



Rockhopper-1ST1

FINAL WELL REPORT

Prepared by



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1.0 WELL DATA SUMMARY

Operator	: Origin Energy Resources Ltd
Well name	: Rockhopper-1ST1
Basin	: Bass
Permit	: T / 18P
Operator	: Origin Energy Resources Ltd
Surface location	: Latitude: 39° 47' 34.1828" S
	: Longitude: 145° 26' 21.4660" E
Bottom Hole Location	: 732.5 m South of Surface Location
	: 17.9 m West of Surface Location
Total depth	: 3482.0 mMDRT
Rotary Table Elevation.	: 26 m above MSL
Sea-water depth	: 76 m
Rig Arrived	: 01:00 hr 29 November, 2009
Kick Off Date	: 03:00 hr 20 January, 2010
Bit Reached TD	: 03:00 hr 03 February, 2010
Well Status	: Plugged and Abandoned
Rig name	: Kan Tan IV (semi-sub)
Drilling Contractor	: Maersk

Drilling Phases

Diameter (inch)	From (m)	To (m)	Mud Type
216mm (8½")	1990.0	3482.0	KCl / Polymer

Cased Hole

Casing Diameter (inch)	Casing Type	Shoe Depth (m)
244(9 ⁵ / ₈ ")*	Intermediate	1965.0MDRT

*Ran and set while drilling Rockhopper-1 well.

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2.0 GENERAL INFORMATION

The proposed Rockhopper-1ST1 exploration well is located in T/18P in the Bass Basin. The location is approximately 0.8km NE from Aroo-1 and 9.5km north from Trefoil-1. The nearest population bases are Melbourne (223km NNW) and Port Latta (117km to the south). The Yolla A platform is 34km ESE from the proposed Rockhopper-1ST1 well location. Rockhopper-1ST1 will deviate from the original Rockhopper-1 prospect to explore and test the formation.

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2.1 Geoservices Personnel

ALS Engineers : Dmitriy Ilyin
: Laurence Hannon
: Cathryn Higgins

Mudloggers : Gavin Fernandes
: Kirupan Velauthapillai

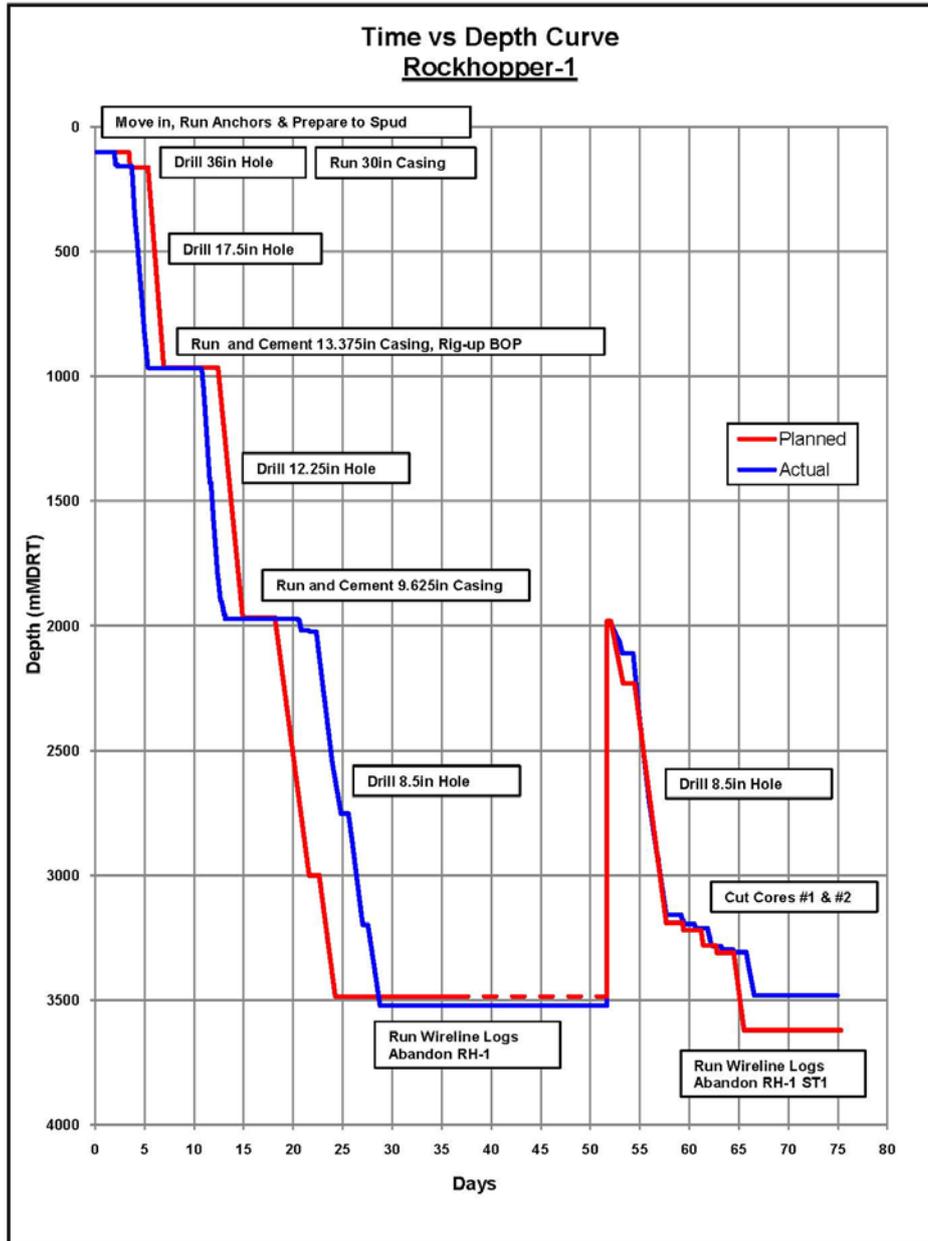
Sample Catchers : Trenton Frost
: Yasir Jadoon

2.2 Contractor Information

Drilling : Maersk Drilling Property
Rig name : Kan Tan 4
Rig type : Semi-submersible
Mud logging : Geoservices Australasia
Mud engineering : Halliburton -Baroid
MWD : Halliburton- Sperry Sun
Wireline logging : Schlumberger Wireline
Cementing : Halliburton Cementing
Well head completion : Dril-Quip
ROV : Fugro
Casing : Premium Casing Services
Helicopters : Bristows

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2.3 Days vs. Depth Progress Chart



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2.4 Sample Collection Summary

Sample Type	Number of sets	Quantity per set	Sampling interval	From (m)	To (m)
Unwashed	1	500 grams	5 meters 3 meters	1990-1995 2052-2055	2050-2052 3480-3482
Washed & Dried	3	100 grams	5 meters 3 meters	1990-1995 2052-2055	2050-2052 3480-3482
Samplex Trays	2	-	5 meters 3 meters	1990-1995 2052-2055	2050-2052 3480-3482

Cuttings Distribution

Company	Unwashed and Dried Samples
Origin Australia	1

Company	Washed and Dried Samples
Origin Australia	1
Mineral Resources Tasmania	1
Geoscience Australia	1

Company	Set of Samplex Trays
Origin Australia	2

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3.0 GEOLOGICAL INFORMATION

3.1 Lithological Summary

Sidetrack well drilled 8½" hole from 1990.0 mMDRT with WBM.

INTERVAL: 1990.0 to 1999 mMDRT
ROP (Range): - m/h
Av. ROP: - m/h

CEMENT

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INTERVAL: 1999.0 to 2065.0 mMDRT
ROP (Range): 2 to 72 m/h
Av. ROP: 6.6 m/h

ARGILLACEOUS SILTSTONE and inter-bedded CLAYSTONE

ARGILLACEOUS SILTSTONE (40-100%): olive black, grayish black, brownish black to dark grey, greenish black in part, very soft to firm, blocky to sub-blocky, 20-35% clay, 0-5% very fine quartz grains, trace carbonaceous specks, trace mica, trace lithic fragments.

CLAYSTONE (0-60%): brownish black grayish black, dark grey, very soft to soft, amorphous, occasional trace mica.

Show Details: No Hydrocarbon Shows

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INTERVAL: 2069.0 to 2112.0 mMDRT
ROP (Range): 2 to 72 m/h
Av. ROP: 20 m/h

Inter-bedded ARGILLACEOUS SILTSTONE and SANDSTONE with small inter-beds of CLAYSTONE and SILTSTONE

ARGILLACEOUS SILTSTONE (0-95%): light olive grey to brownish black, very soft to soft, amorphous to sub-blocky, 20-35% clay, 0-2% very fine sand, trace carbonaceous specks, trace mica, trace lithic fragments.

SANDSTONE (0-95%): very light grey to light grey, light yellowish grey, light olive grey, olive grey, opaque, clear, friable to loose, blocky, 5-10% white clay matrix, 5-90% very fine sand, 5-15% fine sand, 0-50% medium sand, 0-40% course sand, friable to moderately hard, moderately to well sorted, sub angular to sub-rounded, spherical to sub spherical, 0-5% calcareous sand, trace-1% calcareous cement, poor to fair siliceous cement, trace mica, trace

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lithic fragments, trace carbonaceous specks, poor to good inferred visual porosity, no hydrocarbon fluorescence.

SILTSTONE (0-100%): olive grey to olive black, dark grey to grayish black in part, soft to firm, blocky to sub-blocky, 5-15% clay, 0-2% very fine sand, trace mica, trace lithic fragments.

CLAYSTONE (0-40%): olive black, brownish black and grayish black in part, very soft, amorphous, trace mica.

Show Details: No Hydrocarbon Shows

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INTERVAL: 2112.0 to 2130.0 mMDRT
ROP (Range): 8 to 87 m/h
Av. ROP: 23 m/h

ARGILLACEOUS SILTSTONE inter-bedded with SANDSTONE and minor CLAYSTONE.

ARGILLACEOUS SILTSTONE (10-100%): grey, very light grey, yellowish grey and white in part, very soft to firm, amorphous to sub-blocky, 5% very fine sand grains, trace lithic fragments, trace loose medium grained quartz sand, trace carbonaceous specks.

SANDSTONE (0-90%): very light grey to light grey, white to yellowish grey, 5% very fine, 10% fine, 50% medium, 35% coarse grains, friable to moderately hard, moderately to well sorted, rounded to sub angular, sub spherical to spherical, 5% clay, 5% calcareous sand, 1% calcareous cement, trace lithic fragments, good inferred visual porosity, no hydrocarbon fluorescence.

CLAYSTONE (0-10%): olive grey, white, very soft to soft, amorphous.

Show Details: No Hydrocarbon Shows

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INTERVAL: 2130.0 to 2150.0 mMDRT
ROP (Range): 3 to 87 m/h
Av. ROP: 32 m/h

Inter bedded SANDSTONE, ARGILLACEOUS SILTSTONE with minor CLAYSTONE.

SANDSTONE (10-40%): loose grains, clear to opaque, rarely white and pale yellow, 10% very fine, 15% fine, 70% medium, 5% coarse grains, very poorly sorted, sub-rounded to sub-angular, sub-elongated to sub-spherical, good inferred visual porosity, common fractured grains, trace inclusions, no hydrocarbon shows.

ARGILLACEOUS SILTSTONE (60-90%): grey, very light grey, yellowish grey and white in part, very soft to firm, amorphous to sub-blocky, 5% very fine sand grains, trace lithic fragments, trace loose medium grained quartz sand, trace carbonaceous specks.

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CLAYSTONE (0-10%): olive black to dark grey, soft to firm, sub-blocky to blocky, trace pyrite, trace carbonaceous specks.

Show Details: No Hydrocarbon Shows

INTERVAL: 2150.0 to 2195.0 mMDRT
ROP (Range): 10 to 99 m/h
Av. ROP: 29 m/h

Inter-bedded ARGILLACEOUS SILTSTONE and SILTY CLAYSTONE

ARGILLACEOUS SILTSTONE (5-95%): brownish grey, yellowish grey and light brown in part, very soft to firm, amorphous to sub-blocky, 5% very fine to fine sand grains, trace lithic fragments, trace carbonaceous specks, trace fine grained pyrite, trace micro mica.

SILTY CLAYSTONE (5-95%): olive grey to brown, rarely white, very soft to firm, amorphous to sub-blocky, trace pyrite and carbonaceous specks, calcareous in part and firm to moderately hard.

Show Details: No Hydrocarbon Shows

INTERVAL: 2195.0 to 2235.0 mMDRT
ROP (Range): 11 to 138 m/h
Av. ROP: 48 m/h

Inter-bedded ARGILLACEOUS SILTSTONE, SILTY CLAYSTONE, and SANDSTONE with trace COAL.

ARGILLACEOUS SILTSTONE (0-40%): brownish grey, yellowish grey and light brown in part, very soft to firm, amorphous to sub-blocky, 5% very fine to fine sand grains, trace lithic fragments, trace carbonaceous specks, trace fine grained pyrite, trace micro mica.

SILTY CLAYSTONE (5-95%): olive grey to brown, rarely white, very soft to firm, amorphous to sub-blocky, trace pyrite and carbonaceous specks, calcareous in part and firm to moderately hard.

SANDSTONE (0-95%): white to yellowish grey, friable to firm, 80% very fine, 20% fine grained, moderately sorted, angular to sub-rounded, sub-spherical to sub-elongate, trace micro mica, and trace pyrite, poor to fair visual porosity, no hydrocarbon shows.

COAL (Trace): black to dark greenish black, shiny, vitreous lustre, firm to hard, conchoidal fracture, commonly angular fragments.

Show Details: No Hydrocarbon Shows

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INTERVAL: 2235.0 to 2300.0mMDRT
ROP (Range): 13 to 173 m/h
Av. ROP: 64 m/h

Massive SANDSTONE with trace COAL

SANDSTONE (99-100%): loose grains with trace aggregates as above, clear, translucent, white, pale yellow, 60% very fine, 10% fine, 10% medium, 5% coarse, 5% very coarse grained, very poorly sorted, angular to sub-rounded, sub-spherical to elongate, common fractured grains, common inclusions, good inferred porosity, no hydrocarbon shows.

COAL (0-1%): black to olive black, angular to conchoidal fracture, firm to moderately hard, shiny to vitreous lustre.

Show Details: No Hydrocarbon Shows

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INTERVAL: 2300.0 to 2352.0 mMDRT
ROP (Range): 3 to 76 m/h
Av. ROP: 21 m/h

Inter-bedded ARGILLACEOUS SILTSTONE, SANDSTONE, SILTY CLAYSTONE and minor COAL

ARGILLACEOUS SILTSTONE (0-80%): light brown to light brownish grey, very soft to soft, amorphous to sub-blocky, trace micro mica, pyrite and carbonaceous specks.

SANDSTONE (0-95%): white, soft to firm in aggregates, 40% very fine, 40% fine, 10% medium, 5% coarse, 5% very coarse grains, very poorly sorted, angular to sub-rounded, sub-elongated to sub-spherical, trace pyrite, fair inferred porosity, no hydrocarbon shows.

SILTY CLAYSTONE (0-90%): light brownish grey to light olive grey, very soft to soft, amorphous to dispersive, trace micro mica and pyrite.

COAL (0-90%): black to grayish black, firm to moderately hard, angular to conchoidal fracture, shiny to vitreous lustre, hackly appearance in part, trace calcite veinlets.

Show Details: No Hydrocarbon Shows

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INTERVAL: 2352.0 to 2368.0 mMDRT
ROP (Range): 10 to 73 m/h
Av. ROP: 22 m/h

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ARGILLACEOUS SILTSTONE inter-bedded with SILTSTONE, CLAYSTONE and minor COAL

ARGILLACEOUS SILTSTONE (0-100%): light brown, light brownish grey, brownish grey and white in part, very soft to firm, amorphous to sub-blocky, 20% clay, 5% very fine sand, trace lithic fragments, trace coal.

SILTSTONE (0-100%): olive grey to dark greenish grey, brownish grey in part, very soft to soft, amorphous to sub-blocky, 5% clay, 5% very fine quartz sand, trace lithic fragments, trace coal.

CLAYSTONE (0-100%): light olive grey to olive grey, yellowish grey, brownish grey and white in part, very soft, amorphous, 0-15% silt, trace lithic fragments, trace coal.

COAL (0-10%): black, firm to hard, angular to conchoidal, shiny to vitreous lustre, occasionally hackly in appearance, trace calcite veins.

Show Details: No Hydrocarbon Shows

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INTERVAL: 2368.0 to 2450.0 mMDRT
ROP (Range): 6 to 162 m/h
Av. ROP: 23 m/h

Inter-bedded ARGILLACEOUS SILTSTONE, SILTSTONE, SILTY CLAYSTONE and CLAYSTONE with minor inter-beds of SANDSTONE

ARGILLACEOUS SILTSTONE (0-100%): light brown, light brownish grey, brownish grey and white in part, very soft to firm, amorphous to sub-blocky, 20% clay, 10% very fine sand, trace lithic fragments, trace coal.

CLAYSTONE (0-100%): olive grey to light olive grey, yellowish grey in part, very soft, amorphous, trace coal.

SANDSTONE (0-85%): colorless, opaque, white, pale yellow, loose to friable, 50% very fine, 40% fine, 10% medium grains, poorly to moderately sorted, angular to sub-rounded, sub-elongate to sub-spherical, trace white clay matrix, poor to fair inferred porosity, no hydrocarbon fluorescence.

SILTSTONE (0-90%): light brownish grey, brownish grey and olive grey in part, very soft to soft, amorphous to sub-blocky, 10% clay, 5% fine grained sand, trace lithic fragments, trace carbonaceous specks.

SILTY CLAYSTONE (0-100%): olive grey to light olive grey, yellowish grey and brownish grey in part, very soft, amorphous, 20% silt, 1% very fine sand, trace lithic fragments, trace mica, trace pyrite.

Show Details: No Hydrocarbon Shows

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INTERVAL: 2450.0 to 2520.0 mMDRT
ROP (Range): 7 to 121 m/h
Av. ROP: 29 m/h

Interbedded SANDSTONE, ARGILLACEOUS SILTSTONE, CLAYSTONE, SILTY CLAYSTONE, and CALCAREOUS SANDSTONE with minor COAL

SANDSTONE (0-20%): colorless, opaque, white, pale yellow, loose to friable, 50% very fine, 40% fine, 10% medium grains, poorly to moderately sorted, angular to sub-rounded, sub-elongate to sub-spherical, trace white clay matrix, poor to fair inferred porosity, no hydrocarbon fluorescence.

ARGILLACEOUS SILTSTONE (10-95%): brownish grey to olive grey, soft to firm, sub-blocky to blocky, trace micro-mica, pyrite and black carbonaceous specks.

CLAYSTONE (0-10%): light brown to yellowish grey, very soft to soft, amorphous to dispersive.

SILTY CLAYSTONE (0-90%): light brownish grey to brownish grey, very soft to soft, amorphous to sub-blocky, trace micro-mica, pyrite and carbonaceous specks.

CALCAREOUS SANDSTONE (0-30%): white to yellowish grey, firm to hard, 40% very fine, 40% fine, 20% medium grains, poorly to moderately sorted, sub-angular to sub-rounded, sub-elongate to sub-spherical, trace micro-mica, trace pyrite, calcareous cemented, thin hard stringers, poor visual porosity, no hydrocarbon shows.

ARGILLACEOUS SILTSTONE (10-95%): brownish grey to olive grey, soft to firm, sub-blocky to blocky, trace micro-mica, pyrite and black carbonaceous specks.

Show Details: No Hydrocarbon Shows

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INTERVAL: 2520.0 to 2565.0 mMDRT
ROP (Range): 6 to 62 m/h
Av. ROP: 24 m/h

Massive SANDSTONE with ARGILLACEOUS SILTSTONE and SILTY CLAYSTONE inter-beds.

SANDSTONE (0-100%): loose grains, clear, white, opaque, 20% very fine, 60% fine, 10% medium, 10% coarse grains, poorly sorted, sub-angular to sub-rounded, sub-spherical to sub-elongate, trace pyrite, trace fractured grains, fair inferred porosity, no hydrocarbon fluorescence.

SILTY CLAYSTONE (0-65%): light brownish grey to brownish grey, very soft to soft, amorphous to sub-blocky, trace micro mica, pyrite and carbonaceous specks.

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ARGILLACEOUS SILTSTONE (0-80%): brownish grey to light brownish grey, soft to firm, sub-blocky to blocky, trace micro mica, pyrite and black carbonaceous specks.

Show Details: No Hydrocarbon Shows

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INTERVAL: 2565.0 to 2706.0 mMDRT
ROP (Range): 10 to 112 m/h
Av. ROP: 31 m/h

Inter-bedded ARGILLACEOUS SILTSTONE, SILTSTONE, SILTY CLAYSTONE, SANDSTONE and minor COAL

ARGILLACEOUS SILTSTONE (0-100%): brownish grey to light brownish grey, soft to firm, sub-blocky to blocky, 20-30% clay, trace micro mica, pyrite and black carbonaceous specks.

SILTSTONE (0-100%): olive black to olive grey, light olive grey in part, soft to moderately hard, sub-blocky to angular, 10-15% clay, trace pyrite, trace mica, trace coal.

SILTY CLAYSTONE (0-90%): light brownish grey to brownish grey, very soft to soft, amorphous to sub-blocky, 20-25% silt, trace micro mica, pyrite and carbonaceous specks.

SANDSTONE (0-70%): white, yellowish grey, loose to friable, 20-25% very fine, 60-70% fine, 5-10% medium, 0-10% coarse grains, sub-angular to sub-rounded, moderately to well sorted, sub-elongate to sub-spherical, poor to fair inferred porosity, no hydrocarbon fluorescence.

COAL (0-30%): black, firm to hard, angular to conchoidal, trace pyrite.

Show Details: No Hydrocarbon Shows

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INTERVAL: 2706.0 to 2772.0 mMDRT
ROP (Range): 6 to 124 m/h
Av. ROP: 26 m/h

Inter-bedded SANDSTONE, SILTSTONE, ARGILLACEOUS SILTSTONE with minor SILTY CLAYSTONE and CLAYSTONE

SANDSTONE (0-85%): white to yellowish grey, colorless and opaque in part, loose to friable, 10-20% very fine, 20-50% fine, 30-40% medium, 0-20% coarse, 0-10% very coarse grains, sub-rounded to sub-angular, very poorly sorted, sub-spherical to spherical, good inferred porosity, no hydrocarbon fluorescence.

SILTSTONE (0-50%): olive grey to light brownish grey, light olive grey in part, soft to firm, blocky to sub-blocky, 15% clay, trace coal, trace lithic fragments.

ARGILLACEOUS SILTSTONE (0-100%): olive grey to brownish grey, soft to firm, blocky to sub-blocky, 20-30% clay, trace coal, trace lithic fragments, occasional very fine grained quartz aggregates.

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SILTY CLAYSTONE (0-15%): olive grey to light olive grey, brownish grey to light brownish grey in part, very soft, amorphous to dispersive, 20% silt.

CLAYSTONE (0-100%): olive grey to light olive grey, brownish grey to light brownish grey, medium light grey in part, very soft, amorphous to dispersive, 10% silt, trace mica.

Show Details: No Hydrocarbon Shows

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INTERVAL: 2772.0 to 2811.0 mMDRT
ROP (Range): 3 to 137 m/h
Av. ROP: 18 m/h

Interbedded SILTY CLAYSTONE, CLAYSTONE, SILTSTONE and ARGILLACEOUS SILTSTONE

SILTY CLAYSTONE (0-100%): olive grey to olive black, very soft to soft, sub-blocky, trace pyrite, trace carbonaceous specks.

ARGILLACEOUS SILTSTONE (0-100%): olive grey to olive black, brownish grey to light brownish grey in part, soft to firm, sub-blocky to blocky, trace micro-mica, carbonaceous specks and pyrite.

SILTSTONE (0-100%): olive black to olive grey, light olive grey in part, soft to firm, sub-blocky to blocky, 15% clay, trace coal, trace lithic fragments, trace very fine to fine grained quartz aggregates.

CLAYSTONE (0-100%): olive grey to light olive grey, light yellow grey in part, very soft, amorphous to dispersive, trace very fine and fine sand, trace lithic fragments, trace coal.

Show Details: No Hydrocarbon Shows

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INTERVAL: 2811.0 to 2877.0 mMDRT
ROP (Range): 6 to 125 m/h
Av. ROP: 26 m/h

Inter-bedded SILTY CLAYSTONE, ARGILLACEOUS SILTSTONE, CLAYSTONE and SANDSTONE

SILTY CLAYSTONE (0-65%): light olive grey, olive grey, brownish grey, very soft to soft, angular to sub-blocky, trace pyrite, micro-mica, carbonaceous specks.

ARGILLACEOUS SILTSTONE (0-95%): olive grey, brownish grey, soft to firm, sub-blocky to blocky, trace micro-mica, carbonaceous specks and pyrite.

SANDSTONE (0-60%): white to light brown, loose to friable, 30% very fine, 40% fine, 20% medium, 10% coarse grained, sub-angular to sub-rounded, sub-elongate to sub-spherical,

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very poorly sorted, abundant white amorphous rock flour, trace micro-mica, trace pyrite, trace carbonaceous specks, fair visual porosity, no hydrocarbon fluorescence.

CLAYSTONE (0-70%): light olive grey, olive grey, soft to firm, angular to sub-blocky, trace pyrite, micro-mica.

Show Details: No Hydrocarbon Shows

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INTERVAL: 2877.0 to 2940.0 mMDRT
ROP (Range): 2 to 72 m/h
Av. ROP: 19 m/h

Massive SILTY CLAYSTONE inter-bedded with minor ARGILLACEOUS SILTSTONE.

SILTY CLAYSTONE (0-100%): light olive grey, olive black, brownish grey, very soft to firm, angular to sub-blocky, very silty in part, occasional trace loose sand grains, trace pyrite, trace micro-mica, carbonaceous specks.

ARGILLACEOUS SILTSTONE (0-30%): olive grey, brownish grey, soft to firm, sub-blocky to blocky, trace micro-mica, carbonaceous specks and pyrite.

Show Details: No Hydrocarbon Shows

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INTERVAL: 2940.0 to 2973.0 mMDRT
ROP (Range): 11 to 73 m/h
Av. ROP: 27 m/h

SANDSTONE with inter-bedded ARGILLACEOUS SILTSTONE and SILTY CLAYSTONE

SANDSTONE (0-80%): white, light olive grey, yellowish grey, friable to firm, 5% white clay matrix, 25-40% very fine, 45-55% fine, 15-20% medium, 0-5% coarse grains, sub-angular to sub-rounded, poor to moderately sorted, sub-elongate to sub-spherical, trace silica cement, trace mica, poor to fair visual porosity, mostly nil hydrocarbon fluorescence except over interval from 2937.0 - 2949.0 mMDRT where poor to fair shows.

ARGILLACEOUS SILTSTONE (5-95%): light olive grey, olive grey, brownish grey, soft to firm, angular to sub-blocky, 20-30% clay, trace mica, trace coal.

SILTY CLAYSTONE (0-95%): light olive grey, olive grey, brownish grey, very soft to firm, amorphous to sub-blocky, 20-24% silt, occasional trace very fine grained quartz sand, trace pyrite, trace mica, trace coal.

Show Details: (2937.0-2949.0mMDRT) 5-10% dull yellow, slow streaming bluish white crush cut, dull yellow green residue ring.

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INTERVAL: 2973.0 to 3055.0 mMDRT
ROP (Range): 8 to 31 m/h
Av. ROP: 15 m/h

Massive SILTY CLAYSTONE inter-bedded with minor CLAYSTONE and ARGILLACEOUS SILTSTONE

SILTY CLAYSTONE (0-100%): light olive grey, olive grey, brownish grey, very soft to firm, amorphous to sub-blocky, 20-30% silt, occasional trace very fine grained quartz sand, trace pyrite, trace mica, trace coaly specks.

CLAYSTONE (0-100%): light olive grey, olive grey, brownish grey, soft to firm, blocky to sub-blocky, 15% silt, trace mica, trace coaly specks, trace pyrite.

ARGILLACEOUS SILTSTONE (0-20%): olive grey, brownish grey, olive black, firm, angular to sub-blocky, 30% clay, trace mica, trace coaly specks.

Show Details: No Hydrocarbon Shows

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INTERVAL: 3055.0 to 3158.0 mMDRT
ROP (Range): 5 to 73 m/h
Av. ROP: 17 m/h

Inter-bedded ARGILLACEOUS SANDSTONE, SANDSTONE, ARGILLACEOUS SILTSTONE and SILTY CLAYSTONE with minor COAL

ARGILLACEOUS SANDSTONE (0-80%): white to yellowish grey, 40% very fine, 40% fine, 20% medium grained, sub-angular to sub-rounded, sub-spherical to spherical, poorly sorted, trace pyrite, trace carbonaceous specks, trace micro-mica, aggregates cemented with quartz overgrowths and clay matrix, fair visual porosity, no hydrocarbon fluorescence.

SANDSTONE (0-98%): white to yellowish grey, 40% very fine, 40% fine, 20% medium grained, sub-angular to sub-rounded, sub-spherical to spherical, poorly sorted, trace pyrite, trace carbonaceous specks, trace micro-mica, fair visual porosity, weak hydrocarbon fluorescence from trace aggregates at 3078-3084 mMDRT, generally no hydrocarbon fluorescence.

ARGILLACEOUS SILTSTONE (0-80%): olive grey, brownish grey, light olive grey, soft to firm, angular to sub-blocky, trace pyrite, trace micro-mica, trace carbonaceous specks.

SILTY CLAYSTONE (0-70%): olive grey to olive black, brownish black in part, firm, blocky to sub-blocky, 25% silt, trace coal, trace mica, trace pyrite, trace very fine grained quartz sand.

COAL (0-5%): black, firm to moderately hard, angular to conchoidal fracture, shiny to vitreous lustre, trace calcite micro-veinlets.

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Show Details: (3078.0-3084.0mMDRT): Moderate bright white direct fluorescence, very slow bluish white streaming cut, thin dull bluish green residual ring.

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INTERVAL: 3158.0 to 3196.0 mMDRT
ROP (Range): 1 to 42 m/h
Av. ROP: 13 m/h

Inter-bedded ARGILLACEOUS SILTSTONE, SILTY CLAYSTONE and ARGILLACEOUS SANDSTONE with minor COAL

ARGILLACEOUS SANDSTONE (0-100%): white to light yellowish grey and light grey, soft to firm aggregates, common loose grains, 40% very fine, 40% fine, 20% medium grained, poorly sorted, sub-angular to sub-rounded, sub-spherical to spherical, trace inclusions and fractured grains, common argillaceous matrix and carbonaceous specks, rare carbonaceous laminae, fair inferred porosity, no hydrocarbon fluorescence.

ARGILLACEOUS SILTSTONE (0-85%): olive grey, brownish grey, light olive grey, soft to firm, angular to sub-blocky, trace pyrite, trace micro-mica, trace carbonaceous specks.

SILTY CLAYSTONE (0-40%): olive grey to olive black, brownish black in part, firm, blocky to sub-blocky, 25% silt, trace mica.

COAL (0-5%): black, firm to moderately hard, angular to conchoidal fracture, shiny to vitreous lustre, trace calcite micro-veinlets.

Show Details: No Hydrocarbon Shows

 --

INTERVAL: 3196.0 to 3202.0 mMDRT
ROP (Range): 1 to 21 m/h
Av. ROP: 10 m/h

Inter-bedded SILTY CLAYSTONE, ARGILLACEOUS SANDSTONE and ARGILLACEOUS SILTSTONE

SILTY CLAYSTONE (30-45%): olive grey to olive black, brownish black in part, firm, blocky to sub-blocky, commonly laminated, 25% silt, trace mica, trace pyrite.

ARGILLACEOUS SANDSTONE (10-30%): white to light yellowish grey and light grey, soft to firm aggregates, 40% very fine, 40% fine, 20% medium grained, poorly to moderately sorted, sub-angular to sub-rounded, sub-spherical to spherical grains, trace inclusions and fractured grains, common argillaceous matrix and carbonaceous specks, rare carbonaceous laminae, poor inferred porosity, no hydrocarbon fluorescence.

ARGILLACEOUS SILTSTONE (25-80%): olive grey, brownish grey, light olive grey, soft to firm, angular to sub-blocky, trace pyrite, trace micro-mica, trace carbonaceous specks.

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Show Details: No Hydrocarbon Shows

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INTERVAL: 3212.5 to 3234.0 mMDRT
ROP (Range): 6 to 57 m/h
Av. ROP: 15 m/h

ARGILLACEOUS SANDSTONE with ARGILLACEOUS SILTSTONE and SILTY CLAYSTONE inter-beds

ARGILLACEOUS SANDSTONE (5-90%): white, yellowish grey, soft to firm, 20-30% clay, 40-50% very fine, 30-40% fine, 15-20% medium, 0-5% coarse grains, angular to sub-rounded, very poorly to moderately sorted, sub-elongate to sub-spherical, trace quartz cement, trace coal, trace mica, poor to fair visual porosity, no hydrocarbon fluorescence.

ARGILLACEOUS SILTSTONE (15-90%): olive grey, brownish grey, light olive grey, soft to firm, amorphous to blocky, 30% clay, trace mica, trace pyrite, trace coal.

SILTY CLAYSTONE (5-75%): olive grey to olive black, light olive grey, soft to very soft, amorphous to sub-blocky, 20% silt, trace coal, trace mica, trace pyrite.

Show Details: No Hydrocarbon Shows

 --

INTERVAL: 3234.0 to 3258.0 mMDRT
ROP (Range): 1 to 39 m/h
Av. ROP: 14 m/h

ARGILLACEOUS SANDSTONE and SANDSTONE inter-bedded with ARGILLACEOUS SILTSTONE and SILTY CLAYSTONE

ARGILLACEOUS SANDSTONE (0-80%): white, yellowish grey, light olive grey, soft to firm, 25% clay, 50% very fine, 30% fine, 20% medium grains, sub-angular to sub-rounded, moderately to poorly sorted, sub-elongate to sub-spherical, trace quartz cement, trace coal, trace mica, poor to fair visual porosity, no hydrocarbon fluorescence.

SANDSTONE (0-65%): white, yellowish grey, light olive grey, firm, 10% clay, 20% very fine, 20% fine, 50% medium, 5% coarse, 5% very coarse grains, angular to sub-rounded, very poorly to poorly sorted, sub-elongate to sub-spherical, trace quartz cement, fair visual porosity, no hydrocarbon fluorescence.

ARGILLACEOUS SILTSTONE (15-75%): olive grey, brownish grey, light olive grey, soft to firm, amorphous to blocky, 30% clay, trace mica, trace pyrite, trace coal.

SILTY CLAYSTONE (0-40%): olive grey to olive black, light olive grey, soft to very soft, amorphous to sub-blocky, 20% silt, trace coal, trace mica, trace pyrite.

Show Details: No Hydrocarbon Shows

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INTERVAL: 3258.0 to 3283.0 mMDRT
ROP (Range): 5 to 54 m/h
Av. ROP: 14 m/h

SILTY CLAYSTONE and CLAYSTONE with inter-beds of ARGILLACEOUS SILTSTONE

ARGILLACEOUS SILTSTONE (20-35%): olive grey, brownish grey, light olive grey, soft to firm, amorphous to blocky, 20-30% clay, trace mica, trace pyrite, trace coal.

SILTY CLAYSTONE (0-80%): olive grey to olive black, light olive grey, soft to very soft, amorphous to sub-blocky, 20% silt, trace coal, trace mica, trace pyrite.

CLAYSTONE (0-100%): olive grey to olive black, brownish grey, soft to very soft, amorphous to sub-blocky, 15% silt, trace coal, trace mica, trace pyrite.

Show Details: No Hydrocarbon Shows

INTERVAL: 3283.0 to 3290.0 mMDRT
ROP (Range): 2 to 24 m/h
Av. ROP: 8 m/h

Inter-bedded ARGILLACEOUS SILTSTONE and SILTY CLAYSTONE with minor SANDSTONE

ARGILLACEOUS SILTSTONE (30-70%): olive grey, brownish grey, soft to firm, amorphous to blocky, 20% clay, trace mica, trace pyrite, trace carbonaceous specks.

SILTY CLAYSTONE (30-69%): olive grey to olive black, soft to very soft, amorphous to sub-blocky, 20% silt, trace carbonaceous specks, trace micro-mica, trace pyrite.

SANDSTONE (0-5%): white, yellowish grey, light olive grey, firm to friable aggregates, 15% clay, 30% very fine, 50% fine, 20% medium grains, angular to sub-rounded, poorly to moderately sorted, sub-elongate to sub-spherical, trace quartz overgrowths, poor visual porosity, no hydrocarbon fluorescence, weak mineral fluorescence only.

Show Details: No Hydrocarbon Shows

INTERVAL: 3298.5 to 3300.0 mMDRT
ROP (Range): 19 to 26 m/h
Av. ROP: 9 m/h

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Inter-bedded ARGILLACEOUS SILTSTONE and SILTY CLAYSTONE with minor SANDSTONE

ARGILLACEOUS SILTSTONE (30-70%): olive grey, brownish grey, soft to firm, amorphous to blocky, 20% clay, trace mica, trace pyrite, trace carbonaceous specks.

SILTY CLAYSTONE (30-69%): olive grey to olive black, soft to very soft, amorphous to sub-blocky, 20% silt, trace carbonaceous specks, trace micro-mica, trace pyrite.

SANDSTONE (0-1%): white, yellowish grey, light olive grey, firm to friable aggregates, 30% very fine, 50% fine, 19% medium, 1% coarse grains, angular to sub-rounded, sub-elongate to sub-spherical grains, very poorly sorted, 30% quartz overgrowths and white argillaceous non-calcareous matrix, poor visual porosity, no cut fluorescence, dull yellow mineral fluorescence.

Show Details: No Hydrocarbon Shows

 --

INTERVAL: 3300.0 to 3357.0 mMDRT
ROP (Range): 4 to 189 m/h
Av. ROP: 14 m/h

SANDSTONE inter-bedded with SILTY CLAYSTONE and ARGILLACEOUS SILTSTONE

SANDSTONE (0-90%): white, yellowish grey, loose to friable, 5% white clay matrix, 0-35% very fine, 10-60% fine, 10-55% medium, 5-50% coarse, 0-20% very coarse grains, angular to rounded, very poorly to poorly sorted, sub-elongate to sub-spherical, trace quartz cement, trace very fine quartz grains, poor to fair visual porosity, no hydrocarbon fluorescence.

SILTY CLAYSTONE (0-90%): olive black to light olive grey, brownish grey in part, soft to firm, blocky to sub-blocky, 20% silt, trace mica, trace pyrite.

ARGILLACEOUS SILTSTONE (0-70%): olive black to light olive grey, brownish grey in part, soft to firm, blocky to sub-blocky, 20% clay, trace mica, trace pyrite.

Show Details: No Hydrocarbon Shows

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INTERVAL: 3357.0 to 3399.0 mMDRT
ROP (Range): 5 to 35 m/h
Av. ROP: 17 m/h

SANDSTONE inter-bedded with ARGILLACEOUS SILTSTONE and SILTY CLAYSTONE

SANDSTONE (5-80%): white, yellowish grey, loose to friable, 5% white clay matrix, 30-40% very fine, 50-60% fine, 0-20% medium grains, sub-angular to rounded, sub-spherical,

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poorly to moderately sorted, trace quartz cement, poor visual porosity, no cut fluorescence, bright pin-point white mineral fluorescence in parts.

ARGILLACEOUS SILTSTONE (15-90%): olive black to light olive grey, brownish grey in part, soft to firm, blocky to sub-blocky, 20-25% clay, trace mica, trace pyrite.

SILTY CLAYSTONE (0-25%): olive black to light olive grey, soft to firm, blocky to sub-blocky, 20% silt, non-calcareous, trace mica, trace pyrite.

Show Details: No Hydrocarbon Shows

 --

INTERVAL: 3399.0 to 3432.0 mMDRT
ROP (Range): 3 to 42 m/h
Av. ROP: 15 m/h

SANDSTONE inter-bedded with ARGILLACEOUS SILTSTONE and SILTY CLAYSTONE

SANDSTONE (5-95%): white, yellowish grey, firm to friable, 5% calcareous clay, 20% very fine, 20% fine, 60% medium grains, sub-angular to sub-rounded, sub-spherical to spherical, poorly to moderately sorted, trace mica and carbonaceous specks, poor visual porosity, no cut fluorescence, common pinpoint bright white mineral fluorescence from sandstone matrix.

ARGILLACEOUS SILTSTONE (5-15%): olive black to light olive grey, brownish grey in part, soft to firm, blocky to sub-blocky, 20% clay, trace very fine and fine grained quartz sand, trace mica, trace pyrite, trace lithic fragments, trace coal.

SILTY CLAYSTONE (0-90%): olive black to light olive grey, very soft to firm, amorphous to blocky, non-calcareous, trace micro-mica and pyrite.

Show Details: No Hydrocarbon Shows

 --

INTERVAL: 3432.0 to 3482.0 mMDRT
ROP (Range): 6 to 25 m/h
Av. ROP: 18 m/h

VARIABLY WEATHERED / DEGRADED VOLCANICS inter-bedded with minor SANDSTONE

VARIABLY WEATHERED / DEGRADED VOLCANICS (95-100%): white to light green, occasionally dark green to greenish black, firm to hard in parts, angular to blocky, occasional remnant basaltic texture visible (clay replacement), trace quartz fragments (infilling vesicles), common white calcareous matrix, common light brown kaolinitic clay, common chlorite, trace pyrite and red hematite, rare bright white mineral fluorescence, no cut fluorescence.

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SANDSTONE (0-5%): light green, dark greenish grey, friable to firm, 40% very fine. 40% fine, 20% medium grains, poorly sorted, sub-angular to angular, sub-elongate to sub-spherical, common chlorite, mildly calcareous in part, trace pyrite, no hydrocarbon fluorescence.

Show Details: No Hydrocarbon Shows

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3.2 Gas Ratio Interpretation – Introduction Lithological Summary

Gas composition and total gas in mud at the possum belly were measured using the Geoservices Reserval™ that utilises a GZG degasser to extract gas from mud. The Reserval™ also measures the Gas-In values from active pits utilising a GZG degasser installed in the active pit. The Gas-Out/Gas-In was monitored at an 80:20 ratio in the chromatograph cycle. The GFF (coupled with a GZ11degasser) was used as a backup gas detection system. Both use the FID technique of measuring ions released when hydrocarbons are burnt in a pure hydrogen flame.

Gas is extracted from the mud at the shale shakers by a degasser that is essentially an agitator inside a chamber through which the mud continually passes. 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:

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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 except 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.

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$17.5 < W_h < 40$ Non-productive residual oil.
 And $B_h > W_h$

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

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

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

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.

3.5 Gas Composition Discussion

Gas monitoring while drilling Rockhopper-1ST1 commenced using the Geoservices Reserval™ and GFF gas systems from the kick off point at 1990.0 mMDRT. Background gas was first observed from a depth of 1996.0 mMDRT, where it was present in low concentrations of around 0.10 – 0.30 % solely as methane (C1), it remained at this low concentration until approximately 2440.0 mMDRT where the background gas concentrations began to increase. Background gas increased to around 0.3 – 0.5 % to TD of the well 3482.0 mMDRT with peaks reaching as high as 13.91%. A trip gas peak of 0.9% was observed at 3309.0m after a bit trip.

There was CO₂ gas recorded in the Rockhopper-1ST1 well but no H₂S gas was observed. CO₂ gas was first observed from a depth of 2503.0 mMDRT, where it was present in very low concentrations of around 0.01-0.05% with a CO₂ peak of 0.25% seen at 2775.0 mMDRT. Background levels of CO₂ gradually increased to 0.15% from 2775.0 mMDRT. A CO₂ peak of 1.38% was observed at a depth of 2865.0 mMDRT with a background of 0.08%. The background CO₂ increased from 3010.0 mMDRT to TD of 3482.0 mMDRT with levels ranging from 0.15% to 2.35% and a peak of 5.28% seen at 3309.5 mMDRT.

There was no H₂S gas recorded in 8 ½” hole .Gas Peaks listed below are from the Reserval gas equipment. A GFF backup gas system was run as well and plotted the same trends. The Reserval gas is more analytical of gas readings and picks up more background gases and has a constant mud flow. The Backup GZ11 degasser has a higher mud flow through it and liberates more gas from the mud to the chamber and during gas zones. The calibrations of both the gas detection equipment were checked during the well and were very accurate.

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3.6 Gas Peaks (From Reserval™ Gas Detection System)

The following gas peaks were recorded while drilling Rockhopper-1ST1

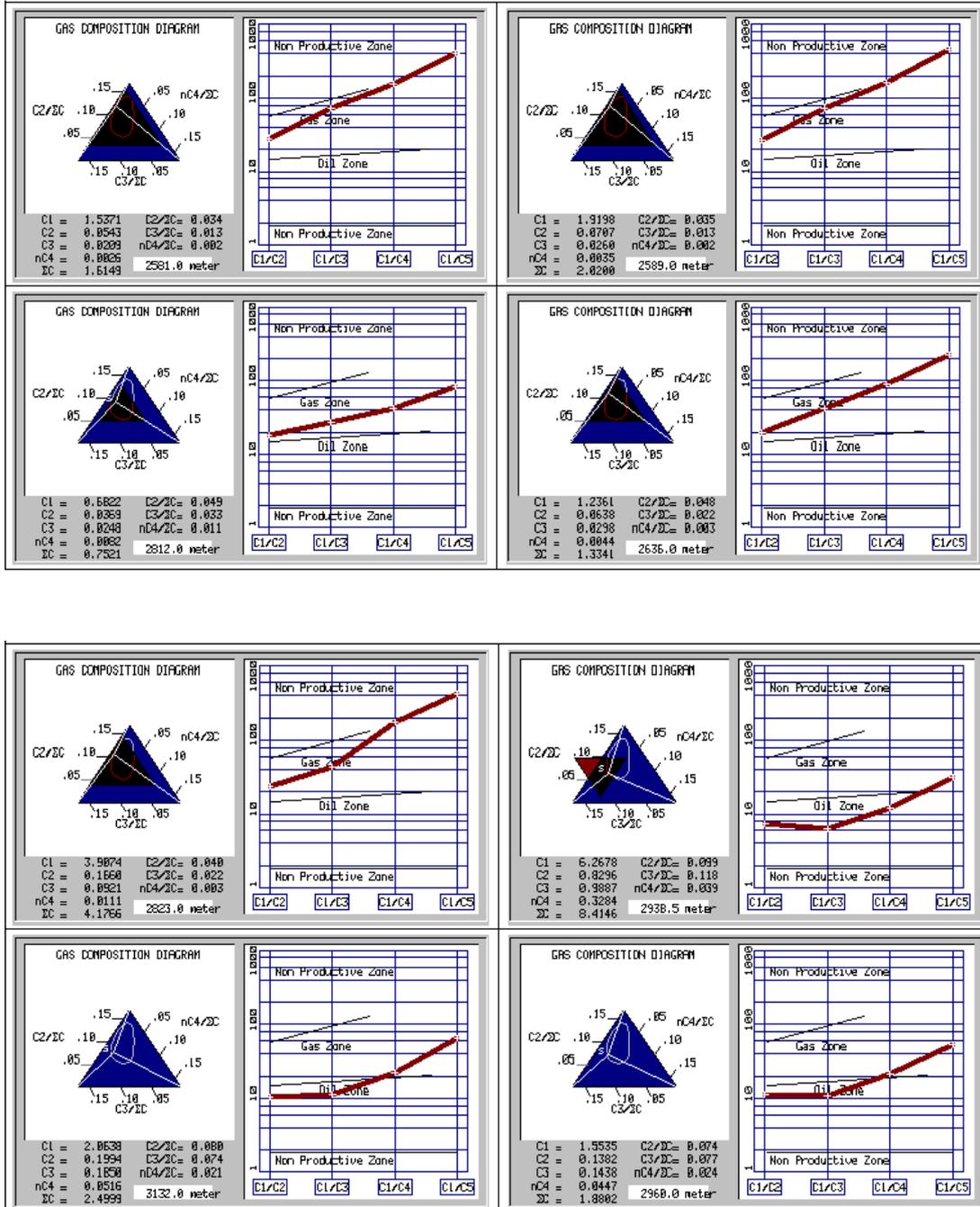
DEPTH METRES	TOTAL GAS PEAK / TRIP %	C1 %	C2 %	C3 %	iC4 %	NC4 %	C5 %
2070.5	0.2540	0.1094	0.0033	0.0033	0.0028	0.0016	0.0021
2091.5	0.3220	0.1637	0.0040	0.0035	0.0030	0.0017	0.0023
2192.5 0	0.3010	0.1096	0.0061	0.0043	0.0026	0.0017	0.0028
2306.0 0	0.2280	0.0815	0.0048	0.0032	0.0020	0.0012	0.0022
2336.0 0	0.7500	0.1880	0.0085	0.0036	0.0025	0.0013	0.0025
2467.0 0	1.0200	0.5447	0.0210	0.0125	0.0051	0.0022	0.0026
2515.0 0	0.9100	0.4821	0.0192	0.0115	0.0053	0.0022	0.0025
2581.0 0	2.5250	1.6530	0.0575	0.0218	0.0075	0.0028	0.0037
2588.0 0	3.8660	2.6680	0.0959	0.0329	0.0095	0.0037	0.0048
2635.0 0	2.8460	1.7512	0.0856	0.0360	0.0099	0.0052	0.0059
2812.5 0	2.4930	1.0636	0.0448	0.0288	0.0091	0.0087	0.0088
2823.0 0	5.9420	4.6653	0.1984	0.1140	0.0123	0.0126	0.0102
2938.5 0	13.912	6.2678	0.8296	0.9887	0.2031	0.3284	0.2027
2960.0 0	2.8370	1.5535	0.1382	0.1438	0.0278	0.0447	0.0291
3081.0 0	2.1620	1.3993	0.0977	0.0866	0.0242	0.0240	0.0191
3131.8 0	3.8840	2.0638	0.1994	0.1850	0.0416	0.0516	0.0319
3148.0 0	3.0210	1.8809	0.1601	0.1083	0.0191	0.0262	0.0154
3166.0 0	2.1090	1.7592	0.1355	0.0687	0.0086	0.0122	0.0068
3181.0 0	1.3360	1.0459	0.0649	0.0421	0.0067	0.0093	0.0062
3198.0 0	0.6690	0.4021	0.0323	0.0176	0.0030	0.0042	0.0036
3220.0 0	0.6080	0.3013	0.0416	0.0253	0.0040	0.0059	0.0043
3228.0 0	1.2970	0.6612	0.0901	0.0591	0.0101	0.0142	0.0082
3235.5 0	2.2640	1.1079	0.1818	0.1190	0.0195	0.0304	0.0167
3253.0	0.7240	0.3702	0.0422	0.0235	0.0045	0.0069	0.0054

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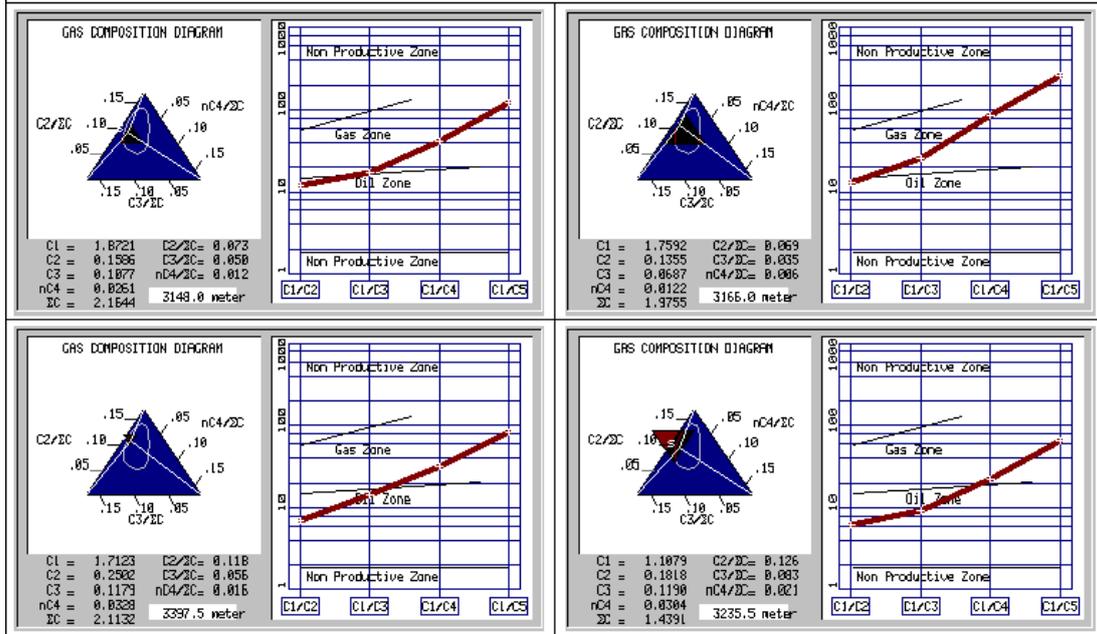
0							
3341.0							
0	0.8365	0.4407	0.0604	0.0267	0.0045	0.0066	0.0051
3354.0							
0	1.4835	0.8336	0.1103	0.0505	0.0082	0.0121	0.0073
3358.5							
0	1.3053	0.7015	0.0924	0.0446	0.0077	0.0116	0.0074
3397.0							
0	3.0941	1.7123	0.2503	0.1174	0.0214	0.0328	0.0219
3408.0							
0	1.1632	0.6545	0.0722	0.0313	0.0057	0.0091	0.0066
3418.7							
0	1.6327	0.8842	0.1218	0.0580	0.0110	0.0168	0.0112

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3.7 Gas Ratio Diagram



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4.0 PRESSURE ANALYSIS

4.1 Pressure Summary

Formation pressures were monitored throughout this well by recording a range of indicators. These indicators vary from direct observations of background gas and cuttings to drilling characteristics such as torque and tight hole, as well as quantitative methods like the D'exponent.

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 shales and clean claystones; and as an indicator in siltstones, silty shales and calcareous claystones. 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.

The D'exponent calculation was not ideally suited for the detection of overpressure in this particular instance due to the fact that PDC bits were used. However Geoservices used both qualitative and quantitative techniques to monitor for abnormal pressure. The D-exponent plus close monitoring of gas levels, pit volumes, hole conditions and mud weights ensured that the well was drilled safely. Continuous consultation with well site Geologist and MWD/LWD operators ensured that Geoservices data was cross-referenced for accuracy and reliability.

Overpressure: The trend line was set for the Rockhopper-1ST1 well from the Rockhopper-1 well depths of 1130.0 mMDRT to 2060.0 mMDRT in the 311mm (12¼") hole section, which drilled through formation dominantly consisted of a suitable Siltstone, Claystone & Sandy Siltstone. The slope of the trend line is

a coeff = 0.001304

b coeff = -0.107314

The trend through this well follows a gradual increasing trend from 1990.0 mMDRT to TD of the well at 3482.0 mMDRT. The D'exponent trend seen was one of general compaction with occasional leftward shifts, due to formation changes. A slight leftward shift was noted in places with increasing amounts of Sand and Silt in the formations drilled. No overpressure was encountered in the Rockhopper-1ST1 well.

Formation pressure evaluation using D'exponent was done using the Eaton method. The Eaton method states the relationship between the formation pressure and the Dcs/Dcn ratio depending on changes in the overburden gradient.

$$P = S - (S - P_n) * (D_{cs}/D_{cn})^{1.2}$$

Where: P : formation pressure gradient

S : overburden gradient

Pn: normal pressure gradient

Dcs: observed d'exponent

Dcn: normalised d'exponent

D'exponent:

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Coefficients used for this well, results plotted in Geoservices Pressure Log.

Poisson : a = 0.26600 b = -2.66700
source : Santa Barbara (Soft)

Overburden : a = 0.01304 b = -0.17314 c = 1.43350
source : Santa Barbara (Soft)

The Rockhopper-1ST1 well was drilled with water based mud.

Gas: No abnormality in gas ratios or connection gas was observed.

Flow-line Temperature: There were no indications of abnormal pressures from temperature measurements of Rockhopper-1ST1

Cuttings: There were no cuttings observed at the shakers that may have indicated an abnormally pressured zone in this well.

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5.0 DRILLING INFORMATION

5.1 Bit Records

BIT	Size	Type	Jets	In (m)	Out	Hour	Condition
2	8½	Baker Christensen	-	1990.0	2112.0	14.7	2-3-WT-A-E-I-ER-BHA
3	8½	REED	6x18	2112.0	3158.0	56.12	2-2-CT-C-X-IN-NO-DFT
4	8½	Security DBS	3x15,3 x12	3158.0	3196.0	3.91	0-0-NO-A-X-IN-NO-CP
5	8½	Core Bit	Core	3196.0	3212.5	3.58	0-0-NO-A-X-I-NO-BHA
4 RR	8½	Security DBS	3x12,3 x15	3212.5	3283.0	5.93	0-0-ER-A-X-I-NO-CP
5 RR	8½	Core Bit	Core32 83.0	3283.0	3298.5	2.13	0-0-NO-A-X-I-NO-PR
5 RR1	8½	Core Bit	Core	3298.5	3309.0	1.43	-
4 RR1	8½	Security DBS	3x12,3 x15	3309.0	3482.0	15.6	0-0-RR-A-X-I-NO-TD

5.2 Mud Records

The 216mm (8½") hole section was drilled with KCL/Polymer mud from 1990.0 to TD of 3482.0 mMDRT with mud weight of 9.3 ppg to 9.4 ppg.

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5.3 Drilling Phase Summary

5.3.2 216 mm (8½”) Hole Section

Dates	: 20 th January to 3 rd February 2010
Measured depth	: 2112.0 mMDRT to 3482.0 mMDRT
Vertical depth	: 2111.0 mMDRT to 3258.0 mMDRT
Number of bits used	: 4
Mud type	: KCL/Polymer

Bit #2, Baker Christensen 8 ½” bit and kick off assembly were made up and run in hole to sidetrack off Rockhopper-1 well. Drilled out cement plug from 1970.0 mMDRT to 1990.0 mMDRT. Commenced kick off at 1990.0 mMDRT. Slide orientate and rotate drilled the hole to 2112.0 mMDRT. The drill string was pulled out to surface. Bit #2 drilled 122.0 m in 14.7 hours and was graded: 2-3-WT-A-E-I-ER-BHA.

Bit #3, Reed Hycalog 8 ½” bit with Geopilot BHA was made up and RIH. Drilled 8 ½” hole to 3158.0 mMDRT with 120/140 RPM, 10/20klb WOB, 610gpm Flow, 2520 psi SPP. Sperry down hole tool failed. Sperry attempted to reset their tools. No success. Pulled out to surface from 3158.0 mMDRT. Bit #3 drilled 1046.0 m in 56.12 hours and was graded: 2-2CT-C-X-IN-NO-DFT

Bit #4, Security DBS 8 ½” BHA was made with replaced Sperry down hole tool and ran back in hole and drilled to 3196.0 mMDRT with 120/140 RPM, 10klb WOB, 600gpm Flow, 2500 psi SPP. The drill string was pulled out to surface. Bit #4 drilled 38m in 3.91 hours and was graded: 0-0-NO-A-X-IN-NO-CP.

Bit #5, Corepro 8 ½” bit was made up to a core barrel BHA and run in the hole. Cut Core #1 from 3196.0 mMDRT to 3212.5 mMDRT. Core head jammed at 3212.5 mMDRT (16.5m of core cut). Pulled out with Core Run#1 and laid out the inner barrels containing the core. 13.38m (81.0%) of core recovered. Bit #5 drilled 16.5m in 3.6 hours and was graded: 0-0-NO-A-X-I-NO-BHA

Bit #4 RR, Security DBS 8 ½” BHA was made and ran in hole. Drilled hole to 3283.0 mMDRT with 120/160 RPM, 5/20klb WOB, 580gpm Flow, 2340 psi SPP. Bit #4 RR drilled 5.3m in 70.5 hours and was graded: 00-ER-A-X-I-NO-CP

Bit #5 RR, Corepro 8 ½”. Made up Core Barrel BHA and ran in hole. Cut Core #2 from 3283.0 mMDRT to 3298.5 mMDRT. Core head jammed at 3298.5 mMDRT (15.5m of core cut) Pulled out with Core Run #2. Laid out inner barrels with core. 14.08m (90.8%) of core recovered. Bit #5 RR drilled 15.5m in 2.13 hours and was graded: 0-0-NO-A-X-I-NO-PR

Bit #5 RR1, Corepro 8 ½”. Made up Core Barrel BHA and ran in hole. Cut Core #3 from 3298.5 mMDRT to 3309.0 mMDRT. Core head jammed at 3309.0 mMDRT (10.5m of core cut) Pulled out with Core Run #3. Laid out inner barrels with core. 9.5m (90.0%) of core recovered. Bit #5 RR1 drilled 10.5m in 1.43 hours and was graded: NO

Bit #4 RR1 , Security DBS 8 ½” BHA was made and ran in hole. Reamed and logged well from 3260.0 mMDRT to 3309.0 mMDRT. Drilled hole to TD of the well 3482.0 mMDRT

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with 140/160 RPM, 5/15klb WOB, 600gpm Flow, 2450 psi SPP. Bit #4 RR1 drilled 173 m in 15.6 hours and was graded: 00-RR-A-X-I-NO-CP

Run 1: SP-HRLA-PEX-HNGS-CMR

Run 2: XPT-GR

Run 3: MDT-GR

Run 4: FMI-DSI-GR

Run 5: MSCT-GR

Run 6: VSI-GR

Wiper Trip

Run 7:MRPA (DUAL PACKER)-GR

Rockhopper-1ST1 was plugged and abandoned.

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6.0 ENCLOSURES

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|----|--------------------------|-------|
| A. | ASCII Data Disc | |
| B. | Formation Evaluation Log | 1:500 |
| C. | Drilling Data Log | 1:500 |
| D. | Pressure Evaluation Log | 1:500 |
| E. | Gas Evaluation Log | 1:500 |
| F. | Cuttings Sample Manifest | |

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