/hr	hrs	bbl
Desander	11.1	3	11	33
Desilter 1.	11	6	15	90
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	**bbl**
Sea W.	
Drill W.	220
other	
other	
Barite	
Chemicals	1
Losses	**bbl**
Sol. Con.	123
Lost/Dumped	63
Down Hole	35
Newhole	15
NET GAIN	
Discharged	186

BAROID Engineer	OFFICE	WAREHOUSE
M. Olejniczak	Melbourne	Adelaide
Tel. 059—787103	03—6213311	08—477433

DAILY COST A$ 1130.96

CUMULATIVE COST A$ 5527.31

RESERVE PITS

NO	TYPE	bbl
6	Pre—Mix	34

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m
1276		1		
1305		1.75		

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	4.3
Low Grav. Solids	ppb	39.1
High Grav. Solids	% Vol	0.3
High Grav. Solids	ppb	4.4
ASG of Solids	g/cc	2.70
Cuttings Volume	bbl	15.0
Interval Dilution	bbl/m	1.1
Interval Consumption	bbl/m	1.4

TIME BREAKDOWN hrs

Drilling	12.5
Circulating	0.5
Reaming In	2
Reaming out	
Tripping	9
Other	
AVE ROP m/hr	5.12

Baroid Australia Pty Ltd

MUD REPORT NO.	8	up to 24:00 hrs,	19/5/94
DATE	20/5/94	**DEPTH–m** MD 1363	TVD 1363
START DATE	12–May–94	**ACTIVITY**	Reaming In

OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia
REPORT FOR Ken Smith	**REPORT FOR** S. Kelly	**TOWNSHIP** Port Campbell
WELL NAME AND NO. Langley–1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria

BIT DATA

Size 8.500 ins
Type Sec S82F
Nozzles 32nds

11	13	13

Noz Area 0.35 ins²
TFA ins²
NV m/sec 66.0
Impact lb f 240

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	4.367	1010.1
Pipe 2	4.5	2.875	55.28
Pipe 3			
Col 1	6.25	2.875	174.6
Col 2			

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	8.5	1028.6

CASINGS

Size ins		Depth m
Riser	Set @	
9 5/8"	Set @	334.43
	Set @	
	Set @	
	Set @	
	Set @	
	Set @	
Liner	Set @	
	Top @	

PUMP DATA

Pump Make	ins	x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	7.75	95	0.054	105	5.67
Nat 8P80	6	8.5	95	0.0705		

Pump Press 600 psi — TOTAL bbl/min 5.67

MUD VOL	**bbl**	**CIRCULATING DATA**		
Downhole	296	Total circ 118 mins	AV	m/min
Active	374	Bottoms up 35 mins	DP	34.2
Total Circ.	670	Surface–bit 12 mins	DC	53.6
Reserve	14	ECD ppg 9.04	Riser	

MUD PROPERTIES

Sample Location	IN or OUT	IN		IN	
Time Sample Taken	hrs	12:00		24:00	
Depth	m	1363		1363	
Flowline Temp	°C			37	
Weight	ppg	9.00		9.00	
Funnel Viscosity	sec/qt	40		38	
Plastic Viscosity	cP	9		7	
Yield Point	lb/100 ft²	12		11	
Gels 10 sec/10min/30 min	lb/100 ft²	9/20/30		7/17/26	
API Filtrate	ml/30min	8.5		8.5	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	2/–		2/–	
Solids	% Vol	4.9		4.9	
Dissolved Salts	% Vol	0.1		0.1	
Oil Content/Water Content	% Vol	–/95.0		–/95.0	
Sand	% Vol	0.1		0.1	
Methylene Blue cap	ppb	8		7	
pH	meter	9.0		8.8	
Alk. Mud Pm	ml	0.50		0.50	
Alk. Filtrate, Pf/Mf	ml	0.05/0.10		0.05/0.10	
Chlorides	mg/Lx10³	1.2		1.5	
Total Hardness/Calcium	mg/L	50/50		60/60	
KCL	% Wt Soln				
ASG of Solids	g/cc	2.6		2.6	
n & K		0.51/0.87		0.47/0.96	
Rheometer	600 rpm/300 rpm	30/21		25/18	
lb/100 ft²	200 rpm/100 rpm				
	6 rpm/3 rpm				

MUD PROPERTY SPECIFICATIONS

WEIGHT <9.2 ppg VIS 40–45 sec YP 10–15 lb/100 ft²
API Filt <15 ml HTHP ml KCL %
BY AUTHORITY Mud Program

REMARKS

Slow drilling as weight on bit reduced attemping to control deviation. BHA change made to stiffen assembly and stop deviation worsening. Problems reaming in due to stiffer, longer BHA going into very close to guage 8 1/2" hole.
Mud losses high due to tripping, but also appear to have had seepage losses into Paaratte Formation for several days.
Continued using CMC–EHV only for mud maintainence.

ACTIVITY

Drilled to 1363 m at 08:30 hrs. Circ out 1/2 hr, then POH for bit and BHA change. Had to work tight hole from 1302 to 1158 m pulling out. Changed bit and added 2 stabilisers to BHA to stiffen BHA. RIH to 947 m. Had to ream in the rest of the way. Reached 1240 m.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Caustic Soda	25 kg	1		30	32.43
CMC EHV	25 kg	11		12	1172.71

MUD TYPE FW/AQUAGEL/CMC

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		50,50,80	16.5
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander	11.2	1.5	15	23
Desilter 1.	11	4	12	48
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	200
other	
other	
Barite	
Chemicals	1
Losses	**bbl**
Sol. Con.	71
Lost/Dumped	82
Down Hole	60
Newhole	10
NET LOSS	12
Discharged	153

BAROID Engineer	OFFICE	WAREHOUSE
M. Olejniczak	Melbourne	Adelaide
Tel. 059–787103	03–6213311	08–477433

DAILY COST A$ 1205.14 **CUMULATIVE COST** A$ 6732.45

RESERVE PITS

NO	TYPE	bbl
6	Pre–Mix	14

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m
1331		1.75		
1363		1.75		

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	4.9
Low Grav. Solids	ppb	44.6
High Grav. Solids	% Vol	
High Grav. Solids	ppb	
ASG of Solids	g/cc	2.60
Cuttings Volume	bbl	10.0
Interval Dilution	bbl/m	1.3
Interval Consumption	bbl/m	1.5

TIME BREAKDOWN

	hrs
Drilling	8.5
Circulating	0.5
Reaming In	7.5
Reaming out	
Tripping	7.5
Other	
AVE ROP m/hr	4.94

Baroid Australia Pty Ltd

MUD REPORT NO. 9 up to 24:00 hrs, 20/5/94	
DATE 21/5/94	**DEPTH–m** MD 1438 TVD 1438
START DATE 12–May–94	**ACTIVITY** Stuck Pipe

OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia
REPORT FOR Ken Smith	**REPORT FOR** S. Kelly	**TOWNSHIP** Port Campbell
WELL NAME AND NO. Langley–1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria

BIT DATA

Size 8.500 ins
Type Sec S82F
Nozzles 32nds

11	13	13

Noz Area 0.35 ins²
TFA ins²
NV m/sec 69.1
Impact lb f 264

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	4.367	1208.1
Pipe 2	4.5	2.875	55.28
Pipe 3			
Col 1	6.25	2.875	174.6
Col 2			

OPEN HOLE SECTIONS

Sect 1
Sect 2
Current 8.5 1103.6

CASINGS

Size ins	Depth m
Riser	Set @
9 5/8"	Set @ 334.43
	Set @
	Set @
	Set @
	Set @
	Set @
Liner	Set @
	Top @

PUMP DATA

Pump Make	ins	x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	7.75	95	0.054	110	5.94
Nat 8P80	6	8.5	95	0.0705		

Pump Press 625 psi TOTAL bbl/min 5.94

MUD VOL	bbl	CIRCULATING DATA	AV m/min
Downhole	312	Total circ 118 mins	
Active	389	Bottoms up 39 mins	DP 35.8
Total Circ	701	Surface–bit 13 mins	DC 56.1
Reserve		ECD ppg 9.06	Riser

MUD PROPERTIES

		IN		IN	
Sample Location	IN or OUT				
Time Sample Taken	hrs	12:15		21:30	
Depth	m	1401		1438	
Flowline Temp	°C	38		38	
Weight	ppg	8.90		9.00	
Funnel Viscosity	sec/qt	38		45	
Plastic Viscosity	cP	7		10	
Yield Point	lb/100 ft²	10		14	
Gels 10 sec/10min/30 min	lb/100 ft²	8/18/27		9/20/30	
API Filtrate	ml/30min	8.5		9.0	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	2/–		2/–	
Solids	% Vol	4.8		4.5	
Dissolved Salts	% Vol	0.2		0.5	
Oil Content/Water Content	% Vol	–/95.0		–/95.0	
Sand	% Vol	0.1		0.1	
Methylene Blue cap	ppb	8		9	
pH	meter	8.6		8.8	
Alk. Mud Pm	ml	0.50		0.45	
Alk. Filtrate, Pf/Mf	ml	0.05/0.10		0.10/0.20	
Chlorides	mg/Lx10³	2.8		5.7	
Total Hardness/Calcium	mg/L	80/80		80/80	
KCL	% Wt Soln	0.4		0.8	
ASG of Solids	g/cc	2.4		2.6	
n & K		0.50/0.75		0.50/1.06	
K+ Ion Conc	mg/Lx10³	2.3		4.6	
Rheometer	600 rpm/300 rpm	24/17		34/24	
lb/100 ft²	200 rpm/100 rpm				
	6 rpm/3 rpm				

MUD PROPERTY SPECIFICATIONS

WEIGHT <9.2 ppg VIS 40–46 sec YP 10–15 lb/100 ft²
API Filt 6–8 ml HTHP ml KCL 3 %
BY AUTHORITY

REMARKS

Started to switch over to KCL / Polymer system.
Mixing batches of Pre–Mix in pill tank and then adding to active tank.

ACTIVITY

Reamed to bottom and continued drilling ahead.
At 1438m incountered some torque. Pulled up and clutch went down.
Could not move the pipe for several hours while repairing clutch.
After fixing the clutch tried to pull pipe. The pipe was stuck, work pipe.
Working pipe and activating jars.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Caustic Soda	25 kg	1		29	32.43
CMC EHV	25 kg	5		7	533.05
KCL,Tech(sx)	25 kg	20		300	288.8
PAC–R	50 lb	2		38	341.48
PAC–L	50 lb	4		36	682.96

MUD TYPE KCL / POLYMER

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		50x50x80	17
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander	11.3	1.3	12	16
Desilter 1.	10.7	3	12	36
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	80
other	
other	
Barite	
Chemicals	3
Losses	**bbl**
Sol. Con.	52
Lost/Dumped	
Down Hole	
Newhole	17
NET GAIN	31
Discharged	52

BAROID Engineer	OFFICE	WAREHOUSE
C. DaSilva	Melbourne	Adelaide
Tel. 059–787103	03–6213311	08–477433

DAILY COST A$ 1878.72

CUMULATIVE COST A$ 8611.17

RESERVE PITS

NO	TYPE	bbl
6	Pre–Mix	

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	4.5
Low Grav. Solids	ppb	40.9
High Grav. Solids	% Vol	
High Grav. Solids	ppb	
ASG of Solids	g/cc	2.60
Cuttings Volume	bbl	17.0
Interval Dilution	bbl/m	1.2
Interval Consumption	bbl/m	1.5

TIME BREAKDOWN hrs

Drilling	12
Circulating	
Reaming In	6
Reaming out	
Tripping	
Other	6
AVE ROP m/hr	6.25

Baroid Australia Pty Ltd

MUD REPORT NO.	10	up to 24:00 hrs,	21/5/94
DATE	22/5/94	**DEPTH–m** MD 1438	TVD 1438
START DATE	12–May–94	**ACTIVITY**	Stuck – Running Free point.

OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia
REPORT FOR Ken Smith	**REPORT FOR** J.Hoffman	**TOWNSHIP** Port Campbell
WELL NAME AND NO. Langley–1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria

BIT DATA

Size 8.500 ins
Type Sec S82F
Nozzles 32nds

11	13	13

Noz Area 0.35 ins²
TFA ins²
NV m/sec
Impact lb f

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	4.367	1207.8
Pipe 2	4.5	2.875	55.28
Pipe 3			
Col 1	6.25	2.875	174.96
Col 2			

OPEN HOLE SECTIONS

Sect 1			
Sect 2			
Current	8.5	1103.6	

CASINGS

		Depth m
Size ins		
Riser	Set @	
9 5/8"	Set @	334.43
	Set @	
	Set @	
	Set @	
	Set @	
	Set @	
Liner	Set @	
	Top @	

PUMP DATA

Pump Make	ins	x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	7.75	95	0.0525		
Nat 8P80	6	8.5	95	0.0705		

Pump Press – psi TOTAL bbl/min

MUD VOL bbl

Downhole	312
Active	311
Total Circ	623
Reserve	

CIRCULATING DATA

Total circ – mins	AV m/min
Bottoms up – mins	DP
Surface–bit – mins	DC
ECD ppg 9	Riser

MUD PROPERTIES

		IN
Sample Location	IN or OUT	
Time Sample Taken	hrs	17:30
Depth	m	1438
Flowline Temp	°C	37
Weight	ppg	9.00
Funnel Viscosity	sec/qt	45
Plastic Viscosity	cP	10
Yield Point	lb/100 ft²	15
Gels 10 sec/10min/30 min	lb/100 ft²	7/17/25
API Filtrate	ml/30min	9.0
HPHT Filtrate	ml/30min	
API/HPHT Filter Cake	32nd ins	2/–
Solids	% Vol	4.5
Dissolved Salts	% Vol	0.5
Oil Content/Water Content	% Vol	–/95.0
Sand	% Vol	0.1
Methylene Blue cap	ppb	9
pH	meter	8.8
Alk. Mud Pm	ml	0.45
Alk. Filtrate, Pf/Mf	ml	0.10/0.20
Chlorides	mg/Lx10³	5.5
Total Hardness/Calcium	mg/L	80/80
KCL	% Wt Soln	0.7
ASG of Solids	g/cc	2.6
n & K		0.49/1.18
K+ Ion Conc	mg/Lx10³	4
Rheometer	600 rpm/300 rpm	35/25
lb/100 ft²	200 rpm/100 rpm	
	6 rpm/3 rpm	

MUD PROPERTY SPECIFICATIONS

WEIGHT <9.3 ppg VIS 40–50 sec YP 10–18 lb/100 ft²
API Filt 6–8 ml HTHP ml KCL 3 %
BY AUTHORITY Mud Program

REMARKS

Lost 78bbls of mud while displacing annulus to water, and then back to mud again.

ACTIVITY

Worked stuck pipe.
Displaced annulas with 258bbls of water and work pipe.
Hold tension and torque on pipe for one hour, then work pipe again.
Reverse circulate with mud to water at shakers and work pipe.
Continued to work pipe while waiting on Schlumberger,not circulating.
Circulated and displaced water with active mud, dump water in sump.
Running wireline free point indicator.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
PAC–L	50 lb	4		32	682.96

MUD TYPE KCL / POLYMER

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		50x50x80	18
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander				
Desilter 1.				
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	
other	
other	
Barite	
Chemicals	
Losses	**bbl**
Sol. Con.	
Lost/Dumped	60
Down Hole	18
Newhole	
NET LOSS	78
Discharged	60

BAROID Engineer	OFFICE	WAREHOUSE
C. Da Silva	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST A$ 682.96

CUMULATIVE COST A$ 9294.13

RESERVE PITS

NO	TYPE	bbl
6	Pre–Mix	

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	4.5
Low Grav. Solids	ppb	40.9
High Grav. Solids	% Vol	
High Grav. Solids	ppb	
ASG of Solids	g/cc	2.60
Cuttings Volume	bbl	
Interval Dilution	bbl/m	1.3
Interval Consumption	bbl/m	1.5

TIME BREAKDOWN hrs

Drilling	
Circulating	4
Reaming In	
Reaming out	
Tripping	
Other	20
AVE ROP m/hr	

Baroid Australia Pty Ltd

MUD REPORT NO.	11	up to 24:00 hrs,	22/5/94
DATE	23/5/94	**DEPTH–m** MD 1438	TVD 1438
START DATE	12–May–94	**ACTIVITY**	CIRC & COND MUD

OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia
REPORT FOR Ken Smith	**REPORT FOR** J.Hoffman	**TOWNSHIP** Port Campbell
WELL NAME AND NO. Langley–1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria

BIT DATA

Size 8.500 ins
Type Sec S82F
Nozzles 32nds

11	13	13

Noz Area 0.35 ins²
TFA ins²
NV m/sec 79.4
Impact lb f 348

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	4.367	1207.8
Pipe 2	4.5	2.875	55.28
Pipe 3			
Col 1	6.25	2.875	174.96
Col 2			

OPEN HOLE SECTIONS

Sect 1			
Sect 2			
Current	8.5	1103.6	

CASINGS

Size ins		Depth m
Riser	Set @	
9 5/8"	Set @	334.43
	Set @	
	Set @	
	Set @	
	Set @	
	Set @	
Liner	Set @	
	Top @	

PUMP DATA

Pump Make	ins	x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	7.75	95	0.0525	130	6.825
Nat 8P80	6	8.5	95	0.0705		

Pump Press 1300 psi — TOTAL bbl/min 6.825

MUD VOL	bbl	**CIRCULATING DATA**	AV m/min
Downhole	312	Total circ 91 mins	
Active	308	Bottoms up 34 mins	DP 41.2
Total Circ	620	Surface–bit 12 mins	DC 64.5
Reserve		ECD ppg 9.07	Riser

MUD PROPERTIES

		IN
Sample Location	IN or OUT	
Time Sample Taken	hrs	04:35
Depth	m	1438
Flowline Temp	°C	38
Weight	ppg	9.00
Funnel Viscosity	sec/qt	46
Plastic Viscosity	cP	11
Yield Point	lb/100 ft²	15
Gels 10 sec/10min/30 min	lb/100 ft²	6/16/24
API Filtrate	ml/30min	7.1
HPHT Filtrate	ml/30min	
API/HPHT Filter Cake	32nd ins	2/–
Solids	% Vol	4.4
Dissolved Salts	% Vol	0.6
Oil Content/Water Content	% Vol	–/95.0
Sand	% Vol	0.1
Methylene Blue cap	ppb	8
pH	meter	8.5
Alk. Mud Pm	ml	0.40
Alk. Filtrate, Pf/Mf	ml	0.10/0.20
Chlorides	mg/Lx10³	6.5
Total Hardness/Calcium	mg/L	60/60
KCL	% Wt Soln	1.0
ASG of Solids	g/cc	2.7
n & K		0.51/1.08
K+ Ion Conc	mg/Lx10³	5.7
Rheometer	600 rpm/300 rpm	37/26
lb/100 ft²	200 rpm/100 rpm	
	6 rpm/3 rpm	

MUD PROPERTY SPECIFICATIONS

WEIGHT <9.3 ppg VIS 40–50 sec YP 10–18 lb/100 ft²
API Filt 6–8 ml HTHP ml KCL 3 %
BY AUTHORITY Mud Program

REMARKS

ACTIVITY

Completed free point.
Circulated hole clean, then displaced the hole to water.
Work stuck pipe. Mix and pump 32 bbls EZ Spot around collars and HWDP, Work pipe straight away.
Rig up and run another free point.
Pipe came free while running free point.
Circulated and displaced water and EZ Spot Diesel with mud.
Circulated and conditioned mud.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
EZ SPOT	208 lt	2			1522.36
KCL,Tech(sx)	25 kg	10		290	144.4
PAC–R	50 lb	1		37	170.74
PAC–L	50 lb	1		31	170.74

MUD TYPE KCL / POLYMER

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		50x50x80	6
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander				
Desilter 1.				
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	
other	
other	
Barite	
Chemicals	4
Losses	**bbl**
Sol. Con.	
Lost/Dumped	7
Down Hole	
Newhole	
NET LOSS	3
Discharged	7

BAROID Engineer	OFFICE	WAREHOUSE
C. Da Silva	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST A$ 2008.24

CUMULATIVE COST A$ 11302.37

RESERVE PITS

NO	TYPE	bbl
6	Pre–Mix	

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	4.1
Low Grav. Solids	ppb	37.3
High Grav. Solids	% Vol	0.3
High Grav. Solids	ppb	4.4
ASG of Solids	g/cc	2.70
Cuttings Volume	bbl	
Interval Dilution	bbl/m	1.3
Interval Consumption	bbl/m	1.5

TIME BREAKDOWN hrs

Drilling	
Circulating	4
Reaming In	
Reaming out	
Tripping	
Other	20
AVE ROP m/hr	

Baroid Australia Pty Ltd

MUD REPORT NO. 12 up to 24:00 hrs, 23/5/94	
DATE 24/5/94	**DEPTH–m** MD 1438 TVD 1438
START DATE 12–May–94	**ACTIVITY** RIH Washing to bottom.

OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia
REPORT FOR Ken Smith	**REPORT FOR** J.Hoffman	**TOWNSHIP** Port Campbell
WELL NAME AND NO. Langley–1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria

BIT DATA

Size 8.500 ins
Type Sec S82F
Nozzles 32nds

11	13	13

Noz Area 0.35 ins²
TFA ins²
NV m/sec 76.4
Impact lb f 322

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	4.367	1207.8
Pipe 2	4.5	2.875	55.28
Pipe 3			
Col 1	6.25	2.875	174.96
Col 2			

OPEN HOLE SECTIONS

Sect 1			
Sect 2			
Current	8.5	1103.6	

CASINGS

Size ins		Depth m
Riser	Set @	
9 5/8"	Set @	334.43
	Set @	
	Set @	
	Set @	
	Set @	
	Set @	
Liner	Set @	
	Top @	

PUMP DATA

Pump Make	ins	x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	7.75	95	0.0525	125	6.563
Nat 8P80	6	8.5	95	0.0705		

Pump Press 825 psi — TOTAL bbl/min 6.563

MUD VOL bbl

Downhole	312
Active	308
Total Circ	620
Reserve	

CIRCULATING DATA

Total circ 94 mins		AV	m/min
Bottoms up 35 mins		DP	39.6
Surface–bit 12 mins		DC	62
ECD ppg	9.08	Riser	

MUD PROPERTIES

Sample Location	IN or OUT			IN
Time Sample Taken	hrs			24:00
Depth	m			1438
Flowline Temp	°C			38
Weight	ppg			9.00
Funnel Viscosity	sec/qt			46
Plastic Viscosity	cP			11
Yield Point	lb/100 ft²			18
Gels 10 sec/10min/30 min	lb/100 ft²			6/15/24
API Filtrate	ml/30min			7.5
HPHT Filtrate	ml/30min			
API/HPHT Filter Cake	32nd ins			2/–
Solids	% Vol			4.0
Dissolved Salts	% Vol			1.0
Oil Content/Water Content	% Vol			–/95.0
Sand	% Vol			0.1
Methylene Blue cap	ppb			10
pH	meter			8.8
Alk. Mud Pm	ml			0.40
Alk. Filtrate, Pf/Mf	ml			0.10/0.20
Chlorides	mg/Lx10³			11.3
Total Hardness/Calcium	mg/L			60/60
KCL	% Wt Soln			1.8
ASG of Solids	g/cc			2.7
n & K				0.46/1.65
K+ Ion Conc	mg/Lx10³			10.3
Rheometer	600 rpm/300 rpm			40/29
lb/100 ft²	200 rpm/100 rpm			
	6 rpm/3 rpm			

MUD PROPERTY SPECIFICATIONS

WEIGHT <9.3 ppg VIS 40–50 sec YP 10–18 lb/100 ft²
API Filt 6–8 ml HTHP ml KCL 3 %
BY AUTHORITY Mud Program

REMARKS

ACTIVITY

Pulled out of the hole and changed bit.
Tight hole from 1361 to1226m on the way out.
Ran in the hole to 1238m washed to bottom.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Caustic Soda	25 kg	1		28	32.43
KCL,Tech(sx)	25 kg	50		240	722
PAC–L	50 lb	10		21	1707.4

MUD TYPE KCL / POLYMER

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		50x50x80	8
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander				
Desilter 1.				
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	
other	
other	
Barite	
Chemicals	5
Losses	**bbl**
Sol. Con.	
Lost/Dumped	5
Down Hole	
Newhole	
NET GAIN	
Discharged	5

BAROID Engineer	OFFICE	WAREHOUSE
C. Da Silva	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST A$ 2461.83

CUMULATIVE COST A$ 13764.20

RESERVE PITS

NO	TYPE	bbl
6	Pre–Mix	

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	3.7
Low Grav. Solids	ppb	33.7
High Grav. Solids	% Vol	0.3
High Grav. Solids	ppb	4.4
ASG of Solids	g/cc	2.70
Cuttings Volume	bbl	
Interval Dilution	bbl/m	1.3
Interval Consumption	bbl/m	1.5

TIME BREAKDOWN hrs

Drilling	
Circulating	5
Reaming In	3
Reaming out	
Tripping	13
Other	3
AVE ROP m/hr	

Baroid Australia Pty Ltd

MUD REPORT NO. 13 up to 24:00 hrs, 24/5/94	
DATE 25/5/94	**DEPTH–m** MD 1557 TVD 1557
START DATE 12–May–94	**ACTIVITY** Drilling

OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia
REPORT FOR Ken Smith	**REPORT FOR** J.Hoffman	**TOWNSHIP** Port Campbell
WELL NAME AND NO. Langley–1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria

BIT DATA

Size 8.500 ins
Type Sec S82F
Nozzles 32nds

11	13	13

Noz Area 0.35 ins²
TFA ins²
NV m/sec 83.7
Impact lb f 393

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	4.367	1326.8
Pipe 2	4.5	2.875	55.28
Pipe 3			
Col 1	6.25	2.875	174.96
Col 2			

OPEN HOLE SECTIONS

Sect 1			
Sect 2			
Current	8.5	1222.6	

CASINGS

Size ins		Depth m
Riser	Set @	
9 5/8"	Set @	334.43
	Set @	
	Set @	
	Set @	
	Set @	
	Set @	
Liner	Set @	
	Top @	

PUMP DATA

Pump Make	ins	x	ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	x	7.75	95	0.0525	137	7.193
Nat 8P80	6	x	8.5	95	0.0705		

Pump Press 1000 psi — TOTAL bbl/min 7.193

MUD VOL bbl

Downhole	339
Active	419
Total Circ	758
Reserve	

CIRCULATING DATA

Total circ 105 mins	AV	m/min
Bottoms up 35 mins	DP	43.4
Surface–bit 12 mins	DC	68
ECD ppg 9.23	Riser	

MUD PROPERTIES

Sample Location	IN or OUT	IN		IN	
Time Sample Taken	hrs	12:15		24:00	
Depth	m	1505		1557	
Flowline Temp	°C	39		39	
Weight	ppg	8.95		9.15	
Funnel Viscosity	sec/qt	48		42	
Plastic Viscosity	cP	12		11	
Yield Point	lb/100 ft²	18		16	
Gels 10 sec/10min/30 min	lb/100 ft²	5/14/23		5/13/22	
API Filtrate	ml/30min	8.0		7.0	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	2/–		2/–	
Solids	% Vol	3.3		3.8	
Dissolved Salts	% Vol	1.7		1.7	
Oil Content/Water Content	% Vol	–/95.0		–/94.5	
Sand	% Vol	0.2		0.2	
Methylene Blue cap	ppb	10		9	
pH	meter	9.0		9.3	
Alk. Mud Pm	ml	0.45		0.40	
Alk. Filtrate, Pf/Mf	ml	0.12/0.25		0.12/0.25	
Chlorides	mg/Lx10³	20.2		20.2	
Total Hardness/Calcium	mg/L	60/60		60/60	
KCL	% Wt Soln	3.2		3.2	
ASG of Solids	g/cc	2.6		3	
n & K		0.49/1.41		0.49/1.27	
K+ Ion Conc	mg/Lx10³	18.4		18.4	
Rheometer	600 rpm/300 rpm	42/30		38/27	
lb/100 ft²	200 rpm/100 rpm				
	6 rpm/3 rpm				

MUD PROPERTY SPECIFICATIONS

WEIGHT <9.3 ppg VIS 40–55 sec YP 10–20 lb/100 ft²
API Filt 6–8 ml HTHP ml KCL 3 %
BY AUTHORITY Mud Program

REMARKS

Increase KCL content to 3.2 %.
Added BARACORE 129 for corrosion control.
Continue pre–mixes and also PAC "R" and PAC "L" for rheology and filtration control. Dumped sand trap as needed.
Build mud volume in tanks.
Tentative formation tops, Nullawaare @ 1435m and Belfast @ 1465m.

ACTIVITY

Continue drilling 8.5" hole, survey at 1527m.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
BARACOR 129	25 kg	4		4	259.84
Caustic Soda	25 kg	4		24	129.72
KCL,Tech(sx)	25 kg	90		150	1299.6
PAC–R	50 lb	7		30	1195.18
PAC–L	50 lb	8		13	1365.92

MUD TYPE KCL / POLYMER

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs	ppg	bbl/hr	hrs	bbl
Shaker 1		50x50x80	24				
Shaker 2							
Shaker 3							
Shaker 4							
Desander				11.3	1	22	22
Desilter 1.				10.7	2	12	24
Desilter 2.							
Centrifuge 1							
Centrifuge 2							

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	205
other	
other	
Barite	
Chemicals	9
Losses	**bbl**
Sol. Con.	46
Lost/Dumped	30
Down Hole	
Newhole	27
NET GAIN	138
Discharged	76

BAROID Engineer	OFFICE	WAREHOUSE
C. Da Silva	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST A$ 4250.26

CUMULATIVE COST A$ 18014.46

RESERVE PITS

NO	TYPE	bbl
6	Pre–Mix	

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m
1527	1527	2		

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	2.9
Low Grav. Solids	ppb	26.4
High Grav. Solids	% Vol	0.9
High Grav. Solids	ppb	13.2
ASG of Solids	g/cc	3.00
Cuttings Volume	bbl	27.0
Interval Dilution	bbl/m	1.3
Interval Consumption	bbl/m	1.5

TIME BREAKDOWN hrs

Drilling	20
Circulating	1
Reaming In	2
Reaming out	
Tripping	
Other	1
AVE ROP m/hr	5.95

Baroid Australia Pty Ltd

MUD REPORT NO. 14	up to 24:00 hrs, 25/5/94		
DATE 26/5/94	DEPTH–m MD 1666	TVD 1666	
START DATE 12–May–94	ACTIVITY Drilling		

OPERATOR GFE Resources Ltd	CONTRACTOR / RIG Century Rig 11	COUNTRY Australia
REPORT FOR Ken Smith	REPORT FOR J.Hoffman	TOWNSHIP Port Campbell
WELL NAME AND NO. Langley–1	FIELD OR BLOCK NO. PPL 1	LOCATION Otway Basin, Victoria

BIT DATA

Size 8.500 ins
Type Sec S82F
Nozzles 32nds

11	13	13

Noz Area 0.35 ins²
TFA ins²
NV m/sec 83.1
Impact lb f 389

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	4.367	1435.8
Pipe 2	4.5	2.875	55.28
Pipe 3			
Col 1	6.25	2.875	174.96
Col 2			

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	8.5	1331.6

CASINGS

Size ins	Depth m	
Riser	Set @	
9 5/8"	Set @	334.43
	Set @	
	Set @	
	Set @	
	Set @	
	Set @	
Liner	Set @	
	Top @	

PUMP DATA

Pump Make	ins	x	ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5		7.75	95	0.0525	136	7.14
Nat 8P80	6		8.5	95	0.0705		

Pump Press 1075 psi — TOTAL bbl/min 7.14

MUD VOL bbl

Downhole	364
Active	371
Total Circ	735
Reserve	

CIRCULATING DATA

Total circ 103 mins	AV	m/min	
Bottoms up 38 mins	DP	43.1	
Surface–bit 13 mins	DC	67.5	
ECD ppg 9.3	Riser		

MUD PROPERTIES

		IN		IN	
Sample Location	IN or OUT				
Time Sample Taken	hrs	13:00		22:35	
Depth	m	1623		1666	
Flowline Temp	°C	39		40	
Weight	ppg	9.25		9.20	
Funnel Viscosity	sec/qt	55		55	
Plastic Viscosity	cP	13		13	
Yield Point	lb/100 ft²	20		22	
Gels 10 sec/10min/30 min	lb/100 ft²	7/18/29		8/19/31	
API Filtrate	ml/30min	8.9		8.0	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	2/–		2/–	
Solids	% Vol	4.3		4.3	
Dissolved Salts	% Vol	1.7		1.7	
Oil Content/Water Content	% Vol	–/94.0		–/94.0	
Sand	% Vol	0.2		0.2	
Methylene Blue cap	ppb	12		12	
pH	meter	9.0		9.3	
Alk. Mud Pm	ml	0.40		0.40	
Alk. Filtrate, Pf/Mf	ml	0.10/0.30		0.10/0.30	
Chlorides	mg/Lx10³	19.5		19.5	
Total Hardness/Calcium	mg/L	60/60		60/60	
KCL	% Wt Soln	3.1		3.1	
ASG of Solids	g/cc	3.1		2.9	
n & K		0.48/1.65		0.46/1.99	
K+ Ion Conc	mg/Lx10³	17.8		17.8	
Rheometer	600 rpm/300 rpm	46/33		48/35	
lb/100 ft²	200 rpm/100 rpm				
	6 rpm/3 rpm				

MUD PROPERTY SPECIFICATIONS

WEIGHT <9.3 ppg VIS 40–55 sec YP 10–20 lb/100 ft²
API Filt 6–8 ml HTHP ml KCL 3 %
BY AUTHORITY Mud Program

REMARKS

Adding pre–mix and Pac "R" & "L" to maintain rheology, and filtrate Requirements. Dumped sand trap when required.

ACTIVITY

Drilling ahead 8.5" hole to 1623m. Made 10 stand wiper trip OK. Continued drilling ahead , at 1628m circulated up a sample.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
BARACOR 129	25 kg	1		3	64.96
Caustic Soda	25 kg	2		22	64.86
CMC EHV	25 kg	3		4	319.83
KCL,Tech(sx)	25 kg	30		120	433.2
PAC–R	50 lb	10		20	1707.4
PAC–L	50 lb	3		10	512.22

MUD TYPE KCL / POLYMER

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		50x50x80	24
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander	11.1	1.25	22	28
Desilter 1.	10.5	2	22	44
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	75
other	
other	
Barite	
Chemicals	4

Losses	bbl
Sol. Con.	72
Lost/Dumped	30
Down Hole	
Newhole	25
NET LOSS	23
Discharged	102

BAROID Engineer	OFFICE	WAREHOUSE
C. Da Silva	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST A$ 3102.47

CUMULATIVE COST A$ 21116.93

RESERVE PITS

NO	TYPE	bbl
6	Pre–Mix	

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m
1610	1610	1.5		

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	3.5
Low Grav. Solids	ppb	31.8
High Grav. Solids	% Vol	0.8
High Grav. Solids	ppb	11.8
ASG of Solids	g/cc	2.90
Cuttings Volume	bbl	25.0
Interval Dilution	bbl/m	1.2
Interval Consumption	bbl/m	1.5

TIME BREAKDOWN hrs

Drilling	21
Circulating	1
Reaming In	
Reaming out	
Tripping	1
Other	1
AVE ROP m/hr	5.19

Baroid Australia Pty Ltd

MUD REPORT NO.	15	up to 24:00 hrs,	26/5/94
DATE	27/5/94	**DEPTH–m** MD 1732	TVD 1732
START DATE	12–May–94	**ACTIVITY**	Tripping

OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia
REPORT FOR Ken Smith	**REPORT FOR** J.Hoffman	**TOWNSHIP** Port Campbell
WELL NAME AND NO. Langley–1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria

BIT DATA

Size 8.500 ins
Type Sec S82F
Nozzles 32nds

11	13	13

Noz Area 0.35 ins²
TFA ins²
NV m/sec 67.8
Impact lb f 262

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	4.367	1501.8
Pipe 2	4.5	2.875	55.28
Pipe 3			
Col 1	6.25	2.875	174.96
Col 2			

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	8.5	1397.6

CASINGS

Size ins	Depth m	
Riser	Set @	
9 5/8"	Set @	334.43
	Set @	
	Set @	
	Set @	
	Set @	
Liner	Set @	
	Top @	

PUMP DATA

Pump Make	ins	x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	7.75	95	0.0525	111	5.828
Nat 8P80	6	8.5	95	0.0705		

Pump Press 850 psi — TOTAL bbl/min 5.828

MUD VOL	bbl
Downhole	379
Active	437
Total Circ	816
Reserve	

CIRCULATING DATA

Total circ 140 mins	AV	m/min
Bottoms up 48 mins	DP	35.2
Surface–bit 17 mins	DC	55.1
ECD ppg 9.37	Riser	

MUD PROPERTIES

Sample Location	IN or OUT	IN		IN	
Time Sample Taken	hrs	09:30		15:35	
Depth	m	1719		1732	
Flowline Temp	°C	40		40	
Weight	ppg	9.25		9.30	
Funnel Viscosity	sec/qt	50		51	
Plastic Viscosity	cP	14		15	
Yield Point	lb/100 ft²	17		18	
Gels 10 sec/10min/30 min	lb/100 ft²	5/15/24		6/17/26	
API Filtrate	ml/30min	6.8		7.0	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	2/–		2/–	
Solids	% Vol	4.5		4.5	
Dissolved Salts	% Vol	1.5		1.5	
Oil Content/Water Content	% Vol	–/94.0		–/94.0	
Sand	% Vol	0.2		0.2	
Methylene Blue cap	ppb	10		13	
pH	meter	9.3		9.5	
Alk. Mud Pm	ml	0.40		0.40	
Alk. Filtrate, Pf/Mf	ml	0.10/0.30		0.10/0.30	
Chlorides	mg/Lx10³	18.0		18.0	
Total Hardness/Calcium	mg/L	60/60		60/60	
KCL	% Wt Soln	3.0		3.0	
ASG of Solids	g/cc	3		3.2	
n & K		0.54/1.07		0.54/1.14	
K+ Ion Conc	mg/Lx10³	17.2		17.2	
Rheometer	600 rpm/300 rpm	45/31		48/33	
lb/100 ft²	200 rpm/100 rpm				
	6 rpm/3 rpm				

MUD PROPERTY SPECIFICATIONS

WEIGHT <9.3 ppg VIS 40–55 sec YP 10–20 lb/100 ft²
API Filt 6–8 ml HTHP ml KCL 3 %
BY AUTHORITY Mud Program

REMARKS

Continue adding pre–mix and PAC for mud maintainence.

ACTIVITY

Continued drilling ahead without any hole problems to 1729m, there was a drilling break at this point. Drilled to 1731m and circulated up a sample. Tried to drill 3m extra but only managed 1m, because the bit was torqueing up. POH.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Caustic Soda	25 kg	1		21	32.43
CMC EHV	25 kg	4			426.44
KCL,Tech(sx)	25 kg	40		80	577.6
PAC–R	50 lb	6		14	1024.44

MUD TYPE KCL / POLYMER

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs	ppg	bbl/hr	hrs	bbl
Shaker 1		50x50x80	15				
Shaker 2							
Shaker 3							
Shaker 4							
Desander				11	1.25	15	19
Desilter 1.				10.3	2	15	30
Desilter 2.							
Centrifuge 1							
Centrifuge 2							

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	126
other	
other	
Barite	
Chemicals	4
Losses	**bbl**
Sol. Con.	49
Lost/Dumped	
Down Hole	
Newhole	15
NET GAIN	81
Discharged	49

BAROID Engineer	OFFICE	WAREHOUSE
C. Da Silva	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST A$ 2060.91

CUMULATIVE COST A$ 23177.84

RESERVE PITS

NO	TYPE	bbl

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	2.8
Low Grav. Solids	ppb	25.5
High Grav. Solids	% Vol	1.7
High Grav. Solids	ppb	25.0
ASG of Solids	g/cc	3.20
Cuttings Volume	bbl	15.0
Interval Dilution	bbl/m	1.2
Interval Consumption	bbl/m	1.5

TIME BREAKDOWN hrs

Drilling	13
Circulating	2
Reaming In	
Reaming out	
Tripping	9
Other	
AVE ROP m/hr	5.08

Baroid Australia Pty Ltd

MUD REPORT NO. 16 up to 24:00 hrs, 27/5/94	
DATE 28/5/94	**DEPTH–m** MD 1745 TVD 1745
START DATE 12–May–94	**ACTIVITY** Tripping

OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia
REPORT FOR Ken Smith	**REPORT FOR** J.Hoffman	**TOWNSHIP** Port Campbell
WELL NAME AND NO. Langley–1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria

BIT DATA

Size 8.500 ins
Type S82F
Nozzles 32nds

11	11	13

Noz Area 0.32 ins²
TFA ins²
NV m/sec 75.7
Impact lb f 293

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	4.367	1514.8
Pipe 2	4.5	2.875	55.26
Pipe 3			
Col 1	6.25	2.875	174.96
Col 2			

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	8.5	1410.6

CASINGS

Size ins	Depth m	
Riser	Set @	
9 5/8"	Set @	334.43
	Set @	
	Set @	
	Set @	
	Set @	
	Set @	
Liner	Set @	
	Top @	

PUMP DATA

Pump Make	ins	x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	7.75	95	0.0525	111	5.828
Nat 8P80	6	8.5	95	0.0705		

Pump Press 850 psi — TOTAL bbl/min 5.828

MUD VOL bbl

Downhole	382
Active	419
Total Circ	801
Reserve	

CIRCULATING DATA

Total circ 137 mins	AV	m/min
Bottoms up 49 mins	DP	35.2
Surface–bit 17 mins	DC	55.1
ECD ppg 9.37	Riser	

MUD PROPERTIES

Sample Location	IN or OUT	IN		IN	
Time Sample Taken	hrs	08:30		18:00	
Depth	m	1745		1745	
Flowline Temp	°C	40		40	
Weight	ppg	9.28		9.30	
Funnel Viscosity	sec/qt	51		50	
Plastic Viscosity	cP	15		15	
Yield Point	lb/100 ft²	20		18	
Gels 10 sec/10min/30 min	lb/100 ft²	6/17/26		5/13/20	
API Filtrate	ml/30min	6.5		6.8	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	2/–		2/–	
Solids	% Vol	4.5		4.5	
Dissolved Salts	% Vol	1.5		1.5	
Oil Content/Water Content	% Vol	–/94.0		–/94.0	
Sand	% Vol	0.2		0.2	
Methylene Blue cap	ppb	13		12	
pH	meter	9.0		9.0	
Alk. Mud Pm	ml	0.35		0.35	
Alk. Filtrate, Pf/Mf	ml	0.10/0.30		0.10/0.25	
Chlorides	mg/Lx10³	18.0		18.0	
Total Hardness/Calcium	mg/L	50/50		50/50	
KCL	% Wt Soln	3.0		3.0	
ASG of Solids	g/cc	3.1		3.2	
n & K		0.51/1.45		0.54/1.14	
K+ Ion Conc	mg/Lx10³	17.2		17.2	
Rheometer	600 rpm/300 rpm	50/35		48/33	
lb/100 ft²	200 rpm/100 rpm				
	6 rpm/3 rpm				

MUD PROPERTY SPECIFICATIONS

WEIGHT <9.3 ppg VIS 40–55 sec YP 10–20 lb/100 ft²
API Filt 6–8 ml HTHP ml KCL 3 %
BY AUTHORITY Mud Program

REMARKS

Remove near bit stabalizer and put on a new bit.
KCL used for slugs.

ACTIVITY

Ran in the hole to 1713m wash to bottom at 1732m. Circulated bottoms up prior to drilling to 1734m, circulated up sample. Drilled to 1745m Circulated up sample. It was decided to do a test at this depth, made a wpier trip to the shoe. Ran back to bottom and circulated hole clean prior to POH for DST # 1.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Caustic Soda	25 kg	1		20	32.43
KCL,Tech(sx)	25 kg	30		50	433.2

MUD TYPE KCL / POLYMER

SOLIDS CONTROL EQUIPMENT

Make	screen size	hrs
Shaker 1	50x50x80	12
Shaker 2		
Shaker 3		
Shaker 4		

	ppg	bbl/hr	hrs	bbl
Desander	10.7	1.2	12	14
Desilter 1.	10.1	2	12	24
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	40
other	
other	
Barite	
Chemicals	3
Losses	**bbl**
Sol. Con.	38
Lost/Dumped	20
Down Hole	
Newhole	3
NET LOSS	15
Discharged	58

BAROID Engineer	OFFICE	WAREHOUSE
C. Da Silva	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST A$ 465.63

CUMULATIVE COST A$ 23643.47

RESERVE PITS

NO	TYPE	bbl

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	2.8
Low Grav. Solids	ppb	25.5
High Grav. Solids	% Vol	1.7
High Grav. Solids	ppb	25.0
ASG of Solids	g/cc	3.20
Cuttings Volume	bbl	3.0
Interval Dilution	bbl/m	1.2
Interval Consumption	bbl/m	1.5

TIME BREAKDOWN hrs

Drilling	2
Circulating	5
Reaming In	
Reaming out	
Tripping	16
Other	1
AVE ROP m/hr	6.5

Baroid Australia Pty Ltd

MUD REPORT NO. 17 up to 24:00 hrs, 28/5/94	
DATE 29/5/94	**DEPTH–m** MD 1745 TVD 1745
START DATE 12–May–94	**ACTIVITY** Tripping in.

OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia
REPORT FOR Ken Smith	**REPORT FOR** J.Hoffman	**TOWNSHIP** Port Campbell
WELL NAME AND NO. Langley–1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria

BIT DATA

Size 8.500 ins
Type CD502
Nozzles 32nds

CORE	BIT

Noz Area ins²
TFA ins²
NV m/sec
Impact lb f

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	4.367	1514.8
Pipe 2	4.5	2.875	55.28
Pipe 3			
Col 1	6.25	2.875	174.96
Col 2			

OPEN HOLE SECTIONS

Sect 1
Sect 2
Current 8.5 1410.6

CASINGS

Size ins		Depth m
Riser	Set @	
9 5/8"	Set @	334.43
	Set @	
	Set @	
	Set @	
	Set @	
	Set @	
Liner	Set @	
	Top @	

PUMP DATA

Pump Make	ins	x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	7.75	95	0.0525	123	6.458
Nat 8P80	6	8.5	95	0.0705		

Pump Press 625 psi TOTAL bbl/min 6.458

MUD VOL	bbl
Downhole	382
Active	389
Total Circ	771
Reserve	

CIRCULATING DATA

Total circ 119 mins	AV	m/min
Bottoms up 44 mins	DP	39
Surface–bit 15 mins	DC	61
ECD ppg 9.38	Riser	

MUD PROPERTIES

		IN
Sample Location	IN or OUT	
Time Sample Taken	hrs	24:00
Depth	m	1745
Flowline Temp	°C	40
Weight	ppg	9.30
Funnel Viscosity	sec/qt	49
Plastic Viscosity	cP	14
Yield Point	lb/100 ft²	18
Gels 10 sec/10min/30 min	lb/100 ft²	5/12/19
API Filtrate	ml/30min	7.0
HPHT Filtrate	ml/30min	
API/HPHT Filter Cake	32nd ins	2/–
Solids	% Vol	4.9
Dissolved Salts	% Vol	1.6
Oil Content/Water Content	% Vol	–/93.5
Sand	% Vol	0.2
Methylene Blue cap	ppb	12
pH	meter	9.0
Alk. Mud Pm	ml	0.30
Alk. Filtrate, Pf/Mf	ml	0.20/0.35
Chlorides	mg/Lx10³	18.5
Total Hardness/Calcium	mg/L	50/50
KCL	% Wt Soln	3.0
ASG of Solids	g/cc	3
n & K		0.52/1.25
K+ Ion Conc	mg/Lx10³	17.2
Rheometer	600 rpm/300 rpm	46/32
lb/100 ft²	200 rpm/100 rpm	
	6 rpm/3 rpm	

MUD PROPERTY SPECIFICATIONS

WEIGHT <9.3 ppg VIS 40–55 sec YP 10–20 lb/100 ft²
API Filt 6–8 ml HTHP ml KCL 3 %
BY AUTHORITY Mud Report

REMARKS

Approx. 5mmcfd of gas.

ACTIVITY

Ran in the hole and perform DST # 1. Interval 1715m to 1745m, Recovered CO2 gas. Pulled out of the hole and laid out test tool. Made up core barrel and ran in the hole. Wash and ream last 15m to bottom.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Caustic Soda	25 kg	1		19	32.43

MUD TYPE KCL / POLYMER

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs	ppg	bbl/hr	hrs	bbl
Shaker 1		50x50x80	2				
Shaker 2							
Shaker 3							
Shaker 4							
Desander				10.7	1.25	2	3
Desilter 1.				10	1.75	2	4
Desilter 2.							
Centrifuge 1							
Centrifuge 2							

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	
other	
other	
Barite	
Chemicals	
Losses	**bbl**
Sol. Con.	7
Lost/Dumped	23
Down Hole	
Newhole	
NET LOSS	30
Discharged	30

BAROID Engineer	OFFICE	WAREHOUSE
C. Da Silva	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST A$ 32.43

CUMULATIVE COST A$ 23675.90

RESERVE PITS

NO	TYPE	bbl

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	3.7
Low Grav. Solids	ppb	33.7
High Grav. Solids	% Vol	1.2
High Grav. Solids	ppb	17.6
ASG of Solids	g/cc	3.00
Cuttings Volume	bbl	
Interval Dilution	bbl/m	1.3
Interval Consumption	bbl/m	1.5

TIME BREAKDOWN

	hrs
Drilling	
Circulating	1
Reaming In	1
Reaming out	
Tripping	15
Testing	4
Other	3
AVE ROP m/hr	

Baroid Australia Pty Ltd

MUD REPORT NO.	18	up to 24:00 hrs,	29/5/94
DATE 30/5/94	**DEPTH–m** MD 1779		TVD 1779
START DATE 12–May–94	**ACTIVITY** Drilling		

OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia
REPORT FOR Ken Smith	**REPORT FOR** J.Hoffman / S. Kelly	**TOWNSHIP** Port Campbell
WELL NAME AND NO. Langley–1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria

BIT DATA

Size 8.500 ins
Type SEC S82F
Nozzles 32nds

11	13	13

Noz Area 0.35 ins²
TFA ins²
NV m/sec 82.5
Impact lb f 390

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	4.367	1548.8
Pipe 2	4.5	2.875	55.28
Pipe 3			
Col 1	6.25	2.875	174.96
Col 2			

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	8.5	1444.6

CASINGS

Size ins		Depth m
Riser	Set @	
9 5/8"	Set @	334.43
	Set @	
	Set @	
	Set @	
	Set @	
	Set @	
Liner	Set @	
	Top @	

PUMP DATA

Pump Make	ins	x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	7.75	95	0.0525	135	7.088
Nat 8P80	6	8.5	95	0.0705		

Pump Press 1075 psi — TOTAL bbl/min 7.088

MUD VOL	bbl	**CIRCULATING DATA**		AV m/min
Downhole	389	Total circ 114 mins		
Active	419	Bottoms up 41 mins		DP 42.8
Total Circ	808	Surface–bit 14 mins		DC 67
Reserve		ECD ppg 9.43		Riser

MUD PROPERTIES

Sample Location	IN or OUT			IN	
Time Sample Taken	hrs			23:25	
Depth	m			1779	
Flowline Temp	°C			40	
Weight	ppg			9.35	
Funnel Viscosity	sec/qt			48	
Plastic Viscosity	cP			15	
Yield Point	lb/100 ft²			18	
Gels 10 sec/10min/30 min	lb/100 ft²			5/10/15	
API Filtrate	ml/30min			7.8	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins			2/–	
Solids	% Vol			4.9	
Dissolved Salts	% Vol			1.6	
Oil Content/Water Content	% Vol			–/93.5	
Sand	% Vol			0.2	
Methylene Blue cap	ppb			11	
pH	meter			9.0	
Alk. Mud Pm	ml			0.30	
Alk. Filtrate, Pf/Mf	ml			0.20/0.40	
Chlorides	mg/Lx10³			19.0	
Total Hardness/Calcium	mg/L			50/50	
KCL	% Wt Soln			3.1	
ASG of Solids	g/cc			3.1	
n & K				0.54/1.14	
K+ Ion Conc	mg/Lx10³			17.8	
Rheometer	600 rpm/300 rpm			48/33	
lb/100 ft²	200 rpm/100 rpm				
	6 rpm/3 rpm				

MUD PROPERTY SPECIFICATIONS

WEIGHT <9.3 ppg VIS 40–55 sec YP 10–20 lb/100 ft²
API Filt 6–8 ml HTHP ml KCL 3 %
BY AUTHORITY Mud Program

REMARKS

Recovered 84 % of the core.
Continued drilling through the Waare formation.

ACTIVITY

Core from 1745m to 1764m. POH with core barrel and lay out core.
Ran in the hole with 8.5" bit, Drilling ahead.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Caustic Soda	25 kg	2		17	64.86
KCL,Tech(sx)	25 kg	10		40	144.4
PAC–R	50 lb	4		10	682.96
PAC–L	50 lb	3		7	512.22

MUD TYPE KCL / POLYMER

SOLIDS CONTROL EQUIPMENT

Make	screen size	hrs
Shaker 1	50x50x80	9
Shaker 2		
Shaker 3		
Shaker 4		

	ppg	bbl/hr	hrs	bbl
Desander	10.9	1.2	9	11
Desilter 1.	10.1	1.5	9	14
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	90
other	
other	
Barite	
Chemicals	2

Losses	bbl
Sol. Con.	25
Lost/Dumped	30
Down Hole	
Newhole	8
NET GAIN	37
Discharged	55

BAROID Engineer	OFFICE	WAREHOUSE
C. Da Silva	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST A$ 1404.44

CUMULATIVE COST A$ 25080.34

RESERVE PITS

NO	TYPE	bbl

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	3.4
Low Grav. Solids	ppb	30.9
High Grav. Solids	% Vol	1.5
High Grav. Solids	ppb	22.0
ASG of Solids	g/cc	3.10
Cuttings Volume	bbl	8.0
Interval Dilution	bbl/m	1.3
Interval Consumption	bbl/m	1.5

TIME BREAKDOWN hrs

Drilling	10
Circulating	
Reaming In	
Reaming out	
Tripping	11
Testing	
Other	3
AVE ROP m/hr	3.4

Baroid Australia Pty Ltd

MUD REPORT NO. 19 up to 24:00 hrs, 30/5/94	
DATE 31/5/94	**DEPTH–m** MD 1853 TVD 1853
START DATE 12–May–94	**ACTIVITY** Drilling

OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia
REPORT FOR Ken Smith	**REPORT FOR** S. Kelly	**TOWNSHIP** Port Campbell
WELL NAME AND NO. Langley–1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria

BIT DATA

Size 8.500 ins
Type SEC S82F
Nozzles 32nds

11	13	13

Noz Area 0.35 ins²
TFA ins²
NV m/sec 80.6
Impact lb f 371

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	3.826	1622.8
Pipe 2	4.5	2.875	55.28
Pipe 3			
Col 1	6.25	2.875	174.96
Col 2			

OPEN HOLE SECTIONS

Sect 1	
Sect 2	
Current	8.5 1518.6

CASINGS

Size ins	Depth m
Riser	Set @
9 5/8"	Set @ 334.43
	Set @
	Set @
	Set @
	Set @
Liner	Set @
	Top @

PUMP DATA

Pump Make	ins	x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	7.75	95	0.0525	132	6.93
Nat 8P80	6	8.5	95	0.0705		

Pump Press 1100 psi — TOTAL bbl/min 6.93

MUD VOL	bbl	CIRCULATING DATA	AV m/min
Downhole	383	Total circ 116 mins	
Active	419	Bottoms up 43 mins	DP 41.8
Total Circ	802	Surface–bit 12 mins	DC 65.5
Reserve		ECD ppg 9.37	Riser

MUD PROPERTIES

		IN		IN	
Sample Location	IN or OUT	IN		23:45	
Time Sample Taken	hrs	10:45		1853	
Depth	m	1821		41	
Flowline Temp	°C	40		9.30	
Weight	ppg	9.30		44	
Funnel Viscosity	sec/qt	48		13	
Plastic Viscosity	cP	14		16	
Yield Point	lb/100 ft²	18		4/8/11	
Gels 10 sec/10min/30 min	lb/100 ft²	4/9/13		7.3	
API Filtrate	ml/30min	8.0			
HPHT Filtrate	ml/30min			2/–	
API/HPHT Filter Cake	32nd ins	2/–		5.0	
Solids	% Vol	4.9		1.5	
Dissolved Salts	% Vol	1.6		–/93.5	
Oil Content/Water Content	% Vol	–/93.5		0.2	
Sand	% Vol	0.2		9	
Methylene Blue cap	ppb	11		9.0	
pH	meter	9.0		0.35	
Alk. Mud Pm	ml	0.30		0.25/0.40	
Alk. Filtrate, Pf/Mf	ml	0.20/0.40		18.0	
Chlorides	mg/Lx10³	18.5		50/50	
Total Hardness/Calcium	mg/L	50/50		3.0	
KCL	% Wt Soln	3.0		3	
ASG of Solids	g/cc	3		0.53/1.06	
n & K		0.52/1.25		17.2	
K+ Ion Conc	mg/Lx10³	17.2			
Rheometer	600 rpm/300 rpm	46/32		42/29	
lb/100 ft²	200 rpm/100 rpm				
	6 rpm/3 rpm				

MUD PROPERTY SPECIFICATIONS

WEIGHT <9.3 ppg VIS 40–55 sec YP 10–20 lb/100 ft²
API Filt 6–8 ml HTHP ml KCL 3 %
BY AUTHORITY Mud Program

REMARKS

Top of Eumeralla formation at 1820m (tentative).
Mud viscosity and Rheology droped (thinned) as we drilled into the Eumeralla formation, as it contains less mudstone and claystone.

ACTIVITY

Continued drilling through Waare and Eumeralla formations at 2–3 m/hr.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Caustic Soda	25 kg	1		16	32.43
PAC–R	50 lb	4		6	682.96
PAC–L	50 lb	2		5	341.48

MUD TYPE KCL / POLYMER

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		50x50x80	24
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander	11	1.2	24	29
Desilter 1.	10.3	1.5	24	36
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	83
other	
other	
Barite	
Chemicals	1

Losses	bbl
Sol. Con.	65
Lost/Dumped	25
Down Hole	
Newhole	17
NET LOSS	6
Discharged	90

BAROID Engineer	OFFICE	WAREHOUSE
C. Da Silva	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST A$ 1056.87 **CUMULATIVE COST** A$ 26137.21

RESERVE PITS

NO	TYPE	bbl

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m
1808	1808	0.75		

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	3.8
Low Grav. Solids	ppb	34.6
High Grav. Solids	% Vol	1.2
High Grav. Solids	ppb	17.6
ASG of Solids	g/cc	3.00
Cuttings Volume	bbl	17.0
Interval Dilution	bbl/m	1.3
Interval Consumption	bbl/m	1.5

TIME BREAKDOWN hrs

Drilling	23
Circulating	
Reaming In	
Reaming out	
Tripping	
Testing	
Other	1
AVE ROP m/hr	3.22

Baroid Australia Pty Ltd

MUD REPORT NO. 20 up to 24:00 hrs, 31/5/94	
DATE 1/6/94	**DEPTH–m** MD 1910 TVD 1910
START DATE 12–May–94	**ACTIVITY** Tripping Out for DST # 2.

OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia
REPORT FOR Ken Smith	**REPORT FOR** S. Kelly	**TOWNSHIP** Port Campbell
WELL NAME AND NO. Langley–1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria

BIT DATA

Size 8.500 ins
Type SEC S82F
Nozzles 32nds

11	13	13

Noz Area 0.35 ins²
TFA ins²
NV m/sec 80.6
Impact lb f 371

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	3.826	1679.8
Pipe 2	4.5	2.875	55.28
Pipe 3			
Col 1	6.25	2.875	174.96
Col 2			

OPEN HOLE SECTIONS

Sect 1
Sect 2
Current 8.5 1575.6

CASINGS

Size ins		Depth m
Riser	Set @	
9 5/8"	Set @	334.43
	Set @	
	Set @	
	Set @	
	Set @	
Liner	Set @	
	Top @	

PUMP DATA

Pump Make	ins	x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	7.75	95	0.0525	132	6.93
Nat 8P80	6	8.5	95	0.0705		

Pump Press 1125 psi TOTAL bbl/min 6.93

MUD VOL	**bbl**
Downhole	395
Active	371
Total Circ	766
Reserve	

CIRCULATING DATA

Total circ 111 mins	AV	m/min
Bottoms up 45 mins	DP	41.8
Surface–bit 12 mins	DC	65.5
ECD ppg 9.38	Riser	

MUD PROPERTIES

Sample Location	IN or OUT	IN		IN	
Time Sample Taken	hrs	11:15		17:10	
Depth	m	1897		1910	
Flowline Temp	°C	41		41	
Weight	ppg	9.30		9.30	
Funnel Viscosity	sec/qt	45		46	
Plastic Viscosity	cP	14		15	
Yield Point	lb/100 ft²	16		18	
Gels 10 sec/10min/30 min	lb/100 ft²	4/9/12		5/9/14	
API Filtrate	ml/30min	7.2		7.0	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	2/–		2/–	
Solids	% Vol	5.0		5.1	
Dissolved Salts	% Vol	1.5		1.4	
Oil Content/Water Content	% Vol	–/93.5		–/93.5	
Sand	% Vol	0.2		0.1	
Methylene Blue cap	ppb	9		10	
pH	meter	9.3		9.2	
Alk. Mud Pm	ml	0.30		0.35	
Alk. Filtrate, Pf/Mf	ml	0.20/0.35		0.25/0.35	
Chlorides	mg/Lx10³	18.0		16.5	
Total Hardness/Calcium	mg/L	50/50		50/50	
KCL	% Wt Soln	3.0		2.8	
ASG of Solids	g/cc	3		2.9	
n & K		0.55/0.97		0.54/1.14	
K+ Ion Conc	mg/Lx10³	17.2		16.1	
Rheometer	600 rpm/300 rpm	44/30		48/33	
lb/100 ft²	200 rpm/100 rpm				
	6 rpm/3 rpm				

MUD PROPERTY SPECIFICATIONS

WEIGHT <9.3 ppg VIS 40–55 sec YP 10–20 lb/100 ft²
API Filt 6–8 ml HTHP ml KCL 3 %
BY AUTHORITY Mud Program

REMARKS

Mud properties staying very steady, PAC and Caustic used for mud maintainance.

ACTIVITY

Drilled to 1897m, circulated up sample for Geologist as gas increased to 70 units. Then made a wiper trip (10 stands), tight from 1802–1742m Drilled on to 1910m, circulated up sample for Geologist. (Gas 87units) Decided to test, POOH for DST # 2.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Caustic Soda	25 kg	1		15	32.43
EZ SPOT	208 lt		1	1	
KCL,Tech(sx)	25 kg		80	120	
PAC–R	50 lb	2	40	44	341.48
PAC–L	50 lb	5	40	40	853.7

MUD TYPE KCL / POLYMER

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		50x50x80	18
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander	10.5	1.2	18	22
Desilter 1.	10	1.5	18	27
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	**bbl**
Sea W.	
Drill W.	48
other	
other	
Barite	
Chemicals	1
Losses	**bbl**
Sol. Con.	49
Lost/Dumped	36
Down Hole	
Newhole	13
NET LOSS	36
Discharged	85

BAROID Engineer	OFFICE	WAREHOUSE
C. Da Silva	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST A$ 1227.61

CUMULATIVE COST A$ 27364.82

RESERVE PITS

NO	TYPE	bbl

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	4.1
Low Grav. Solids	ppb	37.3
High Grav. Solids	% Vol	1.0
High Grav. Solids	ppb	14.7
ASG of Solids	g/cc	2.90
Cuttings Volume	bbl	13.0
Interval Dilution	bbl/m	1.3
Interval Consumption	bbl/m	1.5

TIME BREAKDOWN

	hrs
Drilling	10
Circulating	2
Reaming In	
Reaming out	
Tripping	8
Testing	
Other	4
AVE ROP m/hr	5.7

Baroid Australia Pty Ltd

MUD REPORT NO. 21 up to 24:00 hrs, 1/6/94	
DATE 2/6/94	**DEPTH–m** MD 1915 TVD 1915
START DATE 12–May–94	**ACTIVITY** Drilling

OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia
REPORT FOR Ken Smith	**REPORT FOR** S. Kelly	**TOWNSHIP** Port Campbell
WELL NAME AND NO. Langley–1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria

BIT DATA

Size 8.500 ins
Type ETD–517
Nozzles 32nds

11	13	13

Noz Area 0.35 ins²
TFA ins²
NV m/sec 80.6
Impact lb f 371

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	3.826	1684.8
Pipe 2	4.5	2.875	55.28
Pipe 3			
Col 1	6.25	2.875	174.96
Col 2			

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	8.5	1580.6

CASINGS

Size ins		Depth m
Riser	Set @	
9 5/8"	Set @	334.43
	Set @	
	Set @	
	Set @	
	Set @	
	Set @	
Liner	Set @	
	Top @	

PUMP DATA

Pump Make	ins	x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	7.75	95	0.0525	132	6.93
Nat 8P80	6	8.5	95	0.0705		

Pump Press 1125 psi TOTAL bbl/min 6.93

MUD VOL	bbl
Downhole	396
Active	385
Total Circ	781
Reserve	

CIRCULATING DATA

Total circ 113 mins	AV	m/min
Bottoms up 45 mins	DP	41.8
Surface–bit 12 mins	DC	65.5
ECD ppg 9.39	Riser	

MUD PROPERTIES

		IN
Sample Location	IN or OUT	
Time Sample Taken	hrs	24:00
Depth	m	1915
Flowline Temp	°C	41
Weight	ppg	9.30
Funnel Viscosity	sec/qt	48
Plastic Viscosity	cP	15
Yield Point	lb/100 ft²	20
Gels 10 sec/10min/30 min	lb/100 ft²	7/12/17
API Filtrate	ml/30min	7.1
HPHT Filtrate	ml/30min	
API/HPHT Filter Cake	32nd ins	2/–
Solids	% Vol	5.1
Dissolved Salts	% Vol	1.4
Oil Content/Water Content	% Vol	–/93.5
Sand	% Vol	0.1
Methylene Blue cap	ppb	10
pH	meter	9.0
Alk. Mud Pm	ml	0.30
Alk. Filtrate, Pf/Mf	ml	0.20/0.45
Chlorides	mg/Lx10³	16.5
Total Hardness/Calcium	mg/L	50/50
KCL	% Wt Soln	2.8
ASG of Solids	g/cc	2.9
n & K		0.51/1.45
K+ Ion Conc	mg/Lx10³	16.1
Rheometer	600 rpm/300 rpm	50/35
lb/100 ft²	200 rpm/100 rpm	
	6 rpm/3 rpm	

MUD PROPERTY SPECIFICATIONS

WEIGHT <9.3 ppg VIS 40–55 sec YP 10–20 lb/100 ft²
API Filt 6–8 ml HTHP ml KCL 3 %
BY AUTHORITY Mud Program

REMARKS

No gas to surface.
Packer failed to seat, misrun.

ACTIVITY

Ran in the hole with test tool, and perform DST # 2.
Interval 1875m to 1910m. Did not flow, pulled out of the hole.
Ran back in with bit to 1890m, washed to bottom and circulated for thirty five minutes prior to drilling ahead 8.5" hole.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION	USED	REC	BAL	COST

MUD TYPE KCL / POLYMER

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		50x50x80	2
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander	10.7	1.2	2	2
Desilter 1.	10	1.5	2	3
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	40
other	
other	
Barite	
Chemicals	
Losses	**bbl**
Sol. Con.	5
Lost/Dumped	20
Down Hole	
Newhole	1
NET GAIN	15
Discharged	25

BAROID Engineer	OFFICE	WAREHOUSE
C. Da Silva	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST A$ 0.00

CUMULATIVE COST A$ 27364.82

RESERVE PITS

NO	TYPE	bbl

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	4.1
Low Grav. Solids	ppb	37.3
High Grav. Solids	% Vol	1.0
High Grav. Solids	ppb	14.7
ASG of Solids	g/cc	2.90
Cuttings Volume	bbl	1.0
Interval Dilution	bbl/m	1.3
Interval Consumption	bbl/m	1.5

TIME BREAKDOWN hrs

Drilling	1
Circulating	1
Reaming In	
Reaming out	
Tripping	16
Testing	3
Other	3
AVE ROP m/hr	5

Baroid Australia Pty Ltd

MUD REPORT NO. 22 up to 24:00 hrs, 2/6/94			
DATE 3/6/94	**DEPTH–m** MD 2006 TVD 2006		
START DATE 12–May–94	**ACTIVITY** POOH to log, T.D.		
OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia	
REPORT FOR Ken Smith	**REPORT FOR** S. Kelly	**TOWNSHIP** Port Campbell	
WELL NAME AND NO. Langley–1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria	

BIT DATA

Size 8.500 ins
Type ETD–517
Nozzles 32nds
13 13 13
Noz Area 0.39 ins²
TFA ins²
NV m/sec 73.0
Impact lb f 337

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	3.826	1775.8
Pipe 2	4.5	2.875	55.28
Pipe 3			
Col 1	6.25	2.875	174.96
Col 2			

OPEN HOLE SECTIONS

Sect 1			
Sect 2			
Current	8.5	1671.6	

CASINGS

Size ins		Depth m
Riser	Set @	
9 5/8"	Set @	334.43
	Set @	
	Set @	
	Set @	
	Set @	
	Set @	
Liner	Set @	
	Top @	

PUMP DATA

Pump Make	ins x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5 7.75	95	0.0525	132	6.93
Nat 8P80	6 8.5	95	0.0705		

Pump Press 1100 psi TOTAL bbl/min 6.93

MUD VOL bbl

Downhole	416
Active	419
Total Circ	835
Reserve	

CIRCULATING DATA

Total circ 120 mins	AV m/min
Bottoms up 47 mins	DP 41.8
Surface–bit 13 mins	DC 65.5
ECD ppg 9.43	Riser

MUD PROPERTIES

Sample Location	IN or OUT	IN		IN
Time Sample Taken	hrs	12:45		02:30
Depth	m	1965		2006
Flowline Temp	°C	41		41
Weight	ppg	9.35		9.35
Funnel Viscosity	sec/qt	51		48
Plastic Viscosity	cP	17		16
Yield Point	lb/100 ft²	20		18
Gels 10 sec/10min/30 min	lb/100 ft²	7/12/18		6/10/15
API Filtrate	ml/30min	8.0		7.5
HPHT Filtrate	ml/30min			
API/HPHT Filter Cake	32nd ins	2/–		2/–
Solids	% Vol	5.5		5.5
Dissolved Salts	% Vol	1.5		1.5
Oil Content/Water Content	% Vol	–/93.0		–/93.0
Sand	% Vol	0.2		0.2
Methylene Blue cap	ppb	12		10
pH	meter	9.0		9.3
Alk. Mud Pm	ml	0.30		0.35
Alk. Filtrate, Pf/Mf	ml	0.25/0.50		0.25/0.50
Chlorides	mg/Lx10³	17.5		17.7
Total Hardness/Calcium	mg/L	50/50		50/50
KCL	% Wt Soln	3.0		3.0
ASG of Solids	g/cc	2.9		2.9
n & K		0.55/1.20		0.56/1.03
K+ Ion Conc	mg/Lx10³	17.2		17.2
Rheometer	600 rpm/300 rpm	54/37		50/34
lb/100 ft²	200 rpm/100 rpm			
	6 rpm/3 rpm			

MUD PROPERTY SPECIFICATIONS

WEIGHT <9.3 ppg VIS 40–55 sec YP 10–20 lb/100 ft²
API Filt 6–8 ml HTHP ml KCL 3 %
BY AUTHORITY Mud Program

REMARKS

Nearing T.D. at 2006m, viscosity and rheology began to raise. Adding water and pre–mixes and dumped sand trap as needed, using PAC to maintain filtrate.

ACTIVITY

Continued drilling ahead 8.5" hole to 2006m. (T.D.) circulated bottoms up prior to making a 42 stand wiper trip, no hole problems on trip. Circulated the hole clean, and POOH to log.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
BARACIDE	25 kg	1			549.92
Caustic Soda	25 kg	2		13	64.86
KCL,Tech(sx)	25 kg	40		80	577.6
PAC–R	50 lb	8		36	1365.92

MUD TYPE KCL / POLYMER

SOLIDS CONTROL EQUIPMENT

Make	screen size	hrs
Shaker 1	50x50x80	24
Shaker 2		
Shaker 3		
Shaker 4		

	ppg	bbl/hr	hrs	bbl
Desander	10.9	1.2	24	29
Desilter 1.	10.3	1.5	24	36
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	135
other	
other	
Barite	
Chemicals	4
Losses	**bbl**
Sol. Con.	65
Lost/Dumped	20
Down Hole	
Newhole	21
NET GAIN	54
Discharged	85

BAROID Engineer	OFFICE	WAREHOUSE
C. Da Silva	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST A$ 2558.30

CUMULATIVE COST A$ 29923.12

RESERVE PITS

NO	TYPE	bbl

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	4.5
Low Grav. Solids	ppb	40.9
High Grav. Solids	% Vol	1.0
High Grav. Solids	ppb	14.7
ASG of Solids	g/cc	2.90
Cuttings Volume	bbl	21.0
Interval Dilution	bbl/m	1.3
Interval Consumption	bbl/m	1.5

TIME BREAKDOWN hrs

Drilling	22
Circulating	1
Reaming In	
Reaming out	
Tripping	
Testing	
Other	1
AVE ROP m/hr	4.14

Baroid Australia Pty Ltd

MUD REPORT NO. 23	up to 24:00 hrs, 3/6/94
DATE 4/6/94	**DEPTH–m** MD 2006 TVD 2006
START DATE 12–May–94	**ACTIVITY** Logging

OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia
REPORT FOR Ken Smith	**REPORT FOR** S. Kelly	**TOWNSHIP** Port Campbell
WELL NAME AND NO. Langley–1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria

BIT DATA

Size ins
Type
Nozzles 32nds

Noz Area ins²
TFA ins²
NV m/sec
Impact lb f

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	3.826	1775.8
Pipe 2	4.5	2.875	55.28
Pipe 3			
Col 1	6.25	2.875	174.96
Col 2			

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	8.5	1671.6

CASINGS

Size ins	Depth m
Riser	Set @
9 5/8"	Set @ 334.43
	Set @
	Set @
	Set @
	Set @
	Set @
Liner	Set @
	Top @

PUMP DATA

Pump Make	ins x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5 7.75	95	0.0525		
Nat 8P80	6 8.5	95	0.0705		

Pump Press – psi — TOTAL bbl/min

MUD VOL	**bbl**	**CIRCULATING DATA**		
Downhole	416	Total circ – mins	AV	m/min
Active	405	Bottoms up – mins	DP	
Total Circ	821	Surface–bit – mins	DC	
Reserve		ECD ppg 9.3	Riser	

MUD PROPERTIES

		IN
Sample Location	IN or OUT	
Time Sample Taken	hrs	19:00
Depth	m	2006
Flowline Temp	°C	
Weight	ppg	9.30
Funnel Viscosity	sec/qt	48
Plastic Viscosity	cP	15
Yield Point	lb/100 ft²	19
Gels 10 sec/10min/30 min	lb/100 ft²	6/11/16
API Filtrate	ml/30min	7.5
HPHT Filtrate	ml/30min	
API/HPHT Filter Cake	32nd ins	2/–
Solids	% Vol	5.5
Dissolved Salts	% Vol	1.5
Oil Content/Water Content	% Vol	–/93.0
Sand	% Vol	0.1
Methylene Blue cap	ppb	10
pH	meter	9.0
Alk. Mud Pm	ml	0.30
Alk. Filtrate, Pf/Mf	ml	0.20/0.50
Chlorides	mg/Lx10³	17.5
Total Hardness/Calcium	mg/L	50/50
KCL	% Wt Soln	3.0
ASG of Solids	g/cc	2.8
n & K		0.53/1.25
K+ Ion Conc	mg/Lx10³	17.2
Rheometer	600 rpm/300 rpm	49/34
lb/100 ft²	200 rpm/100 rpm	
	6 rpm/3 rpm	

MUD PROPERTY SPECIFICATIONS

WEIGHT <9.3 ppg VIS 40–55 sec YP 10–20 lb/100 ft²
API Filt 6–8 ml HTHP ml KCL 3 %
BY AUTHORITY Mud Program

REMARKS

Loggers depth 2007m.

ACTIVITY

Running wire line logs. Logging tool got to bottom without any problems.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION	USED	REC	BAL	COST

MUD TYPE KCL / POLYMER

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		50x50x80	1.5
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander	10.7	1.2	1.5	2
Desilter 1.	10.1	1.5	1.5	2
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	
other	
other	
Barite	
Chemicals	
Losses	**bbl**
Sol. Con.	4
Lost/Dumped	10
Down Hole	
Newhole	
NET LOSS	14
Discharged	14

BAROID Engineer	OFFICE	WAREHOUSE
C. Da Silva	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST A$ 0.00

CUMULATIVE COST A$ 29923.12

RESERVE PITS

NO	TYPE	bbl

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m
2000	2000	1		

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	4.8
Low Grav. Solids	ppb	43.7
High Grav. Solids	% Vol	0.7
High Grav. Solids	ppb	10.3
ASG of Solids	g/cc	2.80
Cuttings Volume	bbl	
Interval Dilution	bbl/m	1.3
Interval Consumption	bbl/m	1.5

TIME BREAKDOWN hrs

Drilling	
Circulating	1.5
Reaming In	
Reaming out	
Tripping	5.5
Testing	
Logging	17
Other	
AVE ROP m/hr	

Baroid Australia Pty Ltd

MUD REPORT NO. 24 up to 24:00 hrs, 4/6/94	
DATE 5/6/94	**DEPTH–m** MD 2006 TVD 2006
START DATE 12–May–94	**ACTIVITY** Logging

OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia
REPORT FOR Ken Smith	**REPORT FOR** S. Kelly	**TOWNSHIP** Port Campbell
WELL NAME AND NO. Langley–1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria

BIT DATA

Size ins
Type
Nozzles 32nds

Noz Area ins²
TFA ins²
NV m/sec
Impact lb f

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	3.826	1775.8
Pipe 2	4.5	2.875	55.28
Pipe 3			
Col 1	6.25	2.875	174.96
Col 2			

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	8.5	1671.6

CASINGS

Size ins	Depth m
Riser	Set @
9 5/8"	Set @ 334.43
	Set @
	Set @
	Set @
	Set @
	Set @
Liner	Set @
	Top @

PUMP DATA

Pump Make	ins	x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	7.75	95	0.0525		
Nat 8P80	6	8.5	95	0.0705		

Pump Press – psi TOTAL bbl/min

MUD VOL bbl

Downhole	416
Active	370
Total Circ	786
Reserve	

CIRCULATING DATA

Total circ – mins	AV m/min
Bottoms up – mins	DP
Surface–bit – mins	DC
ECD ppg 9.3	Riser

MUD PROPERTIES

Sample Location	IN or OUT			IN	
Time Sample Taken	hrs			11:00	
Depth	m			2006	
Flowline Temp	°C				
Weight	ppg			9.30	
Funnel Viscosity	sec/qt			48	
Plastic Viscosity	cP			15	
Yield Point	lb/100 ft²			18	
Gels 10 sec/10min/30 min	lb/100 ft²			6/10/16	
API Filtrate	ml/30min			7.5	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins			2/–	
Solids	% Vol			5.5	
Dissolved Salts	% Vol			1.5	
Oil Content/Water Content	% Vol			–/93.0	
Sand	% Vol			0.1	
Methylene Blue cap	ppb			10	
pH	meter			9.0	
Alk. Mud Pm	ml			0.30	
Alk. Filtrate, Pf/Mf	ml			0.20/0.50	
Chlorides	mg/Lx10³			17.5	
Total Hardness/Calcium	mg/L			50/50	
KCL	% Wt Soln			3.0	
ASG of Solids	g/cc			2.8	
n & K				0.54/1.14	
K+ Ion Conc	mg/Lx10³			17.2	
Rheometer	600 rpm/300 rpm			48/33	
lb/100 ft²	200 rpm/100 rpm				
	6 rpm/3 rpm				

MUD PROPERTY SPECIFICATIONS

WEIGHT <9.3 ppg VIS 40–55 sec YP 10–20 lb/100 ft²
API Filt 6–8 ml HTHP ml KCL 3 %
BY AUTHORITY Mud Program

REMARKS

Lost a total of 33 bbls of mud to the hole while logging so far.

ACTIVITY

After WRT log , Ran in the hole for a wiper trip. Circulated the hole clean. Draw works clutch silpping, repair clutch and POOH to log. Continued logging.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Caustic Soda	25 kg	1		12	32.43

MUD TYPE KCL / POLYMER

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		50x50x80	3
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander	10.5	1.2	3	4
Desilter 1.	10	1.5	3	5
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	
other	
other	
Barite	
Chemicals	

Losses	bbl
Sol. Con.	9
Lost/Dumped	3
Down Hole	23
Newhole	
NET LOSS	35
Discharged	12

BAROID Engineer	OFFICE	WAREHOUSE
C. Da Silva	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST A$ 32.43

CUMULATIVE COST A$ 29955.55

RESERVE PITS

NO	TYPE	bbl

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	4.8
Low Grav. Solids	ppb	43.7
High Grav. Solids	% Vol	0.7
High Grav. Solids	ppb	10.3
ASG of Solids	g/cc	2.80
Cuttings Volume	bbl	
Interval Dilution	bbl/m	1.3
Interval Consumption	bbl/m	1.5

TIME BREAKDOWN hrs

Drilling	
Circulating	3
Reaming In	
Reaming out	
Tripping	8
Testing	
Logging	11
Other	2
AVE ROP m/hr	

Baroid Australia Pty Ltd

MUD REPORT NO.	25	up to 24:00 hrs,	5/6/94
DATE 6/6/94		**DEPTH–m** MD 2006	TVD 2006
START DATE 12–May–94		**ACTIVITY** Wiper Trip/Pull to shoe.	

OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia
REPORT FOR Ken Smith	**REPORT FOR** S. Kelly	**TOWNSHIP** Port Campbell
WELL NAME AND NO. Langley–1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria

BIT DATA

Size 8.500 ins
Type ETD–517
Nozzles 32nds

13	13	13

Noz Area 0.39 ins²
TFA ins²
NV m/sec 73.0
Impact lb f 336

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	3.826	1775.8
Pipe 2	4.5	2.875	55.28
Pipe 3			
Col 1	6.25	2.875	174.96
Col 2			

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	8.5	1671.6

CASINGS

Size ins		Depth m
Riser	Set @	
9 5/8"	Set @	334.43
	Set @	
	Set @	
	Set @	
	Set @	
Liner	Set @	
	Top @	

PUMP DATA

Pump Make	ins	x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	7.75	95	0.0525	132	6.93
Nat 8P80	6	8.5	95	0.0705		

Pump Press 1150 psi — TOTAL bbl/min 6.93

MUD VOL	**bbl**	**CIRCULATING DATA**		
Downhole	416	Total circ 113 mins	AV	m/min
Active	368	Bottoms up 47 mins	DP	41.8
Total Circ	784	Surface–bit 13 mins	DC	65.5
Reserve		ECD ppg 9.38	Riser	

MUD PROPERTIES

		IN
Sample Location	IN or OUT	
Time Sample Taken	hrs	20:15
Depth	m	2006
Flowline Temp	°C	41
Weight	ppg	9.30
Funnel Viscosity	sec/qt	48
Plastic Viscosity	cP	16
Yield Point	lb/100 ft²	18
Gels 10 sec/10min/30 min	lb/100 ft²	6/9/14
API Filtrate	ml/30min	8.0
HPHT Filtrate	ml/30min	
API/HPHT Filter Cake	32nd ins	2/–
Solids	% Vol	5.7
Dissolved Salts	% Vol	1.3
Oil Content/Water Content	% Vol	–/93.0
Sand	% Vol	0.1
Methylene Blue cap	ppb	10
pH	meter	9.0
Alk. Mud Pm	ml	0.30
Alk. Filtrate, Pf/Mf	ml	0.25/0.55
Chlorides	mg/Lx10³	15.0
Total Hardness/Calcium	mg/L	50/50
KCL	% Wt Soln	2.6
ASG of Solids	g/cc	2.8
n & K		0.56/1.03
K+ Ion Conc	mg/Lx10³	14.9
Rheometer	600 rpm/300 rpm	50/34
lb/100 ft²	200 rpm/100 rpm	
	6 rpm/3 rpm	

MUD PROPERTY SPECIFICATIONS

WEIGHT <9.3 ppg VIS 40–55 sec YP 10–20 lb/100 ft²
API Filt 6–8 ml HTHP ml KCL 3 %
BY AUTHORITY Mud Program

REMARKS

Mud Losses to the hole today while logging were 65 bbls.
Mixed up 80 bbls of new pre–mix, as low on volume.

ACTIVITY

Completed logging and ran in the hole for a wiper trip.
Circulated bottoms up at 2000m, could not get to bottom as had problems with the clutch slipping. POOH to the shoe and repair clutch.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
KCL,Tech(sx)	25 kg	15		65	216.6
PAC–R	50 lb	2		34	341.48

MUD TYPE KCL / POLYMER

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		50x50x80	2
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander	10.5	1.2	1	1
Desilter 1.	10	1.5	1	2
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	**bbl**
Sea W.	
Drill W.	70
other	
other	
Barite	
Chemicals	1
Losses	**bbl**
Sol. Con.	3
Lost/Dumped	5
Down Hole	65
Newhole	
NET LOSS	2
Discharged	8

BAROID Engineer	OFFICE	WAREHOUSE
C. Da Silva	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST A$ 558.08

CUMULATIVE COST A$ 30513.63

RESERVE PITS

NO	TYPE	bbl

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	5.0
Low Grav. Solids	ppb	45.5
High Grav. Solids	% Vol	0.7
High Grav. Solids	ppb	10.3
ASG of Solids	g/cc	2.80
Cuttings Volume	bbl	
Interval Dilution	bbl/m	1.3
Interval Consumption	bbl/m	1.6

TIME BREAKDOWN hrs

Drilling	
Circulating	1.5
Reaming In	
Reaming out	
Tripping	5.5
Testing	
Logging	15
Other	2
AVE ROP m/hr	

Baroid Australia Pty Ltd

MUD REPORT NO.	26	up to 24:00 hrs,	6/6/94
DATE 7/6/94		**DEPTH–m** MD 2006	TVD 2006
START DATE 12–May–94		**ACTIVITY** Tripping out, Make up test tools.	

OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia
REPORT FOR Ken Smith	**REPORT FOR** S. Kelly	**TOWNSHIP** Port Campbell
WELL NAME AND NO. Langley–1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria

BIT DATA

Size 8.500 ins
Type ETD–517
Nozzles 32nds

13	13	13

Noz Area 0.39 ins²
TFA ins²
NV m/sec 64.7
Impact lb f 264

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	3.826	1775.8
Pipe 2	4.5	2.875	55.28
Pipe 3			
Col 1	6.25	2.875	174.96
Col 2			

OPEN HOLE SECTIONS

Sect 1			
Sect 2			
Current	8.5	1671.6	

CASINGS

Size ins		Depth m
Riser	Set @	
9 5/8"	Set @	334.43
	Set @	
	Set @	
	Set @	
	Set @	
	Set @	
Liner	Set @	
	Top @	

PUMP DATA

Pump Make	ins	x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	7.75	95	0.0525	117	6.143
Nat 8P80	6	8.5	95	0.0705		

Pump Press 900 psi — TOTAL bbl/min 6.143

MUD VOL	bbl
Downhole	416
Active	339
Total Circ	755
Reserve	

CIRCULATING DATA

Total circ 123 mins	AV	m/min
Bottoms up 53 mins	DP	37.1
Surface–bit 14 mins	DC	58.1
ECD ppg 9.37	Riser	

MUD PROPERTIES

		IN
Sample Location	IN or OUT	
Time Sample Taken	hrs	18:35
Depth	m	2006
Flowline Temp	°C	41
Weight	ppg	9.30
Funnel Viscosity	sec/qt	48
Plastic Viscosity	cP	15
Yield Point	lb/100 ft²	18
Gels 10 sec/10min/30 min	lb/100 ft²	6/9/13
API Filtrate	ml/30min	8.0
HPHT Filtrate	ml/30min	
API/HPHT Filter Cake	32nd ins	2/–
Solids	% Vol	5.7
Dissolved Salts	% Vol	1.3
Oil Content/Water Content	% Vol	–/93.0
Sand	% Vol	0.1
Methylene Blue cap	ppb	11
pH	meter	8.7
Alk. Mud Pm	ml	0.30
Alk. Filtrate, Pf/Mf	ml	0.20/0.60
Chlorides	mg/Lx10³	15.0
Total Hardness/Calcium	mg/L	50/50
KCL	% Wt Soln	2.6
ASG of Solids	g/cc	2.8
n & K		0.54/1.14
K+ Ion Conc	mg/Lx10³	14.9
Rheometer	600 rpm/300 rpm	48/33
lb/100 ft²	200 rpm/100 rpm	
	6 rpm/3 rpm	

MUD PROPERTY SPECIFICATIONS

WEIGHT <9.3 ppg VIS 40–55 sec YP 10–20 lb/100 ft²
API Filt 6–8 ml HTHP ml KCL 3 %
BY AUTHORITY Mud Program

REMARKS

ACTIVITY

Ran in the hole, clutch slipping so POOH to the shoe. Work on clutch, then ran in the hole with 25 stands. Clutch slipping so POOH to the shoe again and repair clutch. Ran in the hole clutch OK. Wash last 20m to bottom, and circulated the hole clean prior to POOH to test . Made up test tools.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION	USED	REC	BAL	COST

MUD TYPE KCL / POLYMER

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		50x50x80	1.5
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander	10.5	1	1	1
Desilter 1.	10	1.25	1	1
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	3
other	
other	
Barite	
Chemicals	

Losses	bbl
Sol. Con.	2
Lost/Dumped	
Down Hole	30
Newhole	
NET LOSS	29
Discharged	2

BAROID Engineer	OFFICE	WAREHOUSE
C. Da Silva	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST A$ 0.00

CUMULATIVE COST A$ 30513.63

RESERVE PITS

NO	TYPE	bbl

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	5.0
Low Grav. Solids	ppb	45.5
High Grav. Solids	% Vol	0.7
High Grav. Solids	ppb	10.3
ASG of Solids	g/cc	2.80
Cuttings Volume	bbl	
Interval Dilution	bbl/m	1.4
Interval Consumption	bbl/m	1.6

TIME BREAKDOWN hrs

Drilling	
Circulating	1.5
Reaming In	
Reaming out	
Tripping	17
Testing	
Logging	
Other	5.5
AVE ROP m/hr	

Baroid Australia Pty Ltd

MUD REPORT NO. 27 up to 24:00 hrs, 7/6/94	
DATE 8/6/94	**DEPTH–m** MD 2006 TVD 2006
START DATE 12–May–94	**ACTIVITY** Run in hole to P.& A.

OPERATOR GFE Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia
REPORT FOR Ken Smith	**REPORT FOR** S. Kelly	**TOWNSHIP** Port Campbell
WELL NAME AND NO. Langley–1	**FIELD OR BLOCK NO.** PPL 1	**LOCATION** Otway Basin, Victoria

BIT DATA

Size ins			
Type			
Nozzles 32nds			
Noz Area ins²			
TFA ins²			
NV m/sec			
Impact lb f			

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	3.826	1775.8
Pipe 2	4.5	2.875	55.28
Pipe 3			
Col 1	6.25	2.875	174.96
Col 2			
OPEN HOLE SECTIONS			
Sect 1			
Sect 2			
Current	8.5		1671.6

CASINGS

Size ins		Depth m
Riser	Set @	
9 5/8"	Set @	334.43
	Set @	
	Set @	
	Set @	
	Set @	
	Set @	
Liner	Set @	
	Top @	

PUMP DATA

Pump Make	ins x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5 7.75	95	0.0525		
Nat 8P80	6 8.5	95	0.0705		

Pump Press – psi TOTAL bbl/min

MUD VOL	**bbl**
Downhole	416
Active	325
Total Circ	741
Reserve	

CIRCULATING DATA

		AV m/min
Total circ – mins		DP
Bottoms up – mins		DC
Surface–bit – mins		Riser
ECD ppg	9.3	

MUD PROPERTIES

				IN	
Sample Location	IN or OUT				
Time Sample Taken	hrs			19:00	
Depth	m			2006	
Flowline Temp	°C				
Weight	ppg			9.30	
Funnel Viscosity	sec/qt			48	
Plastic Viscosity	cP			15	
Yield Point	lb/100 ft²			20	
Gels 10 sec/10min/30 min	lb/100 ft²			6/10/15	
API Filtrate	ml/30min			8.0	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins			2/–	
Solids	% Vol			5.7	
Dissolved Salts	% Vol			1.3	
Oil Content/Water Content	% Vol			–/93.0	
Sand	% Vol			0.1	
Methylene Blue cap	ppb			12	
pH	meter			8.6	
Alk. Mud Pm	ml			0.30	
Alk. Filtrate, Pf/Mf	ml			0.20/0.50	
Chlorides	mg/Lx10³			15.0	
Total Hardness/Calcium	mg/L			50/50	
KCL	% Wt Soln			2.6	
ASG of Solids	g/cc			2.8	
n & K				0.51/1.45	
K+ Ion Conc	mg/Lx10³			14.9	
Rheometer	600 rpm/300 rpm			50/35	
lb/100 ft²	200 rpm/100 rpm				
	6 rpm/3 rpm				

MUD PROPERTY SPECIFICATIONS

WEIGHT <9.3 ppg VIS 40–55 sec YP 10–20 lb/100 ft²
API Filt 6–8 ml HTHP ml KCL 3 %
BY AUTHORITY Mud Programe

REMARKS

Flowed weakly +–10,000cfd of gas.
Lost 10 bbls mud to hole. Also lost 4 bbls on trips.
Mud engineer left location after cement plugs were set.

2 x 25 Lt cans of BARAFILM recieved at start of well added onto stock for today. One of these used at end of well to coat pipe while pulling out sideways.

ACTIVITY

Ran in the hole and performed DST # 3, interval 1882.9 –1909.1m
POOH with test tool. Layed out test tools and layed down BHA.
Ran in the hole open ended to set four cement plugs.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
BARAFILM	25 lt	1	2	1	159.7

MUD TYPE KCL / POLYMER

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		50x50x80	
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander				
Desilter 1.				
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	
other	
other	
Barite	
Chemicals	
Losses	**bbl**
Sol. Con.	
Lost/Dumped	4
Down Hole	10
Newhole	
NET LOSS	14
Discharged	4

BAROID Engineer	OFFICE	WAREHOUSE
C. Da Silva	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST A$ 159.70

CUMULATIVE COST A$ 30673.33

RESERVE PITS

NO	TYPE	bbl

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	5.0
Low Grav. Solids	ppb	45.5
High Grav. Solids	% Vol	0.7
High Grav. Solids	ppb	10.3
ASG of Solids	g/cc	2.80
Cuttings Volume	bbl	
Interval Dilution	bbl/m	1.4
Interval Consumption	bbl/m	1.6

TIME BREAKDOWN

	hrs
Drilling	
Circulating	
Reaming In	
Reaming out	
Tripping	12
Testing	6
Logging	
Other	6
AVE ROP m/hr	

APPENDIX 3

GFE RESOURCES LTD

APPENDIX 3

DRILLING OPERATIONS

SUMMARY

LANGLEY-1

DRILLING OPERATIONS SUMMARY

LANGLEY-1

Permit:	PPL 1	**Spud Date:**	12 / 05 / 94	**Rig:**	Century Rig 11
GFE Rep:	K. Smith	**Geologist:**	Val Akbari		

TIME	*HOURS*	*OPERATIONS*	**Page:** 1 of 10

12 / 05 / 94			
0800 - 1000	2	-	Drill Rat Hole and Mouse Hole.
1000 - 1130	1½	-	Rig up to spud.
1130 - 1300	1½	-	Pre-spud and safety meeting with all personnel by GFE's Engineer and Geologist and Century's Tool Pusher and Safety Officer.
1300 - 1330	½	-	Jet cellar and clear floor prior to spud.
1330 - 1500	1½	-	Drill 12¼" hole from 0m to 43m.
1500 - 1530	½	-	Circulate and survey at 30m.
1530 - 1700	1½	-	Drill 12¼" hole from 43m to 80m.
1700 - 1730	½	-	Circulate and survey at 67m.
1730 - 2000	2½	-	Drill 12¼" hole from 80m to 141m.
2000 - 2030	½	-	Circulate and survey at 128m.
2030 - 2230	2	-	Drill 12¼" hole from 141m to 204m.
2230 - 2330	1	-	Circulate and survey at 191m.
2330 - 2400	½	-	Drill 12¼" hole from 204m to 223m.
13 / 05 /94			
0000 - 0130	1½	-	Drill 12¼" hole from 223m to 261m.
0130 - 0200	½	-	Circulate and survey at 248m.
0200 - 0500	3	-	Drill 12¼" hole from 261m to 340m.
0500 - 0530	½	-	Circulate bottoms up.
0530 - 0730	2	-	Wiper trip.
0730 - 0900	1½	-	Run in hole.
0900 - 0930	½	-	Break circulation and clean to bottom - 5m of fill.
0930 - 1030	1	-	Circulate hole clean prior to running casing.
1030 - 1300	2½	-	Pull out of hole.
1300 - 1400	1	-	Lay out stabiliser, 2 x 8" DC's and recover survey.
1400 - 1530	1½	-	Rig up to run and run 9⅝" casing - blew seal in hydraulic motor of power tongs after running first three joints.
1530 - 1600	½	-	Lay out power tongs, clean floor and rig up rotary tongs.
1600 - 2030	4½	-	Continue running casing with chain tongs and rotary tongs.
2030 - 2130	1	-	Head up circulating swage and clean to bottom (8m of fill) and circulate prior to cementing.
2130 - 2200	½	-	Remove swage, head up Dowell, land casing and chain down.
2200 - 2330	1½	-	Pressure test lines, pump pre-flush. Mix cement and displace same - nil cement returns.
2330 - 2400	½	-	Wait on cement.

14 / 05 / 94			
0000 - 0530	5½	-	Continue wait on cement.
0530 - 0730	2	-	Lay out cement head, landing joint and conductor pipe - tag top of cement at 31' (9.4m) below bottom of cellar.
0730 - 0830	1	-	Make up casing bowl and spacer spool.
0830 - 1030	2	-	Top up annulus with cement by hand, rig up 1" line and blow annulus out with air compressor to get cement to fall - used 14 sacks cement.
1030 - 1700	6½	-	Nipple up BOP's and install choke and flare-line.
1700 - 1730	½	-	Function test BOP - HCR valve stem leaking.
1730 - 1930	2	-	Repair HCR valve.
1930 - 2200	2½	-	Pressure test flare-line to 1,000psi, blind rams to 300psi and 1,500psi and pipe rams to 2,500psi, all choke valves, HCR valve, manual choke line valve and 2 kill-line valves to 2,500psi and Hydril to 1,500psi.
2200 - 2230	½	-	Break and lay out cup tester.
2230 - 2400	1½	-	Make up 8½" BHA and run in hole.
15 / 05 / 94			
0000 - 0130	1½	-	Continue run in hole. Pick up jars.
0130 - 0230	1	-	Tag cement at 318m. Break circulation and pressure test upper and lower kelly cocks to 1,500psi with rig pump.
0230 - 0330	1	-	Drill out plug, float collar cement and float shoe.
0330 - 0400	½	-	Drill 8½" hole from 340m to 346m.
0400 - 0430	½	-	Circulate hole clean and condition mud.
0430 - 0530	1	-	Run Formation Integrity Test with Dowell - 22.6ppg EMW.
0530 - 0700	1½	-	Drill 8½" hole from 346m to 395m.
0700 - 0800	1	-	Clean plugged flow-line and work mud ring out of hole.
0800 - 0830	½	-	Continue drilling 8½" hole from 395m to 404m.
0830 - 0900	½	-	Circulate and survey at 391m.
0900 - 1200	3	-	Drill 8½" hole from 404m to 481m.
1200 - 1230	½	-	Centre crown of derrick over centre of rotary table.
1230 - 1300	½	-	Circulate and survey at 468m.
1300 - 1400	1	-	Drill 8½" hole from 481m to 515m.
1400 - 1430	½	-	Circulate and clean mud ring from flow line.
1430 - 1500	½	-	Drill 8½" hole from 515m to 538m.
1500 - 1530	½	-	Circulate and survey at 525m.
1530 - 2100	5½	-	Drill 8½" hole from 538m to 673m.
2100 - 2130	½	-	Circulate and survey at 660m.
2130 - 2230	1	-	Repair kelly spinner - engaging kelly while rotating.
2230 - 2400	1½	-	Drill 8½" hole from 673m to 690m.
16/ 05 / 94			
0000 - 0130	1½	-	Drill 8½" hole from 690m to 721m.
0130 - 0200	½	-	Circulate and survey at 708m.
0200 - 0900	7	-	Drill 8½" hole from 721m to 832m.
0900 - 0930	½	-	Flow check and circulate geological sample at 832m.
0930 - 1100	1½	-	Twenty-five stand wiper trip back to shoe.
1100 - 1130	½	-	Slip 40' of drill line.
1130 - 1230	1	-	Run back in hole - no fill.
1230 - 1430	2	-	Un-plug jet and drill 8½" hole from 832m to 883m.
1430 - 1500	½	-	Circulate and survey at 870m.

1500 - 2030	5½	-	Drill 8½" hole from 883m to 1017m.
2030 - 2100	½	-	Circulate and survey at 1004m.
2100 - 2130	½	-	Drill 8½" hole from 1017m to 1046m.
2130 - 2200	½	-	Circulate and survey at 1033m.
2200 - 2330	1½	-	Drill 8½" hole from 1046m to 1075m.
2330 - 2400	½	-	Circulate and survey at 1062m.
17 / 05 / 94			
0000 - 0200	2	-	Drill 8½" hole from 1075m to 1104m.
0200 - 0230	½	-	Circulate and survey at 1091m.
0230 - 0500	2½	-	Drill 8½" hole from 1104m to 1142m.
0500 - 0530	½	-	Circulate and survey at 1129m.
0530 - 0800	2½	-	Drill 8½" hole from 1142m to 1171m.
0800 - 0830	½	-	Circulate and survey at 1158m.
0830 - 1030	2	-	Drill 8½" hole from 1171m to 1199m.
1030 - 1100	½	-	Circulate and survey at 1196m.
1100 - 1300	2	-	Drill 8½" hole from 1199m to 1228m.
1300 - 1330	½	-	Circulate and survey at 1228m.
1330 - 1630	3	-	Twenty stand wiper trip back to 823m. Work tight hole at 1076m to 1035m. Pipe stuck at 1076m for 20 minutes. 2m of fill.
1630 - 2030	4	-	Drill 8½" hole from 1228m to 1257m.
2030 - 2100	½	-	Circulate and survey at 1244m. Sand line parted while pulling survey barrel out of hole.
2100 - 2230	1½	-	Pull out of hole to recover survey barrel to 870m.
2230 - 2300	½	-	Recover survey barrel.
2300 - 2400	1	-	Continue to pull out of hole to inspect bit.
18 / 05 / 94			
0000 - 0130	1½	-	Continue to pull out of hole.
0130 - 0300	1½	-	Run in hole to casing shoe. Change string stabiliser (1/8" under gauge) and working single.
0300 - 0700	4	-	Slip and cut drill line to remove damaged section of line and repair sand line.
0700 - 0800	1	-	Continue to run in hole.
0800 - 0830	½	-	Circulate - unable to RIH due to storm and sleet.
0830 - 0900	½	-	Continue to RIH to 1062m.
0900 - 0930	½	-	Ream from 1062m to 1075m.
0930 - 1000	½	-	Continue to RIH to 1177m.
1000 - 1130	1½	-	Ream from 1177m to 1257m.
1130 - 1700	5½	-	Drill 8½" hole from 1257m to 1276m.
1700 - 1730	½	-	Circulate and survey at 1276m.
1730 - 2030	3	-	Drill 8½" hole from 1276m to 1305m.
2030 - 2100	½	-	Circulate and survey at 1305m.
2100 - 2400	3	-	Drill 8½" hole from 1305m to 1318m.
19/ 05 /94			
0000 - 0200	2	-	Drill 8½" hole from 1318m to 1334m.
0200 - 0230	½	-	Circulate and survey at 1331m.
0230 - 0830	6	-	Drill 8½" hole from 1334m to 1363m.
0830 - 0900	½	-	Circulate and survey at 1360m.

0900 - 1330	4½	-	Pull out of hole to stiffen up BHA - work tight hole from 1302m to 1158m.
1330 - 1430	1	-	Pick up DC, stabilisers and junk sub and make up new BHA with Bit #3.
1430 - 1630	2	-	Run in hole to 949m.
1630 - 2400	7½	-	Ream tight hole from 949m to 1240m, running stands or singles where possible.
20 / 05 / 94			
0000 - 0400	4	-	Ream tight hole from 1240m to 1363m - work junk sub.
0400 - 1030	6½	-	Drill 8½" hole from 1363m to 1394m.
1030 - 1100	½	-	Circulate and survey at 1390m.
1100 - 1900	8	-	Drill 8½" hole from 1394m to 1438m - stuck in hole. Drill string locked up in hole, stalling motors. Unable to hoist after restarting motors - clutch slipping.
1900 - 2130	2½	-	Check and degrease oily drum clutch and re-fit.
2130 - 2400	2½	-	Try to hoist off bottom, pipe stuck, work jars to 35,000lbs over string weight, pull to 240,000lbs (115,000lbs over string weight) and try to rotate to get pipe free.
21 / 05 / 94			
0000 - 1030	10½	-	Continue to jar and pull on pipe and try to rotate.
1030 - 1200	1½	-	Displace annulas to water.
1200 - 1330	1½	-	Jar and pull on pipe.
1330 - 1530	2	-	Close Hydril and reverse, circulate slowly to displace hole to water completely.
1530 - 1600	½	-	Continue to pull on pipe and jar intermittently.
1600 - 1700	1	-	Visual check of drilling line, anchors, derrick supports and all lines, sheaves and safety pins in mast.
1700 - 1930	2½	-	Continue to pull on pipe and jar intermittently.
1930 - 2030	1	-	Change out drive chain in draw-works.
2030 - 2200	1½	-	Displace hole to mud before running Free-Point Tool.
2200 - 2400	2	-	Try to remove access bull plug in top of swivel goose neck - too tight - remove kelly hose etc. and goose neck.
22 / 05 / 94			
0000 - 0800	8	-	Rig up Schlumberger and run Free-Point Tool to try to establish where drill string is stuck. Schlumberger's tests suggest that the string is stuck at the jars at 1262.97m - jars continues to function.
0800 - 0830	½	-	Test jars for operation check.
0830 - 1200	3½	-	Re-install wash pipe, goose neck and kelly hose while evaluating Free-Point logs. Pressure test to 500psi.
1200 - 1300	1	-	Circulate hole - complete circulation plus 30% - cavings from bottom of hole.
1300 - 1330	½	-	Work pipe to 250,000lbs.
1330 - 1530	2	-	Displace hole to water.
1530 - 1600	½	-	Work jars up to 160,000lbs and down 25,000lbs.
1600 - 1900	3	-	Mix 'Ezy-Spot' and diesel fuel and spot across bottom of hole to 1,200mKB with Dowell (circulated with water slowly while mixing, as pressure indicated hole could be packing-off).

1900 - 1930	½	-	Work jars up and down, hold torque on pipe.
1930 - 2030	1	-	Remove access bull plug in goose neck and rig up Schlumberger.
2030 - 2330	3	-	Run Free-Point tool with Schlumberger, string pulled free while applying tension for locating Free-Point - rig down Schlumberger.
2330 - 2400	½	-	Layout single of drill pipe and replace access plug.
23 / 05 / 94			
0000 - 0100	1	-	Unplug jets in bit.
0100 - 0200	1	-	Displace hole to drilling mud.
0200 - 0500	3	-	Circulate and condition mud.
0500 - 1330	8½	-	Pull out of hole servicing all tool joint connections and lay out jars - work tight hole from 1361m to 1226m.
1330 - 1430	1	-	Make up cup tester and test pipe rams, choke and HCR to 2,500psi and 500psi and Hydril to 1,000psi and 500psi.
1430 - 1700	2½	-	Make up new bit and BHA and run in hole to casing shoe.
1700 - 1930	2½	-	Slip and cut 100' of drilling line.
1930 - 2130	2	-	Run in hole to 1207m. Lay out 20 singles for reaming. Service last 10 connections, not serviced while pulling in tight hole.
2130 - 2400	2½	-	Break circulation and ream and wash from 1207m to 1390m.
24 / 05 / 94			
0000 - 0200	2	-	Ream from 1390m to 1438m.
0200 - 1900	17	-	Drill 8½" hole from 1438m to 1537m.
1900 - 1930	½	-	Circulate and survey at 1524m.
1930 - 2400	4½	-	Drill 8½" hole from 1537m to 1556m.
25 / 05 / 94			
0000 - 1000	10	-	Drill 8½" hole from 1556m to 1614m.
1000 - 1030	½	-	Circulate and survey at 1610m.
1030 - 1300	2½	-	Drill 8½" hole from 1614m to 1623m.
1300 - 1400	1	-	Ten stand wiper trip from 1623m to 1419m - work tight hole 1476m to 1467m - 1 meter of fill.
1400 - 1530	1½	-	Drill 8½" hole from 1623m to 1628m.
1530 - 1630	1	-	Circulate geological sample at 1628m.
1630 - 2400	7½	-	Drill 8½" hole from 1628m to 1675m.
26 / 05 / 94			
0000 - 1300	13	-	Drill 8½" hole from 1675m to 1731m. Lowered circulation rate from 300gpm to 250gpm at 1711m.
1300 - 1400	1	-	Circulate geological sample at 1731m.
1400 - 1500	1	-	Drill 8½" hole from 1731m to 1732m. Drill string torqueing up - unable to put weight on bit.
1500 - 1900	4	-	Pull out of hole to check bit and stabilisers - high winds and driving rain - work tight hole at 1352m to 1243m - 35,000lb over-pull.
1900 - 1930	½	-	Slip 20' of drilling line.
1930 - 2200	2½	-	Continue to pull out of hole.
2200 - 2400	2	-	Lay out stabilisers, make up new bit and stabilisers at 60'. Run in hole.
27 / 05 / 94			
0000 - 0300	3	-	Continue run in hole.
0300 - 0330	½	-	Precautionary ream from 1713m to 1732m - 2m of fill.

0330 - 0430	1	-	Circulate hole clean prior to drilling ahead.
0430 - 0500	½	-	Drill 8½" hole from 1732m to 1734m.
0500 - 0600	1	-	Circulate geological sample at 1734m.
0600 - 0700	1	-	Drill 8½" hole from 1734m to 1745m.
0700 - 0900	2	-	Circulate geological sample at 1745m.
0900 - 1200	3	-	Wiper trip to casing side - work tight hole at 1435m to 1430m.
1200 - 1230	½	-	Slip 20' of drilling line.
1230 - 1530	3	-	Continue to run in hole.
1530 - 1600	½	-	Tag bottom, break circulation, circulate for 10 minutes and pull back 2 stands.
1600 - 1830	2½	-	Circulate at 1706m, working pipe.
1830 - 1900	½	-	Pump weight pill and drop survey.
1900 - 2330	4½	-	Pull out of hole to pick up test tools - strap out.
2330 - 2400	½	-	Lay out bit stabiliser and recover survey.
28 / 05 / 94			
0000 - 0100	1	-	Make up test tools.
0100 - 0600	5	-	Run in hole with test tool.
0600 - 0700	1	-	Head up surface equipment and work pipe until daylight.
0700 - 1030	3½	-	Connect chicksans, set packers and run DST #1 at 1715.22m to 1745m.
1030 - 1500	4½	-	Pull out of hole with test tool.
1500 - 1600	1	-	Lay out test tools.
1600 - 1700	1	-	Service and make up 60' core barrel.
1700 - 1830	1½	-	Run in hole with core barrel.
1830 - 1900	½	-	Slip 20' of drilling line.
1900 - 2200	3	-	Run in hole with core barrel.
2200 - 2400	2	-	Ream to bottom 17m and circulate gas-cut mud.
29 / 05 / 94			
0000 - 0200	2	-	Tag bottom. Drop ball and cut Core #1 at 1745m to 1764m.
0200 - 0700	5	-	Lay out 2 pup joints and pull out of hole with core barrel.
0700 - 0800	1	-	Recover Core #1.
0800 - 0930	1½	-	Break and service core barrel and lay out.
0930 - 1030	1	-	Make up bit #5RR and run 1 stand of drill collars. Pick up cup tester and pressure test pipe rams to 2,500psi and 800psi against HCR valve and Hydril to 1,000psi.
1030 - 1100	½	-	Service Rig.
1100 - 1530	4½	-	Run in hole to 1726m.
1530 - 1630	1	-	Break circulation. Wash and ream down to top of unrecovered core at 1761m.
1630 - 1700	½	-	Drill up 3 metres of unrecovered core.
1700 - 2130	4½	-	Drill 8½" hole from 1764m to 1776m.
2130 - 2200	½	-	Work bit to check for balling up - low penetration.
2200 - 2400	2	-	Drill 8½" hole from 1776m to 1780m.
30 / 05 / 94			
0000 - 0800	8	-	Drill 8½" hole from 1780m to 1802m.
0800 - 0830	½	-	Circulate for survey at 1802m - abort survey due to broken strand in sand-line.
0830 - 1030	2	-	Drill 8½" hole from 1802m to 1821m.
1030 - 1100	½	-	Circulate and survey at 1808m.

1100 - 1200	1	-	Drill 8½" hole from 1821m to 1824m.
1200 - 2400	12	-	Drill 8½" hole from 1824m to 1852m.
31 / 05 / 94			
0000 - 0930	9½	-	Drill 8½" hole from 1852m to 1888m.
0930 - 1000	½	-	Service rig.
1000 - 1100	1	-	Drill 8½" hole from 1888m to 1897m.
1100 - 1230	1½	-	Circulate geological sample at 1897m - circulate for 10 minutes, pull back to 1869m and continue circulating.
1230 - 1430	2	-	Wiper trip back to 1700m. Work tight hole at 1802m to 1736m. RIH to 1770m, pick up kelly and clean out to 1780m. Continue to RIH - 1 metre of fill.
1430 - 1600	1½	-	Drill 8½" hole from 1897m to 1910m.
1600 - 1800	2	-	Circulate for 10 minutes, pull back to 1869m and continue circulating.
1800 - 2130	3½	-	Pull out of hole for DST #2 - strap pipe.
2130 - 2230	1	-	Slip 20' and cut 92' of drilling line.
2230 - 2400	1½	-	Continue to pull out of hole.
01 / 06 / 94			
0000 - 0030	½	-	Continue to pull out of hole.
0030 - 0130	1	-	Make up test tools.
0130 - 0230	1	-	Run in hole with test tool.
0230 - 0300	½	-	Service rig and adjust brakes.
0300 - 0730	4½	-	Continue to run in hole with test tool and work tools through tight hole from 1791 to 1824m.
0730- 0930	2	-	Run DST #2 at 1874.97m to 1910m - test aborted after packer seat failure on final flow opening. Strap result: Driller's depth: 1910m. Strap depth: 1910.61m.
0930 - 1500	5½	-	Pull out of hole - work through tight hole at 1849m to 1773m. Slight swabbing, recover 10bbls of mud.
1500 - 1630	1½	-	Break and lay out test tools.
1630 - 1700	½	-	Restart draw-works motor.
1700 - 1900	2	-	Make up 8½" BHA and run in hole.
1900 - 1930	½	-	Slip 15' of drilling line.
1930 - 2330	4	-	Run in hole to 1888m. Break circulation and precautionary ream to 1910m.
2330 - 2400	½	-	Circulate and condition mud.
02 / 06 / 94			
0000 - 0030	½	-	Continue to circulate gas out.
0030 - 1200	11½	-	Drill 8½" hole from 1910m to 1964m.
1200 - 2100	9	-	Drill 8½" hole from 1964 to 2006m (T.D.).
2100 - 2200	1	-	Circulate bottoms up.
2200 - 2400	2	-	Pull out of hole. Wiper trip back to 1186m - 10-15,000lbs over pull from 1869m to 1773m.

03 / 06 / 94			
0000 - 0130	1½	-	Run in hole. Wiper trip - work tight hole from 1751m to 1761m - 1 metre of fill.
0130 - 0300	1½	-	Circulate hole clean.
0300 - 0400	1	-	Survey at 2000m - apply preservative to sand line.
0400 - 0430	½	-	Pull out of hole to log - strap out of hole.
0430 - 0500	½	-	Pick up kelly and work tight hole from 1761m to 1751m.
0500 - 0800	3	-	Continue to pull out of hole to log - strap pipe.
0800 - 0830	½	-	Pull out of hole. Break bit and stabiliser.
0830 - 1200	3½	-	Rig up Schlumberger. Run #1 - Resistivity/Sonic.
1200 - 2400	12	-	Continue Run #1. Run #2 Neutron/Density. Run #3 Check Shot Survey.
04 / 06 / 94			
0000 - 0300	3	-	Continue Run #3 Check Shot Survey.
0300 - 0400	1	-	Make up 8½" BHA and run in hole.
0400 - 0430	½	-	Slip 27' drilling line.
0430 - 0730	3	-	Continue to run in hole.
0730 - 0900	1½	-	Break circulation and circulate hole.
			Hole took 27.5bbls of mud while logging.
			Driller's Depth: 2006m. Strap Depth: 2005.87m. Logger's Depth: 2007m.
0900 - 1030	1½	-	Work on slipping drum clutch.
1030 - 1500	4½	-	Pull out of hole.
1500 - 2400	9	-	Rig up Schlumberger. Run #4 RFT.
			Hole used 65bbls of mud while logging.
05 / 06 / 94			
0000 - 1330	13½	-	Continue logging with Schlumberger. Run #4 RFT. Run #5 Dipmeter. Run #6 Sidewall Cores.
1330 - 1400	½	-	Rig down Schlumberger.
1400 - 1900	5	-	Make up 8½" BHA and run in hole to 1993m. Filled pipe at 955m when no mud returns being displaced. Break circulation and wash to 2000m. Check operation of drum clutch - started to slip at 147,000lbs indicator weight.
1900 - 2000	1	-	Circulate bottoms up - 60 units gas - work pipe.
2000 - 2330	3½	-	Pull out of hole to casing shoe - hit tight spot at 596m.
2330 - 2400	½	-	Repair draw-works.
06 / 06 / 94			
0000 - 0130	1½	-	Change over drum clutch and Hydromatic clutch.
0130 - 0400	2½	-	Run in hole. Clutch started to slip at 130,000lbs indicator weight while running in hole.
0400 - 0600	2	-	Pull back to casing shoe.
0600 - 0800	2	-	Remove drum clutch and re-face with new facing that arrived overnight in Melbourne.

			Schlumberger lost 4 sidewall core bullets in hole. Hole took 41bbls while logging and 21bbls while repairing.
0800 - 0900	1	-	Change out clutch pads for new ones at shoe.
0900 - 1100	2	-	Run in hole 25 stands and pull back to shoe - cracks in 2 members of draw-works sub-frame.
1100 - 1400	3	-	Shut well in, install stabbing valve and well gussets to reinforce draw-works sub-frame.
1400 - 1730	3½	-	Run in hole to 1993m. Break circulation and clean to bottom - 3m of fill. Picked up kelly and filled pipe and hole at 1138m when mud stopped displacing from hole.
1730 - 1830	1	-	Circulate bottoms up - work pipe - clutch okay.
1830 - 2300	4½	-	Pull out of hole for DST #3.
2300 - 2400	1	-	Make up DST tools.
07 / 06 / 94			
0000 - 0200	2	-	Make up test tools.
0200 - 0700	5	-	Run in hole with test tool - strap pipe - differential of 0.29m less than tally sheet.
0700 - 0800	1	-	Head up surface equipment and pressure test chicksans to 100psi air pressure and change out 3 leaky ones.
0800 - 1400	6	-	Inflate packers and run DST #3 at 1883.07 to 1909.13m.
1400 - 1900	5	-	Pull out of hole with test tool.
1900 - 2100	2	-	Break and lay out test tools - recover 2.2 barrels of mud.
2100 - 2400	3	-	Run in hole with BHA and lay out same.
			Hole took further 35bbls during repairs from 24hrs to 0800. DST #3 interval 1883.07m to 1909.13m.
08 / 06 / 94			
0000 - 0100	1	-	Continue lay out 6¼" D/C.
0100 - 0400	3	-	Run in hole with open ended drill pipe and pick up 12 singles.
0400 - 0530	1½	-	Circulate bottoms up at 1880m.
0530 - 0700	1½	-	Head up Dowell pressure test lines and run cement plug #1 at 1880m to 1820m with 84 sacks Class 'A'.
0700 - 0730	½	-	Pull back to 1760m.
0730 - 0830	1	-	Run cement plug #2 at 1760m to 1700m with 87 sacks Class 'A'.
0830 - 0900	½	-	Pull back 4 stands through cement.
0900 - 0930	½	-	Circulate to clear pipe of any cement.
0930 - 1300	3½	-	Lay out 78 joints of drill pipe.
1300 - 1330	½	-	Run plug #3 at 940m to 880m with 8 sacks Class 'A'.
1330 - 1400	½	-	Pull 9 stands and circulate to clear pipe of any cement.
1400 - 1700	3	-	Lay out 80 singles of drill pipe.
1700 - 1730	½	-	Run in hole 19 stands and run plug #4 at 366m to 306m with 84 sacks Class 'A'.
1730 - 1830	1	-	Pull back 5 stands circulate to clear pipe of cement.
1830 - 1900	½	-	Pull back 14 stands.
1900 - 2300	4	-	Wait on cement - clean shaker tank and remove pipe spinner.
2300 - 2400	1	-	Run in hole - tag plug #4 at 309m.

09 / 06 / 94			
0000 - 0130	1½	-	Lay out drill pipe.
0130 - 0600	4½	-	Nipple down BOP, choke and flare line.
0600 - 0700	1	-	Remove casing bowl and clean suction tank.
0700 - 0730	½	-	Run surface plug with approximately 30 sacks Class 'A'.
0730 - 0800	½	-	Lay out kelly and swivel.
0800 - 0830	½	-	Release Rig.

Release Rig at 0830 hours, 9 JUNE 1994.

APPENDIX 4

APPENDIX 4

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APPENDIX 4

LITHOLOGICAL DESCRIPTIONS

4A. CUTTINGS DESCRIPTIONS
4B. GEOLOGICAL DESCRIPTIONS
FROM DAILY REPORTS

LANGLEY-1

APPENDIX 4A

CUTTINGS DESCRIPTIONS

LANGLEY-1

GFE RESOURCES LTD

WELL:	LANGLEY-1	DATE:	19/02/94 to 25/02/94
GEOLOGIST:	Val Akbari	PAGE:	1 of 16

DEPTH (m)	%	SAMPLE DESCRIPTION	SHOWS						
			TOTAL GAS FOR UNITS	GAS COMPONENTS (PPM)				FLUORESCENCE	
				C1	C2	C3	C4	NAT.	CUT
340-370	100	**MARL:** blue grey, soft, very fossiliferous with abundant coral and shell fragments.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
370-395	80	**MARL:** as for 340-370m.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	20	**LIMESTONE:** off white to tan, mostly fossil fragments.							
395-405	70	**MARL:** dark grey to blue grey, often brown, calcareous, trace glauconite, trace pyrite.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	30	**LIMESTONE:** mainly fossil fragments, common glauconite.							
405-420	50	**MARL:** as for 395-405m.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	50	**LIMESTONE:** as for 395-405m.							
420-430	70	**MARL:** as for 395-405m.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	30	**LIMESTONE:** as for 395-405m.							
430-450	80	**MARL:** dark grey to blue grey, dominantly dark brown, calcareous, fossiliferous, soft, rare to common glauconite.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	20	**LIMESTONE:** as for 395-405m.							
450-460	90	**MARL:** as for 430-450m.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	10	**LIMESTONE:** as for 395-405m.							
460-490	100	**MARL:** as for 430-450m.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
490-510	100	**MARL:** as for 430-450m.	0.1	18	Nil	Nil	Nil	Nil	Nil
510-530	100	**SANDSTONE:** medium to dark brown, very fine to medium, dominantly fine, subangular to subrounded, dominantly subrounded quartz, common fossil fragments, rare glauconite, common argillaceous matrix, soft, poor visual porosity.	0.2	24-30	Nil	Nil	Nil	Nil	Nil
530-560	100	**SANDSTONE:** medium to dark brown, very fine to coarse, dominantly medium, subrounded to rounded, dominantly subrounded quartz, poor to moderately sorted, common argillaceous matrix, poor visual porosity.	0.1	6-8	Nil	Nil	Nil	Nil	Nil

WELL:	LANGLEY-1	DATE:	19/02/94 to 25/02/94
GEOLOGIST:	Val Akbari	PAGE:	2 of 16

DEPTH (m)	%	SAMPLE DESCRIPTION	SHOWS: TOTAL GAS FOR UNITS	GAS COMPONENTS (PPM): C1	C2	C3	C4	FLUORESCENCE: NAT.	CUT
560-590	100	**SANDSTONE:** off white to translucent, very fine to very coarse, dominantly coarse, subrounded to rounded, dominantly rounded, poor to moderately sorted, rare pyrite, unconsolidated, good intergranular porosity.	0.1	6-8	Nil	Nil	Nil	Nil	Nil
590-600	80	**SANDSTONE:** as for 560-590m.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	20	**CLAYSTONE:** dark brown, silty, carbonaceous, soft, massive.							
600-620	90	**SANDSTONE:** as for 560-590m.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	10	**CLAYSTONE:** as for 590-600m.							
620-625	70	**SANDSTONE:** as for 560-590m.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	30	**CLAYSTONE:** as for 590-600m.							
625-740	100	**SANDSTONE:** as for 560-590m.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
740-745	70	**SANDSTONE:** as for 560-590m.							
	30	**CLAYSTONE:** medium to dark brown, silty, carbonaceous, weakly calcareous, rare glauconite, soft.							
745-750	80	**SANDSTONE:** as for 560-590m.							
	20	**CLAYSTONE:** as for 740-745m.							
750-775	100	**SANDSTONE:** as for 560-590m.							
775-780	80	**SANDSTONE:** off white, light brown, very fine to medium, occasionally coarse, dominantly medium, subangular to subrounded, dominantly subrounded quartz, poor to moderately sorted, trace glauconite, trace pyrite, common fossil fragments, abundant argillaceous matrix, poor visual porosity, soft.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	20	**CLAYSTONE:** dark brown, silty, calcareous, carbonaceous, trace to rare glauconite, soft.							

DEPTH (m)	%	SAMPLE DESCRIPTION	SHOWS: TOTAL GAS FOR UNITS	GAS COMPONENTS (PPM): C1	C2	C3	C4	FLUORESCENCE: NAT.	CUT
780-785	70	**SANDSTONE:** off white, light brown, very fine to medium, occasionally coarse, dominantly medium, subangular to subrounded, dominantly subrounded quartz, poor to moderately sorted, trace glauconite, trace pyrite, common fossil fragments, abundant argillaceous matrix, poor visual porosity, soft.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	30	**CLAYSTONE:** dark brown, silty, calcareous, carbonaceous, trace to rare glauconite, soft.							
785-790	60	**SANDSTONE:** as for 780-785m.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	40	**CLAYSTONE:** as for 780-785m.							
790-805	80	**CLAYSTONE:** as for 780-785m.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	20	**SANDSTONE:** as for 780-785m.							
805-830	100	**CLAYSTONE:** as for 780-785m.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
830-835	60	**CLAYSTONE:** as for 780-785m.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	40	**SANDSTONE:** brown to translucent, very fine to granular, dominantly coarse, subangular to subrounded, dominantly subrounded quartz, common glauconite, common pyrite, trace iron oxide staining, abundant argillaceous matrix, nil visual porosity, soft.							
835-840		very poor sample (drilling following the wiper trip to check the hole condition).	Nil	Nil	Nil	Nil	Nil	Nil	Nil
840-880	100	**SANDSTONE:** brown, iron oxide staining, fine to medium, dominantly medium, subangular to subrounded, dominantly subrounded quartz, moderately sorted, trace argillaceous matrix, dominantly unconsolidated, good intergranular porosity.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
880-895	100	**SANDSTONE:** as for 840-880m.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
895-900	90	**SANDSTONE:** as for 840-880m.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	10	**SILTSTONE:** medium grey brown, argillaceous, common glauconite, rare pyrite, rare calcite, massive, moderately firm.							

WELL:	LANGLEY-1	DATE:	19/02/94 to 25/02/94
GEOLOGIST:	Val Akbari	PAGE:	4 of 16

DEPTH (m)	%	SAMPLE DESCRIPTION	SHOWS						
			TOTAL GAS FOR UNITS	GAS COMPONENTS (PPM)				FLUORESCENCE	
				C1	C2	C3	C4	NAT.	CUT
900-905	50	**SILTSTONE:** medium grey brown, argillaceous, common glauconite, rare pyrite, rare calcite, massive, moderately firm.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	50	**SANDSTONE:** as for 840-880m.							
905-914	90	**SILTSTONE:** as for 900-905m.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	10	**SANDSTONE:** brown, iron oxide staining, fine to medium, dominantly medium, subangular to subrounded, dominantly subrounded quartz, moderately sorted, trace argillaceous matrix, dominantly unconsolidated, good intergranular porosity.							
914-1045	100	**SANDSTONE:** off white to translucent, very fine to granular, dominantly very coarse to granular, subangular to subrounded, dominantly subrounded quartz, poorly sorted, trace to common pyrite, trace to rare brown lithics, unconsolidated, very good intergranular porosity.	0.2	30	Nil	Nil	Nil	Nil	Nil
1045-1050	80	**SANDSTONE:** as for 914-1045m.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	20	**CLAYSTONE:** medium grey, silty, carbonaceous, soft.							
1050-1060	90	**SANDSTONE:** as for 914-1045m.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	10	**CLAYSTONE:** as for 1045-1050m.							
1060-1080	100	**SANDSTONE:** off white to translucent, very fine to granular, dominantly very coarse to granular, subangular to subrounded, dominantly subrounded quartz, poorly sorted, trace to common pyrite, trace coal, trace to rare brown lithics, unconsolidated, very good intergranular porosity.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
1080-1100	90	**SANDSTONE:** as for 914-1045m.							
	10	**CLAYSTONE:** as for 1045-1050m.							
1100-1130	100	**SANDSTONE:** as for 1060-1080m.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
1130-1140	80	**SANDSTONE:** as for 1060-1080m.							
	20	**CLAYSTONE:** as for 1045-1050m.							
1140-1150	90	**SANDSTONE:** as for 914-1045m.	Nil	Nil	Nil	Nil	Nil	Nil	Nil

WELL: LANGLEY-1		DATE: 19/02/94 to 25/02/94	SHOWS						
GEOLOGIST: Val Akbari		PAGE: 5 of 16		GAS COMPONENTS (PPM)				FLUORESCENCE	
DEPTH (m)	%	SAMPLE DESCRIPTION	TOTAL GAS FOR UNITS	C1	C2	C3	C4	NAT.	CUT
	10	**CLAYSTONE:** as for 1045-1050m.							
1150-1165	100	**SANDSTONE:** off white to translucent, very fine to granular, dominantly very coarse to granular, subangular to subrounded, dominantly subrounded quartz, poorly sorted, trace to common pyrite, trace to rare brown lithics, unconsolidated, very good intergranular porosity.							
1165-1170	100	**SANDSTONE:** as for 1150-1165m.							
1170-1180	80	**SANDSTONE:** as for 1150-1165m.	0.1	3					
	20	**SILTSTONE:** medium to dark grey, very argillaceous, carbonaceous, moderately firm, massive.							
1180-1185	70	**SILTSTONE:** as for 1170-1180m.	0.1						
	30	**SANDSTONE:** as for 1150-1165m.							
1185-1190	70	**SANDSTONE:** off white to translucent, very fine to granular, dominantly very coarse to granular, subangular to subrounded, dominantly subrounded quartz, poorly sorted, trace to common pyrite, trace to rare brown lithics, unconsolidated, very good intergranular porosity.	0.1	27					
	25	**SILTSTONE:** medium to dark grey, very argillaceous, carbonaceous, moderately firm, massive.							
	5	**COAL:** dark brown to black, firm.							
1190-1195	70	**SILTSTONE:** as for 1185-1190m.	0.1						
	25	**SANDSTONE:** as for 1185-1190m.							
	5	**COAL:** dark brown to black, firm.							

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WELL:	LANGLEY-1	DATE:	19/02/94 to 25/02/94
GEOLOGIST:	Val Akbari	PAGE:	6 of 16

DEPTH (m)	%	SAMPLE DESCRIPTION	SHOWS: TOTAL GAS FOR UNITS	GAS COMPONENTS (PPM): C1	C2	C3	C4	FLUORESCENCE: NAT.	CUT
1195-1210	70	**SANDSTONE:** off white to translucent, very fine to granular, dominantly very coarse to granular, subangular to subrounded, dominantly subrounded quartz, poorly sorted, trace to common pyrite, trace to rare brown lithics, unconsolidated, very good intergranular porosity.	Trace						
	20	**SILTSTONE:** as for 1185-1190m.							
	10	**COAL:** dark brown to black, firm.							
1210-1220	90	**SANDSTONE:** as for 1185-1190m.							
	10	**SILTSTONE:** as for 1185-1190m.							
1220-1230	100	**SANDSTONE:** colourless to translucent, very fine to coarse, dominantly coarse, subangular to subrounded, dominantly subangular quartz, poor to moderately sorted, weak calcareous cement, dominantly unconsolidated, good intergranular porosity.							
1230-1250	70	**SANDSTONE:** as for 1220-1230m.							
	30	**CAVING:** poor quality sample after wiper trip and drilling with reduced weight on bit (5,000lbs).							
1250-1275	60	**SILTSTONE:** dark grey, argillaceous, often sandy grading into very fine sandstone, moderately firm, massive.							
	40	**SANDSTONE:** as for 1230-1250m.							
1275-1285	80	**SANDSTONE:** off white, translucent, very fine, often grading into siltstone, subangular to subrounded, dominantly subangular quartz, well sorted, strong dolomite cement, common pyrite, nil visual porosity, hard; at times medium to coarse, dominantly coarse, unconsolidated.							
	20	**SILTSTONE:** as for 1250-1275m.							
1285-1300	90	**SANDSTONE:** as for 1275-1285m.							
	10	**SILTSTONE:** as for 1250-1275m.							

WELL: LANGLEY-1 DATE: 19/02/94 to 25/02/94
GEOLOGIST: Val Akbari PAGE: 7 of 16

DEPTH (m)	%	SAMPLE DESCRIPTION	SHOWS: TOTAL GAS FOR UNITS	GAS COMPONENTS (PPM): C1	C2	C3	C4	FLUORESCENCE: NAT.	CUT
1300-1355	95	**SANDSTONE:** as for 1275-1285m, but with trace golden amber; first amber at 1325m.	0.1	12					
	5	**COAL and Carbonaceous Material:** common pyrite.	(started at 1340m)						
1355-1365	80	**SANDSTONE:** as for 1275-1285m.	0.4	16.5					
	20	**SILTSTONE:** as for 1250-1275m, but grading to silty claystone.							
1365-1375	70	**SANDSTONE:** as for 1275-1285m.	0.7	40					
	30	**CLAYSTONE:** dark grey, argillaceous, silty, often sandy grading into very fine sandstone, moderately firm, massive.							
1375-1385	60	**SANDSTONE:** as for 1275-1285m.	0.2-0.5	36140	Nil	Nil	Nil	Nil	Nil
	40	**CLAYSTONE:** dark grey, brown grey, very silty grading into siltstone, argillaceous, carbonaceous, very soft, dispersive.							
1385-1400	80	**CLAYSTONE:** as for 1375-1385m.	0.7	116	Nil	Nil	Nil	Nil	Nil
	20	**SANDSTONE:** as for 1275-1285m.							
1400-1405	100	**CLAYSTONE:** dark grey, brown grey, very silty grading into siltstone, argillaceous, carbonaceous, very soft, dispersive.	1.1	204	Nil	Nil	Nil	Nil	Nil
1405-1425	100	**CLAYSTONE:** as for 1400-1405m.	1.2	219	Nil	Nil	Nil	Nil	Nil
1425-1435	100	**CLAYSTONE:** as for 1400-1405m.	2.2	426	Nil	Nil	Nil	Nil	Nil
1435-1445	90	**CLAYSTONE:** as for 1400-1405m.	0.1		Nil	Nil	Nil	Nil	Nil
	10	**SANDSTONE:** off white, translucent, very fine, often grading into siltstone, subangular to subrounded, dominantly subangular quartz, well sorted, strong dolomite cement, nil visual porosity, hard; at times medium to coarse, dominantly coarse, unconsolidated.							

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WELL:	LANGLEY-1	DATE:	19/02/94 to 25/02/94
GEOLOGIST:	Val Akbari	PAGE:	8 of 16

DEPTH (m)	%	SAMPLE DESCRIPTION	SHOWS						
			TOTAL GAS FOR UNITS	GAS COMPONENTS (PPM)				FLUORESCENCE	
				C1	C2	C3	C4	NAT.	CUT
1445-1455	50	**SANDSTONE:** off white, brown, very fine, subangular to subrounded, dominantly subangular quartz, well sorted, common dolomite cement, nil visual porosity, hard.	0.3		Nil	Nil	Nil	Nil	Nil
	50	**CLAYSTONE:** dark grey, silty, carbonaceous, common pyrite, soft.							
1455-1460	80	**CLAYSTONE:** as for 1445-1455m.	1.2		Nil	Nil	Nil	Nil	Nil
	20	**SANDSTONE:** as for 1445-1455m.							
1460-1475	90	**CLAYSTONE:** as for 1445-1455m, but soft to moderately firm.	1.2		Nil	Nil	Nil	Nil	Nil
	10	**SANDSTONE:** as for 1445-1455m.							
1475-1515	100	**CLAYSTONE:** medium to dark grey, brown, weakly calcareous, carbonaceous, rare glauconite, subfissile, soft to moderately firm.	5.5	1037	9	Nil	Nil	Nil	Nil
1515-1520	80	**CLAYSTONE:** as for 1475-1515m.	3.0	600	5	Nil	Nil	Nil	Nil
	20	**SANDSTONE:** colourless, translucent, fine to medium, dominantly medium, subangular to subrounded, dominantly subrounded quartz, poor to moderately sorted, rare lithics, unconsolidated, good intergranular porosity.							
1520-1525	90	**CLAYSTONE:** as for 1475-1515m.	1.3	237	4	Nil	Nil	Nil	Nil
	10	**SANDSTONE:** as for 1515-1520m.							
1525-1540	100	**CLAYSTONE:** as for 1475-1515m.	2.5	475	5	Nil	Nil	Nil	Nil
1540-1595	100	**CLAYSTONE:** as for 1475-1515m.	3.7	705	18	Nil	Nil	Nil	Nil
1595-1600	100	**CLAYSTONE:** medium grey, brown, silty, carbonaceous, rare pyrite, rare glauconite, slightly calcareous, subfissile, soft.	3.2	587	22	Nil	Nil	Nil	Nil
1600-1610	100	**CLAYSTONE:** as for 1595-1600m, but with common glauconite increasing with depth.	3.2	595	22	Nil	Nil	Nil	Nil
1610-1615	100	**CLAYSTONE:** as for 1595-1600m, but with abundant glauconite and dark green glauconite nodules.	3.3	604	24	Nil	Nil	Nil	Nil
1615-1630	100	**CLAYSTONE:** as for 1595-1600m, but with trace to rare glauconite.	2.4	439	12	Nil	Nil	Nil	Nil

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WELL:	LANGLEY-1	DATE:	19/02/94 to 25/02/94
GEOLOGIST:	Val Akbari	PAGE:	9 of 16

DEPTH (m)	%	SAMPLE DESCRIPTION	SHOWS: TOTAL GAS FOR UNITS	GAS COMPONENTS (PPM): C1	C2	C3	C4	FLUORESCENCE: NAT.	CUT
1630-1655	100	**CLAYSTONE:** as for 1600-1610m.	1.8	341	8	Nil	Nil	Nil	Nil
1655-1675	100	**CLAYSTONE:** as for 1595-1600m, but with trace glauconite.	1.8	338	19	Nil	Nil	Nil	Nil
1675-1700	100	**CLAYSTONE:** medium grey, brown, silty, carbonaceous, rare pyrite, slightly calcareous, common glauconite increasing with depth, subfissile, soft. (First C_3 at 1690 1 unit).	2.3	384	22	4	Nil	Nil	Nil
1700-1715	100	**CLAYSTONE:** as for 1675-1700m, but with abundant glauconite.	2.3	384	22	4	Nil	Nil	Nil
1715-1720	100 Trace	**CLAYSTONE:** as for 1675-1700m, but with trace to common glauconite. **SAND:** colourless, translucent, medium to coarse, unconsolidated.							
1720-1729	100	**CLAYSTONE:** medium grey, brown, silty, carbonaceous, abundant glauconite, abundant medium to coarse glauconite nodules, rare to common pyrite, trace fossil fragments, subfissile, soft.	1.6	302	12	1	Nil	Nil	Nil
1729-1732	70 30	**CLAYSTONE:** as for 1720-1729m. **SANDSTONE:** colourless, translucent, fine to coarse, dominantly medium, subangular to subrounded, dominantly subangular quartz, poorly sorted, unconsolidated, weak argillaceous matrix.	19 At 1729.5	3233	86	13	21	Nil	Nil
1732-1733	90 10	**CLAYSTONE:** as for 1720-1729m. **SANDSTONE:** as for 1729-1732m.	1.1	207	4	0	0	Nil	Nil
1733-1734	80 20	**CLAYSTONE:** as for 1720-1729m. **SANDSTONE:** as for 1729-1732m.							
1734-1735	70 30	**CLAYSTONE:** as for 1720-1729m. **SANDSTONE:** as for 1729-1732m.	8.5	1495	35	3	Nil	Nil	Nil

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DEPTH (m)	%	SAMPLE DESCRIPTION	SHOWS						
			TOTAL GAS FOR UNITS	GAS COMPONENTS (PPM)				FLUORESCENCE	
				C1	C2	C3	C4	NAT.	CUT
1735-1737	90	**CLAYSTONE:** medium grey, brown, silty, carbonaceous, abundant glauconite, abundant medium to coarse glauconite nodules, rare to common pyrite, trace fossil fragments, subfissile, soft.	13.6	2538	62	6	8	Nil	Nil
	10	**SANDSTONE:** colourless, translucent, fine to coarse, dominantly medium, subangular to subrounded, dominantly subangular quartz, poorly sorted, unconsolidated, weak argillaceous matrix.							
1737-1739	80	**CLAYSTONE:** as for 1735-1737m.	16.6	3019	77	12	25	Nil	Nil
	20	**SANDSTONE:** as for 1735-1737m, but with trace to rare golden brown amber with bright yellow fluorescence.							
1739-1743	70	**CLAYSTONE:** as for 1735-1737m.	16.2	2964	77	10	24	Nil	Nil
	30	**SANDSTONE:** as for 1735-1737m, but with 5% amber.							
1743-1745	70	**CLAYSTONE:** as for 1735-1737m.	15.8	2913	76	10	18	Nil	Nil
	30	**SANDSTONE:** as for 1735-1737m, but with 10-15% amber.							
1745-1764		**CORE NO. 1:** cut 19m recovered: 15.94m recovery: 83.9%	15.7	2684	119	44	20	Nil	Nil
1764-1770	70	**SANDSTONE:** colourless to translucent, very fine to coarse, dominantly coarse, subangular to subrounded, dominantly subangular quartz, poor to moderately sorted, weak argillaceous matrix, dominantly unconsolidated, good visual intergranular porosity, dominantly friable.	3	519	17	11	1	Nil	Nil
	30	**SHALE:** dark grey to black, carbonaceous, micromica, subfissile, moderately hard.							
1770-1775	80	**SANDSTONE:** as for 1764-1770m.	1.6	256	13	4	Nil	Nil	Nil
	20	**SHALE:** as for 1764-1770m.							

DEPTH (m)	%	SAMPLE DESCRIPTION	SHOWS: TOTAL GAS FOR UNITS	GAS COMPONENTS (PPM): C1	C2	C3	C4	FLUORESCENCE: NAT.	CUT
1775-1780	60	**SANDSTONE:** off white to translucent, very fine to very coarse, dominantly medium, subangular to subrounded, dominantly subrounded quartz, poorly sorted, common pyrite, rare brown lithics, common silt matrix, dominantly unconsolidated, good intergranular porosity.	1.0	162	7	1	Nil	Nil	Nil
	40	**SHALE:** dark grey to black, carbonaceous, micromica, fissile, hard.							
1780-1785	60	**SHALE:** as for 1775-1780m.	4	650	36	10	Nil	Nil	Nil
	40	**SANDSTONE:** as for 1775-1780m.							
1785-1790	60	**SANDSTONE:** as for 1775-1780m.	4.6	759	46	12	Nil	Nil	Nil
	40	**SHALE:** as for 1775-1780m.							
1790-1795	80	**SHALE:** light to medium grey, silty, carbonaceous, micromica, dominantly soft, grading into **CLAYSTONE:** hard in part, subfissile, rare to common pyrite.	1.5	250	19	6	Nil	Nil	Nil
	20	**SANDSTONE:** off white to translucent, very fine to very coarse, dominantly medium, subangular to subrounded, dominantly subrounded quartz, poorly sorted, common pyrite, rare brown lithics, common silt matrix, dominantly unconsolidated, good intergranular porosity.							
1795-1800	60	**CLAYSTONE:** as for 1790-1795m.	4.3	704	50	13	1	Nil	Nil
	40	**SANDSTONE:** as for 1790-1795m.							
1800-1805	50	**SANDSTONE:** off white, light brown, fine to medium, dominantly medium, subangular to subrounded, dominantly subangular quartz, well sorted, abundant argillaceous matrix, weakly calcareous, nil visual porosity, moderately firm.	21	3111	262	104	38	Nil	Nil
	50	**CLAYSTONE:** hard in part, rare to common pyrite, subfissile.							
1805-1810	60	**SANDSTONE:** as for 1800-1805m.	5.3	900	47	17	Nil	Nil	Nil
	40	**CLAYSTONE:** as for 1800-1805m.							

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DEPTH (m)	%	SAMPLE DESCRIPTION	SHOWS						
			TOTAL GAS FOR UNITS	GAS COMPONENTS (PPM) C1	C2	C3	C4	FLUORESCENCE NAT.	CUT
1810-1815	70	**SANDSTONE:** as for 1800-1805m.							
	30	**CLAYSTONE:** as for 1800-1805m.	8.3	1464	72	18	Nil	Nil	Nil
1815-1820	70	**CLAYSTONE:** as for 1800-1805m.	6.4	1067	27	8	Nil	Nil	Nil
	30	**SANDSTONE:** as for 1800-1805m.							
1820-1825	60	**CLAYSTONE:** blue green, silty, sandy, abundant green lithics, very soft.	1.7	275	10	4	Nil	Nil	Nil
	30	**SANDSTONE:** off white, light brown, fine to medium, dominantly medium, subangular to subrounded, dominantly subangular quartz, well sorted, abundant argillaceous matrix, weakly calcareous, nil visual porosity, moderately firm.							
	10	**COAL:** dark brown to black, firm.							
1825-1835	100	**CLAYSTONE:** as for 1820-1825m.	3.1	549	15	4	Nil	Nil	Nil
1835-1840	60	**CLAYSTONE:** as for 1820-1825m.							
	40	**SANDSTONE:** colourless to translucent, fine to medium, dominantly medium, subangular to subrounded, dominantly subrounded quartz, moderately sorted, trace to common green and brown lithics, common white argillaceous matrix, poor visual porosity.							
1840-1845	80	**CLAYSTONE:** as for 1820-1825m.	1.8	326	9	Nil	Nil	Nil	Nil
	20	**SANDSTONE:** as for 1835-1840m.							
1845-1850	70	**CLAYSTONE:** as for 1820-1825m.	2.4	445	10	Nil	Nil	Nil	Nil
	30	**SANDSTONE:** as for 1835-1840m.							

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DEPTH (m)	%	SAMPLE DESCRIPTION	SHOWS						
			TOTAL GAS FOR UNITS	GAS COMPONENTS (PPM)				FLUORESCENCE	
				C1	C2	C3	C4	NAT.	CUT
1850-1875	100	**CLAYSTONE:** light grey, blue grey, very silty grading into siltstone, carbonaceous, common lithics, soft. NOTE: 1859-1860 T.G: 14 Units CI: 2379, C2: 101, C3: 21, C4:10 1800-1801 T.G: 21 Units C1: 3111, C2: 262, C3: 104, C4:38	1.5-3	6222	24	5	Nil	Nil	Nil
1875-1880	80	**CLAYSTONE:** light blue grey, very silty grading into siltstone, carbonaceous, common multicoloured lithics, subfissile, soft to moderately firm.	5	961	25	1	Nil	Nil	Nil
	20	**SANDSTONE:** light to medium green grey, translucent, very fine to coarse, dominantly medium, subangular to subrounded, dominantly subrounded quartz, common brown and green lithics, abundant argillaceous matrix, rare calcite, soft, poor porosity.							
1880-1885	90	**CLAYSTONE:** as for 1875-1880m.	5.2	976	24	3	1	Nil	Nil
	10	**SANDSTONE:** as for 1875-1880m.							
1885-1895	60	**SANDSTONE:** as for 1875-1880m.	78	13664	480	89	167	Nil	Nil
	40	**CLAYSTONE:** as for 1875-1880m.							
1895-1897	70	**SANDSTONE:** as for 1875-1880m.	7	1345	32	7	1	Nil	Nil
	30	**CLAYSTONE:** as for 1875-1880m.							
1897-1898	60	**SANDSTONE:** as for 1875-1880m.	13.5	2287	105	31	20	Nil	Nil
	40	**CLAYSTONE:** as for 1875-1880m.							
1898-1899	60	**SANDSTONE:** as for 1875-1880m.	10.2	1677	89	24	17	Nil	Nil
	40	**CLAYSTONE:** as for 1875-1880m.							
1899-1900	80	**SANDSTONE:** as for 1875-1880m.	15	2531	94	20	20	Nil	Nil
	20	**CLAYSTONE:** as for 1875-1880m.							
1900-1901	60	**SANDSTONE:** as for 1875-1880m.	76	13237	513	110	100	Nil	Nil

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DEPTH (m)	%	SAMPLE DESCRIPTION	SHOWS						
			TOTAL GAS FOR UNITS	GAS COMPONENTS (PPM)				FLUORESCENCE	
				C1	C2	C3	C4	NAT.	CUT
	40	**CLAYSTONE:** as for 1875-1880m.							
1901-1902	70	**SANDSTONE:** as for 1875-1880m.	87	14030	432	130	192	Nil	Nil
	30	**CLAYSTONE:** as for 1875-1880m.							
1902-1903	80	**SANDSTONE:** as for 1875-1880m.	15.5	2607	46	35	45	Nil	Nil
	20	**CLAYSTONE:** as for 1875-1880m.							
1903-1904	60	**SANDSTONE:** as for 1875-1880m.	42	7167	275	57	80	Nil	Nil
	40	**CLAYSTONE:** as for 1875-1880m.							
1904-1905	80	**SANDSTONE:** as for 1875-1880m.	54	9607	302	74	92	Nil	Nil
	20	**CLAYSTONE:** as for 1875-1880m.							
1905-1906	80	**CLAYSTONE:** as for 1875-1880m.	38	6458	213	35	47	Nil	Nil
	20	**SANDSTONE:** as for 1875-1880m.							
1906-1907	80	**SANDSTONE:** as for 1875-1880m.	14	2379	101	29	26	Nil	Nil
	20	**CLAYSTONE:** as for 1875-1880m.							
1907-1908	70	**SANDSTONE:** as for 1875-1880m.	9.2	1647	34	19	3	Nil	Nil
	30	**CLAYSTONE:** as for 1875-1880m.							
1908-1909	80	**SANDSTONE:** as for 1875-1880m.	11.5	1982	77	21	5	Nil	Nil
	20	**CLAYSTONE:** as for 1875-1880m.							
1909-1910	90	**SANDSTONE:** as for 1875-1880m.	9.5	1616	72	21	12	Nil	Nil
	10	**CLAYSTONE:** as for 1875-1880m.							

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DEPTH (m)	%	SAMPLE DESCRIPTION	SHOWS: TOTAL GAS FOR UNITS	GAS COMPONENTS (PPM): C1	C2	C3	C4	FLUORESCENCE: NAT.	CUT
1910-1915	80	**SANDSTONE:** light green grey, very fine to very coarse, dominantly coarse, subangular to subrounded, dominantly subrounded quartz, moderately sorted, common brown and green lithics, rare biotite, common pyrite, strong silica cement, very weakly calcareous, nil visual porosity, hard.	11.2	1770	113	52	16	Nil	Nil
	20	**CLAYSTONE:** dark grey, very silty, carbonaceous, subfissile, moderately firm.							
1915-1940	90	**SANDSTONE:** as for 1910-1915m.							
	10	**CLAYSTONE:** as for 1910-1915m.							
		NOTE: INTERVAL / TOTAL GAS 1910-1916 — 9-11 units 1916-1922 — 5-10 units 1922-1935 — 1.5-5 units							
1940-1945	100	**SANDSTONE:** as for 1910-1915m.	5.3	982	24	3	Nil	Nil	Nil
	Trace	**CLAYSTONE:** light to medium brown, carbonaceous, massive, soft.							
1945-1950	80	**SANDSTONE:** as for 1910-1915m.	4.8	854	42	7	1	Nil	Nil
	20	**CLAYSTONE:** as for 1940-1945m.							
1950-1955	70	**SANDSTONE:** as for 1910-1915m.	3.7	640	27	6	Nil	Nil	Nil
	30	**CLAYSTONE:** as for 1940-1945m.							
1955-1960	80	**CLAYSTONE:** as for 1940-1945m.	4.9	863	34	8	Nil	Nil	Nil
	20	**SANDSTONE:** as for 1910-1915m.							
1960-1965	60	**CLAYSTONE:** as for 1940-1945m.	6.0	1067	38	7	Nil	Nil	Nil
	40	**SANDSTONE:** as for 1910-1915m.							
1965-1975	80	**SANDSTONE:** as for 1910-1915m.	14.1	2379	65	12	12	Nil	Nil

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DEPTH (m)	%	SAMPLE DESCRIPTION	SHOWS						
			TOTAL GAS FOR UNITS	GAS COMPONENTS (PPM)				FLUORESCENCE	
				C1	C2	C3	C4	NAT.	CUT
	20	**CLAYSTONE:** as for 1940-1945m.							
1975-1985	60	**SILTSTONE:** light grey brown, very argillaceous, grading into silty **CLAYSTONE:** subfissile, soft.	4	671	34	12	1	Nil	Nil
	40	**SANDSTONE:** light green grey, very fine to coarse, dominantly medium, subangular to subrounded, subrounded quartz, poor to moderately sorted, common multicoloured lithics, abundant argillaceous and silty matrix, trace to rare pyrite, trace to common carbonaceous material, rare biotite, poor visual porosity, dominantly unconsolidated, soft.							
1985-1995	70	**SANDSTONE:** as for 1975-1985m.	6.0	1067	34	8	Nil	Nil	Nil
	30	**SILTSTONE:** as for 1975-1985m.							
1995-2006 TD	80	**SANDSTONE:** as for 1975-1985m.	2.2 At 2006	366	15	14	1	Nil	Nil
	20	**SILTSTONE:** as for 1975-1985m.							

APPENDIX 4B

GEOLOGICAL DESCRIPTIONS

FROM DAILY REPORTS

LANGLEY-1

DAILY REPORT GEOLOGICAL SUMMARY

LANGLEY-1

Geologist: Val Akbari **Permit:** PPL1 **Spud Date:** 12 / 05 / 94

Interval (m)	*ROP (Av.) (m/hr)*	*Lithological and Fluorescence Description*
110-340	40-120 *(Av.55)*	**Marl:** medium grey to medium green grey, dominantly very calcareous, occasionally slightly calcareous, abundant fossils and shell fragments, trace very fine to fine light grey sand grains and aggregates in part, trace pyrite nodules in part, very sticky, very soft, massive, becoming more argillaceous with depth.
340-370	60-100	**Marl:** blue grey to grey, very soft, very fossiliferous.
370-395		**Marl:** as for 340-370m, but interbedded with thin beds of **Limestone:** mainly fossil fragments.
395-450	10-100 *(Av.50)*	**Marl:** dark blue grey, often brown, calcareous, trace glauconite, trace pyrite, interbedded with thin beds of **Limestone:** mainly fossil fragments, common glauconite.
450-510	40-60 *(Av.50)*	**Marl:** dominantly dark brown, some dark blue grey, calcareous, fossiliferous, rare to common glauconite, soft.
510-560	60-130 *(Av.95)*	**Sandstone:** medium to dark brown, very fine to medium, dominantly medium, often calcareous, subrounded to rounded, dominantly subrounded quartz, poor to moderately sorted, common argillaceous matrix, poor porosity.
560-775	15-200 *(Av.90)*	**Sandstone:** off white to translucent, very fine to very coarse, dominantly coarse, subrounded to rounded, dominantly rounded quartz, poor to moderately sorted, unconsolidated, good intergranular porosity, interbedded with thin beds of **Claystone:** dark brown, silty, carbonaceous.
775-805	14-30 *(Av.20)*	**Sandstone:** off white to light brown, very fine to medium, occasionally coarse, dominantly medium, subangular to subrounded, dominantly subrounded quartz, poor to moderately sorted, trace glauconite, trace pyrite, common fossil fragments, abundant argillaceous matrix, poor visual porosity, soft, interbedded with **Claystone:** dark brown, silty, calcareous, carbonaceous, rare to trace glauconite, soft.
805-840	20-40	Interbedded **Sandstone** and **Claystone** as for 775-805m.
840-900	20-40	**Sandstone:** brown, iron oxide staining, fine to medium, dominantly medium, subangular to subrounded, dominantly subrounded quartz, moderately sorted, trace argillaceous matrix, good intergranular porosity.
900-914	20-40	**Siltstone:** medium brown grey, argillaceous, common glauconite, rare pyrite, weakly calcareous, massive, moderately firm.
914-1045	40-120	**Sandstone:** off white to translucent, very fine to granular, dominantly coarse, subangular to subrounded, dominantly subrounded quartz, poorly sorted, common to trace pyrite, rare to trace brown lithics, unconsolidated, very good intergranular porosity.

Interval (m)	*ROP (Av.) (m/hr)*	*Lithological and Fluorescence Description*
1045-1165	20-30	**Sandstone:** as for 914-1045m, but with trace **Coal**, interbedded with thin beds of **Claystone:** medium grey, silty, carbonaceous, soft.
1165-1185		**Sandstone:** off white to translucent, very fine to very coarse, dominantly coarse, subangular to subrounded, dominantly subrounded quartz, poorly sorted, common pyrite, rare lithics, unconsolidated, interbedded with minor **Siltstone:** medium to dark grey, very argillaceous, carbonaceous, firm.
1185-1220		Interbedded **Sandstone** and **Siltstone** with minor **Coal** as for 1045-1165m.
1220-1230		**Sandstone:** colourless, very fine to coarse, dominantly coarse, subangular to subrounded, dominantly subangular quartz, weak calcareous cement, dominantly unconsolidated.
1230-1250		**Sandstone:** as for 1220-1230m, but poor quality sample after wiper trip and drilling with reduced weight on bit (5,000lbs).
1250-1275	2-27 *(Av.9)*	Interbedded **Sandstone** and **Siltstone:** as for 1165-1185m.
1275-1300	2-30 *(Av.15)*	**Sandstone:** off white to translucent, mostly very fine, often grading into siltstone, subangular to subrounded, dominantly subangular quartz, well sorted, abundant dolomite cement, nil visual porosity, with minor sandstone, dominantly medium to coarse, unconsolidated and interbedded with dark grey, argillaceous siltstone.
1300-1355	4-23 *(Av. 10)*	**Sandstone:** as for 1275-1300m, with minor **Coal** and trace golden amber material (first at 1325m).
1355-1375	5-20 *(Av.10)*	**Sandstone:** off white to translucent, very fine, subangular to subrounded, dominantly subangular quartz, well sorted, strong dolomite cement, common pyrite, rare golden brown amber, nil visual porosity, hard, interbedded with **Siltstone:** dark grey, carbonaceous, argillaceous, often grading to silty **Claystone.**
1375-1400	2-10 *(Av.7)*	**Claystone:** dark grey, brown, very silty, grading into argillaceous **Siltstone:** carbonaceous, rare pyrite, soft, sticky, very dispersive, interbedded with thin beds of **Sandstone:** as for 1355-1375m, but fine grained, dolomite cement.
1400-1435	2-10 *(Av.8)*	**Claystone:** as for 1375-1400m.
1435-1460	8-15 *(Av.7)*	**Sandstone:** off white, light brown, very fine, subangular to subrounded, dominantly subangular quartz, well sorted, common dolomite cement, nil visual porosity, hard, interbedded with **Claystone:** dark grey, silty, carbonaceous, common pyrite, soft.
1460-1475	6-9 *(Av.7)*	**Claystone:** dark grey, silty, carbonaceous, rare pyrite, subfissile, soft to moderately firm.
1475-1515	6-8 *(Av.7)*	**Claystone:** medium to dark grey, brown, weakly calcareous, carbonaceous, rare glauconite, subfissile, soft to moderately firm.
1515-1525	6-8 *(Av.7)*	**Claystone:** as for 1475-1515m, interbedded with **Sandstone:** colourless, translucent, fine to medium, dominantly medium, subangular to subrounded, dominantly subrounded quartz, moderately sorted, rare lithics, unconsolidated, good intergranular porosity.

Interval (m)	*ROP (Av.) (m/hr)*	*Lithological and Fluorescence Description*
1525-1595	6-8 *(Av.7)*	**Claystone:** as for 1475-1515m.
1595-1600	7	**Claystone:** medium grey to brown, silty, carbonaceous, slightly calcareous, rare pyrite, rare glauconite, subfissile, soft.
1600-1615	7-8	**Claystone:** as for 1595-1600m, but glauconite increasing with depth.
1615-1630	5-10 *(Av.7)*	**Claystone:** as for 1595-1600m, but with trace to rare glauconite.
1630-1710	5-10 *(Av.7)*	**Claystone:** as for 1595-1600m, but with common glauconite, increasing with depth over the intervals 1630-1655m, 1675-1700m.
1710-1715	5-6	**Claystone:** as for 1595-1600m, but with abundant glauconite, increasing with depth.
1715-1720	2-5	**Claystone:** as for 1595-1600m, but with trace to common glauconite, common pyrite.
1720-1729	2-30	**Claystone:** as for 1595-1600m, but with abundant glauconite, abundant medium to coarse glauconite nodules, rare to common pyrite, trace fossil fragments.
1729-1732	2-5	**Claystone:** as for 1720-1729m, with up to 30% **Sandstone:** colourless to translucent, fine to coarse, dominantly medium, subangular to subrounded, dominantly subangular quartz, poorly sorted, unconsolidated, trace argillaceous matrix.
1732-1745	6-17	Interbedded **Sandstone** and **Claystone:** as for 1729-1732m, but with rare to trace golden brown amber with bright yellow fluorescence, increasing with depth to a maximum 15% at 1742-1744m.
1745-1750	2-12 *(Av.9)*	**Sandstone:** light to medium grey, very fine to fine, dominantly fine, subangular to subrounded, dominantly subangular quartz, moderately sorted, carbonaceous, rare multicoloured lithics, abundant argillaceous matrix, nil visual porosity, interlaminated with carbonaceous material, sandstone becoming coarse to very coarse, dominantly very coarse, subangular to subrounded, dominantly subrounded, weak calcareous cement, good visual porosity from 1745.4m.
1750-1751.5	30-38 *(Av.34)*	**Shale:** dark grey to black, highly carbonaceous, finely laminated, micromica, hard.
1751.5-1758	10-60 *(Av.34)*	**Sandstone:** off white to light brown, very fine to fine, dominantly fine, subangular to subrounded, dominantly subangular quartz, moderately sorted, carbonaceous, abundant argillaceous matrix, nil visual porosity, becoming coarse below 1751.6m, granular below 1757.4m and very fine **Siltstone** below 1757.90m.
1758-1758.6	60	**Shale:** dark grey to black, highly carbonaceous, micromica, fissile, very hard.
1758.6-1760	20-60 *(Av.44)*	**Sandstone:** colourless, very fine to medium, dominantly fine, subangular to subrounded, dominantly subangular quartz, moderately sorted, abundant argillaceous matrix, becoming coarse to very coarse from 1759.1m.
1760-1775	2-11 *(Av.5)*	**Sandstone:** colourless to translucent, very fine to medium, occasionally coarse, dominantly medium, subangular to subrounded, dominantly subrounded quartz, poor to moderately sorted, trace argillaceous matrix, dominantly unconsolidated, good intergranular porosity, interbedded with thin beds of **Shale:** dark grey to black, carbonaceous, micromica, subfissile, moderately hard.

Interval (m)	*ROP (Av.) (m/hr)*	*Lithological and Fluorescence Description*
1775-1790	2.5-10 *(Av.6)*	**Sandstone:** colourless to translucent, very fine to very coarse, dominantly medium, subangular to subrounded, dominantly subrounded quartz, poorly sorted, common pyrite, rare brown lithics, common silt matrix, occasionally unconsolidated, interbedded with **Shale:** as for 1760-1775m.
1790-1795	1.3-4.3 *(Av.3)*	**Claystone:** light to medium grey, silty, carbonaceous, micromica, rare to common pyrite, dominantly soft, often subfissile, firm.
1795-1820	5-20	**Sandstone:** off white to light brown, fine to medium, dominantly medium, subangular to subrounded, dominantly subangular quartz, well sorted, abundant argillaceous matrix, weak calcareous cement, nil visual porosity, moderately firm, interbedded with thin beds of **Claystone:** as for 1790-1795m.
1820-1835	2-10	**Claystone:** light blue green, sandy, silty, abundant green lithics, very soft, sticky.
1835-1850	3-4	**Sandstone:** colourless to translucent, fine to medium, dominantly medium, subangular to subrounded, dominantly subangular quartz, moderately sorted, trace to common green and brown lithics, common white argillaceous matrix, poor porosity, interbedded with **Claystone:** as for 1820-1835m.
1850-1875	3-4	**Claystone:** light grey to blue grey, very silty, grading into **Siltstone:** carbonaceous, common lithics, soft.
1875-1885	2-8 *(Av.6)*	**Claystone:** light blue grey, very silty grading into **Siltstone:** carbonaceous, common multicoloured lithics, subfissile, soft to moderately firm.
1885-1910	6-20 *(Av.10)*	**Sandstone:** light to medium grey green, translucent, very fine to coarse, dominantly medium, subangular to subrounded, dominantly subrounded quartz, poorly sorted, common brown and green lithics, abundant argillaceous matrix, weakly calcareous, poor porosity, soft, interbedded with thin beds of **Claystone:** as for 1875-1885m.
1910-1915	7-11	**Sandstone:** light grey green, very fine to very coarse, dominantly coarse, subangular to subrounded, dominantly subrounded quartz, common green to brown lithics, common pyrite, rare biotite, strong silica cement, very weakly calcareous, nil visual porosity, hard, with minor **Claystone:** dark grey, very silty, carbonaceous, subfissile, moderately firm.
1915-1940	8	**Sandstone:** as for 1910-1915m.
1940-1955	4-11 *(Av.6)*	**Sandstone:** as for 1910-1915m, but with minor **Claystone:** medium brown, carbonaceous, massive, soft.
1955-1975	3-17 *(Av.7)*	**Claystone:** as for 1940-1955m, but interbedded with **Sandstone:** as for 1910-1915m.
1975-1995	3-13 *(Av.7)*	**Siltstone:** light grey brown, very argillaceous, grading into silty **Claystone:** subfissile, soft, interbedded with minor **Sandstone.**

Interval (m)	*ROP (Av.) (m/hr)*	*Lithological and Fluorescence Description*
1995-2006	2-11 *(Av. 7)*	**Sandstone:** light grey green, very fine to coarse, dominantly medium, subangular to subrounded, dominantly subrounded quartz, poor to moderately sorted, common multicoloured lithics, abundant argillaceous and silt matrix, trace to rare pyrite, trace to common carbonaceous material, rare biotite, poor visual porosity, dominantly unconsolidated, interbedded with minor **Siltstone:** as for 1975-1995m.
Total Depth:		**2006m (driller) reached at 2100hrs on 2 June, 1994.**