LAKES OIL LIMITED

WELL COMPLETION REPORT

(W1037)

SOUTH CARAMUT NO. 1

PEP 122

OTWAY BASIN
VICTORIA

Prepared by:
A. Tabassi
I.D. Buckingham

March, 1991

LAKES OIL LIMITED

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9th May, 1991

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Department of Manufacturing & Industry Development
151 Flinders Street
MELBOURNE Vic 3000

DATA TRANSMITTAL

Please find enclosed the documents which are listed below: After checking for completeness, please sign and return the duplicated copy of this transmittal letter.

One copy Well Completion Report, South Caramut No.1

RECEIVED BY: K. Mehra **DATE:** 9-5-91

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	DLL/M. - CSS/GR (Composite)	1:200 & 1:500

SUMMARY

South Caramut No. 1 was drilled as a wildcat exploration well in PEP 122, Otway Basin, Victoria.

Participants in the well were Lakes Oil Limited (Operator) and Otgas N.L.

South Caramut No. 1 was located 5 km south of the township of Caramut, 52 km north of Warrnambool, 115 km northeast of Portland, 184 km west of Geelong and 259 km west southwest of Melbourne.

The Pretty Hill Sandstone of the Grayfish Formation was the primary objective of the well and was considered to be a potential oil play.

Drilling commenced on 15th October, 1990 and reached a total depth of 435.0m (KB) on 18th October, 1990.

At total depth the following logs were run:

Dual Laterolog/Micro Laterolog
Compensated Sonic Log
Velocity Survey
Sidewall Cores

One open, bottom hole drill stem test was carried out over the interval 375.0 - 435.0 m (T.D.) which covered the Pretty Hill Sandstone as well as Palaeozoic basement. The test recovered 20 m of muddy water and 230 m of mud cut water.

No conventional coring operations were performed.

No significant shows were observed during the drilling. The maximum background gas was a trace of C1 recorded at 385 m.

The DST No. 1 was conducted on the basis of porosity defined by log analysis only.

South Caramut No. 1 was plugged and abandoned as a dry hole and the rig was released at 0600 hours on 20th October, 1990.

CONCLUSIONS

- South Caramut No.1 was drilled on a faulted basement high on the northern flank of the Minjah Trough.

- The primary reservoir objective of this well, the Pretty Hill Sandstone of the Crayfish Formation, was present and exhibited fair-good reservoir characteristics.

- The absence of the upper part of the Crayfish Formation could signify the presence of an unconformity, albiet locally, between the Crayfish and Eumeralla Formations.

- Palynological as well as lithological analyses confirm a major unconformity at the top of the Eumeralla Formation.

- The maturity profile indicates that both the Eumeralla and Crayfish Formations are marginally mature for the generation of hydrocarbons.

- The Pretty Hill Sandstone was encountered shallower than prognosed. This may be attributed to the general lack of velocity control within the permit.

- The reservoir was found to be water flushed, however due to lack of adequate control, particularly in an east-west direction, the well may not have been a valid test of the Pretty Hill Sandstone in a closed position.

- Although plugged and abandoned as a dry hole, South Caramut No. 1 has achieved a number of geological objectives well beyond expectation.

RECOMMENDATIONS

The following recommendations are based on the above observations and conclusions giving full consideration for the limited data available in the PEP 122:

- A gravity survey should be implemented to outline the structural framework of the permit. This should be followed by a reconnaissance and a detailed seismic survey. The latter would eventually delineate and mature prospects.

- A major basin study project should be initiated utilising both existing and data acquired from the above recommendation as well as data in the other parts of the Ardonachie (Minjah) Trough. The project should place particular emphasis on structural analysis, source rock and reservoir potential, play type and aspects relevant to hydrocarbon generation, migration and entrapment.

- Detailed exploration should be directed to the south, west and north west of the Caramut South #1 well, where the Pretty Hill Sandstone reservoir is expected to be thicker developed. Furthermore, this is the direction in which the potential source rocks are believed to be more mature and possibly within the oil window.

- The best prospect, delineated from the above programme of works should be drilled to Basement.

1. INTRODUCTION

South Caramut No. 1 was drilled primarily to determine the presence of the Pretty Hills sandstone and if present to evaluate the nature of the fluids contained within it. As part of this evaluative process the stratigraphy and structure of the prospect was to be verified.

Within the Otway Basin, in both Victoria and South Australia, the Pretty Hill Sandstone (particularly its basal sand unit) exhibits excellent reservoir characteristics, and many of the wells that have penetrated this sequence have shown encouraging hydrocarbon shows. In the Katnook and Ladbroke Grove Gas Fields in the South Australian portion of the Otway Basin the Pretty Hill Sandstone is the primary reservoir.

The South Caramut prospect was seismically identified as a faulted anticline over a relatively shallow basement high. The potential of the prospect was further supported by the presence of a high soil gas geochemical anomaly recorded in the vicinity of the well location.

The well developed infrastructure and proximity of markets were other reasons justifying the drilling of South Caramut No. 1.

2. WELL HISTORY

2.1 Location (*See Figures 1 & 2*)

Co-ordinates:
Latitude: 38° 00' 16"S
Longitude: 142° 28' 32"E

Geophysical Control:
Seismic Line: OLO 88B - 100
Shot Point: 430

Description:
Country of: Villiers
Parish of: Minjah North
Section: XVII
Block: 4B
Shire of: Warrnambool

Property Owner:
Neville Young

2.2 General Data

Well Name:
South Caramut No. 1

Operator:
Lakes Oil Limited
Level 4
766 Elizabeth Street
Melbourne 3000

Participant:
Otgas N.L.
Level 4
766 Elizabeth Street
Melbourne 3000

Elevation:
Ground Level: 142.0 m ASL
Kelly Bushing: 145.3 m ASL
Unless otherwise stated, all depths refer to K.B.)

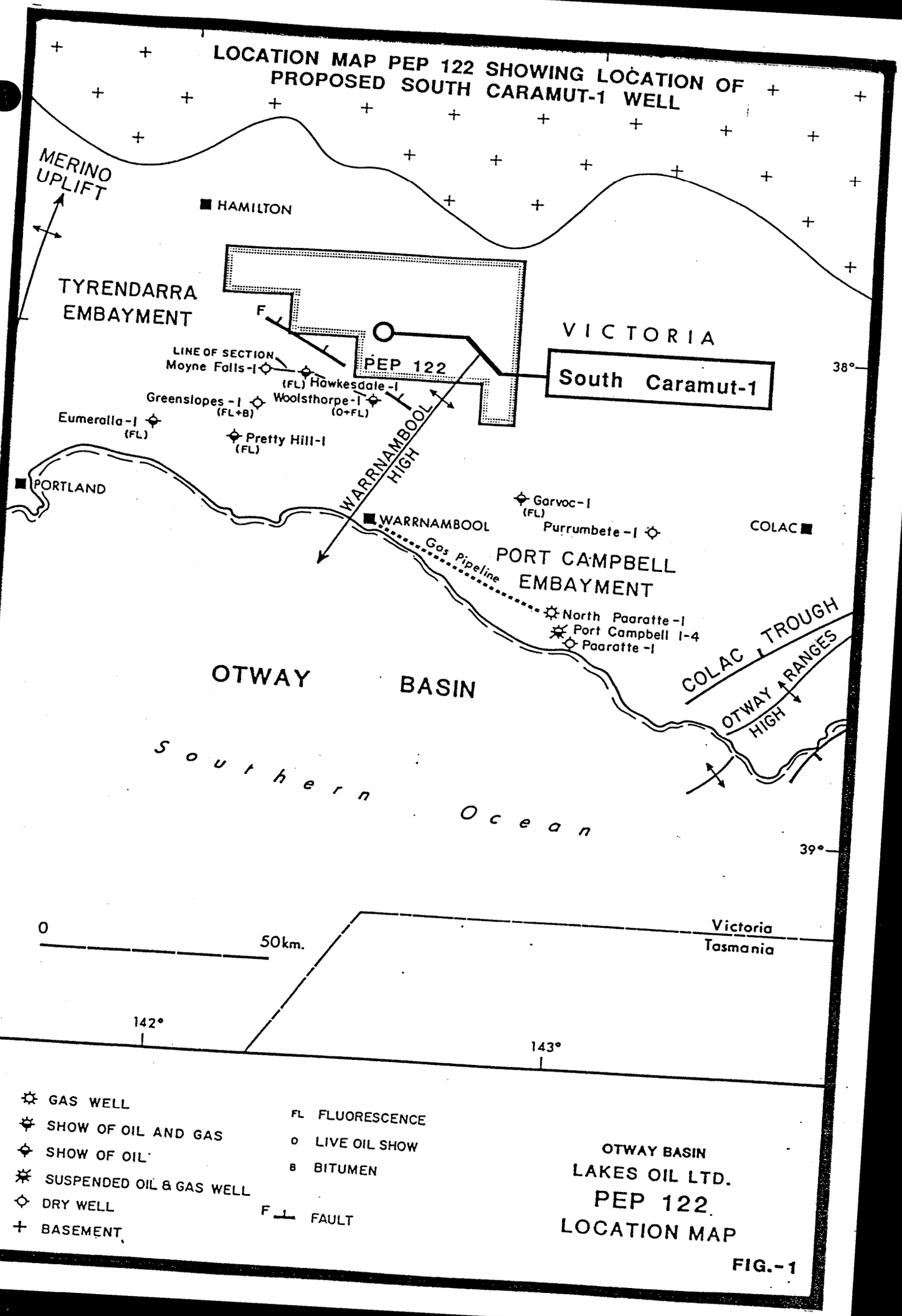
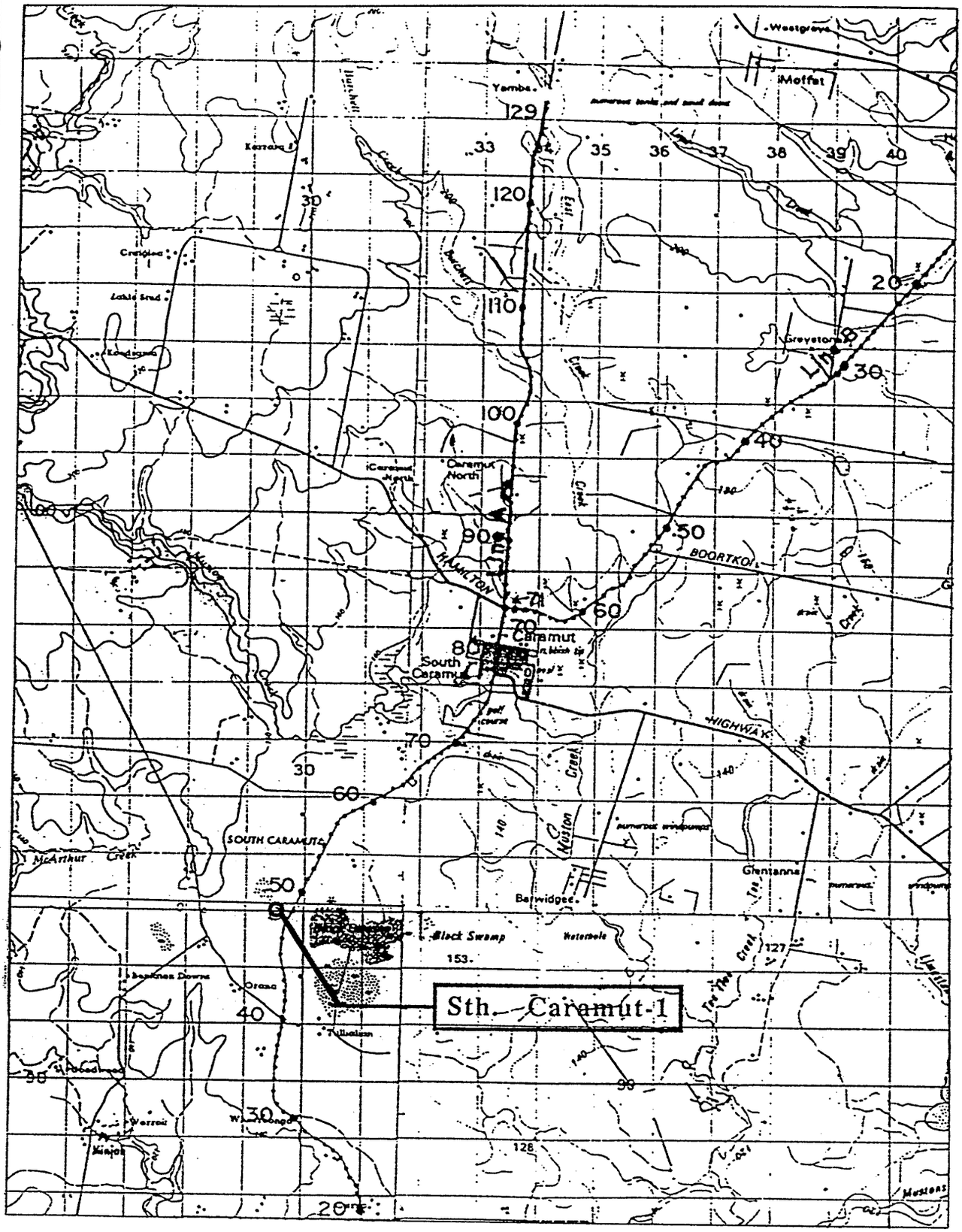

LOCATION MAP PEP 122 SHOWING LOCATION OF PROPOSED SOUTH CARAMUT-1 WELL
MERINO UPLIFT
HAMILTON
TYRENDARRA EMBAYMENT
F
VICTORIA
LINE OF SECTION
Moyne Falls-1
PEP 122
(FL) Hawkesdale-1
South Caramut-1
38°
Greenslopes-1 (FL+B)
Woolsthorpe-1 (O+FL)
Eumeralla-1 (FL)
Pretty Hill-1 (FL)
WARRNAMBOOL HIGH
PORTLAND
Garvoc-1 (FL)
WARRNAMBOOL
Purrumbete-1
COLAC
Gas Pipeline
PORT CAMPBELL EMBAYMENT
North Paaratte-1
Port Campbell 1-4
Paaratte-1
COLAC TROUGH
OTWAY RANGES HIGH
OTWAY BASIN
Southern Ocean
39°
0
50km.
Victoria
Tasmania
142°
143°
GAS WELL
SHOW OF OIL AND GAS
SHOW OF OIL
SUSPENDED OIL & GAS WELL
DRY WELL
BASEMENT
FL FLUORESCENCE
O LIVE OIL SHOW
B BITUMEN
F FAULT
OTWAY BASIN
LAKES OIL LTD.
PEP 122
LOCATION MAP

FIG.-1



0 1 2 3 4 5 6 7

Scale 1 : 100 000

LAKES OIL LIMITED	
LOCATION MAP SOUTH CARAMUT No.1	
I.D. Buckingham	April 1991

FIGURE - 2

Total Depth:	Driller: 435.0 m Wireline Logger: 433.3 m
Drilling Commencement:	15th October 1990 @ 0330 hrs
Total Depth Reached:	18th October 1990 @ 0300 hrs
Rig Released:	20th October 1990 @ 0600 hrs
Drilling Time to T.D.:	3 days
Status:	Plugged and abandoned, dry hole.

2.3 Drilling Data (*see appendices 1 &2*)

2.3.1 Drilling Contractor

Drillcorp Limited

2.3.2 Drilling Rig

Drillcorp Rig No. 24

2.3.3 Casing and Cementing Details

18" conductor was set at 15.0 m prior to rig up.

Surface Casing

Size:	$9^{5}/_{8}$"
Weight and Grade:	47lb/ft, STC N80 Buttress
Centralisers;	at 1st and 3rd Joints
Float Collar:	
Shoe:	87.2 m
Cement:	230 sacks class "A" with 2% Calcium Chloride
Method:	Displacement
Equipment:	Halliburton Services

Cement Plugs

Plug No. 1

Interval:	435.0 - 350.0 m
Cement:	100 sacks Class "A" neat
Method:	Balanced
Tested:	No

Plug No. 2

Interval:	117.0 - 57.0 m
Cement:	70 sacks Class "A" neat
Method:	Balanced
Tested:	No

Plug No. 3

Interval:	Surface
Cement:	10 sacks Class "A" neat

2.3.4 Drilling Fluid

The hole was spudded using fresh water AQUAGEL mud flocculated with lime. The viscosity of the mud was maintained by addition of lime and caustic soda. The $12^{1/4}$" hole was drilled to the casing point at 91.4 m.

The $8^{1}/_{2}$" hole was drilled without any problems to the 435.0 m T.D. using a 2% KCL EZ MUD/Polymer mud. Typical mud properties close to T.D. were:

Weight	9.5 - 9.6 ppg
Viscosity	35 - 37 seconds
yield point	6 - 9lb/100 ft^2
Filtrate	8.0 - 9.0 cc
Chlorides	12000 - 13500 mg/R
KCL	2%

For further details see Appendix III, "Drilling Fluids Recap".

2.3.5 Water Supply

Drilling water was obtained and transported from water supply dams which were located some 2 kilometres south of the well location.

2.4 Formation Sampling and Testing

2.41 Cuttings

Cuttings samples were collected at 5 m intervals from surface to total depth. Each sample was washed, air dried and divided into four splits, three of which were stored in labelled polythene bags and the fourth was stored in a plastic sample tray.

One set of washed and dried samples was dispatched to the Department of Manufacturing and Industry Development (Director of Energy Division) and the remaining was retained by the operator.

In addition, from surface casing to T.D. unwashed air-dried samples were collected at 10 m intervals and stored in labelled cloth bags. These were also retained by the operator. (*see Appendix IV for description*)

2.4.2 Cores

(i) No conventional coring operations were carried out.

(ii) Twenty four sidewall cores were attempted of which all were recovered. The list of these sidewall cores is summarised in Table - 1.

Table 1

LIST OF SIDEWALL CORES
SOUTH CARAMUT NO. 1

No.	Depth (m)	Reocvery (mm)	Lithology	Remarks
1	430.0	23	Quartz Mica Schist	
2	420.0	28	Quartz Mica Schist	
3	411.0	33	Mica Schist	
4	396.0	38	Sandstone	
5	393.0	30	Claystone	Paly. dating
6	390.5	25	Sandstone	
7	384.5	20	Sandstone	
8	382.5	28	Sandstone	
9	381.0	22	Claystone	Paly. dating
10	379.5	35	Claystone	Paly. dating
11	373.0	25	Claystone	Paly. dating
12	351.0	33	Claystone	
13	334.0	25	Sandstone	
14	302.0	23	Claystone	Paly. dating
15	280.0	22	Claystone	
16	275.0	23	Claystone	
17	236.0	22	Claystone	
18	204.0	32	Claystone	
19	196.0	42	Claystone	Paly. dating
20	191.0	37	Marl	Paly. dating
21	182.0	35	Marl	
22	162.0	32	Marl	Paly. dating
23	140.0	30	Marl	Paly. dating
24	100.0	35	Marl	Paly. dating

See Appendix V for detail lithological description

2.4.3 Tests

One conventional open hole drill stem test was carried out at T.D. as follows:-

DST No.	one
Interval Tested	375.0 - 435.0 (T.D.)
Formation	Pretty Hill Sandstone
Packers depth	373.0 m & 374.8 m
Water cushion	None
Preflow	12 minutes, moderate blow
Initial shut-in	22 minutes
Second Flow	120 minutes, moderate blow becoming moderate to weak blow towards to end of the period.
Second Shut-in	120 minutes

Pressures:

	Top Recorder at 368.8 m	Bottom Recorder at 433.0 m
1st Period		
Initial Hydrostatic	627.59 psi	726.38 psi
Initial Flow	62.84 psi	172.92 psi
Final Flow	186.06 psi	272.93 psi
Initial Shut-In	186.06 psi	272.93 psi
Final Shut-In	507.13 psi	597.24 psi
2nd Period		
Initial Flow	212.02 psi	320.754 psi
Final Flow	408.55 psi	495.09 psi
Initial Shut-In	408.55 psi	495.09 psi
Final Shut-In	510.24 psi	602.13 psi
Final Hydrostatic	618.26 psi	708.60 psi

Recovery

20 m	Watery Mud
230 m	Mud Cut Water

Chemical Analysis

Eight fluid samples were collected during pulling out the DST tool. The following are field chemical analysis:

	Sample No	Depth (m)	PH	CT (PPM)	Total Hardness	RW (ohm)
	1	265.0	10.0	11000	120	.42@64°F
	2	231.0	10.0	9700	140	.43@64°F
	3	212.0	10.0	9500	130	.46@62°F
	4	193.0	10.0	9500	100	.56@62°F
	5	155.0	9.5	6500	50	.87@60°F
	6	98.0	9.5	4500	40	1.1 @60°F
	7	25.0	9.0	3700	30	1.4 @64°F
*	8	5.0	8.5	4300	40	1.1 @64°F

* Contaminated by rig water

Assessment

No problems were encountered during the course of drill stem testing.

The test was mechanically successful and the collected data are valid.

The test recovered formation water whose chemical analysis may indicate that the reservoir has been flushed by ground water. (*see Appendix VI for details of DST results*)

2.5 Logging and Surveys *(see Enclosure 1)*

2.5.1 Mud Logging

A standard skid-mounted Halliburton (Geodata Division) unit was used to record penetration rate, continuous mud gas monitoring, intermittent mud and cuttings gas analysis, pump rate and mud volume data. The mud log is included as Enclosure 2.

2.5.2 Wireline Logging *(see enclosure 3)*

Wireline logging was performed by BPB Wireline Services using a standard truck mounted unit. One logging suite consisting of the following logs was carried out at total depth:

Suite 1	Interval (m)
Dual Laterolog/Micro Laterolog	433.3 - 87.0
Gamma Ray, Spontaneous Potential	(GR to Surface)
and Caliper (DLL/MLL/GR/SP/SP/CAL)	
Compensated Sonic Log	433.3 - 87.0
Gamm Ray (CSS/GR)	
Sidewall Coring (SCG)	1 Gun, 24 SWC
Gamma Ray	

2.5.3 Deviation Surveys

Hole deviation surveys were conducted regularly with the following results:

Depth (m)	Deviation (Deg.)
29.0	$^1/_4$
85.0	$^1/_4$
242.0	$^1/_4$
393.0	2
423.0	$1\,^3/_4$

2.5.4 Velocity Survey

A velocity Survey was carried out by Velocity Data Pty. Ltd. the results of which are included as Appendix VII. A synthetic seismogram was also carried out by Welseis and the result is presented as Appendix VIII.

3. RESULTS OF DRILLING

3.1 Stratigraphy

The following stratigraphic intervals have been identified using penetration rate, cutting and sidewall core analysis, wireline log interpretation and palynological results (*see figures 3 & 4*).

Group	Formation	Depth (K.B.)	Depth Sub Sea	Thickness (m)
-	Newer Volcanics	Suf	142.0	37.0
Heytesbury	Gellibrand	37.0	108.3	106.0
	Clifton	143.0	2.3	50.0
Otway	Eumeralla	193.0	- 47.7	185.5
	Crayfish (Pretty Hill Sst.)	378.5	- 233.2	16.5
Palaeozic	Basement	395.0	- 249.7	40.0+
Total Depth (Driller)		435.0	- 289.7	-
Total Depth (Logger)		433.3	- 288.0	-

3.2 Lithological Description

3.2.1 New Volcanics (surface - 37.0 m)

Surface to 20.0 m

Weathered Basalt, medium to dark brownish red, dark to brown grey in part, speckled in part, weathered and crumbly at the top becoming hard to very hard towards the base, common multi-coloured minerals including olivines (?) trace medium grained quartz sand, interbedded/ interlaminated with tuff, medium to dark brown, medium olive brown, medium brown green in part, soft-firm, soapy luster, with apparent subconchoidal fractures.

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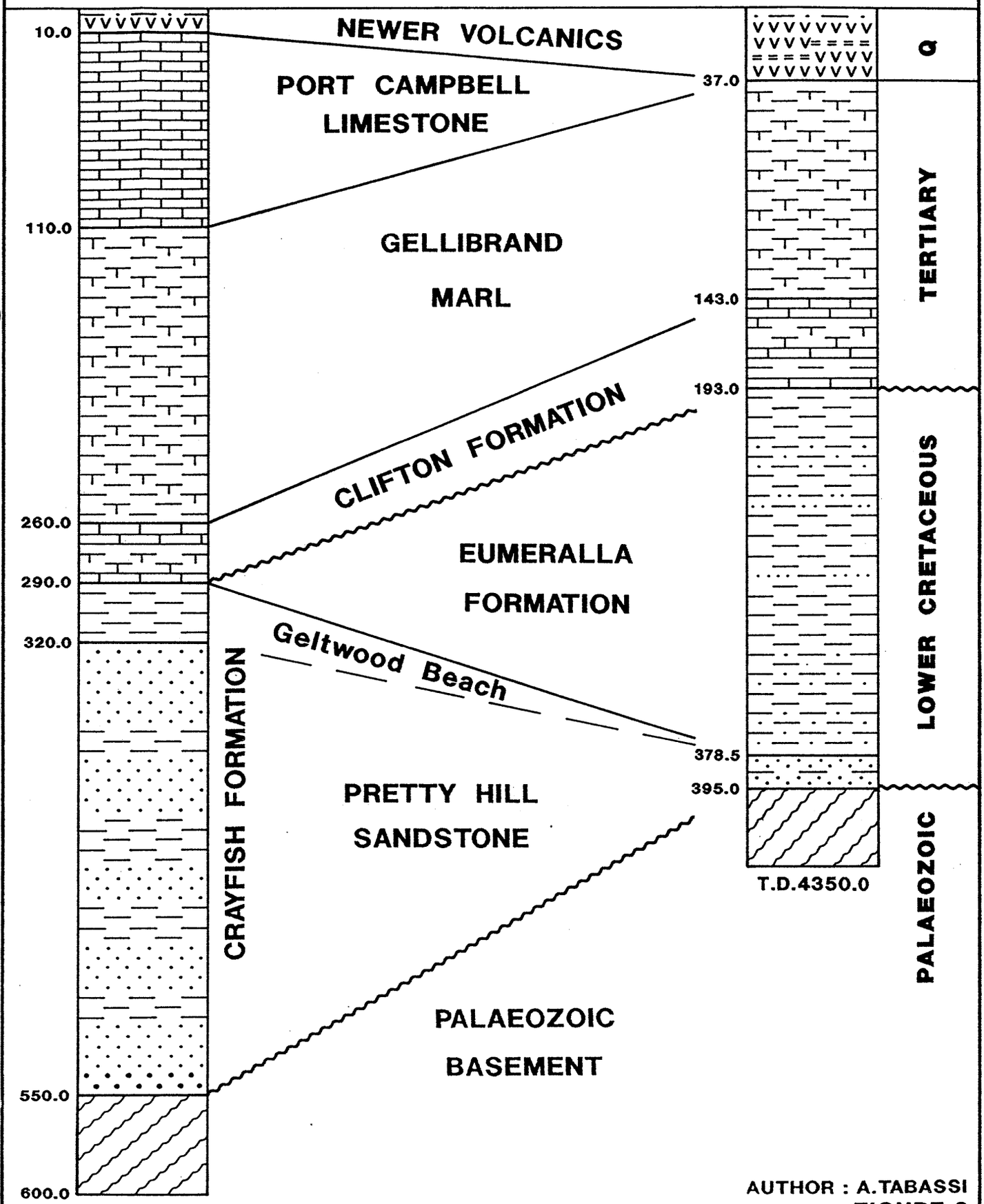
SOUTH CARAMUT No.1

PROGNOSED AND ACTUAL STRATIGRAPHY



AUTHOR : A.TABASSI

FIGURE 3

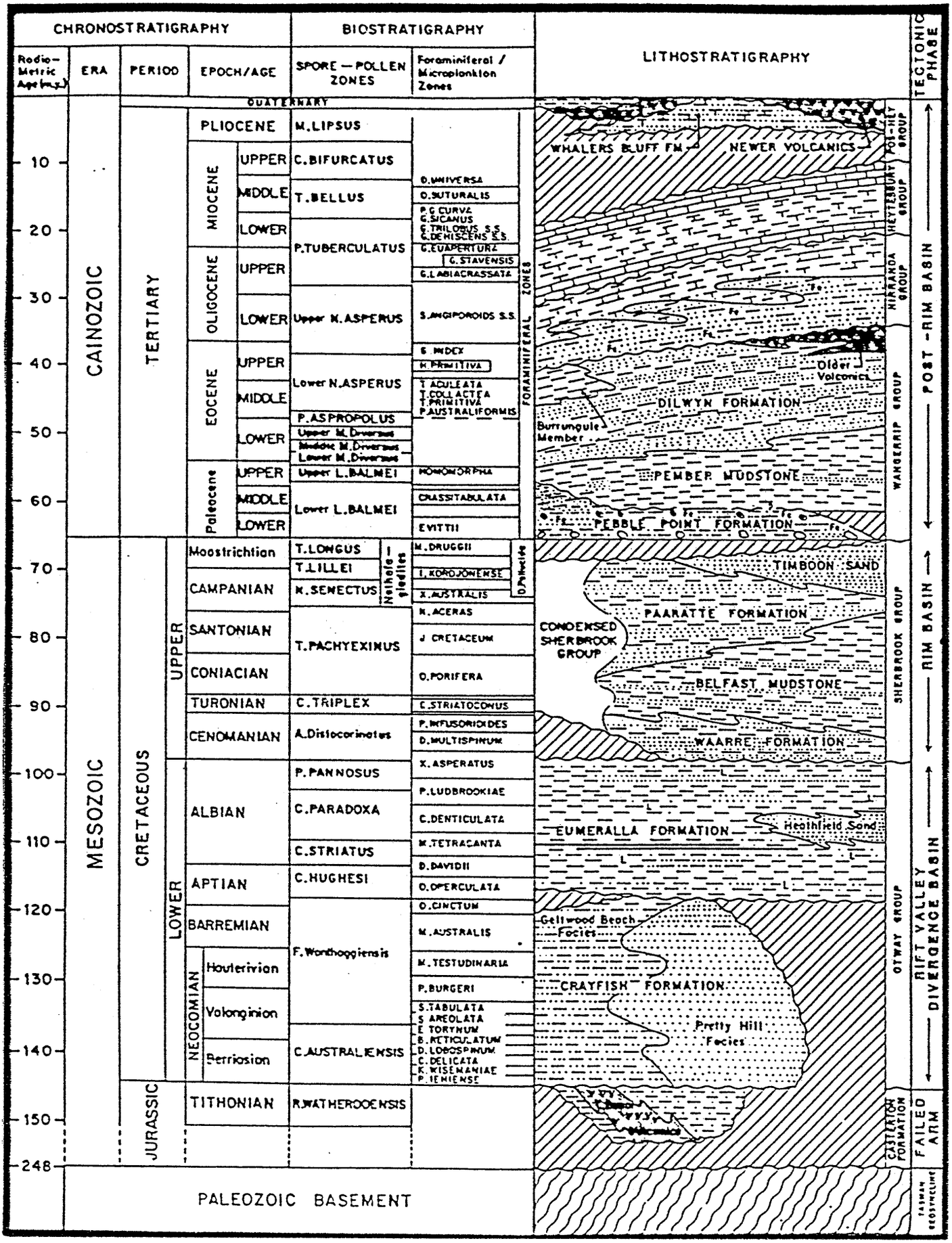


Figure 4. GENERALISED STRATIGRAPHIC TABLE - OTWAY BASIN

20.0 - 37.0 m

Basalt, (possibly Olivine Basalt), dark green grey, dark green, hard to very hard, speckled in part, fresh, amygdaloidal in part, amygdals are occasionally filled with secondary olivine and/or zeolite(?), tholeitic in part(?), interlaminated with dark grey, in part light to medium orange tuff, soapy luster, sub-conchoidal fracture, soft, occasionally firm, trace very coarse olivine and pyroxene laths, trace fine quartz sand grains.

3.2.2 Heytesbury Group 37.0 m - 193.0 m

Gellibrand Marl 37.0 m - 143.0 m

Marl, light to medium yellow, light to medium brown, light olive brown, occasionally medium to dark brown (due to iron oxide staining on forams and shell fragments). Possibly weathered and recycled, soft, sticky in part, dispersive in part, commonly to abundantly fossiliferous, trace rounded medium to coarse quartz sand grains, interbedded/ interlaminated with minor.

Calcarenite, light grey, light olive grey firm to hard, medium to coarse grained, no apparent matrix, moderately strong calcareous cement, trace forams, no visual porosity.

Clifton Formation 143.0 - 193.0 m

Marl, medium olive grey, medium brown grey, light grey to light olive grey in part, soft, very dispersive, extremely fossiliferous, rare iron oxide pellets with iron-stained shell fragments (unconformity surface?), rare medium to coarse rounded quartz sand grains interbedded with;

Calcarenite, light grey to light olive grey, firm to hard, occasionally very hard, are argillaceous matrix, moderately strong calcareous cement, trace shell fragments, rare to trace glauconite, no visual porosity, at the base with minor;
Sandstone, clear to very light brown, loose, fine to very coarse, dominantly medium to coarse, rounded to well rounded, poorly sorted quartz, no apparent matrix, very good visual porosity.

3.2.3 Otway Group 193.0 m - 395.0 m

Eumeralla Formation 193.0 m - 378.5 m

Claystone, dark to very dark grey, medium grey, medium to dark brown grey, medium to dark green grey, soft to firm, hard in part, blocky in part, dispersive in part. Occasionally subfissile, rarely to slightly calcareous at the top, non calcareous towards the base, rare fine lithics, rare to trace carbonaceous detritus, rare fine mica, rare very hard medium brown grey calcite band, becoming dolomitic in part, trace slickenside (possibly minor fault?), moderately to commonly silty in part, grading into and interlaminated with;

Siltstone, light to medium green grey, pale green in part, light brown grey in part, soft to firm, occasionally blocky, rarely carbonaceous and micaceous, interbedded with minor;

Sandstone, light grey to beige, light to medium green grey, occasionally light brown grey, firm to hard, very fine to fine, subangular to subrounded, fairly to well sorted quartz and multicoloured lithic fragments, common off-white kaolinitic argillaceous matrix, trace moderately strong calcite cement, rare partially altered feldspar, very slightly calcareous in part, occasionally micaceous in part, poor to no visual porosity.

Crayfish Formation 378.5 m - 395.0 m

PrettyHill Sandstone

Sandstone, clear to transluscent to very light grey, fine to coarse, dominantly medium, subangular to subrounded, poorly sorted quartz, trace off-white (kaolinitic) argillaceous matrix, trace moderately strong silica cement, rare garnet, rare very coarse quartz overgrowth, good to very good visual porosity, interbedded with;

Claystone, medium to dark grey, medium to dark brown grey in part, rarely medium to dark green grey in part, firm, hard in part, blocky to sub fissile occasionally dispersive, rare carbonaceous detritus, rare fine mica, rare fine lithic fragments, occasionally silty in part.

3.2.4 Palaeozoic Basement 395.0 m - 435.0 m (T.D.)

Quartz Mica Schist, weathered at the top with apparent reworking characteristic, with rare loose quartz sand grains, becoming less weathered with depth; medium green, hard to very hard, occasionally firm, trace pyrite.

3.3 Hydrocarbon Indications

3.3.1 Mud Gas Reading

The mud gas detection equipment was operational from spud to the total depth (435.0 m).

No background gas was recorded during drilling except at 385.0 m where a trace of C1 was detected.

3.3.2 Sample Fluorescence

Cutting samples were routinely inspected for fluorescence at 5 m. intervals from spud to T.D.

No fluorescence or oil staining were reported in any of the cutting samples or any sidewall cores cut.

4. GEOLOGY

4.1 Structure

The South Caramut prospect was defined by the available seismic line in the PEP 122. This is the north - south seismic line OLO88B-100 shot by Lakes Oil Limited (the operator) in 1988.

Based on the interpretation of this line it was postulated that the South Caramut prospect was located on a relatively prominent basement high were both structural and stratigraphic traps may be present. (*see figure 5*)

Further support for locating the prospect on this location was the results of a geochemical soil gas microseepage survey, conducted by Lakes Oil Limited, carried out alongside the seismic line. The most significant anomaly occurred at stations 47 to 50 corresponding to the shot points 418 to 440. The well was located at shot point 430. (*see figure 6*)

Although the post drilling analysis confirms the validity of the well location on the north - south direction (on the seismic line), its position on the east - west direction is clearly questionable. This is due to the lack of any seismic or other means of control. It is therefore possible that well has been located off structure.

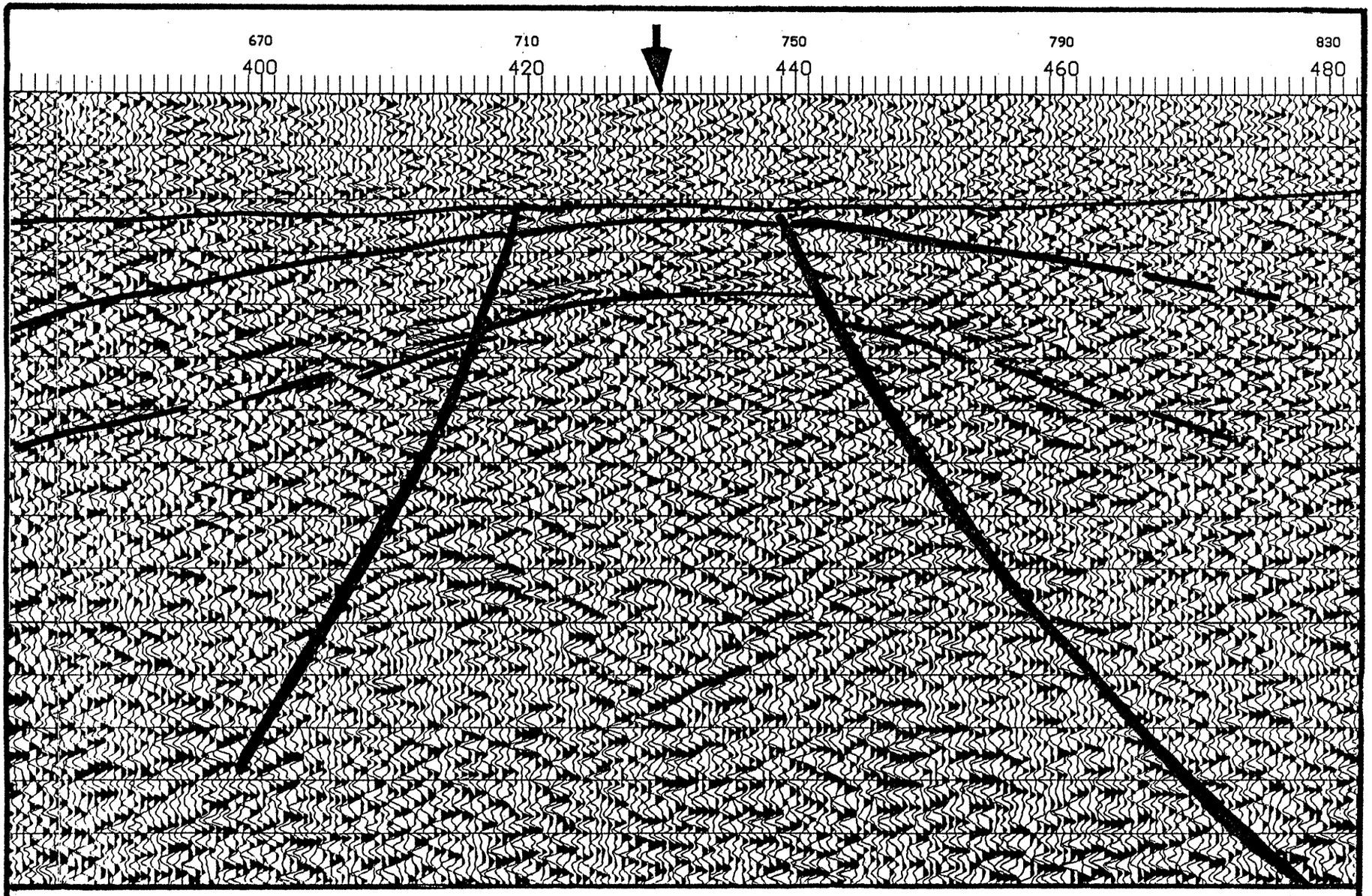


FIGURE 5 - SEISMIC SECTION

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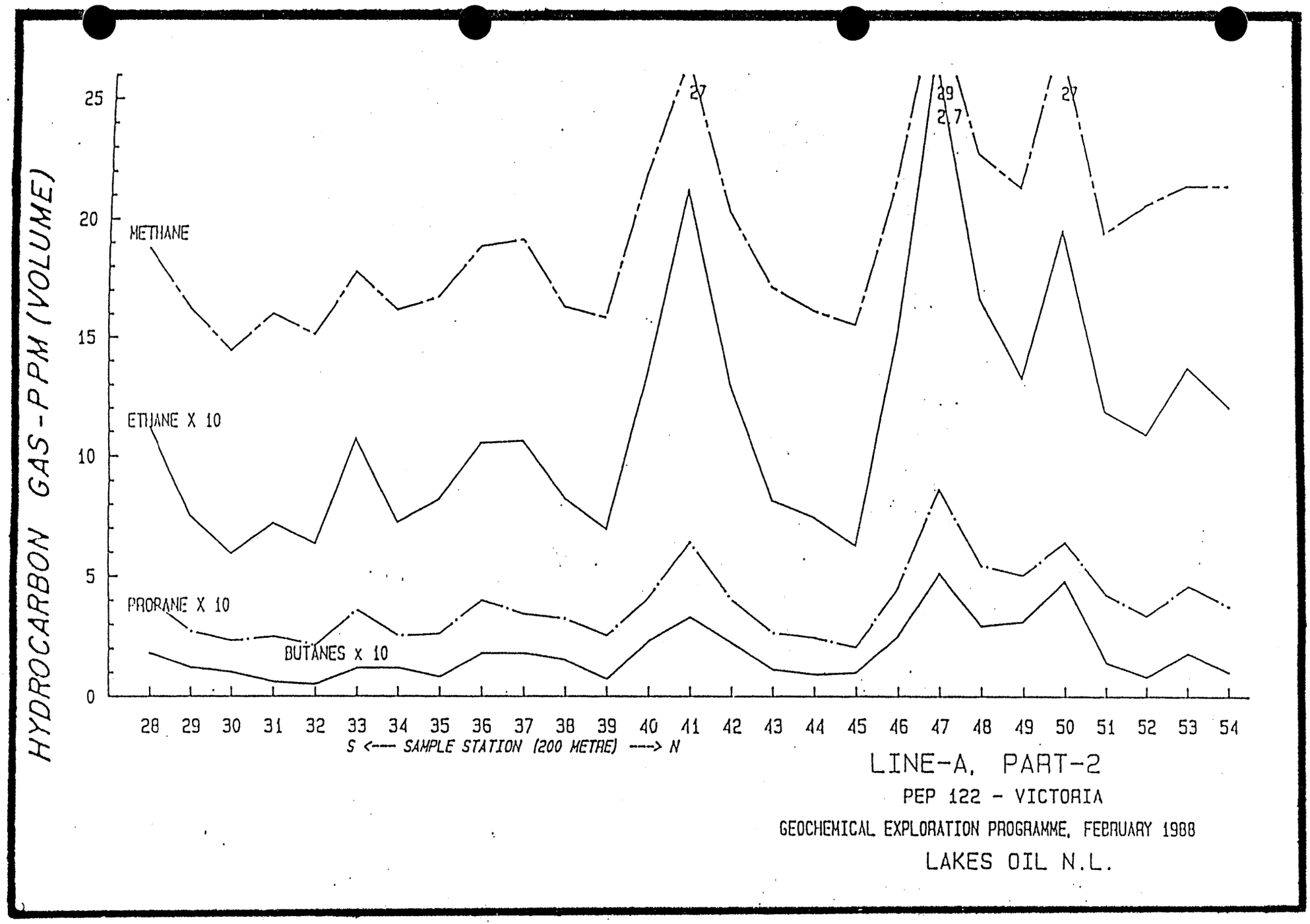

Figure - 6 MAJOR GEOCHEMICAL ANOMALY BETWEEN STATIONS 47 & 50

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4.2 Porosity and Water Saturation

The wireline log suite run in South Caramut No. 1 did not include the density - neutron logs. The decision not to run there logs was justified on the basis of potential reservoir's thickness and the obvious lack of hydrocarbons. The only potential reservoir penetrated in this well was the Pretty Hill Sandstone of the Crayfish Formation with the gross thickness of 16.5 m.

No detailed wireline log analysis was therefore attempted. Sonic porosity calculation is not recommended in this well due to diagenetic cement (s) and secondary porosity, possibly present in the Pretty Hill Sandstone.

The results of the DST-1 conducted over the Pretty Hill Sandstone indicated that the reservoir is porous and has sufficient permeability to flow. However the fresh water saturated reservoir might have been flushed by the ground water flow.

4.3 Contribution to Geology & Relevance to Occurrences of Hydrocarbon

South Caramut No. 1 was the first petroleum exploration well drilled in PEP122.

The prospect was defined as a result of the first and only seismic line shot in the permit. The well's location at shot point 430 was supported by the first hydrocarbon micro see page survey conducted in the PEP 122.

The prospect has also positively tested a new concept in the Otway Basin exploration history. Until the play concept of the South Caramut prospect was suggested it was the consensus amongst explorationists that the northern margin of the Otway Basin lay to the south of the prospect and a veneer of late Tertiary

sediments may be present in part of the permit. This was the major reason why this area remained unexplored for so long.

The drilling of the South Caramut No. 1 well not only proved that the basin margin extends to the north well beyond the prospect location but, also confirmed the validity of this new play concept. which proposed the presence of the stratigraphically oldest and deepest but, best quality reservoir of the Pretty Hill Sandstone to be well placed to reservoir hydrocarbons at very shallow depths. This is probably the shallowest play in Australia.

South Caramut No. 1 has also revealed that the Otway Basin Margin, particularly the prospect and its adjacent area had been tectonically active a number of times during its geological history. These events are summarised below:

- The South Caramut prospect was a low relief basement high in Neocomian time but below sedimentary datum. The lower Pretty Hill Sandstone was therefore deposited at this location. The lack of Barremian Pretty Hill Sandstone could be indicative of either uplift or erosion or both.

- The next significant tectonic event appears to have occurred during the Albian when major uplift probably resulted in the absence of the Upper Eumeralla Formation due to no deposition.

- The Upper Cretaceous appears to have been the period of continuous uplift and/or erosion. This seems to be a regional event along the northern flank in this part of the basin.

- The absence of lower and middle Tertiary sediments in the well is attributed to a minor and possibly local movement.

These structural interpretations have, in turn revealed the following important conclusions:

- These frequent tectonic movements have created an excellent opportunities for both stratigraphic and structural traps to develop in PEP 122.

- The Eumeralla Formation and the shaly part of the Crayfish Formation appeared to be marginally mature (see figure 7). This is clearly indicative of a relatively major uplift in the area. Furthermore, although no significant hydrocarbon generation is expected at the well location ample mature source rock is postulated to be present immediately to the south and west of the prospect within the Minjah Trough.

The results of the drill stem test provided an adequate data on reservoir characteristics of what is considered to be the best potential reservoir, the Pretty Hill Sandstone, in the permit.

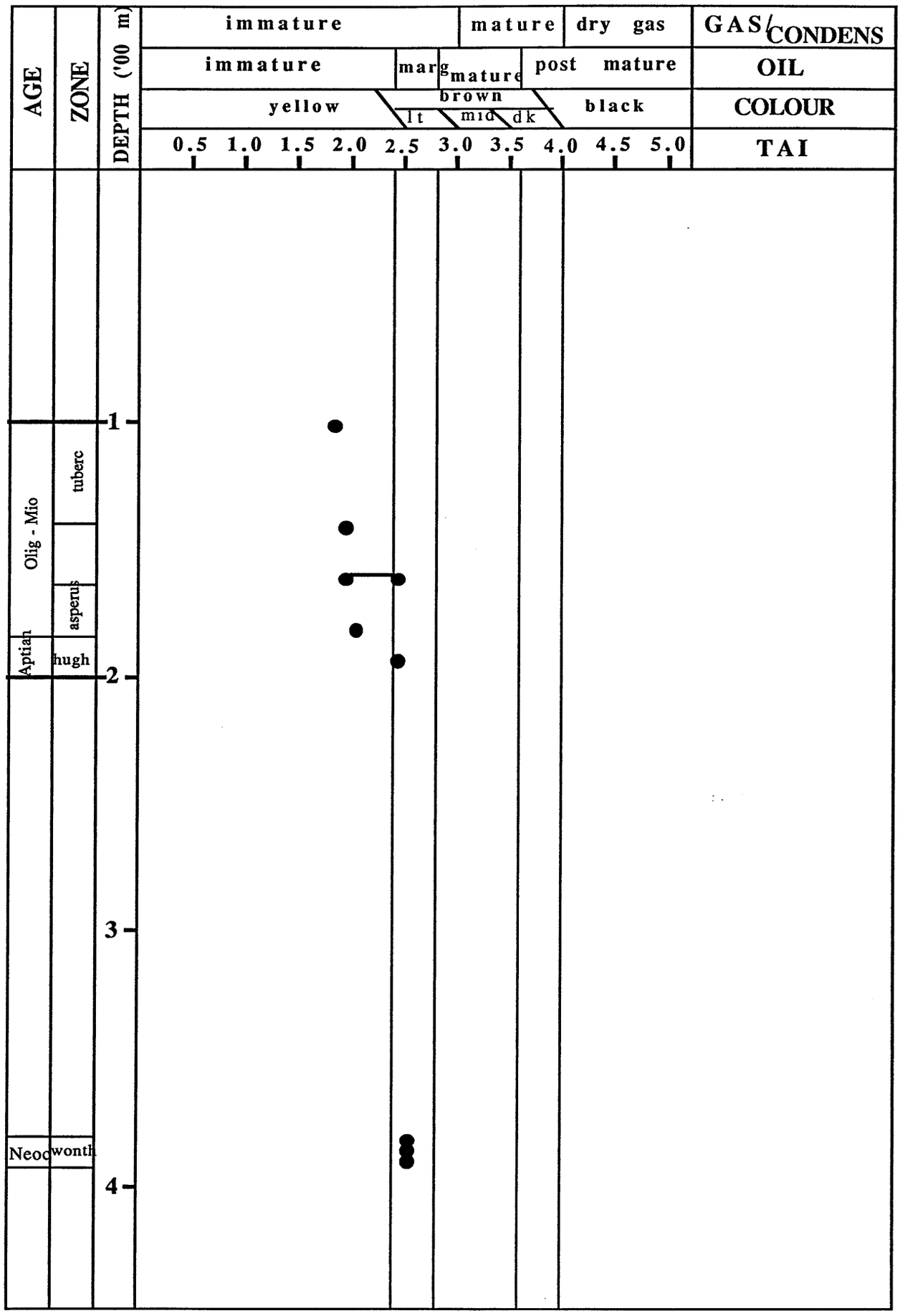


Figure - 7. MATURITY PROFILE - SOUTH CARAMUT #1

APPENDIX

I

DETAILS OF

DRILLING PLANTS

DRILLCORP LTD.

RIG 24

INVENTORY

TYPE:	Franks Cabot Explorer, Carrier Mounted
CAPACITY:	5,000' - 1,600m
DERRICK:	Cabot 96' - 150' 96 X 150,000 lb. capacity 4 leg telescoping
DRAWWORKS:	Cabot Split Drawworks Drilling/Tripping Drums Model 1D58/150-2 2 Detroit Diesel GM6V-71N Belt compound
SUB-STRUCTURE:	1 Piece 8' X 14'
MUD PUMPS:	1. Ideco MM450 Duplex 7-1/4" X 12" Powered by 2 6-71GM
ROTARY TABLE:	Gardner-Denver No. RT-18, 18" opening
SWIVEL:	Brewster Model 40S
BLOCKS:	McKissick Model 83A
HOOK:	Web Wilson Hydra Hook
CROWN:	Cabot 152,000 lb. capacity with 5 X 25" Sheeves
B.O.P.:	Shaffer Type "E" Double Gate, 10" X 3,000 psi 1. Annular Shaffer 10" X 3,000 psi 2. Annular Regan 9" X 3,000psi
B.O.P. CONTROL:	Koomey 80 Gallon, 8 Bottles with 2 Air Pumps
CHOKE MANIFOLD:	Demco 2 X 2 X 3,000 psi, 1/fixed, 1/adjustable

DrillCorp Rig 24 Inventory (cont):

DRILLING LINE:	2,500' X 7/8" OD 6 X 19 E.I.P.S. APISQA
MUD CONTROL EQUIPMENT:	2-FMC 5 x 4 Shakers 1-Warman 2 x 10" Desander Unit 1-Warman 4 x 6" Desilter Unit
KELLY:	ONCOR 4-1/4" Hex 40"
MUD TANKS:	Shaker tank = 250 BBLS Suction tank = 150 BBLS
WATER TANK: & DOG HOUSE	200 BBLS
FUEL TANKS:	400 gallons, 300 gallons
SUCTION TANK:	150 barrels (optional)
GENERATORS:	1 Rolls Royce with 130 KVA Unit 50 HZ
POWER TONGS:	Farr Hydraulic Tubing Tongs, complete with inserts for 2.3/8 inch, 2.7/8 inch, 3.1/2 inch, 4.1/2 inch, 5.1/2 inch, tubing and drillpipe.
LUBRICATOR:	Guiberson Hydraulic Wireline Stripper with 2.3/8inch, 2.7/8 inch, 3.1/2 inch JV rubbers.
DEGASSER:	13ft x 1ft 6 inch Baffled Poor Boy Degasser.
HANDLING TOOLS:	Slips and elevator for 2.3/8 inch, 2.7/8 inch, 3.1/2 inch tubing. Air Slips Cavin model 'C' for 2.3/8 inch, 2.7/8 inch 3.1/2 inch tubing.
MISCELLANEOUS:	2.7/8 inch stabbing valves with 2.3/8 inch X/O. 2 sets pipe raks. Swabbing equipment includes Mandrel and sinker bars.
TUBULARS AVAILABLE:	4,000 ft x 4.1/2 inch pipe grade 'E' 16.60 lb/ft
DRILL COLLARS AVAILABLE:	22 x 6.1/4 inch 2.3/4 inch x 30 ft 4.1/2 in XH conn.

DrillCorp Rig 24 Inventory (cont):

ITEMS AVAILBABLE ON REQUEST

DRILLCOLLARS	15 X 4.3/4 inch x 30 ft with 3.1/2 inch IF conn.
FISHING EQUIPMENT	Wide rang available.
TUBULARS	1. 6014 ft (194 JTS 2.7/8 inch OD x 10.4 lb/ft range 2 grade 'E' drillpipe with 4.1/8 OF tool having 2.7/8 inch IF pin x box connections. 2. 12 JTS 4.1/8 inch OD range 2 slick drillcollars with 2.7/8 inch IF pin x box connections. 3. 12 JTS 3.1/2 inch OD range 2 slick drillcollars with 2.3/8 inch IF pin x box connections.
TUBULARS	DP 4,200Ft x 3.1/2 inch GR 'E' primium 13.3lb/ft 3.1/2 inch IF connection DC 22 x 6.1/4 inch zip with 4 inch IF connection.
MUD TANKS	Shaker tank - 250BBLS
WATER TANK	200BBLS
FUEL TANK	1,000 gallons
GENERATORS	1 Rolls Royce with 130 KVA unit 50HZ.

APPENDIX

II

SUMMARY OF WELLSITE OPERATION

SUMMARY OF WELLSITE OPERATION

The South Caramut No. 1 drill site was prepared by Gordon Rudolph Earthmoving Pty. Ltd. of Timboon.

Prior to rig arrival, a 18" conductor pipe had been installed and cemented.

The Drillcorp Rig No. 24 was rigged up and South Caramut No. 1 was spudded on 0300 hours, 15th October, 1990.

Drilling $12^1/_4$" hole continued to 91.4 m where the $9\ ^5/_8$" casing was run and cemented with shoe at 87.2 m.

The B.O.P's choke manifold, and flareline were installed and the B.O.P.'s were successfully tested to the following pressures:

Blind Rams	1000 psi
HCR - Choke Manifold	1000 psi

The float, cement and shoe were drilled out and after drilling 5 metres of new hole, a formation integrity test was established to be 11.6 ppg equivalent.

Drilling $8^1/_2$" hole continued uneventfully to T.D. The total depth of 435.0 m was reached at 0300 hours 18th October, 1990.

The following logs were then run by BPB Wireline Services:

DLL/MLL/GR/SP/CAL
CSS/GR/CAL
SCG/GR
Velocity Survey

A drill stem test was carried out over the interval 375.0 - 435.0 m (T.D.) using open hole conventional packers.

Cement plugs were then set over the intervals 435.0 - 350.0 m and 117.0 - 57.0 m prior to setting the surface plug and abandonment of the well.

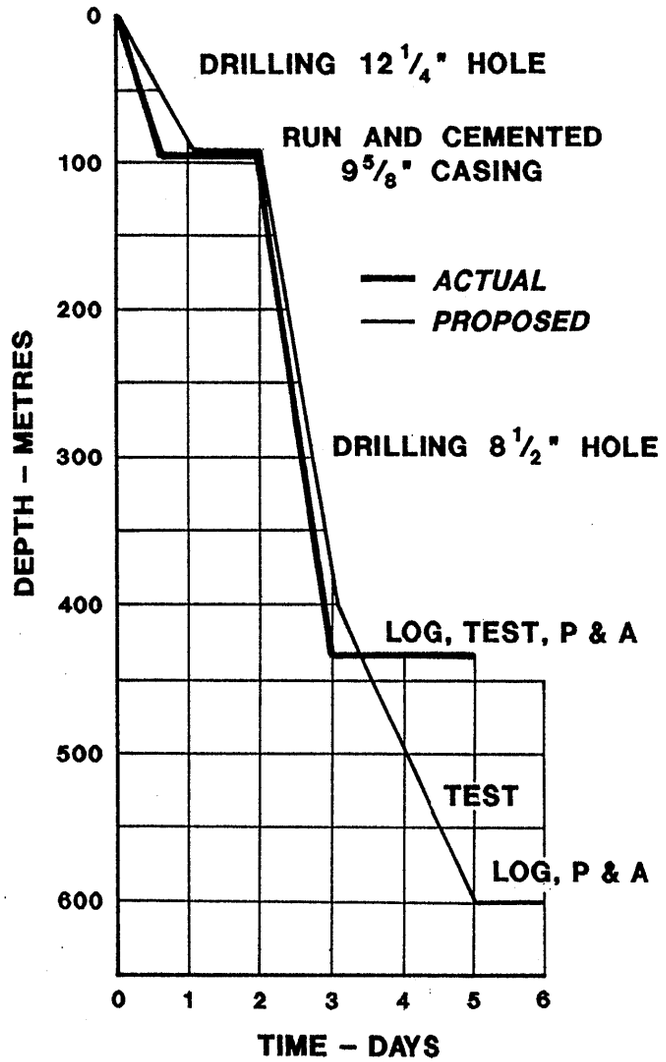
The rig was released at 0600 hours, 20th October, 1990.

LAKES OIL LIMITED

PROPOSED AND ACTUAL DRILLING TIMES

SOUTH CARAMUT No.1

CASING AND PLUGS	FORMATION	TEST	REMARKS
	NEWER VOLCANICS		
	37.0		
	GELLIBRAND MARL		
	143.0		
	CLIFTON FORMATION		
	193.0		
	EUMERALLA FORMATION		
	378.5	DST No.1	DST No.1 375.0 – 435.0m REC.: 20m OF WATERY MUD AND 230m OF MUD CUT WATER
	CRAYFISH FM.		
	395.0		
	PALAEOZOIC BASEMENT		
	T.D.435.0m		



TOTAL DEPTH : 435.0m

CO–ORDINATES :
Latitude : 38°00'16"S
Longitude : 142°28'32"E

ELEVATION : G.L. 142.0m
K.B. 145.3m

SEISMIC LINE : OLO88B–100
SP.: 430

OBJECTIVE : CRAYFISH FM.
(Pretty Hill Sandstone)

SPUDDED : 0330 hrs 15–10–90

REACHED T.D.: 0300 hrs 18–10–90

RIG RELEASED : 0600 hrs 20–10–90

STATUS : P & A

AUTHOR : A.TABASSI

APPENDIX

III

DRILLING FLUID RECAP

LAKES OIL LIMITED

DRILLING FLUIDS RECAP

SOUTH CARAMUT NO. 1

PEP 122, OTWAY BASIN. VICTORIA

Prepared by: M Olejniczak

Dated : November 1990

BAROID AUSTRALIA PTY. LTD.

TABLE OF CONTENTS

APPENDICES

LAKES OIL LIMITED
SOUTH CARAMUT NO. 1
PEP 122, OTWAY BASIN, VICTORIA

WELL SUMMARY

Operator	:	Lakes Oil Limited
Well Name	:	South Caramut No. 1
Location	:	PEP 122, Otway Basin, Victoria
Contractor/Rig	:	Drillcorp / Rig 24
Rig on Location	:	13 October, 1990
Spud Date	:	15 October, 1990
RKB Elevation	:	3.3m
Total Depth	:	435m
Date Reached TD	:	19 October, 1990
Total Days Drilling	:	5 Days
Rig Off Location	:	20 October, 1990
Total Days on Well	:	8

Drilling Fluid Type	Interval	Hole Size	Cost (A$)
Freshwater AQUAGEL/Lime	15m - 91.4m	12 1/4"	$ 615.95
KCL/AQUAGEL/Polymer	91.4m - 435m	8 1/2"	$ 1,888.81

Mud Materials Charged to Drilling	$ 2,504.76
Engineer on Location from Oct 13 to Oct 19. Drilling Fluid Engineering: 7 days @ $410.00	$ 2,870.00
Total Cost Drilling Materials & Engineering	$ 5,374.76
Mud materials not charged to drilling	$ -

Casing Programme : 18" Cond. at 15m
9 5/8" Csg. at 87.2m

Drilling Supervisor : Barry Beetson

Baroid Drilling Fluid Engineer: Gus van der Heide
Manfred Olejniczak

BAROID AUSTRALIA PTY. LTD.

LAKES OIL LIMITED
SOUTH CARAMUT NO. 1
PEP 122, OTWAY BASIN, VICTORIA

INTRODUCTION

The well was spudded in on October 15th, 1990 using Drillcorp's Rig 24.

The 12 1/4" hole was drilled to 91.4m, using Freshwater AQUAGEL mud flocculated with Lime. The 9 5/8" casing was then run and cemented to 87.2m.

The 8 1/2" hole was then drilled without problems to the 435m TD using a 2% KCl/EZ MUD/Polymer mud. After running wireline logs, and a bottom hole DST, the well was plugged and abandoned on October 20th, 1990.

BAROID AUSTRALIA PTY. LTD.

LAKES OIL LIMITED
SOUTH CARAMUT NO. 1
PEP 122, OTWAY BASIN, VICTORIA

DISCUSSION BY INTERVAL

12 1/4" Hole (15m to 91.4m) - 1 day
9 5/8" Casing Set at 87.2m

The Baroid Engineer arrived on location on October 13 while the rig was being erected; the 18" conductor had previously been set at 15m. While the rig-up was being completed 190 bbl of prehydrated AQUAGEL was mixed at 10.5 ppb; this was flocculated with Lime and used to drill the rathole. This proved to be very hard to drill and took almost 18 hours - about 70 bbl of the spud mud was used up.

South Caramut No. 1 was spudded in at 0330 hrs on October 15, 1990. Early drilling through the weathered volcanics/basalt was slow (1/2 to 2 m/hr); a fractured tuff at 34m took 5 bph of mud before the Gellibrand Marl was encountered at 42m. The drilling rate increased to 300 m/hr and the interval TD at 91.4m was reached without problems. Surveys were taken at 29.3m and 85.4m with each showing a deviation of 1/4°.

The viscosity of the spud mud was maintained and controlled by additions of Lime and Caustic Soda. At the interval TD the hole was circulated clean and a wiper trip made; no fill was noticed and the hole was again circulated clean before pulling out to run casing.

The 9 5/8" casing was run and cemented with 230sx of neat cement and 2% calcium chloride, with the shoe at 87.2m.

DISCUSSION BY INTERVAL (cont.)

8 1/2" Hole (91.4m to 435m) - 4 days

During the nippling up and pressure testing of the BOP stack, the sand trap was dumped and washed out, and half the surface mud system dumped.

The cement and casing shoe were drilled out using this remaining old mud diluted with water to control the mud viscosity. A formation leak off pressure test was run at 95.4m giving an 11.6 ppg equivalent.

Drilling then continued through Marl and Coquina with potassium chloride added to 1% concentration immediately. With the Eumeralla Formation encountered from about 193m, the potassium chloride concentration was increased to 2%, and additional EZ MUD polyacrylamide added to improve cuttings quality and reduce hole stickiness.

As drilling continued steadily through the Eumeralla Formation, the filtration control was gradually reduced with additions of CMC HV and DEXTRID. The viscosity was deliberately kept low through most of the section to aid in the breaking up of large clay pieces.

Despite running the desander and desilter constantly the mud weight rose rapidly, even though the mud clay content remained relatively low. Both these machines failed to perform satisfactorily as they suffered from low operating pressure because of improperly designed plumbing.

With basement reached from about 395m, drilling continued on to TD at 435m. The mud weight had risen rapidly up to 9.6 ppg close to TD, but this was then cut back with increased dilution to 9.5 ppg. Typical mud properties close to TD were:

Weight	9.5 - 9.6 ppg
Viscosity	35 - 37 seconds
Yield Point	6 - 9 lb/100ft^2
Filtrate	8.0 - 9.0 cc
Chlorides	12,000 - 13,500 mg/l
KCl	2 %

It had been planned to increase the mud viscosity close to the target point by adding prehydrated AQUAGEL from a separate mixing tank. However, when this was tried it was found to be virtually impossible to mix bentonite in this tank at all, again due to poor design. This meant that the viscosity remained lower than desired at TD.

DISCUSSION BY INTERVAL (cont.)

8 1/2" Hole (cont.)

After running a wiper trip and circulating the hole clean without problems, B.P.B. Wireline logs were run. The loggers reached 433.3m without having any hole problems, and the caliper log showed a very well gauged hole of 8 1/2 to 8 3/4 inches.

Following logging, another wiper trip was run with the hole circulated clean again and a DST run by Halliburton, recovering formation water.

The well was then plugged and abandoned on October 20th, 1990.

LAKES OIL LIMITED
SOUTH CARAMUT NO. 1
PEP 122, OTWAY BASIN, VICTORIA

CONCLUSIONS AND RECOMMENDATIONS

The only real problems experienced from the mud point of view during this well, related to mechanical shortcomings with the mud pit system.

1) Poorly operating Desander and Desilter due to low operating pressure.

2) Premixing tank inadequate for mixing prehydrated bentonite, when using a salt based mud system where bentonite cannot be mixed in directly.

3) Desilter suction is from the same tank as the mixing suction, so that a part of the products being mixed goes directly out of the desilter, unless this is shut down during mixing.

4) Mid pits had no platform for forklifting mud to the mixing hopper, and no stairway at that end of the pits. Mud sacks had to be carried separately, either up the stairs and across the entire mud tank, or thrown up a height of 6 ft; a dangerous situation.

Baroid Australia Pty. Ltd.

MATERIAL RECAP

COMPANY	Lakes Oil Limited	HOLE SIZE	12 1/4"
WELL	South Caramut No. 1	CONTRACTOR/RIG	Drilcorp / Rig 24
LOCATION	PEP 122, Otway Basin, VIC.	MUD TYPE	Flocculated AQUAGEL/Lime

INTERVAL TO (m)	91.4	DRILLING DAYS	1	COST/DAY	$615.95
FROM (m)	15	ROTATING HRS.	11.5	COST/M	$8.06
DRILLED (m)	76.4			COST/BBL	$1.90
DATE	Oct 16, 1990	MUD CONSUMPTION FACTOR (bbl/m)			4.24

MATERIAL	UNIT	UNIT COST	QUANTITY EST	QUANTITY ACT	CONC (ppb) EST	CONC (ppb) ACT	TOTAL COST (A$) ESTIMATE	TOTAL COST (A$) ACTUAL
Barite								
AQUAGEL GOLD SEAL	100lb	18.64	29	29	12.2	9.0	540.56	540.56
Caustic Soda	25kg	27.93	2	2	0.5	0.3	55.86	55.86
Lime	25kg	6.51	2	3	0.5	0.5	13.02	19.53
DIESEL	Bbls							
CHEMICAL VOLUME	Bbls			4				
FRESH WATER	Bbls		238	320				
SEA WATER	Bbls							
TOTAL MUD MADE	Bbls		238	324				
COST LESS BARYTES							$609.44	$615.95
COST WITH BARYTES							$609.44	$615.95

COMMENTS

Baroid Australia Pty. Ltd.

MATERIAL RECAP

COMPANY	Lakes Oil Limited	HOLE SIZE	8 1/2"
WELL	South Caramut No. 1	CONTRACTOR/RIG	Drilcorp / Rig 24
LOCATION	PEP 122, Otway Basin, VIC.	MUD TYPE	KCl/AQUAGEL/Polymer

INTERVAL TO (m)	435	DRILLING DAYS	4	COST/DAY	$472.20
FROM (m)	91.4	ROTATING HRS.	24.5	COST/M	$5.50
DRILLED (m)	343.6			COST/BBL	$5.46
DATE	Oct 19, 1990	MUD CONSUMPTION FACTOR (bbl/m)			1.01

MATERIAL	UNIT	UNIT COST	QUANTITY EST	QUANTITY ACT	CONC (ppb) EST	CONC (ppb) ACT	TOTAL COST (A$) ESTIMATE	TOTAL COST (A$) ACTUAL
Barite								
AQUAGEL GOLD SEAL	100lb	18.64	29	2	5.9	0.6	540.56	37.28
Caustic Soda	25kg	27.93	4	2	0.5	0.3	111.72	55.86
EZ MUD	5gal	61.77		2		0.3		123.54
CMC HV	25kg	67.17	15	7	1.7	1.1	1,007.55	470.19
DEXTRID	50lb	37.96	20	15	2.0	2.2	759.20	569.40
Sodium Bicarbonate	40kg	26.69		1				26.69
Pot. Chloride (Ag)	50kg	17.31	35	35	7.9	11.2	605.85	605.85
Soda Ash	25kg	14.06	2		0.2		28.12	
DIESEL	Bbls							
CHEMICAL VOLUME	Bbls			6				
FRESH WATER	Bbls		488	340				
SEA WATER	Bbls							
TOTAL MUD MADE	Bbls		488	346				
COST LESS BARYTES							$3,053.00	$1,888.81
COST WITH BARYTES							$3,053.00	$1,888.81

COMMENTS

Baroid Australia Pty. Ltd.

MATERIAL SUMMARY

COMPANY Lakes Oil Limited
WELL South Caramut No. 1
LOCATION PEP 122, Otway Basin, VIC.

CONTRACTOR/RIG Drilcorp / Rig 24

INTERVAL	DRILLED	DAYS	HOURS	MUD TYPES:	Flocculated AQUAGEL/Lime
12 1/4"	76.4	1	11.5		KCl/AQUAGEL/Polymer
8 1/2"	343.6	4	24.5		
				COST/DAY	$500.95
TOTALS	420	5	36.00	COST/M	$5.96
RECAP BY	M. Olejniczak			COST/BBL	$3.74
DATE	Oct 19, 1990			MUD CONSUMPTION FACTOR (bbl/m)	1.60

MATERIAL	UNIT	UNIT COST	QUANTITY ESTIMATE	QUANTITY ACTUAL	TOTAL COST (A$) ESTIMATE	TOTAL COST (A$) ACTUAL
Barite						
AQUAGEL GOLD SEAL	100lb	18.64	58	31	1,081.12	577.84
Caustic Soda	25kg	27.93	6	4	167.58	111.72
EZ MUD	5gal	61.77		2		123.54
CMC HV	25kg	67.17	15	7	1,007.55	470.19
DEXTRID	50lb	37.96	20	15	759.20	569.40
Sodium Bicarbonate	40kg	26.69		1		26.69
Pot Chloride (Ag)	50kg	17.31	35	35	605.85	605.85
Lime	25kg	6.51	2	3	13.02	19.53
Soda Ash	25kg	14.06	2		28.12	
DIESEL	Bbls					
CHEMICAL VOLUME	Bbls			10		
FRESH WATER	Bbls		726	660		
SEA WATER	Bbls					
TOTAL MUD MADE	Bbls		726	670		
COST LESS BARYTES					$3,662.44	$2,504.76
COST WITH BARYTES					$3,662.44	$2,504.76

COMMENTS

Total days on hole taken from spud to plug and abandon.

Baroid Australia Pty. Ltd. PROPERTY RECAP

COMPANY Lakes Oil Limited
WELL South Caramut No. 1
LOCATION PEP 122, Otway Basin, VIC.
CONTRACTOR/RIG Drilcorp / Rig 24

DATE 1990	DEPTH m	HOLE SIZE in	F'LINE TEMP C	MUD WT ppg	VIS sec	PV	YP	GELS 10 sec	GELS 10 min	FILTRATION API ml	FILTRATION HTHP ml	FILTRATION CAKE 32nd	FILTRATION TEMP C	pH	Pf	Mf	Cl mg/l x1000	Ca mg/l	K+ xWT %	SAND %	RETORT SOL %	RETORT H2O %	RETORT OIL %	MBC ppb	REMARKS/TREATMENT/FORMATION
Oct. 14	20	12 1/4	20	8.60	41	7	16	10	14	21.0		2		10.5	0.50	0.80	0.4	40		0.30	2	98			Spud 12 1/4" hole
15	91.4	12 1/4	34	9.20	36	12	18	5	18	15.8		3		9.5	0.20	0.40	0.8	80		tr	6	94			Drill, run 9 5/8" csg.
16	91.4	8 1/2		8.40	32	4	10	3	6	nc				12.0	1.20	1.30	2.3	300		0.10	2	98			Nipple up, drill cmt.
17	425	8 1/2		9.60	37	8	9	2	9	9.0		2		10.0	0.15	0.20	12.0	180	2	tr	6	94		9	Drill, Marl
18	435	8 1/2		9.50	35	6	6	1	6	8.0		2		10.0	0.15	0.20	13.5	180	2	tr	6	94		9	Drill to TD, basement, log
19	435	8 1/2		9.50	35	6	6	1	6	8.0		2		10.0	0.15	0.20	13.5	180	2	tr	6	94		9	Run DST, plug & abandon

Baroid Australia Pty. Ltd.

BIT RECORD

COMPANY Lakes Oil Limited
WELL South Caramut No. 1
LOCATION PEP 122, Otway Basin, VIC.

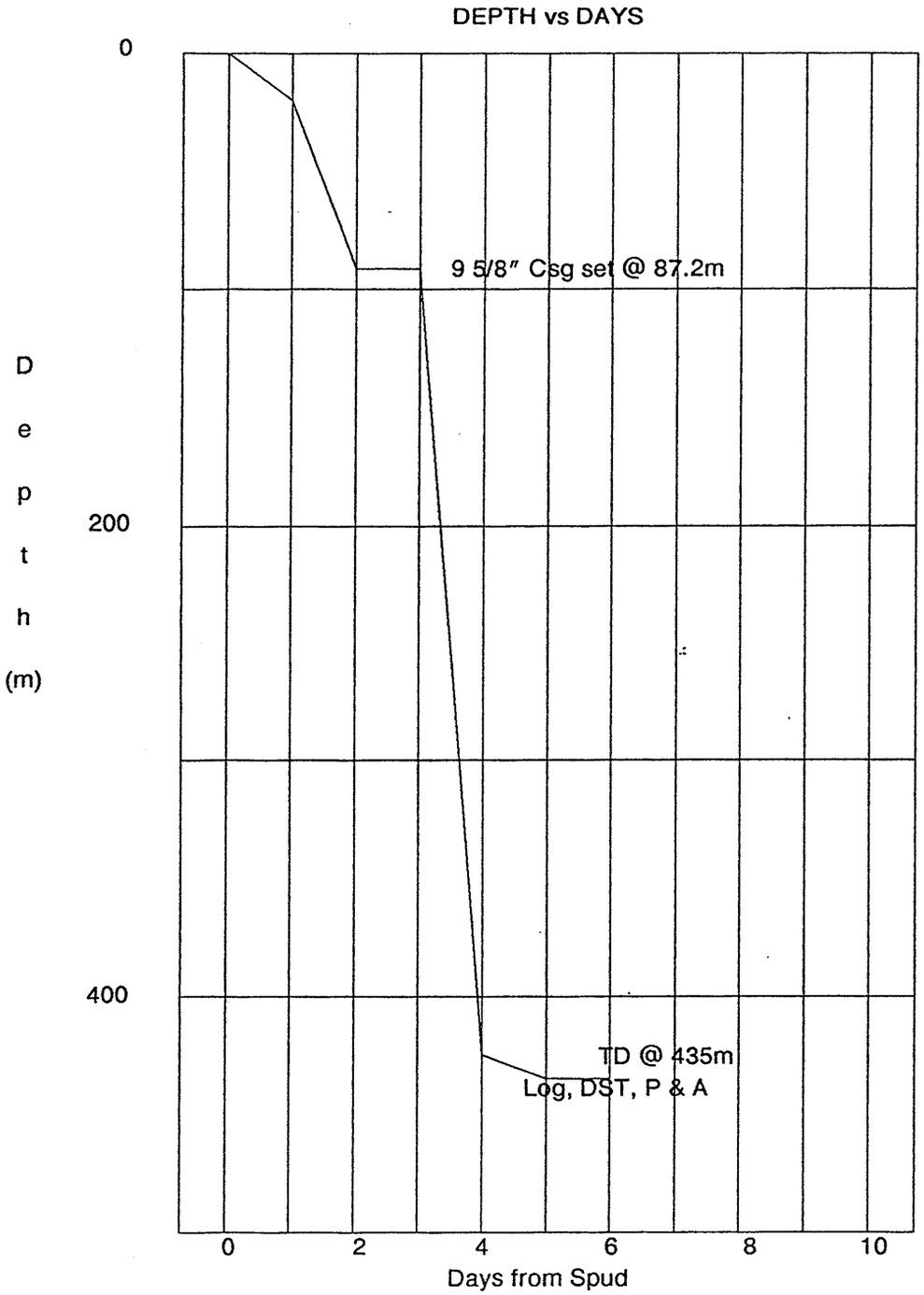
CONTRACTOR/RIG Drilcorp / Rig 24

DATE 1990	BIT NO.	BIT SIZE in	MAKE	TYPE	JETS 32nd"	DEPTH OUT m	METRES DRILLED	HOURS	RATE m/hr	ACCUM DRLG HOURS	BIT WT. tonnes	RPM	VERT DEV'N deg.	PUMP PRESS psi	PUMP RATE gpm	MUD WT ppg	MUD VIS sec	CONDITION T	CONDITION B	CONDITION G	FORMATION
Oct																					
14	1	12 1/4		S335	3 x 16	91.4	155	11.5	23.8	6.5	5–15	120	0.25	900	466	8.90	36	3	3	I	Basalt/Clay
16	2	8 1/2	Varel	L114	13,12,12	435	275	24.5	22.9	18.5	15–30	100	2	850	265	9.60	35	4	2	I	Clay/Basement

Baroid Australia Pty. Ltd.

GRAPH

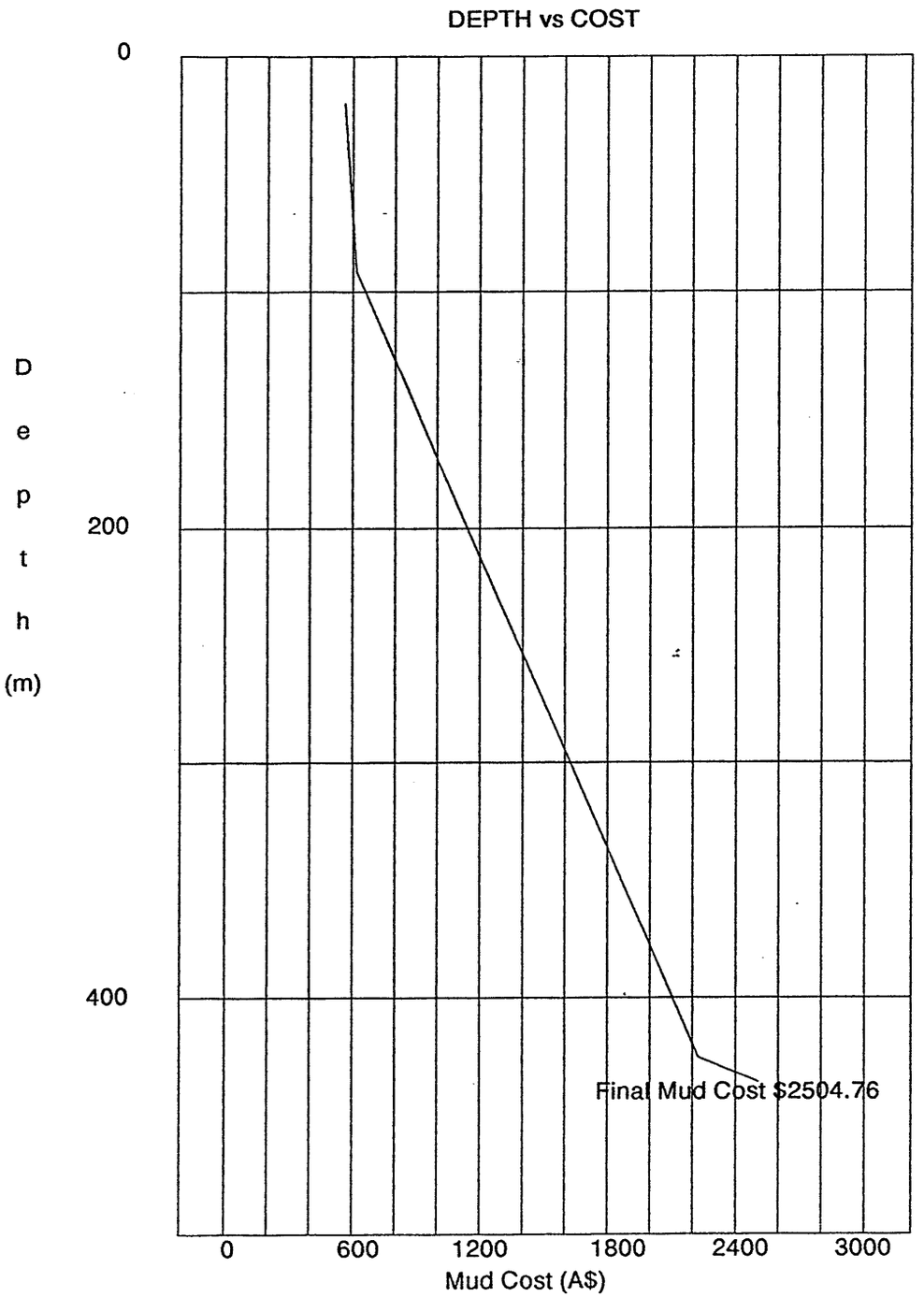
COMPANY Lakes Oil Limited
WELL South Caramut No. 1
LOCATION PEP 122, Otway Basin, VIC.



Baroid Australia Pty. Ltd.

GRAPH

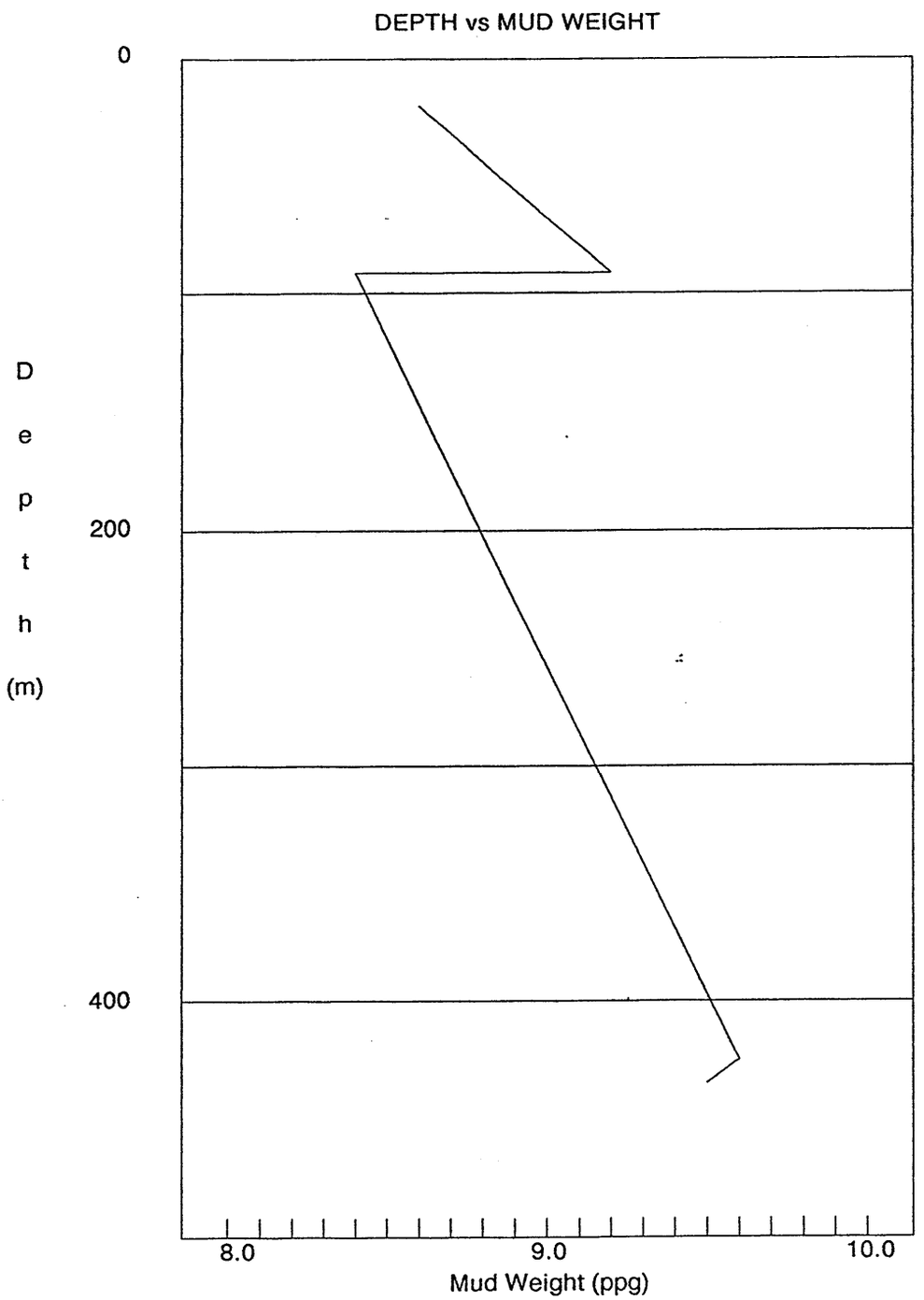
COMPANY Lakes Oil Limited
WELL South Caramut No. 1
LOCATION PEP 122, Otway Basin, VIC.



Baroid Australia Pty. Ltd.

GRAPH

COMPANY	Lakes Oil Limited
WELL	South Caramut No. 1
LOCATION	PEP 122, Otway Basin, VIC.

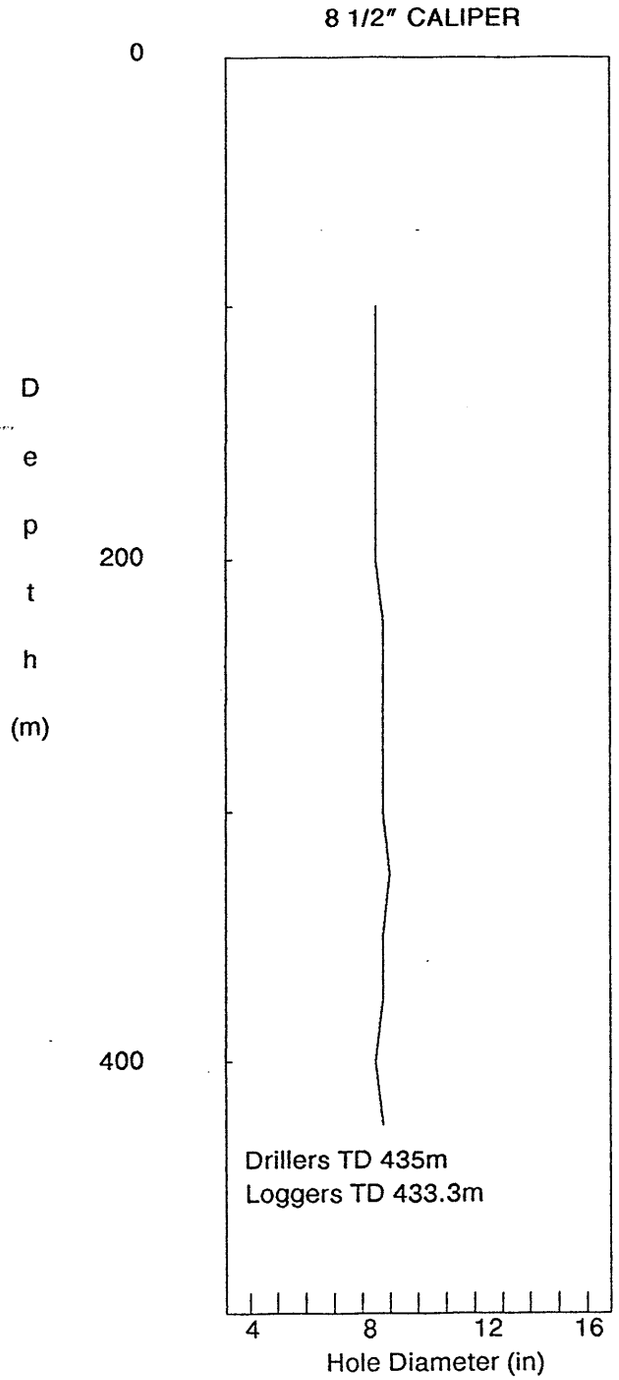


Baroid Australia Pty. Ltd.

CALIPER

APPENDIX A

COMPANY Lakes Oil Limited
WELL South Caramut No. 1
LOCATION PEP 122, Otway Basin, VIC.



APPENDIX

IV

CUTTING SAMPLE DESCRIPTION

WELL: South Caramut #1 DATE: 15/10/90 GEOLOGIST: A. Tabassi PAGE: 1

DEPTH (m)	%	SAMPLE DESCRIPTION	SHOWS						
			GAS					FLUOR	
			TOTAL	C1	C2	C3	C4	NAT	CUT
		SOUTH CARAMUT NO. 1							
		Spudded @ 0330 hrs on Monday 15th October 1990 18" conductor was							
		set @ 15.0 m							
		G.L. to K.B. 3.3m.							
		Elevation: G.L. 142m ASL K.B. 145.3m ASL							
0.0 - 15.0		No sample: Weathered Basalt							
15.0 - 20.0		Valcanic med - dk brn. red dk brn gry in part, spekled in part. hd-vhd							
		partically weathered volcanic rock of basaltic composition with multi							
		coloured minerals including olivine(?) tr med grained qrtz sand, interlam/							
		interbd with minor tuff: med-dk brn, med olive brn, med brn green in part							
		soft-firm, soapy luster, with apparant subconchoidal fractures.							
20.0 - 25.0		Olivine Basalt, dark gry green, dark green, ohd-vhd, speckled in part,							
		fresh, amigdaloidal in part, amigdals are occ. filled with secondary							
		olivine and/or zolite (?) tholeiitic in part (?), interlam with dk gry							

WELL: South Caramut #1 DATE: 15/10/90 GEOLOGIST: A. Tabassi PAGE: 2			SHOWS						
			GAS					FLUOR	
DEPTH (m)	%	SAMPLE DESCRIPTION	TOTAL	C1	C2	C3	C4	NAT	CUT
		tuff with soapy luster and subcon fracture, tr clear calcite crystal.							
25.0-30.0	100	Basalt, generally as above, less olivine, becoming dom tholeiitic (?)							
30.0-35.0	100	Tuff lt-med orange, soft, occ firm, disp, apparantly fractured (lost							
		approx. 5 bbls of drilling mud) oxidised with tr of vf sand or silt grans.							
35.0-40.0	100	Volcanic rock with basaltic composition as per 20-25m with vc olivine							
		and pyroxene laths. tr tuff as above tr grtz sand grains med.							
40.0-42.0	100	Volcanic rock as above.							
42.0-45.0		Marl, lt-med yellow, lt olive brn, soft, sticky in part, disp in part,							
		abundant microfossil and broken shell fragtruglauc. tr med-dk brn iron							
		oxide pellets at the top (weathered unconformity surface.)							
4.50-50.0	100	Marl, generally as above, tan lt-med brn. dom disp.							
50.0-55.0	100	Marl, generally as above, tan lt-med olive gry.							
55.0-60.0	100	Marl, as above, extremely fossiliferous.							

WELL: South Caramut #1 DATE: 15/10/90 GEOLOGIST: A. Tabassi PAGE: 3			SHOWS						
			GAS					FLUOR	
DEPTH (m)	%	SAMPLE DESCRIPTION	TOTAL	C1	C2	C3	C4	NAT	CUT
60.0-65.0	100	Marl, as above, occ med-dk brn due to iron oxide staining on some							
		forams and shell frag (possibly weathered and reworked?).							
65.0-70.0	100	Marl, generally as above, mud brn. lt-med orange to brn. tr olive brn,							
		v disp. abundant iron oxide staining on microfossil and shell frag							
		apparently due to reworked weathered surface.							
70.0-75.0	100	Marl, generally as above, dom lt occ med olive gry.							
75.0-80.0	100	Marl, generally as above, dom lt occ med olive gry.							
80.0-85.0	100	Marl, generally as above becoming less fossiliferous and dom sticky.							
85.0-91.4	100	Marl, generally as above, dom med olive gry, dom sticky becoming less							
		fossiliferous.							
		The casing point of 91.4m was reached at 1700hrs Monday 15/10/90.							
		Ran casing, casing shoe at 87.2 m, drilled out of casing shoe at							
		0130hrs, 17/10/90 F.I.T. then drilled new hole at 0230hrs, 17/10/90.							

WELL: South Caramut #1 DATE: 15/10/90 GEOLOGIST: A. Tabassi PAGE: 4			SHOWS						
			GAS					FLUOR	
DEPTH (m)	%	SAMPLE DESCRIPTION	TOTAL	C1	C2	C3	C4	NAT	CUT
91.4-95.0	100	Marl, as above, med olive gry, dom disp, extremely fossil.							
95.0-100.0	100	Marl, as above.							
100-105	100	Marl, as above, lt-med olive gry, extremely fossil, interbd with minor:							
	tr	Calcarenite, lt gry, lt olive gry, firm to hd, med to occ coarse, no							
		apparent mtx, mod strong calc cmt, tr foram no vis Ø.							
105-110	100	Marl, as above lt-med olive gry, lt-med brn gry in part v disp,							
		extremely fossil.							
	tr	Calcarenite as above.							
110-115	100	Marl as above.							
	tr	Calcarenite as above.							
115-120	100	Marl as above.							
120-125	100	Marl as above, dom med olive gry and med gry.							
125-130	100	Marl as above, becoming sticky in part.							

WELL: South Caramut #1 DATE: 15/10/90 GEOLOGIST: A. Tabassi PAGE: 5			SHOWS						
			GAS					FLUOR	
DEPTH (m)	%	SAMPLE DESCRIPTION	TOTAL	C1	C2	C3	C4	NAT	CUT
130-135	100	Marl as above becoming sticky in part.							
	t r	Calcarenite as above.							
135-140	100	Marl as above, med olive gry occ dk olive gry dom sticky mod							
		fossiliferous.							
	t r	Calcarenite as above.							
140-145	95	Marl, generally as above, med olive gry, med brn gry lt gry to lt							
		olive gry in part, soft, v disp, extremely fossiliferous, shell fragments							
		are med brn-stained by iron oxide, rare iron oxide pellets, rare med-							
		coarse rounded qrtz sand grains interlam with:							
	5	Calcarenite, lt gry, lt olive gry, firm-hd, occ vhd, f-med rare argill mtx,							
		mod strong calc. cmt, tr shell frag, rar-tr glauc, nouvis Ø.							
145-150	80	Marl, generally as above with no iron oxide staining interbedded with:							
	20	Calcarenite, as above no vis Ø.							

WELL: South Caramut #1 DATE: 15/10/90 GEOLOGIST: A. Tabassi PAGE: 6			SHOWS						
			GAS					FLUOR	
DEPTH (m)	%	SAMPLE DESCRIPTION	TOTAL	C1	C2	C3	C4	NAT	CUT
150-155	50	Marl as above.							
	50	Calcarenite as above.							
155-160	30	Marl, generally as above, dom med brn orange possibly due to weathering							
		and oxidation, com-abundant iron oxide pellets, tr med-c, rounded, lt							
		brn stained qrtz sand grains interbedded with:							
	70	Calcarenite, generally as above with iron staining, no vis Ø.							
160-165	50	Marl, as above with moderate iron staining.							
	50	Calcarenite, as above with moderate iron staining, no vis Ø.							
165-170	65	Marl, generally as above, dom lt-med olive gry, lt gry to lt brn gry in							
		part.							
	35	Calcarenite, generally as avove, dom v lt gry, lt-med olive gry in part,							
		no vis Ø.							
170-185	95	Marl, as above.							
	5	Calcarenite as above.							

WELL: South Caramut #1 DATE: 15/10/90 GEOLOGIST: A. Tabassi PAGE: 7

DEPTH (m)	%	SAMPLE DESCRIPTION	SHOWS						
			GAS					FLUOR	
			TOTAL	C1	C2	C3	C4	NAT	CUT
175-180	95	Marl as above.							
	5	Calcarenite as above.							
180-185	95	Marl as above.							
	5	Calcarenite as above.							
185-190	100	Marl as above, tr loose, f-vc dom med-c rounded sand grains.							
	tr	Calcarenite as above.							
190-195	95	Marl as above.							
	5	Sandstone, clear-vult brn, loose, f-vc, dom med-c, rounded-well							
		rounded poorly sorted qrtz, no apparant matrix v good vis Ø.							
195-200		Claystone, dk-vdk gry, dk brn gry in part, soft to firm sticky in part,							
		rare lit, rarely calc.							
200-205	100	Claystone, med gry, med green gry in part, firm, blocky in part, disp in							
		part, v occ silty in part, rare fine lithics.							

WELL: South Caramut #1 DATE: 15/10/90 GEOLOGIST: A. Tabassi PAGE: 8			SHOWS						
			GAS					FLUOR	
DEPTH (m)	%	SAMPLE DESCRIPTION	TOTAL	C1	C2	C3	C4	NAT	CUT
205-210	100	Claystone, as above, occ med-dk brn gry, tr carb det in part.							
210-215	95	Claystone as above, slightly cabrarerous.							
	5	Sandstone, lt gry to beige, firm-hd, vf to silt size SA-SR, well sorted							
		qutz and multi-col lithics, com off white kaolinitic arg mtx tr calc							
		cmt, rare partially altered feldspar, v poor - no vis Ø.							
215-220	95	Claystone as above, in part becoming silty and/or grading into minor							
		siltstone, slightly calcareous.							
	5	Sandstone, lt-med gry and green gry, occ lt brn gry, firm to hd, vf-f,							
		SA-SR, fair to well sorted qrtz and multi-col lithics, com off white							
		kaolinitic arg mtx, tr calc cmt, rare partially altered feldspar, v poor-							
		no vis Ø.							
220-225	100	Claystone as above, non calcareous.							
	tr	Sandstone as above, slightly caleareous.							

WELL: South Caramut #1 DATE: 15/10/90 GEOLOGIST: A. Tabassi PAGE: 9			SHOWS						
			GAS					FLUOR	
DEPTH (m)	%	SAMPLE DESCRIPTION	TOTAL	C1	C2	C3	C4	NAT	CUT
225-230	100	Claystone as above non calcareous.							
	tr	Sandstone as above.							
230-235	100	Claystone as above.							
235-240	95	Claystone as above.							
	5	Sandstone as above.							
240-245	100	Claystone as above.							
	tr	Sandstone as above.							
245-250	95	Claystone as above.							
	5	Siltstone, lt-med green gry, pale green in part, occ lt brn gry, soft to							
		firm, disp, occ blocky in part, rarely carb and micaceous.							
250-255	100	Claystone as above.							
255-260	90	Claystone as above, com micaceous, mod silty in part.							
	10	Sandstone generally as above dom fine, commicareous, v poor to no							
		vis Ø.							

WELL: South Caramut #1 DATE: 15/10/90 GEOLOGIST: A. Tabassi PAGE: 10

DEPTH (m)	%	SAMPLE DESCRIPTION	SHOWS						
			GAS					FLUOR	
			TOTAL	C1	C2	C3	C4	NAT	CUT
260-265	100	Claystone as above.							
265-270	100	Claystone as above.							
270-275	95	Claystone as above.							
	5	Siltstone as above							
275-280	100	Claystone as above with calcite band (286-287m) med brn gry,							
		extremely hd, cryptocrystalline in part, med, coarsely recrystallised,							
		dolomitic (?) in part, tr slickenside (possibly a minor fault).							
280-285	100	Claystone, generally as above, med-dk gry, med-dk green gry, med-dk							
		brn gry in part, firm, hd in part, blocky to subfis, rare carb det & mica,							
		rare lithics, silty in part.							
285-290	100	Claystone as above becoming v silty in part.							
290-295	100	Claystone as above, silty in part.							
295-300	100	Claystone as above.							
300-305	100	Claystone as above becoming v silty in part.							

WELL: South Caramut #1 DATE: 15/10/90 GEOLOGIST: A. Tabassi PAGE: 11

DEPTH (m)	%	SAMPLE DESCRIPTION	SHOWS						
			GAS					FLUOR	
			TOTAL	C1	C2	C3	C4	NAT	CUT
305-310	95	Claystone as above becoming v silty in part.							
	5	Siltstone as above.							
310-315	95	Claystone as above.							
	5	Siltstone as above.							
315-320	90	Claystone as above.							
	10	Siltstone as above.							
320-325	95	Claystone as above.							
	5	Siltstone as above.							
325-330	100	Claystone as above.							
	tr	Sandstone as above.							
330-335	100	Claystone as above.							
	tr	Siltstone as above.							
	tr	Sandstone as above.							

WELL: South Caramut #1 DATE: 15/10/90 GEOLOGIST: A. Tabassi PAGE: 12

DEPTH (m)	%	SAMPLE DESCRIPTION	SHOWS						
			GAS					FLUOR	
			TOTAL	C1	C2	C3	C4	NAT	CUT
335-340	90	Claystone as above.							
	10	Sandstone as above.							
	tr	Siltstone as above.							
340-345	95	Claystone as above.							
	5	Siltstone as above.							
	tr	Sandstone as above.							
345-350	100	Claystone as above							
350-355	95	Claystone as above.							
	5	Siltstone as above.							
355-360	100	Claystone as above, slightly dispersive in part.							
360-365	90	Claystone as above.							
	5	Sandstone as above.							
	5	Siltstone as above.							

WELL: South Caramut #1 DATE: 15/10/90 GEOLOGIST: A. Tabassi PAGE: 13

DEPTH (m)	%	SAMPLE DESCRIPTION	SHOWS						
			GAS					FLUOR	
			TOTAL	C1	C2	C3	C4	NAT	CUT
365-370	95	Claystone as above.							
	5	Sandstone as above.							
370-375	95	Claystone as above.							
	5	Sandstone as above.							
375-380	50	Claystone as above.							
	50	Sandstone, clear-translucent to v lt gry, f-c, dom med, SA-SR, poorly sorted qrtz, tr off white kaolinitic arg mtx, tr silica cmt, rare garnet, rare vc qrtz overgrowth good to v good vis Ø.							
380-385	50	Claystone as above.							
	50	Sandstone as above.							
385-390	50	Sandstone as above.							
	50	Metamorphosed rock consisting of quartzite, quartz schist mica schist, partly weathered, apparently reworked, rare loose qrtz grains.							
390-395	100	Metamorphosed rock as above, comm loose, qrtz grains.		tr					

WELL: South Caramut #1 DATE: 15/10/90 GEOLOGIST: A. Tabassi PAGE: 14

DEPTH (m)	%	SAMPLE DESCRIPTION	SHOWS						
			GAS					FLUOR	
			TOTAL	C1	C2	C3	C4	NAT	CUT
395-400	100	Metamorphosed rock as above, com loose, qrtz grains.							
400-405	100	Metamorphosed rock as above, com loose, qrtz grains.							
405-410	100	Metamorphosed rock as above, com loose, qrtz grains.							
410-415	100	Metamorphosed rock as above, com loose, qrtz grains.							
415-420	100	Metamorphosed rock as above, com loose, qrtz grains.							
420-425	100	Quartz Mica Schist, med green hd-vhd, occ firm to friable, tr pyrite no							
		apparant weathering, becoming fresh.							
	100	Quartz, mica schist as above.							
	100	Quartz mica shist as above.							
		T.D. of 435 m was reached @ 0310 Thursday 18th October 1990.							
				tr					

APPENDIX

V

SIDEWALL CORE DESCRIPTION

SIDE WALL CORE DESCRIPTION
SOUTH CARAMUT #1

No.	Depth (m)	Rec cm	Description
1	430.0	2.3	Quartz Mica Schist, medium green grey, medium green, hard crumbly in part, core appears to be fractured/ fragmented and weathered in part.
2	420.0	2.8	Quartz Mica Schist, as per Sidewall Core No. 1.
3	411.0	3.3	Mica Schist, medium green grey, soft to firm, hard in part, morderately to strongly weathered.
4	396.0	3.8	Sandstone, medium green grey, firm to friable, fine to very coarse, dominantly medium to coarse, subangular to subrounded, poorly sorted quartz and multi-coloured metamorphic lithics, abundant dispersive off white kaolinitic and green (chloritic?) argillaceous matrix very poor visual porosity, no shows. The rock appears to be the product of reworked basement or "basement wash"(?).
5	393.0	3.0	Claystone, medium green grey, firm, sticky, moderately micromicaceous, rarely carbonaceous.
6	390.5	2.5	Sandstone, off white to very pale brown grey, friable, fine to coarse, dominantly medium, subangular to sub rounded, dominantly subangular, poor to fair sorted quartz, common off white kaolinitic clay matrix in part, slightly silty in part, trace to common carbonaceous material, fair to good visual porosity, no shows.
7	384.5	2.0	Sandstone, light to medium brown grey, firm to friable, very fine to medium, dominantly medium, subangular to subrounded, fair sorted quartz, common to abundant off white to light grey argillaceous matrix, silty in part, trace to common fine lithics, trace carbonaceous detritus, trace to common micromica, fair visual porosity, no shows.
8	382.5	2.8	Sandstone, light to medium grey and brown grey, friable, very fine to fine, silt size in part, subangular to sub-rounded fairly sorted quartz, common to abundant off white and light brown grey argillaceous matrix, common fine carbonaceous detritus and laminae, common fine mica flecks, trace lithics, fair to poor visual porosity, no shows.

No.	Depth (m)	Rec cm	Description
9	381.0	2.2	Claystone, medium grey to medium olive grey, soft to firm, dispersive in part, trace to common carbonaceous detritus, trace to occasionally common silt, rare fine lithics, trace fine mica.
10	379.5	3.5	Claystone, as per Sidewall Core No. 9, sticky in part.
11	373.0	2.5	Claystone, as per Sidewall Core No. 9, sticky in part.
12	351.0	3.3	Claystone, medium to dark grey, medium to dark brown grey, soft to firm, dispersive in part, blocky and subfissile in part.
13	334.0	2.5	Sandstone, light green grey, friable, rarely firm, very fine to fine, silty in part, subangular to subrounded, fairly to well sorted quartz and light green grey lithics, common to bundant dispersive argillaceous matrix Kaolinitic in part, very poor visual porosity, no shows.
14	362.0	2.3	Sandstone, off white to very pale brown grey, friable,
15	280.0	2.2	Claystone, medium green grey to medium bluish grey, soft sticky, rarely carbonaceous and micaceous, trace fine mult-coloured lithics (volcano genic?).
16	275.0	2.3	Claystone, light grey to light green grey, soft, sticky, dispersive in part, trace mica and carbonaceous detritus, abundantly silty, in part grading into siltstone.
17	236.0	2.2	Claystone, medium green grey, medium to dark grey in part, soft to firm,dispersive in part, sticky in part, rarely blocky in part, trace to rare biotite flecks, rare lithics.
18	204.0	3.2	Claystone, dark brown grey, soft to firm, dispersive, sticky in part, commonly very fine micaceous and carbonaceous, trace lithics.
19	182.0	3.5	Claystone, as per Sidewall Core No. 18.
20	191.0	3.7	Marl, medium brown green, medium to dark green grey, firm, dispersive, extremely fossiliferous, grading into calcarenite in part

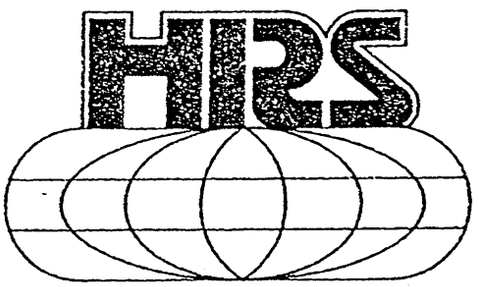
No.	Depth (m)	Rec cm	Description
21	182.0	3.5	Marl, generally as Sidewall Core No. 20, dominantly medium dark green.
22	162.0	3.2	Marl, medium orange, soft, dispersive, very fossiliferous grading into loose calcarenite, (orange colour, "oxidation," of the sample may be due to weathered/unconformity surface).
23	140.0	3.0	Marl, medium to dark green grey, foft, dispersive, extremely fossiliferous, trace to common dark brown (iron oxide) pellets.
24	100.0	3.5	Marl, medium to dark grey, medium brown grey and green grey in part, soft to firm, gritty in part, extremely fossiliferous.

APPENDIX

VI

FORMATION TESTING

FORMATION TEST REPORT



HALLIBURTON
RESERVOIR SERVICES

A Halliburton Company

Customer: LAKES OIL LTD
Well Description: CARAMUT SOUTH #1
Field Name: CARAMUT

TEST NO: DST #1
TEST DATE: 19-10-90
TICKET NO: 352326

HALLIBURTON
SERVICES

REPORT TICKET NO: 352326
BT-GAUGE TICKET NO: 352326
DATE: 19-10-90
HALLIBURTON CAMP: ROMA, QLD.
TESTER: K.Rixon
WITNESS: B.Beetson

DRILLING CONTRACTOR: DRILLCORP #24
LEGAL LOCATION:

OPERATOR: LAKES OIL LTD.
LEASE NAME: CARAMUT SOUTH
WELL NO: 1
TEST NO: 1
TESTED INTERVAL: 1230.00 - 1425.00 ft

FIELD AREA: CARAMUT
COUNTY/LSD:
STATE/PROVINCE: VICTORIA
COUNTRY: AUSTRALIA

TABLE OF CONTENTS

Date: 19-10-90 Ticket No: 352326 Page No: 1.1

SUMMARY OF TEST

Lease Owner: LAKES OIL LTD. Lease Name: CARAMUT SOUTH

Well No.: 1 Test No.: 1

County/LSD: State/Province: VICTORIA

Country: AUSTRALIA

Formation Tested: PRETTY HILL

Hole Temp: 98.00 F

Total Depth: 1425.00 ft

Net Pay: 195.00 ft

Gross Tested Interval: 1230.00 - 1425.00 ft

Perforated Interval (ft):

RECOVERY:

65ft WATERY MUD
754.5ft MUD CUT WATER

REMARKS:

ALL DOWNHOLE PRESSURES ARE IN ABSOLUTE.

Date: 19-10-90 Ticket No: 352326 Page No: 1.1

SUMMARY OF TEST

Lease Owner: LAKES OIL LTD. Lease Name: CARAMUT SOUTH

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RECOVERY:

65ft WATERY MUD
754.5ft MUD CUT WATER

REMARKS:

ALL DOWNHOLE PRESSURES ARE IN ABSOLUTE.

Date: 19-10-90 Ticket No: 352326 Page No: 1.2

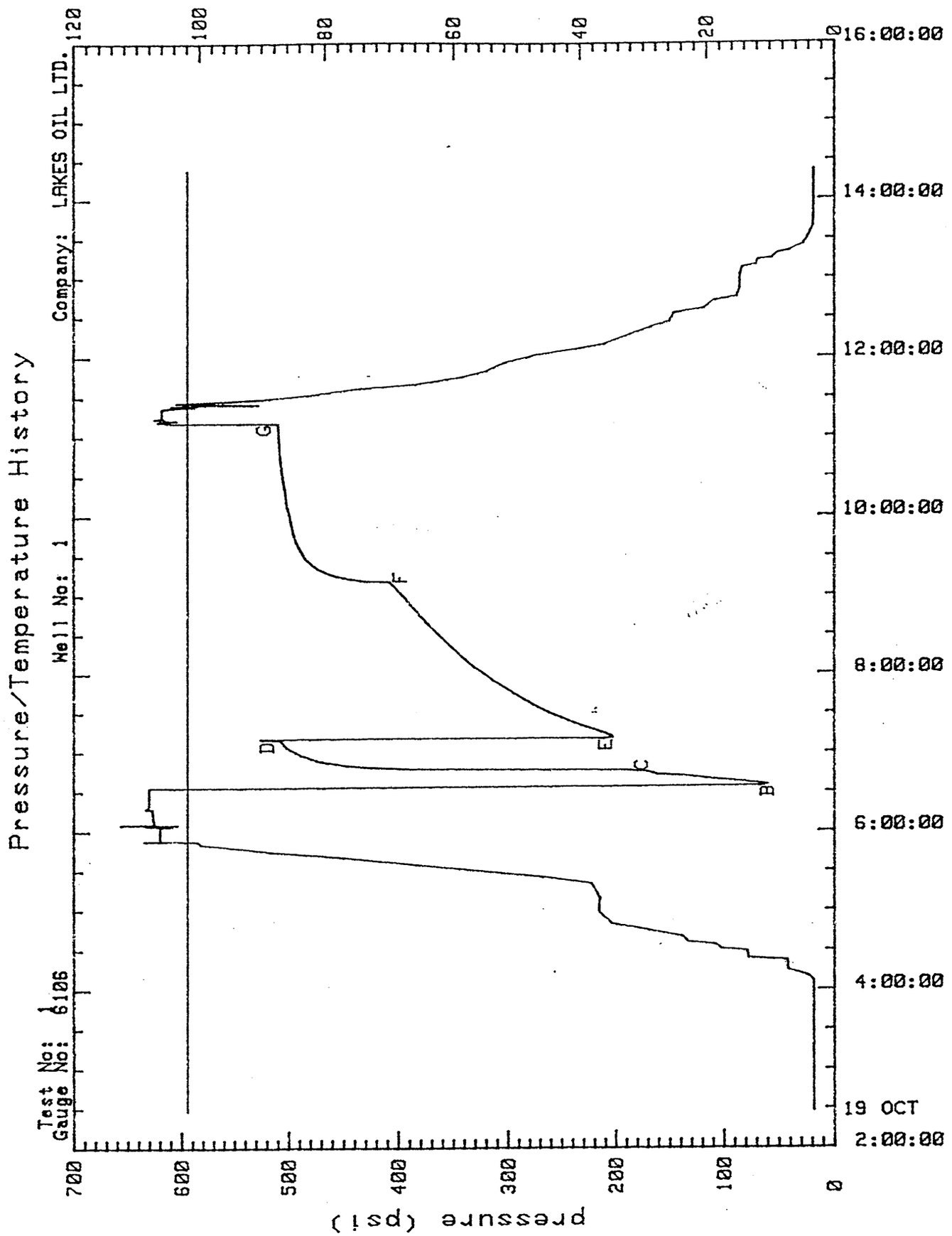
TEST PERIOD SUMMARY

Gauge No.: 6106 Depth: 1210.00 ft Blanked off : No
Hour of clock: 24

ID	PERIOD	DESCRIPTION	PRESSURE (psi)	DURATION (min)
A		Initial Hydrostatic	627.59	
B	1	Start Draw-down	62.84	
C		End Draw-down	186.06	12.00
C	2	Start Build-up	186.06	
D		End Build-up	507.13	23.08
E	3	Start Draw-down	212.02	
F		End Draw-down	408.55	120.51
F	4	Start Build-up	408.55	
G		End Build-up	510.24	119.67
H		Final Hydrostatic	618.26	

NOTE: for Pressure vs. Time Plot, see next page.

Date: 19-10-90 Ticket No: 352326 Page No: 1.3



TEST AND FORMATION DATA

Formation Tested: PRETTY HILL
All Depths Measured From: KELLY BUSHINGS
Elevation: 476.70 ft
Total Depth: 1425.00 ft
Net Pay: 195.00 ft
Hole or Casing Size: 8.500 in
Gross Tested Interval: 1230.00 - 1425.00 ft
Perforated Interval (ft):

HOLE FLUID

Type: DRILLING FLUID
Weight: 9.50 lb/gal
Viscosity: 0 seconds

HOLE TEMPERATURE

Depth: 1420.90 ft
Estimated: 0.00 F
Actual: 98.00 F

HYDROCARBON PROPERTIES

Oil Gravity (API): 0.0 @ 60 F
Gas/Oil ratio (ScF/STB): 0.0
Gas Gravity (SG): 0.75

CUSHION DATA

TYPE	AMOUNT	WEIGHT
NIL		

FLUID PROPERTIES FOR RECOVERED MUD AND WATER

SOURCE	RESISTIVITY	CHLORIDES	SG	PH
	@ F	PPM		
	@ F	PPM		
	@ F	PPM		
	@ F	PPM		
	@ F	PPM		
	@ F	PPM		

SAMPLER DATA

Surface Pressure: 0 psi
Volume of Gas: 0 ft3
Volume of Oil: 0 cc
Volume of Water: 0 cc
Volume of Mud: 0 cc
Total Liquids: 0 cc

REMARKS:
ALL DOWNHOLE PRESSURES ARE IN ABSOLUTE.

RATE HISTORY TABLE

Period No	Test Type	j	Prod Rate q(j) (MCF/D)	Duration (hrs)	Cum. Time t(j) (hrs)
		0	0.0	0.00	0.00
1	DD	1		0.20	0.20
2	BU	2	0.0	0.39	0.59
3	DD	3		2.03	2.62
4	BU	4	0.0	2.02	4.64

TEST STRING CONFIGURATION

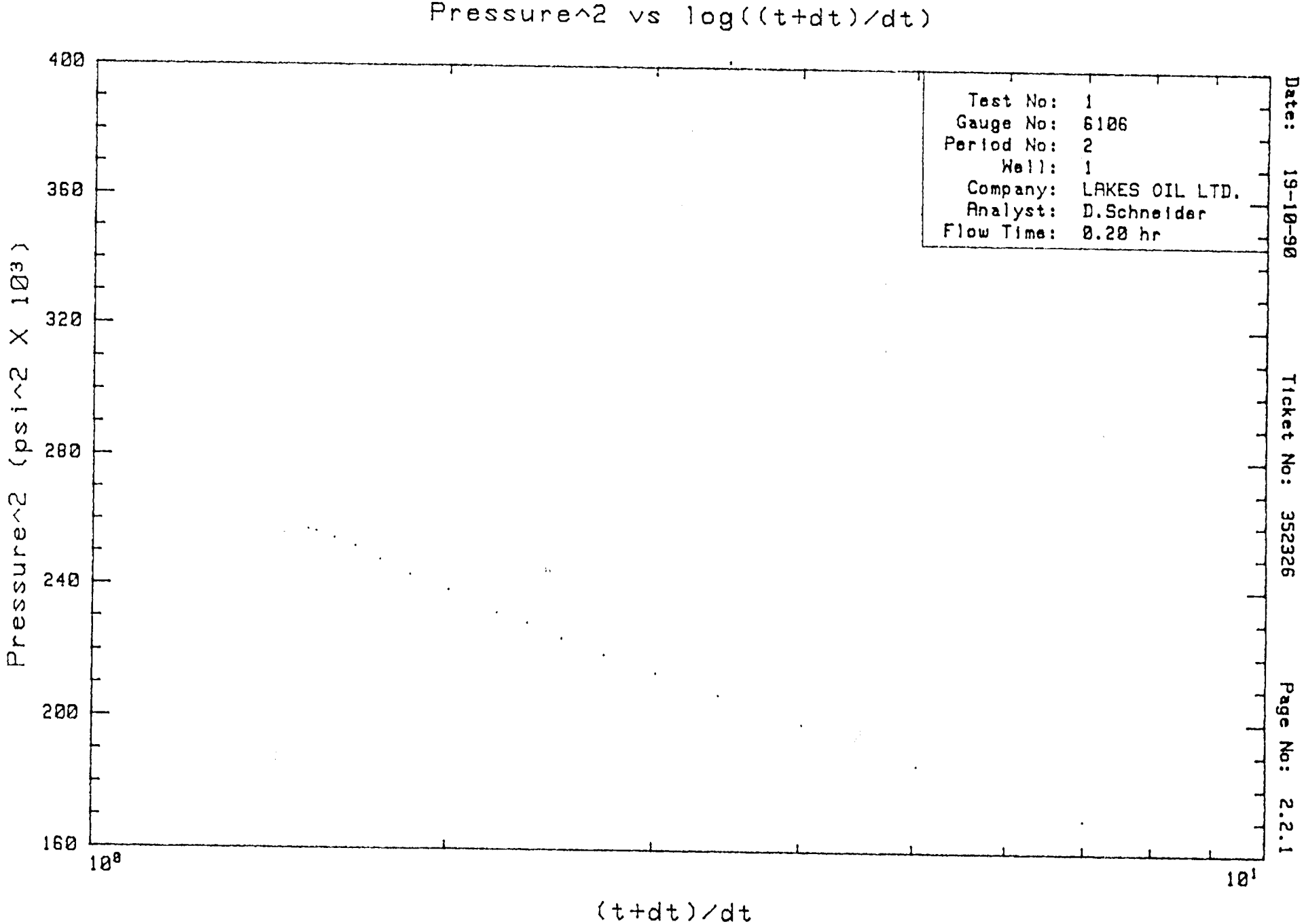
	O.D. (in)	I.D. (in)	LENGTH (ft)	DEPTH (ft)
DRILL PIPE.....	4.500	3.827	841.600	
DRILL COLLARS.....	6.000	2.750	270.890	
PUMP OUT REVERSING SUB.....	6.000	3.000	1.000	1102.84
DRILL COLLARS.....	6.000	2.870	59.140	
IMPACT REVERSING SUB.....	6.000	3.000	1.000	1162.98
DRILL COLLARS.....	6.000	2.750	29.150	
BAR CATCHER SUB.....	6.000	1.500	1.000	
AP RUNNING CASE.....	5.000	3.060	4.140	1195.13
DUAL CIP VALVE.....	5.000	0.870	5.870	1203.00
HYDROSPRING TESTER.....	5.000	0.750	5.000	1208.00
AP RUNNING CASE.....	5.000	3.060	4.140	1210.00
JAR.....	5.000	1.750	5.000	
VR SAFETY JOINT.....	5.000	1.000	2.780	
OPEN HOLE PACKER.....	7.750	1.680	5.850	1223.90
DISTRIBUTOR VALVE.....	5.000	1.680	2.000	
OPEN HOLE PACKER.....	7.750	1.680	5.850	1229.70
PERFORATED TAIL PIPE.....	5.000	2.370	6.000	
CROSSOVER.....	5.750	2.700	1.000	
DRILL COLLARS.....	6.000	2.750	180.320	
CROSSOVER.....	5.850	2.850	1.000	
BLANKED-OFF RUNNING CASE.....	5.000	2.370	4.060	1420.94
TOTAL DEPTH				1425.00

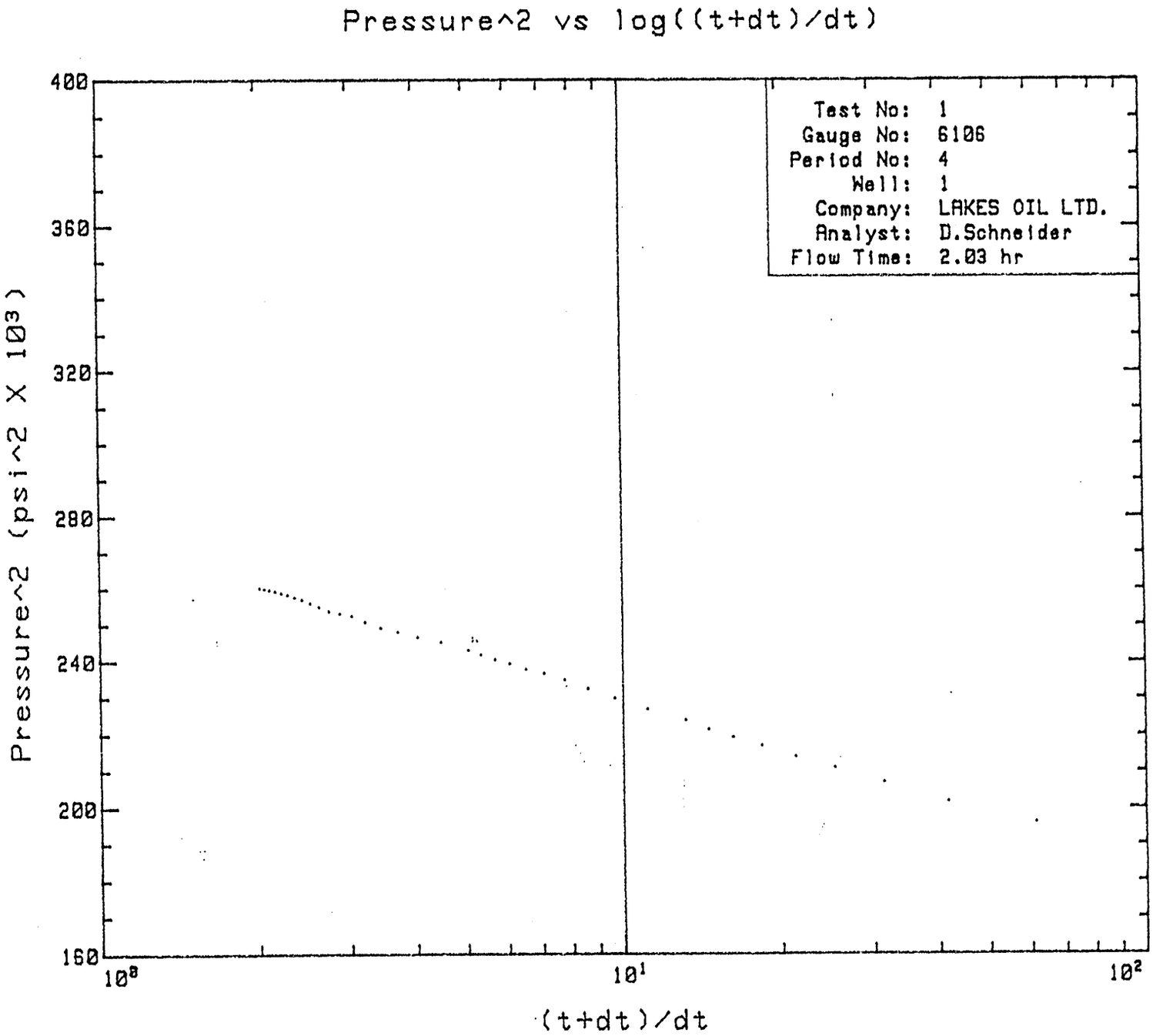
Date: 19-10-90 Ticket No: 352326 Page No: 1.7.1
Test No: 1

OPERATOR JOB LOG

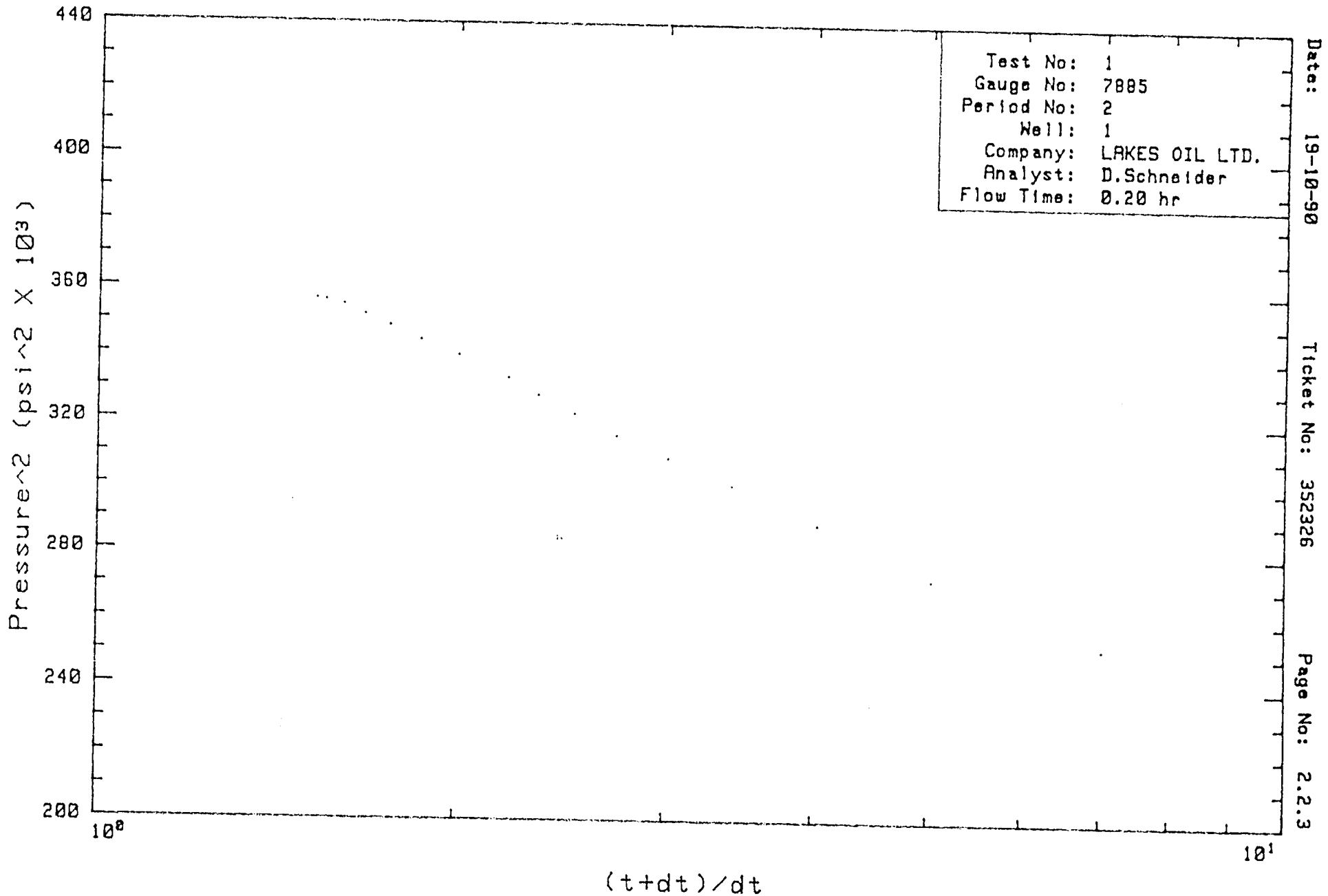
Type of Flow Measuring Device: 6"CERAMIC CHOKE

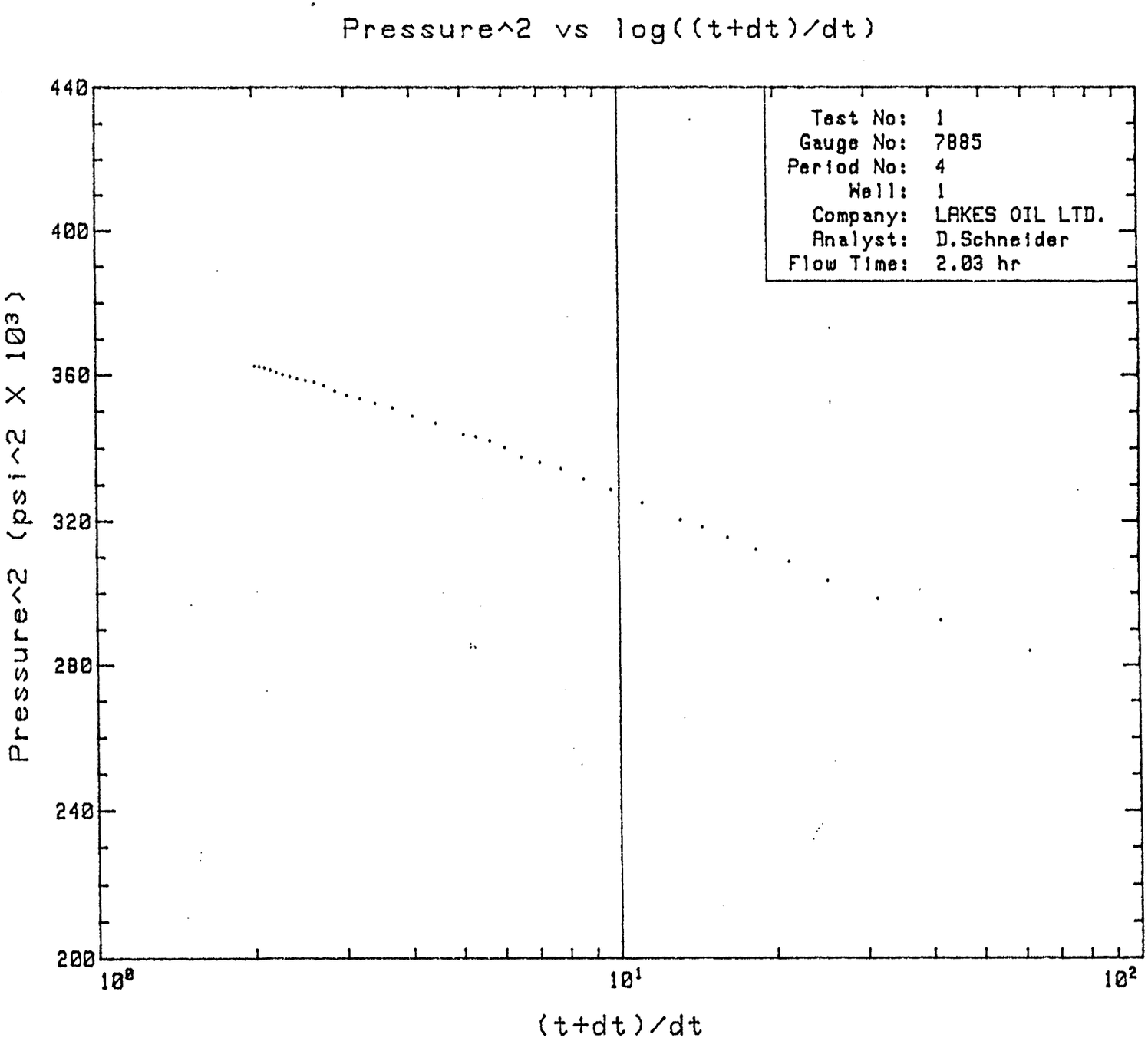
TIME HH:MM:SS	CHOKE SIZE (in)	SURFACE PRESSURE (psi)	GAS RATE (MCF/D)	LIQUID RATE (bbl/d)	REMARKS
19-OCT-90					
02:45:00					SURFACE PRESSURE = PSIG
02:45:00					MAKE UP TOOLS
04:15:00					RUN IN HOLE
06:25:00					RIG UP SURFACE EQUIPMENT
06:34:00					TOOL OPEN, CLOSED AT CHOKE MAN
06:34:00	0/64	0.00			MODERATE BUBBLE
06:47:00					CLOSE TOOL
07:13:00					TOOL OPEN, MOD. BLOW IN BUCKET
07:30:00					MODERATE BLOW IN BUCKET
07:45:00					MODERATE BLOW IN BUCKET
08:00:00					MODERATE BLOW IN BUCKET
08:15:00					MODERATE BLOW IN BUCKET
08:30:00					MODERATE - WEAK BLOW IN BUCKET
08:45:00					MODERATE - WEAK BLOW IN BUCKET
09:00:00					MODERATE - WEAK BLOW IN BUCKET
09:13:00					CLOSE TOOL
11:13:00					PULL PACKERS FREE
11:30:00					PULL OUT OF HOLE
15:00:00					TOOLS LAID OUT


Pressure^2 vs log((t+dt)/dt)
Test No: 1
Gauge No: 6106
Period No: 2
Well: 1
Company: LAKES OIL LTD.
Analyst: D.Schneider
Flow Time: 0.20 hr
Date: 19-10-90
Ticket No: 352326
Page No: 2.2.1
Pressure^2 (psi^2 X 10^3)
400
360
320
280
240
200
160
10^0
10^1
(t+dt)/dt



Date: 19-10-90 Ticket No: 352326 Page No: 2.2.2


Pressure^2 vs log((t+dt)/dt)
Test No: 1
Gauge No: 7885
Period No: 2
Well: 1
Company: LAKES OIL LTD.
Analyst: D.Schneider
Flow Time: 0.20 hr
Date: 19-10-90
Ticket No: 352326
Page No: 2.2.3
Pressure^2 (psi^2 X 10^3)
440
400
360
320
280
240
200
10^0
10^1
(t+dt)/dt



Date: 19-10-90 Ticket No: 352326 Page No: 2.2.4

Date: 19-10-90 Ticket No: 352326 Page No: 3.1

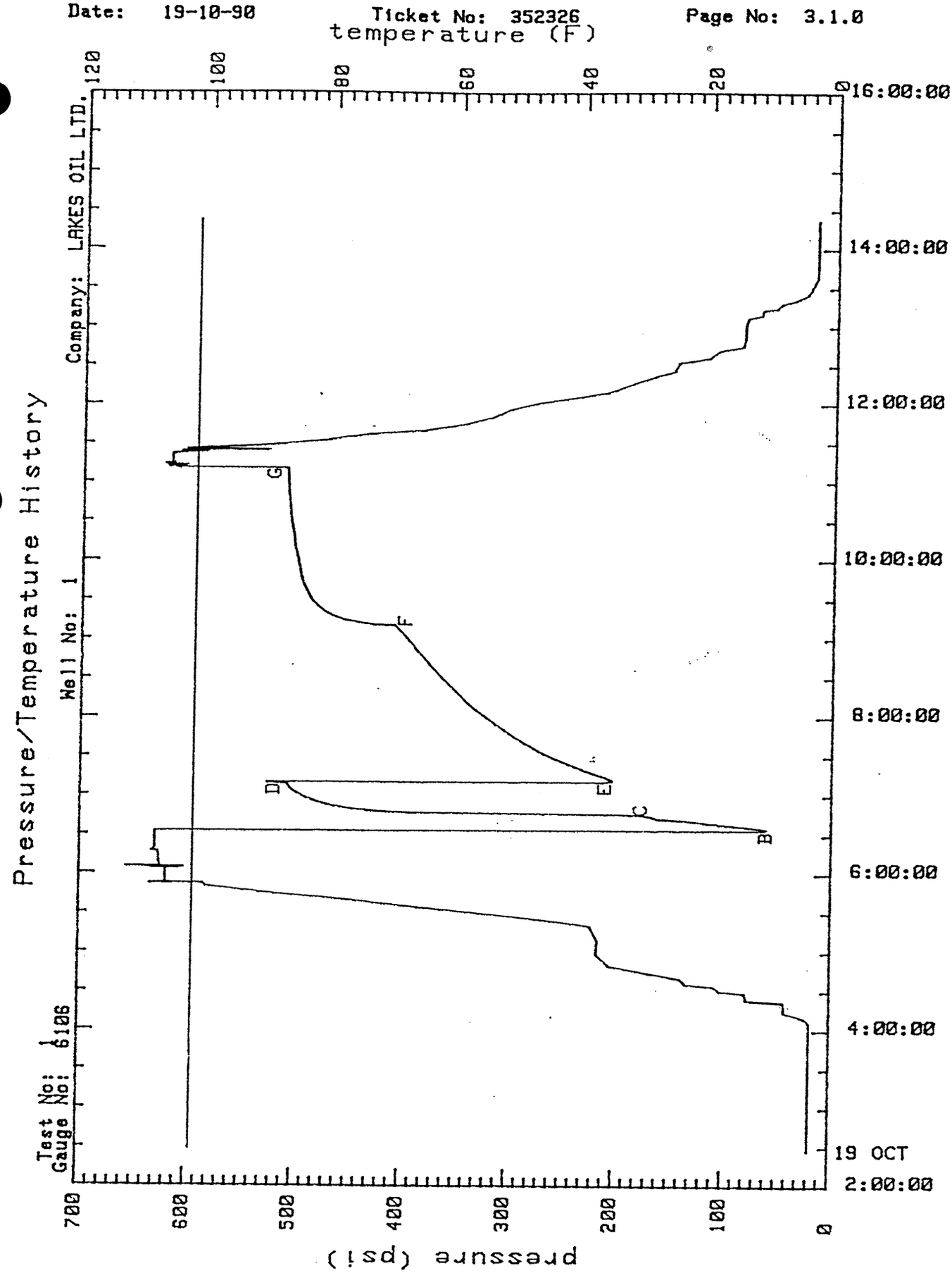
TEST PERIOD SUMMARY

Gauge No.: 6106 Depth: 1210.00 ft Blanked off : No
Hour of clock: 24

ID	PERIOD	DESCRIPTION	PRESSURE (psi)	DURATION (min)
A		Initial Hydrostatic	627.59	
B	1	Start Draw-down	62.84	
C		End Draw-down	186.06	12.00
C	2	Start Build-up	186.06	
D		End Build-up	507.13	23.08
E	3	Start Draw-down	212.02	
F		End Draw-down	408.55	120.51
F	4	Start Build-up	408.55	
G		End Build-up	510.24	119.67
H		Final Hydrostatic	618.26	

NOTE: for Pressure vs. Time Plot, see next page.

Date: 19-10-90 Ticket No: 352326 Page No: 3.1.0



PRESSURE VS TIME

MECHANICAL gauge no.: 6106 Gauge Depth: 1210.00 ft
Clock no.: Hour: 24

TIME HH:MM:SS	D TIME (min)	PRESSURE (psi)	TEMP (F)	COMMENTS
19-OCT-90		Data Print Frequency: 1		
02:27:51		18.199	102.0	
02:42:51		18.199	102.0	
02:45:00				SURFACE PRESSURE = PSIG
02:45:00				MAKE UP TOOLS
02:57:51		18.199	102.0	
03:12:52		18.199	102.0	
03:27:52		18.199	102.0	
03:42:52		18.199	102.0	
03:57:51		18.199	102.0	
04:06:29		18.199	102.0	
04:10:01		23.180	102.0	
04:14:45		41.772	102.0	
04:15:00				RUN IN HOLE
04:22:18		42.767	102.0	
04:23:59		77.603	102.0	
04:29:09		78.597	102.0	
04:30:55		102.963	102.0	
04:34:07		107.272	102.0	
04:36:10		134.104	102.0	
04:40:02		137.912	102.0	
04:44:36		167.537	102.0	
04:49:47		204.083	102.0	
04:58:38		215.817	102.0	
05:09:18		214.826	102.0	
05:20:21		222.592	102.0	
05:25:19		267.177	102.0	
05:30:09		327.210	102.0	
05:34:44		382.713	102.0	
05:40:08		448.991	102.0	
05:44:37		515.495	102.0	
05:50:23		582.554	102.0	
05:52:33		584.520	102.0	
05:52:44		634.623	102.0	
05:52:55		614.163	102.0	
05:53:04		619.892	102.0	
05:58:03		619.892	102.0	
06:03:44		619.892	102.0	
06:04:01		608.105	102.0	
06:04:39		633.641	102.0	
06:05:09		603.520	102.0	
06:05:25		657.036	102.0	
06:05:48		624.476	102.0	
06:09:29		626.440	102.0	
06:13:19		627.094	102.0	
06:16:30		627.585	102.0	
06:17:11		627.585	102.0	

PRESSURE VS TIME

MECHANICAL gauge no.: 6106 Gauge Depth: 1210.00 ft
Clock no.: Hour: 24

TIME HH:MM:SS	D TIME (min)	PRESSURE (psi)	TEMP (F)	COMMENTS
19-OCT-90		Data Print Frequency: 1		
06:17:31		633.477	102.0	
06:17:36		631.350	102.0	
06:20:13		630.204	102.0	
06:25:00				RIG UP SURFACE EQUIPMENT
06:25:23		630.204	102.0	
06:32:38		630.204	102.0	
06:34:00				TOOL OPEN, CLOSED AT CHOKE MAN
06:34:00				MODERATE BUBBLE
		*** Start of Period 1 ***		
06:34:00	0.00	62.843	102.0	
06:35:01	1.01	60.189	102.0	
06:36:01	2.02	65.662	102.0	
06:37:00	3.00	77.603	102.0	
06:38:01	4.01	90.699	102.0	
06:39:01	5.02	103.626	102.0	
06:40:00	6.00	116.052	102.0	
06:41:01	7.01	127.149	102.0	
06:42:01	8.02	138.905	102.0	
06:43:00	9.00	161.912	102.0	
06:44:01	10.01	164.559	102.0	
06:45:01	11.02	170.349	102.0	
06:46:00	12.00	186.062	102.0	
06:47:00				CLOSE TOOL
		*** End of Period 1 ***		
		*** Start of Period 2 ***		
06:47:01	1.01	385.675	102.0	
06:48:01	2.02	412.986	102.0	
06:49:00	3.00	432.061	102.0	
06:50:01	4.01	446.032	102.0	
06:51:01	5.02	455.399	102.0	
06:52:00	6.00	462.628	102.0	
06:53:01	7.01	468.706	102.0	
06:54:01	8.02	473.798	102.0	
06:55:00	9.00	478.397	102.0	
06:56:01	10.01	481.517	102.0	
06:58:00	12.00	488.741	102.0	
07:00:02	14.02	493.338	102.0	
07:02:01	16.01	497.935	102.0	
07:04:00	18.00	502.038	102.0	
07:06:00	20.00	504.500	102.0	
07:08:01	22.02	506.470	102.0	
07:09:05	23.08	507.126	102.0	
		*** End of Period 2 ***		
07:09:36		510.901	102.0	
07:10:06		526.159	102.0	

PRESSURE VS TIME

MECHANICAL gauge no.: 6106 Gauge Depth: 1210.00 ft
Clock no.: Hour: 24

TIME HH:MM:SS	D TIME (min)	PRESSURE (psi)	TEMP (F)	COMMENTS
19-OCT-90		Data Print Frequency: 1		
		*** Start of Period 3 ***		
07:10:13	0.00	212.017	102.0	
07:11:14	1.01	202.761	102.0	
07:12:14	2.02	203.753	102.0	
07:13:00				TOOL OPEN, MOD. BLOW IN BUCKET
07:13:13	3.00	205.736	102.0	
07:14:14	4.01	208.876	102.0	
07:15:14	5.02	212.843	102.0	
07:16:13	6.00	216.644	102.0	
07:17:14	7.01	220.444	102.0	
07:18:14	8.02	223.914	102.0	
07:19:13	9.00	227.548	102.0	
07:20:14	10.01	231.348	102.0	
07:22:13	12.00	237.789	102.0	
07:24:14	14.02	244.065	102.0	
07:26:14	16.01	249.844	102.0	
07:28:13	18.00	256.118	102.0	
07:30:00				MODERATE BLOW IN BUCKET
07:30:14	20.02	261.731	102.0	
07:32:14	22.02	267.012	102.0	
07:34:13	24.01	271.963	102.0	
07:36:13	26.00	276.254	102.0	
07:38:14	28.02	280.379	102.0	
07:40:13	30.01	285.163	102.0	
07:45:00				MODERATE BLOW IN BUCKET
07:45:13	35.00	295.390	102.0	
07:50:14	40.02	304.460	102.0	
07:55:14	45.01	313.858	102.0	
08:00:00				MODERATE BLOW IN BUCKET
08:00:13	50.00	321.771	102.0	
08:05:14	55.02	330.835	102.0	
08:10:14	60.01	338.085	102.0	
08:15:00				MODERATE BLOW IN BUCKET
08:20:13	70.00	351.100	102.0	
08:30:00				MODERATE - WEAK BLOW IN BUCKET
08:30:14	80.01	363.781	102.0	
08:40:14	90.02	375.470	102.0	
08:45:00				MODERATE - WEAK BLOW IN BUCKET
08:50:13	100.00	386.169	102.0	
09:00:00				MODERATE - WEAK BLOW IN BUCKET
09:00:14	110.02	396.207	102.0	
09:10:13	120.00	407.558	102.0	
09:10:43	120.51	408.545	102.0	
		*** End of Period 3 ***		

PRESSURE VS TIME

MECHANICAL gauge no.: 6106 Gauge Depth: 1210.00 ft
Clock no.: Hour: 24

TIME HH:MM:SS	D TIME (min)	PRESSURE (psi)	TEMP (F)	COMMENTS
19-OCT-90		Data Print Frequency: 1		
		*** Start of Period 4 ***		
09:10:59	0.27	426.471	102.0	
09:11:44	1.01	434.691	102.0	
09:12:45	2.02	442.581	102.0	
09:13:00				CLOSE TOOL
09:13:43	3.00	449.155	102.0	
09:14:44	4.01	455.071	102.0	
09:15:45	5.02	459.342	102.0	
09:16:43	6.00	462.628	102.0	
09:17:44	7.01	465.914	102.0	
09:18:45	8.02	468.378	102.0	
09:19:43	9.00	470.677	102.0	
09:20:44	10.01	473.305	102.0	
09:22:43	12.00	476.426	102.0	
09:24:45	14.02	479.546	102.0	
09:26:44	16.01	482.174	102.0	
09:28:44	18.00	484.801	102.0	
09:30:43	20.00	486.607	102.0	
09:32:44	22.02	487.756	102.0	
09:34:44	24.01	489.398	102.0	
09:36:43	26.00	490.547	102.0	
09:38:44	28.02	491.861	102.0	
09:40:44	30.01	493.174	102.0	
09:45:43	35.00	495.472	102.0	
09:50:45	40.02	496.786	102.0	
09:55:44	45.01	498.263	102.0	
10:00:43	50.00	499.412	102.0	
10:05:45	55.02	501.053	102.0	
10:10:44	60.01	502.695	102.0	
10:15:44	65.01	503.351	102.0	
10:20:43	70.00	504.008	102.0	
10:25:44	75.02	505.157	102.0	
10:30:44	80.01	506.141	102.0	
10:35:43	85.00	507.126	102.0	
10:40:45	90.02	507.783	102.0	
10:45:44	95.01	508.439	102.0	
10:50:44	100.00	508.931	102.0	
10:55:43	105.00	509.424	102.0	
11:00:44	110.02	509.752	102.0	
11:05:44	115.01	510.080	102.0	
11:10:24	119.67	510.244	102.0	
		*** End of Period 4 ***		
11:10:31		611.216	102.0	
11:11:46		622.184	102.0	
11:13:00				PULL PACKERS FREE
11:13:02		604.502	102.0	

Date: 19-10-90 Ticket No: 352326 Page No: 3.1.5

PRESSURE VS TIME

MECHANICAL gauge no.: 6106 Gauge Depth: 1210.00 ft
Clock no.: Hour: 24

TIME HH:MM:SS	D TIME (min)	PRESSURE (psi)	TEMP (F)	COMMENTS
19-OCT-90		Data Print Frequency: 1		
11:14:12		624.967	102.0	
11:14:49		616.291	102.0	
11:15:07		618.910	102.0	
11:17:01		618.255	102.0	
11:20:05		618.255	102.0	
11:21:48		618.092	102.0	
11:23:03		586.486	102.0	
11:23:39		609.742	102.0	
11:24:25		527.800	102.0	
11:25:49		604.666	102.0	
11:28:36		523.863	102.0	
11:30:00				PULL OUT OF HOLE
11:32:30		472.484	102.0	
11:36:40		435.020	102.0	
11:39:50		382.877	102.0	
11:44:39		343.193	102.0	
11:49:42		318.804	102.0	
11:55:19		304.460	102.0	
12:00:47		276.914	102.0	
12:05:52		235.642	102.0	
12:09:33		210.199	102.0	
12:16:23		187.220	102.0	
12:21:49		168.364	102.0	
12:26:22		149.665	102.0	
12:32:34		146.355	102.0	
12:36:28		118.371	102.0	
12:42:14		109.425	102.0	
12:45:08		88.047	102.0	
12:51:53		85.395	102.0	
13:02:28		84.898	102.0	
13:07:25		83.074	102.0	
13:09:41		70.140	102.0	
13:13:42		68.980	102.0	
13:15:02		56.042	102.0	
13:18:27		52.060	102.0	
13:20:32		40.444	102.0	
13:25:17		27.995	102.0	
13:30:22		24.342	102.0	
13:34:44		21.686	102.0	
13:38:55		18.863	102.0	
13:47:02		18.531	102.0	
13:56:37		18.365	102.0	
14:04:55		18.365	102.0	
14:08:38		18.199	102.0	
14:16:59		18.199	102.0	
14:22:19		18.199	102.0	

PRESSURE VS TIME

MECHANICAL gauge no.: 6106 Gauge Depth: 1210.00 ft
Clock no.: Hour: 24

TIME HH:MM:SS	D TIME (min)	PRESSURE (psi)	TEMP (F)	COMMENTS
19-OCT-90 15:00:00				Data Print Frequency: 1 TOOLS LAID OUT

Date: 19-10-90 Ticket No: 352326 Page No: 3.2

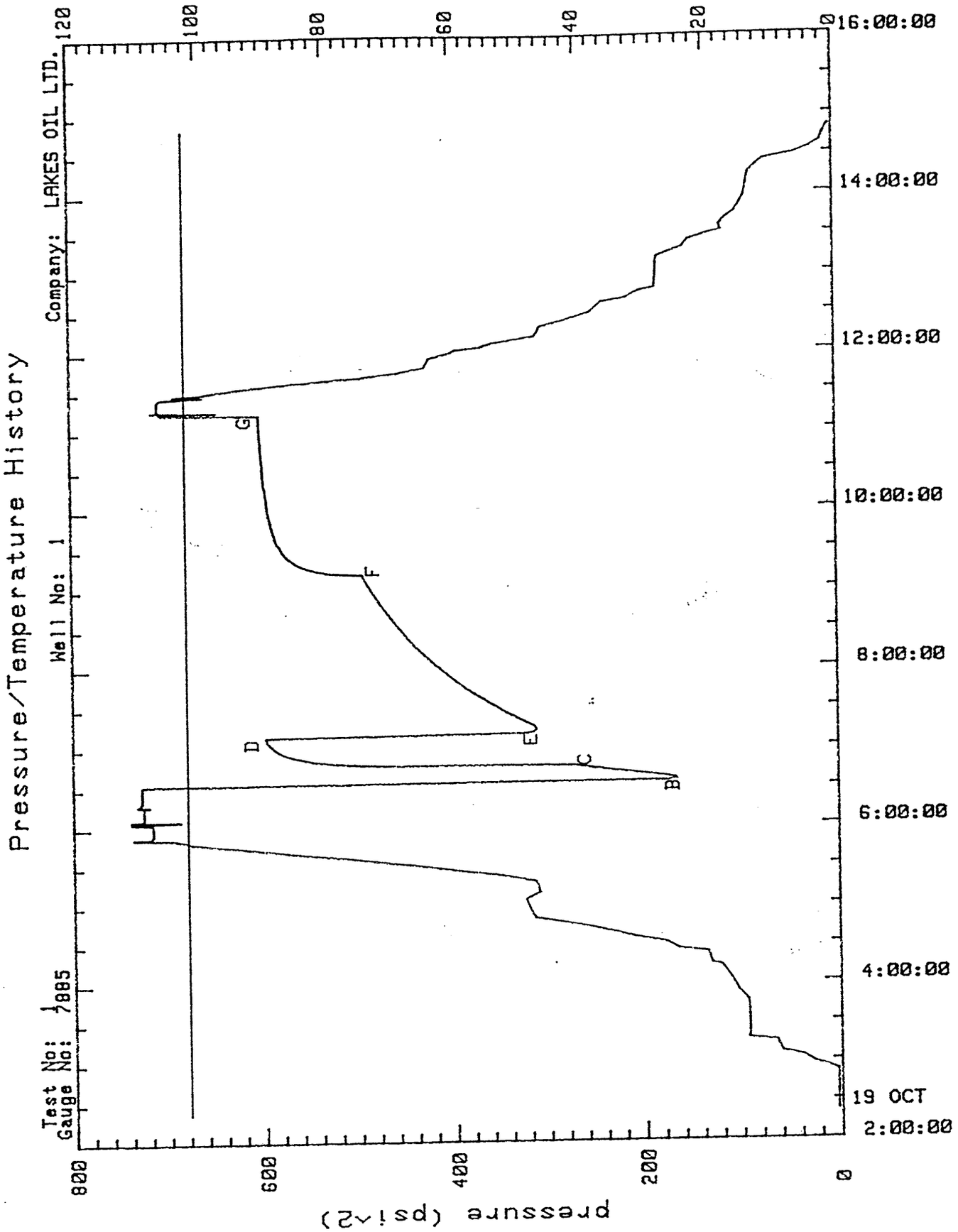
TEST PERIOD SUMMARY

Gauge No.: 7885 Depth: Bottom 1420.90 ft Blanked off : Yes
Hour of clock: 24

ID	PERIOD	DESCRIPTION	PRESSURE (psi)	DURATION (min)
A		Initial Hydrostatic	726.38	
B	1	Start Draw-down	172.92	
C		End Draw-down	272.93	12.05
C	2	Start Build-up	272.93	
D		End Build-up	597.24	23.15
E	3	Start Draw-down	320.74	
F		End Draw-down	495.09	121.33
F	4	Start Build-up	495.09	
G		End Build-up	602.13	121.24
H		Final Hydrostatic	708.60	

NOTE: for Pressure vs. Time Plot, see next page.

Date: 19-10-90 Ticket No: 352326 Page No: 3.2.0



Date: 19-10-90 Ticket No: 352326 Page No: 3.2.1

PRESSURE VS TIME

MECHANICAL gauge no.: 7885 Gauge Depth: 1420.90 ft
Clock no.: Hour: 24

TIME HH:MM:SS	D TIME (min)	PRESSURE (psi)	TEMP (F)	COMMENTS
19-OCT-90		Data Print Frequency: 1		
02:22:18		3.437	102.0	
02:37:18		3.437	102.0	
02:45:00				SURFACE PRESSURE = PSIG
02:45:00				MAKE UP TOOLS
02:52:18		3.437	102.0	
02:58:28		28.191	102.0	
03:02:56		38.619	102.0	
03:06:42		60.352	102.0	
03:14:40		65.828	102.0	
03:17:06		94.434	102.0	
03:34:25		93.551	102.0	
03:45:52		95.316	102.0	
03:52:52		103.789	102.0	
04:03:11		112.260	102.0	
04:12:52		121.258	102.0	
04:14:16		131.314	102.0	
04:15:00				RUN IN HOLE
04:23:18		135.900	102.0	
04:25:49		166.227	102.0	
04:30:36		177.507	102.0	
04:35:05		210.273	102.0	
04:41:40		247.593	102.0	
04:47:51		294.731	102.0	
04:50:14		315.295	102.0	
04:59:26		322.148	102.0	
05:04:27		324.608	102.0	
05:09:35		309.848	102.0	
05:17:58		313.890	102.0	
05:22:47		350.077	102.0	
05:27:12		400.625	102.0	
05:31:37		447.266	102.0	
05:36:28		505.244	102.0	
05:40:28		563.504	102.0	
05:45:05		619.775	102.0	
05:49:05		675.111	102.0	
05:51:53		692.031	102.0	
05:53:09		737.706	102.0	
05:53:21		718.360	102.0	
05:55:37		716.966	102.0	
06:01:10		717.140	102.0	
06:03:58		717.837	102.0	
06:04:56		739.797	102.0	
06:06:06		687.322	102.0	
06:06:24		739.797	102.0	
06:06:55		726.204	102.0	
06:10:49		726.378	102.0	

PRESSURE VS TIME

MECHANICAL gauge no.: 7885 Gauge Depth: 1420.90 ft
Clock no.: Hour: 24

TIME HH:MM:SS	D TIME (min)	PRESSURE (psi)	TEMP (F)	COMMENTS
19-OCT-90		Data Print Frequency: 1		
06:17:23		726.378	102.0	
06:17:35		726.378	102.0	
06:17:42		721.149	102.0	
06:18:02		732.827	102.0	
06:18:15		730.561	102.0	
06:21:08		728.296	102.0	
06:25:00				RIG UP SURFACE EQUIPMENT
06:26:22		728.644	102.0	
06:33:08		728.121	102.0	
06:34:00				TOOL OPEN, CLOSED AT CHOKE MAN
06:34:00				MODERATE BUBBLE
		*** Start of Period 1 ***		
06:34:00	0.00	172.924	102.0	
06:35:01	1.02	165.874	102.0	
06:36:01	2.01	166.756	102.0	
06:37:00	3.01	173.982	102.0	
06:38:00	4.00	184.731	102.0	
06:39:01	5.02	195.126	102.0	
06:40:01	6.01	207.103	102.0	
06:41:00	7.00	218.373	102.0	
06:42:00	8.00	229.817	102.0	
06:43:01	9.02	241.610	102.0	
06:44:01	10.01	252.696	102.0	
06:45:00	11.00	262.373	102.0	
06:46:03	12.05	272.927	102.0	
06:47:00				CLOSE TOOL
		*** End of Period 1 ***		
		*** Start of Period 2 ***		
06:47:05	1.02	467.242	102.0	
06:48:04	2.01	502.443	102.0	
06:49:04	3.01	522.046	102.0	
06:50:03	4.00	537.619	102.0	
06:51:04	5.02	548.464	102.0	
06:52:04	6.01	555.984	102.0	
06:53:04	7.00	562.105	102.0	
06:54:03	8.00	567.875	102.0	
06:55:04	9.02	572.770	102.0	
06:56:04	10.01	577.315	102.0	
06:58:05	12.02	583.083	102.0	
07:00:04	14.01	586.928	102.0	
07:02:05	16.02	590.598	102.0	
07:04:04	18.01	593.395	102.0	
07:06:05	20.02	595.841	102.0	
07:08:04	22.00	596.889	102.0	
07:09:12	23.15	597.239	102.0	
		*** End of Period 2 ***		

PRESSURE VS TIME

MECHANICAL gauge no.: 7885 Gauge Depth: 1420.90 ft
Clock no.: Hour: 24

TIME HH:MM:SS	D TIME (min)	PRESSURE (psi)	TEMP (F)	COMMENTS
19-OCT-90		Data Print Frequency: 1		
		*** Start of Period 3 ***		
07:10:30	0.00	320.743	102.0	
07:11:31	1.02	314.768	102.0	
07:12:31	2.01	312.659	102.0	
07:13:00				TOOL OPEN, MOD. BLOW IN BUCKET
07:13:30	3.01	311.956	102.0	
07:14:30	4.00	312.308	102.0	
07:15:31	5.02	313.362	102.0	
07:16:30	6.01	314.768	102.0	
07:17:30	7.00	317.931	102.0	
07:18:29	8.00	320.391	102.0	
07:19:31	9.02	323.730	102.0	
07:20:30	10.01	326.365	102.0	
07:22:31	12.02	332.162	102.0	
07:24:30	14.01	337.432	102.0	
07:26:31	16.02	343.404	102.0	
07:28:30	18.01	348.672	102.0	
07:30:00				MODERATE BLOW IN BUCKET
07:30:31	20.02	352.887	102.0	
07:32:30	22.00	357.803	102.0	
07:34:31	24.02	363.070	102.0	
07:36:30	26.00	367.108	102.0	
07:38:31	28.02	372.198	102.0	
07:40:30	30.00	377.113	102.0	
07:45:00				MODERATE BLOW IN BUCKET
07:45:31	35.02	387.818	102.0	
07:50:30	40.01	396.941	102.0	
07:55:30	45.00	405.712	102.0	
08:00:00				MODERATE BLOW IN BUCKET
08:00:31	50.02	413.781	102.0	
08:05:30	55.01	422.198	102.0	
08:10:30	60.00	429.737	102.0	
08:15:00				MODERATE BLOW IN BUCKET
08:20:30	70.01	443.936	102.0	
08:30:00				MODERATE - WEAK BLOW IN BUCKET
08:30:31	80.02	455.853	102.0	
08:40:30	90.00	467.067	102.0	
08:45:00				MODERATE - WEAK BLOW IN BUCKET
08:50:31	100.01	477.402	102.0	
09:00:00				MODERATE - WEAK BLOW IN BUCKET
09:00:31	110.02	486.859	102.0	
09:10:30	120.01	494.739	102.0	
09:11:49	121.33	495.089	102.0	
		*** End of Period 3 ***		

PRESSURE VS TIME

MECHANICAL gauge no.: 7885 Gauge Depth: 1420.90 ft
Clock no.: Hour: 24

TIME HH:MM:SS	D TIME (min)	PRESSURE (psi)	TEMP (F)	COMMENTS
19-OCT-90		Data Print Frequency: 1		
		*** Start of Period 4 ***		
09:12:51	1.02	519.771	102.0	
09:13:00				CLOSE TOOL
09:13:50	2.01	532.895	102.0	
09:14:50	3.01	540.942	102.0	
09:15:49	4.00	546.365	102.0	
09:16:51	5.02	550.913	102.0	
09:17:50	6.01	555.635	102.0	
09:18:50	7.00	558.782	102.0	
09:19:49	8.00	561.755	102.0	
09:20:50	9.02	564.378	102.0	
09:21:50	10.01	566.126	102.0	
09:23:51	12.02	570.322	102.0	
09:25:50	14.01	573.469	102.0	
09:27:51	16.02	575.917	102.0	
09:29:50	18.01	578.364	102.0	
09:31:51	20.02	579.937	102.0	
09:33:50	22.00	581.161	102.0	
09:35:50	24.02	583.433	102.0	
09:37:50	26.00	585.006	102.0	
09:39:50	28.02	585.880	102.0	
09:41:49	30.00	586.404	102.0	
09:46:51	35.02	589.026	102.0	
09:51:50	40.01	590.598	102.0	
09:56:49	45.00	592.521	102.0	
10:01:51	50.02	593.569	102.0	
10:06:50	55.01	594.618	102.0	
10:11:50	60.00	595.317	102.0	
10:16:51	65.02	596.365	102.0	
10:21:50	70.01	597.588	102.0	
10:26:50	75.00	598.462	102.0	
10:31:51	80.02	598.811	102.0	
10:36:50	85.01	599.161	102.0	
10:41:50	90.00	599.685	102.0	
10:46:51	95.02	600.209	102.0	
10:51:50	100.01	600.733	102.0	
10:56:50	105.00	601.258	102.0	
11:01:51	110.02	601.782	102.0	
11:06:50	115.01	601.957	102.0	
11:11:50	120.01	602.131	102.0	
11:13:00				PULL PACKERS FREE
11:13:04	121.24	602.131	102.0	
		*** End of Period 4 ***		
11:14:05		704.239	102.0	
11:15:15		706.854	102.0	
11:15:57		646.141	102.0	

Date: 19-10-90 Ticket No: 352326 Page No: 3.2.5

PRESSURE VS TIME

MECHANICAL gauge no.: 7885 Gauge Depth: 1420.90 ft
Clock no.: Hour: 24

TIME HH:MM:SS	D TIME (min)	PRESSURE (psi)	TEMP (F)	COMMENTS
19-OCT-90		Data Print Frequency: 1		
11:16:22		715.223	102.0	
11:16:24		685.578	102.0	
11:16:49		707.551	102.0	
11:18:19		709.121	102.0	
11:20:40		708.598	102.0	
11:22:21		708.598	102.0	
11:24:02		708.598	102.0	
11:26:05		706.505	102.0	
11:27:38		660.628	102.0	
11:28:25		691.508	102.0	
11:30:00				PULL OUT OF HOLE
11:30:14		659.232	102.0	
11:33:23		625.014	102.0	
11:36:07		583.608	102.0	
11:38:55		536.044	102.0	
11:41:06		494.039	102.0	
11:44:12		455.678	102.0	
11:48:09		426.757	102.0	
11:54:42		422.373	102.0	
11:59:01		399.924	102.0	
12:00:51		395.713	102.0	
12:03:10		367.108	102.0	
12:05:08		358.857	102.0	
12:07:35		338.135	102.0	
12:10:45		309.496	102.0	
12:17:54		303.696	102.0	
12:23:15		276.268	102.0	
12:28:33		251.289	102.0	
12:36:38		238.794	102.0	
12:39:33		213.795	102.0	
12:44:45		200.234	102.0	
12:47:18		183.674	102.0	
12:57:39		181.912	102.0	
13:06:16		181.560	102.0	
13:10:59		180.678	102.0	
13:13:53		171.162	102.0	
13:18:20		154.239	102.0	
13:23:33		149.302	102.0	
13:26:39		135.371	102.0	
13:30:43		113.495	102.0	
13:34:35		116.142	102.0	
13:39:38		109.966	102.0	
13:44:43		100.259	102.0	
13:51:04		94.610	102.0	
13:57:08		90.020	102.0	
14:05:24		87.902	102.0	

Date: 19-10-90 Ticket No: 352326 Page No: 3.2.6

PRESSURE VS TIME

MECHANICAL gauge no.: 7885 Gauge Depth: 1420.90 ft
Clock no.: Hour: 24

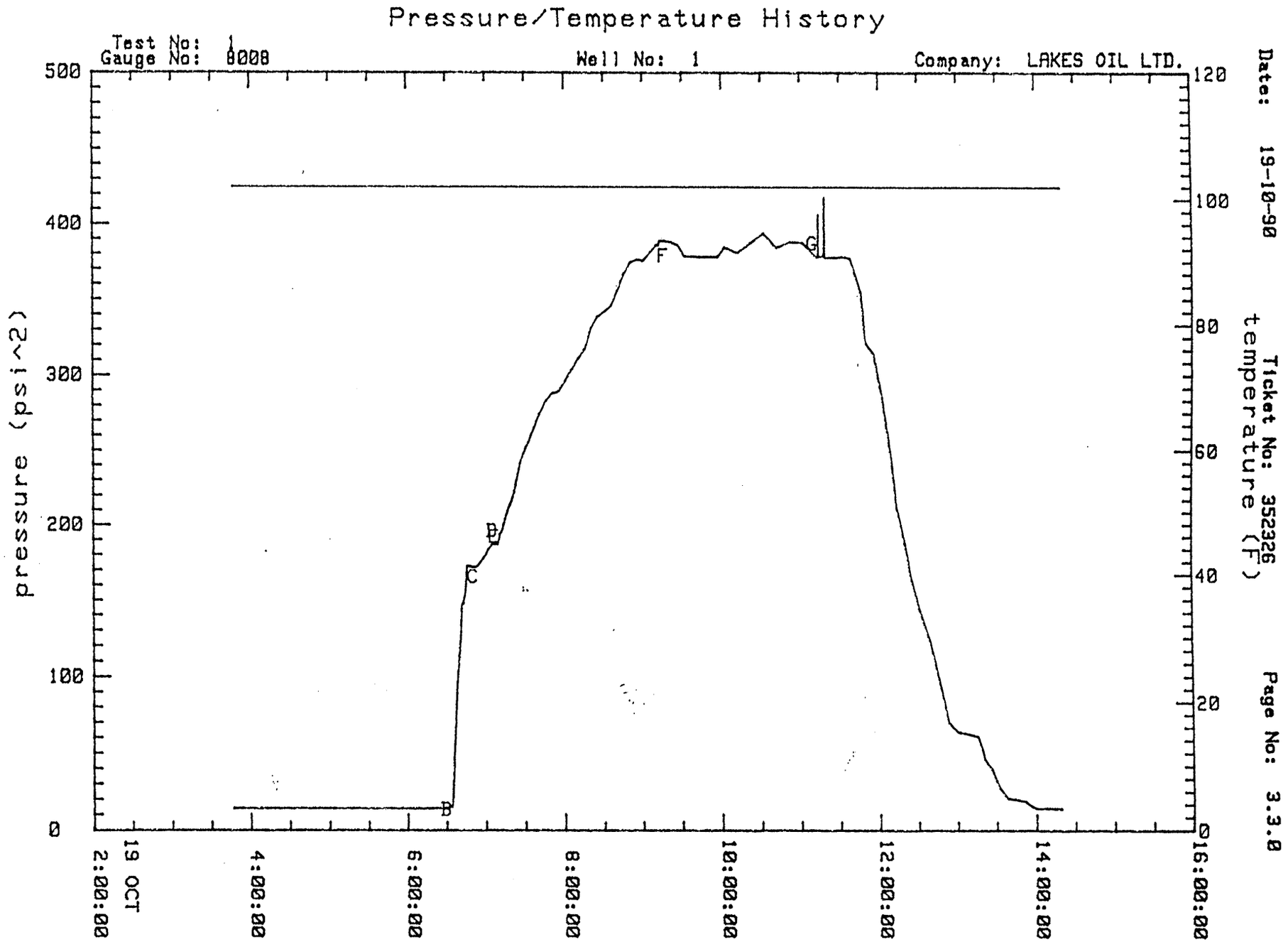
TIME HH:MM:SS	D TIME (min)	PRESSURE (psi)	TEMP (F)	COMMENTS
19-OCT-90		Data Print Frequency: 1		
14:14:27		85.607	102.0	
14:18:50		79.250	102.0	
14:24:33		70.597	102.0	
14:28:49		38.442	102.0	
14:33:22		22.887	102.0	
14:38:05		11.748	102.0	
14:43:29		8.919	102.0	
14:49:25		4.321	102.0	
14:49:50		3.437	102.0	
14:50:21		3.437	102.0	
15:00:00				TOOLS LAID OUT

TEST PERIOD SUMMARY

Gauge No.: 8008 Depth: 1195.10 ft Blanked off : No
Hour of clock: 24

ID	PERIOD	DESCRIPTION	PRESSURE (psi)	DURATION (min)
A		Initial Hydrostatic	726.38	
B	1	Start Draw-down	15.04	
C		End Draw-down	172.55	12.12
C	2	Start Build-up	172.55	
D		End Build-up	186.77	23.18
E	3	Start Draw-down	193.71	
F		End Draw-down	386.03	121.67
F	4	Start Build-up	386.03	
G		End Build-up	378.07	121.15
H		Final Hydrostatic	708.60	

NOTE: for Pressure vs. Time Plot, see next page.


Pressure/Temperature History
Test No: 1
Gauge No: 8008
Well No: 1
Company: LAKES OIL LTD.
Date: 19-10-90
Ticket No: 352326
Page No: 3.3.0
pressure (psi^2)
temperature (F)
500
400
300
200
100
0
120
100
80
60
40
20
0
A
B
C
D
E
F
G
19 OCT
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00:00
16:00:00

PRESSURE VS TIME

MECHANICAL gauge no.: 8008 Gauge Depth: 1195.10 ft
Clock no.: Hour: 24

TIME HH:MM:SS	D TIME (min)	PRESSURE (psi)	TEMP (F)	COMMENTS
19-OCT-90		Data Print Frequency: 1		
02:45:00				SURFACE PRESSURE = PSIG
02:45:00				MAKE UP TOOLS
03:46:58		13.688	102.0	
04:15:00				RUN IN HOLE
04:16:58		13.688	102.0	
04:46:59		13.688	102.0	
05:16:59		13.688	102.0	
05:46:59		13.688	102.0	
06:16:59		13.688	102.0	
06:25:00				RIG UP SURFACE EQUIPMENT
06:34:00				TOOL OPEN, CLOSED AT CHOKE MAN
06:34:00				MODERATE BUBBLE
		*** Start of Period 1 ***		
06:34:00	0.00	15.041	102.0	
06:35:01	1.02	21.468	102.0	
06:36:01	2.01	45.825	102.0	
06:37:00	3.01	65.955	102.0	
06:38:00	4.00	84.733	102.0	
06:39:01	5.02	101.652	102.0	
06:40:01	6.01	113.495	102.0	
06:41:00	7.00	122.632	102.0	
06:42:00	8.00	147.168	102.0	
06:43:01	9.02	147.506	102.0	
06:44:01	10.01	152.583	102.0	
06:45:00	11.00	158.844	102.0	
06:46:00	12.00	172.552	102.0	
06:46:07	12.12	172.552	102.0	
06:47:00				CLOSE TOOL
		*** End of Period 1 ***		
		*** Start of Period 2 ***		
06:47:08	1.02	172.552	102.0	
06:48:08	2.01	172.382	102.0	
06:49:07	3.01	172.044	102.0	
06:50:07	4.00	171.875	102.0	
06:51:08	5.02	171.875	102.0	
06:52:08	6.01	171.875	102.0	
06:53:07	7.00	172.213	102.0	
06:54:07	8.00	172.721	102.0	
06:55:08	9.02	173.736	102.0	
06:56:08	10.01	175.090	102.0	
06:58:07	12.00	177.290	102.0	
07:00:07	14.01	179.998	102.0	
07:02:08	16.02	183.552	102.0	
07:04:07	18.01	185.921	102.0	
07:06:08	20.02	187.106	102.0	
07:08:07	22.01	186.768	102.0	

Date: 19-10-90 Ticket No: 352326 Page No: 3.3.2

PRESSURE VS TIME

MECHANICAL gauge no.: 8008 Gauge Depth: 1195.10 ft
Clock no.: Hour: 24

TIME HH:MM:SS	D TIME (min)	PRESSURE (psi)	TEMP (F)	COMMENTS
19-OCT-90		Data Print Frequency: 1		
07:09:18	23.18	186.768	102.0	
		*** End of Period 2 ***		
		*** Start of Period 3 ***		
07:10:59	0.00	193.707	102.0	
07:12:00	1.02	195.061	102.0	
07:13:00				TOOL OPEN, MOD. BLOW IN BUCKET
07:13:00	2.01	196.922	102.0	
07:13:59	3.01	200.477	102.0	
07:14:59	4.00	203.692	102.0	
07:16:00	5.02	206.231	102.0	
07:16:59	6.01	209.447	102.0	
07:17:59	7.00	211.647	102.0	
07:18:58	8.00	213.340	102.0	
07:20:00	9.02	215.710	102.0	
07:20:59	10.01	218.248	102.0	
07:21:59	11.00	222.142	102.0	
07:22:58	12.00	225.865	102.0	
07:24:59	14.01	234.667	102.0	
07:27:00	16.02	241.777	102.0	
07:28:59	18.01	247.194	102.0	
07:30:00				MODERATE BLOW IN BUCKET
07:31:00	20.02	251.256	102.0	
07:32:59	22.01	255.319	102.0	
07:35:00	24.02	259.890	102.0	
07:36:59	26.00	264.122	102.0	
07:39:00	28.02	268.862	102.0	
07:40:59	30.00	273.433	102.0	
07:45:00				MODERATE BLOW IN BUCKET
07:46:00	35.02	282.406	102.0	
07:50:59	40.01	287.823	102.0	
07:55:59	45.00	289.347	102.0	
08:00:00				MODERATE BLOW IN BUCKET
08:01:00	50.02	296.119	102.0	
08:06:00	55.02	303.569	102.0	
08:10:59	60.01	310.849	102.0	
08:15:00				MODERATE BLOW IN BUCKET
08:15:58	65.00	316.944	102.0	
08:21:00	70.02	331.675	102.0	
08:25:59	75.01	338.956	102.0	
08:30:00				MODERATE - WEAK BLOW IN BUCKET
08:30:59	80.00	342.004	102.0	
08:36:00	85.02	345.730	102.0	
08:40:59	90.01	355.212	102.0	
08:45:00				MODERATE - WEAK BLOW IN BUCKET
08:45:59	95.00	366.728	102.0	
08:51:00	100.02	374.348	102.0	

PRESSURE VS TIME

MECHANICAL gauge no.: 8008 Gauge Depth: 1195.10 ft
Clock no.: Hour: 24

TIME HH:MM:SS	D TIME (min)	PRESSURE (psi)	TEMP (F)	COMMENTS
19-OCT-90		Data Print Frequency: 1		
08:55:59	105.01	376.380	102.0	
09:00:00				MODERATE - WEAK BLOW IN BUCKET
09:00:59	110.00	375.534	102.0	
09:06:00	115.02	381.292	102.0	
09:10:59	120.01	385.864	102.0	
09:12:39	121.67	386.034	102.0	
09:13:00				CLOSE TOOL
		*** End of Period 3 ***		
		*** Start of Period 4 ***		
09:13:40	1.02	388.743	102.0	
09:14:39	2.01	388.743	102.0	
09:15:39	3.01	388.743	102.0	
09:16:38	4.00	388.743	102.0	
09:17:40	5.02	388.743	102.0	
09:22:39	10.01	387.896	102.0	
09:27:39	15.00	385.864	102.0	
09:32:40	20.02	378.582	102.0	
09:37:39	25.01	378.243	102.0	
09:42:39	30.00	377.905	102.0	
09:47:40	35.02	377.735	102.0	
09:52:39	40.01	377.735	102.0	
09:57:39	45.00	377.735	102.0	
10:02:40	50.02	384.509	102.0	
10:12:39	60.01	380.784	102.0	
10:22:41	70.05	387.388	102.0	
10:32:38	80.00	393.993	102.0	
10:42:39	90.01	384.340	102.0	
10:52:40	100.02	388.235	102.0	
11:02:39	110.00	387.388	102.0	
11:12:39	120.01	378.074	102.0	
11:13:00				PULL PACKERS FREE
11:13:48	121.15	378.074	102.0	
		*** End of Period 4 ***		
11:14:02		406.526	102.0	
11:14:13		378.413	102.0	
11:18:15		378.413	102.0	
11:18:51		417.874	102.0	
11:19:22		377.566	102.0	
11:26:56		377.566	102.0	
11:30:00				PULL OUT OF HOLE
11:31:56		378.243	102.0	
11:38:16		377.058	102.0	
11:46:32		354.874	102.0	
11:50:14		321.347	102.0	
11:56:18		314.235	102.0	
12:01:02		292.564	102.0	

Date: 19-10-90 Ticket No: 352326 Page No: 3.3.4

PRESSURE VS TIME

MECHANICAL gauge no.: 8008 Gauge Depth: 1195.10 ft
Clock no.: Hour: 24

TIME HH:MM:SS	D TIME (min)	PRESSURE (psi)	TEMP (F)	COMMENTS
19-OCT-90		Data Print Frequency: 1		
12:05:09		270.724	102.0	
12:10:10		239.576	102.0	
12:13:30		210.970	102.0	
12:19:20		187.445	102.0	
12:24:27		163.413	102.0	
12:30:47		143.107	102.0	
12:38:18		123.986	102.0	
12:46:31		95.223	102.0	
12:53:06		69.846	102.0	
12:59:55		63.756	102.0	
13:08:18		62.064	102.0	
13:15:31		60.542	102.0	
13:19:17		51.915	102.0	
13:20:52		45.994	102.0	
13:26:19		39.735	102.0	
13:32:18		27.557	102.0	
13:38:33		20.622	102.0	
13:43:54		19.946	102.0	
13:52:19		18.423	102.0	
13:56:53		15.548	102.0	
14:00:55		13.857	102.0	
14:09:00		13.857	102.0	
14:16:38		13.688	102.0	
14:19:23		13.688	102.0	
15:00:00				TOOLS LAID OUT

APPENDIX VII

VELOCITY SURVEY

Velocity Data

WELL VELOCITY SURVEY

SOUTH CARAMUT #1

PEP 122

VICTORIA

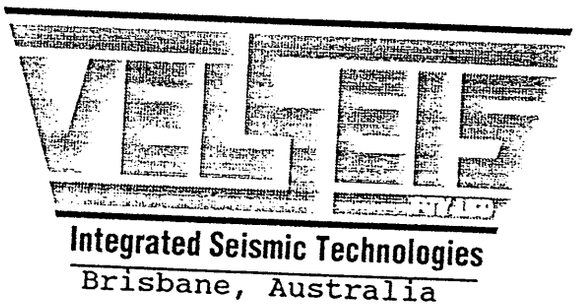
for

LAKES OIL LIMITED

recorded by

VELOCITY DATA PTY. LTD.

processed by

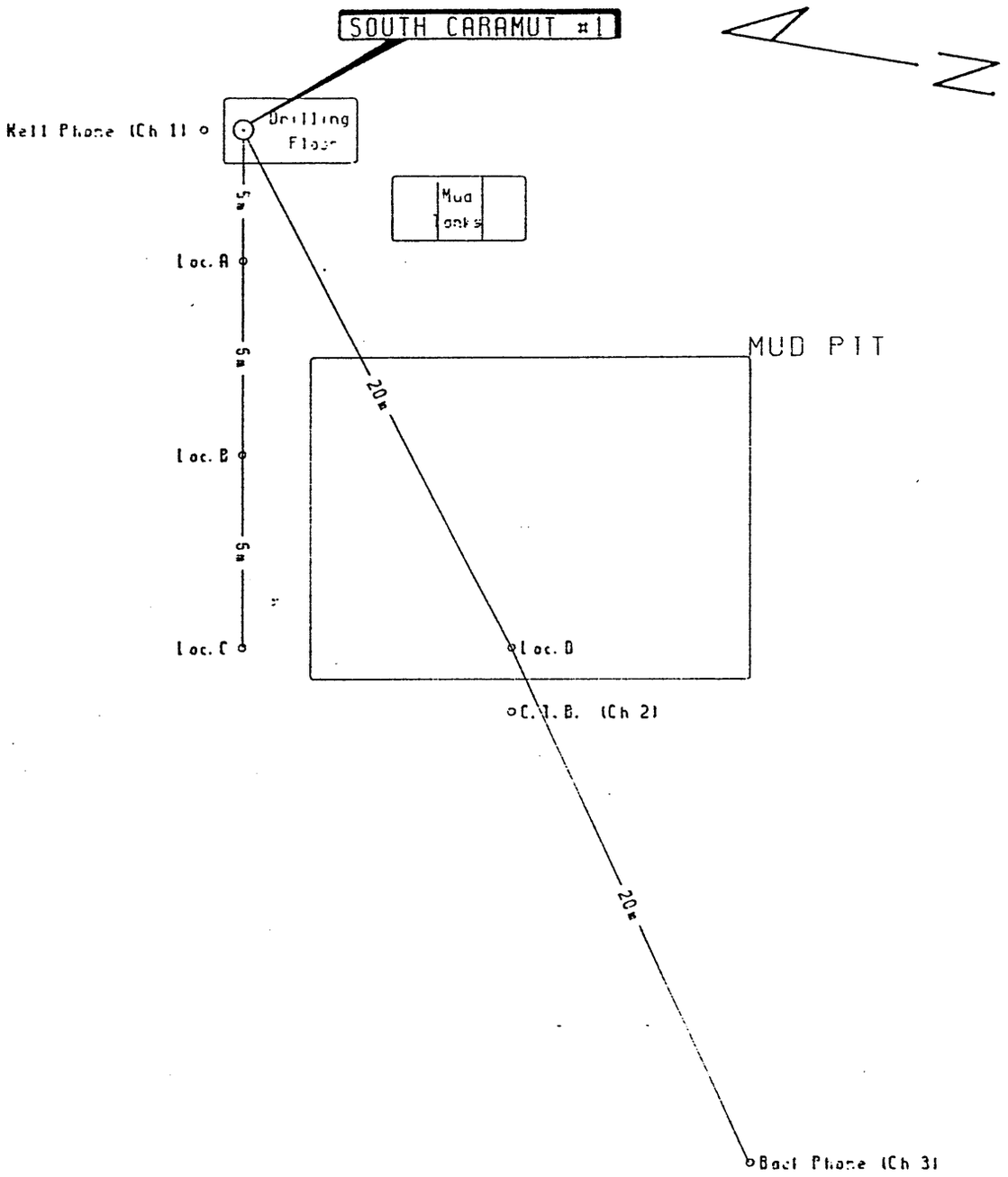


Integrated Seismic Technologies

Brisbane, Australia

December 13, 1990

CONTENTS



SOUTH CARAMUT #1

LAKES OIL LIMITED

SHOT POINT LOCATION SKETCH

Figure 2

SUMMARY

Velocity Data Pty Ltd conducted a velocity survey for Lakes Oil Limited in the South Caramut No1 well, PEP-112, Otway Basin, Victoria ,Australia. The date of the survey was the 18th October 1990.

The results of the survey, which are considered to be reliable, have been used to calibrate the sonic log.

Explosives were used as an energy source with shots being fired in the mud pit in the majority of instances.

GENERAL INFORMATION

Name of Well	:	South Caramut #1
Location (Figure 1)	:	PEP 122 , Otway Basin
Coordinates	:	Latitude 033 00 08.9
	:	Longitude 142 28 44.0
Seismic Reference	:	VP 430/88-100
Date of Survey	:	October 18th, 1990.
Wireline Logging	:	BPB V1030
Weather	:	Fine
Operational Base	:	Brisbane
Operator	:	H Hunt
Shooter	:	J Brown
Client Representative	:	Mr A. Tabassi

EQUIPMENT

Downhole Tool

Veldata Camlock 100 (90 mm)

Sensors:

6 HSI 4.5 Hz 215 ohm, high temperature (300 degrees F) detectors connected in series parallel. Frequency response 8-300 Hz within 3 dB.

Preamplifier:

48 dB fixed gain.
Frequency response 5-200 Hz within 3 dB.

Reference Geophone

Mark Products L1 4.5 Hz

Recording Instrument

VDLS 11/10 software controlled digital recording system utilising SIE OPA-10 floating point amplifiers for digital recording and SIE OPA-4 amplifiers for analog presentation. The system includes a DEC LSI-11 CPU,twin cassette tape unit and printer.

RECORDING

Energy Source	:	Explosive, AN-60
Shot Location	:	Mud pit
Charge Size	:	.25 (125grm) sticks
Average Shot Depth	:	3.0 metres
Average Shot Offset	:	20.0 metres
Recording Geometry	:	Figure 2

Shots were recorded on digital cassette tape. Printouts of the shots used are included with this report.(Enclosure 2)

The sample rate was 1 ms with 0.5 ms sampling over a 200ms window encompassing the first arrivals. The scale of the graphic display varies with signal strength and is noted on each playout.

The times were picked from the printouts using the numerical value of the signal strength. (Enclosure 2)

The surface channels showed evidence of pit fatigue and Table 2 shows the modifications made to the pick times to allow for this.

PROCESSING

Elevation Data

Elevation of KB	:	145.3m above sea level
Elevation of Ground	:	142.0m above sea level
Elevation of Seismic Datum	:	150.0m above sea level
Depth Surveyed	:	434.0m below KB
Total Depth	:	435.0m below KB
Depth of Casing	:	87.0m below KB
Sonic Log Interval	:	11.0 to 432.0m below KB

PROCESSING

Recorded Data

Number of Shots Used	:	24
Number of Levels Recorded	:	20
Data Quality	:	Fair
Noise Level	:	Low

Correction for Instrument Delay and Shot Offset

The 'corrected' times shown on the calculation sheet have been obtained by:

(i) Subtraction of the instrument delay (4msec) from the recorded arrival times
(ii) geometric correction for non-verticality of ray paths resulting from shot offset.
(iii) shot static correction to correct for the depth of shot below ground level at the well head using a correction velocity of 870 metres/sec
(iv) readdition of the instrument delay (4msec).

Correction to Datum

The datum chosen was 150.0 metres ASL that is 4.7 metres above KB . This level is above ground level and it was necessary to calculate a datum correction using a suitable replacement velocity. The value used was 3500m/sec which over the 8m above ground gives 2.3msecs. An allowance for the instrument delay is then necessary to modify this time to be consistent with the other picks. This yields a time of 1.7msecs for the effective datum correction.

PROCESSING

Calibration of Sonic Log - Method

The sonic log was edited to exclude readings that lay within the casing that is to 100 metres below KB. The last sonic reading available was 432m KB this value was extrapolated to include the last check shot.

Sonic times were adjusted to checkshot times using a polynomial derived least squares fit correction of the sonic transient times.

These differences arise as the sonic tool measures the local velocity characteristics of the formation with a high frequency signal, whereas the downhole geophone records the bulk velocity character using a signal of significantly lower frequency.

Calibration of Sonic Log - Results (Enclosure 1)

The discrepancies between shot and sonic interval velocities were in general quite small except over some very short intervals which exhibited magnified errors.

In aggregate, the shot and sonic interval times differed by 0.7 msec over the logged portion of the well.

PROCESSING

Trace Playouts (Figure 4)

Figure 4A is a plot of all traces used. No filter or gain recovery has been applied.

Figure 4B is a plot to scale in depth and time of selected traces. No filter or gain recovery has been applied.

Figure 4C is a plot to scale in depth and time of selected traces with a 5 Hz - 40 Hz filter and a gain recovery function of t^2 applied.

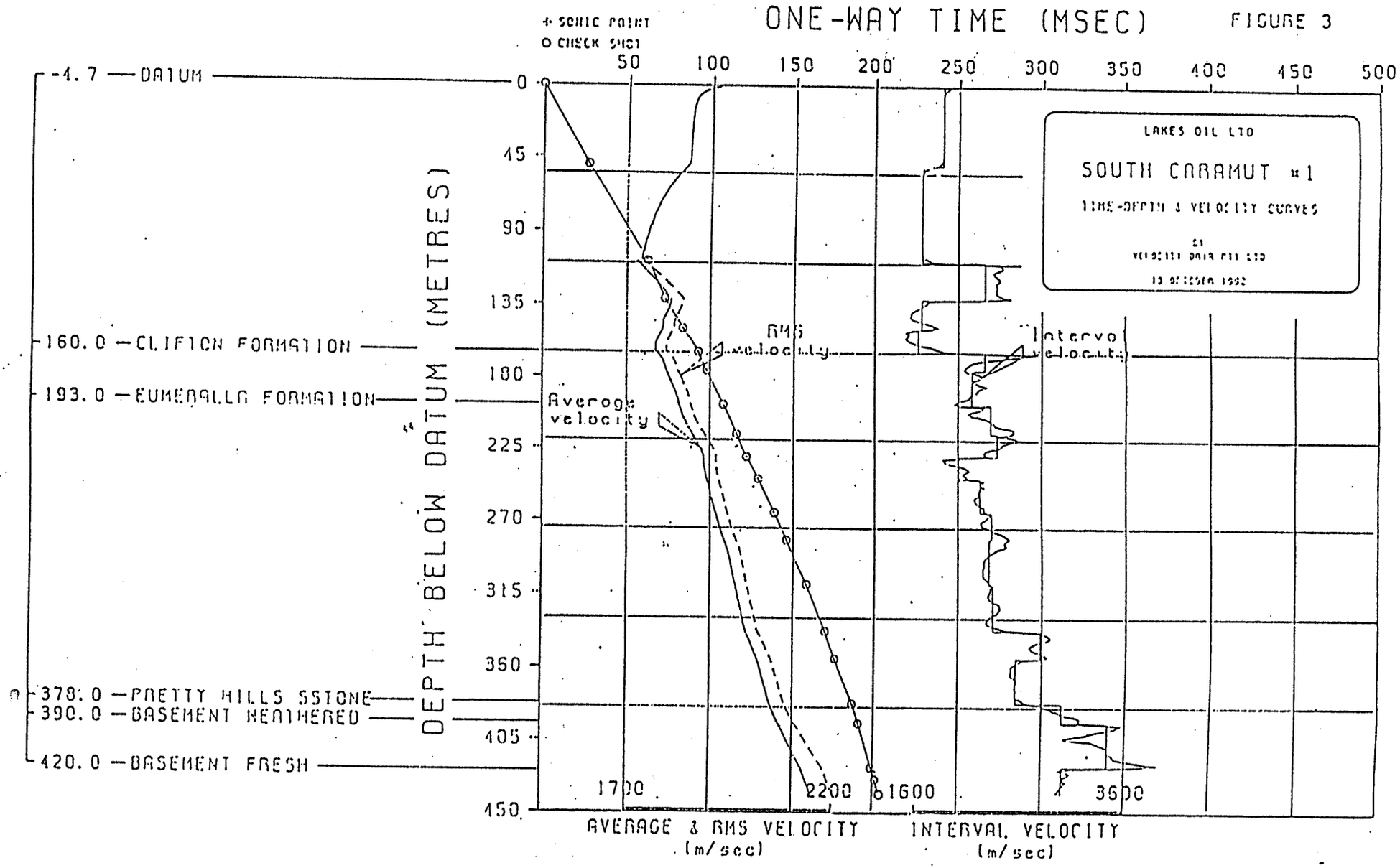
Figure 4D is a plot of selected surface traces. No filter or gain recovery has been applied.

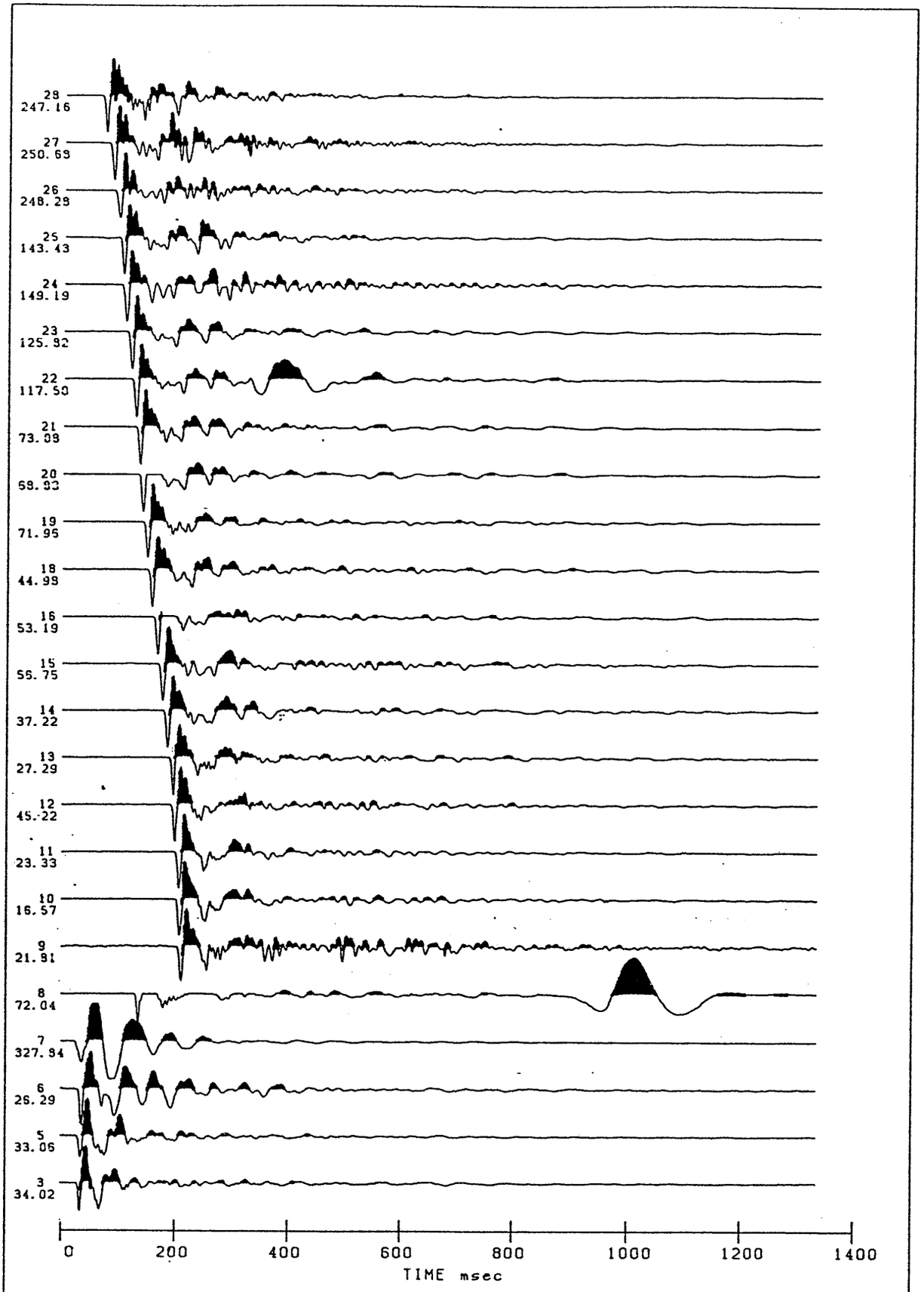
Geoffrey Bell
Geophysical Analyst.

T A B L E 2

Shot Number	Allowance for Fatigue
11	-1
12	-1
13	-2
14	-3
16	-2
18	-3
19	-2
20	-2
21	-2
22	-2
23	-2
24	-2
25	-2
26	-2
27	-2
28	-2

FIGURE 3


ONE-WAY TIME (MSEC)
+ SONIC POINT
O CHECK SHOT
50
100
150
200
250
300
350
400
450
500
-4.7 — DATUM
160.0 — CLIFTON FORMATION
193.0 — EUMERALLA FORMATION
378.0 — PRETTY HILLS SSTONE
390.0 — BASEMENT WEATHERED
420.0 — BASEMENT FRESH
DEPTH BELOW DATUM (METRES)
0
45
90
135
180
225
270
315
360
405
450
RMS velocity
Average velocity
Interval velocity
LAKES OIL LTD
SOUTH CARAMUT #1
TIME-DEPTH & VELOCITY CURVES
1700
2200
1600
3600
AVERAGE & RMS VELOCITY (m/sec)
INTERVAL VELOCITY (m/sec)



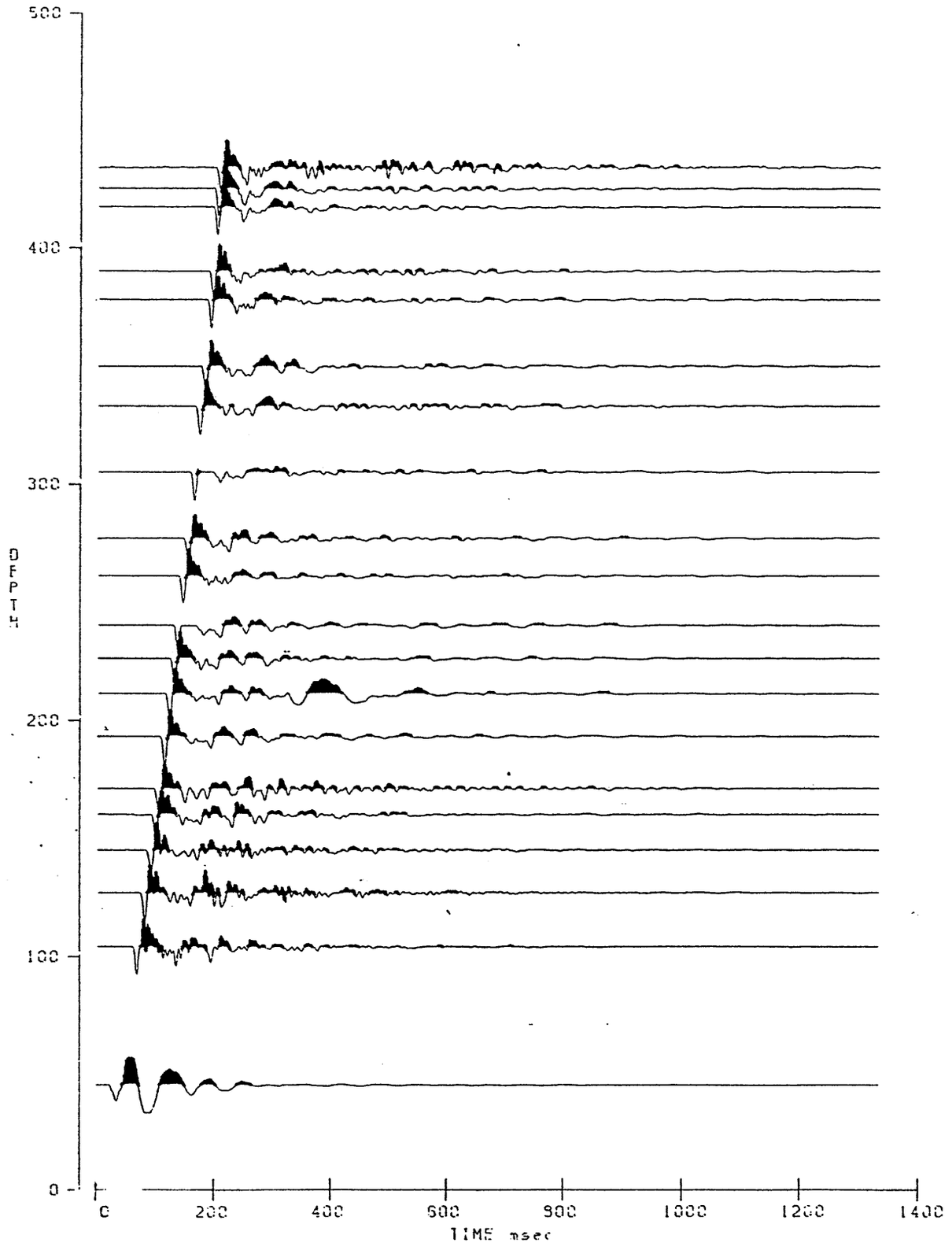
SOUTH CARAMUT #1

VELOCITY SURVEY TRACE DISPLAY

Filter OUT-OUT

No gain recovery

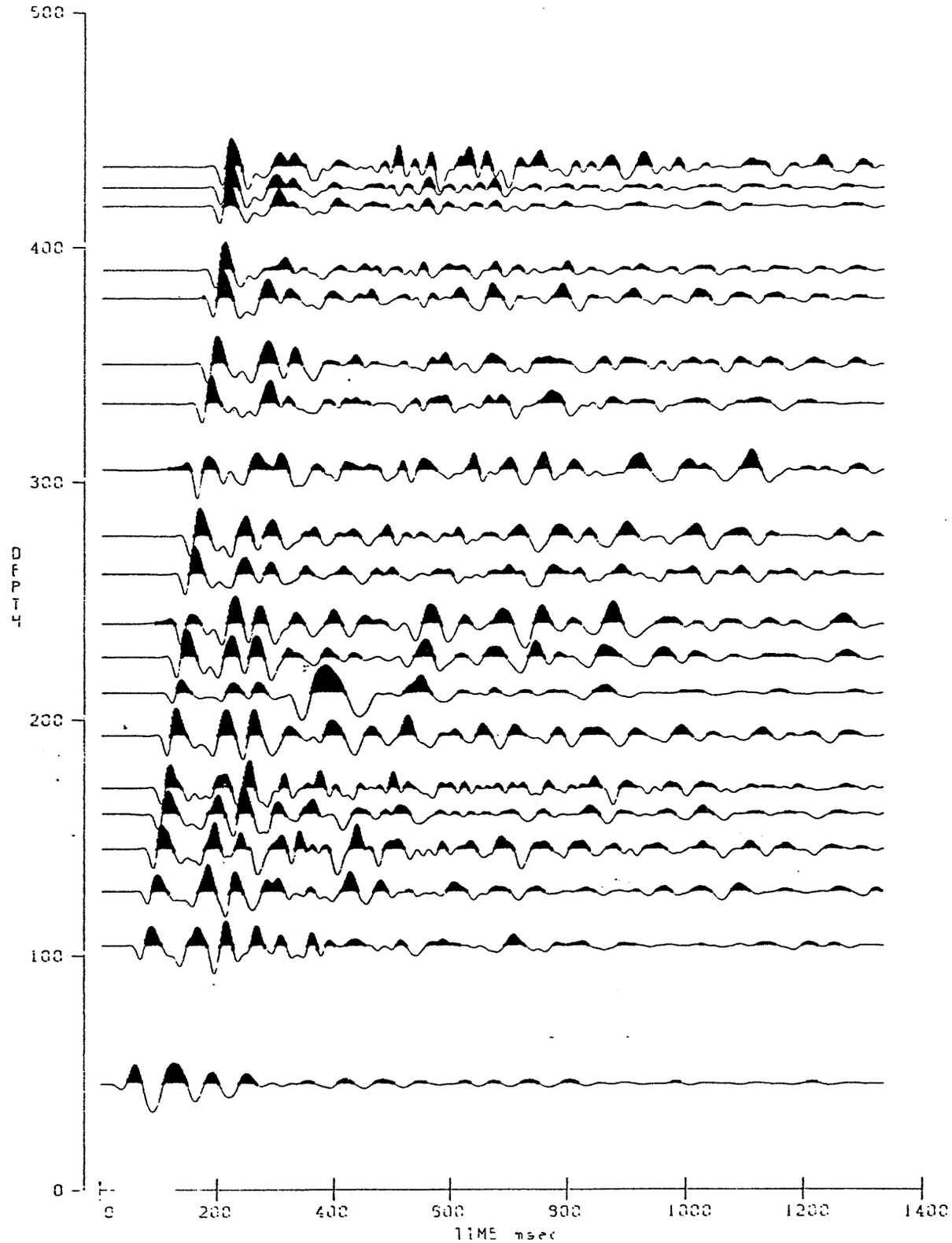
Figure 4A



SOUTH CARAMUT #1

VELOCITY SURVEY TRACE DISPLAY
Filter OUT-OUT
No gain recovery

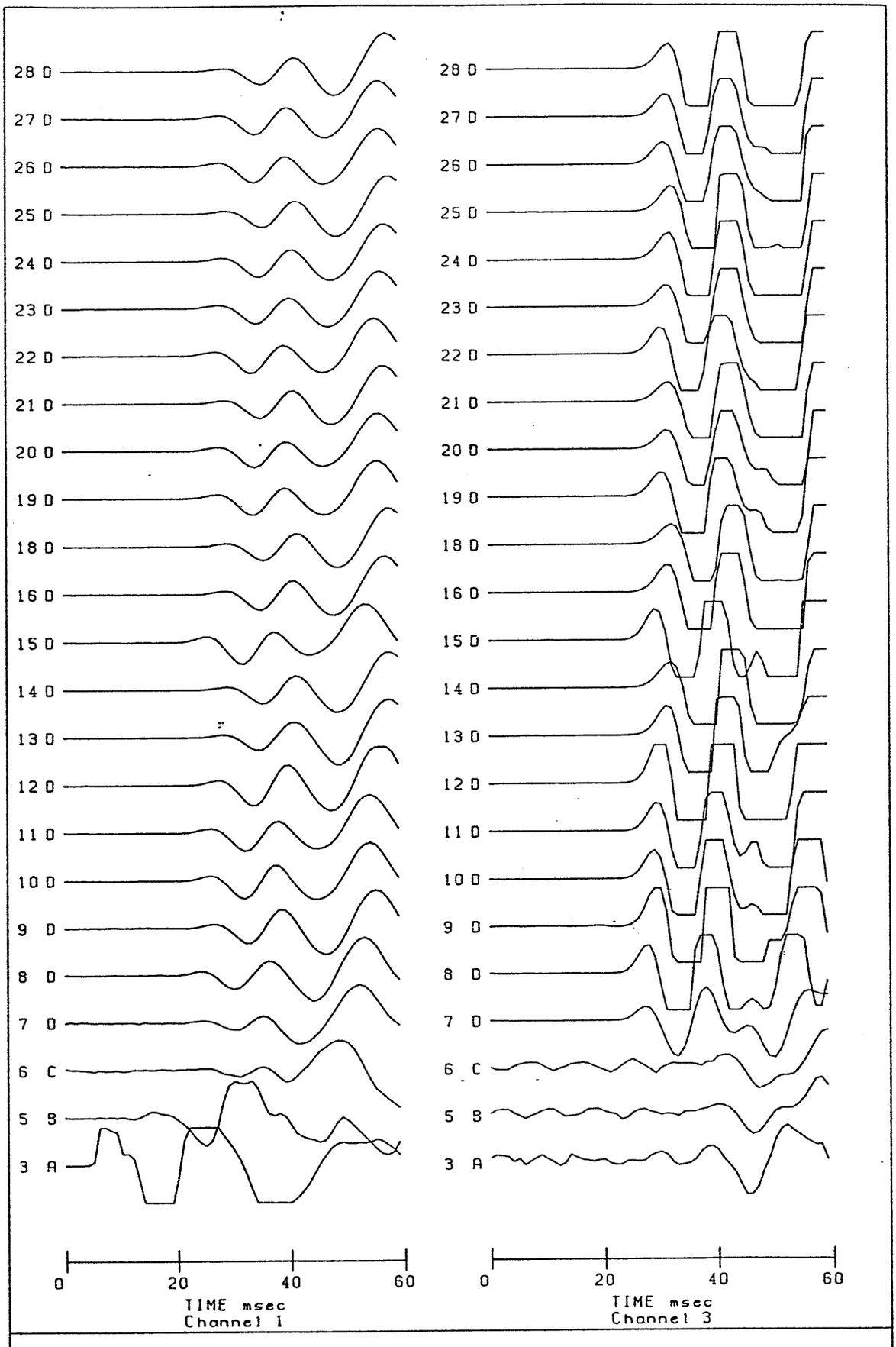
Figure 46



SOUTH CARAMUT ¤1

VELOCITY SURVEY TRACE DISPLAY
Filter 5-40
Gain $T^{2.0}$

Figure 40



SOUTH CARAMUT #1

VELOCITY SURVEY TRACE DISPLAY
Auxiliary channels
Filter OUT-OUT

Figure 40

TABLE 1. Time-Depth curve values Page 1.

Well : SOUTH CARAMUT #1 Client : LAKES OIL LTD
Survey units : METRES Datum : 150.0
Calibrated sonic interval velocities used from 109.0 to 438.0

Datum Depth	One-way time(ms)	VELOCITIES Average	RMS	Interval	Datum Depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
1.0	0.5	1919	1919	1919	41.0	22.2	1849	1849	1845
2.0	1.1	1900	1900	1882	42.0	22.7	1849	1849	1845
3.0	1.6	1888	1888	1864	43.0	23.3	1849	1849	1845
4.0	2.1	1880	1880	1855	44.0	23.8	1849	1849	1844
5.0	2.7	1874	1874	1850	45.0	24.3	1849	1849	1843
6.0	3.2	1869	1869	1848	46.0	24.9	1848	1848	1840
7.0	3.8	1866	1866	1847	47.0	25.4	1848	1848	1835
8.0	4.3	1863	1864	1846	48.0	26.0	1848	1848	1825
9.0	4.8	1861	1862	1846	49.0	26.5	1847	1847	1805
10.0	5.4	1860	1860	1846	50.0	27.1	1845	1845	1768
11.0	5.9	1859	1859	1846	51.0	27.7	1842	1842	1713
12.0	6.5	1857	1858	1845	52.0	28.3	1839	1839	1679
13.0	7.0	1857	1857	1845	53.0	28.9	1835	1836	1662
14.0	7.5	1856	1856	1845	54.0	29.5	1831	1832	1654
15.0	8.1	1855	1855	1845	55.0	30.1	1828	1829	1650
16.0	8.6	1854	1855	1845	56.0	30.7	1824	1825	1647
17.0	9.2	1854	1854	1845	57.0	31.3	1821	1822	1646
18.0	9.7	1853	1854	1845	58.0	31.9	1817	1819	1646
19.0	10.3	1853	1853	1845	59.0	32.5	1814	1816	1646
20.0	10.8	1853	1853	1845	60.0	33.1	1811	1813	1645
21.0	11.3	1852	1852	1845	61.0	33.7	1808	1810	1645
22.0	11.9	1852	1852	1845	62.0	34.3	1805	1807	1645
23.0	12.4	1852	1852	1845	63.0	35.0	1802	1804	1645
24.0	13.0	1851	1851	1845	64.0	35.6	1800	1802	1645
25.0	13.5	1851	1851	1845	65.0	36.2	1797	1799	1645
26.0	14.0	1851	1851	1845	66.0	36.8	1795	1797	1645
27.0	14.6	1851	1851	1845	67.0	37.4	1792	1794	1645
28.0	15.1	1851	1851	1845	68.0	38.0	1790	1792	1645
29.0	15.7	1850	1850	1845	69.0	38.6	1788	1790	1645
30.0	16.2	1850	1850	1845	70.0	39.2	1785	1788	1645
31.0	16.8	1850	1850	1845	71.0	39.8	1783	1786	1645
32.0	17.3	1850	1850	1845	72.0	40.4	1781	1784	1645
33.0	17.8	1850	1850	1845	73.0	41.0	1779	1782	1645
34.0	18.4	1850	1850	1845	74.0	41.6	1777	1780	1645
35.0	18.9	1850	1850	1845	75.0	42.2	1775	1778	1645
36.0	19.5	1849	1849	1845	76.0	42.9	1773	1776	1645
37.0	20.0	1849	1849	1845	77.0	43.5	1772	1774	1645
38.0	20.5	1849	1849	1845	78.0	44.1	1770	1773	1645
39.0	21.1	1849	1849	1845	79.0	44.7	1768	1771	1645
40.0	21.6	1849	1849	1845	80.0	45.3	1767	1769	1645

TABLE 1. Time-Depth curve values

Well : SOUTH CARAMUT #1 Client : LAKES OIL LTD
Survey units : METRES Datum : 150.0
Calibrated sonic interval velocities used from 109.0 to 438.0

Datum Depth	One-way time(ms)	VELOCITIES Average	RMS	Interval	Datum Depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
81.0	45.9	1765	1768	1645	121.0	68.7	1762	1739	1809
82.0	46.5	1763	1766	1645	122.0	69.2	1762	1740	1791
83.0	47.1	1762	1765	1645	123.0	69.8	1763	1740	1808
84.0	47.7	1760	1763	1645	124.0	70.3	1763	1740	1785
85.0	48.3	1759	1762	1645	125.0	70.9	1762	1740	1677
86.0	48.9	1758	1760	1645	126.0	71.6	1761	1739	1605
[illegible]0	49.5	1756	1759	1645	127.0	72.1	1760	1738	1690
[illegible].0	50.1	1755	1758	1645	128.0	72.7	1760	1739	1786
89.0	50.8	1754	1756	1645	129.0	73.3	1760	1739	1756
90.0	51.4	1752	1755	1645	130.0	73.8	1761	1739	1771
91.0	52.0	1751	1754	1645	131.0	74.4	1761	1739	1764
92.0	52.6	1750	1753	1645	132.0	75.0	1761	1740	1824
93.0	53.2	1749	1751	1645	133.0	75.4	1763	1742	2048
94.0	53.8	1747	1750	1645	134.0	75.9	1764	1744	1992
95.0	54.4	1746	1749	1645	135.0	76.4	1766	1746	2038
96.0	55.0	1745	1748	1645	136.0	77.0	1766	1746	1734
97.0	55.6	1744	1747	1645	137.0	77.6	1765	1745	1691
98.0	56.2	1743	1746	1645	138.0	78.2	1765	1745	1740
99.0	56.8	1742	1745	1646	139.0	78.8	1764	1744	1588
100.0	57.4	1741	1744	1646	140.0	79.4	1762	1743	1568
101.0	58.0	1740	1743	1646	141.0	80.1	1761	1742	1583
102.0	58.7	1739	1742	1647	142.0	80.7	1759	1741	1601
[illegible]0	59.3	1738	1741	1649	143.0	81.3	1759	1740	1679
104.0	59.9	1737	1740	1652	144.0	81.9	1759	1741	1801
105.0	60.5	1736	1739	1659	145.0	82.4	1760	1741	1815
106.0	61.1	1736	1739	1673	146.0	83.0	1759	1740	1637
107.0	61.7	1735	1738	1701	147.0	83.6	1758	1740	1649
108.0	62.2	1736	1738	1759	148.0	84.2	1758	1740	1838
109.0	61.8	1763	1737	1887	149.0	84.6	1761	1743	2248
110.0	62.3	1765	1740	2004	150.0	85.0	1764	1747	2299
111.0	62.9	1765	1740	1764	151.0	85.5	1766	1749	2083
112.0	63.5	1765	1740	1741	152.0	86.0	1767	1751	2070
113.0	64.1	1764	1739	1613	153.0	86.5	1770	1753	2211
114.0	64.7	1763	1738	1654	154.0	86.9	1771	1756	2132
115.0	65.2	1763	1738	1762	155.0	87.4	1773	1757	2017
116.0	65.8	1763	1739	1802	156.0	87.9	1774	1758	1938
117.0	66.4	1763	1739	1803	157.0	88.4	1777	1762	2324
118.0	67.0	1762	1738	1641	158.0	88.8	1779	1765	2268
[illegible]0	67.6	1761	1738	1655	159.0	89.3	1780	1766	1975
[illegible].0	68.1	1762	1739	1840	160.0	89.9	1781	1766	1880

TABLE 1. Time-Depth curve values

Well : SOUTH CARAMUT #1 Client : LAKES OIL LTD
Survey units : METRES Datum : 150.0
Calibrated sonic interval velocities used from 109.0 to 438.0

Datum Depth	One-way time(ms)	-----VELOCITIES----- Average	RMS	Interval	Datum Depth	One-way time(ms)	-----VELOCITIES----- Average	RMS	Interval
161.0	90.3	1783	1770	2383	201.0	108.9	1846	1848	1659
162.0	90.6	1787	1775	2799	202.0	109.4	1846	1847	1698
163.0	91.0	1791	1780	2747	203.0	110.0	1845	1846	1730
164.0	91.3	1795	1785	2819	204.0	110.6	1844	1846	1685
165.0	91.7	1800	1791	2968	205.0	111.2	1843	1845	1683
166.0	92.0	1804	1797	3012	206.0	111.8	1843	1844	1741
167.0	92.4	1808	1802	2923	207.0	112.4	1842	1844	1774
168.0	92.7	1812	1808	2969	208.0	112.9	1842	1844	1849
169.0	93.1	1816	1812	2666	209.0	113.3	1844	1846	2292
170.0	93.6	1817	1814	2085	210.0	113.8	1846	1848	2288
171.0	94.1	1818	1814	1930	211.0	114.3	1846	1848	1916
172.0	94.6	1817	1814	1760	212.0	114.8	1847	1848	1915
173.0	95.2	1817	1814	1731	213.0	115.3	1847	1848	1859
174.0	95.8	1817	1814	1823	214.0	115.9	1846	1848	1733
175.0	96.3	1818	1814	1962	215.0	116.5	1846	1848	1868
176.0	96.7	1821	1818	2532	216.0	116.9	1848	1850	2422
177.0	97.0	1824	1822	2711	217.0	117.3	1851	1853	2586
178.0	97.5	1826	1825	2307	218.0	117.7	1852	1855	2281
179.0	98.0	1827	1826	1997	219.0	118.1	1854	1857	2429
180.0	98.5	1827	1826	1879	220.0	118.5	1857	1860	2589
181.0	99.0	1828	1827	1961	221.0	118.9	1859	1863	2618
182.0	99.4	1830	1829	2335	222.0	119.4	1860	1864	2104
183.0	99.9	1831	1830	2070	223.0	119.9	1861	1865	1981
184.0	100.4	1832	1831	1983	224.0	120.3	1862	1866	2276
185.0	100.9	1834	1833	2249	225.0	120.8	1863	1867	2007
186.0	101.4	1835	1834	2041	226.0	121.4	1862	1866	1774
187.0	101.8	1838	1837	2481	227.0	121.9	1863	1867	1960
188.0	102.2	1839	1839	2242	228.0	122.3	1865	1869	2414
189.0	102.6	1841	1841	2293	229.0	122.7	1866	1871	2328
190.0	103.1	1844	1844	2467	230.0	123.3	1866	1871	1851
191.0	103.6	1844	1844	1892	231.0	123.8	1866	1870	1771
192.0	104.2	1843	1844	1754	232.0	124.4	1866	1870	1872
193.0	104.6	1844	1845	2035	233.0	124.8	1867	1872	2311
194.0	105.1	1845	1846	2090	234.0	125.2	1869	1874	2359
195.0	105.7	1845	1846	1780	235.0	125.7	1870	1875	2213
196.0	106.2	1846	1847	2053	236.0	126.1	1872	1877	2418
197.0	106.6	1848	1850	2478	237.0	126.5	1874	1880	2651
198.0	107.0	1850	1851	2133	238.0	126.9	1876	1881	2247
199.0	107.6	1849	1850	1657	239.0	127.3	1877	1883	2288
200.0	108.3	1847	1849	1649	240.0	127.7	1879	1885	2470

TABLE 1. Time-Depth curve values

Well : SOUTH CARAMUT #1
Survey units : METRES
Client : LAKES OIL LTD
Datum : 150.0
Calibrated sonic interval velocities used from 109.0 to 438.0

Datum Depth	One-way time(ms)	-----VELOCITIES----- Average	RMS	Interval	Datum Depth	One-way time(ms)	-----VELOCITIES----- Average	RMS	Interval
241.0	128.1	1881	1887	2524	281.0	145.5	1932	1943	2214
242.0	128.5	1883	1890	2550	282.0	145.9	1933	1945	2618
243.0	128.9	1885	1893	2700	283.0	146.2	1936	1948	2999
244.0	129.3	1886	1894	2220	284.0	146.6	1937	1950	2406
245.0	129.9	1887	1894	1953	285.0	147.0	1939	1951	2522
246.0	130.3	1888	1896	2398	286.0	147.4	1941	1954	2634
247.0	130.6	1891	1899	2765	287.0	147.8	1942	1955	2516
248.0	131.1	1892	1900	2339	288.0	148.2	1944	1957	2624
249.0	131.5	1893	1902	2216	289.0	148.6	1945	1959	2353
250.0	132.0	1894	1903	2242	290.0	149.0	1946	1960	2436
251.0	132.4	1896	1905	2485	291.0	149.4	1948	1961	2398
252.0	132.8	1898	1906	2326	292.0	149.9	1949	1962	2251
253.0	133.2	1899	1908	2247	293.0	150.3	1949	1963	2264
254.0	133.7	1900	1909	2255	294.0	150.7	1950	1964	2292
255.0	134.1	1901	1910	2316	295.0	151.2	1952	1965	2340
256.0	134.6	1903	1912	2266	296.0	151.6	1953	1967	2366
257.0	135.0	1904	1913	2246	297.0	152.0	1954	1968	2329
258.0	135.4	1905	1914	2290	298.0	152.4	1955	1969	2303
259.0	135.9	1906	1916	2293	299.0	152.9	1956	1970	2335
260.0	136.3	1907	1917	2214	300.0	153.3	1957	1971	2345
261.0	136.8	1908	1917	2088	301.0	153.7	1958	1972	2272
262.0	137.2	1909	1919	2339	302.0	154.2	1959	1973	2304
263.0	137.7	1911	1920	2343	303.0	154.6	1960	1974	2289
264.0	138.1	1912	1922	2349	304.0	155.1	1961	1975	2248
265.0	138.5	1914	1924	2629	305.0	155.5	1962	1976	2304
266.0	138.8	1916	1926	2689	306.0	155.9	1963	1977	2394
267.0	139.3	1917	1928	2339	307.0	156.3	1964	1978	2311
268.0	139.7	1918	1929	2270	308.0	156.8	1965	1979	2311
269.0	140.2	1919	1930	2243	309.0	157.2	1966	1980	2390
270.0	140.6	1920	1931	2177	310.0	157.6	1967	1982	2417
271.0	141.1	1921	1931	2014	311.0	158.0	1968	1983	2480
272.0	141.6	1921	1931	1969	312.0	158.4	1969	1984	2366
273.0	142.1	1922	1932	2269	313.0	158.9	1970	1985	2362
274.0	142.5	1923	1934	2357	314.0	159.3	1971	1986	2275
275.0	142.9	1924	1935	2306	315.0	159.8	1972	1986	2132
276.0	143.4	1925	1936	2239	316.0	160.3	1972	1987	2029
277.0	143.8	1926	1937	2335	317.0	160.7	1973	1988	2339
278.0	144.2	1928	1939	2434	318.0	161.1	1974	1989	2373
279.0	144.6	1930	1941	2543	319.0	161.5	1975	1990	2336
280.0	145.0	1931	1942	2338	320.0	162.0	1976	1991	2373

TABLE 1. Time-Depth curve values

Well : SOUTH CARAMUT #1 Client : LAKES OIL LTD
Survey units : METRES Datum : 150.0
Calibrated sonic interval velocities used from 109.0 to 438.0

Datum Depth	One-way time(ms)	-----VELOCITIES----- Average	RMS	Interval	Datum Depth	One-way time(ms)	-----VELOCITIES----- Average	RMS	Interval
321.0	162.4	1977	1992	2368	361.0	178.5	2022	2041	2465
322.0	162.8	1978	1993	2363	362.0	178.9	2023	2042	2424
323.0	163.2	1979	1994	2401	363.0	179.3	2024	2043	2441
324.0	163.6	1980	1995	2454	364.0	179.7	2025	2045	2653
325.0	164.0	1981	1997	2423	365.0	180.1	2027	2046	2632
326.0	164.4	1982	1998	2432	366.0	180.5	2028	2048	2587
327.0	164.9	1984	1999	2435	367.0	180.9	2029	2049	2593
328.0	165.3	1984	2000	2364	368.0	181.3	2030	2050	2553
329.0	165.7	1985	2001	2286	369.0	181.7	2031	2051	2532
330.0	166.2	1986	2002	2274	370.0	182.0	2032	2053	2612
331.0	166.6	1987	2002	2280	371.0	182.4	2034	2054	2727
332.0	167.1	1987	2003	2160	372.0	182.8	2035	2056	2658
333.0	167.5	1988	2003	2084	373.0	183.2	2036	2057	2537
334.0	168.0	1988	2004	2302	374.0	183.6	2037	2058	2583
335.0	168.4	1989	2005	2341	375.0	184.0	2038	2059	2559
336.0	168.8	1990	2006	2251	376.0	184.4	2040	2060	2561
337.0	169.3	1991	2006	2329	377.0	184.7	2041	2062	2542
338.0	169.7	1992	2008	2583	378.0	185.1	2042	2063	2578
339.0	170.0	1994	2010	2911	379.0	185.5	2043	2064	2679
340.0	170.3	1996	2012	2927	380.0	185.9	2044	2066	2639
341.0	170.7	1998	2014	2745	381.0	186.3	2045	2067	2596
342.0	171.1	1999	2016	2781	382.0	186.7	2047	2068	2594
343.0	171.4	2001	2018	2686	383.0	187.0	2048	2069	2642
344.0	171.8	2002	2019	2541	384.0	187.4	2049	2071	2997
345.0	172.2	2003	2020	2466	385.0	187.7	2051	2073	2803
346.0	172.7	2004	2021	2403	386.0	188.1	2052	2075	2844
347.0	173.1	2005	2022	2367	387.0	188.4	2054	2077	3184
348.0	173.5	2006	2023	2297	388.0	188.7	2056	2079	3129
349.0	173.9	2007	2024	2481	389.0	189.0	2058	2081	3107
350.0	174.3	2008	2025	2487	390.0	189.4	2059	2083	2884
351.0	174.7	2009	2027	2494	391.0	189.7	2061	2085	2871
352.0	175.1	2010	2028	2615	392.0	190.0	2063	2087	3170
353.0	175.5	2012	2030	2714	393.0	190.4	2065	2089	3149
354.0	175.8	2013	2032	2781	394.0	190.7	2067	2092	3388
355.0	176.2	2015	2033	2794	395.0	190.9	2069	2095	3799
356.0	176.6	2016	2035	2572	396.0	191.2	2071	2098	3529
357.0	177.0	2017	2036	2650	397.0	191.5	2073	2100	3055
358.0	177.4	2019	2038	2538	398.0	191.9	2074	2102	3073
359.0	177.7	2020	2039	2568	399.0	192.2	2076	2104	3197
360.0	178.1	2021	2040	2650	400.0	192.5	2078	2106	2986

TABLE 1. Time-Depth curve values

Well : SOUTH CARAMUT #1 Client : LAKES OIL LTD
Survey units : METRES Datum : 150.0
Calibrated sonic interval velocities used from 109.0 to 438.0

Datum Depth	One-way time(ms)	-----VELOCITIES----- Average	RMS	Interval	Datum Depth	One-way time(ms)	-----VELOCITIES----- Average	RMS	Interval
401.0	192.8	2079	2108	2911	420.0	199.0	2110	2145	3169
402.0	193.2	2081	2110	2894	421.0	199.3	2112	2147	3381
403.0	193.5	2082	2111	2866	422.0	199.6	2114	2150	4025
404.0	193.9	2084	2113	2839	423.0	199.8	2117	2154	4322
405.0	194.2	2085	2114	2868	424.0	200.0	2120	2158	4223
406.0	194.6	2087	2116	3118	425.0	200.3	2122	2161	4109
407.0	194.9	2089	2119	3292	426.0	200.5	2124	2164	3973
408.0	195.2	2090	2121	3106	427.0	200.8	2127	2168	3920
409.0	195.5	2092	2122	2874	428.0	201.1	2129	2171	3903
410.0	195.9	2093	2124	2903	429.0	201.3	2131	2174	3886
411.0	196.2	2095	2126	3204	430.0	201.6	2133	2177	3868
412.0	196.5	2097	2128	3230	431.0	201.8	2135	2180	3850
413.0	196.8	2098	2131	3209	432.0	202.1	2138	2183	3831
414.0	197.1	2100	2133	3214	433.0	202.4	2140	2186	3812
415.0	197.4	2102	2135	3208	434.0	202.6	2142	2188	3791
416.0	197.8	2104	2137	3145	435.0	202.9	2144	2191	3771
417.0	198.1	2105	2139	3100	436.0	203.1	2146	2194	3750
418.0	198.4	2107	2141	3107	437.0	203.4	2148	2197	3729
419.0	198.7	2109	2143	3144	438.0	203.7	2150	2199	3706

APPENDIX VIII

SYNTHETIC SEISMOGRAMS

Velocity Data

SYNTHETIC SEISMOGRAMS

SOUTH CARAMUT #1

PEP 122

VICTORIA

for

LAKES OIL LIMITED

recorded by

VELOCITY DATA PTY. LTD.

processed by

Integrated Seismic Technologies

Brisbane, Australia

February 19, 1991

CONTENTS

SUMMARY

Synthetic seismograms have been produced for the South Caramut No1 well, PEP 122, Victoria, Australia for Lakes Oil Limited.

These seismograms have been computed using a combination of check shot and sonic data. Velocity Data Pty Ltd acquired the check shot data and BPB Instruments provided the other wireline services.

The sonic data was calibrated using the check shot information. Reflection coefficients were then derived from the calibrated sonic data and convolved with specified wavelets to produce the synthetic seismograms. A number of trials were run before establishing the most appropriate wavelet.

GENERAL INFORMATION

Name of Well	:	South Caramut #1
Location	:	PEP 122, Victoria
Coordinates	:	Latitude 038 00 08.9
	:	Longitude 142 28 44.0
Seismic Reference	:	VP 430/88-100
Velocity Survey	:	Velocity Data Pty Ltd
Wireline Logging	:	BPB Instruments V1030
Elevation of KB	:	145.3m above sea level
Elevation of Ground	:	142.0m above sea level
Elevation of Seismic Datum	:	150.0m above sea level
Casing depth	:	87.0m below KB
Total Depth of well	:	433.3m below KB

CHECK SHOT DATA

Recorded by	:	Velocity Data Pty Ltd
Date	:	October 18th 1990
Energy Source	:	Explosive, AN-60
Shot Location	:	Mud pit
Charge Size	:	0.25 (125 grm) sticks
Average Shot Depth	:	3.0 metres
Average Shot Offset	:	20 metres
Number of shots used	:	24
Number of levels recorded	:	20

SONIC DATA

Recorded by	:	BPB Instruments
Date	:	October 18th 1990
Top logged interval	:	11m below KB
Bottom logged interval	:	432m below KB
Logging units	:	microseconds/metre

CALIBRATION OF SONIC LOG

Method

The sonic log was extended to 800 metres below KB in order to get full wavelet response at the end of the sonic. The log was edited out above 100 metres due to the casing effecting the results.

Sonic times were adjusted to checkshot times using a least squares polynomial fit for the sonic transit times. This method being chosen over a linear correction as the latter tends to introduce fictitious interfaces at areas of high drift correction.

Differences arise as the sonic tool measures the local velocity characteristics of the formation with a high frequency signal, whereas the downhole geophone records the bulk velocity character using a signal of significantly lower frequency.

Results

The discrepancies between shot and sonic interval velocities were in general quite small except over some very short intervals which exhibited magnified errors.

In aggregate, the shot and sonic interval times differed by 0.7 msecs over the logged portion of the well.

REFLECTION COEFFICIENT GENERATION

Reflection coefficients were generated from the calibrated sonic log only as no density information was available.

MULTIPLES

Only the primary response of the reflection coefficient series has been generated for the six seismograms.

WAVELETS

A variety of wavelets are presented of both phase.

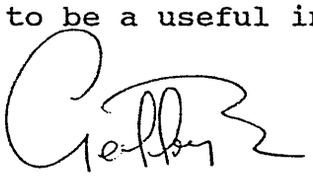
Seismogram 1
1) Bandpass 20-80Hz Zero Phase Normal Polarity.
2) Bandpass 20-60Hz Zero Phase Normal Polarity.
3) Bandpass 10-40Hz Zero Phase Normal Polarity.

Seismogram 2
1) Bandpass 20-80Hz Zero Phase Reverse Polarity.
2) Bandpass 20-60Hz Zero Phase Reverse Polarity.
3) Bandpass 10-40Hz Zero Phase Reverse Polarity.

SEISMOGRAM DISPLAYS

The final displays show the contributing logs in schematic form with time scale. The seismogram is displayed for each wavelet against two way time below the check shot datum. Trace amplitudes are normalized against their maxima. The subdatum two way time of 121 msecs for the start of the sonic was taken from the checkshot results.

A seismic section was received however the quality of the reflectors in the vicinity of the well was very poor and in such circumstances no comment can be made on the quality of the tie however it is hoped that the synthetic will prove to be a useful interpretation aid.



Geoffrey Bell
Geophysical Analyst.

SYNTHETIC SEISMOGRAM

COMPANY - LAKES OIL LTD

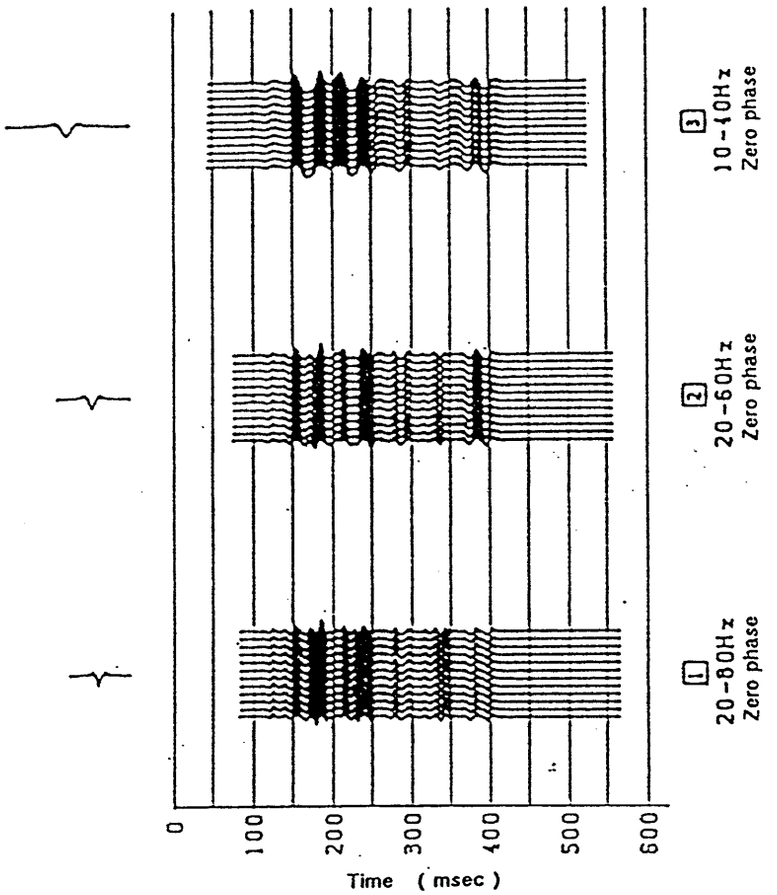
AREA - PEP 122 CARAMUT

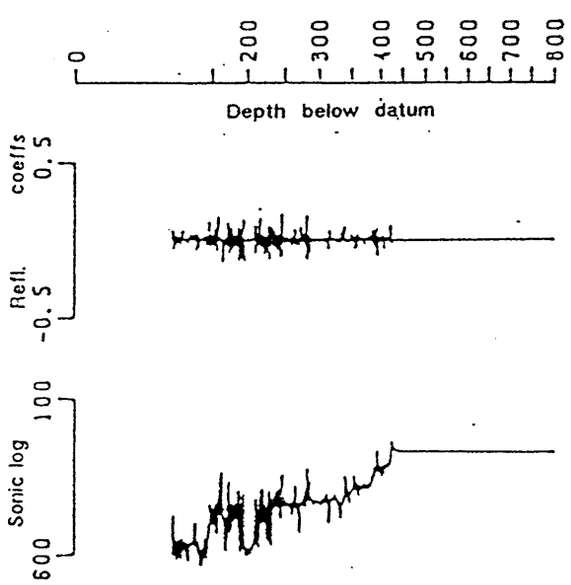
1 - Primaries only

2 - Primaries only

3 - Primaries only

Reflection coeffs. calculated from SONIC data only.

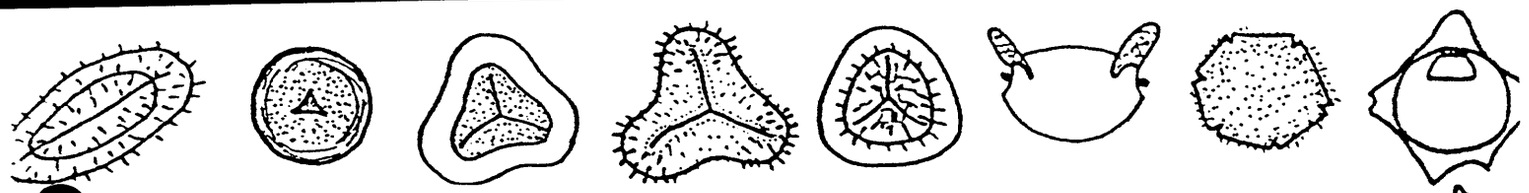




SOUTH CARAMUT # 1

APPENDIX IX

PALYNOLOGY



PALYNOLOGY OF LAKES OIL SOUTH CARAMUT-1

OTWAY BASIN, VICTORIA

BY

ROGER MORGAN
BOX 161
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REF:DW:OTW.STHCARAM

for LAKES OIL

February 1991

PALYNOLOGY OF LAKES OIL SOUTH CARAMUT-1

OTWAY BASIN, VICTORIA

BY

ROGER MORGAN

CONTENTS

I SUMMARY

100m (swc)-140m (swc) : lower to middle P. tuberculatus zone : Late Oligocene to Early Miocene : nearshore marine : immature

162m (swc)-191m (swc) : apparently upper N. asperus zone : Early Oligocene : nearshore marine : immature

196m (swc) : C. hughesi zone : Aptian : lacustrine : early marginal mature for oil

302m (swc)-373m (swc) : lean and indeterminate

379.5m (swc)-381m (swc) : F. wonthaggiensis zone : Late Neocomian : non-marine : marginal mature

393m (swc) : very lean F. wonthaggiensis - C. australiensis zones : Neocomian : non-marine : marginal mature

II INTRODUCTION

Eight sidewall cores were processed, to provide information on age, environment and maturity for the completion report.

Palynomorph occurence data are shown as Appendix I and form the basis for the assignment of the samples to four spore-pollen units of Neocomian to Miocene age. The Cretaceous spore-pollen zonation is essentially that of Dettmann and Playford (1969), but has been significantly modified and improved by various authors since, and most recently discussed in Helby et al (1987), as shown on figure 1 and modified by Morgan (1985) for application in the Otway Basin. The Tertiary zonation is that of Stover and Partridge (1973) and Stover and Evans (1973) as modified by Partridge (1976).

Maturity data was generated in the form of Spore Colour Index, and is plotted on figure 2 Maturity profile of South Caramat-1. The oil and gas windows in figure 2 follow the general consensus of geochemical literature. The oil window corresponds to spore colours of light-mid brown (Staplin Spore Colour Index of 2.7) to dark brown (3.6). These correspond to vitrinite reflectance values of 0.6% to 1.3%.

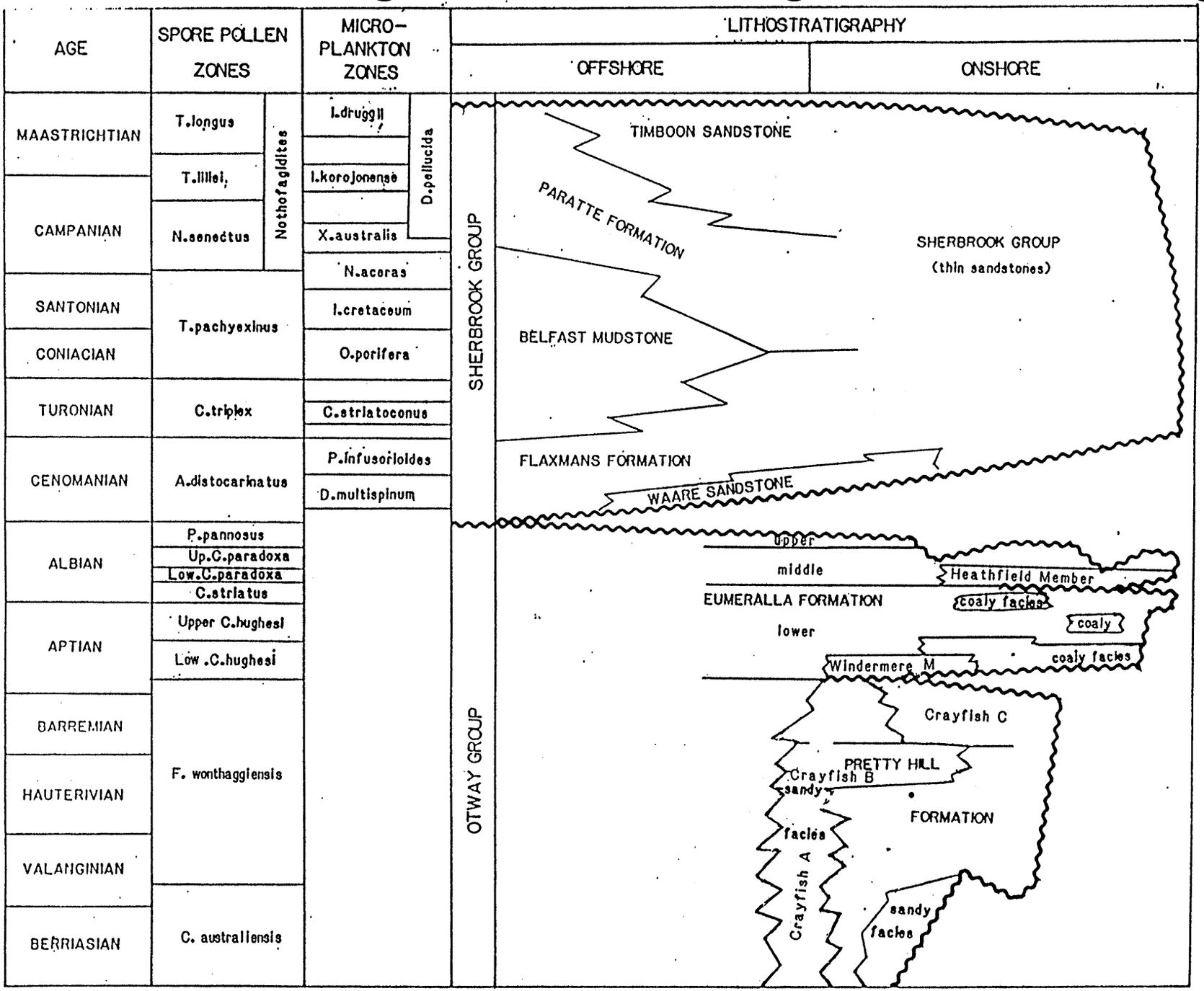

FIGURE 1. CRETACEOUS REGIONAL FRAMEWORK, OTWAY BASIN

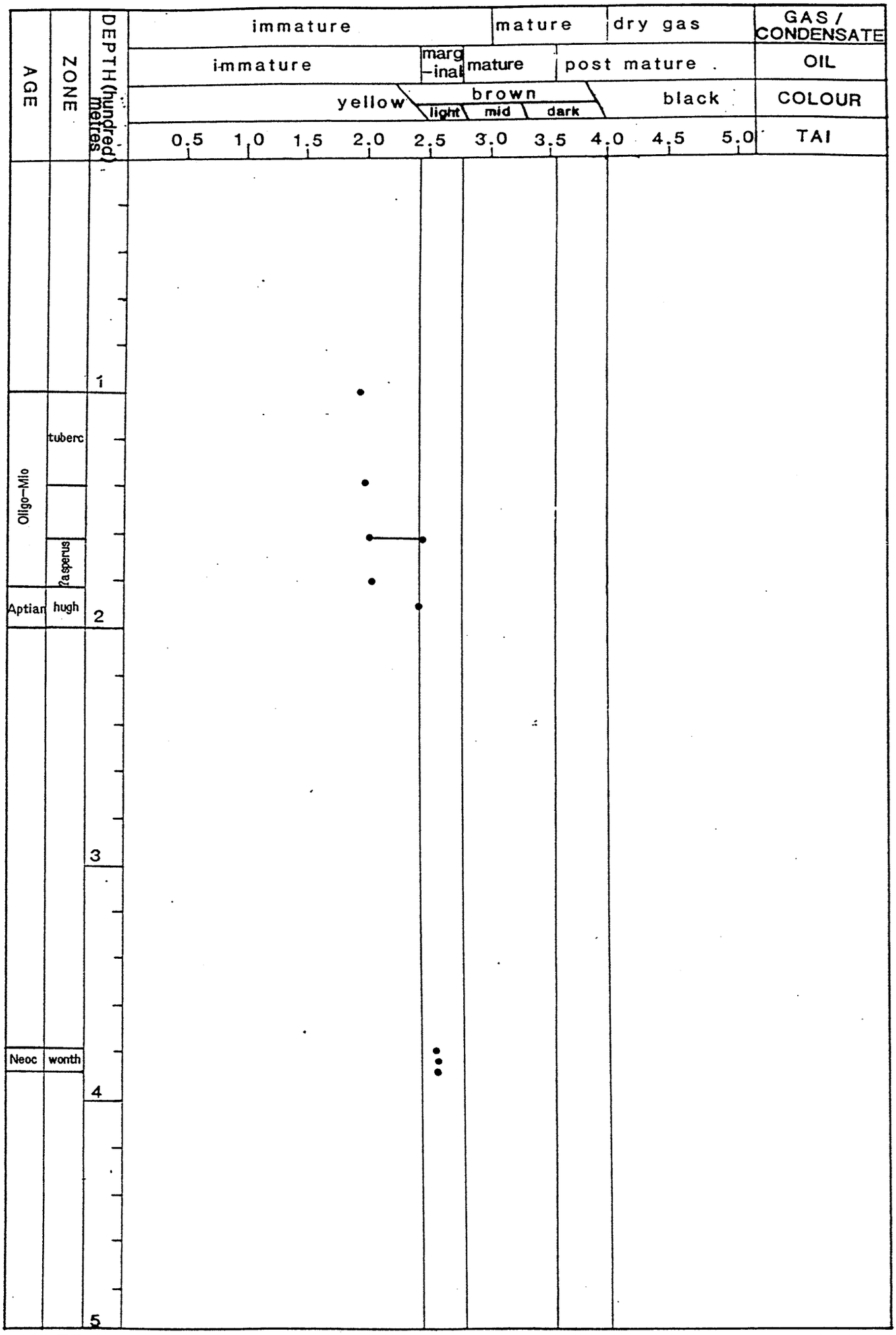

FIGURE 2 MATURITY PROFILE SOUTH CARAMUT 1

III PALYNOSTRATIGRAPHY

A 100m (swc)-140m (swc) : lower to middle *P. tuberculatus* zone

Assignment to the lower-middle *Proteacidites tuberculatus* zone is indicated at the top by youngest *Nothofagidites flemingii* and *Periporopollenites vesicus* and at the base by oldest *Cyatheacidites annulatus*. *Haloragacidites harrisii* is dominant with frequent *Cyathidites minor*, *Lygistepollenites florinii* and *Nothofagidites falcata*. The dinoflagellates are not age diagnostic but frequent *Operculodinium* and *Apteodinium* is consistent with the spore-pollen assignment.

Nearshore environments are indicated by the dominant and diverse spores and pollen and subordinate low diversity dinoflagellates.

These features are normally seen in the Gellibrand Marl, Clifton Formatin and Nirranda Subgroup in the Otway Basin.

Colourless to light yellow palynomorphs indicate immaturity for hydrocarbons.

B 162m (swc)-191m (swc) : apparently upper *N. asperus* zone

These two samples are somewhat problematic. The swc at 162m is lean but contains a fair Early Cretaceous spore-pollen assemblage with trace quantities of Tertiary palynomorphs, and in isolation might be considered Early Cretaceous with minor mud contamination.

The swc at 191m however, contains a very lean but exclusively Tertiary assemblage similar to that from the overlying P. tuberculatus zone, but lacking the key index C. annulatus. H. harrisii is dominant with Nothofagidites falcata and N. emarcidus common. Rare elements inclue Nothofagidites asperus, Banksieacidites elongatus, Cupaneidites orthoteichus and Proteacidites rictomarginus/incurvatus and an upper N. asperus zone assignment is tentatively applied, more on the absence of the other indicators than on firm positive occurrence. The nature of the assemblages indicates that it cannot possibly be older than lower N. asperus zone.

In view of the Tertiary swc at 191m, the shallower swc is considered to be Oligocene-Miocene with heavily reworked Cretaceous.

Nearshore marine environments are indicated by the dominant and diverse spores and pollen, and the subordinate low diversity dinoflagellates.

These features are normally seen in the Gellibrand Marl, Clifton Formation and Nirranda Subgroup or topmost Dilwyn formation in the Otway Basin.

Colourless to light yellow Tertiary palynomorphs indicate immaturity for hydrocarbons.

C 196m (swc) : C. hughesi zone

Assignment to the Cydosporites hughesi zone is indicated at the top by youngest C. hughesi without younger indicators, and at the base by oldest Pilosisporites notensis, P. parvispinosus and

Triporoletes reticulatus. Cyathidites and Falcisporites are common, with frequent Microcacliryidites antarcticus and Osmundacidites wellmannii.

Non-marine lacustrine environments are indicated by the dominance (60% of palynomorphs) of a thin walled leiosphere with rare Microfasta evansii. Spores and pollen are therefore subordinate but of high diversity.

These features are normally seen in the lower Eumeralla Formation and correlatives of Kopsen and Scholefield (1990).

Dark yellow to light brown spore colours indicate early marginal maturity for oil generation.

D 302m-373m : indeterminate

Yields are very low and confident zonal assignment is not possible. Non-marine environments are suggested by the dominant and diverse spores and pollen and absence of marine indicators.

Dark yellow to light brown spore colours indicate early marginal maturity for oil generation.

E 379.5m (swc)-381m (swc) : F. wonthaggiensis zone

Assignment to the Foraminisporis wonthaggiensis zone is indicated at the top by the absence of younger indicators and at the base by olderst Dictyotosporites speciosus. Cyathidites, O. wellmannii and Falcisporites dominate the assemblages.

Non-marine environments are indicated by the dominant

and diverse spores and pollen, common cuticle and absence of marine indicators. Minor lacustrine influence is indicated by the rare non-spiny acritarchs, including M. evansii at 381m.

These features are normally seen in the upper Pretty Hill Formation and correlatives.

Light brown spore colours indicate early maturity for hydrocarbons.

F 393m (swc) : F. wonthaggiensis or C. australiensis zones

Microfossil yield was lean in this sample, but it is essentially similar to that above. The absence of the key marker taxa D. speciosus suggests the C. australiensis zone, but its absence may be due to scarcity in a lean assemblage, and a F. wonthaggiensis age may be possible. The presence of Cicatricosisporites australiensis indicates that it can be no older than the Early Neocomian C. australiensis zone. Cyathidites, Falcisporites and Osmundacidites dominate the assemblage.

Non-marine probably fluvial environments are suggested by the common and diverse spores and pollen, and absence of acritarchs.

These features are normally seen in the Pretty Hill Formation and correlatives in the Otway Basin.

Light brown spore colours indicate marginal maturity for oil generation but immaturity for gas/condensate.

IV CONCLUSIONS

The sampled section includes a truncated Early Cretaceous sequence (consisting of Pretty Hill and basal Eumeralla correlatives) unconformably overlain by a thin Tertiary section (consisting of Oligocene to Miocene Gellibrand Marl, to Nirranda Group correlatives).

The Early Cretaceous is marginally mature near surface and suggests that it has been much more deeply buried at some time in the past, probably before deposition of the thin Tertiary section.

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SOUTH CARAMUT #1 palynological data

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Box 161, Maitland, South Australia, 5573.
phone (088) 32 3795 ... fax (088) 32 2798

CLIENT: Lakes Oil
WELL: South Caramut #1
FIELD / AREA: Otway Basin

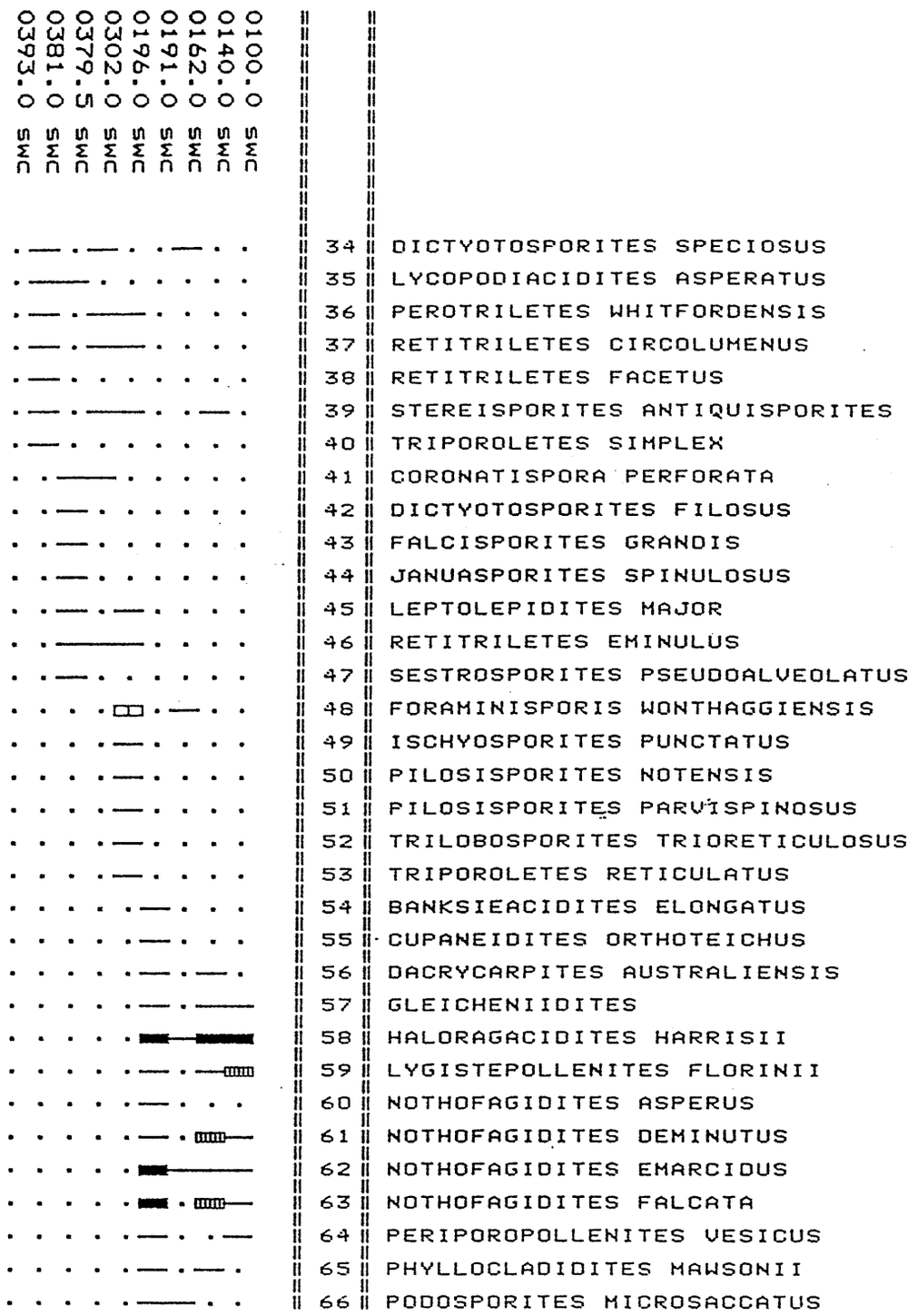
ANALYST: Roger Morgan DATE: February '91
NOTES: all sample depths are in metres

RANGE CHART OF GRAPHIC ABUNDANCES BY LOWEST APPEARANCE: dino & s/p

Key to Symbols

	= Very Rare
	= Rare
	= Few
	= Common
	= Abundant
?	= Questionably Present
.	= Not Present

	1 MICROFASTA EVANSII	2 SCHIZOSPORIS RETICULATUS	3 LEIOSPHAERIDIA SP.	4 CORDOSPHAERIDIUM FIBROSPINOSUM	5 OPERCULODINIUM SPP	6 SPINIFERITES FURCATUS/RAMOSUS	7 SYSTEMATOPHORA PLACACANTHA	8 APTEODINIUM AUSTRALIENSE	9 AEQUITRIRADITES SPINULOSUS	10 BIRETRISPORITES SPECTABILIS	11 CERATOSPORITES EQUALIS	12 CICATRICOSISPORITES AUSTRALIENSIS	13 CONTIGNISPORITES COOKSONIAE	14 CONTIGNISPORITES GLEBULENTUS	15 COROLLINA TOROSUS	16 CYATHIDITES AUSTRALIS	17 CYATHIDITES MINOR	18 DICTYOTOSPORITES COMPLEX	19 FALCISPORITES SIMILIS	20 FORAMINISPORIS DAILYI	21 KLUKISPORITES SCABERIS	22 LEPTOLEPIDITES VERRUCATUS	23 MICROCACHRYIDITES ANTARCTICUS	24 OSMUNDACIDITES WELLMANII	25 RETITRILETES AUSTROCLAVATIDITES	26 RETITRILETES WATHAROOENSIS	27 TRIPOROLETES RADIATUS	28 TRIPOROLETES fine RETICULATUS	29 AEQUITRIRADITES VERRUCOSUS	30 ARAUCARIACITES AUSTRALIS	31 COUPERISPORITES TABULATUS	32 CYCADOPITES FOLLICULARIS	33 CYCLOSPORITES HUGHESI
100.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
140.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
162.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
191.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
196.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
302.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
379.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
381.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
393.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.


0100.0 SWC
0140.0 SWC
0162.0 SWC
0191.0 SWC
0196.0 SWC
0302.0 SWC
0379.5 SWC
0381.0 SWC
0393.0 SWC
34 DICTYOTOSPORITES SPECIOSUS
35 LYCOPODIACIDITES ASPERATUS
36 PEROTRILETES WHITFORDENSIS
37 RETITRILETES CIRCOLUMENUS
38 RETITRILETES FACETUS
39 STEREISPORITES ANTIQUISPORITES
40 TRIPOROLETES SIMPLEX
41 CORONATISPORA PERFORATA
42 DICTYOTOSPORITES FILOSUS
43 FALCISPORITES GRANDIS
44 JANUASPORITES SPINULOSUS
45 LEPTOLEPIDITES MAJOR
46 RETITRILETES EMINULUS
47 SESTROSPORITES PSEUDOALVEOLATUS
48 FORAMINISPORIS WONTHAGGIENSIS
49 ISCHYOSPORITES PUNCTATUS
50 PILOSISPORITES NOTENSIS
51 PILOSISPORITES PARVISPINOSUS
52 TRILOBOSPORITES TRIORETICULOSUS
53 TRIPOROLETES RETICULATUS
54 BANKSIEACIDITES ELONGATUS
55 CUPANEIDITES ORTHOTEICHUS
56 DACRYCARPITES AUSTRALIENSIS
57 GLEICHENIIDITES
58 HALORAGACIDITES HARRISII
59 LYGISTEPOLLENITES FLORINII
60 NOTHOFAGIDITES ASPERUS
61 NOTHOFAGIDITES DEMINUTUS
62 NOTHOFAGIDITES EMARCIDUS
63 NOTHOFAGIDITES FALCATA
64 PERIPOROPOLLENITES VESICUS
65 PHYLLOCLADIDITES MAWSONII
66 PODOSPORITES MICROSACCATUS

	67 PROTEACIDITES INCURVATUS	68 PROTEACIDITES SCABORATUS	69 SAPATACEOIDAEPOLLENITES ROTUNDA	70 TRILETES TUBERCULIFORMIS	71 CYATHEACIDITES ANNULATUS	72 MYRTACEIDITES PARVUS	73 NOTHOFAGIDITES FLEMINGII	74 PERIPOROPOLLENITES POLYORATUS	75 PROTEACIDITES SP	76 TETRACOLPORITES OAMARUENSIS	77 VERRUCOSISPORITES KOPUKUENSIS	78 DILWYNITES GRANULATUS	
0100.0 SWC	.	.	|	|	|	.	|	.	|	|	.	|	0100.0 SWC
0140.0 SWC	.	.	.	|	|	|	|	|	|	|	|	.	0140.0 SWC
0162.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	0162.0 SWC
[illegible]	.	.	.	.									[illegible]

PE907571

This is an enclosure indicator page.
The enclosure PE907571 is enclosed within the container PE902067 at this location in this document.

The enclosure PE907571 has the following characteristics:

ITEM_BARCODE	= PE907571
CONTAINER_BARCODE	= PE902067
NAME	= Well Summary Sheet
BASIN	= OTWAY
PERMIT	= PEP/122
TYPE	= WELL
SUBTYPE	= MONTAGE
DESCRIPTION	= Well Summary Sheet (enclosure from WCR) for South Caramut-1
REMARKS	=
DATE_CREATED	= 31/03/91
DATE_RECEIVED	=
W_NO	= W1037
WELL_NAME	= South Caramut-1
CONTRACTOR	= Lakes Oil Ltd
CLIENT_OP_CO	= Lakes Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE605031

This is an enclosure indicator page.
The enclosure PE605031 is enclosed within the container PE902067 at this location in this document.

The enclosure PE605031 has the following characteristics:

ITEM_BARCODE	= PE605031
CONTAINER_BARCODE	= PE902067
NAME	= Composite Well Log
BASIN	= OTWAY
PERMIT	= PEP/122
TYPE	= WELL
SUBTYPE	= COMPOSITE lOG
DESCRIPTION	= Composite Well Log (enclosure from WCR) for South Caramut-1
REMARKS	=
DATE_CREATED	= 18/10/90
DATE_RECEIVED	= 9/05/91
W_NO	= W1037
WELL_NAME	= South Caramut-1
CONTRACTOR	= Lakes Oil Ltd
CLIENT_OP_CO	= Lakes Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE600889

This is an enclosure indicator page.
The enclosure PE600889 is enclosed within the container PE902067 at this location in this document.

The enclosure PE600889 has the following characteristics:

ITEM_BARCODE	= PE600889
CONTAINER_BARCODE	= PE902067
NAME	= Mud Log
BASIN	= OTWAY
PERMIT	= PEP/122
TYPE	= WELL
SUBTYPE	= MUD_LOG
DESCRIPTION	= Mud Log, Halliburton Geodata Services (enclosure fro WCR) for South Caramut-1
REMARKS	=
DATE_CREATED	= 18/10/90
DATE_RECEIVED	= 9/05/91
W_NO	= W1037
WELL_NAME	= South Caramut-1
CONTRACTOR	= Halliburton Geodata Services
CLIENT_OP_CO	= Lakes Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE600890

This is an enclosure indicator page.
The enclosure PE600890 is enclosed within the container PE902067 at this location in this document.

The enclosure PE600890 has the following characteristics:

ITEM_BARCODE	= PE600890
CONTAINER_BARCODE	= PE902067
NAME	= Dual Laterolog MLL Sonic CR
BASIN	= OTWAY
PERMIT	= PEP/122
TYPE	= WELL
SUBTYPE	= WELL_LOG
DESCRIPTION	= Dual Laterolog MLL Sonic CR (enclosure from WCR) for South Caramut-1
REMARKS	=
DATE_CREATED	= 18/10/90
DATE_RECEIVED	= 9/05/91
W_NO	= W1037
WELL_NAME	= South Caramut-1
CONTRACTOR	= BPB
CLIENT_OP_CO	= Lakes Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE600891

This is an enclosure indicator page.
The enclosure PE600891 is enclosed within the container PE902067 at this location in this document.

The enclosure PE600891 has the following characteristics:

ITEM_BARCODE	= PE600891
CONTAINER_BARCODE	= PE902067
NAME	= Dual Laterolog MLL Gamma Ray Caliper
BASIN	= OTWAY
PERMIT	= PEP/122
TYPE	= WELL
SUBTYPE	= WELL_LOG
DESCRIPTION	= Dual Laterolog MLL Gamma Ray Caliper (enclosure from WCR) for South Caramut-1
REMARKS	=
DATE_CREATED	= 18/10/90
DATE_RECEIVED	= 9/05/91
W_NO	= W1037
WELL_NAME	= South Caramut-1
CONTRACTOR	= BPB
CLIENT_OP_CO	= Lakes Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE600892

This is an enclosure indicator page.
The enclosure PE600892 is enclosed within the container PE902067 at this location in this document.

The enclosure PE600892 has the following characteristics:

ITEM_BARCODE	= PE600892
CONTAINER_BARCODE	= PE902067
NAME	= Compensated Sonic GR Cal
BASIN	= OTWAY
PERMIT	= PEP/122
TYPE	= WELL
SUBTYPE	= WELL_LOG
DESCRIPTION	= Compensated Sonic GR Cal (enclosure from WCR) for South Caramut-1
REMARKS	=
DATE_CREATED	= 18/10/90
DATE_RECEIVED	= 9/05/91
W_NO	= W1037
WELL_NAME	= South Caramut-1
CONTRACTOR	= BPB
CLIENT_OP_CO	= Lakes Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE600893

This is an enclosure indicator page.
The enclosure PE600893 is enclosed within the container PE902067 at this location in this document.

The enclosure PE600893 has the following characteristics:

ITEM_BARCODE	= PE600893
CONTAINER_BARCODE	= PE902067
NAME	= Compensated Sonic GR Cal
BASIN	= OTWAY
PERMIT	= PEP/122
TYPE	= WELL
SUBTYPE	= WELL_LOG
DESCRIPTION	= Compensated Sonic GR Cal (enclosure from WCR) for South Caramut-1
REMARKS	=
DATE_CREATED	= 18/10/90
DATE_RECEIVED	= 9/05/91
W_NO	= W1037
WELL_NAME	= South Caramut-1
CONTRACTOR	= BPB
CLIENT_OP_CO	= Lakes Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE600894

This is an enclosure indicator page.
The enclosure PE600894 is enclosed within the container PE902067 at this location in this document.

The enclosure PE600894 has the following characteristics:

ITEM_BARCODE	= PE600894
CONTAINER_BARCODE	= PE902067
NAME	= Dual Laterolog MLL GR Cal
BASIN	= OTWAY
PERMIT	= PEP/122
TYPE	= WELL
SUBTYPE	= WELL_LOG
DESCRIPTION	= Dual Laterolog MLL Sonic GR (enclosure from WCR) for South Caramut-1
REMARKS	=
DATE_CREATED	= 18/10/90
DATE_RECEIVED	= 9/05/91
W_NO	= W1037
WELL_NAME	= South Caramut-1
CONTRACTOR	= BPB
CLIENT_OP_CO	= Lakes Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE600895

This is an enclosure indicator page.
The enclosure PE600895 is enclosed within the container PE902067 at this location in this document.

The enclosure PE600895 has the following characteristics:

ITEM_BARCODE	PE600895
CONTAINER_BARCODE	PE902067
NAME	Dual Laterolog MLL Sonic GR
BASIN	OTWAY
PERMIT	PEP/122
TYPE	WELL
SUBTYPE	WELL_LOG
DESCRIPTION	Dual Laterolog MLL Sonic GR (enclosure from WCR) for South Carramut-1
REMARKS	
DATE_CREATED	18/10/90
DATE_RECEIVED	9/05/91
W_NO	W1037
WELL_NAME	South Caramut-1
CONTRACTOR	BPB
CLIENT_OP_CO	Lakes Oil Ltd

(Inserted by DNRE - Vic Govt Mines Dept)