AGE and PALEOENVIRONMENTAL ASSESSMENT of FIFTY ONE SELECTED WELL SEQUENCES: OFFSHORE GIPPSLAND BASIN.

for: UNION TEXAS PETROLEUM AUSTRALIA, INC.

June 23, 1983.

T1330 Part 1 of 1

Paltech Report 1983/10

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SYDNEY AUSTRALIA

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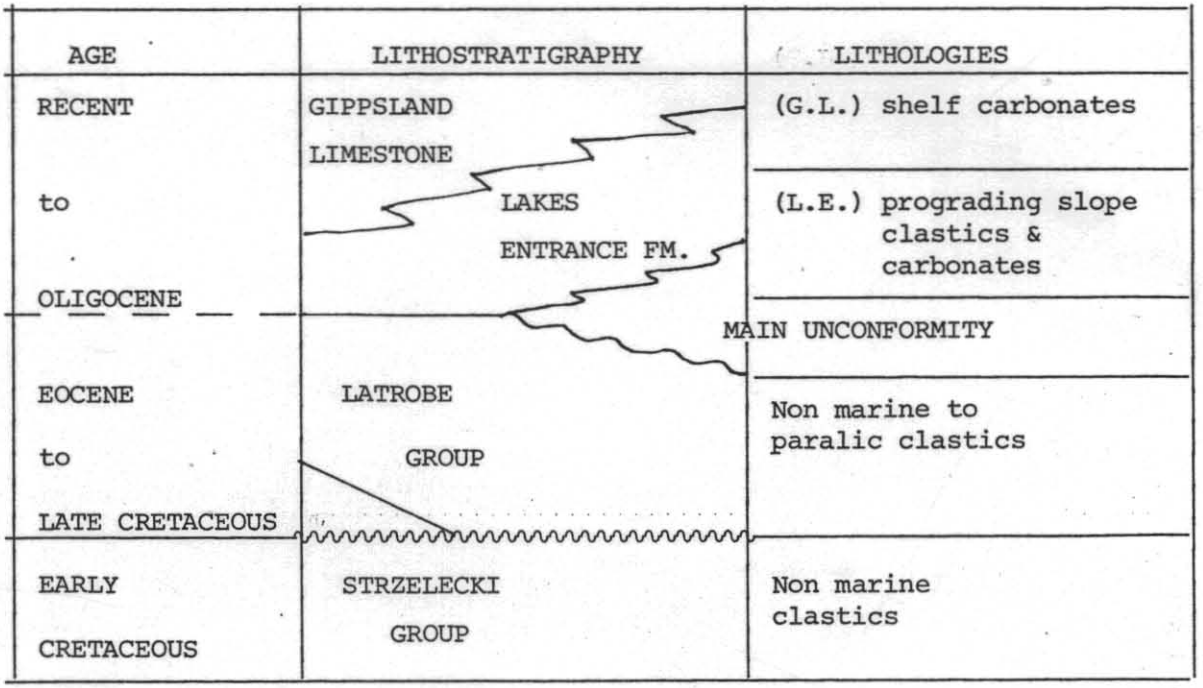
AGE & PALEOENVIRONMENTAL LOGS

PLATE	WELL
1	ALBACORE - 1
2	ALBATROSS - 1
3	BARRACOUTA - 2
4	BATFISH - 1
5	BONITA - 1A
6	BREAM - 2
7	" - 3
8	BULLSEYE - 1
9	COBIA - 1
10	DART - 1
11	DOLPHIN - 1
12	FLATHEAD - 1
13	FLOUNDER - 1
14	" 2
15	" 3
16	" 4
17	" 5
18	FLYING FISH - 1
19	GANNETT - 1
20	GOLDEN BEACH - 1
21	GROPER - 1
22	" 2
23	HALIBUT - 1
24	HAPUKU - 1
25	KINGFISH - 1
26	" 2
27	KINGFISH - 3
28	" 5
29	" 6
30	" 7
31	MACKEREL - 1
32	MARLIN - 1
33	" 4
34	MORAY - 1
35	MORWONG - 1
36	NANNYGAI - 1
37	OPAH - 1
38	PERCH - 1
39	PIKE - 1
40	SALMON - 1
41	SNAPPER - 1
42	SOLE - 1
43	STONEFISH - 1
44	SWEEP - 1
45	TAILOR - 1
46	THREADFIN - 1
47	TREVALLY - 1
48	TUNA - 1
49	" 2
50	" 3
51	TURRUM - 1

Transparencies held

INTRODUCTION.

The stratigraphy of the offshore Gippsland Basin may be summarised as follows:-



GIPPSLAND BASIN SUMMARY STRATIGRAPHY

The primary oil exploration targets in the offshore Gippsland Basin are reservoirs just below the "Main Unconformity" between the LATROBE GROUP and the LAKES ENTRANCE FORMATION and (lately) within the LATROBE GROUP.

Sedimentation within the LATROBE GROUP and the LAKES ENTRANCE FORMATION is controlled by a variety of factors, the result of which is that lithologic units are markedly time transgressive on both a large and small scale. E-log and seismic correlations within these units correlate lithologies (or paleoenvironments) and not ages (except over very small areas).

Chronologic subdivision of the Gippsland Basin is based on foraminifera in the GIPPSLAND LIMESTONE and LAKES ENTRANCE FORMATION and palynology in the LATROBE GROUP and STRZELECKI GROUP.

This study is based on data made available to Union Texas Petroleum Australia, Inc., by the Victorian Mines Department. This data varies markedly, from well to well, in amount and quality. It ranges from "data sheets" showing biostratigraphic zones only, to full documentation with species distribution charts.

The aim of this study is to provide a standardised data-base for well to well correlation within the offshore Gippsland Basin. The format chosen was age and paleoenvironmental strip logs at 1:10 000 scale.

Part 1 of this report details the methods used in preparing the strip logs.

Part 2 of this report discusses how to use the strip logs for correlation purposes.

PART I: PREPARATION OF STRIP LOGS.

The strip-logs (PLATES 1 to 51) are divided into three columns. The left hand column shows the age subdivision in terms of foraminiferal and palynologic zones. The middle column shows the paleoenvironmental subdivision in terms of environmental regimes from non-marine to outer continental rise. The third column provides comments on specific aspects of the well sequence, e.g. positions of possible unconformities and timing of major paleoenvironmental changes.

AGE DATA.

The GIPPSLAND LIMESTONE and LAKES ENTRANCE FORMATION are mainly age-dated using planktonic foraminifera; the LATROBE GROUP and STRZELECKI GROUP are mainly age-dated using spore/pollen or dinoflagellates. There is some overlap between the schemes at about the Eocene/Oligocene boundary as can be seen on PLATE A. Discussion of the zonations follows.

PLANKTONIC FORAMINIFERAL ZONES.

The planktonic foraminiferal zones used for the Gippsland Basin are (in part) a local adaptation by D. Taylor (in prep.) of zones observed in New Zealand and refined over many years of examination of Gippsland Basin sequences. The accuracy and refinement of the zones varies in response to physico-chemical character of the water masses existing in the Basin at the time.

A sub-tropical water mass means more tropical planktonic foraminifera may live in the water column and hence the resultant zonation may approach the resolution of the tropical planktonic foraminiferal zonations such as those of Blow (1979) and Stainforth et al (1975). Warmer water conditions existed in the Basin during the early Middle Miocene and to a lesser extent late Oligocene to early Miocene.

Deeper water over the depositional site also means a greater likelihood of more planktonic foraminifera and more water masses and thus a more refined zonation. Taylor's planktonic foraminiferal zonal scheme (PLATE A) has two"regimes", a shelf or "margin"

regime and a deeper "basin" regime. The zonation in the "basin" is more refined than that for the "margin" (PLATE A).

Finally, the zonation is expressed in terms of letters rather than fossil names to permit a greater ease of communication, expecially with non-biostratigraphers. Correlation of the zones with the STANDARD AGE SCHEME is based on correlation via New Zealand and D.S.D.P. sites between New Zealand, the Coral Sea and in the South West Pacific.

PALYNOLOGIC ZONES.

A spore/pollen zonation for the Gippsland Basin was first published by Stover & Evans (1973) and refined by Stover & Partridge (1973). Correlation with the STANDARD AGE SCHEME was considerably hampered by the endemic nature of spore/pollen assemblages. Correlation of the spore/pollen scheme was eventually accomplished through development of a dinoflagellate scheme which could be correlated with New Zealand sequences, themselves dated using planktonic foraminifera. This convoluted process contains the inherent possibility of errors and the correlation shown on PLATE A represents only the most recent interpretation of Partridge (unpublished).

The spore/pollen and dinoflagellate zones are named in terms of representative fossils. These are often abbreviated on the strip logs. The dinoflagellate zone names are always abbreviated (key:- see right hand side of Dinoflagellate Zones column, PLATE A) since they are the least important for basin-wide correlation.

RELIABILITY OF ZONE DETERMINATIONS.

Since the early 1970's, zone determinations by ESSO biostratigraphers have been given confidence ratings. Thus a sample is determined to be within a zone and the determination is given a confidence rating according to the following scheme (slightly modified):-

Rating		Interpretation
0	:	SWC (sidewall core) or CORE, EXCELLENT CONFIDENCE, assemblage complete.
1	:	SWC or CORE, GOOD CONFIDENCE, almost complete assemblages.
2	:	SWC or CORE, POOR CONFIDENCE, assemblages incomplete, non diagnostic.
3	:	CUTTINGS, FAIR CONFIDENCE, assemblage complete.
4	:	CUTTINGS, VERY LOW CONFIDENCE, poor assemblage.

For many of the wells in this study, data sheets (with zone determinations and confidence ratings) were the only information available. It was considered best to convert all other data (e.g. distribution charts, species lists) into this form where possible to provide a uniform data base. The data is shown graphically on the strip-logs. The highest and lowest data for each zone is given a line type according the following code:-

Rating	Line type	Confidence Interpretation
0	———	GOOD
1	———	
2	– – – – –	POOR
3	– – – – –	
4	.....	VERY POOR

The use of these line types in correlation is explained on PLATE A.

PALEOENVIRONMENTAL DATA.

Paleoenvironmental data for the GIPPSLAND LIMESTONE and LAKES ENTRANCE FORMATION is mainly based on benthonic foraminifera as such information is readily collected during age analysis. For

the LATROBE GROUP and STRZELECKI GROUP, paleoenvironmental analysis is necessarily based on spore/pollen and dinoflagellates distribution - samples are seldom examined for foraminifera, although they are often present.

BENTHONIC FORAMINIFERAL DATA.

Benthonic foraminiferal distribution is widely acknowledged as the most accurate measure of paleoenvironments in temperate marine sequences. Even so, different depth ranges are observed for the same species in different basins at the present time.

A study of present day distribution of benthonic foraminifera in the Gippsland Basin was undertaken by ESSO during 1969 and 1970. The results are contained in an unpublished report by Taylor and Mee (1970). This study collected samples from the petroleum pipeline routes on the basin margin and from deep water traverses into the deep basin east of the platform and well area.

The subdivision of present day environments observed by Taylor & Mee (1970) is shown on page 7. Taylor & Mee (1970) found that benthonic foraminiferal distribution was controlled by factors other than depth, although depth was certainly a dominant factor. Significant among these were temperature, salinity, nutrient and oxygen availability and bottom slope. This latter factor was considered as important a factor as water depth, although it is obviously related. Because of the importance of bottom slope it is not easy to give sharp depth ranges for the environments in the subdivision. It is possible to give a depth range for the boundaries between the environments and these are given on next page.

BROAD ENVIRON-MENT.	ENVIRONMENT (THIS STUDY)	COMMENTS	DEPTH (m.below sea level)
NON MARINE	NON MARINE	Swamps, rivers etc.	
MARGINAL MARINE	INNER LAKES	Present day Gippsland Lakes	
	OUTER LAKES		0 (barrier bars)
NERITIC	INNER SHELF	Probably includes mid shelf of others	
	OUTER SHELF		119
	SHELF/SLOPE BREAK	Not a sharp break but a zone of instability.	146-220
BATHYAL	UPPER SLOPE		730
	LOWER SLOPE		1830
	INNER RISE		?
ABYSSAL	OUTER RISE		4575
	ABYSSAL PLAIN		?

SUBDIVISION OF PRESENT DAY ENVIRONMENTS - GIPPSLAND BASIN

(after Taylor & Mee, 1970).

The depth distribution of the neritic environments (above) are probably controlled by Pleistocene sea-level low-stands which have created a broad flat shelf. Because the Oligocene too, was a time of low sea level (Vail, et al, 1977) a broad flat shelf can be fairly safely assumed to have existed since then, and the depths provided above should be fairly accurate for Oligo-Miocene paleo-water-depth interpretations.

This is probably not true for the bathyal and abyssal environments where water mass physico-chemical character plays a more important part in foraminiferal depth distribution. Oxygen content, $CaCO_3$

compensation depth and other vital parameters are known to have fluctuated markedly since the Oligocene, in response to the establishment of the present day oceanic hydrodynamic regime. As a result, depths to the bathyal environments shown above should be used with caution in estimating paleo-water-depths. Geohistory analysis of several wells in the basin indicates that the depths shown above should be reduced by 10-20% for paleobathymetric interpretation of Oligo-Miocene sequences.

PALYNOMORPH DATA.

As mentioned above, quantitative distributional data are not often collected during routine palynological analysis of the Gippsland Basin.

By analogy with the present day onshore Gippsland Basin, the data available provides a subdivision into three environments, utilising the following system:-

ENVIRONMENT	INDICATORS
NON-MARINE	coal, fresh water dinoflagellates (no marine forms), spore/pollen only.
INNER LAKES	dominantly spore/pollen, rare marine dinoflagellates.
OUTER LAKES (& ? INNER SHELF)	marine dinoflagellates dominant.

This system was utilised when palynologic distribution charts were available. When only data sheets were available, spore/pollen zones were designated non-marine; dinoflagellate zones were designated inner to outer lakes. Where no palynologic data at all was available, the LATROBE GROUP was designated non-marine to inner lakes.

PART II: CORRELATION TECHNIQUE.

This part of the report deals with methods of using the strip logs (PLATES 1 to 51) for well to well correlation purposes.

It is understood the following data will also be available:-

*E-logs at 1:10 000 scale
*Lithologic data
*Seismic sections (?between wells)

LATROBE GROUP

Correlation within the LATROBE GROUP would be best carried out in the following sequence:-

1. Seismic Stratigraphy.
2. Conversion to 1:10 000 depth scale
3. Age dating of seismic stratigraphic sequences using age and paleoenvironmental strip logs (PLATES 1 to 51).
4. Extrapolation to wells with little or no age data.

The methodology of seismo-stratigraphy is detailed by Vail et al (1977). Some of its application to LATROBE GROUP correlation is briefly discussed by Steele (1976) and Partridge (1976).

The resulting data from steps 1 to 4 would be in a form suitable for isopach mapping, structural mapping and burial & thermal geohistory analysis and would also provide an accurate basis for seismic interpolation between well sites.

LAKES ENTRANCE FORMATION AND GIPPSLAND LIMESTONE.

Correlation within the LAKES ENTRANCE FORMATION and GIPPSLAND LIMESTONE is more complicated than for the underlying units.

Shelf environments may be correlated using seismic stratigraphic techniques, as they are within the range of effective wave base

and eustatic sea level adjustments.

Age correlations within the bathyal sequences is complicated by the mechanisms of shelf progradation within the offshore Gippsland Basin. There are two main pathways for shelf sediment to reach the deep basin.

Firstly, along the shelf edge high productivity due to upwelling of nutrient enriched waters leads to outbuilding of the shelf over slumped biogenic detritus.

Secondly, major submarine canyon systems act as transport routes for detritus from the shelf directly to the slope. Sediments within canyon systems commonly differ from normal outbuilding shelf/slope sediment in containing more quartz and more reworked bryozoal debris, both elements derived from the inner shelf.

Age correlation within these two systems differs slightly:-

Within the shelf edge prograding system, providing slumping is not major, time lines are readily observed on seismic sections as the outward migrating shelf/slope profile.

Within canyon systems regular outbuilding is not the rule. The locus of most rapid deposition will, in general, move seawards with time. However, the canyon system will often cut back in to older canyon deposits. Erosion at the base of a canyon sequence is very common, resulting in major hiatuses.

Plate B shows a correlation chart through ALBACORE # 1 - MORWONG # 1 - FLOUNDER # 1 - HAPUKU # 1. Both paleoenvironments and age have been correlated (as allowed by data) and show clearly thatthe paleoenvironments are markedly time-transgressive.

No attempt has been made to correlate within the LATROBE GROUP

and STRZELECKI GROUP and no attempt has been made to show faults at the base of the LAKES ENTRANCE FORMATION.

A number of interesting features are apparent on this diagram. Some of these are:-

*Erosion of J-G sediment at MORWONG-1, I-F sediment at FLOUNDER-1 and C sediment at HAPUKU-1 demonstrates the erosional "base of canyon sequence" mentioned previously.

*Zones E, D-2 & D-1 prograding lenses are anomalously thick in comparison to those of other zones. This is even more apparent when the time spans occupied by these zones are noted (PLATE A). Warmer temperatures during Zone E to D presumably resulted in greater shelf productivity and more rapid shelf progradation.

*Great care needs to be taken when interpreting cross-sections such as on PLATE B. It must be remembered that sites received sediment from other directions than along the line of cross-section. This is the probable explanation for the much greater thickness of lower slope sediments at HAPUKU-1. Basement subsidence rates at the various sites may also need to be examined.

In conclusion, PLATE B demonstrates the complexity of considerations which should be remembered when correlating within the LAKES ENTRANCE FORMATION and GIPPSLAND LIMESTONE.

SUMMARY.

Age and paleo-environmental strip logs have been presented for fifty one offshore Gippsland Basin wells, compiled from data available to Union Texas Petroleum Australia, Inc.

These logs form a standardised basis for well to well correlations and for interpolative seismic stratigraphy within the offshore Gippsland Basin.

Furthermore, the logs can be upgraded readily if new data comes to hand.

Methods of correlation of age and paleoenvironments in the target Latrobe Group and overlying Lakes Entrance Formation and Gippsland Limestone have been discussed.

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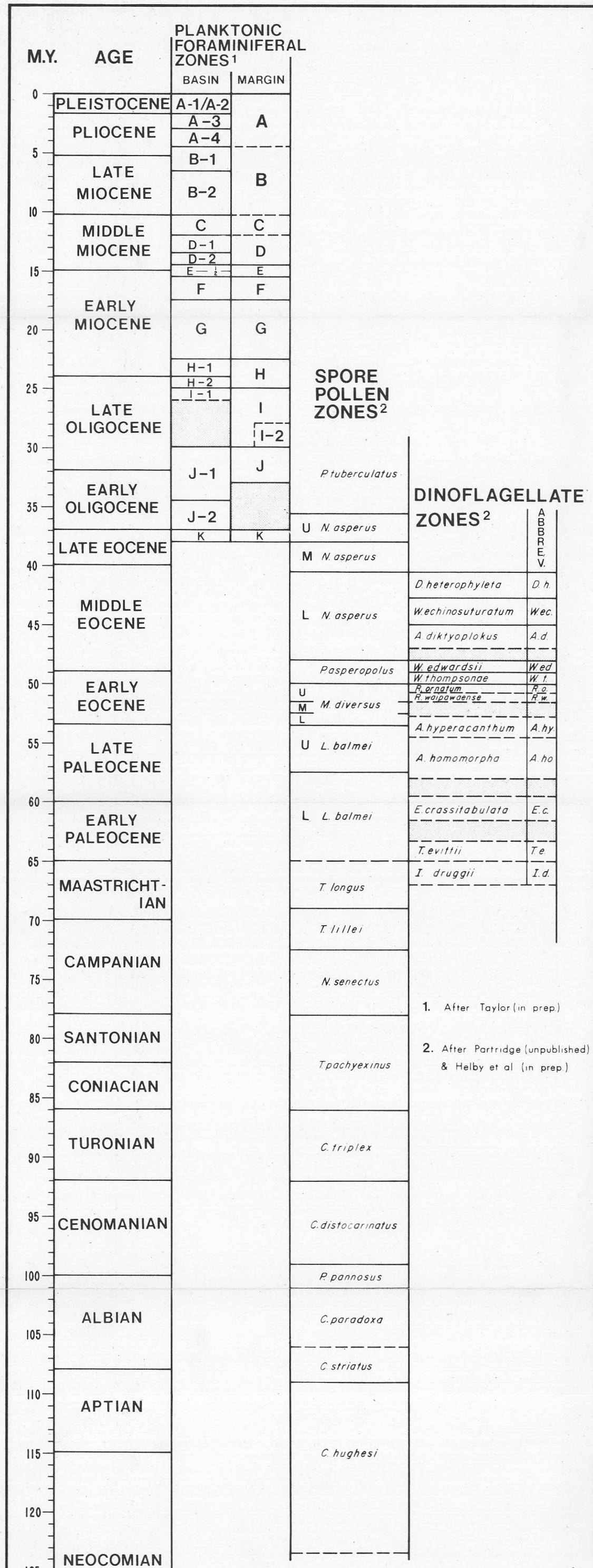
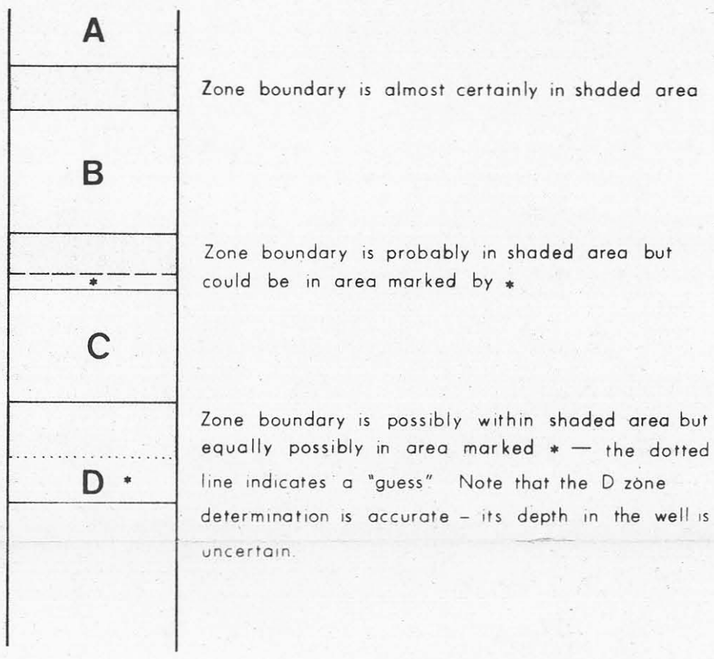


1. After Taylor (in prep.)

2. After Partridge (unpublished) & Helby et al (in prep.)

KEY TO FORAMINIFERAL, SPORE/ POLLEN and DINOFLAGELLATE ZONAL CORRELATION



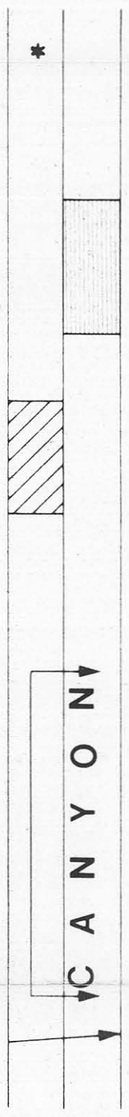
Zone boundary is almost certainly in shaded area

Zone boundary is probably in shaded area but could be in area marked by *

Zone boundary is possibly within shaded area but equally possibly in area marked * — the dotted line indicates a "guess" Note that the D zone determination is accurate – its depth in the well is uncertain.

ZONE DETERMINATION – RELIABILITY KEY

PALEOENVIRONMENTAL KEY



Indicates present day environmental position of well site

Section in well is within the range of paleoenvironments indicated by shading. Interpretation based on fossil assemblages. GOOD CONFIDENCE

Section in well is probably within the range of paleoenvironments indicated by shading. Interpretation based on lithology, comments in report text etc. POOR CONFIDENCE

Section in well contains fossil and lithological evidence of detritus transported to well site by submarine canyon systems. Origin (environment) of detritus is shown by position of line at left.

Section of well with canyon detritus is bracketed by arrows.

Rapid change of paleoenvironment (see also comments.)

5 cm

GIPPSLAND BASIN

KEY TO
AGE and PALEOENVIRONMENTAL LOG
PLATES 1 to 51

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PALTECH REPORT 1983/10
July, 1983 PLATE A

OR-103

T113P part 15 Copy1

ALBATROSS – 1 | MORWONG – 1 | FLOUNDER – 1 | HAPUKU – 1

S.L.

INNER SHELF

OUTER SHELF

SHELF SLOPE

UPPER SLOPE

LOWER SLOPE

BREAK

INNER RISE

OUTER RISE

H-1

H-2

G

F

E

D-2

D-1

C

B

A-4

A-3

A-2

A-1

J

J-1

F
G
H-1
H-2

E
F

B
C
D-1
D-2
E
J-1

A-2
A-3
A-4
B-1
B-2
D-1
D-2
E
F

LEGEND

- Paleoenvironment boundary
- Zone boundary
- Paleoenvironmental data reliable
- Age data reliable

5 cm

HORIZONTAL SCALE 1 : 300,000 approx.

VERTICAL SCALE 1 : 10,000

GIPPSLAND BASIN 097018

CORRELATION EXAMPLE

ALBATROSS – 1, MORWONG – 1, FLOUNDER – 1
HAPUKU – 1

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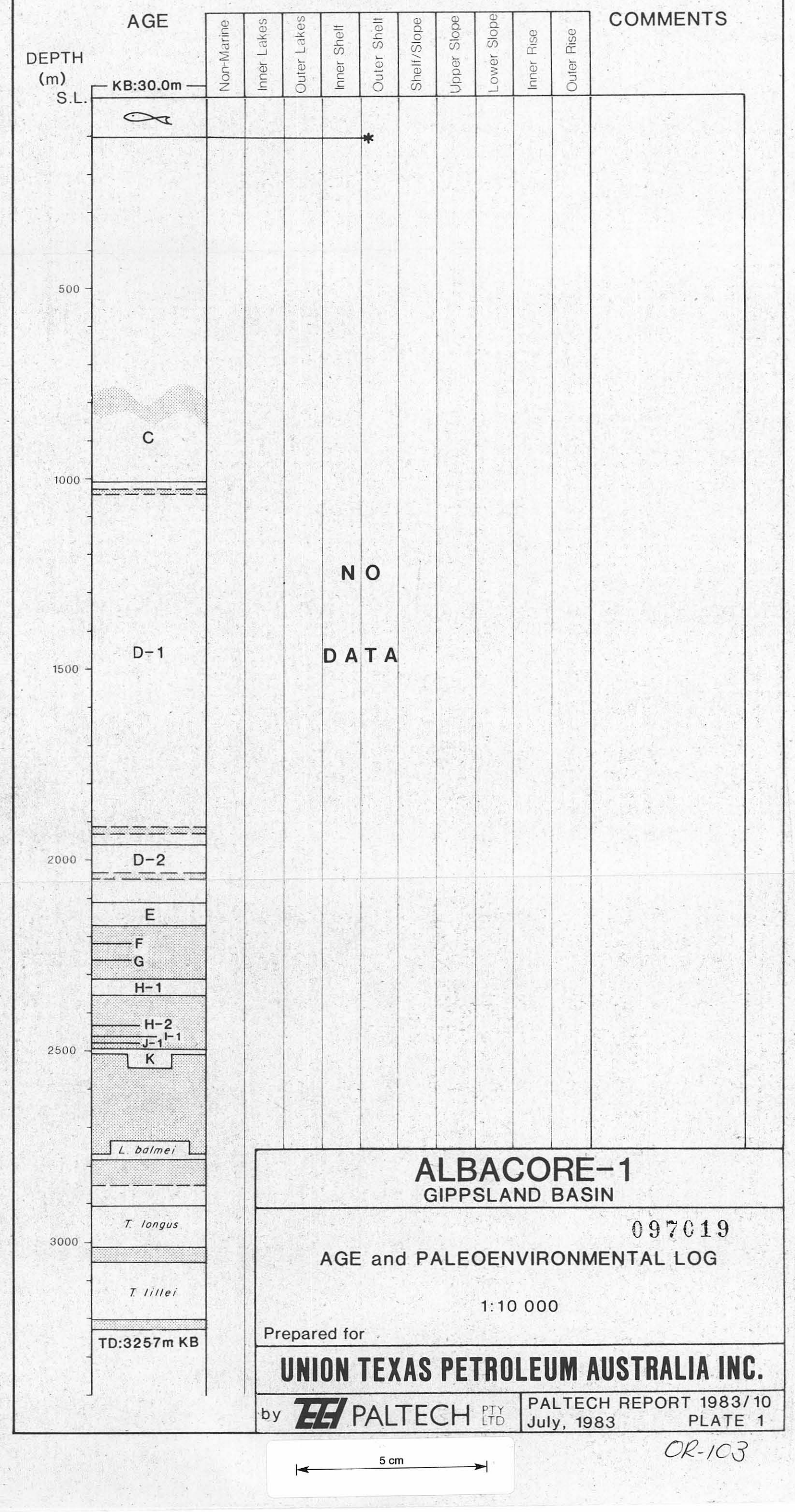
ALBACORE-1

PALEOENVIRONMENT



ALBACORE-1

GIPPSLAND BASIN

097019

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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5 cm

OR-103

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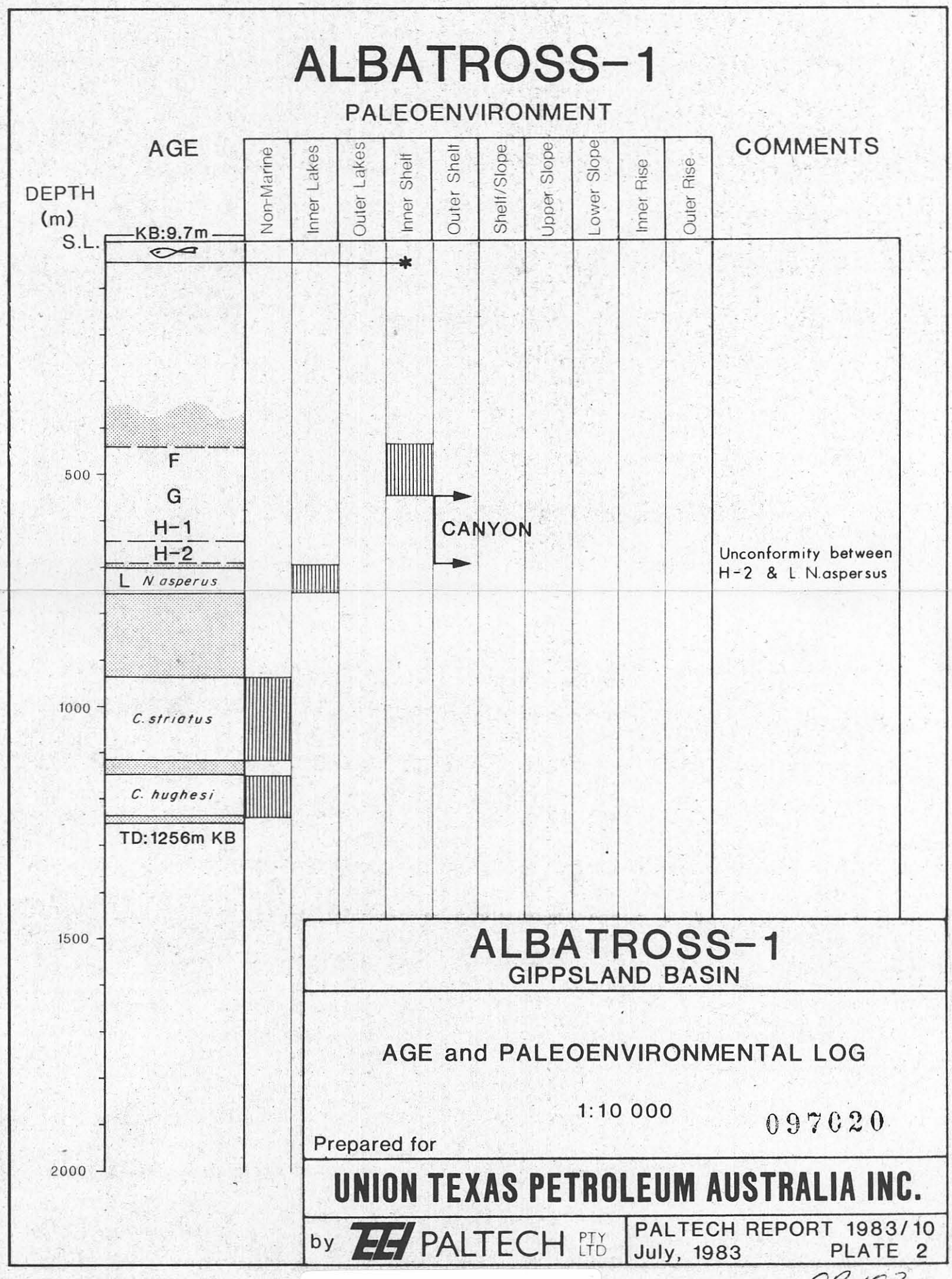
ALBATROSS-1

PALEOENVIRONMENT



ALBATROSS-1

GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

097020

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5 cm

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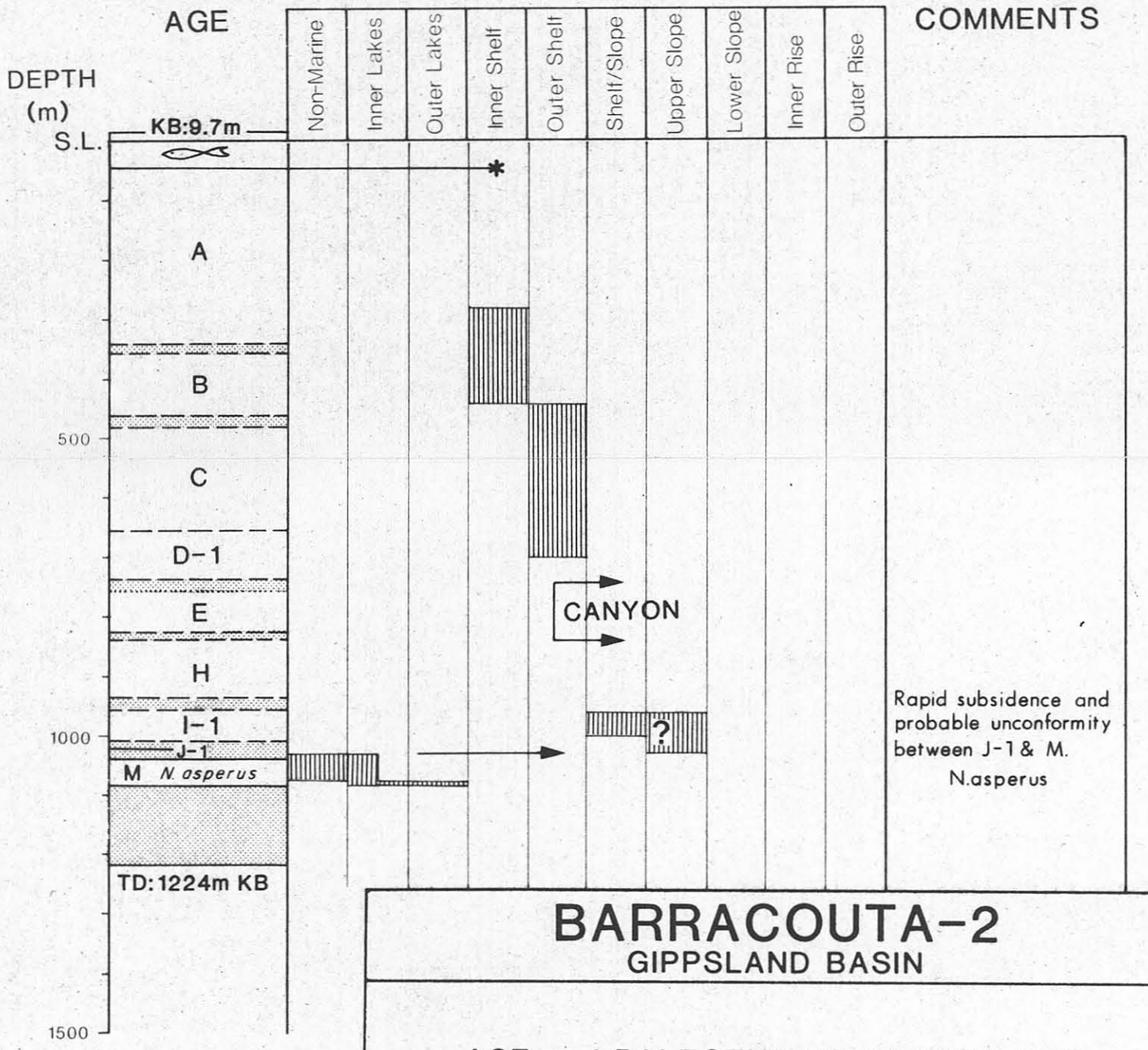
OR-103

BARRACOUTA-2

PALEOENVIRONMENT



BARRACOUTA-2

GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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5 cm

T1138 part 15 (copy 1)

OR-103

BATFISH-1

PALEOENVIRONMENT

AGE

DEPTH (m)

S.L.

KB:9.5m

Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise

COMMENTS

A

B

500

C

1000

D-1

D-2

E

F

G

J-1

1500

P.asperopolus

U *M.diversus*

E.c

2000

L *L.balmei*

T. longus

2500

T. lillei

TD:2975m KB

3000

3500

Unconformity between G and J-1

BATFISH-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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5 cm

097022

OR-103

T/13P part 15 Copy

BONITA-1A

PALEOENVIRONMENT

AGE

DEPTH (m) S.L.

KB:30.0m

Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise

COMMENTS

500

B

C

1000

D-1

1500

D-2

2000

E

F

G

H

J(or I & J rew)

2500

NO DATA

3000

T. longus

TD:3179m KB

3500

Rapid subsidence at top Latrobe

BONITA-1A
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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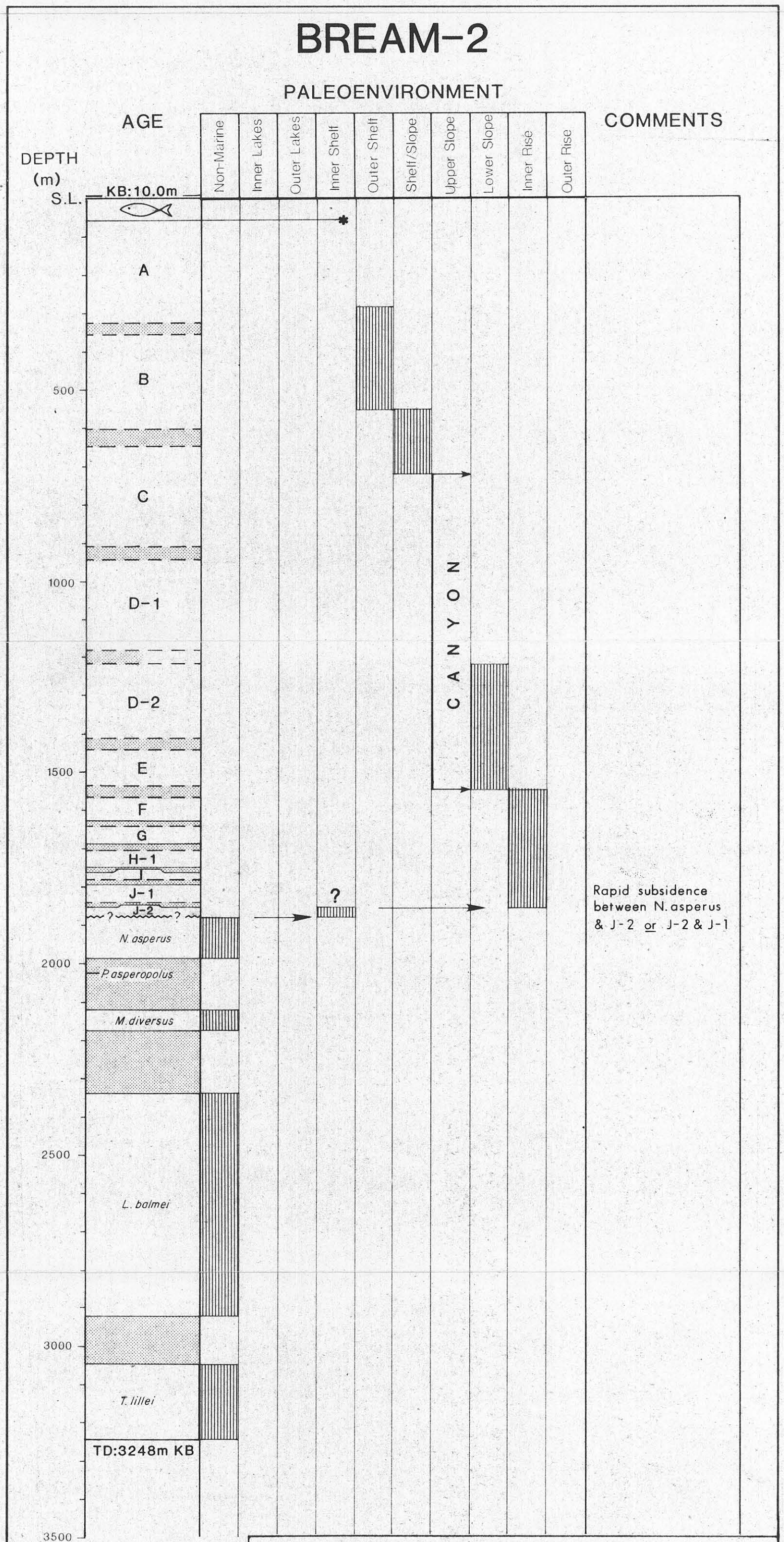
OR-103

T1130 part 15 Copy 1

5 cm

BREAM-2



BREAM-2
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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OR-103

T/13p part 15 Copy 1

5 cm

BREAM-3

PALEOENVIRONMENT

AGE

DEPTH (m)

KB:30.0m

S.L.

Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise

COMMENTS

500

C

1000

D-1

D-2

E

F

1500

G

H

I-1

J

L *N. asperus*

P. asperopolus

2000

U *M. diversus*

2500

L *L. balmei*

T. longus

3000

T. lillei

TD:3356m KB

3500

NO DATA

BREAM-3
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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OR-103

T/13P part 15 (copy)

5 cm

BULLSEYE-1

PALEOENVIRONMENT

AGE | DEPTH (m) | Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise | COMMENTS

S.L.

KB:9.7m

500

1000

1500

2000

C

D-1

D-2

E

F

G

H-1

H-2

I-1

I-2

J-1

M. diversus

TD:2369m KB

5 cm

BULLSEYE-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

Prepared for

097026

UNION TEXAS PETROLEUM AUSTRALIA INC.

by PALTECH PTY LTD

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OR-103.

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COBIA-1

PALEOENVIRONMENT

AGE | DEPTH (m) | Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise | COMMENTS

KB:10.0m

S.L.

500

1000

1500

2000

2500

NO DATA

NO DATA

H-2

I-1

J-1

L *M.diversus*

U *L.balmei* | *A.ho.*

TD:2594m KB

Submarine disconformity between I-1 & J-1. Rapid subsidence and disconformity between L. M.diversus and J-1.

COBIA-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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5 cm

DART-1

PALEOENVIRONMENT

AGE

DEPTH (m)

S.L.

KB:9.7m

Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise

COMMENTS

*

?

NO DATA

NO DATA

500

Ku-mid Paleocene

?

?

1000

TD:1219m KB

1500

2000

DART-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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5 cm

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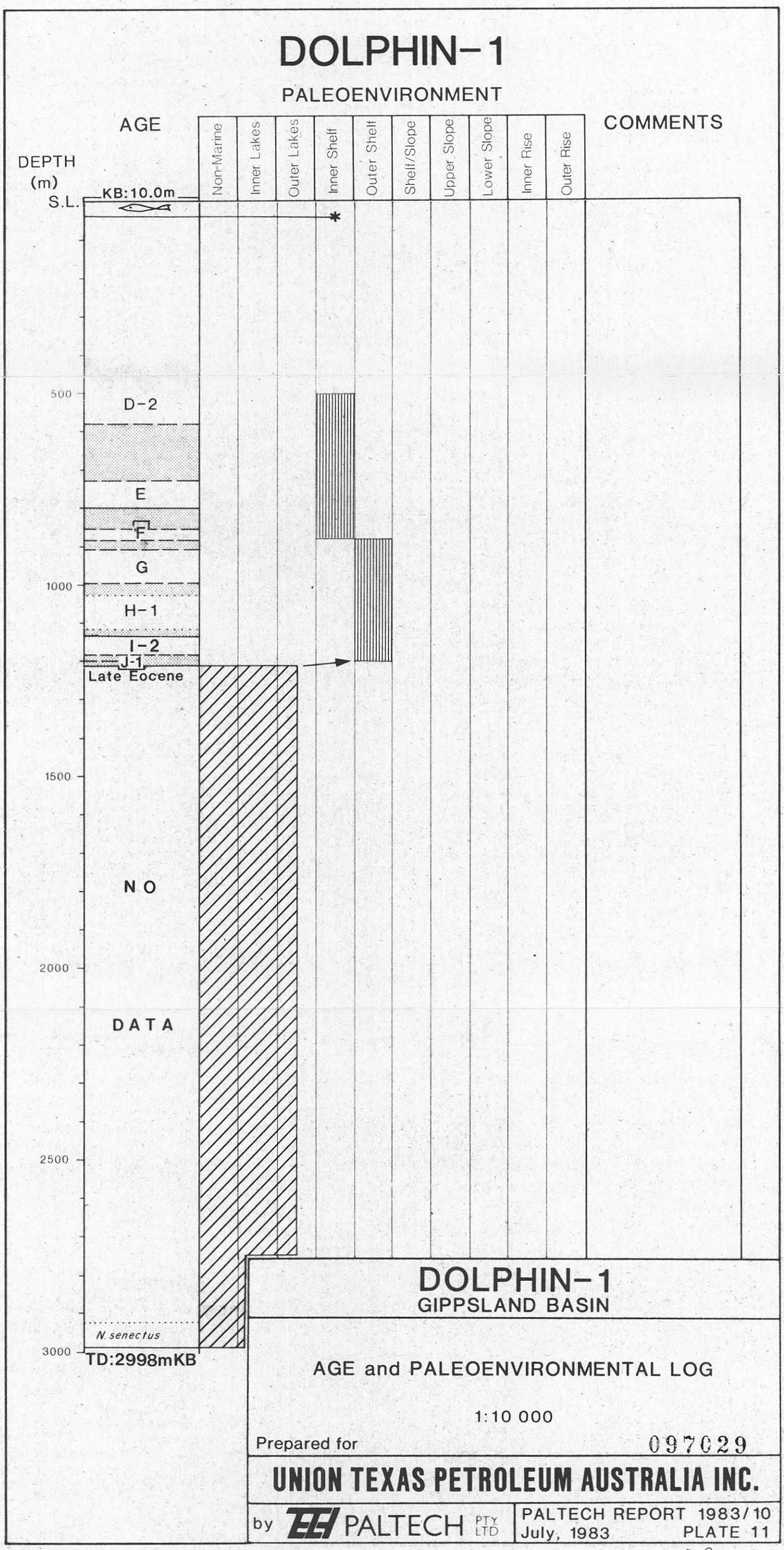
DOLPHIN-1

PALEOENVIRONMENT



DOLPHIN-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

Prepared for

097029

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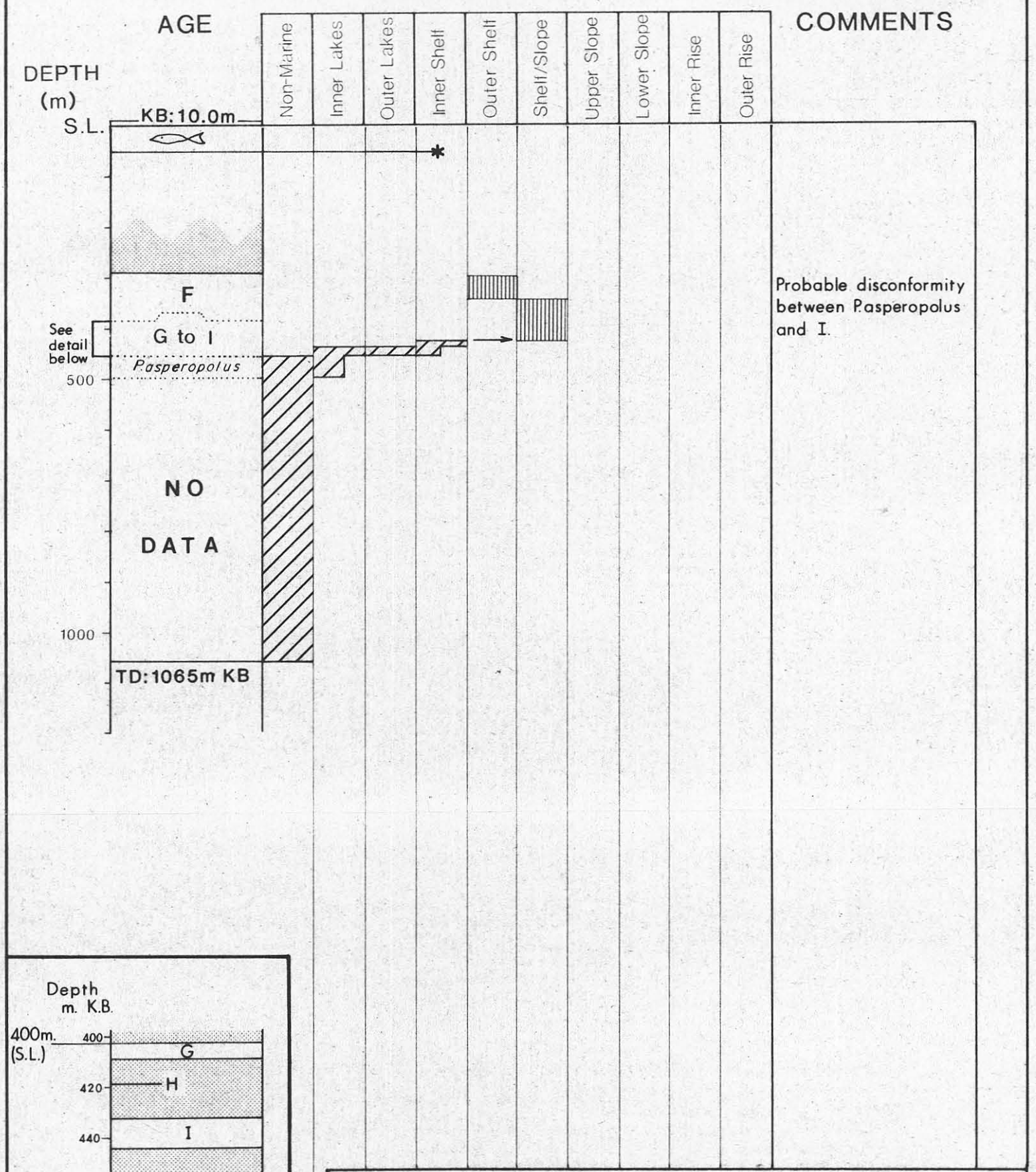
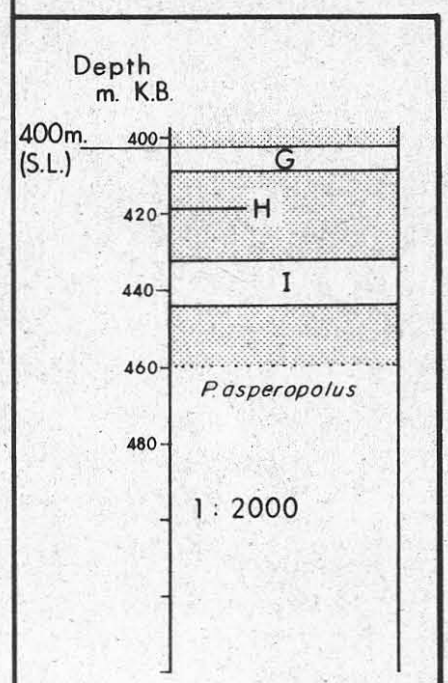
OR-103

5 cm

FLATHEAD-1

PALEOENVIRONMENT





FLATHEAD-1

GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

Prepared for

097030

UNION TEXAS PETROLEUM AUSTRALIA INC.

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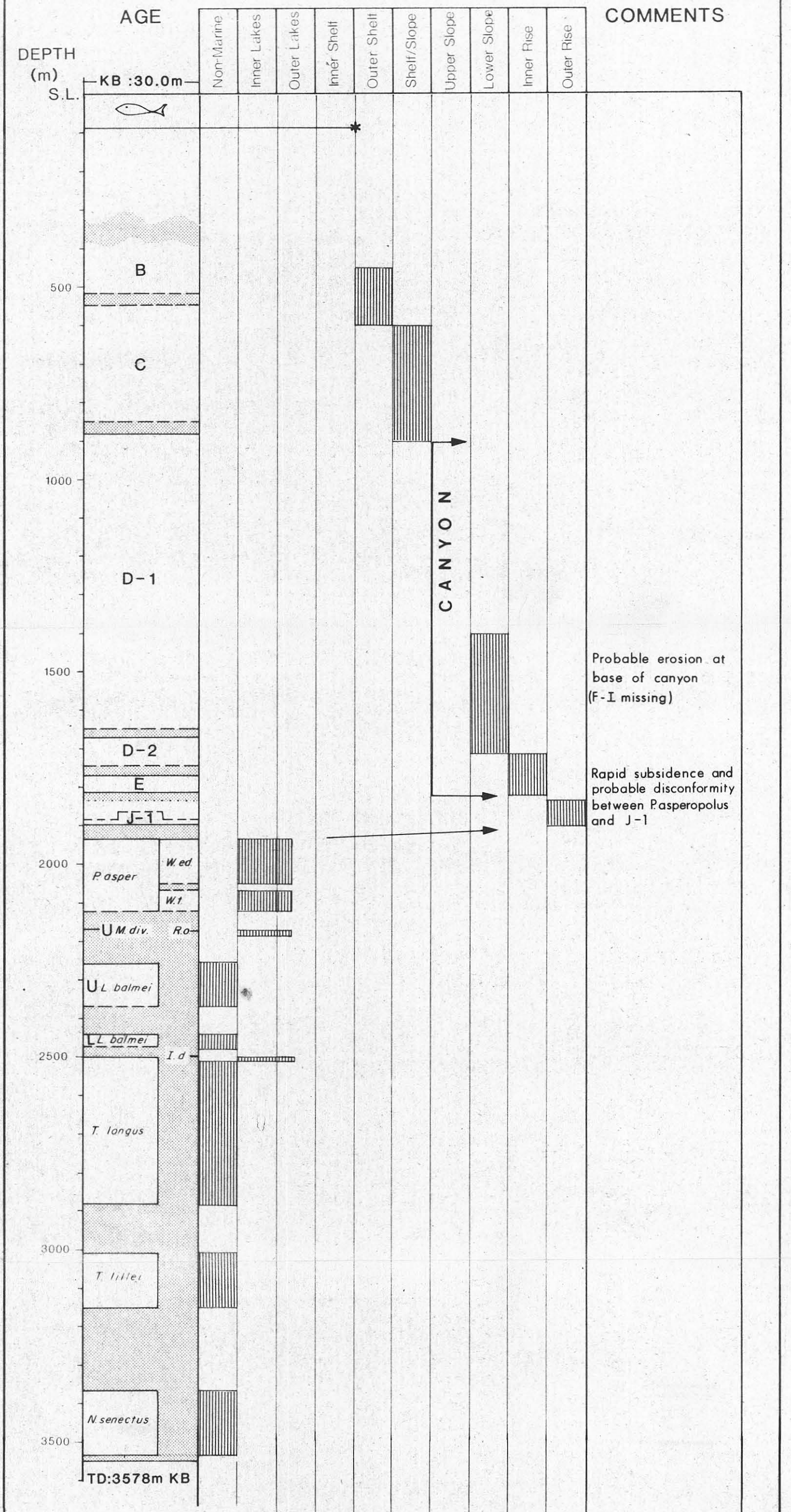
OR-103

T 1138 part 15 Copy

5 cm

FLOUNDER-1

PALEOENVIRONMENT



FLOUNDER-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

Prepared for

097031

UNION TEXAS PETROLEUM AUSTRALIA INC.

by PALTECH PTY LTD

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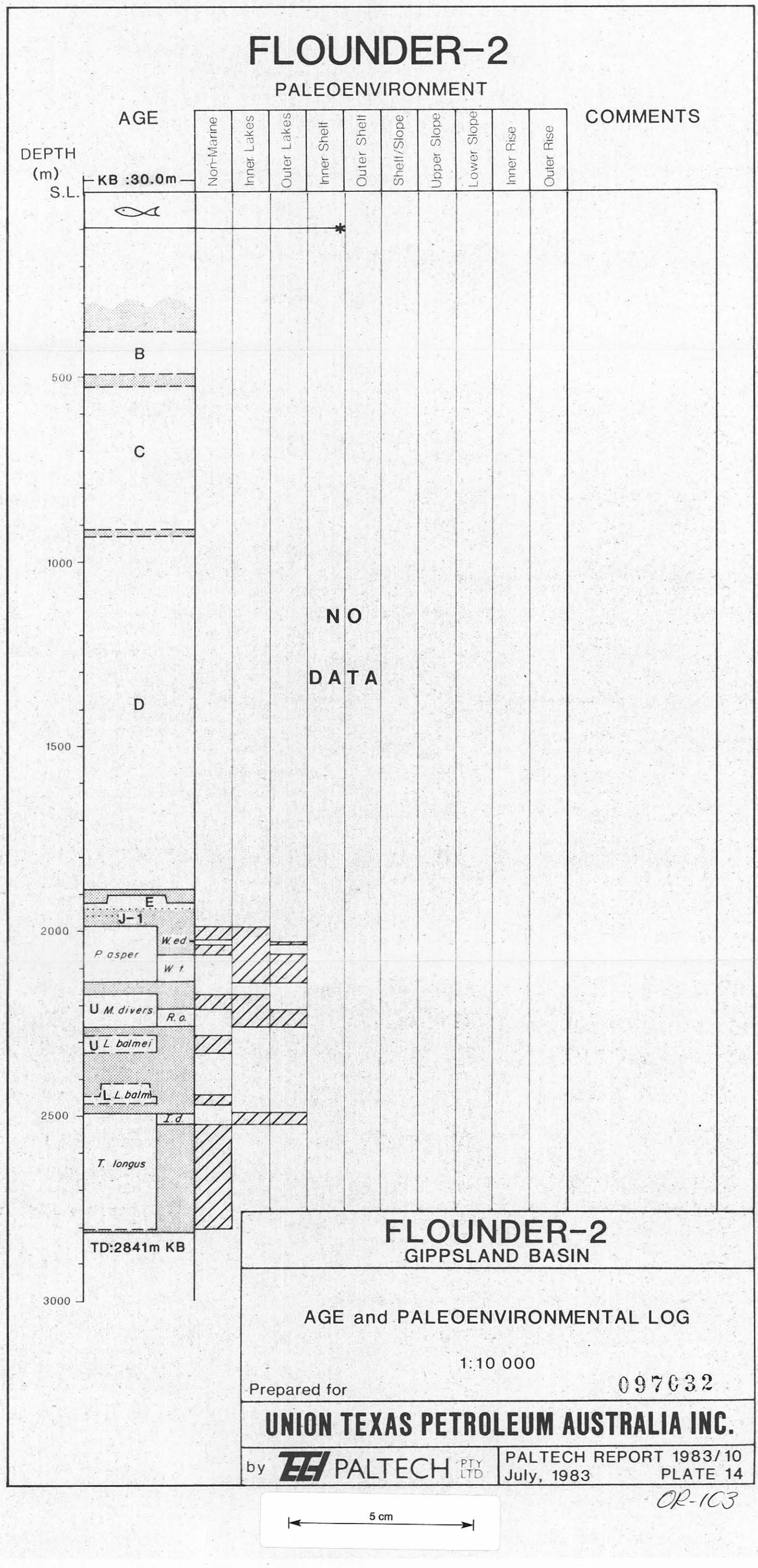
OR-103

T1/13p part 1S Copy/

5 cm

FLOUNDER-2

PALEOENVIRONMENT



FLOUNDER-2
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

Prepared for

097032

UNION TEXAS PETROLEUM AUSTRALIA INC.

by PALTECH PTY LTD

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OR-103

5 cm

T/13P part IS Copy 1

FLOUNDER-3

PALEOENVIRONMENT

AGE | DEPTH (m) | Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise | COMMENTS

KB :30.0m

S.L.

500

NO DATA

1000

1500

D-2

E

J-1

2000

P. asperopolus | W. ed | W. t

U M. diversus | R. o | R. w

U L. balmei

2500

T. longus | I. d

TD :2631m KB

3000

NO DATA

NO DATA

FLOUNDER-3
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

Prepared for

097033

UNION TEXAS PETROLEUM AUSTRALIA INC.

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T113P part 15 Copy 1

5 cm

FLOUNDER-4

PALEOENVIRONMENT

AGE

DEPTH (m)

COMMENTS

Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise

KB:9.8m

S.L.

500

1000

1500

2000

2500

3000

NO DATA

D-1

D-2

E

F

J-1

P. asp. Wt.

U M. divers. R. o.

L M. divers

U L. balmei A. ho.

L L. balmei

T. longus

TD:2624m KB

FLOUNDER-4
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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097034

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5 cm

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FLOUNDER-5

PALEOENVIRONMENT

AGE

DEPTH (m)

S.L.

KB:9.0m

Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise

COMMENTS

500

A

1000

B

1500

C

D-2

See detail below

F

E

W. ed

2000

P. asper

W. t.

U M. diversus

U L. balmei

2500

L L. balmei

T. longus

TD:2607m KB

N O

D A T A

Depth m. KB

1880

F

1900

1900m (S.L.)

I-1

1920

L N. asperus

P. asper.

W. ed

1940

1 : 2000

FLOUNDER-5

GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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T/13P part 15 (Copy)

5 cm

FLYING FISH-1

PALEOENVIRONMENT

AGE

DEPTH (m)

S.L.

KB:10.3m

Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise

COMMENTS

500

NO DATA

NO DATA

1000

P. tuberculatus

L *N. asperus*

1500

P. asperopolus

U *L. balmei*

L *L. balmei*

T. longus

2000

TD:1987m KB

2500

Probable unconformity between P.asperopolus and U. L.balmei

FLYING FISH-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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097036

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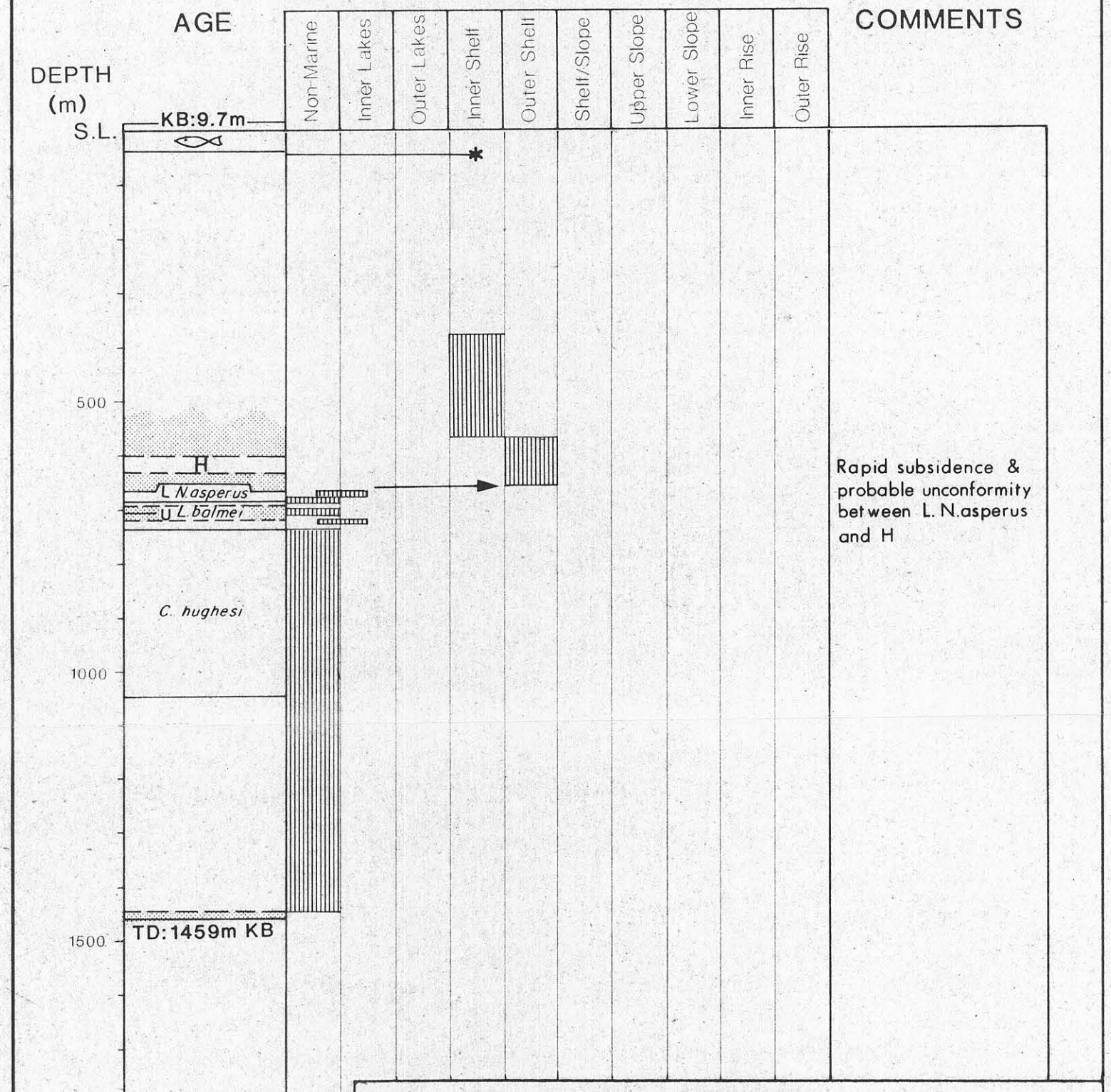
OR-103

5 cm

T 1130 part 15 Copy 1

GANNET-1

PALEOENVIRONMENT



GANNET-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

Prepared for

097037

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OR-103

5 cm

T/13P part 15 Copy 1

GOLDEN BEACH-1

PALEOENVIRONMENT

AGE | DEPTH (m) | Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise | COMMENTS

S.L.
KB: 12.0m

500

K

M-L
N. asperus

1000

L *M. diversus*

U *L. balmei*

1500

T. longus

T. lillei

N. senectus

C. trip/T.pach

2000

C. distocar.

C. striatus

2500

C. hughesi

TD: 2937m KB

3000

3500

GOLDEN BEACH-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

Prepared for

097038

UNION TEXAS PETROLEUM AUSTRALIA INC.

by PALTECH PTY LTD

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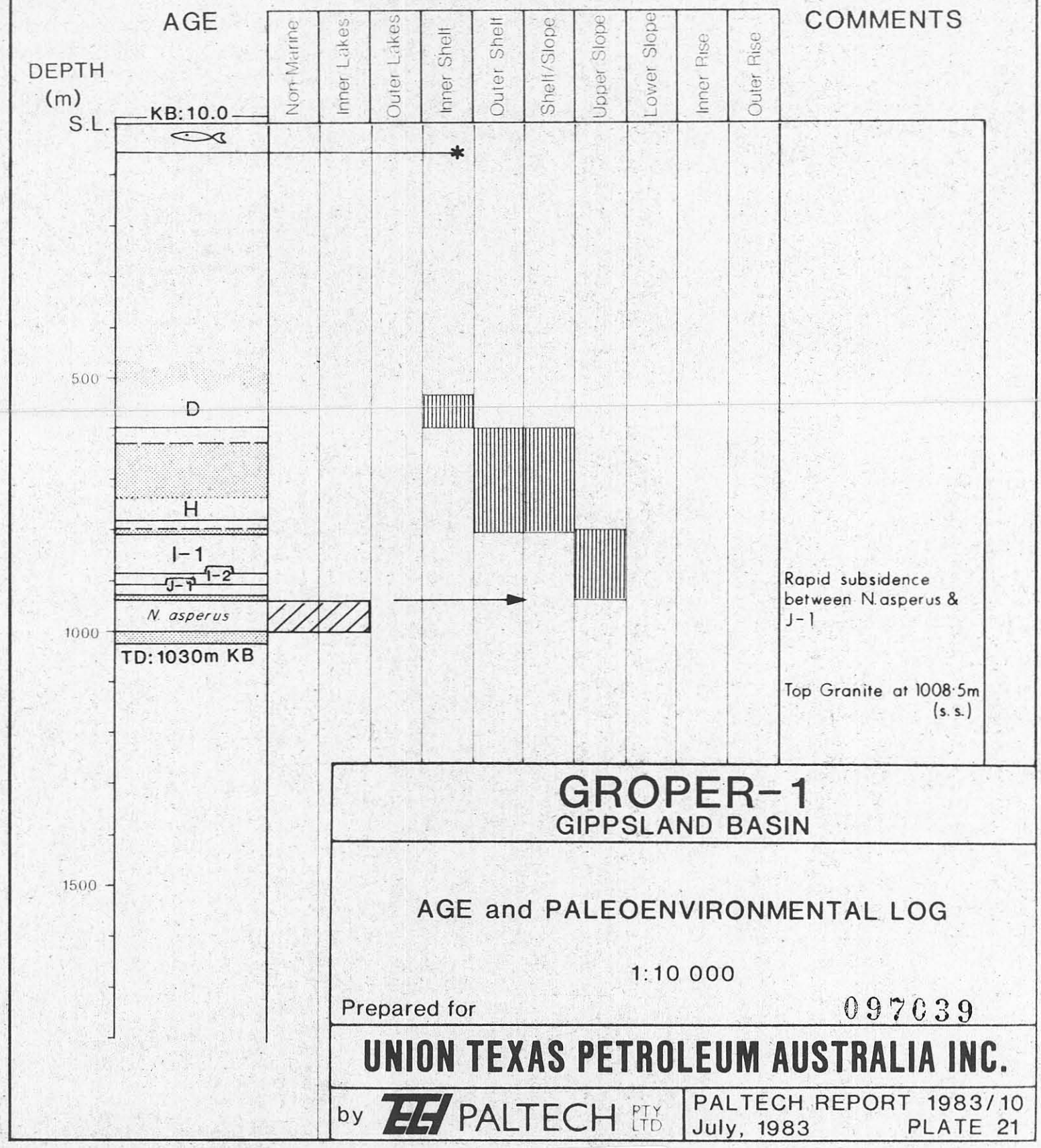
OR-103

5 cm

T1138 part 15 Copy 1

GROPER-1

PALEOENVIRONMENT



GROPER-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

Prepared for

097039

UNION TEXAS PETROLEUM AUSTRALIA INC.

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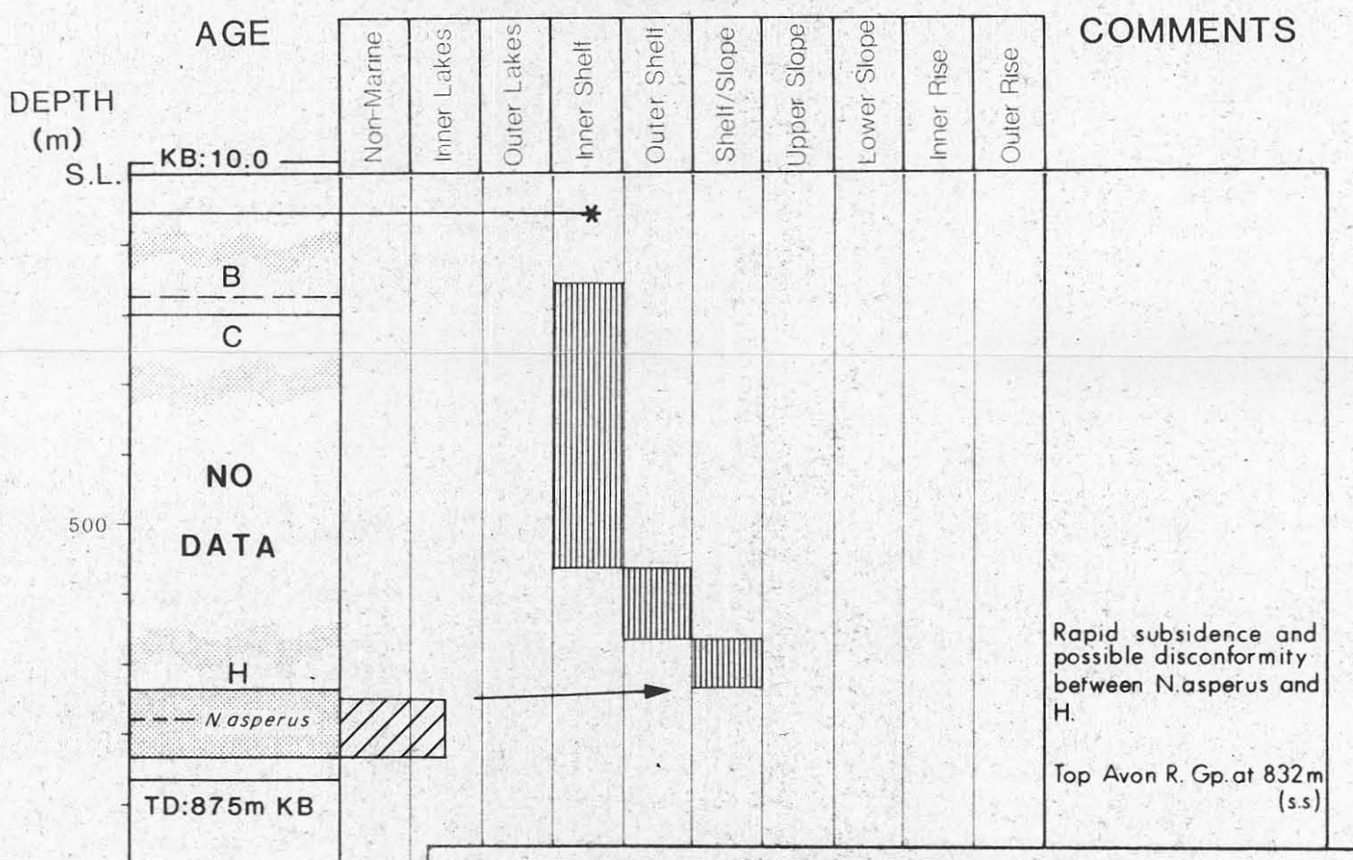
5 cm

T1130 part 15 Copy 1

CR-103

GROPER-2

PALEOENVIRONMENT



GROPER-2
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

Prepared for

097040

UNION TEXAS PETROLEUM AUSTRALIA INC.

by PALTECH PTY LTD

PALTECH REPORT 1983/10
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OR-103

5 cm

T/13P pack 15 Copy 1

HALIBUT-1

PALEOENVIRONMENT

AGE

DEPTH (m)

COMMENTS

Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise

S.L.

KB: 10.0m

A

B

500

C

1000

D-1

1500

D-2

2000

E

H

I

M. diversus

2500

3000

TD:3051m KB

3500

NO DATA

CANYON

Rapid subsidence and unconformity between M. diversus and I.

5 cm

HALIBUT-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

Prepared for

097041

UNION TEXAS PETROLEUM AUSTRALIA INC.

by PALTECH PTY LTD

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OR-103

T/13P part 15 Copy 1

HAPUKU-1

PALEOENVIRONMENT

AGE | DEPTH (m) S.L. | Non-Marine | Inner Lakes | Outer Lake | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise | COMMENTS

KB:8.5m

500

A-2

A-3

1000

1500

A-4

2000

B-1

B-2

D-1

2500

D-2

E

F

3000

T. longus

?

N. senectus

3500

TD:3650m KB

DISTAL CANYON

Probable erosion at base canyon (C missing)

Rapid subsidence & probable erosion below F

5 cm

HAPUKU-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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097042

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OR-103

T1/3P pant 15 Copy 1

KINGFISH-1

PALEOENVIRONMENT

AGE

DEPTH (m)

S.L.

KB:10.0m

Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise

COMMENTS

500

1000

1500

2000

2500

3000

D-1

D-2

E

H

I

J

L. balmei

TD:2576m KB

CANYON

Possible erosion at base canyon (F-G missing?)

Rapid subsidence below J.

KINGFISH-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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097643

UNION TEXAS PETROLEUM AUSTRALIA INC.

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5 cm

OR-103

T/13P part 1S Copy 1

KINGFISH-2

PALEOENVIRONMENT

AGE | DEPTH (m) | Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise | COMMENTS

S.L.

KB : 10.0m

500

NO DATA

NO DATA

1000

1500

2000

P.asperopolus

TD : 2445m KB

2500

KINGFISH-2
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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097044

UNION TEXAS PETROLEUM AUSTRALIA INC.

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T113P part 15 Copy 1

5 cm

KINGFISH-3

PALEOENVIRONMENT

AGE | DEPTH (m) | Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise | COMMENTS

KB: 10.0m

S.L.

500

1000

1500

2000

2500

NO DATA

NO DATA

L *M. diversus*

L *L. balmei*

TD: 2528m KB

KINGFISH-3
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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097045

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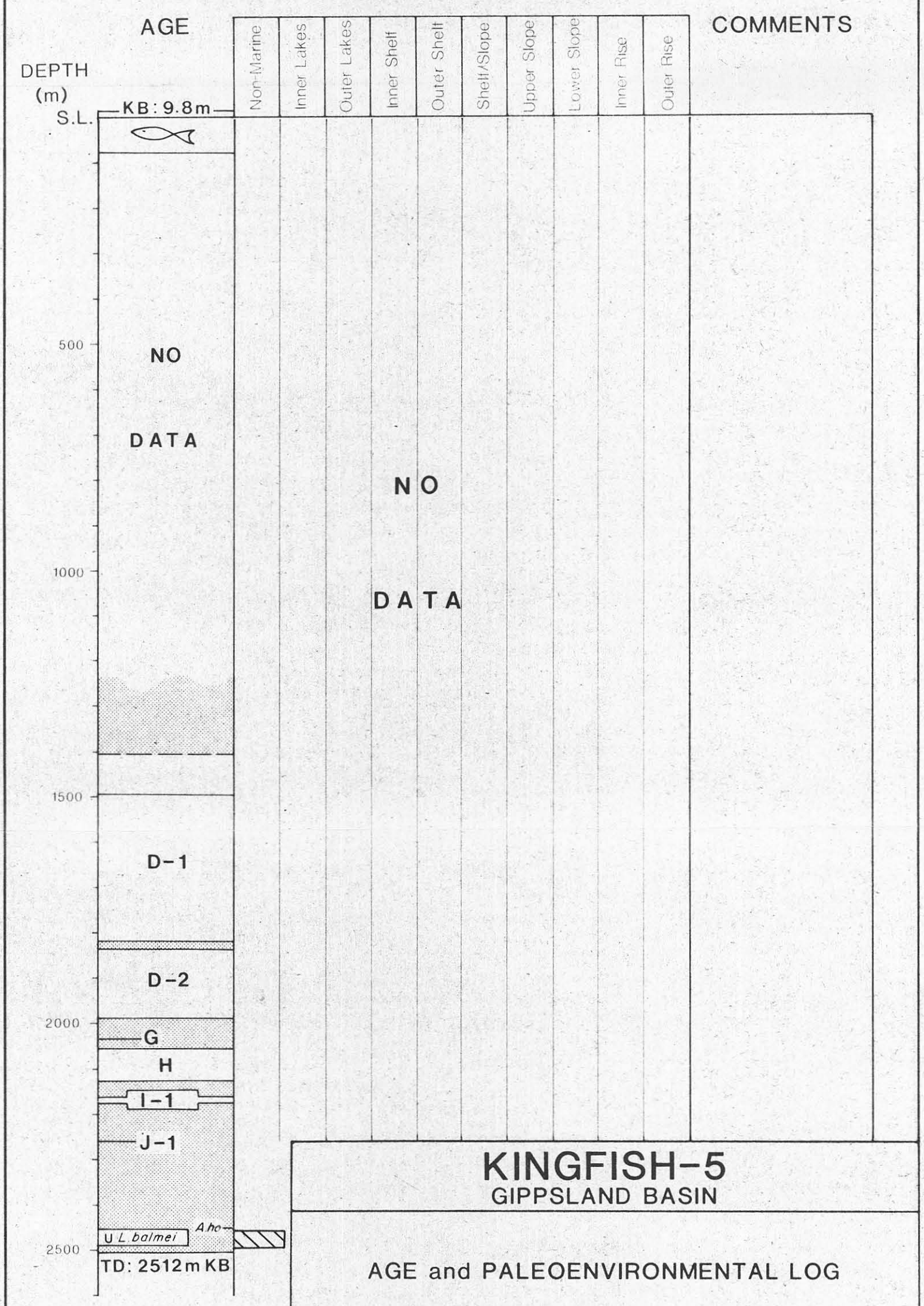
OR-103

5 cm

T/13P panel 15 Copy)

KINGFISH-5

PALEOENVIRONMENT



KINGFISH-5
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

Prepared for

097046

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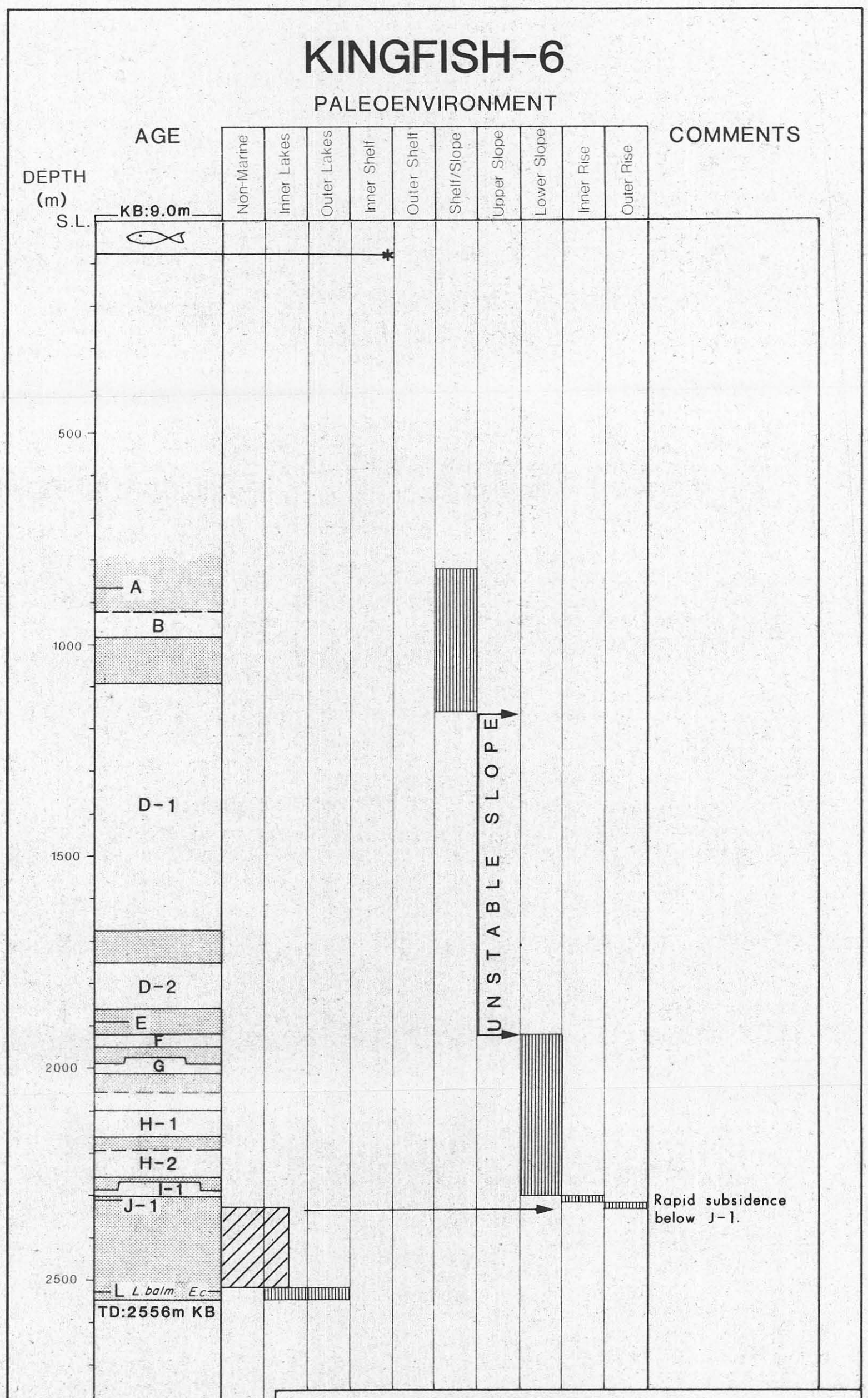
OR-103

5 cm

T 113P part 15 Copy 1

KINGFISH-6

PALEOENVIRONMENT



KINGFISH-6
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

097047

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UNION TEXAS PETROLEUM AUSTRALIA INC.

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OR-103

T 113P part 15 Copy 1

5 cm

KINGFISH-7

PALEOENVIRONMENT

AGE | DEPTH (m) | Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise | COMMENTS

KB: 25.3m
S.L.

500
1000
1500
2000
2500

C

NO DATA

INCORRECT SAMPLE LABELLING INFERRED OVER THIS INTERVAL

E
F
G
H-1
H-2
I-1 to *P. asperopolus*
L *M. diversus*

See detail below

TD: 2415m KB

Rapid subsidence between U. N.asperus and J-2

Depth m. KB

2200m (S.L.) 2220
2240
2260
2280
2300
2300m (S.L.) 2320

H-2
I-1
J-1
M *N. asperus*
L *N. asperus*
Wec
Wed
P. asper
W.t
L *M. diversus*
J-2
U *N.asperus*

ALL I-2 & HALF I-1 probably missing

1:2000

KINGFISH-7
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

Prepared for

097048

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by PALTECH PTY LTD

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July, 1983 PLATE 30

CR-103

T113P part 15 Copy 1

5 cm

MACKEREL-1

PALEOENVIRONMENT

AGE | DEPTH (m) | Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise | COMMENTS

KB:30.0m

S.L.

500

1000

1500

D-1

2000

D-2

E

F

G

H

I

J

2500

L. balmei

3000

TD:3049m KB

3500

CANYON

CANYON

Rapid subsidence & unconformity between L. balmei and J.

MACKEREL-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

Prepared for

097049

UNION TEXAS PETROLEUM AUSTRALIA INC.

by PALTECH PTY LTD

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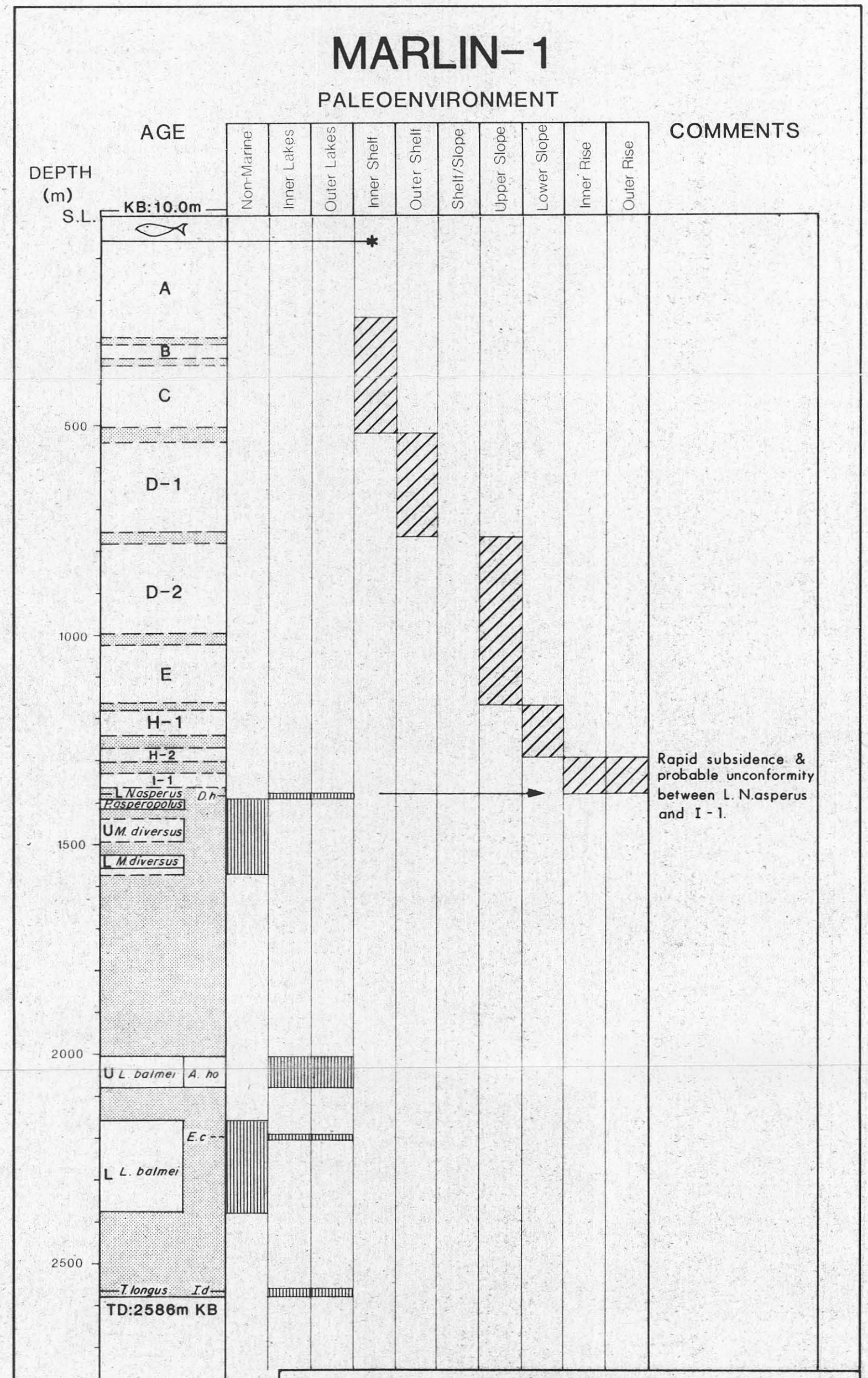
OR-103

5 cm

T1/13P part 15 Copy 1

MARLIN-1

PALEOENVIRONMENT



MARLIN-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

Prepared for

097050

UNION TEXAS PETROLEUM AUSTRALIA INC.

by PALTECH PTY LTD

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5 cm

OR-103

T/13P part 15 Copy/

MARLIN-4

PALEOENVIRONMENT

AGE

DEPTH (m)

S.L.

KB:9.7m

Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise

COMMENTS

500

1000

D-1

D-2

1500

F

G

H-1

H-2

I-1

L. N. asperus

P. asperopolus

2000

L. balmei

2500

T. longus

TD:2621m KB

3000

?

?

Rapid subsidence & probable unconformity between L. N. asperus and I-1.

Probable unconformity between L. balmei & P. asperopolus.

MARLIN-4
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

Prepared for

097051

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OR-103

5 cm

T/13P part 15 Copy 1

MORAY-1

PALEOENVIRONMENT

AGE

DEPTH (m) S.L.

KB: 10.0m

Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise

COMMENTS

500

D-2

1000

E-1

E-2

F

G

1500

H-1

H-2

See detail below

I-1 to U *L. balmei*

D.h

A.ho

E.c

L *L. balmei*

T.e

T. longus

T. lillei

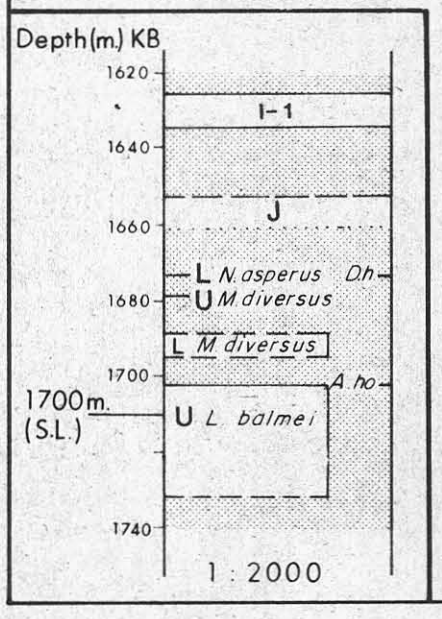
C. distocarinatus

2000

2500

TD: 2670m KB

NO DATA



MORAY-1

GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

097052

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UNION TEXAS PETROLEUM AUSTRALIA INC.

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OR-103

5 cm

T/13P part 15 (copy)

MORWONG-1

PALEOENVIRONMENT

AGE

DEPTH (m)

S.L.

KB:10.0m

Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise

COMMENTS

500

D-1

1000

D-2

1500

E

F

L *M. diversus*

A hy

U *L. balmei*

A ho

2000

L *L. balmei*

E c

TD:2439m KB

2500

3000

Rapid subsidence & unconformity between L. M.diversus and F.

MORWONG-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

Prepared for

097053

UNION TEXAS PETROLEUM AUSTRALIA INC.

by PALTECH PTY LTD

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July, 1983 PLATE 35

OR-103

5 cm

T/13P part 15 Copy

NANNYGAI-1

PALEOENVIRONMENT

AGE

DEPTH (m) S.L.

KB: 10.0m

Non-Marine	Inner Lakes	Outer Lakes	Inner Shelf	Outer Shelf	Shelf/Slope	Upper Slope	Lower Slope	Inner Rise	Outer Rise
			*						

COMMENTS

500

1000

1500

2000

2500

3000

NO DATA

NO DATA

L *N. asperus*

P. asperopolus

M. diversus

L. balmei

T. longus

TD: 3019m KB

NANNYGAI-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

097054

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T/13P Part 15 Copy

5 cm

OPAH-1

PALEOENVIRONMENT

AGE

DEPTH (m) S.L.

KB: 25.3m

Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise

COMMENTS

A-3

A-4

500

B

1000

C

1500

D-1

D-2

2000

E

F

G

H-1

H-2

See detail below

I to J

U *L. balmei* | *A.ho*

2500

TD: 2500m KB

C A N Y O N

Rapid subsidence & disconformity between U. M. diversus & P. tuberculatus

N.B. ESSO interprets U. M. diversus (here) as P. asperopolus.

Depth m. K.B.

2340 H-2

2360

I-1

2380

J-1

2400 J-2

P. tuberculat(part)

U M. diversus

2400m (S.L.) 2420

U *L. balmei*

2440

1 : 2000

OPAH-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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5 cm

PERCH-1

PALEOENVIRONMENT

AGE

DEPTH (m)

COMMENTS

Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise

S.L.

KB:10.0m

500

D-2

F

1000

H

I

J

EARLY EOCENE

1500

N O

D A T A

2000

2500

T. lillei

TD:2870m KB

3000

CANYON

Rapid subsidence & unconformity below J.

PERCH-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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5 cm

PIKE-1

PALEOENVIRONMENT

AGE | Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise | COMMENTS

DEPTH (m)

S.L.

KB: 10.0m

500

C

1000

D-1

D-2

1500

E-1

F

G

H-1

2000

L. balmei

TD: 2133m KB

2500

?

Rapid subsidence between H-1 and Latrobe Group

PIKE-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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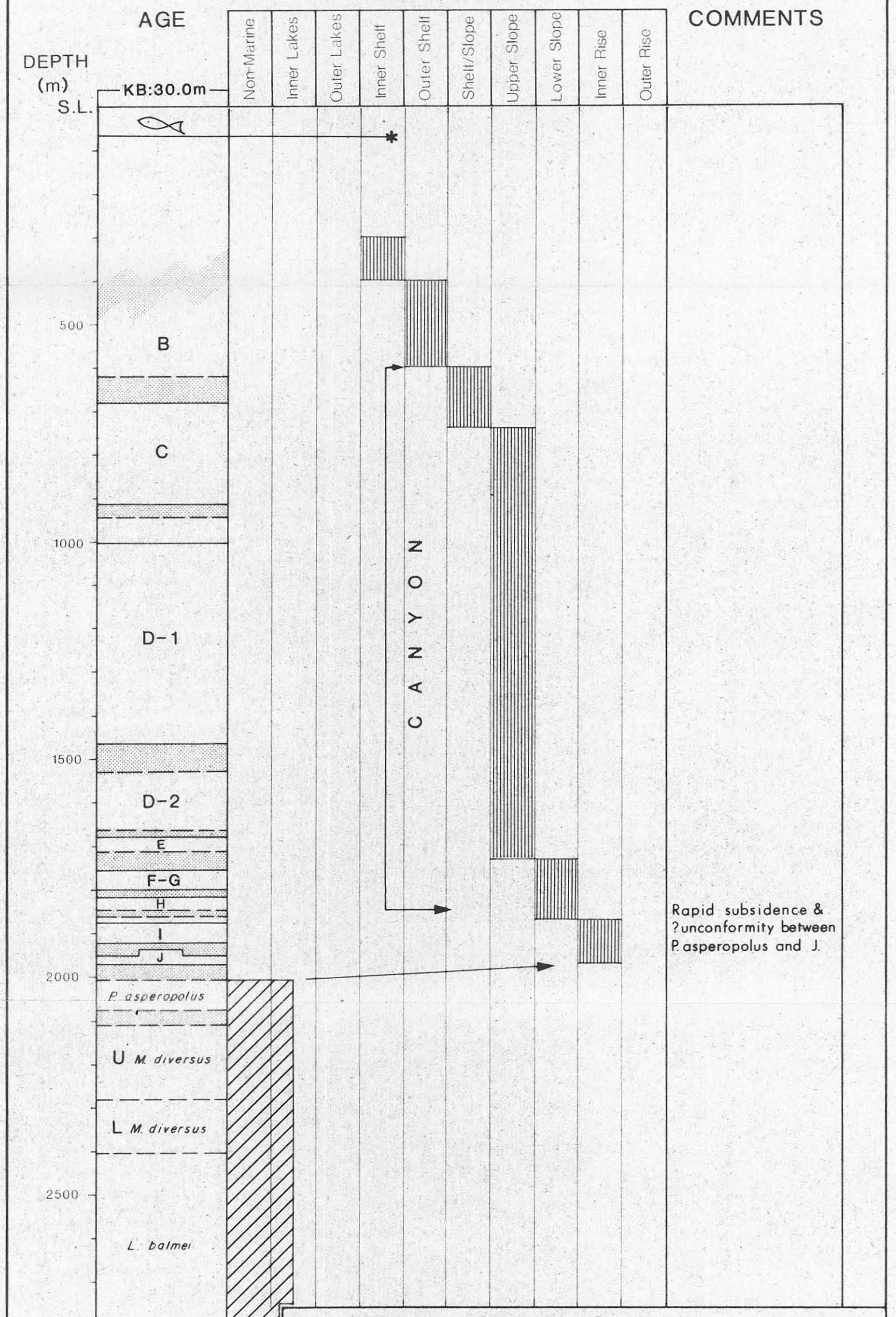
5 cm

T/13P pcm 1/15 Copy 1

SALMON-1

PALEOENVIRONMENT



SALMON -1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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5 cm

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SNAPPER-1

PALEOENVIRONMENT

AGE | DEPTH (m) | Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise | COMMENTS

KB:10.0m

S.L.

NO DATA

500

D

1000

E

F

G

L *N.asperus*

P. asper.

D.h.

W.t.

1500

L *M. div.*

U *L.balmei*

A.ho.

2000

L *L.balm.*

T. longus

2500

T. lilliei

3000

N.senectus

3500

TD:3755m KB

SNAPPER-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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5 cm

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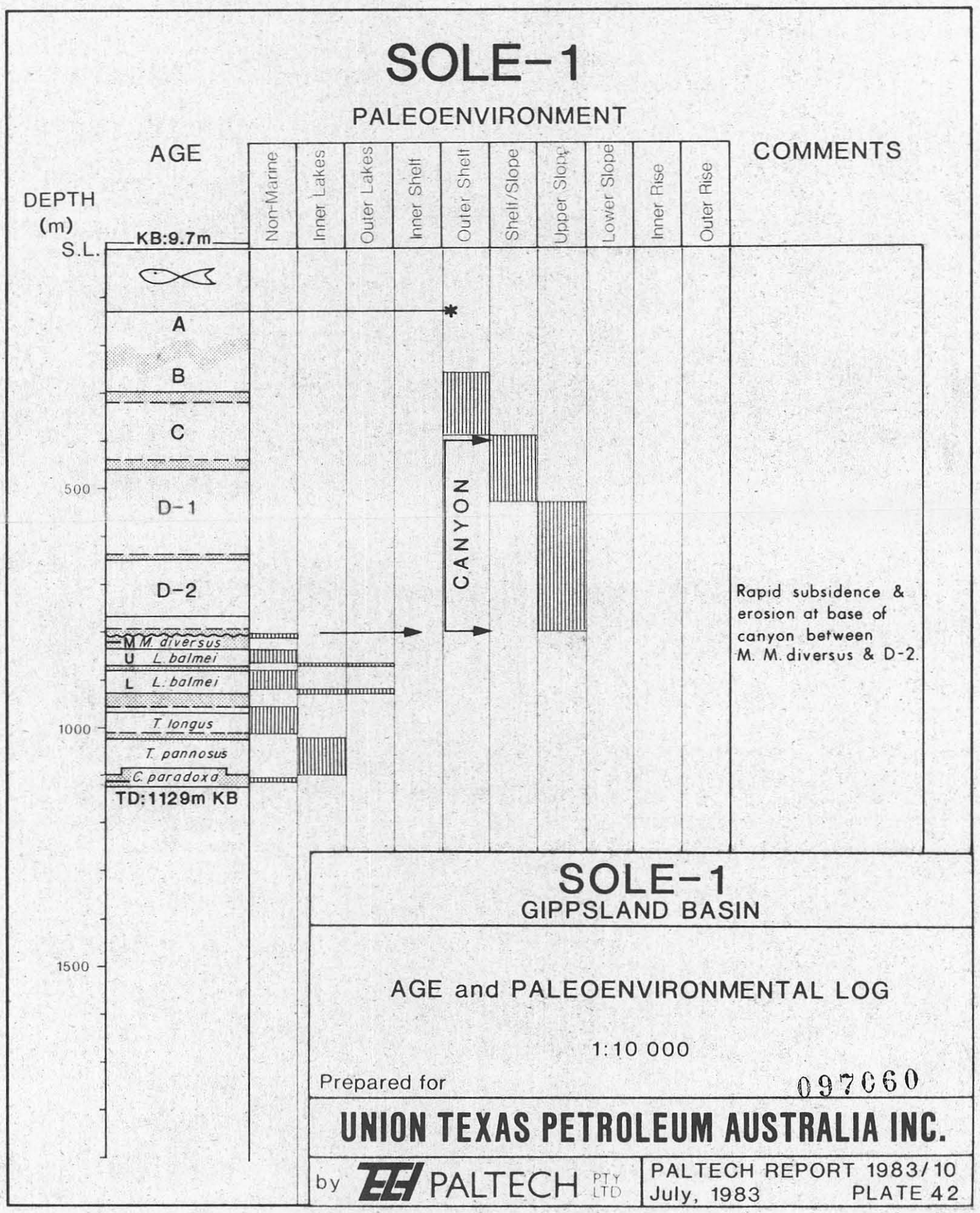
T 113 p part 15 (copy)

SOLE-1

PALEOENVIRONMENT



SOLE-1

GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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5 cm

STONEFISH-1

PALEOENVIRONMENT

AGE

DEPTH (m)

S.L.

KB : 10.0m

Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise

COMMENTS

500

C

1000

D-1

D-2

1500

E

F

G

See detail below

H-1

P. asperopolus

2000

U *L. balmei*

A. ho.

L *L. balmei*

2500

T. longus

T. lillei

3000

N. senectus

TD: 3183m KB

Erosion & rapid subsidence between H-1 and J.

Disconformity between P. asperopolus and J.

Depth m. K.B.

1780

H-1

1800

J

1800m (S.L.)

P. asperopolus

1820

1:2000

STONEFISH-1

GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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5 cm

SWEEP-1

PALEOENVIRONMENT

AGE

DEPTH (m)

KB: 25.0m

S.L.

Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise

COMMENTS

A-3

A-4

B-1

500

C

D-1

D-2

E-1

E-2

F

See detail below

G to *T. longus*

?

Unconformity between L. N.asperus and H-2

TD. 900m KB

1000

Depth m. K.B.

700

700m. (S.L.)

720

F

740

G

H-1

H-2

760

L *N. asperus*

780

800

U *L. balmei*

800m. (S.L.)

820

T. longus

840

1:2000

SWEEP-1

GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

097062

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OR-103

5 cm

T1113P part 1S Copy 1

TAILOR-1

PALEOENVIRONMENT

AGE

DEPTH (m)

S.L.

KB: 10.0m

Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise

COMMENTS

500

C

1000

D-1

1500

D-2

2000

E

F

G

H

I

J

2500

L. balmei

TD: 2590m KB

3000

?

CANYON

Rapid subsidence below J.

TAILOR-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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OR-103

5 cm

T/13P part 15 (Copy)

THREADFIN-1

PALEOENVIRONMENT

AGE | Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise | COMMENTS

DEPTH (m) S.L.

KB:25.3m

500

1000

NO DATA

1500

2000

2500

P. tuberculatus

?

U L. balmei

A ho

T. longus

I. d

TD:2735m KB

3000

NO DATA

THREADFIN-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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T/13P part 15 Copy1

5 cm

TREVALLY-1

PALEOENVIRONMENT

AGE | DEPTH (m) | Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise | COMMENTS

KB: 10.0m

S.L.

500

1000

1500

2000

2500

C

D-1

D-2

E

G

L. M. diversus

U L. balmei | A. ho

TD: 2284m KB

N O

D A T A

Unconformity between L. M. diversus and G.

TREVALLY-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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5 cm

T/13P Part 15 Copy 1

TUNA-1

PALEOENVIRONMENT

AGE

DEPTH (m)

S.L.

KB:10.0m

Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise

COMMENTS

A

B

500

C

D-1

1000

D-2

E

F

L N.asp.

P.asper

W.t.

1500

U L. balmei

L L. balmei

T. longus

T. lillei

2000

N. senectus

2500

C trip / T. pach

3000

C. distocarin

3500

TD:3640m KB

NO DATA

Unconformity between L. N. asperus and F.

TUNA-1
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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5 cm

300

T/13P park 15 Copy 1

TUNA-2

PALEOENVIRONMENT

AGE | DEPTH (m) | Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise | COMMENTS

KB:10.0m

S.L.

500

C

D-1

D-2

1000

E

F G

P asperopolus

1500

U *M. diversus*

L *L. balmei*

T. longus

2000

T. lillei

2500

TD:2762m KB

3000

NO DATA

Probable unconformity between P.asperopolus and G.

TUNA-2
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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5 cm

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TUNA-3

PALEOENVIRONMENT

AGE | DEPTH (m) | Non-Marine | Inner Lakes | Outer Lakes | Inner Shelf | Outer Shelf | Shelf/Slope | Upper Slope | Lower Slope | Inner Rise | Outer Rise | COMMENTS

KB:10.0m

S.L.

500

C

NO DATA

D-1

1000

D-2

E

F

Unconformity between L.N. asperus and F.

? K

L. N. asperus

Puspel.

L. M. diversus

1500

U *L. balmei*

L *L. balmei*

T. longus

2000

T. lillei

N. senectus

2500

C. trip / T. poch

TD:2823m KB

3000

5 cm

TUNA-3
GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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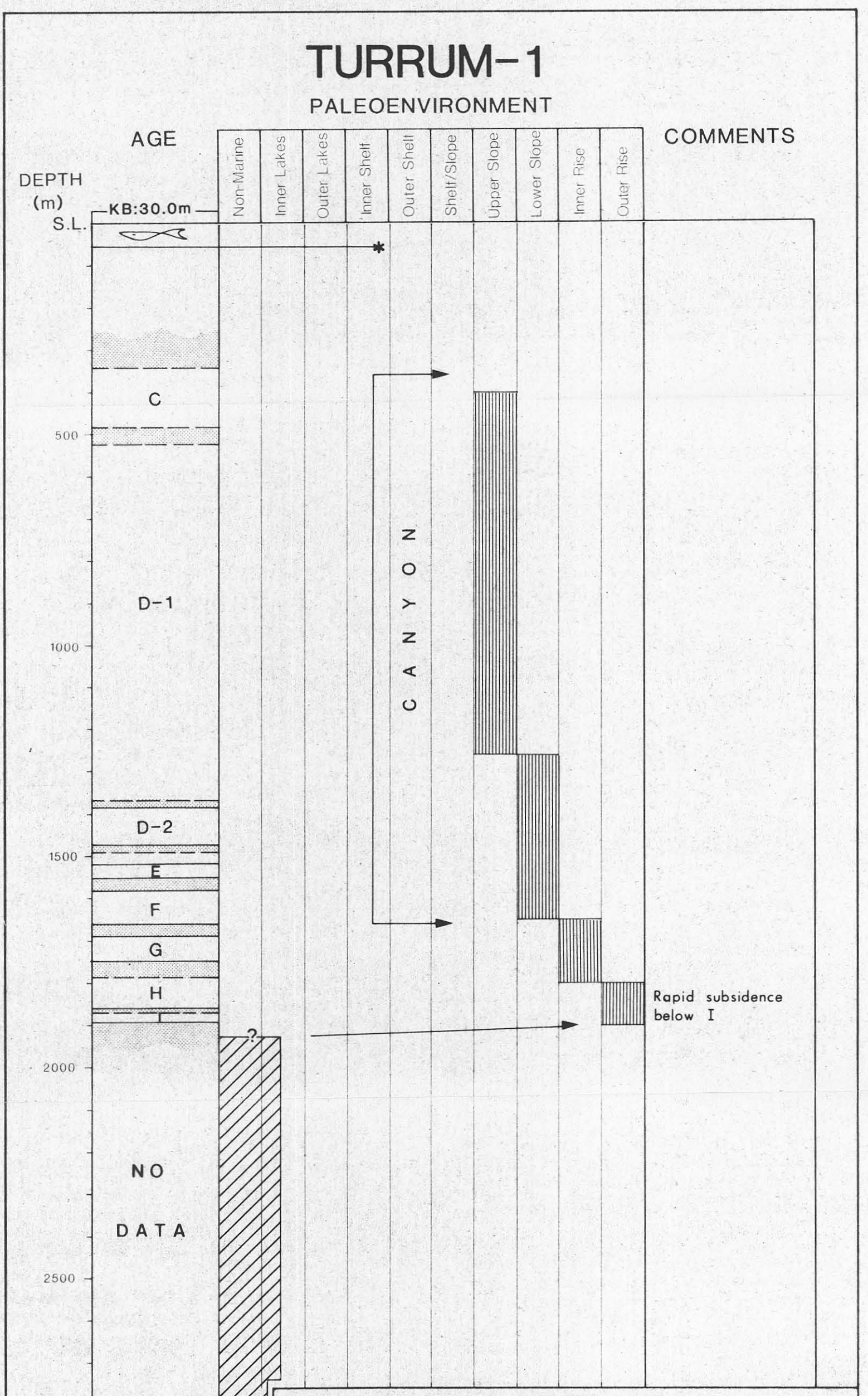
TURRUM-1

PALEOENVIRONMENT



TURRUM-1

GIPPSLAND BASIN

AGE and PALEOENVIRONMENTAL LOG

1:10 000

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5 cm

CR-103.

T 113 P part 15 Copy 1