WELL COMPLETION REPORT

SAWBELLY-1

VOLUME 2

INTERPRETED DATA

VIC/P26
ESSO AUSTRALIA RESOURCES LIMITED

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GEOLOGICAL AND GEOPHYSICAL ANALYSIS

1. SUMMARY OF WELL RESULTS

KB ≈ 21m

Formation/Horizon	Pre-drill Depth (mSS)	Post Drill Depth (mSS)	(KB)
Gippsland Limestone (seafloor)	-63	-63	
Top of Latrobe Group	-1948	-1964	1985 ← ?
Top of "Coarse Clastics"	-1975	-1992	2013
51.5 Million Year Sequence Boundary	-2200	-2213	2234
54.5 Million Year Sequence Boundary	-2524	-2534	2555
60.0 Million Year Sequence Boundary	-2869	-2873	2894
TD	-3050	-3047	

2. INTRODUCTION

The Sawbelly-1 well was drilled to test a fault-dependent, intra Latrobe closure located in permit VIC/P26. The bounding fault is orientated east-west and shows evidence of partial inversion and strong compression. The prospect was the southern highside block. Fault closure was predicted to occur below the top of the 51.5 Ma sequence predicted at 2205mSS.

No hydrocarbons were encountered. The stratigraphy was as predicted, both reservoir units and lithologies capable of providing top seal where encountered. Mature source is present, thus the most likely reason for the failure of the prospect is the absence of fault seal.

Sawbelly-1 represented the Year 3 commitment well for the VIC/P26 permit and was completed in March 1990.

3. STRATIGRAPHY

The stratigraphy encountered in Sawbelly-1 was essentially as predicted. The top of Latrobe Group is interpreted at 1964mSS, 16m → 1980 m low to prediction. Twenty eight metres of middle to lower N. asperus glauconitic shales of the Gurnard Formation overlie the top of "Coarse Clastics" at -1992mSS. A further 25m of lower N. asperus sandstones and shales occur below the base of the Gurnard Formation. This unit may represent a transitional unit between the "Coarse Clastics" and the Gurnard.

A thick sequence of P. asperopolis to upper M. diversus marginal marine sediments, mainly sandstones with minor shales and coals form the upper part of the Latrobe Group. The 51.5 million year sequence boundary, (MYSB) is at -2213m, 18m low to prediction.

Below this sequence boundary, the section is dominated by shales and coals. These sediments are representative of a lower coastal plain environment and range in age from middle M. diversus to lower L. balmei. The 54.5 MYSB is interpreted at -2534mSS, at the base of a thin sand.

Below -2854mSS, well developed sandstones which formed the primary target are encountered. The sands are each 15-20m thick, have porosities of up to 15% and are entirely water saturated.

The sands represent a return to more marginal conditions and together with common coals indicate a lower coastal plain/estuarine environment. The 60MYSB is interpreted at -2873mSS, 4m low to prediction.

The 68MYSB is tentatively located at -3008mSS based on the correlations to Veilfin-1 and Conger-1. No palynological evidence is available to support this, sidewall core 1 at 3001mSS recording a lower L. balmei age.

The well reached a total depth of -3047mSS.

4. STRUCTURE

The Sawbelly structure is situated on the south side of an E-W trending fault. At the eastern end of the structure the fault changes orientation trending southeast. Closure was provided by E-W roll and regional dip to the south. At the time of folding in the late Eocene to mid Miocene compression and some reverse movement occurred along the bounding fault.

5. GEOPHYSICAL DISCUSSION

5.1 Pre-Drill Versus Post-Drill Analysis

The top of "Coarse Clastics", the key horizon for depth conversion was 17m deep to prediction, primarily because of erroneous prediction of conversion factor (.920 pre-drill, .930 post drill). All of the mapped intra-Latrobe horizons were also deep to prediction, by between 4 and 12m, because of the prediction error at the top of "Coarse Clastics".

5.2 Seismic Coverage

Seismic coverage for the Sawbelly Prospect is provided by both 2D and 3D data. The 2D coverage ranges in density from approximately 1/2 x 1km over the western part of Sawbelly to 2 x 2km at the easternmost end of the prospect. Seven surveys are represented: G74A, G77A, G80A G81A, G84A, 85G and G88A. The G74A, G77A and some of the G80A and G81A surveys have been reprocessed. Most of the 2D lines have been migrated.

The northern part of Sawbelly is covered by the G88AJ (John Dory) "RECON" 3D survey. This survey was recorded with a line spacing of 125m and interpolated to a line spacing of 62.5m during processing.

5.3 Time Interpretation

Seven horizons were interpreted: top of high velocity channel fill, base of high velocity channel, top of Latrobe Group, top of "Coarse Clastics", 51.5 M.Y. sequence boundary, 54.5 M.Y.S.B. and 60.0 M.Y.S.B.

The 3D interpretation was performed on the GECO "CHARISMA" 3D interpretation system. Correlation along each fault block within the 3D volume was aided by the generation of a number of random, zig-zag lines adjacent to the faults.

2D and 3D data quality is good for the post-Latrobe, top of Latrobe, "Coarse Clastics" and 51.5 M.Y. horizons and confidence in the time interpretation is high. Over the eastern part of the prospect data quality for the 54.5 and 60.0 M.Y. horizons is also good. However, there is a marked degradation in the continuity of these events, particularly the 60.0 M.Y., towards the west of the prospect.

The mapped two way time closure for Sawbelly is small, because the southern and western parts of the prospect have been pulled up by a steep velocity gradient associated with a major Miocene high velocity channel.

5.4 Velocity Analysis and Depth Conversion

Depth conversion velocities for the top of "Coarse Clastics" were derived from two sources: for the southwestern part of the prospect, below the high velocity channel, the SIERRA "SIVA" interval velocity analysis system was used. For the area outside the high velocity channel, a smoothed VNMO and conversion factor approach was used. The average velocity pictures derived from each of these two approaches were combined into one average velocity map for depth conversion.

An average velocity difference method was used for the intra-Latrobe depth conversions. Maps of the average velocity difference between the top of "Coarse Clastics" and each of the intra-Latrobe horizons were generated. Away from the wells these maps were contoured in accordance with a curve of well average velocity difference versus interval two-way time. The intra-Latrobe depth conversions were then performed by adding the average velocity difference to the "Coarse Clastics" average velocity and then multiplying the gridded average velocity map so produced by the gridded, lag-corrected time map.

The enclosed post-drill maps were produced by adjusting the contours on the pre-drill maps to tie the Sawbelly-1 horizon intersections.

5.5 Conclusion

Sawbelly-1 tested a valid fault-dependent structural closure. The continuity of the Sawbelly fault is confirmed by the 3D grid. Even though the time closure for the prospect is very small, regional dips indicate that a large closure is present in depth on the southern side of the fault. Hence the failure of the well to intersect hydrocarbons must be attributed to the inability of the fault to seal a significant hydrocarbon column.

5.6 Synthetic Seismograms

The enclosed synthetic seismograms were generated with the Sierra Geophysics program "QUIKLOG".

Input

Density log and Schlumberger's drift-corrected sonic (see velocity survey report). A gamma ray log is also displayed for reference.

Wavelets

Synthetic No.1: Zero-phase Ricker Wavelet, 47Hz
Synthetic No.2: Zero-phase Ricker Wavelet, 47Hz, 90° phase-shifted.
Synthetic No.2 is considered to provide the best match to line G88AJ-472, the line on which Sawbelly-1 was drilled. The 90° phase-shifted zero-phase wavelet is similar in appearance to a minimum phase wavelet but it is acausal (the wavelet is centred on the reflection, in the same way as a normal zero-phase wavelet).

Polarity Convention

Esso Australia's normal polarity; a positive pressure at the hydrophone produces a trough (white) on the synthetic seismogram. This polarity convention is negative in "QUIKLOG".

Processing Sample Interval

4msec

Log Ranges

Sonic: top S.L., base 3047mSS
Density: top 762mSS, base 3049mSS

Display Scale

10m/sec

Explanation of "QUIKLOG" Montage Display

The acoustic impedance log is calculated in 4msec steps as is the reflection coefficient log. "Raw Synthetic" is the seismic trace, showing a decrease in amplitude corresponding to transmission loss. "Seq.1" has an AGC applied, with 200msec gates.

Synthetic/Seismic Match

The synthetic seismic match is generally good between the surface and the top of "Coarse Clastics". Below the top "Coarse Clastics" the match is poor.

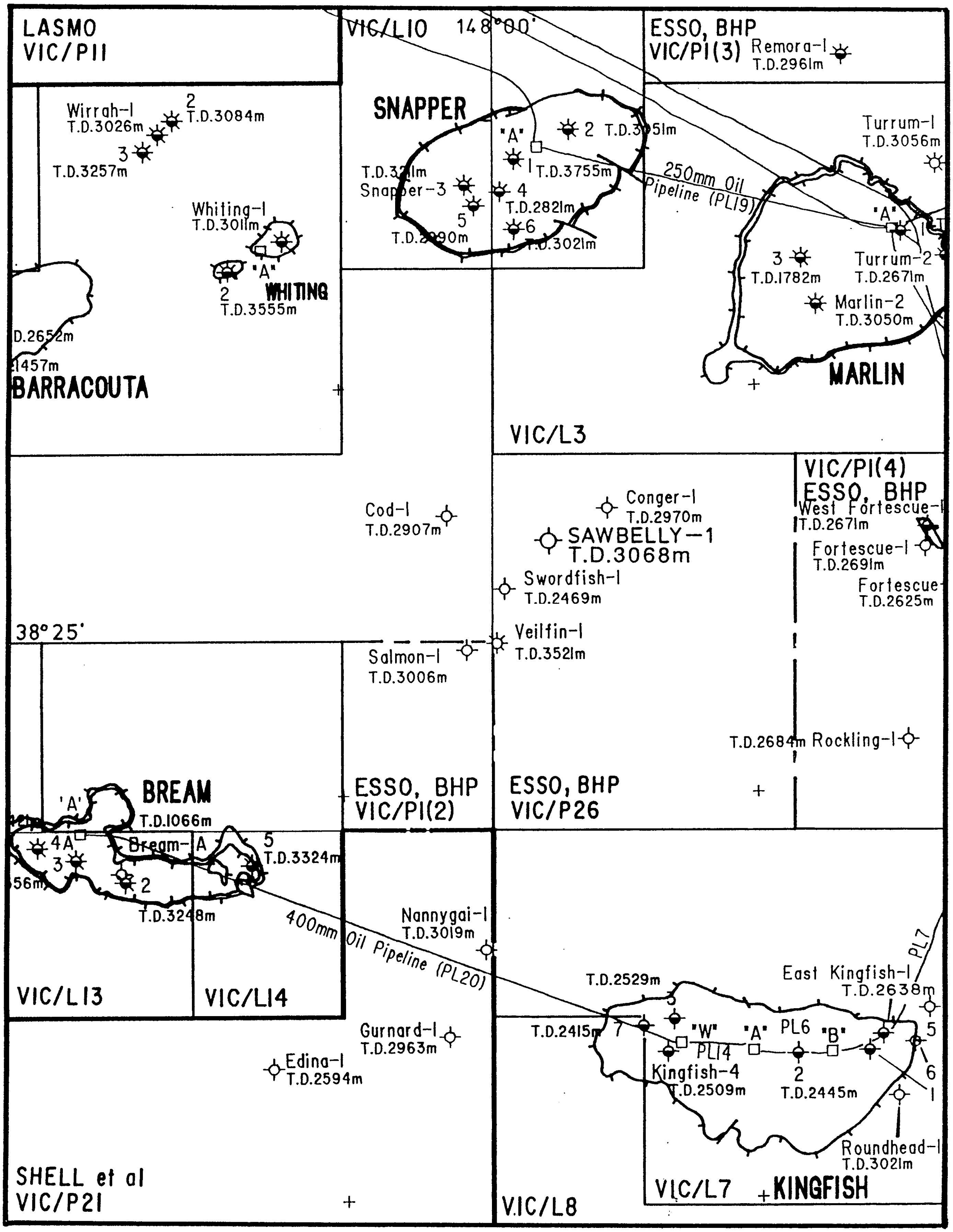
6. DISCUSSION

Sawbelly-1 encountered both good quality sandstones and lithologies capable of providing top seal. Regional correlations suggest that the sandstones below -2803mSS are regionally extensive as are the sealing units. Geochemical analysis suggests that the section below -3000mSS is early mature and capable of generating hydrocarbons. The regionally extensive sands should provide excellent migration pathways from additional source areas off structure.

The most likely reason for the failure of the Sawbelly-1 well to encounter hydrocarbons is a lack of fault seal along the north bounding fault.

FIGURES

SAWBELLY-1
Location Map
Scale 1: 250 000



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APPENDIX I

APPENDIX-1

PALYNOLOGICAL ANALYSIS OF SAWBELLY-1
GIPPSLAND BASIN.

by

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INTERPRETED DATA

INTRODUCTION

SUMMARY OF RESULTS

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INTRODUCTION

Twenty-nine sidewall core samples were processed from Sawbelly-1 and examined for spores, pollen and microplankton. Although oxidized organic residue yields were mostly high the palynomorph concentrations were mostly moderate to low. Consequentially only moderate spores and pollen diversities were recorded from the majority of samples. Average diversity was 20.2 species per sample. A few samples from the Early Eocene section did, however, contain high diversity assemblages. Low spore-pollen diversity correlates directly to the poorer preserved samples. Microplankton, principally dinoflagellates cysts, were present in about two-thirds of the samples with the most diverse assemblages being identified from the Gurnard Formation. Microplankton diversity is mainly low. Preservation of all palynomorphs was mostly poor.

Lithological units and palynological zones from base of Lakes Entrance Formation to T.D. are given in the following summary. Interpretative data with indentification of zones and confidence ratings are recorded in Table-1 and basic data on residue yields, preservation and diversity are recorded in Table-2. All species which can be identified with binomial names are tabulated on the accompanying range chart.

PALYNOLOGICAL SUMMARY OF SAWBELLY-1

AGE	UNIT/FACIES	SPORE-POLLEN ZONES (Dinoflagellate Zones)	DEPTH RANGE (mKB)
Oligocene	Lakes Entrance	*P. tuberculatus*	1976.0-1983.0
	1984.0m		
Late Eocene	Latrobe Group (Gurnard Fm.)	Middle *N. asperus*	1989.0-1994.0
		(*G. extensa*)	(1989.0)
		(*C. incompositum*)	(1994.0)
Middle Eocene		Lower *N. asperus*	2000.0
	2015.5m		
Middle Eocene	Latrobe Group (Transition Beds)	Lower *N. asperus*	2023.0
	2037.0m		
Early Eocene	Latrobe Group	*P. asperopolus*	2041.0-2116.8
Early Eocene	(Coarse clastic facies)	Upper *M. diversus*	2144.7-2223.0
Early Eocene		Middle *M. diversus*	2275.0-2331.0
Early Eocene		Lower *M. diversus*	2417.0-2438.0
		(*A. hyperacanthum*)	(2438.0)
Paleocene		*L. balmei*	2531.0-2639.5
		(*A. homomorphum*)	(2531.0)
Paleocene		Lower *L. balmei*	2838.0-3022.5
	T.D. 3069.5m		

GEOLOGICAL COMMENTS

1. The deepest palynological samples in Sawbelly-1, although poorly preserved and containing only meager assemblages, indicate that the well at total depth is still with in the Paleocene Lower *L. balmei* Zone. These deepest assemblages do not contain either *T. longus* Zone indicator species or the abundance of *Gambierina rudata* which is so characteristic of the top of the latter zone. Similarly no key dinoflagellates were recorded. On this evidence it is therefore suggested that no equivalents to the T-1 Shale which straddle the Cretaceous/Tertiary boundary were reached in Sawbelly-1.

2. In the Conger-1 palynological report the Latrobe Group was sudivided into informal lithological units (Partridge, 1989). The equivalent units in Sawbelly-1 are as follows:

UNIT	SAWBELLY-1 Depth	SAWBELLY-1 Thickness	CONGER-1 Depth	CONGER-1 Thickness
Gurnard Formation	1984m	31.5m	1814m	17m
Transition beds	2015.5m	21.5m	1831m	13m
Upper Sands	2037m	201m	1844m	181m
Coal Measures	2238m	41m	2025m	30m
Top Coastal Plain facies	2279m	601m	2279m	555m
Lower Sands	2880m	188m+	2610m	269m
Bottom Coastal Plain facies	NA		2879m	91m+

NA = Not Penetrated

3. The top of the Gurnard Formation in Sawbelly-1 is picked at the sharp increase on the gamma-ray log at 1984m which also corresponds to an increased separation between the neutron porosity and bulk density logs compared to the overlying Lakes Entrance Formation. The base of the Gurnard Formation is picked at 2015.5m corresponding to a reduction on the gamma-ray log and a decrease in

the separation between the neutron porosity and bulk density logs. The sidewall cores through this 31.5 metre thick unit all contain glauconite. As thus delimited it is equivalent to the Gurnard Formation as recognised in Conger-1 between 1814-1831m (Partridge, 1989), but only equivalent to Unit A of the Gurnard Formation in Swordfish-1 between 1998.9-2030.0m (6558-6660ft) of Partridge (1977). The microplankton assemblages present in the samples suggest that only part of the Lower and Middle *N. asperus* Zones are represented.

The unit between 2015.5-2037m is considered to represent "Transition Beds" between the Gurnard Formation with glauconite and the undifferentiated coarse reservoir facies of the Latrobe Group. These Transition Beds are characterised by lower gamma-ray log response and moderate but variable separation between the neutron porosity and bulk density logs. The lithology of the single sidewall recovered from this unit at 2023m was a iron stained silty sandstone suggestive of a oxidised "Gurnard facies". It contained a poor Lower *N. asperus* age flora. This unit is considered equivalent to the Transition beds in Conger-1 between 1831-1844m (see Partridge, 1977), and the lower Unit B of the Gurnard Formation in Swordfish-1 between 2030.0-2045.2m (6660-6710ft).

BIOSTRATIGRAPHY

Zone and age-determinations have been made using criteria proposed by Stover & Partridge (1973, 1982), Helby *et al.* (1987) and unpublished observations made on Gippsland Basin wells drilled by Esso Australia Ltd.

Author citations for most spore-pollen species can be sourced from Stover & Partridge (1973, 1982), Helby *et al.* (1987) and Dettmann & Jarzen (1988) or other references cited herein. Species names followed by "ms" are unpublished manuscript names. Author citations for dinoflagellates can be found in Lentin & Williams (1985, 1989).

Lower *Lygistepollenites balmei* Zone: 2838.0-3022.5 metres Paleocene.

The five samples assigned to this zone are all poorly preserved, and mainly as a consequence of this palynomorph concentrations are low. Key zone species are therefore rare and it proved difficult to estimate the relative abundance of the principal species in the assemblages. The absence of either species typical of the *T. longus* Zone, or any abundance of *Gambierina rudata*, are the main reasons for assigning the two deepest sidewall cores to the Lower *L. balmei* Zone, albeit with low confidence ratings. The sidewall core at 2977.0m is the deepest high confidence pick for the base of the zone based on the presence of *Proteacidites angulatus*. Other significant species are the common occurrence of *Australopollis obscurus* at 2860.0m, and the presence of fragmented specimens of dinoflagellate *Glaphrocysta retiintexta* at 2838.0m.

Lygistepollenites balmei Zone: 2531.0-2629.5 metres Paleocene.
and
Apectodinium homomorphum Zone: 2531.0 metres Paleocene.

The two samples in this interval although confidently *L. balmei* Zone in age cannot be definitively assigned to either the Upper or Lower subdivisions because of the lack of key spore-pollen species. The rare presence of the dinoflagellate *Apectodinium homomorphum* (short spined variety) in the shallower sample suggest that it most likely represents the Upper subdivision based on association of this dinoflagellate with key spore-pollen species of the Upper subdivision in other wells.

Lower *Malvacipollis diversus* Zone: 2417.0-2438.0 metres Early Eocene.
and
Apectodinium hyperacanthum Zone: 2438.0 metres Early Eocene.

The base of the zone is picked on an abundance of *Malvacipollis diversus* and the FADs (First Appearance Datums) of the spores *Crassiretitriletes vanraadshoovenii* and *Polypodiaceoisporites varus* ms, and the palm pollen *Spinozonocolpites prominatus*. These latter three species are all considered to be derived from plants growing in mangrove environments. Also present is a species of *Spinozonocolpites* characterised by gemmate rather than baculate ornament which has previously only been recorded in Australia from the Tertiary of northern Australia (eg. species recorded as *Gemmamonocolpites* sp. by Hekel 1972, pl.3, fig.23). The shallower samples assigned to the zone are all characterised by frequent *Proteacidites grandis* but rely on the of absence of key species characteristic of the next younger zone for their assignment to the Lower subzone. A rare but significant species is *Myrtaceoipollenites australis* Harris 1965, recorded from the sample at 2417.0m.

The deepest sample, at 2438.0m, also contains a microplankton assemblage referable to the *Apectodinium hyperacanthum* Zone. The key indicators for the zone are the eponymous species and *Fibrocysta bipolare*. The diversity of the assemblage is considerably higher than recorded, but unfortunately most of the species are too poorly preserved to be properly identified. The shallowest sample, at 2417.0m, also contained dinoflagellates but again poor preservation hampered full identification of the assemblage.

Middle *Malvacipollis diversus* Zone: 2331.0-2275.0 metres Early Eocene.

This interval is assigned to the Middle subdivision of the *M. diversus* Zone based on the FAD of *Proteacidites tuberculiformis* in the deepest sample. Other species whose usual FADs are in this zone are *Polycolpites esobalteus* identified at 2331.0m and 2275.0m and *Proteacidites nasus* Truswell & Owen 1988 identified at 2301.0m. The shallowest sample also contains the dinoflagellates association of common *Homotryblium tasmaniense* with abundant *Apectodinium longispinosum* which is generally considered typical of the younger Upper *M. diversus* and *P. asperopolus* Zones. However, after considerable searching neither of the key species *Proteacidites pachypolus* or *Myrtaceidites tenuis* could be found.

Upper *Malvacipollis diversus* Zone: 2144.7-2223.0 metres Early Eocene.

The base of this zone is picked at the FAD of *Poteacidites pachypolus* at 2223.0m. The other key species used to indicate the base of this zone is *Myrtaceidites tenuis* whose FAD occurs in the shallowest sample at 2144.7m. The base of the *P. pachypolus* abundance or Acme is in the middle sample at 2156.0m. Abundant specimens of the dinoflagellate *Apectodinium longispinosum* also characterise the shallowest sample.

Proteacidites asperopolus Zone: 2041.0-2116.8 metres Early Eocene.

The lower boundary of this zone is placed at the FADs for *Conbaculites apiculatus* and *Sapotaceoidaepollenites rotundus*, below the FAD for *Proteacidites asperopolus* in the next deepest sample at 2066.8m. The upper boundary is placed at the LAD (Last Appearance Datum) for *Myrtaceidites tenuis*. Unlike in the adjacent Conger-1 well (Partridge, 1989) the *P. pachypolus* abundance or Acme does not extend to the top of the zone but is characteristic of the deeper two samples. Of considerable interest is the generally rare index species for the zone *Bombacacidites bombaxoides* at 2116.8m, *Clavastephanocolporites meleosus* ms at 2066.8m, and *Triporopollenites simplis* Truswell & Owen 1988 (= *Triporopollenites spinosus* ms) at 2041.0m and 2066.8m. Other interesting species in the samples, but of no zone significance, are the records of single specimens of the fresh-water megaspore *Azolla* sp. at 2116.8m, the distinctive pollen *Anisotricolporites triplaxis* at 2041.0m and a closely related species *Anisotricolporites* sp. cf. *A. truncatus* Pocknall & Mildenhall 1984, at 2066.8m.

The only significant dinoflagellate in the zone is the occurrence of rare specimens of *Apectodinium longispinosum* in the deepest sample.

Lower *Nothofagidites asperus* Zone: 2000.0-2023.0 metres Middle Eocene.

The base of the zone is picked at 2023.0m on the increase in abundance of *Nothofagidites* spp. above the LAD of *M. tenuis*. However, in the absence of key indicator species known to first occur in the Lower *N. asperus* Zone only a low confidence rating can be assigned to the sample. The shallower sample at 2000.0m although clearly no older than this zone based on the

FAD of *Nothofagidites falcatus* is also only given a low confidence rating because the associated microplankton assemblage has closer similarities to assemblages from the Middle rather than Lower subdivision of the *N. asperus* Zone. The dinoflagellates suggesting a younger age are the frequent to common occurrence of the species *Operculodinium centrocarpum, Phthanoperidinium comatum* and *Areosphaeridium* sp. cf. *A. capricornum.* Given the presence of the last species it is noted that no specimens which could be confidently identified as *Areosphaeridium australicum* ms (= *Areosphaeridium* sp. cf. *A. diktyoplokus* of Marshall & Partridge 1987) could be found in any of the palynological slides.

Middle *Nothofagidites asperus* Zone: **1989.0-1994.0 metres** **Late Eocene.**

Two samples are assigned to this zone on their microplankton content as the associated spores and pollen while supportive are not particularly diagnostic of the zone. Key dinoflagellate species are *Corrudinium incompositum* and *Areosphaeridium capricornum* at 1994.0m and *Gippslandica extensa* associated with abundant *Tectactodinium marlum* ms at 1989.0m.

The *Gippslandica extensa* Zone was informally proposed (as the *Deflandrea extensa* Zone) in Partridge (1976). It is typically characterised by abundances of the nominated species in "coastal plain" environments, and is best developed in wells to the west and north of the Sawbelly-1 location. However, *G. extensa* is not characteristic of the coeval "shelfal marine" environments of the Gurnard Formation developed to the east and south of the Sawbelly-1 location and therefore the *Corrudinium incompositum* Zone has been used as an alternative name. The *G. extensa* and *C. incompositum* Zones have therefore been treated as time equivalent but representative of different environments. The occurrence of the *G. extensa* Zone above the *C. incompositum* Zone in Sawbelly-1 suggest the alternative interpretation that the "typical" development of the *G.extensa* Zone lies above the *C. incompositum* Zone.

Proteacidites tuberculatus Zone: 1976.0-1983.0 metres Oligocene.

The two samples are confidently assigned to the *P. tuberculatus* Zone based on the occurrence of the spore *Cyatheacidites annulatus* in both samples. Both assemblages are dominated by dinoflagellates consistent with the open marine environment of the Lakes Entrance Formation. Of particular interest is the first record in Australia of the unique dinoflagellate

Evittosphaerula paratabulata Manum 1979 from the sample at 1983.0m. This dinoflagellate cyst is characterised by consisting solely of a parasutural network of wall material whose strands define a standard gonyaulacaecean paratabulation. The stratigraphic range of this species given in Manum (1979) is late Middle Oligocene to Early Miocene.

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TABLE-1: INTERPRETATIVE PALYNOLOGICAL DATA SAWBELLY-1, GIPPSLAND BASIN

SAMPLE TYPE	DEPTH (metres)	SPORE-POLLEN ZONE	DINOFLAGELLATE ZONE	CONFIDENCE RATING	COMMENT
SWC 60	1976.0	*P. tuberculatus*		1	
SWC 59	1983.0	*P. tuberculatus*		0	*Evittosphaerula paratabulata* present.
SWC 58	1989.0	Middle *N. asperus*	*G. extensa*	2	Abundant *Tectatodinium marlum* ms.
SWC 57	1994.0	Middle *N. asperus*	*C. incompositum*	1	
SWC 56	2000.0	Lower *N. asperus*		2	
SWC 54	2011.0	Indeterminate			
SWC 53	2023.0	Lower *N. asperus*		2	LAD *Proteacidites asperopolus*
SWC 52	2041.0	*P. asperopolus*		1	LAD *Myrtaceidites tenuis*.
SWC 51	2066.8	*P. asperopolus*		1	*Clavastephanocolporites meleosus* ms present.
SWC 49	2116.8	*P. asperopolus*	(*A. longispinosum*)	1	*Bombacacidites bombaxoides* present.
SWC 48	2144.7	Upper *M. diversus*	(*A. longispinosum*)	2	Fossils badly pyrite pitted.
SWC 47	2156.0	Upper *M. diversus*		1	Base *Proteacidites pachypolus* Acme.
SWC 46	2223.0	Upper *M. diversus*		1	
SWC 43	2275.0	Middle *M. diversus*	(*A. longispinosum*)	2	Fossils badly pyrite pitted.
SWC 42	2301.0	Middle *M. diversus*	(*A. longispinosum*)	2	
SWC 41	2309.0	Indeterminate			Most fossils probably contaminants.
SWC 40	2331.0	Middle *M. diversus*		1	FAD *Proteacidites tuberculifomis*.
SWC 35	2417.0	Lower *M. diversus*		2	*Mytaceoipollenites australis* present.
SWC 34	2423.0	Lower *M. diversus*		1	
SWC 33	2431.0	Indeterimate			Virtually barren.
SWC 32	2438.0	Lower *M. diversus*	*A. hyperacanthum*	0	
SWC 29	2531.0	*L. balmei*	*A. homomorphum*	1	
SWC 25	2639.5	*L. balmei*		1	
SWC 16	2822.0	Indeterminate			
SWC 15	2838.0	Lower *L. balmei*	(*G. retiintexta*)	2	
SWC 14	2860.0	Lower *L. balmei*		1	
SWC 5	2977.0	Lower *L. balmei*		1	*Proteacidites angulatus* present.
SWC 2	3008.0	Lower *L. balmei*		2	
SWC 1	3022.5	Lower *L. balmei*		2	

LAD = Last Appearance Datum
FAD = First Appearance Datum

P A L Y N O L O G Y   D A T A   S H E E T

B A S I N: *GIPPSLAND* ELEVATION: KB: *+21.0m* GL: *-63.0m*

WELL NAME: *SAWBELLY-1* TOTAL DEPTH: *3068m*

AGE	PALYNOLOGICAL ZONES	HIGHEST DATA					LOWEST DATA				
		Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time	Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time
NEOGENE	*T. pleistocenicus*										
	M. lipsis										
	C. bifurcatus										
	T. bellus										
PALEOGENE	*P. tuberculatus*	1976	1				1983	0			
	Upper *N. asperus*										
	Mid *N. asperus*	1989	2				1994	1			
	Lower *N. asperus*	2000	2				2023	2			
	P. asperopolus	2041	1				2116.8	1			
	Upper *M. diversus*	2144.7	2	2156	1		2223	1			
	Mid *M. diversus*	2275	2				2331	1			
	Lower *M. diversus*	2417	2	2423	1		2438	0			
	Upper *L. balmei*										
	Lower *L. balmei*	2838	2	2860	1		3022.5	2	2977	1	
LATE CRETACEOUS	Upper *T. longus*										
	Lower *T. longus*										
	T. lilliei										
	N. senectus										
	T. apoxyexinus										
	P. mawsonii										
	A. distocarinatus										
EARLY CRET.	*P. pannosus*										
	C. paradoxa										
	C. striatus										
	C. hughesi										
	F. wonthaggiensis										
	C. australiensis										

COMMENTS: *Dinoflagellate Zones: G. extensa 1989m; C. incompositum 1994m; A. hyperacanthum 2438m; A. homomorphum 2531m; Top sample from L. balmei Zone is at 2531m; but assignment to Upper or Lower subdivision is not possible. All depths in metres.*

CONFIDENCE RATING:
- O: SWC or Core, Excellent Confidence, assemblage with zone species of spores, pollen and microplankton.
- 1: SWC or Core, Good Confidence, assemblage with zone species of spores and pollen or microplankton.
- 2: SWC or Core, Poor Confidence, assemblage with non-diagnostic spores, pollen and/or microplankton.
- 3: Cuttings, Fair Confidence, assemblage with zone species of either spores and pollen or microplankton, or both.
- 4: Cuttings, No Confidence, assemblage with non-diagnostic spores, pollen and/or microplankton.

NOTE: If an entry is given a 3 or 4 confidence rating, an alternative depth with a better confidence rating should be entered, if possible. If a sample cannot be assigned to one particular zone, then no entry should be made, unless a range of zones is given where the highest possible limit will appear in one zone and the lowest possible limit in another.

DATA RECORDED BY: *A.D. Partridge* DATE: *June 1990.*

DATA REVISED BY: ____________ DATE: ____________

BASIC DATA

TABLE-2: BASIC DATA

RANGE CHART

TABLE-2: BASIC PALYNOLOGICAL DATA SAWBELLY-1, GIPPSLAND BASIN

SAMPLE TYPE	DEPTH (metres)	LAB. NO.	LITHOLOGY	RESIDUE YIELD	PALYNOMORPH CONCENTRATION	PRESERVATION	NO. OF S-P SPECIES*	MICROPLANKTON ABUNDANCE	NO. SPECIES*
SWC 60	1976.0	78352 H	Calcareous claystone	Very low	Low	Poor-good	9+	Low	4+
SWC 59	1983.0	78352 G	Calcareous claystone	Moderate	Moderate	Poor-good	15+	Moderate	8+
SWC 58	1989.0	78352 F	Glauconitic claystone	Low	Moderate	Poor-fair	21+	Moderate	4+
SWC 57	1994.0	78352 E	Glauconitic claystone	Moderate	Low	Fair	13+	Moderate	9+
SWC 56	2000.0	78352 D	Calc. quartz sst. (tr. glauc.)	Low	Moderate	Poor-fair	26+	Moderate	8+
SWC 54	2011.0	78352 B	Glauconitic sandstone	Very low	Barren				
SWC 53	2023.0	78352 A	Oxidised brown sandstone	Low	High	Good	38+	Low	5+
SWC 52	2041.0	78351 Z	Mottled sandstone	High	Modertae	Fair-good	34+	Very low	2+
SWC 51	2066.8	78351 Y	Carbonaceous sandstone	Moderate	High	Good	57+		
SWC 49	2116.8	78351 W	Mottled sandstone	High	High	Good	36+	Moderate	5+
SWC 48	2144.7	78351 V	Laminated siltstone	High	Moderate	Poor-fair	19+	Moderate	1
SWC 47	2156.0	78351 U	Chocolate brown mudstone	High	High	Fair	26+		
SWC 46	2223.0	78351 T	Medium brown siltstone	High	Very low	Poor-fair	7+		
SWC 43	2275.0	78351 Q	Micaceous/carbonaceous sltst	High	Moderate	Poor	23+	Moderate	5+
SWC 42	2301.0	78351 P	Interbedded sst./siltst.	High	Moderate	Poor-fair	30+	Low	1
SWC 41	2309.0	78351 O	White-light grey sandstone	Low	Low	Fair	11+		
SWC 40	2331.0	78351 N	Siltstone	High	Moderate	Fair	32+		
SWC 35	2417.0	78351 I	Carbonaceous sandstone	Low	Moderate	Poor-good	28+	Very low	3
SWC 34	2423.0	78351 H	Massive pyritic mudstone	High	Moderate	Poor	20+	Low	3+
SWC 33	2431.0	78351 G	Very fine grained sandstone	Very low	Very low	Fair	3		
SWC 32	2438.0	78351 F	Massive mudstone	High	High	Poor-fair	20+	Abundant	6+
SWC 29	2531.0	78351 C	Interbedded sst./siltst.	High	Low	Poor	13+	Low	1
SWC 25	2639.5	78350 Y	Massive mudstone	High	Low	Poor	20+		
SWC 16	2822.0	78350 P	Siltstone	High	Very low	Poor	2+	Very low	1
SWC 15	2838.0	78350 O	Very fine grained sandstone	High	Very low	Very poor	7+	Low	2
SWC 14	2860.0	78350 N	Carbonaceous mudstone	High	Moderate	Poor-fair	13+		
SWC 5	2977.0	78350 R	Siltstone	High	Low	Very poor	18+		
SWC 2	3008.0	78350 B	Carbonaceous siltstone	High	Low	Very poor	13+		
SWC 1	3022.5	78350 A	Carbonaceous siltstone	High	Low	Very poor	12+		

* Diversity:
Very Low = 1- 5 species
Low = 6-10 species
Moderate = 11-25 species
High = 26-74 species
Very High = 75+ species

PE900807

This is an enclosure indicator page.
The enclosure PE900807 is enclosed within the container PE902096 at this location in this document.

The enclosure PE900807 has the following characteristics:

ITEM_BARCODE =	PE900807
CONTAINER_BARCODE =	PE902096
NAME =	Palynological Range Chart
BASIN =	GIPPSLAND
PERMIT =	VIC/P26
TYPE =	WELL
SUBTYPE =	DIAGRAM
DESCRIPTION =	Palynological Range Chart for Sawbelly-1
REMARKS =	
DATE_CREATED =	30/06/90
DATE_RECEIVED =	
W_NO =	W1022
WELL_NAME =	SAWBELLY-1
CONTRACTOR =	
CLIENT_OP_CO =	ESSO AUSTRALIA LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)

APPENDIX 2

APPENDIX 2

SAWBELLY 1

QUANTITATIVE LOG ANALYSIS

Interval: 2000-3050m MDKB
Analyst : A.R. Gilby
Date : April, 1990

(04900231)

SAWBELLY 1

QUANTITATIVE LOG ANALYSIS

CONTENTS

Logs Used

Analysis Methodology

Analysis Parameters

Discussion

Analysis Summary Table (Net and Gross Sand - MDKB)

Appendix I: Algorithms and logic used in the quantitative analysis

Enclosure:

SOLAR Depth Plot (MDKB)

(04900231)

SAWBELLY 1
QUANTITATIVE LOG ANALYSIS

Wireline log data from the Sawbelly 1 well have been quantitatively analysed over the interval 2000-3050m MDKB for effective porosity and effective water saturation. Results are presented in the form of the accompanying tabular listing and depth plot and are summarised and discussed below. Sawbelly 1 intersected no hydrocarbon bearing intervals.

LOGS RUN		LOGS USED	
SP	(spontaneous potential)	CALI	(caliper)
CALI	(caliper)	GR	(gamma ray)
GR	(gamma ray)	LLD	(deep laterolog)
LLD	(deep laterolog)	RHOB	(bulk density)
LLS	(shallow laterolog)	DRHO	(density correction)
MSFL	(micro-spherically focussed log)	NPHI	(neutron porosity)
RHOB	(bulk density)		
DRHO	(density correction)		
NPHI	(neutron porosity)		
DT	(sonic)		

No log quality control problems were encountered apart from relatively minor washouts which adversely affected the density log.

ANALYSIS METHODOLOGY

Apparent total porosity and shale volume was calculated using density-neutron crossplot algorithms.

Water saturations were determined from the dual water relationship. Effective porosities and water saturations were derived from the apparent total porosity and water saturation, calculated shale volume and apparent shale porosity.

ANALYSIS PARAMETERS

Esso Australia Logic Model	: K12 (option 1)
Tortuosity "a"	: 1.00
Cementation factor "m"	: 2.00
Saturation exponent "n"	: 2.00
Fluid density (rhof)	: 1.00
Gamma Ray value in clean formation (grmin)	: 40 gapi
Gamma Ray value in shale (grmax)	: 160 gapi
Shale Resistivity (Rsh)	: 20 ohmm
Apparent bulk density of shale (RHOBSH)	: 2.65 g/cc
Apparent neutron porosity of shale (PHINSH)	: 0.33
Lower limit of grain density	: 2.645 g/cc
Upper limit of grain density	: 2.675 g/cc
Measured Rmf	: 0.24 ohmm
Temperature at which Rmf measured	: 24°C
AMS used?	: No
Total Depth	: 3070 m
BHT	: 94°C
Sea bed/Surface temperature	: 10°C
Water depth/GL	: 84 m
KB height	: 21 m
Irreducible water saturation	: 0.025
Vsh upper limit for effective porosity	: 0.65
PHIE minimum for hydrocarbons	: 0.03
Salinity	: 2000-2270m 50,000ppm
	: 2271-2875m 30,000ppm
	: 2876-3050m 20,000ppm

DISCUSSION

No mudlog or electric log anomalies were encountered in Sawbelly 1. Correspondingly the well was plugged and abandoned.
(04900231)

SAWBELLY_1

ANALYSIS SUMMARY.

Net porosity cut-off..........: 0.100 volume per volume

Net Porous Interval based on Porosity cut-off only.

	GROSS INTERVAL (metres) (top) -(base)	Gross Metres	NET POROUS INTERVAL Net Metres	Net to Gross	Mean Vsh	(Std.) (Dev.)	Mean Porosity	(Std.) (Dev.)
MDKB	2013.3-2037.5	24.2	14.4	60 %	0.281	(0.098)	0.149	(0.029)
MDKB	2041.2-2043.7	2.5	2.5	100 %	0.115	(0.143)	0.157	(0.032)
MDKB	2045.6-2048.4	2.8	2.8	100 %	0.105	(0.138)	0.206	(0.014)
MDKB	2051.6-2064.9	13.3	13.1	99 %	0.090	(0.081)	0.213	(0.031)
MDKB	2068.0-2147.9	79.9	78.1	98 %	0.043	(0.085)	0.207	(0.035)
MDKB	2156.3-2219.6	63.4	62.9	99 %	0.071	(0.087)	0.206	(0.032)
MDKB	2221.8-2237.6	15.9	15.9	100 %	0.090	(0.096)	0.208	(0.034)
MDKB	2239.7-2242.6	2.9	2.3	81 %	0.192	(0.147)	0.185	(0.047)
MDKB	2255.1-2264.1	9.0	2.8	31 %	0.144	(0.122)	0.166	(0.032)
MDKB	2283.1-2287.8	4.7	2.8	61 %	0.220	(0.153)	0.176	(0.049)
MDKB	2295.2-2305.1	9.9	6.7	68 %	0.163	(0.127)	0.182	(0.044)
MDKB	2307.6-2319.3	11.6	8.8	76 %	0.073	(0.086)	0.226	(0.040)
MDKB	2340.4-2354.1	13.7	6.4	47 %	0.273	(0.111)	0.136	(0.032)
MDKB	2360.2-2370.3	10.1	6.0	60 %	0.242	(0.121)	0.133	(0.029)
MDKB	2372.6-2388.4	15.8	9.5	61 %	0.164	(0.136)	0.168	(0.054)
MDKB	2398.6-2413.0	14.4	9.8	69 %	0.137	(0.067)	0.165	(0.035)
MDKB	2458.9-2488.9	30.0	24.4	81 %	0.123	(0.093)	0.168	(0.034)
MDKB	2509.1-2516.6	7.5	2.7	37 %	0.147	(0.074)	0.142	(0.029)
MDKB	2523.8-2531.6	7.9	2.0	25 %	0.224	(0.063)	0.118	(0.006)
MDKB	2683.4-2692.8	9.4	5.0	53 %	0.137	(0.091)	0.139	(0.020)
MDKB	2827.5-2842.8	15.3	11.2	74 %	0.064	(0.068)	0.150	(0.028)
MDKB	2875.0-2892.9	17.9	14.0	78 %	0.059	(0.057)	0.152	(0.021)
MDKB	2896.6-2916.0	19.4	7.4	38 %	0.160	(0.064)	0.121	(0.015)
MDKB	2921.5-2928.2	6.7	4.7	71 %	0.062	(0.060)	0.145	(0.023)
MDKB	2930.3-2952.1	21.8	20.0	92 %	0.041	(0.035)	0.148	(0.013)
MDKB	2956.9-2972.7	15.8	12.0	76 %	0.043	(0.055)	0.142	(0.019)
MDKB	3022.6-3049.9	27.3	21.3	78 %	0.019	(0.032)	0.130	(0.015)

APPENDIX 1

ALGORITHMS & LOGIC USED IN THE QUANTITATIVE ANALYSIS

Initial Total Porosity and Shale Volume was calculated from the bulk density and neutron porosity log responses as follows:

```
vsh = ((nphi+0.04) - ((2.65-rhob)/(2.65-rhof)))/
      ((phinsh+0.04) - ((2.65-rhobsh)/(2.65-rhof)))
vsh = min(1,(max(0,vsh)))


h = (2.71-rhob) + (nphi*(rhof-2.71))
  if (h>=0)
    rhoma=2.71-(0.5*h)
  else
    rhoma=2.71-(0.64*h)
phit = max(0.001,(min(1,((rhoma-rhob)/(rhoma-rhof)))))
```

The Apparent Salinity profile was derived from aRw back-calculated in clean sands from Archie's equation, assuming 100% Sw.

Swt (total Water Saturation) was calculated using the dual water relationship

```
1/rt = (swt**n)*(phit**m)/(a*rw)+swt**(n-1)*(swb*(phit**m)/a)*((1/rwb)-(1/rw))
```

This is solved for Sw by Newtons solution:

```
exsw=0
sw  =0.9
aa  =((phit**m)/(a*rw))
bb  =((swb*(phit**m)/a)*((1/rwb)-(1/rw))
    repeat
      fx1=(aa*(sw**n))+(bb*(sw**(n-1)))-(1/rt)
      fx2=(n*aa*(sw**(n-1)))+((n-1)*bb*(sw**(n-2)))
         if((abs(fx2)) < 0.0001)
          fx2=0.0001
      swp=sw
      sw =swp-(fx1/fx2)
      exsw=exsw+1
    until (exsw > 4 or (abs(sw-swp)) <= 0.01)
swt=sw
```

Effective Porosity and Water Saturation were derived as follows:

```
if (vsh > vshco){
 swt  = 1
 swe  = 1
 phie = 0
}
else {
  phie= max(0.0,(phit-(vsh*phish)))
  swe = max(swirr,( 1 - ((phit/phie)*(1-swt))))
  if (vsh > (vshco-0.2)){
     phie= phie*((vshco-vsh)/0.2)
     swe = 1-((1-swe)*((vshco-vsh)/0.2))
  }
}
where vshco = 0.65
```

APPENDIX 3

APPENDIX 3

GEOCHEMICAL REPORT

ON

SAWBELLY 1

BY

B.J. BURNS

JUNE 1990

Analyses

H. Schiller

LIST OF TABLES AND FIGURES

Table 1 Total Organic Carbon Analyses, Sawbelly 1 sidewall cores.

Table 2 Rockeval Pyrolysis Analysis, Sawbelly 1 sidewall cores.

Figure 1 Depth Profile - TOC and Rockeval S2 results, Sawbelly 1.

Figure 2 Rockeval HI vs Tmax by Palaeo Zones, Sawbelly 1.

Figure 3 Maturity Profile, Rockeval Tmax vs Depth, Sawbelly 1.

Figure 4 Rockeval HI vs Tmax by Depositional Environments, Sawbelly 1.

INTRODUCTION

Sawbelly 1 was located approx. 4 km south-west of the Conger 1 well and it penetrated over a thousand meters of Latrobe Group sediments. Most of this Latrobe section consisted of thinly interbedded sands, siltstones and shales with numerous thin coalseams (< 5m). Twenty sidewall core (SWC) samples were selected for routine Total Organic Carbon and Rockeval geochemical analyses. No hydrocarbons were recovered from the well.

RESULTS

The twenty SWC samples were selected over the interval from 1983-3022.5m and included two from the Lakes Entrance and Gurnard Formations and the remaining eighteen from the Latrobe Group. The TOC and Rockeval results are presented in Tables 1 and 2 and Figure 1. Most of the samples were medium brown to brown siltstones and mudstones, often with visible carbonaceous fragments. The Lakes Entrance and Gurnard samples had TOC's less than 1.0% and are not considered as potential source rocks along with two of the Latrobe samples at 2252m and 2431m. Of the remaining samples, eleven have TOC's exceeding 2.0% and ranging up to 9.55% with two of the "coaly mudstones" having TOC's 17.21% and 32.57% These eleven samples would be rated as good to very rich source rocks.

The corresponding Rockeval results (Table 2) support the "poor" source rating of the two Lakes Entrance and Gurnard samples which had very low S2 yields and Hydrogen Indices. The seven Eocene M. diversus shales of the Latrobe Group exhibit a much richer source rating with five of the samples having S2 yields greater than 6 mg/g (S2 levels above 6 mg/g are rated as "good" source rocks). Of the ten Paleocene *L. balmei* samples five are rated as "good" sources including the two very carbonaceous (?coaly?) samples at 2957m and 2981m which had S2 yields in excess of 50 mg/g.

Of the eight samples with Hydrogen Indices greater than 250, two from the *M. diversus* and four from the *L. balmei* Zones (Fig 2) would be expected to yield oil and some gas (at peak maturity) while the remaining samples would be expected to yield mainly gas with minor liquids.

The Tmax values are low (less than 435) for samples down to approx. 3000m (Fig 3) which indicates that most of the penetratred section is immature with only the deepest samples approaching the early-mature stage.

ENVIRONMENT OF DEPOSITION

Lower Coastal Plain (LCP) is the major depositional environment represented in the sample suite (A.D.Partridge, 1990, Palynological Analysis of Sawbelly 1, this report). The Lower Coastal Plain/Beach setting is characterised by an interbedded package of coals (some seams occasionaly greater than 3m thick) sands and silts, perhaps similar to the present-day environment adjacent to the Gippsland coast. Proximity to the ancestral coast is recognised by the presence of occasional marine dinoflagellates which are believed to result from periodic marine inundations behind the coastline. In Sawbelly 1 all of the Latrobe Group samples below 2144.7m are representative of LCP with the exception of the *A. hyperacantha* sample at 2438m which represents the condensed marine shale at the base of the Lower *M.diversus* Zone. Since condensed marine shale units often provide good oil-prone source rocks the unexpectedly low TOC and Hydrogen Index values of the *A. hyperacantha* Zone (1.36% and 150 respectively) suggest that the bottom waters were sufficiently oxidised to destroy and degrade much of the organic matter, perhaps indicating relatively shallow water depths at this location.

Regardless of the age of the rocks, the Lower Coastal Plain environment in Sawbelly 1 (Fig 4) clearly contains many samples that would be regarded as excellent sources for oil (with some gas) if they were encountered in a more mature part of the basin.

SUMMARY

1. The *M. diversus* and *L. balmei* sediments in Sawbelly 1 consist mainly of Lower Coastal Plain depositional facies which contain many carbonaceous mudstone and siltstone intervals that are rated as very good sources for oil (with associated gas).

2. The condensed marine environment of the *A. hyperacantha* Zone is rated as only a fair-good gas source.

3. Most of the samples in the well are immature for significant hydrocarbon generation with only the samples below 3000m approaching the early mature zone.

REFERENCE

PARTRIDGE, A.D., 1990. Palynological analysis of Sawbelly 1, Gippsland Basin. *Esso Australia Ltd. Palaeo. Rept. 1990/11.*

(BJB155)

TABLE 1 **TOTAL ORGANIC CARBON**

WELL: SAWBELLY 1

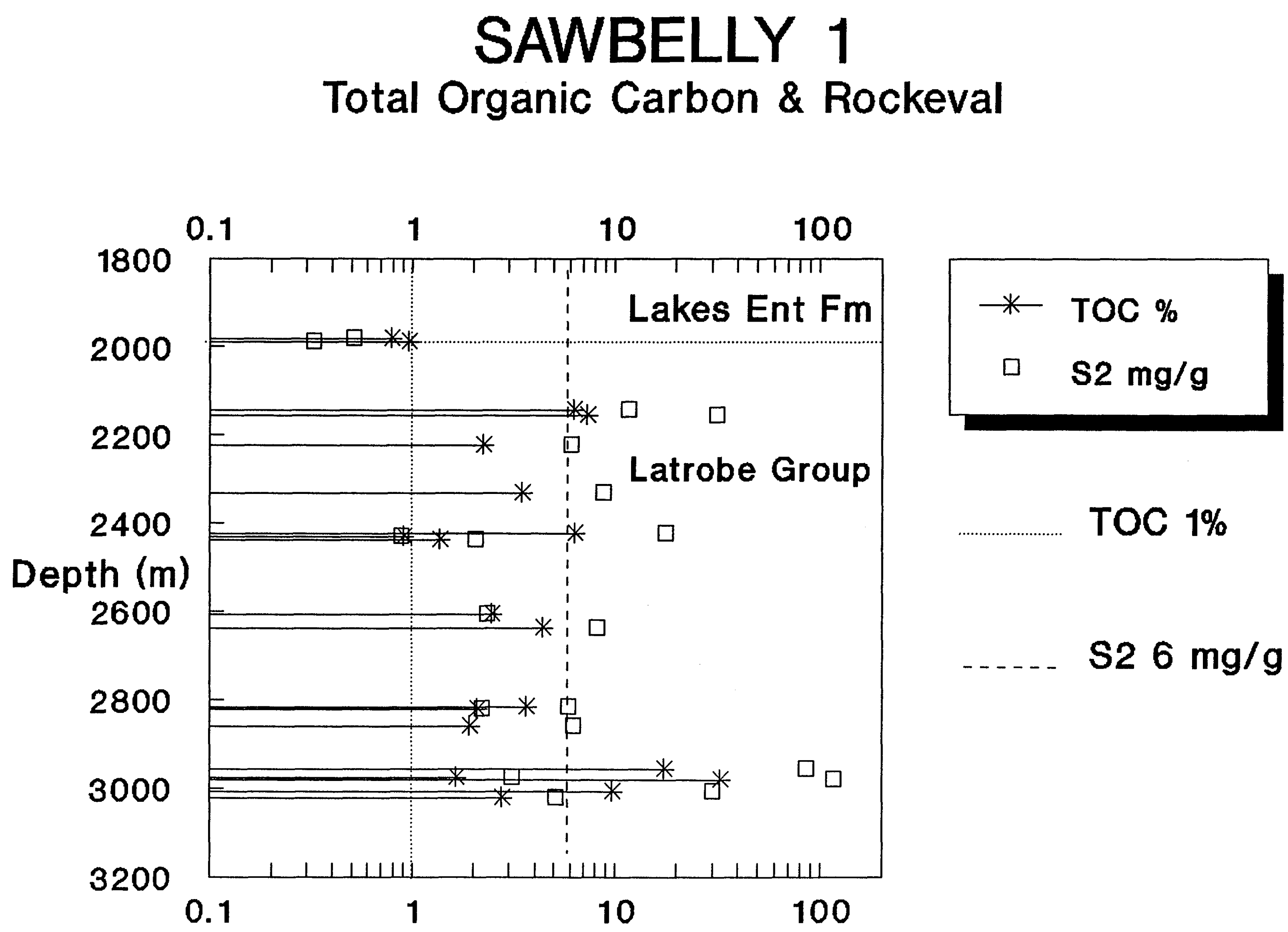
SAMPLE No.	DEPTH (m)	TYPE	AGE	ZONE	TOC %	CO3 %	DESCRIPTION
78352 G	1983.0	CRSW	Oligocene	Lakes Entr	0.78	34.73	MDSTN M GY, V CALC
78352 F	1989.0	CRSW	Eocene	Gurnard	0.96	18.75	MDSTN DK BRN, V CALC
78351 V	2144.7	CRSW	" "	U.M.diversus	6.18	4.75	SLTSTN M BRN, FIRM
78351 U	2156.0	CRSW	" "	" "	7.23	2.50	MDSTN DK CHOC BRN, CARB
78351 T	2223.0	CRSW	" "	" "	2.24	2.60	SLTSTN M BRN, FIRM MIC
78351 R	2252.0	CRSW	" "	M.M.diversus	0.29	4.52	SLTSTN LT GY, SOFT
78351 N	2331.0	CRSW	" "	" "	3.46	3.04	SLTSTN M BRN, CARB FRAGS
78351 H	2423.0	CRSW	" "	L.M.diversus	6.27	4.71	MDSTN V DK BRN, CARB FRAGS
78351 G	2431.0	CRSW	" "	" "	0.90	6.05	SST, LT GY, MICAC
78351 F	2438.0	CRSW	" "	A.hyperacantha	1.36	5.87	MDSTN M BRN, MASSIVE, MICAC
78350 Z	2607.0	CRSW	Paleocene	U.L.balmei	2.44	2.10	SLTSTN DK BRN
78350 Y	2639.5	CRSW	" "	L.balmei	4.35	4.13	MDSTN DK BRN, MASSIVE, MICAC
78350 Q	2817.5	CRSW	" "	L.L.balmei	3.63	4.54	SLTSTN M BRN, CARB, MICAC
78350 P	2822.0	CRSW	" "	" "	2.08	6.88	SLTSTN M BRN, MICAC
78350 N	2860.0	CRSW	" "	" "	1.92	2.63	MDSTN M BRN, SOFT-FIRM
78350 F	2957.0	CRSW	" "	" "	17.21	0.89	COALY MDSTN DK BRN-BLK
78350 E	2977.0	CRSW	" "	" "	1.65	5.69	SLTSTN LT-M BRN, MICAC
78350 D	2981.0	CRSW	" "	" "	32.57	1.29	COALY MDSTN DK BRN-BLK
78350 B	3008.0	CRSW	" "	" "	9.55	1.89	SLTSTN/MDSTN M-DK BRN, CARB
78350 A	3022.5	CRSW	" "	" "	2.75	8.51	SLTSTN DK BRN, CARB, MICAC

TABLE 2 # ROCKEVAL REPORT

WELL: SAWBELLY 1

SAMPLE NO.	DEPTH (m)	TYPE	TOC %	Tmax	S1 mg/g	S2 mg/g	S3 mg/g	HI	OI	HI/OI	ENVIRONMENT
78352 G	1983.0	CRSW	0.78	421	0.04	0.51	0.10	65	13	5.20	Open Marine
78352 F	1989.0	CRSW	0.96	427	0.03	0.32	0.28	33	30	1.11	Marine
78351 V	2144.7	CRSW	6.18	421	0.58	11.41	0.45	185	7	25.49	Nearshore Marine
78351 U	2156.0	CRSW	7.23	429	2.06	31.17	0.71	431	10	43.79	Lower Coastal Plain
78351 T	2223.0	CRSW	2.24	425	0.51	6.03	0.18	269	8	34.39	" " "
78351 N	2331.0	CRSW	3.46	425	0.54	8.61	0.44	249	13	19.73	" " "
78351 H	2423.0	CRSW	6.27	431	1.24	17.50	0.85	279	14	20.63	" " "
78351 G	2431.0	CRSW	0.90	432	0.20	0.87	0.80	97	89	1.09	" " "
78351 F	2438.0	CRSW	1.36	426	0.28	2.04	0.24	150	17	8.68	Condensed Marine
78350 Z	2607.0	CRSW	2.44	432	0.24	2.31	0.17	95	7	13.88	Lower Coastal Plain
78350 Y	2639.5	CRSW	4.35	434	0.57	8.07	0.29	186	7	28.07	" " "
78350 Q	2817.5	CRSW	3.63	433	0.44	5.79	0.21	160	6	27.59	" " "
78350 P	2822.0	CRSW	2.08	433	0.34	2.17	0.31	104	15	7.06	" " "
78350 N	2860.0	CRSW	1.92	437	0.56	6.17	0.30	322	16	20.45	" " "
78350 F	2957.0	CRSW	17.21	432	6.17	84.28	2.90	490	17	29.02	" " "
78350 E	2977.0	CRSW	1.65	434	0.43	3.07	0.28	186	17	10.87	" " "
78350 D	2981.0	CRSW	32.57	438	6.79	115.18	2.80	354	9	41.09	" " "
78350 B	3008.0	CRSW	9.55	437	3.64	29.65	0.49	310	5	60.44	" " "
78350 A	3022.5	CRSW	2.75	436	0.74	5.02	0.20	183	7	24.95	" " "

Figure 1



SAWBELLY 1
Total Organic Carbon & Rockeval
0.1
1
10
100
1800
2000
2200
2400
2600
2800
3000
3200
Depth (m)
Lakes Ent Fm
Latrobe Group
TOC %
S2 mg/g
TOC 1%
S2 6 mg/g

Figure 2

ROCKEVAL MATURATION PLOT

Sawbelly 1

Gippsland Basin

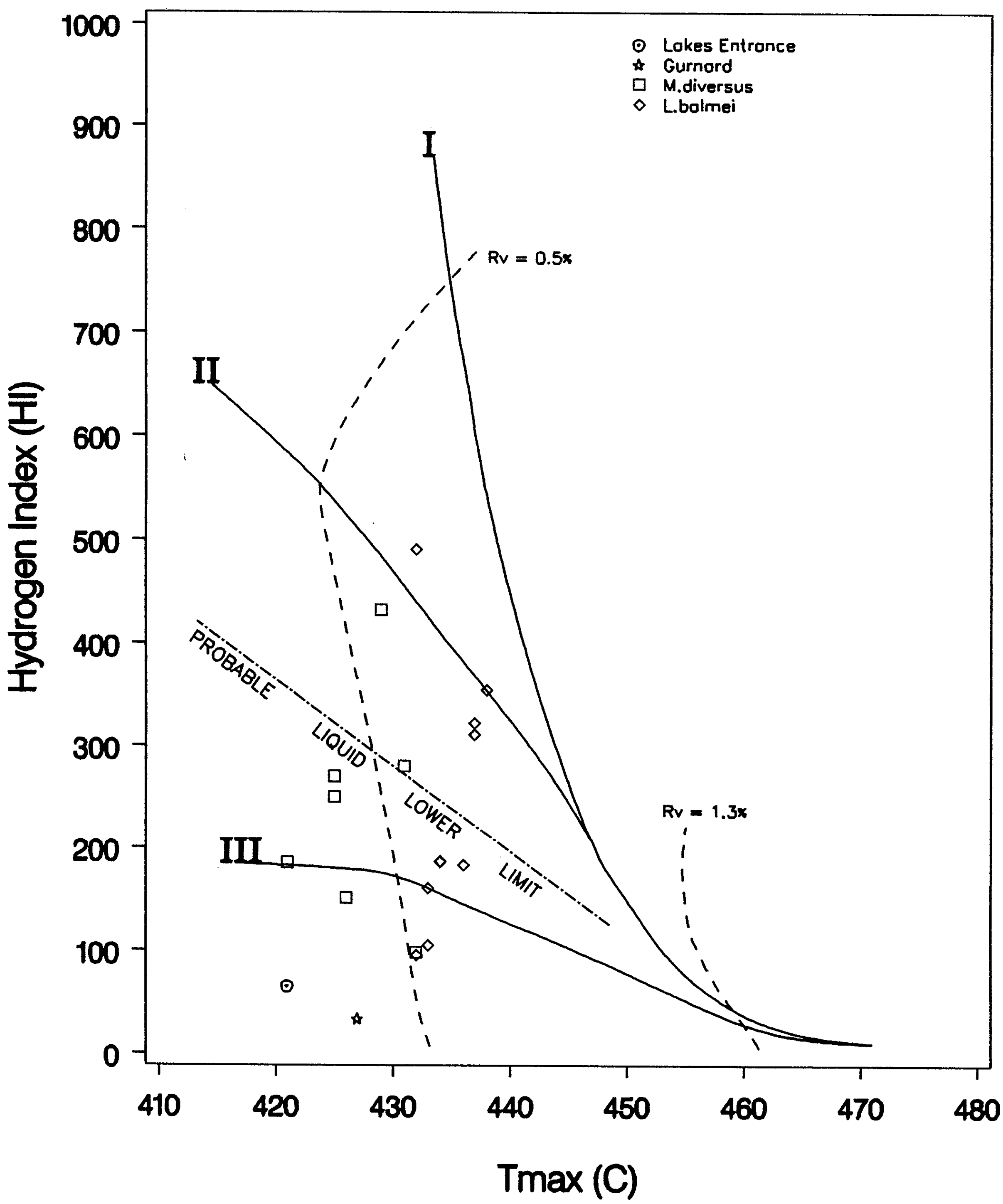


Figure 3

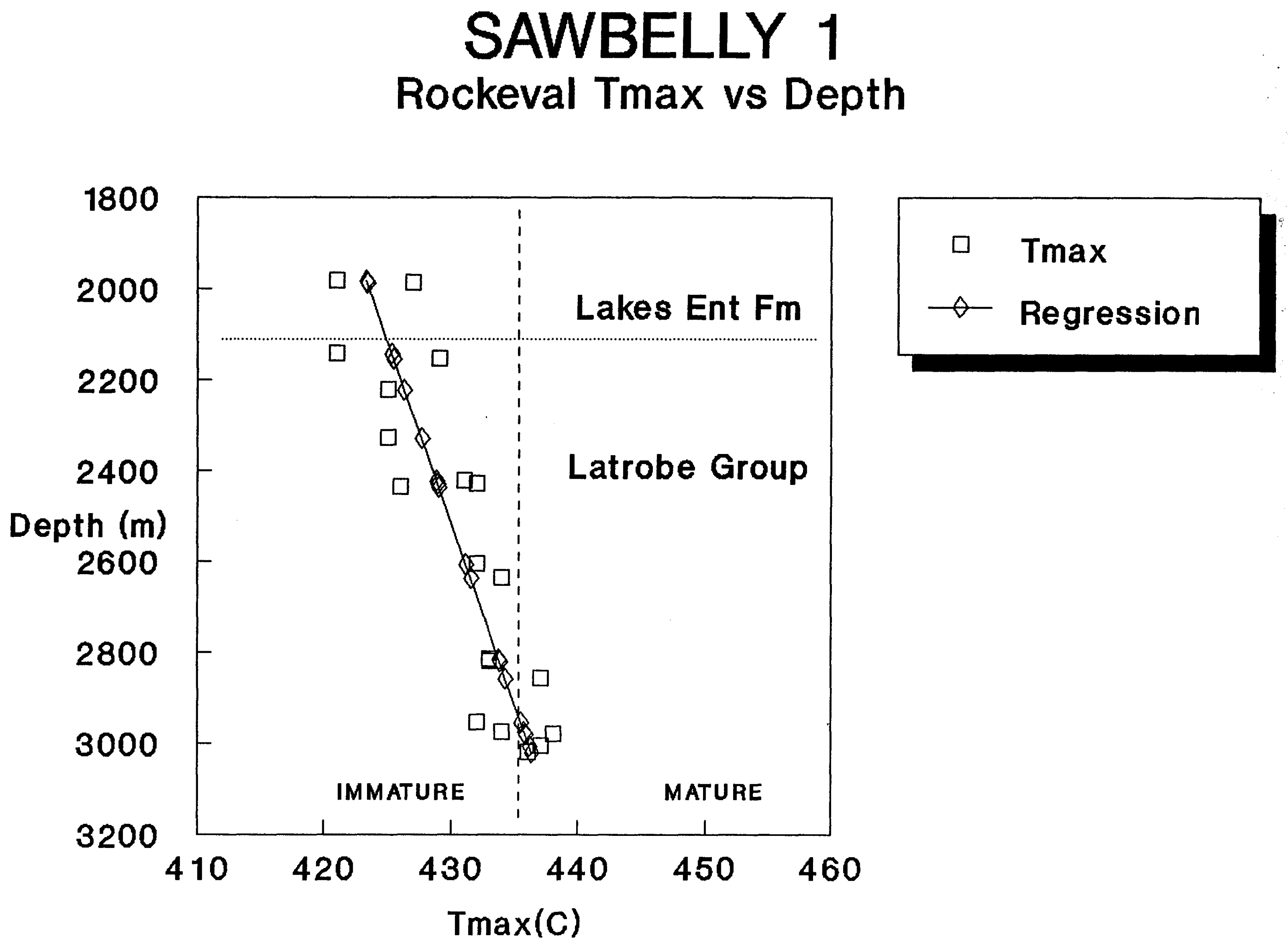
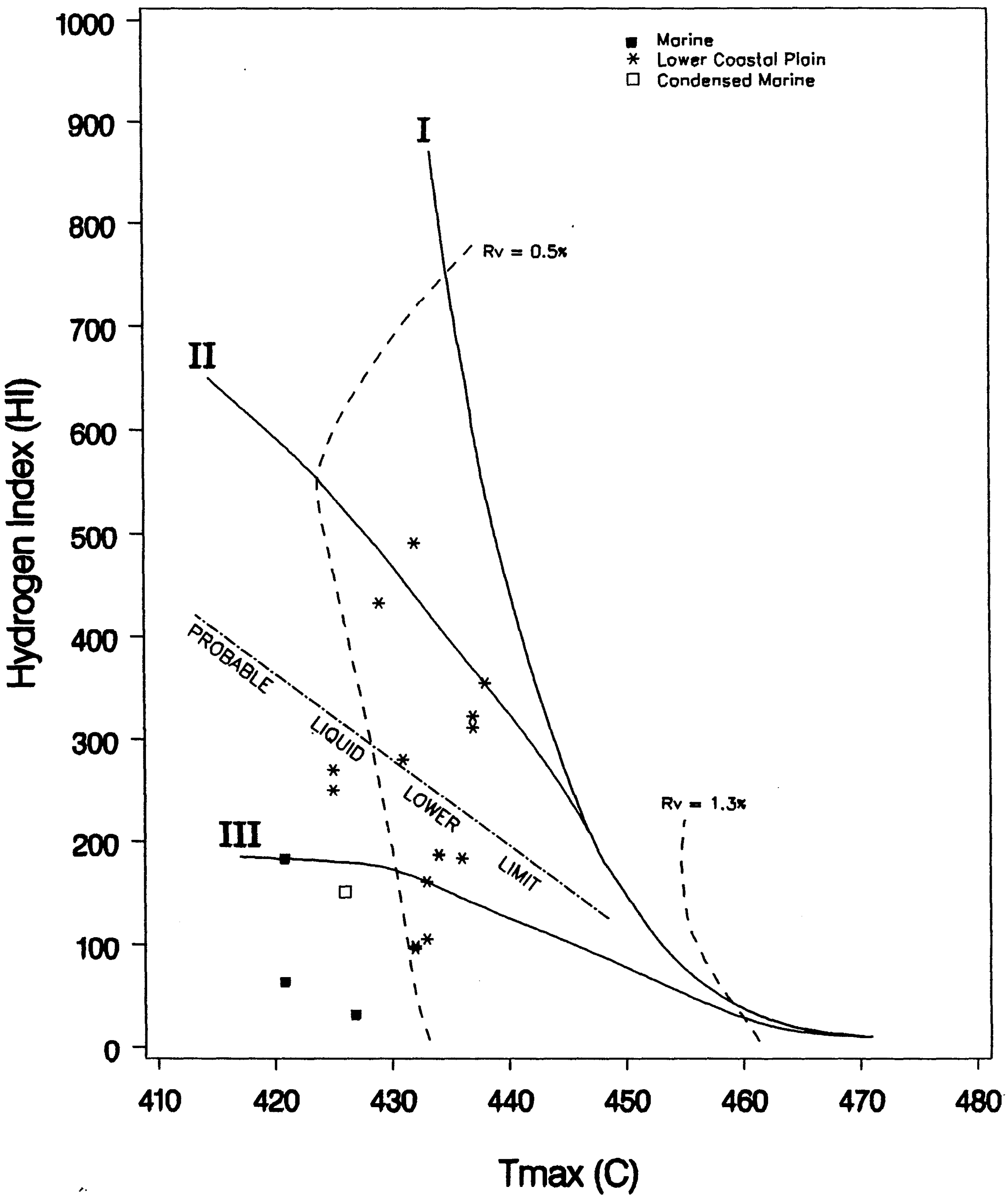

SAWBELLY 1
Rockeval Tmax vs Depth
1800
2000
2200
2400
2600
2800
3000
3200
Depth (m)
410
420
430
440
450
460
Tmax(C)
Lakes Ent Fm
Latrobe Group
IMMATURE
MATURE
Tmax
Regression

Figure 4

ROCKEVAL MATURATION PLOT

Sawbelly 1

Gippsland Basin



ENCLOSURES

PE600959

This is an enclosure indicator page.
The enclosure PE600959 is enclosed within the container PE902096 at this location in this document.

The enclosure PE600959 has the following characteristics:

ITEM_BARCODE = PE600959
CONTAINER_BARCODE = PE902096
NAME = Quantative Log
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = WELL_LOG
DESCRIPTION = Quantative Log
REMARKS =
DATE_CREATED = 26/04/90
DATE_RECEIVED = 11/07/90
W_NO = W1022
WELL_NAME = Sawbelly-1
CONTRACTOR = SOLAR
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE902097

This is an enclosure indicator page.
The enclosure PE902097 is enclosed within the container PE902096 at this location in this document.

The enclosure PE902097 has the following characteristics:

ITEM_BARCODE = PE902097
CONTAINER_BARCODE = PE902096
NAME = Structural Cross Section
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = CROSS_SECTION
DESCRIPTION = Structural Cross Section
REMARKS =
DATE_CREATED = 1/06/90
DATE_RECEIVED = 11/07/90
W_NO = W1022
WELL_NAME = Sawbelly-1
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE902098

This is an enclosure indicator page.
The enclosure PE902098 is enclosed within the container PE902096 at this location in this document.

The enclosure PE902098 has the following characteristics:

ITEM_BARCODE =	PE902098
CONTAINER_BARCODE =	PE902096
NAME =	Structure Map Top of Latrobe Group
BASIN =	GIPPSLAND
PERMIT =	
TYPE =	SEISMIC
SUBTYPE =	HRZN_CONTR_MAP
DESCRIPTION =	Structure Map Top of Latrobe Group
REMARKS =	
DATE_CREATED =	1/06/90
DATE_RECEIVED =	11/07/90
W_NO =	W1022
WELL_NAME =	Sawbelly-1
CONTRACTOR =	ESSO
CLIENT_OP_CO =	ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE902099

This is an enclosure indicator page.
The enclosure PE902099 is enclosed within the container PE902096 at this location in this document.

The enclosure PE902099 has the following characteristics:

ITEM_BARCODE = PE902099
CONTAINER_BARCODE = PE902096
NAME = Structure map - 54.5 MY Sequence Boundary
BASIN = GIPPSLAND
PERMIT =
TYPE = SEISMIC
SUBTYPE = HRZN_CONTR_MAP
DESCRIPTION = Structure map - 54.5 MY Sequence Boundary
REMARKS =
DATE_CREATED = 1/06/90
DATE_RECEIVED = 11/07/90
W_NO = W1022
WELL_NAME = Sawbelly-1
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE902100

This is an enclosure indicator page.
The enclosure PE902100 is enclosed within the container PE902096 at this location in this document.

The enclosure PE902100 has the following characteristics:
ITEM_BARCODE = PE902100
CONTAINER_BARCODE = PE902096
NAME = Structure map - 60 MY Sequence Boundary
BASIN = GIPPSLAND
PERMIT =
TYPE = SEISMIC
SUBTYPE = HRZN_CONTR_MAP
DESCRIPTION = Structure map - 60 MY Sequence Boundary
REMARKS =
DATE_CREATED = 1/06/90
DATE_RECEIVED = 11/07/90
W_NO = W1022
WELL_NAME = Sawbelly-1
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE600961

This is an enclosure indicator page.
The enclosure PE600961 is enclosed within the container PE902096 at this location in this document.

The enclosure PE600961 has the following characteristics:

ITEM_BARCODE = PE600961
CONTAINER_BARCODE = PE902096
NAME = Formation Evaluation Log
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = MUD_LOG
DESCRIPTION = Formation Evaluation Log
REMARKS =
DATE_CREATED = 21/03/90
DATE_RECEIVED = 11/07/90
W_NO = W1022
WELL_NAME = Sawbelly-1
CONTRACTOR = EXLOG
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE600964

This is an enclosure indicator page.
The enclosure PE600964 is enclosed within the container PE902096 at this location in this document.

The enclosure PE600964 has the following characteristics:

ITEM_BARCODE = PE600964
CONTAINER_BARCODE = PE902096
NAME = Well Completion Log
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = COMPLETION_LOG
DESCRIPTION = Well Completion Log
REMARKS =
DATE_CREATED = 26/03/90
DATE_RECEIVED = 11/07/90
W_NO = W1022
WELL_NAME = Sawbelly-1
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE600963

This is an enclosure indicator page.
The enclosure PE600963 is enclosed within the container PE902096 at this location in this document.

The enclosure PE600963 has the following characteristics:

ITEM_BARCODE = PE600963
CONTAINER_BARCODE = PE902096
NAME = Synthetic Seismic trace 2
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = SYNTH_SEISMOGRAM
DESCRIPTION = Synthetic Seismic trace 2
REMARKS =
DATE_CREATED = 28/06/90
DATE_RECEIVED = 11/07/90
W_NO = W1022
WELL_NAME = Sawbelly-1
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE600962

This is an enclosure indicator page.
The enclosure PE600962 is enclosed within the container PE902096 at this location in this document.

The enclosure PE600962 has the following characteristics:

ITEM_BARCODE = PE600962
CONTAINER_BARCODE = PE902096
NAME = Synthetic Seismic trace 2
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = SYNTH_SEISMOGRAM
DESCRIPTION = Synthetic Seismic trace 2
REMARKS =
DATE_CREATED = 28/06/90
DATE_RECEIVED = 11/07/90
W_NO = W1022
WELL_NAME = Sawbelly-1
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)