CASINO 1

LOG ANALYSIS

CASINO 1 - LOG ANALYSIS

Casino 1 wireline logs were analysed over the Waarre Sandstone (1743m-2068m) interval. Conventional gas pay was identified in the Waarre Formation. Casino 1 was cased and suspended as a potential future gas producer.

A 914mm (36") surface hole was drilled to 130 metres and 762mm casing set at 128 metres. A 445mm (17.5") hole was drilled to 752 metres and 340mm casing set at 743 metres. A 311mm (12.25") hole was then drilled with KCl/PHPA mud to 2118 metres (D). Wireline logging was carried out by Schlumberger (as described below).

Unless otherwise specified, all depths mentioned below are loggers depths referenced to the drill floor.

Logs Acquired

Run 1	GR	2098.5-95
	SGR	2098.5-1650
	Resistivity	2098.5-742m
	SP	2098.5-742m
	HCAL	2098.5-742m
	Sonic (upper dipole)	2098.5-1650m
	Sonic (full waveforms)	2098.5-500m
	Neutron-density	2098.5-742m
Run 2	MDT (tool failed)	
	GR	
Run 3	MDT (total 29: 8 good, 10 valid but tight, 5 lost seals, 2 bad data, 5 curtailed, 3 samples collected)	2016-1525m
	GR	
Run 4	SWC (30 shot, 30 recovered)	1520-2030m

Mud Parameters

Mud Type	KCl/polymer
Mud Density	10.3ppg
KCl	7%
Rm	0.138 ohmm @ 24^{o}C
Rmf	0.1137 ohmm @ 24^{o}C
Rmc	0.397 ohmm @ 24^{o}C
MRT	80^{o}C from Run 1 at 2098m

Remarks

- Approximately 1-2% Barite in mud.
- Multimin (Multimineral Component Analysis) was utilised to determine pay in Casino1. See Table 2.
- The Spectral Gamma Ray indicates predominantly illitic clays, with also kaolinite, mica and rare glauconite present. One point to note is that Casino 1 is predominantly illitic in the Waarre, where Casino 2 is predominantly mixed clays. This would indicate that Casino 1 may have a problem with the migration of fines, if it is produced.
- Bad hole was encountered throughout the hole. See the bad hole flag on the WES plot attached.

Log Processing

- A Pickett plot was used to derive the R_w used for this analysis.
- A BHT of 80°C was used for the analysis (Gradient of 25.97°C/km).
- The wireline logs were environmentally corrected by Schlumberger.

Interpretation Procedures and Parameters

An interpretation over the Waarre Sandstone interval was conducted using Multimin. Water saturations were computed using the Dual-water Equation (Parameters used for the interpretation are detailed in Table 1). The parameters used in the Multimin model for this evaluation can be found in the report at the end of this document.

- The NGT from Run 1 was corrected for environmental effects such as mud-weight, KCl and borehole size using measurements made from the MCFL caliper.

- Borehole corrections for the HALS, HLLS and HLLD curves were applied. These are ratios used to emulate the algorithms illustrated in the Schlumberger chartbook.

- The invasion corrected R_T was derived using the Schlumberger laterolog invasion correction supplied with in Geolog.

Conclusions

1. 18.7m of gas pay was identified in the Waarre Formation.
2. Casino 1 was cased and suspended.

Attached is the well evaluation summary (WES) plot for Casino 1 (03.047)
data/wes_ot/casino1_03047.wes

TABLE 1
Log Analysis Parameters

PARAMETERS	WAARRE A SANDSTONE
R_w (ohmm) @ 80°C	0.6
a	1
m	1.65
n	2

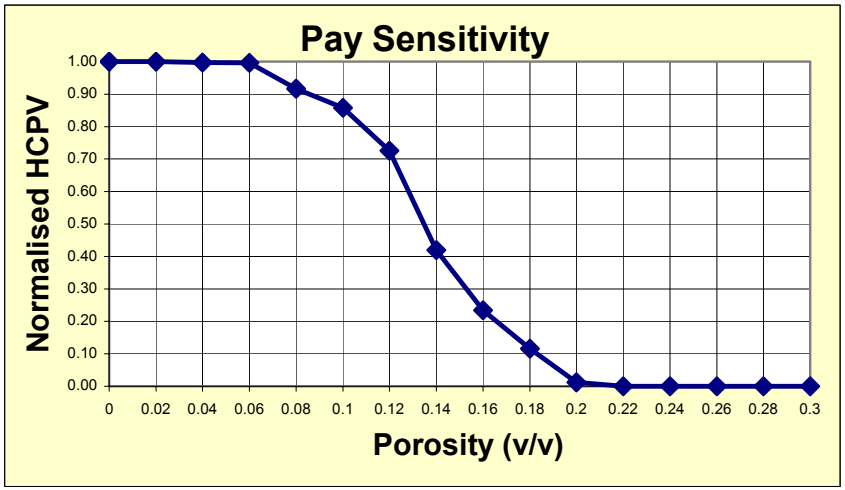
TABLE 2
Conventional Pay Summary

FORMATION	SAND	SAND INTERVAL	GROSS SAND (m)	NET SAND (m)	AVG PHIs (%)	Kh_s (MD)	NET PAY (m)	AVG PHIp (%)	WT.AVG SW (%)
Waarre Formation	Waarre	1743-1956	42.5	23.5	12.7	404	18.7	13	30

Cutoffs: Gross Sand < 45% VSH, Net Sand > 8% PHIE, Net Pay > 8% PHIE & <50% Sw

CASINO_1
Waarre Sandstone

PHIT Cutoff	SWT Cutoff	AVG PHIE V/V	AVG SWT V/V	Phie*H	HCPV Sg*Phie*H	NET (ft)	NHCPV
0	0.5	0.124	0.433	2.101	1.191	17	1.00
0.02	0.5	0.124	0.433	2.101	1.191	17	1.00
0.04	0.5	0.124	0.433	2.096	1.188	16.8	1.00
0.06	0.5	0.125	0.433	2.091	1.186	16.7	1.00
0.08	0.5	0.134	0.43	1.916	1.092	14.3	0.92
0.1	0.5	0.139	0.429	1.788	1.022	12.8	0.86
0.12	0.5	0.146	0.422	1.495	0.864	10.2	0.73
0.14	0.5	0.163	0.4	0.833	0.5	5.11	0.42
0.16	0.5	0.178	0.363	0.438	0.279	2.46	0.23
0.18	0.5	0.19	0.3	0.197	0.138	1.04	0.12
0.2	0.5	0.202	0.328	0.02	0.014	0.1	0.01
0.22	0.5	0	0	0	0	0	0.00
0.24	0.5	0	0	0	0	0	0
0.26	0.5	0	0	0	0	0	0
0.28	0.5	0	0	0	0	0	0
0.3	0.5	0	0	0	0	0	0



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*          MULTIMIN REPORT         *
*                                  *
*    Project : PETRO_TXDM          *
*    User id : exptxd              *
*    Date    : 17-Apr-2003 11:35:04 *
*                                  *
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MULTIMIN REPORT for well CASINO_1 interval WAARRE FORMATION (1743.00 - 1791.50 metres) Project PETRO_TXDM

Reported by exptxd on 17-Apr-2003 at 11:35
Analysed by exptxd on 21-Mar-2003 at 10:24

MODELS:

Type	Name	Cond#	Cutoff	Expression
Primary	CASINO2_KILL	6.028	10.0	

FORMATION FLUID PARAMETERS:

Fluid properties option = DEPTH
Oil Gravity Degrees API = 30.00 dapi Gas specific gravity = 0.650
Rws = 0.6000 @ 80.00 degC Cwbs = - @ - degC Rmfs = 0.1140 @ 24.00

BOREHOLE PARAMETERS:

Mud base = WATER Mud density = 1234.212 k/m3 KCl concentration of mud = 7.00 %
SHT = - BHT = 84.00
Rms = 0.1380 @ 24.00 Rmcs = 0.397 @ 24.00 Total depth = 2118.00 metres

Average temperature of 77.41 degC by method.
Average pressure of 21393.34 kpa by method.

MULTIMIN REPORT for well CASINO_1 interval WAARRE FORMATION (1743.00 - 1791.50 metres) Project PETRO_TXDM

PRIMARY MODEL CASINO2_KILL:
Cementation factor m = 1.650 Saturation exponent n = 2.000 Linear dual-water w = 2.00
Expansion of clay bound water is enabled.

Component	QUARTZ	ORTHOCL	PYRITE	SIDER	ILLITE	KAOLIN	XGAS	XBNDWAT	XFREWAT	XSPCFLU	UGAS
Error of prediction	0.0948	0.2958	0.5637	0.9175	0.7801	0.8159	0.0260	0.1009	0.1115	0.0085	0.3177

EQUATION RESPONSES:

Log	Method	Uncertainty										
Formation density [G/C3]		0.0264	2.645	2.541	4.987	3.911	2.776	2.620	0.019	1.019	1.019	4.084
RHO8	Linear											0.000
Neutron [V/V]		0.0140	-0.050	-0.050	-0.019	0.129	0.300	0.451	0.347	0.956	0.956	-0.002
NPOR	Linear											0.000
Sonic transit time [US/F]		1.0000	55.5	53.5	37.6	43.8	105.0	100.0	210.0	189.0	189.0	189.0
DTCO	Linear											0.0
Photoelectric absorption [B/C3]		3.0000	4.78	7.29	82.22	56.22	11.73	5.38	0.02	0.65	0.65	1065.00
U	Linear											0.00
Total gamma [GAPI]		5.0000	40.0	280.0	5.0	5.0	265.0	150.0	0.0	0.0	33.6	0.0
GR	Linear											0.0
Spectral thorium [PPM]		0.5000	1.0	5.0	0.0	0.0	22.0	19.3	0.0	0.0	0.0	0.0
THOR_COR	Linear											0.0
Spectral uranium [PPM]		1.0000	0.6	1.0	0.0	0.0	5.0	3.2	0.0	0.0	0.0	0.0
URAN_COR	Linear											0.0
Unflushed conductivity [MH/M]		0.0400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CT	Dual-water nonlinear											
Flushed conductivity [MH/M]	0.0800	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.58	19.12	0.00	0.00
CXO	Dual-water nonlinear											
CONSTRAINTS:	Value Type	Uncertainty										
<PROG UNITY>	1.000 Tool	0.0100	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.000	1.000
<PROG POROSITY>	0.000 Tool	0.0100	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000	1.000
<PROG X BNDWAT>	0.000 Tool	0.0100	0.000	0.000	0.000	0.000	0.184	0.049	0.000	-1.000	0.000	0.000
<PROG U BNDWAT>	0.000 Tool	0.0100	0.000	0.000	0.000	0.000	0.264	0.070	0.000	0.000	0.000	0.000
<PROG WATER MUD>	0.000 <=	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000
PROPERTIES AND BOUNDS:												
Mineral grain density			2.650	2.570	5.000	3.960	2.780	2.620	0.000	0.000	0.000	0.000
Mineral cation exchange capacity			0.000	0.000	0.000	0.000	0.250	0.070	0.000	0.000	0.000	0.000
Lower Bound			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Upper Bound			1.000	1.000	1.000	1.000	1.000	1.000	0.500	0.500	0.500	0.500

MULTIMIN REPORT for well CASINO_1 interval WAARRE FORMATION (1743.00 - 1791.50 metres) Project PETRO_TXDM

PRIMARY MODEL CASINO2_KILL (continued):

Component	UBNDWAT	UFREWAT
Error of prediction	0.2726	0.6057

EQUATION RESPONSES:

Log	Method	Uncertainty		
Formation density [G/C3]		0.0264	0.000	0.000
RHO8	Linear			
Neutron [V/V]		0.0140	0.000	0.000
NPOR	Linear			
Sonic transit time [US/F]		1.0000	0.0	0.0
DTCO	Linear			
Photoelectric absorption [B/C3]		3.0000	0.00	0.00
U	Linear			
Total gamma [GAPI]		5.0000	0.0	0.0
GR	Linear			
Spectral thorium [PPM]		0.5000	0.0	0.0
THOR_COR	Linear			
Spectral uranium [PPM]		1.0000	0.0	0.0
URAN_COR	Linear			
Unflushed conductivity [MH/M]		0.0400	8.00	1.62
CT	Dual-water nonlinear			
Flushed conductivity [MH/M]		0.0800	0.00	0.00
CXO	Dual-water nonlinear			

CONSTRAINTS:

	Value	Type	Uncertainty		
<PROG UNITY>	1.000	Tool	0.0100	1.000	1.000
<PROG POROSITY>	0.000	Tool	0.0100	-1.000	-1.000
<PROG X BNDWAT>	0.000	Tool	0.0100	0.000	0.000
<PROG U BNDWAT>	0.000	Tool	0.0100	-1.000	0.000
<PROG WATER MUD>	0.000	<=	-	-1.000	-1.000

PROPERTIES AND BOUNDS:

Mineral grain density	0.000	0.000
Mineral cation exchange capacity	0.000	0.000
Lower Bound	0.000	0.001
Upper Bound	0.500	0.500

MULTIMIN REPORT for well CASINO_1 interval LOWER WAARRE FORMATION (1792.00 - 1955.50 metres) Project PETRO_TXDM

Reported by exptxd on 17-Apr-2003 at 11:35
Analysed by exptxd on 21-Mar-2003 at 10:25

MODELS:

Type	Name	Cond#	Cutoff	Expression
Primary	CASINO2_KCALC	6.345	10.0	

FORMATION FLUID PARAMETERS:

Fluid properties option = DEPTH
Oil Gravity Degrees API = 30.00 dapi Gas specific gravity = 0.650
Rws = 0.6000 @ 80.00 degC Cwbs = - @ - degC Rmfs = 0.1140 @ 24.00

BOREHOLE PARAMETERS:

Mud base = WATER Mud density = - k/m3 KCl concentration of mud = 7.00 %
SHT = - BHT = 84.00
Rms = 0.1380 @ 24.00 Rmcs = 0.397 @ 24.00 Total depth = 2118.00 metres

Average temperature of 80.63 degC by method.
Average pressure of 22682.07 kpa by method.

MULTIMIN REPORT for well CASINO_1 interval LOWER WAARRE FORMATION (1792.00 - 1955.50 metres) Project PETRO_TXDM

PRIMARY MODEL CASINO2_KCALC:
Cementation factor m = 1.650 Saturation exponent n = 2.000 Linear dual-water w = 2.00
Expansion of clay bound water is enabled.

Component	QUARTZ	CALCITE	ILLITE	KAOLIN	CHLOR	SPCMIN2	XGAS	XBNDWAT	XFREWAT	XSPCFLU	UGAS
Error of prediction	0.9168	0.9047	0.4045	0.4301	0.0975	0.0154	0.0451	0.0561	0.0628	0.0055	0.2183

EQUATION RESPONSES:

Log	Method	Uncertainty										
Formation density [G/C3]		0.0200	2.645	2.710	2.776	2.620	2.800	4.510	0.027	1.017	1.017	4.084	0.000
RHO8	Linear												
Neutron [V/V]		0.0140	-0.050	0.000	0.300	0.451	0.500	-0.030	0.359	0.955	0.955	-0.002	0.000
NPOR	Linear												
Sonic transit time [US/F]		1.0000	55.5	47.8	105.0	100.0	85.3	95.8	210.0	189.0	189.0	189.0	0.0
DTCO	Linear												
Photoelectric absorption [B/C3]		3.0000	4.78	13.77	11.73	5.38	25.00	490.00	0.02	0.65	0.65	1065.00	0.00
U	Linear												
Total gamma [GAPI]		3.0000	40.0	15.0	265.0	104.0	70.0	2800.0	0.0	0.0	33.6	0.0	0.0
GR	Linear												
Spectral thorium [PPM]		1.0000	1.0	1.0	22.0	19.3	5.0	50.0	0.0	0.0	0.0	0.0	0.0
THOR_COR	Linear												
Spectral uranium [PPM]		1.0000	0.6	1.0	5.0	3.2	5.0	10.0	0.0	0.0	0.0	0.0	0.0
URAN_COR	Linear												
Unflushed conductivity [MH/M]		0.0400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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      CT          Dual-water nonlinear    |-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------
|
 Flushed conductivity [MH/M]       0.0800 |   0.00|   0.00|   0.00|   0.00|   0.00|   0.00|   0.00|  23.62|  19.74|   0.00|
0.00|
      CXO         Dual-water nonlinear     ---------------------------------------------------------------------------------------

 CONSTRAINTS:       Value Type Uncertainty
                                           ---------------------------------------------------------------------------------------
 <PROG UNITY>       1.000 Tool      0.0100 |  1.000|  1.000|  1.000|  1.000|  1.000|  1.000|  0.000|  0.000|  0.000|  0.000|
1.000|
                                          |-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------
|
 <PROG POROSITY>    0.000 Tool      0.0100 |  0.000|  0.000|  0.000|  0.000|  0.000|  0.000|  1.000|  1.000|  1.000|  1.000| -
1.000|
                                          |-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------
|
 <PROG X BNDWAT>    0.000 Tool      0.0100 |  0.000|  0.000|  0.184|  0.049|  0.111|  0.000|  0.000| -1.000|  0.000|  0.000|
0.000|
                                          |-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------
|
 <PROG U BNDWAT>    0.000 Tool      0.0100 |  0.000|  0.000|  0.264|  0.070|  0.160|  0.000|  0.000|  0.000|  0.000|  0.000|
0.000|
                                          |-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------
|
 <PROG WATER MUD>   0.000 <=             - |  0.000|  0.000|  0.000|  0.000|  0.000|  0.000|  0.000|  1.000|  1.000|  1.000|
0.000|
                                          |-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------
|
 <USER CONSTR1>     0.040 >=             - |  0.000|  1.000|  0.000|  0.000|  0.000|  0.000|  0.000|  0.000|  0.000|  0.000|
0.000|
                                          |-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------
|
 <USER CONSTR2>     0.010 >=             - |  0.000|  0.000|  0.000|  0.000|  0.000|  1.000|  0.000|  0.000|  0.000|  0.000|
0.000|
                                           ---------------------------------------------------------------------------------------
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MULTIMIN REPORT for well CASINO_1 interval LOWER WAARRE FORMATION (1792.00 - 1955.50 metres) Project PETRO_TXDM

PRIMARY MODEL CASINO2_KCALC (continued):

PROPERTIES AND BOUNDS:

	QUARTZ	CALCITE	ILLITE	KAOLIN	CHLOR	SPCMIN2	XGAS	XBNDWAT	XFREWAT	XSPCFLU	UGAS
Mineral grain density	2.650	2.710	2.780	2.620	2.800	4.510	0.000	0.000	0.000	0.000	0.000
Mineral cation exchange capacity	0.000	0.000	0.250	0.070	0.150	0.000	0.000	0.000	0.000	0.000	0.000
Lower Bound	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Upper Bound	1.000	1.000	1.000	1.000	1.000	1.000	0.500	0.500	0.500	0.500	0.500

Component	UBNDWAT	UFREWAT
Error of prediction	0.1523	0.3400

EQUATION RESPONSES:

Log	Method	Uncertainty		
Formation density [G/C3]		0.0200	0.000	0.000
RHO8	Linear			
Neutron [V/V]		0.0140	0.000	0.000
NPOR	Linear			
Sonic transit time [US/F]		1.0000	0.0	0.0
DTCO	Linear			
Photoelectric absorption [B/C3]		3.0000	0.00	0.00
U	Linear			
Total gamma [GAPI]		3.0000	0.0	0.0
GR	Linear			
Spectral thorium [PPM]		1.0000	0.0	0.0
THOR_COR	Linear			
Spectral uranium [PPM]		1.0000	0.0	0.0

URAN_COR	Linear			
Unflushed conductivity [MH/M]		0.0400	8.29	1.68
CT	Dual-water nonlinear			
Flushed conductivity [MH/M]		0.0800	0.00	0.00
CXO	Dual-water nonlinear			

MULTIMIN REPORT for well CASINO_1 interval LOWER WAARRE FORMATION (1792.00 - 1955.50 metres) Project PETRO_TXDM

PRIMARY MODEL CASINO2_KCALC (continued):

CONSTRAINTS:

	Value	Type	Uncertainty	UBNDWAT	UFREWAT
<PROG UNITY>	1.000	Tool	0.0100	1.000	1.000
<PROG POROSITY>	0.000	Tool	0.0100	-1.000	-1.000
<PROG X BNDWAT>	0.000	Tool	0.0100	0.000	0.000
<PROG U BNDWAT>	0.000	Tool	0.0100	-1.000	0.000
<PROG WATER MUD>	0.000	<=	-	-1.000	-1.000
<USER CONSTR1>	0.040	>=	-	0.000	0.000
<USER CONSTR2>	0.010	>=	-	0.000	0.000

PROPERTIES AND BOUNDS:

	UBNDWAT	UFREWAT
Mineral grain density	0.000	0.000
Mineral cation exchange capacity	0.000	0.000
Lower Bound	0.000	0.001
Upper Bound	0.500	0.500

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*          MULTIMIN REPORT         *
*                                  *
*       *** End of Report ***      *
*                                  *
*    Project : PETRO_TXDM          *
*    User id : exptxd              *
*    Date    : 17-Apr-2003 11:35:05 *
*    Pages   :   7                 *
*                                  *
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