



13 JAN 1994



BHP
Petroleum

VIC/P31
MINERVA_1
WELL COMPLETION REPORT
BASIC DATA

PETROLEUM DIVISION



BHP PETROLEUM PTY LTD
ACN 006 918 832

VIC/P31

MINERVA-1

WELL COMPLETION REPORT

BASIC DATA

PETROLEUM DIVISION

DECEMBER 1993

13 JAN 1994

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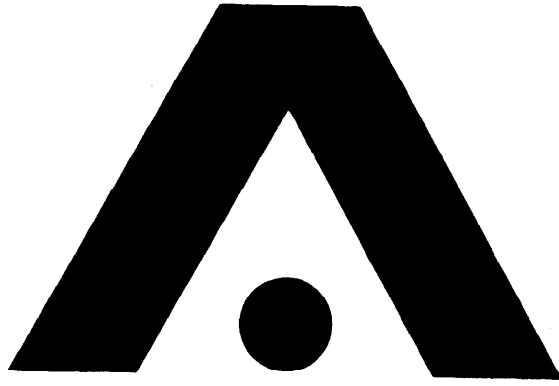
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AMDEL

CORE

SERVICES

MINERVA-1 GAS QUALITY TESTING

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1. SUMMARY

Quality testing was performed on gas from the wildcat well MINERVA-1 during a 24 hour production test on the 11th and 12th of April 1993. The methods used and results obtained are detailed in this report with a brief summary of results below. Water samples were also collected during the test and analysed for the parameters as reported.

1.1 OXYGEN

Pressure: 4816 kPag @ 26.9°C, Flow: 28.8 MMCFD
Date: 11/04/93, Time: 2311 h Cylinder #176

Oxygen: <0.01 % Mol Vol

1.2 HELIUM

Pressure: 4816 kPag @ 26.9°C, Flow: 28.8 MMCFD
Date: 11/04/93, Time: 2311 h Cylinder #176

Helium: 0.016 % Mol Vol

1.3 ARGON

Pressure: 4816 kPag @ 26.9°C, Flow: 28.8 MMCFD
Date: 11/04/93, Time: 2311 h Cylinder #176

Argon: <0.01 % Mol Vol

1.4 RADIOACTIVE MATERIAL

1.4.1 Date: 11/04/93, Time: 1430 h, Flow: 17 MMCFD

Radioactivity: <8 Becquerels/m³

1.4.2 Date: 11/04/93, Time: 2200 h, Flow: 28.8 MMCFD

Radioactivity: 15 Becquerels/m³

1.5 HYDROGEN SULPHIDE

1.5.1 5.5 MMCFD, 0419-1027 h 11/4/93

Hydrogen Sulphide: 0.4 mg/m³ (ppm w/v)
0.3 mL/m³ (ppm v/v)

1.5 HYDROGEN SULPHIDE (cont.)

1.5.2 17 MMCFD, 1126-1519 h 11/4/93

Hydrogen Sulphide: 0.5 mg/m³ (ppm w/v)
0.4 mL/m³ (ppm v/v)

1.5.3 23 MMCFD, 1611-2108 h 11/4/93

Hydrogen Sulphide: 0.5 mg/m³ (ppm w/v)
0.4 mL/m³ (ppm v/v)

1.5.4 28.8 MMCFD, 2232-0030 h + 0150-0330 h 11-12/4/93

Hydrogen Sulphide: 0.4 mg/m³ (ppm w/v)
0.3 mL/m³ (ppm v/v)

1.6 CARBONYL SULPHIDE

Pressure: 4816 kPag @ 26.9°C, Flow: 28.8 MMCFD
Date: 11/04/93, Time: 2258 h Cylinder #07

Carbonyl Sulphide: <0.1 ppm by vol

1.7 MERCAPTANS

1.7.1 5.5 MMCFD, 0419-1027 h 11/4/93

Mercaptans: < 0.1 mg/m³ (ppm w/v)
< 0.1 mL/m³ (ppm v/v)

1.7.2 17 MMCFD, 1126-1519 h 11/4/93

Mercaptans: < 0.1 mg/m³ (ppm w/v)
< 0.1 mL/m³ (ppm v/v)

1.7.3 23 MMCFD, 1611-2108 h 11/4/93

Mercaptans: < 0.1 mg/m³ (ppm w/v)
< 0.1 mL/m³ (ppm v/v)

1.7.4 28.8 MMCFD, 2232-0030 h + 0150-0330 h 11-12/4/93

Mercaptans: < 0.1 mg/m³ (ppm w/v)
< 0.1 mL/m³ (ppm v/v)

1.8 TOTAL SULPHUR

Pressure: 4816 kPag @ 26.9°C, Flow: 28.8 MMCFD
Date: 11/04/93, Time: 2256 h Cylinder #03

Total Sulphur: 0.5 mg/m³ (ppm w/v)

1.9 MERCURY

1.9.1 Method A

Date: 11/04/93, Time: 1739-2108 h Flow: 23 MMCFD

Mercury: 0.8 µg/m³ (0.8 g/m³x10⁶)

1.9.2 Method B

Date: 11/04/93, Time: 2142-2234 h Flow: 28.8 MMCFD

Mercury: > 0.1 µg/m³ NB: sample tubes overloaded

1.10 TRACE METALS

Pressure: 4816 kPag @ 26.9°C, Flow: 28.8 MMCFD
Date: 11/04/93, Time: 2302 h Cylinder #04

Trace Metals: Ca, Mg, Na, K < 0.001 mg/m³

Cr, As, Sn, Mo, Cd, Pb, Ba, Co,
V, Ni, Y, Sr, Bi, Se, Ag, Cu < 0.01 mg/m³

Zn < 0.05 mg/m³

Fe, SiO₂, P, Mn < 0.1 mg/m³

1.11 WATER ANALYSIS

See results in body of report, 13.

2. INTRODUCTION

Amdel Core Services Pty Ltd was requested to provide on-site testing, sampling and laboratory services to monitor the gas quality during production testing of the MINERVA-1 wildcat well.

The sampling and on-site testing was performed using a manifold located immediately downstream of the gas outlet from the HRS test separator.

The hydrogen sulphide determination was performed on-site in the mud logging unit.

The radioactive material determination was performed at Australian Radiation Laboratories in Melbourne.

The carbonyl sulphide determination was performed by SAGASCO in Adelaide.

All remaining tests were performed in the Frewville laboratories of Amdel Core Services Pty Ltd.

At the conclusion of the production test water samples were taken from the separator. These were analysed by Amdel Laboratories in Thebarton.

3. OXYGEN

3.1 METHOD

A sample of the gas is collected in a stainless steel cylinder and analysed by gas chromatography using a molecular sieve column and thermal conductivity detector.

3.2 RESULT

Pressure: 4816 kPag @ 26.9°C, Flow: 28.8 MMCFD
Date: 11/04/93, Time: 2311 h Cylinder #176

Oxygen: <0.01 % Mol Vol

4. HELIUM

4.1 METHOD

A sample of the gas is collected in a stainless steel cylinder and analysed by gas chromatography using a molecular sieve column with argon carrier gas and a thermal conductivity detector.

4.2 RESULT

Pressure: 4816 kPag @ 26.9°C, Flow: 28.8 MMCFD
Date: 11/04/93, Time: 2311 h Cylinder #176

Helium: 0.016 % Mol Vol

5. ARGON

5.1 METHOD

A sample of the gas is collected in a stainless steel cylinder and analysed by gas chromatography using a molecular sieve column at sub-ambient conditions and a thermal conductivity detector.

5.2 RESULT

Pressure: 4816 kPag @ 26.9°C, Flow: 28.8 MMCFD
Date: 11/04/93, Time: 2311 h Cylinder #176

Argon: <0.01 % Mol Vol

6. RADIOACTIVE MATERIAL

6.1 METHOD

A measured volume of gas is passed through a copper tube containing activated charcoal. The radioactivity from adsorbed radon and its decay products is then measured by Australian Radiation Laboratories and this is then back-calculated to determine the activity of the original sample.

6.2 RESULTS

6.2.1 Date: 11/04/93, Time: 1430 h, Flow: 17 MMCFD

Radioactivity: < 8 Becquerels/m³

6.2.2 Date: 11/04/93, Time: 2200 h, Flow: 28.8 MMCFD

Radioactivity: 15 Becquerels/m³

7. HYDROGEN SULPHIDE

7.1 METHOD

Hydrogen sulphide is absorbed into cadmium sulphate solution on site by bubbling a measured volume of gas through an absorber train. The H₂S content is then determined by an Iodometric Titration of the solution. The method follows ASTM D2385.

7.2. RESULTS

7.2.1 5.5 MMCFD, 0419-1027 h 11/4/93

Hydrogen Sulphide: $\frac{0.4 \text{ mg/m}^3}{0.3 \text{ mL/m}^3}$ (ppm w/v) (101.3 kPag @ 15°C)
(ppm v/v) (101.3 kPag @ 20°C)

7.2.2 17 MMCFD, 1126-1519 h 11/4/93

Hydrogen Sulphide: $\frac{0.5 \text{ mg/m}^3}{0.4 \text{ mL/m}^3}$ (ppm w/v) (101.3 kPag @ 15°C)
(ppm v/v) (101.3 kPag @ 20°C)

7.2.3 23 MMCFD, 1611-2108 h 11/4/93

Hydrogen Sulphide: $\frac{0.5 \text{ mg/m}^3}{0.4 \text{ mL/m}^3}$ (ppm w/v) (101.3 kPag @ 15°C)
(ppm v/v) (101.3 kPag @ 20°C)

7.2.4 28.8 MMCFD, 2232-0030 h + 0150-0330 h 11-12/4/93

Hydrogen Sulphide: $\frac{0.4 \text{ mg/m}^3}{0.3 \text{ mL/m}^3}$ (ppm w/v) (101.3 kPag @ 15°C)
(ppm v/v) (101.3 kPag @ 20°C)

8. CARBONYL SULPHIDE

8.1 METHOD

A sample of the gas is collected in a teflon lined stainless steel cylinder and analysed by gas chromatography in the laboratory.

8.2 RESULT

Pressure: 4816 kPag @ 26.9°C, Flow: 28.8 MMCFD
Date: 11/04/93, Time: 2258 h Cylinder #07

Carbonyl Sulphide: <0.1 ppm by vol

9. MERCAPTANS

9.1 METHOD

Mercaptans are absorbed into alkaline cadmium sulphate solution on site by bubbling a measured volume of gas through an absorber train. The mercaptan content is then determined by an Iodometric Titration of the solution. The method follows ASTM D2385.

9.2. RESULTS

9.2.1 5.5 MMCFD, 0419-1027 h 11/4/93

Mercaptans: $\frac{< 0.1 \text{ mg/m}^3}{< 0.1 \text{ mL/m}^3}$ (ppm w/v) (101.3 kPag @ 15°C)
(ppm v/v) (101.3 kPag @ 20°C)

9.2.2 17 MMCFD, 1126-1519 h 11/4/93

Mercaptans: $\frac{< 0.1 \text{ mg/m}^3}{< 0.1 \text{ mL/m}^3}$ (ppm w/v) (101.3 kPag @ 15°C)
(ppm v/v) (101.3 kPag @ 20°C)

9.2.3 23 MMCFD, 1611-2108 h 11/4/93

Mercaptans: $\frac{< 0.1 \text{ mg/m}^3}{< 0.1 \text{ mL/m}^3}$ (ppm w/v) (101.3 kPag @ 15°C)
(ppm v/v) (101.3 kPag @ 20°C)

9.2.4 28.8 MMCFD, 2232-0030 h + 0150-0330 h 11-12/4/93

Mercaptans: $\frac{< 0.1 \text{ mg/m}^3}{< 0.1 \text{ mL/m}^3}$ (ppm w/v) (101.3 kPag @ 15°C)
(ppm v/v) (101.3 kPag @ 20°C)

10. TOTAL SULPHUR

10.1 METHOD

A sample of gas is collected in a teflon-lined stainless steel cylinder and transported to the laboratory. The sample is combusted and the waste gases absorbed into solution where oxides of sulphur are oxidised to sulphates as per ASTM D1072. The solution is then analysed by ion chromatography for sulphate concentration.

10.2 RESULT

Pressure: 4816 kPag @ 26.9°C, Flow: 28.8 MMCFD
Date: 11/04/93, Time: 2256 h Cylinder #03

Total Sulphur: 0.5 mg/m³ (ppm w/v)

11. MERCURY

11.1A METHOD

A measured volume of gas is bubbled through acidified 0.5% potassium permanganate solution. The potassium permanganate is decolourised with 20% hydroxylamine hydrochloride and the mercury is evolved by reduction with stannous chloride and measured by cold vapour AAS (Atomic Absorption Spectrometry).

11.2A RESULT

Date: 11/04/93, Time: 1739-2108 h Flow: 23 MMCFD

Mercury: 0.8 µg/m³ (0.8 g/m³x10⁶)

11.1B METHOD

The mercury is trapped onto silver lint in a silica tube as the gas is passed through the tube within a stainless steel, high-pressure vessel. In the laboratory the mercury is released by heat and passed through a tube containing gold thread where it is trapped while other materials pass through. The mercury vapour is then released from the gold by heating and the concentration of mercury determined by absorption at 253.7 nm in the beam of a flameless atomic absorption spectrophotometer. This conforms to Standard ISO/DIS 6978 Method B.

11.2B RESULT

Date: 11/04/93, Time: 2142-2234 h Flow: 28.8 MMCFD

Mercury: > 0.1 µg/m³ NB: sample tubes overloaded

12. TRACE METALS

12.1 METHOD

A sample of gas is collected in a teflon-lined stainless steel cylinder and transported to the laboratory.

The gas is bubbled through 1N nitric acid. The acid solution is then analysed by inductively coupled plasma (ICP) spectroscopy for the trace elements listed below.

12.2 RESULT

Pressure: 4816 kPag @ 26.9°C, Flow: 28.8 MMCFD

Date: 11/04/93, Time: 2302 h Cylinder #04

<i>Trace Metals:</i>	Calcium	< 0.001	mg/m ³
	Magnesium	< 0.001	"
	Sodium	< 0.001	"
	Potassium	< 0.001	"
	Chromium	< 0.01	mg/m ³
	Arsenic	< 0.01	"
	Tin	< 0.01	"
	Molybdenum	< 0.01	"
	Cadmium	< 0.01	"
	Lead	< 0.01	"
	Barium	< 0.01	"
	Cobalt	< 0.01	"
	Vanadium	< 0.01	"
	Nickel	< 0.01	"
	Yttrium	< 0.01	"
	Strontium	< 0.01	"
	Bismuth	< 0.01	"
	Selenium	< 0.01	"
	Silver	< 0.01	"
	Copper	< 0.01	"
	Zinc	< 0.05	mg/m ³
	Iron	< 0.1	mg/m ³
	Silica	< 0.1	"
	Phosphorous	< 0.1	"
	Manganese	< 0.1	"

13. WATER ANALYSIS

13.1 METHOD

Water samples were allowed to degas then split into three subsamples; one was left natural, one preserved at pH 2 with nitric acid and one preserved at pH 9 with sodium hydroxide.

The natural sample was used for the standard water analysis, pH, anions by ion chromatography and total dissolved solids at 180°C. The filtered natural sample was used for specific gravity and resistivity measurements.

The pH 2 sample was used for standard cations plus iron, strontium and barium by ICP.

The pH 9 sample was used for the sulphide determination.

13.2 RESULTS

Two sets of water samples were collected from the separator sight glass drain at 0220 and 0240 hours 12/4/93 near the end of the 24 hour production test.

The water results are presented on the following three pages.

Water Analysis Report

Job No. 3AD1425

Method WAT 2 Page W2

Sample ID. Minerva 0240 Hrs.

Chemical Composition				Derived Data			
		mg/L	me/L				mg/L
Cations				Total Dissolved Solids			
Calcium	(Ca)	11.0	0.55	A. Based on E.C.			13975
Magnesium	(Mg)	19.0	1.56	B. Calculated (HCO3=CO3)			14140
Sodium	(Na)	361.0	15.70				
Potassium	(K)	6958.0	177.95				
Anions				Total Hardness			
Hydroxide	(OH)			Carbonate Hardness			106
Carbonate	(CO3)			Non-Carbonate Hardness			106
Bi-Carbonate	(HCO3)	59.8	0.98	Total Alkalinity			525
Sulphate	(SO4)	120.0	2.50	(Each as CaCO3)			
Chloride	(Cl)	6626	186.65	Totals and Balance			
Nitrate	(NO3)	15.0	0.24	Cations (me/L)	195.8	Diff=	5.40
				Anions (me/L)	190.4	Sum =	386.14
Other Analyses				ION BALANCE (Diff*100/Sum) =			
				1.40%			
				Sodium / Total Cation Ratio			
				8.0%			
Remarks							
Reaction - pH				6.4			
Conductivity (E.C)				21000			
(micro -S/cm at 25°C)							
Resistivity Ohm.M at 25°C				0.48			
Note:				mg/L = Milligrams per litre			
				me/L = MilliEqivs. per litre			

Name: Paul Marty
 Address: AMDEL Core Services
 P.O. Box 338
 Torrensville. SA.

Date Collected 12-04-93
 Date Received 20-04-93
 Collected by Client

Job No.3AD1425

Page W3

Sample	0220	0240	Method No.
TDS (180 Deg.C.)	36460	14645	WAT 2G
Specific Gravity (g/mL)	1.017	1.014	WAT 26
Sulphide (mg/L)	3.62	8.44	WAT 20
Iron as Fe (mg/L)	500	436	WAT 3E
Strontium as Sr (mg/L)	1.17	0.50	WAT 3M
Barium as Ba (mg/L)	2.49	2.53	WAT 3E

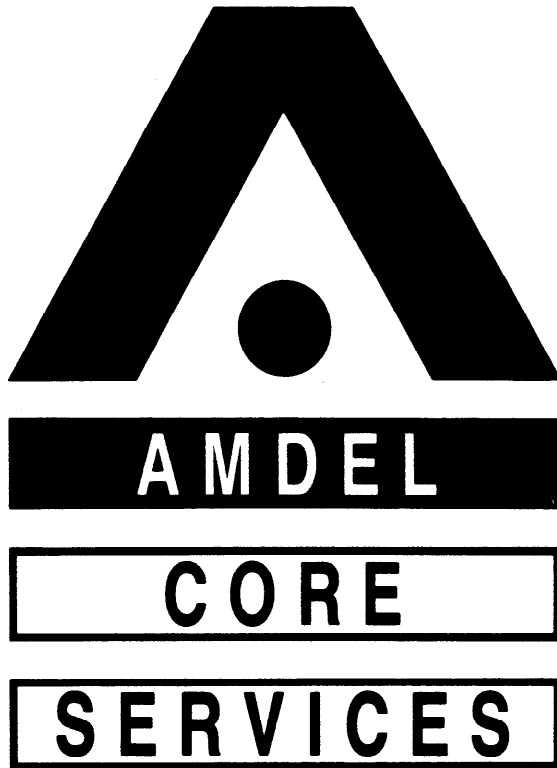
14. DISCUSSION and CONCLUSIONS

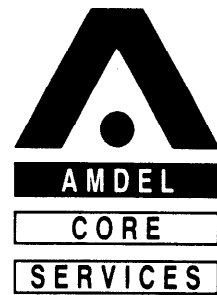
The results of the above tests on the Minerva-1 gas as sampled on the 11th and 12th April 1993 show a relatively high mercury content with the remainder of the components tested being low and within typically acceptable ranges. The water samples appear to be contaminated with KCl brine.

The concentration of both mercury and hydrogen sulphide may increase over a longer period of production as the reactive surfaces of the tubing and production train become saturated with these compounds.

OTW/1/MINERVA-1/004

(ENCLOSURE)

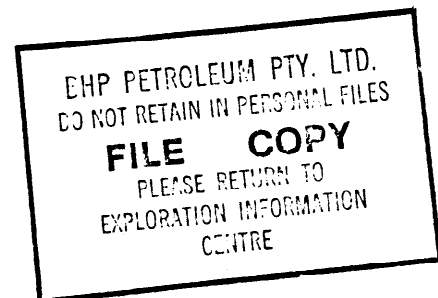




20 May 1993

BHP Petroleum Pty Ltd
GPO Box 1911R
MELBOURNE VIC 3001

Attention: Jim Phipps



REPORT: RG-205

CLIENT REFERENCE: S/O No. 1632

MATERIAL: Core - Minerva No. 1

LOCALITY: Victoria

WORK REQUIRED: Conventional Core Analysis

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

CHRIS GAUGHAN
on behalf of Amdel Core Services Pty Ltd

Amdel Core Services Pty Limited shall not be liable or responsible for any loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from any information or interpretation given in this report. In no case shall Amdel Core Services Pty Ltd be responsible for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report.

13 May 1993

BHP Petroleum Pty Limited
120 Collins Street
MELBOURNE VIC 3000

Attention: Jim Phipps

FINAL DATA REPORT - CONVENTIONAL CORE ANALYSIS

REPORT: RG202 - Minerva No.1

LOGISTICS

Three cores were collected from Portland, Victoria on May 20, 1993. Core intervals are as follows: Core 1, 1821.00 - 1824.04m (3.04m), core 2, 1828.00 - 1841.27m (13.27m) and core 3, 1842.50 - 1846.87m (4.37m).

INTRODUCTION

The following report includes tabular data of permeability to air, helium injection porosity, summation of fluids porosity, residual fluid saturations and density determinations. Data presented graphically includes a continuous core gamma log, a core log plot and a porosity versus permeability to air plot.

STUDY AIMS

The analyses were performed with the following aims:

1. To provide depth correlation through provision of a continuous core gamma log over the cored interval.
2. To provide quick (16 hour turnaround) air permeability, saturation, (S_o & S_w) and summation of fluids porosity data.
3. To provide 72 hour air permeability, helium injection porosity and density data.
4. To determine the effect of overburden stress on air permeability and helium injection porosity data.
5. To examine the effect of heterogeneities and 'scale' on measured air permeability and helium injection porosity data through determination of these properties on whole core sections. To identify and quantify vertical permeability barriers.
6. To confirm whether permeability is directionally controlled.
7. To provide information on the strength of the formation through Brinell Hardness measurements.
8. To provide quick API gravity measurements on retorted oil.

SAMPLING

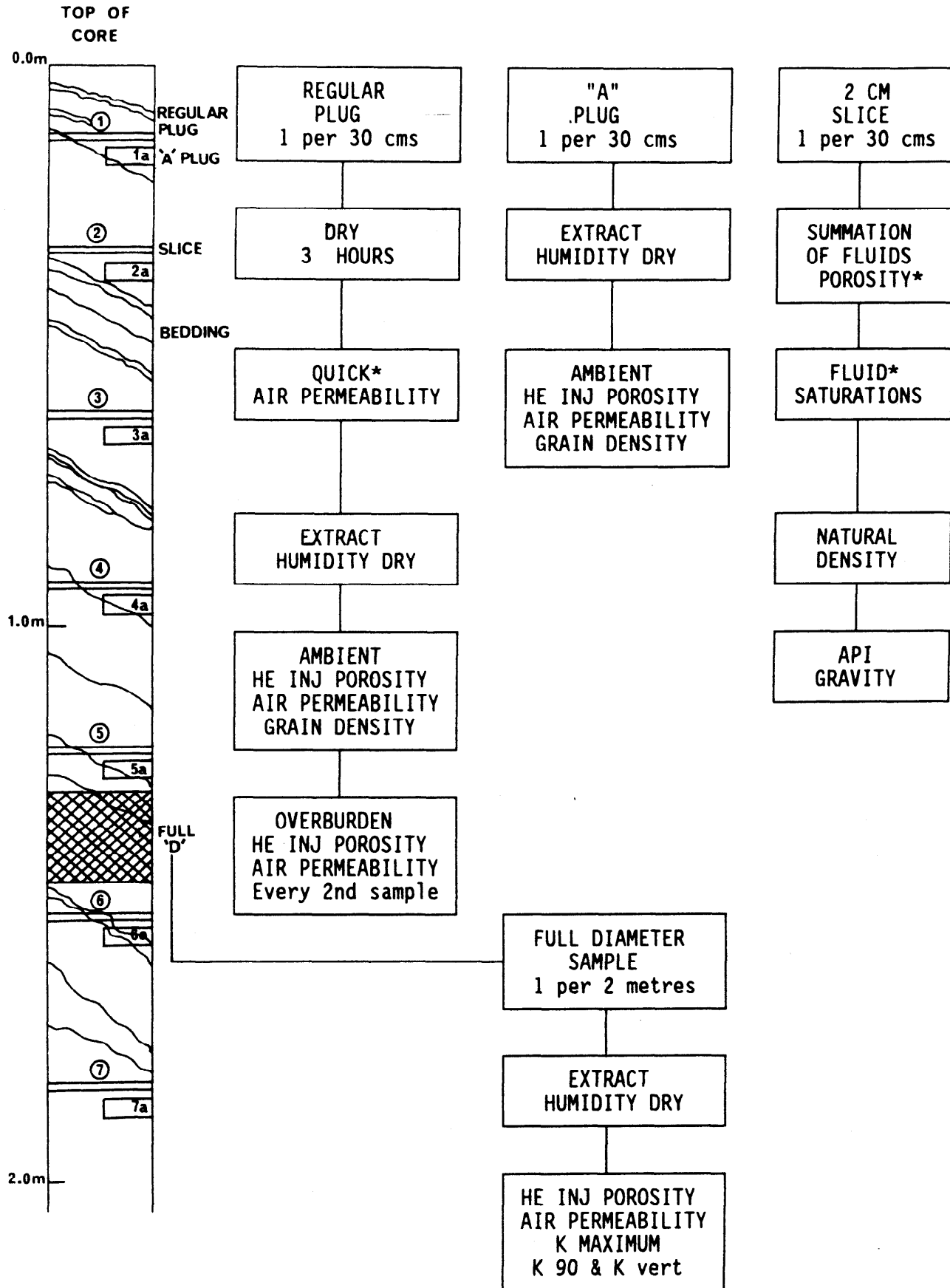
The core was sampled as follows:

- A. 2cm slices were taken across the core at 30cm intervals for fluid saturation and summation of fluids porosity measurements.
- B. 1.5" diameter core plugs were drilled from the whole core at 30cm intervals using KCl brine as lubricant. The core was oriented such that the plugs were drilled parallel to the bedding. These plugs are designated as the 'regular' plugs.
- C. Further 1.5" diameter plugs were taken from the same intervals but with the core oriented such that the plugs were drilled perpendicular to the 'regular' plug. These plugs are designated as the 'A' plugs.
- D. All 'regular' and 'A' plugs were trimmed and offcuts retained. The offcuts were dispatched immediately to BHP Petroleum for viewing and possible selection of petrology/palaeontology samples.

This sampling procedure is illustrated along with an analytical flow chart on the following page for easy reference.

The core was sampled and analysed as follows:

ANALYTICAL FLOW CHART



* Data reported within 16 hours of receipt of core

1. CONTINUOUS CORE GAMMA

The core was laid out according to depth markings, and a continuous core gamma trace produced by passing the core beneath a gamma radiation detector. The detector is protected from extraneous radiation by a lead tunnel. The detector signal is amplified and digitised to produce a gamma trace for comparison with the downhole log.

2. FLUID SATURATIONS AND SUMMATION OF FLUIDS POROSITY

The 2cm slices taken at 30cm intervals were used for these analyses. Approximately 100 gms of material was taken from the centre of the slice, crushed and placed in a thermostatically controlled high temperature retort. The retort is programmed to heat initially to 180°C. At this temperature pore water is vaporised, condensed and recovered in receiving tubes. When water production ceases at 180°C the retort temperature is increased to 650°C. At this temperature residual hydrocarbons and remaining bound water are recovered. Using this procedure the volumes of oil and water in a known weight of core material can be determined.

To determine the gas volume, approximately 40g of fresh core is taken from the same slice, weighed and placed in a mercury displacement pump to determine bulk volume. Mercury is then injected into the sample at 750psig (5200 kpa). The amount of mercury injected corresponds to the gas volume of the sample. From these measurements the summation of fluids porosity is calculated and oil and water saturations expressed as a percentage of the porosity.

3. NATURAL DENSITY

The natural density of the sample is obtained by dividing the weight of the fresh sample used for the gas volume measurement by its bulk volume.

4. SAMPLE EXTRACTION AND DRYING

After sampling as described in section 2B the 'regular' set of plugs were dried in an oven at 80°C for 3 hours. After the quick permeability measurement the 'regular' and 'A' plugs were placed in a soxhlet extractor to remove hydrocarbons. When the toluene in the Soxhlet is no longer discoloured the core plugs were removed and checked under ultraviolet light to ensure all hydrocarbons had been removed.

After cleaning, all plugs were dried in a controlled humidity environment at 60°C and 40% relative humidity. The plugs were stored in an airtight plastic container and allowed to cool to room temperature before analysis.

5. AIR PERMEABILITY

Air permeability was determined on the 'regular' and 'A' set plugs. The plugs are placed in a Hassler cell at a confining pressure of 250 psig (1720 kpa). This pressure is used to prevent bypassing of air around the sample when the measurement is made. During the measurement a known air pressure is applied to the upstream face of the sample, creating a flow of air through the sample. Permeability for each sample is then calculated using Darcy's Law through knowledge of the upstream pressure and flow rate during the test, the viscosity of air and the plug dimensions.

6. HELIUM INJECTION POROSITY

The helium injection porosity of the extracted and dried 'regular' and 'A' set core plugs was determined as follows. The plugs were sealed in a matrix cup. A known volume of helium was held at 100psi reference pressure and then introduced to the cup. From the resultant pressure change the unknown grain volume was calculated using Boyles law, i.e $P_1V_1 = P_2V_2$.

The bulk volume of the plugs was determined by mercury immersion. The difference between the grain volume and the bulk volume is the pore volume and from this the porosity is calculated as the volume percentage of pores with respect to the bulk volume. The porosity calculated using this technique is an effective porosity.

7. APPARENT GRAIN DENSITY

The apparent grain density is determined by dividing the weight of the plug by the grain volume determined from the helium injection porosity measurement.

8. POROSITY AND PERMEABILITY AT OVERBURDEN PRESSURE

To determine the porosity and permeability of the core plug at overburden pressure, the sample is placed in a heavy duty Hassler sleeve. The assembly is loaded into a thick walled hydrostatic cell capable of withstanding the simulated reservoir overburden stress. After loading, helium injection porosity and air permeability was determined at simulated reservoir load conditions. The overburden stress values used in these analyses were supplied by BHP Petroleum.

9. BRINELL HARDNESS

Where possible, five readings (in a crossed pattern) are taken at each sample point. A pre-load of 10 kgs and a constant load of 20 kgs are applied at the load point using the 3.175 mm indenter; the depth of indentation is measured and this is used to obtain the Brinell Hardness. An average is given for the five points at each sample depth. Using this technique, the minimum attainable Brinell Hardness reading is 4.

10. ROLLING AND SPECIFIED AVERAGES

These averages of both Helium injection porosity and permeability are obtained by using a "rolling" three (3) point method. In the case of porosity a weighted arithmetic average is used:

$$\phi_{av(i+1)} = [\phi_i + 2\phi_{(i+1)} + \phi_{(i+2)}] / 4$$

In the case of permeability a weighted geometric average is used:

$$K_{av(i+1)} = 10^{[(\log_{10} K_i + 2 \log_{10} K_{(i+1)} + \log_{10} K_{(i+2)}) / 4]}$$

At any sample point, excluding the first and last, a rolling average is obtained by using the value at the specified sample point, the value before it and the value of the sample point after it. In the cases of the first and last sample points, only 2 sample points are used.

Using porosity as an example, the average of the first data point is obtained from the formula:

$$\phi_{av(i)} = [2\phi_i + \phi_{(i+1)}] / 3$$

The average at the final data point is obtained by:

$$\phi_{av(f)} = [\phi_{(f-1)} + 2\phi_{(f)}] / 3$$

The same method is used for permeability averages. At any break in the data the rolling averages are "re-started".

<u>Data Key:</u>	ϕ	=	porosity
	K	=	permeability
	i	=	initial
	av	=	average
	f	=	final

Specified averages are normal arithmetic averages which can be taken over any specified section of the core, as well as over the whole core.

On completion of the analysis the core was slabbed into one half, and two quarter slabs using water as the lubricating medium. One quarter was packed and shipped to the BMR, Canberra. The remaining quarter was packed and shipped to the Victorian Department of Mines and Energy. The one half slab was photographed under both white light and ultra-violet light at a 5m format and under white light at a 30cm(1:1) format. This core was then packed and shipped to the BHPP core store in Melbourne.

We have enjoyed working with BHPP and look forward to working with you again in the near future.

END OF REPORT.

Amdel Core Services
 Petroleum Reservoir Engineering Data

PO Box 5523 Brendale Q 4500
 Tel : (07) 298-5272

CORE ANALYSIS FINAL REPORT

Company : BHP PETROLEUM PTY LTD
 Well : Minerva No.1
 Field : Wildcat Date : 21/03/93
 Core Interval : Core 1: 1821.00 - 1824.04m
 Core Interval : Core 2: 1828.00 - 1841.27m
 Core Interval : Core 3: 1842.50 - 1846.87m
 File No. : RG205
 Country : AUSTRALIA State : Victoria

Sample No.	Depth	Porosity		Density		Permeability (md)		Summation of Fluids			Remarks
		HeInj	RollPor	Nat. Grain	KH	Roll KH	Por	Oil	Water	See Below	
1	1821.15	19.5	19.7	2.20	2.65	3839	3867	22.6	0.0	43.9	C#1
2	1821.37	20.1	19.3	2.16	2.65	3924	3303	26.1	0.0	51.2	
3	1821.67	17.5	18.4	2.43	2.71	2013	1525	17.6	0.0	42.7	
4	1821.97	18.6	17.5	2.57	2.94	340	724	15.0	0.0	36.0	
5	1822.27	15.4	16.3	2.49	2.70	1180	1224	14.8	0.0	43.6	
6	1822.57	15.9	14.9	2.26	2.66	4729	1327	21.2	0.0	43.6	SP
7	1822.87	12.4	13.4	2.45	2.65	117	682	12.7	0.0	36.7	
8	1823.17	12.8	13.5	2.34	2.65	3322	1211	16.0	0.0	33.6	
9	1823.47	15.8	16.2	2.30	2.65	1660	1562	17.3	0.0	30.5	
10	1823.77	20.4	19.1	2.22	2.65	651	633	21.0	0.0	39.2	
11	1824.00	19.6	19.8	2.15	2.64	229	516	23.8	0.0	34.4	SP B#1
12	1828.15	19.5	19.6	2.20	2.65	2076	1309	25.0	0.0	44.8	C#2
13	1828.37	19.7	19.3	2.18	2.65	2976	2106	22.4	0.0	38.9	
14	1828.67	18.1	18.2	2.24	2.65	1070	1624	19.9	0.0	38.3	
15	1828.97	16.7	16.8	2.25	2.65	2041	1703	19.3	0.0	32.7	
16	1829.27	15.8	15.2	2.30	2.65	1888	1922	17.1	0.0	33.6	
17	1829.57	12.3	12.7	2.44	2.66	1874	1458	11.1	0.0	39.6	
18	1829.87	10.3	10.4	2.37	2.65	681	1284	13.8	0.0	35.9	
19	1830.17	8.8	9.5	2.43	2.66	3128	1493	13.1	0.0	37.1	
20	1830.47	10.2	10.1	2.43	2.68	746	1445	12.3	0.0	33.7	
21	1830.77	11.3	12.3	2.30	2.65	2502	1301	17.3	0.0	39.9	
22	1831.10	16.5	13.9	2.29	2.65	613	881	18.0	0.0	35.5	
23	1831.40	11.4	12.8	2.31	2.65	641	595	17.5	0.0	34.3	
24	1831.70	11.8	11.9	2.36	2.65	496	577	15.0	0.0	31.5	
25	1832.00	12.6	12.0	2.39	2.66	701	564	14.3	0.0	35.0	
26	1832.30	10.9	11.4	2.34	2.66	416	478	16.3	0.0	32.9	
27	1832.60	11.1	10.6	2.40	2.66	432	202	13.1	0.0	34.7	
28	1832.90	9.3	10.4	2.39	2.68	21.3	70.9	14.4	0.0	34.9	VF
29	1833.20	11.9	10.6	2.37	2.65	129	22.5	15.3	0.0	43.2	
30	1833.50	9.4	11.4	2.40	2.66	0.72	6.3	10.9	0.0	44.1	
31	1833.80	14.7	14.1	2.25	2.65	23.3	15.3	21.3	0.0	47.4	
32	1834.10	17.7	16.7	2.26	2.65	139	107	20.3	0.0	46.7	
33	1834.40	16.6	16.1	2.22	2.65	288	216	22.0	0.0	43.3	
34	1834.70	13.5	15.0	2.28	2.65	188	410	19.8	0.0	43.9	
35	1835.00	16.3	15.1	2.27	2.65	2766	673	19.1	0.0	38.2	
36	1835.30	14.1	15.8	2.28	2.69	143	366	20.5	0.0	40.1	
37	1835.60	18.6	17.3	2.24	2.66	318	322	20.4	0.0	45.1	
38	1835.90	17.9	18.4	2.23	2.65	743	607	21.9	0.0	38.7	
39	1836.20	19.2	18.9	2.18	2.66	773	846	25.4	0.0	42.9	
40	1836.50	19.4	18.6	2.18	2.66	1154	927	22.9	0.0	38.0	

BHP PETROLEUM PTY LTD :
 Minerva No.1 : Analysis by
 Amdel Core Services

Sample No.	Depth	Porosity		Density		Permeability (md)		Summation of Fluids			Remarks See Below
		HeInj	RollPor	Nat. Grain		KH	Roll KH	Por	Oil	Water	
41	1836.80	16.4	13.6	2.42	2.66	716	167	12.6	0.0	40.3	
42	1837.15	2.2	5.5		2.54	1.31	2.67				NO SAMPLE
43	1838.10	1.1	1.4	2.38	2.45	0.04	0.08	5.1	0.0	46.7	
44	1839.10	1.2	2.2	2.50	2.54	0.02	0.03	7.5	0.0	70.2	
45	1839.40	5.2	4.4	2.47	2.56	0.07	0.11	7.9	0.0	72.2	
46	1839.70	6.0	4.8	2.48	2.53	1.14	0.43	9.1	0.0	70.5	
47	1840.00	1.8	5.8	2.43	2.49	0.37	1.81	8.0	0.0	76.1	
48	1840.30	13.4	11.3	2.29	2.65	68.1	13.1	16.5	0.0	23.6	SP
49	1840.60	16.4	16.2	2.26	2.65	17.2	50.3	20.3	0.0	44.5	
50	1840.90	18.7	17.7	2.30	2.65	318	129	19.1	0.0	57.8	
51	1841.20	16.8	16.3	2.25	2.66	157	273	17.5	0.0	38.6	B#2
52	1842.80	12.9	14.6	2.30	2.65	709	824	16.4	0.0	23.7	C#3
53	1843.10	15.7	15.3	2.25	2.65	5854	4200	20.5	0.0	36.2	
54	1843.40	17.0	15.8	2.34	2.65	12810	6113	16.3	0.0	32.9	
55	1843.70	13.4	14.8	2.30	2.65	1454	1817	16.0	0.0	27.3	
56	1844.05	15.2	14.0	2.24	2.65	402	306	19.8	0.0	36.2	
57	1844.30	12.1	13.8	2.28	2.65	37.1	138	17.2	0.0	30.5	
58	1844.60	15.8	15.4	2.26	2.65	647	397	17.2	0.0	27.6	
59	1844.90	17.7	16.2	2.22	2.65	1601	1199	18.8	0.0	29.5	
60	1845.22	13.5	15.1	2.29	2.65	1247	1936	17.8	0.0	36.2	
61	1845.52	15.7	15.6	2.30	2.65	5641	3676	16.5	0.0	39.0	
62	1845.82	17.6	16.5	2.28	2.65	4598	3863	17.1	0.0	38.6	
63	1846.12	15.1	16.4	2.24	2.65	1867	2563	19.3	0.0	37.1	
64	1846.42	17.7	16.2	2.23	2.65	2693	2076	20.7	0.0	37.6	
65	1846.72	14.4	15.5	2.29	2.65	1371	1717	17.1	0.0	36.1	B#3

VF = Vertical Fracture; HF = Horizontal Fracture; MP = Mounted Plug; SP= Short Plug
 C# = Top of Core; B# = Bottom of Core; OWC = Probable Oil/Water Contact
 Tr = Probable Transition Zone; GC = Probable Gas Cap

Amdel Core Services Pty Ltd shall not be liable or responsible for any loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from any information or interpretation given in this report. In no case shall Amdel Core Services Pty Ltd be responsible for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report

CORE ANALYSIS FINAL REPORT

Company : BHP PETROLEUM PTY LTD
 Well : Minerva No.1
 Field : Wildcat Date : 21/03/93
 Core Interval : Core 1: 1821.00 - 1824.04m
 Core Interval : Core 2: 1828.00 - 1841.27m
 Core Interval : Core 3: 1842.50 - 1846.87m
 File No. : RG205
 Country : AUSTRALIA State : Victoria

Sample No.	Depth	Porosity		Density Nat. Grain	Permeability (md)		Summation of Fluids			Remarks
		HeInj	RollPor		KH	Roll KH	Por	Oil	Water	
1A	1821.15	19.7	19.2	2.65	2160	1929				C#1 SP
2A	1821.37	18.2	17.7	2.65	1539	1581				
3A	1821.67	14.6	14.8	2.84	1223	896				
4A	1821.97	11.6	12.7	2.79	280	407				
5A	1822.27	13.1	13.8	2.67	285	499				
6A	1822.57	17.4	15.0	2.69	2744	1389				
8A	1823.17	11.9	15.2	2.65	1736	2363				
12A	1828.15	19.5	17.5	2.65	3774	2442				C#2
13A	1828.37	19.0	18.9	2.65	1438	2051				
14A	1828.67	17.9	17.9	2.65	2267	2140				
15A	1828.97	16.7	16.5	2.65	2839	2443				
16A	1829.27	14.6	14.6	2.66	1950	2100				
17A	1829.57	12.4	12.6	2.65	1803	2028				
18A	1829.87	11.1	11.1	2.66	2670	1868				
19A	1830.17	9.9	10.2	2.66	948	1260				
20A	1830.47	9.7	10.9	2.69	1049	1255				
21A	1830.77	14.4	13.5	2.65	2380	1246				
22A	1831.10	15.3	14.6	2.65	406	756				
23A	1831.40	13.4	13.5	2.65	833	629				
24A	1831.70	12.0	12.2	2.66	558	581				
25A	1832.00	11.5	11.7	2.71	438	478				
26A	1832.30	11.6	11.5	2.66	488	473				
27A	1832.60	11.4	11.3	2.67	482	405				
28A	1832.90	10.8	12.0	2.67	239	355				
29A	1833.20	14.8	14.0	2.65	578	221				
30A	1833.50	15.6	16.2	2.65	29.9	102				
31A	1833.80	18.8	18.1	2.65	210	160				
32A	1834.10	19.0	19.4	2.66	498	535				
33A	1834.40	20.8	18.7	2.65	1568	795				
34A	1834.70	14.3	16.9	2.66	326	851				
35A	1835.00	18.3	17.3	2.66	3147	928				
36A	1835.30	18.3	18.3	2.66	230	386				
37A	1835.60	18.2	18.1	2.66	134	205				
38A	1835.90	17.7	18.3	2.66	426	388				
39A	1836.20	19.5	19.4	2.66	937	961				
40A	1836.50	20.7	18.6	2.65	2274	797				
41A	1836.80	13.4	12.4	2.68	83.1	115				
42A	1837.15	2.0	5.0	1.51	11.1	5.9				
43A	1838.10	2.6	2.2	2.52	0.12	0.47				

BHP PETROLEUM PTY LTD :
 Minerva No.1 : Analysis by
 Andel Core Services

Sample No.	Depth	Porosity		Density	Permeability (md)		Summation of Fluids			Remarks
		HeInj	RollPor		Nat. Grain	KH	Roll KH	Por	Oil	
44A	1839.10	1.7	2.7	2.56	0.30	0.14				
45A	1839.40	4.8	3.5	2.57	0.04	0.18				
46A	1839.70	2.7	3.0	2.48	2.43	0.65				VF
47A	1840.00	1.8	3.1	2.53	0.81	1.27				
48A	1840.30	5.9	7.3	2.60	1.68	2.86				
49A	1840.60	15.7	12.5	2.63	29.6	8.3				
50A	1840.90	12.7	14.5	2.63	3.25	18.2				
51A	1841.20	16.9	15.5	2.66	347	154				B#2
52A	1842.80	15.3	15.4	2.65	1439	1381				C#3
53A	1843.10	14.2	15.0	2.65	5052	4792				
54A	1843.40	16.1	15.5	2.65	14362	8351				
55A	1843.70	15.7	15.4	2.65	4668	5502				
56A	1844.05	13.9	14.4	2.65	2929	3309				
57A	1844.30	14.0	14.7	2.65	2994	3207				
58A	1844.60	16.8	16.4	2.65	4031	3713				
59A	1844.90	18.0	16.5	2.65	3910	2500				
60A	1845.22	13.1	14.6	2.65	634	1308				
61A	1845.52	14.1	14.2	2.65	1865	1596				
62A	1845.82	15.3	15.1	2.65	2948	2781				
63A	1846.12	15.7	16.2	2.65	3695	4308				
64A	1846.42	18.2	16.9	2.65	8563	5365				
65A	1846.72	15.5	16.4	2.65	3058	4310				B#3

VF = Vertical Fracture; HF = Horizontal Fracture; MP = Mounted Plug; SP= Short Plug
 C# = Top of Core; B# = Bottom of Core; OWC = Probable Oil/Water Contact
 Tr = Probable Transition Zone; GC = Probable Gas Cap

Andel Core Services Pty Ltd shall not be liable or responsible for any loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from any information or interpretation given in this report. In no case shall Andel Core Services Pty Ltd be responsible for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report

Amdel Core Services
 Petroleum Reservoir Engineering Data

PO Box 5523 Brendale Q 4500
 Tel : (07) 298-5272

CORE ANALYSIS FINAL REPORT

Company : BHP PETROLEUM PTY LTD
 Well : Minerva No.1
 Field : Wildcat
 Core Interval : Core 1: 1821.00 - 1824.04m
 Core Interval : Core 2: 1828.00 - 1841.27m
 Core Interval : Core 3: 1842.50 - 1846.87m
 File No. : RG205
 Country : AUSTRALIA

Date : 21/03/93

State : Victoria

Sample No.	Depth	Porosity		Density		Permeability (md)		Summation of Fluids			Remarks
		HeInj	RollPor	Nat. Grain		KH	Roll KH	Por	Oil	Water	
1	1821.15	19.5	19.5	2.20	2.65	3839	3867	22.6	0.0	43.9	C#1
1A	1821.15	19.7			2.65	2160					SP
2	1821.37	20.1	18.5	2.16	2.65	3924	3303	26.1	0.0	51.2	
2A	1821.37	18.2			2.65	1539					
3	1821.67	17.5	16.6	2.43	2.71	2013	1525	17.6	0.0	42.7	
3A	1821.67	14.6			2.84	1223					
4	1821.97	18.6	15.2	2.57	2.94	340	724	15.0	0.0	36.0	
4A	1821.97	11.6			2.79	280					
5	1822.27	15.4	15.1	2.49	2.70	1180	1224	14.8	0.0	43.6	
5A	1822.27	13.1			2.67	285					
6	1822.57	15.9	15.0	2.26	2.66	4729	1327	21.2	0.0	43.6	SP
6A	1822.57	17.4			2.69	2744					
7	1822.87	12.4	13.5	2.45	2.65	117	682	12.7	0.0	36.7	
8	1823.17	12.8	13.3	2.34	2.65	3322	1211	16.0	0.0	33.6	
8A	1823.17	11.9			2.65	1736					
9	1823.47	15.8	16.1	2.30	2.65	1660	1562	17.3	0.0	30.5	
10	1823.77	20.4	19.1	2.22	2.65	651	633	21.0	0.0	39.2	
11	1824.00	19.6	19.8	2.15	2.64	229	516	23.8	0.0	34.4	SP B#1
12	1828.15	19.5	19.5	2.20	2.65	2076	1309	25.0	0.0	44.8	C#2
12A	1828.15	19.5			2.65	3774					
13	1828.37	19.7	19.1	2.18	2.65	2976	2106	22.4	0.0	38.9	
13A	1828.37	19.0			2.65	1438					
14	1828.67	18.1	18.0	2.24	2.65	1070	1624	19.9	0.0	38.3	
14A	1828.67	17.9			2.65	2267					
15	1828.97	16.7	16.7	2.25	2.65	2041	1703	19.3	0.0	32.7	
15A	1828.97	16.7			2.65	2839					
16	1829.27	15.8	14.9	2.30	2.65	1888	1922	17.1	0.0	33.6	
16A	1829.27	14.6			2.66	1950					
17	1829.57	12.3	12.7	2.44	2.66	1874	1458	11.1	0.0	39.6	
17A	1829.57	12.4			2.65	1803					
18	1829.87	10.3	10.8	2.37	2.65	681	1284	13.8	0.0	35.9	
18A	1829.87	11.1			2.66	2670					
19	1830.17	8.8	9.9	2.43	2.66	3128	1493	13.1	0.0	37.1	
19A	1830.17	9.9			2.66	948					
20	1830.47	10.2	10.5	2.43	2.68	746	1445	12.3	0.0	33.7	
20A	1830.47	9.7			2.69	1049					
21	1830.77	11.3	12.9	2.30	2.65	2502	1301	17.3	0.0	39.9	
21A	1830.77	14.4			2.65	2380					
22	1831.10	16.5	14.3	2.29	2.65	613	881	18.0	0.0	35.5	
22A	1831.10	15.3			2.65	406					

BHP PETROLEUM PTY LTD :
 Minerva No.1 : Analysis by
 Amdel Core Services

Sample No.	Depth	Porosity		Nat. Grain	Density	Permeability (md)		Summation of Fluids			Remarks
		HeInj	RollPor			KH	Roll KH	Por	Oil	Water	
23	1831.40	11.4	13.2	2.31	2.65	641	595	17.5	0.0	34.3	
23A	1831.40	13.4			2.65	833					
24	1831.70	11.8	12.1	2.36	2.65	496	577	15.0	0.0	31.5	
24A	1831.70	12.0			2.66	558					
25	1832.00	12.6	11.9	2.39	2.66	701	564	14.3	0.0	35.0	
25A	1832.00	11.5			2.71	438					
26	1832.30	10.9	11.5	2.34	2.66	416	478	16.3	0.0	32.9	
26A	1832.30	11.6			2.66	488					
27	1832.60	11.1	11.0	2.40	2.66	432	202	13.1	0.0	34.7	
27A	1832.60	11.4			2.67	482					
28	1832.90	9.3	11.2	2.39	2.68	21.3	70.9	14.4	0.0	34.9	VF
28A	1832.90	10.8			2.67	239					
29	1833.20	11.9	12.4	2.37	2.65	129	22.5	15.3	0.0	43.2	
29A	1833.20	14.8			2.65	578					
30	1833.50	9.4	13.8	2.40	2.66	0.72	6.3	10.9	0.0	44.1	
30A	1833.50	15.6			2.65	29.9					
31	1833.80	14.7	16.1	2.25	2.65	23.3	15.3	21.3	0.0	47.4	
31A	1833.80	18.8			2.65	210					
32	1834.10	17.7	18.1	2.26	2.65	139	107	20.3	0.0	46.7	
32A	1834.10	19.0			2.66	498					
33	1834.40	16.6	17.4	2.22	2.65	288	216	22.0	0.0	43.3	
33A	1834.40	20.8			2.65	1568					
34	1834.70	13.5	16.0	2.28	2.65	188	410	19.8	0.0	43.9	
34A	1834.70	14.3			2.66	326					
35	1835.00	16.3	16.2	2.27	2.65	2766	673	19.1	0.0	38.2	
35A	1835.00	18.3			2.66	3147					
36	1835.30	14.1	17.0	2.28	2.69	143	366	20.5	0.0	40.1	
36A	1835.30	18.3			2.66	230					
37	1835.60	18.6	17.7	2.24	2.66	318	322	20.4	0.0	45.1	
37A	1835.60	18.2			2.66	134					
38	1835.90	17.9	18.4	2.23	2.65	743	607	21.9	0.0	38.7	
38A	1835.90	17.7			2.66	426					
39	1836.20	19.2	19.2	2.18	2.66	773	846	25.4	0.0	42.9	
39A	1836.20	19.5			2.66	937					
40	1836.50	19.4	18.6	2.18	2.66	1154	927	22.9	0.0	38.0	
40A	1836.50	20.7			2.65	2274					
41	1836.80	16.4	13.0	2.42	2.66	716	167	12.6	0.0	40.3	
41A	1836.80	13.4			2.68	83.1					
42	1837.15	2.2	5.3		2.54	1.31	2.67				NO SAMPLE
42A	1837.15	2.0			1.51	11.1					
43	1838.10	1.1	1.9	2.38	2.45	0.04	0.08	5.1	0.0	46.7	
43A	1838.10	2.6			2.52	0.12					
44	1839.10	1.2	2.5	2.50	2.54	0.02	0.03	7.5	0.0	70.2	
44A	1839.10	1.7			2.56	0.30					
45	1839.40	5.2	4.0	2.47	2.56	0.07	0.11	7.9	0.0	72.2	
45A	1839.40	4.8			2.57	0.04					
46	1839.70	6.0	3.9	2.48	2.53	1.14	0.43	9.1	0.0	70.5	
46A	1839.70	2.7			2.48	2.43					VF
47	1840.00	1.8	4.4	2.43	2.49	0.37	1.81	8.0	0.0	76.1	
47A	1840.00	1.8			2.53	0.81					
48	1840.30	13.4	9.3	2.29	2.65	68.1	13.1	16.5	0.0	23.6	SP
48A	1840.30	5.9			2.60	1.68					
49	1840.60	16.4	14.4	2.26	2.65	17.2	50.3	20.3	0.0	44.5	
49A	1840.60	15.7			2.63	29.6					

BHP PETROLEUM PTY LTD :
 Minerva No.1 : Analysis by
 Amdel Core Services

Sample No.	Depth	Porosity		Density	Permeability (md)			Summation of Fluids			Remarks
		HeInj	RollPor		Nat. Grain	KH	Roll KH	KH	Por	Oil	
50	1840.90	18.7	16.1	2.30	2.65	318	129	19.1	0.0	57.8	
50A	1840.90	12.7			2.63	3.25					
51	1841.20	16.8	15.9	2.25	2.66	157	273	17.5	0.0	38.6	
51A	1841.20	16.9			2.66	347					B#2
52	1842.80	12.9	15.0	2.30	2.65	709	824	16.4	0.0	23.7	C#3
52A	1842.80	15.3			2.65	1439					
53	1843.10	15.7	15.2	2.25	2.65	5854	4200	20.5	0.0	36.2	
53A	1843.10	14.2			2.65	5052					
54	1843.40	17.0	15.7	2.34	2.65	12810	6113	16.3	0.0	32.9	
54A	1843.40	16.1			2.65	14362					
55	1843.70	13.4	15.1	2.30	2.65	1454	1817	16.0	0.0	27.3	
55A	1843.70	15.7			2.65	4668					
56	1844.05	15.2	14.2	2.24	2.65	402	306	19.8	0.0	36.2	
56A	1844.05	13.9			2.65	2929					
57	1844.30	12.1	14.3	2.28	2.65	37.1	138	17.2	0.0	30.5	
57A	1844.30	14.0			2.65	2994					
58	1844.60	15.8	15.9	2.26	2.65	647	397	17.2	0.0	27.6	
58A	1844.60	16.8			2.65	4031					
59	1844.90	17.7	16.4	2.22	2.65	1601	1199	18.8	0.0	29.5	
59A	1844.90	18.0			2.65	3910					
60	1845.22	13.5	14.9	2.29	2.65	1247	1936	17.8	0.0	36.2	
60A	1845.22	13.1			2.65	634					
61	1845.52	15.7	14.9	2.30	2.65	5641	3676	16.5	0.0	39.0	
61A	1845.52	14.1			2.65	1865					
62	1845.82	17.6	15.8	2.28	2.65	4598	3863	17.1	0.0	38.6	
62A	1845.82	15.3			2.65	2948					
63	1846.12	15.1	16.3	2.24	2.65	1867	2563	19.3	0.0	37.1	
63A	1846.12	15.7			2.65	3695					
64	1846.42	17.7	16.6	2.23	2.65	2693	2076	20.7	0.0	37.6	
64A	1846.42	18.2			2.65	8563					
65	1846.72	14.4	16.0	2.29	2.65	1371	1717	17.1	0.0	36.1	
65A	1846.72	15.5			2.65	3058					B#3

VF = Vertical Fracture; HF = Horizontal Fracture; MP = Mounted Plug; SP= Short Plug
 C# = Top of Core; B# = Bottom of Core; OWC = Probable Oil/Water Contact
 Tr = Probable Transition Zone; GC = Probable Gas Cap

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Amdel Core Services
Petroleum Reservoir Engineering Data

PO Box 5523 Brendale Q 4500
 Tel : (07) 298-5272

OVERBURDEN ANALYSIS FINAL REPORT

Company : BHP PETROLEUM PTY LTD
 Well : Minerva No.1
 Field : Wildcat
 Core Interval : Core 1: 1821.00 - 1824.04m
 Core Interval : Core 2: 1828.00 - 1841.27m
 Core Interval : Core 3: 1842.50 - 1846.87m
 File No. : RG205
 Country : AUSTRALIA

Date : 21/03/93

State : Victoria

SAMPLE NUMBER	DEPTH	POROSITY at OVERBURDEN Pressures				Porosity Rolling Average	PERMEABILITY at OVERBURDEN Pressures				PERM. Rolling Average
		Ambient Porosity	psi 2100	psi 0	psi 0		Ambient Permeability	psi 2100	psi 0	psi 0	
					2100					2100	
1	1821.15	19.5	18.7			3839	2741				
7	1822.87	12.4	11.4			117	100				
10	1823.77	20.4	19.6			651	557				
15	1828.97	16.7	15.9			2041	1622				
17	1829.57	12.3	11.4			1874	1494				
21	1830.77	11.3	10.3			2502	1793				
25	1832.00	12.6	11.8			701	551				
31	1833.80	14.7	13.9			23.3	17.3				
34	1834.70	13.5	12.6			188	158				
37	1835.60	18.6	17.8			318	268				
40	1836.50	19.4	18.6			1154	947				
41	1836.80	16.4	15.7			716	592				
49	1840.60	16.4	15.6			17.2	12.3				
51	1841.20	16.8	16.2			157	141				
54	1843.40	17.0	15.9			12810	4118				
57	1844.30	12.1	11.5			37.1	8.6				
61	1845.52	15.7	15.0			5641	3145				
65	1846.72	14.4	13.8			1371	1133				

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Amdel Core Services
Petroleum Reservoir Engineering Data

PO Box 5523 Brendale Q 4500
Tel : (07) 298-5272

FULL DIAMETER CORE ANALYSIS
FINAL REPORT

Company : BHP PETROLEUM PTY LTD
Well : Minerva No.1
Field : Wildcat Date : 21/03/93
Core Interval : Core 1: 1821.00 - 1824.04m
Core Interval : Core 2: 1828.00 - 1841.27m
Core Interval : Core 3: 1842.50 - 1846.87m
File No. : RG205
Country : AUSTRALIA State : Victoria

Sample No.	Depth From	Depth To	Porosity HeInj	Density Grain Nat	KaH MAX	KaH 45	KaH 90	KaV Vert	Fluid Saturations %Oil %Water
1	1832.39	1832.52	11.5	2.67	2.36	492	487	296	
2	1845.00	1845.15	14.6	2.65	2.26	899	529	96.2	

VF = Vertical Fracture; HF = Horizontal Fracture; MP = Mounted Plug; SP= Short Plug
C# = Top of Core; B# = Bottom of Core; OWC = Probable Oil/Water Contact
Tr = Probable Transition Zone; GC = Probable Gas Cap

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SPECIFIED AVERAGE of DATA

Company : BHP PETROLEUM PTY LTD
Well : Minerva No.1
Field : Wildcat Date : 21/03/93
Core Interval : Core 1: 1821.00 - 1824.04m
Core Interval : Core 2: 1828.00 - 1841.27m
Core Interval : Core 3: 1842.50 - 1846.87m
File No. : RG205
Country : AUSTRALIA State : Victoria

SUMMATION POROSITY Average sample 1 to 65 Sample Type : R
POROSITY Average : 17.0 over 65 Samples
0 Samples with a ZERO Porosity Value Ignored
SUMMATION % WATER Average Sample 1 to 65 Sample Type : R
% WATER Average : 39.5 over 65 Samples
0 Samples with a ZERO % Water Value Ignored

AMBIENT He POROSITY Average Sample 1 to 65 Sample Type : R
POROSITY Average : 14.1 over 65 Samples
0 Samples with a ZERO Porosity Value Ignored
AMBIENT PERMEABILITY Average Sample 1 to 65 Sample Type : R
PERMEABILITY Average : 1434 over 65 Samples
0 Samples with a ZERO Permeability Value Ignored

OVERBURDEN POROSITY Average Sample 1 to 65 Sample Type : R
POROSITY Average : 14.8 over 18 Samples
0 Samples with a ZERO Porosity Value Ignored
OVERBURDEN PERMEABILITY Average Sample 1 to 65 Sample Type : R
PERMEABILITY Average : 1077.8 over 18 Samples
0 Samples with a ZERO Permeability Value Ignored

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SPECIFIED AVERAGE of DATA

Company : BHP PETROLEUM PTY LTD
Well : Minerva No.1
Field : Wildcat Date : 21/03/93
Core Interval : Core 1: 1821.00 - 1824.04m
Core Interval : Core 2: 1828.00 - 1841.27m
Core Interval : Core 3: 1842.50 - 1846.87m
File No. : RG205
Country : AUSTRALIA State : Victoria

SUMMATION POROSITY Average sample 1 to 11 Sample Type : R
POROSITY Average : 18.9 over 11 Samples
0 Samples with a ZERO Porosity Value Ignored

SUMMATION % WATER Average Sample 1 to 11 Sample Type : R
% WATER Average : 39.6 over 11 Samples
0 Samples with a ZERO % Water Value Ignored

AMBIENT He POROSITY Average Sample 1 to 11 Sample Type : R
POROSITY Average : 17.1 over 11 Samples
0 Samples with a ZERO Porosity Value Ignored

AMBIENT PERMEABILITY Average Sample 1 to 11 Sample Type : R
PERMEABILITY Average : 2000 over 11 Samples
0 Samples with a ZERO Permeability Value Ignored

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SPECIFIED AVERAGE of DATA

Company : BHP PETROLEUM PTY LTD
Well : Minerva No.1
Field : Wildcat Date : 21/03/93
Core Interval : Core 1: 1821.00 - 1824.04m
Core Interval : Core 2: 1828.00 - 1841.27m
Core Interval : Core 3: 1842.50 - 1846.87m
File No. : RG205
Country : AUSTRALIA State : Victoria

AMBIENT He POROSITY Average Sample 1 to 11 Sample Type : A
POROSITY Average : 15.2 over 7 Samples
0 Samples with a ZERO Porosity Value Ignored
AMBIENT PERMEABILITY Average Sample 1 to 11 Sample Type : A
PERMEABILITY Average : 1424 over 7 Samples
0 Samples with a ZERO Permeability Value Ignored

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SPECIFIED AVERAGE of DATA

Company : BHP PETROLEUM PTY LTD
Well : Minerva No.1
Field : Wildcat Date : 21/03/93
Core Interval : Core 1: 1821.00 - 1824.04m
Core Interval : Core 2: 1828.00 - 1841.27m
Core Interval : Core 3: 1842.50 - 1846.87m
File No. : RG205
Country : AUSTRALIA State : Victoria

SUMMATION POROSITY Average sample 12 to 41 Sample Type : R
POROSITY Average : 17.7 over 30 Samples
0 Samples with a ZERO Porosity Value Ignored
SUMMATION % WATER Average Sample 12 to 41 Sample Type : R
% WATER Average : 38.8 over 30 Samples
0 Samples with a ZERO % Water Value Ignored

AMBIENT He POROSITY Average Sample 12 to 41 Sample Type : R
POROSITY Average : 14.4 over 30 Samples
0 Samples with a ZERO Porosity Value Ignored
AMBIENT PERMEABILITY Average Sample 12 to 41 Sample Type : R
PERMEABILITY Average : 989 over 30 Samples
0 Samples with a ZERO Permeability Value Ignored

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Amdel Core Services
Petroleum Reservoir Engineering Data

PO Box 5523 Brendale Q 4500 Australia
Tel : (07) 298-5272

SPECIFIED AVERAGE of DATA

Company : BHP PETROLEUM PTY LTD
Well : Minerva No.1
Field : Wildcat Date : 21/03/93
Core Interval : Core 1: 1821.00 - 1824.04m
Core Interval : Core 2: 1828.00 - 1841.27m
Core Interval : Core 3: 1842.50 - 1846.87m
File No. : RG205
Country : AUSTRALIA State : Victoria

AMBIENT He POROSITY Average Sample 12 to 41 Sample Type : A
POROSITY Average : 15.4 over 30 Samples
0 Samples with a ZERO Porosity Value Ignored
AMBIENT PERMEABILITY Average Sample 12 to 41 Sample Type : A
PERMEABILITY Average : 1167 over 30 Samples
0 Samples with a ZERO Permeability Value Ignored

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SPECIFIED AVERAGE of DATA

Company : BHP PETROLEUM PTY LTD
Well : Minerva No.1
Field : Wildcat Date : 21/03/93
Core Interval : Core 1: 1821.00 - 1824.04m
Core Interval : Core 2: 1828.00 - 1841.27m
Core Interval : Core 3: 1842.50 - 1846.87m
File No. : RG205
Country : AUSTRALIA State : Victoria

SUMMATION POROSITY Average sample 42 to 47 Sample Type : R
POROSITY Average : 6.3 over 6 Samples
0 Samples with a ZERO Porosity Value Ignored
SUMMATION % WATER Average Sample 42 to 47 Sample Type : R
% WATER Average : 56.0 over 6 Samples
0 Samples with a ZERO % Water Value Ignored

AMBIENT He POROSITY Average Sample 42 to 47 Sample Type : R
POROSITY Average : 2.9 over 6 Samples
0 Samples with a ZERO Porosity Value Ignored
AMBIENT PERMEABILITY Average Sample 42 to 47 Sample Type : R
PERMEABILITY Average : 0.49 over 6 Samples
0 Samples with a ZERO Permeability Value Ignored

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SPECIFIED AVERAGE of DATA

Company : BHP PETROLEUM PTY LTD
Well : Minerva No.1
Field : Wildcat Date : 21/03/93
Core Interval : Core 1: 1821.00 - 1824.04m
Core Interval : Core 2: 1828.00 - 1841.27m
Core Interval : Core 3: 1842.50 - 1846.87m
File No. : RG205
Country : AUSTRALIA State : Victoria

AMBIENT He POROSITY Average Sample 42 to 48 Sample Type : A
POROSITY Average : 3.1 over 7 Samples
0 Samples with a ZERO Porosity Value Ignored
AMBIENT PERMEABILITY Average Sample 42 to 48 Sample Type : A
PERMEABILITY Average : 2.4 over 7 Samples
0 Samples with a ZERO Permeability Value Ignored

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Amdel Core Services
Petroleum Reservoir Engineering Data

PO Box 5523 Brendale Q 4500 Australia
Tel : (07) 298-5272

SPECIFIED AVERAGE of DATA

Company : BHP PETROLEUM PTY LTD
Well : Minerva No.1
Field : Wildcat Date : 21/03/93
Core Interval : Core 1: 1821.00 - 1824.04m
Core Interval : Core 2: 1828.00 - 1841.27m
Core Interval : Core 3: 1842.50 - 1846.87m
File No. : RG205
Country : AUSTRALIA State : Victoria

SUMMATION POROSITY Average sample 52 to 65 Sample Type : R
POROSITY Average : 17.9 over 14 Samples
0 Samples with a ZERO Porosity Value Ignored
SUMMATION % WATER Average Sample 52 to 65 Sample Type : R
% WATER Average : 33.5 over 14 Samples
0 Samples with a ZERO % Water Value Ignored

AMBIENT He POROSITY Average Sample 52 to 65 Sample Type : R
POROSITY Average : 15.3 over 14 Samples
0 Samples with a ZERO Porosity Value Ignored
AMBIENT PERMEABILITY Average Sample 52 to 65 Sample Type : R
PERMEABILITY Average : 2924 over 14 Samples
0 Samples with a ZERO Permeability Value Ignored

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SPECIFIED AVERAGE of DATA

Company : BHP PETROLEUM PTY LTD
Well : Minerva No.1
Field : Wildcat Date : 21/03/93
Core Interval : Core 1: 1821.00 - 1824.04m
Core Interval : Core 2: 1828.00 - 1841.27m
Core Interval : Core 3: 1842.50 - 1846.87m
File No. : RG205
Country : AUSTRALIA State : Victoria

AMBIENT He POROSITY Average Sample 52 to 65 Sample Type : A
POROSITY Average : 15.4 over 14 Samples
0 Samples with a ZERO Porosity Value Ignored
AMBIENT PERMEABILITY Average Sample 52 to 65 Sample Type : A
PERMEABILITY Average : 4296 over 14 Samples
0 Samples with a ZERO Permeability Value Ignored

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BRINELL HARDNESS DATA

Company: BHP PETROLEUM

Report: RG-205

Well: Minerva No.1

Sample Number	Depth (m)	Brinell Hardness (kg/sq.mm)
1	1821.15	11
2	1821.37	11
3	1821.67	14
4	1821.97	14
5	1822.27	15
6	1822.57	15
7	1822.87	11
8	1823.17	17
9	1823.47	13
10	1823.77	14
11	1824.00	14
12	1828.15	17
13	1828.37	13
14	1828.67	12
15	1828.97	13
16	1829.27	14
17	1829.57	17
18	1829.87	14
19	1830.17	15
20	1830.47	21
21	1830.77	14
22	1831.10	14
23	1831.40	14
24	1831.70	16
25	1832.00	16
26	1832.30	17
27	1832.60	13
28	1832.90	15
29	1833.20	16
30	1833.50	14
31	1833.80	13
32	1834.10	11
33	1834.40	8
34	1834.70	7
35	1835.00	11
36	1835.30	9
37	1835.60	8
38	1835.90	8
39	1836.20	7
40	1836.50	7

Sample Number	Depth (m)	Brinell Hardness (kg/sq.mm)
---------------	-----------	-----------------------------

41	1836.80	10
42	1837.15	4
43	1838.10	9
44	1839.10	11
45	1839.40	11
46	1839.70	9
47	1840.00	8
48	1840.30	11
49	1840.60	8
50	1840.90	7
51	1841.20	10
52	1842.80	11
53	1843.10	11
54	1843.40	12
55	1843.70	11
56	1844.05	8
57	1844.30	11
58	1844.60	12
59	1844.90	12
60	1845.22	11
61	1845.52	10
62	1845.82	9
63	1846.12	11
64	1846.42	12
65	1846.72	12

CORE PLUG DESCRIPTION

Company: BHP PETROLEUM

Report: RG-205

Well: Minerva No.1

Sample Number	Description
1	Sst lt gry, med - crs gr, sb ang, mod srt, mod hd, wh Cl Mtrx, Qtz, bd
2	Sst lt - med gry, crs - v crs gr, com v crs sbrndd Qtz Gr, prly srt, ang - sbang, hd, non calc, Qtz Cmt, occ Qtz Pbl
3	Sst med - dk gry, crs - v crs gr, com sbrndd Qtz Pbl, prly srt, ang - sbang, hd, non calc, pred Pyr Cmt, Sid Cmt I/P, occ Qtz Pbl
4	Sst As in 3
5	Sst As in 4 w/ less pyr cmt
6	Sst As in 4 but with inc Qtz Pbl
7	Sst lt brnish gry, f gr w/ Pbl upto 5 mm, sb rndd, w wl srt, wh Cl Mtrx, Qtz, Tr Musc/C/Pyr
8	Sst lt gry, crs - v crs gr, com lg sbrndd Qtz Pbl, prly srt, ang - sbang, hd, non calc, Qtz Cmt,
9	Sst lt gry, med - crs gr, com lg sbrndd Qtz Pbl, prly srt, ang - sbang, hd, non calc, Qtz Cmt
10	Sst lt gry, f - med gr, sb rndd, wl srt, mod hd, wh Cl Mtrx, Qtz, Tr Pyr/C, Occ Qtz Pbl
11	Sst lt gry, f gr, mod wl srt, ang - sbang, hd, non calc, Qtz Cmt
12	Sst lt gry, med - v crs gr, prly srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt
13 - 14	Sst As in 12
15	Sst lt gry, crs - v crs gr, sb rndd, mod srt, mod hd, wh Cl Mtrx, Qtz, Tr Pyr
16	Sst lt gry, med - v crs gr, rr Qtz Pbl, prly srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt
17	Sst lt med gry, crs - v crs gr - gran, sb rndd - wl rndd, pr srt, hd, Cl Mtrx I.P., Qtz, Tr Pyr, Tr Cl Gr and carb Mat

Sample Number	Description
18	Sst lt - med gry, v crs - lge Qtz Pbl, v prly srt, ang - sbrndd, v hd, non calc, com Pyr & Qtz Cmt
19	Sst As in 18 w/ inc Qtz Pbl, conglomeritic
20	Sst As in 19 w/ inc Pyr Cmt
21	Cgl lt med gry, crs gr w/ rndd w/ srt Sd w/ rndd Qtz Pbls from 2-10mm, sm wh Cl Mtrx, Tr Pyr
22	Sst lt gry, med gr, ang - sb rndd, mod w/ srt, non calc, com Pyr Cmt, Qtz Cmt
23	Sst lt - med gry, v crs - lge Qtz Pbl, v prly srt, ang - sbrndd, v hd, non calc, com Pyr & Qtz Cmt
24	Sst As in 23
25	Sst lt med gry, f - v crs gr w/ Gran of 2-4mm, rndd, pr srt, mod hd, Cl Mtrx, Qtz, Tr Pyr
26 - 27	Sst As in 23 w/ inc Pyr Cmt
28	Sst lt gry, med - v crs gr, rr Qtz Pbl, prly srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt, dk gry Clst I/P
29	Sst lt - med gry, v crs - lge Qtz Pbl, v prly srt, ang - sbrndd, v hd, non calc, com Pyr & Qtz Cmt
30	Sst lt gry, f gr, com med gr, w/ srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt, w/ Clst bnd
31	Sst lt gry, f - med gr, sb ang - sb rndd, w/ srt, mod hd, abd Cl Mtrx, Qtz, Tr Pyr/Mic/C, vague Lam
32	Sst lt gry, f - med gr, mod w/ srt, ang - sbang, hd, non calc, Qtz Cmt
33	Sst As in 32
34	Sst med gry, med - v crs gr, scatt Gran, rndd, mod srt, fri - mod hd, Cl Mtrx, Qtz, Tr C/Musc, bd
35	Sst lt gry, med - v crs gr, com Qtz Pbl, prly srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt
36	Sst As in 35 w/ lt gry, f - med gr, mod w/ srt, ang - sbang Qtz Sd
37	Sst lt gry, med - v crs gr, sb rndd, mod srt, Cl Mtrx, Qtz
38	Sst lt - med gry, crs - v crs gr, com v crs sbrndd Qtz Gr, prly srt, ang - sbang, hd, non calc, Qtz Cmt, rr Pyr Cmt, occ Qtz Pbl
39	Sst As in 38

Sample Number	Description
40-41	Sst lt gry, crs - v crs gr, sb rndd - wl rndd, mod hd, var wh Cl Mtrx, Qtz Cmt, Qtz, Tr Pyr, often open framework
42 - 44	Clst dk brn - blk, com Pyr Gr, hd, sdy I/P, sb fis
45	Sltst dk gry, v hd, non calc, sdy, cly Mtrx, bioturb
46	Sltst med gry - dk gry, v hd, non calc, bnnd, Tr Pyr Cmt, bioturb
47	Clst dk brn - blk, com Pyr Gr, hd, sdy I/P, sb fis
48	Sst lt gry, f gr, wl srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt
49	Sst med gry, f - med gr, sbrndd, wl srt, mod hd, wh - lt brn Cl Mtrx, Qtz, Tr Mic/C, Tr carb Lam
50	Sst lt gry, f - med gr, mod wl srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt, Pyr Bnd
51	Sst lt gry, f - med gr, sb rndd, wl srt, mod hd, Qtz Cmt, var Cl Mtrx, Qtz
52	Sst lt gry, med - v crs gr, occ Qtz pbl, prly srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt
53	Sst lt - med gry, v crs - lge Qtz Pbl, v prly srt, ang - sbrndd, v hd, non calc, com Pyr & Qtz Cmt
54	Sst med gry, v crs gr - gran, rndd, pr - mod srt, mod hd, Qtz Cmt, Qtz, open framework
55	Sst lt gry, med - v crs gr, prly srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt
56	Sst As in 53
57	Sst lt - med gry, med - v crs gr w/ comm Gran, rndd, hd, Qtz Cmt, Qtz, Tr Pyr
58	Sst lt - med gry, pred crs gr, mod wl srt, ang - sbang, v hd, non calc, Tr Pyr, Mnr Bioturb, cly I/P
59	Sst As in 58
60	Sst lt gry, med - v crs gr, occ Qtz pbl, prly srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt
61	Sst lt med gry, med - v crs gr, rndd, hd, Qtz Cmt, sm Cl Mtrx, Qtz, Tr C
62	Sst lt gry, med - v crs gr, rr Qtz Pbl, prly srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt
63 - 64	Sst lt - med gry, med - v crs, pred crs gr, mod wl srt, ang - sbang, v hd, non calc, Tr Pyr, Mnr Bioturb, cly I/P

Sample Number	Description
65	Sst lt med gry, med - v crs gr, slily gran, rndd, hd, Qtz Cmt, sm Cl Mtrx, Qtz, Tr C
1A	Sst lt - med gry, crs - v crs gr, com v crs sbang Qtz Gr, prly srt, ang - sbang, hd, non calc, Qtz Cmt
2A	Sst lt - med gry, crs - v crs gr, com v crs sbang Qtz Gr, prly srt, ang - sbang, hd, non calc, Qtz Cmt, com lge Qtz Pbl
3A	Sst med - dk gry, crs - v crs gr, com sbrndd Qtz Pbl, prly srt, ang - sbang, hd, non calc, pred Pyr Cmt, Sid Cmt I/P, occ Qtz Pbl
4A	Sst As in 3A
5A	Sst As in 4A w/ less pyr cmt
6A	Sst As in 4A but with dec Qtz Pbl
7A	No plug
8A	Sst lt gry, crs - v crs gr, com lg rndd - sbrndd Qtz Pbl, prly srt, ang - sbang, hd, non calc, Qtz Cmt,
9A	Sst lt gry, med - crs gr, com lg sbrndd Qtz Pbl, prly srt, ang - sbang, hd, non calc, Qtz Cmt
10A	No plug
11A	No plug
12A	Sst lt gry, med - crs gr, pred med, mod wl srt, ang - sbang, hd, non calc, Qtz Cmt
13 - 14A	Sst As in 12A
15A	Sst lt - med gry, crs - v crs gr, prly srt, ang - sbang, hd, non calc, Qtz Cmt, occ Qtz Pbl
16A	Sst lt gry, crs - v crs gr, com lg rndd - sbrndd Qtz Pbl, prly srt, ang - sbang, hd, non calc, Qtz Cmt
17A	Sst As in 16A w/ abd v crs - lge Qtz Pbl, v prly srt
18 - 20A	Sst As in 17A
21A	Sst lt - med gry, crs - v crs gr, prly srt, ang - sbang, hd, non calc, Qtz Cmt, com rndd Qtz Pbl
22A	Sst lt gry, f - crs gr, ang - sbrndd, prly srt, non calc, Qtz Cmt, occ Qtz Pbl
23A	Sst As in 16A

Sample Number	Description
24 - 27A	Sst lt gry, crs - v crs gr, com lg rndd - sbrndd Qtz Pbl, prly srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt
28A	Sst As in 24A w/ inc Pyr Cmt
29A	Sst As in 21A
30A	Sst lt gry, f gr, com med gr, wl srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt, w/ Clst bnd
31 - 33A	Sst lt gry, f - med gr, mod wl srt, ang - sbang, hd, non calc, Qtz Cmt
34A	Sst lt - med gry, med - crs gr, pred med, prly srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt, Org Mat, com lge Qtz Pbl
35 - 38A	Sst lt gry, med - v crs gr, com Qtz Pbl, prly srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt
39 - 41A	Sst lt gry, f - med gr, mod wl srt, ang - sbang, hd, Tr Pyr Cmt, Qtz Cmt
42A	Coal blk - dk brn, hd, bnnd, Pyr I/P
43A	Clst dk brn - blk, com Pyr Gr, hd, sdy I/P, sb fis
44 - 47A	Slst med gry - dk gry, v hd, non calc, bnnd, Tr Pyr Cmt, bioturb, Org Mat
48A	Sst lt gry, f gr, wl srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt, Slsts asin 47A I/P
49 - 50A	Sst lt - med gry, f gr, wl srt, ang - sbang, hd, non calc, Qtz Cmt, Tr Mic, w/ Clst bnd
51A	Sst lt - med gry, f - med gr, mod wl srt, ang - sbang, hd, non calc, Qtz Cmt
52A	Sst lt gry, med - v crs gr, occ Qtz pbl, prly srt, ang - sbang, hd, non calc, Qtz Cmt
53A	Sst lt - med gry, v crs - lge sbrndd Qtz Pbl, v prly srt, ang - sbrndd, v hd, non calc, Qtz Cmt
54 - 57A	Sst As in 53A w/ com Pyr Cmt
58A	Sst lt - med gry, pred crs gr, mod wl srt, ang - sbang, v hd, non calc, Tr Pyr, cly I/P
59A	Sst lt - med gry, v crs - lge sbrndd Qtz Pbl, v prly srt, ang - sbrndd, v hd, non calc, Qtz Cmt
60A	Sst lt gry, med - v crs gr, occ sbang Qtz pbl, prly srt, ang - sbang, hd, non calc, Qtz Cmt, TR Pyr Cmt
61A	Sst As in 60A

Sample Number	Description
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62A	Sst	lt gry, med - v crs gr, com rndd Qtz Pbl, prly srt, ang - sbang, hd, non calc, Qtz & Pyr Cmt
63 - 64A	Sst	As in 62A
65A	Sst	As in 60

POROSITY vs PERMEABILITY

Company: BHP PETROLEUM PTY LTD
Well: Minerva No.1
Depth: 1821.00 - 1846.87 Metres

