DEPT. NAT. RES & ENV
PE900938

GFE Resources Ltd

WELL COMPLETION REPORT

HOWMAINS-1

PEP104

OTWAY BASIN, VICTORIA

compiled by

Kevin Lanigan

JUNE, 1995

VOLUME 1

TEXT AND APPENDICES

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(W1100) Howmains-1 WCR vol. 1

GFE RESOURCES LTD

PEP104

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submitted

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SUMMARY

WELL DATA SUMMARY

HOWMAINS-1

Permit: PEP104 Otway Basin, Victoria
Lat./Long.: 38° 31' 41.237"S / 142° 44' 24.966"E
AMG: 651694.5mE 5734136.1mN
Seismic: Line HA90-07 VP 127
Elevation: Ground Level: 44.0m AHD
Kelly Bushing (well datum): 49.7m AHD
Total Depth: Driller 2150.0mKB
Logger 2151.0mKB
Rig: Century Rig 11

Pre-drill Status: Exploration Well
Post-drill Status: Plugged and Abandoned
Participants: GFE Resources Ltd. 40%
Bridge Oil Ltd. 50%*
Beach Petroleum N.L. 10%

** Reduced to 30% when Sun Resources and Lakes Oil earned 10% each on the drilling of the well.*

Spud Date: 1300hrs, 4 July, 1994
TD Reached: 0130hrs, 20 July, 1994
Rig Released: 2200hrs, 22 July, 1994

Engineering

Hole Size

20" to 18mGL
12¼" to 359mKB
8½" to 2150mKB

Casing

16" Conductor to 12mGL (pre-spud)
9⁵/₈" 36lb/ft STC K55 R3 to 355.2mKB

Plugs

1. 1930-1845m (not tested)
2. 1660-1600m (not tested)
3. 1190-1130m (not tested)
4. 395-335m (tagged at 336m)
5. Surface (30 sacks)

Stratigraphy

Group	Formation/Unit	Depth		Thickness	Two-Way Time	High/Low to Prognosis	
		(mKB)	(mSS)	(m)	(milliseconds)	Depth	Time
Heytesbury	Port Campbell Limestone	5.7	+44.0	197.3			
	Gellibrand Marl	203.0	-153.3	382.0			
	Clifton Formation	585.0	-535.3	9.8			
Nirranda	Narrawaturk Marl	594.8	-545.1	43.8		34.9m High	
	Mepunga Formation	638.6	-588.9	76.6		55.1m High	
Wangerrip	Dilwyn Formation	715.2	-665.5	309.3		33.5m High	
	Pember Mudstone	1024.5	-974.8	50.5			
	Pebble Point Formation	1075.0	-1025.3	63.0			
Sherbrook	Paaratte Formation	1138.0	-1088.3	340.8	*979*	30.7m High	*3ms Low*
	Skull Creek Mudstone	1478.8	-1429.1	158.6			
	Nullawarre Greensand (equiv.)	1637.4	-1587.7	23.0			
	Belfast Mudstone	1660.4	-1610.7	177.6	*1311*	58.3m High	*7ms Low*
	Waarre Formation Unit D	1838.0	-1788.3	18.0	*1426*	51.7m High	*8ms Low*
	Unit C	-	-	-			
	Unit B	1856.0	-1806.3	16.5			
	Unit A	1872.5	-1822.8	31.5	*1446*		
Otway	Eumeralla Formation	1904.0	-1854.3	246.0	*1461*	81.7m High	*9ms High*
	TD	2150.0	-2100.3				

Key Hydrocarbon Indications

Nullawarre Greensand (equiv.): Mostly 5-6 units Total Gas, with peak of 43.0 units at 1636.5m
Waarre Formation Unit A: 23.0-34.7 units over 1873.2-1875.5m
35.0 units at 1880.2m; 84.0 units at 1886.5m; 50.0 units at 1892.0m
Eumeralla Formation: Mostly 2.4-11.5 units, with occasional peaks of up to 19.0 units in top 90 metres

Logging

DLL-MSFL-GR-SP-Cal: 2146.5 - 356.0m (GR to surface MSFL to 1000m)
LDL-CNL-GR-Cal: 2150.0 - 1750.0m
BHC-GR-Cal: 2139.0 - 356.0m
WST-A (Checkshots): 2137.0 - 365.0m (20 levels)
CST-GR (Sidewall cores): Shot 30, Recovered 24

Coring

No cores were cut

Formation Tests

DST-1: 1866.5-1875.5m, conventional bottom-hole test, 5min. PF, 60min. ISI, 90min. MF, 180min. FSI, flowed 15-25MCFD dry gas, and recovered 1789m (77bbls) gas-cut water and rat-hole mud.

Log Analysis (Pay Zones)

Interval	Thickness (m)	Net Sand (m)	Net Pay (m)	Av. Eff. ∅ (%)	S_w (%)	V_{cl} (%)
1871.9-1903.9m	32.0	11.1	0.0	18.4	90.6	21.3
1903.9-2030.4m	126.5	9.1	0.0	17.3	93.6	24.0
2030.4-2138.0m	107.6	34.9	0.0	17.6	94.1	25.7

(AJ:F64)

INTRODUCTION

1. INTRODUCTION

The Howmains prospect is located in the southeast of PEP104 (Figure 1), about 25 kilometres southeast of Warrnambool. The PEP104 permit is operated by GFE Resources for a Joint Venture which, prior to the drilling of Howmains-1, comprised GFE Resources (40%), Bridge Oil (50%) and Beach Petroleum (10%). With the drilling of Howmains-1, Bridge Oil lowered its interest in the well (and subsequently the permit) to 30% by farming out 10% to both Sun Resources and Lakes Oil.

After being originally identified from the 1990 Halladale Seismic Survey, the Howmains prospect was further delineated by part of the 1993 Nirranda Seismic Survey (Figure 2), and then approved by the Joint Venture for drilling in 1994, even though there was no requirement for a well in the permit commitment for that year.

The Howmains structure is a rotated horst block similar in style to smaller structures in the onshore Port Campbell area. It is also thought to be similar to (and along trend from) the larger offshore Minerva structure. Being of intermediate size, Howmains is a relatively large onshore feature, which increases its attractiveness as an exploration prospect. However, a long-recognized weakness (and the major risk) of the prospect was doubt about the trap integrity due to its proximity to the nearshore "no data" zone, which precludes any verification of the structural interpretation on the southwestern edge of the prospect.

Based on other wells in the region and interpretation of the seismic data, there appeared to be a reasonable probability that all the other requirements for a commercial hydrocarbon accumulation to be trapped in the Howmains structure could be satisfied, in particular;

- source and maturity are favourable, especially for gas
- sufficient seal thickness (Belfast Mudstone) appears to be present
- suitable migration pathways from source areas have been identified
- reservoir was thought to be more than adequate (lower quality than in the Port Campbell area, but with about 60 metres net sand)

PE907066

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The enclosure PE907066 has the following characteristics:

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PERMIT =	PEP/104
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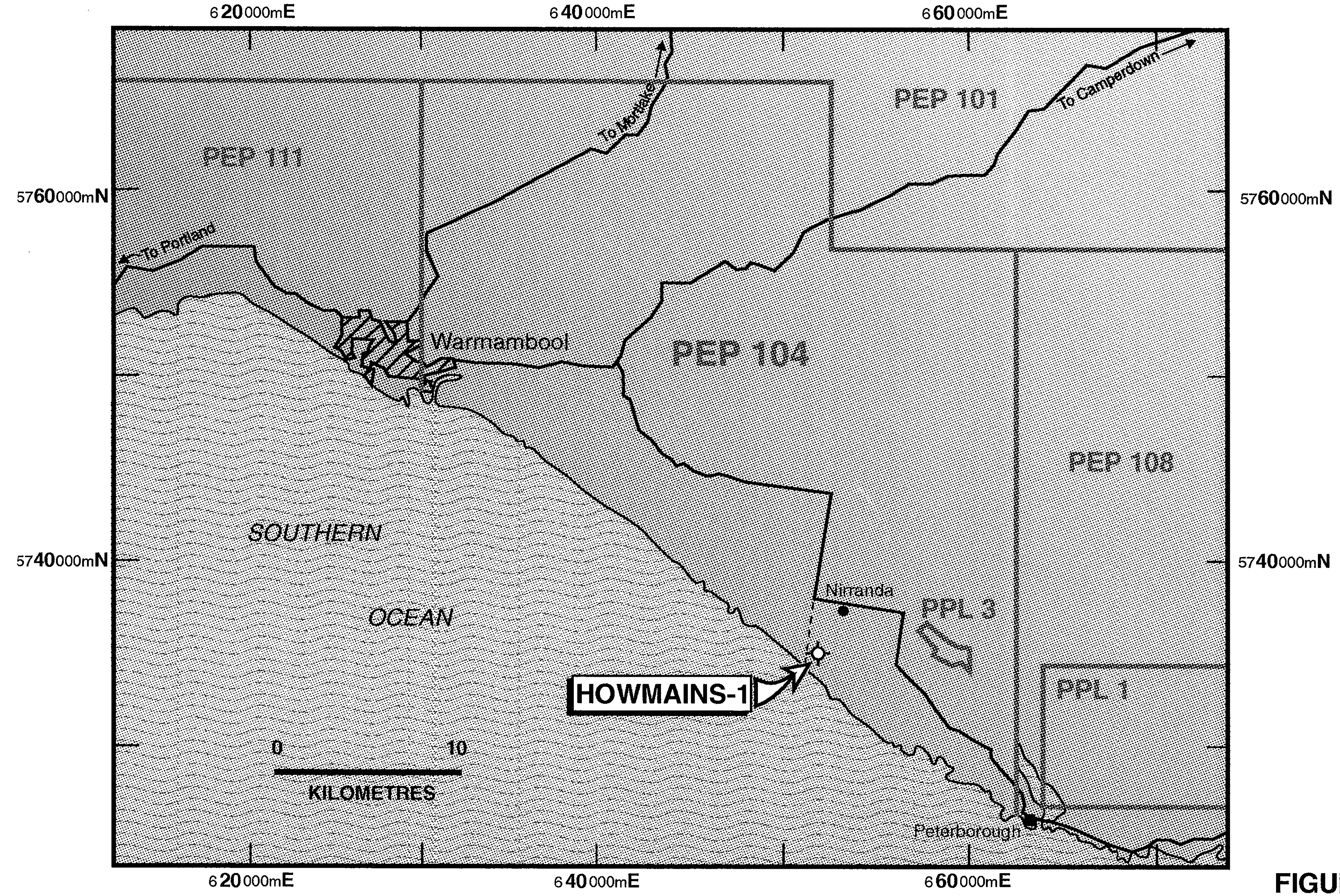
SUBTYPE =	MAP
DESCRIPTION =	Well Location Map, figure 1 (enclosure from WCR vol.1) for Howmains-1
REMARKS =	
DATE_CREATED =	
DATE_RECEIVED =	
W_NO =	W1100
WELL_NAME =	Howmains-1
CONTRACTOR =	
CLIENT_OP_CO =	GFE RSOURCES LTD

(Inserted by DNRE - Vic Govt Mines Dept)

PEP 104
HOWMAINS-1 LOCATION



HOWLOC1

FIGURE 1

PE907067

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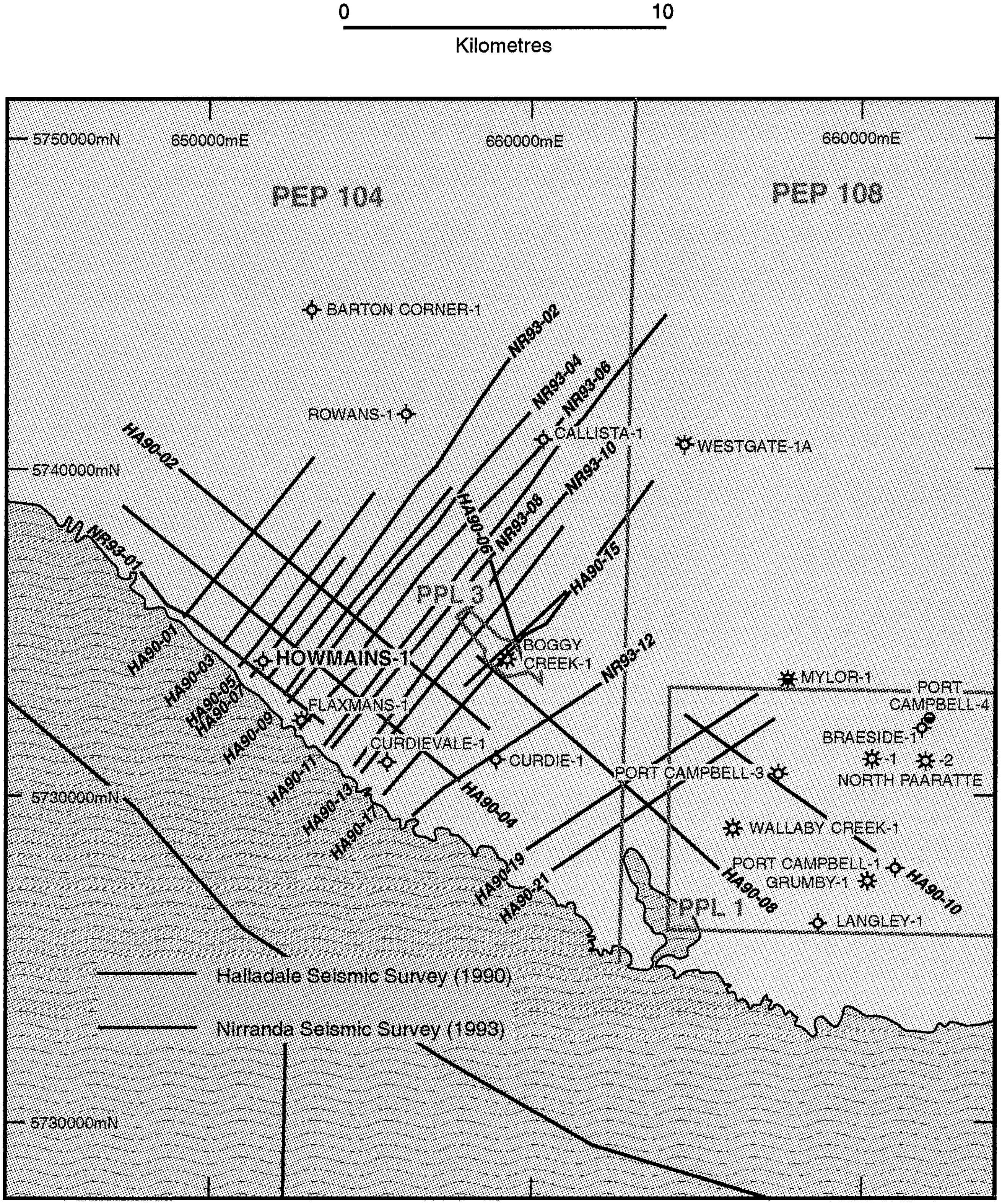
BASIN =	OTWAY
PERMIT =	PEP/104
TYPE =	WELL
SUBTYPE =	MAP
DESCRIPTION =	Halladale and Nirranda Seismic Surveys Location Map Location Map, figure 2 (enclosure from WCR vol.1) for Howmains-1
REMARKS =	
DATE_CREATED =	
DATE_RECEIVED =	
W_NO =	W1100
WELL_NAME =	Howmains-1
CONTRACTOR =	
CLIENT_OP_CO =	GFE RSOURCES LTD

(Inserted by DNRE - Vic Govt Mines Dept)

HALLADALE & NIRRANDA SEISMIC SURVEYS LOCATION MAP



HOWSEIS

FIGURE 2

- age of the structure is around the time of Belfast Mudstone deposition.

Therefore, with these parameters being favourable and considering the relative cost and logistical difficulty of acquiring seismic in the coastal "no data" zone to validate a structural closure, the Howmains prospect was deemed to be relatively high-risk, but worthy of evaluation with an exploration well.

WELL HISTORY

2. WELL HISTORY

2.1 LOCATION (see Figure 3)

Surface Location:	Latitude:	38° 31' 41.237"S
	Longitude:	142° 44' 24.966"E
	AMG:	651694.5mE
		5734136.1mN
Seismic:	Line:	HA90-07
		VP 127
Property Title:	County:	Heytesbury
	Parish:	Nirranda
	Allotment:	47
Property Owner:	G.L. Blake	

2.2. GENERAL DATA

Well Name: Howmains-1

Permit: PEP104 Otway Basin, Victoria

Operator: GFE Resources Ltd
Level 6, 6 Riverside Quay
South Melbourne Victoria 3205

Participants:

GFE Resources Ltd	40%
Bridge Oil Ltd	50%*
Beach Petroleum N.L.	10%

* *Bridge Oil farmed out 20% of their interest in the well (10% each to Lakes Oil and Sun Resources) with the option to extend this to their interest in the permit, which was subsequently taken up by both companies.*

Elevation: Ground Level (GL): 44.0m AHD
Kelly Bushing (KB): 49.7m AHD *(datum)*

(All depths are Drilled Depths relative to KB unless otherwise stated).

PE907068

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The enclosure PE907068 has the following characteristics:

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PERMIT =	PEP/104
TYPE =	WELL
SUBTYPE =	MAP
DESCRIPTION =	Well Location Map, figure 3, 1:25000, (enclosure from WCR vol.1) for Howmains-1
REMARKS =	
DATE_CREATED =	
DATE_RECEIVED =	
W_NO =	W1100
WELL_NAME =	Howmains-1
CONTRACTOR =	
CLIENT_OP_CO =	GFE RSOURCES LTD

(Inserted by DNRE - Vic Govt Mines Dept)

GFE Resources Ltd

HOWMAINS-1 LOCATION MAP

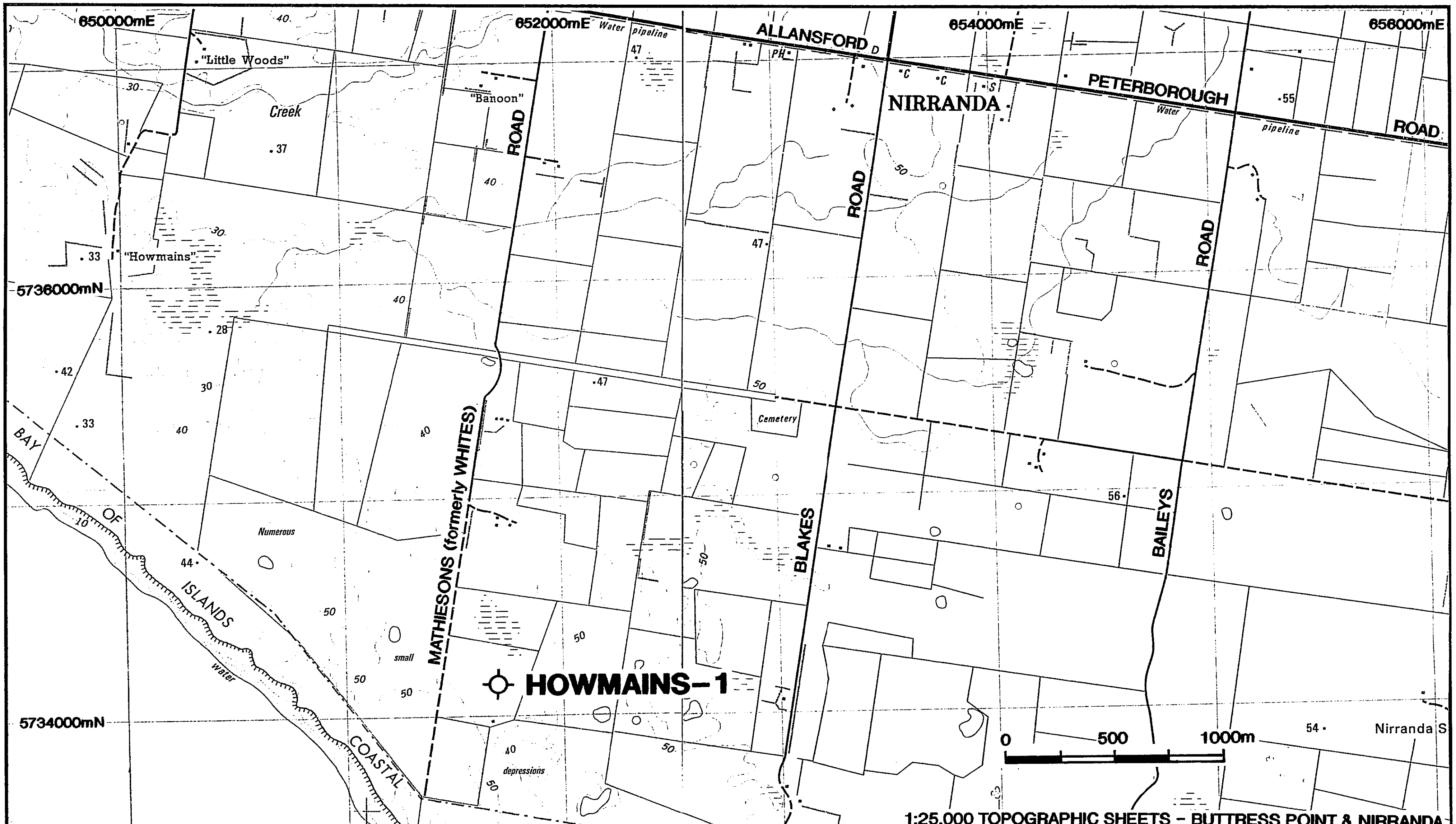


FIGURE 3

Total Depth:	Driller:	2150.0mKB
	Logger:	2151.0mKB
Drilling Commenced:	1300 hours, 4 July, 1994	
Total Depth Reached:	0130 hours, 20 July, 1994	
Rig Released:	2200 hours, 22 July, 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 12 metres (GL) prior to rig up.

Surface Casing

Size:	$9^5/_8$"
Weight & Grade:	36 lb/ft STC K55 R3 (31 Joints)
Centralizers:	352m, 333m, 321m and 310m
Float Collar:	344.8m
Shoe:	355.2m
Hole Depth:	359m
Cement:	640 sacks Class "A" neat cement
Method:	Single plug displacement (top plug only)
Equipment:	Dowell/Schlumberger

Cement plugs

Plug No.1	Interval:	1930-1845m
	Cement:	107 sacks class "A" cement
	Method:	Balanced
	Tested:	No
Plug No.2	Interval:	1660-1600m
	Cement:	80 sacks class "A" cement
	Method:	Balanced
	Tested:	No
Plug No.3	Interval:	1190-1130m
	Cement:	71 sacks class "A" cement
	Method:	Balanced
	Tested:	No
Plug No.4	Interval:	395-335m
	Cement:	110 sacks class "A" cement
	Method:	Balanced
	Tested:	Yes (tagged at 336m)
Surface Plug	30 sacks class "A" cement	

2.3.4 Drilling Fluid

The drilling fluid program used was that designed and recommended by Baroid after consultation with GFE representatives. The well was spudded with pre-hydrated Aquagel flocculated with lime and, after overcoming some lost circulation problems above 104 metres, 1% KCl was added below 149 metres without any further additions of Aquagel. The 1% KCl/Native Clay system was then used down to 577 metres, below which conversion to a 1-2% KCl/Polymer system was initiated, and continued down to about 1500 metres. From 1500 metres to Total Depth the KCl content was increased to 4-5% and EZ-MUD (liquid PHPA) was added. Details of the mud system used and assessment of its performance are contained in the Drilling Fluid Recap (Appendix 2).

2.3.5 Drilling Bits

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

2.3.6 Water Supply

Drilling water was obtained from an existing bore just south of the lease and stored in a pit dug at the wellsite.

2.3.7 Drilling History

The following summary of operations and the drilling progress chart (Figure 4) for Howmains-1 are based on tour sheets and daily drilling reports. A more detailed account can be found in the compilation of the operations summaries from daily drilling reports in Appendix 3.

A 16" conductor pipe was cemented at 12 metres (GL) prior to rig up. Howmains-1 was spudded at 1300 hours on July 4, 1994 with a $12^1/_4$" bit. Significant mud losses began to occur at 32 metres and, with the addition of lost circulation material, the hole was continued with partial returns to 104 metres, but then halted due to increasing wash-out around the cellar. Using three batches of cement the hole was plugged back to seven metres. After drilling out the cement the hole was reamed to 104 metres, then drilled without further difficulty in $12^1/_4$" hole to 359 metres, the $9^5/_8$" casing point.

After running and cementing the $9^5/_8$" casing then nippling up and pressure testing the Blow Out Preventers (BOPs), the cement and five metres of new formation were drilled out with an $8^1/_2$" bit and a Formation Integrity Test was conducted (Equivalent Mud Weight = 15.04 ppg). The $8^1/_2$" hole was then continued, with periodic wiper trips and reaming due to tight hole conditions, down to 1875.5 metres, where a drill stem test was run.

Drill Stem Test One (DST-1) was conducted over the interval 1866.5-1875.5 metres, producing a 1789-metre column (77bbls) of gas-cut water and a gas flow estimated at 15-25 MCFD. Drilling then continued in $8^1/_2$" hole to a Total Depth of 2150 metres. After running wireline logs, four cement plugs were emplaced via open-ended drill pipe, the last of which (across the casing shoe) was tagged at 326 metres. Then the drill pipe was layed out, the BOPs were nippled down, and the surface plug was emplaced. The rig was released at 2200 hours on July 22, 1994.

TABLE 1

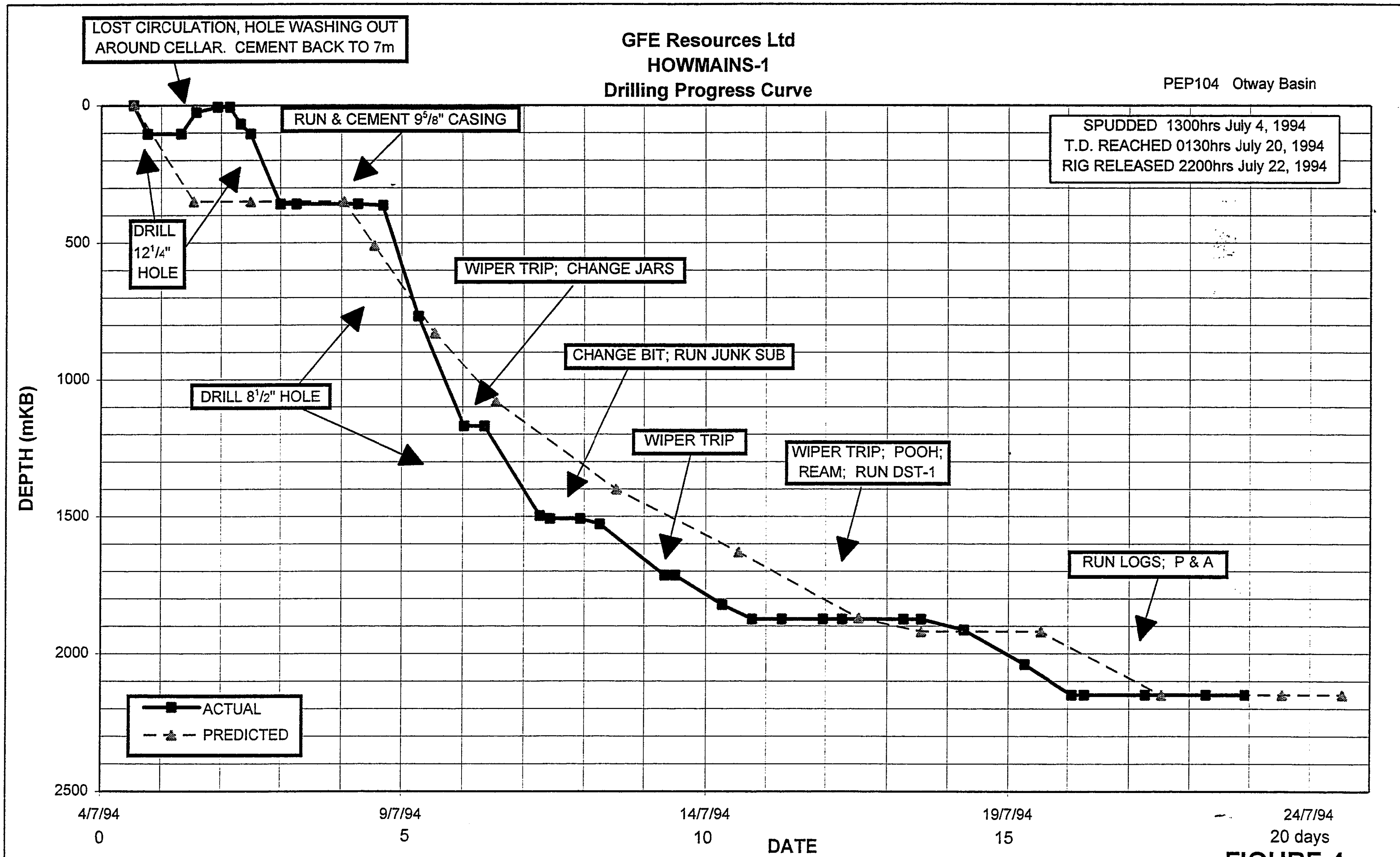
BIT RECORD

Contractor: Century Drilling
State: Victoria
Spud: 4/7/94

GFE Representative: Ken Smith
Permit: PEP104
Reached T.D.: 20/7/94

Rig: # 11
Well: Howmains-1

No.	Size	Make	Type	IADC Code	Serial	Depth Out (m)	Metres Drilled	Hours	Av. Rate (m/hr)	Accum Drlg Hours	Wt. on bit (000 lbs)	RPM	Vert Dev. (°)	Pump Press. (psi)	Jets	GPM	Mud			Dull. Cond.			Remarks
																	WT	VIS	WL	T	B	G	
IRR	12¼"	Varel	L-114	1.1.4	26776	359	359	15	24	15	10-15	100	0.25	500	1x18 2x20	442	8.8	44	N/C	1	1	I	12¼" T.D.
2	8½"	Varel	ETD417	4.1.7	88987	1509	1150	53.5	21.5	68.5	25-28	90-110	2.0	1025	1x12 2x13	310	9.25	41	7.4	8	5	½	
3	8½"	Varel	ETD417	4.1.7	92600	1875	366	56	6.53	109.5	22-28	75-120	1.25	1100	1x12 2x13	290	10.1	50	6.8	1	3	<⅛	shirt-tail damage
	5 inserts damaged by inserts from Bit #2																						
4	8½"	Varel	ETD517	5.1.7	93494	2150	275	58.5	4.7	168	25-30	80-90	0.25	1125	1x12 2x13	290	9.8	41	6.4	2	4	1/16	
	34 inserts damaged by inserts from previous bits - teeth graded on undamaged teeth only.																						


GFE Resources Ltd
HOWMAINS-1
Drilling Progress Curve
PEP104 Otway Basin
SPUDDED 1300hrs July 4, 1994
T.D. REACHED 0130hrs July 20, 1994
RIG RELEASED 2200hrs July 22, 1994
LOST CIRCULATION, HOLE WASHING OUT AROUND CELLAR. CEMENT BACK TO 7m
RUN & CEMENT 9⁵/8" CASING
DRILL 12¹/4" HOLE
WIPER TRIP; CHANGE JARS
CHANGE BIT; RUN JUNK SUB
DRILL 8¹/2" HOLE
WIPER TRIP
WIPER TRIP; POOH; REAM; RUN DST-1
RUN LOGS; P & A
ACTUAL
PREDICTED
DEPTH (mKB)
0
500
1000
1500
2000
2500
4/7/94
0
9/7/94
5
14/7/94
10
19/7/94
15
24/7/94
20 days
DATE
FIGURE 4

2.4 FORMATION SAMPLING AND TESTING

2.4.1 Cuttings

Cuttings samples were collected at five-metre intervals from 60 metres to 2150 metres (T.D.) and subdivided into sets as follows;

1 set of unwashed and air-dried samples in calico bags 60 - 2150 metres
3 sets of washed and dried samples in plastic bags 60 - 2150 metres
2 sets of washed and dried samples in plastic bags 600 - 2150 metres
1 set of washed and dried samples in Samplex trays 60 - 2150 metres

A set of washed and dried samples was subsequently made available to each joint venture partner and to the Victorian Department of Energy and Minerals (Petroleum Division) sample store. The remaining samples were retained by GFE Resources Ltd.

Lithological descriptions of cuttings by the wellsite geologist are provided in Appendix 4A, and a compilation of the lithological descriptions from daily reports issued during the drilling can be found in Appendix 4B.

2.4.2 Cores

2.4.2.1 Conventional Core

No conventional cores were cut in Howmains-1.

2.4.2.2 Sidewall Cores

A total of 30 sidewall cores were attempted (Enclosure 7), of which 24 were recovered.

All recovered sidewall core samples were checked for lithology and hydrocarbon shows, descriptions of which are contained in Appendix 5. A summary of analyses subsequently undertaken on the sidewall cores is given in Section 2.4.4.

2.4.3 Testing

2.4.3.1 Drill Stem Testing

After drilling through a predominantly shaly interval (comprising Belfast Mudstone and Waarre Formation Unit D) with Total Gas readings ranging 3-6 units, a peak of 34.7 units was recorded at 1873.2 metres followed by 23.0 units down to 1875.5 metres. This coincided with a lithology change to fine-to-coarse sandstone and a rate of penetration (ROP) increase from 5-8 metres/hour to 17-25 metres/hour below 1870.5 metres. These observations suggested that the top of the primary objective had been intersected, so the decision to conduct a drill stem test (DST) was made.

DST-1 was a conventional dual-packer, bottom-hole test conducted on 16 July 1994 over the interval 1866.5-1875.5 metres (driller's depth) to evaluate the top of the Waarre Formation sandstone (subsequently found to be a preserved Unit A section, and not the Unit C section which had been anticipated).

The tool was opened at 1055 hours for a five-minute Pre-Flow, during which an initially moderate air blow built to strong (with the test chamber closed to the flare line the surface pressure increased by about four psi), but with no gas to surface. After a 60-minute Initial Shut-In the tool was opened for the Main Flow at 1200 hours and a moderate blow built to strong in about one minute. The test chamber was then opened to the flare line, initially through a $^3/_8$" then $^1/_8$" choke, but with no observable flow. About 17 minutes into the Main Flow the flare line and bubble hose were closed and surface pressure built to around 32 psig in about 20 minutes, at which time the bubble hose and $^1/_8$" choke to the flare line were re-opened.

Surface pressure continued to build slowly over the next half hour to around 60 psig at about 1309 hours (when gas reached surface) then began to decline for the remaining 14 minutes of flow through the $^1/_8$" choke. The calculated flow rate for this gas ranged 25-15 MCFD.

Following a three-hour Final Shut-In (commencing at 1330 hours) the test was ended and the pipe was pulled to the top of the liquid recovery, which was encountered in the fifth stand out of the hole at

1789 metres. After failing to open the impact sub when dropping the bar, the pump-out sub was eventually unplugged by applying up to 2500 psi, and the 77 barrel recovery of gas-cut water was reverse circulated out.

Data and observations recorded during DST-1, including charts from the three mechanical and one electronic gauge, are included in Appendix 6. Of the ten liquid samples taken, four were analysed (Table 2); one from just above the sample chamber and the others from 980* and 269* metres above the tool, as well as a sample of mud from near the bottom of the annulus* pumped behind the recovery during reverse-circulation. The similarity of the first three samples (and their difference from the mud sample) suggests that they largely comprise formation water and thus, the calculated salinity of around 22,000 ppm has provided a useful estimate of R_w for analysis of the wireline log data.

Subsequent calculations (using the pressure increase during the Pre-Flow read from the recovery gauge and the estimated density of the recovered water column) suggest that the initial flow rate of the water influx from this zone was approximately 3,000 barrels per day. A cursory comparison of the volumes of gas and water flowed during DST-1 suggests that the gas could have all been readily accommodated in solution. Analytical data for this gas is contained in Table 3. A notable shortcoming of the DST, as evidenced in the charts from the inside and outside gauges, pertains to build-up analysis. This could not be undertaken on the Initial Shut-In due to an apparent pressure comunication with the annulus, and was limited for the Final Shut-In because the well had "killed itself" (i.e., hydrostatic head reached formation pressure) during the Main Flow.

* *Depths for liquid samples were initially measured by pump strokes, then calculated to depth below top of liquid, which was 809, 1520 and 1794 metres, respectively, for these three samples. These depths were then converted to the equivalent height above the shut-in tool (using the recorded top of liquid as 1789 metres above the shut-in tool).*

2.4.3.2 Wireline Formation Testing

No Repeat Formation Test (RFT) pressure readings were carried out in Howmains-1.

TABLE 2

ANALYSIS OF DST-1 WATER SAMPLES

Sample	Just above sample chamber within DST tool	Reverse circulated; 269 metres above tool	Reverse circulated; 980 metres above tool	Reverse circulated; MUD from annulus
Chemical Composition	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Cations:				
Calcium (Ca)	1020.0	900.0	1100.0	120.0
Magnesium (Mg)	116.0	100.0	114.0	115.0
Sodium (Na)	7260.0	6950.0	6900.0	3800.0
Potassium (K)	620.0	135.0	350.0	15950.0
Anions:				
Hydroxide (OH)				
Carbonate (CO_3)				
Bi-Carbonate (HCO_3)	338.2	729.3	726.2	517.7
Sulphate (SO_4)	104.0	46.0	64.0	850.0
Chloride (Cl)	13538	13575	12890	21840
Nitrate (NO_3)	<0.1	<0.1	<0.1	<0.1
Bromide (Br)	6.0	n/a	5.4	n/a
Reaction - pH	5.5	6.1	6.5	7.1
Conductivity (E.C.) (micro -S/cm at 25°)	34000	34900	34200	64500
Resistivity (ohm.m at 25°C)	0.29	0.29	0.29	0.16
Derived Data:	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Total Dissolved Solids				
A. Based on E.C.	21760	22336	21888	41280
B. Calculated (HCO_3=CO_3)	22827	22071	21781	42934
Total Hardness	3024	2659	3216	773
Carbonate Hardness	307	578	660	411
Non-Carbonated Hardness	2717	2080	2555	362
Total Alkalinity (Each as $CaCO_3$)	307	578	660	411
Totals and Balance:				
Cations (me/L)	392.1	358.9	373.4	588.7
Anions (me/L)	389.1	395.3	376.3	641.4
	Difference= 3.03	Difference = 36.41	Difference = 2.98	Difference = 52.72
	Sum=781.15	Sum=754.2	Sum=749.69	Sum=1230.1
Ion Balance (Diff*100/Sum)	0.39%	4.83%	0.40%	4.29%
Sodium/Total Cation Ratio	80.5%	84.2%	80.4%	28.1%

Note:mg/L = Milligrams per litre
me/L = MilliEqivs. per litre
n/a = not analysed

full Amdel reports in Appendix 6

TABLE 3

DST-1 GAS ANALYSIS

Component	*Mole Percent Concentration*
Methane	92.3
Ethane	3.60
Propane	0.855
Iso-Butane	0.136
Normal-Butane	0.160
Neo-Pentane	0.002
Iso-Pentane	0.042
Normal-Pentane	0.030
Hexanes	0.067
Heptanes+	0.098
Carbon Dioxide	0.01
Oxygen + Argon	0.03
Nitrogen	3.69
Helium	0.024
Total	**101.044**

Calculated Properties for the dry gas at M.S.C.	
Gross Heating Value	**38.8 MJ/m^3**
Wobbe Index	**50.0 MJ/m^3**
Relative Density	**0.603**

full report in Appendix 6

2.4.4 Sample Analyses

Analysis of selected cuttings and sidewall core samples from Howmains-1 comprised organic geochemistry and palynology. Table 4 lists the analyses performed on each sample, details of which can be found in the appropriate Section/Appendix.

Geochemistry	see Section 3.4	and Appendix 8
Palynology	see Section 3.5	and Appendix 9

TABLE 4

SIDEWALL CORES AND CUTTINGS ANALYSES

Sample	Depth (mKB)	SWC Recovery (cm)	Palynology	Geochemistry
SWC#30	1036.0	5.0	✓	
SWC#29	1072.0	5.5	✓	
SWC#28	1483.0	3.5	✓	
SWC#27	1558.0	3.0	✓	
SWC#26	1632.0	4.0	✓	
SWC#25	1663.0	2.5	✓	
SWC#24	1807.0	2.5	✓	
SWC#23	1815.0	3.0	✓	
SWC#22	1828.0	4.5	✓	
SWC#21	1838.0	4.0	✓	
SWC#20	1847.0	3.5	✓	
SWC#19	1854.0	3.5	✓	
SWC#18	1860.0	4.0	✓	
SWC#17	1871.0	no recovery		
SWC#16	1874.0	3.5	✓	✓
SWC#15	1882.0	3.5	✓	
SWC#14	1884.0	2.0	✓	✓
SWC#13	1887.5	3.5	✓	
SWC#12	1890.0	no recovery		
SWC#11	1900.0	no recovery		
SWC#10	1904.0	3.0	✓	
SWC#9	1907.0	3.5	✓	
SWC#8	1912.5	2.0	✓	
SWC#7	1936.0	5.0	✓	
SWC#6	1950.0	no recovery		
SWC#5	1977.0	no recovery		
SWC#4	1997.0	3.0	✓	
SWC#3	2027.5	3.0	✓	
SWC#2	2088.0	no recovery		
SWC#1	2098.0	3.0	✓	
Cuttings	1900 - 1910		✓	
Cuttings	1930- 1940		✓	
Cuttings	1940 - 1950		✓	

2.5 LOGGING AND SURVEYS

2.5.1 Mud Logging

A standard skid-mounted unit equipped for continuous recording of depth, rate of penetration (ROP), mud gas, pump rate and mud volume data, as well as intermittent mud and cuttings gas (blender) analysis was operative from 75 metres until the well was plugged and abandoned. The ROP and gas data is included on the 1:1000 scale Composite Log (Enclosure 1), the Formation Evaluation Log (i.e., "Mud Log") at 1:500 scale is provided in Enclosure 2a, and a Gas Ratio Analysis Log at 1:1000 scale is provided in Enclosure 2b.

2.5.2 Wireline Logging

Wireline logging was performed by Schlumberger Seaco using a standard truck-mounted unit. Only one logging suite was carried out (at total depth) and comprised the following:-

Log	*Interval (mKB)*	*Enclosure Number*
Dual Laterolog - Micro-Spherically Focussed Log - Gamma Ray - Spontaneous Potential - Caliper (DLL-MSFL-GR-SP-Cal)	2146.5 - 356.0 (MSFL T.D. - 1000m) (GR T.D. - Surface)	3
Lithodensity Log - Compensated Neutron Log - Gamma Ray - Caliper (LDL-CNL-GR-Cal)	2150.0 - 1750.0	4
Sonic - Gamma Ray - Caliper (BHC-GR-Cal)	2139.0 - 356.0	5
Checkshot Survey (WST-A)	2137.0 - 365.0	6
Sidewall Core Sampler (CST)	2098.0 - 1036.0	7

2.5.3 Bottom Hole Temperature

Maximum temperatures recorded during wireline logging were as follows:

Log	(mKB) Depth	Temperature (°C)	Time since end of circulation (hours)
DLL-MSFL-BHC-GR	2146.5	75.6	7.62
WST	2137.0	81.7	16.00
LDL-CNL-GR	2150.0	83.0	20.68

Plotting these on a modified Horner plot and extrapolating a straight line of best-fit back to the Temperature axis yields an estimated stabilized bottom hole temperature of 87.7°C (Figure 5). Assuming a mean surface temperature of 18°C, the stabilized bottom hole temperature of 87.7°C at 2150 metres yields a temperature gradient of 3.2°C per 100 metres.

2.5.4 Deviation Surveys

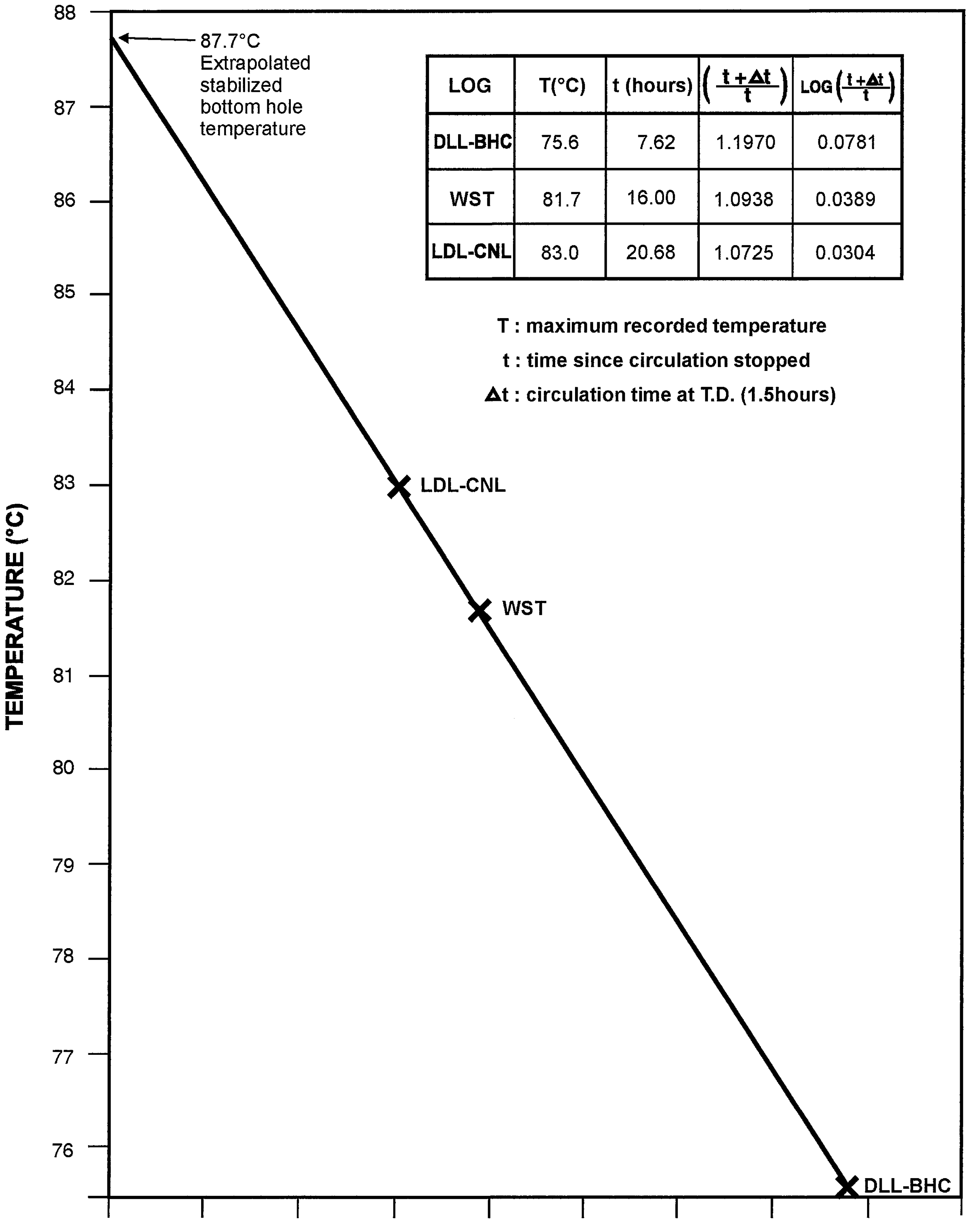
Totco deviation surveys were carried out periodically throughout the drilling of Howmains-1, with results as shown in Table 5. Using this data a maximum radius of deviation was calculated by summing the products of the component of horizontal shift [*interval length* × sin(*deviation angle*)] for each interval. This indicates that the Waarre Formation primary objective was intersected within a 35-metre radius of the surface location and the bottom hole location was within a 36.2-metre radius, which equates to an overall deviation of no more than one degree.

2.5.5 Velocity Survey

A Velocity Survey (WST-Checkshot) was carried out by Schlumberger Seaco, and the raw data (Enclosure 6) was corrected to obtain time versus depth values below the seismic reference datum (Mean Sea Level). The procedure used in this correction and the resulting values are presented in Appendix 10. The resulting time-depth and velocity-depth curves and the synthetic seismogram are shown in Enclosure 8.

HOWMAINS-1
HORNER-TYPE PLOT FOR ESTIMATING TRUE BOTTOM HOLE TEMPERATURE

GFE Resources Ltd



LOG	T(°C)	t (hours)	$\left(\frac{t+\Delta t}{t}\right)$	$LOG\left(\frac{t+\Delta t}{t}\right)$
DLL-BHC	75.6	7.62	1.1970	0.0781
WST	81.7	16.00	1.0938	0.0389
LDL-CNL	83.0	20.68	1.0725	0.0304

T : maximum recorded temperature

t : time since circulation stopped

Δt : circulation time at T.D. (1.5hours)

$LOG\left(\frac{t+\Delta t}{t}\right)$

HOWTEMP

FIGURE 5

TABLE 5

Totco Deviation Surveys

Depth (mKB)	*Deviation (degree)*	*Horizontal Shift (metres)*
30	¾	0.39
91	¾	0.80
144	½	0.46
199	½	0.48
245	¼	0.20
293	¾	0.63
350	¼	0.25
468	½	1.03
669	¾	2.63
870	0	0.00
1052	¾	2.38
1147	¾	1.24
1347	mis run	-
1357	1	3.67
1501	2	5.03
1597	2¾	4.61
1635	2½	1.66
1667	2¾	1.54
1696	2¾	1.39
1721	3½	1.53
1751	3	1.57
1779	3	1.47
1817	1¾	1.16
1846	1¼	0.63
1884	½	0.33
2143	¼	1.13
Maximum Radius of Deviation		**36.20**

GEOLOGY

3. GEOLOGY

3.1 STRATIGRAPHY

The section penetrated in Howmains-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. Unless stated otherwise, depths mentioned in this report will be referenced on the well datum, the kelly bushing (KB).

Comparison with a selection of nearby wells was undertaken, particularly Flaxmans-1, Curdie-1, Curdievale-1 and Boggy Creek-1 for which a correlation diagram is shown in Enclosure 9. It should be noted that re-interpretation of some formation tops in those previous wells has been made.

Above 104 metres the hole was drilled with partial to complete lost circulation, with no sample description above 65 metres. Also, apart from those on the mud log, no sample descriptions were undertaken on samples down to the $9^5/_8$" casing point (359 metres).

Based on the mud log descriptions the contact between the Port Campbell Limestone and the Gellibrand Marl appears to be between 148 metres (where samples of marl are first noted) and about 220 metres (where the last significant proportions of calcarenite are noted). Whether this represents a transition zone between the two lithologies or is due to caving of the calcarenite is unclear, and creates uncertainty about the most appropriate position for placing the formation boundary. The only wireline log through this interval, the gamma ray, does not show much change in character, except for a slight (but sharp) increase at 203 metres. This shift has been chosen as the formation boundary in preference to the other plausible choice, the top of observed marl cuttings at 148 metres, which has no discernible gamma ray log character.

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 25 metres thick in Howmains-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

TABLE 6

HOWMAINS-1 FORMATION TOPS AND THICKNESSES

Stratigraphic Unit	Depth		Thickness
	(mKB)	(mSS)	(m)
Heytesbury Group	5.7	+44.0	589.1
Port Campbell Limestone	5.7	+44.0	197.3
Gellibrand Marl	203.0	-153.3	382.0
Clifton Formation	585.0	-535.3	9.8
Nirranda Group	594.8	-545.1	120.4
Narrawaturk Marl	594.8	-545.1	43.8
Mepunga Formation	638.6	-588.9	76.6
Wangerrip Group	715.2	-665.5	447.8
Dilwyn Formation	715.2	-665.5	309.3
Pember Mudstone	1024.5	-974.8	50.5
Pebble Point Formation	1075.0	-1025.3	63.0
Sherbrook Group	1138.0	-1088.3	766.0
Paaratte Formation	1138.0	-1088.3	340.8
Skull Creek Mudstone	1478.8	-1429.1	158.6
Nullawarre Greensand (equiv.)	1637.4	-1587.7	23.0
Belfast Mudstone	1660.4	-1610.7	177.6
Waarre Formation	1838.0	-1788.3	66.0
Unit D †	1838.0	-1788.3	18.0
Unit C	-	-	-
Unit B	1856.0	-1806.3	16.5
Unit A	1872.5	-1822.8	31.5
Otway Group	1904.0	-1854.3	246.0
Eumeralla Formation	1904.0	-1854.3	246.0
Total Depth (Driller)	2150.0	-2100.3	
Total Depth (Logger)	2150.0	-2100.3	

† *Also known as the Flaxman Formation*

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 at least partly Maastrichtian in age. Therefore, in Howmains-1 the shaly interval is included in the top of the Paaratte Formation, rather than the basal Pebble Point Formation. (Based on samples from Langley-1, this shaly unit is referred to as the "Cretaceous/Tertiary boundary shale" and, given its ubiquity in wells across much of the Otway Basin, it may eventually be recognised as a separate stratigraphic entity).

The log character of the Nullawarre Greensand equivalent in Howmains-1 does 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 at the base of the Skull Creek Mudstone and the top of the Belfast Mudstone.

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 (Howmains-1 is a good example of this). Also, its utility in conjunction with biostratigraphic data remains unclear.

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).

That notwithstanding, the subdivision was successfully applied to reasonably complete Waarre Formation sections in two recent wells (Iona-2 in PPL2 and Langley-1 in PPL1). The relatively detailed palynological sampling in those wells has relevance to Howmains-1 in that it has allowed a more meaningful subdivision of the relict Waarre Formation section than would have otherwise been possible. In particular, it has demonstrated that the Waarre Formation in Howmains-1 has an internal hiatus, where the prime potential reservoir Unit C and part of Unit B are absent. The palynology places the resulting unconformity within the otherwise indivisible shaly upper half of the preserved Waarre Formation section.

Tops for Units D and B have been selected based principally on the palynological comparison with Langley-1. Consideration has also been given to wireline log character, however, the similar lithologies of these two units and the uncertain/varying extent to which the logs (especially density) are affected by the badly washed out hole in this interval make it impossible to have complete confidence that the depths chosen are correct. Although the palynology suggests that the top of Unit D is probably between 1838.0 and 1847.0 metres, the supposedly definitive resistivity kick used to identify the Unit D-Belfast Mudstone contact is not readily apparent in Howmains-1, but may instead be embodied by one of the laterolog lows at 1828, 1832, 1833 or 1838 metres - the latter of which has been chosen. Similarly, palynology suggests that the Unit B top should be located between 1854 and 1860 metres and (from a few possible alternatives) 1856.0 has been chosen.

The palynology report placed the top of Unit A at the top of the lower sand unit (1888.5 metres), but subsequent discussion with the palynologist revealed that he had arbitrarily chosen the deeper end of an interval within which the A-B contact could be placed (based on comparison with the Langley-1 palynology), and that 1872.5 metres would be equally as appropriate. Thus, the top of the Waarre Formation Unit A was chosen at the top of the first sand (1872.5 metres) where, as well as honouring the palynological data, most of the wireline logs showed a significant shift.

Placement of the Waarre-Eumeralla formation boundary also relies on palynology, but differs slightly from the position suggested in the palynology report. The difference arises from alternate interpretations of the material observed in SWC#10 (1904.0 metres), which contains both typical Waarre and Eumeralla Formation lithologies, each with distinct palynological assemblages. The palynology report prefers to place the formation boundary at the prominent gamma ray/resistivity/density log shift at 1902 metres, and to explain the Waarre Formation material in SWC#10 as being from a clastic dike into the Eumeralla Formation. While accepting that this scenario is quite possible, the Waarre-Eumeralla formation boundary has instead been placed at 1904.0 metres (where there is a smaller gamma ray shift) to strictly honour the palynology data.

3.2 LITHOLOGY

The following is a summary of the lithological units observed in Howmains-1 compiled from the descriptions by the wellsite geologist (Appendix 4), as well as the Mud Log (Enclosure 2a), and sidewall core descriptions (Appendix 5).

3.2.1 Heytesbury Group (Surface - 594.8 metres)

3.2.1.1 Port Campbell Limestone (Surface - 203.0 metres)

Calcarenite; light grey, fine-grained, with common fossil fragments including bryozoa, foraminifera, echinoid spines, sponge spicules, gastropods and bivalves, rare coarse quartz grains (possibly cavings) minor argillaceous matrix, weak calcareous cement, friable, fair visual intergranular porosity. Below 148 metres increasingly interbedded with

Marl; medium grey, with locally abundant calcarenite grains and trace to occasionally common very fine to pebbly subangular to subrounded quartz grains, common to abundant fossil fragments (as above), very soft, sticky, very dispersive, non-fissile.

3.2.1.2 Gellibrand Marl (203.0 - 585.0 metres)

Marl; mostly light to medium grey (occasionally greenish to brownish, especially towards base), soft to firm, becoming occasionally moderately hard towards base, commonly sticky, rarely dispersive, occasionally moderately silty, with common to abundant fossil fragments (including bryozoa, gastropods, foraminifera, echinoid spines and sponge spicules) and rare micromica, very rare glauconite and coaly fragments near base, rarely to occasionally interlaminated with

Argillaceous Siltstone; medium to brownish and rarely dark grey, firm to occasionally moderately hard, dominantly blocky, moderately to strongly calcareous, in part grading to **Silty Claystone**, common fossil fragments, rare micromica.

3.2.1.3 Clifton Formation (585.0 - 594.8 metres)

Calcarenite; medium orange, yellow to light orange brown in part, friable to rarely moderately hard, dominantly medium, rarely coarse grained in part, dominantly iron-stained, trace fine to medium grained iron oxide/hydroxide pellets, trace to common iron-stained fossil fragments, trace calcite vein, very rare iron-stained medium quartz sand grains, fair to good visual porosity.

3.2.2 Nirranda Group (594.8 - 715.2 metres)

3.2.2.1 Narrawaturk Marl (594.8 - 638.6 metres)

Marl; medium brownish grey, rarely medium greenish grey, soft to dominantly firm, commonly blocky, dominantly sticky, dispersive in places, commonly argillaceous (becoming abundant with depth), slightly silty in places (becoming common with depth), common dark green fine to medium grained glauconite, common fossil fragments, trace orange and brown lithic fragments and pyrite nodules, trace fine quartz sand grains.

3.2.2.2 Mepunga Formation (638.6 - 715.2 metres)

Ferruginous Sandstone; medium brown, becoming light brown to clear with depth, medium to very coarse grained, occasionally pebbly, dominantly coarse, dominantly subrounded to rounded, poorly to moderately sorted iron-stained quartz, nil to trace at top, becoming dominantly common with depth, medium brown and occasionally white kaolinitic, dispersive argillaceous matrix, trace iron oxide/hydroxide pellets, trace pyrite nodules, trace iron-stained fossil fragments, rare mica, friable with abundant loose grains, porosity inferred to be very good at top, becoming fair with depth. Basal 15 metres comprises

Claystone; dark brown, becoming dominantly medium brown with depth, soft, moderately dispersive, commonly silty, trace to common dispersive, very fine to coarse quartz sand grains, slightly calcareous in places, trace to common glauconite, trace fossil fragments, and pyrite.

3.2.3 Wangerrip Group (715.2 - 1138.0 metres)

3.2.3.1 Dilwyn Formation (715.2 - 1024.5 metres)

Sandstone; light to medium brown, dominantly iron-stained at top; fine to very coarse, dominantly medium to coarse; occasionally pebbly towards top, poorly to mostly moderately sorted; with dominantly subrounded quartz; trace to occasionally common brown to medium grey dispersive argillaceous matrix, trace to common iron oxide/hydroxide pellets and glauconite and fossil fragments towards top, trace weak cement (pyritic in lower half and locally calcareous above), trace yellow, brown and grey lithic fragments, friable with abundant loose grains, good inferred porosity in lower half, becoming mostly poor to fair towards top. Interbedded with

Claystone; dark green and dominantly glauconitic at top, becoming greenish grey then light to medium brown and grey with depth, slightly to commonly silty with trace to common fine to coarse quartz grains, trace white vein calcite and slight calcareous cement in places; trace carbonaceous detritus becoming locally common with depth, trace pyrite with depth, soft to firm, moderately dispersive in places, mostly non- to sub-fissile.

3.2.3.2 Pember Mudstone (1024.5 - 1075.0 metres)

Claystone; medium brown and brownish grey; medium to dark grey in part, moderately to occasionally abundantly silty; trace to common dispersive fine to medium quartz sand grains, trace to common glauconite pellets; trace carbonaceous detritus, trace micromica, trace fossil fragments and pyrite nodules; soft to firm; sticky in part, occasionally dispersive. Minor interbedded

Sandstone; light to medium brown, dominantly iron-stained, mostly medium to coarse, subangular to subrounded, argillaceous matrix, trace to rare pyritic and siliceous cement, trace mica, trace glauconite and grey-brown lithic fragments, friable with common loose grains to moderately hard in places, fair inferred visual porosity.

3.2.3.3 Pebble Point Formation (1075.0 - 1138.0 metres)

Sandstone; light to medium brown; dominantly iron-stained, rarely clear, medium to very coarse, dominantly medium to coarse; subangular to dominantly subrounded, moderately sorted iron-stained quartz; trace to common dispersive medium brown argillaceous/chamositic(?) matrix, trace to rare moderately strong iron oxide/hydroxide, pyrite and siliceous cement, trace mica, trace glauconite and grey and brown lithic fragments; trace iron oxide/hydroxide pellets, friable with common loose grains to moderately hard in part; fair inferred visual porosity. With minor ***Claystone;*** medium to dark brown and brownish grey, silty; soft, trace fine carbonaceous detritus, trace fine dispersive quartz grains.

3.2.4 Sherbrook Group (1138.0 - 1904.0 metres)

3.2.4.1 Paaratte Formation (1138.0 - 1478.8 metres)

(1138.0 - 1163.0 metres)

Claystone; medium to occasionally dark brown, medium grey and medium greenish grey in part, commonly silty and micromicaceous, trace fine carbonaceous detritus, trace fine dispersive quartz grains, soft, rarely firm, sticky in part, rarely dispersive. With minor ***Sandstone;*** as above.

(1163.0 - 1478.8 metres)

Sandstone; light brown to light brownish grey at top changing to clear and light grey towards base, fine to pebble size (dominantly very coarse) at top, very fine to very coarse (dominantly medium) throughout, occasionally pebbly, dominantly subangular to subrounded, poorly sorted quartz; trace to common light to medium brownish grey argillaceous matrix becoming light grey with depth, trace weak siliceous cement becoming slightly stronger and more common with depth in lower half, trace pyrite and dolomite cements in places, trace grey and brown lithic fragments, rare mica; trace carbonaceous detritus and very sparse trace pyrite, friable with common loose grains to occasionally moderately hard in finer sands, fair to good and locally poor visual/inferred porosity. Frequently interbedded with

Claystone: medium to dark grey and medium brownish grey, commonly to abundantly silty and often grading to **Argillaceous Siltstone**, trace to common dispersive fine quartz grains; trace to common micromica; trace pyrite, trace fossil fragments, glauconite and very fine carbonaceous flecks in lower half, slightly calcareous in places, soft to firm, blocky to subfissile.

3.2.4.2 Skull Creek Mudstone (1478.8 - 1637.4 metres)

Silty Claystone: medium to dark grey, brownish grey in places; commonly silty, grading locally to **Argillaceous Siltstone**; trace dispersive very fine quartz sand grains, trace glauconite, carbonaceous and coaly detritus, rare amber, partially pyritized, trace pyrite nodules, common medium brown dolomite, trace micromica; firm to occasionally moderately hard; slightly dispersive in places, commonly to rarely blocky. Interbedded with minor, thin
Sandstone: off-white to light and occasionally medium grey, very fine to dominantly fine; moderately to well sorted; subangular to subrounded, trace to occasionally common light brown to white (kaolinitic) argillaceous matrix, trace to common weak to strong siliceous cement and sparse moderately strong dolomitic cement, trace very fine mica in places, trace fine carbonaceous detritus, trace fine glauconite, friable to moderately hard, mostly poor visual porosity.

3.2.4.3 Nullawarre Greensand (equivalent) (1637.4 - 1660.4 metres)

Silty Claystone: dominantly medium to dark brown, locally medium to dark grey, moderately to commonly silty, locally grading to **Argillaceous Siltstone**, slightly to occasionally commonly finely arenaceous, commonly carbonaceous, trace partially pyritized coaly detritus, slightly calcareous in places, trace partially altered feldspar, trace glauconite, rare amber, trace pyrite nodules, trace hard brown dolomite bands with glauconite and fine quartz grains, firm to occasionally moderately hard, dominantly blocky, dispersive in places, occasionally subfissile in places. Interbedded (mostly in top few metres) with
Sandstone: light grey to clear, fine to rarely medium in places, well sorted; subangular to subrounded, trace dispersive light grey

argillaceous matrix, rare weak siliceous cement, trace glauconite, carbonaceous detritus and partially altered feldspar; friable with abundant loose grains, fair to occasionally good inferred porosity.

3.2.4.4 Belfast Mudstone (1660.4 - 1838.0m)

Silty Claystone; medium to dark brown, becoming medium brownish grey and medium to dark grey with depth; commonly to abundantly silty; in places grading to **Argillaceous Siltstone** and occasionally very finely arenaceous, common to occasionally abundant carbonaceous and coaly detritus, common glauconite, trace to locally common medium brown cryptocrystalline and hard dolomite, trace micromica, pyrite and amber, rare to trace *Inoceramus* near base, firm, dispersive in places, blocky to subfissile in places.

3.2.4.5 Waarre Formation (1838.0 - 1904.0 metres)

3.2.4.5.1 Unit D (1838.0 - 1856.0 metres)

Silty Claystone; medium to dominantly dark brown, occasionally medium to dark grey; abundantly silty and glauconitic; trace to common very fine to very coarse partially yellow-stained quartz, trace pyrite, trace medium brown dolomite bands with fine glauconite pellets, trace micromica and carbonaceous flecks; firm, blocky to dominantly subfissile. Interbedded with minor, thin

Argillaceous Siltstone; light to medium grey, occasionally dark grey, abundantly argillaceous, trace to occasionally abundant, very fine to fine quartz grains, common glauconite pellets, trace carbonaceous flecks, micromica and pyrite, and very minor

Argillaceous Glauconitic Sandstone; medium to occasionally dark green, very fine to coarse, subrounded to dominantly rounded, poorly sorted glauconite and quartz, abundant brownish green argillaceous matrix, friable with abundant loose grains, very poor to nil inferred/visual porosity, and trace

Argillaceous Sandstone; light grey to occasionally clear, very fine to fine, medium to very coarse in part, subangular to subrounded, poorly to moderately well sorted quartz, abundant light grey to light brownish grey argillaceous and silty matrix, very poor to nil visual/inferred porosity.

3.2.4.5.2 Unit B (1856.0 - 1872.5 metres)

Silty Claystone; medium to dominantly dark brown, occasionally medium to dark grey; abundantly silty and glauconitic; trace to common very fine to very coarse partially yellow-stained quartz, trace pyrite, trace medium brown dolomite bands with fine glauconite pellets, trace micromica and carbonaceous flecks; firm, blocky to dominantly subfissile. Interbedded with minor, thin
Argillaceous Siltstone; light to medium grey, occasionally dark grey, abundantly argillaceous, trace to occasionally abundant, very fine to fine quartz grains, common glauconite pellets, trace carbonaceous flecks, micromica and pyrite, and trace
Argillaceous Glauconitic Sandstone; medium to occasionally dark green, very fine to coarse, subrounded to dominantly rounded, poorly sorted glauconite and quartz, abundant brownish green argillaceous matrix, friable with abundant loose grains, very poor to nil inferred/visual porosity.

3.2.4.5.3 Unit A (1872.5 - 1904.0 metres)

Sandstone; light grey to clear, fine to coarse; dominantly medium; moderately sorted; subangular to dominantly subrounded quartz; trace to common light grey dispersive argillaceous matrix, trace to common (and locally abundant) calcareous and rarely siliceous and pyritic cement, trace partially altered feldspar and grey to brown lithics; trace carbonaceous detritus throughout with common black **Coal** and translucent brown amber in top five metres; trace mica; pyrite and dull orange brown mineral fluorescence, friable with abundant loose grains at top becoming moderately hard to hard with depth, mostly very poor to fair visual/inferred porosity, locally improving to fair to good at top. Interbedded/interlaminated (dominantly in middle) with

Silty Claystone; medium to dark grey, medium to dark brown in places, abundantly silty in places, grading to **Argillaceous Siltstone**, common glauconite, non-calcareous, trace to common micromica and carbonaceous flecks, trace pyrite and amber, rare to trace hard brown dolomite bands, firm to hard, dominantly moderately hard, dominantly subfissile to fissile.

3.2.5 Otway Group (1904.0 - 2150.0 metres)

3.2.5.1 Eumeralla Formation (1904.0 - 2150.0 metres)

Lithic Sandstone; mottled light grey to very light greenish grey; locally off-white and occasionally medium to rarely dark brown, very fine to medium, dominantly medium to fine, rarely coarse, moderately to moderately well sorted, subangular to dominantly subrounded, green, red, brown and grey volcanic lithics, quartz and partially altered feldspar, abundant off-white to light and medium greenish grey, kaolinitic and/or chloritic argillaceous matrix, trace to occasionally common moderately weak siliceous and calcareous cement, trace carbonaceous detritus and pyrite, rare biotite, friable to moderately hard, very poor to nil visual porosity. Occasionally to commonly interbedded with

Claystone; light greenish grey varying locally to bluish grey-green and medium to dark brown; slightly to occasionally commonly silty; slightly calcareous in places, slightly to occasionally moderately carbonaceous; common to occasionally abundant fine partially altered feldspar, trace multicolour lithic fragments, nil to trace micromica, rare pyrite towards base, soft to hard, dominantly firm, dispersive in part, blocky to subfissile in part.

3.3 HYDROCARBON INDICATIONS

3.3.1 Mud Gas Readings

The mud gas detection equipment was operational from a hole depth of 75 metres until the cement plug at the 9⁵/₈" casing shoe was set. The levels of gas detected during drilling are plotted on the Mud Log (Enclosure 2a), tabulated in Appendix 7 and summarised in the following:

- Down to 1437 metres no gas was detected.

- Over the interval 1437 - 1475 metres (near the base of the Paaratte Formation) mud gas readings were only;

Total Gas	:	0.1 - 0.2 units
C_1	:	1 - 45 ppm

- From 1480 metres down to 1636 metres (within the Skull Creek Mudstone) gas levels generally increased slowly with depth, mostly ranging;

Total Gas	:	0.2 - 5.2 units
C_1	:	30 - 800 ppm
C_2	:	1 - 100 ppm
C_3	:	1 - 50 ppm
C_4	:	BDL* - 3 ppm

**BDL denotes Below Detection Limit.*

with small spikes as follows;

Depth	:	1585.5 m	1588.3 m
Total Gas	:	7.0 units	8.5 units
C_1	:	912 ppm	1368 ppm
C_2	:	92 ppm	92 ppm
C_3	:	35 ppm	29 ppm

- Over the interval 1636 - 1660 metres (broadly corresponding to the Nullawarre Greensand equivalent) gas readings mostly ranged;

Total Gas	:	5 - 6 units
C_1	:	720 - 912 ppm

C_2	:	60 - 82 ppm
C_3	:	30 - 65 ppm
C_4	:	1 - 2 ppm

with a peak at the top (1636.5 metres) of;

Total Gas	:	43.0 units
C_1	:	6808 ppm
C_2	:	659 ppm
C_3	:	592 ppm
C_4	:	477 ppm
C_5	:	33 ppm

which comprised one of the best readings throughout the well.

- Between 1660 metres down to 1870.5 metres (broadly corresponding to the Belfast Mudstone and the Waarre Formation Units D and B) mud gas readings gradually declined then gradually rose again, spanning;

Total Gas	:	2.6 - 6.0 units
C_1	:	484 - 1050 ppm
C_2	:	8 - 75 ppm
C_3	:	BDL -27 ppm
C_4	:	BDL - 2 ppm

- In the interval 1873 - 1904 metres (corresponding to the Waarre Formation Unit A) gas readings were mostly only 5 - 6 units, with thin intervals (usually just single readings) ranging 12 - 84 units, the best of which were;

Depth	:	1886.5 m	1892.0 m	1880.2 m
Total Gas	:	84.0 units	50.0 units	35.0 units
C_1	:	11220 ppm	7480 ppm	4546 ppm
C_2	:	1280 ppm	884 ppm	493 ppm
C_3	:	531 ppm	473 ppm	262 ppm
C_4	:	341 ppm	222 ppm	122 ppm

At the top of Unit A, within the interval drill stem tested (DST-1), readings between 1873.2 and 1875.5 metres ranged;

Total Gas	:	23.0 - 34.7 units
C_1	:	3250 - 4136 ppm
C_2	:	375 - 612 ppm
C_3	:	100 - 249 ppm
C_4	:	111 - 120 ppm
C_5	:	2 - 3 ppm

- Within the Eumeralla Formation (1904 - 2150 metres) gas readings mostly ranged;

Total Gas	:	2.4 - 11.5 units
C_1	:	400 - 2220 ppm
C_2	:	8 - 84 ppm
C_3	:	7 - 35 ppm
C_4	:	BDL - 2 ppm

with occasional peaks in the top 90 metres of up to;

Total Gas	:	19.0 units
C_1	:	3300 ppm
C_2	:	160 ppm
C_3	:	54 ppm

3.3.2 Fluorescence

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

3.3.2.1 Cuttings

Apart from trace amounts of dull orange brown mineral fluorescence observed in Waarre Formation Unit A sandstone cuttings from 1875.5 to 1885 metres, no fluorescence or oil staining was observed in cuttings from Howmains-1.

3.3.2.2 Sidewall Cores

Fluorescence was observed in two sidewall cores from Waarre Formation Unit A and described as follows;

SWC#16 (1874.0 metres) Sandstone has up to 30% patchy, moderately bright to bright blue white direct fluorescence, slow blooming dull milky white cut, moderately slow, dull to moderately bright milky white crush cut, moderately thick dull blue residual ring fluorescence.

SWC#14 (1884.0 metres) Sandstone has up to 60% patchy, moderately bright to bright blue white direct fluorescence, slow blooming blue cut, moderately slow, dull to moderately bright blue crush cut, moderately thin dull blue residual ring fluorescence.

These two samples were submitted for geochemical analysis via extraction, liquid chromatographic separation and gas chromatography of the saturates fraction, results of which are provided in Appendix 8 and discussed in the Geochemistry section (3.4).

Fragments from two Eumeralla Formation sidewall cores (SWC#1 at 2098.0m and SWC#7 at 1936.0m) were observed to have a very thin, dull blue residual ring, but with no direct, cut or crush cut fluorescence. No further work was done on these cores.

3.3.4 Drill Stem Test Gas Sample

During DST-1, which was conducted to evaluate the top of the Waarre Formation Unit A sandstone, a gas sample was taken after gas was detected at surface during the Main Flow. Analysis of this sample, given in Table 3, indicates the gas to be relatively dry (92.3% methane), and essentially devoid of carbon dioxide (the small amount reported could be from air in the drill pipe).

3.4 GEOCHEMISTRY

3.4.1 Analyses

Samples from both of the Howmains-1 sidewall cores which exhibited fluorescence (from Waarre Formation Unit A) were submitted to Geotech for extraction of their soluble organic matter followed by liquid chromatographic separation and then gas chromatography of the saturates fraction (GC_{sats}). No source rock studies were undertaken due to a perceived lack of source potential throughout the penetrated section.

3.4.2 Results and Discussion

Summary tables and chromatograms for the two samples are given in Appendix 8. Extract yields were 2283.2 ppm from 14.8 grams (1874 m) and 821.0 ppm from 10.1 grams (1884 m). Based on weighing of the components of the larger sample , the saturates fraction comprised 71.6%. The lower yield sample provided enough material for a saturates gas chromatogram, but not enough to also be weighed.

The saturate chromatograms from both sidewall cores characterize the same oil, which displays a relatively smooth profile of n-alkanes up to at least C_{31}. This profile, with a subtle trimodal distribution, is indicative of a terrestrially sourced, peak maturity crude oil similar to many Gippsland Basin crudes, such as those from the Kingfish field (Burns *et al.*, APEA J., 1987, 73-84). (Note: the diminution of the light ends below about C_{12} is due to the solvent extraction process used on these samples). The lack of a strong odd-over-even preference is thought to be due to thermal cracking of the long chain hydrocarbons, and the high pristane/phytane ratios (5.03 and 5.05) are strongly indicative of oxic conditions in the depositional environment.

3.5 PALYNOLOGY

Palynological analysis of Howmains-1 comprised a quick-look assessment of three samples of cuttings (by Roger Morgan) during the drilling, and a detailed post-drill investigation of twenty sidewall cores (by Alan Partridge).

The quick-look assessment (Appendix 9a) was undertaken on cuttings samples from 1900-1910, 1930-1940, and 1940-1950 metres, with the specific goal of identifying whether any or all of these samples were within the Eumeralla Formation. The conclusion was that the top of the Eumeralla Formation appeared to be between 1900 and 1940 metres, which was confirmed by the subsequent analysis of sidewall cores.

In the post-drill investigation (Appendix 9b) twenty sidewall cores from 2098.0 metres (Eumeralla Formation) up to 1036.0 metres (upper Pember Mudstone) were examined. They revealed a succession of spore-pollen assemblages which ranged from the Late Albian *Phimopollenites pannosus* Zone up to the Early Eocene Lower *Malvacipollis diversus* Zone and microplankton zones (confined to the Sherbrook Group) which ranged from the Turonian *Cribroperidinium edwardsii* Subzone of the

Palaeohystrichophora infusorioides Zone up to the Early Campanian *Xenikoon australis* Zone.

There was particular interest in the Waarre Formation samples due to the discrepancy between the observed section and that which had been anticipated, most notably the lack of the potential reservoir sandstone in Unit C. The palynology results, especially when compared to the detailed sampling in the Langley-1 exploration well, showed definitively that, while at least parts of Units A, B and D were present in Howmains-1, Unit C was absent. In the three sidewall cores between 1860 and 1904.0 metres assemblages characteristic of Units A and B occur, which include the pollen *Hoegisporis trinalis* ms, the spore *Appendicisporites distocarinatus*, and an association of microplankton featuring *Cribroperidinium edwardsii*, *Palaeoperidinium cretaceum* and *Cyclonephelium compactum*, which does not occur above Unit B in Langley-1. The two sidewall cores above this interval (at 1847.0 and 1854.0 metres) are correlated with Unit D based on the characteristic increasing abundance of the microplankton *Heterosphaeridium* spp. and *Amosopollis cruciformis*.

Also pertinent to the Waarre Formation is the absence of the *Appendicisporites distocarinatus* Zone in Howmains-1 (similarly absent in Langley-1 and Iona-2), which supports the notion that this zone, and thus the Cenomanian, is not present in the Waarre Formation, but instead comprises part of the mid-Cretaceous unconformity.

All of the Eumeralla Formation samples are non-marine, while all of the Sherbrook Group samples are regarded as clearly offshore marine (i.e. not marginal marine). The two Pember Mudstone samples are also marine, but could not be assigned to any established microplankton zones.

3.6 STRUCTURE

The Howmains structure was originally identified from the 1990 Halladale Seismic Survey and further delineated as part of the 1993 Nirranda Seismic Survey (Figure 2). It is a rotated horst block similar in style to structures in the onshore Port Campbell area and is also thought to be similar to the offshore Minerva structure, which it is interpreted to be along trend from.

A long-recognized weakness of the prospect arises from its close proximity to the "no data" zone to the southwest, which comprises the shallow water nearshore zone and the Port Campbell National Park extending 200-800 metres back from the cliff coastline.

The lack of data over this area precludes any verification of the structural interpretation on the southwestern edge of the prospect.

Seismic data over the Howmains prospect was mapped on five horizons (Figure 6) ranging from the Eocene Lower Mepunga Formation through the Late Cretaceous Top Sherbrook Group, Top Belfast Formation and Top Waarre Formation to the mid-Cretaceous Top Eumeralla Formation (Enclosures 10a-e). The only depth map produced was for the Top Waarre Formation (Enclosure 10f), just above the primary target. The interpretation on the four horizons which span the Late Cretaceous (Top Sherbrook Group to Top Eumeralla Formation) show fault traces with two dominant trends, northwest-southeast and east-west. A critical component in the integrity of the pre-drill Howmains structural interpretation was a long arcuate fault with limbs trending in each of these directions from a steeply southwesterly plunging hinge which cuts the Belfast-Waarre interval just south of the proposed well location. The validity of this interpretation was the major risk for the Howmains prospect, particularly because the hinge and a long section of the western limb of the fault lie in the "no data" zone.

The formation top depths encountered in Howmains-1 were all higher than prognosed (Figure 7). However, when the two-way time (TWT) to each prognosed horizon was calculated from check shot data (Enclosure 6 and Appendix 10) it became evident that all but one of the time picks had identified the correct horizon, but were low to prognosis by up to 8 milliseconds (italics on Figure 7) - this was subsequently attributed to a seismic mis-tie. (The exception to this was the top of the Eumeralla Formation, which proved to be half a cycle above where it was picked, and thus came in 9 milliseconds high). Therefore, the discrepancy between the prognosed and actual depths was due to the actual velocity profile being significantly different to the model used in the depth prognosis, which was based on wells in the region (Figure 8).

Although the overall form of the time maps is not substantially altered by the data obtained from drilling the well, a major difference in the primary target is evident in the time isochore for the Waarre Formation interval, which is 17 milliseconds thinner than prognosed at the well location (due mainly to the incorrect pick of the Top Eumeralla Formation). This is shown in the post-drill interpretation of seismic line HA90-07 (Figure 9). The implication for the structural development of the Howmains horst is that there was an episode of uplift during deposition of the Waarre Formation, which is slightly earlier than the previous seismic-based estimate (syn-Belfast Mudstone).

As might have been expected, the drilling of Howmains-1 has not otherwise contributed

PE907069

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SUBTYPE = SECTION
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DATE_CREATED =
DATE_RECEIVED =
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WELL_NAME = Howmains-1
CONTRACTOR =
CLIENT_OP_CO = GFE RSOURCES LTD

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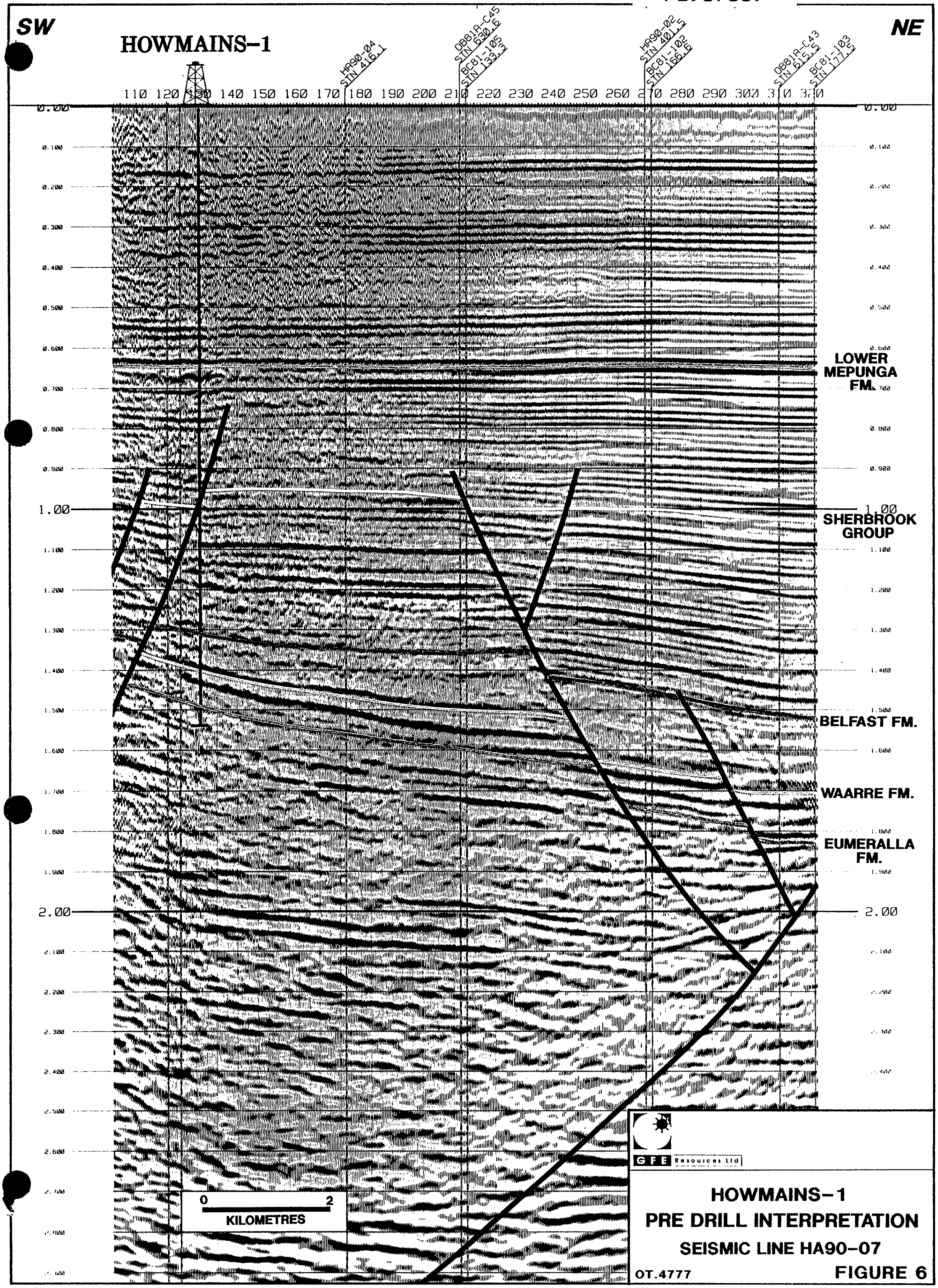

HOWMAINS-1
PRE DRILL INTERPRETATION
SEISMIC LINE HA90-07

OT.4777 FIGURE 6

PE907070

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CONTRACTOR =
CLIENT_OP_CO = GFE RSOURCES LTD

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HOWMAINS-1
FORMATION TOP DEPTHS AND TIMES

DEPT. NAT. RES & ENV
PE907070

Formation	Predicted (mss)	Predicted Two-Way Time (milliseconds)	Predicted (mKB)	Actual (mss)	Actual Two-Way Time (milliseconds)	Actual (mKB)	
GELLIBRAND ML.				-147.6		203.0	
CLIFTON FM.				-535.3		585.0	
NARRAWATURK ML.	-580		629.7	-545.1		594.8	34.9m HIGH
MEPUNGA FM.	-644		693.7	-588.9		638.6	55.1m HIGH
LWR MEP. MARKER		648			653		(5ms LOW)
DILWYN FM.	-699		748.7	-665.5		715.2	33.5m HIGH
PEMBER MDST.				-974.8		1024.5	
PEBBLE POINT FM.				-1025.3		1075.0	
PAARATTE FM.	-1119	976	1168.7	-1113.3	979	1163.0	5.7m HIGH (3ms LOW)
SKULL CREEK MDST.				-1429.1		1478.8	
NULLAWARRE GNSD (equiv)				-1587.7		1637.4	
BELFAST MDST.	-1669	1304	1718.7	-1610.7	1311	1660.4	58.3m HIGH (7ms LOW)
WAARRE FM. D	-1840	1418	1889.7	-1788.3	1426	1838.0	51.7m HIGH (8ms LOW)
WAARRE FM. B				-1806.3		1856.0	
WAARRE FM. A				-1822.8	1446	1872.5	
EUMERALLA FM.	-1936	1470	1985.7	-1854.3	1461	1904.0	81.7m HIGH (9ms HIGH)

Predicted: TOTAL DEPTH 2150mKB

Actual: TOTAL DEPTH 2150.0mKB

HOWFTOPS

FIGURE 7

PE907071

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PERMIT =	PEP/104
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DESCRIPTION =	Average Velocity vs. Depth Chart, To Top of Waarre Formation, Figure 8, (enclosure from WCR vol.1) for Howmains-1
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DATE_CREATED =	
DATE_RECEIVED =	
W_NO =	W1100
WELL_NAME =	Howmains-1
CONTRACTOR =	
CLIENT_OP_CO =	GFE RSOURCES LTD

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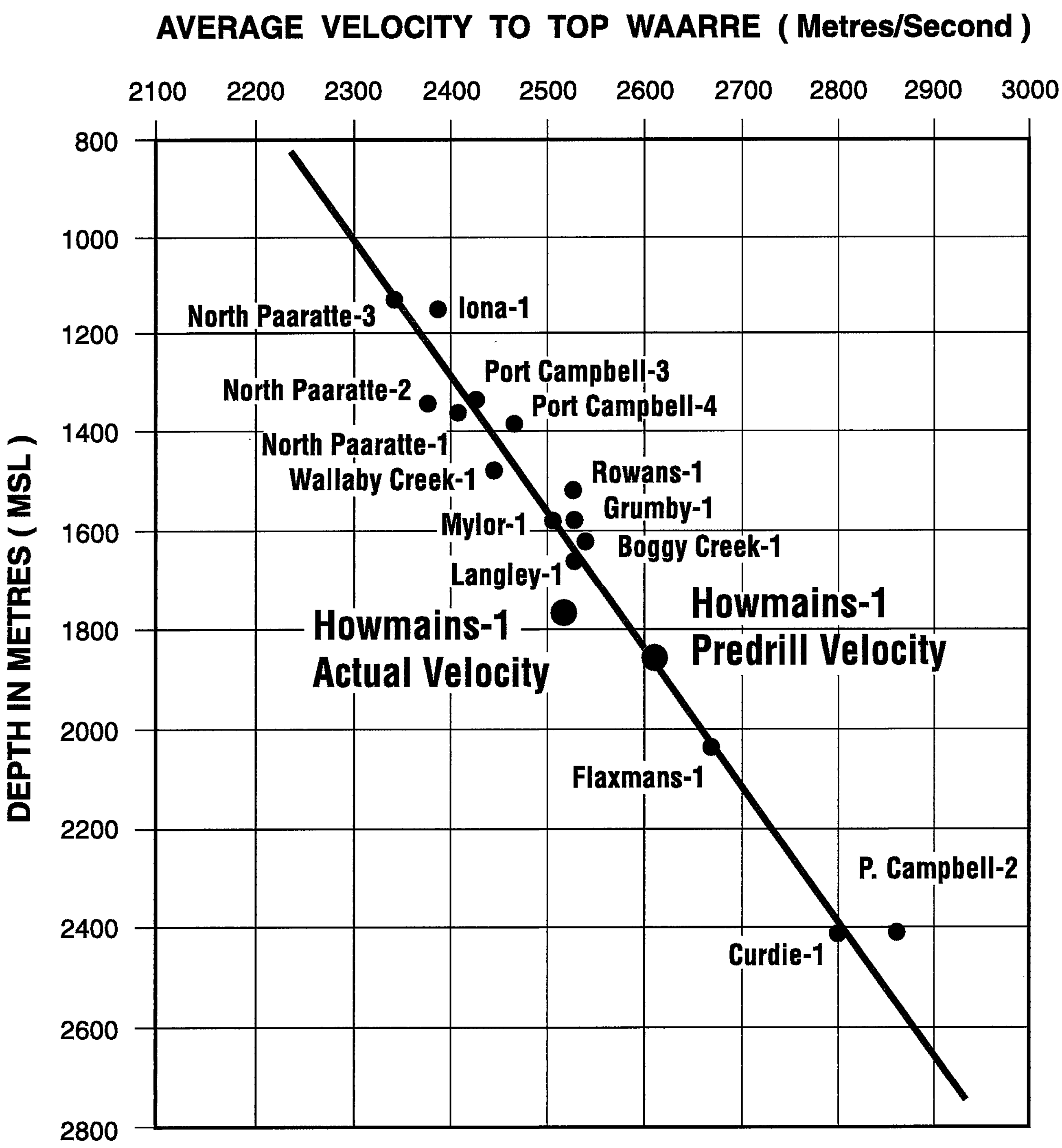
AVERAGE VELOCITY Vs DEPTH TO TOP WAARRE FORMATION

PORT CAMPBELL AREA



HOWVEL

FIGURE 8

PE907072

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                    Howmains-1
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       CONTRACTOR =
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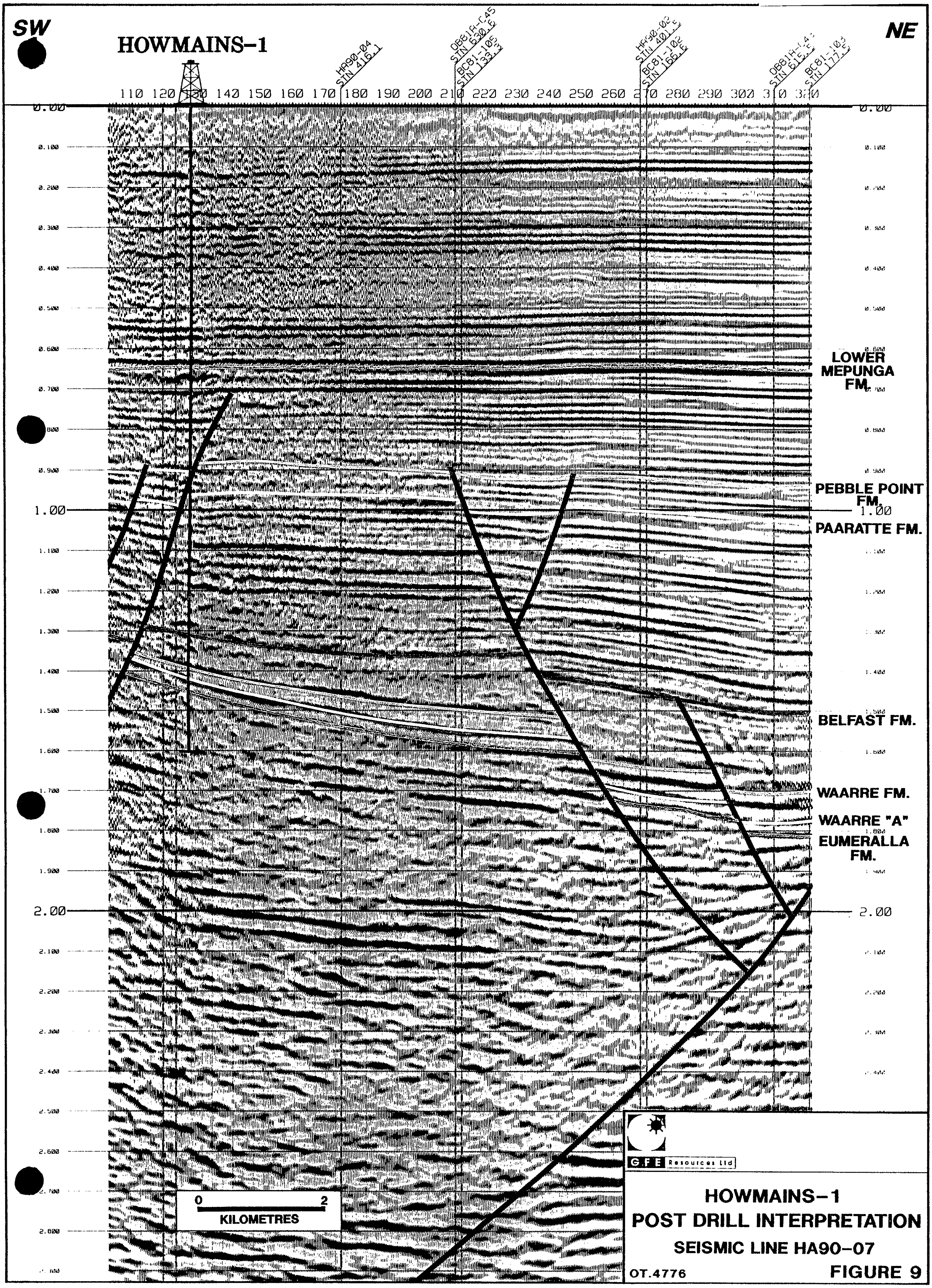

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HOWMAINS-1
POST DRILL INTERPRETATION
SEISMIC LINE HA90-07

OT.4776

FIGURE 9

to the structural understanding of the area. The same uncertainty about the validity of the pre-drill interpretation remains and is unlikely to be significantly revised without the acquisition of more seismic data, particularly in the "no data" zone to the southwest.

3.7 LOG ANALYSIS

Log analysis was performed on the wireline logs using Crocker Data Processing's PETROLOG software. Three intervals were analysed, one spanning the Waarre Formation Unit A and two covering most of the drilled Eumeralla Formation section. Subdivision of the Eumeralla Formation in two zones was done partly to avoid using one large zone, but also to take into account an overall increase in the resistivity data below 2030 metres.

For each zone basic input parameters are given in Table 7 and a summary of the results is provided in Table 8. A detailed listing of all input parameters, environmental corrections, preinterpretation results and complex lithology results can be found in Appendix 11 and a 1:500 scale analysis log is provided as Enclosure 11.

The overall quality of the logs in the zones analyzed is regarded as good to very good, which contrasts starkly with the rest of the Cretaceous section above Zone 1, which was commonly badly caved.

As shown in Table 8, the Waarre Unit A and Eumeralla Formations were interpreted to contain about 11 and 44 metres of net sand, respectively, with average effective porosities around 18% and water saturations of over 90%, thus no intervals of pay were identified.

TABLE 7

HOWMAINS-1

BASIC INPUT PARAMETERS FOR LOG ANALYSIS

ZONE #	1	2	3
FORMATION	Waarre Unit A	Eumeralla	Eumeralla
From (m)	1871.93	1903.93	2030.43
To (m)	1903.93	2030.43	2138.02
Interval (m)	32.00	126.49	107.59
Average Zone Temperature (°C)	76.1	78.2	81.3
Rw at Av. Zone Temp. (ohm.m)	0.14	0.44	0.51
Salinity (Kppm)	20.4	5.8	4.8
Mud Filtrate Salinity (Kppm)	37.7	37.7	37.7
Assumed Matrix Density (g/cc)	2.67	2.68	2.68
GRclean (API units)	35.0	60	60
GRclay (API units)	120	115	115
Rclay (ohm.m)	6.5	3.7	4.4
Saturation Equation	Indonesian	Indonesian	Indonesian
Tortuosity (a)	1.0	0.7	0.7
Cementation Exponent (m)	2.0	2.1	2.1
Saturation Exponent (n)	2.0	2.0	2.0

TABLE 8

HOWMAINS-1

LOG ANALYSIS RESULTS SUMMARY

ZONE #	1	2	3
FORMATION	Waarre Unit A	Eumeralla	Eumeralla
From (m)	1871.93	1903.93	2030.43
To (m)	1903.93	2030.43	2138.02
Interval (m)	32.00	126.49	107.59
Net Sand† (m)	11.1	9.1	34.9
Sand Average $\varnothing_{eff.}$† (%)	18.4	17.3	17.6
Sand Average S_w† (%)	90.6	93.6	94.1
Sand Average V_{clay}† (%)	21.3	24.0	25.7
To calculate net pay:			
Average $\varnothing_{eff.}$ Cut off	0.05	0.05	0.05
S_w Cut off	0.50	0.50	0.50
V_{clay} Cut off	0.30	0.30	0.30
Net Pay (m)	0.00	0.00	0.00
Integrated $\varnothing$ (m)	0.00	0.00	0.00
Sum $\varnothing$*(1-S_w) (m)	0.00	0.00	0.00

†Obtained using cut offs of S_w = 100%; $\varnothing_{eff.}$ = 5%; V_{clay} = 30%

CONCLUSIONS

4. CONCLUSIONS

4.1 OBJECTIVES VERSUS PERFORMANCE

From an engineering perspective the drilling of Howmains-1 largely met the set objectives. As shown on the Drilling Progress Curve (Figure 4), the operation was completed about one and a half days faster than anticipated, mostly due to quicker than expected setting of the 9⁵/₈" casing and faster drilling through the Tertiary section and the Paaratte Formation. This was despite delays due to problems with lost circulation and cellar wash-out in the first 100 metres and difficulty with initiating reverse circulation at the end of the drill stem test. Also, (as outlined in Section 2.5.4) the hole deviation was kept inside acceptable limits, being within a 35-metre radius of the proposed location at the target horizon, which equates to a maximum overall deviation of no more than one degree. One engineering operation which proved to be less informative than it otherwise might have been was the drill stem test (DST-1), particularly with regard to build-up analysis.

Assessment of the Howmains-1 results from a geophysical perspective is somewhat mixed. As outlined in Section 3.6 and Figure 7, the prediction of formation top depths was not very successful, with all horizons coming in high to prognosis, most by 30 metres or more. In particular, tops of the Waarre and Eumeralla Formations came in 51.7 and 81.7 metres high, respectively, with the latter being incorrectly picked half a cycle too low on the pre-drill interpretation. However, the depth discrepancies were mostly not due to incorrect picking of seismic horizons, which were all within nine milliseconds of their actual two-way times. The greatest source of error in the prognosed depths was the velocity model used in the depth conversion, which was based on the general trend for wells in the Port Campbell region. It is now apparent that the velocity profile observed in Howmains-1 is anomalous relative to this regional trend, and could not have been anticipated prior to drilling the well.

The greatest effect of the variations in time picks was (unfortunately) on the interval of greatest interest, the Waarre Formation, where the isochore was 17 milliseconds thinner than prognosed due to the top being eight milliseconds low and the base being nine milliseconds high. This was a major contributing factor in the reservoir section not being as good as anticipated. The pre-drill interpretation had indicated that Waarre Formation sandstones in Howmains-1 were expected to have poorer reservoir properties than observed in the Port Campbell gas fields, but there was no overt suggestion that the prime Unit C reservoir sands might not be present. Therefore, in this regard the outcome of the well fell substantially short of expectations.

The major objective which remains unsatisfied by the drilling of Howmains-1 is a definitive assessment of hydrocarbon prospectivity of the entire Howmains structure. As no commercial accumulations were intersected in the well, the structure down-dip of Howmains-1 (and, therefore, the prospect as currently mapped) has been effectively demonstrated to be unprospective. However, the structural uncertainty inherent in the current interpretation due to the "no data" zone to the southwest still leaves the possibility that up-dip closure could exist. This could only be further investigated by extending the seismic coverage. Given the paucity of oil shows encountered in the well and the likelihood that the gas produced in DST-1 was in-solution at reservoir conditions, the Howmains-1 well does not provide encouragement to further pursue evaluation of the Howmains structure.

4.2 CONTRIBUTION TO GEOLOGICAL KNOWLEDGE AND HYDROCARBON PROSPECTIVITY

In addition to the basic information that drilling a petroleum 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 Howmains-1 has;

- identified the absence of an intra-Waarre Formation section (including the prime reservoir target sands of Unit C) on this structure. Seismic data had suggested some thinning of the Waarre Formation, but could not differentiate between overall thinning and absence of a particular interval. The resulting gap indicates a previously unrecognized episode of relative uplift during the latter part of the time interval which encompasses Waarre Formation deposition. In doing so it increases the reservoir-component of risk associated with drilling similar style features in this area.

- emphasized the potential for unpredictable velocity variations in this region. The anomalous velocity profile encountered in Howmains-1 was the primary cause of the difference between prognosed and actual depths to formation tops, and the apparently unpredictable nature of such anomalies provides an increased uncertainty in the characterization of prospects.

- confirmed the migration of Eumeralla-sourced hydrocarbons into the Waarre Formation. Although no commercial accumulation was encountered in Howmains-1, the penetrated section did yield small amounts of liquid hydrocarbon in two sidewall cores, which appear typical of products generated from Eumeralla Formation source material.

- provided a useful addition to the small number of formation water samples from the Waarre Formation. Relatively pristine samples of formation water from prospective reservoir units (especially the Waarre Formation) in this region of the Otway Basin are few in number, so the samples from DST-1 have allowed a rare opportunity to obtain a compositional analysis and R_w (= 0.29 ohm.m at 25°C) which can be used in log analysis.

APPENDIX 1

GFE RESOURCES LTD

APPENDIX 1

RIG SPECIFICATIONS

HOWMAINS-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 Rcord-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

HOWMAINS-1

GFE RESOURCES LTD
DRILLING FLUID RECAP
HOWMAINS-1
PEP-105, OTWAY BASIN, VIC

Prepared by : M. Olejniczak
Date : July 1994

Table Of Contents

Well Summary

Operator	:	GFE Resources Ltd
Well Name	:	Howmains-1
Average Angle	:	1.25 degrees
Location	:	PEP 105, Otway Basin, Vic
Contractor	:	Century Drilling
Rig	:	Rig 11
Rig On Location	:	2 July 1994
Start Date	:	4 July 1994
RKB Elevation	:	5.2 m
Total Depth	:	2151 m
Date Reached TD.	:	20 July 94
Total Days Drilling	:	18
Rig Release	:	22 July 94
Total Days On Well	:	18

Drilling Fluid Type	**Interval**	**Hole Size**	**Cost (A$)**
Fresh Water/AQUAGEL/Native Clay	12 m -359 m	12-1/4"	7,325.40
Fresh Water/AQUAGEL/CMC HV	359 m - 1500 m	8-1/2"	9,556.06
Fresh Water/EZ MUD/Polymer	1500 m - 2151 m	8-1/2"	24,394.77
Mud Materials Charged To Drilling		**TOTAL**	**41,276.23**

Engineer On Location From	:	4/7/94 To 21/7/94	
Drilling Fluid Engineering	:	18 Days @ $ 530/Day	9,540.00
Total Cost Of Drilling Materials & Engineering			5,0816.23
Mud Material Not Charged To Drilling			838.20

Casing Program	:	16 " Conductor	@ 12 m
	:	9-5/8"	@ 355.37 m

Drilling Supervisors : Ken Smith

Baroid Mud Engineers : Manfred Olenjniczak, Philip Innes, Chris Wallace

Introduction

Howmains-1 was spudded on the 4 July 1994 using Century Rig 11.

A 12-1/4" hole was drilled to 359 m and 9-5/8" casing set at 355.4 m. Lost circulation occurred immediately below the conductor shoe at 21 m while using Lime-flocculated AQUAGEL. Drilling continued blind to 104 m with partial returns from 70 m after drilling into the Port Campbell Limestone. Three cement plugs were then set from 28 m to stabilise the conductor shoe and cellar. After drilling out the cement and adding Mica the losses were cured. The remainder of the 12-1/4" hole was then drilled through the Gellibrand Marl using 1% KCl to control dispersion of the marl.

The upper part of the 8-1/2" hole was drilled to 1500 m through the remainder of the Gellibrand Marl, Dilwyn and Paaratte Formations without problems. The 1% KCl /Native clay system was continued through the marl to 620 m. Filtration control was then reduced by converting this to a 1 to 2% KCl/CMC EHV/PAC-R system through the sands.

At 1500 m the mud was converted to a 3-4% KCl/EZ MUD/Polymer with filtration control further reduced. The mud weight was increased with barite to a maximum of 10.1 ppg to combat tight hole and reaming problems through the Belfast Formation, which appeared to be over-pressured.

A drill stem test was successfully run at 1875 m. Drilling then continued into the Eumeralla Formation to a total depth of 2151 m with a reduced mud weight of 9.85 ppg

Wireline logs were run at TD without problems. The hole was then plugged and abandoned.

The caliper log showed the hole to be overgauge from 1475 m to 1870 m to between 10.5 to 11.5" This corresponded with the tight hole section through the Belfast Formation for which the mud weight was raised. The rest of the section was in very good gauge.

12-1/4" Hole : 12 m to 359 m (347 m drilled - 4 Days)
Formations : Surface sands, Port Campbell Limestone & Gellibrand Marl

Drilling Fluid : FW/AQUAGEL to 1% KCl/Naive Clay

Howmains-1 was spudded in using 15 ppb pre-hydrated AQUAGEL flocculated with 0.5 ppb Lime.

After encountering total lost circulation at 21 m, drilling continued blind to 104 m, maintaining a 40 second viscosity. 8 ppb pre-hydrated AQUAGEL extended with 1 ppb EZ MUD L was used to allow additional volume to be mixed rapidly and economically and conserve the limited stocks of AQUAGEL on site. Partial returns began from 70 m after drilling into the Port Campbell Limestone.

Three cement plugs were set from 28 m back into the conductor shoe after it was noticed the conductor was beginning to wash out. The cement was drilled out using the remaining EZ MUD extended AQUAGEL system, with the cement contamination having very little effect on viscosity.

After drilling out the cement partial losses of about 50 bbl/hr again occurred while washing and reaming back to bottom. A 50 bbl pill containing 20 ppb medium Mica was pumped and losses reduced to only 5 bbl/hr. Drilling continued with negligible losses.

Additions of prehydrated AQUAGEL only were used to maintain a 40 second viscosity and 14 lb/100ft^2 down to 149 m. No more EZ MUD L was used as the increased AQUAGEL would provide better wall cake formation for hole stability and there was now additional AQUAGEL stock on site.

At 149 m 1% KCl was added to the active system after increasing amounts of soft clay returns at the shakers indicated that the Gellibrand Marl had been reached. No further AQUAGEL was added. A 1% KCl/Native Clay system was then maintained to the 359 m casing point with no hole problems. A relatively low dilution rate of only about 1 bbl/m of water added was used to control the viscosity, with large quantities of good marl cuttings returned at the shakers.

Typical Properties

Depth	:	96	359	m
Mud Weight	:	8.7	8.8	ppg
Viscosity	:	40	44	seconds
Plastic Viscosity	:	8	8	cPs
Yield Point	:	14	28	lb/100ft^2
API Filtrate	:	N/C	N/C	
Solids	:	2.8	3	% by vol
MBT.	:	12	12	ppb
Chlorides	:	300	5500	mg/l
Total Hardness	:	40	90	mg/l

Hole Conditions

Lost circulation occurred immediately below the conductor shoe at 21 m in fine loose sands. After using the only lost circulation material on location, (34 sacks of medium Kwikseal), drilling continued with no returns. It was reasoned that if the Gellibrand Marl could be reached the dispersion of the marl cuttings would provide sufficient solids to seal the lost circulation above.

Partial returns began at about 70 m after drilling into the top of the Port Campbell Limestone, and continued to steadily improve. However, at 104 m the cellar began to show signs of washing out with mud returning through the rathole and mousehole. To avoid cellar collapse and possible loss of the hole, three cement plugs were set on top of a hi-vis AQUAGEL pill from 28 m to get the top of the cement back to 7 m. (inside the conductor).

The cement was drilled out and the drill string washed and reamed back to bottom. Initial partial losses of about 50 bbl/hr were reduced to 5 bbl/hr with a 50 bbl pill of 20 ppb medium Mica. Drilling then continued to the 359 m casing point without any further hole problems. Downhole losses stopped totally as drilling continued into the Gellibrand Marl.

A wiper trip was run at 359 m without problems, but with 14 m fill on going back to bottom. The 9-5/8" casing was then run and cemented to 355.4 m without problems. During cementing there were partial losses but cement was still returned to surface.

Solids Control

The Triton shale shaker was run with 3 x 50 mesh screens throughout out this section. The desander and desilter and desilter were only run when all active pits were brought into the mud system at 140 m.

The addition of 1% KCl at 149 m restricted the dispersion of the clays, keeping the cuttings firm and intact and enabled the solids control equipment to work more efficiently.

Conclusions & Recommendations

- The lost circulation in this section was the reason for the mud cost of $7325.40 exceeding the programmed cost of $2107.14.
- Lost circulation is a very rare event in the area, even in the Port Campbell Limestone. In this case it occurred in the near surface loose sands above the Port Campbell Limestone. These sands were not present in most other wells in the area. For this reason it is not practical to keep large stocks of lost circulation materials and AQUAGEL on site for every well.
- The practice of drilling the Gellibrand Marl using a 1% KCl/Native Clay system is very effective and economical. There were no mud ring or hole problems and a low dilution rate of only about 1 bbl/m. This reduced water consumption and filling of the sump significantly.

8-1/2" Hole : 359 m to 1500 m (1141 m drilled - 4 days)
Formations : Gellibrand Marl to Paaratte

Drilling Fluid : KCl/Polymer

The cement and casing shoe were drilled out using 325 bbls of mud salvaged from the 12 1/4" interval, diluted with the 90 bbls water, used to displace the cement in the casing.

Drilling then continued through the Gellibrand Marl, at 30 to 40 m/hr maintaining the same 1%KCl/Native Clay system used prior to casing point.

After drilling into the Narrawaturk at 577 m, treatment of the system for reduced filtration control began, converting to a 1-2% KCl/Polymer. From 620 m the volume was maintained with additions of pre-mixed KCl/Polymer using CMC EHV, PAC-R and PAC-L. Soda ash was also added to reduce the Calcium content back to 100 mg/L.

This steadily reduced the API Filtrate to 8 mls by 950 m, prior to reaching the top of the Paaratte Formation at 1159 m. The mud properties were then constantly maintained to 1500 m. The mud weight was controlled to 9.25 ppg through dilution with premixes and constant running of the desander and desilter while circulating.

Typical Properties

Depth	:	615	950	1437	m
Mud Weight	:	9.0	9.2	9.25	ppg
Viscosity	:	44	41	42	seconds
Plastic Viscosity	:	11	16	20	cPs
Yield Point	:	22	13	15	lb/100ft2
API Filtrate	:	N/C	8.4	7.4	ml
Solids	:	5	5.1	5.4	% by vol
MBT.	:	10	15	12	ppb
Chlorides	:	3000	10000	10000	mg/l
Total Hardness	:	400	100	100	mg/l
KCl					

Hole Conditions

There were no problems during drilling.

On a wiper trip at 1170 m the hole pulled tight from 985 m to 870 m and from 698 m to 659 m. On running back in the hole reaming in was required from 698 m to 717 m and 889 m to 918 m over 1-1/2 hrs only, with 3 m fill on bottom.

Solids Control

The shale shaker screens were changed to 84,50,50 mesh prior to drilling out the casing shoe. This combination was kept throughout this section. Some sand blinding of the screens occurred, but mud losses were minimised by tilting the screens further.

The desander and desilter were run continuously. The mud weight had rose from 8.8 ppg at the casing shoe to 9.25 ppg by 1100 m at which it was then maintained.

Conclusions & Recommendations

- The mud cost of $9556.06 to 1500 m for this section was significantly less than the programmed cost of $12848.89 to 1600 m. An analysis of materials used shows that this was totally the result of a low dilution rate due to minimised mud losses and dumping with effective use of the solids control equipment.
- Hole conditions were generally good except for some tight hole on the wiper trip at 1170 m. It should be remembered that this was the first trip run in the 8-1/2" hole with 811 m of new hole. The caliper log run at well TD showed the upper section to 625 m through the Gellibrand Marl washed out to 11-12 inches, but the rest of the section close to gauge even through the Dilwyn sands. This indictes the tight hole was most likely due to filter cake buildup in near gaugr hole.
- The mud system as used produced a good hole at an economical cost, so should be considered for future use.
- The original intention had been to maintain a 1% KCl concentration to 1600 m, but at the request of the operators representative the KCl concentration was increased earlier to 4% at 1500 m, prior to running a trip at 1509 m.

8-1/2" HOLE : 1500 m to 2151 m (651 m drilled - 11 days)
Formations : Paaratte to Eumeralla

Drilling Fluid : KCl/EZ MUD/Polymer

The KCl/Polymer from the upper part of the 8-1/2" hole was modified to a higher KCl/EZ MUD/Polymer for this section to TD. There were no major changes in the mud type which could upset hole conditions. However, there were several changes in the mud formulation to improve its inhibition for the higher clay Belfast and Eumeralla Formations.

- From 1500 m the KCl content was increased to 4%.
- EZ MUD L (liquid PHPA) was added to the active system, at an active concentration of 0.5 ppb to increase the inhibition of the system and reduce drill solids dispersion prior to reaching the Belfast Formation.
- Filtration control was reduced to the 6.0 to 6.5 ml range using a combination of PAC-R and PAC-L.
- Use of CMC-EHV was stopped as the PAC type polymers would be more effective in the increased salinity.
- Caustic Potash was used for pH control instead of Caustic Soda to maintain Potassium levels.
- The mud was also treated with BARACOR 129, an oxygen scavenger.

The mud weight was raised to 10.1 ppg and the KCl content increased to 5% between 1586 m and 1875 m to control tight hole problems through the Skull Creek Mudstone and Belfast Formations. The mud weight was then lowered to 9.85 ppg with the desilter and dilution, from 1890 m to TD.

Prior to the drill stem test, the mud was treated with 25 litres of BARACIDE as a precaution against fermentation of the mud during testing.

Typical Properties

Depth	:	1578	1875	2145	m
Mud Weight	:	9.4	10.1	9.8	ppg
Viscosity	:	47	43	44	seconds/L
Plastic Viscosity	:	24	22	16	Cps
Yield Point	:	16	12	13	lb/100 ft2
API Filtrate	:	6	6.4	6.4	ml
Solids	:	6.7	9	8.2	% by vol
MBT	:	13	13	14	ppb
Chlorides	:	19000	24000	23000	mg/L

Hole Conditions

A trip for a bit change at 1509 m had some tight hole pulling out from 1213 m to 1204 m. On running back in reaming was required from 1160 m to 1237 m, 1293 m to 1313 m and 1447 m to 1509 m over 4 hours. This was reaming near gauge hole through the Paaratte Formation.

At 1586 m the mud weight was increased from 9.4 to 9.6 ppg with barite as a precautionary response to increasing connection gas. The formation was suspected of being overpressured. The mud weight was further increased to 9.8 ppg at 1679 m as connection gas persisted.

A wiper trip at 1715 m required working and back reaming of the pipe from 1510 m to 1443 m and 377 m to 1338 m while pulling out. It was run back in with only minor precautionary reaming in from 1695 m to 1715 m.

At 1875 m a full trip was run prior to running a DST. The trip out was tight from 1687 m to 1485 m and between 1293 m and 1103 m. On running back to bottom the hole required reaming all the way from 1424 m back to bottom with 4 m fill. The cuttings at the shakers appeared to indicate that the hole was still sloughing. In response to the persistent tight hole the mud weight was increased to 10.1 ppg, and the KCl content was also increased to 5%.

A wiper trip was then run back to 1084 m. There was still some tight hole pulling out from 1619 to 1581 m, but no reaming was required running in, although there was still 6m of fill.

The test string was then run in without problems, but there was again 6 m fill on bottom. DST 1 was successfully run and pulled out without problems.

Some reaming was still required to get back to bottom after the DST, from 793 to 816 m, 870 to 893 m, 1280 to 1313 m and 1426 to 1466 m. This was all reaming near gauge hole through the sand sections. There was no reaming required through the previously troublesome section below 1500m.

Drilling then continued to the 2151 m TD without any further hole problems, with the mud weight actually reduced to 9.8 ppg. A wiper trip was run back to 800 m prior to logging without any reaming being required. Wireline logs were successfully run to bottom. The well was then plugged and abandoned.

Solids Control

The shale shaker screens were changed to 110,84,84 at 1800 m.

The desander and desilter were run continuously while circulating, while the mud was unweighted. When the mud weight was increased to 10.1 ppg the desilter was only run as required to control or reduce the mud weight.

Conclusions & Recommendations

- The tight hole in the 8-1/2" section appeared to be a due to an overpressured Belfast Formation. While circulating at 1875 m after a wiper trip the nature and amount of the cuttings indicated the hole was sloughing. The cuttings, however, remained firm and dry suggesting lack of inhibition was not a contributing cause. These conclusions appeared to be borne out as hole conditions improved after 1875 m with the increased mud weight and still only just under 5% KCl content.

- The actual mud cost of $24,243 for this section was 35% higher than the programmed cost of $18,007. This was mostly due to the increased Barite and KCl consumption resulting from the increased mud weight and KCl content..

- PAC-L was used with PAC-R to control filtration instead of the DEXTRID programmed. The PAC L worked well providing good filtrate control at a comparable cost with no problems of bacterial decay which can cause problems when using DEXTRID.

- The caliper run at TD showed the section from 1500 m to 1875 m, through the Belfast Mudstone to be overgauge at an average of 10.5 to 11.5 inches. This confirms earlier indications that the formation was sloughing and causing tight hole problems due to overpressure. The remainder of the caliper through to TD showed the hole to be in very good gauge through the Eumeralla.

APPENDIX A

FORMATION TOPS

FORMATION	DEPTH m	PROGNOSED DEPTH m
Port Campbell Limestone	Surface	Surface
Gellibrand Marl		49.7
Narrawaturk	577	629.7
Mepunga	638	693.7
Dilwyn	698.5	748.7
Pember Mudstone	1017	
Pebble Point	1054	
Paaratte	1159	1168.7
Skull Creek Mudstone		
Nullawarre Greensand		
Belfast Mudstone	1637	1718.7
Waarre	1870.5	1919.7
Eumeralla	1899	1985.7
TD	2151	2150

APPENDIX B

8-1/2" HOLE CALIPER DATA

DEPTH m	HOLE SIZE ins	DEPTH m	HOLE SIZE ins
375	11	1600	9.5
400	11	1625	10
425	11.5	1650	10.5
450	12	1675	11
475	11	1700	11.5
500	12	1725	11
525	13	1750	10.5
550	13	1775	10.5
575	12	1800	10.5
600	10	1825	11
625	10	1850	10
650	8.5	1875	8.5
675	8.5	1900	8.5
700	8.5	1925	8.5
725	8.5	1950	8.5
750	10	1975	8.5
775	9	2000	8.5
800	8.5	2025	8.5
825	8.5	2050	8.5
850	8.5	2075	8.5
875	8.5	2100	8.5
900	8.5	2125	8.5
925	8.5		
950	8.5		
975	8.5		
1000	8.5		
1025	9		
1050	8.5		
1075	8.5		
1100	8.5		
1125	8.5		
1150	8.5		
1175	8.5		
1200	8.5		
1225	8.5		
1250	8.5		
1250	8.5		
1275	8.5		
1300	8.5		
1325	8.5		
1350	8.5		
1375	9		
1400	9.5		
1425	8.5		
1450	8.5		
1475	9.5		
1500	10.5		
1525	11		
1550	8.5		
1575	10		

RECAP TABLES

Baroid Australia Pty Ltd.

MATERIAL RECAP

COMPANY G.F.E. Resources Ltd
WELL Howmains-1
LOCATION Otway Basin, Victoria

HOLE SIZE 12.25
CONTRACTOR/RIG Century Rig 11
MUD TYPE Hi Vis GEL to 1%KCl Native

INTERVAL TO (m)	359	DRILLING DAYS	4	COST/DAY	A$1,831.35
FROM (m)	12	ROTATING HRS	15	COST/m	A$21.11
DRILLED (m)	347			COST/bbl	A$4.42
DATE	7-Jul-94			CONSUMPTION FACTOR (bbl/m)	4.78

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	76	251	4.9	8.3	1,089.08	3,596.83
Caustic Soda	25 kg	32.43	2	7	0.1	0.2	64.86	227.01
Lime	20 kg	6.43	9	4	0.5	0.1	57.87	25.72
KCL,Tech(sx)	25 kg	14.44	61	50	4.0	1.7	880.84	722.00
Kwikseal M	40 lb	50.16		34		0.8		1,705.44
EZ MUD L	19 lt	82.15		8		0.2		657.20
Mica M	25 kg	19.56		20		0.7		391.20
						COST LESS BARITE :	A$2,092.65	A$7,325.40
						COST WITH BARITE :	A$2,092.65	A$7,325.40

VOLUMES		EST	ACT
Sea W.	bbl		
Drill W.	bbl	838	1632
other	bbl		
other	bbl		
Chemical	bbl	10.2	26
Salvaged Mud	bbl		
TOTAL MUD USED	bbl	848	1658

COMMENTS
Higher than estimated volumes and LCM materials used to combat lost circulation.

Baroid Australia Pty Ltd.

MATERIAL RECAP

COMPANY	G.F.E. Resources Ltd	HOLE SIZE	8.5
WELL	Howmains-1	CONTRACTOR/RIG	Century Rig 11
LOCATION	Otway Basin, Victoria	MUD TYPE	KCl/Polymer

INTERVAL TO (m)	1500	DRILLING DAYS	3	COST/DAY	A$3,185.35
FROM (m)	359	ROTATING HRS	53.5	COST/m	A$8.38
DRILLED (m)	1141			COST/bbl	A$7.17
DATE	10-Jul-94			CONSUMPTION FACTOR (bbl/m)	1.17

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	158		3.6		2,264.14	
Caustic Soda	25 kg	32.43	12	12	0.3	0.5	389.16	389.16
Caustic Potash	25 kg	57.35		1		0.0		57.35
CMC EHV	25 kg	106.61	39	16	0.9	0.7	4,157.79	1,705.76
PAC-R	50 lb	170.74	22	18	0.5	0.7	3,756.28	3,073.32
PAC-L	50 lb	170.74		11		0.4		1,878.14
Soda Ash	25 kg	16.15		7		0.3		113.05
KCL,Tech(sx)	25 kg	14.44	158	162	3.6	6.7	2,281.52	2,339.28

	ESTIMATE	ACTUAL
COST LESS BARITE :	A$12,848.89	A$9,556.06
COST WITH BARITE :	A$12,848.89	A$9,556.06

VOLUMES		EST	ACT
Sea W.	bbl		
Drill W.	bbl	2162	897
other	bbl		
other	bbl		
Chemical	bbl	29	18
Salvaged Mud	bbl	250	417
TOTAL MUD USED	bbl	2441	1332

COMMENTS

Baroid Australia Pty Ltd.

MATERIAL RECAP

COMPANY	G.F.E. Resources Ltd	HOLE SIZE	8.5
WELL	Howmains-1	CONTRACTOR/RIG	Century Rig 11
LOCATION	Otway Basin, Victoria	MUD TYPE	KCl/EZ MUD/Polymer

INTERVAL TO (m)	2151	DRILLING DAYS	11	COST/DAY	A$2,217.71
FROM (m)	1500	ROTATING HRS	114.5	COST/m	A$37.47
DRILLED (m)	651			COST/bbl	A$13.46
DATE	21-Jul-94			CONSUMPTION FACTOR (bbl/m)	2.78

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		10		0.3		143.30
Barite,sx	50 kg	15.96		63		3.8		1,005.48
Barite,sx	25 kg	7.98	90	337	3.3	10.2	718.20	2,689.26
Caustic Soda	25 kg	32.43	8		0.3		259.44	
Caustic Potash	25 kg	57.35		29		0.9		1,663.15
DEXTRID	50 lb	54.32	70		2.3		3,802.40	
PAC-R	50 lb	170.74	28	35	0.9	1.0	4,780.72	5,975.90
PAC-L	50 lb	170.74		25		0.7		4,268.50
KCL,Tech(sx)	25 kg	14.44	315	418	11.5	12.7	4,548.60	6,035.92
EZ MUD L	19 lt	82.15	23	18	0.6	0.4	1,889.45	1,478.70
BARACOR 129	25 kg	64.96	8	9	0.3	0.3	519.68	584.64
BARACIDE	25 kg	549.92	2	1	0.1	0.0	1,099.84	549.92

	ESTIMATE	ACTUAL
COST LESS BARITE :	A$16,900.13	A$20,700.03
COST WITH BARITE :	A$17,618.33	A$24,394.77

VOLUMES

		EST	ACT
Sea W.	**bbl**		
Drill W.	**bbl**	819	1082
other	**bbl**		
other	**bbl**		
Chemical	**bbl**	41.7	61
Salvaged Mud	**bbl**	650	670
TOTAL MUD USED	**bbl**	1511	1813

COMMENTS

Mud required weighting up with barite due to over pressured Belfast Formation.

Baroid Australia Pty Ltd.

MATERIAL SUMMARY

COMPANY G.F.E. Resources Ltd
WELL Howmains-1

LOCATION Otway Basin, Victoria
CONTRACTOR/RIG Century Rig 11

INTERVAL MUD TYPES	SIZE	m	DAYS	HOURS
Hi Vis GEL to 1%KCl Native	12.25	347	4	15
KCl/Polymer	8.5	1141	3	53.5
KCl/EZ MUD/Polymer	8.5	651	11	114.5
TOTALS		2139	18	183

WELL DURATION
FROM : 04-Jul-94
TO : 21-Jul-94

COST/DAY	A$2,293.12
COST/m	A$19.30
COST/bbl	A$11.11
CONSUMPTION FACTOR (bbl/m)	1.74

RECAP BY Philip Innes

MATERIAL	UNIT SIZE	UNIT COST	QUANTITY ESTIMATE	QUANTITY ACTUAL	TOTAL COSTS ESTIMATE	TOTAL COSTS ACTUAL
AQUAGEL,sx	25 kg	14.33	234	261	3,353.22	3,740.13
Barite,sx	50 kg	15.96		63		1,005.48
Barite,sx	25 kg	7.98	90	337	718.20	2,689.26
Caustic Soda	25 kg	32.43	22	19	713.46	616.17
Caustic Potash	25 kg	57.35		30		1,720.50
CMC EHV	25 kg	106.61	39	16	4,157.79	1,705.76
DEXTRID	50 lb	54.32	70		3,802.40	
PAC-R	50 lb	170.74	50	53	8,537.00	9,049.22
PAC-L	50 lb	170.74		36		6,146.64
Soda Ash	25 kg	16.15		7		113.05
Lime	20 kg	6.43	9	4	57.87	25.72
KCL,Tech(sx)	25 kg	14.44	534	630	7,710.96	9,097.20
Kwikseal M	40 lb	50.16		34		1,705.44
EZ MUD L	19 lt	82.15	23	26	1,889.45	2,135.90
BARACOR 129	25 kg	64.96	8	9	519.68	584.64
BARACIDE	25 kg	549.92	2	1	1,099.84	549.92
Mica M	25 kg	19.56		20		391.20
COST LESS BARITE :					A$31,841.67	A$37,581.49
COST WITH BARITE :					A$32,559.87	A$41,276.23

VOLUMES		ESTIMATE	ACTUAL
Sea W.	bbl		
Drill W.	bbl	3819	3611
other	bbl		
other	bbl		
Chemical	bbl	80.9	105
Salvaged Mud	bbl		
TOTAL MUD USED	bbl	3900	3716

COMMENTS
Higher costs than estimated due to lost circulation in 12 1/4" surface hole and weighting up in 8 1/2" hole.

Baroid Australia Pty Ltd.

MATERIAL RECAP
NON-DRILLING

COMPANY G.F.E. Resources Ltd
WELL Howmains-1
LOCATION Otway Basin, Victoria

HOLE SIZE
CONTRACTOR/RIG Century Rig 11
USED FOR

MATERIAL	UNIT SIZE	UNIT COST	QUANTITY EST	QUANTITY ACT	CONC (lb/bbl) EST	CONC (lb/bbl) ACT	TOTAL COSTS ESTIMATE	TOTAL COSTS ACTUAL
Barite,sx	50 kg	15.96		17				271.32
Barite,sx	25 kg	7.98		11				87.78
BARAFILM	25 lt	159.7		3				479.10

COST LESS BARITE : A$479.10
COST WITH BARITE : A$838.20

VOLUMES		
Sea W.	bbl	
Drill W.	bbl	
other	bbl	
other	bbl	
Chemical	bbl	2
Salvaged Mud	bbl	
TOTAL MUD USED	bbl	2

COMMENTS
Barite sacks broken when transporting material around lease with forklift.
BARAFILM used to coat pipe at end of well.

Baroid Australia Pty Ltd.

COMPANY G.F.E. Resources Ltd

WELL Howmains-1

WEEKLY INVENTORY

Page 1

YEAR 1994

MATERIAL	DATE	04/07			05/07			06/07			07/07			08/07			09/07			10/07		
	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	233		96		480	576	18		558			558			558			558			558
Barite,sx	50 kg			187			187			187			187			187			187	17		170
Barite,sx	25 kg			270			270			270			270			270			270	11		259
Caustic Soda	25 kg	6		13		42	55	1		54			54			54	10		44	2		42
Caustic Potash	25 kg					40	40			40			40			40			40	1		39
CMC EHV	25 kg			56			56			56			56	2		54	14		40			40
DEXTRID	50 lb		40	80			80			80			80		40	120			120			120
PAC-R	50 lb			15			15			15			15	1	40	54	9		45	8		37
PAC-L	50 lb			36			36			36			36			36	3		33	8		25
Soda Ash	25 kg			18			18			18			18			18	7		11			11
Lime	20 kg	4	54	62			62			62			62			62			62			62
KCL,Tech(sx)	25 kg		200	200			200	50		150			150	60	400	490	54		436	48		388
QB-II	25 kg			14			14			14			14			14			14			14
EZ SPOT	208 lt			2			2			2			2			2			2			2
Kwikseal M	40 lb	34				20	20			20			20			20			20			20
BARAFILM	25 lt			1			1			1			1			1			1			1
Sodium Nitrate	50 kg			1			1			1			1			1			1			1
EZ MUD L	19 lt	8		18			18			18			18			18			18			18
BARACOR 129	25 kg																					
BARACIDE	25 kg														2	2			2			2
Mica F	25 kg					40	40			40			40			40			40			40
Mica M	25 kg					40	40	20		20			20			20			20			20

Baroid Australia Pty Ltd.

COMPANY G.F.E. Resources Ltd

WELL Howmains-1

WEEKLY INVENTORY

YEAR 1994

MATERIAL	DATE / Size	11/07 Used	11/07 Rec	11/07 Bal	12/07 Used	12/07 Rec	12/07 Bal	13/07 Used	13/07 Rec	13/07 Bal	14/07 Used	14/07 Rec	14/07 Bal	15/07 Used	15/07 Rec	15/07 Bal	16/07 Used	16/07 Rec	16/07 Bal	17/07 Used	17/07 Rec	17/07 Bal
AQUAGEL,sx	25 kg			558			558			558			558			558	10		548			548
Barite,sx	50 kg			170			170			170			170	43		127			127			127
Barite,sx	25 kg		160	419	70		349	70		279			279	197	400	482			482			482
Caustic Soda	25 kg			42			42			42			42			42			42			42
Caustic Potash	25 kg	6		33	4		29	2		27	5		22	2		20			20	2		18
CMC EHV	25 kg			40			40			40			40			40			40			40
DEXTRID	50 lb			120			120			120			120			120			120			120
PAC-R	50 lb	12	40	65	4		61	3		58			58			58			58	6		52
PAC-L	50 lb	4		21	3		18	1		17	2		15	3		12	3		9	3		6
Soda Ash	25 kg			11			11			11			11			11			11			11
Lime	20 kg			62			62			62			62			62			62			62
KCL,Tech(sx)	25 kg	126	100	362	24		338	12		326	23		303	100	5	208	19		189	64		125
QB-II	25 kg			14			14			14			14			14			14			14
EZ SPOT	208 lt			2			2			2			2			2			2			2
Kwikseal M	40 lb			20			20			20			20			20			20			20
BARAFILM	25 lt		2	3			3			3			3			3			3			3
Sodium Nitrate	50 kg			1			1			1			1			1			1			1
EZ MUD L	19 lt			18	6		12	8		4	4											
BARACOR 129	25 kg	1	11	10	2		8	1		7	2		5			5			5	1		4
BARACIDE	25 kg			2			2			2	1		1			1			1			1
Mica F	25 kg			40			40			40			40			40			40			40
Mica M	25 kg			20			20			20			20			20			20			20

Baroid Australia Pty Ltd.

WEEKLY INVENTORY

YEAR 1994

COMPANY G.F.E. Resources Ltd

WELL Howmains-1

MATERIAL	DATE	18/07			19/07			20/07			21/07		
	Size	Used	Rec	Bal	Used	Rec	Bal	Used	Rec	Bal	Used	Rec	Bal
AQUAGEL,sx	25 kg			548			548			548			548
Barite,sx	50 kg			127			127	20		107			107
Barite,sx	25 kg			482			482			482			482
Caustic Soda	25 kg			42			42			42			42
Caustic Potash	25 kg	2		16	5		11	1		10			10
CMC EHV	25 kg			40			40			40			40
DEXTRID	50 lb			120			120			120			120
PAC-R	50 lb	6		46	4		42			42			42
PAC-L	50 lb	3		3	3								
Soda Ash	25 kg			11			11			11			11
Lime	20 kg			62			62			62			62
KCL,Tech(sx)	25 kg	4		121	45		76	1		75			75
QB-II	25 kg			14			14			14			14
EZ SPOT	208 lt			2			2			2			2
Kwikseal M	40 lb			20			20			20			20
BARAFILM	25 lt			3			3			3	3		
Sodium Nitrate	50 kg			1			1			1			1
EZ MUD L	19 lt												
BARACOR 129	25 kg	1		3	1		2			2			2
BARACIDE	25 kg			1			1			1			1
Mica F	25 kg			40			40			40			40
Mica M	25 kg			20			20			20			20

Baroid Australia Pty Ltd

MATERIAL RECONCILIATION

COMPANY GFE Resources Ltd
WELL Howmains-1

LOCATION Otway Basin, Victoria
CONT/RIG Century Rig 11

DATES : FROM 04-Jul-94
TO 21-Jul-94

MATERIAL	UNIT SIZE	ON SITE PRICE (A$)	DELIVERIES BY DT No. or from: Mylor 1 Bridge	GFE Cobden	337118 30/6/94	337119 4/7/94	338222 5/7/94	78872 12/7/94	TOTAL	VALUE (A$)	INTERVAL USEAGE: (1) 12.25	(2) 8.5	(3) 8.5	Non Drlg	TOTAL	VALUE (A$)	FINAL INVENTORY: Rig	Cobden	VALUE (A$)	COMMENTS
AQUAGEL,sx	25 kg	14.33	329			480			809	11592.97	251		10		261	3740.13	548		7852.84	
Barite,sx	50 kg	15.96	187						187	2984.52			63	17	80	1276.8	107		1707.72	
Barite,sx	25 kg	7.98	270				160	880	1310	10453.8			337	11	348	2777.04	482	480	7676.76	480 stored in Cobden
Caustic Soda	25 kg	32.43	19		42				61	1978.23	7	12			19	616.17	42		1362.06	
Caustic Potash	25 kg	57.35				40			40	2294		1	29		30	1720.5	10		573.5	
CMC EHV	25 kg	106.61	56						56	5970.16		16			16	1705.76	40		4264.4	
DEXTRID	50 lb	54.32	40		80				120	6518.4							120		6518.4	
PAC-R	50 lb	170.74	15		80				95	16220.3		18	35		53	9049.22	42		7171.08	
PAC-L	50 lb	170.74	36						36	6146.64		11	25		36	6146.64				
Soda Ash	25 kg	16.15	18						18	290.7		7			7	113.05	11		177.65	
Lime	20 kg	6.43	12		54				66	424.38	4				4	25.72	62		398.66	
KCL,Tech(sx)	25 kg	14.44		105	600				705	10180.2	50	162	418		630	9097.2	75		1083	105 from Langley-1
QB-II	25 kg	32.92	14						14	460.88							14		460.88	
EZ SPOT	208 lt	761.18	2						2	1522.36							2		1522.36	
Kwikseal M	40 lb	50.16	34			40			74	3711.84	34				34	1705.44	20	20	2006.4	20 stored in Cobden
BARAFILM	25 lt	159.7	1				2		3	479.1				3	3	479.1				
Sodium Nitrate	50 kg	80.83	1						1	80.83							1		80.83	
EZ MUD L	19 lt	82.15	26						26	2135.9	8		18		26	2135.9				
BARACOR 129	25 kg	64.96		3			8		11	714.56			9		9	584.64	2		129.92	3 from langley-1
BARACIDE	25 kg	549.92			2				2	1099.84			1		1	549.92	1		549.92	
Mica F	25 kg	19.56				40			40	782.4							40		782.4	
Mica M	25 kg	19.56				40			40	782.4	20				20	391.2	20		391.2	
TOTALS A$										86824.41						42114.43			44709.9	

Baroid Australia Pty Ltd.

SOLIDS CONTROL and MUD VOLUME ANALYSIS

COMPANY G.F.E. Resources Ltd
WELL Howmains-1
LOCATION Otway Basin, Victoria
CONT/RIG Century Rig 11

1994

SOLIDS CONTROL		04-Jul	05-Jul	06-Jul	07-Jul	08-Jul	09-Jul	10-Jul	11-Jul	12-Jul	13-Jul
Shaker 1	Screens	50,50,50	50,50,50	3x50	2x50,84	2x50,84	2x50,84	2x50,84	2x50,84	2x50,84	2x50,80
	Hrs	4.5		15.5	3	7	22	22	15.5	21	21
Shaker 2	Screens										
	Hrs										
Shaker 3	Screens										
	Hrs										
Shaker 4	Screens										
	Hrs										
Desander 2x12"	U/F ppg			11.4	11.4	11.1	12.7	12.9	12.3	10	12.1
	bbl/hr			1.64	1.64	1.05	3.29	1.02	3.06	3.57	1.43
	Hrs			8	1	7	22	22	15.5	21	20
	bbl			13	2	7	72	22	47	75	29
Desilter 1. 11x4"	U/F ppg	11.5		12.6	12.6	11	14.1	13.2	13.7	15.8	14.1
	bbl/hr	8		6.43	6.43	2.15	3.9	3.84	2.62	0.39	0.99
	Hrs	1		8	1	7	22	22	15.5	21	20
	bbl	8		51	6	15	86	84	41	8	20
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		04-Jul	05-Jul	06-Jul	07-Jul	08-Jul	09-Jul	10-Jul	11-Jul	12-Jul	13-Jul
Downhole Volume		49	50	149	92	122	238	298	314	345	373
Initial Reserve			61	61	4	4	68		62	68	50
Added:	Act Mud	58									
	Seawater										
	Drill-Water			60		62	360	350	180	120	120
	other										
	other										
	Chemical	3		6		2	6	4	11	2	2
Final Reserve		61	61	4	4	68		62	68	50	68
Initial Active			164	242	450	325	379	335	352	355	355
Added:	Res Mud			123			434	292	185	140	104
	Seawater										
	Drill-Water	950	79	448	98	121					
	other										
	other										
	Chemical	17				3	2	3	1	5	4
Losses:	Solids Control	8		64	8	22	158	106	88	83	49
	Lost/Dumped			100	272	18	166	112	79	16	25
	DownHole	688		100			40			15	20
Final Active		164	242	450	325	379	335	352	355	355	341
Total Final Volume		225	303	454	329	447	335	414	423	405	409
DILUTION											
Interval Type		12 1/4"	12 1/4"	12 1/4"	12 1/4"	8.5	8.5	8.5	8.5	8.5	8.5
Depth m		104	104	359	359	615	1160	1437	1511	1658	1788
Daily drilled m		89		255		256	545	277	74	147	130
Daily Dilution bbl		696		264	280	40	364	218	167	114	94
Daily Consumption bbl		970	79	514	98	188	368	357	192	127	126
Interval Drilled m		89	89	344	344	256	801	1078	1152	1299	1429
Interval Dilution bbl		696	696	960	1240	40	404	622	789	903	997
Rate bbl/m		7.82	7.82	2.79	3.6	0.16	0.5	0.58	0.68	0.7	0.7
Interval Consumption bbl		970	1049	1563	1661	188	556	913	1105	1232	1358
Rate bbl/m		10.9	11.79	4.54	4.83	0.73	0.69	0.85	0.96	0.95	0.95

Baroid Australia Pty Ltd.

SOLIDS CONTROL and MUD VOLUME ANALYSIS

COMPANY G.F.E. Resources Ltd
WELL Howmains-1
LOCATION Otway Basin, Victoria
CONT/RIG Century Rig 11

SOLIDS CONTROL		14-Jul	15-Jul	16-Jul	17-Jul	18-Jul	19-Jul	20-Jul	21-Jul		1994 TOTALS
Shaker 1	Screens	2x84,110	2x84,110	2x84,110	2x84,110	2x84,110	2x84,110	2x84,110	2x84,110		
	Hrs	18.5	12.5	2	13	23.5	23.5	13			237.5
Shaker 2	Screens										
	Hrs										
Shaker 3	Screens										
	Hrs										
Shaker 4	Screens										
	Hrs										
Desander	U/F ppg	10.8	10.8		11.8	11.5	11.7	11.7			
2x12"	bbl/hr	0.8	0.8		2.7	2.15	1.9	0.9			
	Hrs	18.5	10		10	6	15	3			179
	bbl	15	8		27	13	29	3			362
Desilter 1.	U/F ppg	123.6	12.6		17.5	15.3	14.1	14.1			
11x4"	bbl/hr	2.4	2.4		4.4	4.4	2.85	0.85			
	Hrs	18.5	8		7	6	15	2			174
	bbl	44	19		31	26	43	2			484
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		14-Jul	15-Jul	16-Jul	17-Jul	18-Jul	19-Jul	20-Jul	21-Jul		
Downhole Volume		416	391	398	397	419	449	504	504		
Initial Reserve		68	59	46	87	68	45	41	33		
Added:	Act Mud							33			91
	Seawater										
	Drill-Water	123	60	60	180	60	180				1915
	other										
	other										
	Chemical	2	1	2	6	1	5				53
Final Reserve		59	46	87	68	45	41	33	16		
Initial Active		341	311	339	319	388	365	373	284		
Added:	Res Mud	134	74	21	205	84	189	41	17		2043
	Seawater										
	Drill-Water										1696
	other										
	other										
	Chemical	1	18					2	1		57
Losses:	Solids Control	59	27		58	39	72	5			846
	Lost/Dumped	43	42	14	59	26	59	3	2		1036
	DownHole	20	20	20	20	20	20	36	16		1035
Final Active		311	339	319	388	365	373	284	284		
Total Final Volume		370	385	406	456	410	414	317	300		
DILUTION											
Interval Type		8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5		
Depth m		1875	1875	1875	1901	2004	2145	2151	2151		
Daily drilled m		87			26	103	141	6			2136
Daily Dilution bbl		122	89	34	137	85	151	44	18		2917
Daily Consumption bbl		126	79	62	186	61	185	2	1		3721
Interval Drilled m		1516	1516	1516	1542	1645	1786	1792	1792		
Interval Dilution bbl		1125	1214	1248	1385	1470	1621	1665	1683		
Rate bbl/m		0.74	0.8	0.82	0.9	0.89	0.91	0.93	0.94		
Interval Consumption bbl		1490	1569	1631	1817	1878	2063	2065	2066		
Rate bbl/m		0.98	1.03	1.08	1.18	1.14	1.16	1.15	1.15		

Baroid Australia Pty Ltd.

COMPANY G.F.E. Resources Ltd
WELL Howmains-1

WATER BASE MUD PROPERTIES

YEAR 1994

		04/07		05/07		06/07		07/07		08/07		09/07		10/07		11/07		12/07		13/07		14/07		15/07	
Sample Location	IN or OUT	In	In	In		IN	OUT	IN	IN	IN	OUT	OUT	OUT	OUT	OUT	IN	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT	OUT
Time Sample Taken	hrs	13:00	17:00	22:00		11:00	23:55	05:00	21:00	17:00	23:55	14:00	24:00	13:15	23:55	10:30	23:55	12:00	24:00	12:10	24:00	12:10	18:20	12:30	22:40
Depth	m	15	95	104		96	359	359		392	615	950	1160	1280	1437	1509	1511	1578	1658	1723	1788	1850	1875	1875	1875
Hole Size	ins	12.2	12.2	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	8.5
Flowline Temp	°C									28	32	38	39	38	41	43	40	43	44	43	44	44	44	38	40
Weight	ppg	8.6	8.7	8.6		8.7	8.8	8.8	8.8	8.6	9	9.2	9.25	9.25	9.25	9.35	9.4	9.4	9.6	9.8	9.8	9.8	9.75	9.75	10.1
Funnel Viscosity	sec/qt	50	40	35		40	44	47	46	38	44	41	44	41	42	42	48	47	47	48	50	50	50	51	50
600 rpm	lb/100 ft²	50	37	20		30	44	46	46	41	44	45	51	47	55	36	58	64	67	65	67	62	61	68	66
300 rpm	lb/100 ft²	45	30	15		22	36	38	39	36	33	29	33	31	35	23	37	40	43	42	44	40	39	43	41
200 rpm	lb/100 ft²																								
100 rpm	lb/100 ft²																								
6 rpm	lb/100 ft²																								
3 rpm	lb/100 ft²																								
Plastic Viscosity	cP	5	7	5		8	8	8	7	5	11	16	18	16	20	13	21	24	24	23	23	22	22	25	25
Yield Point	lb/100 ft²	40	23	10		14	28	30	32	31	22	13	15	15	15	10	16	16	19	19	21	18	17	18	16
Gel - 10 sec	lb/100 ft²	20	5	3		4	5	8	8	9	8	2	2	2	2	1	2	2	2	2	2	2	2	2	2
Gel - 10 min	lb/100 ft²	25	15	6		6	8	10	15	12	16	7	8	7	6	4	7	6	7	5	9	7	6	6	8
Gel - 30 min	lb/100 ft²																								
API Filtrate	ml/30min	N.C.	15	15		N/C	N/C	N/C	N/C	N/C	N/C	8.4	7.6	7.2	7.4	7.6	6	6	6	6	6	6.4	6.4	6.4	6.8
API Filter Cake	32nd ins		3			3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1
HPHT Filtrate	ml/30min																								
HPHT Filter Cake	32nd ins																								
HPHT Temp	°F																								
Solids	% Vol	2.5	3	2.5		2.8	3	3.3	3.3	2	5	5.1	5.1	5.4	5.4	6.1	6.3	6.7	7.5	8.6	8.6	8.7	8.4	8.4	8.5
Oil	% Vol																								
Water	% Vol	97.5	97	97.5		97.2	96.5	96.5	96.5	97.7	94.7	94	94	93.7	93.7	92.2	92	91.7	91	90	90.1	90.1	90.4	90.4	89.5
Sand	% Vol			0.1		1	0.5	1.5	0.75	0.25	0.25	1.25	1	0.75	1	0.2	0.25	0.5	0.5	0.5	0.4	0.5	0.5	0.5	1
Methylene Blue cap	ppb	15	10	12		12	12	11	11	8	10	14	15	11	12	13	12	13	13	12	13	13	13	13	13
pH	meter	10.5	10	10		11.5	10	9.5	9.5	11.5	10	9.5	10	10	9	9.5	9.5	9.5	9	9	9	9.5	9.5	9.5	9.5
Alk. Mud Pm	ml	0.4	0.35	0.4		4.6	2.8	1.45	1.45	2.25	1	1.25	1.65	1.3	1.2	1.1	1.4	1.3	1.1	0.9	0.9	0.85	0.8	0.8	0.85
Alk. Filtrate Pf	ml	0.1	0.1	0.1		1.5	0.4	0.12	0.15	1.1	0.35	0.1	0.2	0.25	0.1	0.15	0.05	0.1	0.05	0.1	0.05	0.15	0.15	0.15	0.1
Alk. Mf	ml	0.15	0.15	0.15		1.75	0.55	0.22	0.25	1.25	0.5	0.25	0.35	0.35	0.2	0.2	0.15	0.25	0.2	0.2	0.2	0.3	0.3	0.3	0.25
Chlorides	mg/Lx10³	0.3	0.3	0.3		0.3	5.5	2.5	2.5	3	3	10	10	10	10	20	20	19	18	16.5	16	.15	15	15.2	24
Total Hardness	mg/L	80	60	40		40	90	120	120	500	400	320	100	60	80	50	100	100	80	100	80	80	80	80	80
Calcium	mg/L	80	60	40		40	90	120	120	500	400	300	80	60	100	50	100	80	50	80	60	50	50	50	50
KCL	% Wt Soln						1	0.75	0.75	0.75	0.75	1.75	1.75	1.8	1.8	4	4	3.6	3.5	3.5	3.5	3	3	3	4.8
n & K		0.15/1	0.30/4	0.41/1		0.45/1	0.29/5	0.28/6	0.24/8	0.19/1	0.41/2	0.63/0	0.63/0	0.60/0	0.65/0	0.65/0	0.65/0	0.68/0	0.64/0	0.63/0	0.61/0	0.63/0	0.64/0	0.66/0	0.69/0
ASG of Solids	g/cc	2.3	2.5	2.3		2.6	2.7	2.6	2.6	2.4	2.5	2.8	2.9	2.8	2.8	2.7	2.7	2.6	2.8	2.9	2.9	2.9	2.9	2.9	3.2
K+	ppm													9850	9850	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
Sulphite	ppm																	40	40	40	40	40	40	40	10

Baroid Australia Pty Ltd.

WATER BASE MUD PROPERTIES

YEAR 1994

COMPANY G.F.E. Resources Ltd

WELL Howmains-1

		16/07		17/07		18/07		19/07		20/07		21/07
Sample Location	IN or OUT	IN	IN	OUT	OUT	OUT	OUT	OUT	OUT	OUT	IN	IN
Time Sample Taken	hrs	10:40	23:30	13:50	24:00	12:30	24:00	11:30	24:00	7:40	23:00	14:00
Depth	m	1875	1875	1876	1901	1946	2004	2080	2145	2151	2151	2152
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
Flowline Temp	°C				43	43	44	44	44	44		
Weight	ppg	10.1	10.1	10.1	9.85	9.85	9.85	9.85	9.8	9.8	9.8	9.8
Funnel Viscosity	sec/qt	48	43	45	43	43	43	41	41	41	41	41
600 rpm	lb/100 ft²	55	56	48	41	48	45	47	45	42	42	43
300 rpm	lb/100 ft²	33	34	31	27	30	29	30	29	28	28	27
200 rpm	lb/100 ft²											
100 rpm	lb/100 ft²											
6 rpm	lb/100 ft²											
3 rpm	lb/100 ft²											
Plastic Viscosity	cP	22	22	17	14	18	16	17	16	14	14	16
Yield Point	lb/100 ft²	11	12	14	13	12	13	13	13	14	14	11
Gel - 10 sec	lb/100 ft²	2	2	1	1	2	2	2	2	2	1	1
Gel - 10 min	lb/100 ft²	6	6	6	6	6	5	6	5	5	5	5
Gel - 30 min	lb/100 ft²											
API Filtrate	ml/30min	6.4	6.4	7.2	6.6	6.4	6.2	6.4	6.4	6.4	6.4	6.6
API Filter Cake	32nd ins	1	1	1	1	1	1	1	1	1	1	1
HPHT Filtrate	ml/30min											
HPHT Filter Cake	32nd ins											
HPHT Temp	°F											
Solids	% Vol	9	9	9	8.6	8.6	8.8	8.2	8.2	8.2	8.2	8.6
Oil	% Vol											
Water	% Vol	89.1	89.1	89.1	89.4	89.4	89.4	89.9	89.9	89.9	89.9	89.5
Sand	% Vol	0.3	0.3	1	0.25	0.25	0.25	0.1	0.1	0.2	0.2	0.1
Methylene Blue cap	ppb	13	13	13	13	14	14	14	14	14	14	14
pH	meter	9	9	9.5	9.5	9.5	9	9	9.5	9.5	9.5	9.5
Alk. Mud Pm	ml	0.75	0.75	0.75	0.75	0.7	0.75	0.7	0.65	0.6	0.6	0.6
Alk. Filtrate Pf	ml	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.1	0.1	0.1
Alk. Mf	ml	0.2	0.2	0.25	0.2	0.25	0.15	0.15	0.2	0.2	0.2	0.2
Chlorides	mg/Lx10³	24	24	24	24	24	22	23	23	23	23	23
Total Hardness	mg/L	60	60	100	80	80	80	120	120	120	120	120
Calcium	mg/L	40	40	80	60	60	60	100	100	100	100	100
KCL	% Wt Soln	4.8	4.8	4.8	4.8	4.8	4.4	4.6	4.6	4.4	4.4	4.4
n & K		0.74/0	0.72/0	0.63/0	0.60/0	0.68/0	0.63/0	0.65/0	0.63/0	0.58/0	0.58/0	0.67/0
ASG of Solids	g/cc	3.1	3.1	3.1	2.8	2.8	2.8	2.9	2.9	2.9	2.9	2.8
K+	ppm	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******	*******
Sulphite	ppm	10	10	10	40	10	10	10	10	10	10	10

Baroid Australia Pty Ltd.

BIT RECORD

COMPANY G.F.E. Resources Ltd
WELL Howmains-1
LOCATION Otway Basin, Victoria
CONT/RIG Century Rig 11

DATES : FROM 04-Jul-94
TO 10-Jul-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
1	12.25	Varel	L-114	18,20,20	12	359	347	15	23.1	15	10/15	100	0.25	500	10.52	8.8	44	1 1 i Casing depth
2	8.5	Varel	ETD-417	12,13,13	359	1509	1150	53.5	21.5	68.5	25/28	110	2	1025	7.38	9.25	41	8 8 0.5 Slow penetration rate
3	8.5	Varel	ETD-417	12,13,13	1509	1875	366	56	6.5	124.5	22/28	120	1.25	1100	6.9	10.1	50	1 3 0.1 Shirt tail damage
4	8.5	Varel	ETD-517	12,13,13	1875	2151	276	58.5	4.7	183	25/28	90	0.25	1125	6.9	9.8	41	2 4 0.1 Total depth

Baroid Australia Pty Ltd. DIRECTIONAL SURVEYS

COMPANY G.F.E. Resources Ltd

WELL Howmains-1

LOCATION Otway Basin, Victoria

CONT/RIG Century Rig 11

PAGE-1

MD m	TVD m	INCL°	DIR °	DISP m
30	30	0.75		
91	91	0.75		
144	144	0.5		
199	199	0.5		
245	245	0.25		
293	293	0.75		
350	350	0.25		
468	468	0.5		
669	669	0.75		
870	870	0.01		
1052	1052	0.75		
1147	1147	0.75		
1357	1357	1		
1501	1501	2		
1597	1597	2.75		
1635	1635	2.5		
1664	1664	2.75		
1693	1693	2.75		
1721	1721	3.5		
1751	1751	3		
1779	1779	3		
1817	1817	1.75		
1846	1846	1.25		
1884	1884	0.5		
2143	2143	0.25		

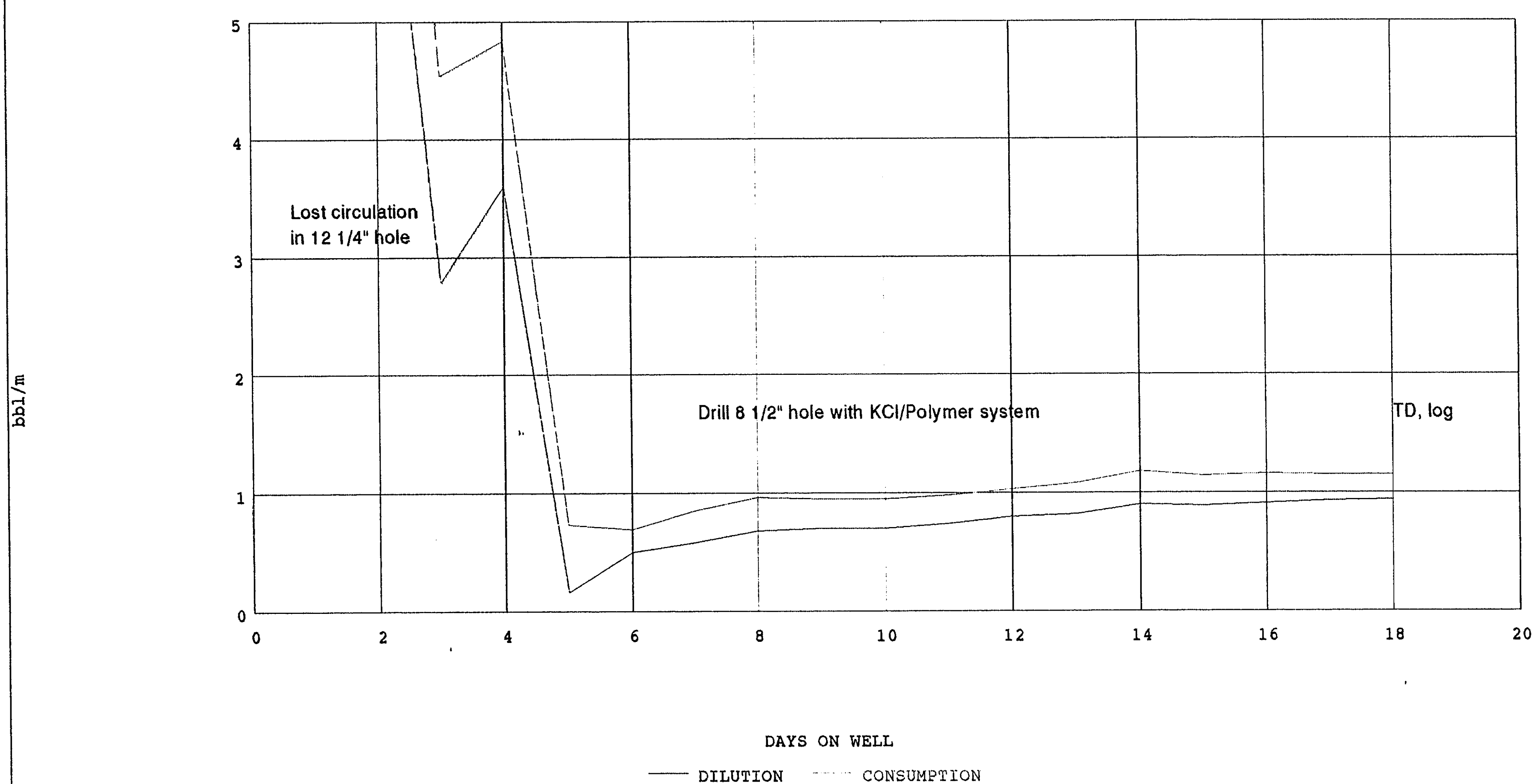
GRAPHS

Baroid Australia Pty Ltd.

GRAPH – 1

COMPANY G.F.E. Resources Ltd
WELL Howmains-1
LOCATION Otway Basin, Victoria
CONT/RIG Century Rig 11

INTERVAL CUMULATIVE DILUTION AND CONSUMPTION RATES



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

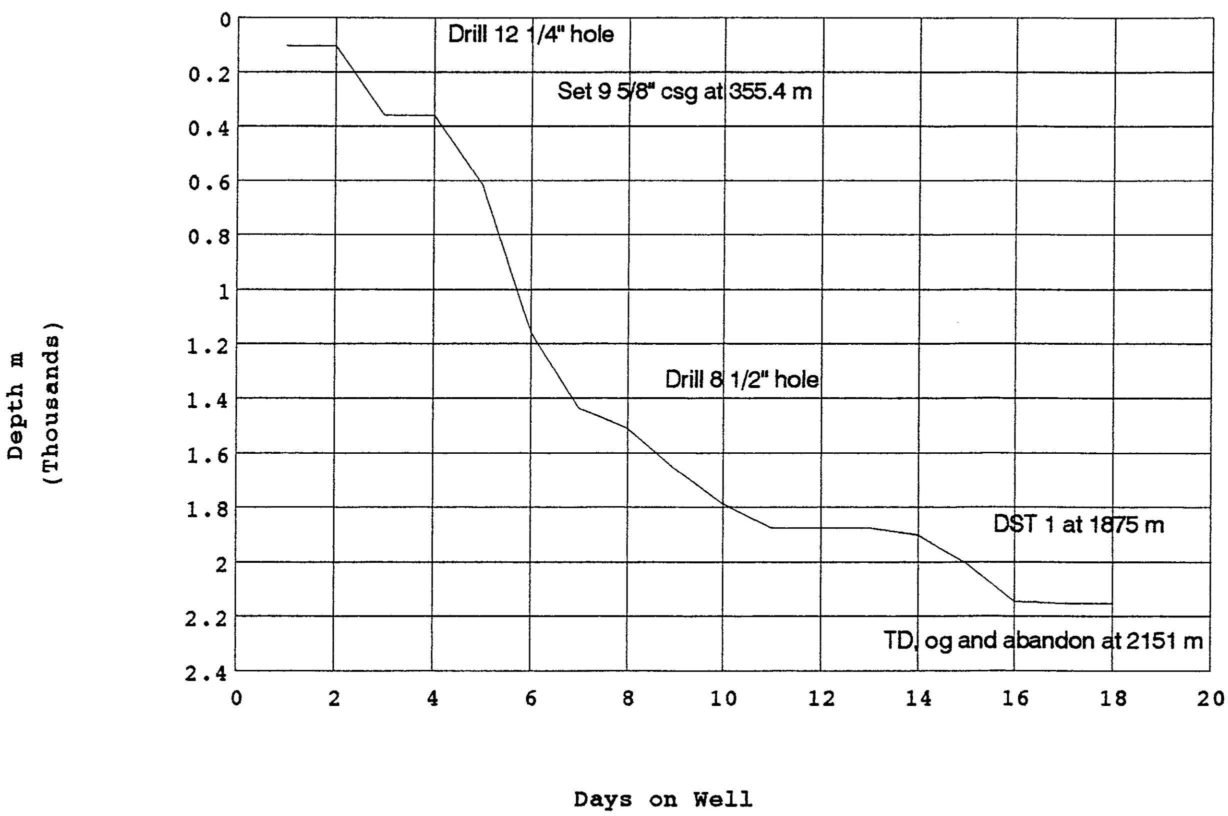
$$\text{Consumption Rate} = \frac{\text{Mud Made}}{\text{Metres Drilled}}$$

Baroid Australia Pty Ltd.

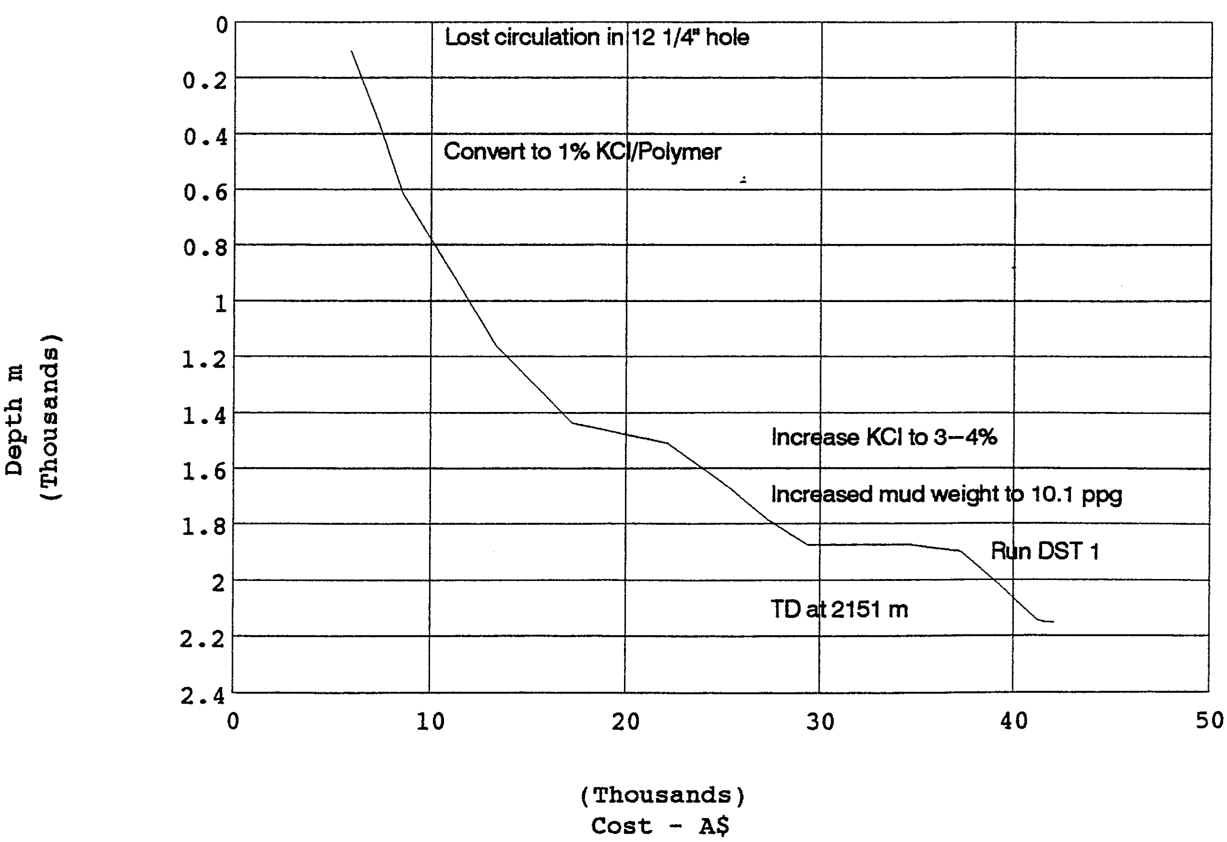
COMPANY G.F.E. Resources Ltd
WELL Howmains-1
LOCATION Otway Basin, Victoria
CONT/RIG Century Rig 11

GRAPH – 2

DEPTH vs DAYS



DEPTH vs COST

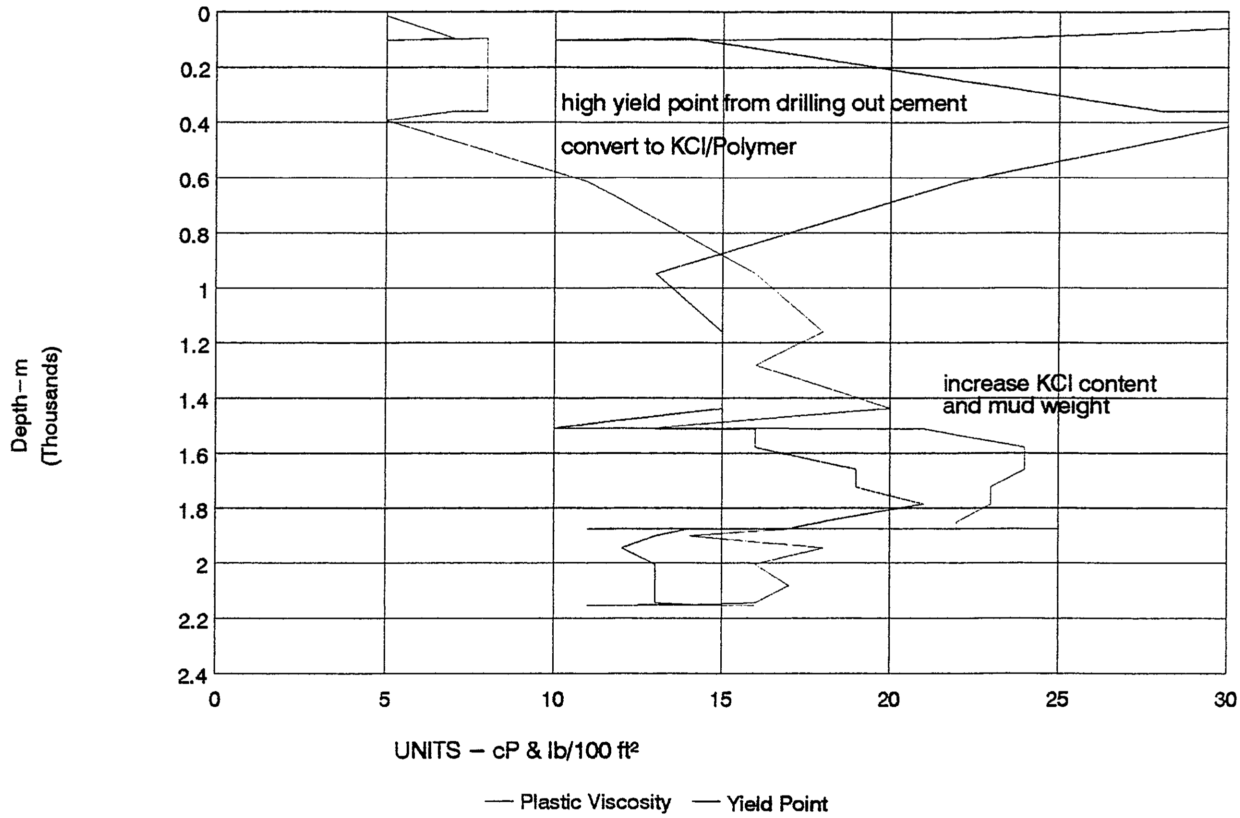


Baroid Australia Pty Ltd.

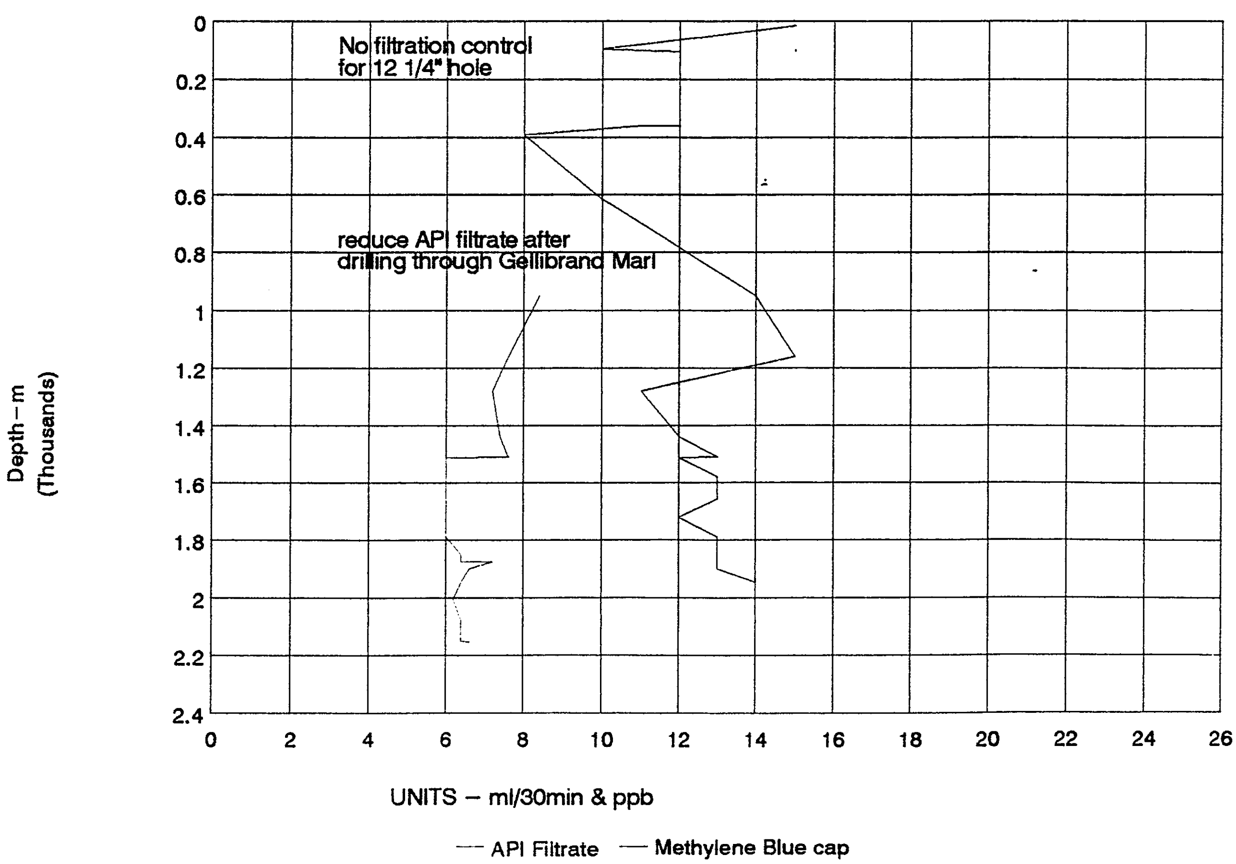
COMPANY G.F.E. Resources Ltd
WELL Howmains-1

GRAPH - 3

Depth vs Plastic Viscosity & Yield Point



Depth vs API Filtrate & Methylene Blue cap

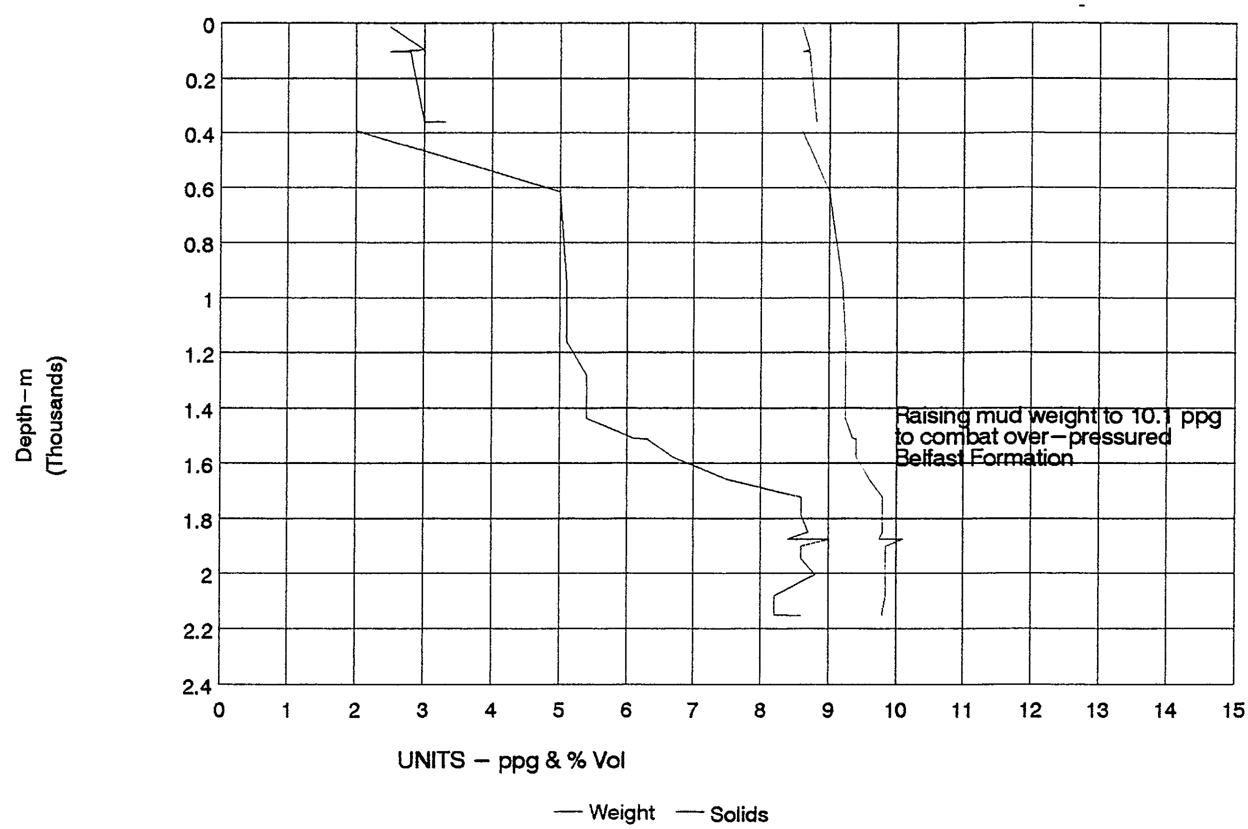


Baroid Australia Pty Ltd.

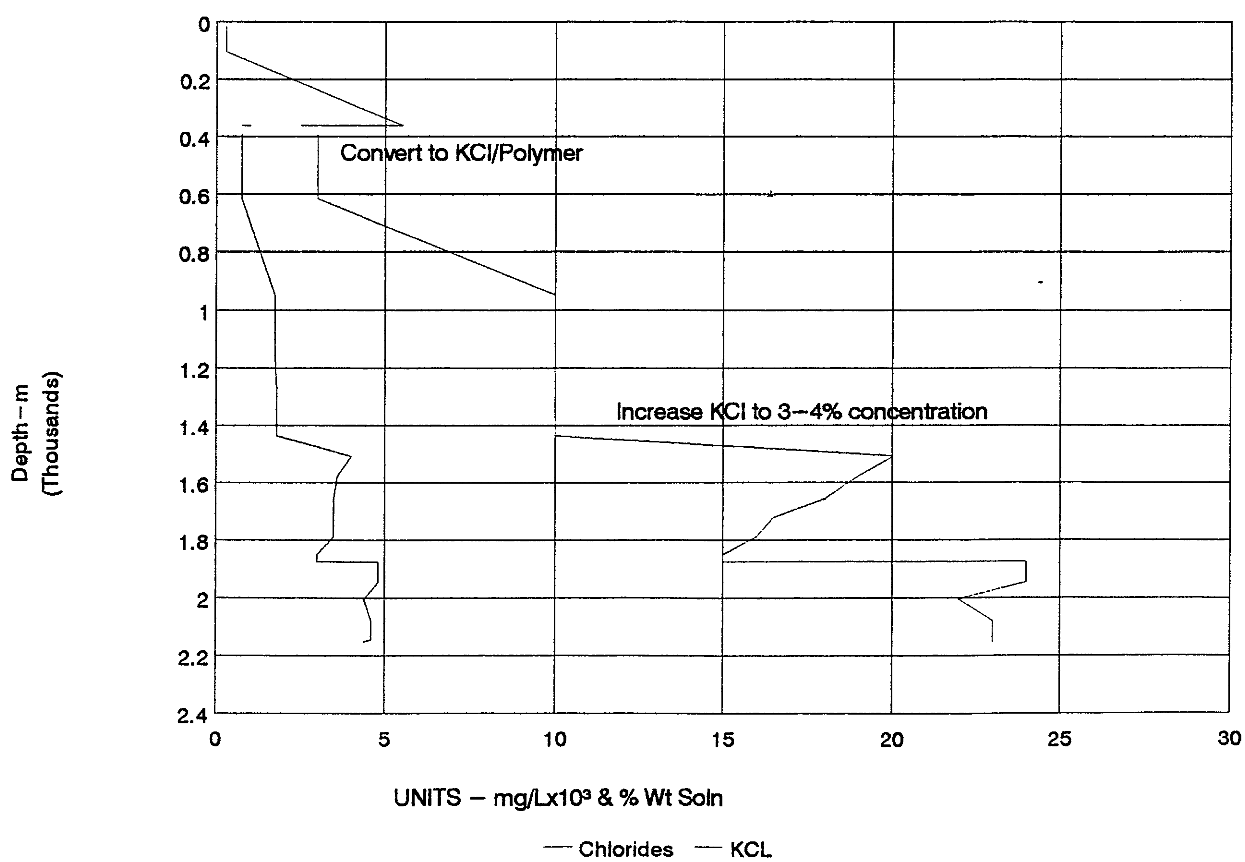
GRAPH – 4

COMPANY G.F.E. Resources Ltd
WELL Howmains-1

Depth vs Weight & Solids



Depth vs Chlorides & KCL



DAILY MUD REPORTS

Baroid Australia Pty Ltd.

MUD REPORT NO. 1	up to 24:00 hrs, 4/7/94		
DATE 5/7/94	DEPTH–m MD 104 TVD 104		
START DATE 4–Jul–94	ACTIVITY Wait on cement		

OPERATOR	CONTRACTOR / RIG	COUNTRY
G.F.E. Resources Ltd	Century Rig 11	Australia
REPORT FOR	**REPORT FOR**	**TOWNSHIP**
Ken Smith	Sean Kelly	Port Campbell
WELL NAME AND NO.	**FIELD OR BLOCK NO.**	**LOCATION**
Howmains–1	PEP 105	Otway Basin, Victoria

BIT DATA / DRILLING STRING / CASINGS

BIT DATA			DRILLING STRING	OD ins	ID ins	Length m	CASINGS Size ins	Depth m
Size 12.250 ins								
Type Var L114			Pipe 1	4.5	3.825	28	Riser	Set @
Nozzles 32nds			Pipe 2					Set @
18	20	20	Pipe 3					Set @
			Col 1	6.125	2.875			Set @
			Col 2	4.5	2.875			Set @
Noz Area 0.86 ins^2			OPEN HOLE SECTIONS					Set @
TFA ins^2			Sect 1					Set @
NV m/sec 24.9			Sect 2				Liner	Set @
Impact lb f 81			Current		12.25	104		Top @

PUMP DATA

Pump Make	ins	x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	7.75	95	0.0525	100	5.25
Nat 8P80	6	8.5	95	0.0705		

Pump Press 250 psi — TOTAL bbl/min 5.25

MUD VOL	bbl	CIRCULATING DATA	AV m/min
Downhole	49	Total circ 41 mins	
Active	164	Bottoms up 2 mins	DP 12.7
Total Circ	213	Surface–bit – mins	DC
Reserve	61	ECD ppg 8.71	Riser

MUD PROPERTIES

Sample Location	IN or OUT	In		In	
Time Sample Taken	hrs	13:00		17:00	
Depth	m	15		95	
Flowline Temp	°C				
Weight	ppg	8.60		8.70	
Funnel Viscosity	sec/qt	50		40	
Plastic Viscosity	cP	5		7	
Yield Point	lb/100 ft^2	40		23	
Gels 10 sec/10min/30 min	lb/100 ft^2	20/25/–		5/15/–	
API Filtrate	ml/30min	N.C.		15.0	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins			3/–	
Solids	% Vol	2.5		3.0	
Dissolved Salts	% Vol				
Oil/Water Content	% Vol	–/97.5		–/97.0	
Sand	% Vol				
Methylene Blue cap	ppb	15		10	
pH	meter	10.5		10.0	
Alk. Mud Pm	ml	0.40		0.35	
Alk. Filtrate, Pf/Mf	ml	0.10/0.15		0.10/0.15	
Chlorides	mg/Lx10^3	0.3		0.3	
Total Hardness/Calcium	mg/L	80/80		60/60	
KCL	% Wt Soln				
n & K		0.15/17.6[illegible]		0.30/4.62	
ASG of Solids	g/cc	2.3		2.5	
Rheometer	600 rpm/300 rpm	50/45		37/30	
lb/100 ft^2	200 rpm/100 rpm				
	6 rpm/3 rpm				

MUD PROPERTY SPECIFICATIONS

WEIGHT ppg VIS sec YP lb/100 ft^2
API Filt ml HTHP ml KCL %
BY AUTHORITY

REMARKS

Engineer arrived on site at 02:00 hrs
Surface conductor set at about 15 m RKB in loose fine sands. Surface topography of area undulating with numerous sunken hollows.
Not a great deal of AQUAGEL or LCM on site to fight lost circulation, as it is very rare onshore Victorian Otway basin. Recommended drilling blind with mud to attempt to reach Gellibrand Marl, while reducing chances of washing out conductor. Used 10 ppb pre–hydrated AQUAGEL with 1 ppb EZ MUD L to provide sufficient volume.
Began getting partial returns after drilling into Port Campbell Lst.
Had about 75 % returns when drilling stopped to attempt to cement conductor.

ACTIVITY

Drilled kelly rathole and mousehole with mud. Spud in at 13:00 hrs with hi–vis freshwater AQUAGEL mud. Lost total circulation almost immediately out of conductor shoe at 21 m. Drilled blind to 32 m. Pumped 30 bbl LCM pill, without any success. Continued drilling blind with mud at slow pump rate from 15:00 hrs. Began getting partial returns from about 70 m. Reached 104 m at 18:30 hrs. Cellar beginning to washout. Spotted a 20 bbl pill of hi–vis pre–hydrated AQUAGEL at 37 m, then spotted a 27 sx cement plug at 28 m.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
AQUAGEL,sx	25 kg	233		96	3338.89
Caustic Soda	25 kg	6		13	194.58
DEXTRID	50 lb		40	80	
Lime	20 kg	4	54	62	25.72
KCL,Tech(sx)	25 kg		200	200	
Kwikseal M	40 lb	34			1705.44
EZ MUD L	19 lt	8		18	657.2

MUD TYPE FW/AQUAGEL

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		50,50,50	4.5
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander				
Desilter 1.	11.5	8	1	8
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	950
other	
other	
Barite	
Chemicals	20
Losses	**bbl**
Sol. Con.	8
Lost/Dumped	
Down Hole	688
Newhole	43
NET GAIN	274
Discharged	8

BAROID Engineer	OFFICE	WAREHOUSE
M. Olejniczak	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST	CUMULATIVE COST
A$ 5921.83	A$ 5921.83

RESERVE PITS / SURVEY DATA

NO	TYPE	bbl	MD m	TVD m	INCL°	DIR °	DISP m
6	LCM	61					
7	Trip						

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	3.2
Low Grav. Solids	ppb	29.1
High Grav. Solids	% Vol	
High Grav. Solids	ppb	
ASG of Solids	g/cc	2.50
Cuttings Volume	bbl	43.0
Interval Dilution	bbl/m	7.8
Interval Consumption	bbl/m	10.9

TIME BREAKDOWN

	hrs
Drilling	4.5
Circulating	
Reaming In	
Reaming out	
Tripping	
Other	17.5
AVE ROP m/hr	19.78

Baroid Australia Pty Ltd.	
MUD REPORT NO. 2 up to 24:00 hrs, 5/7/94	
DATE 6/7/94	DEPTH–m MD 104 TVD 104
START DATE 4–Jul–94	ACTIVITY Waiting on cement

OPERATOR: G.F.E. Resources Ltd	CONTRACTOR / RIG: Century Rig 11	COUNTRY: Australia
REPORT FOR: Ken Smith	REPORT FOR: Sean Kelly	TOWNSHIP: Port Campbell
WELL NAME AND NO.: Howmains–1	FIELD OR BLOCK NO.: PEP 105	LOCATION: Otway Basin, Victoria

BIT DATA / DRILLING STRING / CASINGS

BIT DATA		DRILLING STRING	OD ins	ID ins	Length m	CASINGS Size ins		Depth m
Size ins						Riser	Set @	
Type		Pipe 1	4.5	3.825			Set @	
Nozzles 32nds		Pipe 2					Set @	
		Pipe 3					Set @	
		Col 1	6.125	2.875			Set @	
		Col 2	4.5	2.875			Set @	
Noz Area ins²		OPEN HOLE SECTIONS					Set @	
TFA ins²		Sect 1					Set @	
NV m/sec		Sect 2				Liner	Set @	
Impact lb f		Current		12.25	104		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		AV m/min
Downhole	50	Total circ – mins		
Active	242	Bottoms up – mins		DP
Total Circ	292	Surface–bit – mins		DC
Reserve	61	ECD ppg	8.6	Riser

MUD PROPERTIES

Sample Location	IN or OUT	In			
Time Sample Taken	hrs	22:00			
Depth	m	104			
Flowline Temp	°C				
Weight	ppg	8.60			
Funnel Viscosity	sec/qt	35			
Plastic Viscosity	cP	5			
Yield Point	lb/100 ft²	10			
Gels 10 sec/10min/30 min	lb/100 ft²	3/6/–			
API Filtrate	ml/30min	15.0			
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins				
Solids	% Vol	2.5			
Dissolved Salts	% Vol				
Oil/Water Content	% Vol	–/97.5			
Sand	% Vol	0.1			
Methylene Blue cap	ppb	12			
pH	meter	10.0			
Alk. Mud Pm	ml	0.40			
Alk. Filtrate, Pf/Mf	ml	0.10/0.15			
Chlorides	mg/Lx10³	0.3			
Total Hardness/Calcium	mg/L	40/40			
KCL	% Wt Soln				
n & K		0.41/1.16			
ASG of Solids	g/cc	2.3			
Rheometer	600 rpm/300 rpm	20/15			
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

Added water to active to thin down mud in preparation for drilling cement. One pallet of AQUAGEL at mixing hopper on standby to maintain viscosity. Additional AQUAGEL, Mica and KWIKSEAL arrived, in case of further lost crculation problems.

ACTIVITY

Waited on cement. Attempted to tag the plug without success. Set cement plug no 2 at 08:00 hrs. (58 sxs). Waited on cement until 14:00 hrs. Tagged cement at 27 m. Set cement plug 3, (480 sxs) on top of plug 2 at 16:00 hrs. Tagged cement at 7 m at 18:30 hrs. Continued waiting on cement to harden sufficiently for drilling out.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
AQUAGEL,sx	25 kg		480	576	
Caustic Soda	25 kg		42	55	
Caustic Potash	25 kg		40	40	
Kwikseal M	40 lb		20	20	
Mica F	25 kg		40	40	
Mica M	25 kg		40	40	

MUD TYPE FW/AQUAGEL

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		50,50,50	
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.	79
other	
other	
Barite	
Chemicals	
Losses	**bbl**
Sol. Con.	
Lost/Dumped	
Down Hole	
Newhole	
NET GAIN	79
Discharged	

BAROID Engineer	OFFICE	WAREHOUSE
M. Olejniczak	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST **A$ 0.00** CUMULATIVE COST **A$ 5921.83**

RESERVE PITS

NO	TYPE	bbl
6	LCM	61
7	Trip	

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	3.0
Low Grav. Solids	ppb	27.3
High Grav. Solids	% Vol	
High Grav. Solids	ppb	
ASG of Solids	g/cc	2.30
Cuttings Volume	bbl	
Interval Dilution	bbl/m	7.8
Interval Consumption	bbl/m	11.8

TIME BREAKDOWN

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

Baroid Australia Pty Ltd.

MUD REPORT NO. 3	up to 24:00 hrs, 6/7/94		
DATE 7/7/94	DEPTH–m MD 359	TVD 359	
START DATE 4–Jul–94	ACTIVITY Wiper Trip		

OPERATOR G.F.E. Resources Ltd	CONTRACTOR / RIG Century Rig 11	COUNTRY Australia
REPORT FOR Ken Smith	REPORT FOR Sean Kelly	TOWNSHIP Port Campbell
WELL NAME AND NO. Howmains–1	FIELD OR BLOCK NO. PEP 105	LOCATION Otway Basin, Victoria

BIT DATA / DRILLING STRING / CASINGS

BIT DATA			DRILLING STRING	OD ins	ID ins	Length m	CASINGS Size ins		Depth m
Size 12.250 ins									
Type L114			Pipe 1	4.5	3.825	123	Riser	Set @	
Nozzles 32nds			Pipe 2	4.5	2.8125	55	16	Set @	12
18	20	20	Pipe 3					Set @	
			Col 1	6.5	2.875	160		Set @	
			Col 2	8	2.8125	21		Set @	
Noz Area 0.86 ins²			OPEN HOLE SECTIONS					Set @	
TFA ins²			Sect 1					Set @	
NV m/sec 50.1			Sect 2				Liner	Set @	
Impact lb f 331			Current		12.25	347		Top @	

PUMP DATA

Pump Make	ins	x ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	7.75	95	0.0525	88	4.62
Nat 8P80	6	8.5	95	0.0705	84	5.922

Pump Press 600 psi — TOTAL bbl/min 10.542

MUD VOL	bbl	CIRCULATING DATA	AV m/min	
Downhole	149	Total circ 57 mins		
Active	450	Bottoms up 13 mins	DP	25.5
Total Circ	599	Surface–bit 1 mins	DC	38.4
Reserve		ECD ppg 8.86	Riser	

MUD PROPERTIES

Sample Location	IN or OUT	IN		OUT	
Time Sample Taken	hrs	11:00		23:55	
Depth	m	96		359	
Flowline Temp	°C				
Weight	ppg	8.70		8.80	
Funnel Viscosity	sec/qt	40		44	
Plastic Viscosity	cP	8		8	
Yield Point	lb/100 ft²	14		28	
Gels 10 sec/10min/30 min	lb/100 ft²	4/6/–		5/8/–	
API Filtrate	ml/30min	N/C		N/C	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	3/–		3/–	
Solids	% Vol	2.8		3.0	
Dissolved Salts	% Vol			0.5	
Oil/Water Content	% Vol	–/97.2		–/96.5	
Sand	% Vol	1.0		0.5	
Methylene Blue cap	ppb	12		12	
pH	meter	11.5		10.0	
Alk. Mud Pm	ml	4.60		2.80	
Alk. Filtrate, Pf/Mf	ml	1.50/1.75		0.40/0.55	
Chlorides	mg/Lx10³	0.3		5.5	
Total Hardness/Calcium	mg/L	40/40		90/90	
KCL	% Wt Soln			1.0	
n & K		0.45/1.33		0.29/5.90	
ASG of Solids	g/cc	2.6		2.7	
Rheometer	600 rpm/300 rpm	30/22		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

Start losing returns after drilling out cement.
Treat active with LCM pill. Add mica medium to active.
Mud losses to hole drop from approximately 50bbls/hr to 5bbls/hr after LCM.
Make up 60bbls AQUAGEL premix.
At 149m treat active with 4ppb KCl. Initial high viscosities from mud as KCl added.
Incorporate settling and desander pits into active mud system.
High pH from drilling cement.
Dumping sand trap as required. Adding water to control viscosity.
Appears little or no mud losses to hole on drilling formation.

Total mud losses to hole approximately 100bbls.

ACTIVITY

Wait on cement. Tag cement at7m.
Drill out cement to 28m. Wash and ream 43m to 104m.
Drill from 104m to 359m. Wiper trip.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
AQUAGEL,sx	25 kg	18		558	257.94
Caustic Soda	25 kg	1		54	32.43
KCL,Tech(sx)	25 kg	50		150	722
Mica M	25 kg	20		20	391.2

MUD TYPE FW/KCl/AQUAGEL

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs	
Shaker 1		3x50	15.5	
Shaker 2			.	
Shaker 3				
Shaker 4				
	ppg	bbl/hr	hrs	bbl
Desander	11.4	1.64	8	13
Desilter 1.	12.6	6.43	8	51
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	508
other	
other	
Barite	
Chemicals	6
Losses	**bbl**
Sol. Con.	64
Lost/Dumped	100
Down Hole	100
Newhole	122
NET GAIN	250
Discharged	164

BAROID Engineer	OFFICE	WAREHOUSE
P. Innes, C. Wallace	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST	CUMULATIVE COST
A$ 1403.57	A$ 7325.40

RESERVE PITS / SURVEY DATA

NO	TYPE	bbl	MD m	TVD m	INCL°	DIR °	DISP m
6	Pill		30	30	0.75		
7	Trip		91	91	0.75		
			144	144	0.5		
			199	199	0.5		
			245	245	0.25		
			293	293	0.75		

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	2.8
Low Grav. Solids	ppb	25.5
High Grav. Solids	% Vol	0.2
High Grav. Solids	ppb	2.9
ASG of Solids	g/cc	2.70
Cuttings Volume	bbl	122.0
Interval Dilution	bbl/m	2.8
Interval Consumption	bbl/m	4.5

TIME BREAKDOWN

	hrs
Drilling	9.5
Circulating	
Reaming In	6
Reaming out	
Tripping	
Surveys	3
Other	5.5
AVE ROP m/hr	26.84

Baroid Australia Pty Ltd.

MUD REPORT NO. 4	up to 24:00 hrs,	7/7/94	
DATE 8/7/94	DEPTH–m	MD 359	TVD 359
START DATE 4–Jul–94	ACTIVITY Working on BOP's		

OPERATOR G.F.E. Resources Ltd	CONTRACTOR / RIG Century Rig 11	COUNTRY Australia
REPORT FOR Ken Smith	REPORT FOR John Hughson	TOWNSHIP Port Campbell
WELL NAME AND NO. Howmains–1	FIELD OR BLOCK NO. PEP 105	LOCATION Otway Basin, Victoria

BIT DATA

Size ins	
Type	
Nozzles 32nds	
Noz Area ins²	
TFA ins²	
NV m/sec	
Impact lb f	

DRILLING STRING / OPEN HOLE SECTIONS

	OD ins	ID ins	Length m
Pipe 1	4.5	3.825	
Pipe 2			
Pipe 3			
Col 1	6.5	2.875	
Col 2	4.5	2.8125	
OPEN HOLE SECTIONS			
Sect 1			
Sect 2			
Current		12.25	3.6

CASINGS

Size ins		Depth m
Riser	Set @	
16	Set @	12
9.625	Set @	355.37
	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	92	Total circ – mins		AV m/min
Active	325	Bottoms up – mins		DP
Total Circ	417	Surface–bit – mins		DC
Reserve		ECD ppg	8.8	Riser

MUD PROPERTIES

Sample Location	IN or OUT	IN		IN	
Time Sample Taken	hrs	05:00		21:00	
Depth	m	359			
Flowline Temp	°C				
Weight	ppg	8.80		8.80	
Funnel Viscosity	sec/qt	47		46	
Plastic Viscosity	cP	8		7	
Yield Point	lb/100 ft²	30		32	
Gels 10 sec/10min/30 min	lb/100 ft²	8/10/–		8/15/–	
API Filtrate	ml/30min	N/C		N/C	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	3/–		3/–	
Solids	% Vol	3.3		3.3	
Dissolved Salts	% Vol	0.2		0.2	
Oil/Water Content	% Vol	–/96.5		–/96.5	
Sand	% Vol	1.5		0.8	
Methylene Blue cap	ppb	11		11	
pH	meter	9.5		9.5	
Alk. Mud Pm	ml	1.45		1.45	
Alk. Filtrate, Pf/Mf	ml	0.12/0.22		0.15/0.25	
Chlorides	mg/Lx10³	2.5		2.5	
Total Hardness/Calcium	mg/L	120/120		120/120	
KCL	% Wt Soln	0.8		0.8	
n & K		0.28/6.63		0.24/8.73	
ASG of Solids	g/cc	2.6		2.6	
Rheometer	600 rpm/300 rpm	46/38		46/39	
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

Control viscosities with water while circulating.

Cement displaced with water. Dump excess mud while cementing.

Cement returns to surface. Some loss of returns when cement to surface.

Settling pit and sand trap dumped and cleaned.

No mud material additions made today.

ACTIVITY

Wiper trip, 14m fill. Circulate hole clean.
Pull out of hole. Pick up & run 9 5/8" casing.
Land casing at 355.37m and cement. Wait on cement.
Back off casing at landing joint. Nipple up BOP's.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Barite,sx	50 kg			187	
Barite,sx	25 kg			270	

MUD TYPE FW/KCl/AQUAGEL

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		2x50,84	3
Shaker 2			.
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander	11.4	1.64	1	2
Desilter 1.	12.6	6.43	1	6
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	98
other	
other	
Barite	
Chemicals	
Losses	**bbl**
Sol. Con.	8
Lost/Dumped	272
Down Hole	
Newhole	
NET LOSS	182
Discharged	280

BAROID Engineer	OFFICE	WAREHOUSE
P. Innes, C. Wallace	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST	CUMULATIVE COST
A$ 0.00	A$ 7325.40

RESERVE PITS / SURVEY DATA

NO	TYPE	bbl	MD m	TVD m	INCL°	DIR °	DISP m
6	Pill		350	350	0.25		
7	Trip						

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	3.3
Low Grav. Solids	ppb	30.0
High Grav. Solids	% Vol	
High Grav. Solids	ppb	
ASG of Solids	g/cc	2.60
Cuttings Volume	bbl	
Interval Dilution	bbl/m	3.6
Interval Consumption	bbl/m	4.8

TIME BREAKDOWN

	hrs
Drilling	
Circulating	0.5
Reaming In	0.5
Reaming out	
Tripping	5.5
Surveys	0.5
Run csg & cement	7
Other	9
AVE ROP m/hr	

Baroid Australia Pty Ltd.

MUD REPORT NO.	5 up to 24:00 hrs, 8/7/94		
DATE	9/7/94	DEPTH–m	MD 615 TVD 615
START DATE	4–Jul–94	ACTIVITY	Drilling

OPERATOR: G.F.E. Resources Ltd	CONTRACTOR / RIG: Century Rig 11	COUNTRY: Australia
REPORT FOR: Ken Smith	REPORT FOR: John Hughson	TOWNSHIP: Port Campbell
WELL NAME AND NO.: Howmains–1	FIELD OR BLOCK NO.: PEP 105	LOCATION: Otway Basin, Victoria

BIT DATA

Size	8.500 ins
Type	ETD417
Nozzles	32nds
	12 / 12 / 13
Noz Area	0.35 ins²
TFA ins²	
NV m/sec	83.4
Impact lb f	382

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	3.825	385
Pipe 2			
Pipe 3			
Col 1	6.5	2.875	175
Col 2	4.5	2.8125	55

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	8.5	259.6

CASINGS

Size ins		Depth m
Riser	Set @	
16	Set @	12
9.625	Set @	355.37
	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 950 psi — TOTAL bbl/min 7.14

MUD VOL	bbl	CIRCULATING DATA		AV	m/min
Downhole	122	Total circ 70 mins			
Active	379	Bottoms up 14 mins		DP	43.1
Total Circ	501	Surface–bit 3 mins		DC	74.6
Reserve	68	ECD ppg	9.14	Riser	

MUD PROPERTIES

Sample Location	IN or OUT	IN		OUT	
Time Sample Taken	hrs	17:00		23:55	
Depth	m	392		615	
Flowline Temp	°C	28		32	
Weight	ppg	8.60		9.00	
Funnel Viscosity	sec/qt	38		44	
Plastic Viscosity	cP	5		11	
Yield Point	lb/100 ft²	31		22	
Gels 10 sec/10min/30 min	lb/100 ft²	9/12/–		8/16/–	
API Filtrate	ml/30min	N/C		N/C	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	3/–		3/–	
Solids	% Vol	2.0		5.0	
Dissolved Salts	% Vol	0.3		0.3	
Oil/Water Content	% Vol	–/97.8		–/94.8	
Sand	% Vol	0.3		0.3	
Methylene Blue cap	ppb	8		10	
pH	meter	11.5		10.0	
Alk. Mud Pm	ml	2.25		1.00	
Alk. Filtrate, Pf/Mf	ml	1.10/1.25		0.35/0.50	
Chlorides	mg/Lx10³	3.0		3.0	
Total Hardness/Calcium	mg/L	500/500		400/400	
KCL	% Wt Soln	0.8		0.8	
n & K		0.19/11.01		0.41/2.56	
ASG of Solids	g/cc	2.4		2.5	
Rheometer	600 rpm/300 rpm	41/36		44/33	
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

Treat active with KCl to maintain concentration and water to maintain volume.
High pH and calcium levels from drilling cement.
Make up premix with CMC and PAC R for volume after marl drilled through.

ACTIVITY

Nipple up BOP's. Test BOP's.
Run in hole with new assembly. Tag cement at 339.5.
Pressure test casing. Drill out cement and casing shoe.
Drill formation to 364m. Perform F.I.T.
Drill from 364m.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Barite,sx	50 kg			187	
Barite,sx	25 kg			270	
CMC EHV	25 kg	2		54	213.22
DEXTRID	50 lb		40	120	
PAC–R	50 lb	1	40	54	170.74
PAC–L	50 lb			36	
KCL,Tech(sx)	25 kg	60	400	490	866.4
BARACIDE	25 kg		2	2	

MUD TYPE FW/KCl/AQUAGEL

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		2x50,84	7
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander	11.1	1.05	7	7
Desilter 1.	11	2.15	7	15
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	183
other	
other	
Barite	
Chemicals	5
Losses	**bbl**
Sol. Con.	22
Lost/Dumped	18
Down Hole	
Newhole	59
NET GAIN	148
Discharged	40

BAROID Engineer	OFFICE	WAREHOUSE
P. Innes, C. Wallace	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST A$ 1250.36 — CUMULATIVE COST A$ 8575.76

RESERVE PITS

NO	TYPE	bbl
6	Pill	68
7	Trip	

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m
468	468	0.5		

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	5.3
Low Grav. Solids	ppb	48.2
High Grav. Solids	% Vol	
High Grav. Solids	ppb	
ASG of Solids	g/cc	2.50
Cuttings Volume	bbl	59.0
Interval Dilution	bbl/m	0.2
Interval Consumption	bbl/m	0.7

TIME BREAKDOWN

	hrs
Drilling	7
Circulating	
Reaming In	
Reaming out	
Tripping	2.5
Surveys	0.5
Other	14
AVE ROP m/hr	36.57

Baroid Australia Pty Ltd.		
MUD REPORT NO. 6	up to 24:00 hrs,	9/7/94
DATE 10/7/94	DEPTH–m MD 1160	TVD 1160
START DATE 4–Jul–94	ACTIVITY Drilling	

OPERATOR G.F.E. Resources Ltd	CONTRACTOR / RIG Century Rig 11	COUNTRY Australia
REPORT FOR Ken Smith	REPORT FOR John Hughson	TOWNSHIP Port Campbell
WELL NAME AND NO. Howmains–1	FIELD OR BLOCK NO. PEP 105	LOCATION Otway Basin, Victoria

BIT DATA

Size 8.500 ins		
Type ETD417		
Nozzles 32nds		
12	12	13
Noz Area 0.35 ins²		
TFA ins²		
NV m/sec 83.4		
Impact lb f 393		

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	3.825	930
Pipe 2	4.5	2.8125	55
Pipe 3			
Col 1	6.5	2.875	175
Col 2			

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	8.5	804.6

CASINGS

Size ins		Depth m
Riser	Set @	
16	Set @	12
9.625	Set @	355.37
	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 975 psi				TOTAL bbl/min		7.14

MUD VOL	bbl	CIRCULATING DATA		
Downhole	238	Total circ 80 mins	AV	m/min
Active	335	Bottoms up 26 mins	DP	43.1
Total Circ	573	Surface–bit 7 mins	DC	74.6
Reserve		ECD ppg 9.33	Riser	

MUD PROPERTIES

Sample Location	IN or OUT	OUT		OUT	
Time Sample Taken	hrs	14:00		24:00	
Depth	m	950		1160	
Flowline Temp	°C	38		39	
Weight	ppg	9.20		9.25	
Funnel Viscosity	sec/qt	41		44	
Plastic Viscosity	cP	16		18	
Yield Point	lb/100 ft²	13		15	
Gels 10 sec/10min/30 min	lb/100 ft²	2/7/–		2/8/–	
API Filtrate	ml/30min	8.4		7.6	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	1/–		1/–	
Solids	% Vol	5.1		5.1	
Dissolved Salts	% Vol	0.9		0.9	
Oil/Water Content	% Vol	–/94.0		–/94.0	
Sand	% Vol	1.3		1.0	
Methylene Blue cap	ppb	14		15	
pH	meter	9.5		10.0	
Alk. Mud Pm	ml	1.25		1.65	
Alk. Filtrate, Pf/Mf	ml	0.10/0.25		0.20/0.35	
Chlorides	mg/Lx10³	10.0		10.0	
Total Hardness/Calcium	mg/L	320/300		100/80	
KCL	% Wt Soln	1.8		1.8	
n & K		0.63/0.57		0.63/0.65	
ASG of Solids	g/cc	2.8		2.9	
Rheometer	600 rpm/300 rpm	45/29		51/33	
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

Make up premix with CMC, PAC R & KCl and add to active for volume from bottom off Gellibrand Marl. Approximately 620m.

Add CMC @ 1ppb & PAC R @ 0.5ppb to active, to reduce water loss from no control to 8.4cc. Filtrate at 7.6cc at report time.

Continue to add premix with KCl @ 10ppb, PAC L & PAC R @ 1ppb to maintain volume and control mud weight. Dump sand traps at regular intervals to allow premix dilution volume.
Lose approximately 40bbls mud in seepage losses to top of Dilwyn Formation. (640 to 650m).

Treat active with soda ash to lower total hardness.
Maintain alkalinity with caustic soda.

ACTIVITY

Continue drilling from 615m.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Barite,sx	50 kg			187	
Barite,sx	25 kg			270	
CMC EHV	25 kg	14		40	1492.54
DEXTRID	50 lb			120	
PAC–R	50 lb	9		45	1536.66
PAC–L	50 lb	3		33	512.22
KCL,Tech(sx)	25 kg	54		436	779.76
Caustic Soda	25 kg	10		44	324.3
Soda Ash	25 kg	7		11	113.05

MUD TYPE FW/KCl/Polymer

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		2x50,84	22
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander	12.7	3.29	22	72
Desilter 1.	14.1	3.9	22	86
Desilter 2.				
Centrifuge 1				
Centrifuge 2				
Solids Control Effic. %				

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	360
other	
other	
Barite	
Chemicals	8
Losses	**bbl**
Sol. Con.	158
Lost/Dumped	166
Down Hole	40
Newhole	125
NET GAIN	4
Discharged	324

DAILY COST	CUMULATIVE COST
A$ 4758.53	A$ 13334.29

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RESERVE PITS

NO	TYPE	bbl
6	Pill	
7	Trip	

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m
669	669	0.75		
870	870	0.01		
1052	1052	0.75		
1147	1147	0.75		

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	125.0
Interval Dilution	bbl/m	0.5
Interval Consumption	bbl/m	0.7

TIME BREAKDOWN

	hrs
Drilling	21.5
Circulating	
Reaming In	
Reaming out	
Tripping	
Surveys	2
Other	0.5
AVE ROP m/hr	25.35

Baroid Australia Pty Ltd.

MUD REPORT NO. 7 up to 24:00 hrs, 10/7/94	
DATE 11/7/94	DEPTH–m MD 1437 TVD 1437
START DATE 4–Jul–94	ACTIVITY Drilling

OPERATOR	CONTRACTOR / RIG	COUNTRY
G.F.E. Resources Ltd	Century Rig 11	Australia
REPORT FOR	REPORT FOR	TOWNSHIP
Ken Smith	John Hughson	Port Campbell
WELL NAME AND NO.	FIELD OR BLOCK NO.	LOCATION
Howmains–1	PEP 105	Otway Basin, Victoria

BIT DATA

Size	8.500 ins
Type	ETD417
Nozzles 32nds	12, 12, 13
Noz Area	0.35 ins²
TFA ins²	
NV m/sec	86.3
Impact lb f	420

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	3.825	1207
Pipe 2	4.5	2.8125	55
Pipe 3			
Col 1	6.25	2.875	175
Col 2			

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	8.5	1081.6

CASINGS

Size ins		Depth m
Riser	Set @	
16	Set @	12
9.625	Set @	355.37
	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	0.0542	136	7.381
Nat 8P80	6	8.5	95	0.0705		

Pump Press 1100 psi TOTAL bbl/min 7.381

MUD VOL bbl		CIRCULATING DATA			
Downhole	298	Total circ 88 mins		AV m/min	
Active	352	Bottoms up 32 mins		DP	44.5
Total Circ	650	Surface–bit 8 mins		DC	69.8
Reserve	62	ECD ppg	9.33	Riser	

MUD PROPERTIES

Sample Location	IN or OUT	OUT		OUT	
Time Sample Taken	hrs	13:15		23:55	
Depth	m	1280		1437	
Flowline Temp	°C	38		41	
Weight	ppg	9.25		9.25	
Funnel Viscosity	sec/qt	41		42	
Plastic Viscosity	cP	16		20	
Yield Point	lb/100 ft²	15		15	
Gels 10 sec/10min/30 min	lb/100 ft²	2/7/–		2/6/–	
API Filtrate	ml/30min	7.2		7.4	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	1/–		1/–	
Solids	% Vol	5.4		5.4	
Dissolved Salts	% Vol	0.9		0.9	
Oil/Water Content	% Vol	–/93.8		–/93.8	
Sand	% Vol	0.8		1.0	
Methylene Blue cap	ppb	11		12	
pH	meter	10.0		9.0	
Alk. Mud Pm	ml	1.30		1.20	
Alk. Filtrate, Pf/Mf	ml	0.25/0.35		0.10/0.20	
Chlorides	mg/Lx10³	10.0		10.0	
Total Hardness/Calcium	mg/L	60/60		80/100	
KCL	% Wt Soln	1.8		1.8	
n & K		0.60/0.74		0.65/0.61	
ASG of Solids	g/cc	2.8		2.8	
K+	ppm	9850		9850	
Rheometer	600 rpm/300 rpm	47/31		55/35	
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

Make up premixes with KCl @ 11ppb, PACR & PAC L @ 1ppb.
Maintain properties and control mud weight with premix additions.

Dump sand traps at regular intervals to allow premix dilution volume

Control mud alkalinity with additions of caustic soda and caustic potash.

Minor mud losses of 5bbls over shale shaker through screen blinding from sand.

Barite broken on lease, written off.

ACTIVITY

Drill to 1170m. Wiper trip.
Tight hole 985 to 870m and 698 to 659m.
Pull out of hole to 174m. Run in hole to 698m.
Hole bridged of at 698m. Wash and ream 698 to 717m and 889 to 918m. Run in hole to 1155m. Wash to 1170m. 3m fill.
Drill from 1170m.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Barite,sx	50 kg	17		170	271.32
Barite,sx	25 kg	11		259	87.78
CMC EHV	25 kg			40	
DEXTRID	50 lb			120	
PAC–R	50 lb	8		37	1365.92
PAC–L	50 lb	8		25	1365.92
KCL,Tech(sx)	25 kg	48		388	693.12
Caustic Soda	25 kg	2		42	64.86
Caustic Potash	25 kg	1		39	57.35

MUD TYPE FW/KCl/Polymer

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		2x50,84	22
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander	12.9	1.02	22	22
Desilter 1.	13.2	3.84	22	84
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	350
other	
other	
Barite	2
Chemicals	5
Losses	**bbl**
Sol. Con.	106
Lost/Dumped	112
Down Hole	
Newhole	64
NET GAIN	139
Discharged	218

BAROID Engineer	OFFICE	WAREHOUSE
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DAILY COST A$ 3906.27 CUMULATIVE COST A$ 17240.56

RESERVE PITS / SURVEY DATA

NO	TYPE	bbl	MD m	TVD m	INCL°	DIR °	DISP m
6	Pill	62	1357	1357	1		
7	Trip						

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	4.7
Low Grav. Solids	ppb	42.8
High Grav. Solids	% Vol	0.7
High Grav. Solids	ppb	10.3
ASG of Solids	g/cc	2.80
Cuttings Volume	bbl	64.0
Interval Dilution	bbl/m	0.6
Interval Consumption	bbl/m	0.9

TIME BREAKDOWN

	hrs
Drilling	15
Circulating	1
Reaming In	1.5
Reaming out	
Tripping	4.5
Surveys	1
Other	1
AVE ROP m/hr	18.47

Baroid Australia Pty Ltd.

MUD REPORT NO.	8 up to 24:00 hrs, 11/7/94
DATE	12/7/94
DEPTH–m	MD 1511 TVD 1511
START DATE	4–Jul–94
ACTIVITY	Drilling

OPERATOR	CONTRACTOR / RIG	COUNTRY
G.F.E. Resources Ltd	Century Rig 11	Australia
REPORT FOR	**REPORT FOR**	**TOWNSHIP**
Ken Smith	John Hughson	Port Campbell
WELL NAME AND NO.	**FIELD OR BLOCK NO.**	**LOCATION**
Howmains–1	PEP 105	Otway Basin, Victoria

BIT DATA

Size 8.500 ins
Type ETD417
Nozzles 32nds: 12, 13, 13
Noz Area 0.37 ins²
TFA ins²
NV m/sec 76.4
Impact lb f 353

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	3.825	1281
Pipe 2	4.5	2.8125	55
Pipe 3			
Col 1	6.25	2.875	175
Col 2			

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	8.5	1155.6

CASINGS

Size ins		Depth m
Riser	Set @	
16	Set @	12
9.625	Set @	355.37
	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	0.0542	127	6.892
Nat 8P80	6	8.5	95	0.0705		

Pump Press 1000 psi — TOTAL bbl/min 6.892

MUD VOL	bbl	CIRCULATING DATA		AV m/min
Downhole	314	Total circ 97 mins		
Active	355	Bottoms up 36 mins	DP	41.6
Total Circ	669	Surface–bit 10 mins	DC	65.1
Reserve	68	ECD ppg 9.48	Riser	

MUD PROPERTIES

Sample Location	IN or OUT	IN		OUT	
Time Sample Taken	hrs	10:30		23:55	
Depth	m	1509		1511	
Flowline Temp	°C	43		40	
Weight	ppg	9.35		9.40	
Funnel Viscosity	sec/qt	42		48	
Plastic Viscosity	cP	13		21	
Yield Point	lb/100 ft²	10		16	
Gels 10 sec/10min/30 min	lb/100 ft²	1/4/–		2/7/–	
API Filtrate	ml/30min	7.6		6.0	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	1/–		1/–	
Solids	% Vol	6.1		6.3	
Dissolved Salts	% Vol	1.7		1.7	
Oil/Water Content	% Vol	–/92.2		–/92.0	
Sand	% Vol	0.2		0.3	
Methylene Blue cap	ppb	13		12	
pH	meter	9.5		9.5	
Alk. Mud Pm	ml	1.10		1.40	
Alk. Filtrate, Pf/Mf	ml	0.15/0.20		0.05/0.15	
Chlorides	mg/Lx10³	20.0		20.0	
Total Hardness/Calcium	mg/L	50/50		100/100	
KCL	% Wt Soln	4.0		4.0	
n & K		0.65/0.40		0.65/0.64	
ASG of Solids	g/cc	2.7		2.7	
K+	ppm	21200		21200	
Rheometer	600 rpm/300 rpm	36/23		58/37	
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

Increase KCl from 2% to 4% at 1500m. Mud weight increase from additional KCl.
Make up premixes with 15ppb KCl.
Drop in yield point. Treat active with PAC R @ 0.3ppb to raise yield point, when back on bottom. Also make up one premix with 2ppb PAC R and no PAC L.
Maintain alkalinity with caustic potash.

Add BARACORE 129 to mud as oxygen scavanger, at report time.

Recieved BARACORE 129, Barite, KCl, BARAFILM and PAC R today.

ACTIVITY

Drill to 1509m. Pull out of hole for new bit.
Tight hole 1213m to 1204m.
Pick up new bit and junk sub, and run in hole.
Wash and ream 1160m to 1237m, 1293m to 1313m and 1447m to 1509m.
Drill from 1509m.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Barite,sx	50 kg			170	
Barite,sx	25 kg		160	419	
PAC–R	50 lb	12	40	65	2048.88
PAC–L	50 lb	4		21	682.96
Caustic Potash	25 kg	6		33	344.1
KCL,Tech(sx)	25 kg	126	100	362	1819.44
DEXTRID	50 lb			120	
EZ MUD L	19 lt			18	
BARACOR 129	25 kg	1	11	10	64.96
BARAFILM	25 lt		2	3	

MUD TYPE KCl/EZ MUD/Polymer

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		2x50,84	15.5
Shaker 2			.
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander	12.3	3.06	15.5	47
Desilter 1.	13.7	2.62	15.5	41
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	180
other	
other	
Barite	
Chemicals	12
Losses	**bbl**
Sol. Con.	88
Lost/Dumped	79
Down Hole	
Newhole	17
NET GAIN	25
Discharged	167

BAROID Engineer	OFFICE	WAREHOUSE
P. Innes, C. Wallace	Melbourne	Adelaide
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DAILY COST A$ 4960.34 **CUMULATIVE COST** A$ 22200.90

RESERVE PITS

NO	TYPE	bbl
6	Pill	68
7	Trip	

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m
1501	1501	2		

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	5.9
Low Grav. Solids	ppb	53.7
High Grav. Solids	% Vol	0.4
High Grav. Solids	ppb	5.9
ASG of Solids	g/cc	2.70
Cuttings Volume	bbl	17.0
Interval Dilution	bbl/m	0.7
Interval Consumption	bbl/m	1.0

TIME BREAKDOWN

	hrs
Drilling	11.5
Circulating	
Reaming In	4
Reaming out	
Tripping	7.5
Surveys	0.5
Other	0.5
AVE ROP m/hr	6.43

Baroid Australia Pty Ltd.

MUD REPORT NO. 9	up to 24:00 hrs, 12/7/94		
DATE 13/7/94	DEPTH–m MD 1658	TVD 1658	
START DATE 4–Jul–94	ACTIVITY Drilling		

OPERATOR G.F.E. Resources Ltd	CONTRACTOR / RIG Century Rig 11	COUNTRY Australia
REPORT FOR Ken Smith	REPORT FOR John Hughson	TOWNSHIP Port Campbell
WELL NAME AND NO. Howmains–1	FIELD OR BLOCK NO. PEP 105	LOCATION Otway Basin, Victoria

BIT DATA

Size 8.500 ins		
Type ETD417		
Nozzles 32nds		
12	13	13
Noz Area 0.37 ins²		
TFA ins²		
NV m/sec 76.4		
Impact lb f 360		

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	3.825	1428
Pipe 2	4.5	2.8125	55
Pipe 3			
Col 1	6.25	2.875	175
Col 2			

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	8.5	1302.6

CASINGS

Size ins		Depth m
Riser	Set @	
16	Set @	12
9.625	Set @	355.37
	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	0.0542	127	6.892
Nat 8P80	6	8.5	95	0.0705		
Pump Press 1075 psi				TOTAL bbl/min		6.892

MUD VOL	bbl	CIRCULATING DATA		
Downhole	345	Total circ 102 mins	AV	m/min
Active	355	Bottoms up 40 mins	DP	41.6
Total Circ	700	Surface–bit 11 mins	DC	65.1
Reserve	50	ECD ppg 9.69	Riser	

MUD PROPERTIES

Sample Location	IN or OUT	OUT		OUT	
Time Sample Taken	hrs	12:00		24:00	
Depth	m	1578		1658	
Flowline Temp	°C	43		44	
Weight	ppg	9.40		9.60	
Funnel Viscosity	sec/qt	47		47	
Plastic Viscosity	cP	24		24	
Yield Point	lb/100 ft²	16		19	
Gels 10 sec/10min/30 min	lb/100 ft²	2/6/–		2/7/–	
API Filtrate	ml/30min	6.0		6.0	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	1/–		1/–	
Solids	% Vol	6.7		7.5	
Dissolved Salts	% Vol	1.6		1.5	
Oil/Water Content	% Vol	–/91.7		–/91.0	
Sand	% Vol	0.5		0.5	
Methylene Blue cap	ppb	13		13	
pH	meter	9.5		9.0	
Alk. Mud Pm	ml	1.30		1.10	
Alk. Filtrate, Pf/Mf	ml	0.10/0.25		0.05/0.20	
Chlorides	mg/Lx10³	19.0		18.0	
Total Hardness/Calcium	mg/L	100/80		80/50	
KCL	% Wt Soln	3.6		3.5	
n & K		0.68/0.58		0.64/0.79	
ASG of Solids	g/cc	2.6		2.8	
K+	ppm	19100		18500	
Sulphite	ppm	40		40	
Rheometer	600 rpm/300 rpm	64/40		67/43	
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

Make up premix with KCl @ 14ppb, PAC R & PAC L @ 1ppb.
Spot 5bbl KCl brine pill on bottom at 1513m. Bit Balling.
Begin additions of EZ MUD to active for cuttings encapsulation, as per program.
At 1586m increase mud weight to 9.6ppg with barite.
Make up additional premix with KCl @ 7ppb, PAC L @ 0.5ppb, PAC R @ 1ppb.
Maintaining alkalinity with caustic potash.
Treating mud system with BARACOR 129, an oxygen scavanger.

Seepage loss to hole estimated at 15bbls over 24 hours.

ACTIVITY

Drill to 1513m. Bit balling. Work bit
Drill from 1513m. Drilling break 1588m, circulate sample to surface. Drill from 1588m.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Barite,sx	50 kg			170	
Barite,sx	25 kg	70		349	558.6
PAC–R	50 lb	4		61	682.96
PAC–L	50 lb	3		18	512.22
Caustic Potash	25 kg	4		29	229.4
KCL,Tech(sx)	25 kg	24		338	346.56
DEXTRID	50 lb			120	
EZ MUD L	19 lt	6		12	492.9
BARACOR 129	25 kg	2		8	129.92

MUD TYPE KCl/EZ MUD/Polymer

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs	
Shaker 1		2x50,84	21	
Shaker 2				
Shaker 3				
Shaker 4				
	ppg	bbl/hr	hrs	bbl
Desander	10	3.57	21	75
Desilter 1.	15.8	0.39	21	8
Desilter 2.				
Centrifuge 1				
Centrifuge 2				
Solids Control Effic.		%		

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	120
other	
other	
Barite	3
Chemicals	4
Losses	**bbl**
Sol. Con.	83
Lost/Dumped	16
Down Hole	15
Newhole	34
NET GAIN	13
Discharged	99

BAROID Engineer	OFFICE	WAREHOUSE
P. Innes, C. Wallace	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST	CUMULATIVE COST
A$ 2952.56	A$ 25153.46

RESERVE PITS

NO	TYPE	bbl
6	Pill	50
7	Trip	

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m
1597	1597	2.75		
1635	1635	2.5		

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	6.6
Low Grav. Solids	ppb	60.0
High Grav. Solids	% Vol	0.9
High Grav. Solids	ppb	13.2
ASG of Solids	g/cc	2.80
Cuttings Volume	bbl	34.0
Interval Dilution	bbl/m	0.7
Interval Consumption	bbl/m	1.0

TIME BREAKDOWN

	hrs
Drilling	19
Circulating	0.5
Reaming In	
Reaming out	
Tripping	
Surveys	1
Other	3.5
AVE ROP m/hr	7.74

Baroid Australia Pty Ltd.	**MUD REPORT NO.** 10 up to 24:00 hrs, 13/7/94
	DATE 14/7/94 **DEPTH–m** MD 1788 TVD 1788
	START DATE 4–Jul–94 **ACTIVITY** Drilling

OPERATOR G.F.E. Resources Ltd	**CONTRACTOR / RIG** Century Rig 11	**COUNTRY** Australia
REPORT FOR Ken Smith	**REPORT FOR** John Hughson	**TOWNSHIP** Port Campbell
WELL NAME AND NO. Howmains–1	**FIELD OR BLOCK NO.** PEP 105	**LOCATION** Otway Basin, Victoria

BIT DATA

Size 8.500 ins		
Type ETD417		
Nozzles 32nds		
12	13	13
Noz Area 0.37 ins²		
TFA ins²		
NV m/sec 76.4		
Impact lb f 368		

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	3.825	1558
Pipe 2	4.5	2.8125	55
Pipe 3			
Col 1	6.25	2.875	175
Col 2			

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	8.5	1432.6

CASINGS

Size ins		Depth m
Riser	Set @	
16	Set @	12
9.625	Set @	355.37
	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	0.0542	127	6.892
Nat 8P80	6	8.5	95	0.0705		

Pump Press 1125 psi TOTAL bbl/min 6.892

MUD VOL	bbl	CIRCULATING DATA	AV m/min	
Downhole	373	Total circ 104 mins		
Active	341	Bottoms up 43 mins	DP	41.6
Total Circ	714	Surface–bit 11 mins	DC	65.1
Reserve	68	ECD ppg 9.89	Riser	

MUD PROPERTIES

Sample Location	IN or OUT	OUT		OUT	
Time Sample Taken	hrs	12:10		24:00	
Depth	m	1723		1788	
Flowline Temp	°C	43		44	
Weight	ppg	9.80		9.80	
Funnel Viscosity	sec/qt	48		50	
Plastic Viscosity	cP	23		23	
Yield Point	lb/100 ft²	19		21	
Gels 10 sec/10min/30 min	lb/100 ft²	2/5/–		2/9/–	
API Filtrate	ml/30min	6.0		6.0	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	1/–		1/–	
Solids	% Vol	8.6		8.6	
Dissolved Salts	% Vol	1.4		1.3	
Oil/Water Content	% Vol	–/90.0		–/90.1	
Sand	% Vol	0.5		0.4	
Methylene Blue cap	ppb	12		13	
pH	meter	9.0		9.0	
Alk. Mud Pm	ml	0.90		0.90	
Alk. Filtrate, Pf/Mf	ml	0.10/0.20		0.05/0.20	
Chlorides	mg/Lx10³	16.5		16.0	
Total Hardness/Calcium	mg/L	100/80		80/60	
KCL	% Wt Soln	3.5		3.5	
n & K		0.63/0.83		0.61/0.98	
ASG of Solids	g/cc	2.9		2.9	
K+	ppm	14400		13600	
Sulphite	ppm	40		40	
Rheometer	600 rpm/300 rpm	65/42		67/44	
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

Treat active with premix. Make up new premix with KCl 7ppb.
PAC R 0.5ppb. PAC L 0.5ppb.
Increase mud weight to 9.8ppg with barite at 1679m.
Adding EZ MUD for cuttings encapsulation.

Add BARACORE 129 as on oxygen scavanger.

Maintain alkalinity with caustic potash additions.

Seepage losses estimated at 20bbls for 24 hours.

One 50 mesh screen replaced on shale shaker.

ACTIVITY

Drill to 1715m. Wiper trip.
Pull back to 1510m. Work pipe to 1443m.
Wash and ream 1443m to 1434m. Pull back to 1377m.
Work pipe 1377m to 1338m. Pull back to 1166m.
Run in hole to 1693m. Wash and ream 1695m to 1715m.
Drill from 1715m. Bit balled at 1725m. Unball bit.
Drill from 1725m.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Barite,sx	50 kg			170	
Barite,sx	25 kg	70		279	558.6
PAC–R	50 lb	3		58	512.22
PAC–L	50 lb	1		17	170.74
Caustic Potash	25 kg	2		27	114.7
KCL,Tech(sx)	25 kg	12		326	173.28
DEXTRID	50 lb			120	
EZ MUD L	19 lt	8		4	657.2
BARACOR 129	25 kg	1		7	64.96

MUD TYPE KCl/EZ MUD/Polymer

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs	
Shaker 1		2x50,80	21	
Shaker 2				
Shaker 3				
Shaker 4				
	ppg	bbl/hr	hrs	bbl
Desander	12.1	1.43	20	29
Desilter 1.	14.1	0.99	20	20
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	120
other	
other	
Barite	3
Chemicals	3
Losses	**bbl**
Sol. Con.	49
Lost/Dumped	25
Down Hole	20
Newhole	30
NET GAIN	32
Discharged	74

BAROID Engineer	OFFICE	WAREHOUSE
P. Innes, C. Wallace	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST A$ 2251.70 **CUMULATIVE COST** A$ 27405.16

RESERVE PITS / SURVEY DATA

NO	TYPE	bbl	MD m	TVD m	INCL°	DIR °	DISP m
6	Pill	68	1664	1664	2.75		
7	Trip		1693	1693	2.75		
			1721	1721	3.5		
			1751	1751	3		
			1779	1779	3		

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	7.0
Low Grav. Solids	ppb	63.7
High Grav. Solids	% Vol	1.6
High Grav. Solids	ppb	23.5
ASG of Solids	g/cc	2.90
Cuttings Volume	bbl	30.0
Interval Dilution	bbl/m	0.7
Interval Consumption	bbl/m	1.0

TIME BREAKDOWN

	hrs
Drilling	17
Circulating	
Reaming In	0.5
Reaming out	
Tripping	2.5
Surveys	2.5
Other	1.5
AVE ROP m/hr	7.65

Baroid Australia Pty Ltd.

MUD REPORT NO.	11 up to 24:00 hrs, 14/7/94
DATE	15/7/94
DEPTH–m	MD 1875 TVD 1875
START DATE	4–Jul–94
ACTIVITY	Pulling Out Of Hole

OPERATOR G.F.E. Resources Ltd	CONTRACTOR / RIG Century Rig 11	COUNTRY Australia
REPORT FOR Ken Smith	REPORT FOR John Hughson	TOWNSHIP Port Campbell
WELL NAME AND NO. Howmains–1	FIELD OR BLOCK NO. PEP 105	LOCATION Otway Basin, Victoria

BIT DATA

Size 8.500 ins			
Type ETD417			
Nozzles 32nds			
12	13	13	
Noz Area 0.37 ins²			
TFA ins²			
NV m/sec			
Impact lb f			

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	3.825	299
Pipe 2	4.5	2.8125	55
Pipe 3			
Col 1	6.25	2.875	175
Col 2			

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	8.5	1519.6

CASINGS

Size ins		Depth m
Riser	Set @	
16	Set @	12
9.625	Set @	355.37
	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	0.0542		
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	311	Bottoms up – mins		DP
Total Circ	727	Surface–bit – mins		DC
Reserve	59	ECD ppg	9.75	Riser

MUD PROPERTIES

Sample Location	IN or OUT	OUT		OUT	
Time Sample Taken	hrs	12:10		18:20	
Depth	m	1850		1875	
Flowline Temp	°C	44		44	
Weight	ppg	9.80		9.75	
Funnel Viscosity	sec/qt	50		50	
Plastic Viscosity	cP	22		22	
Yield Point	lb/100 ft²	18		17	
Gels 10 sec/10min/30 min	lb/100 ft²	2/7/–		2/6/–	
API Filtrate	ml/30min	6.4		6.4	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	1/–		1/–	
Solids	% Vol	8.7		8.4	
Dissolved Salts	% Vol	1.2		1.2	
Oil/Water Content	% Vol	–/90.1		–/90.4	
Sand	% Vol	0.5		0.5	
Methylene Blue cap	ppb	13		13	
pH	meter	9.5		9.5	
Alk. Mud Pm	ml	0.85		0.80	
Alk. Filtrate, Pf/Mf	ml	0.15/0.30		0.15/0.30	
Chlorides	mg/Lx10³	15.0		15.0	
Total Hardness/Calcium	mg/L	80/50		80/50	
KCL	% Wt Soln	3.0		3.0	
n & K		0.63/0.79		0.64/0.72	
ASG of Solids	g/cc	2.9		2.9	
K+	ppm	13600		13600	
Sulphite	ppm	40		40	
Rheometer	600 rpm/300 rpm	62/40		61/39	
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

Make up premix with KCl @ 11ppb PAC L @ 0.5ppb.
Add remaining EZ MUD L to active mud system.
Allowing mud weight to drop. No longer to maintain with barite.
Maintaining alkalinity with caustic potash.
BIOCIDE added to active mud system to prevent bacterial attack.
Sand trap dumped.
Shale shaker screens changed to 2x84,110 mesh.

22 tonnes barite delivered to and stored at Compton.

ACTIVITY

Drill to 1875m. Pull out of hole.
Hole tight 1687m to 1485m, and 1293m to 1103m.
Continue pulling out of hole.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Barite,sx	50 kg			170	
Barite,sx	25 kg			279	
PAC–R	50 lb			58	
PAC–L	50 lb	2		15	341.48
Caustic Potash	25 kg	5		22	286.75
KCL,Tech(sx)	25 kg	23		303	332.12
DEXTRID	50 lb			120	
EZ MUD L	19 lt	4			328.6
BARACOR 129	25 kg	2		5	129.92
BARACIDE	25 kg	1		1	549.92

MUD TYPE KCl/EZ MUD/Polymer

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		2x84,110	18.5
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander	10.8	0.8	18.5	15
Desilter 1.	123.	2.4	18.5	44
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	123
other	
other	
Barite	
Chemicals	3
Losses	**bbl**
Sol. Con.	59
Lost/Dumped	43
Down Hole	20
Newhole	20
NET GAIN	4
Discharged	102

BAROID Engineer	OFFICE	WAREHOUSE
P. Innes, C. Wallace	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST **A$ 1968.79**

CUMULATIVE COST **A$ 29373.95**

RESERVE PITS / SURVEY DATA

NO	TYPE	bbl	MD m	TVD m	INCL°	DIR °	DISP m
6	Pill	41	1817	1817	1.75		
7	Trip	18	1846	1846	1.25		

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	6.8
Low Grav. Solids	ppb	61.9
High Grav. Solids	% Vol	1.6
High Grav. Solids	ppb	23.5
ASG of Solids	g/cc	2.90
Cuttings Volume	bbl	20.0
Interval Dilution	bbl/m	0.7
Interval Consumption	bbl/m	1.0

TIME BREAKDOWN

	hrs
Drilling	15
Circulating	2.5
Reaming In	
Reaming out	1
Tripping	4.5
Surveys	1
Other	
AVE ROP m/hr	5.8

Baroid Australia Pty Ltd.

MUD REPORT NO.	12 up to 24:00 hrs, 15/7/94
DATE	16/7/94
DEPTH–m	MD 1875 TVD 1875
START DATE	4–Jul–94
ACTIVITY	Pulling Out Of Hole

OPERATOR	CONTRACTOR / RIG	COUNTRY
G.F.E. Resources Ltd	Century Rig 11	Australia
REPORT FOR	**REPORT FOR**	**TOWNSHIP**
Ken Smith	John Hughson	Port Campbell
WELL NAME AND NO.	**FIELD OR BLOCK NO.**	**LOCATION**
Howmains–1	PEP 105	Otway Basin, Victoria

BIT DATA

Size 8.500 ins		
Type ETD417		
Nozzles 32nds		
12	13	13
Noz Area 0.37 ins²		
TFA ins²		
NV m/sec 76.4		
Impact lb f 379		

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	3.825	1645
Pipe 2	4.5	2.8125	55
Pipe 3			
Col 1	6.25	2.875	175
Col 2			

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	8.5	1519.6

CASINGS

Size ins		Depth m
Riser	Set @	
16	Set @	12
9.625	Set @	355.37
	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	0.0542	127	6.892
Nat 8P80	6	8.5	95	0.0705		

Pump Press 1100 psi TOTAL bbl/min 6.892

MUD VOL	bbl	CIRCULATING DATA	AV m/min	
Downhole	391	Total circ 106 mins		
Active	339	Bottoms up 45 mins	DP	41.6
Total Circ	730	Surface–bit 12 mins	DC	65.1
Reserve	46	ECD ppg 10.18	Riser	

MUD PROPERTIES

Sample Location	IN or OUT	OUT		OUT	
Time Sample Taken	hrs	12:30		22:40	
Depth	m	1875		1875	
Flowline Temp	°C	38		40	
Weight	ppg	9.75		10.10	
Funnel Viscosity	sec/qt	51		50	
Plastic Viscosity	cP	25		25	
Yield Point	lb/100 ft²	18		16	
Gels 10 sec/10min/30 min	lb/100 ft²	2/6/–		2/8/–	
API Filtrate	ml/30min	6.4		6.8	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	1/–		1/–	
Solids	% Vol	8.4		8.5	
Dissolved Salts	% Vol	1.2		2.0	
Oil/Water Content	% Vol	–/90.4		–/89.5	
Sand	% Vol	0.5		1.0	
Methylene Blue cap	ppb	13		13	
pH	meter	9.5		9.5	
Alk. Mud Pm	ml	0.80		0.85	
Alk. Filtrate, Pf/Mf	ml	0.15/0.30		0.10/0.25	
Chlorides	mg/Lx10³	15.2		24.0	
Total Hardness/Calcium	mg/L	80/50		80/50	
KCL	% Wt Soln	3.0		4.8	
n & K		0.66/0.70		0.69/0.55	
ASG of Solids	g/cc	2.9		3.2	
K+	ppm	15900		24200	
Sulphite	ppm	40		10	
Rheometer	600 rpm/300 rpm	68/43		66/41	
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

Increase the mud weight to 10.1ppg from 9.75ppg with barite.
Increase the KCl content to 5%.
Make up additional premix with PAC L @ 1.5ppb and KCl @ 12ppb.

Recieved 10 tonnes barite.
Add 5 sacks KCl to inventory. Incorrect total reported recieved report 8.

ACTIVITY

Pull out of hole. Test BOP's. Run in hole to 1424m.
Ream 1424m to 1875m. 4m fill.
Circulate bottoms up. Pull out to 1084m.
Hole tight 1619m to 1581m, and 1485m to 1466m.
Run back to bottom, 6m fill. Circulate hole clean.
Pull out of hole.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Barite,sx	50 kg	43		127	686.28
Barite,sx	25 kg	197	400	482	1572.06
PAC–R	50 lb			58	
PAC–L	50 lb	3		12	512.22
Caustic Potash	25 kg	2		20	114.7
KCL,Tech(sx)	25 kg	100	5	208	1444
DEXTRID	50 lb			120	
EZ MUD L	19 lt				
BARACOR 129	25 kg			5	

MUD TYPE KCl/EZ MUD/Polymer

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		2x84,110	12.5
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander	10.8	0.8	10	8
Desilter 1.	12.6	2.4	8	19
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	60
other	
other	
Barite	11
Chemicals	8
Losses	**bbl**
Sol. Con.	27
Lost/Dumped	42
Down Hole	20
Newhole	
NET LOSS	10
Discharged	69

BAROID Engineer	OFFICE	WAREHOUSE
P. Innes, C. Wallace	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST	CUMULATIVE COST
A$ 4329.26	A$ 33703.21

RESERVE PITS

NO	TYPE	bbl
6	Pill	46
7	Trip	

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	5.3
Low Grav. Solids	ppb	48.2
High Grav. Solids	% Vol	3.2
High Grav. Solids	ppb	47.0
ASG of Solids	g/cc	3.20
Cuttings Volume	bbl	
Interval Dilution	bbl/m	0.8
Interval Consumption	bbl/m	1.0

TIME BREAKDOWN

	hrs
Drilling	
Circulating	2.5
Reaming In	10
Reaming out	
Tripping	9.5
Surveys	
Other	2
AVE ROP m/hr	

Baroid Australia Pty Ltd.

MUD REPORT NO. 13 up to 24:00 hrs, 16/7/94	
DATE 17/7/94	DEPTH–m MD 1875 TVD 1875
START DATE 4–Jul–94	ACTIVITY Pulling Out Of Hole

OPERATOR G.F.E. Resources Ltd	CONTRACTOR / RIG Century Rig 11	COUNTRY Australia
REPORT FOR Ken Smith	REPORT FOR John Hughson	TOWNSHIP Port Campbell
WELL NAME AND NO. Howmains–1	FIELD OR BLOCK NO. PEP 105	LOCATION Otway Basin, Victoria

BIT DATA

Size 8.500 ins		
Type ETD417		
Nozzles 32nds		
12	13	13
Noz Area 0.37 ins²		
TFA ins²		
NV m/sec		
Impact lb f		

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	3.825	1262
Pipe 2	4.5	2.8125	55
Pipe 3			
Col 1	6.25	2.875	175
Col 2			

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	8.5	1519.6

CASINGS

Size ins		Depth m
Riser	Set @	
16	Set @	12
9.625	Set @	355.37
	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	0.0542		
Nat 8P80	6	8.5	95	0.0705		

Pump Press – psi TOTAL bbl/min

MUD VOL	bbl	CIRCULATING DATA		AV m/min
Downhole	398	Total circ – mins		
Active	319	Bottoms up – mins		DP
Total Circ	717	Surface–bit – mins		DC
Reserve	87	ECD ppg	10.1	Riser

MUD PROPERTIES

Sample Location	IN or OUT	IN		IN	
Time Sample Taken	hrs	10:40		23:30	
Depth	m	1875		1875	
Flowline Temp	°C				
Weight	ppg	10.10		10.10	
Funnel Viscosity	sec/qt	48		43	
Plastic Viscosity	cP	22		22	
Yield Point	lb/100 ft²	11		12	
Gels 10 sec/10min/30 min	lb/100 ft²	2/6/–		2/6/–	
API Filtrate	ml/30min	6.4		6.4	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	1/–		1/–	
Solids	% Vol	9.0		9.0	
Dissolved Salts	% Vol	1.9		1.9	
Oil/Water Content	% Vol	–/89.1		–/89.1	
Sand	% Vol	0.3		0.3	
Methylene Blue cap	ppb	13		13	
pH	meter	9.0		9.0	
Alk. Mud Pm	ml	0.75		0.75	
Alk. Filtrate, Pf/Mf	ml	0.10/0.20		0.10/0.20	
Chlorides	mg/Lx10³	24.0		24.0	
Total Hardness/Calcium	mg/L	60/40		60/40	
KCL	% Wt Soln	4.8		4.8	
n & K		0.74/0.33		0.72/0.38	
ASG of Solids	g/cc	3.1		3.1	
K+	ppm	25450		25450	
Sulphite	ppm	10		10	
Rheometer	600 rpm/300 rpm	55/33		56/34	
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

Make up premix with KCl @ 17ppb, AQUAGEL @ 9ppb, and PAC L @ 2.5ppb.

ACTIVITY

Continue to Pull Out Of Hole.
Make Up DST tool and Run In Hole.
Tag Bottom @ 1864m. 6m Fill.
Conduct DST on test interval 1866 to 1875m.
Pull free 165m, Reverse Circulate with possible fill in pipe.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Barite,sx	50 kg			127	
Barite,sx	25 kg			482	
PAC–R	50 lb			58	
PAC–L	50 lb	3		9	512.22
Caustic Potash	25 kg			20	
KCL,Tech(sx)	25 kg	19		189	274.36
DEXTRID	50 lb			120	
EZ MUD L	19 lt				
BARACOR 129	25 kg			5	
AQUAGEL,sx	25 kg	10		548	143.3

MUD TYPE KCl/EZ MUD/Polymer

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		2x84,110	2
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.	60
other	
other	
Barite	
Chemicals	2
Losses	**bbl**
Sol. Con.	
Lost/Dumped	14
Down Hole	20
Newhole	
NET GAIN	28
Discharged	14

BAROID Engineer	OFFICE	WAREHOUSE
P. Innes, C. Wallace	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST A$ 929.88 CUMULATIVE COST A$ 34633.09

RESERVE PITS

NO	TYPE	bbl
6	Pill	54
7	Trip	33

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	6.2
Low Grav. Solids	ppb	56.4
High Grav. Solids	% Vol	2.8
High Grav. Solids	ppb	41.1
ASG of Solids	g/cc	3.10
Cuttings Volume	bbl	
Interval Dilution	bbl/m	0.8
Interval Consumption	bbl/m	1.1

TIME BREAKDOWN

	hrs
Drilling	
Circulating	2
Reaming In	
Reaming out	
Tripping	10
DST	6.5
Other	5.5
AVE ROP m/hr	

Baroid Australia Pty Ltd.

MUD REPORT NO.	18 up to 24:00 hrs, 21/7/94
DATE	22/7/94
DEPTH-m	MD 2151 TVD 2151
START DATE	4-Jul-94
ACTIVITY	Lay Down Pipe

OPERATOR: G.F.E. Resources Ltd	CONTRACTOR / RIG: Century Rig 11	COUNTRY: Australia
REPORT FOR: Ken Smith	REPORT FOR: Sean Kelly	TOWNSHIP: Port Campbell
WELL NAME AND NO.: Howmains-1	FIELD OR BLOCK NO.: PEP 105	LOCATION: Otway Basin, Victoria

BIT DATA

Size	8.500 ins
Type	ETD417
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	3.825	
Pipe 2	4.5	2.8125	
Pipe 3			
Col 1	6.25	2.875	
Col 2			

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	8.5	1795.6

CASINGS

Size ins		Depth m
Riser	Set @	
16	Set @	12
9.625	Set @	355.37
	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	0.0542		
Nat 8P80	6	8.5	95	0.0705		

Pump Press - psi TOTAL bbl/min

MUD VOL	bbl	CIRCULATING DATA		
Downhole	504	Total circ - mins		AV m/min
Active	284	Bottoms up - mins		DP
Total Circ	788	Surface-bit - mins		DC
Reserve	16	ECD ppg	9.8	Riser

MUD PROPERTIES

Sample Location	IN or OUT	IN			
Time Sample Taken	hrs	14:00			
Depth	m	2152			
Flowline Temp	°C				
Weight	ppg	9.80			
Funnel Viscosity	sec/qt	41			
Plastic Viscosity	cP	16			
Yield Point	lb/100 ft²	11			
Gels 10 sec/10min/30 min	lb/100 ft²	1/5/-			
API Filtrate	ml/30min	6.6			
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	1/-			
Solids	% Vol	8.6			
Dissolved Salts	% Vol	1.9			
Oil/Water Content	% Vol	-/89.5			
Sand	% Vol	0.1			
Methylene Blue cap	ppb	14			
pH	meter	9.5			
Alk. Mud Pm	ml	0.60			
Alk. Filtrate, Pf/Mf	ml	0.10/0.20			
Chlorides	mg/Lx10³	23.0			
Total Hardness/Calcium	mg/L	120/100			
KCL	% Wt Soln	4.4			
n & K		0.67/0.41			
ASG of Solids	g/cc	2.8			
K+	ppm	22600			
Sulphite	ppm	10			
Rheometer	600 rpm/300 rpm	43/27			
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

BARAFILM used to protect stacked pipe from corrossion.

Lose 21bbls mud to hole while logging.

ACTIVITY

Run #3: LDL, CNL, GR.
Run #4: CST.
Lay down drillpipe.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Barite,sx	50 kg			107	
Barite,sx	25 kg			482	
PAC-R	50 lb			42	
PAC-L	50 lb				
Caustic Potash	25 kg			10	
KCL,Tech(sx)	25 kg			75	
DEXTRID	50 lb			120	
EZ MUD L	19 lt				
BARACOR 129	25 kg			2	
BARAFILM	25 lt	3			479.1

MUD TYPE KCl/EZ MUD/Polymer

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		2x84,110	
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	1
Losses	**bbl**
Sol. Con.	
Lost/Dumped	2
Down Hole	16
Newhole	
NET LOSS	17
Discharged	2

BAROID Engineer	OFFICE	WAREHOUSE
P. Innes, C. Wallace	Melbourne	Adelaide
Tel. 03-6213367 (Fax)	03-6213311	08-477433

DAILY COST A$ 479.10

CUMULATIVE COST A$ 42114.43

RESERVE PITS

NO	TYPE	bbl
6	Pill	
7	Trip	16

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	7.5
Low Grav. Solids	ppb	68.2
High Grav. Solids	% Vol	1.1
High Grav. Solids	ppb	16.2
ASG of Solids	g/cc	2.80
Cuttings Volume	bbl	
Interval Dilution	bbl/m	0.9
Interval Consumption	bbl/m	1.2

TIME BREAKDOWN hrs

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

Baroid Australia Pty Ltd.

MUD REPORT NO. 17	up to 24:00 hrs, 20/7/94		
DATE 21/7/94	DEPTH–m MD 2151 TVD 2151		
START DATE 4–Jul–94	ACTIVITY Logging		

OPERATOR G.F.E. Resources Ltd	CONTRACTOR / RIG Century Rig 11	COUNTRY Australia
REPORT FOR Ken Smith	REPORT FOR Sean Kelly	TOWNSHIP Port Campbell
WELL NAME AND NO. Howmains–1	FIELD OR BLOCK NO. PEP 105	LOCATION Otway Basin, Victoria

BIT DATA / DRILLING STRING / CASINGS

BIT DATA	DRILLING STRING	OD ins	ID ins	Length m	CASINGS Size ins		Depth m
Size 8.500 ins							
Type ETD417	Pipe 1	4.5	3.825		Riser	Set @	
Nozzles 32nds	Pipe 2	4.5	2.8125		16	Set @	12
	Pipe 3				9.625	Set @	355.37
	Col 1	6.25	2.875			Set @	
	Col 2					Set @	
Noz Area ins²	OPEN HOLE SECTIONS					Set @	
TFA ins²	Sect 1					Set @	
NV m/sec	Sect 2				Liner	Set @	
Impact lb f	Current		8.5	1795.6		Top @	

PUMP DATA

Pump Make	ins x	ins	Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	7.75	95	0.0542	127	6.892
Nat 8P80	6	8.5	95	0.0705		
Pump Press 1125 psi				TOTAL bbl/min		6.892

MUD VOL	bbl	CIRCULATING DATA			
Downhole	504	Total circ	114 mins	AV	m/min
Active	284	Bottoms up	– mins	DP	
Total Circ	788	Surface–bit	– mins	DC	
Reserve	33	ECD ppg	9.8	Riser	

MUD PROPERTIES

Sample Location	IN or OUT	OUT		IN	
Time Sample Taken	hrs	7:40		23:00	
Depth	m	2151		2151	
Flowline Temp	°C	44			
Weight	ppg	9.80		9.80	
Funnel Viscosity	sec/qt	41		41	
Plastic Viscosity	cP	14		14	
Yield Point	lb/100 ft²	14		14	
Gels 10 sec/10min/30 min	lb/100 ft²	2/5/–		1/5/–	
API Filtrate	ml/30min	6.4		6.4	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	1/–		1/–	
Solids	% Vol	8.2		8.2	
Dissolved Salts	% Vol	1.9		1.9	
Oil/Water Content	% Vol	–/89.9		–/89.9	
Sand	% Vol	0.2		0.2	
Methylene Blue cap	ppb	14		14	
pH	meter	9.5		9.5	
Alk. Mud Pm	ml	0.60		0.60	
Alk. Filtrate, Pf/Mf	ml	0.10/0.20		0.10/0.20	
Chlorides	mg/Lx10³	23.0		23.0	
Total Hardness/Calcium	mg/L	120/100		120/100	
KCL	% Wt Soln	4.4		4.4	
n & K		0.58/0.75		0.58/0.75	
ASG of Solids	g/cc	2.9		2.9	
K+	ppm	23000		23000	
Sulphite	ppm	10		10	
Rheometer	600 rpm/300 rpm	42/28		42/28	
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

Maintain alkalinity with additions of caustic potash.

Losing mud to hole at 1.5 bbl/hour while logging.

ACTIVITY

Drill from 2145m to TD @ 2151m.
Pull Out Of The Hole to 800m, working pipe 1922 to 1904m.
Run In Hole and tag bottom. 4m Fill.
Wash to 2151m and circulate clean.
Pull out of Hole. Rig up and run logs.
Run #1: DLT, Sonic, MSFL, GR, SP.
Run #2: Check Shot (VD)

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Barite,sx	50 kg	20		107	319.2
Barite,sx	25 kg			482	
PAC–R	50 lb			42	
PAC–L	50 lb				
Caustic Potash	25 kg	1		10	57.35
KCL,Tech(sx)	25 kg	1		75	14.44
DEXTRID	50 lb			120	
EZ MUD L	19 lt				
BARACOR 129	25 kg			2	

MUD TYPE KCl/EZ MUD/Polymer

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		2x84,110	13
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander	11.7	0.9	3	3
Desilter 1.	14.1	0.85	2	2
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	
other	
other	
Barite	2
Chemicals	
Losses	**bbl**
Sol. Con.	5
Lost/Dumped	3
Down Hole	36
Newhole	1
NET LOSS	42
Discharged	8

BAROID Engineer	OFFICE	WAREHOUSE
P. Innes, C. Wallace	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST A$ 390.99 CUMULATIVE COST A$ 41635.33

RESERVE PITS / SURVEY DATA

NO	TYPE	bbl	MD m	TVD m	INCL°	DIR °	DISP m
6	Pill		2143	2143	0.25		
7	Trip	33					

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	6.7
Low Grav. Solids	ppb	61.0
High Grav. Solids	% Vol	1.5
High Grav. Solids	ppb	22.0
ASG of Solids	g/cc	2.90
Cuttings Volume	bbl	1.0
Interval Dilution	bbl/m	0.9
Interval Consumption	bbl/m	1.2

TIME BREAKDOWN

	hrs
Drilling	1.5
Circulating	2.5
Reaming In	
Reaming out	
Tripping	9
Surveys	0.5
Logging	10
Other	0.5
AVE ROP m/hr	4

Baroid Australia Pty Ltd.

MUD REPORT NO. 16	up to 24:00 hrs,	19/7/94	
DATE 20/7/94	DEPTH–m MD 2145	TVD 2145	
START DATE 4–Jul–94	ACTIVITY Drilling		

OPERATOR G.F.E. Resources Ltd	CONTRACTOR / RIG Century Rig 11	COUNTRY Australia
REPORT FOR Ken Smith	REPORT FOR Sean Kelly	TOWNSHIP Port Campbell
WELL NAME AND NO. Howmains–1	FIELD OR BLOCK NO. PEP 105	LOCATION Otway Basin, Victoria

BIT DATA

Size	8.500 ins
Type	ETD417
Nozzles 32nds	12 / 13 / 13
Noz Area	0.37 ins²
TFA ins²	
NV m/sec	76.4
Impact lb f	368

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	3.825	1915
Pipe 2	4.5	2.8125	55
Pipe 3			
Col 1	6.25	2.875	175
Col 2			

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	8.5	1789.6

CASINGS

Size ins		Depth m
Riser	Set @	
16	Set @	12
9.625	Set @	355.37
	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	0.0542	127	6.892
Nat 8P80	6	8.5	95	0.0705		

Pump Press 1125 psi   TOTAL bbl/min 6.892

MUD VOL	bbl	CIRCULATING DATA			
Downhole	449	Total circ 119 mins		AV	m/min
Active	373	Bottoms up 51 mins		DP	41.6
Total Circ	822	Surface–bit 14 mins		DC	65.1
Reserve	41	ECD ppg	9.86	Riser	

MUD PROPERTIES

Sample Location	IN or OUT	OUT		OUT	
Time Sample Taken	hrs	11:30		24:00	
Depth	m	2080		2145	
Flowline Temp	°C	44		44	
Weight	ppg	9.85		9.80	
Funnel Viscosity	sec/qt	41		41	
Plastic Viscosity	cP	17		16	
Yield Point	lb/100 ft²	13		13	
Gels 10 sec/10min/30 min	lb/100 ft²	2/6/–		2/5/–	
API Filtrate	ml/30min	6.4		6.4	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	1/–		1/–	
Solids	% Vol	8.2		8.2	
Dissolved Salts	% Vol	1.9		1.9	
Oil/Water Content	% Vol	–/89.9		–/89.9	
Sand	% Vol	0.1		0.1	
Methylene Blue cap	ppb	14		14	
pH	meter	9.0		9.5	
Alk. Mud Pm	ml	0.70		0.65	
Alk. Filtrate, Pf/Mf	ml	0.05/0.15		0.10/0.20	
Chlorides	mg/Lx10³	23.0		23.0	
Total Hardness/Calcium	mg/L	120/100		120/100	
KCL	% Wt Soln	4.6		4.6	
n & K		0.65/0.52		0.63/0.57	
ASG of Solids	g/cc	2.9		2.9	
K+	ppm	24400		24400	
Sulphite	ppm	10		10	
Rheometer	600 rpm/300 rpm	47/30		45/29	
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

Make up premix with KCl @ 18ppb and PAC R @ 1.67ppb.
Make up premix with KCl @ 14ppb and PAC L @ 2.5ppb.
Make up premix with KCl @ 9ppb and PAC R @ 1.67ppb.

Maintain alkalinity with additions of caustic potash.
Treat system with BARACORE 129, an oxygen scavenger.

Sump water tested with a Chloride level of 4500mg/l

ACTIVITY

Drill from 2004m.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Barite,sx	50 kg			127	
Barite,sx	25 kg			482	
PAC–R	50 lb	4		42	682.96
PAC–L	50 lb	3			512.22
Caustic Potash	25 kg	5		11	286.75
KCL,Tech(sx)	25 kg	45		76	649.80
DEXTRID	50 lb			120	
EZ MUD L	19 lt				
BARACOR 129	25 kg	1		2	64.96

MUD TYPE KCl/EZ MUD/Polymer

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		2x84,110	23.5
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander	11.7	1.9	15	29
Desilter 1.	14.1	2.85	15	43
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	180
other	
other	
Barite	
Chemicals	5
Losses	**bbl**
Sol. Con.	72
Lost/Dumped	59
Down Hole	20
Newhole	32
NET GAIN	34
Discharged	131

BAROID Engineer	OFFICE	WAREHOUSE
P. Innes, C. Wallace	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST A$ 2196.69   CUMULATIVE COST A$ 41244.34

RESERVE PITS

NO	TYPE	bbl
6	Pill	41
7	Trip	

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	6.7
Low Grav. Solids	ppb	61.0
High Grav. Solids	% Vol	1.5
High Grav. Solids	ppb	22.0
ASG of Solids	g/cc	2.90
Cuttings Volume	bbl	32.0
Interval Dilution	bbl/m	0.9
Interval Consumption	bbl/m	1.2

TIME BREAKDOWN

	hrs
Drilling	23.5
Circulating	
Reaming In	
Reaming out	
Tripping	
Surveys	
Other	0.5
AVE ROP m/hr	6

Baroid Australia Pty Ltd.

MUD REPORT NO. 15	up to 24:00 hrs, 18/7/94		
DATE 19/7/94	DEPTH–m	MD 2004	TVD 2004
START DATE 4–Jul–94	ACTIVITY Drilling		

OPERATOR G.F.E. Resources Ltd	CONTRACTOR / RIG Century Rig 11	COUNTRY Australia
REPORT FOR Ken Smith	REPORT FOR John Hughson	TOWNSHIP Port Campbell
WELL NAME AND NO. Howmains–1	FIELD OR BLOCK NO. PEP 105	LOCATION Otway Basin, Victoria

BIT DATA / DRILLING STRING / CASINGS

BIT DATA		DRILLING STRING	OD ins	ID ins	Length m	CASINGS Size ins		Depth m
Size 8.500 ins						Riser	Set @	
Type ETD417		Pipe 1	4.5	3.825	1774	16	Set @	12
Nozzles 32nds		Pipe 2	4.5	2.8125	55	9.625	Set @	355.37
12 | 13 | 13		Pipe 3					Set @	
		Col 1	6.25	2.875	175		Set @	
		Col 2					Set @	
Noz Area 0.37 ins²		OPEN HOLE SECTIONS					Set @	
TFA ins²		Sect 1					Set @	
NV m/sec	76.4	Sect 2				Liner	Set @	
Impact lb f	370	Current		8.5	1648.6		Top @	

PUMP DATA

Pump Make	ins x ins		Eff %	bbl/stk	spm	bbl/min
Nat 7P50	5.5	7.75	95	0.0542	127	6.892
Nat 8P80	6	8.5	95	0.0705		
Pump Press 1100 psi				TOTAL bbl/min		6.892

MUD VOL	bbl	CIRCULATING DATA		AV m/min	
Downhole	419	Total circ 114 mins			
Active	365	Bottoms up 48 mins		DP	41.6
Total Circ	784	Surface–bit 13 mins		DC	65.1
Reserve	45	ECD ppg	9.91	Riser	

MUD PROPERTIES

Sample Location	IN or OUT	OUT		OUT	
Time Sample Taken	hrs	12:30		24:00	
Depth	m	1946		2004	
Flowline Temp	°C	43		44	
Weight	ppg	9.85		9.85	
Funnel Viscosity	sec/qt	43		43	
Plastic Viscosity	cP	18		16	
Yield Point	lb/100 ft²	12		13	
Gels 10 sec/10min/30 min	lb/100 ft²	2/6/–		2/5/–	
API Filtrate	ml/30min	6.4		6.2	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	1/–		1/–	
Solids	% Vol	8.6		8.8	
Dissolved Salts	% Vol	2.0		1.8	
Oil/Water Content	% Vol	–/89.4		–/89.4	
Sand	% Vol	0.3		0.3	
Methylene Blue cap	ppb	14		14	
pH	meter	9.5		9.0	
Alk. Mud Pm	ml	0.70		0.75	
Alk. Filtrate, Pf/Mf	ml	0.10/0.25		0.10/0.15	
Chlorides	mg/Lx10³	24.0		22.0	
Total Hardness/Calcium	mg/L	80/60		80/60	
KCL	% Wt Soln	4.8		4.4	
n & K		0.68/0.43		0.63/0.57	
ASG of Solids	g/cc	2.8		2.8	
K+	ppm	25450		23300	
Sulphite	ppm	10		10	
Rheometer	600 rpm/300 rpm	48/30		45/29	
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

Maintain viscosity with PAC R additions to active mud system.
Add caustic potash to maintain alkalinity.
Make up premix with KCl @ 9ppb and PAC L @ 1.67ppb.
Adding BARACOR 129 to active, as an oxygen scavanger.

ACTIVITY

Drill from 1901m.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Barite,sx	50 kg			127	
Barite,sx	25 kg			482	
PAC–R	50 lb	6		46	1024.44
PAC–L	50 lb	3		3	512.22
Caustic Potash	25 kg	2		16	114.70
KCL,Tech(sx)	25 kg	4		121	57.76
DEXTRID	50 lb			120	
EZ MUD L	19 lt				
BARACOR 129	25 kg	1		3	64.96

MUD TYPE KCl/EZ MUD/Polymer

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		2x84,110	23.5
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander	11.5	2.15	6	13
Desilter 1.	15.3	4.4	6	26
Desilter 2.				
Centrifuge 1				
Centrifuge 2				
Solids Control Effic.			%	

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	60
other	
other	
Barite	
Chemicals	1
Losses	**bbl**
Sol. Con.	39
Lost/Dumped	26
Down Hole	20
Newhole	24
NET LOSS	24
Discharged	65

BAROID Engineer	OFFICE	WAREHOUSE
P. Innes, C. Wallace	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST A$ 1774.08 CUMULATIVE COST A$ 39047.65

RESERVE PITS / SURVEY DATA

NO	TYPE	bbl	MD m	TVD m	INCL°	DIR °	DISP m
6	Pill	45					
7	Trip						

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	7.7
Low Grav. Solids	ppb	70.0
High Grav. Solids	% Vol	1.1
High Grav. Solids	ppb	16.2
ASG of Solids	g/cc	2.80
Cuttings Volume	bbl	24.0
Interval Dilution	bbl/m	0.9
Interval Consumption	bbl/m	1.1

TIME BREAKDOWN

	hrs
Drilling	23.5
Circulating	
Reaming In	
Reaming out	
Tripping	
Surveys	
Other	0.5
AVE ROP m/hr	4.38

Baroid Australia Pty Ltd.

MUD REPORT NO. 14	up to 24:00 hrs, 17/7/94		
DATE 18/7/94	DEPTH–m	MD 1901	TVD 1901
START DATE 4–Jul–94	ACTIVITY Drilling		

OPERATOR G.F.E. Resources Ltd	CONTRACTOR / RIG Century Rig 11	COUNTRY Australia
REPORT FOR Ken Smith	REPORT FOR John Hughson	TOWNSHIP Port Campbell
WELL NAME AND NO. Howmains–1	FIELD OR BLOCK NO. PEP 105	LOCATION Otway Basin, Victoria

BIT DATA

Size	8.500 ins
Type	ETD417
Nozzles	32nds
	12 / 13 / 13
Noz Area	0.37 ins²
TFA	ins²
NV m/sec	76.4
Impact lb f	370

DRILLING STRING

	OD ins	ID ins	Length m
Pipe 1	4.5	3.825	1671
Pipe 2	4.5	2.8125	55
Pipe 3			
Col 1	6.25	2.875	175
Col 2			

OPEN HOLE SECTIONS

Sect 1		
Sect 2		
Current	8.5	1545.6

CASINGS

Size ins		Depth m
Riser	Set @	
16	Set @	12
9.625	Set @	355.37
	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	0.0542	127	6.892
Nat 8P80	6	8.5	95	0.0705		

Pump Press 1100 psi — TOTAL bbl/min 6.892

MUD VOL	bbl	CIRCULATING DATA		AV	m/min
Downhole	397	Total circ	114 mins		
Active	388	Bottoms up	45 mins	DP	41.6
Total Circ	785	Surface–bit	12 mins	DC	65.1
Reserve	68	ECD ppg	9.91	Riser	

MUD PROPERTIES

Sample Location	IN or OUT	OUT		OUT	
Time Sample Taken	hrs	13:50		24:00	
Depth	m	1876		1901	
Flowline Temp	°C			43	
Weight	ppg	10.10		9.85	
Funnel Viscosity	sec/qt	45		43	
Plastic Viscosity	cP	17		14	
Yield Point	lb/100 ft²	14		13	
Gels 10 sec/10min/30 min	lb/100 ft²	1/6/–		1/6/–	
API Filtrate	ml/30min	7.2		6.6	
HPHT Filtrate	ml/30min				
API/HPHT Filter Cake	32nd ins	1/–		1/–	
Solids	% Vol	9.0		8.6	
Dissolved Salts	% Vol	1.9		2.0	
Oil/Water Content	% Vol	–/89.1		–/89.4	
Sand	% Vol	1.0		0.3	
Methylene Blue cap	ppb	13		13	
pH	meter	9.5		9.5	
Alk. Mud Pm	ml	0.75		0.75	
Alk. Filtrate, Pf/Mf	ml	0.10/0.25		0.10/0.20	
Chlorides	mg/Lx10³	24.0		24.0	
Total Hardness/Calcium	mg/L	100/80		80/60	
KCL	% Wt Soln	4.8		4.8	
n & K		0.63/0.61		0.60/0.64	
ASG of Solids	g/cc	3.1		2.8	
K+	ppm	25450		25450	
Sulphite	ppm	10		40	
Rheometer	600 rpm/300 rpm	48/31		41/27	
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

AQUAGEL added into premix, report 13, to maintain gel strengths and suspend barite.
Allowing mud weight to decrease through dilution with premix and running solids control, to desired mud weight of 9.8 ppg.
Make up premix with KCl @ 20ppb, and PAC R @ 1.67ppb and PAC L @ 0.8ppb.
Maintain alkalinity with additions of caustic potash.
Treat system with BARACORE 129, an oxygen scavenger.
Dumped sand traps to allow for new volume.

ACTIVITY

Continue to Pull Out Of Hole and retrieve DST tool.
Run In Hole to 793m. Ream 793 to 816m, and 870 to 893m.
Work Tight Hole 975 to 1014m, 1052 to 1090m, and 1204 to 1280m
Ream 1280 to 1313m, and 1426 to 1466m.
Run In Hole to 1869m and wash out 6m fill.
Drill from 1888m.

INVENTORY AND CONSUMPTION

PRODUCT DESCRIPTION		USED	REC	BAL	COST
Barite,sx	50 kg			127	
Barite,sx	25 kg			482	
PAC–R	50 lb	6		52	1024.44
PAC–L	50 lb	3		6	512.22
Caustic Potash	25 kg	2		18	114.7
KCL,Tech(sx)	25 kg	64		125	924.16
DEXTRID	50 lb			120	
EZ MUD L	19 lt				
BARACOR 129	25 kg	1		4	64.96

MUD TYPE KCl/EZ MUD/Polymer

SOLIDS CONTROL EQUIPMENT

	Make	screen size	hrs
Shaker 1		2x84,110	13
Shaker 2			
Shaker 3			
Shaker 4			

	ppg	bbl/hr	hrs	bbl
Desander	11.8	2.7	10	27
Desilter 1.	17.5	4.4	7	31
Desilter 2.				
Centrifuge 1				
Centrifuge 2				

Solids Control Effic. %

CONSUMPTION

Additions	bbl
Sea W.	
Drill W.	180
other	
other	
Barite	
Chemicals	6
Losses	**bbl**
Sol. Con.	58
Lost/Dumped	59
Down Hole	20
Newhole	6
NET GAIN	49
Discharged	117

BAROID Engineer	OFFICE	WAREHOUSE
P. Innes, C. Wallace	Melbourne	Adelaide
Tel. 03–6213367 (Fax)	03–6213311	08–477433

DAILY COST	CUMULATIVE COST
A$ 2640.48	A$ 37273.57

RESERVE PITS

NO	TYPE	bbl
6	Pill	68
7	Trip	

SURVEY DATA

MD m	TVD m	INCL°	DIR °	DISP m
1884	1884	0.5		

SOLIDS ANALYSIS

Low Grav. Solids	% Vol	7.5
Low Grav. Solids	ppb	68.2
High Grav. Solids	% Vol	1.1
High Grav. Solids	ppb	16.2
ASG of Solids	g/cc	2.80
Cuttings Volume	bbl	6.0
Interval Dilution	bbl/m	0.9
Interval Consumption	bbl/m	1.2

TIME BREAKDOWN hrs

Drilling	10
Circulating	
Reaming in	1.5
Reaming out	
Tripping	9
Surveys	0.5
Other	3
AVE ROP m/hr	2.5

APPENDIX B

GFE RESOURCES LTD

APPENDIX 3

DAILY REPORT SUMMARY

OF DRILLING OPERATIONS

HOWMAINS-1

DRILLING OPERATIONS SUMMARY

HOWMAINS-1

Permit:	PEP 104	**Spud Date:**	04 / 07 / 94	**Rig:**	Century Rig 11
GFE Rep:	K. Smith	**Geologist:**	A. Tabassi		

TIME	*HOURS*	*OPERATIONS*
04 / 07 / 94		
0800-1300	5	Drill rathole and mousehole. Re-socket sand line. Rig safety inspection and pre-spud meeting with GFE and all contractors' personnel.
1300-1400	1	Spud in and drill 12¼" hole to 32m - total loss of circulation at 21m.
1400-1500	1	Mix LCM and build volume.
1500-1830	3½	Drill 12¼" hole from 32m to 104m, blind and with partial returns after approximately 40m - cellar washing out in two places on outside.
1830-1930	1	Pull out of hole.
1930-2300	3½	Wait on trailer load of cement and unload same.
2300-2330	½	Spot 10bbl megaviscosity pill at 38m and run 27sx cement plug at 28m.
2330-2400	½	Wait on cement.
05 / 07 / 94		
0000-0600	6	Wait on cement.
0600-0700	1	Run in hole to 38m - no tag of cement plug.
0700-0800	1	Rig up Dowell and run cement plug #2 at 28m with 45sx Class 'A' cement.
0800-1200	4	Wait on cement.
1200-1400	2	Run in hole, tag cement at 26m. Rig up Dowell and unload bulk cement tanker.
1400-1500	1	Lay out 2 x 8" drill collars and stabiliser prior to plugging back to surface.
1500-1600	1	Weld up drain holes in kelly scabbard to prevent cement-up, prior to plugging. Run cement plug #3 at 26m with approximately 280sx Class 'A' cement.
1600-1830	2½	Stop for 15 minutes, lay out 1 single and resume at 19m with 120sx Class 'A', water returns - hole holding - stop for 15 minutes, lay out 1 single and resume at 9m with 80sx Class 'A', watery cement returns, hole losing slowly.
1830-2400	5½	Wait on cement samples to set up - tag cement plug #3 at 7m at 2230 hrs.
06 / 07 / 94		
0000-0330	3½	Wait on cement.
0330-0630	3	Drill out cement plug to 28m and clean to 43m.
0630-0700	½	Circulate and survey at 30m.
0700-0930	2½	Clean and ream 12¼" hole from 43m to 78m. Hole taking mud at approximately 40bbl/hr since 50m. Lost circulation material returns from approximately 63m while cleaning to bottom.
0930-1130	2	Jack derrick and re-centre crown over rotary table.
1130-1200	½	Clean and ream 12¼" hole from 78m to 104m.
1200-2400	12	Drill 12¼" hole from 104m to 359m with surveys.

TIME	HOURS	OPERATIONS
07 / 07 / 94		
0000-0030	1/2	Circulate bottoms up.
0030-0330	3	Wiper trip, strap out - 1.5m deeper. Run in hole to 359m.
0330-0400	1/2	Break circulation and clean from 345m to 359m - 14m of fill.
0400-0430	1/2	Circulate hole clean.
0430-0500	1/2	Survey at 350m.
0500-0730	2 1/2	Pull out of hole to run casing. Lay out two 8" Drill Collars and 12 1/4" stabiliser.
0730-1230	5	Rig up and run 9 5/8" surface casing. Safety meeting held.
1230-1300	1/2	Head up Dowell cement head.
1300-1330	1/2	Circulate casing at 220gpm. Safety meeting held.
1330-1500	1 1/2	Hook up cement line, pump pre-flush and test lines. Mix and displace cement. Cement in place at 1510 hours.
1500-2130	6 1/2	Wait on cement.
2130-2400	2 1/2	Slack off and lay out cement head, landing joint and conductor barrel. Make up casing bowl.
08 / 07 / 94		
0000-0700	1	Nipple up B.O.P.'s.
0700-0800	1	Function test B.O.P.'s, stake flare line and make up cup tester.
0800-1100	3	Pressure test flare line to 1500 psi, pipe ram and all choke manifold valves, HCR, manual choke line valve and kill line valves to 200 psi and 3000 psi. Annular and blind rams to 200 psi and 1500 psi. Function emergency shut downs (tighten B.O.P. studs and replace seal in flare line union to effect seal).
1100-1330	2 1/2	Make up 8 1/2" BHA and run in hole. Tag cement at 339.52m.
1330-1400	1/2	Pressure test stabbing valve, upper and lower kelly cocks to 1500 psi.
1400-1500	1	Drill out cement plug, shoe and five metres of new hole.
1500-1630	1 1/2	Circulate and run Formation Integrity Test with Dowell with repairs to pressure losses on cementing unit. EMW = 15.04 ppg.
1630-1930	3	Drill 8 1/2" hole from 364m to 481m.
1930-2000	1/2	Circulate and survey at 481m.
2000-2400	4	Drill 8 1/2" hole from 481m to 615m.
09 / 07 / 94		
0000-0230	2 1/2	Drill 8 1/2" hole from 615m to 682m.
0230-0300	1/2	Circulate and survey at 669m.
0300-1030	7 1/2	Drill 8 1/2" hole from 682m to 883m.
1030-1100	1/2	Service rig.
1100-1130	1/2	Circulate and survey at 870m.
1130-1900	7 1/2	Drill 8 1/2" hole from 883m to 1065m.
1900-1930	1/2	Circulate and survey at 1052m.
1930-2330	4	Drill 8 1/2" hole from 1065m to 1160m.
2330-2400	1/2	Circulate and survey at 1147m.
10 / 07 / 94		
0000-0030	1/2	Drill 8 1/2" hole from 1160m to 1170m.
0030-0130	1	Circulate hole clean prior to wiper trip.
0130-0400	2 1/2	Pull out of hole to 174m. Work tight hole at 985m to 870m and 698m to 659m.
0400-0430	1/2	Change out drilling jars and work single. Install corrosion ring.
0430-0500	1/2	Slip 40' of drilling line.

TIME	HOURS	OPERATIONS
0500-0600	1	Run in to 698m, hole bridged.
0600-0630	1/2	Pick up kelly, clean out bridge at 698m and 717m.
0630-0700	1/2	Clean and ream from 889m to 918m.
0700-0800	1	Continue run in hole to 1147m.
0800-0830	1/2	Break circulation and clean from 1155m to 1170m.
0830-1800	9 1/2	Drill 8 1/2" hole from 1170m to 1360m.
1800-1830	1/2	Circulate and survey at 1347m.
1830-1900	1/2	Drill 8 1/2" hole from 1360m to 1370m.
1900-1930	1/2	Circulate and survey at 1357m.
1930-2400	4 1/2	Drill 8 1/2" hole from 1370m to 1428m.
11 / 07 / 94		
0000-1000	10	Drill 8 1/2" hole from 1428m to 1509.
1000-1030	1/2	Survey at 1501m.
1030-1530	5	Pull out of hole. Tight from 1366m to 1204m.
1530-1800	2 1/2	Run in hole with new bit and junk sub. Pick up one 6 1/4" DC. Holding up down to 1160m.
1800-2200	4	Wash and ream from 1160m to 1237m, 1293m to 1313m, and 1447m to 1509m.
2200-2230	1/2	Work junk sub on bottom.
2230-2400	1 1/2	Drill from 1509m to 1511m.
12 / 07 / 94		
0000-1330	13 1/2	Drill 8 1/2" hole from 1511m to 1588m.
1330-1400	1/2	Circulate geological sample at 1588m.
1400-1630	2 1/2	Drill 8 1/2" hole from 1588m to 1610m.
1630-1700	1/2	Circulate and survey at 1597m.
1700-2100	4	Drill 8 1/2" hole from 1610m to 1638m.
2100-2130	1/2	Circulate and survey at 1635m.
2130-2400	2 1/2	Drill 8 1/2" from 1638m to 1658m.
13 / 07 / 94		
0000-0100	1	Drill 8 1/2" hole from 1658m to 1667m.
0100-0130	1/2	Circulate and survey at 1667m.
0130-0430	3	Drill 8 1/2" hole from 1667m to 1696m.
0430-0500	1/2	Circulate and survey at 1696m.
0500-0800	3	Drill 8 1/2" hole from 1696m to 1715m.
0800-1200	4	Pull out of hole (wiper trip) to 1510m - work tight hole from 1510m to 1443m. Pick up kelly, unplug jets and clean out tight hole from 1434m to 1447m. Pull 5 stands and work tight hole from 1377m to 1338m. Pull out to 1166m, run in hole to 1693m, break circulation and clean and ream from 1695m to 1715m.
1200-1230	1/2	Drill 8 1/2" from 1715m to 1725m.
1230-1300	1/2	Circulate and survey at 1721m.
1300-1400	1	Drill 8 1/2" hole from 1725m to 1730m.
1400-1430	1/2	Clean balled-up bit.
1430-1800	3 1/2	Drill 8 1/2" hole from 1730m to 1754m.
1800-1830	1/2	Circulate and survey at 1751m.
1830-2230	4	Drill 8 1/2" hole from 1754m to 1782m.
2230-2300	1/2	Circulate and survey at 1779m.
2300-2400	1	Drill 8 1/2" hole from 1782m to 1792m.

TIME	HOURS	OPERATIONS
14 / 07 / 94		
0000-0530	5½	Drill 8½" hole from 1792m to 1821m.
0530-0600	½	Circulate and survey at 1817m.
0600-1130	5½	Drill 8½" hole from 1821m to 1849m.
1130-1200	½	Circulate and survey at 1846m.
1200-1530	3½	Drill 8½" hole from 1849m to 1874m.
1530-1700	1½	Circulate geological sample at 1874m.
1700-1730	½	Drill 8½" hole from 1874m to 1875.5m.
1730-1830	1	Circulate geological sample at 1875.5m.
1830-2400	5½	Pull out of hole, running wiper trip to to 529m - tight hole 1687m to 1485m. Pick up kelly to fill pipe and try to wash stabiliser clean (hole swabbing). Continue pull out of hole, tight from 1293m to 1103m, hole still swabbing. Continue breaking circulation to fill pipe. Pull maximum 50,000lbs over from 1687m to 1485m.
15 / 07 / 94		
0000-0030	½	Continue pull out of hole to casing shoe.
0030-0100	½	Slip 40 feet of drilling line.
0100-0200	1	Pull out of hole to lay out stabiliser and junk subs.
0200-0300	1	Pick up cup tester and test B.O.P. stack and pipe rams, choke manifold rear valves and HCR valve to 3,000 psi and flow line 1,500 psi.
0300-0630	3½	Run in hole, clean and ream tight hole at 1424m.
0630-1630	10	Ream and clean tight hole from 1424m to 1875m - 4m of fill. Circulate for 10 minutes and pull back 2 stands.
1630-1800	1½	Circulate hole clean.
1800-2200	4	Wiper trip to 1084m. Hole tight from 1619m to 1581m and 1485m to 1466m - 6m of fill. Circulate for 10 minutes and pull back 2 stands.
2200-2300	1	Circulate hole clean.
2300-2400	1	Pull out of hole for DST-1. Strap pipe.
16 / 07 / 94		
0000-0200	2	Pull out of hole for DST-1. Strap pipe.
0200-0300	1	Slip and cut drilling line.
0300-0400	1	Pull out of hole - strap pipe. Drillers depth: 1875.5m, strap depth: 1876.67m.
0400-0530	1½	Make up test tools.
0530-1000	4½	Run in hole with test tool for DST-1, tag at 1869m - 6m of fill.
1000-1630	6½	Head up surface equipment and run DST-1 from 1866.5m to 1875.5m.
1630-1730	1	Unseat packers and pull 6 stands - liquid top at 4½ stands.
1730-2100	3½	Head up and drop bar to reverse circulate - no shear at impact sub. Pressure up on pump-out sub to 1800psi - minimal circulation. Attempt to reverse circulate at 300psi annular pressure maximum - no circulation. Pull 2 stands to move string. Head up Dowell and circulate through pump-out sub at 2500psi.
2100-2230	1½	Reverse circulate contents of drill string.
2230-2300	½	Pick up kelly and circulate capacity of string.
2300-2400	1	Pull out of hole with test tool.
17 / 07 / 94		
0000-0330	3½	Pull out of hole with test tool.
0330-0530	2	Break and lay out test tools.
0530-0630	1	Flush choke manifold. Make up 8½" drilling BHA and run in hole.

TIME	HOURS	OPERATIONS
0630-0800	$1^1/2$	Run in hole with $8^1/2$" drilling assembly to 793m.
0800-0830	$^1/2$	Ream tight hole from 793m to 816m and 870m to 893m.
0830-1030	2	Run in hole - work tight hole from 975m to 1014m, 1054m to 1090m and 1204m to 1280m.
1030-1100	$^1/2$	Ream tight hole from 1280m to 1313m.
1100-1130	$^1/2$	Run in hole to 1424m.
1130-1200	$^1/2$	Ream from 1424m to 1466m.
1200-1300	1	Run in hole to 1869m.
1300-1330	$^1/2$	Wash 6m of fill to 1875m and work junk sub.
1330-2000	$6^1/2$	Drill $8^1/2$" hole from 1875m to 1888m. Checked for balled up bit several times due to low R.O.P. and rolling rotary torque.
2000-2030	$^1/2$	Circulate and survey at 1884m.
2030-2400	$3^1/2$	Drill $8^1/2$" hole from 1888m to 1901m.
18 / 07 / 94		
0000-0530	$5^1/2$	Drill $8^1/2$" hole from 1901m to 1912m.
0530-0600	$^1/2$	Power failure, restore power.
0600-2400	18	Drill $8^1/2$" hole from 1912m to 2004m.
19 / 07 / 94		
0000-0830	$8^1/2$	Drill $8^1/2$" hole from 2004m to 2060m.
0830-0900	$^1/2$	Service rig.
0900-2400	15	Drill $8^1/2$" hole from 2060m to 2145m.
20 / 07 / 94		
0000-0130	$1^1/2$	Drill $8^1/2$" hole from 2145m to 2150m.
0130-0230	1	Circulate bottoms up.
0230-0630	4	Wiper trip back to 800m.
0630-0700	$^1/2$	Run in hole, wiper trip - 4m of fill.
0700-0830	$1^1/2$	Clean to bottom and circulate hole clean prior to logging.
0830-0900	$^1/2$	Run bottom survey and lubricate sand line.
0900-1200	3	Pull out of hole to casing shoe, strap out.
1200-1230	$^1/2$	Slip 20' of drilling line.
1230-1400	$1^1/2$	Pull out of hole, lay out jars, stabiliser and choke sub.
1400-2400	10	Rig up Schlumberger and run wireline logs: Run #1 DLL-MSFL-BHC-GR-SP-CAL Run #2 WST
21 / 07 / 94		
0000-1230	$12^1/2$	Run wireline logs with Schlumberger: Run #2 WST Run #3 LDL-CNL-GR-CAL Run #4 CST (Sidewall cores) and rig down loggers.
1230-1400	1½	Run in hole 8½" BHA.
1400-1700	3	Lay out BHA. Service tool joints.
1700-2030	3½	Run in hole open ended drill pipe to 1930m.
2030-2130	1	Circulate hole.
2130-2230	1	Head up Dowell, pressure test line to 1500psi, run plug #1 from 1930m to 1845m with 107sx class 'A' cement.
2230-2300	½	Pull back 14 stands to 1660m.
2300-2400	1	Run plug #2 from 1660m to 1600m with 80sx Class 'A' cement.

TIME	HOURS	OPERATIONS
22 / 07 / 94		
0000-0030	½	Pull 4 stands and circulate pipe clean.
0030-0200	1½	Lay out 41 joints drill pipe.
0200-0230	½	Run plug #3 from 1190m to 1130m with 71sx class 'A' cement.
0230-0300	½	Pull 3 stands and circulate pipe clean.
0300-0630	3½	Lay out 119 joints drill pipe.
0630-0730	1	Run in hole with open-ended drill pipe.
0730-0800	1/2	Run plug #4 from 395m to 355m with 110 sacks class 'A' cement.
0800-0900	1	Pull out of hole.
0900-1300	4	Wait on cement plug.
1300-1400	1	Run in hole - tag plug at 336m.
1400-1430	1/2	Lay out drill pipe.
1430-1500	1/2	Break kelly connections.
1500-1630	1 1/2	Lay out drill pipe.
1630-1930	3	Nipple down and lay out B.O.P.s.
1930-2000	1/2	Recover casing bowl.
2000-2030	1/2	Mix cement by hand and run surface plug.
2030-2200	1 1/2	Lay out kelly and finish cleaning mud tanks.
		Release Rig at 2200 hours, 22 July 1994.

APPENDIX 4

GFE RESOURCES LTD

APPENDIX 4A

CUTTINGS DESCRIPTIONS

HOWMAINS-1

WELL:	HOWMAINS-1	**PERMIT:**	PEP104	**DATE**	08/07/1994
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INTERVAL (m)	%	CUTTINGS DESCRIPTION
359-365	100	**MARL:** light to occasionally medium grey and brownish grey, medium greenish grey in part, soft, sticky in part, rarely dispersive, slightly to occasionally moderately silty, common to occasionally abundant fossil fragments, common foraminifera, rare micromica. NOTE: Sample is heavily contaminated by cement.
365-385	100	**MARL:** as for 359 - 365.
385-390	100	**MARL:** generally as for 359 - 365, trace to common fossil fragments and foraminifera.
390-395	100	**MARL:** as for 385 - 390.
395-400	100	**MARL:** generally as for 359 - 385, dominantly medium brown to brownish grey.
400-415	100	**MARL:** as for 395 - 400.
415-420	-	sample missed
420-430	100	**MARL:** as for 395 - 400.
430-435	-	sample missed
435-440	100	**MARL:** medium grey and brownish grey, medium greenish grey in part, soft to occasionally firm, rarely platy in part, sticky in part, rarely dispersive, slightly to occasionally moderately silty, slightly argillaceous in part, grading in part to **Calcareous Argillaceous Siltstone**, common fossil fragments and foraminifera, rare micromica.
440-445	100	**MARL:** as for 435 - 440.
445-450	70 20 10	**MARL:** as for 435 - 440, interbedded/interlaminated with: **ARGILLACEOUS SILTSTONE:** medium to rarely dark grey, firm to occasionally moderately hard, blocky to occasionally subfissile, moderately to strongly calcareous, in part grading to **Silty Claystone**, common fossil fragments and foraminifera, rare micromica and carbonaceous detritus, interlaminated with: **CALCARENITE:** light greenish grey to grey, firm to hard, dominantly fine, occasionally very fine grained, trace to rare argillaceous matrix, trace to occasionally common moderately strong calcareous cement, trace micromica and very fine carbonaceous matter, very rare very fine quartz sand grains, very poor visual porosity.
450-460	85 15	**MARL:** as for 435 - 440. **ARGILLACEOUS SILTSTONE:** as for 445 - 450.
460-465	100 Tr	**MARL:** as for 445 - 450. **ARGILLACEOUS SILTSTONE:** as for 445 - 450.
465-470	-	sample missed
470-475	100	**MARL:** light to rarely greenish grey trace brownish grey in part, soft to occasionally firm in places, sticky in part, rarely dispersive, slightly silty, slightly argillaceous in part, common fossil fragments and foraminifera, rare micromica.

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INTERVAL (m)	%	CUTTINGS DESCRIPTION
475-480	60	<u>**MARL:**</u> as for 470 - 475, interbedded/interlaminated with:
	30	<u>**ARGILLACEOUS SILTSTONE:**</u> medium to rarely dark brown, medium brownish grey in part, firm to occasionally moderately hard, blocky to occasionally subfissile, moderately to strongly calcareous, in part grading to **Silty Claystone**, common fossil fragments and foraminifera, rare micromica and carbonaceous detritus, interlaminated with:
	10	<u>**CALCARENITE:**</u> light greenish grey to grey, firm to hard, dominantly fine, occasionally very fine grained, trace to rare argillaceous matrix, trace to occasionally common moderately strong calcareous cement, trace micromica and very fine carbonaceous matter, very rare very fine quartz sand grains, very poor visual porosity.
480-485	100	<u>**MARL:**</u> light grey and light to medium greenish grey, soft and dominantly dispersive, rarely sticky, common fossil fragments and foraminifera, rare mica.
485-490	100	<u>**MARL:**</u> as for 480 - 485.
490-495	-	sample missed
495-500	100	<u>**MARL:**</u> as for 480 - 485.
	Tr	<u>**ARGILLACEOUS SILTSTONE:**</u> medium brown, medium brownish grey in part, firm to occasionally moderately hard, dominantly blocky, moderately to strongly calcareous, in part grading to **Silty Claystone**, common fossil fragments and foraminifera, rare micromica.
500-505	100	<u>**MARL:**</u> as for 480 - 485.
	Tr	<u>**ARGILLACEOUS SILTSTONE:**</u> as for 495 - 500.
505-515	100	<u>**MARL:**</u> as for 480 - 485.
	Tr	<u>**ARGILLACEOUS SILTSTONE:**</u> as for 495 - 500.
515-520	100	<u>**MARL:**</u> medium grey to brownish grey, medium greenish grey in part, firm to occasionally moderately hard, blocky to platy in part, moderately argillaceous in part, slightly silty, common fossil fragments, trace to common foraminifera.
520-525	100	<u>**MARL:**</u> generally as for 515 - 520, dominantly light to medium greenish grey and grey, dominantly soft and sticky.
525-540	100	<u>**MARL:**</u> as for 520 - 525.
540-545	100	<u>**MARL:**</u> medium grey to brownish grey, medium greenish grey in part, firm to occasionally moderately hard, platy to subfissile in part, moderately argillaceous in part, slightly silty,common fossil fragments, trace to common foraminifera, very rare fine medium to dark green glauconite (?), very rare coaly fragments.
545-550	100	<u>**MARL:**</u> as for 540 - 545.
565-570	100	<u>**MARL:**</u> generally as for 540 - 545, dominantly light grey and greenish grey, rarely brownish grey, dominantly soft to firm, dispersive in part, slightly silty, common to occasionally abundant fossil fragments, trace to common foraminifera, very rare glauconite and coaly fragments.

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INTERVAL (m)	%	CUTTINGS DESCRIPTION
570-575	100	**MARL:** generally as for565 - 570, dominantly firm to occasionally moderately hard, dominantly blocky.
575-580	50	**MARL:** light to medium grey, light greenish grey, occasionally light brownish grey, firm to occasionally moderately hard, dominantly blocky, slightly silty, occasionally moderately argillaceous, common fossil fragments and foraminifera, rare glauconite.
	50	**CALCARENITE:** medium orange, yellow to light orange brown in part, friable to rarely moderately hard, dominantly medium, rarely coarse grained in part, dominantly iron-stained, trace fine to medium grained iron oxide/hydroxide pellets, trace to common iron-stained fossil fragments, trace calcite vein, very rare iron-stained medium quartz sand grains, fair to good visual porosity.
580-585	-	sample missed
585-590	50	**MARL:** as for 575 - 580.
	50	**CALCARENITE:** as for 575 - 580.
590-595	80	**MARL:** as for 575 - 580.
	20	**CALCARENITE:** as for 575 - 580.
595-605	100	**MARL:** medium brownish grey, rarely medium greenish grey, soft, occasionally firm, dominantly sticky, dispersive in part, commonly argillaceous, slightly silty in part, common dark green fine to medium grained glauconite, common fossil fragments and foraminifera, trace orange and brown lithic fragments and pyrite nodules, trace fine quartz sand grains.
605-610	50	**MARL:** as for 595 - 605.
	50	**CALCARENITE:** light grey to very light brownish grey, friable, fine to medium grained, trace fossil fragments, foraminifera and glauconite, fair to good visual porosity.
610-635	100	**MARL:** generally as for 595 - 605, dominantly firm, commonly blocky, abundantly argillaceous, commonly silty.
635-640	100	**FERRUGINOUS SANDSTONE:** medium brown, occasionally light brown, medium to very coarse grained, occasionally pebbly, dominantly coarse, dominantly subrounded to rounded poorly to moderately sorted iron-stained quartz, nil to trace medium brown dispersive argillaceous matrix, trace iron oxide/hydroxide pellets, trace pyrite nodules, trace iron-stained fossil fragments, rare mica, friable with abundant loose grains. Very good inferred porosity. No fluorescence.
640-645	100	**FERRUGINOUS SANDSTONE:** generally as for 635 - 640, with trace to common light to medium brownish grey and white kaolinitic argillaceous matrix, and good inferred porosity. No fluorescence.
645-650	95	**FERRUGINOUS SANDSTONE:** generally as for 635 - 640, common to occasionally abundant argillaceous matrix, fair to occasionally good inferred porosity. No fluorescence.
	5	**CLAYSTONE:** medium grey to medium brown, soft and dispersive, moderately silty, common to abundant very fine dispersive quartz sand grains, rare micromica.
650-655	-	sample missed
655-660	90	**FERRUGINOUS SANDSTONE:** generally as for 635 - 640, becoming dominantly light brown with depth, abundant argillaceous matrix, fair inferred porosity. No fluorescence.
	10	**CLAYSTONE:** as for 645 - 650.
660-665	-	sample missed

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INTERVAL (m)	%	CUTTINGS DESCRIPTION
665-670	85	**FERRUGINOUS SANDSTONE:** as for 635 - 640.
	15	**CLAYSTONE:** as for 645 - 650.
670-675	-	sample missed
675-680	90	**FERRUGINOUS SANDSTONE:** as for 635 - 640.
	10	**CLAYSTONE:** as for 645 - 650.
680-685	-	sample missed
685-690	85	**FERRUGINOUS SANDSTONE:** generally as for 635 - 640, becoming very light brown to clear (less ferruginous) with depth.
	15	**CLAYSTONE:** as for 645 - 650.
690-695	85	**FERRUGINOUS SANDSTONE:** as for 685 - 690, becoming dominantly medium grained with depth.
	15	**CLAYSTONE:** as for 645 - 650.
695-700	60	**FERRUGINOUS SANDSTONE/SANDSTONE:** as for 685 - 690.
	40	**CLAYSTONE:** dark brown, becoming dominantly medium brown with depth, soft, moderately dispersive, commonly silty, trace to common dispersive very fine to coarse quartz sand grains, slightly calcareous in part, trace to common glauconite, trace fossil fragments and pyrite.
700-705	100	**CLAYSTONE:** generally as for 695 - 700, with trace of iron oxide/hydroxide pellets.
705-710	100	**CLAYSTONE:** as for 695 - 700.
710-715	-	sample missed
715-720	50	**CLAYSTONE:** as for 695 - 700.
	50	**CALCAREOUS SANDSTONE:** light to medium brown, dominantly iron-stained, fine to coarse, dominantly medium, dominantly subrounded, moderately sorted quartz in very light grey to white, amorphous to cryptocrystalline limestone matrix, trace to dominantly common glauconite, trace to common iron oxide/hydroxide pellets, friable to moderately hard in part, fair to occasionally good inferred porosity. No fluorescence.
720-725	-	sample missed
725-730	20	**CALCAREOUS SANDSTONE:** as for 715 - 720.
	80	**FERRUGINOUS SANDSTONE:** light to medium brown, dominantly iron-stained, medium to very coarse, dominantly coarse, occasionally pebbly, dominantly subrounded, moderately sorted quartz, trace dispersive light brown argillaceous matrix, trace to common iron oxide/hydroxide pellets and glauconite, common fossil fragments, friable with abundant loose grains, fair to occasionally good inferred porosity. No fluorescence.
730-735	-	sample missed
735-740	80	**FERRUGINOUS SANDSTONE:** as for 725 - 730.
	20	**CLAYSTONE:** as for 695 - 700.
740-745	100	**CLAYSTONE:** dark green, dominantly glauconitic, soft to firm, dispersive in part, common to occasionally abundant fine to medium iron-stained quartz sand grains, trace carbonaceous detritus, rare pyrite and fossil fragments.

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INTERVAL (m)	%	CUTTINGS DESCRIPTION
745-750	90	**CLAYSTONE:** mottled medium green and greenish grey, dominantly glauconitic, argillaceous material with white amorphous and in part vein calcite, firm, rarely subfissile, with common fine to coarse quartz sand grains, dominantly green and iron-stained, trace to common glauconite, trace carbonaceous detritus, slightly silty in part.
	10	**FERRUGINOUS SANDSTONE:** generally as for 725 - 730, becoming very light brown to occasionally clear with depth.
750-755	100	**CLAYSTONE:** as for 745 - 750.
	Tr	**SANDSTONE:** as for 856 - 750, dominantly clear.
755-760	100	**CLAYSTONE:** as for 745 - 750.
760-765	80	**CLAYSTONE:** mottled medium green and greenish grey, dominantly glauconitic, argillaceous material with white amorphous and in part vein calcite, firm, rarely subfissile, with common fine to coarse quartz sand grains, dominantly green and iron-stained, trace to common glauconite, trace carbonaceous detritus, slightly silty in part.
	20	**SANDSTONE:** light brown to clear, occasionally iron-stained, medium to very coarse, dominantly coarse, dominantly subrounded, moderately sorted quartz, trace dispersive light brown argillaceous matrix, trace iron oxide/hydroxide pellets and glauconite, common fossil fragments, friable with abundant loose grains, fair to occasionally good inferred porosity. No fluorescence.
765-775	100	**CLAYSTONE:** as for 760 - 765.
775-785	50	**SANDSTONE:** light to medium brown, very fine to very coarse, dominantly medium to coarse, subrounded, occasionally rounded, poorly sorted commonly iron-stained quartz, trace to abundant dark brown argillaceous and silty matrix, trace weak calcareous cement, friable with abundant loose grains, poor to good inferred porosity. No fluorescence. Interbedded with:
	50	**CLAYSTONE:** medium to dark brown, commonly silty, moderately calcareous, nil to common dispersive fine to very coarse quartz sand grains, trace calcite veins, trace pyrite, soft and dispersive.
785-790	90	**SANDSTONE:** as for 775 - 785.
	10	**CLAYSTONE:** as for 775 - 785.
790-795	10	**SANDSTONE:** as for 775 - 785.
	90	**CLAYSTONE:** as for 775 - 785.
795-800	-	sample missed
800-805	20	**SANDSTONE:** generally as for 775 - 785, becoming very light brown to occasionally clear.
	80	**CLAYSTONE:** as for 775 - 785.
805-810	-	sample missed
810-815	50	**SANDSTONE:** generally as for 775 - 785, becoming very light brown to occasionally clear.
	50	**CLAYSTONE:** as for 775 - 785.
815-820	-	sample missed

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INTERVAL (m)	%	CUTTINGS DESCRIPTION
820-825	10	**SANDSTONE:** generally as for 775 - 785, becoming very light brown to occasionally clear.
	90	**CLAYSTONE:** as for 775 - 785.
825-830	-	sample missed
830-835	60	**SANDSTONE:** generally as for 775 - 785, becoming very light brown to occasionally clear.
	40	**CLAYSTONE:** as for 775 - 785.
835-840	-	sample missed
840-845	40	**SANDSTONE:** generally as for 775 - 785, becoming very light brown to occasionally clear.
	60	**CLAYSTONE:** as for 775 - 785.
845-850	-	sample missed
850-860	90	**SANDSTONE:** generally as for 775 - 785, light brown to clear, fine to very coarse, dominantly medium to course, dominantly subrounded, fairly sorted quartz, trace to occasionally common medium grey to brown dispersive argillaceous matrix, trace weak pyrite cement, trace yellow, brown and grey lithic fragments, trace carbonaceous detritus, friable with abundant loose grains, good inferred porosity. No fluorescence. Interbedded with:
	10	**CLAYSTONE:** light grey to brownish grey, occasionally dark brownish grey, moderately silty in part, trace to common dispersive, very fine to very coarse quartz sand grains, trace to common carbonaceous detritus, trace pyrite, slightly calcareous, soft to firm, dispersive in part, non-fissile.
860-865	-	sample missed
865-870	90	**SANDSTONE:** as for 850 - 860.
	10	**CLAYSTONE:** as for 850 - 860.
870-875	100	**SANDSTONE:** as for 850 - 860.
	Tr	**CLAYSTONE:** as for 850 - 860.
875-885	90	**SANDSTONE:** as for 850 - 860.
	10	**CLAYSTONE:** as for 850 - 860.
885-890	100	**SANDSTONE:** as for 850 - 860.
	Tr	**CLAYSTONE:** as for 850 - 860.
890-905	90	**SANDSTONE:** as for 850 - 860.
	10	**CLAYSTONE:** as for 850 - 860.
905-910	100	**SANDSTONE:** generally as for 850 - 860, trace moderately strong siliceous cement, moderately hard in part, fair to good inferred porosity.
	Tr	**CLAYSTONE:** as for 850 - 860.
910-915	90	**SANDSTONE:** generally as for 850 - 860, very rare moderately weak to strong siliceous cement, moderately hard in part, fair to dominantly good inferred porosity.
	10	**CLAYSTONE:** as for 850 - 860.
915-920	70	**SANDSTONE:** as for 850 - 860.
	30	**CLAYSTONE:** as for 850 - 860.

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INTERVAL (m)	%	CUTTINGS DESCRIPTION
920-925	80	**SANDSTONE:** as for 850 - 860.
	20	**CLAYSTONE:** as for 850 - 860.
925-930	70	**SANDSTONE:** generally as for 850 - 860, trace moderately strong siliceous cement, moderately hard in part, fair to good inferred porosity.
	30	**CLAYSTONE:** as for 850 - 860.
930-935	80	**SANDSTONE:** generally as for 850 - 860, very rare moderately weak to strong siliceous cement, moderately hard in part, fair to dominantly good inferred porosity.
	20	**CLAYSTONE:** as for 850 - 860.
935-940	90	**SANDSTONE:** as for 850 - 860.
	10	**CLAYSTONE:** as for 850 - 860.
940-945	-	sample missed
945-950	90	**SANDSTONE:** generally as for 850 - 860, dominantly coarse grains, subangular to subrounded.
	10	**CLAYSTONE:** as for 850 - 860.
950-955	-	sample missed
955-960	100	**SANDSTONE:** as for 850 - 860.
	Tr	**CLAYSTONE:** as for 850 - 860.
960-965	50	**SANDSTONE:** as for 850 - 860.
	50	**CLAYSTONE:** as for 850 - 860.
965-970	60	**SANDSTONE:** generally as for 850 - 860, dominantly subrounded.
	40	**CLAYSTONE:** as for 850 - 860.
970-975	-	sample missed
975-980	100	**SANDSTONE:** as for 850 - 860, light brown to clear, light brownish grey in part, fine to very coarse, dominantly medium to coarse, subangular to dominantly subrounded, poorly to moderately sorted quartz, trace to dominantly common light brownish grey, dispersive (washed away) argillaceous matrix, trace weak pyrite and occasionally siliceous cement, trace grey and brown lithic fragments, rare mica, friable with abundant loose grains, good inferred porosity. No fluorescence..
980-985	-	sample missed
985-990	95	**SANDSTONE:** generally as for 975 - 980, dominantly subangular to subrounded.
	5	**CLAYSTONE:** as for 850 - 860.
990-995	80	**SANDSTONE:** as for 975 - 980
	20	**CLAYSTONE:** as for 850 - 860.
995-1010	100	**SANDSTONE:** as for 975 - 980.
1010-1015	90	**SANDSTONE:** as for 975 - 980.
	10	**CLAYSTONE:** as for 850 - 860.

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INTERVAL (m)	%	CUTTINGS DESCRIPTION
1015-1020	100	**CLAYSTONE:** medium brown and brownish grey, medium to dark grey in part, moderately to occasionally abundantly silty, trace to common dispersive fine to medium quartz sand grains, trace to common glauconite pellets, trace carbonaceous detritus, trace micromica, trace fossil fragments and pyrite nodules, soft to firm, sticky in part, occasionally dispersive.
1020-1025	100	**CLAYSTONE:** generally as for 1015 - 1020, medium greenish grey and grey in part, firm to moderately hard in part, blocky to rarely subfissile in part.
1025-1045	100	**CLAYSTONE:** as for 1015 - 1020.
1045-1050	100	**CLAYSTONE:** generally as for 1020 - 1025, dominantly medium to dark brown and brownish grey, dominantly soft.
1050-1055	90	**CLAYSTONE:** as for 1045 - 1050.
	10	**SANDSTONE:** light to medium brown, dominantly iron-stained, rarely clear, medium to very coarse, dominantly medium to coarse, subangular to dominantly subrounded, moderately sorted iron-stained quartz, trace to common dispersive medium brown argillaceous (chamositic?) matrix, trace to rare moderately strong iron oxide/hydroxide, pyrite and siliceous cement, trace mica, trace glauconite and grey and brown lithic fragments, trace iron oxide/hydroxide pellets, friable with common loose grains to moderately hard in part, fair inferred visual porosity.
1055-1070	80	**CLAYSTONE:** as for 1045 - 1050.
	20	**SANDSTONE:** as for 1050 - 1055.
1070-1075	60	**CLAYSTONE:** as for 1045 - 1050.
	40	**SANDSTONE:** as for 1050 - 1055.
1075-1080	90	**SANDSTONE:** as for 1050 - 1055.
	10	**CLAYSTONE:** as for 1045 - 1050.
1080-1085	-	sample missed
1085-1100	80	**SANDSTONE:** as for 1050 - 1055.
	20	**CLAYSTONE:** as for 1045 - 1050.
1100-1105	-	sample missed
1105-1125	100	**SANDSTONE:** as for 1050 - 1055
1125-1130	90	**SANDSTONE:** as for 1050 - 1055.
	10	**CLAYSTONE:** as for 1045 - 1050.
1130-1135	80	**SANDSTONE:** as for 1050 - 1055.
	20	**CLAYSTONE:** as for 1045 - 1050.
1135-1140	100	**CLAYSTONE:** medium to occasionally dark brown, medium grey and medium greenish grey in part, commonly silty and micromicaceous, trace fine carbonaceous detritus, trace fine dispersive quartz sand grains, soft, rarely firm, sticky in part, rarely dispersive.
1140-1145	90	**CLAYSTONE:** as for 1135 - 1140.
	10	**SANDSTONE:** as for 1050 - 1055.

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INTERVAL (m)	%	CUTTINGS DESCRIPTION
1145-1160	80	**CLAYSTONE:** as for 1135 - 1140
	20	**SANDSTONE:** as for 1050 - 1055.
1160-1165	50	**CLAYSTONE:** as for 1135 - 1140.
	50	**SANDSTONE:** as for 1050 - 1055.
1165-1170	100	**SANDSTONE:** light to occasionally medium brown, clear in part, fine to pebble size, dominantly very coarse, angular to rounded, dominantly subangular, poorly sorted quartz, trace to common light to medium brownish grey argillaceous matrix, trace weak siliceous cement, trace grey and brown lithic fragments, rare mica, friable with abundant loose grains, fair to good visual porosity. No fluorescence.
1170-1175	100	**SANDSTONE:** generally as for 1165 - 1170, clear to light brown in part, fine to pebble size, dominantly very coarse, angular to rounded, dominantly subangular, poorly sorted quartz, trace to common light to medium brownish grey argillaceous matrix, trace weak siliceous cement, trace grey and brown lithic fragments, rare mica, friable with abundant loose grains, fair to good visual porosity. No fluorescence.
1175-1180	80	**SANDSTONE:** as for 1170 - 1175.
	20	**CLAYSTONE:** medium to dark grey, medium brownish grey in part, moderately silty, trace to common dispersive fine to coarse quartz sand grains, trace to common micromica and pyrite, soft to occasionally firm, commonly dispersive (washed away), rarely subfissile in part.
1180-1185	100	**SANDSTONE:** as for 1170 - 1175.
	Tr	**CLAYSTONE:** as for 1175 - 1180.
1185-1190	100	**SANDSTONE:** as for 1170 - 1175.
1190-1200	70	**SANDSTONE:** as for 1170 - 1175.
	30	**CLAYSTONE:** as for 1175 - 1180.
1200-1205	90	**SANDSTONE:** as for 1170 - 1175.
	10	**CLAYSTONE:** as for 1175 - 1180.
1205-1210	80	**SANDSTONE:** as for 1170 - 1175.
	20	**CLAYSTONE:** as for 1175 - 1180.
1210-1215	-	sample missed
1215-1220	85	**SANDSTONE:** as for 1170 - 1175.
	15	**CLAYSTONE:** as for 1175 - 1180.
1220-1225	95	**SANDSTONE:** light brown to light brownish grey, very fine to very coarse, dominantly medium, subangular to occasionally subrounded, poorly sorted quartz, trace to common medium grey to medium brownish grey argillaceous matrix, occasionally silty, trace pyrite and moderately weak siliceous cement, trace carbonaceous detritus, rare mica, friable, poor visual/inferred porosity. No fluorescence.
	5	**CLAYSTONE:** medium to dark grey, occasionally medium brownish grey, commonly to abundantly silty, in part grading to **Argillaceous Siltstone**, trace pyrite, slightly micromicaceous, slightly calcareous in part, soft to firm.
1225-1230	20	**SANDSTONE:** as for 1220 - 1225.
	80	**CLAYSTONE:** as for 1220 - 1225.

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INTERVAL (m)	%	CUTTINGS DESCRIPTION
1230-1235	-	sample missed
1235-1240	50	**SANDSTONE:** as for 1220 - 1225.
	50	**CLAYSTONE:** as for 1220 - 1225.
1240-1245	60	**SANDSTONE:** as for 1220 - 1225.
	40	**CLAYSTONE:** as for 1220 - 1225.
1245-1250	50	**SANDSTONE:** as for 1220 - 1225.
	50	**CLAYSTONE:** as for 1220 - 1225.
1250-1255	30	**SANDSTONE:** as for 1220 - 1225.
	70	**CLAYSTONE:** as for 1220 - 1225.
1255-1265	80	**CLAYSTONE:** as for 1220 - 1225.
	20	**SANDSTONE:** as for 1220 - 1225.
1265-1270	10	**CLAYSTONE:** as for 1220 - 1225.
	90	**SANDSTONE:** as for 1220 - 1225.
1270-1285	50	**CLAYSTONE:** as for 1220 - 1225.
	50	**SANDSTONE:** as for 1220 - 1225.
1285-1290	40	**CLAYSTONE:** as for 1220 - 1225.
	60	**SANDSTONE:** as for 1220 - 1225.
1290-1295	70	**CLAYSTONE:** as for 1220 - 1225.
	30	**SANDSTONE:** as for 1220 - 1225.
1295-1305	60	**SANDSTONE:** light brown to clear, very fine to very coarse, dominantly medium, subangular to occasionally subrounded, poorly sorted quartz, occasionally iron-stained, trace to common medium grey to medium brownish grey argillaceous matrix, occasionally silty, trace moderately strong pyrite and siliceous cement, rare to trace dolomite cement, trace iron oxide/hydroxide pellets,trace carbonaceous detritus (pyritized in part), rare mica, friable to occasionally moderately hard, poor visual/inferred porosity. No fluorescence.
	40	**CLAYSTONE:** medium to dark grey, occasionally medium brownish grey, commonly to abundantly silty, in part grading to **Argillaceous Siltstone**, trace pyrite, trace glauconite, slightly micromicaceous, slightly calcareous in part, soft to dominantly firm, dominantly blocky.
1305-1310	50	**CLAYSTONE:** as for 1295 - 1305.
	50	**SANDSTONE:** as for 1295 - 1305.
1310-1315	70	**CLAYSTONE:** as for 1295 - 1305.
	30	**SANDSTONE:** as for 1295 - 1305.
1315-1320	80	**CLAYSTONE:** as for 1295 - 1305.
	20	**SANDSTONE:** as for 1295 - 1305.
1320-1330	50	**CLAYSTONE:** as for 1295 - 1305.
	50	**SANDSTONE:** as for 1295 - 1305.

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INTERVAL (m)	%	CUTTINGS DESCRIPTION
1330-1335	70	**CLAYSTONE:** as for 1295 - 1305.
	30	**SANDSTONE:** as for 1295 - 1305.
1335-1340	90	**CLAYSTONE:** medium to dark brown and brownish grey, commonly to abundantly silty, in part grading to **Argillaceous Siltstone**, trace pyrite, trace glauconite, slightly micromicaceous, slightly calcareous in part, soft to dominantly firm, dominantly blocky, rarely dispersive in part.
	10	**SANDSTONE:** clear to very light grey in part, medium to very coarse, occasionally pebbly, dominantly coarse, dominantly subangular, moderately sorted clear to smoky quartz, rare to occasionally trace light grey dispersive argillaceous matrix, trace moderately strong siliceous, pyrite and occasionally dolomite cement, trace brown and grey lithic fragments, trace mica, rare to trace carbonaceous detritus, trace quartz overgrowths, friable with common loose grains to occasionally moderately hard, good inferred porosity. No fluorescence.
1340-1360	100	**SANDSTONE:** as for 1335 - 1340.
1360-1365	50	**SILTY CLAYSTONE:** medium brown, medium to dark grey, rarely medium greenish grey, abundantly in part, silty, in part grading to **Argillaceous Siltstone**, slightly to moderately micromicaceous, very slightly calcareous, trace very fine carbonaceous flecks, trace to common very fine dispersive quartz sand grains, in part interlaminated with minor very fine **Sandstone**, trace pyrite and fossil fragments, rare glauconite, soft to moderately hard in part, dominantly firm, dominantly blocky to subfissile.
	50	**SANDSTONE:** as for 1335 - 1340.
1365-1370	100	**SILTY CLAYSTONE:** as for 1360 - 1365.
1370-1375	50	**SILTY CLAYSTONE:** as for 1360 - 1365.
	50	**SANDSTONE:** as for 1335 - 1340.
1375-1380	90	**SILTY CLAYSTONE:** as for 1360 - 1365.
	10	**SANDSTONE:** as for 1335 - 1340.
1380-1390	100	**SILTY CLAYSTONE:** as for 1360 - 1365..
1390-1395	90	**CLAYSTONE:** as for 1335 - 1340.
	10	**SANDSTONE:** generally as for 1335 - 1340, interbedded with trace very fine **Sandstone**; light grey, with common moderately strong siliceous and dolomitic cement, trace medium brown strong dolomite bands with fine glauconite, moderately hard, very poor visual porosity. No fluorescence.
1395-1400	100	**SILTY CLAYSTONE:** as for 1360 - 1365.
1400-1405	70	**SILTY CLAYSTONE:** as for 1360 - 1365.
	30	**SANDSTONE:** as for 1390 - 1395.
1405-1410	-	sample missed
1410-1415	100	**SILTY CLAYSTONE:** as for 1360 - 1365.

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INTERVAL (m)	%	CUTTINGS DESCRIPTION
1415-1420	80	**SILTY CLAYSTONE:** as for 1360 - 1365.
	20	**SANDSTONE:** generally as for 1390 - 1395., clear to light grey, occasionally medium grey, very fine to very coarse, dominantly fine to coarse, dominantly subangular, poorly sorted quartz, trace to dominantly common light grey argillaceous matrix, common moderately weak to moderately strong siliceous cement, rare dolomite cement, trace mica, glauconite and carbonaceous detritus, trace brown and grey lithic fragments, rare partially altered feldspar, trace pyrite nodules, trace rock flour, friable with common loose grains in coarse sandstone portion, moderately hard in fine sandstone portion, fair to very poor inferred/visual porosity. No fluorescence.
1420-1425	-	sample missed
1425-1430	50	**SILTY CLAYSTONE:** as for 1360 - 1365.
	50	**SANDSTONE:** as for 1415 - 1420.
1430-1435	-	sample missed
1435-1440	70	**SILTY CLAYSTONE:** as for 1360 - 1365.
	30	**SANDSTONE:** as for 1415 - 1420.
1440-1455	90	**SILTY CLAYSTONE:** as for 1360 - 1365.
	10	**SANDSTONE:** generally as for 1415 - 1420, dominantly fine.
1455-1460	80	**SILTY CLAYSTONE:** as for 1360 - 1365.
	20	**SANDSTONE:** as for 1415 - 1420.
1460-1465	60	**SILTY CLAYSTONE:** as for 1360 - 1365.
	40	**SANDSTONE:** as for 1415 - 1420.
1465-1470	90	**SILTY CLAYSTONE:** as for 1360 - 1365.
	10	**SANDSTONE:** as for 1415 - 1420.
1470-1500	100	**SILTY CLAYSTONE:** medium to dark grey, medium brownish grey in part, commonly silty, grading to **Argillaceous Siltstone** in part, trace dispersive very fine quartz sand grains, trace glauconite, carbonaceous and coaly detritus, partially pyritized, trace pyrite nodules, common medium brown dolomite, trace micromica, firm, slightly dispersive in part, subfissile in part.
1500-1510	95	**SILTY CLAYSTONE:** as for 1470 - 1500, medium to dark grey, medium brownish grey in part, commonly silty, grading to **Argillaceous Siltstone** in part, trace dispersive very fine quartz sand grains, trace glauconite, carbonaceous and coaly detritus, partially pyritized, trace pyrite nodules, common medium brown dolomite, trace micromica, firm, slightly dispersive in part, subfissile in part, interbedded with minor:
	5	**SANDSTONE:** off-white, very fine, dominantly subangular, well sorted quartz, common white, kaolinitic in part, argillaceous matrix, common strong siliceous cement, trace very fine mica, trace carbonaceous detritus, rare red and brown lithic fragments. dominantly hard, very poor to nil visual porosity. No fluorescence.
1510-1525	100	**SILTY CLAYSTONE:** as for 1500 - 1500.
	Tr	**SANDSTONE:** as for 1500 - 1510.

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INTERVAL (m)	%	CUTTINGS DESCRIPTION
1525-1530	100	<u>SILTY CLAYSTONE:</u> generally as for 1500 - 1510, medium to dark grey, medium brownish grey in part, moderately to commonly silty, in part grading to **Argillaceous Siltstone**, slightly to occasionally commonly finely arenaceous, commonly carbonaceous, trace partially pyritized coaly detritus, slightly calcareous in part, trace trace partially altered feldspar, trace glauconite, rare amber, trace pyrite nodules, trace hard brown dolomite bands with glauconite and fine quartz sand grains, firm to occasionally moderately hard, dominantly blocky, dispersive in part, occasionally subfissile in part.
1530-1535	90	<u>SILTY CLAYSTONE:</u> as for 1525 - 1530, interbedded/interlaminated with :
	10	<u>SANDSTONE:</u> light grey, very fine to dominantly fine, subangular to subrounded, moderately well sorted quartz, trace light brown to grey argillaceous matrix, trace moderately weak siliceous and moderately strong dolomite cement, trace fine carbonaceous detritus, trace fine glauconite, friable to moderately hard in part, poor visual porosity. No fluorescence.
1535-1540	100	<u>SILTY CLAYSTONE:</u> as for 1525 - 1530.
1540-1550	90	<u>SILTY CLAYSTONE:</u> as for 1525 - 1530.
	10	<u>SANDSTONE:</u> as for 1530 - 1535.
1550-1570	100	<u>SILTY CLAYSTONE:</u> as for 1525 - 1530.
1570-1575	100	<u>SILTY CLAYSTONE:</u> generally as for 1525 - 1530, dominantly medium to dark brown, medium to dark grey in part, moderately to commonly silty, in part grading to **Argillaceous Siltstone**, slightly to occasionally commonly finely arenaceous, commonly carbonaceous, trace partially pyritized coaly detritus, slightly calcareous in part, trace partially altered feldspar, trace glauconite, rare amber, trace pyrite nodules, trace hard brown dolomite bands with glauconite and fine quartz sand grains, firm to occasionally moderately hard, dominantly blocky, dispersive in part, occasionally subfissile in part.
1575-1585	100	<u>SILTY CLAYSTONE:</u> as for 1570 - 1575, dominantly blocky, non-fissile.
1585-1590	5	<u>SILTY CLAYSTONE:</u> as for 1575 - 1585.
	95	<u>SANDSTONE:</u> light to occasionally medium grey, very fine to dominantly fine, subangular to subrounded, well sorted quartz, trace light grey, white kaolinitic and light brown argillaceous matrix, trace weak siliceous cement, trace to common coaly detritus, trace glauconite, friable with abundant loose grains, poor to rarely fair inferred porosity. No fluorescence.
1590-1610	100	<u>SILTY CLAYSTONE:</u> as for 1575 - 1585.
1610-1625	100	<u>SILTY CLAYSTONE:</u> as for 1575 - 1585.
	Tr	<u>SANDSTONE:</u> as for 1585 - 1590.
1625-1635	100	<u>SILTY CLAYSTONE:</u> as for 1575 - 1585.
1635-1640	60	<u>SILTY CLAYSTONE:</u> as for 1575 - 1585.
	40	<u>SANDSTONE:</u> light grey to clear, fine to rarely medium in part, subangular to subrounded, well sorted quartz, trace dispersive light grey argillaceous matrix, rare weak siliceous cement, trace glauconite, carbonaceous detritus,partially altered feldspar, friable with abundant loose grains, fair to occasionally good inferred porosity. No fluorescence.
1640-1650	100	<u>SILTY CLAYSTONE:</u> as for 1575 - 1585.

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INTERVAL (m)	%	CUTTINGS DESCRIPTION
1650-1655	95	SILTY CLAYSTONE: as for 1575 - 1585.
	5	SANDSTONE: as for 1635 - 1640.
1655-1665	100	SILTY CLAYSTONE: as for 1575 - 1585.
1665-1670	90	SILTY CLAYSTONE: medium brown to medium brown grey, occasionally medium to dark grey, commonly to abundantly silty, in part grading to **Argillaceous Siltstone**, very finely arenaceous in part, common to occasionally abundant carbonaceous and coaly detritus, common glauconite, common medium brown, cryptocrystalline and hard dolomite, trace micromica, pyrite and amber, firm, dispersive in part, blocky to subfissile in part, interbedded/interlaminated with:
	10	SANDSTONE: light grey to occasionally light brownish grey, very fine, subangular to subrounded, well sorted quartz, common off-white kaolinitic and light grey argillaceous matrix, dominantly silty, trace to common moderately strong siliceous cement, common calcareous cement, dominantly strong and dolomitic, trace to common fine carbonaceous detritus, trace bright white amber and dull yellow to orange mineral fluorescence, moderately hard, very poor visual porosity. No fluorescence.
1670-1700	100	SILTY CLAYSTONE: as for 1665 - 1670.
1700-1800	100	SILTY CLAYSTONE: generally as for 1665 - 1670, medium to dark brown to medium brown grey, occasionally medium to dark grey, commonly to abundantly silty, in part grading to **Argillaceous Siltstone**, very finely arenaceous in part, common to occasionally abundant carbonaceous and coaly detritus, common to abundant glauconite, nil to trace medium brown, cryptocrystalline and hard dolomite, trace micromica, pyrite and amber, firm, dispersive in part, blocky to commonly subfissile.
1800-1820	100	SILTY CLAYSTONE: generally as for 1700 - 1800, medium to dark grey to brownish grey, commonly to abundantly silty, in part greding to **Argillaceous Siltstone**, very finely arenaceous in part, common to occasionally abundant carbonaceous and coaly detritus, common to abundant glauconite, nil to trace medium brown, cryptocrystalline and hard dolomite, trace micromica, and amber, rare to trace *Inoceramus*, firm, dispersive in part, blocky to commonly subfissile.
1820-1830	100	SILTY CLAYSTONE: generally as for 1800 - 1820, medium to dark grey to brownish grey, commonly to abundantly silty, in part greding to **Argillaceous Siltstone**, very finely arenaceous in part, common to occasionally abundant carbonaceous and coaly detritus, common to abundant glauconite, nil to trace medium brown, cryptocrystalline and hard dolomite, trace micromica, and amber, rare to trace *Inoceramus*, firm, dispersive in part, blocky to commonly subfissile.
1830-1835	90	SILTY CLAYSTONE: generally as for 1820 - 1830, medium to dominantly dark brown, occasionally medium to dark grey, abundantly silty and glauconitic, trace to common very fine to very coarse grained partially yellow stained quartz sand, trace pyrite, trace medium brown dolomite bands with fine glauconite pellets, trace micromica and carbonaceous flecks, firm, blocky to dominantly subfissile, in part grading to interlaminated with:
	5	ARGILLACEOUS SILTSTONE: light to medium grey, occasionally dark grey, abundantly argillaceous, trace to occasionally abundant very fine to fine quartz sand grains, common glauconite pellets, trace carbonaceous flecks micromica and pyrite, interlaminated with:
	5	ARGILLACEOUS GLAUCONITIC SANDSTONE: medium to occasionally dark green, mottled greenish brown, very fine to very coarse, dominantly medium to coarse, subrounded to dominantly rounded, poorly sorted glauconite and quartz, abundant brownish green argillaceous matrix in part grading to **Glauconitic Arenaceous Claystone**, friable with abundant loose grains, very poor to nil inferred/visual porosity. No fluorescence. Interlaminated with minor:

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INTERVAL (m)	%	CUTTINGS DESCRIPTION
	Tr	**ARGILLACEOUS SANDSTONE:** light grey to occasionally clear, very fine to fine, medium to very coarse in part, subangular to subrounded, poorly to moderately well sorted clear quartz, abundant light grey to light brownish grey argillaceous and silty matrix, in part grading to **Arenaceous Silty Claystone**, very poor to nil visual/inferred porosity. No fluorescence.
1835-1840	95	**SILTY CLAYSTONE:** as for 1830 - 1835.
	5	**ARGILLACEOUS SILTSTONE:** as for 1830 - 1835.
1840-1845	90	**SILTY CLAYSTONE:** as for 1830 - 1835.
	5	**ARGILLACEOUS SILTSTONE:** as for 1830 - 1835.
	5	**ARGILLACEOUS GLAUCONITIC SANDSTONE:** as for 1830 - 1835.
	Tr	**ARGILLACEOUS SANDSTONE:** as for 1830 - 1835.
1845-1850	100	**SILTY CLAYSTONE:** as for 1830 - 1835.
1850-1855	90	**SILTY CLAYSTONE:** as for 1830 - 1835.
	10	**ARGILLACEOUS SILTSTONE:** as for 1830 - 1835.
	Tr	**ARGILLACEOUS GLAUCONITIC SANDSTONE:** as for 1830 - 1835.
1855-1860	90	**SILTY CLAYSTONE:** as for 1830 - 1835.
	10	**ARGILLACEOUS SILTSTONE:** as for 1830 - 1835.
1860-1870	90	**SILTY CLAYSTONE:** as for 1830 - 1835.
	10	**ARGILLACEOUS SILTSTONE:** as for 1830 - 1835.
	Tr	**ARGILLACEOUS GLAUCONITIC SANDSTONE:** as for 1830 - 1835.
1870-1875	95	**SANDSTONE:** light grey to clear, fine to coarse, dominantly medium, subangular to dominantly subrounded, moderately sorted clear quartz, trace to common light grey dispersive argillaceous matrix, nil to trace weak siliceous and calcareous cement, common black **Coal**, firm with conchoidal fracture and medium translucent brown amber at top (sample was circulated twice), nil to trace pyrite nodules, mica, and medium grey lithic fragments, friable with abundant loose grains, poor to good, dominantly fair inferred porosity. No oil fluorescence.
	5	**CLAYSTONE:** light to medium grey, slightly silty, moderately micromicaceous, trace carbonaceous flecks, pyrite, glauconite, and fine quartz sand grains, soft to occasionally firm, dispersive in part, non-fissile. NOTE: - Sandstone contains trace rock flour and nil to trace slickensiding(?). - **Coal** has no direct, cut or crush cut fluorescence, but has patchy to thin, occasionally thick moderately bright to bright bluish white residual ring. - Amber has moderately bright bluish white fluorescence with moderately slow diffusing cut fluorescence.
1875-1885	90	**SILTY CLAYSTONE:** medium to dark grey, medium to dark brown in part, abundantly silty in part, grading to **Argillaceous Siltstone**, common glauconite, non-calcareous, trace to common micromica and carbonaceous flecks, trace pyrite and amber, rare to trace hard brown dolomite band, firm to hard, dominantly moderately hard, dominantly subfissile to fissile. Interbedded/interlaminated with:

INTERVAL (m)	%	CUTTINGS DESCRIPTION
	10	**SANDSTONE:** clear to light grey, fine to coarse, occasionally very coarse in part, dominantly fine to medium, becoming dominantly medium with depth, subangular to dominantly subrounded with depth, trace to occasionally common white kaolinitic and light grey argillaceous matrix, common to abundant moderately strong calcareous and rare siliceous and pyrite cement, trace partially altered feldspar, trace grey, brown, rare yellow and non-glauconitic green lithic fragments, rare mica, coaly particles and calcite crystals, rare amber, trace dull orange brown mineral fluorescence, moderately hard to hard, rarely friable with depth, very poor to nil (becoming poor with depth) visual porosity. NOTE: Sample contains trace to rarely common slickensides and rock flour.
1885-1890	50	**SILTY CLAYSTONE:** as for 1875 - 1885.
	50	**SANDSTONE:** clear to light grey, fine to dominantly medium, occasionally coarse, subangular to dominantly subrounded, poorly to occasionally moderately well sorted quartz, common to abundant white kaolinitic and occasionally light grey argillaceous matrix, trace moderately weak calcareous cement, trace to occasionally common grey, brown and non-glauconitic green lithic fragments, trace mica, pyrite and coaly particles, poor to occasionally fair inferred porosity. No fluorescence.
1890-1895	50	**SILTY CLAYSTONE:** as for 1875 - 1885.
	50	**SANDSTONE:** generally as for 1885 - 1890, clear to light grey, fine to coarse, dominantly medium to coarse, subangular to subrounded, poorly to occasionally moderately well sorted quartz, common to abundant white kaolinitic and occasionally light grey argillaceous matrix, trace moderately weak calcareous cement, common grey, brown and non-glauconitic green lithic fragments, trace mica, pyrite and coaly particles, rare garnet(?), poor inferred porosity. No fluorescence.
1895-1900	90	**SILTY CLAYSTONE:** as for 1875 - 1885.
	10	**SANDSTONE:** as for 1890 - 1895.
1900-1905	100	**CLAYSTONE:** light greenish grey to light bluish grey, light to medium brown and grey in part, trace to occasionally common silt, slightly calcareous in part, slightly to occasionally moderately carbonaceous, common to occasionally abundant fine partially altered feldspar, trace multicolour lithic fragments, nil to trace micromica, firm to hard, blocky to subfissile.
1905-1910	90	**CLAYSTONE:** as for 1900 - 1905.
	10	**LITHIC SANDSTONE:** mottled light grey to very light greenish grey, off-white in part, very fine to fine, rarely medium, subangular to subrounded, moderately sorted green, red, brown, grey volcanolithics, partially altered feldspar and minor quartz grains, abundant off-white kaolinitic argillaceous matrix, trace moderately weak siliceous and calcareous cement, trace carbonaceous detritus and pyrite, friable to moderately hard, very poor to nil visual porosity. No fluorescence.
1910-1915	50	**CLAYSTONE:** as for 1900 - 1905.
	50	**LITHIC SANDSTONE:** as for 1905 - 1910.
1915-1920	20	**CLAYSTONE:** as for 1900 - 1905.
	80	**LITHIC SANDSTONE:** generally as for 1905 - 1910., dominantly medium grained, dominantly subrounded.
1920-1930	10	**CLAYSTONE:** as for 1900 - 1905.
	90	**LITHIC SANDSTONE:** generally as for 1905 - 1910., dominantly medium grained, dominantly subrounded to occasionally rounded.

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INTERVAL (m)	%	CUTTINGS DESCRIPTION
1930-1940	80	**CLAYSTONE:** generally as for 1900 - 1905, light greenish grey, medium to dark brown, grey and bluish green in part, trace to occasionally common silt, slightly calcareous in part, slightly to occasionally moderately carbonaceous, common to occasionally abundant fine partially altered feldspar, trace multicolour lithic fragments, firm, soft in part, dispersive in part.
	20	**LITHIC SANDSTONE:** as for 1905 - 1910.
1940-1945	100	**CLAYSTONE:** generally as for 1930 - 1940, dominantly light greenish grey, medium to rarely dark brown, grey and bluish green in part, trace to occasionally common silt, slightly calcareous in part, slightly to occasionally moderately carbonaceous, common to occasionally abundant fine partially altered feldspar, trace multicolour lithic fragments, nil to trace micromica, soft to moderately hard, dominantly firm, dispersive in part, blocky to subfissile in part.
1945-1950	100	**CLAYSTONE:** as for 1940 - 1945.
	Tr	**LITHIC SANDSTONE:** as for 1905 - 1910.
1950-1955	90	**CLAYSTONE:** as for 1940 - 1945.
	10	**LITHIC SANDSTONE:** as for 1905 - 1910.
1955-1960	20	**CLAYSTONE:** as for 1940 - 1945.
	80	**LITHIC SANDSTONE:** generally as for 1905 - 1910, mottled light grey to very light greenish grey, off-white in part, very fine to medium, dominantly fine to medium, subangular to dominantly subrounded, moderately well sorted green, red, brown, grey volcanolithics, quartz and partially altered feldspar, abundant off-white kaolinitic and occasionally very light grey argillaceous matrix, trace moderately weak siliceous and calcareous cement, trace carbonaceous detritus and pyrite, friable to moderately hard, very poor to nil visual porosity. No fluorescence.
1960-1965	90	**CLAYSTONE:** as for 1940 - 1945.
	10	**LITHIC SANDSTONE:** as for 1955 - 1960.
1965-1970	20	**CLAYSTONE:** as for 1940 - 1945.
	80	**LITHIC SANDSTONE:** as for 1955 - 1960.
1970-1975	60	**CLAYSTONE:** as for 1940 - 1945.
	40	**LITHIC SANDSTONE:** as for 1955 - 1960.
1975-1985	100	**CLAYSTONE:** generally as for 1940 - 1945, dominantly light greenish grey, medium to rarely dark brown, grey and bluish green and beige in part, trace to occasionally common silt, slightly calcareous in part, slightly to occasionally moderately carbonaceous, common to occasionally abundant fine partially altered feldspar, rare to trace multicolour lithic fragments, nil to trace micromica, soft to moderately hard, dominantly firm, dispersive in part, blocky to subfissile in part.
1985-1990	50	**CLAYSTONE:** as for 1975 - 1985.
	50	**LITHIC SANDSTONE:** as for 1955 - 1960.
1990-1995	40	**CLAYSTONE:** as for 1975 - 1985.
	60	**LITHIC SANDSTONE:** as for 1955 - 1960.
1995-2000	100	**CLAYSTONE:** as for 1975 - 1985.

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INTERVAL (m)	%	CUTTINGS DESCRIPTION
2000-2005	95	**CLAYSTONE:** as for 1975 - 1985.
	5	**LITHIC SANDSTONE:** as for 1955 - 1960.
2005-2015	90	**CLAYSTONE:** as for 1975 - 1985.
	10	**LITHIC SANDSTONE:** as for 1955 - 1960.
2015-2020	100	**CLAYSTONE:** as for 1975 - 1985.
2020-2030	90	**CLAYSTONE:** as for 1975 - 1985.
	10	**LITHIC SANDSTONE:** as for 1955 - 1960.
2030-2040	50	**LITHIC SANDSTONE:** generally as for 1955 - 1960, light to medium greenish grey, off-white and light grey, very fine to medium, rarely coarse in part, dominantly medium grained, subangular to dominantly subrounded, moderately well sorted volcanolithics (grey, green, brown, black, and rare yellow and red), quartz and partially altered feldspar, common to dominantly abundant white kaolinitic and light to medium greenish grey chloritic(?) argillaceous matrix, trace to occasionally common moderately weak calcareous and moderately weak to moderately strong siliceous cement (mostly in fine grained portion), trace coaly detritus, rare pyrite and biotite, friable to moderately hard in part, dominantly very poor to nil inferred porosity. No fluorescence.
	50	**CLAYSTONE:** generally as for 1975 - 1985, very light to light greenish grey and bluish grey, occasionally light grey and light to medium brown, rarely dark brown in part, slightly to occasionally commonly silty, rarely finely arenaceous in part, common very fine partially altered feldspar, trace to common very fine multicolour volcanolithics, trace carbonaceous flecks and laminae, rare pyrite and micromica, very slightly calcareous in part, soft to rarely firm, rarely moderately hard in part, dispersive in part, rarely subfissile in part.
2040-2045	90	**LITHIC SANDSTONE:** as for 2030 - 2040.
	10	**CLAYSTONE:** as for 2030 - 2040.
2045-2050	100	**LITHIC SANDSTONE:** as for 2030 - 2040.
2050-2055	90	**LITHIC SANDSTONE:** as for 2030 - 2040.
	10	**CLAYSTONE:** as for 2030 - 2040.
2055-2065	80	**LITHIC SANDSTONE:** as for 2030 - 2040.
	20	**CLAYSTONE:** as for 2030 - 2040.
2065-2070	100	**LITHIC SANDSTONE:** as for 2030 - 2040.
2070-2080	70	**LITHIC SANDSTONE:** as for 2030 - 2040.
	30	**CLAYSTONE:** as for 2030 - 2040.
2080-2085	80	**LITHIC SANDSTONE:** as for 2030 - 2040.
	20	**CLAYSTONE:** as for 2030 - 2040.
2085-2090	20	**LITHIC SANDSTONE:** as for 2030 - 2040.
	80	**CLAYSTONE:** as for 2030 - 2040.
2090-2095	100	**CLAYSTONE:** as for 2030 - 2040.
2095-2100	20	**LITHIC SANDSTONE:** as for 2030 - 2040.
	80	**CLAYSTONE:** as for 2030 - 2040.

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CUTTINGS DESCRIPTION

INTERVAL (m)	%	CUTTINGS DESCRIPTION
2100-2105	70	**LITHIC SANDSTONE:** as for 2030 - 2040.
	30	**CLAYSTONE:** as for 2030 - 2040.
2105-2115	90	**LITHIC SANDSTONE:** as for 2030 - 2040.
	10	**CLAYSTONE:** as for 2030 - 2040.
2115-2120	100	**LITHIC SANDSTONE:** as for 2030 - 2040.
2120-2130	80	**LITHIC SANDSTONE:** as for 2030 - 2040.
	20	**CLAYSTONE:** as for 2030 - 2040.
2130-2135	40	**LITHIC SANDSTONE:** as for 2030 - 2040.
	60	**CLAYSTONE:** as for 2030 - 2040.
2135-2145	50	**LITHIC SANDSTONE:** generally as for 2030 - 2040, dominantly moderately hard.
	50	**CLAYSTONE:** as for 2030 - 2040.
2145-2150	10	**LITHIC SANDSTONE:** as for 2135 - 2145.
	90	**CLAYSTONE:** as for 2030 - 2040.

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APPENDIX 4B

LITHOLOGICAL DESCRIPTIONS FROM DAILY REPORTS

HOWMAINS-1

DAILY REPORT GEOLOGY SUMMARY

HOWMAINS-1

Geologist: Ahmad Tabassi **Permit:** PEP104 **Spud Date:** 04/07/94

Interval (m)	*ROP (Av.) (m/hr)*	*Lithological and Fluorescence Description*
359-435	30-120 *(Av. 55)*	**MARL: (100%)** light to occasionally medium grey and brownish grey, medium greenish grey in part, soft, sticky in part, rarely dispersive, slightly to occasionally moderately silty, common to occasionally abundant fossil fragments, common foraminifera, rare micromica.
435-470	20-150 *(Av. 60)*	**MARL: (70-100%)** as per interval 359m to 435m, interbedded/interlaminated with: **ARGILLACEOUS SILTSTONE: (0-30%)** medium to rarely dark grey, firm to occasionally moderately hard, blocky to occasionally subfissile, moderately to strongly calcareous, in part grading to **Silty Claystone**, common fossil fragments and foraminifera, rare micromica and carbonaceous detritus, interlaminated with: **CALCARENITE: (0-10%)** light greenish grey to grey, firm to hard, dominantly fine, occasionally very fine grained, trace to rare argillaceous matrix, trace to occasionally common moderately strong calcareous cement, trace micromica and very fine carbonaceous matter, very rare very fine quartz sand grains, very poor visual porosity.
470-540	30-150 *(Av. 45)*	**MARL: (100%)** medium grey to brownish grey, medium greenish grey in part, firm to occasionally moderately hard, blocky to platy in part, moderately argillaceous in part, slightly silty, common fossil fragments, trace to common foraminifera. **ARGILLACEOUS SILTSTONE: (Trace)** medium brown, medium brownish grey in part, firm to occasionally moderately hard, dominantly blocky, moderately to strongly calcareous, in part grading to **Silty Claystone**, common fossil fragments and foraminifera, rare micromica.
540-577	25-60 *(Av. 35)*	**MARL: (100%)** medium grey to brownish grey, medium greenish grey in part, firm to occasionally moderately hard, platy to subfissile in part, moderately argillaceous in part, slightly silty, common fossil fragments, trace to common foraminifera, very rare fine medium to dark green glauconite(?), very rare coaly fragments.
577-595	30-200 *(Av. 100)*	**MARL: (50-100%)** light to medium grey, light greenish grey, occasionally light brownish grey, firm to occasionally moderately hard, dominantly blocky, slightly silty, occasionally moderately argillaceous, common fossil fragments and foraminifera, rare glauconite. **CALCARENITE: (0-50%)** medium orange, yellow to light orange brown in part, friable to rarely moderately hard, dominantly medium, rarely coarse grained in part, dominantly iron-stained, trace fine to medium grained iron oxide/hydroxide pellets, trace to common iron-stained fossil fragments, trace calcite vein, very rare iron-stained medium quartz sand grains, fair to good visual porosity.

Interval (m)	ROP (Av.) (m/hr)	Lithological and Fluorescence Description
595-638	15-60 *(Av. 40)*	**MARL: (50-100%)** medium brownish grey, rarely medium greenish grey, soft, occasionally firm, dominantly sticky, dispersive in part, commonly argillaceous, slightly silty in part, common dark green fine to medium grained glauconite, common fossil fragments and foraminifera, trace orange and brown lithic fragments and pyrite nodules, trace fine quartz sand grains. **CALCARENITE: (0-50%)** light grey to very light brownish grey, friable, fine to medium grained, trace fossil fragments, foraminifera and glauconite, fair to good visual porosity.
638-698.5	5-200 *(Av. 70)*	**FERRUGINOUS SANDSTONE: (85-100%)** medium brown, becoming light brown to clear with depth, medium to very coarse grained, occasionally pebbly, dominantly coarse, dominantly subrounded to rounded poorly to moderately sorted iron-stained quartz, nil to trace at top, becoming dominantly common at depth, medium brown and occasionally white kaolinitic, dispersive argillaceous matrix, trace iron oxide/hydroxide pellets, trace pyrite nodules, trace iron-stained fossil fragments, rare mica, friable with abundant loose grains, inferred porosity very good at top, becoming fair with depth. **CLAYSTONE: (0-15%)** medium grey to medium brown, soft and dispersive, moderately silty, common to abundant very fine dispersive quartz sand grains, rare micromica.
698.5-725	5-85 *(Av. 40)*	**CLAYSTONE: (50-100%)** dark brown, becoming dominantly medium brown with depth, soft, moderately dispersive, commonly silty, trace to common dispersive very fine to coarse quartz sand grains, slightly calcareous in part, trace to common glauconite, trace fossil fragments and pyrite. **CALCAREOUS SANDSTONE: (0-50%)** light to medium brown, dominantly iron-stained, fine to coarse, dominantly medium, dominantly subrounded, moderately sorted quartz in very light grey to white, amorphous to cryptocrystalline limestone matrix, trace to dominantly common glauconite, trace to common iron oxide/hydroxide pellets, friable to moderately hard in part, fair to occasionally good inferred porosity.
725-765	3-170 *(Av. 35)*	**CLAYSTONE: (20-100%)** dark green and dominantly glauconitic at top, becoming mottled medium green and greenish grey with depth, argillaceous material with white amorphous and in part vein calcite, firm, rarely subfissile, with common fine to coarse quartz sand grains, dominantly green and iron-stained, trace to common glauconite, trace carbonaceous detritus, slightly silty in part. **FERRUGINOUS SANDSTONE: (0-80%)** light to medium brown, dominantly iron-stained, medium to very coarse, dominantly coarse, occasionally pebbly, dominantly subrounded, moderately sorted quartz, trace dispersive light brown argillaceous matrix, trace to common iron oxide/hydroxide pellets and glauconite, common fossil fragments, friable with abundant loose grains, fair to occasionally good inferred porosity.
765-775	4-33 *(Av. 30)*	**CLAYSTONE: (80-100%)** dark green and dominantly glauconitic at top, becoming mottled medium green and greenish grey with depth, argillaceous material with white amorphous and in part vein calcite, firm, rarely subfissile, with common fine to coarse quartz sand grains, dominantly green and iron-stained, trace to common glauconite, trace carbonaceous detritus, slightly silty in part. **FERRUGINOUS SANDSTONE: (0-20%)** light to medium brown, dominantly iron-stained, medium to very coarse, dominantly coarse, occasionally pebbly, dominantly subrounded, moderately sorted quartz, trace dispersive light brown argillaceous matrix, trace to common iron oxide/hydroxide pellets and glauconite, common fossil fragments, friable with abundant loose grains, fair to occasionally good inferred porosity.

Interval (m)	*ROP (Av.) (m/hr)*	*Lithological and Fluorescence Description*
775-850	5-190 *(Av. 65)*	**<u>SANDSTONE:</u> (20-90%)** light to medium brown, very fine to very coarse, dominantly medium to coarse, subrounded, occasionally rounded, poorly sorted commonly iron-stained quartz, trace to abundant dark brown argillaceous and silty matrix, trace weak calcareous cement, friable with abundant loose grains, poor to good inferred porosity. Interbedded with:
		<u>CLAYSTONE:</u> (10-80%) medium to dark brown, commonly silty, moderately calcareous, nil to common dispersive fine to very coarse quartz sand grains, trace calcite veins, trace pyrite, soft and dispersive.
850-1017	8.6-180 *(Av. 87)*	**<u>SANDSTONE:</u> (50-100%)** generally as per interval 775m to 850m, light brown to clear, fine to very coarse, dominantly medium to coarse, dominantly subrounded, moderately sorted quartz, trace to occasionally common medium grey to brown dispersive argillaceous matrix, trace weak pyrite cement, trace yellow, brown and grey lithic fragments, trace carbonaceous detritus, friable with abundant loose grains, good inferred porosity. Interbedded with:
		<u>CLAYSTONE:</u> (0-50%) light grey to brownish grey, occasionally dark brownish grey, moderately silty in part, trace to common dispersive, very fine to very coarse quartz sand grains, trace to common carbonaceous detritus, trace pyrite, slightly calcareous, soft to firm, dispersive in part, non-fissile.
1017-1054	8-85 *(Av. 20)*	**<u>CLAYSTONE:</u> (100%)** medium brown and brownish grey, medium to dark grey in part, moderately to occasionally abundantly silty, trace to common dispersive fine to medium quartz sand grains, trace to common glauconite pellets, trace carbonaceous detritus, trace micromica, trace fossil fragments and pyrite nodules, soft to firm, sticky in part, occasionally dispersive.
1054-1159	10-60 *(Av. 35)*	**<u>SANDSTONE:</u> (20-100%)** light to medium brown, dominantly iron-stained, rarely clear, medium to very coarse, dominantly medium to coarse, subangular to dominantly subrounded, moderately sorted iron-stained quartz, trace to common dispersive medium brown argillaceous (chamositic?) matrix, trace to rare moderately strong iron oxide/hydroxide, pyrite and siliceous cement, trace mica, trace glauconite and grey and brown lithic fragments, trace iron oxide/hydroxide pellets, friable with common loose grains to moderately hard in part, fair inferred/visual porosity.
		<u>CLAYSTONE:</u> (0-80%) medium to occasionally dark brown, medium grey and medium greenish grey in part, commonly silty and micromicaceous, trace fine carbonaceous detritus, trace fine dispersive quartz sand grains, soft, rarely firm, sticky in part, rarely dispersive.
1159-1170	24-85 *(Av. 65)*	**<u>SANDSTONE:</u> (50-100%)** light to occasionally medium brown, clear in part, fine to pebble size, dominantly very coarse, angular to rounded, dominantly subangular, poorly sorted quartz, trace to common light to medium brownish grey argillaceous matrix, trace weak siliceous cement, trace grey and brown lithic fragments, rare mica, friable with abundant loose grains, fair to good visual porosity.
		<u>CLAYSTONE:</u> (0-50%) medium to dark grey, medium brownish grey in part, moderately silty, trace to common dispersive fine to coarse quartz sand grains, trace to common micromica and pyrite, soft to occasionally firm, commonly dispersive (washed away), rarely subfissile in part.

Interval (m)	ROP (Av.) (m/hr)	Lithological and Fluorescence Description
1170-1225	5-85 *(Av. 55)*	**SANDSTONE: (80-100%)** generally as above,clear to light brown in part, fine to pebble size, dominantly very coarse, angular to rounded, dominantly subangular, poorly sorted quartz, trace to common light to medium brownish grey argillaceous matrix, trace weak siliceous cement, trace grey and brown lithic fragments, rare mica, friable with abundant loose grains, fair to good visual porosity. **CLAYSTONE: (0-20%)** medium to dark grey, medium brownish grey in part, moderately silty, trace to common dispersive fine to coarse quartz sand grains, trace to common micromica and pyrite, soft to occasionally firm, commonly dispersive (washed away), rarely subfissile in part.
1225-1302	12-60 *(Av. 25)*	**SANDSTONE: (30-70%)** light brown to light brownish grey, very fine to very coarse, dominantly medium, subangular to occasionally subrounded, poorly sorted quartz, trace to common medium grey to medium brownish grey argillaceous matrix, occasionally silty, trace pyrite and moderately weak siliceous cement, trace carbonaceous detritus, rare mica, friable, poor visual/inferred porosity. **CLAYSTONE: (30-70%)** medium to dark grey, occasionally medium brownish grey, commonly to abundantly silty, in part grading to **Argillaceous Siltstone**, trace pyrite, slightly micromicaceous, slightly calcareous in part, soft to firm.
1302-1342	5.5-67 *(Av. 40)*	**SANDSTONE: (20-60%)** light brown to clear, very fine to very coarse, dominantly medium, subangular to occasionally subrounded, poorly sorted quartz, occasionally iron-stained, trace to common medium grey to medium brownish grey argillaceous matrix, occasionally silty, trace moderately strong pyrite and siliceous cement, rare to trace dolomite cement, trace iron oxide/hydroxide pellets, trace carbonaceous detritus (pyritized in part), rare mica, friable to occasionally moderately hard, poor visual/inferred porosity. **CLAYSTONE: (40-80%)** medium to dark grey, occasionally medium brownish grey, commonly to abundantly silty, in part grading to **Argillaceous Siltstone**, trace pyrite, trace glauconite, slightly micromicaceous, slightly calcareous in part, soft to dominantly firm, dominantly blocky.
1342-1365	9-38 *(Av. 30)*	**SANDSTONE: (100%)** clear to very light grey in part, medium to very coarse, occasionally pebbly, dominantly coarse, dominantly subangular, moderately sorted clear to smoky quartz, rare to occasionally trace light grey dispersive argillaceous matrix, trace moderately strong siliceous cement, pyrite and occasionally dolomite cement, trace brown and grey lithic fragments, trace mica, rare to trace carbonaceous detritus, trace quartz overgrowths, friable with common loose grains to occasionally moderately hard, good inferred porosity.
1365-1471	8-33 *(Av. 20)*	**SILTY CLAYSTONE: (50-100%)** medium brown, medium to dark grey, rarely medium greenish grey, abundantly in part, silty, in part grading to **Argillaceous Siltstone**, slightly to moderately micromicaceous, very slightly calcareous, trace very fine carbonaceous flecks, trace to common very fine dispersive quartz sand grains, in part interlaminated with minor very fine **Sandstone**, trace pyrite and fossil fragments, rare glauconite, soft to moderately hard in part, dominantly firm, dominantly blocky to subfissile. **SANDSTONE: (0-50%)** generally as per 1342m to 1365m, clear to light grey, occasionally medium grey, very fine to very coarse, dominantly fine and coarse, dominantly subangular, poorly sorted quartz, trace to dominantly common light grey argillaceous matrix, common moderately weak to moderately strong siliceous cement, rare dolomite cement, trace mica, glauconite and carbonaceous detritus, trace brown and grey lithic fragments, rare partially altered feldspar, trace pyrite nodules, trace rock flour, friable with common loose grains in coarse sandstone portion, moderately hard in fine sandstone portion, fair to very poor inferred/visual porosity.

Interval (m)	ROP (Av.) (m/hr)	Lithological and Fluorescence Description
1471-1500	4.5-16 *(Av. 6)*	**SILTY CLAYSTONE: (100%)** medium to dark grey, medium brownish grey in part, commonly silty, grading to **Argillaceous Siltstone** in part, trace dispersive very fine quartz sand grains, trace glauconite, carbonaceous and coaly detritus, partially pyritised, trace pyrite nodules, common medium brown dolomite, trace micromica, firm, slightly dispersive in part, subfissile in part.
1500-1525	1-24 *(Av.4)*	**SILTY CLAYSTONE: (95-100%)** as for 1471m to 1500m, medium to dark grey, medium brownish grey in part, commonly silty, grading to **Argillaceous Siltstone** in part, trace dispersive very fine quartz sand grains, trace glauconite, carbonaceous and coaly detritus, partially pyritised, trace pyrite nodules, common medium brown dolomite, trace micromica, firm, slightly dispersive in part, subfissile in part, interbedded with minor: **SANDSTONE: (5-0%)** off-white, very fine, dominantly subangular, well sorted quartz, common white, kaolinitic in part, argillaceous matrix, common strong siliceous cement, trace very fine mica, trace carbonaceous detritus, rare red and brown lithic fragments, dominantly hard, very poor to nil visual porosity.
1525-1585	6.3-50.0 *(Av.12)*	**SILTY CLAYSTONE: (90-100%)** generally as for 1500m to 1525m, medium to dark grey, medium brownish grey in part, moderately to commonly silty, in part grading to **Argillaceous Siltstone**, slightly to occasionally commonly finely arenaceous, commonly carbonaceous, trace partially pyritized coaly detritus, slightly calcareous in part, trace partially altered feldspar, trace glauconite, rare amber, trace pyrite nodules, trace hard brown dolomite bands with glauconite and fine quartz sand grains, firm to occasionally moderately hard, dominantly blocky, dispersive in part, occasionally subfissile in part. **SANDSTONE: (0-10%)** light grey, very fine to dominantly fine, subangular to subrounded, moderately well sorted quartz, trace light brown to grey argillaceous matrix, trace moderately weak siliceous and moderately strong dolomite cement, trace fine carbonaceous detritus, trace fine glauconite, friable to moderately hard in part, poor visual porosity.
1585-1590	12-38 *(Av. 30)*	**SANDSTONE: (100%)** light to occasionally medium grey, very fine to dominantly fine, subangular to subrounded, well sorted quartz, trace light grey, white kaolinitic and light brown argillaceous matrix, trace weak siliceous cement, trace to common coaly detritus, trace glauconite, friable with abundant loose grains, poor to rarely fair inferred porosity.
1590-1635	6-18 *(Av. 8)*	**SILTY CLAYSTONE: (100%)** generally as for 1525m to 1585m, dominantly medium to dark brown, medium to dark grey in part, moderately to commonly silty, in part grading to **Argillaceous Siltstone**, slightly to occasionally commonly finely arenaceous, commonly carbonaceous, trace partially pyritized coaly detritus, slightly calcareous in part, trace partially altered feldspar, trace glauconite, rare amber, trace pyrite nodules, trace hard brown dolomite bands with glauconite and fine quartz sand grains, firm to occasionally moderately hard, dominantly blocky, dispersive in part, occasionally subfissile in part.
1635-1637	25-30 *(Av. 28)*	**SANDSTONE: (100%)** light grey to clear, fine to rarely medium in part, subangular to subrounded, well sorted quartz, trace dispersive light grey argillaceous matrix, rare weak siliceous cement, trace glauconite, carbonaceous detritus, partially altered feldspar, friable with abundant loose grains, fair to occasionally good inferred porosity. No fluorescence.
1637-1665	8-12 *(Av.9)*	**SILTY CLAYSTONE: (100%)** as for 1590m to 1635m.

Interval (m)	*ROP (Av.) (m/hr)*	*Lithological and Fluorescence Description*
1665-1700	9-13 *(Av. 10)*	**SILTY CLAYSTONE:** **(90-100%)** medium brown to medium brown grey, occasionally medium to dark grey, commonly to abundantly silty, in part grading to **Argillaceous Siltstone**, very finely arenaceous in part, common to occasionally abundant carbonaceous and coaly detritus, common glauconite, common medium brown, cryptocrystalline and hard dolomite, trace micromica, pyrite and amber, firm, dispersive in part, blocky to subfissile in part, interbedded/interlaminated with: **SANDSTONE:** **(0-10%)** light grey to occasionally light brownish grey, very fine, subangular to subrounded, well sorted quartz, common off-white kaolinitic and light grey argillaceous matrix, dominantly silty, trace to common moderately strong siliceous cement, common calcareous cement, dominantly strong and dolomitic, trace to common fine carbonaceous detritus, trace bright white amber and dull yellow to orange mineral fluorescence, moderately hard, very poor visual porosity. No fluorescence.
1700-1800	5.5-13.0 *(Av. 9)*	**SILTY CLAYSTONE:** **(100%)** generally as for 1665m to 1700m, medium to dark brown to medium brown grey, occasionally medium to dark grey, commonly to abundantly silty, in part grading to **Argillaceous Siltstone**, very finely arenaceous in part, common to occasionally abundant carbonaceous and coaly detritus, common to abundant glauconite, nil to trace medium brown, crypotocrystalline and hard dolomite, trace micromica, pyrite and amber, firm, dispersive in part, blocky to commonly subfissile.
1800-1820	5.5-10.0 *(Av. 7.5)*	**SILTY CLAYSTONE:** **(100%)** generally as for 1700m to 1800m, medium to dark grey to brownish grey, commonly to abundantly silty, in part grading to **Argillaceous Siltstone**, very finely arenaceous in part, common to occasionally abundant carbonaceous and coaly detritus, common to abundant glauconite, nil to trace medium brown, crypotocrystalline and hard dolomite, trace micromica and amber, rare to trace *Inoceramus,* firm, dispersive in part, blocky to commonly subfissile.
1820-1830	4.6-8.0 *(Av. 7.5)*	**SILTY CLAYSTONE:** **(100%)** generally as for 1800m to 1820m, medium to dark grey to brownish grey, commonly to abundantly silty, in part grading to **Argillaceous Siltstone**, very finely arenaceous in part, common to occasionally abundant carbonaceous and coaly detritus, common to abundant glauconite, nil to trace medium brown, cryptocrystalline and hard dolomite, trace micromica and amber, rare to trace *Inoceramus* firm, dispersive in part, blocky to commonly subfissile.

Interval (m)	ROP (Av.) (m/hr)	Lithological and Fluorescence Description
1830-1870.5	3.9-7.1 *(Av. 5.5)*	**SILTY CLAYSTONE:** **(90-100%)** generally as above, medium to dominantly dark brown, occasionally medium to dark grey, abundantly silty and glauconitic, trace to common very fine to very coarse, partially yellow-stained quartz grains, trace pyrite, trace medium brown dolomite bands with fine glauconite pellets, trace micromica and carbonaceous flecks, firm, blocky to dominantly subfissile. In part grading to/interlaminated with; **ARGILLACEOUS SILTSTONE:** **(0-10%)** light to medium grey, occasionally dark grey, abundantly argillaceous, trace to occasionally abundant, very fine to fine quartz grains, common glauconite pellets, trace carbonaceous flecks, micromica and pyrite. Interlaminated with; **ARGILLACEOUS GLAUCONITIC SANDSTONE:** **(0-5%)** medium to occasionally dark green, mottled greenish brown, very fine to very coarse, dominantly medium to coarse, subrounded to dominantly rounded, poorly sorted glauconite and quartz, abundant brownish green argillaceous matrix, in part grading to **Glauconitic Arenaceous Claystone**, friable with abundant loose grains, very poor to nil inferred/visual porosity. Interlaminated with minor; **ARGILLACEOUS SANDSTONE:** **(0-Tr%)** light grey to occasionally clear, very fine to fine, medium to very coarse in part, subangular to subrounded, poorly to moderately well sorted clear quartz, abundant light grey to light brownish grey argillaceous and silty matrix, in part grading to **Arenaceous Silty Claystone**, very poor to nil visual/inferred porosity.
1870.5-1875.5	8.0-25 *(Av. 20)*	**SANDSTONE:** **(95-100%)** light grey to clear, fine to coarse, dominantly medium, subangular to dominantly subrounded, moderately sorted clear quartz, trace to common light grey dispersive argillaceous matrix, nil to trace weak siliceous and calcareous cement, common black coal, firm with conchoidal fracture, and medium translucent brown amber at top (sample was circulated twice), nil to trace pyrite nodules, mica and medium grey lithic fragments, friable with abundant loose grains, poor to good (dominantly fair) inferred porosity. **CLAYSTONE:** **(0-5%)** light to medium grey, slightly silty, moderately micromicaceous, trace carbonaceous flecks, pyrite, glauconite, and fine quartz grains, soft to occasionally firm, dispersive in part, non-fissile.
1875.5-1885	0.6-15.0 *(Av. 4)*	**SILTY CLAYSTONE:** **(90%)** medium to dark grey, medium to dark brown in part, abundantly silty in part, grading to **Argillaceous Siltstone**, common glauconite, non-calcareous, trace to common micromica and carbonaceous flecks, trace pyrite and amber, rare to trace hard brown dolomite band, firm to hard, dominantly moderately hard, dominantly subfissile to fissile. Interbedded/interlaminated with: **SANDSTONE:** **(10%)** clear to light grey, fine to coarse, occasionally very coarse in part, dominantly fine to medium, becoming dominantly medium with depth, subangular to dominantly subrounded with depth, trace to occasionally common white kaolinitic and light grey argillaceous matrix, common to abundant moderately strong calcareous and rare siliceous and pyrite cement, trace partially altered feldspar, trace grey, brown, rare yellow and non-glauconitic green lithic fragments, rare mica, coaly particles and calcite crystals, rare amber, trace dull orange brown mineral fluorescence, moderately hard to hard, rarely friable with depth, very poor to nil visual porosity, becoming poor with depth. **NOTE:** sample contains trace to rarely common slickensides and rock flour.

Interval (m)	ROP (Av.) (m/hr)	Lithological and Fluorescence Description
1885-1899	3.8-18.0 *(Av. 8)*	**SILTY CLAYSTONE: (50%)** as for 1875.5m to 1885m. **SANDSTONE: (50%)** clear to light grey, fine to dominantly medium, occasionally coarse, subangular to dominantly subrounded, poorly to occasionally moderately well sorted quartz, common to abundant white kaolinitic and occasionally light grey argillaceous matrix, trace moderately weak calcareous cement, trace to occasionally common grey, brown and non-glauconitic green lithic fragments, trace mica, pyrite and coaly particles, rare garnet(?), poor to occasionally fair inferred porosity.
1899-1910	0.4-4.3 *(Av. 2)*	**CLAYSTONE: (90-100%)** light greenish grey to light bluish grey, light to medium brown and grey in part, trace to occasionally common silt, slightly calcareous in part, slightly to occasionally moderately carbonaceous, common to occasionally abundant fine partially altered feldspar, trace multicolour lithic fragments, nil to trace micromica. **LITHIC SANDSTONE: (0-10%)** mottled light grey to very light greenish grey, off-white in part, very fine to fine, rarely medium, subangular to subrounded, moderately sorted green, red, brown, grey volcanolithics, partially altered feldspar and minor quartz grains, abundant off white kaolinitic argillaceous matrix, trace moderately weak siliceous and calcareous cement, trace carbonaceous detritus and pyrite, friable to moderately hard, very poor to nil visual porosity.
1910-2035	2.7-22.0 *(Av.8.0)*	**CLAYSTONE: (10-100%)** generally as for 1899m to 1910m, light greenish grey, medium to dark brown, grey and bluish green in part, trace to occasionally common silt, slightly calcareous in part, slightly to occasionally moderately carbonaceous, common to occasionally abundant fine partially altered feldspar, trace multicolour lithic fragments, firm, soft in part, dispersive in part. **LITHIC SANDSTONE: (90-0%)** generally as for 1899m to 1910m, mottled light grey to very light greenish grey, off-white in part, very fine to medium, dominantly fine to medium, subangular to dominantly subrounded, moderately well sorted green, red, brown, grey volcanolithics, quartz and partially altered feldspar, abundant off-white kaolinitic and occasionally very light grey argillaceous matrix, trace moderately weak siliceous and calcareous cement, trace carbonaceous detritus and pyrite, friable to moderately hard, very poor to nil visual porosity.
2035-2150	2.3-18.0 *(Av.7.0)*	**LITHIC SANDSTONE: (0-100%)** generally as for 1910m to 2035m, light to medium greenish grey, off-white and light grey, very fine to medium, rarely coarse in part, dominantly medium grained, subangular to dominantly subrounded, moderately well sorted volcanolithics (grey, green, brown, black, and rare yellow and red), quartz and partially altered feldspar, common to dominantly abundant white kaolinitic and light to medium greenish grey chloritic(?) argillaceous matrix, trace to occasionally common moderately weak calcareous and moderately weak to moderately strong siliceous cement (mostly in fine grained portion), trace coaly detritus, rare pyrite and biotite, friable to moderately hard in part, dominantly very poor to nil inferred porosity. **CLAYSTONE: (100-0%)** generally as for 1910m to 2035m, very light to light greenish grey and bluish grey, occasionally light grey and light to medium brown, rarely dark brown in part, slightly to occasionally commonly silty, rarely finely arenaceous in part, common very fine partially altered feldspar, trace to common very fine multicolour volcanolithics, trace carbonaceous flecks and laminae, rare pyrite and micromica, very slightly calcareous in part, soft to rarely firm, rarely moderately hard in part, dispersive in part, rarely subfissile in part.

APPENDIX 5

GFE RESOURCES LTD

APPENDIX 5

SIDEWALL CORE DESCRIPTIONS

HOWMAINS-1

SIDEWALL CORE DESCRIPTION

WELL NAME: HOWMAINS-1 **PAGE:** 1 of 4

GEOLOGIST: Ahmad Tabassi **DATE:** 21 / 07 / 94

SWC No.	DEPTH (m)	REC'D (mm)	DESCRIPTION
Attempted 30 cores, recovered 24 (5 bullets lost, 1 empty).			
1	2098.0	30	**CLAYSTONE:** medium greenish grey, slightly silty, non-calcareous, rarely finely micaceous, trace carbonaceous flecks and laminae, firm to hard, subfissile. **Fluorescence:** No direct, cut or crush cut fluorescence, very thin, dull blue residual ring.
2	2088.0	-	Bullet Empty (broken).
3	2027.5	30	**SILTY CLAYSTONE:** light greenish grey, abundantly silty, in part grading to **Argillaceous Siltstone**, commonly finely arenaceous in part, grading in part to very fine **Argillaceous Sandstone**, abundant multicolour lithic fragments and partially altered feldspar, rare micromica, non-calcareous, firm, blocky. **Fluorescence:** Nil
4	1997.0	30	**CLAYSTONE:** light greenish blue to greenish grey, rarely silty, non-calcareous, trace fine multicolour lithic fragments and partially altered feldspar, firm, dominantly subfissile. **Fluorescence:** Nil
5	1977.0	-	Bullet Lost.
6	1950.0	-	Bullet Lost.
7	1936.0	50	**SILTY CLAYSTONE:** medium to dark grey and brownish grey, dominantly silty, trace fine lithic fragments and micromica, trace carbonaceous flecks, firm to hard, dominantly subfissile. **Fluorescence:** No direct, cut or crush cut fluorescence, very thin to patchy, dull blue residual ring.
8	1912.5	20	**ARGILLACEOUS LITHIC SANDSTONE:** mottled light greenish grey, fine to dominantly medium grained, subangular to subrounded, moderately well sorted multicolour volcanolithics and quartz, abundant white kaolinitic and light grey to greenish grey argillaceous matrix, common moderately weak calcareous cement, trace partially altered feldspar, friable to moderately hard, very poor to nil visual porosity. **Fluorescence:** Nil
9	1907.0	35	**CLAYSTONE:** light to medium greenish grey, non-calcareous, moderately silty in part, trace to common multicolour lithic fragments, rare partially altered feldspar, soft to firm in part, sticky in part. **Fluorescence:** Nil

SIDEWALL CORE DESCRIPTION

WELL NAME: HOWMAINS-1 **PAGE:** 2 of 4

GEOLOGIST: Ahmad Tabassi **DATE:** 21 / 07 / 94

SWC No.	DEPTH (m)	REC'D (mm)	DESCRIPTION
10	1904.0	30	<u>CALCAREOUS CLAYSTONE:</u> medium greenish grey, commonly silty, strongly calcareous with very coarse calcite crystals, trace multicolour lithic fragments, hard to very hard in part, blocky. Interlaminated/interbedded with <u>SANDSTONE:</u> mottled light brownish grey to greenish grey, fine to medium grained, subangular to subrounded, moderately well sorted multicolour volcanolithics and minor quartz, common light grey to white argillaceous matrix, abundant strong calcareous cement, trace pyrite and partially altered feldspar, hard, no visual porosity. <u>Fluorescence:</u> Nil <u>Note:</u> Core crumbly, bullet was broken in half.
11	1900.0	-	Bullet Lost.
12	1890.0	-	Bullet Lost.
13	1887.5	35	<u>CLAYSTONE:</u> light to medium brownish grey, non-calcareous, moderately micromicaceous, slightly silty, common carbonaceous flecks and coaly particles, firm to moderately hard, dominantly subfissile. <u>Fluorescence:</u> Nil
14	1884.0	20	<u>SANDSTONE:</u> off-white to clear very fine to very coarse, dominantly fine to coarse, dominantly subangular to subrounded, poorly sorted clear quartz, common white kaolinitic argillaceous matrix, often silty, rare moderately strong siliceous cement, trace to occasionally common in part green, grey and brown lithic fragments, trace partially altered feldspar, rare mica, friable to moderately hard in part, poor visual porosity. Interlaminated with <u>CLAYSTONE:</u> medium brown to brownish grey, moderately silty, non-calcareous, trace to common partially altered feldspar, rare micromica and carbonaceous flecks, soft to firm, dispersive in part. <u>Fluorescence:</u> Sandstone has up to 60% patchy, moderately bright to bright blue white direct fluorescence, slow blooming dull blue cut, moderately slow dull to moderately bright blue crush cut, moderately thin dull blue residual ring fluorescence.
15	1882.0	35	<u>CLAYSTONE:</u> medium to dark grey and brownish grey, dominantly silty in part, non-calcareous, rare micromica, moderately arenaceous in part, firm to occasionally moderately hard. Grading to/interlaminated with <u>SANDSTONE:</u> light grey to greenish grey, dominantly very fine to fine, subangular to subrounded, well sorted quartz, common to abundant light grey to greenish grey argillaceous matrix, trace grey and brown lithic fragments, rare partially altered feldspar, friable to moderately hard in part, very poor visual porosity. <u>Fluorescence:</u> Nil

SIDEWALL CORE DESCRIPTION

WELL NAME: HOWMAINS-1 **PAGE:** 3 of 4

GEOLOGIST: Ahmad Tabassi **DATE:** 21 / 07 / 94

SWC No.	DEPTH (m)	REC'D (mm)	DESCRIPTION
16	1874.0	35	**SANDSTONE:** light grey, fine to very coarse grained, subangular to dominantly subrounded, moderately well sorted clear quartz, trace light grey argillaceous matrix, trace light green lithic fragments and partially altered feldspar, friable, good visual porosity. Interlaminated with minor **COAL:** dark brown to black, soft , dispersive(?) on touch. **Fluorescence:** Sandstone has up to 30% patchy, moderately bright to bright blue white direct fluorescence, slow blooming dull milky white cut, moderately slow, dull to moderately bright milky white crush cut, moderately thick dull blue residual ring fluorescence. Coal has no direct, cut or crush cut fluorescence, thin to patchy, dull blue residual ring fluorescence.
17	1871.0	-	Bullet Lost.
18	1860.0	40	**SILTY CLAYSTONE:** medium grey, common to abundantly silty, slightly calcareous in part, rarely finely arenaceous in part, common carbonaceous flecks and very fine laminae, rare micromica and partially altered feldspar, firm, subfissile in part. **Fluorescence:** Nil
19	1854.0	35	**SILTY CLAYSTONE:** medium grey to brownish grey, abundantly silty, grading in part to **Argillaceous Siltstone**, commonly arenaceous in part, very slightly calcareous in part, common to occasionally abundant fine grained glauconite, rare partially altered feldspar, rare pebble size hard pyrite nodules, firm to hard, dominantly blocky. **Fluorescence:** Nil
20	1847.0	35	**SILTY CLAYSTONE:** medium grey to brownish grey, commonly to abundantly silty, non-calcareous, trace very fine glauconite, partially altered feldspar and carbonaceous flecks, rare micromica, firm to moderately hard, subfissile in part. **Fluorescence: Nil**
21	1838.0	40	**CLAYSTONE:** dark green to greenish grey, rarely dark brown, non-calcareous, common glauconite, moderately silty in part, hard, subfissile. **Fluorescence:** Nil
22	1828.0	45	**CLAYSTONE** dark brown, non-calcareous, common to abundant glauconite, rarely silty in part, firm to hard, subfissile in part. **Fluorescence:** Nil
23	1815.0	30	**CLAYSTONE:** medium brownish grey, slightly to occasionally moderately calcareous, slightly to moderately silty in part, trace glauconite, rare very fine partially altered feldspar, micromica and carbonaceous flecks, firm to hard, subfissile. **Fluorescence:** Nil

SIDEWALL CORE DESCRIPTION

WELL NAME: HOWMAINS-1 **PAGE:** 4 of 4

GEOLOGIST: Ahmad Tabassi **DATE:** 21 / 07 / 94

SWC No.	DEPTH (m)	REC'D (mm)	DESCRIPTION
24	1807.0	25	<u>CLAYSTONE:</u> as for SWC #23, medium brownish grey, slightly to occasionally moderately calcareous, slightly to moderately silty in part, trace glauconite, rare very fine partially altered feldspar, micromica and carbonaceous flecks, firm to hard, subfissile. **<u>Fluorescence:</u>** Nil
25	1663.0	25	<u>CLAYSTONE:</u> medium to dark brownish grey, non-calcareous, slightly silty in part, trace carbonaceous flecks and micromica, firm, rarely subfissile in part. **<u>Fluorescence:</u>** Nil
26	1632.0	40	<u>SILTY CLAYSTONE:</u> medium to dark brownish grey, commonly to abundantly silty, trace carbonaceous flecks and micromica, firm, blocky in part. **<u>Fluorescence</u>** Nil
27	1558.0	30	<u>SILTY CLAYSTONE:</u> as for SWC #26, medium to dark brownish grey, commonly to abundantly silty, trace carbonaceous flecks and micromica, firm, blocky in part. **<u>Fluorescence</u>** Nil
28	1483.0	35	<u>ARGILLACEOUS SANDSTONE:</u> medium grey to brownish grey, very fine to silt size in part, dominantly subrounded, well sorted quartz, abundant light grey argillaceous matrix, common carbonaceous flecks, moderately hard no visual porosity. Interlaminated with/grading to <u>SILTY CLAYSTONE:</u> light to medium grey to brownish grey, commonly silty, moderately to abundantly arenaceous in part, trace micromica, non-calcareous, firm, subfissile in part. **<u>Fluorescence:</u>** Nil **<u>Note</u>** Microlaminae are less than 1 mm thick.
29	1072.0	55	<u>SILTY CLAYSTONE:</u> dark brown to brownish grey, abundantly silty, grading in part to **<u>Argillaceous Siltstone</u>**, common micromica, trace fine to medium grained subrounded quartz sand, firm, non-fissile. **<u>Fluorescence:</u>** Nil
30	1036.0	50	<u>SILTY CLAYSTONE:</u> dark brownish grey, abundantly silty, grading to **<u>Argillaceous Siltstone</u>** in part, common glauconite and micromica, occasionally finely arenaceous in part, non-calcareous, firm, non-fissile. **<u>Fluorescence:</u>** Nil

APPENDIX 6

GFE RESOURCES LTD

APPENDIX 6

DRILL STEM TEST DATA

(DST-1)

HOWMAINS-1

GFE Resources Ltd

DST REPORT

Well: HOWMAINS-1	Permit: PEP104	DST No.: One	Date: 16 / 7 / 94
Formation: Waarre	Total Depth: 1875.5 mKB	Interval: 1866.5 - 1875.5 mKB	
TEST Co.: Australian D.S.T.	Test Type: Conventional Bottom Hole		

FLUID PROPERTIES		TIMES		NUMBER OF SAMPLES TAKEN	
SOURCE	RESISTIVITY	FIRST FLOW	5 mins.	GAS	3
MAKE-UP WATER	3.45 at 15.0 °C	FIRST SHUT-IN	60 mins.	OIL	-
MUD	0.10 at 37.0 °C	SECOND FLOW	90 mins.	WATER	9
RECOVERY		SECOND SHUT-IN	180 mins.	MUD	1
1384m above S-I tool	0.326 at 18.5 °C	TOTAL FLOW	95 mins.	GAS SPECIFIC GRAVITY	-
522m above S-I tool	0.329 at 19.0 °C			OIL GRAVITY (°API)	-
4m above S-I tool	0.228 at 24.0 °C	FORM. TEMP.	82.2 °C	MUD WEIGHT	10.1 ppg
Just above S-I tool	0.368 at 17.5 °C	FORM. DEPTH	1870 m	MUD VISCOSITY (Sec./qt.)	50

Found fluid in pipe on fifth stand out of hole. Dropped impact bar to shear pin in impact sub and reverse-circulate contents. Unable to reverse-circulate at 300psi annular pressure. Pressure string to 1800psi to try to dislodge plug in pump-out sub. Still not able to circulate at 300psi. Connect Dowell and pump a total of 6¾bbls in two attempts at up to 2500psi. Reverse-circulated slowly for a couple of minutes before string started to "U-Tube" freely. Reverse-circulated contents then picked up Kelly and pumped string capacity.

DOWNHOLE PRESSURE DATA (psig)		
GAUGE POSITION	Outside	Inside
TYPE & SERIAL No.	Mech. 137834	EMP 080-258
DEPTH (mKB)	1869m	1862m
INITIAL HYDROSTATIC	3232	3203
START FIRST FLOW	2165	1261
END FIRST FLOW	2376	1549
FIRST SHUT-IN	2903	2710
START SECOND FLOW	2249	1833
END SECOND FLOW	2629	2590
SECOND SHUT-IN	2639	2617
FINAL HYDROSTATIC	3200	3194

FIRST OPENING BLOW DESCRIPTION: Moderate air blow building to strong. No gas to surface.

SECOND OPENING BLOW DESCRIPTION: Moderate air blow building to strong. Gas to surface. after 66 minutes.

SURFACE FLOW DATA — FINAL FLOW: Too low to measure?

BOTTOM CHOKE SIZE (inches): ¾	MANIFOLD CHOKE SIZE & PRESSURE		ORIFICE PLATE SIZE & PRESSURE	FLOWING TIME (minutes)	FINAL FLOW PERIOD DATA TIME (mins.)	PRESSURE(psig)
END FIRST FLOW	$^3/_8$"	$3^1/_2$ psig	N/A	5	70	57 ($^1/_8$" choke)
FINAL FLOW-START	$^3/_8$"	$3^1/_2$ psig	N/A	7	75	52 ($^1/_8$" choke)
	$^1/_8$"	16 psig	N/A	23	83	39 ($^1/_8$" choke)
FINAL FLOW-MIDDLE	$^1/_8$"	53 psig	N/A	60		
FINAL FLOW-END	$^1/_8$"	37 psig	N/A	90		

RECOVERY: 1789 metres (77 bbls)of gas cut water.

REMARKS: Gas to surface occurred 66 minutes into Final Flow at rates of 15 - 25 mcfd through $^1/_8$" choke for about 15 minutes.

AJ:F60

GFE Resources Ltd

DST OPERATIONS SHEET

Well: HOWMAINS-1	Permit: PEP104	DST No.: One	Date: 16 / 7 / 94
Formation: Waarre	Total Depth: 1875.5 mKB	Interval: 1866.5 - 1875.5 mKB	
TEST Co.: Australian D.S.T.	Test Type: Conventional Bottom Hole		

TIME	EVENT	FLOOR MANIFOLD			PROVER		
		CHOKE (inches)	PRESSURE (psig)	TEMPERATURE (°C)	PLATE (inches)	PRESSURE (psig)	TEMPERATURE (°C)
10:55	Pre-Flow	Moderate air blow in bucket, building to strong; well closed-in to flare line, built to 4 psig at surface.					
11:00	Shut well in						
12:00	Second flow	Open well; moderate air blow building to strong.					
12:01	Second flow	Open to flare line through 3/8" choke.					
12:14	Second flow	Change to 1/8" choke; surface pressure 3½ psig.					
12:18	Second flow	Close flare line and bubble bucket valves.					
12:20	Second flow	8½ psig at surface.					
12:25	Second flow	15½ psig at surface.					
12:30	Second flow	20½ psig at surface.					
12:35	Second flow	28½ psig at surface.					
12:37	Second flow	Open bubble hose, 32 psig.					
12:39	Second flow	Open through 1/8" choke, 33½ psig.					
12:45	Second flow	39¾ psig at surface.					
12:50	Second flow	43½ psig at surface.					
13:00	Second flow	57 psig at surface.					
13:09	Second flow	60 psig at surface, gas to surface.					
13:15	Second flow	52 psig at surface.					
13:23	Second flow	39 psig at surface.					
13:26	Second flow	Open through 1" choke, 0 psig.					
13:30	Second shut-in	Shut-in for 3 hours.					

AJ:F60

AUSTRALIAN DST

Telephone
(076) 222 655
(076) 221 150 FAX
AUSTRALIAN D.S.T. CO. PTY. LTD.

COMPANY NAME	GFE Resources Ltd.
WELL NAME	Howmains # 1
LOCATION	Otway Basin, PEP-104, Victoria
TICKET #	2476
DST #	One

Australian DST Co. Pty. Ltd.

Box 619, Roma, Queensland 4455

FINAL REPORT

CONVENTIONAL STRADDLE BYPASS

COMPANY NAME :	GFE Resources Ltd.	TICKET #	2476
WELL NAME :	Howmains # 1	D.S.T.#	One
LOCATION :	Otway Basin, PEP-104, Victoria	FORMATION	Waarre
TESTED INTERVAL :	1866.52 to 1875.50 m ((8.98 m)	DATE	16/07/1994

TEST PERIOD MINUTES:

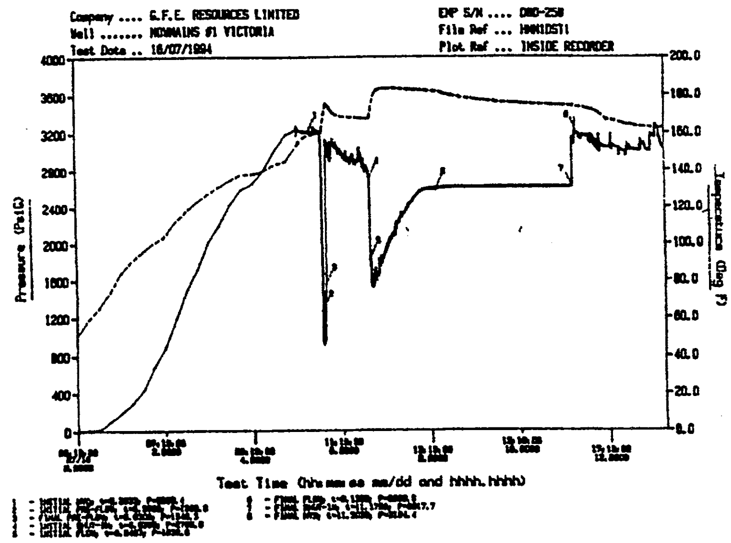
PRE-FLOW :	05	FIRST SHUT-IN :	60
SECONFLOW:	90	SECOND SHUT-IN :	180
THIRDFLOW :		THIRD SHUT-IN :	

RECOVERY DURING FLOW PERIODS

FLUID RECOVERY TOTAL 1789.00 m

77.00 m of Gas cut watery rat hole mud
1712.00 m of Gas cut water
m of
m of

GAS RECOVERY
TIME kPa m^3/DAY
T.S.T.M.



DOWNHOLE PRESSURE DATA (PSIG) **ALL MEASSUREMENTS ARE "SI"**

RECORDER NUMBER		13782	338	080-258	13784		
CLOCK HOUR - EMP		24 Hr.	24 Hr.	EMP	24 Hr.		
DEPTH METRES		1850.00	1859.00	1862.00	1869.00		
PRESSURE PORT		FLUID	INSIDE	INSIDE	OUTSIDE	OUTSIDE	OUTSIDE
INITIAL HYDROSTATIC	(A)	-	3208.0	3203.4	3213.8		
START FIRST FLOW	(B)	0.0	72.2	1260.8	1555.2		
END FIRST FLOW	(B1)	498.2	536.7	1549.3	2130.8		
FIRST SHUT-IN	(C)	501.9	2742.7	2709.9	2808.0		
START SECONDFLOW	(D)	721.2	1260.2	1832.6	2232.1		
END SECONDFLOW	(E)	2569.0	2594.8	2589.9	2600.2		
SECOND SHUT-IN	(F)	2562.3	2616.7	2617.7	2622.4		
FINAL HYDROSTATIC	(G)	-	3196.4	3194.4	3201.1		
START THIRD FLOW	(H)						
END THIRD FLOW	(I)						
THIRD SHUTIN	(J)						

SEMI-LOG EXTRAPOLATION	FIRST SHUT-IN :	kPa	SLOPE	kPa^2/10^6 / Log Cycle
	SECOND SHUT-IN :	kPa	SLOPE	kPa^2/10^6 / Log Cycle
RECORDER #	THIRD SHUT-IN :	kPa	SLOPE	kPa^2/10^6 / Log Cycle
Permeability MD	Skin Factor	Damage Ratio		
Draw Down				

FIRST FLOW : Moderate air blow increasing to strong. 3.5 lbs. at 5 minutes. No gas to surface.

SECONDFLOW : Moderate air blow building to strong. Gas to surface after 66 minutes, (37 psi on 3.18 mm choke at the end of the flow period) . Too small to measure.

TEST SUCCESSFUL

Sample chamber recovered on rig floor (500 PSI)
The fluid chart indicates approximately 351 metres of fluid came in during the preflow and 1438 metres during the

Australian DST Co. Pty. Ltd.
Box 619, Roma, Queensland 4455

FINAL REPORT

GAS - FLOW RATES and GENERAL DATA

COMPANY NAME :	GFE Resources Ltd.	TICKET #	2476
WELL NAME :	Howmains # 1	D.S.T.#	One
LOCATION :	Otway Basin, PEP-104, Victoria	FORMATION	Waarre
TESTED INTERVAL :	1866.52 to 1875.50 m ((8.98 m)	DATE	16/07/1994

FLUID SAMPLES:

Source	Resistivity	°F
Make-up water	3.450	59.0
Mud	0.100	98.6
Above tool	0.368	63.5
Top Sample	0.228	75.2
Mid Sample	0.329	75.2
Btm Sample	0.326	65.3

FLOW SUMMARY

10:55 Preflow-MAB bulding to SAB. Closed to flare. Built to 4 PSI at surface.
11:00 Shut well in.
12:00 Secondflow-MAB building to SAB

12:01	Open to flare through (3/8 in.) 9.53 mm choke.
12:14	Change to (1/8 in.) 3.18 mm choke.
12:18	Close flare line and to bucket.
12:20	8.5 psi at surface.
12:25	15.5 psi at surface.
12:30	20.5 psi at surface.
12:35	28.5 psi at surface.
12:37	Open bubble hose, 32 psi
12:38	Open through (1/8 in.) 3.18 mm choke, 33.5 psi
12:45	39.75 psi at surface.
12:50	43.50 psi at surface.
13:00	57.00 psi at surface.
13:09	60.00 psi at surface.
	Gas to surface.
13:15	52.00 psi at surface.
13:23	39 psi at surface.
13:25	Open through (1 in.) 25.4 mm choke, 0.00 psi at surface.
13:30	Closed for final shutin of 180 minutes.

ADDITIONAL WELL and TEST INFORMATION:

Time started in	04:30	Hours	Mud Type	KCL-GEL		**ELEVATIONS:**	
Time on bottom	10:42	Hours	Mud Weight	10.1	ft/lb.	K.B.	m
Time tool opened	10:52	Hours	Mud Viscosity	48	cp	Ground	m
Time tool pulled	16:27	Hours	Water Loss	6.4		Total Depth	m
Time out of hole	05:00	Hours	Filter Cake	(1/32 ") 0.79	mm	**PIPE ABOVE TOOLS**	
Tool weight		lbs	Mud Drop		m	Drill Collar I.D.	mm
Weight set on packer	30 000	lbs	Tool Skid	Yes	m	Drill Pipe I.D.	mm
Initial String Weight	110 000	lbs	Bottom Choke	19.05	mm	Drill Collar	m
Weight pulled	150 000	lbs	Hole Size	216	mm	Drill Pipe	m
Unseated string weight	125 000	lbs	Reverse		mm	HWD. Pipe	m
			Circulated	Yes		Packer Size	mm
			BH. TEMP	(183°F) 84	C	No. of Packers	
			FILL	20	m		

SAMPLES TAKEN:		Hole Condition
Bottom Hole sampler	Recovered on rig floor (500psi)	Tester
Fluid (water)	Ten	Representative
Gas	Three	Contractor
Sent to		Rig Number

Australian DST Co. Pty. Ltd.

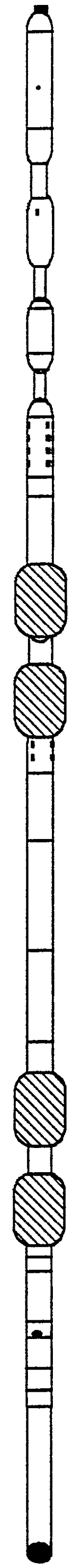
Box 619, Roma, Queensland 4455

FINAL REPORT

TEST TOOL - CONVENTIONAL

COMPANY NAME :	GFE Resources Ltd.	TICKET #	2476
WELL NAME :	Howmains # 1	D.S.T.#	One
LOCATION :	Otway Basin, PEP-104, Victoria	FORMATION	Waarre
TESTED INTERVAL :	1866.52 to 1875.50 m ((8.98 m)	DATE	16/07/1994

TOTAL TOOL TO BOTTOM OF TOP PACKER			17.21
TOOL IN INTERVAL			8.98
BOTTOM PACKER AND ANCHOR			
TOTAL TOOL			26.19
DRILL COLLAR IN INTERVAL			
D.C. ANCHOR	STANDS	SINGLES	
D.P. ANCHOR	STANDS	SINGLES	
TOTAL ASSEMBLY			
D.C. ABOVE TOOLS	9 STANDS	1 SINGLES	167.95
H.W.D.P	3 STANDS	SINGLES	55.36
D.P. ABOVE TOOLS	85 STANDS	SINGLES	1626.80
PUP			6.10
TOTAL DRILL COLLARS, DRILL PIPE & TOOLS			1882.40
TOTAL DEPTH			1875.50
TOTAL STICK-UP ABOVE K.B.			6.90



BO SUB	.30
PO SUB	.30
CO SUB	.30
Fluid Rec. 13782	1.52
SHUT-IN TOOL	1.72
SAMPLER	1.48
SAMPLER	
HMV	1.72
REC #	
REC #	
JARS	1.98
REC # 338	1.52
REC # 080-258	1.83
SAFETY JOINT	.67
PACKER	2.38
PACKER	1.49
DEPTH 1866.52 m	
STUB	.89
PERS.	1.52
REC.# 13784	1.52
RECEIVER SUB	
SPACING	
C.O. SUB	
DRILL COLLAR	
C.O. SUB	
T.COLLAR	
DEPTH ______ m	
PACKER	
PACKER	
PERFS	4.56
REC #	
C.O. SUB	
DRILL PIPE	
C.O. SUB	
BULL NOSE	.49
T.D. 1875.50 m	

PIPE TALLY

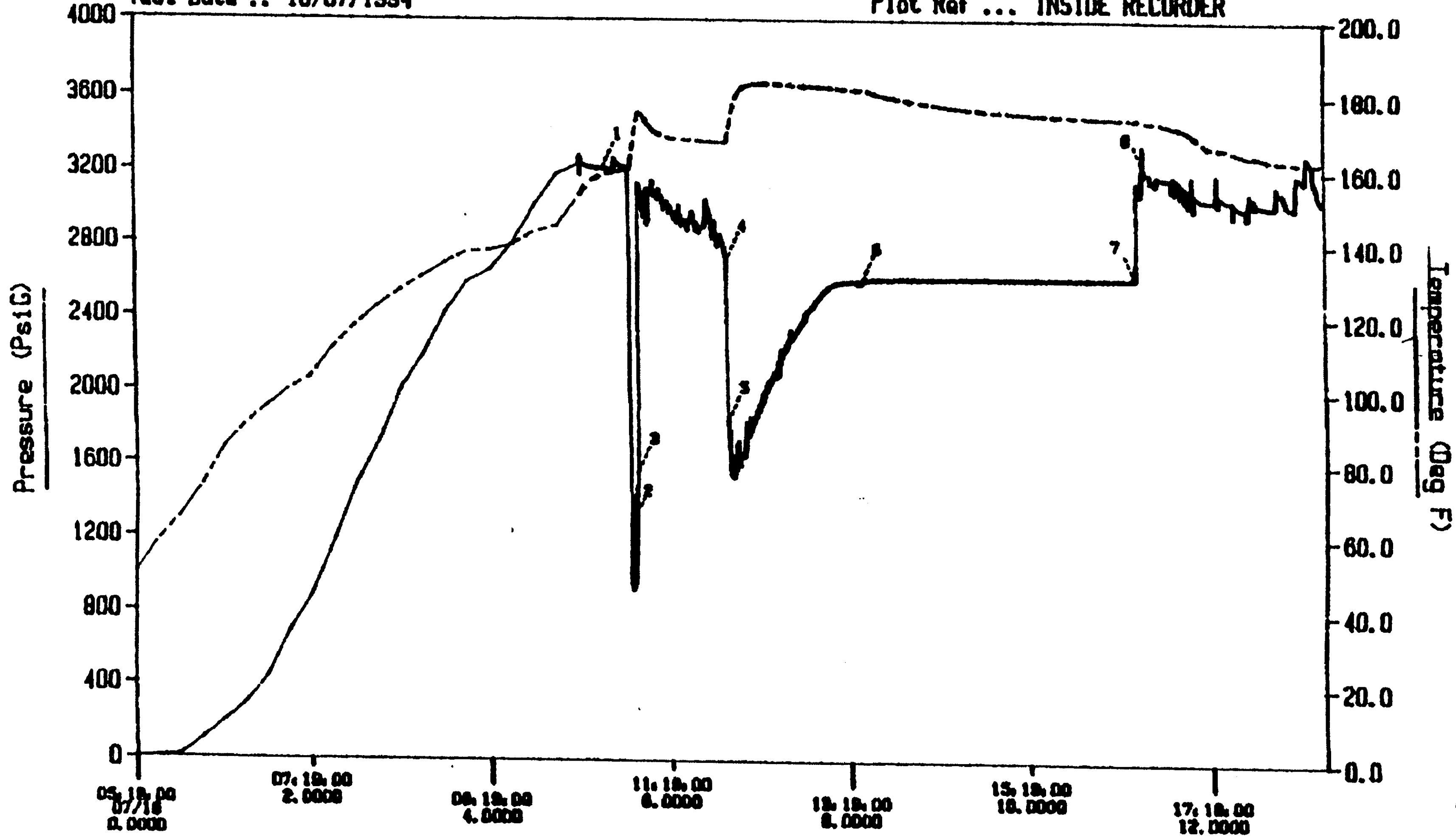
DRILL COLLAR JOINT LENGTH — DRILL PIPE JOINT LENGTH

1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10
Total 1	Total 2	Total 3	Total 4
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10
Total 5	Total 6	Total 7	Total 8
1	1	1	DC 1
2	2	2	DP 2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10
			11
Total 9	Total 10	Total 11	TOTAL

Australian DST Co. Pty. Ltd.
Box 61[illegible] Roma, Queensland 4455

Company .... G.F.E. RESOURCES LIMITED
Well .... NOWNAINS #1 VICTORIA
Test Date .. 16/07/1994

EMP S/N 080-258
File Ref ... HMN1DST1
Plot Ref ... INSIDE RECORDER



Test Time (hh:mm:ss mm/dd and hhhh.hhhh)

1 - INITIAL HYD, t=5.2833, P=3203.4
2 - INITIAL PRE-FLOW, t=5.5522, P=1280.6
3 - FINAL PRE-FLOW, t=5.6300, P=1548.3
4 - INITIAL SHUT-IN, t=6.6350, P=2708.8
5 - INITIAL FLOW, t=6.6487, P=1636.8
6 - FINAL FLOW, t=8.1322, P=2500.8
7 - FINAL SHUT-IN, t=11.1750, P=2617.7
8 - FINAL HYD, t=11.3033, P=3134.4

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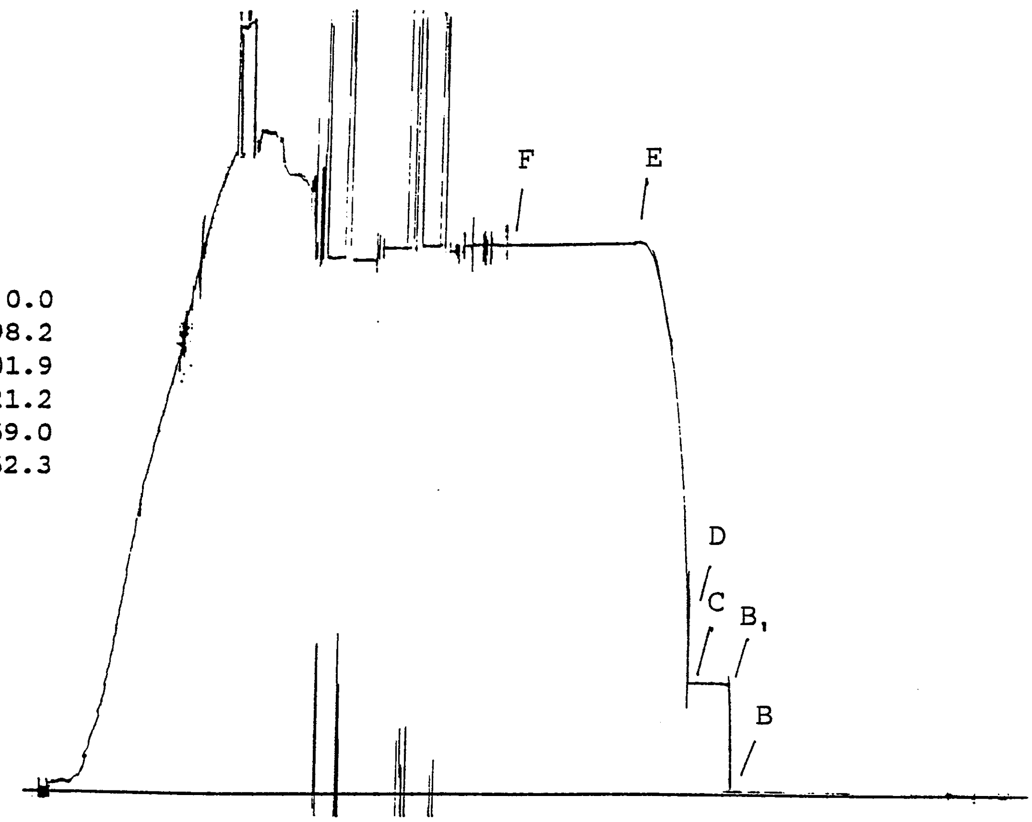
Well Name :Howmains # 1
Location :Otway Basin, PEP-104 Victoria

Ticket #:2476
DST # :One

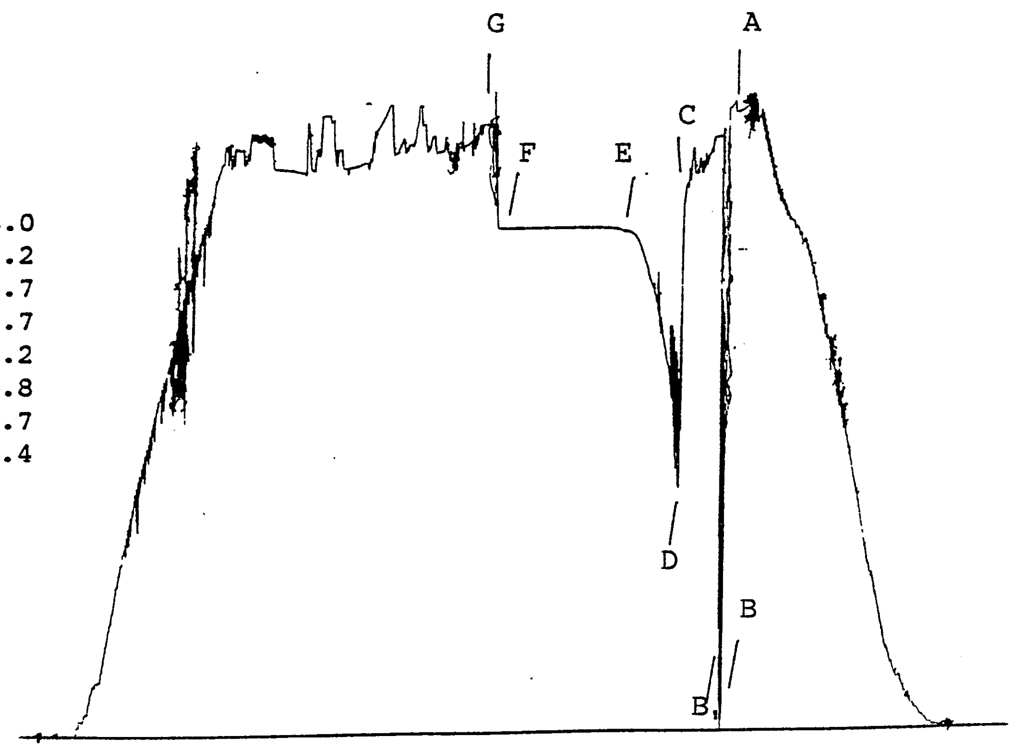
Recorder :13782
Depth :1850.00
Port :Fluid

A	IN Hydrostatic	:	
B	Preflow	:	0.0
B1	End Preflow	:	498.2
C	First Shutin	:	501.9
D	Second flow	:	721.2
E	End 2nd flow	:	2569.0
F	Second Shutin	:	2562.3
G	FL Hydrostatic	:	
H	Third flow	:	
I	End third flow	:	
J	Third Shutin	:	



Recorder :338
Depth :1859.00
Port :Inside

A	IN Hydrostatic	:	3208.0
B	Preflow	:	72.2
B1	End Preflow	:	536.7
C	First Shutin	:	2742.7
D	Second flow	:	1260.2
E	End 2nd flow	:	2594.8
F	Second Shutin	:	2616.7
G	FL Hydrostatic	:	3196.4
H	Third flow	:	
I	End third flow	:	
J	Third Shutin	:	



Australian DST Co. Pty. Ltd.

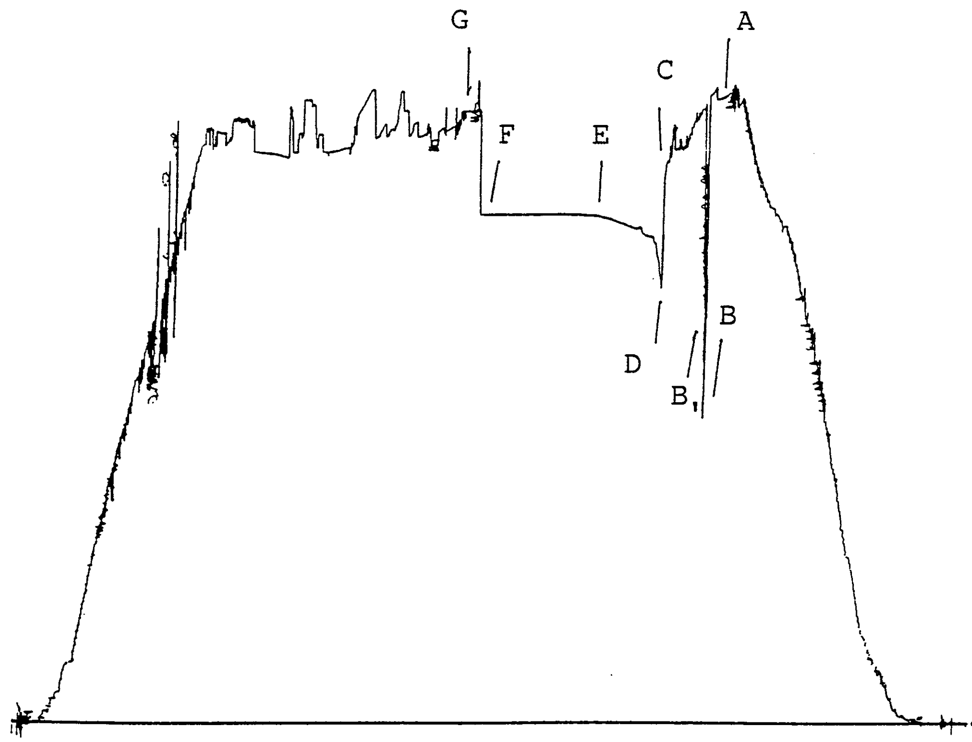
Box 619, Roma, Queensland 4455

Well Name :Howmains # 1
Location :Otway Basin, PEP-104 Victoria

Ticket #:2476
DST # :One

Recorder :13784
Depth :1869.00
Port :Outside

A	IN Hydrostatic	:	3213.8
B	Preflow	:	1555.2
B1	End Preflow	:	2130.8
C	First Shutin	:	2808.0
D	Second flow	:	2232.1
E	End 2nd flow	:	2600.2
F	Second Shutin	:	2622.4
G	FL Hydrostatic	:	3201.1
H	Third flow	:	
I	End third flow	:	
J	Third Shutin	:	



amdel

Amdel Limited
A.C.N. 008 127 802

Petroleum Services
PO Box 338
Torrensville SA 5031

Telephone: (08) 416 5240
Facsimile: (08) 234 0355

RECEIVED
12 AUG 1994
5535
GFE RESOURCES LTD

9 August 1994

GFE Resources Ltd
PO Box 629
Market Street Post Office
MELBOURNE VIC 3000

Attention: Kevin Lanigan

REPORT LQ3174

CLIENT REFERENCE: P/O 3566

WELL NAME/RE: Howmains-1, DST-1

MATERIAL: Water Sample

WORK REQUIRED: Water Analysis

Please direct technical enquiries regarding this work to the signatory below under whose supervision the work was carried out.

Brian L. Watson
Manager
Petroleum Services

amdel

Water Analysis Report   Job No. LQ3174   Method WAT 2 Page 1

Sample ID. HOWMAINS-1, DST-1

Chemical Composition

		mg/L	me/L
Cations			
Calcium	(Ca)	1020.0	50.90
Magnesium	(Mg)	116.0	9.55
Sodium	(Na)	7260.0	315.79
Potassium	(K)	620.0	15.86
Anions			
Hydroxide	(OH)		
Carbonate	(CO3)		
Bi-Carbonate	(HCO3)	338.2	5.54
Sulphate	(SO4)	104.0	2.17
Chloride	(Cl)	13538	381.35
Nitrate	(NO3)	<0.1	
Bromide	(Br)	6.0	

Other Analyses

Reaction - pH	5.5
Conductivity (E.C.) (micro -S/cm at 25 degC)	34000
Resistivity (Ohm.M at 25 degC)	0.29

Derived Data

	mg/L
Total Dissolved Solids	
A. Based on E.C.	21760
B. Calculated (HCO3=CO3)	22827
Total Hardness	3024
Carbonate Hardness	307
Non-Carbonate Hardness	2717
Total Alkalinity	307
(Each as CaCO3)	

Totals and Balance

Cations (me/L)	392.1	Diff=	3.03
Anions (me/L)	389.1	Sum =	781.15

ION BALANCE (Diff*100/Sum) = 0.39%

Sodium / Total Cation Ratio 80.5%

Remarks

DST Tool, Just above sample chamber

Note: mg/L = Milligrams per litre
me/L = MilliEqivs.per litre

Name: KEVIN LANIGAN
Address: GFE RESOURCES Ltd
PO BOX 629 MARKET St PO
MELBOURNE VIC 3000

Date Collected UNKNOWN
Date Received 28/07/94
Collected by CLIENT

amdel

Water Analysis Report Job No. LQ3174 Method WAT 2 Page 2

Sample ID. HOWMAINS-1, DST-1 Reverse Circulation

Chemical Composition

		mg/L	me/L
Cations			
Calcium	(Ca)	1100.0	54.89
Magnesium	(Mg)	114.0	9.38
Sodium	(Na)	6900.0	300.13
Potassium	(K)	350.0	8.95
Anions			
Hydroxide	(OH)		
Carbonate	(CO3)		
Bi-Carbonate	(HCO3)	726.2	11.91
Sulphate	(SO4)	64.0	1.33
Chloride	(Cl)	12890	363.10
Nitrate	(NO3)	<0.1	
Bromide	(Br)	5.4	

Other Analyses

Reaction - pH	6.5
Conductivity (E.C.) (micro -S/cm at 25 degC)	34200
Resistivity (Ohm.M at 25 degC)	0.29

Derived Data

	mg/L
Total Dissolved Solids	
A. Based on E.C.	21888
B. Calculated (HCO3=CO3)	21781
Total Hardness	3216
Carbonate Hardness	660
Non-Carbonate Hardness	2555
Total Alkalinity	660
(Each as CaCO3)	

Totals and Balance

Cations (me/L)	373.4	Diff=	2.98
Anions (me/L)	376.3	Sum =	749.69

ION BALANCE (Diff*100/Sum) = 0.40%

Sodium / Total Cation Ratio 80.4%

Remarks

809m Above tool

Note: mg/L = Milligrams per litre
me/L = MilliEqivs.per litre

Name: KEVIN LANIGAN
Address: GFE RESOURCES Ltd
PO BOX 629 MARKET St PO
MELBOURNE VIC 3000

Date Collected UNKNOWN
Date Received 28/07/94
Collected by CLIENT

amdel

AMDEL LABORATORIES LTD
(ACN 009 076 555)

508 City Road
South Melbourne Vic. 3205
Telephone: (03) 699 8333
Facsimile: (03) 699 9695

DATE: 14 July 1995 **REPORT NUMBER:** M954285

KL

RECEIVED
10 JUL 1995
4270
GFE RESOURCES LTD

CLIENT: **GFE Resources**
Level 6, 6 Riverside Quay,
SOUTH MELBOURNE, VICTORIA, 3205.

Attention: Mr Kevin Lanigan.

SAMPLES: Two water samples were received for analysis.

DATE RECEIVED: 3 July 1995

DATE COMMENCED: 3 July 1995

PARAMETER	METHOD
1. Water Analysis	WAT2

RESULTS:

The samples were analysed as received. Please refer to the attached page for results.

Reported By:
Mr C Chiappalone
Senior Chemist

Authorised By:
Mr J F Leeder
Manager-Environmental Services

amdel

Water Analysis Report   Job No. M954285   Method WAT 2
Page 1

Sample ID. HOWMAINS-1 DST-1

Chemical Composition

		mg/L	me/L
Cations			
Calcium	(Ca)	900.0	44.91
Magnesium	(Mg)	100.0	8.23
Sodium	(Na)	6550.0	284.91
Potassium	(K)	135.0	3.45
Anions			
Hydroxide	(OH)		
Carbonate	(CO3)		
Bi-Carbonate	(HCO3	729.3	11.96
Sulphate	(SO4)	46.0	0.96
Chloride	(Cl)	13575	382.39
Nitrate	(NO3)	<0.1	
Bromide	(Br)	50.0	

Other Analyses :

Reaction - pH	6.1
Conductivity (E.C) (micro -S/cm at 25°C)	34900
Resistivity Ohm.M at 25°C	0.29

Derived Data

	mg/L
Total Dissolved Solids	
A. Based on E.C.	22336
B. Calculated (HCO3=CO3)	21671
Total Hardness	2659
Carbonate Hardness	578
Non-Carbonate Hardness	2080
Total Alkalinity	578
(Each as CaCO3)	

Totals and Balance

Cations (me/L)	341.5	Diff=	53.81
Anions (me/L)	395.3	Sum =	736.8

ION BALANCE (Diff*100/Sum) = 7.30%

Sodium / Total Cation Ratio 83.4%

mg/L = Milligrams per litre
me/L = MilliEqivs.per litre

Name: CARMELLO
Address: AMDEL
MELBOURNE

Date Collected : UNKNOWN
Date Received 06/07/95
Collected by CLIENT

Formation
Type REVERSE CICULATED
Point
Time
Interval
Geologist
Depth 1520m

amdel

Water Analysis Report   Job No. M954285   Method WAT 2
Page 2

Sample ID. HOWMAINS-1 DST-1

Chemical Composition		mg/L	me/L
Cations			
Calcium	(Ca)	120.0	5.99
Magnesium	(Mg)	115.0	9.47
Sodium	(Na)	3300.0	143.54
Potassium	(K)	15950.0	407.93
Anions			
Hydroxide	(OH)		
Carbonate	(CO3)		
Bi-Carbonate	(HCO3	517.7	8.49
Sulphate	(SO4)	850.0	17.70
Chloride	(Cl)	21840	615.21
Nitrate	(NO3)	<0.1	
Bromide	(Br)	70.0	

Other Analyses :

Reaction - pH	7.1
Conductivity (E.C) (micro -S/cm at 25°C)	64500
Resistivity Ohm.M at 25°C	0.16

Derived Data	mg/L
Total Dissolved Solids	
A. Based on E.C.	41280
B. Calculated (HCO3=CO3)	42434
Total Hardness	773
Carbonate Hardness	411
Non-Carbonate Hardness	362
Total Alkalinity	411
(Each as CaCO3)	

Totals and Balance

Cations (me/L)	566.9	Diff=	74.47
Anions (me/L)	641.4	Sum =	1208.3

ION BALANCE (Diff*100/Sum) = 6.16%

Sodium / Total Cation Ratio 25.3%

mg/L = Milligrams per litre
me/L = MilliEqivs.per litre

Name:	CARMELLO	Formation	
Address:	AMDEL	Type	MUD SAMPLE
	MELBOURNE	Point	
		Time	
		Interval	
Date Collected	UNKNOWN	Geologist	
Date Received	06/07/95	Depth	1794m
Collected by	CLIENT		

GAS AND FUEL CORPORATION OF VICTORIA
SCIENTIFIC SERVICES - LABORATORY REPORT
1136 Nepean Highway, Highett, Victoria 3190, Australia

Tel. (03) 556 6222 Fax (03) 555 7616

Requested by: Kevin Lanigan, GFE Resources Ltd.

File Number: 94/1016

Subject: Analysis of Howmains 1 Gas Sample

Order Number: 3563

Sampled: 25th of July, 1994

Author: Ivan Strudwick

Approved by: A. J. Stevenson

Date: 9th of August, 1994

Distribution: John Foster, Operations Co-ordinator
GFE Resources Ltd.
Level 6, 6 Riverside Quay
South Melbourne 3205

Kevin Lanigan, Explorationist
GFE Resources Ltd.
Level 6, 6 Riverside Quay
South Melbourne 3205

A. J. Stevenson, Scientific Services

Gas Quality & Environment (2)

Master File

Keywords: Howmains 1, Natural, Analysis

LAN Reference: U:\CHEMISTR\TYPING\ILS\GFE1016.94

Master Report Number: 94/1016/C

SSS Flame Number: 10031140

43:ILS:ils

GAS AND FUEL CORPORATION OF VICTORIA
SCIENTIFIC SERVICES - LABORATORY REPORT

HOWMAINS 1 (DST#1 - SAMPLE 1 - 60 PSI - 1.13 PM)

Date Sampled: 25th of July, 1994

Report Reference Number: 94/1016

Component	**Mole Percent Concentration**
Methane	92.3
Ethane	3.60
Propane	0.855
Iso-Butane	0.136
Normal-Butane	0.160
Neo-Pentane	0.002
Iso-Pentane	0.042
Normal-Pentane	0.030
Hexanes	0.067
Heptanes+	0.098
Carbon Dioxide	0.01
Oxygen+Argon	0.03
Nitrogen	2.69
Helium	0.024

Calculated Properties for the dry gas at M.S.C.

Gross Heating Value	38.8 MJ/m^3
Wobbe Index	50.0 MJ/m^3
Relative Density	0.603

Procedure References: SSS-11-006
ISO 6976

Analyst: I. Strudwick

Checked: AJ

Date: 09/08/1994

COMPANY G.F.E. RESOURCES LIMITED STATE VICTORIA DATE 16/7/1994

Well Name HOWMAINS #1 KB Elv. 49.7 m Ticket No. 2476 DST No. 1.

Well Location OTWAY BASIN, PEP-104, VICTORIA. GR Elv. 44 m Formation WAARRE FRM.

Interval 1866.52 - 1875.50 T.D. 1875.50 ft. Net Pay ft. Type of Test BTM HOLE

API Gravity W.S. Average Porosity

RECORDER DATA

Mins.	EMP			
PF ___ Rec. #	# 13784	# 258	# K338	# 13782.
SI ___ Range ___ lbs.	4175	5000	4150	
SF ___ Clock ___ hrs.	24		24	24
FS ___ Depth ___ m	1869	1862	1859	1850 m
	PSI	PSI	PSI	PSI
A. Init. Hyd.	3232	3203	3187	
B. First Flow	2165	1261	102	
B1 Final Flow	2376	1549	559	510
C. In. Shut-In	2903	2710	2727	
D. Init. Flow	2249	1833	1531	
E. Final Flow	2629	2590	2560	
F. Fl. Shut-in	2639	2617	2592	2569
G. Final Hyd.	3200	3194.	3145	
Inside/Outside	(OUT)	(IN)	(IN)	(FLUID.)

TIME DATA

PF Fr. 10.52 to 10.57 hr.

IS Fr. 10.57 to 11.57 hr.

SF Fr. 11.57 to 13.27 hr.

FS Fr. 13.27 to 16.27. hr.

T. STARTED 04.30 hr.

T. ON BOTM. 10.42. hr.

T. OPEN 10.52. hr.

T. PULLED 16.27 hr.

T. OUT 05.00. hr.

RECOVERY

Total Fluid 1789 m of 167.95 m in D.C. and 1621.05 m in D.P.

77 m of WATERY RAT HOLE MUD. GAS CUT

1712. m of WATER. GAS CUT.

ft. of

ft. of

TOOL DATA

Tool Wt. lbs.

Wt. Set on Packer 30,000 lbs.

Wt. Pulled Loose 150,000 lbs.

Initial Str. Wt. 110 000 UP lbs.

Unseated Str. Wt. 125,000 lbs.

Bot. Choke 3/4. in.

Hole Size 8½. in.

D. Col. I.D. 2 7/8 in.

D. Pipe I.D. 3.8 in.

D.C. Leng. 167.95 ft.

D.P. Leng. 1632.90 ft.

HWDP 55.36

GAS RECOVERY MEASURED WITH

Time Mins.	Orifice inches	Pressure PSI	H_2O inches	Rate mcf/d
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

SURFACE CHOKE SIZE:

MUD DATA

Mud type KCL - GEL.

Weight 90.1

Vis. 48

W.L. 6.4

F.C. 1/32. in.

Mud Drop

GENERAL DATA

Amt. of fill 20 ft.

Btm. H. Temp. 183 °F

Hole Cond. FAIR.

Packer Size 7½ x 2½ x 36 in.

No. of Packers 2.

Cushion Amt. NIL ft.

Cushion Type NIL.

Reversed Out YES

Tool Chased YES

Tester RICHARD SMITH.

Co. Rep. KEN SMITH.

Contractor CENTURY DRILLING.

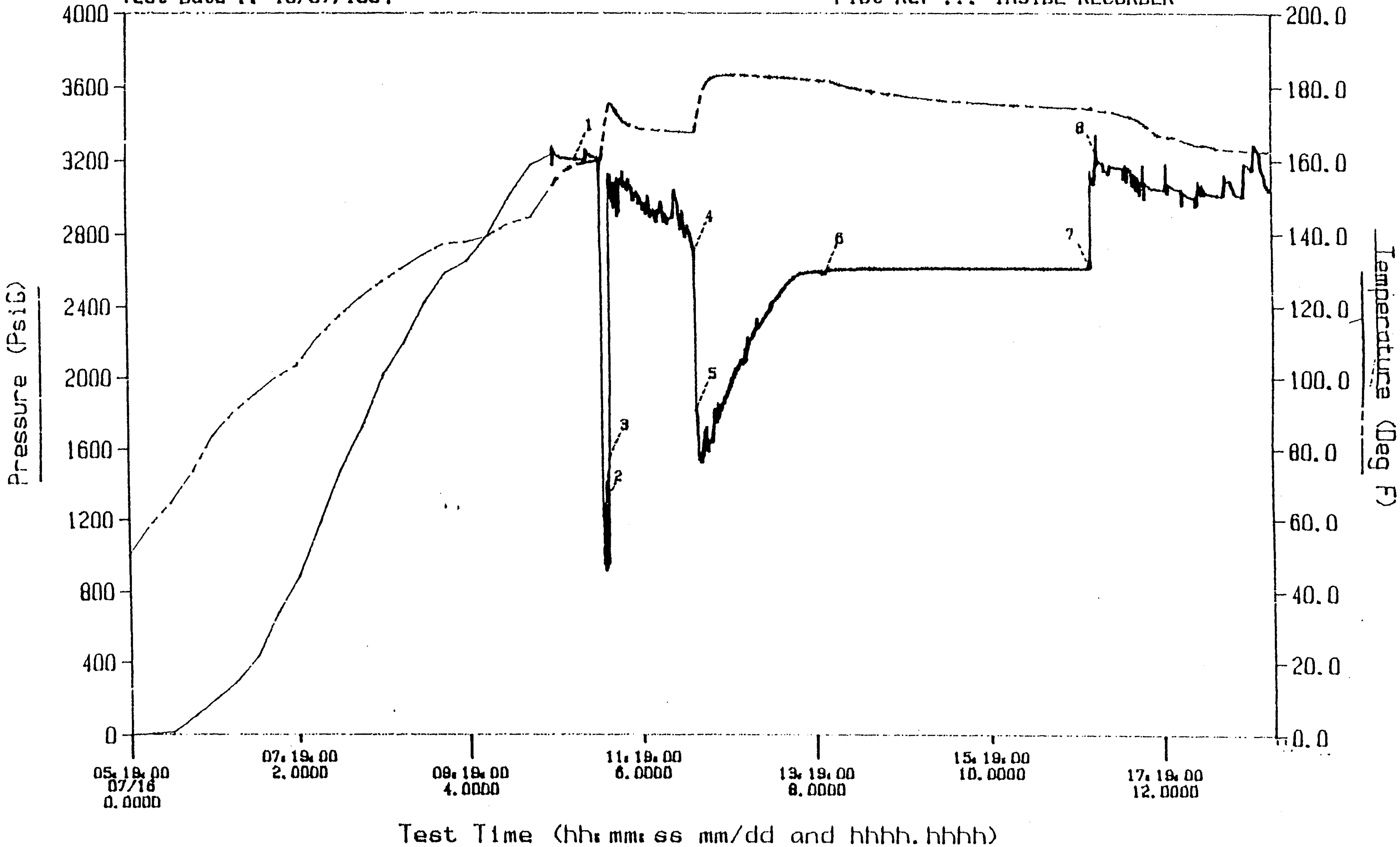
Rig No. ELEVEN.

BLOW DESCRIPTION 1st FLOW: OPEN WITH MODERATE AIR BLOW INCREASING TO STRONG 3½ PSI AT END FL.

94/07/17
06:33:02

Company .... G.F.E. RESOURCES LIMITED
Well .... NOWMAINS #1 VICTORIA
Test Date .. 16/07/1994

EMP S/N 080-258
File Ref ... HMN1DST1
Plot Ref ... INSIDE RECORDER

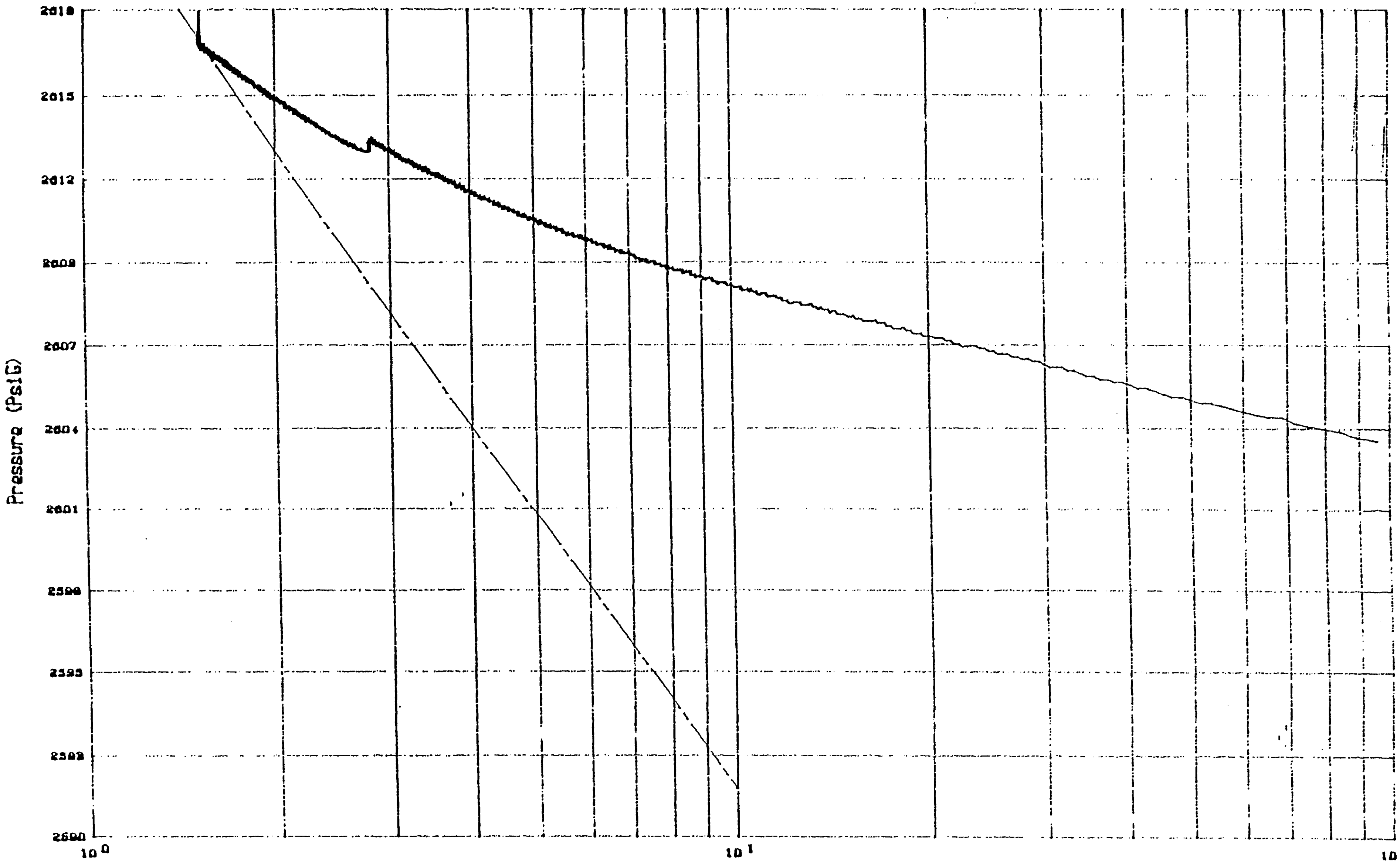


1 - INITIAL HYD; t=5.2633; P=3203.4
2 - INITIAL PRE-FLOW; t=5.5522; P=1260.8
3 - FINAL PRE-FLOW; t=5.6300; P=1548.3
4 - INITIAL SHUT-IN; t=6.6356; P=2708.8
5 - INITIAL FLOW; t=6.6467; P=1832.6
6 - FINAL FLOW; t=8.1322; P=2588.8
7 - FINAL SHUT-IN; t=11.1756; P=2617.7
8 - FINAL HYD; t=11.3039; P=3194.4

94/07/17
08:52:20

Company .... G.F.E. RESOURCES LIMITED
Well .... NOWMAINS #1 VICTORIA
Test Date .. 16/07/1994

EMP S/N 080-258
File Ref ... HMN1DST1
Plot Ref ... INSIDE RECORDER



Horner Time; (Tf+dT)/dT
[Final Shut-In]

Shut-in Started 94/07/16 13:26:56
Shut-in Ended 94/07/16 16:29:32
Total Flow Time .... 94.6 minute(s)

First Delta-t .... 1.0 minute(s)
Intercept .... 2622.4 PsiG
Slope .... 30.8 PsiG/Cycle

AUSTRALIAN D.S.T. File Reference HMN1DST1

Company .... G.F.E. RESOURCES LIMITED
Street .... LEVEL 6, 6 RIVERSIDE QUAY
City .... SOUTH MELBOURNE, VIC, 3205.
Country .... AUSTRALIA
Service Company/Rep .... AUSTRALIAN D.S.T. RICHARD SMITH, CHAD McGUINN

Well Name .... NOWMAINS #1
Well Location .... VICTORIA
Field / Pool .... WILDCAT
Status (Oil, Gas, Other) .... GAS

Test Type .... CONVENTIONAL BOTTOM HOLE
Date of Test 16/07/1994
Producing Interval .... 1866.52 - 1875.50 MTR ~~ft~~
Perf. Type ....
Producing Through .... .75
Elevation ....
Pool Datum (subsea).............
Mid Point of Prod. Intvl (MPP)..
Datum Depth of Well from (KB)... 6153.0 ft

Recorder Depth (KB) .... 6109.0 ft
Recorder Position .... INSIDE RECORDER

McAllister EMP Identification

EMP Serial Number 258
EMP Model Number 168
Pressure Range .... 5000.0 PSIA
EMP Battery Usage (Probe) ... 23.2711 (0 23:16:16)
Connected 94/07/16 05:19:00
Disconnected 94/07/17 04:35:16
EMP Calibration I.D. 344-11059
EMP Last Calibration 91/02/28

EMP Setup Parameters

Probe Set Up Time 1:29
Time Delay to First Reading 00:00:00
Data Recording Interval .... VARIES due to custom setup
Data Recording Format .... VARIES due to custom setup
Custom Program I.D. .... Custom 3.2 / 0 - var. interval
Abs. to Ga. pressure adjustment. 13.5 PsiG

Company: G.F.E. RESOURCES LIMITED
Well: NOWMAINS #1 VICTORIA
Ref: HMN1DST1

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	05:19:04	0.0000	0.02	50.10		
07/16	05:34:04	0.2500	9.71	58.56		
07/16	05:49:04	0.5000	16.97	64.85		
07/16	06:04:04	0.7500	108.54	73.30		
07/16	06:19:04	1.0000	200.82	83.71		
07/16	06:34:04	1.2500	291.98	90.35		
07/16	06:49:04	1.5000	433.44	95.28		
07/16	07:04:04	1.7500	686.61	99.94		
07/16	07:19:04	2.0000	882.42	103.22		
07/16	07:34:04	2.2500	1182.09	111.11		
07/16	07:49:04	2.5000	1490.90	117.14		
07/16	08:04:04	2.7500	1724.27	122.33		
07/16	08:19:04	3.0000	2017.55	126.84		
07/16	08:34:04	3.2500	2193.05	130.58		
07/16	08:49:04	3.5000	2426.56	134.32		
07/16	09:04:04	3.7500	2591.23	137.30		
07/16	09:19:04	4.0000	2652.95	137.86		
07/16	09:34:04	4.2500	2800.48	139.28		
07/16	09:49:04	4.5000	3004.53	142.75		
07/16	10:04:04	4.7500	3175.45	144.32		
07/16	10:19:04	5.0000	3230.22	152.50		
07/16	10:19:08	5.0011	3276.03	152.57		
07/16	10:19:28	5.0067	3254.27	152.78		
07/16	10:19:48	5.0122	3175.14	153.07		
07/16	10:20:08	5.0178	3263.03	153.28		
07/16	10:20:28	5.0233	3256.18	153.50		
07/16	10:20:48	5.0289	3244.91	153.71		
07/16	10:21:08	5.0344	3238.25	153.92		
07/16	10:21:28	5.0400	3235.22	154.14		
07/16	10:21:48	5.0456	3232.09	154.35		
07/16	10:22:08	5.0511	3229.22	154.50		
07/16	10:22:28	5.0567	3226.68	154.71		
07/16	10:22:48	5.0622	3224.30	154.85		
07/16	10:23:08	5.0678	3222.31	154.99		
07/16	10:23:28	5.0733	3220.55	155.21		
07/16	10:23:48	5.0789	3218.96	155.35		
07/16	10:24:08	5.0844	3217.65	155.49		
07/16	10:24:28	5.0900	3216.65	155.64		
07/16	10:24:48	5.0956	3215.64	155.78		
07/16	10:25:08	5.1011	3214.82	155.92		
07/16	10:25:28	5.1067	3214.01	156.07		
07/16	10:25:48	5.1122	3213.36	156.14		
07/16	10:26:08	5.1178	3212.74	156.28		
07/16	10:26:28	5.1233	3212.13	156.42		
07/16	10:26:48	5.1289	3211.48	156.49		
07/16	10:27:08	5.1344	3210.96	156.64		
07/16	10:27:28	5.1400	3210.50	156.71		
07/16	10:27:48	5.1456	3209.99	156.85		
07/16	10:28:08	5.1511	3209.53	156.92		
07/16	10:28:28	5.1567	3209.11	157.07		
07/16	10:28:48	5.1622	3208.66	157.14		
07/16	10:29:08	5.1678	3208.30	157.21		
07/16	10:29:28	5.1733	3207.84	157.28		
07/16	10:29:48	5.1789	3207.52	157.42		
07/16	10:30:08	5.1844	3207.16	157.49		
07/16	10:30:28	5.1900	3206.81	157.57		
07/16	10:30:48	5.1956	3206.45	157.64		
07/16	10:31:08	5.2011	3206.09	157.71		
07/16	10:31:28	5.2067	3205.93	157.78		
07/16	10:31:48	5.2122	3205.57	157.85		
07/16	10:32:08	5.2178	3205.41	157.92		
07/16	10:32:28	5.2233	3205.15	157.99		
07/16	10:32:48	5.2289	3204.86	157.99		
07/16	10:33:08	5.2344	3204.60	158.07		
07/16	10:33:28	5.2400	3204.25	158.14		
07/16	10:33:48	5.2456	3204.08	158.21		
07/16	10:34:08	5.2511	3203.82	158.28		
07/16	10:34:28	5.2567	3203.63	158.28		
07/16	10:34:48	5.2622	3203.37	158.35		INITIAL HYD
07/16	10:35:08	5.2678	3203.11	158.42		
07/16	10:35:28	5.2733	3203.01	158.42		
07/16	10:35:48	5.2789	3203.15	158.49		
07/16	10:36:08	5.2844	3203.15	158.49		

Company: G.F.E. RESOURCES LIMITED Ref: HMN1DST1
Well: NOWMAINS #1 VICTORIA

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	10:36:28	5.2900	3203.18	158.57		
07/16	10:36:48	5.2956	3203.02	158.64		
07/16	10:37:08	5.3011	3203.02	158.64		
07/16	10:37:28	5.3067	3202.86	158.71		
07/16	10:37:48	5.3122	3202.76	158.71		
07/16	10:38:08	5.3178	3202.50	158.78		
07/16	10:38:28	5.3233	3202.40	158.78		
07/16	10:38:48	5.3289	3202.24	158.85		
07/16	10:39:08	5.3344	3202.05	158.85		
07/16	10:39:28	5.3400	3201.98	158.92		
07/16	10:39:48	5.3456	3201.79	158.92		
07/16	10:40:08	5.3511	3201.82	158.99		
07/16	10:40:28	5.3567	3201.53	158.99		
07/16	10:40:48	5.3622	3201.33	158.99		
07/16	10:41:08	5.3678	3201.37	159.07		
07/16	10:41:28	5.3733	3201.17	159.07		
07/16	10:41:48	5.3789	3200.98	159.07		
07/16	10:42:08	5.3844	3200.82	159.14		
07/16	10:42:28	5.3900	3257.88	159.14		
07/16	10:42:48	5.3956	3252.92	159.21		
07/16	10:43:08	5.4011	3248.71	159.21		
07/16	10:43:28	5.4067	3244.80	159.21		
07/16	10:43:48	5.4122	3240.98	159.21		
07/16	10:44:08	5.4178	3237.39	159.28		
07/16	10:44:28	5.4233	3234.06	159.28		
07/16	10:44:48	5.4289	3230.93	159.28		
07/16	10:45:08	5.4344	3228.19	159.28		
07/16	10:45:28	5.4400	3225.68	159.35		
07/16	10:45:48	5.4456	3223.33	159.35		
07/16	10:46:08	5.4511	3221.18	159.35		
07/16	10:46:28	5.4567	3219.26	159.42		
07/16	10:46:48	5.4622	3217.49	159.42		
07/16	10:47:08	5.4678	3223.17	159.42		
07/16	10:47:28	5.4733	3222.00	159.42		
07/16	10:47:48	5.4789	3220.66	159.50		
07/16	10:48:08	5.4844	3219.19	159.50		
07/16	10:48:28	5.4900	3217.53	159.50		
07/16	10:48:48	5.4956	3216.06	159.50		
07/16	10:49:08	5.5011	3214.82	159.57		
07/16	10:49:28	5.5067	3213.94	159.57		
07/16	10:49:48	5.5122	3212.67	159.57		
07/16	10:50:08	5.5178	3212.80	159.64		
07/16	10:50:28	5.5233	3212.21	159.64		
07/16	10:50:48	5.5289	3211.92	159.64		
07/16	10:51:08	5.5344	3211.73	159.64		
07/16	10:51:28	5.5400	3211.86	159.71		
07/16	10:51:48	5.5456	3212.74	159.71		INITIAL PRE-FLOW
07/16	10:52:08	5.5511	1260.83	159.71		
07/16	10:52:28	5.5567	1022.58	159.78		
07/16	10:52:48	5.5622	947.66	160.14		
07/16	10:53:08	5.5678	1296.49	160.85		
07/16	10:53:28	5.5733	1215.12	161.71		
07/16	10:53:48	5.5789	1017.18	162.64		
07/16	10:54:08	5.5844	916.69	163.65		
07/16	10:54:28	5.5900	1427.60	164.65		
07/16	10:54:48	5.5956	928.89	165.65		
07/16	10:55:08	5.6011	1170.93	166.66		
07/16	10:55:28	5.6067	1057.34	167.66		
07/16	10:55:48	5.6122	1194.72	168.59		
07/16	10:56:08	5.6178	1477.59	169.53		
07/16	10:56:28	5.6233	951.12	170.39		
07/16	10:56:48	5.6289	1549.35	171.25		FINAL PRE-FLOW
07/16	10:57:08	5.6344	1648.83	171.97		
07/16	10:57:28	5.6400	2648.82	172.76		
07/16	10:57:48	5.6456	3085.06	173.41		
07/16	10:58:08	5.6511	3126.71	173.99		
07/16	10:58:28	5.6567	3083.84	174.49		
07/16	10:58:48	5.6622	3057.79	174.85		
07/16	10:59:08	5.6678	2996.60	175.14		
07/16	10:59:28	5.6733	3124.82	175.28		
07/16	10:59:48	5.6789	3016.86	175.28		
07/16	11:00:08	5.6844	3055.08	175.28		
07/16	11:00:28	5.6900	2990.69	175.21		

Company: G.F.E. RESOURCES LIMITED Ref: HMN1DST1
Well: NOWMAINS #1 VICTORIA

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	11:00:48	5.6956	2971.94	175.14		
07/16	11:01:08	5.7011	3076.75	174.92		
07/16	11:01:28	5.7067	2942.40	174.78		
07/16	11:01:48	5.7122	3023.70	174.56		
07/16	11:02:08	5.7178	3084.16	174.34		
07/16	11:02:28	5.7233	3061.91	174.13		
07/16	11:02:48	5.7289	3022.98	173.91		
07/16	11:03:08	5.7344	2949.20	173.63		
07/16	11:03:28	5.7400	3072.86	173.41		
07/16	11:03:48	5.7456	2897.58	173.19		
07/16	11:04:08	5.7511	3105.43	172.98		
07/16	11:04:28	5.7567	2946.07	172.69		
07/16	11:04:48	5.7622	2917.28	172.47		
07/16	11:05:08	5.7678	2927.74	172.33		
07/16	11:05:28	5.7733	3084.50	172.11		
07/16	11:05:48	5.7789	3076.97	171.90		
07/16	11:06:08	5.7844	3103.31	171.68		
07/16	11:06:28	5.7900	3078.45	171.54		
07/16	11:06:48	5.7956	3073.11	171.40		
07/16	11:07:08	5.8011	3078.17	171.18		
07/16	11:07:28	5.8067	3068.44	171.04		
07/16	11:07:48	5.8122	3138.74	170.89		
07/16	11:08:08	5.8178	3089.47	170.75		
07/16	11:08:28	5.8233	3062.16	170.61		
07/16	11:08:48	5.8289	3061.31	170.46		
07/16	11:09:08	5.8344	3051.90	170.39		
07/16	11:09:28	5.8400	3062.47	170.25		
07/16	11:09:48	5.8456	3061.26	170.17		
07/16	11:10:08	5.8511	3082.12	170.10		
07/16	11:10:28	5.8567	3085.36	169.96		
07/16	11:10:48	5.8622	3070.78	169.89		
07/16	11:11:08	5.8678	3054.05	169.82		
07/16	11:11:28	5.8733	3036.64	169.74		
07/16	11:11:48	5.8789	3073.50	169.67		
07/16	11:12:08	5.8844	3098.65	169.60		
07/16	11:12:28	5.8900	3078.50	169.53		
07/16	11:12:48	5.8956	3059.92	169.46		
07/16	11:13:08	5.9011	3069.25	169.38		
07/16	11:13:28	5.9067	3065.31	169.31		
07/16	11:13:48	5.9122	3045.85	169.24		
07/16	11:14:08	5.9178	3055.48	169.17		
07/16	11:14:28	5.9233	3046.40	169.17		
07/16	11:14:48	5.9289	3014.53	169.10		
07/16	11:15:08	5.9344	2979.94	169.03		
07/16	11:15:28	5.9400	3007.66	169.03		
07/16	11:15:48	5.9456	3013.97	168.95		
07/16	11:16:08	5.9511	3005.64	168.88		
07/16	11:16:28	5.9567	3000.66	168.88		
07/16	11:16:48	5.9622	2997.50	168.81		
07/16	11:17:08	5.9678	3010.38	168.81		
07/16	11:17:28	5.9733	3031.04	168.74		
07/16	11:17:48	5.9789	3002.15	168.74		
07/16	11:18:08	5.9844	3022.22	168.67		
07/16	11:18:28	5.9900	2998.89	168.67		
07/16	11:18:48	5.9956	3007.73	168.59		
07/16	11:19:08	6.0011	2962.05	168.59		
07/16	11:19:28	6.0067	2997.19	168.59		
07/16	11:19:48	6.0122	2996.57	168.52		
07/16	11:20:08	6.0178	2978.80	168.52		
07/16	11:20:28	6.0233	2971.54	168.45		
07/16	11:20:48	6.0289	2968.61	168.45		
07/16	11:21:08	6.0344	2961.97	168.45		
07/16	11:21:28	6.0400	2970.72	168.38		
07/16	11:21:48	6.0456	2954.22	168.38		
07/16	11:22:08	6.0511	2935.78	168.38		
07/16	11:22:28	6.0567	2934.27	168.31		
07/16	11:22:48	6.0622	2928.81	168.31		
07/16	11:23:08	6.0678	2958.38	168.31		
07/16	11:23:28	6.0733	2973.12	168.31		
07/16	11:23:48	6.0789	2949.56	168.24		
07/16	11:24:08	6.0844	2925.94	168.24		
07/16	11:24:28	6.0900	2910.42	168.24		
07/16	11:24:48	6.0956	2910.62	168.24		

Company: G.F.E. RESOURCES LIMITED
Well: NOWMAINS #1 VICTORIA

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Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	11:25:08	6.1011	2908.82	168.16		
07/16	11:25:28	6.1067	3007.12	168.16		
07/16	11:25:48	6.1122	2986.71	168.16		
07/16	11:26:08	6.1178	2969.63	168.16		
07/16	11:26:28	6.1233	2962.66	168.09		
07/16	11:26:48	6.1289	2924.79	168.09		
07/16	11:27:08	6.1344	2893.85	168.09		
07/16	11:27:28	6.1400	2895.12	168.09		
07/16	11:27:48	6.1456	2907.42	168.09		
07/16	11:28:08	6.1511	2919.48	168.02		
07/16	11:28:28	6.1567	2925.53	168.02		
07/16	11:28:48	6.1622	2922.41	168.02		
07/16	11:29:08	6.1678	2934.61	168.02		
07/16	11:29:28	6.1733	2909.23	168.02		
07/16	11:29:48	6.1789	2903.04	167.95		
07/16	11:30:08	6.1844	2887.23	167.95		
07/16	11:30:28	6.1900	2884.01	167.95		
07/16	11:30:48	6.1956	2882.06	167.95		
07/16	11:31:08	6.2011	2865.96	167.95		
07/16	11:31:28	6.2067	2903.04	167.95		
07/16	11:31:48	6.2122	2924.67	167.88		
07/16	11:32:08	6.2178	2934.63	167.88		
07/16	11:32:28	6.2233	2923.50	167.88		
07/16	11:32:48	6.2289	2911.59	167.88		
07/16	11:33:08	6.2344	2913.84	167.88		
07/16	11:33:28	6.2400	2923.89	167.88		
07/16	11:33:48	6.2456	2945.95	167.88		
07/16	11:34:08	6.2511	2974.32	167.80		
07/16	11:34:28	6.2567	2972.27	167.80		
07/16	11:34:48	6.2622	2956.85	167.80		
07/16	11:35:08	6.2678	2951.09	167.80		
07/16	11:35:28	6.2733	2928.93	167.80		
07/16	11:35:48	6.2789	2893.40	167.80		
07/16	11:36:08	6.2844	2865.00	167.80		
07/16	11:36:28	6.2900	2894.38	167.80		
07/16	11:36:48	6.2956	2902.54	167.73		
07/16	11:37:08	6.3011	2916.88	167.73		
07/16	11:37:28	6.3067	2905.27	167.73		
07/16	11:37:48	6.3122	2890.53	167.73		
07/16	11:38:08	6.3178	2874.33	167.73		
07/16	11:38:28	6.3233	2888.38	167.73		
07/16	11:38:48	6.3289	2858.62	167.73		
07/16	11:39:08	6.3344	2881.61	167.66		
07/16	11:39:28	6.3400	2894.98	167.66		
07/16	11:39:48	6.3456	2879.95	167.66		
07/16	11:40:08	6.3511	2894.30	167.66		
07/16	11:40:28	6.3567	2893.81	167.66		
07/16	11:40:48	6.3622	2884.64	167.66		
07/16	11:41:08	6.3678	2886.39	167.66		
07/16	11:41:28	6.3733	2891.96	167.66		
07/16	11:41:48	6.3789	2888.54	167.66		
07/16	11:42:08	6.3844	2889.67	167.59		
07/16	11:42:28	6.3900	2896.99	167.59		
07/16	11:42:48	6.3956	2910.85	167.59		
07/16	11:43:08	6.4011	3021.47	167.59		
07/16	11:43:28	6.4067	3039.43	167.59		
07/16	11:43:48	6.4122	3036.99	167.59		
07/16	11:44:08	6.4178	3010.43	167.59		
07/16	11:44:28	6.4233	3004.48	167.59		
07/16	11:44:48	6.4289	2993.34	167.59		
07/16	11:45:08	6.4344	2992.56	167.59		
07/16	11:45:28	6.4400	2981.43	167.59		
07/16	11:45:48	6.4456	2970.21	167.59		
07/16	11:46:08	6.4511	2947.36	167.59		
07/16	11:46:28	6.4567	2910.66	167.59		
07/16	11:46:48	6.4622	2889.73	167.52		
07/16	11:47:08	6.4678	2880.07	167.52		
07/16	11:47:28	6.4733	2860.16	167.52		
07/16	11:47:48	6.4789	2841.33	167.52		
07/16	11:48:08	6.4844	2823.76	167.52		
07/16	11:48:28	6.4900	2834.98	167.52		
07/16	11:48:48	6.4956	2906.72	167.52		
07/16	11:49:08	6.5011	2930.49	167.45		

Company: G.F.E. RESOURCES LIMITED
Well: NOWMAINS #1 VICTORIA
Ref: HMN1DST1

Date MM/DD G Atm.	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi
07/16	11:49:28	6.5067	2907.65	167.45		
07/16	11:49:48	6.5122	2884.13	167.45		
07/16	11:50:08	6.5178	2859.73	167.45		
07/16	11:50:28	6.5233	2840.02	167.45		
07/16	11:50:48	6.5289	2807.43	167.45		
07/16	11:51:08	6.5344	2787.13	167.45		
07/16	11:51:28	6.5400	2808.01	167.45		
07/16	11:51:48	6.5456	2827.82	167.45		
07/16	11:52:08	6.5511	2848.41	167.45		
07/16	11:52:28	6.5567	2851.40	167.37		
07/16	11:52:48	6.5622	2835.20	167.37		
07/16	11:53:08	6.5678	2835.88	167.37		
07/16	11:53:28	6.5733	2810.41	167.37		
07/16	11:53:48	6.5789	2817.34	167.37		
07/16	11:54:08	6.5844	2798.21	167.37		
07/16	11:54:28	6.5900	2796.56	167.37		
07/16	11:54:48	6.5956	2794.90	167.37		
07/16	11:55:08	6.6011	2773.63	167.37		
07/16	11:55:28	6.6067	2757.92	167.37		
07/16	11:55:48	6.6122	2739.97	167.37		
07/16	11:56:08	6.6178	2733.20	167.30		
07/16	11:56:28	6.6233	2723.54	167.30		
07/16	11:56:48	6.6289	2717.40	167.30		
07/16	11:57:08	6.6344	2709.89	167.30		INITIAL SHUT-IN
07/16	11:57:28	6.6400	1816.19	167.30		
07/16	11:57:48	6.6456	1832.58	167.37		INITIAL FLOW
07/16	11:58:08	6.6511	1756.73	167.73		
07/16	11:58:28	6.6567	1789.68	168.38		
07/16	11:58:48	6.6622	1699.46	169.10		
07/16	11:59:08	6.6678	1573.47	169.96		
07/16	11:59:28	6.6733	1537.98	170.75		
07/16	11:59:48	6.6789	1544.91	171.54		
07/16	12:00:08	6.6844	1554.03	172.26		
07/16	12:00:28	6.6900	1578.43	173.05		
07/16	12:00:48	6.6956	1576.32	173.70		
07/16	12:01:08	6.7011	1526.87	174.34		
07/16	12:01:28	6.7067	1532.04	174.99		
07/16	12:01:48	6.7122	1600.39	175.57		
07/16	12:02:08	6.7178	1652.35	176.14		
07/16	12:02:28	6.7233	1650.80	176.65		
07/16	12:02:48	6.7289	1565.95	177.15		
07/16	12:03:08	6.7344	1711.66	177.59		
07/16	12:03:28	6.7400	1598.92	178.02		
07/16	12:03:48	6.7456	1687.11	178.45		
07/16	12:04:08	6.7511	1594.11	178.81		
07/16	12:04:28	6.7567	1727.23	179.17		
07/16	12:04:48	6.7622	1597.52	179.46		
07/16	12:05:08	6.7678	1631.10	179.75		
07/16	12:05:28	6.7733	1585.09	180.04		
07/16	12:05:48	6.7789	1621.60	180.25		
07/16	12:06:08	6.7844	1649.20	180.47		
07/16	12:06:28	6.7900	1660.47	180.76		
07/16	12:06:48	6.7956	1657.19	180.90		
07/16	12:07:08	6.8011	1634.10	181.12		
07/16	12:07:28	6.8067	1632.52	181.34		
07/16	12:07:48	6.8122	1658.22	181.48		
07/16	12:08:08	6.8178	1634.68	181.63		
07/16	12:08:28	6.8233	1656.50	181.77		
07/16	12:08:48	6.8289	1681.72	181.91		
07/16	12:09:08	6.8344	1686.81	181.99		
07/16	12:09:28	6.8400	1805.96	182.13		
07/16	12:09:48	6.8456	1828.70	182.20		
07/16	12:10:08	6.8511	1743.92	182.28		
07/16	12:10:28	6.8567	1794.19	182.35		
07/16	12:10:48	6.8622	1829.73	182.42		
07/16	12:11:08	6.8678	1827.84	182.49		
07/16	12:11:28	6.8733	1792.22	182.56		
07/16	12:11:48	6.8789	1746.86	182.56		
07/16	12:12:08	6.8844	1817.29	182.64		
07/16	12:12:28	6.8900	1805.22	182.71		
07/16	12:12:48	6.8956	1862.42	182.71		
07/16	12:13:08	6.9011	1773.00	182.78		
07/16	12:13:28	6.9067	1791.41	182.78		

Company: G.F.E. RESOURCES LIMITED Ref: HMN10ST1
Well: NOWMAINS #1 VICTORIA

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	12:13:48	6.9122	1800.29	182.85		
07/16	12:14:08	6.9178	1831.12	182.85		
07/16	12:14:28	6.9233	1817.16	182.85		
07/16	12:14:48	6.9289	1821.18	182.93		
07/16	12:15:08	6.9344	1826.81	182.93		
07/16	12:15:28	6.9400	1859.77	182.93		
07/16	12:15:48	6.9456	1864.23	182.93		
07/16	12:16:08	6.9511	1861.86	183.00		
07/16	12:16:28	6.9567	1855.85	183.00		
07/16	12:16:48	6.9622	1863.80	183.00		
07/16	12:17:08	6.9678	1895.70	183.00		
07/16	12:17:28	6.9733	1882.90	183.00		
07/16	12:17:48	6.9789	1886.29	183.00		
07/16	12:18:08	6.9844	1901.81	183.00		
07/16	12:18:28	6.9900	1908.50	183.00		
07/16	12:18:48	6.9956	1917.76	183.07		
07/16	12:19:08	7.0011	1925.91	183.07		
07/16	12:19:12	7.0022	1923.97	183.07		
07/16	12:19:16	7.0033	1923.78	183.07		
07/16	12:19:20	7.0044	1925.62	183.07		
07/16	12:19:24	7.0056	1929.01	183.07		
07/16	12:19:28	7.0067	1928.72	183.07		
07/16	12:19:32	7.0078	1929.11	183.07		
07/16	12:19:36	7.0089	1931.34	183.07		
07/16	12:19:40	7.0100	1932.99	183.07		
07/16	12:19:44	7.0111	1934.64	183.07		
07/16	12:19:48	7.0122	1933.67	183.07		
07/16	12:19:52	7.0133	1932.70	183.07		
07/16	12:19:56	7.0144	1936.97	183.07		
07/16	12:20:00	7.0156	1939.20	183.07		
07/16	12:20:04	7.0167	1942.11	183.07		
07/16	12:20:08	7.0178	1943.08	183.07		
07/16	12:20:12	7.0189	1943.95	183.07		
07/16	12:20:16	7.0200	1945.31	183.07		
07/16	12:20:20	7.0211	1948.89	183.07		
07/16	12:20:24	7.0222	1948.89	183.07		
07/16	12:20:28	7.0233	1949.38	183.07		
07/16	12:20:32	7.0244	1951.90	183.07		
07/16	12:20:36	7.0256	1951.32	183.07		
07/16	12:20:40	7.0267	1953.94	183.07		
07/16	12:20:44	7.0278	1956.46	183.07		
07/16	12:20:48	7.0289	1957.62	183.07		
07/16	12:20:52	7.0300	1960.82	183.07		
07/16	12:20:56	7.0311	1963.54	183.07		
07/16	12:21:00	7.0322	1963.83	183.07		
07/16	12:21:04	7.0333	1964.80	183.07		
07/16	12:21:08	7.0344	1965.38	183.07		
07/16	12:21:12	7.0356	1966.16	183.07		
07/16	12:21:16	7.0367	1965.38	183.07		
07/16	12:21:20	7.0378	1964.99	183.07		
07/16	12:21:24	7.0389	1965.19	183.07		
07/16	12:21:28	7.0400	1970.62	183.07		
07/16	12:21:32	7.0411	1967.71	183.07		
07/16	12:21:36	7.0422	1973.58	183.14		
07/16	12:21:40	7.0433	1980.32	183.07		
07/16	12:21:44	7.0444	1982.16	183.07		
07/16	12:21:48	7.0456	1984.39	183.07		
07/16	12:21:52	7.0467	1986.67	183.14		
07/16	12:21:56	7.0478	1986.77	183.14		
07/16	12:22:00	7.0489	1990.85	183.14		
07/16	12:22:04	7.0500	1989.92	183.07		
07/16	12:22:08	7.0511	1993.17	183.14		
07/16	12:22:12	7.0522	1993.32	183.07		
07/16	12:22:16	7.0533	1994.63	183.14		
07/16	12:22:20	7.0544	1994.05	183.14		
07/16	12:22:24	7.0556	1996.96	183.14		
07/16	12:22:28	7.0567	1996.08	183.14		
07/16	12:22:32	7.0578	1992.11	183.14		
07/16	12:22:36	7.0589	1992.69	183.14		
07/16	12:22:40	7.0600	1995.50	183.14		
07/16	12:22:44	7.0611	1998.80	183.14		
07/16	12:22:48	7.0622	2002.39	183.14		
07/16	12:22:52	7.0633	2002.68	183.14		

Company: G.F.E. RESOURCES LIMITED
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Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhn	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	12:22:56	7.0644	2005.10	183.14		
07/16	12:23:00	7.0656	2003.36	183.14		
07/16	12:23:04	7.0667	2004.91	183.14		
07/16	12:23:08	7.0678	2005.20	183.14		
07/16	12:23:12	7.0689	2007.53	183.14		
07/16	12:23:16	7.0700	2007.92	183.14		
07/16	12:23:20	7.0711	2008.69	183.14		
07/16	12:23:24	7.0722	2011.41	183.14		
07/16	12:23:28	7.0733	2009.86	183.14		
07/16	12:23:32	7.0744	2012.57	183.14		
07/16	12:23:36	7.0756	2010.05	183.14		
07/16	12:23:40	7.0767	2011.60	183.14		
07/16	12:23:44	7.0778	2014.71	183.14		
07/16	12:23:48	7.0789	2023.05	183.14		
07/16	12:23:52	7.0800	2019.95	183.14		
07/16	12:23:56	7.0811	2020.82	183.14		
07/16	12:24:00	7.0822	2027.22	183.14		
07/16	12:24:04	7.0833	2026.15	183.14		
07/16	12:24:08	7.0844	2026.64	183.14		
07/16	12:24:12	7.0856	2028.00	183.14		
07/16	12:24:16	7.0867	2027.61	183.14		
07/16	12:24:20	7.0878	2034.11	183.14		
07/16	12:24:24	7.0889	2030.42	183.14		
07/16	12:24:28	7.0900	2037.60	183.14		
07/16	12:24:32	7.0911	2036.92	183.14		
07/16	12:24:36	7.0922	2034.69	183.14		
07/16	12:24:40	7.0933	2039.15	183.14		
07/16	12:24:44	7.0944	2041.87	183.14		
07/16	12:24:48	7.0956	2042.16	183.14		
07/16	12:24:52	7.0967	2044.30	183.14		
07/16	12:24:56	7.0978	2046.62	183.14		
07/16	12:25:00	7.0989	2050.02	183.14		
07/16	12:25:04	7.1000	2051.28	183.14		
07/16	12:25:08	7.1011	2049.92	183.14		
07/16	12:25:12	7.1022	2047.50	183.14		
07/16	12:25:16	7.1033	2047.01	183.14		
07/16	12:25:20	7.1044	2050.12	183.14		
07/16	12:25:24	7.1056	2054.77	183.14		
07/16	12:25:28	7.1067	2057.01	183.14		
07/16	12:25:32	7.1078	2055.94	183.14		
07/16	12:25:36	7.1089	2052.74	183.14		
07/16	12:25:40	7.1100	2050.31	183.14		
07/16	12:25:44	7.1111	2049.73	183.14		
07/16	12:25:48	7.1122	2046.33	183.14		
07/16	12:25:52	7.1133	2044.98	183.14		
07/16	12:25:56	7.1144	2046.62	183.14		
07/16	12:26:00	7.1156	2047.30	183.14		
07/16	12:26:04	7.1167	2050.21	183.14		
07/16	12:26:08	7.1178	2048.95	183.14		
07/16	12:26:12	7.1189	2049.24	183.14		
07/16	12:26:16	7.1200	2048.08	183.14		
07/16	12:26:20	7.1211	2052.64	183.14		
07/16	12:26:24	7.1222	2054.87	183.14		
07/16	12:26:28	7.1233	2050.80	183.14		
07/16	12:26:32	7.1244	2059.72	183.14		
07/16	12:26:36	7.1256	2057.20	183.14		
07/16	12:26:40	7.1267	2059.63	183.14		
07/16	12:26:44	7.1278	2060.60	183.14		
07/16	12:26:48	7.1289	2061.08	183.14		
07/16	12:26:52	7.1300	2060.98	183.14		
07/16	12:26:56	7.1311	2058.56	183.14		
07/16	12:27:00	7.1322	2064.19	183.14		
07/16	12:27:04	7.1333	2062.05	183.14		
07/16	12:27:08	7.1344	2065.64	183.14		
07/16	12:27:12	7.1356	2068.75	183.14		
07/16	12:27:16	7.1367	2067.58	183.14		
07/16	12:27:20	7.1378	2070.01	183.14		
07/16	12:27:24	7.1389	2072.72	183.14		
07/16	12:27:28	7.1400	2070.39	183.14		
07/16	12:27:32	7.1411	2070.78	183.14		
07/16	12:27:36	7.1422	2075.88	183.07		
07/16	12:27:40	7.1433	2074.37	183.14		
07/16	12:27:44	7.1444	2075.00	183.07		

Company: G.F.E. RESOURCES LIMITED
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Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	12:27:48	7.1456	2077.14	183.07		
07/16	12:27:52	7.1467	2074.81	183.07		
07/16	12:27:56	7.1478	2074.32	183.07		
07/16	12:28:00	7.1489	2074.90	183.07		
07/16	12:28:04	7.1500	2075.78	183.07		
07/16	12:28:08	7.1511	2079.56	183.07		
07/16	12:28:12	7.1522	2081.60	183.07		
07/16	12:28:16	7.1533	2082.67	183.07		
07/16	12:28:20	7.1544	2081.70	183.07		
07/16	12:28:24	7.1556	2086.06	183.07		
07/16	12:28:28	7.1567	2086.55	183.07		
07/16	12:28:32	7.1578	2091.50	183.07		
07/16	12:28:36	7.1589	2098.48	183.07		
07/16	12:28:40	7.1600	2100.33	183.07		
07/16	12:28:44	7.1611	2098.29	183.07		
07/16	12:28:48	7.1622	2096.06	183.07		
07/16	12:28:52	7.1633	2093.34	183.07		
07/16	12:28:56	7.1644	2081.79	183.07		
07/16	12:29:00	7.1656	2073.93	183.07		
07/16	12:29:04	7.1667	2084.32	183.07		
07/16	12:29:08	7.1678	2075.97	183.07		
07/16	12:29:12	7.1689	2077.91	183.07		
07/16	12:29:16	7.1700	2079.76	183.07		
07/16	12:29:20	7.1711	2086.26	183.07		
07/16	12:29:24	7.1722	2081.02	183.07		
07/16	12:29:28	7.1733	2080.92	183.07		
07/16	12:29:32	7.1744	2081.79	183.07		
07/16	12:29:36	7.1756	2081.11	183.07		
07/16	12:29:40	7.1767	2075.88	183.07		
07/16	12:29:44	7.1778	2082.57	183.07		
07/16	12:29:48	7.1789	2092.86	183.07		
07/16	12:29:52	7.1800	2095.86	183.07		
07/16	12:29:56	7.1811	2107.12	183.07		
07/16	12:30:00	7.1822	2095.86	183.07		
07/16	12:30:04	7.1833	2084.90	183.07		
07/16	12:30:08	7.1844	2086.84	183.07		
07/16	12:30:12	7.1856	2087.13	183.07		
07/16	12:30:16	7.1867	2088.20	183.07		
07/16	12:30:20	7.1878	2089.46	183.07		
07/16	12:30:24	7.1889	2090.53	183.07		
07/16	12:30:28	7.1900	2094.60	183.07		
07/16	12:30:32	7.1911	2092.08	183.07		
07/16	12:30:36	7.1922	2093.53	183.07		
07/16	12:30:40	7.1933	2094.12	183.07		
07/16	12:30:44	7.1944	2103.72	183.07		
07/16	12:30:48	7.1956	2093.15	183.07		
07/16	12:30:52	7.1967	2093.44	183.07		
07/16	12:30:56	7.1978	2090.72	183.07		
07/16	12:31:00	7.1989	2086.55	183.07		
07/16	12:31:04	7.2000	2086.45	183.07		
07/16	12:31:08	7.2011	2086.26	183.07		
07/16	12:31:12	7.2022	2087.81	183.07		
07/16	12:31:16	7.2033	2088.20	183.07		
07/16	12:31:20	7.2044	2087.23	183.07		
07/16	12:31:24	7.2056	2090.04	183.07		
07/16	12:31:28	7.2067	2088.97	183.07		
07/16	12:31:32	7.2078	2090.82	183.07		
07/16	12:31:36	7.2089	2091.21	183.07		
07/16	12:31:40	7.2100	2091.79	183.07		
07/16	12:31:44	7.2111	2120.41	183.07		
07/16	12:31:48	7.2122	2159.53	183.07		
07/16	12:31:52	7.2133	2143.90	183.07		
07/16	12:31:56	7.2144	2160.50	183.07		
07/16	12:32:00	7.2156	2146.13	183.07		
07/16	12:32:04	7.2167	2144.58	183.07		
07/16	12:32:08	7.2178	2149.53	183.07		
07/16	12:32:12	7.2189	2146.81	183.07		
07/16	12:32:16	7.2200	2143.80	183.07		
07/16	12:32:20	7.2211	2144.68	183.07		
07/16	12:32:24	7.2222	2143.41	183.07		
07/16	12:32:28	7.2233	2150.01	183.07		
07/16	12:32:32	7.2244	2150.79	183.07		
07/16	12:32:36	7.2256	2161.08	183.07		

Company: G.F.E. RESOURCES LIMITED
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Ref: HMN1DST1

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	12:32:40	7.2267	2157.88	183.07		
07/16	12:32:44	7.2278	2162.15	183.07		
07/16	12:32:48	7.2289	2156.61	183.07		
07/16	12:32:52	7.2300	2156.71	183.07		
07/16	12:32:56	7.2311	2155.45	183.07		
07/16	12:33:00	7.2322	2156.32	183.07		
07/16	12:33:04	7.2333	2158.17	183.07		
07/16	12:33:08	7.2344	2159.23	183.07		
07/16	12:33:12	7.2356	2231.55	183.07		
07/16	12:33:16	7.2367	2186.41	183.07		
07/16	12:33:20	7.2378	2197.48	183.07		
07/16	12:33:24	7.2389	2190.58	183.07		
07/16	12:33:28	7.2400	2193.98	183.07		
07/16	12:33:32	7.2411	2187.58	183.07		
07/16	12:33:36	7.2422	2179.33	183.07		
07/16	12:33:40	7.2433	2194.95	183.07		
07/16	12:33:44	7.2444	2209.47	183.00		
07/16	12:33:48	7.2456	2201.84	183.07		
07/16	12:33:52	7.2467	2207.38	183.07		
07/16	12:33:56	7.2478	2205.87	183.00		
07/16	12:34:00	7.2489	2217.86	183.07		
07/16	12:34:04	7.2500	2220.77	183.07		
07/16	12:34:08	7.2511	2218.98	183.00		
07/16	12:34:12	7.2522	2207.33	183.00		
07/16	12:34:16	7.2533	2210.44	183.00		
07/16	12:34:20	7.2544	2211.21	183.00		
07/16	12:34:24	7.2556	2213.06	183.00		
07/16	12:34:28	7.2567	2207.91	183.00		
07/16	12:34:32	7.2578	2213.54	183.00		
07/16	12:34:36	7.2589	2216.36	183.00		
07/16	12:34:40	7.2600	2216.45	183.00		
07/16	12:34:44	7.2611	2216.84	183.00		
07/16	12:34:48	7.2622	2210.05	183.00		
07/16	12:34:52	7.2633	2212.18	183.00		
07/16	12:34:56	7.2644	2213.93	183.00		
07/16	12:35:00	7.2656	2213.64	183.00		
07/16	12:35:04	7.2667	2217.23	183.00		
07/16	12:35:08	7.2678	2218.20	183.00		
07/16	12:35:12	7.2689	2217.04	183.00		
07/16	12:35:16	7.2700	2214.32	183.00		
07/16	12:35:20	7.2711	2212.67	183.00		
07/16	12:35:24	7.2722	2212.86	183.00		
07/16	12:35:28	7.2733	2213.83	183.00		
07/16	12:35:32	7.2744	2215.78	183.00		
07/16	12:35:36	7.2756	2217.13	183.00		
07/16	12:35:40	7.2767	2218.69	183.00		
07/16	12:35:44	7.2778	2219.85	183.00		
07/16	12:35:48	7.2789	2221.70	183.00		
07/16	12:35:52	7.2800	2222.86	183.00		
07/16	12:35:56	7.2811	2223.35	183.00		
07/16	12:36:00	7.2822	2223.49	182.93		
07/16	12:36:04	7.2833	2224.51	183.00		
07/16	12:36:08	7.2844	2226.84	183.00		
07/16	12:36:12	7.2856	2228.30	183.00		
07/16	12:36:16	7.2867	2229.71	182.93		
07/16	12:36:20	7.2878	2231.75	182.93		
07/16	12:36:24	7.2889	2231.36	182.93		
07/16	12:36:28	7.2900	2232.33	182.93		
07/16	12:36:32	7.2911	2232.33	182.93		
07/16	12:36:36	7.2922	2232.72	182.93		
07/16	12:36:40	7.2933	2233.20	182.93		
07/16	12:36:44	7.2944	2233.98	182.93		
07/16	12:36:48	7.2956	2233.98	182.93		
07/16	12:36:52	7.2967	2236.99	182.93		
07/16	12:36:56	7.2978	2237.86	182.93		
07/16	12:37:00	7.2989	2239.22	182.93		
07/16	12:37:04	7.3000	2240.58	182.93		
07/16	12:37:08	7.3011	2241.45	182.93		
07/16	12:37:12	7.3022	2239.80	182.93		
07/16	12:37:16	7.3033	2242.13	182.93		
07/16	12:37:20	7.3044	2242.72	182.93		
07/16	12:37:24	7.3056	2249.22	182.93		
07/16	12:37:28	7.3067	2255.24	182.93		

Company: G.F.E. RESOURCES LIMITED Ref: HMN1OST1
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Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	12:37:32	7.3078	2254.85	182.93		
07/16	12:37:36	7.3089	2254.08	182.93		
07/16	12:37:40	7.3100	2252.43	182.93		
07/16	12:37:44	7.3111	2255.14	182.93		
07/16	12:37:48	7.3122	2262.04	182.93		
07/16	12:37:52	7.3133	2263.01	182.93		
07/16	12:37:56	7.3144	2259.90	182.93		
07/16	12:38:00	7.3156	2263.01	182.93		
07/16	12:38:04	7.3167	2264.17	182.93		
07/16	12:38:08	7.3178	2267.28	182.93		
07/16	12:38:12	7.3189	2267.82	182.85		
07/16	12:38:16	7.3200	2268.83	182.93		
07/16	12:38:20	7.3211	2268.45	182.93		
07/16	12:38:24	7.3222	2267.04	182.85		
07/16	12:38:28	7.3233	2269.42	182.93		
07/16	12:38:32	7.3244	2267.82	182.85		
07/16	12:38:36	7.3256	2270.34	182.85		
07/16	12:38:40	7.3267	2272.67	182.85		
07/16	12:38:44	7.3278	2273.93	182.85		
07/16	12:38:48	7.3289	2275.20	182.85		
07/16	12:38:52	7.3300	2273.93	182.85		
07/16	12:38:56	7.3311	2273.54	182.85		
07/16	12:39:00	7.3322	2275.39	182.85		
07/16	12:39:04	7.3333	2273.64	182.85		
07/16	12:39:08	7.3344	2271.60	182.85		
07/16	12:39:12	7.3356	2281.60	182.85		
07/16	12:39:16	7.3367	2282.48	182.85		
07/16	12:39:20	7.3378	2282.48	182.85		
07/16	12:39:24	7.3389	2283.45	182.85		
07/16	12:39:28	7.3400	2282.87	182.85		
07/16	12:39:32	7.3411	2286.26	182.85		
07/16	12:39:36	7.3422	2286.17	182.85		
07/16	12:39:40	7.3433	2286.56	182.85		
07/16	12:39:44	7.3444	2329.58	182.85		
07/16	12:39:48	7.3456	2319.38	182.85		
07/16	12:39:52	7.3467	2294.62	182.85		
07/16	12:39:56	7.3478	2283.84	182.85		
07/16	12:40:00	7.3489	2302.97	182.85		
07/16	12:40:04	7.3500	2298.69	182.85		
07/16	12:40:08	7.3511	2277.53	182.85		
07/16	12:40:12	7.3522	2277.23	182.85		
07/16	12:40:16	7.3533	2273.93	182.85		
07/16	12:40:20	7.3544	2276.94	182.85		
07/16	12:40:24	7.3556	2277.62	182.85		
07/16	12:40:28	7.3567	2281.60	182.85		
07/16	12:40:32	7.3578	2279.37	182.85		
07/16	12:40:36	7.3589	2280.24	182.85		
07/16	12:40:40	7.3600	2281.02	182.85		
07/16	12:40:44	7.3611	2280.05	182.85		
07/16	12:40:48	7.3622	2280.83	182.85		
07/16	12:40:52	7.3633	2281.41	182.85		
07/16	12:40:56	7.3644	2283.40	182.78		
07/16	12:41:00	7.3656	2285.44	182.78		
07/16	12:41:04	7.3667	2286.02	182.78		
07/16	12:41:08	7.3678	2289.91	182.78		
07/16	12:41:12	7.3689	2289.62	182.78		
07/16	12:41:16	7.3700	2289.71	182.78		
07/16	12:41:20	7.3711	2289.91	182.78		
07/16	12:41:24	7.3722	2290.98	182.78		
07/16	12:41:28	7.3733	2292.34	182.78		
07/16	12:41:32	7.3744	2294.96	182.78		
07/16	12:41:36	7.3756	2295.54	182.78		
07/16	12:41:40	7.3767	2299.62	182.78		
07/16	12:41:44	7.3778	2299.72	182.78		
07/16	12:41:48	7.3789	2300.49	182.78		
07/16	12:41:52	7.3800	2299.62	182.78		
07/16	12:41:56	7.3811	2301.08	182.78		
07/16	12:42:00	7.3822	2301.56	182.78		
07/16	12:42:04	7.3833	2302.34	182.78		
07/16	12:42:08	7.3844	2302.34	182.78		
07/16	12:42:12	7.3856	2302.43	182.78		
07/16	12:42:16	7.3867	2304.28	182.78		
07/16	12:42:20	7.3878	2306.61	182.78		

Company: G.F.E. RESOURCES LIMITED
Well: NOWMAINS #1 VICTORIA

Ref: HMN1OST1

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	12:42:24	7.3889	2308.70	182.71		
07/16	12:42:28	7.3900	2308.65	182.78		
07/16	12:42:32	7.3911	2309.67	182.71		
07/16	12:42:36	7.3922	2310.55	182.71		
07/16	12:42:40	7.3933	2312.00	182.71		
07/16	12:42:44	7.3944	2312.00	182.71		
07/16	12:42:48	7.3956	2313.46	182.71		
07/16	12:42:52	7.3967	2315.40	182.71		
07/16	12:42:56	7.3978	2313.36	182.71		
07/16	12:43:00	7.3989	2314.53	182.71		
07/16	12:43:04	7.4000	2314.62	182.71		
07/16	12:43:08	7.4011	2314.82	182.71		
07/16	12:43:12	7.4022	2316.86	182.71		
07/16	12:43:16	7.4033	2319.48	182.71		
07/16	12:43:20	7.4044	2321.81	182.71		
07/16	12:43:24	7.4056	2321.52	182.71		
07/16	12:43:28	7.4067	2323.17	182.71		
07/16	12:43:32	7.4078	2323.85	182.71		
07/16	12:43:36	7.4089	2324.14	182.71		
07/16	12:43:40	7.4100	2325.11	182.71		
07/16	12:43:44	7.4111	2325.40	182.71		
07/16	12:43:48	7.4122	2325.99	182.71		
07/16	12:43:52	7.4133	2327.35	182.71		
07/16	12:43:56	7.4144	2328.03	182.71		
07/16	12:44:00	7.4156	2330.07	182.71		
07/16	12:44:04	7.4167	2330.94	182.71		
07/16	12:44:08	7.4178	2331.13	182.71		
07/16	12:44:12	7.4189	2332.40	182.71		
07/16	12:44:16	7.4200	2334.88	182.64		
07/16	12:44:20	7.4211	2334.78	182.64		
07/16	12:44:24	7.4222	2335.94	182.64		
07/16	12:44:28	7.4233	2336.28	182.71		
07/16	12:44:32	7.4244	2337.30	182.64		
07/16	12:44:36	7.4256	2337.06	182.71		
07/16	12:44:40	7.4267	2337.93	182.71		
07/16	12:44:44	7.4278	2337.79	182.64		
07/16	12:44:48	7.4289	2339.25	182.64		
07/16	12:44:52	7.4300	2339.44	182.64		
07/16	12:44:56	7.4311	2340.22	182.64		
07/16	12:45:00	7.4322	2341.29	182.64		
07/16	12:45:04	7.4333	2341.97	182.64		
07/16	12:45:08	7.4344	2343.23	182.64		
07/16	12:45:12	7.4356	2344.01	182.64		
07/16	12:45:16	7.4367	2344.49	182.64		
07/16	12:45:20	7.4378	2344.88	182.64		
07/16	12:45:24	7.4389	2346.43	182.64		
07/16	12:45:28	7.4400	2346.92	182.64		
07/16	12:45:32	7.4411	2347.02	182.64		
07/16	12:45:36	7.4422	2349.06	182.64		
07/16	12:45:40	7.4433	2349.15	182.64		
07/16	12:45:44	7.4444	2349.44	182.64		
07/16	12:45:48	7.4456	2351.00	182.64		
07/16	12:45:52	7.4467	2351.10	182.64		
07/16	12:45:56	7.4478	2352.46	182.64		
07/16	12:46:00	7.4489	2352.94	182.64		
07/16	12:46:04	7.4500	2353.91	182.64		
07/16	12:46:08	7.4511	2354.88	182.64		
07/16	12:46:12	7.4522	2355.66	182.64		
07/16	12:46:16	7.4533	2356.34	182.64		
07/16	12:46:20	7.4544	2357.12	182.64		
07/16	12:46:24	7.4556	2358.28	182.64		
07/16	12:46:28	7.4567	2359.26	182.64		
07/16	12:46:32	7.4578	2360.03	182.64		
07/16	12:46:36	7.4589	2360.81	182.64		
07/16	12:46:40	7.4600	2362.56	182.64		
07/16	12:46:44	7.4611	2362.95	182.64		
07/16	12:46:48	7.4622	2363.29	182.56		
07/16	12:46:52	7.4633	2364.75	182.56		
07/16	12:46:56	7.4644	2365.57	182.64		
07/16	12:47:00	7.4656	2366.83	182.64		
07/16	12:47:04	7.4667	2370.13	182.64		
07/16	12:47:08	7.4678	2369.31	182.56		
07/16	12:47:12	7.4689	2369.51	182.56		

Company: G.F.E. RESOURCES LIMITED Ref: HMN1DST1
Well: NOWMAINS #1 VICTORIA

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	12:47:16	7.4700	2370.77	182.56		
07/16	12:47:20	7.4711	2370.38	182.56		
07/16	12:47:24	7.4722	2371.40	182.64		
07/16	12:47:28	7.4733	2371.40	182.64		
07/16	12:47:32	7.4744	2372.13	182.56		
07/16	12:47:36	7.4756	2372.52	182.56		
07/16	12:47:40	7.4767	2373.59	182.56		
07/16	12:47:44	7.4778	2374.95	182.56		
07/16	12:47:48	7.4789	2375.72	182.56		
07/16	12:47:52	7.4800	2375.82	182.56		
07/16	12:47:56	7.4811	2376.99	182.56		
07/16	12:48:00	7.4822	2377.67	182.56		
07/16	12:48:04	7.4833	2379.61	182.56		
07/16	12:48:08	7.4844	2379.51	182.56		
07/16	12:48:12	7.4856	2380.09	182.56		
07/16	12:48:16	7.4867	2380.77	182.56		
07/16	12:48:20	7.4878	2382.33	182.56		
07/16	12:48:24	7.4889	2382.13	182.56		
07/16	12:48:28	7.4900	2384.17	182.56		
07/16	12:48:32	7.4911	2385.24	182.56		
07/16	12:48:36	7.4922	2385.05	182.56		
07/16	12:48:40	7.4933	2386.60	182.56		
07/16	12:48:44	7.4944	2387.19	182.56		
07/16	12:48:48	7.4956	2388.25	182.56		
07/16	12:48:52	7.4967	2387.77	182.56		
07/16	12:48:56	7.4978	2388.93	182.56		
07/16	12:49:00	7.4989	2389.03	182.56		
07/16	12:49:04	7.5000	2390.49	182.56		
07/16	12:49:08	7.5011	2391.85	182.56		
07/16	12:49:12	7.5022	2394.08	182.56		
07/16	12:49:16	7.5033	2393.89	182.56		
07/16	12:49:20	7.5044	2399.13	182.56		
07/16	12:49:24	7.5056	2404.09	182.56		
07/16	12:49:28	7.5067	2405.55	182.56		
07/16	12:49:32	7.5078	2406.23	182.56		
07/16	12:49:36	7.5089	2407.00	182.56		
07/16	12:49:40	7.5100	2408.27	182.56		
07/16	12:49:44	7.5111	2416.91	182.56		
07/16	12:49:48	7.5122	2414.19	182.56		
07/16	12:49:52	7.5133	2415.46	182.56		
07/16	12:49:56	7.5144	2416.91	182.56		
07/16	12:50:00	7.5156	2414.48	182.56		
07/16	12:50:04	7.5167	2414.29	182.56		
07/16	12:50:08	7.5178	2417.20	182.56		
07/16	12:50:12	7.5189	2418.66	182.56		
07/16	12:50:16	7.5200	2418.86	182.56		
07/16	12:50:20	7.5211	2418.47	182.56		
07/16	12:50:24	7.5222	2420.51	182.56		
07/16	12:50:28	7.5233	2420.22	182.56		
07/16	12:50:32	7.5244	2425.37	182.56		
07/16	12:50:36	7.5256	2423.52	182.56		
07/16	12:50:40	7.5267	2428.86	182.56		
07/16	12:50:44	7.5278	2427.41	182.56		
07/16	12:50:48	7.5289	2427.60	182.56		
07/16	12:50:52	7.5300	2428.77	182.56		
07/16	12:50:56	7.5311	2431.49	182.56		
07/16	12:51:00	7.5322	2431.83	182.49		
07/16	12:51:04	7.5333	2430.66	182.49		
07/16	12:51:08	7.5344	2431.73	182.49		
07/16	12:51:12	7.5356	2431.58	182.56		
07/16	12:51:16	7.5367	2430.86	182.49		
07/16	12:51:20	7.5378	2429.15	182.56		
07/16	12:51:24	7.5389	2428.67	182.56		
07/16	12:51:28	7.5400	2431.00	182.56		
07/16	12:51:32	7.5411	2434.69	182.56		
07/16	12:51:36	7.5422	2434.69	182.56		
07/16	12:51:40	7.5433	2435.47	182.56		
07/16	12:51:44	7.5444	2435.47	182.56		
07/16	12:51:48	7.5456	2433.33	182.56		
07/16	12:51:52	7.5467	2433.24	182.56		
07/16	12:51:56	7.5478	2433.00	182.49		
07/16	12:52:00	7.5489	2434.36	182.49		
07/16	12:52:04	7.5500	2433.77	182.49		

Company: G.F.E. RESOURCES LIMITED Ref: HMN1DST1
Well: NOWMAINS #1 VICTORIA

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	12:52:08	7.5511	2433.87	182.49		
07/16	12:52:12	7.5522	2434.16	182.49		
07/16	12:52:16	7.5533	2434.75	182.49		
07/16	12:52:20	7.5544	2435.91	182.49		
07/16	12:52:24	7.5556	2436.40	182.49		
07/16	12:52:28	7.5567	2437.47	182.49		
07/16	12:52:32	7.5578	2437.76	182.49		
07/16	12:52:36	7.5589	2443.20	182.49		
07/16	12:52:40	7.5600	2441.16	182.49		
07/16	12:52:44	7.5611	2439.99	182.49		
07/16	12:52:48	7.5622	2442.52	182.49		
07/16	12:52:52	7.5633	2442.13	182.49		
07/16	12:52:56	7.5644	2441.26	182.49		
07/16	12:53:00	7.5656	2441.45	182.49		
07/16	12:53:04	7.5667	2442.13	182.49		
07/16	12:53:08	7.5678	2442.81	182.49		
07/16	12:53:12	7.5689	2443.49	182.49		
07/16	12:53:16	7.5700	2443.88	182.49		
07/16	12:53:20	7.5711	2444.66	182.49		
07/16	12:53:24	7.5722	2444.56	182.49		
07/16	12:53:28	7.5733	2445.72	182.49		
07/16	12:53:32	7.5744	2446.31	182.49		
07/16	12:53:36	7.5756	2447.77	182.49		
07/16	12:53:40	7.5767	2448.25	182.49		
07/16	12:53:44	7.5778	2449.81	182.49		
07/16	12:53:48	7.5789	2450.58	182.49		
07/16	12:53:52	7.5800	2450.58	182.49		
07/16	12:53:56	7.5811	2452.53	182.49		
07/16	12:54:00	7.5822	2449.61	182.49		
07/16	12:54:04	7.5833	2448.54	182.49		
07/16	12:54:08	7.5844	2449.71	182.49		
07/16	12:54:12	7.5856	2449.71	182.49		
07/16	12:54:16	7.5867	2453.60	182.49		
07/16	12:54:20	7.5878	2451.36	182.49		
07/16	12:54:24	7.5889	2453.11	182.49		
07/16	12:54:28	7.5900	2453.69	182.49		
07/16	12:54:32	7.5911	2453.40	182.49		
07/16	12:54:36	7.5922	2461.27	182.49		
07/16	12:54:40	7.5933	2466.52	182.49		
07/16	12:54:44	7.5944	2466.42	182.49		
07/16	12:54:48	7.5956	2468.07	182.49		
07/16	12:54:52	7.5967	2467.39	182.49		
07/16	12:54:56	7.5978	2468.75	182.49		
07/16	12:55:00	7.5989	2469.53	182.49		
07/16	12:55:04	7.6000	2470.60	182.49		
07/16	12:55:08	7.6011	2471.09	182.49		
07/16	12:55:12	7.6022	2471.67	182.49		
07/16	12:55:16	7.6033	2472.84	182.49		
07/16	12:55:20	7.6044	2473.22	182.49		
07/16	12:55:24	7.6056	2473.61	182.49		
07/16	12:55:28	7.6067	2474.20	182.49		
07/16	12:55:32	7.6078	2475.26	182.49		
07/16	12:55:36	7.6089	2475.85	182.49		
07/16	12:55:40	7.6100	2476.33	182.49		
07/16	12:55:44	7.6111	2477.21	182.49		
07/16	12:55:48	7.6122	2477.60	182.49		
07/16	12:55:52	7.6133	2478.28	182.49		
07/16	12:55:56	7.6144	2478.47	182.49		
07/16	12:56:00	7.6156	2479.35	182.49		
07/16	12:56:04	7.6167	2480.22	182.49		
07/16	12:56:08	7.6178	2481.73	182.42		
07/16	12:56:12	7.6189	2481.48	182.49		
07/16	12:56:16	7.6200	2481.39	182.49		
07/16	12:56:20	7.6211	2482.36	182.49		
07/16	12:56:24	7.6222	2483.82	182.49		
07/16	12:56:28	7.6233	2484.11	182.49		
07/16	12:56:32	7.6244	2484.36	182.42		
07/16	12:56:36	7.6256	2485.23	182.42		
07/16	12:56:40	7.6267	2485.72	182.42		
07/16	12:56:44	7.6278	2486.59	182.42		
07/16	12:56:48	7.6289	2488.63	182.42		
07/16	12:56:52	7.6300	2488.34	182.42		
07/16	12:56:56	7.6311	2488.92	182.42		

Company: G.F.E. RESOURCES LIMITED Ref: HMN1DST1
Well: NOWMAINS #1 VICTORIA

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	12:57:00	7.6322	2489.70	182.42		
07/16	12:57:04	7.6333	2489.99	182.42		
07/16	12:57:08	7.6344	2490.77	182.42		
07/16	12:57:12	7.6356	2492.03	182.42		
07/16	12:57:16	7.6367	2492.81	182.42		
07/16	12:57:20	7.6378	2493.20	182.42		
07/16	12:57:24	7.6389	2494.46	182.42		
07/16	12:57:28	7.6400	2495.82	182.42		
07/16	12:57:32	7.6411	2496.70	182.42		
07/16	12:57:36	7.6422	2496.99	182.42		
07/16	12:57:40	7.6433	2497.18	182.42		
07/16	12:57:44	7.6444	2497.77	182.42		
07/16	12:57:48	7.6456	2498.45	182.42		
07/16	12:57:52	7.6467	2499.13	182.42		
07/16	12:57:56	7.6478	2499.90	182.42		
07/16	12:58:00	7.6489	2501.36	182.42		
07/16	12:58:04	7.6500	2501.36	182.42		
07/16	12:58:08	7.6511	2501.85	182.42		
07/16	12:58:12	7.6522	2502.43	182.42		
07/16	12:58:16	7.6533	2503.31	182.42		
07/16	12:58:20	7.6544	2504.47	182.42		
07/16	12:58:24	7.6556	2505.64	182.42		
07/16	12:58:28	7.6567	2506.22	182.42		
07/16	12:58:32	7.6578	2506.71	182.42		
07/16	12:58:36	7.6589	2507.49	182.42		
07/16	12:58:40	7.6600	2507.87	182.42		
07/16	12:58:44	7.6611	2508.65	182.42		
07/16	12:58:48	7.6622	2508.94	182.42		
07/16	12:58:52	7.6633	2509.43	182.42		
07/16	12:58:56	7.6644	2510.01	182.42		
07/16	12:59:00	7.6656	2510.01	182.42		
07/16	12:59:04	7.6667	2511.18	182.42		
07/16	12:59:08	7.6678	2512.25	182.42		
07/16	12:59:12	7.6689	2513.37	182.35		
07/16	12:59:16	7.6700	2513.95	182.35		
07/16	12:59:20	7.6711	2514.34	182.35		
07/16	12:59:24	7.6722	2515.55	182.42		
07/16	12:59:28	7.6733	2515.65	182.42		
07/16	12:59:32	7.6744	2516.62	182.42		
07/16	12:59:36	7.6756	2517.84	182.35		
07/16	12:59:40	7.6767	2518.33	182.35		
07/16	12:59:44	7.6778	2519.20	182.35		
07/16	12:59:48	7.6789	2519.88	182.35		
07/16	12:59:52	7.6800	2519.98	182.35		
07/16	12:59:56	7.6811	2522.21	182.35		
07/16	13:00:00	7.6822	2522.60	182.35		
07/16	13:00:04	7.6833	2523.38	182.35		
07/16	13:00:08	7.6844	2523.87	182.35		
07/16	13:00:12	7.6856	2524.55	182.35		
07/16	13:00:16	7.6867	2525.81	182.35		
07/16	13:00:20	7.6878	2526.69	182.35		
07/16	13:00:24	7.6889	2526.88	182.35		
07/16	13:00:28	7.6900	2527.66	182.35		
07/16	13:00:32	7.6911	2527.85	182.35		
07/16	13:00:36	7.6922	2528.63	182.35		
07/16	13:00:40	7.6933	2528.34	182.35		
07/16	13:00:44	7.6944	2527.75	182.35		
07/16	13:00:48	7.6956	2528.14	182.35		
07/16	13:00:52	7.6967	2528.53	182.35		
07/16	13:00:56	7.6978	2528.73	182.35		
07/16	13:01:00	7.6989	2529.41	182.35		
07/16	13:01:04	7.7000	2529.89	182.35		
07/16	13:01:08	7.7011	2531.74	182.35		
07/16	13:01:12	7.7022	2532.42	182.35		
07/16	13:01:16	7.7033	2533.29	182.35		
07/16	13:01:20	7.7044	2533.78	182.35		
07/16	13:01:24	7.7056	2534.46	182.35		
07/16	13:01:28	7.7067	2534.66	182.35		
07/16	13:01:32	7.7078	2535.43	182.35		
07/16	13:01:36	7.7089	2536.11	182.35		
07/16	13:01:40	7.7100	2536.50	182.35		
07/16	13:01:44	7.7111	2537.09	182.35		
07/16	13:01:48	7.7122	2537.96	182.35		

Company: G.F.E. RESOURCES LIMITED
Well: NOWMAINS #1 VICTORIA
Ref: HMN10ST1

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	13:01:52	7.7133	2537.96	182.35		
07/16	13:01:56	7.7144	2538.74	182.35		
07/16	13:02:00	7.7156	2539.81	182.35		
07/16	13:02:04	7.7167	2540.15	182.28		
07/16	13:02:08	7.7178	2540.59	182.35		
07/16	13:02:12	7.7189	2541.07	182.35		
07/16	13:02:16	7.7200	2541.27	182.35		
07/16	13:02:20	7.7211	2541.51	182.28		
07/16	13:02:24	7.7222	2542.72	182.35		
07/16	13:02:28	7.7233	2543.11	182.35		
07/16	13:02:32	7.7244	2543.75	182.28		
07/16	13:02:36	7.7256	2544.72	182.28		
07/16	13:02:40	7.7267	2545.11	182.28		
07/16	13:02:44	7.7278	2545.60	182.28		
07/16	13:02:48	7.7289	2545.89	182.28		
07/16	13:02:52	7.7300	2546.76	182.28		
07/16	13:02:56	7.7311	2546.96	182.28		
07/16	13:03:00	7.7322	2547.15	182.28		
07/16	13:03:04	7.7333	2547.54	182.28		
07/16	13:03:08	7.7344	2548.12	182.28		
07/16	13:03:12	7.7356	2548.61	182.28		
07/16	13:03:16	7.7367	2549.29	182.28		
07/16	13:03:20	7.7378	2549.78	182.28		
07/16	13:03:24	7.7389	2549.29	182.28		
07/16	13:03:28	7.7400	2549.29	182.28		
07/16	13:03:32	7.7411	2549.87	182.28		
07/16	13:03:36	7.7422	2550.46	182.28		
07/16	13:03:40	7.7433	2551.14	182.28		
07/16	13:03:44	7.7444	2552.01	182.28		
07/16	13:03:48	7.7456	2552.21	182.28		
07/16	13:03:52	7.7467	2553.28	182.28		
07/16	13:03:56	7.7478	2552.98	182.28		
07/16	13:04:00	7.7489	2553.66	182.28		
07/16	13:04:04	7.7500	2553.86	182.28		
07/16	13:04:08	7.7511	2554.83	182.28		
07/16	13:04:12	7.7522	2555.32	182.28		
07/16	13:04:16	7.7533	2555.80	182.28		
07/16	13:04:20	7.7544	2556.19	182.28		
07/16	13:04:24	7.7556	2556.68	182.28		
07/16	13:04:28	7.7567	2556.97	182.28		
07/16	13:04:32	7.7578	2557.46	182.28		
07/16	13:04:36	7.7589	2557.75	182.28		
07/16	13:04:40	7.7600	2558.43	182.28		
07/16	13:04:44	7.7611	2559.01	182.28		
07/16	13:04:48	7.7622	2559.59	182.28		
07/16	13:04:52	7.7633	2560.18	182.28		
07/16	13:04:56	7.7644	2560.66	182.28		
07/16	13:05:00	7.7656	2561.15	182.28		
07/16	13:05:04	7.7667	2561.25	182.28		
07/16	13:05:08	7.7678	2561.49	182.20		
07/16	13:05:12	7.7689	2562.18	182.20		
07/16	13:05:16	7.7700	2562.56	182.20		
07/16	13:05:20	7.7711	2563.19	182.28		
07/16	13:05:24	7.7722	2563.63	182.20		
07/16	13:05:28	7.7733	2564.07	182.28		
07/16	13:05:32	7.7744	2564.55	182.28		
07/16	13:05:36	7.7756	2564.99	182.20		
07/16	13:05:40	7.7767	2565.58	182.20		
07/16	13:05:44	7.7778	2565.87	182.20		
07/16	13:05:48	7.7789	2566.36	182.20		
07/16	13:05:52	7.7800	2566.84	182.20		
07/16	13:05:56	7.7811	2567.23	182.20		
07/16	13:06:00	7.7822	2567.72	182.20		
07/16	13:06:04	7.7833	2568.11	182.20		
07/16	13:06:08	7.7844	2568.69	182.20		
07/16	13:06:12	7.7856	2569.08	182.20		
07/16	13:06:16	7.7867	2569.47	182.20		
07/16	13:06:20	7.7878	2569.86	182.20		
07/16	13:06:24	7.7889	2570.34	182.20		
07/16	13:06:28	7.7900	2570.73	182.20		
07/16	13:06:32	7.7911	2571.22	182.20		
07/16	13:06:36	7.7922	2571.60	182.20		
07/16	13:06:40	7.7933	2571.90	182.20		

Company: G.F.E. RESOURCES LIMITED Ref: HMN1DST1
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Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	13:06:44	7.7944	2572.19	182.20		
07/16	13:06:48	7.7956	2572.58	182.20		
07/16	13:06:52	7.7967	2572.87	182.20		
07/16	13:06:56	7.7978	2573.26	182.20		
07/16	13:07:00	7.7989	2573.55	182.20		
07/16	13:07:04	7.8000	2573.84	182.20		
07/16	13:07:08	7.8011	2574.23	182.20		
07/16	13:07:12	7.8022	2574.42	182.20		
07/16	13:07:16	7.8033	2574.81	182.20		
07/16	13:07:20	7.8044	2575.20	182.20		
07/16	13:07:24	7.8056	2575.49	182.20		
07/16	13:07:28	7.8067	2575.79	182.20		
07/16	13:07:32	7.8078	2575.98	182.20		
07/16	13:07:36	7.8089	2576.37	182.20		
07/16	13:07:40	7.8100	2576.76	182.20		
07/16	13:07:44	7.8111	2577.05	182.20		
07/16	13:07:48	7.8122	2577.34	182.20		
07/16	13:07:52	7.8133	2577.54	182.20		
07/16	13:07:56	7.8144	2577.78	182.13		
07/16	13:08:00	7.8156	2577.98	182.13		
07/16	13:08:04	7.8167	2578.17	182.13		
07/16	13:08:08	7.8178	2578.41	182.20		
07/16	13:08:12	7.8189	2578.56	182.13		
07/16	13:08:16	7.8200	2578.85	182.13		
07/16	13:08:20	7.8211	2578.95	182.13		
07/16	13:08:24	7.8222	2579.24	182.13		
07/16	13:08:28	7.8233	2579.34	182.13		
07/16	13:08:32	7.8244	2579.53	182.13		
07/16	13:08:36	7.8256	2579.83	182.13		
07/16	13:08:40	7.8267	2579.92	182.13		
07/16	13:08:44	7.8278	2580.02	182.13		
07/16	13:08:48	7.8289	2580.31	182.13		
07/16	13:08:52	7.8300	2580.51	182.13		
07/16	13:08:56	7.8311	2580.70	182.13		
07/16	13:09:00	7.8322	2580.89	182.13		
07/16	13:09:04	7.8333	2581.09	182.13		
07/16	13:09:08	7.8344	2581.38	182.13		
07/16	13:09:12	7.8356	2581.48	182.13		
07/16	13:09:16	7.8367	2581.77	182.13		
07/16	13:09:20	7.8378	2581.96	182.13		
07/16	13:09:24	7.8389	2582.16	182.13		
07/16	13:09:28	7.8400	2582.35	182.13		
07/16	13:09:32	7.8411	2582.55	182.13		
07/16	13:09:36	7.8422	2582.74	182.13		
07/16	13:09:40	7.8433	2582.94	182.13		
07/16	13:09:44	7.8444	2583.13	182.13		
07/16	13:09:48	7.8456	2583.33	182.13		
07/16	13:09:52	7.8467	2583.52	182.13		
07/16	13:09:56	7.8478	2583.71	182.13		
07/16	13:10:00	7.8489	2583.87	182.06		
07/16	13:10:04	7.8500	2584.06	182.06		
07/16	13:10:08	7.8511	2584.30	182.13		
07/16	13:10:12	7.8522	2584.39	182.13		
07/16	13:10:16	7.8533	2584.59	182.13		
07/16	13:10:20	7.8544	2584.74	182.06		
07/16	13:10:24	7.8556	2584.93	182.06		
07/16	13:10:28	7.8567	2585.13	182.06		
07/16	13:10:32	7.8578	2585.42	182.06		
07/16	13:10:36	7.8589	2585.62	182.06		
07/16	13:10:40	7.8600	2585.81	182.06		
07/16	13:10:44	7.8611	2586.00	182.06		
07/16	13:10:48	7.8622	2586.10	182.06		
07/16	13:10:52	7.8633	2586.30	182.06		
07/16	13:10:56	7.8644	2586.39	182.06		
07/16	13:11:00	7.8656	2586.49	182.06		
07/16	13:11:04	7.8667	2586.68	182.06		
07/16	13:11:08	7.8678	2586.88	182.06		
07/16	13:11:12	7.8689	2586.98	182.06		
07/16	13:11:16	7.8700	2587.17	182.06		
07/16	13:11:20	7.8711	2587.27	182.06		
07/16	13:11:24	7.8722	2587.46	182.06		
07/16	13:11:28	7.8733	2587.56	182.06		
07/16	13:11:32	7.8744	2587.66	182.06		

Company: G.F.E. RESOURCES LIMITED Ref: HMN1DST1
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Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	13:11:36	7.8756	2587.85	182.06		
07/16	13:11:40	7.8767	2587.95	182.06		
07/16	13:11:44	7.8778	2588.00	181.99		
07/16	13:11:48	7.8789	2588.24	182.06		
07/16	13:11:52	7.8800	2588.34	182.06		
07/16	13:11:56	7.8811	2588.53	182.06		
07/16	13:12:00	7.8822	2588.59	181.99		
07/16	13:12:04	7.8833	2588.68	181.99		
07/16	13:12:08	7.8844	2588.78	181.99		
07/16	13:12:12	7.8856	2588.98	181.99		
07/16	13:12:16	7.8867	2589.07	181.99		
07/16	13:12:20	7.8878	2589.07	181.99		
07/16	13:12:24	7.8889	2589.07	181.99		
07/16	13:12:28	7.8900	2589.17	181.99		
07/16	13:12:32	7.8911	2589.27	181.99		
07/16	13:12:36	7.8922	2589.36	181.99		
07/16	13:12:40	7.8933	2589.36	181.99		
07/16	13:12:44	7.8944	2589.56	181.99		
07/16	13:12:48	7.8956	2589.66	181.99		
07/16	13:12:52	7.8967	2589.75	181.99		
07/16	13:12:56	7.8978	2589.85	181.99		
07/16	13:13:00	7.8989	2589.95	181.99		
07/16	13:13:04	7.9000	2590.14	181.99		
07/16	13:13:08	7.9011	2590.24	181.99		
07/16	13:13:12	7.9022	2590.34	181.99		
07/16	13:13:16	7.9033	2590.43	181.99		
07/16	13:13:20	7.9044	2590.53	181.99		
07/16	13:13:24	7.9056	2590.59	181.91		
07/16	13:13:28	7.9067	2590.73	181.99		
07/16	13:13:32	7.9078	2590.82	181.99		
07/16	13:13:36	7.9089	2590.92	181.99		
07/16	13:13:40	7.9100	2590.97	181.91		
07/16	13:13:44	7.9111	2591.07	181.91		
07/16	13:13:48	7.9122	2591.17	181.91		
07/16	13:13:52	7.9133	2591.17	181.91		
07/16	13:13:56	7.9144	2591.27	181.91		
07/16	13:14:00	7.9156	2591.27	181.91		
07/16	13:14:04	7.9167	2591.27	181.91		
07/16	13:14:08	7.9178	2591.36	181.91		
07/16	13:14:12	7.9189	2591.46	181.91		
07/16	13:14:16	7.9200	2591.56	181.91		
07/16	13:14:20	7.9211	2591.65	181.91		
07/16	13:14:24	7.9222	2591.75	181.91		
07/16	13:14:28	7.9233	2591.85	181.91		
07/16	13:14:32	7.9244	2591.95	181.91		
07/16	13:14:36	7.9256	2591.95	181.91		
07/16	13:14:40	7.9267	2592.14	181.91		
07/16	13:14:44	7.9278	2592.14	181.91		
07/16	13:14:48	7.9289	2592.34	181.91		
07/16	13:14:52	7.9300	2592.43	181.91		
07/16	13:14:56	7.9311	2592.63	181.91		
07/16	13:15:00	7.9322	2592.72	181.91		
07/16	13:15:04	7.9333	2592.82	181.91		
07/16	13:15:08	7.9344	2592.88	181.84		
07/16	13:15:12	7.9356	2592.88	181.84		
07/16	13:15:16	7.9367	2592.88	181.84		
07/16	13:15:20	7.9378	2592.88	181.84		
07/16	13:15:24	7.9389	2592.88	181.84		
07/16	13:15:28	7.9400	2592.88	181.84		
07/16	13:15:32	7.9411	2592.97	181.84		
07/16	13:15:36	7.9422	2593.07	181.84		
07/16	13:15:40	7.9433	2593.07	181.84		
07/16	13:15:44	7.9444	2593.17	181.84		
07/16	13:15:48	7.9456	2593.26	181.84		
07/16	13:15:52	7.9467	2593.36	181.84		
07/16	13:15:56	7.9478	2593.46	181.84		
07/16	13:16:00	7.9489	2593.36	181.84		
07/16	13:16:04	7.9500	2593.36	181.84		
07/16	13:16:08	7.9511	2593.46	181.84		
07/16	13:16:12	7.9522	2593.56	181.84		
07/16	13:16:16	7.9533	2593.56	181.84		
07/16	13:16:20	7.9544	2593.65	181.84		
07/16	13:16:24	7.9556	2593.75	181.84		

Company: G.F.E. RESOURCES LIMITED Ref: HMN1DST1
Well: NOWMAINS #1 VICTORIA

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	13:16:28	7.9567	2593.85	181.84		
07/16	13:16:32	7.9578	2593.85	181.84		
07/16	13:16:36	7.9589	2593.95	181.84		
07/16	13:16:40	7.9600	2594.00	181.77		
07/16	13:16:44	7.9611	2594.10	181.77		
07/16	13:16:48	7.9622	2594.10	181.77		
07/16	13:16:52	7.9633	2594.19	181.77		
07/16	13:16:56	7.9644	2594.29	181.77		
07/16	13:17:00	7.9656	2594.39	181.77		
07/16	13:17:04	7.9667	2594.39	181.77		
07/16	13:17:08	7.9678	2594.49	181.77		
07/16	13:17:12	7.9689	2594.49	181.77		
07/16	13:17:16	7.9700	2594.39	181.77		
07/16	13:17:20	7.9711	2594.39	181.77		
07/16	13:17:24	7.9722	2594.10	181.77		
07/16	13:17:28	7.9733	2594.00	181.77		
07/16	13:17:32	7.9744	2594.10	181.77		
07/16	13:17:36	7.9756	2594.19	181.77		
07/16	13:17:40	7.9767	2594.29	181.77		
07/16	13:17:44	7.9778	2594.39	181.77		
07/16	13:17:48	7.9789	2594.39	181.77		
07/16	13:17:52	7.9800	2594.49	181.77		
07/16	13:17:56	7.9811	2594.58	181.77		
07/16	13:18:00	7.9822	2594.68	181.77		
07/16	13:18:04	7.9833	2594.68	181.77		
07/16	13:18:08	7.9844	2594.73	181.70		
07/16	13:18:12	7.9856	2594.83	181.70		
07/16	13:18:16	7.9867	2594.83	181.70		
07/16	13:18:20	7.9878	2594.93	181.70		
07/16	13:18:24	7.9889	2595.03	181.70		
07/16	13:18:28	7.9900	2595.03	181.70		
07/16	13:18:32	7.9911	2595.12	181.70		
07/16	13:18:36	7.9922	2595.12	181.70		
07/16	13:18:40	7.9933	2595.22	181.70		
07/16	13:18:44	7.9944	2595.22	181.70		
07/16	13:18:48	7.9956	2595.32	181.70		
07/16	13:18:52	7.9967	2595.32	181.70		
07/16	13:18:56	7.9978	2595.41	181.70		
07/16	13:19:00	7.9989	2595.41	181.70		
07/16	13:19:04	8.0000	2595.51	181.70		
07/16	13:19:08	8.0011	2595.51	181.70		
07/16	13:19:12	8.0022	2595.61	181.70		
07/16	13:19:16	8.0033	2595.71	181.70		
07/16	13:19:20	8.0044	2595.71	181.70		
07/16	13:19:24	8.0056	2595.80	181.70		
07/16	13:19:28	8.0067	2595.80	181.70		
07/16	13:19:32	8.0078	2595.90	181.70		
07/16	13:19:36	8.0089	2595.90	181.70		
07/16	13:19:40	8.0100	2596.00	181.70		
07/16	13:19:44	8.0111	2596.05	181.63		
07/16	13:19:48	8.0122	2596.05	181.63		
07/16	13:19:52	8.0133	2596.15	181.63		
07/16	13:19:56	8.0144	2596.15	181.63		
07/16	13:20:00	8.0156	2596.25	181.63		
07/16	13:20:04	8.0167	2596.25	181.63		
07/16	13:20:08	8.0178	2596.34	181.63		
07/16	13:20:12	8.0189	2596.44	181.63		
07/16	13:20:16	8.0200	2596.44	181.63		
07/16	13:20:20	8.0211	2596.44	181.63		
07/16	13:20:24	8.0222	2596.54	181.63		
07/16	13:20:28	8.0233	2596.64	181.63		
07/16	13:20:32	8.0244	2596.64	181.63		
07/16	13:20:36	8.0256	2596.73	181.63		
07/16	13:20:40	8.0267	2596.83	181.63		
07/16	13:20:44	8.0278	2597.02	181.63		
07/16	13:20:48	8.0289	2597.02	181.63		
07/16	13:20:52	8.0300	2597.12	181.63		
07/16	13:20:56	8.0311	2597.12	181.63		
07/16	13:21:00	8.0322	2597.22	181.63		
07/16	13:21:04	8.0333	2597.22	181.63		
07/16	13:21:08	8.0344	2597.32	181.63		
07/16	13:21:12	8.0356	2597.32	181.63		
07/16	13:21:16	8.0367	2597.32	181.63		

Company: G.F.E. RESOURCES LIMITED Ref: HMN1DST1
Well: NOWMAINS #1 VICTORIA

Date MM/DD G Atm.	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi
07/16	13:21:20	8.0378	2597.41	181.63		
07/16	13:21:24	8.0389	2597.41	181.63		
07/16	13:21:28	8.0400	2597.51	181.63		
07/16	13:21:32	8.0411	2597.51	181.63		
07/16	13:21:36	8.0422	2597.57	181.55		
07/16	13:21:40	8.0433	2597.57	181.55		
07/16	13:21:44	8.0444	2597.57	181.55		
07/16	13:21:48	8.0456	2597.66	181.55		
07/16	13:21:52	8.0467	2597.76	181.55		
07/16	13:21:56	8.0478	2597.76	181.55		
07/16	13:22:00	8.0489	2597.76	181.55		
07/16	13:22:04	8.0500	2597.76	181.55		
07/16	13:22:08	8.0511	2597.86	181.55		
07/16	13:22:12	8.0522	2597.86	181.55		
07/16	13:22:16	8.0533	2597.86	181.55		
07/16	13:22:20	8.0544	2597.95	181.55		
07/16	13:22:24	8.0556	2597.95	181.55		
07/16	13:22:28	8.0567	2598.05	181.55		
07/16	13:22:32	8.0578	2598.05	181.55		
07/16	13:22:36	8.0589	2598.15	181.55		
07/16	13:22:40	8.0600	2598.15	181.55		
07/16	13:22:44	8.0611	2598.15	181.55		
07/16	13:22:48	8.0622	2598.15	181.55		
07/16	13:22:52	8.0633	2598.15	181.55		
07/16	13:22:56	8.0644	2598.15	181.55		
07/16	13:23:00	8.0656	2598.15	181.55		
07/16	13:23:04	8.0667	2598.25	181.55		
07/16	13:23:08	8.0678	2598.34	181.55		
07/16	13:23:12	8.0689	2598.34	181.55		
07/16	13:23:16	8.0700	2598.30	181.48		
07/16	13:23:20	8.0711	2598.40	181.48		
07/16	13:23:24	8.0722	2598.40	181.48		
07/16	13:23:28	8.0733	2598.40	181.48		
07/16	13:23:32	8.0744	2598.49	181.48		
07/16	13:23:36	8.0756	2598.49	181.48		
07/16	13:23:40	8.0767	2598.49	181.48		
07/16	13:23:44	8.0778	2598.59	181.48		
07/16	13:23:48	8.0789	2598.59	181.48		
07/16	13:23:52	8.0800	2598.59	181.48		
07/16	13:23:56	8.0811	2598.69	181.48		
07/16	13:24:00	8.0822	2598.69	181.48		
07/16	13:24:04	8.0833	2598.79	181.48		
07/16	13:24:08	8.0844	2598.79	181.48		
07/16	13:24:12	8.0856	2598.79	181.48		
07/16	13:24:16	8.0867	2598.88	181.48		
07/16	13:24:20	8.0878	2598.88	181.48		
07/16	13:24:24	8.0889	2598.88	181.48		
07/16	13:24:28	8.0900	2598.98	181.48		
07/16	13:24:32	8.0911	2598.98	181.48		
07/16	13:24:36	8.0922	2598.98	181.48		
07/16	13:24:40	8.0933	2599.08	181.48		
07/16	13:24:44	8.0944	2599.08	181.48		
07/16	13:24:48	8.0956	2599.08	181.48		
07/16	13:24:52	8.0967	2599.18	181.48		
07/16	13:24:56	8.0978	2599.18	181.48		
07/16	13:25:00	8.0989	2599.13	181.41		
07/16	13:25:04	8.1000	2599.13	181.41		
07/16	13:25:08	8.1011	2598.94	181.41		
07/16	13:25:12	8.1022	2596.02	181.41		
07/16	13:25:16	8.1033	2593.20	181.41		
07/16	13:25:20	8.1044	2589.41	181.41		
07/16	13:25:24	8.1056	2586.69	181.41		
07/16	13:25:28	8.1067	2584.64	181.41		
07/16	13:25:32	8.1078	2583.38	181.41		
07/16	13:25:36	8.1089	2582.31	181.41		
07/16	13:25:40	8.1100	2581.63	181.41		
07/16	13:25:44	8.1111	2581.24	181.41		
07/16	13:25:48	8.1122	2581.24	181.41		
07/16	13:25:52	8.1133	2581.34	181.41		
07/16	13:25:56	8.1144	2581.34	181.41		
07/16	13:26:00	8.1156	2581.44	181.41		
07/16	13:26:04	8.1167	2581.53	181.41		
07/16	13:26:08	8.1178	2581.73	181.41		

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Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	13:26:12	8.1189	2581.92	181.41		
07/16	13:26:16	8.1200	2582.02	181.41		
07/16	13:26:20	8.1211	2582.21	181.41		
07/16	13:26:24	8.1222	2582.41	181.41		
07/16	13:26:28	8.1233	2582.60	181.41		
07/16	13:26:32	8.1244	2582.80	181.41		
07/16	13:26:36	8.1256	2582.99	181.41		
07/16	13:26:40	8.1267	2583.23	181.48		
07/16	13:26:44	8.1278	2583.42	181.48		
07/16	13:26:48	8.1289	2583.62	181.48		
07/16	13:26:52	8.1300	2583.71	181.48		
07/16	13:26:56	8.1311	2589.94	181.48		FINAL FLOW
07/16	13:27:00	8.1322	2597.13	181.48		
07/16	13:27:04	8.1333	2598.69	181.48		
07/16	13:27:08	8.1344	2599.56	181.48		
07/16	13:27:12	8.1356	2600.25	181.48		
07/16	13:27:16	8.1367	2600.83	181.48		
07/16	13:27:20	8.1378	2601.22	181.48		
07/16	13:27:24	8.1389	2601.61	181.48		
07/16	13:27:28	8.1400	2602.04	181.55		
07/16	13:27:32	8.1411	2602.23	181.55		
07/16	13:27:36	8.1422	2602.52	181.55		
07/16	13:27:40	8.1433	2602.72	181.55		
07/16	13:27:44	8.1444	2602.91	181.55		
07/16	13:27:48	8.1456	2603.11	181.55		
07/16	13:27:52	8.1467	2603.21	181.55		
07/16	13:27:56	8.1478	2603.40	181.55		
07/16	13:28:00	8.1489	2603.50	181.55		
07/16	13:28:04	8.1500	2603.69	181.55		
07/16	13:28:08	8.1511	2603.79	181.55		
07/16	13:28:12	8.1522	2603.89	181.55		
07/16	13:28:16	8.1533	2603.98	181.55		
07/16	13:28:20	8.1544	2604.18	181.55		
07/16	13:28:24	8.1556	2604.18	181.55		
07/16	13:28:28	8.1567	2604.27	181.55		
07/16	13:28:32	8.1578	2604.37	181.55		
07/16	13:28:36	8.1589	2604.47	181.55		
07/16	13:28:40	8.1600	2604.57	181.55		
07/16	13:28:44	8.1611	2604.66	181.55		
07/16	13:28:48	8.1622	2604.66	181.55		
07/16	13:28:52	8.1633	2604.76	181.55		
07/16	13:28:56	8.1644	2604.86	181.55		
07/16	13:29:00	8.1656	2604.86	181.55		
07/16	13:29:04	8.1667	2604.96	181.55		
07/16	13:29:08	8.1678	2605.05	181.55		
07/16	13:29:12	8.1689	2605.15	181.55		
07/16	13:29:16	8.1700	2605.15	181.55		
07/16	13:29:20	8.1711	2605.25	181.55		
07/16	13:29:24	8.1722	2605.34	181.55		
07/16	13:29:28	8.1733	2605.34	181.55		
07/16	13:29:32	8.1744	2605.44	181.55		
07/16	13:29:36	8.1756	2605.44	181.55		
07/16	13:29:40	8.1767	2605.54	181.55		
07/16	13:29:44	8.1778	2605.54	181.55		
07/16	13:29:48	8.1789	2605.64	181.55		
07/16	13:29:52	8.1800	2605.73	181.55		
07/16	13:29:56	8.1811	2605.73	181.55		
07/16	13:30:00	8.1822	2605.83	181.55		
07/16	13:30:04	8.1833	2605.83	181.55		
07/16	13:30:08	8.1844	2605.83	181.55		
07/16	13:30:12	8.1856	2605.93	181.55		
07/16	13:30:16	8.1867	2606.03	181.55		
07/16	13:30:20	8.1878	2606.03	181.55		
07/16	13:30:24	8.1889	2606.12	181.55		
07/16	13:30:28	8.1900	2606.08	181.48		
07/16	13:30:32	8.1911	2606.18	181.48		
07/16	13:30:36	8.1922	2606.18	181.48		
07/16	13:30:40	8.1933	2606.27	181.48		
07/16	13:30:44	8.1944	2606.27	181.48		
07/16	13:30:48	8.1956	2606.27	181.48		
07/16	13:30:52	8.1967	2606.37	181.48		
07/16	13:30:56	8.1978	2606.37	181.48		
07/16	13:31:00	8.1989	2606.47	181.48		

Company: G.F.E. RESOURCES LIMITED Ref: HMN1DST1
Well: NOWMAINS #1 VICTORIA

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	13:31:04	8.2000	2606.47	181.48		
07/16	13:31:08	8.2011	2606.57	181.48		
07/16	13:31:12	8.2022	2606.57	181.48		
07/16	13:31:16	8.2033	2606.52	181.41		
07/16	13:31:20	8.2044	2606.52	181.41		
07/16	13:31:24	8.2056	2606.62	181.41		
07/16	13:31:28	8.2067	2606.62	181.41		
07/16	13:31:32	8.2078	2606.72	181.41		
07/16	13:31:36	8.2089	2606.72	181.41		
07/16	13:31:40	8.2100	2606.81	181.41		
07/16	13:31:44	8.2111	2606.81	181.41		
07/16	13:31:48	8.2122	2606.81	181.41		
07/16	13:31:52	8.2133	2606.87	181.34		
07/16	13:31:56	8.2144	2606.87	181.34		
07/16	13:32:00	8.2156	2606.87	181.34		
07/16	13:32:04	8.2167	2606.97	181.34		
07/16	13:32:08	8.2178	2606.97	181.34		
07/16	13:32:12	8.2189	2606.97	181.34		
07/16	13:32:16	8.2200	2607.06	181.34		
07/16	13:32:20	8.2211	2607.06	181.34		
07/16	13:32:24	8.2222	2607.16	181.34		
07/16	13:32:28	8.2233	2607.12	181.26		
07/16	13:32:32	8.2244	2607.12	181.26		
07/16	13:32:36	8.2256	2607.12	181.26		
07/16	13:32:40	8.2267	2607.22	181.26		
07/16	13:32:44	8.2278	2607.22	181.26		
07/16	13:32:48	8.2289	2607.31	181.26		
07/16	13:32:52	8.2300	2607.31	181.26		
07/16	13:32:56	8.2311	2607.31	181.26		
07/16	13:33:00	8.2322	2607.41	181.26		
07/16	13:33:04	8.2333	2607.37	181.19		
07/16	13:33:08	8.2344	2607.37	181.19		
07/16	13:33:12	8.2356	2607.37	181.19		
07/16	13:33:16	8.2367	2607.37	181.19		
07/16	13:33:20	8.2378	2607.46	181.19		
07/16	13:33:24	8.2389	2607.46	181.19		
07/16	13:33:28	8.2400	2607.46	181.19		
07/16	13:33:32	8.2411	2607.56	181.19		
07/16	13:33:36	8.2422	2607.52	181.12		
07/16	13:33:40	8.2433	2607.52	181.12		
07/16	13:33:44	8.2444	2607.62	181.12		
07/16	13:33:48	8.2456	2607.62	181.12		
07/16	13:33:52	8.2467	2607.62	181.12		
07/16	13:33:56	8.2478	2607.62	181.12		
07/16	13:34:00	8.2489	2607.71	181.12		
07/16	13:34:04	8.2500	2607.71	181.12		
07/16	13:34:08	8.2511	2607.67	181.05		
07/16	13:34:12	8.2522	2607.77	181.05		
07/16	13:34:16	8.2533	2607.77	181.05		
07/16	13:34:20	8.2544	2607.77	181.05		
07/16	13:34:24	8.2556	2607.87	181.05		
07/16	13:34:28	8.2567	2607.77	181.05		
07/16	13:34:32	8.2578	2607.87	181.05		
07/16	13:34:36	8.2589	2607.87	181.05		
07/16	13:34:40	8.2600	2607.96	181.05		
07/16	13:34:44	8.2611	2607.92	180.98		
07/16	13:34:48	8.2622	2607.92	180.98		
07/16	13:34:52	8.2633	2607.92	180.98		
07/16	13:34:56	8.2644	2607.92	180.98		
07/16	13:35:00	8.2656	2608.02	180.98		
07/16	13:35:04	8.2667	2608.02	180.98		
07/16	13:35:08	8.2678	2608.02	180.98		
07/16	13:35:12	8.2689	2608.02	180.98		
07/16	13:35:16	8.2700	2607.97	180.90		
07/16	13:35:20	8.2711	2607.97	180.90		
07/16	13:35:24	8.2722	2608.07	180.90		
07/16	13:35:28	8.2733	2608.07	180.90		
07/16	13:35:32	8.2744	2608.07	180.90		
07/16	13:35:36	8.2756	2608.17	180.90		
07/16	13:35:40	8.2767	2608.17	180.90		
07/16	13:35:44	8.2778	2608.17	180.90		
07/16	13:35:48	8.2789	2608.22	180.83		
07/16	13:35:52	8.2800	2608.22	180.83		

Company: G.F.E. RESOURCES LIMITED Ref: HMN1DST1
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Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	13:35:56	8.2811	2608.22	180.83		
07/16	13:36:00	8.2822	2608.22	180.83		
07/16	13:36:04	8.2833	2608.22	180.83		
07/16	13:36:08	8.2844	2608.32	180.83		
07/16	13:36:12	8.2856	2608.32	180.83		
07/16	13:36:16	8.2867	2608.32	180.83		
07/16	13:36:20	8.2878	2608.28	180.76		
07/16	13:36:24	8.2889	2608.28	180.76		
07/16	13:36:28	8.2900	2608.37	180.76		
07/16	13:36:32	8.2911	2608.37	180.76		
07/16	13:36:36	8.2922	2608.37	180.76		
07/16	13:36:40	8.2933	2608.47	180.76		
07/16	13:36:44	8.2944	2608.37	180.76		
07/16	13:36:48	8.2956	2608.47	180.76		
07/16	13:36:52	8.2967	2608.43	180.69		
07/16	13:36:56	8.2978	2608.43	180.69		
07/16	13:37:00	8.2989	2608.43	180.69		
07/16	13:37:04	8.3000	2608.53	180.69		
07/16	13:37:08	8.3011	2608.53	180.69		
07/16	13:37:12	8.3022	2608.53	180.69		
07/16	13:37:16	8.3033	2608.53	180.69		
07/16	13:37:20	8.3044	2608.53	180.69		
07/16	13:37:24	8.3056	2608.58	180.62		
07/16	13:37:28	8.3067	2608.58	180.62		
07/16	13:37:32	8.3078	2608.58	180.62		
07/16	13:37:36	8.3089	2608.58	180.62		
07/16	13:37:40	8.3100	2608.68	180.62		
07/16	13:37:44	8.3111	2608.68	180.62		
07/16	13:37:48	8.3122	2608.68	180.62		
07/16	13:37:52	8.3133	2608.68	180.62		
07/16	13:37:56	8.3144	2608.68	180.62		
07/16	13:38:00	8.3156	2608.64	180.54		
07/16	13:38:04	8.3167	2608.73	180.54		
07/16	13:38:08	8.3178	2608.73	180.54		
07/16	13:38:12	8.3189	2608.73	180.54		
07/16	13:38:16	8.3200	2608.83	180.54		
07/16	13:38:20	8.3211	2608.83	180.54		
07/16	13:38:24	8.3222	2608.83	180.54		
07/16	13:38:28	8.3233	2608.83	180.54		
07/16	13:38:32	8.3244	2608.79	180.47		
07/16	13:38:36	8.3256	2608.79	180.47		
07/16	13:38:40	8.3267	2608.88	180.47		
07/16	13:38:44	8.3278	2608.88	180.47		
07/16	13:38:48	8.3289	2608.88	180.47		
07/16	13:38:52	8.3300	2608.88	180.47		
07/16	13:38:56	8.3311	2608.88	180.47		
07/16	13:39:00	8.3322	2608.88	180.47		
07/16	13:39:04	8.3333	2608.94	180.40		
07/16	13:39:08	8.3344	2608.94	180.40		
07/16	13:39:12	8.3356	2608.94	180.40		
07/16	13:39:16	8.3367	2609.04	180.40		
07/16	13:39:20	8.3378	2609.04	180.40		
07/16	13:39:24	8.3389	2609.04	180.40		
07/16	13:39:28	8.3400	2609.04	180.40		
07/16	13:39:32	8.3411	2609.04	180.40		
07/16	13:39:36	8.3422	2608.99	180.33		
07/16	13:39:40	8.3433	2609.09	180.33		
07/16	13:39:44	8.3444	2609.09	180.33		
07/16	13:39:48	8.3456	2609.09	180.33		
07/16	13:39:52	8.3467	2609.09	180.33		
07/16	13:39:56	8.3478	2609.09	180.33		
07/16	13:40:00	8.3489	2609.09	180.33		
07/16	13:40:04	8.3500	2609.09	180.33		
07/16	13:40:08	8.3511	2609.15	180.25		
07/16	13:40:12	8.3522	2609.15	180.25		
07/16	13:40:16	8.3533	2609.15	180.25		
07/16	13:40:20	8.3544	2609.15	180.25		
07/16	13:40:24	8.3556	2609.24	180.25		
07/16	13:40:28	8.3567	2609.15	180.25		
07/16	13:40:32	8.3578	2609.24	180.25		
07/16	13:40:36	8.3589	2609.24	180.25		
07/16	13:40:40	8.3600	2609.24	180.25		
07/16	13:40:44	8.3611	2609.20	180.18		

Company: G.F.E. RESOURCES LIMITED Ref: HMN1DST1
Well: NOWMAINS #1 VICTORIA

Date MM/DD G Atm.	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi
07/16	13:40:48	8.3622	2609.30	180.18		
07/16	13:40:52	8.3633	2609.30	180.18		
07/16	13:40:56	8.3644	2609.30	180.18		
07/16	13:41:00	8.3656	2609.30	180.18		
07/16	13:41:04	8.3667	2609.30	180.18		
07/16	13:41:08	8.3678	2609.39	180.18		
07/16	13:41:12	8.3689	2609.39	180.18		
07/16	13:41:16	8.3700	2609.39	180.18		
07/16	13:41:20	8.3711	2609.39	180.18		
07/16	13:41:24	8.3722	2609.35	180.11		
07/16	13:41:28	8.3733	2609.35	180.11		
07/16	13:41:32	8.3744	2609.35	180.11		
07/16	13:41:36	8.3756	2609.45	180.11		
07/16	13:41:40	8.3767	2609.45	180.11		
07/16	13:41:44	8.3778	2609.45	180.11		
07/16	13:41:48	8.3789	2609.45	180.11		
07/16	13:41:52	8.3800	2609.45	180.11		
07/16	13:41:56	8.3811	2609.45	180.11		
07/16	13:42:00	8.3822	2609.45	180.11		
07/16	13:42:04	8.3833	2609.50	180.04		
07/16	13:42:08	8.3844	2609.50	180.04		
07/16	13:42:12	8.3856	2609.50	180.04		
07/16	13:42:16	8.3867	2609.50	180.04		
07/16	13:42:20	8.3878	2609.60	180.04		
07/16	13:42:24	8.3889	2609.60	180.04		
07/16	13:42:28	8.3900	2609.60	180.04		
07/16	13:42:32	8.3911	2609.60	180.04		
07/16	13:42:36	8.3922	2609.60	180.04		
07/16	13:42:40	8.3933	2609.70	180.04		
07/16	13:42:44	8.3944	2609.70	180.04		
07/16	13:42:48	8.3956	2609.65	179.97		
07/16	13:42:52	8.3967	2609.65	179.97		
07/16	13:42:56	8.3978	2609.65	179.97		
07/16	13:43:00	8.3989	2609.65	179.97		
07/16	13:43:04	8.4000	2609.65	179.97		
07/16	13:43:08	8.4011	2609.75	179.97		
07/16	13:43:12	8.4022	2609.75	179.97		
07/16	13:43:16	8.4033	2609.65	179.97		
07/16	13:43:20	8.4044	2609.75	179.97		
07/16	13:43:24	8.4056	2609.75	179.97		
07/16	13:43:28	8.4067	2609.75	179.97		
07/16	13:43:32	8.4078	2609.71	179.89		
07/16	13:43:36	8.4089	2609.71	179.89		
07/16	13:43:40	8.4100	2609.81	179.89		
07/16	13:43:44	8.4111	2609.81	179.89		
07/16	13:43:48	8.4122	2609.81	179.89		
07/16	13:43:52	8.4133	2609.81	179.89		
07/16	13:43:56	8.4144	2609.81	179.89		
07/16	13:44:00	8.4156	2609.90	179.89		
07/16	13:44:04	8.4167	2609.81	179.89		
07/16	13:44:08	8.4178	2609.90	179.89		
07/16	13:44:12	8.4189	2609.86	179.82		
07/16	13:44:16	8.4200	2609.86	179.82		
07/16	13:44:20	8.4211	2609.86	179.82		
07/16	13:44:24	8.4222	2609.86	179.82		
07/16	13:44:28	8.4233	2609.96	179.82		
07/16	13:44:32	8.4244	2609.96	179.82		
07/16	13:44:36	8.4256	2609.96	179.82		
07/16	13:44:40	8.4267	2609.96	179.82		
07/16	13:44:44	8.4278	2609.96	179.82		
07/16	13:44:48	8.4289	2609.96	179.82		
07/16	13:44:52	8.4300	2609.96	179.82		
07/16	13:44:56	8.4311	2609.96	179.82		
07/16	13:45:00	8.4322	2610.01	179.75		
07/16	13:45:04	8.4333	2610.01	179.75		
07/16	13:45:08	8.4344	2610.01	179.75		
07/16	13:45:12	8.4356	2610.01	179.75		
07/16	13:45:16	8.4367	2610.01	179.75		
07/16	13:45:20	8.4378	2610.01	179.75		
07/16	13:45:24	8.4389	2610.11	179.75		
07/16	13:45:28	8.4400	2610.11	179.75		
07/16	13:45:32	8.4411	2610.11	179.75		
07/16	13:45:36	8.4422	2610.11	179.75		

Company: G.F.E. RESOURCES LIMITED Ref: HMN1DST1
Well: NOWMAINS #1 VICTORIA

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	13:45:40	8.4433	2610.11	179.75		
07/16	13:45:44	8.4444	2610.07	179.68		
07/16	13:45:48	8.4456	2610.16	179.68		
07/16	13:45:52	8.4467	2610.07	179.68		
07/16	13:45:56	8.4478	2610.16	179.68		
07/16	13:46:00	8.4489	2610.16	179.68		
07/16	13:46:04	8.4500	2610.16	179.68		
07/16	13:46:08	8.4511	2610.26	179.68		
07/16	13:46:12	8.4522	2610.16	179.68		
07/16	13:46:16	8.4533	2610.26	179.68		
07/16	13:46:20	8.4544	2610.16	179.68		
07/16	13:46:24	8.4556	2610.26	179.68		
07/16	13:46:28	8.4567	2610.26	179.68		
07/16	13:46:32	8.4578	2610.22	179.61		
07/16	13:46:36	8.4589	2610.22	179.61		
07/16	13:46:40	8.4600	2610.22	179.61		
07/16	13:46:44	8.4611	2610.22	179.61		
07/16	13:46:48	8.4622	2610.22	179.61		
07/16	13:46:52	8.4633	2610.32	179.61		
07/16	13:46:56	8.4644	2610.32	179.61		
07/16	13:47:00	8.4656	2610.32	179.61		
07/16	13:47:04	8.4667	2610.32	179.61		
07/16	13:47:08	8.4678	2610.32	179.61		
07/16	13:47:12	8.4689	2610.32	179.61		
07/16	13:47:16	8.4700	2610.32	179.61		
07/16	13:47:20	8.4711	2610.37	179.53		
07/16	13:47:24	8.4722	2610.27	179.53		
07/16	13:47:28	8.4733	2610.37	179.53		
07/16	13:47:32	8.4744	2610.37	179.53		
07/16	13:47:36	8.4756	2610.37	179.53		
07/16	13:47:40	8.4767	2610.37	179.53		
07/16	13:47:44	8.4778	2610.37	179.53		
07/16	13:47:48	8.4789	2610.47	179.53		
07/16	13:47:52	8.4800	2610.47	179.53		
07/16	13:47:56	8.4811	2610.47	179.53		
07/16	13:48:00	8.4822	2610.47	179.53		
07/16	13:48:04	8.4833	2610.47	179.53		
07/16	13:48:08	8.4844	2610.47	179.53		
07/16	13:48:12	8.4856	2610.43	179.46		
07/16	13:48:16	8.4867	2610.43	179.46		
07/16	13:48:20	8.4878	2610.43	179.46		
07/16	13:48:24	8.4889	2610.52	179.46		
07/16	13:48:28	8.4900	2610.52	179.46		
07/16	13:48:32	8.4911	2610.52	179.46		
07/16	13:48:36	8.4922	2610.52	179.46		
07/16	13:48:40	8.4933	2610.52	179.46		
07/16	13:48:44	8.4944	2610.52	179.46		
07/16	13:48:48	8.4956	2610.52	179.46		
07/16	13:48:52	8.4967	2610.52	179.46		
07/16	13:48:56	8.4978	2610.62	179.46		
07/16	13:49:00	8.4989	2610.52	179.46		
07/16	13:49:04	8.5000	2610.58	179.39		
07/16	13:49:08	8.5011	2610.58	179.39		
07/16	13:49:12	8.5022	2610.58	179.39		
07/16	13:49:16	8.5033	2610.58	179.39		
07/16	13:49:20	8.5044	2610.58	179.39		
07/16	13:49:24	8.5056	2610.67	179.39		
07/16	13:49:28	8.5067	2610.67	179.39		
07/16	13:49:32	8.5078	2610.67	179.39		
07/16	13:49:36	8.5089	2610.67	179.39		
07/16	13:49:40	8.5100	2610.67	179.39		
07/16	13:49:44	8.5111	2610.67	179.39		
07/16	13:49:48	8.5122	2610.67	179.39		
07/16	13:49:52	8.5133	2610.77	179.39		
07/16	13:49:56	8.5144	2610.73	179.32		
07/16	13:50:00	8.5156	2610.63	179.32		
07/16	13:50:04	8.5167	2610.73	179.32		
07/16	13:50:08	8.5178	2610.73	179.32		
07/16	13:50:12	8.5189	2610.73	179.32		
07/16	13:50:16	8.5200	2610.73	179.32		
07/16	13:50:20	8.5211	2610.73	179.32		
07/16	13:50:24	8.5222	2610.83	179.32		
07/16	13:50:28	8.5233	2610.83	179.32		

Company: G.F.E. RESOURCES LIMITED Ref: HMN1DST1
Well: NOWMAINS #1 VICTORIA

Ga. Press Ref. to 13.5 Psi G Atm.

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment
07/16	13:50:32	8.5244	2610.83	179.32		
07/16	13:50:36	8.5256	2610.83	179.32		
07/16	13:50:40	8.5267	2610.83	179.32		
07/16	13:50:44	8.5278	2610.83	179.32		
07/16	13:50:48	8.5289	2610.83	179.32		
07/16	13:50:52	8.5300	2610.78	179.24		
07/16	13:50:56	8.5311	2610.88	179.24		
07/16	13:51:00	8.5322	2610.78	179.24		
07/16	13:51:04	8.5333	2610.88	179.24		
07/16	13:51:08	8.5344	2610.88	179.24		
07/16	13:51:12	8.5356	2610.88	179.24		
07/16	13:51:16	8.5367	2610.88	179.24		
07/16	13:51:20	8.5378	2610.88	179.24		
07/16	13:51:24	8.5389	2610.88	179.24		
07/16	13:51:28	8.5400	2610.98	179.24		
07/16	13:51:32	8.5411	2610.88	179.24		
07/16	13:51:36	8.5422	2610.98	179.24		
07/16	13:51:40	8.5433	2610.98	179.24		
07/16	13:51:44	8.5444	2610.88	179.24		
07/16	13:51:48	8.5456	2610.94	179.17		
07/16	13:51:52	8.5467	2610.94	179.17		
07/16	13:51:56	8.5478	2610.94	179.17		
07/16	13:52:00	8.5489	2610.94	179.17		
07/16	13:52:04	8.5500	2610.94	179.17		
07/16	13:52:08	8.5511	2610.94	179.17		
07/16	13:52:12	8.5522	2611.03	179.17		
07/16	13:52:16	8.5533	2611.03	179.17		
07/16	13:52:20	8.5544	2611.03	179.17		
07/16	13:52:24	8.5556	2611.03	179.17		
07/16	13:52:28	8.5567	2611.03	179.17		
07/16	13:52:32	8.5578	2611.03	179.17		
07/16	13:52:36	8.5589	2611.03	179.17		
07/16	13:52:40	8.5600	2611.03	179.17		
07/16	13:52:44	8.5611	2611.13	179.17		
07/16	13:52:48	8.5622	2611.09	179.10		
07/16	13:52:52	8.5633	2611.09	179.10		
07/16	13:52:56	8.5644	2611.09	179.10		
07/16	13:53:00	8.5656	2611.09	179.10		
07/16	13:53:04	8.5667	2611.09	179.10		
07/16	13:53:08	8.5678	2611.09	179.10		
07/16	13:53:12	8.5689	2611.09	179.10		
07/16	13:53:16	8.5700	2611.09	179.10		
07/16	13:53:20	8.5711	2611.18	179.10		
07/16	13:53:24	8.5722	2611.18	179.10		
07/16	13:53:28	8.5733	2611.18	179.10		
07/16	13:53:32	8.5744	2611.18	179.10		
07/16	13:53:36	8.5756	2611.18	179.10		
07/16	13:53:40	8.5767	2611.18	179.10		
07/16	13:53:44	8.5778	2611.14	179.03		
07/16	13:53:48	8.5789	2611.24	179.03		
07/16	13:53:52	8.5800	2611.14	179.03		
07/16	13:53:56	8.5811	2611.24	179.03		
07/16	13:54:00	8.5822	2611.24	179.03		
07/16	13:54:04	8.5833	2611.24	179.03		
07/16	13:54:08	8.5844	2611.24	179.03		
07/16	13:54:12	8.5856	2611.24	179.03		
07/16	13:54:16	8.5867	2611.24	179.03		
07/16	13:54:20	8.5878	2611.24	179.03		
07/16	13:54:24	8.5889	2611.34	179.03		
07/16	13:54:28	8.5900	2611.34	179.03		
07/16	13:54:32	8.5911	2611.24	179.03		
07/16	13:54:36	8.5922	2611.34	179.03		
07/16	13:54:40	8.5933	2611.34	179.03		
07/16	13:54:44	8.5944	2611.29	178.96		
07/16	13:54:48	8.5956	2611.29	178.96		
07/16	13:54:52	8.5967	2611.29	178.96		
07/16	13:54:56	8.5978	2611.29	178.96		
07/16	13:55:00	8.5989	2611.29	178.96		
07/16	13:55:04	8.6000	2611.39	178.96		
07/16	13:55:08	8.6011	2611.39	178.96		
07/16	13:55:12	8.6022	2611.39	178.96		
07/16	13:55:16	8.6033	2611.39	178.96		
07/16	13:55:20	8.6044	2611.39	178.96		

Company: G.F.E. RESOURCES LIMITED Ref: HMN1DST1
Well: NOWMAINS #1 VICTORIA

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	13:55:24	8.6056	2611.39	178.96		
07/16	13:55:28	8.6067	2611.39	178.96		
07/16	13:55:32	8.6078	2611.39	178.96		
07/16	13:55:36	8.6089	2611.39	178.96		
07/16	13:55:40	8.6100	2611.39	178.96		
07/16	13:55:44	8.6111	2611.49	178.96		
07/16	13:55:48	8.6122	2611.45	178.88		
07/16	13:55:52	8.6133	2611.45	178.88		
07/16	13:55:56	8.6144	2611.45	178.88		
07/16	13:56:00	8.6156	2611.45	178.88		
07/16	13:56:04	8.6167	2611.45	178.88		
07/16	13:56:08	8.6178	2611.45	178.88		
07/16	13:56:12	8.6189	2611.45	178.88		
07/16	13:56:16	8.6200	2611.45	178.88		
07/16	13:56:20	8.6211	2611.54	178.88		
07/16	13:56:24	8.6222	2611.54	178.88		
07/16	13:56:28	8.6233	2611.54	178.88		
07/16	13:56:32	8.6244	2611.45	178.88		
07/16	13:56:36	8.6256	2611.54	178.88		
07/16	13:56:40	8.6267	2611.54	178.88		
07/16	13:56:44	8.6278	2611.54	178.88		
07/16	13:56:48	8.6289	2611.50	178.81		
07/16	13:56:52	8.6300	2611.50	178.81		
07/16	13:56:56	8.6311	2611.50	178.81		
07/16	13:57:00	8.6322	2611.50	178.81		
07/16	13:57:04	8.6333	2611.60	178.81		
07/16	13:57:08	8.6344	2611.60	178.81		
07/16	13:57:12	8.6356	2611.60	178.81		
07/16	13:57:16	8.6367	2611.60	178.81		
07/16	13:57:20	8.6378	2611.60	178.81		
07/16	13:57:24	8.6389	2611.60	178.81		
07/16	13:57:28	8.6400	2611.60	178.81		
07/16	13:57:32	8.6411	2611.60	178.81		
07/16	13:57:36	8.6422	2611.60	178.81		
07/16	13:57:40	8.6433	2611.69	178.81		
07/16	13:57:44	8.6444	2611.69	178.81		
07/16	13:57:48	8.6456	2611.69	178.81		
07/16	13:57:52	8.6467	2611.65	178.74		
07/16	13:57:56	8.6478	2611.65	178.74		
07/16	13:58:00	8.6489	2611.65	178.74		
07/16	13:58:04	8.6500	2611.65	178.74		
07/16	13:58:08	8.6511	2611.65	178.74		
07/16	13:58:12	8.6522	2611.75	178.74		
07/16	13:58:16	8.6533	2611.75	178.74		
07/16	13:58:20	8.6544	2611.75	178.74		
07/16	13:58:24	8.6556	2611.75	178.74		
07/16	13:58:28	8.6567	2611.75	178.74		
07/16	13:58:32	8.6578	2611.75	178.74		
07/16	13:58:36	8.6589	2611.75	178.74		
07/16	13:58:40	8.6600	2611.75	178.74		
07/16	13:58:44	8.6611	2611.75	178.74		
07/16	13:58:48	8.6622	2611.71	178.67		
07/16	13:58:52	8.6633	2611.71	178.67		
07/16	13:58:56	8.6644	2611.80	178.67		
07/16	13:59:00	8.6656	2611.71	178.67		
07/16	13:59:04	8.6667	2611.80	178.67		
07/16	13:59:08	8.6678	2611.80	178.67		
07/16	13:59:12	8.6689	2611.80	178.67		
07/16	13:59:16	8.6700	2611.80	178.67		
07/16	13:59:20	8.6711	2611.80	178.67		
07/16	13:59:24	8.6722	2611.90	178.67		
07/16	13:59:28	8.6733	2611.80	178.67		
07/16	13:59:32	8.6744	2611.80	178.67		
07/16	13:59:36	8.6756	2611.90	178.67		
07/16	13:59:40	8.6767	2611.90	178.67		
07/16	13:59:44	8.6778	2611.90	178.67		
07/16	13:59:48	8.6789	2611.90	178.67		
07/16	13:59:52	8.6800	2611.86	178.60		
07/16	13:59:56	8.6811	2611.86	178.60		
07/16	14:00:00	8.6822	2611.86	178.60		
07/16	14:00:04	8.6833	2611.96	178.60		
07/16	14:00:08	8.6844	2611.86	178.60		
07/16	14:00:12	8.6856	2611.96	178.60		

Company: G.F.E. RESOURCES LIMITED Ref: HMN1DST1
Well: NOWMAINS #1 VICTORIA

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	14:00:16	8.6867	2611.96	178.60		
07/16	14:00:20	8.6878	2611.86	178.60		
07/16	14:00:24	8.6889	2611.96	178.60		
07/16	14:00:28	8.6900	2611.96	178.60		
07/16	14:00:32	8.6911	2611.96	178.60		
07/16	14:00:36	8.6922	2611.96	178.60		
07/16	14:00:40	8.6933	2611.96	178.60		
07/16	14:00:44	8.6944	2611.96	178.60		
07/16	14:00:48	8.6956	2612.05	178.60		
07/16	14:00:52	8.6967	2611.96	178.60		
07/16	14:00:56	8.6978	2612.01	178.52		
07/16	14:01:00	8.6989	2612.01	178.52		
07/16	14:01:04	8.7000	2612.01	178.52		
07/16	14:01:08	8.7011	2612.01	178.52		
07/16	14:01:12	8.7022	2612.01	178.52		
07/16	14:01:16	8.7033	2612.01	178.52		
07/16	14:01:20	8.7044	2612.01	178.52		
07/16	14:01:24	8.7056	2612.01	178.52		
07/16	14:01:28	8.7067	2612.11	178.52		
07/16	14:01:32	8.7078	2612.01	178.52		
07/16	14:01:36	8.7089	2612.11	178.52		
07/16	14:01:40	8.7100	2612.11	178.52		
07/16	14:01:44	8.7111	2612.11	178.52		
07/16	14:01:48	8.7122	2612.11	178.52		
07/16	14:01:52	8.7133	2612.11	178.52		
07/16	14:01:56	8.7144	2612.11	178.52		
07/16	14:02:00	8.7156	2612.11	178.52		
07/16	14:02:04	8.7167	2612.06	178.45		
07/16	14:02:08	8.7178	2612.06	178.45		
07/16	14:02:12	8.7189	2612.16	178.45		
07/16	14:02:16	8.7200	2612.06	178.45		
07/16	14:02:20	8.7211	2612.06	178.45		
07/16	14:02:24	8.7222	2612.06	178.45		
07/16	14:02:28	8.7233	2612.16	178.45		
07/16	14:02:32	8.7244	2612.16	178.45		
07/16	14:02:36	8.7256	2612.16	178.45		
07/16	14:02:40	8.7267	2612.16	178.45		
07/16	14:02:44	8.7278	2612.16	178.45		
07/16	14:02:48	8.7289	2612.26	178.45		
07/16	14:02:52	8.7300	2612.16	178.45		
07/16	14:02:56	8.7311	2612.16	178.45		
07/16	14:03:00	8.7322	2612.26	178.45		
07/16	14:03:04	8.7333	2612.26	178.45		
07/16	14:03:08	8.7344	2612.22	178.38		
07/16	14:03:12	8.7356	2612.22	178.38		
07/16	14:03:16	8.7367	2612.22	178.38		
07/16	14:03:20	8.7378	2612.22	178.38		
07/16	14:03:24	8.7389	2612.22	178.38		
07/16	14:03:28	8.7400	2612.22	178.38		
07/16	14:03:32	8.7411	2612.31	178.38		
07/16	14:03:36	8.7422	2612.22	178.38		
07/16	14:03:40	8.7433	2612.31	178.38		
07/16	14:03:44	8.7444	2612.22	178.38		
07/16	14:03:48	8.7456	2612.31	178.38		
07/16	14:03:52	8.7467	2612.22	178.38		
07/16	14:03:56	8.7478	2612.31	178.38		
07/16	14:04:00	8.7489	2612.31	178.38		
07/16	14:04:04	8.7500	2612.31	178.38		
07/16	14:04:08	8.7511	2612.31	178.38		
07/16	14:04:12	8.7522	2612.27	178.31		
07/16	14:04:16	8.7533	2612.27	178.31		
07/16	14:04:20	8.7544	2612.27	178.31		
07/16	14:04:24	8.7556	2612.27	178.31		
07/16	14:04:28	8.7567	2612.27	178.31		
07/16	14:04:32	8.7578	2612.27	178.31		
07/16	14:04:36	8.7589	2612.27	178.31		
07/16	14:04:40	8.7600	2612.37	178.31		
07/16	14:04:44	8.7611	2612.37	178.31		
07/16	14:04:48	8.7622	2612.37	178.31		
07/16	14:04:52	8.7633	2612.37	178.31		
07/16	14:04:56	8.7644	2612.37	178.31		
07/16	14:05:00	8.7656	2612.37	178.31		
07/16	14:05:04	8.7667	2612.37	178.31		

Ref: HMN1DST1

Company: G.F.E. RESOURCES LIMITED
Well: NOWMAINS #1 VICTORIA

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	14:05:08	8.7678	2612.37	178.31		
07/16	14:05:12	8.7689	2612.37	178.31		
07/16	14:05:16	8.7700	2612.47	178.31		
07/16	14:05:20	8.7711	2612.33	178.23		
07/16	14:05:24	8.7722	2612.42	178.23		
07/16	14:05:28	8.7733	2612.42	178.23		
07/16	14:05:32	8.7744	2612.42	178.23		
07/16	14:05:36	8.7756	2612.42	178.23		
07/16	14:05:40	8.7767	2612.42	178.23		
07/16	14:05:44	8.7778	2612.42	178.23		
07/16	14:05:48	8.7789	2612.42	178.23		
07/16	14:05:52	8.7800	2612.42	178.23		
07/16	14:05:56	8.7811	2612.52	178.23		
07/16	14:06:00	8.7822	2612.42	178.23		
07/16	14:06:04	8.7833	2612.42	178.23		
07/16	14:06:08	8.7844	2612.52	178.23		
07/16	14:06:12	8.7856	2612.42	178.23		
07/16	14:06:16	8.7867	2612.52	178.23		
07/16	14:06:20	8.7878	2612.42	178.23		
07/16	14:06:24	8.7889	2612.52	178.23		
07/16	14:06:28	8.7900	2612.52	178.23		
07/16	14:06:32	8.7911	2612.48	178.16		
07/16	14:06:36	8.7922	2612.48	178.16		
07/16	14:06:40	8.7933	2612.48	178.16		
07/16	14:06:44	8.7944	2612.48	178.16		
07/16	14:06:48	8.7956	2612.48	178.16		
07/16	14:06:52	8.7967	2612.48	178.16		
07/16	14:06:56	8.7978	2612.48	178.16		
07/16	14:07:00	8.7989	2612.48	178.16		
07/16	14:07:04	8.8000	2612.58	178.16		
07/16	14:07:08	8.8011	2612.48	178.16		
07/16	14:07:12	8.8022	2612.58	178.16		
07/16	14:07:16	8.8033	2612.58	178.16		
07/16	14:07:20	8.8044	2612.58	178.16		
07/16	14:07:24	8.8056	2612.58	178.16		
07/16	14:07:28	8.8067	2612.58	178.16		
07/16	14:07:32	8.8078	2612.58	178.16		
07/16	14:07:36	8.8089	2612.58	178.16		
07/16	14:07:40	8.8100	2612.58	178.16		
07/16	14:07:44	8.8111	2612.58	178.16		
07/16	14:07:48	8.8122	2612.58	178.16		
07/16	14:07:52	8.8133	2612.63	178.09		
07/16	14:07:56	8.8144	2612.53	178.09		
07/16	14:08:00	8.8156	2612.53	178.09		
07/16	14:08:04	8.8167	2612.53	178.09		
07/16	14:08:08	8.8178	2612.63	178.09		
07/16	14:08:12	8.8189	2612.63	178.09		
07/16	14:08:16	8.8200	2612.63	178.09		
07/16	14:08:20	8.8211	2612.63	178.09		
07/16	14:08:24	8.8222	2612.63	178.09		
07/16	14:08:28	8.8233	2612.63	178.09		
07/16	14:08:32	8.8244	2612.63	178.09		
07/16	14:08:36	8.8256	2612.73	178.09		
07/16	14:08:40	8.8267	2612.63	178.09		
07/16	14:08:44	8.8278	2612.63	178.09		
07/16	14:08:48	8.8289	2612.73	178.09		
07/16	14:08:52	8.8300	2612.73	178.09		
07/16	14:08:56	8.8311	2612.73	178.09		
07/16	14:09:00	8.8322	2612.73	178.09		
07/16	14:09:04	8.8333	2612.73	178.09		
07/16	14:09:08	8.8344	2612.73	178.09		
07/16	14:09:12	8.8356	2612.68	178.02		
07/16	14:09:16	8.8367	2612.68	178.02		
07/16	14:09:20	8.8378	2612.68	178.02		
07/16	14:09:24	8.8389	2612.78	178.02		
07/16	14:09:28	8.8400	2612.78	178.02		
07/16	14:09:32	8.8411	2612.78	178.02		
07/16	14:09:36	8.8422	2612.78	178.02		
07/16	14:09:40	8.8433	2612.68	178.02		
07/16	14:09:44	8.8444	2612.68	178.02		
07/16	14:09:48	8.8456	2612.78	178.02		
07/16	14:09:52	8.8467	2612.78	178.02		
07/16	14:09:56	8.8478	2612.78	178.02		

Company: G.F.E. RESOURCES LIMITED Ref: HMN1DST1
Well: NOWMAINS #1 VICTORIA

Date MM/DD.	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	14:10:00	8.8489	2612.78	178.02		
07/16	14:10:04	8.8500	2612.78	178.02		
07/16	14:10:08	8.8511	2612.78	178.02		
07/16	14:10:12	8.8522	2612.78	178.02		
07/16	14:10:16	8.8533	2612.78	178.02		
07/16	14:10:20	8.8544	2612.78	178.02		
07/16	14:10:24	8.8556	2612.78	178.02		
07/16	14:10:28	8.8567	2612.78	178.02		
07/16	14:10:32	8.8578	2612.74	177.95		
07/16	14:10:36	8.8589	2612.84	177.95		
07/16	14:10:40	8.8600	2612.84	177.95		
07/16	14:10:44	8.8611	2612.84	177.95		
07/16	14:10:48	8.8622	2612.84	177.95		
07/16	14:10:52	8.8633	2612.84	177.95		
07/16	14:10:56	8.8644	2612.84	177.95		
07/16	14:11:00	8.8656	2612.84	177.95		
07/16	14:11:04	8.8667	2612.84	177.95		
07/16	14:11:08	8.8678	2612.84	177.95		
07/16	14:11:12	8.8689	2612.84	177.95		
07/16	14:11:16	8.8700	2612.84	177.95		
07/16	14:11:20	8.8711	2612.84	177.95		
07/16	14:11:24	8.8722	2612.93	177.95		
07/16	14:11:28	8.8733	2612.93	177.95		
07/16	14:11:32	8.8744	2612.93	177.95		
07/16	14:11:36	8.8756	2612.93	177.95		
07/16	14:11:40	8.8767	2612.93	177.95		
07/16	14:11:44	8.8778	2612.93	177.95		
07/16	14:11:48	8.8789	2612.93	177.95		
07/16	14:11:52	8.8800	2612.93	177.95		
07/16	14:11:56	8.8811	2612.89	177.87		
07/16	14:12:00	8.8822	2612.89	177.87		
07/16	14:12:04	8.8833	2612.99	177.87		
07/16	14:12:08	8.8844	2612.89	177.87		
07/16	14:12:12	8.8856	2612.99	177.87		
07/16	14:12:16	8.8867	2612.89	177.87		
07/16	14:12:20	8.8878	2612.89	177.87		
07/16	14:12:24	8.8889	2612.99	177.87		
07/16	14:12:28	8.8900	2612.99	177.87		
07/16	14:12:32	8.8911	2612.99	177.87		
07/16	14:12:36	8.8922	2612.99	177.87		
07/16	14:12:40	8.8933	2612.99	177.87		
07/16	14:12:44	8.8944	2612.99	177.87		
07/16	14:12:48	8.8956	2612.99	177.87		
07/16	14:12:52	8.8967	2612.99	177.87		
07/16	14:12:56	8.8978	2613.09	177.87		
07/16	14:13:00	8.8989	2613.09	177.87		
07/16	14:13:04	8.9000	2613.09	177.87		
07/16	14:13:08	8.9011	2612.99	177.87		
07/16	14:13:12	8.9022	2613.09	177.87		
07/16	14:13:16	8.9033	2613.04	177.80		
07/16	14:13:20	8.9044	2613.04	177.80		
07/16	14:13:24	8.9056	2613.04	177.80		
07/16	14:13:28	8.9067	2613.04	177.80		
07/16	14:13:32	8.9078	2613.04	177.80		
07/16	14:13:36	8.9089	2613.04	177.80		
07/16	14:13:40	8.9100	2613.04	177.80		
07/16	14:13:44	8.9111	2613.04	177.80		
07/16	14:13:48	8.9122	2613.04	177.80		
07/16	14:13:52	8.9133	2613.14	177.80		
07/16	14:13:56	8.9144	2613.04	177.80		
07/16	14:14:00	8.9156	2613.04	177.80		
07/16	14:14:04	8.9167	2613.14	177.80		
07/16	14:14:08	8.9178	2613.14	177.80		
07/16	14:14:12	8.9189	2613.14	177.80		
07/16	14:14:16	8.9200	2613.14	177.80		
07/16	14:14:20	8.9211	2613.14	177.80		
07/16	14:14:24	8.9222	2613.14	177.80		
07/16	14:14:28	8.9233	2613.10	177.73		
07/16	14:14:32	8.9244	2613.10	177.73		
07/16	14:14:36	8.9256	2613.10	177.73		
07/16	14:14:40	8.9267	2613.10	177.73		
07/16	14:14:44	8.9278	2613.10	177.73		
07/16	14:14:48	8.9289	2613.10	177.73		

Ref: HMN1DST1

Company: G.F.E. RESOURCES LIMITED
Well: NOWMAINS #1 VICTORIA

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	14:14:52	8.9300	2613.10	177.73		
07/16	14:14:56	8.9311	2613.10	177.73		
07/16	14:15:00	8.9322	2613.10	177.73		
07/16	14:15:04	8.9333	2613.19	177.73		
07/16	14:15:08	8.9344	2613.19	177.73		
07/16	14:15:12	8.9356	2613.19	177.73		
07/16	14:15:16	8.9367	2613.19	177.73		
07/16	14:15:20	8.9378	2613.19	177.73		
07/16	14:15:24	8.9389	2613.19	177.73		
07/16	14:15:28	8.9400	2613.19	177.73		
07/16	14:15:32	8.9411	2613.19	177.73		
07/16	14:15:36	8.9422	2613.19	177.73		
07/16	14:15:40	8.9433	2613.19	177.73		
07/16	14:15:44	8.9444	2613.19	177.73		
07/16	14:15:48	8.9456	2613.19	177.73		
07/16	14:15:52	8.9467	2613.29	177.73		
07/16	14:15:56	8.9478	2613.19	177.73		
07/16	14:16:00	8.9489	2613.25	177.66		
07/16	14:16:04	8.9500	2613.25	177.66		
07/16	14:16:08	8.9511	2613.25	177.66		
07/16	14:16:12	8.9522	2613.25	177.66		
07/16	14:16:16	8.9533	2613.25	177.66		
07/16	14:16:20	8.9544	2613.25	177.66		
07/16	14:16:24	8.9556	2613.25	177.66		
07/16	14:16:28	8.9567	2613.25	177.66		
07/16	14:16:32	8.9578	2613.25	177.66		
07/16	14:16:36	8.9589	2613.25	177.66		
07/16	14:16:40	8.9600	2613.35	177.66		
07/16	14:16:44	8.9611	2613.35	177.66		
07/16	14:16:48	8.9622	2613.25	177.66		
07/16	14:16:52	8.9633	2613.35	177.66		
07/16	14:16:56	8.9644	2613.35	177.66		
07/16	14:17:00	8.9656	2613.35	177.66		
07/16	14:17:04	8.9667	2613.35	177.66		
07/16	14:17:08	8.9678	2613.35	177.66		
07/16	14:17:12	8.9689	2613.35	177.66		
07/16	14:17:16	8.9700	2613.30	177.59		
07/16	14:17:20	8.9711	2613.30	177.59		
07/16	14:17:24	8.9722	2613.30	177.59		
07/16	14:17:28	8.9733	2613.30	177.59		
07/16	14:17:32	8.9744	2613.30	177.59		
07/16	14:17:36	8.9756	2613.40	177.59		
07/16	14:17:40	8.9767	2613.30	177.59		
07/16	14:17:44	8.9778	2613.30	177.59		
07/16	14:17:48	8.9789	2613.40	177.59		
07/16	14:17:52	8.9800	2613.40	177.59		
07/16	14:17:56	8.9811	2613.30	177.59		
07/16	14:18:00	8.9822	2613.40	177.59		
07/16	14:18:04	8.9833	2613.40	177.59		
07/16	14:18:08	8.9844	2613.40	177.59		
07/16	14:18:12	8.9856	2613.40	177.59		
07/16	14:18:16	8.9867	2613.40	177.59		
07/16	14:18:20	8.9878	2613.40	177.59		
07/16	14:18:24	8.9889	2613.40	177.59		
07/16	14:18:28	8.9900	2613.40	177.59		
07/16	14:18:32	8.9911	2613.50	177.59		
07/16	14:18:36	8.9922	2613.40	177.59		
07/16	14:18:40	8.9933	2613.36	177.51		
07/16	14:18:44	8.9944	2613.36	177.51		
07/16	14:18:48	8.9956	2613.36	177.51		
07/16	14:18:52	8.9967	2613.46	177.51		
07/16	14:18:56	8.9978	2613.46	177.51		
07/16	14:19:00	8.9989	2613.46	177.51		
07/16	14:19:04	9.0000	2613.46	177.51		
07/16	14:19:08	9.0011	2613.46	177.51		
07/16	14:19:12	9.0022	2613.46	177.51		
07/16	14:19:32	9.0078	2613.07	177.51		
07/16	14:19:52	9.0133	2613.07	177.51		
07/16	14:20:12	9.0189	2613.02	177.44		
07/16	14:20:32	9.0244	2613.02	177.44		
07/16	14:20:52	9.0300	2613.08	177.37		
07/16	14:21:12	9.0356	2613.08	177.37		
07/16	14:21:32	9.0411	2613.08	177.37		

Company: G.F.E. RESOURCES LIMITED Ref: HMN1DST1
Well: NOWMAINS #1 VICTORIA

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	14:21:52	9.0467	2613.13	177.30		
07/16	14:22:12	9.0522	2613.13	177.30		
07/16	14:22:32	9.0578	2613.13	177.30		
07/16	14:22:52	9.0633	2613.13	177.30		
07/16	14:23:12	9.0689	2613.19	177.23		
07/16	14:23:32	9.0744	2613.19	177.23		
07/16	14:23:52	9.0800	2613.19	177.23		
07/16	14:24:12	9.0856	2613.28	177.23		
07/16	14:24:32	9.0911	2613.24	177.15		
07/16	14:24:52	9.0967	2613.24	177.15		
07/16	14:25:12	9.1022	2613.34	177.15		
07/16	14:25:32	9.1078	2613.24	177.15		
07/16	14:25:52	9.1133	2613.30	177.08		
07/16	14:26:12	9.1189	2613.30	177.08		
07/16	14:26:32	9.1244	2613.39	177.08		
07/16	14:26:52	9.1300	2613.30	177.08		
07/16	14:27:12	9.1356	2613.35	177.01		
07/16	14:27:32	9.1411	2613.45	177.01		
07/16	14:27:52	9.1467	2613.35	177.01		
07/16	14:28:12	9.1522	2613.45	177.01		
07/16	14:28:32	9.1578	2613.45	177.01		
07/16	14:28:52	9.1633	2613.41	176.94		
07/16	14:29:12	9.1689	2613.50	176.94		
07/16	14:29:32	9.1744	2613.50	176.94		
07/16	14:29:52	9.1800	2613.50	176.94		
07/16	14:30:12	9.1856	2613.60	176.94		
07/16	14:30:32	9.1911	2613.56	176.87		
07/16	14:30:52	9.1967	2613.56	176.87		
07/16	14:31:12	9.2022	2613.56	176.87		
07/16	14:31:32	9.2078	2613.56	176.87		
07/16	14:31:52	9.2133	2613.61	176.79		
07/16	14:32:12	9.2189	2613.61	176.79		
07/16	14:32:32	9.2244	2613.61	176.79		
07/16	14:32:52	9.2300	2613.71	176.79		
07/16	14:33:12	9.2356	2613.71	176.79		
07/16	14:33:32	9.2411	2613.67	176.72		
07/16	14:33:52	9.2467	2613.67	176.72		
07/16	14:34:12	9.2522	2613.76	176.72		
07/16	14:34:32	9.2578	2613.76	176.72		
07/16	14:34:52	9.2633	2613.76	176.72		
07/16	14:35:12	9.2689	2613.76	176.72		
07/16	14:35:32	9.2744	2613.82	176.65		
07/16	14:35:52	9.2800	2613.82	176.65		
07/16	14:36:12	9.2856	2613.82	176.65		
07/16	14:36:32	9.2911	2613.82	176.65		
07/16	14:36:52	9.2967	2613.87	176.58		
07/16	14:37:12	9.3022	2613.87	176.58		
07/16	14:37:32	9.3078	2613.87	176.58		
07/16	14:37:52	9.3133	2613.87	176.58		
07/16	14:38:12	9.3189	2613.97	176.58		
07/16	14:38:32	9.3244	2613.93	176.51		
07/16	14:38:52	9.3300	2613.93	176.51		
07/16	14:39:12	9.3356	2614.03	176.51		
07/16	14:39:32	9.3411	2614.03	176.51		
07/16	14:39:52	9.3467	2614.03	176.51		
07/16	14:40:12	9.3522	2613.98	176.43		
07/16	14:40:32	9.3578	2613.98	176.43		
07/16	14:40:52	9.3633	2614.08	176.43		
07/16	14:41:12	9.3689	2614.08	176.43		
07/16	14:41:32	9.3744	2614.08	176.43		
07/16	14:41:52	9.3800	2614.08	176.43		
07/16	14:42:12	9.3856	2614.18	176.43		
07/16	14:42:32	9.3911	2614.04	176.36		
07/16	14:42:52	9.3967	2614.14	176.36		
07/16	14:43:12	9.4022	2614.14	176.36		
07/16	14:43:32	9.4078	2614.23	176.36		
07/16	14:43:52	9.4133	2614.14	176.36		
07/16	14:44:12	9.4189	2614.19	176.29		
07/16	14:44:32	9.4244	2614.19	176.29		
07/16	14:44:52	9.4300	2614.19	176.29		
07/16	14:45:12	9.4356	2614.29	176.29		
07/16	14:45:32	9.4411	2614.29	176.29		
07/16	14:45:52	9.4467	2614.29	176.29		

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Date MM/DD G Atm.	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi
07/16	14:46:12	9.4522	2614.29	176.29		
07/16	14:46:32	9.4578	2614.24	176.22		
07/16	14:46:52	9.4633	2614.34	176.22		
07/16	14:47:12	9.4689	2614.34	176.22		
07/16	14:47:32	9.4744	2614.34	176.22		
07/16	14:47:52	9.4800	2614.34	176.22		
07/16	14:48:12	9.4856	2614.34	176.22		
07/16	14:48:32	9.4911	2614.44	176.22		
07/16	14:48:52	9.4967	2614.30	176.14		
07/16	14:49:12	9.5022	2614.40	176.14		
07/16	14:49:32	9.5078	2614.40	176.14		
07/16	14:49:52	9.5133	2614.49	176.14		
07/16	14:50:12	9.5189	2614.49	176.14		
07/16	14:50:32	9.5244	2614.49	176.14		
07/16	14:50:52	9.5300	2614.45	176.07		
07/16	14:51:12	9.5356	2614.45	176.07		
07/16	14:51:32	9.5411	2614.45	176.07		
07/16	14:51:52	9.5467	2614.55	176.07		
07/16	14:52:12	9.5522	2614.55	176.07		
07/16	14:52:32	9.5578	2614.55	176.07		
07/16	14:52:52	9.5633	2614.51	176.00		
07/16	14:53:12	9.5689	2614.51	176.00		
07/16	14:53:32	9.5744	2614.60	176.00		
07/16	14:53:52	9.5800	2614.60	176.00		
07/16	14:54:12	9.5856	2614.51	176.00		
07/16	14:54:32	9.5911	2614.60	176.00		
07/16	14:54:52	9.5967	2614.70	176.00		
07/16	14:55:12	9.6022	2614.66	175.93		
07/16	14:55:32	9.6078	2614.66	175.93		
07/16	14:55:52	9.6133	2614.66	175.93		
07/16	14:56:12	9.6189	2614.66	175.93		
07/16	14:56:32	9.6244	2614.66	175.93		
07/16	14:56:52	9.6300	2614.76	175.93		
07/16	14:57:12	9.6356	2614.76	175.93		
07/16	14:57:32	9.6411	2614.71	175.86		
07/16	14:57:52	9.6467	2614.71	175.86		
07/16	14:58:12	9.6522	2614.71	175.86		
07/16	14:58:32	9.6578	2614.71	175.86		
07/16	14:58:52	9.6633	2614.81	175.86		
07/16	14:59:12	9.6689	2614.81	175.86		
07/16	14:59:32	9.6744	2614.81	175.86		
07/16	14:59:52	9.6800	2614.77	175.78		
07/16	15:00:12	9.6856	2614.77	175.78		
07/16	15:00:32	9.6911	2614.77	175.78		
07/16	15:00:52	9.6967	2614.86	175.78		
07/16	15:01:12	9.7022	2614.77	175.78		
07/16	15:01:32	9.7078	2614.86	175.78		
07/16	15:01:52	9.7133	2614.86	175.78		
07/16	15:02:12	9.7189	2614.86	175.78		
07/16	15:02:32	9.7244	2614.86	175.78		
07/16	15:02:52	9.7300	2614.92	175.71		
07/16	15:03:12	9.7356	2614.82	175.71		
07/16	15:03:32	9.7411	2614.92	175.71		
07/16	15:03:52	9.7467	2614.92	175.71		
07/16	15:04:12	9.7522	2614.92	175.71		
07/16	15:04:32	9.7578	2614.92	175.71		
07/16	15:04:52	9.7633	2614.92	175.71		
07/16	15:05:12	9.7689	2615.02	175.71		
07/16	15:05:32	9.7744	2614.88	175.64		
07/16	15:05:52	9.7800	2614.97	175.64		
07/16	15:06:12	9.7856	2614.97	175.64		
07/16	15:06:32	9.7911	2614.97	175.64		
07/16	15:06:52	9.7967	2615.07	175.64		
07/16	15:07:12	9.8022	2614.97	175.64		
07/16	15:07:32	9.8078	2615.07	175.64		
07/16	15:07:52	9.8133	2615.03	175.57		
07/16	15:08:12	9.8189	2615.03	175.57		
07/16	15:08:32	9.8244	2615.03	175.57		
07/16	15:08:52	9.8300	2615.13	175.57		
07/16	15:09:12	9.8356	2615.03	175.57		
07/16	15:09:32	9.8411	2615.13	175.57		
07/16	15:09:52	9.8467	2615.13	175.57		
07/16	15:10:12	9.8522	2615.13	175.57		

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Date MM/DD G Atm.	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi
07/16	15:10:32	9.8578	2615.08	175.50		
07/16	15:10:52	9.8633	2615.18	175.50		
07/16	15:11:12	9.8689	2615.08	175.50		
07/16	15:11:32	9.8744	2615.08	175.50		
07/16	15:11:52	9.8800	2615.18	175.50		
07/16	15:12:12	9.8856	2615.18	175.50		
07/16	15:12:32	9.8911	2615.18	175.50		
07/16	15:12:52	9.8967	2615.24	175.42		
07/16	15:13:12	9.9022	2615.14	175.42		
07/16	15:13:32	9.9078	2615.24	175.42		
07/16	15:13:52	9.9133	2615.24	175.42		
07/16	15:14:12	9.9189	2615.24	175.42		
07/16	15:14:32	9.9244	2615.24	175.42		
07/16	15:14:52	9.9300	2615.24	175.42		
07/16	15:15:12	9.9356	2615.24	175.42		
07/16	15:15:32	9.9411	2615.19	175.35		
07/16	15:15:52	9.9467	2615.19	175.35		
07/16	15:16:12	9.9522	2615.29	175.35		
07/16	15:16:32	9.9578	2615.29	175.35		
07/16	15:16:52	9.9633	2615.29	175.35		
07/16	15:17:12	9.9689	2615.29	175.35		
07/16	15:17:32	9.9744	2615.29	175.35		
07/16	15:17:52	9.9800	2615.29	175.35		
07/16	15:18:12	9.9856	2615.39	175.35		
07/16	15:18:32	9.9911	2615.34	175.28		
07/16	15:18:52	9.9967	2615.34	175.28		
07/16	15:19:12	10.0022	2615.34	175.28		
07/16	15:19:32	10.0078	2615.34	175.28		
07/16	15:19:52	10.0133	2615.34	175.28		
07/16	15:20:12	10.0189	2615.34	175.28		
07/16	15:20:32	10.0244	2615.44	175.28		
07/16	15:20:52	10.0300	2615.44	175.28		
07/16	15:21:12	10.0356	2615.44	175.28		
07/16	15:21:32	10.0411	2615.44	175.28		
07/16	15:21:52	10.0467	2615.40	175.21		
07/16	15:22:12	10.0522	2615.40	175.21		
07/16	15:22:32	10.0578	2615.40	175.21		
07/16	15:22:52	10.0633	2615.40	175.21		
07/16	15:23:12	10.0689	2615.40	175.21		
07/16	15:23:32	10.0744	2615.50	175.21		
07/16	15:23:52	10.0800	2615.50	175.21		
07/16	15:24:12	10.0856	2615.50	175.21		
07/16	15:24:32	10.0911	2615.50	175.21		
07/16	15:24:52	10.0967	2615.50	175.21		
07/16	15:25:12	10.1022	2615.45	175.14		
07/16	15:25:32	10.1078	2615.55	175.14		
07/16	15:25:52	10.1133	2615.45	175.14		
07/16	15:26:12	10.1189	2615.55	175.14		
07/16	15:26:32	10.1244	2615.45	175.14		
07/16	15:26:52	10.1300	2615.55	175.14		
07/16	15:27:12	10.1356	2615.55	175.14		
07/16	15:27:32	10.1411	2615.55	175.14		
07/16	15:27:52	10.1467	2615.55	175.14		
07/16	15:28:12	10.1522	2615.51	175.06		
07/16	15:28:32	10.1578	2615.61	175.06		
07/16	15:28:52	10.1633	2615.61	175.06		
07/16	15:29:12	10.1689	2615.61	175.06		
07/16	15:29:32	10.1744	2615.61	175.06		
07/16	15:29:52	10.1800	2615.61	175.06		
07/16	15:30:12	10.1856	2615.61	175.06		
07/16	15:30:32	10.1911	2615.61	175.06		
07/16	15:30:52	10.1967	2615.70	175.06		
07/16	15:31:12	10.2022	2615.56	174.99		
07/16	15:31:32	10.2078	2615.66	174.99		
07/16	15:31:52	10.2133	2615.66	174.99		
07/16	15:32:12	10.2189	2615.66	174.99		
07/16	15:32:32	10.2244	2615.66	174.99		
07/16	15:32:52	10.2300	2615.66	174.99		
07/16	15:33:12	10.2356	2615.66	174.99		
07/16	15:33:32	10.2411	2615.76	174.99		
07/16	15:33:52	10.2467	2615.76	174.99		
07/16	15:34:12	10.2522	2615.76	174.99		

Ref: HMN1DST1

Company: G.F.E. RESOURCES LIMITED
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Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	15:34:52	10.2633	2615.72	174.92		
07/16	15:35:12	10.2689	2615.76	174.99		
07/16	15:35:32	10.2744	2615.72	174.92		
07/16	15:35:52	10.2800	2615.81	174.92		
07/16	15:36:12	10.2856	2615.72	174.92		
07/16	15:36:32	10.2911	2615.81	174.92		
07/16	15:36:52	10.2967	2615.81	174.92		
07/16	15:37:12	10.3022	2615.72	174.92		
07/16	15:37:32	10.3078	2615.81	174.92		
07/16	15:37:52	10.3133	2615.81	174.92		
07/16	15:38:12	10.3189	2615.77	174.85		
07/16	15:38:32	10.3244	2615.77	174.85		
07/16	15:38:52	10.3300	2615.77	174.85		
07/16	15:39:12	10.3356	2615.77	174.85		
07/16	15:39:32	10.3411	2615.77	174.85		
07/16	15:39:52	10.3467	2615.77	174.85		
07/16	15:40:12	10.3522	2615.87	174.85		
07/16	15:40:32	10.3578	2615.77	174.85		
07/16	15:40:52	10.3633	2615.87	174.85		
07/16	15:41:12	10.3689	2615.87	174.85		
07/16	15:41:32	10.3744	2615.87	174.85		
07/16	15:41:52	10.3800	2615.82	174.78		
07/16	15:42:12	10.3856	2615.92	174.78		
07/16	15:42:32	10.3911	2615.92	174.78		
07/16	15:42:52	10.3967	2615.82	174.78		
07/16	15:43:12	10.4022	2615.92	174.78		
07/16	15:43:32	10.4078	2615.92	174.78		
07/16	15:43:52	10.4133	2615.92	174.78		
07/16	15:44:12	10.4189	2615.92	174.78		
07/16	15:44:32	10.4244	2615.92	174.78		
07/16	15:44:52	10.4300	2615.88	174.70		
07/16	15:45:12	10.4356	2616.02	174.78		
07/16	15:45:32	10.4411	2615.88	174.70		
07/16	15:45:52	10.4467	2615.98	174.70		
07/16	15:46:12	10.4522	2615.98	174.70		
07/16	15:46:32	10.4578	2615.98	174.70		
07/16	15:46:52	10.4633	2615.98	174.70		
07/16	15:47:12	10.4689	2615.98	174.70		
07/16	15:47:32	10.4744	2615.98	174.70		
07/16	15:47:52	10.4800	2616.07	174.70		
07/16	15:48:12	10.4856	2615.98	174.70		
07/16	15:48:32	10.4911	2615.93	174.63		
07/16	15:48:52	10.4967	2616.03	174.63		
07/16	15:49:12	10.5022	2616.03	174.63		
07/16	15:49:32	10.5078	2616.03	174.63		
07/16	15:49:52	10.5133	2616.03	174.63		
07/16	15:50:12	10.5189	2616.03	174.63		
07/16	15:50:32	10.5244	2616.03	174.63		
07/16	15:50:52	10.5300	2616.03	174.63		
07/16	15:51:12	10.5356	2616.03	174.63		
07/16	15:51:32	10.5411	2616.03	174.63		
07/16	15:51:52	10.5467	2616.13	174.63		
07/16	15:52:12	10.5522	2616.03	174.63		
07/16	15:52:32	10.5578	2616.09	174.56		
07/16	15:52:52	10.5633	2616.03	174.63		
07/16	15:53:12	10.5689	2616.09	174.56		
07/16	15:53:32	10.5744	2616.09	174.56		
07/16	15:53:52	10.5800	2616.09	174.56		
07/16	15:54:12	10.5856	2616.09	174.56		
07/16	15:54:32	10.5911	2616.09	174.56		
07/16	15:54:52	10.5967	2616.09	174.56		
07/16	15:55:12	10.6022	2616.09	174.56		
07/16	15:55:32	10.6078	2616.18	174.56		
07/16	15:55:52	10.6133	2616.09	174.56		
07/16	15:56:12	10.6189	2616.18	174.56		
07/16	15:56:32	10.6244	2616.09	174.56		
07/16	15:56:52	10.6300	2616.18	174.56		
07/16	15:57:12	10.6356	2616.09	174.56		
07/16	15:57:32	10.6411	2616.14	174.49		
07/16	15:57:52	10.6467	2616.14	174.49		
07/16	15:58:12	10.6522	2616.14	174.49		
07/16	15:58:32	10.6578	2616.14	174.49		
07/16	15:58:52	10.6633	2616.14	174.49		

Ref: HMN1DST1

Company: G.F.E. RESOURCES LIMITED
Well: NOWMAINS #1 VICTORIA

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	15:59:12	10.6689	2616.24	174.49		
07/16	15:59:32	10.6744	2616.24	174.49		
07/16	15:59:52	10.6800	2616.24	174.49		
07/16	16:00:12	10.6856	2616.24	174.49		
07/16	16:00:32	10.6911	2616.24	174.49		
07/16	16:00:52	10.6967	2616.24	174.49		
07/16	16:01:12	10.7022	2616.14	174.49		
07/16	16:01:32	10.7078	2616.20	174.42		
07/16	16:01:52	10.7133	2616.24	174.49		
07/16	16:02:12	10.7189	2616.20	174.42		
07/16	16:02:32	10.7244	2616.20	174.42		
07/16	16:02:52	10.7300	2616.20	174.42		
07/16	16:03:12	10.7356	2616.20	174.42		
07/16	16:03:32	10.7411	2616.29	174.42		
07/16	16:03:52	10.7467	2616.29	174.42		
07/16	16:04:12	10.7522	2616.29	174.42		
07/16	16:04:32	10.7578	2616.29	174.42		
07/16	16:04:52	10.7633	2616.29	174.42		
07/16	16:05:12	10.7689	2616.29	174.42		
07/16	16:05:32	10.7744	2616.25	174.34		
07/16	16:05:52	10.7800	2616.25	174.34		
07/16	16:06:12	10.7856	2616.35	174.34		
07/16	16:06:32	10.7911	2616.25	174.34		
07/16	16:06:52	10.7967	2616.25	174.34		
07/16	16:07:12	10.8022	2616.35	174.34		
07/16	16:07:32	10.8078	2616.35	174.34		
07/16	16:07:52	10.8133	2616.35	174.34		
07/16	16:08:12	10.8189	2616.35	174.34		
07/16	16:08:32	10.8244	2616.35	174.34		
07/16	16:08:52	10.8300	2616.35	174.34		
07/16	16:09:12	10.8356	2616.35	174.34		
07/16	16:09:32	10.8411	2616.35	174.34		
07/16	16:09:52	10.8467	2616.35	174.34		
07/16	16:10:12	10.8522	2616.35	174.34		
07/16	16:10:32	10.8578	2616.40	174.27		
07/16	16:10:52	10.8633	2616.31	174.27		
07/16	16:11:12	10.8689	2616.40	174.27		
07/16	16:11:32	10.8744	2616.31	174.27		
07/16	16:11:52	10.8800	2616.40	174.27		
07/16	16:12:12	10.8856	2616.40	174.27		
07/16	16:12:32	10.8911	2616.40	174.27		
07/16	16:12:52	10.8967	2616.40	174.27		
07/16	16:13:12	10.9022	2616.40	174.27		
07/16	16:13:32	10.9078	2616.40	174.27		
07/16	16:13:52	10.9133	2616.40	174.27		
07/16	16:14:12	10.9189	2616.40	174.27		
07/16	16:14:32	10.9244	2616.40	174.27		
07/16	16:14:52	10.9300	2616.40	174.27		
07/16	16:15:12	10.9356	2616.40	174.27		
07/16	16:15:32	10.9411	2616.50	174.27		
07/16	16:15:52	10.9467	2616.36	174.20		
07/16	16:16:12	10.9522	2616.36	174.20		
07/16	16:16:32	10.9578	2616.46	174.20		
07/16	16:16:52	10.9633	2616.46	174.20		
07/16	16:17:12	10.9689	2616.46	174.20		
07/16	16:17:32	10.9744	2616.46	174.20		
07/16	16:17:52	10.9800	2616.46	174.20		
07/16	16:18:12	10.9856	2616.46	174.20		
07/16	16:18:32	10.9911	2616.46	174.20		
07/16	16:18:52	10.9967	2616.46	174.20		
07/16	16:19:12	11.0022	2616.46	174.20		
07/16	16:19:32	11.0078	2616.46	174.20		
07/16	16:19:52	11.0133	2616.55	174.20		
07/16	16:20:12	11.0189	2616.46	174.20		
07/16	16:20:32	11.0244	2616.51	174.13		
07/16	16:20:52	11.0300	2616.41	174.13		
07/16	16:21:12	11.0356	2616.51	174.13		
07/16	16:21:32	11.0411	2616.51	174.13		
07/16	16:21:52	11.0467	2616.51	174.13		
07/16	16:22:12	11.0522	2616.51	174.13		
07/16	16:22:32	11.0578	2616.51	174.13		
07/16	16:22:52	11.0633	2616.51	174.13		
07/16	16:23:12	11.0689	2616.51	174.13		

Ref: HMN1DST1

Company: G.F.E. RESOURCES LIMITED
Well: NOWMAINS #1 VICTORIA

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	16:23:32	11.0744	2616.51	174.13		
07/16	16:23:52	11.0800	2616.51	174.13		
07/16	16:24:12	11.0856	2616.51	174.13		
07/16	16:24:32	11.0911	2616.61	174.13		
07/16	16:24:52	11.0967	2616.51	174.13		
07/16	16:25:12	11.1022	2616.51	174.13		
07/16	16:25:32	11.1078	2616.61	174.13		
07/16	16:25:52	11.1133	2616.61	174.13		
07/16	16:26:12	11.1189	2616.61	174.13		
07/16	16:26:32	11.1244	2616.51	174.13		
07/16	16:26:52	11.1300	2616.61	174.13		
07/16	16:27:12	11.1356	2616.61	174.13		
07/16	16:27:32	11.1411	2616.57	174.06		
07/16	16:27:52	11.1467	2616.57	174.06		
07/16	16:28:12	11.1522	2616.76	174.06		
07/16	16:28:32	11.1578	2616.86	174.06		
07/16	16:28:52	11.1633	2616.66	174.06		
07/16	16:29:12	11.1689	2617.83	174.06		FINAL SHUT-IN
07/16	16:29:32	11.1744	2617.74	174.06		
07/16	16:29:52	11.1800	2631.56	174.06		
07/16	16:30:12	11.1856	3039.63	174.06		
07/16	16:30:32	11.1911	3144.60	174.06		
07/16	16:30:52	11.1967	3113.67	174.06		
07/16	16:31:12	11.2022	3094.36	174.06		
07/16	16:31:32	11.2078	3101.87	174.06		
07/16	16:31:52	11.2133	3109.19	174.06		
07/16	16:32:12	11.2189	3077.54	173.99		
07/16	16:32:32	11.2244	3087.10	173.99		
07/16	16:32:52	11.2300	3099.55	173.91		
07/16	16:33:12	11.2356	3072.69	173.84		
07/16	16:33:32	11.2411	3152.56	173.77		
07/16	16:33:52	11.2467	3160.85	173.77		
07/16	16:34:12	11.2522	3185.61	173.70		
07/16	16:34:32	11.2578	3260.34	173.63		
07/16	16:34:52	11.2633	3342.72	173.55		
07/16	16:35:12	11.2689	3276.22	173.55		
07/16	16:35:32	11.2744	3205.02	173.48		
07/16	16:35:52	11.2800	3177.01	173.48		
07/16	16:36:12	11.2856	3194.15	173.41		
07/16	16:36:32	11.2911	3198.35	173.41		
07/16	16:36:52	11.2967	3195.68	173.34		FINAL HYD
07/16	16:37:12	11.3022	3194.41	173.34		
07/16	16:37:32	11.3078	3191.97	173.34		
07/16	16:37:52	11.3133	3188.85	173.34		
07/16	16:38:12	11.3189	3186.96	173.27		
07/16	16:38:32	11.3244	3185.30	173.27		
07/16	16:38:52	11.3300	3185.49	173.27		
07/16	16:39:12	11.3356	3184.81	173.27		
07/16	16:39:32	11.3411	3179.15	173.27		
07/16	16:39:52	11.3467	3175.89	173.19		
07/16	16:40:12	11.3522	3143.59	173.19		
07/16	16:40:32	11.3578	3149.06	173.19		
07/16	16:40:52	11.3633	3146.23	173.19		
07/16	16:41:12	11.3689	3146.32	173.19		
07/16	16:41:32	11.3744	3145.15	173.19		
07/16	16:41:52	11.3800	3143.10	173.19		
07/16	16:42:12	11.3856	3140.96	173.19		
07/16	16:42:32	11.3911	3137.83	173.19		
07/16	16:42:52	11.3967	3132.56	173.19		
07/16	16:43:12	11.4022	3129.83	173.19		
07/16	16:43:32	11.4078	3127.65	173.12		
07/16	16:43:52	11.4133	3175.08	173.12		
07/16	16:44:12	11.4189	3174.30	173.12		
07/16	16:44:32	11.4244	3172.44	173.12		
07/16	16:44:52	11.4300	3170.78	173.12		
07/16	16:45:12	11.4356	3169.03	173.12		
07/16	16:45:32	11.4411	3167.76	173.12		
07/16	16:45:52	11.4467	3166.36	173.05		
07/16	16:46:12	11.4522	3165.48	173.05		
07/16	16:46:32	11.4578	3164.70	173.05		
07/16	16:46:52	11.4633	3164.11	173.05		
07/16	16:47:12	11.4689	3163.49	172.98		
07/16	16:47:32	11.4744	3162.91	172.98		

Company: G.F.E. RESOURCES LIMITED
Well: NOWMAINS #1 VICTORIA

Ref: HMN1DST1

Date MM/DD G Atm.	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi
07/16	16:47:52	11.4800	3162.48	172.91		
07/16	16:48:12	11.4856	3162.09	172.91		
07/16	16:48:32	11.4911	3161.86	172.83		
07/16	16:48:52	11.4967	3161.37	172.83		
07/16	16:49:12	11.5022	3161.14	172.76		
07/16	16:49:32	11.5078	3160.65	172.76		
07/16	16:49:52	11.5133	3160.32	172.69		
07/16	16:50:12	11.5189	3160.03	172.69		
07/16	16:50:32	11.5244	3159.70	172.62		
07/16	16:50:52	11.5300	3159.41	172.62		
07/16	16:51:12	11.5356	3159.18	172.55		
07/16	16:51:32	11.5411	3158.95	172.47		
07/16	16:51:52	11.5467	3158.75	172.47		
07/16	16:52:12	11.5522	3158.62	172.40		
07/16	16:52:32	11.5578	3158.43	172.40		
07/16	16:52:52	11.5633	3158.20	172.33		
07/16	16:53:12	11.5689	3158.00	172.33		
07/16	16:53:32	11.5744	3157.77	172.26		
07/16	16:53:52	11.5800	3097.36	172.26		
07/16	16:54:12	11.5856	3112.64	172.19		
07/16	16:54:32	11.5911	3105.42	172.19		
07/16	16:54:52	11.5967	3178.00	172.11		
07/16	16:55:12	11.6022	3173.03	172.11		
07/16	16:55:32	11.6078	3168.99	172.04		
07/16	16:55:52	11.6133	3165.34	171.97		
07/16	16:56:12	11.6189	3084.23	171.97		
07/16	16:56:32	11.6244	3160.03	171.90		
07/16	16:56:52	11.6300	3166.48	171.90		
07/16	16:57:12	11.6356	3161.37	171.83		
07/16	16:57:32	11.6411	3157.66	171.83		
07/16	16:57:52	11.6467	3154.40	171.76		
07/16	16:58:12	11.6522	3151.76	171.76		
07/16	16:58:32	11.6578	3149.68	171.68		
07/16	16:58:52	11.6633	3148.21	171.68		
07/16	16:59:12	11.6689	3120.26	171.61		
07/16	16:59:32	11.6744	3083.04	171.54		
07/16	16:59:52	11.6800	3076.30	171.54		
07/16	17:00:12	11.6856	3062.60	171.47		
07/16	17:00:32	11.6911	3059.68	171.47		
07/16	17:00:52	11.6967	3132.45	171.40		
07/16	17:01:12	11.7022	3128.61	171.32		
07/16	17:01:32	11.7078	3124.96	171.25		
07/16	17:01:52	11.7133	3121.64	171.25		
07/16	17:02:12	11.7189	3051.14	171.18		
07/16	17:02:32	11.7244	3043.78	171.11		
07/16	17:02:52	11.7300	3037.99	171.04		
07/16	17:03:12	11.7356	3047.41	170.96		
07/16	17:03:32	11.7411	3116.00	170.89		
07/16	17:03:52	11.7467	3111.47	170.82		
07/16	17:04:12	11.7522	3107.33	170.75		
07/16	17:04:32	11.7578	3033.02	170.68		
07/16	17:04:52	11.7633	3013.76	170.61		
07/16	17:05:12	11.7689	3090.53	170.53		
07/16	17:05:32	11.7744	3087.37	170.46		
07/16	17:05:52	11.7800	3084.12	170.39		
07/16	17:06:12	11.7856	3081.11	170.25		
07/16	17:06:32	11.7911	3078.34	170.17		
07/16	17:06:52	11.7967	3075.67	170.10		
07/16	17:07:12	11.8022	3177.73	169.96		
07/16	17:07:32	11.8078	3114.71	169.89		
07/16	17:07:52	11.8133	2999.78	169.82		
07/16	17:08:12	11.8189	2989.98	169.74		
07/16	17:08:32	11.8244	3086.16	169.60		
07/16	17:08:52	11.8300	3081.43	169.53		
07/16	17:09:12	11.8356	3077.16	169.38		
07/16	17:09:32	11.8411	3073.42	169.31		
07/16	17:09:52	11.8467	3069.93	169.17		
07/16	17:10:12	11.8522	3066.76	169.10		
07/16	17:10:32	11.8578	3063.86	168.95		
07/16	17:10:52	11.8633	3061.19	168.88		
07/16	17:11:12	11.8689	3058.67	168.74		
07/16	17:11:32	11.8744	3056.29	168.67		
07/16	17:11:52	11.8800	3053.97	168.52		

Company: G.F.E. RESOURCES LIMITED Ref: HMN1DST1
Well: NOWMAINS #1 VICTORIA

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	17:12:12	11.8856	3052.08	168.45		
07/16	17:12:32	11.8911	3050.15	168.31		
07/16	17:12:52	11.8967	3048.65	168.24		
07/16	17:13:12	11.9022	3047.41	168.09		
07/16	17:13:32	11.9078	3046.49	168.02		
07/16	17:13:52	11.9133	3045.64	167.88		
07/16	17:14:12	11.9189	3044.92	167.80		
07/16	17:14:32	11.9244	3044.26	167.66		
07/16	17:14:52	11.9300	3043.73	167.59		
07/16	17:15:12	11.9356	3043.30	167.52		
07/16	17:15:32	11.9411	3042.74	167.37		
07/16	17:15:52	11.9467	3042.22	167.30		
07/16	17:16:12	11.9522	3041.79	167.23		
07/16	17:16:32	11.9578	3041.46	167.16		
07/16	17:16:52	11.9633	3041.03	167.09		
07/16	17:17:12	11.9689	3040.57	166.94		
07/16	17:17:32	11.9744	3040.24	166.87		
07/16	17:17:52	11.9800	3039.81	166.80		
07/16	17:18:12	11.9856	3039.48	166.73		
07/16	17:18:32	11.9911	3039.15	166.66		
07/16	17:18:52	11.9967	3038.82	166.59		
07/16	17:19:12	12.0022	3038.49	166.51		
07/16	17:19:32	12.0078	3038.16	166.44		
07/16	17:19:52	12.0133	3037.83	166.37		
07/16	17:20:12	12.0189	3037.60	166.30		
07/16	17:20:32	12.0244	3037.30	166.30		
07/16	17:20:52	12.0300	3036.97	166.23		
07/16	17:21:12	12.0356	3036.64	166.15		
07/16	17:21:32	12.0411	3036.41	166.08		
07/16	17:21:52	12.0467	3036.18	166.01		
07/16	17:22:12	12.0522	3035.98	166.01		
07/16	17:22:32	12.0578	3039.56	165.94		
07/16	17:22:52	12.0633	3185.12	165.87		
07/16	17:23:12	12.0689	3119.44	165.87		
07/16	17:23:32	12.0744	3070.92	165.94		
07/16	17:23:52	12.0800	3022.89	166.01		
07/16	17:24:12	12.0856	3019.12	166.08		
07/16	17:24:32	12.0911	3022.09	166.15		
07/16	17:24:52	12.0967	3077.38	166.15		
07/16	17:25:12	12.1022	3073.12	166.23		
07/16	17:25:32	12.1078	3069.54	166.30		
07/16	17:25:52	12.1133	3066.35	166.37		
07/16	17:26:12	12.1189	3063.42	166.37		
07/16	17:26:32	12.1244	3060.78	166.37		
07/16	17:26:52	12.1300	3058.24	166.37		
07/16	17:27:12	12.1356	3055.90	166.37		
07/16	17:27:32	12.1411	3053.62	166.30		
07/16	17:27:52	12.1467	3051.56	166.30		
07/16	17:28:12	12.1522	3049.71	166.30		
07/16	17:28:32	12.1578	3047.91	166.23		
07/16	17:28:52	12.1633	3046.35	166.23		
07/16	17:29:12	12.1689	3045.04	166.15		
07/16	17:29:32	12.1744	3043.84	166.08		
07/16	17:29:52	12.1800	3042.96	166.08		
07/16	17:30:12	12.1856	3042.24	166.01		
07/16	17:30:32	12.1911	3041.51	165.94		
07/16	17:30:52	12.1967	3040.89	165.87		
07/16	17:31:12	12.2022	3040.31	165.87		
07/16	17:31:32	12.2078	3039.88	165.80		
07/16	17:31:52	12.2133	3039.35	165.72		
07/16	17:32:12	12.2189	3038.96	165.72		
07/16	17:32:32	12.2244	3038.44	165.65		
07/16	17:32:52	12.2300	3038.11	165.58		
07/16	17:33:12	12.2356	3037.58	165.51		
07/16	17:33:32	12.2411	3037.29	165.51		
07/16	17:33:52	12.2467	2970.05	165.44		
07/16	17:34:12	12.2522	2957.41	165.37		
07/16	17:34:32	12.2578	3017.09	165.37		
07/16	17:34:52	12.2633	3028.29	165.29		
07/16	17:35:12	12.2689	3024.93	165.22		
07/16	17:35:32	12.2744	3022.25	165.15		
07/16	17:35:52	12.2800	3019.71	165.15		
07/16	17:36:12	12.2856	3017.33	165.08		

Company: G.F.E. RESOURCES LIMITED Ref: HMN1DST1
Well: NOWMAINS #1 VICTORIA

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	17:36:32	12.2911	3014.95	165.01		
07/16	17:36:52	12.2967	3013.00	165.01		
07/16	17:37:12	12.3022	3010.91	164.94		
07/16	17:37:32	12.3078	3008.95	164.94		
07/16	17:37:52	12.3133	3007.06	164.86		
07/16	17:38:12	12.3189	3005.26	164.79		
07/16	17:38:32	12.3244	3003.51	164.79		
07/16	17:38:52	12.3300	3002.00	164.72		
07/16	17:39:12	12.3356	3000.54	164.72		
07/16	17:39:32	12.3411	2999.13	164.65		
07/16	17:39:52	12.3467	2997.96	164.65		
07/16	17:40:12	12.3522	2996.95	164.58		
07/16	17:40:32	12.3578	2996.07	164.58		
07/16	17:40:52	12.3633	2995.34	164.51		
07/16	17:41:12	12.3689	2994.72	164.43		
07/16	17:41:32	12.3744	2994.23	164.43		
07/16	17:41:52	12.3800	2993.61	164.36		
07/16	17:42:12	12.3856	2995.86	164.36		
07/16	17:42:32	12.3911	3001.88	164.29		
07/16	17:42:52	12.3967	3002.07	164.29		
07/16	17:43:12	12.4022	2949.96	164.22		
07/16	17:43:32	12.4078	2961.39	164.22		
07/16	17:43:52	12.4133	2959.21	164.15		
07/16	17:44:12	12.4189	2959.40	164.15		
07/16	17:44:32	12.4244	2963.27	164.08		
07/16	17:44:52	12.4300	3034.50	164.08		
07/16	17:45:12	12.4356	3085.28	164.00		
07/16	17:45:32	12.4411	3039.05	164.00		
07/16	17:45:52	12.4467	3030.06	164.00		
07/16	17:46:12	12.4522	3025.27	164.00		
07/16	17:46:32	12.4578	3021.07	164.00		
07/16	17:46:52	12.4633	3017.07	164.00		
07/16	17:47:12	12.4689	3013.55	164.00		
07/16	17:47:32	12.4744	3011.53	164.08		
07/16	17:47:52	12.4800	3068.50	164.08		
07/16	17:48:12	12.4856	3057.17	164.08		
07/16	17:48:32	12.4911	3051.89	164.08		
07/16	17:48:52	12.4967	3047.34	164.15		
07/16	17:49:12	12.5022	3043.43	164.15		
07/16	17:49:32	12.5078	3040.10	164.15		
07/16	17:49:52	12.5133	3011.38	164.15		
07/16	17:50:12	12.5189	3025.93	164.15		
07/16	17:50:32	12.5244	3026.19	164.08		
07/16	17:50:52	12.5300	3024.92	164.08		
07/16	17:51:12	12.5356	3023.46	164.08		
07/16	17:51:32	12.5411	3021.95	164.00		
07/16	17:51:52	12.5467	3020.49	164.00		
07/16	17:52:12	12.5522	3019.18	163.93		
07/16	17:52:32	12.5578	3018.01	163.93		
07/16	17:52:52	12.5633	3016.99	163.86		
07/16	17:53:12	12.5689	3016.21	163.86		
07/16	17:53:32	12.5744	3015.39	163.79		
07/16	17:53:52	12.5800	3014.71	163.79		
07/16	17:54:12	12.5856	3014.08	163.72		
07/16	17:54:32	12.5911	3013.46	163.65		
07/16	17:54:52	12.5967	3012.97	163.65		
07/16	17:55:12	12.6022	3009.03	163.57		
07/16	17:55:32	12.6078	3012.06	163.57		
07/16	17:55:52	12.6133	3012.80	163.50		
07/16	17:56:12	12.6189	3012.80	163.50		
07/16	17:56:32	12.6244	3012.37	163.43		
07/16	17:56:52	12.6300	3011.79	163.43		
07/16	17:57:12	12.6356	3011.16	163.36		
07/16	17:57:32	12.6411	3010.67	163.36		
07/16	17:57:52	12.6467	3010.05	163.29		
07/16	17:58:12	12.6522	3009.66	163.29		
07/16	17:58:32	12.6578	3009.23	163.22		
07/16	17:58:52	12.6633	3008.84	163.22		
07/16	17:59:12	12.6689	3008.51	163.14		
07/16	17:59:32	12.6744	3008.12	163.14		
07/16	17:59:52	12.6800	3007.92	163.14		
07/16	18:00:12	12.6856	3007.59	163.07		
07/16	18:00:32	12.6911	3007.30	163.07		

Company: G.F.E. RESOURCES LIMITED Ref: HMN1DST1
Well: NOWMAINS #1 VICTORIA

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	18:00:52	12.6967	3007.10	163.07		
07/16	18:01:12	12.7022	3006.77	163.00		
07/16	18:01:32	12.7078	3006.58	163.00		
07/16	18:01:52	12.7133	3006.25	162.93		
07/16	18:02:12	12.7189	3006.05	162.93		
07/16	18:02:32	12.7244	3028.24	162.93		
07/16	18:02:52	12.7300	3066.55	162.93		
07/16	18:03:12	12.7356	3123.41	162.86		
07/16	18:03:32	12.7411	3111.58	162.86		
07/16	18:03:52	12.7467	3097.60	162.86		
07/16	18:04:12	12.7522	3089.00	162.86		
07/16	18:04:32	12.7578	3088.80	162.86		
07/16	18:04:52	12.7633	3084.89	162.86		
07/16	18:05:12	12.7689	3084.11	162.86		
07/16	18:05:32	12.7744	3084.47	162.79		
07/16	18:05:52	12.7800	3087.20	162.79		
07/16	18:06:12	12.7856	3088.18	162.79		
07/16	18:06:32	12.7911	3092.87	162.79		
07/16	18:06:52	12.7967	3093.36	162.79		
07/16	18:07:12	12.8022	3085.44	162.79		
07/16	18:07:32	12.8078	3080.56	162.79		
07/16	18:07:52	12.8133	3072.44	162.79		
07/16	18:08:12	12.8189	3066.38	162.79		
07/16	18:08:32	12.8244	3060.77	162.72		
07/16	18:08:52	12.8300	3055.59	162.72		
07/16	18:09:12	12.8356	3050.51	162.72		
07/16	18:09:32	12.8411	3044.45	162.72		
07/16	18:09:52	12.8467	3033.21	162.72		
07/16	18:10:12	12.8522	3021.87	162.72		
07/16	18:10:32	12.8578	3019.92	162.72		
07/16	18:10:52	12.8633	3017.37	162.72		
07/16	18:11:12	12.8689	3015.61	162.72		
07/16	18:11:32	12.8744	3014.05	162.72		
07/16	18:11:52	12.8800	3012.35	162.64		
07/16	18:12:12	12.8856	3010.89	162.64		
07/16	18:12:32	12.8911	3009.42	162.64		
07/16	18:12:52	12.8967	3008.05	162.64		
07/16	18:13:12	12.9022	3006.88	162.64		
07/16	18:13:32	12.9078	3005.90	162.64		
07/16	18:13:52	12.9133	3005.12	162.64		
07/16	18:14:12	12.9189	3004.50	162.57		
07/16	18:14:32	12.9244	3004.01	162.57		
07/16	18:14:52	12.9300	3003.32	162.57		
07/16	18:15:12	12.9356	3002.54	162.57		
07/16	18:15:32	12.9411	3001.76	162.57		
07/16	18:15:52	12.9467	3058.74	162.57		
07/16	18:16:12	12.9522	3106.45	162.57		
07/16	18:16:32	12.9578	3145.72	162.50		
07/16	18:16:52	12.9633	3181.52	162.50		
07/16	18:17:12	12.9689	3183.38	162.50		
07/16	18:17:32	12.9744	3179.37	162.50		
07/16	18:17:52	12.9800	3175.45	162.50		
07/16	18:18:12	12.9856	3171.54	162.50		
07/16	18:18:32	12.9911	3172.32	162.50		
07/16	18:18:52	12.9967	3171.84	162.50		
07/16	18:19:12	13.0022	3173.50	162.50		
07/16	18:19:32	13.0078	3171.15	162.50		
07/16	18:19:52	13.0133	3168.12	162.50		
07/16	18:20:12	13.0189	3164.99	162.50		
07/16	18:20:32	13.0244	3161.86	162.50		
07/16	18:20:52	13.0300	3158.79	162.43		
07/16	18:21:12	13.0356	3155.86	162.43		
07/16	18:21:32	13.0411	3152.93	162.43		
07/16	18:21:52	13.0467	3149.99	162.43		
07/16	18:22:12	13.0522	3147.06	162.43		
07/16	18:22:32	13.0578	3144.22	162.43		
07/16	18:22:52	13.0633	3194.98	162.43		
07/16	18:23:12	13.0689	3251.32	162.43		
07/16	18:23:32	13.0744	3284.49	162.43		
07/16	18:23:52	13.0800	3285.96	162.43		
07/16	18:24:12	13.0856	3281.16	162.43		
07/16	18:24:32	13.0911	3276.56	162.43		
07/16	18:24:52	13.0967	3272.16	162.43		

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Company: G.F.E. RESOURCES LIMITED
Well: NOWMAINS #1 VICTORIA

Date MM/DD	Time hh:mm:ss	Test Time hhhh.hhhh	Pressure PsiG	Temp Deg F	DeltaP PsiG	Comment Ga. Press Ref. to 13.5 Psi G Atm.
07/16	18:25:12	13.1022	3267.76	162.43		
07/16	18:25:32	13.1078	3263.61	162.36		
07/16	18:25:52	13.1133	3259.51	162.36		
07/16	18:26:12	13.1189	3255.40	162.36		
07/16	18:26:32	13.1244	3251.48	162.36		
07/16	18:26:52	13.1300	3247.67	162.36		
07/16	18:27:12	13.1356	3243.95	162.36		
07/16	18:27:32	13.1411	3200.72	162.36		
07/16	18:27:52	13.1467	3163.55	162.36		
07/16	18:28:12	13.1522	3156.41	162.36		
07/16	18:28:32	13.1578	3150.64	162.36		
07/16	18:28:52	13.1633	3145.26	162.36		
07/16	18:29:12	13.1689	3140.08	162.36		
07/16	18:29:32	13.1744	3135.09	162.36		
07/16	18:29:52	13.1800	3130.30	162.36		
07/16	18:30:12	13.1856	3125.80	162.36		
07/16	18:30:32	13.1911	3121.79	162.36		
07/16	18:30:52	13.1967	3081.22	162.36		
07/16	18:31:12	13.2022	3072.13	162.36		
07/16	18:31:32	13.2078	3067.63	162.36		
07/16	18:31:52	13.2133	3063.72	162.36		
07/16	18:32:12	13.2189	3059.81	162.36		
07/16	18:32:32	13.2244	3056.00	162.36		
07/16	18:32:52	13.2300	3052.28	162.36		
07/16	18:33:12	13.2356	3048.66	162.36		
07/16	18:33:32	13.2411	3045.24	162.36		
07/16	18:33:52	13.2467	3042.02	162.36		
07/16	18:34:12	13.2522	3038.99	162.36		
07/16	18:34:32	13.2578	3036.15	162.36		
07/16	18:34:52	13.2633	3033.61	162.36		
07/16	18:35:12	13.2689	3031.07	162.36		

APPENDIX 7

GFE RESOURCES LTD

APPENDIX 7

TABULATED MUD GAS DATA

HOWMAINS-1

HOWMAINS-1

Total Gas and Chromatography

Depth (m)	TOTAL GAS (unit)	C1 (ppm)	C2 (ppm)	C3 (ppm)	C4 (ppm)	C5 (ppm)
1437	0.1	1				
1445	0.1	10				
1450	0.1	9				
1455	0.1	12				
1460	0.1	18				
1465	0.2	32				
1470	0.2	45				
1475	0.2	35				
1480	0.2	38	1			
1485	0.3	45	2			
1490	0.3	55	3	1		
1495	0.5	70	9	2		
1500	0.4	60	8	2		
1501.5	0.2	30	4	1		
1502	0.6	105	7	2		
1503	0.4	75	6	2		
1505	0.5	80	8	2		
1509	0.2	30	3	1		
1515	0.3	45	4	1		
1520	1.3	190	23	8		
1523	2.8	400	50	23		
1525	2.3	300	40	25		
1530	2.8	340	55	35		
1535	2.7	325	50	35	1	
1540	4	470	85	50	2	
1545	3.1	315	65	50	4	
1550	3.6	450	60	45	4	
1555	3.3	400	55	40	4	
1560	3	360	50	40	3	
1565	3.7	478	64	38	1	
1570	3.8	513	70	41		
1575	2.8	376	48	23		
1580	3.6	470	62	32		
1585	4.5	598	69	20		
1585.5	7	912	92	35		
1586	4.5	598	69	20		
1587	4.5	590	72	25		
1588.3	8.5	1368	92	29		
1589.5	4.4	590	72	25		
1595	4.4	590	72	25		

Depth (m)	TOTAL GAS (unit)	C1 (ppm)	C2 (ppm)	C3 (ppm)	C4 (ppm)	C5 (ppm)
1600	4	615	55	17		
1605	3.4	564	41	9		
1610	5.2	669	73	23		
1615	5	798	69	32		
1620	3.8	428	103	35		
1625	4.8	656	81	41		
1630	4.2	570	69	26		
1635.5	4.7	712	63	32	1	1
1636.5	43	6808	659	592	477	33
1637	5	720	65	33	1	1
1645	5.8	883	81	65	1	1
1650	5.9	912	82	32		
1655	5.7	900	70	30	1	
1660	5.7	910	60	32	2	
1665	5.6	940	57	20	2	
1670	5.5	920	55	18	2	
1675	5.2	885	50	15	1	
1680	4.1	740	25	10		
1685	4.6	850	24	9		
1690	4.6	840	30	10		
1695	4.1	750	25	8		
1700	3.8	710	20	6		
1705	3.8	720	18	4		
1710	3.6	685	15	2		
1715	4.1	760	28	9		
1720	5.7	997	54	6		
1725	4.7	826	46	5		
1730	3.5	599	30	4		
1735	3.6	627	44	2		
1740	4.2	741	41	5		
1745.1	5	883	42	6		
1750	4.8	869	35	4		
1755	4.5	826	25	3		
1760	3.1	570	16	1		
1765	3.4	627	16	1		
1770	3.4	656	12			
1775	3.4	627	13			
1780	3.1	570	17			
1785	2.6	484	10			
1790	2.9	540	20	1		
1795	3.5	630	25	2		
1800	3.3	600	23	2		
1805	3.4	610	25	2		
1810	3.5	630	30	3		

Depth (m)	TOTAL GAS (unit)	C1 (ppm)	C2 (ppm)	C3 (ppm)	C4 (ppm)	C5 (ppm)
1815	3.3	600	23	4		
1820	3.5	615	27	6		
1825	3.9	700	25	5		
1830	4.4	790	25	10		
1835	5.6	1050	20	8		
1840	3.5	660	8	5		
1845	4.1	770	15	6		
1850	3.8	704	17	4		
1855	4.8	814	61	9		
1860	5.8	969	68	16		
1868	6	980	53	27		
1870.5	6	980	75	20	1	1
1873.2	34.7	4136	612	249	120	3
1875	23	3250	375	100	115	2
1875.5	23	3250	375	100	111	2
1876	5.7	924	34	20	2	1
1877.5	5.7	900	30	17	2	
1878	15.5	2200	170	66	5	
1878.5	5.7	942	37	20	2	
1879.5	4	814	61	9	1	
1880.2	35	4546	493	262	122	
1880.6	6.3	1000	80	23	2	
1880.8	6	980	75	20	1	
1881.6	42	5456	592	315	160	
1882	5	705	72	30	1	
1885	5.5	937	48	17		
1886	5	704	71	29	1	
1886.5	84	11220	1280	531	341	
1887.5	5.3	792	51	33	15	
1888	5	775	48	30	12	
1889.5	5.3	790	51	32	13	
1890	12	1760	136	76	20	
1892	50	7480	884	473	222	
1893	5.3	792	51	33	12	
1894	5.6	800	47	30	11	
1895	21	2904	244	162	89	
1896	5.7	812	55	35	16	
1897	5	726	64	48	2	
1897.5	8	1139	69	49	15	
1898	5.7	690	57	32	11	
1899	6	800	50	32	17	
1900	5.3	726	65	48	7	
1902	2.6	425	27	12	1	
1906	2.4	400	24	10		

Depth (m)	TOTAL GAS (unit)	C1 (ppm)	C2 (ppm)	C3 (ppm)	C4 (ppm)	C5 (ppm)
1907.5	4.2	700	35	12		
1910	4.4	790	30	12		
1915	6.5	1190	35	13		
1918	7	1250	38	15		
1918.5	17	3050	120	70		
1919.5	4.3	710	45	15		
1920.5	16.7	3000	115	35		
1921.5	3.3	600	23	7		
1922.5	14	2640	75	24		
1923.7	7	1320	40	12		
1924.8	12.2	2240	70	20		
1925.5	6.1	1115	35	12		
1926.5	12	2200	65	18		
1927.3	4.2	730	22	6		
1930	8.4	1580	30	12		
1935	7.1	1320	27	18		
1940	6.8	1276	25	11		
1942	8.6	1434	95	29		
1945	6.8	1100	74	33		
1954	7	1170	53	36		
1955	15	2520	136	46		
1956	13	2500	128	46		
1957	7	1170	52	36		
1957.5	7	1167	50	39	1	
1958.5	13	2402	105	33	2	
1959.5	9	1971	100	29	1	
1965.5	11.3	1971	100	29		
1966	18.5	3256	135	35		
1968	6	990	47	7		
1969.5	6	990	52	22		
1972	19	3300	160	54		
1973.3	5.7	968	49	20		
1975	6	980	52	26		
1980	5.5	937	48	17	1	
1982	8	1663	84	18	3	
1985	6.1	1100	48	8	1	
1990	6.5	1125	50	10		
1991.5	15.9	2956	71	20		
1992.2	4	616	18	9		
1994	4	616	17	9		
2000	3.8	660	27	8		
2005	3	528	20	8		
2009	3.2	540	22	8		
2009.5	5.2	950	30	10		

Depth (m)	TOTAL GAS (unit)	C1 (ppm)	C2 (ppm)	C3 (ppm)	C4 (ppm)	C5 (ppm)
2010.3	2.8	475	15	5		
2015	2.7	500	15	5		
2020	2.8	520	17	6		
2024	2.6	490	14	4		
2024.8	7.7	1450	35	8		
2026	3.4	630	18	5		
2030	2.6	475	15	3		
2031	2.7	500	16	4		
2032	8.8	1670	15	8		
2032.8	4.4	840	8	5		
2034	10	1800	40	7		
2035	11.1	2110	45	8		
2037	5.5	1060	22	5		
2040	9	1700	37	7		
2045	10.1	1900	35	9		
2050	10.2	1940	35	10		
2055	10.2	1900	37	10		
2059	10.1	1880	35	9		
2060	5.1	850	16	6		
2061.2	5	835	15	5		
2062.2	10	1965	22	7		
2065	11	2150	27	8		
2070	11.4	2200	30	8		
2073.3	11.5	2220	32	8		
2075	3.8	750	12	5		
2076.8	3.7	710	11	4		
2080	6.4	1230	20	5		
2084	9.2	1716	34	6		
2085.6	3	440	25	2		
2087.5	3.9	721	27	2		
2090	4.2	792	14	2		
2091.7	2.7	428	15	1		
2095	2.5	422	15	1		
2096	2.5	422	15	1		
2105.5	4.8	880	29	3		
2110	4	726	31	3		
2115	6.1	1144	27	1		
2120	5.7	1056	29	1		
2125	5.2	969	20	1		
2130	4.5	836	17			
2135	5	860	19			
2140	3.6	682	16			
2145	5.1	970	20			
2150	2.4	440	18			

APPENDIX 8

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APPENDIX 8

GEOCHEMISTRY DATA

HOWMAINS-1

GEOTECH GEOTECHNICAL SERVICES PTY LTD
125 Burswood Road, Victoria Park, Western Australia 6100
Telephone (09) 362 5222
Facsimile (09) 362 5908

3 August, 1994

Kevin Lanigan
GFE Resources Ltd
Box 629
Market Street Post Office
Melbourne
VIC 3000

Dear Kevin,

Please find enclosed saturate GC results for 2 samples from Howmains-1, as well as an invoice for this work.

If you have further queries or if we can be of any assistance to you, please do not hesitate to contact us.

Yours sincerely,

Dr. Birgitta Hartung-Kagi
Managing Director

TABLE 1

Summary of Extraction and Liquid Chromatography

HOWMAINS 1 Aug-94

A. Concentrations of Extracted Material

DEPTH(m)	Weight of Rock Extd (grams)	Total Extract (ppm)	Loss on Column (ppm)	-------Hydrocarbons------- Saturates (ppm)	Aromatics (ppm)	HC Total (ppm)	----Nonhydrocarbons---- NSO's (ppm)	Asphalt (ppm)	NonHC Total (ppm)
1874.0	14.8	2283.2	447.2	1314.4	237.1	1551.5	284.6	nd	284.6
1884.0	10.1	821.0	nd	nd	nd	nd	nd	nd	nd

TABLE 1

Summary of Extraction and Liquid Chromatography

HOWMAINS 1 Aug-94

B. Compositional Data

DEPTH(m)	---Hydrocarbons---- %SAT	%AROM	%HC's	---Nonhydrocarbons----- %NSO	%ASPH	%Non HC's	EOM(mg) / TOC(g)	SAT(mg) / TOC(g)	SAT / AROM	ASPH / NSO	HC / Non HC
1874.0	71.6	12.9	84.5	15.5	nd	15.5	nd	nd	5.5	nd	5.5
1884.0	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

nd = no data

TABLE 2

HOWMAINS 1 Summary of Gas Chromatography Data

A. Alkane Compositional Data SATURATE FRACTION

DEPTH(m)	Prist./Phyt.	Prist./n-C17	Phyt./n-C18	CPI(1)	CPI(2)	(C21+C22)/(C28+C29)
1874.0	5.05	0.36	0.07	1.09	1.08	3.46
1884.0	5.03	0.38	0.08	1.07	1.06	3.30

TABLE 2

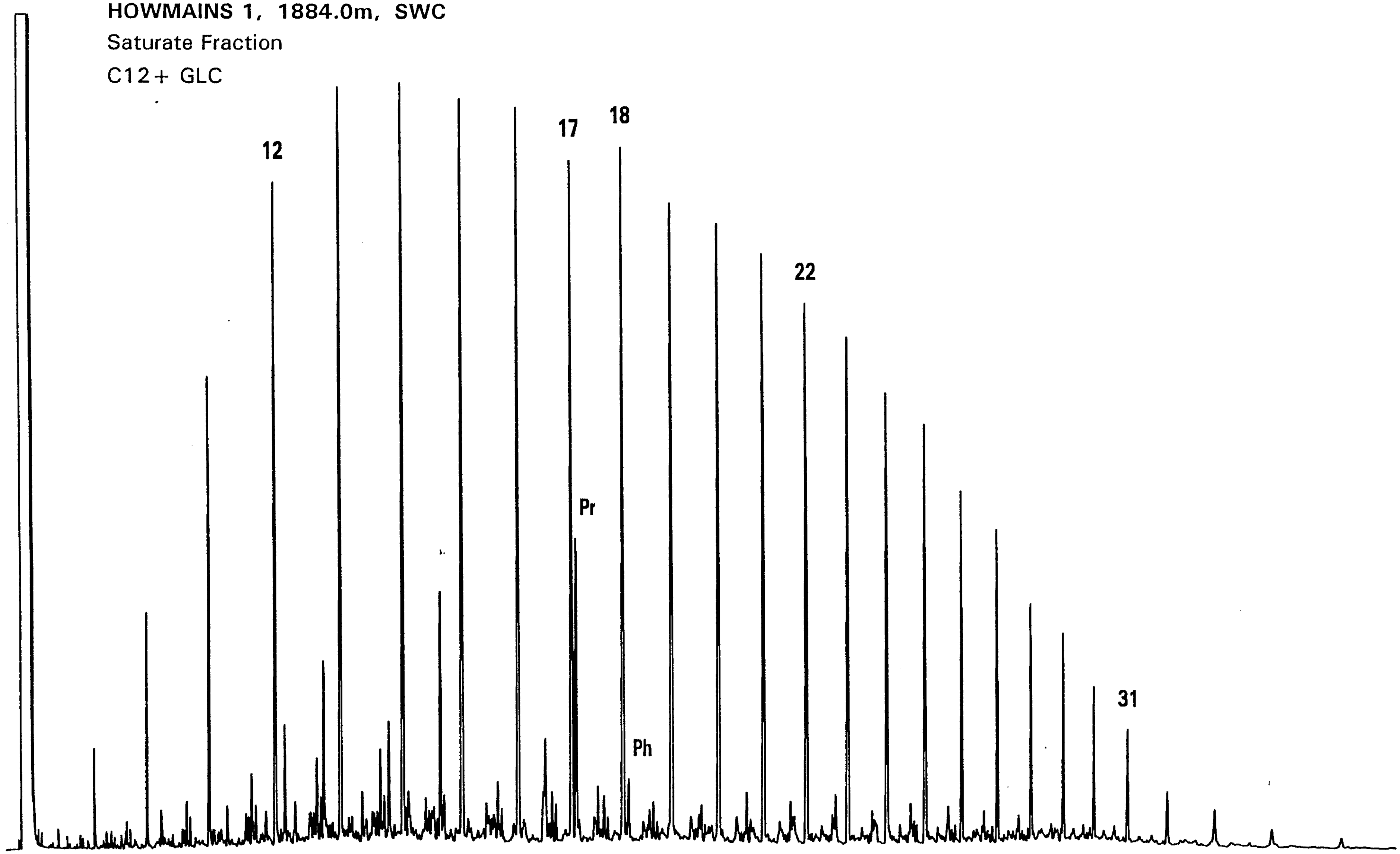
HOWMAINS 1 Summary of Gas Chromatography Data

B. n-Alkane Distributions SATURATE FRACTION

DEPTH(m)	nC12	nC13	nC14	nC15	nC16	nC17	iC19	nC18	iC20	nC19	nC20	nC21	nC22	nC23	nC24	nC25	nC26	nC27	nC28	nC29	nC30	nC31
1874.0	6.9	7.5	7.7	7.7	7.5	7.4	2.6	7.0	0.5	6.8	6.0	5.4	5.1	4.7	3.9	3.6	2.6	2.3	1.7	1.4	1.0	0.8
1884.0	5.4	6.6	7.1	7.4	7.3	7.2	2.7	7.1	0.5	7.0	6.2	5.8	5.4	5.0	4.4	3.9	2.9	2.5	1.8	1.5	1.1	0.9

nd = no data

HOWMAINS 1, 1884.0m, SWC
Saturate Fraction
C12+ GLC



2088ED2

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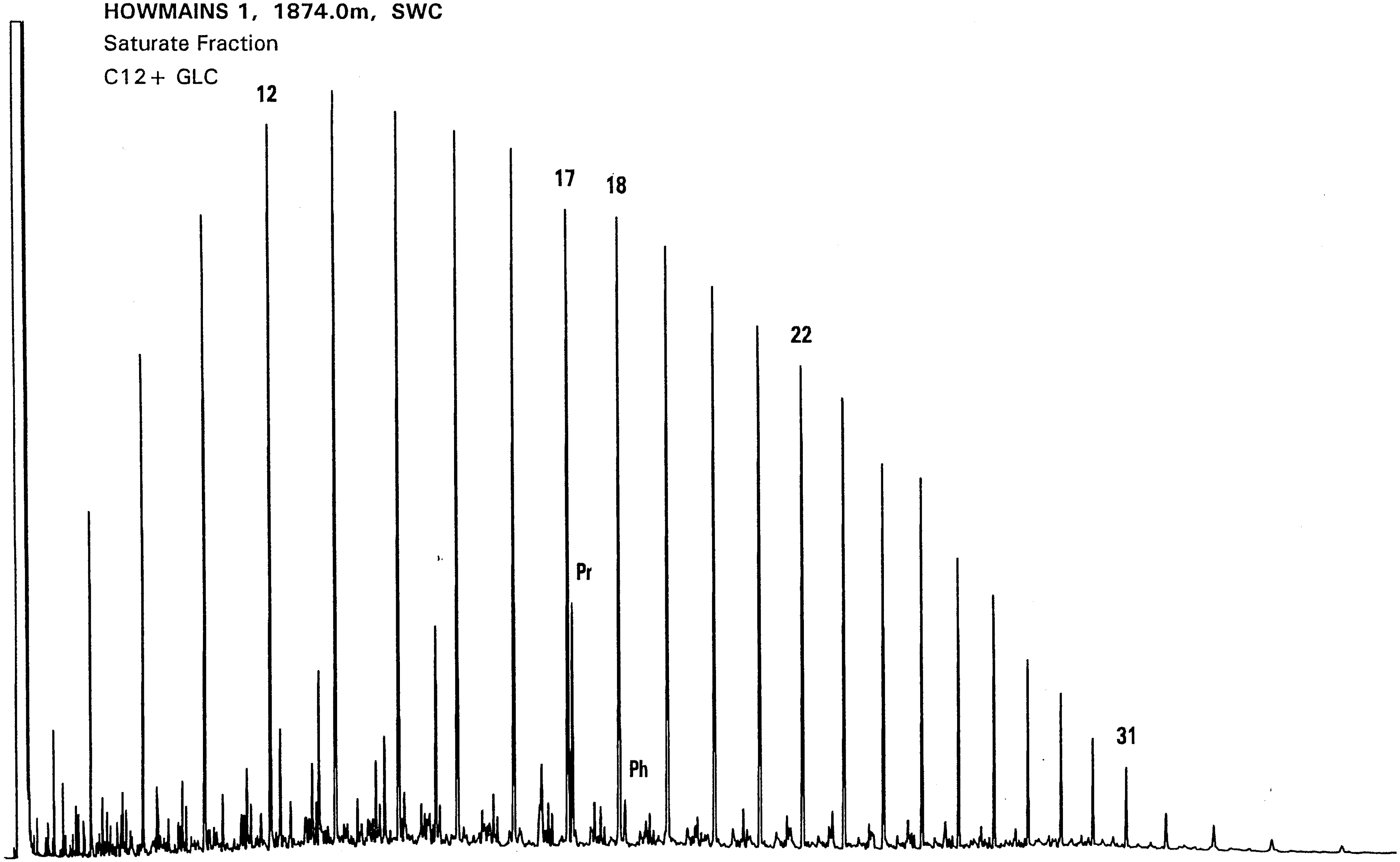
HOWMAINS 1, 1874.0m, SWC

Saturate Fraction

C12+ GLC



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APPENDIX 9

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APPENDIX 9A

HOT SHOT PALYNOLOGY

(by Roger Morgan)

HOWMAINS-1

MORGAN PALAEO ASSOCIATES

PALYNOLOGICAL/PETROLEUM GEOLOGICAL CONSULTANTS

POSTAL ADDRESS: Box 161, Maitland, South Australia 5573
DELIVERIES: 1 Shannon Tce, Maitland, South Australia 5573
Phone (088) 32 2795 Fax (088) 32 2798

Howmains-1 Hot Shot Palynology

Onshore Otway Basin Victoria

Three samples were analysed as below. Samples were met at 8.30am at Adelaide Airport and processed and examined in the Geology Department at the University of Adelaide. Results were phoned at 10.30am with a written report at 12 noon.

1900-10m(cutts) : mixed Late Cretaceous, mostly *apoxyexinus* to *mawsonii* Zones : Santonian-Turonian : nearshore marine ; usually Sherbrook Group.

1930-40m(cutts) : mixed Late Cretaceous but with rare Early Cretaceous elements (consistent *C. paradoxa* and *C. striatus*, very rare *F. asymmetricus*, *T. trioreticulosus*) therefore considered *paradoxa* Zone with heavy Late Cretaceous caving. Early Cretaceous reworking into the Late Cretaceous is possible but considered unlikely. Therefore probably Eumeralla Formation.

1940-50m(cutts) : Mixed late Cretaceous with Early Cretaceous elements (consistent *C. paradoxa*, *C striatus* with frequent *C. australiensis*, very rare *B. holodictyus*) therefore considered *paradoxa* Zone with Late Creataceous caving. Therefore probably Eumeralla Formation.

In summary, penetration of the top Eumeralla Formation appear to have occurred between 1900 and 1940m.

Raw data is presented as an Appendix.
Cretaceous Regional Framework is presented as Figure 1

Roger Morgan
19.7.94

OTW.RPHOWMAI

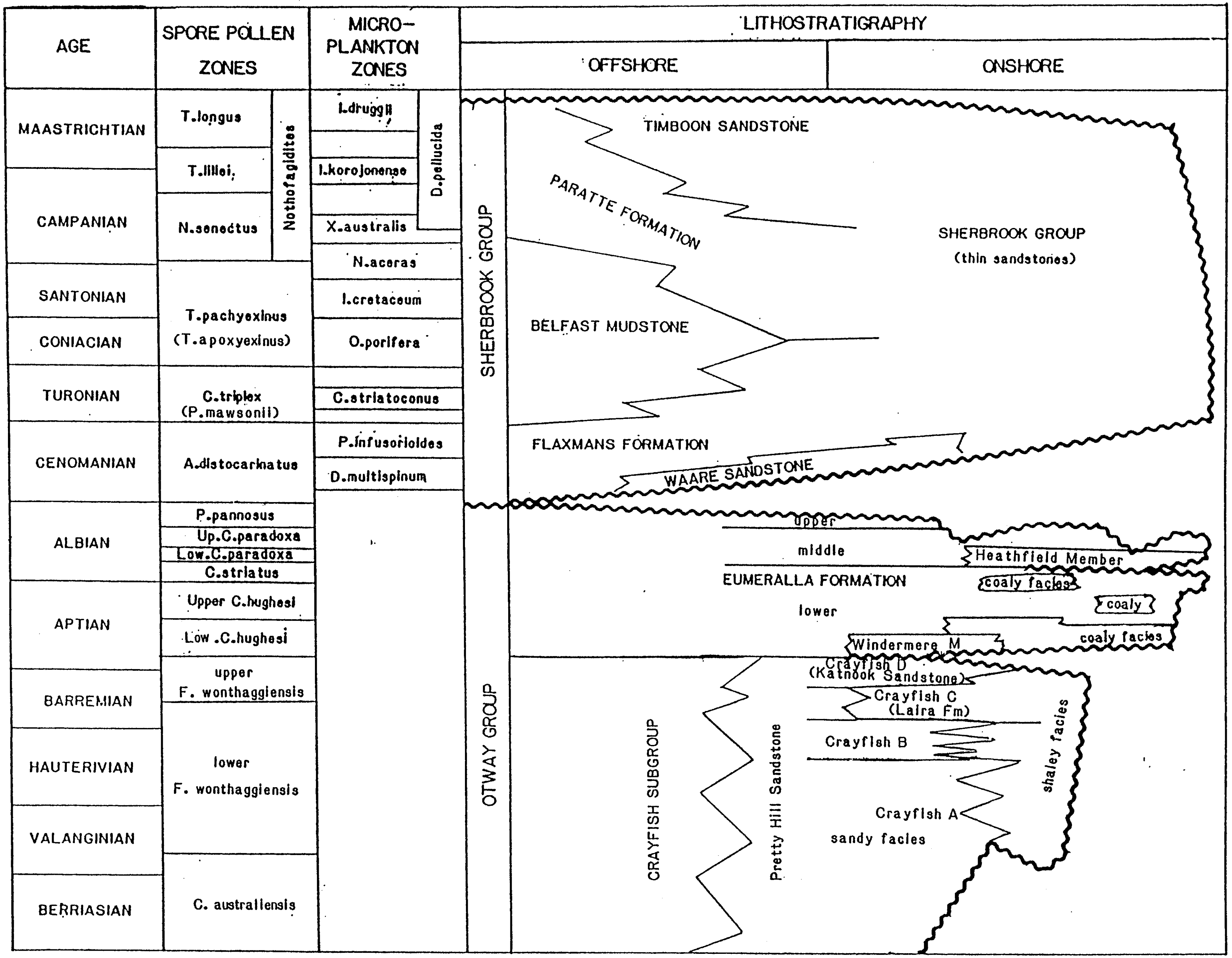

FIGURE 1. CRETACEOUS REGIONAL FRAMEWORK, OTWAY BASIN

HOWMAINS #1

MORGAN PALAEO ASSOCIATES
BOX 161, MAITLAND, SOUTH AUSTRLALIA, 5573
PHONE: (088) 322795 FAX: (088) 322798

C L I E N T: GAS & FUEL
W E L L: HOWMAINS #1
F I E L D / A R E A: ONSHORE OTWAY BASIN, VICTORIA

A N A L Y S T: ROGER MORGAN D A T E : AUGUST 1994
N O T E S: ALL DEPTHS IN METRES. ALL FIGURES ARE PERCENTAGES.
X MEANS THAT SPECIES IS VERY RARE AND OCCURRED OUTSIDE GRAIN COUNT.

RANGE CHART OF OCCURRENCES BY ALPHABETICAL (grouped)

1900-10 CUTTS 3	1930-40 CUTTS 2	1940-50 CUTTS 1		
			1	BOTRYOCOCCUS
.	.	X	2	SCHIZOSPORIS RETICULATUS
X	.	.	3	ALISOCYSTA CIRCUMTABULATA
.	.	1	4	AMPHIDIADEMA DENTICULATA
1	.	.	5	CIRCULODINIUM DEFLANDREI
X	.	1	6	CRIBROPERIDINIUM EDWARDSII
X	.	.	7	CRIBROPERIDINIUM SPP
X	.	.	8	EXOCHOSPHAERIDIUM PHRAGMITES
.	1	X	9	HETEROSPHAERIDIUM CONJUNCTUM
4	4	3	10	HETEROSPHAERIDIUM HETEROCANTHUM
5	.	1	11	HETEROSPHAERIDIUM SOLIDA
.	.	X	12	IMPLETOSPHERIDIUM SP
.	.	1	13	ISABELIDINIUM
X	.	.	14	ISABELIDINIUM BELFASTENSE ROTUNDATA
X	.	.	15	ISABELIDINIUM COOKSNIAE
.	X	X	16	ISABELIDINIUM CRETACEUM
.	X	.	17	ISABELIDINIUM KOROJONENSE
.	X	.	18	ISABELIDINIUM RECTANGULARIS
1	.	.	19	KIOKANSIUM POLYPES
1	.	X	20	NELSONIELLA ACERAS
X	X	X	21	ODONTOCHITINA CRIBROPODA
.	X	1	22	ODONTOCHITINA OPERCULATA

		1900-10 CUTS	1930-40 CUTS	1940-50 CUTS
23	OLIGOSPHAERIDIUM COMPLEX	2	X	.
24	OLIGOSPHAERIDIUM PULCHERRIMUM	1	.	.
25	PALAEOHYSTRICHOPHORA INFUSORIOIDES	.	.	X
26	PALAEOPERIDINIUM CRETACEUM	1	.	.
27	SPINIFERITES FURCATUS/RAMOSUS	3	.	1
28	TRITHYRODINIUM MARSHALLII	X	.	.
29	TRITHYRODINIUM THICK RETICULATA	X	.	.
30	TRITHYRODINIUM THICK VERRUCATE	X	.	.
31	XENIKOON AUSTRALIS	X	.	.
32	AEQUITRIRADITES VERRUCOSUS	.	X	X
33	AMOSOPOLLIS CRUCIFORMIS	2	.	.
34	ARAUCARIACITES AUSTRALIS	.	X	1
35	BALMEISPORITES HOLODICTYUS	.	.	1
36	BIRETRISPORITES	.	.	1
37	CALLIALASPORITES DAMPIERI	.	1	.
38	CALLIALASPORITES TURBATUS	1	1	2
39	CERATOSPORITES EQUALIS	1	X	.
40	CICATRICOSISPORITES AUSTRALIENSIS	2	1	8
41	CICATRICOSISPORITES LUDBROOKIAE	.	X	X
42	CINGUTRILETES CLAVUS	.	1	.
43	CLAVIFERA TRIPLEX	.	.	X
44	CONTIGNISPORITES COOKSONIAE	X	.	.

No.	Taxon	1900-10 CUTTS	1930-40 CUTTS	1940-50 CUTTS
45	COPTOSPORA PARADOXA	.	X	X
46	COROLLINA TOROSUS	3	1	X
47	CRYBELOSPORITES STRIATUS	.	X	X
48	CYATHIDITES AUSTRALIS	3	12	6
49	CYATHIDITES MINOR	12	12	12
50	CYCADOPITES FOLLICULARIS	1	1	.
51	FALCISPORITES GRANDIS	4	8	13
52	FALCISPORITES SIMILIS	27	22	35
53	FORAMINISPORIS ASYMMETRICUS	.	X	.
54	FORAMINISPORIS WONTHAGGIENSIS	.	X	.
55	-GLEICHENIIDITES	1	X	.
56	KLUKISPORITES SCABERIS	.	X	.
57	MICROCACHRYIDITES ANTARCTICUS	10	8	7
58	OSMUNDACIDITES WELLMANII	7	22	4
59	PEROTRILETES MAJUS	.	.	X
60	PHYLLOCLADIDITES MAWSONII	X	.	.
61	PODOSPORITES MICROSACCATUS	1	1	.
62	RETITRILETES AUSTROCLAVATIDITES	2	1	X
63	RETITRILETES EMINULUS	.	.	X
64	REWORKING - PERMIAN	X	.	.
65	TRICOLPORITES APOXYEXINUS	.	1	.
66	TRILOBOSPORITES TRIORETICULOSUS	.	X	.

		1900-10 CUTTS	1930-40 CUTTS	1940-50 CUTTS
67	TRIPOROLETES RADIATUS	.	X	X
68	TRIPOROLETES RETICULATUS	.	X	X
69	VITREISPORITES PALLIDUS	1	.	X

1900-10 CUTTS
1930-40 CUTTS
1940-50 CUTTS

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APPENDIX 9B

PALYNOLOGICAL ANALYSIS

(by Alan Partridge)

HOWMAINS-1

Palynological analysis of Howmains-1, Port Campbell Embayment, Otway Basin.

by

Alan D. Partridge
Biostrata Pty Ltd
A.C.N. 053 800 945

Biostrata Report 1994/13
22 September 1994

INTERPRETATIVE DATA

Introduction

Twenty sidewall cores samples between 1036.0-2098.0m were analysed in Howmains-1. The author cleaned and split the samples then forwarded them to Laola Pty Ltd in Perth for processing to prepare the palynological slides.

Between 8.2 to 14.4 grams (average 11.3 g) of the sidewall cores were processed for palynological analysis. High residue yields were extracted from most samples. Kerogen slides were prepared with filtered and unfiltered fractions, whilst separate oxidised slides were prepared from fractions concentrated from the residues using 8 and 15 micron filters. Palynomorph concentrations on the palynological slides were mostly low to moderate, while palynomorph preservation was poor to fair and only very occasionally good. The interaction of poor preservation and low palynomorph concentration made most palynological slides slow and difficult to examine.

Excluding the two nearly barren samples at 1907m and 1997m the overall spore-pollen diversity was high averaging 26+ species per sample. Microplankton diversity was low to very low in the Tertiary and Early Cretaceous but moderate in the Late Cretaceous Sherbrook Group where the average diversity was 12+ species per sample. The microplankton abundance data presented in Table-2 was obtained from counts made on slides prepared using 8 microns filter cloth.

Geological ages, formations and palynological zones for the interval sampled in Howmains-1 are given in Table-1. Additional interpretative data with zone identification and Confidence Ratings are recorded in Table-3, whilst basic data on sidewall core lithologies, residue yields, preservation and diversity are recorded on Tables-4 and 5. All species which have been identified with binomial names are tabulated on separate range charts for spore-pollen and microplankton which present the recorded assemblages in order of lowest appearances.

Table-1: Palynological Summary Howmains-1

<table>
<tr><th>AGE</th><th>UNIT</th><th>SPORE-POLLEN ZONES</th><th>MICROPLANKTON ZONES (SUBZONES)</th></tr>
<tr><td>EOCENE</td><td rowspan="2">PEMBER MUDSTONE
1017-1082m</td><td rowspan="2">Lower M. diversus
1036m
L. balmei
1072m</td><td rowspan="2">INDETERMINATE</td></tr>
<tr><td rowspan="3">PALEOCENE</td></tr>
<tr><td>PEBBLE POINT FORMATION
1082-1138m</td><td rowspan="5">NOT SAMPLED</td><td rowspan="5">NOT SAMPLED</td></tr>
<tr><td rowspan="2">K/T BOUNDARY SHALE
1138-1163m</td></tr>
<tr><td rowspan="2">MAASTRICHTIAN</td></tr>
<tr><td rowspan="2">PAARATTE FORMATION
1163-1473m</td></tr>
<tr><td rowspan="3">CAMPANIAN</td></tr>
<tr><td rowspan="3">SKULL CREEK MUDSTONE
1473-1637m</td><td rowspan="5">N. senectus
to
T. apoxyexinus
1483-1815m</td><td>X. australis
1483m</td></tr>
<tr><td>N. aceras
1558m</td></tr>
<tr><td rowspan="3">SANTONIAN</td><td rowspan="2">I. cretaceum
1632-1807m</td></tr>
<tr><td rowspan="3">BELFAST MUDSTONE
1637-1840m</td></tr>
<tr><td>O. porifera
1815m</td></tr>
<tr><td>CONIACIAN</td><td rowspan="4">P. mawsonii
1828-1887.5m</td><td>C. striatoconus
1828-1838m</td></tr>
<tr><td rowspan="3">TURONIAN</td><td>WAARRE D
1840-1856m</td><td>P. infusorioides
1847-1854m</td></tr>
<tr><td>WAARRE B
1856-1888.5m</td><td rowspan="2">P. infusorioides
(C. edwardsii)
1860-1904m</td></tr>
<tr><td>WAARRE A
1888.5-1902m</td></tr>
<tr><td>LATE ALBIAN</td><td>EUMERALLA FORMATION
1902-2150m (T.D.)</td><td>P. pannosus
1936-2098m</td><td></td></tr>
</table>

Geological Comments

1. The sequence sampled in Howmains-1 spans the time interval of Late Albian to Early Eocene. With some minor modifications most samples can be readily assigned to the Mesozoic spore-pollen and microplankton zones defined by Helby, Morgan & Partridge (1987) or the Tertiary spore-pollen zones of Stover & Partridge (1973).

2. A number of the spore-pollen zones used or discussed herein represent modifications or name changes by Helby *et al.* (1987) of zones originally erected by Dettmann & Playford (1969) upon wells from the Port Campbell Embayment. As these zones are ~~is~~ still widely used in reports and publications on the Otway Basin it is appropriate to provide a summary of the equivalence between the two zonation schemes. Explanations of the reasons for the zone name changes can be found in Helby *et al.* (1987). The zones referred to in this report are:

Dettmann & Playford (1969)		**Helby *et al.* (1987)**
Nothofagidites Microflora (in part only)	=	*N. senectus* Zone
T. pachyexinus Zone	=	*T. apoxyexinus* Zone
C. triplex Zone	=	*P. mawsonii* Zone
A. distocarinatus Zone	=	*A. distocarinatus* Zone
P. pannosus Zone	=	*P. pannosus* Zone

3. The spore-pollen succession commences with the *P. pannosus* Zone identified in the Eumeralla Formation. In the overlying Waarre Formation the *P. mawsonii* Zone was found to extend to the base of the unit and the Cenomanian *A. distocarinatus* Zone as redefined by Helby *et al.* (1987) is considered to be absent at the unconformity between the Waarre and Eumeralla Formations. This relationship confirms results previously obtained from Iona-2 and Langley-1 (Partridge 1994a,b). Assemblages from the succeeding Belfast and Skull Creek Mudstones proved to be disappointing as the boundaries between the *P. mawsonii* and overlying *T. apoxyexinus* Zone and between the *T. apoxyexinus* and *N. senectus* Zones could not be confidently identified. The two shallowest samples from the Tertiary were also disappointing, for although displaying high diversity they contained few key species.

4. Marine microplankton were recorded in all samples analysed from the Late Cretaceous Sherbrook Group and both samples from the Early Tertiary Pember Mudstone. Abundant marine microplankton comprising 90% of the assemblage count were also recorded from the sidewall core at 1904m, which is below the most logical log pick for the top of the Eumeralla Formation at 1902m. This sample consisted of two lithologies, a friable sandstone and a greenish grey claystone which is most similar to the underlying Eumeralla samples (Table-4). The sample could not be adequately cleaned and is therefore possibly contaminated. It is suspected the dinoflagellates are coming from sandstone lithology which has been introduced as a clastic dike into the Eumeralla Formation. Such clastic dikes are a typical features of the better exposures of the unconformity between the Eumeralla and Pebble Point Formations which outcrop at Point Margaret and Buckleys Point (see Keating 1993). The two other good assemblages from the Eumeralla Formation contained only the single non-marine algae species *Circulosporites parvus* (De Jersey 1962).

5. Six microplankton zones are recorded from the Sherbrook Group between the basal Turonian to Early Campanian and they conform to the normal sequence documented by Helby *et al.* (1987). As well the new *C. edwardsii* Subzone previously recorded in Iona-2 and Langley-1 was identified in the lower half of the *P. infusorioides* Zone. The microplankton recorded from the two Tertiary samples could not be assigned to any of the established zones.

6. The oldest unit penetrated in Howmains-1 is the Eumeralla Formation between 1902-~~12~~2150m (T.D.). The lithology is a variable greenish-grey to medium grey claystone to sandstone (Table-4). Although the Late Albian *P. pannosus* Zone identified form this section conforms to the youngest age known from this formation, there are compositional differences in both the spore-pollen and non-marine microplankton in the unit which indicate there is no direct correlation to the *P. pannosus* Zone sections in Iona-2 and Langley-1. This is not considered surprising as the *P. pannosus* Zone represents a time interval of between 4 to 5 million years and the wells may well be sampling different parts of the zone below the top of Eumeralla unconformity.

7. In the Waarre Formation identified between 1840-1902m palynological correlation with the more detailed sampled Langley-1 well suggests that the Howmains-1 section contains parts of Units A, B and D of the Waarre (*sensus* Buffin 1989) and that Unit C is missing at an unconformity at 1856m.

8. Palynological assemblages characteristic of the Waarre Units A and B were recorded from the three sidewall cores between 1860-1887.5m as well as the sample at 1904m whose problematical location is discussed above. The spore-pollen assemblages are characterised by the pollen *Hoegisporis trinalis* ms and spore *Appendicisporites distocarinatus* while the microplankton assemblages are characterised by the association of *Cribroperidinium edwardsii, Palaeoperidinium cretaceum* and *Cyclonephelium compactum.* The association of these three species does not occur above Unit B in Langley-1. The two overlying samples at 1847m and 1854m are in turn best correlated with palynological assemblages in the Waarre Unit D in Langley-1 between 1712.5-1729.5m based on the characteristic increase in abundance of *Heterosphaeridium* spp and *Amosopollis cruciformis*.

9. The above correlation is also strongly supported by the identification of the *Conosphaeridium striatoconus* Zone at 1828m and 1838m. This zone provides a critical tie point to Langley-1 at 1701m (Partridge 1994b) and Iona-1 at 1276.5m (Morgan 1988). The zone was also recorded from the nearby Flaxmans-1 well in core-21 at 6832ft (= 2082m) by Stacy (1981). Unfortunately this record is unreliable as the well completion report records core-21 as no recovery. It is therefore uncertain where Stacy obtained his sample although it may have come from the lower part of core-22 between 6632-6635ft (= 2021-2022m) as recently suggested by Partridge (letter to GFE Resources Ltd on 7 September 1994). Following the arguments given in the Langley-1 palynological report the base of the Belfast Mudstone is picked below the *C. striatoconus* Zone at 1840m where there is a sharp increase in separation between the bulk density and neutron porosity logs.

10. The Belfast Mudstone in Howmains-1 contains the *C. striatoconus, O. porifera* and *I. cretaceum* microplankton Zones as was also found in Langley-1. The presence of the *Isabelidinium rotundatum* ms (Marshall 1984) at 1632m and 1663m suggests that the log pick for the top of the Belfast at 1637m is actually the characteristic log break for the base of the Skull Creek Mudstone in Langley-1 (at 1517m) and Iona-2 (at 1163m). This means that the Nullawarre Greensand Member in the latter two wells is a facies of the uppermost part of the Belfast Mudstone in Howmains-1.

11. The Cretaceous/Tertiary (K/T) boundary shale identified in Langley-1 between 892-917.5m is correlated using the gamma log to the shale between 1138-1163m in Howmains-1. This would make the overlying sand between 1082-1138m the Pebble Point Formation and place the two

shallowest samples analysed in the Pember Mudstone Member. These suggested correlations could be tested by palynological analysis of cuttings sample from the interpreted K/T boundary shale which in Langley-1 and Iona-1 contains distinctive dinoflagellate assemblages.

12. Howmains-1 is similar to Langley-1 in that all samples analysed from the Sherbrook Group are considered to be marine based on the abundance and diversity of microplankton (Tables 2 & 5). Whilst superficially the microplankton abundance appears greater in Howmains-1 relatively to Langley-1 this cannot yet be demonstrated as significance because of difference in palynomorph preservation and concentrations resulting from slightly different sample preparations between the two wells. What is clear is that the palynological analysis has not identified any non-marine fluviatile to coastal plain environments within the Sherbrook Group. Instead all the palynological samples examined are representative of offshore marine environments.

13. In contrast to both Langley-1 and Iona-2 only the non-marine algal cyst *Circulosporites parvus* (De Jersey 1962) was recorded in the samples from the Eumeralla Formation in Howmains-1. Because there are also differences between these three wells in the composition of the associated spore-pollen assemblages it is considered more likely that the assemblage differences reflect time differences within the *P. pannosus* Zone rather than being due to lateral facies changes. This suggests there is potential for future subdivision of the *P. pannosus* Zone.

14. Reworked palynomorphs were recorded from virtually all samples analysed. Because of age and preservation differences Permian and Triassic spore-pollen are the most obvious reworked palynomorphs. Reworked Early Cretaceous spores and pollen from the Otway Group are found throughout the Sherbrook Group, but the full extent of this reworking is impossible to estimate as many Early Cretaceous species are considered to range into the Late Cretaceous.

Table-2: Microplankton Abundance for Selected Samples.

Sample Type	Depth (m)	Microplankton Zone or Subzone	Microplankton Abundance as % Relative to total Spore-pollen and Microplankton	Most abundant microplankton species as % of total microplankton
SWC-30	1036.0		8%	*Paralecaniella indentata* >75%.
SWC-29	1072.0		6%	*Paralecaniella indentata* >35%.
SWC-28	1483.0	*X. australis*	40%	*Heterosphaeridium* spp. >75%.
SWC-27	1558.0	*N. aceras*	36%	*Heterosphaeridium* spp. >65%.
SWC-26	1632.0	*I. cretaceum*	28%	*Heterosphaeridium* spp. >35%.
SWC-25	1663.0	*I. cretaceum*	12%	*Heterosphaeridium* spp. >30%.
SWC-24	1807.0	*I. cretaceum*	19%	*Amosopollis cruciformis* >30%.
SWC-23	1815.0	*O. porifera*	33%	*Heterosphaeridium* spp. 35%. *Amosopollis cruciformis* 35%.
SWC-22	1828.0	*C. striatoconus*	42%	*Heterosphaeridium* spp. >25%. *Amosopollis cruciformis* >30%.
SWC-21	1838.0	*C. striatoconus*	66%	*Amosopollis cruciformis* >50%.
SWC-20	1847.0	*P. infusorioides*	52%	*Heterosphaeridium* spp. 30%. *Amosopollis cruciformis* 30%.
SWC-19	1854.0	*P. infusorioides*	43%	*Heterosphaeridium* spp. 21%. *Amosopollis cruciformis* 35%.
SWC-18	1860.0	*C. edwardsii*	35%	*Cribroperidinium edwardsii* >15%.
SWC-15	1882.0	*C. edwardsii*	15%	*Cyclonephelium* spp. >35%.
SWC-13	1887.5	*C. edwardsii*	10%	*Cyclonephelium* spp. >40%.
SWC-10	1904.0	*C. edwardsii*	90%	*Palaeoperidinium cretaceum* >60%.
SWC- 7	1936.0		2%	*Circulisporites parvus* 100%.
SWC- 1	2098.0		<1%	*Circulisporites parvus* 100%.

Biostratigraphy

The zone and age determinations for the Cretaceous samples are based on the Australia wide Mesozoic spore-pollen and microplankton zonation schemes described by Helby, Morgan & Partridge (1987). For the Tertiary zone and age determinations are based on the spore-pollen zonation scheme of Stover & Partridge (1973) with subsequent unpublished modifications.

Author citations for most spore-pollen species can be sourced from Helby, Morgan & Partridge (1987), Dettmann (1963), Dettmann & Jarzen (1988), Stover & Partridge (1973) or other references cited herein. Author citations for dinoflagellates can be found in the indexes of Lentin & Williams (1985, 1989) or other references cited herein. Species names followed by "ms" are unpublished manuscript names.

Spore-Pollen Zones

Lower *Malvacipollis diversus* Zone.
Interval: 1036.0 metres.
Age: Early Eocene.

The shallowest sample is assigned to this zone on the presence of *Proteacidites grandis* and *P. nasus* Truswell & Owens 1988 and absence of *Lygistepollenites balmei*. Although the assemblage is of high diversity (31+ species) it lacks certain species which would be considered typical of the zone (eg. *Malvacipollis diversus* and *Intratriporopollenites notabilis*) and contains other species whose occurrence would be considered anomalous such as *Proteacidites confragosus*. It is possible the sample could belong to the Middle *M. diversus* Zone on the presence of a questionable specimen of *Proteacidites xestoformis* ms. The few specimens of *Australopollis obscurus* recorded were interpreted as reworked, although this species is known to range higher in the Otway Basin compared to the Gippsland Basin. The assemblage is dominated by *Podocarpidites* spp. 20%, *Cyathidites* spp. 16%, *Proteacidites* spp. 14%, *Dilwynites* spp. 13%, and *Gleicheniidites circinidites* 10%. The associated microplankton are not zone diagnostic but do indicate a marine environment of deposition.

***Lygistepollenites balmei* Zone.**
Interval: 1072.0 metres.
Age: Paleocene.

The dominance of *Dilwynites* spp. and *Proteacidites* spp. both at 23% in association with frequent *Lygistepollentites balmei* at 3.5% is typical of the gross assemblage character of this zone. Even though of high diversity (29+ species) the sample could not be assigned with confidence to either the Upper or Lower *L. balmei* Subzones although the presence of *Anacolosidites acutullus* and *Proteacidites adenanthoides* would favour assignment to the Upper subzone. The few microplankton recorded were not diagnostic but confirm a marine environment of deposition.

The sample also contained a single specimen of the interesting and unusual primitive angiosperm *Lactoripollenites africanus* Zavada & Benson 1987.

***Nothofagidites senectus* to *Tricolporites apoxyexinus* Zones.**
Interval: 1483.0-1815.0 metres (368+ metres).
Age: Lower Campanian to Santonian.

The six samples over this interval contained moderate to high diversity spore-pollen assemblages with a total diversity of 55+ species. Unfortunately the assemblages were dominated by long ranging species and the FADs (First Appearance Datums) for the key index species which define the zone boundaries were significantly younger than the established relationships of their FADs to the parallel microplankton zones. Thus, the two shallowest and two deepest samples to be honest with the recorded data had to be bracketed with their adjacent zones (Table-3). Examples of delayed FADs are the index species *Nothofagidites senectus* and *Forcipites sabulosus* diagnostic of the base of the *N. senectus* Zone which could not be found in the two shallowest samples at 1483m and 1558m. It is well established that these species range as old as the *N. aceras* Zone (Helby *et al.* 1987) and this was recently confirmed in the palynological analysis of Iona-2 (Partridge 1994a). Similarly, the possible index species for the base of the *T. apoxyexinus* Zone were either not recorded (eg. *Forcipites stipulatus* and *Ornamentifera sentosa*) or are recorded later than expected as for example *Tricolporites apoxyexinus* and *Peninsulapollis gillii* which were not confidently recorded until 1632m. However, on abundance data the *T. apoxyexinus* Zone clearly to extend as deep as 1663m based on the frequent to common occurrence of *Proteacidites* spp. and *Australopollis obscurus*, while the established relationships between the spore-pollen and microplankton zones suggests it should extend as deep as 1815m. Overall the assemblages in this interval are dominated by *Podocardipites* spp. with a significant increase in angiosperm pollen from 1663m.

***Phyllocladidites mawsonii* Zone** (formerly the *Clavifera triplex* Zone).
Interval: 1828.0-1887.5 metres (60+ metres).
Age: Turonian-Coniacian.

The seven samples assigned to the *P. mawsonii* Zone can be subdivided into two subzones based mainly on the range of *Hoegisporis trinalis* ms.

The lower subzone represented by the three samples between 1860-1887.5m (and probably the spore-pollen poor sample at 1904m) is characterised by the consistent and often frequent occurrence of *H. trinalis* ms, *Appendicisporites distocarinatus*, *Rugulatisporites admirabilis* ms and *Cicatricoisisporites pseudotripartitus* with only the very rare occurrence of the eponymous species *P. mawsonii* (only at 1887.5m). Other rare species from this lower interval include *Densoisporites muratus* ms, *Stoverisporites microverrucatus* Burger 1976 and a single specimen of *Hoegisporis uniforma*. These samples correlate well with assemblages documented from the Waarre Units A and B in Langley-1 (Partridge 1994b).

The upper subzone represented by the four samples between 1828-1854m is characterised by the consistent occurrence of *P. mawsonii* and the first appearance and increasing presence of *Clavifera triplex*. The overall character of the assemblages also changes with the incoming of abundances of the dinoflagellate *Heterosphaeridium* spp. and the enigmatic algal cyst *Amosopollis cruciformis*. The more abundant microplankton combined with lower yields and lower palynomorph concentrations means that the full spore-pollen diversity probably has not been adequately recorded from this upper subzone. Important LADs (Last Appearance Datums) include *Appendicisporites distocarinatus* at 1854m and *Rugulatisporites admirabilis* ms at 1828m. This upper subzone correlates moderately well with similar assemblages from the Waarre Unit D and basal Belfast Mudstone in Langley-1 (Partridge 1994b).

***Appendicisporites distocarinatus* Zone.**
Interval: Not recorded in Howmains-1.
Age: Cenomanian.

The results from Howmains-1 confirms the observations in Langley-1 and Iona-2 that the *A. distocarinatus* Zone in terms of the modified concept of Helby *et al.* (1987) is not present in the Waarre Formation.

***Phimopollenites pannosus* Zone.**
Interval: 1936.0-2098.0 metres (162+ metres).
Age: Late Albian.

Only two of the four samples analysed from the Eumeralla Formation gave datable assemblages which are assigned to the zone on the presence of the eponymous species *P. pannosus*. The presence of *Trilobosporites trioreticulosus* in both samples could be considered an important accessory indicator in line with the range for this species given by Dettmann & Playford (1969, table 9.4) but not its range given by Helby *et al.* (1987, fig.33). This species has not been recovered *insitu* from the Waarre Formation in the other wells recently analysed. In overall composition the assemblages in Howmains-1 differ from those in Langley-1 and Iona-2 by their significant abundances of *Cicatricosisporites* spp. (5% to 9%) and limited abundance of *Corallina* spp. (<3%).

Microplankton Zones

***Xenikoon australis* Zone**
Interval: 1483.0 metres
Age: Early Campanian.

The shallowest sample from the Late Cretaceous is assigned to the *X. australis* Zone on the presence of the eponymous species. The assemblage is dominated by *Heterosphaeridium heteracanthum* and the only other diagnostic species are *Nelsoniella tuberculata* and *Isabelidinium thomasii.*

***Nelsoniella aceras* Zone.**
Interval: 1558.0 metres.
Age: Early Campanian.

The single sample is assigned to the zone on presence of eponymous species *N. aceras* (>6%) and lack of next zone index *X. australis*. The sample is dominated by *Heterosphaeridium* spp. (>55%) and contains common *Palaeohystrichophora infusorioides* (15%) and *Gilliania hymenophora* (4.5%), whilst *Amosopollis cruciformis* is rare (<1%).

***Isabelidinium cretaceum* Zone.**
Interval: 1632.0-1807.0 metres (175+ metres).
Age: Santonian.

The three samples assigned to the zone lack *Isabelidinium cretaceum* s.s. but contain the accessory indicator species *Isabelidinium belfastense* (at 1807m) and *Amphidiadema denticulata* (at 1663m) which were considered by Helby *et al.*

(1987, fig.40) to have their FADs in the upper part of the zone. The two shallower samples also contain *Isabelidinium rotundatum* ms Marshall 1984. This species is the variety of *I. cretaceum* recorded by Cookson & Eisenack (1961, p.11, figs 1,2) from the Belfast No. 4 bore. It is characteristically circumcavate rather than simply cavate at the apices like the holotype and most of the paratypes of *I. cretaceum*. This species was also found in the Nullawarre Greensand and basal part of Skull Creek Mudstone in Iona-2 and Langley-1 (Partridge 1994 a,b) and is undoubtedly a useful form for future formal subdivision of the *I. cretaceum* Zone.

***Odontochitina porifera* Zone.**
Interval: 1815.0 metres (<21 metres).
Age: Santonian.

The sample lacks *Odontochitina porifera* but is assigned to the zone on presence of *Chatangiella victoriensis* and absence of eponymous and other index species for underlying and overlying zones. The sample is equated with the upper part of the principal reference section for the *O. porifera* Zone in Morum-1 (Helby *et al.* 1987, p.64) which contains *C. victoriensis*. *Odontochitina porifera* was recorded in only 3 of the 9 sidewall core samples over this upper interval and only in one of the samples containing *C. victoriensis* (Partridge 1975). The sample is dominated equally by *Heterosphaeridium* spp. and *Amosopollis cruciformis* both at 35%.

***Conosphaeridium striatoconus* Zone.**
Interval: 1828.0-1838.0 metres (10+ metres).
Age: Coniacian.

Of the two samples assigned to the zone the shallower contains frequent *C. striatoconus* (5%) whilst from the deeper only a single detached operculum with a distinctive central process characteristic of *C. striatoconus* was recorded. None of the other species recorded can be considered diagnostic of the zone. The microplankton assemblages from both samples are dominated by *Heterosphaeridium heteracanthum* and *Amosopollis cruciformis* (Table-2).

***Palaeohystrichophora infusorioides* Zone.**
Interval: 1847.0-1904.0 metres (55+ metres).
Age: Turonian.

The samples are assigned to the *P. infusorioides* Zone based on the absence of index species *Pseudoceratium ludbrookiae* and significant accessory species *Litosphaeridium siphoniphorum* and *Canninginopsis denticulata* diagnostic of the underlying *D. multispinum* Zone and absence of *Conosphaeridium striatoconus* whose FAD defines the base of the overlying zone. The zone is therefore recognised on negative evidence identical to the way it was originally defined (Helby *et al.* 1987, p.62). As with other wells in the Otway Basin the assemblages are depauperate compared to equivalent age assemblages from the North West Shelf. The zone has an average microplankton diversity of 12+ species/sample and a total diversity of 32+ species. Only the oldest of three subzones established in Langley-1 could be recognised in Howmains-1.

Cribroperidinium edwardsii **Subzone.**
Interval: 1860.0-1904.0 metres (42+ metres).
Age: Turonian.

This zone was originally defined in Iona-2 and Langley-1 palynological reports (Partridge 1994a, b). In Howmains-1 it is best characterised by the consistent presence of *Cribroperidinium edwardsii, Palaeoperidinium cretaceum* and *Cyclonephelium compactum.* The samples also contain fairly consistent *Odontochitina costata/operculata* and *Oligosphaeridium complex/pulcherrimum* and inconsistent *P. infusorioides.* The consistent presence of *Kiokansium polypes* in the shallowest three samples supports the assignment of the shaley section between 1856-1888.5m to the the Waarre Unit B based on a weak subdivision of this subzone seen in Langley-1.

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Table-3: Interpretative Palynological Data for Howmains-1, Otway Basin

Sample Type	Depth (m)	Spore-pollen Zone	CR*	Microplankton Zones	CR*	Comments and Key Species
SWC-30	1036.0	Lower *M. diversus*	B1	Indeterminate		*Proteacidites grandis* present.
SWC-29	1072.0	*L. balmei*	B1	Indeterminate		Frequent *L. balmei* with *Tricolpites phillipsii.*
SWC-28	1483.0	*N. senectus* to *T. apoxyexinus*		*X. australis*	B3	FAD of *Xenikoon australis* with *Nelsoniella tuberculata*.
SWC-27	1558.0	*N. senectus* to *T. apoxyexinus*		*N. aceras*	B2	FAD of *Nelsoniella aceras*.
SWC-26	1632.0	*T. apoxyexinus*	B4	*I. cretaceum*	B3	*Isabelidinium rotundatum* ms present.
SWC-25	1663.0	*T. apoxyexinus*	B4	*I. cretaceum*	B2	FADs for *I. rotundatum* ms, *Aphidiadema denticulata* and *Heterosphaeridium evansii* ms.
SWC-24	1807.0	*T. apoxyexinus* to *P. mawsonii*		*I. cretaceum*	B4	Zone pick based on *Isabelidinium belfastense*.
SWC-23	1815.0	*T. apoxyexinus* to *P. mawsonii*		*O. porifera*	B5	Zone pick based on presence of *Chatangiella victoriensis* and absence of *C. striatoconus*.
SWC-22	1828.0	*P. mawsonii*	B4	*C. striatoconus*	B2	*Conosphaeridium striatoconus* common.
SWC-21	1838.0	*P. mawsonii*	B2	*C. striatoconus*	B2	Dominated by *Amosopollis cruciformis* comprising 35% of total count. *C. striatoconus* identified on single detached opercula.
SWC-20	1847.0	*P. mawsonii*	B2	*P. infusorioides*	B2	LAD *Rugulatisporites admirabilis* ms.
SWC-19	1854.0	*P. mawsonii*	B2	*P. infusorioides*	B2	FAD of *Clavifera triplex* and common *Amosopollis cruciformis* with LAD of *Appendicisporites distocarinatus*.
SWC-18	1860.0	*P. mawsonii*	B1	*P. infusorioides (C. edwardsii)*	B2	LAD *Hoegisporis trinalis* ms and LAD of consistent *C. edwardsii*.
SWC-15	1882.0	*P. mawsonii*	B1	*P. infusorioides (C. edwardsii)*	B2	Single specimen of *Hoegisporis trinalis* ms recorded.
SWC-13	1887.5	*P. mawsonii*	B1	*P. infusorioides (C. edwardsii)*	B2	FADs *Phyllocladidites mawsonii* and *Hoegisporis trinalis* ms.
SWC-10	1904.0	Indeterminate		*P. infusorioides (C. edwardsii)*	B3	Microplankton >85% at base of marine transgression with FAD *Cribroperidinium edwardsii.*
SWC- 9	1907.0	Indeterminate				Sample virtually barren.
SWC- 7	1936.0	*P. pannosus*	B1			LAD *Trilobosporites trioreticulosus*. with *Cicatricosisporties* spp. 9%.
SWC- 4	1997.0	Indeterminate				Sample virtually barren.
SWC- 1	2098.0	*P. pannosus*	B1			FAD *Phimopollenites pannosus*.

*CR = Confidence Ratings
LAD = Last Appearance Datum
FAD = First Appearance Datum

Confidence Ratings

The Confidence Ratings assigned to the zone identifications on Table-4 are quality codes used in the STRATDAT relational database being developed by the Australian Geological Survey Organisation (AGSO) as a National Database for interpretive biostratigraphic data. Their purpose is to provide a simple relative comparison of the quality of the zone assignments. The alpha and numeric components of the codes have been assigned the following meanings:

Alpha codes: Linked to sample type

- **A** Core
- **B** Sidewall core
- **C** Coal cuttings
- **D** Ditch cuttings
- **E** Junk basket
- **F** Miscellaneous/unknown
- **G** Outcrop

Numeric codes: Linked to fossil assemblage

1	**Excellent confidence:**	High diversity assemblage recorded with key zone species.
2	**Good confidence:**	Moderately diverse assemblage recorded with key zone species.
3	**Fair confidence:**	Low diversity assemblage recorded with key zone species.
4	**Poor confidence:**	Moderate to high diversity assemblage recorded without key zone species.
5	**Very low confidence:**	Low diversity assemblage recorded without key zone species.

BASIC DATA

Table 4: Basic Sample Data - Howmains-1, Otway Basin

Table-5: Basic Palynomorph Data for Howmains-1, Otway Basin

Palynomorph Range Charts for Howmains-1, Otway Basin

Range Chart 1: Spore-pollen by Lowest Appearance

Range Chart 2: Microplankton by Lowest Appearance

Table 4: Basic Sample Data - Howmains-1, Otway Basin.

SAMPLE TYPE	DEPTH (metres)	REC (cm)	LITHOLOGY	SAMPLE WT (g)	RESIDUE YIELD
SWC-30	1036.0	5.0	Dark grey brown bioturbated silty claystone (well cleaned).	11.4	High
SWC-29	1072.0	5.5	Dk grey brown silty claystone with coarse sandstone burrows and occasional quartz pebbles up to 4mm (well cleaned).	11.3	High
SWC-28	1483.0	3.0	Interlaminated med grey brown claystone and off-white fine grn sandstone. Laminations <1-4mm with crosscutting burrows 2mm diam. (well cleaned).	11.6	High
SWC-27	1558.0	3.0	Med. grey firm silty claystone (sample well cleaned).	11.3	High
SWC-26	1632.0	3.8	Dk gry bioturbated silty claystone (well cleaned).	11.3	High
SWC-25	1663.0	2.8	Med. grey non-calcareous claystone (well cleaned).	11.0	High
SWC-24	1807.0	2.5	Med-dk grey slightly calcareous claystone with pyritised fossils, but no obvious glauconite (well cleaned).	9.3	Moderate
SWC-23	1815.0	3.0	Med-dk grey calcareous claystone; glauconite not obvious (well cleaned).	12.9	High
SWC-22	1828.0	4.5	Dk gry claystone with very fine glauconite and with common slickensides through core (well cleaned).	10.5	Moderate
SWC-21	1838.0	4.0	Dk greenish grey pelletised to pebbly claystone with brown (limonitic?) cement between pellets. Qtz pebbles up to 3mm; but no obvious glauconite (well cleaned).	14.4	Low
SWC-20	1847.0	3.8	Med. brn grey mottled silty claystone.	12.3	Moderate
SWC-19	1854.0	3.5	Med. grey sandy claystone with pyrite nodules and calcareous fragments (well cleaned).	9.3	Moderate
SWC-18	1860.0	4.0	Med. grey silty claystone faintly laminated, with carbonaceous flecks and bioturbated (well cleaned).	11.0	Moderate
SWC-16	1874.0	<1.0	Light grey f. to crs grn quartz sandstone with blk coal partings which may be suitable for palynological analysis.		
SWC-15	1882.0	3.5	Med. gry sandy claystone with lt gry sandstone laminae (6mm) which are pyritic or micaceous (well cleaned).	8.2	Moderate
SWC-14	1884.0	<1.0	Off white argillaceous sandstone with kaolinitic matrix with med. brn-gry laminated claystone whose relationship to sandstone is not clear. Not analysed by palynology.		

Table 4: Basic Sample Data - Howmains-1, Otway Basin. Cont...

SAMPLE TYPE	DEPTH (metres)	REC (cm)	LITHOLOGY	SAMPLE WT (g)	RESIDUE YIELD
SWC-13	1887.5	3.7	Med. gry, faintly laminated hard claystone with carbonaceous flecks. Slickensided fractures cut across core (well cleaned).	11.6	High
SWC-10	1904.0	3.0	Med. greenish-grey calc. claystone mixed with green grey sandstone. Sample friable, poorly cleaned, possibly contaminated.	13.5	Low
SWC- 9	1907.0	3.4	Lt greenish-grey non-calcareous brittle claystone (well cleaned/no contamination).	11.3	Very low
SWC- 8	1912.5	<2.0	Lt greenish-grey argillaceous lithic sandstone (not sampled for palynology).		
SWC- 7	1936.0	4.8	Lt and dk grey mottled claystone with carbonaceous flecks (well cleaned)	10.1	High
SWC- 4	1997.0	3.0	Lt greenish grey non-calc. claystone. Fairly brittle, well cleaned sample.	10.9	Very low
SWC- 3	2027.5	<3.0	Lt greenish grey homogeneous clayey siltstone. (Not sampled for palynology, well cleaned.		
SWC- 1	2098.0	<3.0	Med grey homogenous brittle claystone (well cleaned).	11.1	Moderate

Table-5: Basic Palynomorph Data for Howmains-1, Otway Basin.

SAMPLE TYPE	DEPTH (metres)	Palynomorph Concentration	Palynomorph Preservation	No. S-P spp*	Microplankton Abundance	No MP Species*
SWC-30	1036.0	Moderate	Poor	31+	Frequent	2+
SWC-29	1072.0	Moderate	Poor	29+	Rare	6+
SWC-28	1483.0	Very low	Poor	23+	Abundant	10+
SWC-27	1558.0	Moderate	Poor	25+	Abundant	12+
SWC-26	1632.0	Moderate	Poor	30+	Abundant	9+
SWC-25	1663.0	Low	Poor	23+	Frequent	11+
SWC-24	1807.0	Moderate	Poor	24+	Common	11+
SWC-23	1815.0	Moderate	Poor	34+	Abundant	10+
SWC-22	1828.0	Low	Poor	27+	Abundant	15+
SWC-21	1838.0	Moderate	Poor	25+	Very abundant	17+
SWC-20	1847.0	Very low	Poor	18+	Very abundant	17+
SWC-19	1854.0	Low	Poor-fair	23+	Abundant	19+
SWC-18	1860.0	Low	Poor	25+	Common	12+
SWC-15	1882.0	Moderate	Poor-fair	31+	Common	10+
SWC-13	1887.5	Moderate	Poor-fair	35+	Common	11+
SWC-10	1904.0	Moderate	Poor	10+	Very abundant	7+
SWC- 9	1907.0	Very low	Poor	2+		
SWC- 7	1936.0	Moderate	Fair-good	27+	Very rare	1
SWC- 4	1997.0	Very low	Poor	3+		
SWC- 1	2098.0	High	Poor-fair	33+	Very rare	1

*Diversity:				
	Very low	=	1-5	species
	Low	=	6-10	species
	Moderate	=	11-25	species
	High	=	26-74	species
	Very high	=	75+	species

PE900750

This is an enclosure indicator page.
The enclosure PE900750 is enclosed within the
container PE900938 at this location in this
document.

The enclosure PE907066 has the following characteristics:

```
     ITEM_BARCODE = PE900750
CONTAINER_BARCODE = PE900938
             NAME = Microplankton Range Chart
            BASIN = OTWAY
           PERMIT = PEP/104
             TYPE = WELL
          SUBTYPE = DIAGRAM
      DESCRIPTION = Microplankton Range Chart, Otway Basin,
                    (enclosure from WCR vol.1) for Howmains-
                    1
          REMARKS =
     DATE_CREATED =  18/09/94
    DATE_RECEIVED =
             W_NO = W1100
        WELL_NAME = Howmains-1
       CONTRACTOR =
     CLIENT_OP_CO = GFE RSOURCES LTD
```

(Inserted by DNRE - Vic Govt Mines Dept)

APPENDIX 10

GFE RESOURCES LTD

APPENDIX 10

CHECK SHOT CALCULATIONS

HOWMAINS-1

A well check shot (WST) survey was carried out in Howmains-1 by Schlumberger on July 21, 1994. A total of twenty four shots were fired, of which four were repeats.

The raw data from the survey is as follows:

Depth (mKB)	**Transit Time** (milliseconds)
365.0	194.2
365.0	198.3
500.0	265.5
638.0	325.8
638.0	325.8
740.0	362.6
820.0	393.4
930.0	436.9
1055.0	480.7
1055.0	480.3
1163.0	510.4
1275.0	551.1
1360.0	581.7
1494.0	624.2
1592.0	654.8
1592.0	652.7
1640.0	672.1
1740.0	704.2
1835.0	733.0
1872.0	745.4
1902.0	753.4
1970.0	765.8
2050.0	788.8
2137.0	816.3

The quality of the data was generally good, however the value at 1970.0 metres was not used in the sonic calibration because its inclusion resulted in excessive drift correction on the sonic log. For those depths with repeat shots, the transit time used was the value that minimised the overall drift correction in the calibrated sonic log.

Corrections applied to the raw data to obtain values of time versus depth below seismic reference datum (SRD) comprise:

- correction for the difference between shot and SRD, and
- correction for the shot and geophone geometry.

Correction to SRD

The seismic reference datum for this area is mean sea level (MSL). The well was drilled at VP 127 on seismic line HA90-07, which has an elevation of 44.0 metres above MSL.

The shallowest check shot was at a depth of 365.0mKB. The calculated average velocity from the surface shot to this depth was 1842 metres per second, and this was used to compute the correction to the SRD. This produces a one-way time shift of 22.5 milliseconds (45.0 milliseconds two-way time) from the shot to the SRD.

Correction For Shot and Geophone Geometry

This exercise is the standard procedure used for vertical hole calculations and is illustrated in Figure A1. The corrected values are presented in Table A1.

Synthetic Seismogram

The check shot data was used to calibrate the sonic log which was loaded into Crocker Data Processing's Petrolog Software. The calibrated sonic was integrated with the density log to produce an impedance log from which a reflectivity series was derived. Wavelets were convolved with the series to produce synthetic seismograms. Over the zone of interest (the Waarre Formation) the synthetic derived using the 40 Hertz Ricker wavelet appears to produce the best match with the seismic (Enclosure 8), noting that an approximately eight millisecond mistie occurs between the synthetic and seismic section.

The two way time to each of the interpreted horizons came in as prognosed, except for the Eumeralla Formation which was shown to have been picked half a cycle low. However, in depth the formation tops encountered in Howmains-1 were all higher than prognosed. This discrepancy results from the actual velocity profile encountered being significantly different to the velocity model used in the prognosis, which was based on wells in the region.

In the prognosis, the Waarre Formation Unit C (expected to be the top of porosity) was predicted to be close to the mapped "Top Waarre Formation" reflector. From the results of the well, Unit C is absent and the top of porosity came in one cycle below the "Top Waarre Formation" reflector, within the Waarre Formation Unit A.

HOWMAINS-1

Table A1

CHECK SHOT DATA

CHECK SHOT NUMBER	GEOPHONE DEPTH BELOW KB (M)	GUN TO GEOPHONE TRAVEL TIME (MSEC)	GUN DEPTH BELOW KB (M)	WELL TO GUN OFFSET (M)	GEOPHONE DEPTH BELOW MSL (M)	VERTICAL TIME MSL TO GEOPHONE (MSEC)	INTERVAL VELOCITY (MSEC)
1	365	194.2	8.2	25	315.3	171.19	1841.8
2	500	265.5	8.2	25	450.3	242.62	1889.9
3	638	325.8	8.2	25	588.3	303.01	2285.3
4	740	362.6	8.2	25	690.3	339.86	2768.4
5	820	393.4	8.2	25	770.3	370.68	2595.3
6	930	436.9	8.2	25	880.3	414.21	2527.2
7	1055	480.7	8.2	25	1005.3	458.03	2852.3
8	1163	510.4	8.2	25	1113.3	487.75	3634.2
9	1275	551.1	8.2	25	1225.3	528.46	2751.0
10	1360	581.7	8.2	25	1310.3	559.07	2777.1
11	1494	624.2	8.2	25	1444.3	601.58	3152.1
12	1592	654.8	8.2	25	1542.3	632.19	3201.9
13	1640	672.1	8.2	25	1590.3	649.49	2774.1
14	1740	704.2	8.2	25	1690.3	681.59	3114.7
15	1835	733.0	8.2	25	1785.3	710.40	3298.1
16	1872	745.4	8.2	25	1822.3	722.80	2983.5
17	1902	753.4	8.2	25	1852.3	730.80	3749.3
18*	1970	765.8	8.2	25	1920.3	743.21	5482.3
19	2050	788.8	8.2	25	2000.3	766.21	3477.8
20	2137	816.3	8.2	25	2087.3	793.71	3163.3

*Check shot 18 was not used in the calculations

(i) RECORDING DATA:

ENERGY SOURCES	'D' charges going down level shots 'P' charges, others
SOURCE LOCATION	25 m SSE of Well-head
SOURCE DEPTH	2.5 m below GL
ELEVATION DATA:	
KB:	49.7 m Above MSL
GL:	44.0 m Above MSL
DF:	49.4 m Above MSL
Seismic Datum:	0 m MSL

(ii) PROCESSING DATA:

NEAR SURFACE SHOT VELOCITY	1842 m/sec
CALIBRATED SONIC INTERVAL VELOCITIES USED	From 365 m to 2137 m

PEP 104 - OTWAY BASIN

HOWMAINS-1
CHECKSHOT SURVEY

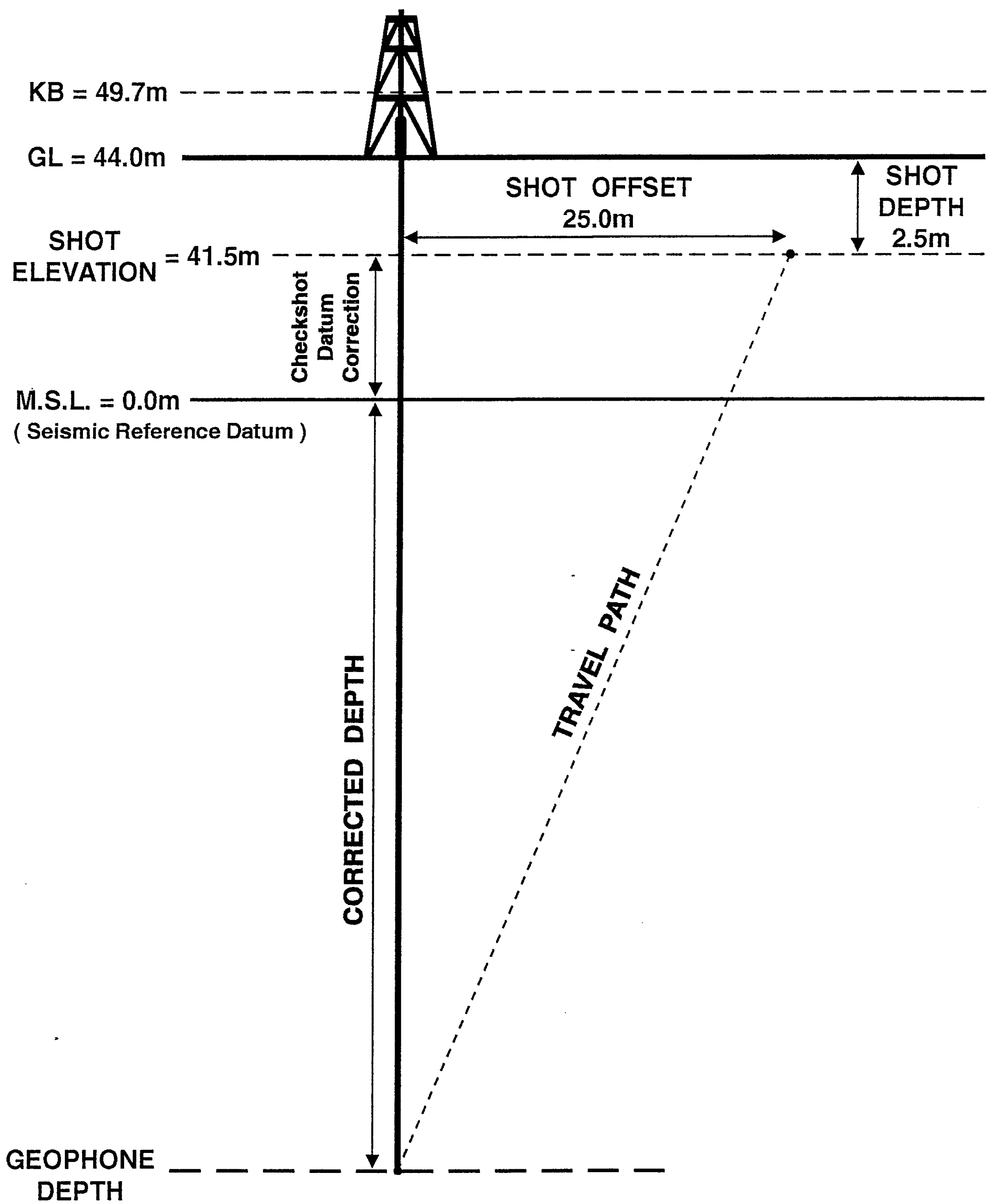


FIGURE A1

PEP 104/HOWWELL

APPENDIX 11

GFE RESOURCES LTD

APPENDIX 11

LOG ANALYSIS DATA

HOWMAINS-1

HOWMAINS-1

WELL COMPLETION REPORT Appendix 11

LOG ANALYSIS RESULTS

by Kevin Lanigan

Zone no.	1	2	3
Formation Name	Waarre	Eumeralla	Eumeralla
Depth high	1871.93	1903.93	2030.43
Depth low	1903.93	2030.43	2138.02

23-06-95 **ENVIRONMENTAL CORRECTIONS**

Logs used

Log Mnemonic	Column Number	Corrected (* = YES)
DEPT	1	
LLD	2	*
LLS	3	*
SP	9	
GR	10	*
DT	5	
NPHI	32	*
CALI	15	
DRHO	14	
MSFL	31	*
RHOB	12	*
PEF	13	

DLL Correction	**Logging Company**	**GR Correction**
0 = NONE	0 = SCHLUMBERGER	0 = NONE
1 = TYPE C	1 = HLS	1 = CENTRED
2 = D ECCENTRED	2 = DRESSER ATLAS	2 = ECCENTRED
3 = D CENTRED	3 = BPB	
	4 = SPERRY MWD	
	5 = BAKER MWD	
	6 = ANADRIL MWD	
	7 = NO CORRECTION	

Zone properties

Zone no.	1	2	3
Formation Name	Waarre	Eumeralla	Eumeralla
Depth high	1871.93	1903.93	2030.43
Depth low	1903.93	2030.43	2138.02
RMC	.12	.12	.11
RM	.10	.10	.10
ZONE Temperature	76.13	78.21	81.28
FILT SAL (KPPM)	37.71	37.71	37.71
FORM WATER(KPPM)	16.49	5.81	4.81
PRESSURE (PSI)	3149.63	3281.83	3477.10
MUD WEIGHT	9.80	9.80	9.80
Logging Company	0	0	0
DLL Correction	3	3	3
GR Correction	2	2	2
GR SONDE DIAM	STD	STD	STD
Neutron Temp Cor	YES	YES	YES
Inductn Standoff	1.50	1.50	1.50

Zone no. 1 Environmental Corrections

DEPT & CALI	LLD	LLS	GR	NPHI	MSFL	RHOB
1871.929	6.685	5.855	92.940	.270	2.923	2.470
8.530	6.743	5.986	92.132	.298	2.452	2.470
1872.996	3.269	2.987	62.160	.250	2.484	2.350
7.960	3.289	3.037	60.270	.276	2.066	2.350
1874.063	2.318	2.136	52.940	.230	1.098	2.280
8.000	2.340	2.187	51.412	.254	.874	2.280
1875.130	2.380	2.161	44.030	.215	1.689	2.310
8.000	2.402	2.212	42.759	.238	1.376	2.310
1876.196	2.434	2.750	53.340	.214	1.807	2.330
8.090	2.461	2.810	51.986	.237	1.478	2.330
1877.263	2.735	2.648	43.870	.190	2.056	2.340
8.090	2.763	2.708	42.756	.211	1.693	2.340
1878.330	5.947	5.513	52.120	.182	2.111	2.380
8.210	5.971	5.588	51.036	.202	1.741	2.380
1879.397	7.842	7.541	75.190	.172	12.253	2.490
8.320	7.857	7.630	73.941	.191	11.042	2.490
1880.464	5.987	5.788	84.730	.250	4.744	2.410
8.050	5.991	5.834	82.448	.276	4.080	2.410
1881.530	10.240	9.583	90.230	.260	9.662	2.470
8.530	10.250	9.721	89.446	.287	8.607	2.470
1882.597	6.031	5.726	75.840	.252	3.279	2.360
8.000	6.028	5.763	73.651	.278	2.767	2.360
1883.664	8.925	7.341	76.270	.222	3.525	2.410
8.000	8.865	7.357	74.069	.245	2.986	2.410
1884.731	5.291	6.215	104.320	.410	10.398	2.300
8.270	5.328	6.299	102.389	.451	9.296	2.300
1885.798	8.396	7.908	96.450	.256	2.008	2.460
8.270	8.394	7.982	94.665	.282	1.652	2.460
1886.864	4.321	4.569	125.600	.324	4.246	2.500
8.350	4.370	4.665	123.656	.357	3.631	2.500
1887.931	6.674	5.281	112.180	.398	8.656	2.370
8.350	6.708	5.379	110.444	.438	7.669	2.370
1888.998	4.029	3.657	67.880	.240	2.736	2.340
8.030	4.051	3.713	66.000	.265	2.287	2.340
1890.065	3.248	2.919	58.630	.220	2.424	2.320
7.820	3.258	2.957	56.528	.243	2.014	2.320
1891.132	5.461	4.877	88.130	.248	4.762	2.380
8.050	5.472	4.930	85.757	.274	4.096	2.380

Zone no. 1 Environmental Corrections

DEPT & CALI	LLD	LLS	GR	NPHI	MSFL	RHOB
1892.198	4.860	4.322	79.230	.254	5.137	2.390
8.070	4.879	4.380	77.157	.280	4.435	2.390
1893.265	3.826	3.743	61.570	.250	2.691	2.310
7.910	3.839	3.785	59.579	.276	2.248	2.310
1894.332	4.912	4.866	85.610	.256	4.512	2.400
8.050	4.929	4.919	83.304	.283	3.870	2.400
1895.399	16.430	14.734	63.190	.170	22.188	2.550
8.350	16.223	14.757	62.212	.189	20.566	2.550
1896.466	3.812	3.685	56.830	.223	2.342	2.340
7.910	3.825	3.727	54.992	.247	1.942	2.340
1897.532	3.256	3.096	64.020	.260	2.201	2.350
7.910	3.272	3.141	61.949	.287	1.819	2.350
1898.599	6.085	5.785	61.100	.160	20.998	2.490
8.210	6.108	5.859	59.829	.178	19.413	2.490
1899.666	2.568	2.273	62.750	.260	1.842	2.300
7.910	2.586	2.318	60.720	.287	1.509	2.300
1900.733	2.777	2.531	65.530	.260	1.982	2.310
7.910	2.794	2.577	63.411	.287	1.629	2.310
1901.800	2.243	2.040	97.620	.240	1.736	2.300
8.020	2.266	2.091	94.878	.265	1.417	2.300
1902.866	6.799	6.239	106.960	.280	8.281	2.470
8.710	6.880	6.407	106.748	.309	7.321	2.470
1903.933	7.074	6.877	111.520	.260	9.531	2.470
8.350	7.104	6.975	109.794	.287	8.485	2.470

Zone no. 2 Environmental Corrections

DEPT & CALI	LLD	LLS	GR	NPHI	MSFL	RHOB
1903.933	7.074	6.877	111.520	.260	9.531	2.470
8.350	7.101	6.972	109.794	.289	8.493	2.470
1906.981	4.660	4.692	110.250	.240	6.289	2.450
8.650	4.735	4.830	109.786	.267	5.491	2.450
1910.029	6.054	6.399	87.030	.280	8.367	2.410
8.350	6.092	6.495	85.683	.311	7.409	2.410
1913.077	6.976	7.156	82.610	.230	7.938	2.430
8.410	7.013	7.264	81.519	.256	7.011	2.430
1916.125	4.651	4.566	85.070	.270	6.934	2.370
8.350	4.698	4.660	83.754	.300	6.083	2.370
1919.173	8.779	8.351	76.080	.220	8.305	2.470
8.390	8.787	8.450	75.018	.245	7.351	2.470
1922.221	5.020	4.948	73.030	.240	43.000	2.410
8.000	5.029	4.991	70.922	.266	41.132	2.410
1925.269	5.540	5.425	85.000	.280	3.975	2.380
7.980	5.540	5.460	82.481	.310	3.391	2.380
1928.317	4.380	4.383	79.700	.240	5.582	2.360
8.270	4.420	4.466	78.225	.267	4.845	2.360
1931.365	4.362	4.266	89.130	.260	4.414	2.360
7.820	4.361	4.291	85.935	.288	3.786	2.360
1934.413	3.622	3.621	104.690	.270	3.490	2.400
8.280	3.664	3.702	102.792	.300	2.958	2.400
1937.461	4.426	4.377	117.120	.290	5.789	2.450
8.350	4.473	4.471	115.308	.322	5.033	2.450
1940.509	3.569	3.659	123.040	.280	4.680	2.430
8.270	3.610	3.739	120.762	.311	4.026	2.430
1943.557	3.944	4.228	116.370	.270	5.957	2.440
8.270	3.985	4.311	114.216	.300	5.187	2.440
1946.605	4.580	4.614	98.380	.260	5.141	2.380
8.230	4.616	4.692	96.409	.289	4.443	2.380
1949.653	1.829	1.877	109.520	.350	.959	2.240
8.420	1.865	1.947	108.115	.388	.759	2.240
1952.701	2.555	2.600	100.390	.330	.966	2.310
8.270	2.592	2.672	98.532	.366	.765	2.310
1955.749	5.319	5.252	79.390	.260	3.258	2.410
8.510	5.380	5.374	78.640	.289	2.751	2.410
1958.797	4.846	4.936	82.330	.250	5.578	2.390
8.370	4.894	5.035	81.118	.278	4.841	2.390

Zone no. 2 Environmental Corrections

DEPT & CALI	LLD	LLS	GR	NPHI	MSFL	RHOB
1961.845	5.282	5.360	82.230	.260	6.207	2.400
8.530	5.345	5.486	81.515	.289	5.416	2.400
1964.893	4.501	4.511	72.800	.260	5.313	2.340
8.180	4.532	4.582	71.203	.289	4.600	2.340
1967.941	5.235	5.155	79.210	.270	5.797	2.390
8.270	5.271	5.239	77.744	.300	5.041	2.390
1970.989	4.462	4.540	88.610	.280	4.238	2.380
8.000	4.477	4.586	86.053	.310	3.627	2.380
1974.037	3.613	3.729	101.810	.270	4.234	2.410
8.510	3.672	3.836	100.849	.300	3.624	2.410
1977.085	3.795	3.906	119.960	.280	4.547	2.480
8.050	3.819	3.962	116.729	.310	3.906	2.480
1980.133	5.045	5.149	115.830	.250	6.805	2.480
8.330	5.088	5.242	113.950	.278	5.965	2.480
1983.181	5.139	5.291	88.420	.270	6.152	2.400
8.530	5.202	5.417	87.651	.300	5.365	2.400
1986.229	5.643	5.895	80.370	.250	4.910	2.400
8.270	5.676	5.977	78.882	.278	4.234	2.400
1989.277	5.250	5.488	73.710	.250	5.484	2.390
8.270	5.286	5.571	72.346	.278	4.755	2.390
1992.325	3.822	3.751	82.610	.290	4.434	2.350
8.180	3.856	3.822	80.797	.322	3.804	2.350
1995.373	3.350	3.413	88.420	.270	3.596	2.350
7.680	3.348	3.432	84.766	.299	3.052	2.350
1998.421	4.614	4.713	117.540	.270	6.961	2.490
8.350	4.661	4.808	115.721	.300	6.108	2.490
2001.469	4.049	4.189	107.720	.280	7.465	2.450
8.180	4.082	4.260	105.356	.311	6.573	2.450
2004.517	3.952	4.018	98.490	.270	5.406	2.430
8.180	3.986	4.089	96.329	.300	4.684	2.430
2007.565	3.612	3.787	98.710	.250	4.551	2.410
8.240	3.651	3.865	96.770	.278	3.909	2.410
2010.613	3.855	3.923	99.360	.280	4.801	2.380
8.180	3.889	3.994	97.180	.311	4.135	2.380
2013.661	3.946	4.137	110.300	.250	5.535	2.460
8.270	3.987	4.219	108.258	.278	4.802	2.460
2016.709	4.167	4.299	94.880	.240	4.117	2.380
8.040	4.188	4.352	92.288	.267	3.519	2.380

Zone no. 2

Environmental Corrections

DEPT & CALI	LLD	LLS	GR	NPHI	MSFL	RHOB
2019.757	4.994	5.248	104.400	.250	6.422	2.470
8.270	5.031	5.332	102.467	.278	5.613	2.470
2022.805	4.267	4.366	113.420	.270	5.961	2.450
8.270	4.307	4.449	111.320	.300	5.191	2.450
2025.853	4.075	4.131	90.330	.260	4.258	2.380
7.860	4.080	4.163	87.233	.288	3.645	2.380
2028.901	4.222	4.308	109.010	.250	5.844	2.470
8.270	4.263	4.391	106.992	.278	5.084	2.470

Zone no. 3 Environmental Corrections

DEPT & CALI	LLD	LLS	GR	NPHI	MSFL	RHOB
2030.425	3.251	3.364	99.290	.250	3.688	2.420
8.270	3.291	3.441	97.452	.279	3.139	2.420
2033.473	4.984	4.974	81.210	.270	5.160	2.420
8.270	5.019	5.055	79.707	.301	4.468	2.420
2036.521	4.945	5.203	75.010	.250	7.211	2.370
8.270	4.981	5.284	73.621	.279	6.348	2.370
2039.569	6.247	6.468	82.550	.240	8.781	2.390
8.350	6.281	6.561	81.273	.268	7.805	2.390
2042.617	6.811	7.043	80.160	.230	7.113	2.410
8.350	6.838	7.134	78.919	.257	6.258	2.410
2045.665	6.530	6.766	80.440	.250	6.688	2.390
8.350	6.561	6.858	79.195	.279	5.866	2.390
2048.713	7.405	7.616	85.160	.240	9.000	2.410
8.350	7.424	7.705	83.842	.268	8.010	2.410
2051.761	6.547	6.734	79.920	.240	8.273	2.400
8.350	6.577	6.826	78.683	.268	7.332	2.400
2054.809	5.990	6.183	79.540	.250	7.371	2.380
8.350	6.026	6.277	78.309	.279	6.496	2.380
2057.857	7.004	7.105	83.330	.260	8.961	2.390
8.350	7.029	7.196	82.040	.290	7.973	2.390
2060.905	6.440	6.604	80.320	.230	7.180	2.400
8.350	6.472	6.697	79.077	.257	6.319	2.400
2063.953	6.548	6.628	79.910	.240	8.086	2.440
8.350	6.578	6.721	78.673	.268	7.159	2.440
2067.001	6.198	6.303	85.350	.260	7.473	2.410
8.180	6.211	6.363	83.477	.290	6.590	2.410
2070.049	6.725	6.676	82.830	.240	7.906	2.390
8.180	6.730	6.733	81.012	.268	6.991	2.390
2073.097	6.651	6.725	75.170	.240	6.031	2.400
8.180	6.658	6.782	73.520	.268	5.262	2.400
2076.145	5.545	5.705	105.070	.240	7.820	2.410
8.270	5.576	5.785	103.125	.268	6.912	2.410
2079.193	5.622	5.664	85.150	.240	5.930	2.430
8.110	5.634	5.716	83.053	.268	5.170	2.430
2082.241	6.980	6.885	76.960	.240	6.332	2.400
8.600	7.039	7.031	76.493	.268	5.538	2.400
2085.289	6.319	6.508	75.170	.240	7.809	2.390
8.410	6.359	6.613	74.177	.268	6.902	2.390

Zone no. 3 Environmental Corrections

DEPT & CALI	LLD	LLS	GR	NPHI	MSFL	RHOB
2088.337	6.435	6.917	109.980	.270	8.695	2.450
8.350	6.467	7.009	108.278	.301	7.725	2.450
2091.385	4.660	4.746	98.830	.260	6.559	2.410
8.270	4.697	4.827	97.000	.290	5.747	2.410
2094.433	5.613	5.639	112.020	.240	7.133	2.440
8.270	5.643	5.719	109.946	.268	6.276	2.440
2097.481	5.250	5.366	113.840	.260	8.117	2.470
8.270	5.283	5.447	111.733	.290	7.187	2.470
2100.529	4.625	4.639	97.560	.250	5.355	2.390
8.270	4.662	4.720	95.754	.279	4.645	2.390
2103.577	6.676	6.662	87.440	.250	7.453	2.390
8.270	6.694	6.738	85.821	.279	6.572	2.390
2106.625	7.021	7.281	79.120	.220	8.859	2.370
8.350	7.046	7.371	77.896	.246	7.878	2.370
2109.673	6.855	7.235	76.880	.250	8.766	2.400
8.350	6.882	7.326	75.690	.279	7.791	2.400
2112.721	7.582	7.788	76.160	.250	9.445	2.410
8.350	7.599	7.876	74.981	.279	8.425	2.410
2115.769	8.433	8.553	80.010	.190	8.344	2.410
8.380	8.440	8.645	78.863	.213	7.398	2.410
2118.817	7.675	7.885	82.930	.250	9.555	2.410
8.350	7.690	7.973	81.647	.279	8.528	2.410
2121.865	6.905	7.307	85.730	.240	8.641	2.400
8.350	6.931	7.397	84.403	.268	7.675	2.400
2124.913	7.113	7.491	77.900	.230	8.406	2.400
8.350	7.136	7.581	76.694	.257	7.456	2.400
2127.961	7.008	7.158	84.900	.250	8.141	2.410
8.270	7.022	7.231	83.328	.279	7.210	2.410
2131.009	6.989	7.175	88.280	.230	8.102	2.430
8.200	6.993	7.232	86.410	.257	7.173	2.430
2134.057	7.741	7.986	86.720	.240	10.867	2.410
8.350	7.755	8.073	85.378	.268	9.760	2.410
2137.105	6.290	6.472	132.730	.240	10.617	2.480
8.270	6.313	6.549	130.273	.268	9.525	2.480

23-06-95

PREINTERPRETATION RESULTS

VCL flag values (If flag is set, that indicator is not used)

Indicator	Threshold (used by software to set Flag ON/OFF)
1. SP	ABS (SSP) less than 20 mV
2. GR	(GRMAX - GRMIN) less than 20 API
3. RT	R lim less than 10 * R clay
4. Neutron	(PHIN clay - PHIN min) less than 0.20
5. Sonic	(t clay - tma) less than 30.0
6. M - N	(4.545 * Mclay - 3.20 - Nclay) greater than -0.4
7. Density - Neutron	ABS ((PHIN clay -PHINMA) * (2.2-RHOMA) - (RHOBclay - RHOMA) * (PHIN 2.2 - PHIN min)) less than 0.06 Where PHINMA = ((66.67 * RHOMA) - 180.67) * 0.01
8. Density - Sonic	(t Clay - tMA min) * (2.2 - RHOMA) - (RHOB clay - RHOMA) * (t 2.2 - tMA min) less than -8.0
9. Sonic - Neutron	(PHIN clay - PHINMA) * (t 2.2 - tMA min) - (t Clay - tMA min) - (PHIN 2.2 -PHINMA) less than 5.0 Where PHINMA = ((66.67 * RHOMA) - 180.67) * 0.01

These flags may also be set by the NO CLAY parameter in the control file

VGRTYPE :Vclay from GR Equations used

0. Not Used
   IGR=(GR-GRmin)/(GRmax-GRmin)
1. Linear VGR=IGR
2. Asymmetric (S shaped)
   Defined by 2 sets of intermediate points through which the S bend passes through. GR1, VGR1 and GR2, VGR2.
   Steiber equation: VGR= IGR/(A + (A-1.0)*IGR)
3. Steiber 1 A = 2.0
4. Steiber 2 A = 3.0
5. Steiber 3 A = 4.0
6. Steiber 50%
   A is computed to give VGR= 0.5 when GR = GR50%)
7. Larinov Old Rocks: VGR= (2**(2*IGR)-1.0)/3.0
8. Larinov Tertiary : VGR= 0.083*(2.0*(3.7058*IGR)-1.0)
9. Clavier : VGR= 1.7-SQRT(3.38-(IGR+0.7)**2.0)

PRE flag values

1. Bad hole - Caliper
2. Bad hole - DRHO
3. Bad hole - RUGOSITY

Sonic option

0. Wyllie formula
1. Raymer - Hunt - Gardner formula

Logging Company	Mud type	Neutron log type	RT Determination Flags by priority
0. Schlumberger	0. NaCl	0. CNL	1. Dual Laterolog - RXO
1. HLS	1. KCl %	1. TNPH	20. PHASOR-SFL
2. Dresser	2. Oil-base	2. SNP	21. PHASOR-RXO
3. BPB	3. Barite	3. N	2. Dual Induction - LL8
4. Sperry MWD		4. DSN2	3. ILD-SFL-RXO
5. Baker MWD			10. DIL-SFL
6. Anadril MWD			11. DIL-LL3
			8. ILD and 16 inch Normal
			17. LLD-LLS
			18. ID PHASOR
			4. ILD
			5. LLD
			6. LL3 or LL7
			7. Dual Laterolog
			13. LLS
			19. IM PHASOR
			14. ILM
			15. LL8
			9. 64 inch Normal Log
			12. SFL
			16. RXO
			0. No RT logs

Formation Water	CNL Chart
0=NaCl	0=1988
1=NaHCO3	1=1987

Zone no.	1	2	3
Formation Name	Waarre	Eumeralla	Eumeralla
Top depth	1871.929	1903.933	2030.425
Bottom depth	1903.933	2030.425	2138.020
Logging Company	0	0	0
Mud type	1	1	1
Formation Water Type	0	0	0
Neutron Log Type	0	0	0
Density-CNL Chart	0	0	0
RT derivation	1	1	1
Sonic option	0	0	0
Vclay flags	1 6 89	1 6 89	1 6 89

INPUT PARAMETERS

	Zone no.	1	2	3
	Formation	Waarre	Eumeralla	Eumeralla
1.	Top depth	1871.929	1903.933	2030.425
2.	Bottom depth	1903.933	2030.425	2138.020
3.	No logs			
4.	RM	.241	.241	.241
5.	Temp. RM	21.000	21.000	21.000
6.	RMF	.215	.215	.215
7.	Temp. RMF	15.000	15.000	15.000
8.	RMC	.338	.338	.338
9.	Temp. RMC	13.000	13.000	13.000
10.	Bit size	8.500	8.500	8.500
11.	Mud wt	9.800	9.800	9.800
12.	SSP	15.000	7.000	11.000
13.	RW (SP)	.086	.067	.088
14.	FT=Form temp	76.133	78.210	81.276
15.	RW @ FT	.140	.440	.510
16.	RW@75F(23.9C	.301	.966	1.154
17.	KPPM (RW)	20.378	5.811	4.810
18.	RMF @ FT	.080	.079	.076
19.	KPPM (RMF)	37.708	37.708	37.708
20.	RM @ FT	.105	.103	.100
21.	RHO H	.600	.600	.600
22.	RHO F	1.018	1.017	1.017
23.	t F	188.990	188.990	188.990
24.	RHOMA	2.671	2.683	2.683
25.	PHIN min	-.035	-.031	-.031
26.	t MA	55.500	55.500	55.500
27.	t MA min	48.000	48.000	48.000
28.	Sonic option	.000	.000	.000
29.	Compact/Over	1.000	1.000	1.000
30.	CAL cut off	9.500	9.500	9.500
31.	RUGO.cut off	1.000	1.000	1.000
32.	DRHO cut off	.150	.150	.150
33.	No clay	SP MN SD	MN SD	MN SD
34.	Vclay Flag	.000	.000	.000
35.	Vclay type	.000	.000	.000
36.	Vclay inp1	.200	.200	.200
37.	Vclay out1	.150	.150	.150
38.	Vclay inp2	.800	.800	.800
39.	Vclay out2	.800	.800	.800
40.	Vclay 50%	.500	.500	.500
41.	VclayGR type	1.000	1.000	1.000
42.	GR clean	35.000	60.000	60.000
43.	GR clay	120.000	115.000	115.000
44.	GR1	45.517	66.000	66.000
45.	VGR1	.100	.100	.100
46.	GR2	89.906	102.809	102.809
47.	VGR2	.800	.800	.800
48.	GR50%	70.000	70.000	70.000

INPUT PARAMETERS (cont'd)

	Zone no.	1	2	3
49.	R clay	6.500	3.700	4.400
50.	R limit	1000.000	1000.000	1000.000
51.	Rclay1 flag	.000	.000	.000
52.	Rclay1	1.000	1.000	1.000
53.	Vcl @ Rclay1	.150	.150	.150
54.	RHOB clay	2.467	2.458	2.458
55.	PHIN clay	.366	.312	.312
56.	t clay	93.840	88.837	88.841
57.	M clay	.657	.695	.695
58.	N clay	.433	.478	.477
59.	PHIN 2.2	.223	.259	.259
60.	t 2.2	90.000	90.000	90.000
61.	COER (a)	1.000	.700	.700
62.	MXP (m)	2.000	2.100	2.100
63.	SXP (n)	2.000	2.000	2.000
64.	Lithomod	1.000	1.000	1.000
65.	SXO limit	.200	.200	.200
66.	PHI max	.287	.301	.289
67.	PHI min c.o.	.0010000	.0010000	.0010000
68.	EXPX	1.500	1.500	1.500
69.	Clay cut off	.300	.300	.300
70.	Por. cut off	.050	.050	.050
71.	SW cut off	.500	.500	.500
72.	Sat Equation	1.000	1.000	1.000
73.	SWirr.cutoff	.300	.300	.300
74.	Perm Expon.	6.000	6.000	6.000
75.	PERM K coef	62500.000	62500.000	62500.000
76.	RHOMA 1	2.710	2.672	2.668
77.	RHOMA 2	2.710	2.803	2.776
78.	RHOMA 3	2.959	3.000	3.000
79.	UMA 1	8.358	6.404	6.730
80.	UMA 2	15.921	16.172	15.696
81.	UMA 3	10.612	10.386	10.637
82.	UF	.400	.400	.400
93.	PHINmat1	.223	.219	.219
94.	PHIDmat1	.235	.259	.259
95.	PHINmat2	.377	.458	.458
96.	PHIDmat2	.199	.179	.179
97.	PHINmat3	.050	.050	.050
98.	PHIDmat3	.000	.000	.000
99.	PHINmat4	.200	.200	.200
100.	PHIDmat4	-.100	-.100	-.100

Zone No. 1

Preinterpretation Results

23-06-95

																Clay Indicators									
DEPTH M	SP	GR	CALI	DI	RXO	RT	PHIS	PHID	PHIN	PHCP	PHRT	RWA	RMFA	VCL	FV	SP	GR	S	N	RT	DN	MN	SD	SN	FLAGS
1871.9	4.3	92	8.5	17.7	2.5	7.6	23.7	14.2	34.1	23.7	11.9	.612	.198	67.6	GR		68	86	83	99	77				
1872.4	8.0	80	8.4	120.0	6.4	7.8	23.5	15.4	32.0	23.1	11.7	.604	.494	53.5	GR		54	85	78	99	66				
1872.8	11.8	64	8.2	10.7	4.2	4.3	34.0	17.7	31.0	23.4	16.6	.337	.327	34.3	GR		34	99	75	99	54				
1873.3	14.9	51	7.9	10.4	.8	2.4	36.2	26.0	33.0	27.6	23.0	.254	.087	19.4	GR		19	99	80	99	35				
1873.8	17.6	49	8.0	10.4	1.0	2.4	35.2	25.4	25.6	23.7	23.3	.190	.077	10.8	DN		17	99	61	99	11				
1874.2	19.5	59	8.0	22.5	1.3	2.6	37.8	27.2	39.2	31.6	22.1	.345	.168	28.9	GR		29	99	97	99	54				
1874.7	18.8	47	8.0	21.7	1.2	2.6	35.1	29.0	29.7	27.5	22.1	.270	.123	13.7	DN		15	99	72	99	14				
1875.1	19.3	43	8.0	10.9	1.4	2.6	32.4	23.6	28.3	23.7	22.0	.210	.111	9.7	GR		10	99	68	99	26				
1875.6	20.1	45	8.0	10.7	1.2	3.0	29.9	24.2	29.1	24.4	20.4	.251	.100	12.6	GR		13	99	70	99	27				
1876.0	21.1	51	8.1	25.9	1.8	6.7	31.5	22.5	30.0	24.4	12.8	.570	.153	19.2	GR		19	99	72	99	36				
1876.5	20.7	45	8.1	11.0	1.3	2.8	33.7	22.5	27.3	22.7	21.0	.210	.096	11.8	GR		12	99	66	99	26				
1877.0	19.8	46	8.1	22.7	1.2	4.6	28.1	23.6	27.5	23.3	15.9	.359	.094	13.2	GR		13	98	66	99	23				
1877.4	20.5	45	8.1	10.0	1.4	2.6	29.3	21.9	25.6	21.5	22.2	.175	.095	11.8	GR		12	99	61	99	22				
1877.9	21.3	53	8.2	10.5	1.2	2.9	27.6	22.5	26.7	22.3	20.8	.208	.088	22.0	GR		22	97	64	99	24				
1878.3	20.1	51	8.2	10.7	1.7	6.4	19.4	19.5	24.7	20.0	13.2	.380	.104	19.4	GR		19	73	59	99	27				
1878.8	19.8	53	8.4	28.6	24.9	59.7	6.8	3.5	10.3	6.3	3.7	.475	.198	21.9	GR		22	36	25	41	31				
1879.2	17.2	80	8.4	10.4	9.6	10.4	12.3	8.9	17.4	12.3	10.0	.267	.247	36.8	DN		53	52	42	99	37				
1879.7	16.6	75	8.4	10.3	13.9	7.7	17.5	17.1	28.9	22.0	11.9	.539	.982	47.3	GR		47	67	69	99	49				
1880.2	14.3	87	8.1	10.2	3.9	6.3	24.7	18.9	30.9	23.7	13.3	.509	.314	50.1	DN		61	88	75	99	50				
1880.6	15.2	77	8.0	10.3	3.6	6.1	25.1	18.9	30.2	23.3	13.5	.478	.279	47.7	DN		50	89	73	99	48				
1881.1	14.4	79	8.2	10.6	4.9	10.6	24.9	18.3	30.3	23.2	9.8	.824	.381	49.8	DN		52	89	73	99	50				
1881.5	13.4	89	8.5	10.5	8.6	10.8	22.5	14.2	33.1	23.2	9.8	.839	.669	64.5	GR		64	82	80	99	73				
1882.0	14.0	97	8.4	10.8	5.0	6.8	22.3	17.1	35.6	25.6	12.8	.621	.462	72.7	GR		73	81	87	99	73				
1882.4	13.6	72	8.0	10.6	2.8	5.6	24.9	21.3	34.3	26.5	14.3	.545	.279	44.2	GR		44	89	83	99	55				
1882.9	13.2	79	8.1	10.3	4.7	6.5	24.3	19.5	31.0	24.0	13.1	.535	.392	48.8	DN		53	87	75	99	49				
1883.4	13.6	86	8.3		6.1	7.0	23.4	16.5	34.5	24.8	12.5	.611	.535	60.7	GR		61	85	84	99	71				
1883.8	12.9	64	8.0	10.0	2.5	4.9	24.9	19.5	26.7	21.3	15.4	.326	.169	33.5	DN		35	89	64	99	34				
1884.3	10.4	89	8.1	48.0	4.0	6.7	28.8	20.7	36.2	27.3	12.8	.690	.417	63.9	DN		64	99	89	99	64				
1884.7	7.9	102	8.3		9.3	4.6	38.9	24.2	48.4	33.4	15.8	.682	1.363	79.6	GR		80	99	99	99	98				
1885.2	6.0	117	8.3		2.0	4.5	30.0	15.4	40.3	26.7	16.2	.442	.199	96.3	DN		96	99	99	99	96				
1885.6	5.5	99	8.3	44.8	3.1	12.6	26.9	14.8	35.5	24.6	9.0	1.077	.269	76.0	GR		76	95	87	99	80				
1886.1	5.0	101	8.4		.5	3.6	18.9	12.4	34.6	23.3	18.3	.280	.043	71.3	S		78	71	84	99	85				
1886.6	5.5	124	8.4		.9	4.1	25.4	19.5	42.3	29.3	17.1	.471	.106	90.3	DN		99	90	99	99	90				
1887.0	5.0	127	8.4		4.0	4.2	29.4	13.0	39.8	25.5	16.6	.387	.362	98.3	N		99	99	98	99	99				
1887.5	5.6	111	8.4	120.0	4.1	6.9	29.4	15.4	45.3	28.0	12.6	.740	.443	89.3	GR		89	99	99	99	99				

Zone No. 1

Preinterpretation Results

DEPTH M	SP	GR	CALI	DI	RXO	RT	PHIS	PHID	PHIN	PHCP	PHRT	RWA	RMFA	VCL	FV	Clay Indicators SP	GR	S	N	RT	DN	MN	SD	SN	FLAGS
1887.9	7.6	110	8.4	120.0	7.7	9.8	31.9	20.1	47.2	30.9	10.3	1.258	.980	89.1	GR		89	99	99	99	99				
1888.4	9.6	94	8.3	11.0	2.8	5.7	26.4	16.5	35.9	25.5	14.1	.518	.252	69.9	GR		70	93	88	99	76				
1888.8	13.6	65	8.1	120.0	3.9	4.6	25.9	21.3	31.0	24.6	15.9	.395	.335	36.4	GR		36	92	75	99	43				
1889.3	15.8	59	7.8	10.7	2.2	3.8	28.1	23.6	32.0	26.1	17.7	.363	.208	29.2	GR		29	98	77	99	39				
1889.8	19.0	61	7.8	10.8	2.0	3.7	27.1	24.2	29.8	24.9	17.9	.329	.173	29.4	DN		31	95	72	99	29				
1890.2	19.1	54	7.8	23.0	1.7	3.4	30.2	22.5	27.8	23.0	18.9	.260	.129	22.4	GR		22	99	67	99	28				
1890.7	18.1	59	7.8	28.9	2.0	3.7	25.7	22.5	26.6	22.3	18.1	.265	.147	23.6	DN		29	91	64	99	24				
1891.1	17.3	86	8.1	43.2	4.1	6.1	20.8	19.5	31.8	24.5	13.6	.518	.349	51.6	DN		60	77	77	99	52				
1891.6	16.6	87	8.1	26.5	3.1	6.4	22.1	15.4	35.6	24.8	13.2	.558	.272	62.0	GR		62	81	87	99	79				
1892.0	16.3	74	8.0	29.8	2.7	4.6	22.6	20.1	34.2	26.0	15.9	.435	.254	46.8	GR		47	82	83	99	58				
1892.5	16.9	92	8.4	120.0	6.0	6.6	20.6	16.5	32.1	23.6	12.9	.526	.479	62.3	DN		67	76	78	99	62				
1893.0	18.1	72	7.9	10.4	2.1	5.2	23.3	20.1	32.6	25.1	14.8	.464	.186	43.5	GR		43	84	79	99	52				
1893.4	18.9	56	7.9	10.1	2.2	3.8	27.3	23.6	31.6	25.9	17.8	.355	.206	25.5	GR		25	96	76	99	38				
1893.9	17.7	78	7.9	10.0	2.9	4.2	25.6	23.6	28.8	24.1	16.7	.348	.237	27.8	DN		51	91	69	99	28				
1894.3	17.8	83	8.1	10.0	3.9	4.9	22.3	18.3	32.7	24.5	15.3	.422	.331	57.3	GR		57	81	79	99	58				
1894.8	17.7	63	8.0		2.9	5.2	19.9	16.0	33.8	24.3	14.8	.437	.239	33.1	GR		33	74	82	99	70				
1895.2	18.2	60	8.3	10.3	16.3	10.4	12.5	12.4	25.5	18.5	10.0	.541	.850	30.0	GR		30	53	61	99	52				
1895.7	17.9	70	8.4	10.7	33.0	28.9	7.1	8.9	22.3	15.6	5.6	1.116	1.274	37.1	S		41	37	53	88	53				
1896.2	18.6	57	8.0	10.2	2.2	6.3	16.0	16.5	28.8	21.7	13.3	.437	.151	25.9	GR		26	63	69	99	51				
1896.6	18.9	56	7.9	10.1	2.0	3.9	24.5	23.6	30.3	25.0	17.4	.348	.175	24.9	GR		25	88	73	99	33				
1897.1	19.4	62	7.9	10.1	2.0	3.7	24.2	21.3	31.0	24.6	18.0	.319	.171	32.4	GR		32	87	75	99	43				
1897.5	18.7	62	7.9	10.4	1.8	3.4	24.0	21.3	33.0	25.9	18.9	.319	.171	32.2	GR		32	86	80	99	50				
1898.0	19.2	56	8.1	10.8	7.4	5.6	19.9	16.0	27.3	20.6	14.2	.352	.466	24.9	GR		25	74	65	99	47				
1898.4	18.2	59	8.3	120.0	68.9	19.4	8.2	9.5	18.8	13.4	7.0	.579	2.050	28.4	GR		28	40	45	99	39				
1898.9	19.6	59	7.9	40.4	2.2	3.3	19.3	18.9	29.9	23.2	19.1	.257	.171	28.3	GR		28	72	72	99	47				
1899.4	20.1	62	7.9	28.4	1.7	2.9	25.6	23.0	32.0	25.9	20.7	.272	.155	32.0	GR		32	91	77	99	41				
1899.8	21.2	61	7.9	10.9	1.5	2.8	25.9	24.2	34.1	27.6	21.0	.297	.157	31.1	GR		31	92	83	99	45				
1900.3	19.3	55	8.0	25.7	1.7	3.1	25.3	23.6	32.0	26.1	19.7	.300	.159	24.2	GR		24	90	78	99	39				
1900.7	19.1	63	7.9	10.8	1.6	3.0	25.4	23.6	33.0	26.7	20.2	.301	.162	33.9	GR		34	90	80	99	43				
1901.2	18.2	55	8.0	10.9	1.6	3.0	25.8	23.0	29.9	24.6	20.3	.256	.139	23.6	GR		24	92	72	99	33				
1901.6	16.9	82	8.0	10.7	1.4	2.4	27.5	24.8	32.0	26.5	23.2	.233	.136	35.3	DN		55	96	78	99	35				
1902.1	13.2	115	8.5	10.9	3.2	3.9	25.8	17.1	33.1	24.3	17.5	.328	.272	63.8	DN		94	91	80	99	64				
1902.6	9.4	103	8.6	10.9	7.4	8.4	24.1	13.6	37.2	24.8	11.2	.734	.645	80.5	GR		81	87	91	99	90				
1903.0	7.7	101	8.8	10.6	7.2	7.0	24.4	14.8	34.1	24.0	12.5	.572	.587	75.3	DN		78	87	83	99	75				
1903.5	7.1	100	8.5	10.7	7.0	7.9	16.3	11.8	29.9	20.8	11.7	.507	.449	63.9	S		77	64	72	99	70				
1903.9	5.9	110	8.4	10.2	8.5	7.2	17.2	14.2	28.5	23.2	21.3	.479	.563	66.3	S		88	66	81	99	74				

Zone No. 2

Preinterpretation Results

																Clay Indicators									
DEPTH M	SP	GR	CALI	DI	RXO	RT	PHIS	PHID	PHIN	PHCP	PHRT	RWA	RMFA	VCL	FV	SP	GR	S	N	RT	DN	MN	SD	SN	FLAGS
1903.9	5.9	110	8.4	10.2	8.5	7.2	17.2	14.2	28.5	23.2	21.3	.479	.563	66.3	S		88	66	81	99	74				
1907.0	3.0	110	8.6		5.5	4.7	22.0	15.4	26.4	22.5	26.2	.292	.343	74.5	DN		91	90	86	99	75				
1910.0	7.2	86	8.4		7.4	5.8	20.6	17.7	30.7	25.5	23.6	.472	.602	46.7	GR		47	86	99	99	84				
1913.1	5.3	82	8.4		7.0	6.8	18.1	16.5	25.3	22.3	21.8	.419	.430	39.1	GR		39	77	83	99	63				
1916.1	5.4	84	8.4	10.1	6.1	4.7	23.1	20.1	29.6	25.9	26.0	.397	.510	43.2	GR		43	94	95	99	67				
1919.2	5.9	75	8.4	10.4	7.4	9.1	15.2	14.2	24.2	20.9	19.0	.489	.394	27.3	GR		27	68	80	99	70				
1922.2	6.1	71	8.0	10.1	41.1	5.1	19.0	17.7	26.3	23.3	25.2	.340	2.764	19.9	GR		20	80	86	99	63				
1925.3	7.3	82	8.0	10.1	3.4	5.6	21.6	19.5	30.7	26.2	24.0	.482	.291	40.9	GR		41	89	98	99	75				
1928.3	5.0	78	8.3		4.8	4.4	23.7	20.7	26.3	24.4	27.0	.323	.357	33.1	GR		33	96	86	99	48				
1931.4	6.8	86	7.8	10.2	3.8	4.4	22.5	20.7	28.5	25.6	26.9	.361	.308	47.2	GR		47	92	92	99	59				
1934.4	2.9	103	8.3		3.0	3.6	24.6	18.3	29.6	25.2	29.5	.289	.235	75.6	DN		78	99	95	99	76				
1937.5	1.1	115	8.4	10.0	5.0	4.5	24.6	15.4	31.8	25.1	26.7	.349	.393	98.7	S		99	99	99	99	99				
1940.5	1.1	121	8.3		4.0	3.5	25.4	16.5	30.7	25.1	30.0	.275	.314	89.5	DN		99	99	99	99	90				
1943.6	1.3	114	8.3		5.2	3.8	25.3	15.9	29.6	24.3	29.0	.276	.381	87.2	DN		99	99	95	99	87				
1946.6	4.6	96	8.2		4.4	4.6	22.3	19.5	28.5	25.1	26.5	.359	.349	64.6	DN		66	91	92	99	65				
1949.7	-1.1	108	8.4		.8	1.8	33.9	27.8	38.3	33.2	41.1	.255	.107	71.3	DN		87	99	99	99	71				
1952.7	.5	99	8.3		.8	2.5	31.9	23.6	36.1	30.4	35.0	.297	.089	70.1	GR		70	99	99	99	81				
1955.7	6.9	79	8.5	10.0	2.8	5.4	22.5	17.7	28.5	24.5	24.5	.401	.205	33.9	GR		34	92	92	99	73				
1958.8	4.7	81	8.4		4.8	4.8	21.8	18.9	27.4	24.3	25.9	.353	.356	38.4	GR		38	90	89	99	62				
1961.8	6.3	82	8.5		5.4	5.2	22.7	18.3	28.5	24.7	24.8	.398	.411	39.1	GR		39	93	92	99	70				
1964.9	6.1	71	8.2		4.6	4.5	22.5	21.9	28.5	26.0	26.7	.380	.389	20.4	GR		20	92	92	99	53				
1967.9	6.9	78	8.3	10.1	5.0	5.3	23.2	18.9	29.6	25.5	24.7	.428	.407	32.3	GR		32	94	95	99	73				
1971.0	7.2	86	8.0		3.6	4.4	22.3	19.5	30.7	26.2	26.9	.378	.312	47.4	GR		47	91	98	99	75				
1974.0	2.1	101	8.5		3.6	3.6	25.5	17.7	29.6	25.0	29.8	.277	.282	74.3	GR		74	99	95	99	79				
1977.1	.6	117	8.1		3.9	3.7	24.3	13.6	30.7	23.9	29.2	.263	.276	97.7	S		99	98	98	99					2
1980.1	3.4	114	8.3		6.0	5.0	23.0	13.6	27.4	22.4	25.4	.308	.369	88.3	DN		98	94	89	99	88				
1983.2	5.7	88	8.5		5.4	5.1	22.9	18.3	29.6	25.3	25.2	.401	.426	50.3	GR		50	93	95	99	76				
1986.2	6.9	79	8.3		4.2	5.5	23.4	18.3	27.4	24.1	24.3	.394	.306	34.3	GR		34	95	89	99	65				
1989.3	7.3	72	8.3		4.8	5.1	17.1	18.9	27.4	24.3	25.1	.374	.350	22.4	GR		22	74	89	99	62				
1992.3	7.5	81	8.2	10.1	3.8	3.9	25.8	21.3	31.8	27.5	28.6	.368	.360	37.8	GR		38	99	99	99	72				
1995.4	5.6	85	7.7		3.1	3.3	23.2	21.3	29.6	26.4	30.9	.286	.265	45.0	GR		45	94	95	99	61				
1998.4	.9	116	8.4		6.1	4.6	22.5	13.0	29.6	23.2	26.5	.303	.406	92.1	S		99	92	95	99	99				
2001.5	-.1	105	8.2		6.6	4.0	27.0	15.4	30.7	24.6	28.3	.297	.493	82.5	GR		82	99	98	99	95				
2004.5	1.0	96	8.2		4.7	3.9	23.0	16.5	29.6	24.6	28.5	.293	.351	66.1	GR		66	94	95	99	84				
2007.6	.1	97	8.2		3.9	3.5	22.7	17.7	27.4	23.9	30.0	.248	.277	66.9	GR		67	93	89	99	68				
2010.6	1.2	97	8.2		4.1	3.8	24.0	19.5	30.7	26.2	28.8	.328	.355	67.6	GR		68	97	98	99	75				

Zone No. 2

Preinterpretation Results

DEPTH M	SP	GR	CALI	DI	RXO	RT	PHIS	PHID	PHIN	PHCP	PHRT	RWA	RMFA	VCL	FV	Clay Indicators SP	GR	S	N	RT	DN	MN	SD	SN	FLAGS
2013.7	-1.4	108	8.3		4.8	3.8	22.5	14.8	27.4	22.9	28.8	.246	.309	82.5	DN		88	92	89	99	83				
2016.7	.7	92	8.0		3.5	4.1	22.1	19.5	26.3	23.9	27.9	.289	.250	54.0	DN		59	91	86	99	54				
2019.8	.3	102	8.3		5.6	4.8	20.8	14.2	27.4	22.6	25.8	.304	.354	77.2	GR		77	86	89	99	85				
2022.8	1.0	111	8.3		5.2	4.2	22.8	15.4	29.6	24.1	27.5	.303	.374	90.1	DN		93	93	95	99	90				
2025.9	5.5	87	7.9		3.6	4.0	21.6	19.5	28.5	25.1	28.1	.316	.286	49.5	GR		50	89	92	99	64				
2028.9	-.2	107	8.3		5.1	4.2	22.4	14.2	27.4	22.6	27.6	.264	.321	85.4	DN		85	92	89	99	85				

Zone No. 3

Preinterpretation Results

DEPTH M	SP	GR	CALI	DI	RXO	RT	PHIS	PHID	PHIN	PHCP	PHRT	RWA	RMFA	VCL	FV	Clay Indicators SP	GR	S	N	RT	DN	MN	SD	SN	FLAGS
2030.4	1.5	97	8.3		3.1	3.2	23.9	17.1	27.6	23.8	31.4	.223	.220	68.1	GR		68	96	89	99	72				
2033.5	5.7	80	8.3		4.5	5.0	20.5	17.1	29.7	24.9	40.6	.384	.343	35.8	GR		36	85	96	99	82				
2036.5	6.4	74	8.3		6.3	4.8	23.4	20.1	27.6	24.8	41.5	.366	.487	24.8	GR		25	95	89	99	57				
2039.6	6.6	81	8.4		7.8	6.1	20.5	18.9	26.5	23.8	36.9	.427	.548	38.7	GR		39	85	86	99	58				
2042.6	9.0	79	8.4		6.3	6.6	19.7	17.7	25.4	22.8	35.5	.425	.401	34.4	GR		34	83	83	99	58				
2045.7	7.9	79	8.4		5.9	6.4	21.1	18.9	27.6	24.4	36.2	.470	.434	34.9	GR		35	87	89	99	63				
2048.7	9.6	84	8.4		8.0	7.2	20.3	17.7	26.5	23.4	34.0	.489	.542	43.3	GR		43	85	86	99	63				
2051.8	9.5	79	8.4		7.3	6.4	20.9	18.3	26.5	23.6	36.0	.442	.506	34.0	GR		34	87	86	99	61				
2054.8	10.9	78	8.4		6.5	5.9	23.1	19.5	27.6	24.6	37.6	.441	.490	33.3	GR		33	94	89	99	60				
2057.9	10.7	82	8.4		8.0	6.9	21.1	18.9	28.7	25.0	34.8	.537	.620	40.1	GR		40	87	93	99	68				
2060.9	8.7	79	8.4		6.3	6.3	22.1	18.3	25.4	23.0	36.3	.412	.412	34.7	GR		35	91	83	99	55				
2064.0	6.8	79	8.4		7.2	6.5	19.6	15.9	26.5	22.8	35.8	.415	.458	34.0	GR		34	82	86	99	72				
2067.0	9.8	83	8.2		6.6	6.1	21.1	17.7	28.7	24.6	36.9	.457	.493	42.7	GR		43	87	93	99	74				
2070.0	11.1	81	8.2		7.0	6.7	21.6	18.9	26.5	23.8	35.2	.472	.491	38.2	GR		38	89	86	99	58				
2073.1	11.0	74	8.2		5.3	6.6	20.5	18.3	26.5	23.6	35.6	.453	.363	24.6	GR		25	85	86	99	61				
2076.1	6.9	103	8.3		6.9	5.4	20.9	17.7	26.5	23.4	39.0	.368	.468	63.4	DN		78	87	86	99	63				
2079.2	6.8	83	8.1		5.2	5.6	21.1	16.5	26.5	23.0	38.5	.363	.337	41.9	GR		42	87	86	99	69				
2082.2	9.6	76	8.6	10.0	5.5	7.0	18.2	18.3	26.5	23.6	34.4	.486	.382	30.0	GR		30	78	86	99	61				
2085.3	10.3	74	8.4		6.9	6.2	20.5	18.9	26.5	23.8	36.7	.434	.485	25.8	GR		26	85	86	99	58				
2088.3	1.5	108	8.4		7.7	6.1	24.7	15.4	29.8	24.2	36.9	.441	.560	87.8	GR		88	99	96	99	91				
2091.4	3.6	97	8.3		5.7	4.6	22.8	17.7	28.7	24.6	42.2	.345	.430	67.3	GR		67	93	93	99	74				
2094.4	4.5	110	8.3		6.3	5.6	20.9	15.9	26.5	22.8	38.5	.358	.402	72.1	DN		91	87	86	99	72				
2097.5	-2.3	112	8.3		7.2	5.2	23.5	14.2	28.7	23.2	39.9	.345	.479	91.3	DN		94	95	93	99	91				
2100.5	5.0	96	8.3		4.6	4.6	21.4	18.9	27.6	24.4	42.1	.342	.344	62.9	DN		65	88	89	99	63				
2103.6	8.6	86	8.3		6.6	6.7	19.4	18.9	27.6	24.4	35.4	.493	.486	46.9	GR		47	82	89	99	63				
2106.6	9.4	78	8.4		7.9	6.8	17.2	20.1	24.3	22.9	35.0	.442	.511	32.5	GR		33	75	80	99	41				
2109.7	10.1	76	8.4		7.8	6.6	20.1	18.3	27.6	24.2	35.6	.477	.566	28.5	GR		29	84	89	99	66				
2112.7	9.1	75	8.4		8.4	7.4	19.5	17.7	27.6	24.0	33.6	.528	.601	27.2	GR		27	82	89	99	69				
2115.8	10.2	79	8.4		7.4	8.3	18.4	17.7	21.1	20.1	31.9	.407	.363	34.3	GR		34	79	70	99	37				
2118.8	11.0	82	8.4		8.5	7.5	20.0	17.7	27.6	24.0	33.4	.534	.608	39.4	GR		39	84	89	99	69				
2121.9	9.6	84	8.4		7.7	6.6	20.2	18.3	26.5	23.6	35.5	.456	.529	44.4	GR		44	84	86	99	61				
2124.9	7.6	77	8.4		7.5	6.8	20.4	18.3	25.4	23.0	35.0	.445	.486	30.4	GR		30	85	83	99	55				
2128.0	8.2	83	8.3		7.2	6.9	20.9	17.7	27.6	24.0	34.8	.490	.514	42.4	GR		42	87	89	99	69				
2131.0	6.2	86	8.2		7.2	6.8	19.0	16.5	25.4	22.4	35.0	.421	.443	48.0	GR		48	80	83	99	64				
2134.1	6.2	85	8.4		9.8	7.5	19.1	17.7	26.5	23.4	33.4	.510	.661	46.1	GR		46	81	86	99	63				
2137.1	6.2	130	8.3		9.5	6.1	19.9	13.6	26.5	22.0	36.8	.364	.564	83.2	S		99	83	86	99	84				

CPX flag values

1. VCL greater than 0.95
2. VN greater than 0.75
3. VS greater than 0.75
4. Bad hole condition
5. Matrix density greater than Lithological model
6. Matrix density less than Lithological model
7. Porosity derived from Sonic Log
8. Porosity derived from or limited by PHIMAX
9. Porosity derived from Density Log

$. Pay zone

Water saturation equations

1. Indonesia
2. Simandoux
3. Fertl & Hammock
4. Laminar
5. Bussian
6. User defined

VGRTYPE :Vclay from GR Equations used

0. Not Used

IGR=(GR-GRmin)/(GRmax-GRmin)

1. Linear VGR=IGR
2. Asymmetric (S shaped)
   Defined by 2 sets of intermediate points through which the S bend passes through. GR1, VGR1 and GR2, VGR2.

Steiber equation: VGR= IGR/(A + (A-1.0)*IGR)

3. Steiber 1 A = 2.0
4. Steiber 2 A = 3.0
5. Steiber 3 A = 4.0
6. Steiber 50%
   A is computed to give VGR= 0.5 when GR = GR50%)
7. Larinov Old Rocks: VGR= (2**(2*IGR)-1.0)/3.0
8. Larinov Tertiary : VGR= 0.083*(2.0*(3.7058*IGR)-1.0)
9. Clavier : VGR= 1.7-SQRT(3.38-(IGR+0.7)**2.0)

Zone No. 1

Complex Lithology Results
23-06-95

DEPTH M	GR	RT	RXO	PHIN	RHOB	DD	SPI	SWU	SXOU	PHIS	VCL	FVCL	RHOMAU	SXO	SW	PHIE	RHOMA	POR-M	HC-M	FLAGS
1871.9	92	7.6	2.5	29.8	2.470	.0	.0	83.5	133.8	23.7	67.6	GR	2.741	96.5	83.5	4.9	2.919	.00	.00	
1872.4	80	7.8	6.4	27.6	2.450	-.1	.0	76.9	74.0	23.5	53.5	GR	2.740	76.9	76.9	8.1	2.893	.00	.00	
1872.8	64	4.3	4.2	26.5	2.410	-.3	.0	92.0	76.5	34.0	34.3	GR	2.737	92.0	92.0	13.6	2.833	.00	.00	
1873.3	51	2.4	.8	28.7	2.270	-.6	.0	92.9	124.1	36.2	19.4	GR	2.694	98.5	92.9	22.6	2.747	.00	.00	
1873.8	49	2.4	1.0	21.0	2.280	-.5	.0	106.1	128.8	35.2	10.8	DN	2.651	100.0	100.0	21.2	2.676	.00	.00	
1874.2	59	2.6	1.3	35.2	2.250	-.5	.0	91.2	104.0	37.8	28.9	GR	2.739	98.2	91.2	20.4	2.809	.00	.00	8
1874.7	47	2.6	1.2	25.2	2.220	-.5	.0	87.1	99.9	35.1	13.7	DN	2.646	97.3	87.1	24.4	2.680	.00	.00	
1875.1	43	2.6	1.4	23.8	2.310	-.5	.0	100.6	106.7	32.4	9.7	GR	2.693	100.0	100.0	21.4	2.712	.00	.00	
1875.6	45	3.0	1.2	24.5	2.300	-.5	.0	92.3	113.5	29.9	12.6	GR	2.688	98.4	92.3	21.4	2.714	.00	.00	
1876.0	51	6.7	1.8	25.5	2.330	-.4	.0	64.2	97.3	31.5	19.2	GR	2.707	91.5	64.2	19.2	2.769	.00	.00	
1876.5	45	2.8	1.3	22.8	2.330	-.4	.0	102.2	117.3	33.7	11.8	GR	2.690	100.0	100.0	19.8	2.715	.00	.00	
1877.0	46	4.6	1.2	22.9	2.310	-.4	.0	77.8	118.1	28.1	13.2	GR	2.683	95.1	77.8	20.3	2.710	.00	.00	
1877.4	45	2.6	1.4	21.1	2.340	-.4	.0	112.6	118.6	29.3	11.8	GR	2.681	100.0	100.0	18.8	2.704	.00	.00	
1877.9	53	2.9	1.2	22.1	2.330	-.3	.0	105.2	127.9	27.6	22.0	GR	2.659	100.0	100.0	17.2	2.708	.00	.00	
1878.3	51	6.4	1.7	20.2	2.380	-.3	.0	80.0	121.3	19.4	19.4	GR	2.680	95.6	80.0	15.2	2.728	.00	.00	
1878.8	53	59.7	24.9	6.7	2.650	-.1	.0	100.0	100.0	6.8	21.9	GR	2.701	100.0	100.0	.0	2.760	.00	.00	
1879.2	80	10.4	9.6	13.2	2.560	-.1	.0	149.3	147.5	12.3	36.8	DN	2.650	100.0	100.0	1.3	2.778	.00	.00	
1879.7	75	7.7	13.9	24.3	2.420	-.1	.0	78.6	50.0	17.5	47.3	GR	2.672	78.6	78.6	8.9	2.831	.00	.00	
1880.2	87	6.3	3.9	26.4	2.390	-.4	.0	78.7	85.5	24.7	50.1	DN	2.662	85.5	78.7	10.2	2.828	.00	.00	
1880.6	77	6.1	3.6	25.7	2.390	-.5	.0	80.5	89.5	25.1	47.7	DN	2.660	89.5	80.5	10.5	2.816	.00	.00	
1881.1	79	10.6	4.9	25.8	2.400	-.3	.0	62.6	78.8	24.9	49.8	DN	2.666	78.8	62.6	9.6	2.833	.00	.00	
1881.5	89	10.8	8.6	28.7	2.470	.0	.0	70.7	71.8	22.5	64.5	GR	2.734	71.8	70.7	5.2	2.917	.00	.00	
1882.0	97	6.8	5.0	31.3	2.420	-.1	.0	89.6	96.0	22.3	72.7	GR	2.671	96.0	89.6	4.1	2.894	.00	.00	8
1882.4	72	5.6	2.8	30.0	2.350	-.5	.0	71.4	82.7	24.9	44.2	GR	2.707	82.7	71.4	14.4	2.846	.00	.00	
1882.9	79	6.5	4.7	26.6	2.380	-.4	.0	75.5	74.8	24.3	48.8	DN	2.667	75.5	75.5	10.9	2.832	.00	.00	
1883.4	86	7.0	6.1	30.2	2.430	-.2	.0	76.5	71.8	23.4	60.7	GR	2.737	76.5	76.5	8.1	2.905	.00	.00	
1883.8	64	4.9	2.5	22.1	2.380	-.5	.0	91.3	103.9	24.9	33.5	DN	2.656	98.2	91.3	12.7	2.750	.00	.00	
1884.3	89	6.7	4.0	32.0	2.360	-.4	.0	68.3	76.0	28.8	63.9	DN	2.658	76.0	68.3	10.4	2.874	.00	.00	8
1884.7	102	4.6	9.3	45.1	2.300	-.2	.0	112.5	75.4	38.9	79.6	GR	2.671	100.0	100.0	2.6	2.918	.00	.00	8
1885.2	117	4.5	2.0	36.4	2.450	-.2	.0			30.0	96.3	DN	2.671	100.0	100.0	.0	2.958	.00	.00	1
1885.6	99	12.6	3.1	31.2	2.460	-.2	.0	67.0	125.5	26.9	76.0	GR	2.671	92.3	67.0	3.4	2.923	.00	.00	8
1886.1	101	3.6	.5	30.3	2.500	-.1	.0	121.7	286.5	18.9	71.3	S	2.671	100.0	100.0	4.4	2.945	.00	.00	8
1886.6	124	4.1	.9	38.6	2.380	-.1	.0	126.1	260.5	25.4	90.3	DN	2.671	100.0	100.0	.9	2.927	.00	.00	8
1887.0	127	4.2	4.0	35.9	2.490	-.1	.0			29.4	98.3	N	2.671	100.0	100.0	.0	2.981	.00	.00	1
1887.5	111	6.9	4.1	41.8	2.450	-.1	.0	96.5	122.1	29.4	89.3	GR	2.671	99.3	96.5	1.0	2.989	.00	.00	8
1887.9	110	9.8	7.7	43.8	2.370	-.1	.0	80.6	89.3	31.9	89.1	GR	2.671	89.3	80.6	1.0	2.951	.00	.00	8

Zone No. 1

Complex Lithology Results

DEPTH M	GR	RT	RXO	PHIN	RHOB	DD	SPI	SWU	SXOU	PHIS	VCL	FVCL	RHOMAU	SXO	SW	PHIE	RHOMA	POR-M	HC-M	FLAGS
1888.4	94	5.7	2.8	31.7	2.430	-.2	.0	87.4	112.7	26.4	69.9	GR	2.700	97.3	87.4	6.3	2.905	.00	.00	
1888.8	65	4.6	3.9	26.5	2.350	-.4	.0	82.0	72.8	25.9	36.4	GR	2.689	82.0	82.0	14.9	2.807	.00	.00	
1889.3	59	3.8	2.2	27.6	2.310	-.7	.0	81.5	86.1	28.1	29.2	GR	2.694	86.1	81.5	18.4	2.787	.00	.00	
1889.8	61	3.7	2.0	25.3	2.300	-.7	.0	84.0	92.9	27.1	29.4	DN	2.655	92.9	84.0	17.9	2.736	.00	.00	
1890.2	54	3.4	1.7	23.2	2.330	-.7	.0	94.6	106.2	30.2	22.4	GR	2.668	98.9	94.6	17.5	2.722	.00	.00	
1890.7	59	3.7	2.0	22.0	2.330	-.7	.0	93.6	99.9	25.7	23.6	DN	2.653	98.7	93.6	16.7	2.707	.00	.00	
1891.1	86	6.1	4.1	27.4	2.380	-.4	.0	77.5	80.4	20.8	51.6	DN	2.663	80.4	77.5	10.6	2.836	.00	.00	
1891.6	87	6.4	3.1	31.3	2.450	-.4	.0	79.8	100.5	22.1	62.0	GR	2.800	95.6	79.8	8.0	2.920	.00	.00	
1892.0	74	4.6	2.7	29.9	2.370	-.5	.0	82.0	89.6	22.6	46.8	GR	2.708	89.6	82.0	13.1	2.851	.00	.00	
1892.5	92	6.6	6.0	27.7	2.430	-.1	.0	85.6	80.0	20.6	62.3	DN	2.657	85.6	85.6	6.5	2.864	.00	.00	
1893.0	72	5.2	2.1	28.2	2.370	-.6	.0	78.7	103.5	23.3	43.5	GR	2.692	95.3	78.7	13.2	2.827	.00	.00	
1893.4	56	3.8	2.2	27.2	2.310	-.6	.0	81.7	85.2	27.3	25.5	GR	2.702	85.2	81.7	19.1	2.784	.00	.00	
1893.9	78	4.2	2.9	24.3	2.310	-.6	.0	81.8	79.3	25.6	27.8	DN	2.666	81.8	81.8	17.4	2.748	.00	.00	
1894.3	83	4.9	3.9	28.3	2.400	-.4	.0	89.6	87.8	22.3	57.3	GR	2.660	89.6	89.6	8.9	2.846	.00	.00	
1894.8	63	5.2	2.9	29.5	2.440	-.5	.0	77.2	84.7	19.9	33.1	GR	2.861	84.7	77.2	15.4	2.908	.00	.00	
1895.2	60	10.4	16.3	21.0	2.500	-.2	.0	76.2	50.3	12.5	30.0	GR	2.777	76.2	76.2	10.0	2.860	.00	.00	
1895.7	70	28.9	33.0	17.9	2.560	-.1	.0	62.9	52.1	7.1	37.1	S	2.747	62.9	62.9	4.5	2.862	.00	.00	
1896.2	57	6.3	2.2	24.3	2.430	-.5	.0	78.9	108.0	16.0	25.9	GR	2.758	95.4	78.9	14.4	2.829	.00	.00	
1896.6	56	3.9	2.0	25.8	2.310	-.6	.0	81.8	91.6	24.5	24.9	GR	2.683	91.6	81.8	18.7	2.755	.00	.00	
1897.1	62	3.7	2.0	26.5	2.350	-.6	.0	90.2	99.8	24.2	32.4	GR	2.688	98.0	90.2	15.8	2.784	.00	.00	
1897.5	62	3.4	1.8	28.7	2.350	-.6	.0	90.2	99.7	24.0	32.2	GR	2.715	98.0	90.2	16.8	2.811	.00	.00	
1898.0	56	5.6	7.4	22.7	2.440	-.4	.0	89.7	62.8	19.9	24.9	GR	2.736	89.7	89.7	13.3	2.811	.00	.00	
1898.4	59	19.4	68.9	14.5	2.550	-.2	.0	86.8	39.9	8.2	28.4	GR	2.696	86.8	86.8	4.8	2.789	.00	.00	
1898.9	59	3.3	2.2	25.4	2.390	-.6	.0	102.8	101.7	19.3	28.3	GR	2.714	100.0	100.0	15.0	2.803	.00	.00	
1899.4	62	2.9	1.7	27.6	2.320	-.6	.0	95.3	101.6	25.6	32.0	GR	2.680	99.0	95.3	17.4	2.773	.00	.00	
1899.8	61	2.8	1.5	29.8	2.300	-.6	.0	90.0	99.2	25.9	31.1	GR	2.694	97.9	90.0	19.2	2.785	.00	.00	
1900.3	55	3.1	1.7	27.6	2.310	-.5	.0	88.6	96.5	25.3	24.2	GR	2.695	96.5	88.6	19.6	2.765	.00	.00	
1900.7	63	3.0	1.6	28.7	2.310	-.6	.0	90.4	99.5	25.4	33.9	GR	2.680	98.0	90.4	17.8	2.779	.00	.00	
1901.2	55	3.0	1.6	25.4	2.320	-.5	.0	95.7	102.9	25.8	23.6	GR	2.681	99.1	95.7	18.5	2.744	.00	.00	
1901.6	82	2.4	1.4	27.6	2.290	-.5	.0	101.1	107.1	27.5	35.3	DN	2.647	100.0	100.0	17.8	2.749	.00	.00	
1902.1	115	3.9	3.2	28.7	2.420	.0	.0	107.2	104.8	25.8	63.8	DN	2.656	100.0	100.0	6.9	2.867	.00	.00	
1902.6	103	8.4	7.4	33.1	2.480	.1	.0	83.9	85.2	24.1	80.5	GR	2.671	85.2	83.9	2.5	2.954	.00	.00	8
1903.0	101	7.0	7.2	29.8	2.460	.3	.0	89.6	82.5	24.4	75.3	DN	2.671	89.6	89.6	3.5	2.910	.00	.00	8
1903.5	100	7.9	7.0	25.4	2.510	.0	.0	100.9	101.5	16.3	63.9	S	2.696	100.0	100.0	2.4	2.903	.00	.00	
1903.9	110	7.2	8.5	28.9	2.470	-.1	.0	88.1	74.3	17.2	66.3	S	2.709	88.1	88.1	4.6	2.908	.00	.00	

Zone No. 2

Complex Lithology Results

DEPTH M	GR	RT	RXO	PHIN	RHOB	DD	SPI	SWU	SXOU	PHIS	VCL	FVCL	RHOMAU	SXO	SW	PHIE	RHOMA	POR-M	HC-M	FLAGS
1903.9	110	7.2	8.5	28.9	2.470	-.1	.0	86.7	70.2	17.2	66.3	S	2.709	86.7	86.7	4.6	2.908	.00	.00	
1907.0	110	4.7	5.5	26.7	2.450	.1	.0	94.2	74.6	22.0	74.5	DN	2.683	94.2	94.2	3.9	2.865	.00	.00	8
1910.0	86	5.8	7.4	31.1	2.410	-.1	.0	79.7	44.0	20.6	46.7	GR	2.866	79.7	79.7	14.1	2.902	.00	.00	
1913.1	82	6.8	7.0	25.6	2.430	-.1	.0	85.9	52.5	18.1	39.1	GR	2.769	85.9	85.9	12.4	2.835	.00	.00	
1916.1	84	4.7	6.1	30.0	2.370	-.1	.0	88.7	47.2	23.1	43.2	GR	2.770	88.7	88.7	15.2	2.838	.00	.00	
1919.2	75	9.1	7.4	24.5	2.470	-.1	.0	82.1	51.1	15.2	27.3	GR	2.848	82.1	82.1	14.3	2.877	.00	.00	
1922.2	71	5.1	41.1	26.6	2.410	-.5	.0	104.6	18.6	19.0	19.9	GR	2.806	100.0	100.0	18.3	2.832	.00	.00	
1925.3	82	5.6	3.4	31.0	2.380	-.5	.0	80.7	61.1	21.6	40.9	GR	2.837	80.7	80.7	16.3	2.881	.00	.00	
1928.3	78	4.4	4.8	26.7	2.360	-.2	.0	101.9	55.0	23.7	33.1	GR	2.716	100.0	100.0	15.9	2.790	.00	.00	
1931.4	86	4.4	3.8	28.8	2.360	-.7	.0	92.0	62.5	22.5	47.2	GR	2.713	92.0	92.0	13.7	2.817	.00	.00	
1934.4	103	3.6	3.0	30.0	2.400	-.2	.0	106.5	102.4	24.6	75.6	DN	2.683	100.0	100.0	3.6	2.861	.00	.00	8
1937.5	115	4.5	5.0	32.2	2.450	-.1	.0			24.6	98.7	S	2.683	100.0	100.0	.0	2.921	.00	.00	1
1940.5	121	3.5	4.0	31.1	2.430	-.2	.0	105.8	95.2	25.4	89.5	DN	2.683	100.0	100.0	1.0	2.896	.00	.00	8
1943.6	114	3.8	5.2	30.0	2.440	-.2	.0	102.9	83.1	25.3	87.2	DN	2.683	100.0	100.0	1.4	2.892	.00	.00	8
1946.6	96	4.6	4.4	28.9	2.380	-.3	.0	87.5	64.3	22.3	64.6	DN	2.677	87.5	87.5	9.3	2.833	.00	.00	
1949.7	108	1.8	.8	38.8	2.240	-.1	.0	151.9	195.5	33.9	71.3	DN	2.683	100.0	100.0	4.6	2.833	.00	.00	8
1952.7	99	2.5	.8	36.6	2.310	-.2	.0	128.4	192.8	31.9	70.1	GR	2.683	100.0	100.0	4.9	2.860	.00	.00	8
1955.7	79	5.4	2.8	28.9	2.410	.0	.0	90.6	72.1	22.5	33.9	GR	2.822	90.6	90.6	16.1	2.857	.00	.00	
1958.8	81	4.8	4.8	27.8	2.390	-.1	.0	95.0	56.2	21.8	38.4	GR	2.763	95.0	95.0	14.7	2.829	.00	.00	
1961.8	82	5.2	5.4	28.9	2.400	.0	.0	89.2	52.2	22.7	39.1	GR	2.799	89.2	89.2	15.0	2.849	.00	.00	
1964.9	71	4.5	4.6	28.9	2.340	-.3	.0	99.6	49.1	22.5	20.4	GR	2.768	99.6	99.6	20.9	2.801	.00	.00	
1967.9	78	5.3	5.0	30.0	2.390	-.2	.0	88.7	50.4	23.2	32.3	GR	2.819	88.7	88.7	17.5	2.854	.00	.00	
1971.0	86	4.4	3.6	31.0	2.380	-.5	.0	89.7	61.3	22.3	47.4	GR	2.798	89.7	89.7	14.5	2.857	.00	.00	
1974.0	101	3.6	3.6	30.0	2.410	.0	.0	107.9	91.6	25.5	74.3	GR	2.683	100.0	100.0	3.9	2.869	.00	.00	8
1977.1	117	3.7	3.9	31.0	2.480	-.4				24.3	97.7	S	2.683	100.0	100.0	.0	2.916	.00	.00	1 4
1980.1	114	5.0	6.0	27.8	2.480	-.2	.0	100.0	100.0	23.0	88.3	DN	2.683	100.0	100.0	.7	2.901	.00	.00	
1983.2	88	5.1	5.4	30.0	2.400	.0	.0	85.8	53.8	22.9	50.3	GR	2.797	85.8	85.8	12.8	2.862	.00	.00	
1986.2	79	5.5	4.2	27.8	2.400	-.2	.0	91.2	59.5	23.4	34.3	GR	2.787	91.2	91.2	15.5	2.837	.00	.00	
1989.3	72	5.1	4.8	27.8	2.390	-.2	.0	98.9	52.6	17.1	22.4	GR	2.799	98.9	98.9	18.7	2.828	.00	.00	
1992.3	81	3.9	3.8	32.2	2.350	-.3	.0	94.5	54.2	25.8	37.8	GR	2.801	94.5	94.5	18.2	2.846	.00	.00	
1995.4	85	3.3	3.1	29.9	2.350	-.8	.0	104.3	66.0	23.2	45.0	GR	2.734	100.0	100.0	15.2	2.822	.00	.00	
1998.4	116	4.6	6.1	30.0	2.490	-.1	.0			22.5	92.1	S	2.683	100.0	100.0	.0	2.931	.00	.00	3
2001.5	105	4.0	6.6	31.1	2.450	-.3	.0	101.1	72.0	27.0	82.5	GR	2.683	100.0	100.0	2.2	2.911	.00	.00	8
2004.5	96	3.9	4.7	30.0	2.430	-.3	.0	96.5	65.9	23.0	66.1	GR	2.805	96.5	96.5	8.2	2.885	.00	.00	
2007.6	97	3.5	3.9	27.8	2.410	-.3	.0	104.3	75.5	22.7	66.9	GR	2.683	100.0	100.0	7.3	2.845	.00	.00	
2010.6	97	3.8	4.1	31.1	2.380	-.3	.0	92.5	64.5	24.0	67.6	GR	2.717	92.5	92.5	9.5	2.858	.00	.00	
2013.7	108	3.8	4.8	27.8	2.460	-.2	.0	102.9	84.2	22.5	82.5	DN	2.683	100.0	100.0	2.2	2.885	.00	.00	8

Zone No. 2

Complex Lithology Results

DEPTH M	GR	RT	RXO	PHIN	RHOB	DD	SPI	SWU	SXOU	PHIS	VCL	FVCL	RHOMAU	SXO	SW	PHIE	RHOMA	POR-M	HC-M	FLAGS
2016.7	92	4.1	3.5	26.7	2.380	-.5	.0	98.4	72.3	22.1	54.0	DN	2.677	98.4	98.4	10.7	2.807	.00	.00	
2019.8	102	4.8	5.6	27.8	2.470	-.2	.0	92.3	75.2	20.8	77.2	GR	2.683	92.3	92.3	3.3	2.893	.00	.00	8
2022.8	111	4.2	5.2	30.0	2.450	-.2	.0	96.7	84.0	22.8	90.1	DN	2.683	96.7	96.7	.9	2.900	.00	.00	8
2025.9	87	4.0	3.6	28.8	2.380	-.6	.0	97.2	65.9	21.6	49.5	GR	2.736	97.2	97.2	12.7	2.833	.00	.00	
2028.9	107	4.2	5.1	27.8	2.470	-.2	.0	98.2	83.5	22.4	85.4	DN	2.683	98.2	98.2	1.6	2.893	.00	.00	

Zone No. 3

Complex Lithology Results

DEPTH M	GR	RT	RXO	PHIN	RHOB	DD	SPI	SWU	SXOU	PHIS	VCL	FVCL	RHOMAU	SXO	SW	PHIE	RHOMA	POR-M	HC-M	FLAGS
2030.4	97	3.2	3.1	27.9	2.420	-.2	.0	119.7	90.5	23.9	68.1	GR	2.695	100.0	100.0	6.7	2.854	.00	.00	
2033.5	80	5.0	4.5	30.1	2.420	-.2	.0	99.5	56.5	20.5	35.8	GR	2.853	99.5	99.5	16.0	2.879	.00	.00	
2036.5	74	4.8	6.3	27.9	2.370	-.2	.0	107.2	45.0	23.4	24.8	GR	2.775	100.0	100.0	18.6	2.814	.00	.00	
2039.6	81	6.1	7.8	26.8	2.390	-.1	.0	93.4	46.4	20.5	38.7	GR	2.741	93.4	93.4	14.0	2.817	.00	.00	
2042.6	79	6.6	6.3	25.7	2.410	-.1	.0	94.7	53.5	19.7	34.4	GR	2.758	94.7	94.7	14.0	2.820	.00	.00	
2045.7	79	6.4	5.9	27.9	2.390	-.1	.0	90.4	50.5	21.1	34.9	GR	2.776	90.4	90.4	15.7	2.830	.00	.00	
2048.7	84	7.2	8.0	26.8	2.410	-.1	.0	85.5	48.3	20.3	43.3	GR	2.755	85.5	85.5	12.4	2.834	.00	.00	
2051.8	79	6.4	7.3	26.8	2.400	-.1	.0	93.3	47.0	20.9	34.0	GR	2.769	93.3	93.3	15.0	2.825	.00	.00	
2054.8	78	5.9	6.5	27.9	2.380	-.1	.0	94.1	47.1	23.1	33.3	GR	2.767	94.1	94.1	16.3	2.822	.00	.00	
2057.9	82	6.9	8.0	29.0	2.390	-.1	.0	82.6	42.8	21.1	40.1	GR	2.808	82.6	82.6	15.2	2.864	.00	.00	
2060.9	79	6.3	6.3	25.7	2.400	-.1	.0	96.3	52.8	22.1	34.7	GR	2.743	96.3	96.3	14.1	2.812	.00	.00	
2064.0	79	6.5	7.2	26.8	2.440	-.1	.0	95.5	49.5	19.6	34.0	GR	2.821	95.5	95.5	14.3	2.858	.00	.00	
2067.0	83	6.1	6.6	29.0	2.410	-.3	.0	88.9	49.3	21.1	42.7	GR	2.808	88.9	88.9	13.9	2.859	.00	.00	
2070.0	81	6.7	7.0	26.8	2.390	-.3	.0	89.0	48.9	21.6	38.2	GR	2.742	89.0	89.0	14.1	2.817	.00	.00	
2073.1	74	6.6	5.3	26.8	2.400	-.3	.0	96.0	52.6	20.5	24.6	GR	2.790	96.0	96.0	17.4	2.825	.00	.00	
2076.1	103	5.4	6.9	26.8	2.410	-.2	.0	93.0	59.5	20.9	63.4	DN	2.678	93.0	93.0	7.6	2.833	.00	.00	
2079.2	83	5.6	5.2	26.8	2.430	-.4	.0	99.2	60.8	21.1	41.9	GR	2.789	99.2	99.2	12.4	2.850	.00	.00	
2082.2	76	7.0	5.5	26.8	2.400	.1	.0	90.5	52.8	18.2	30.0	GR	2.779	90.5	90.5	16.1	2.826	.00	.00	
2085.3	74	6.2	6.9	26.8	2.390	-.1	.0	97.6	45.7	20.5	25.8	GR	2.776	97.6	97.6	17.3	2.817	.00	.00	
2088.3	108	6.1	7.7	30.1	2.450	-.1	.0	88.2	74.0	24.7	87.8	GR	2.683	88.2	88.2	1.2	2.902	.00	.00	8
2091.4	97	4.6	5.7	29.0	2.410	-.2	.0	97.2	63.3	22.8	67.3	GR	2.709	97.2	97.2	7.7	2.859	.00	.00	
2094.4	110	5.6	6.3	26.8	2.440	-.2	.0	94.5	73.4	20.9	72.1	DN	2.683	94.5	94.5	4.3	2.858	.00	.00	8
2097.5	112	5.2	7.2	29.0	2.470	-.2	.0	100.0	100.0	23.5	91.3	DN	2.683	100.0	100.0	.7	2.906	.00	.00	8
2100.5	96	4.6	4.6	27.9	2.390	-.2	.0	97.1	67.5	21.4	62.9	DN	2.677	97.1	97.1	8.9	2.830	.00	.00	
2103.6	86	6.7	6.6	27.9	2.390	-.2	.0	84.3	51.0	19.4	46.9	GR	2.757	84.3	84.3	12.7	2.846	.00	.00	
2106.6	78	6.8	7.9	24.6	2.370	-.1	.0	93.1	46.4	17.2	32.5	GR	2.698	93.1	93.1	14.8	2.772	.00	.00	
2109.7	76	6.6	7.8	27.9	2.400	-.1	.0	92.0	42.7	20.1	28.5	GR	2.802	92.0	92.0	17.1	2.838	.00	.00	
2112.7	75	7.4	8.4	27.9	2.410	-.1	.0	87.8	41.2	19.5	27.2	GR	2.815	87.8	87.8	17.2	2.846	.00	.00	
2115.8	79	8.3	7.4	21.3	2.410	-.1	.0	93.4	56.7	18.4	34.3	GR	2.684	93.4	93.4	11.6	2.761	.00	.00	
2118.8	82	7.5	8.5	27.9	2.410	-.1	.0	82.5	43.5	20.0	39.4	GR	2.813	82.5	82.5	14.3	2.866	.00	.00	
2121.9	84	6.6	7.7	26.8	2.400	-.1	.0	88.5	49.2	20.2	44.4	GR	2.735	88.5	88.5	12.3	2.825	.00	.00	
2124.9	77	6.8	7.5	25.7	2.400	-.1	.0	94.3	47.3	20.4	30.4	GR	2.756	94.3	94.3	15.3	2.812	.00	.00	
2128.0	83	6.9	7.2	27.9	2.410	-.2	.0	85.8	48.7	20.9	42.4	GR	2.784	85.8	85.8	13.4	2.846	.00	.00	
2131.0	86	6.8	7.2	25.7	2.430	-.3	.0	90.3	56.3	19.0	48.0	GR	2.740	90.3	90.3	10.1	2.837	.00	.00	
2134.1	85	7.5	9.8	26.8	2.410	-.1	.0	82.5	44.2	19.1	46.1	GR	2.764	82.5	82.5	11.9	2.851	.00	.00	
2137.1	130	6.1	9.5	26.8	2.480	-.2	.0			19.9	83.2	S	2.683	100.0	100.0	.0	2.891	.00	.00	3

Complex Lithology Results 23-06-95

Hydrocarbon Volume Report

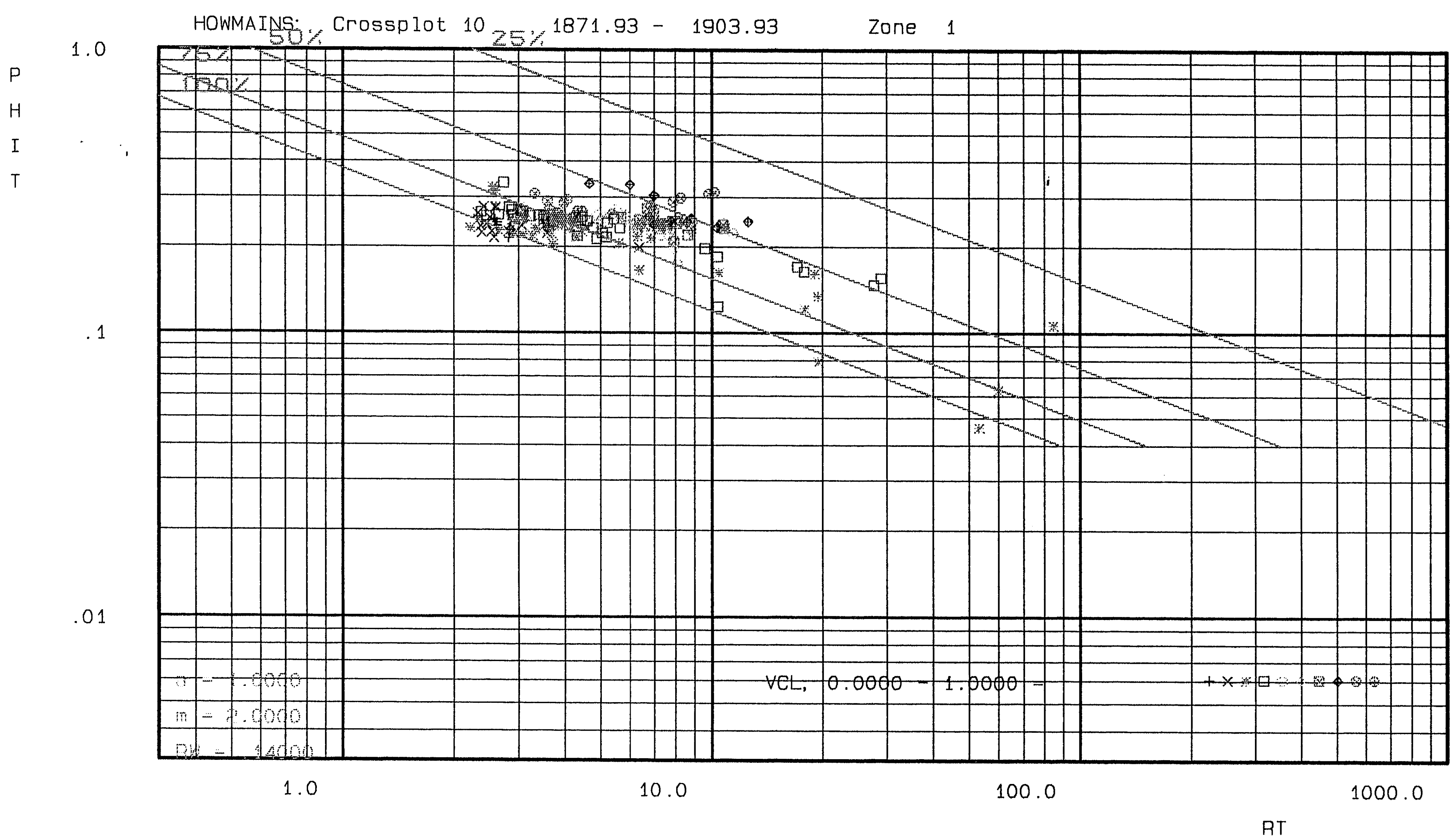
ZONE #	1	2	3
	Waarre	Eumeralla	Eumeralla
FROM M	1871.929	1903.933	2030.425
TO M	1903.933	2030.425	2138.020
INTERVAL M	32.004	126.492	107.594

FOR NET SAND (i.e. Sw cut off set to 1.000)

PHIE Cut off	.050	.050	.050
SW Cut Off	1.000	1.000	1.000
Vclay Cut Off	.300	.300	.300
Net Sand M	11.125	9.144	34.900
Average PHIE %	18.404	17.296	17.646
Average SW %	90.555	93.634	94.135
Average Vclay %	21.336	24.026	25.680

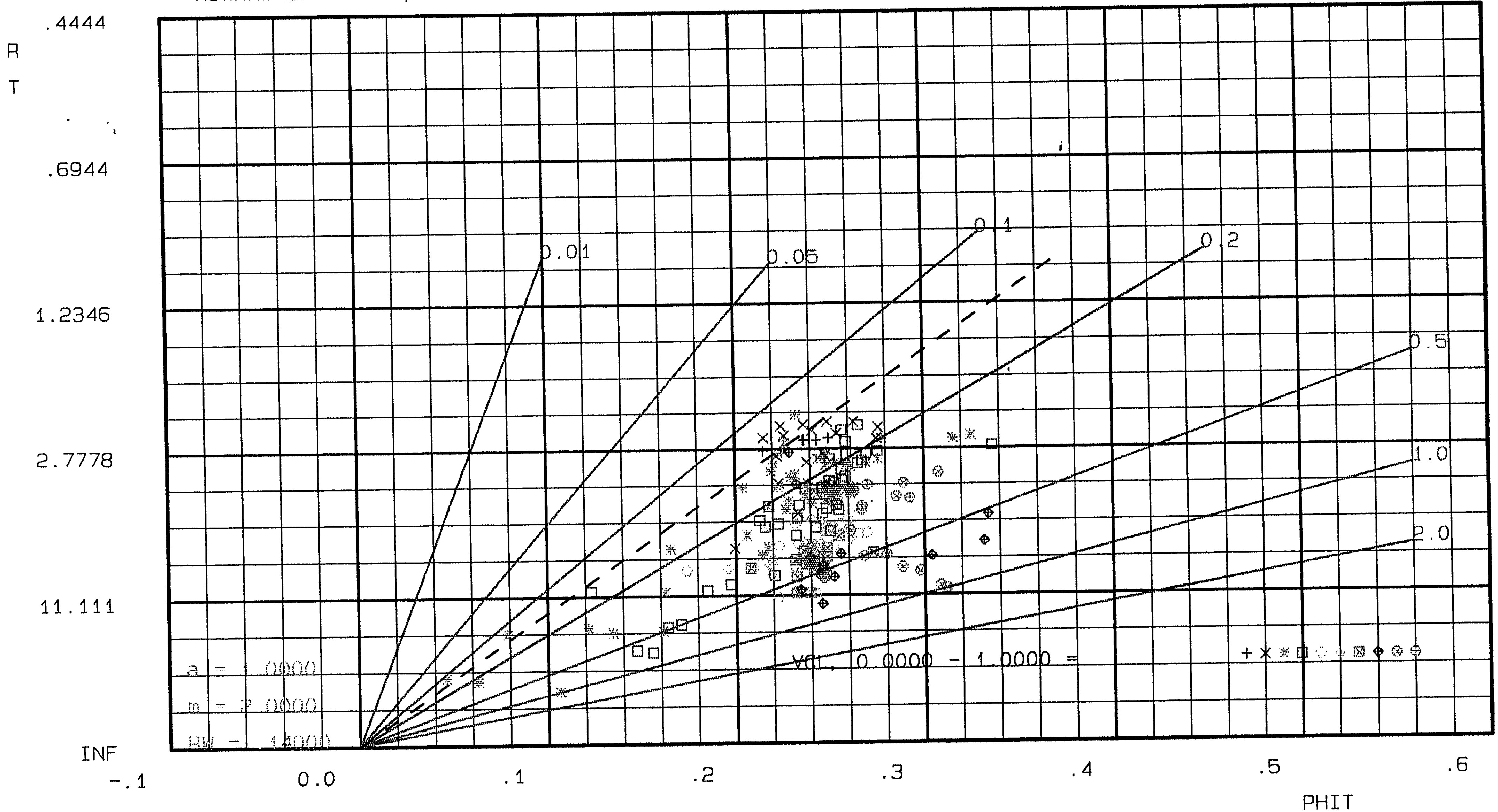
FOR NET PAY (i.e. Sw cut off set to 0.500)

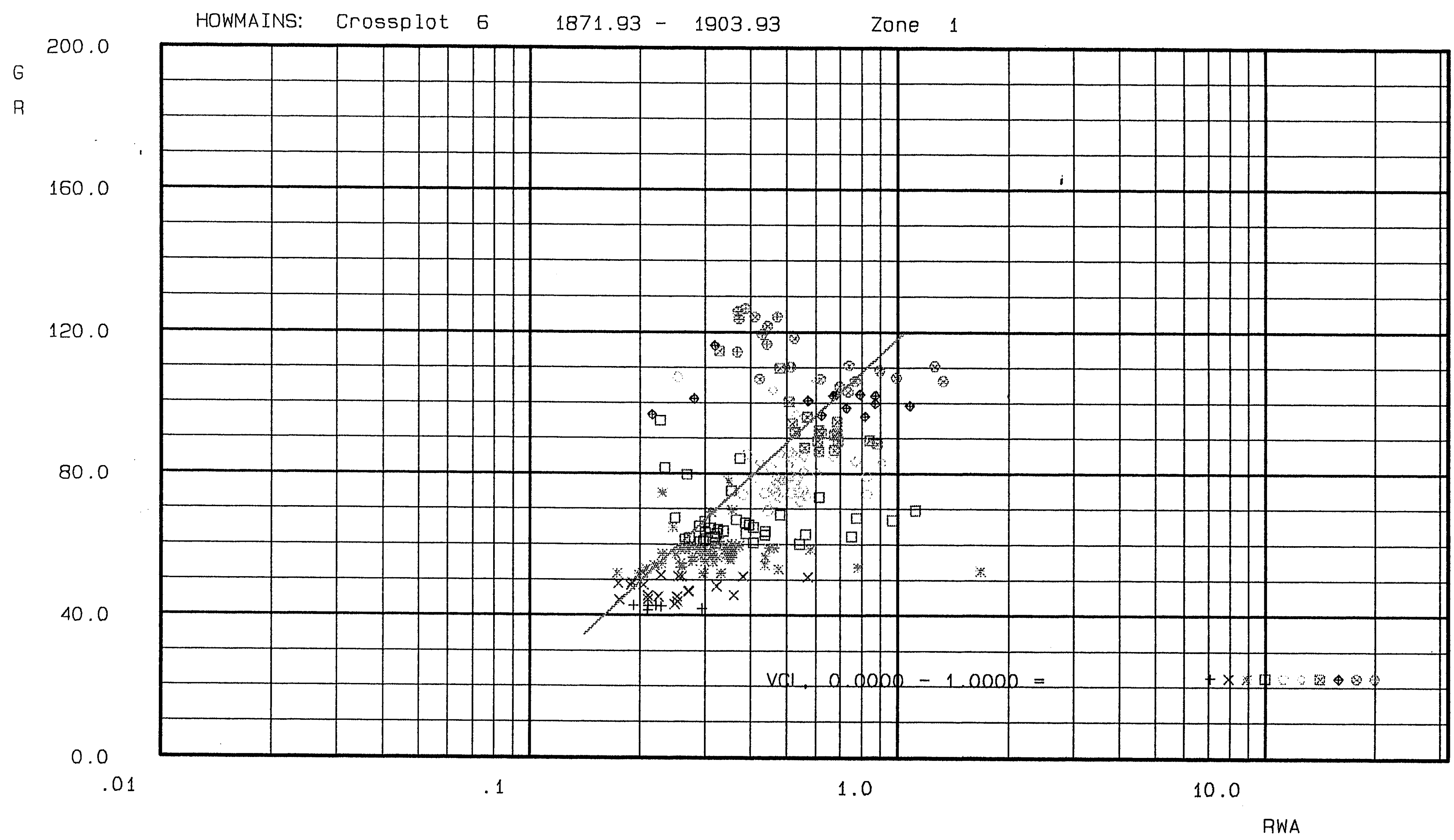
PHIE Cut off	.050	.050	.050
SW Cut Off	.500	.500	.500
Vclay Cut Off	.300	.300	.300
Net Pay M	.000	.000	.000
Integrated PHI M	.000	.000	.000
Sum PHI*(1-SW) M	.000	.000	.000



HOWMAINS: Crossplot 10 1871.93 - 1903.93 Zone 1
75%
50%
25%
100%
PHIT
1.0
.1
.01
a = 1.0000
m = 2.0000
RW = .14000
VCL, 0.0000 - 1.0000 -
1.0
10.0
100.0
1000.0
RT

HOWMAINS: Crossplot 5 1871.93 - 1903.93 Zone 1




HOWMAINS: Crossplot 6 1871.93 - 1903.93 Zone 1
G
R
200.0
160.0
120.0
80.0
40.0
0.0
.01
.1
1.0
10.0
RWA
VCL, 0.0000 - 1.0000 =

HOWMAINS: Crossplot 2 1871.93 - 1903.93 Zone 1