

Well Completion Report for  
Dolphin A-3  
W1163

**Esso Australia Ltd.**

**WELL COMPLETION REPORT  
DOLPHIN A-3  
GIPPSLAND BASIN, VICTORIA**

**PETROLEUM DIVISION**

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Compiler: Sheryl Sazenis  
January 1998

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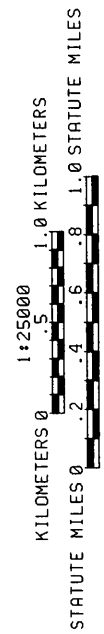
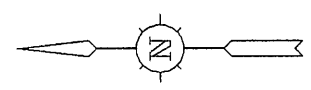
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ESSO AUSTRALIA LTD.  
DOLPHIN

TOP OF N-1.1 RESERVOIR DEPTH MAP  
CI = 10M  
EST. 00WC = 1224M TVDSS

SCALE 1:25,000  
DATE 24-MAR-96  
DRAWN BY H.A.S.M.I.T.H.



<b>II. WELL DATA RECORD (cont.)</b>
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**LOCATION\***

<b>Field</b>	Dolphin	<b>Conductor #1 Surface Coordinates</b>	
<b>Well Name</b>	Dolphin A3	AMG X	532809.05mE
<b>Conductor Number</b>	3	AMG Y	5739857.95mN
<b>State</b>	Victoria	Latitude	38° 29' 19.99" S
<b>Permit/Licence</b>	VIC/L15	Longitude	147° 22' 34.32" E
<b>Geological Basin</b>	Gippsland	<b>Perforations:</b>	1288.0 - 1290.9m MDRT
<b>Top of N-1.1</b>	1288.0m MDRT 1245.0m TVDRT		1245.0 - 1247.9m TVDRT
AMG X	533043.9mE		1295.2 - 1297.2m MDRT
AMG Y	5739673.6mN		1252.2 1254.2m TVDRT

**ELEVATIONS & DEPTHS**

<b>Water Depth</b>	37.8m
<b>Top Wellhead to MSL</b>	14.3m
<b>Main Deck Rel to MSL</b>	24.1m
<b>RT Relative to MSL</b>	41.2m
<b>Average Well Angle</b>	10°
<b>Total Depth</b>	1373.0mMDRT 1329.3mTVDRT
<b>Plug Back Depth</b>	Not Plugged back

**DATES**

<b>Skid Rig</b>	12/09/1997
<b>Spudded Well</b>	16/09/1997
<b>Development Rig Days</b>	16
<b>NPT Days</b>	0.1
<b>Rig Released</b>	27/09/1997
<b>LP. Established</b>	01/10/1997

**MISCELLANEOUS**

<b>Operator</b>	Esso Australia Ltd	<b>Drilling AFE No.</b>	L. 05337006
<b>Esso Interest</b>	50%	<b>Contractor</b>	Sante Fe Drilling
<b>Permittee/Licencee</b>	Esso/BHPP	<b>Rig Name</b>	Parameswara
<b>Other Interest</b>	50% BHPP	<b>Equipment Type</b>	Platform
<b>Overriding Royalty</b>	2.5%	<b>Completion Type</b>	Tandem - 5-1/2"

**WELL CLASSIFICATION**

<b>Before Drilling</b>	Development	<b>After Drilling</b>	Oil Well
	<b>*Datum</b>	AGD-66	
	Spheroid	ANS	
	Projection	UTM	

<b>II. WELL DATA RECORD (cont.)</b>
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**CASING RECORD**

Type	Size (inches)	Weight (ppf)	Grade	Thread	Depth (mMDRT)
Surface	13.375"	68	K55	BTC	877.5
Intermediate	9.625"	43.5	L-80	LT&C	1369.16

**CEMENTING RECORD**

String Cemented	Cement Type	Dry Cmt Vol (sx)	Cement Additives	Mix Water (bbls)	Slurry Vol (bbls)	Slurry Density (ppg)	Cement to/from (mMDRT)	Csg Test Pressure (psi)
Surface								
Lead	Class G	1570	0.45gal/sx Econolite	192	718	12.6		
Tail	Class G	300		89	71	15.2		2000
Intermediate	Class G	327	Halad 322-LXP 2.2 gals/bbl	68		15.8		

<b>II. WELL DATA RECORD (cont.)</b>
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**DRILLING PERFORMANCE**1. OVERVIEW:

Platform:	Dolphin	
Well:	A-3	
Total Depth:		
Planned	(m MDRT)	1360
	(m TVDRT)	1311
Actual	(m MDRT)	1373
	(m TVDRT)	1330
Conductor Shoe	(m TVDRT)	141
Kick off Point:	(m MDRT)	141
Interval Drilled:	(m)	1219
Maximum Angle:		22.6°
Maximum Mud Weight:		9.8 ppg
Start Date:		13-09-97 @ 0000hrs
Time	- Target Days:	11.1
	- AFE Days:	15.9
	- Actual Days:	16.0
	- Days to TD:	8.9
	- % ± Target:	44% over target
PIT	- Surface Casing:	11.4 ppge EMW
Completion	- Type:	Tandem
	- Size:	5-1/2"
	- Perforations:	Lower: 1295.2 - 1297.2mMDRT / Upper: 1288.0 - 1290.9mMDRT
Cost	- Original AFE (A\$k):	\$ 4,084
	- Revision to AFE (A\$k):	Nil
	- Actual (A\$k):	\$ 3,836
		- \$/m Total: \$2794/m
		- \$/day Total (A\$k): \$240k/day
Lost Time	- Days:	0.1
	- % Total Time:	<1
	- Estimated Cost (A\$k):	Nil

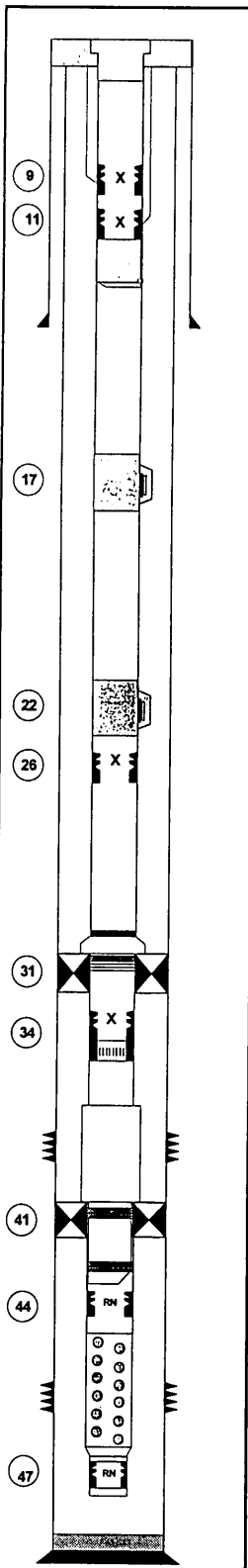
Field: **Dolphin**

Plat: **DPA** Well: **A3**

Rev. No. **E01-MHH**

Rev. Date **3/02/98**

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No.	Qty.	Description	OD Max	ID Min	Length (m)	MD (m)	TVD (m)
1	1	KB to top of Tubing Head Flange			28.00		
2	1	Depth Correction for tubing tally / wireline discrepancy			-2.33	28.00	
3	1	Tubing Compression (15,000 lb)					
4	1	Tubing Hanger, 5-1/2" Cameron, 11" MC-2, 2070098-01, bottom = 5-1/2" Vam Ace Box	10.737	4.930	0.48	25.67	
5	4	Pup Joint, 5-1/2" 17.0 lb/ft SM13Cr-80 VAM ACE	5.500	4.892	5.99	26.15	
6	34	Tubing, 5-1/2" 17.0 lb/ft SM13Cr-80 VAM ACE	5.500	4.892	409.92	32.14	
7	1	Pup Joint, 5-1/2" 17.0 lb/ft SM13Cr-80 VAM ACE	5.500	4.892	1.88	442.06	
8	1	Flow Coupling, 5-1/2" Hbtn 811FN55001 Vam Ace, 9Cr1Mo	6.180	4.758	1.79	443.94	
9	1	SSV Baker LP Nipple, 824-15-4562, 5-1/2" 13Cr, 4.562" X profile	8.145	4.562	0.85	445.73	433
10	1	Flow Coupling, 5-1/2" Hbtn 811FN55001 Vam Ace, 9Cr1Mo	6.180	4.758	1.64	446.58	
11	1	TRSSV, 5-1/2" Baker "TE5", 824-83-4519, 4.562" X profile, Vam Ace, 13Cr, 1970 psi	8.375	4.562	2.13	448.22	436
12	1	Flow Coupling, 5-1/2" Hbtn 811FN55001 Vam Ace, 9Cr1Mo	6.180	4.758	1.78	450.35	
13	1	Pup Joint, 5-1/2" 17.0 lb/ft SM13Cr-80 VAM ACE	5.500	4.892	0.67	452.13	
14	24	Tubing, 5-1/2" 17.0 lb/ft SM13Cr-80 VAM ACE	5.500	4.892	289.72	452.80	
15	1	Pup Joint, 5-1/2" 17.0 lb/ft SM13Cr-80 VAM ACE	5.500	4.892	1.88	742.52	
16	1	Flow Coupling, 5-1/2" Hbtn 811FN55001 Vam Ace, 9Cr1Mo	6.180	4.758	1.80	744.40	
17	1	Side Pocket Mandrel, 5-1/2" Hbtn LB 215LB73151 with 1.5" pocket	7.780	4.620	2.97	746.20	716
18	1	Pup Joint, 5-1/2" 17.0 lb/ft SM13Cr-80 VAM ACE	5.500	4.892	1.88	749.17	
19	25	Tubing, 5-1/2" 17.0 lb/ft SM13Cr-80 VAM ACE	5.500	4.892	302.55	751.05	
20	1	Pup Joint, 5-1/2" 17.0 lb/ft SM13Cr-80 VAM ACE	5.500	4.892	1.88	1053.60	
21	1	Flow Coupling, 5-1/2" Hbtn 811FN55001 Vam Ace, 9Cr1Mo	6.180	4.758	1.79	1055.48	
22	1	Side Pocket Mandrel, 5-1/2" Hbtn LB 215LB73151 with 1.5" pocket	7.780	4.620	2.97	1057.27	1017
23	1	Pup Joint, 5-1/2" 17.0 lb/ft SM13Cr-80 VAM ACE	5.500	4.892	1.88	1060.24	
24	1	Tubing, 5-1/2" 17.0 lb/ft SM13Cr-80 VAM ACE	5.500	4.892	12.13	1062.12	
25	1	Pup Joint, 5-1/2" 17.0 lb/ft SM13Cr-80 VAM ACE	5.500	4.892	1.89	1074.25	
26	1	Landing Nipple, 5-1/2" Hbtn "X", 811X45652, 4.562" packing bore, VAM ACE	6.081	4.562	0.44	1076.14	1035
27	1	Pup Joint, 5-1/2" 17.0 lb/ft SM13Cr-80 VAM ACE	5.500	4.892	1.89	1076.58	
28	16	Tubing, 5-1/2" 17.0 lb/ft SM13Cr-80 VAM ACE	5.500	4.892	194.13	1078.47	
29	1	Pup Joint, 5-1/2" 17.0 lb/ft SM13Cr-80 VAM ACE	5.500	4.892	1.89	1272.60	
30	1	Ratch Latch Seal Assembly, 5-1/2" Hbtn 212SSR2-C, 5-1/2" Vam Ace Box, 9Cr-1Mo	7.750	4.939	0.38	1274.49	
31	1	Packer, 9-5/8" Hbtn VHR 12VHR7, Vam Ace, 9Cr1Mo	8.300	4.939	2.40	1274.87	1232
32	1	Pup Joint, 5-1/2" 17.0 lb/ft SM13Cr-80 VAM ACE	5.500	4.892	1.57	1277.27	
33	1	Pup Joint, 5-1/2" 17.0 lb/ft SM13Cr-80 VAM ACE	5.500	4.892	1.88	1278.84	
34	1	Sliding Sleeve, 5-1/2" Baker CMD 810-80-6705, 4.562" X profile	6.050	4.562	1.38	1280.72	1238
35	2	Pup Joint, 5-1/2" 17.0 lb/ft SM13Cr-80 VAM ACE	5.500	4.892	3.66	1282.10	
36	3	Flow Coupling, 5-1/2" Hbtn 811FN55001 Vam Ace, 9Cr1Mo	6.180	4.758	5.40	1285.76	
37	1	Straight Slot Locator, Hbtn 812S60011, 5-1/2" VAM ACE 9Cr1Mo	6.600	4.860	0.45	1291.16	
38	2	Seal Unit, 6.000" Hbtn 212RTR60000-C	6.018	4.860	1.12	1291.61	
39	1	Mule Shoe Guide, Hbtn 212G60000-C	5.960	4.860	0.21	1292.73	
40	1	Depth Correction for overlap of seal assembly inside packer			-1.54	1292.94	
41	1	Packer, 9-5/8" Hbtn MGP 12MGP90004-T Wireline Set Retrievable	8.450	6.000	1.63	1291.40	1248
42	1	Xover, 5-1/2" x 7" VAM ACE x 8UNS PxP Hbtn 812C95508, 9Cr-1Mo	7.200	4.853	0.29	1293.03	
43	1	Pup Joint, 5-1/2" 17.0 lb/ft SM13Cr-80 VAM ACE	5.500	4.892	0.66	1293.32	
44	1	Landing Nipple, 5-1/2" Hbtn "RN", 811RN43101, 4.313" packing bore, 3.987" NoGo	6.110	3.987	0.44	1293.98	1251
45	1	Perforated Pup Joint, 5-1/2" 17.0 lb/ft SM13Cr-80 VAM ACE	5.500	4.892	3.71	1294.42	
46	1	Xover, 4-1/2" x 5-1/2" EUE x VAM ACE PxB, Hbtn 892BPC54016, 9Cr1Mo	5.550	3.958	0.23	1298.13	
47	1	Landing Nipple, 4-1/2" Hbtn "RN", 11RN34316, 3.437" packing bore, 3.260" NoGo	5.619	3.260	0.41	1298.36	1255
48	1	Wireline Guide, 4-1/2" EUE	5.750	3.833	0.21	1298.77	
49	1	Bottom of Tubing				1298.98	1256

**Wellhead Size and Type:**  
Xmas Tree: Cooper 7-1/16" x 5-1/8", 3000 psi

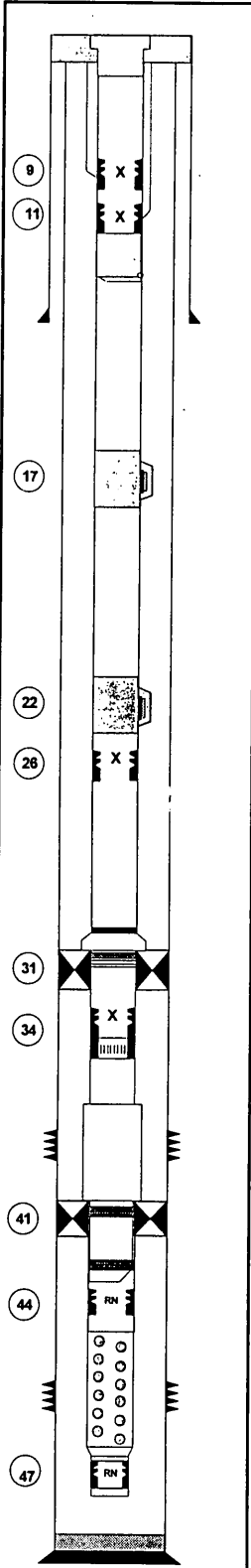
**Wellhead Cap:**  
7-1/16" API 3000 WP  
VAMACE Lifting Threads.

**BPV Preparation:**  
5" Cameron Type "H" BPV

NOTE: See Page 2 of 2 for Casing and Perforation Data



Field: **Dolphin** Plat: **DPA** Well: **A3** Rev. No. **E01-MHH** Rev. Date **3/02/98** Page 2 of 2



No.	Description	OD	ID	Length (m)	MD (m)	TVD (m)
		Max	Min			
1	KB to top of Surface Casing	0.000	0.000	28.00		
2	Surface Casing, MC-2 wellhead	0.000	0.000	0.75	28.00	
3	Surface Casing, 13-3/8" 68.00 lb/ft K-55 BTC (69 jts.)	13.375	12.260	813.30	28.75	
4	Surface Casing, 13-3/8" 68.00 lb/ft K-55 BTC (Float collar)	13.375	12.260	11.88	842.05	
5	Surface Casing, 13-3/8" 68.00 lb/ft K-55 BTC (1 joint)	13.375	12.260	11.80	853.93	
6	Surface Casing, 13-3/8" 68.00 lb/ft K-55 BTC (Float shoe)	13.375	12.260	11.77	865.73	
7	Surface Casing Setting Depth	0.000	0.000	0.00	877.50	
1	KB to top of Production Casing	0.000	0.000	28.64		
2	Production Casing, 9-5/8" 43.50 lb/ft L-80 LT&C (101 jts.)	9.625	8.599	1209.43	28.64	
3	Production Casing, 9-5/8" 43.50 lb/ft L-80 LT&C	9.625	8.599	11.84	1238.07	
4	Production Casing, 9-5/8" 43.50 lb/ft L-80 LT&C (7 jts)	9.625	8.599	83.22	1249.91	
5	Production Casing, 9-5/8" 43.50 lb/ft L-80 LT&C (Float collar)	9.625	8.599	11.75	1333.13	
6	Production Casing, 9-5/8" 43.50 lb/ft L-80 LT&C	9.625	8.599	12.00	1344.88	
7	Production Casing, 9-5/8" 43.50 lb/ft L-80 LT&C (Float shoe)	9.625	8.599	12.28	1356.88	
8	Production Casing Setting Depth	0.000	0.000	0.00	1369.16	

Perforation Details

Name	Eff.	Aband.	Top	Bot.	Interval	TVD	Gun Description	Comment
N-1.1	25/09/1997		1288.00	1290.90	2.90	1245	HBTN 7" csg, 12spf, 39gm, DP	Open
N-1.2	25/09/1997		1295.20	1297.20	2.00	1252	HBTN 7" csg, 12spf, 39gm, DP	Open

**DPA MONOTOWER**

**Wellhead Size and Type:**  
Xmas Tree: Cooper 7-1/16" x 5-1/8", 3000 psi

**Wellhead Cap:**  
7-1/16" API 3000 WP  
VAMACE Lifting Threads.

**BPV Preparation:**  
5" Cameron Type "H" BPV

**Avg Angle:** 10°

**Max:** 23° @ 13.9 m MDRT

**Original Completion:** 25/09/97

**Last Workover:**

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### III. SAMPLES

#### Cuttings

Three sets of washed and oven dried cuttings were taken at 10m intervals from 100m MDRT above predicted Top of Latrobe Group to approximate Top of Latrobe Group, then at 5m intervals to TD. Cuttings descriptions for the interval 870m to 1373.5m MDRT are contained in Appendix 3a.

#### Conventional coring

No conventional cores were cut in Dolphin A-3.

#### Sidewall coring

No sidewall cores were shot in Dolphin A-3.

### IV. LOGS AND SURVEYS

Survey/Log	Company	Top (m MDRT)	Bottom (m MDRT)
MWD (Directional)	Halliburton	154.8	1373.5
DLL-MSFL-CAL-DSN-SDL-NGRT-CSNG-SP	Halliburton	1194.0	1369.0
MDT-MRPO-MRSC-MRFA-MRFC-GR	Schlumberger	1289.0	1338.8

<b>V. FORMATION RESERVOIR TOPS</b>
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Formation/ Zone	m TVDSS			m MDRT	m TVT Net Oil Sand	
	Predicted	Actual	Difference		Predicted	Actual
Top of Latrobe Group (TOL)	1180.0	1179.2	0.8 High	1264.0		
Top N-1.1	1200.0	1203.0	3.0 Low	1288.0	7	4
Top N-1.2	1208.0	1209.5	1.5 Low	1294.5	3	2.4
Top N-1.4	-	1219.4		1304.5		
Top N. asp coal	1229.0	1229.8	0.8 Low	1315.0		
Total Depth	1269.0	1287.3		1373.0		

## VI. GEOLOGICAL ANALYSIS

### Objectives

The Dolphin oil field is located in 38 metres of water, 21 km offshore in the Gippsland Basin, Victoria, Licence Area Vic/L15. The Dolphin field is situated approximately 10 km NE of Perch and 15 km SE of Tarwhine along a regional series of NE-SW trending anticlines. The Dolphin-Blenny NE-SW anticlinal structure is modified by NW-SE trending normal faults. The Dolphin oil field is situated on the highside of the most SW fault block. Oil is reservoired in three thin, upper N. asperus sands, with current production from the top two (N-1.1 and N-1.2 sands).

The Dolphin A3 well was the second development well drilled in the Dolphin oil field. The well was designed to capture economic reserves (2.2 MSTB) by accelerating production from beyond life end of the monotower. The well is located 275m southeast of Dolphin 2 and 75 metres SW of the main Dolphin fault.

The top of the N-1.1 Sand was prognosed at 1200m TVDss with a NTG of 100%, average porosity of 25% and an oil saturation of 80%.

Three mappable seismic horizons were used; the Top of Latrobe (TOL), the top of the N-1.1 reservoir and the top of the N. asperus Coal. The top of the N-1.1 Sand and TOL were mapped by isopaching from the N. asp. Coal.

### Results

The well intersected the target, with the TOL 0.8m high, top of the N-1.1 Sand 3.0m low and N. asp Coal 0.8m low to prognosis. Dolphin A3 encountered 4.0m of net oil in the N-1.1 sand and 2.4m net oil in the N-1.2 sand.

Logs from the Dolphin A3 well display relatively low resistivity values for the N-1.1 sand. This resistivity is equivalent to the resistivity of the water wet sands deeper within the Latrobe section. A Schlumberger MDT tool sampled oil in the N-1.1 sand confirming that it was not water wet. The relatively low resistivity values are a result of slightly poorer reservoir quality at the A3 location when compared to Dolphin A2.

No OWC is detected from logs, which leads to uncertainty in the position of the OOWC. The latest structural mapping when integrated with production history places the OOWC at approximately -1224m TVDss.

The average porosity of the N-1.1 sand is 27% in Dolphin 1 and Dolphin A2, and 18% in Dolphin A3. The N-1.2 reservoir has an average porosity of 25% in all three Dolphin wells. The thin, lower, water wet sands have porosities greater than 20%. The reservoir quality of the N-1.1 and N-1.2 sands is good with inferred multidarcy permeabilities. Net to Gross (NTG) for the N-1.1 reservoir is >95% in Dolphin 1 and Dolphin A2 and 80% in Dolphin A3. The NTG is lower in Dolphin A3 due to the presence of silt at the top and base of the sand.

## V. GEOLOGICAL ANALYSIS (cont'd)

The N-1.1 sand is a clean, highly porous unit in the Dolphin 1 and Dolphin A2 wells and is interpreted to be an upper shoreface marine reservoir. In the absence of core data and 3D seismic, it is difficult to determine the depositional environment and understand the stratigraphic relationships between the three Dolphin wells. However, logs from the Dolphin A3 well display much lower resistivity and net to gross. The N-1.2 sand is coarse grained with good porosity and was possibly deposited as a tidal channel sand. The thin shales, sands and coals below the two main reservoirs reflect a lagoonal or coastal plain environment.

Dolphin A3 was completed as a tandem 5.5" completion (with sliding sleeve) with perforations in the N-1.1 Sand (1288.0 - 1290.9m MDRT (1203-1205.9 TVDss)) and N-1.2 Sand (1295.2-1297.2m MDRT (1210.17-1212.15m TVDss)). The well flowed at an initial rate of 10,000 bopd with 27% water cut.

### Geophysical Analysis

The three seismically mappable horizons used for structure mapping were the top of Latrobe, top of the N-1.1 Reservoir and top of the N.asperus Coal. The seismic data coverage over the Dolphin field consists of 7 different vintages of 2D data. The latest mapping suggests the Dolphin-Blenny structure to be a broad, shallow SW plunging anticline offset by a series of NW-SE trending down to the NE normal faults. Previous mapping proposes a much steeper plunging anticline. Current mapping in conjunction with performance data, places the OOWC at -1224m TVDss compared to -1242m TVDss. This difference in the OOWC depths is attributed to the different structural interpretations and stacking velocities used during depth conversion.

### Objectives

914254 014

**APPENDIX 1a**

**DOLPHIN A-3**

**Survey Data**

Halliburton Australia Pty Ltd - Drilling Systems

Survey Report

Date: 22/09/97  
 Time: 3:27 am  
 Wellpath ID: DPA A-3 mwd  
 Date Created: 12/09/97  
 Last Revision: 22/09/97

Calculated using the Minimum Curvature Method  
 Computed using WIN-CADDs REV2.2.2  
 Vertical Section Plane: 129.07 deg.

Survey Reference: STRUCTURE ORIGIN  
 Reference World Coordinates: Lat. 38.29.20 S - Long. 147.22.34 E  
 Reference GRID System: Australian (UTM) Zone: 55, Cent. Merid: 147.00.00 E  
 Reference GRID Coordinates: (m): 5739858.00 N 532809.10 E  
 North Aligned To: GRID NORTH  
 Offset, Reference To WellHead: (m): 0.80 S 0.20 W 0.00 TVD  
 Vertical Section Reference: STRUCTURE ORIGIN  
 Exposure Reference: STRUCTURE ORIGIN  
 TVD Reference: STRUCTURE ORIGIN

ESSO AUSTRALIA LTD.  
 PASS STRAIT  
 Dolphin  
 3  
 DPA A-3 mwd

Measured Depth (m)	Incl (deg.)	Drift Dir. (deg.)	TVD (m)	Subsea Depth (m)	TOTAL Rectangular Offsets (m)		Vertical Section (m)	Build Rate (dg/30m)	Walk Rate (dg/30m)	DLS (dg/30m)
0.00	0.00	0.00	0.00	-42.10	0.80 S	0.20W	0.35	0.00	0.00	0.00
30.00	0.26	221.69	30.00	-12.10	0.85 S	0.25W	0.35	0.26	0.00	0.26
35.00	0.46	259.34	35.00	-7.10	0.86 S	0.27W	0.33	1.20	225.90	1.80
40.00	0.42	230.99	40.00	-2.10	0.88 S	0.31W	0.32	-0.24	-170.10	1.31
45.00	0.43	248.07	45.00	2.90	0.90 S	0.34W	0.30	0.06	102.48	0.76
50.00	0.43	222.54	50.00	7.90	0.92 S	0.37W	0.29	0.00	-153.18	1.14
55.00	0.49	233.91	55.00	12.90	0.94 S	0.40W	0.29	0.36	68.22	0.65
60.00	0.56	225.13	60.00	17.90	0.97 S	0.43W	0.28	0.42	-52.68	0.64
65.00	0.61	231.42	65.00	22.90	1.01 S	0.47W	0.27	0.30	37.74	0.49
70.00	0.39	222.01	70.00	27.90	1.04 S	0.50W	0.26	-1.32	-56.46	1.40
75.00	0.37	193.81	75.00	32.90	1.07 S	0.52W	0.27	-0.12	-169.20	1.12
80.00	0.64	160.30	80.00	37.90	1.11 S	0.51W	0.30	1.62	-201.06	2.34
85.00	1.66	134.19	85.00	42.90	1.18 S	0.45W	0.40	6.12	-156.66	6.73
90.00	2.07	134.46	89.99	47.89	1.30 S	0.34W	0.56	2.46	1.62	2.46
95.00	2.53	130.76	94.99	52.89	1.43 S	0.19W	0.76	2.76	-22.20	2.90
100.00	2.95	133.19	99.98	57.88	1.59 S	0.01W	1.00	2.52	14.58	2.61
105.00	3.71	132.02	104.98	62.88	1.79 S	0.20 E	1.29	4.56	-7.02	4.58
108.20	4.06	131.06	108.17	66.07	1.93 S	0.37 E	1.50	3.28	-9.00	3.34
115.80	4.58	130.72	115.75	73.65	2.31 S	0.80 E	2.08	2.05	-1.34	2.06
125.50	4.07	134.80	125.42	83.32	2.80 S	1.34 E	2.80	-1.58	12.62	1.84
136.20	6.77	131.77	136.07	93.97	3.49 S	2.08 E	3.81	7.57	-8.50	7.61
W.D. Surveys										
154.80	8.40	136.60	154.51	112.41	5.21 S	3.83 E	6.26	2.63	7.79	2.82
182.40	10.60	131.65	181.73	139.63	8.36 S	7.11 E	10.79	2.39	-5.38	2.55
211.70	11.20	127.20	210.50	168.40	11.87 S	11.39 E	16.33	0.61	-4.56	1.06
240.60	11.80	129.30	238.82	196.72	15.44 S	15.91 E	22.09	0.62	2.18	0.76
269.50	13.80	130.00	267.00	224.90	19.53 S	20.84 E	28.49	2.08	0.73	2.08
298.40	15.70	129.30	294.95	252.85	24.22 S	26.51 E	35.85	1.97	-0.73	1.98
327.30	17.40	130.10	322.65	280.55	29.48 S	32.84 E	44.08	1.76	0.83	1.78
356.10	19.10	131.60	350.00	307.90	35.38 S	39.66 E	53.09	1.77	1.56	1.84
385.00	20.90	132.50	377.15	335.05	42.01 S	46.99 E	62.96	1.87	0.93	1.90
413.90	22.60	133.00	404.00	361.90	49.28 S	54.86 E	73.65	1.76	0.52	1.78
442.80	22.10	132.90	430.73	388.63	56.76 S	62.90 E	84.61	-0.52	-0.10	0.52
471.60	21.60	133.40	457.46	415.36	64.09 S	70.72 E	95.30	-0.52	0.52	0.56
500.50	21.20	130.70	484.36	442.26	71.16 S	78.55 E	105.83	-0.42	-2.80	1.10
529.40	21.20	126.30	511.31	469.21	77.66 S	86.72 E	116.27	0.00	-4.57	1.65
558.30	20.70	126.20	538.30	496.20	83.77 S	95.05 E	126.60	-0.52	-0.10	0.52
588.90	20.10	125.93	566.98	524.88	90.05 S	103.68 E	137.25	-0.59	-0.26	0.60
617.90	19.80	125.80	594.24	552.14	95.85 S	111.69 E	147.13	-0.31	-0.13	0.31
646.60	19.40	125.10	621.28	579.18	101.43 S	119.54 E	156.73	-0.42	-0.73	0.48



## Halliburton Australia Pty Ltd - Drilling Systems

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## Survey Report

Wellpath ID: DPA A-3 mwd

Measured Depth (m)	Incl (deg.)	Drift Dir. (deg.)	TVD (m)	Subsea Depth (m)	TOTAL		Vertical Section (m)	Build Rate (dg/30m)	Walk Rate (dg/30m)	DLS (dg/30m)
					Rectangular (m)	Offsets (m)				
675.60	18.90	125.10	648.67	606.57	106.90 S	127.32 E	166.22	-0.52	0.00	0.52
704.20	18.30	125.00	675.78	633.68	112.14 S	134.79 E	175.32	-0.63	-0.10	0.63
732.90	17.60	126.80	703.08	660.98	117.32 S	141.95 E	184.15	-0.73	1.88	0.93
761.70	17.00	128.40	730.58	688.48	122.55 S	148.74 E	192.72	-0.62	1.67	0.80
790.60	16.70	128.20	758.24	716.14	127.74 S	155.31 E	201.09	-0.31	-0.21	0.32
819.13	16.20	128.20	785.60	743.50	132.73 S	161.66 E	209.17	-0.53	0.00	0.53
846.20	16.00	128.00	811.61	769.51	137.37 S	167.57 E	216.68	-0.22	-0.22	0.23
859.00	15.70	128.30	823.92	781.82	139.53 S	170.32 E	220.17	-0.70	0.70	0.73
3 3/8" Casing Shoe										
877.50	15.42	128.72	841.74	799.64	142.62 S	174.20 E	225.13	-0.45	0.68	0.49
885.00	15.30	128.90	848.98	806.88	143.86 S	175.75 E	227.12	-0.48	0.72	0.52
923.10	15.30	127.90	885.73	843.63	150.11 S	183.63 E	237.17	0.00	-0.79	0.21
951.80	14.60	127.30	913.45	871.35	154.62 S	189.49 E	244.57	-0.73	-0.63	0.75
982.20	12.20	128.00	943.02	900.92	158.92 S	195.07 E	251.62	-2.37	0.69	2.37
1011.00	11.00	128.80	971.23	929.13	162.52 S	199.61 E	257.41	-1.25	0.83	1.26
Top Lakes Entrance										
1027.00	10.39	128.11	986.96	944.86	164.37 S	201.94 E	260.38	-1.14	-1.29	1.17
1039.80	9.90	127.50	999.56	957.46	165.75 S	203.72 E	262.63	-1.15	-1.43	1.18
1068.70	9.80	128.00	1028.03	985.93	168.77 S	207.63 E	267.57	-0.10	0.52	0.14
1097.50	9.60	128.10	1056.42	1014.32	171.77 S	211.45 E	272.42	-0.21	0.10	0.21
1126.40	9.50	125.80	1084.92	1042.82	174.65 S	215.28 E	277.21	-0.10	-2.39	0.41
1155.10	7.70	115.30	1113.30	1071.20	176.85 S	218.94 E	281.45	-1.88	-10.98	2.49
1184.00	7.70	115.00	1141.94	1099.84	178.50 S	222.45 E	285.21	0.00	-0.31	0.04
1212.70	7.70	115.30	1170.38	1128.28	180.13 S	225.93 E	288.94	0.00	0.31	0.04
1240.90	7.50	115.04	1198.33	1156.23	181.72 S	229.30 E	292.56	-0.21	-0.28	0.22
Top of Latrobe										
1263.60	7.50	115.17	1220.83	1178.73	182.98 S	231.99 E	295.43	0.00	0.17	0.02
1269.80	7.50	115.20	1226.98	1184.88	183.32 S	232.72 E	296.22	0.00	0.15	0.02
Top of Course Clastics										
1285.20	7.50	114.72	1242.25	1200.15	184.17 S	234.54 E	298.17	0.00	-0.94	0.12
Top of N1.1										
1288.50	7.50	114.61	1245.52	1203.42	184.35 S	234.93 E	298.59	0.00	-1.00	0.13
Base of N1.1										
1294.00	7.50	114.44	1250.97	1208.87	184.65 S	235.58 E	299.28	0.00	-0.93	0.12
Top of N1.2										
1295.20	7.50	114.41	1252.16	1210.06	184.71 S	235.73 E	299.43	0.00	-0.75	0.10
1297.60	7.50	114.33	1254.54	1212.44	184.84 S	236.01 E	299.74	0.00	-1.00	0.13
Base of N1.2										
1297.80	7.50	114.33	1254.74	1212.64	184.85 S	236.04 E	299.76	0.00	0.00	0.00
Top of N1.4										
1306.00	7.47	114.35	1262.87	1220.77	185.29 S	237.01 E	300.79	-0.11	0.07	0.11
Base of N1.4										
1308.00	7.46	114.35	1264.86	1222.76	185.40 S	237.25 E	301.04	-0.15	0.00	0.15
Top of N1 Coal										
1317.20	7.43	114.38	1273.98	1231.88	185.89 S	238.33 E	302.20	-0.10	0.10	0.10
1326.60	7.40	114.40	1283.30	1241.20	186.39 S	239.44 E	303.37	-0.10	0.06	0.10
1347.40	7.50	113.37	1303.92	1261.82	187.49 S	241.90 E	305.97	0.14	-1.49	0.24
1373.50	7.50	113.40	1329.80	1287.70	188.84 S	245.03 E	309.25	0.00	0.03	0.00

**APPENDIX 1b**

**DOLPHIN A-3**

**MD-TVD Survey Data Listing**

## Dolphin A-3 MD-TVD Survey Data Listing

MD	Angle	Direction	TVDRT	TVDSS	DNorth	DEast	Northing	Easting
0	0	0	0	-42	-0.80	-0.20	5739857.0	532808.9
5	0.04	36.95	5.00	-37.00	-0.80	-0.20	5739857.0	532808.9
10	0.09	73.90	10.00	-32.00	-0.80	-0.19	5739857.0	532808.9
15	0.13	110.85	15.00	-27.00	-0.81	-0.18	5739857.0	532808.9
20	0.17	147.79	20.00	-22.00	-0.83	-0.18	5739857.0	532808.9
25	0.22	184.74	25.00	-17.00	-0.85	-0.20	5739857.0	532808.9
30	0.26	221.69	30.00	-12.00	-0.85	-0.25	5739857.0	532808.8
35	0.46	259.34	35.00	-7.00	-0.86	-0.27	5739857.0	532808.8
40	0.42	230.99	40.00	-2.00	-0.88	-0.31	5739857.0	532808.8
45	0.43	248.07	45.00	3.00	-0.90	-0.34	5739857.0	532808.7
50	0.43	222.54	50.00	8.00	-0.92	-0.37	5739857.0	532808.7
55	0.49	233.91	55.00	13.00	-0.94	-0.40	5739857.0	532808.7
60	0.56	225.13	60.00	18.00	-0.97	-0.43	5739857.0	532808.6
65	0.61	231.42	65.00	23.00	-1.01	-0.47	5739857.0	532808.6
70	0.39	222.01	70.00	28.00	-1.04	-0.50	5739857.0	532808.6
75	0.37	193.81	75.00	33.00	-1.07	-0.52	5739857.0	532808.5
80	0.64	160.30	80.00	38.00	-1.11	-0.51	5739857.0	532808.5
85	1.66	134.19	85.00	43.00	-1.18	-0.45	5739857.0	532808.6
90	2.07	134.46	89.99	47.99	-1.30	-0.34	5739857.0	532808.7
95	2.53	130.76	94.99	52.99	-1.43	-0.19	5739857.0	532808.9
100	2.95	133.19	99.98	57.98	-1.59	-0.01	5739856.0	532809.0
105	3.71	132.02	104.98	62.98	-1.79	0.20	5739856.0	532809.3
110	4.18	130.98	109.96	67.96	-2.02	0.46	5739856.0	532809.5
115	4.53	130.76	114.95	72.95	-2.27	0.75	5739856.0	532809.8
120	4.36	132.49	119.93	77.93	-2.53	1.04	5739855.0	532810.1
125	4.10	134.59	124.92	82.92	-2.78	1.31	5739855.0	532810.4
130	5.21	133.53	129.91	87.91	-3.06	1.60	5739855.0	532810.7
135	6.47	132.11	134.88	92.88	-3.40	1.97	5739855.0	532811.0
140	7.10	132.76	139.84	97.84	-3.80	2.42	5739854.0	532811.5
145	7.54	134.06	144.80	102.80	-4.24	2.88	5739854.0	532811.9
150	7.98	135.35	149.76	107.76	-4.71	3.36	5739853.0	532812.4
155	8.42	136.56	154.71	112.71	-5.23	3.85	5739853.0	532812.9
160	8.81	135.67	159.65	117.65	-5.77	4.37	5739852.0	532813.4
165	9.21	134.77	164.59	122.59	-6.32	4.92	5739852.0	532814.0
170	9.61	133.87	169.52	127.52	-6.89	5.51	5739851.0	532814.6
175	10.01	132.98	174.45	132.45	-7.48	6.13	5739850.0	532815.2
180	10.41	132.08	179.37	137.37	-8.07	6.78	5739850.0	532815.8
185	10.65	131.26	184.28	142.28	-8.68	7.47	5739849.0	532816.5
190	10.76	130.50	189.20	147.20	-9.29	8.17	5739849.0	532817.2
195	10.86	129.74	194.11	152.11	-9.89	8.89	5739848.0	532817.9
200	10.96	128.98	199.02	157.02	-10.49	9.62	5739847.0	532818.7
205	11.06	128.22	203.93	161.93	-11.08	10.37	5739847.0	532819.4
210	11.17	127.46	208.83	166.83	-11.67	11.13	5739846.0	532820.2
215	11.27	127.44	213.74	171.74	-12.26	11.90	5739846.0	532821.0
220	11.37	127.80	218.64	176.64	-12.86	12.68	5739845.0	532821.7
225	11.48	128.17	223.54	181.54	-13.47	13.46	5739844.0	532822.5
230	11.58	128.53	228.44	186.44	-14.09	14.24	5739844.0	532823.3
235	11.68	128.89	233.34	191.34	-14.72	15.03	5739843.0	532824.1
240	11.79	129.26	238.23	196.23	-15.36	15.82	5739843.0	532824.9
245	12.10	129.41	243.12	201.12	-16.02	16.62	5739842.0	532825.7
250	12.45	129.53	248.01	206.01	-16.69	17.44	5739841.0	532826.5
255	12.80	129.65	252.89	210.89	-17.39	18.28	5739841.0	532827.3
260	13.14	129.77	257.76	215.76	-18.11	19.14	5739840.0	532828.2
265	13.49	129.89	262.63	220.63	-18.85	20.03	5739839.0	532829.1
270	13.83	129.99	267.49	225.49	-19.61	20.93	5739838.0	532830.0
275	14.16	129.87	272.34	230.34	-20.38	21.86	5739838.0	532830.9
280	14.49	129.75	277.18	235.18	-21.17	22.81	5739837.0	532831.9
285	14.82	129.62	282.02	240.02	-21.98	23.78	5739836.0	532832.8
290	15.15	129.50	286.85	244.85	-22.80	24.78	5739835.0	532833.8
295	15.48	129.38	291.67	249.67	-23.64	25.80	5739834.0	532834.9
300	15.79	129.34	296.49	254.49	-24.50	26.84	5739833.0	532835.9
305	16.09	129.48	301.29	259.29	-25.37	27.90	5739833.0	532837.0
310	16.38	129.62	306.09	264.09	-26.26	28.98	5739832.0	532838.0
315	16.68	129.76	310.89	268.89	-27.17	30.08	5739831.0	532839.1
320	16.97	129.90	315.67	273.67	-28.09	31.19	5739830.0	532840.2
325	17.26	130.04	320.45	278.45	-29.04	32.32	5739829.0	532841.4
330	17.56	130.24	325.22	283.22	-30.00	33.46	5739828.0	532842.5
335	17.85	130.50	329.99	287.99	-30.99	34.62	5739827.0	532843.7
340	18.15	130.76	334.74	292.74	-32.00	35.79	5739826.0	532844.8
345	18.44	131.02	339.49	297.49	-33.02	36.98	5739825.0	532846.0
350	18.74	131.28	344.23	302.23	-34.07	38.18	5739824.0	532847.2
355	19.04	131.54	348.96	306.96	-35.15	39.39	5739823.0	532848.4
360	19.34	131.72	353.68	311.68	-36.24	40.62	5739822.0	532849.7

MD	Angle	Direction	TVDRT	TVDSS	DNorth	DEast	Northing	Easting
365	19.65	131.88	358.39	316.39	-37.35	41.86	5739821.0	532850.9
370	19.97	132.03	363.10	321.10	-38.48	43.12	5739819.0	532852.2
375	20.28	132.19	367.79	325.79	-39.64	44.40	5739818.0	532853.5
380	20.59	132.34	372.48	330.48	-40.81	45.69	5739817.0	532854.7
385	20.90	132.50	377.15	335.15	-42.01	46.99	5739816.0	532856.1
390	21.19	132.59	381.82	339.82	-43.22	48.32	5739815.0	532857.4
395	21.49	132.67	386.48	344.48	-44.45	49.66	5739814.0	532858.7
400	21.78	132.76	391.13	349.13	-45.70	51.01	5739812.0	532860.1
405	22.08	132.85	395.76	353.76	-46.97	52.38	5739811.0	532861.4
410	22.37	132.93	400.39	358.39	-48.26	53.77	5739810.0	532862.8
415	22.58	133.00	405.01	363.01	-49.56	55.17	5739808.0	532864.2
420	22.49	132.98	409.63	367.63	-50.87	56.57	5739807.0	532865.6
425	22.41	132.96	414.25	372.25	-52.17	57.97	5739806.0	532867.0
430	22.32	132.94	418.88	376.88	-53.47	59.36	5739804.0	532868.4
435	22.23	132.93	423.50	381.50	-54.76	60.75	5739803.0	532869.8
440	22.15	132.91	428.13	386.13	-56.05	62.13	5739802.0	532871.2
445	22.06	132.94	432.76	390.76	-57.33	63.51	5739801.0	532872.6
450	21.97	133.03	437.40	395.40	-58.61	64.88	5739799.0	532873.9
455	21.89	133.11	442.04	400.04	-59.88	66.24	5739798.0	532875.3
460	21.80	133.20	446.68	404.68	-61.15	67.60	5739797.0	532876.7
465	21.71	133.29	451.32	409.32	-62.42	68.95	5739796.0	532878.0
470	21.63	133.37	455.97	413.97	-63.69	70.29	5739794.0	532879.4
475	21.55	133.08	460.62	418.62	-64.95	71.63	5739793.0	532880.7
480	21.48	132.62	465.27	423.27	-66.20	72.98	5739792.0	532882.0
485	21.41	132.15	469.92	427.92	-67.43	74.33	5739791.0	532883.4
490	21.35	131.68	474.58	432.58	-68.65	75.68	5739789.0	532884.7
495	21.28	131.21	479.24	437.24	-69.85	77.04	5739788.0	532886.1
500	21.21	130.75	483.90	441.90	-71.04	78.41	5739787.0	532887.5
505	21.20	130.01	488.56	446.56	-72.21	79.79	5739786.0	532888.8
510	21.20	129.25	493.22	451.22	-73.36	81.18	5739785.0	532890.2
515	21.20	128.49	497.88	455.88	-74.50	82.59	5739783.0	532891.6
520	21.20	127.73	502.55	460.55	-75.61	84.01	5739782.0	532893.1
525	21.20	126.97	507.21	465.21	-76.71	85.45	5739781.0	532894.5
530	21.19	126.30	511.87	469.87	-77.79	86.90	5739780.0	532896.0
535	21.10	126.28	516.53	474.53	-78.85	88.35	5739779.0	532897.4
540	21.02	126.26	521.20	479.20	-79.92	89.80	5739778.0	532898.9
545	20.93	126.25	525.87	483.87	-80.98	91.24	5739777.0	532900.3
550	20.84	126.23	530.54	488.54	-82.03	92.68	5739776.0	532901.7
555	20.76	126.21	535.21	493.21	-83.08	94.11	5739775.0	532903.2
560	20.67	126.18	539.89	497.89	-84.12	95.54	5739774.0	532904.6
565	20.57	126.14	544.57	502.57	-85.16	96.96	5739773.0	532906.0
570	20.47	126.10	549.25	507.25	-86.20	98.38	5739772.0	532907.4
575	20.37	126.05	553.94	511.94	-87.22	99.79	5739771.0	532908.8
580	20.27	126.01	558.63	516.63	-88.24	101.19	5739770.0	532910.2
585	20.18	125.96	563.32	521.32	-89.26	102.59	5739769.0	532911.6
590	20.09	125.93	568.01	526.01	-90.27	103.98	5739768.0	532913.0
595	20.04	125.90	572.71	530.71	-91.28	105.37	5739767.0	532914.4
600	19.99	125.88	577.41	535.41	-92.28	106.76	5739766.0	532915.8
605	19.93	125.86	582.11	540.11	-93.28	108.14	5739765.0	532917.2
610	19.88	125.84	586.81	544.81	-94.28	109.52	5739764.0	532918.6
615	19.83	125.81	591.51	549.51	-95.27	110.90	5739763.0	532920.0
620	19.77	125.75	596.22	554.22	-96.26	112.27	5739762.0	532921.3
625	19.70	125.63	600.92	558.92	-97.25	113.64	5739761.0	532922.7
630	19.63	125.50	605.63	563.63	-98.23	115.01	5739760.0	532924.1
635	19.56	125.38	610.34	568.34	-99.20	116.38	5739759.0	532925.4
640	19.49	125.26	615.05	573.05	-100.16	117.74	5739758.0	532926.8
645	19.42	125.14	619.77	577.77	-101.12	119.10	5739757.0	532928.2
650	19.34	125.10	624.48	582.48	-102.08	120.46	5739756.0	532929.5
655	19.26	125.10	629.20	587.20	-103.03	121.81	5739755.0	532930.9
660	19.17	125.10	633.93	591.93	-103.97	123.16	5739754.0	532932.2
665	19.08	125.10	638.65	596.65	-104.92	124.50	5739753.0	532933.6
670	19.00	125.10	643.38	601.38	-105.85	125.83	5739752.0	532934.9
675	18.91	125.10	648.10	606.10	-106.79	127.16	5739751.0	532936.2
680	18.81	125.08	652.84	610.84	-107.72	128.48	5739750.0	532937.5
685	18.70	125.07	657.57	615.57	-108.64	129.80	5739749.0	532938.9
690	18.60	125.05	662.31	620.31	-109.56	131.11	5739748.0	532940.2
695	18.49	125.03	667.05	625.05	-110.47	132.41	5739747.0	532941.5
700	18.39	125.01	671.79	629.79	-111.38	133.71	5739747.0	532942.8
705	18.28	125.05	676.54	634.54	-112.28	134.99	5739746.0	532944.1
710	18.16	125.36	681.29	639.29	-113.18	136.27	5739745.0	532945.3
715	18.04	125.68	686.04	644.04	-114.09	137.54	5739744.0	532946.6
720	17.91	125.99	690.80	648.80	-114.99	138.79	5739743.0	532947.8
725	17.79	126.30	695.56	653.56	-115.89	140.02	5739742.0	532949.1
730	17.67	126.62	700.32	658.32	-116.80	141.25	5739741.0	532950.3
735	17.56	126.92	705.08	663.08	-117.70	142.46	5739740.0	532951.5

MD	Angle	Direction	TVDRT	TVDSS	DNorth	DEast	Northing	Easting
740	17.45	127.19	709.85	667.85	-118.61	143.66	5739739.0	532952.7
745	17.35	127.47	714.62	672.62	-119.52	144.85	5739738.0	532953.9
750	17.24	127.75	719.40	677.40	-120.42	146.03	5739738.0	532955.1
755	17.14	128.03	724.17	682.17	-121.33	147.19	5739737.0	532956.3
760	17.04	128.31	728.95	686.95	-122.24	148.35	5739736.0	532957.4
765	16.97	128.38	733.73	691.73	-123.14	149.50	5739735.0	532958.6
770	16.91	128.34	738.52	696.52	-124.05	150.64	5739734.0	532959.7
775	16.86	128.31	743.30	701.30	-124.95	151.78	5739733.0	532960.8
780	16.81	128.27	748.09	706.09	-125.85	152.91	5739732.0	532962.0
785	16.76	128.24	752.87	710.87	-126.74	154.05	5739731.0	532963.1
790	16.71	128.20	757.66	715.66	-127.63	155.18	5739730.0	532964.2
795	16.62	128.20	762.45	720.45	-128.52	156.31	5739729.0	532965.4
800	16.54	128.20	767.25	725.25	-129.40	157.43	5739729.0	532966.5
805	16.45	128.20	772.04	730.04	-130.28	158.54	5739728.0	532967.6
810	16.36	128.20	776.84	734.84	-131.15	159.65	5739727.0	532968.7
815	16.27	128.20	781.63	739.63	-132.02	160.76	5739726.0	532969.8
820	16.19	128.19	786.44	744.44	-132.88	161.85	5739725.0	532970.9
825	16.16	128.16	791.24	749.24	-133.75	162.95	5739724.0	532972.0
830	16.12	128.12	796.04	754.04	-134.60	164.04	5739723.0	532973.1
835	16.08	128.08	800.84	758.84	-135.46	165.13	5739722.0	532974.2
840	16.05	128.05	805.65	763.65	-136.31	166.22	5739722.0	532975.3
845	16.01	128.01	810.45	768.45	-137.16	167.31	5739721.0	532976.4
850	15.91	128.09	815.26	773.26	-138.01	168.39	5739720.0	532977.5
855	15.79	128.21	820.07	778.07	-138.85	169.47	5739719.0	532978.5
860	15.68	128.32	824.88	782.88	-139.69	170.53	5739718.0	532979.6
865	15.61	128.44	829.70	787.70	-140.53	171.59	5739717.0	532980.6
870	15.53	128.55	834.52	792.52	-141.37	172.64	5739717.0	532981.7
875	15.46	128.66	839.33	797.33	-142.20	173.68	5739716.0	532982.7
880	15.38	128.78	844.15	802.15	-143.03	174.72	5739715.0	532983.8
885	15.30	128.90	848.98	806.98	-143.86	175.75	5739714.0	532984.8
890	15.30	128.77	853.80	811.80	-144.69	176.78	5739713.0	532985.8
895	15.30	128.64	858.62	816.62	-145.51	177.81	5739712.0	532986.9
900	15.30	128.51	863.44	821.44	-146.34	178.84	5739712.0	532987.9
905	15.30	128.38	868.27	826.27	-147.16	179.87	5739711.0	532988.9
910	15.30	128.24	873.09	831.09	-147.97	180.91	5739710.0	532990.0
915	15.30	128.11	877.91	835.91	-148.79	181.95	5739709.0	532991.0
920	15.30	127.98	882.74	840.74	-149.60	182.98	5739708.0	532992.0
925	15.25	127.86	887.56	845.56	-150.41	184.02	5739708.0	532993.1
930	15.13	127.76	892.38	850.38	-151.22	185.06	5739707.0	532994.1
935	15.01	127.65	897.21	855.21	-152.01	186.09	5739706.0	532995.1
940	14.89	127.55	902.04	860.04	-152.80	187.11	5739705.0	532996.2
945	14.77	127.44	906.88	864.88	-153.58	188.13	5739704.0	532997.2
950	14.64	127.34	911.71	869.71	-154.35	189.13	5739704.0	532998.2
955	14.35	127.37	916.55	874.55	-155.11	190.13	5739703.0	532999.2
960	13.95	127.49	921.40	879.40	-155.85	191.10	5739702.0	533000.2
965	13.56	127.60	926.26	884.26	-156.58	192.04	5739701.0	533001.1
970	13.16	127.72	931.12	889.12	-157.28	192.96	5739701.0	533002.0
975	12.77	127.83	935.99	893.99	-157.97	193.85	5739700.0	533002.9
980	12.37	127.95	940.87	898.87	-158.64	194.71	5739699.0	533003.8
985	12.08	128.08	945.76	903.76	-159.29	195.54	5739699.0	533004.6
990	11.87	128.22	950.65	908.65	-159.93	196.35	5739698.0	533005.4
995	11.67	128.36	955.55	913.55	-160.56	197.16	5739697.0	533006.2
1000	11.46	128.49	960.45	918.45	-161.18	197.94	5739697.0	533007.0
1005	11.25	128.63	965.35	923.35	-161.80	198.71	5739696.0	533007.8
1010	11.04	128.77	970.25	928.25	-162.40	199.46	5739696.0	533008.5
1015	10.85	128.63	975.16	933.16	-162.99	200.21	5739695.0	533009.3
1020	10.66	128.41	980.07	938.07	-163.57	200.94	5739694.0	533010.0
1025	10.47	128.20	984.99	942.99	-164.14	201.65	5739694.0	533010.7
1030	10.28	127.97	989.91	947.91	-164.70	202.36	5739693.0	533011.4
1035	10.08	127.73	994.83	952.83	-165.24	203.06	5739693.0	533012.1
1040	9.90	127.50	999.75	957.75	-165.77	203.75	5739692.0	533012.8
1045	9.88	127.59	1004.68	962.68	-166.29	204.43	5739692.0	533013.5
1050	9.86	127.68	1009.61	967.61	-166.82	205.11	5739691.0	533014.2
1055	9.85	127.76	1014.53	972.53	-167.34	205.78	5739691.0	533014.8
1060	9.83	127.85	1019.46	977.46	-167.86	206.46	5739690.0	533015.5
1065	9.81	127.94	1024.39	982.39	-168.39	207.13	5739690.0	533016.2
1070	9.79	128.00	1029.31	987.31	-168.91	207.80	5739689.0	533016.9
1075	9.76	128.02	1034.24	992.24	-169.43	208.47	5739689.0	533017.5
1080	9.72	128.04	1039.17	997.17	-169.95	209.14	5739688.0	533018.2
1085	9.69	128.06	1044.10	1002.10	-170.47	209.80	5739687.0	533018.9
1090	9.65	128.07	1049.02	1007.02	-170.99	210.46	5739687.0	533019.5
1095	9.62	128.09	1053.95	1011.95	-171.51	211.12	5739686.0	533020.2
1100	9.59	127.90	1058.88	1016.88	-172.02	211.78	5739686.0	533020.8
1105	9.57	127.50	1063.81	1021.81	-172.53	212.44	5739685.0	533021.5
1110	9.56	127.11	1068.75	1026.75	-173.03	213.10	5739685.0	533022.2

MD	Angle	Direction	TVDRT	TVDSS	DNorth	DEast	Northing	Easting
1115	9.54	126.71	1073.68	1031.68	-173.53	213.76	5739684.0	533022.8
1120	9.52	126.31	1078.61	1036.61	-174.02	214.43	5739684.0	533023.5
1125	9.50	125.91	1083.54	1041.54	-174.51	215.09	5739683.0	533024.2
1130	9.27	124.48	1088.47	1046.47	-174.99	215.76	5739683.0	533024.8
1135	8.96	122.65	1093.41	1051.41	-175.42	216.42	5739683.0	533025.5
1140	8.65	120.82	1098.35	1056.35	-175.83	217.07	5739682.0	533026.1
1145	8.33	119.00	1103.29	1061.29	-176.20	217.71	5739682.0	533026.8
1150	8.02	117.17	1108.24	1066.24	-176.54	218.33	5739681.0	533027.4
1155	7.71	115.34	1113.20	1071.20	-176.85	218.93	5739681.0	533028.0
1160	7.70	115.25	1118.15	1076.15	-177.14	219.53	5739681.0	533028.6
1165	7.70	115.20	1123.11	1081.11	-177.42	220.14	5739681.0	533029.2
1170	7.70	115.15	1128.06	1086.06	-177.71	220.75	5739680.0	533029.8
1175	7.70	115.09	1133.02	1091.02	-177.99	221.35	5739680.0	533030.4
1180	7.70	115.04	1137.97	1095.97	-178.27	221.96	5739680.0	533031.0
1185	7.70	115.01	1142.93	1100.93	-178.56	222.57	5739679.0	533031.6
1190	7.70	115.06	1147.88	1105.88	-178.84	223.17	5739679.0	533032.2
1195	7.70	115.11	1152.84	1110.84	-179.12	223.78	5739679.0	533032.8
1200	7.70	115.17	1157.79	1115.79	-179.41	224.39	5739679.0	533033.4
1205	7.70	115.22	1162.75	1120.75	-179.69	224.99	5739678.0	533034.1
1210	7.70	115.27	1167.70	1125.70	-179.98	225.60	5739678.0	533034.7
1215	7.68	115.28	1172.66	1130.66	-180.27	226.21	5739678.0	533035.3
1220	7.65	115.23	1177.61	1135.61	-180.55	226.81	5739677.0	533035.9
1225	7.61	115.19	1182.57	1140.57	-180.83	227.41	5739677.0	533036.5
1230	7.58	115.14	1187.52	1145.52	-181.11	228.01	5739677.0	533037.1
1235	7.54	115.09	1192.48	1150.48	-181.39	228.60	5739677.0	533037.7
1240	7.51	115.05	1197.44	1155.44	-181.67	229.20	5739676.0	533038.3
1245	7.50	115.06	1202.39	1160.39	-181.95	229.79	5739676.0	533038.8
1250	7.50	115.09	1207.35	1165.35	-182.22	230.38	5739676.0	533039.4
1255	7.50	115.12	1212.31	1170.31	-182.50	230.97	5739675.0	533040.0
1260	7.50	115.15	1217.27	1175.27	-182.78	231.56	5739675.0	533040.6
□								
1264	7.50	115.17	1221.23	1179.23	-183.00	232.03	5739675.0	533041.1
1265	7.50	115.18	1222.22	1180.22	-183.06	232.15	5739675.0	533041.2
1266	7.50	115.18	1223.21	1181.21	-183.11	232.27	5739675.0	533041.3
1267	7.50	115.19	1224.21	1182.21	-183.17	232.39	5739675.0	533041.4
1268	7.50	115.19	1225.20	1183.20	-183.22	232.51	5739675.0	533041.6
1269	7.50	115.20	1226.19	1184.19	-183.28	232.62	5739675.0	533041.7
1270	7.50	115.19	1227.18	1185.18	-183.33	232.74	5739675.0	533041.8
1271	7.50	115.16	1228.17	1186.17	-183.39	232.86	5739675.0	533041.9
1272	7.50	115.13	1229.16	1187.16	-183.44	232.98	5739675.0	533042.0
1273	7.50	115.10	1230.15	1188.15	-183.50	233.10	5739674.0	533042.2
1274	7.50	115.07	1231.15	1189.15	-183.56	233.21	5739674.0	533042.3
1275	7.50	115.04	1232.14	1190.14	-183.61	233.33	5739674.0	533042.4
1276	7.50	115.01	1233.13	1191.13	-183.67	233.45	5739674.0	533042.5
1277	7.50	114.98	1234.12	1192.12	-183.72	233.57	5739674.0	533042.6
1278	7.50	114.94	1235.11	1193.11	-183.78	233.69	5739674.0	533042.7
1279	7.50	114.91	1236.10	1194.10	-183.83	233.81	5739674.0	533042.9
1280	7.50	114.88	1237.10	1195.10	-183.89	233.92	5739674.0	533043.0
1281	7.50	114.85	1238.09	1196.09	-183.94	234.04	5739674.0	533043.1
1282	7.50	114.82	1239.08	1197.08	-184.00	234.16	5739674.0	533043.2
1283	7.50	114.79	1240.07	1198.07	-184.05	234.28	5739674.0	533043.3
1284	7.50	114.76	1241.06	1199.06	-184.11	234.40	5739674.0	533043.5
1285	7.50	114.73	1242.05	1200.05	-184.16	234.52	5739674.0	533043.6
1286	7.50	114.69	1243.04	1201.04	-184.21	234.63	5739674.0	533043.7
1287	7.50	114.66	1244.04	1202.04	-184.27	234.75	5739674.0	533043.8
1288	7.50	114.63	1245.03	1203.03	-184.32	234.87	5739674.0	533043.9
1289	7.50	114.59	1246.02	1204.02	-184.38	234.99	5739674.0	533044.0
1290	7.50	114.56	1247.01	1205.01	-184.43	235.11	5739674.0	533044.2
1291	7.50	114.53	1248.00	1206.00	-184.49	235.23	5739673.0	533044.3
1292	7.50	114.50	1249.99	1207.99	-184.54	235.35	5739673.0	533044.4
1293	7.50	114.47	1249.98	1207.98	-184.59	235.47	5739673.0	533044.5
1294	7.50	114.44	1250.98	1208.98	-184.65	235.58	5739673.0	533044.6
1295	7.50	114.41	1251.97	1209.97	-184.70	235.70	5739673.0	533044.8
1296	7.50	114.38	1252.96	1210.96	-184.76	235.82	5739673.0	533044.9
1297	7.50	114.35	1253.95	1211.95	-184.81	235.94	5739673.0	533045.0
1298	7.50	114.33	1254.94	1212.94	-184.86	236.06	5739673.0	533045.1
1299	7.50	114.33	1255.93	1213.93	-184.92	236.18	5739673.0	533045.2
1300	7.49	114.34	1256.92	1214.92	-184.97	236.30	5739673.0	533045.4
1301	7.49	114.34	1257.92	1215.92	-185.03	236.42	5739673.0	533045.5
1302	7.48	114.34	1258.91	1216.91	-185.08	236.54	5739673.0	533045.6
1303	7.48	114.34	1259.90	1217.90	-185.13	236.65	5739673.0	533045.7
1304	7.48	114.35	1260.89	1218.89	-185.19	236.77	5739673.0	533045.8
1305	7.47	114.35	1261.88	1219.88	-185.24	236.89	5739673.0	533045.9
1306	7.47	114.35	1262.87	1220.87	-185.29	237.01	5739673.0	533046.1
1307	7.46	114.35	1263.86	1221.86	-185.35	237.13	5739673.0	533046.2

MD	Angle	Direction	TVDRT	TVDSS	DNorth	DEast	Northing	Easting
1308	7.46	114.35	1264.86	1222.86	-185.40	237.25	5739673.0	533046.3
1309	7.46	114.35	1265.85	1223.85	-185.45	237.36	5739673.0	533046.4
1310	7.45	114.36	1266.84	1224.84	-185.51	237.48	5739672.0	533046.5
1311	7.45	114.36	1267.83	1225.83	-185.56	237.60	5739672.0	533046.6
1312	7.45	114.36	1268.82	1226.82	-185.61	237.72	5739672.0	533046.8
1313	7.44	114.37	1269.81	1227.81	-185.67	237.84	5739672.0	533046.9
1314	7.44	114.37	1270.81	1228.81	-185.72	237.95	5739672.0	533047.0
1315	7.44	114.37	1271.80	1229.80	-185.77	238.07	5739672.0	533047.1
1316	7.43	114.38	1272.79	1230.79	-185.83	238.19	5739672.0	533047.2
1317	7.43	114.38	1273.78	1231.78	-185.88	238.31	5739672.0	533047.4
1318	7.43	114.38	1274.77	1232.77	-185.94	238.43	5739672.0	533047.5
1319	7.42	114.38	1275.76	1233.76	-185.99	238.54	5739672.0	533047.6
1320	7.42	114.39	1276.75	1234.75	-186.04	238.66	5739672.0	533047.7
1321	7.42	114.39	1277.75	1235.75	-186.10	238.78	5739672.0	533047.8
1322	7.41	114.39	1278.74	1236.74	-186.15	238.90	5739672.0	533048.0
1323	7.41	114.39	1279.73	1237.73	-186.20	239.01	5739672.0	533048.1
1324	7.41	114.39	1280.72	1238.72	-186.25	239.13	5739672.0	533048.2
1325	7.41	114.40	1281.71	1239.71	-186.31	239.25	5739672.0	533048.3
1326	7.40	114.40	1282.70	1240.70	-186.36	239.37	5739672.0	533048.4
1327	7.40	114.38	1283.70	1241.70	-186.41	239.48	5739672.0	533048.5
1328	7.41	114.33	1284.69	1242.69	-186.47	239.60	5739671.0	533048.7
1329	7.41	114.28	1285.68	1243.68	-186.52	239.72	5739671.0	533048.8
1330	7.42	114.23	1286.67	1244.67	-186.57	239.84	5739671.0	533048.9
1331	7.42	114.18	1287.66	1245.66	-186.63	239.95	5739671.0	533049.0
1332	7.43	114.13	1288.65	1246.65	-186.68	240.07	5739671.0	533049.1
1333	7.43	114.08	1289.65	1247.65	-186.73	240.19	5739671.0	533049.2
1334	7.44	114.03	1290.64	1248.64	-186.79	240.31	5739671.0	533049.4
1335	7.44	113.98	1291.63	1249.63	-186.84	240.43	5739671.0	533049.5
1336	7.45	113.93	1292.62	1250.62	-186.89	240.54	5739671.0	533049.6
1337	7.45	113.88	1293.61	1251.61	-186.94	240.66	5739671.0	533049.7
1338	7.45	113.84	1294.60	1252.60	-187.00	240.78	5739671.0	533049.8
1339	7.46	113.79	1295.60	1253.60	-187.05	240.90	5739671.0	533050.0
1340	7.46	113.74	1296.59	1254.59	-187.10	241.02	5739671.0	533050.1
1341	7.47	113.69	1297.58	1255.58	-187.15	241.14	5739671.0	533050.2
1342	7.47	113.64	1298.57	1256.57	-187.20	241.26	5739671.0	533050.3
1343	7.48	113.59	1299.56	1257.56	-187.26	241.38	5739671.0	533050.4
1344	7.48	113.54	1300.55	1258.55	-187.31	241.50	5739671.0	533050.6
1345	7.49	113.49	1301.54	1259.54	-187.36	241.62	5739671.0	533050.7
1346	7.49	113.44	1302.54	1260.54	-187.41	241.74	5739671.0	533050.8
1347	7.50	113.39	1303.53	1261.53	-187.46	241.86	5739670.0	533050.9
1348	7.50	113.37	1304.52	1262.52	-187.52	241.97	5739670.0	533051.0
1349	7.50	113.37	1305.51	1263.51	-187.57	242.09	5739670.0	533051.2
1350	7.50	113.37	1306.50	1264.50	-187.62	242.21	5739670.0	533051.3
1351	7.50	113.37	1307.49	1265.49	-187.67	242.33	5739670.0	533051.4
1352	7.50	113.38	1308.48	1266.48	-187.72	242.45	5739670.0	533051.5
1353	7.50	113.38	1309.48	1267.48	-187.78	242.57	5739670.0	533051.6
1354	7.50	113.38	1310.47	1268.47	-187.83	242.69	5739670.0	533051.8
1355	7.50	113.38	1311.46	1269.46	-187.88	242.81	5739670.0	533051.9
1356	7.50	113.38	1312.45	1270.45	-187.93	242.93	5739670.0	533052.0
1357	7.50	113.38	1313.44	1271.44	-187.98	243.05	5739670.0	533052.1
1358	7.50	113.38	1314.43	1272.43	-188.03	243.17	5739670.0	533052.2
1359	7.50	113.38	1315.42	1273.42	-188.09	243.29	5739670.0	533052.4
1360	7.50	113.38	1316.42	1274.42	-188.14	243.41	5739670.0	533052.5
1361	7.50	113.39	1317.41	1275.41	-188.19	243.53	5739670.0	533052.6
1362	7.50	113.39	1318.40	1276.40	-188.24	243.65	5739670.0	533052.7
1363	7.50	113.39	1319.39	1277.39	-188.29	243.77	5739670.0	533052.8
1364	7.50	113.39	1320.38	1278.38	-188.34	243.89	5739670.0	533052.9
1365	7.50	113.39	1321.37	1279.37	-188.40	244.01	5739670.0	533053.1
1366	7.50	113.39	1322.37	1280.37	-188.45	244.13	5739670.0	533053.2
1367	7.50	113.39	1323.36	1281.36	-188.50	244.25	5739669.0	533053.3
1368	7.50	113.39	1324.35	1282.35	-188.55	244.37	5739669.0	533053.4
1369	7.50	113.39	1325.34	1283.34	-188.60	244.49	5739669.0	533053.5
1370	7.50	113.40	1326.33	1284.33	-188.66	244.61	5739669.0	533053.7
1371	7.50	113.40	1327.32	1285.32	-188.71	244.73	5739669.0	533053.8
1372	7.50	113.40	1328.31	1286.31	-188.76	244.85	5739669.0	533053.9
1373	7.50	113.40	1329.31	1287.31	-188.81	244.97	5739669.0	533054.0

□





**APPENDIX 2a**

**DOLPHIN A-3**


**Petrophysics Evaluation Summary**

**Esso Australia Ltd**  
**Exploration Department**

**DOLPHIN A-3**  
**Formation Evaluation**  
**Log Analysis Report**

**Petrophysicist: C.R. Mills**  
**September 1997**

Endorsed by:

  
.....  
FE Team Leader

Date:

07.10.97

<b>DOLPHIN A-3 LOG ANALYSIS</b>
---------------------------------

Dolphin A-3 was drilled by the jackup drilling rig Parameswara which was cantilevered over the Dolphin monotower. The well was spudded on 17 September 1997 and reached a total depth of 1373.5m MDKB on 21 September 1997. Halliburton wireline logs were successfully acquired over the interval 1369 - 1194m MDKB on the 22nd of September. Schlumberger MDT measurements (14 pre-tests and 1 sample) were also taken on September 22.

Dolphin A-3 open hole logs have been analysed for porosity and water saturation over the interval 1270 to 1350m MDKB. Analysis was carried out using Esso's in-house SOLAR based analysis model "K12" which derives effective porosity from density and neutron log responses and saturation using the Dual Water model.

Note that all depths quoted below are MDKB unless specified otherwise.

## DATA

### *Log Data Available*

Run 1: MSFL, DLL, SDL, DSN, CSNG, GR, CAL.  
Run 2: MDT, GR.

### *Deviation*

Maximum hole deviation was 11° while drilling through the Lakes Entrance Formation. Within the Coarse Clastics section the well was drilled vertically.

### *Mud*

Mud type: KCl/PHPA/Glycol  
Mud Weight: 9.8 ppg  
Rm: 0.182 @ 15.9° C  
Rmf: 0.160 @ 16.4° C  
Rmc: 0.218 @ 18.7° C  
BHT: 63.3° C @ 1370m MDKB  
Time Since Circ: 9.13 hours

### *Log Quality*

All log data appear to be of good quality. The large offset between the MSFL and the deeper investigating resistivity logs below 1322m probably results from the large resistivity contrast between the invaded zone and the very low salinity (1.9kppm NaCl equivalent) formation water. This separation is not present above 1322m, where formation waters are interpreted to be more saline (20kppm NaCl equivalent).

*Log Processing*

- The high resolution bulk density curve ERHO and neutron porosity curve ENPH were used as recorded in the field.

**INTERPRETATION***Logs Used*

ERHO, ENPH, GR, LLD.

*Analysis Parameters*

a	1
m	2.00
n	2.00
GR clay	130 gapi
GR clean	25 gapi
Apparent Shale Porosity (PHISH)	0.33 frac
Apparent Bulk Density of Shale	2.35 g/cc
Shale Resistivity (RSH)	25 ohmm
Formation Water Resistivity	20000 ppm: 1270 - 1302m; 1900ppm 1302 - 1350m.
Bottom Hole Temperature	63.3° C @ 1370m MDKB, 9.13 hrs since circ. stopped

*Total Porosity*

Total porosity was derived from the "K12" analysis model using the above input parameters.

*Shale Volume*

The Volume of shale (Vsh) was derived from "K12" using a combination of neutron/density and gamma ray data. This value was used in effective porosity and water saturation calculations.

*Free Formation Water Resistivity*

Dolphin field is in the region of the Gippsland Basin that is affected by invasion of fresh formation water. This is zone of low salinity water is commonly referred to as the "fresh water wedge". At Dolphin A3 the top of this wedge is interpreted to be at 1302m.

Below 1302m, free formation water resistivity was derived from RWA calculations in clean water sands. Connate water salinities calculated in Dolphin A-3 according to this method are 1900ppm.

Above 1302m, free formation water resistivity was assumed to be the same as that used in Dolphin A2. This value was chosen as no clean water bearing sands are present above the fresh water wedge to allow an independent determination.

### *Water Saturations*

Total water saturation was calculated using "K12" total porosity and a Dual Water saturation model. Effective porosity and effective water saturation were calculated using the "K12" determined shale volume.

Prior to "K12" analysis, zones covering coals and carbonaceous shales were defined. As part of the "K12" calculation process water saturation was set to 1 and porosity to 0 in these zones.

### DISCUSSION

Calculated effective porosities within the Latrobe Group reservoir sands range between 20 to 30%. Within the hydrocarbon column, hydrocarbon saturations within these are typically in excess of 55%.

No gas character is evident in Dolphin A3 and the entire hydrocarbon column in the well is interpreted to be oil bearing.

At Dolphin Field the connate water within the hydrocarbon column is assumed to have a salinity of 20,000ppm. However, the water in the aquifer below the hydrocarbon column is calculated from Rwa determinations to have a salinity of 1900ppm. This fluid combination gives rise to the result that sands within the hydrocarbon column (which reservoir a combination of oil and saline water) have a similar resistivity to those within the fresh water aquifer. Because of this oil charged intervals and fresh water saturated sands are difficult to separate.

To help define fluid contacts 14 MDT pressure tests and 1 (10 litre) sample were taken in Dolphin A3. The sample was taken from 1290.1m and constituted 7.7 litres of oil and 1.5 litres of water. Wellsite titration analysis for total chlorides and potassium content suggest the sampled water is filtrate.

Oil down to 1295.59m (1210.55m TVDSS) is indicated by the MDT's optical fluid analyser which is interpreted show that an oil / water mix was pumped from the formation during the drawdown permeability test at this depth. No clear oil gradient can be interpreted from the pressure test data in the well and the oil column is thought to be partitioned and differentially drawn down. However, pressure test analysis is considered valid deeper in the well and gives a water gradient up to a sample point at 1302.84m (1217.74m TVDSS) (figure 1). Several attempts were made to take pressure tests between the lowest oil test at 1295.95m and the highest water test at 1302.84m but these tests were tight and non diagnostic.

Inspection of the raw LLD and LLS resistivity curves may give a qualitative indication of fluid content which is consistent with the MDT data. Sands below 1302.2m are seen to have a slightly more resistive baseline of 13 to 30 ohmm compared with about 10 ohmm above 1302.2m. The higher resistivity sands below 1302.2m are interpreted to contain low salinity (1900ppm) water whereas the lower resistivity sands are interpreted to reservoir oil.

Low resistivity pay is seen to arise from the generally poor reservoir quality of the sands within the oil column. The resultant high irreducible saturation of more conductive (20 kppm) water suppresses resistivity within the oil zone such that it less than that seen in sands within the fresh water wedge.

According to this model the lowest known oil (LKO) is interpreted at the base of a thin sand at 1301.4m (1216.3m TVDSS) and the highest known water (HKW) at 1302.2m (1217.1m TVDSS).

Gas chromatograph data is not diagnostic of fluid contacts. No visual oil shows are noted for the interval.

*Summary*

1. The LKO is interpreted at 1301.4m MDKB (1216.3m TVDSS).
2. The HKW is interpreted at 1302.2m MDKB (1217.1m TVDSS).
4. Dolphin A3 was perforated between 1288.0 - 1290.0m MDKB (1203.0 - 1205.9m TVDSS) and 1295.2 - 1297.2m MDKB (1210.2 - 1212.2m TVDSS). The well has not as yet been brought onto production.

Attached are a Summary of Results, "K12" Analysis Parameters, a Listing and a Log Analysis depthplot .

## DOLPHIN A-3

## ANALYSIS PARAMETERS.

Some zoned interval(s) not processed

VSH and POROSITY from DENSITY-NEUTRON ( GR used for initial est. of VSH).

Tortuosity; 'a' .....	1.00
Cementation factor; 'm' .....	2.00
Saturation exponent; 'n' .....	2.00
Fluid density .....	1.02
Database curves selected for GR max and min.	
Apparent shale resistivity .....	25.00
Apparent bulk density of shale .....	2.350
Apparent neutron porosity of shale .....	0.330
Database curve selected for hydrocarbon density input.	
Lower limit of grain density .....	2.645
Upper limit of grain density .....	2.675
Formation Water entered in terms of SALINITY.	
Formation water salinity .....	20000ppm: 1270-1302m 1,900ppm: 1302-1351m
Measured Rmf .....	0.160
Temperature at which Rmf measured .....	16.4° C
Sxo derived from Sw ( $S_{xo} = S_w^{**z}$ ).	
Z (where $S_{xo} = S_w^{**Z}$ ) .....	0.30
Logged TD .....	1370m MD
Logged bottom hole temperature .....	63.3° C
Est. sea bed temperature .....	14° C
Water depth .....	38.0
KB height .....	42
Irreducible water saturation .....	0.025
Vsh upper limit for effective porosity .....	0.65
Minimum effective porosity for hydrocarbons .....	0.03

**Dolphin A3**  
**PETROPHYSICS ANALYSIS SUMMARY**

Net porosity cut-off: 0.120 volume per volume  
 Net water saturation cut-off: 0.600 volume per volume.  
 Depth reference: m MDKB

Net Porous Interval based on Porosity cut-off only.  
 Both Porosity and Sw cut-offs invoked when generating Hydrocarbon-Metres.

Top m MDKB	Gross		Net Sand m MD	Net to Gross Ratio %	Vshale Mean Deci	Vshale Std dev	Porosity Mean Deci	Porosity Std dev	Mode Porosity Deci	Mean Sw	Fluid Type	Hydrocarbon Pore Volume
	Base m MDKB	Interval m MD										
1288.2	1292.6	4.4	4.0	91%	0.22	0.069	0.17	0.026	0.19	0.49	Oil	0.333
1294.6	1297.2	2.6	2.4	92%	0.24	0.114	0.25	0.039	0.21	0.26	Oil	0.446
1298.4	1301.4	3.0	0.9	30%	0.33	0.121	0.22	0.052	0.19	0.33	Possible Oil	0.128
1302.2	1309.7	7.5	3.8	51%	0.18	0.148	0.26	0.050	0.29	1.00	Water	0.000
1302.2	1309.7	7.5	3.8	51%	0.18	0.148	0.26	0.050	0.29	1.00	Water	0.000
1322.8	1328.6	5.8	3.3	57%	0.19	0.108	0.20	0.045	0.23	1.00	Water	0.000
1328.6	1335.2	6.6	6.5	98%	0.03	0.060	0.24	0.021	0.25	1.00	Water	0.000
1328.6	1335.2	6.6	6.5	98%	0.03	0.060	0.24	0.021	0.25	1.00	Water	0.000
1337.0	1351.0	14.0	13.7	98%	0.05	0.081	0.27	0.041	0.31	1.00	Water	0.000



Dolphin A3

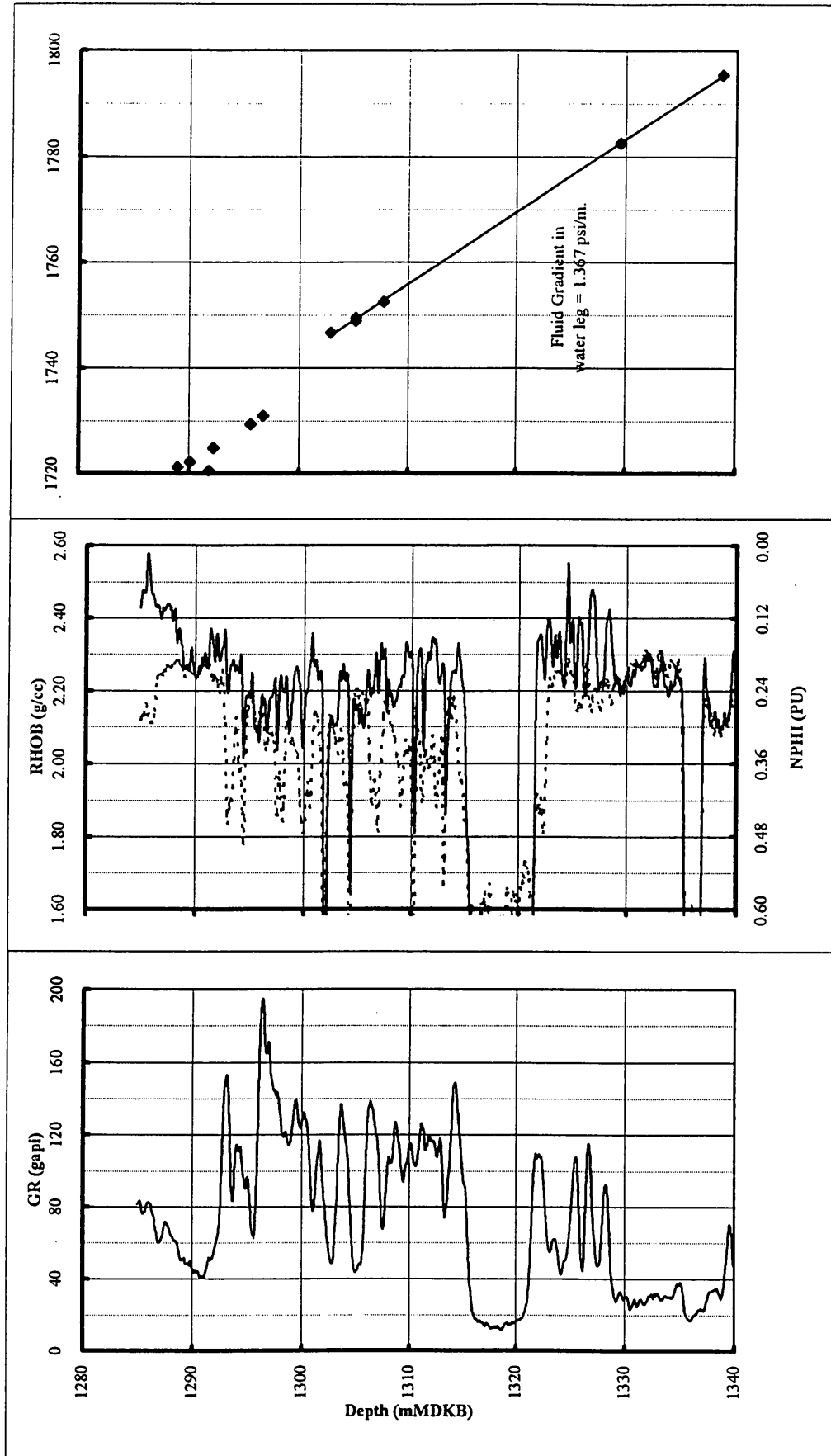
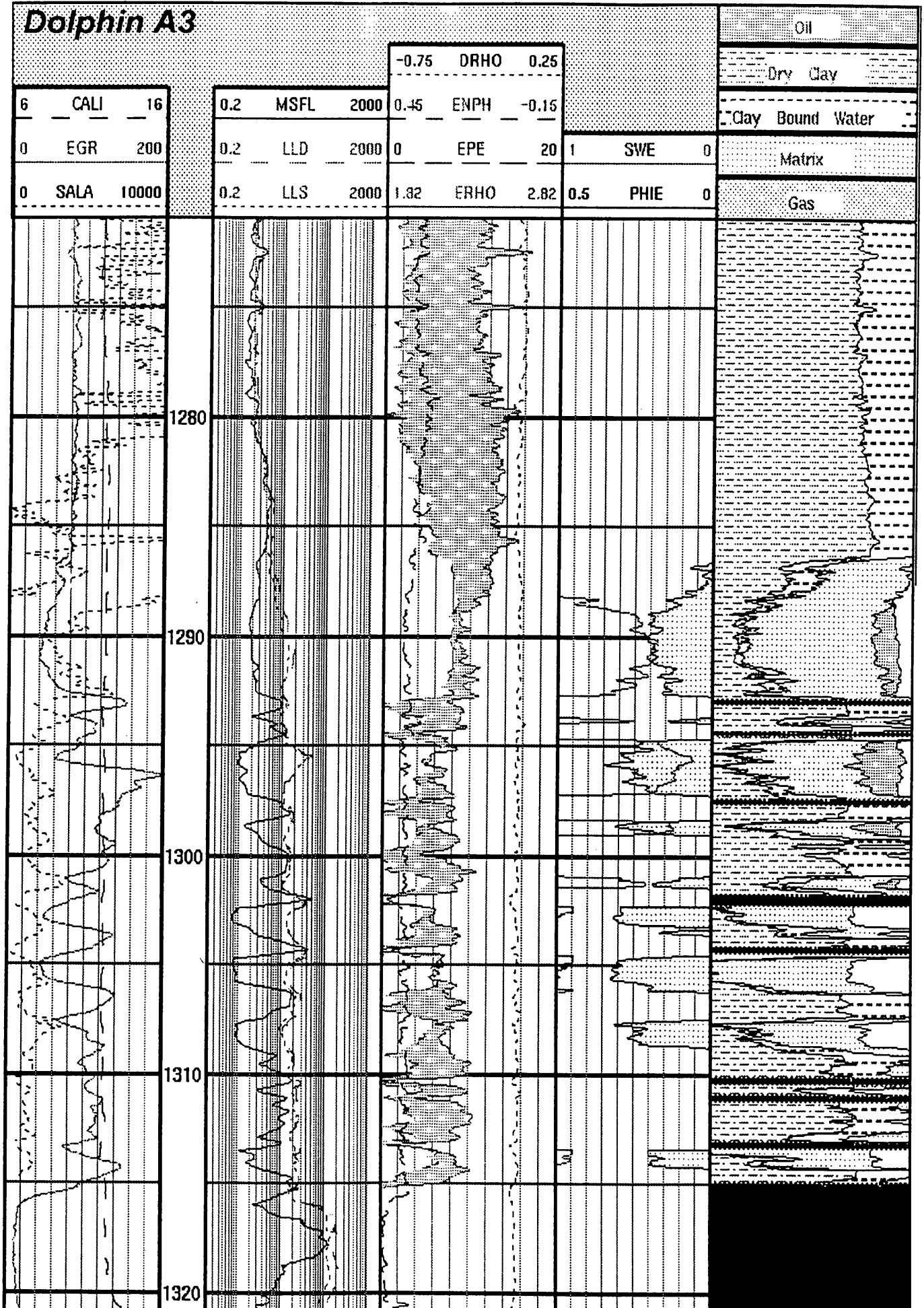
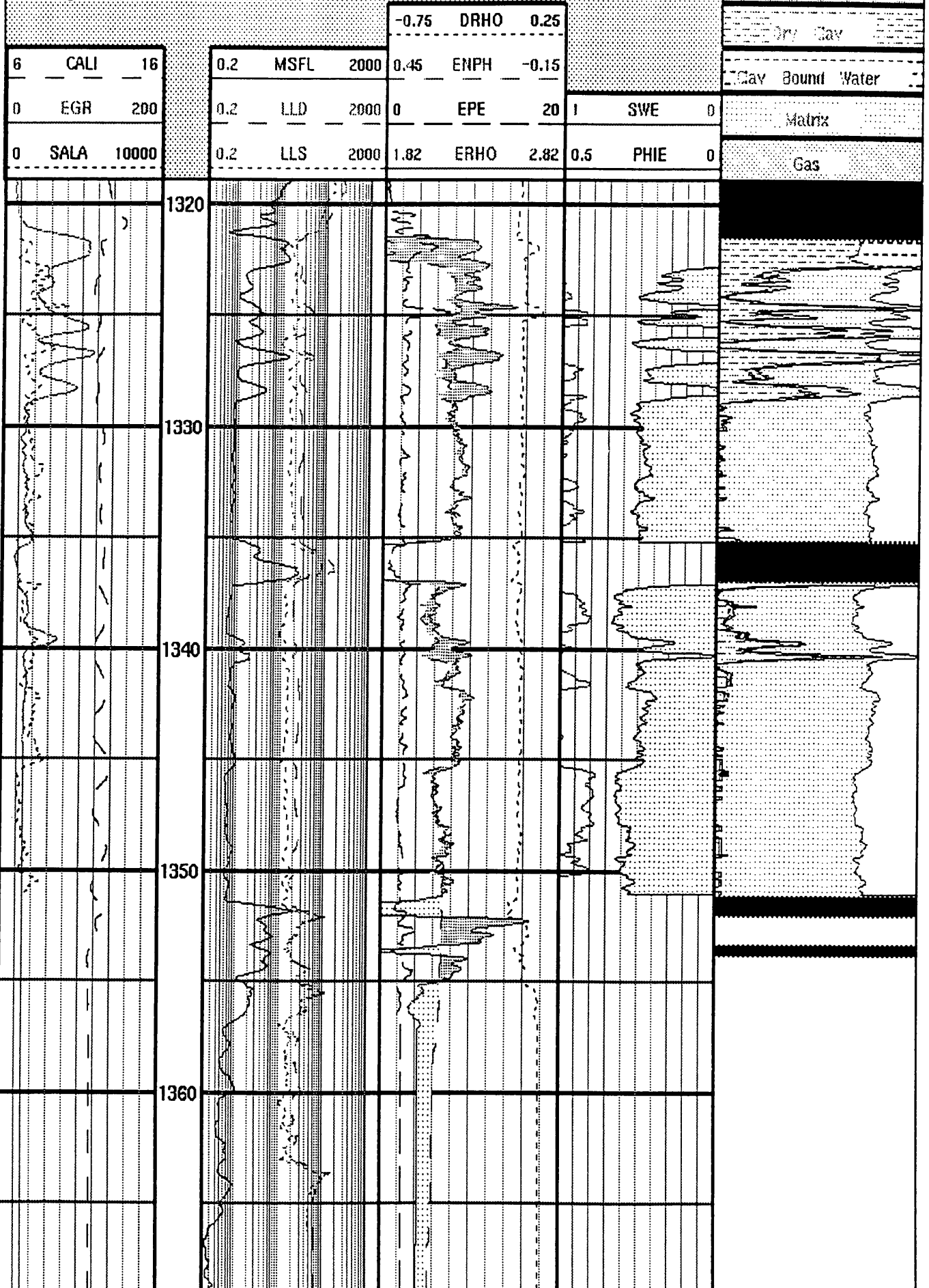


Figure 1: Summary plot of Dolphin A3 MDT pressure measurements.

# Dolphin A3



# Dolphin A3



PE609716

This is an enclosure indicator page.  
The enclosure PE609716 is enclosed within the  
container PE914254 at this location in this  
document.

The enclosure PE609716 has the following characteristics:

ITEM\_BARCODE = PE609716  
CONTAINER\_BARCODE = PE914254  
NAME = CPI Log for Dolphin A-3. 1:200  
BASIN = GIPPSLAND  
ONSHORE? = N  
DATA\_TYPE = WELL  
DATA\_SUB\_TYPE = WELL\_LOG  
DESCRIPTION = CPI Log for Dolphin A-3. 1:200.  
Contains multiple log curves. By Solar  
for Esso Australia Ltd. October 1997.  
REMARKS =  
DATE\_WRITTEN = 10-OCT-1997  
DATE\_PROCESSED =  
DATE\_RECEIVED =  
RECEIVED\_FROM = Esso Australia Ltd  
WELL\_NAME = Dolphin A-3  
CONTRACTOR = Solar  
AUTHOR =  
ORIGINATOR = Esso Australia Ltd  
TOP\_DEPTH = 1270  
BOTTOM\_DEPTH = 1378  
ROW\_CREATED\_BY = DH00\_SW

(Inserted by DNRE - Vic Govt Mines Dept)



**APPENDIX 3a**

**DOLPHIN A-3**

**Lithology/Show Descriptions**

**Geologist: Martin Turner**

## Dolphin A3 Lithology/Show Descriptions

Interval	%	Lithology/Show Description
		Geologist onboard from 885m.
870-900	90	LIMESTONE: very light grey to yellowish grey, Calcarenite, medium to very coarse grained, common spary cement, occasional to locally common Bryzoa fragments, moderately hard.
	10	CEMENT
900-930	90	LIMESTONE: as above, medium dark grey to medium dark grey.
	10	CEMENT
930-960	10	LIMESTONE: As above, medium grey, Calcilutite, trace disseminated micropyrte.
	0	
960-990	10	LIMESTONE: As above, medium grey to light olive grey, calcilutite, occasionally grading to Calcarenite.
	0	
990-1020	90	LIMESTONE: As above, medium light grey to light grey, olive grey.
	10	CLAYSTONE: very light grey to light grey, very calcareous, micromicaceous, slightly silty, minor carbonaceous material, firm to soft, subblocky.
1020-1050	80	LIMESTONE: light grey to medium light grey, Calcilutite grading to Calcisiltite, commonly grades to calcareous Claystone, rare carbonaceous specks, firm to soft, subblocky.
	20	CLAYSTONE: very light grey to light grey, very calcareous, minor carbonaceous material, firm to soft, subblocky.
1050-1080	50	LIMESTONE: As above.
	50	CLAYSTONE: As above.
1080-1110	20	LIMESTONE: As above, medium light grey to light olive grey.
	80	CLAYSTONE: As above, medium light grey to light olive grey.
1110-1140	10	LIMESTONE: As above.
	90	CLAYSTONE: As above, commonly light grey to light brownish grey.
1140-1170	10	LIMESTONE: As above, medium dark grey, rare foraminifera.
	90	CLAYSTONE: As above, medium light grey to light olive grey.
1170-1180	10	LIMESTONE: As above.
	90	CLAYSTONE: As above.
1180-1190	10	CLAYSTONE: As above, occasionally light bluish grey, occasional glauconite.
	0	
1190-1200	10	CLAYSTONE: As above, light grey to light olive grey, occasional dark green glauconite, rare disseminated pyrite.
	0	
1200-1210	10	CLAYSTONE: As above, occasional to locally common dark green glauconite, firm.
	0	
1210-1220	10	CLAYSTONE: medium light grey to light olive grey, moderately calcareous, slightly silty, micromicaceous, minor carbonaceous material, occasional dark green glauconite, firm to moderately hard, subblocky.
	0	
1220-1230	10	CLAYSTONE: As above, predominantly medium light grey.
	0	
1230-1240	10	CLAYSTONE: As above, medium light grey to light olive grey, occasional to locally common glauconite.
	0	
1240-1250	10	CLAYSTONE: As above, minor glauconite.
	0	
1250-1260	10	CLAYSTONE: As above.
	0	
1260-1270	80	CLAYSTONE: As above, medium light grey to light olive grey, minor to common fine carbonaceous material, minor glauconite.
	20	SILTSTONE: brownish grey to moderate brown, argillaceous to very argillaceous, common dark green glauconite, common carbonaceous material, soft to firm, amorphous to subblocky.
1270-1275	60	CLAYSTONE: As above.
	40	SILTSTONE: As above.

Interval	%	Lithology/Show Description
1275-1280	10	CLAYSTONE: As above.
	90	SILTSTONE: As above, abundant green to greenish black pelloidal glauconite, firm, subblocky to predominantly subfissile.
1280-1285	10	CLAYSTONE: As above, very light grey.
	90	SILTSTONE: As above, predominantly moderate brown to moderate yellowish brown.
1285-1290	100	SILTSTONE: As above, brownish grey to moderate brown, firm to soft, subfissile.
1290-1295	90	SILTSTONE: moderate brown, very argillaceous, micromicaceous, common fine carbonaceous material, common glauconite, slightly to moderately calcareous, firm to soft, subfissile to fissile.
1295-1300	10	SANDSTONE: clear, coarse to very coarse, predominantly coarse.
	90	SANDSTONE: moderate to well sorted, subrounded, trace silica cement, trace argillaceous matrix, loose grains, fair inferred porosity, no florescence.
1300-1305	10	SILTSTONE: As above.
	80	SANDSTONE: As above, coarse to very coarse, moderately sorted, fair to good inferred porosity, no florescence.
1305-1310	20	SILTSTONE: As above.
	70	SANDSTONE: As above, medium to coarse, predominantly coarse, moderately sorted.
1310-1315	30	SILTSTONE: As above.
	70	SANDSTONE: As above, moderate to very coarse, common granules, predominantly medium to coarse.
1315-1320	30	SILTSTONE: As above.
	50	SILTSTONE: greyish brown to moderately brown, argillaceous, micromicaceous to micaceous, common carbonaceous material, slightly calcareous, firm, sub fissile to fissile.
1320-1325	40	SANDSTONE: clear to translucent, medium to very coarse, predominantly coarse, moderately sorted, trace silica cement, trace argillaceous matrix, loose grains, fair inferred porosity.
	10	COAL: As above.
1325-1330	60	SANDSTONE: As above, no florescence.
	40	SILTSTONE: As above.
1330-1335	80	SANDSTONE: As above, moderately to predominantly coarse, moderately sorted, fair to good inferred porosity, no florescence.
	20	SILTSTONE
1335-1340	100	SANDSTONE: As above, predominantly clear, fine to coarse, predominantly medium grained, well sorted.
1340-1345	90	SANDSTONE: As above, medium to coarse, well sorted, fair to good inferred porosity.
	10	COAL: As above.
1345-1350	100	SANDSTONE: predominantly clear, medium to very coarse, predominantly coarse, moderately sorted, trace silica cement, trace argillaceous matrix, clean loose grains, good inferred porosity, no florescence.
1350-1355	100	SANDSTONE: As above, predominantly coarse to very coarse
1355-1360	90	SANDSTONE: As above, medium to very coarse, predominantly coarse to very coarse, poor to moderate sorting.
1360-1365	100	SANDSTONE: As above.
1365-1370	100	SANDSTONE: As above, fine to very coarse, predominantly medium to coarse.
1370-1373.5	100	SANDSTONE: As above.





**APPENDIX 4a**

**DOLPHIN A-3**

**Mud Log**

PE609717

This is an enclosure indicator page.  
The enclosure PE609717 is enclosed within the  
container PE914254 at this location in this  
document.

The enclosure PE609717 has the following characteristics:

ITEM\_BARCODE = PE609717  
CONTAINER\_BARCODE = PE914254  
NAME = Drilling Evaluation Log for Dolphin A-3  
BASIN =

GIPPSLAND

ONSHORE? = N  
DATA\_TYPE = WELL  
DATA\_SUB\_TYPE = WELL\_LOG  
DESCRIPTION = Drilling Evaluation Log for Dolphin  
A-3. 1:500. By Halliburton for Esso  
Australia Ltd. September 1997  
REMARKS =  
DATE\_WRITTEN = 21-SEP-1997  
DATE\_PROCESSED =  
DATE\_RECEIVED =  
RECEIVED\_FROM = Esso Australia Ltd  
WELL\_NAME = Dolphin A-3  
CONTRACTOR = Halliburton Australia Pty Ltd  
AUTHOR =  
ORIGINATOR = Esso Australia Ltd  
TOP\_DEPTH = 140  
BOTTOM\_DEPTH = 1373  
ROW\_CREATED\_BY = DH00\_SW

(Inserted by DNRE - Vic Govt Mines Dept)

**APPENDIX 4b**

**DOLPHIN A-3**

**Well Completion Log**

PE609718

This is an enclosure indicator page.  
The enclosure PE609718 is enclosed within the  
container PE914254 at this location in this  
document.

The enclosure PE609718 has the following characteristics:

ITEM\_BARCODE = PE609718  
CONTAINER\_BARCODE = PE914254  
    NAME = Well Completion Log for Dolphin A-3  
    BASIN = GIPPSLAND  
    ONSHORE? = N  
    DATA\_TYPE = WELL  
    DATA\_SUB\_TYPE = COMPLETION\_LOG  
    DESCRIPTION = Well Completion Log for Dolphin A-3.  
                  1:200. Esso Australia Ltd. October  
                  1997.  
    REMARKS =  
    DATE\_WRITTEN = 01-OCT-1997  
    DATE\_PROCESSED =  
    DATE\_RECEIVED =  
    RECEIVED\_FROM = Esso Australia Ltd  
    WELL\_NAME = Dolphin A-3  
    CONTRACTOR =  
    AUTHOR =  
    ORIGINATOR = Esso Australia Ltd  
    TOP\_DEPTH = 1194  
    BOTTOM\_DEPTH = 1369  
    ROW\_CREATED\_BY = DH00\_SW

(Inserted by DNRE - Vic Govt Mines Dept)



**APPENDIX 5a**

**DOLPHIN A-3**

**MDT Report**

TOOL  
WELL  
Date  
KB

Esso Engineer  
Service Co Engineer  
Last Measured and weight  
Conversion ppg -> psi/m

Graham Cooper/Stewart Anderson  
Fand (Schlumberger)  
9.8 ppg  
0.1770433

Schlumberger MDT  
Dolphin 3  
22-Sep-97  
42.0 m

Run/Seat	Depth		Sand unit	Test Type	Initial Hydrostatic		Tool Set hr:mm	Test Time hr:mm	Formation Pressure psi	Test Volume cc	Tool Retract hr:mm	Final Hydrostatic		COMMENT
	mMDRT	mTTSES			Pressure psi	Temperature °C						Pressure psi	Temperature °C	
1/1	1338.8	1253.3	N-1.9	Pretest	2211.36 10.0 ppg	58.3	19:12	19:16	1795.6 8.1 ppg	20	19:20	2211.33 10.0 ppg	58.8	Pretest perm : 1893.5 md/cp (INC P. 14)
1/2	1329.5	1244.2	N-1.7	Pretest	2195.29 10.0 ppg	59.7	19:32	19:35	1782.52 8.1 ppg	20	19:38	2195.00 10.0 ppg	59.9	Pretest perm : 41.5 md/cp
1/3	1307.7	1223.6	N-1.5	Pretest	2158.23 10.0 ppg	60.3	19:49	19:52	1752.57 8.1 ppg	20	19:55	2157.61 10.0 ppg	60.4	Pretest perm : 100.2 md/cp
1/4	1305.1	1220.0	N-1.4	Pretest Perm	2153.7 10.0 ppg	60.5	20:06	20:08 20:11	1748.97 8.1 ppg	20 1000	20:20	2153.02 10.0 ppg	60.6	Flow control failed to operate. Retracted tool to avoid differential sticking <b>REPEAT ON SEAT 1/5</b>
1/5	1305.1	1220.0	N-1.4	Pretest Perm OFA	2153.89 10.0 ppg	60.6	20:28	20:32 20:36	1749.46 8.1 ppg 1750.09 24.1 ppg	20 1000 11.115 L	20:39 20:51	2153.22 10.0 ppg	62.3	Pretest perm : 91 md/cp Flow control 100 cc/sec - perm 9.1 md/cp calc. ??? NO % OFA showed water, no oil. Fluid resistivity 0.26 ohm
1/6	1302.8	1217.7	N-1.3	Pretest	2148.92 10.0 ppg	62.1	21:03	21:07	1746.62 10.0 ppg	20	21:10	2149.22 10.0 ppg	62	Pretest perm : 135.7 md/cp
1/7	1298.6	1213.5	N-1.2	Pretest	2141.99 10.0 ppg	61.9	21:16	21:18		20	20:20			Pretest abandoned. Tight seat or supercharged?
1/8	1298.7	1213.4	N-1.2	Pretest	2142.79 10.0 ppg	61.8	21:24	21:27		20	21:28	2142.54 10.0 ppg	61.9	Pretest abandoned. Tight seat or supercharged?
1/9	1296.6	1211.5	N-1.2	Pretest	2139.3 10.0 ppg	61.8	21:32	21:35	1731.06 8.1 ppg	20	21:40	2139.21 10.0 ppg	61.8	Pretest perm : 1.9 md/cp Decided against refined perm since pretest took 5 min and drawdown reached 957 psia
1/10	1295.5	1210.5	N-1.2	Pretest Perm OFA	2137.58 10.0 ppg	61.8	21:47	21:50 21:54 21:56	1729.34 8.1 ppg 1729.31 24.4 ppg	20 1000 5.2 L		2137.46 24.4 ppg	62.2	Flow control 200 cc/sec - perm 268.9 md/cp calc. NO % OFA showed oil. Fluid resistivity 21.40 ohm No trouble with differential sticking
1/11	1292.2	1207.2	N-1.1	Pretest Perm	2131.99 10.0 ppg	62.19	22:18	22:20 22:28	1725.02 8.1 ppg	20 1000	22:33	2131.66 10.0 ppg		Pretest perm: 0.4 md/cp; buildup time 8 mins Refined perm abandoned due to lack of flow
1/12	1291.8	1206.8	N-1.1	Pretest OFA	2130.74 10.0 ppg	62.16	23:02	23:05 23:22	1720.35 8.1 ppg	20 0.595 L	23:18 23:26	2130.2 24.4 ppg	62.3	3 min pretest perm: 0.2 md/cp. Poor perm so abandoned refined perm test OFA showed contaminated sample, low perm - abandoned test 0.5 L pumped out volume reached early in test duration. Not pumping effectively
1/13	1290.0	1205.0	N-1.1	Pretest	2127.86 10.0 ppg	62.12	23:31	23:34	1722.36 10.0 ppg	20	23:36			Pretest perm: 22 md/cp



1/14	1289.0	1204.0	N-1.1	Perm @ 200 cc/s	10.0 PPG	23:36	1722.04 1.1 PPG 240.6 PPG	1000	23:40	2127.2	2125.00	Average reservoir flowrate - 60 cc/sec (screen display) OFA showed oil and water, fluid resistivity 10-16 ohm fluctuating Sample pressure not recorded. Sample recovered to surface Small amount of differential sticking coming off this test	
				OFA	10.0 PPG	23:40	1720.37 1.1 PPG	20	0:17			Pretest perm: 20.4 md/cp OFA showed oil/water. Fluid resistivity 22.9 ohms Average reservoir flowrate: 40 cc/s. Refined perm: 106 md/cp Flowed thru OFA at 0.31 to check oil content - same fraction of water as previous Sample kept in chamber for recovery at surface	
				Sample	10.0 PPG	23:40	1721.22 240.3 PPG	14.7 L	0:26				
				Perm @ 200 cc/s	10.0 PPG	0:12	63.02	1000	0:28/0:33				

NOTES:  
(1) All pretests conducted at 60 cc/sec