W772. PISCES-1.

GEOLOGICAL EVALUATION REPORT

PISCES NO. 1

(WCR VOL 2)

VICTORIA PERMIT 12, GIPPSLAND BASIN, AUSTRALIA

ALLIED Corporation

UNION TEXAS AUSTRALIA, INC.

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OIL and GAS DIVISION

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UNION TEXAS AUSTRALIA INCORPORATED

PISCES NO. 1
VICTORIA PERMIT 12, OFFSHORE GIPPSLAND BASIN
GEOLOGICAL EVALUATION REPORT

UNION TEXAS AUSTRALIA INC.
MELBOURNE
JULY 1982

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1. INTRODUCTION

The Pisces No. 1 exploration well in Permit Vic P/12 of the Offshore Gippsland Basin was spudded at 1200 hrs. on April 15th, 1982. The well was located in 122 m. of water at shot point 1157 on seismic line GC 80-11A (Fig. 1). The exact co-ordinates of the well-site were 39° 03' 35.919" S and 148° 30' 42.474" E, which is an error of 33 m. at an azimuth of 224.614° from the specified location.

The Pisces No. 1 well was designed to test what were considered to be complex combined stratigraphically/structurally trapped Latrobe Group sediments at a position immediately adjacent to the northern boundary fault of the Southern Platform. The Latrobe Gp. sediments are the primary hydrocarbon reservoir rocks in the highly productive Gippsland Basin. The well also tested a fault-defined structural prospect involving Latrobe Group sediments at the same location (the "Archer Prospect").

The location of Pisces No. 1 was also selected in that it would provide essential stratigraphic information relating to deep water prospects in the north-east of Permit Vic P/12 and to shallow water prospects located on the Southern Platform in the south-west of the Permit.

The well was plugged and abandoned 31 days later on May 15th, 1982. No significant hydrocarbon indications were recorded during the drilling of Pisces No. 1 and the well was abandoned as a dry hole.

While an earlier report dealt with a detailed description of the geology penetrated in Pisces No. 1 (Geological Completion Report and Drilling Summary Report, Pisces No. 1, Union Texas Australia Inc., Melbourne, June 1982) the present report is designed as a detailed geological evaluation and attempts to explain the lack of hydrocarbons in the well.

The report commences with a brief synopsis of the original prognosis of the Pisces Prospect since this was a new concept for the Offshore

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Gippsland Basin in that for the first time complex stratigraphically/structurally defined traps were the primary target.

The section penetrated by the well is then compared with the predicted geology as outlined in the well prognosis (Well Proposal, Pisces No. 1, Union Texas Australia Inc., Melbourne, March 1982). Major differences between the two are outlined and discussed.

The results of Pisces No. 1 well are discussed in terms of their contribution to the regional geological knowledge of the Offshore Gippsland Basin, in particular to a knowledge of the geology of the southern flank of that basin. This entails a discussion of the age and particular lithological characteristics of the Gippsland Limestone Fm., Lakes Entrance Fm. and Latrobe Valley Group sediments; of the geochemistry of the Latrobe Valley Group sediments; and of the nature of the Gurnard Formation and Lakes Entrance Formation Greensand sediments.

The proposal is presented that the Pisces No. 1 well penetrated a distinctively different Latrobe Group section from that normally encountered in the Gippsland Basin: the well penetrated sediments deposited in a topographically higher "rim basin" located to the south of the deep Gippsland Basin. This has been informally named the "Pisces Sub-Basin".

2. THE ORIGINAL CONCEPT OF THE PISCES PROSPECT

The Pisces No. 1 well was designed to test complex stratigraphically/structurally trapped Latrobe Valley Group sediments at a position immediately adjacent to the northern boundary fault of the Southern Platform, the latter being a basement high regarded as defining the southern side of the Gippsland Basin (Fig. 1).

Correlation with wells drilled to the north-west suggested that reworked marginal marine and deltaic sediments might provide reservoir sands along the northern margin of the Southern Platform. Such reservoir sands were considered to have been deposited in a high-energy, marginal marine environment and, therefore, might retain excellent porosity and permeability characteristics.

The recognition of the Pisces Prospect was based upon the recognition, extrapolation and correlation of Lower Tertiary delta top coal swamp deposits within the upper part of the Latrobe Valley Group which were recognised as providing stratigraphic seal in the productive Fortescue and West Kingfish oil fields to the north (Fig. 1). Such coal swamp deposits were recognisible by distinctive stratigraphic truncation events seen to occur on seismic sections in the north-east of Permit Vic P/12 (Fig. 8). Fig. 2 maps the truncation of three such sequences which were considered to be capable of providing basal and lateral seal to potential oil pools.

The prospect geometry was completed by combining an element of structural closure with the mapped stratigraphic truncation events. In this instance structural closure was provided at the level of the regionally extensive Top Latrobe Valley Group unconformity (Fig. 3). A number of potential prospect geometries could be defined in this way, each showing stratigraphic truncation to the south and west and dip-reversal at the Top Latrobe Valley Group unconformity to the north and east. The Pisces Prospect was located to test the maximum number of such prospect geometries.

In every instance it was believed that vertical seal to potential hydrocarbon reservoirs would be provided by the uniform marine mudstones of the overlying Oligocene-Miocene Lakes Entrance Formation (Fig. 8).

It was considered that hydrocarbons would have been sourced in a deep structural trough located to the north of Permit Vic P/12, in an area which was considered to be the main hydrocarbon source area in the basin (Fig. 2). The Pisces Prospect was located on the steeply dipping southern flank of this depression and could have received hydrocarbons migrating laterally away from the trough.

In addition, sufficiently mature sediment might have directly underlain the area of the Pisces Prospect to have allowed in-situ oil generation and migration along fault planes.

3. PREDICTED GEOLOGY COMPARED WITH SECTION DRILLED

Figure 4 compares the predicted section, as presented in the well prognosis, with the geological section penetrated by Pisces No. 1. The detailed geological composite log, with palynological and micropaleontological dates attached, is presented as Enclosure (4).

Each of the eleven seismic events chosen as marker horizons before the drilling of Pisces No. 1 were penetrated at depths within acceptable limits of error: the maximum error of 35 m. for the Light Green marker (Intra-Latrobe Event (1)) represents only a 1.7% error at its depth of 2030 m. (s.s.). This suggests that the velocities used in migrating the stack sections are accurate and that confidence can be placed on previous structural mapping.

The Light Blue marker appeared at a depth of 544 m. (s.s.) and represented a multicoloured volcanic tuff of Middle Miocene-Pleistocene age. This lithological unit appears to be an extremely useful chronological marker over the southern flank of the basin as a correlatable volcanic unit of similar age occurs in the Sailfish No. 1 well, 50 kms. to the south-east of Pisces No. 1.

The Light Brown marker appeared within 2 m. of prediction at 683 m. (s.s.) and represented the base of a series of distinctive pale brown microcrystalline limestones.

The Pale Green marker at 843 m. (s.s.) represented the top of a sequence containing a higher percentage of clastics than the overlying section. The event is probably of Middle-Late Miocene rather than Early Miocene age.

The event predicted to appear at 1155 m. (s.s.) and suggested to represent the top of the Lakes Entrance Formation appeared at 1132 m. (s.s.) and proved to be the base of a sequence of middle shelf claystones, siltstones and distinctive limestones.

The important Orange event appeared at 1662.5 m. (s.s.). It separated Middle Miocene siltstones and mudstones, deposited in a deep water environment as carbonate canyon infill, from a Lower Miocene sequence of high energy progradational sediments which, as predicted, contained an increased percentage of coarser clastics, including several units of fine grained sandstone.

The Yellow marker, the Top Latrobe unconformity, appeared 20 m. high on prediction at 1804.5 m. (s.s). While the marker did, as predicted, represent the top of a series of marginal marine sediments, these proved to be of Late Cretaceous rather than Early Tertiary age.

Each of the first three intra-Latrobe markers (Dark Blue, Dark Green and Light Green markers) were penetrated within acceptable limits of error and, as predicted, proved to be the top or base of distinctive deltaic mudstone intervals capable of providing stratigraphic seal.

The Dark Brown marker, suggested as representing a "Top Cretaceous" event, proved to be the base of a distinctive intra-Latrobe channel. The marker appeared within 19 m. of prediction at 2266 m. (s.s.) which is an error of 0.8% at this depth.

The Grey marker, thought to represent the top of the Strzelecki Group, appeared 26 m. low at 2436 m. (s.s.). It represented the top of a sequence of carbonaceous claystones, siltstones and sandstones of Campanian age which were both lithologically and genetically quite distinct from the overlying sediments.

4. CONTRIBUTIONS TO REGIONAL GEOLOGICAL KNOWLEDGE

The drilling of the Pisces No. 1 well has led to a greatly increased understanding of the geology and prospectivity of the southern flank of the Gippsland Basin. The following details the main observations drawn from the drilling of the well.

4.1. The Nature of the Gippsland Limestone Formation and Lakes Entrance Formation over the Interval 1650 - 1796.5 m.

The character of the Gippsland Limestone and Lakes Entrance Formations sediments down to the level of the Orange seismic event at 1684.5 m. was much as expected in that they represented deep water equivalents of the more normal shelfal facies associated with these formations. However, the section below 1684.5 represented a Lower Miocene high energy progradational sequence deposited at the shelf/slope edge in approximately 200 m. of water (Fig. 5).

The progradational sequence can be subdivided into two distinct units: an upper unit from 1684.5 m. to 1745 m. was characterised by 2-3 m. thick beds of mature, well sorted, fine grained sandstones interbedded with siltstones and claystones; while the lower unit from 1745 m. to 1796.5 m. was dominated by calcareous and glauconitic mudstones and siltstones deposited in relatively deep water.

The stratigraphic dipmeter from 1750 m. to 1796.5 m. (Enclosure 5) demonstrates low angle and well ordered current bedding in opposing directions which suggests winnowing of the sediments under the influence of a strong bottom current as might be expected at the distal margin of a prograding deep water sedimentary pile.

The upper unit is, therefore, considered to represent the foresetting of a progradational wedge building out across a lower

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basal shale unit at the edge of the shelf.

The sedimentary wedge probably resulted from distal, carbonate discharge from a submarine canyon which was apparent as canyon infill above 1684.5 m. (Figure 5).

Seismic lines GC 80-11A (Fig. 8) illustrates a marked thickening of the Yellow-Orange seismic interval towards the south-west of the Pisces well-site and onto the Southern Platform. That is, it illustrates substantial thickening of the progradational wedge towards the south-west.

It is probable that the proportion of coarser grained clastics also increases in this same direction as the more proximal part of the wedge is approached. This is borne out by the character of the seismic events within the sedimentary wedge which strongly suggest an interbedded sequence of sandstones and finer grained clastics.

4.2. The Nature of the Gurnard Formation and Lakes Entrance Formation Greensand

The 30 m. thick section between the base of the Lower Miocene progradational wedge at 1796.5 and the top of the Latrobe Valley Group at 1826.5 m. can be subdivided into two distinct greensand formations as follows (Fig. 5):

1. Between 1796.5 m. and 1808 m.: a sequence of fine grained, quartzose, argillaceous sandstones containing coarse wind blown quartz grains. The unit represents the "Lakes Entrance Formation Greensand" of Early Oligocene age and is interpreted as having been deposited as a prodeltaic sheet sand. The unit is delimited above and below by pronounced unconformities.

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2. Between 1808 m. and 1826.5 m.: a coarser grained sandstone unit containing distinctive pellets of glauconite. The glauconites were oxidised to limonite over the interval from 1808 to 1816.5 m. such that an upper, red iron-stained interval could be distinguished from a lower, green unoxidised interval. The lowermost part of this unit graded into a glauconitic siltstone between 1819 m. and 1826.5 m.

   The whole of the section from 1808 m. to 1826.5 m. is considered to represent the Gurnard Formation of Eocene? age, deposited in a sub-tidal (estuarine or lagoonal) environment.

   The Gurnard Formation is separated by unconformities from the overlying Lakes Entrance Formation Greensand and the underlying Latrobe Valley Group sediments.

Comparison of the section between 1796.5 m. and 1826.5 m. in Pisces No. 1 and the type section of the "Gurnard Formation" in the Gurnard No. 1 well (Fig. 6, after Esso) suggests that, in the latter well, a dual subdivision into an upper and a lower greensand unit can also be achieved i.e. the "Gurnard Formation" in Gurnard No. 1 can be divided into the Lakes Entrance Formation Greensand and Gurnard Formation (sensu stricto).

Such a correlation, over a distance of 76 km. between Pisces No. 1 and Gurnard No. 1 (via Moray No. 1), can be extrapolated to the northern flank of the basin through Salmon No. 1 and Flathead No. 1 (Enclosure 1), a distance of 160 km. Both the Lakes Entrance Formation Greensand and Gurnard Formation retain remarkably consistent e-log and lithological characteristics across this distance.

Clearly these two distinct formations, although no more than 30-40 m. thick over an extremely wide area, are regionally important sheet sands which are transgressive across Latrobe Group sediments ranging in age from Campanian (T. Longus) to Middle Eocene (P. Asperopolus) (Enclosure 1).

The importance of this observation is paramount in that the geometry of the Lakes Entrance Formation and Gurnard Formation Greensands as sheet sands, destroys the potential for stratigraphically confined hydrocarbons on the southern flank of the Gippsland Basin.

Figure 7 (Part 1 and 2) illustrate the assertion upon which the Pisces prospect had been based: that the Gurnard Formation was the youngest part of the Latrobe Valley Group. In reality the Gurnard Formation and Lakes Entrance Formation Greensands are lithologically, genetically and geochronologically distinctly different formations which unconformably overlie the Latrobe Valley Group (Fig. 7 Part 3). Any oil migrating into the stratigraphic traps tested would continue their movement into the overlying sheet sands and up dip to the south and west of the Pisces No. 1 well. [illegible]

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Figures 8 and 9 emphasise the fact that the Pisces No. 1 well was probably dry because the existence of sheet sands between the Latrobe Valley Group and Lakes Entrance Formation destroyed the integrity of vertical seal to the reservoirs.

Further towards the north-east along seismic line GC 80-11A from Pisces No.1 Lower Miocene progradational sands will be in direct contact with the underlying Eocene-Oligocene sheet sands and add to the destruction of vertical seal (Fig. 9).

Perhaps the lack of emphasis upon the nature of such sheet sands is brought about by the fact that where they exist across structural traps they will enhance reservoir capacity rather than destroy it (Fig. 7, Part 4). Such is the situation in the central part of the Gippsland Basin where structural traps have been the main exploration target.

Figure 10 illustrates the way in which the litho/chronostratigraphic picture of the southern flank of the basin might be re-drawn to emphasise the nature of the Gurnard Formation (and Lakes Entrance Formation Greensand).

4.3. The Ages and Depositional Environments of the Labrobe Valley Group Sediments

The regional unconformity marking the top of the Latrobe Valley Group was penetrated at 1826.5 m. in Pisces No. 1 (Enclosure 5). While it had been predicted that the Latrobe Group sediments would be Early Tertiary in age the whole Latrobe Group section proved to be of Late Cretaceous age. Sediments in the interval between the unconformity at 1826.5 m. and a depth of 2161 m. proved to be Maastrichtian, while sediments between 2161 m. and T.D. at 2580 m. were Late Campanian to Maastrichtian. A full discussion of this dating is attached as Appendix 1.

The palynological studies revealed that both dinoflagellates and spore/pollen were preserved below the Gurnard Formation, thus allowing both techniques to be used for dating (Enclosure 4).

Sporadic benthonic foraminifera between 1820.5 and 2320 m. were composed entirely of arenaceous forms which were euryhaline, tolerating fluctuating water salinities and, as such, this interval is interpreted as having been deposited in marginal marine environments such as lagoons, estuaries and delta fronts.

The section studied also yielded a well preserved Lower Cretaceous marine dinoflagellate sequence which confirmed this interpretation and extended the boundary of marginal marine deposition to a depth of 2509 m. From 2580 m. to 2509 m. (T.D.) the sediments were deposited in a continental environment.

The palynological and foraminiferal interpretation of marginal marine environments of deposition from 2509 m. to 1826.5 m. is at variance with the stratigraphic dipmeter interpretation which suggests deep water shelf or slope deposition in a single genetic cycle from 2486 m. to 2052 m. (Appendix 2). The dipmeter study suggests that this is followed by a regressive deltaic cycle between 2052 and 1826.5 m., grading from distal prodeltaic silts and sands at the base to meander belt channel sands of the delta plain at the top.

The freshness and immaturity of the sediments between 2509 m. and 1826.5 m. in the form of unaltered micas, subangularity and coarseness of quartz grains and the percentage of Kaolinite (altered feldspars) suggests close proximity to the provenance area (? the granite basement of the Southern Platform) and, therefore, a marginal marine environment of deposition.

The entire sedimentary pile above 2486 m. shows well defined progradation towards the north-east away from the Southern Platform. The section below 2486 m., however, corresponding with the change to continental-style deposition, shows a completely different pattern of progradation towards the south-west, away from some topographic high to the north-east.

The change from south-westerly prograding continental clastics of Campanian age below 2486 m. to north-easterly prograding marginal marine clastics of Late Campanian - Maastrichtian age above corresponds with a well defined seismic event seen on the seismic sections (Grey Seismic marker: Fig. 9) and on the time-depth curve (Appendix 4).

4.4. The Geochemistry of the Latrobe Valley Group Sediments

Preliminary geochemical studies involved the determination of vitrinite reflectance values and a description of the organic petrology of selected sidewall core samples. Full results of these studies are attached as Appendix 3.

Vitrinite reflectance values vary from 0.32 - 0.33 in the upper part of the Latrobe Valley Group to 0.50 - 0.60 below a depth of 2300 m. in the well. Therefore, the upper part of the Latrobe Group is highly immature. Using a value of 0.5% to represent the upper boundary of the oil generation window then the section below 2300 m. is marginally oil mature. The principal zone of oil generation, with vitrinite reflectance values ranging from 0.7 to 0.9%, probably lies between 2700 m. and 3000 m.

The reflectance gradients at the 0.5% and 0.6% vitrinite reflectance levels are moderate to high at 0.28%/km. and 0.37%/km. respectively.

While the geothermal gradient is fairly high, being 39 ^{o}c/km. sediments are only mature at T.D. This suggests that the geothermal gradient may be the product of a late thermal episode, possibly an intrusion of Middle Miocene volcanics as recorded in the well at 566 m.

Organic matter is common to abundant in the Latrobe Valley Group sediments, with the deeper samples from the continental sediments below 2486 m. generally having a higher content of organic matter than those from the upper part of the section.

In most samples the dispersed organic matter is dominated by inertinite. Exinite is typically rare in the samples and appears to consist largely of dinoflagellate cysts. The exinite is unlikely to have generated significant quantities of oil at the levels of maturity recorded at T.D.

However, low reflecting inertinite and vitrinite may have a significant potential for oil generation even though the specific yield is less than for exinite. In addition it is probable that maturation occurs earlier in these macerals as compared with exinite. Therefore, the possibility exists of moderate oil generation potential for the section below 2300 m. and that some generation has taken place even though the maturity level is relatively low.

Therefore, it can be concluded that the Campanian continental clastics below 2486 m., which represent the uppermost part of the infill of a "rim-basin", and which are genetically distinct from the overlying Upper Campanian-Maastrichtian sediments, will be mature and retain potential for generating oil.

It should also be re-stated that the well prognosis envisaged that the primary source of hydrocarbons for the Pisces Prospect comprised the thick sediments deposited in the deep Gippsland Basin to the north of Permit Vic P/12 with potential migration up flank to the south. This concept has not been changed with the completion of Pisces No. 1.

4.5. The Existence of the "Pisces Sub-Basin"

Prior to the drilling of Pisces No. 1 it was realised that the well was to be located within what appeared to be a "marine embayment" south of the main Gippsland Basin axis (Fig. 2). It was within this "embayment" that the stratigraphic pinch-out or truncation events had been mapped.

The results of the well suggested that this marine embayment was, in fact, a separate sub-basin lying to the south of the Gippsland Basin proper. This existence of this sub-basin, which has been informally termed the "Pisces Sub-Basin", is suggested for the following reasons:

1. The Latrobe Group sediments within this sub-basin were lithologically dis-similar to those of the main Gippsland Basin in that they were more markedly immature as witnessed by the freshness of micas, the immaturity of quartz sands, the freshness of the Kaolinitic clays derived from altered feldspars and the lack of thick coal seams.

2. The occurrence of Upper Cretaceous dinoflagellate assemblages older than the I. drugii zone which had not been previously reported in the Gippsland Basin.

3. The identify of the dinoflagellate assemblages which were more akin to assemblages recovered from the Campbell Plateau, south-west of New Zealand than they were of the deep Gippsland Basin.

4. The majority of the organic exinite which appeared to be dinoflagellate - related forms rather than of higher plant exinite more typical of the Gippsland Basin proper.

The existence and the configuration of the Pisces Sub-Basin is illustrated in Enclosure 2. Seismic lines GC 80-11A and GC 81A-09 are aligned north-east to south-west perpendicular to the axis of the sub-basin, while seismic line GC 80-21A trends sub-parallel to the axis.

The sub-basin is delineated by inner and outer rims. Maximum sedimentary thicknesses of 1800 m. occur at the foot of the inner rim which is located by the position of the Southern Boundary fault, south-west of the Pisces well. Thicknesses are reduced to less than 400 m. at the outer rim of the sub-basin to the north-east.

North of the Pisces Sub-Basin a terrace area lies in an intermediate position between the deep Gippsland Basin and the Southern

Platform (Enclosure 2).

Two distinct sedimentary cycles can be recognised within the Pisces Sub-Basin (Enclosure 2):

1. A Lower Cretaceous? to Campanian sedimentary wedge prograding towards the south-west away from basement highs constituting the outer rim of the Pisces Sub-Basin. This sedimentary wedge thickens towards the inner rim (Fig. 9). Sediments are predominantly continental in type, in which carbonaceous shales and coals are present. Such a sedimentary wedge is characteristic of a rim-basin, topographically higher than the deeply rifted Gippsland Basin to the north-east.

2. An Upper Campanian to Maastrichtian sedimentary pile deposited in a marginal marine environment and prograding towards the north-east, away from the inner rim of the Pisces Sub-Basin (Fig. 9). Sedimentary environments were probably lagoonal, estuarine and sub-tidal for the most part but at the top of the unit, above 2052 m. (Light Green Seismic marker), a distinctive regressive delta complex occurred. Such sediments were deposited rapidly, thus not allowing the deposition of substantial coal seams. The rate of deposition in this upper unit is calculated as being 100 m. per million years which is more conducive of shallow water deposition than deep water deposition.

The existance of the outer rim of the Pisces Sub-Basin is of major significance, lying as it does in close proximity to the deep Gippsland Basin. Seismic lines GC 81A-16 and GC 81A-17 (Enclosure 3) are aligned north-east to south-west at right-angles to the axis of this outer rim and illustrate the fact that it is constructed of an old basement remnant high across which Cretaceous and Tertiary sediment lie draped.

Seismic line GC 81A-16 also illustrates the fact that seismic truncation events occur north-east of this outer rim (Fig. 11). Such events are probably of Early Tertiary age while, as has been indicated previously, events of similar nature tested by Pisces No. 1 are of Late Cretaceous age (Fig. 12).

5. CONCLUSIONS

1. The seismic velocities used in calculating structural depths and thicknesses proved to be accurate in that the maximum error in the depths to mapped seismic events was only 35 m. As such, confidence can be felt about the presently available seismic depth maps.

2. The Gippsland Limestone Formation and Lakes Entrance Formation sediments in Pisces No. 1 represented for the most part the deep water equivalents of the more normal shelfal facies associated with these sequences. They constituted carbonate canyon infill deposited between the base of the Continental Slope and the edge of the Continental Shelf.

3. The Lakes Entrance Formation sediments of Early Miocene age below 1684.5 m. in Pisces No. 1 represented the distal part of a high energy prograding sedimentary wedge deposited in approximately 200 m. of water. The 112 m. thick unit was characterised by fine grained sands and silts prograding north-eastward across deep water marine shales.

4. The interval 1796.5 m. to 1826.5 m. in Pisces No. 1 was characterised by two distinctive sheet sands: from 1796.5 m. to 1808 m. the Lakes Entrance Formation Greensand of Early Oligocene age; and from 1808 m. to 1826.5 m. the Gurnard Formation of probable Eocene age.

5. Such Eocene and Oligocene sheet sands can be correlated virtually unchanged from the southern flank of the Gippsland Basin to its northern flank, a distance of at least 160 km. The sheet sands lie unconformably upon Latrobe Group sediments varying in age from Campanian to Middle Eocene across the width of the Gippsland Basin.

6. The existence of the Lakes Entrance Formation Greensand and Gurnard Formation as sheet sands above the potentially pros-

pective Latrobe Valley Group sediments destroyed vertical seal to the potential stratigraphic traps and is the probable cause of the lack of hydrocarbons in Pisces No. 1.

7. The sheet sands, while destroying vertical seal to the Pisces Prospect, may have also acted as a potential migration pathway for hydrocarbons moving further upflank to the south towards the Southern Platform.

8. The intra-Latrobe truncation events upon which the Pisces Prospect was mapped were penetrated at their predicted depths. In addition the lithologies associated with these seismic events proved to be mudstone/claystone intervals deposited in a marginal marine to deltaic environment as predicted. This indicates that the concept upon which the model was based was valid. However, these truncation events proved to be of Late Cretaceous age rather than Early Tertiary age and contained less coal than previously suggested.

9. The Latrobe Valley Group sediments proved to be mature only at the base of the well in spite of the relatively high recorded heat flow. Such a high heat flow may, therefore, be associated with a recent (Middle to Upper Miocene) volcanic event.

10. The dispersed organic material is dominated by inertinite. Exinite is typically rare in the samples and consists largely of dinoflagellate cysts. While the exinite is unlikely to have generated significant quantities of oil the low reflecting inertinite and vitrinite may have a significant potential for oil generation even though the specific yield is less than for exinite. The possibility exists that oil generation has taken place below 2300 m. in Pisces No. 1.

11. The well penetrated Latrobe Group sediments which were, both palynologically and lithologically, dissimilar to Latrobe Group sediments penetrated elsewhere in the basin. For this and other reasons it is considered that Pisces No. 1 penetrated a section deposited in a separate sub-basin, informally called

the "Pisces Sub-Basin", which lies south of the deeply rifted Gippsland Basin proper.

12. The "Pisces Sub-Basin" contains two quite distinct units: a lower unit (below 2486 m.) of Lower Cretaceous to Campanian continental sediments deposited as rim-basin infill at a position topographically higher than the true rifted Gippsland Basin; and an upper, younger unit (1826.5 - 2486 m.) of Upper Campanian to Maastrichtian marginal marine to deltaic sediments.

13. The "Pisces Sub-Basin" is located between an inner-rim (the northern edge of the Southern Platform) and an outer-rim lying to the north-east of Pisces No. 1. The outer rim is an ancient feature being composed of long upstanding basement highs.

14. The main boundary fault to the deep Gippsland Basin is not the Southern Boundary Fault located south-west of Pisces No. 1 as previously considered, but is instead the normal fault defining the northern side of the outer rim of the Pisces Sub-Basin.

15. The Early Tertiary truncation events which were to be tested by Pisces No. 1 in fact occur in deep water north of the outer rim of the Pisces Sub-Basin.

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APPENDIX 1

The Geochronology and Depositional Environments of Pisces No. 1 sediments over the interval from 1075.2 m. to 2564.5 m. (after Paltech Pty. Ltd.).

1.1. The Foraminiferal Sequence in Pisces No. 1.

1.2. The Palynological Sequence in Pisces No. 1.

1.1. THE FORAMINIFERAL SEQUENCE in PISCES # 1.

Fifty sidewall cores were examined from PISCES # 1. The sequence is divisible into an upper, *carbonate* marine unit and an underlying series of *non-carbonate*, marginal marine to non-marine units. The absence of planktonic foraminifera in the *non-carbonate* series prohibits any comment regarding biostratigraphy or age in this report (refer Palynology). However, the *carbonate* unit contains a number of planktonic foraminiferal assemblages, thus permitting precise biostratigraphic designation as summarised below:-

Sidewall Cores Depth(m)	Approx. E-Log Unit Boundary	Age	Zone*	Paleoenvironment¶
1075.2 to 1155.0		Mid Miocene	D-1	Mid Shelf (≈100m)
	?			
1198.5 to 1464.0		Mid Miocene	D-1 to D-2	Outer Shelf Canyon (≈150m)
	?			
1475.0 to 1604.0		Mid Miocene	D-2 to E-1	Shelf Edge Canyon (≈200m)
	?			
1620.0 to 1681.5		Early Miocene	E-2	Shelf Edge Canyon (≈200m)
	?			
1684.5 to 1794.5		Early Miocene	F to G	Prograding Wedge at Shelf/Slope Break (≈200m)
	1796			
1796.5 to 2320.5		? No planktonic foraminifera found	?	Marginal marine *non-carbonates*

* Planktonic foraminiferal zonation after Taylor (in prep). This report includes distribution chart for Pisces on Table 1 with reliability of zonal determinations.

¶ Interpretation based on distribution of selected benthonic foraminiferal species and other sediment grains (<.075mm) as shown on Table 2 of this report. Paleobathymetric ranges are in parentheses.

The sidewall core at 1794.5 representing the base of the carbonate sequence, contains an "upper" Zone G assemblage, indicating an Early Miocene age at approximately 18 million years ago. The sequence continued, apparently uninterrupted, to at least the mid Miocene Zone D-1 at 1075. (The sidewall core at 1075.2m was the highest recovered in Pisces # 1.)

Faunal and other sediment grains in the basal part of the carbonate sequence (1794.5 to 1684.5) indicate a prograding wedge of the shelf edge. This wedge probably resulted from distal, carbonate sediment discharge from a submarine canyon which was apparent as canyon fill at and above 1681.5m.

The *non-carbonate* series between 1796.5 and 2320 contain at least three lithological units, with no planktonic foraminifera and only sporadic benthonic foraminifera and fish fragments. However, some sidewall cores were heavily contaminated with mid Miocene from the carbonate unit above (for example at 2097).

Directly below the carbonate unit were two "Greensand" units; each lithologically distinct from the other. The higher one, from 1796.5 to 1803.0 was a fine quartz, glauconitic clayey sandstone containing some coarse wind blown quartz grains. This unit may represent the "Lakes Entrance Greensand", but this cannot be confirmed either micropaleontologically or palynologically. The lower "Greensand", from 1808.5 to 1825, was coarser grained with distinct pellet glauconite which was oxidised to limonite in the top half of the unit (1808.5 to 1816.5).

Palynological examinations (see Palynology Report) revealed that dinoflagellates and spore/pollen were present only below this oxidised horizon (i.e. at and below 1820.5). These microfloras were of Late Cretaceous age and were dominated by low specific diversity dinoflagellate assemblages. The sporadic benthonic foraminiferal assemblages, between 1820.5 and 2320 were composed completely of arenaceous forms (refer Table 2 - this Report). These forms were euryhaline, tolerating fluctuating salinities; conditions also indicated by the low diversity nature of the dinoflagellate assemblages. Therefore we interpret that sedimentation between 1820.5 to at least 2320 took place in marginal marine situations such as lagoons, estuaries and delta fronts.

TABLE 1 : PLANKTONIC FORAMINIFERAL DISTRIBUTION - PISCES ≠ 1
Paltech Report 1982/18

SIDEWALL CORE Depth in metres	PLANKTONIC FORAMINIFERA																											PLANKTONIC FORAMINIFERAL ASSEMBLAGE		AGE
	G'oides trilobus	*G'alia bella*	*G'alia continuosa*	*G'alia nana*	*G'alia zealandica* (S.S.)	*G'quad dehiscens* (S.L.)	*G'quad dehiscens* (S.S.)	*G'quad advena*	*G'quad venezuelana*	*G'ina bulloides*	*G'ina woodi connecta*	*G'ina woodi woodi*	*Cat. dissimilis*	*G'oides bisphericus*	*G'oides trilobus* (elongate)	*G'alia siakensis*	*G'alia miozea miozea*	*G'alia praescitula*	*Praeorb. glomerosa*	*G'alia peripheronda*	*G'quad altispira*	*G'alia conica*	*Orb. suturalis*	*Orb. universa*	*G'alia praemenardii*	*G'alia miozea conoidea*	*G'ina ciperoensis*	ZONE	Depth at Base	
1075.2	x									x		x												x		x		D-1	1198.5	MIDDLE MIOCENE
1155.0	x									x		x												x						
1198.5	x									x		x										°		x	°	x	°			
1251.0	x		x			x				x		x		x		x	x	x	°	°		x	°	x	x	x	x	D-2	1541.0	
1293.0	x									x				x			x	x						x	x	x				
1351.5	x									x							x	°						x	x	x				
1398.0										x		?												°		°				
1454.0										x		?												°		x				
1464.0										x		?												°		°				
1475.0	°						°			x				°			°							x						
1487.0							°			x							°	°						°	°					
1498.5										x														x						
1514.0	x				x		x	°		x		x		x		x	x	x		°		°		x	°					
1527.0	x				°		x	°		x		x		x			°	°				°		°						
1541.0	°				°					°		°		°			°							°						
1553.0	INDET																											?		
1564.5	x		x		x					x		x	x	x			x	x	x	x			x					E-1	1604.0	
1575.5	x		x		x					x		x	x	x			x	x	x				x							
1589.5								°		x								x	°											
1604.0	x				x			°		x		x	x				x	x	x				x							
1620.0	x		x		x		x	°		x		x	x	x		°	x	x	x	°	°	°						E-2	1681.5	EARLY MIOCENE
1633.0	x		x		x		x			x		x	x	x		°	x	x	x	°		°								
1643.0	°							°		°				°							°									
1668.5	°				°		°	°		°		°	°				°													
1679.5		x					x	x	x	x		x		x			x	x	x											
1681.5	x	x	x		°		x	x	?	x		x	x	x	x	x	x	x	x	x	°									
1684.5	°				x		x			x		x		°			x	x										F	1791.0	
1687.5							°	°		x		x		°			°													
1696.5	x		?	?	?							x		°																
1722.5	x	°	x		x			°	?	x	°	x		x			x													
1745.5	°									x		x		°			°													
1769.5	x	°	x		°					x	x	x		x		x	°													
1791.0	x	x	x		x			x		x	x	x	x	x	x	x	x													
1792.5	x	°	x	x	°	x	x			x	x	x	x															G	1794.5	
1794.5	x	°	x	x	°	°	°	°	°	x	x	x																		
1796.5	NO PLANKTONICS SEEN																											?		?
1799.0																														
1803.0																														
1808.5																														
1812.5																														
1816.5																														
1820.5																														
1823.0																														
1825.0																														
1827.0																														
1834.0																														
2097.0	DOWNHOLE MUD CONTAMINANTS from Zone D-2																													
2287.5	NO PLANKTONICS SEEN																													
2295.5																														
2320.5																														

KEY:

° = <20 specimens
x = >20 specimens
D = Dominant >60% specimens

INDET = indeterminate because of recrystallisation
? = identification doubtful because of recyrstallisation.

SIDEWALL CORE Depth in metres	SELECTED BENTHONIC FORAMINIFERA IN ENVIRONMENTAL GROUPS																						
	LAGOCN	SLOPE/SHELF BREAK ↔ MID SHELF																		MISPLACED INNER SHELF			
	SHALLOW WATER EURYHALINE PRIMITIVE ARENACEOUS	DEEP WATER PRIMITIVE ARENACEOUS	*Osangularia* sp.	*Martinotiella communis*	*Vulvulina granulosa*	*Cibicides mediocris*	*Cibicides temperatus*	*Discorbinella berthelotti*	*Bolivina* spp. (smooth)	*Cibicides karreriformis*	*Euuvigerina* spp.	*Stilostomella* spp.	*Pleurostomella* spp.	*Siphouvigerina proboscidea*	*Globobulimina pacifica*	*Nonionella* sp.	*Globocassidulina subglobosa*	*Astrononion* spp.	*Cibicides subhaidingeri*	Nodosarids	Miliolids	*Cibicides opaquus*	*Cibicides lobatulus*
1075.2		°				x	x		x		°								x	x			
1155.0						°	°		°		°									°		°	
1198.5						x	x		x									°	x	x			
1251.0						x	x		x						°		°	°	x	x		W	W
1293.0														°				°		x			
1351.5		°			°						°			°	°		°			x	W		
1398.0			INDET																				
1454.0			INDET																				
1464.0			INDET																				
1475.0			INDET																				
1489.0			INDET																				
1498.5		°						°						°						°			
1514.0		°				x								x			x						
1527.0		x													°					x			
1541.0		°																		°			
1553.0			INDET																				
1564.5						x	x		x							°				x		W	W
1575.5														D		°				°			
1589.5						°														°			
1604.0														x						x			
1620.0							x							x									
1633.0						°	°							x						°	W		
1643.0																				x			
1668.5		x	°	°							°												
1679.5															x					°			
1681.5		°				°	°		x					x						°	W		
1684.5			INDET																				
1687.5		°				°	°						°		°					°	W		
1696.5						°	°													°			
1722.5		°				°	°																
1745.5		°				°	°																
1769.5		°								°				x						°			
1791.0		x				°	°	°		°	°	°	°							°	W	W	
1792.5					°	x	x	°	°											°			
1794.5		D	°	°	°	°																	
1796.5																							
1799.0																							
1803.0																							
1808.5																							
1812.5	NO FORAMINIFERA FOUND																						
1816.5																							
1820.5																							
1823.0	D																						
1825.0																							
1827.0																							
1834.0	D																						
2097.0			DOWNHOLE MUD CONTAMINANTS																				
2287.5	D																						
2295.5	D																						
2320.5	D																						

SIDEWALL CORE Depth in metres	RESIDUE	LITHOLOGY														PALEO-ENVIRONMENT					MAJOR E-LOG CHARACTER CHANGES	PLANKTONIC FORAMINIFERAL ASSEMBLAGE		AGE
	MAJOR COMPONENTS	MINOR COMPONENTS																						
	p: pyrite f: foraminifera m: micritic limestone B: limonite after glauc. G: glauc. pellets S: silt & clay Q: c-m.ang.qtz. q: f.ang.qtz.	c. ang. qtz.	pyrite	limonite after pyrite	qtz. pebbles	glauc. pellets	rock frags.	mica	fish frags.	bryozoa	sponge spicules	echinoid spines	ostracodes	foram count	plank foram %	DELTAIC-ESTUARINE	INNER SHELF <100m	MID SHELF ≈100m	OUTER SHELF CANYON ≈150m	SHELF EDGE CANYON ≈200m & PROGRADING WEDGE		Zone	Depth at Base	
1075.2	mmmmmmmmmmmmmmmmmmmm			A						C		r	r	500	50			▨						
1155.0	mmmmmmmmmmmmmmmmmmmm			A								r		50	50			▨						
1198.5	mmmmmmmmmmmmmmmm ff										r	r		500	50				▨			D-1	1198.5	
1251.0	mmm fffffffffffff		A	A							A	r		3000	90				▨					
1293.0	mmmmmmmmmmmmmmmmmmmm	C		A							C			300	80				▨					
1351.5	mmmmmmmmmmmmmmmmmmmm			A									r	300	60				▨					
1398.0	mmmmmmmmmmmmmmmmmmmm			A										?	?				▨					
1454.0	mmmmmmmmmmmmmmmmmmmm													?	?				▨					
1464.0	mmmmmmmmmmmmmmmmmmmm													?	?				▨					MIDDLE
1475.0	mmmmmmmmmmmmmmmmmmmm													100	?					▨		D-2		
1489.0	mmmmmmmmmmmmmmmmmmmm													50	100					▨				MIOCENE
1498.5	mmmmmmmmmmmmmmmmmmmm		C											50	50					▨				
1514.0	mmmmmmmmmmmmmmmm fff													20	95					▨				
1527.0	mmmmmmmm ffffffff p	C	C											200	90					▨				
1541.0	mmmmmmmmmmmmmmmm ppp	C												50	?					▨			1541.0	
1553.0	mmmmmmmmmmmmmmmmmmmm													?	?					▨		?		
1564.5	m ffffffffffffffff		A									r		500	90					▨				
1575.5	m ffffffffffffffff		r											1000	95					▨				
1589.5	mmmmmmmmmmmmmmmmmmmm													50	90					▨				
1604.0	mmmmmmmmmmmmmmmmmm f										C	r	r	300	95					▨		E-1	1604.0	
1620.0	mmmmmmmmmmmmmmmmmm f													500	95					▨				
1633.0	mmmmmmmmmmmmmmmmmm f	C					f							500	90					▨				
1643.0	mmmmmmmmmmmmmmmmmmmm		r											100	95					▨				
1668.5	mmmmmmmmmmmmmmmmmmmm													50	90					▨		E-2		
1679.5	mmmmmmmmmmmmmmmmmm f													200	80					▨				
1681.5	mmmmmmmmmmmmmmmm fff			A							C	r		3000	98					▨			1681.5	EARLY
1684.5	mmmmmmmmmmmmmmmmmmmm	C		A										200	95					▨				
1687.5	mmmmmmmmmmmmmmmmmmmm			A										200	90					▨				MIOCENE
1696.5	mmmmmmmmmmmmmmmmmmmm	C		C								r		200	95					▨				
1722.5	mmmmmmmmmmmmmmmmmmmm	C		C										250	98					▨				
1745.5	Q mmmmmmmmmmmmmmmmmm			A		r		r			r			100	95					▨		F		
1769.5	mmmmmmmmmmmmmmmmmmmm	C		C				r						300	98					▨				
1791.0	Q mmmmmmmmmmmmmmm ff					C								1500	95					▨			1791.0	
1792.5	mmmmmmmmmmmmmmmmm ff	r				r								1000	90					▨				
1794.5	Q mmmmmmmmmmm fffff		A			r								300	90					▨		G	1794.5	
1796.5	Q qqqqqqqqqq GGGG															▨					1796.0			
1799.0	QQQ qqqqqqqqqqqqqq		C	C	r	A	r			?						▨								
1803.0	QQQ qqqqqqqqqqqqqq			C	r	A	r									▨								
1808.5	Q qqqqqqq BBBB GG															▨					1807.0			
1812.5	QQQQQQ BBBBBB GGG															▨						?		?
1816.5	QQQQ BBBBBBB GGGG															▨								
1820.5	QQQQQ SSSSS GGGGG								C							▨								
1823.0	QQQQQQQQQQQQQQ GGG			r			A		C					10	–	▨								
1825.0	QQQQQQQQQQQQQQ GGG			r			A									▨								
1827.0	QQQQQQQQQQQQQQQQQQ				A	A	A									▨					1826.0			
1834.0	SSSSSSSSSSSSS QQQ													50	–	▨								
2097.0	CONTAMINATION															▨								
2287.5	qqqqqqq QQQQQQQQQ			A	A				r					50	=	▨								
2295.5	qqqqqqqqqqqqqqqqqq				A				r					50	–	▨								
2320.5	qqqqqqqqqqqqqqqqqq	A												20	–	▨								

KEY: ° = <20 specimens
x = >20 specimens
D = Dominant >60% of assemblage
W = Worn specimens

TABLE 2: SIGNIFICANT BENTHONIC FORAMINIFERAL DISTRIBUTION, RESIDUE LITHOLOGY & PALEOENVIRONMENTAL ASSESSMENT- PISCES # 1

MICROPALEONTOLOGICAL DATA SHEET

B A S I N: GIPPSLAND ELEVATION: KB:22.0m GL: 122.0m

WELL NAME: PISCES # 1 TOTAL DEPTH:

AGE		FORAM. ZONULES	HIGHEST DATA					LOWEST DATA				
			Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time	Preferred Depth	Rtg	Alternate Depth	Rtg	Two Way Time
PLEIS-TOCENE		A_1										
		A_2										
PLIO-CENE		A_3										
		A_4										
		B_1										
MIOCENE	LATE	B_2										
		C										
	MIDDLE	D_1	1075.0	2				1198.5	1			
		D_2	1251.0	0				1541.0*	1			
		E_1	1564.9*	0				1604.0	0			
		E_2	1620.0	0				1681.5	0			
	EARLY	F	1684.5	1				1791.0	0			
		G	1792.5	1				1794.5	0			
		H_1										
OLIGOCENE	LATE	H_2										
		I_1										
		I_2										
	EARLY	J_1										
		J_2										
EOC-ENE		K	? ¶β					? ¶β				
		Pre-K	¶α					¶α				

COMMENTS: * SWC at 1553 contained indeterminate planktonic specimens due to carbonate recrystallisation.

¶ 10 SWCs of "Greensand" sediments contained no planktonic assemblages, but can be divided lithologically into two units, namely:-

?¶β from 1796.5 to 1803.0 possibly ≡ "Lakes Entrance Greensand"

¶α and from 1808.5 to 1825.0 to ? 1827.0

CONFIDENCE RATING:

O:	SWC or Core	-	Complete assemblage (very high confidence).
1:	SWC or Core	-	Almost complete assemblage (high confidence).
2:	SWC or Core	-	Close to zonule change but able to interpret (low confidence).
3:	Cuttings	-	Complete assemblage (low confidence).
4:	Cuttings	-	Incomplete assemblage, next to uninterpretable or SWC with depth suspicion (very low confidence).

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.

1.2. THE PALYNOLOGICAL SEQUENCE IN PISCES # 1.

Fifty sidewall cores from Pisces # 1 were examined for palynological content. On the basis of that examination, the following breakdown of the sequence was noted:-

Depth (m)	Age	Dinoflagellate Zone	Spore-Pollen Zone	Paleoenvironment
1796.5 to 1812.5	Indet -barren	?	?	?
1816.5	Indet			
1820.5 to 2161.0	Maastrichtian	*I. druggii* Zone	*T. longus* Zone — 2081 —	marginal
2179 to 2490	Early Maastrichtian -Late Campanian	*I. korojonense* Zone — — 2379.5 —	? — 2320 — *T. lillei* Zone	marine
2509 to 2554.5	Campanian			Continental
2564.5	? Campanian		? *T. lillei* Zone	

The zonation scheme used is that established by Stover & Partridge (1973) and further updated in unpublished reports.

A list of the sidewall cores studied is shown on tables 1 and 2. The five shallowest sidewall cores, from 1796.5 to 1812.5, were barren and the sample at 1816.5 yielded insufficient information for dating purposes.

The section studied yielded an excellent well preserved Late Cretaceous marine dinoflagellate sequence. A detailed examination is beyond the scope of this report, but further examination is warranted as this sequence should provide valuable input into the clarification of a biostratigraphic Zonation for the Late Cretaceous.

The preservation of the palynomorphs, particularly in the predominantly marine samples, is poor and the ranges of some of the species appear to be at variance with their known ranges. This may be the result of probable Oligocene/Miocene contamination, which was also mentioned in the foraminiferal report and is probably due to drilling mud contamination. Data provided by the spore-pollen assemblage allowed for zone determinations to be made, however the boundary between the *T. longus* and *T. lillei* Zones is rather indistinct, being somewhere between 2081m and 2320m.

The boundary at 2161m is based on the upper limit of the dinoflagellate *Isabelidinium korojonense* which is known to have a limited vertical range in the late Campanian/early Maastrichtian. The correlation of the dinoflagellate Zones with the European Stages is based on unpublished ranges for Western Australian sequences. However the *I. korojonense* /*I. druggii* boundary in W.A. is marked by a major disconformity. There is no evidence for a disconformity at that horizon in PISCES # 1, which leaves open the question of the age of the *I. korojonense*/*I. druggii* boundary in PISCES # 1.

The occurrence of Late Cretaceous dinoflagellate assemblages older than the *I. druggii* Zone, in the Gippsland Basin has not been previously reported and makes this an important sequence for further study.

REFERENCES.

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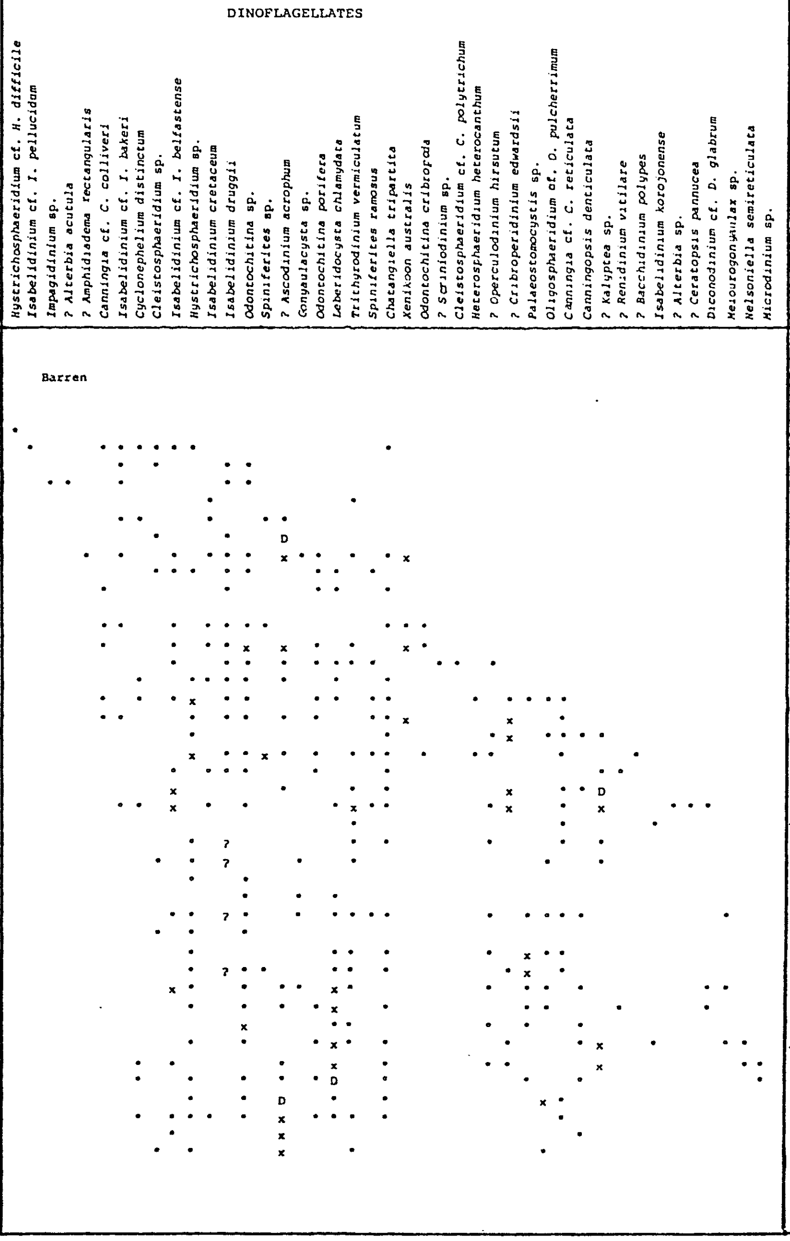
STOVER, L.E. & PARTRIDGE A.D., 1973: Tertiary and Late Cretaceous Spores & Pollen from the Gippsland Basin, South Eastern Australia. *Proc. R. Soc. Vict. Vol. 85,* Pt. 2.



KEY
- • <20 specimens
- x >20 specimens
- D Dominant >60%
- R Recycled

YIELD
- VP 1-19
- P 20-99
- F 100-499

per 22mm coverslip

DIVERSITY
- L = low (1-7)
- M = moderate (8-14)
- H = high (15-19)
- VH = very high

PRESERVATION
- VP = very poor
- P = poor
- F = fair
- G = good

SIDEWALL CORE Depth in metres	DINOFLAGELLATE ZONE HELBY et al	AGE	ENVIRONMENTAL DATA					
			Total Count	% Marine	Preservation	Yield	Diversity	Maturation
1796.5								
1799.0								
1803.0								
1808.5								
1812.5								
1816.5			4	50	P	VP	L	
1820.5	*I. druggii* Zone	MAASTRICHTIAN	100	40	F	F	VH	Kerogens were not prepared but maturation for all samples did not exceed 1-3 i.e. marginally mature
1823.0			100	15	F	F	VH	
1825.0			100	5	F	F	VH	
1827.0			100	7	F	F	VH	
1834.0			100	7	VP	P	VH	
1863.0			80	60	P	P	M	
1881.0			100	59	F	F	VH	
1906.0			40	33	VP	P	H	
1919.3			60	31	VP	P	M	
1932.0			6	30	VP	VP	L	
1940.0			100	70	P	F	H	
1944.0			100	53	VP	P	VH	
1968.5			84	65	VP	P	H	
1985.5			100	70	P	F	H	
2053.5			100	80	F	F	VH	
2057.0			100	70	F	F	H	
2060.0			100	78	G	F	H	
2081.0			100	68	G	P	VH	
2097.0			100	66	G	F	M	
2107.0			100	62	F	F	M	
2112.5			100	99	G	F	H	
2161.0	*I. korojonense* Zone		100	92	G	F	L	
2179.0			100	42	P	P	M	
2183.0		— — ? — —	15	70	VP	VP	L	
2249.0		CAMPANIAN	3	65	VP	VP	L	
2260.0			30	53	VP	VP	L	
2274.5			100	65	VP	F	VH	
2281.5			15	65	F	VP	M	
2287.5			114	64	F	F	H	
2295.5			70	83	F	P	H	
2305.5			100	97	P	F	H	
2320.0			100	84	F	P	H	
2360.5			100	99	G	F	L	
2379.5	— — ? — —		100	99	G	F	H	
2388.0			100	96	G	F	M	
2391.0			100	79	G	F	VH	
2432.5			100	97	G	F	M	
2435.0			100	49	G	F	VH	
2466.5			44	26	P	P	M	
2490.0			45	75	P	P	M	
2509.0			26	-	VP	P	L	
2514.0			25	-	VP	P	L	
2554.5			80	-	P	P	L	
2564.5			2	-	VP	VP	L	

TABLE 2: DINOFLAGELLATE DISTRIBUTION CHART & ENVIRONMENTAL DATA - PISCES # 1.

Paltech Report 1982/20

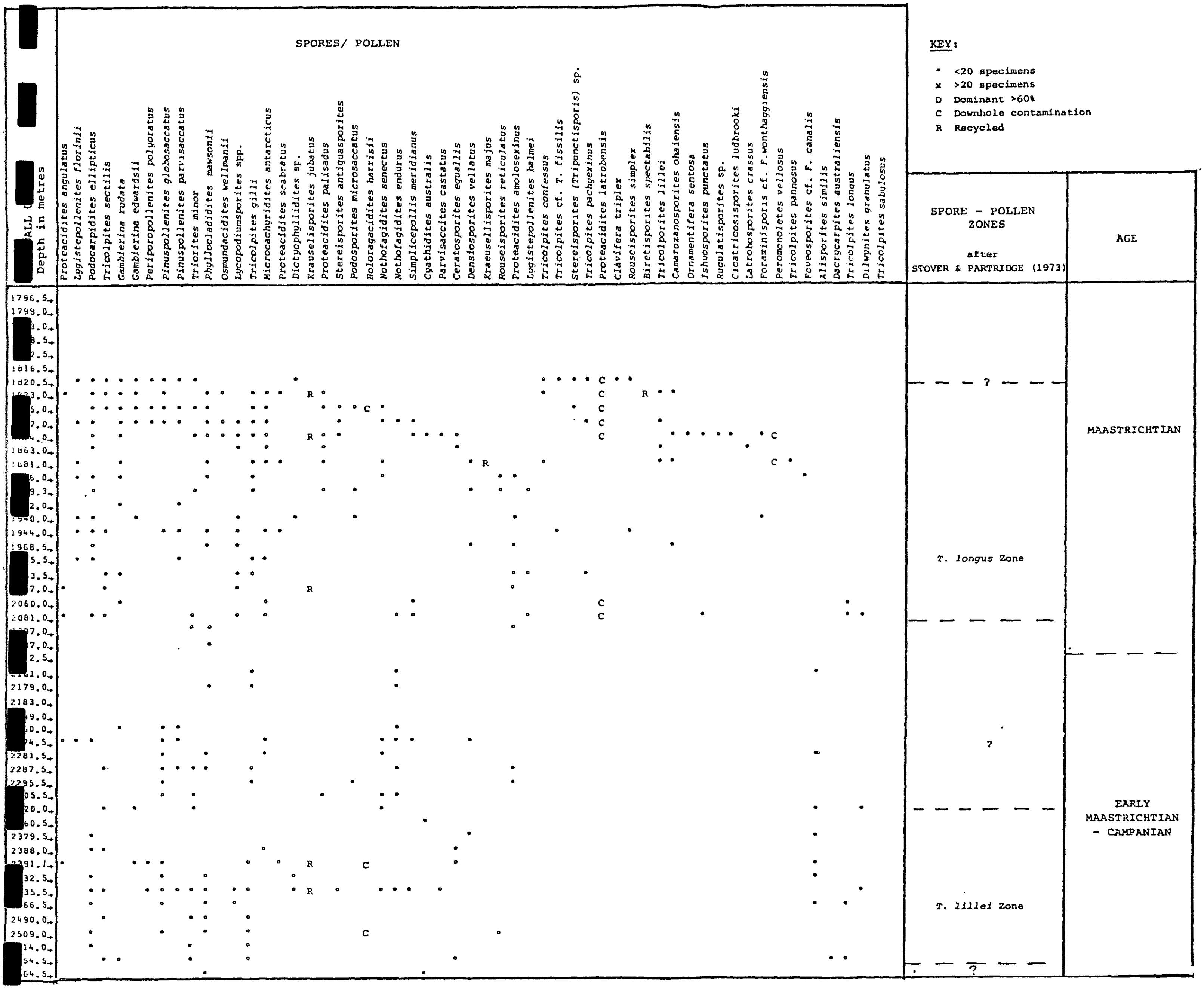


TABLE 1: SPORE/POLLEN DISTRIBUTION CHART - PISCES # 1.

Paltech Report 1982/20

PE906267

This is an enclosure indicator page.
The enclosure PE906267 is enclosed within the container PE906254 at this location in this document.

The enclosure PE906267 has the following characteristics:

ITEM_BARCODE = PE906267
CONTAINER_BARCODE = PE906254
NAME = Biostratigraphic Table
BASIN = GIPPSLAND
PERMIT = VIC/P12
TYPE = WELL
SUBTYPE = DIAGRAM
DESCRIPTION = Summary of Planktonic Foraminiferal Biostratigraphy - Gippsland Basin
REMARKS = After Taylor 1981
DATE_CREATED = 15/07/82
DATE_RECEIVED = 28/07/82
W_NO = W772
WELL_NAME = PISCES-1
CONTRACTOR =
CLIENT_OP_CO = UNION TEXAS AUSTRALIA INC.

(Inserted by DNRE - Vic Govt Mines Dept)

APPENDIX 2

Pisces No. 1: Sedimentological Analysis of Well Logs
(An interpretation of the stratigraphic dipmeter
over the interval from 1750 m. to 2578 m.).
(Hugh Crocker Consultants)

HUGH CROCKER CONSULTANTS

PISCES No. 1

DIPMETER INTERPRETATION.

HUGH CROCKER
JUNE 1982

HUGH CROCKER CONSULTANTS
CONSULTANT PETROLEUM ENGINEER

Telephone: 3215404
Cables: Terramin Perth

25, Mount Street,
Perth,
W. Australia 6000

DIPMETER, STRATIGRAPHIC APPLICATIONS AND LIMITATIONS.

Well logs may be used as an approach to stratigraphic interpretation, and by extension an approach to Geologic concepts. Almost all aspects of stratigraphy; succession, fabric, petrology, mineralogy etc., find their expression in well logs and once the directional and geometric data is provided by the Dipmeter may lead to useful inferences as to depositional environments, provenance and directions of progradation, definitions of genetic depositional units, paleobathymetry, burial history, topography at unconformities.

Each depositional sequence is defined as a conformable succession of genetically related strata bounded by upper and lower unconformities or disconformities. Thus the order of inferred paleogeography may help to reconstruct the paleohistory.

Since a single well is a vertical record of rock properties the model is limited to two dimensions. If data is available from adjacent wells a true three dimensional model may be constructed. For this reason the interpretation of a single dipmeter must be limited in scope and the lateral extrapolation must be done with caution. Nevertheless should a particular geologic feature persist over a long vertical interval its lateral extension is more probable

Unfortunately many cases exist where the statigraphic interpretation is ambiguous, and sometimes it is difficult to choose between the options. Yet, in a genetically related deposition succession some alternates are more likely than others and a choice may be made. Nevertheless such interpretations are tentative and require cross checks.

Other imputs such as regional setting, tectonic framework, seismic, paleontology, etc., are relevant and should be integrated to reach a balanced interpretation. For this reason the stratigraphic interpretation should best be made by a geologist familiar with the area and well versed in sedimentary processes and with the aid of geophysicists, paleontologists and log analysts.

It follows that this interpretation must be tentative; it certainly does not claim to be anything but a starting point and its only claim to authority is based upon a wide experience of relating well logs and dipmeters to stratigraphic interpretation.

Hugh Crocker
February 1980

PISCES No.1

SEDIMENTOLOGICAL ANALYSIS OF WELL LOGS.

2486m-2578m

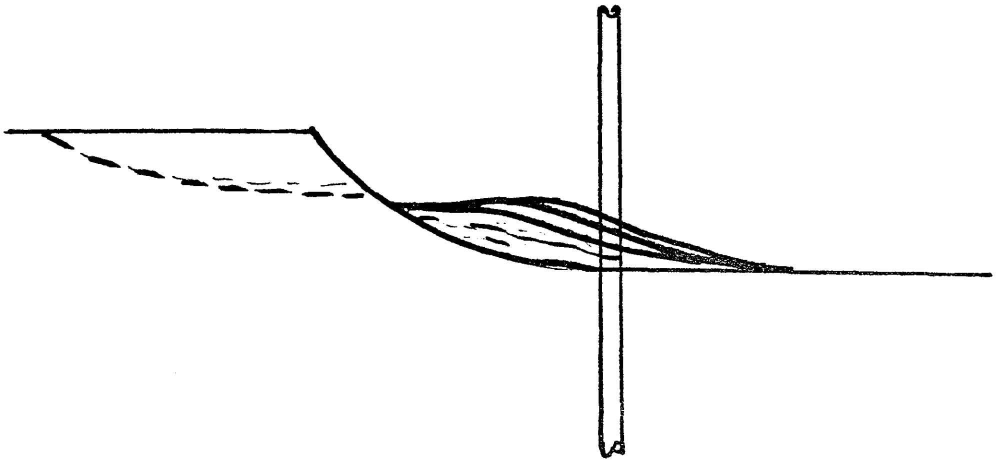
This interval is a sequence of liminated silts, shales and sands with little evidence of preferred grading. The clays are quite radioactive with Gamma peaks significantly higher than the intervals above, perhaps volcanics are present.
Depositional current was very active as indicated by the strong current bedding throughout this interval. Directions of current bedding in individual units are summarised on the right ; these may be themselves summarised as:

which shows that although the current bedding is widely diverse it nevertheless indicates a progradation to the S.W. This is in marked contrast to the remainder of the intervals present on this log. Since it does not belong to the same genetic sequence as the rest of the log we are reluctant to assign a sedimentary environment since several possibilities exist that cannot be crosschecked against a genetic framework. The decreasing yellow pattern with fill suggests a waning depositional environment.

2440m-2486m

Here there are fine grained sands, silts and thin shales, with units 1 and 2 showing a gross upward fining whilst units 3 and 5 show upward coasening. Current bedding is strong and indicates an active depositional environment. It shows that deposition consisted of five pulses each with markedly different direction as summarised on the right. These in turn as summarised as:

and indicate a N.E. progradation in contrast to the previous interval. The highly ordered and directionally controlled current bedding indicates a fan and given the succeeding sequences is very probably a deep water marine fan in front of the shelf sloping to the N.E.



2346m-2440m

This thick interval consists of predominantly shale with silt and minor fine grained sands. There is evidence of repetitive bedding of upward fining cycles. Units are of variable thickness but sequences such as "A" are thick whilst sequences such as "B" are thinly repetitive. These cyclic units can readily be seen on the Gamma Ray log.

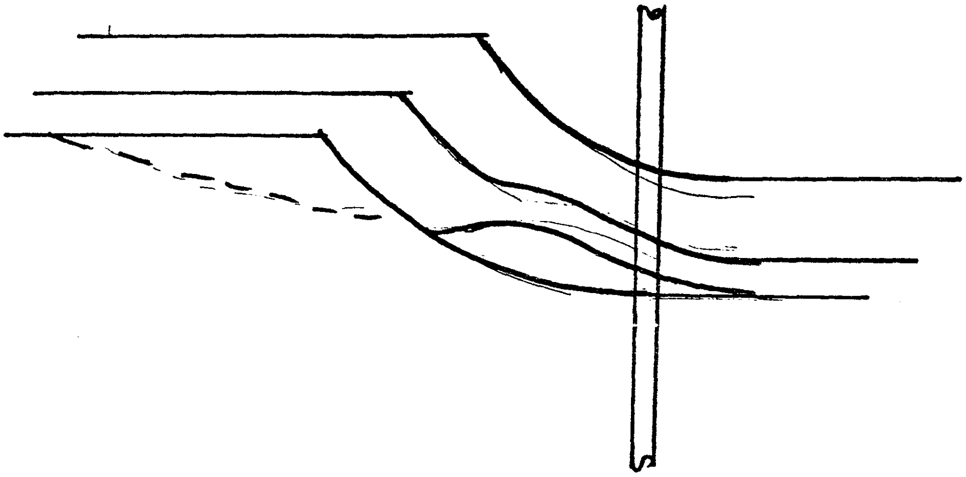
Current bedding is less well developed than in the previous interval but remains strongly to the N.E.

The cyclic upward fining and log characteristics are strongly indicative of turbidite deposition.

Current bedding is highly orientated to the N.E. showing that direction of deposition is strongly controlled.

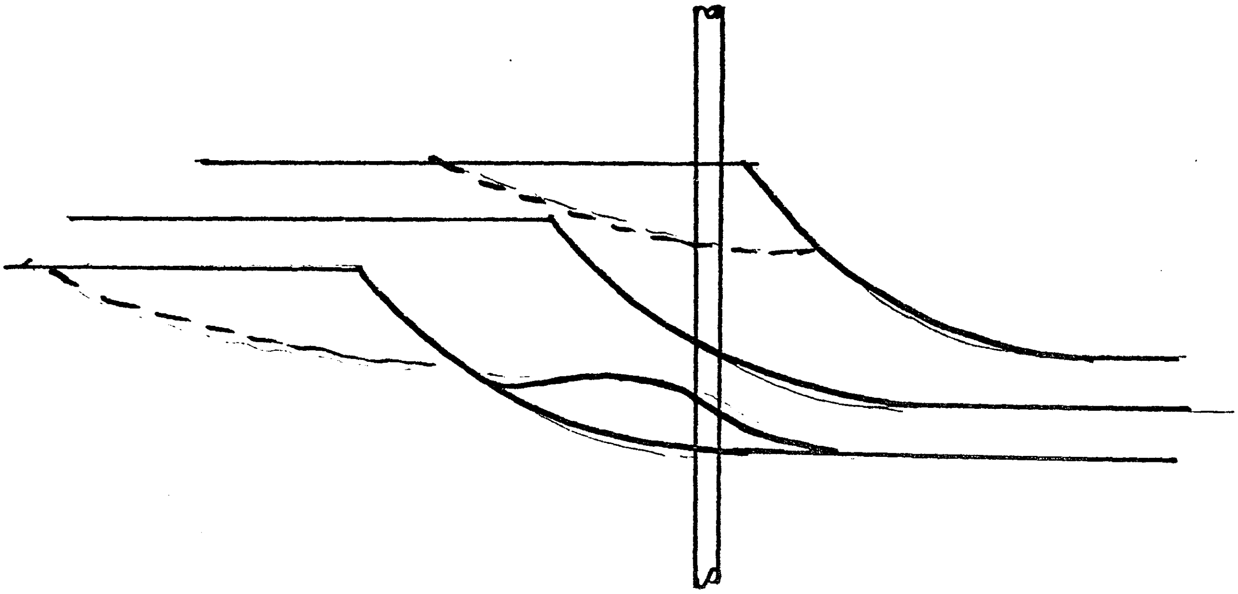
Hence these turbidite deposits are proximal to the continental slope and both turbidite and traction current deposition is present.

At the base of this interval there is a gross overall red pattern that strongly indicates compaction over a topographic high sloping to the N.E. and is thus consistent with the geometry of the fan noted below.



2289m-2346m

This interval is almost entirely silt with an overall cycle of fill as seen on the Gamma-Ray log. Most dips are of poor quality and randomly scattered. Where crossbedding is present it is highly orientated to the N.E. There is an overall red pattern to the crossbedding indicating a channel morphology. Given the enormous thickness of this channel and its strong N.E. direction it looks like a submarine canyon. The basal crossbedded part may be deposited whilst the channel was active but the remaining fill postdates abandonment and is therefore fine grained and highly bioturbated. Bioturbation having destroyed the original fabric.

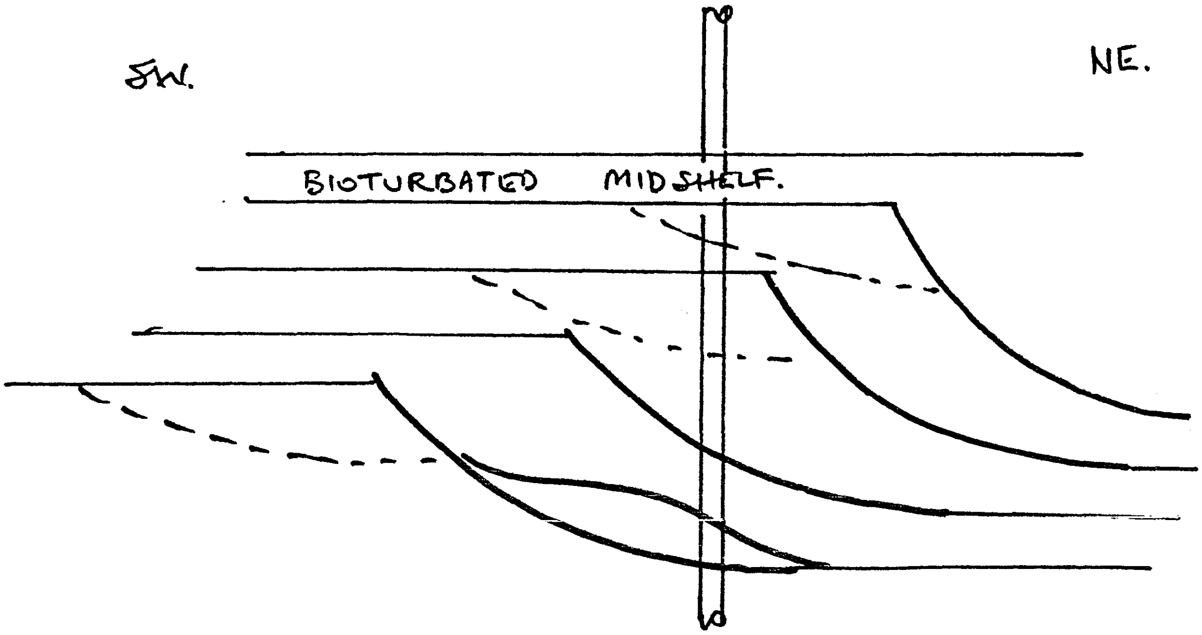


2245m-2289m

The Gamma-Ray, Density and Neutron logs indicate a similar overall cycle of fill to that seen in the previous interval. Clay fraction has increased. It may be that this is only a part of the same canyon fill or a rejuvenation of the channel. Current bedding is almost absent and dips are of poor quality and random. Again bioturbation is likely.

2226m-2245m.

The well logs show this to be finely laminated silts and muds. All depositional fabric has been destroyed by active bioturbation. A midshelf environment therefore seems appropriate and fits neatly into the genetic framework of previous intervals. The active fill seen below 2350m has largely ceased at this location - moved further towards the N.E.

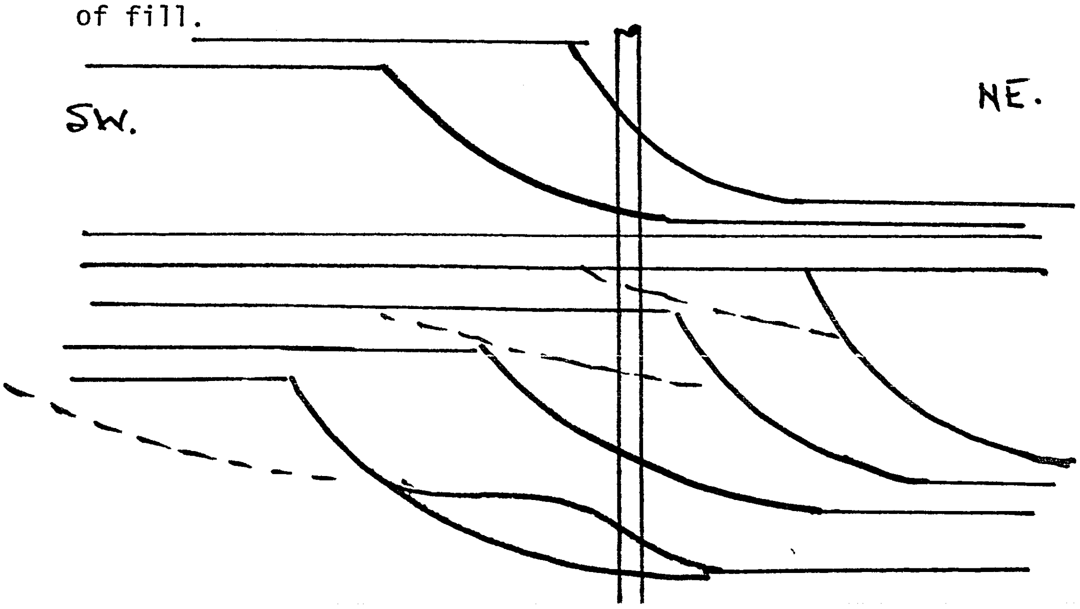


2226m Downwarp Here.

2113m-2226m.

Although this interval is much thicker than is usually considered, its geometry is such that it must be considered in its entirety. The structural dip increases with fill over the whole interval and hence determines the deposition. Note the resumption of strong cross-bedding highly orientated to the preferred N.E. direction and the reduction of the yellow pattern with fill. It is obvious that this represents a genetic unit on a grand scale. The preceeding silty mudstones have been succeeded by shales, silts, sands and minor carbonates. Hence a much more active environment is present but sediment supply appears to be reduced, (presence of carbonates and occasions when bioturbation can occur). Perhaps the source of sediments has become more distant.

The overall geometry of 20^{0} dip at the top and a regional dip of 8^{0} at the base indicates gross downdip thinning of the interval which is best explained by a N.E. prograding shelf slope. This is consistent with the rejuvenation of sedimentation but would require a downwarp to the N.E. producing a second cycle of fill.



2052m-2113m

This shale interval and minor silts shows pronounced N.E. current bedding. It is highly laminar and bed thickness is much less than the 0.7m of correlation interval, so the red and blue patterns are not truely representative of individual crossbedded units. There is some 10° of N.E. sedimentary dip present. The structural dip conforms to the regional dip, hence these sediments were laid down on a flat surface. These look like shelf sediments. Because there is little or no bioturbation the water depth is probably considerable and hence an outer shelf environment is probable - although there is some evidence of bioturbation at the top of the interval so perhaps a shift towards middle shelf is present (incipient regression).

2033m-2052m

This interval consists firstly of shale but grades into sand - upward coarsening. It is remarkable because it is the first evidence of strong North crossbedding. Given the Northerly prograding Deltaic sequence seen above then this looks like the distal prodelta silts and the onset of Delta Front sands
Continued Regressive Phase.

1994m-2033m

Here is a sequence of repetitive upward coasening cycles with increasing unit thickness with fill. This is strong evidence of the onset of a major sedimentary feature. It looks very much like a supply dominated environment. The well ordered patterns indicate a controlled sedimentary environment, almost certainly marine. Proximal prodelta sediments seem probable. The Delta progrades to the North. Periods of reduced supply lead to a resumption of N.E. fill and bioturbation. Regression is continued.

1960m-1994m

This interval has another four cycles of upward coarsening sediments grading from silt to fine grained sand.
However, the regional N.E. slope determines the current bedding. This suggests that the transport energy is more important than the sediment supply in contrast to the preceeding interval. Again a shallow water environment is indicated with repeated shoaling leading to upward coarsening cycles.

1927m-1960m

In marked contrast to the two preceeding intervals, these sediments consist of a lower thick silt and an upper monotonous shale.
Current bedding is well defined to the N.E. with little evidence of supply from the South. Hence the dominance of transport over supply allows the distribution of sediments to conform to the regional slope.
Hence relatively quiet depositional conditions are reached by the end of this interval

1927m Depositional Break Here.

1881m-1927m

This interval is almost entirely sand, two thin shales separate three very clean blocky sands.
Strong Northerly crossbedding is evident throughout.
Such large blocky sands are characteristic of distributory channel sands of a highly constructive delta.
In this case prograding to the North. What is curious is the lack of Distributory mouth bar sand at the base of the sequence. It may be that the lowermost sand unit is such a distributory mouth bar but it does not have the usual upward coarsening character.
Hence the regression noted below is here completed.

1869m-1881m

This sand really belongs with the preceeding three sands to which it has clear affinities. The main difference is in the current bedding which in this sand shows the more usual foreset pattern rather than the simple high angle regular crossbedding of the sands below.

1859m-1869m

By inference these sands are delta plain sands.

1826m-1859m

Here there are three stacked channel units of upward fining sequences as indicated on the left. They are significantly different to the distributory channel sands noted below. They have lower angle current bedding which is also more random in direction. They therefore look like meandering channel sands and thus represent Meander Belt of the Delta plain

1826m Depositional Break Here - Marine Transgression.
Latrobe Formation.

1807m-1826m

This thick mudstone contrasts strongly with the preceeding clastic interval. It is well sorted and shows bipolar opposed low angle current bedding.
Hence it appears to have the character of subtidal muds, but is too thin to be sure.

1797m-1807m Miocene.

These homogeneous silts are also probably marine but again too thin an interval is present to be sure.

1797m A Major Regional Unconformity Here.

1750m-1797m Lakes Entrance Formation.

These look like marine silts and shales. They are thinly laminar and show good sorting and evidence of active reworking.
Current bedding is low angle and well ordered with predominantly opposed bipolar directions - probably a tidal influence is present.

APPENDIX 3

Organic Petrology of Samples from Pisces No. 1
(Keiraville Konsultants Pty. Ltd.)

PISCES NO. 1

Organic petrology of a suite of samples from Pisces No. 1

A.C. COOK

A report prepared for
Union Texas Australia Inc.

Keiraville Konsultants Pty. Ltd.,
7 Dallas St.,
Keiraville, N.S.W., 2500,
Australia.

July 1982

Pisces No. 1

Contents

Organic petrology of a suite of samples from Pisces No. 1

Introduction

Twenty nine sidewall cores were received from Union Texas for petrological examination of the contained organic matter. These samples covered a depth interval from 1075m to 2545.5m and comprised eight samples from the Tertiary marine sequence and twenty one samples from a unit equated with the Latrobe Group.

Short descriptions of the organic matter in each sample, together with vitrinite reflectance data and descriptions of rock-types, are given in Appendix 1. This report draws together the petrological and other data for the suite of samples and develops an interpretation of the source-potential of, and the extent to which hydrocarbons are likely to have been generated from, the sequence drilled at the location of Pisces No. 1. Estimates of the thermal history and the probable timing of maturation are also made.

Experimental Methods

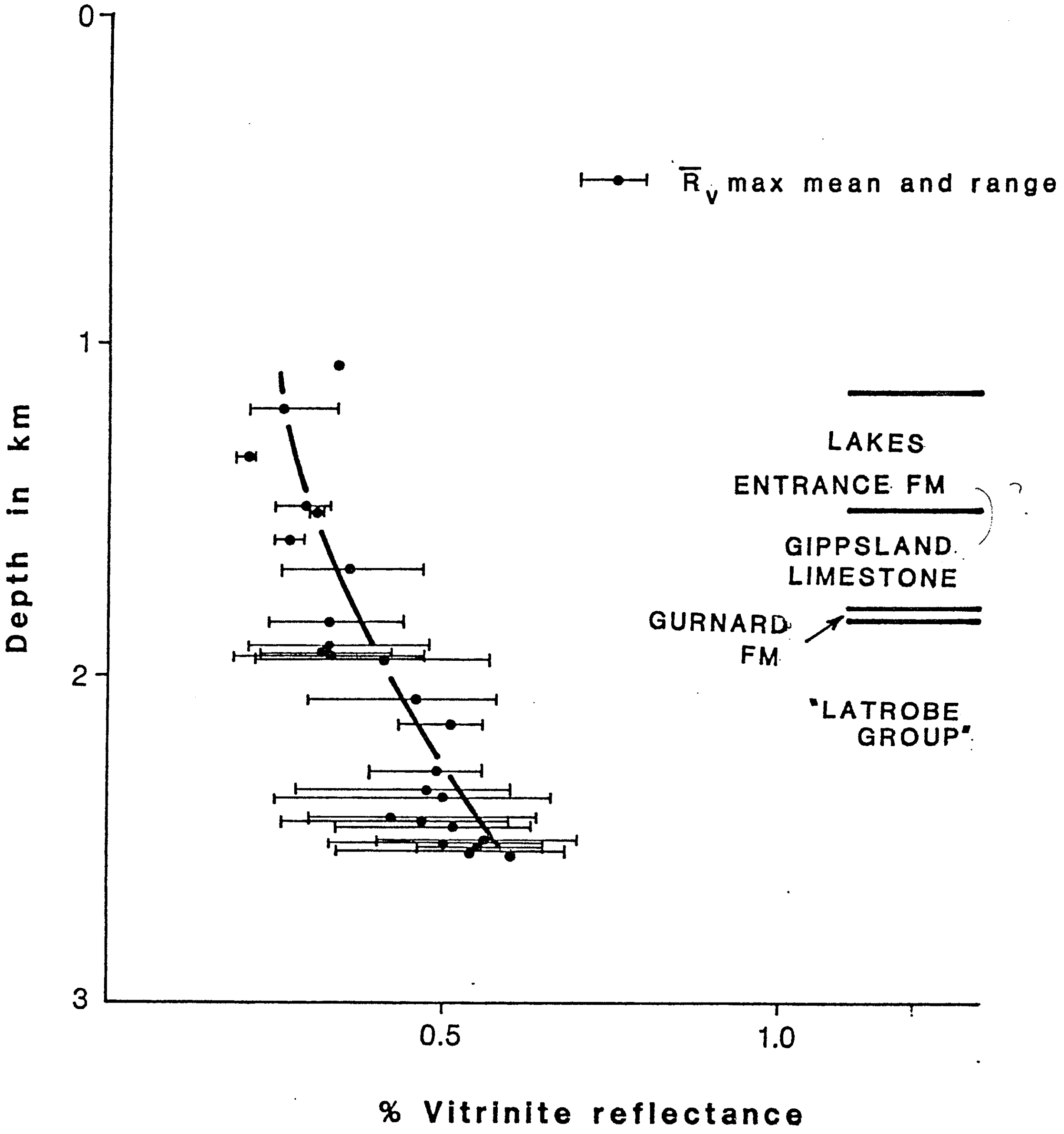
The sidewall cores were checked for mud-cake and then crushed using a mortar and pestle to a grain-size of about -3mm. Samples were mounted in cold-setting polyester resin and polished "as received", so that whole-rock samples rather than concentrates of organic matter were examined. This method is preferred to the use of demineralised concentrates because of the greater ease, with whole-rock samples, of identifying first generation vitrinite and, for sidewall cores, of recognizing mud-cake contamination. The whole-rock method also permits the examination of maceral associations.

Vitrinite reflectance measurements were made using immersion oil of refractive index 1.518 (at 546nm and 23°C) and spinel and garnet standards of 0.42%, 0.917% and 1.726% reflectance. Fluorescence-mode observations were made on all samples and provide supplementary evidence concerning organic matter type, and exinite abundance and maturity. For fluorescence-mode a 3mm BG 3 excitation filter was used with a TK400 dichroic mirror and a K490 barrier filter. A Leitz MPV 1.1 photometer mounted on a Leitz Orthoplan was used for photometric work. A separate Opal illuminator is normally used for examination in fluorescence-mode.

Vitrinite Reflectance

The full sample set provides good control over the variation of the vitrinite reflectance as a function of depth even though the overall range of reflectance is low. Seven out of the eight sidewall cores shot in the upper part of the sequence were found to contain vitrinite. The number of readings for these samples is low but the values obtained are consistent. In these samples, the vitrinite population was very small but reasonably well defined. The results for the samples from the "Latrobe Group" fall on a similar trend to the data from units above the "Latrobe Group". The number of readings of vitrinite reflectance per sample range from none to twenty five. Overall they provide a good indication of the level and the rate of change (with depth) of maturation. Coal is rare in the samples from the

PISCES No.1


$\overline{R}_V$ max mean and range
Depth in km
0
1
2
3
0.5
1.0
% Vitrinite reflectance
LAKES ENTRANCE FM
GIPPSLAND LIMESTONE
GURNARD FM
"LATROBE GROUP"

"Latrobe Group" relative to typical intersections of the Latrobe Group.

Figure 1 (p. 4) shows the mean maximum reflectance and the range of reflectance attributed to each of the horizons sampled. The curved line represents the most probable vitrinite reflectance trend. The data are relatively tightly clustered about the most probable trend. The range for individual samples is high in comparison with the data which would be obtained from a coal-dominated sequence, but is typical for vitrinite occurring in marine or marine influenced rocks in association with a dominant population of inertinite.

The upper part of the sequence in Pisces No. 1 is highly immature. Using a value of 0.5% vitrinite reflectance for the upper boundary of the oil generation window, the sequence below 2300m is marginally oil mature but T.D. apparently lies above the principal zone of oil generation (0.7% to 0.9% vitrinite reflectance). The 0.9% reflectance horizon probably lies at about 3000m. The reflectance gradients at the 0.5% and 0.6% vitrinite reflectance levels are moderate to high at 0.28%/km and 0.37%/km respectively. The very low reflectance values found in the upper part of the sequence may be due, in part, to type effects. In this case, the reflectance gradients may slightly overestimate the real rate of increase in maturation down-section.

Organic Matter Type

Dispersed organic matter (d.o.m.) is rare in all of the samples from the Lake Entrance Formation and the Gippsland Limestone. Dinoflagellates are the most common form of exinite in this part of the section and are typically the dominant type of d.o.m.

D.o.m ranges from rare to abundant in the "Latrobe Group" with the deeper samples generally having a higher content of organic matter than those from the upper part of the unit. Inertinite is the dominant maceral present in most samples. Some of the inertinite has probably been gelified prior to oxidation. This has the appearance, in some cases, of oxidized vitrinite but also resembles macrinite. Semifusinite, inertodetrinite and fusinite are also present. Exinite is typically rare but is sparse in a few samples. The distinction of dinoflagellates from sporinite is difficult in polished section, but the morphology and fluorescence characteristics of the exinite suggests that dinoflagellates are dominant over sporinite in most if not all samples. Cutinite is rare relative to the other forms of exinite. Vitrinite is abundant in two samples and common in three samples, all of these lying below 2300m —— that is, in the lower part of the "Latrobe Group".

Pyrite is typically a significant component of the samples from the "Latrobe Group". No well-defined bitumens were found but some intergranular fluorescence was noted in the sample from 2545.5m. No oil-cuts were found during examination of any of the samples, and the bitumen-related maceral exsudatinite was not found.

Thermal History

Present well temperatures are not available for this report, but it is probable that the well temperatures in the lower part of the section are high in relation to the vitrinite reflectances found. This probability, together with the absence of any evidence of an early coalification event, suggests that the section at the location of Pisces is currently in a phase of increasing rates of maturation.

Source-potential and hydrocarbon generation

The upper part of the sequence has very little source-potential and is too immature for significant generation to have occurred. The "Latrobe Group" has low to moderate source-potential in terms of its exinite content. The dominance of algal-related exinite suggests that little oil-generation from exinite will have occurred within the section drilled. Oil-generation from the exinite may not occur until depths of about 3000m are reached. Vitrinite and inertinite are commonly assumed to have little or no potential for oil-generation. On this view, assuming the samples examined are representative, the section in Pisces must be assessed as having a relatively low potential for oil generation.

I consider that vitrinite, and to a lesser extent, low reflecting inertinite have a significant potential for oil generation even though the specific yield is less than for exinite. Of equal significance is the probability that maturation occurs earlier in these macerals as compared with exinite. This interpretation indicates moderate oil generation potential for the part of the section below 2300m and implies that some generation has probably taken place even though the maturation level is relatively low.

The organic facies found in the "Latrobe Group" samples is unusual. Coals and coal-related facies are normally abundant. Inertinite is dominant in some of the older parts of the "Latrobe Group", but not normally to the extent which was encountered in Pisces No. 1. Sidewall cores can, in some circumstances, prove to be unrepresentative of the organic matter in a section. The large number of samples examined for Pisces No. 1 makes this a relatively unlikely occurrence, but it may be useful to examine the relationship of the organic matter in the lithologies chosen for sidewall coring to that of the remainder of the section.

Conclusions

Pisces No. 1 penetrated an immature to marginally mature section of the "Latrobe Group". The vitrinite reflectance profile can be considered as relatively precise and accurate. The vitrinite reflectance mear T.D. is 0.60%. The reflectance gradient near T.D. is moderately high.

Organic matter is common to abundant in a number of samples from the "Latrobe Group". In most samples, however, the dispersed organic matter (d.o.m.) is dominated by inertinite. Exinite is typically rare and appears to consist largely of dinoflagellate cysts. The exinite is unlikely to have generated significant amounts of oil at the levels of maturity found to T.D. Some possibility does exist that oil generation from vitrinite has occurred, especially in the section below 2300m.

PISCES No. 1

K.K. No.	Depth	$\bar{R}_o$max	Range	N	Exinite Fluorescence (Remarks)
15725	1075 SWC	0.34		1	Rare greenish yellow to orange dinoflagellates and liptodetrinite. (Claystone, d.o.m rare, E>I>V. Pyrite sparse.)
					LAKES ENTRANCE FORMATION 1150m
15726	1198.5 SWC	0.26	0.21-0.34	3	Rare greenish yellow dinoflagellates and rare liptodetrinite. (Claystone, calcareous with nannofossils, pyrite sparse overall but locally common. D.o.m. rare, E>I=V.)
15727	1351.5 SWC	0.21	0.19-0.22	3	Rare greenish yellow to yellow dinoflagellates. (Silty calcareous claystone, with nannofossils and sparse pyrite. D.o.m. rare, E>I=V.)
15728	1490 SWC	0.30	0.25-0.33	5	Rare liptodetrinite, yellow. (Silty claystone with abundant nannofossils and rare pyrite. D.o.m. rare, E>I=V.)
					GIPPSLAND LIMESTONE 1500m
15729	1514 SWC	0.31	0.30-0.32	4	Rare liptodetrinite greenish yellow to yellow and rare cutinite dull orange. (Silty claystone, pyrite rare overall but locally common. D.o.m. rare, E>I=V.)
15730	1589.5 SWC	0.27	0.25-0.29	3	Rare liptodetrinite, greenish yellow to yellow. (Silty claystone with sparse pyrite and nannofossils. D.o.m. rare, E=I=V.)
15731	1668.5 SWC	0.36	0.26-0.47	4	Rare greenish yellow to orange dinoflagellates and liptodetrinite. (Calcareous mudstone with abundant microfossils and common pyrite. D.o.m. rare, I=V=E. Some of the vitrinite may be reworked, and a value close to 0.26% may be most representative of first generation vitrinite.)
15732	1791 SWC	<0.96		-	Rare dinoflagellates, orange, probably reworked. (Calcareous mudstone with abundant microfossils, including foraminifers. Some of the microfossils show strong autofluoresence. Pyrite is common. D.o.m. rare, E>I, no vitrinite found.)
					GURNARD FORMATION 1796m
					"LATROBE GROUP" 1826m
15733	1834 SWC	0.33	0.24-0.44	10	Rare greenish yellow to orange sporinite and cutinite. (Pyritic claystone with common inertinite and rare vitrinite and exinite. Some of the inertinite appears to be formed from tissue which has been gelified and then oxidized - oxidized vitrinite. The pyrite occurs as framboids and in a massive, ?replacive habit.)
15734	1906 SWC	0.33	0.21-0.48	4	Greenish yellow to yellow ?dinoflagellates, sporinite and liptodetrinite. (Sandstone dominant over claystone and siltstone. Pyrite common, d.o.m. rare, I>V=E.)

PISCES No. 1

K.K. No.	Depth	$\bar{R}_o$max	Range	N	Exinite Fluorescence (Remarks)
					"LATROBE GROUP" 1826m
15735	1927 SWC	0.32	0.23-0.42	7	Similar to 15733. (Sandy siltstone with pyrite less abundant as compared with 15733. Some of the cutinite lacks ornament and resembles thin-walled tasmanitids.)
15736	1936 SWC	0.33	0.19-0.47	6	Rare yellow dinoflagellates and sporinite. (Siltstone with pyrite common and d.o.m. sparse. I>V=E.)
15737	1940 SWC	0.41	0.22-0.57	12	Rare dinoflagellates, greenish yellow to yellow. (Siltstone with d.o.m. sparse, I>E=V. Pyrite common. The d.o.m. includes some material vitrinite transitional from vitrinite to inertinite. The vitrinite reflectance values are unusually sensitive to the cut-point taken and the proportion of transitional material included in the vitrinite data set.)
15738	2068.5 SWC	0.46	0.30-0.58	7	Rare dinoflagellates, yellow. (Claystone with minor siltstone and coal. The coal is composed of massive textoulminite and the presence of this material is associated with the relatively high reflectance.)
15739	2157 SWC	0.51	0.43-0.56	12	Rare dinoflagellates, yellow to orange, cutinite, orange. (Siltstone with d.o.m. rare, E>V>I. The vitrinite population is biased towards massive phytoclasts transitional to inertinite. Pyrite abundant.)
15740	2230.5 SWC	-		-	Rare dinoflagellates, yellow to orange. (Siltstone with d.o.m. very rare, E>I, no V. Possible fluorescing bitumen found. Pyrite very abundant.)
15741	2284.5 SWC	0.49	0.39-0.56	7	Rare dinoflagellates, greenish yellow to yellow orange. (Siltstone, silty sandstone and claystone, d.o.m. sparse and more abundant in the siltstone than in the other rock-types. I>V=E. Massive inertinite forms a large part of the inertinite population with reflectances in the range 0.72% to 1.1%.)
15742	2357 SWC	0.48	0.28-0.60	21	Sparse dinoflagellates, greenish yellow to yellow orange. Rare dull orange resinite associated with textoulminite. (Siltstone with d.o.m. common, I>V>E. V and I both common.)
15743	2377 SWC	0.50	0.25-0.66	20	Rare dinoflagellates, greenish yellow to yellow. Rare ?cutinite, orange. (Siltstone and silty sandstone, d.o.m. common, I>V>E. Vitrinite common. Pyrite sparse.)
15744	2429 SWC	0.42	0.30-0.64	11	Rare to sparse dinoflagellates, greenish yellow to yellow orange. (Siltstone with d.o.m. sparse, E>I>V. Vitrinite rare, pyrite common.)
15745	2441.5 SWC	0.47	0.26-0.60	9	Rare greenish yellow to yellow dinoflagellates. (Siltstone, subordinite sandstone and rare claystone. D.o.m. sparse, I>V>E, vitrinite rare, inertinite sparse.)
15746	2462.5 SWC	0.51	0.34-0.63	21	Rare yellow to orange dinoflagellates and orange cutinite. (Sandy siltstone with abundant d.o.m, I and V both common, I>V>E.)

PISCES No. 1

K.K. No.	Depth	$\bar{R}_o$max	Range	N	Exinite Fluorescence (Remarks)
					"LATROBE GROUP" 1826m
15747	2505 SWC	0.56	0.40-0.70	20	Rare greenish yellow to yellow dinoflagellates, and orange to dull orange sporinite and resinite. (Carbonaceous siltstone with abundant I and V, d.o.m. abundant, I>V>E. Rare grains of coal. These may be autochthonous because their bedding always appears to be parallel with that of the host sediment. Shell fragments are also present and the assemblage of macerals and minerals is unusual.)
15748	2512.5 SWC	0.50	0.33-0.65	10	Rare to sparse yellow to orange dinoflagellates, dull orange cutinite and rare bright green fluorinite. (Siltstone dominant over silty sandstone and claystone. D.o.m. common to abundant, but vitrinite rare, I>E>V.)
15749	2524.5 SWC	-		-	Rare greenish yellow to yellow dinoflagellates. (Siltstone, d.o.m. common, I>>E, vitrinite absent. Pyrite common.)
15750	2530.5 SWC	0.55	0.46-0.65	3	Rare to sparse yellow to orange dinoflagellates. (Siltstone with d.o.m. common to abundant, chiefly I, I>E>V. Vitrinite rare. Pyrite sparse.)
15751	2535 SWC	0.54	0.34-0.68	25	Sparse to common greenish yellow to orange dinoflagellates, and orange sporinite and cutinite. (Carbonaceous claystone with some siltstone. D.o.m. abundant, V>I>E. Vitrinite and inertinite both abundant.)
15752	2545.5 SWC	0.60		1	Rare greenish yellow to orange dinoflagellates. (Siltstone with d.o.m. common, I>>E, vitrinite very rare. Pyrite sparse. Some intergranular yellow fluorescence is present, possibly from relatively insoluble bitumens. No staining developed into the immersion oil showing that live oil is not present. This component may have been the cause of the "visual" fluorescence reported.)
15753	2559.5 SWC	-		-	Rare greenish yellow to orange sporinite and cutinite. (Micaceous siltstone. Inertinite common, exinite rare, no undoubted vitrinite found. The palynomorphs are uniformly small and could be smooth walled dinoflagellates. Most of the inertinite is structured and oxidized vitrinite is not as abundant as in samples from the top of the Latrobe Group. The mean inertinite reflectance is 1.31%.)

ABUNDANCE TERMS FOR VISUAL ESTIMATES BY VOLUME

ABUNDANT	>2.0%
COMMON	0.5%< x <2.0%
SPARSE	0.1%< x <0.5%
Rare	<0.1%

APPENDIX 4

Velocity Survey (Seismograph Service Ltd.)

4.1 Time - Depth Computation Sheets

4.2 Time - Depth Curve

PRELIMINARY DATA

SEISMOGRAPH SERVICE (ENGLAND) LTD.
WELL SURVEY DIVISION

COMPANY: UNION TEXAS AUSTRALIA, INC
WELL: PISCES NO 1
AIRGUN COMPUTATION

EKB= 22.0 M
KB= 22.0 M AMSL
VW= 1524 M/S
ED= MSL

GUN DEPTH 15.2 M
GUN HYDROPHONE DEPTH 18.3 M
GUN OFFSET 37.2 M

RECORD NO	D' M	D M	Z M	X M	T S	TV S	TE S	TC S	AVERAGE VELOCITY M/S	INTERVAL DEPTH M	INTERVAL TIME S	INTERVAL VELOCITY M/S
94	220.0	220.0	198.0	37.2	0.1180	0.1176	0.0100	0.1276	1552			
93	250.0	250.0	228.0	37.2	0.1270	0.1271	0.0100	0.1371	1663			
92	280.0	280.0	258.0	37.2	0.1420	0.1423	0.0100	0.1523	1694			
91	310.0	310.0	288.0	37.2	0.1520	0.1526	0.0100	0.1626	1771			
										120.0	0.0501	2393
90	340.0	340.0	318.0	37.2	0.1670	0.1677	0.0100	0.1777	1789			
89	370.0	370.0	348.0	37.2	0.1800	0.1809	0.0100	0.1909	1823			
88	400.0	400.0	378.0	37.2	0.1910	0.1920	0.0100	0.2020	1871			
87	430.0	430.0	408.0	37.2	0.2050	0.2061	0.0100	0.2161	1888			
										120.0	0.0464	2584
86	460.0	460.0	438.0	37.2	0.2130	0.2142	0.0100	0.2242	1954			
85	490.0	490.0	468.0	37.2	0.2290	0.2302	0.0100	0.2402	1948			
84	520.0	520.0	498.0	37.2	0.2400	0.2413	0.0100	0.2513	1982			
83	550.0	550.0	528.0	37.2	0.2500	0.2513	0.0100	0.2613	2020			
										123.0	0.0502	2450
82	583.0	583.0	561.0	37.2	0.2630	0.2644	0.0100	0.2744	2045			
81	610.0	610.0	588.0	37.2	0.2740	0.2754	0.0100	0.2854	2060			
80	640.0	640.0	618.0	37.2	0.2880	0.2894	0.0100	0.2994	2064			
79	679.0	679.0	657.0	37.2	0.3020	0.3035	0.0100	0.3135	2096			
										137.0	0.0591	2317
78	720.0	720.0	698.0	37.2	0.3220	0.3235	0.0100	0.3335	2093			
77	750.0	750.0	728.0	37.2	0.3320	0.3335	0.0100	0.3435	2119			
76	780.0	780.0	758.0	37.2	0.3450	0.3466	0.0100	0.3566	2126			
75	810.0	810.0	788.0	37.2	0.3570	0.3586	0.0100	0.3686	2138			
										120.0	0.0481	2496
74	840.0	840.0	818.0	37.2	0.3700	0.3716	0.0100	0.3816	2144			
73	870.0	870.0	848.0	37.2	0.3830	0.3846	0.0100	0.3946	2149			
72	900.0	900.0	878.0	37.2	0.3940	0.3956	0.0100	0.4056	2165			
71	930.0	930.0	908.0	37.2	0.4080	0.4096	0.0100	0.4196	2164			
										120.0	0.0471	2550
70	960.0	960.0	938.0	37.2	0.4170	0.4187	0.0100	0.4287	2188			
69	990.0	990.0	968.0	37.2	0.4300	0.4317	0.0100	0.4417	2192			
68	1025.0	1025.0	1003.0	37.2	0.4420	0.4437	0.0100	0.4537	2211			
67	1050.0	1050.0	1028.0	37.2	0.4500	0.4517	0.0100	0.4617	2227			
										130.0	0.0490	2650
66	1090.0	1090.0	1068.0	37.2	0.4660	0.4677	0.0100	0.4777	2236			
65	1120.0	1120.0	1098.0	37.2	0.4770	0.4787	0.0100	0.4887	2247			
64	1150.0	1150.0	1128.0	37.2	0.4880	0.4897	0.0100	0.4997	2257			
63	1180.0	1180.0	1158.0	37.2	0.5000	0.5017	0.0100	0.5117	2263			
										120.0	0.0440	2725
62	1210.0	1210.0	1188.0	37.2	0.5100	0.5117	0.0100	0.5217	2277			

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
59	1300.0	1300.0	1278.0	37.2	0.5460	0.5478	0.0100	0.5578	2291			
										120.0	0.0470	2552
58	1330.0	1330.0	1308.0	37.2	0.5570	0.5588	0.0100	0.5688	2300			
57	1360.0	1360.0	1338.0	37.2	0.5680	0.5698	0.0100	0.5798	2308			
56	1390.0	1390.0	1368.0	37.2	0.5780	0.5798	0.0100	0.5898	2320			
55	1420.0	1420.0	1398.0	37.2	0.5880	0.5898	0.0100	0.5998	2331			
										120.0	0.0420	2856
54	1450.0	1450.0	1428.0	37.2	0.5990	0.6008	0.0100	0.6108	2338			
53	1480.0	1480.0	1458.0	37.2	0.6100	0.6118	0.0100	0.6218	2345			
52	1510.0	1510.0	1488.0	37.2	0.6210	0.6228	0.0100	0.6328	2351			
51	1540.0	1540.0	1518.0	37.2	0.6310	0.6328	0.0100	0.6428	2362			
										120.0	0.0440	2726
50	1570.0	1570.0	1548.0	37.2	0.6430	0.6448	0.0100	0.6548	2364			
49	1600.0	1600.0	1578.0	37.2	0.6520	0.6538	0.0100	0.6638	2377			
48	1623.0	1623.0	1601.0	37.2	0.6620	0.6638	0.0100	0.6738	2376			
47	1653.0	1653.0	1631.0	37.2	0.6720	0.6738	0.0100	0.6838	2385			
										113.0	0.0400	2824
46	1683.0	1683.0	1661.0	37.2	0.6830	0.6848	0.0100	0.6948	2391			
45	1710.0	1710.0	1688.0	37.2	0.6920	0.6938	0.0100	0.7038	2398			
44	1730.0	1730.0	1708.0	37.2	0.6980	0.6998	0.0100	0.7098	2406			
43	1750.0	1750.0	1728.0	37.2	0.7050	0.7068	0.0100	0.7168	2411			
42	1770.0	1770.0	1748.0	37.2	0.7130	0.7148	0.0100	0.7248	2412			
										113.0	0.0380	2973
41	1796.0	1796.0	1774.0	37.2	0.7210	0.7228	0.0100	0.7328	2421			
40	1807.0	1807.0	1785.0	37.2	0.7270	0.7288	0.0100	0.7388	2416			
39	1826.0	1826.0	1804.0	37.2	0.7320	0.7338	0.0100	0.7438	2425			
38	1838.0	1838.0	1816.0	37.2	0.7350	0.7368	0.0100	0.7468	2432			
37	1859.0	1859.0	1837.0	37.2	0.7410	0.7428	0.0100	0.7528	2440			
36	1882.0	1882.0	1860.0	37.2	0.7480	0.7498	0.0100	0.7598	2448			
35	1902.5	1902.5	1880.5	37.2	0.7550	0.7568	0.0100	0.7668	2452			
										130.0	0.0390	3332
34	1926.0	1926.0	1904.0	37.2	0.7600	0.7619	0.0100	0.7719	2467			
33	1945.5	1945.5	1923.5	37.2	0.7660	0.7679	0.0100	0.7779	2473			
32	1967.0	1967.0	1945.0	37.2	0.7720	0.7739	0.0100	0.7839	2481			
31	1978.5	1978.5	1956.5	37.2	0.7760	0.7779	0.0100	0.7879	2483			
30	2005.0	2005.0	1983.0	37.2	0.7830	0.7849	0.0100	0.7949	2495			
29	2017.0	2017.0	1995.0	37.2	0.7880	0.7899	0.0100	0.7999	2494			
										109.0	0.0320	3405
28	2035.0	2035.0	2013.0	37.2	0.7920	0.7939	0.0100	0.8039	2504			
27	2051.0	2051.0	2029.0	37.2	0.7970	0.7989	0.0100	0.8089	2508			
26	2073.0	2073.0	2051.0	37.2	0.8040	0.8059	0.0100	0.8159	2514			
25	2096.0	2096.0	2074.0	37.2	0.8080	0.8099	0.0100	0.8199	2530			
24	2117.0	2117.0	2095.0	37.2	0.8150	0.8169	0.0100	0.8269	2534			
23	2134.5	2134.5	2112.5	37.2	0.8210	0.8229	0.0100	0.8329	2536			
										116.5	0.0340	3426
22	2151.5	2151.5	2129.5	37.2	0.8260	0.8279	0.0100	0.8379	2542			
21	2171.0	2171.0	2149.0	37.2	0.8300	0.8319	0.0100	0.8419	2553			
20	2193.5	2193.5	2171.5	37.2	0.8370	0.8389	0.0100	0.8489	2558			
19	2227.0	2227.0	2205.0	37.2	0.8440	0.8459	0.0100	0.8559	2576			
18	2245.0	2245.0	2223.0	37.2	0.8500	0.8519	0.0100	0.8619	2579			
										117.0	0.0300	3899
17	2268.5	2268.5	2246.5	37.2	0.8560	0.8579	0.0100	0.8679	2588			
16	2288.5	2288.5	2266.5	37.2	0.8610	0.8629	0.0100	0.8729	2597			
15	2304.0	2304.0	2282.0	37.2	0.8660	0.8679	0.0100	0.8779	2599			
14	2322.0	2322.0	2300.0	37.2	0.8710	0.8729	0.0100	0.8829	2605			
13	2347.5	2347.5	2325.5	37.2	0.8760	0.8779	0.0100	0.8879	2619			
										107.5	0.0270	3980
12	2376.0	2376.0	2354.0	37.2	0.8830	0.8849	0.0100	0.8949	2630			
11	2400.0	2400.0	2378.0	37.2	0.8910	0.8929	0.0100	0.9029	2634			
10	2420.0	2420.0	2398.0	37.2	0.8960	0.8979	0.0100	0.9079	2641			
9	2440.5	2440.5	2418.5	37.2	0.9020	0.9039	0.0100	0.9139	2646			
8	2460.0	2460.0	2438.0	37.2	0.9050	0.9069	0.0100	0.9169	2659			
										113.0	0.0310	3644
7	2489.0	2489.0	2467.0	37.2	0.9140	0.9159	0.0100	0.9259	2664			
6	2510.0	2510.0	2488.0	37.2	0.9180	0.9199	0.0100	0.9299	2676			
5	2530.0	2530.0	2508.0	37.2	0.9230	0.9249	0.0100	0.9349	2683			

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
3	2568.0	2568.0	2546.0	37.2	0.9340	0.9359	0.0100	0.9459	2692	79.0	0.0200	3949

IS THE TIME MEASURED FROM THE FIRST TROUGH ON THE GUN HYDROPHONE SIGNAL TO THE FIRST TROUGH ON THE DOWNHOLE SIGNAL

TIME CORRECTION FOR THE DISTANCE FROM THE GUN TO GUN HYDROPHONE, AT WATER ELOCITY, IS ADDED TO T BEFORE CORRECTION TO THE VERTICAL

J IS THE TIME FROM THE GUN TO THE WELL GEOPHONE CORRECTED TO THE VERTICAL

$=\frac{\text{GUN DEPTH}}{\text{VW}}$

PRELIMINARY COMPUTATION

SEISMOGRAPH SERVICE LIMITED

WELL SURVEY DIVISION Unit 5

COMPANY : UNION TEXAS AUST.
WELL NAME : PISCES No: 1

COUNTRY : AUSTRALIA
DATE : 9TH MAY 1982

Reference level : 22 Metre AMSL
Seabed elevation : -122 Metre
Sea Velocity : 1524 Metre/second

Gun depth : 15.24 Metre
Hydrophone depth : 18.3 Metre
Offset distant : 37.2 Metre
Datum : Mean Sea Level

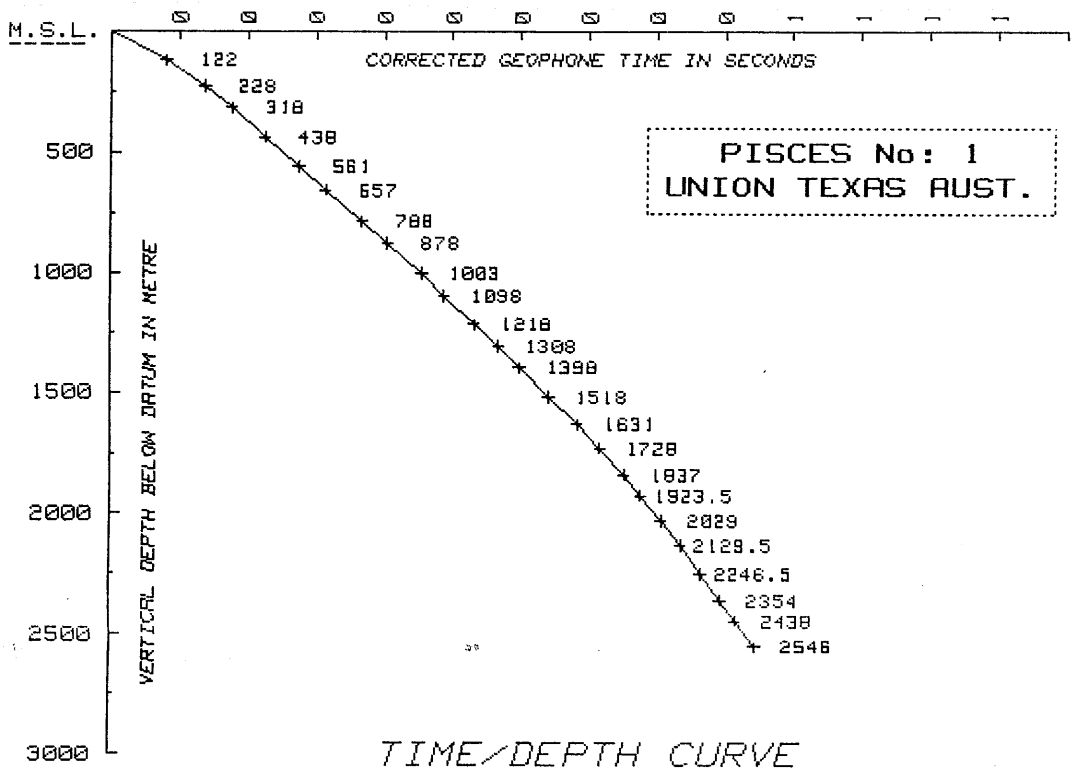
No:	D	Z	T	Tv	Te	Tc	Vavg	Zi	Ti	Vint
Seabed		122.0				0.0801	1524			
								106.0	0.0570	1859
1	250.0	228.0	0.127	0.1271	0.0100	0.1371	1663			
								90.0	0.0397	2268
2	340.0	318.0	0.166	0.1668	0.0100	0.1768	1799			
								120.0	0.0484	2478
3	460.0	438.0	0.214	0.2152	0.0100	0.2252	1945			
								123.0	0.0502	2449
4	583.0	561.0	0.264	0.2654	0.0100	0.2754	2037			
								96.0	0.0391	2455
5	679.0	657.0	0.303	0.3045	0.0100	0.3145	2089			
								131.0	0.0531	2467
6	810.0	788.0	0.356	0.3576	0.0100	0.3676	2144			
								90.0	0.0380	2366
7	900.0	878.0	0.394	0.3956	0.0100	0.4056	2164			
								125.0	0.0501	2497
8	1025.0	1003.0	0.444	0.4457	0.0100	0.4557	2201			
								95.0	0.0330	2876
9	1120.0	1098.0	0.477	0.4787	0.0100	0.4887	2247			
								120.0	0.0440	2725
10	1240.0	1218.0	0.521	0.5228	0.0100	0.5328	2286			
								90.0	0.0360	2499
11	1330.0	1308.0	0.557	0.5588	0.0100	0.5688	2300			
								90.0	0.0310	2902
12	1420.0	1398.0	0.588	0.5898	0.0100	0.5998	2331			
								120.0	0.0430	2789
13	1540.0	1518.0	0.631	0.6328	0.0100	0.6428	2361			
								113.0	0.0420	2690
14	1653.0	1631.0	0.673	0.6748	0.0100	0.6848	2382			
								97.0	0.0330	2938
15	1750.0	1728.0	0.706	0.7078	0.0100	0.7178	2407			
								109.0	0.0360	3027
16	1859.0	1837.0	0.742	0.7439	0.0100	0.7539	2437			
								86.5	0.0250	3459
17	1945.5	1923.5	0.767	0.7689	0.0100	0.7789	2470			
								105.5	0.0290	3637
18	2051.0	2029.0	0.796	0.7979	0.0100	0.8079	2512			
								100.5	0.0290	3465
19	2151.5	2129.5	0.825	0.8269	0.0100	0.8369	2545			
								117.0	0.0300	3899
20	2268.5	2246.5	0.855	0.8569	0.0100	0.8669	2591			
								107.5	0.0280	3838
21	2376.0	2354.0	0.883	0.8849	0.0100	0.8949	2630			
								84.0	0.0220	3817
22	2460.0	2438.0	0.905	0.9069	0.0100	0.9169	2659			
								108.0	0.0300	3599
23	2568.0	2546.0	0.935	0.9369	0.0100	0.9469	2689			

GLOSSARY

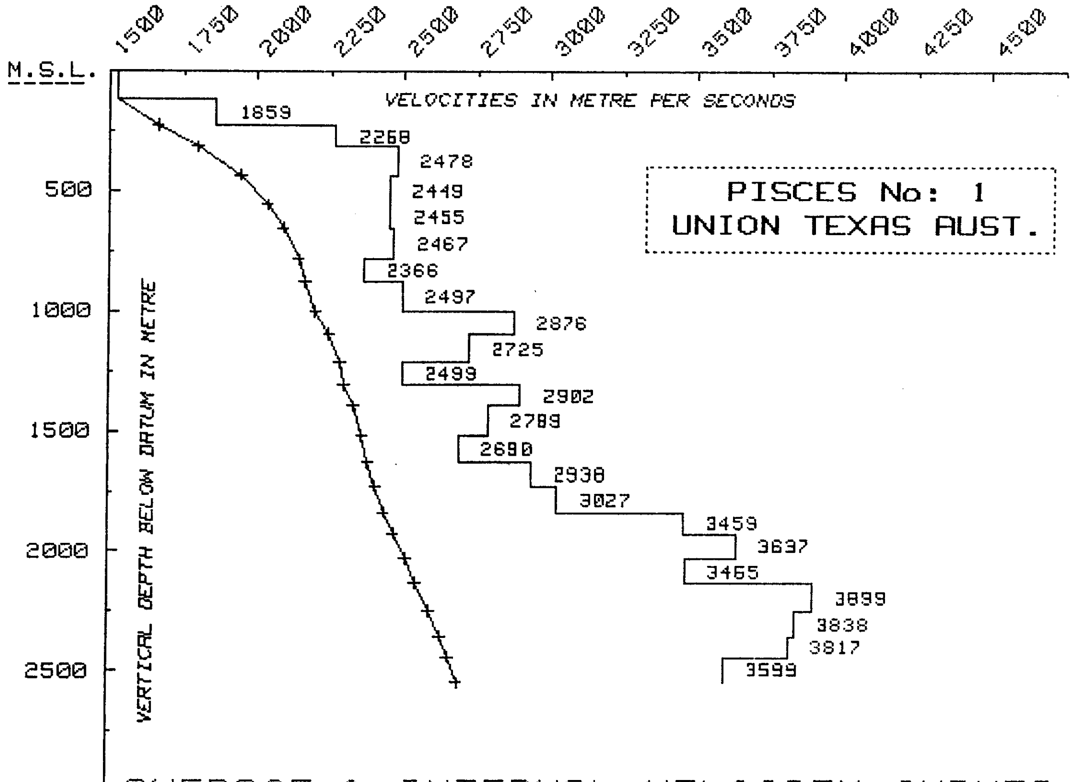
D = Measured Depth
T = Measured Time
Te = Gun depth / Water Velocity
Vavg = Average Velocity
Zi = Interval Depth

Z = Depth below M.S.L.
Tv = Time corrected to Vertical
Tc = Tv + Te
Vint = Interval Velocity
Ti = Interval Time

TIME CORRECTION FOR THE DISTANT FROM THE GUN TO THE GUN HYDROPHONE AT WATER VELOCITY IS ADDED TO T BEFORE CORRECTION TO THE VERTICAL



TIME/DEPTH CURVE



AVERAGE & INTERVAL VELOCITY CURVES

PE906258

This is an enclosure indicator page.
The enclosure PE906258 is enclosed within the container PE906254 at this location in this document.

The enclosure PE906258 has the following characteristics:

ITEM_BARCODE = PE906258
CONTAINER_BARCODE = PE906254
NAME = Stratigraphic Pinch-Out Events
BASIN = GIPPSLAND
PERMIT = VIC/P12
TYPE = GENERAL
SUBTYPE = GEOL_MAP
DESCRIPTION = Stratigraphic Pinch-Out Events in the North-Eastern Part of Permit VIC/P12 (Figure 2)
REMARKS =
DATE_CREATED = 15/07/82
DATE_RECEIVED = 28/07/82
W_NO = W772
WELL_NAME = PISCES-1
CONTRACTOR =
CLIENT_OP_CO = UNION TEXAS AUSTRALIA INC.

(Inserted by DNRE - Vic Govt Mines Dept)

PE906259

This is an enclosure indicator page.
The enclosure PE906259 is enclosed within the container PE906254 at this location in this document.

The enclosure PE906259 has the following characteristics:

ITEM_BARCODE = PE906259
CONTAINER_BARCODE = PE906254
NAME = Depth Structure Top of Latrobe
BASIN = GIPPSLAND
PERMIT = VIC/P12
TYPE = SEISMIC
SUBTYPE = HRZN_CNTR_MAP
DESCRIPTION = Depth Structure of Top of Latrobe Group (Figure 3)
REMARKS =
DATE_CREATED = 15/07/82
DATE_RECEIVED = 28/07/82
W_NO = W772
WELL_NAME = PISCES-1
CONTRACTOR =
CLIENT_OP_CO = UNION TEXAS AUSTRALIA INC.

(Inserted by DNRE - Vic Govt Mines Dept)

PE906260

This is an enclosure indicator page.
The enclosure PE906260 is enclosed within the container PE906254 at this location in this document.

The enclosure PE906260 has the following characteristics:

ITEM_BARCODE = PE906260
CONTAINER_BARCODE = PE906254
NAME = Predicted v Drilled Section
BASIN = GIPPSLAND
PERMIT = VIC/P12
TYPE = WELL
SUBTYPE = DIAGRAM
DESCRIPTION = Predicted Section v Drilled Section for Pisces-1 (Figure 4)
REMARKS =
DATE_CREATED = 15/07/82
DATE_RECEIVED = 28/07/82
W_NO = W772
WELL_NAME = PISCES-1
CONTRACTOR =
CLIENT_OP_CO = UNION TEXAS AUSTRALIA INC.

(Inserted by DNRE - Vic Govt Mines Dept)

PE906262

This is an enclosure indicator page.
The enclosure PE906262 is enclosed within the container PE906254 at this location in this document.

The enclosure PE906262 has the following characteristics:

ITEM_BARCODE = PE906262
CONTAINER_BARCODE = PE906254
NAME = Seismic Line - Original Concept
BASIN = GIPPSLAND
PERMIT = VIC/P12
TYPE = SEISMIC
SUBTYPE = SECTION
DESCRIPTION = The Original Concept of the Pisces Prospect Seismic Line GC 80-11A (Figure 8)
REMARKS =
DATE_CREATED = 15/07/82
DATE_RECEIVED = 28/07/82
W_NO = W772
WELL_NAME = PISCES-1
CONTRACTOR =
CLIENT_OP_CO = UNION TEXAS AUSTRALIA INC.

(Inserted by DNRE - Vic Govt Mines Dept)

PE906261

This is an enclosure indicator page.
The enclosure PE906261 is enclosed within the container PE906254 at this location in this document.

The enclosure PE906261 has the following characteristics:

ITEM_BARCODE = PE906261
CONTAINER_BARCODE = PE906254
NAME = Geometry of Gurnard Formation
BASIN = GIPPSLAND
PERMIT = VIC/P12
TYPE = WELL
SUBTYPE = DIAGRAM
DESCRIPTION = The Significance of the Geometry of the Gurnard Formation (Figure 7)
REMARKS =
DATE_CREATED = 15/07/82
DATE_RECEIVED = 28/07/82
W_NO = W772
WELL_NAME = PISCES-1
CONTRACTOR =
CLIENT_OP_CO = UNION TEXAS AUSTRALIA INC.

(Inserted by DNRE - Vic Govt Mines Dept)

PE906264

This is an enclosure indicator page.
The enclosure PE906264 is enclosed within the container PE906254 at this location in this document.

The enclosure PE906264 has the following characteristics:

ITEM_BARCODE = PE906264
CONTAINER_BARCODE = PE906254
NAME = Stratigraphic Correlation Table
BASIN = GIPPSLAND
PERMIT = VIC/P12
TYPE = WELL
SUBTYPE = DIAGRAM
DESCRIPTION = Litho/Chrono-Stratigraphic Correlation from the Latrobe Valley to the Offshore Gippsland Basin Area (Figure 10)
REMARKS =
DATE_CREATED = 15/07/82
DATE_RECEIVED = 28/07/82
W_NO = W772
WELL_NAME = PISCES-1
CONTRACTOR =
CLIENT_OP_CO = UNION TEXAS AUSTRALIA INC.

(Inserted by DNRE - Vic Govt Mines Dept)

PE906263

This is an enclosure indicator page.
The enclosure PE906263 is enclosed within the container PE906254 at this location in this document.

The enclosure PE906263 has the following characteristics:
ITEM_BARCODE = PE906263
CONTAINER_BARCODE = PE906254
NAME = Seismic Line - Post Drilling
BASIN = GIPPSLAND
PERMIT = VIC/P12
TYPE = SEISMIC
SUBTYPE = SECTION
DESCRIPTION = The Existence and Significance of Sheet Sands across the Pisces Prospect, Seismic Line GC 80-11A (Figure 9)
REMARKS =
DATE_CREATED = 15/07/82
DATE_RECEIVED = 28/07/82
W_NO = W772
WELL_NAME = PISCES-1
CONTRACTOR =
CLIENT_OP_CO = UNION TEXAS AUSTRALIA INC.

(Inserted by DNRE - Vic Govt Mines Dept)

PE906265

This is an enclosure indicator page.
The enclosure PE906265 is enclosed within the container PE906254 at this location in this document.

The enclosure PE906265 has the following characteristics:

ITEM_BARCODE = PE906265
CONTAINER_BARCODE = PE906254
NAME = Seismic Line - Truncation Events
BASIN = GIPPSLAND
PERMIT = VIC/P12
TYPE = SEISMIC
SUBTYPE = SECTION
DESCRIPTION = Seismic Truncation Events North-east of the Outer Rim of the Pisces Sub-basin, Seismic Line GC 81A-16 (Figure 11)
REMARKS =
DATE_CREATED = 15/07/82
DATE_RECEIVED = 28/07/82
W_NO = W772
WELL_NAME = PISCES-1
CONTRACTOR =
CLIENT_OP_CO = UNION TEXAS AUSTRALIA INC.

(Inserted by DNRE - Vic Govt Mines Dept)

PE906266

This is an enclosure indicator page.
The enclosure PE906266 is enclosed within the container PE906254 at this location in this document.

The enclosure PE906266 has the following characteristics:
ITEM_BARCODE = PE906266
CONTAINER_BARCODE = PE906254
NAME = Stratigraphic Truncation Plan
BASIN = GIPPSLAND
PERMIT = VIC/P12
TYPE = GENERAL
SUBTYPE = GEOL_MAP
DESCRIPTION = Stratigraphic Truncation Events in the north-eastern part of Permit VIC/P12 (Figure 12)
REMARKS =
DATE_CREATED = 15/07/82
DATE_RECEIVED = 28/07/82
W_NO = W772
WELL_NAME = PISCES-1
CONTRACTOR =
CLIENT_OP_CO = UNION TEXAS AUSTRALIA INC.

PE906255

This is an enclosure indicator page.
The enclosure PE906255 is enclosed within the container PE906254 at this location in this document.

The enclosure PE906255 has the following characteristics:

ITEM_BARCODE = PE906255
CONTAINER_BARCODE = PE906254
NAME = Lithostratigraphic Correlation
BASIN = GIPPSLAND
PERMIT = VIC/P12
TYPE = WELL
SUBTYPE = CROSS_SECTION
DESCRIPTION = Detailed Lithostratigraphic Correlation across the Offshore Gippsland Basin
REMARKS =
DATE_CREATED = 15/07/82
DATE_RECEIVED = 28/07/82
W_NO = W772
WELL_NAME = PISCES-1
CONTRACTOR =
CLIENT_OP_CO = UNION TEXAS AUSTRALIA INC.

(Inserted by DNRE - Vic Govt Mines Dept)

PE906256

This is an enclosure indicator page.
The enclosure PE906256 is enclosed within the container PE906254 at this location in this document.

The enclosure PE906256 has the following characteristics:

ITEM_BARCODE = PE906256
CONTAINER_BARCODE = PE906254
NAME = Seismic Interpretation, Pisces Sub-basin
BASIN = GIPPSLAND
PERMIT = VIC/P12
TYPE = SEISMIC
SUBTYPE = SECTION
DESCRIPTION = Evidence for the existence and configuration of the ""Pisces Sub-Basin"" (seismic sections)
REMARKS =
DATE_CREATED = 15/07/82
DATE_RECEIVED = 28/07/82
W_NO = W772
WELL_NAME = PISCES-1
CONTRACTOR =
CLIENT_OP_CO = UNION TEXAS AUSTRALIA INC.

(Inserted by DNRE - Vic Govt Mines Dept)

PE906257

This is an enclosure indicator page.
The enclosure PE906257 is enclosed within the container PE906254 at this location in this document.

The enclosure PE906257 has the following characteristics:

ITEM_BARCODE = PE906257
CONTAINER_BARCODE = PE906254
NAME = Seismic Interpretation, Outer Rim
BASIN = GIPPSLAND
PERMIT = VIC/P12
TYPE = SEISMIC
SUBTYPE = SECTION
DESCRIPTION = Evidence for the existence and configuration of the Outer Rim of the ""Pisces Sub-Basin"" (seismic sections)
REMARKS =
DATE_CREATED = 15/07/82
DATE_RECEIVED = 28/07/82
W_NO = W772
WELL_NAME = PISCES-1
CONTRACTOR =
CLIENT_OP_CO = UNION TEXAS AUSTRALIA INC.

(Inserted by DNRE - Vic Govt Mines Dept)

PE603611

This is an enclosure indicator page.
The enclosure PE603611 is enclosed within the container PE906254 at this location in this document.

The enclosure PE603611 has the following characteristics:

ITEM_BARCODE = PE603611
CONTAINER_BARCODE = PE906254
NAME = Mater (Mud) Log
BASIN = GIPPSLAND
PERMIT = VIC/P12
TYPE = WELL
SUBTYPE = MUD_LOG
DESCRIPTION = Masterlog (Mud Log) for Pisces-1
REMARKS =
DATE_CREATED = 15/05/82
DATE_RECEIVED =
W_NO = W772
WELL_NAME = PISCES-1
CONTRACTOR = GEOSERVICES
CLIENT_OP_CO = UNION TEXAS AUSTRALIA INC.

(Inserted by DNRE - Vic Govt Mines Dept)

PE603614

This is an enclosure indicator page.
The enclosure PE603614 is enclosed within the container PE906254 at this location in this document.

The enclosure PE603614 has the following characteristics:

ITEM_BARCODE = PE603614
CONTAINER_BARCODE = PE906254
NAME = Geological Composite Log
BASIN = GIPPSLAND
PERMIT = VIC/P12
TYPE = WELL
SUBTYPE = COMPOSITE_LOG
DESCRIPTION = Geological Composite Log for Pisces-1 containing gamma ray, sonic and stratigraphic data
REMARKS =
DATE_CREATED = 15/07/82
DATE_RECEIVED = 28/07/82
W_NO = W772
WELL_NAME = PISCES-1
CONTRACTOR =
CLIENT_OP_CO = UNION TEXAS AUSTRALIA INC.

(Inserted by DNRE - Vic Govt Mines Dept)

PE603615

This is an enclosure indicator page.
The enclosure PE603615 is enclosed within the container PE906254 at this location in this document.

The enclosure PE603615 has the following characteristics:

ITEM_BARCODE = PE603615
CONTAINER_BARCODE = PE906254
NAME = Dipmeter Log
BASIN = GIPPSLAND
PERMIT = VIC/P12
TYPE = WELL
SUBTYPE = WELL_LOG
DESCRIPTION = Interpreted Stratigraphic Dipmeter Log for Pisces-1
REMARKS =
DATE_CREATED = 15/07/82
DATE_RECEIVED = 28/07/82
W_NO = W772
WELL_NAME = PISCES-1
CONTRACTOR =
CLIENT_OP_CO = UNION TEXAS AUSTRALIA INC.

(Inserted by DNRE - Vic Govt Mines Dept)