Grayling-1/1A

VIC/P54

Well Completion Report

Interpretive Data

February 2006

WELL COMPLETION REPORT
(INTERPRETIVE DATA)

GRAYLING-1/1A

PERMIT VIC/P54
OFFSHORE VICTORIA

APACHE ENERGY PTY LTD

FEBRUARY, 2006

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1. WELL SUMMARY

Grayling-1/1A is located in the southeast corner of permit VIC/P54, approximately 5.6 km east southeast of Sunfish-2, and 6.1 km northeast of Turrum-1 (Figure 1). The well was drilled to explore a northeast-southwest trending faulted anticline with some fault independent four-way dip closure at the primary objective Volador Formation - *F.longus* stratigraphic level and deeper secondary objective Golden Beach Sub-group sandstones (Figues 2 and 3). The deeper objective level is the same as as the reservoir in the Kipper Field where volcanics appear to provide some of the lateral cross fault seal, as well as top seal.

Grayling-1 was spudded at 20:30 hrs on December 23, 2004 by the Ocean Patriot rig, in 58.5 m of water. After reaching a total depth -778.4 mTVDAHD (800.0 mMDRT) mechanical problems were encountered and the well was abandoned (Figure 4). The rig was then skidded to the Grayling-1A location. Grayling-1A was spudded at 16:30 hrs on December 28, 2004. The vertical well reached a total depth of -2891.8 mTVDAHD (2914.0 mMDRT) at 14:30hrs on January 11, 2005.

In addition to the acquisition of logging-while-drilling data (Sperry-Sun LWD), the following suite of wireline logs was run:

Run 1: RCI-GR (Baker Atlas)
Run 2: RCI-GR (Baker Atlas)
Run 3: MLR-GR (Baker Atlas)

No conventional coring or testing was carried out.

The primary objective Volador Formation (*F. longus* section) was intersected at -2134.7 mTVDAHD (2156.5 mMDRT), 87.3 m high to prognosis (Figure 5). Total average gas values remained low throughout the well. No hydrocarbon shows were observed within the Volador Formation. Weak hydrocarbon shows were observed and several significant gas peaks were recorded in the lower part of the Kingfish Formation above the Volador Formation, and in the deeper objective Chimaera Formation, which lies below.

Petrophysical analysis (Appendix 1) has interpreted an 8.8 m gross gas column that contains 8.8 m net pay within the Lower Kingfish Formation. Average porosity and water saturations are 22.2% and 34.0%, respectively. The base of the sandstone unit represents a ‘gas-down-to’ level as no gas-water contact is evident on logs. The Golden Beach Formation has been interpreted to contain a 68.2 m gross gas column with 31.6 m net pay. Average porosity and water saturations are 15.4% and 36.2%, respectively. The gas-water contact is evident at -2617.2 mTVDAHD (2639.1 mMDRT).

An RCI pressure survey was run over the Lower Kingfish Formation and Golden Beach Formation intervals and 20 pressure points were acquired. Interpretation of these survey points suggests that the gas column identified within the Golden Beach Sub-group comprises two zones, with the upper zone gas-water contact at -2594.0 mTVDAHD (2615.9 mMDRT), and the lower zone gas-water contact the same as that identified on log analysis.

Grayling-1A, a gas discovery, was plugged and abandoned and the rig was skidded to complete abandonment operations in Grayling-1. Following abandonment operations the rig was released at 05:00 hrs on January 27, 2005 when 1 km from location.

2. WELL INDEX SHEETS

2.1 Grayling-1

Well:	Grayling-1	**Operator:**	Apache Energy Limited
Well Type:	Exploration	**Partners:**	Apache Northwest Pty Ltd
Basin:	Gippsland		Nexus Energy Vic P54 Pty Ltd
Tenement:	VIC/P54		
Objective:	Volador Formation – *F. longus* section		
Status:	P & A, Dry Hole		
Spudded:	20:30hrs 23 December 2004	**Latitude:**	38° 09' 40.26" S
TD Reached:	15:30hrs 25 December 2004	**Longitude:**	148° 17' 35.90" E
Rig Released:	05:00hrs 27 January 2005	**Northing:**	5,775,510.94 mN
		Easting:	613,302.06 mE
Total Depth:	-778.4 mTVDAHD (800.0mMDRT)		
RT Elevation:	21.5 m above AHD	**Datum:**	GDA94, Spheroid GRS80
Water Depth:	58.5 m below AHD	**Projection:**	MGA Zone 55, CM 147° E
Drill. Contr.:	Diamond Offshore	**Seis Loc:**	Northern Fields 3D
Rig (Type):	Ocean Patriot (Semi-Sub)		Inline 3708, Crossline 7845

Formation Tops

Subgroup	Formation/Marker	Tops		
		mMDRT	mTVDAHD	mTVT
Seaspray	Gippsland Limestone (seabed)	80.0	-58.5	719.9
	Total Depth	800.0	-778.4	

MWD/LWD Logs

Bit No.	Log Suite	Interval (mMDRT)	Max °C	Hole Size (mm)	Remarks
2	DGR-EWRP4-ACAL-BAT-PM	113.0 to 800.0	29	406	Drilled 406mm hole section from 113.0 to 800.0 mMDRT. Gap in data due to air retriever line breaking. Periods of poor detection due to downhole noise and some pump noise. All recorded data was recovered at surface.

Hole and Casing Details

Hole Size (mm)	Interval (mMDRT)	Interval (mTVDAHD)	Casing Size (mm)	Depth (mMDRT)	Depth (mTVDAHD)
914	80.0 to 113.3	-58.5 to -91.8	762	112.4	-90.9
406	113.3 to 800.0	-91.8 to -778.4	340	783.9	-762.3

Cement Plugs

Plug No.	Interval (mMDRT)	Tagged
1	170.0 to 100.0	N

Testing: No testing was carried out.

Coring: No conventional cores were cut.

Comments: Grayling-1 was abandoned due to mechanical problems. Abandonment operations were completed following the drilling of Grayling-1A.

2.2 Grayling-1A

Well:	Grayling-1A	**Operator:**	Apache Energy Limited
Well Type:	Exploration	**Partners:**	Apache Northwest Pty Ltd
Basin:	Gippsland		Nexus Energy Vic P54 Pty Ltd
Tenement:	VIC/P54		
Objective:	Volador Formation-*F.longus* section		
Status:	P & A, Gas Discovery		
Spudded:	16:30hrs 28 December 2004	**Latitude:**	38° 09' 40.28" S
TD Reached	14:30hrs 11 January 2005	**Longitude:**	148° 17' 34.73" E
Rig Released:	23:00hrs 20 January 2005	**Northing:**	5 775 510.58 mN
		Easting:	613 273 .61 mE
Total Depth:	-2891.8 mTVDAHD (2914.0 mMDRT)		
RT Elevation:	21.5 m above AHD	**Datum:**	GDA94, Spheroid GRS80
Water Depth:	58.5 m below AHD	**Projection:**	MGA Zone 55, CM 147° E
Drill. Contr.:	Diamond Offshore	**Seis Loc:**	Northern Fields 3D
Rig (Type):	Ocean Patriot (Semi-Sub)		Inline 3708, Crossline 7845

Formation Tops

Subgroup	Formation/Marker	Tops		
		mMDRT	mTVDAHD	mTVT
Seaspray	Gippsland Limestone (Seabed)	80.0	-58.5	1245.0
	Lakes Entrance Formation	1325.0	-1303.5	179.8
Cobia	Gurnard Formation	1504.8	-1483.3	6.8
Halibut	Kingfish Formation	1511.7	-1490.1	288.2
	Lower *M. diversus* seq	1799.9	-1778.3	342.0
	Kate Shale	2142.1	-2120.3	14.4
	Volador Formation	2156.5	-2134.7	376.9
	Top Campanian Volcanics	2533.5	-2511.6	32.7
Golden Beach	Chimaera Formation	2566.3	-2544.3	347.5
	Total Depth	2914.0	-2891.8	

Wireline Logs

Suite	Run	Log Suite	Interval (mMDRT)	BHT (°C)	Remarks
2	1	RCI-GR	2074.0 to 2077.8	N/A	Tool fished & latched onto pipe. POOH to change out backup RCI tool. One sample.
	2	RCI-GR	2683.7 to 2572.2	N/A	POOH due to communication failure with tool. 20 pressure points and 3 samples collected.
	3	MLR-GR	2569.4 to 2503.9	N/A	

Hole and Casing Details

Hole Size (mm)	Interval (mMDRT)	Interval (mTVDAHD)	Casing Size (mm)	Depth (mMDRT)	Depth (mTVDAHD)
914	80.0 to 114.0	-58.5 to -92.5	762	112.4	-90.9
406	114.0 to 811.0	-92.5 to -789.5	340	796.2	-774.7
216	811.0 to 2914.0	-789.5 to -2891.8			

Grayling-1A Well Index Sheet (Cont.)

MWD/LWD Logs

Bit No.	Log Suite	Interval (mMDRT)	Max °C	Hole Size (mm)	Remarks
2	DGR-EWRP4-ACAL-BAT-PM	114.0 to 810.0	28	406	Drilled to section TD at 800.0 mMDRT. All recorded data recovered at surface.
3	DGR-EWRP4-ACAL-BAT-SLD-CNP	810.0 to 2740.0	85	216	Drilled 216mm hole section from 810.0 to 2740.0 mMDRT.
4	DGR-EWRP4-ACAL-BAT-SLD-CNP	2740.0 to 2914.0	107	216	Drill 216mm hole section to TD at 2914.0 mMDRT, all recorded data recovered at surface.

Cement Plugs

Plug No.	Interval (mMDRT)	Tagged
1a	2675.0 to 2585.0	N
1b	2585 to 2538.0	Y
2	2110.0 to 1996.0	Y
3	826.0 to 737.0	Y
4	170.0 to 100.0	N

Testing: No testing was carried out.

Coring: No conventional cores were cut.

Comments: Grayling-1A was drilled following abandonment of Grayling-1 due to mechanical problems.

3. GEOLOGY

3.1 Summary of Regional Geology

The Grayling structure is located within the Rosedale Fault System on the southern edge of the Northern Terrace of the Gippsland Basin (Figure 1). The Gippsland Basin is located at the eastern end of the major Late Jurassic to Late Cretaceous rift system that formed the southern edge of the Australian continent. It developed as a series of asymmetrical grabens in response to the break-up of Australia and Antarctica during the Early Cretaceous, and separation of Australia from the Lord Howe Rise/Campbell Plateau during the Late Cretaceous.

Clastic deposition commenced during the Early Cretaceous and continued in the basin at least until the Miocene in onshore regions. The onshore western part of the basin is dominated by terrestrial rift-fill of the Early Cretaceous Strzelecki Group which is Albian and older in age. The eastern offshore part has a much more complete and complex sedimentary record and all of the economic hydrocarbon accumulations. A thick interval of carbonates, the Gippsland Limestone, was deposited in the offshore Gippsland during the Miocene.

The structural evolution of the Gippsland Basin involved extensional and compressional events. Two phases of superimposed extension associated with southeastern Australian rifting events affected the region. Extension resulted in a series of NW-SE to WNW-ESE orientated en-echelon basement-involved normal faults on both the northern and southern margins of the basin. The en-echelon, soft-linked dog-leg pattern of normal faults on both the southern and northern margins of the basin is a characteristic of basement involvement in faulting, suggesting pre-existing structural grain influencing the orientation of subsequent faults. Locally, on the basin margins, these faults accommodate large syn-depositional thickness variations.

During the Cenomanian and Turonian, sediments of the syn-rift phase were deposited in lacustrine and lake margin settings (Emperor Sub-Group). The separation of the Lord Howe Rise and the onset of the Tasman Sea opening to the east of the Gippsland Basin during the Santonian were responsible for generating a basin-wide unconformity surface referred to as the Longtom Unconformity. This unconformity separates the underlying lacustrine Emperor Sub-Group from the overlying braided fluvial, deltaic to paralic and shallow marine rocks of the Golden Beach Sub-Group. Shallow marine depositional environments within the Golden Beach Sub-Group are only recorded from the eastern part of the basin. As the Tasman Sea rifting progressed to seafloor spreading in the mid-Campanian (*T. lilliei* biozone), basaltic volcanism within the basin and on the basin flanks reached a peak, covering much of the Golden Beach coastal plain environment with basic extrusives. The unconformity at the top of the Golden Beach Sub-Group is known as the Seahorse Unconformity.

Following this volcanic episode the sediments of the Halibut Sub-Group were deposited during the late syn-rift to post-rift thermal subsidence phase of basin evolution. These were deposited in fluvial, alluvial, deltaic and paralic environments in a basin that opened out to the east onto a developing ocean. The majority of the Halibut Sub-Group was deposited in a non-marine coastal plain setting behind a generally NE-SW orientated beach-barrier complex. During the deposition of the Halibut Sub-Group syn-depositional growth was achieved via extensional reactivation of pre-existing NW-SE to WNW-ESE faults. This faulting progressively ceased during the Paleocene to Eocene. Towards the end of the

Lower Eocene the coastal plain was well established with fluvial systems feeding a strand line beach/barrier system.

Compressional tectonics began to affect the Gippsland Basin from the Early Eocene. Uplift and inversion of the central region and northern margins initiated at this stage caused erosion and generation of initially fluvially incised canyon systems. Within the eastern part of the basin several erosional monadnocks are formed within these canyon systems. In eastern parts of the basin significant amounts of erosion have resulted in a prominent unconformity surface which cuts down into the Halibut Sub-Group to the level of the Maastrichtian Volador Formation. The section underlying the Top Latrobe Unconformity in the western part of the basin is much younger than in eastern parts of the basin. Backstepping (or transgressing) of a series of barrier beach/strandline complexes from east to west occurred during the Eocene. Subsequent to this period of incision and downcutting several pulses of relative sea-level rise took place as subsidence and sedimentation rates slowed, allowing flooding/transgressive pulses to gradually push the shoreline system towards the NW. The depositional lows (eroded canyons) are flooded first preferentially as Eocene offshore marine facies, e.g. the Flounder Formation, are deposited. By the Middle Eocene the palaeo-shoreline had transgressed westwards. By the end of the Eocene the palaeo-shoreline is believed to have moved inland from Lakes Entrance. In most of the offshore areas deposition of condensed glauconitic siltstones and shales replaced deposition of coarse siliciclastics.

Northwest directed compression and transpression began in the Early Eocene and continued episodically with varying intensity through to the Pliocene. Major pulses of compression subsequent to the Early Eocene affected the basin during the Lower Oligocene, Middle Miocene and Pliocene. A series of NE to ENE trending anticlines are the result of this compression. Whilst many of the resultant compressional features are eroded and partially truncated, suggesting periods of sub-aerial exposure, several structures in the west of the basin are not eroded, suggesting they were not emergent sub-aerially.

The marine marls of the Lakes Entrance formation record the final marine transgression in the Early Oligocene. Locally, this succession onlaps onto the flanks of the earlier formed compressional features. From the Mid-Miocene onwards a thick limestone unit, the Gippsland Limestone, was deposited. Major incisions during the mid to Late Miocene are interpreted as offshore erosion/mass wasting events that may have been initiated during compressional reactivation. These incisions are infilled by prograding limestone depositional wedges, which are ultimately responsible for creating the present day shelf-slope break.

The presence of mature source rock intervals within the basin is evidenced by significant oil and gas reserves in the basin. Within the Central Deep portion of the basin coals, coaly or carbonaceous shales of the Strzelecki Group, Golden Beach and Halibut Sub-Groups have all contributed to the oil and gas pools reservoired in the basin. The most prolific source rock intervals however, are suggested to be within the lower coastal plain facies of the Golden Beach and Halibut Sub-Groups. Contributions from source rock intervals in more marine-influenced shales in the eastern parts of the basin have been noted. The regional top seal for the reservoirs in the Gippsland Basin is the Lakes Entrance Formation, however, the presence of volcanics, shales, coaly shales, coals, shales and glauconitic shales related to marine flooding within the Golden Beach and Halibut Sub-Groups have been proven at several intersections to provide valid top seals and cross-fault seals. Within the Latrobe Group there are several proven reservoir levels distributed throughout the entire stratigraphy. The various extensional

phases of faulting and subsequent compressional events and incision, in combination with the presence of intra-formational seal units, have developed a myriad of proven trapping configurations in the basin.

3.2 Surrounding Wells

Well Name	Permit	Operator	Date Completed	TD (mRT)	Status
Tuna-2	VIC/L4	Esso Aust. Ltd.	09/12/1968	2761	P & A*, oil & gas shows
Turrum-1	VIC/L3	Esso Aust. Ltd.	27/06/1969	3057	P & A*, oil & gas shows
Sunfish-1	VIC/P1	Esso Aust. Ltd.	03/03/1974	2492	P & A*, oil & gas shows
Sunfish-2	VIC/P1	Esso Aust. Ltd.	14/10/1983	2647	P & A*
Tuna-4	VIC/L4	Esso Aust. Ltd.	31/08/1984	3321	P & A*
Remora-1	VIC/P1	Esso Aust. Ltd.	29/05/1987	2961	P & A*
Longtom-1	VIC/P1	BHP Petroleum	14/06/1995	2242	Abandoned Gas Well
Longtom-2	VIC/P54	Apache Energy Ltd.	22/12/2004	2422	P & A*, Gas Discovery

P & A*- Plugged & Abandoned

3.3 Structure

The Grayling feature is a northeast-southwest trending faulted anticline, with some fault independent four-way dip closure, located within the Rosedale Fault System on the southern edge of the Northern Terrace, Gippsland Basin (Figures 2, 3 and 6). At the primary objective Volador Formation - *F. longus* level there is both fault independent, four-way dip closure and fault dependent closure. The structure formed in response to NW directed compression and transpression which began in the Early Eocene and continue episodically with varying intensity through to the Pliocene. Major pulses of compression affected the basin during the Lower Oligocene, Middle Miocene and Pliocene. A series of NE to ENE trending anticlines, including the Grayling structure, are the result of this compression. The structure is bounded to the north and south by two SE-NW trending normal faults with downthrows to the SSW. Both of these faults are part of the Rosedale Fault System.

3.4 Stratigraphy

The stratigraphic section penetrated in Grayling-1A is described below and summarised in Figure 7; delineation of age units is based on log correlation with nearby wells together with palynological data (Appendix 1). Detailed lithological descriptions are included in the cuttings descriptions, daily geological reports and mudlog section of the Grayling-1/1A Basic Data Well Completion Report. Age, lithology and drilling data have been collated on the composite well logs accompanying this report (Enclosures 1 & 2). No cuttings were recovered from spud to -789.5 mTVDAHD (811.0 mMDRT).

Gippsland Limestone

Depth: -58.5 (Seabed) to -1303.5 mTVDAHD (80.0 to 1325.0 mMDRT)
Thickness: 1245.0 mTVT
Age: Late Oligocene to Recent

The Gippsland Limestone sediments were not sampled above -789.5 mTVDAHD (811.0 mMDRT) as returns were circulated to the seafloor. Below this level the lithology comprises interbedded calcisiltite, which becomes argillaceous below -1128.5 mTVDAHD (1150.0 mMDRT), and calcilutite. Rare limestone, silty dolomite and chert are seen. Regionally, the Gippsland Limestone is interpreted to have been deposited in an offshore marine environment.

Lakes Entrance Formation

Depth: -1303.5 to -1483.3 mTVDAHD (1325.0 to 1504.8 mMDRT)
Thickness: 179.8 mTVT
Age: Oligocene

The Lakes Entrance Formation lies disconformably below the Gippsland Limestone. The lithology comprises argillaceous calcisiltite with minor calcilutite and rare limestone. Regionally, the Lakes Entrance Formation is interpreted to have been deposited in an offshore marine environment.

Gurnard Formation

Depth: -1483.3 to -1490.1 mTVDAHD (1504.8 to 1511.7 mMDRT)
Thickness: 6.8 mTVT
Age: Early Oligocene to Middle Eocene

The Gurnard Formation lies unconformably below the Lakes Entrance Formation. It is interpreted from LWD logs by an increase in resistivity and minor increase in gamma ray response. The lithology comprises argillaceous calcisilutite with minor calcilutite and rare limestone.

Palynological analysis (Appendix 1) has interpreted these sediments to be Late Eocene in age, deposited within the *P. tuberculatus* biozone, in a shallow to open, offshore marine environment.

Kingfish Formation

Depth: -1490.1 to -2120.3 mTVDAHD (1511.7 to 2142.1 mMDRT)
Thickness: 630.2 mTVT
Age: Early Eocene to Middle Paleocene

The Kingfish Formation lies unconformably below the Gurnard Formation. It is interpreted from LWD logs by peaks in gamma ray response and resistivity, and a sharp decrease in neutron porosity and formation density. The lithology comprises interbedded sandstone, carbonaceous siltstone, siltstone and silty claystone below -1868.4 mTVDAHD (1890.0 mMDRT). Minor calcareous claystone and argillaceous siltstone, and rare coal and lignite are seen. The lithology becomes predominately sandy siltstone below -2028.3 mTVDAHD

(2050.0 mTVDAHD). The sandy siltstone is fine to medium-grained with abundant white clay matrix. Poor visual porosity and weak hydrocarbon shows are seen. Log analysis, gas peaks and RDT pressure points all indicate gas columns of ~8.5 m.

Palynological analysis has interpreted these sediments to be Early Eocene to Paleocene in age, spanning the *M. diversus* to *L. balmei* biozone. Deposition is interpreted to have been in a non-marine to marginal marine environment.

Kate Shale

Depth: -2120.3 to -2134.7 mTVDAHD (2142.1 to 2156.5 mMDRT)
Thickness: 14.4 mTVT
Age: Paleocene

The Kate Shale lies conformably below the Kingfish Formation. It is interpreted from LWD logs by a peak in gamma ray response. The lithology comprises sandy siltstone with minor silty claystone. Rare siltstone and very fine-grained sandstone are seen. Weak hydrocarbon shows are associated with the sandy siltstone (Section 3.5).

Palynological analysis has interpreted these sediments to be Paleocene in age, deposited within the *L. balmei* biozone, in a non-marine to marginal marine environment although regionally the presence of marine dinocysts in the Kate Shale and its regional correlatability show it to be a marine transgression shale related to a major flooding event.

Volador Formation

Depth: -2134.7 to -2511.6 mTVDAHD (2156.5 to 2533.5 mMDRT)
Thickness: 376.9 mTVT
Age: Maastrichtian

The Volador Formation lies conformably below the Kate Shale. It is interpreted from LWD logs by a decrease in gamma ray and resistivity. The lithology comprises interbedded and intergradational sandstone, sandy siltstone, siltstone that is carbonaceous in parts and silty claystone. Minor argillaceous sandstone and sandy claystone are seen. The sandstone is dominantly fine to medium-grained with sub-spherical, sub-angular grains that are moderately to well sorted. Visual and inferred porosity are fair to poor. No hydrocarbon shows were observed within this primary objective formation.

Palynological analysis has interpreted these sediments to be Paleocene to Maastrichtian in age, spanning the *L. balmei* to *F. longus* biozones, in a non-marine to nearshore marine environment.

Top Campanian Volcanics

Depth: -2511.6 to -2544.3 mTVDAHD (2533.5 to 2566.3 mMDRT)
Thickness: 32.7 mTVT
Age: Campanian

The Top Campanian Volcanics lie unconformably below the Volador Formation. They are interpreted from LWD logs by a sharp decrease in gamma ray and resistivity. The lithology comprises massive volcanics.

Palynological analysis has interpreted these sediments to be Maastrichtian in age, deposited within the *F. longus* biozone, in a non-marine to nearshore marine environment.

Chimaera Formation

Depth: -2544.3 to -2891.8 mTVDAHD (2566.3 to 2914.0 mMDRT)
Thickness: >347.5 mTVT
Age: Santonian to Campanian

The Chimaera Formation lies unconformably below the Top Campanian Volcanics. The lithology comprises interbedded claystone and sandstone, with minor coaly claystone, silty claystone and siltstone in part. Rare volcanics are seen. The sandstone is dominantly fine to medium-grained, with sub-angular to sub-rounded and sub-spherical grains that are poorly to well sorted. Weak hydrocarbon shows were observed (Section 3.5). Gas peaks, log analysis, and RDT points and samples indicate a gas column of 68.2 m.

Palynological analysis has interpreted these sediments to be Maastrichtian to Campanian in age, spanning the *F. longus* to *N. senectus* biozones. Deposition is interpreted to have been in a non-marine to marginal marine environment.

3.5 Hydrocarbon Occurrences

Total gas and chromatographic gas analysis were recorded during the drilling of Grayling-1A and results are presented in the daily geological reports and the mudlog section of the Grayling-1/1A Basic Data Well Completion Report. Riserless drilling resulted in no returns to surface from spud to -789.5 mTVDAHD (811.0 mMDRT) and therefore no gas or cuttings data were available.

Total gas levels recorded remained low throughout the entire interval drilled and ranged between 0.08 to 2.70%. Gas composition was predominantly C_1 but included up to C_4 components. Two significant gas peaks of 20.7% over a background of 0.4% and 11.9% over a background of 1.1% were recorded within Kingfish and Chimaera Formations. Gas data is unreliable due to problems with calibration of both the total gas and chromatograph machines.

Very weak hydrocarbon shows were observed in cuttings samples taken from -2038.3 to -2048.3 mTVDAHD (2060.0 to 2070.0 mMDRT) and -2088.2 to -2128.2 mTVDAHD (2110.0 to 2150.0 mMDRT) within the Kate Shale and Kingfisher Formation intervals. Fluorescence was non-direct, with a weak diffuse to very slow solvent cut and thin residual ring. Very weak shows (1 to 4%) were also seen from -2568.1 to -2588.1 mTVDAHD (2590.0 to 2610.0 mMDRT) and -2613.1 to -2638.1 mTVDAHD (2635.0 to 2660.0 mMDRT) in the Chimaera Formation. Fluorescence was direct with a diffuse, slow pale blue solvent and crush cut and thin residual ring.

Petrophysical analysis (Appendix 1) has interpreted an 8.8 m gross gas column that contains 8.8 m net pay within the Lower Kingfish Formation. Average porosity

and water saturations are 22.2% and 34.0%, respectively. The base of the sandstone unit represents a 'gas-down-to' level as no gas-water contact is evident on logs. The Golden Beach Sub-group has been interpreted to contain a 68.2 m gross gas column with 31.6 m net pay. Average porosity and water saturations are 15.4% and 36.2%, respectively. A gas-water contact is evident at -2617.2 mTVDAHD (2639.1 mMDRT).

An RCI pressure survey was run over the Lower Kingfish Formation (Figure 8) and Golden Beach Sub-group (Figure 9) intervals and 20 pressure points were acquired. Interpretation of these survey points suggests that the gas column identified within the Golden Beach Sub-group comprises two zones, with the upper zone gas-water contact at -2594.0 mTVDAHD (2615.9 mMDRT), and the lower zone gas-water contact the same as that identified on log analysis.

3.6 Contributions to Geological Knowledge and Conclusions

Grayling-1/1A was designed as an exploration well to test the northeast-southwest trending faulted anticline, mapped at Top Volador Formation - *F.longus* stratigraphic level.

The primary objective Volador Formation (*F. longus*) was intersected at -2134.7 mTVDAHD (2156.5 mMDRT) and was dry (no hydrocarbons). Significant gas peaks were observed in the Kingfish and Chimaera Formations although gas data was unreliable due to equipment calibration problems throughout the drilling of the well.

An 8.8 m gas column was encountered within the Kingfish Formation, whilst in the Chimaera Formation (Golden Beach Sub-group) a 68.2 m column (gross) was identified. RCI interpretation suggests the latter is comprised of two separate gas zones.

The deeper *N. senectus*, intra-Golden Beach Sub-group volcanics predicted pre-drill from offset well data were not encountered at the Grayling location. Total depth was consequently called 27.2 m higher than pre-drill prognosis.

Palynology data from the well should be used with caution due to caving (see note at end of palynology report).

Grayling-1A was plugged and abandoned, a gas discovery, and the rig was released at 23:00 hrs on January 20, 2005 when 1 km from location.

APPENDIX 1

Palynological Interpretation Report

APPENDIX 2

Petrophysical Report

ENCLOSURE 1

Grayling-1

Composite Log 1: 500 TVD

ENCLOSURE 2

Grayling-1A

Composite Log 1: 500 TVD