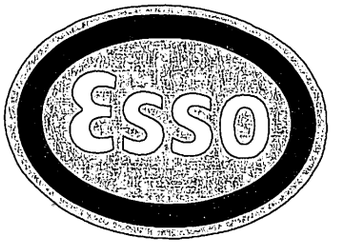

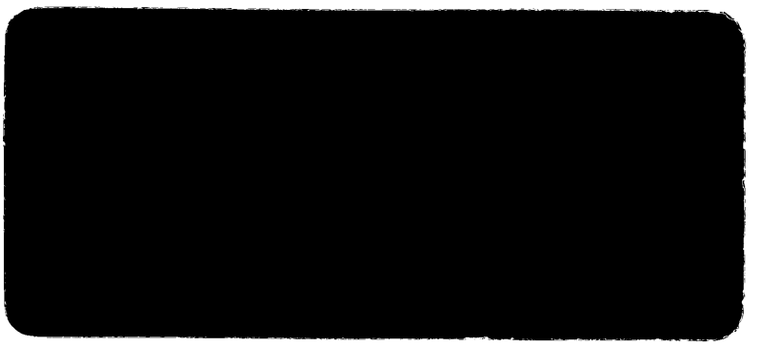

WELL COMPLETION REPORT

BLACKBACK - A1A

Esso Australia Ltd.

W1295

WELL COMPLETION REPORT

BLACKBACK A-1A

GIPPSLAND BASIN, VICTORIA

Author: Kevin Lanigan
Compiler: Sheryl Sazenis
January 2000

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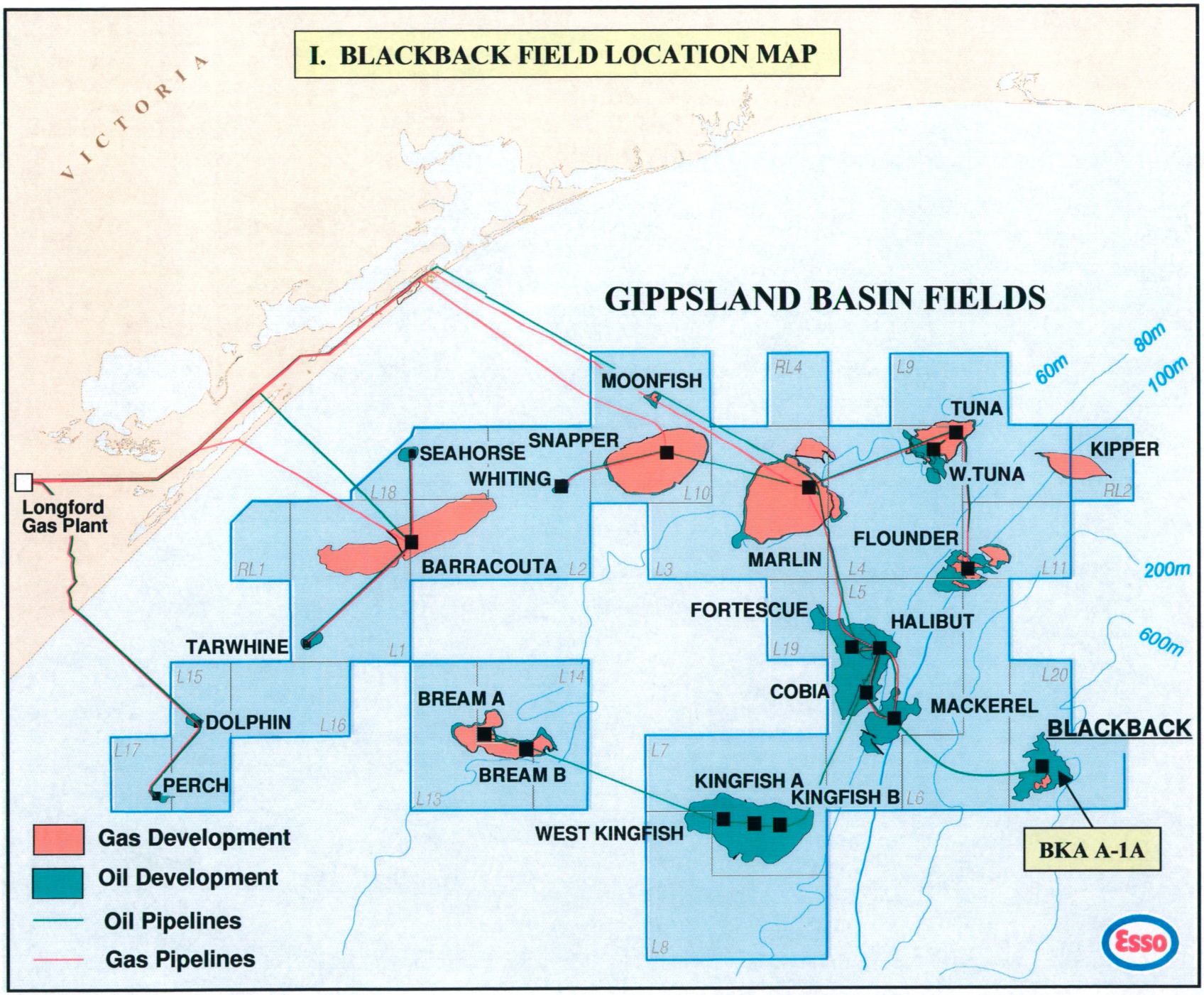
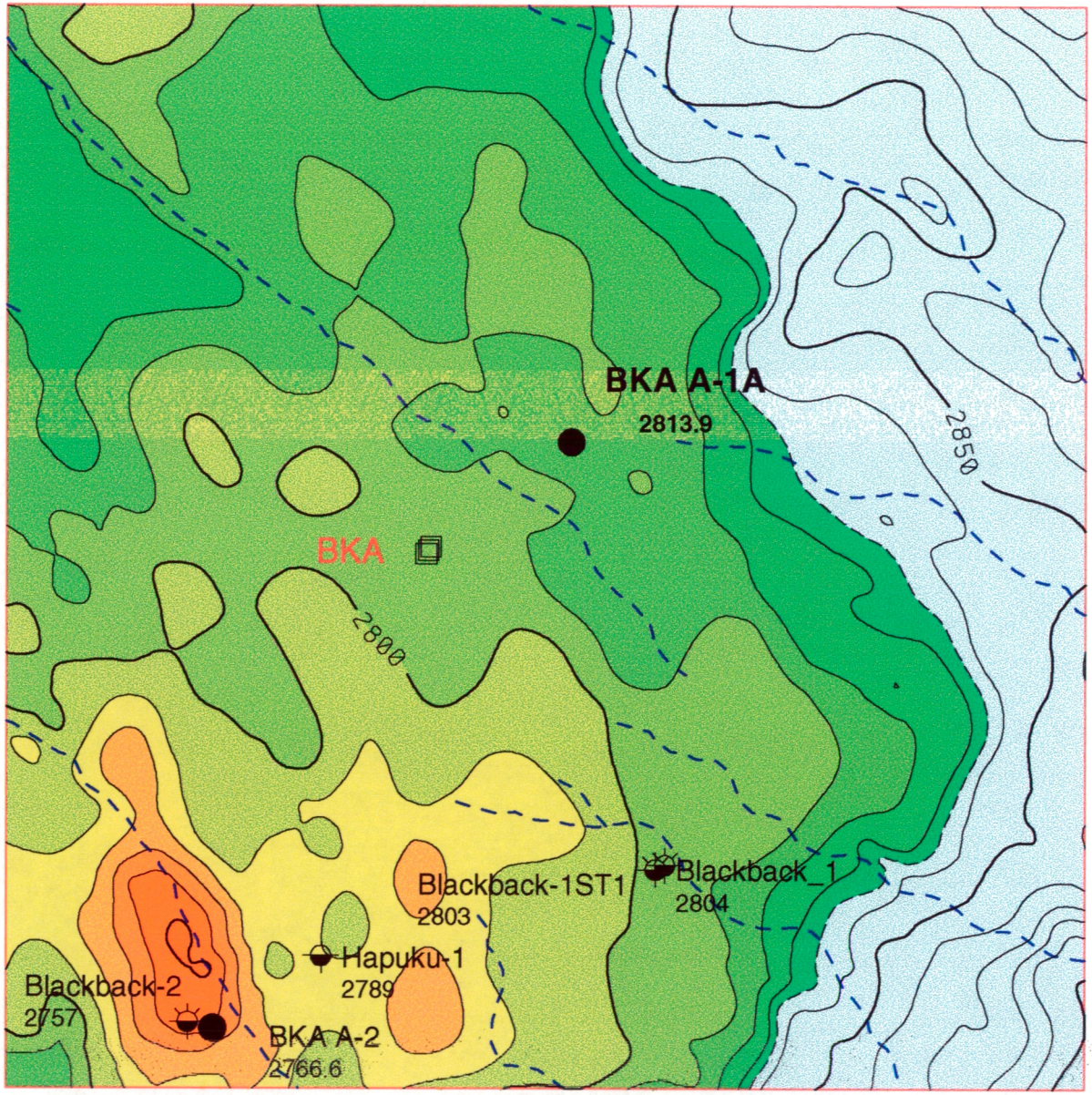

I. BLACKBACK FIELD LOCATION MAP
VICTORIA
GIPPSLAND BASIN FIELDS
Longford Gas Plant
MOONFISH
SEAHORSE
SNAPPER
WHITING
BARRACOUTA
TARWHINE
DOLPHIN
PERCH
BREAM A
BREAM B
MARLIN
TUNA
W.TUNA
KIPPER
FLOUNDER
FORTESCUE
HALIBUT
COBIA
MACKEREL
BLACKBACK
KINGFISH A
KINGFISH B
WEST KINGFISH
BKA A-1A
RL4
L9
L18
L10
RL1
L2
L3
L4
L5
L11
RL2
L1
L19
L20
L15
L14
L16
L17
L7
L13
L6
L8
60m
80m
100m
200m
600m
Gas Development
Oil Development
Oil Pipelines
Gas Pipelines
Esso

Top of Latrobe Group Depth Structure Map



II. WELL DATA RECORD (cont.)

LOCATION*

Field	Blackback	**Wellhead Coordinates**	
Well Name	Blackback A-1A	AMG X	635 355.0mE
Conductor Number	N/A	AMG Y	5 732 873.3mN
State	Victoria	Latitude	38° 32' 31.677" S
Permit/Licence	VIC/L20	Longitude	148° 33' 11.274" E
Geological Basin	Gippsland	**Perforations (driller)**	3174.0 - 3185.0mMDRT
Top of Latrobe	3175.8mMDRT		2838.3 - 2848.2 m TVDRT
	2839.9mTVDRT		2812.3 - 2822.2m TVDSS
	2813.9mTVDSS		
AMG X	635895.2mE		
AMG Y	5733286.6mN		

ELEVATIONS & DEPTHS

Water Depth	395.7m
Top Wellhead to MSL	391.84m
Main Deck Rel to MSL	N/A
RT Relative to MSL	26.0m
Average Well Angle	23°
Total Depth	3272m MDRT
	2926.3m TVDRT
	2900.3m TVDSS
Plug Back Depth	3238.2m MDRT

DATES

Skid Rig	02/06/1999
Spudded Well	06/06/1999
Development Rig Days	37.5
NPT Days	2.4
Rig Released	21/08/1999
I.P. Established	22/08/1999

MISCELLANEOUS

Operator	Esso Australia Ltd		
Esso Interest	50%	**Contractor**	Sedco Forex
Permittee/Licencee	Esso/BHPP	**Rig Name**	Sedco 702
Other Interest	50% BHPP	**Equipment Type**	Semi-submersible
Overriding Royalty	N/A	**Completion Type**	Single oil
Drilling AFE No.	LO6249909	**Completion Size**	4-1/2 & 2-7/8"

WELL CLASSIFICATION

Before Drilling	Subsea Development	**After Drilling**	Oil Well
	***Datum**	AGD-66	
	Spheroid	ANS	
	Projection	UTM-zone 55	

II. WELL DATA RECORD (cont.)

CASING RECORD

Type	Size (inches)	Weight (ppf)	Grade	Thread	Depth (mMDRT)
Conductor	30	457 / 310	X-52	RL-4	487.0
Surface	20	129.3	X-56	RL-4S	682.0
Intermediate	13.375	68	K-55	BTC	1302.12
Production	10.75 9.625	55.5 47.0 53.5	L-80 L-80 L-80	VAM TOP LTC LTC	 3261.9
Tubing	4.5/2.875	12.6/ 6.4	Super 13CR-80	VAM ACE	3145.8

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)
Conductor	Class G	1040	2% Calcium Chloride	128	219	15.9	487 - 421	--
Surface Casing Lead	Class G	340	0.45 gal/sx Econolite	105	135	12.5	532 -421	1000
Surface Casing Tail	Class G	1295	1% Calcium Chloride	159	268	15.9	682 - 532	1000
Intermediate Casing	Class G	949		115	196	15.8	1302 - 852	2500
Production Casing Lead	Class G	372	0.14 gal/sx SCR-100L 0.75 gal/sx GasCon 469 0.01 ga/sx NF-5	80	136	13.2	2173-2883	1850
Production Casing Tail	Class G	366	0.05 gal/sx SCR-100L 0.39 gal/sx Halad413L 0.02 gal/sx GasCon 469 0.01 gal/sx NF-5	41	74	15.8	2883 - 3272	

II. WELL DATA RECORD (cont.)

DRILLING PERFORMANCE

Esso Australia Ltd./ Drilling Division - Technical Report
BLACKBACK A-1A FINAL WELL REPORT

Facility: Blackback	**Rig:** Sedco 702	**Reservoir:** Latrobe
Well: A-1A	**Location:** VIC-L-20	**Well Type:** Subsea

**DEPTH:*	**INCLINATION:*	**MUD:*
m MD: 3272	**Average (deg):** 23.4	**Type:** Petrofree
m TVD: 2926	**Maximum (deg):** 56.9	**Max. wt. (ppg):** 10.9

Vert. Section (m): 699.3	**m per day:** 90.8

**TIME ANALYSIS:*

Start Date: 2 June 99 @ 02:15	**Finish Date:** 21 Aug 99 @ 12:00	**Total Days:** 37.5
Target Days: 35.3	**% Over/Under Target:** 6.2% Over	**AFE Days:** 42.0

NPT Days: 2.4	**% of Total:** 6.40%

**COSTS:*

AFE No.: L06249909	**Revisions:** 0

	Material	Equipment	Contracts	Allocations	Contingency	TOTAL
AFE	$1,670,000	$2,210,000	$11,230,000	$1,990,000	$0	$17,100,000
Revised AFE	N/A	N/A	N/A	N/A	$0	N/A
DIMS	$1,799,521	$2,229,958	$9,910,248	$2,079,215	$0	$16,018,942
Projected	$1,799,521	$2,229,958	$9,910,248	$2,079,215	$0	$16,018,942

$ per day:	427172	**$ per day (excl. T&L):**	362213	**$ per m:**	8131

**CASING:*

	Size / Weight / Grade / Thread	m MDRT	m TVDRT	PIT
Structural	30"/457&310/X-52/RL4HT&RL4	487	487	N/A
Conductor	20"/129.3/X-56/RL4S	682	682	10.8 ppg, jug
Surface Casing	13-3/8"/68/K55/BTC	1302	1205	12.5 ppg, jug
Production Casing or Liner	10-3/4"/55.5/L80/VAM TOP & 9-5/8"/53.5&47/LTC	**3261.9**	2920	N/A

Casing Comments:
A-1A is a sidetrack in the original A-1 well. 30", 20" and 13-3/8" were previously set on A-1 well.

**COMPLETION:*

Size: 4-1/2" x 2-7/8"	**Type:** Single Oil	**Perforation Intervals:**	3174m-3185m

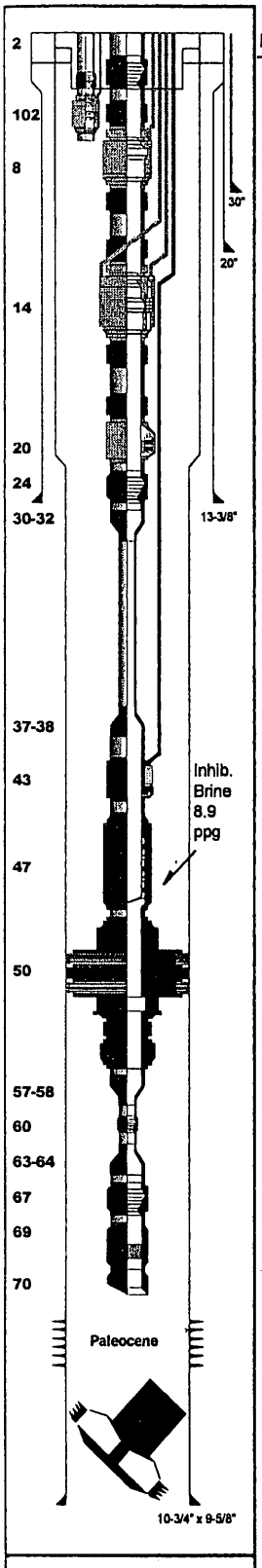
Completion Comments:
The well was perforated 350 psi underbalanced with 7" HSD gun, 12 shots/ft, using MAXR gun hanger. Perforation depth correlated with PEX log dated 23 June 1999. The reservoir quality was less than anticipated, and to effectively produce at a reduced flow rate, a tapered 4-1/2" x 2-7/8" tubing string was used. The subsea tree was landed and pressure tested. The subsurface safety valves, control system and pressure/temperature transducers were fully functional.

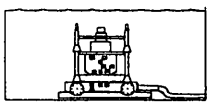
**ADDITIONAL:*

Logging Comments:
Ran PEX(AIT)/DSI/HNGS/DSI/GR/Caliper/CSAT with no problems. 27m of core was cut in the Latrobe Formation from 3172m-3199m with 100% recovery. All appraisal objectives were met.

Field: BLACKBACK Plat: BKA Well: A1A

Updated By: cmshaug Rev. Date 01/09/99





Wellhead Size and Type:

ABB Vetco Gray MS-700 10,000 psi Subsea Wellhead System

Wellhead Cap:

ABB Vetco Gray, TR-16, 5" x 2", LC-7 Mandrel Up

BPV Preparation:

Halliburton 3.813" X

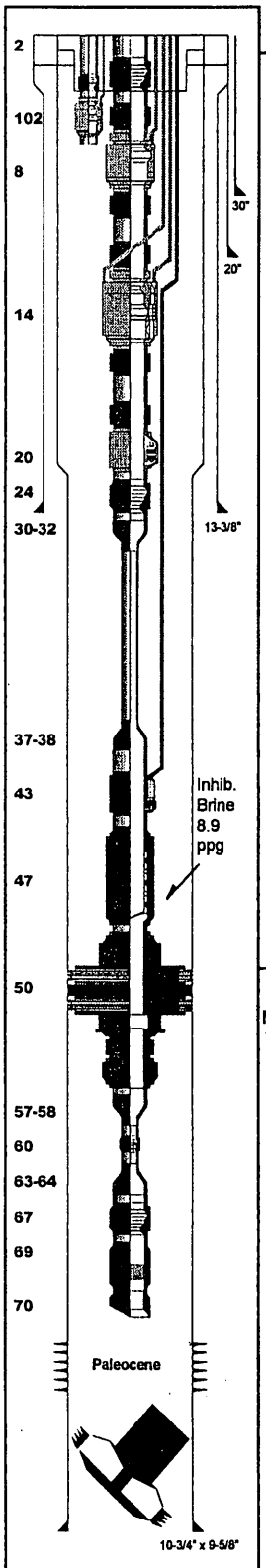
No.	Qty.	Description	OD Max	ID Min	Length (m)	MD (m)	TVD (m)
1	1	RT to top of Tubing Hanger			418.00		
2	1	Tubing Hanger, ABB Vetco Gray, for MS-700 WH, 4.5" x 2.375", 3.813" X Profile	18.560	1.875	0.72	418.00	418
3	1	Tubing, 4-1/2" 12.6 lb/ft Super 13Cr-80 VAM ACE	4.500	3.958	9.30	418.72	
4	1	Pup Joint, 4-1/2" 12.6 lb/ft Super 13Cr-80 V/Ace	4.500	3.958	1.18	428.02	
5	5	Tubing, 4-1/2" 12.6 lb/ft Super 13Cr-80 VAM ACE	4.500	3.958	48.40	429.20	
6	1	Pup Joint, 4-1/2" 12.6 lb/ft Super 13Cr-80 V/Ace	4.500	3.958	1.80	477.60	
7	1	Flow Coupling, 4-1/2" Hbtn 811FN38117, Vam Ace BxP, Inc-925	5.250	3.865	1.62	479.40	
8	1	Comm Nipple, 4-1/2" Camco RH-2 Hbtn 3.813 "X" Profile, Vam Ace BxP, Inc-925	6.813	3.813	0.77	481.02	481
9	1	Flow Coupling, 4-1/2" Hbtn 811FN38117, Vam Ace BxP, Inc-925	5.250	3.865	1.75	481.79	
10	1	Pup Joint, 4-1/2" 12.6 lb/ft Super 13Cr-80 V/Ace	4.500	3.958	1.80	483.54	
11	55	Tubing, 4-1/2" 12.6 lb/ft Super 13Cr-80 VAM ACE	4.500	3.958	532.49	485.34	
12	1	Pup Joint, 4-1/2" 12.6 lb/ft Super 13Cr-80 V/Ace	4.500	3.958	1.80	1017.83	
13	1	Flow Coupling, 4-1/2" Hbtn 811FN38117, Vam Ace BxP, Inc-925	5.250	3.865	1.75	1019.63	
14	1	TRSSV, 4-1/2" Camco TRC-DH-5-F, 3.75" DB profile, Vam Ace BxP, Inc-925	7.437	3.750	3.74	1021.38	1010
15	1	Flow Coupling, 4-1/2" Hbtn 811FN38117, Vam Ace BxP, Inc-925	5.250	3.865	1.75	1025.12	
16	1	Pup Joint, 4-1/2" 12.6 lb/ft Super 13Cr-80 V/Ace	4.500	3.958	1.80	1026.87	
17	4	Tubing, 4-1/2" 12.6 lb/ft Super 13Cr-80 VAM ACE	4.500	3.958	38.73	1028.67	
18	1	Pup Joint, 4-1/2" 12.6 lb/ft Super 13Cr-80 V/Ace	4.500	3.958	1.80	1067.40	
19	1	Flow Coupling, 4-1/2" Hbtn 811FN38117, Vam Ace BxP, Inc-925	5.250	3.865	1.75	1069.20	
20	1	Side Pocket Mandrel, 4-1/2" Camco Type MMRG-4, 1.5" pocket to accept SO2-30R Valve w/ RKP Latch, Inc-925	7.250	3.855	2.91	1070.95	1051
21	1	Pup Joint, 4-1/2" 12.6 lb/ft Super 13Cr-80 V/Ace	4.500	3.958	1.80	1073.86	
22	2	Tubing, 4-1/2" 12.6 lb/ft Super 13Cr-80 VAM ACE	4.500	3.958	19.35	1075.66	
23	1	Pup Joint, 4-1/2" 12.6 lb/ft Super 13Cr-80 V/Ace	4.500	3.958	1.80	1095.01	
24	1	Landing Nipple, 4-1/2" Hbtn "R", 3.688" bore, Vam Ace, Inc925	4.991	3.688	0.36	1096.81	1072
25	1	Pup Joint, 4-1/2" 12.6 lb/ft Super 13Cr-80 V/Ace	4.500	3.958	1.80	1097.17	
26	3	Tubing, 4-1/2" 12.6 lb/ft Super 13Cr-80 VAM ACE	4.500	3.958	28.99	1098.97	
27	1	Pup Joint, 4-1/2" 12.6 lb/ft Super 13Cr-80 V/Ace	4.500	3.958	1.80	1127.96	
28	1	Coupling, 4-1/2" 12.6 lb/ft Super13Cr-80 VAM ACE	4.961	3.958	0.24	1129.76	
29	1	Flow Coupling, 4-1/2" Hbtn 811FN38117, Vam Ace BxP, Inc-925	5.250	3.865	1.75	1130.00	
30	1	Xover, 3-1/2" x 4-1/2", VAM ACE x VAM ACE PxP Inc925, Baker made	4.515	2.995	0.19	1131.75	
31	1	Flow Coupling, 3-1/2" Hbtn 811FN28712, Vam Ace, BxP, Incoloy 925	3.920	2.900	1.75	1131.94	
32	1	Xover, 2-7/8" x 3-1/2" VAM ACE x VAM ACE PxB Inc.925 892BPC32043	3.919	2.402	0.19	1133.69	1101
33	1	Pup Joint, 2-7/8" 6.4 lb/ft Super 13Cr-80 VAM ACE	2.875	2.441	1.88	1133.88	
34	196	Tubing, 2-7/8" 6.4 lb/ft Super 13Cr-80 VAM ACE	2.875	2.441	1866.87	1135.76	
35	1	Pup Joint, 2-7/8" 6.4 lb/ft Super 13Cr-80 VAM ACE	2.875	2.441	1.89	3002.63	
36	1	Coupling, 2-7/8" 6.4 lb/ft Super13Cr-80 VAM ACE	3.230	2.441	0.19	3004.52	2685
37	1	Xover, 2-7/8" x 3-1/2" VAM ACE x VAM ACE PxB Inc.925 892BPC32043	3.919	2.402	0.18	3004.71	
38	1	Xover, 3-1/2" x 4-1/2" VAM ACE x VAM ACE PxP SAF-2507 Baker made	4.515	2.995	0.23	3004.89	
39	1	Pup Joint, 4-1/2" 12.6 lb/ft Super 13Cr-80 V/Ace	4.500	3.958	1.80	3005.12	
40	9	Tubing, 4-1/2" 12.6 lb/ft Super 13Cr-80 VAM ACE	4.500	3.958	87.14	3006.92	
41	1	Pup Joint, 4-1/2" 12.6 lb/ft Super 13Cr-80 V/Ace	4.500	3.958	1.80	3094.06	
42	1	Coupling, 4-1/2" 12.6 lb/ft Super13Cr-80 VAM ACE	4.961	3.958	0.24	3095.86	
43	1	Solid Gauge Mandrel, 4-1/2" with Perm Quartz Gauge, Schlum. Vam Ace PxP, Alloy 450	6.023	3.958	2.29	3096.10	2768
44	1	Pup Joint, 4-1/2" 12.6 lb/ft Super 13Cr-80 V/Ace	4.500	3.958	1.80	3098.39	
45	1	Pup Joint, 4-1/2" 12.6 lb/ft Super 13Cr-80 V/Ace	4.500	3.958	1.80	3100.19	
46	1	PBR, 5" Seal Bore, 20' stroke, Hbtn 812PBA70503, 4-1/2" VAMACE BxP, Inconel	5.875	3.850	8.13	3101.99	2773
47	1	Pup Joint, 4-1/2" 12.6 lb/ft Super 13Cr-80 V/Ace	4.500	3.958	1.80	3110.12	
48	1	Pup Joint, 4-1/2" 12.6 lb/ft Super 13Cr-80 V/Ace	4.500	3.958	1.81	3111.92	
49	1	Ratch Latch Seal Assembly, 4-1/2" Hbtn 812SSR5001, Vam Ace Box, Inc925	5.290	3.938	0.51	3113.73	
50	1	Packer, 9-5/8" Hbtn MHP 212MHP9500-C, 36-59.4lb, Btm Thd 5" Vam Ace box, Inc-925	8.125	3.875	1.98	3114.24	2784
51	1	Millout Extension, 5" Hbtn 812MOE40019, 15# Vam Ace PxP, Inc-925	5.036	4.250	2.35	3116.22	
52	1	Xover, 4-1/2" x 5", Vam Ace x Vam Ace PxB, Inc925	5.593	3.958	0.21	3118.57	
53	1	Pup Joint, 4-1/2" 12.6 lb/ft Super 13Cr-80 V/Ace	4.500	3.958	1.80	3118.78	
54	1	Tubing, 4-1/2" 12.6 lb/ft Super 13Cr-80 VAM ACE	4.500	3.958	9.69	3120.58	
55	1	Pup Joint, 4-1/2" 12.6 lb/ft Super 13Cr-80 V/Ace	4.500	3.958	1.80	3130.27	
56	1	Coupling, 4-1/2" 12.6 lb/ft Super13Cr-80 VAM ACE	4.961	3.958	0.24	3132.07	
57	1	Xover, 3-1/2" x 4-1/2" VAM ACE x VAM ACE PxP SAF-2507 Baker made	4.515	2.995	0.23	3132.31	
58	1	Xover, 2-7/8" x 3-1/2" VAM ACE x VAM ACE PxB Inc.925 892BPC32043	3.919	2.402	0.19	3132.54	
59	1	Pup Joint, 2-7/8" 6.4 lb/ft Super 13Cr-80 VAM ACE	2.875	2.441	3.11	3132.73	
60	1	Landing Nipple, 2-7/8" Hbtn "X", 711X23223, 2.313" P/bore, V/Ace BxP, Inc 925	3.259	2.313	0.34	3135.84	2804
61	1	Pup Joint, 2-7/8" 6.4 lb/ft Super 13Cr-80 VAM ACE	2.875	2.441	3.11	3136.18	
62	1	Coupling, 2-7/8" 6.4 lb/ft Super13Cr-80 VAM ACE	3.230	2.441	0.19	3139.29	
63	1	Xover, 2-7/8" x 3-1/2" VAM ACE x VAM ACE PxP 9Cr1Mo	3.530	2.400	0.24	3139.48	
64	1	Xover, 3-1/2" x 4-1/2" VAM ACE x VAM ACE BxP 9Cr Hbtn 892BPC34023	4.529	2.980	0.21	3139.72	
65	1	Pup Joint, 4-1/2" 12.6 lb/ft Super 13Cr-80 V/Ace	4.500	3.958	1.79	3139.93	
66	1	Pup Joint, 4-1/2" 12.6 lb/ft Super 13Cr-80 V/Ace	4.500	3.958	1.80	3141.72	
67	1	Landing Nipple, 4-1/2" Hbtn "RN", 3.437" bore, 3.260" NoGo, Vam Ace BxP, Inc925	4.991	3.260	0.41	3143.52	
68	1	Xover, 4-1/2" x 4-1/2" VAMACE x NEWVAM, BxP, Hbtn , 9Cr1Mo	4.500	3.958	0.26	3143.93	
69	1	Plug, Mirage Tailpipe, 4-1/2" NEWVAM BxP, Hbtn 21MPA38800, 13Cr	5.880	3.880	1.40	3144.19	
70	1	Wireline Guide, 4-1/2" New Vam Box, 13Cr	5.875	3.984	0.21	3145.59	
71	1	Bottom of Tubing				3145.80	2813
100	0						
101	1	Pup Joint, 2-3/8" 4.6 lb/ft 13Cr(S)80 VAM ACE PxP	2.697	1.995	2.93		
102	1	TRSSV, 2-3/8" Camco "TRM-4P", 1.875" X profile, 13Cr/410, Vam Ace BxP	3.640	1.875	1.21		
103	1	Pup Joint, 2-3/8" 4.6 lb/ft 13Cr(S)80 VAM ACE BxP	2.697	1.995	3.03		
104	1	Mule Shoe Guide (2-3/8" VAM ACE Modified Coupling with Brass Pin)	3.850	2.992	0.18		

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

907524 010

Field: BLACKBACK Plat: BKA Well: A1A

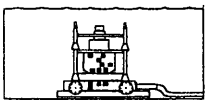
Updated By: cmshaug Rev. Date 01/09/99



No.	Description	OD Max	ID Min	Length (m)	MD (m)	TVD (m)
1	RT to top of 10-3/4" Casing Hanger			418.48		
2	Casing Hanger, 10-3/4"		9.760	0.34	418.48	418
3	Pup Joint - Production Casing, 10-3/4" 55.5 lb/ft VAM TOP	11.750	9.760	2.97	418.82	
4	Production Casing, 10-3/4" 55.5 lb/ft VAM TOP (61 jts)	11.750	9.760	734.17	421.79	
5	Crossover, 10-3/4" x 9-5/8"	11.750	8.681	9.35	1155.96	1117
6	Production Casing, 9-5/8" 47 lb/ft L-80 LTC (97 jts)	10.625	8.681	1151.06	1165.31	
7	Production Casing, 9-5/8" 53.5 lb/ft L-80 LTC (56 jts)	10.625	8.535	668.49	2316.37	
8	Pup Joint - Production Casing, 9-5/8" 53.5 lb/ft L-80 LTC	10.625	8.535	3.01	2984.86	
9	Production Casing, 9-5/8" 53.5 lb/ft L-80 LTC (7 jts)	10.625	8.535	83.77	2987.87	
10	RA PIP Tag			0.00	3071.64	2746
11	Production Casing, 9-5/8" 53.5 lb/ft L-80 LTC (14 jts)	10.625	8.535	166.16	3071.64	
12	Float Collar, 9-5/8" 53.5 lb/ft L-80 LTC	10.625	8.535	0.36	3237.80	
13	Production Casing, 9-5/8" 53.5 lb/ft L-80 LTC	10.625	8.535	11.52	3238.16	
14	Production Casing Float Shoe Joint, 9-5/8" 53.5 lb/ft L-80 LTC	10.625	8.535	12.26	3249.68	
15	Production Casing Setting Depth			0.00	3261.94	2917
16						
1	RT to top of 13-3/8" Casing Hanger			419.14		
2	Casing Hanger Joint, 13-3/8"		12.415	3.38	419.14	419
3	Surface Casing, 13-3/8" 68 lb/ft K-55 BTC (72 Jts)	14.375	12.415	854.70	422.52	
4	Float Collar, 13-3/8"	14.375	12.415	0.54	1277.22	
5	Surface Casing, 13-3/8" 68 lb/ft K-55 BTC (2 Jts)	14.375	12.415	24.11	1277.76	
6	Float Shoe, 13-3/8"	14.375		0.35	1301.87	
7	Surface Casing Setting Depth			0.00	1302.22	1205
8						
1	RT to Top 18-3/4" Wellhead Housing			417.75		
2	18-3/4" Wellhead Housing Joint, 20" 129.3 lb/ft X-56 RL-4S	27.375	17.563	3.91	417.75	418
3	Structural Casing, 20" 129.3 lb/ft X-56 RL-4S (21 jts)	20.000	18.750	248.37	421.66	
4	Structural Casing Float Shoe Joint, 20" 129.3 lb/ft X-56 RL-4S	20.000	18.750	11.99	670.03	
6	Structural Casing Setting Depth			0.00	682.02	682
7						
1	RT to 30" Wellhead Housing			418.53		
2	Wellhead Housing Joint, 30 " 1-1/2" Wall 457 lb/ft X-52 RL-4HT	35.750	27.000	10.47	418.53	419
3	Structural Casing, 30" 1" Wall 310 lb/ft X-52 RL-4HT (3 jts)	30.000	28.000	34.82	429.00	
4	Structural Casing, 30" 1" Wall 310 lb/ft X-52 RL-4S (2 jts)	30.000	28.000	23.29	463.82	
5	Float Shoe, 30" RL-4	30.000		0.23	487.11	
6	Structural Casing Setting Depth			0.00	487.34	487

Perforation Details

Name	Eff.	Aband.	Top	Bot.	Interval	TVD	Gun Description	Comment
Paleocene	19/08/1999		3174.00	3185.00	11.00	2838	7" HSD 12 SPF 51J Ultraje	Open 2838-48 m TVD



Wellhead Size and Type:
ABB Vetco Gray MS-700 10,000 psi Subsea Wellhead System

Wellhead Cap:
ABB Vetco Gray, TR-16, 5" x 2", LC-7 Mandrel Up

BPV Preparation:
Halliburton 3.813" X

Avg Angle: 23°

Max: 60° @ 1289.16

Original Completion: /08/1999

Last Workover:

Other: Description	Depth
RT to Sea Level	26.00
Water Depth	395.00

III. SAMPLES

Cuttings

Three sets of washed and oven dried cuttings were taken at 10m intervals from 3030 metres, aproximately 150m MDRT above predicted top of Latrobe Group to 3170 metres, approximate top of Latrobe Group, then at 5m intervals to TD. Cuttings descriptions for the interval 1770m to 3272m MDRT are contained in Appendix 3a.

Conventional coring

One conventional core was cut in Blackback A-1A as follows

Core	Depth (m MDRT)		Depth (m TVDSS)		Recovery
	Top	Bottom	Top	Bottom	m MD (%)
1	3172 (driller depth) 3176.1 (wireline log)	3199.4 (driller depth) 3203.5 (wireline log)	2814.2	2838.8	27.4 (100%)

Note: A depth shift of +4.1 metres is required to match the driller's core depth to the wireline log data.

Sidewall coring

No sidewall core samples were shot in BLACKBACK A-1A.

IV. LOGS AND SURVEYS

Survey/Log	Company	Top (m MDRT)	Bottom (m MDRT)
MWD (Directional)	Anadrill	1289*	3260
(Gamma Ray)	Anadrill	1320	3260**
Wireline PEX(AIT-H), HNGS	Schlumberger	3145	3275**
GR, CDSI, Caliper	Schlumberger	1270	3275**
Checkshot Survey	Schlumberger	1250	3170

* Tie-in point to MWD from previous well (A-1).
** Cropped at 3255m on Composite Log

V. FORMATION RESERVOIR TOPS

Formation/ Zone	m TVDSS			m MDRT	m TVT Net Oil Sand	
	Predicted	Actual	Difference	Actual	Predicted	Actual
Sea Floor	402	395	-7	421		
Gippsland Limestone	402	395	-7	421		
Base of High Velocity Channel (BHVC)		2452.6		2778.0		
Top of Lakes Entrance Formation (TOLE)	2556	2556.7	0.7	2892.0		
Mid-Miocene Marker (MMM)		2588.9		2927.4		
Top Oligocene Wedge (TOW)		2801.9		3162.5		
Top of Latrobe Group (TOL)	2814	2813.9	-0.1	3175.8	24	~4.5+
Base Eocene / Top Paleocene		2819.1		3181.6		
Top of B230		2820.5		3183.2		
Lowest Known Oil (LKO)*		2822.0*		3184.8*		
Field Oil-Water Contact (FOWC)*	2834					
Top of B250		2835.9		3200.2		
Highest Known Water (HKW)		2847.9		3213.6		
Base Paleocene		2876.6		3245.6		
Total Depth (TD)	2926	2900.3	-25.7	3272.0		

* A formation Oil/Water Contact cannot be identified in this well, but is considered likely to occur well below LKO. Shows were observed to the base of the core; below the expected FOWC.

+ Using permeability cut-off based on permeameter values ≥ 1md.

VI. GEOLOGICAL ANALYSIS

Drilling Operations Summary

Phase I of the Blackback "new field" development comprises three subsea wellheads spaced 25 metres apart and joined by flexible jumpers in a "daisy chain" arrangement at the end of a 23 kilometre pipeline to host facilities on Mackerel platform.

The Blackback Phase I (BKA) development program commenced at 1930hrs on February 13, 1999, with the arrival of the Sedco 702 semi-submersible drilling rig at the nominated location of the subsea completion. Drilling operations commenced at 0000hrs on February 16 with the batch drilling and emplacement of three conductors (A-3, then A-2 and A-1) followed by deployment of the inter-well flexible jumpers and Completion Guide Bases (CGBs).

Having already set surface casing for BKA A-3 and BKA A-2, the rig began to move to the A-1 location at 0000hrs on February 24 and, after running a Temporary Guide Base to the sea floor (395mSS) the BKA A-1 well was spudded at 1115hrs that day. A 36" hole was drilled to 491m with 30" casing set to 487m and then a 26" hole was drilled to 687m with 20" casing set to 682m.

At 0200hrs on February 27 the rig was temporarily released from BKA A-1 to deploy the flexible jumpers and the CGBs for A-3 and A-2. The rig returned to A-1 at 1930hrs on March 1 and (with some difficulty) ran the CGB, and completed rebuilding and testing of the BOP.

On March 9 at 1215hrs drilling of BKA A-1 re-commenced with a 17½" bit drilling out of surface casing and continuing to 1310m, after which 13⅜" casing was set at 1302.12m. From March 16 to April 24 BKA A-1/ST1 was drilled to develop the northernmost fault block (Terakihi) but was plugged and abandoned due to a smaller than expected oil column. The rig then skidded to and drilled BKA A-2 before returning to the A-1 conductor on June 2 to drill BKA A-1A (appraising the previously undrilled "North East Paleocene" fault block).

Commencing on June 6, the cement plug at the 13⅜" casing shoe was drilled out, the 12¼" hole kicked-off at 1320m, and the well drilled ahead until reaching core point (Top of Latrobe) at 3172 mMD on June 17. A 27-metre 8"x5¼" core barrel with 9⅞" bit was run and the full core length was cut in three hours, with 100% core recovery achieved. BKA A-1A was then drilled to a TD of 3272mMD (2926mTVDRT) which was reached on June 22. After running wireline logs (comprising one PEX combo and a checkshot survey) 10¾"x9⅝" production casing was run and cemented to 3262mMD. On June 27 the well was temporarily suspended (with an interim cement plug 460-670m) pending the arrival of suitable (smaller) tubulars to optimize the completion.

Following the drilling and completion of BKA A-3 the rig was re-skidded to A-1A on August 6 and the well was completed with 2⅞" tubing. On August 15 operations on A-1A were temporarily suspended (to run the tree on A-3) with the rig returning to A-1A on August 18 to run the tree and

VI. GEOLOGICAL ANALYSIS (cont'd)

perforate the well, which occurred on the evening of August 19. After running and testing the tree cap, operations on A-1A were concluded at the end of August 21, with the rig moving back to A-3 for demooring and demobilization.

Objectives

The BKA A-1A well was designed to appraise and develop the "North East Paleocene" (NEP), a previously undrilled major fault block located between the Terakihi-1 and Blackback-1 exploration wells.

Based on similar seismic character to the upper Latrobe Group section in the Blackback-2/Hapuku-1 area, the NEP was interpreted to have Paleocene-age strata subcropping (or close to) the Top of Latrobe (TOL) unconformity. Based on this interpretation, the presence of Paleocene-age strata represented the major risk for this well location. The validity of the structural interpretation was also a major risk in this part of the field due to uncertainty in both conversion of two-way-time to depth and the time pick position of the TOL horizon. Depth conversion at TOL is complicated by complex water bottom topography and extensive channelling within the overlying Gippsland limestone. Both of these effects produce lateral and vertical distortions of the shallow velocity field. Time pick position uncertainty is due to lateral changes in impedance contrast at TOL and poor seismic data quality in this part of the field.

Reservoir quality was also a significant risk because, even with the seemingly encouraging seismic character, the relatively thin (20m) oil column anticipated at TOL could be readily devalued if substantially contained in poor reservoir. A wedge of (poor quality) Eocene strata is interpreted to thin below seismic resolution across the NEP, and the possibility of a poor net-to-gross Paleocene section could also not be discounted.

Positioning of the target (pre-drill 'Location B') attempted to obtain the best balance between the inferred north-ward increasing structural risk and the south-ward thickening Eocene.

Results

Depth Uncertainty

Wireline logs in BKA A-1A were run without any hole problems. Just after starting to run in hole a −1m tide correction was applied. A depth check was reportedly made at the $13^3/_8$" casing shoe (1302mMD Driller) during the run in hole, but no comment of any discrepancy or correction was noted. Upon tagging bottom (3272mMD Driller, 3275mMD Logger) a stretch correction of +5.5m was applied and logs were acquired while pulling out of the hole. The gamma ray (GR), sonic (DSI) and caliper were logged up to 1270m, with the latter indicating a casing shoe depth of 1288mMD, ie. 14m shallower than the Driller's depth.

VI. GEOLOGICAL ANALYSIS (cont'd)

The log data were subsequently adjusted to match the Driller's $13^3/_8$" casing shoe depth, however no corrections were applied below 3100mMD because the wireline GR was in close agreement to the MWD GR (which is tied to the Driller's depth) in the basal part of the well. All other wireline logs were then depth aligned to the wireline GR curve.

Log picks have been made on the resulting measured depth logs and converted to TVD using the MWD survey data. However, the inability to identify an Oil/Water Contact (OWC) on the logs (which would be expected to correspond to the Field Oil/Water Contact) leaves some doubt as to the correctness of the TVD depths. If the well is on depth (or close to) then the FOWC should be around 3196-8mMD, within the basal section of the core. The observation that the core has shows to its base, and elevated gas readings extending several metres below the cored interval may just be due to a relict column (as noted in Blackback-2) but they could also be indicating the OWC is "deeper" (lower) than expected. Given that a truly deeper OWC in this block would be inconsistent with well data from adjacent blocks, this may be indicating that the TVD depths used in A-1A are incorrectly deep. If true, this would mean the structure is higher, and the oil column larger, than currently interpreted.

Geology and Hydrocarbons

Beneath a 12mTVT "Oligocene Wedge" section in the basal Lakes Entrance Formation, BKA A-1A intersected the TOL unconformity at 3175.8mMD (2813.9mTVDSS), 0.1 metres high to prognosis.

A 27-metre core was cut from just below TOL with full recovery, providing a continuous lithologic section through the upper part of the preserved Latrobe Group. Micropalaeontological work (Appendix 5) on selected core samples indicates that the core spans a 20m.y. time interval from Late Paleocene (Upper *L. balmei*) to Late Eocene (Middle *N. asperus*) thereby reconfirming the highly condensed nature of this secion in the Blackback area. At least three unconformities are indicated within the cored interval, with the largest being from Late Paleocene to Middle Eocene at 3181.6mMD (2819.1mTVDSS) wireline log depth. Thus, the Latrobe Group section penetrated in A-1A comprises 5.2mTVT of Eocene, overlying a Paleocene section interpreted to be 56.5mTVT (base Paleocene picked on distinctive high gamma ray peak at 3245.6mMD) and, therefore, terminating in Cretaceous strata.

The Eocene section in A-1A consists mainly of very poorly sorted, clay-rich, glauconitic sandstone, which is "massive" to chaotic to crudely planar bedded, with generally low to very low permeabilities (mostly <10md). While these characteristics are typical of much of the Eocene in the Blackback area, the A-1A section most closely compares to the (poor reservoir quality) section cored in Blackback-3 and, to a lesser extent, the upper part of the Eocene in Blackback-1. This unit has been informally labelled B140 for reservoir management purposes.

VI. GEOLOGICAL ANALYSIS (cont'd)

The Paleocene section in A-1A is also "massive" to crudely planar bedded and dominantly sandy, but most of the cored interval and, more importantly, most of the oil column comprises very fine to fine sand of generally very poor reservoir quality (permeability mostly <2md) due to various reservoir-degrading components (including labile framework grains, detrital clays, carbonate cements and pyrite) combining with the small grainsize. Only one interval of good/excellent reservoir quality occurs within the oil column in A-1A; a 1.1mTVT medium- to coarse-grained, high permeability (mostly >1 darcy) sand just near the top of the relict Paleocene section. The paucity of suitable reservoir quality sand in this uppermost 15 metres of Paleocene section is well below expectations, comprising a substantially lower proportion than was encountered in any 15m interval of Paleocene section in previous Blackback wells.

Just below the assumed FOWC a much thicker (17mTVT) medium- to coarse-grained, but extensively dolomitized sand occurs. Based solely on lithologic similarity this sand is correlated to the main oil-bearing sand in Blackback-2 and BKA A-2, both 2.6km to the south-west. (The sparse biostratigraphic data in Blackback-2 and A-1A places both sections in the Upper *L. balmei* spore pollen zone, but the First Appearance Datum of *Proteacidites annularis* suggests this sand is probably older in A-1A). Previously in A-2, and now in A-1A, this sand has been informally labelled B250 for reservoir management purposes. Assuming the B250 correlation is valid, the aforementioned thin sand above it in A-1A is correlated to the B230 sand in A-2.

Accurate assessment from wireline logs of the oil column in BKA A-1A is severely limited by the lithologic character of the Eocene and Paleocene strata in which it occurs. The oil column extends from TOL (3175.8mMD, 2813.9mTVDSS) to an unknown depth below Lowest Known Oil (3184.4mMD, 2822mTVDSS) notionally to the FOWC (expected to be about 2834mTVDSS). Due to the masking of pore fluid content by lithological properties, Highest Known Water (HKW) could not be confidently picked higher than 3213.6mMD (2847.9mTVDSS) but is probably at least as high as 3203mMD (2838.4mTVDSS). Between the FOWC and HKW picks fluorescence was observed down to the bottom of the core (3203.5mMD corrected depth) and elevated mud gas extended down to 3209mMD (Driller's depth) but the significance of these shows remains unclear.

In conjunction with not being able to identify the OWC, basic petrophysical parameters such as effective porosity and water saturation have considerable uncertainty associated with them, resulting in varying estimates of net oil pay. Depending on the choice of cut-off applied to the log analysis (Appendix 2a) net oil pay is estimated to range from 1.7mTVD (using permeameter values ≥10md) through 2.2mTVD (using effective log porosity ≥12%) to 4.5mTVD (using permeameter values ≥1md). However, given that the thin, but mostly very high permeability (>1 darcy) B230 sand seems certain to overwhelmingly dominate production from this otherwise very low to low permeability oil column, precise determination of net-to-gross and other standard parameters in the poorer-quality sections is less important than monitoring production from A-1A to investigate the accessible hydrocarbon volume away from the well bore.

VI. GEOLOGICAL ANALYSIS (cont'd)(

A-1A was completed with perforations over the interval 3174.0-3185.0mMD, spanning from just above TOL to just below the B230 sand. Production of BKA A-1A commenced on August 22, 1999, but direct measurement of its flow rate has not yet been possible due to continuous co-mingling with the much more productive (but choked-back) BKA A-3 well. From a combined flow rate ranging 8-12 KSTBD the A-1A is estimated to be contributing 2-3 KSTBD. Up to mid-December 168 KSTB was attributed to A-1A, with no water-cut evident.

Geophysical Analysis

The depth to TOL in BKA A-1A was essentially as prognosed (0.1m high to prognosis). A synthetic seismogram constructed from the sonic and density logs illustrates that the pre-drill pick time position for TOL is correct. The accurate depth prognosis and the checkshot survey acquired in the well indicates the pre-drill velocity model is also essentially correct. The thin Eocene section penetrated in the well was not specifically prognosed at the well location, but a wedge of Eocene strata was interpreted pre-drill to thin below seismic resolution across the NEP.

APPENDIX 1a

BLACKBACK A-1A

Survey Data

907524 020

Schlumberger
Anadrill

Survey

Client:	Esso Australia Ltd	Survey Computation Method:	Minimum Curvature
Field:	EAL - BlackBack	DLS Computation Method:	Lubinski
Structure:	BlackBack Sedco 702 A-1	Vertical Section Azimuth:	54.070°
Well:	A-1	Vertical Section Origin:	N 0.000 m, E 0.000 m
Borehole:	A-1A	TVD Reference:	Rotary Table
API #:			26.0 m above MSL
Date:	June 24, 1999	Magnetic Declination:	13.388°
Grid Convergence:	-0.96788765°	Total Field Strength:	60293.193 nT
Scale Factor:	0.99982562	Dip:	-69.040°
		Declination Date:	June 02, 1999
Location:	S 38 32 31.677, E 148 33 11.274	Magnetic Declination Model:	BGS 1998
:	N 5732873.400 m, E 635355.100 m	North Reference:	Grid North
Coordinate System:	UTM Zone 55 S on Australian Datum 1984	Coordinate Reference To:	Structure Reference Point

Station ID	MD (m)	Incl (°)	Azim (°)	TVD (m)	VSec (m)	N/-S (m)	E/-W (m)	Closure (m)	at Azim (°)	DLS (°/30m)	TF (°)
Rotary Table	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	119MTF
	421.00	0.00	118.67	421.00	0.00	0.00	0.00	0.00	0.00	0.00	119MTF
	424.40	0.44	118.67	424.40	0.01	-0.01	0.01	0.01	118.67	3.88	119MTF
	433.90	0.67	118.67	433.90	0.05	-0.05	0.09	0.11	118.67	0.73	119MTF
	443.60	1.22	118.67	443.60	0.11	-0.13	0.23	0.27	118.67	1.70	119MTF
	453.30	1.40	118.67	453.30	0.21	-0.23	0.43	0.49	118.67	0.56	119MTF
	463.00	1.35	118.67	462.99	0.31	-0.35	0.63	0.72	118.67	0.15	119MTF
	472.60	1.94	118.67	472.59	0.43	-0.48	0.87	1.00	118.67	1.84	119MTF
	482.30	1.67	118.67	482.28	0.56	-0.62	1.14	1.30	118.67	0.84	119MTF
	487.00	1.35	118.67	486.98	0.61	-0.68	1.25	1.42	118.67	2.04	119MTF
	491.10	1.06	118.67	491.08	0.65	-0.72	1.33	1.51	118.67	2.12	119MTF
	519.90	0.83	118.67	519.88	0.85	-0.95	1.74	1.99	118.67	0.24	112MTF
	548.90	0.85	112.10	548.87	1.06	-1.13	2.13	2.41	118.08	0.10	118MTF
	578.00	0.76	117.52	577.97	1.26	-1.30	2.50	2.82	117.59	0.12	121MTF
	607.00	0.44	120.87	606.97	1.39	-1.45	2.76	3.12	117.70	0.33	123MTF
	636.10	0.66	122.56	636.07	1.49	-1.60	3.00	3.40	118.04	0.23	118MTF
	650.00	0.56	118.40	649.97	1.55	-1.67	3.13	3.55	118.15	0.24	120MTF
	689.12	1.26	120.18	689.08	1.81	-1.98	3.67	4.17	118.37	0.54	65MTF
	719.19	1.50	65.10	719.15	2.33	-1.98	4.31	4.74	114.69	1.29	17MTF
	748.79	3.53	17.27	748.72	3.44	-0.95	4.93	5.02	100.88	2.79	13MTF
	807.91	6.57	13.29	807.60	7.46	4.08	6.25	7.47	56.85	1.55	-7
	838.21	9.51	11.16	837.60	10.60	8.23	7.13	10.89	40.93	2.93	-10
	865.42	12.94	8.40	864.29	14.38	13.45	8.01	15.65	30.79	3.83	-22
	896.24	16.67	3.22	894.08	19.58	21.28	8.77	23.01	22.39	3.85	-17
	924.88	20.03	0.25	921.26	25.08	30.29	9.02	31.60	16.58	3.65	-8
	951.82	23.17	359.15	946.30	30.85	40.20	8.96	41.19	12.57	3.53	-9
	981.56	25.16	358.42	973.44	37.78	52.37	8.70	53.09	9.43	2.03	9
	1009.78	28.29	359.43	998.64	45.03	65.06	8.47	65.61	7.42	3.36	8
	1038.86	31.04	0.21	1023.91	53.44	79.45	8.43	79.90	6.05	2.86	-10
	1067.13	33.93	359.33	1047.75	62.30	94.63	8.36	95.00	5.05	3.11	-12
	1096.16	36.75	358.31	1071.43	71.87	111.42	8.01	111.70	4.11	2.98	-8
	1127.05	39.69	357.70	1095.69	82.53	130.51	7.34	130.72	3.22	2.88	-30
	1155.88	43.87	354.25	1117.19	92.66	149.66	5.97	149.78	2.28	4.96	-20
	1183.49	47.66	352.36	1136.45	102.31	169.30	3.65	169.34	1.24	4.37	20
	1212.09	51.37	354.08	1155.02	112.91	190.90	1.10	190.90	0.33	4.13	12
	1242.07	54.60	354.94	1173.06	125.04	214.73	-1.19	214.73	359.68	3.30	9
	1271.80	57.80	355.55	1189.60	137.83	239.34	-3.24	239.36	359.23	3.27	6
Tie In Point	1289.16	60.26	355.87	1198.53	145.63	254.19	-4.35	254.22	359.02	4.28	-166
BHA #2 - 7th June 1999	1305.60	58.77	355.43	1206.87	153.05	268.31	-5.42	268.37	358.84	2.81	159
	1316.76	56.98	356.26	1212.81	158.03	277.74	-6.11	277.80	358.74	5.17	146

	1326.30	56.12	356.96	1218.06	162.31	285.68	-6.58	285.76	358.68	3.27	59
	1346.98	56.53	357.77	1229.53	171.76	302.87	-7.37	302.96	358.61	1.14	93
	1363.10	56.49	358.75	1238.43	179.31	316.31	-7.78	316.41	358.59	1.52	152
	1390.81	54.23	0.22	1254.18	192.52	339.11	-7.99	339.20	358.65	2.77	152
	1423.46	51.09	2.35	1273.98	208.21	365.05	-7.42	365.13	358.84	3.28	143
	1451.72	48.62	4.89	1292.20	221.95	386.61	-6.06	386.65	359.10	3.33	134
	1477.95	46.73	7.60	1309.86	234.96	405.88	-3.96	405.90	359.44	3.15	150
	1508.98	44.79	9.23	1331.51	250.50	427.87	-0.71	427.87	359.90	2.19	145
8th June 1999	1536.52	43.39	10.65	1351.29	264.25	446.74	2.59	446.75	0.33	1.87	161
	1565.14	40.78	12.05	1372.53	278.34	465.55	6.36	465.59	0.78	2.91	177
	1593.91	37.97	12.26	1394.77	291.92	483.39	10.20	483.50	1.21	2.93	162
	1622.66	36.16	13.24	1417.71	304.93	500.29	14.03	500.49	1.61	1.99	148
	1653.60	32.70	17.26	1443.23	318.53	517.17	18.60	517.50	2.06	4.01	128
	1684.02	31.03	21.55	1469.06	331.72	532.31	23.92	532.84	2.57	2.77	140
	1711.33	28.73	25.70	1492.75	343.44	544.77	29.35	545.56	3.08	3.40	145
BHA #3 - 9th June 1999	1740.48	26.25	29.79	1518.60	355.48	556.68	35.59	557.82	3.66	3.21	135
BHA #4 - 10th June 1999	1769.03	24.22	34.87	1544.43	366.77	566.97	42.08	568.53	4.24	3.12	125
	1800.09	22.39	42.33	1572.96	378.58	576.57	49.71	578.71	4.93	3.35	106
	1831.77	21.60	52.57	1602.35	390.32	584.58	58.40	587.49	5.71	3.70	109
11th June 1999	1855.32	20.88	59.61	1624.30	398.83	589.34	65.47	592.96	6.34	3.37	106
	1883.59	20.21	68.69	1650.78	408.57	593.66	74.36	598.30	7.14	3.45	88
	1913.23	20.52	77.41	1678.57	418.30	596.66	84.21	602.57	8.03	3.08	90
	1942.31	20.68	85.05	1705.80	427.38	598.21	94.30	605.60	8.96	2.78	89
12th June 1999	1970.90	21.09	95.65	1732.52	435.56	598.14	104.45	607.19	9.91	3.98	87
	1999.70	21.50	104.27	1759.36	442.82	596.33	114.72	607.26	10.89	3.29	105
	2026.19	20.95	112.15	1784.06	448.43	593.35	123.82	606.13	11.79	3.29	-101
	2054.03	20.92	111.69	1810.06	453.73	589.63	133.05	604.46	12.72	0.18	-97
BHA #5 - 13th June 1999	2081.01	20.87	110.40	1835.27	458.97	586.18	142.03	603.14	13.62	0.51	20
	2108.21	21.51	111.03	1858.76	463.98	582.95	150.55	602.08	14.48	0.81	173
	2136.20	21.18	111.14	1886.70	469.92	579.03	160.73	600.92	15.51	0.33	-126
	2164.54	21.12	110.91	1913.13	475.50	575.36	170.27	600.03	16.49	0.11	-52
	2194.42	21.18	110.70	1940.99	481.41	571.53	180.35	599.31	17.51	0.10	-10
	2221.95	21.46	110.57	1966.64	486.92	568.00	189.72	598.85	18.47	0.31	-14
	2252.81	21.91	110.26	1995.32	493.24	564.02	200.41	598.57	19.56	0.45	36
	2281.68	22.15	110.72	2022.08	499.23	560.23	210.55	598.49	20.60	0.31	27
14th June 1999	2311.87	22.79	111.57	2049.98	505.50	556.07	221.31	598.49	21.70	0.71	-27
	2340.55	23.16	111.09	2076.38	511.56	552.00	231.74	598.67	22.77	0.43	129
	2370.63	23.11	111.25	2104.04	517.98	547.73	242.76	599.12	23.90	0.08	129
	2402.20	22.82	112.19	2133.11	524.57	543.17	254.20	599.71	25.08	0.44	4
	2427.71	23.03	112.23	2156.60	529.81	539.42	263.40	600.29	26.03	0.25	-23
	2457.08	23.70	111.53	2183.57	536.02	535.08	274.21	601.25	27.13	0.74	41
	2485.07	23.95	112.07	2209.17	542.06	530.88	284.71	602.40	28.20	0.36	174
	2514.43	23.28	112.24	2236.07	548.27	526.44	295.60	603.76	29.31	0.69	168
	2544.27	22.77	112.52	2263.53	554.41	522.00	306.39	605.28	30.41	0.52	171
15th June 1999	2572.04	22.48	112.64	2289.17	559.99	517.90	316.26	606.83	31.41	0.32	25
	2603.59	23.20	113.48	2318.24	566.29	513.10	327.53	608.72	32.55	0.75	-31
	2632.52	23.44	113.12	2344.81	572.15	508.57	338.04	610.67	33.61	0.29	86
	2662.71	23.47	114.16	2372.51	578.24	503.75	349.05	612.86	34.72	0.41	-160
	2687.92	22.78	113.51	2395.69	583.22	499.75	358.11	614.81	35.62	0.88	-174
16th June 1999	2717.71	22.51	113.43	2423.18	589.06	495.18	368.63	617.33	36.67	0.27	16
	2747.27	23.23	113.94	2450.42	594.87	490.57	379.15	620.01	37.70	0.76	5
	2776.91	23.86	114.08	2477.59	600.80	485.75	389.96	622.92	38.76	0.64	26
	2806.06	24.16	114.43	2504.22	606.70	480.88	400.78	625.99	39.81	0.34	107
	2833.89	24.08	115.09	2529.62	612.27	476.11	411.10	629.04	40.81	0.30	-106
	2865.25	24.06	114.92	2558.25	618.48	470.71	422.70	632.64	41.92	0.07	-24
	2891.57	24.25	114.71	2582.27	623.74	466.19	432.47	635.89	42.85	0.24	64
	2921.00	24.48	115.83	2609.08	629.59	461.00	443.45	639.67	43.89	0.53	-94
	2950.41	24.46	114.98	2635.85	635.44	455.78	454.45	643.63	44.92	0.36	65
	2979.92	24.69	116.16	2662.68	641.29	450.48	465.52	647.80	45.94	0.55	-34
17th June 1999	3005.73	24.88	115.86	2686.12	646.38	445.73	475.25	651.57	46.84	0.26	42

	3037.47	25.06	116.24	2714.89	652.68	439.85	487.29	656.44	47.93	0.23	52
	3069.26	25.26	116.84	2743.66	658.92	433.81	499.38	661.49	49.02	0.31	-82
	3096.42	25.29	116.36	2768.22	664.27	428.62	509.75	666.00	49.94	0.23	33
	3125.86	25.43	116.57	2794.83	670.11	423.00	521.03	671.12	50.93	0.17	48
	3154.17	25.60	117.00	2820.37	675.70	417.50	531.92	676.20	51.87	0.27	79
BHA #6	3179.95	25.62	117.24	2843.62	680.75	412.42	541.84	680.94	52.72	0.12	-39
BHA #7	3210.03	26.05	116.45	2870.70	686.75	406.51	553.53	686.77	53.71	0.55	-24
	3241.71	26.17	116.33	2899.14	693.23	400.31	566.02	693.27	54.73	0.12	-14
	3255.17	26.29	116.26	2911.22	696.00	397.67	571.36	696.13	55.16	0.28	-24
Projection to the bit	3272.00	26.35	116.20	2926.30	699.49	394.38	578.05	699.77	55.70	0.12	

APPENDIX 1b

BLACKBACK A-1A

MD-TVD Survey Data Listing

BLACKBACK A-1A MD-TVD Survey Data Listing

MD	Angl	irectio	VDR	TVDSS	DNorth	DEast	Northing	Easting
0	0.0	0.00	0.00	-26.00	0.00	0.00	5732873.3	635354.9
5	0.00	1.41	5.00	-21.00	0.00	0.00	5732873.3	635354.9
10	0.00	2.82	10.00	-16.00	0.00	0.00	5732873.3	635354.9
15	0.00	4.23	15.00	-11.00	0.00	0.00	5732873.3	635354.9
20	0.00	5.64	20.00	-6.00	0.00	0.00	5732873.3	635354.9
25	0.00	7.05	25.00	-1.00	0.00	0.00	5732873.3	635354.9
30	0.00	8.46	30.00	4.00	0.00	0.00	5732873.3	635354.9
35	0.00	9.87	35.00	9.00	0.00	0.00	5732873.3	635354.9
40	0.00	11.28	40.00	14.00	0.00	0.00	5732873.3	635354.9
45	0.00	12.68	45.00	19.00	0.00	0.00	5732873.3	635354.9
50	0.00	14.09	50.00	24.00	0.00	0.00	5732873.3	635354.9
55	0.00	15.50	55.00	29.00	0.00	0.00	5732873.3	635354.9
60	0.00	16.91	60.00	34.00	0.00	0.00	5732873.3	635354.9
65	0.00	18.32	65.00	39.00	0.00	0.00	5732873.3	635354.9
70	0.00	19.73	70.00	44.00	0.00	0.00	5732873.3	635354.9
75	0.00	21.14	75.00	49.00	0.00	0.00	5732873.3	635354.9
80	0.00	22.55	80.00	54.00	0.00	0.00	5732873.3	635354.9
85	0.00	23.96	85.00	59.00	0.00	0.00	5732873.3	635354.9
90	0.00	25.37	90.00	64.00	0.00	0.00	5732873.3	635354.9
95	0.00	26.78	95.00	69.00	0.00	0.00	5732873.3	635354.9
100	0.00	28.19	100.00	74.00	0.00	0.00	5732873.3	635354.9
105	0.00	29.60	105.00	79.00	0.00	0.00	5732873.3	635354.9
110	0.00	31.01	110.00	84.00	0.00	0.00	5732873.3	635354.9
115	0.00	32.42	115.00	89.00	0.00	0.00	5732873.3	635354.9
120	0.00	33.83	120.00	94.00	0.00	0.00	5732873.3	635354.9
125	0.00	35.23	125.00	99.00	0.00	0.00	5732873.3	635354.9
130	0.00	36.64	130.00	104.00	0.00	0.00	5732873.3	635354.9
135	0.00	38.05	135.00	109.00	0.00	0.00	5732873.3	635354.9
140	0.00	39.46	140.00	114.00	0.00	0.00	5732873.3	635354.9
145	0.00	40.87	145.00	119.00	0.00	0.00	5732873.3	635354.9
150	0.00	42.28	150.00	124.00	0.00	0.00	5732873.3	635354.9
155	0.00	43.69	155.00	129.00	0.00	0.00	5732873.3	635354.9
160	0.00	45.10	160.00	134.00	0.00	0.00	5732873.3	635354.9
165	0.00	46.51	165.00	139.00	0.00	0.00	5732873.3	635354.9
170	0.00	47.92	170.00	144.00	0.00	0.00	5732873.3	635354.9
175	0.00	49.33	175.00	149.00	0.00	0.00	5732873.3	635354.9
180	0.00	50.74	180.00	154.00	0.00	0.00	5732873.3	635354.9
185	0.00	52.15	185.00	159.00	0.00	0.00	5732873.3	635354.9
190	0.00	53.56	190.00	164.00	0.00	0.00	5732873.3	635354.9
195	0.00	54.97	195.00	169.00	0.00	0.00	5732873.3	635354.9
200	0.00	56.38	200.00	174.00	0.00	0.00	5732873.3	635354.9
205	0.00	57.78	205.00	179.00	0.00	0.00	5732873.3	635354.9
210	0.00	59.19	210.00	184.00	0.00	0.00	5732873.3	635354.9
215	0.00	60.60	215.00	189.00	0.00	0.00	5732873.3	635354.9
220	0.00	62.01	220.00	194.00	0.00	0.00	5732873.3	635354.9
225	0.00	63.42	225.00	199.00	0.00	0.00	5732873.3	635354.9
230	0.00	64.83	230.00	204.00	0.00	0.00	5732873.3	635354.9
235	0.00	66.24	235.00	209.00	0.00	0.00	5732873.3	635354.9
240	0.00	67.65	240.00	214.00	0.00	0.00	5732873.3	635354.9
245	0.00	69.06	245.00	219.00	0.00	0.00	5732873.3	635354.9
250	0.00	70.47	250.00	224.00	0.00	0.00	5732873.3	635354.9
255	0.00	71.88	255.00	229.00	0.00	0.00	5732873.3	635354.9
260	0.00	73.29	260.00	234.00	0.00	0.00	5732873.3	635354.9
265	0.00	74.70	265.00	239.00	0.00	0.00	5732873.3	635354.9
270	0.00	76.11	270.00	244.00	0.00	0.00	5732873.3	635354.9
275	0.00	77.52	275.00	249.00	0.00	0.00	5732873.3	635354.9
280	0.00	78.93	280.00	254.00	0.00	0.00	5732873.3	635354.9
285	0.00	80.33	285.00	259.00	0.00	0.00	5732873.3	635354.9
290	0.00	81.74	290.00	264.00	0.00	0.00	5732873.3	635354.9
295	0.00	83.15	295.00	269.00	0.00	0.00	5732873.3	635354.9
300	0.00	84.56	300.00	274.00	0.00	0.00	5732873.3	635354.9
305	0.00	85.97	305.00	279.00	0.00	0.00	5732873.3	635354.9
310	0.00	87.38	310.00	284.00	0.00	0.00	5732873.3	635354.9
315	0.00	88.79	315.00	289.00	0.00	0.00	5732873.3	635354.9
320	0.00	90.20	320.00	294.00	0.00	0.00	5732873.3	635354.9
325	0.00	91.61	325.00	299.00	0.00	0.00	5732873.3	635354.9
330	0.00	93.02	330.00	304.00	0.00	0.00	5732873.3	635354.9
335	0.00	94.43	335.00	309.00	0.00	0.00	5732873.3	635354.9
340	0.00	95.84	340.00	314.00	0.00	0.00	5732873.3	635354.9
345	0.00	97.25	345.00	319.00	0.00	0.00	5732873.3	635354.9
350	0.00	98.66	350.00	324.00	0.00	0.00	5732873.3	635354.9

MD	Angl	irectio	VDR	TVDSS	DNorth	DEast	Northing	Easting
355	0.00	100.07	355.00	329.00	0.00	0.00	5732873.3	635354.9
360	0.00	101.48	360.00	334.00	0.00	0.00	5732873.3	635354.9
365	0.00	102.88	365.00	339.00	0.00	0.00	5732873.3	635354.9
370	0.00	104.29	370.00	344.00	0.00	0.00	5732873.3	635354.9
375	0.00	105.70	375.00	349.00	0.00	0.00	5732873.3	635354.9
380	0.00	107.11	380.00	354.00	0.00	0.00	5732873.3	635354.9
385	0.00	108.52	385.00	359.00	0.00	0.00	5732873.3	635354.9
390	0.00	109.93	390.00	364.00	0.00	0.00	5732873.3	635354.9
395	0.00	111.34	395.00	369.00	0.00	0.00	5732873.3	635354.9
400	0.00	112.75	400.00	374.00	0.00	0.00	5732873.3	635354.9
405	0.00	114.16	405.00	379.00	0.00	0.00	5732873.3	635354.9
410	0.00	115.57	410.00	384.00	0.00	0.00	5732873.3	635354.9
415	0.00	116.98	415.00	389.00	0.00	0.00	5732873.3	635354.9
420	0.00	118.39	420.00	394.00	0.00	0.00	5732873.3	635354.9
425	0.45	118.67	425.00	399.00	-0.01	0.02	5732873.3	635355.0
430	0.58	118.67	430.00	404.00	-0.03	0.06	5732873.3	635355.0
435	0.73	118.67	435.00	409.00	-0.06	0.10	5732873.3	635355.1
440	1.02	118.67	440.00	414.00	-0.09	0.17	5732873.2	635355.1
445	1.25	118.67	445.00	419.00	-0.14	0.26	5732873.2	635355.2
450	1.34	118.67	450.00	424.00	-0.20	0.36	5732873.1	635355.3
455	1.39	118.67	455.00	429.00	-0.25	0.46	5732873.1	635355.4
460	1.37	118.67	459.99	433.99	-0.31	0.57	5732873.0	635355.5
465	1.47	118.67	464.99	438.99	-0.37	0.67	5732873.0	635355.6
470	1.78	118.67	469.99	443.99	-0.44	0.80	5732872.9	635355.7
475	1.87	118.67	474.99	448.99	-0.52	0.94	5732872.8	635355.9
480	1.73	118.67	479.99	453.99	-0.59	1.08	5732872.7	635356.0
485	1.49	118.67	484.98	458.98	-0.66	1.21	5732872.7	635356.2
490	1.14	118.67	489.98	463.98	-0.71	1.31	5732872.6	635356.3
495	1.03	118.67	494.98	468.98	-0.76	1.39	5732872.6	635356.3
500	0.99	118.67	499.98	473.98	-0.80	1.47	5732872.5	635356.4
505	0.95	118.67	504.98	478.98	-0.84	1.54	5732872.5	635356.5
510	0.91	118.67	509.98	483.98	-0.88	1.61	5732872.5	635356.6
515	0.87	118.67	514.98	488.98	-0.92	1.68	5732872.4	635356.6
520	0.83	118.65	519.98	493.98	-0.95	1.74	5732872.4	635356.7
525	0.83	117.51	524.98	498.98	-0.99	1.81	5732872.4	635356.8
530	0.84	116.38	529.98	503.98	-1.02	1.87	5732872.3	635356.8
535	0.84	115.25	534.98	508.98	-1.05	1.94	5732872.3	635356.9
540	0.84	114.12	539.98	513.98	-1.08	2.01	5732872.3	635357.0
545	0.85	112.98	544.97	518.97	-1.11	2.07	5732872.2	635357.0
550	0.85	112.30	549.97	523.97	-1.14	2.14	5732872.2	635357.1
555	0.83	113.24	554.97	528.97	-1.17	2.21	5732872.2	635357.2
560	0.82	114.17	559.97	533.97	-1.20	2.27	5732872.1	635357.2
565	0.80	115.10	564.97	538.97	-1.23	2.34	5732872.1	635357.3
570	0.78	116.03	569.97	543.97	-1.26	2.40	5732872.1	635357.3
575	0.77	116.96	574.97	548.97	-1.29	2.46	5732872.1	635357.4
580	0.74	117.75	579.97	553.97	-1.32	2.52	5732872.0	635357.5
585	0.68	118.33	584.97	558.97	-1.35	2.57	5732872.0	635357.5
590	0.63	118.91	589.97	563.97	-1.37	2.63	5732872.0	635357.6
595	0.57	119.48	594.97	568.97	-1.40	2.67	5732871.9	635357.6
600	0.52	120.06	599.97	573.97	-1.42	2.71	5732871.9	635357.7
605	0.46	120.64	604.97	578.97	-1.44	2.75	5732871.9	635357.7
610	0.46	121.04	609.97	583.97	-1.46	2.78	5732871.9	635357.7
615	0.50	121.33	614.97	588.97	-1.48	2.82	5732871.9	635357.8
620	0.54	121.62	619.97	593.97	-1.51	2.86	5732871.8	635357.8
625	0.58	121.92	624.97	598.97	-1.53	2.90	5732871.8	635357.8
630	0.61	122.21	629.97	603.97	-1.56	2.94	5732871.8	635357.9
635	0.65	122.50	634.97	608.97	-1.59	2.99	5732871.7	635357.9
640	0.63	121.39	639.97	613.97	-1.62	3.04	5732871.7	635358.0
645	0.60	119.90	644.97	618.97	-1.65	3.08	5732871.7	635358.0
650	0.56	118.40	649.97	623.97	-1.67	3.13	5732871.7	635358.1
655	0.65	118.63	654.97	628.97	-1.70	3.17	5732871.6	635358.1
660	0.74	118.86	659.97	633.97	-1.73	3.23	5732871.6	635358.2
665	0.83	119.08	664.97	638.97	-1.76	3.29	5732871.6	635358.2
670	0.92	119.31	669.97	643.97	-1.80	3.35	5732871.5	635358.3
675	1.01	119.54	674.97	648.97	-1.84	3.43	5732871.5	635358.4
680	1.10	119.77	679.96	653.96	-1.89	3.51	5732871.5	635358.5
685	1.19	119.99	684.96	658.96	-1.94	3.59	5732871.4	635358.5
690	1.27	118.57	689.96	663.96	-1.99	3.68	5732871.4	635358.6
695	1.31	109.41	694.96	668.96	-2.04	3.79	5732871.3	635358.7
700	1.35	100.25	699.96	673.96	-2.06	3.90	5732871.3	635358.8
705	1.39	91.09	704.96	678.96	-2.07	4.01	5732871.3	635359.0
710	1.43	81.93	709.96	683.96	-2.06	4.12	5732871.3	635359.1
715	1.47	72.77	714.96	688.96	-2.03	4.23	5732871.3	635359.2

MD	Angl	irectio	VDR	TVDSS	DNorth	DEast	Northing	Easting
720	1.56	63.79	719.95	693.95	-1.97	4.33	5732871.4	635359.3
725	1.90	55.71	724.95	698.95	-1.90	4.46	5732871.4	635359.4
730	2.24	47.63	729.95	703.95	-1.78	4.59	5732871.6	635359.5
735	2.58	39.55	734.95	708.95	-1.62	4.73	5732871.7	635359.7
740	2.93	31.47	739.94	713.94	-1.41	4.83	5732871.9	635359.8
745	3.27	23.39	744.93	718.93	-1.16	4.91	5732872.2	635359.9
750	3.59	17.19	749.93	723.93	-0.88	4.95	5732872.5	635359.9
755	3.85	16.85	754.91	728.91	-0.57	5.05	5732872.8	635360.0
760	4.11	16.52	759.90	733.90	-0.23	5.15	5732873.1	635360.1
765	4.36	16.18	764.89	738.89	0.12	5.25	5732873.5	635360.2
770	4.62	15.84	769.87	743.87	0.50	5.36	5732873.8	635360.3
775	4.88	15.51	774.86	748.86	0.90	5.47	5732874.2	635360.4
780	5.13	15.17	779.84	753.84	1.32	5.58	5732874.7	635360.5
785	5.39	14.83	784.82	758.82	1.76	5.70	5732875.1	635360.6
790	5.65	14.50	789.79	763.79	2.23	5.82	5732875.6	635360.8
795	5.91	14.16	794.77	768.77	2.72	5.94	5732876.1	635360.9
800	6.16	13.82	799.74	773.74	3.23	6.06	5732876.6	635361.0
805	6.42	13.49	804.71	778.71	3.76	6.18	5732877.1	635361.1
810	6.77	13.14	809.68	783.68	4.32	6.31	5732877.7	635361.3
815	7.26	12.79	814.64	788.64	4.91	6.44	5732878.3	635361.4
820	7.74	12.44	819.60	793.60	5.55	6.58	5732878.9	635361.5
825	8.23	12.09	824.55	798.55	6.23	6.73	5732879.6	635361.7
830	8.71	11.74	829.49	803.49	6.95	6.88	5732880.3	635361.8
835	9.20	11.39	834.43	808.43	7.71	7.03	5732881.1	635362.0
840	9.74	10.98	839.37	813.37	8.52	7.19	5732881.9	635362.1
845	10.37	10.47	844.29	818.29	9.38	7.35	5732882.7	635362.3
850	11.00	9.96	849.20	823.20	10.29	7.52	5732883.6	635362.5
855	11.63	9.46	854.10	828.10	11.26	7.68	5732884.6	635362.6
860	12.26	8.95	859.00	833.00	12.28	7.84	5732885.6	635362.8
865	12.89	8.44	863.88	837.88	13.35	8.00	5732886.7	635362.9
870	13.49	7.63	868.74	842.74	14.48	8.16	5732887.8	635363.1
875	14.10	6.79	873.60	847.60	15.67	8.31	5732889.0	635363.3
880	14.70	5.95	878.44	852.44	16.90	8.44	5732890.2	635363.4
885	15.31	5.11	883.27	857.27	18.19	8.56	5732891.5	635363.5
890	15.91	4.27	888.09	862.09	19.53	8.67	5732892.9	635363.6
895	16.52	3.43	892.89	866.89	20.92	8.75	5732894.3	635363.7
900	17.11	2.83	897.68	871.68	22.37	8.82	5732895.7	635363.8
905	17.70	2.31	902.45	876.45	23.86	8.89	5732897.2	635363.8
910	18.28	1.79	907.20	881.20	25.41	8.95	5732898.7	635363.9
915	18.87	1.27	911.94	885.94	27.00	8.99	5732900.3	635363.9
920	19.46	0.76	916.67	890.67	28.64	9.01	5732902.0	635364.0
925	20.04	1.85	921.37	895.37	30.33	9.02	5732903.7	635364.0
930	20.63	68.46	926.12	900.12	31.51	9.87	5732904.9	635364.8
935	21.21	135.07	931.09	905.09	30.74	10.37	5732904.1	635365.3
940	21.79	201.68	936.02	910.02	30.27	7.95	5732903.6	635362.9
945	22.38	268.29	940.46	914.46	33.70	5.12	5732907.0	635360.1
950	22.96	334.90	944.68	918.68	39.05	6.96	5732912.4	635361.9
955	23.38	359.07	949.23	923.23	41.46	8.94	5732914.8	635363.9
960	23.72	358.95	953.81	927.81	43.46	8.91	5732916.8	635363.9
965	24.05	358.83	958.38	932.38	45.48	8.87	5732918.8	635363.8
970	24.39	358.70	962.94	936.94	47.53	8.82	5732920.9	635363.8
975	24.72	358.58	967.49	941.49	49.61	8.77	5732922.9	635363.7
980	25.06	358.46	972.02	946.02	51.71	8.72	5732925.1	635363.7
985	25.54	358.54	976.55	950.55	53.85	8.66	5732927.2	635363.6
990	26.10	358.72	981.05	955.05	56.02	8.61	5732929.4	635363.6
995	26.65	358.90	985.53	959.53	58.24	8.56	5732931.6	635363.5
1000	27.21	359.08	989.98	963.98	60.51	8.52	5732933.8	635363.5
1005	27.76	359.26	994.42	968.42	62.81	8.49	5732936.2	635363.4
1010	28.31	356.71	998.83	972.83	65.16	8.46	5732938.5	635363.4
1015	28.78	294.95	1003.33	977.33	66.87	7.29	5732940.2	635362.2
1020	29.26	233.18	1008.24	982.24	66.05	6.30	5732939.4	635361.2
1025	29.73	171.42	1013.21	987.21	64.92	9.04	5732938.3	635364.0
1030	30.20	109.65	1017.35	991.35	68.33	13.50	5732941.7	635368.4
1035	30.67	47.89	1020.90	994.90	75.50	13.25	5732948.8	635368.2
1040	31.16	14.69	1024.88	998.88	80.03	8.50	5732953.4	635363.4
1045	31.67	78.21	1029.35	1003.35	81.44	10.07	5732954.8	635365.0
1050	32.18	141.73	1034.34	1008.34	80.05	10.46	5732953.4	635365.4
1055	32.69	205.24	1039.13	1013.13	79.69	6.38	5732953.0	635361.3
1060	33.20	268.76	1042.78	1016.78	85.06	2.35	5732958.4	635357.3
1065	33.71	332.27	1046.10	1020.10	92.69	5.06	5732966.0	635360.0
1070	34.21	359.23	1050.13	1024.13	96.24	8.34	5732969.6	635363.3
1075	34.69	359.05	1054.25	1028.25	99.07	8.30	5732972.4	635363.2
1080	35.18	358.88	1058.35	1032.35	101.93	8.25	5732975.3	635363.2

MD	Angl	irectio	VDR	TVDSS	DNorth	DEast	Northing	Easting
1085	35.67	358.70	1062.42	1036.42	104.83	8.18	5732978.2	635363.1
1090	36.15	358.53	1066.47	1040.47	107.76	8.11	5732981.1	635363.1
1095	36.64	358.35	1070.50	1044.50	110.72	8.03	5732984.1	635363.0
1100	37.12	358.23	1074.50	1048.50	113.72	7.94	5732987.1	635362.9
1105	37.59	358.14	1078.47	1052.47	116.76	7.84	5732990.1	635362.8
1110	38.07	358.04	1082.42	1056.42	119.82	7.74	5732993.2	635362.7
1115	38.54	357.94	1086.35	1060.35	122.92	7.63	5732996.3	635362.6
1120	39.02	357.84	1090.24	1064.24	126.05	7.52	5732999.4	635362.5
1125	39.49	357.74	1094.11	1068.11	129.21	7.39	5733002.5	635362.3
1130	40.12	357.35	1097.96	1071.96	132.41	7.26	5733005.7	635362.2
1135	40.84	356.75	1101.76	1075.76	135.65	7.09	5733009.0	635362.0
1140	41.57	356.15	1105.52	1079.52	138.93	6.89	5733012.3	635361.8
1145	42.29	355.55	1109.24	1083.24	142.27	6.64	5733015.6	635361.6
1150	43.02	354.95	1112.92	1086.92	145.64	6.36	5733019.0	635361.3
1155	43.74	354.36	1116.56	1090.56	149.06	6.03	5733022.4	635361.0
1160	44.44	353.97	1120.15	1094.15	152.52	5.68	5733025.9	635360.6
1165	45.12	353.63	1123.70	1097.70	156.02	5.29	5733029.4	635360.2
1170	45.81	353.28	1127.20	1101.20	159.56	4.89	5733032.9	635359.8
1175	46.49	352.94	1130.67	1104.67	163.14	4.45	5733036.5	635359.4
1180	47.18	352.60	1134.09	1108.09	166.76	3.99	5733040.1	635358.9
1185	47.86	352.45	1137.46	1111.46	170.41	3.51	5733043.8	635358.5
1190	48.50	352.75	1140.80	1114.80	174.11	3.03	5733047.4	635358.0
1195	49.15	353.05	1144.09	1118.09	177.84	2.56	5733051.2	635357.5
1200	49.80	353.35	1147.34	1121.34	181.62	2.11	5733055.0	635357.1
1205	50.45	353.65	1150.54	1124.54	185.43	1.68	5733058.8	635356.6
1210	51.10	353.95	1153.71	1127.71	189.28	1.26	5733062.6	635356.2
1215	51.68	354.16	1156.83	1130.83	193.17	0.86	5733066.5	635355.8
1220	52.22	354.31	1159.91	1133.91	197.08	0.47	5733070.4	635355.4
1225	52.76	354.45	1162.95	1136.95	201.03	0.08	5733074.4	635355.0
1230	53.30	354.59	1165.96	1139.96	205.01	-0.30	5733078.3	635354.6
1235	53.84	354.74	1168.93	1142.93	209.01	-0.68	5733082.4	635354.3
1240	54.38	354.88	1171.86	1145.86	213.05	-1.04	5733086.4	635353.9
1245	54.92	355.00	1174.75	1148.75	217.11	-1.40	5733090.5	635353.5
1250	55.45	355.10	1177.61	1151.61	221.20	-1.75	5733094.5	635353.2
1255	55.99	355.21	1180.42	1154.42	225.32	-2.10	5733098.7	635352.8
1260	56.53	355.31	1183.20	1157.20	229.46	-2.45	5733102.8	635352.5
1265	57.07	355.41	1185.94	1159.94	233.63	-2.79	5733107.0	635352.2
1270	57.61	355.51	1188.64	1162.64	237.83	-3.12	5733111.2	635351.8
1275	58.25	355.61	1191.29	1165.29	242.05	-3.44	5733115.4	635351.5
1280	58.96	355.70	1193.90	1167.90	246.31	-3.77	5733119.6	635351.2
1285	59.67	355.79	1196.45	1170.45	250.59	-4.09	5733123.9	635350.9
1290	60.18	355.85	1198.95	1172.95	254.91	-4.40	5733128.3	635350.5
1295	59.73	355.71	1201.45	1175.45	259.23	-4.72	5733132.6	635350.2
1300	59.28	355.58	1203.99	1177.99	263.52	-5.05	5733136.9	635349.9
1305	58.82	355.45	1206.56	1180.56	267.80	-5.38	5733141.1	635349.6
1310	58.06	355.76	1209.18	1183.18	272.05	-5.71	5733145.4	635349.2
1315	57.26	356.13	1211.85	1185.85	276.26	-6.01	5733149.6	635348.9
1320	56.69	356.50	1214.58	1188.58	280.44	-6.28	5733153.8	635348.7
1325	56.24	356.86	1217.34	1191.34	284.60	-6.52	5733157.9	635348.4
1330	56.19	357.10	1220.12	1194.12	288.75	-6.74	5733162.1	635348.2
1335	56.29	357.30	1222.90	1196.90	292.90	-6.94	5733166.2	635348.0
1340	56.39	357.50	1225.67	1199.67	297.06	-7.13	5733170.4	635347.8
1345	56.49	357.69	1228.44	1202.44	301.22	-7.30	5733174.6	635347.6
1350	56.52	357.95	1231.20	1205.20	305.39	-7.46	5733178.7	635347.5
1355	56.51	358.26	1233.96	1207.96	309.56	-7.60	5733182.9	635347.3
1360	56.50	358.56	1236.71	1210.71	313.73	-7.72	5733187.1	635347.2
1365	56.34	334.17	1239.49	1213.49	317.83	-8.14	5733191.2	635346.8
1370	55.93	269.47	1242.85	1216.85	319.60	-11.15	5733192.9	635343.8
1375	55.52	204.78	1248.12	1222.12	317.05	-10.93	5733190.4	635344.0
1380	55.11	140.09	1251.67	1225.67	318.72	-1.79	5733192.1	635353.2
1385	54.70	75.39	1252.14	1226.14	328.93	1.59	5733202.3	635356.5
1390	54.30	10.70	1253.74	1227.74	338.31	-5.99	5733211.7	635349.0
1395	53.83	0.49	1256.64	1230.64	342.50	-7.97	5733215.8	635347.0
1400	53.35	0.82	1259.61	1233.61	346.52	-7.92	5733219.9	635347.0
1405	52.87	1.15	1262.61	1236.61	350.52	-7.85	5733223.9	635347.1
1410	52.38	1.47	1265.64	1239.64	354.49	-7.76	5733227.8	635347.2
1415	51.90	1.80	1268.71	1242.71	358.44	-7.65	5733231.8	635347.3
1420	51.42	2.12	1271.81	1245.81	362.36	-7.52	5733235.7	635347.4
1425	50.96	2.49	1274.95	1248.95	366.25	-7.36	5733239.6	635347.6
1430	50.52	2.94	1278.11	1252.11	370.12	-7.18	5733243.5	635347.8
1435	50.08	3.39	1281.31	1255.31	373.96	-6.97	5733247.3	635348.0
1440	49.64	3.84	1284.53	1258.53	377.77	-6.73	5733251.1	635348.2
1445	49.21	4.29	1287.78	1261.78	381.56	-6.46	5733254.9	635348.5

MD	Angl	irectio	VDR	TVDSS	DNorth	DEast	Northing	Easting
1450	48.77	4.74	1291.06	1265.06	385.32	-6.17	5733258.7	635348.8
1455	48.38	5.23	1294.37	1268.37	389.05	-5.84	5733262.4	635349.1
1460	48.02	5.75	1297.71	1271.71	392.77	-5.49	5733266.1	635349.5
1465	47.66	6.26	1301.06	1275.06	396.45	-5.10	5733269.8	635349.8
1470	47.30	6.78	1304.44	1278.44	400.11	-4.68	5733273.5	635350.3
1475	46.94	7.30	1307.84	1281.84	403.75	-4.24	5733277.1	635350.7
1480	46.60	7.71	1311.27	1285.27	407.36	-3.76	5733280.7	635351.2
1485	46.29	7.97	1314.71	1288.71	410.95	-3.27	5733284.3	635351.7
1490	45.98	8.23	1318.18	1292.18	414.52	-2.76	5733287.9	635352.2
1495	45.66	8.50	1321.66	1295.66	418.07	-2.24	5733291.4	635352.7
1500	45.35	8.76	1325.17	1299.17	421.59	-1.70	5733294.9	635353.2
1505	45.04	9.02	1328.69	1302.69	425.10	-1.15	5733298.4	635353.8
1510	44.74	9.28	1332.23	1306.23	428.58	-0.59	5733301.9	635354.4
1515	44.48	9.54	1335.79	1309.79	432.04	-0.02	5733305.4	635354.9
1520	44.23	9.80	1339.37	1313.37	435.49	0.57	5733308.8	635355.5
1525	43.98	10.06	1342.96	1316.96	438.92	1.17	5733312.3	635356.1
1530	43.72	10.31	1346.57	1320.57	442.33	1.78	5733315.7	635356.7
1535	43.47	10.57	1350.19	1324.19	445.72	2.40	5733319.1	635357.3
1540	43.07	10.82	1353.83	1327.83	449.09	3.04	5733322.4	635358.0
1545	42.62	11.06	1357.49	1331.49	452.42	3.68	5733325.8	635358.6
1550	42.16	11.31	1361.19	1335.19	455.73	4.34	5733329.1	635359.3
1555	41.70	11.55	1364.90	1338.90	459.01	5.00	5733332.3	635359.9
1560	41.25	11.80	1368.65	1342.65	462.25	5.67	5733335.6	635360.6
1565	40.79	12.04	1372.42	1346.42	465.46	6.34	5733338.8	635361.3
1570	40.31	12.09	1376.22	1350.22	468.64	7.02	5733342.0	635362.0
1575	39.82	12.12	1380.05	1354.05	471.79	7.70	5733345.1	635362.6
1580	39.33	12.16	1383.90	1357.90	474.90	8.37	5733348.2	635363.3
1585	38.84	12.19	1387.78	1361.78	477.98	9.03	5733351.3	635364.0
1590	38.35	12.23	1391.69	1365.69	481.03	9.69	5733354.4	635364.6
1595	37.90	12.30	1395.63	1369.63	484.05	10.35	5733357.4	635365.3
1600	37.59	12.47	1399.58	1373.58	487.04	11.00	5733360.4	635366.0
1605	37.27	12.64	1403.55	1377.55	490.00	11.66	5733363.3	635366.6
1610	36.96	12.81	1407.54	1381.54	492.94	12.33	5733366.3	635367.3
1615	36.64	12.98	1411.54	1385.54	495.86	13.00	5733369.2	635367.9
1620	36.33	13.15	1415.56	1389.56	498.76	13.67	5733372.1	635368.6
1625	35.90	13.54	1419.60	1393.60	501.63	14.34	5733375.0	635369.3
1630	35.34	14.19	1423.66	1397.66	504.46	15.04	5733377.8	635370.0
1635	34.78	14.84	1427.76	1401.76	507.24	15.76	5733380.6	635370.7
1640	34.22	15.49	1431.88	1405.88	509.97	16.50	5733383.3	635371.4
1645	33.66	16.14	1436.03	1410.03	512.66	17.26	5733386.0	635372.2
1650	33.10	16.79	1440.20	1414.20	515.30	18.03	5733388.6	635373.0
1655	32.62	17.46	1444.41	1418.41	517.89	18.82	5733391.2	635373.8
1660	32.35	18.16	1448.62	1422.62	520.44	19.64	5733393.8	635374.6
1665	32.07	18.87	1452.85	1426.85	522.97	20.49	5733396.3	635375.4
1670	31.80	19.57	1457.10	1431.10	525.47	21.36	5733398.8	635376.3
1675	31.53	20.28	1461.35	1435.35	527.93	22.25	5733401.3	635377.2
1680	31.25	20.98	1465.62	1439.62	530.37	23.17	5733403.7	635378.1
1685	30.95	21.70	1469.90	1443.90	532.78	24.10	5733406.1	635379.1
1690	30.53	22.46	1474.20	1448.20	535.14	25.06	5733408.5	635380.0
1695	30.11	23.22	1478.52	1452.52	537.47	26.04	5733410.8	635381.0
1700	29.68	23.98	1482.85	1456.85	539.75	27.04	5733413.1	635382.0
1705	29.26	24.74	1487.21	1461.21	542.00	28.05	5733415.3	635383.0
1710	28.84	25.50	1491.58	1465.58	544.19	29.08	5733417.5	635384.0
1715	28.42	26.21	1495.97	1469.97	546.35	30.12	5733419.7	635385.1
1720	27.99	26.92	1500.37	1474.37	548.46	31.18	5733421.8	635386.1
1725	27.57	27.62	1504.80	1478.80	550.54	32.24	5733423.9	635387.2
1730	27.14	28.32	1509.24	1483.24	552.56	33.32	5733425.9	635388.3
1735	26.72	29.02	1513.70	1487.70	554.55	34.40	5733427.9	635389.3
1740	26.29	29.72	1518.17	1492.17	556.50	35.49	5733429.8	635390.4
1745	25.93	30.59	1522.66	1496.66	558.40	36.59	5733431.7	635391.5
1750	25.57	31.48	1527.17	1501.17	560.26	37.71	5733433.6	635392.7
1755	25.22	32.37	1531.68	1505.68	562.08	38.84	5733435.4	635393.8
1760	24.86	33.26	1536.22	1510.22	563.86	39.99	5733437.2	635394.9
1765	24.51	34.15	1540.76	1514.76	565.60	41.14	5733438.9	635396.1
1770	24.16	35.10	1545.32	1519.32	567.29	42.31	5733440.6	635397.3
1775	23.87	36.30	1549.88	1523.88	568.95	43.49	5733442.3	635398.4
1780	23.57	37.50	1554.46	1528.46	570.56	44.70	5733443.9	635399.6
1785	23.28	38.71	1559.05	1533.05	572.12	45.93	5733445.5	635400.9
1790	22.98	39.91	1563.65	1537.65	573.64	47.17	5733447.0	635402.1
1795	22.69	41.11	1568.26	1542.26	575.12	48.42	5733448.5	635403.4
1800	22.40	42.31	1572.88	1546.88	576.55	49.68	5733449.9	635404.6
1805	22.27	43.92	1577.50	1551.50	577.93	50.98	5733451.3	635405.9
1810	22.14	45.53	1582.13	1556.13	579.28	52.31	5733452.6	635407.3

MD	Angl	irectio	VDR	TVDSS	DNorth	DEast	Northing	Easting
1815	22.02	47.15	1586.77	1560.77	580.57	53.67	5733453.9	635408.6
1820	21.89	48.77	1591.41	1565.41	581.82	55.05	5733455.2	635410.0
1825	21.77	50.38	1596.05	1570.05	583.03	56.46	5733456.4	635411.4
1830	21.64	52.00	1600.70	1574.70	584.18	57.89	5733457.5	635412.8
1835	21.50	53.54	1605.35	1579.35	585.29	59.35	5733458.6	635414.3
1840	21.35	55.03	1610.01	1584.01	586.36	60.83	5733459.7	635415.8
1845	21.20	56.52	1614.67	1588.67	587.38	62.33	5733460.7	635417.3
1850	21.04	58.02	1619.33	1593.33	588.35	63.85	5733461.7	635418.8
1855	20.89	59.51	1624.00	1598.00	589.28	65.37	5733462.6	635420.3
1860	20.77	61.11	1628.68	1602.68	590.16	66.91	5733463.5	635421.9
1865	20.65	62.72	1633.35	1607.35	590.99	68.47	5733464.3	635423.4
1870	20.53	64.33	1638.03	1612.03	591.78	70.04	5733465.1	635425.0
1875	20.41	65.93	1642.72	1616.72	592.51	71.63	5733465.9	635426.6
1880	20.30	67.54	1647.41	1621.41	593.20	73.22	5733466.5	635428.2
1885	20.22	69.10	1652.10	1626.10	593.84	74.82	5733467.2	635429.8
1890	20.28	70.58	1656.79	1630.79	594.43	76.44	5733467.8	635431.4
1895	20.33	72.05	1661.48	1635.48	594.99	78.09	5733468.3	635433.0
1900	20.38	73.52	1666.17	1640.17	595.50	79.75	5733468.8	635434.7
1905	20.43	74.99	1670.86	1644.86	595.97	81.42	5733469.3	635436.4
1910	20.49	76.46	1675.55	1649.55	596.40	83.11	5733469.7	635438.1
1915	20.53	77.88	1680.23	1654.23	596.79	84.81	5733470.1	635439.8
1920	20.56	79.19	1684.91	1658.91	597.14	86.53	5733470.5	635441.5
1925	20.58	80.50	1689.59	1663.59	597.45	88.26	5733470.8	635443.2
1930	20.61	81.82	1694.28	1668.28	597.72	90.00	5733471.1	635444.9
1935	20.64	83.13	1698.96	1672.96	597.95	91.74	5733471.3	635446.7
1940	20.67	84.44	1703.64	1677.64	598.14	93.49	5733471.5	635448.4
1945	20.72	86.05	1708.32	1682.32	598.28	95.25	5733471.6	635450.2
1950	20.79	87.90	1712.99	1686.99	598.38	97.02	5733471.7	635452.0
1955	20.86	89.75	1717.67	1691.67	598.41	98.79	5733471.8	635453.7
1960	20.93	91.61	1722.34	1696.34	598.39	100.57	5733471.7	635455.5
1965	21.01	93.46	1727.01	1701.01	598.31	102.35	5733471.7	635457.3
1970	21.08	95.32	1731.68	1705.68	598.17	104.13	5733471.5	635459.1
1975	21.15	96.88	1736.35	1710.35	597.98	105.92	5733471.3	635460.9
1980	21.22	98.37	1741.01	1715.01	597.74	107.71	5733471.1	635462.7
1985	21.29	99.87	1745.67	1719.67	597.45	109.50	5733470.8	635464.4
1990	21.36	101.37	1750.33	1724.33	597.12	111.28	5733470.5	635466.2
1995	21.43	102.86	1754.98	1728.98	596.73	113.06	5733470.1	635468.0
2000	21.49	104.36	1759.64	1733.64	596.30	114.83	5733469.6	635469.8
2005	21.39	105.85	1764.29	1738.29	595.82	116.60	5733469.2	635471.5
2010	21.29	107.33	1768.95	1742.95	595.31	118.34	5733468.6	635473.3
2015	21.18	108.82	1773.61	1747.61	594.75	120.06	5733468.1	635475.0
2020	21.08	110.31	1778.28	1752.28	594.14	121.75	5733467.5	635476.7
2025	20.97	111.80	1782.95	1756.95	593.50	123.42	5733466.8	635478.4
2030	20.95	112.09	1787.62	1761.62	592.83	125.08	5733466.2	635480.0
2035	20.94	112.00	1792.29	1766.29	592.16	126.74	5733465.5	635481.7
2040	20.94	111.92	1796.96	1770.96	591.49	128.39	5733464.8	635483.3
2045	20.93	111.84	1801.63	1775.63	590.83	130.05	5733464.2	635485.0
2050	20.92	111.76	1806.30	1780.30	590.16	131.71	5733463.5	635486.7
2055	20.92	111.64	1810.97	1784.97	589.50	133.37	5733462.8	635488.3
2060	20.91	111.40	1815.64	1789.64	588.85	135.03	5733462.2	635490.0
2065	20.90	111.17	1820.31	1794.31	588.20	136.69	5733461.5	635491.6
2070	20.89	110.93	1824.98	1798.98	587.56	138.35	5733460.9	635493.3
2075	20.88	110.69	1829.65	1803.65	586.93	140.02	5733460.3	635495.0
2080	20.87	110.45	1834.32	1808.32	586.30	141.69	5733459.6	635496.6
2085	20.97	110.50	1838.99	1812.99	585.68	143.36	5733459.0	635498.3
2090	21.10	110.62	1843.66	1817.66	585.05	145.04	5733458.4	635500.0
2095	21.23	110.75	1848.32	1822.32	584.41	146.73	5733457.8	635501.7
2100	21.35	110.87	1852.98	1826.98	583.77	148.43	5733457.1	635503.4
2105	21.48	111.00	1857.64	1831.64	583.11	150.13	5733456.5	635505.1
2110	21.47	111.04	1862.29	1836.29	582.46	151.84	5733455.8	635506.8
2115	21.41	111.06	1866.94	1840.94	581.80	153.55	5733455.1	635508.5
2120	21.36	111.08	1871.60	1845.60	581.14	155.25	5733454.5	635510.2
2125	21.30	111.10	1876.26	1850.26	580.49	156.95	5733453.8	635511.9
2130	21.25	111.12	1880.92	1854.92	579.84	158.64	5733453.2	635513.6
2135	21.19	111.14	1885.58	1859.58	579.18	160.33	5733452.5	635515.3
2140	21.17	111.11	1890.24	1864.24	578.53	162.01	5733451.9	635517.0
2145	21.16	111.07	1894.90	1868.90	577.88	163.70	5733451.2	635518.6
2150	21.15	111.03	1899.56	1873.56	577.23	165.38	5733450.6	635520.3
2155	21.14	110.99	1904.23	1878.23	576.59	167.06	5733449.9	635522.0
2160	21.13	110.95	1908.89	1882.89	575.94	168.75	5733449.3	635523.7
2165	21.12	110.91	1913.56	1887.56	575.30	170.43	5733448.6	635525.4
2170	21.13	110.87	1918.22	1892.22	574.66	172.11	5733448.0	635527.1
2175	21.14	110.84	1922.88	1896.88	574.01	173.80	5733447.4	635528.7

MD	Angl	irectio	VDR	TVDSS	DNorth	DEast	Northing	Easting
2180	21.15	110.80	1927.55	1901.55	573.37	175.48	5733446.7	635530.4
2185	21.16	110.77	1932.21	1906.21	572.73	177.17	5733446.1	635532.1
2190	21.17	110.73	1936.87	1910.87	572.09	178.86	5733445.4	635533.8
2195	21.19	110.70	1941.53	1915.53	571.45	180.55	5733444.8	635535.5
2200	21.24	110.67	1946.20	1920.20	570.82	182.24	5733444.2	635537.2
2205	21.29	110.65	1950.86	1924.86	570.18	183.94	5733443.5	635538.9
2210	21.34	110.63	1955.51	1929.51	569.54	185.64	5733442.9	635540.6
2215	21.39	110.60	1960.17	1934.17	568.89	187.34	5733442.2	635542.3
2220	21.44	110.58	1964.82	1938.82	568.25	189.05	5733441.6	635544.0
2225	21.50	110.54	1969.48	1943.48	567.61	190.77	5733441.0	635545.7
2230	21.58	110.49	1974.13	1948.13	566.97	192.49	5733440.3	635547.4
2235	21.65	110.44	1978.78	1952.78	566.32	194.21	5733439.7	635549.2
2240	21.72	110.39	1983.42	1957.42	565.68	195.94	5733439.0	635550.9
2245	21.80	110.34	1988.07	1962.07	565.03	197.68	5733438.4	635552.6
2250	21.87	110.29	1992.71	1966.71	564.39	199.42	5733437.7	635554.4
2255	21.93	110.29	1997.35	1971.35	563.74	201.17	5733437.1	635556.1
2260	21.97	110.37	2001.99	1975.99	563.09	202.93	5733436.4	635557.9
2265	22.01	110.45	2006.62	1980.62	562.44	204.68	5733435.8	635559.6
2270	22.05	110.53	2011.26	1985.26	561.78	206.44	5733435.1	635561.4
2275	22.09	110.61	2015.89	1989.89	561.12	208.20	5733434.5	635563.1
2280	22.14	110.69	2020.52	1994.52	560.46	209.96	5733433.8	635564.9
2285	22.22	110.81	2025.15	1999.15	559.79	211.72	5733433.1	635566.7
2290	22.33	110.95	2029.78	2003.78	559.11	213.49	5733432.5	635568.4
2295	22.43	111.10	2034.40	2008.40	558.43	215.27	5733431.8	635570.2
2300	22.54	111.24	2039.02	2013.02	557.74	217.05	5733431.1	635572.0
2305	22.64	111.38	2043.64	2017.64	557.04	218.84	5733430.4	635573.8
2310	22.75	111.52	2048.25	2022.25	556.34	220.64	5733429.7	635575.6
2315	22.83	111.52	2052.86	2026.86	555.62	222.44	5733429.0	635577.4
2320	22.89	111.43	2057.47	2031.47	554.91	224.25	5733428.3	635579.2
2325	22.96	111.35	2062.07	2036.07	554.20	226.06	5733427.5	635581.0
2330	23.02	111.27	2066.68	2040.68	553.49	227.88	5733426.8	635582.8
2335	23.09	111.18	2071.28	2045.28	552.78	229.71	5733426.1	635584.7
2340	23.15	111.10	2075.88	2049.88	552.08	231.54	5733425.4	635586.5
2345	23.15	111.11	2080.47	2054.47	551.37	233.37	5733424.7	635588.3
2350	23.14	111.14	2085.07	2059.07	550.66	235.21	5733424.0	635590.2
2355	23.14	111.17	2089.67	2063.67	549.95	237.04	5733423.3	635592.0
2360	23.13	111.19	2094.27	2068.27	549.24	238.87	5733422.6	635593.8
2365	23.12	111.22	2098.86	2072.86	548.53	240.70	5733421.9	635595.6
2370	23.11	111.25	2103.46	2077.46	547.82	242.53	5733421.2	635597.5
2375	23.07	111.38	2108.06	2082.06	547.11	244.36	5733420.4	635599.3
2380	23.02	111.53	2112.66	2086.66	546.39	246.18	5733419.7	635601.1
2385	22.98	111.68	2117.27	2091.27	545.67	247.99	5733419.0	635602.9
2390	22.93	111.83	2121.87	2095.87	544.95	249.81	5733418.3	635604.8
2395	22.89	111.98	2126.47	2100.47	544.22	251.61	5733417.6	635606.6
2400	22.84	112.12	2131.08	2105.08	543.50	253.41	5733416.8	635608.4
2405	22.84	112.19	2135.69	2109.69	542.76	255.21	5733416.1	635610.2
2410	22.88	112.20	2140.30	2114.30	542.03	257.01	5733415.4	635612.0
2415	22.93	112.21	2144.90	2118.90	541.29	258.81	5733414.6	635613.8
2420	22.97	112.22	2149.51	2123.51	540.56	260.61	5733413.9	635615.6
2425	23.01	112.23	2154.11	2128.11	539.82	262.42	5733413.2	635617.4
2430	23.08	112.18	2158.71	2132.71	539.08	264.23	5733412.4	635619.2
2435	23.20	112.06	2163.31	2137.31	538.34	266.05	5733411.7	635621.0
2440	23.31	111.94	2167.90	2141.90	537.60	267.88	5733410.9	635622.8
2445	23.42	111.82	2172.49	2146.49	536.86	269.72	5733410.2	635624.7
2450	23.54	111.70	2177.08	2151.08	536.12	271.57	5733409.5	635626.5
2455	23.65	111.58	2181.66	2155.66	535.38	273.43	5733408.7	635628.4
2460	23.73	111.59	2186.24	2160.24	534.65	275.30	5733408.0	635630.3
2465	23.77	111.68	2190.82	2164.82	533.90	277.18	5733407.2	635632.1
2470	23.82	111.78	2195.39	2169.39	533.16	279.05	5733406.5	635634.0
2475	23.86	111.88	2199.96	2173.96	532.41	280.92	5733405.7	635635.9
2480	23.90	111.97	2204.54	2178.54	531.65	282.80	5733405.0	635637.8
2485	23.95	112.07	2209.11	2183.11	530.89	284.68	5733404.2	635639.6
2490	23.84	112.10	2213.68	2187.68	530.13	286.56	5733403.5	635641.5
2495	23.72	112.13	2218.25	2192.25	529.37	288.43	5733402.7	635643.4
2500	23.61	112.16	2222.83	2196.83	528.61	290.29	5733402.0	635645.2
2505	23.50	112.19	2227.42	2201.42	527.86	292.14	5733401.2	635647.1
2510	23.38	112.21	2232.00	2206.00	527.11	293.98	5733400.4	635648.9
2515	23.27	112.25	2236.60	2210.60	526.36	295.81	5733399.7	635650.8
2520	23.18	112.29	2241.19	2215.19	525.61	297.64	5733399.0	635652.6
2525	23.10	112.34	2245.79	2219.79	524.86	299.45	5733398.2	635654.4
2530	23.01	112.39	2250.39	2224.39	524.12	301.26	5733397.5	635656.2
2535	22.93	112.43	2254.99	2228.99	523.38	303.07	5733396.7	635658.0
2540	22.84	112.48	2259.60	2233.60	522.63	304.87	5733396.0	635659.8

MD	Angl	irectio	VDR	TVDSS	DNorth	DEast	Northing	Easting
2545	22.76	112.52	2264.21	2238.21	521.89	306.66	5733395.2	635661.6
2550	22.71	112.54	2268.82	2242.82	521.15	308.44	5733394.5	635663.4
2555	22.66	112.57	2273.43	2247.43	520.41	310.22	5733393.8	635665.2
2560	22.61	112.59	2278.05	2252.05	519.67	312.00	5733393.0	635666.9
2565	22.55	112.61	2282.66	2256.66	518.93	313.77	5733392.3	635668.7
2570	22.50	112.63	2287.28	2261.28	518.20	315.54	5733391.5	635670.5
2575	22.55	112.72	2291.90	2265.90	517.46	317.30	5733390.8	635672.3
2580	22.66	112.85	2296.52	2270.52	516.72	319.08	5733390.1	635674.0
2585	22.78	112.99	2301.13	2275.13	515.96	320.85	5733389.3	635675.8
2590	22.89	113.12	2305.74	2279.74	515.20	322.64	5733388.5	635677.6
2595	23.00	113.25	2310.34	2284.34	514.44	324.43	5733387.8	635679.4
2600	23.12	113.38	2314.94	2288.94	513.66	326.23	5733387.0	635681.2
2605	23.21	113.46	2319.54	2293.54	512.88	328.04	5733386.2	635683.0
2610	23.25	113.40	2324.13	2298.13	512.09	329.84	5733385.4	635684.8
2615	23.29	113.34	2328.73	2302.73	511.31	331.66	5733384.7	635686.6
2620	23.34	113.28	2333.32	2307.32	510.53	333.48	5733383.9	635688.4
2625	23.38	113.21	2337.91	2311.91	509.75	335.30	5733383.1	635690.2
2630	23.42	113.15	2342.50	2316.50	508.96	337.12	5733382.3	635692.1
2635	23.44	113.21	2347.09	2321.09	508.18	338.95	5733381.5	635693.9
2640	23.45	113.38	2351.67	2325.67	507.40	340.78	5733380.7	635695.7
2645	23.45	113.55	2356.26	2330.26	506.60	342.60	5733379.9	635697.6
2650	23.46	113.72	2360.85	2334.85	505.81	344.43	5733379.1	635699.4
2655	23.46	113.89	2365.43	2339.43	505.00	346.25	5733378.3	635701.2
2660	23.47	114.07	2370.02	2344.02	504.19	348.07	5733377.5	635703.0
2665	23.41	114.10	2374.61	2348.61	503.38	349.88	5733376.7	635704.8
2670	23.27	113.97	2379.20	2353.20	502.57	351.69	5733375.9	635706.6
2675	23.13	113.84	2383.79	2357.79	501.77	353.49	5733375.1	635708.4
2680	23.00	113.71	2388.39	2362.39	500.98	355.29	5733374.3	635710.2
2685	22.86	113.59	2393.00	2367.00	500.20	357.07	5733373.5	635712.0
2690	22.76	113.50	2397.61	2371.61	499.43	358.85	5733372.8	635713.8
2695	22.72	113.49	2402.22	2376.22	498.66	360.62	5733372.0	635715.6
2700	22.67	113.48	2406.83	2380.83	497.89	362.39	5733371.2	635717.3
2705	22.63	113.46	2411.45	2385.45	497.12	364.15	5733370.5	635719.1
2710	22.58	113.45	2416.06	2390.06	496.36	365.92	5733369.7	635720.9
2715	22.53	113.44	2420.68	2394.68	495.59	367.68	5733368.9	635722.6
2720	22.57	113.47	2425.30	2399.30	494.83	369.43	5733368.2	635724.4
2725	22.69	113.56	2429.91	2403.91	494.07	371.20	5733367.4	635726.1
2730	22.81	113.64	2434.53	2408.53	493.29	372.97	5733366.6	635727.9
2735	22.93	113.73	2439.13	2413.13	492.51	374.75	5733365.9	635729.7
2740	23.05	113.81	2443.73	2417.73	491.72	376.54	5733365.1	635731.5
2745	23.17	113.90	2448.33	2422.33	490.93	378.33	5733364.3	635733.3
2750	23.29	113.95	2452.93	2426.93	490.13	380.13	5733363.5	635735.1
2755	23.39	113.98	2457.52	2431.52	489.32	381.94	5733362.7	635736.9
2760	23.50	114.00	2462.11	2436.11	488.52	383.76	5733361.9	635738.7
2765	23.61	114.02	2466.69	2440.69	487.70	385.59	5733361.0	635740.5
2770	23.71	114.05	2471.27	2445.27	486.88	387.42	5733360.2	635742.4
2775	23.82	114.07	2475.85	2449.85	486.06	389.26	5733359.4	635744.2
2780	23.89	114.12	2480.42	2454.42	485.24	391.11	5733358.6	635746.1
2785	23.94	114.18	2484.99	2458.99	484.41	392.96	5733357.7	635747.9
2790	23.99	114.24	2489.56	2463.56	483.58	394.81	5733356.9	635749.8
2795	24.05	114.30	2494.12	2468.12	482.74	396.66	5733356.1	635751.6
2800	24.10	114.36	2498.69	2472.69	481.90	398.52	5733355.2	635753.5
2805	24.15	114.42	2503.25	2477.25	481.06	400.38	5733354.4	635755.3
2810	24.15	114.52	2507.81	2481.81	480.21	402.25	5733353.5	635757.2
2815	24.13	114.64	2512.38	2486.38	479.36	404.10	5733352.7	635759.1
2820	24.12	114.76	2516.94	2490.94	478.50	405.96	5733351.8	635760.9
2825	24.11	114.88	2521.50	2495.50	477.65	407.82	5733351.0	635762.8
2830	24.09	115.00	2526.07	2500.07	476.78	409.67	5733350.1	635764.6
2835	24.08	115.08	2530.63	2504.63	475.92	411.52	5733349.3	635766.5
2840	24.08	115.06	2535.20	2509.20	475.06	413.36	5733348.4	635768.3
2845	24.07	115.03	2539.76	2513.76	474.19	415.21	5733347.5	635770.2
2850	24.07	115.00	2544.33	2518.33	473.33	417.06	5733346.7	635772.0
2855	24.07	114.98	2548.89	2522.89	472.47	418.91	5733345.8	635773.9
2860	24.06	114.95	2553.46	2527.46	471.61	420.76	5733344.9	635775.7
2865	24.06	114.92	2558.03	2532.03	470.75	422.60	5733344.1	635777.6
2870	24.09	114.88	2562.59	2536.59	469.89	424.45	5733343.2	635779.4
2875	24.13	114.84	2567.15	2541.15	469.03	426.31	5733342.4	635781.3
2880	24.17	114.80	2571.72	2545.72	468.17	428.16	5733341.5	635783.1
2885	24.20	114.76	2576.28	2550.28	467.31	430.02	5733340.7	635785.0
2890	24.24	114.72	2580.84	2554.84	466.46	431.89	5733339.8	635786.8
2895	24.28	114.84	2585.40	2559.40	465.60	433.75	5733338.9	635788.7
2900	24.32	115.03	2589.95	2563.95	464.73	435.62	5733338.1	635790.6
2905	24.35	115.22	2594.51	2568.51	463.85	437.48	5733337.2	635792.4

MD	Angl	irectio	VDR	TVDSS	DNorth	DEast	Northing	Easting
2910	24.39	115.41	2599.06	2573.06	462.97	439.35	5733336.3	635794.3
2915	24.43	115.60	2603.62	2577.62	462.08	441.21	5733335.4	635796.2
2920	24.47	115.79	2608.17	2582.17	461.18	443.08	5733334.5	635798.0
2925	24.48	115.71	2612.72	2586.72	460.28	444.94	5733333.6	635799.9
2930	24.47	115.57	2617.27	2591.27	459.39	446.81	5733332.7	635801.8
2935	24.47	115.43	2621.82	2595.82	458.49	448.68	5733331.8	635803.6
2940	24.47	115.28	2626.37	2600.37	457.61	450.55	5733330.9	635805.5
2945	24.46	115.14	2630.92	2604.92	456.73	452.43	5733330.1	635807.4
2950	24.46	114.99	2635.47	2609.47	455.85	454.30	5733329.2	635809.2
2955	24.50	115.16	2640.02	2614.02	454.97	456.18	5733328.3	635811.1
2960	24.53	115.36	2644.57	2618.57	454.09	458.05	5733327.4	635813.0
2965	24.57	115.56	2649.12	2623.12	453.19	459.93	5733326.5	635814.9
2970	24.61	115.76	2653.67	2627.67	452.29	461.81	5733325.6	635816.8
2975	24.65	115.96	2658.21	2632.21	451.38	463.68	5733324.7	635818.6
2980	24.69	116.16	2662.76	2636.76	450.46	465.55	5733323.8	635820.5
2985	24.73	116.10	2667.30	2641.30	449.54	467.43	5733322.9	635822.4
2990	24.76	116.04	2671.84	2645.84	448.62	469.31	5733322.0	635824.3
2995	24.80	115.98	2676.38	2650.38	447.71	471.19	5733321.0	635826.1
3000	24.84	115.93	2680.92	2654.92	446.79	473.08	5733320.1	635828.0
3005	24.87	115.87	2685.45	2659.45	445.87	474.97	5733319.2	635829.9
3010	24.90	115.91	2689.99	2663.99	444.95	476.87	5733318.3	635831.8
3015	24.93	115.97	2694.52	2668.52	444.03	478.76	5733317.4	635833.7
3020	24.96	116.03	2699.06	2673.06	443.10	480.66	5733316.4	635835.6
3025	24.99	116.09	2703.59	2677.59	442.18	482.55	5733315.5	635837.5
3030	25.02	116.15	2708.12	2682.12	441.25	484.45	5733314.6	635839.4
3035	25.05	116.21	2712.65	2686.65	440.31	486.35	5733313.7	635841.3
3040	25.08	116.29	2717.18	2691.18	439.38	488.25	5733312.7	635843.2
3045	25.11	116.38	2721.71	2695.71	438.44	490.15	5733311.8	635845.1
3050	25.14	116.48	2726.24	2700.24	437.49	492.05	5733310.8	635847.0
3055	25.17	116.57	2730.76	2704.76	436.54	493.95	5733309.9	635848.9
3060	25.20	116.67	2735.29	2709.29	435.59	495.85	5733308.9	635850.8
3065	25.23	116.76	2739.81	2713.81	434.63	497.76	5733308.0	635852.7
3070	25.26	116.83	2744.33	2718.33	433.67	499.66	5733307.0	635854.6
3075	25.27	116.74	2748.85	2722.85	432.71	501.56	5733306.0	635856.5
3080	25.27	116.65	2753.38	2727.38	431.75	503.47	5733305.1	635858.4
3085	25.28	116.56	2757.90	2731.90	430.79	505.38	5733304.1	635860.3
3090	25.28	116.47	2762.42	2736.42	429.84	507.29	5733303.2	635862.2
3095	25.29	116.39	2766.94	2740.94	428.89	509.20	5733302.2	635864.2
3100	25.31	116.39	2771.46	2745.46	427.94	511.12	5733301.3	635866.1
3105	25.33	116.42	2775.98	2749.98	426.99	513.03	5733300.3	635868.0
3110	25.35	116.46	2780.50	2754.50	426.04	514.95	5733299.4	635869.9
3115	25.38	116.49	2785.02	2759.02	425.08	516.87	5733298.4	635871.8
3120	25.40	116.53	2789.53	2763.53	424.12	518.78	5733297.5	635873.7
3125	25.43	116.56	2794.05	2768.05	423.16	520.70	5733296.5	635875.7
3130	25.45	116.63	2798.56	2772.56	422.20	522.62	5733295.5	635877.6
3135	25.48	116.71	2803.08	2777.08	421.24	524.55	5733294.6	635879.5
3140	25.51	116.78	2807.59	2781.59	420.27	526.47	5733293.6	635881.4
3145	25.54	116.86	2812.10	2786.10	419.30	528.39	5733292.6	635883.3
3150	25.57	116.94	2816.61	2790.61	418.32	530.31	5733291.7	635885.3
3155	25.60	117.01	2821.12	2795.12	417.34	532.24	5733290.7	635887.2
3160	25.60	117.05	2825.63	2799.63	416.36	534.16	5733289.7	635889.1
3165	25.61	117.10	2830.14	2804.14	415.38	536.09	5733288.7	635891.0
3170	25.61	117.15	2834.65	2808.65	414.39	538.01	5733287.7	635893.0
3175	25.62	117.19	2839.16	2813.16	413.40	539.93	5733286.7	635894.9
3176	25.62	117.20	2840.06	2814.06	413.21	540.32	5733286.5	635895.3
3177	25.62	117.21	2840.96	2814.96	413.01	540.70	5733286.3	635895.7
3178	25.62	117.22	2841.86	2815.86	412.81	541.09	5733286.2	635896.0
3179	25.62	117.23	2842.77	2816.77	412.61	541.47	5733286.0	635896.4
3180	25.62	117.24	2843.67	2817.67	412.41	541.86	5733285.8	635896.8
3181	25.64	117.21	2844.57	2818.57	412.22	542.24	5733285.6	635897.2
3182	25.65	117.19	2845.47	2819.47	412.02	542.63	5733285.4	635897.6
3183	25.66	117.16	2846.37	2820.37	411.82	543.01	5733285.2	635898.0
3184	25.68	117.13	2847.27	2821.27	411.62	543.40	5733285.0	635898.3
3185	25.69	117.11	2848.17	2822.17	411.43	543.78	5733284.8	635898.7
3186	25.71	117.08	2849.08	2823.08	411.23	544.17	5733284.6	635899.1
3187	25.72	117.05	2849.98	2823.98	411.03	544.56	5733284.4	635899.5
3188	25.74	117.03	2850.88	2824.88	410.83	544.94	5733284.2	635899.9
3189	25.75	117.00	2851.78	2825.78	410.64	545.33	5733284.0	635900.3
3190	25.76	116.98	2852.68	2826.68	410.44	545.72	5733283.8	635900.7
3191	25.78	116.95	2853.58	2827.58	410.24	546.10	5733283.6	635901.1
3192	25.79	116.92	2854.48	2828.48	410.05	546.49	5733283.4	635901.4
3193	25.81	116.90	2855.38	2829.38	409.85	546.88	5733283.2	635901.8

MD	Angl	irectio	VDR	TVDSS	DNorth	DEast	Northing	Easting
3194	25.82	116.87	2856.28	2830.28	409.65	547.27	5733283.0	635902.2
3195	25.84	116.84	2857.18	2831.18	409.45	547.66	5733282.8	635902.6
3196	25.85	116.82	2858.08	2832.08	409.26	548.05	5733282.6	635903.0
3197	25.86	116.79	2858.98	2832.98	409.06	548.44	5733282.4	635903.4
3198	25.88	116.77	2859.88	2833.88	408.86	548.82	5733282.2	635903.8
3199	25.89	116.74	2860.78	2834.78	408.67	549.21	5733282.0	635904.2
3200	25.91	116.71	2861.68	2835.68	408.47	549.60	5733281.8	635904.6
3201	25.92	116.69	2862.58	2836.58	408.28	550.00	5733281.6	635904.9
3202	25.94	116.66	2863.48	2837.48	408.08	550.39	5733281.4	635905.3
3203	25.95	116.63	2864.38	2838.38	407.88	550.78	5733281.2	635905.7
3204	25.96	116.61	2865.28	2839.28	407.69	551.17	5733281.0	635906.1
3205	25.98	116.58	2866.18	2840.18	407.49	551.56	5733280.8	635906.5
3206	25.99	116.56	2867.07	2841.07	407.29	551.95	5733280.6	635906.9
3207	26.01	116.53	2867.97	2841.97	407.10	552.34	5733280.4	635907.3
3208	26.02	116.50	2868.87	2842.87	406.90	552.74	5733280.2	635907.7
3209	26.04	116.48	2869.77	2843.77	406.71	553.13	5733280.0	635908.1
3210	26.05	116.45	2870.67	2844.67	406.51	553.52	5733279.9	635908.5
3211	26.05	116.45	2871.57	2845.57	406.32	553.92	5733279.7	635908.9
3212	26.06	116.44	2872.47	2846.47	406.12	554.31	5733279.5	635909.3
3213	26.06	116.44	2873.36	2847.36	405.93	554.70	5733279.3	635909.6
3214	26.07	116.43	2874.26	2848.26	405.73	555.10	5733279.1	635910.0
3215	26.07	116.43	2875.16	2849.16	405.53	555.49	5733278.9	635910.4
3216	26.07	116.43	2876.06	2850.06	405.34	555.88	5733278.7	635910.8
3217	26.08	116.42	2876.96	2850.96	405.14	556.28	5733278.5	635911.2
3218	26.08	116.42	2877.86	2851.86	404.95	556.67	5733278.3	635911.6
3219	26.08	116.42	2878.75	2852.75	404.75	557.06	5733278.1	635912.0
3220	26.09	116.41	2879.65	2853.65	404.56	557.46	5733277.9	635912.4
3221	26.09	116.41	2880.55	2854.55	404.36	557.85	5733277.7	635912.8
3222	26.10	116.40	2881.45	2855.45	404.16	558.24	5733277.5	635913.2
3223	26.10	116.40	2882.35	2856.35	403.97	558.64	5733277.3	635913.6
3224	26.10	116.40	2883.24	2857.24	403.77	559.03	5733277.1	635914.0
3225	26.11	116.39	2884.14	2858.14	403.58	559.43	5733276.9	635914.4
3226	26.11	116.39	2885.04	2859.04	403.38	559.82	5733276.7	635914.8
3227	26.11	116.39	2885.94	2859.94	403.19	560.22	5733276.5	635915.2
3228	26.12	116.38	2886.84	2860.84	402.99	560.61	5733276.3	635915.6
3229	26.12	116.38	2887.73	2861.73	402.80	561.00	5733276.1	635916.0
3230	26.13	116.37	2888.63	2862.63	402.60	561.40	5733275.9	635916.3
3231	26.13	116.37	2889.53	2863.53	402.40	561.79	5733275.7	635916.7
3232	26.13	116.37	2890.43	2864.43	402.21	562.19	5733275.5	635917.1
3233	26.14	116.36	2891.32	2865.32	402.01	562.58	5733275.4	635917.5
3234	26.14	116.36	2892.22	2866.22	401.82	562.98	5733275.2	635917.9
3235	26.14	116.36	2893.12	2867.12	401.62	563.37	5733275.0	635918.3
3236	26.15	116.35	2894.02	2868.02	401.43	563.77	5733274.8	635918.7
3237	26.15	116.35	2894.92	2868.92	401.23	564.16	5733274.6	635919.1
3238	26.16	116.34	2895.81	2869.81	401.03	564.56	5733274.4	635919.5
3239	26.16	116.34	2896.71	2870.71	400.84	564.95	5733274.2	635919.9
3240	26.16	116.34	2897.61	2871.61	400.64	565.35	5733274.0	635920.3
3241	26.17	116.33	2898.51	2872.51	400.45	565.74	5733273.8	635920.7
3242	26.17	116.33	2899.40	2873.40	400.25	566.14	5733273.6	635921.1
3243	26.18	116.32	2900.30	2874.30	400.06	566.53	5733273.4	635921.5
3244	26.19	116.32	2901.20	2875.20	399.86	566.93	5733273.2	635921.9
3245	26.20	116.31	2902.10	2876.10	399.67	567.32	5733273.0	635922.3
3246	26.21	116.31	2902.99	2876.99	399.47	567.72	5733272.8	635922.7
3247	26.22	116.30	2903.89	2877.89	399.27	568.12	5733272.6	635923.1
3248	26.23	116.30	2904.79	2878.79	399.08	568.51	5733272.4	635923.5
3249	26.23	116.29	2905.68	2879.68	398.88	568.91	5733272.2	635923.9
3250	26.24	116.29	2906.58	2880.58	398.69	569.30	5733272.0	635924.3
3251	26.25	116.28	2907.48	2881.48	398.49	569.70	5733271.8	635924.6
3252	26.26	116.28	2908.37	2882.37	398.29	570.10	5733271.6	635925.0
3253	26.27	116.27	2909.27	2883.27	398.10	570.49	5733271.4	635925.4
3254	26.28	116.27	2910.17	2884.17	397.90	570.89	5733271.2	635925.8
3255	26.29	116.26	2911.06	2885.06	397.71	571.29	5733271.0	635926.2
3256	26.29	116.26	2911.96	2885.96	397.51	571.69	5733270.9	635926.6
3257	26.29	116.26	2912.86	2886.86	397.31	572.08	5733270.7	635927.0
3258	26.29	116.26	2913.75	2887.75	397.12	572.48	5733270.5	635927.4
3259	26.29	116.26	2914.65	2888.65	396.92	572.88	5733270.3	635927.8
3260	26.29	116.26	2915.55	2889.55	396.73	573.27	5733270.1	635928.2
3261	26.29	116.26	2916.44	2890.44	396.53	573.67	5733269.9	635928.6
3262	26.29	116.26	2917.34	2891.34	396.34	574.07	5733269.7	635929.0
3263	26.29	116.26	2918.24	2892.24	396.14	574.47	5733269.5	635929.4
3264	26.29	116.26	2919.13	2893.13	395.94	574.86	5733269.3	635929.8
3265	26.29	116.26	2920.03	2894.03	395.75	575.26	5733269.1	635930.2
3266	26.29	116.26	2920.93	2894.93	395.55	575.66	5733268.9	635930.6

MD	Angl	irectio	VDR	TVDSS	DNorth	DEast	Northing	Easting
3267	26.29	116.26	2921.82	2895.82	395.36	576.06	5733268.7	635931.0
3268	26.29	116.26	2922.72	2896.72	395.16	576.45	5733268.5	635931.4
3269	26.29	116.26	2923.62	2897.62	394.96	576.85	5733268.3	635931.8
3270	26.29	116.26	2924.51	2898.51	394.77	577.25	5733268.1	635932.2
3271	26.29	116.26	2925.41	2899.41	394.57	577.64	5733267.9	635932.6
3272	26.29	116.26	2926.31	2900.31	394.38	578.04	5733267.7	635933.0

APPENDIX 2a

BLACKBACK A-1A

Petrophysics Evaluation Summary

Esso Australia Ltd

Exploration Department

Blackback A-1A
Formation Evaluation
Log Analysis Report

R. J. Lyons

October 1999

Endorsed by:
FE Team Leader

Date: 8/10/99

Blackback A-1A LOG ANALYSIS

Blackback A-1A was the third well of the Blackback Phase 1 development project. The well was drilled by the semi-submersible Sedco 702 intersecting the Top of Latrobe approximately 800m north-east of the of the subsea wellhead, targeting the previously untested "North East Paleocene". The well was spudded on June 7, 1999, drilling 12 ¼" hole out of the A-1 20" casing shoe. A total depth of 3272m MD was reached on June 22, 1999. Open hole logging consisted of a PEX(AIT)-HNGS on a single wireline run. One core was taken from 3172 to 3199.4m, with a core recovery of 100%.

The electric log data have been analysed for effective porosity and water saturation from 3145 to 3250m. Esso's "K12" log model was used to derive effective porosity from density and neutron log responses and saturation using the Dual Water model. Note that all depths quoted below are logged MDKB unless specified otherwise. The result of the analyses is included as Attachment 1.

DATA

Open Hole Logs Acquired

1.	PEX(AIT-H), HNGS:	3275 – 3145m
	GR, CAL, DSI:	3275 – 1270m
2.	Checkshot Survey:	3170 – 1250m
3.	MWD-GR	1320 – 3260m

Hole Data

Hole Size:	12 ¼"
Max. Deviation:	60.2 degrees

Mud Data

Mud Type:	Petrofree
O/W:	80/20, water phase salinity 254,000 ppm
Mud Weight:	10.6 LB/G
BHT:	83 ^{0}C

LOG QUALITY

Neutron Log Response:

As with the other Blackback Phase 1 development wells the neutron logs appear to read anomalously low in hydrocarbon zones relative to the exploration wells. The log response is attributed to light hydrocarbon effect (oil density of approximately 0.52 g/cc @ reservoir conditions, see Blackback A-2 Log Analysis Report for details).

Resistivity Response:

As observed in the other Blackback development wells the array induction tool is affected by the high relative dip (approximately 50 degrees) between the borehole and formation. At these high angles, the tool's response cuts across several beds and is unable to resolve individual beds. The varying depths of investigation (10, 20, 30, 60, 90 inches) measure differing formation volumes resulting in horns at bed boundaries and unstable resistivity profiles. For example, the separation observed between the induction curves over the oil zone (3184 - 3185m) and dolomitic zone (3202 – 3215m) is attributed to tool response, rather than an invasion profile.

The AIT is unable to fully resolve true formation resistivity in the thin hydrocarbon sand from 3183 to 3184m MD. Consequently, water saturations are considered to be slightly overstated over this interval.

Depth Control

- The PEX up pass was recorded after applying a tide correction of –1m and a stretch correction 0f +5.5m at TD. There was good agreement between the wireline and MWD gamma rays at the reservoir level.

- The logs were shallow relative to the casing shoe (1302m Drillers depth) by approximately 14 meters. The log data were subsequently tied into the casing shoe at 1302m MD. No corrections were applied below 3100m MD as the wireline and MWD gamma ray data were in close agreement.

- The input logs were then depth aligned using the GR as the base curve.

CORE DATA

One 27m conventional core was cut from 3177.8 to 3182m MD with 100% recovery. The following analyses have been conducted as of this report:

Set 1 (on-site set, 9 plugs):
- Preliminary wellsite permeability with probe permeameter.
- Fluid Saturations (Dean Stark).
- Helium Porosity (ambient)

Set 2 (off-site, "quick-look" analysis, 31 plugs) after humidity drying (60 C and 40 % Relative Humidity):

- Helium Injection Porosity @ NOB and ambient conditions
- Air Permeability @ NOB and ambient conditions.
- Calculated and Absolute Grain Density.

Profile Permeability and Gamma Ray on slabbed core.

Set 3 (16 plugs) after humidity drying (60 C and 40 % Relative Humidity):

- Helium Injection Porosity @ NOB conditions.
- Air Permeability @ NOB conditions.
- Calculated and Absolute Grain Density.

A summary of the core analysis data is provided in Attachment 2.

A core to log depth shift of +4.1m has been used in this analysis, based on comparison of the core and wireline gamma ray data.

INTERPRETATION

Logs Used

GR, AHT90, RHOZ, NPHI

Analysis Parameters

a	1
m	2
n	2
Fluid Density	0.85
GRmin	35
GRmax	120
Apparent Shale Neutron Porosity	.30
Apparent Shale Bulk Density	2.52
Input Hydrocarbon Density	.5
Shale Resistivity	10
Lower Grain Density Limit	2.65 g/cc
Upper Grain Density Limit	2.68 g/cc
Formation Water Resistivity	.065
Measured Rmf	N/A, POBM used

Free Formation Water Resistivity

The free formation water resistivity of 0.085 ohmm (41,000 ppm NaCl @ 90C) used in this analysis was derived from Rwa calculations in the clean water sands underlying the oil leg (assuming a=1, m=2). Note, the temperature used in this calculation is from the

Blackback-2 Production Test, the maximum BHT (83C) measured from the wireline logs is slightly lower.

Shale Volume, Total Porosity and Water Saturation

An initial VSH calculated from the GR was compared to a calculated neutron-density value to test for input into an iterative log analysis model (K12). Initial neutron-density total porosity and dual-water total water saturation were then calculated and hydrocarbon and shale corrections applied to the neutron and density data using those values. The resulting calculated grain density was compared to a supplied grain density window and the initial VSH increased or decreased until the calculated GD fell within the window.

Effective Porosity and Water Saturations

Effective porosity was calculated using the final values of total porosity and VSH and the effective water saturation from the total water saturation using the following equations:

PHIE = (PHIT - (VSH * PHISH))
SWE = (1 - ((PHIT/PHIE) * (1 - SWT)))

DISCUSSION

1. Blackback A-1A penetrated 2.5m MD (2.2m TVD) of net known oil pay (using an effective porosity cutoff of 12 p.u.) with a mean effective porosity of 17 p.u., and a mean effective water saturation of 48 s.u. (Table 1).

2. There is poor agreement between the log-derived net sand and profile permeameter data (Table 1). As documented in the 1994, Blackback/Terakihi Formation Evaluation Field Study, there is a poor relationship between porosity and permeability in this complex lithology. Consequently, the permeameter data is recommended for netting purposes.

   Net known oil sand from profile permeameter data is as follows:

   4.5m TVD using a 1 md cutoff
   1.7m TVD using a 10 md cutoff

3. Log-derived porosity data agrees well with overburden corrected (4700 psi) core porosity in the clean sands, however core porosity is lower than log-derived total porosity (PHIT) in the non-reservoir intervals. The discrepancy between the core and log data is attributed to (1) K12's tendency to overestimate total porosity in shaly sands and (2) the core drying process (60 C and 40 % relative humidity) may not have driven off all of the clay bound water, resulting in a core porosity slightly lower than Total Porosity (total void volume divided by the total bulk volume) but higher than effective (total porosity excluding clay-bound water).

4. A formation oil / water contact can not be determined from the log data. Lowest Known Oil is placed at 3184.8m MD (-2822 m SS), the field oil-water contact at 3198m MD (-2834m SS). Log-derived saturations calculated below 3201m MD affected by high resistivities in the adjacent dolomitized zones have been hand edited.

5. Log-derived saturations have not been calibrated to core data as of this report, however comparison of capillary pressure measurements from Blackback 2 and 3 cores and water saturations from Dean Stark analysis from the A-1A (Petrofree mud) well (Figure 2) indicate:

   - Log-derived water saturations are considered to be overstated by 10 to 15 s.u in the thin hydrocarbon sand from 3183 t0 3184m MD.
   - The logs underestimate oil saturations over the poorer quality reservior (< 10 md) by as much as 20 s.u.

6. The well was perforated over the intervals 3174-3185 m MD (-2812.2 to -2822.2 m SS). To date the well has not been flow tested on its own, the calculated online production rate for the A1A with the A3 at 45% choke (5/9/99) was 2kstbd, 333kld.

Attached are the following presentations of results:

- Table 1 - Summary of Results, Blackback A-1A
- Figure 1 - Depth Plot of Analysis.
- Figure 2 - Blackback, Brine Saturation vs. Permeability.
- Attachment 1 - Analysis Depth Plot Blackback A-1A
- Attachment 2 - Core Analysis Data.

BLACKBACK A1A

PETROPHYSICS ANALYSIS SUMMARY

Net porosity cut-off: 0.120 volume per volume
Net water saturation cut-off: 0.500 volume per volume
Depth reference: MDKB

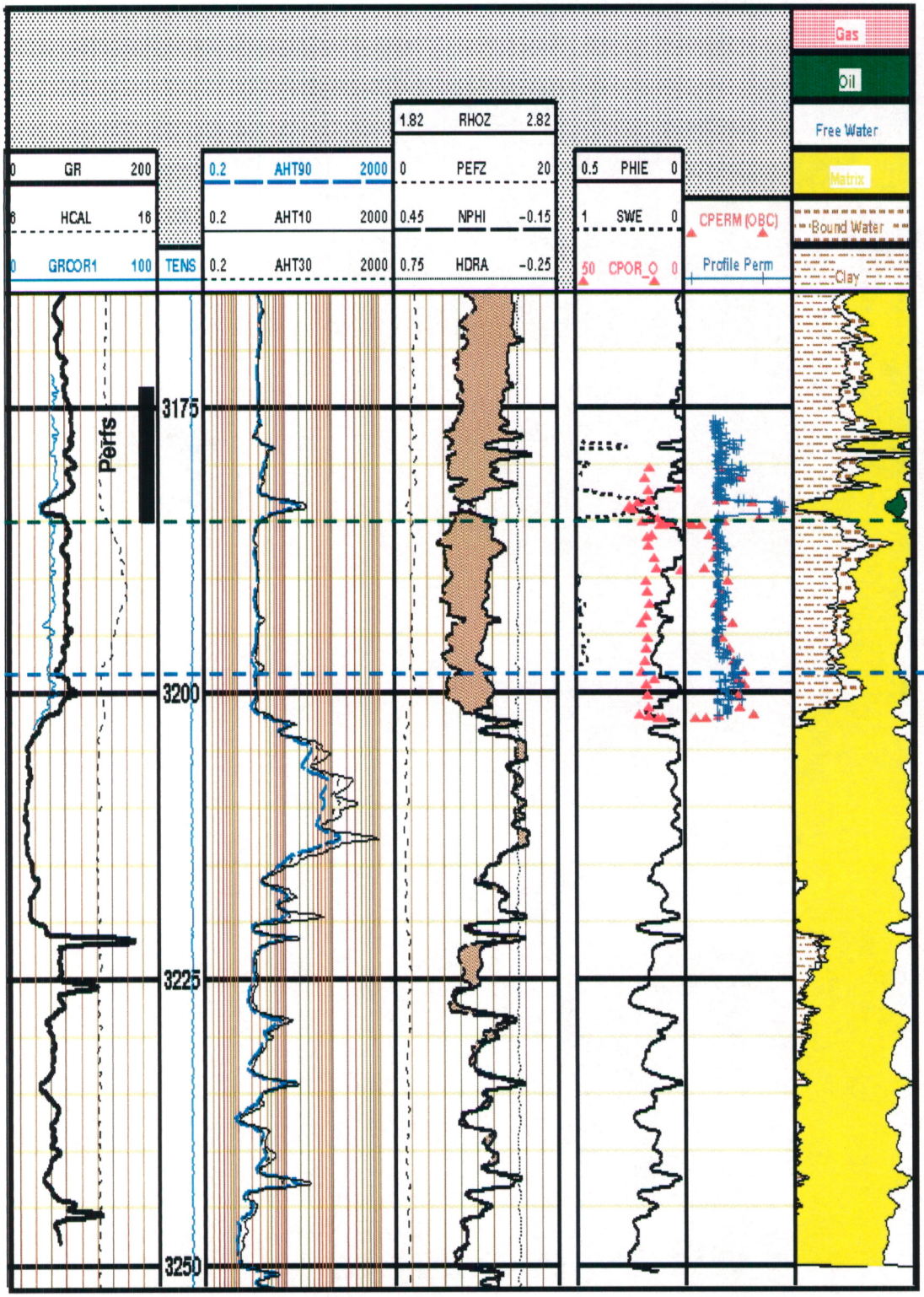
Net Porous Interval based on Porosity cut-off only.
Both Porosity and Sw cut-offs invoked when generating Hydrocarbon-Metres.

GROSS INTERVAL (metres) MDKB (top)	(base)	NET POROUS INTERVAL Gross Metres	Net Metres	Net to Gross(%)	Mean Vsh	(Std.) (Dev.)	Mean Porosity	(Std.) (Dev.)	Mode Porosity	Mean Sw	Comments	Profile Permeameter Data Net meters > 1 md	Net Meters > 10 md	Minimum perm (md)	Maximum perm (md)	Mean perm (md)	(Std.) (Dev.)
3177.8	3182.1	4.3	0.1	3	0.44	0.001	0.12	0	0.12	0.54	oil, low quality	3.1	0.5	0.5	27.7	3.49	0.53
3182.1	3184.8	2.7	2.3	87	0.21	0.134	0.17	0.039	0.13	0.48	Oil	1.9	1.4	0.64	3532	580	844
3177.8	3184.8	7.0	2.5	35	0.23	0.14	0.17	0.039	0.13	0.48	LKO 3184.8m MD	5.0	1.9				
3184.8	3197.6	12.8	2.5	20	0.4	0.029	0.14	0.01	0.13	0.92	Prob. Oil, poor quality reservoir	4.8	0.0	0.49	10.1	1.24	1.48
3197.6	3203.7	6.1	1.8	30	0.11	0.116	0.15	0.02	0.17	1	Field OWC @ 3198m MD	4.0	0.4	0.62	14.1	3.88	3.52
3203.8	3213.5	9.7	0	0							Tight						
3213.6	3221.1	7.5	2.9	38	0.03	0.035	0.16	0.029	0.15	1	Water						
3221.8	3250.0	28.2	22.7	80	0.06	0.078	0.19	0.042	0.15	1	Water						

GROSS INTERVAL (metres) SS (top)	(base)	NET POROUS INTERVAL Gross Metres	Net Metres	Net to Gross(%)	Mean Vsh	(Std.) (Dev.)	Mean Porosity	(Std.) (Dev.)	Mode Porosity	Mean Sw	Comments	Profile Permeameter Data Net meters > 1 md	Net Meters > 10 md
2815.7	2822	6.3	2.21	35	0.23	0.14	0.17	0.039	0.13	0.48	Known Oil	4.5	1.7
2822	2833.5	11.5	2.30	20	0.4	0.029	0.14	0.01	0.13	0.92	Prob. Oil, poor quality reservoir	4.8	0.0

Lowest Kown Oil 3184.8m MDKB (-2822m SS).
Field OWC @ 3198m MDKB (-2834m SS)

Blackback A-1A



Net Known Oil

4.5m TVD (> 1md)
1.7m TVD (> 10 md)

avg. Phie 17 p.u.
avg. Swe 48 s.u.

Lowest Known Oil
3184.8 MD
-2822m SS

Field OWC

3198 m MD
(-2834 m SS)

Figure 1.

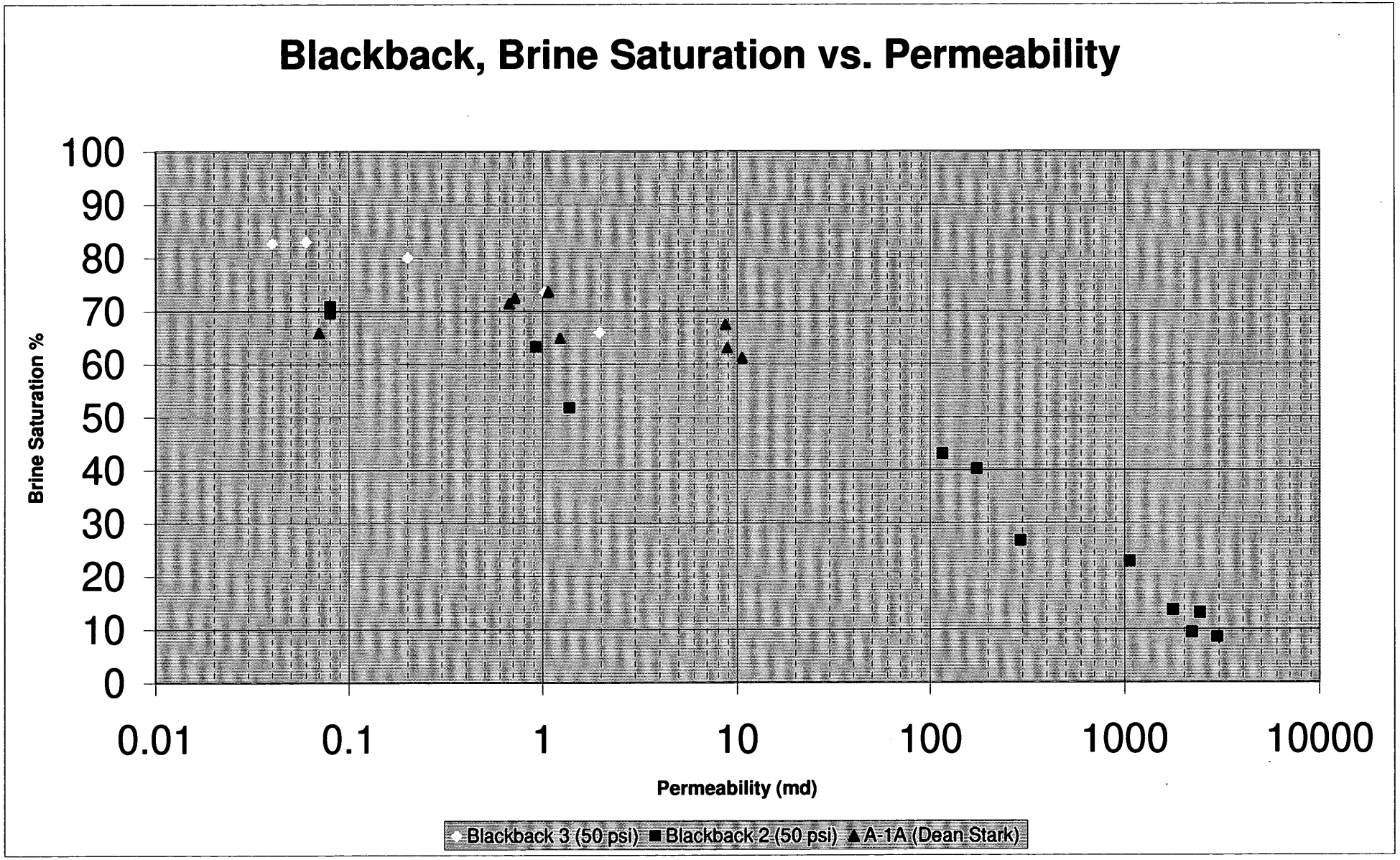


Figure 2.

PE602998

This is an enclosure indicator page.
The enclosure PE602998 is enclosed within the container PE907524 at this location in this document.

The enclosure PE602998 has the following characteristics:

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CONTAINER_BARCODE	= PE907524
NAME	= Blackback-A1A Log Analysis Depth Plot
BASIN	= GIPPSLAND
ONSHORE?	= N
DATA_TYPE	= WELL
DATA_SUB_TYPE	= WELL_LOG
DESCRIPTION	= Blackback-A1A Log Analysis Depth Plot Scale 1: 200 Attachment 1
REMARKS	=
DATE_WRITTEN	= 15-OCT-1999
DATE_PROCESSED	=
DATE_RECEIVED	= 16-FEB-2000
RECEIVED_FROM	= Esso Australia Ltd
WELL_NAME	= Blackback-A1A
CONTRACTOR	= Solar
AUTHOR	=
ORIGINATOR	= Esso Australia Ltd
TOP_DEPTH	= 3145
BOTTOM_DEPTH	= 3275
ROW_CREATED_BY	= DN07_SW

(Inserted by DNRE - Vic Govt Mines Dept)

907524 047

PE 602998

BLACKBACK A-1A

Attachment 1

Log Analysis Depth Plot
3145 - 3275MD

OVERBURDEN CORE ANALYSIS PRELIMINARY REPORT

Company : Esso Australia Ltd
Well : Blackback A-1A
Field : Blackback
Core Int. : 3172.00m - 3199.40m
Core Int. :
Core Int. :

Date : 23/06/1999
File : 0300-02
Location : Bass Strait
Analysts : pnc, ijm, kw

Overburden Pressure 1: 4700 psi

Sample Number	Depth	Dir	Ambient Porosity	OB1 Porosity	Grain Density	Ambient Permeability	OB1 Permeability
A1	3172.10	H	0.9	0.8	2.68	0.00	0.00
B1	3172.50	H	13.3	12.0	2.66	0.42	0.07
A2	3173.75	H	19.5	18.0	2.82	37.7	24.3
A3	3174.75	H	19.4	18.0	2.69	9.0	5.6
A4	3175.75	H	16.1	15.0	2.73	1.87	0.94
B2	3176.00	H	17.4	16.2	2.67	2.97	1.07
A5	3176.75	H	20.0	18.6	2.68	20.0	11.8
A6	3177.75	H	3.0	2.7	2.79	0.00	0.00
B3	3178.00	H	18.6	17.0	2.72	1.88	0.67
A7	3178.75	H	16.9	15.5	2.66	1.85	0.71
A8	3180.90	H	6.9	6.5	2.72	0.05	0.01
A9	3181.90	H	16.8	15.3	2.63	0.60	0.22
B5	3182.10	H	19.0	17.4	2.70	1.93	0.72
A10	3182.90	H	18.3	16.7	2.65	1.85	0.63
A11	3183.90	H	15.7	14.1	2.72	0.83	0.41
A12	3184.90	H	14.8	13.2	2.69	0.47	0.14
B6	3185.08	H	1.8	1.6	2.87	0.00	0.00
A13	3185.90	H	19.5	17.9	2.68	4.85	2.59
A14	3186.90	H	18.8	17.2	2.70	2.22	1.02
A15	3187.90	H	17.8	16.3	2.70	1.29	0.48
B7	3189.00	H	19.5	17.8	2.68	2.59	1.23
A16	3189.70	H	21.6	19.9	2.68	8.0	4.75
A17	3190.90	H	18.8	17.3	2.68	2.55	1.21
A18	3191.90	H	19.7	17.9	2.68	5.3	2.98
A19	3192.90	H	20.2	18.5	2.67	8.3	4.94
A20	3193.90	H	21.5	19.9	2.70	31.9	20.2
B8	3194.50	H	15.2	14.2	2.70	11.5	8.9
A21	3194.90	H	19.0	17.8	2.70	25.8	20.6
B9	3195.90	H	18.7	17.4	2.72	12.9	8.8
B10	3196.90	H	18.4	16.7	2.72	16.2	10.7
A22	3197.90	H	11.1	10.3	2.69	0.22	0.04

Attachment 2

CORE ANALYSIS PRELIMINARY REPORT

Dean-Stark Fluid Saturations

Client	: Esso Australia Ltd	**Date**	: 6/23/99
Well	: Blackback A-1A	**File**	: 0300-02
Field	: Blackback	**Location**	: Bass Strait
Core Int	: 3172.00m - 3199.40m	**Analysts**	: pnc, ijm, kw

Sample Number	Depth (m)	Dir	Porosity Helium (percent)	Grain Density (g/cm^3)	Permeability to Air (mD)	Fluid Saturation So (percent)	Fluid Saturation Sw (percent)	Remarks
B1	3172.50	H	14.4			24.7	65.9	
B2	3176.00	H	17.1			8.4	73.7	
B3	3178.00	H	20.0			8.2	71.4	
B5	3182.10	H	19.8			11.2	72.5	
B6	3185.08	H	18.0		1.39	16.6	69.1	
B7	3189.00	H	20.5			12.9	64.9	
B8	3194.50	H	16.1			2.6	63.1	
B9	3195.90	H	19.5			2.9	67.5	
B10	3196.90	H	21.2			4.1	61.2	

907524 050

OVERBURDEN CORE ANALYSIS FINAL REPORT

Company : Esso Australia Ltd
Well : Blackback A-1A
Field : Blackback
Core Int. : 3172.00m - 3199.40m

Date : 14/9/1999
File : 0300-02
Location : Vic P24
Analysts : ijm, pnc, kw

Sample Number	Depth (metres)	Dir	Overburden Pressure (psi)	Permeability to Air (milliDarcy's)	Porosity (percent)	Grain Density Calculated (g/cm^3)	Grain Density Absolute (g/cm^3)	Remarks
83	3178.90	R	4700	1.51	16.5	2.70	2.70	
85	3179.10	R	4700	56.2	21.6	2.79	2.79	
87	3179.30	R	4700	1549	25.3	2.72	2.72	
89	3179.47	R	4700	2184	25.7	2.68	2.66	slv
91	3179.67	R	4700	1885	23.9	2.68	2.65	slv
99	3180.35	R	4700	127	12.7	2.76	2.81	slv, Dual Lithology
101	3180.50	R	4700	1.11	16.2	2.74	2.75	
103	3180.65	R	4700	1.57	19.3	2.68	2.69	
105	3180.85	R	4700	0.02	8.7	2.76	2.75	
107	3180.97	V	4700	0.03	9.6	2.76	2.75	
109	3181.05	R	4700	0.08	11.3	2.74	2.72	
305	3197.45	R	4700	65.5	21.0	2.71	2.69	
307	3197.65	R	4700	0.74	16.8	2.69	2.68	
309	3197.85	R	4700	0.16	12.7	2.72	2.92	frac pyr
325	3199.30	R	4700	1227	14.7	2.70	2.69	slv
327	3199.45	R	4700	624	11.4	2.70	2.69	slv

907524 051

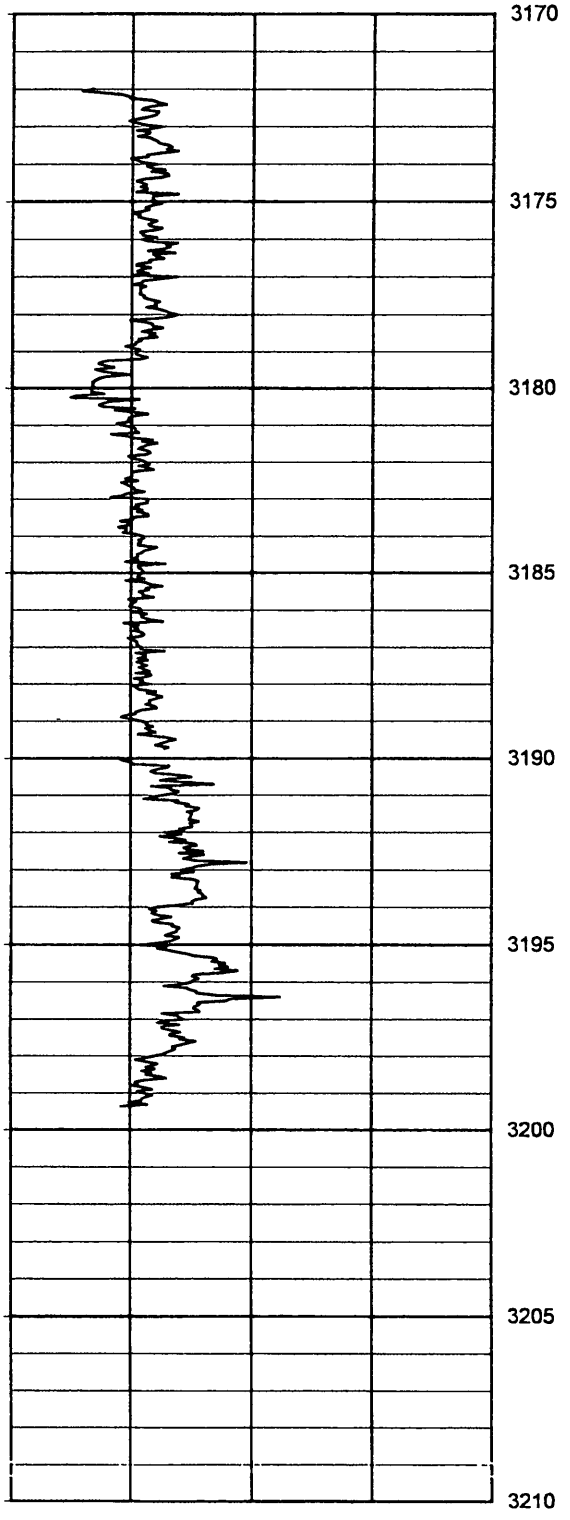
CORE PLOT

Scale 200:1

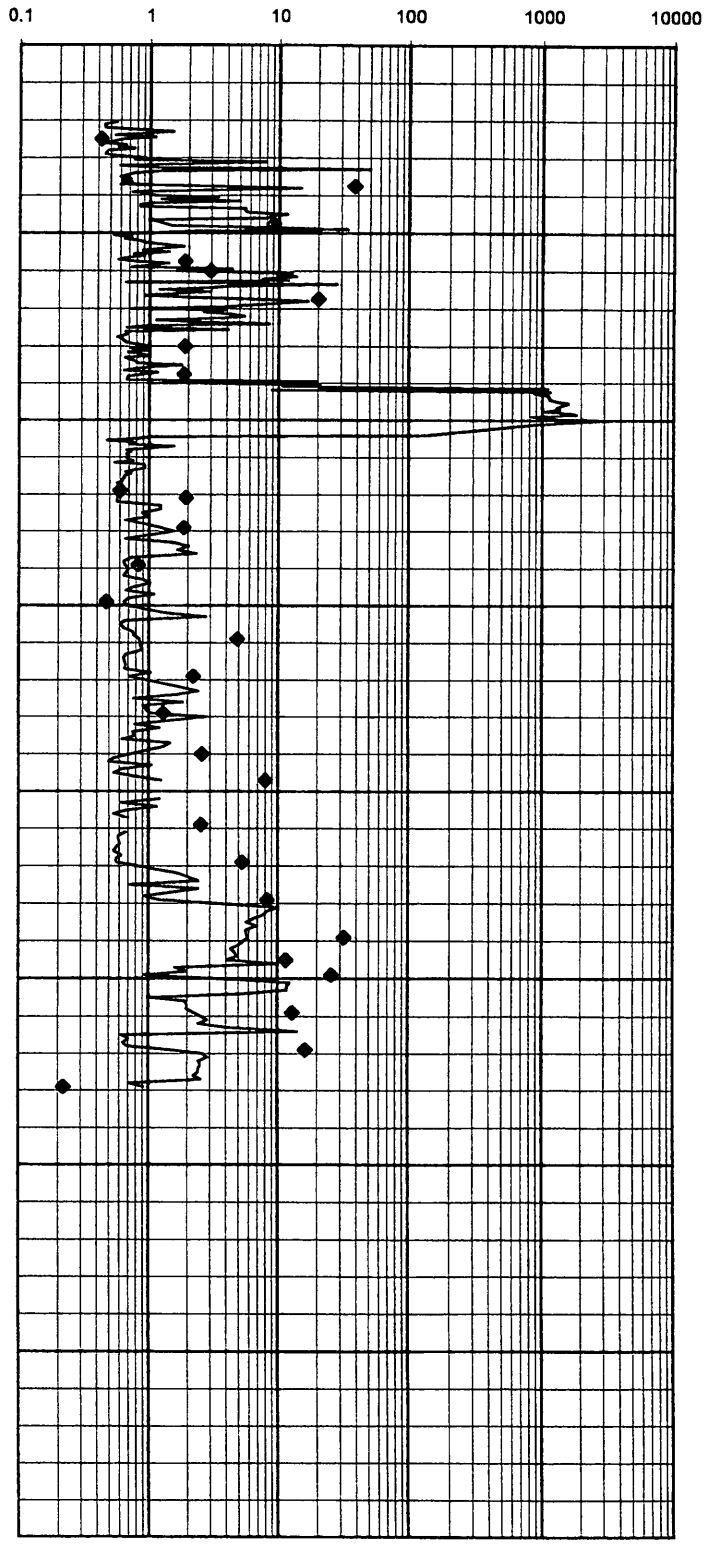
ACS LABORATORIES PTY. LTD.

Client: Esso Ltd
Well: Blackback A-1A

CORE GAMMA



PERMEABILITY



APPENDIX 3a

BLACKBACK A-1A

Lithology/Show Descriptions

Geologist: Greg Clota

BLACKBACK A-1A Lithology / Show Descriptions

Interval (m) From	To	%	Lithology / Show Description
			Geologist onboard from 1770mMD
1770	1800	100	**LIMESTONE:** Medium grey to brown grey, calcisiltite, micritic, trace carbonaceous specks, trace very fine calcareous sand in part, firm, blocky.
1800	1830	100	**LIMESTONE:** Predominantly as above, calcisiltite locally grades to very fine calcarenite in part.
1830	1860	100	**LIMESTONE:** Medium grey to brown grey, calcisiltite, micritic, trace carbonaceous specks in part, trace white calcite infill, firm, massive, blocky.
1860	1890	100	**LIMESTONE:** Predominantly as above, calcisiltite locally common very fine calcareous sand grades in part to calcarenite.
1890	1920	100	**LIMESTONE:** medium light grey to medium grey, calcisiltite grades to calcarenite, very fine to fine, micritic, common carbonaceous fragments, firm to locally moderately hard, massive to blocky.
1920	1950	100	**LIMESTONE:** Medium grey to medium dark grey, brown grey, calcisiltite grades to calcilutite, micritic, trace fine calcareous sand, trace carbonaceous specks, locally white vein calcite, firm to moderately hard, massive to blocky.
1950	1980	100	**LIMESTONE:** Medium light to medium grey, brown grey, calcisiltite, locally common very fine calcareous sand grades to calcarenite in part, trace carbonaceous specks, firm, massive to blocky.
1980	2010	100	**LIMESTONE:** medium to medium dark grey, brown grey, calcilutite, trace fine calcareous sand, trace carbonaceous specks, firm, blocky.
2010	2040	100	**LIMESTONE:** Medium to medium dark grey, brown grey, calcisiltite very argillaceous grades to calcilutite in part, micritic, locally common very light grey very fine grained calcarenite inclusions/laminae, trace carbonaceous fragments, firm to locally moderately hard, massive to blocky.
2040	2070	100	**LIMESTONE:** Medium to medium dark grey, brown grey, calcilutite, slightly silty, micritic, trace carbonaceous specks, occasionally light grey very fine calcarenite inclusions/laminae, moderately hard, massive to blocky.
2070	2100	100	**LIMESTONE:** Medium light to medium grey, calcisiltite grades to calcarenite in part, micritic, trace carbonaceous flecks, common very light grey very fine to fine calcarenite inclusions, firm, massive to blocky.
2100	2130	100	**LIMESTONE:** Medium grey to medium dark grey, brown grey, calcisiltite, locally moderately argillaceous, micritic, trace carbonaceous specks, locally trace forams, trace fine calcareous sand, firm to moderately hard in part, massive to blocky.
2130	2160	100	**LIMESTONE:** As above.
2160	2190	100	**LIMESTONE:** Medium grey to medium dark grey, olive grey, calcilutite, micritic, slightly dolomitic, trace carbonaceous specks, rare forams, trace fine rounded calcareous sand, moderately hard, massive to blocky.
2190	2220	100	**LIMESTONE:** Predominantly as above, less dolomitic, becomes firm to moderately hard.

2220-2250	100	**LIMESTONE:** Medium dark grey, olive grey, calcilutite, micritic, slightly silty, trace carbonaceous specks, rare forams, firm to moderately hard, massive to blocky.
2250-2280	100	**LIMESTONE:** Medium dark grey, olive grey, calcilutite, slightly silty, micritic, trace carbonaceous specks, trace to locally common very fine calcareous sand, firm to moderately hard, blocky to massive.
2280-2310	100	**LIMESTONE:** Predominantly as above, rare glauconite.
2310-2340	100	**LIMESTONE:** Medium dark to dark grey, olive grey, calcilutite, locally silty grades to calcisiltite, micritic, trace fine rounded calcareous sand, trace carbonaceous fragments, firm to moderately hard, massive to blocky.
2340-2370	100	**LIMESTONE:** medium to medium dark grey, olive grey, calcilutite, slightly silty, micritic, locally common light grey very fine calcarenite inclusions/laminae, moderately hard to firm in part, massive to blocky.
2370-2400	100	**LIMESTONE:** As above.
2400-2430	100	**LIMESTONE:** Medium to medium dark grey, olive grey, calcilutite, micritic, rare glauconite, trace very fine calcareous sand, firm, blocky.
2430-2460	100	**LIMESTONE:** Predominantly as above, calcilutite, trace forams.
2460-2490	100	**LIMESTONE:** Medium grey, brown grey, calcilutite, slightly silty, micritic, slightly dolomitic in part, trace carbonaceous specks, firm to moderately hard, massive to blocky.
2490-2520	100	**LIMESTONE:** Medium dark to dark grey, olive grey, calcilutite, micritic, trace carbonaceous specks, slightly dolomitic in part, firm to moderately hard, blocky.
2520-2550	100	**LIMESTONE:** As above.
2550-2580	100	**LIMESTONE:** Medium grey to medium dark grey, olive grey, calcilutite, micritic, slightly silty, trace carbonaceous specks, locally trace light grey very fine calcarenite inclusions/laminae, firm to moderately hard, massive to blocky.
2580-2610	100	**LIMESTONE:** Predominantly as above, occasionally clear crystalline calcite infill, trace light grey calcarenite inclusions.
2610-2640	100	**LIMESTONE:** Medium to medium dark grey, olive grey, calcilutite, silty in part, micritic, trace carbonaceous fragments, rare glauconite, firm, massive to blocky.
2640-2670	100	**LIMESTONE:** Predominantly as above, becomes brown grey in part, calcilutite becoming increasingly silty grades to calcisiltite.
2670-2700	100	**LIMESTONE:** Medium dark grey to brown grey, calcisiltite, locally becomes very argillaceous grades to calcilutite, trace carbonaceous fragments, trace light grey very fine calcarenite inclusions/laminae, firm, blocky to massive.
2700-2730	100	**LIMESTONE:** Medium to dark grey, olive grey, calcilutite, micritic, trace carbonaceous specks, rare disseminated pyrite, waxy texture, homogeneous, firm, massive to blocky.

2730-2760	100	**LIMESTONE:** Medium to medium dark grey, olive grey, calcilutite, micritic, slightly silty, trace carbonaceous specks, rare disseminated pyrite, homogeneous, waxy texture in part, , firm to moderately hard, massive to blocky.
2760-2790	100	**LIMESTONE:** As above.
2790-2820	100	**LIMESTONE:** Medium dark to dark grey, brown grey, calcilutite, becoming very argillaceous grades to calcareous claystone, slightly silty in part, common very light grey soft micritic inclusions/laminae, trace fossil fragments, moderately hard to hard in part, massive top blocky.
2820-2850	80	**LIMESTONE:** As above.
	20	**CLAYSTONE:** Dark grey to olive black, moderately to locally very calcareous grades to calcilutite in part, trace carbonaceous material, homogeneous, waxy texture in part, moderately hard to hard, massive to blocky.
2850-2880	70	**LIMESTONE:** Medium light to medium grey, calcilutite, micritic, slightly silty, trace carbonaceous flecks, locally common very light slightly hygroturgid micritic inclusions/laminae, soft to firm, massive to amorphous in part.
	30	**CLAYSTONE:** As above.
2880-2910	50	**CLAYSTONE:** Dark grey, brown black, moderately to locally very calcareous grades to calcilutite in part, occasionally carbonaceous specks, homogeneous, waxy texture, moderately hard, massive to blocky.
	50	**LIMESTONE:** As above.
2910-2940	60	**CLAYSTONE:** As above.
	40	**LIMESTONE:** Light to medium light grey, calcilutite, locally very argillaceous grades to calcareous claystone, trace fine calcareous sand, rare micro-glauconite, marly texture, soft to plastic, massive to amorphous.
2940-2970	80	**CLAYSTONE:** Medium dark grey, brownish black, moderately to very calcareous, occasional carbonaceous specks, moderately hard, massive to blocky.
	20	**LIMESTONE:** Medium light grey, calcilutite, commonly argillaceous grades to calcareous claystone, occasional carbonaceous specks, marly texture, soft, amorphous.
2970-3000	100	**CLAYSTONE:** Medium light to medium dark grey, moderately calcareous, argillaceous in places, trace carbonaceous specks, moderately hard to firm, massive to blocky.
3000-3030	100	**CLAYSTONE:** Medium to medium dark grey, slightly calcareous, trace carbonaceous specks, rare disseminated pyrite, firm to locally moderately hard, blocky to massive, with occasional interbedded/interlaminated light grey calcilutite, micritic, marly texture, soft to plastic, massive to amorphous.
3030-3040	100	**CLAYSTONE:** As above.
3040-3050	100	**CLAYSTONE:** Medium grey to brown grey in part, slightly calcareous, slightly silty, common disseminated pyrite, trace carbonaceous specks, firm to moderately hard, massive to blocky.
3050-3060	100	**CLAYSTONE:** As above.

3060-3070	100	**CLAYSTONE:** Medium light to medium grey, brown grey in part, slightly to locally moderately calcareous, slightly silty, trace carbonaceous flecks, occasionally fine crystalline calcarenite infill, firm, massive to blocky.
3070-3080	100	**CLAYSTONE:** As above.
3080-3090	100	**CLAYSTONE:** Predominantly as above, trace nodular pyrite.
3090-3100	100	**CLAYSTONE:** Medium grey, brown grey, slightly to moderately calcareous, trace nodular and disseminated pyrite, trace carbonaceous specks, trace very fine light grey calcarenite inclusions, firm, massive to blocky.
3100-3110	100	**CLAYSTONE:** Medium dark grey, brown grey, slightly calcareous, slightly silty, tarce carbonaceous specks, trace disseminated pyrite, occasionally light grey soft calcilutite inclusions, firm to moderately hard, massive to blocky.
3110-3120	100	**CLAYSTONE:** Medium light grey, medium grey to brown grey, slightly calcareous, minor disseminated and nodular pyrite, trace carbonaceous specks, firm, blocky.
3120-3130	100	**CLAYSTONE:** As above. (Abundant Barocarb contamination in samples)
3130-3140	100	**CLAYSTONE:** Medium grey to medium dark grey, slightly cal;careous, slightly silty, trace carbonaceous material, occasionally light grey to light blue grey calcilutite inclusions, trace disseminated pyrite, firm to moderately hard, massive.
3140-3150	100	**CLAYSTONE:** As above.
3150-3160	100	**CLAYSTONE:** Medium grey to medium dark grey, slightly calcareous, slightly silty, rare microglauconite, trace blue grey calcilutite inclusions, firm to moderately hard, massive to blocky.
3160-3166	100	**CLAYSTONE:** Predominantly as above, increasing amount of microglauconite.
3166-3170	100	**CLAYSTONE:** As above.
3170-3172	10	**SILTSTONE:** Medium to dark brown, very argillaceous grades to argillaceous siltstone, trace pelletal glauconite, rare medium to coarse milky quartz float, moderately hard to hard in part, massive.
	90	**CLAYSTONE:** As above.
		Core #1 3172-3199.4m. Core Chip Descriptions.
3172		**SANDSTONE:** Grey brown, medium dark brown, fine to occasionally medium, subangular to subrounded, moderate to good sorting, strong siliceous cement, trace calcareous/dolomitic cement, common pelletal glauconite, trace disseminated pyrite, trace muscovite, hard, tight, no fluorescence.
3172.85		**SANDSTONE:** Predominantly as abovebecomes medium, common muscovite, no fluorescence.
3173.85		**SANDSTONE:** Green black, brown grey, medium to coarse, angular to subangular, moderate sorting, moderate siliceous cement, abundant pelletal glauconite, common muscovite, trace very coarse milky quartz float, moderately hard, poor ro fair porosity. FLUORESCENCE: 20% Moderately bright pale yellow patchy fluorescence, weak instant cut, trace to nil ring residue.

3174.85	**SANDSTONE:** Brown grey, fine to medium, subangular to subrounded, moderate sorting, strong siliceous cement, common very coarse smoky quartz float, common pelletal & micro-glauconite, moderately hard, poor to nil porosity, no fluorescence.
3175.85	**SANDSTONE:** Brown grey, fine to medium, subangular to subrounded, moderate sorting, moderate siliceous cement, common silty/argillaceous matrix, common pelletal glauconite, common very coarse milky quartz float, trace Fe stained quartz, moderately hard, poor to nil porosity. FLUORESCENCE: 10% Dull pale yellow patchy fluorescence, weak instant cut nil ring residue.
3176.85	**SANDSTONE:** Green black to brown black, medium to coarse, occasionally very coarse, angular to subangular, moderate to poor sorting, moderate siliceous cement, common pelletal glauconite, common very coarse, milky quartz float, moderately hard, poor porosity, no fluorescence.
3177.85	**SANDSTONE:** Light to medium grey, fine to medium, subangular to subrounded, moderate to good sorting, strong calcareous/dolo cement, common pyritic cement, trace microglauconite, trace biotite, hard, tight, no fluorescence.
3178.85	**SANDSTONE:** Medium grey, brown grey, fine, subangular, good sorting, abundant brown argillaceous matrix, common pyritic cement, common very coarse smoky quartz, trace biotite, trace muscovite, moderately hard, very poor porosity. FLUORESCENCE: Trace blue white dull patchy fluorescence, faint instant cut, nil ring residue.
3179.85	**SANDSTONE:** Medium dark grey, clear to translucent in part, medium to coarse, subangular to subrounded, moderate to good sorting, weak siliceous cement, common pelletal glauconite, trace rock fragments, firable, very good porosity. FLUORESCENCE: 100% Bright pale yellow pale yellow solid fluorescence, instant cut, moderate ring residue.
3180.3	**SANDSTONE:** Predominantly as above, becomes medium to very coarse, friable to disaggregated, excellent porosity. FLUORESCENCE: As above.
3181	**SANDSTONE:** Brown grey, medium dark grey, fine, subangular good sorting, strong siliceous cement, common muscovite, trace pelletal glauconite, hard, tight, no fluorescence.
3182	**SANDSTONE:** Predominantly as above, trace calcareous/dolo cement.
3183	**SANDSTONE:** Light to medium grey, fine, subangular, good sorting, moderately silty, slightly calcareous cement, abundant pelletal glauconite, trace rock fragments, trace muscovite, moderately hard to friable, poor porosity, no fluorescence.
3185	**SANDSTONE:** Medium light grey, fine, subangular, good sorting, strong calcareous/dolo cement, common pyritic cement, trace microglauconite, very hard, tight, no fluorescence.
3186	**SANDSTONE:** Light to medium grey, fine to medium, subangular to subrounded, moiderate to good sorting, weak siliceous cement, common pelletal glauconite, trace muscovite, friable to moderately hard, poor to fai porosity, no fluorescence.

3187	**SANDSTONE:** Predominantly as above, becomes medium to coarse, no fluorescence.
3188.8	**SANDSTONE:** Light to medium grey, olive grey, fine to medium, subangular to subrounded, moderate to good sorting, moderately strong siliceous cement, common glauconite, trace biotite, moderately hard, poor porosity. FLUORESCENCE: 10% Dull pale yellow patchy fluorescence, weak slow cut, nil ring residue.
3189.9	**SANDSTONE:** Light grey, fine, subangular, good sorting, strong siliceous cement, weal calcareous/dolo cement, abundant glauconite, trace muscovite, hard, very poor porosity, FLUORESCENCE: 10% As above.
3191	**SANDSTONE:** Medium dark grey, medium to coarse, subangular to subrounded, poor ro moderate sorting, weak siliceous cement, trace pyritic cement, common smoky quartz, abundant pelletal glauconite, friabl;e to moderately hard, poor porosity. FLUORESCENCE: 50% Bright pale yellow patchy fluorescence, moderate fast cut thin ring residue.
3192	**SANDSTONE:** Medium dark grey, fine, subangular to subrounded, good sorting, moderate siliceous cement, common microglauconite, common biotite, trace rock fragments, moderately hard, poor porosity. FLUORESCENCE: 20% As above.
3193	**SANDSTONE:** Dark green grey, fine to medium, subangular, moderate to good sorting, trace weak siliceous cement, common pelletal glauconite, trace muscovite, common milky/smoky quartz, friable to moderately hard, fair porosity. FLOURESCENCE: 50% Moderately bright pale yellow solid fluorescence, instant cut, thin to moderate ring residue.
3194	**SANDSTONE:** Dark green grey, fine to medium, subangular to subrounded, moderate sorting, moderate siliceous cement, trace pyritic cement, trace biotite, common pelletal glauconite, friable to moderately hard, fair porosity. FLUORESCENCE: 20% Dull patchy pale yellow fluorescence, weak faint cut, nil ring residue.
3195	**SANDSTONE:** Dark grey, fine to medium, subangular, good sorting, moderate siliceous cement, trace pyritic cement, trace pelletal/microglauconite, trace very coarse smoky quartz, friable to moderately hard, poor porosity, no fluorescence.
3196	**SANDSTONE:** Predominantly as above. FLUORESCENCE: 10% Dull pale yellow streaky fluorescence, weak faint cut, nil ring residue.
3197	**SANDSTONE:** Dark green grey, fine to medium, subangular to subrounded, poor sorting, strong siliceous cement, trace caorse milky quartz, common microglauconite, trace nodu;lar pyrite, friable to moderately hard, poor to nil porosity, no fluorescence.
3198	**SANDSTONE:** Light to medium grey, medium to coarse, subangular to subrounded, poor to moderate sorting, weak siliceous cement, trace pelletal glauconite, common coarse milky quartz, friable, good porosity. FLUORESCENCE: 5% Dull pale yellow streaky fluorescence, weak faint cut, no residue.

3199.4		**SANDSTONE:** Light grey, clear to translucent, frosted, medium to coarse, subangular to subrounded, moderate sorting, clean, common pelletal glauconite, common very coarse rounded milky quartz float, friable to disaggregated, good porosity. FLUORESCENCE: 60% Bright pale yellow fluorescence, instant cut, moderate ring residue.
		End Core Chip Descriptions at 3199.4m
3199.4-3200	70	**SANDSTONE:** Clear to translucent, light brown grey, medium, subangular to subrounded, moderate sorting, strong calcareous/dolo cement, trace nodular pyrite, disaggregated, poor porosity, no fluorescence.
	30	**SILTSTONE:** Medium dark grey, very argillaceous, common glauconite, arenaceous, soft to sticky, massive to amorphous.
3200-3205	70	**SANDSTONE:** As above.
	30	**SILTSTONE:** As above.
3205-3210	80	**SANDSTONE:** Clear to translucent, light brown, fine to predominantly medium, subangular to subrounded, moderate sorting, strong calcareous/dolo cement, trace nodular pyrite, common micro/pelletal glauconite, disaggregated, poor porosity, no fluorescence.
	20	**SILTSTONE:** Medium dark grey, green grey, very argillaceous, common glauconite, micromicaceous, trace disseminated pyrite, trace carbonaceous fragments, common fine quartz sand, soft, massive to amorphous.
3210-3215	90	**SANDSTONE:** As above.
	10	**SILTSTONE:** As above.
3215-3220	90	**SANDSTONE:** Clear to translucent, frosted, medium to coarse, angular to subangular, poor sorting, common kaolinitic matrix, common very coarse fractured milky quartz, trace microglauconite, disaggregated, fair porosity. FLUORESCENCE: Trace - 5% Dull to moderately bright pale yellow patchy fluorescence, faint instant cut, thin ring residue.
	10	**SILTSTONE:** As above.
3220-3225	70	**SANDSTONE:** As above. FLUORESCENCE: Trace - 5% As above.
	30	**SILTSTONE:** As above.
3225-3230	90	**SANDSTONE:** Clear to translucent, frosted, coarse, angular to subangular, moderate sorting, trace to common kaolinitic matrix/inclusions, occasionally very coarse quartz float, trace disseminated pyrite, locally common glauconite, disaggregated, fair porosity. FLUORESCENCE: Trace - 5% Dull to moderately bright pale yellow patchy fluorescence, faint instant cut, thin ring residue.
	10	**SILTSTONE:** Dark grey, brown black, very argillaceous, arenaceous, common pelletal glauconite, trace disseminated/nodular pyrite, soft to sticky, massive to amorphous.
3230-3235	90	**SANDSTONE:** As above. FLUORESCENCE: Trace - 5% As above.
	10	**SILTSTONE:** As above.

3235-3240	90	**SANDSTONE:** Light grey, clear to translucent, medium to predominantly coarse, angular to subangular, poor sorting, common kaolinitic matrix, common glauconite, locally common very coarse fractured milky quartz grains, disaggregated, poor porosity. FLUORESCENCE: Trace dull pale yellow patchy fluorescence, faint weak cut, nil residue.
	10	**SILTSTONE:** As above.
3240-3245	100	**SANDSTONE:** Predominantly as above, no fluorescence.
3245-3250	100	**SANDSTONE:** Clear to translucent, frosted, medium to coarse, angular to subangular, poor sorting, common kaolinitic matrix, tarce glauconite, common very coarse fractured milky quartz, disaggregated, fair to good porosity, no fluorescence.
3250-3255	100	**SANDSTONE:** Clear to translucent, light grey, medium to coarse, subangular to subrounded, poor sorting, abundant kaolinitic matrix, rare glauconite, friable, fair porosity, no fluorescence.
3255-3260	100	**SANDSTONE:** Clear to translucent, light grey, medium to coarse, angular to subangular, poor sorting, weak calcareous cement, common kaolinitic matrix, tarec glauconite, common very coarse milky quartz float, fair porosity, no show.
3260-3265	100	**SANDSTONE:** As above.
3265-3272	90	**SANDSTONE:** Clear to translucent, frosted, light grey, coarse to very coarse, angular to subrounded, poor sorting, weak calcareous cement, common kaolinitic matrix, common very coarse milky quartz float, disaggregated, fair porosity, no show.
	10	**SILTSTONE:** Medium dark grey, brown black, very argillaceous, trace glauconite, micromicaceous, trace lithics, soft to sticky, massive to amorphous.
		Reached Total Depth of 3272mMDRT/2926mTVDRT at 21:00 hours 22/06/1999.

APPENDIX 3b

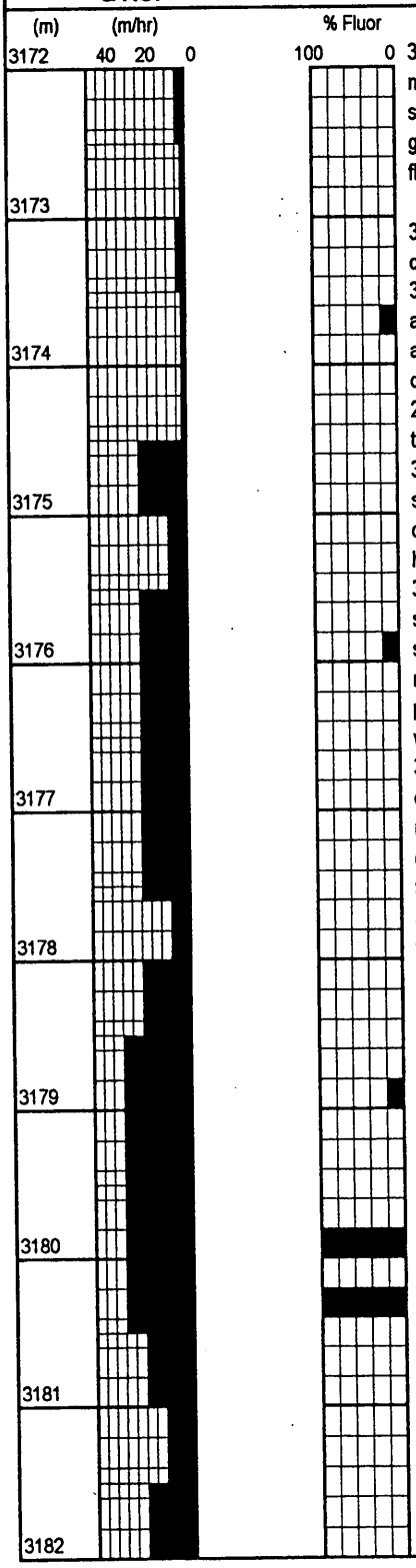
BLACKBACK A-1A

Core End Descriptions

Geologist: Greg Clota

ESSO AUSTRALIA LTD
CORE DESCRIPTION

CORE No.:	1	**WELL:**	Blackback A-1A
Interval cored:	3172-3199.4m	Recovered:	27.4m (100%)
Cut:	27.4m	Bit size:	9.875"
Bit type:	ARC425	Date:	20/06/99
Described by:	Greg Clota		



Descriptive Lithology

3172 SANDSTONE: Grey brown, medium dark brown, fine to occasionally medium, subangular to subrounded, moderate to good sorting, strong siliceous cement, trace calcareous/dolomitic cement, common pelletal glauconite, trace disseminated pyrite, trace muscovite, hard, tight, no fluorescence.

3172.85 SANDSTONE: Predominantly as above, becomes medium, common muscovite, no fluorescence.

3173.85 SANDSTONE: Green black, brown grey, medium to coarse, angular to subangular, moderate sorting, moderate siliceous cement, abundant pelletal glauconite, common muscovite, trace very coarse milky quartz float, moderately hard, poor to fair porosity. FLUORESCENCE: 20% Moderately bright pale yellow patchy fluorescence, weak instant cut, trace to nil ring residue.

3174.85 SANDSTONE: Brown grey, fine to medium, subangular to subrounded, moderate sorting, strong siliceous cement, common very coarse smoky quartz float, common pelletal & micro-glauconite, moderately hard, poor to nil porosity, no fluorescence.

3175.85 SANDSTONE: Brown grey, fine to medium, subangular to subrounded, moderate sorting, moderate siliceous cement, common silty/argillaceous matrix, common pelletal glauconite, common very coarse milky quartz float, trace Fe stained quartz, moderately hard, poor to nil porosity. FLUORESCENCE: 10% Dull pale yellow patchy fluorescence, weak instant cut nil ring residue..

3176.85 SANDSTONE: Green black to brown black, medium to coarse, occasionally very coarse, angular to subangular, moderate to poor sorting, moderate siliceous cement, common pelletal glauconite, common very coarse, milky quartz float, moderately hard, poor porosity, no fluorescence..

3177.85 SANDSTONE: Light to medium grey, fine to medium, subangular to subrounded, moderate to good sorting, strong calcareous/dolo cement, common Pyritic cement, trace microglauconite, trace biotite, hard, tight, no fluorescence.

3178.85 SANDSTONE: Medium grey, brown grey, fine, subangular, good sorting, abundant brown argillaceous matrix, common pyritic cement, common very coarse smoky quartz, trace biotite, trace muscovite, moderately hard, very poor porosity. FLUORESCENCE: Trace blue white dull patchy fluorescence, faint instant cut, nil ring residue.

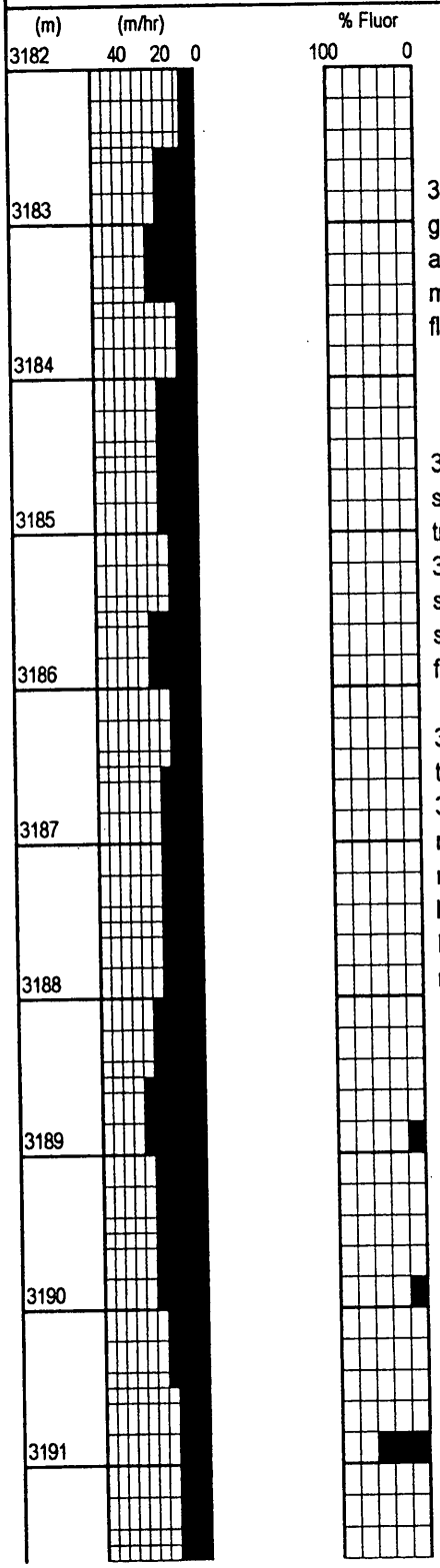
3179.85 SANDSTONE: Medium dark grey, clear to translucent in part, medium to coarse, subangular to subrounded, moderate to good sorting, weak siliceous cement, common pelletal glauconite, trace rock fragments, friable, very good porosity. FLUORESCENCE: 100% Bright pale yellow pale yellow solid fluorescence, instant cut, moderate ring residue.

3180.3 SANDSTONE: Predominantly as above, becomes medium to very coarse, friable to disaggregated, excellent porosity. FLUORESCENCE: As above.

3181 SANDSTONE: Brown grey, medium dark grey, fine, subangular good sorting, strong siliceous cement, common muscovite, trace pelletal glauconite, hard, tight, no fluorescence.

ESSO AUSTRALIA LTD
CORE DESCRIPTION

CORE No.:	1	**WELL:**	Blackback A-1A
Interval cored:	3172-3199.4m	Recovered:	27.4m (100%)
Cut:	27.4m	Bit size:	9.875"
Bit type:	ARC425	Date:	15/06/99
Described by:	Greg Clota		



Descriptive Lithology

3183 SANDSTONE: Light to medium grey, fine, subangular, good sorting, moderately silty, slightly calcareous cement, abundant pelletal glauconite, trace rock fragments, trace muscovite, moderately hard to friable, poor porosity, no fluorescence.

3185 SANDSTONE: Medium light grey, fine, subangular, good sorting, strong calcareous/dolo cement, common pyritic cement, trace microglauconite, very hard, tight, no fluorescence.

3186 SANDSTONE: Light to medium grey, fine to medium, subangular to subrounded, moderate to good sorting, weak siliceous cement, common pelletal glauconite, trace muscovite, friable to moderately hard, poor to fair porosity, no fluorescence.

3187 SANDSTONE: Predominantly as above, becomes medium to coarse, no fluorescence.

3188.8 SANDSTONE: Light to medium grey, olive grey, fine to medium, subangular to subrounded, moderate to good sorting, moderately strong siliceous cement, common glauconite, trace biotite, moderately hard, poor porosity. FLUORESCENCE: 10% Dull pale yellow patchy fluorescence, weak slow cut, nil ring residue.

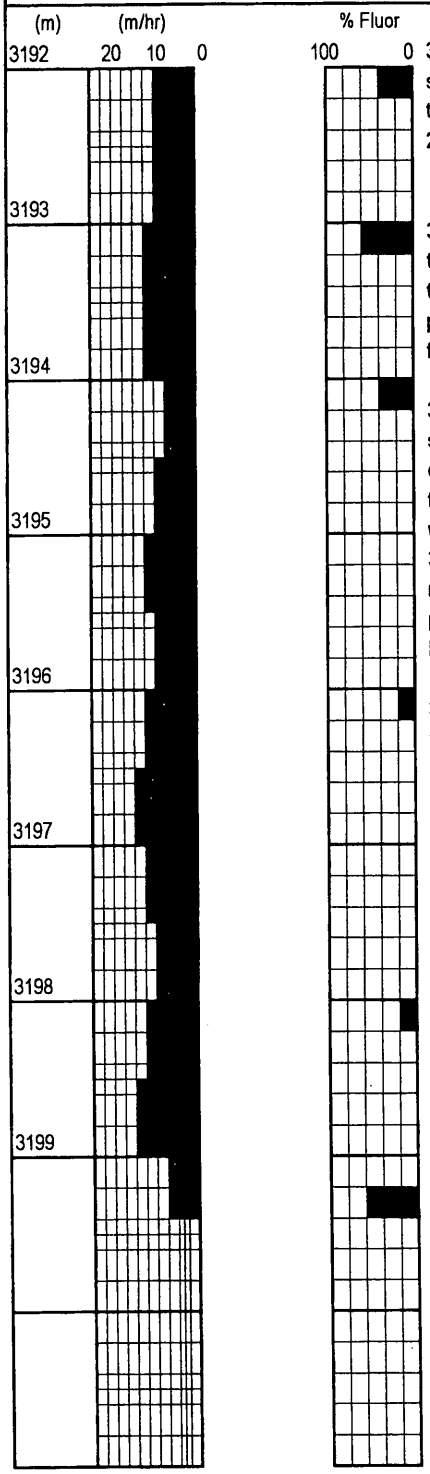
3189.9 SANDSTONE: Light grey, fine, subangular, good sorting, strong siliceous cement, weal calcareous/dolo cement, abundant glauconite, trace muscovite, hard, very poor porosity, FLUORESCENCE: 10% As above.

3191 SANDSTONE: Medium dark grey, medium to coarse, subangular to subrounded, poor to moderate sorting, weak siliceous cement, trace pyritic cement, common smoky quartz, abundant pelletal glauconite, friable to moderately hard, poor porosity. FLUORESCENCE: 50% Bright pale yellow patchy fluorescence, moderate fast cut thin ring residue.


3192

ESSO AUSTRALIA LTD
CORE DESCRIPTION

CORE No.:	1	**WELL:**	Blackback A-1A
Interval cored:	3172-3199.4m	Recovered:	27.4m (100%)
Cut:	27.4m	Bit size:	9.875"
Bit type:	ARC425	Date:	20/06/99
Described by:	Greg Clota		



3192 SANDSTONE: Medium dark grey, fine, subangular to subrounded, good sorting, moderate siliceous cement, common microglauconite, common biotite, trace rock fragments, moderately hard, poor porosity. FLUORESCENCE: 20% As above.

3193 SANDSTONE: Dark green grey, fine to medium, subangular, moderate to good sorting, trace weak siliceous cement, common pelletal glauconite, trace muscovite, common milky/smoky quartz, friable to moderately hard, fair porosity. FLUORESCENCE: 50% Moderately bright pale yellow solid fluorescence, instant cut, thin to moderate ring residue.

3194 SANDSTONE: Dark green grey, fine to medium, subangular to subrounded, moderate sorting, moderate siliceous cement, trace pyritic cement, trace biotite, common pelletal glauconite, friable to moderately hard, fair porosity. FLUORESCENCE: 20% Dull patchy pale yellow fluorescence, weak faint cut, nil ring residue.

3195 SANDSTONE: Dark grey, fine to medium, subangular, good sorting, moderate siliceous cement, trace pyritic cement, trace pelletal/microglauconite, trace very coarse smoky quartz, friable to moderately hard, poor porosity, no fluorescence.

3196 SANDSTONE: Predominantly as above. FLUORESCENCE: 10% Dull pale yellow streaky fluorescence, weak faint cut, nil ring residue.

3197 SANDSTONE: Dark green grey, fine to medium, subangular to subrounded, poor sorting, strong siliceous cement, trace coarse milky quartz, common microglauconite, trace nodular pyrite, friable to moderately hard, poor to nil porosity, no fluorescence.

3198 SANDSTONE: Light to medium grey, medium to coarse, subangular to subrounded, poor to moderate sorting, weak siliceous cement, trace pelletal glauconite, common coarse milky quartz, friable, good porosity. FLUORESCENCE: 5% Dull pale yellow streaky fluorescence, weak faint cut, no residue.

3199.4 SANDSTONE: Light grey, clear to translucent, frosted, medium to coarse, subangular to subrounded, moderate sorting, clean, common pelletal glauconite, common very coarse rounded milky quartz float, friable to disaggregated, good porosity. FLUORESCENCE: 60% Bright pale yellow fluorescence, instant cut, moderate ring residue.

* Note: The core had collapsed and jammed in the barrel over the last 1.5m.

CORING PARAMETERS LOG.

BAKER HUGHES INTEQ

WELL INFORMATION

COMPANY	ESSO
RIG No.	SEDCO-702
WELL NO	BLACK BACK
FIELD	BLACK BACK
LOCATION	Sale-Victoria
HOLE SIZE	8 7/8"
FORM NAME	Latrobe
LITHOLOGY	SS/SH
MUD TYPE	PETROLINE GREE

EQUIPMENT

CORE BARREL TYPE	CONV 250 P BARREL
SIZE	8" x 6 1/4" x 27 M
INNER TUBE TYPE	FIBRE GLASS
LOWER SHOE/CATC.	C.U W/ SPI LINERS
BIT STYLE / SIZE	ARC-425
BIT SERIAL NO	1402137
BIT COND. -> START	0 % WEAR
BIT COND. -> FINISH	5 % WEAR
PUMP PRESS ON/OFF	900-970 LINER SIZE: 5 1/2"
STROKE	12" GPM/LPM: 200-240 Gpm JOB No

PERFORMANCE

CORE No	1 DATE : JUNE, 20, 99
INTV.CORE - FINISH	: 3199.4 M
INTV. CORE - START	: 3172 M
AMOUNT CORED	: 27.4 M
CORE RECOVERED	: 27.4 M
CORING HOURS	: 2.8 Hrs
REAMING - NO/YES	: NO
SERVICE ENGINEER	: BRETT DUNCAN
	MOHD.NOER

DEPTH (Mtr)	NO MT CORE	R.O.P Mt/Hr	R.O.P Min/Mt
3172	0	Start	09:10
3173	1	1.5	40.0
3174	2	1.9	32.0
3175	3	7.5	8.0
3176	4	15.0	4.0
3177	5	15.0	4.0
3178	6	15.0	4.0
3179	7	20.0	3.0
3180	8	30.0	2.0
3181	9	20.0	3.0
3182	10	10.0	6.0
3183	11	20.0	3.0
3184	12	12.0	5.0
3185	13	15.0	4.0
3186	14	15.0	4.0
3187	15	15.0	4.0
3188	16	15.0	4.0
3189	17	20.0	3.0
3190	18	15.0	4.0
3191	19	15.0	4.0
3192	20	12.0	5.0
3193	21	15.0	4.0
3194	22	15.0	4.0
3195	23	20.0	3.0
3196	24	15.0	4.0
3197	25	30.0	2.0
3198	26	20.0	3.0
3199.4	27	15.0	4.0
	FINISH TIME:		09:58

TOMMY VESIA / M.LUNDUNKON

Company Representative

PENETRATION RATE (MIN/MT)

SPL

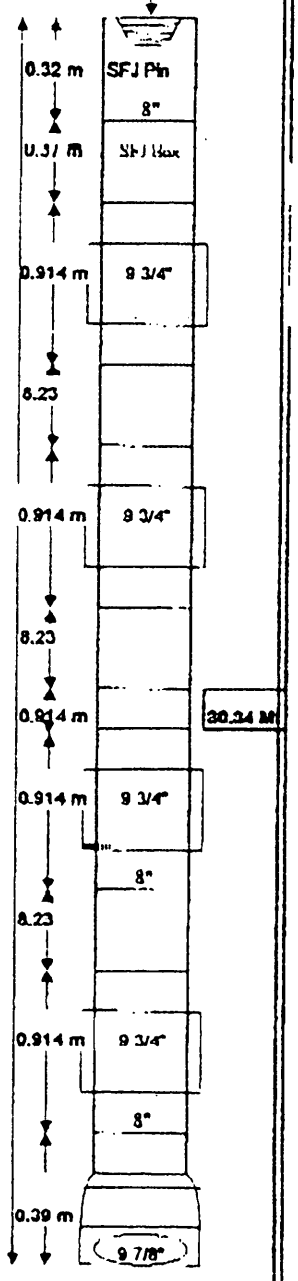
COLUMN LITHOLOGY

OPERATING CONDITIONS

W.O.B K.Lbs	R.P.M	GPM	PRES. Psi
3-6	60	250	970
10-14	60	250	970
10-14	60	250	960
8	60	240	950
6-8	60	225	900
6-8	60	225	900
6-8	60	200	820
6-8	60	200	820
6-8	60	200	800
6-8	60	200	800
6-8	70	200	800
2-6	70	200	800
2-6	70	200	800
2-6	70	200	800
2-6	70	200	800
2-6	70	200	800
2-6	70	200	800
2-6	70	200	800
2-6	70	200	800
2-6	70	200	800
2-6	70	200	800
2-6	70	200	800
2-6	70	200	800
2-6	70	200	800
2-6	70	200	800
4-8	70	200	800

[redacted]

Well site Geologist



907524 068 Job No.

BAKER HUGHES INTEQ

Core Run Log

OPERATOR: ESSO
RIG/PLATFORM: SEDCO - 702
WELL No. : BLACK BACK A. A1A
DATE: 20 / 06 / 1999

CORE : 1

HOLE SIZE: 12 1/4" HOLE ANGLE: 23 DEG DEPTH AT START OF RUN: 3172 m END: 3199.4 m
FORMATION NAME: LATROBE DESCRIPTION: SAND / SHALE
BOTTOM HOLE TEMP: 88 C SURFACE TEMP: 10 C SPACING USED: 0.750"

EQUIPMENT

CORE BARREL SIZE: 8 " x 5 1/4" LENGTH: 27 M
INNER TUBE TYPE: FIBREGLASS L.SHOE/CATCHER: COREGARD & SPRIN
COREHEAD TYPE: ARC-425 SIZE: 9 7/8" x 8" x 5 1/4" SERIAL No. : 1402137
PREVIOUS FT/M: 0 M FT/M THIS RUN: 27.4 TOTAL FT/M: 27.4 m

COREHEAD CONDITION AT RUN START: AT RUN END:

		NEW					NEW
O	O	NO	NO	x	1	-	-

I. T. STAB. : YES DAP TOOL NO BIT END WEAR: YES CJI: NO
CORING B.H.A. : BIT, CBBL, DBL PIN SUB,FLOAT SUB,CIRC SUB, 3 x D C.,X/O, 3 x HWDP , JAR , 11x HWDP

BACKGROUND PARAMETERS

STRING WTS

		TORQUE (OFF BTM)		BALL VALVE; PRESS INC.		ON & OFF BOTTOM PRESS. (BALL SEATED)	
385	Klbs	40 rpm	11-15 K	FLOWRATE	250	FLOWRATE	250
305	Klbs	60 rpm	8 - 15 K	PRESS INCR.	100	OFF BTM	800
260	Klbs	80 rpm	7-16 K			ON BTM	900

MUD PROPERTIES

TYPE	MARSH VISC	PPG WT	PV	YP	GEL	HT/HP FL (ml)	% SAND	%H2O/OIL
PETROFREE	38	10.8	38	35	22/42	4.6		

TIMINGS

(24 HOUR) DAY OF START

	PICK UP BBL	START IN HOLE	CIRCU-LATING	DROP BALL	CORING	P.O.O.H. SERVICE BBL	LAY DOWN STD BCK BBL
START:	08:30-19/6	12:30	20:30	23:30	00:10 20/6	13:15	16:00
STOP:	11:30 19/6	20:20	23:20	23:55	02:58 20/6		
INTERVAL	3 HRS	7.40 HRS	2.40 HRS	25 MIN	2.8 HRS		

CONNECTION OVERPULL (Last connection is P.O.O.H.)

Connection	1	2	3	4	5	6	7
Overpull	20 k						

PERFORMANCE

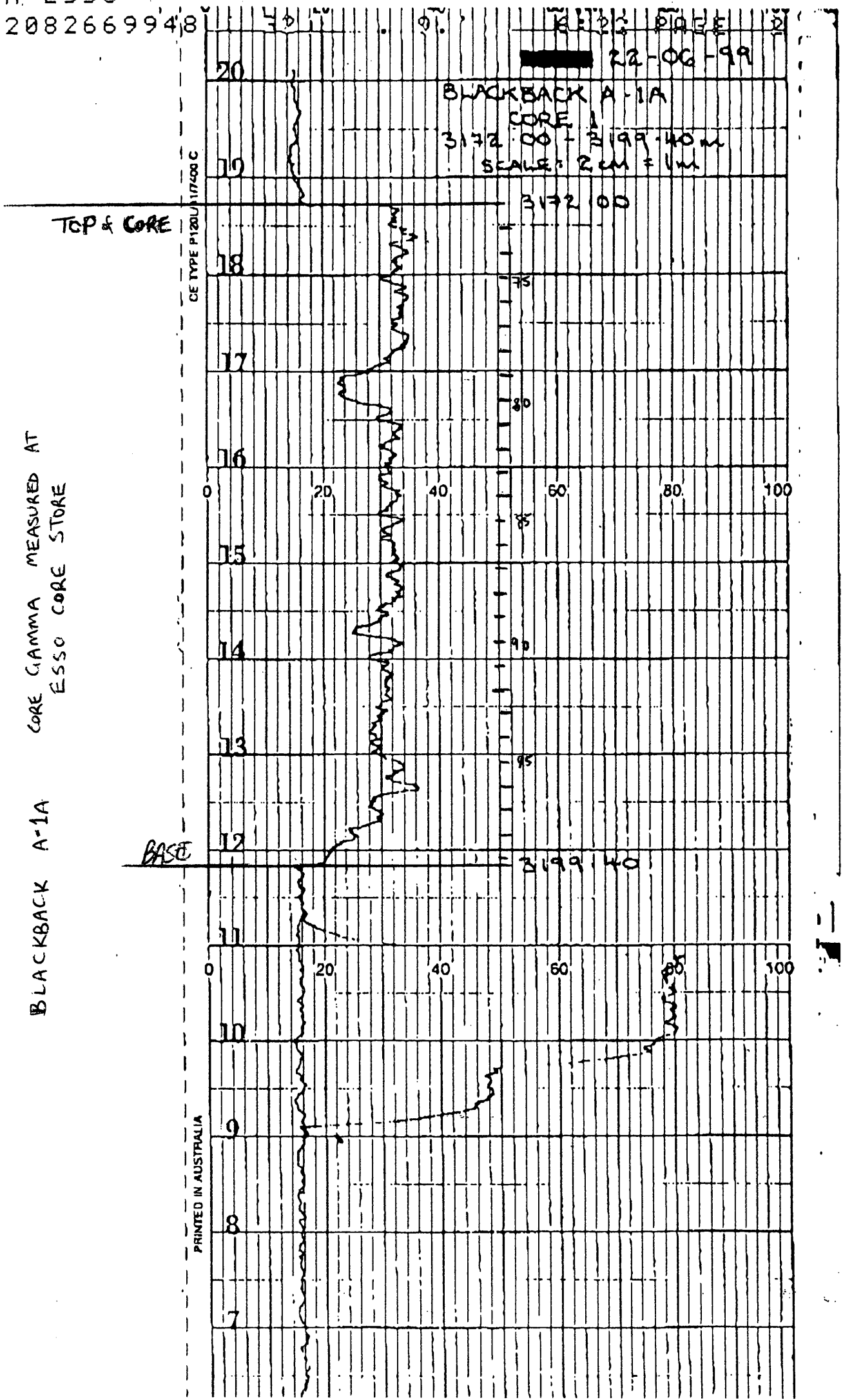
Depth in	Depth Out	Ft/m Cut	Coring Hrs	ROP 9.64 m / hr	Ft/m Recovered	% Recovered
3172 m	3199.4	27.4 m	2.8	9.64 m / hr	27.4 m	100

EFFICIENCY: % REASON FOR STOPPING CORING: As required

SPARE PARTS USED:

On service ticket

Customer Rep : TOMMY VESTAL / M.DUBUISSON B.H.Inteq Rep: MOH'D.NOER / BRETT DUNCAN



BLACKBACK A-1A CORE GAMMA MEASURED AT ESSO CORE STORE

APPENDIX 4a

BLACKBACK A-1A

Mud Log

PE602999

This is an enclosure indicator page.
The enclosure PE602999 is enclosed within the container PE907524 at this location in this document.

The enclosure PE602999 has the following characteristics:

ITEM_BARCODE	= PE602999
CONTAINER_BARCODE	= PE907524
NAME	= Blackback-A1A Mud Log
BASIN	= GIPPSLAND
ONSHORE?	= N
DATA_TYPE	= WELL
DATA_SUB_TYPE	= MUD_LOG
DESCRIPTION	= Blackback-A1A Masterlog Mud Log Scale 1:500 Attachment 4a
REMARKS	=
DATE_WRITTEN	=
DATE_PROCESSED	=
DATE_RECEIVED	= 16-FEB-2000
RECEIVED_FROM	= Esso Australia Ltd
WELL_NAME	= Blackback-A1A
CONTRACTOR	= Geoservices
AUTHOR	=
ORIGINATOR	= Esso Australia Ltd
TOP_DEPTH	= 1270
BOTTOM_DEPTH	= 3280
ROW_CREATED_BY	= DN07_SW

(Inserted by DNRE - Vic Govt Mines Dept)

APPENDIX 4b

BLACKBACK A-1A

Well Completion Log

PE603000

This is an enclosure indicator page.
The enclosure PE603000 is enclosed within the container PE907524 at this location in this document.

The enclosure PE603000 has the following characteristics:

ITEM_BARCODE	= PE603000
CONTAINER_BARCODE	= PE907524
NAME	= Blackback-A1A Well Completion Log
BASIN	= GIPPSLAND
ONSHORE?	= N
DATA_TYPE	= WELL
DATA_SUB_TYPE	= MONTAGE_LOG
DESCRIPTION	= Blackback-A1A Well Completion Log Scale 1:500 for 1280-3100 m, 1:200 3100-TD Attachment 4b
REMARKS	=
DATE_WRITTEN	=
DATE_PROCESSED	=
DATE_RECEIVED	= 16-FEB-2000
RECEIVED_FROM	= Esso Australia Ltd
WELL_NAME	= Blackback-A1A
CONTRACTOR	=
AUTHOR	=
ORIGINATOR	= Esso Australia Ltd
TOP_DEPTH	= 3100
BOTTOM_DEPTH	= 3272
ROW_CREATED_BY	= DN07_SW

(Inserted by DNRE - Vic Govt Mines Dept)

APPENDIX 5

BLACKBACK A-1A

Palynological Analysis

APPENDIX 5

BLACKBACK A-1A

Palynological Analysis

Palynological analysis on an additional four core samples from the Blackback A–1A Production well, Gippsland Basin.

by

Alan D. Partridge

Biostrata Pty Ltd
A.C.N. 053 800 945

Biostrata Report 1999/9

29 September 1999

Palynological analysis on an additional four core samples from the Blackback A–1A Production well, Gippsland Basin.

by Alan D. Partridge

INTERPRETATIVE DATA

Summary

Four core samples were examined over a 4.6 metre interval between 3173.5 and 3178.1m in the Blackback A–1A Production well to provide additional zone and age resolution to the eight core samples previously analysed between 3172 and 3198m. Using larger quantites of sample and slower acid digestion better assemblages were obtained even though the amount of palynological residues recovered was still low, relative to other facies. The top sample at 3173.5m is assigned to the Late Eocene Middle *N. asperus* and *C. incompositum* Zones, the two middle samples from 3176.3 to 3177.5m are assigned to the Middle Eocene Lower *N. asperus* and *E. partridgei* Zones, while the bottom sample at 3178.1m is assigned to the Late Paleocene Upper *L. balmei* Zone and lower part of the *A. hyperacanthum* Zone. As significant zones are missing from this sequence two disconformities or unconformities are postulated to occur between the three ages recorded. An additional unconformity probably occurs between the bottom sample and the top of the *A. reburrus* Zone recorded in the previous report between 3178.85m and 3198m.

All samples contained abundant marine organic-walled microplankton indicative of a distal marine environment of deposition. The spore-pollen assemblages from the Paleocene sample also contained common *Dilwynites* pollen interpreted to represent a Neves effect, which also indicates a distal marine environment of deposition. As has previously been reported from the Blackback field the Middle and Late Eocene assemblages contain reworked Early Eocene palynomorphs.

Table 1: Palynological Summary of Blackback A–1A Production well.

AGE	UNIT/FACIES	SPORE-POLLEN ZONES (MICROPLANKTON ZONES)	DEPTHS mKB
LATE EOCENE	LATROBE GROUP Eocene channel fill	Middle *N. asperus* (*C. incompositum*)	3172.0–3173.85
MIDDLE EOCENE	LATROBE GROUP Eocene channel fill	Lower *N. asperus* (*E. partridgei*)	3176.3–3177.5
LATE PALEOCENE	LATROBE GROUP Paleocene channel fill	Upper *L. balmei* (Lower *A. hyperacanthum*)	3178.1
LATE PALEOCENE	LATROBE GROUP Paleocene channel fill	Upper *L. balmei* (*A. reburrus*)	3178.85–3198.0

Introduction

Four additional core samples were submitted for palynological analysis from the top of the Latrobe Group in the Blackback A–1A in an endeavour to more precisely locate the position of the boundary between the Eocene and Paleocene channel fill sequences identified in the initial analysis of eight core samples by Partridge (1999).

The four samples were received and inspected by the author on 3rd September 1999, then forwarded by courier to Laola Pty Ltd in Perth for palynological processing. In contrast to the initial core samples analysed, that had been given urgent palynological processing resulting in poor preparations, the new samples were given slow acid digestion over several days and greater quantities of the samples were processed (average 31.5 grams). Higher residue yields were therefore obtained and overall the assemblages were much better preserved and easier to analyse. The palynological slides were received on the 16th September and a Provisional Report issued on the 19th September.

Details of zone assignments, confidence ratings and key comments are given in Table 2, basic sample data provided in Table 3, and residues yields, preservation and recorded species diversity provided in Table 4. Distribution of the spore-pollen and microplankton in the samples are arranged in order of oldest occurrence on Tables 5 and 6. Author citations for spore-pollen species can be sourced from Stover & Partridge (1973), and for the microplankton from the index of Williams *et al.* (1998). Species names followed by "ms" are unpublished manuscript names.

Geological Comments

The four new core samples analysed from Blackback A–1A confirm the presence of two new zones/ages in the five metre sampling gap between 3173.85 and 3178.85m. The unconformity between the Eocene and Paleocene channel fill sediments is consequently narrowed to between 3177.5 and 3178.1m. At this break all of the Early Eocene palynological zones are missing.

A second break or unconformity is suggested to occur in the ~2.5 metre sampling gap between 3173.85 and 3176.3m. At this break the *D. heterophlycta* and lower part of the *C. incompositum* microplankton Zones are suggested to be missing.

However, given the apparently highly condensed nature of the Middle and Late Eocene section it is still possible that these zones could lie in the sampling gap.

A third break or unconformity may also be present in the 0.75 metre sampling gap between 3178.1 and 3178.85m, corresponding to the boundary between the *A. hyperacanthum* and *A. reburrus* microplankton Zones. This break corresponds to the 54.2 Ma sequence boundary identified in the Fortescue–Cobia field by Rahmanian *et al.* (1990; fig.18).

The presence of four zone intervals representing a time span of 20 million years (36 to 56 Ma) in just 26 metres of core section in the Blackback A–1A production well reconfirms the highly condensed nature of the Paleocene and Eocene section at the top of the Latrobe Group in the Blackback field, that has been documented in previous palynological reports (Partridge, 1975, 1993, 1994; Partridge & Hannah, 1990).

Discussion of Assemblages

Middle *Nothofagidites asperus* spore-pollen Zone
and
***Corrudinium incompositum* microplankton Zone**
Sample at: 3173.5 metres
Age: Late Eocene

Assignment to the Middle subzone of the *N. asperus* Zone is based on the presence of *Aglaoreidia qualumis*, *Proteacidites truncatus* and *Verrucosisporites cristatus* which are not known to range below this zone (Partridge, 1971; Stover & Partridge, 1973). The associated microplankton assemblage is assigned to the *C. incompositum* Zone of Harris (1985) based on the presence of the eponymous species in association with the acritarch *Tritonites spinosus*. A position near the top of the zone is favoured by the presence of *Deflandrea* sp. nov. cf *D. heterophlycta* and *Stoveracysta* sp. cf *S. kakanuiensis*.

Lower *Nothofagidites asperus* spore-pollen Zone
and
Lower *Enneadocysta partridgei* microplankton Zone
Interval: 3176.3—3177.5 metres
Age: Middle Eocene

The middle two samples gave the lowest yields but clearly belong to the broad *N. asperus* Zone of Stover & Evans (1974) based on presence of abundant *Nothofagidites* pollen (>45%). Assignment to the Lower subzone is based on FADs

of *Nothofagidites falcatus* in the deeper sample and *Tricolpites simatus* in the shallower sample. These samples can also be confidently assigned to the *E. partridgei* Zone (formerly the *Areosphaeridium australicum* Zone) on the presence of the eponymous species and the diagnostic acritarchs *Tritonites tricornus* and *T. pandus* described by Marshall & Partridge (1988). The dinoflagellate *Homotryblium tasmaniense* is a frequently recorded species in the assemblages, but is interpreted to be reworked, as has previously been discussed by Partridge & Hannah (1990).

Upper *Lygistepollenites balmei* spore-pollen Zone
and
Lower *Apectodinium hyperacanthum* microplankton Zone
Sample at: 3178.1 metres
Age: Latest Paleocene.

The bottom core sample is confidently assigned to the *L. balmei* Zone on the common occurrence of the eponymous species in association with accessory index species *Gambierina edwardsii*, G. *rudata* and *Polycolpites langstonii*. The sample is assigned to the Upper subzone based on its stratigraphic position above deeper core samples belonging to that subzone (Partridge, 1999). The spore-pollen assemblage is dominated by the gymnosperm pollen *Dilwynites* (~17%) and *Podocarpidites* (~26%), the abundances of which are interpreted to be the manifestation of a Neves effect (Traverse, 1988; Partridge, 1996, fig.2), and therefore indicative of deposition in a distal offshore environment. Microplankton in the assemblage indicate the sample belongs to the *A. hyperacanthum* Zone based on the common occurrence of the eponymous species. A position low in this zone is favoured by the abundant occurrence of *Glaphyrocysta retiintexta* and absence of *Fibrocysta bipolaris* or any species of *Kenleyia*. The *A. hyperacanthum* Zone has not previously been found in the Blackback field, and its closest known occurrence is in the Mackerel field, where it has been recorded from Mackerel–2 between 2397.3 and 2398.5m, and from Mackerel–3 at 2408.8m.

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Table 2: Interpretative data from Blackback A-1A Production well.

Sample	Depth Metres	Spore-Pollen Zone (Microplankton Zone)	CR*	Comments and Key Species Present
Core-1 Plug# 18C	3173.5	Middle *N. asperus* (*C. incompositum*)	A1 A2	MP >15%. *Nothofagidites* >25% Index species present are microplankton *Corrudinium incompositum* and *Tritonites spinosus* and spore-pollen *Aglaoreidia qualumis.*
Core-1 Plug# 52C	3176.3	Lower *N. asperus* (*E. partridgei*)	A1 A2	MP >45%. *Nothofagidites* >30% Index species include microplankton *Enneadocysta partridgei, Tritonites tricornus* and *T. pandus* and spore-pollen *Tricolpites simatus.* Reworked Early Eocene dinoflagellates are conspicuous.
Core-1 Plug# 66C	3177.5	Lower *N. asperus* (*E. partridgei*)	A1 A2	MP ~50%. *Nothofagidites* >30% Index species include microplankton *Arachnodinium antarcticum, E. partridgei, T. tricornus* and *T. pandus.* Spore-pollen include FAD of *Nothofagidites falcatus.* Reworked Early Eocene dinoflagellates again conspicuous.
Core-1 Plug# 74C	3178.1	Upper *L. balmei* (lower part of *A. hyperacanthum*)	A1 A1	MP 45%. *Nothofagidites* <15% Sample contains LADs of spore-pollen *Lygistepollenites balmei, Gambierina rudata, G. edwardsii* and *Polycolpites langstonii.* Index microplankton *Apectodinium hyperacanthum* frequent.

MP %= microplankton expressed as % of combined SP & MP count.
Nothofagidites % = abundance expressed as % of SP count only.

***Confidence Ratings used in STRATDAT data base.**

Alpha codes: Linked to sample type		**Numeric codes:** Linked to fossil assemblage		
A	Core	**1**	**Excellent confidence:**	High diversity assemblage recorded with key zone species.
B	Sidewall core	**2**	**Good confidence:**	Moderately diverse assemblage recorded with key zone species.
C	Coal cuttings	**3**	**Fair confidence:**	Low diversity assemblage recorded with key zone species.
D	Ditch cuttings	**4**	**Poor confidence:**	Moderate to high diversity assemblage recorded without key zone species.
E	Junk basket	**5**	**Very low confidence:**	Low diversity assemblage recorded without key zone species.
F	Miscellaneous/unknown			
G	Outcrop			

BASIC DATA

Table 3: Basic sample data from Blackback A–1A Production well.

Sample Type	Depth metres	Lithology	Wt (g)
Core–1 Plug# 18C	3173.5	Medium grey siltstone.	28.6
Core–1 Plug# 52C	3176.3	Dark green-grey glauconitic sandstone.	25.7
Core–1 Plug# 66C	3177.5	Dark green-grey glauconitic sandstone with quartz pebbles up to 5mm diam.	24.6
Core–1 Plug# 74C	3178.1	Medium grey glauconitic sandstone, with <10% glauconite.	47.3

Table 4: Basic assemblage data from Blackback A–1A Production well.

Sample Type	Depth metres	Visual Yield	Palynomorph Concentration	Preservation	No. SP Spp.	No. MP Spp.
Core–1 Plug# 18C	3173.5	Moderate	High	Poor–good	36+	10+
Core–1 Plug# 52C	3176.3	Low	High	Poor–fair	26+	17+
Core–1 Plug# 66C	3177.5	Low	High	Poor–fair	22+	16+
Core–1 Plug# 74C	3178.1	Low-moderate	High	Good	33+	13+
				Averages:	**29+**	**14+**

SAMPLE TYPE	DEPTHS IN METRES	*Clavifera triplex*	*Foveotriletes balteus*	*Gambierina edwardsii*	*Gambierina rudata*	*Lygistepollenites balmei*	*Nothofagidites endurus*	*Peninsulapollis gillii*	*Peromonolites vellosus*	*Phyllocadidites reticulosaccatus*	*Polycolpites langstonii*	*Proteacidites adenanthoides*	*Stereisporites australis*	*Tripunctisporis maastrichtiensis*	*Dilwynites tuberculatus*	*Parvisaccites catastus*	*Araucariacites australis*	*Baculatisporites* spp.	*Cyathidites paleospora*	*Cyathidites splendens*	*Dilwynites granulatus*	*Gleicheniidites circinidites*	*Haloragacidites harrisii*	*Laevigatosporites ovatus*	*Lygistepollenites florinii*	*Microcachryidites antarcticus*	*Nothofagidites brachyspinulosus*	*Nothofagidites emarcidus/heterus*	*Phyllocladidites mawsonii*	*Podocarpidites* spp.	*Proteacidites* spp.	*Retitriletes* spp.	*Stereisporites antiquisporites*	*Trichotomosulcites subgranulatus*
Core	3173.50																C	X	C	X	F	F	F	C	F	F	X	A	C	C	C	X	X	X
Core	3176.30															X	X	X	C	F	•	X	C	F	X	•	X	A	X	F	C	•	X	X
Core	3177.50														C	•	X	•	C	•	C	X	C	F	X	•	X	A	C	F	C	•	•	•
Core	3178.10	X	X	X	X	C	X	X	X	X	X	X	X	X	X	X	X	X	C	X	A	C	F	X	X	C	C	F	X	A	X	X	X	X

SAMPLE TYPE	DEPTHS IN METRES	*Intratriporopollenites notabilis*	*Ischyosporites gremius*	*Nothofagidites falcatus*	*Periporopollenites demarcatus*	*Proteacidites differentipollis*	*Proteacidites pseudomoides*	*Cupanieidites orthoteichus*	*Malvacipollis subtilis*	*Nothofagidites deminutus*	*Nothofagidites vansteenisii*	*Myrtaceidites parvus*	*Proteacidites crassus*	*Proteacidites pachypolis*	*Tricolpites simatus*	*Nothofagidites asperus*	*Nothofagidites flemingii*	*Aglaoreidia qualumis*	*Cupressacites* sp.	*Ericipites crassiexinus*	*Foveotriletes balteus*	*Herkosporites elliottii*	*Ischyosporites irregularis* ms	*Matonisporites ornamentalis*	*Nothofagidites flemingii*	*Polypodiidites perverrucatus*	*Proteacidites lapis* ms	*Proteacidites obscurus*	*Proteacidites truncatus*	*Verrucosisporites cristatus*	*Verrucosisporites kopukuensis*	Fungal spores and hyphae
Core	3173.50									X	X					X	C	X	X	X	X	F	F	X	X	X	X	X	X	X	X	C
Core	3176.30							X	F	X	F	F	X	X	X	F	X															C
Core	3177.50	W	X	X	X	X	X	X	F	F	X																					X
Core	3178.10																															X

Table-5: Distribution of spore-pollen species and fungal remains in Blackback A-1A Production Well.

Legend:
- A = Abundant
- C = Common
- F = Frequent
- X = Present
- W = Reworked
- • = Not present

SAMPLE TYPE	DEPTHS IN METRES	*Deflandrea medcalfii*	*Fromea laevigata*	*Glaphyrocysta retiintexta*	*Impagidinium maculatum*	*Paralecaniella indentata*	*Spinidinium* spp.	*Apectodinium hyperacanthum*	*Palaeocystodinium golzowense*	*Cordosphaeridium inodes*	*Pyxidinopsis waiparaensis*	*Deflandrea* sp. indent.	*Operculodinium centrocarpum*	*Spiniferites* spp.	*Arachnodinium antarcticum*	*Impagidinium* spp.	*Tritonites asteris*	*Deflandrea antarctica*	*Enneadocysta partridgei*	*Enneadocysta* sp. cf. *E. arcuatum*	*Homotryblium tasmaniense*	*Tectatodinium marlum* ms	*Trionites tricornus*	*Tritonites pandus*	*Vozznenikovia apertura*	*Botryococcus braunii*	*Achomosphaera* sp.	*Alisocysta* sp. cf *A. circumtabulata*	*Corrudinium corrugatum* ms	*Systematophora placacantha*	*Fromea bubbly* ms	*Cooksonidium capricornum*	*Corrudinium incompositum*	*Deflandrea* sp. cf. *D. heterophlycta*	*Stoveracysta* sp. cf *S. kakanuiensis*	*Tritonites spinosus*	Scolecodont
Core–1	3173.50											X	C	X												C					C	X	X	X	C	X	X
Core–1	3176.30									X	X	F	F	X				X	C	X	W	X	F	C	C	•	X	X	cf	X	cf						
Core–1	3177.50							W	X	•	X	X	X	X	X	X	cf	X	A	X	W	X	C	F	C	X											
Core–1	3178.10	C	X	A	C	X	X	C	X	X	X	X	X	C																							

Table-6: Distribution of microplankton and algal palynomorphs in Blackback A–1A Production Well.

Legend:
- A = Abundant
- C = Common
- F = Frequent
- X = Present
- W = Reworked
- • = Not present

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19 September 1999

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BLACKBACK A-1A PRODUCTION WELL PROVISIONAL REPORT NO. 2

Sample	Depth Metres	Spore-Pollen Zone (Microplankton Zone)	Comments
Core-1 Plug# 18C	3173.5	Middle *N. asperus* (*C. incompositum*) **LATE EOCENE**	Key microplankton include *Corrudinium incompositum* and *Tritonites spinosus*. Spore-pollen diverse with common *Nothofagidites* spp..
Core-1 Plug# 52C	3176.3	Lower *N. asperus* (*E. partridgei*) **MIDDLE EOCENE**	Key microplankton include *Enneadocysta partridgei*, *Tritonites tricornus* and *T. pandus*. Spore-pollen relatively rare but include *Tricolpites simatus*. Reworked Early Eocene dinoflagellates are common.
Core-1 Plug# 66C	3177.5	Lower *N. asperus* (*E. partridgei*) **MIDDLE EOCENE**	Key microplankton present include *Arachnodinium antarcticum*, *E. partridgei*, *T. tricornus* and *T. pandus*. Spore-pollen include FAD of *Nothofagidites falcatus*.
Core-1 Plug# 74C	3178.1	Upper *L. balmei* (Lower *Apectodinium hyperacanthum*) **LATEST PALEOCENE**	Sample contains LADs of *Lygistepollenites balmei*, *Gambierina rudata*, *G. edwardsii* and *Polycolpites langstonii*. Index microplankton *Apectodinium hyperacanthum* frequent.

LAD = Last Appearance Datum FAD = First Appearance Datum

Discussion: The top three samples are interpreted to be part of the Eocene channel fill. Although the assemblages are lean they contain moderately diverse spore-pollen and microplankton assemblages, mixed with significant reworking, mostly of palynomorphs from the missing Early Eocene section. The bottom sample gave an unexpected latest Paleocene age not previously recorded from any other well in the Blackback field. The combination of numerous index species of the *L. balmei* Zone with good specimens of *Apectodinium hyperacanthum* place the sample firmly in the Lower part of the *A. hyperacanthum* Zone.

Two unconformities representing multiple sequences boundaries are interpreted in the section. The shallowest is between the core samples at 3173.85m (analysed in previous report) and 3176.3m. The deeper is between 3177.5m and 3178.1m.

Prepared by

Alan Partridge

Alan D. Partridge

Palynological Analysis of eight Core Samples From the Blackback A-1A Production Well, Gippsland Basin

by

Alan D. Partridge

Biostrata Pty Ltd
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Biostrata Report 1999/5

1 July 1999

Palynological analysis of eight core samples from the Blackback 1A Production well, Gippsland Basin.

by Alan D. Partridge

INTERPRETATIVE DATA

Summary

Eight core samples were examined over a 26 metre interval between 3172 and 3198 metres in the Blackback 1A Production well to provide zone and age determinations. Although the palynological residues recovered from all samples were lean, sufficient palynomorphs were recovered to assign the top two samples between 3172 and 3173.85 metres to the Eocene channel fill sediments (Middle *N. asperus* Zone), and the bottom six samples between 3178.85 and 3198 metres to the older Paleocene channel fill sediments (Upper *L. balmei* Zone). Most samples contained abundant marine organic-walled microplankton indicative of a distal marine environment of deposition. The spore-pollen assemblages from the Paleocene samples also contained abundant *Dilwynites* pollen interpreted to represent a Neves effect, and to also indicate a distal marine environment of deposition. Based on the microplankton the Paleocene section can be assigned to the *Apectodinium reburrus* Zone[1], while the younger Eocene section probably belongs to the *Corrudinium incompositum* Zone. Precise age of the latter is complicated by the presence of common Early Eocene reworking in the top two samples derived from the older *Homotryblium tasmaniense* microplankton Zone. Source of this reworking has previously been speculated to lie to the southwest of the Blackback field (Partridge & Hannah, 1990).

Table 1: Palynological Summary of Blackback 1A Production well.

AGE	UNIT/FACIES	SPORE-POLLEN ZONES (MICROPLANKTON ZONES)	DEPTHS mKB
LATE EOCENE	LATROBE GROUP Eocene channel fill	Middle *N. asperus*	3172-3173.85m
PALEOCENE	LATROBE GROUP Paleocene channel fill	Upper *L. balmei* (*A. reburrus*)	3178.85–3198m

[1] In work in progress it is planned to change the name of the informal *Apectodinium homomorphum* Zone to the *Apectodinium reburrus* Acme Zone. This change is necessary because the former name has been incorrectly applied.

Introduction

The eight samples were sent by courier directly to Laola Pty Ltd in Perth for palynological processing on Monday 21st June and returned to the author for examination and preparation of a Provisional Palynological Report on Thursday 24th June 1999.

Because results of the analysis was required urgently, and previous palynological studies of wells is the Blackback field had always resulted in very low recovery of palynological residues from sediments near the top of the Latrobe Group, a variation to the normal preparation procedures was requested. This involved, skipping the production of unoxidised kerogen slides and giving the samples a nitric acid oxidation before the heavy liquid separation and concentration of the organic matter. It was hoped by this procedure to remove any pyrite embedded in the palynomorphs and thereby increase the potential yield. The change was successful to the extent that all sample gave workable assemblages, however, the overall yields were still very low and this has meant that only low to moderate diversity assemblages could be recorded.

Preservation of the samples was also considered poor, owing partly to the rushed preparation but also because the samples were not given enough oxidation. From previous palynological work conducted on the cores from Hapuku-1 it is anticipated that more diverse and better preserved assemblages could certainly be extracted from the cores in the new production well, provided time was available for more careful preparation of the samples.

Details of zone assignments, confidence ratings and key comments are given in Table 2, residues yields, preservation and recorded species diversity are provided in Table 3, and distribution of the spore-pollen and microplankton in the samples are arranged in order of oldest occurrence on Tables 4 and 5. Author citations for spore-pollen species can be sourced from Stover & Partridge (1973, 1982), and for the microplankton from the index of Williams *et al.* (1998). Species names followed by "ms" are unpublished manuscript names.

Discussion of Assemblages

Middle *Nothofagidites asperus* Spore-Pollen Zone

Interval: 3172-3173.85 metres

Age: Late Eocene

The shallowest two samples gave the lowest yields but clearly belong to the broad *N. asperus* Zone of Stover & Evans (1974) based on frequent to abundant *Nothofagidites* pollen. Assignment to the Middle subzone is based on the presence

of *Aglaoreidia qualumis* in the deeper sample and *Proteacidites rectomarginis* in the shallower sample following ranges in Stover & Partridge (1973, 1982). The associated microplankton assemblages are characterised by common to abundant *Spiniferites* species but unfortunately lacks zone species. A position high in the Late Eocene is favoured by the presence of *Deflandrea* sp. nov. cf *D. heterophlycta*. This assemblage would equate to the *Corrudinium incompositum* microplankton Zone of Harris (1985), but the index species for that zone was only tentatively identified. As the microplankton represent over 50% of the palynomorphs in the assemblages the environment of deposition is interpreted as distal marine.

Late Eocene sediments have previously be identified in the adjacent wells Blackback–1 between 2903–2911.41mMDKB, Blackback–1 Sidetrack–1 between 2897–2912.8mMDKB (Partridge & Hannah, 1990), and Blackback–3 between 2835–2850mMDKB (Partridge, 1994).

The two new samples analysed here and the Late Eocene assemblages previously recorded from the Blackback–1 and 3 wells are all characterised by presence of reworked spores, pollen and microplankton of Maastrichtian to Early Eocene age. As the most abundantly reworked species is *Homotryblium tasmaniense* most of the reworking is interpreted to be Early Eocene in age. Assemblages of this latter age with common *H. tasmaniense* have been recorded to the southwest of the Blackback field in the Athene–1 and Helios–1 wells (Partridge & Hannah, 1990).

***Lygistepollenites balmei* Spore-Pollen Zone**
and
***Apectodinium reburrus* Microplankton Zone**
Interval: 3178.85–3198 metres
Age: Late Paleocene.

The six deeper core samples are confidently assigned to the *L. balmei* Zone on frequent to common occurrence of the eponymous species associated the rare specimens of *Australopollis obscurus*, *Gambierina edwardsii* and *G. rudata*. All of the interval is also interpreted to belong to the Upper subzone based on the presence of *Proteacidites grandis* at 3188m and *P. annularis* at 3178.85m, and absence of *Proteacidites angulatus* in all samples. The spore-pollen assemblages are dominated by gymnosperm pollen of *Dilwynites* (~15% to 40%) and *Podocarpidites* (~15% to 45%), the abundances of which are interpreted to be the manifestation of a Neves effect (Traverse, 1988; Partridge, 1996, fig.2), and therefore indicative of deposition in a distal offshore environment.

The deeper samples are also assigned to the *Apectodinium reburrus* microplankton Zone based on the rare to common occurrence of the eponymous species in combination with *Deflandrea medcalfii*, *Diphyes colligerum* and *Rivernookia septata*. This zone was previously called the *Apectodinium homomorphum* based on an abundance or acme of what was considered to be a short spined variety of *A. homomorphum*. Recent morphological studies of these species have indicated that the identification cannot be maintained and *Apectodinium reburrus* sp. nov. is proposed as a replacement name. As the microplankton represent between ~8% to >50% of the palynomorphs in the assemblages the environment of deposition is interpreted as distal marine.

Late Paleocene sediments of equivalent age have previously been identified in the adjacent wells Hapuku–1 between 2815–2824mMDKB (Partridge, 1975), and Blackback–2 between 2835.5–2839.5mMDKB (Partridge, 1993).

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Table 2: Interpretative data from Blackback 1A Production well.

Sample	Depth Metres	Spore-Pollen Zone (Microplankton Zone)	CR*	Comments and Key Species Present
Core	3172	Middle *N. asperus*	A3	MP >50%. *Nothofagidites* >20%. *Proteacidites rectomarginis* present.
Core	3173.85	Middle *N. asperus*	A3	MP >50%. *Nothofagidites* >30%. *Aglaoreidia qualumis* present.
Core	3178.85	Upper *L. balmei* (*A. reburrus*)	A2 A3	MP ~40%. *Proteacidites annularis* present. *Deflandrea medcalfii* >30% of microplankton.
Core	3182	Upper *L. balmei* (*A. reburrus*)	A4 A3	MP >50%. *Diphyes colligerum* present.
Core	3188	Upper *L. balmei* (*A. reburrus*)	A2 A2	MP ~30% *Gambierina rudata* and *Proteacidites grandis* present.
Core	3192	Upper *L. balmei* (*A. reburrus*)	A4 A2	MP >50% *Gambierina edwardsii* and *Palaeocystodinium australinum* present.
Core	3194	Upper *L. balmei* (*A. reburrus*)	A4 A3	MP ~40%. *Australopollis obscurus* present. *Dilwynites* ~30%.
Core	3198	Upper *L. balmei* (*A. reburrus*)	A4 A3	MP <10%. *Lygistepollenites balmei* frequent. Strong Neves effect with *Dilwynites* >30%.

*Confidence Ratings used in STRATDAT data base.

Alpha codes: Linked to sample type		**Numeric codes:** Linked to fossil assemblage		
A	Core	**1**	**Excellent confidence:**	High diversity assemblage recorded with key zone species.
B	Sidewall core	**2**	**Good confidence:**	Moderately diverse assemblage recorded with key zone species.
C	Coal cuttings	**3**	**Fair confidence:**	Low diversity assemblage recorded with key zone species.
D	Ditch cuttings	**4**	**Poor confidence:**	Moderate to high diversity assemblage recorded without key zone species.
E	Junk basket	**5**	**Very low confidence:**	Low diversity assemblage recorded without key zone species.
F	Miscellaneous/unknown			
G	Outcrop			

Table 3: Basic data from Blackback 1A Production well.

Sample Type	Depth metres	Visual Yield	Palynomorph Concentration	Preservation	No. SP Spp.	No. MP Spp.
Core	3172	Low	Low	Poor	18+	10+
Core	3173.85	Low	Very low	Poor	17+	20+
Core	3178.85	Low	Low	Poor	19+	9+
Core	3182	Low	Low	Poor	20+	8+
Core	3188	Low	Low	Poor	16+	12+
Core	3192	Low	Low	Poor	15+	13+
Core	3194	Low	Very low	Poor	13+	7+
Core	3198	Low	Low-Moderate	Poor	12+	5+
				Averages:	**16+**	**10+**

SAMPLE TYPE	DEPTHS IN METRES	*Camarozonosporites heskermensis*	*Peninsulapollis gillii*	*Lygistepollenites balmei*	*Lygistepollenites florinii*	*Microcachryidites antacticus*	*Nothofagidites brachyspinulosus*	*Araucariacites australis*	*Cyathidites paleospora*	*Dilwynites granulatus*	*Phyllocladidites mawsonii*	*Podocarpidites* spp.	*Proteacidites* spp.	*Australopollis obscurus*	*Clavifera triplex*	*Laevigatosporites ovatus*	*Gleicheniidites circinidites*
Core	3172.00							C	A	F	F	C	X				X
Core	3173.85							C	C	F	F	C	•			F	•
Core	3178.85			X	X	X	X	X	X	A	X	A	F			X	X
Core	3182.00		X	F	X	X	•	X	X	A	X	A	X		X	X	X
Core	3188.00		•	C	F	F	•	X	F	C	X	A	X		X	•	F
Core	3192.00		•	F	X	F	X	X	F	C	F	A	X		•	•	X
Core	3194.00		•	F	F	X	•	X	X	A	X	C	•	X	X	X	X
Core	3198.00	X	X	F	X	X	X	X	X	A	F	A	X				

SAMPLE TYPE	DEPTHS IN METRES	*Herkosporites elliottii*	*Trichotomosulcites subgranulatus*	*Gambierina edwardsii*	*Baculatisporites* spp.	*Dacrycarpites australiensis*	*Gambierina rudata*	*Proteacidites adenanthoides*	*Proteacidites grandis*	*Cyathidites splendens*	*Dicotetradites clavatus*	*Reitriletes* spp.	*Dilwynites tuberculatus*	*Haloragacidites harrisii*	*Nothofagidites emarcidus/heturus*	*Laevigatosporites major*	*Periporopollenites polyoratus*
Core	3172.00	X			X								X	X	F		
Core	3173.85	•			•					X			•	C	A		
Core	3178.85	•			X					•		X	•	•	X	X	X
Core	3182.00	•			X					X	X	X	X	X	X		
Core	3188.00	•			•	X	X	X	X	X							
Core	3192.00	X	X	X	X												
Core	3194.00	X															
Core	3198.00																

SAMPLE TYPE	DEPTHS IN METRES	*Proteacidites annularis*	*Nothofagidites flemingii*	*Aglaoreidia qualumis*	*Ischyosporites irregularis* ms	*Malvacipollis robustus* ms	*Malvacipollis subtilis*	*Nothofagidites asperus*	*Myrtaceidites parvus*	*Nothofagidites falcatus*	*Nothofagidites deminutus*	*Proteacidites recavus*	*Verrucosisporites kopukuensis*	*Proteacidites rectomarginis*	*Corollina torosa* RW	Fungal spores and hyphae	*Persavis tagluensis*
Core	3172.00		F								X	X	X	X	W	X	
Core	3173.85		•	X	X	X	X	X	X	X	X					X	
Core	3178.85	X	X													X	
Core	3182.00															X	
Core	3188.00															X	X
Core	3192.00															X	
Core	3194.00															X	
Core	3198.00															X	

Table-4: Distribution of spore-pollen species and fungal remains in Blackback 1A Production Well.

Legend:
- A = Abundant
- C = Common
- F = Frequent
- X = Present
- W = Reworked
- • = Not present

SAMPLE TYPE	DEPTHS IN METRES	*Hystiocysta variata* ms	*Apectodinium reburrus* ms	*Deflandrea* sp. indent.	*Impagidinium* spp.	*Operculodinium centrocarpum*	*Areligera senonensis*	*Palaeocystodinium golzowense*	*Senegalinium dilwynense*	*Achomosphaera crassipellis*	*Deflandrea medcalfii*	*Spiniferites* spp.	*Rivernookia septata*	*Apectodinium hyperacanthum*	*Deflandrea dartmooria*	*Palaeocystodinium australinum*	*Spinidinium* spp.	*Amosopollis cruciformis*	*Fromea laevigata*	*Cordosphaeridium inodes*	*Glaphyrocysta retiintexta*	*Diphyes colligerum*	*Pyxidinopsis waiparaensis*	*Tubulifera heterosolenia*	*Corrudinium incompositum*	*Crassosphaera concinnia*	*Deflandrea truncata*	*Corrudinium corrugatum* ms	*Enneadocysta* sp. cf. *E. arcuatum*	*Fromea bubbly* ms	*Hystrichokolpoma rigaudiae*	*Hystrichokolpoma wilsonii*	*Impagidinium dispertitum*	*Phthanoperidinium* sp.	*Samlandia reticulifera*	*Systematophora placacantha*	*Homotryblium tasmaniense*	*Lingulodinium machaerophorum*	*Nematosphaeropsis balcombiana*	*Deflandrea* sp. cf. *D. heterophlycta*	*Phthanoperidinium comatum*	*Manumiella* sp.	Microforaminiferal liner	Scolecodont
Core	3172.00			X	X	C						A																									W	C	X	X	X	W	X	X
Core	3173.85			X	•	F						C								X	W				cf	X	W	X	X	F	X	W	X	X	X	X	W	F	X					
Core	3178.85		X	•	•	C					A	X						X		•	X	X	X	X																			•	
Core	3182.00		C	•	•	F					C	F					X	•		X	A	X																					•	
Core	3188.00	X	C	X	•	X			F	X	C	X					X	•	X	F	F																						•	
Core	3192.00	•	F	X	•	F	A	X	•	•	X	X	X	cf	X	X	X	X																									•	
Core	3194.00	•	X	•	•	•	X	X	F	X	X	F																															X	
Core	3198.00	X	X	X	X	X																																					X	

Table-5: Distribution of microplankton species and other marine palynomorphs in Blackback 1A Production Well.

Legend:
- A = Abundant
- C = Common
- F = Frequent
- X = Present
- W = Reworked
- • = Not present

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24 June 1999

Our ref: PR99/05

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BLACKBACK 1A PRODUCTION WELL PROVISIONAL REPORT NO. 1

Sample	Depth Metres	Spore-Pollen Zone (Microplankton Zone)	Comments and Key Species Present
Core	3172	Middle to Upper *N. asperus*	Microplankton >50%. *Nothofagidites* spp. >20%. *Proteacidites rectomarginis* present.
Core	3173.85	Middle *N. asperus*	Microplankton >50%. *Nothofagidites* spp. >30%. *Aglaoreidia qualumis* present. Reworked Early Eocene dinoflagellates are common.
Core	3178.85	Upper *L. balmei*	Microplankton <40%. *Lygistepollenites balmei* present. Strong Neves effect with *Dilwynites* >35%. *Deflandrea medcalfii* >30% of microplankton.
Core	3182.0	*L. balmei* (*A. reburrus*)	Microplankton <40%. *Lygistepollenites balmei* present.
Core	3188	Upper *L. balmei*	*Proteacidites grandis* present.
Core	3192	*L. balmei*	*Palaeocystodinium golzowense* present.
Core	3194	*L. balmei* (*A. reburrus*)	Microplankton <40%. *Lygistepollenites balmei* frequent. *Australopollis obscurus* present. *Dilwynites* ~30%.
Core	3198	*L. balmei* (*A. reburrus*)	Microplankton <10%. *Lygistepollenites balmei* frequent. Strong Neves effect with *Dilwynites* >30%.

Discussion: The top two samples are interpreted to be part of the Eocene channel fill previously found in the Blackback–1 exploration well. The assemblages are very lean and contain a mixture of Late Eocene and reworked Early Eocene palynomorphs.

The bottom six samples are all interpreted to be part of the Paleocene channel fill previously found in Hapuku–1. They belong to the Upper *L. balmei* SP Zone and *A. reburrus* MP Zone (= formerly the *A. homomorphum* Zone). These assemblages contain moderately abundant microplankton and common to abundant *Dilwynites* pollen diagnostic of a Neves effect which indicates deposition in a distal marine environment.

Prepared by

Alan Partridge

Alan D. Partridge

907524 100

APPENDIX 6

BLACKBACK A-1A

Checkshot Survey Report

907524 101

Schlumberger Wireline & Testing

Schlumberger Oilfield Australia Pty Limited
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Level 4, 150 Albert Road
South Melbourne Victoria 3205
Ph: (03) 9696 6266 Fax: (03) 9690 0309

ESSO AUSTRALIA LTD

CHECKSHOT PROCESSING REPORT

Vertical Incidence Checkshot Survey

BLACKBACK A-1A

FIELD : BLACKBACK

COUNTRY : AUSTRALIA

COORDINATES : 038 42' 31.677" S
148 33' 01.274" E

CHECKSHOT SURVEY : 23-Jun-1999

REFERENCE No:

INTERVAL : 3170-1250 m MD

Prepared by Henry Cao

CONTENTS

1. Acquisition Summary

The aim of the checkshot survey at Blackback A-1A was to record the vertical transit time from the surface to the downhole tool in the well at 11 different levels. To achieve this, the airgun was suspended from a boat that followed the deviated well trajectory and fired remotely over a radio link.

A single G airgun with a 150 cubic inch chamber was used as the energy source and charged from high pressure bottled nitrogen. The gun was fired at 1800 psi, 6 m below the sea level off the side of the boat.

A CSAT tool was used for downhole data acquisition. The Macha offset shooting equipment (OSE) was used to remotely fire the airgun and return the hydrophone signal to the Maxis logging unit. Pre-job checks determined a 3 msec delay in the hydrophone data transmission over the radio link, so a +3 msec correction has been applied to the raw transit times to compensate for the radio delay.

Navigation was supplied by Esso Australia Limited (see Appendix I). On average, the airgun locations were misplaced to their target positions (the surface projections of the pre-job determined downhole geophone locations) by 2.8 and 6.0 meters in easting (X) and northing (Y), respectively. The standard deviations for the misplacement are 17.2 and 19.5 metres in easting and northing.

By comparing the pre-job target source positions with the surface projections of the actual downhole geophone locations, it was found that most discrepancies between these two were within 10 m. The combined discrepancies (difference between the actual source position and the target source position and that between the target source position and the surface projection of the actual downhole sensor) can yield a maximum TWT difference of 0.3 ms from the true vertical TWT. Therefore, all the data meet the accuracy requirement.

2. Processing Sequence

1. Re-stack data using radio hydrophone channels as zero time reference. The break times from these stacks are very close (within 0.5 ms) to those shown on the field acquisition log print except for levels at 1970 and 2570 m MD where the Maxis picked earlier on the reference hydrophone channels.
2. Add 3 msec to the one way times to compensate for radio delay.
3. Enter surface gun co-ordinates, gun depth and hydrophone depth. The gun depth was 6 metres below sea level and the hydrophone depth was 4.5 metres below sea level.
4. Enter well deviation and inclination data. The true vertical depths are computed using the "minimum radius of curvature" method.
5. Compute vertical transit times based on the survey geometry. Interval velocities are derived from the vertical transit times and TVD's.

Table 1 lists the key parameters and result of the checkshot survey. Figure 1 shows the stacked Z-component data. The X and Y data were recorded but not required for checkshot processing so are not displayed. Figure 2 displays TWT and interval velocity computed from checkshot corrected transit times

Table 1 Listing of key parameters for the checkshot survey

MD (m)	R_X (m)	R_Y (m)	R_Z (m)	S_X (m)	S_Y (m)	S_Z (m)	TT (s)	TWT (s)	Velocity (m/s)
421			395			6	0.2553	0.5266	1500
1250	635353	5733095	1151	635353	5733095	6	0.5712	1.1585	2393
1370	635347	5733195	1216	635347	5733205	6	0.5956	1.2073	2663
1570	635362	5733343	1350	635362	5733343	6	0.6417	1.2993	2912
1770	635397	5733441	1519	635397	5733440	6	0.6931	1.4021	3287
1970	635459	5733471	1715	635459	5733471	6	0.7472	1.5104	3621
2170	635527	5733448	1892	635527	5733448	6	0.7986	1.6132	3443
2370	635598	5733421	2077	635597	5733421	6	0.8513	1.7186	3511
2570	635671	5733392	2261	635670	5733391	6	0.8961	1.8082	4109
2770	635742	5733360	2445	635742	5733360	6	0.9444	1.9047	3811
2970	635817	5733326	2628	635816	5733326	6	1.0075	2.0310	2898
3170	635893	5733288	2809	635893	5733288	6	1.0696	2.1553	2914

Note that MD stands for measured depth, R and S for receiver and source, and X, Y and Z are easting, northing and TVD depth from MSL respectively. TT stands for transit time, a time difference between the arrival times at the hydrophone and downhole geophone. TWT is the two way time for a seismic wave traveling from the surface at MSL to the downhole geophone, and back to the mean sea level. Velocity is the interval velocity derived between two neighboring levels.

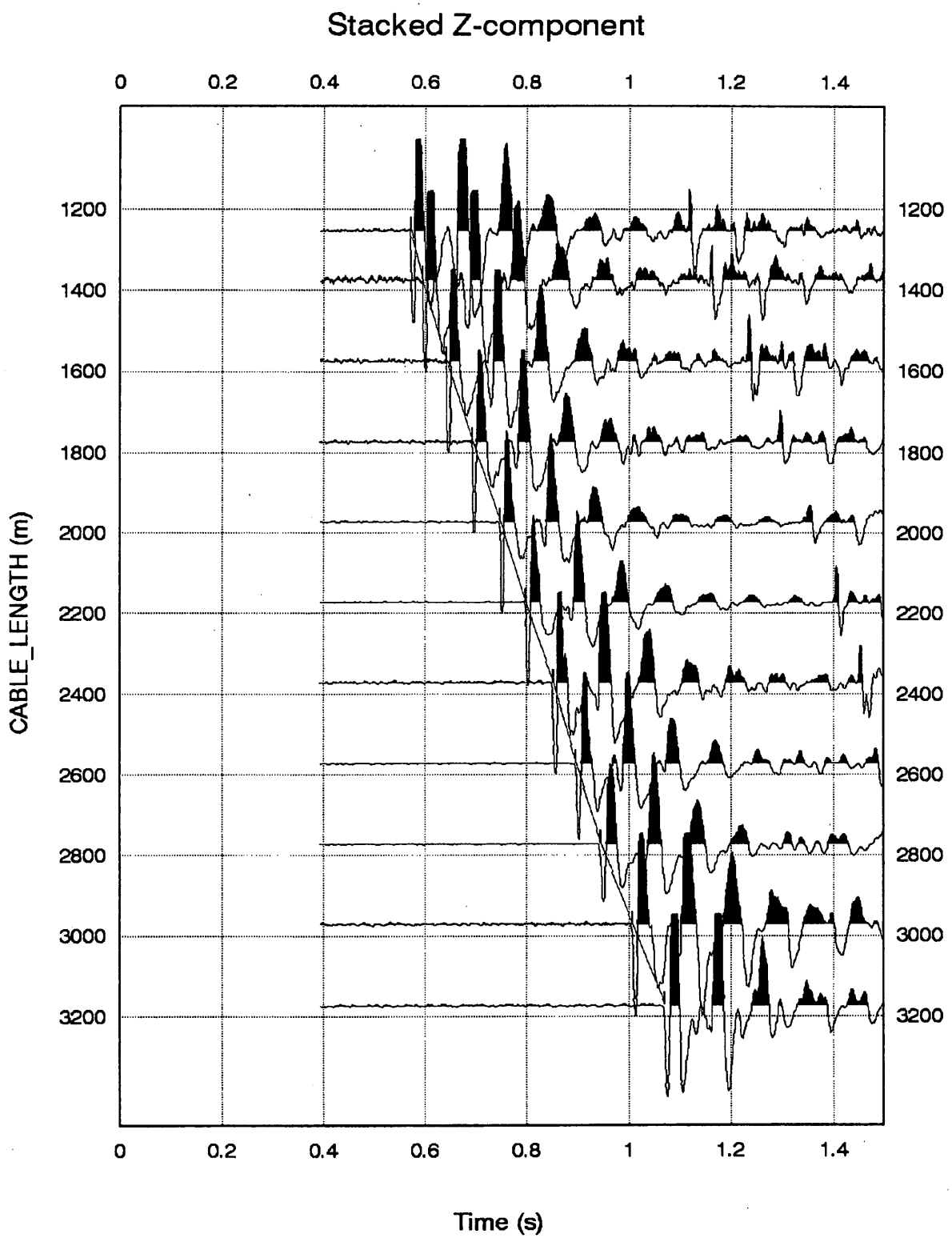
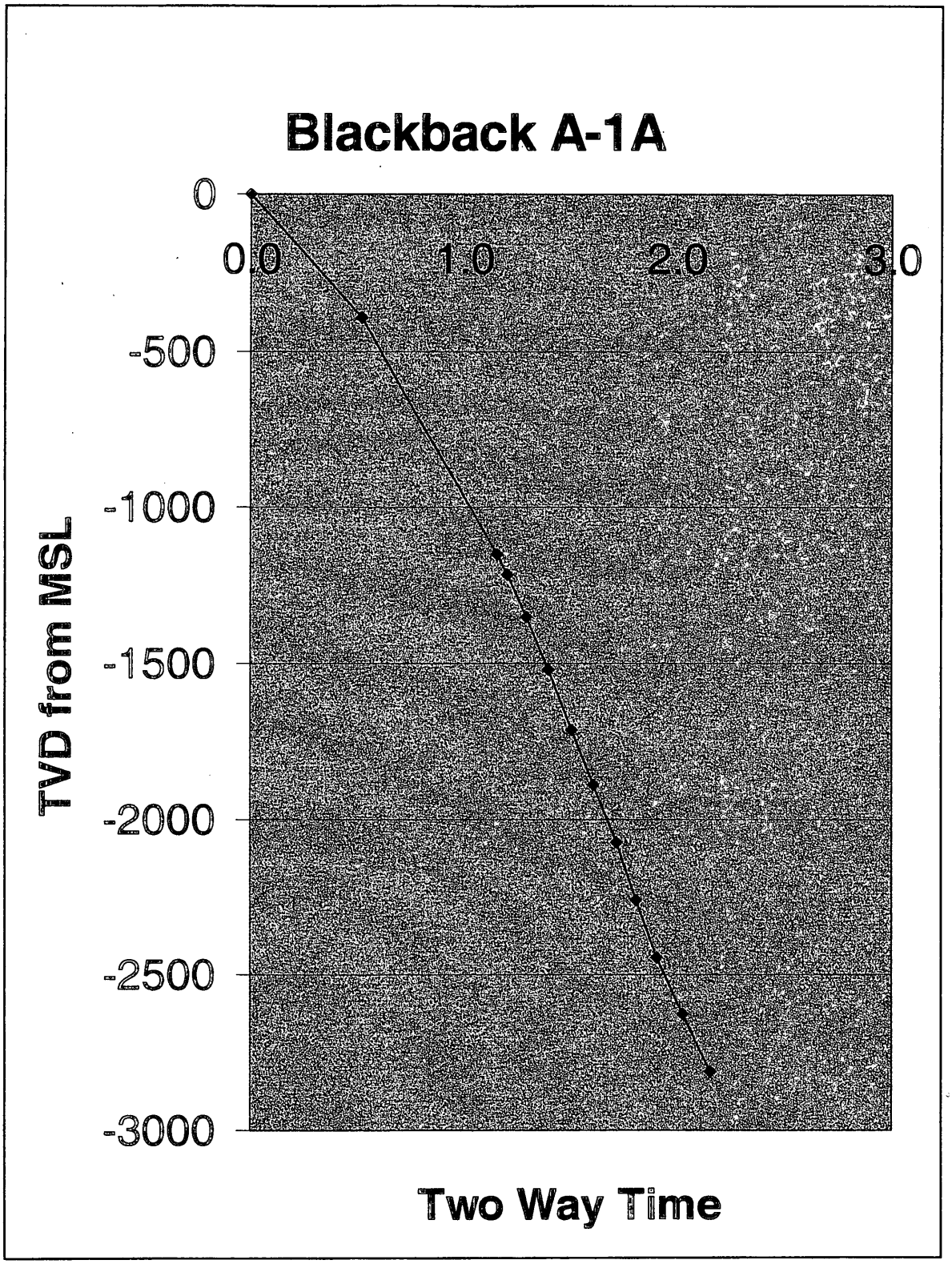
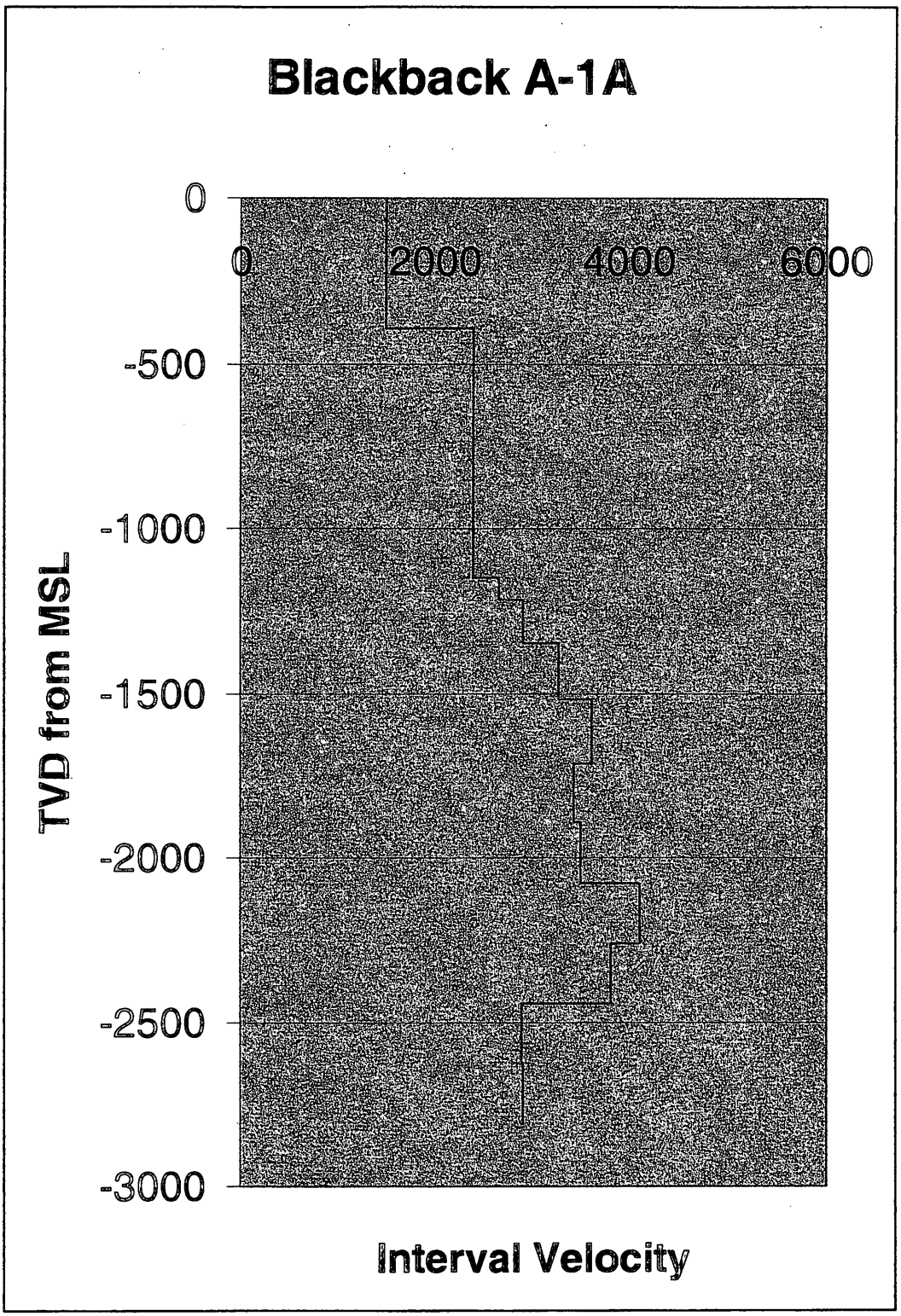


Figure 1. Stacked Z-component data, traces indexed by measured depth


Blackback A-1A
0
0.0
1.0
2.0
3.0
-500
-1000
-1500
-2000
-2500
-3000
TVD from MSL
Two Way Time

(A)



(B)

Figure 2. TWT and Interval Velocity derived from corrected transit times.

A1 Navigation Data for Source Position

Acquisition Geometry Summary for Checkshot Survey at Blackback A-1A

Wellhead Position: 635355.1E 5732873.4N

Location Bass Strait

Client Esso Australia BB A-1A

Navigated By Date 23/06/1999

MD	Shot #	Actual Easting	Northing	Target Easting	Northing	dE	dN
1250	1	635345.2	5733096.6	635353.4	5733094.6	-8.2	2.0
	2	635348.3	5733095.5	635353.4	5733094.6	-5.1	0.9
	3	635341.9	5733090.5	635353.4	5733094.6	-11.5	-4.1
	4	635339.2	5733093.8	635353.4	5733094.6	-14.2	-0.8
	5	635344.3	5733095.6	635353.4	5733094.6	-9.1	1.0
	6	635353.4	5733099.5	635353.4	5733094.6	0.0	4.9
	7	635359.7	5733097.4	635353.4	5733094.6	6.3	2.8
	8	635362.8	5733097.0	635353.4	5733094.6	9.4	2.4
	9	635365.7	5733097.0	635353.4	5733094.6	12.3	2.4
2170	10	635550.8	5733425.1	635527.2	5733448.1	23.6	-23.0
	11	635556.5	5733424.8	635527.2	5733448.1	29.3	-23.3
	12	635551.2	5733425.6	635527.2	5733448.1	24.0	-22.5
	13	635563.2	5733434.1	635527.2	5733448.1	36.0	-14.0
	14	635566.8	5733434.8	635527.2	5733448.1	39.6	-13.3
	15	635548.6	5733438.3	635527.2	5733448.1	21.4	-9.8
3170	16	635901.6	5733291.3	635893.1	5733287.8	8.5	3.5
	17	635916.4	5733303.5	635893.1	5733287.8	23.3	15.7
	18	635920.5	5733294.4	635893.1	5733287.8	27.4	6.6
	19	635925.7	5733244.5	635893.1	5733287.8	32.6	-43.3
	20	635866.5	5733197.5	635893.1	5733287.8	-26.6	-90.3
	21	635915.8	5733206.8	635893.1	5733287.8	22.7	-81.0
	22	635916.1	5733193.1	635893.1	5733287.8	23.0	-94.7
	23	635927.4	5733261.6	635893.1	5733287.8	34.3	-26.2
	24	635924.2	5733260.9	635893.1	5733287.8	31.1	-26.9
2970	25	635804.9	5733306.0	635816.0	5733326.0	-11.1	-20.0
	26	635810.4	5733318.8	635816.0	5733326.0	-5.6	-7.2
	27	635802.2	5733322.2	635816.0	5733326.0	-13.8	-3.8
	28	635803.9	5733336.3	635816.0	5733326.0	-12.1	10.3
2770	29	635733.8	5733389.7	635742.0	5733360.0	-8.2	29.7
	30	635720.8	5733388.3	635742.0	5733360.0	-21.2	28.3
	31	635714.4	5733390.6	635742.0	5733360.0	-27.6	30.6
	32	635724.3	5733369.7	635742.0	5733360.0	-17.7	9.7
	33	635728.4	5733366.8	635742.0	5733360.0	-13.6	6.8
	34	635735.8	5733356.8	635742.0	5733360.0	-6.2	-3.2
	35	635747.0	5733363.0	635742.0	5733360.0	5.0	3.0
	36	635753.0	5733353.4	635742.0	5733360.0	11.0	-6.6
2570	37	635681.2	5733374.4	635670.0	5733391.0	11.2	-16.6
	38	635682.7	5733373.9	635670.0	5733391.0	12.7	-17.1
	39	635683.4	5733375.1	635670.0	5733391.0	13.4	-15.9
	40	635683.7	5733374.3	635670.0	5733391.0	13.7	-16.7
	41	635681.6	5733370.8	635670.0	5733391.0	11.6	-20.2

	42	635683.5	5733372.3	635670.0	5733391.0	13.5	-18.7
	43	635687.6	5733371.7	635670.0	5733391.0	17.6	-19.3
	44	635685.8	5733373.6	635670.0	5733391.0	15.8	-17.4
	45	635684.4	5733384.9	635670.0	5733391.0	14.4	-6.1
2370	46	635577.4	5733418.1	635597.0	5733421.0	-19.6	-2.9
	47	635576.1	5733421.5	635597.0	5733421.0	-20.9	0.5
	48	635574.1	5733424.3	635597.0	5733421.0	-22.9	3.3
	49	635575.4	5733425.2	635597.0	5733421.0	-21.6	4.2
	50	635579.1	5733426.6	635597.0	5733421.0	-17.9	5.6
	51	635586.2	5733422.3	635597.0	5733421.0	-10.8	1.3
	52	635592.6	5733413.3	635597.0	5733421.0	-4.4	-7.7
	53	635589.9	5733407.5	635597.0	5733421.0	-7.1	-13.5
	54	635592.8	5733406.5	635597.0	5733421.0	-4.2	-14.5
2170	55	635530.6	5733439.2	635527.2	5733448.1	3.4	-8.9
	56	635529.2	5733442.0	635527.2	5733448.1	2.0	-6.1
	57	635531.9	5733451.0	635527.2	5733448.1	4.7	2.9
	58	635531.6	5733453.4	635527.2	5733448.1	4.4	5.3
	59	635528.0	5733454.4	635527.2	5733448.1	0.8	6.3
	60	635527.1	5733454.5	635527.2	5733448.1	-0.1	6.4
	61	635524.8	5733454.3	635527.2	5733448.1	-2.4	6.2
	62	635523.7	5733448.7	635527.2	5733448.1	-3.5	0.6
	63	635515.9	5733447.0	635527.2	5733448.1	-11.3	-1.1
	64	635513.8	5733439.7	635527.2	5733448.1	-13.4	-8.4
	65	635520.3	5733436.0	635527.2	5733448.1	-6.9	-12.1
	66	635522.0	5733432.8	635527.2	5733448.1	-5.2	-15.3
	67	635529.1	5733434.2	635527.2	5733448.1	1.9	-13.9
	68	635528.4	5733446.5	635527.2	5733448.1	1.2	-1.6
	69	635525.4	5733464.4	635527.2	5733448.1	-1.8	16.3
	70	635517.8	5733454.3	635527.2	5733448.1	-9.4	6.2
	71	635515.2	5733446.8	635527.2	5733448.1	-12.0	-1.3
	72	635516.9	5733445.7	635527.2	5733448.1	-10.3	-2.4
1970	73	635464.5	5733473.8	635459.0	5733471.0	5.5	2.8
	74	635468.5	5733473.9	635459.0	5733471.0	9.5	2.9
	75	635469.3	5733470.2	635459.0	5733471.0	10.3	-0.8
	76	635476.2	5733460.5	635459.0	5733471.0	17.2	-10.5
	77	635472.8	5733460.7	635459.0	5733471.0	13.8	-10.3
	78	635470.1	5733459.1	635459.0	5733471.0	11.1	-11.9
	79	635468.1	5733460.2	635459.0	5733471.0	9.1	-10.8
	80	635466.0	5733461.7	635459.0	5733471.0	7.0	-9.3
	81	635467.7	5733466.4	635459.0	5733471.0	8.7	-4.6
1770	82	635396.3	5733448.7	635397.0	5733440.0	-0.7	8.7
	83	635385.7	5733436.5	635397.0	5733440.0	-11.3	-3.5
	84	635379.9	5733431.1	635397.0	5733440.0	-17.1	-8.9
	85	635381.5	5733412.6	635397.0	5733440.0	-15.5	-27.4
	86	635379.4	5733416.8	635397.0	5733440.0	-17.6	-23.2
	87	635382.0	5733421.1	635397.0	5733440.0	-15.0	-18.9
	88	635374.5	5733440.9	635397.0	5733440.0	-22.5	0.9
	89	635388.5	5733453.1	635397.0	5733440.0	-8.5	13.1
	90	635380.4	5733441.8	635397.0	5733440.0	-16.6	1.8
	91	635395.2	5733418.1	635397.0	5733440.0	-1.8	-21.9
1570	92	635355.1	5733336.4	635362.0	5733342.0	-6.9	-5.6
	93	635355.3	5733341.3	635362.0	5733342.0	-6.7	-0.7
	94	635355.7	5733344.1	635362.0	5733342.0	-6.3	2.1

	95	635350.4	5733349.1	635362.0	5733342.0	-11.6	7.1
	96	635350.6	5733340.5	635362.0	5733342.0	-11.4	-1.5
	97	635350.7	5733330.4	635362.0	5733342.0	-11.3	-11.6
	98	635358.1	5733338.7	635362.0	5733342.0	-3.9	-3.3
	99	635357.9	5733342.2	635362.0	5733342.0	-4.1	0.2
	100	635354.9	5733337.7	635362.0	5733342.0	-7.1	-4.3
	101	635362.6	5733340.3	635362.0	5733342.0	0.6	-1.7
1370	102	635324.2	5733190.8	635347.0	5733205.0	-22.8	-14.2
	103	635347.1	5733216.2	635347.0	5733205.0	0.1	11.2
	104	635339.5	5733197.4	635347.0	5733205.0	-7.5	-7.6
	105	635341.4	5733191.2	635347.0	5733205.0	-5.6	-13.8
	106	635326.7	5733187.7	635347.0	5733205.0	-20.3	-17.3
	107	635413.2	5733282.3	635347.0	5733205.0	66.2	77.3
	108	635327.3	5733204.4	635347.0	5733205.0	-19.7	-0.6
	109	635342.3	5733211.9	635347.0	5733205.0	-4.7	6.9
	110	635341.8	5733202.8	635347.0	5733205.0	-5.2	-2.2
1250	111	635342.4	5733082.3	635353.4	5733094.6	-11.0	-12.3
	112	635345.3	5733078.3	635353.4	5733094.6	-8.1	-16.3
	113	635363.6	5733079.1	635353.4	5733094.6	10.2	-15.5
	114	635363.2	5733069.4	635353.4	5733094.6	9.8	-25.2
	115	635366.4	5733072.7	635353.4	5733094.6	13.0	-21.9
	116	635362.3	5733075.7	635353.4	5733094.6	8.9	-18.9
	117	635357.0	5733102.1	635353.4	5733094.6	3.6	7.5
	118	635352.6	5733101.3	635353.4	5733094.6	-0.8	6.7
	119	635347.7	5733101.9	635353.4	5733094.6	-5.7	7.3
	120	635348.6	5733112.2	635353.4	5733094.6	-4.8	17.6
	121	635351.2	5733100.0	635353.4	5733094.6	-2.2	5.4
Mean Value						2.8	-6.0
Std Dev						17.2	19.5

A2 Wellbore Trajectory Summary and Downhole Geophone Positions

Client:	Esso Australia Ltd	**Survey Computation Method:**	Minimum Curvature
Field:	BlackBack Gippsland Offshore	**DLS Computation Method:**	Lubinski
Structure:	BlackBack Sedco 702 A-1	**Vertical Section Azimuth:**	54.070°
Well:	A-1	**Vertical Section Origin:**	N 0.000 m, E 0.000 m
Borehole:	A-1A	**TVD Reference:**	Rotary Table
API #:			26.0 m above MSL
Date:	July 08, 1999	**Magnetic Declination:**	13.388°
Grid Convergence:	-0.96788765°	**Total Field Strength:**	60292.708 nT
Scale Factor:	0.99982562	**Dip:**	-69.040°
		Declination Date:	June 15, 1999
Location:	S 38 32 31.677, E 148 33 11.274	**Magnetic Declination Model:**	BGS 1998
:	N 5732873.400 m, E 635355.100 m	**North Reference:**	Grid North
Coordinate System:	UTM Zone 55 S on Australian Datum 1984	**Coordinate Reference To:**	Structure Reference Point

Station	MD (m)	Incl (°)	Azim (°)	TVD (m)	VSec (m)	N/-S (m)	E/-W (m)	DLS (°/30m)	Northing (m)	Easting (m)
Tie-In	0.0	0.00	0.00	0.0	0.0	0.00	0.00	0.00	5732873	635355
	421.0	0.00	118.67	421.0	0.0	0.00	0.00	0.00	5732873	635355
	424.4	0.44	118.67	424.4	0.0	-0.01	0.01	3.88	5732873	635355
	433.9	0.67	118.67	433.9	0.1	-0.05	0.09	0.73	5732873	635355
	443.6	1.22	118.67	443.6	0.1	-0.13	0.23	1.70	5732873	635355
	453.3	1.40	118.67	453.3	0.2	-0.23	0.43	0.56	5732873	635356
	463.0	1.35	118.67	463.0	0.3	-0.35	0.63	0.15	5732873	635356
	472.6	1.94	118.67	472.6	0.4	-0.48	0.87	1.84	5732873	635356
	482.3	1.67	118.67	482.3	0.6	-0.62	1.14	0.84	5732873	635356
	487.0	1.35	118.67	487.0	0.6	-0.68	1.25	2.04	5732873	635356
	491.1	1.06	118.67	491.1	0.7	-0.72	1.33	2.12	5732873	635356
	519.9	0.83	118.67	519.9	0.9	-0.95	1.74	0.24	5732872	635357
	548.9	0.85	112.10	548.9	1.1	-1.13	2.13	0.10	5732872	635357
	578.0	0.76	117.52	578.0	1.3	-1.30	2.50	0.12	5732872	635358
	607.0	0.44	120.87	607.0	1.4	-1.45	2.76	0.33	5732872	635358
	636.1	0.66	122.56	636.1	1.5	-1.60	3.00	0.23	5732872	635358
	650.0	0.56	118.40	650.0	1.6	-1.67	3.13	0.24	5732872	635358
	689.1	1.26	120.18	689.1	1.8	-1.98	3.67	0.54	5732871	635359
	719.2	1.50	65.10	719.2	2.3	-1.98	4.31	1.29	5732871	635359
	748.8	3.53	17.27	748.7	3.4	-0.95	4.93	2.79	5732872	635360
	807.9	6.57	13.29	807.6	7.5	4.08	6.25	1.55	5732877	635361
	838.2	9.51	11.16	837.6	10.6	8.23	7.13	2.93	5732882	635362
	865.4	12.94	8.40	864.3	14.4	13.45	8.01	3.83	5732887	635363
	896.2	16.67	3.22	894.1	19.6	21.28	8.77	3.85	5732895	635364
	924.9	20.03	0.25	921.3	25.1	30.29	9.02	3.65	5732904	635364
	951.8	23.17	359.15	946.3	30.9	40.20	8.96	3.53	5732914	635364
	981.6	25.16	358.42	973.4	37.8	52.37	8.70	2.03	5732926	635364

	1009.8	28.29	359.43	998.6	45.0	65.06	8.47	3.36	5732938	635364
	1038.9	31.04	0.21	1023.9	53.4	79.45	8.43	2.86	5732953	635364
	1067.1	33.93	359.33	1047.8	62.3	94.63	8.36	3.11	5732968	635363
	1096.2	36.75	358.31	1071.4	71.9	111.42	8.01	2.98	5732985	635363
	1127.1	39.69	357.70	1095.7	82.5	130.51	7.34	2.88	5733004	635362
	1155.9	43.87	354.25	1117.2	92.7	149.66	5.97	4.96	5733023	635361
	1183.5	47.66	352.36	1136.5	102.3	169.30	3.65	4.37	5733043	635359
	1212.1	51.37	354.08	1155.0	112.9	190.90	1.10	4.13	5733064	635356
	1242.1	54.60	354.94	1173.1	125.0	214.73	-1.19	3.30	5733088	635354
Level 11	1250.0			1177.5					5733095	635353
	1271.8	57.80	355.55	1189.6	137.8	239.34	-3.24	3.27	5733113	635352
	1289.2	60.26	355.87	1198.5	145.6	254.19	-4.35	4.28	5733128	635351
	1305.6	58.77	355.43	1206.9	153.1	268.31	-5.42	2.81	5733142	635350
	1316.8	56.98	356.26	1212.8	158.0	277.74	-6.11	5.17	5733151	635349
	1326.3	56.12	356.96	1218.1	162.3	285.68	-6.58	3.27	5733159	635349
	1347.0	56.53	357.77	1229.5	171.8	302.87	-7.37	1.14	5733176	635348
	1363.1	56.49	358.75	1238.4	179.3	316.31	-7.78	1.52	5733190	635347
Level 10	1370.0			1242.4					5733195	635347
	1390.8	54.23	0.22	1254.2	192.5	339.11	-7.99	2.77	5733212	635347
	1423.5	51.09	2.35	1274.0	208.2	365.05	-7.42	3.28	5733238	635348
	1451.7	48.62	4.89	1292.2	222.0	386.61	-6.06	3.33	5733260	635349
	1477.9	46.73	7.60	1309.9	235.0	405.88	-3.96	3.15	5733279	635351
	1509.0	44.79	9.23	1331.5	250.5	427.87	-0.71	2.19	5733301	635354
	1536.5	43.39	10.65	1351.3	264.3	446.74	2.59	1.87	5733320	635358
	1565.1	40.78	12.05	1372.5	278.3	465.55	6.36	2.91	5733339	635361
Level 9	1570.0			1376.3					5733342	635362
	1593.9	37.97	12.26	1394.8	291.9	483.39	10.20	2.93	5733357	635365
	1622.7	36.16	13.24	1417.7	304.9	500.29	14.03	1.99	5733374	635369
	1653.6	32.70	17.26	1443.2	318.5	517.17	18.60	4.01	5733390	635374
	1684.0	31.03	21.55	1469.1	331.7	532.31	23.92	2.77	5733406	635379
	1711.3	28.73	25.70	1492.8	343.4	544.77	29.35	3.40	5733418	635384
	1740.5	26.25	29.79	1518.6	355.5	556.68	35.59	3.21	5733430	635391
	1769.0	24.22	34.87	1544.4	366.8	566.97	42.08	3.12	5733440	635397
Level 8	1770.0			1545.3					5733441	635397
	1800.1	22.39	42.33	1573.0	378.6	576.57	49.71	3.35	5733450	635405
	1831.8	21.60	52.57	1602.4	390.3	584.58	58.40	3.70	5733458	635413
	1855.3	20.88	59.61	1624.3	398.8	589.34	65.47	3.37	5733463	635421
	1883.6	20.21	68.69	1650.8	408.6	593.66	74.36	3.45	5733467	635429
	1913.2	20.52	77.41	1678.6	418.3	596.66	84.21	3.08	5733470	635439
	1942.3	20.68	85.05	1705.8	427.4	598.21	94.30	2.78	5733472	635449
Level 7	1970.0			1731.7					5733471	635459
	1970.9	21.09	95.65	1732.5	435.6	598.14	104.45	3.98	5733471	635460
	1999.7	21.50	104.27	1759.4	442.8	596.33	114.72	3.29	5733470	635470

	2026.2	20.95	112.15	1784.1	448.4	593.35	123.82	3.29	5733467	635479
	2054.0	20.92	111.69	1810.1	453.7	589.63	133.05	0.18	5733463	635488
	2081.0	20.87	110.40	1835.3	459.0	586.18	142.03	0.51	5733459	635497
	2106.2	21.51	111.03	1858.8	464.0	582.95	150.55	0.81	5733456	635506
	2136.2	21.18	111.14	1886.7	469.9	579.03	160.73	0.33	5733452	635516
	2164.5	21.12	110.91	1913.1	475.5	575.36	170.27	0.11	5733449	635525
Level 6	2170.0			1918.2					5733448	635527
Repeat										
	2194.4	21.18	110.70	1941.0	481.4	571.53	180.35	0.10	5733445	635535
	2221.9	21.46	110.57	1966.6	486.9	568.00	189.72	0.31	5733441	635545
	2252.8	21.91	110.26	1995.3	493.2	564.02	200.41	0.45	5733437	635555
	2281.7	22.15	110.72	2022.1	499.2	560.23	210.55	0.31	5733434	635566
	2311.9	22.79	111.57	2050.0	505.5	556.07	221.31	0.71	5733429	635576
	2340.6	23.16	111.09	2076.4	511.6	552.00	231.74	0.43	5733425	635587
Level 5	2370.0			2103.5					5733421	635598
	2370.6	23.11	111.25	2104.0	518.0	547.73	242.76	0.08	5733421	635598
	2402.2	22.82	112.19	2133.1	524.6	543.17	254.20	0.44	5733416	635609
	2427.7	23.03	112.23	2156.6	529.8	539.42	263.40	0.25	5733413	635618
	2457.1	23.70	111.53	2183.6	536.0	535.08	274.21	0.74	5733408	635629
	2485.1	23.95	112.07	2209.2	542.1	530.88	284.71	0.36	5733404	635640
	2514.4	23.28	112.24	2236.1	548.3	526.44	295.60	0.69	5733400	635651
	2544.3	22.77	112.52	2263.5	554.4	522.00	306.39	0.52	5733395	635661
Level 4	2570.0			2287.3					5733392	635671
	2572.0	22.48	112.64	2289.2	560.0	517.90	316.26	0.32	5733391	635671
	2603.6	23.20	113.48	2318.2	566.3	513.10	327.53	0.75	5733386	635683
	2632.5	23.44	113.12	2344.8	572.2	508.57	338.04	0.29	5733382	635693
	2662.7	23.47	114.16	2372.5	578.2	503.75	349.05	0.41	5733377	635704
	2687.9	22.78	113.51	2395.7	583.2	499.75	358.11	0.88	5733373	635713
	2717.7	22.51	113.43	2423.2	589.1	495.18	368.63	0.27	5733368	635724
	2747.3	23.23	113.94	2450.4	594.9	490.57	379.15	0.76	5733364	635734
Level 3	2770.0			2471.3					5733360	635742
	2776.9	23.86	114.08	2477.6	600.8	485.75	389.96	0.64	5733359	635745
	2806.1	24.16	114.43	2504.2	606.7	480.88	400.78	0.34	5733354	635756
	2833.9	24.08	115.09	2529.6	612.3	476.11	411.10	0.30	5733349	635766
	2865.3	24.06	114.92	2558.3	618.5	470.71	422.70	0.07	5733344	635778
	2891.6	24.25	114.71	2582.3	623.7	466.19	432.47	0.24	5733340	635787
	2921.0	24.48	115.83	2609.1	629.6	461.00	443.45	0.53	5733334	635798
	2950.4	24.46	114.98	2635.9	635.4	455.78	454.45	0.36	5733329	635809
Level 2	2970.0			2653.7					5733326	635817
	2979.9	24.69	116.16	2662.7	641.3	450.48	465.52	0.55	5733324	635821
	3005.7	24.88	115.86	2686.1	646.4	445.73	475.25	0.26	5733319	635830
	3069.3	25.26	116.84	2743.7	658.9	433.79	499.37	0.27	5733307	635854
	3096.4	25.29	116.36	2768.2	664.3	428.59	509.74	0.23	5733302	635865
	3125.9	25.43	116.57	2794.8	670.1	422.97	521.03	0.17	5733296	635876
	3154.2	25.60	117.00	2820.4	675.7	417.48	531.91	0.27	5733291	635887
Level 1	3170.0			2834.6					5733288	635893

	3179.9	25.62	117.24	2843.6	680.7	412.40	541.83	0.12	5733286	635897
	3210.0	26.05	116.45	2870.7	686.7	406.48	553.53	0.55	5733280	635909
	3241.7	26.17	116.33	2899.1	693.2	400.28	566.02	0.12	5733274	635921
	3255.2	26.29	116.26	2911.2	696.0	397.65	571.35	0.28	5733271	635926
	3272.0	26.35	116.20	2926.3	699.5	394.35	578.04	0.12	5733268	635933