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SANTOS LIMITED

(A.B.N. 80 007 550 923)

JARVER 1

INTERPRETED DATA REPORT

PREPARED BY:
J.Pitman
(Consultant)
October 2008

JARVER 1

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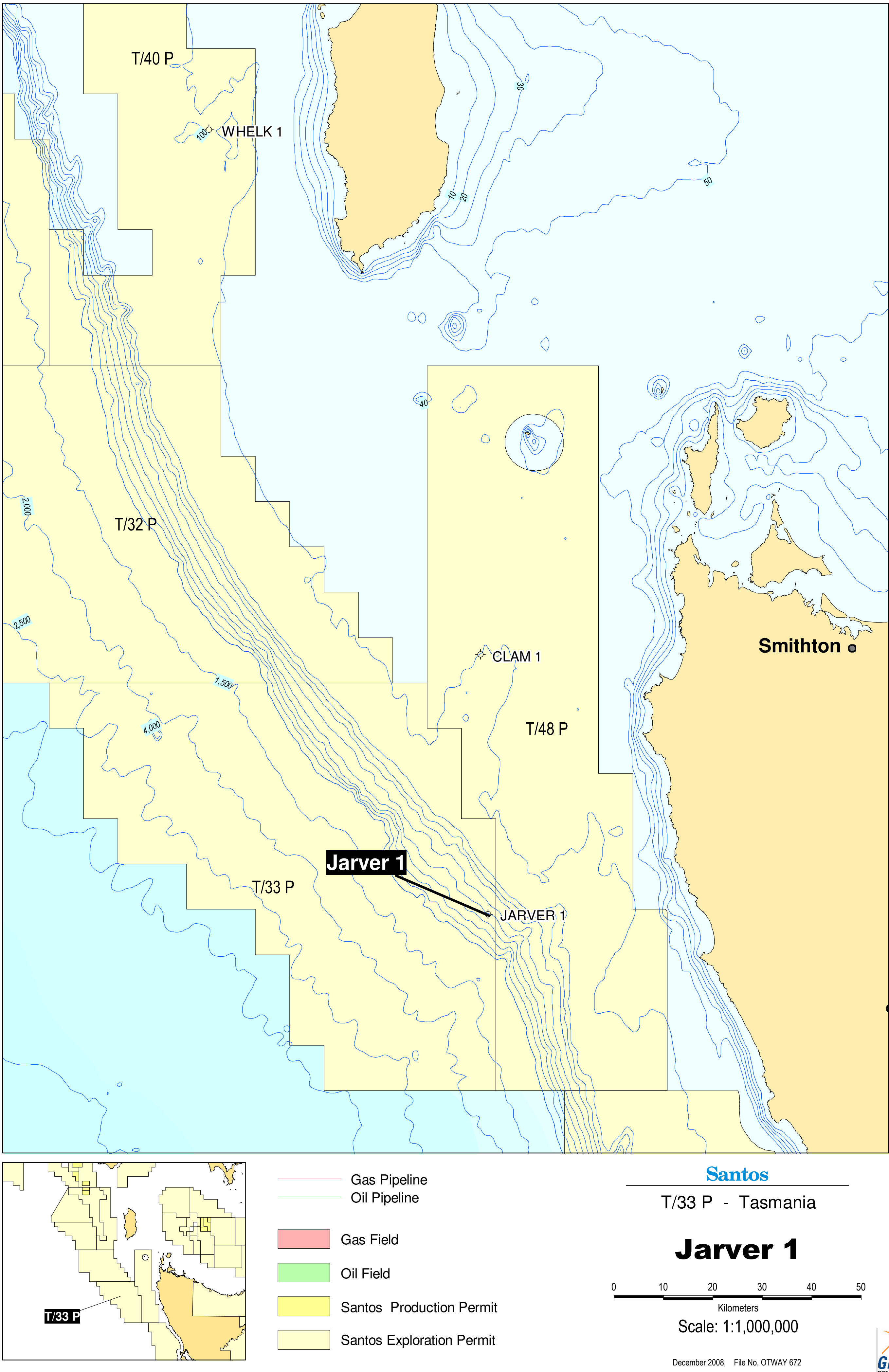
REGIONAL LOCATION MAP



Santos

T/33 P - Tasmania

Jarver 1

0 10 20 30 40 50

Kilometers

Scale: 1:1,000,000

December 2008, File No. OTWAY 672

GDA

WELL CARD

WELL: JARVER 1	**WELL CATEGORY:** Offshore Gas / Oil Exploration	**SPUD:** 05:30 16/05/2008 **TD REACHED:** 07:30 04/06/2008
	WELL INTENT: Gas / Oil	**RIG RELEASED:** 09:00 18/06/2008
		RIG: Ocean Patriot
SURFACE LOCATION: **LAT:** 41° 20' 27.25" S **LONG:** 144° 14' 03.19" E **(GDA94)** **NORTHING:** 5 418 350.393 m **EASTING:** 770 615.074 m **(MGA 54)**		**STATUS:** Abandoned Dry Hole (ABDH)
SEISMIC STATION: DS01-142X, Trace 1280		**REMARKS:** The well was plugged and abandoned having intersected the prognosed geological section. Way point between Jarver 1 and Pecten East 1 reached at 09:00 hours on 18/06/2008.
ELEVATION SEA FLOOR: -576.85 m, **RT:** +20.85 m AHD **RT–SEA FLOOR:** 597.7 m		
BLOCK / LICENCE: Tasmania, T/33P		
TD: 3062 m **(Logger Extrap.)**, 3062 m MD **(Driller)**		
PBTD: Well Plugged and Abandoned – Cement Plugs Set		
TYPE STRUCTURE: Anticlinal: 4 Way Dip Closure		
TYPE COMPLETION: Nil		
ZONE(S): Nil		

HOLE SIZE	CASING SIZE	SHOE DEPTH	TYPE
914 mm (36")	762 mm (30")	643 m	X52, 461kg/m (310 lb/ft), X52
660 mm (26")	508 mm (20")	1398 m	X56, 198 kg/m (133 lb/ft)
445 mm (17½")	340 mm (13 3/8")	1942 m	L80, 101 kg/m (68 lb/ft)

SEISMIC HORIZON	AGE	FORMATION OR ZONE TOPS	DEPTH (m) LGR (mRT)	SUBSEA (TVDSS)	THICKNESS (metres) (TVD)	HIGH (H) LOW (L)
		SEA LEVEL	20.9	0.0		
	MID – LATE MIOCENE	SEA FLOOR AND HEYTESBURY GROUP	597.7	-576.8	578.3	0.8 m L
T20	EOCENE	WANGERRIP GROUP	1176.0	-1155.1	194.0	199.9 m H
	PALAEOCENE	PEBBLE POINT FORMATION	1370.0	-1349.1	198.0	N.P.
	PALAEOCENE	MASSACRE SHALE	1568.0	-1547.1	64.0	N.P.
T1	LATE CRETACEOUS	SHERBROOK GROUP: TIMBOON SANDSTONE	1632.0	-1611.1	371.0	118.9 m H
K93	LATE CRETACEOUS	PAARATTE FORMATION	2003.0	-1982.1	345.0	162.9 m H
	LATE CRETACEOUS	SKULL CREEK MUDSTONE	2348.0	-2327.1	344.0	N.P.
K83	LATE CRETACEOUS	BELFAST MUDSTONE: THYLACINE MEMBER	2692.0	-2671.1	90.0	208.9 m H
	LATE CRETACEOUS	FLAXMANS FORMATION	2782.0	-2761.1	218.0	N.P.
		CONGLOMERATE	3000.0	-2979.1	62.0+	N.P.
		TOTAL DEPTH	**3062.0**	**-3041.1**		**238.9 m H**

N.P. = Not Prognosed.

LOG INTERPRETATION				
FORMATION	**INTERVAL (m)**	**NET PAY (m)**	**Ø %**	**SW %**
No Net Pay Identified.				

PERFORATIONS	
FORMATION	**INTERVAL (m)**
Well Plugged and Abandoned	

CORES CUT				
FORM.	**NO.**	**INTERVAL (m)**	**CUT**	**REC.**
		No Cores Cut		

LOG (WIRELINE)	SUITE / RUN	INTERVAL (m)	COMMENTS
VSP (Checkshot)	1 / 1	3060 – 795	72.2ºC (162ºFht)/ 28.5 hours. Loss of signal at 795m.
CST–GR	1 / 2	Mis-run	Sample examination indicates the sidewall cores fired simultaneously. 9 cores were recovered, 1 lost bullet and 20 misfires.

LOG (LWD)	SUITE / RUN	INTERVAL (m)	COMMENTS
ARC–MWD	1 / 1	1407 – 1947	445 mm (17½") hole section. Final Circulating Temperature: 29ºC.
ARC5-MWD-SONIC-ADN	2 / 1	1942 – 3061.8	311mm (12¼") hole section.

PRODUCTION TEST RESULTS
No Production Tests were conducted.

SUMMARY:

Jarver 1 is located in permit T/33P, in the Sorell Basin, offshore western Tasmania. The Jarver Prospect is a moderate relief 4-way dip anticline. The primary target was the Thylacine Member-equivalent sandstones, with top seal provided by the Belfast Mudstone. The secondary target was the Paaratte Formation sandstones, with top seal provided by intra-formational shales.

Jarver 1 was spudded at 05:30 hours on 16th May 2008 utilising the semi-submersible drilling facility "Ocean Patriot". The 914mm (36") hole section was drilled from seafloor at 597.7m to 645m. A string of 762mm (30") conductor casing was run and set at 643m. The 660m (26") hole section was drilled in one bit run from 645m to 1407m. A string of 508mm (20") casing was run and set at 1399m. The blow out preventer and marine riser were run and pressure tested. The 445mm (17½") hole section was drilled in 1 bit run to section end at 1947m. A string of 340mm (13 3/8") 101 kg/m (68 lb/ft) L80 casing was run with the shoe set at 1942m. The 311mm (12 ¼") hole was drilled in one bit run to total depth at 3062m. Total depth was reached at 07:30 hours on 4th June 2008. Suite 1 wireline logs were conducted and the well was plugged and abandoned. Anchors were pulled and the rig was on tow to Portland at 20:30 hours on 15th June 2008. Way point for the tow Jarver 1 / Pecten East 1 was reached at 09:00 hours on 18th June 2008.

Formations were intersected from 208.9m high for the primary target Thylacine Equivalent to 118.9m high for the Timboon Sandstone. Trace dull orange fluorescence was observed in cuttings samples from the Paaratte Formation. No significant gas peaks were observed.

One suite of wireline logs was conducted after reaching total depth and consisted of:
Run 1: VSP (Check-shot).
Run 2: CST (Miss-run, shots fired simultaneously.).

LWD/MWD tools were run while drilling consisting of:
Run 1: ARC-MWD (445mm (17½") hole section).
Run 2: ARC5-MWD-SONIC-ADN (311mm (12¼") hole section).

AUTHOR: J.PITMAN	**DATE:** January, 2009

1. <u>GEOLOGY</u>

1.1 INTRODUCTION

The Jarver Prospect is located in Permit T/33P, in the Sorell Basin, offshore western Tasmania.

The Sorell Basin is considered to be a southern extension of the Otway Basin. The Jarver prospect tested a similar Late Cretaceous play to that which has been proven in the Shipwreck Trough region of the offshore Otway Basin.

The Jarver Prospect targets a 4-way dip closure with Belfast Mudstone top seal and Thylacine Sandstone Member reservoir, charged from the Eumeralla Formation. This play has been proven in the Thylacine and Geographe Fields in the offshore Otway Basin.

The Thylacine Sandstone is located at the base of the Belfast Mudstone and is an amplitude-driven play. Regional mapping of this unit shows high amplitude low frequency anomalies at the Geographe and Thylacine gas fields in the Otway Basin, with a string of similar amplitude anomalies extending southwards through the Sorell Basin. These amplitude anomalies include the Aragorn Prospect in the Woodside-operated Permit T/34P, the Florey Prospect in T/35P, Wolseley and Savage Prospects in T/32P and Taylor and Jarver Prospects in T/33P. Jarver is the southern-most of these anomalies, and the largest of these prospects in shallow enough water to be drilled by the Ocean Patriot semi-submersible rig, which was contracted to Santos in 2008.

The Jarver Prospect is defined by an area of elevated amplitude anomalies, which roughly conform to a moderate relief 4-way dip anticline. Upside is given by potential stratigraphic trapping as sands pinch out onto the margins of a palaeo-high.

Distance from analogue fields and difficulty of correlation increases the risk on this prospect.

Success or failure of this prospect will impact the risk and uncertainty ranges of remaining prospects along this play trend in the Sorell Basin

1.2 FIELD DESCRIPTION (after well proposal Jarver 1)

The Sorell Basin formed during oblique rifting between the Australian and Antarctic continents in the Late Cretaceous. While relatively open ocean conditions existed to the north and west in the Otway Basin, a restricted marine embayment was formed in the Sorell region, bounded to the southeast by a land-bridge between the two continents, which did not separate until the Eocene.

Late Cretaceous reservoir sandstones, belonging to the Waarre Formation, Flaxman Formation and Thylacine Sandstone Member, form the main productive zones within fields such as Casino (Santos-operated), Minerva, La Bella, Thylacine and Geographe, located north of the deep water acreage trend. These sandstones exhibit excellent reservoir quality with average log porosity in the range of 15-28% and permeabilities of up to 8 Darcies.

These sandstones are mapped extending southwards into Santos' deepwater permits. Deposition of coarse-grained siliciclastics in the Turonian-Santonian is associated with periodic fluvio-deltaic pulses into an overall upwards-deepening/fining section (Belfast Mudstone), providing an effective reservoir-seal couplet. Regional regression in the Campanian led to renewed coarse-grained, fluvio-deltaic input to the basin as the Paaratte and Timboon Sandstone. Potential sealing sequences of the Skull Creek and Timboon mudstones and the Massacre Shale are observed to thicken into the basin. Mild structural inversion in the latest Cretaceous was followed by rapid subsidence and transgression resulting in retrogradation of the deltaic systems and deposition of the Wangerrip Group in the Palaeogene. Eventually the marginal sedimentary systems were drowned and, in association with the opening of the seaway in the late Eocene and subsequent formation of the Circum-Antarctic current, deposition came to be dominated by cool-water carbonates that persist through to the present day.

Eight offshore discoveries have been made to date proving in excess of 1.7 TCF recoverable gas. These discoveries have been full to spill, with liquids content increasing generally from north to south. Hydrocarbon charge in the basin is considered to come from Albian-aged, Eumeralla Formation source rocks.

The Jarver Prospect is located in Permit T/33P, in the Sorell Basin, offshore western Tasmania.

The Sorell Basin is considered to be a southern extension of the Otway Basin. The Jarver prospect will test a similar Late Cretaceous play to that which has been proven in the offshore Otway Basin

1.3 WELL LOCATION

The Jarver Prospect is a moderate relief 4-way dip anticline. Upside is given by potential stratigraphic trapping as sands pinch out onto the margins of a palaeo-high.

Two reservoir targets have been identified. The primary target is the Thylacine Member-equivalent sandstones, with top seal provided by the Belfast Mudstone. The secondary target is the Paaratte Fm sandstones, with top seal provided by intra-formational shales.

All gas discoveries in the Otway Basin to the north exhibit elevated full-stack seismic amplitudes which conform to structural closure and extent of hydrocarbon in place. The Jarver Prospect also exhibits elevated full-stack seismic amplitudes at the Thylacine level in an area which conforms roughly to anticlinal closure. This slightly reduces the charge risk on the prospect, although the distance from the nearest analogue field limits the level of confidence in seismic amplitudes.

Elevated amplitudes at Paaratte Fm level extend beyond the anticlinal closure to pinch out on the basement high to the north-west. If the anomalous amplitudes in the Paaratte Formation are also indicative of hydrocarbon in place, then a more complicated trapping mechanism must be invoked, involving a stratigraphic component

Geological Prognosis

Play – THYLACINE MEMBER

The Sorell Basin is an unproven basin. The base of the Belfast Mudstone can be mapped regionally, extending southwards from the Otway Basin into the Sorell Basin. The Thylacine Sandstone is located at the base of the Belfast Mudstone and is an amplitude-driven play. Regional mapping of this unit shows high amplitude low frequency anomalies at the Geographe and Thylacine gas fields in the Otway Basin, with a string of similar amplitude anomalies extending southwards through the Sorell Basin. These amplitude anomalies include the Aragorn Prospect in the Woodside-operated Permit T/34P, the Florey Prospect in T/35P, Wolseley and Savage Prospects in T/32P and Taylor and Jarver Prospects in T/33P. Jarver is the southern-most of these anomalies.

Closure

New seismic data acquired in 2006 confirmed the moderate-relief 4-way dip anticline at the Jarver Prospect. The key risk for closure is related to depth conversion of the structure.

Reservoir

The nearest wells, Clam 1, Whelk 1 and Cape Sorell 1, are sand-prone in the Late Cretaceous section. Confidence of sand presence is only reduced by the distance from wells and difficulty of correlation.

Seal

The Belfast Mudstone provides a top seal for this reservoir unit and can be correlated from the offshore Otway wells to the north. The closest well to the Jarver Prospect is Clam 1, which was in a separate sub-basin and highly sand-prone. The more distal location of the Jarver prospect is anticipated to result in a more shale prone section which should aid in forming competent reservoir seals. However, there is a risk that this unit may be silty or absent and hence fail to seal the trap. Minor crestal faulting identified on new data may be a seal risk. However, throw of faults appears to be substantially less than interpreted thickness of top seal.

Charge

The Sorell Basin is unproven as a petroleum system. The Eumeralla Formation is the proven source unit in the Otway Basin to the north. A thick band of elevated amplitude has been correlated from the Otway Basin, which is thought to relate to the coals within the Eumeralla Formation. However, due to the distance from wells and difficulty of correlation, this correlation is uncertain. Assuming that these events are Eumeralla Formation or another similar source interval, maturity modelling indicates that this should be within the current-day oil and gas window in the vicinity of the Jarver Prospect, with migration updip into the prospect. Elevated seismic amplitudes over the Jarver Prospect, which roughly conform to anticlinal closure, slightly reduces the charge risk for the prospect, by analogue with the discovered fields in the Otway Basin to the north

The Surface Surveyed Location for Jarver 1 is:

Surveyed Location (GDA94)	Latitude: 41° 20' 27.25" South Longitude: 144° 14' 03.19" East Northing: 5 418 350.393 m Easting: 770 615.074 m
Seismic Location:	DS01-142X, Trace 1280

2. RESULTS OF DRILLING

2.1 STRATIGRAPHY & GEOPHYSICAL PROGNOSIS

Formations were intersected from 208.9m high for the primary target Thylacine Equivalent to 118.9m high for the Timboon Sandstone.

TABLE 1: SUMMARY OF SEISMIC MARKERS

SEISMIC HORIZON	AGE	FORMATION	ACTUAL mRT	ACTUAL TVDSS	HIGH (H) LOW (L)
		SEA LEVEL	20.9	0.0	
	MID – LATE MIOCENE	SEA FLOOR AND HEYTESBURY GROUP	597.7	-576.8	0.8 m L
T20	EOCENE	WANGERRIP GROUP	1176.0	-1155.1	199.9 m H
	PALAEOCENE	PEBBLE POINT FORMATION	1370.0	-1349.1	N.P.
	PALAEOCENE	MASSACRE SHALE	1568.0	-1547.1	N.P.
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	LATE CRETACEOUS	SKULL CREEK MUDSTONE	2348.0	-2327.1	N.P.
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	LATE CRETACEOUS	FLAXMANS FORMATION	2782.0	-2761.1	N.P.
		CONGLOMERATE	3000.0	-2979.1	N.P.
		TOTAL DEPTH	**3062.0**	**-3041.1**	**238.9 m H**

N.P. = Not Prognosed.

2.2 STRATIGRAPHY & DEPOSITIONAL ENVIRONMENT (Drillers LWD RT Depths)

The well card at the front of this report tables the subsea elevations and thickness of formations penetrated in Jarver 1. A brief description of typical lithology for the Jarver 1 location and interpreted environments of deposition follows. More detailed descriptions can be found in Section 2.1 of the Basic Data Report.

The well reached total depth after penetrating 62m of **CONGLOMERATE**. This formation Sandstone (described as Meta-sandstone) which is clear to translucent with an occasional red-orange stain, it has rare nodular pyrite and common red and green lithics, common feldspars and biotite, quartz grains are disaggregated and fractured, porosity is inferred to be tight and there was no hydrocarbon fluorescence. Interbedded Siltstones (described as Meta-siltstone) are white to very light greenish grey, pinkish grey, cuttings are soft due to the cutting action of the PDC bit producing rock flour.

The **FLAXMANS FORMATION** (Late Cretaceous) overlies the lower Conglomerate and is 218m thick at the Jarver 1 location. The formation consists of interbedded siltstone and sandstone. Siltstones are medium grey to medium dark grey, argillaceous grading to CLAYSTONE, locally arenaceous grading to very fine SANDSTONE. The siltstones have minor fine carbonaceous specks and thin laminae, trace lithics and are soft to firm becoming friable when grading to fine grained sandstone. The clay content of samples is dispersive and easily washes from samples. Sandstones are very light brown to very light brownish grey, off white, very fine to fine grained and are well sorted, sub angular to predominately sub rounded with trace weak calcareous cement and abundant off white argillaceous matrix. There are trace carbonaceous flecks and trace fine grained glauconite. Sandstones are friable with very poor visual porosity and no fluorescence. The Flaxmans Formation was deposited in a lower delta plain distributary proximal to a restricted marine environment.

The base of the Belfast Mudstone can be mapped regionally, extending southwards from the Otway Basin into the Sorell Basin. The **THYLACINE SANDSTONE** (Late Cretaceous) is located at the base of the Belfast Mudstone and is an amplitude-driven play. Regional mapping of this unit shows high amplitude low frequency anomalies at the Geographe and Thylacine gas fields in the Otway Basin, with a string of similar amplitude anomalies extending southwards through the Sorell Basin. The formation at the Jarver 1 location consists of sandstone with interbedded siltstone. Siltstones are medium grey to medium dark grey, argillaceous grading to and interbedded with CLAYSTONE, locally arenaceous grading to very fine SANDSTONE, with minor fine carbonaceous specks and thin laminae, trace lithics, cuttings are soft to firm, friable when grading to sandstone, dispersive to blocky. Sandstones are clear to translucent , off white, light to medium grey, light brown, very fine to medium grained, moderately sorted, sub angular to sub rounded, with light brown argillaceous to silty matrix which easily washes from samples, trace red lithics, grains are predominantly loose with trace friable aggregates, very poor inferred porosity and no fluorescence was observed.

The **SKULL CREEK MUDSTONE** (Late Cretaceous), (sometimes considered part of the Paaratte Formation), unconformably overlies the Thylacine Sandstone. The Skull Creek Mudstone is 344m thick at the Jarver 1 location and consists of interbedded Claystone, Siltstone and Sandstones. Siltstones are light to medium grey, light to medium greenish grey, occasionally medium brownish grey with common carbonaceous flecks. Siltstones are arenaceous locally grading to very fine silty SANDSTONE and have trace very fine glauconite, trace micro mica and are soft to firm, locally dispersive to blocky. Claystones are medium grey to medium dark grey, greenish grey, minor red brown and silty grading to argillaceous SILTSTONE. There are minor fine carbonaceous flecks, rare nodular pyrite, trace micro mica, minor fine grained glauconite and trace lithics. Claystones are soft to firm, dispersive to blocky occasionally sub fissile. Sandstones are very light brown, very light brownish grey to off white, very fine to fine grained, well sorted, sub angular to predominately sub rounded with weak calcareous cement and abundant off white argillaceous matrix, trace carbonaceous flecks, trace fine grained glauconite, aggregates are firm to friable with very poor visual porosity, no fluorescence was observed in cuttings. A pro-delta environment of deposition is interpreted for the Skull Creek Mudstone.

The **PAARATTE FORMATION** (Late Cretaceous) conformably overlies the Skull Creek Mudstone and is the youngest formation of the Sherbrook Group. The Paaratte Formation was intersected at 2003m, 162.9m high to prognosis. The formation typically consists of interbedded siltstone and sandstone. The Siltstone is medium grey to medium dark grey, brownish grey, locally very finely arenaceous, argillaceous with clay content easily washed from samples with rare fine carbonaceous specks, trace micro mica, trace very fine lithics and trace nodular pyrite, cuttings are soft to firm and dispersive to blocky. The Sandstone is typically clear to translucent very fine to medium grained, sub angular to predominately sub rounded grains with common white to off white argillaceous matrix, there are trace fine carbonaceous specks, nodular pyrite and trace lithics, cuttings are soft to friable, with poor visual porosity. Trace fluorescence was observed in fine grained aggregates at 2328m.

The **TIMBOON FORMATION** (Late Cretaceous) overlies the Paaratte Formation. The formation typically consists of thin to fairly thick sandstone packages, interbedded with siltstone. The sandstone is typically clear to translucent occasionally with yellow Fe staining, fine to medium grained with trace loose coarse grains, there is common light grey silty / argillaceous matrix which easily washes from samples, rare pyrite and trace orange lithics with poor inferred porosity and no hydrocarbon fluorescence. The siltstone is light to medium grey, arenaceous, commonly argillaceous grading to Claystone, there is trace carbonaceous specks and muscovite and cuttings samples are generally soft to dispersive. The Timboon Formation was deposited in a deltaic environment.

The **MASSACRE SHALE** (Palaeocene) overlies the Timboon Formation. The formation typically consists of siltstone / claystone interbedded with minor sandstone. The claystone is typically medium to dark grey, medium to dark brown, arenaceous and grades to silty sandstone and is moderately hard and generally sub blocky. The interbedded sandstone are light to medium grey, clear to translucent to off white, fine to coarse grained. The sandstone is poorly sorted with sub angular to minor angular grains. The sandstone has common strong calcareous and siliceous cement and minor white argillaceous matrix. There is rare pyrite and the aggregates are hard. There are loose grains in part and no hydrocarbon fluorescence was observed. The Massacre Shale forms the boundary between the Cretaceous and the Tertiary.

Overlying the Massacre Shale is the oldest unit in the **Wangerrip Group**, the **PEBBLE POINT FORMATION** (Palaeocene). At Jarver 1, the Pebble Point is 198m thick and consists of Sandstone with interbedded Claystone. The Sandstone is clear to translucent, light grey, fine to medium grained with minor coarse grains, sub angular to sub rounded with trace weak to moderately strong siliceous cement. Aggregates are friable to moderately hard but generally loose and has fair to good inferred porosity, no hydrocarbon fluorescence was observed. The interbedded claystone is medium grey to dark grey, slightly arenaceous, soft to firm and dispersive easily washing from the cuttings samples. The environment of deposition for the Pebble Point is interpreted to be shallow water, nearshore, restricted marine with periodic influxes of coarse detrital material.

Formations overlying the Pebble Point Formation were not observed in drill cuttings at the Jarver 1 location as all returns were to the seafloor prior to running the 508mm (20") casing, blow out preventer and marine riser at 1407m.

2.3 HYDROCARBON SUMMARY (Logger's MDRT Depths)

Ditch gas values were monitored and recorded in units (U) by F.I.D (flame ionisation detector) Total Gas detector, where one unit is equivalent to 200 ppm (parts per million) of methane gas in air. The ditch gas was also monitored for hydrocarbon gas composition by a F.I.D. chromatograph. Gas composition refers to percent components of the hydrocarbon alkane series: (methane, ethane, propane, butane and pentane). Gas compositions are quoted as the percentage ratios of these five gases (ie 94/2/1/1/1 denotes 94% C1, 2% C2, 1% C3, 1% C4 and 1% C5). Ditch cuttings were tested for hydrocarbon fluorescence by using an ultra-violet fluoroscope.

Background gas remained low through-out the drilling of Jarver 1. Trace fluorescence was observed in cuttings samples in the secondary target Paaratte Formation however no pay is assigned.

2.4 SUMMARY

Jarver 1 is located in permit T/33P, in the Sorell Basin, offshore western Tasmania. The Jarver Prospect is a moderate relief 4-way dip anticline. The primary target was the Thylacine Member-equivalent sandstones, with top seal provided by the Belfast Mudstone. The secondary target was the Paaratte Formation sandstones, with top seal provided by intra-formational shales.

Jarver 1 was spudded at 05:30 hours on 16th May 2008 utilising the semi-submersible drilling facility "Ocean Patriot". The 914mm (36") hole section was drilled from seafloor at 597.7m to 645m. A string of 762mm (30") conductor casing was run and set at 643m. The 660m (26") hole section was drilled in one bit run from 645m to 1407m. A string of 508mm (20") casing was run and set at 1399m. The blow out preventer and marine riser were run and pressure tested. The 445mm (17½") hole section was drilled in 1 bit run to section end at 1947m. A string of 340mm (13 3/8") 101 kg/m (68 lb/ft) L80 casing was run with the shoe set at 1942m. The 311mm (12 ¼") hole was drilled in one bit run to total depth at 3062m. Total depth was reached at 07:30 hours on 4th June 2008. Suite 1 wireline logs were conducted and the well was plugged and abandoned. Anchors were pulled and the rig was on tow to Portland at 20:30 hours on 15th June 2008. Way point for the tow Jarver 1 / Pecten East 1 was reached at 09:00 hours on 18th June 2008.

Formations were intersected from 208.9m high for the primary target Thylacine Equivalent to 118.9m high for the Timboon Sandstone. Trace dull orange fluorescence was observed in cuttings samples from the Paaratte Formation. No significant gas peaks were observed.

One suite of wireline logs was conducted after reaching total depth and consisted of:
Run 1: VSP (Check-shot)
Run 2: CST (Mis-run, shots fired simultaneously.)

LWD/MWD tools were run while drilling consisting of:
Run 1: ARC-MWD (445mm (17½") hole section.)
Run 2: ARC5-MWD-SONIC-ADN (311mm (12¼") hole section)

3. REFERENCES

SANTOS, 2008	JARVER 1 Well Proposal, prepared for SANTOS Ltd, (unpublished).
J.PITMAN, 2008	JARVER 1 Basic Data Report, prepared for SANTOS Limited, (unpublished).
SANTOS, 2008	JARVER 1 Log Analysis, prepared for SANTOS Limited, (unpublished).
SUBRAMANIAN, R., 2005	HENRY-1 & HENRY-1 ST1 Interpreted Data Report, prepared for SANTOS Limited, (unpublished).

APPENDIX I : ELECTRIC LOG EVALUATION RESULTS

PETROPHYSICAL FORMATION EVALUATION

Well Name: Jarver 1

Basin: Sorell Basin

Report Location: \\adefp01\Tech_Servs\PETRO\General\Documents\Log Analysis

WES Location: \\emu\data\wesoa\jarver_1_2008065.cgm

JARVER 1

Jarver 1 was drilled as an exploration well. A 30” conductor casing was set at 643mMDRT followed by 20” and 13⅜” casing set at 1399 and 1942mMDRT respectuvely. A 12¼” hole was then drilled with KCl/Polymer mud to a total depth of 3062mMDRT.

Jarver 1 LWD memory logs were analysed over in the interval 1993m - TD and no hydrocarbon bearing intervals have been identified. Due to the absence of any hydrocarbon shows, the well was permanently abandoned by placing cement plugs.

Unless otherwise specified, all depths mentioned below are wireline depths referenced to the drill floor.

Discussion

No hydrocarbon shows were recorded on the mudlogs during the drilling of this well.

Logs Acquired

Run 1: LWD (17½” hole)

GR_ARC	1385.0 – 1935.0m	
P16H	1385.0 – 1935.0m	
P22H	1385.0 – 1935.0m	
P28H	1385.0 – 1935.0m	
P34H	1385.0 – 1935.0m	
P40H	1385.0 – 1935.0m	

Run 2: LWD (12¼” hole)

GR_ARC	1935.0 – 3047.2m	
P16H	1935.0 – 3047.3m	
P22H	1935.0 – 3047.3m	
P28H	1935.0 – 3047.3m	
P34H	1935.0 – 3047.3m	
P40H	1935.0 – 3047.3m	
RHOB	1935.0 – 3024.0m	
TNPH	1935.0 – 3022.0m	
DTCO	1938.4 – 3033.0m	

Run 3: VSP-GR

VSP-GR	795.0 – 3062.0	BHT: 72.2ºC after 28.5hrs

Run 4: CST-GR

CST-GR	1985.0 – 3046.0	9 Recovered, 1 lost and 20 misfired.

Mud Parameters

Mud Type	KCl/Glycol
Mud Density	10.4ppg
KCl	8.2%
Rm	0.0912Ωm @ 22°C
Rmf	0.0840Ωm @ 26.8°C
Rmc	0.1782 Ωm @ 22.8°C
MRT	72.2°C at 3062m

Remarks

- The borehole conditions were considered to be satisfactory.
- Data acquired was of fair quality and considered to be fit for purpose.
- During the CST run, electrical lines 1 and 2 of the sidewall core gun failed resulting in 20 misfires.

Log Processing

- No corrections were applied to the LWD logs due to non availability of Anadrill modules in Geolog. Raw data received from Anadrill are assumed to be environmentally corrected.
- Data from offset wells were used to derive the R_w used for this analysis.
- Jarver 1 was evaluated using Multimin module of Geolog.
- Permeability was not estimated due to lack of mobility data for calibration.

Interpretation Parameters for Multimin Method

Following are tabulations of the analysis parameters utilised in each of the interpreted intervals in Jarver 1 well.

Parameter	Paaratte	Belfast	Thylacine
R_w (ohmm) @ 75°F	0.6	0.6	0.6
a	1	1	1
m	2	2	2
n	2	2	2
Sw equation	Dual Water	Dual Water	Dual Water

Pay Summary

The definitions of 'sand' and 'non-conventional (HIP) pay' as utilised in this analysis, based on pay sensitivity plots are as follows:

- HIP net sand is defined for late Cretaceous formations as any interval where PHIE >10%.
- HIP pay for late Cretaceous formations is any interval where PHIE > 10% and SWT< 60%

Following are tabulations of HIP intervals interpreted in the Jarver 1 well.

FORMATION	SAND INTERVAL (m)	GROSS SAND (m)	NET SAND (m)	AVG. PHITs (%)	NET PAY (m)	AVG. PHITp (%)	AVG. SWT (%)
PAARATTE	2003 - 2348	343.2	273.8	26.3	-	-	-
SKULL CREEK	2348 - 2692	330.5	215.6	24.3	-	-	-
THYLACINE	2692 - 2782	88.4	47.7	22.3	-	-	-
FLAXMANS	2782 - 3000	202.4	106.3	20.5	-	-	-
CONGLOMERATE	3000 - 3024	11.7	3.8	17.8	-	-	-

Conclusions

- Jarver 1 has failed to encounter any hydrocarbon bearing intervals. The well was permanently abandoned.

Jarver 1 analysis results have been graphically presented in the well evaluation summary (WES) plots: */data/wesoa/jarver_1_2008065.cgm*

Interpretation Procedures for Multimin Method

The GEOLOG Multimin Probabilistic method was used in the section with all logs. This method focuses wireline logging tools response to the environment being logged. Response equations for predicting each measurement in the logging suite are posed in terms of summing all the volumes of minerals and fluids that influenced each sensor. These volumes were adjusted to give the optimum or most probable match of the measured and predicted readings across the suite of measurements being modelled. From this most likely solution, the volumes of minerals were derived, as were the fluid volumes and hence, porosity and fluid saturations of the modelled formation.

In general, the tool response equation can be defined as:

$$tool = (toola.xwa)(vxwa) + (toola.xga)(vxga) + (toola.xoi)(vxoi) + \sum_{i=1}^{nm}(toola.i)(v.i) +$$

$$\sum_{i=1}^{nclays}((toola_{cl}.i)(1-\phi_{cl}.i) + (toola.xbw)(\phi_{cl}.i)(v_{cl}.i))$$

Where		
tool	=	Input log such as ρ_b, ϕ_N, *DT and etc.*
toola.xwa	=	The response parameter for flushed fluid
vxwa	=	Volume of flushed fluid
toola.xga	=	The response parameter for gas
vxga	=	Volume of gas
toola.xoi	=	The response parameter for oil
vxoi	=	Volume of oil
nm	=	Number of formation minerals, excluding clay
toola.i	=	The response parameter for mineral *i*
v.i	=	The volume of mineral *i*
nclays	=	The number of clays in the formation
$toola_{cl}.i$	=	The dry clay response parameter for clay *i*
$\phi_{cl}.i$	=	Clay *i* porosity
tools.xbw	=	The response parameter for bound water
$v_{cl}.i$	=	The volume of clay *i*

The complete Multimin models are enclosed in Appendices 1.

APPENDICES 1


```
MULTIMIN REPORT for well JARVER_1 interval PAARATTE GROUP (2003.00 - 2347.90 metres)         Project PETRO_SSBM
     Reported by bulsu            on 01-Jul-2008 at 14:51
     Analysed by bulsu            on 01-Jul-2008 at 14:38



MODELS:
       Type    Name               Cond# Cutoff Expression

     Primary   JARVER1_SAND      5.590  10.0
     Secondary JARVER1_SHALE     4.672  10.0 vol_wetclay>0.45


FORMATION FLUID PARAMETERS:
     Fluid properties option = DEPTH
     Oil Gravity Degrees API = 30.00 dapi    Gas specific gravity = 0.720
     Rws = 0.6000  @ 25.00 degC              Rmfs = 0.0710  @ 25.00 degC


BOREHOLE PARAMETERS:
     Mud base = WATER                        Mud density = 1.246 g/c3                KCl concentration of mud = 8.20 %
     SHT = -                                 BHT = 162.00 degF
     Rms = 0.1400  @ 25.00 degC              Rmcs = 0.294  @ 25.00 degC              Total depth = - metres

     Average pressure of 3856.07 psi by MUD_DENS method.


DATA SOURCES:
     Input set: WIRE
```

PRIMARY MODEL JARVER1_SAND:

Conductivity equation methods:
Unflushed conductivity: DUAL-WATER NONLINEAR, Flushed conductivity: DUAL-WATER NONLINEAR
Cementation factor M = 2.000 Saturation exponent N = 2.000 Linear dual-water W = 2.00
Clay bound water expansion enabled Beta dilution enabled.

Component	QUARTZ	ORTHOCL	PYRITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UGAS	UBNDWAT	UFREWAT
Error of prediction	0.2007	0.5861	0.0468	0.9997	0.6084	0.1311	0.0997	0.2623	0.2628	0.4859

EQUATION RESPONSES:

Log	Method	Uncertainty	QUARTZ	ORTHOCL	PYRITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UGAS	UBNDWAT	UFREWAT
Formation density [G/C3] RHOB	Linear	RHO_COR_UNC	2.650	2.570	4.987	2.780	2.620	1.038	1.038	0.000	0.000	0.000
Neutron [V/V] TNPH_COR	Anadrill cdn 8.00	TNPH_COR_UNC	-0.050	-0.006	-0.019	0.247	0.451	0.927	0.927	0.000	0.000	0.000
Photoelectric absorption [B/C3] U	Linear	U_UNC	5.04	8.71	82.22	11.12	5.38	0.85	0.85	0.00	0.00	0.00
Total gamma [GAPI] GR_COR	Linear	GR_COR_UNC	40.0	171.0	5.0	160.0	104.0	0.0	39.4	0.0	0.0	0.0
Unflushed conductivity [MH/M] CT	Dual-water nonlinear	0.0618I	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.44	4.24
Flushed conductivity [MH/M] CXO	Dual-water nonlinear	0.1796I	0.00	0.00	0.00	0.00	0.00	29.10	35.83	0.00	0.00	0.00

CONSTRAINTS:	Value	Type	Uncertainty	QUARTZ	ORTHOCL	PYRITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UGAS	UBNDWAT	UFREWAT
<PROG UNITY>	1.000	Tool	0.0100	1.000	1.000	1.000	1.000	1.000	0.000	0.000	1.000	1.000	1.000
<PROG POROSITY>	0.000	Tool	0.0100	0.000	0.000	0.000	0.000	0.000	1.000	1.000	-1.000	-1.000	-1.000
<PROG X BNDWAT>	0.000	Tool	0.0100	0.000	0.000	0.000	0.160	0.060	-1.000	0.000	0.000	0.000	0.000
<PROG U BNDWAT>	0.000	Tool	0.0100	0.000	0.000	0.000	0.354	0.133	0.000	0.000	0.000	-1.000	0.000
<PROG WATER MUD>	0.000	<=	-	0.000	0.000	0.000	0.000	0.000	1.000	1.000	0.000	-1.000	-1.000

PROPERTIES AND BOUNDS:

	QUARTZ	ORTHOCL	PYRITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UGAS	UBNDWAT	UFREWAT
Mineral grain density	2.650	2.570	5.000	2.780	2.620	0.000	0.000	0.000	0.000	0.000
Mineral cation exchange capacity	0.000	0.000	0.000	0.250	0.100	0.000	0.000	0.000	0.000	0.000
Lower Bound	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Upper Bound	1.000	1.000	1.000	1.000	1.000	0.500	0.500	0.500	0.500	0.500

SECONDARY MODEL JARVER1_SHALE:

Conductivity equation methods:
Unflushed conductivity: DUAL-WATER NONLINEAR, Flushed conductivity: DUAL-WATER NONLINEAR
Cementation factor M = 2.000 Saturation exponent N = 2.000 Linear dual-water W = 2.00
Clay bound water expansion enabled Beta dilution enabled.

Component	QUARTZ	ORTHOCL	PYRITE	BIOTITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UBNDWAT	UFREWAT
Error of prediction	0.0510	0.2030	0.0775	0.4059	0.1429	0.1451	0.0264	0.0486	0.0487	0.0727

EQUATION RESPONSES:

Log	Method	Uncertainty	QUARTZ	ORTHOCL	PYRITE	BIOTITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UBNDWAT	UFREWAT
Formation density [G/C3] RHOB	Linear	RHO_COR_UNC	2.650	2.570	4.987	3.220	2.780	2.620	1.038	1.038	0.000	0.000
Neutron [V/V] TNPH_COR	Anadrill cdn 8.00	TNPH_COR_UNC	-0.050	-0.006	-0.019	0.110	0.247	0.451	0.927	0.927	0.000	0.000
Photoelectric absorption [B/C3] U	Linear	U_UNC	5.04	8.71	82.22	22.42	11.12	5.38	0.85	0.85	0.00	0.00
Total gamma [GAPI] GR_COR	Linear	GR_COR_UNC	40.0	171.0	5.0	127.0	160.0	104.0	0.0	39.4	0.0	0.0
Unflushed conductivity [MH/M] CT	Dual-water nonlinear	0.0618I	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.44	4.24
Flushed conductivity [MH/M] CXO	Dual-water nonlinear	0.1796I	0.00	0.00	0.00	0.00	0.00	0.00	29.10	35.83	0.00	0.00

CONSTRAINTS:

Constraint	Value	Type	Uncertainty	QUARTZ	ORTHOCL	PYRITE	BIOTITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UBNDWAT	UFREWAT
<PROG UNITY>	1.000	Tool	0.0100	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000	1.000	1.000
<PROG POROSITY>	0.000	Tool	0.0100	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	-1.000	-1.000
<PROG X BNDWAT>	0.000	Tool	0.0100	0.000	0.000	0.000	0.000	0.160	0.060	-1.000	0.000	0.000	0.000
<PROG U BNDWAT>	0.000	Tool	0.0100	0.000	0.000	0.000	0.000	0.354	0.133	0.000	0.000	-1.000	0.000

PROPERTIES AND BOUNDS:

	QUARTZ	ORTHOCL	PYRITE	BIOTITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UBNDWAT	UFREWAT
Mineral grain density	2.650	2.570	5.000	3.020	2.780	2.620	0.000	0.000	0.000	0.000
Mineral cation exchange capacity	0.000	0.000	0.000	0.000	0.250	0.100	0.000	0.000	0.000	0.000
Lower Bound	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Upper Bound	1.000	1.000	1.000	1.000	1.000	1.000	0.500	0.500	0.500	0.500

MULTIMIN REPORT for well JARVER_1 interval SKULL CREEK MUDSTONE (2348.00 - 2691.90 metres) Project PETRO_SSBM

Reported by bulsu on 01-Jul-2008 at 14:51

Analysed by bulsu on 01-Jul-2008 at 14:38

MODELS:

Type	Name	Cond#	Cutoff	Expression
Primary	JARVER1_SAND	5.540	10.0	
Secondary	JARVER1_SHALE	4.681	10.0	vol_wetclay>0.45

FORMATION FLUID PARAMETERS:

Fluid properties option = DEPTH

Oil Gravity Degrees API = 30.00 dapi   Gas specific gravity = 0.720

Rws = 0.6000 @ 25.00 degC   Rmfs = 0.0710 @ 25.00 degC

BOREHOLE PARAMETERS:

Mud base = WATER   Mud density = 1.246 g/c3   KCl concentration of mud = 8.20 %

SHT = -   BHT = 162.00 degF

Rms = 0.1400 @ 25.00 degC   Rmcs = 0.294 @ 25.00 degC   Total depth = - metres

Average pressure of 4466.70 psi by MUD_DENS method.

DATA SOURCES:

Input set: WIRE

MULTIMIN REPORT for well JARVER_1 interval SKULL CREEK MUDSTONE (2348.00 - 2691.90 metres) Project PETRO_SSBM

PRIMARY MODEL JARVER1_SAND:

Conductivity equation methods:
Unflushed conductivity: DUAL-WATER NONLINEAR, Flushed conductivity: DUAL-WATER NONLINEAR
Cementation factor M = 2.000 Saturation exponent N = 2.000 Linear dual-water W = 2.00
Clay bound water expansion enabled Beta dilution enabled.

Component	QUARTZ	ORTHOCL	PYRITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UGAS	UBNDWAT	UFREWAT
Error of prediction	0.1896	0.5543	0.0441	0.9418	0.5708	0.1202	0.0923	0.2489	0.2526	0.4654

EQUATION RESPONSES:

Log / Method	Uncertainty	QUARTZ	ORTHOCL	PYRITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UGAS	UBNDWAT	UFREWAT
Formation density [G/C3] RHOB Linear	RHO_COR_UNC	2.650	2.570	4.987	2.780	2.620	1.030	1.030	0.000	0.000	0.000
Neutron [V/V] TNPH_COR Anadrill cdn 8.00	TNPH_COR_UNC	-0.050	-0.006	-0.019	0.247	0.451	0.921	0.921	0.000	0.000	0.000
Photoelectric absorption [B/C3] U Linear	U_UNC	5.04	8.71	82.22	11.12	5.38	0.84	0.84	0.00	0.00	0.00
Total gamma [GAPI] GR_COR Linear	GR_COR_UNC	40.0	171.0	5.0	160.0	104.0	0.0	39.4	0.0	0.0	0.0
Unflushed conductivity [MH/M] CT Dual-water nonlinear	0.0647I	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.71	4.65
Flushed conductivity [MH/M] CXO Dual-water nonlinear	0.1880I	0.00	0.00	0.00	0.00	0.00	33.17	39.27	0.00	0.00	0.00

CONSTRAINTS:

Constraint	Value	Type	Uncertainty	QUARTZ	ORTHOCL	PYRITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UGAS	UBNDWAT	UFREWAT
<PROG UNITY>	1.000	Tool	0.0100	1.000	1.000	1.000	1.000	1.000	0.000	0.000	1.000	1.000	1.000
<PROG POROSITY>	0.000	Tool	0.0100	0.000	0.000	0.000	0.000	0.000	1.000	1.000	-1.000	-1.000	-1.000
<PROG X BNDWAT>	0.000	Tool	0.0100	0.000	0.000	0.000	0.160	0.060	-1.000	0.000	0.000	0.000	0.000
<PROG U BNDWAT>	0.000	Tool	0.0100	0.000	0.000	0.000	0.354	0.133	0.000	0.000	0.000	-1.000	0.000
<PROG WATER MUD>	0.000	<=	-	0.000	0.000	0.000	0.000	0.000	1.000	1.000	0.000	-1.000	-1.000

PROPERTIES AND BOUNDS:

Property	QUARTZ	ORTHOCL	PYRITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UGAS	UBNDWAT	UFREWAT
Mineral grain density	2.650	2.570	5.000	2.780	2.620	0.000	0.000	0.000	0.000	0.000
Mineral cation exchange capacity	0.000	0.000	0.000	0.250	0.100	0.000	0.000	0.000	0.000	0.000
Lower Bound	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Upper Bound	1.000	1.000	1.000	1.000	1.000	0.500	0.500	0.500	0.500	0.500

MULTIMIN REPORT for well JARVER_1 interval SKULL CREEK MUDSTONE (2348.00 - 2691.90 metres)   Project PETRO_SSBM

SECONDARY MODEL JARVER1_SHALE:

Conductivity equation methods:
Unflushed conductivity: DUAL-WATER NONLINEAR, Flushed conductivity: DUAL-WATER NONLINEAR
Cementation factor M = 2.000   Saturation exponent N = 2.000   Linear dual-water W = 2.00
Clay bound water expansion enabled   Beta dilution enabled.

Component	QUARTZ	ORTHOCL	PYRITE	BIOTITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UBNDWAT	UFREWAT
Error of prediction	0.0509	0.2043	0.0782	0.4098	0.1421	0.1457	0.0258	0.0485	0.0497	0.0740

EQUATION RESPONSES:

Log	Method	Uncertainty	QUARTZ	ORTHOCL	PYRITE	BIOTITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UBNDWAT	UFREWAT
Formation density [G/C3] RHOB	Linear	RHO_COR_UNC	2.650	2.570	4.987	3.220	2.780	2.620	1.030	1.030	0.000	0.000
Neutron [V/V] TNPH_COR	Anadrill cdn 8.00	TNPH_COR_UNC	-0.050	-0.006	-0.019	0.110	0.247	0.451	0.921	0.921	0.000	0.000
Photoelectric absorption [B/C3] U	Linear	U_UNC	5.04	8.71	82.22	22.42	11.12	5.38	0.84	0.84	0.00	0.00
Total gamma [GAPI] GR_COR	Linear	GR_COR_UNC	40.0	171.0	5.0	127.0	160.0	104.0	0.0	39.4	0.0	0.0
Unflushed conductivity [MH/M] CT	Dual-water nonlinear	0.0647I	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.71	4.65
Flushed conductivity [MH/M] CXO	Dual-water nonlinear	0.1880I	0.00	0.00	0.00	0.00	0.00	0.00	33.17	39.27	0.00	0.00

CONSTRAINTS:

Constraint	Value	Type	Uncertainty	QUARTZ	ORTHOCL	PYRITE	BIOTITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UBNDWAT	UFREWAT
<PROG UNITY>	1.000	Tool	0.0100	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000	1.000	1.000
<PROG POROSITY>	0.000	Tool	0.0100	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	-1.000	-1.000
<PROG X BNDWAT>	0.000	Tool	0.0100	0.000	0.000	0.000	0.000	0.160	0.060	-1.000	0.000	0.000	0.000
<PROG U BNDWAT>	0.000	Tool	0.0100	0.000	0.000	0.000	0.000	0.354	0.133	0.000	0.000	-1.000	0.000

PROPERTIES AND BOUNDS:

Property	QUARTZ	ORTHOCL	PYRITE	BIOTITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UBNDWAT	UFREWAT
Mineral grain density	2.650	2.570	5.000	3.020	2.780	2.620	0.000	0.000	0.000	0.000
Mineral cation exchange capacity	0.000	0.000	0.000	0.000	0.250	0.100	0.000	0.000	0.000	0.000
Lower Bound	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Upper Bound	1.000	1.000	1.000	1.000	1.000	1.000	0.500	0.500	0.500	0.500

MULTIMIN REPORT for well JARVER_1 interval THYLACINE MEMBER (2692.00 - 2781.90 metres) Project PETRO_SSBM
Reported by bulsu on 01-Jul-2008 at 14:51
Analysed by bulsu on 01-Jul-2008 at 14:38

MODELS:

Type	Name	Cond#	Cutoff	Expression
Primary	JARVER1_SAND	5.513	10.0	
Secondary	JARVER1_SHALE	4.686	10.0	vol_wetclay>0.45

FORMATION FLUID PARAMETERS:
Fluid properties option = DEPTH
Oil Gravity Degrees API = 30.00 dapi Gas specific gravity = 0.720
Rws = 0.6000 @ 25.00 degC Rmfs = 0.0710 @ 25.00 degC

BOREHOLE PARAMETERS:
Mud base = WATER Mud density = 1.246 g/c3 KCl concentration of mud = 8.20 %
SHT = - BHT = 162.00 degF
Rms = 0.1400 @ 25.00 degC Rmcs = 0.294 @ 25.00 degC Total depth = - metres

Average pressure of 4851.33 psi by MUD_DENS method.

DATA SOURCES:
Input set: WIRE

MULTIMIN REPORT for well JARVER_1 interval THYLACINE MEMBER (2692.00 - 2781.90 metres)   Project PETRO_SSBM

PRIMARY MODEL JARVER1_SAND:

Conductivity equation methods:
Unflushed conductivity: DUAL-WATER NONLINEAR, Flushed conductivity: DUAL-WATER NONLINEAR
Cementation factor M = 2.000   Saturation exponent N = 2.000   Linear dual-water W = 2.00
Clay bound water expansion enabled   Beta dilution enabled.

Component	QUARTZ	ORTHOCL	PYRITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UGAS	UBNDWAT	UFREWAT
Error of prediction	0.1838	0.5375	0.0427	0.9112	0.5508	0.1144	0.0883	0.2417	0.2474	0.4546

EQUATION RESPONSES:

Log	Method	Uncertainty	QUARTZ	ORTHOCL	PYRITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UGAS	UBNDWAT	UFREWAT
Formation density [G/C3] RHOB	Linear	RHO_COR_UNC	2.650	2.570	4.987	2.780	2.620	1.024	1.024	0.000	0.000	0.000
Neutron [V/V] TNPH_COR	Anadrill cdn 8.00	TNPH_COR_UNC	-0.050	-0.006	-0.019	0.247	0.451	0.917	0.917	0.000	0.000	0.000
Photoelectric absorption [B/C3] U	Linear	U_UNC	5.04	8.71	82.22	11.12	5.38	0.84	0.84	0.00	0.00	0.00
Total gamma [GAPI] GR_COR	Linear	GR_COR_UNC	40.0	171.0	5.0	160.0	104.0	0.0	39.4	0.0	0.0	0.0
Unflushed conductivity [MH/M] CT	Dual-water nonlinear	0.0664I	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.48	4.90
Flushed conductivity [MH/M] CXO	Dual-water nonlinear	0.1931I	0.00	0.00	0.00	0.00	0.00	35.82	41.44	0.00	0.00	0.00

CONSTRAINTS:

Constraint	Value	Type	Uncertainty	QUARTZ	ORTHOCL	PYRITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UGAS	UBNDWAT	UFREWAT
<PROG UNITY>	1.000	Tool	0.0100	1.000	1.000	1.000	1.000	1.000	0.000	0.000	1.000	1.000	1.000
<PROG POROSITY>	0.000	Tool	0.0100	0.000	0.000	0.000	0.000	0.000	1.000	1.000	-1.000	-1.000	-1.000
<PROG X BNDWAT>	0.000	Tool	0.0100	0.000	0.000	0.000	0.160	0.060	-1.000	0.000	0.000	0.000	0.000
<PROG U BNDWAT>	0.000	Tool	0.0100	0.000	0.000	0.000	0.354	0.133	0.000	0.000	0.000	-1.000	0.000
<PROG WATER MUD>	0.000	<=	-	0.000	0.000	0.000	0.000	0.000	1.000	1.000	0.000	-1.000	-1.000

PROPERTIES AND BOUNDS:

Property	QUARTZ	ORTHOCL	PYRITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UGAS	UBNDWAT	UFREWAT
Mineral grain density	2.650	2.570	5.000	2.780	2.620	0.000	0.000	0.000	0.000	0.000
Mineral cation exchange capacity	0.000	0.000	0.000	0.250	0.100	0.000	0.000	0.000	0.000	0.000
Lower Bound	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Upper Bound	1.000	1.000	1.000	1.000	1.000	0.500	0.500	0.500	0.500	0.500

MULTIMIN REPORT for well JARVER_1 interval THYLACINE MEMBER (2692.00 - 2781.90 metres) Project PETRO_SSBM

SECONDARY MODEL JARVER1_SHALE:

Conductivity equation methods:
Unflushed conductivity: DUAL-WATER NONLINEAR, Flushed conductivity: DUAL-WATER NONLINEAR
Cementation factor M = 2.000 Saturation exponent N = 2.000 Linear dual-water W = 2.00
Clay bound water expansion enabled Beta dilution enabled.

Component	QUARTZ	ORTHOCL	PYRITE	BIOTITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UBNDWAT	UFREWAT
Error of prediction	0.0509	0.2051	0.0786	0.4122	0.1417	0.1460	0.0255	0.0485	0.0504	0.0749

EQUATION RESPONSES:

Log	Method	Uncertainty	QUARTZ	ORTHOCL	PYRITE	BIOTITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UBNDWAT	UFREWAT
Formation density [G/C3] RHOB	Linear	RHO_COR_UNC	2.650	2.570	4.987	3.220	2.780	2.620	1.024	1.024	0.000	0.000
Neutron [V/V] TNPH_COR	Anadrill cdn 8.00	TNPH_COR_UNC	-0.050	-0.006	-0.019	0.110	0.247	0.451	0.917	0.917	0.000	0.000
Photoelectric absorption [B/C3] U	Linear	U_UNC	5.04	8.71	82.22	22.42	11.12	5.38	0.84	0.84	0.00	0.00
Total gamma [GAPI] GR_COR	Linear	GR_COR_UNC	40.0	171.0	5.0	127.0	160.0	104.0	0.0	39.4	0.0	0.0
Unflushed conductivity [MH/M] CT	Dual-water nonlinear	0.0664I	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.48	4.90
Flushed conductivity [MH/M] CXO	Dual-water nonlinear	0.1931I	0.00	0.00	0.00	0.00	0.00	0.00	35.82	41.44	0.00	0.00

CONSTRAINTS:

Constraint	Value	Type	Uncertainty	QUARTZ	ORTHOCL	PYRITE	BIOTITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UBNDWAT	UFREWAT
<PROG UNITY>	1.000	Tool	0.0100	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000	1.000	1.000
<PROG POROSITY>	0.000	Tool	0.0100	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	-1.000	-1.000
<PROG X BNDWAT>	0.000	Tool	0.0100	0.000	0.000	0.000	0.000	0.160	0.060	-1.000	0.000	0.000	0.000
<PROG U BNDWAT>	0.000	Tool	0.0100	0.000	0.000	0.000	0.000	0.354	0.133	0.000	0.000	-1.000	0.000

PROPERTIES AND BOUNDS:

Property	QUARTZ	ORTHOCL	PYRITE	BIOTITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UBNDWAT	UFREWAT
Mineral grain density	2.650	2.570	5.000	3.020	2.780	2.620	0.000	0.000	0.000	0.000
Mineral cation exchange capacity	0.000	0.000	0.000	0.000	0.250	0.100	0.000	0.000	0.000	0.000
Lower Bound	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Upper Bound	1.000	1.000	1.000	1.000	1.000	1.000	0.500	0.500	0.500	0.500

MULTIMIN REPORT for well JARVER_1 interval FLAXMANS FORMATION (2782.00 - 2999.90 metres) Project PETRO_SSBM
Reported by bulsu on 01-Jul-2008 at 14:51
Analysed by bulsu on 01-Jul-2008 at 14:39

MODELS:

Type	Name	Cond#	Cutoff	Expression
Primary	JARVER1_SAND	5.495	10.0	
Secondary	JARVER1_SHALE	4.690	10.0	vol_wetclay>0.45

FORMATION FLUID PARAMETERS:
Fluid properties option = DEPTH
Oil Gravity Degrees API = 30.00 dapi   Gas specific gravity = 0.720
Rws = 0.6000 @ 25.00 degC   Rmfs = 0.0710 @ 25.00 degC

BOREHOLE PARAMETERS:
Mud base = WATER   Mud density = 1.246 g/c3   KCl concentration of mud = 8.20 %
SHT = -   BHT = 162.00 degF
Rms = 0.1400 @ 25.00 degC   Rmcs = 0.294 @ 25.00 degC   Total depth = - metres

Average pressure of 5124.29 psi by MUD_DENS method.

DATA SOURCES:
Input set: WIRE

PRIMARY MODEL JARVER1_SAND:

Conductivity equation methods:
Unflushed conductivity: DUAL-WATER NONLINEAR, Flushed conductivity: DUAL-WATER NONLINEAR
Cementation factor M = 2.000 Saturation exponent N = 2.000 Linear dual-water W = 2.00
Clay bound water expansion enabled Beta dilution enabled.

Component	QUARTZ	ORTHOCL	PYRITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UGAS	UBNDWAT	UFREWAT
Error of prediction	0.1800	0.5267	0.0418	0.8917	0.5381	0.1107	0.0857	0.2371	0.2443	0.4478

EQUATION RESPONSES:

Log	Method	Uncertainty	QUARTZ	ORTHOCL	PYRITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UGAS	UBNDWAT	UFREWAT
Formation density [G/C3] RHOB	Linear	RHO_COR_UNC	2.650	2.570	4.987	2.780	2.620	1.020	1.020	0.000	0.000	0.000
Neutron [V/V] TNPH_COR	Anadrill cdn 8.00	TNPH_COR_UNC	-0.050	-0.006	-0.019	0.247	0.451	0.914	0.914	0.000	0.000	0.000
Photoelectric absorption [B/C3] U	Linear	U_UNC	5.04	8.71	82.22	11.12	5.38	0.83	0.83	0.00	0.00	0.00
Total gamma [GAPI] GR_COR	Linear	GR_COR_UNC	40.0	171.0	5.0	160.0	104.0	0.0	39.4	0.0	0.0	0.0
Unflushed conductivity [MH/M] CT	Dual-water nonlinear	0.0677I	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.02	5.09
Flushed conductivity [MH/M] CXO	Dual-water nonlinear	0.1967I	0.00	0.00	0.00	0.00	0.00	37.75	42.98	0.00	0.00	0.00

CONSTRAINTS:	Value	Type	Uncertainty	QUARTZ	ORTHOCL	PYRITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UGAS	UBNDWAT	UFREWAT
<PROG UNITY>	1.000	Tool	0.0100	1.000	1.000	1.000	1.000	1.000	0.000	0.000	1.000	1.000	1.000
<PROG POROSITY>	0.000	Tool	0.0100	0.000	0.000	0.000	0.000	0.000	1.000	1.000	-1.000	-1.000	-1.000
<PROG X BNDWAT>	0.000	Tool	0.0100	0.000	0.000	0.000	0.160	0.060	-1.000	0.000	0.000	0.000	0.000
<PROG U BNDWAT>	0.000	Tool	0.0100	0.000	0.000	0.000	0.354	0.133	0.000	0.000	0.000	-1.000	0.000
<PROG WATER MUD>	0.000	<=	-	0.000	0.000	0.000	0.000	0.000	1.000	1.000	0.000	-1.000	-1.000

PROPERTIES AND BOUNDS:

	QUARTZ	ORTHOCL	PYRITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UGAS	UBNDWAT	UFREWAT
Mineral grain density	2.650	2.570	5.000	2.780	2.620	0.000	0.000	0.000	0.000	0.000
Mineral cation exchange capacity	0.000	0.000	0.000	0.250	0.100	0.000	0.000	0.000	0.000	0.000
Lower Bound	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Upper Bound	1.000	1.000	1.000	1.000	1.000	0.500	0.500	0.500	0.500	0.500

SECONDARY MODEL JARVER1_SHALE:

Conductivity equation methods:
Unflushed conductivity: DUAL-WATER NONLINEAR, Flushed conductivity: DUAL-WATER NONLINEAR
Cementation factor M = 2.000 Saturation exponent N = 2.000 Linear dual-water W = 2.00
Clay bound water expansion enabled Beta dilution enabled.

Component	QUARTZ	ORTHOCL	PYRITE	BIOTITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UBNDWAT	UFREWAT
Error of prediction	0.0508	0.2056	0.0790	0.4139	0.1415	0.1463	0.0253	0.0484	0.0508	0.0756

EQUATION RESPONSES:

Log	Method	Uncertainty	QUARTZ	ORTHOCL	PYRITE	BIOTITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UBNDWAT	UFREWAT
Formation density [G/C3] RHOB	Linear	RHO_COR_UNC	2.650	2.570	4.987	3.220	2.780	2.620	1.020	1.020	0.000	0.000
Neutron [V/V] TNPH_COR	Anadrill cdn 8.00	TNPH_COR_UNC	-0.050	-0.006	-0.019	0.110	0.247	0.451	0.914	0.914	0.000	0.000
Photoelectric absorption [B/C3] U	Linear	U_UNC	5.04	8.71	82.22	22.42	11.12	5.38	0.83	0.83	0.00	0.00
Total gamma [GAPI] GR_COR	Linear	GR_COR_UNC	40.0	171.0	5.0	127.0	160.0	104.0	0.0	39.4	0.0	0.0
Unflushed conductivity [MH/M] CT	Dual-water nonlinear	0.0677I	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.02	5.09
Flushed conductivity [MH/M] CXO	Dual-water nonlinear	0.1967I	0.00	0.00	0.00	0.00	0.00	0.00	37.75	42.98	0.00	0.00

CONSTRAINTS:

Constraint	Value	Type	Uncertainty	QUARTZ	ORTHOCL	PYRITE	BIOTITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UBNDWAT	UFREWAT
<PROG UNITY>	1.000	Tool	0.0100	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000	1.000	1.000
<PROG POROSITY>	0.000	Tool	0.0100	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	-1.000	-1.000
<PROG X BNDWAT>	0.000	Tool	0.0100	0.000	0.000	0.000	0.000	0.160	0.060	-1.000	0.000	0.000	0.000
<PROG U BNDWAT>	0.000	Tool	0.0100	0.000	0.000	0.000	0.000	0.354	0.133	0.000	0.000	-1.000	0.000

PROPERTIES AND BOUNDS:

Property	QUARTZ	ORTHOCL	PYRITE	BIOTITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UBNDWAT	UFREWAT
Mineral grain density	2.650	2.570	5.000	3.020	2.780	2.620	0.000	0.000	0.000	0.000
Mineral cation exchange capacity	0.000	0.000	0.000	0.000	0.250	0.100	0.000	0.000	0.000	0.000
Lower Bound	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Upper Bound	1.000	1.000	1.000	1.000	1.000	1.000	0.500	0.500	0.500	0.500

MULTIMIN REPORT for well JARVER_1 interval CONGLOMERATE (3000.00 - 3061.90 metres) Project PETRO_SSBM
Reported by bulsu on 01-Jul-2008 at 14:51
Analysed by bulsu on 01-Jul-2008 at 14:39

MODELS:

Type	Name	Cond#	Cutoff	Expression
Primary	JARVER1_SAND	5.479	10.0	
Secondary	JARVER1_SHALE	4.693	10.0	vol_wetclay>0.45

FORMATION FLUID PARAMETERS:
Fluid properties option = DEPTH
Oil Gravity Degrees API = 30.00 dapi   Gas specific gravity = 0.720
Rws = 0.6000 @ 25.00 degC   Rmfs = 0.0710 @ 25.00 degC

BOREHOLE PARAMETERS:
Mud base = WATER   Mud density = 1.246 g/c3   KCl concentration of mud = 8.20 %
SHT = -   BHT = 162.00 degF
Rms = 0.1400 @ 25.00 degC   Rmcs = 0.294 @ 25.00 degC   Total depth = - metres

Average pressure of 5372.44 psi by MUD_DENS method.

DATA SOURCES:
Input set: WIRE

MULTIMIN REPORT for well JARVER_1 interval CONGLOMERATE (3000.00 - 3061.90 metres) Project PETRO_SSBM

PRIMARY MODEL JARVER1_SAND:

Conductivity equation methods:
Unflushed conductivity: DUAL-WATER NONLINEAR, Flushed conductivity: DUAL-WATER NONLINEAR
Cementation factor M = 2.000 Saturation exponent N = 2.000 Linear dual-water W = 2.00
Clay bound water expansion enabled Beta dilution enabled.

Component	QUARTZ	ORTHOCL	PYRITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UGAS	UBNDWAT	UFREWAT
Error of prediction	0.1769	0.5178	0.0410	0.8753	0.5274	0.1076	0.0835	0.2331	0.2417	0.4422

EQUATION RESPONSES:

Log / Method / Uncertainty	QUARTZ	ORTHOCL	PYRITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UGAS	UBNDWAT	UFREWAT
Formation density [G/C3] RHO_COR_UNC RHOB Linear	2.650	2.570	4.987	2.780	2.620	1.016	1.016	0.000	0.000	0.000
Neutron [V/V] TNPH_COR_UNC TNPH_COR Anadrill cdn 8.00	-0.050	-0.006	-0.019	0.247	0.451	0.911	0.911	0.000	0.000	0.000
Photoelectric absorption [B/C3] U_UNC U Linear	5.04	8.71	82.22	11.12	5.38	0.83	0.83	0.00	0.00	0.00
Total gamma [GAPI] GR_COR_UNC GR_COR Linear	40.0	171.0	5.0	160.0	104.0	0.0	39.4	0.0	0.0	0.0
Unflushed conductivity [MH/M] 0.0687I CT Dual-water nonlinear	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.50	5.25
Flushed conductivity [MH/M] 0.1999I CXO Dual-water nonlinear	0.00	0.00	0.00	0.00	0.00	39.54	44.38	0.00	0.00	0.00

CONSTRAINTS:

Constraint	Value	Type	Uncertainty	QUARTZ	ORTHOCL	PYRITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UGAS	UBNDWAT	UFREWAT
<PROG UNITY>	1.000	Tool	0.0100	1.000	1.000	1.000	1.000	1.000	0.000	0.000	1.000	1.000	1.000
<PROG POROSITY>	0.000	Tool	0.0100	0.000	0.000	0.000	0.000	0.000	1.000	1.000	-1.000	-1.000	-1.000
<PROG X BNDWAT>	0.000	Tool	0.0100	0.000	0.000	0.000	0.160	0.060	-1.000	0.000	0.000	0.000	0.000
<PROG U BNDWAT>	0.000	Tool	0.0100	0.000	0.000	0.000	0.354	0.133	0.000	0.000	0.000	-1.000	0.000
<PROG WATER MUD>	0.000	<=	-	0.000	0.000	0.000	0.000	0.000	1.000	1.000	0.000	-1.000	-1.000

PROPERTIES AND BOUNDS:

Property	QUARTZ	ORTHOCL	PYRITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UGAS	UBNDWAT	UFREWAT
Mineral grain density	2.650	2.570	5.000	2.780	2.620	0.000	0.000	0.000	0.000	0.000
Mineral cation exchange capacity	0.000	0.000	0.000	0.250	0.100	0.000	0.000	0.000	0.000	0.000
Lower Bound	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Upper Bound	1.000	1.000	1.000	1.000	1.000	0.500	0.500	0.500	0.500	0.500

SECONDARY MODEL JARVER1_SHALE:

Conductivity equation methods:
Unflushed conductivity: DUAL-WATER NONLINEAR, Flushed conductivity: DUAL-WATER NONLINEAR
Cementation factor M = 2.000 Saturation exponent N = 2.000 Linear dual-water W = 2.00
Clay bound water expansion enabled Beta dilution enabled.

Component	QUARTZ	ORTHOCL	PYRITE	BIOTITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UBNDWAT	UFREWAT
Error of prediction	0.0508	0.2062	0.0792	0.4154	0.1414	0.1465	0.0251	0.0484	0.0513	0.0761

EQUATION RESPONSES:

Log / Method	Uncertainty	QUARTZ	ORTHOCL	PYRITE	BIOTITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UBNDWAT	UFREWAT
Formation density [G/C3] RHOB Linear	RHO_COR_UNC	2.650	2.570	4.987	3.220	2.780	2.620	1.016	1.016	0.000	0.000
Neutron [V/V] TNPH_COR Anadrill cdn 8.00	TNPH_COR_UNC	-0.050	-0.006	-0.019	0.110	0.247	0.451	0.911	0.911	0.000	0.000
Photoelectric absorption [B/C3] U Linear	U_UNC	5.04	8.71	82.22	22.42	11.12	5.38	0.83	0.83	0.00	0.00
Total gamma [GAPI] GR_COR Linear	GR_COR_UNC	40.0	171.0	5.0	127.0	160.0	104.0	0.0	39.4	0.0	0.0
Unflushed conductivity [MH/M] CT Dual-water nonlinear	0.0687I	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.50	5.25
Flushed conductivity [MH/M] CXO Dual-water nonlinear	0.1999I	0.00	0.00	0.00	0.00	0.00	0.00	39.54	44.38	0.00	0.00

CONSTRAINTS:

Constraint	Value	Type	Uncertainty	QUARTZ	ORTHOCL	PYRITE	BIOTITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UBNDWAT	UFREWAT
<PROG UNITY>	1.000	Tool	0.0100	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000	1.000	1.000
<PROG POROSITY>	0.000	Tool	0.0100	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	-1.000	-1.000
<PROG X BNDWAT>	0.000	Tool	0.0100	0.000	0.000	0.000	0.000	0.160	0.060	-1.000	0.000	0.000	0.000
<PROG U BNDWAT>	0.000	Tool	0.0100	0.000	0.000	0.000	0.000	0.354	0.133	0.000	0.000	-1.000	0.000

PROPERTIES AND BOUNDS:

Property	QUARTZ	ORTHOCL	PYRITE	BIOTITE	ILLITE	KAOLIN	XBNDWAT	XFREWAT	UBNDWAT	UFREWAT
Mineral grain density	2.650	2.570	5.000	3.020	2.780	2.620	0.000	0.000	0.000	0.000
Mineral cation exchange capacity	0.000	0.000	0.000	0.000	0.250	0.100	0.000	0.000	0.000	0.000
Lower Bound	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Upper Bound	1.000	1.000	1.000	1.000	1.000	1.000	0.500	0.500	0.500	0.500

APPENDIX II : MDT PRESSURE SURVEY REPORT

An MDT Pressure Survey was not conducted at the Jarver 1 location.

APPENDIX III: HYDROCARBON SHOW REPORT

SANTOS LIMITED

OIL SHOW EVALUATION REPORT

WELL: Jarver 1

GEOLOGIST: J. PITMAN

INTERVAL 2322 – 2328m

DATE: 3-6-08

FORMATION Paaratte Fm

C1 ppm	**trace**	10k	20k	30k	40k	50k	100k	150k	200k	>250k
C2+ ppm	80	750	1k	2k	3.5k	4k	5k	7.5k	10k	>15k
Porosity Ø	**tight**			poor		fair		good		
% with fluorescence	**trace**	10	20	30	40	50	60	70	80	>90
Fluorescence appearance	**trace**		spotted			streaked		patchy		solid
Brightness of fluorescence	v. dull		dull		Dim			bright	v. bright	glowing
Type of cut	trace	v. slow crush cut	**crush cut**	instant crush cut	v. slow streaming cut	slow bleeding	moderate bleeding	streaming	fast streaming	instant
Residue on spot plate	trace	heavy trace	**v. thin ring**	thin ring	thick ring	v. thick ring	thin film	moderate film	thick film	solid
Show rating	**trace**		poor		fair		good			
Comments:	SANDSTONE: white, very light grey, very fine to fine grained, well sorted, sub angular to predominately sub rounded, abundant white – off white argillaceous matrix, trace fine carbonaceous specks, trace nodular pyrite, trace lithics, soft to friable, poor visual porosity, 2322 – 2328m Fluorescence: Poor show, trace very dull orange spotted fluorescence in fine grained aggregates, faint dull yellow white crush cut, faint white ring residue.									

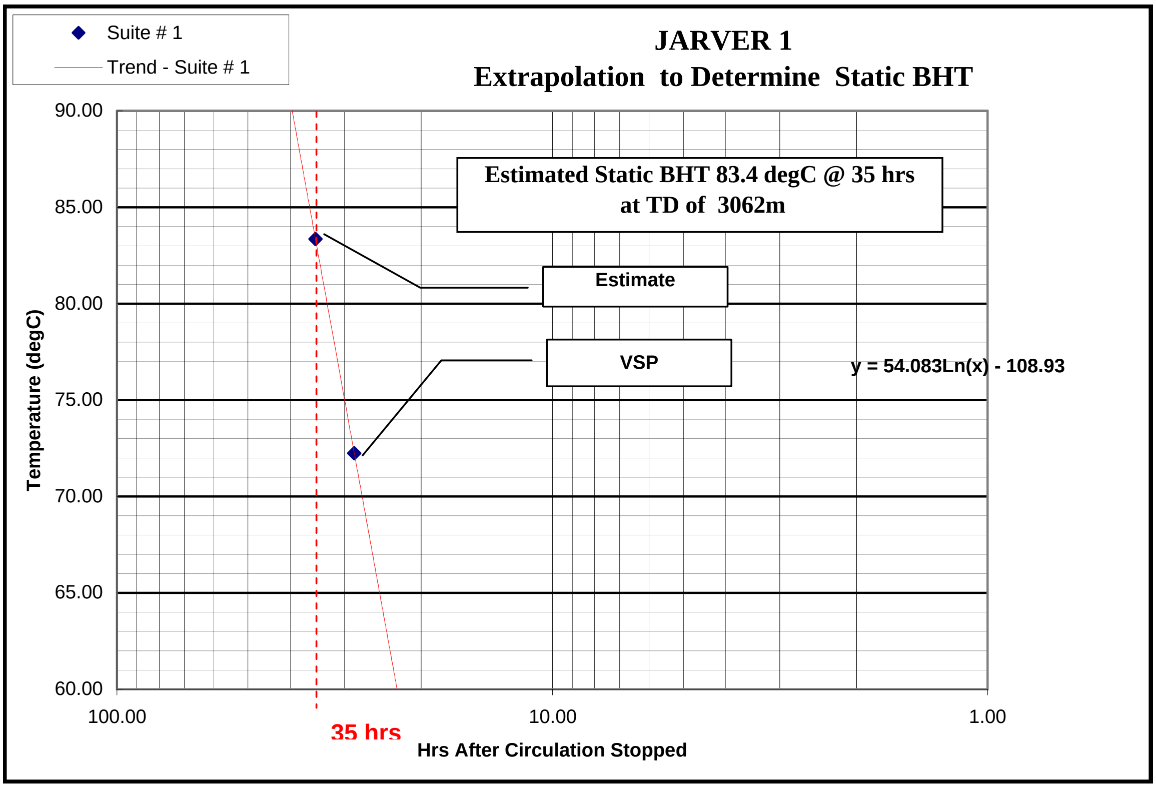
APPENDIX IV : GEOTHERMAL GRADIENT

GEOTHERMAL GRADIENT

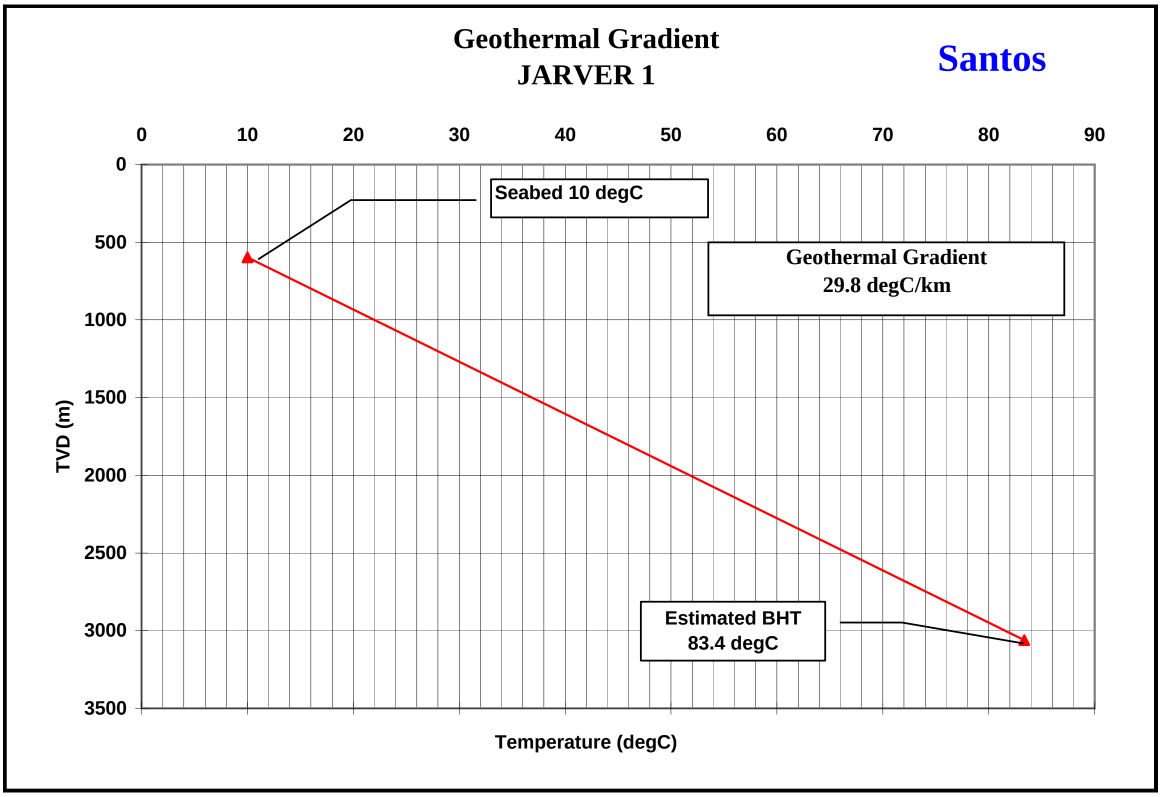
A bottom hole temperature of 83.4°C was extrapolated from wireline temperature data which enabled a geothermal gradient of 2.98°C / 100m to be calculated. A seafloor temperature of 10°C was assumed. Temperature data used is listed below.

Logging Run	Temperature	Time since Circulation	Depth
Run 1 VSP	72.2ºC (162ºFht)	28 hours 30 minutes	3062m

	Max Recorded Temp (degC)	Depth Recorded (m)	Time Since Circulation. (hrs)	Total Depth (m)	Estimated BHT (degC)
Run 1	72.2	3060	28.50	3062	72.25
Estimate	-	-	35.00	3062	83.36



STATIC BHT @ 35 hrs	83.4	°C @	3062	m
SURFACE TEMP.	10	°C @	597.7	m
Geothermal Gradient for Suite 1		29.77	°C/km	



APPENDIX V : PETROLOGY REPORT

Jarver-1, Otway Basin. Rock Type Assessment of Thylacine Member cutting samples

Claire Behan, June 2008

Introduction

Drill cutting samples were selected for rock type analysis from the Thylacine Member, from samples collected between 2690 – 2780m KB. The main focus of the study was a visual estimation of porosity to complement the petrophysical analysis. The samples were gently washed to remove drilling mud, dried, then microscopically assessed using a Zeiss binocular microscope with x10 magnification. The standard Santos Rock Type assessment spreadsheet was completed and a WES plot produced. A Klingenberg (KOB) and overburden corrected (OB) permeability calculation was not made as Otway Basin well core data has not yet been assessed for the relevant age overburden factors included the General OB and KOB equations.

Assessment

Drill cutting samples from 2682 – 2796m KB, bagged in 6m intervals, were analysed. Five samples were extracted from the set for palynological analysis – 2688-2694m, 2700-2706m, 2766-2772m, 2778-2784m, and 2784-2790m.

All the samples are predominantly argillaceous sandstone, with up to 20% organic shale (2682 – 2700m KB), decreasing with depth to 10% siltstone / 5% organic shale. Grain size over this same top interval is Fine to Very Fine (177-62 micron). The interval 2706 – 2772mKB is Medium – Fine Upper (500-177 micron) fining downwards to Fine (250-125 micron). All samples contain 10 – 20% coarse to very coarse quartz grains, possibly plucked from a younger formation, that occur as loose grains amongst smaller grain size quartz grains and clay clumps. (Figure 1) Iron stained clay and minerals was observed in 1-4% of sandstone and clay aggregates in all sample intervals.

Figure 1. Jarver-1 (2745m KB)

Quartz grains are sub-angular/ sub-rounded, have low relief and dull to moderately bright lustre. Consolidation is poor, due to the high proportion of clay matrix. (Figure 2)

Figure 2. Jarver-1 (2706m KB)

Quartz cemented aggregates are well consolidated but make up only 3-10% of total sandstone aggregates in the interval 2682-2748m KB, and 15 – 25% between 2748-2778m KB. (Figure 3)

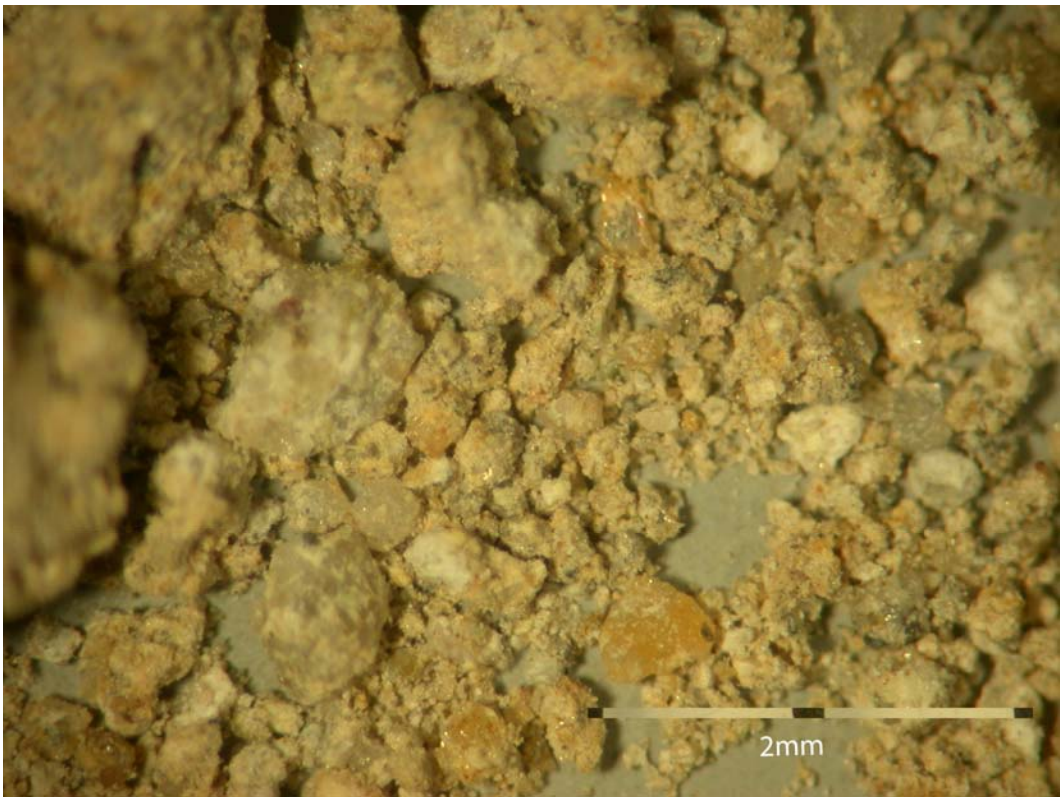


Figure 3. Jarver-1 (2772m KB)

Framework minerals include glauconite, muscovite mica, plagioclase feldspars and/or coal or other dark coloured rock fragments in 1-2% each, the remaining 90+% comprising quartz. (Figure 4) Siderite and pyrite is present, (trace-2%) in some samples. (Figure 5)

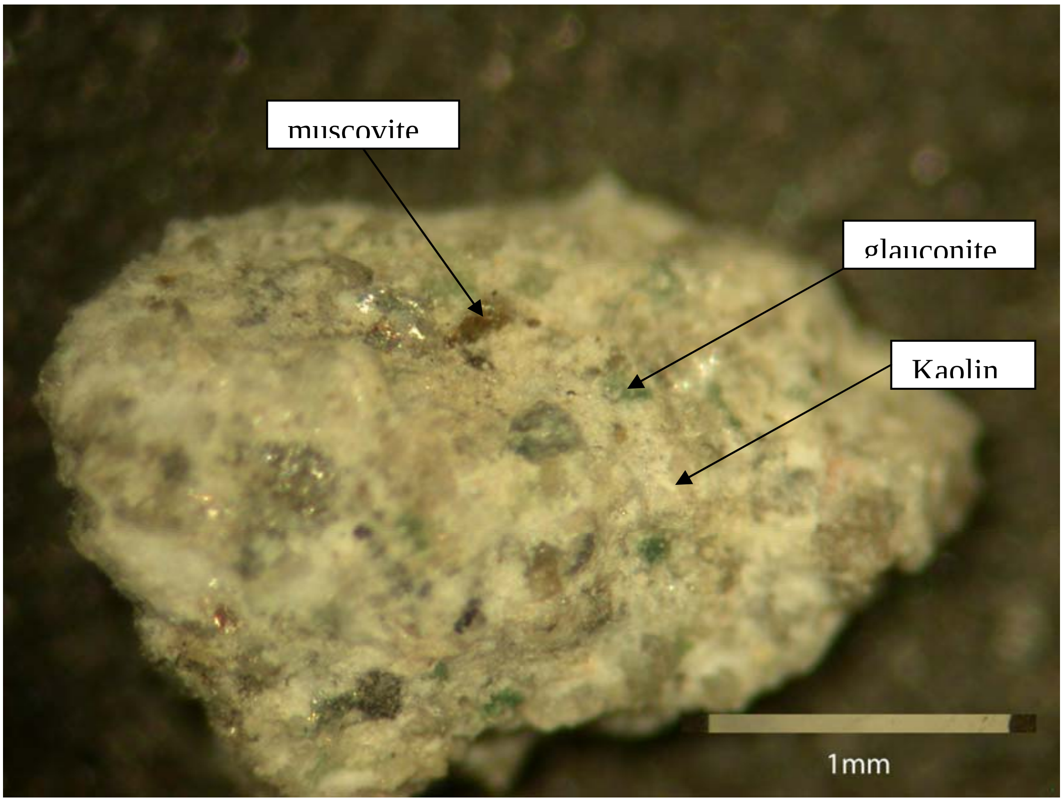


Figure 4. Jarver-1 (2754m KB)

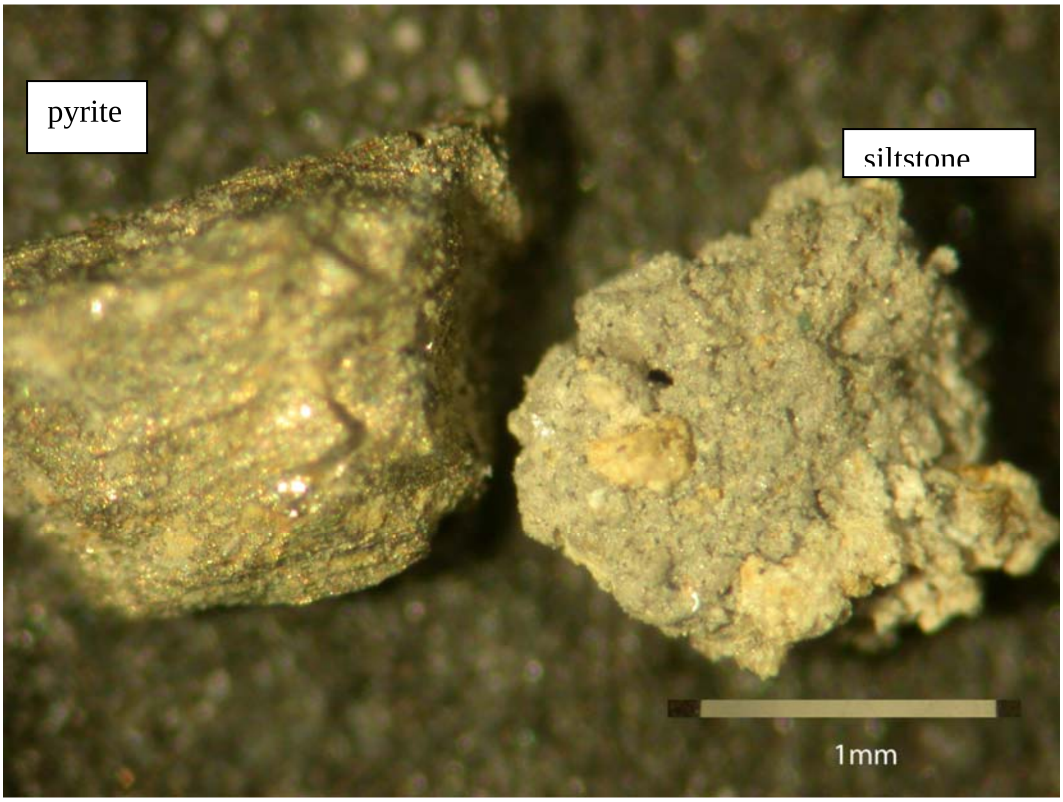


Figure 5 Jarver-1 (2706m KB)

The matrix is characterised by increasing quartz cement with depth in proportion to decreasing macro effective porosity. Kaolin clay occurs as pore filling, feldspar replacement and re-crystallisation from original clays. (Figure 6)

Quartz grains are also coated with white grains too small to identify under the binocular microscope.
Illite may be present, but was not observed at the available microscope resolution. Identification may also be masked by the abundant kaolin.

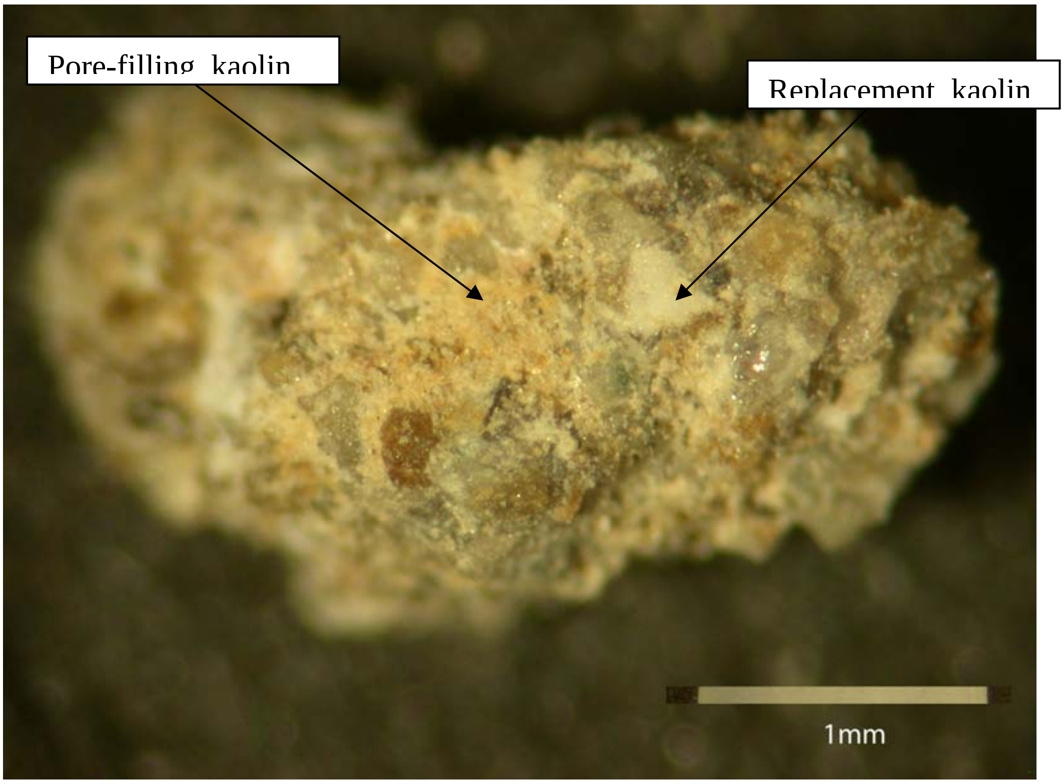


Figure 6 Jarver-1 (2772m KB)

At 2682-2712m KB sandstone aggregates have visible porosity and micro-effective porosity (Figure 1 & 7) in both the consolidated and clay-dominated aggregates. The rock type is assessed as 60-80% Rock Type 1D, 20-40% 1C for the 3 samples. Kaolin from altered feldspar is common, grain coat rare. Micro-effective porosity accounts for approximately 45% of total porosity.

Figure 7 Jarver-1 (2706m KB)

Between 2712-2748m KB clay-rich sandstone aggregates make up 95% of total sandstone aggregates. However, visible porosity decreases, as does kaolin-replaced feldspar, but grain coating clay increases to a maximum of 25% total clay content. Rock type classification for this interval is 40-50% Rock Type 1D, 30-45% Type II, plus a minor proportion of Rock Type 1C and Type III. The proportion of micro-effective porosity is greater than macro-effective porosity. (Refer to Appendices for Rock Type Classification characteristics)

The interval 2748-2778m KB is assessed as Rock Type II (45-55%) with 15-30% Type 1D and III. The proportion of consolidated sandstone aggregates is 15-25% in which pore-filling kaolin predominates, replacement kaolin representing almost 50% total clay and grain coat clay decreasing to 1% total intergranular volume at 2778m KB. Porosity is 60% micro-effective, 40% macro-effective. (Figures 8 - 10)

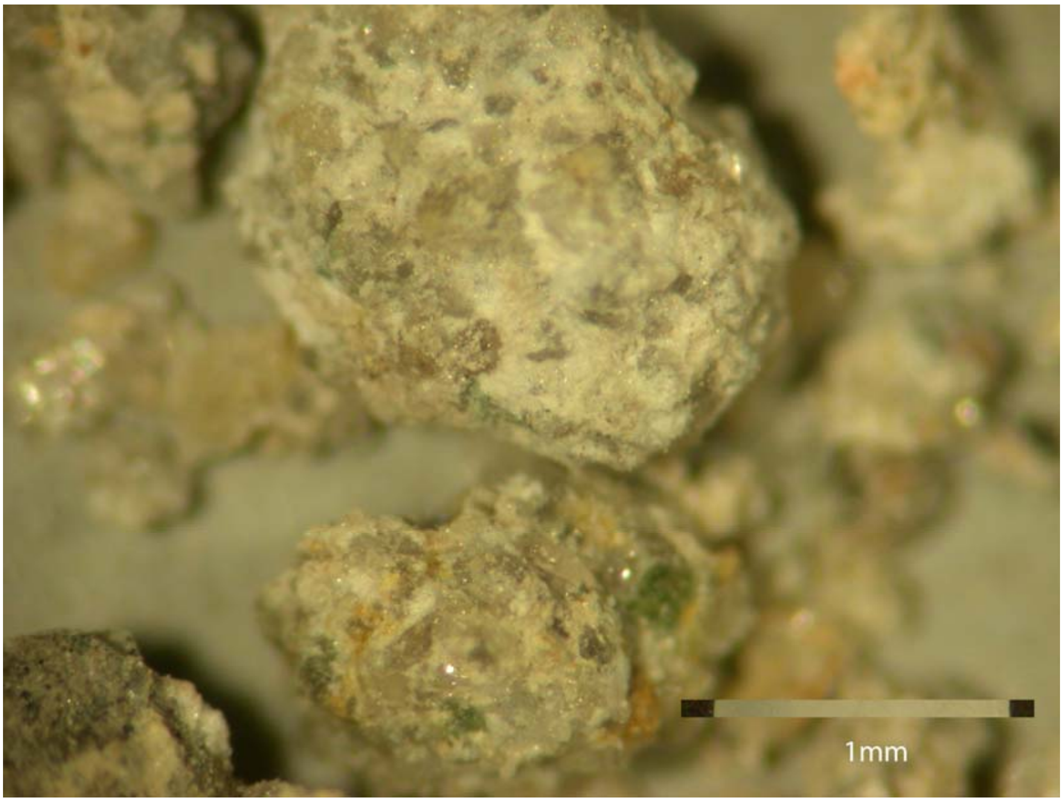


Figure 8 Jarver-1 (2754m KB)   Rock Type Classification 1D aggregates

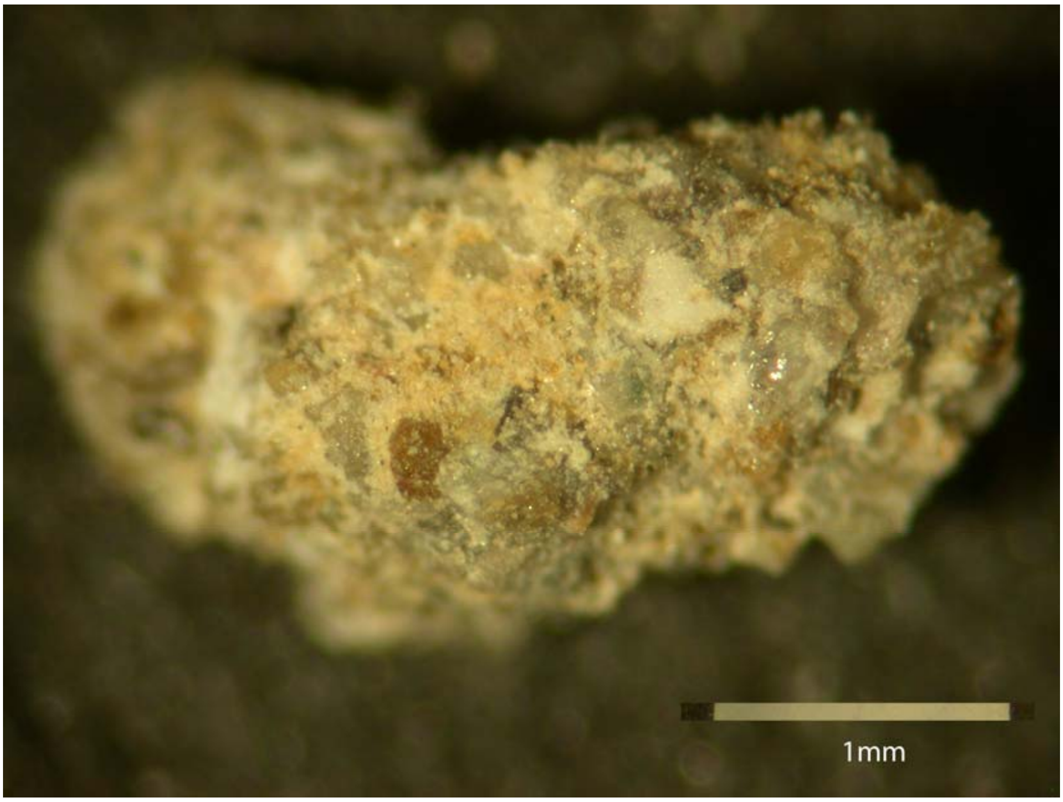


Figure 9 Jarver-1 (2772m KB) Rock Type Classification 1D aggregate

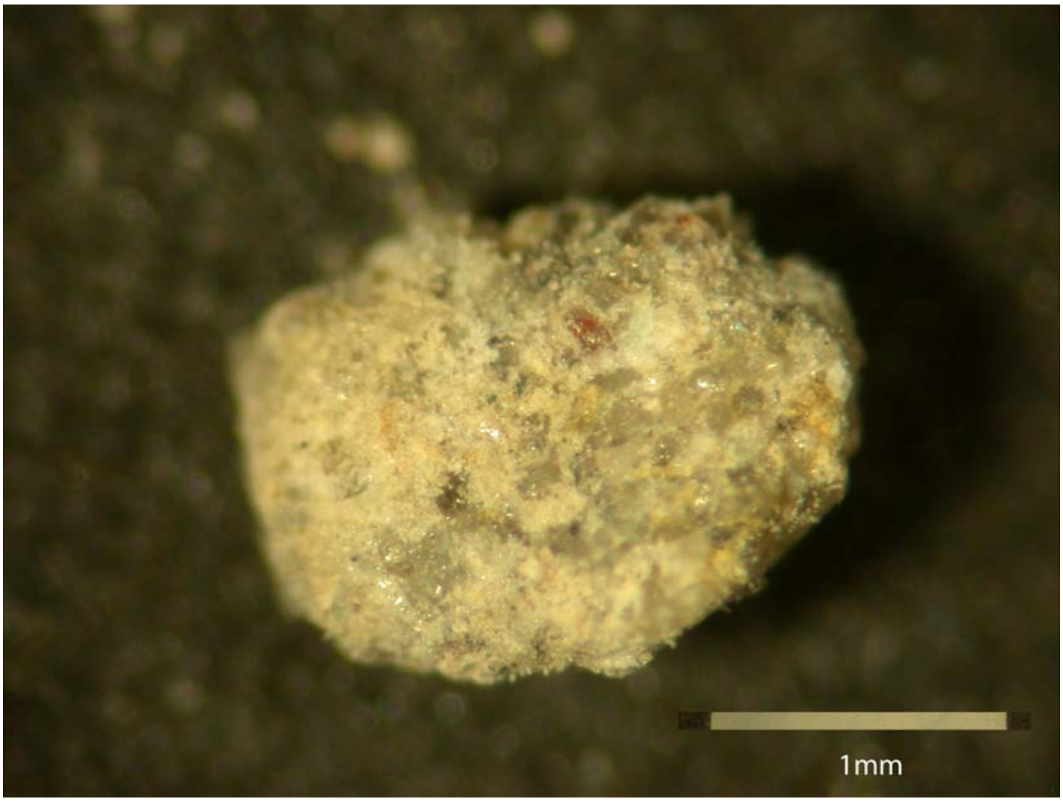


Figure 10 Jarver-1 (2772m KB)   Rock Type Classification II aggregate

Unfortunately the sample interval covering basal Thylacine Mbr - top Flaxman Fm was used for palynological analysis.
The drill cutting sample interval 2790-2796mKB was assessed, primarily to check if a depth shift to match wireline was necessary, but also to ascertain the Flaxman Fm lithological characteristics.

In this Flaxman Fm interval of 85% sandstone / 10% siltstone / 5% shale, grainsize is Medium to very Fine (350-88 micron), with 5% larger sized loose quartz grains observed. Grain relief is low, consolidation moderate to well consolidated (90% consolidated aggregates), lustre is dull, grains sub-angular/sub-rounded, and moderately spherical. The framework mineral suite is similar to the Thylacine Mbr, but the matrix comprises less pore-filling kaolin than Thylacine and proportionally more feldspar-replacement kaolin and quartz cement, plus 2% pyrite. (Figure 11)

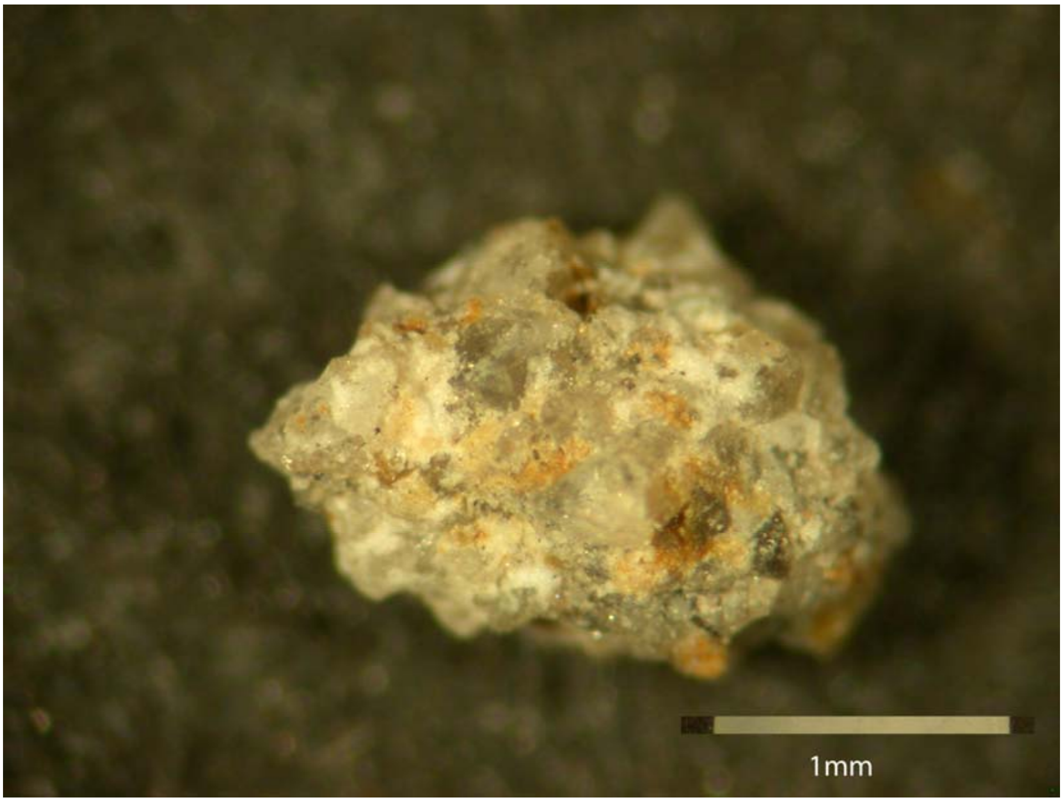


Figure 11 Jarver-1 (2790m KB) Rock Type Classification 1D

Macro-effective porosity is low, most aggregates are well cemented, of Rock type Classification 1D (60%) and II. (35%) (Figure 12, 13, 14)

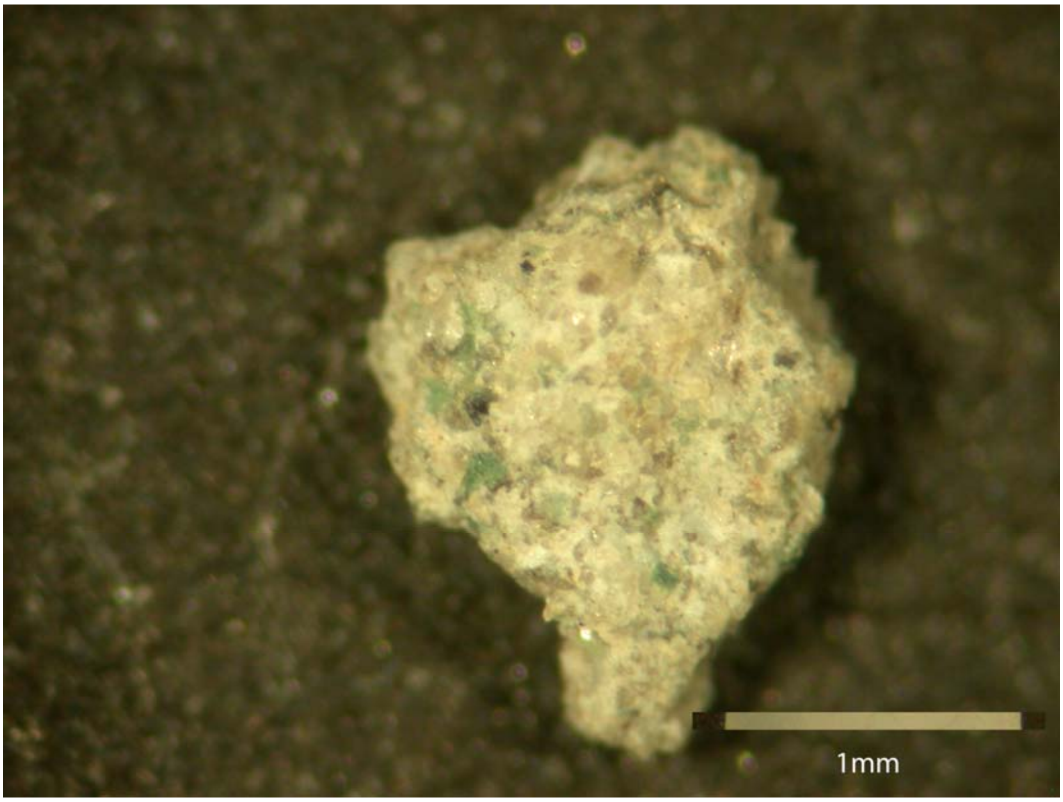


Figure 12 Jarver-1 (2790m KB) Rock Type Classification 1D

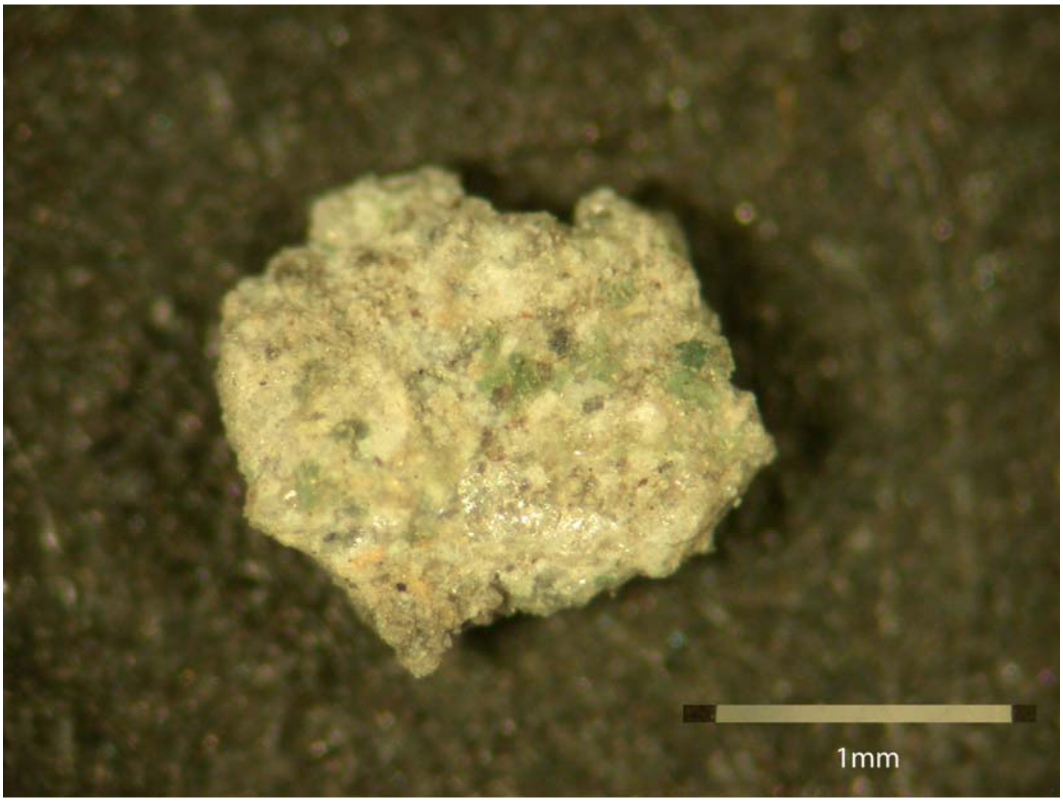


Figure 13 Jarver-1 (2790m KB) Rock Type Classification II

Figure 14 Jarver-1 (2790m KB) Rock Type Classification III

Summary

The Thylacine Member is a medium to fine grained argillaceous sandstone, with a high proportion of kaolin clay as pore-fill, replacement of feldspar, and re-crystallisation from original muds. A deltaic environment of deposition is inferred, where low energy fine grained sand and silt deposition and glauconite formation is interlaminated with muds.
At present depth the unit is fluid-saturated, as evidenced by the extensive clay and feldspar alteration and clay precipitation. No oil smears were observed.

Rock Type Classification results favour the top 2682-2712mKB interval as reasonable reservoir quality rock. Below 2712mKB, rock type classification 1D & II implies poor quality, low permeability and tight reservoir conditions for gas, and the high clay content further decreases the mobility of any hydrocarbons.

Appendix – Rock Type Classification Tables

Rock Type	Air Permeability Range (mD)	Reservoir Type
1A	>100	Conventional
1B	10-100	Conventional
1C	1-10	Conventional
1D	0.5-1	Tight Gas
II	0.07-0.5	Marginal tight gas
III	<0.07	Non-reservoir

Table 1. Santos Cooper Basin Rock Type Classification

Table 1. Pore Type Classification and characteristics, Deep Basin, Canada after Sneider and King (1984)

Type	Characteristics of dry, freshly broken surfaces at 20X magnification	Remarks
I	• Visible ϕ—very abundant to common • Pinpoint ϕ—very abundant to common • Pore interconnection is visible on many pores • Needle probe can easily dislodge some grains from rock surface and reveal pore	• Reservoir quality rock for gas without natural and/ or artificial fracturing (if thick enough) Permeability, mD • 1A >100 • 1B 10–100 • 1C 1–10 • 1D 0.5–1
II	• Visible ϕ—scattered • Pinpoint ϕ—abundant to common • Needle probe can only occasionally dislodge a grain from rock surface	• Capable of gas production if inter-layered with Type 1 rock, or has natural open fractures and/or is artificially fractured and is thick enough • Permeability is > 0.07 to 0.5 mD (depending on particle size, sorting and clay mineral content)
III	• Visible ϕ—none to very isolated • Pinpoint ϕ—none to few, scattered pores • Usually very well consolidated and/or pore filled with clays or other pore filling material	• Usually too tight to produce at commercial rate with natural or artificial fractures or when inter-layered with Type 1 rock

Table 2. after Sneider & King (1984) Rock Type Classification and Characteristics, Deep Basin, Canada

Jarver-1 Clay Mineralogy by XRD Analysis,
1980 – 3054m KB

Claire Behan, Nick Lemon, July 2008

Introduction

The bottom hole temperature determined for Jarver 1 was 74^{0}C at a depth of 3062m, a value that was unexpectedly cold. XRD analysis of the clays from ditch cutting samples selected at intervals between 1980 – 3054m was used as one way to add to the understanding of the thermal history of the area.

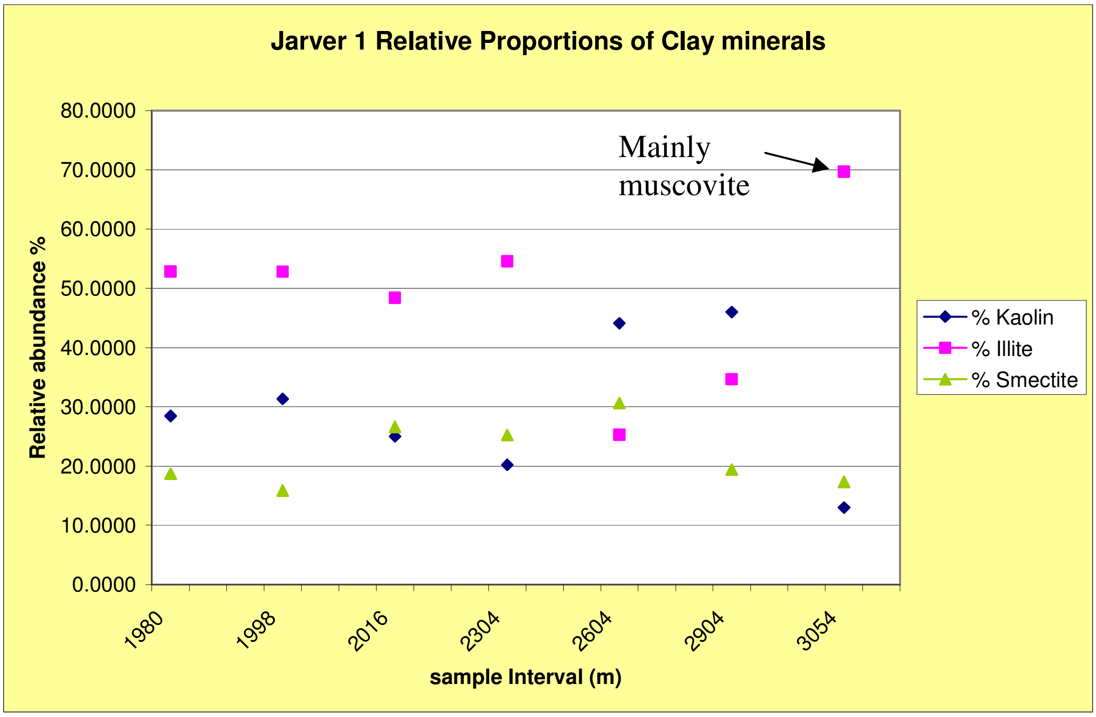
Method

The cuttings samples from Jarver 1 were collected at 6m intervals, from which 7 were chosen for XRD analysis from 1980m, 1998m, 2016m, 2304m, 2604m, 2904m, and 3054m representing the Timboon Fm, Paaratte Gp, Intra-Paaratte Gp, Belfast Shale and near basement.
The samples were prepared by gently washing off the drilling mud, gentle grinding in a mortar and pestle to liberate the clay, adding water and the sample shaken, from which the suspended clay and other fines were decanted into a vial and allowed to settle. After removing excess water, the clay sample was further ground, the resulting slurry spread onto a glass slide. This process concentrates the clays but does not remove all rushed sand particles, leaving quartz in particular in the sample as a reference peak.

In order to enhance the smectite-illite XRD peaks, the remaining sample was saturated with a strong (1M) MgCl solution, and rinsed several times before a sample was smeared on a glass disk. All slides were sent to the Amdel XRD laboratory for analysis. Scans from 5 to 40 degrees 2 theta at 0.08 degree increments were requested to assess the bulk mineralogy of the samples. Additionally, the MgCl-treated samples were re-analysed after the swelling clays were expanded with glycerol. The resulting scan files were printed and peaks picked by reference to published mineral peak positions (Hardy and Tucker, in Tucker 1988). Percentages of minerals were estimated by comparing peaks heights and using approximate relative ratios between the key peaks of the minerals present.

Results

The main mineral present is quartz, despite the attempts to concentrate the clays
Illite-muscovite is the most abundant clay (>50%) in the majority of samples, except 2604m and 2904m (25% & 35% respectively).
Kaolin occurs in all samples, at approximately 20-32% abundance, except for 2604m and 2904m depths where it is at 44-46%.
Smectite occurs in all samples at 15 – 30% abundance.
Feldspar, in the form of albite and orthoclase is more abundant in the sample at 1998m (Paaratte Gp sandstone) but occurs in all samples.
Siderite is present in all samples, decreasing in proportion with depth.
The near basement sample has 70% illite-muscovite, with less than 18% smectite and 13% kaolin, a markedly different distribution to the Cretaceous samples. Thin section petrology at this depth shows the key mineral is muscovite, not illite.



Interpretation of results

The occurrence and relative proportions of clay minerals in these samples can be used as an indication only of maximum burial depth. Comparing Jarver 1 results to Foscolos (1990) paper on of clay catagenesis and organic matter diagenesis, (Fig 1) the relatively high illite / low smectite abundance, and continued kaolin presence places the Jarver 1 clays at, or just below the First Clay Dehydration demarcation and on the boundary of the early phase of hydrocarbon generation.

The higher proportion of kaolin in the 2604m and 2904m samples can be attributed to feldspar dissolution and precipitation as kaolin pore-filling cements adding to the total. The illite concentration at 3054m is misleading as much of that is in fact muscovite, included in the sediment at the time of deposition and not a function of smectite conversion.

As the bulk mineralogy is somewhat equivocal in this well, more information can be gleaned from the nature of the smectite itself, the degree of illite interlayers indicated by the peak position and the amount of swelling character remaining as determined by the shift in the peak position during glycerol treatment. This is addressed in the discussion section below.

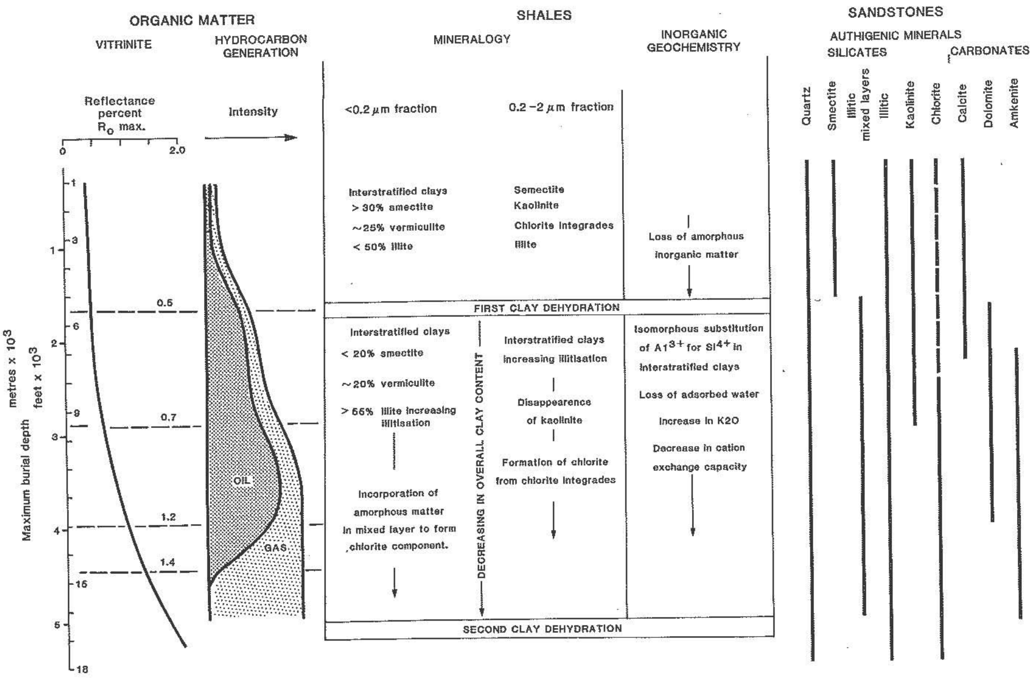


Figure 1. from Foscolos, A.E. 1979. - Relationship between diagenesis (catagenesis) of shales and the occurrence of authigenic minerals in sandstones

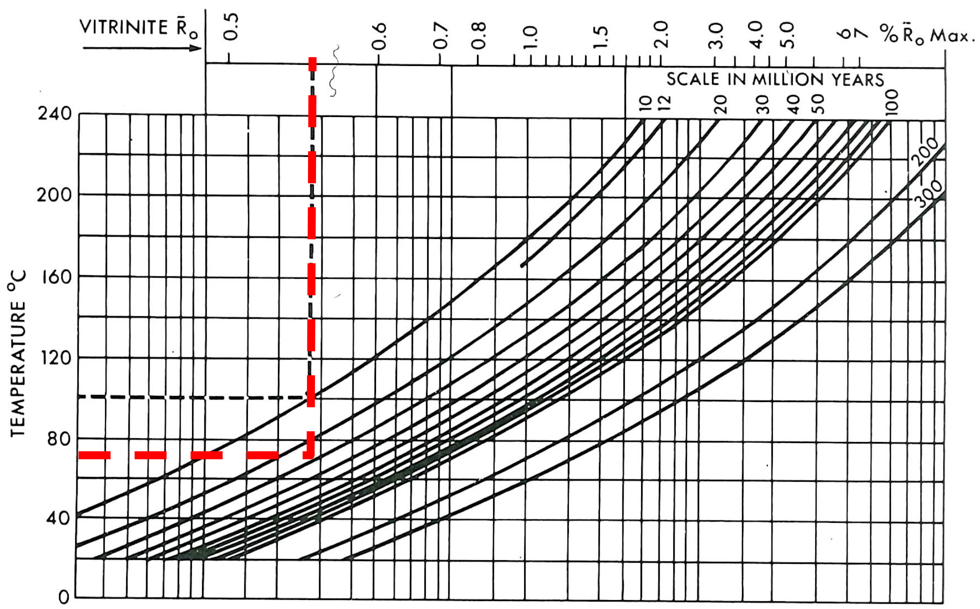
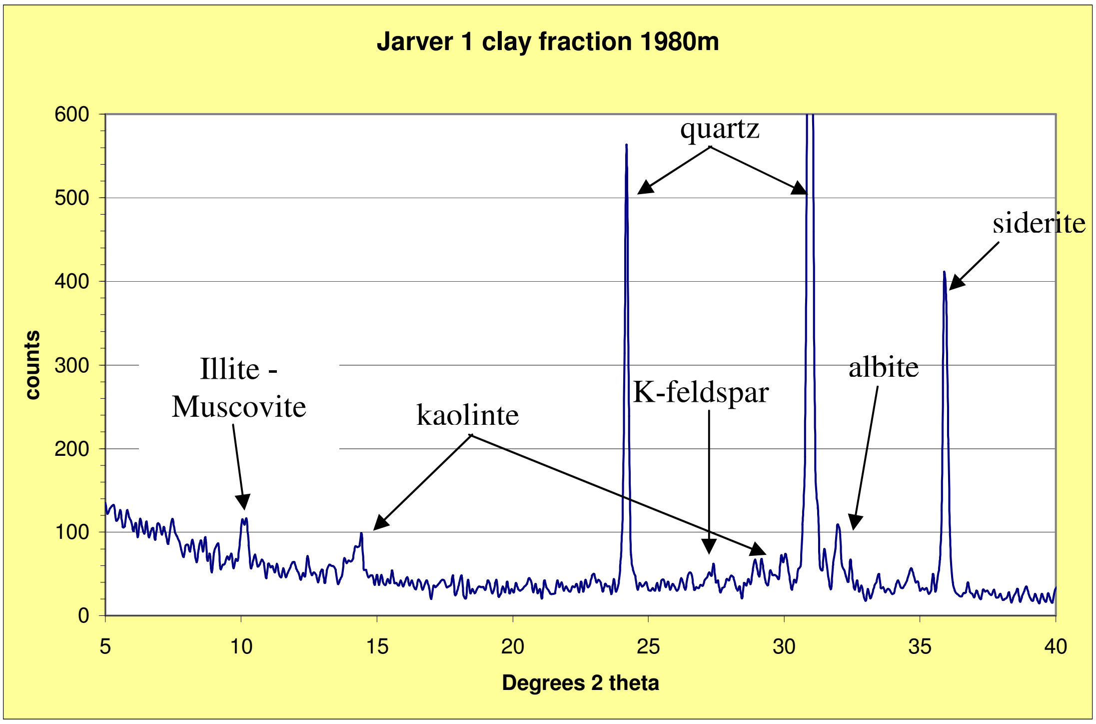
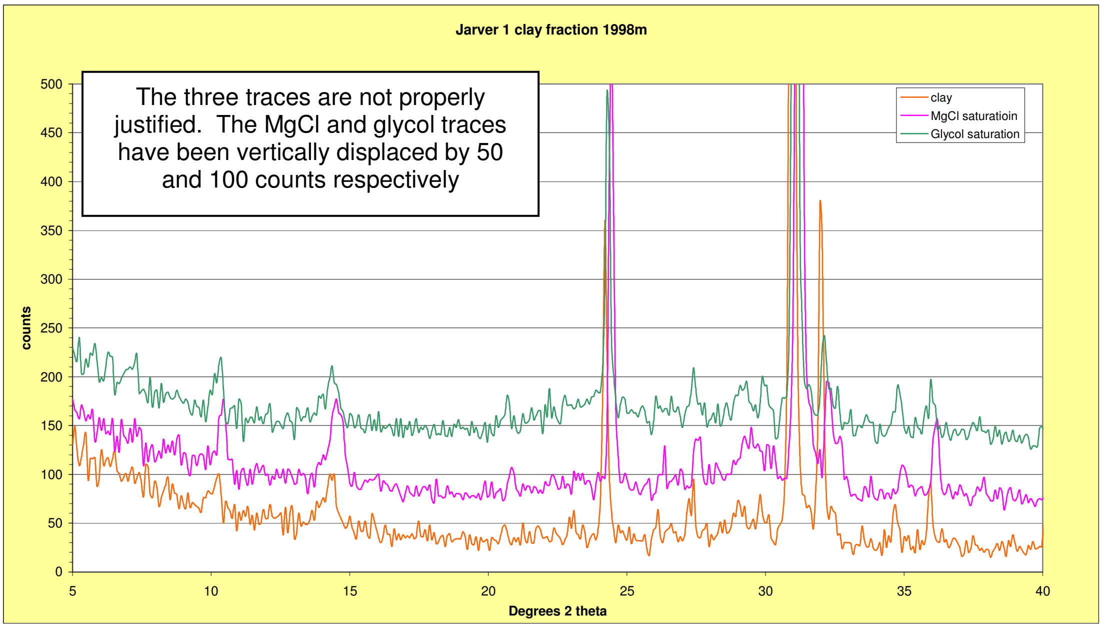
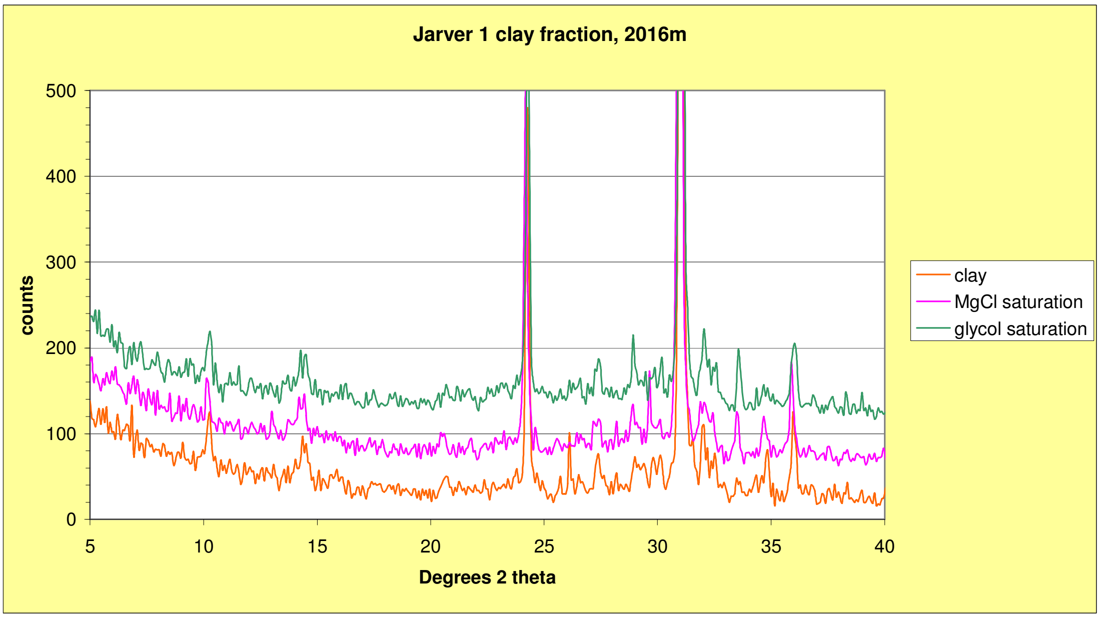


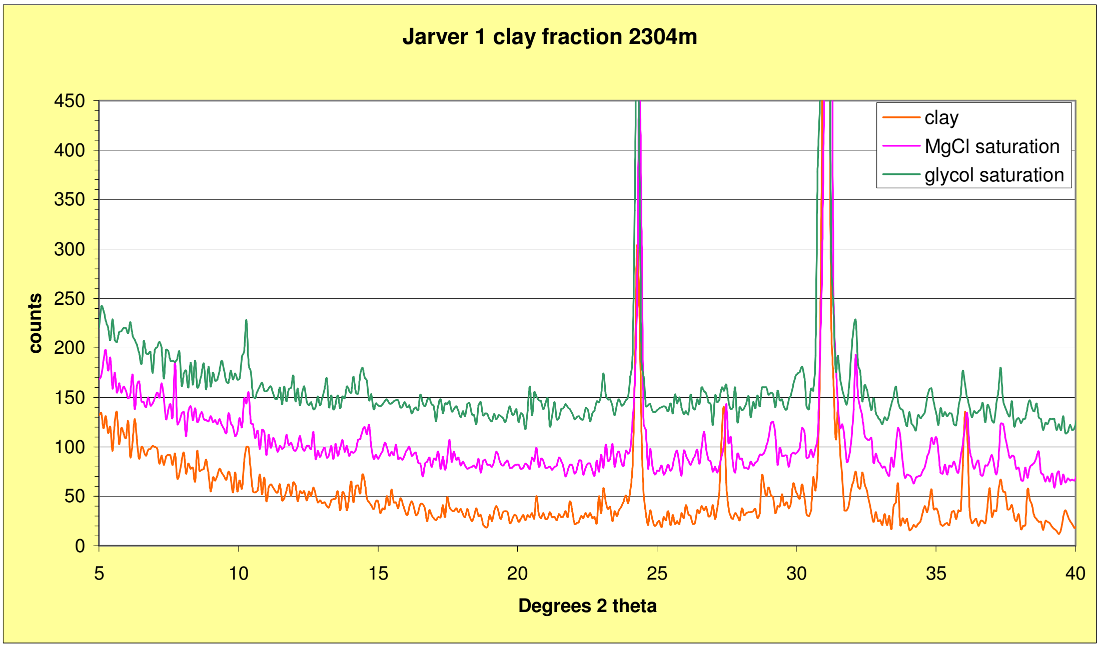
Figure 2. Correlation between Temperature, time and level of organic diagenesis (from Bustin, Barnes and Barnes, 1990). The red dashed line shows that the bottom hole temperature in Jarver 1 and the level of diagenesis indicated by the clay mineralogy suggests the sediments should have been exposed to that temperature for 30 million years.

XRD plots from each sample depth:






Jarver 1 clay fraction, 2016m
counts
0
100
200
300
400
500
5
10
15
20
25
30
35
40
Degrees 2 theta
clay
MgCl saturation
glycol saturation


Jarver 1 clay fraction 2304m
counts
0
50
100
150
200
250
300
350
400
450
5
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15
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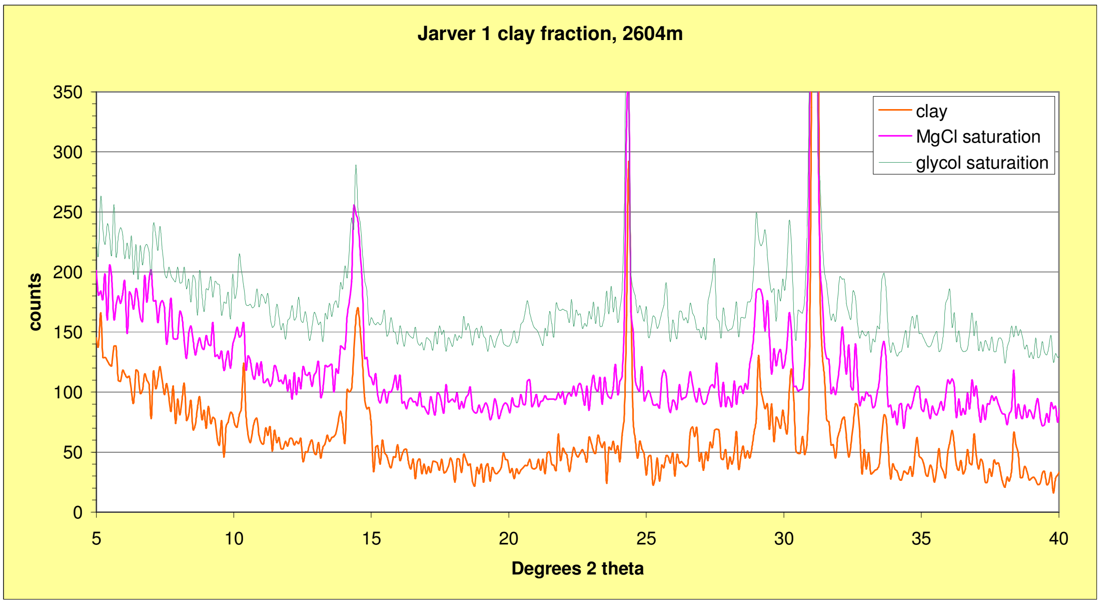
clay
MgCl saturation
glycol saturation


Jarver 1 clay fraction, 2604m
counts
Degrees 2 theta
clay
MgCl saturation
glycol saturaition
350
300
250
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35
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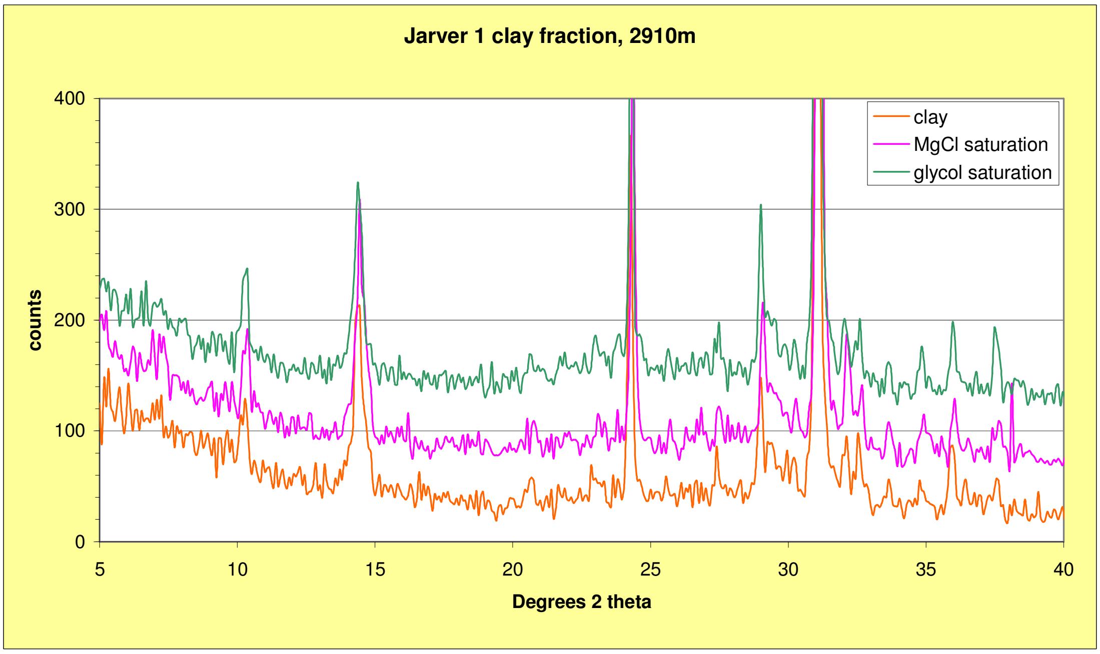
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Degrees 2 theta
clay
MgCl saturation
glycol saturation
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300
200
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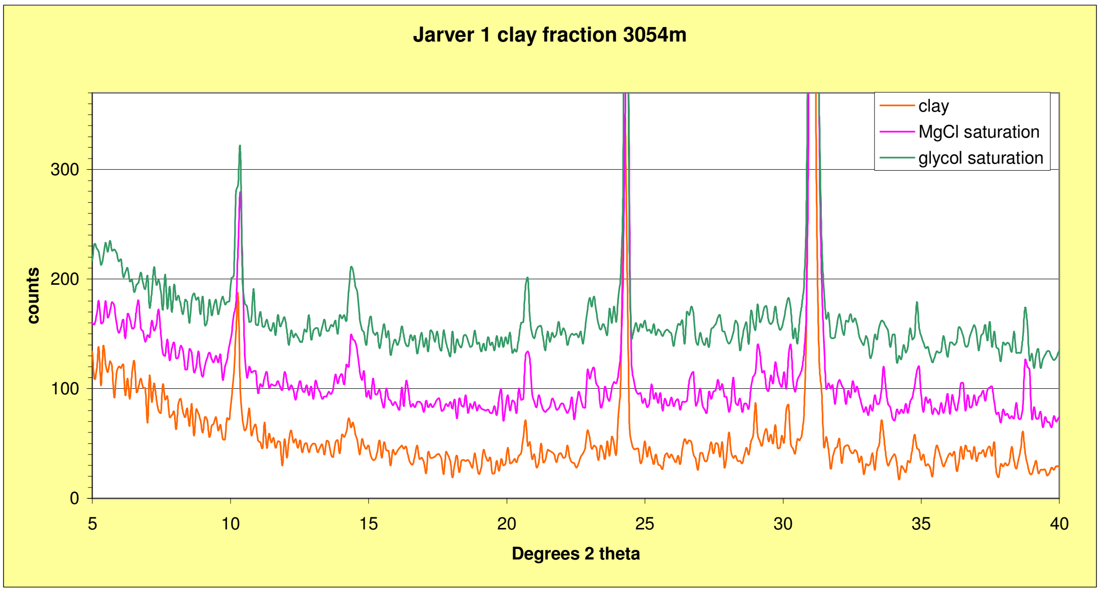

Discussion

The sample preparation technique was a compromise between a pure clay separate and a whole rock analysis. As it happened, the whole rock components could be seen well but definition of the clays, particularly the smectites, was compromised. Smectites should report around 7 degrees but the peaks here on the traces above are very diffuse. Mg saturation has sharpened the smectite peak a little, although the proportion in each sample is low. The Mg-saturated sample gives the best results for determination of the relative proportions of the various clays in each sample. Well crystallized muscovite produces a sharp peak in exactly the same position (10 degrees) as illite, making interpretation of the relative proportion of muscovite and illite very difficult. Some distinction is afforded the sharpness of the muscovite peak with respect to the broader, more diffuse illite peak and its tendency to be asymmetric towards 9 degrees.

Pure smectite, as indicated by a Mg-saturated peak at $14A^0$ (7.4 degrees 2 theta) with expansion to $17A^0$ or $18A^0$ (5-6 degrees 2 theta), occurs in samples from all the sampled depths in Jarver 1. There is some conversion of smectite to illite in the sample from 2604m (illite-smectite at $13A^0$ with expansion to $14A^0$. The conversion of some of the smectite to illite is more complete in the near-basement sample at 3054m where a peak at $10.81A^0$, very close to the 10 degree illite peak, only expands as far as $11.67A^0$ upon glycerol treatment.

The sample from 2604m has just entered the first clay dehydration zone at vitrinite reflectance 0.5. The sample from 3054m shows illite conversion and a loss of adsorbed water and swelling capacity, thought to be around a vitrinite reflectance of 0.6. Assuming that clays convert at similar rates as organic matter, a sediment would need to be at a temperature of 74^0C for 40 million years to achieve this level of alteration (see Figure 2 above). A similar level of conversion could be achieved in a shorter time if the temperature were raised; for example 15 Ma at 100^0C. The degree of clay conversion observed infers that at least the lower half of the succession intersected in Jarver 1 has seen higher temperatures in the past.

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APPENDIX VI : PALYNOLOGY REPORT

INTERPRETATIVE DATA.
Palynological analysis of cuttings samples between 1440 and 3030 metres in Jarver-1, offshore Sorell Basin.

by

Alan D. Partridge

Biostrata Pty Ltd
A.B.N. 39 053 800 945

Biostrata Report 2008/06A

21st October 2008

INTERPRETATIVE DATA.
Palynological analysis of cuttings samples between 1440 and 3030 metres in Jarver-1, offshore Sorell Basin.

by Alan D. Partridge

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INTERPRETATIVE DATA.
Palynological analysis of cuttings samples between 1440 and 3030 metres in Jarver-1, offshore Sorell Basin.

by Alan D. Partridge

Summary

Palynological analyses have been performed on 38 cuttings samples from Jarver-1 between 1440 and 3030m and the final results are summarised in Table 1. The spore-pollen assemblages form am almost complete succession from the uppermost *Phyllocladidites mawsonii* Zone to Lower *Lygistepollenites balmei* Zone, while the microplankton assemblages form an incomplete succession from the *Kiokansium polypes* Subzone of the *Palaeohystrichophora infusorioides* Zone to no younger than the *Eisenackia crassitabulata* Zone. The overall age range is latest Turonian to Early Paleocene. Possible equivalence to the stratigraphic units in the Port Campbell Embayment of the Otway Basin is discussed.

Table 1. Palynological and Stratigraphic Summary of Jarver–1.

Age	Spore-Pollen Zones/Subzones (Microplankton Zones/Subzones)	Depths (mMD)	Stratigraphic Equivalence
Early Paleocene	Lower *Lygistepollenites balmei* Zone (*Eisenackia crassitabulata* to *Alisocysta circumtabulata* Zones)	1440 to 1450m (1440m)	Wangerrip Group
Late Maastrichtian	Upper *Forcipites longus* Zone (*Manumiella druggii* Zone)	1570 to 1620m (1530 to 1680m)	Massacre Shale to Timboon Sandstone
Early Maastrichtian	Lower *Forcipes longus* Zone (*Palaeostomocystis ovata* Zone) (*Isabelidinium pellucidum* Zone)	1750 to 1790m (1750m) (1790m)	Timboon Sandstone
Early Maastrichtian to Late Campanian	Lower *F. longus* to *T. lilliei* Zones (*Isabelidinium greenense* Zone)	1880 to 1940m (1880 to 1940m)	Paaratte Formation
?Late Campanian	Seven indeterminate assemblages	1968 to 2226m	?Paaratte Formation
Early Campanian	*Nothofagidites senectus* Zone (*Xenikoon australis* Zone)	2304 to 2358m (2304 to 2358m)	Paaratte Formation
Santonian	*Tricolporites apoxyexinus* Zone (*Isabelidinium rotundatum* Subzone)	2598 to 2628m (2598 to 2628m)	Belfast Mudstone Unit C or Nullawarre Greensand
Santonian	*Tricolporites apoxyexinus* Zone (*Isabelidinium cretaceum* Zone)	2706m (2706 to 2742m)	Belfast Mudstone Unit C
?Santonian	Two indeterminate assemblages	2766 to 2790m	?Belfast Mudstone
Santonian	*Tricolporites apoxyexinus* Zone (*Odontochitina porifera* Zone)	2808 to 2952m (2808 to 2952m)	Belfast Mudstone Unit B
?Early Coniacian to ?Late Turonian	*Phyllocladidites mawsonii* Zone (*Kiokansium polypes* to *Trithyrodinium* Subzone)	2970 to 3030m (2970 to 3030m)	Belfast Mudstone to Flaxman Formation

Introduction

Thirty-eight cuttings samples have been analysed for palynomorphs in the Jarver-1 exploration well through the basal part of the Cenozoic to Upper Cretaceous succession encountered between 1440 and 3030m. The well was drilled by Santos Ltd during May and June 2008, and is located in permit T/33P within the Sorell Basin, offshore western Tasmania. The objective of the study was to provide age subdivision of the succession penetrated using palynology.

Materials and Methods: The study is based on 88 palynological slides from 38 cuttings samples which where prepared at the Santos Ltd Palynological Laboratory in Adelaide. The slides were received by the author on 11th July 2008 and five Provisional Reports providing initial results were submitted between the 17th July and 11th August. Analysis of the samples was based on assemblage counts of over 150 palynomorphs in the more productive samples and rapid scanning of all the remaining slides. In those samples with low organic-residue recovery and low concentrations of palynomorphs all the specimens found on supplied slides were counted.

Results: Final interpretative results of the palynological analysis are provided in Tables 1 and 2. Basic assemblage data comprising the visual organic residues yields, palynomorph concentrations on the slides, the preservation of the palynomorphs, and the number of spore-pollen and microplankton species recorded from individual samples are provided in Table 3. All palynological slides supplied and examined are listed in Table 4.

Overall, the visual organic-yields varies from moderate to very low, with less than half of the samples categorised as having moderate to good concentrations of palynomorphs on the slides. For about one-quarter of the samples analysed the supplied slides contained less than 100 identifiable palynomorph specimens. Preservation of the palynomorphs is mostly fair to good through the shallowest 500 metres, but declines to mostly poor to fair through the deepest 1600 metres of the stratigraphic succession.

The poor recovery of organic-residues and low recovery of palynomorphs is understood to be mainly due to the selective removal of fine-grained lithologies from the cuttings during either the drilling operations or the collection and subsequent washing and drying of the cuttings. These problems could not be compensated for in the laboratory preparation of the samples and are reflected in the palynological assemblages recorded, which are interpreted to be skewed or biased towards the larger palynomorph specimens and species. Relative to palynological studies of other wells penetrating equivalent stratigraphic successions in the greater Otway Basin the palynological assemblages recorded from Jarver-1 contain higher abundances of the larger dinocysts and the bigger spore species, and lower abundances of the smaller gymnosperm and angiosperm pollen (eg. *Dilwynites* and *Nothofagidites* species).

Description of Range Chart: The palynomorphs identified in the samples are documented on the accompanying StrataBugs™ range chart which display the recorded palynomorph species in the cuttings samples proportional to their depth in the well and in terms of their percentage abundance. The palynomorphs recorded are split between different categories. The panel labelled SP Categories provides total percentage of spores, gymnosperm and angiosperm pollen counted in the samples. The species within these categories are then displayed in separate panels for spores, gymnosperm pollen and angiosperm pollen. The panel labelled Microplankton-% provides a breakdown of the total microplankton count into categories of environmental significance, with their abundances expressed as a percentage of the combined spore-pollen and microplankton count. The following panel labelled Microplankton provides the abundances of individual species as a percentage of just the microplankton count. The panel labelled Other palynomorphs provides the abundance of a number of miscellaneous categories expressed as a percentage of the combined count of the spore-pollen and the Other palynomorphs. The final biostratigraphic panel records interpreted reworked Permian, Triassic and Early Cretaceous species. Within the panels the species are plotted in order of their youngest occurrences or alternatively in alphabetical order. In addition to the biostratigraphic panels on the left of the chart are displayed columns which give a Depth Scale, the Casing points and a Lithological column based on the proportions of three principal lithologies in the cuttings descriptions. Two columns for the Spore-Pollen and Microplankton zones identifies are also included.

The following codes or abbreviations apply to the individual species occurrences and abundances on the range chart:

Numbers	=	Percentage abundances
+	=	Species outside of count
C	=	Caved species
R	=	Reworked species
?	=	Questionable identification of species.

Author citations for most of the recorded spore-pollen species can be sourced from the papers by Dettmann (1963, 1986), Dettmann & Playford (1968), Helby *et al.* (1987) and Stover & Partridge (1973). Author citations for the microplankton species can be sourced from the indexes for dinocysts and other miscellaneous organic-walled microplankton prepared by Fensome *et al.* (1990), and Williams *et al.* (1998). Manuscript species names and combinations are indicated by “sp. nov.” or “comb. nov.” on the range chart and “ms” in the text. Most of the manuscript species used are derived from PhD theses of Marshall (1984) and Partridge (1999).

Geological Discussion

The palynological results indicate that the suite of cuttings samples supplied from Jarver-1 extend from somewhere in the bottom half of the Sherbrook Group to the base of the Wangerrip Group. However, as copies of the electric logs were not supplied for integration with the palynological results it is not possible to accurately apply the revised formation nomenclature proposed for these groups by Partridge (2001). Instead, the following discussion provides a general outline of the likely stratigraphic assignment of the samples based solely on consideration of their palynomorph content and the principal cuttings lithologies displayed graphically on the StrataBugs™ range chart.

The palynological succession starts below the 20" casing shoe at 1407m with Early Paleocene assemblages that would be equivalent to either the basal Pebble Point Formation or the upper part of the Massacre Shale in subsurface well sections in the Port Campbell Embayment on the northern margin of the Otway Basin. This is underlain by a Late Maastrichtian interval containing a thick *Manumiella druggii* Zone which would be equivalent to the lower upper part of the Massacre Shale or the uppermost Timboon Formation. It is important to note however that: **(i)** the youngest microplankton assemblages recorded in Jarver-1 are older than all microplankton assemblages reported from the type outcrop section of the Pebble Point Formation, and **(ii)** the cuttings over the interval 1407 to 1760m are predominantly sand suggesting the Massacre Shale may not be present. The current sampling suggests a thickness for the *M. druggii* Zone of 150 metres, but considering the overlying and underlying sampling gaps it could be as much as 300 metres thick.

The next group of assemblages lying between the base of the *M. druggii* Zone at 1680m and the top of the *Xenikoon australis* Zone at 2304m covers part of the Late Cretaceous that is generally poorly sampled for palynology and therefore poorly understood in the greater Otway Basin. The spore-pollen assemblage are particularly poor through this interval, although entirely consistent with the expected *Tricolporites lilliei* and Lower *Forcipites longus* Zones (Partridge, 2006). The associated microplankton assemblage are more informative with two new zones and one previously recognised zone found above the 13-3/8" casing point at 1942m. Based on the most recent work by the author the new *Palaeostomocystis ovata* Zone at 1750m, and emended *Isabelidinium pellucidum* Zone at 1790m, would be regarded as belonging to the Timboon Formation, while the new *Isabelidinium greenense* Zone would be considered approximately equivalent to the *Isabelidinium korojonense* Zone and represent the top of the Paaratte Formation. Inspection of the lithological column on the range chart suggests the logical position of the top of the Paaratte Formation is at 1860m. Sadly, there still remains a ~350 metre thick section below the base of the casing and the top of the *X. australis* Zone which lack adequate palynological control.

The underlying *Xenikoon australis* Zone at 2304m and 2358m can be typical of either the basal Paaratte Formation in proximal (onshore) areas, or the upper Skull Creek Mudstone in more distal (offshore) areas according to Partridge (2001, fig.2). Considering the location of these assemblages at the sandy base of a mostly siltstone interval, which overlies a predominantly claystone interval, the suggested position for the top of the Skull Creek Formation is around 2350m. The next oldest *Nelsoniella aceras* Zone was not recovered in the Jarver-1 well but would be expected to lie within the unsampled interval between 2358 and 2598m, which also correspond to the most "shaly" interval on the cuttings descriptions.

The next group of assemblages between 2598 and 2952m would all be equivalent to the Belfast Mudstone and its lateral facies the Nullawarre Greensand (Partridge, 2001, fig.2). The spore-pollen assemblages belong to the broad *Tricolporites apoxyexinus* Zone, but finer resolution is provided by the associated microplankton. The *Isabelidinium rotundatum* Subzone at 2598 and 2628m and all samples down to the base of the parent *Isabelidinium cretaceum* Zone at 2742m would be equivalent to Unit C of the Belfast Mudstone, while the *Odontochitina porifera* Zone between 2808 and 2952m would be equivalent to Unit B of the Belfast Mudstone. There is no clear lithological break on the cuttings descriptions at which to place the top of Unit C, but the top of Unit B could be placed at approximately 2785m at the based of a significant sand.

At the bottom of Jarver-1 the two deepest assemblages at 2970 and 3030m contain spore-pollen assemblages considered diagnostic of the *Phyllocladidites mawsonii* Zone, while the associated microplankton are best placed in either the *Kiokansium polypes* or *Trithyrodinium* Subzones within the upper *Palaeohystrichophora infusorioides* Zone (Partridge, 2006). These zone assignments suggests that at TD the Jarver-1 well had penetrated no older than the Banoon Member or Unit C of the Flaxman Formation

Surprisingly missing from the palynological assemblages recovered in Jarver-1 is any clear evidence for the presence of either the *Conosphaeridium striatoconum* microplankton Zone or the equivalent *Clavifera vultuosus* spore-pollen Subzone of the *P. mawsonii* Zone. This section could be very thin or absent, but potentially could also be masked by cavings from the most "shaly" portion of the *O. porifera* Zone between 2815 and 2910m.

Biostratigraphy

The samples analysed in Jarver-1 are initially classified according to the Australian standard palynological zonation schemes established by Stover & Partridge (1973) and Helby *et al.* (1987). Finer resolution is then achieved using the local spore-pollen and microplankton subzones described from the Otway Basin by Partridge (1999, 2001). Finally, two new local microplankton zones, and one revived or emended zone, are used to describe new assemblages recovered from the late Campanian to mid-Maastrichtian interval. Correlation of the zones to the latest Geologic Time Scale of Gradstein *et al.* (2004) is in accord with the chart prepared by Partridge (2006). A recent summary of the zonation schemes can also be found in the latest edition of the *Geology of Victoria* (Partridge & Dettmann, 2003).

Lower *Lygistepollenites balmei* spore-pollen Zone
Interval: 1440 to 1450 metres
Age: Early Paleocene.

The two shallowest samples, from just below the 20" casing shoe at 1407m, contain Early Paleocene assemblages with approximately equal proportions of spore-pollen and marine microplankton. The terrestrially derived component is dominated by *Dilwynites* spp. (average 33% of SP count) and *Podocarpidites* spp. (average 19%), with secondary abundances of *Cyathidites* spp., *Phyllocladidites mawsonii* and *Proteacidites* spp. which all average less than 10%. The assemblages are no younger than the *L. balmei* Zone based on the presence of the eponymous species *Lygistepollenites balmei* in association with *Gambierina rudata* and *Australopollis obscurus*, and both samples are considered no younger than the Lower subzone based on the occurrence of *Proteacidites angulatus* in the bottom sample.

The marine component is dominated by the schizosporous algae *Paralecaniella indentata* (average >50% of MP count), and the dinocyst *Glaphyrocysta retiintexta* (average ~20%). The shallower sample is probably equivalent to either the *Eisenackia crassitabulata* or *Alisocysta circumtabulata* Zones of Partridge (1999), based on the presence of the manuscript species *Eisenackia hapuku* sp. nov., which can be characterised by “high paratabular pads” with incomplete internal reticulation. The zone assignment of the deeper sample is uncertain, but based on the occurrence of a single endocyst with a characteristic 3I archeopyle diagnostic of the genus *Trithyrodinium* it is feasible that the sample could represent either the *Palaeoperidinium pyrophorum* Zone or *Trithyrodinium evittii* Acme zone of Partridge (1999).

The samples also contain rare Eocene pollen and frequent Early Miocene dinocysts which are most likely derived from the section above the 20" casing shoe. The presence of these younger species suggested that a significant volume of caved rock remained in the rat-hole after running the casing.

Upper *Forcipites longus* spore-pollen Zone and
***Manumiella druggii* microplankton Zone**
Interval: 1530 to 1680 metre
Age: Late Maastrichtian.

The five samples assigned to the Upper *F. longus* and *M. druggii* Zones confirm the presence of a Late Maastrichtian section that is minimum of 150 metres thick, but which could easily be twice that thickness considering the overlying and underlying sampling gaps. The recovered assemblages are split 75 to 80% marine microplankton and 20 to 25% terrestrial spore-pollen.

The microplankton assemblages are assigned to the *M. druggii* Zone based on the dominance of an intergrading morphological complex of the *Manumiella* species *M. druggii*, *M. conorata* and *M. seelandica* which in total average ~70% of the MP count, and ~50% of the total count across all samples in zone. Most specimens are either assigned to *Manumiella conorata* or alternatively are fragmentary, with their apical and antapical extremities broken, and are consequently lumped together on the range chart under *Manumiella* spp. (indet. specimens). In contrast, to the relative abundance of good specimens of *M. conorata*, the other two end-member species *M. druggii* and *M. seelandica* are comparatively rare. The next most abundant species are *Paralecaniella indentata* and *Glaphyrocysta retiintexta* which are most likely caved from the overlying Paleocene section. The only other significant species is a common large brown sphere with a 2I archeopyle, which is recorded on the range chart under the manuscript name *Sorelasphaera* gen. et sp. nov., and rare *Deflandrea diebelii* whose the LAD (Last Appearance Datum) in the well is recorded at 1570m.

The moderate diversity spore-pollen assemblages are roughly equally dominated by *Proteacidites* spp., *Podocarpidites* spp. and *Dilwynites* spp. The samples are assigned to the Upper *F. longus*

Zone based on the LADs of *Beaupreaidites orbiculatus* and *Proteacidites crotonoides* at 1580m, *Grapnelispora evansii* at 1620m, and the FAD (First Appearance Datum) of *Tripunctisporis maastrichtiensis* at 1620m.

Lower *Forcipites longus* spore-pollen Zone
Interval: 1750 to 1790 metre, possibly extending to 1880 metres
Age: Late Campanian to Early Maastrichtian.

Although spore-pollen, at an average of ~55% of the total count, are slightly more abundant than microplankton in these three assemblages, the low yields have resulted in relatively bland spore-pollen assemblages which lack any clear dominance by individual species, or species groups. In addition, zone index species are extremely rare, and as a consequence the samples are assigned to the Lower *F. longus* Zone based on the presence of single specimens of key species in the individual samples. These marker species consist of *Grapnelispora evansii* at 1750m, *Tetracolporites verrucosus* at 1790m and *Proteacidites reticuloconcavus* ms at 1880m. However, because the last species is associated with older dinocysts it potentially could be caved into the next older *Tricolporites lilliei* Zone.

***Palaeostomocystis ovata* microplankton Zone — new**
Sample at: 1750 metres
Age: Late? Maastrichtian.

The new *Palaeostomocystis ovata* Zone was first established in the Gippsland Basin where it has been found in wells along the edge of the continental shelf and upper continental slope in the south-east portion of the basin. The zone is defined as the interval from the LAD of *Isabelidinium pellucidum* to the LAD of *Palaeostomocystis ovata* (Wilson) Eisenack *et al*. 1973. The zone partly fills a longstanding gap in the microplankton succession in the Gippsland Basin between the top of the *Isabelidinium korojonense* Zone and base of the *Manumiella druggii* Zone (Helby *et al*., 1987; Partridge 1999, 2006). In the Gippsland Basin the samples that have been assigned to the zone are characterised by near monospecific assemblages of the eponymous species.

In Jarver-1 the single sample assigned to *P. ovata* Zone also contains the LADs of *Alterbidinium acutulum*, *Xiphophoridium alatum* and *Odontochitina echinata* sp. nov. of Marshall 1984 in addition to the LAD of the eponymous species *Palaeostomocystis ovata*. The joint youngest occurrences of these four species strongly suggests that Jarver-1 has penetrated a slightly older assemblage than the *M. druggii* Zone, notwithstanding the fact that the microplankton assemblage at 1750m remains completely dominated by the *Manumiella druggii-conorata-seelandica* complex which represents 64% of MP count, and 30% of the total count. However, based on comparison with the Gippsland Basin where there is no observed overlap in the range of *P. ovata* with the index species for the *M. druggii Zone*, in the 11 samples from 5 wells which have so far assigned to the zone, it is interpreted that the whole *Manumiella druggii-conorata-seelandica* species complex is most likely caved into the sample at 1750m, and this also applies to all deeper samples.

***Isabelidinium pellucidum* microplankton Zone — emended**
Sample at: 1790 metres
Age: probably Early Maastrichtian.

The original *Isabelidinium pellucidum* Zone dates back to the early palynological studies on the Otway Basin by Evans (1966), who recognised the occurrence of the eponymous species in the Paaratte Formation (or “Curdies Beds”) as a potential marker for the microplankton assemblages younger than his original *Xenikoon australis* Zone. However, the zone was not recognised by Helby *et al*. (1987), although it can be considered partly subsumed into their *Isabelidinium korojonense* Zone. Nor was the zone recognised in the subsequent studies by Partridge (1999; 2001). More recent studies have nevertheless demonstrated that an emended concept for the zone is a useful subdivision of the hitherto unzoned interval between the *I. korojonense* and *M. druggii* Zones, in both the Otway and Gippsland basins. This emended zone concept can be defined as the interval from the LAD of *Isabelidinium korojonense* (or equivalent) to the LAD of *Isabelidinium pellucidum*.

In Jarver-1 the emended zone concept is applicable to the assemblage from the cuttings at 1790m which contains the joint LADs of *Isabelidinium pellucidum*, *Canninginopsis bretonica* and *Leberidocysta lancelinica* of sp. nov. of Marshall 1984, associated with an increased abundance of *Nummus* spp. (>12% of MP count). The microplankton assemblage is however still dominated by the younger *Manumiella druggii-conorata-seelandica* species complex (representing ~40% of MP count, and ~20% of the total count) which is interpreted to be caved.

***Isabelidinium greenense* microplankton Zone — informal**
(= *Isabelidinium korojonense* microplankton Zone — partim)
Interval: 1880 to 1940 metres
Age: mid to Late Campanian.

The next two samples in the succession at 1880m and 1940m can be characterised by the occurrence of specimens of *Isabelidinium greenense* of the "*cretaceum*-shape" end-member illustrated by Marshall (1990; fig.21A-E), associated with the LADs of *Chatangiella packhamii* (at 1940m) and the additional *Odontochitina* species *O. fenestrata* sp. nov. of Marshall 1984 (at 1880m) and *O. indigena* Marshall 1988 (at 1940m). At the same time there is a marked decline in the abundance of caved specimens of the *Manumiella druggii-conorata-seelandica* species complex and a rise in the prominence of *Nummus* spp. In the Gippsland Basin the incoming of this new assemblage would be placed in the *Isabelidinium variabile* Superzone, and be considered no younger than the *Isabelidinium korojonense* Zone following Partridge (1999). This microplankton association would also equate to the *Tricolporites lilliei* Zone and is possible that both samples should be assigned to this spore-pollen zone. For the purposes of this report the informal *Isabelidinium greenense* Zone is defined at the interval from the LAD of *Xenikoon australis* to the LAD of *Isabelidinium greenense* which would make it effectively equivalent to the *I. korojonense* Zone.

Zone Indeterminate Interval: 1968 to 2226 metres
Age: Campanian.

The next seven sample analysed between 1968 and 2226m are all from **below** the 13-3/8" casing shoe at 1942m and are characterised by very lean assemblages. All slides from the seven samples were counted to give a range of 12 to 85 identifiable palynomorphs per sample, or an average of less than 30 palynomorphs per slide. Such low numbers of palynomorphs on the slides makes precise age dating extremely difficult, for although the assemblages are clearly consistent with a Late Cretaceous age none of the samples can confidently be assigned to a single spore-pollen or microplankton zone.

Most species recorded are long-ranging, and all the possible index species are only represented by single specimens. The most noteworthy are the pollen *Nothofagidites senectus* at 1968m and 2178m; *Nothofagidites endurus* at 1992m and 2178m; and *Stellidiopollis annulatu*s at 2022m and 2178m. The only significant microplankton are *Odontochitina echinata* sp. nov. at 2022m, and a possible fragment of a dinocyst with an ornament characteristic of *Xenikoon australis* recorded at 2178m. Four of the seven samples also contain caved specimens of *Manumiella conorata* or *Manumiella* spp. so it is highly likely that many of the other species could also be caved.

Nothofagidites senectus **spore-pollen Zone and**
Xenikoon australis **microplankton Zone**
Interval: 2304 to 2358 metres
Age: Early Campanian.

The cuttings at 2304m gave a low to moderate organic yield containing a moderate diversity but distinct assemblage which can be confidently assigned to the *N. senectus* Zone based on the rare occurrence of *Nothofagidites senectus*, associated with the frequent occurrence of the secondary index species *Forcipites sabulosus* (4% of SP count), and to the *X. australis* Zone based on the abundant occurrence of *Xenikoon australis* (55% of MP count and 9% of SP + MP count), associated with common *Nelsoniella aceras*. The cuttings at 2358m, in contrast, gave a very lean assemblage with only 58 identifiable palynomorphs, but nevertheless these could be confidently assigned to both zones based on frequent occurrence of both *F. sabulosus* (5% of SP count) and *X. australis* (~9% of MP count). In additional the deeper sample contains the secondary index species *Nelsoniella semireticulata* and *N. tuberculata*, which do not range above this microplankton zone. Overall the assemblages are dominated by the gymnosperm pollen *Podocarpidites* spp. (average 28% of SP count) and *Araucariacites australis* (average 18%), and the eponymous dinocyst species *X. australis*.

Tricolporites apoxyexinus **spore-pollen Zone**
Interval: 2598 to 2952 metres
Age: Santonian.

The *T. apoxyexinus* Zone is strictly defined as the interval from the FADs of *Tricolporites apoxyexinus* and/or *Ornamentifera sentosa* to the FAD of *Nothofagidites senectus* (Helby *et al*. 1987). Unfortunately, the principal index species can be very rare and inconsistent, and as neither were recorded in Jarver-1 identification of the zone has to rely on the oldest occurrences of the secondary index species *Latrobosporites amplus* and *L. ohaiensis*, and even weaker tertiary index species such as *Peninsulapollis gillii* and *Ilexpollenites primus* ms.

In Jarver-1 the base of the zone is placed at the FADs of *Latrobosporites ohaiensis* and *Ilexpollenites primus* ms at 2952m and *Latrobosporites amplus* and *Peninsulapollis gillii* in the immediately overlying sample at 2946m, while the top of zone is considered to range as high as 2598m based on the absence of any specimens of younger index species *Nothofagidites senectus* and *Forcipites sabulosus*. Furthermore, above 2598m there is a 240 metre sampling gap to the established base of the *N. senectus* Zone at 2358m.

Of the 16 cuttings samples analysed through the zone interval only 13 could be assigned to the zone even at the lowest confidence rating. The other three samples between 2742 and 2790m gave low yields with low diversity assemblage and are best left unzoned, although by superposition they must lie within the zone. The spore-pollen assemblages are consistently dominated by bisaccate gymnosperm pollen of *Podocarpidites* spp. which averages 35%. The next most abundant categories are spores of *Cyathidites* (average 13%), the alete gymnosperm pollen of the genera *Dilwynites* and *Araucariacites* (average 11%), and rather surprisingly the Cheirolepidaceae pollen *Corollina torosa* which averages 7%. The common occurrence of the last species is not typical of equivalent age assemblages in the northern Otway Basin so it may be indicative of local reworking from sediments of Early Jurassic age located either to the south or east of Jarver-1.

Samples between 2790 and 2844m (and possibly caved at 2970m) also contain the conspicuous occurrence of a new megaspore genus which is characterised by a single long phallic-like projection arising proximally from the central spore body, and a flange or skirt extending distally which is ornamented by numerous short “threads” which end in distinctive “crochet-like” hooks. The megaspore is given the manuscript name *Jarvamegaspora crochetensis* gen. et sp. nov. on the range charts. The genus *Ariadnaesporites* can be distinguished from this new genus by having threads which arise exclusively from the opposite proximal surface of the central spore body, and which also lack terminal hooks. This last occurrence of this new megaspore could prove a useful marker for the lower part of the *Tricolporites apoxyexinus* Zone. Specimens of the megaspore genus *Balmeisporites* are also recorded in this zone but they are considered to be much less abundant in the assemblages compared to equivalent age sections from the northern Otway Basin.

***Isabelidinium cretaceum* microplankton Zone and**
***Isabelidinium rotundatum* microplankton Subzone**
Interval: 2598 to 2742 metres
Age: Santonian.

The six samples are assigned to the parent *I. cretaceum* Zone based on the occurrence of *Amphidiadema denticulata* in the cuttings at 2628m, and the occurrence of single specimens of the *Isabelidinium cretaceum* in the two deepest cuttings at 2706m and 2742m, in accord with the zone concepts and species ranges provided in Helby *et al.* (1987, p.64-65). The *I. rotundatum* Subzone is identified in the two shallowest samples at 2598m and 2968m based on the occurrence of the eponymous species *Isabelidinium rotundatum* ms in both cuttings, and the presence of the morphologically similar species *Eucladinium kaikourense* in the deeper cuttings. The two middle cuttings, which lack the zone index species are included in the parent zone based on superposition. All the assemblages are dominated by *Heterosphaeridium* spp. which averages 54% of the microplankton counts.

Zone Indeterminate Interval: 2766 to 2790 metres
Age: Santonian.

The next two samples cannot be confidently assigned to either the *I. cretaceum* or *O. porifera* Zone. The shallower cuttings is lean with less than 10 microplankton recorded, while the deeper cuttings contains an almost monospecific assemblage *of Heterosphaeridium heteracanthum*, but lack any accompanying index species. This latter sample nevertheless shows greater similarity with the deeper samples based on the shallowest occurrence of rare specimens of a large cyst with a coarsely reticulate sculpture which is tentatively compared with *Valensiella griphus*.

***Odontochitina porifera* microplankton Zone**
Interval: 2808 to 2952 metres
Age: Santonian.

The microplankton assemblages over this interval are dominated by *Heterosphaeridium* spp., which average 70% of the MP count, and are assigned to the *O. porifera* Zone based on the presence of the eponymous species *Odontochitina porifera* in 7 of the 8 samples. Other species characteristics of the assemblages are the rare presence of *Odontochitina cribropoda* and a gradual increase in abundance of the colonial algae *Amosopollis cruciformis* with depth to a maximum of 27% in the deepest sample. In the original Provisional Report the deeper cuttings at 2892m and 2952m were tentatively assigned to the *C. tripartita* Subzone based on the presence of rare specimens of *Chatangiella tripartita*, but upon plotting all the data on the range chart it proved impossible to confidently identify this subzone due to the rarity of the eponymous species and the morphological variability of the specimens referred to the species.

The interval also contains rare specimens of a large cyst with a coarsely reticulate sculpture which is a cross between *Schizosporis reticulatus* and *Valensiella griphus*. Because insufficient specimens were recorded to be confident about the identification these specimens are recorded on the range chart as either *Valensiella* sp. aff. *V. griphus* or as reworked specimens of *Schizosporis reticulatus*.

The preferred assignments of the sample at 2952m to the *O. porifera* Zone and the immediately underlying sample at 2970m to the *Kiokansium polypes* or *Trithyrodinium* Subzones suggests that the Coniacian age *Conosphaeridium striatoconum* Zone is missing in Jarver-1. However, it is possible the latter zone could be masked by cavings from the "shaly" interval described in the cuttings between 2815 and 2910m. The only hint in the assemblages that this could be a possibility is the higher abundances of *Amosopollis cruciformis* at 2946 and 2952m, and the presence of single specimens of the spores *Clavifera vultuosus* ms and *Cyatheacidites tectifera* at 2952m

***Phyllocladidites mawsonii* spore-pollen Zone**
Interval: 2970 to 3030 metres
Age: latest Turonian to basal Coniacian.

The bottom two samples analysed in Jarver-1 are assigned to the *P. mawsonii* Zone principally on the absence of index species diagnostic of younger zones. The FAD of *Phyllocladidites mawsonii* is recorded in the shallower sample while the FAD of the former index species *Clavifera triplex* occurs in the deeper sample. Although both assemblages are dominated by *Podocarpidites* spp. with an average abundance of 39%, the abundances of the secondary species are significantly different.

For example, the cuttings at 2970m is most like the assemblages from the overlying *T. apoxyexinus* Zone, with abundant *Dilwynites* and *Araucariacites* pollen (20% of SP count), and common *Corollina torosa* (12%) and *Cyathidites* spores (9%). In contrast, in the deeper cuttings at 3030m gleichenaceous spores are conspicuous and represent 22% of the SP count. Species represented are *Clavifera triplex* at 9%, *Gleicheniidites circinidites* at 12% and *G. ancorus* ms at <1%. As no similar abundances of any of these species are recorded in shallower samples in Jarver-1 it would be highly unlikely that they could be caved from higher in the well. Notwithstanding the fact that there certainly are caved palynomorphs in the deepest cuttings exemplified by presence of three well-preserved specimens of *Manumiella conorata*!

In this author's experience *Clavifera triplex* only occurs sporadically and in low abundance (<1%) through the Waarre Formation and does not become common in assemblages (>5%) until somewhere in the Flaxman Formation, or even higher in the stratigraphic succession. This correlation is supported by the rare presence of *Gleicheniidites ancorus* ms in the deepest cuttings which suggests the oldest age reached is equivalent to the *G. ancorus* Subzone. Based on these observation the Jarver-1 well is interpreted to have penetrated no older than the Flaxman Formation, and perhaps no older than the Banoon Member (Partridge, 2001).

***Kiokansium polypes* to *Trithyrodinium* Subzones of**
***Palaeohystrichophora infusorioides* microplankton Zone**
Interval: 2970 to 3030 metres
Age: latest Turonian to basal Coniacian.

The shallower assemblage at 2970m contains abundant microplankton (~25% of combined MP + SP count) which are dominated by *Heterosphaeridium* spp. at 40% and *Amosopollis cruciformis* at 28% of MP count. The assemblage also contains the rare LADs of poorly preserved *Valensiella griphus* and *Tanyosphaeridium salpinx* as well as tentatively identified specimens of *Kiokansium polypes* and *Isabelidinium evexus* ms favouring assignment to the *K. polypes* Subzone. However, as multiple specimens of *Trithyrodinium* spp. are also recorded the assemblage could also belong to the next younger *Trithyrodinium* Subzone. The latter possibility is based on recent work in other wells in the Otway Basin which has demonstrated that *Valensiella griphus* can range younger than *Kiokansium polypes* and overlap with the oldest range of *Trithyrodinium* spp.

The deepest assemblage at 3030m contains significant lower microplankton abundance (~5% of combined MP + SP count), and as all the species recorded occur higher in the well it is possible that all specimens could be caved. If not caved, the presence of multiple specimens of *Trithyrodinium* spp. favours assignment to the *Trithyrodinium* Subzone.

As a consequence of the uncertainties expressed about both assemblages the preferred interpretation is to assign them to a composite interval covering both subzones.

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Table 2. Interpretative assemblage data for Jarver-1, offshore Sorrel Basin.

Sample Type	Depth metres	Spore-Pollen Zones (Microplankton Zones)	CR*	Comments and Key Species Present
Cuttings	1440m	Lower *L. balmei* Zone (*E. crassitabulata* to *A. circumtabulata* Zones) **early Paleocene**	D4 D4	Microplankton (MP) ~19% LADs of *Lygistepollenites balmei* and *Gambierina rudata*, and LADs of *Deflandrea speciosus* and rare *Eisenackia hapuku* sp. nov. without younger zone index species.
Cuttings	1450m	Lower *L. balmei* Zone **early Paleocene**	D3	MP ~40%, with *Paralecaniella indentata* 57% of MP count. LADs of *Proteacidites angulatus* and *Trithyrodinium* sp.
Cuttings	1530m	(*M. druggii* Zone) **Late Maastrichtian**	D2	MP ~70%, with *Manumiella conorata* 58% of MP count. LADs of *Manumiella druggii*, *M. conorata*, and *M. seelandica*.
Cuttings	1570m	Upper *F. longus* Zone (*M. druggii* Zone) **Late Maastrichtian**	D4 D1	MP ~53%, with *Manumiella* spp. >50% of MP count. LADs of *Deflandrea diebelii*, *Beaupreaidites orbiculatus* and *Proteacidites* (*Propylipollis*) *crotonoides*.
Cuttings	1580m	Upper *F. longus* Zone (*M. druggii* Zone) **Late Maastrichtian**	D4 D2	MP ~74%, with *Manumiella* spp. >75% of MP count. LAD of *Proteacidites clinei* ms.
Cuttings	1620m	Upper *F. longus* Zone (*M. druggii* Zone) **Late Maastrichtian**	D3 D2	MP ~79% with *Manumiella* spp. ~73% of MP count. LAD of *Grapnelispora evansii* and FAD of *Tripunctisporis maastrichtiensis*.
Cuttings	1680m	*F. longus* Zone (*M. druggii* Zone) **Late? Maastrichtian**	D3 D2	MP ~75% with *Manumiella* spp. ~82% of MP count. SP assemblage sparse but containing *Tetracolporites verrucosus* and *Proteacidites* (*Propylipollis*) *crotonoides*.
Cuttings	1750m	Lower *F. longus* Zone (*P. ovata* Zone) **Early Maastrichtian**	D3 D2	MP ~48% with *Manumiella* spp. ~64% of MP count. LADs of *Palaeostomocystis ovata*, *Alterbidinium acutulum* and *Odontochitina echinata* ms. FAD of *Grapnelispora evansii*.
Cuttings	1790m	Lower *F. longus* Zone (*I. pellucidum* Zone) **Early Maastrichtian to Late Campanian**	D3 D2	MP ~53%, with caved? *Manumiella* spp. ~45% of MP count. LADs of *Isabelidinium pellucidum*, *Canninginopsis bretonica* and *Tricolporites lilliei*. FAD of *Tetracolporites verrucosus*.
Cuttings	1880m	Lower *F. longus* Zone (*I. greenense* Zone) **Late Campanian**	D3 D2	MP ~28%, with *Paralecaniella indentata* 45% of MP count. LADs of *Isabelidinium greenense* and *Odontochitina fenestrata* ms. FAD of *Proteacidites reticuloconcavus* ms.
Cuttings	1940m	Lower *F. longus* to *T. lilliei* Zones (*I. greenense* Zone) **Late Campanian**	D4 D2	MP >30%, with *Nummus* sp. 27% of MP count. LADs of *Odontochitina indigena*, and *Chatangiella packhamii*. FAD of *Deflandrea diebelii*. SP assemblage not diagnostic.
Cuttings	1968m	Zone indeterminate **undiff. Late Cretaceous**		Low recovery with <75 identifiable palynomorphs on one slide. Long-ranging Late Cretaceous species present. MP only 5%.
Cuttings	1992m	Zone indeterminate **undiff. Late Cretaceous**		Low recovery with only 30 palynomorphs on one slide. No key species recorded. MP ~7% but all specimens probably caved.
Cuttings	2022m	Zone indeterminate **undiff. Late Cretaceous**		Low recovery with <100 identifiable palynomorphs on 2 slides. No zone index species recorded. MP >40%, but mostly caved.
Cuttings	2076m	Zone indeterminate **undiff. Late Cretaceous**		Low recovery of only 50 palynomorphs on one slide. No key species recorded. MP ~20% but all specimens probably caved.
Cuttings	2136m	Zone indeterminate **undiff. Late Cretaceous**		Very low recovery with <20 identifiable palynomorphs on 2 slides. All recorded species known from Late Cretaceous.

Table 2. Interpretative assemblage data for Jarver-1 (continued)

Sample Type	Depth metres	Spore-Pollen Zones (Microplankton Zones)	CR*	Comments and Key Species Present
Cuttings	2178m	Zone indeterminate **undiff. Late Cretaceous**		Low recovery with <60 identifiable palynomorphs on 2 slides. Possible fragment of *Xenikoon australis* was recorded.
Cuttings	2226m	Zone indeterminate **undiff. Late Cretaceous**		Very low recovery with <20 identifiable palynomorphs on 2 slides. All recorded species known from Late Cretaceous.
Cuttings	2304m	*N. senectus* Zone (*X. australis* Zone) **Early Campanian**	D3 D3	MP ~16%, with *Xenikoon australis* >50% of MP count. LADs of *Nelsoniella aceras* and *Forcipites sabulosus.*
Cuttings	2358m	*N. senectus* Zone (*X. australis* Zone) **Early Campanian**	D3 D3	MP ~27% in low recovery of <60 palynomorphs on single slide. LADs of *Nelsoniella tuberculata* and *N. semireticulata.* FAD of *Xenikoon australis*.
Cuttings	2598m	*T. apoxyexinus* Zone (*I. rotundatum* Subzone) **late Santonian**	D5 D3	MP ~30% with *Heterosphaeridium* spp. ~52% of MP count. LADs of *Isabelidinium rotundatum* and *Gillinia hymenophora*.
Cuttings	2628m	*T. apoxyexinus* Zone (*I. rotundatum* Subzone) **late Santonian**	D5 D2	MP ~53%, with *Heterosphaeridium* spp. ~56% of MP count. FADs of *Isabelidinium rotundatum, Eucladinium kaikourense*, and *Amphidiadema denticulata*.
Cuttings	2676m	*T. apoxyexinus* Zone (*I. cretaceum* Zone) **Santonian**	D5 D5	MP ~47%, with *Heterosphaeridium* spp. ~25% of MP count. MP zone assignment based on stratigraphic superposition, but includes LAD of *Odontochitina cribropoda.*
Cuttings	2694m	*T. apoxyexinus* Zone (*I. cretaceum* Zone) **Santonian**	D5 D5	MP ~55%, with *Heterosphaeridium* spp. at ~78% of MP count. MP zone assignment based on stratigraphic superposition, but includes LAD of *Odontochitina porifera*.
Cuttings	2706m	*T. apoxyexinus* Zone (*I. cretaceum* Zone) **Santonian**	D5 D3	MP ~64%, with *Heterosphaeridium* spp. 53% of MP count. MP zone assignment based on single specimen of *Isabelidinium cretaceum*.
Cuttings	2742m	(*I. cretaceum* Zone) **Santonian**	D3	Low recovery with <100 identifiable palynomorphs on 2 slides. MP <10%, but includes FAD of *Isabelidinium cretaceum*.
Cuttings	2766m	Zone indeterminate **undiff. Late Cretaceous**		Low recovery with only 60 palynomorphs on 2 slides. Both MP and SP assemblages non-descript. MP ~15%.
Cuttings	2790m	Zone indeterminate **undiff. Late Cretaceous**		MP ~43%, with *Heterosphaeridium* spp. ~82% of MP count. LAD of new *Jarvamegaspora crochetensis* gen. et sp. nov.
Cuttings	2808m	*T. apoxyexinus* Zone (*O. porifera* Zone) **Santonian**	D5 D3	MP ~62%, with *Heterosphaeridium* spp. ~90% of MP count. LADs of consistent *Odontochitina porifera*, and possible *Chatangiella tripartita.*
Cuttings	2820m	*T. apoxyexinus* Zone (*O. porifera* Zone) **Santonian**	D5 D3	MP ~55%, with *Heterosphaeridium* spp. ~78% of MP count. *Odontochitina porifera*, *O. cribropoda* and poor *Chatangiella tripartita* all present, with *Amosopollis cruciformis* ~2% of MP.
Cuttings	2844m	*T. apoxyexinus* Zone (*O. porifera* Zone) **Santonian**	D5 D3	MP ~30%, with *Heterosphaeridium* spp. at ~61% of MP count. Assemblage contains *Odontochitina cribropoda* along with common *Amosopollis cruciformis* (~10% of MP).
Cuttings	2868m	*T. apoxyexinus* Zone (*O. porifera* Zone) **Santonian**	D5 D5	MP ~22%, with *Heterosphaeridium* spp. ~66% of MP count. Zone assignments based on stratigraphic superposition, as assemblage lacks key index species.

Table 2. Interpretative assemblage data for Jarver-1 (continued)

Sample Type	Depth metres	Spore-Pollen Zones (Microplankton Zones)	CR*	Comments and Key Species Present
Cuttings	2892m	*T. apoxyexinus* Zone (*O. porifera* Zone) **Santonian**	D3 D3	MP ~30%, with *Heterosphaeridium* spp. ~64% of MP count. *Odontochitina porifera* common at 19% of MP count and containing single specimen of *Chatangiella tripartita*.
Cuttings	2916m	*T. apoxyexinus* Zone (*O. porifera* Zone) **Santonian**	D5 D5	MP ~34%, with *Heterosphaeridium* spp. ~74% of MP count. Assemblage contains *Odontochitina porifera* and *O. cribropoda* along with common *Amosopollis cruciformis* (~11% of MP).
Cuttings	2946m	*T. apoxyexinus* Zone (*O. porifera* Zone) **Santonian**	D3 D3	MP ~37%, with *Heterosphaeridium* spp. ~61% and *Amosopollis cruciformis* ~19% of MP count. *Odontochitina porifera* present and SP assemblage contains FADs of *Latrobosporites amplus* and *Peninsulapollis gillii*.
Cuttings	2952m	*T. apoxyexinus* Zone (*O. porifera* Zone) **Santonian**	D3 D3	MP ~24%, with *Heterosphaeridium* spp. ~48% and *Amosopollis cruciformis* ~27% of MP count. FADs of multiple specimens of *Odontochitina porifera* and *Chatangiella tripartita*. FADs of *Latrobosporites ohaiensis* and *Ilexpollenites primus* ms.
Cuttings	2970m	*P. mawsonii* Zone (*P. infusorioides* Zone *K. polypes* Subzone) **Coniacian – Turonian**	D5 D4	MP ~25%, with *Heterosphaeridium* spp. ~40% and *Amosopollis cruciformis* 28% of MP count. LADs of poorly preserved *Valensiella griphus* and possible *Kiokansium polypes* and *Isabelidinium evexus*. FAD of *Phyllocladidites mawsonii*.
Cuttings	3030m	*P. mawsonii* Zone (*P. infusorioides* Zone *Trithyrodinium* Subz.) **Coniacian – Turonian**	D3 D5	MP ~5% mainly *Amosopollis cruciformis* and *Trithyrodinium* spp. SP assemblage dominated by gymnosperm pollen but with spores *Clavifera triplex* 9% and *Gleicheniidites* spp. 13% of SP count. FAD of rare *Gleicheniidites ancorus* sp. nov.

*CR = Confidence Ratings according to STRATDAT database.
FAD & LAD = First and Last Appearance Datums.

CR = Confidence Ratings used in STRATDAT database and applied to Table 2.

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

Table 3. Basic assemblage data for Jarver-1, offshore Sorrel Basin.

Sample Type	Depth metres	Visual Yield	Palynomorph Concentration	Palynomorph Preservation	No. SP Species	No. MP Species
Cuttings	1440m	Low	Low-Moderate	Fair-Good	29+	13+
Cuttings	1450m	Low	Low	Poor-Good	27+	12+
Cuttings	1530m	Low	Moderate	Fair-Good	23+	15+
Cuttings	1570m	Low-Moderate	Moderate	Fair-Good	33+	15+
Cuttings	1580m	Low	Moderate	Poor-Good	22+	14+
Cuttings	1620m	Moderate	Moderate	Fair-Good	23+	15+
Cuttings	1680m	Moderate	Moderate	Poor-Good	25+	15+
Cuttings	1750m	Low	Low-Moderate	Poor-Good	38+	18+
Cuttings	1790m	Low-Moderate	Moderate	Fair-Good	32+	19+
Cuttings	1880m	Very Low	Moderate	Poor-Good	36+	13+
Cuttings	1940m	Low	Low	Poor-Good	37+	14+
Cuttings	1968m	Very Low	Very Low	Poor-Fair	22+	4+
Cuttings	1992m	Low	Very Low	Poor-Fair	19+	5+
Cuttings	2022m	Low	Very Low	Poor-Fair	23+	12+
Cuttings	2076m	Very Low	Very Low	Poor	13+	2+
Cuttings	2136m	Very Low	Negligible	Poor	7+	4+
Cuttings	2178m	Very Low	Very Low	Poor-Good	23+	4+
Cuttings	2226m	Very Low	Negligible	Poor	5+	2+
Cuttings	2304m	Low	Very Low	Poor-Fair	27+	5+
Cuttings	2358m	Very Low	Very Low	Poor-Fair	18+	10+
Cuttings	2598m	Low	Low	Poor-Fair	22+	10+
Cuttings	2628m	Very Low	Very Low	Poor-Fair	20+	11+
Cuttings	2676m	Low	Low	Poor-Fair	19+	10+
Cuttings	2694m	Low	Low	Poor-Fair	27+	11+
Cuttings	2706m	Moderate	Low	Poor-Fair	17+	14+
Cuttings	2742m	Low	Very Low	Poor	18+	7+
Cuttings	2766m	Low	Very Low	Poor	19+	6+
Cuttings	2790m	Low	Low	Poor	18+	7+
Cuttings	2808m	Moderate	Moderate	Poor	27+	15+
Cuttings	2820m	Moderate	Moderate	Poor	29+	15+
Cuttings	2844m	Moderate	Moderate	Poor-Very Poor	27+	12+
Cuttings	2868m	Moderate	Low-Moderate	Poor-Very Poor	30+	7+
Cuttings	2892m	Moderate	Low	Poor-Fair	33+	13+
Cuttings	2916m	Moderate	Low	Poor-Fair	26+	9+
Cuttings	2946m	Low	Low	Poor-Fair	29+	12+
Cuttings	2952m	Moderate	Moderate	Poor-Fair	42+	13+
Cuttings	2970m	Low-Moderate	Low-Moderate	Poor-Very Poor	37+	17+
Cuttings	3030m	Low	Moderate	Poor-Fair	23+	5+
				Average:	**25+**	**10+**

Table 4. Palynological slides from Jarver-1, offshore Sorrel Basin.

Slide No.	Sample Type	Depth Metres	Catalogue Number	Santos Lab Prep. No.	Description
1	Cuttings	1440m		11604	Kerogen slide
2	Cuttings	1440m		11604	Oxidised slide
3	Cuttings	1450m		11605	Kerogen slide
4	Cuttings	1450m		11605	Oxidised slide
5	Cuttings	1530m		11642	Kerogen slide – half cover slip
6	Cuttings	1530m		11642	Kerogen slide
7	Cuttings	1570m		11636	Kerogen slide
8	Cuttings	1570m		11636	Oxidised slide
9	Cuttings	1580m		11643	Kerogen slide – half cover slip
10	Cuttings	1580m		11643	Kerogen slide
11	Cuttings	1620m		11644	Kerogen slide – half cover slip
12	Cuttings	1620m		11644	Kerogen slide
13	Cuttings	1620m		11644	Kerogen slide – half cover slip
14	Cuttings	1680m		11645	Kerogen slide – half cover slip
15	Cuttings	1680m		11645	Kerogen slide
16	Cuttings	1680m		11645	Kerogen slide – half cover slip
17	Cuttings	1750m		11593	Kerogen slide
18	Cuttings	1750m		11593	Kerogen slide
19	Cuttings	1790m		11595	Kerogen slide
20	Cuttings	1790m		11595	Kerogen slide
21	Cuttings	1880m		11647	Kerogen slide – half cover slip
22	Cuttings	1880m		11647	Kerogen slide – half cover slip
23	Cuttings	1940m		11591	Kerogen slide – half cover slip
24	Cuttings	1940m		11591	Kerogen slide
25	Cuttings	1968m		11648	Kerogen slide
26	Cuttings	1992m		11650	Kerogen slide
27	Cuttings	2022m		11652	Kerogen slide
28	Cuttings	2022m		11652	Kerogen slide – half cover slip
29	Cuttings	2076m		11658	Kerogen slide
30	Cuttings	2136m		11653	Kerogen slide
31	Cuttings	2136m		11653	Kerogen slide – half cover slip
32	Cuttings	2178m		11655	Kerogen slide
33	Cuttings	2178m		11655	Kerogen slide – half cover slip
34	Cuttings	2226m		11656	Kerogen slide – half cover slip
35	Cuttings	2226m		11656	Oxidised slide

Table 4. Palynological slides from Jarver-1, offshore Sorrel Basin (continued).

Slide No.	Sample Type	Depth Metres	Catalogue Number	Santos Lab Prep. No.	Description
36	Cuttings	2304m		11618	Kerogen slide
37	Cuttings	2304m		11618	Kerogen slide
38	Cuttings	2304m		11618	Oxidised slide
39	Cuttings	2358m		11620	Kerogen slide
40	Cuttings	2598m		11597	Kerogen slide
41	Cuttings	2598m		11597	Oxidised slide
42	Cuttings	2628m		11599	Kerogen slide – half cover slip
43	Cuttings	2628m		11599	Oxidised slide
44	Cuttings	2676m		11600	Kerogen slide
45	Cuttings	2676m		11600	Kerogen slide
46	Cuttings	2676m		11600	Oxidised slide
47	Cuttings	2694m		11601	Kerogen slide
48	Cuttings	2694m		11601	Oxidised slide
49	Cuttings	2706m		11602	Kerogen slide
50	Cuttings	2706m		11602	Kerogen slide
51	Cuttings	2706m		11602	Oxidised slide
52	Cuttings	2742m		11639	Kerogen slide
53	Cuttings	2742m		11639	Kerogen slide
54	Cuttings	2766m		11641	Kerogen slide
55	Cuttings	2766m		11641	Kerogen slide
56	Cuttings	2790m		11623	Kerogen slide – half cover slip
57	Cuttings	2790m		11623	Oxidised slide
58	Cuttings	2808m		11624	Kerogen slide – half cover slip
59	Cuttings	2808m		11624	Oxidised slide
60	Cuttings	2808m		11624	Oxidised slide
61	Cuttings	2820m		11625	Kerogen slide – half cover slip
62	Cuttings	2820m		11625	Oxidised slide
63	Cuttings	2820m		11625	Oxidised slide
64	Cuttings	2844m		11628	Kerogen slide
65	Cuttings	2844m		11628	Kerogen slide
66	Cuttings	2844m		11628	Kerogen slide
67	Cuttings	2868m		11630	Kerogen slide
68	Cuttings	2868m		11630	Kerogen slide
69	Cuttings	2868m		11630	Kerogen slide

Table 2. Palynological slides from Jarver-1, offshore Sorrel Basin (continued).

Slide No.	Sample Type	Depth Metres	Catalogue Number	Santos Lab Prep. No.	Description
70	Cuttings	2892m		11632	Kerogen slide
71	Cuttings	2892m		11632	Kerogen slide
72	Cuttings	2892m		11632	Kerogen slide
73	Cuttings	2892m		11632	Kerogen slide
74	Cuttings	2916m		11606	Kerogen slide
75	Cuttings	2916m		11606	Oxidised slide
76	Cuttings	2916m		11606	Oxidised slide
77	Cuttings	2946m		11607	Kerogen slide
78	Cuttings	2946m		11607	Oxidised slide
79	Cuttings	2946m		11607	Oxidised slide
80	Cuttings	2952m		11608	Oxidised slide
81	Cuttings	2952m		11608	Oxidised slide
82	Cuttings	2952m		11608	Oxidised slide
83	Cuttings	2970m		11610	Oxidised slide
84	Cuttings	2970m		11610	Oxidised slide
85	Cuttings	2970m		11610	Kerogen slide
86	Cuttings	2970m		11610	Kerogen slide – half cover slip
87	Cuttings	3030m		11611	Kerogen slide
88	Cuttings	3030m		11611	Kerogen slide – half cover slip

Well Name : Jarver-1

Operator : Santos Ltd — Spudded : 16 May 2008
Well Code : JARVER-1 — Completed : 18 June 2008
Lat/Long : 41°20' 27.25"S 144°14' 3.19"E
Interval : 1350m - 3100m — INTERPRETATIVE Spore-Pollen Range Chart
Scale : 1:5000 — Sample interval 1440 to 3030m
Chart date: 21 October 2008 — Microscope analysis by Alan D. Partridge

Jarver-1

Biostrata Pty Ltd
AUSTRALIA

Attachment to Biostrata Reports 2008/06A

Well Name : Jarver-1

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Spudded : 16 May 2008
Completed : 18 June 2008
INTERPRETATIVE Microplankton Range Chart
Sample interval 1440 to 3030m
Microscope analysis by Alan D. Partridge

Jarver-1

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AUSTRALIA

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ENCLOSURE I : COMPOSITE LOG

ENCLOSURE II : DEPTH STRUCTURE MAP

ENCLOSURE III : SEISMIC CROSS SECTION

ENCLOSURE IV : LOG INTERPRETATION ANALOGUE PLOT