BHP

CHAMPION-1, VIC/P30

WELL COMPLETION REPORT

INTERPRETIVE VOLUME

CHAMPION-1

VIC/P30

INTERPRETIVE WELL COMPLETION REPORT

PREPARED BY: S. Horan

71585.wcr

DATE: November, 1995

BHP PETROLEUM PTY. LTD.
A.C.N. 006 918 832

Acknowledgments

Jim Preston	Senior Petroleum Geologist
Richard Carter	Petroleum Geophysicist
Cathy Ellis	Technical Assistant

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End of Well Report (Mudlogging)
Final Well Report (MWD)
Rig Positioning Report
Dual Propagation Resistivity, Gamma Ray Logs (Scales 1:200, 1:500 and 1:1000)

VOLUME TWO:
Well Seismic Processing Report

1.0 WELL INDEX SHEET

Well Name:	CHAMPION-1
Basin(s):	Otway
Country:	Australia
State/District/Province:	Victoria
Permit:	VIC/P30
Well Type:	Wildcat
Current Well Status:	Dry Hole - Abandoned

Total Depth:

Drillers:	1882m
Loggers:	
Planned:	2225m

Surface Location:

Actual:	Lat:	38 deg 32 min 33.54 sec S
	Long:	142 deg 23 min 18.66 sec E
	Survey System:	Australian Geodetic Datum 1984
	Source of Location Data:	BHPE GPS Survey
Planned:	Lat:	38 deg 32 min 33.50 sec S
	Long:	142 deg 23 min 18.20 sec E
	Survey System:	Australian Geodetic Datum 1984
	Source of Location Data:	Application To Drill

Onshore/Ofshore: Offshore - Marine

Seismic Reference: Intersection of Lines: OH94-203 and OH94-210A

Elevations:	Log Ref.:	RT,	25.3m above MSL
	Ground Level:		53.0m below MSL
	Water Depth:		53.0m

Operation Dates:	On Location:	07-AUG-1995, 09:50
	Spudded:	08-AUG-1995, 15:00
	Total Depth Reached:	15-AUG-1995, 09:30
	Rig Released:	19-AUG-1995, 08:45

Operator:	BHP Petroleum	Interest: 90%
Partners:	Parker and Parsley	Interest: 10%

Drilling Summary:

Rig Name:	Ocean Bounty
Rig Type:	Semi-submersible
Drilling Contractor:	Diamond M Offshore Pty Ltd

Bit Size	Interval	Casing	Shoe Depth
36 IN	78 - 120m	20 IN	120m
17.5 IN	120 - 1225m	13.375 IN	1216m
12.25 IN	1225 - 1882m		

Plugs:

Type	No.	Interval	Tagged	Sacks Cement
ABN	1	1380 - 1246 m	N	344
ABN	2	1246 - 1142 m	Y	235
ABN	3	118 - 88 m	N	170

Conventional Cores: none

DST and Production Tests: none

Wireline Logs:

Suite	Run	Tool String	Interval	Date Run
1	1	AS-MSFL-GR-DLL-AMS	1856 - 79m	15-AUG-95
1	1	LDL-CNL-GR-AMS	1843 - 1216m	15-AUG-95
1	1	CSI-VSP	1845 - 150m	15-AUG-95
1	1	CST-GR	1812 - 1255m	15-AUG-95
1	1	MSD	1854 - 1216m	15-AUG-95
1	1	FMI-IMAGES	1854 - 1216m	15-AUG-95
		MWD	1882 - 1225m	15-AUG-95
		FEL	1882 - 78m	14-AUG-95
		PRESSURE	1882 - 78m	14-AUG-95
		DPP	1882 - 78m	14-AUG-95

2 WELL SUMMARY

Champion-1 was an exploration well drilled in VIC/P30 in the eastern part of the offshore Otway Basin (Fig.1). The well is the second to be drilled by the VIC/P30 Joint Venture in this permit area and is located 25km NW of Pecten-1A and 52 kms NW of Minerva-1 (Fig. 1).

The well was designed to test the prospectivity of the Late Cretaceous Shipwreck Group on an E-W trending horst. Top seal and cross fault seal was expected to be provided by Late Cretaceous Group Sherbrook Group claystones. Hydrocarbon charge was expected to be sourced from Eumeralla Formation Coals to the south and north of the prospect.

The semi-submersible MODU Ocean Bounty spudded the well on the 8th of August 1995 in 48m of water.

The well was drilled to a total depth of 1882mRT without penetrating any Late Cretaceous Shipwreck Group reservoir sandstones. The Minerva Formation was absent with only 22m of La Bella Formation claystones seen. No hydrocarbon shows were seen in the well. The well reached total depth in Early Cretaceous Otway Group claystones and argillaceous lithic sandstones.

As a result of the dry hole, there were no conventional cores cut, no RFT/MDT or DST programs conducted in the well.

The well was plugged and abandoned as a dry hole on the 20th of August 1995.

The primary reason for the lack of hydrocarbons was the absence of reservoir at the Top Shipwreck Group. Cross fault seal, source maturity and effectiveness also contributed to the lack of hydrocarbons.

3 HYDROCARBONS

No fluorescence shows or significant ditch cuttings gas peaks were seen during drilling. Intermittent background gas of trace to 0.004% C1 was seen between 574-700mRT and 1125-1170mRT. At 1170mRT a consistent background of C1 was recorded with consistent C2 and trace C3 seen from 1690mRT from within the Otway Group.

An electric log interpretation was carried out over the interval 1500-1830mRT (Sherbrook, Shipwreck and Otway Group) and a copy of the resultant report is presented in Appendix 1. In summary, no reservoir sandstones were seen in the Shipwreck Group and Otway Group with sandstones in the Paaratte Formation water saturated.

No RFT/MDT pretests or samples were attempted and no DSTs were performed.

4 STRUCTURE

4.1 Trap Type and Structural Style

The Champion Prospect was mapped as an E-W trending horst feature at Top Shipwreck Group level. The horst is bound by two normal faults, a NW-SE down to the north fault and an E-W down to the south fault, which intersect at the eastern limit of the structure. The structure was probably initiated during the Early Cretaceous with structural movement continuing until the end of the Late Cretaceous.

4.2 Pre Drill Mapping

The Champion Prospect was defined by a 1x1 km spaced grid of dip and strike lines. The closure measured 12 km in the NW-SE direction, and 5 km in the NE-SW direction, with 400m of vertical closure. The Sherbrook Group and younger sediments were mapped gently dipping basinward (SW) where as Shipwreck Group sediments beneath the base Sherbrook Group Unconformity dipped to the NW due to fault tilt, and showed some truncation.

4.3 Post Drill Mapping

No Shipwreck Group reservoir units were encountered at the well with only 22m of La Bella Formation (Shipwreck Group) claystones and siltstones present. The angularity noted beneath the base Sherbrook Group Unconformity was in fact from the Otway Group.

No post drill mapping has been undertaken. The pre drill Top Shipwreck Group map is, however, believed to be a fair approximation of the form of structure at the Top Otway Group and probably the Top La Bella Formation.

5.0 STRATIGRAPHY

5.1 Predicted versus Actual

The stratigraphic sequence penetrated in Champion-1 ranges in age from Recent to Early Cretaceous. The proposed stratigraphy was based on seismic and wireline log correlations from Pecten-1A, Minerva-1 and La Bella-1 (Fig. 1). A predicted vs actual section is shown in Figure 2 and is summarised below;

-Top Nirranda Group, 215m high
-Top Wangerrip Megasequence, 228m high
-Top Sherbrook Group, 15m high
-Top Shipwreck Group, 72m low
- Minerva Formation absent
- La Bella Formation and Otway Group present.

Significant differences in the prognosed thickness of Heytesbury, Nirranda Groups and Wangerrip Megasequence was due to the lack of well control. The nearest well penetration was at Pecten-1A, 25 kms to the east.

The Top Sherbrook Group came in 15m low due to a 30ms mis-pick and a 0.5% difference in velocities (see section 6.2). The Sherbrook Group was expected to consist of Belfast Formation claystones but consisted predominantly of interbedded sandstones and claystones of the Paaratte Formation (77% of total Sherbrook Group).

No Minerva Formation sediments were present as prognosed with the Shipwreck Group represented by only 22m of the La Bella Formation claystones. The well was prognosed to reach total depth in either La Bella Formation or the younger Minerva Formation but reached total depth at 1882 mRT within the Early Cretaceous Eumeralla Formation of the Otway Group.

5.2 Stratigraphic Summary

A generalised stratigraphic section for the Otway Basin is presented in Figure 3.

Lithological descriptions from cuttings and CST cores, together with wireline log character, provide the basis for stratigraphic breakdown. Delineation of age units is primarily from palynology (Appendix 2) and from log correlation. No open hole electric logs or palynological analysis was undertaken on sediments in the 17 1/2" hole section (120-1225mRT). In this section a gamma ray log recorded through casing and comparisons with well sections in VICP30/P31 (Fig.1) were used to breakout the stratigraphic section.

Age, lithology and drilling data are marked on the composite log accompanying this report (Enclosure 1)

5.2.1 Tertiary Heytesbury Group

Port Campbell Limestone

Depth:	122-258mRT
Thickness:	136
Age:	Miocene to Recent

First returns were established at 122mRT. Ditch cuttings consisted of a greyish yellow to very light grey medium to coarse grained bioclastic calcarenite. Calcarenites commonly contained fossil fragments and trace amounts of glauconite.

No palynological/micropalaeontological data is available to determine the age or likely depositional environment. Regional studies (Preston, 1995) suggest it ranges in age from Miocene to Recent and was deposited in a shallow marine carbonate shelf environment.

Gellibrand Marl

Depth:	258-400mRT
Thickness:	142m
Age:	Miocene

The boundary with the overlying Port Campbell Limestone is conformable.

The Gellibrand Marl consists of yellowish grey to medium grey argillaceous calcilutite with minor yellowish grey calcisiltite and ten metres of very light grey to olive grey calcarenite at the base.

No palynological/micropalaeontological data is available to determine the age or likely depositional environment. Regional studies (Preston, 1995) suggest the age is most likely Miocene and was deposited in a shallow marine carbonate shelf environment.

5.2.2 Tertiary Nirranda Group

Narrawaturk Marl

Depth:	400-787mRT
Thickness:	387m
Age:	Oligocene.

The boundary with the overlying Gellibrand Marl is unconformable.

The Narrawaturk Marl consists of a light olive grey to medium grey calcisiltite with a basal 87m light olive grey to medium grey marl unit. The gamma ray log measured through casing is relatively featureless through the Narrawaturk marl except for a slightly higher gamma ray background through the basal marl unit.

No palynological/micropalaeontological data is available to determine the age or likely depositional environment. Regional studies (Preston, 1995) suggest it is Oligocene in age and was deposited in a shallow marine carbonate shelf environment.

5.2.3 Tertiary Wangerrip Megasequence

Depth:	787-1225mRT
Thickness:	438m
Age:	Eocene

The boundary with the overlying Narrawaturk Marl is unconformable. The unconformity is marked on the gamma ray log by a significant decrease in gamma ray counts.

The Wangerrip Megasequence consists of sandstone interbedded with argillaceous siltstone and sandstone. Sandstones are ferrigenous, quartzose dark yellow to light brown medium to coarse grained sandstones from 787-920mRT and quartzose medium to coarse grained from 920-1225mRT. Argillaceous siltstones are brownish grey and grade to argillaceous sandstone, and claystones are moderate brown to brownish grey.

No palynological/micropalaeontological data is available to determine the age or likely depositional environment. Regional studies (Preston, 1995) suggest it is Eocene in age.

5.2.4 Late Cretaceous Sherbrook Group

Paaratte Formation

Depth:	1225-1617mRT
Thickness:	392m
Biozone:	T.*longus*-Upper T.*apoxyexinus*, M.*druggii*-Mid/Lower N.*aceras*.
Age:	Maastrichtian-Campanian
Depositional Environment:	nearshore to very nearshore marine, brackish.

The boundary with the overlying Wangerrip Megasequence is unconformable.

The Paaratte Formation consists of interbedded sandstone, siltstone and claystone which forms a coarsening upward sequence from the underlying Belfast Mudstone Formation claystones. Sandstones are quartzose, white to light grey and brownish grey in colour and coarsen from very fine to fine at the base to predominantly medium to coarse grained at the top. Siltstones are claystones are medium grey to brownish grey and grade into each other.

Nearshore to very nearshore marine environments are indicated by the low dinoflagellate content and diversity compared to a dominant and diverse spore pollen assemblage. The freshwater algae *Botryococcus* and *Paralecaniella* are frequently seen.

Belfast Formation

Depth:	1617-1674mRT
Thickness:	57m
Biozone:	Upper T.*apoxyexinus*, Mid-Lower N.*aceras*-Upper I.*cretacea*
Age:	Campanian-Santonian
Depositional Environment:	nearshore marine.

The boundary with the overlying Paaratte Formation is conformable.

The Belfast Mudstone Formation consists of medium to dark grey and brownish grey claystone. These claystones contain trace amounts of glauconite, carbonaceous material and trace fossil fragments.

Nearshore marine environments are indicated by the low to moderate dinoflagellate content and diversity, abundant and diverse spores and pollens, rare to frequent freshwater algae (*Botryococcus*) and common cuticle.

5.2.5 Late Cretaceous Shipwreck Group

La Bella Formation

Depth:	1674-1696mRT
Thickness:	22m
Biozone:	A.*distocarinatus* , P.*infusoriodes*
Age:	Cenomanian
Depositional Environment:	very nearshore marine.

The boundary with the overlying Belfast Formation is unconformable. The unconformity is marked by a distinctive decrease in sonic transit time and increase in claystone resistivity.

The La Bella Formation consists of medium grey to brownish grey claystone with trace amounts of carbonaceous material and glauconite.

Very nearshore marine environments are indicated by the very rare dinoflagellate content and diversity, dominant and diverse spores and pollens and common freshwater algae.

5.2.6 Early Cretaceous Otway Group

Eumeralla Formation

Depth:	1696-1882mRT
Thickness:	186+m
Biozone:	P.*pannosus*-C.*paradoxa*
Age:	Albian
Depositional Environment:	non-marine to slightly brackish.

The boundary with the overlying La Bella Formation is unconformable. The unconformity is marked by a decrease in sonic transit time.

The Eumeralla Formation consists of light grey to olive grey claystone and white to light grey sandstone.

Non-marine environments are indicated with dominant and diverse spore and pollens with common cuticle and tracheid. One sample at 1812mRT has rare spiny acritarchs suggesting a slightly brackish environment.

6 GEOPHYSICAL DISCUSSION

6.1 Seismic Coverage

The Champion Prospect was defined by a 1x1km grid of OH91 and reprocessed OE80A and OH94 seismic data. Table 1 lists more information on the seismic surveys.

TABLE 1

SURVEY	OPERATOR	DATE	COMMENTS
OE80A	ESSO	1980	66kms, 48 Fold Reprocessed 1991 by BHPP
OH91	BHPP	1991	387kms, 60 fold
OH94	BHPP	1994	290 kms, 80 fold. Reprocessed 1995 by BHPP.

Seismic data quality was good down to the Base Tertiary Unconformity but only fair at the Top Minerva Formation. Data quality at this level suffered due to the presence of Tertiary volcanics and due to the structural complexity of the Pre Base Tertiary sequence.

6.2 Velocities

Table 2 details predicted versus actual depths for the five major formation tops and the predicted vs actual TWT reflection times and average velocities for the two seismic horizons mapped.

A regional Tertiary velocity function was used to depth convert the Base Tertiary Unconformity seismic horizon. The error between the predicted and actual average velocity is only 0.5% but the actual depth is 20m high due to the combination of the velocity difference and a 30ms mis-pick. If the time pick had been correct the Base Tertiary Unconformity horizon would have been only 5m deep to prognosis.

The primary target, the Minerva Formation, was absent in the well. However, the Top Minerva Formation velocity function provided a fairly good approximation of the average velocity of the post-Sherbrook Group at the well location.

TABLE 2
Predicted vs Actual Depths, TWTs and Average Velocities for Major Formation Tops.

Horizon	Depth (mSS)		TWT (ms)		V ave (m/s)	
	Predicted	Actual	Predicted	Actual	Predicted	Actual
Top Nirranda	615	400				
Top Wangerrip	1015	787				
Base Tertiary U/C (Top Sherbrook)	1240	1225	990	960	2455	2444
Top Minerva	1602	Absent	1268	Absent	2487	2550
Top La Bella	Undiff	1674	Undiff			
Top Eumeralla	2225+	1696	1590+			

6.3 VSP Interpretation

The VSP-to-seismic tie at Champion-1 is fairly good. The best tie is obtained with the Normal Polarity Corridor Stack with no static shift. This gives a good tie to the Shipwreck and Otway Groups but only fair-good tie to the Sherbrook Group and Tertiary section. The critical event ties are summarised as follows:

Top Sherbrook Group (Base Tertiary Unconformity)	VSP ties approximately 30 msec higher than pre-drill pick; fair-good quality tie.
Top La Bella Formation	No pre-drill pick; poor quality tie.
Top Otway Group	No pre-drill pick; good quality tie.

7 GEOLOGICAL DISCUSSION

7.1 Summary of Permit History

Champion-1 was drilled in VIC/P30 in the eastern offshore Otway Basin. The permit is currently held by BHP Petroleum (90%, Operator) and Parker and Parsley Australasia Ltd (10%).

Table 3 lists the wells drilled in VIC/P30 and VIC/P31 prior to the drilling of Champion-1.

TABLE 3
WELLS DRILLED IN VIC/P30 AND VIC/P31

WELL NAME (OPERATOR)	CURRENT PERMIT	COMPLETION DATE	TOTAL DEPTH	STATUS
Pecten-1A	VIC/P30	JUL 1967	2850	P/A, SHIPWRECK GROUP GAS DISCOVERY
Nautilus-1A	VIC/P30	MAY 1968	2011	P/A
Mussel-1	VIC/P31	SEPT 1969	2450	P/A
Triton-1ST	VIC/P30	MAY 1982	3545	P/A
La Bella-1	VIC/P30	FEB 1993	2735	P/A, MINERVA FM GAS DISCOVERY
Eric The Red-1	VIC/P31	MAR 1993	1875	P/A
Minerva-1	VIC/P31	APRIL 1993	2425	SUSPENDED MINERVA FM GAS DISCOVERY
Minerva-2A	VIC/P31	SEPT 1993	2170	SUSPENDED, SUCCESSFUL MINERVA FM GAS APPRAISAL WELL
Loch Ard-1	VIC/P31	OCT 1993	2425	P/A
Conan-1	VIC/P31	AUG 1995	1985	P/A

7.2 Regional Geology

The first phase of rifting in the Otway Basin was initiated during the Late Jurassic to very Early Cretaceous period. The syn-rift Crayfish Group was deposited during the Valanginian to Barremian period as fluvial and alluvial fan sands, silts and clays, in tilted NW-SE half-graben settings.

Rifting effectively ceased by early Aptian time, giving way to a thermal-sag phase of basin development. During this phase, the post-rift Aptian to Albian Eumeralla Formation was deposited, comprising fluvial and lacustrine lithic sandstones, siltstones, and claystones provenanced by a volcanic arc system to the east. The Middle and Lower Eumeralla Coal

Measures represent two discrete coal-bearing units deposited in lake-margin environments, and are dominated by claystones and thin coals, with significant hydrocarbon source potential.

A second phase of rifting commenced during the earliest Cenomanian (96 Ma), inheriting and enhancing the structural style of the previous rifting episode, and resulting in block-faulting, uplift and erosional truncation of the Eumeralla Formation sequences (which can therefore be thought of as representing the post-rift section of the first rift-phase, and the pre-rift section of the second rift-phase). A series of NW-SE-trending terraces, stepping down towards the basin centre, were created at this time (for example, the Mussel Terrace of VIC/P30-31).

This second phase of rifting continued from Cenomanian to Santonian time. The La Bella, Minerva and Napier Formations of the syn-rift Shipwreck Group were deposited within a vast delta system, depositional facies varying from non-marine/fluvial in the north and east of the VIC/P30-31 permit areas, to nearshore and offshore/deltaic in the south and west. The litharenitic La Bella Formation represents the initial erosion product of the block-faulted Eumeralla section, particularly the Otway Ranges high-trend emerging to the east. The cleaner, more strongly quartz-arenitic Minerva Formation resulted from either a re-working of the La Bella Formation sediments, or a switch in sediment provenance to northern basin-flanking basement highs, or both. The Napier Formation claystones represent the pro-delta to delta-front facies of the retrograding Shipwreck Group delta system.

The second rifting episode ended, and sea-floor spreading began, at about 85 Ma (late Santonian). This event is marked by a regional, often angular, unconformity, with which an episode of NW-SE compression was associated (gently folding Shipwreck Group sediments in the permit areas).

The post-rift to drift-phase Sherbrook Group sediments, deposited from the late Santonian to late Maastrichtian, show onlap and downlap onto the gently folded break-up unconformity. The Sherbrook Group is dominated by the distal claystones and siltstones of several extensive delta systems. These lithologies grade vertically to more proximal delta sand and clay/silt facies as sediment supply came to match the available accommodation space. NE-SW extension, punctuated by periods of NW-SE compression, continued throughout this period.

Sherbrook Group sedimentation was ended by a period of compressional uplift and erosion. This was followed by thermal, south-westerly subsidence of the basin, with attendant relative fall in sea-level and marine transgression. A long period of sediment starvation followed within the basin proper, until the sands and silts of the Wangerrip Group Megasequence prograded south-westwards into the basin during the Eocene. This progradation was terminated by further sediment starvation, the likely result of an interplay between sediment supply, basin subsidence and eustatic sea-level rise.

This pre-Oligocene hiatus also coincided with the establishment of open-marine conditions, and a corresponding shift from clastic-dominated to carbonate-dominated sedimentary systems, along the southern margin of Australia. The Nirranda Group, comprising marls and limestones of the Narrawaturk Marl, prograded into the basin during the Oligocene, followed by the prograding bioclastic carbonate systems of the Miocene to Recent Heytesbury Group (Gellibrand Marl and Port Campbell Limestone).

7.3 Contributions to Geological Concepts and Conclusions

7.3.1 Reservoir

No effective reservoirs were intersected at the mapped closure in the well.

The primary target sandstones from the Minerva Formation were absent in the well. The only Shipwreck Group sediments present were 22m of La Bella Formation Claystones. Otway Group Sandstones were intersected approximately 150m beneath mapped closure but these sandstones were argillaceous and strongly lithic with no reservoir potential. The absence of Minerva and La Bella Formation sandstones is due to either post depositional erosion or non-deposition at the well location.

Quartzose sandstones of the Paaratte Formation were intersected and a petrophysical evaluation was carried out over the interval 1528-1617mRT (see Appendix 1). This interval contained a net to gross of 47% (using a Vshale =50% cut off) with an average porosity of 16% (using a 0% porosity cut-off). The lack of hydrocarbons in these good quality reservoir sandstones is believed to be related to seal integrity and possibly source limitations (see sections 7.3.2 and 7.3.3).

7.3.2 Seal

The sand rich Sherbrook Group has poor cross fault seal potential and may not have allowed hydrocarbons to accumulate at the prospect if a reservoir unit had been present.

The claystones of the Belfast Mudstone are of sufficient thickness (57m) and character (see 5.2.4) to act as a top seal but may not have been an effective cross fault seal. Fault throws on the two normal faults bounding the prospect were mapped at up to 1000+m (Preston, 1995). For the prospect to have trapped hydrocarbons, a similar thickness of Sherbrook Group claystone would be required in the absence of other sealing mechanisms such as sealing faults or stratigraphic seals.

7.3.3 Source

An immature source kitchen or lack of adequate source rocks may have contributed to the lack of hydrocarbons.

The Eumeralla Formation was intersected approximately 500m shallower than expected (Table 2). Consequently the proposed source units, the Middle and Lower Eumeralla Coal Measures, may not have attained sufficient maturity to expel gas in the proposed source kitchens to the south and north of the prospect. These source units were not penetrated in the well and have not been penetrated in any of the eastern offshore Otway Basin wells. The absence of an effective source rock cannot be discounted as a reason for lack of hydrocarbons at the prospect.

Vitrinite reflectance measurements were made on six samples from the Paaratte, Belfast, La Bella and Eumeralla formations. Descriptions of these samples can be found in Volume One of the Basic Well Completion Report.

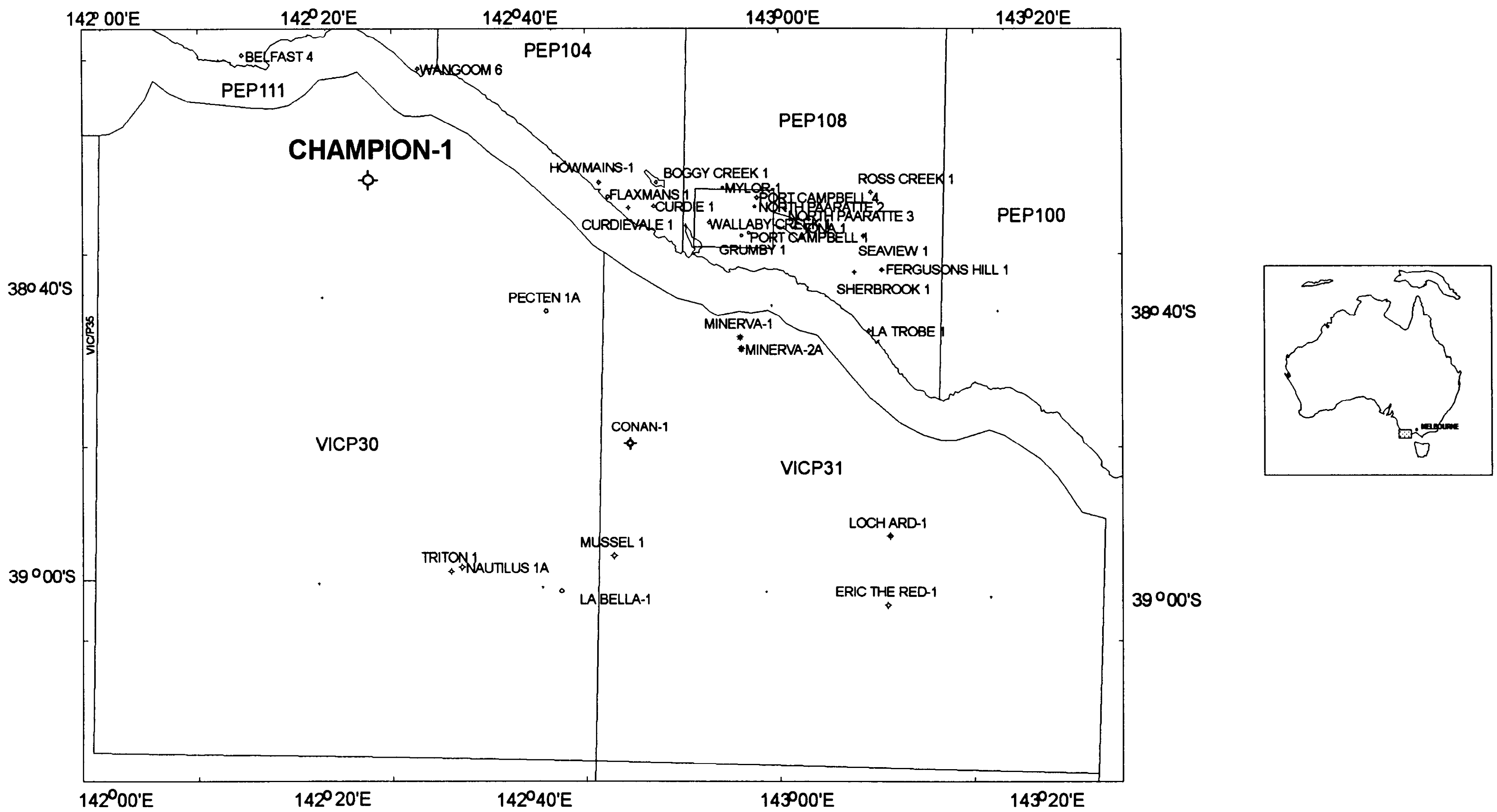
REFERENCES

Preston, J. C., 1995. Champion Prospect File, Permit VIC/P30, Otway Basin, Victoria. Unpublished BHPP internal report.

Figures

Otway Basin : VIC/P30 and VIC/P31

Champion-1 Location Map



CHAMPION.PRE

APRIL 1995

Figure 1

AUSTRALASIA DIVISION

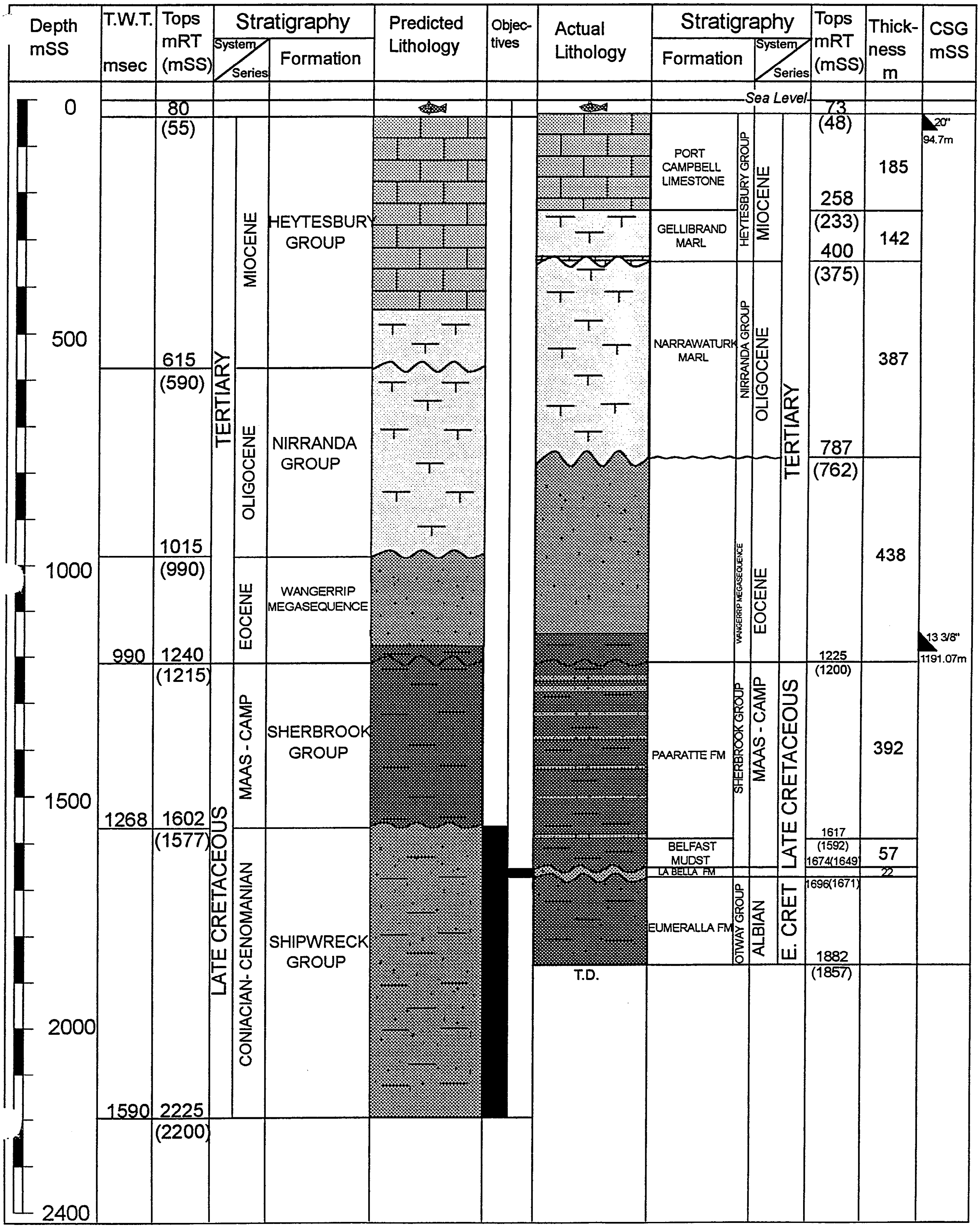
BHP Petroleum

CRLN 1/PE 900629/P24

CHAMPION - 1
PREDICTED v ACTUAL

PERMIT: VIC/P30

LINE: OH94-203	LAT: 38°32' 33.50"	ELEV: RT: 25.3m	SPUD: 8 Aug 1995	STATUS: P.&A.
SP: 1451	LONG: 142°23' 17.86"	WATER DEPTH: 48m	RIG RELEASE: 18 Aug 1995	RIG: Ocean Bounty



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NOVEMBER 1995

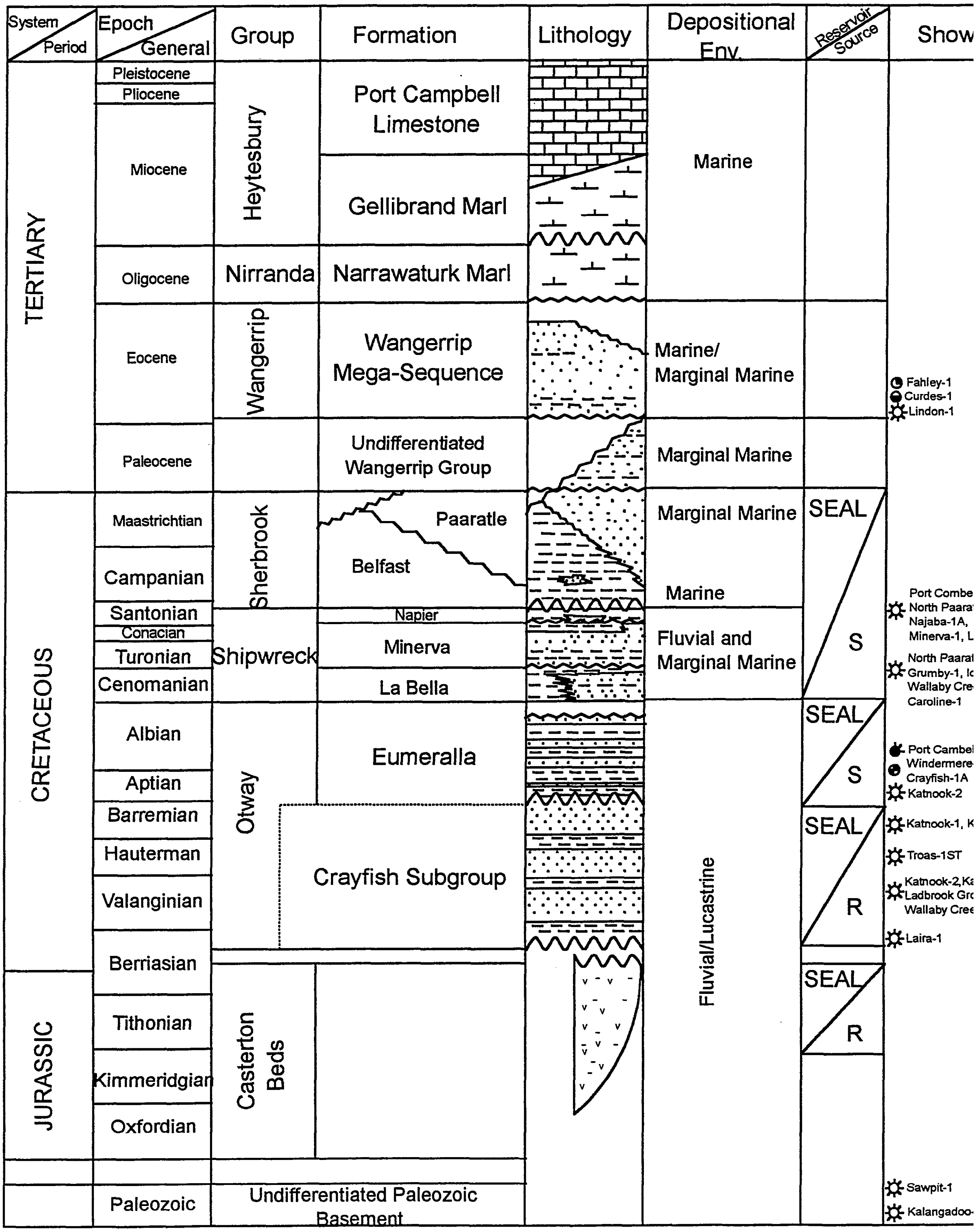
Figure 2

AUSTRALASIA DIVISION
BHP Petroleum

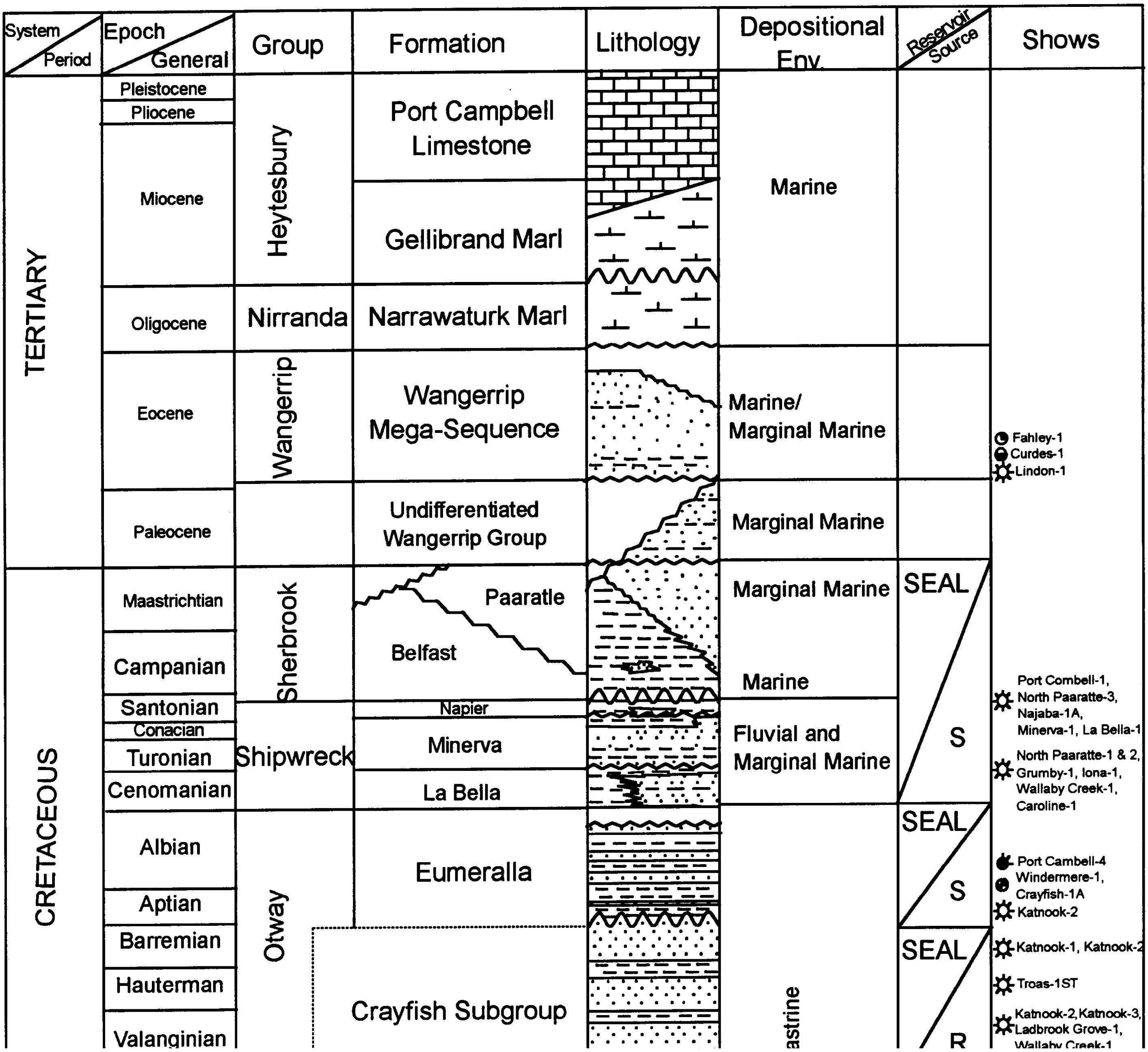
CRLN 1/PE 900629 / P25

OTWAY BASIN
STRATIGRAPHIC COLUMN

BHP



OTWAY BASIN
STRATIGRAPHIC COLUMN



APPENDICES

CHAMPION-1

PERMIT VIC/P30

PETROPHYSICAL INTERPRETATION

REPORT

PREPARED BY:

Angie Cernovskis
Petrophysicist

APPROVED BY:

Robert A Hogarth
Production Geoscience Manager

File No: Champion

DATE: August, 1995

BHP PETROLEUM PTY. LTD.
A.C.N. 006 918 832

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1. EXECUTIVE SUMMARY

The exploration well Champion-1 was drilled to test the likelihood of there being hydrocarbons being trapped within sediments of the Late Cretaceous Minerva Formation and Early Cretaceous La Bella Formation. The well is located in VIC/P30, 25km northwest of Pecten-1A, 17km from shore.

The well intersected the target zones high to prognosis, there were no hydrocarbon indications reported during drilling operations.

A quantitative assessment of the Suite 1 logs over the interval 1500-1830mRT confirmed that all the sandstone units within the Minerva and La Bella Formations are water saturated.

The well was plugged and abandoned as a dry hole.

No MSCT, conventional core or wireline formation tests were attempted in this well.

2. BASIC DATA

All depths in this report are loggers' depths in metres along hole (mRT), unless stated otherwise, below the Rotary Table of the drill rig "Ocean Bounty", measured at 25.3m. The seabed was tagged at 56.25 below mean sea level.

2.1 Wireline Logs

Wireline logs were run by Schlumberger on a Maxis 500 logging unit. Table 1 shows the available log data, with temperature and time data.

Table 1
Champion-1
Wireline Logs & Temperatures

Time Circ Stopped / Time log on bottom	TOOL STRING	Maximum Temp	INTERVAL
Suite 1			
15-8-95 10:12 /15-8-95 18:10	DLL-SLS-CAL-GR-AMS	67^{0}C	79-1856m
/15-8-95 23:45	LDL-CNL-GR-AMS-FMI	70^{0}C	1216-1843m

2.2 MWD Data

MWD was run in the well from 1225-1882mRT by Baker Hughes which consisted of gamma ray and dual propagation resistivity. A good correlation exists between the MWD data and the and the Schlumberger wireline data.

2.3 Hole Conditions

Hole conditions tend to be good throughout the interpreted section, with some evidence of mudcake buildup across the 'Minerva Sand', 1528.5-1539.5mRT.

2.4 Conventional Cores

No conventional cores were cut.

2.5 Sidewall Cores

Twenty four sidewall cores taken from 1500-1770mRT, the minerals identified along with the rock descriptions were used to help constrain the log interpretation.

2.6 Mechanical Sidewall Cores

No mechanical sidewall cores were cut.

2.7 Wireline Formation Tests

No RFT program conducted.

2.8 Drill Stem/Production Tests

No drill stem tests or production tests performed.

2.9 Petrology

No cuttings or sidewall core material has been submitted for detailed petrographic analysis.

3. INTERPRETATION PROCEDURE

3.1 Data Preparation

The Suite-1 open-hole wireline log data was read from tape and loaded into "Well Data System" (WDS), a log storage manipulation, interpretation and presentation software package developed by Western Atlas International Inc. The data was prepared for interpretation by depth-matching curves and by applying environmental corrections as per the Schlumberger chart book (1991).

3.2 Interpretation Model

The data was interpreted using a shaly sand interpretation model which incorporated the Juhaz Water Saturation Model. Shale fraction was derived from the gamma ray log and porosity from the density and neutron logs.

The interpretation parameters are given in Appendix 1.

3.3 Water Salinity

A water salinity of 20,000ppm NaCl equivalent was used to estimate water saturations. This value is consistent with offset well data. The pickett plot shown in Figure 1 supports the use of this value.

3.4 Formation Electrical Properties

As no core data is available to measure the electrical properties of the reservoir units, the following default values were used:

$m = 2$, $n = 2$ and $a = 1.0$

4. INTERPRETATION RESULTS

Table 2 contains a summary of the target zones intersected by the well. An analogue plot of the interpretation results is presented in Enclosure 1.

Table 2
Interpretation Results

Cut-offs
por > 0;Vsh < 50%

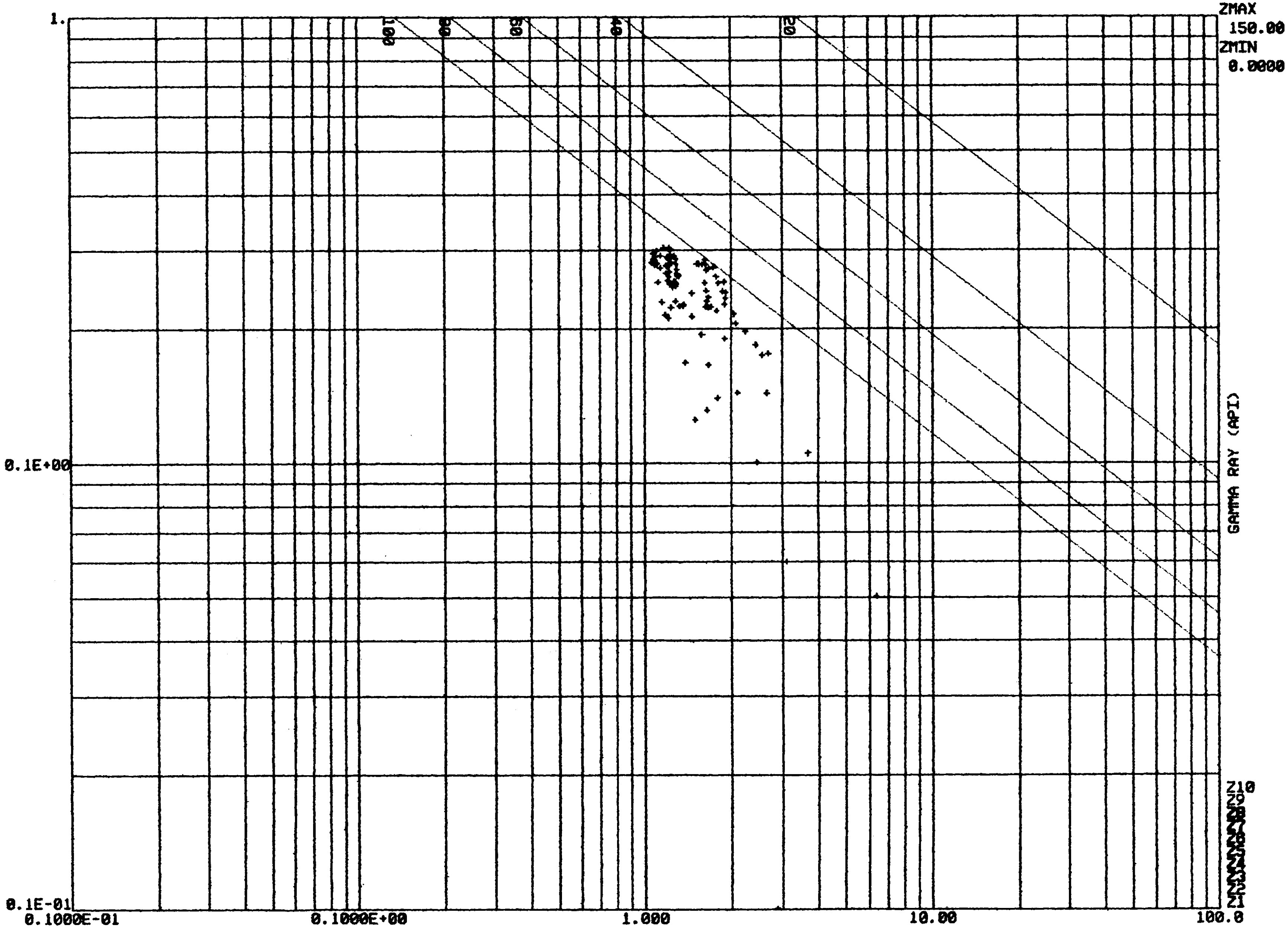
Zone	**Depth (mRT)**	**Gross (m)**	**Net (m)**	**N/G (%)**	**Por (%)**	**Sw (%)**	
Minerva Fm	1528-1617	89.0	23.3	26	18	100	Water
'Minerva Sand'	1528.5-1539.5	11.0	11.0	100	24	100	Water
La Bella Fm	1617-1674	57.0	0	0	0	100	Water

NB: All thicknesses are calculated using data recorded along hole.

Date: 9- 4-95

Company:

Well Name:
Field Name:



ZOOM LEVEL: 0

DEEP RESISTIVITY (OHM-M)

1540.0, 1525.0

APPENDIX 1

LOG INTERPRETATION PARAMETERS

CHAMPION-1 **BHP PETROLEUM**

CURVE INPUTS

Porosity Density, Neutron

Vsh GR

Saturation Rt & Rxo

All input curve data have been corrected for environmental and borehole type effects.

INTERPRETATION PARAMETERS

DEPTH (mRT)	1500-1830	
Salinity (Rw) ppm NaCl Equiv	20,000	
Rsh	10	
GR API min	60	
GR API max	110	
DT sst shale filtrate	 55.6 80 189	
RHOB sst shale	 2.16 2.45	
CNL sst shale	 24 35	

a:1, m:2.0, n:2.0, BHT 70 °C Bit Size: 12.25"

PE600533

This is an enclosure indicator page.
The enclosure PE600533 is enclosed within the container PE900629 at this location in this document.

The enclosure PE600533 has the following characteristics:

ITEM_BARCODE = PE600533
CONTAINER_BARCODE = PE900629
NAME = Champion 1 Appendix 1, Enclosure 1 Log Interpretation
BASIN = Otway
PERMIT = *
TYPE = WELL
SUBTYPE = WELL_LOG
DESCRIPTION = Champion 1 Appendix 1, Enclosure 1 Log Interpretation
REMARKS =
DATE_CREATED =
DATE_RECEIVED =
W_NO = W1139
WELL_NAME = Champion 1
CONTRACTOR = Petrophysics Group
CLIENT_OP_CO = BHP

(Inserted by DNRE - Vic Govt Mines Dept)

2

MORGAN PALAEO ASSOCIATES

PALYNOLOGICAL/PETROLEUM GEOLOGICAL CONSULTANTS

POSTAL ADDRESS: Box 161, Maitland, South Australia 5573
DELIVERIES: 1 Shannon Tce, Maitland, South Australia 5573
Phone (08) 8832 2795 Fax (08) 8832 2798

PALYNOLOGY OF BHPP CHAMPION-1

OFFSHORE OTWAY BASIN, VICTORIA, AUSTRALIA

BY

ROGER MORGAN

for **BHP PETROLEUM** **October 1995**

REF:OTW.RPCHAMPN

PALYNOLOGY OF CHAMPION-1

OFFSHORE OTWAY BASIN, VICTORIA, AUSTRALIA

by

Roger Morgan

CONTENTS **PAGE**

I SUMMARY

1255.0m(swc) - 1277.0m(swc) : *longus* Zone (*druggii* Dino Zone) : Maastrichtian : nearshore marine : immature : usually topmost Sherbrook Group

1313.0m(swc) : lean and zonally indeterminate but clearly Late Cretaceous : marine : immature : usually Sherbrook Group

1428.0m(swc) : *lillei* Zone (no Dino Zone) : Campanian : very nearshore marine : immature : usually Sherbrook Group

1460.0m(swcs) - 1482.0m(swc) : upper *senectus* Zone (1460.0-1480m lower *australis* Dino Zone, 1482.0m upper *aceras* Dino Zone) : early Campanian : nearshore marine : immature : usually Belfast Mudstone

1504.0m(swc) - 1547.0m(swc) : middle *senectus* Zone (upper *aceras* Dino Zone) : early Campanian : very nearshore marine : immature : usually Belfast Mudstone, here partly sandy

1572.0m(swc) - 1673.0m(swc) : lower *senectus* to upper *apoxyexinus* Zones (1572.0-1620.0m middle to lower *aceras* Dino Zone, 1654.0m upper *cretacea* Dino Zone, 1673.0m lower *cretacea* Dino Zone) : early Campanian to late Santonian : nearshore to very nearshore marine : immature : usually Belfast Mudstone, here partly sandy

1686.0m(swc) : *distocarinatus* Zone (*infusorioides* Dino Zone) : Cenomanian : very nearshore marine : marginally mature : usually La Bella Formation

1700m(cutts) - 1812.0m(swc) : *pannosus* Zone : late Albian : non-marine to slightly brackish : marginally mature : usually Eumeralla Formation

1820m(cutts) - 1882m(cutts) : *paradoxa* Zone : late to mid Albian : non-marine : marginally mature : usually Eumeralla Formation.

Depth (m)	Sample Type	Spore-Pollen Zone	Dinoflagellate Zone	Dino %	Environment
1255.0	swc	apparently balmei presumed longus	druggii	17	nearshore
1277.0	swc	longus	druggii	10	nearshore
1313.0	swc	indeterminate	indeterminate	-	marine
1428.0	swc	lillei	indeterminate	5	very nearshore
1460.0	swc	upper senectus	lower australis	1	very nearshore
1480	cutts	upper senectus	lower australis	(20)	nearshore
1482.0	swc	upper senectus	upper aceras	19	nearshore
1504.0	swc	middle senectus	upper aceras	13	nearshore
1518.0	swc	middle senectus	upper aceras	<1	brackish
1525	cutts	middle senectus	upper aceras		
1527.0	swc	middle senectus	upper aceras	6	nearshore
1545	cutts	middle senectus	upper aceras		
1547.0	swc	middle senectus	upper aceras	8	nearshore
1572.0	swc	lower senectus	mid-low aceras	6	nearshore
1592.0	swc	lower senectus	mid-low aceras	12	nearshore
1610	cutts	upper apoxyexinus	mid-low aceras	(20)	nearshore
1612.0	swc	upper apoxyexinus	mid-low aceras	9	nearshore
1620.0	swc	upper apoxyexinus	mid-low aceras	6	nearshore
1654.0	swc	upper apoxyexinus	upper cretacea	21	nearshore
1673.0	swc	upper apoxyexinus	lower cretacea	10	nearshore
1686.0	swc	distocarinatus	infusorioides	2	very nearshore
1700	cutts	pannosus	-	caved	?non-marine
1712.0	swc	pannosus	-	0	non-marine
1751.0	swc	pannosus	-	0	non-marine
1812.0	swc	pannosus	-	2	brackish
1820	cutts	paradoxa	-	0	non-marine
1850	cutts	paradoxa	-	caved	?non-marine
1882	cutts	paradoxa	-	caved	?non-marine

TABLE 1 : INDIVIDUAL SAMPLE SUMMARY : CHAMPION-1

II INTRODUCTION

Eight cuttings samples were studied during drilling on an urgent basis, and reported by fax, at the request of Jim Preston. After well completion, two batches of sidewall cores (fifteen and five) were submitted for detailed study. All these results are summarised herein.

Palynomorph occurrence data are shown as Appendix I and form the basis for the assignment of the samples to eight spore-pollen units and seven dinoflagellate units of Maastrichtian to Albian age.

Specimen counts were made on all assemblages and expressed in the raw data as percentages. In the summary table, percentages from cuttings are bracketed (5%) to show that they may be inaccurate due to caving.

The Cretaceous spore-pollen zonation is essentially that of Dettmann and Playford (1969), but has been significantly modified and improved by various authors since, and most recently discussed in Helby et al (1987), as shown on Figure 1. The Late Cretaceous zonation has been modified by Morgan (1992) in project work for BHPP (Figure 2).

Maturity data was generated in the form of Spore Colour Index, and is plotted on Figure 3 Maturity Profile of Champion-1. The oil and gas windows on Figure 3 follow the general consensus of geochemical literature. The oil window corresponds to spore colours of light-mid brown (Staplin Spore Colour Index of 2.7) to dark brown (3.6). These correspond to vitrinite reflectance values of 0.6% to 1.3%. Geochemists argue variations on kerogen type, basin type and basin history. The maturity interpretation is thus open to reinterpretation using the basic colour observations as raw data. However, the range of interpretation philosophies is not great, and probably would not move the oil window by more than 200 metres.

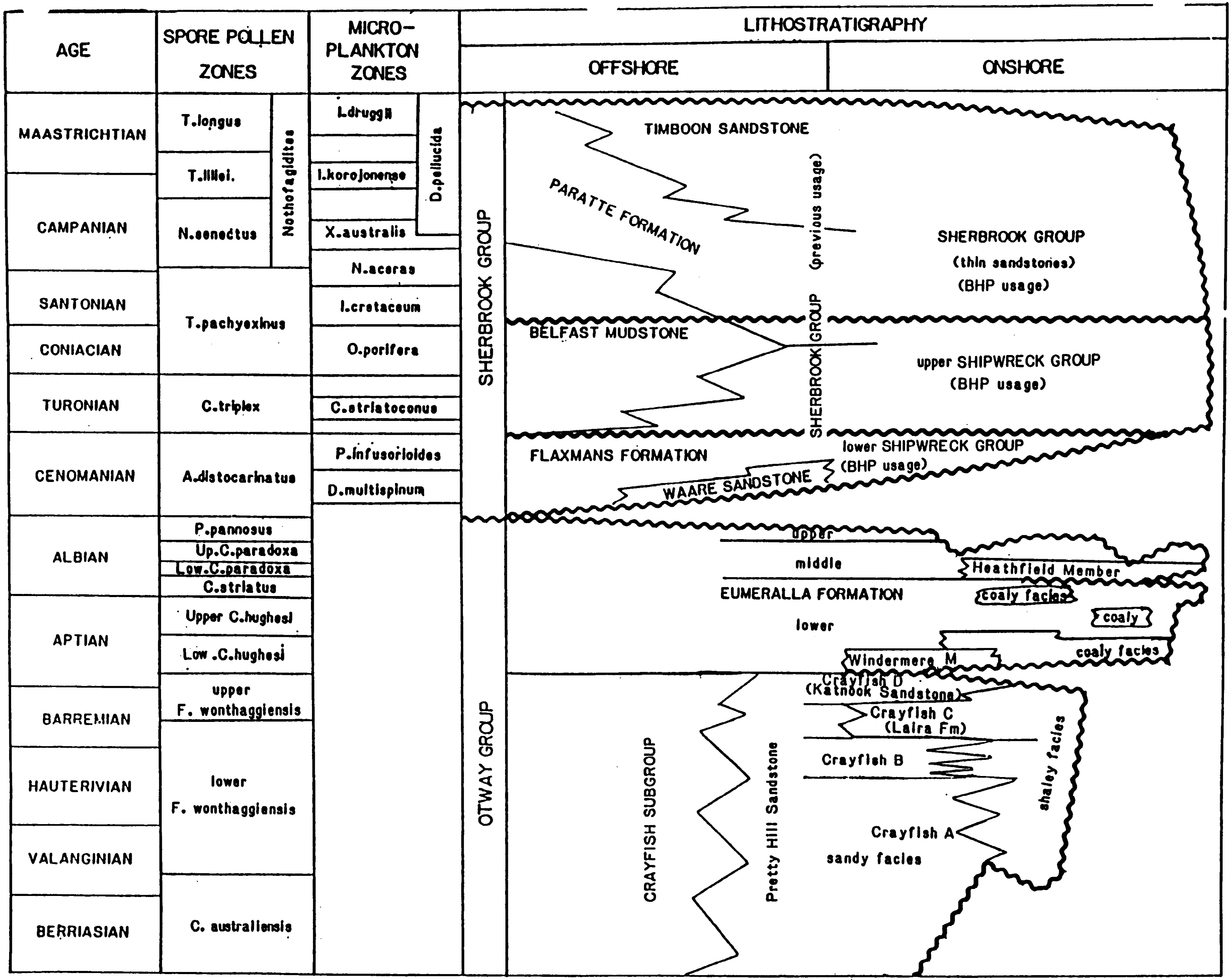


FIGURE 1. CRETACEOUS REGIONAL FRAMEWORK, OTWAY BASIN

CRLN 1/PE900629/P43

SPORE-POLLEN ZONES	SPORE-POLLEN HORIZONS	DINOFLAGELLATE ZONES	DINOFLAGELLATE HORIZONS
LONGUS upper	T. confessus T. sectilis 1	DRUGGII	M. conorata 1a
	G. rudata ● 1b		M. conorata 1c
LONGUS lower	N. senectus ● 1d		M. druggii 1e
	T. sabulosus 2a		I. pellucida 2
	T. longus 2b		
LILLEI upper		KOROJONENSE	I. korojonense 3 I. cretacea
LILLEI lower	T. sectilis 3a		I. korojonense 3c I. pellucida
	T. lillei 3b	AUSTRALIS upper	X. australis 4 X. ceratoides A. wisemaniae
SENECTUS upper			A. suggestium 4a
		AUSTRALIS lower	N. aceras 5 N. semireticulata X. australis ● 6
	G. rudata 7a	ACERAS upper	N. tuberculata 7 X. australis 7b N. tuberculata 7c N. semireticulata
SENECTUS middle	T. sabulosus 7e		O. obesa 7d
SENECTUS lower	N. senectus 9a	ACERAS middle	T. suspectum Heterosphaeridium 10%+ 8
		ACERAS lower	Heterosphaeridium 20%+ 9 N. aceras 9b
APOXYEXINUS upper	A. cruciformis 1%	CRETACEA upper	I. belfastense 10 A. denticulata Heterosphaeridium 20%+ 1 I. belfastense A. denticulata 11a
APOXYEXINUS middle	A. cruciformis 1-4% 11	CRETACEA lower	I. cretacea 11b
	12 A. cruciformis 10%+	PORIFERA	
APOXYEXINUS lower	12a A. cruciformis 10%+		O. porifera 12b
MAWSONII	A. distocarinatus 12c	STRIATOCONUS	
	consistent 13 A. distocarinatus	INFUSORIOIDES	C. edwardsii 14
	P. mawsonii 15a		C. edwardsii ● 15
DISTOCARINATUS			C. edwardsii ● 15b
	common saccates A. cruciformis		dinoflagellates

FIGURE 2. ZONATION USED HEREIN SHOWING THE NUMBERED HORIZONS AGAINST

SPORE-POLLEN ZONES	SPORE-POLLEN HORIZONS	DINOFLAGELLATE ZONES	DINOFLAGELLATE HORIZONS
LONGUS upper	T. confessus T. sectilis 1 G. rudata ● 1b	DRUGGII	M. conorata 1a M. conorata 1c
LONGUS lower	N. senectus ● 1d T. sabulosus 2a T. longus 2b	DRUGGII	M. druggii 1e I. pellucida 2
LILLEI upper	T. sectilis 3a	KOROJONENSE	I. korojonense 3 I. cretacea
LILLEI lower	T. lillei 3b	KOROJONENSE	I. korojonense 3c I. pellucida
SENECTUS upper	G. rudata 7a	AUSTRALIS upper	X. australis 4 X. ceratoides A. wisemaniae A. suggestium 4a
		AUSTRALIS lower	N. aceras 5 N. semireticulata X. australis ● 6
SENECTUS middle	T. sabulosus 7e	ACERAS upper	N. tuberculata 7 X. australis 7b N. tuberculata 7c N. semireticulata
		ACERAS middle	O. obesa 7d T. suspectum Heterosphaeridium 10%+ 8
SENECTUS lower	N. senectus 9a	ACERAS lower	Heterosphaeridium 20%+ 9 N. aceras 9b
APOXYEXINUS upper	A. cruciformis 1%	CRETACEA upper	I. belfastense 10 A. denticulata Heterosphaeridium 20%+ 10a I. belfastense A. denticulata 11a
APOXYEXINUS middle	A. cruciformis 1-4% 11 12	CRETACEA lower	I. cretacea 11b
APOXYEXINUS lower	A. cruciformis 10%+ 12a A. cruciformis 10%+	PORIFERA	O. porifera 12b

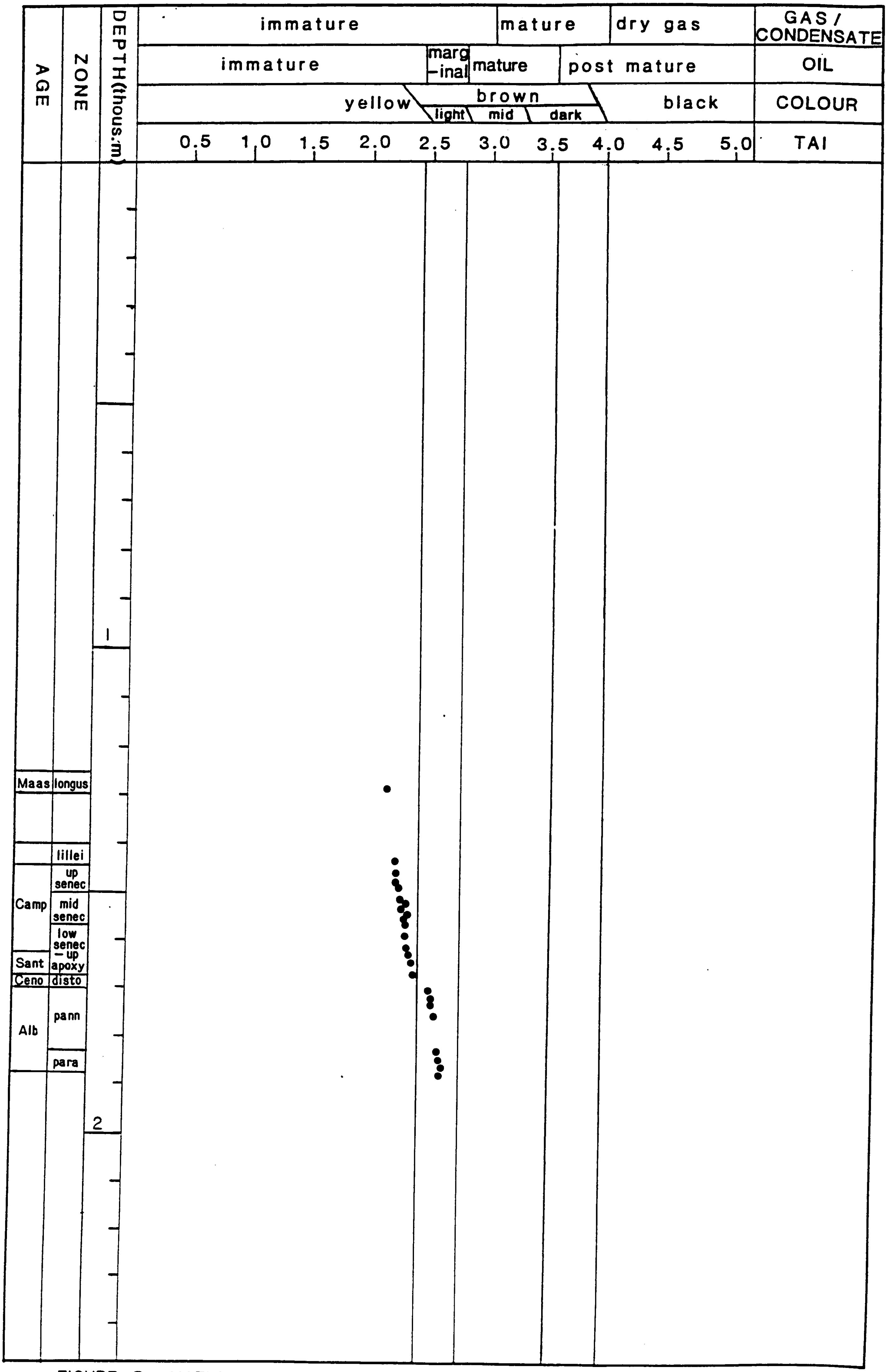


FIGURE 3 MATURITY PROFILE : CHAMPION - I

III PALYNOSTRATIGRAPHY

A 1255.0m(swc) - 1277.0m(swc) : *longus* Zone (*druggii* Dino Zone)

Assignment to the *Tricolpites longus* Zone of Maastrichtian age is indicated at the top by the dinoflagellates, with the spore pollen assemblage suggesting the *Lygistepollenites balmei* Zone of Paleocene age (*L. balmei*, *G. rudata* without older spore-pollen markers). At 1277.0m(swc), definitive *T. longus* Zone is indicated by *T. longus*, *Tricolpites waipawaensis*, *Tetracolporites verrucosus* and *Triporopollenites sectilis*. In both samples, *Proteacidites* spp are very common with *Gambierina rudata* common, and *Cyathidites minor*, *Falcisporites similis* and *Stereisporites antiquasporites* frequent. Rare Permian reworking was seen.

Amongst the minor dinoflagellates, *Manumiella coronata* indicates the *Manumiella druggii* Dino Zone, with *Canninginopsis bretonica* at 1277.0m.

Nearshore marine environments are indicated by low dinoflagellate content and diversity amongst the dominant and diverse spores and pollen. Freshwater algae (*Botryococcus* and *Paralecaniella indentata*) are frequent.

Yellow spore colours indicate immaturity for hydrocarbons.

These features are normally seen in the topmost Sherbrook Group.

B 1313.0m(swc) : indeterminate

This sample was extremely lean with inertinite dominant. Too few palynomorphs were seen for zonal assignment. *F. similis* and *C. minor* were the most frequent, with *Australopollis obscurus*, *Nothofagidites endurus* and *Tricolpites sabulosus* rare.

Dinoflagellates were extremely rare and not age diagnostic, but their presence indicates marine environments, probably very nearshore.

Yellow spore colours indicate immaturity for hydrocarbons.

The Late Cretaceous age suggests the Sherbrook Group.

C 1428.0m(swc) : *lillei* Zone

Assignment to the *Tricolporites lillei* Zone of Campanian age is indicated at the top by the lack of younger markers and at the base by oldest *Triporopollenites sectilis*. *F. similis* and *Proteacidites* spp are common, with *C. minor*, *M. antarcticus*, *Podosporites microsaccatus* and *Microcachryidites antarcticus* frequent. Minor Permian reworking was seen.

Rare dinoflagellates are not age diagnostic and so no Dino Zone assignment is possible. Very nearshore marine environments are indicated by the rare low diversity dinoflagellates amongst dominant and diverse spores and pollen.

Yellow spore colours indicate immaturity for hydrocarbons.

These features are usually seen in the Sherbrook Group.

D 1460.0m(swc) - 1482.0m(swc) : upper *senectus* Zone (1460.0-1480m lower *australis* Dino Zone, 1482.0m upper *aceras* Dino Zone)

Assignment to the upper *Nothofagidites senectus* Zone of early Campanian age is indicated by the absence of younger markers at the top, and oldest *Gambierina rudata* and frequent *N. endurus* at the interval base. Common are *Falcisporites similis*, *Cyathidites* spp and *Proteacidites* spp, with frequent *N. senectus*. *Tricolpites sabulosus*, *T. gillii* and *Tricolporites apoxyexinus* are rare components. *Tricolpites confessus* occurs to 1480m(cutts). Rare Permian reworking was seen.

Amongst the dinoflagellates, *Nelsoniella semireticulata* at 1460.0m without older markers, indicates the lower *Xenikoon australis* Dino Zone. *X. australis* is common at 1480m and 1482m, with rare *Areosphaeridium suggestium* and *Odontochitina porifera*. At 1482.0m(swc), the presence of *Nelsoniella tuberculata* indicates the upper *Nelsoniella aceras* Dino Zone. *X. australis* is again common with *Maduradinium pentagonum* and *O. porifera* rare.

Nearshore marine environments are indicated by the low dinoflagellate content (17-20%) and diversity, and the dominant and diverse spores and pollen.

Yellow spore colours indicate immaturity for hydrocarbons.

These features are normally seen in the Belfast Mudstone.

E 1504.0m(swc) - 1547.0m(swc) : middle *senectus* Zone (upper *aceras* Dino Zone)

Assignment to the middle *N. senectus* Zone is indicated at the top by the absence of younger markers, and at the base by oldest *T. sabulosus*. Other confirming markers include oldest frequent *Australopollis obscurus* and oldest consistent *N. endurus*. Overall, *F. similis*, *Cyathidites* spp and *Proteacidites* spp are common, with *Microcachryidites* and *Podosporites microsaccatus* frequent to common. Cuticle is common at 1518m and below. Very minor Permian reworking was seen at the base.

Amongst the dinoflagellates, *N. tuberculata* in all samples indicates the upper *N. aceras* Zone. *Heterosphaeridium* spp are the most frequent dinoflagellate, especially *H. solida*. Other age significant taxa include rare *N. aceras* seen throughout, and *X. australis* (frequent at 1504m, rare down to 1527m in swcs and to 1545m in cuttings). *O. porifera* occurs only at 1504m while *Maduradinium pentagonum* is rare throughout.

Very nearshore marine environments are indicated by the low to very low dinoflagellate content (<1-13%) and diversity, the dominant and diverse spores and pollen, and the frequent to common freshwater algae (*Botryococcus*).

Yellow spore colours indicate immaturity for hydrocarbons.

These features are normally seen in the Belfast Formation, but here include significant sands below 1530m.

F 1572.0m(swc) - 1673.0m(swc) : lower *senectus* to upper *apoxyexinus* Zones (1572.0-1620.0m middle to lower *aceras* Dino Zone, 1654.0m upper *cretacea* Dino Zone, 1673.0m lower *cretacea* Dino Zone)

Assignment to this Spore-Pollen Zone interval of Campanian to Santonian age is based on the absence of younger and older markers. Dinoflagellate data suggest that 1572-1620m is probably lower *senectus* Zone, and 1654-1673m upper *apoxyexinus* Zone, but *N. senectus* is always rare and was not seen below 1592.0m(swc). Common are *F. similis*, *Cyathidites* spp and

Proteacidites spp with frequent *Dilwynites granulatus*, *M. antarcticus* and *P. microsaccatus*. *Proteacidites* are common to 1612m, but only frequent below. Large *Proteacidites* does not occur below 1612m. *Camarozonosporites ohaiensis* does not occur below 1620m. *D. granulatus* is more common at 1654.0m and below. Rare elements include *A. obscurus* (consistent throughout), *Ornamentifera sentosa, Tricolpites twisted* and *T. apoxyexinus* (intermittently present). *Amosopollis cruciformis* occurs at 1673.0m only. Consistent minor Permian and occasional minor Triassic reworking was seen.

Amongst the dinoflagellates the absence of younger markers at the top, and consistent *N. aceras* to the base, indicate assignment of 1572.0m(swc)-1620.0m(swc) to the middle to lower *N. aceras* Dino Zone. *Heterosphaeridium* spp are frequent to common, with other elements rare. Rare but significant are *Heterosphaeridium* aff *laterobrachius*, *Isabelidinium cretacea*, *Nelsoniella aceras* and *Trithyrodinium* spp. Rare reworking was seen at 1592.0m(swc) (*Isabelidinium belfastense*) and 1572.0m(swc) (*Pseudoceratium turneri*). *Senoniasphaera* sp occurs at 1612.0 and 1620m only.

At 1654.0m(swc), the presence of *Amphidiadema denticulata*, *I. belfastense* and *I. belfastense rotundata* indicate the upper *I. cretacea* Zone. *Heterosphaeridium solida* is common with other elements rare, including *H. hidesi*, *H.* aff *laterobrachius*, *I. cretacea*, *Odontochitina hornless*, *O. porifera* and *Senoniasphaera* sp.

At 1673.0m(swc), the absence of younger markers at the top, and oldest *I. cretacea* and *Isabelidinium rectangulare* at the base, indicate the lower *I. cretacea* Zone. All dinoflagellates are rare and include *I. cretacea elongata*, *Odontochitina cribropoda* and *Trithyrodinium marshalli*.

Nearshore to very nearshore marine environments are indicated by the low to very low dinoflagellate contents (mostly 6-12% with 20% at 1610m possibly caved and 21% at 1654m swc), low to moderate dinoflagellate diversity, abundant and diverse spores and pollen, rare to frequent freshwater algae (*Botryococcus*) and common cuticle, especially at 1673m.

These features are normally seen in the Belfast Mudstone, but here include significant sands above 1620m.

G 1686.0m(swc) : *distocarinatus* Zone (*infusorioides* Dino Zone)

Assignment to the *Appendicisporites distocarinatus* Zone of Cenomanian age is indicated at the top by youngest *A. distocarinatus* without *Phyllocladidites mawsonii*, and at the base by oldest *A. distocarinatus* without older markers. The upper part of the Zone is indicated by the dinoflagellates. Amongst the spore-pollen, *Cyathidites* spp are common, with *D. granulatus*, *Falcisporites grandis*, *F. similis* and *Gleicheniidites* frequent. Rare elements include *Appendicisporites tricornutatus*, *Balmeisporites holodictyus*, *Phyllocladidites eunuchus* and *Trilobosporites trioreticulatus*. Rare Early Cretaceous reworking includes *Foraminisporis asymmetricus* and *Pilosisporites notensis*.

Dinoflagellates are very rare but include *Cribroperidinium edwardsii* indicating the *Palaeohystrichophora infusorioides* Dino Zone. Other rare elements include *Callaoisphaeridium asymmetricum*, *Cyclonephelium compactum* and *Odontochitina operculata*.

Very nearshore marine environments are indicated by the very rare dinoflagellates (2%) of low diversity, the dominant and diverse spores and pollen, and the common freshwater algae (16%, mostly *Botryococcus*).

These features are normally seen in the La Bella Formation.

H 1700m(cutts) - 1812.0m(swc) : *pannosus* Zone

Assignment to the *Phimopollenites pannosus* Zone of late Albian age is indicated by youngest *Coptospora paradoxa* at the top, and oldest *P. pannosus* at the base. Other extinctions at 1700m include *Crybelosporites striatus*, *Foraminisporis asymmetricus*, *Triporoletes bireticulatus* and frequent *Cicatricosporites australiensis*. Other rare elements include *P. pannosus* and *Clavatipollenites hughesi*. Rare Permian and Triassic reworking are present. Late Cretaceous caving is frequent at 1700m (cuttings).

No dinoflagellates are considered in place, but extremely rare spiny acritarchs occur in some samples.

Environments are non-marine to slightly brackish, with the only saline markers being extremely rare spiny acritarchs at 1812.0m only. Spores and pollen are dominant and diverse with cuticle and tracheid being frequent to common.

These features are normally seen in the topmost Eumeralla Formation.

I 1820m(cutts) - 1882m(cutts) : *paradoxa* Zone

Assignment to the *Coptospora paradoxa* Zone of late to mid Albian is indicated by the absence of younger markers at the top, and oldest *C. paradoxa* at the base. Common are *Araucariacites australis*, *Cyathidites* spp, *F. similis* and *Osmundacidites wellmanii*, with frequent *C. australiensis*. Rare elements include *C. striatus*, *Perotriletes majus*, *F. asymmetricus* and *Triporoletes* spp. Rare Permian and Triassic reworking as seen.

Rare dinoflagellates were seen but are considered caved in these cuttings samples.

Non-marine environments are indicated by the dominant and diverse spores and pollen, absence of "in place" saline markers, and abundant plant debris.

These features are normally seen in the upper Eumeralla Formation.

IV CONCLUSIONS

The section appears to be grossly incomplete.

At the base, a normal topmost Eumeralla Formation was encountered, with non-marine to brackish environments in the Albian *paradoxa* and *pannosus* Zones. Log top may be near 1701m.

Above this, a thin La Bella Formation comprising only the more marine upper part is present with very nearshore marine environments in the Cenomanian *distocarinatus* Zone. Log top may be near 1677m.

Above this, a normal age of Belfast Mudstone occurs in nearshore to very nearshore marine environments in the upper *apoxyexinus* to *longus* Zones. Lithologies are not normal however, and include significant sands which may produce a new reservoir play upstructure from the Minerva Formation ones.

V REFERENCES

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Helby RJ, Morgan RP and Partridge AD (1987) A palynological zonation of the Australian Mesozoic **In** Studies in Australian Mesozoic Palynology **Assoc. Australas. Palaeontols. Mem 4** 1-94

Morgan RP (1992) Overview of new cuttings based Late Cretaceous correlations, Otway Basin, Australia **unpubl. rept. for BHPP**.

PE900630

This is an enclosure indicator page.
The enclosure PE900630 is enclosed within the container PE900629 at this location in this document.

The enclosure PE900630 has the following characteristics:

ITEM_BARCODE = PE900630
CONTAINER_BARCODE = PE900629
NAME = Champion 1 Palynological Data
BASIN = Otway
PERMIT = *
TYPE = WELL
SUBTYPE = DIAGRAM
DESCRIPTION = Champion 1 Palynological Data
REMARKS =
DATE_CREATED = 30/09/95
DATE_RECEIVED =
W_NO = W1139
WELL_NAME = Champion - 1
CONTRACTOR = BHP
CLIENT_OP_CO = BHP

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ENCLOSURES

PE600534

This is an enclosure indicator page.
The enclosure PE600534 is enclosed within the container PE900629 at this location in this document.

The enclosure PE600534 has the following characteristics:

ITEM_BARCODE = PE600534
CONTAINER_BARCODE = PE900629
NAME = Champion 1 Enclosure 1 Composite Log (Well Summary)
BASIN = Otway
PERMIT = *
TYPE = WELL
SUBTYPE = COMPOSITE_LOG
DESCRIPTION = Champion 1 Enclosure 1 Composite Log (Well Summary)
REMARKS =
DATE_CREATED =
DATE_RECEIVED =
W_NO = W1139
WELL_NAME = Champion 1
CONTRACTOR = BHP
CLIENT_OP_CO = BHP

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