

Log Analysis of  
The Latrobe Group in  
Angler-1

**INTERPRETATIVE**

GL/89/023  
JMQ/k1  
7 September 1989

CONTENTSPAGE

1.	SUMMARY AND CONCLUSIONS.....	1
2.	INTRODUCTION.....	3
3.	METHOD.....	4
4.	PARAMETERS, CUTOFFS AND ANALYSIS OPTIONS.....	5
4.1	Formation Water Resistivity (Rw).....	5
4.2	Matrix and Reservoir Parameters.....	7
4.3	Analysis.....	7
4.4	Cutoffs.....	8
5.	LOG ANALYSIS RESULTS.....	8
5.1	Upper T.Longus.....	8
5.2	Middle T.Longus.....	8
5.3	Upper Lower T.Longus.....	9
5.4	Selene Sandstone.....	10
5.5	Upper Campanian.....	10
5.6	Campanian "A" Sandstone.....	11
5.7	Lower Campanian.....	11
5.8	Campanian "B" Sandstone.....	11
6.	REFERENCES.....	14



LIST OF FIGURES

- FIGURE 1     Effective porosity versus depth - Angler-1 (2800-4330m)
- FIGURE 2     Density neutron cross-plot in Campanian "B" Sandstones  
(4213-4239m). Points taken only where density and neutron logs  
cross-over.
- FIGURE 3     Density neutron cross-plot in Campanian "B" Sandstones  
(4213-4239m). Gas effect where density-neutron cross-over exceeds  
9 pu.

LIST OF TABLES

- TABLE 1     Summary of Hydrocarbon-Bearing Zones
- TABLE 2     Reservoir Zonation and Key Analysis Parameters
- TABLE 3     Summary of Log Analysis Results
- TABLE 4     Results of Sensitivity Runs in Campanian "B" Sandstone Gas Zone  
(4213-4239m)

LIST OF ENCLOSURES

- ENCLOSURE 1    Raw and Corrected Logs - 1:500 scale (2800-3650m)
- ENCLOSURE 2    Raw and Corrected Logs - 1:500 scale (3650-4330m)
- ENCLOSURE 3    Log Analysis Results - 1:500 scale (2800-3650m)
- ENCLOSURE 4    Log Analysis Results - 1:500 scale (3650-4330m)
- ENCLOSURE 5    Log Analysis Results - 1:200 scale (3175-3275m)
- ENCLOSURE 6    Log Analysis Results - 1:200 scale (3825-3875m)
- ENCLOSURE 7    Log Analysis Results - 1:200 scale (4200-4325m)  
                  Campanian "B" Sandstones

LIST OF APPENDICES

- APPENDIX 1    Log Analysis Parameters
- APPENDIX 2    Detailed Log Analysis Results

## 1. SUMMARY AND CONCLUSIONS

A total of 1530m of wireline logs, covering the entire Latrobe Group at Angler-1 have been evaluated. The analysis covers the interval from 2800m (21m above Top Latrobe Unconformity) to 4330m (TD).

The conclusions are:

- (a) The presence of hydrocarbons has been confirmed in three zones. These zones and their characteristics are listed in Table 1 below.

TABLE 1  
ANGLER-1 SUMMARY OF HYDROCARBON BEARING ZONES

INTERVAL	RESERVOIR TYPE	HYDROCARBON TYPE	COMMENTS
3175-3255m	Thinly bedded sandstones within a siltstone and coal sequence	gas/oil	Low hydrocarbon saturations. Good gas shows while drilling. Average porosity = 21.3% Average Sw = 80.6%
3830-3842.5m Campanian "A" Sandstone	Tight pebbly sandstone cemented by calcite/dolomite	oil	Residual oil observed in Core #1. Measured K/porosity very low. Porous sandstone beneath with no shows. Average porosity = 10.9% Average Sw = 86.5%
4213-4239m Campanian "B" Sandstone	Thickly bedded sandstones with siltstone interbeds	gas	14.5m of net gas sandstone. Average porosity = 13.0%, Sw = 29.5%. RFT gradient indicates GWC @ 4239m. RFT fluid sample @ 4226m recovered 92.4 ft <sup>3</sup> gas and 600 cc condensate

- (b) The Selene Sandstone, the primary target at Angler-1 occurs between 2352m and 3517m, and as predicted, proved to be an excellent reservoir section with a gross sandstone thickness of 197.7m and an average porosity of 21.4%. Unfortunately, apart from minor gas shows in the top 5m of sandstone, the entire section was water-bearing.
- (c) Two intervals show major seal potential, the first from 3481-3517m is a shale/siltstone unit at the base of the Selene Sandstone which directly overlies stream mouth bar sandstones of Campanian age. The second interval from 3900-4213m is a massive argillaceous siltstone unit which seals the underlying gas bearing Campanian "B" Sandstones.
- Interbedded siltstone units up to 30m thick occur in the Upper T.Longus interval (2820-2957m) and if laterally persistent could also have a good seal potential.
- (d) The lack of major seals within the Maastrichtian (2821-3517m) is one likely reason for the lack of reservoired hydrocarbons within this sandstone rich interval.
- (e) The porosity versus depth plot for Angler-1 (Fig. 1) shows that moderate effective porosities of 12-15% are still preserved to a depth of at least 4275m in zones where favourable sandy facies are developed.

## 2. INTRODUCTION

This report presents the results of a log analysis over the entire Latrobe Group drilled in Angler-1, a section 1530m thick. The aims of this work were to assess the reservoir and seal potential of all the sandstones within the Latrobe Group at Angler-1 paying particular attention to zones with hydrocarbon shows detected while drilling.

The computations were performed using LOGCALC 2, using environmentally corrected wireline logs. As with the previous Petrofina log analysis performed on wells in the VIC/P20 area (Tringham and Questiaux, 1988), a shaley sand model was used with water saturations derived from the Indonesian equation.

Reservoir parameters were selected separately for each zone and  $R_w$  values were automatically corrected during computation for temperature changes with depth. Results are presented on a zone by zone basis and include a summary of results for quick reference (Table 3), a listing of reservoir and log analysis parameters (Appendix 1), and detailed tabulated results over each zone (Appendix 2): Enclosures 1 to 4 show graphic output logs at 1:500 scale displaying the raw and corrected logs, together with the log analysis results over the entire Latrobe Group. Detailed 1:200 scale plots over the zones of hydrocarbon interest are shown on Enclosures 5 to 7.

The log quality is good throughout with very few washed out or highly rugose hole sections. As a result of both overlap problems and tool failure, there is no Neutron log for 2893-2900m, no Density log for 2900-2960m, and the Sonic log is not valid for 2880-2900m.

### 3. METHOD

All log analysis computations were done by computer using LOGCALC 2 software from Scientific Software-Intercomp Inc., Denver.

Briefly summarized below is the method employed for the log evaluation:

- (i) The final edited logs received from Schlumberger at the end of the well were loaded into LOGCALC 2 and interactively depth matched, using the Gamma Ray and Sonic Logs as the reference depth.
- (ii) The Gamma Ray, density and neutron logs were then corrected for borehole effects, and the resistivity logs corrected for invasion to give the true Rt. Enclosures 1 and 2 display the raw and corrected logs for Angler-1.
- (iii) The well was then zoned into eight separate intervals, defined on the basis of palynological age dating, wireline log breaks and hydrocarbon indications.

This zonation is consistent with the one used on the earlier VIC/P20 wells and will facilitate updating of maps from the VIC/P20 reservoir study (Tringham, 1988).

- (iv) Reservoir parameters were selected for each zone and by means of an iterative process modified until results became internally consistent (good match between various porosity curves computed from the separate logs) and satisfied the constraints from the wellsite data (Vshale, mineralogy, hydrocarbon shows, etc.).

- (v) Where applicable, sensitivity runs were performed to evaluate the effect of parameter variations. Results from sensitivity runs over the gas zone from 4213-4239m are included in this report (Table 4).

#### 4. PARAMETERS, CUTOFFS AND ANALYSIS OPTIONS

The key reservoir parameters used in the log analysis are listed in Table 2 and the full list of parameters are contained in Appendix 1.

##### 4.1 Formation Water Resistivity (Rw)

No formation water samples were obtained in Angler-1 and Rw values had to be indirectly derived. Rw values from neighbouring Selene-1 were taken as a first approximation, and then modified until the Ro and Rt curves closely matched in known water-bearing sandstones. Rwa was also used as a check over intervals of clean water-bearing sandstones. The output logs (Encls. 3 to 7) show Ro and Rt plotted together in the same track. In water bearing sandstones these curves overlay each other, while in hydrocarbon bearing sandstones Rt reads higher than Ro, the separation between the two curves being a function of the hydrocarbon saturation. Table 2 lists the Rw values at the base of each zone.

TABLE 2

## ANGLER-1 ZONATION AND KEY RESERVOIR PARAMETERS

ZONE	INTERVAL (m) Top - Bottom		PARAMETER SET NAME	Rw @ BOTTOM OF ZONE (ohm-m)	GR Matrix (API)	GR Shale (API)	Rho Shale (g/cc)	PhiN Shale (pu)	$\Delta t$ Shale ( $\mu$ s/ft)	Res Shale (ohm-m)	Rho Matrix (g/cc)	$\Delta t$ Matrix ( $\mu$ s/ft)	Cp	Rho Fluid (g/cc)
UPPER T.LONGUS	2821	2909	U.T.LONG	0.0999	28	120	2.45	33	95	2.5	2.66	56	1.1	1
	2909	2923	U.T.LONG	0.0815	28	120	2.45	33	95	2.5	2.66	56	1.1	1
	2923	2957	U.T.LONG	0.0628	28	120	2.45	33	95	2.5	2.66	56	1.1	1
MIDDLE T.LONGUS	2957	3022	M.T.LONG	0.1048	28	135	2.45	24	85	3	2.66	56	1	1
	3022	3083	M.T.LONG	0.1291	28	135	2.45	24	85	3	2.66	56	1	1
UPPER LOWER T.LONGUS	3083	3252	L.T.LONG	0.1285	38	140	2.58	25.5	78	11	2.65	55	1	1
SELENE SST	3252	3517	SELENE	0.0939	38	140	2.58	25.5	78	11	2.65	55	1	1
UPPER CAMPANIAN	3517	3830	TOP CAMP	0.0990	45	140	2.55	25	77	10	2.65	55	1	1
CAMPANIAN 'A' SANDSTONE	3830	3842.5	CAMPA/T	0.1075	39	135	2.57	25	78	11	2.67	52	1	1
	3442.5	3860	CAMPA/B	0.1363	42	135	2.55	25	78	11	2.64	55	1	1
LOWER CAMPANIAN	3860	4213	LOW CAMP	0.1074	45	140	2.57	25	77	10	2.65	55	1	1
CAMPANIAN 'B' SANDSTONE	4213	4239	CAMPB/T	0.1018	40	135	2.6	24	74	12	2.66	56	1	0.9
	4239	4330	CAMPB/B	0.1070	40	135	2.6	24	74	12	2.66	56	1	1

NOTE: Core # 1 core analysis results show: Rho mat = 2.64 -2.68 g/cc from 3839.2 -3842.5m  
Rho mat = 2.58 -2.63 g/cc from 3842.5 -3848m



#### 4.2 Matrix and Reservoir Parameters

Selected matrix parameters range from 2.64 g/cc to 2.67 g/cc and 55  $\mu$ s/ft to 52  $\mu$ s/ft (Table 2). The variations in the matrix parameters reflect the variation in mineralogy within the sandstones. Petrographic work has indicated that the Latrobe Group sandstones at Angler-1 originate from a granitic source, and contain high proportions of feldspar and micas together with some dolomite cement (Lemon and Phillips, 1989).

The shale and coal parameters were selected for each zone from the logs, while mud properties and temperatures were taken from the log headers. Bottom hole temperatures for each run were first corrected for static borehole conditions. Table 2 includes a list of the shale parameters for each zone.

#### 4.3 Analysis

A shaley sand analysis was selected because of the complete gradation of sandstone to shale within the Latrobe Group. In all Vshale determinations both the GR and the Density Neutron cross plots were used, with LOGCALC 2 selecting the lowest computed Vshale from either. Porosities were calculated using the three standard porosity curves while the effective porosity (Phie) was computed from the density porosity. The three computed porosities together with Phie are displayed on the output logs (Encls. 3 to 7).

The Indonesian formula was used for Sw determination, with the Humble parameters of  $a = 0.62$ ;  $m = 2.15$  and  $n = 2$ .

#### 4.4 Cutoffs

Cutoff values used were:

- (i) porosity = 6%; Vshale = 40% for gross reservoir sandstone
- (ii) porosity = 6%; Vshale = 40% and Sw = 50% for net reservoir sandstone

### 5. LOG ANALYSIS RESULTS

Overall Angler-1 contains 636.3m of gross sandstone, representing a 42% gross sandstone/gross interval ratio. The average porosity by zone ranges from 21.4% down to 11.7%. The only net hydrocarbon sandstones in the well occur from 4212m to 4239m and these have a total net thickness of 14.5m, an average porosity of 13.0% and an average Sw of 29.5%.

#### 5.1 Upper T.Longus (2820-2957m)

The lower shoreface and stream mouthbar deposits in this interval have a good reservoir potential with 63.7m of gross sandstone and an average porosity of 19.1%. These sandstones are sealed above by glauconitic siltstones of the Gurnard Formation. Other interbedded siltstone units are present within this interval, up to 30m in thickness, giving good top seal potential. As expected, no hydrocarbons were detected in this zone. There being no structural or stratigraphic closure interpreted at this level.

#### 5.2 Middle T.Longus (2957-3083m)

This interval contains abundant upward coarsening stream mouthbar sandstones near the top, grading downwards to interbedded coastal plain sandstones, siltstones and coals. The reservoir potential is good with 50.4m of gross sandstone, and a gross reservoir/gross

interval ratio of 0.4. Porosities average 19.6%. No potential sealing units are present in this zone. No hydrocarbons were detected in this zone.

### 5.3 Upper Lower T.Longus (3083-3252m)

This interval comprises a coastal plain sequence similar to that found at the base of the Middle T.Longus section. Point bar sandstones, 1m to 5m thick, are developed in this interval, and these are interbedded with abundant siltstones and coals. While drilling below 3175m, gas values increased, climbing from traces only, to a peak of 4% total gas at 3235m before dropping back to traces at 3255m. The gas dryness index (C1/C Total) ranged from 100% to 83% with the heaviest hydrocarbon identified being traces of C4. The log analysis results over the zone with shows indicate a number of sandstones around 1m thick with Sw values ranging from 55% to 90%, with most values greater than 70% (Encls. 3 and 5). RFT pressures over this same interval showed overall a salt water gradient of 0.455 psi/ft, but with one point at 3231m 21 psi above trend. Geochemical evidence shows that the coals in this interval are rich in Resinite, Suberinite and Bituminite which have a good potential for generating oil/condensate at low maturity levels (VR threshold of 0.45). The average vitrinite reflectance levels measured in the coals range from 0.41 to 0.47, and this, coupled with the presence of the Exsudatinitite found in these coals, indicate that the hydrocarbons at this level were generated in situ from the thermally labile Exinites listed above. The poor seal potential of the section above 3175m however, prevented any significant amounts of hydrocarbon from being trapped.

5.4 Selene Sandstone (3252-3517m)

This interval, interpreted as a massive sequence of stacked stream mouthbar sandstones contains 197.7m of gross sandstone with an average porosity of 21.4%. Minor coal interbeds are concentrated in the upper 30m of this interval. The log analysis shows an  $S_w$  of 80% at the top between 3252m and 3256m, increasing rapidly to 100% at 3263m and below (Encls. 3 and 6). The interpreted minor gas saturations at the top of the Selene Sandstone coincide with a small gas peak of 0.2% recorded when drilling. The lack of adequate seal directly above and across the prospect boundary fault to the north is probably responsible for the lack of hydrocarbons trapped in this primary objective. A siltstone/shale unit at the base of the Selene Sandstone from 3481m to 3517m forms a significant intra-Latrobe seal.

5.5 Upper Campanian (3517-3830m)

This interval contains abundant upward coarsening stream mouthbar sandstones interbedded with upper and lower delta front siltstones. The reservoir potential in this interval is good with a 169m of gross sandstone, a gross reservoir/gross interval ratio of 0.54, and an average porosity of 18.1%. The Interbedded siltstones are thin and sandy, and generally do not show a good shale response on the density neutron logs making them poor potential seals. No hydrocarbons were detected in the zone.

5.6 Campanian "A" Sandstone (3830-3860m)

This is an anomalous stream mouthbar sandstone unit which displayed excellent hydrocarbon shows while drilling. Core #1 was cut from 3839.2m to 3848.1m (loggers depth) to evaluate its reservoir potential. The upper portion of the core (3839.2m to 3842.5m) comprises a pebbly sandstone, rich in feldspars and micas but tightly cemented by dolomite, with porosities less than 4%. Thin-section petrography showed residual oil coating on the grains predating the dolomite cement (Lemon and Phillips, 1989). The lower portion of the core (3842.5m to 3848.1m) is an upward coarsening unit, with a coarse pebbly sandstone at the top grading down to a medium sandstone at the base. Cementation is weak resulting in good porosities between 16% to 24%. Enclosure 6 shows the excellent match between the computed log porosities and those measured by core analysis.

5.7 Lower Campanian (3860-4213m)

This interval comprises a massive pro-delta siltstone with sandstones totally absent except for a few tight stringers (Encl. 3). This interval represents the best intra-Latrobe seal found at Angler-1 and actually traps the gas in the underlying Campanian "B" Sandstone.

5.8 Campanian "B" Sandstone (4213-4330m TD)

The Campanian "B" Sandstones are interpreted as upper and lower shoreface deposits, underlain by offshore siltstones. This interval contains the only net reservoirs found at Angler-1. The total gross reservoir thickness is 35.8m and the net reservoir thickness is 14.5m, all of which is concentrated in the interval

4213-4233m (Encl. 7). The average porosity in the net sandstone is 13.0% with an average  $S_w$  of 29.5%.

The density neutron cross plots (Figs. 2 and 3) covering the net interval only, clearly shows a gas effect where the cross-over between the two curves exceeds nine porosity units (Fig. 3). RFT pressure measurements taken over the entire interval show a gas gradient of 0.110 psi/ft from 4213m down to 4239m, and a water gradient of 0.430 psi/ft below this, indicating a gas/water contact at 4239m. An RFT sample collected at 4226m recovered 92.4 ft<sup>3</sup> of gas ( $C_1 = 88\%$ ;  $C_2 = 5\%$ ;  $C_3 = 1.63\%$ ;  $C_4 = 0.24\%$ ) and 600 cc of condensate ( $SG = 0.77$  @ 21.8°C, 52° API) confirming a moderately lean gas as the reservoired hydrocarbon. During drilling, high gas values occurred down to 4285m and the log analysis shows a high  $S_w$  of around 80% down to 4300m. Below the interpreted gas/water contact, the RFT pressure gradient of 0.430 psi/ft is slightly lower than a water gradient indicating that the presence of gas observed while drilling may be related to a transition zone.

Several sensitivity runs were performed over the gas zone to evaluate the effects of parameter variation, including fluid and matrix density, matrix transit time and  $R_w$ . Results are shown in Table 4, and illustrate a porosity range from 13.8% to 12.3% and an  $S_w$  range from 27.5% to 30.8%. The net reservoir thickness ranges from a low of 13.1m to a maximum of 15.2m.

**TABLE 3**  
**ANGLER-1 SUMMARY OF LOG ANALYSIS RESULTS**

ZONE	INTERVAL (m) Top - Bottom		THICKNESS (m)	GROSS RESERVOIR THICKNESS (m)	GROSS RESERVOIR THICKNESS/GROSS INTERVAL THICKNESS	AVERAGE PHIE (%)	AVERAGE Sw (%)	NET RESERVOIR THICKNESS (m)	AVERAGE PHIE (%)	AVERAGE Sw (%)
UPPER T. LONGUS	2821	2957	137	63.7	0.46	19.1	98.9	0	-	-
MIDDLE T. LONGUS	2957	3083	126	50.4	0.40	19.6	96.2	0	-	-
UPPER LOWER T. LONGUS	3083	3252	169	92.3	0.55	20.6	90.3	0	-	-
SELENE SANDSTONE	3252	3517	265	197.7	0.75	21.4	97.7	0	-	-
UPPER CAMPANIAN	3517	3830	313	169.0	0.54	18.1	98.3	0	-	-
CAMPANIAN 'A' SANDSTONE	3830	3860	30	9.0	0.30	17.7	95.0	0	-	-
LOWER CAMPANIAN	3860	4213	353	18.9	0.05	12.1	92.1	0	-	-
CAMPANIAN 'B' SANDSTONE	4213	4330 (TD)	117	35.8	0.16	11.7	56.4	14.5	13.0	29.5

Gross Reservoir Cut off = Phie >6%; Vshale <40%

Net Reservoir Cut Off = Phie >6%; Vshale <40%, Sw <50%

TABLE 4

ANGLER-1 RESULTS OF SENSITIVITY RUN IN GAS ZONE OF CAMPANIAN 'B' SANDSTONE (4213-4239m)

RUN #	Rw @ BOTTOM OF ZONE (ohm-m)	Rho Fluid (g/cc)	$\Delta t$ Mat ( $\mu$ s/ft) (ohm-m)	Rho <sub>b</sub> Mat (g/cc)	Thickness of Net Sandstone (m)	Average Porosity (%)	Average Sw (%)
1	0.112	1	55	2.67	14.8	13.8	29.6
2	0.112	1	56	2.65	14.3	13.3	30.2
3	0.112	0.8	56	2.65	13.1	12.5	31.0
4	0.112	0.8	55	2.67	14.7	12.8	30.8
5	0.102	0.9	56	2.66	15.1	12.7	28.8
6	0.102	0.9	56	2.66	14.5	13.0	29.5
7	0.102	0.9	56	2.66	14.3	13.1	30.6
8	0.092	1	55	2.67	15.2	13.7	27.5
9	0.092	1	56	2.65	15.1	13.2	28.4
10	0.092	0.8	56	2.65	14.0	12.3	29.3
11	0.092	0.8	55	2.67	14.9	12.7	29.0

Run # 6 taken as most likely case.



WELL NUMBER

00001

22-SEP-69

13:36:06

ANGLER-1

DEPTH VERSUS POROSITY PLOT

LATROBE GROUP (2800-4330M)

SCALE 1:7500

FIGURE 1

GR

150

30

0

EFFECTIVE POROSITY (%)

TOP LATROBE

TOP SELENE SST

TOP CAMPANIAN

TOP CAMPANIAN "B" SST

2800

3000

3200

3400

3600

3800

4000

4200

FIGURE 2

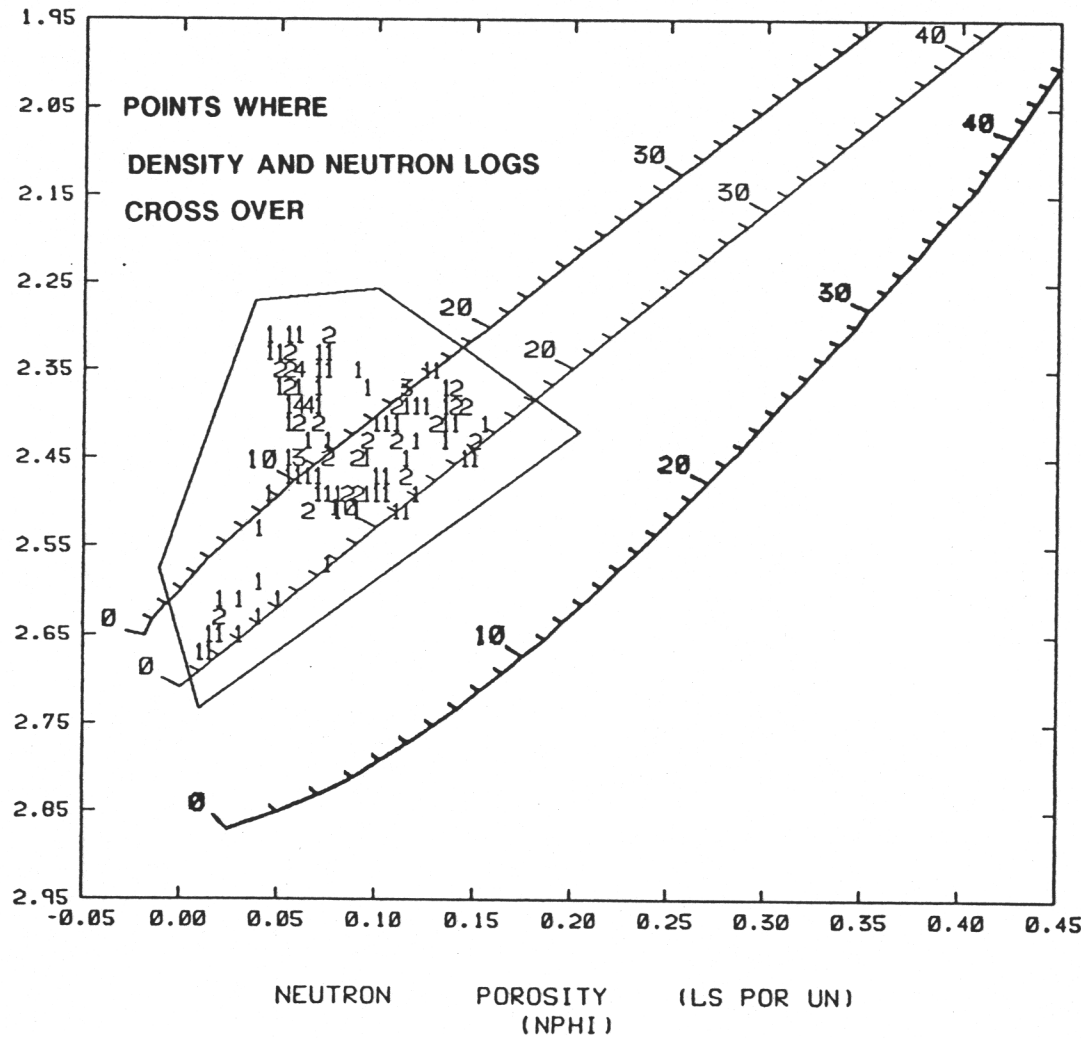
WELL 00001 ANGLER-1 - CAMPANIAN B SST(GAS ZONE)

TOP - 4200.  
BOTTOM - 4239.

DRAW POLYGON	SELECT ZONE	SELECT INTERVAL
-----------------	----------------	--------------------

USE THE CURSOR TO SELECT  
A POLYGON ON THE DISPLAY  
SELECT OPTION  
PICK COMPLETE WHEN DONE

BULK DENSITY RAW (RHOB)  
DATA (GRAMS/CC)



IF SYMBOL - 1 2 3 4 5 6 7 8 9 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z \*

THEN COUNT - 5 10 15 20 25 30 35

4200

4225

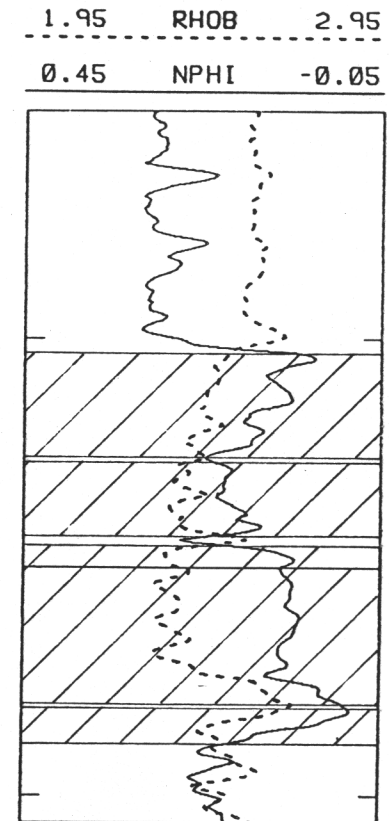


FIGURE 3

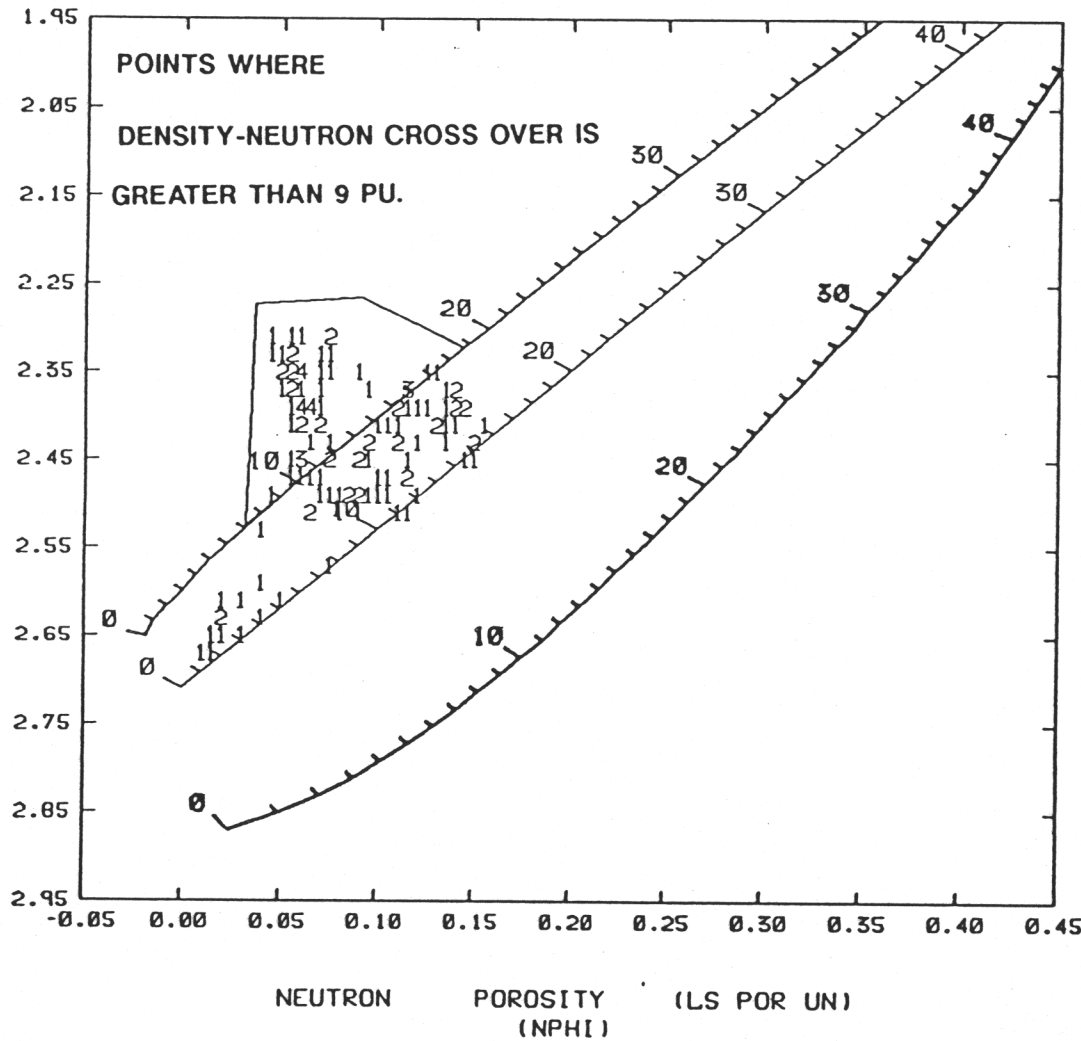
WELL 00001 ANGLER-1 CAMPANIAN B SST (GAS ZONE)

TOP - 4200.  
BOTTOM - 4239.

DRAW POLYGON	SELECT ZONE	SELECT INTERVAL
-----------------	----------------	--------------------

USE THE CURSOR TO SELECT  
A POLYGON ON THE DISPLAY  
SELECT OPTION  
PICK COMPLETE WHEN DONE

BULK  
DENSITY  
RAW  
(RHOGB)  
DATA (GRAMS/CC)

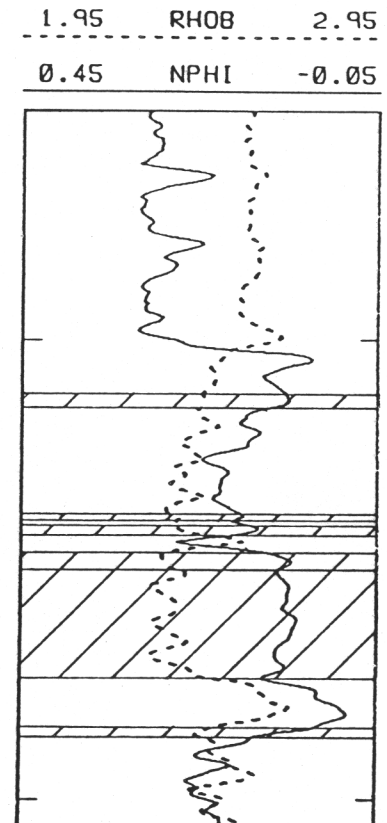


IF SYMBOL - 1 2 3 4 5 6 7 8 9 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z \*

THEN COUNT- 5 10 15 20 25 30 35

4  
2  
0  
0

4  
2  
0  
0



6. REFERENCES

LEMON, N. and PHILLIPS, S. (1989). Petrology Report Angler-1

Core Services of Australia

TRINGHAM, M.E. (1988). VIC/P20 Latrobe Group Reservoir Study

Petrofina Exploration Australia S.A., Unpublished Company Report

GL/88/008

TRINGHAM, M.E. and QUESTIAUX, J.M. (1988). A Log Analysis of the Latrobe

and Strzelecki Group in the Wells of the VIC/P20 Area

Petrofina Exploration Australia S.A., Unpublished Company Report

GL/88/006

## **APPENDIX 1**

### **Log Analysis Parameters**

\*\*\*\*\*  
LISTING OF ENVIRON PARAMETERS

ZONE U.T.LONG WELL ANGLER-1

\*\*\*\*\*

TOP 2800.0000 (METRES) TOP OF INTERVAL  
BOTTOM 2957.0000 (METRES) BOTTOM OF INTERVAL

DESCRIPTION OF PARAMETERS : U.T.LONGUS 2800-2957M

\*\*\*\*\*  
\*\*\*\*\* FLUID VALUES \*\*\*\*\*  
\*\*\*\*\*

RHOFR 1.00 (KG/M3 OR GR/CC) RECORDED FLUID DENSITY  
SALFM 35000. (PPM) FORMATION SALINITY (NACL)  
SALMD 19000. (PPM) MUD SALINITY (NACL)  
RMM 0.3300 (OHM-M) RM  
IF USING AN OIL BASED MUD SET TO > 100  
RMMT 70. (FARENHEIT) MEASURED TEMPERATURE FOR RM  
RMFM 0.2420 (OHM-M) RMF  
RMFMT 73. (FARENHEIT) MEASURED TEMPERATURE FOR RMF  
RMCM 0.5090 (OHM-M) RMC  
RMCMT 70. (FARENHEIT) MEASURED TEMPERATURE FOR RMC

\*\*\*\*\*  
\*\*\*\*\* HOLE AND MUD VALUES \*\*\*\*\*  
\*\*\*\*\*

MW 10.00 (KG/M3 LBS/GAL LBS/FT3 OR SP. GRAV) MUD WT  
ENTER 0 MW FOR AIR FILLED HOLE  
BITSIZ 12.500 (MM OR INCHES) BIT SIZE  
AMST 54.0 (FARENHEIT) ANNUAL MEAN SURFACE TEMP  
BHT 166.0 (FARENHEIT) BOTTOM HOLE TEMPERATURE  
TD 2896. (METRES) TOTAL DEPTH OF BOREHOLE  
RSTAND 1.500 (INCHES) STANDOFF SETTING ON INDUCTION

\*\*\*\*\*  
\*\*\*\*\* LIMITING VALUES \*\*\*\*\*  
\*\*\*\*\*

RHOMIN 1.25 (KG/M3 OR GR/CC) MIN. VALID BULK DENSITY  
DLTMIN 40. (USEC/FT) MIN. VALID SONIC ITT  
DLTMAX 190. (USEC/FT) MAX. VALID SONIC ITT  
PHNMAX 70. (PERCENT) MAXIMUM VALID NEUTRON POROSITY  
RUGMAX 6.00 (INCHES) MAX. RUGOSITY TO ACCEPT NEUTRON  
STOMAX 3.00 (INCHES) MAX. NEUT. STANDOFF  
STOMIN 0.00 (INCHES) MIN. NEUT. STANDOFF TO CORRECT  
(SET TO STOMAX TO BYPASS STANDOFF LOGIC)  
DROLIM 0.20 (KG/M3 OR GR/CC) MAXIMUM DENSITY CORRECTION  
TO ACCEPT (+ OR -)

LIST FOR WELL ANGLER-1 ZONE U.T.LONG

\*\*\*\*\*  
LISTING OF CALC PARAMETERS

ZONE U.T.LONG WELL ANGLER-1

\*\*\*\*\*

TOP 2800.0000 (METRES) TOP OF INTERVAL  
BOTTOM 2957.0000 (METRES) BOTTOM OF INTERVAL

\*\*\*\*\*  
\*\*\*\*\* MATRIX VALUES \*\*\*\*\*  
\*\*\*\*\*

GRMA 28. (API) GAMMA RAY MATRIX  
SPMA -40. (MV) SP MATRIX (MV)  
ATMA 150. (DB/M) ATTENUATION OF THE MATRIX (DB/M)  
DLTSS 56.00 (USEC/FT) DELTA T SANDSTONE  
DLTLS 48.78 (USEC/FT) DELTA T LIMESTONE  
DLTDOL 43.96 (USEC/FT) DELTA T DOLOMITE  
DLTANH 50.00 (USEC/FT) DELTA T ANHYDRITE  
RHOSS 2.66 (KG/M3 OR GR/CC) MATRIX DENS OF SANDSTONE  
RHOLS 2.71 (KG/M3 OR GR/CC) MATRIX DENS OF LIMESTONE  
RHODOL 2.87 (KG/M3 OR GR/CC) MATRIX DENS OF DOLOMITE  
RHOANH 2.98 (KG/M3 OR GR/CC) MATRIX DENS OF ANHYDRITE

TPLSS 7.20 (NSEC/M) TPL OF SANDSTONE  
TPLLS 9.10 (NSEC/M) TPL OF LIMESTONE  
TPLDOL 8.70 (NSEC/M) TPL OF DOLOMITE  
TPLANH 8.40 (NSEC/M) TPL OF ANHYDRITE

VALUES FOR SOLO TOOLS

RHOMAB 2.66 (KG/CM OR GR/CC) MATRIX DENSITY  
DLTMAB 56. (KG/M3 OR GR/CC) TRANSIT TIME MATRIX  
TPLMAB 8.50 (NSEC/M) TPL MATRIX  
NEUMAB 0 NEUTRON MATRIX 0=LS 1=SS 2=DOL

VALUES FOR COAL DETECTION

GRCOAL 180. (API) MAXIMUM GR IN COAL.  
DLTCOL 100. (USEC/FT) MINIMUM SONIC IN COAL.  
UCOAL 8.00 (PPM) MINIMUM URANIUM IN COAL.  
RHOCOL 2.25 (KG/M3 OR GR/CC) MAXIMUM DENSITY OF COAL.  
PNCOL 28. (PERCENT) MINIMUM LS. NEUTRON POR. IN COAL.  
PECOL 3.00 (BARNSE/ELEC.) MAXIMUM PEF IN COAL.  
COALCK 6 NUMBER OF POSITIVE COAL CHECKS NEEDED TO  
IDENTIFY COAL (COAL=1).

## LIST FOR WELL ANGLER-1

ZONE U.T.LONG

```

*****
*****      FLUID VALUES      *****
*****
RHOF      1.00      (KG/M3 OR GR/CC)      FLUID DENSITY
DLTF      189.      (USEC/FT) TRANSIT TIME OF FLUID
RHOH      0.60      (KG/M3 OR GR/CC)      HYDROCARBON DENSITY
ANEUT     1.00      NEUTRON GAS FACTOR(USUAL RANGE 1 TO 1.4)
                        1=HIGH DENSITY AND 1.5 LOW DENSITY
RHOMF     1.00      (KG/M3 OR GR/CC)      MUD FILTRATE DENSITY
TPLH      5.00      (NSEC/M)      HYDROCARBON TPL
SALMD     19000.    (PPM)      MUD SALINITY
RWM       0.110     (OHM-M)  RW AT MEASURED TEMPERATURE
RWMT      166.      (FARENHEIT) TEMPERATURE OF RW MEASUREMENT
RWBH      0.11      (OHM-M)  BOUND WATER RESISTIVITY
RWBMT     166.      (FARENHEIT) TEMPERATURE OF RWB MEASUREMENT

```

```

*****
*****      SHALE AND CLAY VALUES      *****
*****
GRSH      120.      (API) GAMMA RAY VALUE IN SHALE
SPSH      -45.      (MV) SP VALUE IN SHALE
ATTSH     600.      (DB/M) EPT ATTENUATION IN SHALE
RHOSH     2.45      (KG/M3 OR GR/CC) MATRIX DENSITY OF SHALE
PEFSH     3.60      (BARN/ELECTRON) PEF IN SHALE
TPLSH     9.00      (NSEC/M)      TPL IN SHALE
PHINSH    33.      (PERCENT) NEUTRON LOG POROSITY OF SHALE
DLTSH     95.      (USEC/FT) TRANSIT TIME OF SHALE
RSH       2.50      (OHM-M) RESISTIVITY OF SHALE
PHIMAX    39.00     (PERCENT) MAX SHALE POROSITY IN INTERVAL

```

## WAXMAN SMITS CONSTANTS

```

RHOCCL    2.70      (KG/M3 OR GR/CC) DENS OF DRY CLAY
HICL      25.00     (PERCENT) HYDROGEN INDEX OF DRY CLAY
CEC       0.100     (MEQ/G) CATION EXCHANGE CAPACITY
NOTE: ALSO SUPPLY RSH, M (USED AS M*),
      N (USED AS N*), RW, AND A.

```

```

*****
*****      LOG CALCULATION CONSTANTS AND EXPONENTS      *****
*****

```

```

A         0.62      CONSTANT IN FORMATION FACTOR EQUATION
M         2.15      CEMENTATION EXPONENT
N         2.00      SATURATION EXPONENT
CP        1.10      COMPACTION FACTOR

```

## LIST FOR WELL ANGLER-1

ZONE U.T.LONG

```

*****
*****      LIMITING VALUES FOR NET AND GROSS PAY CALCULATIONS      *****
*****

```

```

PHILIM     6.00      (PERCENT) LOWER POROSITY LIMIT
VSHLIM     0.40      (FRACTION) VOLUME OF SHALE UPPER LIMIT
SWLIM      50.00     (PERCENT) WATER SATURATION LIMIT

```

```

*****
*****      LOG CALCULATION OPTIONS AND SWITCHES      *****
*****

```

```

MSI        0        0=STANDARD UNITS 1=MSI
VSHCIN     3        GR TO VOL. OF SHALE CURVATURE INDEX
VSHOFF     0        0=CALC VOL. OF SHALE - 1=VOL.OF SH=0
GROFF      0        GR AS SHALE INDICATOR (0-USE ,1-NO)
KTHOFF     1        TH & K AS SHALE INDICATOR (0-USE ,1-NO)
NEUOFF     0        NEUTRON AS SHALE INDICATOR (0-USE ,1-NO)
DLTOFF     1        SONIC AS SHALE INDICATOR (0-USE ,1-NO)
ATTOFF     1        EPT AS SHALE INDICATOR (0-USE ,1-NO)
SPOFF      1        SP AS SHALE INDICATOR (0-USE ,1-NO)
PEOFF      0        USE PEF? (0-USE ,1-NO)
MINOPT     3        MINERAL OPTION SWITCH
                        0 = COMPLEX LITHOLOGY
                        1 = SANDSTONE AND DOLOMITE ONLY
                        2 = LIMESTONE AND DOLOMITE ONLY
                        3 = SANDSTONE AND SHALE ONLY (CLASSICAL)
                        4 = SANDSTONE AND SHALE ONLY (MODERN)
                        5 = SANDSTONE AND LIMESTONE ONLY

```

```

MOPOFF     0        MOVEABLE OIL PLOT SWITCH 0-USE RXO
                        1-NO RXO
QOPT       1        SW OPTION - 0=SW FROM PHIT AND Q
                        1=SW FROM PHIE AND VSH
NOPRT      0        PRINT OPTION - 0=PRINT ALL VALUES
                        1=SKIP SHALE ZONES
SWOPT      5        1 - ARCHIE; 2 - SIMANDOUX; 3 - SIMANDOUX
                        LAMINAR; 4 - V2 SIMANDOUX; 5 - INDONESIAN
                        6 - DISPERSED CLAY 7 - DUAL WATER MODEL
                        8 - DUAL WATER Q=VSH MODEL
                        9 - NORMALIZED WAXMAN-SMITS
                        10 - WAXMAN-SMITS

```

```

SWIRR      10.00     (FRACTION) IRREDUCIBLE WATER SATURATION FOR
                        PERMEABILITY EQUATION

```

## LIST FOR WELL ANGLER-1      ZONE M.T.LONG

## LISTING OF ENVIRON PARAMETERS

ZONE      M.T.LONG      WELL      ANGLER-1

TOP      2957.0000      (METRES) TOP OF INTERVAL  
 BOTTOM   3087.0000      (METRES) BOTTOM OF INTERVAL

DESCRIPTION OF PARAMETERS : M.T.LONG ANGLER 2957-3087m

## FLUID VALUES

RHOFR      1.00      (KG/M3 OR GR/CC) RECORDED FLUID DENSITY  
 SALFM      18500.      (PPM) FORMATION SALINITY (NACL)  
 SALMD      26000.      (PPM) MUD SALINITY (NACL)  
 RMM      0.2580      (OHM-M) RM  
                  IF USING AN OIL BASED MUD SET TO > 100  
 RMMT      68.      (FARENHEIT) MEASURED TEMPERATURE FOR RM  
 RMFM      0.2100      (OHM-M) RMF  
 RMFMT      64.      (FARENHEIT) MEASURED TEMPERATURE FOR RMF  
 RMCMT      0.4280      (OHM-M) RMC  
 RMCMT      66.      (FARENHEIT) MEASURED TEMPERATURE FOR RMC

## HOLE AND MUD VALUES

MW      9.60      (KG/M3 LBS/GAL LBS/FT3 OR SP. GRAV) MUD WT  
                  ENTER 0 MW FOR AIR FILLED HOLE  
 BITSIZ   8.500      (MM OR INCHES) BIT SIZE  
 AMST      54.0      (FARENHEIT) ANNUAL MEAN SURFACE TEMP  
 BHT      246.0      (FARENHEIT) BOTTOM HOLE TEMPERATURE  
 TD      4337.      (METRES) TOTAL DEPTH OF BOREHOLE  
 RSTAND   1.500      (INCHES) STANDOFF SETTING ON INDUCTION

## LIMITING VALUES

RHOMIN      1.30      (KG/M3 OR GR/CC) MIN. VALID BULK DENSITY  
 DLININ      40.      (USEC/FT) MIN. VALID SONIC ITT  
 DLIMAX      190.      (USEC/FT) MAX. VALID SONIC ITT  
 PHNMAX      70.      (PERCENT) MAXIMUM VALID NEUTRON POROSITY  
 RUGMAX      6.00      (INCHES) MAX. RUGOSITY TO ACCEPT NEUTRON  
 STOMAX      3.00      (INCHES) MAX. NEUT. STANDOFF  
 STOMIN      0.00      (INCHES) MIN. NEUT. STANDOFF TO CORRECT  
                  (SET TO STOMAX TO BYPASS STANDOFF LOGIC)  
 DROLIM      0.10      (KG/M3 OR GR/CC) MAXIMUM DENSITY CORRECTION  
                  TO ACCEPT (+ OR -)

## LIST FOR WELL ANGLER-1      ZONE M.T.LONG

## LISTING OF CALC PARAMETERS

ZONE      M.T.LONG      WELL      ANGLER-1

TOP      2957.0000      (METRES) TOP OF INTERVAL  
 BOTTOM   3087.0000      (METRES) BOTTOM OF INTERVAL

## MATRIX VALUES

GRMA      28.      (API) GAMMA RAY MATRIX  
 SPMA      -40.      (MV) SP MATRIX (MV)  
 ATMA      150.      (DB/M) ATTENUATION OF THE MATRIX (DB/M)  
 DLTSS      56.00      (USEC/FT) DELTA T SANDSTONE  
 DLTLS      48.78      (USEC/FT) DELTA T LIMESTONE  
 DLTDL      43.96      (USEC/FT) DELTA T DOLOMITE  
 DLTANH      50.00      (USEC/FT) DELTA T ANHYDRITE  
 RHOSS      2.66      (KG/M3 OR GR/CC) MATRIX DENS OF SANDSTONE  
 RHOLS      2.71      (KG/M3 OR GR/CC) MATRIX DENS OF LIMESTONE  
 RHODOL      2.87      (KG/M3 OR GR/CC) MATRIX DENS OF DOLOMITE  
 RHOANH      2.98      (KG/M3 OR GR/CC) MATRIX DENS OF ANHYDRITE  
 TPLSS      7.20      (NSEC/M) TPL OF SANDSTONE  
 TPLLS      9.10      (NSEC/M) TPL OF LIMESTONE  
 TPLDOL      8.70      (NSEC/M) TPL OF DOLOMITE  
 TPLANH      8.40      (NSEC/M) TPL OF ANHYDRITE

## VALUES FOR SOLO TOOLS

RHOMAB      2.66      (KG/CM OR GR/CC) MATRIX DENSITY  
 DLIMAB      56.      (KG/M3 OR GR/CC) TRANSIT TIME MATRIX  
 TPLMAB      8.50      (NSEC/M) TPL MATRIX  
 NEUMAB      0      NEUTRON MATRIX 0=LS 1=SS 2=DOL

## VALUES FOR COAL DETECTION

GRCOAL      180.      (API) MAXIMUM GR IN COAL.  
 DLTCOL      89.      (USEC/FT) MINIMUM SONIC IN COAL.  
 UCOAL      8.00      (PPM) MINIMUM URANIUM IN COAL.  
 RHOCOL      2.30      (KG/M3 OR GR/CC) MAXIMUM DENSITY OF COAL.  
 PNCOL      29.      (PERCENT) MINIMUM LS. NEUTRON POR. IN COAL  
 PECOL      3.00      (BARN/ELEC.) MAXIMUM PEF IN COAL.  
 COALCK      4      NUMBER OF POSITIVE COAL CHECKS NEEDED TO  
                  IDENTIFY COAL (COAL=1).



## LIST FOR WELL ANGLER-1

ZONE M.T.LONG

```
*****
***** FLUID VALUES *****
*****
RHOFF      1.00      (KG/M3 OR GR/CC)  FLUID DENSITY
DLTF       189.      (USEC/FT)  TRANSIT TIME OF FLUID
RHOH       0.60      (KG/M3 OR GR/CC)  HYDROCARBON DENSITY
ANEUT      1.00      NEUTRON GAS FACTOR(USUAL RANGE 1 TO 1.4)
                        1=HIGH DENSITY AND 1.5 LOW DENSITY
RHOHF      1.00      (KG/M3 OR GR/CC)  MUD FILTRATE DENSITY
TPLH       5.00      (NSEC/M)          HYDROCARBON TPL
SALMD      26000.     (PPM)           MUD SALINITY
RWM        0.080     (OHM-M)  RW AT MEASURED TEMPERATURE
RWT        246.      (FARENHEIT) TEMPERATURE OF RW MEASUREMENT
RWB        0.08      (OHM-M)  BOUND WATER RESISTIVITY
RWBMT      246.      (FARENHEIT) TEMPERATURE OF RWB MEASUREMENT
```

```
*****
***** SHALE AND CLAY VALUES *****
*****
GRSH       135.      (API) GAMMA RAY VALUE IN SHALE
SPSH       -45.      (MV)  SP VALUE IN SHALE
ATTSH      600.      (DB/M) EPT ATTENUATION IN SHALE
RHOSH      2.45      (KG/M3 OR GR/CC) MATRIX DENSITY OF SHALE
PEFSH      3.60      (BARN/ELECTRON) PEF IN SHALE
TPLSH      9.00      (NSEC/M)          TPL IN SHALE
PHINSH     24.       (PERCENT) NEUTRON LOG POROSITY OF SHALE
DLTSH      85.       (USEC/FT) TRANSIT TIME OF SHALE
RSH        3.00      (OHM-M) RESISTIVITY OF SHALE
PHIMAX     25.00     (PERCENT) MAX SHALE POROSITY IN INTERVAL
```

## WAXMAN SMITS CONSTANTS

```
RHOCL      2.70      (KG/M3 OR GR/CC) DENS OF DRY CLAY
HICL       25.00     (PERCENT) HYDROGEN INDEX OF DRY CLAY
CEC        0.100     (MEQ/G) CATION EXCHANGE CAPACITY
NOTE: ALSO SUPPLY RSH, M (USED AS M*),
      N (USED AS N*), RW, AND A.
```

```
*****
***** LOG CALCULATION CONSTANTS AND EXPONENTS *****
*****
```

```
A          0.62      CONSTANT IN FORMATION FACTOR EQUATION
M          2.15      CEMENTATION EXPONENT
N          2.00      SATURATION EXPONENT
CP         1.00      COMPACTION FACTOR
```

## LIST FOR WELL ANGLER-1

ZONE M.T.LONG

```
*****
***** LIMITING VALUES FOR NET AND GROSS PAY CALCULATIONS *****
*****
PHILIM      6.00      (PERCENT) LOWER POROSITY LIMIT
VSHLIM      0.40      (FRACTION) VOLUME OF SHALE UPPER LIMIT
SWLIM       50.00     (PERCENT) WATER SATURATION LIMIT
```

```
*****
***** LOG CALCULATION OPTIONS AND SWITCHES *****
*****
```

```
MSI         0        0=STANDARD UNITS 1=MSI
VSHCIN      3        GR TO VOL. OF SHALE CURVATURE INDEX
VSHOFF      0        0=CALC VOL. OF SHALE - 1=VOL.OF SH=0
GROFF       0        GR AS SHALE INDICATOR (0-USE ,1-NO)
KTHOFF      1        TH & K AS SHALE INDICATOR (0-USE ,1-NO)
NEUOFF      0        NEUTRON AS SHALE INDICATOR (0-USE ,1-NO)
DLTOFF      1        SONIC AS SHALE INDICATOR (0-USE ,1-NO)
ATTOFF      1        EPT AS SHALE INDICATOR (0-USE ,1-NO)
SPOFF       1        SP AS SHALE INDICATOR (0-USE ,1-NO)
PEOFF       0        USE PEF? (0-USE ,1-NO)
MINOPT      3        MINERAL OPTION SWITCH
                        0 = COMPLEX LITHOLOGY
                        1 = SANDSTONE AND DOLOMITEONLY
                        2 = LIMESTONE AND DOLOMITE ONLY
                        3 = SANDSTONE AND SHALE ONLY (CLASSICAL)
                        4 = SANDSTONE AND SHALE ONLY (MODERN)
                        5 = SANDSTONE AND LIMESTONE ONLY
```

```
MOPOFF      0        MOVEABLE OIL PLOT SWITCH 0-USE RXO
                        1-NO RXO
QOPT        1        SW OPTION - 0=SW FROM PHIT AND Q
                        1=SW FROM PHIE AND VSH
NOPRT       0        PRINT OPTION - 0=PRINT ALL VALUES
                        1=SKIP SHALE ZONES
SWOPT       5        1 - ARCHIE; 2 - SIMANDOUX; 3 - SIMANDOUX
                        LAMINAR; 4 - V2 SIMANDOUX; 5 - INDONESIAN
                        6 - DISPERSED CLAY 7 - DUAL WATER MODEL
                        8 - DUAL WATER Q=VSH MODEL
                        9 - NORMALIZED WAXMAN-SMITS
                        10 - WAXMAN-SMITS
```

```
SWIRR       10.00     (FRACTION)IRREDUCIBLE WATER SATURATION FOR
                        PERMEABILITY EQUATION
```

## LIST FOR WELL ANGLER-1 ZONE L.T.LONG

## LISTING OF ENVIRON PARAMETERS

\*\*\*\*\*

ZONE	L.T.LONG	WELL	ANGLER-1
------	----------	------	----------

\*\*\*\*\*

TOP	3083.0000	(METRES) TOP OF INTERVAL
BOTTOM	3252.0000	(METRES) BOTTOM OF INTERVAL

DESCRIPTION OF PARAMETERS : UPPER L.T.LONGUS 3083-3252M.

## \*\*\*\*\* FLUID VALUES \*\*\*\*\*

RHOFR	1.00	(KG/M3 OR GR/CC) RECORDED FLUID DENSITY
SALFM	18500.	(PPM) FORMATION SALINITY (NACL)
SALMD	26000.	(PPM) MUD SALINITY (NACL)
RMM	0.2580	(OHM-M) RM
		IF USING AN OIL BASED MUD SET TO > 100
RMT	68.	(FARENHEIT) MEASURED TEMPERATURE FOR RM
RMFM	0.2100	(OHM-M) RMF
RMFMT	64.	(FARENHEIT) MEASURED TEMPERATURE FOR RMF
RMCM	0.4280	(OHM-M) RMC
RMCMT	66.	(FARENHEIT) MEASURED TEMPERATURE FOR RMC

## \*\*\*\*\* HOLE AND MUD VALUES \*\*\*\*\*

MW	9.60	(KG/M3 LBS/GAL LBS/FT3 OR SP. GRAV) MUD WT
		ENTER 0 MW FOR AIR FILLED HOLE
BITSIZ	8.500	(MM OR INCHES) BIT SIZE
AMST	54.0	(FARENHEIT) ANNUAL MEAN SURFACE TEMP
BHT	246.0	(FARENHEIT) BOTTOM HOLE TEMPERATURE
TD	4337.	(METRES) TOTAL DEPTH OF BOREHOLE
RSTAND	1.500	(INCHES) STANDOFF SETTING ON INDUCTION

## \*\*\*\*\* LIMITING VALUES \*\*\*\*\*

RHOMIN	1.25	(KG/M3 OR GR/CC) MIN. VALID BULK DENSITY
DLTMIN	40.	(USEC/FT) MIN. VALID SONIC ITT
DLTMAX	190.	(USEC/FT) MAX. VALID SONIC ITT
PHNMAX	70.	(PERCENT) MAXIMUM VALID NEUTRON POROSITY
RUGMAX	6.00	(INCHES) MAX. RUGOSITY TO ACCEPT NEUTRON
STOMAX	3.00	(INCHES) MAX. NEUT. STANDOFF
STOMIN	0.00	(INCHES) MIN. NEUT. STANDOFF TO CORRECT
		(SET TO STOMAX TO BYPASS STANDOFF LOGIC)
DROLIM	0.20	(KG/M3 OR GR/CC) MAXIMUM DENSITY CORRECTION
		TO ACCEPT (+ OR -)

## LIST FOR WELL ANGLER-1 ZONE L.T.LONG

## LISTING OF CALC PARAMETERS

\*\*\*\*\*

ZONE	L.T.LONG	WELL	ANGLER-1
------	----------	------	----------

\*\*\*\*\*

TOP	3083.0000	(METRES) TOP OF INTERVAL
BOTTOM	3252.0000	(METRES) BOTTOM OF INTERVAL

## \*\*\*\*\* MATRIX VALUES \*\*\*\*\*

GRMA	38.	(API) GAMMA RAY MATRIX
SPMA	-40.	(MV) SP MATRIX (MV)
ATMA	140.	(DB/M) ATTENUATION OF THE MATRIX (DB/M)
DLTSS	55.00	(USEC/FT) DELTA T SANDSTONE
DLTLS	48.78	(USEC/FT) DELTA T LIMESTONE
DLTDOL	43.96	(USEC/FT) DELTA T DOLOMITE
DLTANH	50.00	(USEC/FT) DELTA T ANHYDRITE
RHOSS	2.65	(KG/M3 OR GR/CC) MATRIX DENS OF SANDSTONE
RHOLS	2.71	(KG/M3 OR GR/CC) MATRIX DENS OF LIMESTONE
RHODOL	2.87	(KG/M3 OR GR/CC) MATRIX DENS OF DOLOMITE
RHOANH	2.98	(KG/M3 OR GR/CC) MATRIX DENS OF ANHYDRITE
TPLSS	7.20	(NSEC/M) TPL OF SANDSTONE
TPLLS	9.10	(NSEC/M) TPL OF LIMESTONE
TPLDOL	8.70	(NSEC/M) TPL OF DOLOMITE
TPLANH	8.40	(NSEC/M) TPL OF ANHYDRITE

## VALUES FOR SOLO TOOLS

RHOMAB	2.65	(KG/CM OR GR/CC) MATRIX DENSITY
DLTMAB	54.	(KG/M3 OR GR/CC) TRANSIT TIME MATRIX
TPLMAB	8.50	(NSEC/M) TPL MATRIX
NEUMAB	0	NEUTRON MATRIX 0=LS 1=SS 2=DOL

## VALUES FOR COAL DETECTION

GRCOAL	180.	(API) MAXIMUM GR IN COAL.
DLTCOL	89.	(USEC/FT) MINIMUM SONIC IN COAL.
UCOAL	8.00	(PPM) MINIMUM URANIUM IN COAL.
RHOCOL	2.30	(KG/M3 OR GR/CC) MAXIMUM DENSITY OF COAL.
PNCOL	29.	(PERCENT) MINIMUM LS. NEUTRON POR. IN COAL
PECOL	3.00	(BARN/ELEC.) MAXIMUM PEF IN COAL.
COALCK	4	NUMBER OF POSITIVE COAL CHECKS NEEDED TO IDENTIFY COAL (COAL=1).

## LIST FOR WELL ANGLER-1

ZONE L.T.LONG

\*\*\*\*\*  
 \*\*\*\*\* FLUID VALUES \*\*\*\*\*  
 \*\*\*\*\*

RHOF	1.00	(KG/M3 OR GR/CC)	FLUID DENSITY
DLTF	189.	(USEC/FT)	TRANSIT TIME OF FLUID
RHOH	0.60	(KG/M3 OR GR/CC)	HYDROCARBON DENSITY
ANEUT	1.00	NEUTRON GAS FACTOR(USUAL RANGE 1 TO 1.4) 1=HIGH DENSITY AND 1.5 LOW DENSITY	
RHOMF	1.00	(KG/M3 OR GR/CC)	MUD FILTRATE DENSITY
TPLH	5.00	(NSEC/M)	HYDROCARBON TPL
SALMD	26000.	(PPM)	MUD SALINITY
RWM	0.100	(OHM-M)	RW AT MEASURED TEMPERATURE
RWMT	246.	(FARENHEIT)	TEMPERATURE OF RW MEASUREMENT
RWBM	0.10	(OHM-M)	BOUND WATER RESISTIVITY
RWBMT	246.	(FARENHEIT)	TEMPERATURE OF RWB MEASUREMENT

\*\*\*\*\*  
 \*\*\*\*\* SHALE AND CLAY VALUES \*\*\*\*\*  
 \*\*\*\*\*

GRSH	140.	(API)	GAMMA RAY VALUE IN SHALE
SPSH	-45.	(MV)	SP VALUE IN SHALE
ATTSH	600.	(DB/M)	EPT ATTENUATION IN SHALE
RHOSH	2.58	(KG/M3 OR GR/CC)	MATRIX DENSITY OF SHALE
PEFSH	3.60	(BARN/ELECTRON)	PEF IN SHALE
TPLSH	9.00	(NSEC/M)	TPL IN SHALE
PHINSH	26.	(PERCENT)	NEUTRON LOG POROSITY OF SHALE
DLTSH	78.	(USEC/FT)	TRANSIT TIME OF SHALE
RSH	11.00	(OHM-M)	RESISTIVITY OF SHALE
PHIMAX	27.00	(PERCENT)	MAX SHALE POROSITY IN INTERVAL

## WAXMAN SMITS CONSTANTS

RHOCL	2.70	(KG/M3 OR GR/CC)	DENS OF DRY CLAY
HICL	27.00	(PERCENT)	HYDROGEN INDEX OF DRY CLAY
CEC	0.100	(MEQ/G)	CATION EXCHANGE CAPACITY
NOTE: ALSO SUPPLY RSH, M (USED AS M*), N (USED AS N*), RW, AND A.			

\*\*\*\*\*  
 \*\*\*\*\* LOG CALCULATION CONSTANTS AND EXPONENTS \*\*\*\*\*  
 \*\*\*\*\*

A	0.62	CONSTANT IN FORMATION FACTOR EQUATION
M	2.15	CEMENTATION EXPONENT
N	2.00	SATURATION EXPONENT
CP	1.00	COMPACTION FACTOR

## LIST FOR WELL ANGLER-1

ZONE L.T.LONG

\*\*\*\*\*  
 \*\*\*\*\* LIMITING VALUES FOR NET AND GROSS PAY CALCULATIONS \*\*\*\*\*  
 \*\*\*\*\*

PHILIM	6.00	(PERCENT)	LOWER POROSITY LIMIT
VSHLIM	0.40	(FRACTION)	VOLUME OF SHALE UPPER LIMIT
SWLIM	50.00	(PERCENT)	WATER SATURATION LIMIT

\*\*\*\*\*  
 \*\*\*\*\* LOG CALCULATION OPTIONS AND SWITCHES \*\*\*\*\*  
 \*\*\*\*\*

MSI	0	0=STANDARD UNITS 1=MSI
VSHCIN	3	GR TO VOL. OF SHALE CURVATURE INDEX
VSHOFF	0	0=CALC VOL. OF SHALE - 1=VOL.OF SH=0
GROFF	0	GR AS SHALE INDICATOR (0=USE ,1=NO)
KTHOFF	1	TH & K AS SHALE INDICATOR (0=USE ,1=NO)
NEUOFF	0	NEUTRON AS SHALE INDICATOR (0=USE ,1=NO)
DLTOFF	1	SONIC AS SHALE INDICATOR (0=USE ,1=NO)
ATTOFF	1	EPT AS SHALE INDICATOR (0=USE ,1=NO)
SPOFF	1	SP AS SHALE INDICATOR (0=USE ,1=NO)
PEOFF	0	USE PEF? (0=USE ,1=NO)
MINOPT	3	MINERAL OPTION SWITCH 0 = COMPLEX LITHOLOGY 1 = SANDSTONE AND DOLOMITEONLY 2 = LIMESTONE AND DOLOMITE ONLY 3 = SANDSTONE AND SHALE ONLY (CLASSICAL) 4 = SANDSTONE AND SHALE ONLY (MODERN) 5 = SANDSTONE AND LIMESTONE ONLY
MPOFF	0	MOVEABLE OIL PLOT SWITCH 0=USE RXO 1=NO RXO
QOPT	1	SW OPTION - 0=SW FROM PHIT AND Q 1=SW FROM PHIE AND VSH
NOPRT	0	PRINT OPTION - 0=PRINT ALL VALUES 1=SKIP SHALE ZONES
SWOPT	5	1 - ARCHIE; 2 - SIMANDOUX; 3 - SIMANDOUX LAMINAR; 4 - V2 SIMANDOUX; 5 - INDONESIAN 6 - DISPERSED CLAY 7 - DUAL WATER MODEL 8 - DUAL WATER Q=VSH MODEL 9 - NORMALIZED WAXMAN-SMITS 10 - WAXMAN-SMITS

SWIRR	10.00	(FRACTION)IRREDUCIBLE WATER SATURATION FOR PERMEABILITY EQUATION
-------	-------	---

## LIST FOR WELL ANGLER-1 ZONE SELENE

## LISTING OF ENVIRON PARAMETERS

ZONE SELENE WELL ANGLER-1

TOP 3252.0000 (METRES) TOP OF INTERVAL  
 BOTTOM 3517.0000 (METRES) BOTTOM OF INTERVAL

DESCRIPTION OF PARAMETERS : SELENE SST 3252-3517M

## FLUID VALUES

RHOFR 1.00 (KG/M3 OR GR/CC) RECORDED FLUID DENSITY  
 SALFM 18500. (PPM) FORMATION SALINITY (NACL)  
 SALMD 26000. (PPM) MUD SALINITY (NACL)  
 RMM 0.2580 (OHM-M) RM  
 IF USING AN OIL BASED MUD SET TO > 100  
 RMTT 68. (FARENHEIT) MEASURED TEMPERATURE FOR RM  
 RMFM 0.2100 (OHM-M) RMF  
 RMFMT 64. (FARENHEIT) MEASURED TEMPERATURE FOR RMF  
 RMCN 0.4280 (OHM-M) RMC  
 RMCMT 66. (FARENHEIT) MEASURED TEMPERATURE FOR RMC

## HOLE AND MUD VALUES

MW 9.60 (KG/M3 LBS/GAL LBS/FT3 OR SP. GRAV) MUD WT  
 ENTER 0 MW FOR AIR FILLED HOLE  
 BITSIZ 8.500 (MM OR INCHES) BIT SIZE  
 AMST 54.0 (FARENHEIT) ANNUAL MEAN SURFACE TEMP  
 BHT 246.0 (FARENHEIT) BOTTOM HOLE TEMPERATURE  
 TD 4337. (METRES) TOTAL DEPTH OF BOREHOLE  
 RSTAND 1.500 (INCHES) STANDOFF SETTING ON INDUCTION

## LIMITING VALUES

RHOMIN 1.25 (KG/M3 OR GR/CC) MIN. VALID BULK DENSITY  
 DLIMIN 40. (USEC/FT) MIN. VALID SONIC ITT  
 DLTMAX 190. (USEC/FT) MAX. VALID SONIC ITT  
 PHNMAX 70. (PERCENT) MAXIMUM VALID NEUTRON POROSITY  
 RUGMAX 6.00 (INCHES) MAX. RUGOSITY TO ACCEPT NEUTRON  
 STOMAX 3.00 (INCHES) MAX. NEUT. STANDOFF  
 STOMIN 0.00 (INCHES) MIN. NEUT. STANDOFF TO CORRECT  
 (SET TO STOMAX TO BYPASS STANDOFF LOGIC)  
 DROLIM 0.20 (KG/M3 OR GR/CC) MAXIMUM DENSITY CORRECTION  
 TO ACCEPT (+ OR -)

## LIST FOR WELL ANGLER-1 ZONE SELENE

## LISTING OF CALC PARAMETERS

ZONE SELENE WELL ANGLER-1

TOP 3252.0000 (METRES) TOP OF INTERVAL  
 BOTTOM 3517.0000 (METRES) BOTTOM OF INTERVAL

## MATRIX VALUES

GRMA 38. (API) GAMMA RAY MATRIX  
 SPMA -40. (MV) SP MATRIX (MV)  
 ATTMA 140. (DB/M) ATTENUATION OF THE MATRIX (DB/M)  
 DLTSS 55.00 (USEC/FT) DELTA T SANDSTONE  
 DLTLS 48.78 (USEC/FT) DELTA T LIMESTONE  
 DLTDL 43.96 (USEC/FT) DELTA T DOLOMITE  
 DLTANH 50.00 (USEC/FT) DELTA T ANHYDRITE  
 RHOSS 2.65 (KG/M3 OR GR/CC) MATRIX DENS OF SANDSTONE  
 RHOLS 2.71 (KG/M3 OR GR/CC) MATRIX DENS OF LIMESTONE  
 RHODOL 2.87 (KG/M3 OR GR/CC) MATRIX DENS OF DOLOMITE  
 RHOANH 2.98 (KG/M3 OR GR/CC) MATRIX DENS OF ANHYDRITE  
 TPLSS 7.20 (NSEC/M) TPL OF SANDSTONE  
 TPLLS 9.10 (NSEC/M) TPL OF LIMESTONE  
 TPLDOL 8.70 (NSEC/M) TPL OF DOLOMITE  
 TPLANH 8.40 (NSEC/M) TPL OF ANHYDRITE

## VALUES FOR SOLO TOOLS

RHOMAB 2.65 (KG/CM OR GR/CC) MATRIX DENSITY  
 DLTMA 54. (KG/M3 OR GR/CC) TRANSIT TIME MATRIX  
 TPLMAB 8.50 (NSEC/M) TPL MATRIX  
 NEUMAB 0 NEUTRON MATRIX 0=LS 1=SS 2=DOL

## VALUES FOR COAL DETECTION

GRCOAL 180. (API) MAXIMUM GR IN COAL.  
 DLTCOL 89. (USEC/FT) MINIMUM SONIC IN COAL.  
 UCOAL 8.00 (PPM) MINIMUM URANIUM IN COAL.  
 RHOCOL 2.30 (KG/M3 OR GR/CC) MAXIMUM DENSITY OF COAL.  
 PNCOL 29. (PERCENT) MINIMUM LS. NEUTRON POR. IN COAL.  
 PECOL 3.00 (BARN/ELEC.) MAXIMUM PEF IN COAL.  
 COALCK 4 NUMBER OF POSITIVE COAL CHECKS NEEDED TO  
 IDENTIFY COAL (COAL=1).

## LIST FOR WELL ANGLER-1 ZONE SELENE

\*\*\*\*\*  
 \*\*\*\*\* FLUID VALUES \*\*\*\*\*  
 \*\*\*\*\*

RHOF	1.00	(KG/M3 OR GR/CC)	FLUID DENSITY
DLTF	189.	(USEC/FT)	TRANSIT TIME OF FLUID
RHOH	0.60	(KG/M3 OR GR/CC)	HYDROCARBON DENSITY
ANEUT	1.00	NEUTRON GAS FACTOR(USUAL RANGE 1 TO 1.4) 1=HIGH DENSITY AND 1.5 LOW DENSITY	
RHOMF	1.00	(KG/M3 OR GR/CC)	MUD FILTRATE DENSITY
TPH	5.00	(NSEC/M)	HYDROCARBON TPL
SALMD	26000.	(PPM)	MUD SALINITY
RWM	0.080	(OHM-M)	RW AT MEASURED TEMPERATURE
RWMT	246.	(FARENHEIT)	TEMPERATURE OF RW MEASUREMENT
RWBM	0.08	(OHM-M)	BOUND WATER RESISTIVITY
RWBMT	246.	(FARENHEIT)	TEMPERATURE OF RWB MEASUREMENT

\*\*\*\*\*  
 \*\*\*\*\* SHALE AND CLAY VALUES \*\*\*\*\*  
 \*\*\*\*\*

GRSH	140.	(API)	GAMMA RAY VALUE IN SHALE
SPSH	-45.	(MV)	SP VALUE IN SHALE
ATTSH	600.	(DB/M)	EPT ATTENUATION IN SHALE
RHOSH	2.58	(KG/M3 OR GR/CC)	MATRIX DENSITY OF SHALE
PEFSH	3.60	(BARNES/ELECTRON)	PEF IN SHALE
TPLSH	9.00	(NSEC/M)	TPL IN SHALE
PHINSH	26.	(PERCENT)	NEUTRON LOG POROSITY OF SHALE
DLTSH	78.	(USEC/FT)	TRANSIT TIME OF SHALE
RSH	11.00	(OHM-M)	RESISTIVITY OF SHALE
PHIMAX	27.00	(PERCENT)	MAX SHALE POROSITY IN INTERVAL

## WAXMAN SMITS CONSTANTS

RHOCL	2.70	(KG/M3 OR GR/CC)	DENS OF DRY CLAY
HICL	27.00	(PERCENT)	HYDROGEN INDEX OF DRY CLAY
CEC	0.100	(MEQ/G)	CATION EXCHANGE CAPACITY

NOTE: ALSO SUPPLY RSH, M (USED AS M\*),  
N (USED AS N\*), RW, AND A.

\*\*\*\*\*  
 \*\*\*\*\* LOG CALCULATION CONSTANTS AND EXPONENTS \*\*\*\*\*  
 \*\*\*\*\*

A	0.62	CONSTANT IN FORMATION FACTOR EQUATION
M	2.15	CEMENTATION EXPONENT
N	2.00	SATURATION EXPONENT
CP	1.00	COMPACTION FACTOR

## LIST FOR WELL ANGLER-1 ZONE SELENE

\*\*\*\*\*  
 \*\*\*\*\* LIMITING VALUES FOR NET AND GROSS PAY CALCULATIONS \*\*\*\*\*  
 \*\*\*\*\*

PHILIM	6.00	(PERCENT)	LOWER POROSITY LIMIT
VSHLIM	0.40	(FRACTION)	VOLUME OF SHALE UPPER LIMIT
SWLIM	50.00	(PERCENT)	WATER SATURATION LIMIT

\*\*\*\*\*  
 \*\*\*\*\* LOG CALCULATION OPTIONS AND SWITCHES \*\*\*\*\*  
 \*\*\*\*\*

MSI	0	0=STANDARD UNITS 1=MSI
VSHCIN	3	GR TO VOL. OF SHALE CURVATURE INDEX
VSHOFF	0	0=CALC VOL. OF SHALE - 1=VOL.OF SH=0
GROFF	0	GR AS SHALE INDICATOR (0=USE ,1=NO)
KTHOFF	1	TH & K AS SHALE INDICATOR (0=USE ,1=NO)
NEUOFF	0	NEUTRON AS SHALE INDICATOR (0=USE ,1=NO)
DLTOFF	1	SONIC AS SHALE INDICATOR (0=USE ,1=NO)
ATTOFF	1	EPT AS SHALE INDICATOR (0=USE ,1=NO)
SPOFF	1	SP AS SHALE INDICATOR (0=USE ,1=NO)
PEOFF	0	USE PEF? (0=USE ,1=NO)
MINOPT	3	MINERAL OPTION SWITCH 0 = COMPLEX LITHOLOGY 1 = SANDSTONE AND DOLOMITE ONLY 2 = LIMESTONE AND DOLOMITE ONLY 3 = SANDSTONE AND SHALE ONLY (CLASSICAL) 4 = SANDSTONE AND SHALE ONLY (MODERN) 5 = SANDSTONE AND LIMESTONE ONLY
MOPOFF	0	MOVEABLE OIL PLOT SWITCH 0=USE RXO 1=NO RXO
QOPT	1	SW OPTION - 0=SW FROM PHIT AND Q 1=SW FROM PHIE AND VSH
NOPRT	0	PRINT OPTION - 0=PRINT ALL VALUES 1=SKIP SHALE ZONES
SWOPT	5	1 - ARCHIE; 2 - SIMANDOUX; 3 - SIMANDOUX LAMINAR; 4 - V2 SIMANDOUX; 5 - INDONESIAN 6 - DISPERSED CLAY 7 - DUAL WATER MODEL 8 - DUAL WATER Q=VSH MODEL 9 - NORMALIZED WAXMAN-SMITS 10 - WAXMAN-SMITS

SWIRR	10.00	(FRACTION)IRREDUCIBLE WATER SATURATION FOR PERMEABILITY EQUATION
-------	-------	---

## LIST FOR WELL ANGLER-1 ZONE TOP CAMP

## LISTING OF ENVIRON PARAMETERS

ZONE TOP CAMP WELL ANGLER-1

TOP 3517.0000 (METRES) TOP OF INTERVAL  
 BOTTOM 3830.0000 (METRES) BOTTOM OF INTERVAL

DESCRIPTION OF PARAMETERS : UPPER CAMPANIAN ANGLER 3517-3830

## FLUID VALUES

RHOFR 1.00 (KG/M3 OR GR/CC) RECORDED FLUID DENSITY  
 SALFM 18500. (PPM) FORMATION SALINITY (NACL)  
 SALMD 26000. (PPM) MUD SALINITY (NACL)  
 RMM 0.2580 (OHM-M) RM  
 IF USING AN OIL BASED MUD SET TO > 100  
 RMMT 68. (FARENHEIT) MEASURED TEMPERATURE FOR RM  
 RMFM 0.2100 (OHM-M) RMF  
 RMFMT 64. (FARENHEIT) MEASURED TEMPERATURE FOR RMF  
 RMCM 0.4280 (OHM-M) RMC  
 RMCMT 66. (FARENHEIT) MEASURED TEMPERATURE FOR RMC

## HOLE AND MUD VALUES

MW 9.60 (KG/M3 LBS/GAL LBS/FT3 OR SP. GRAV) MUD WT  
 ENTER 0 MW FOR AIR FILLED HOLE  
 BITSIZ 8.500 (MM OR INCHES) BIT SIZE  
 AMST 54.0 (FARENHEIT) ANNUAL MEAN SURFACE TEMP  
 BHT 246.0 (FARENHEIT) BOTTOM HOLE TEMPERATURE  
 TD 4337. (METRES) TOTAL DEPTH OF BOREHOLE  
 RSTAND 1.500 (INCHES) STANDOFF SETTING ON INDUCTION

## LIMITING VALUES

RHOMIN 1.25 (KG/M3 OR GR/CC) MIN. VALID BULK DENSITY  
 DLTIMIN 40. (USEC/FT) MIN. VALID SONIC ITT  
 DLTMAX 190. (USEC/FT) MAX. VALID SONIC ITT  
 PHNMAX 70. (PERCENT) MAXIMUM VALID NEUTRON POROSITY  
 RUGMAX 6.00 (INCHES) MAX. RUGOSITY TO ACCEPT NEUTRON  
 STOMAX 3.00 (INCHES) MAX. NEUT. STANDOFF  
 STOMIN 0.00 (INCHES) MIN. NEUT. STANDOFF TO CORRECT  
 (SET TO STOMAX TO BYPASS STANDOFF LOGIC)  
 DROLIM 0.20 (KG/M3 OR GR/CC) MAXIMUM DENSITY CORRECTION  
 TO ACCEPT (+ OR -)

## LIST FOR WELL ANGLER-1 ZONE TOP CAMP

## LISTING OF CALC PARAMETERS

ZONE TOP CAMP WELL ANGLER-1

TOP 3517.0000 (METRES) TOP OF INTERVAL  
 BOTTOM 3830.0000 (METRES) BOTTOM OF INTERVAL

## MATRIX VALUES

GRMA 45. (API) GAMMA RAY MATRIX  
 SPMA -40. (MV) SP MATRIX (MV)  
 ATTMA 150. (DB/M) ATTENUATION OF THE MATRIX (DB/M)  
 DLTSS 55.00 (USEC/FT) DELTA T SANDSTONE  
 DLTLS 48.78 (USEC/FT) DELTA T LIMESTONE  
 DLTDO 43.96 (USEC/FT) DELTA T DOLOMITE  
 DLTANH 50.00 (USEC/FT) DELTA T ANHYDRITE  
 RHOSS 2.65 (KG/M3 OR GR/CC) MATRIX DENS OF SANDSTONE  
 RHOLS 2.71 (KG/M3 OR GR/CC) MATRIX DENS OF LIMESTONE  
 RHODOL 2.87 (KG/M3 OR GR/CC) MATRIX DENS OF DOLOMITE  
 RHOANH 2.98 (KG/M3 OR GR/CC) MATRIX DENS OF ANHYDRITE  
 TPLSS 7.20 (NSEC/M) TPL OF SANDSTONE  
 TPLLS 9.10 (NSEC/M) TPL OF LIMESTONE  
 TPLDOL 8.70 (NSEC/M) TPL OF DOLOMITE  
 TPLANH 8.40 (NSEC/M) TPL OF ANHYDRITE

## VALUES FOR SOLO TOOLS

RHOMAB 2.65 (KG/CM OR GR/CC) MATRIX DENSITY  
 DLTMAB 55. (KG/M3 OR GR/CC) TRANSIT TIME MATRIX  
 TPLMAB 8.50 (NSEC/M) TPL MATRIX  
 NEUMAB 0 NEUTRON MATRIX 0=LS 1=SS 2=DOL

## VALUES FOR COAL DETECTION

GRCOAL 180. (API) MAXIMUM GR IN COAL.  
 DLTCOAL 86. (USEC/FT) MINIMUM SONIC IN COAL.  
 UCOAL 8.00 (PPM) MINIMUM URANIUM IN COAL.  
 RHOCOAL 2.30 (KG/M3 OR GR/CC) MAXIMUM DENSITY OF COAL.  
 PNCOAL 27. (PERCENT) MINIMUM LS. NEUTRON POR. IN COAL.  
 PECOAL 3.00 (BARN/ELEC.) MAXIMUM PEF IN COAL.  
 COALCK 4 NUMBER OF POSITIVE COAL CHECKS NEEDED TO  
 IDENTIFY COAL (COAL=1).

## LIST FOR WELL ANGLER-1 ZONE TOP CAMP

\*\*\*\*\*  
 \*\*\*\*\* FLUID VALUES \*\*\*\*\*  
 \*\*\*\*\*

RHOF	1.00	(KG/M3 OR GR/CC)	FLUID DENSITY
DLTF	189.	(USEC/FT)	TRANSIT TIME OF FLUID
RHOH	0.60	(KG/M3 OR GR/CC)	HYDROCARBON DENSITY
ANEUT	1.00	NEUTRON GAS FACTOR(USUAL RANGE 1 TO 1.4)	
		1=HIGH DENSITY AND 1.5 LOW DENSITY	
RHOMF	1.00	(KG/M3 OR GR/CC)	MUD FILTRATE DENSITY
TPLH	5.00	(NSEC/M)	HYDROCARBON TPL
SALMD	26000.	(PPM)	MUD SALINITY
RWM	0.090	(OHM-M)	RW AT MEASURED TEMPERATURE
RWMT	246.	(FARENHEIT)	TEMPERATURE OF RW MEASUREMENT
RWB	0.09	(OHM-M)	BOUND WATER RESISTIVITY
RWBMT	246.	(FARENHEIT)	TEMPERATURE OF RWB MEASUREMENT

\*\*\*\*\*  
 \*\*\*\*\* SHALE AND CLAY VALUES \*\*\*\*\*  
 \*\*\*\*\*

GRSH	140.	(API)	GAMMA RAY VALUE IN SHALE
SPSH	-45.	(MV)	SP VALUE IN SHALE
ATTSH	600.	(DB/M)	EPT ATTENUATION IN SHALE
RHOSH	2.55	(KG/M3 OR GR/CC)	MATRIX DENSITY OF SHALE
PEFSH	2.90	(BARN/ELECTRON)	PEF IN SHALE
TPLSH	9.00	(NSEC/M)	TPL IN SHALE
PHINSH	25.	(PERCENT)	NEUTRON LOG POROSITY OF SHALE
DLTSH	77.	(USEC/FT)	TRANSIT TIME OF SHALE
RSH	11.00	(OHM-M)	RESISTIVITY OF SHALE
PHIMAX	29.00	(PERCENT)	MAX SHALE POROSITY IN INTERVAL

## WAXMAN SMITS CONSTANTS

RHOCL	2.70	(KG/M3 OR GR/CC)	DENS OF DRY CLAY
HICL	25.00	(PERCENT)	HYDROGEN INDEX OF DRY CLAY
CEC	0.100	(MEQ/G)	CATION EXCHANGE CAPACITY

NOTE: ALSO SUPPLY RSH, M (USED AS M\*),  
 N (USED AS N\*), RW, AND A.

\*\*\*\*\*  
 \*\*\*\*\* LOG CALCULATION CONSTANTS AND EXPONENTS \*\*\*\*\*  
 \*\*\*\*\*

A	0.62	CONSTANT IN FORMATION FACTOR EQUATION
M	2.15	CEMENTATION EXPONENT
N	2.00	SATURATION EXPONENT
CP	1.00	COMPACTION FACTOR

## LIST FOR WELL ANGLER-1 ZONE TOP CAMP

\*\*\*\*\*  
 \*\*\*\*\* LIMITING VALUES FOR NET AND GROSS PAY CALCULATIONS \*\*\*\*\*  
 \*\*\*\*\*

PHILIM	6.00	(PERCENT)	LOWER POROSITY LIMIT
VSHLIM	0.40	(FRACTION)	VOLUME OF SHALE UPPER LIMIT
SWLIM	50.00	(PERCENT)	WATER SATURATION LIMIT

\*\*\*\*\*  
 \*\*\*\*\* LOG CALCULATION OPTIONS AND SWITCHES \*\*\*\*\*  
 \*\*\*\*\*

MSI	0	0=STANDARD UNITS 1=MSI
VSHCIN	3	GR TO VOL. OF SHALE CURVATURE INDEX
VSHOFF	0	0=CALC VOL. OF SHALE - 1=VOL.OF SH=0
GROFF	0	GR AS SHALE INDICATOR (0-USE ,1-NO)
KTHOFF	1	TH & K AS SHALE INDICATOR (0-USE ,1-NO)
NEUOFF	1	NEUTRON AS SHALE INDICATOR (0-USE ,1-NO)
DLTOFF	1	SONIC AS SHALE INDICATOR (0-USE ,1-NO)
ATTOFF	1	EPT AS SHALE INDICATOR (0-USE ,1-NO)
SPOFF	1	SP AS SHALE INDICATOR (0-USE ,1-NO)
PEOFF	0	USE PEF? (0-USE ,1-NO)
MINOPT	3	MINERAL OPTION SWITCH
		0 = COMPLEX LITHOLOGY
		1 = SANDSTONE AND DOLOMITE ONLY
		2 = LIMESTONE AND DOLOMITE ONLY
		3 = SANDSTONE AND SHALE ONLY (CLASSICAL)
		4 = SANDSTONE AND SHALE ONLY (MODERN)
		5 = SANDSTONE AND LIMESTONE ONLY
MOPOFF	0	MOVEABLE OIL PLOT SWITCH 0-USE RXO 1-NO RXO
QOPT	1	SW OPTION - 0=SW FROM PHIT AND Q 1=SW FROM PHIE AND VSH
NOPRT	0	PRINT OPTION - 0=PRINT ALL VALUES 1=SKIP SHALE ZONES
SWOPT	5	1 - ARCHIE; 2 - SIMANDOUX; 3 - SIMANDOUX LAMINAR; 4 - V2 SIMANDOUX; 5 - INDONESIAN 6 - DISPERSED CLAY 7 - DUAL WATER MODEL 8 - DUAL WATER Q=VSH MODEL 9 - NORMALIZED WAXMAN-SMITS 10 - WAXMAN-SMITS

SWIRR	10.00	(FRACTION)IRREDUCIBLE WATER SATURATION FOR PERMEABILITY EQUATION
-------	-------	---



## LIST FOR WELL ANGLER-1      ZONE CAMPA/T

## LISTING OF ENVIRON PARAMETERS

ZONE      CAMPA/T      WELL      ANGLER-1

TOP      3830.0000      (METRES) TOP OF INTERVAL  
 BOTTOM      3842.5000      (METRES) BOTTOM OF INTERVAL

DESCRIPTION OF PARAMETERS : CAMPANIAN A SST (3830-3842.5M)

## FLUID VALUES

RHOFR      1.00      (KG/M3 OR GR/CC) RECORDED FLUID DENSITY  
 SALFM      32000.      (PPM) FORMATION SALINITY (NACL)  
 SALMD      27000.      (PPM) MUD SALINITY (NACL)  
 RMM      0.2580      (OHM-M) RM  
                  IF USING AN OIL BASED MUD SET TO > 100  
 RMMT      68.      (FARENHEIT) MEASURED TEMPERATURE FOR RM  
 RMFM      0.2100      (OHM-M) RMF  
 RMFMT      64.      (FARENHEIT) MEASURED TEMPERATURE FOR RMF  
 RMCM      0.4280      (OHM-M) RMC  
 RMCMT      66.      (FARENHEIT) MEASURED TEMPERATURE FOR RMC

## HOLE AND MUD VALUES

MW      9.50      (KG/M3 LBS/GAL LBS/FT3 OR SP. GRAV) MUD WT  
                  ENTER 0 MW FOR AIR FILLED HOLE  
 BITSIZ      8.500      (MM OR INCHES) BIT SIZE  
 AMST      45.0      (FARENHEIT) ANNUAL MEAN SURFACE TEMP  
 BHT      230.0      (FARENHEIT) BOTTOM HOLE TEMPERATURE  
 TD      4330.      (METRES) TOTAL DEPTH OF BOREHOLE  
 RSTAND      1.500      (INCHES) STANDOFF SETTING ON INDUCTION

## LIMITING VALUES

RHOMIN      1.25      (KG/M3 OR GR/CC) MIN. VALID BULK DENSITY  
 DLIMIN      40.      (USEC/FT) MIN. VALID SONIC ITT  
 DLIMAX      190.      (USEC/FT) MAX. VALID SONIC ITT  
 PHNMAX      70.      (PERCENT) MAXIMUM VALID NEUTRON POROSITY  
 RUGMAX      6.00      (INCHES) MAX. RUGOSITY TO ACCEPT NEUTRON  
 STOMAX      3.00      (INCHES) MAX. NEUT. STANDOFF  
 STOMIN      0.00      (INCHES) MIN. NEUT. STANDOFF TO CORRECT  
                  (SET TO STOMAX TO BYPASS STANDOFF LOGIC)  
 DROLIM      0.20      (KG/M3 OR GR/CC) MAXIMUM DENSITY CORRECTION  
                  TO ACCEPT (+ OR -)

## LIST FOR WELL ANGLER-1      ZONE CAMPA/T

## LISTING OF CALC PARAMETERS

ZONE      CAMPA/T      WELL      ANGLER-1

TOP      3830.0000      (METRES) TOP OF INTERVAL  
 BOTTOM      3842.5000      (METRES) BOTTOM OF INTERVAL

## MATRIX VALUES

GRMA      39.      (API) GAMMA RAY MATRIX  
 SPMA      -40.      (MV) SP MATRIX (MV)  
 ATMA      150.      (DB/M) ATTENUATION OF THE MATRIX (DB/M)  
 DLTSS      52.00      (USEC/FT) DELTA T SANDSTONE  
 DLTLS      48.78      (USEC/FT) DELTA T LIMESTONE  
 DLTDL      43.96      (USEC/FT) DELTA T DOLOMITE  
 DLTANH      50.00      (USEC/FT) DELTA T ANHYDRITE  
 RHOSS      2.67      (KG/M3 OR GR/CC) MATRIX DENS OF SANDSTONE  
 RHOLS      2.71      (KG/M3 OR GR/CC) MATRIX DENS OF LIMESTONE  
 RHODOL      2.87      (KG/M3 OR GR/CC) MATRIX DENS OF DOLOMITE  
 RHOANH      2.98      (KG/M3 OR GR/CC) MATRIX DENS OF ANHYDRITE  
 TPLSS      7.20      (NSEC/M) TPL OF SANDSTONE  
 TPLLS      9.10      (NSEC/M) TPL OF LIMESTONE  
 TPLDOL      8.70      (NSEC/M) TPL OF DOLOMITE  
 TPLANH      8.40      (NSEC/M) TPL OF ANHYDRITE

## VALUES FOR SOLO TOOLS

RHOMAB      2.67      (KG/CM OR GR/CC) MATRIX DENSITY  
 DLTAB      52.      (KG/M3 OR GR/CC) TRANSIT TIME MATRIX  
 TPLMAB      8.50      (NSEC/M) TPL MATRIX  
 NEUMAB      0      NEUTRON MATRIX 0=LS 1=SS 2=DOL

## VALUES FOR COAL DETECTION

GRCOAL      150.      (API) MAXIMUM GR IN COAL.  
 DLTCOL      90.      (USEC/FT) MINIMUM SONIC IN COAL.  
 UCOAL      8.00      (PPM) MINIMUM URANIUM IN COAL.  
 RHOCOL      2.25      (KG/M3 OR GR/CC) MAXIMUM DENSITY OF COAL.  
 PNCOL      29.      (PERCENT) MINIMUM LS. NEUTRON POR. IN COAL  
 PECOL      2.30      (BARN/ELEC.) MAXIMUM PEF IN COAL.  
 COALCK      4      NUMBER OF POSITIVE COAL CHECKS NEEDED TO  
                  IDENTIFY COAL (COAL=1).



## LIST FOR WELL ANGLER-1

ZONE CAMPA/T

\*\*\*\*\*  
 \*\*\*\*\* FLUID VALUES \*\*\*\*\*  
 \*\*\*\*\*

RHOF	1.00	(KG/M3 OR GR/CC)	FLUID DENSITY
DLTF	189.	(USEC/FT)	TRANSIT TIME OF FLUID
RHOH	0.60	(KG/M3 OR GR/CC)	HYDROCARBON DENSITY
ANEUT	1.00	NEUTRON GAS FACTOR (USUAL RANGE 1 TO 1.4)	
		1=HIGH DENSITY AND 1.5 LOW DENSITY	
RHOMF	1.00	(KG/M3 OR GR/CC)	MUD FILTRATE DENSITY
TPLH	5.00	(NSEC/M)	HYDROCARBON TPL
SALMD	27000.	(PPM)	MUD SALINITY
RWM	0.110	(OHM-M)	RW AT MEASURED TEMPERATURE
RWMT	219.	(FARENHEIT)	TEMPERATURE OF RW MEASUREMENT
RWBM	0.11	(OHM-M)	BOUND WATER RESISTIVITY
RWBMT	219.	(FARENHEIT)	TEMPERATURE OF RWB MEASUREMENT

\*\*\*\*\*  
 \*\*\*\*\* SHALE AND CLAY VALUES \*\*\*\*\*  
 \*\*\*\*\*

GRSH	135.	(API)	GAMMA RAY VALUE IN SHALE
SPSH	-45.	(MV)	SP VALUE IN SHALE
ATTSH	600.	(DB/M)	EPT ATTENUATION IN SHALE
RHOSH	2.57	(KG/M3 OR GR/CC)	MATRIX DENSITY OF SHALE
PEFSH	2.90	(BARN/ELECTRON)	PEF IN SHALE
TPLSH	9.00	(NSEC/M)	TPL IN SHALE
PHINSH	25.	(PERCENT)	NEUTRON LOG POROSITY OF SHALE
DLTSH	78.	(USEC/FT)	TRANSIT TIME OF SHALE
RSH	11.00	(OHM-M)	RESISTIVITY OF SHALE
PHIMAX	29.00	(PERCENT)	MAX SHALE POROSITY IN INTERVAL

## WAXMAN SMITS CONSTANTS

RHOCL	2.70	(KG/M3 OR GR/CC)	DENS OF DRY CLAY
HICL	25.00	(PERCENT)	HYDROGEN INDEX OF DRY CLAY
CEC	0.100	(MEQ/G)	CATION EXCHANGE CAPACITY
NOTE: ALSO SUPPLY RSH, M (USED AS M*),			
N (USED AS N*), RW, AND A.			

\*\*\*\*\*  
 \*\*\*\*\* LOG CALCULATION CONSTANTS AND EXPONENTS \*\*\*\*\*  
 \*\*\*\*\*

A	0.62	CONSTANT IN FORMATION FACTOR EQUATION
M	2.15	CEMENTATION EXPONENT
N	2.00	SATURATION EXPONENT
CP	1.00	COMPACTION FACTOR

## LIST FOR WELL ANGLER-1

ZONE CAMPA/T

\*\*\*\*\*  
 \*\*\*\*\* LIMITING VALUES FOR NET AND GROSS PAY CALCULATIONS \*\*\*\*\*  
 \*\*\*\*\*

PHILIM	6.00	(PERCENT)	LOWER POROSITY LIMIT
VSHLIM	0.40	(FRACTION)	VOLUME OF SHALE UPPER LIMIT
SWLIM	50.00	(PERCENT)	WATER SATURATION LIMIT

\*\*\*\*\*  
 \*\*\*\*\* LOG CALCULATION OPTIONS AND SWITCHES \*\*\*\*\*  
 \*\*\*\*\*

MSI	0	0=STANDARD UNITS 1=MSI
VSHCIN	3	GR TO VOL. OF SHALE CURVATURE INDEX
VSHOFF	0	0=CALC VOL. OF SHALE - 1=VOL.OF SH=0
GROFF	0	GR AS SHALE INDICATOR (0-USE ,1-NO)
KTHOFF	1	TH & K AS SHALE INDICATOR (0-USE ,1-NO)
NEUOFF	0	NEUTRON AS SHALE INDICATOR (0-USE ,1-NO)
DLTOFF	1	SONIC AS SHALE INDICATOR (0-USE ,1-NO)
ATTOFF	1	EPT AS SHALE INDICATOR (0-USE ,1-NO)
SPOFF	1	SP AS SHALE INDICATOR (0-USE ,1-NO)
PEOFF	0	USE PEF? (0-USE ,1-NO)
MINOPT	3	MINERAL OPTION SWITCH
		0 = COMPLEX LITHOLOGY
		1 = SANDSTONE AND DOLOMITEONLY
		2 = LIMESTONE AND DOLOMITE ONLY
		3 = SANDSTONE AND SHALE ONLY (CLASSICAL)
		4 = SANDSTONE AND SHALE ONLY (MODERN)
		5 = SANDSTONE AND LIMESTONE ONLY

MOPOFF	0	MOVEABLE OIL PLOT SWITCH 0-USE RXO
		1-NO RXO
QOPT	1	SW OPTION - 0=SW FROM PHIT AND Q
		1=SW FROM PHIE AND VSH
NOPRT	0	PRINT OPTION - 0=PRINT ALL VALUES
		1=SKIP SHALE ZONES
SWOPT	5	1 - ARCHIE; 2 - SIMANDOUX; 3 - SIMANDOUX
		LAMINAR; 4 - V2 SIMANDOUX; 5 - INDONESIAN
		6 - DISPERSED CLAY 7 - DUAL WATER MODEL
		8 - DUAL WATER Q=VSH MODEL
		9 - NORMALIZED WAXMAN-SMITS
		10 - WAXMAN-SMITS

SWIRR	10.00	(FRACTION)IRREDUCIBLE WATER SATURATION FOR PERMEABILITY EQUATION
-------	-------	--

## LIST FOR WELL ANGLER-1 ZONE CAMPA/B

## LISTING OF ENVIRON PARAMETERS

ZONE CAMPA/B WELL ANGLER-1

TOP 3842.5000 (METRES) TOP OF INTERVAL  
 BOTTOM 3860.0000 (METRES) BOTTOM OF INTERVAL

DESCRIPTION OF PARAMETERS : LOWER CAMPANIAN "A" SST

## FLUID VALUES

RHOFR 1.00 (KG/M3 OR GR/CC) RECORDED FLUID DENSITY  
 SALFM 32000. (PPM) FORMATION SALINITY (NACL)  
 SALMD 27000. (PPM) MUD SALINITY (NACL)  
 RMM 0.2580 (OHM-M) RM  
 IF USING AN OIL BASED MUD SET TO > 100  
 RMT 68. (FARENHIT) MEASURED TEMPERATURE FOR RM  
 RMFM 0.2100 (OHM-M) RMF  
 RMFMT 64. (FARENHIT) MEASURED TEMPERATURE FOR RMF  
 RMCN 0.4280 (OHM-M) RMC  
 RMCNT 66. (FARENHIT) MEASURED TEMPERATURE FOR RMC

## HOLE AND MUD VALUES

MW 9.50 (KG/M3 LBS/GAL LBS/FT3 OR SP. GRAV) MUD WT  
 ENTER 0 MW FOR AIR FILLED HOLE  
 BITSIZ 8.500 (MM OR INCHES) BIT SIZE  
 AMST 45.0 (FARENHIT) ANNUAL MEAN SURFACE TEMP  
 BHT 230.0 (FARENHIT) BOTTOM HOLE TEMPERATURE  
 TD 4330. (METRES) TOTAL DEPTH OF BOREHOLE  
 RSTAND 1.500 (INCHES) STANDOFF SETTING ON INDUCTION

## LIMITING VALUES

RHOMIN 1.25 (KG/M3 OR GR/CC) MIN. VALID BULK DENSITY  
 DLTIMIN 40. (USEC/FT) MIN. VALID SONIC ITT  
 DLTMAX 190. (USEC/FT) MAX. VALID SONIC ITT  
 PHNMAX 70. (PERCENT) MAXIMUM VALID NEUTRON POROSITY  
 RUGMAX 6.00 (INCHES) MAX. RUGOSITY TO ACCEPT NEUTRON  
 STOMAX 3.00 (INCHES) MAX. NEUT. STANDOFF  
 STOMIN 0.00 (INCHES) MIN. NEUT. STANDOFF TO CORRECT  
 (SET TO STOMAX TO BYPASS STANDOFF LOGIC)  
 DROLIM 0.20 (KG/M3 OR GR/CC) MAXIMUM DENSITY CORRECTION  
 TO ACCEPT (+ OR -)

## LIST FOR WELL ANGLER-1 ZONE CAMPA/B

## LISTING OF CALC PARAMETERS

ZONE CAMPA/B WELL ANGLER-1

TOP 3842.5000 (METRES) TOP OF INTERVAL  
 BOTTOM 3860.0000 (METRES) BOTTOM OF INTERVAL

## MATRIX VALUES

GRMA 42. (API) GAMMA RAY MATRIX  
 SPMA -40. (MV) SP MATRIX (MV)  
 ATMA 150. (DB/M) ATTENUATION OF THE MATRIX (DB/M)  
 DLTSS 55.00 (USEC/FT) DELTA T SANDSTONE  
 DLTL 48.78 (USEC/FT) DELTA T LIMESTONE  
 DLTDL 43.96 (USEC/FT) DELTA T DOLOMITE  
 DLTANH 50.00 (USEC/FT) DELTA T ANHYDRITE  
 RHOS 2.64 (KG/M3 OR GR/CC) MATRIX DENS OF SANDSTONE  
 RHOLS 2.71 (KG/M3 OR GR/CC) MATRIX DENS OF LIMESTONE  
 RHODOL 2.87 (KG/M3 OR GR/CC) MATRIX DENS OF DOLOMITE  
 RHOANH 2.98 (KG/M3 OR GR/CC) MATRIX DENS OF ANHYDRITE  
 TPLSS 7.20 (NSEC/M) TPL OF SANDSTONE  
 TPLLS 9.10 (NSEC/M) TPL OF LIMESTONE  
 TPLDOL 8.70 (NSEC/M) TPL OF DOLOMITE  
 TPLANH 8.40 (NSEC/M) TPL OF ANHYDRITE

## VALUES FOR SOLO TOOLS

RHOMAB 2.64 (KG/CM OR GR/CC) MATRIX DENSITY  
 DLIMAB 55. (KG/M3 OR GR/CC) TRANSIT TIME MATRIX  
 TPLMAB 8.50 (NSEC/M) TPL MATRIX  
 NEUMAB 0 NEUTRON MATRIX 0=LS 1=SS 2=DOL

## VALUES FOR COAL DETECTION

GRCOAL 150. (API) MAXIMUM GR IN COAL.  
 DLTOOL 90. (USEC/FT) MINIMUM SONIC IN COAL.  
 UCOAL 6.00 (PPM) MINIMUM URANIUM IN COAL.  
 RHOCOAL 2.25 (KG/M3 OR GR/CC) MAXIMUM DENSITY OF COAL.  
 PNCOL 29. (PERCENT) MINIMUM LS. NEUTRON POR. IN COAL.  
 PECOL 2.30 (BARN/ELEC.) MAXIMUM PEF IN COAL.  
 COALCK 4 NUMBER OF POSITIVE COAL CHECKS NEEDED TO  
 IDENTIFY COAL (COAL=1).

## LIST FOR WELL ANGLER-1

ZONE CAMPA/B

\*\*\*\*\*  
 \*\*\*\*\* FLUID VALUES \*\*\*\*\*  
 \*\*\*\*\*

RHOF	1.00	(KG/M3 OR GR/CC)	FLUID DENSITY
DLTF	189.	(USEC/FT)	TRANSIT TIME OF FLUID
RHOH	0.60	(KG/M3 OR GR/CC)	HYDROCARBON DENSITY
ANEUT	1.00	NEUTRON GAS FACTOR(USUAL RANGE 1 TO 1.4)	
		1=HIGH DENSITY AND 1.5 LOW DENSITY	
RHOMF	1.00	(KG/M3 OR GR/CC)	MUD FILTRATE DENSITY
TPLH	5.00	(NSEC/M)	HYDROCARBON TPL
SALMD	27000.	(PPM)	MUD SALINITY
RWM	0.140	(OHM-M)	RW AT MEASURED TEMPERATURE
RWMT	219.	(FARENHEIT)	TEMPERATURE OF RW MEASUREMENT
RWBH	0.14	(OHM-M)	BOUND WATER RESISTIVITY
RWBMT	219.	(FARENHEIT)	TEMPERATURE OF RWB MEASUREMENT

\*\*\*\*\*  
 \*\*\*\*\* SHALE AND CLAY VALUES \*\*\*\*\*  
 \*\*\*\*\*

GRSH	135.	(API)	GAMMA RAY VALUE IN SHALE
SPSH	-45.	(MV)	SP VALUE IN SHALE
ATTSH	600.	(DB/M)	EPT ATTENUATION IN SHALE
RHOSH	2.55	(KG/M3 OR GR/CC)	MATRIX DENSITY OF SHALE
PEFSH	2.90	(BARNS/ELECTRON)	PEF IN SHALE
TPLSH	9.00	(NSEC/M)	TPL IN SHALE
PHINSH	25.	(PERCENT)	NEUTRON LOG POROSITY OF SHALE
DLTSH	78.	(USEC/FT)	TRANSIT TIME OF SHALE
RSH	16.00	(OHM-M)	RESISTIVITY OF SHALE
PHIMAX	29.00	(PERCENT)	MAX SHALE POROSITY IN INTERVAL

## WAXMAN SMITS CONSTANTS

RHOCL	2.70	(KG/M3 OR GR/CC)	DENS OF DRY CLAY
HICL	25.00	(PERCENT)	HYDROGEN INDEX OF DRY CLAY
CEC	0.100	(MEQ/G)	CATION EXCHANGE CAPACITY
NOTE: ALSO SUPPLY RSH, M (USED AS M*),			
N (USED AS N*), RW, AND A.			

\*\*\*\*\*  
 \*\*\*\*\* LOG CALCULATION CONSTANTS AND EXPONENTS \*\*\*\*\*  
 \*\*\*\*\*

A	0.62	CONSTANT IN FORMATION FACTOR EQUATION
M	2.15	CEMENTATION EXPONENT
N	2.00	SATURATION EXPONENT
CP	1.00	COMPACTION FACTOR

## LIST FOR WELL ANGLER-1

ZONE CAMPA/B

\*\*\*\*\*  
 \*\*\*\* LIMITING VALUES FOR NET AND GROSS PAY CALCULATIONS \*\*\*\*  
 \*\*\*\*\*

PHILIM	6.00	(PERCENT)	LOWER POROSITY LIMIT
VSHLIM	0.40	(FRACTION)	VOLUME OF SHALE UPPER LIMIT
SWLIM	50.00	(PERCENT)	WATER SATURATION LIMIT

\*\*\*\*\*  
 \*\*\*\*\* LOG CALCULATION OPTIONS AND SWITCHES \*\*\*\*\*  
 \*\*\*\*\*

MSI	0	0=STANDARD UNITS 1=MSI
VSHCIN	3	GR TO VOL. OF SHALE CURVATURE INDEX
VSHOFF	0	0=CALC VOL. OF SHALE - 1=VOL.OF SH=0
GROFF	0	GR AS SHALE INDICATOR (0-USE ,1-NO)
KTHOFF	1	TH & K AS SHALE INDICATOR (0-USE ,1-NO)
NEUOFF	0	NEUTRON AS SHALE INDICATOR (0-USE ,1-NO)
DLTOFF	1	SONIC AS SHALE INDICATOR (0-USE ,1-NO)
ATTOFF	1	EPT AS SHALE INDICATOR (0-USE ,1-NO)
SPOFF	1	SP AS SHALE INDICATOR (0-USE ,1-NO)
PEOFF	0	USE PEF? (0-USE ,1-NO)
MINOPT	3	MINERAL OPTION SWITCH
		0 = COMPLEX LITHOLOGY
		1 = SANDSTONE AND DOLOMITEONLY
		2 = LIMESTONE AND DOLOMITE ONLY
		3 = SANDSTONE AND SHALE ONLY (CLASSICAL)
		4 = SANDSTONE AND SHALE ONLY (MODERN)
		5 = SANDSTONE AND LIMESTONE ONLY
MOPOFF	0	MOVEABLE OIL PLOT SWITCH 0-USE RXO
		1-NO RXO
QOPT	1	SW OPTION - 0=SW FROM PHIT AND Q
		1=SW FROM PHIE AND VSH
NOPRT	0	PRINT OPTION - 0=PRINT ALL VALUES
		1=SKIP SHALE ZONES
SWOPT	5	1 - ARCHIE; 2 - SIMANDOUX; 3 - SIMANDOUX
		LAMINAR; 4 - V2 SIMANDOUX; 5 - INDONESIAN
		6 - DISPERSED CLAY 7 - DUAL WATER MODEL
		8 - DUAL WATER Q=VSH MODEL
		9 - NORMALIZED WAXMAN-SMITS
		10 - WAXMAN-SMITS

SWIRR	10.00	(FRACTION)IRREDUCIBLE WATER SATURATION FOR PERMEABILITY EQUATION
-------	-------	--

## LIST FOR WELL ANGLER-1 ZONE LOW CAMP

## LISTING OF ENVIRON PARAMETERS

ZONE LOW CAMP WELL ANGLER-1

TOP 3860.0000 (METRES) TOP OF INTERVAL  
 BOTTOM 4210.0000 (METRES) BOTTOM OF INTERVAL

DESCRIPTION OF PARAMETERS : L CAMPANIAN ANGLER 3860-4210m

## FLUID VALUES

RHOFR 1.00 (KG/M3 OR GR/CC) RECORDED FLUID DENSITY  
 SALFM 18500. (PPM) FORMATION SALINITY (NACL)  
 SALMD 26000. (PPM) MUD SALINITY (NACL)  
 RMM 0.2580 (OHM-M) RM  
 IF USING AN OIL BASED MUD SET TO > 100  
 RMMT 68. (FARENHEIT) MEASURED TEMPERATURE FOR RM  
 RMFM 0.2100 (OHM-M) RMF  
 RMFMT 64. (FARENHEIT) MEASURED TEMPERATURE FOR RMF  
 RMCN 0.4280 (OHM-M) RMC  
 RMCMT 66. (FARENHEIT) MEASURED TEMPERATURE FOR RMC

## HOLE AND MUD VALUES

MW 9.60 (KG/M3 LBS/GAL LBS/FT3 OR SP. GRAV) MUD WT  
 ENTER 0 MW FOR AIR FILLED HOLE  
 BITSIZ 8.500 (MM OR INCHES) BIT SIZE  
 AMST 54.0 (FARENHEIT) ANNUAL MEAN SURFACE TEMP  
 BHT 246.0 (FARENHEIT) BOTTOM HOLE TEMPERATURE  
 TD 4337. (METRES) TOTAL DEPTH OF BOREHOLE  
 RSTAND 1.500 (INCHES) STANDOFF SETTING ON INDUCTION

## LIMITING VALUES

RHOMIN 1.25 (KG/M3 OR GR/CC) MIN. VALID BULK DENSITY  
 DLTMIN 40. (USEC/FT) MIN. VALID SONIC ITT  
 DLTMAX 190. (USEC/FT) MAX. VALID SONIC ITT  
 PHNMAX 70. (PERCENT) MAXIMUM VALID NEUTRON POROSITY  
 RUGMAX 6.00 (INCHES) MAX. RUGOSITY TO ACCEPT NEUTRON  
 STOMAX 3.00 (INCHES) MAX. NEUT. STANDOFF  
 STOMIN 0.00 (INCHES) MIN. NEUT. STANDOFF TO CORRECT  
 (SET TO STOMAX TO BYPASS STANDOFF LOGIC)  
 DROLIM 0.20 (KG/M3 OR GR/CC) MAXIMUM DENSITY CORRECTION  
 TO ACCEPT (+ OR -)

## LIST FOR WELL ANGLER-1 ZONE LOW CAMP

## LISTING OF CALC PARAMETERS

ZONE LOW CAMP WELL ANGLER-1

TOP 3860.0000 (METRES) TOP OF INTERVAL  
 BOTTOM 4210.0000 (METRES) BOTTOM OF INTERVAL

## MATRIX VALUES

GRMA 45. (API) GAMMA RAY MATRIX  
 SPMA -40. (MV) SP MATRIX (MV)  
 ATTMA 135. (DB/M) ATTENUATION OF THE MATRIX (DB/M)  
 DLTSS 55.00 (USEC/FT) DELTA T SANDSTONE  
 DLTLS 48.78 (USEC/FT) DELTA T LIMESTONE  
 DLTDL 43.96 (USEC/FT) DELTA T DOLOMITE  
 DLTANH 50.00 (USEC/FT) DELTA T ANHYDRITE  
 RHOSS 2.65 (KG/M3 OR GR/CC) MATRIX DENS OF SANDSTONE  
 RHOLS 2.71 (KG/M3 OR GR/CC) MATRIX DENS OF LIMESTONE  
 RHODOL 2.87 (KG/M3 OR GR/CC) MATRIX DENS OF DOLOMITE  
 RHOANH 2.98 (KG/M3 OR GR/CC) MATRIX DENS OF ANHYDRITE  
 TPLSS 7.20 (NSEC/M) TPL OF SANDSTONE  
 TPLLS 9.10 (NSEC/M) TPL OF LIMESTONE  
 TPLDL 8.70 (NSEC/M) TPL OF DOLOMITE  
 TPLANH 8.40 (NSEC/M) TPL OF ANHYDRITE

## VALUES FOR SOLO TOOLS

RHOMAB 2.65 (KG/CM OR GR/CC) MATRIX DENSITY  
 DLTAB 55. (KG/M3 OR GR/CC) TRANSIT TIME MATRIX  
 TPLMAB 8.50 (NSEC/M) TPL MATRIX  
 NEUMAB 0 NEUTRON MATRIX 0=LS 1=SS 2=DOL

## VALUES FOR COAL DETECTION

GRCOAL 180. (API) MAXIMUM GR IN COAL.  
 DLTOOL 89. (USEC/FT) MINIMUM SONIC IN COAL.  
 UCOAL 8.00 (PPM) MINIMUM URANIUM IN COAL.  
 RHOCOAL 2.30 (KG/M3 OR GR/CC) MAXIMUM DENSITY OF COAL.  
 PNCOL 29. (PERCENT) MINIMUM LS. NEUTRON POR. IN COAL  
 PECOL 3.00 (BARN/ELEC.) MAXIMUM PEF IN COAL.  
 COALCK 4 NUMBER OF POSITIVE COAL CHECKS NEEDED TO  
 IDENTIFY COAL (COAL=1).

## LIST FOR WELL ANGLER-1

## ZONE LOW CAMP

\*\*\*\*\*  
 \*\*\*\*\* FLUID VALUES \*\*\*\*\*  
 \*\*\*\*\*

RHOF	1.00	(KG/M3 OR GR/CC)	FLUID DENSITY
DLTF	189.	(USEC/FT)	TRANSIT TIME OF FLUID
RHOH	0.60	(KG/M3 OR GR/CC)	HYDROCARBON DENSITY
ANEUT	1.00	NEUTRON GAS FACTOR(USUAL RANGE 1 TO 1.4)	
		1=HIGH DENSITY AND 1.5 LOW DENSITY	
RHOMF	1.00	(KG/M3 OR GR/CC)	MUD FILTRATE DENSITY
TPLH	5.00	(NSEC/M)	HYDROCARBON TPL
SALMD	26000.	(PPM)	MUD SALINITY
RWM	0.105	(OHM-M)	RW AT MEASURED TEMPERATURE
RWMT	246.	(FARENEIT)	TEMPERATURE OF RW MEASUREMENT
RWBM	0.10	(OHM-M)	BOUND WATER RESISTIVITY
RWBMT	246.	(FARENEIT)	TEMPERATURE OF RWB MEASUREMENT

\*\*\*\*\*  
 \*\*\*\*\* SHALE AND CLAY VALUES \*\*\*\*\*  
 \*\*\*\*\*

GRSH	140.	(API)	GAMMA RAY VALUE IN SHALE
SPSH	-45.	(MV)	SP VALUE IN SHALE
ATTSH	600.	(DB/M)	EPT ATTENUATION IN SHALE
RHOSH	2.57	(KG/M3 OR GR/CC)	MATRIX DENSITY OF SHALE
PEFSH	3.60	(BARN/ELECTRON)	PEF IN SHALE
TPLSH	9.00	(NSEC/M)	TPL IN SHALE
PHINSH	25.	(PERCENT)	NEUTRON LOG POROSITY OF SHALE
DLTSH	77.	(USEC/FT)	TRANSIT TIME OF SHALE
RSH	10.00	(OHM-M)	RESISTIVITY OF SHALE
PHIMAX	27.00	(PERCENT)	MAX SHALE POROSITY IN INTERVAL

## WAXMAN SMITS CONSTANTS

RHOCL	2.70	(KG/M3 OR GR/CC)	DENS OF DRY CLAY
HICL	25.00	(PERCENT)	HYDROGEN INDEX OF DRY CLAY
CEC	0.100	(MEQ/G)	CATION EXCHANGE CAPACITY

NOTE: ALSO SUPPLY RSH, M (USED AS M\*),  
 N (USED AS N\*), RW, AND A.

\*\*\*\*\*  
 \*\*\*\*\* LOG CALCULATION CONSTANTS AND EXPONENTS \*\*\*\*\*  
 \*\*\*\*\*

A	0.62	CONSTANT IN FORMATION FACTOR EQUATION
M	2.15	CEMENTATION EXPONENT
N	2.00	SATURATION EXPONENT
CP	1.00	COMPACTION FACTOR

## LIST FOR WELL ANGLER-1

## ZONE LOW CAMP

\*\*\*\*\*  
 \*\*\*\*\* LIMITING VALUES FOR NET AND GROSS PAY CALCULATIONS \*\*\*\*\*  
 \*\*\*\*\*

PHILIM	6.00	(PERCENT)	LOWER POROSITY LIMIT
VSHLIM	0.40	(FRACTION)	VOLUME OF SHALE UPPER LIMIT
SWLIM	50.00	(PERCENT)	WATER SATURATION LIMIT

\*\*\*\*\*  
 \*\*\*\*\* LOG CALCULATION OPTIONS AND SWITCHES \*\*\*\*\*  
 \*\*\*\*\*

MSI	0	0=STANDARD UNITS 1=MSI
VSHCIM	3	GR TO VOL. OF SHALE CURVATURE INDEX
VSHOFF	0	0=CALC VOL. OF SHALE - 1=VOL.OF SH=0
.GROFF	0	GR AS SHALE INDICATOR (0-USE ,1-NO)
KTHOFF	1	TH & K AS SHALE INDICATOR (0-USE ,1-NO)
NEUOFF	0	NEUTRON AS SHALE INDICATOR (0-USE ,1-NO)
DLTOFF	1	SONIC AS SHALE INDICATOR (0-USE ,1-NO)
ATTOFF	1	EPT AS SHALE INDICATOR (0-USE ,1-NO)
SPOFF	1	SP AS SHALE INDICATOR (0-USE ,1-NO)
PEOFF	0	USE PEF? (0-USE ,1-NO)
MINOPT	3	MINERAL OPTION SWITCH
		0 = COMPLEX LITHOLOGY
		1 = SANDSTONE AND DOLOMITEONLY
		2 = LIMESTONE AND DOLOMITE ONLY
		3 = SANDSTONE AND SHALE ONLY (CLASSICAL)
		4 = SANDSTONE AND SHALE ONLY (MODERN)
		5 = SANDSTONE AND LIMESTONE ONLY

MOPOFF	0	MOVEABLE OIL PLOT SWITCH 0-USE RXO 1-NO RXO
QOPT	1	SW OPTION - 0=SW FROM PHIT AND Q 1=SW FROM PHIE AND VSH
NOPRT	0	PRINT OPTION - 0=PRINT ALL VALUES 1=SKIP SHALE ZONES
SWOPT	5	1 - ARCHIE; 2 - SIMANDOUX; 3 - SIMANDOUX LAMINAR; 4 - V2 SIMANDOUX; 5 - INDONESIAN 6 - DISPERSED CLAY 7 - DUAL WATER MODEL 8 - DUAL WATER Q=VSH MODEL 9 - NORMALIZED WAXMAN-SMITS 10 - WAXMAN-SMITS

SWIRR	10.00	(FRACTION)IRREDUCIBLE WATER SATURATION FOR PERMEABILITY EQUATION
-------	-------	---

## LIST FOR WELL ANGLER-1 ZONE CAMPB/T

## LISTING OF ENVIRON PARAMETERS

ZONE CAMPB/T WELL ANGLER-1

TOP 4210.0000 (METRES) TOP OF INTERVAL  
 BOTTOM 4239.0000 (METRES) BOTTOM OF INTERVAL

DESCRIPTION OF PARAMETERS : CAMPANIAN B SST GAS ZONE

## FLUID VALUES

RHOFR 1.00 (KG/M3 OR GR/CC) RECORDED FLUID DENSITY  
 SALFM 18500. (PPM) FORMATION SALINITY (NACL)  
 SALMD 26000. (PPM) MUD SALINITY (NACL)  
 RMM 0.2580 (OHM-M) RM  
 IF USING AN OIL BASED MUD SET TO > 100  
 RMMT 68. (FARENHEIT) MEASURED TEMPERATURE FOR RM  
 RMFM 0.2100 (OHM-M) RMF  
 RMFMT 64. (FARENHEIT) MEASURED TEMPERATURE FOR RMF  
 RMCN 0.4280 (OHM-M) RMC  
 RMCMT 66. (FARENHEIT) MEASURED TEMPERATURE FOR RMC

## HOLE AND MUD VALUES

MW 9.60 (KG/M3 LBS/GAL LBS/FT3 OR SP. GRAV) MUD WT  
 ENTER 0 MW FOR AIR FILLED HOLE  
 BITSIZ 8.500 (MM OR INCHES) BIT SIZE  
 AMST 54.0 (FARENHEIT) ANNUAL MEAN SURFACE TEMP  
 BHT 246.0 (FARENHEIT) BOTTOM HOLE TEMPERATURE  
 TD 4337. (METRES) TOTAL DEPTH OF BOREHOLE  
 RSTAND 1.500 (INCHES) STANDOFF SETTING ON INDUCTION

## LIMITING VALUES

RHOMIN 1.25 (KG/M3 OR GR/CC) MIN. VALID BULK DENSITY  
 DLTMIN 40. (USEC/FT) MIN. VALID SONIC ITT  
 DLTMAX 190. (USEC/FT) MAX. VALID SONIC ITT  
 PHNMAX 70. (PERCENT) MAXIMUM VALID NEUTRON POROSITY  
 RUGMAX 6.00 (INCHES) MAX. RUGOSITY TO ACCEPT NEUTRON  
 STOMAX 3.00 (INCHES) MAX. NEUT. STANDOFF  
 STOMIN 0.00 (INCHES) MIN. NEUT. STANDOFF TO CORRECT  
 (SET TO STOMAX TO BYPASS STANDOFF LOGIC)  
 DROLIM 0.20 (KG/M3 OR GR/CC) MAXIMUM DENSITY CORRECTION  
 TO ACCEPT (+ OR -)

## LIST FOR WELL ANGLER-1 ZONE CAMPB/T

## LISTING OF CALC PARAMETERS

ZONE CAMPB/T WELL ANGLER-1

TOP 4210.0000 (METRES) TOP OF INTERVAL  
 BOTTOM 4239.0000 (METRES) BOTTOM OF INTERVAL

## MATRIX VALUES

GRMA 40. (API) GAMMA RAY MATRIX  
 SPMA -40. (MV) SP MATRIX (MV)  
 ATMA 135. (DB/M) ATTENUATION OF THE MATRIX (DB/M)  
 DLTSS 56.00 (USEC/FT) DELTA T SANDSTONE  
 DLTLS 48.78 (USEC/FT) DELTA T LIMESTONE  
 DLTDL 43.96 (USEC/FT) DELTA T DOLOMITE  
 DLTANH 50.00 (USEC/FT) DELTA T ANHYDRITE  
 RHOSS 2.66 (KG/M3 OR GR/CC) MATRIX DENS OF SANDSTONE  
 RHOLS 2.71 (KG/M3 OR GR/CC) MATRIX DENS OF LIMESTONE  
 RHODOL 2.87 (KG/M3 OR GR/CC) MATRIX DENS OF DOLOMITE  
 RHOANH 2.98 (KG/M3 OR GR/CC) MATRIX DENS OF ANHYDRITE  
 TPLSS 7.20 (NSEC/M) TPL OF SANDSTONE  
 TPLLS 9.10 (NSEC/M) TPL OF LIMESTONE  
 TPLDOL 8.70 (NSEC/M) TPL OF DOLOMITE  
 TPLANH 8.40 (NSEC/M) TPL OF ANHYDRITE

## VALUES FOR SOLO TOOLS

RHOMAB 2.66 (KG/CM OR GR/CC) MATRIX DENSITY  
 DLTAB 56. (KG/M3 OR GR/CC) TRANSIT TIME MATRIX  
 TPLMAB 8.50 (NSEC/M) TPL MATRIX  
 NEUMAB 0 NEUTRON MATRIX 0=LS 1=SS 2=DOL

## VALUES FOR COAL DETECTION

GRCOAL 180. (API) MAXIMUM GR IN COAL.  
 DLTCOL 89. (USEC/FT) MINIMUM SONIC IN COAL.  
 UCOAL 8.00 (PPM) MINIMUM URANIUM IN COAL.  
 RHOCOL 2.30 (KG/M3 OR GR/CC) MAXIMUM DENSITY OF COAL.  
 PNCOL 29. (PERCENT) MINIMUM LS. NEUTRON POR. IN COAL  
 PECOL 3.00 (BARN/ELEC.) MAXIMUM PEF IN COAL.  
 COALCK 4 NUMBER OF POSITIVE COAL CHECKS NEEDED TO  
 IDENTIFY COAL (COAL=1).

## LIST FOR WELL ANGLER-1

ZONE CAMPB/T

```

*****
***** FLUID VALUES *****
*****
RHOF      0.90      (KG/M3 OR GR/CC)  FLUID DENSITY
DLTF      189.      (USEC/FT)  TRANSIT TIME OF FLUID
RHOH      0.60      (KG/M3 OR GR/CC)  HYDROCARBON DENSITY
ANEUT     1.40      NEUTRON GAS FACTOR(USUAL RANGE 1 TO 1.4)
                      1=HIGH DENSITY AND 1.5 LOW DENSITY
RHOMF     1.00      (KG/M3 OR GR/CC)  MUD FILTRATE DENSITY
TPLH      5.00      (NSEC/M)          HYDROCARBON TPL
SALMD     26000.    (PPM)            MUD SALINITY
RWM       0.100     (OHM-M)  RW AT MEASURED TEMPERATURE
RWMF      246.      (FARENHEIT) TEMPERATURE OF RW MEASUREMENT
RWB       0.10      (OHM-M)  BOUND WATER RESISTIVITY
RWBMT     246.      (FARENHEIT) TEMPERATURE OF RWB MEASUREMENT

```

```

*****
***** SHALE AND CLAY VALUES *****
*****
GRSH      135.      (API) GAMMA RAY VALUE IN SHALE
SPSH      -45.      (MV)  SP VALUE IN SHALE
ATTSH     600.      (DB/M)  EPT ATTENUATION IN SHALE
RHOSH     2.60      (KG/M3 OR GR/CC) MATRIX DENSITY OF SHALE
PEFSH     3.60      (BARN/ELECTRON) PEF IN SHALE
TPLSH     9.00      (NSEC/M)          TPL IN SHALE
PHINSH    24.      (PERCENT) NEUTRON LOG POROSITY OF SHALE
DLTSH     74.      (USEC/FT) TRANSIT TIME OF SHALE
RSH       12.00     (OHM-M) RESISTIVITY OF SHALE
PHIMAX    27.00     (PERCENT) MAX SHALE POROSITY IN INTERVAL

```

## WAXMAN SMITS CONSTANTS

```

RHOCL     2.70      (KG/M3 OR GR/CC) DENS OF DRY CLAY
HICL      25.00     (PERCENT) HYDROGEN INDEX OF DRY CLAY
CEC       0.100     (MEQ/G) CATION EXCHANGE CAPACITY
NOTE: ALSO SUPPLY RSH, M (USED AS M*),
      N (USED AS N*), RW, AND A.

```

```

*****
***** LOG CALCULATION CONSTANTS AND EXPONENTS *****
*****

```

```

A         0.62      CONSTANT IN FORMATION FACTOR EQUATION
M         2.15      CEMENTATION EXPONENT
N         2.00      SATURATION EXPONENT
CP        1.00      COMPACTION FACTOR

```

## LIST FOR WELL ANGLER-1

ZONE CAMPB/T

```

*****
***** LIMITING VALUES FOR NET AND GROSS PAY CALCULATIONS *****
*****
PHILIM     6.00      (PERCENT) LOWER POROSITY LIMIT
VSHLIM     0.40      (FRACTION) VOLUME OF SHALE UPPER LIMIT
SWLIM      50.00     (PERCENT) WATER SATURATION LIMIT

```

```

*****
***** LOG CALCULATION OPTIONS AND SWITCHES *****
*****

```

```

MSI        0        0=STANDARD UNITS  1=MSI
VSHCIN     3        GR TO VOL. OF SHALE CURVATURE INDEX
VSHOFF     0        0=CALC VOL. OF SHALE - 1=VOL.OF SH=0
GROFF      0        GR AS SHALE INDICATOR (0=USE ,1=NO)
KTHOFF     1        TH & K AS SHALE INDICATOR (0=USE ,1=NO)
NEUOFF     0        NEUTRON AS SHALE INDICATOR (0=USE ,1=NO)
DLTOFF     1        SONIC AS SHALE INDICATOR (0=USE ,1=NO)
ATTOFF     1        EPT AS SHALE INDICATOR (0=USE ,1=NO)
SPOFF      1        SP AS SHALE INDICATOR (0=USE ,1=NO)
PEOFF      0        USE PEF? (0=USE ,1=NO)
MINOPT     3        MINERAL OPTION SWITCH
                      0 = COMPLEX LITHOLOGY
                      1 = SANDSTONE AND DOLOMITE ONLY
                      2 = LIMESTONE AND DOLOMITE ONLY
                      3 = SANDSTONE AND SHALE ONLY (CLASSICAL)
                      4 = SANDSTONE AND SHALE ONLY (MODERN)
                      5 = SANDSTONE AND LIMESTONE ONLY

```

```

MOPOFF     0        MOVEABLE OIL PLOT SWITCH  0=USE RXO
                      1=NO RXO
QOPT       1        SW OPTION - 0=SW FROM PHIT AND Q
                      1=SW FROM PHIE AND VSH
NOPRT      0        PRINT OPTION - 0=PRINT ALL VALUES
                      1=SKIP SHALE ZONES
SWOPT      5        1 - ARCHIE; 2 - SIMANDOUX; 3 - SIMANDOUX
                      LAMINAR; 4 - V2 SIMANDOUX; 5 - INDONESIAN
                      6 - DISPERSED CLAY  7 - DUAL WATER MODEL
                      8 - DUAL WATER Q=VSH MODEL
                      9 - NORMALIZED WAXMAN-SMITS
                      10 - WAXMAN-SMITS

```

```

SWIRR      10.00     (FRACTION)IRREDUCIBLE WATER SATURATION FOR
                      PERMEABILITY EQUATION

```



LIST FOR WELL ANGLER-1

ZONE CAMPB/B

## LISTING OF ENVIRON PARAMETERS

ZONE CAMPB/B WELL ANGLER-1

TOP 4239.0000 (METRES) TOP OF INTERVAL  
 BOTTOM 4330.0000 (METRES) BOTTOM OF INTERVAL

DESCRIPTION OF PARAMETERS : CAMPANIAN B SST 4239-4330M TD

## FLUID VALUES

RHOFR 1.00 (KG/M3 OR GR/CC) RECORDED FLUID DENSITY  
 SALFM 18500. (PPM) FORMATION SALINITY (NACL)  
 SALMD 26000. (PPM) MUD SALINITY (NACL)  
 RMM 0.2580 (OHM-M) RM  
 IF USING AN OIL BASED MUD SET TO > 100  
 RMMT 68. (FARENHEIT) MEASURED TEMPERATURE FOR RM  
 RMFM 0.2100 (OHM-M) RMF  
 RMFMT 64. (FARENHEIT) MEASURED TEMPERATURE FOR RMF  
 RMCN 0.4280 (OHM-M) RMC  
 RMCMT 66. (FARENHEIT) MEASURED TEMPERATURE FOR RMC

## HOLE AND MUD VALUES

MW 9.60 (KG/M3 LBS/GAL LBS/FT3 OR SP. GRAV) MUD WT  
 ENTER 0 MW FOR AIR FILLED HOLE  
 BITSIZ 8.500 (MM OR INCHES) BIT SIZE  
 AMST 54.0 (FARENHEIT) ANNUAL MEAN SURFACE TEMP  
 BHT 246.0 (FARENHEIT) BOTTOM HOLE TEMPERATURE  
 TD 4337. (METRES) TOTAL DEPTH OF BOREHOLE  
 RSTAND 1.500 (INCHES) STANDOFF SETTING ON INDUCTION

## LIMITING VALUES

RHOMIN 1.25 (KG/M3 OR GR/CC) MIN. VALID BULK DENSITY  
 DLTMIN 40. (USEC/FT) MIN. VALID SONIC ITT  
 DLTMAX 190. (USEC/FT) MAX. VALID SONIC ITT  
 PHNMAX 70. (PERCENT) MAXIMUM VALID NEUTRON POROSITY  
 RUGMAX 6.00 (INCHES) MAX. RUGOSITY TO ACCEPT NEUTRON  
 STOMAX 3.00 (INCHES) MAX. NEUT. STANDOFF  
 STOMIN 0.00 (INCHES) MIN. NEUT. STANDOFF TO CORRECT  
 (SET TO STOMAX TO BYPASS STANDOFF LOGIC)  
 DROLIN 0.20 (KG/M3 OR GR/CC) MAXIMUM DENSITY CORRECTOR  
 TO ACCEPT (+ OR -)

LIST FOR WELL ANGLER-1

ZONE CAMPB/B

## LISTING OF CALC PARAMETERS

ZONE CAMPB/B WELL ANGLER-1

TOP 4239.0000 (METRES) TOP OF INTERVAL  
 BOTTOM 4330.0000 (METRES) BOTTOM OF INTERVAL

## MATRIX VALUES

GRMA 40. (API) GAMMA RAY MATRIX  
 SPMA -40. (MV) SP MATRIX (MV)  
 ATMA 135. (DB/M) ATTENUATION OF THE MATRIX (DB/M)  
 DLTSS 56.00 (USEC/FT) DELTA T SANDSTONE  
 DLTL 48.78 (USEC/FT) DELTA T LIMESTONE  
 DLTDOL 43.96 (USEC/FT) DELTA T DOLOMITE  
 DLTANH 50.00 (USEC/FT) DELTA T ANHYDRITE  
 RHSS 2.66 (KG/M3 OR GR/CC) MATRIX DENS OF SANDSTONE  
 RHLS 2.71 (KG/M3 OR GR/CC) MATRIX DENS OF LIMESTONE  
 RHODOL 2.87 (KG/M3 OR GR/CC) MATRIX DENS OF DOLOMITE  
 RHANH 2.98 (KG/M3 OR GR/CC) MATRIX DENS OF ANHYDRITE

TPLSS 7.20 (NSEC/M) TPL OF SANDSTONE  
 TPLS 9.10 (NSEC/M) TPL OF LIMESTONE  
 TPLDOL 8.70 (NSEC/M) TPL OF DOLOMITE  
 TPLANH 8.40 (NSEC/M) TPL OF ANHYDRITE

## VALUES FOR SOLO TOOLS

RHMAB 2.66 (KG/CM OR GR/CC) MATRIX DENSITY  
 DLTAB 56. (KG/M3 OR GR/CC) TRANSIT TIME MATRIX  
 TPLMAB 8.50 (NSEC/M) TPL MATRIX  
 NEUMAB 0 NEUTRON MATRIX 0=LS 1=SS 2=DOL

## VALUES FOR COAL DETECTION

GROCAL 180. (API) MAXIMUM GR IN COAL.  
 DLTCOL 89. (USEC/FT) MINIMUM SONIC IN COAL.  
 UOCAL 8.00 (PPM) MINIMUM URANIUM IN COAL.  
 RHOCOL 2.30 (KG/M3 OR GR/CC) MAXIMUM DENSITY OF COAL.  
 PNCOL 29. (PERCENT) MINIMUM LS. NEUTRON POR. IN COAL  
 PECOL 3.00 (BARN/ELEC.) MAXIMUM PEF IN COAL.  
 COALCK 4 NUMBER OF POSITIVE COAL CHECKS NEEDED TO  
 IDENTIFY COAL (COAL=1).



## LIST FOR WELL ANGLER-1

ZONE CAMPB/B

\*\*\*\*\*  
 \*\*\*\*\* FLUID VALUES \*\*\*\*\*  
 \*\*\*\*\*

RHOF	0.90	(KG/M3 OR GR/CC)	FLUID DENSITY
DLTF	189.	(USEC/FT)	TRANSIT TIME OF FLUID
RHOH	0.60	(KG/M3 OR GR/CC)	HYDROCARBON DENSITY
ANEUT	1.00	NEUTRON GAS FACTOR(USUAL RANGE 1 TO 1.4)	
		1=HIGH DENSITY AND 1.5 LOW DENSITY	
RHOMF	1.00	(KG/M3 OR GR/CC)	MUD FILTRATE DENSITY
TPLH	5.00	(NSEC/M)	HYDROCARBON TPL
SALMD	26000.	(PPM)	MUD SALINITY
RWM	0.100	(OHM-M)	RW AT MEASURED TEMPERATURE
RWMT	246.	(FARENHEIT)	TEMPERATURE OF RW MEASUREMENT
RWBM	0.10	(OHM-M)	BOUND WATER RESISTIVITY
RWBMT	246.	(FARENHEIT)	TEMPERATURE OF RWB MEASUREMENT

\*\*\*\*\*  
 \*\*\*\*\* SHALE AND CLAY VALUES \*\*\*\*\*  
 \*\*\*\*\*

GRSH	135.	(API)	GAMMA RAY VALUE IN SHALE
SPSH	-45.	(MV)	SP VALUE IN SHALE
ATTSH	600.	(DB/M)	EPT ATTENUATION IN SHALE
RHOSH	2.60	(KG/M3 OR GR/CC)	MATRIX DENSITY OF SHALE
PEFSH	3.60	(BARN/ELECTRON)	PEF IN SHALE
TPLSH	9.00	(NSEC/M)	TPL IN SHALE
PHINSH	24.	(PERCENT)	NEUTRON LOG POROSITY OF SHALE
DLTSH	74.	(USEC/FT)	TRANSIT TIME OF SHALE
RSH	12.00	(OHM-M)	RESISTIVITY OF SHALE
PHIMAX	27.00	(PERCENT)	MAX SHALE POROSITY IN INTERVAL

## WAXMAN SMITS CONSTANTS

RHOCL	2.70	(KG/M3 OR GR/CC)	DENS OF DRY CLAY
HICL	25.00	(PERCENT)	HYDROGEN INDEX OF DRY CLAY
CEC	0.100	(MEQ/G)	CATION EXCHANGE CAPACITY

NOTE: ALSO SUPPLY RSH, M (USED AS M\*),  
 N (USED AS N\*), RW, AND A.

\*\*\*\*\*  
 \*\*\*\*\* LOG CALCULATION CONSTANTS AND EXPONENTS \*\*\*\*\*  
 \*\*\*\*\*

A	0.62	CONSTANT IN FORMATION FACTOR EQUATION
M	2.15	CEMENTATION EXPONENT
N	2.00	SATURATION EXPONENT
CP	1.00	COMPACTION FACTOR

## LIST FOR WELL ANGLER-1

ZONE CAMPB/B

\*\*\*\*\*  
 \*\*\*\*\* LIMITING VALUES FOR NET AND GROSS PAY CALCULATIONS \*\*\*\*\*  
 \*\*\*\*\*

PHILIM	6.00	(PERCENT)	LOWER POROSITY LIMIT
VSHLIM	0.40	(FRACTION)	VOLUME OF SHALE UPPER LIMIT
SWLIM	50.00	(PERCENT)	WATER SATURATION LIMIT

\*\*\*\*\*  
 \*\*\*\*\* LOG CALCULATION OPTIONS AND SWITCHES \*\*\*\*\*  
 \*\*\*\*\*

MSI	0	0=STANDARD UNITS 1=MSI
VSHCIN	3	GR TO VOL. OF SHALE CURVATURE INDEX
VSHOFF	0	0=CALC VOL. OF SHALE - 1=VOL.OF SH=0
GROFF	0	GR AS SHALE INDICATOR (0=USE ,1=NO)
KTHOFF	1	TH & K AS SHALE INDICATOR (0=USE ,1=NO)
NEUOFF	0	NEUTRON AS SHALE INDICATOR (0=USE ,1=NO)
DLTOFF	1	SONIC AS SHALE INDICATOR (0=USE ,1=NO)
ATTOFF	1	EPT AS SHALE INDICATOR (0=USE ,1=NO)
SPOFF	1	SP AS SHALE INDICATOR (0=USE ,1=NO)
PEOFF	0	USE PEF? (0=USE ,1=NO)
MINOPT	3	MINERAL OPTION SWITCH
		0 = COMPLEX LITHOLOGY
		1 = SANDSTONE AND DOLOMITEONLY
		2 = LIMESTONE AND DOLOMITE ONLY
		3 = SANDSTONE AND SHALE ONLY (CLASSICAL)
		4 = SANDSTONE AND SHALE ONLY (MODERN)
		5 = SANDSTONE AND LIMESTONE ONLY
MOPOFF	0	MOVEABLE OIL PLOT SWITCH 0=USE RXO
		1=NO RXO
QOPT	1	SW OPTION - 0=SW FROM PHIT AND Q
		1=SW FROM PHIE AND VSH
NOPRT	0	PRINT OPTION - 0=PRINT ALL VALUES
		1=SKIP SHALE ZONES
SWOPT	5	1 - ARCHIE; 2 - SIMANDOUX; 3 - SIMANDOUX
		LAMINAR; 4 - V2 SIMANDOUX; 5 - INDONESIAN
		6 - DISPERSED CLAY 7 - DUAL WATER MODEL
		8 - DUAL WATER Q=VSH MODEL
		9 - NORMALIZED WAXMAN-SMITS
		10 - WAXMAN-SMITS

SWIRR	10.00	(FRACTION)IRREDUCIBLE WATER SATURATION FOR PERMEABILITY EQUATION
-------	-------	--

## **APPENDIX 2**

### **Detailed Log Analysis Results**

## LOG ANALYSIS RESULTS

WELL : ANGLER-1  
 PARAMETER SET : U.T. LONG #1

TOP DEPTH 2820.0000 BOTTOM DEPTH 2909.0000

## RESERVOIR SUMMARY

GROSS RESERVOIR							NET PAY						
INTERVAL		AVG.	AVG.	AVG.	SHALE VOL	METERS	INTERVAL		AVG.	AVG.	AVG.	SHALE	METERS
PHIE	SWE	PHIE	SWE	PERM			PHIE	SWE	PHIE	SWE	PERM	VOL	
0- 6	0-100	0.0	0.00	0.00	0.74	73.0	0- 6	0- 50	0.0	0.00	0.00	0.00	0.0
6-12	0-100	10.1	100.00	0.00	0.40	0.2	6-12	0- 50	0.0	0.00	0.00	0.00	0.0
12-18	0-100	16.3	97.63	0.00	0.36	4.4	12-18	0- 50	0.0	0.00	0.00	0.00	0.0
18-24	0-100	21.2	98.90	0.02	0.32	28.5	18-24	0- 50	0.0	0.00	0.00	0.00	0.0
24-99	0-100	24.9	99.73	0.03	0.22	3.0	24-99	0- 50	0.0	0.00	0.00	0.00	0.0
6-99	0-100	20.9	98.82	0.02	0.31	36.1	6-99	0- 50	0.0	0.00	0.00	0.00	0.0

CUTOFFS USED: POROSITY ( PHILIM ) = 6.0, SW ( SWLIM ) = 50.0, SHALE ( VSHLIM ) = 0.400

## LITHOLOGY SUMMARY

POINTS ABOVE SANDSTONE LINE..... 713  
 POINTS BETWEEN SANDSTONE AND LIMESTONE LINES..... 0  
 POINTS BETWEEN SANDSTONE AND DOLOMITE LINES..... 0  
 POINTS BETWEEN LIMESTONE AND DOLOMITE LINES..... 0  
 POINTS BELOW DOLOMITE LINE WITH POROSITY..... 0  
 POINTS BELOW DOLOMITE LINE WITH NO POROSITY..... 0  
 POINTS WHERE LITHOLOGY IS UNDETERMINED ( SOLO TOOL )... 3  
 METERS OF POTENTIAL SOURCE ROCK..... 0.0

## RESERVOIR SUMMARY

TOTAL METERS .....	GROSS 36.12	NET 0.00
EFFECTIVE POROSITY METERS ..... ( PHIE )	7.54	0.00
HYDROCARBON METERS ..... ( SUM ( INCR * PHIE * (1-SWE) )	0.08	0.00
AVERAGE EFFECTIVE POROSITY ..... ( PHIE )	20.87	0.00
WEIGHTED AVERAGE OF SW ..... ( SUM ( PHIE*SWE ) / SUM ( PHIE ) )	98.88	0.00
AVERAGE UNBOUNDED EFFECTIVE POROSITY ..... ( PHIE )		6.91

## COMPUTATIONAL SUMMARY

BOTTOM DEPTH OF INTERVAL = 2909.01 METERS  
 FORMATION TEMPERATURE AT BOTTOM DEPTH = 182.8  
 RW AT BOTTOM DEPTH = 0.0999  
 RMF AT BOTTOM DEPTH = 0.0735  
 POINTS WITH SW ABOVE 100 = 193  
 POINTS WITH VSH ABOVE 1.0 = 14  
 POINTS WITH VSH ABOVE VSHLIM ( 0.40 ) = 479  
 POINTS AFFECTED BY BAD HOLE = 0

## COMPUTATIONAL METHODS USED

POROSITY CALCULATIONS		SHAPE CALCULATIONS	
NEUTRON/DENSITY	610 PTS.	GAMMA RAY	546 PTS.
NEUTRON/SONIC	57 PTS.	SPECTRAL LOGS	0 PTS.
SONIC/DENSITY	46 PTS.	SONIC/DENSITY	0 PTS.
SOLO POROSITY TOOL	3 PTS.	NEUTRON/DENSITY	170 PTS.
		SP	0 PTS.
		TPL ATTENUATION	0 PTS.

## LOG ANALYSIS RESULTS

WELL : ANGLER-1  
 PARAMETER SET : U.T.LONG #2  
 TOP DEPTH 2909.0000 BOTTOM DEPTH 2923.0000

## RESERVOIR SUMMARY

## GROSS RESERVOIR

INTERVAL	AVG.	AVG.	AVG.	SHALE	METERS
PHIE SWE PHIE SWE PERM VOL					
0- 6 0-100	0.0	0.00	0.00	0.82	1.1
6-12 0-100	0.0	0.00	0.00	0.00	0.0
12-18 0-100	16.5	100.00	0.01	0.22	6.4
18-24 0-100	19.9	99.22	0.01	0.18	6.4
24-99 0-100	25.3	80.51	0.03	0.12	0.3
6-99 0-100	18.3	99.16	0.01	0.20	13.1

## NET PAY

INTERVAL	AVG.	AVG.	AVG.	SHALE	METERS
PHIE SWE PHIE SWE PERM VOL					
0- 6 0- 50	0.0	0.00	0.00	0.00	0.0
6-12 0- 50	0.0	0.00	0.00	0.00	0.0
12-18 0- 50	0.0	0.00	0.00	0.00	0.0
18-24 0- 50	0.0	0.00	0.00	0.00	0.0
24-99 0- 50	0.0	0.00	0.00	0.00	0.0
6-99 0- 50	0.0	0.00	0.00	0.00	0.0

CUTOFFS USED: POROSITY ( PHILIM ) = 6.0, SW ( SWLIM ) = 50.0, SHALE ( VSHLIM ) = 0.400

## LITHOLOGY SUMMARY

POINTS ABOVE SANDSTONE LINE.....	90
POINTS BETWEEN SANDSTONE AND LIMESTONE LINES.....	0
POINTS BETWEEN SANDSTONE AND DOLOMITE LINES.....	0
POINTS BETWEEN LIMESTONE AND DOLOMITE LINES.....	0
POINTS BELOW DOLOMITE LINE WITH POROSITY.....	0
POINTS BELOW DOLOMITE LINE WITH NO POROSITY.....	0
POINTS WHERE LITHOLOGY IS UNDETERMINED ( SOLO TOOL )...	3
METERS OF POTENTIAL SOURCE ROCK.....	0.0

## RESERVOIR SUMMARY

	GROSS	NET
TOTAL METERS .....	13.11	0.00
EFFECTIVE POROSITY METERS .....	2.40	0.00
HYDROCARBON METERS .....	0.03	0.00
AVERAGE EFFECTIVE POROSITY .....	18.34	0.00
WEIGHTED AVERAGE OF SW .....	98.90	0.00
AVERAGE UNBOUNDED EFFECTIVE POROSITY .....		16.96

## COMPUTATIONAL SUMMARY

BOTTOM DEPTH OF INTERVAL	=	2923.03 METERS
FORMATION TEMPERATURE AT BOTTOM DEPTH	=	183.4
RW AT BOTTOM DEPTH	=	0.0815
RMF AT BOTTOM DEPTH	=	0.0733
POINTS WITH SW ABOVE 100	=	76
POINTS WITH VSH ABOVE 1.0	=	2
POINTS WITH VSH ABOVE VSHLIM ( 0.40)	=	7
POINTS AFFECTED BY BAD HOLE	=	8

## COMPUTATIONAL METHODS USED

## POROSITY CALCULATIONS

NEUTRON/DENSITY	0 PTS.
NEUTRON/SONIC	90 PTS.
SONIC/DENSITY	0 PTS.
SOLO POROSITY TOOL	3 PTS.

## SHALE CALCULATIONS

GAMMA RAY	93 PTS.
SPECTRAL LOGS	0 PTS.
SONIC/DENSITY	0 PTS.
NEUTRON/DENSITY	0 PTS.
SP	0 PTS.
TPL ATTENUATION	0 PTS.

## LOG ANALYSIS RESULTS

WELL : ANGLER-1  
 PARAMETER SET : U.T.LONG #3

TOP DEPTH 2923.0000 BOTTOM DEPTH 2957.0000

## RESERVOIR SUMMARY

## GROSS RESERVOIR

INTERVAL	AVG.	AVG.	AVG.	SHALE	METERS
PHIE SWE PHIE SWE PERM VOL					
0- 6 0-100	0.0	0.00	0.00	0.92	18.7
6-12 0-100	10.6	100.00	0.00	0.26	3.0
12-18 0-100	15.7	99.41	0.00	0.17	8.1
18-24 0-100	19.0	99.22	0.01	0.11	4.1
24-99 0-100	25.5	71.82	0.03	0.11	0.2
6-99 0-100	15.7	99.20	0.01	0.17	15.4

## NET PAY

INTERVAL	AVG.	AVG.	AVG.	SHALE	METERS
PHIE SWE PHIE SWE PERM VOL					
0- 6 0- 50	0.0	0.00	0.00	0.00	0.0
6-12 0- 50	0.0	0.00	0.00	0.00	0.0
12-18 0- 50	0.0	0.00	0.00	0.00	0.0
18-24 0- 50	0.0	0.00	0.00	0.00	0.0
24-99 0- 50	0.0	0.00	0.00	0.00	0.0
6-99 0- 50	0.0	0.00	0.00	0.00	0.0

CUTOFFS USED: POROSITY ( PHILIM ) = 6.0, SW ( SWLIM ) = 50.0, SHALE ( VSHLIM ) = 0.400

## LITHOLOGY SUMMARY

POINTS ABOVE SANDSTONE LINE.....	141
POINTS BETWEEN SANDSTONE AND LIMESTONE LINES.....	0
POINTS BETWEEN SANDSTONE AND DOLOMITE LINES.....	0
POINTS BETWEEN LIMESTONE AND DOLOMITE LINES.....	0
POINTS BELOW DOLOMITE LINE WITH POROSITY.....	0
POINTS BELOW DOLOMITE LINE WITH NO POROSITY.....	0
POINTS WHERE LITHOLOGY IS UNDETERMINED ( SOLO TOOL )...	83
METERS OF POTENTIAL SOURCE ROCK.....	0.2

## RESERVOIR SUMMARY

	GROSS	NET
TOTAL METERS .....	15.39	0.00
EFFECTIVE POROSITY METERS .....	2.41	0.00
HYDROCARBON METERS .....	0.03	0.00
AVERAGE EFFECTIVE POROSITY .....	15.67	0.00
WEIGHTED AVERAGE OF SW .....	98.94	0.00
AVERAGE UNBOUNDED EFFECTIVE POROSITY .....		7.07

## COMPUTATIONAL SUMMARY

BOTTOM DEPTH OF INTERVAL	=	2957.02 METERS
FORMATION TEMPERATURE AT BOTTOM DEPTH	=	184.9
RW AT BOTTOM DEPTH	=	0.0628
RMF AT BOTTOM DEPTH	=	0.0727
POINTS WITH SW ABOVE 100	=	84
POINTS WITH VSH ABOVE 1.0	=	81
POINTS WITH VSH ABOVE VSHLIM ( 0.40)=	=	123
POINTS AFFECTED BY BAD HOLE	=	1

## COMPUTATIONAL METHODS USED

## POROSITY CALCULATIONS

NEUTRON/DENSITY	0 PTS.
NEUTRON/SONIC	141 PTS.
SONIC/DENSITY	0 PTS.
SOLO POROSITY TOOL	83 PTS.

## SHALE CALCULATIONS

GAMMA RAY	224 PTS.
SPECTRAL LOGS	0 PTS.
SONIC/DENSITY	0 PTS.
NEUTRON/DENSITY	0 PTS.
SP	0 PTS.
TPL ATTENUATION	0 PTS.

## LOG ANALYSIS RESULTS

WELL : ANGLER-1  
 PARAMETER SET : M.T.LONG #1

TOP DEPTH 2957.0000 BOTTOM DEPTH 3022.0000

## RESERVOIR SUMMARY

## GROSS RESERVOIR

INTERVAL	AVG.	AVG.	AVG.	SHALE	METERS
PHIE SWE PHIE SWE PERM VOL					
0- 6 0-100	0.3	9.15	0.00	0.63	29.1
6-12 0-100	9.5	98.15	0.00	0.10	2.9
12-18 0-100	15.6	97.59	0.00	0.27	5.5
18-24 0-100	20.4	99.55	0.01	0.16	25.5
24-99 0-100	24.9	98.67	0.03	0.19	2.1
6-99 0-100	19.1	99.09	0.01	0.17	36.0

## NET PAY

INTERVAL	AVG.	AVG.	AVG.	SHALE	METERS
PHIE SWE PHIE SWE PERM VOL					
0- 6 0- 50	0.0	0.00	0.00	0.00	0.0
6-12 0- 50	0.0	0.00	0.00	0.00	0.0
12-18 0- 50	0.0	0.00	0.00	0.00	0.0
18-24 0- 50	0.0	0.00	0.00	0.00	0.0
24-99 0- 50	0.0	0.00	0.00	0.00	0.0
6-99 0- 50	0.0	0.00	0.00	0.00	0.0

CUTOFFS USED: POROSITY ( PHILIM ) = 6.0, SW ( SWLIM ) = 50.0, SHALE ( VSHLIM ) = 0.400

## LITHOLOGY SUMMARY

POINTS ABOVE SANDSTONE LINE.....	401
POINTS BETWEEN SANDSTONE AND LIMESTONE LINES.....	0
POINTS BETWEEN SANDSTONE AND DOLOMITE LINES.....	0
POINTS BETWEEN LIMESTONE AND DOLOMITE LINES.....	0
POINTS BELOW DOLOMITE LINE WITH POROSITY.....	0
POINTS BELOW DOLOMITE LINE WITH NO POROSITY.....	0
POINTS WHERE LITHOLOGY IS UNDETERMINED ( SOLO TOOL )...	26
METERS OF POTENTIAL SOURCE ROCK.....	0.0

## RESERVOIR SUMMARY

TOTAL METERS .....	GROSS	NET
EFFECTIVE POROSITY METERS .....	35.97	0.00
HYDROCARBON METERS .....	6.87	0.00
AVERAGE EFFECTIVE POROSITY .....	0.06	0.00
WEIGHTED AVERAGE OF SW .....	19.09	0.00
AVERAGE UNBOUNDED EFFECTIVE POROSITY .....	99.15	0.00
	10.68	

## COMPUTATIONAL SUMMARY

BOTTOM DEPTH OF INTERVAL	=	3021.94 METERS
FORMATION TEMPERATURE AT BOTTOM DEPTH	=	187.8
RW AT BOTTOM DEPTH	=	0.1048
RMF AT BOTTOM DEPTH	=	0.0716
POINTS WITH SW ABOVE 100	=	217
POINTS WITH VSH ABOVE 1.0	=	13
POINTS WITH VSH ABOVE VSHLIM ( 0.40)	=	166
POINTS AFFECTED BY BAD HOLE	=	4

## COMPUTATIONAL METHODS USED

POROSITY CALCULATIONS		SHALE CALCULATIONS	
NEUTRON/DENSITY	363 PTS.	GAMMA RAY	231 PTS.
NEUTRON/SONIC	38 PTS.	SPECTRAL LOGS	0 PTS.
SONIC/DENSITY	0 PTS.	SONIC/DENSITY	0 PTS.
SOLO POROSITY TOOL	26 PTS.	NEUTRON/DENSITY	196 PTS.
		SP	0 PTS.
		TPL ATTENUATION	0 PTS.

## LOG ANALYSIS RESULTS

WELL : ANGLER-1  
 PARAMETER SET : M.T.LONG #2  
 TOP DEPTH 3022.0000 BOTTOM DEPTH 3083.0000

## RESERVOIR SUMMARY

## GROSS RESERVOIR

INTERVAL	AVG.	AVG.	AVG.	SHALE	METERS
PHIE SWE PHIE SWE PERM VOL					
0- 6 0-100	0.0	1.24	0.00	0.70	46.8
6-12 0-100	0.0	0.00	0.00	0.00	0.0
12-18 0-100	17.2	95.06	0.01	0.36	1.2
18-24 0-100	20.9	95.46	0.01	0.30	12.2
24-99 0-100	25.8	64.10	0.04	0.24	1.1
6-99 0-100	21.0	93.11	0.02	0.30	14.5

## NET PAY

INTERVAL	AVG.	AVG.	AVG.	SHALE	METERS
PHIE SWE PHIE SWE PERM VOL					
0- 6 0- 50	0.0	0.00	0.00	0.00	0.0
6-12 0- 50	0.0	0.00	0.00	0.00	0.0
12-18 0- 50	0.0	0.00	0.00	0.00	0.0
18-24 0- 50	0.0	0.00	0.00	0.00	0.0
24-99 0- 50	27.5	40.06	0.05	0.27	0.5
6-99 0- 50	27.5	40.06	0.05	0.27	0.5

CUTOFFS USED: POROSITY ( PHILIM ) = 6.0, SW ( SWLIM ) = 50.0, SHALE ( VSHLIM ) = 0.400

## LITHOLOGY SUMMARY

POINTS ABOVE SANDSTONE LINE..... 315  
 POINTS BETWEEN SANDSTONE AND LIMESTONE LINES..... 0  
 POINTS BETWEEN SANDSTONE AND DOLOMITE LINES..... 0  
 POINTS BETWEEN LIMESTONE AND DOLOMITE LINES..... 0  
 POINTS BELOW DOLOMITE LINE WITH POROSITY..... 0  
 POINTS BELOW DOLOMITE LINE WITH NO POROSITY..... 0  
 POINTS WHERE LITHOLOGY IS UNDETERMINED ( SOLO TOOL )... 87  
 METERS OF POTENTIAL SOURCE ROCK..... 0.6

## RESERVOIR SUMMARY

TOTAL METERS .....	GROSS	NET
EFFECTIVE POROSITY METERS .....	14.48	0.46
HYDROCARBON METERS .....	3.04	0.13
AVERAGE EFFECTIVE POROSITY .....	0.23	0.08
WEIGHTED AVERAGE OF SW .....	20.99	27.54
AVERAGE UNBOUNDED EFFECTIVE POROSITY .....	92.43	40.21
	4.96	

## COMPUTATIONAL SUMMARY

BOTTOM DEPTH OF INTERVAL = 3083.05 METERS  
 FORMATION TEMPERATURE AT BOTTOM DEPTH = 190.5  
 RW AT BOTTOM DEPTH = 0.1291  
 RMF AT BOTTOM DEPTH = 0.0706  
 POINTS WITH SW ABOVE 100 = 48  
 POINTS WITH VSH ABOVE 1.0 = 37  
 POINTS WITH VSH ABOVE VSHLIM ( 0.40 ) = 272  
 POINTS AFFECTED BY BAD HOLE = 37

## COMPUTATIONAL METHODS USED

## POROSITY CALCULATIONS

NEUTRON/DENSITY 291 PTS.  
 NEUTRON/SONIC 24 PTS.  
 SONIC/DENSITY 0 PTS.  
 SOLO POROSITY TOOL 87 PTS.

## SHALE CALCULATIONS

GAMMA RAY 221 PTS.  
 SPECTRAL LOGS 0 PTS.  
 SONIC/DENSITY 0 PTS.  
 NEUTRON/DENSITY 181 PTS.  
 SP 0 PTS.  
 TPL ATTENUATION 0 PTS.

# LOG ANALYSIS RESULTS

WELL : ANGLER-1  
PARAMETER SET : L.T.LONG #1

TOP DEPTH 3083.0000 BOTTOM DEPTH 3105.0000

## RESERVOIR SUMMARY

GROSS RESERVOIR							NET PAY						
INTERVAL		AVG.	AVG.	AVG.	SHALE	METERS	INTERVAL		AVG.	AVG.	AVG.	SHALE	METERS
PHIE	SWE	PHIE	SWE	PERM	VOL		PHIE	SWE	PHIE	SWE	PERM	VOL	
0- 6	0-100	0.0	2.87	0.00	0.65	11.9	0- 6	0- 50	0.0	0.00	0.00	0.00	0.0
6-12	0-100	0.0	0.00	0.00	0.00	0.0	6-12	0- 50	0.0	0.00	0.00	0.00	0.0
12-18	0-100	16.9	75.57	0.01	0.37	0.5	12-18	0- 50	0.0	0.00	0.00	0.00	0.0
18-24	0-100	21.1	96.08	0.01	0.28	9.6	18-24	0- 50	0.0	0.00	0.00	0.00	0.0
24-99	0-100	42.1	28.82	0.30	0.04	0.2	24-99	0- 50	42.1	28.82	0.30	0.04	0.2
6-99	0-100	21.2	94.16	0.02	0.28	10.2	6-99	0- 50	42.1	28.82	0.30	0.04	0.2

CUTOFFS USED: POROSITY ( PHILIM ) = 6.0, SW ( SWLIM ) = 50.0, SHALE ( VSHLIM ) = 0.400

## LITHOLOGY SUMMARY

POINTS ABOVE SANDSTONE LINE..... 128  
POINTS BETWEEN SANDSTONE AND LIMESTONE LINES..... 0  
POINTS BETWEEN SANDSTONE AND DOLOMITE LINES..... 0  
POINTS BETWEEN LIMESTONE AND DOLOMITE LINES..... 0  
POINTS BELOW DOLOMITE LINE WITH POROSITY..... 0  
POINTS BELOW DOLOMITE LINE WITH NO POROSITY..... 0  
POINTS WHERE LITHOLOGY IS UNDETERMINED ( SOLO TOOL )... 17  
METERS OF POTENTIAL SOURCE ROCK..... 0.0

## RESERVOIR SUMMARY

TOTAL METERS .....	GROSS	NET
EFFECTIVE POROSITY METERS .....	10.21	0.15
HYDROCARBON METERS .....	2.17	0.06
AVERAGE EFFECTIVE POROSITY .....	0.14	0.05
WEIGHTED AVERAGE OF SW .....	21.21	42.09
AVERAGE UNBOUNDED EFFECTIVE POROSITY .....	93.48	28.82
	9.80	

## COMPUTATIONAL SUMMARY

BOTTOM DEPTH OF INTERVAL = 3105.00 METERS  
FORMATION TEMPERATURE AT BOTTOM DEPTH = 191.5  
RW AT BOTTOM DEPTH = 0.1285  
RMF AT BOTTOM DEPTH = 0.0702  
POINTS WITH SW ABOVE 100 = 40  
POINTS WITH VSH ABOVE 1.0 = 5  
POINTS WITH VSH ABOVE VSHLIM ( 0.40 ) = 69  
POINTS AFFECTED BY BAD HOLE = 3

## COMPUTATIONAL METHODS USED

POROSITY CALCULATIONS		SHAPE CALCULATIONS	
NEUTRON/DENSITY	128 PTS.	GAMMA RAY	15 PTS.
NEUTRON/SONIC	0 PTS.	SPECTRAL LOGS	0 PTS.
SONIC/DENSITY	0 PTS.	SONIC/DENSITY	0 PTS.
SOLO POROSITY TOOL	17 PTS.	NEUTRON/DENSITY	130 PTS.
		SP	0 PTS.
		TPL ATTENUATION	0 PTS.



## LOG ANALYSIS RESULTS

WELL : ANGLER-1  
 PARAMETER SET : L.T.LONG #2

TOP DEPTH 3105.0000 BOTTOM DEPTH 3252.0000

## RESERVOIR SUMMARY

GROSS RESERVOIR							NET PAY						
INTERVAL		AVG.	AVG.	AVG.	SHALE	METERS	INTERVAL		AVG.	AVG.	AVG.	SHALE	METERS
PHIE	SWE	PHIE	SWE	PERM	VOL		PHIE	SWE	PHIE	SWE	PERM	VOL	
0- 6	0-100	0.0	0.00	0.00	0.77	115.2	0- 6	0- 50	0.0	0.00	0.00	0.00	0.0
6-12	0-100	11.4	100.00	0.00	0.30	0.2	6-12	0- 50	0.0	0.00	0.00	0.00	0.0
12-18	0-100	16.1	91.20	0.00	0.32	7.5	12-18	0- 50	0.0	0.00	0.00	0.00	0.0
18-24	0-100	20.5	88.07	0.01	0.28	23.9	18-24	0- 50	19.6	46.94	0.01	0.36	0.3
24-99	0-100	24.5	92.82	0.03	0.21	0.5	24-99	0- 50	0.0	0.00	0.00	0.00	0.0
6-99	0-100	19.5	88.93	0.01	0.29	32.0	6-99	0- 50	19.6	46.94	0.01	0.36	0.3

CUTOFFS USED: POROSITY ( PHILIM ) = 6.0, SW ( SWLIM ) = 50.0, SHALE ( VSHLIM ) = 0.400

## LITHOLOGY SUMMARY

POINTS ABOVE SANDSTONE LINE..... 710  
 POINTS BETWEEN SANDSTONE AND LIMESTONE LINES..... 0  
 POINTS BETWEEN SANDSTONE AND DOLOMITE LINES..... 0  
 POINTS BETWEEN LIMESTONE AND DOLOMITE LINES..... 0  
 POINTS BELOW DOLOMITE LINE WITH POROSITY..... 0  
 POINTS BELOW DOLOMITE LINE WITH NO POROSITY..... 0  
 POINTS WHERE LITHOLOGY IS UNDETERMINED ( SOLO TOOL )... 256  
 METERS OF POTENTIAL SOURCE ROCK..... 6.4

## RESERVOIR SUMMARY

TOTAL METERS .....	GROSS	NET
EFFECTIVE POROSITY METERS .....	32.00	0.30
HYDROCARBON METERS ..... ( SUM ( INCR * PHIE * (1-SWE) ) )	6.23	0.06
AVERAGE EFFECTIVE POROSITY .....	0.71	0.03
WEIGHTED AVERAGE OF SW ..... ( SUM ( PHIE*SWE ) / SUM ( PHIE ) )	19.48	19.56
AVERAGE UNBOUNDED EFFECTIVE POROSITY ..... ( PHIE )	88.54	46.85
	4.23	

## COMPUTATIONAL SUMMARY

BOTTOM DEPTH OF INTERVAL = 3252.06 METERS  
 FORMATION TEMPERATURE AT BOTTOM DEPTH = 198.0  
 RW AT BOTTOM DEPTH = 0.0994  
 RMF AT BOTTOM DEPTH = 0.0679  
 POINTS WITH SW ABOVE 100 = 91  
 POINTS WITH VSH ABOVE 1.0 = 128  
 POINTS WITH VSH ABOVE VSHLIM ( 0.40 ) = 740  
 POINTS AFFECTED BY BAD HOLE = 1

## COMPUTATIONAL METHODS USED

POROSITY CALCULATIONS		SHAPE CALCULATIONS	
NEUTRON/DENSITY	710 PTS.	GAMMA RAY	966 PTS.
NEUTRON/SONIC	0 PTS.	SPECTRAL LOGS	0 PTS.
SONIC/DENSITY	0 PTS.	SONIC/DENSITY	0 PTS.
SOLO POROSITY TOOL	256 PTS.	NEUTRON/DENSITY	0 PTS.
		SP	0 PTS.
		TPL ATTENUATION	0 PTS.

## LOG ANALYSIS RESULTS

WELL : ANGLER-1  
 PARAMETER SET : SELENE  
 TOP DEPTH 3252.0000 BOTTOM DEPTH 3517.0000

## RESERVOIR SUMMARY

## GROSS RESERVOIR

INTERVAL	AVG.	AVG.	AVG.	SHALE	METERS
PHIE SWE PHIE SWE PERM VOL					
0- 6 0-100	0.0	1.32	0.00	0.66	67.4
6-12 0-100	10.6	97.56	0.00	0.29	3.4
12-18 0-100	16.0	97.05	0.00	0.30	23.9
18-24 0-100	21.3	98.28	0.02	0.16	122.4
24-99 0-100	25.2	96.87	0.03	0.14	48.0
6-99 0-100	21.4	97.78	0.02	0.17	197.7

## NET PAY

INTERVAL	AVG.	AVG.	AVG.	AVG.	SHALE	METERS
PHIE SWE PHIE SWE PERM VOL						
0- 6 0- 50	0.0	0.00	0.00	0.00	0.00	0.0
6-12 0- 50	0.0	0.00	0.00	0.00	0.00	0.0
12-18 0- 50	17.4	41.57	0.01	0.30	0.2	
18-24 0- 50	0.0	0.00	0.00	0.00	0.0	
24-99 0- 50	32.3	33.05	0.09	0.33	0.2	
6-99 0- 50	24.9	37.31	0.05	0.32	0.3	

CUTOFFS USED: POROSITY ( PHILIM ) = 6.0, SW ( SWLIM ) = 50.0, SHALE ( VSHLIM ) = 0.400

## LITHOLOGY SUMMARY

POINTS ABOVE SANDSTONE LINE..... 1664  
 POINTS BETWEEN SANDSTONE AND LIMESTONE LINES..... 12  
 POINTS BETWEEN SANDSTONE AND DOLOMITE LINES..... 0  
 POINTS BETWEEN LIMESTONE AND DOLOMITE LINES..... 0  
 POINTS BELOW DOLOMITE LINE WITH POROSITY..... 0  
 POINTS BELOW DOLOMITE LINE WITH NO POROSITY..... 0  
 POINTS WHERE LITHOLOGY IS UNDETERMINED ( SOLO TOOL )... 63  
 METERS OF POTENTIAL SOURCE ROCK..... 0.0

## RESERVOIR SUMMARY

TOTAL METERS .....	GROSS	NET
EFFECTIVE POROSITY METERS .....	197.66	0.30
HYDROCARBON METERS .....	42.32	0.08
AVERAGE EFFECTIVE POROSITY .....	0.97	0.05
WEIGHTED AVERAGE OF SW .....	21.41	24.87
AVERAGE UNBOUNDED EFFECTIVE POROSITY .....	97.71	36.03
	15.97	

## COMPUTATIONAL SUMMARY

BOTTOM DEPTH OF INTERVAL = 3516.93 METERS  
 FORMATION TEMPERATURE AT BOTTOM DEPTH = 209.7  
 RW AT BOTTOM DEPTH = 0.0939  
 RMF AT BOTTOM DEPTH = 0.0641  
 POINTS WITH SW ABOVE 100 = 1013  
 POINTS WITH VSH ABOVE 1.0 = 29  
 POINTS WITH VSH ABOVE VSHLIM ( 0.40 ) = 420  
 POINTS AFFECTED BY BAD HOLE = 18

## COMPUTATIONAL METHODS USED

## POROSITY CALCULATIONS

NEUTRON/DENSITY 1666 PTS.  
 NEUTRON/SONIC 10 PTS.  
 SONIC/DENSITY 0 PTS.  
 SOLO POROSITY TOOL 63 PTS.

## SHALE CALCULATIONS

GAMMA RAY 687 PTS.  
 SPECTRAL LOGS 0 PTS.  
 SONIC/DENSITY 0 PTS.  
 NEUTRON/DENSITY 1052 PTS.  
 SP 0 PTS.  
 TPL ATTENUATION 0 PTS.

## LOG ANALYSIS RESULTS

WELL : ANGLER-1  
 PARAMETER SET : TOP CAMP  
 TOP DEPTH 3517.0000 BOTTOM DEPTH 3830.0000

## RESERVOIR SUMMARY

## GROSS RESERVOIR

INTERVAL	AVG.	AVG.	AVG.	SHALE	METERS
PHIE SWE PHIE SWE PERM VOL					
0- 6 0-100 0.1 2.17 0.00 0.74					144.2
6-12 0-100 9.3 97.51 0.00 0.28					6.6
12-18 0-100 15.7 98.82 0.00 0.24					66.6
18-24 0-100 20.3 98.04 0.01 0.17					92.2
24-99 0-100 24.7 97.45 0.03 0.11					3.7
6-99 0-100 18.1 98.32 0.01 0.20					169.0

## NET PAY

INTERVAL	AVG.	AVG.	AVG.	SHALE	METERS
PHIE SWE PHIE SWE PERM VOL					
0- 6 0- 50 0.0 0.00 0.00 0.00					0.0
6-12 0- 50 0.0 0.00 0.00 0.00					0.0
12-18 0- 50 0.0 0.00 0.00 0.00					0.0
18-24 0- 50 0.0 0.00 0.00 0.00					0.0
24-99 0- 50 0.0 0.00 0.00 0.00					0.0
6-99 0- 50 0.0 0.00 0.00 0.00					0.0

CUTOFFS USED: POROSITY ( PHILIM ) = 6.0, SW ( SWLIM ) = 50.0, SHALE ( VSHLIM ) = 0.400

## LITHOLOGY SUMMARY

POINTS ABOVE SANDSTONE LINE..... 1865  
 POINTS BETWEEN SANDSTONE AND LIMESTONE LINES..... 8  
 POINTS BETWEEN SANDSTONE AND DOLOMITE LINES..... 0  
 POINTS BETWEEN LIMESTONE AND DOLOMITE LINES..... 0  
 POINTS BELOW DOLOMITE LINE WITH POROSITY..... 0  
 POINTS BELOW DOLOMITE LINE WITH NO POROSITY..... 0  
 POINTS WHERE LITHOLOGY IS UNDETERMINED ( SOLO TOOL )... 182  
 METERS OF POTENTIAL SOURCE ROCK..... 3.4

## RESERVOIR SUMMARY

TOTAL METERS .....	GROSS	NET
EFFECTIVE POROSITY METERS .....	169.01	0.00
HYDROCARBON METERS .....	30.65	0.00
AVERAGE EFFECTIVE POROSITY .....	0.53	0.00
WEIGHTED AVERAGE OF SW .....	18.14	0.00
AVERAGE UNBOUNDED EFFECTIVE POROSITY .....	98.28	0.00
	9.82	

## COMPUTATIONAL SUMMARY

BOTTOM DEPTH OF INTERVAL = 3829.96 METERS  
 FORMATION TEMPERATURE AT BOTTOM DEPTH = 223.6  
 RW AT BOTTOM DEPTH = 0.0990  
 RMF AT BOTTOM DEPTH = 0.0601  
 POINTS WITH SW ABOVE 100 = 926  
 POINTS WITH VSH ABOVE 1.0 = 148  
 POINTS WITH VSH ABOVE VSHLIM ( 0.40 ) = 917  
 POINTS AFFECTED BY BAD HOLE = 2

## COMPUTATIONAL METHODS USED

## POROSITY CALCULATIONS

NEUTRON/DENSITY 1871 PTS.  
 NEUTRON/SONIC 2 PTS.  
 SONIC/DENSITY 0 PTS.  
 SOLO POROSITY TOOL 182 PTS.

## SHALE CALCULATIONS

GAMMA RAY 2055 PTS.  
 SPECTRAL LOGS 0 PTS.  
 SONIC/DENSITY 0 PTS.  
 NEUTRON/DENSITY 0 PTS.  
 SP 0 PTS.  
 TPL ATTENUATION 0 PTS.

## LOG ANALYSIS RESULTS

WELL : ANGLER-1  
 PARAMETER SET : CAMPA/T

TOP DEPTH 3830.0000 BOTTOM DEPTH 3842.5000

## RESERVOIR SUMMARY

## GROSS RESERVOIR

INTERVAL	PHIE	SWE	AVG. PHIE	AVG. SWE	AVG. PERM	SHALE VOL	METERS
0- 6	0-100	1.8	38.93	0.00	0.10		9.9
6-12	0-100	8.3	65.06	0.00	0.08		1.2
12-18	0-100	14.1	65.18	0.00	0.06		1.2
18-24	0-100	19.9	1.25	0.01	0.00		0.3
24-99	0-100	0.0	0.00	0.00	0.00		0.0
6-99	0-100	12.2	58.02	0.00	0.06		2.7

## NET PAY

INTERVAL	PHIE	SWE	AVG. PHIE	AVG. SWE	AVG. PERM	SHALE VOL	METERS
0- 6	0- 50	2.9	26.65	0.00	0.04		1.7
6-12	0- 50	7.1	28.55	0.00	0.00		0.3
12-18	0- 50	14.7	12.61	0.00	0.00		0.5
18-24	0- 50	19.9	1.25	0.01	0.00		0.3
24-99	0- 50	0.0	0.00	0.00	0.00		0.0
6-99	0- 50	14.0	13.92	0.00	0.00		1.1

CUTOFFS USED: POROSITY ( PHILIM ) = 6.0, SW ( SWLIM ) = 50.0, SHALE ( VSHLIM ) = 0.400

## LITHOLOGY SUMMARY

POINTS ABOVE SANDSTONE LINE.....	83
POINTS BETWEEN SANDSTONE AND LIMESTONE LINES.....	0
POINTS BETWEEN SANDSTONE AND DOLOMITE LINES.....	0
POINTS BETWEEN LIMESTONE AND DOLOMITE LINES.....	0
POINTS BELOW DOLOMITE LINE WITH POROSITY.....	0
POINTS BELOW DOLOMITE LINE WITH NO POROSITY.....	0
POINTS WHERE LITHOLOGY IS UNDETERMINED ( SOLO TOOL )...	0
METERS OF POTENTIAL SOURCE ROCK.....	0.0

## RESERVOIR SUMMARY

	GROSS	NET
TOTAL METERS .....	2.74	1.07
EFFECTIVE POROSITY METERS .....	0.33	0.15
HYDROCARBON METERS ..... ( SUM ( INCR * PHIE * (1-SWE) ) )	0.15	0.13
AVERAGE EFFECTIVE POROSITY .....	12.15	14.02
WEIGHTED AVERAGE OF SW ..... ( SUM ( PHIE*SWE ) / SUM ( PHIE ) )	54.05	9.78
AVERAGE UNBOUNDED EFFECTIVE POROSITY .....		4.03

## COMPUTATIONAL SUMMARY

BOTTOM DEPTH OF INTERVAL	=	3842.46 METERS
FORMATION TEMPERATURE AT BOTTOM DEPTH	=	224.1
RW AT BOTTOM DEPTH	=	0.1075
RMF AT BOTTOM DEPTH	=	0.0600
POINTS WITH SW ABOVE 100	=	17
POINTS WITH VSH ABOVE 1.0	=	0
POINTS WITH VSH ABOVE VSHLIM ( 0.40)=		5
POINTS AFFECTED BY BAD HOLE	=	31

## COMPUTATIONAL METHODS USED

## POROSITY CALCULATIONS

NEUTRON/DENSITY	52 PTS.
NEUTRON/SONIC	31 PTS.
SONIC/DENSITY	0 PTS.
SOLO POROSITY TOOL	0 PTS.

## SHALE CALCULATIONS

GAMMA RAY	66 PTS.
SPECTRAL LOGS	0 PTS.
SONIC/DENSITY	0 PTS.
NEUTRON/DENSITY	17 PTS.
SP	0 PTS.
TPL ATTENUATION	0 PTS.

## LOG ANALYSIS RESULTS

WELL : ANGLER-1  
 PARAMETER SET : CAMPA/B  
 TOP DEPTH 3842.5000 BOTTOM DEPTH 3860.0000

## RESERVOIR SUMMARY

## GROSS RESERVOIR

INTERVAL	PHIE	SWE	AVG. PHIE	AVG. SWE	AVG. PERM	SHALE VOL	METERS
0- 6	0-100	0.1	2.90	0.00	0.54	10.5	
6-12	0-100	8.9	100.00	0.00	0.25	0.3	
12-18	0-100	16.0	100.00	0.00	0.19	1.4	
18-24	0-100	20.8	96.78	0.01	0.16	5.5	
24-99	0-100	0.0	0.00	0.00	0.00	0.0	
6-99	0-100	19.4	97.54	0.01	0.17	7.2	

## NET PAY

INTERVAL	PHIE	SWE	AVG. PHIE	AVG. SWE	AVG. PERM	SHALE VOL	METERS
0- 6	0- 50	0.0	0.00	0.00	0.00	0.00	0.0
6-12	0- 50	0.0	0.00	0.00	0.00	0.00	0.0
12-18	0- 50	0.0	0.00	0.00	0.00	0.00	0.0
18-24	0- 50	0.0	0.00	0.00	0.00	0.00	0.0
24-99	0- 50	0.0	0.00	0.00	0.00	0.00	0.0
6-99	0- 50	0.0	0.00	0.00	0.00	0.00	0.0

CUTOFFS USED: POROSITY ( PHILIM ) = 6.0, SW ( SWLIM ) = 50.0, SHALE ( VSHLIM ) = 0.400

## LITHOLOGY SUMMARY

POINTS ABOVE SANDSTONE LINE.....	111
POINTS BETWEEN SANDSTONE AND LIMESTONE LINES.....	5
POINTS BETWEEN SANDSTONE AND DOLOMITE LINES.....	0
POINTS BETWEEN LIMESTONE AND DOLOMITE LINES.....	0
POINTS BELOW DOLOMITE LINE WITH POROSITY.....	0
POINTS BELOW DOLOMITE LINE WITH NO POROSITY.....	0
POINTS WHERE LITHOLOGY IS UNDETERMINED ( SOLO TOOL )...	0
METERS OF POTENTIAL SOURCE ROCK.....	0.0

## RESERVOIR SUMMARY

	GROSS	NET
TOTAL METERS .....	7.16	0.00
EFFECTIVE POROSITY METERS .....	1.39	0.00
HYDROCARBON METERS ..... ( SUM ( INCR * PHIE * (1-SWE) ) )	0.04	0.00
AVERAGE EFFECTIVE POROSITY ..... ( PHIE )	19.41	0.00
WEIGHTED AVERAGE OF SW ..... ( SUM ( PHIE*SWE ) / SUM ( PHIE ) )	97.28	0.00
AVERAGE UNBOUNDED EFFECTIVE POROSITY ..... ( PHIE )		7.93

## COMPUTATIONAL SUMMARY

BOTTOM DEPTH OF INTERVAL	=	3859.99 METERS
FORMATION TEMPERATURE AT BOTTOM DEPTH	=	224.9
RW AT BOTTOM DEPTH	=	0.1363
RMF AT BOTTOM DEPTH	=	0.0598
POINTS WITH SW ABOVE 100	=	34
POINTS WITH VSH ABOVE 1.0	=	0
POINTS WITH VSH ABOVE VSHLIM ( 0.40 )	=	61
POINTS AFFECTED BY BAD HOLE	=	0

## COMPUTATIONAL METHODS USED

## POROSITY CALCULATIONS

NEUTRON/DENSITY	116 PTS.
NEUTRON/SONIC	0 PTS.
SONIC/DENSITY	0 PTS.
SOLO POROSITY TOOL	0 PTS.

## SHALE CALCULATIONS

GAMMA RAY	5 PTS.
SPECTRAL LOGS	0 PTS.
SONIC/DENSITY	0 PTS.
NEUTRON/DENSITY	111 PTS.
SP	0 PTS.
TPL ATTENUATION	0 PTS.

## LOG ANALYSIS RESULTS

WELL : ANGLER-1  
 PARAMETER SET : LOW CAMP  
 TOP DEPTH 3860.0000 BOTTOM DEPTH 4213.0000

## RESERVOIR SUMMARY

## GROSS RESERVOIR

INTERVAL	AVG.	AVG.	AVG.	SHALE	METERS
PHIE SWE PHIE SWE PERM VOL					
0- 6 0-100	0.1	2.05	0.00	0.78	334.2
6-12 0-100	8.9	93.34	0.00	0.28	9.4
12-18 0-100	13.9	94.93	0.00	0.27	7.3
18-24 0-100	19.4	91.44	0.01	0.18	1.8
24-99 0-100	24.5	42.36	0.03	0.06	0.3
6-99 0-100	12.1	92.95	0.00	0.26	18.9

## NET PAY

INTERVAL	AVG.	AVG.	AVG.	SHALE	METERS
PHIE SWE PHIE SWE PERM VOL					
0- 6 0- 50	3.7	27.89	0.00	0.20	0.3
6-12 0- 50	0.0	0.00	0.00	0.00	0.0
12-18 0- 50	0.0	0.00	0.00	0.00	0.0
18-24 0- 50	21.1	49.98	0.01	0.00	0.2
24-99 0- 50	24.5	42.36	0.03	0.06	0.3
6-99 0- 50	23.3	44.90	0.02	0.04	0.5

CUTOFFS USED: POROSITY ( PHILIM ) = 6.0, SW ( SWLIM ) = 50.0, SHALE ( VSHLIM ) = 0.400

## LITHOLOGY SUMMARY

POINTS ABOVE SANDSTONE LINE.....	2157
POINTS BETWEEN SANDSTONE AND LIMESTONE LINES.....	27
POINTS BETWEEN SANDSTONE AND DOLOMITE LINES.....	0
POINTS BETWEEN LIMESTONE AND DOLOMITE LINES.....	0
POINTS BELOW DOLOMITE LINE WITH POROSITY.....	0
POINTS BELOW DOLOMITE LINE WITH NO POROSITY.....	0
POINTS WHERE LITHOLOGY IS UNDETERMINED ( SOLO TOOL )...	133
METERS OF POTENTIAL SOURCE ROCK.....	1.4

## RESERVOIR SUMMARY

	GROSS	NET
TOTAL METERS .....	18.90	0.46
EFFECTIVE POROSITY METERS .....	2.29	0.11
HYDROCARBON METERS .....	0.18	0.06
AVERAGE EFFECTIVE POROSITY .....	12.09	23.34
WEIGHTED AVERAGE OF SW .....	92.08	44.66
AVERAGE UNBOUNDED EFFECTIVE POROSITY .....		0.73

## COMPUTATIONAL SUMMARY

BOTTOM DEPTH OF INTERVAL	=	4212.95 METERS
FORMATION TEMPERATURE AT BOTTOM DEPTH	=	240.5
RW AT BOTTOM DEPTH	=	0.1074
RMF AT BOTTOM DEPTH	=	0.0559
POINTS WITH SW ABOVE 100	=	101
POINTS WITH VSH ABOVE 1.0	=	116
POINTS WITH VSH ABOVE VSHLIM ( 0.40)	=	2131
POINTS AFFECTED BY BAD HOLE	=	0

## COMPUTATIONAL METHODS USED

## POROSITY CALCULATIONS

NEUTRON/DENSITY	2184 PTS.
NEUTRON/SONIC	0 PTS.
SONIC/DENSITY	0 PTS.
SOLO POROSITY TOOL	133 PTS.

## SHALE CALCULATIONS

GAMMA RAY	1918 PTS.
SPECTRAL LOGS	0 PTS.
SONIC/DENSITY	0 PTS.
NEUTRON/DENSITY	399 PTS.
SP	0 PTS.
TPL ATTENUATION	0 PTS.

## LOG ANALYSIS RESULTS

WELL : ANGLER-1  
 PARAMETER SET : CAMPB/T  
 TOP DEPTH 4213.0000 BOTTOM DEPTH 4239.0000

## RESERVOIR SUMMARY

## GROSS RESERVOIR

INTERVAL	PHIE	SWE	AVG. PHIE	AVG. SWE	AVG. PERM	SHAPE VOL	METERS
0- 6	0-100	0.4	13.94	0.00	0.45	7.5	
6-12	0-100	9.4	52.39	0.00	0.21	9.3	
12-18	0-100	13.7	27.94	0.00	0.10	9.4	
18-24	0-100	0.0	0.00	0.00	0.00	0.0	
24-99	0-100	0.0	0.00	0.00	0.00	0.0	
6-99	0-100	11.6	40.06	0.00	0.15	18.7	

## NET PAY

INTERVAL	PHIE	SWE	AVG. PHIE	AVG. SWE	AVG. PERM	SHAPE VOL	METERS
0- 6	0- 50	3.1	35.39	0.00	0.06	0.2	
6-12	0- 50	10.6	34.93	0.00	0.19	4.8	
12-18	0- 50	14.7	26.94	0.00	0.10	9.7	
18-24	0- 50	0.0	0.00	0.00	0.00	0.0	
24-99	0- 50	0.0	0.00	0.00	0.00	0.0	
6-99	0- 50	13.0	29.51	0.00	0.13	14.5	

CUTOFFS USED: POROSITY ( PHILIM ) = 6.0, SW ( SWLIM ) = 50.0, SHALE ( VSHLIM ) = 0.400

## LITHOLOGY SUMMARY

POINTS ABOVE SANDSTONE LINE.....	170
POINTS BETWEEN SANDSTONE AND LIMESTONE LINES.....	2
POINTS BETWEEN SANDSTONE AND DOLOMITE LINES.....	0
POINTS BETWEEN LIMESTONE AND DOLOMITE LINES.....	0
POINTS BELOW DOLOMITE LINE WITH POROSITY.....	0
POINTS BELOW DOLOMITE LINE WITH NO POROSITY.....	0
POINTS WHERE LITHOLOGY IS UNDETERMINED ( SOLO TOOL )...	0
METERS OF POTENTIAL SOURCE ROCK.....	0.0

## RESERVOIR SUMMARY

	GROSS	NET
TOTAL METERS .....	18.75	14.50
EFFECTIVE POROSITY METERS .....	2.17	1.77
HYDROCARBON METERS .....	1.37	1.24
AVERAGE EFFECTIVE POROSITY .....	11.58	13.01
WEIGHTED AVERAGE OF SW .....	36.94	29.51
AVERAGE UNBOUNDED EFFECTIVE POROSITY .....		8.39

## COMPUTATIONAL SUMMARY

BOTTOM DEPTH OF INTERVAL	=	4239.01 METERS
FORMATION TEMPERATURE AT BOTTOM DEPTH	=	241.7
RW AT BOTTOM DEPTH	=	0.1018
RMF AT BOTTOM DEPTH	=	0.0556
POINTS WITH SW ABOVE 100	=	2
POINTS WITH VSH ABOVE 1.0	=	0
POINTS WITH VSH ABOVE VSHLIM ( 0.40)=		35
POINTS AFFECTED BY BAD HOLE	=	0

## COMPUTATIONAL METHODS USED

## POROSITY CALCULATIONS

NEUTRON/DENSITY	172 PTS.
NEUTRON/SONIC	0 PTS.
SONIC/DENSITY	0 PTS.
SOLO POROSITY TOOL	0 PTS.

## SHALE CALCULATIONS

GAMMA RAY	29 PTS.
SPECTRAL LOGS	0 PTS.
SONIC/DENSITY	0 PTS.
NEUTRON/DENSITY	143 PTS.
SP	0 PTS.
TPL ATTENUATION	0 PTS.

## LOG ANALYSIS RESULTS

WELL : ANGLER-1  
 PARAMETER SET : CAMPB/B  
 TOP DEPTH 4239.0000 BOTTOM DEPTH 4330.0000

## RESERVOIR SUMMARY

## GROSS RESERVOIR

INTERVAL	AVG.	AVG.	AVG.	SHALE	METERS
PHIE SWE PHIE SWE PERM VOL					
0- 6 0-100	0.2	4.72	0.00	0.61	72.4
6-12 0-100	9.7	80.32	0.00	0.32	10.1
12-18 0-100	13.9	77.18	0.00	0.21	8.7
18-24 0-100	0.0	0.00	0.00	0.00	0.0
24-99 0-100	0.0	0.00	0.00	0.00	0.0
6-99 0-100	11.7	78.86	0.00	0.27	18.7

## NET PAY

INTERVAL	AVG.	AVG.	AVG.	SHALE	METERS
PHIE SWE PHIE SWE PERM VOL					
0- 6 0- 50	2.9	42.00	0.00	0.33	0.3
6-12 0- 50	0.0	0.00	0.00	0.00	0.0
12-18 0- 50	0.0	0.00	0.00	0.00	0.0
18-24 0- 50	0.0	0.00	0.00	0.00	0.0
24-99 0- 50	0.0	0.00	0.00	0.00	0.0
6-99 0- 50	0.0	0.00	0.00	0.00	0.0

CUTOFFS USED: POROSITY ( PHILIM ) = 6.0, SW ( SWLIM ) = 50.0, SHALE ( VSHLIM ) = 0.400

## LITHOLOGY SUMMARY

POINTS ABOVE SANDSTONE LINE..... 574  
 POINTS BETWEEN SANDSTONE AND LIMESTONE LINES..... 9  
 POINTS BETWEEN SANDSTONE AND DOLOMITE LINES..... 0  
 POINTS BETWEEN LIMESTONE AND DOLOMITE LINES..... 0  
 POINTS BELOW DOLOMITE LINE WITH POROSITY..... 0  
 POINTS BELOW DOLOMITE LINE WITH NO POROSITY..... 0  
 POINTS WHERE LITHOLOGY IS UNDETERMINED ( SOLO TOOL )... 15  
 METERS OF POTENTIAL SOURCE ROCK..... 11.1

## RESERVOIR SUMMARY

TOTAL METERS .....	GROSS	NET
EFFECTIVE POROSITY METERS .....	18.75	0.00
HYDROCARBON METERS .....	2.19	0.00
AVERAGE EFFECTIVE POROSITY .....	0.48	0.00
WEIGHTED AVERAGE OF SW .....	11.67	0.00
AVERAGE UNBOUNDED EFFECTIVE POROSITY .....	78.06	0.00
	2.53	

## COMPUTATIONAL SUMMARY

BOTTOM DEPTH OF INTERVAL = 4329.99 METERS  
 FORMATION TEMPERATURE AT BOTTOM DEPTH = 230.0  
 RW AT BOTTOM DEPTH = 0.1070  
 RMF AT BOTTOM DEPTH = 0.0584  
 POINTS WITH SW ABOVE 100 = 13  
 POINTS WITH VSH ABOVE 1.0 = 13  
 POINTS WITH VSH ABOVE VSHLIM ( 0.40 ) = 444  
 POINTS AFFECTED BY BAD HOLE = 0

## COMPUTATIONAL METHODS USED

## POROSITY CALCULATIONS

NEUTRON/DENSITY 583 PTS.  
 NEUTRON/SONIC 0 PTS.  
 SONIC/DENSITY 0 PTS.  
 SOLO POROSITY TOOL 15 PTS.

## SHALE CALCULATIONS

GAMMA RAY 261 PTS.  
 SPECTRAL LOGS 0 PTS.  
 SONIC/DENSITY 0 PTS.  
 NEUTRON/DENSITY 331 PTS.  
 SP 0 PTS.  
 TPL ATTENUATION 0 PTS.