Fur Seal 1

FINAL WELL REPORT

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1.0 WELL DATA SUMMARY

(All depths are measured depths from rotary table (MDRT) unless otherwise specified.)

Well Name	: Fur Seal 1
Basin	: Gippsland
Permit	: Vic/P-54
Operator	: Apache Energy Ltd
Drilling Rig	: Ocean Patriot
Well Classification	: Exploration - Vertical
Surface Location	
Latitude	: 38° 07' 47.91" S
Longitude	: 148° 09' 08.44" E
Easting	: 600 995.5
Northing	: 5 779 136.7
Depth Reference	: AHD
Water Depth	: 56.62 m
Rotary Table	: 21.5 m
Rotary Table to Seabed	: 78.12 m
Casing Data	: (1) 762/508 mm (30"/20") conductor at 78.1 m. : (2) 340 mm (13.375") casing shoe at 817.6 m.
Hole Size	: (1) 660 mm (26") + 914 mm (36") hole opener from 78.1m to 111.7m. : (2) 406 mm (16.0") hole from 111.7 m to 824 m. : (3) 216 mm (8½") hole from 824 m to 2610 m.
Mud Type	: (1) Seawater / Pre-Hydrated Gel Sweeps : (2) Seawater / Pre-Hydrated Gel Sweeps : (3) KCL / PHPA / Glycol
Offset Wells	: Sweetlips-1, Emperor-1, Moonfish-1, Remora-1 Grayling-1A, Sunfish-1, Longtom-2.
Proposed Total Depth	: 2634 mRT MD (2634.0m TVD RT)
Actual Total Depth	: 2610 mRT MD (2609.7m TVD RT)
Subsea Vertical Depth	: 2588 m TVDSS
Date arrived on Location	: 23rd October 2005
Date Rig Released	: 05th November 2005
Date Spudded	: 24th October 2005 @ 03:30 hours.
Date TD Reached	: 1st November 2005 @ 01:45 hours.
Well Status	: Plugged and Abandoned.

2.0 GENERAL INFORMATION

2.1 Executive Summary

The Fur Seal 1 well was drilled to determine the hydrocarbon potential of the well.

The Fur Seal structure was located approximately 30 km from the nearest landfall in the Gippsland Basin, South-eastern Victoria. The surface location was in 56.6 m of water. Fur Seal 1 was close to the location of several previously drilled exploration wells including Sunfish 1 (~6.7 km East), Remora 1 (~4.3 km Southeast), Moonfish (~11.2 km West), Sweetlips 1 (10.9 km Northwest) and ~14 km to the Snapper field operated by Esso / BHPB joint venture. The Diamond Offshore semi-submersible rig, 'Ocean Patriot', drilled the well.

Fur Seal 1 was an exploration well designed to test a combined stratigraphical/structural trap in the Southwest part of VIC/P-54.

Fur Seal 1 was drilled in three phases: a 914mm (36") phase, a 406mm (16") phase and a 216mm (8½"). The well was spudded on the 24th October 2005 at 03:30 hours using a 660mm (26") bit in conjunction with a 914mm (36") hole opener.

The 914mm (36") phase was drilled in 2.2 on bottom hours with an open hole total depth of 111.6 m. The 762mm (30") conductor was then run and cemented with the Casing Shoe set at 78.1 m. No problems were encountered during this phase.

The 406mm (16") phase was drilled in 10.6 hrs with an open hole total depth of 824 m and the 340mm ($13^3/_8$") casing, run and cemented Casing Shoe set at 817.6 m. No problems were encountered during this phase.

Following the casing cement job the BOP stack was run and set on marine riser and a full pressure test was performed on the stack.

Drilling resumed in the 216mm (8.5") phase from 824 m to 827 m. The well was displaced to 1.2 sg (10 ppg) mud and a formation integrity test was performed, EMW = 1.7 sg. Drilling then proceeded in the 216mm (8.5") phase from 827 m to 2610 m. TD at 2610 mMDRT was reached at 01:45 hours on the 1st November 2005. No problems were encountered during this phase.

The wireline tools were then rigged up and a VSP log was run. The cement plugs were then run and set to abandon the well. The BOPs were pulled and the anchors raised, with the rig released on the 5th November 2005.

Geoservices provided a full mudlogging service from spud to TD during this well. This service included 'Reserval' gas monitoring.

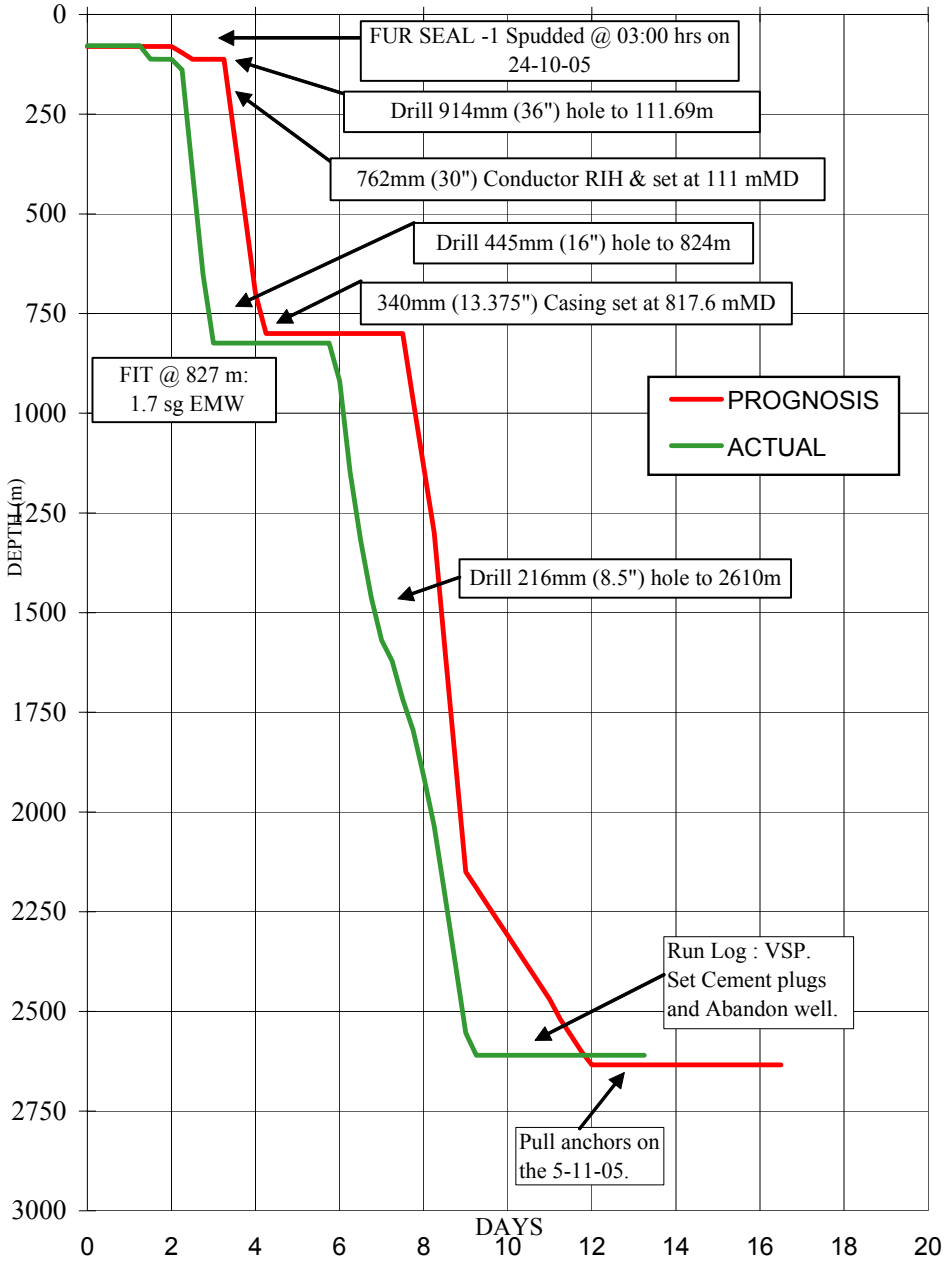
2.2 Geoservices Personnel

ALS Engineers	: Adderley, David : Mc Gilveray, Paul : Dunn, Alan
Mudloggers	: Tang, David : Elliott, Noel

2.3 Contractor Information

Drilling	: Diamond Offshore
Rig name	: Ocean Patriot
Rig type	: Semi-Submersible
Mudlogging	: Overseas Oilfield Services S.A.
Mud engineering	: M.I. Swaco
MWD	: Halliburton, Sperry Sun
Wireline logging	: Schlumberger, Anadrill
Cementing	: Dowel Schlumberger
Well head completion	: Cameron
ROV	: Fugro
Casing	: Weatherford
Work boats	: Far Grip, Wrangler
Helicopters	: Bristows
Catering	: E.S.S.

2.4 Days versus Depth Progress Chart



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1	April 2006	Geoservices Unit 170	Operations Manager	

2.5 Sample Collection Summary

Three sets of washed and dried samples and one set of samplex trays were collected during Fur Seal 1, from 824 m to TD at 2610 m.

Sample intervals: 830 m to 2050 m, 20 m
2050 m to 2200 m, 10 m
2200 m to 2610 m, 5 m

Sample distribution was as follows:

Recipient	Washed and Dried 200 g	Samplex Trays (box)
Apache Energy	1	1
AGSO	1	
Victorian DPI	1	

Mud samples: 916m, 2220 m, 2610 m.

Filtrate samples: 2220 m.

3.0 GEOLOGICAL INFORMATION

3.1 Lithology and Show Summary

From spud to 824 m returns were to the sea floor.

824 m –840 m:

Drilling Parameters:
WOB: 2.1-14.0 klbs MF: 511–605 gpm
RPM: 97-100 SPP: 1118-2000 psi
TRQ: 3.1-12.0 klb*ft

Lithology	Lithology description	ROP m/hr			Depth	Total	C1	C2	C3	iC4	nC4	C5
		ave.	max.	Min.	m	Gas %	ppm	ppm	ppm	ppm	ppm	ppm
Argillaceous Calcilutite	Medium grey to light grey, rarely pale brown to yellowish brown, soft to firm, amorphous to locally sub-blocky, dominantly argillaceous with trace fine quartz silt, trace micro-pyrite, trace pyrite nodules, trace forams and assorted fossil fragments. Minor cement contamination.	40	81.5	3.2		0.15	1478	10	3	4	1	1
					839.0	0.29	2859	20	8	7	3	2

840 m – 920 m :

Drilling Parameters:
WOB: 0-12.5 klbs MF: 596-607 gpm
RPM: 100 SPP: 1575-2015 psi
TRQ: 0-6.4 klb*ft

Lithology	Lithology description	ROP m/hr			Depth	Total	C1	C2	C3	iC4	nC4	C5
		ave.	max.	Min.	m	Gas %	ppm	ppm	ppm	ppm	ppm	ppm
Argillaceous Calcilutite	Light grey to white, rarely pale brown to yellowish brown, occasionally light olive grey, very soft to dispersive, rarely firm to locally sub-blocky, dominantly argillaceous with trace fine quartz silt, trace micro-pyrite, trace pyrite nodules, trace forams and assorted fossil fragments.	47	142	6.1		0.44	4305	31	7	11	1	2
					874.0	0.59	5893	44	11	18	4	6
Calcarenite (0-10%)	Light brown to yellowish brown, firm to moderately hard, occasionally brittle, massive to blocky, moderately argillaceous with trace fine quartz silt, trace micro-pyrite, trace pyrite nodules, trace assorted fossil fragments.											
Calcisiltite (0-10%)	Light brown-grey to pale yellowish brown, firm to moderately hard, amorphous to locally sub-blocky, moderately argillaceous, trace micro-pyrite, trace black lithic specks.											

920 m – 980 m

Drilling Parameters:
WOB: 7.0-9.7 klbs MF: 599-603 gpm
RPM: 95-100 SPP: 1527-2015 psi
TRQ: 3.4-6.2 klb*ft

Lithology	Lithology description	ROP m/hr			Depth	Total	C1	C2	C3	iC4	nC4	C5
		ave.	max.	min.	m	Gas %	ppm	ppm	ppm	ppm	ppm	ppm
Marl : (20-100%)	Greenish grey to light olive grey, very soft to dispersive, rarely firm to locally sub-blocky, trace fine quartz silt, trace micro-pyrite, trace black lithic specks, trace pyrite nodules, trace forams and assorted fossil fragments.	48.7	123.1	14.5		0.44	4288	30	7	11	Tr	Tr
					922.0	0.53	5146	39	10	15	Tr	Tr
Argillaceous Calcilutite : (0-80%)	Light grey to white, rarely pale brown to yellowish brown, occasionally light olive grey, very soft to dispersive, rarely firm to locally sub-blocky, dominantly argillaceous with trace fine quartz silt, trace micro-pyrite, trace pyrite nodules, trace forams and assorted fossil fragments.											
Calcisiltite : (0-20%)	Light brown-grey to pale yellowish brown, firm to moderately hard, amorphous to locally sub-blocky, moderately argillaceous, trace micro-pyrite, trace black lithic specks.											

980 m - 1132 m :

Drilling Parameters:
WOB: 6.8-12.1 klbs MF: 582-603 gpm
RPM: 95-100 SPP: 1527-2098 psi
TRQ: 2.9-6.3 klb*ft

Lithology	Lithology description	ROP m/hr			Depth	Total	C1	C2	C3	iC4	nC4	C5
		ave.	max.	min.	m	Gas %	ppm	ppm	ppm	ppm	ppm	ppm
Marl : (100%)	Greenish grey to light olive grey, soft to dispersive, rarely firm to locally sub-blocky, trace fine quartz silt, trace micro-pyrite, trace black lithic specks, trace pyrite nodules, trace forams and assorted fossil fragments.	57.4	86.4	19.6		0.6	5847	43	15	20	2	4
					1019.0	0.85	8367	63	24	28	7	8

1132 m – 1360 m :

Drilling Parameters:
WOB: 6-15 klbs MF: 596-610 gpm
RPM: 55-100 SPP: 1842-2557 psi
TRQ: 4-6 klb*ft

Lithology	Lithology description	ROP m/hr			Depth	Total	C1	C2	C3	iC4	nC4	C5
		ave.	max.	min.	m	Gas %	ppm	ppm	ppm	ppm	ppm	ppm
Marl : (100-80 %)	Greenish grey to light olive grey, soft to dispersive, rarely firm to locally sub-blocky, trace fine quartz silt, trace micro-pyrite, trace black lithic specks, trace pyrite nodules, trace forams and assorted fossil fragments.	37.5	91.5	10.5		0.47	4478	39	13	16	2	4
					1141.5	1.03	10055	2259	29	37	24	17
Calcilutite : (0-20 %)	Light grey to white, rarely pale brown to yellowish brown, occasionally light olive grey, very soft to dispersive, rarely firm to locally sub-blocky, dominantly argillaceous with trace fine quartz silt, trace micro-pyrite, trace pyrite nodules, trace forams and assorted fossil fragments.											

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1360 m – 1400 m

Drilling Parameters:
WOB: 8.7-14.2 klbs MF: 600 gpm
RPM: 100-110 SPP: 2194-2471 psi
TRQ: 3.8-5.3 klb*ft

Lithology	Lithology description	ROP m/hr			Depth	Total	C1	C2	C3	iC4	nC4	C5
		ave.	max.	min.	m	Gas %	ppm	ppm	ppm	ppm	ppm	ppm
Marl : (60-70%)	Medium light grey to medium grey, trace very fine pyrite in part, trace carbonaceous specks, trace micro-fossils including forams and echinoids, soft, sub-blocky.	40.0	90.0	14.0		0.32	2990	24	13	6	2	5
					1360.5	0.43	3908	33	18	14	5	11
Calcareous Claystone : (30-40%)	Medium light grey to medium grey, trace forams and micro-fossils, trace glauconite, trace carbonaceous specks, soft, sub-blocky.											

1400.0 – 1820.0

Drilling Parameters:
WOB: 10.9-26 klbs MF: 596-606 gpm
RPM: 90-100 SPP: 1855-2749 psi
TRQ: 3.2-5.6 klb*ft

Lithology	Lithology description	ROP m/hr			Depth	Total	C1	C2	C3	iC4	nC4	C5
		ave.	max.	min.	m.	Gas %	ppm	ppm	ppm	ppm	ppm	ppm
Calcareous Claystone: (100%)	Light grey to medium grey, common forams and micro-fossils, trace micro-pyrite, trace glauconite and rare hard brittle shelly material, trace carbonaceous specks, soft to firm, sub-blocky-blocky.	18.7	102.6	2.4		0.25	2207	21	12	11	3	11
					1460.5	0.53	4866	47	26	27	8	22

1820.0 - 1880.0 m

Drilling Parameters:
WOB: 19.3-23.5 klbs MF: 580-603 gpm
RPM: 238-248 SPP: 2506-2790 psi
TRQ: 4.1-6.7 klb*ft

Lithology	Lithology description	ROP m/hr			Depth m.	Total Gas %	C1 ppm	C2 ppm	C3 ppm	iC4 ppm	nC4 ppm	C5 ppm
		ave.	max.	min.								
Calcareous Claystone: (100%)	Light grey to medium grey, commonly calcareous, becoming less calcareous and lighter in colour with depth, commonly homogenous, trace very fine disseminated pyrite, very rare micro-fossils, soft to rarely firm, sub-blocky to amorphous.	27.2	94.2	11.8		0.30	2566	30	20	18	6	12
					1842	0.48	4082	50	32	29	8	22
Calcisiltite : (Trace)	Predominantly off white to very light grey, occasionally very pale grey-brown, trace calcareous silt grains, grading to Calcareous Claystone in part, trace carbonaceous specks, very soft to moderately firm, amorphous.											

1880.0 – 2020.0 m

Drilling Parameters:
WOB: 18.7-30 klbs MF: 582-604 gpm
RPM: 90-105 SPP: 2616-3200 psi
TRQ: 3.9-7.6 klb*ft

Lithology	Lithology description	ROP m/hr			Depth m.	Total Gas %	C1 ppm	C2 ppm	C3 ppm	iC4 ppm	nC4 ppm	C5 ppm
		ave.	max.	min.								
Claystone : (100%)	Light medium grey - medium grey, soft - rarely firm, sub-blocky, commonly amorphous, trace very fine disseminated pyrite, very rare micro-fossils, commonly homogenous, becoming less calcareous and lighter in colour with depth.	28.0	89.3	10.0		0.3	2384	48	30	32	13	35
					2094	0.44	3983	97	56	65	28	88

2020.0 – 2198.0 m

Drilling Parameters:
WOB: 24.6-30 klbs MF: 592-603 gpm
RPM: 80-100 SPP: 2779-3155 psi
TRQ: 4.1-7.6 klb*ft

Lithology	Lithology description	ROP m/hr			Depth m.	Total Gas %	C1 ppm	C2 ppm	C3 ppm	iC4 ppm	nC4 ppm	C5 ppm
		ave.	max.	min.								
Calcareous Claystone : (100%)	Light grey - medium light grey, rare medium grey, soft to occasionally firm, sub blocky, trace disseminated pyrite, trace dark carbonaceous and pyritic patches, rare glauconite.	32.3	81.4	11.4		0.34	2737	64	34	43	17	48
					2094	0.44	3983	97	56	65	28	88

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2198.0 – 2210.0 m

Drilling Parameters:
WOB: 20.7-28.5 klbs MF: 597-601 gpm
RPM: 85-95 SPP: 2918-3104 psi
TRQ: 5.5-6.8 klb*ft

Lithology	Lithology description	ROP m/hr			Depth m.	Total Gas %	C1 ppm	C2 ppm	C3 ppm	iC4 ppm	nC4 ppm	C5 ppm
		ave.	max.	min.								
Siltstone : (0-1%)	Brownish grey, very soft to firm, sub-blocky to amorphous, micro micaceous, carbonaceous specks and flakes, very argillaceous.	30	46.1	20.8		0.36	2302	90	41	35	16	51
					2290	0.49	4465	238	88	51	21	66
Sandstone : (0-1%)	Clear to off-white, fine to medium, moderately sorted, rounded to angular, moderate to poor sphericity, common argillaceous matrix, trace glauconite, poor to fair inferred porosity, no fluorescence.											
Calcareous Claystone : (98-100%)	Light grey - medium light grey, rare medium grey, soft to occasionally firm, sub-blocky, trace disseminated pyrite, trace dark carbonaceous and pyritic patches, glauconite and small glauconite nodules.											

2210.0 – 2240.0 m

Drilling Parameters:
WOB: 18.1-21.8 klbs MF: 597-600 gpm
RPM: 85-95 SPP: 2924-3152 psi
TRQ: 5.4-7.2 klb*ft

Lithology	Lithology description	ROP m/hr			Depth	Total	C1	C2	C3	iC4	nC4	C5
		ave.	max.	min.	m.	Gas %	ppm	ppm	ppm	ppm	ppm	ppm
Siltstone : (60-80%)	Brownish grey, very soft to rarely firm, sub-blocky, rarely sub-fissile, carbonaceous specks and laminae, grading to Carbonaceous Siltstone in part.	42.8	84.9	25.5		1.03	8700	532	185	84	32	56
					2221.5	1.48	12828	769	245	114	40	66
					2228.0	1.22	10300	618	211	89	39	74
Carbonaceous Siltstone : (Trace)	Brownish black to black, firm, brittle in part, silty, gradational to Coal in part.											
Calcareous Claystone : (20-40%)	Light grey, off white, very soft to firm, sub blocky to amorphous in part, glauconitic in part.											
Sandstone : (Trace)	Very light grey, soft aggregates, very fine to fine grained, well sorted, rounded, 60% argillaceous matrix, matrix supported. No fluorescence.											
Sandstone : (Trace)	Clear to off white, medium to coarse and loose, poorly sorted, sub rounded to very angular, commonly fractured grains, moderate to poor sphericity, fair inferred porosity. No fluorescence.											

2240.0 – 2270.0 m

Drilling Parameters:
WOB: 11-20.9 klbs MF: 587-604 gpm
RPM: 85-100 SPP: 2554-3141 psi
TRQ: 4.8-7 klb*ft

Lithology	Lithology description	ROP m/hr			Depth	Total	C1	C2	C3	iC4	nC4	C5
		ave.	max.	min.	m.	Gas %	ppm	ppm	ppm	ppm	ppm	ppm
Claystone : (60-80%)	Very light grey, light greyish brown, very soft to rarely firm, calcareous, rare glauconite, trace very fine sand grains.	37.5	63.1	15.5		1.16	9736	617	231	85	41	42
					2259.0	1.79	15235	924	348	122	59	53
Siltstone: (10-40%)	Brownish grey, very soft to rarely firm, sub-blocky, rarely sub-fissile, carbonaceous specks and laminae, grading to Carbonaceous Siltstone in part.											
Sandstone : (0-10%)	Clear, loose, medium to coarse, moderately sorted, sub angular to rounded, moderate sphericity, fair to good inferred porosity. No fluorescence.											

2270.0 – 2344.0 m

Drilling Parameters:
WOB: 6.4-17.3 klbs MF: 593-604 gpm
RPM: 90-100 SPP: 2743-3094 psi
TRQ: 5-7.4 klb*ft

Lithology	Lithology description	ROP m/hr			Depth	Total	C1	C2	C3	iC4	nC4	C5
		ave.	max.	min.	m.	Gas %	ppm	ppm	ppm	ppm	ppm	ppm
Kaolinitic Sandstone : (0-95%)	White to rarely clear, dominantly very soft aggregates to loose grains, fine - coarse, poorly sorted, locally well sorted, sub-angular to rounded, moderate to high sphericity, abundant white kaolinitic matrix to 95%, gradational to white Claystone, poor - fair inferred porosity, no fluorescence.	37	63.2	17.1		0.69	5869	286	114	44	26	25
					2340	1.15	9686	588	252	73	59	48
Sandstone : (0-90%)	Clear to white, very light grey, loose to very soft aggregates, fine to coarse, poorly sorted, occasionally well sorted in fine aggregates, sub angular to sub rounded, moderate sphericity, high sphericity in fine component, common white argillaceous matrix washing out in part, occasionally matrix supported in fine aggregates, poor - fair inferred porosity. no fluorescence.											
Siltstone : (5-40%)	Brownish grey, very soft to rarely firm, sub-blocky, rarely sub-fissile, carbonaceous specks and laminae, grading to Carbonaceous Siltstone in part, trace lithic fragments and pyrite.											

2344.0 – 2370.0 m

Drilling Parameters:
WOB: 7-13.4 klbs MF: 595-601 gpm
RPM: 95-100 SPP: 2752-2997 psi
TRQ: 4.9-6.7 klb*ft

Lithology	Lithology description	ROP m/hr			Depth	Total	C1	C2	C3	iC4	nC4	C5
		ave.	max.	min.	m.	Gas %	ppm	ppm	ppm	ppm	ppm	ppm
Siltstone : (90-100%)	Brownish grey, very soft to rarely firm, sub-blocky, rarely sub-fissile, carbonaceous specks and laminae, grading to Carbonaceous Siltstone in part, trace lithic fragments and pyrite.	32.5	67.3	18.2		1.27	10569	745	354	90	81	43
					2348.0	1.72	14714	928	385	106	84	47
					2361.5	1.38	11674	903	441	99	98	51
Kaolinitic Sandstone : (0-10%)	White to rarely clear, dominantly very soft aggregates to loose grains, fine - coarse, poorly sorted, locally well sorted, sub -angular to rounded, moderate to high sphericity, abundant white kaolinitic matrix to 95%, gradational to white Claystone, poor - fair inferred porosity. No fluorescence.											

2370.0 – 2565.0 m

Drilling Parameters:
WOB: 5.8-19.6 klbs MF: 595-602 gpm
RPM: 80-100 SPP: 2756-3254 psi
TRQ: 5-8.8 klb*ft

Lithology	Lithology description	ROP m/hr			Depth	Total	C1	C2	C3	iC4	nC4	C5
		ave.	max.	min.	m.	Gas %	ppm	ppm	ppm	ppm	ppm	ppm
Argillaceous Sandstone : (30-90%)	Clear to white, very light grey, loose to very soft aggregates, fine to coarse, poorly sorted, occasionally well sorted in fine aggregates, sub angular to sub rounded, common off-white argillaceous matrix washing out in part, poor - fair inferred porosity. No Fluorescence.	39	88.1	14.6		0.78	6443	402	189	52	51	36
					2374.5	1.28	10396	756	367	100	95	52
					2448.0	1.23	10816	739	343	86	87	43
Siltstone : (0-70%)	Brownish grey, very soft to rarely firm, sub-blocky, rarely sub-fissile, carbonaceous specks and laminae, grading to Carbonaceous Siltstone in part, trace lithic fragments and pyrite.											
Carbonaceous Siltstone : (0-10%)	Light grey to speckled black/white, soft to firm, sub-blocky to blocky, common platy carbonaceous specks, rare carbonaceous laminae, rare to common disseminated pyrite, grading into Siltstone.											
Coal : (0-Trace)	Black to dark brown, sub-blocky to platy, firm to brittle, hackly fracture, shiny lustre to dull matt colour.											

2565.0 – 2610.0 m

Drilling Parameters:
WOB: 7.9-18.7 klbs MF: 595-604 gpm
RPM: 80-105 SPP: 2776-3204 psi
TRQ: 5-8 klb*ft

Lithology	Lithology description	ROP m/hr			Depth	Total	C1	C2	C3	iC4	nC4	C5
		ave.	max.	min.	m.	Gas %	ppm	ppm	ppm	ppm	ppm	ppm
Claystone : (70-90%)	Light olive grey to grey, soft to firm, rare silty grains, mildly calcareous in part, trace micro-mica, trace micro-pyrite, trace carbonaceous laminae.	37.5	105.7	17.1		0.74	6243	321	129	35	32	31
					2584.5	1.24	11071	610	227	55	47	37
Argillaceous Sandstone : (0-10%)	White to light grey, fine to medium grained, sub-angular to sub-rounded, moderately sorted, trace calcite cement, trace nodular and disseminated pyrite, local aggregates weakly cemented, moderate inferred porosity. No shows. (probably cavings)											
Coal : (0-Trace)	Brownish black, mainly shiny lustre, platy to blocky, firm to brittle, slightly argillaceous in part.											
Silty Claystone: (10-30%)	Light brownish grey to light olive grey, occasionally white, soft to amorphous, trace carbonaceous specks, trace micro-micaceous, rare very fine sand, trace pyrite, grading into Claystone.											

3.6 Gas Ratio Interpretation – Introduction

Gas composition and total gas in mud were measured using the Geoservices Reserval (A combined total gas detector and chromatograph coupled with a GZG degasser). As a backup gas detection system a Geoservices FID Chromatograph Panel (FCP) and FID Gas Panel (FGP) were in operation, in tandem with a GZ11 degasser motor. Both gas systems use the FID technique of measuring ions released when hydrocarbons are burnt in a hydrogen flame.

Gas is extracted from the mud prior to it reaching the shale shakers by the degassers, which are essentially an agitator inside a chamber through which the mud continually passes. The GZG degasser is specially designed to degas a constant volume of mud regardless of pump rates and has the advantage of being placed within the flowline, limiting any early emissions of gas from the mud as it is circulated through the rig. The GZ11 degasser is located on the header box in the shaker room where it is reliant on stable mud circulation and shaker operation. The gas is then drawn back to the unit through tubing to the gas analysis equipment. Independent sensors in the unit also measure H2S and CO2.

The composition of the gas in mud from the formation is significant in determining the geochemical origin and value of a show. There are several methods that can be used to determine whether the hydrocarbon gas in mud comes from a potential gas or oil zone. Amongst these methods are the Triangle Diagram (also known as the gas composition diagram), Pixler Diagram (also known as the gas ratios method) and the gas Wetness/Balance/Character plots.

3.3 Explanation of Gas Composition Diagrams

The Triangle or Gas Composition Diagram is used to graphically represent the hydrocarbon distribution in the gas and to determine whether it corresponds to a gas or oil reservoir. The triangular diagram is obtained by tracing lines on three scales at 120° to each other, corresponding respectively to the ratios of ethane, propane and normal butane to the total gas. The scales are arranged in such a way that if the apex of the triangle is upward, the diagram represents the analysis of gas from a gas zone, while if the apex points downwards, the diagram represents the analysis of gas from an oil zone. A large triangle diagram represents dry gas or low GOR oil, while small triangles represent wet gases or high GOR oils. The centre of the triangle should fall inside the area delineated by the dotted line, which encircles compositions that are regarded as 'normal'. If the triangle area is outside this area the gas indicates that the reservoir is not exploitable and that the heavier hydrocarbon composition is 'abnormal' i.e. hydrocarbons that are chemically altered or gases with special compositions which are not associated with oil.

The Gas Ratio Analysis Diagram is a plot of the ratio of C1 to the other gas elements. The magnitude of the methane to ethane ratio determines if the reservoir contains gas or oil or if it is non-productive. The following conclusions are possible:

Ratio C1/C2:	< 2	non-productive zone
	2 - 15	oil present
	15 - 65	gas present
	> 65	non-productive zone

The slope of the line of the ratio plot of C1/C2, C1/C3, C1/C4 and C1/C5 indicates whether the reservoir will produce hydrocarbons or hydrocarbons and water. Positive line slopes

indicate production; negative line slopes indicate water-bearing formations. When using the Gas Ratio Diagram, the following points should be borne in mind:

1. Productive dry gas zones may show only C1, but abnormally high shows of C1 are usually indicative of saltwater zones.
2. If the ratio C1/C2 is low in the oil section and the ratio C1/C4 is high in the gas section, the zone is probably non-productive.
3. If any ratio (C1/C5 excepted in an oil based mud) is lower than the preceding ratio then the zone is probably non-productive.
4. The ratios may not be definitive for zones of low permeability.
5. Steep gas ratio plots may be indicative of tight zones.

3.4 Explanation of Wetness/Balance/Character Curves

Another method for evaluating gas zones plots against depth three ratios: hydrocarbon Wetness (W_h), hydrocarbon Balance (B_h) and hydrocarbon Character (C_h), where:

$$W_h = \frac{(C2 + C3 + C4 + C5)}{(C1+C2+C3+C4+C5)} \times 100\ (\%)$$

$$B_h = \frac{(C1 + C2)}{(C3 + C4 + C5)}$$

$$C_h = \frac{(C4 + C5)}{C3}$$

Wetness (W_h) is the primary zone indicator and provides a measure of the relative proportion of heavier gases in the overall gas show as follows:

$W_h < 0.5$	Light non-associated gas with low productivity potential or only geo-pressured methane.
$0.5 < W_h < 17.5$	Potentially productive gas with gas density increasing with W_h.
$17.5 < W_h < 40.0$	Potentially productive oil with gravity decreasing as W_h increases.
$W_h > 40.0$	Heavy or residual oil with low productivity potential.

As reservoir hydrocarbons become denser in the transition from gas to oil, Balance (B_h) and Wetness (W_h) values move closer together and eventually intersect. The zone guidelines for B_h combine with those for W_h to improve reliability of show evaluation as follows:

$W_h < 0.5$ and $B_h > 100$	Very light, dry gas that is almost certainly non-productive.
$0.5 < W_h < 17.5$ and $W_h < B_h < 100$	Productive gas with gas increasing in wetness and density as the two curves converge.
$0.5 < W_h < 17.5$ and $B_h < W_h$	Productive gas condensate or a high gravity gas/oil ratio.
$17.5 < W_h < 40$ and $B_h < W_h$	Productive oil with oil gravity decreasing - density increasing as the curves diverge.
$17.5 < W_h < 40$ and $B_h > W_h$	Non-productive residual oil.

Character (C_h) values serve to resolve ambiguities between oil or gas indications by defining the following:

$0.5 < W_h < 17.5$ and $B_h < W_h$ and $C_h < 0.5$ — Productive wet gas or condensate.

$0.5 < W_h < 17.5$ and $B_h < W_h$ and $C_h > 0.5$ — Productive high gravity and/or high GOR oil.

It is important to note that in the conclusion to each of the interpretive tools, the terms 'productive' and 'non-productive' are used in a geochemical sense. Ultimate production of a zone is dependent upon reservoir thickness and extent as well as other physical and economic factors that are not taken into account when analysing gas compositions. The methods discussed here are intended to assist the interpretive skills of the geologist or log analyst. Please refer to the Gas Ratio Log enclosure.

3.5 Gas Composition Discussion

Gas monitoring commenced using the Geoservices Reserval from the beginning of the 216mm (8.5") phase at 824 m after top hole casing was run, through to the well's total depth of 2610 m.

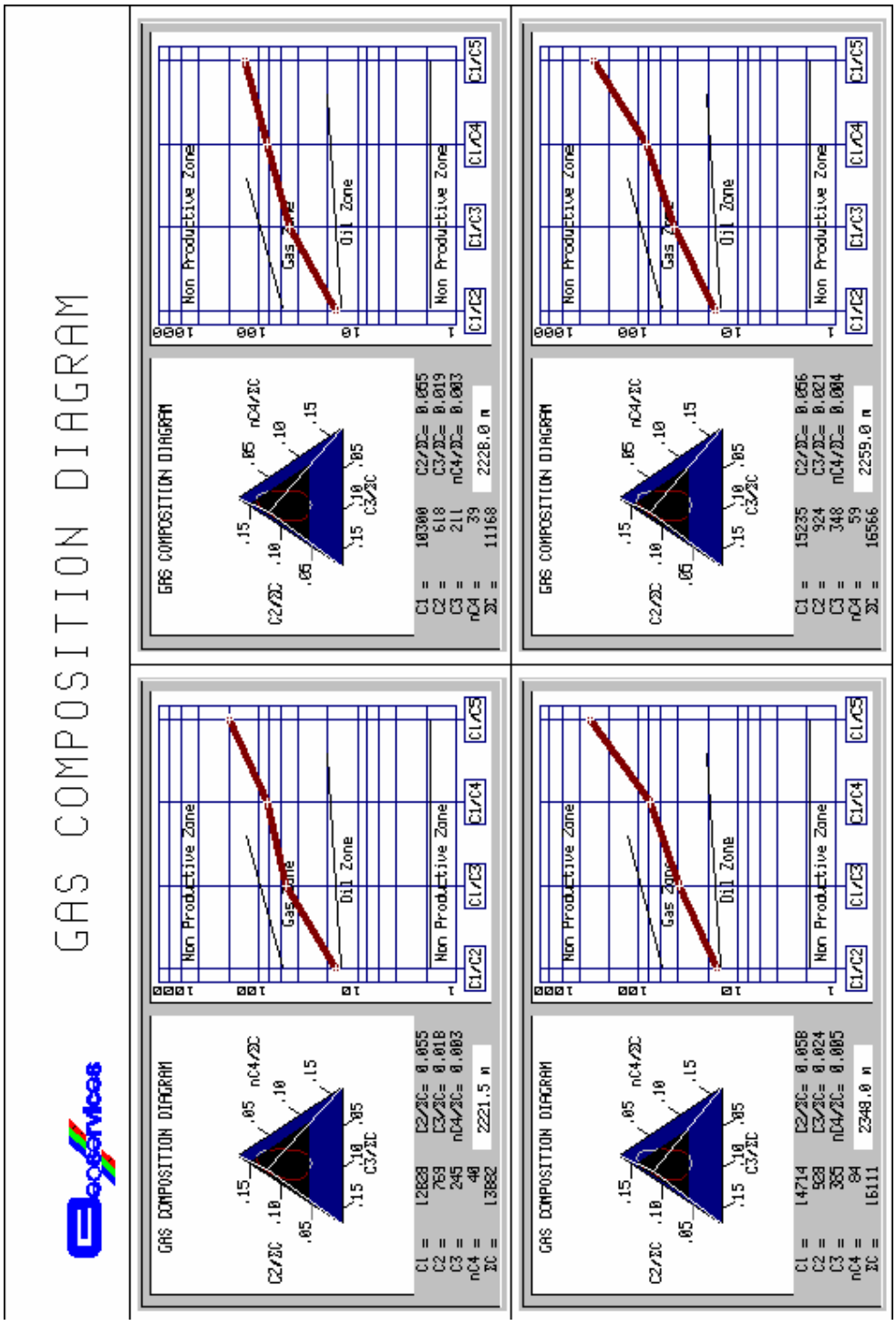
No significant gas was encountered while drilling through the calcareous sediments of the Gippsland Limestone in the 16" or 8.5" hole section. The gas throughout the 8.5" section was uniformly dry, consisting of mainly C1 (methane), with traces of C2 (ethane), C3 (propane), C4 (butane), and C5 (pentane) gas.

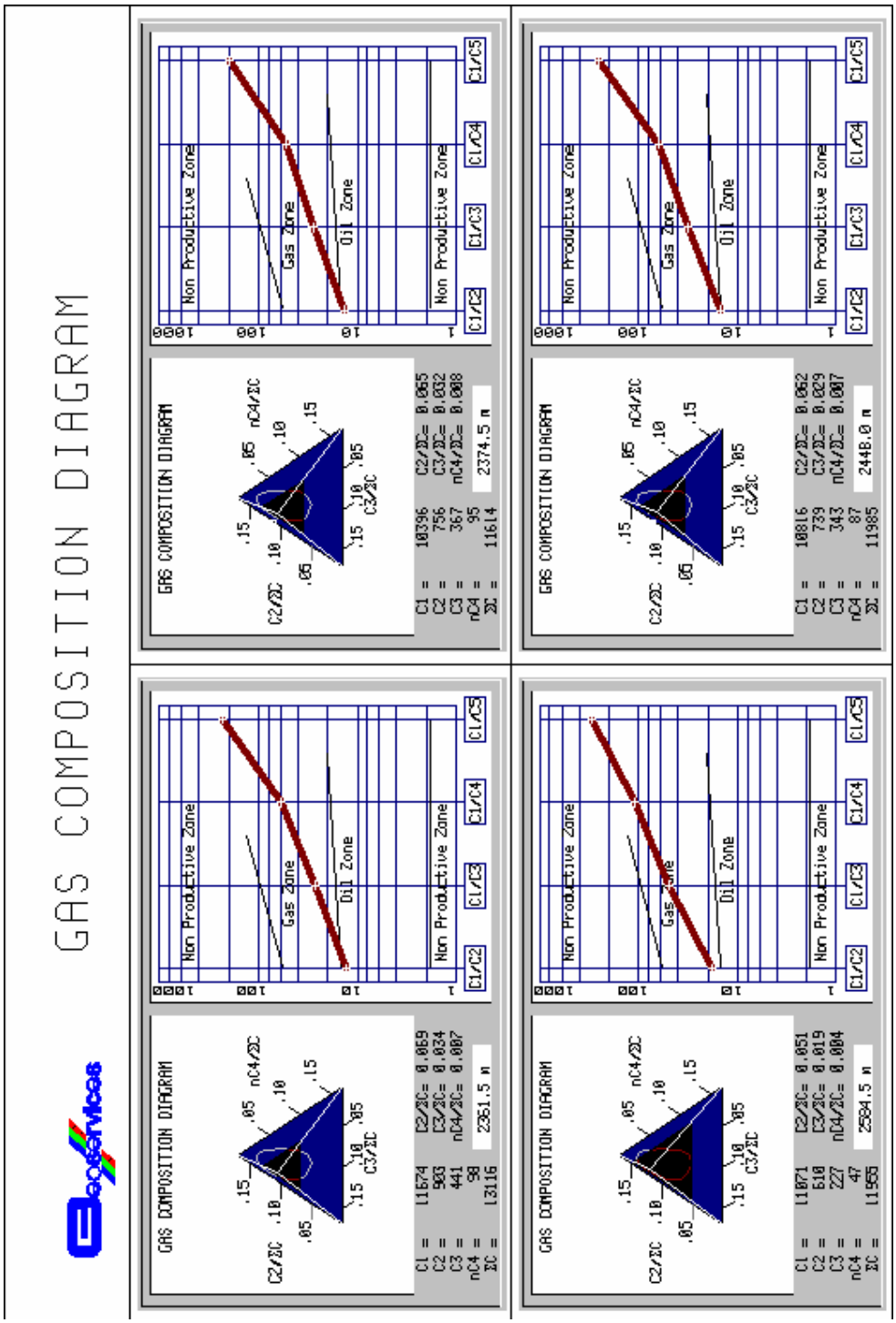
Background gas levels ranged from 0.3 % to 0.5 % from 824 m to 2200 m, background gas remained around 0.5 % down to TD at 2610 m. Gas peaks over 1% concentration were encountered, with the maximum gas level recorded being 1.79% at 2259.5 m depth and these were mostly associated with thin layers of Coal or Sandstone lithology, plus higher ROP. The mud weight was varied only slightly during this interval, ranging from 1.22 SG (10.2 ppg) to 1.24 SG (10.3 ppg) when drilling was terminated at 2610 mMDRT.

It is interesting to note that according to the hydrocarbon Wetness, Balance and Character ratio indicators, each of the gas peaks in the reservoir zone corresponds to a very light dry gas (essentially geo-pressured methane) that is almost certainly non-productive (i.e. where $W_h < 0.5$, and $B_h > 100$).

No H2S or CO2 was recorded during drilling of this well.

3.6 Gas Ratio Diagrams





Revision	Date	Issued by	Approved by	Remarks
1	April 2006	Geoservices Unit 170	Operations Manager	

4.0 PRESSURE ANALYSIS

4.1 Introduction

There are several techniques available which when used in the appropriate overpressured environment, can often predict an approaching overpressured zone while drilling. Each technique may give slightly different results according to geological and drilling conditions. Geoservices currently uses the following parameters to indicate overpressured regions while drilling:

D Exponent: This is a normalized rate of penetration that takes into account mud weight, bit wear and hydraulics. It can be reliably used in Shale and clean Claystone; and as an indicator in Siltstone, silty Shale and calcareous Claystone. A normal trend line is established through normally pressured shale points, representing a normal compaction trend, and any leftward deviation of subsequent shale points from this trend, representing relative under-compaction, indicates overpressure (plotted relative to depth) or increased porosity due to changes in the lithology.

Temperature: By plotting mud flowline temperature against depth a temperature gradient can be established. Theory states that a zone of low heat flow or "thermal shadow" occurs prior to the overpressured zone, which in turn is followed, by a complementary zone of abnormally high heat flow in the overpressured zone (due to its higher water content). However, the data has to be interpreted cautiously as additions of water to the active system/shakers can lower the mud temperature and mud chemicals added to the active system can cause exothermic/endothermic reactions. Bit and wiper trips cause decreases in temperature on surface.

Cuttings: Small, splintery cuttings can be used as an indicator of overpressured regions. Long propeller shaped cuttings may be an indicator of overpressure or may be the result of hydration of reactive or swelling clays.

Over-pull / Torque / Fill: Over-pull when making a connection or tripping can be an indicator that the hole is collapsing into the well bore, either due to clay hydration or a formation pressure that is greater than the mud weight. Similarly, excessive fill on a trip or after a connection can also indicate that the well bore is collapsing in. High torque can also be an indicator of well bore collapse, although it can also be due to formation type, bearing failure or simply the annulus becoming clogged up by cuttings due to insufficient hole cleaning in large diameter holes.

Gas *Connection gas*: During circulation the down-hole pressure exerted by the mud, weight increases due to friction losses in the annulus. This is calculated as an ECD - or equivalent circulating density. Thus, when the pumps are stopped for a connection the down-hole pressure exerted by the mud decreases by an amount equivalent to the difference between the ECD and mud weight. If the mud weight is close to or actually underbalanced, then gas may be fed-in to the well bore during the few minutes the pumps are turned off and register as a gas peak one lag time after the connection. The magnitude of this peak is determined by such factors as permeability, gas content of the formation, the amount of swabbing as well as the relative pore pressure / mud weight.

Background gas: Background gas is not as good an indicator of formation pressure as connection gas since several factors can influence it unrelated to abnormal pressure.

Increases in porosity and permeability, gas saturation, coal content of formation, etc., can cause the background to increase in addition to an underbalanced situation. Another point is that the formation pressure would have to exceed the ECD (not just the mud weight as in connection gas), in order for the formation gas to feed-in to the well bore.

Trip gas: Analogous in some ways to connection gas, trip gas is the gas registered at surface after circulating bottoms up after a round trip. However, trip gas magnitude is influenced by various other factors such as amount of swabbing and time since last circulation. The presence of trip gas is not necessarily indicative of an underbalanced situation, but the value above background can be used comparatively with other trip peaks.

4.2 Pressure Summary

Formation pressures were monitored throughout this well by recording a range of indicators, varying from direct observations of background gas and cuttings, to drilling characteristics such as torque and drag when pulling off bottom. Incorrect hole fill when tripping and mud properties such as flowline temperature were also taken into consideration. The Geoservices D'Exponent package was also used as a tool in the determination of abnormal formation pressures.

D'exponent:
Coefficients used for this well, results plotted in Geoservices Pressure Log.
From 81 m to 2610 m

a coefficient	=	0.0002084
b coefficient	=	-0.1244643
b offset	=	-0.0200000

The D'exponent plot increased in a generally steady linear direction. The plot of the trend gave no indication of abnormally pressured zones. The first argillaceous section was from 1400 m down to 2210 m in which the trend was set, the sandstones that were encountered below 2210 m showed very little deviation from the normal trend line.
The plot's results are affected to some degree by the control drilling which was performed from 2260 m down to 2500 m.

Gas: This well was drilled with a 1.22 sg (10.2 ppg) over balanced mud system and as a result connection gas was rarely observed. The few small gas peaks observed were of levels less than 2% concentration and these were liberated from the rock of the Kingfish / Moonfish / Volador and Strzelecki formations.

Torque & Drag: No abnormal torque or drag was observed during the drilling or tripping operations, which took place on the Fur Seal-1 well. Minor over-pull was recorded while pulling back from 2610 m to 2200 m, and at 1300 m.

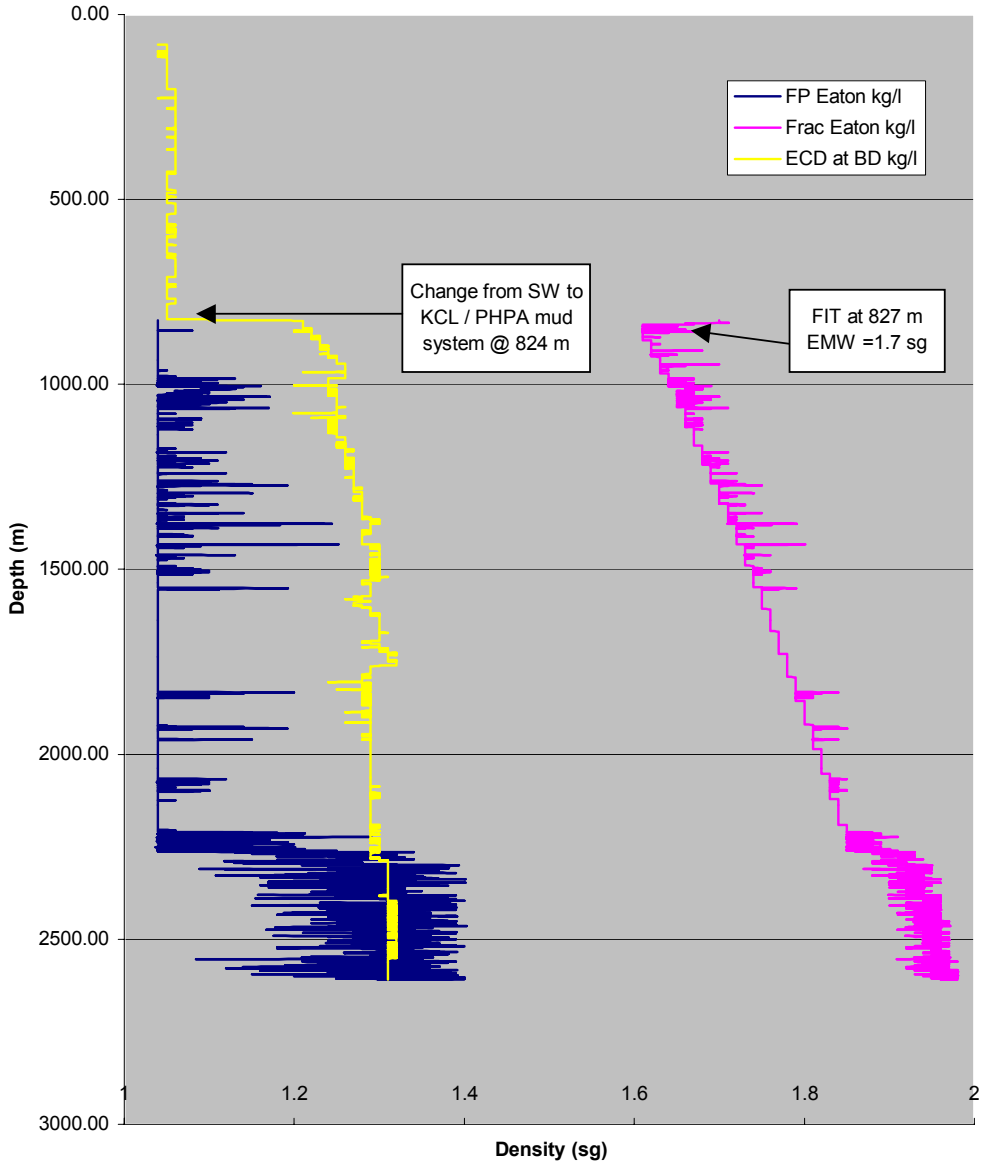
Flowline Temperature: The flowline temperature increased generally in a linear trend over the length of the well. It went from a low of 44.9 °C at the beginning of the 8.5" section to 60.1 °C when drilling was terminated at 2610 m. A minor drop in the temperature may be associated with a change in formation, or possible presence of formation water.

Cuttings: There were no unusually sharp splintery cavings or large cuttings with concave cross section observed at the shakers that may have indicated an abnormally pressured zone in this well.

The majority of indicators pointed to a normally pressured environment from surface to TD while drilling Fur Seal-1.

4.3 Formation Pressure Plot

FUR SEAL - 1


0.00
500.00
1000.00
1500.00
2000.00
2500.00
3000.00
Depth (m)
1
1.2
1.4
1.6
1.8
2
Density (sg)
FP Eaton kg/l
Frac Eaton kg/l
ECD at BD kg/l
Change from SW to KCL / PHPA mud system @ 824 m
FIT at 827 m EMW =1.7 sg

5.0 DRILLING INFORMATION

5.1 Mud Record

From spud to the end of the 406mm (16") hole phase at 824 m the well was drilled riser less with returns to the seafloor. This section was drilled with seawater and Hi-Vis Gel sweeps.

The 216mm (8.5") hole was drilled from 824 m to TD at 2610 m with returns to surface, this section was drilled using a KCL / PHPA mud system.

Properties of this mud are also listed below.

Depth m	MW	FV sec/qt	PV cps	YP lb/100'	Gels Lb/100'	WL cm/ 30"	Solids %	Sand %	Chlorides mg/L	Cake /32"
824	1.20	54	10	8	4/6	5.6	7	-	26000	1
819	1.22	49	12	10	5/7	6	8	0.2	27000	1
1236	1.21	62	14	15	9/14/18	5.2	9	0.5	34000	1
1541	1.20	55	14	13	6/13/19	5.6	9	0.6	34000	1
1662	1.22	54	16	16	8/12/19	5.6	10	0.25	47000	1
1854	1.22	61	22	17.5	8/16/22	4.4	10	0.2	47000	1
2095	1.22	62	22	19	9/21/27	4.8	11	0.75	45000	1
2470	1.22	67	26	18.5	9/19/27	4.8	14	0.6	47000	1
2610	1.23	71	25	19	9/21/27	4.2	13	0.25	50000	1

5.2 Bit Record

Bit #	Size (in)	Make	Type	Jets	TFA In^2	In (m)	Out (m)	Run (m)	Hrs	WOB klbs	RPM	TORQ kft*lbs	SPP psi	Flow gpm	Grading
1	26 – 36 HO	Reed	Y11C	2 x 24 1 x 18	1.574	80.1	111.7	31.6	2.2	0-1	65-75	1.6-4.6	770-933	980-1009	0-0-NO-A-I-NO-TD
2	16	Security	FS2563	7 x 18	1.574	111.7	824	712.3	10.6	0-15	65-100	5.6-10.7	480-3350	490-1100	0-0-NO-A-I-NO-TD
3	8½	Smith	S73VPX	3 x 15 3 x 16	1.106	824	2610	1786	60.5	0-25	90-110	1-12	1100-3000	590-606	1-0-ER-N-X-I-WT-TD

5.3 Hydraulic Listing

Depth (m)	Mud Weight (ppg)	ECD (ppg.)	Flow Rate (gpm)	Total Pressure Loss (psi)	Pressure Loss Across Bit (psi)	Mud Velocity Through bit (m/sec)	Bit Hydraulic Power (hp)	Mud Impact at Bit (lbf)	Total Hydraulic Power (hp)	Ratio (Bit Pwr/Total Pwr) (%)
824	1.22	1.25	605	1856	274	53	97	543.2	657	14.8
1541	1.24	1.32	600	2211	283.1	53	100.2	561.3	783	12.8
1800	1.23	1.32	600	2455	275.1	53	97.4	551.1	869	11.2
2520	1.24	1.32	600	2900	277.3	53	98.2	555.6	1027	9.6
2610	1.22	1.31	600	3003	272.8	53	96.6	546.6	1063	9.1

5.4 Drilling Phase Summary

5.4.1 914mm (36") Hole Section

Date	: 24th October 2005
Measured depth	: 80.1 m – 111.7 m
TVDSS LAT	: 80.1 m – 111.7 m
Number of bits used	: 1
Mud type	: Seawater, with gel sweeps

Fur Seal 1 was spudded at 03:30 hours, on the 24th October 2005. A 914mm (36") BHA was made up, consisting of a 660mm (26") Reed Y11C bit, and a 914mm (36") hole opener. Sea floor sediments were tagged at 80.1 m and 914mm hole was drilled without incident to a depth of 111.7 m. Gel sweeps were then pumped around the well prior to displacing to a gel mud before pulling out of hole and rigging up to run the 762mm (30") conductor. This bit drilled 31.6 m of new formation in 2.2 hours, at an average ROP of 14.4 m/hr. The bit was graded 0-0-NO-A-I-NO-TD.

The 762mm (30") conductor was run and cemented on bottom at a depth of 111.0 m as per programme.

5.4.2 406mm (16.0") Hole Section

Dates	: 25th October 2005
Measured depth	: 111.7 m – 824.0 m
TVDSS LAT	: 111.7 m – 824.0 m
Number of bits used	: 1
Mud type	: Seawater with gel sweeps

The 406mm (16") hole phase was drilled using a Security FS2563 bit with 7 x 18 jets. This bit was run in the hole and drilled out the cement and conductor shoe, new hole was drilled ahead from 111.7 m down to 824 m, which was T.D. for this phase. This section was drilled with seawater and gel sweeps, at T.D. the hole was displaced to pre-hydrated gel mud. A wiper trip was then performed up to the casing shoe. This bit drilled a total of 712.4 m in 10.6 on bottom hours at an average ROP of 67.2 m/hr. This bit was graded 0-0-NO-A-E-I-NO-TD.

There were no hole problems encountered during the drilling of this section. 340mm ($13^3/_8$") casing was run at this point and cemented in at 817.6 m. Following this the BOP stack was moved into position in the moon pool area and then was run to the sea floor on the marine riser and latched to the well head.

After the BOP stack was pressure tested successfully, the 16" BHA was then laid down.

5.4.3 216mm (8.5") Hole Section

Dates	: 28-10-05 to 01-11-05
Measured depth	: 824 m - 2610 m
TVDSS LAT	: 824 m - 2609.7 m
Number of bits used	: 1
Mud type	: KCL-PHPA

The 216mm (8.5") phase was drilled to a depth of 2610 m, T.D. for the well.

A Smith S73VPX bit was run in the hole with MWD tools and a motor. The cement and casing shoe were drilled out and the hole displaced to 1.2 sg (10 ppg) KCl/PHPA drilling mud, 3 metres of formation was drilled to 827 m. An F.I.T. was performed resulting in an EMW of 1.7 SG (14.0 ppg). No problems or losses were encountered whist drilling this section. Loss circulation material was added to the mud system (graphite) whilst drilling the target zones. This bit drilled a total of 1786 m in 60.5 on bottom hours at an average ROP of 29.5 m/hr, though the reservoir was control drilled from 2260 m to 2500 m. This bit was graded 1-0-ER-N-X-I-WT-TD.
Mud weight ranged from 1.22 to 1.25 sg (10.2-10.4 ppg). The final survey recorded 1.41° bearing 56.39°. TD was reached at 01:45 hours on 1st of November 2005.