DEPT. NAT. RES & ENV
PE903384

AMDEL
CORE
SERVICES

Attachment to Terakihi-1

Core Analysis Report

Terakihi-1

AMDEL
CORE
SERVICES

PETROLEUM Limited

29 June 1990

01 AUG 1990

Esso Australia
Esso House
127 Kent Street
SYDNEY NSW 2000

Attention: Mr A P Whittle

REPORT: 008/044

CLIENT REFERENCE:	RSA 001104
MATERIAL:	Core Plugs
LOCALITY:	Bass Strait - Terakihi No 1
WORK REQUIRED:	Conventional Core Analysis

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

RUSSELL R MARTIN
Laboratory Supervisor
Core Analysis/Special Core Analysis

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Please reply to: PO Box 109 Eastwood SA 5063 Ph: (08)372 2834

Amdel Core Services Pty Limited
Incorporated in South Australia

29 June 1990

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Esso House
127 Kent Street
SYDNEY NSW 2000

Attention: Mr A P Whittle

FINAL DATA REPORT - CONVENTIONAL CORE ANALYSIS

REPORT: 008/044 - TERAKIHI NO 1

A total of eighty one (81) core plugs were received by Amdel Core Services, Adelaide from Esso's Terakihi No 1 well.

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

The data contained in this report has been derived by the following methods:

1. FLUID SATURATION

Samples were first placed in a Dean and Stark apparatus in which toluene (boiling point 110°C) vapour is condensed and collects in a calibrated side arm where it overflows and passes down onto the sample, leaching the residual hydrocarbons and water. The toluene and water are continually refluxed and water collects in the side arm. After drying the extracted core plug, the oil volume is determined as the difference between the core plug weight loss and the weight of accumulated water. Oil volume present is corrected by assuming an oil specific gravity of 0.85.

After drying the plugs at 100°C to complete Dean and Stark results, all plugs were dried at 50°C and 50% relative humidity prior to porosity and permeability to air determinations.

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2. PERMEABILITY TO AIR

A plug sample is used for this measurement and is placed in a Hassler cell to which a confining pressure of 150 psig (1035 kpa) is applied; this pressure is used to prevent bypassing of air around the sides of the sample when the measurement is made. A known pressure is then applied to the upstream sample face and the differential pressure (between the upstream and downstream faces) is monitored at the downstream face. Permeability is then calculated using Darcy's Law.

3. HELIUM INJECTION POROSITY

The porosity of a clean dry core plug is determined as follows: it is first placed in a matrix cup where the grain volume is measured by helium injection: a known volume of helium at a known pressure is expanded into the matrix cup which contains the core plug; the resulting pressure is recorded and the unknown volume (that is, the volume of the grains) is determined using Boyle's Law. The bulk volume is 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.

4. APPARENT GRAIN DENSITY

The apparent grain density is derived from the measurements described in Section 3, above, and is the ratio of the weight of the core plug divided by the grain volume determined as in paragraph 4.

5. POROSITY AND PERMEABILITY AT OVERBURDEN PRESSURE

To determine the porosity and permeability of the core plug at overburden pressure, the sample is first placed in a cylindrical neoprene sheath and this assembly is loaded into a triaxial hydrostatic cell. The pore volume is then determined at "ambient" pressure. The overburden pressure (the value as supplied by the client) is then applied to the sample in the cell and the pore volume reduction caused by this increase in pressure, is measured. By this means the actual overburden pore volume and the bulk volume can be determined and are used to derive a value for the porosity at the applied overburden pressure. The permeability at overburden pressure is then measured in the hydrostatic cell exactly as described in paragraph 2.

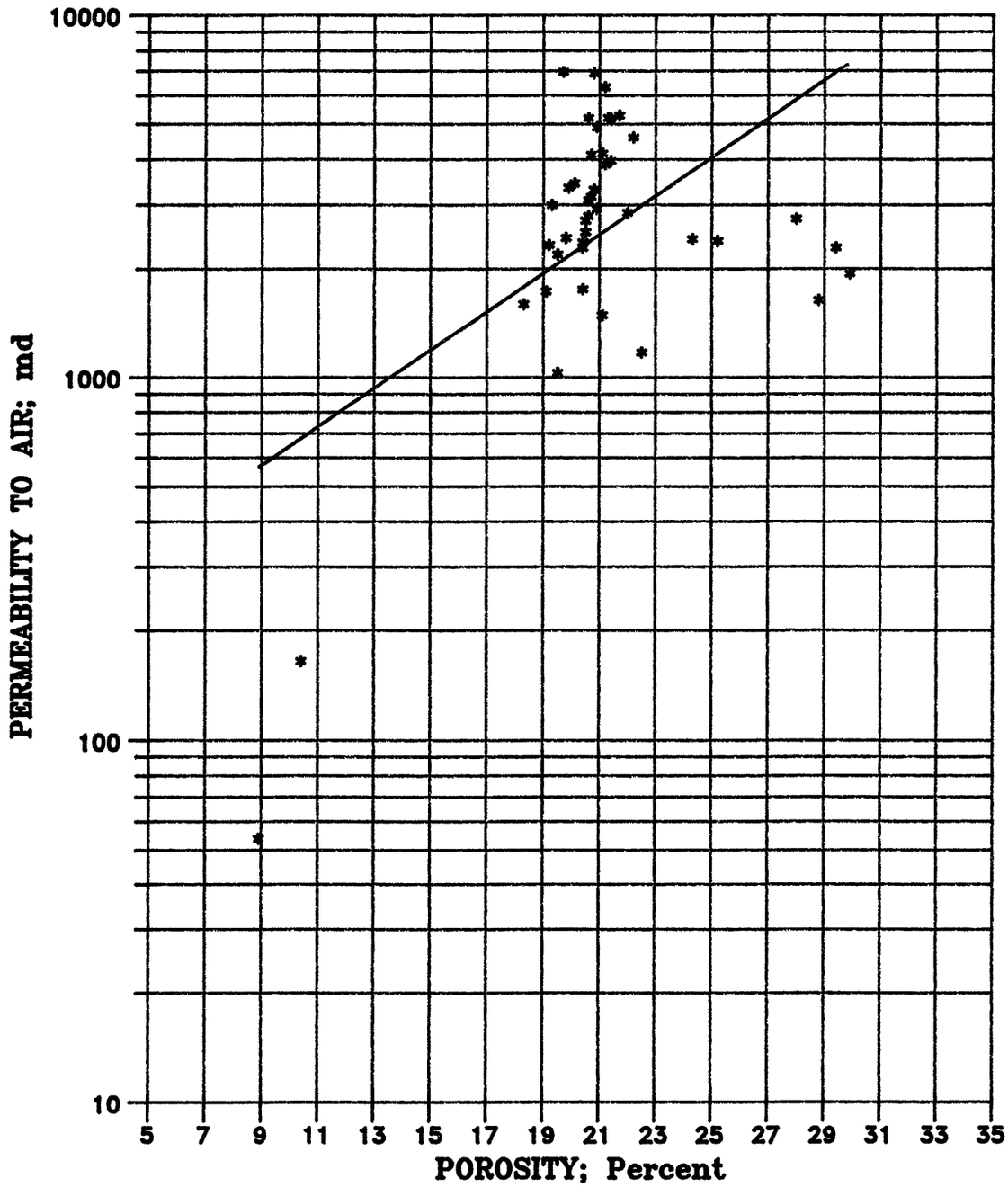
6. ABSOLUTE GRAIN DENSITY

An irregular fragment of sample which has been dried is used for this determination; the sample is coarsely crushed to approximately grain size or a little coarser and the granular material is then weighed. The volume of the grains is determined by conventional pycnometry and by this means the actual density of the grains is determined.

POROSITY vs PERMEABILITY

Company: Esso Australia
Well : Terakihi No. 1 Core No. 1

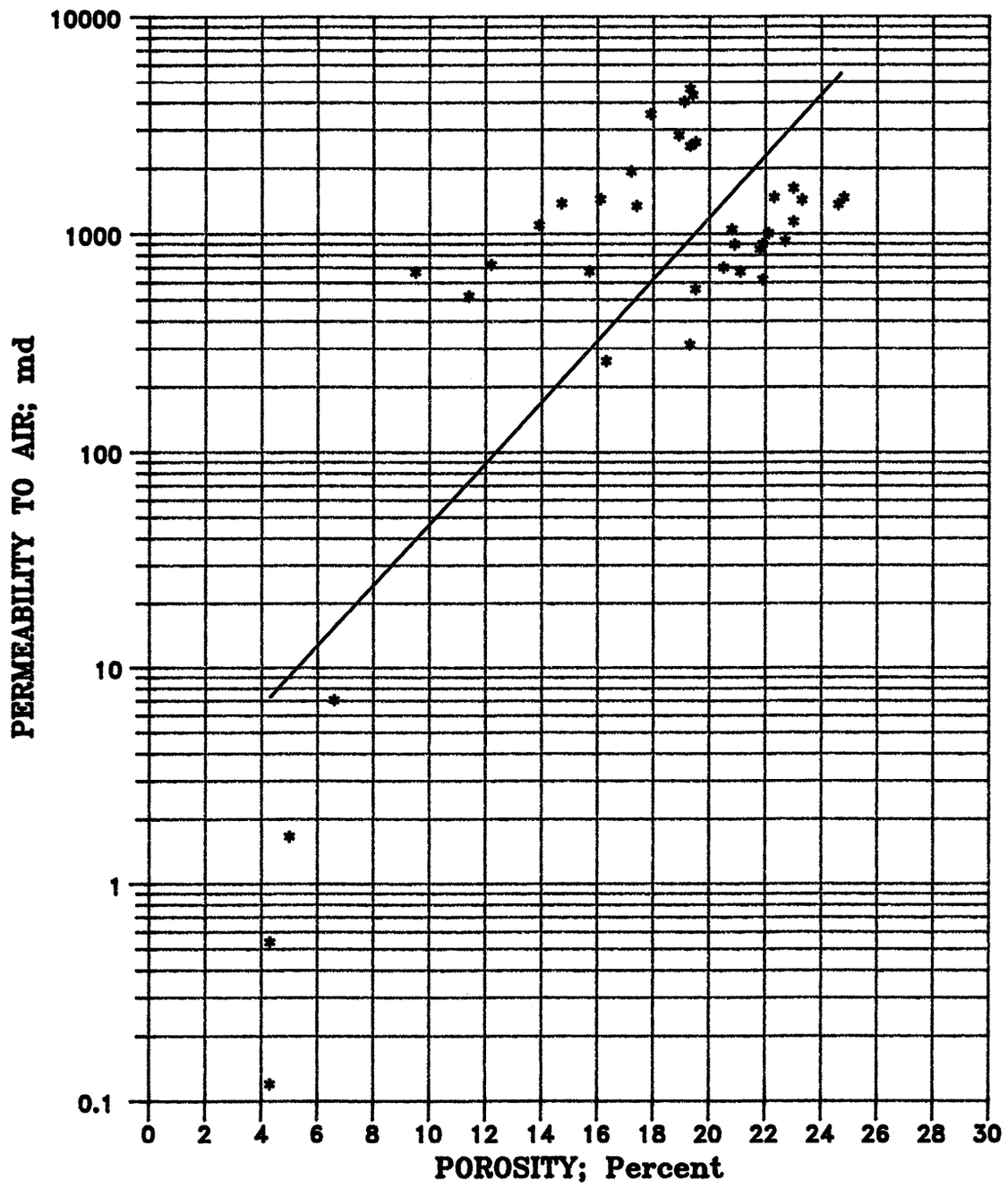
Ambient Y = EXP(0.1224X) * 190.7



POROSITY vs PERMEABILITY

Company: Esso Australia
Well : Terakihi No. 1 Core No. 2

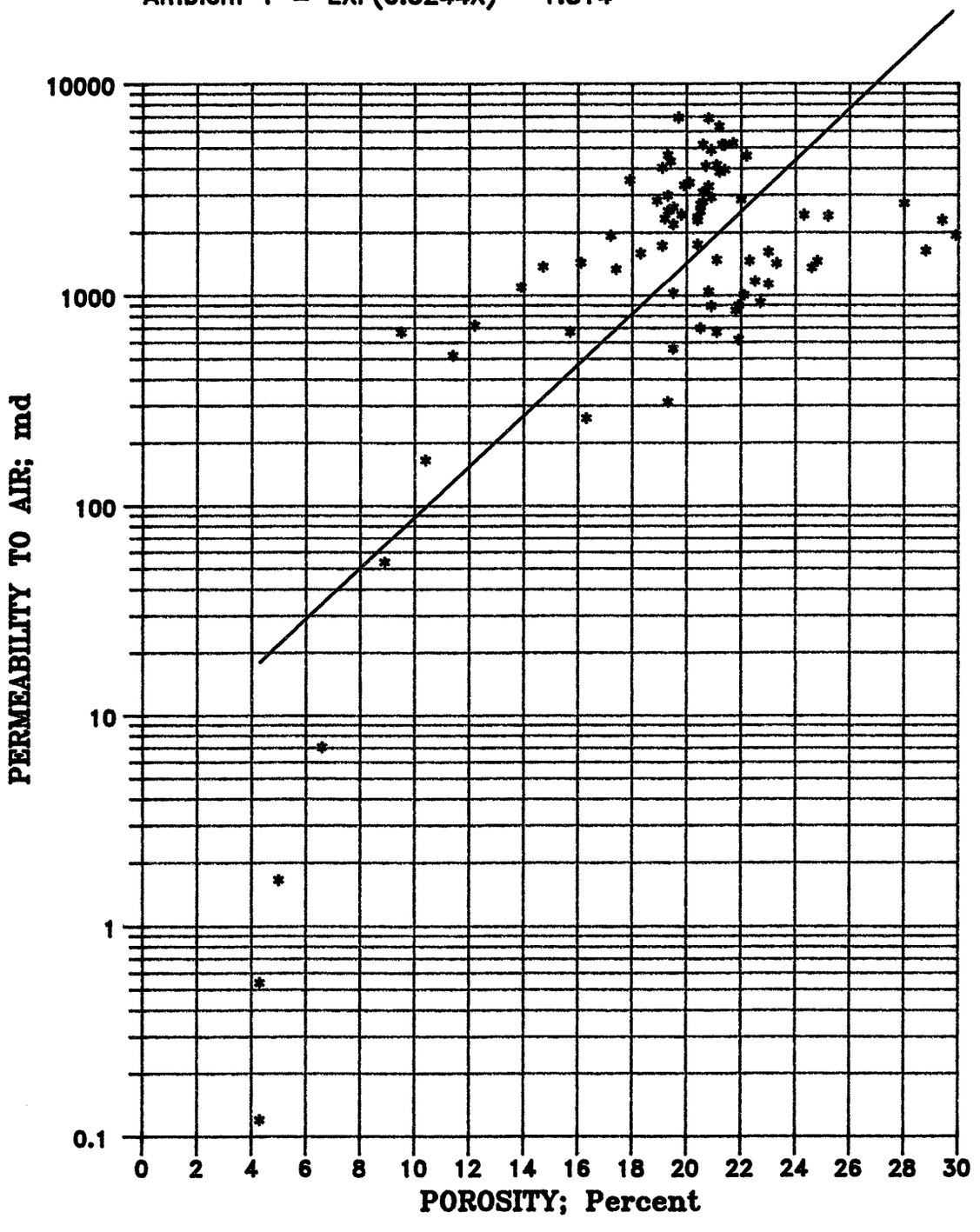
Ambient Y = EXP(0.3244X) * 1.814



POROSITY vs PERMEABILITY

Company: Esso Australia
Well : Terakihi No. 1 Composite

Ambient Y = EXP(0.3244X) * 1.814



ROUTINE CORE ANALYSIS RESULTS

Company: Esso Australia
Well: Terakihi No 1

Location: Bass Strait
Overburden Pressure: 4550 psi
Core No: 1

Report: 008/044

Sample Number	Depth feet	Permeability to air, md		Porosity percent		Grain Density gms/cc		Residual Fluids		Bulk Dry Density		Bulk Volume ccs	
		Ambient	NOBP	Ambient	NOBP	Calculated	Absolute	Sw%	So%	Ambient	NOBP	Ambient	NOBP
2	2844.12	1173	993	22.5	22.2	2.62	2.65	67.9	9.9	2.03	2.04	16.59	16.51
5	2844.28	2417	2162	24.3	24.0	2.61	2.64	72.1	1.9	1.98	1.98	21.15	21.09
7	2844.69	1760	1521	20.4	19.9	2.62	2.64	72.4	9.3	2.09	2.10	17.98	17.87
9	2844.83	2390	2099	25.2	24.9	2.61	2.65	76.8	4.9	1.95	1.96	19.36	19.27
13	2845.17	1490	1177	21.1	18.1	2.63	2.65	73.9	13.0	2.07	2.15	22.32	21.49
16	2845.40	1640	1439	28.8	26.0	2.62	2.64	70.5	5.2	1.86	1.94	20.39	19.62
18	2845.60	1941	1686	29.9	27.0	2.62	2.64	77.5	5.7	1.83	1.91	22.12	21.23
21	2845.80	2287	2038	29.4	27.1	2.70	2.67	62.6	2.2	1.90	1.97	21.60	20.93
24	2846.04	2745	2391	28.0	24.3	2.62	2.63	75.7	7.4	1.89	1.99	22.38	21.30
38	2848.60	2287	1745	20.4	16.0	2.64	2.65	82.5	4.2	2.10	2.21	19.64	18.62
40	2849.81	2928	2272	20.9	16.2	2.65	2.65	65.3	17.6	2.09	2.22	19.41	18.31
46	2849.24	2327	1772	19.2	16.4	2.64	2.65	47.8	20.9	2.13	2.21	21.20	20.50
48	2849.43	1601	1219	18.3	15.4	2.63	2.65	41.6	13.6	2.15	2.23	22.24	21.50

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Sample Number	Depth feet	Permeability to air, md		Porosity percent		Grain Density gms/cc		Residual Fluids		Bulk Dry Density		Bulk Volume ccs	
		Ambient	NOBP	Ambient	NOBP	Calculated	Absolute	Sw%	So%	Ambient	NOBP	Ambient	NOBP
50	2849.60	1735	1262	19.1	15.9	2.64	2.64	32.5	14.1	2.13	2.22	21.52	20.70
52	2849.73	6331	5531	21.2	17.5	2.64	2.65	56.0	13.0	2.08	2.18	21.86	20.87
54	2850.21	4159	3384	21.1	17.0	2.64	2.65	70.0	17.7	2.08	2.19	21.58	20.50
56	2850.40	4122	3491	20.7	16.3	2.64	2.64	80.6	9.0	2.09	2.21	19.69	18.66
59	2850.63	3346	2716	19.9	16.1	2.63	2.64	46.3	12.7	2.11	2.21	19.56	18.67
62	2850.83	3436	2761	20.1	16.9	2.64	2.64	56.0	3.4	2.11	2.20	19.08	18.33
63	2851.00	6909	5924	20.8	18.4	2.64	2.64	63.8	1.6	2.09	2.16	19.25	18.67
66	2851.26	2993	2253	19.3	16.1	2.64	2.64	46.9	11.5	2.13	2.22	19.20	18.47
68	2851.40	2189	1685	19.5	15.7	2.64	2.64	62.6	6.3	2.12	2.22	19.50	18.62
71	2851.64	4908	4232	20.9	17.8	2.63	2.65	69.8	9.9	2.08	2.17	19.33	18.60
72	2851.78	2524	2059	20.5	17.5	2.64	2.65	71.9	5.9	2.10	2.18	19.26	18.55
76	2852.03	3095	2562	20.6	18.1	2.64	2.65	68.2	4.8	2.09	2.16	19.51	18.91
78	2852.23	5181	4412	21.4	18.6	2.64	2.64	68.9	8.7	2.07	2.15	19.37	18.70
79	2852.28	2716	2241	20.5	17.2	2.64	2.64	63.4	7.2	2.10	2.19	19.44	18.67
85	2852.83	5203	4464	21.3	18.3	2.73	2.65	47.3	2.3	2.15	2.23	19.37	18.66
87	2853.03	1030	777	19.5	16.1	2.68	2.66	78.2	7.0	2.16	2.25	19.35	18.56

Sample Number	Depth feet	Permeability to air, md		Porosity percent		Grain Density gms/cc		Residual Fluids		Bulk Dry Density		Bulk Volume ccs	
		Ambient	NOBP	Ambient	NOBP	Calculated	Absolute	Sw%	So%	Ambient	NOBP	Ambient	NOBP
89	2853.17	3156	2413	20.7	18.0	2.64	2.64	57.5	5.0	2.10	2.17	19.72	19.05
92	2853.43	2367	1925	20.4	17.1	2.64	2.65	67.9	3.8	2.10	2.19	19.81	19.01
93	2853.53	2796	2218	20.6	17.3	2.65	2.65	66.0	11.8	2.10	2.19	19.85	19.06
96	2853.72	3306	2617	20.8	17.7	2.65	2.65	65.5	10.1	2.10	2.18	19.41	18.69
98	2854.00	2854	2140	22.0	18.2	2.65	2.65	65.3	7.5	2.07	2.17	19.40	18.50
104	2854.46	6962	5913	19.7	18.8	2.68	2.65	72.2	7.8	2.15	2.17	19.34	19.13
105	2854.60	3870	3179	21.2	18.0	2.69	2.66	81.7	9.3	2.12	2.20	19.77	18.99
108	2854.84	2433	3029	19.8	16.8	2.63	2.65	71.2	14.7	2.11	2.19	19.89	19.18
110	2855.00	3954	3043	21.4	17.5	2.63	2.64	71.9	11.5	2.07	2.17	20.33	19.36
115	2855.33	5194	4359	20.6	17.5	2.64	2.64	56.2	8.1	2.10	2.18	16.40	15.78
117	2855.43	4598	3606	22.2	18.1	2.64	2.65	67.6	3.6	2.05	2.16	18.77	17.83
120	2855.63	5280	4191	21.7	17.7	2.64	2.64	70.7	7.1	2.06	2.17	19.53	18.60
122	2856.43	53.8	39.7	8.9	6.7	2.68	2.65	76.9	5.5	2.44	2.50	20.34	19.86
124	2856.54	165	141	10.4	8.2	2.67	2.66	71.9	8.4	2.40	2.46	21.52	21.00

ROUTINE CORE ANALYSIS RESULTS

Company: Esso Australia
Well: Terakihi No 1

Location: Bass Strait
Overburden Pressure: 4600 psi
Core No: 2

Report: 008/044

Sample Number	Depth feet	Permeability to air, md		Porosity percent		Grain Density gms/cc		Residual Fluids		Bulk Dry Density		Bulk Volume ccs	
		Ambient	NOBP	Ambient	NOBP	Calculated	Absolute	Sw%	So%	Ambient	NOBP	Ambient	NOBP
127	2863.39	2520	440	19.3	18.2	2.63	2.65	59.7	1.5	2.13	2.16	18.68	18.42
130	2864.20	2625	2260	19.5	16.8	2.63	2.66	56.3	1.7	2.12	2.19	18.77	18.17
134	2864.46	4631	3423	19.3	17.1	2.64	2.64	58.4	0.9	2.13	2.19	19.35	18.82
137	2864.64	4040	3015	19.1	16.8	2.63	2.64	63.4	0.7	2.13	2.19	19.20	18.68
139	2864.77	4326	3205	19.4	16.4	2.63	2.64	57.2	0.9	2.12	2.20	19.26	18.57
143	2865.04	2824	2115	18.9	16.4	2.63	2.63	54.2	3.3	2.13	2.20	19.55	18.96
145	2865.20	3538	2698	17.9	16.0	2.63	2.63	61.7	2.3	2.16	2.21	19.21	18.78
148	2865.36	1380	1046	14.7	12.4	2.82	2.63	60.0	2.9	2.41	2.47	19.96	19.43
151	2865.60	1345	1017	17.4	15.1	2.64	2.65	68.8	1.1	2.18	2.24	19.34	18.82
154	2865.75	1929	1341	17.2	14.8	2.64	2.65	67.6	0.8	2.18	2.25	19.44	18.89
158	2866.00	1444	1072	16.1	13.3	2.65	2.65	68.5	1.6	2.22	2.30	19.51	18.88
161	2866.20	520	270	11.4	9.5	2.65	2.65	55.5	6.5	2.35	2.40	20.11	19.69

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Sample Number	Depth feet	Permeability to air, md		Porosity percent		Grain Density gms/cc		Residual Fluids		Bulk Dry Density		Bulk Volume ccs	
		Ambient	NOBP	Ambient	NOBP	Calculated	Absolute	Sw%	So%	Ambient	NOBP	Ambient	NOBP
165	2866.40	1096	505	13.9	11.7	2.65	2.65	51.2	4.2	2.28	2.34	16.48	16.07
168	2866.61	674	485	15.7	14.6	2.65	2.65	69.2	1.2	2.23	2.26	19.61	19.35
172	2866.94	723	558	12.2	10.5	2.65	2.65	70.0	2.0	2.33	2.37	19.31	18.96
176	2867.15	1.66	0.296	5.0	4.3	2.67	2.66	60.6	3.6	2.54	2.56	19.89	19.74
179	2867.31	7.08	3.02	6.6	5.7	2.67	2.66	40.3	0.0	2.50	2.52	19.86	19.68
182	2867.59	0.54	0.082	4.3	3.6	2.67	2.65	47.6	6.3	2.55	2.57	20.26	20.11
185	2867.80	670	497	9.5	7.6	2.67	2.65	54.0	3.1	2.41	2.47	11.23	10.99
189	2868.46	0.12	0.028	4.3	3.7	2.68	2.66	51.2	3.7	2.56	2.58	20.03	19.91
192	2868.63	262	195	16.3	15.4	2.65	2.65	63.7	6.9	2.22	2.24	19.77	19.55
195	2868.84	312	260	19.3	17.7	2.64	2.65	66.4	6.0	2.13	2.17	19.93	19.53
199	2869.00	561	466	19.5	17.9	2.64	2.65	71.1	3.7	2.12	2.17	19.49	19.11
202	2869.23	671	573	21.1	19.6	2.64	2.65	72.2	2.6	2.08	2.12	19.77	19.40
205	2869.42	1367	1219	24.6	23.1	2.63	2.65	71.6	0.8	1.98	2.02	20.14	19.73
209	2869.63	1464	1308	24.8	23.3	2.63	2.64	79.8	2.7	1.98	2.02	19.79	19.40
213	2869.94	1140	1006	23.0	20.8	2.63	2.64	77.4	2.9	2.03	2.08	19.43	18.91
216	2870.17	618	534	21.9	20.3	2.63	2.65	74.2	3.6	2.05	2.10	19.64	19.24

Sample Number	Depth feet	Permeability to air, md		Porosity percent		Grain Density gms/cc		Residual Fluids		Bulk Dry Density		Bulk Volume ccs	
		Ambient	NOBP	Ambient	NOBP	Calculated	Absolute	Sw%	So%	Ambient	NOBP	Ambient	NOBP
220	2870.38	929	809	22.7	20.8	2.63	2.62	77.5	1.3	2.04	2.08	19.56	19.10
223	2870.61	894	775	20.9	19.1	2.64	2.65	78.2	2.2	2.09	2.14	19.49	19.04
226	2870.82	700	599	20.5	18.3	2.62	2.62	78.6	0.7	2.09	2.14	19.44	18.92
231	2871.24	1620	1405	23.0	21.0	2.63	2.65	56.9	2.1	2.03	2.08	19.11	18.63
234	2871.44	1431	1233	23.3	21.2	2.63	2.66	73.1	3.5	2.02	2.07	19.01	18.51
238	2871.66	899	763	21.9	20.4	2.63	2.65	67.2	2.1	2.05	2.09	19.33	18.96
240	2871.82	1472	1275	22.3	20.4	2.63	2.65	57.2	9.9	2.04	2.09	19.39	18.93
244	2872.06	1049	873	20.8	18.9	2.63	2.65	66.3	0.5	2.08	2.13	19.13	18.68
247	2872.23	1006	863	22.1	20.0	2.63	2.65	70.4	0.5	2.05	2.10	19.19	18.67
250	2872.43	852	720	21.8	19.7	2.63	2.65	74.5	0.4	2.06	2.11	19.07	18.56

Terakihi No 1 - Core No 1

2 Sst: lt gry, fn gr w/ rr crs gr thru, w/ srt, p cmt, v fri, sbang, carb spk thru, mnr arg mtrx

5 Sst: a/a but incr abd of rndd crs gr

7 Sst: a/a but incr abd of crs gr

9 Sst: lt gry, mnr fn gr - v crs gr, p srt, p cmt, v fri, sbang - rndd w/ crs, dom cln

13 Sst: lt gry, fn - crs gr, p srt, p cmt, v fri, sbang - sbrnd, mnr arg mtrx

16 Sst: lt gry,fn - rr med gr thru, mod w/ srt, p cmt, v fri, sbang, carb incl thru mnr lam, mnr arg mtrx

18 Sst: lt gry,fn gr, wl srt, p cmt, v fri, sbang, mnr carb spk thru, mnr arg mtrx

21 Sst: lt gry, fn - med gr, mod wl srt, p cmt, v fri, sbang mnr carb lam & spk thru, mnr arg mtrx

24 Sst: lt gry, dom fn gr w/ crs - v crs grn thru, p srt, p cmt, v fri, sbang, arg mtrx

38 Sst: lt gry, rr fn gr - dom crs - v crs gr, mod srt, p cmt, v fri, sbang - occ sbrnd, dom cln Sst

40 Sst: a/a

46 Sst: a/a

48 Sst: a/a

50 Sst: a/a but w/ slightly more mtrx matl

52 Sst: a/a but dom med - crs gr

54 Sst: a/a

56 Sst: a/a but dom med gr

59 Sst: a/a

62 Sst: lt gry, rr fn - v crs gr, p srt, p cmt, v fri, sbang - rr sbrnd gr, dom cln Sst w/v mnr arg mtrx matl

63 Sst: a/a

66 Sst: a/a

68 Sst: a/a dom crs gr

71 Sst: a/a dom crs gr

72 Sst: a/a

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76 Sst: lt gry, rr fn - v crs gr, dom crs, p srt, p cmt, v fri, sbang - rr sbrnd gr thru, dom cln Sst w mnr arg mtrx matl

78 Sst: a/a

79 Sst: a/a dom crs gr w/ mnr v crs gr

85 Sst: a/a

87 Sst: a/a

89 Sst: a/a but w/ more abd crs gr thru

92 Sst: a/a but w/ v crs gr thru

93 Sst: a/a

96 Sst: a/a

98 Sst: a/a

104 Sst: a/a

105 Sst: a/a

108 Sst: a/a dom crs gr w/ rr v crs gr thru

110 Sst: a/a

115 Sst: a/a but w/ more crs gr thru

117 Sst: a/a dom med - crs gr

120 Sst: a/a

122 Sst: lt gry/wh, rr fn - dom crs gr, mod srt, wl cmt, sbang - rr sbrnd gr thru, abd wh cly mtrx

124 Sst: a/a

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Terakihi No 1 - Core No 2

127 Sst: lt gry, rr fn - dom v crs gr, mod-p srt, p cmt, v fri, rr sbang w/ fn gr - dom mod w rndd w/ crs gr, rr carb spks thru, dom cln v mnr arg mtrx

130 Sst: a/a

134 Sst: a/a w/ marginal incr in arg mtrx matl

137 Sst: a/a but dom med gr w/ incr matrx matl abd carb incl

139 Sst: lt gry, fn - v crs gr, dom crs gr, p srt, p cmt, v fri, dom sbrnd - sbang w/ fn gr, mnr arg mtrx thru

143 Sst: a/a w/ mnr frac thru

145 Sst: a/a

148 Sst: a/a but dom med gr

151 Sst: a/a but dom med gr & more abd mtrx

154 Sst: a/a

158 Sst: lt gry fn - rr v crs gr dom crs gr p - mod srt, p cmt, fri, dom sbrnd - sbang w/ fn gr, arg mtrx thru rr tr mica thru & rr pyr incl

161 Sst: a/a but no pyr and predom cln

165 Sst: lt gry fn - rr v crs gr dom crs gr p - mod srt, p cmt, fri, dom sbrnd, sbang w/ fn gr, mnr arg mtrx dom cln, rr tr mica thru, rr qtz o'gth

168 Sst: a/a

172 Sst: a/a

176 Sst: lt gry dom fn gr - v crs gr, p - mod srt, w cmt, dom sbang w/ fn sbrnd - rnd w/ crs gr, arg mtrx, tr mica thru

179 Sst: a/a

182 Sst: a/a

185 Sst: a/a but only mod w/ cmt

189 Sst: a/a

192 Sst: a/a but only mod w/ cmt

195 Sst: lt gry, dom fn gr w/ crs gr thru, w srt, mod cmt, fri, dom sbang w/ fn gr crs gr sbrnd, mnr arg mtrx, tr mica thru

199 Sst: a/a but w/ rr v crs grn thru

202 Sst: a/a

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205 Sst: a/a

209 Sst: lt gry, dom fn - med gr w/ rr crs gr thru, mod w/ srt, p - mod cmt, fri, sbang, mnr arg mtrx dom cln, rr tr mica thru

213 Sst: a/a

216 Sst: a/a but incr abd of crs - v crs gr thru v fri

220 Sst: a/a

223 Sst: lt gry, fn - med gr w/ abd crs gr thru p - mod srt, p cmt, v fri, sbang - rnd w/ crs gr, rr arg mtrx dom cln, rr tr mica thru

226 Sst: a/a

231 Sst: a/a mnr frac thru

234 Sst: a/a

238 Sst: lt gry, dom fn - med gr, w/ rr crs gr thru, mod wl srt, p cmt, v fri, sbang, mnr arg mtrx dom cln

240 Sst: a/a

244 Sst: a/a

247 Sst: a/a

250 Sst: lt gry, fn - dom med gr, w/ srt, p cmt, v fri, sbang - sbrnd, rr carb spk thru, rr tr mica thru, mnr arg mtrx, dom cln