SPECIAL CORE ANALYSIS REPORT

YOLLA-2

Prepared for:

Premier Oil Australia Pty

November 1998

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Nov 24,1998

Mr. David Evans
Premier Oil Australia Pty Ltd
45 Ord Street
West Perth, WA 6872

Dear Dave,

Re: Yolla-2, Special Core Analysis Report

This is the final special core analysis report. Preliminary data were sent to Premier Oil as they became available. It has been a pleasure working for Premier Oil and please do not hesitate to contact us if you have any queries.

Regards,

Khiam Ooi
Manager- Petrophysics Division

ACN 050 543 194

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1. INTRODUCTION

Yolla –2 (T-RL-1) was cored on the 14 May 1998 and 17.7m of core was recovered over the depth interval 3033.00-3050.70m. The 5 ¼ " diameter core was cut using water based drilling mud and retrieved in fluted aluminium tubes. Routine core analysis had been performed on the core and the data was presented in a separate report.

The objective of the special core analysis program was to obtain detailed log calibration data and reservoir properties. Based on the core analysis data, the following analyses listed below was proposed. Two of the analyses, that is, Brinell Hardness Number and air-brine capillary pressure by the centrifuge method was deleted after discussions with Mr Tom Fontaine of Fekete Australia Pty Ltd.

1. Brinell Hardness Number.
2. Helium porosity and air permeability at 4702 psia.,
3. Formation resistivity factor and resistivity index at 4702 psia.
4. Cation exchange capacity.
5. Air-brine capillary pressure by the porous plate method.
6. Residual gas saturation by the dynamic displacement method at 4702 psia.

There was a delay in getting the analyses started because of discrepancy in the resistivity (Rw) of the formation brine (sample 3044.0m , MDT RUN #1, Serial No. 0193) reported by Petrolab. The discrepancy was due to poor quality of the water sample collected. After discussions with Mr John McGowan of Petrolab, a Rw of 0.403 ohm metre was used. This value was agreed upon by Mr David Evans of Premier Oil and Mr Tom Fontaine of Fekete on the 11 Aug 1998.

2. SAMPLE PREPARATION

The plugs which had undergone routine core analysis were recleaned in hot toluene and methanol.They were dried at 95 deg C in a top ventilated fan-forced convection oven until constant weights were achieved. Plugs were allowed to cool to room temperature in an evacuated dessicator prior to poroperm measurements.

3. HELIUM POROSITY AND AIR PERMEABILITY AT 4702 PSIA

The poroperm measurements were conducted at a hydrostatic pressure of 4702 psia. The porosities were determined by injecting the plugs with helium. Air permeabilities were measured using a DGP200 steady state digital gas permeameter (Stim-Lab formerly known as Edinburgh Petroleum Services Ltd , EPS).

4. PLUG SATURATION

Following poroperm measurements, the plugs were loaded into a saturator and evacuated overnight. The plugs were then pressure saturated with degassed synthesized formation brine of Rw 0.399 ohm metre.

5. FORMATION RESISTIVITY FACTOR AT 4702 PSIA

The resistivities of the fully saturated plugs were measured daily until reading stabilised, indicating that ionic equilibrium had been achieved between the plugs and the brine. The plugs were individually inserted into a rubber boot. Silver membranes were placed at the top and bottom ends of the plug between the end faces and the electrodes. The whole assembly was then loaded into a core holder. Porosity reductions were determined by observing the incremental brine displacement when overburden pressure was applied. The resistivities of the plugs were monitored at regular intervals until reading stabilised.

6. RESISTIVITY INDEX AT 4702 PSIA

After formation resistivity factor tests, the plugs were loaded into a porous plate cell and desaturated using humidified pressurised air. As the plugs came to equilibrium at each pressure, they were unloaded, weighed and individually inserted into a rubber boot. . Silver membranes were placed at the top and bottom ends of the plug between the end faces and the electrodes. The whole assembly was then loaded into a core holder and pressure was applied. The resistivities of the plugs were monitored at regular intervals until reading stabilised.

7. AIR/BRINE CAPILLARY PRESSURE BY THE POROUS PLATE METHOD

This analysis was conducted in conjunction with the resistivity index measurements.

8. RESIDUAL GAS SATURATION BY THE DYNAMIC DISPLACEMENT METHOD

After poroperm measurements, the plugs were saturated with synthesized formation brine and then desaturated to irreducible water saturations by the porous plate method. The plugs were individually loaded into a hydrostatic core holder and 4702 psia pressure was applied. Air was passed through the plugs to determine the air permeabilty at irreducible water saturations. After that, synthesized formation brine was injected into the plugs until stabilised gas recoveries were achieved. Water permeabilities at residual gas saturations were measured in the forward and reverse directions.

9. DISCUSSION

The CEC values for the two samples from 3039.35m and 3049.44m are very low, at 5.1meq/100g and 3.7meq/100g respectively.

The cementation exponents 'm', do not vary much from its average value of 2.00, which is consistent with clean sandstones. The values range from 1.92 (plugs 4 and 14) to 2.13 (plug 48). This narrow range indicates a narrow range of pore geometries. The lower 'm' values exhibited by the lower permeability, finer grained plugs (plugs 4 and 10) may be attributed to the presence of minor argillacous/carbonaceous laminations. The higher 'm' values are associated with the coarser grained, higher permeability plugs (plugs 30 and 48).

The average saturation exponent 'n' varies from a minimum of 1.35 (plug 48) to a maximum of 1.72 (plug 14). The higher 'n' values are associated with the tighter plugs and vice versa. The plugs exhibiting higher 'n' values also have more consistent 'n' values at different water saturations. On the other hand, the plugs exhibiting lower 'n' values have a much wider range of 'n' values at different water saturations. For instance, in the coarser, higher permeability plug 30, the 'n' values range from 1.17 at 41.1% water saturation and gradually increases to 1.66 as the water saturation decreases to 16.3%. This trend is commonly exhibited by heterogenous samples.

The air-brine capillary pressure data are consistent with the permeabilities of the samples. The low permeability plugs have higher water saturations and vice-versa. The water saturations at irreducible water saturations range from 35.4% (plug 4,34md) to 5.8% (plug 48, 4725md).

The residual gas saturations in percent pore volumes vary from 21.2% (plug 7,19md) to 48% (plug 29,6050md). Variations in the permeability do not seem to have a large effect on the residual gas saturations. Plugs 29 (Srg, 50.1% pore volume) and 49 (Srg, 50.5% pore volume) that have permeabilities of 6050md and 898md respectively have only a small difference in the residual gas saturations. At residual gas saturations, the water permeabilities are higher in the reverse than in the forward directions, indicating movement of mobile fines. When the flow direction is reversed, the fines are dislodged from the pore throats, causing a temporary increase in the permeability.

TABLE 1
PREMIER OIL – YOLLA-2
LITHOLOGICAL DESCRIPTIONS

2, 3033.35m ss, mass, subparrallel arg strk, v fine, sbrd, high sphericity, v well srtd, qtz, nmr fine reworkd arg deb l.P., sil cmt, v well cmt.

4, 3033.94m ss, brn, mass, subparallel arg strk, slt – fine, sbrd, high sphericity, v well srtd, qtz, mnr fine reworked arg deb l.P., sil cmt, mnr sericite cmt, v well cmt.

5, 3034.28m ss, mass, subparallel arg strk, v fine, sbang-sbrd, mod sphericity, v well srtd, qtz, wthr fspr, mnr fine reworked arg deb l.P., sil cmt, v well cmt.

7, 3034.82m ss, gry, mass, slt – v fine, sbrd, high sphericity, well srtd, qtz, mnr reworked arg deb l.P., sil cmt, v well cmt.

8, 3035.15m ss, lam, v fine, s bnag, mod sphericity, v well srtd, qtz, ard deb (defines lam), sil cmt, v well cmt.

10, 3035.75m ss, gry, mass, v fine-fine, sbrd, mod sphericity, v well srted, qtz mnr reworked arg deb l.P., sil cmt, v well cmt.

11, 3036.04m ss, mas, subparallel arg strk, v fine, sbrd, mod sphericity, v well srtd, qtz nmr fine reworked arg deb, sil cmt, v well cmt.

14, 3036.95m ss, gry, v t.b., fine-v fine, sbang, high sphericity, v well srtd, qtz, mnr reworked arg deb l.P, v rr glau, sil cmt, v well cmt.

27, 3040.81m ss, mass, fine-v crs, sbang-sbrd, mod sphericity, p srtd, qtz, mnr reworked arg deb l.P., sil cmt, well cmt.

29, 3041.40m ss, gry, mass, med-crs, ang-subang, low-mod sphericity, mod srtd, qtz, mnr reworked arg debris l.P., sil cmt, mod cmt.

30, 3041.70m ss, gry, mass, crs-v crs, sbang-sbrd, mod sphericity, mod srtd, qtz, mnr reworked arg debris l.P., sil cmt, mod cmt.

47, 3046.75m ss, mass, crs-vcrs, sbrd-rd, mod sphericity, mod srtd, qtz, mnr reworked arg deb l.P., sil cmt, well cmt.

48, 3047.05m ss, gry, mass, med- v crs, sbang, mod sphericity, p srtd, qtz, mnr reworked arg deb l.P., mnr wthr fspr, sil cmt, well cmt.

49, 3047.35m ss, gry, mass, med – v crs, pbl, ang-sbang, low-mod sphericity, p srtd, qtz, mnr reworked arg deb l.P, rr sericte, sil cmt, mod-well cmt.

HELIUM POROSITY AND AIR PERMEABILITY AT 4702 PSIA

Company: PREMIER OIL AUSTRALIA PTY LTD
Well: YOLLA-2
Permit: T-RL-1
Country: AUSTRALIA

Date: Nov 1998
File No:CA 98052

Sample ID	Depth (m)	Helium Porosity (%)		Grain Density	Air Permeability (md)		Remarks
		Ambient	4207 PSIA	(gm/cc)	Ambient	4207 psia	
2	3033.35	15.7	15.0	2.68	12	10	
4	3033.94	18.3	17.4	2.71	34	29	
5	3034.28	15.8	15.0	2.68	14	10	
7	3034.82	16.5	15.7	2.67	22	19	
8	3035.15	9.2	8.2	2.69	<0.1	<0.1	
10	3035.75	16.9	16.0	2.67	54	45	
11	3036.04	15.7	15.0	2.68	8.4	6.5	
14	3036.95	18.3	17.5	2.67	208	185	
27	3040.81	21.4	20.0	2.65	1678	1449	retrimmed
29	3041.40	25.4	24.2	2.67	6672	6050	
30	3041.70	23.2	21.8	2.67	4725	4049	
47	3046.75	19.4	17.8	2.65	873	706	retrimmed
48	3047.05	18.7	17.8	2.67	304	245	
49	3047.35	19.0	18.0	2.67	1100	898	

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TABLE 3

Company: PREMIER OIL AUSTRALIA PTY LTD
Well: YOLLA-2
Permit: T-RL-1
Country: AUSTRALIA

Date: Nov 1998
File No:CA 98052

FORMATION RESISTIVITY FACTOR AT 4207 PSIA

Rw=0.399 ohm-metre at 25 deg C

Sample	Depth (m)	Permeability to air (md)	Helium Porosity (%)	Grain Density gm/cc	Cation Exchange Capacity *	Cementation Exponent m	Formation Resistivity Factor	Core Resistivity Ro @ 25 deg C
4	3033.94	29	17.4	2.71	no data	1.92	28.8	11.473
10	3035.75	45	16.0	2.67	no data	1.97	36.9	14.728
14	3036.95	185	17.5	2.67	no data	1.92	28.2	11.244
30	3041.70	4049	21.8	2.67	no data	2.05	22.8	9.098
48	3047.05	245	17.8	2.67	no data	2.13	39.3	15.671
22	3039.35	no data	no data	no data	5.1	no data	no data	no data
56	3049.44	no data	no data	no data	3.7	no data	no data	no data

* meq/100g

Average=2.00

TABLE 4

RESISTIVITY INDEX AT 4207 PSIA

Sample	Depth (m)	Permeability to air (md)	Helium Porosity (%)	Formation Factor	Brine Saturation % pore space	Resistivity Index	Saturation Exponent n	Average n
4	3033.94	29	17.4	28.8	79.2	1.48	1.68	
					56.5	2.59	1.67	
					44.0	4.04	1.70	
					37.3	5.14	1.66	1.68
10	3035.75	45	16.0	36.9	94.2	1.11	1.75	
					59.7	2.25	1.57	
					44.8	3.88	1.69	
					36.7	5.19	1.64	
					31.8	6.38	1.62	1.65
14	3036.95	185	17.5	28.2	61.1	2.24	1.64	
					44.4	4.14	1.75	
					33.4	6.89	1.76	
					23.9	12.1	1.74	1.72
30	3041.70	4049	21.8	22.8	41.1	2.83	1.17	
					34.2	4.05	1.30	
					28.7	5.97	1.43	
					22.7	11.28	1.63	
					16.3	20.48	1.66	1.44
48	3047.05	245	17.8	39.3	58.9	1.87	1.18	
					49.9	2.41	1.27	
					39.2	3.36	1.29	
					28.1	6.48	1.47	
					22.5	9.73	1.53	1.35

TABLE 5

Company: PREMIER OIL AUSTRALIA PTY LTD Date: Nov 1998
Well: YOLLA-2 File No:CA 98052
Permit: T-RL-1
Country: AUSTRALIA

AIR BRINE CAPILLARY PRESSURE AT AMBIENT BY THE POROUS PLATE METHOD

Sample	4	10	14	30	48
Depth (m)	3033.94	3035.75	3036.95	3041.70	3047.05
Permeability to air (md)	34	54	208	4725	304
Helium Porosity (%)	18.3	16.9	18.3	23.2	18.7
Grain Density (gm/cc)	2.71	2.67	2.67	2.67	2.67
PRESSURE, psig					
1	92.8	92.0	89.6	19.5	50.0
2	92.4	88.9	58.0	16.9	41.5
4	75.1	56.3	42.2	13.9	31.4
8	53.6	42.2	31.7	8.1	20.9
15	41.8	34.6	25.2	6.7	15.7
35	35.4	30.5	22.7	5.8	14.9

TABLE 6

RESIDUAL GAS SATURATION BY THE DYNAMIC DISPLACEMENT METHOD

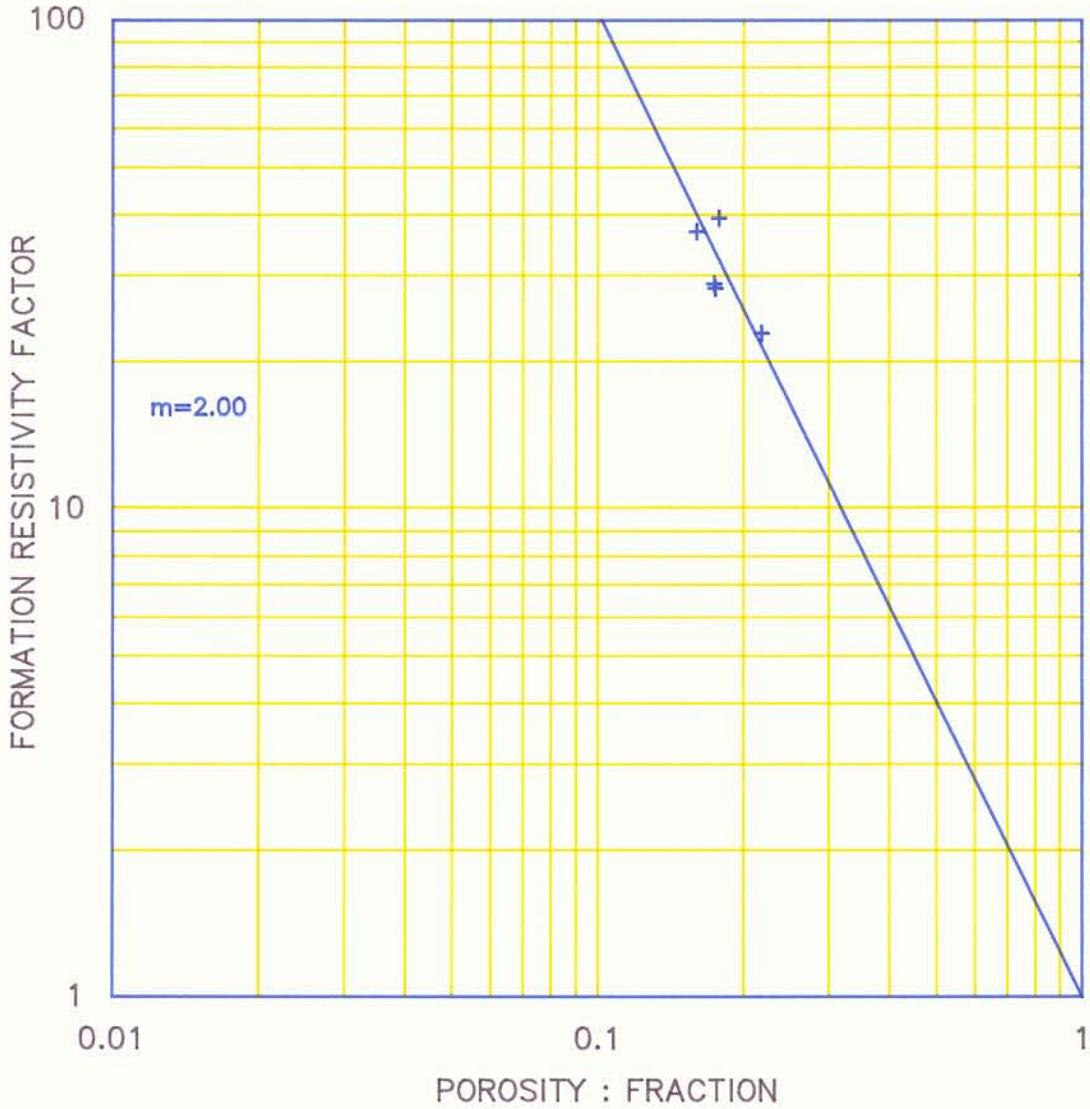
Sample	7		29		49
Depth, m	3034.82		3041.40		3047.35
Ka @(OB)	19		6050		898
Ka @ Swi(OB)	9.9		5896		658
Porosity,%	15.7		24.2		18.0
Grain density, gm/cc	2.67		2.67		2.67
Swi, % PV	44.2		4.2		5.8
Initial GIP,% PV	55.8		95.8		94.2
Gas recovery, % PV	34.6		47.8		46.6
Kw@Srg, forward	1.2		1160		51
Kw@Srg, reverse	1.4		2193		119
Srg, PV,%	21.2		48.0		47.6
Srg, GIP,%	38.0		50.1		50.5

Ka=gas permeability
Swi=irreducible water saturation
GIP=gas in place
PV=pore volume
Kw=water permeability
Srg=irreducible gas saturation

FIGURE 1

FORMATION RESISTIVITY FACTOR

CLIENT	PREMIER OIL AUSTRALIA PTY LTD
WELL	YOLLA-2
DATE	NOV 1998
FILE No	CA-98052



SATURANT RESISTIVITY 0.399 OHM-M AT 25°C
HYDROSTATIC PRESSURE : 4702 PSIA
CEMENTATION EXPONENT (m)

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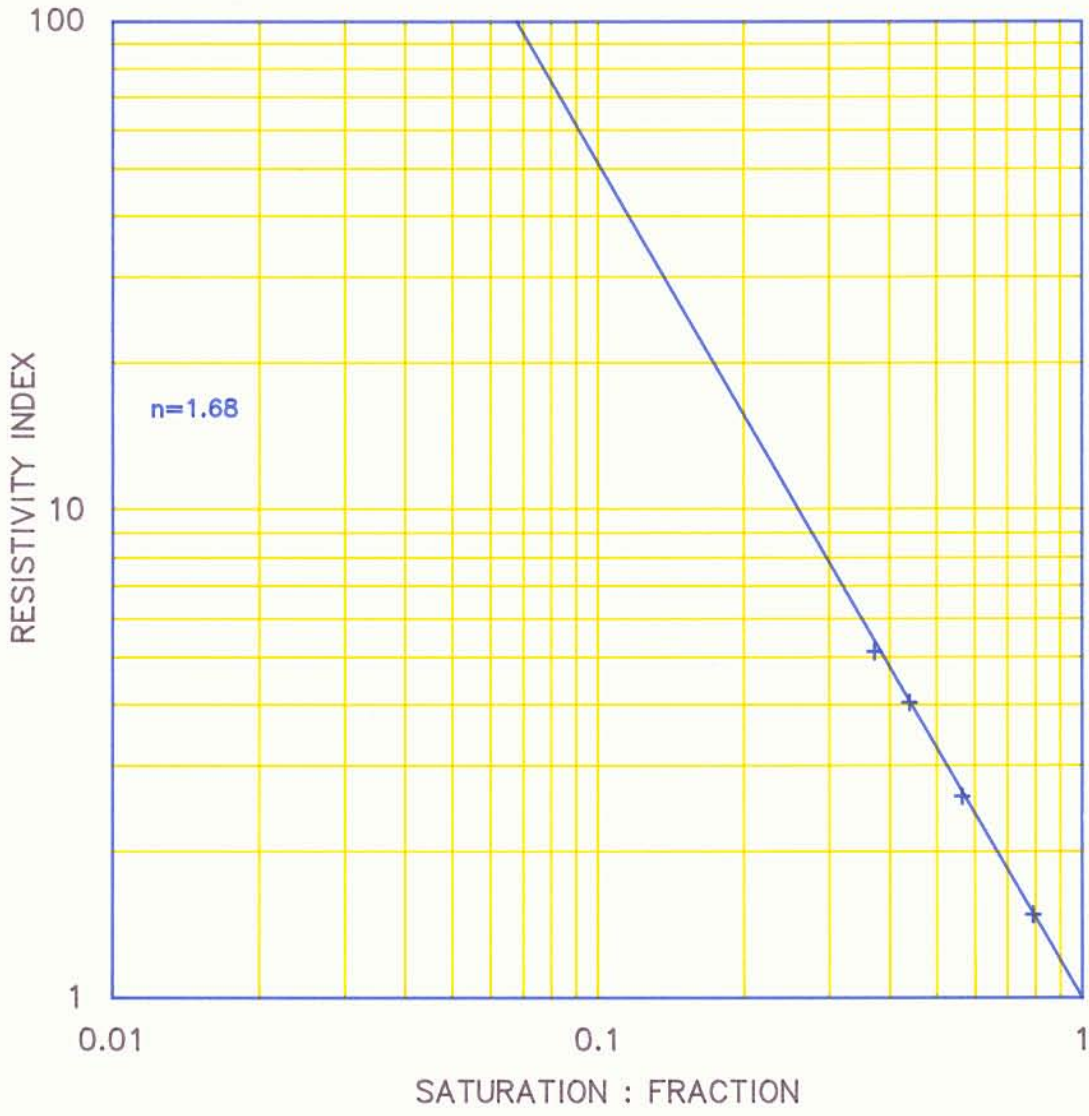
FIGURE 2.1

RESISTIVITY INDEX

CLIENT	PREMIER OIL AUSTRALIA PTY LTD
WELL	YOLLA-2
DEPTH	3033.94m
SAMPLE	4
POROSITY	17.4%
PERMEABILITY	29md
DATE	NOV 1998
FILE No	CA-98052

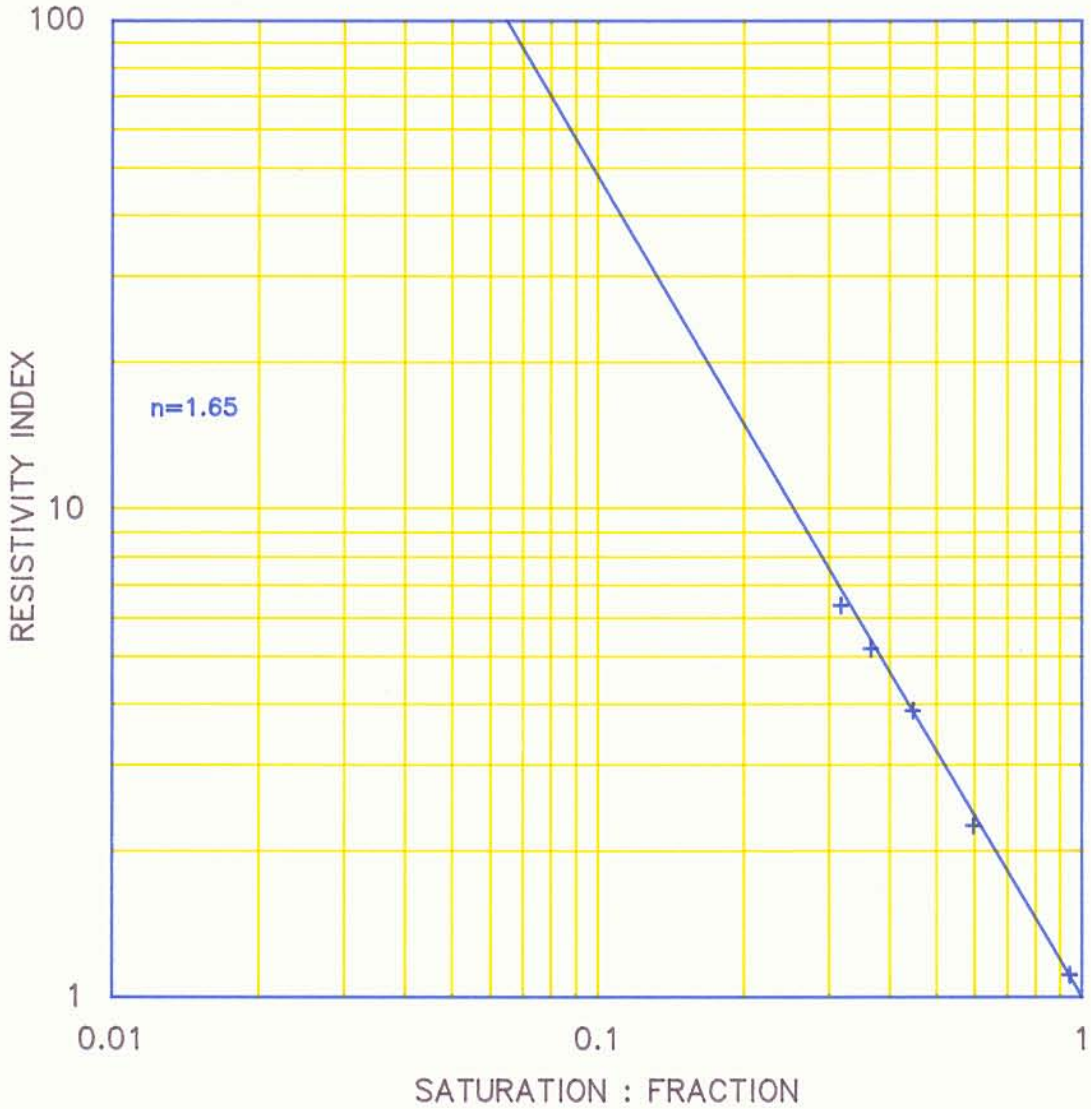


SATURANT RESISTIVITY 0.399 OHM-M AT 25°C
HYDROSTATIC PRESSURE : 4702 PSIA
SATURATION EXPONENT (n)

FIGURE 2.2

RESISTIVITY INDEX

CLIENT	PREMIER OIL AUSTRALIA PTY LTD
WELL	YOLLA-2
DEPTH	3035.75m
SAMPLE	10
POROSITY	16.0%
PERMEABILITY	45md
DATE	NOV 1998
FILE No	CA-98052

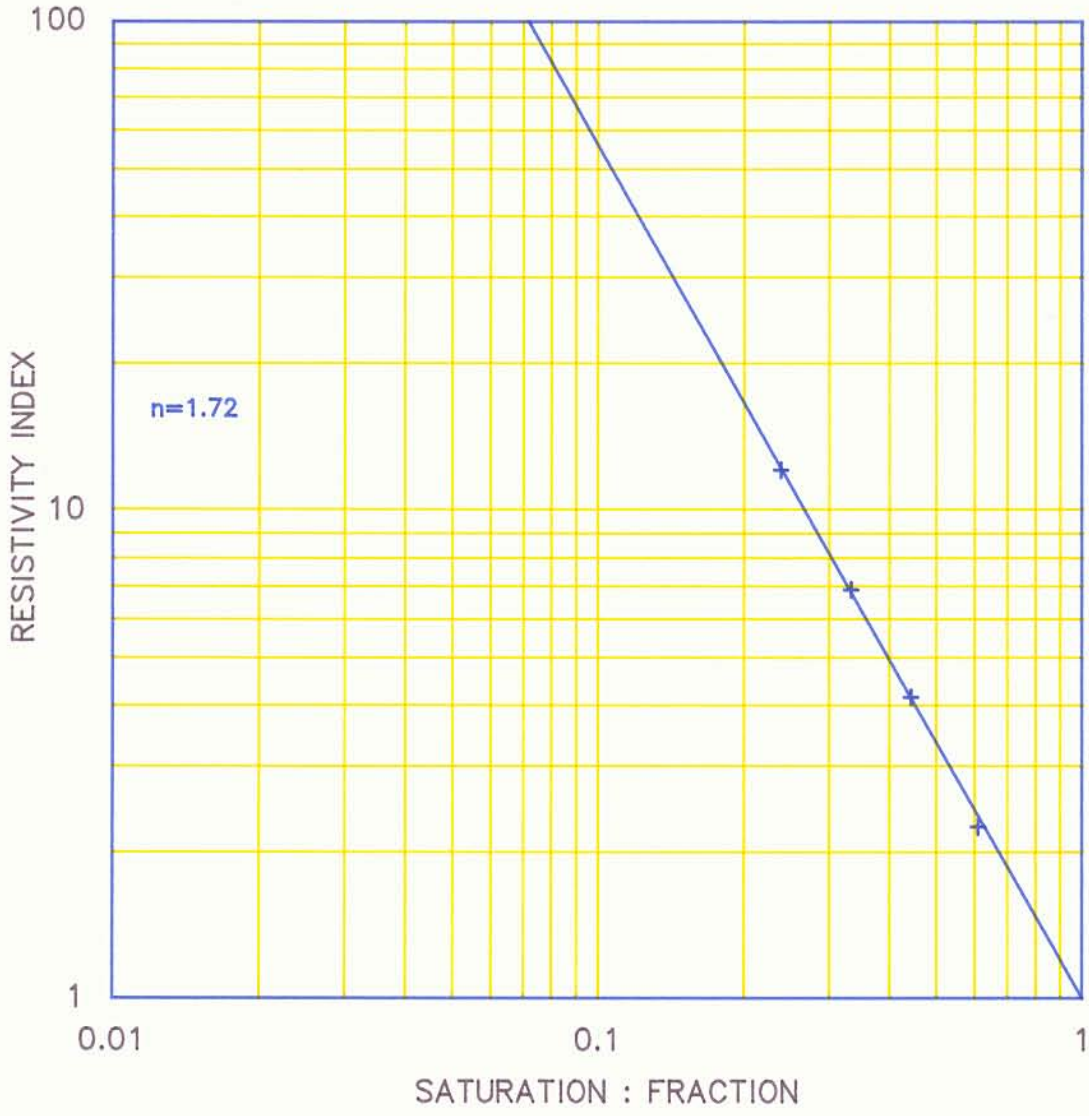


SATURANT RESISTIVITY 0.399 OHM-M AT 25°C
HYDROSTATIC PRESSURE : 4702 PSIA
SATURATION EXPONENT (n)

FIGURE 2.3

RESISTIVITY INDEX

CLIENT	PREMIER OIL AUSTRALIA PTY LTD
WELL	YOLLA-2
DEPTH	3036.95m
SAMPLE	14
POROSITY	17.5%
PERMEABILITY	185md
DATE	NOV 1998
FILE No	CA-98052

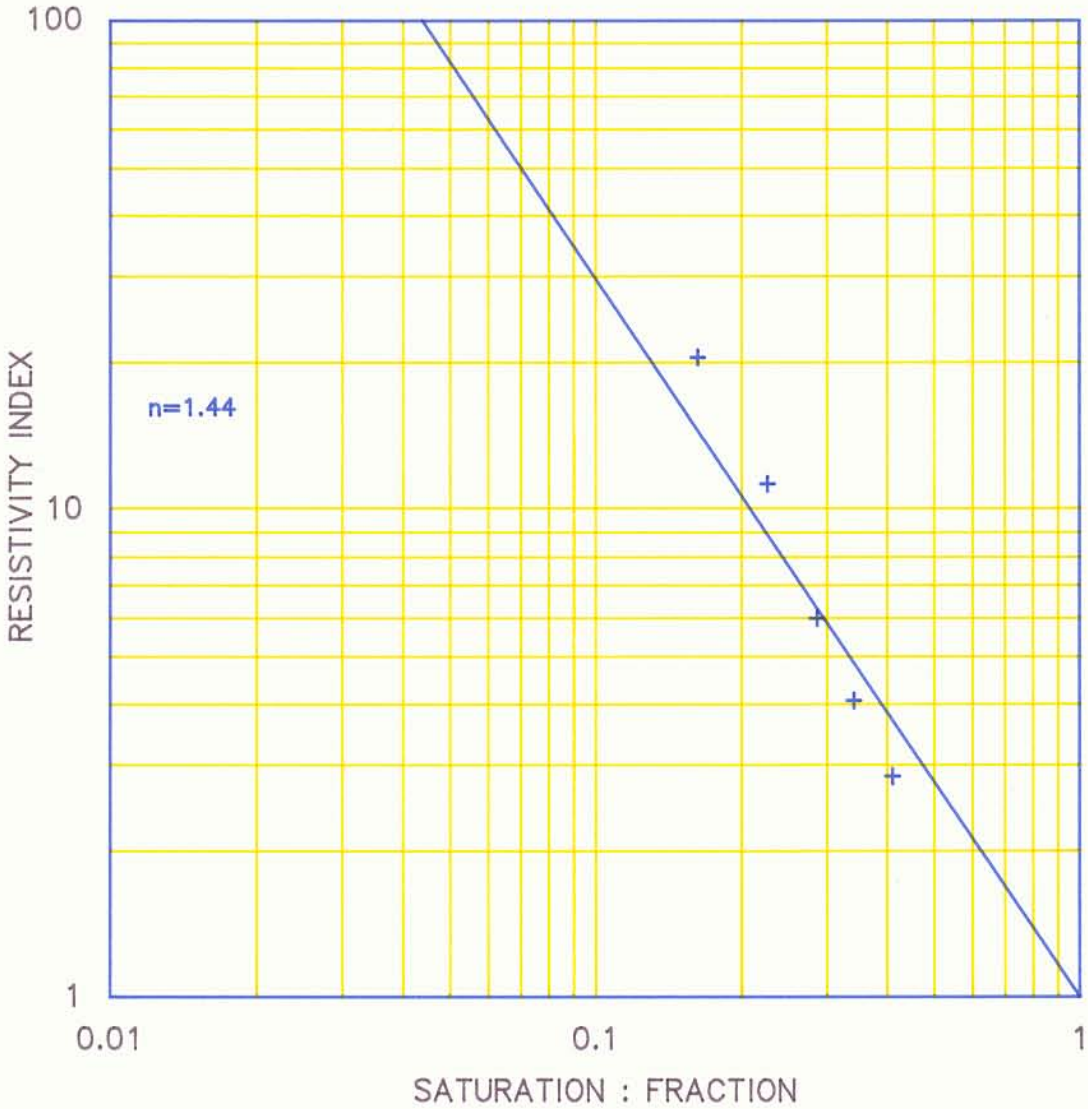


SATURANT RESISTIVITY 0.399 OHM-M AT 25°C
HYDROSTATIC PRESSURE : 4702 PSIA
SATURATION EXPONENT (n)

FIGURE 2.4

RESISTIVITY INDEX

CLIENT	PREMIER OIL AUSTRALIA PTY LTD
WELL	YOLLA-2
DEPTH	3041.70m
SAMPLE	30
POROSITY	21.8%
PERMEABILITY	4049md
DATE	NOV 1998
FILE No	CA-98052

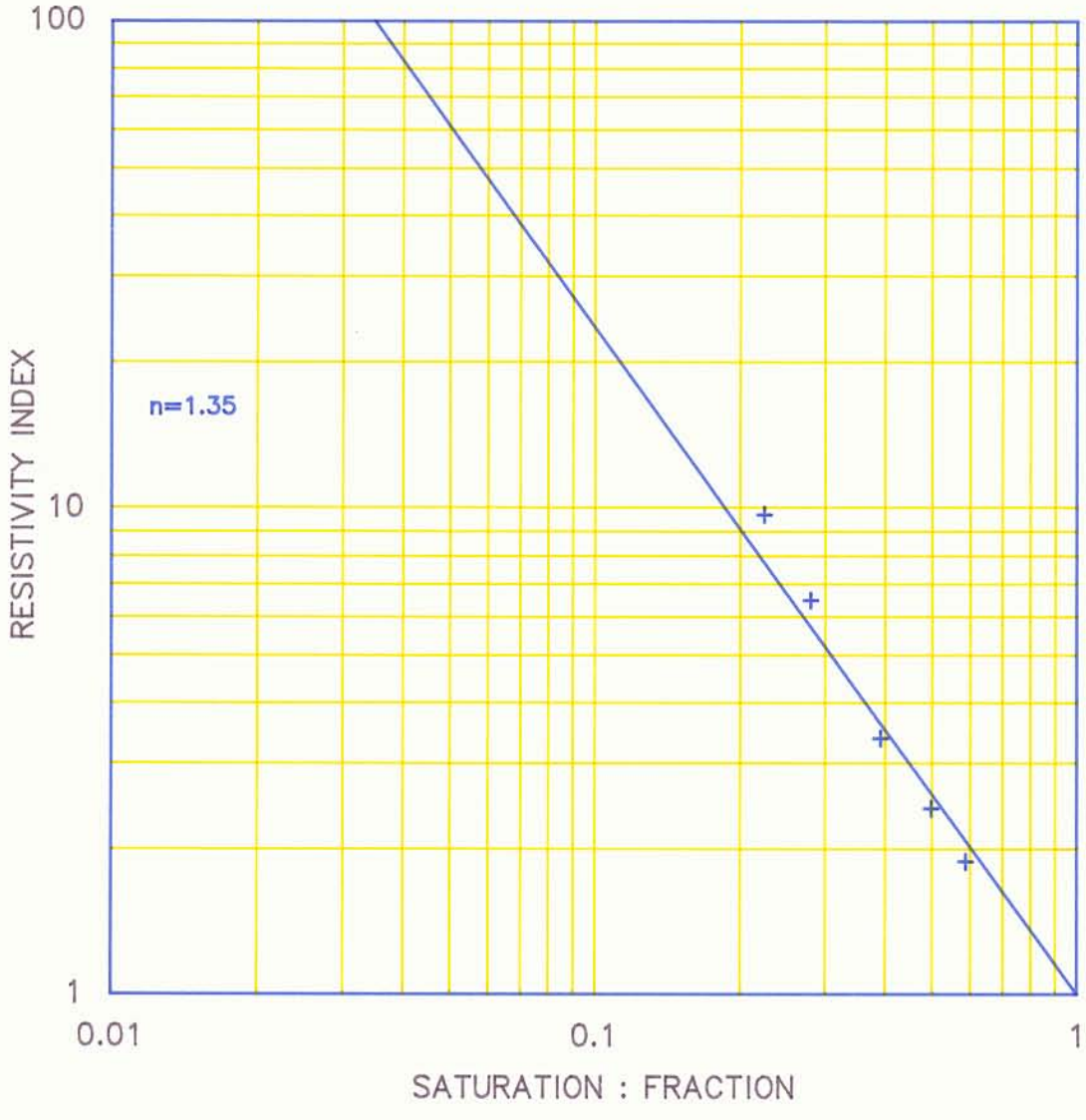


SATURANT RESISTIVITY 0.399 OHM-M AT 25°C
HYDROSTATIC PRESSURE : 4702 PSIA
SATURATION EXPONENT (n)

FIGURE 2.5

RESISTIVITY INDEX

CLIENT	PREMIER OIL AUSTRALIA PTY LTD
WELL	YOLLA-2
DEPTH	3047.05m
SAMPLE	48
POROSITY	17.8%
PERMEABILITY	245md
DATE	NOV 1998
FILE No	CA-98052

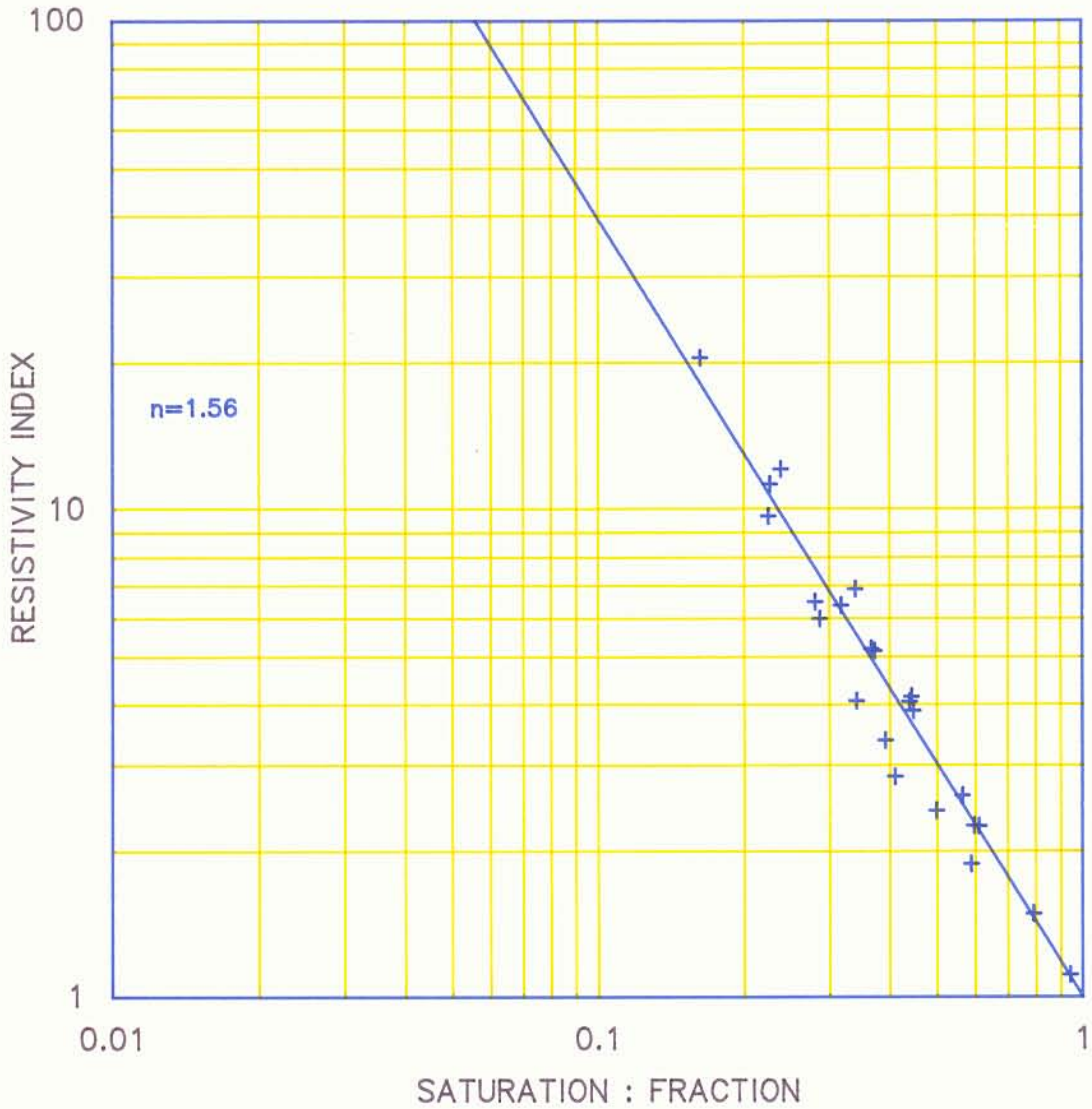


SATURANT RESISTIVITY 0.399 OHM-M AT 25°C
HYDROSTATIC PRESSURE : 4702 PSIA
SATURATION EXPONENT (n)

FIGURE 2.6

RESISTIVITY INDEX

CLIENT	PREMIER OIL AUSTRALIA PTY LTD
WELL	YOLLA-2
SAMPLE	COMPOSITE
DATE	NOV 1998
FILE No	CA-98052



SATURANT RESISTIVITY 0.399 OHM-M AT 25°C
HYDROSTATIC PRESSURE : 4702 PSIA
SATURATION EXPONENT (n)

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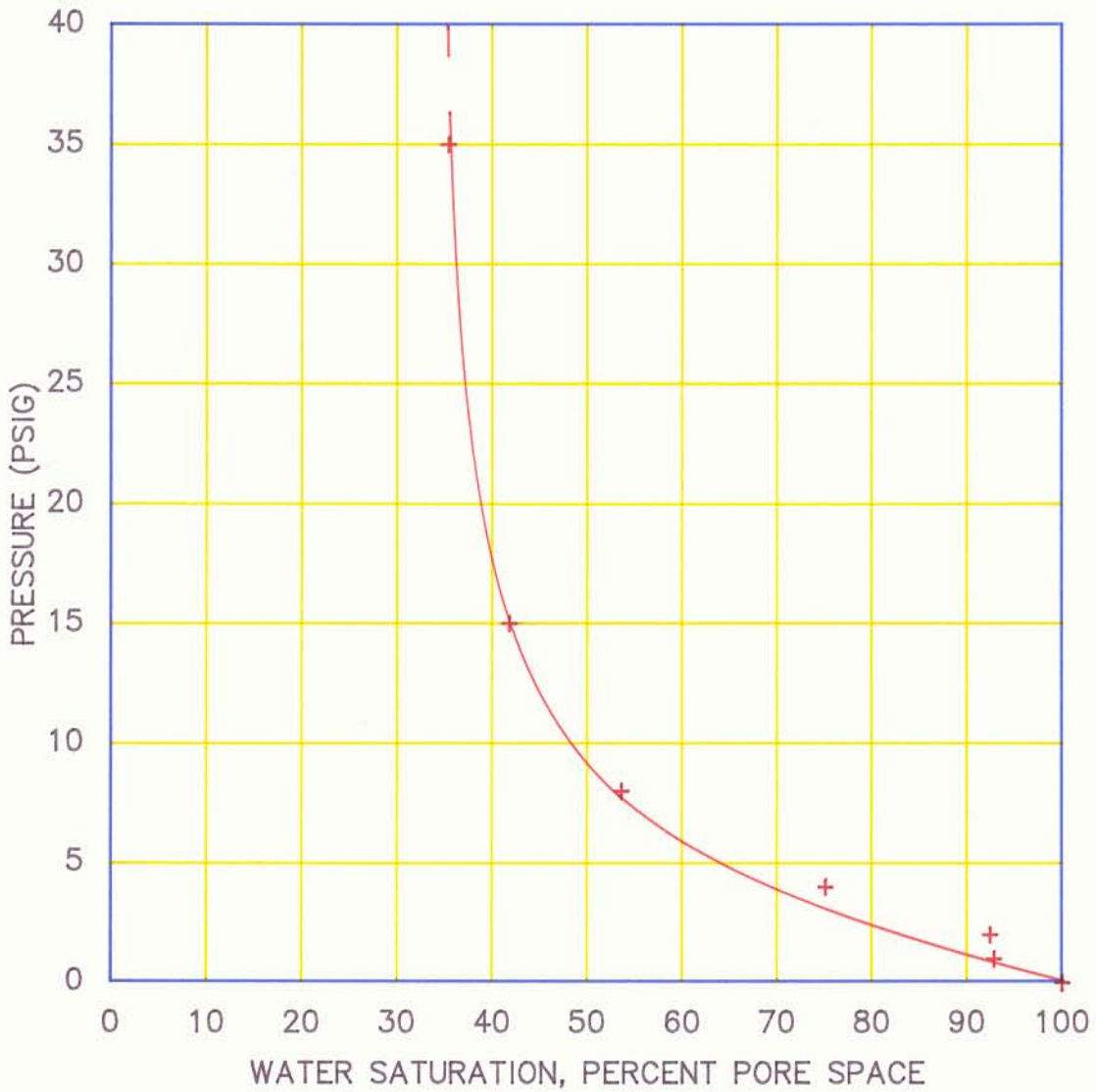
FIGURE 3.1

AIR BRINE CAPILLARY PRESSURE

CLIENT	PREMIER OIL AUSTRALIA PTY LTD
WELL	YOLLA-2
DATE	NOV 1998
FILE No	CA-98052

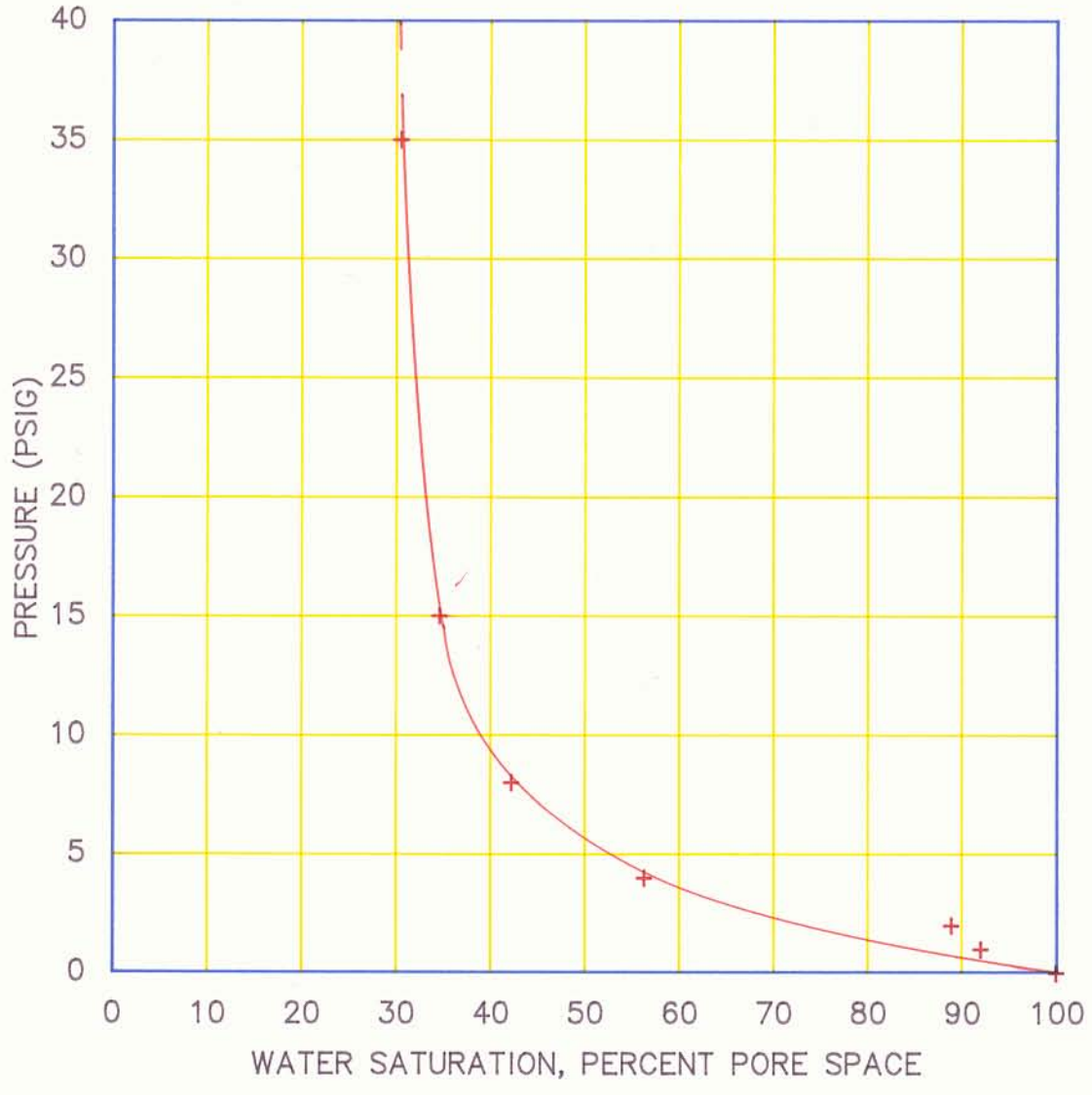


METHOD	POROUS PLATE CELL
SAMPLE	4
DEPTH	3033.94m
PERMEABILITY	34 md
POROSITY	18.3 %

FIGURE 3.2

AIR BRINE CAPILLARY PRESSURE

CLIENT	PREMIER OIL AUSTRALIA PTY LTD
WELL	YOLLA-2
DATE	NOV 1998
FILE No	CA-98052



METHOD	POROUS PLATE CELL
SAMPLE	10
DEPTH	3035.75m
PERMEABILITY	54 md
POROSITY	16.9 %

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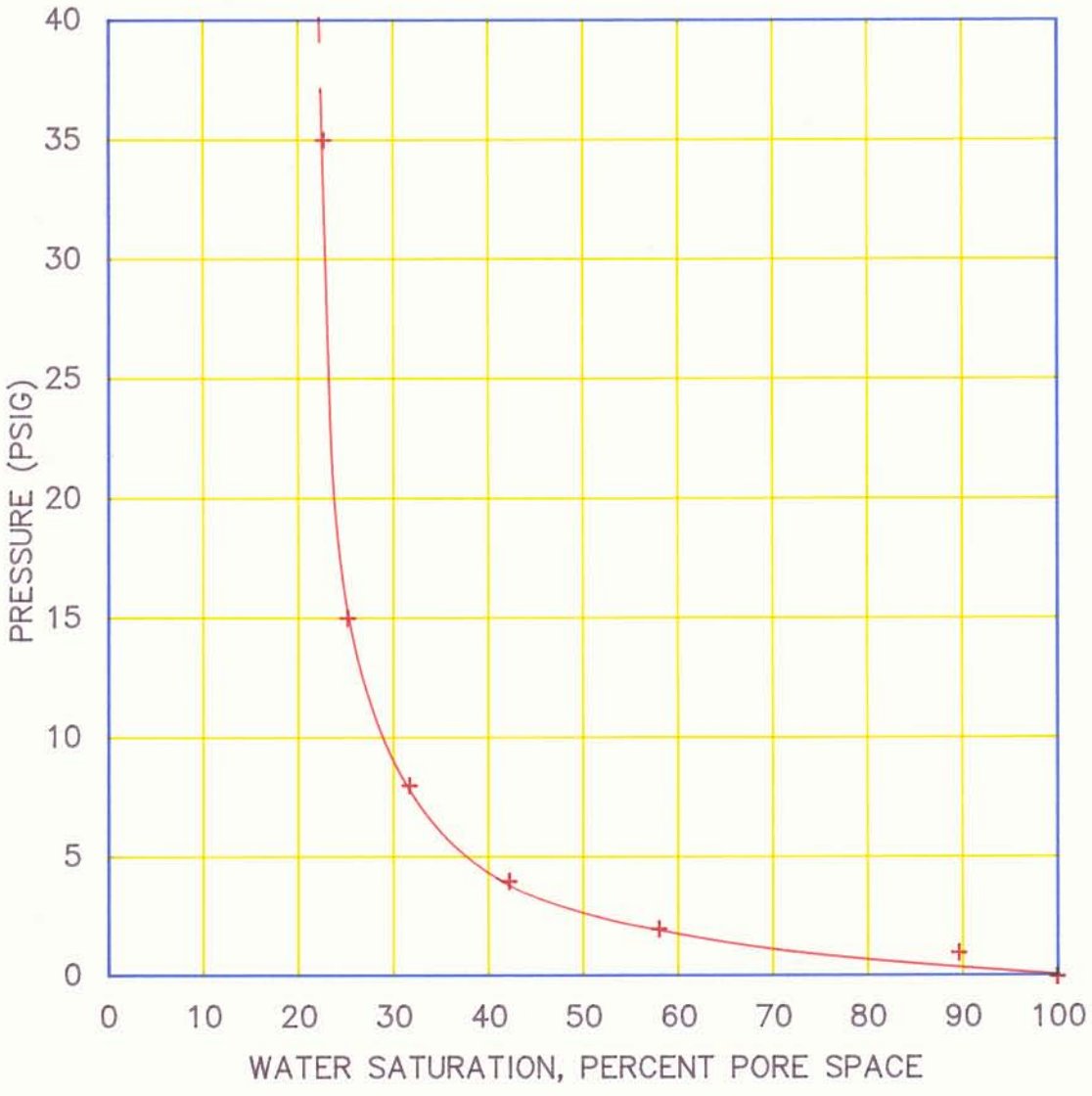
FIGURE 3.3

AIR BRINE CAPILLARY PRESSURE

CLIENT	PREMIER OIL AUSTRALIA PTY LTD
WELL	YOLLA-2
DATE	NOV 1998
FILE No	CA-98052

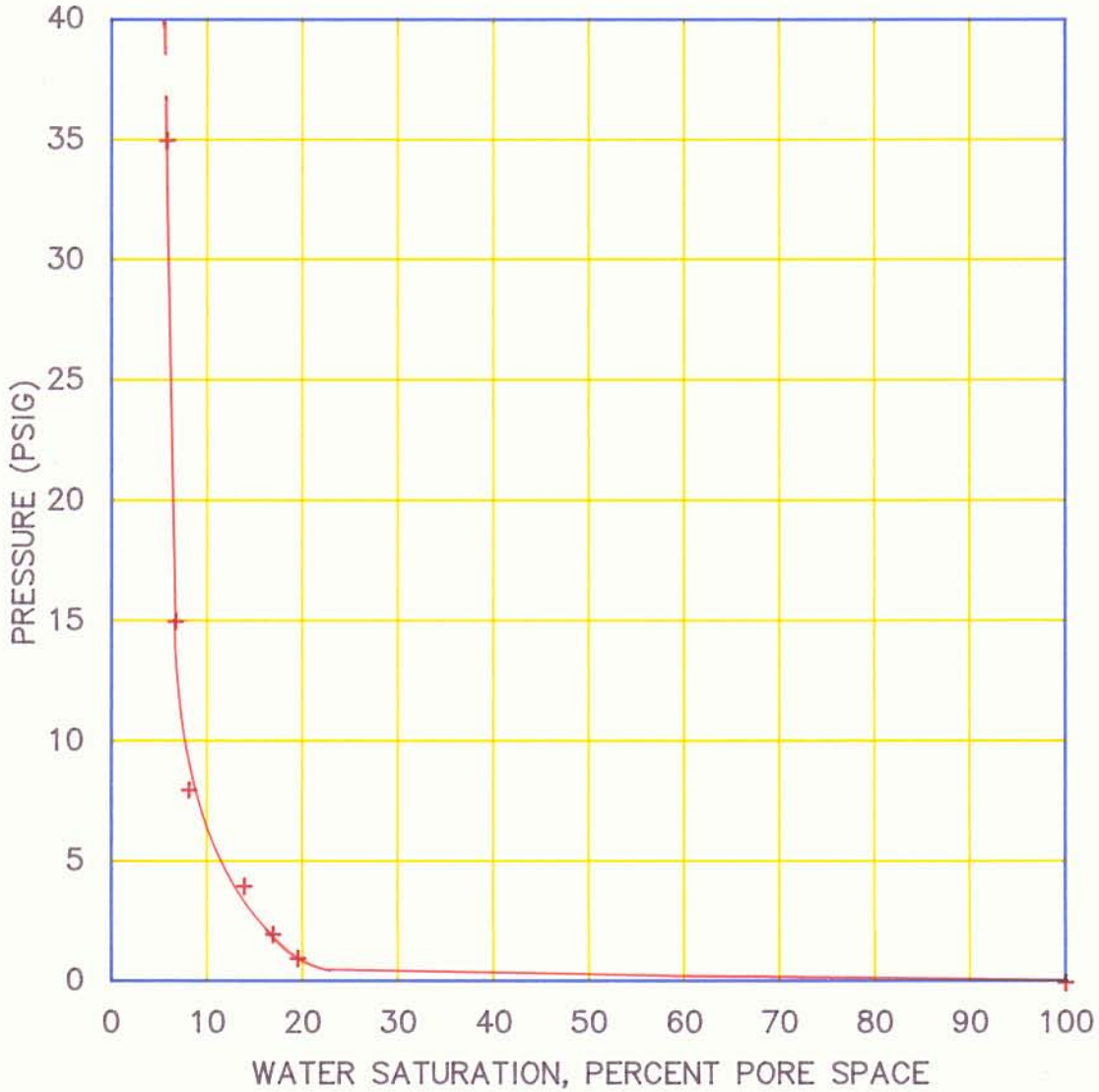


METHOD	POROUS PLATE CELL
SAMPLE	14
DEPTH	3036.95m
PERMEABILITY	208 md
POROSITY	18.3 %

FIGURE 3.4

AIR BRINE CAPILLARY PRESSURE

CLIENT	PREMIER OIL AUSTRALIA PTY LTD
WELL	YOLLA-2
DATE	NOV 1998
FILE No	CA-98052



METHOD	POROUS PLATE CELL
SAMPLE	30
DEPTH	3041.70m
PERMEABILITY	4725 md
POROSITY	23.2 %

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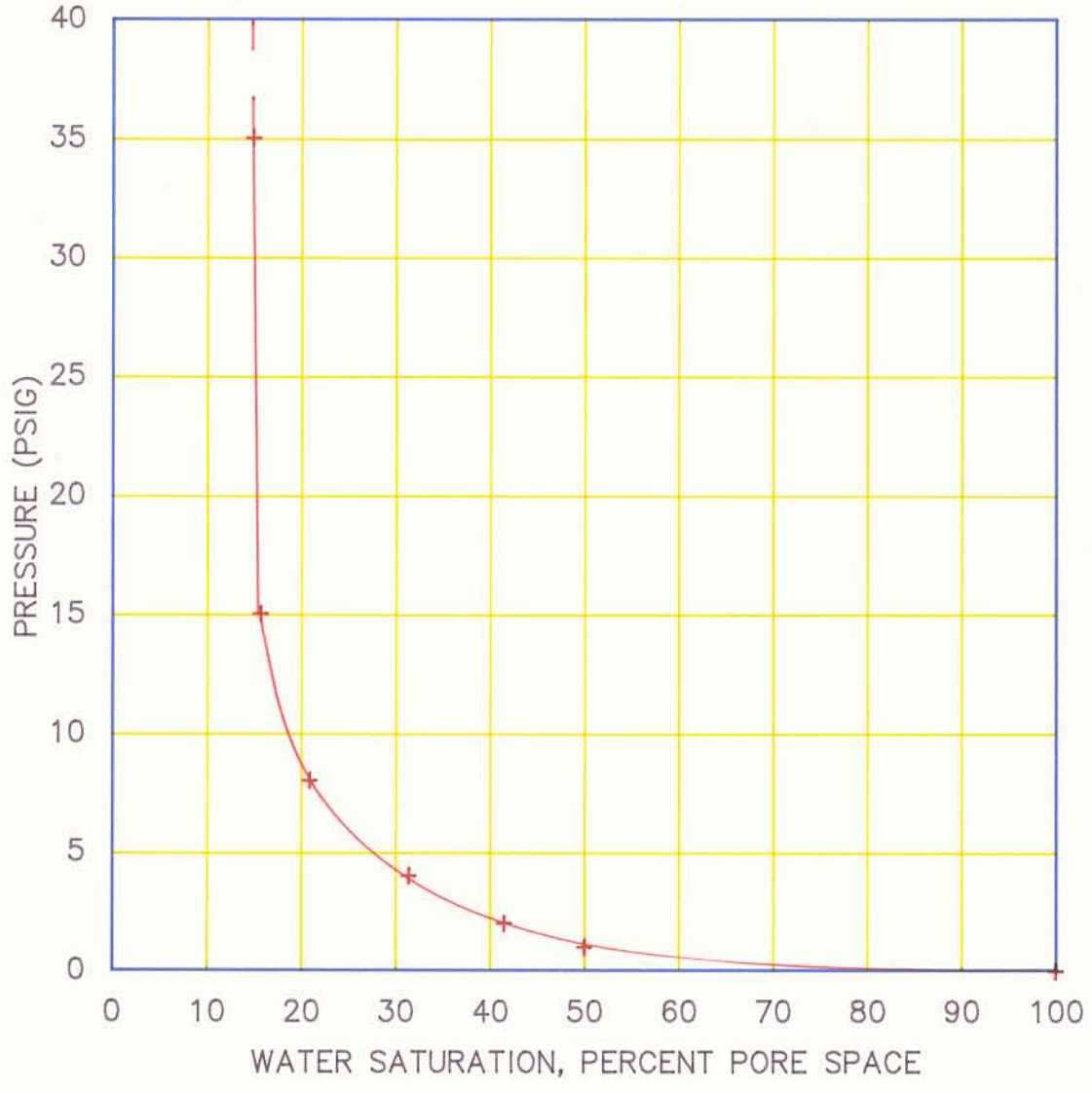
FIGURE 3.5

AIR BRINE CAPILLARY PRESSURE

CLIENT	PREMIER OIL AUSTRALIA PTY LTD
WELL	YOLLA-2
DATE	NOV 1998
FILE No	CA-98052



METHOD	POROUS PLATE CELL
SAMPLE	48
DEPTH	3047.05m
PERMEABILITY	304 md
POROSITY	18.7 %

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