Esso



# WCR VOL 2

# SUNFISH-2

W833

ESSO EXPLORATION AND PRODUCTION AUSTRALIA INC.

W833



# WELL COMPLETION REPORT
# SUNFISH-2

## VOLUME 2
## INTERPRETATIVE DATA



GIPPSLAND BASIN
VICTORIA

ESSO AUSTRALIA LIMITED

Compiled by: M. FITTALL

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# SUNFISH-2

# WELL COMPLETION REPORT

## VOLUME 2

(Interpretative Data)

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0929L/8

# GEOLOGICAL AND GEOPHYSICAL ANALYSIS

## PROGNOSIS (KB=21m ASL)

| Formation/Horizon | Pre-Drill Depth (m SS) | Post-Drill Depth (m SS) |
|---|---|---|
| GIPPSLAND LIMESTONE | 62 | 59 |
| LAKES ENTRANCE FORMATION | 915 | 1436.5 |
| LATROBE GROUP | | |
| Top of "coarse clastics" | 1570 | 1594.5 |
| *M. diversus* Seismic marker | 1706 | 1736.0 |
| Upper *L. balmei* Seismic Marker | 1730 | 1787.0 |
| Lower *L. balmei* Seismic Marker | 1918 | 1980.0? |
| Strzelecki Group | 2581 | Not penetrated |
| TOTAL DEPTH | 2750 | 2626.5 |

## INTRODUCTION

Sunfish-2 was primarily targeted to test the potential traps formed by truncation of the ENE plunging Sunfish nose by the Marlin Channel. These traps would be sealed by internal Latrobe group shales combined with marls and claystones of the Lakes Entrance formation. The well was also planned to test the small western culmination of the erosional closure at the top of the Latrobe Group, and to allow evaluation of the hydrocarbon zones intersected in Sunfish-1.

## PREVIOUS DRILLING HISTORY

The Sunfish discovery was made in February 1974 by the Sunfish-1 exploration well. Five small oil accumulations, totalling 25.1m net, and 73.5m of net gas were penetrated in Latrobe Group sandstones from the *M. diversus*, *L. balmei*, *T. longus* and *T. lilliei* zones (Enclosure 1).

## GEOLOGICAL SUMMARY

### Structure

The Sunfish structure is a complex feature resulting from the combination of three structural events.

1. Intra-Latrobe Group

   Normal basin-forming growth faulting prevailed during Latrobe Group deposition. The faults are generally oriented northwest to southeast with throw down to the southwest. The major fault bounding the structure to the north and to the east is also thought to have formed as a normal fault, with throw down to the south and southwest (Enclosures 2-4).

2. Marlin Channel

   The Marlin Channel is a major northwest to southeast trending topographic feature immediately to the west of the Sunfish structure. The eastern margin of the channel appears to be controlled by underlying normal faults.

   The Marlin Channel was cut towards the end of Latrobe Group deposition. Turrum Formation partially fills the Marlin Channel in this area with Lakes Entrance Formation and Gippsland Limestone providing the remaining infill (Enclosures 1-4).

3. Compression

   Overprinted on the Latrobe Group normal faults and the Marlin Channel erosion are the effects of a compressional event which resulted in the formation of the major anticlines in the basin. In this area most of the movement appears to have occurred during the late Eocene and Oligocene.

   This compressional deformation reversed the normal displacement along the western segment of the east-west trending fault to the north of Sunfish (Enclosures 2-4).

The above deformation events resulted in the recognition, prior to the drilling of Sunfish-2, of three different trapping mechanisms in the Sunfish area.

1. Sunfish-1 discovered oil and gas trapped in a faulted anticline which is the product of compressional overprint on the extensional faulting within the Latrobe Group.

2. A truncation trap has been set up to the east of Sunfish-1 by erosion of easterly dipping Latrobe Group sediments during cutting of the Marlin Channel. A simple, unfaulted closure is present which is enhanced if the high angle reverse fault to the north of the Sunfish structure seals.

3. Erosion of the top of Latrobe Group surface has produced a small erosional closure to the north-east of Sunfish-1 (Enclosure 2).

All the horizons predicted at the Sunfish-2 location are interpreted to have been penetrated low to prediction (see Prognosis).

The Lakes Entrance Formation was penetrated 521.5m low to prediction. However, the top of Lakes Entrance Formation is difficult to pick on well logs and seismic sections, and does not have a significant impact on the Sunfish prospect.

The top of Latrobe Group ("coarse clastics") was penetrated 24.5m low to prediction. Remapping of the top of Latrobe Group structure after drilling Sunfish-2, indicates the amount of closure has not changed (approximately 30m), but the area of closure has decreased. The structure remains as a double crested feature (Enclosure 2).

The M. diversus, Upper L. balmei, Lower L. balmei (originally designated T. longus) seismic markers are all interpreted to have been penetrated increasingly low to prediction:- 30m, 57m and approximately 62m low respectively. In addition, the Strzelecki Group was predicted at -2581m and had not been penetrated before reaching the T.D. of -2626m. The top of Strzelecki Group is therefore at least 45m low to prediction.

These seismic markers are thought to have come in low to prediction for two reasons. The Latrobe Group interval velocities used for the Sunfish-2 location were taken from Sunfish-1 and assumed to have been constant across the Sunfish structure. After drilling Sunfish-2 the interval velocities were shown to increase from Sunfish-1 to Sunfish-2, resulting in high predictions. Growth faulting is also evident in Sunfish-2 by comparison to Sunfish-1. Stratigraphic thickening of the L. balmei, T. longus, T. lilliei and N. senectus sections can be demonstrated in Sunfish-2.

The trapping mechanism formed as a result of the truncation of Latrobe Group sediments by the Marlin Channel, and sealed by the Lakes Entrance Formation and intraformation shales, is invalid at the Sunfish-2 location. The top 73m of the Latrobe Group consists of massive sand. Therefore, no intraformation shale seals are present to complete the trapping mechanism.

## STRATIGRAPHY

Sunfish-2 penetrated typical limestones and calcareous sediments of the Gippsland Limestone and Lakes Entrance Formation as expected. These sediments are of Early Miocene to Early Pliocene age. The basal 7m of the Lakes Entrance Formation consists of thin, strongly cemented sandstones and calcareous siltstones containing carbonaceous laminae. Reworked Early Oligocene to Late Eocene foraminifera are reported in sidewall cores from this zone (see Appendix 1). This basal section is interpreted to contain reworked material which was introduced as the Lakes Entrance Formation onlapped the paleotopographic high of the Sunfish structure.

The top of the Latrobe Group was penetrated at -1594.5m; 24.5m low to prediction. 73.0m of net sand was penetrated to -1668m, which is of M. diversus to P. asperopolus age. It consists of loosely consolidated, coarse grained sand with an average porosity of 26%. The equivalent section has been removed by erosion at the Sunfish-1 location. The sequence is interpreted as stacked beach sands. The dipmeter log over this section shows some dips of scattered dip direction and magnitude, indicating a lack of discrete bedding within the sand. The top 10m of the sand contains two fining upward sequences with decreasing dip magnitude, indicating a waning of energy in the environment of deposition. Dip direction is in a northeasterly to easterly direction. The sequence is interpreted as the beginning of a regressive phase of deposition which could be related to the 53 Mya eustatic drop in sea level.

A sequence of T. longus to M. diversus age consisting of interbedded sands, silts, shales and thin coals is present in Sunfish-2 from -1668m to -2283m. The thin coals are rarely present below -2036m. The sands are 4m to 10m thick, occasionally 20m thick, with average porosities of 19% to 24%. The sands are thicker in Sunfish-2 than in the equivalent section of Sunfish-1 (Enclosure 1). Sets of large scale cross-beds with decreasing dip can be interpreted from the dipmeter log in some of the thick sands, indicating deposition as point bar sands. The overall sequence is interpreted to have been deposited in a coastal plain environment, with occasional marine influence (See Appendix 2).

A 73m thick section of igneous rock is present from -2283m to -2356m, near the base of the T. longus zone. An equivalent sequence is seen near the base of the T. longus zone in Sunfish-1. Cuttings from this section show a crystalline texture and are commonly highly altered, containing abundant clay and some pyrite. Chips recovered from the junk basket show frequent veining. A relatively fresh sample recovered from the junk basket at T.D. is described as a dolerite which has undergone hydrothermal alteration and has been extensively chloritised (Appendix 7). This igneous section is interpreted as an intruded sill.

A sequence of sandstones with minor siltstones and shales is present from -2356m to -2480m. The sands are 5m to 10m thick, and are fine to coarse grained. Dolomite cement is commonly present, and average porosities range from 14% to 18%.

A 17m thick section of altered intrusives, similar to the sequence above, is present from -2480m to -2497m. This section is near the base of the T. lilliei zone, and correlates with a similar section between the T. lilliei and N. senectus zones identified in Sunfish-1.

A sequence of conglomeratic sandstones and minor siltstones is present from -2497m to -2588m. The sands are very poorly sorted and contain granule to pebble size quartz clasts, which are commonly strongly recrystallised (originally described as grey chert). The sands are very well cemented by dolomitic and siliceous cement, and have very poor visible porosities with log-derived average porosities of 11% to 17%. These conglomeratic sands show a distinctive "spiky" GR log characteristic. The sequence is of N. senectus age, and is not recognised in Sunfish-1. Some sets of large scale cross-beds can be interpreted from the dipmeter within this section, which is interpreted to have been deposited in an upper delta plain environment of deposition.

A sequence of N. senectus age, consisting of thinly interbedded sandstones and siltstones with minor shales, is present from -2588m to -2614m. A distinct change in lithology occurs at -2588m. The sands below -2588m, unlike the typical quartzose Latrobe Group sands, are a speckled brown to brown grey colour and of a heterogeneous composition, containing medium sized quartz, dark lithic grains, buff clayey grains, silty and argillaceous matrix, and carbonaceous flecks. The siltstones are argillaceous and of a similar composition.

A marked decrease in rate of penetration occurred during drilling at -2614m. The lithology from -2614m to the T.D. of -2626.5m consists of very hard heterogeneous siltstones similar to those above. A sidewall core from within this interval gave a Late Cretaceous T. apoxyexinus age. This basal sequence from -2588m to T.D. has not been recorded from the Gippsland Basin previously, and is interpreted as a basal Latrobe Group sequence, containing reworked Strzelecki Group material. Reworked Early Cretaceous spore-pollen are reported from the N. senectus zone (See Appendix 2).

HYDROCARBONS

Sunfish-2 penetrated 3.3m of net oil sand at the top of Latrobe Group from 1615.5 mkB (-1594.5m) to the OWC at 1619.0 mKB (-1598.0m). This section is of P. asperopolus age. The average porosity of the oil sand is 24% and the average water saturation is 54%, although the RFT recovery suggests the actual water saturation is less than this. Log analysis also suggests 4m of residual oil saturation is present below the OWC (See Appendix 3). A 22.7 litre RFT sample taken at 1616.8 mKB (-1595.8m) recovered 40.5 cu.ft. of gas and 10.25 litres of mature, paraffinic, $48.5^{o}$ API oil which has probably been sourced from a non-marine/terrestrial source rock (Appendix 5).

Mapping of the top of Latrobe Group suggests the closure is probably full to the synclinal spill point to the northeast of Sunfish-1, allowing for the limits of seismic interpretation. The 4m of residual oil column interpreted below the OWC is anomalous. Log analysis calculates salinities of 55,000 ppm below the oil zone. Thus the closure is not subject to freshwater flushing. Also, geochemical analysis of the oil sample gave no indication of being water washed or biodegraded. The structure has not been breached by faulting, and it is unlikely that hydrocarbons have leaked out through the Lakes Entrance Formation seal. It is possible the OWC is controlled by a leak point on the fault to the north of the structure. Slight recent movement on this fault could have altered the leak point and allowed some hydrocarbons to leak from the structure. A more likely explanation is that slight recent movement on the fault has tilted the structure towards the south slightly, with subsequent adjustment of the OWC. The base of the 4m of residual oil would then represent a fossil OWC.

3m of net gas sand was penetrated from 2059 mKB (-2038m) to the GWC at 2062 mKB (-2041m). This gas zone is at the base of the Lower L. balmei zone. The average porosity of the gas sand is 23% and the average water saturation is 56%. This gas zone is considered to be in a separate system to the gas sands penetrated in the upper T. longus section of Sunfish-1, and is probably stratigraphically trapped.

Some cut and fluorescence was noted in cuttings and sidewall cores over a 30m interval below -2509m. These shows underlie volcanics at the base of the T. lilliei zone, and correlate with 10m of net gas sands underlying volcanics in Sunfish-1 (see Enclosure 1). Log analysis calculates this hydrocarbon zone in Sunfish-2 to be 100% water saturated, and to have poor reservoir quality (average porosities of 11% to 16%). This hydrocarbon bearing section in Sunfish-2 is interpreted as a very low saturation oil leg to the N. senectus gas sands penetrated in Sunfish-1.

Sunfish-2 has demonstrated the eight hydrocarbon zones penetrated in Sunfish-1 are less extensive than originally thought. The Sunfish structure is not as broad as originally proposed, and Sunfish-2 therefore drilled outside the contacts of the hydrocarbon zones.

## GEOPHYSICAL SUMMARY

Mapping over the Sunfish Prospect was based on a grid of ninety-five G80S 3D lines. All lines have undergone G.S.I.'s 3D processing and migration. Data quality is good down to and incuding the Lower L. balmei zone. However, the line orientation is such that the delineation of ENE-WSW trending faults is difficult. Time fields were prepared from interpreting every second line over the prospect and every fifth line over the remaining part of the grid.

The top of Latrobe Group was penetrated at 1594.5mss in Sunfish-2, 24.5m low to prediction (Table 1). Post-drill mapping of the top of Latrobe Group was carried out using the existing two-way time field with a velocity field reinterpreted from all the available G80S and G80A velscan data (both inline and crossline data). In addition, a conversion factor map was generated with values ranging from 95.67% at Sunfish-1 to 96.44% at Sunfish-2. Due to the absence of an apparent cause for the differences in lags between the two wells (Table 1), a constant lag of 5ms was applied to the entire two-way time field such that between the wells the adjusted lags were symmetrically distributed about zero. The residual discrepancies were eliminated by a perturbation in the conversion factor map. Remapping has not changed the amount of vertical closure but has resulted in a decrease in the area of closure.

The M. diversus, Upper L. balmei and Lower L. balmei seismic horizons were intersected at 30m, 57m and 62m low to prediction respectively (Table 1). Pre-drill depth conversion consisted of using interval velocities derived from Sunfish-1 to isopach down from the top of Latrobe Group. However, the significant increases in interval velocities from Sunfish-1 to Sunfish-2 (Table 1), combined with the 24m depth error at the top of the Latrobe Group, are attributed as being the primary cause of the progressive deepening.

Post-drill mapping of the M. diversus seismic marker was carried out by using the existing two-way time field, with a constant lag of 5 ms, and isopaching down from the top of Latrobe Group using a time weighted average pseudo-interval velocity of 2862 $ms^{-1}$. Inconsistencies in the fault interpretation and residual depth errors at the well sites were eliminated in the final hand contouring of the depth fields.

Remapping of the Lower L. balmei seismic marker was carried out by using the existing two-way time field, with a constant lag of 5 ms, and correcting by hand minor fault inconsistencies within the reservoir area. In an attempt to minimize the ray path distortion caused by the overlying Miocene channel, the velocity reinterpretation concentrated on repicking G80A crossline scattergrams. Two methods of depth conversion were then used. The first involved generating a Dix interval velocity field, with a constant conversion factor, to isopach down from the top of Latrobe Group. The second method used was identical to that employed at the top of Latrobe Group and consisted of generating $V_{NMO}$ and conversion factor fields. The resultant depth fields were remarkably similar along truncation edges and over the reservoir area. The $V_{VNMO}$ conversion factor approach produced a slightly smoother depth map and hence was favoured over the Dix interval velocity method.

## TABLE 1

## GEOPHYSICAL SUMMARY

| | SUNFISH-1 | | | | SUNFISH-2 | | | | |
|---|---|---|---|---|---|---|---|---|---|
| SEISMIC HORIZON | DEPTH M(ss) | SEISMIC TWT (ZERO CROSSING) s | LAGS Millisec | INTERVAL VELOCITY $ms^{-1}$ | DEPTH m(ss) | SEISMIC TWT (ZERO CROSSING) s | LAGS millisec | INTERVAL VELOCITY $ms^{-1}$ | DEPTH ERROR m |
| TOP OF LATROBE GROUP | 1671 | 1.308 | 4 | | 1594 | 1.258 | -13 | | 24 |
| | | | | 3220 | | | | 3213 | |
| *M. diversus* | 1704 | 1.337 | -4 | | 1736 | 1.345 | -12 | | 30 |
| | | | | 2990 | | | | 3131 | |
| Upper *L. balmei* | 1745 | 1.363 | -1 | | 1787 | 1.387 | -19 | | 57 |
| | | | | 3039 | | | | 3217 | |
| Lower *L. balmei* | 1905 | 1.468 | -2 | | 1980 | 1.500 | -15 | | 62 |

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# FIGURES

# SUNFISH-2
## STRATIGRAPHIC TABLE

| FORMATION HORIZON | DRILL DEPTH (metres) | SUBSEA DEPTH (metres) | THICKNESS (metres) |
|---|---|---|---|
| SEA FLOOR | | | |
| GIPPSLAND LIMESTONE | 80.0 | 59.0 | 1377.5 |
| LAKES ENTRANCE FORMATION | 1457.5 | 1436.5 | 158.0 |
| (hatched interval) | 1615.5 | 1594.5 | |
| LATROBE GROUP | 1615.5 | 1594.5 | 1032.0 + |
| | 2647.5 | 2626.5 | |

| AGE (M.A.) | EPOCH | SERIES |
|---|---|---|
| 0–5 | PLEIST. | |
| | PLIO. | |
| 5–25 | MIOCENE | LATE |
| | | MID. |
| | | EARLY |
| 25–37 | OLIGOCENE | LATE |
| | | EARLY |
| 37–58 | EOCENE | LATE |
| | | MIDDLE |
| | | EARLY |
| 58–67 | PALEOCENE | LATE |
| | | EARLY |
| 67–80 | LATE CRET. | |

| PALYNOLOGICAL ZONATION SPORE-POLLEN (ASSEMBLAGE ZONE) |
|---|
| *T. bellus* |
| *P. tuberculatus* |
| *Upper N. asperus* |
| *Mid. N. asperus* |
| *Lower N. asperus* |
| *P. asperopolus* |
| *Upper M. diversus* |
| *Mid. M. diversus* |
| *Lower M. diversus* |
| *Upper L. balmei* |
| *Lower L. balmei* |
| *T. longus* |
| *T. lilliei* |
| *N. senectus* |
| *T. apoxyexinus* |

| PLANKTONIC FORAMINIFERAL ZONATION |
|---|
| A1/A2 |
| A3 |
| A4 |
| B1 |
| B2 |
| C |
| D1/D2 |
| E/F |
| G |
| H1 |
| H2 |
| I |
| J1 |
| J2 |
| K |

STRATIGRAPHIC.TABLE.WCR.I-84

Dwg. 2186/OP/4

# APPENDIX 1

APPENDIX 1

MICROPALEONTOLOGICAL ANALYSIS

# FORAMINIFERAL ANALYSIS OF SUNFISH-2, GIPPSLAND BASIN

by

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# PART-1

# INTERPRETATIVE DATA

INTRODUCTION

GEOLOGICAL COMMENTS

BIOSTRATIGRAPHY

INTERPRETATIVE DATA

DATA SHEET

## INTRODUCTION

The datable marine sediments in Sunfish-2 range in age from Early Miocene (Zone G) to Late Miocene/earliest Pliocene (Zone B1). The top of the Latrobe Group occurs at 1615.5m and is a significant unconformity (Early-Mid Eocene sediments overlain by Early Miocene). Late Miocene/Early Pliocene age sediments (Zones C to B1) are well developed in the well, reaching a thickness of 318m.

Fifty-six sidewall cores were processed and examined.

## GEOLOGICAL COMMENTS

(a) Top of the Latrobe Group

The boundary between the Latrobe Group and the Lakes Entrance Formation in Sunfish-2 is an unconformity surface. It is placed at the log break which occurs at 1615.5m.

The 30MA unconformity documented by Vail *et al*, usually sits within the basal part of the Lakes Entrance Formation, separating sediments of Early Miocene/Late Oligocene age from carbonates of earliest Oligocene/Late Eocene age. In this case the boundary between the Latrobe Group and the Lakes Entrance Formation is not an unconformity but a condensed interval represented by the greensands of the Gurnard Formation.

In Sunfish-2, however, the 30 MA unconformity has apparently cut down into and removed both the Gurnard Formation and the upper part of the Latrobe Group. This results in the Early Miocene zone G sediment immediately overlying the *P. asperopolus* age (Early Eocene) sediment.

(b) Comparison with Sunfish-1

Comparisons between Sunfish-1 and 2 are almost impossible due to (1) poor sampling in Sunfish-1 and (2) the sparce, poorly preserved faunas obtained.

## TABLE 1 - GEOLOGICAL SUMMARY

| AGE | FORMATION | ZONATION |
|---|---|---|
| | SEA FLOOR | |
| PLEISTOCENE | | |
| | | ? |
| PLIOCENE | | B1 |
| | | (950.5-1160.7) |
| | | B2 |
| | GIPPSLAND | |
| LATE | LIMESTONE | (1199.0-1234.0) |
| MIOCENE | | |
| | | C |
| | | (1251.0) |
| | | D1 |
| | | (1268.0-1409.8) |
| MID | | D2 |
| MIOCENE | 1457.5m | (1425.2-1477.7) |
| | LAKES | |
| | ENTRANCE | E2 |
| | FORMATION | (1514.5) |
| | | F |
| | | (1530.0-1590.0) |
| EARLY | | G |
| MIOCENE | | (1598.8-1613.9) |
| | 1615.5m | |
| EARLY/MID | LATROBE | (P. asperopolus |
| EOCENE | GROUP | (1615.7-1634.6) |
| | T.D. 2647.5m | |

TABLE 2 - SUNFISH-2 INTERPRETATIVE DATA

| SIDEWALL CORE NO. | DEPTH (M) | MICROFOSSIL YIELD | MICROFOSSIL PRESERVATION | PLANKTON DIVERSITY | ZONE | AGE |
|---|---|---|---|---|---|---|
| 141 | 810.0 | V. Low | Poor | Moderate | ? | Indeterminate |
| 140 | 821.0 | Moderate | Poor | Moderate | ? | Indeterminate |
| 139 | 831.0 | Moderate | Poor | Low | ? | Indeterminate |
| 138 | 840.1 | Low | Poor | Low | ? | Indeterminate |
| 137 | 850.5 | Low | V. Poor | Low | ? | Indeterminate |
| 136 | 860.7 | V. Low | V. Poor | Low | ? | Indeterminate |
| 135 | 870.5 | V. Low | V. Poor | Low | ? | Indeterminate |
| 134 | 881.2 | Barren | - | - | ? | Indeterminate |
| 133 | 890.6 | V. Low | V. Poor | Low | ? | Indeterminate |
| 132 | 903.0 | Low | V. Poor | Low | ? | Indeterminate |
| 131 | 925.7 | Low | V. Poor | Low | ? | Indeterminate |
| 130 | 950.3 | Moderate | Poor | Moderate | B1 | Late Miocene/Early Pliocene |
| 129 | 973.3 | Moderate | Moderate | Moderate | B1 | Late Miocene/Early Pliocene |
| 128 | 1007.4 | Moderate | Moderate | Poor/Mod | B1 | Late Miocene/Early Pliocene |
| 127 | 1039.1 | High | Good | High | B1 | Late Miocene/Early Pliocene |
| 126 | 1059.2 | High | Good | Moderate | B1 | Late Miocene/Early Pliocene |
| 125 | 1089.3 | Moderate | V. Poor | High | B1 | Late Miocene/Early Pliocene |
| 124 | 1118.3 | Moderate | V. Poor | Moderate | B1 | Late Miocene/Early Pliocene |
| 123 | 1139.3 | Moderate | Poor | High | B1 | Late Miocene/Early Pliocene |

| SIDEWALL CORE NO. | DEPTH (M) | MICROFOSSIL YIELD | MICROFOSSIL PRESERVATION | PLANKTON DIVERSITY | ZONE | AGE |
|---|---|---|---|---|---|---|
| 81 | 1160.7 | Moderate | V. Poor | High | B1 | Late Miocene/Early Pliocene |
| 79 | 1199.0 | High | Good | Moderate | B2 | Late Miocene |
| 78 | 1216.4 | Moderate | V. Poor | High | B2 | Late Miocene |
| 77 | 1234.0 | Moderate | Poor | High | B2 | Late Miocene |
| 76 | 1251.0 | Moderate | Poor | High | C | Late Miocene |
| 75 | 1268.0 | Moderate | Poor | High | D1 | Mid. Miocene |
| 74 | 1283.0 | Low | Poor | Moderate | D1 | Mid. Miocene |
| 73 | 1300.0 | Moderate | Poor | High | D1 | Mid. Miocene |
| 72 | 1314.9 | Low | Poor | Moderate | D1 | Mid. Miocene |
| 71 | 1330.2 | High | Good | High | D1 | Mid. Miocene |
| 70 | 1345.2 | High | Moderate | High | D1 | Mid. Miocene |
| 68 | 1369.9 | Moderate | Moderate | Moderate | D1 | Mid. Miocene |
| 122 | 1409.8 | Moderate | Good | High | D1 | Mid. Miocene |
| 121 | 1425/2 | Moderate | Good | High | D2 | Mid. Miocene |
| 120 | 1443..7 | Moderate | Good | High | D2 | Mid. Miocene |
| 119 | 1460.4 | High | Good | High | D2 | Mid. Miocene |
| 102 | 1477.7 | High | Moderate | Moderate | D2 | Mid. Miocene |
| 100 | 1514.5 | High | Moderate | High | E2 | Mid. Miocene |

| SIDEWALL CORE NO. | DEPTH (M) | MICROFOSSIL YIELD | MICROFOSSIL PRESERVATION | PLANKTON DIVERSITY | ZONE | AGE |
|---|---|---|---|---|---|---|
| 99 | 1530.0 | Moderate | Very Poor | Moderate | F | Early Miocene |
| 98 | 1500.4 | Low | Poor | Moderate | ? | Indeterminate |
| 97 | 1560.6 | Low | Poor | Moderate | F | Early Miocene |
| 96 | 1568.7 | Moderate | Poor | High | F | Early Miocene |
| 95 | 1581.1 | Moderate | Poor | Moderate | F | Early Miocene |
| 94 | 1590.0 | Moderate | Moderate | High | F | Early Miocene |
| 93 | 1598.8 | Moderate | Moderate | Moderate | G | Early Miocene |
| 92 | 1602.7 | Moderate | Moderate | Moderate | G | Early Miocene |
| 91 | 1607.5 | High | Moderate | Moderate | G | Early Miocene |
| 118 | 1608.8 | Moderate | Poor | Moderate | G | Early Miocene |
| 90 | 1610.0 | Moderate | Moderate | Moderate | G | Early Miocene |
| 88 | 1613.9 | Low | Poor | Low | G | Early Miocene |
| 87 | 1615.7 | Barren | - | - | ? | Indeterminate |
| 85 | 1618.8 | Barren | - | - | ? | Indeterminate |
| 117 | 1683.8 | Barren | - | - | ? | Indeterminate |
| 116 | 1699.6 | Barren | - | - | ? | Indeterminate |
| 114 | 1748.2 | Barren | - | - | ? | Indeterminate |
| 112 | 1784.2 | Barren | - | - | ? | Indeterminate |

BIOSTRATIGRAPHY

## ZONE G: EARLY MIOCENE (1613.9m to 1598.8m)

The appearance of Globigerinoides quadrilobatus trilobus without Globigerinoides sicanus in the lowest sample from the Lakes Entrance Formation is indicative of an Early Miocene, Zone G age.

The assemblage obtained from this zone is fairly sparce with diversity increasing upsection with the addition of various species of Globorotalia notably mayeri and miozea.

Reworking of the Late Eocene-Early Oligocene species, Globigerina linaperta, and Globorotalia postcretacea occurs in the basal three samples from the zone SWC's 88, 90, 118, at 1613m, 1610.0m and 1608.8m respectively.

## ZONE F: EARLY MIOCENE (1590.0m to 1530.0m)

The base of Zone F is marked by (a) the first appearance, upsection of Globigerinoides sicanus and (b) a sharp increase in species diversity. Although this relatively high level of species diversity decreases upsection it is always higher than in the preceeding zone. Coincident with this slight decrease in diversity is a rapid deterioration in the quality of preservation.

## ZONE E2: MIDDLE MIOCENE 1514.5m

The presence of Praeorbulina glomerosa in SWC 100 at 1514.5m without either form of Oerbulina indicates a zone E2 age for the sample.

## ZONE D: MIDDLE MIOCENE

D2 - 1477.7m to 1425.2m

D1 - 1409.8m to 1268.0m

The Zone D assignment is based on the presence of Oerbulina universa in samples from this interval without the presence of Globorotalia miotumida miotumida is indicative of a Middle Miocene, Zone D age. Quality of preservation is good at the base of the zone but deteriorates towards the top. Diversity of plankton is moderate to high throughout. The D1/D2 boundary is placed between sidewall cores 121 and 122 (1425.2m and 1409.8m respectively). This coincides with the first appearance of Globorotalia peripheroacuta.

ZONE C: LATE MIOCENE 1251.0m

A single sample is assigned to Zone C on the basis of its containing Globorotalia miotumida miotumida without Globorotalia acostaensis. This sample may be from near the top of the zone since some specimens of Globorotalia mayenri are very close to the zone species.

ZONE B2: LATE MIOCENE 1234.0m to 1199.0m

The first appearance of Globorotalia acostaensis in SWC 77 at 1234.0m marks the base of Zone B2. Plankton diversity is moderate to high throughout the zone especially the globorotalids.

Reworking of Globorotalia mayeri occurs in the lowest sample.

ZONE B1: LATE MIOCENE/EARLY PLIOCENE 1160.7m to 950.5m

The appearance of Globorotalia miotumida conomiozea ss in sidewall core 81 at 1160.7m is regarded as the base of Zone B1. This zone attains a considerable thickness in Sunfish-2. Preservation and planktonic species diversity is variable but generally both deteriorate upsection. Globorotalia miotumida miotumida is reworked into the base of the zone.

The remaining sidewall cores (131 to 141; 925.7m to 810.0m respectively) contain no identifiable index species due to appalling preservation.

# MICROPALEONTOLOGICAL DATA SHEET

BASIN: GIPPSLAND ELEVATION: KB: 21.0 GL: 59.00

WELL NAME: SUNFISH-2 TOTAL DEPTH:

| AGE | | FORAM. ZONULES | HIGHEST DATA Preferred Depth | Rtg | Alternate Depth | Rtg | Two Way Time | LOWEST DATA Preferred Depth | Rtg | Alternate Depth | Rtg | Two Way Time |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PLEISTOCENE | | $A_1$ | | | | | | | | | | |
| | | $A_2$ | | | | | | | | | | |
| PLIOCENE | | $A_3$ | | | | | | | | | | |
| | | $A_4$ | | | | | | | | | | |
| | | $B_1$ | 950.3 | 2 | | | | 1160.7 | 1 | | | |
| MIOCENE | LATE | $B_2$ | 1199.0 | 2 | | | | 1234.0 | 2 | | | |
| | | C | 1251.0 | 2 | | | | 1251.0 | 2 | | | |
| | MIDDLE | $D_1$ | 1268.0 | 1 | | | | 1409.8 | 2 | | | |
| | | $D_2$ | 1425.2 | 2 | | | | 1477.7 | 1 | | | |
| | | $E_1$ | | | | | | | | | | |
| | | $E_2$ | 1514.5 | 1 | | | | 1514.5 | 1 | | | |
| | EARLY | F | 1530.0 | 0 | | | | 1590.0 | 0 | | | |
| | | G | 1598.8 | 1 | | | | 1613.9 | 1 | | | |
| | | $H_1$ | | | | | | | | | | |
| OLIGOCENE | LATE | $H_2$ | | | | | | | | | | |
| | | $I_1$ | | | | | | | | | | |
| | | $I_2$ | | | | | | | | | | |
| | EARLY | $J_1$ | | | | | | | | | | |
| | | $J_2$ | | | | | | | | | | |
| EOCENE | | K | | | | | | | | | | |
| | | Pre-K | | | | | | | | | | |

COMMENTS:
1. The absence of Zone E1 is probably due to a sample gap.
2. Samples above 950.3m are indeterminate due to very poor preservation.

CONFIDENCE RATING:
- 0: 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.

DATA RECORDED BY: MICHAEL HANNAH DATE: 2/4/84

DATA REVISED BY: DATE:

# PART-2 BASIC DATA

BASIC DATA

RANGE CHART

TABLE 3 - SUNFISH-2 BASIC DATA

| SIDEWALL CORE NO. | DEPTH (M) | MICROFOSSIL YIELD | MICROFOSSIL PRESERVATION | PLANKTON DIVERSITY |
|---|---|---|---|---|
| 141 | 810.0 | V. Low | Poor | Moderate |
| 140 | 821.0 | Moderate | Poor | Moderate |
| 139 | 831.0 | Moderate | Poor | Low |
| 138 | 840.1 | Low | Poor | Low |
| 137 | 850.5 | Low | V. Poor | Low |
| 136 | 860.7 | V. Low | V. Poor | Low |
| 135 | 870.5 | V. Low | V. Poor | Low |
| 134 | 881.2 | Barren | - | - |
| 133 | 890.6 | V. Low | V. Poor | Low |
| 132 | 903.0 | Low | V. Poor | Low |
| 131 | 925.7 | Low | V. Poor | Low |
| 130 | 950.3 | Moderate | Poor | Moderate |
| 129 | 973.3 | Moderate | Moderate | Moderate |
| 128 | 1007.4 | Moderate | Moderate | Poor/Mod |
| 127 | 1039.1 | High | Good | High |
| 126 | 1059.2 | High | Good | Moderate |
| 125 | 1089.3 | Moderate | V. Poor | High |
| 124 | 1118.3 | Moderate | V. Poor | Moderate |
| 123 | 1139.3 | Moderate | Poor | High |

| SIDEWALL CORE NO. | DEPTH (M) | MICROFOSSIL YIELD | MICROFOSSIL PRESERVATION | PLANKTON DIVERSITY |
|---|---|---|---|---|
| 81 | 1160.7 | Moderate | V. Poor | High |
| 79 | 1199.0 | High | Good | Moderate |
| 78 | 1216.4 | Moderate | V. Poor | High |
| 77 | 1234.0 | Moderate | Poor | High |
| 76 | 1251.0 | Moderate | Poor | High |
| 75 | 1268.0 | Moderate | Poor | High |
| 74 | 1283.0 | Low | Poore | Moderate |
| 73 | 1300.0 | Moderate | Poor | High |
| 72 | 1314.9 | Low | Poor | Moderate |
| 71 | 1330.2 | High | Good | High |
| 70 | 1345.2 | High | Moderate | High |
| | 1369.9 | Moderate | Moderate | Moderate |
| 122 | 1409.8 | Moderate | Good | High |
| 121 | 1425/2 | Moderate | Good | High |
| 120 | 1443..7 | Moderate | Good | High |
| 119 | 1460.4 | High | Good | High |
| 102 | 1477.7 | High | Moderate | Moderate |
| 100 | 1514.5 | High | Moderate | High |

| SIDEWALL CORE NO. | DEPTH (M) | MICROFOSSIL YIELD | MICROFOSSIL PRESERVATION | PLANKTON DIVERSITY |
|---|---|---|---|---|
| 99 | 1530.0 | Moderate | Very Poor | Moderate |
| 98 | 1500.4 | Low | Poor | Moderate |
| 97 | 1560.6 | Low | Poor | Moderate |
| 96 | 1568.7 | Moderate | Poor | High |
| 95 | 1581.1 | Moderate | Poor | Moderate |
| 94 | 1590.0 | Moderate | Moderate | High |
| 93 | 1598.8 | Moderate | Moderate | Moderate |
| 92 | 1602.7 | Moderate | Moderate | Moderate |
| 91 | 1607.5 | High | Moderate | Moderate |
| 118 | 1608.8 | Moderate | Poor | Moderate |
| 90 | 1610.0 | Moderate | Moderate | Moderate |
| 88 | 1613.9 | Low | Poor | Low |
| 87 | 1615.7 | Barren | - | - |
| 85 | 1618.8 | Barren | - | - |
| 117 | 1683.8 | Barren | - | - |
| 116 | 1699.6 | Barren | - | - |
| 114 | 17428.2 | Barren | - | - |
| 112 | 1784.2 | Barren | - | - |

PE904244

This is an enclosure indicator page.
The enclosure PE904244 is enclosed within the container PE902518 at this location in this document.

The enclosure PE904244 has the following characteristics:

| | |
|---|---|
| ITEM_BARCODE = | PE904244 |
| CONTAINER_BARCODE = | PE902518 |
| NAME = | Foraminifera Range Chart |
| BASIN = | GIPPSLAND |
| PERMIT = | VIC/P1 |
| TYPE = | WELL |
| SUBTYPE = | DIAGRAM |
| DESCRIPTION = | Planktonic Foraminiferal Range Chart for Sunfish-2 |
| REMARKS = | |
| DATE_CREATED = | 30/04/84 |
| DATE_RECEIVED = | 25/01/85 |
| W_NO = | W833 |
| WELL_NAME = | SUNFISH-2 |
| CONTRACTOR = | |
| CLIENT_OP_CO = | ESSO AUSTRALIA LIMITED |

(Inserted by DNRE - Vic Govt Mines Dept)

# APPENDIX 2

# APPENDIX 2

## PALYNOLOGICAL ANALYSIS

PALYNOLOGICAL ANALYSIS

SUNFISH-2, GIPPSLAND BASIN

by

M.K. Macphail.

Esso Australia Ltd.

March, 1984

Palaeontology Report 1984/9.

0772L

# INTERPRETATIVE DATA

INTRODUCTION
SUMMARY TABLE
GEOLOGICAL COMMENTS
DISCUSSION OF AGE ZONES
TABLE-1 INTERPRETATIVE DATA
TABLE-2 ANOMALOUS AND UNUSUAL OCCURRENCES OF SPORE POLLEN
PALYNOLOGY DATA SHEET

INTRODUCTION

Sixty five (65) sidewall core samples were processed and examined for spore-pollen and dinoflagellates. Recovery, preservation and diversity of the palynofloras was unusually good and the well is likely to prove important in any future revision of the Late Cretaceous/Paleocene biostratigraphy of the Gippsland basin. Palynological zones and lithological facies division from the base of the Lakes Entrance Formation to the total depth of the well are given below. The occurrence of spore-pollen and dinoflagellate species are tabulated in the accompanying range chart. Anomalous and unusual occurrences of taxa are listed in Table 2.

SUMMARY

| UNIT/FACIES | ZONE | DEPTH (m |
|---|---|---|
| Lakes Entrance Formation | P. tuberculatus | 1499.7 - 1613.9 |
| Latrobe Group coarse clastics | P. asperopolus | 1615.7 - 1634.6m |
| | Lower M. diversus | 1721.2 |
| | Upper L. balmei | 1768.5 - 1978.0 |
| | Lower L. balmei | 1999.1 - 2073.0 |
| | Upper T. longus | 2089.0 - 2269.5 |
| | Lower T. longus | 2284.9 - 2421.2 |
| | T. lilliei | 2437.0 - 2530.8 |
| | N. senectus | 2534.8 - 2630.5 |
| | T. apoxyexinus | 2639.0m |

T.D. 2647.5m

GEOLOGICAL COMMENTS

1. Although Lower and Upper M. diversus Zone age sediments were not recorded, the interval between 1634.0 and 1721.2m was poorly sampled and it is likely that deposition at the Sunfish-2 well was continuous from the Late Cretaceous Tricolporites apoxyexinus Zone to the Early/Middle Eocene Proteacidites asperopolus Zone. Sediments of T. apoxyexinus (= T. pachyexinus) Zone age have not been previously recorded in the Gippsland Basin.

2. The base of the Lakes Entrance Formation is picked on lithological characteristics and electric logs as occurring at 1615.5m. The spore-pollen data support foraminiferal evidence (Hannah 1984) for a major unconformity at the top of Latrobe. This represents all or part of Late Eocene, Oligocene and possibly early Early Miocene time. It is possible that the sandstones between 1634.6 and 1615.7m, dated as P. asperopolus Zone in age, includes a condensed sequence of lowermost Lower N. asperus Zone sediments. Absence of (i) greensands referable to the Gurnard Formation and (ii) calcareous sediments of Oligocene and Early Miocene (Zone $H_1$) age suggests substantial erosion has taken place (see Rexilius, 1984).

3. Dinoflagellates occur in low numbers in the top 3m of the Latrobe Group coarse clastics but the first unequivocal evidence of a marine environment within this Group is at 1683.8m. This sample contains Apectodinium hyperacantha and is likely to represent a M. diversus Zone marine transgression. Unlike in Sunfish-1 (5580 ft, Stover 1974) there is no evidence for a Lower M. diversus Zone marine transgression equivalent to that recorded in the Rivernook Bed, Princetown Section, Otway Basin (Cookson & Eisenack 1967)

4. Earlier marine or marginal marine environments are recorded between 1838.4 to 1943.3m (Upper L. balmei Zone) and at 2089.0m (Upper T. longus Zone). The latter can almost certainly be correlated with the Isabelidium (Deflandrea) druggii marine transgression defined by Partridge (1976).

5. Because of relatively poor sample control in Sunfish-1, it is difficult to compare this well with Sunfish-2. Nevertheless several major inconsistencies appear to exist:

(a) In Sunfish-2, the Upper L. balmei Zone sediments are thick (ca 210m) relative to the Lower L. balmei section (ca 74m) with the total possible thickness of L. balmei sediments being about 390m. The "T. longus seismic horizon" appears to occur within the Upper L. balmei Zone. In Sunfish-1 one sample only (5790') has been dated as Upper L. balmei Zone in age and the total possible thickness of L. balmei sediments is ca. 280m. The "T. longus seismic horizon" occurs within an undated interval below some 60m of Lower L. balmei sediments.

(b) Marine sediments of Isabelidinium druggii Zone age occur in both wells: at 6510' (1984m) in Sunfish-1 and 2089m in Sunfish-2. The former depth is considerably higher than would be anticipated given the structural relationship between the two wells.

(c) The Sunfish-1 well bottomed in sediments identified as Early Cretaceous (Coptospora paradoxa Zone) in age. Conversely Sunfish-2 bottomed in sediments no older than the Late Cretaceous Clavifera triplex Zone in age. It is noted that virtually all of the spores used by Stover (1974) to assign a C. paradoxa Zone age to the interval between 8000' and 8152' in Sunfish-1 are found reworked into Late Cretaceous sediments.

## BIOSTRATIGRAPHY

The zone boundaries have been established using the criteria of Stover & Evans (1973), Stover & Partridge (1973), subsequent proprietary revisions including Macphail (1983), and palynological range data for Morum-1 well, Otway Basin.

### Tricolporites apoxyexinus Zone 2639.0m

One sidewall core sample has been assigned to this age on the basis of (i) Tricolpites vergillus, a species which in Morum-1 first appears in this zone and (ii) the absence of Nothofagidites, a taxon which first appears in the overlying N. senectus Zone. The occurrence of Phyllocladidites mawsonii and undescribed Tricolpites and Proteacidites spp. (abundant) demonstrate the sample is no older than C. triplex Zone in age.

### Nothofagidites senectus Zone 2534.8 - 2630.5m

Seven samples have been assigned to this zone. The lowermost three, at 2630.5, 2621.1 and 2599.6m lack Nothofagidites but contain either Tricolpites sabulosus or Proteacidites otwayensis, species which in Morum-1 first appear in the N. senectus Zone. The first appearance of Nothofagidites, including the nominate species N. senectus, is at 2564.0m. The upper boundary is picked at 2534.8m, the highest sample containing Nothofagidites, Tricolpites sabulosus and T. vergillus but lacking species first appearing in the overlying T. lilliei Zone. A feature of this latter zone and the N. senectus Zone is the presence (due to reworking ?) of spores which are usually indicative of an Early Cretaceous age.

### Tricolporites lilliei Zone 2437.0-2530.8m

The base of the T. lilliei Zone is defined by the first appearance of Gambierina rudata at 2530.8m. Although G. rudata is present throughout, it is always much less common than Nothofagidites. The first appearance of the nominate species, Tricolporites lilliei, is at 2477.7m.

### Lower Tricolpites longus Zone 2421.2-2284.9m

The base of the Lower T. longus Zone is defined by the first appearance of the nominate species Tricolpites longus. This sample contains relatively frequent Nothofagidites and occasional occurrences of species which become frequent within the Upper T. longus Zone, e.g. Proteacidites clinei, P. palisadus and P. reticuloconcavus, but lacks Tetracolporites verrucosus and Stereisporites punctatus. Gambierina rudata and Triporopollenites sectilis become uncommon upwards through the zone. The upper boundary of the Zone is defined by the occurrence of Quadraplanus brossus in a Gambierina rudata-dominated assemblage which lacks species first appearing in the Upper T. longus Zone.

Upper Tricolpites longus Zone 2269.5-2089.0m

Palynofloras within this interval are dominated by Gambierina rudata and include at least several Proteacidites clinei, P. gemmatus, P. otwayensis, P. palisadus, P. reticuloconcavus, P. wahooensis, Quadraplanus brossus, Tricolporites lillei, Tricolpites longus, T. waiparensis, Tetracolporites verrucosus, Stereisporites punctatus and S. regium. The base of the zone is defined by the first appearance of Proteacidites gemmatus and Stereisporites punctatus, at 2269.5m. Dilwynites granulatus first occurs at 2268.1m. The upper boundary is picked at 2089.0m, based on occurrences of the Late Cretaceous dinoflagellate species Isabelidinium druggii and the very rare spore Ornamentifera sentosa. Neither species is known to range above the Upper T. longus Zone. The sample also contains frequent occurrences of Stereisporites punctatus and Tetracolporites verrucosus but is unusual in that Lygistepollenites balmei is frequent. This suggests the sample lies closer to the L. balmei/T. longus Zone boundary than is usually the case with T. longus Zone age sidewall core samples taken in the Gippsland Basin.

Lower Lygistepollenites balmei Zone 1999.1-2073.0m

Samples within this interval are dominated by Proteacidites and gymnosperm pollen but the nominate species, Lygistepollenites balmei, does not become frequent until 1999.1m. The first occurrence of species which first appear in the L. balmei Zone is considerably higher up the section again: six grains of Polycolpites langstonii at 1915.0m. The lower boundary is placed at 2073.0m, a sample containing Tetracolporites verrucosus and Proteacidites angulatus. These species typically range no higher than the Lower L. balmei Zone and species restricted to the Late Cretaceous are absent. The upper boundary is provisionally picked at 1999.1m, the highest L. balmei Zone sample lacking zone indicator species of Upper L. balmei Zone. The common occurrence of Herkosporites elliottii in this sample supports the age-determination.

Upper Lygistepollenites balmei Zone 1768.5-1978m

The lower boundary is picked at 1978.0m, based on the occurrence of Verrucosisporites kopukuensis and frequent Gleicheniidites. As is usually the case in L. balmei Zone sections of Gippsland wells, the first occurrence of V. kopukuensis lies below occurrences of species which are usually reliable indicators of the Lower L. balmei Zone. For example Proteacidites angulatus is common at 1966.0m; Tetracolporites verrucosus and the Late Cretaceous species Tetradopollis securus and Camarozonosporites horrendus occur at 1934.0m; Jaxtacolpus pieratus occurs in a marine sample at 1915m. Occurrences of Verrucosisporites kopukuensis are continuous from 1915.0m up to the upper boundary at 1768.5m, defined by the simultaneous occurrence of V. kopukuensis, Cyathidites gigantis with abundant Lygistepollenites balmei and Gleicheniidites. Preservation and diversity are unusually good over this (largely marine) interval and anomalous occurrences of several Eocene species may represent real extensions of range into the Paleocene e.g. Gemmatricolporites divaricatus and Triporopollenites ambiguus. There is now no doubt that 'Eocene' taxa such as Ilexpollenites anguloclavatus, Matonisporites ornamentalis and Polycolpites esobalteus first appear within the L. balmei Zone. The dinoflagellate species Glaphryacysta retiintextum is frequent at 1934.0m and Apectadinium homomorpha present to frequent in good dinoflagellate assemblages over the interval 1934.0 to 1834.4m.

Lower Malvacipollis diversus Zone 1721.2m

One sample, at 1721.2m, is provisionally assigned to this zone on the basis of a single, poorly preserved specimen of Cyathidites gigantis. This species has not been recorded above the Lower M. diversus Zone but it is noted that the sample also contains Banksieacidites elongatus, a species first appearing in the Middle M. diversus Zone and Tricolporites moultonii, which is rarely recorded below the same zone. The samples at 1699.6 and 1683.8m cannot be precisely dated, but are no older than Lower M. diversus Zone in age.

Proteacidites asperopolus Zone 1615.7-1634.6m

Three samples, including the top sample of the Latrobe Group coarse clastics are assigned to this zone. The lowermost, at 1634.6m, contains Proteacidites asperopolus, P. rugulatus and Sapotaceoidaepollenites rotundus, species which first appear at or within this zone. Myrtaceidites tenuis, a species which ranges no higher than the P. asperopolus Zone is present at 1618.2m and, in association with Proteacidites asperopolus and Tricolpites incisus, at 1615.7m. Although this combination of taxa by definition defines the interval as P. asperopolus Zone in age, Nothofagidites pollen are rather more common (up to 24%) than is usually the case in P. asperopolus Zone palynofloras. This fact plus isolated occurrences of typically N. asperus Zone taxa, e.g. Proteacidites vesicus and Proteacidites reticulatus at 1618.2m, makes it possible that the section extends into lower Lower N. asperus Zone time. Species whose first appearance defines the Lower N. asperus Zone, e.g. Tricolporites leuros, T. delicatus and Nothofagidites falcatus, are absent.

Proteacidites tuberculatus 1499.7-1613.9m

Occurrences of Cyatheacidites annulatus at 1611.6 and 1499m confirm a P. tuberculatus Zone age for this interval. The sample at 1613.9m lacks C. annulatus but is included in this zone on the basis of (i) the dinoflagellate species Dinosphaera pontus and D. vietus and (ii) a general similarity to the above samples.

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

BASIN: GIPPSLAND    ELEVATION: KB: +21.0m  GL: -59.0m

WELL NAME: SUNFISH-2    TOTAL DEPTH: 2643m

| AGE | PALYNOLOGICAL ZONES | HIGHEST DATA Preferred Depth | Rtg | Alternate Depth | Rtg | Two Way Time | LOWEST DATA Preferred Depth | Rtg | Alternate Depth | Rtg | Two Way Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NEOGENE | *T. pleistocenicus* | | | | | | | | | | |
| | *M. lipsis* | | | | | | | | | | |
| | *C. bifurcatus* | | | | | | | | | | |
| | *T. bellus* | | | | | | | | | | |
| | *P. tuberculatus* | 1499.7 | 0 | | | | 1613.9 | 2 | 1611.6 | 0 | |
| PALEOGENE | Upper *N. asperus* | | | | | | | | | | |
| | Mid *N. asperus* | | | | | | | | | | |
| | Lower *N. asperus* | | | | | | | | | | |
| | *P. asperopolus* | 1615.7 | 1 | | | | 1634.6 | 1 | | | |
| | Upper *M. diversus* | | | | | | | | | | |
| | Mid *M. diversus* | | | | | | | | | | |
| | Lower *M. diversus* | 1721.2 | 0 | | | | 1721.2 | 0 | | | |
| | Upper *L. balmei* | 1768.5 | 0 | | | | 1978.0 | 1 | | | |
| | Lower *L. balmei* | 1999.1 | 2 | 2057.8 | 1 | | 2073.0 | 1 | | | |
| LATE CRETACEOUS | *T. longus* | 2089.0 | 0 | | | | 2421.2 | 1 | | | |
| | *T. lilliei* | 2437.0 | 2 | 2477.7 | 1 | | 2530.8 | 2 | | | |
| | *N. senectus* | 2534.8 | 1 | | | | 2630.5 | 2 | | | |
| | *T. apoxyexinus* | 2639.0 | 2 | | | | 2639.2 | 2 | | | |
| | | | | | | | | | | | |
| | *C. triplex* | | | | | | | | | | |
| | *A. distocarinatus* | | | | | | | | | | |
| EARLY CRET. | *C. paradoxus* | | | | | | | | | | |
| | *C. striatus* | | | | | | | | | | |
| | *F. asymmetricus* | | | | | | | | | | |
| | *F. wonthaggiensis* | | | | | | | | | | |
| | *C. australiensis* | | | | | | | | | | |
| PRE-CRETACEOUS | | | | | | | | | | | |

COMMENTS: Subdivision of the T. longus Zone is as follows (confidence ratings in parenthesis): Upper T. longus 2089.0 (0) - 2269.6 (0)
Lower T. longus 2284.9 (1) - 2421.2 (1)

Please note the Upper T. longus Zone approximates to the T. longus Zone as recognized in pre-1982 wells.

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

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

DATA RECORDED BY: M.K. MACPHAIL    DATE: 9 March 1984

DATA REVISED BY:    DATE:

## TABLE I : SUMMARY OF PALYNOLOGICAL ANALYSIS SUNFISH-2

INTERPRETATIVE DATA

| SAMPLE NO. | DEPTH (m) | YIELD | DIVERSITY SPORE POLLEN | LITHOLOGY | ZONE | AGE | CONFIDENCE RATING | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| SWC 101 | 1499.7 | Fair | Low | Slst., calc. | P. tuberculatus | Early-Middle Eocene | 0 | C. annulata, D. simplex |
| SWC 89 | 1611.6 | Good | Low | Slst., calc. | P. tuberculatus | " | 0 | C. annulata, reworked G. rudata |
| SWC 88 | 1613.9 | Fair | Low | Slst., calc. | P. tuberculatus | " | 2 | D. pontus, D. vietus |
| SWC 87 | 1615.7 | Good | High | Ss. | P. asperopolus | " | 1 | M. tenuis, P. asperopolus |
| SWC 86 | 1618.2 | Good | High | Ss. | P. asperopolus | " | 2 | M. tenuis, P. pachypolus |
| SWC 84 | 1623.9 | Fair | Fair | Ss. | Indeterminate | " | - | |
| SWC 83 | 1634.6 | Good | High | Ss. | P. asperopolus | " | 1 | P. asperopolus, P. rugulatus |
| SWC 82 | 1659.0 | Nil | - | Ss. | Indeterminate | | | |
| SWC 117 | 1683.8 | V. Low | Low | Slst. ss. | No older than Lower M. diversus Zone | | | A. homomorpha |
| SWC 116 | 1699.6 | V. Low | Low | Slst. | No older than Lower M. diversus Zone | | | P.latrobensis, reworked Late Cret.spores |
| SWC 115 | 1721.2 | Good | High | Slst. | Lower M. diversus | Early Eocene | 0 | C.gigantis, T.moultonii, P.esobalteus |
| SWC 113 | 1768.5 | V. good | High | Ss. | Upper L. balmei | Paleocene | 0 | L.balmei common, C.gigantis, L.amplus |
| SWC 112 | 1784.2 | Good | Low | Ss. | Upper L. balmei | Paleocene | 1 | L. balmei abundant, V. kopukuensis |
| SWC 110 | 1819.5 | V. good | Low | Slst. | L. balmei | Paleocene | - | L. balmei common, A. obscurus |
| SWC 109 | 1838.4 | V. good | High | Sh., carb. | Upper L. balmei | Paleocene | 0 | L.balmei abund., P.incurvatus, V. kopukuensis, G.Edwardsii, P.langstonii |
| SWC 108 | 1853.1 | V. good | | Slst., carb. | Upper L. balmei | Paleocene | 0 | as for SWC 109 |
| SWC 107 | 1867.5 | Good | Fair | Sh., carb. | Upper L. balmei | Paleocene | 2 | L.balmei abund., Gleicheniidites freq. |
| SWC 106 | 1882.9 | V. good | High | Slst., carb. | Upper L. balmei | Paleocene | 0 | C.gigantis, V.kopukuensis, P.incurvatus, P.langstonii (freq.), G.rudata, G.edwardsii |

TABLE I : SUMMARY OF PALYNOLOGICAL ANALYSIS SUNFISH-2

INTERPRETATIVE DATA

| SAMPLE NO. | DEPTH (m) | YIELD | DIVERSITY SPORE POLLEN | LITHOLOGY | ZONE | AGE | CONFIDENCE RATING | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| SWC 105 | 1898.1 | Good | High | Sh., carb | Upper L. balmei | Paleocene | 1 | Gleicheniidites & L.balmei abundant, V. kopukuensis |
| SWC 104 | 1915.0 | V. good | High | Slst., carb. | Upper L. balmei | Paleocene | 1 | L.balmei abudant, V.kopukuensis |
| SWC 103 | 1934.0 | Good | High | Slst., carb. | Upper L. balmei | Paleocene | 2 | L.balmei common, P.annulares |
| SWC 66 | 1943.3 | Fair | Low | Slst., carb. | L. balmei | Paleocene | - | G. rudata |
| SWC 64 | 1978.0 | Fair | Low | Sh. | Upper L. balmei | Paleocene | 1 | L. balmei & Gleichenites frequent, V. kopukuensis |
| SWC 63 | 1999.1 | Good | Fair | Slst. | Lower L. balmei | Paleocene | 2 | H. elliottii common |
| SWC 62 | 2014.6 | Fair | Low | Slst. | Lower L. balmei | Paleocene | 2 | Proteacidites dominant, P.angulatus abundant |
| SWC 61 | 2032.2 | Fair | Low | Slst. | Lower L. balmei | Paleocene | 2 | as above |
| SWC 60 | 2045.2 | Low | Fair | Slst. | Lower L. balmei | Paleocene | 2 | L.balmei & B.otwayensis frequent |
| SWC 59 | 2057.8 | Low | Fair | Ss., carb. | Lower L. balmei | Paleocene | 1 | T. verrucosus |
| SWC 57 | 2073.0 | Good | Fair | Slst., carb. | Lower L. balmei | Paleocene | 1 | Proteacidites abundant, D. granulatus, T. phillipsii & T. verrucosus frequent |
| SWC 56 | 2089.0 | Good | Fair | Slst., carb. | Upper T. longus | Maastrichtian | 0 | O. sentosa, I. druggii, S. punctatus, T. verrucosus, P. gemmatus, T. securus, T. waiparensis |
| SWC 55 | 2102.7 | Good | High | Slst., carb. | Upper T. longus | Maastrichtian | 0 | T. longus, S. punctatus, P. wahooensis, P. otwayensis, P. palisadus, P. clinei, G. rudata frequent |

TABLE 1 : SUMMARY OF PALYNOLOGICAL ANALYSIS SUNFISH -2

INTERPRETATIVE DATA

| SAMPLE NO. | DEPTH (m) | YIELD | DIVERSITY SPORE POLLEN | LITHOLOGY | ZONE | AGE | CONFIDENCE RATING | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| SWC 54 | 2116.7 | Low | Fair | Ss. | Upper T. longus | Maastrichtian | 0 | Q. brossus, T. longus, S. punctatus, T. verrucosus |
| SWC 53 | 2135.1 | Good | High | Slst., carb. | Upper T. longus | Maastrichtian | 0 | as SWC 53 with T. verrucosus & S. punctatus frequent |
| SWC 52 | 2150.2 | Good | High | Slst. | Upper T. longus | Maastrichtian | 0 | P.gemmatus, S.punctatus (common), Q. brossus, P.reticuloconcavus, T.sectilis |
| SWC 51 | 2165.0 | Negligible | SS. | - | Indeterminate | | | |
| SWC 47 | 2224.8 | Good | Fair | Slst., coaly | Upper T. longus | Maastrichtian | 0 | T.verrucosus, S.punctatus, J.pieratus |
| SWC 46 | 2241.9 | Fair | High | SS., carb. | Upper T. longus | Maastrichtian | 0 | T.longus, T.verrucosus, P.angulatus |
| SWC 45 | 2254.6 | Good | Fair | Slst., carb. | Upper T. longus | Maastrichtian | 1 | G. rudata abundant, P. gemmatus |
| SWC 44 | 2268.1 | Good | Fair | Slst., coaly | Upper T. longus | Maastrichtian | 1 | as above plus D. granulatus |
| SWC 43 | 2269.5 | Good | High | Slst. | Upper T. longus | Maastrichtian | 0 | as above plus S. punctatus |
| SWC 42 | 2284.9 | V. good | High | Slst., coaly | Lower T. longus | Late Cretaceous | 1 | N. endurus & G. rudata abundant, T. sectilis (common), Q. brossus, T. lilliei, T. waiparensis, P. polyoratus |
| SWC 41 | 2295.1 | Low | Fair | Coal | Lower T. longus | Late Cretaceous | 2 | N. endurus & G. rudata common, T. securus, T. waiparensis, N. flemingii, T. sectilis (frequent) |
| SWC 35 | 2361.1 | Barren | - | Volcanic | - | - | | |
| SWC 33 | 2393.6 | Good | Fair | Ss., carb. | No older than T. lilliei Zone | | - | N. endurus frequent, S. regium, T. waiparensis |
| SWC 31 | 2421.2 | Fair | High | Slst. | Lower T. longus | Late Cretaceous | 1 | T.longus, P.palisadus, P.reticuloconcavus |
| SWC 30 | 2437.0 | Fair | Fair | Slst. | T. lilliei | Late Cretaceous | 2 | G. rudata, T. sabulosus, T. sectilis |
| SWC 28 | 2477.7 | Good | Fair | Slst., coaly | T. lilliei | Late Cretaceous | 1 | T.lilliei, G.rudata. N.endurus (freq.) |

TABLE I : SUMMARY OF PALYNOLOGICAL ANALYSIS SUNFISH-2

INTERPRETATIVE DATA

| SAMPLE NO. | DEPTH (m) | YIELD | DIVERSITY SPORE POLLEN | LITHOLOGY | ZONE | AGE | CONFIDENCE RATING | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| SWC 27 | 24900.0 | Barren | - | Ss. | - | - | - | |
| SWC 26 | 2509.0 | Barren | - | Volcanic | - | - | - | |
| SWC 23 | 2521.7 | Fair | Fair | Slst., carb. | T. lilliei | Late Cretaceous | 2 | N. endurus common, T. sabulosus, P. polyoratus |
| SWC 22 | 2523.1 | Low | Low | Slst. | No older than T. lilliei | | - | T. sabulosus |
| SWC 20 | 2530.8 | Low | Low | Slst. | T. lilliei | Late Cretaceous | 2 | G. rudata |
| SWC 19 | 2534.8 | Low | Low | Ss. | N. senectus | Late Cretaceous | 1 | Nothofagidites spp., T. sabulosus T. apoxyexinus, P. amolosexinus |
| SWC 17 | 2546.1 | Low | Low | Ss. | N. senectus | Late Cretaceous | 2 | Nothofagidites abundant, T. sabulosus common |
| SWC 16 | 2547.6 | V. Low | Low | Ss. | N. senectus | Late Cretaceous | 2 | Nothofagidites,T.sabulosus,T.vergilius |
| SWC 11 | 2559.4 | Barren | - | Ss. | Indeterminate | - | - | |
| SWC 10 | 2564.0 | Low | Fair | Slst. | N. senectus | Late Cretaceous | 2 | Nothofagidites, T. sabulosus |
| SWC 8 | 2599.6 | Fair | Fair | Coal | N. senectus | Late Cretaceous | 1 | P.otwayensis,B.otwayensis,T.vergilius L.balmei, A.obscurus |
| SWC 7 | 2611.0 | V. Low | V. low | Slst., carb. | No older than C. triplex Zone | | - | P. mawsonii |
| SWC 6 | 2617.5 | Barren | | | - | - | - | |
| SWC 5 | 2621.1 | Low | Fair | Slst./Sh. | N. senectus | Late Cretaceous | 2 | T. sabulosus |
| SWC 4 | 2623.5 | Barren | - | Ss. | - | - | - | |
| SWC 3 | 2630.5 | V. low | Low | Slst. | N. senectus | Late Cretaceous | 2 | T. sabulosus, Gleichenildites (common) |
| SWC 2 | 2636.0 | V. low | Low | Slst. | No older than C. triplex Zone | | - | P. mawsonii |
| SWC 1 | 2639.0 | Good | Fair | Slst., carb. | T. apoxyexinus | Late Cretaceous | 2 | T. vergilius, abundant Proteacidites |

TABLE

ANOMALOUS AND UNUSUAL OCCURRENCES OF SPORE-POLLEN TAXA IN SUNFISH-2

| SAMPLE NO. | DEPTH(m) | ZONE | TAXON | COMMENTS |
|---|---|---|---|---|
| SWC 86 | 1618.2 | P. asperopolus (2) | Periporopollenites vesicus | Very rarely recorded below Lower N. asperus Zone |
| SWC 86 | " | " | Proteacidites reticulatus | Rarely recorded below middle of Lower N. asperus Zone |
| SWC 84 | 1623.9 | P. asperopolus | Periporopollenites vesicus | as above |
| SWC 84 | " | " | Proteacidites reticulatus | as above |
| SWC 84 | " | " | Phyllocladidites paleogenicus | Rare sp. |
| SWC 83 | 1634.6 | P. asperopolus (1) | P. paleogenicus | as above |
| SWC 83 | " | " | Proteacidites callosus | Rare sp. |
| SWC 83 | " | " | Tricolpites reticulatus Cookson | Rare sp. |
| SWC 115 | 1721.2 | Lower M. diversus (0) | Banksi eacidites elongatus | Not recorded below Middle M. diversus Zone |
| SWC 115 | " | " | Clavifera Vultuosus | Very rare ms sp. (A. Partridge) |
| SWC 113 | 1768.5 | Upper L. balmei (0) | Triporopollenites ambiguus | Not recorded below Middle M. diversus Zone |
| SWC 113 | " | " | Matonisporites ormanentalis | Unusual below Lower N. asperus Zone |
| SWC 109 | 1838.4 | Upper L. balmei (0) | Tricolpites gigantis | Rare ms sp. (Macphail) |
| SWC 109 | " | " | Ilexpollenites anguloclavatus | Early occurrance |
| SWC 108 | 1853.1 | Upper L. balmei (0) | Amosopollis cruciformis | Rare sp. |
| SWC 108 | " | " | Camarozonosporites dumus | Not previously noted in this zone |
| SWC 108 | " | " | Polycolpites esobalteus | Extends range of species into Upper L. balmei Zone |
| SWC 108 | " | " | Tricolpites gigantis | Rare ms sp. (Macphail) |
| SWC 106 | 1882.9 | Upper L. balmei (0) | Ilexpollenites anguloclavatus | as above |
| SWC 106 | " | " | Tricolpites gigantis | Rare ms sp. (Macphail) |
| SWC 106 | " | " | Triporopollenites ambiguus | See SWC 113 |
| SWC 105 | 1898.1 | Upper L. balmei (1) | Ilexpollenites anguloclavatus | as above |
| SWC 104 | 1915.0 | Upper L. balmei (1) | Ilexpollenites anguloclavatus | as above |

TABLE 1

ANOMALOUS AND UNUSUAL OCCURRENCES OF SPORE-POLLEN TAXA IN SUNFISH-2

| SAMPLE NO. | DEPTH(m) | ZONE | TAXON | COMMENTS |
|---|---|---|---|---|
| SWC 104 | 1915.0 | Upper L. balmei (1) | Jaxtacolpus pieratus | Not previously recorded above Lower L. balmei Zone |
| SWC 103 | 1934.0 | Upper L. balmei (2) | Camorozonosporites horrendus | Not previously noted in this zone |
| SWC 103 | " | " | Tetradopollis securus | Late Cretaceous sp. |
| SWC 66 | 1943.3 | L. balmei | Deflandrea dartmooria | Lower M. diversus Zone species |
| SWC 63 | 1999.1 | Lower L. balmei (2) | Proteacidites amolosexinus | Late Cretaceous sp. in non marine sediment |
| SWC 62 | 2014.6 | Lower L. balmei (2) | Schizaea digitatoides | Rare sp. |
| SWC 57 | 2073.0 | Lower L. balmei (1) | Proteacidites cf vulgaris | cf rare ms sp. (Harris) |
| SWC 56 | 2089.0 | Upper T. longus (0) | Lygistepollenites balmei | Frequent in assemblage |
| SWC 56 | " | " | Ornamentifera sentosa | Very rare in Maastrichtian |
| SWC 56 | " | " | Proteacidites protograndis | Ms sp. (Macphail) |
| SWC 53 | 2135.1 | Upper T. longus (0) | Tricolpites vergilius | Rare ms sp. (Partridge) |
| SWC 53 | " | " | Grapnelispora evansii | Rare sp., tips of processes bifurcated |
| SWC 53 | 2150.2 | Upper T. longus (0) | Tubulifloridites truswellii | Rare ms sp. (Macphail) |
| SWC 52 | 2150.2 | Upper T. longus (0) | Grapnelispora evansii | as for SWC 53 |
| SWC 47 | 2224.8 | Upper T. longus (0) | Jaxtacolpus pieratus | Rare sp. |
| SWC 47 | " | " | Grapnelispora cf evansii | Tips of processes simple |
| SWC 47 | " | " | Foveogleicheniidites sp. | Rare genus |
| SWC 42 | 2284.9 | Lower T. longus (1) | Proteacidites vulgaris | Rare ms sp. (Harris) |
| SWC 42 | " | " | Grapnelispora cf evansii | as for SWC 47 |
| SWC 41 | 2295.1 | Lower T. longus (2) | Phyllocladidites paleogenicus | Rare sp. |
| SWC 31 | 2421.2 | Lower T. longus (1) | Cyclosporites hughesii | Early Cretaceous sp. |

TABLE I

ANOMALOUS AND UNUSUAL OCCURRENCES OF SPORE-POLLEN TAXA IN SUNFISH-2

| SAMPLE NO. | DEPTH(m) | ZONE | TAXON | COMMENTS |
|---|---|---|---|---|
| SWC 23 | 2521.7 | *T. lilliei*(2) | *Periporopollenites polyoratus* | First appears in this zone? |
| SWC 22 | 2523.1 | Indet. | *Cyclosporites hughesii* | as for SWC 31 |
| SWC 19 | 2534.8 | *N. senectus* (2) | *Tricolpites sabulosus* | Forms with and without strongly thickened endexine along margins of colpi |
| SWC 17 | 2546.1 | *N. senectus* (1) | *Tricolpites sabulosus* | Population as in SWC 19 |
| SWC 10 | 2564.0 | *N. senectus* (2) | *Foraminisporis asymmetricus* | Early Cretaceous sp. |
| SWC 5 | 2621.1 | *N. senectus* (2) | *Basopollis otwayensis* | Early occurrence |
| SWC 5 | " | " | *Gephyrapollenites wahooensis* | Early occurrence |

PE904245

This is an enclosure indicator page.
The enclosure PE904245 is enclosed within the container PE902518 at this location in this document.

The enclosure PE904245 has the following characteristics:

ITEM_BARCODE = PE904245
CONTAINER_BARCODE = PE902518
NAME = Palynology Range Chart
BASIN = GIPPSLAND
PERMIT = VIC/P1
TYPE = WELL
SUBTYPE = DIAGRAM
DESCRIPTION = Palynology Range Chart for Sunfish-2
REMARKS =
DATE_CREATED =
DATE_RECEIVED = 2/01/85
W_NO = W833
WELL_NAME = SUNFISH-2
CONTRACTOR =
CLIENT_OP_CO = ESSO AUSTRALIA LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)

# APPENDIX 3

# APPENDIX 3

# QUANTITATIVE LOG ANALYSIS

# SUNFISH-2
# QUANTITATIVE LOG ANALYSIS

Interval: 1613 - 2630m KB
Analyst : L.J. Finlayson
Date : December, 1983

# SUNFISH 2 QUANTITATIVE LOG ANALYSIS

Sunfish-2 wireline logs have been analysed for effective porosity and water saturation using a Dual Water saturation relationship over the interval 1613m to 2630m KB.

## Logs Used

LLD, LLS, MSFL, GR, Caliper, NPHI (CNL), BHC.

The resistivity, neutron and gamma ray logs were corrected for borehole and environmental effects. The corrected resistivity logs were then used to derive Rt, Rxo and invasion diameter logs.

## Log Quality

1. Two CNL tools (CNTA and CNTH) were run in this well. Schlumberger claim that these tools have identical responses however we have noticed that the CNTH almost always reads lower porosity than the CNTA. In this well and other Gippsland Basin wells it appears that the CNTA is the correct log, therefore this log (run in combination with the Dual Laterolog) has been used in this analysis.

2. The LDT log in this well is considered unsatisfactory.

   Calculated sonic and neutron porosities agree in clean water bearing sands whereas density porosity does not. The DRHO curve appears to be reading too high in zones where the hole conditions are good. For these reasons the LDT log is not used in this analysis.

3. Hole conditions in this well are generally good except for a few shaley zones that are washed out.

## Shale Volume

VSH was calculated from the corrected GR, assuming a linear response between shale and sand, using the following parameters:

| Depth Interval (m) | GR min (API units) | GR max (API units) |
|---|---|---|
| 1613 - 2300 | 30 | 130 |
| 2300 - 2610 | 30 | 100 |
| 2610 - 2630 | 40 | 85 |

$$VSH = \frac{GR\ log - GR\ min}{GR\ max - GR\ min}$$

## Total Porosities

Total porosity was calculated by the following methods.

1. Calculated from NPHI using the following algorithm:

   $PHITN = NPHI + 0.035$

2. Calculated from the Sonic log using a Hunt-Raymer transform with

$$V = \frac{10^6}{\text{Delta T}},$$

Vma = 5440 m/sec. (Delta T = 183.7 ms/m) and

Vf = 1615 m/sec. (Delta T = 620 ms/m)

$$V = (1 - PHIT)^2 \, Vma + PHIT \, Vf$$

The minimum of sonic and neutron porosity was then taken as the best estimate of total porosity.

## Free Formation Water (Rw) and Bound Water (Rwb) Resistivities

Rw and Rwb were determined from a computation of Rwa (Apparent Water Resistivity) where:

$$Rwa = Rt * PHIT^m \quad (m = 2)$$

Rw values were selected from clean water bearing zones and Rwb values were selected from shale zones. The SP curve was also useful in identifying salinity changes below 2525m KB.

Listed below are the selected Rwb and Rwb values.

| Depth Interval (m) | Rw (ohm.m) | Salinity (ppm NaCleq.) |
|---|---|---|
| 1613 - 1700 | 0.07 | 55,000 |
| 1700 - 1950 | 0.11 | 31,000 |
| 1950 - 2075 | 0.14 | 22,000 |
| 2075 - 2521 | 0.11 | 26,000 |
| 2521 - 2580 | 0.25 | 10,000 |
| 2580 - 2630 | 0.30 | 8,000 |

| Depth Interval (m) | Rwb (ohm.m) |
|---|---|
| 1613 - 1950 | 0.45 |
| 1950 - 2300 | 0.30 |
| 2300 - 2630 | 0.20 |

## Effective Porosity

Effective porosity was calculated as follows:

$$PHIE = PHIT - PHISH * VSH$$

where PHISH = total porosity in shales.

Listed below are PHISH values selected from zones where VSH was close to 1.

| Depth Interval (m) | PHISH |
|---|---|
| 1613 - 1950 | 0.27 |
| 1950 - 2300 | 0.20 |
| 2300 - 2630 | 0.18 |

Summary of Results

Interval Evaluated: 1613m - 2630m KB

| Depth Interval (m KB) | Gross Thickness (m) | *Net Porous Thickness (m) | *Porosity Average | *Calculated Sw Average | Fluid Content |
|---|---|---|---|---|---|
| 1615.00 - 1619.00 | 4.00 | 3.25 | 0.239 | 0.54** | Oil |
| 1619.00 - 1623.00 | 4.00 | 4.00 | 0.295 | 0.85 | Oil-Residual |
| 1623.00 - 1689.25 | 66.25 | 66.00 | 0.251 | 1.06 | Water |
| 1710.25 - 1720.25 | 10.00 | 9.00 | 0.236 | 0.93 | Water |
| 1741.00 - 1746.50 | 5.00 | 5.50 | 0.202 | 0.88 | Water |
| 1802.75 - 1806.75 | 4.00 | 4.00 | 0.224 | 0.98 | Water |
| 1824.25 - 1827.00 | 3.75 | 3.50 | 0.195 | 0.92 | Water |
| 1871.50 - 1875.75 | 4.25 | 4.00 | 0.219 | 1.05 | Water |
| 1905.50 - 1909.50 | 4.00 | 4.00 | 0.239 | 1.01 | Water |
| 1967.75 - 1976.75 | 9.00 | 8.75 | 0.229 | 0.98 | Water |
| 2005.00 - 2010.25 | 5.25 | 5.25 | 0.241 | 1.10 | Water |
| 2038.00 - 2041.25 | 3.25 | 3.00 | 0.232 | 1.09 | Water |
| 2059.00 - 2062.00 | 3.00 | 3.00 | 0.231 | 0.56 | Gas |
| 2062.25 - 2071.25 | 9.00 | 9.00 | 0.241 | 1.00 | Water |
| 2098.50 - 2101.75 | 3.25 | 3.25 | 0.214 | 0.83 | Water |
| 2117.75 - 2133.50 | 15.75 | 15.75 | 0.221 | 1.03 | Water |
| 2152.75 - 2161.50 | 8.75 | 8.50 | 0.195 | 1.10 | Water |
| 2166.75 - 2171.00 | 4.25 | 4.00 | 0.194 | 1.07 | Water |
| 2187.25 - 2194.50 | 7.25 | 7.25 | 0.185 | 1.00 | Water |
| 2195.75 - 2201.25 | 4.50 | 4.50 | 0.190 | 0.99 | Water |
| 2234.50 - 2238.25 | 3.75 | 3.75 | 0.200 | 0.85 | Water |
| 2276.50 - 2283.75 | 7.25 | 7.25 | 0.211 | 0.99 | Water |
| 2286.75 - 2290.75 | 4.00 | 4.00 | 0.199 | 1.03 | Water |
| 2297.00 - 2300.50 | 3.50 | 3.25 | 0.186 | 1.08 | Water |
| 2425.25 - 2429.50 | 4.25 | 4.00 | 0.158 | 1.18 | Water |
| 2439.25 - 2451.00 | 11.75 | 11.00 | 0.183 | 1.14 | Water |
| 2461.50 - 2467.75 | 6.25 | 6.25 | 0.163 | 0.98 | Water |
| 2474.00 - 2477.00 | 3.00 | 3.00 | 0.160 | 0.96 | Water |
| 2493.25 - 2499.00 | 5.75 | 4.25 | 0.145 | 0.98 | Water |
| 2532.00 - 2536.50 | 4.25 | 4.00 | 0.157 | 1.05 | Water |
| 2540.75 - 2544.50 | 3.75 | 3.00 | 0.114 | 1.09 | Water |
| 2545.75 - 2549.25 | 3.50 | 3.00 | 0.121 | 1.04 | Water |
| 2550.25 - 2554.50 | 4.25 | 3.00 | 0.123 | 1.03 | Water |
| 2586.25 - 2592.50 | 6.25 | 6.25 | 0.160 | 1.10 | Water |
| 2593.25 - 2598.75 | 5.50 | 5.50 | 0.164 | 1.26 | Water |
| 2600.25 - 2603.25 | 3.00 | 2.75 | 0.156 | 0.99 | Water |
| 2604.00 - 2610.00 | 6.00 | 6.00 | 0.173 | 0.99 | Water |
| 2622.25 - 2624.30 | 2.25 | 1.75 | 0.168 | 0.93 | Water |

* Porosity Average, Net Porous Thickness and Sw Average refer to zones with calculated porosities in excess of 10%.

** An RFT at 1616.8m recovered 10.25 litres of oil in a 6 gallon chamber. This recovery suggests that the water saturation in this zone may be less than that (0.54) calculated.

## Water Saturations

Water saturations were determined from the Dual Water model which uses the following relationship:

$$\frac{1}{Rt} = SwT^{n} * \left(\frac{PHIT^{m}}{aRw}\right) + SwT^{(n-1)} \left[\frac{Swb * PHIT^{m}}{a} \left(\frac{1}{Rwb} - \frac{1}{Rwa}\right)\right]$$

where SwT = total water saturation

Swb (bound water saturation) $= \frac{VSH * PHISH}{PHIT}$

a = 1
m = 2
n = 2

Effective water saturations were calculated using the following relationship.

$$SWe = 1 - \frac{PHIT\ (1 - SwT)}{PHIE}$$

## Comments

1. A 4 metre oil column is interpreted from 1615m KB to an OWC at 1619m KB.

2. A residual oil zone is interpreted over the interval 1619m KB to 1623m KB.

3. A 3 metre gas column is interpreted from 2059m KB to 2062m KB.

4. Shows were encountered while drilling and in sidewall cores over the interval 2521m KB to 2561m KB, however no significant hydrocarbons could be calculated in this interval. RFT data suggests this interval to be water bearing.

5. All other zones are considered to be water bearing.

6. Zones with PHIE less than 0.1 or VSH greater than 0.5 had Swe set to 1.

7. Coals and carbonaceous shales were edited for an output of VSH = 0, PHIE = 0 and Swe = 1.

8. Zones of volcanics were not analysed.

## Attachments

Porosity-Saturation Depth Plot.

PE604135

This is an enclosure indicator page.
The enclosure PE604135 is enclosed within the container PE902518 at this location in this document.

The enclosure PE604135 has the following characteristics:

| | |
|---|---|
| ITEM_BARCODE = | PE604135 |
| CONTAINER_BARCODE = | PE902518 |
| NAME = | Quantitative Log Analysis |
| BASIN = | GIPPSLAND |
| PERMIT = | |
| TYPE = | WELL |
| SUBTYPE = | WELL_LOG |
| DESCRIPTION = | Quantitative Log Analysis |
| REMARKS = | |
| DATE_CREATED = | |
| DATE_RECEIVED = | 25/01/85 |
| W_NO = | W833 |
| WELL_NAME = | Sunfish-2 |
| CONTRACTOR = | ESSO |
| CLIENT_OP_CO = | ESSO |

(Inserted by DNRE - Vic Govt Mines Dept)

# APPENDIX 4

# APPENDIX 4

# WIRELINE TEST REPORT

# SUNFISH-2 RFT REPORT

M. E. Fittall

June, 1984.

## SUMMARY AND DISCUSSION OF RESULTS

A series of RFT tests were conducted in the Sunfish-2 exploration well on the 9th and 10th of October, 1983. These tests were carried out at the T.D. of the well, over the interval 2634.0 mKB (-2613.0m) to 1616.8 mKB (-1595.8m).

Run 1 consisted of 34 pretest pressures, three of which were seal failures, two were tight, and four were supercharged. One other pretest at 2632.5 mKB (-2611.5m) also showed evidence of overpressure or supercharging (see Table of Pretest Pressures). The valid pretest pressures are plotted and show a straight line water gradient (Figure 1) except for the supercharged pretests. No hydrocarbon zones can be interpreted from the results of the RFT pretest pressures.

Run 2 consisted of five attempted pretests which were all seal failures, and one valid pretest and sample at 1616.8 mKB (-1595.8m). The 22.7 lit chamber was opened but the 10.4 lit chamber could not be opened. The 22.7 lit chamber recovered 40.5 cu. ft of gas and 10.25 lit of $48.5^{0}$ API oil. The GOR of the sample was 629 SCF/STB.

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## RFT PRETEST PRESSURES - SUNFISH 2

SERVICE COMPANY: Schlumberger    RUN NO: 1    DATE: 09/10/83    OBSERVERS: M. Fittal, R. Key

| SEAT NO. | DEPTH (m) | DEPTH (SS) (m) | REASON 1 FOR TEST | GAUGE 2 | TEMP 3 CORR. | UNITS 4 | IHP | | FM. PRESS | | FHP | | TEST RESULT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | psi | ppg | psi | ppg | psi | ppg | |
| 1/1 | 2634.0 | 2613.0 | PT | HP | Y | A | 4269.2 | 9.5 | | | 4270.0 | 9.5 | Seal failure |
| | | | | SCH | Y | G | 4255 | 9.4 | | | 4254.0 | 9.4 | |
| 1/2 | 2634.5 | 2613.5 | PT | HP | Y | A | 4272.0 | 9.5 | | | 4270.0 | 9.5 | Seal failure |
| | | | | SCH | Y | G | 4250.0 | 9.4 | | | 4250.0 | 9.4 | |
| 1/3 | 2632.5 | 2611.5 | PT | HP | Y | A | 4266.7 | 9.5 | 3848.5 | 8.6 | 4268.5 | 9.5 | Valid. Over-pressure or supercharged |
| | | | | SCH | Y | G | 4247.0 | 9.4 | 3828.0 | 8.6 | 4248.0 | 9.4 | |
| 1/4 | 2605.5 | 2584.5 | PT | HP | Y | A | 4221.6 | 9.5 | 3748.0 | 8.5 | 4222.8 | 9.5 | Valid |
| | | | | SCH | Y | G | 4204 | 9.4 | 3729.0 | 8.4 | 4205.0 | 9.4 | |
| 1/5 | 2596.3 | 2575.3 | PT | HP | Y | A | 4206.9 | 9.5 | 3736.8 | 8.5 | 4209.5 | 9.5 | Valid |
| | | | | SCH | Y | G | 4190 | 9.4 | 3719.0 | 8.4 | 4191.0 | 9.4 | |
| 1/6 | 2588.8 | 2567.8 | PT | HP | Y | A | 4196.6 | 9.5 | 3725.8 | 8.5 | 4196.9 | 9.5 | Valid |
| | | | | SCH | Y | G | 4177 | 9.4 | 3708.0 | 8.4 | 4177.0 | 9.4 | |
| 1/7 | 2559.5 | 2548.5 | PT | HP | Y | A | 4148.6 | 9.5 | 3685.9 | 8.5 | 4150.6 | 9.5 | Valid, tight |
| | | | | SCH | Y | G | 4136 | 9.4 | 3671.0 | 8.4 | 4136.0 | 9.4 | |

1. Pressure Test = PT
   Sample & Pressure = SPT

2. Gauges = SCH = Schlumberger Strain Gauge
   = HP = Hewlett Packard

3. Yes = Y
   No = N

4. PSIA = A
   PSIG = G

## RFT PRETEST PRESSURES - SUNFISH 2

SERVICE COMPANY: Schlumberger    RUN NO: 1    DATE: 10/10/83    OBSERVERS: M. Fittal, R. Key

| SEAT NO. | DEPTH (m) | DEPTH (SS) (m) | REASON 1 FOR TEST | GAUGE 2 | TEMP 3 CORR. | UNITS 4 | IHP psi | IHP ppg | FM. PRESS psi | FM. PRESS ppg | FHP psi | FHP ppg | TEST RESULT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/8 | 2527.0 | 2506.0 | PT | HP | Y | A | 4094.9 | 9.5 | 3647.6 | 8.5 | 4095.0 | 9.5 | Valid |
| | | | | SCH | Y | G | 4082.0 | 9.4 | 3630.0 | 8.5 | 4079.0 | 9.4 | |
| 1/9 | 2532.2 | 2511.2 | PT | HP | Y | A | 4104.2 | 9.5 | 3647.9 | 8.5 | 4106.0 | 9.5 | Valid |
| | | | | SCH | Y | G | 4086.0 | 9.4 | 3627.0 | 8.4 | 4083.0 | 9.4 | |
| 1/10 | 2495.0 | 2474.0 | PT | HP | Y | A | 4045.3 | 9.5 | 3641.2 | 8.6 | 4046.0 | 9.5 | Valid. |
| | | | | SCH | Y | G | 4013.0 | 9.4 | 3624.0 | 8.6 | 4028 | 9.4 | Supercharged |
| 1/11 | 2449.0 | 2428.0 | PT | HP | Y | A | 3972.5 | 9.5 | 3639.8 | 8.8 | 3972.9 | 9.5 | Valid. |
| | | | | SCH | Y | G | 3953.0 | 9.4 | 3621.0 | 8.7 | 3951.0 | 9.4 | Supercharged |
| 1/12 | 2440.0 | 2419.0 | PT | HP | Y | A | 3957.9 | 9.5 | 3627.5 | 8.8 | 3958.7 | 9.5 | Valid. |
| | | | | SCH | Y | G | 3936.0 | 9.4 | 3607.0 | 8.7 | 3937.0 | 9.4 | Supercharged |
| 1/13 | 2427.0 | 2406.0 | PT | HP | Y | A | 3936.6 | 9.5 | 3609.3 | 8.8 | 3937.2 | 9.5 | Valid |
| | | | | SCH | Y | G | 3914.0 | 9.4 | 3587.0 | 8.7 | 3914.0 | 9.4 | Supercharged |
| 1/14 | 2281.0 | 2260.0 | PT | HP | Y | A | 3705.7 | 9.5 | 3292.0 | 8.5 | 3706.5 | 9.5 | Valid |
| | | | | SCH | Y | G | 3680.0 | 9.4 | 3268.0 | 8.4 | 3680.0 | 9.4 | |

1. Pressure Test = PT
   Sample & Pressure = SPT

2. Gauges = SCH = Schlumberger Strain Gauge
   = HP = Hewlett Packard

3. Yes = Y
   No = N

4. PSIA = A
   PSIG = G

## RFT PRETEST PRESSURES - SUNFISH 2

SERVICE COMPANY: Schlumberger    RUN NO: 1    DATE: 10/10/83    OBSERVERS: M. Fittal, R. Key

| SEAT NO. | DEPTH (m) | DEPTH (SS) (m) | REASON 1 FOR TEST | GAUGE 2 | TEMP 3 CORR. | UNITS 4 | IHP psi | IHP ppg | FM. PRESS psi | FM. PRESS ppg | FHP psi | FHP ppg | TEST RESULT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/15 | 2236.5 | 2215.5 | PT | HP | Y | A | 3632.8 | 9.5 | 3223.8 | 8.5 | 3633.1 | 9.5 | Valid |
| | | | | SCH | Y | G | 3613.0 | 9.4 | 3204.0 | 8.5 | 3612.0 | 9.4 | |
| 1/16 | 2198.0 | 2177.0 | PT | HP | Y | A | 3571.2 | 9.5 | 3158.7 | 8.5 | 3572.0 | 9.5 | Valid |
| | | | | SCH | Y | G | 3551.0 | 9.4 | 3138.0 | 8.4 | 3551.0 | 9.4 | |
| 1/17 | 2188.0 | 2167.0 | PT | HP | Y | A | 3555.0 | 9.5 | 3146.0 | 8.5 | 3557.1 | 9.5 | Valid |
| | | | | SCH | Y | G | 3534.0 | 9.4 | 3125.0 | 8.4 | 3532.0 | 9.4 | |
| 1/18 | 2133.0 | 2112.0 | PT | HP | Y | A | 3467.0 | 9.5 | | | 3467.0 | 9.5 | Tight |
| | | | | SCH | Y | G | 3447.0 | 9.4 | | | 3447.0 | 9.4 | |
| 1/19 | 2130.0 | 2109.0 | PT | HP | Y | A | 3463.3 | 9.5 | 3064.9 | 8.5 | 3463.8 | 9.5 | Valid |
| | | | | SCH | Y | G | 3440.0 | 9.4 | 3043.0 | 8.4 | 3440.0 | 9.4 | |
| 1/20 | 2119.0 | 2098.0 | PT | HP | Y | A | 3444.6 | 9.5 | 3049.4 | 8.5 | 3446.0 | 9.5 | Valid |
| | | | | SCH | Y | G | 3424.0 | 9.4 | 3030.0 | 8.5 | 3423.0 | 9.4 | |
| 1/21 | 2070.5 | 2049.5 | PT | HP | Y | A | 3365.2 | 9.5 | 2975.4 | 8.5 | 3366.4 | 9.5 | Valid |
| | | | | SCH | Y | G | 3349.0 | 9.4 | 2962.0 | 8.5 | 3349.0 | 9.4 | |

1. Pressure Test = PT
   Sample & Pressure = SPT

2. Gauges = SCH = Schlumberger Strain Gauge
   = HP = Hewlett Packard

3. Yes = Y
   No = N

4. PSIA = A
   PSIG = G

## RFT PRETEST PRESSURES - SUNFISH 2

SERVICE COMPANY: Schlumberger  RUN NO: 1  DATE: 10/10/83  OBSERVERS: M. Fittal, R. Key

| SEAT NO. | DEPTH (m) | DEPTH (SS) (m) | REASON 1 FOR TEST | GAUGE 2 | TEMP 3 CORR. | UNITS 4 | IHP psi | IHP ppg | FM. PRESS psi | FM. PRESS ppg | FHP psi | FHP ppg | TEST RESULT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/22 | 2041.5 | 2020.5 | PT | HP | Y | A | 3317.0 | 9.5 | 2931.0 | 8.5 | 3321.4 | 9.5 | Valid |
| | | | | SCH | Y | G | 3299.0 | 9.5 | 2912.0 | 8.4 | 3299 | 9.5 | |
| 1/23 | 2007.0 | 1986.0 | PT | HP | Y | A | 3266.8 | 9.5 | 2885.2 | 8.5 | 3269.0 | 9.5 | Valid |
| | | | | SCH | Y | G | 3248.0 | 9.5 | 2864.0 | 8.4 | 3244.0 | 9.5 | |
| 1/24 | 1973.0 | 1952.0 | PT | HP | Y | A | 3211.4 | 9.5 | 2835.8 | 8.5 | 3214.2 | 9.5 | Valid |
| | | | | SCH | Y | G | 3188.0 | 9.5 | 2817.0 | 8.4 | 3193.0 | 9.5 | |
| 1/25 | 1907.5 | 1886.5 | PT | HP | Y | A | 3107.2 | 9.5 | 2746.6 | 8.5 | 3107.5 | 9.5 | Valid |
| | | | | SCH | Y | G | 3089.0 | 9.5 | 2729.0 | 8.4 | 3087.0 | 9.5 | |
| 1/26 | 1875.0 | 1854.0 | PT | HP | Y | A | 3054.1 | 9.5 | 2689.5 | 8.5 | 3055.0 | 9.5 | Valid |
| | | | | SCH | Y | G | 3036.0 | 9.5 | 2674.0 | 8.4 | 3037.0 | 9.5 | |
| 1/27 | 1804.0 | 1783.0 | PT | HP | Y | A | 2937.9 | 9.5 | 2583.9 | 8.5 | 2939.4 | 9.5 | Valid |
| | | | | SCH | Y | G | 2924.0 | 9.5 | 2569.0 | 8.4 | 2923.0 | 9.5 | |
| 1/28 | 1790.0 | 1769.0 | PT | HP | Y | A | 2917.0 | 9.5 | | | 2917.0 | 9.5 | Tight |
| | | | | SCH | Y | G | 2899.0 | 9.5 | | | 2899.0 | 9.5 | |

1. Pressure Test = PT
   Sample & Pressure = SPT

2. Gauges = SCH = Schlumberger Strain Gauge
   = HP = Hewlett Packard

3. Yes = Y
   No = N

4. PSIA = A
   PSIG = G

## RFT PRETEST PRESSURES - SUNFISH 2

SERVICE COMPANY: Schlumberger    RUN NO: 1, 2    DATE: 10/10/83    OBSERVERS: M. Fittal, R. Key

| SEAT NO. | DEPTH (m) | DEPTH (SS) (m) | REASON 1 FOR TEST | GAUGE 2 | TEMP 3 CORR. | UNITS 4 | IHP psi | IHP ppg | FM. PRESS psi | FM. PRESS ppg | FHP psi | FHP ppg | TEST RESULT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/29 | 1745.0 | 1724.0 | PT | HP | Y | A | 2843.0 | 9.5 | | | 2844.0 | 9.5 | Seal failure |
| | | | | SCH | Y | G | 2830.0 | 9.5 | | | 2830.0 | 9.5 | |
| 1/30 | 1744.5 | 1723.5 | PT | HP | Y | A | 2843.4 | 9.5 | 2498.9 | 8.5 | 2845.3 | 9.5 | Valid |
| | | | | SCH | Y | G | 2829.0 | 9.5 | 2484.0 | 8.4 | 2825.0 | 9.5 | |
| 1/31 | 1717.0 | 1696.0 | PT | HP | Y | A | 2801.6 | 9.5 | 2459.8 | 8.5 | 2801.8 | 9.5 | Valid |
| | | | | SCH | Y | G | 2778.0 | 9.5 | 2439.0 | 8.4 | 2778.0 | 9.5 | |
| 1/32 | 1685.0 | 1664.0 | PT | HP | Y | A | 2749.9 | 9.5 | 2414.4 | 8.5 | 2750.2 | 9.5 | Valid |
| | | | | SCH | Y | G | 2727.0 | 9.5 | 2395.0 | 8.4 | 2728.0 | 9.5 | |
| 1/33 | 1630.0 | 1609.0 | PT | HP | Y | A | 2660.7 | 9.5 | 2336.2 | 8.5 | 2661.5 | 9.5 | Valid |
| | | | | SCH | Y | G | 2640.0 | 9.5 | 2318.0 | 8.4 | 2640.0 | 9.5 | |
| 1/34 | 1617.0 | 1596.0 | PT | HP | Y | A | 2640.5 | 9.5 | 2318.7 | 8.5 | 2640.8 | 9.5 | Valid |
| | | | | SCH | Y | G | 2618.0 | 9.5 | 2299.0 | 8.4 | 2620.0 | 9.5 | |
| 2/35 | 1617.0 | 1596.0 | SPT | HP | Y | A | 2641.0 | 9.5 | | | 2641.0 | 9.5 | Seal failure |
| | | | | SCH | Y | G | 2621.0 | 9.5 | | | 2624.0 | 9.5 | |

1. Pressure Test = PT
   Sample & Pressure = SPT

2. Gauges = SCH = Schlumberger Strain Gauge
   = HP = Hewlett Packard

3. Yes = Y
   No = N

4. PSIA = A
   PSIG = G

# RFT PRETEST PRESSURES - SUNFISH 2

SERVICE COMPANY: Schlumberger    RUN NO: 2    DATE: 10/10/83    OBSERVERS: M. Fittall, R. Key

| SEAT NO. | DEPTH (m) | DEPTH (SS) (m) | REASON 1 FOR TEST | GAUGE 2 | TEMP 3 CORR. | UNITS 4 | IHP psi | IHP ppg | FM. PRESS psi | FM. PRESS ppg | FHP psi | FHP ppg | TEST RESULT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2/36 | 1617.0 | 1596.0 | SPT | HP | Y | A | 2640.9 | 9.5 | | | 2641.0 | 9.5 | Seal failure |
| | | | | SCH | Y | G | 2620.0 | 9.5 | | | 2621.0 | 9.5 | |
| 2/37 | 1617.5 | 1596.5 | SPT | HP | Y | A | 2641.9 | 9.5 | | | 2641.0 | 9.5 | Seal failure |
| | | | | SCH | Y | G | 2619.0 | 9.5 | | | 2620.0 | 9.5 | |
| 2/38 | 1617.5 | 1596.5 | SPT | HP | Y | A | 2642.0 | 9.5 | | | 2642.0 | 9.5 | Seal failure |
| | | | | SCH | Y | G | 2620.0 | 9.5 | | | 2620.0 | 9.5 | |
| 2/39 | 1616.8 | 1595.8 | SPT | HP | Y | A | 2640.7 | 9.5 | | | 2620.0 | 9.5 | Seal failure |
| | | | | SCH | Y | G | 2620.0 | 9.5 | | | 2620.0 | 9.5 | |
| 2/40 | 1616.8 | 1595.8 | SPT | HP | Y | A | 2641.0 | 9.5 | 2320.4 | 8.5 | 2642.0 | 9.5 | Valid |
| | | | | SCH | Y | G | 2630.0 | 9.5 | 2304.0 | 7.9 | 2630.0 | 9.5 | 22.7 lit sample only |

1. Pressure Test = PT
   Sample & Pressure = SPT

2. Gauges = SCH = Schlumberger Strain Gauge
   = HP = Hewlett Packard

3. Yes = Y
   No = N

4. PSIA = A
   PSIG = G

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# RFT SAMPLE TEST REPORT - SUNFISH 2

OBSERVER: M. Fittall, R. Key DATE: 10-10-83 SUITE: 2 RUN: RFT-2

| | | | | |
|---|---|---|---|---|
| SEAT NO. | 2/40 | | 2/40 | |
| DEPTH | 1616.8 | m | 1616.8 | m |
| | CHAMBER 1 (22.7 | lit.) | CHAMBER 2 (10.4 | lit.) |
| **A. RECORDING TIMES** | | | | |
| Tool Set | 09-34-45 | hrs | | |
| Pretest Open | 09-35-00 | hrs | | |
| Time Open | 1-10 | hrs | | |
| Chamber Open | 09-36-10 | hrs | 10-00-00 | hrs |
| Chamber Full | 09-46-35 | hrs | | hrs |
| Fill Time | 10-25 | min | | min |
| Start Build up | 09-46-35 | hrs | | hrs |
| Finish Build up | 09-58-30 | hrs | | hrs |
| Build Up Time | 11-55 | min | | min |
| Seal Chamber | 09-58-30 | hrs | | hrs |
| Tool Retract | | min | 10-24-00 | hrs |
| Total Time | 25-15 | min | 24-00 | min |
| **B. SAMPLE PRESSURES** | psia | | psia | |
| IHP | 2641.0 | | 2320.0 | |
| ISIP | 2320.4 | | | |
| Initial Flowing Press. | 403.9 | | | |
| Final Flowing Press. | 1324.3 | | | |
| Sampling Press. Range | 920.4 | | | |
| FSIP | 2316.2 | | | |
| FHP | 2320.0 | | 2642.0 | |
| Form.Press.(Horner) | | | | |
| **C. TEMPERATURE** | | | | |
| Depth Tool Reached | 1650 | m | | m |
| Max.Rec. Temp. | 174 | °F | | °C |
| Time Circ. Stopped | 08/10/83 @ 17-20 | hrs | | hrs |
| Time since Circ. | 39-10 | hrs | | hrs |
| Form. Temp.(Horner) | | °C | | °C |
| **D. SAMPLE RECOVERY** | | | | |
| Surface Pressure | 1180 | psig | | psig |
| Amt Gas | 40.54 | cu ft | | cu ft |
| Amt Oil | 10.25 | lit. | | lit. |
| Amt Water | 4.75 | lit. | | lit. |
| Amt Others/Emulsion | 0.50 | lit. | | lit. |
| **E. SAMPLE PROPERTIES** | | | | |
| Gas Composition | | | | |
| C1 | 131,834 | ppm | | ppm |
| C2 | 105,553 | ppm | | ppm |
| C3 | 3,317 | ppm | | ppm |
| 1C4/nC4 | 923 | ppm | | ppm |
| C5 | 234 | ppm | | ppm |
| C6+ | 261+ | ppm | | ppm |
| CO2/H2S | 0.8%/Nil | ppm | | ppm |
| Oil Properties | 48.5°API @ 60°C | | | |
| Colour | Greenish black | | | |
| Fluorescence | Cream to blue white | | | |
| GOR | 628.9 SCF/STB | | | |
| Water Properties | | | | |
| Resistivity | 0.212 @ 64 | °C | | °C |
| NaCl Equivalent | 14,000 | ppm | | ppm |
| Cl-titrated | 18,000 | ppm | | ppm |
| pH/Nitrates | 110 | ppm | | ppm |
| Est. Water Type | Filtrate/Fm Water ph - 7.0 | | | |
| Mud Properties | | | | |
| Resistivity | 0.226 @ 17.8 | °C | | °C |
| NaCl Equivalent | 30,000 | ppm | | ppm |
| Cl-titrated | 18,500 | ppm | | ppm |
| pH/Nitrates | | ppm | | ppm |
| Calibration | | | | |
| Hewlett Packard Gauge No. | 746 | | | |
| Calibration Press. | | psig | | psig |
| Calibration Temp. | | °C | | °C |
| Mud Weight | 9.4 | ppg | 9.7 | ppg |
| Calc.Hydrostatic | 9.85 | psig | 9.85 | psig |
| RFT Chokesize | 1 x 0.03 | inch | | |

REMARKS: 2/40: Martineau probe used. Seal valves to chamber would not open

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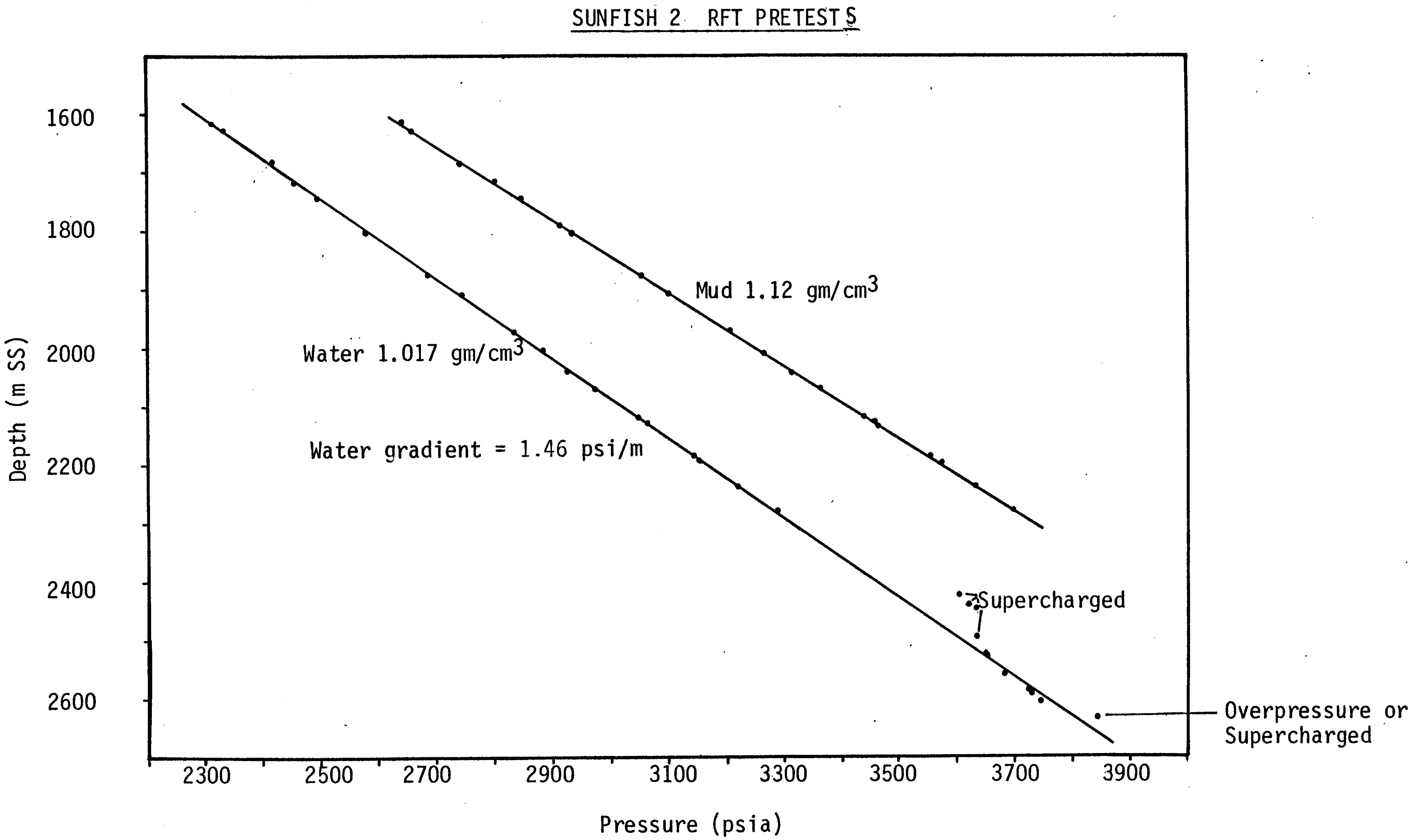
FIGURE 1



SUNFISH 2 RFT PRETESTS
1600
1800
2000
2200
2400
2600
Depth (m SS)
Mud 1.12 gm/cm3
Water 1.017 gm/cm3
Water gradient = 1.46 psi/m
Supercharged
Overpressure or Supercharged
2300
2500
2700
2900
3100
3300
3500
3700
3900
Pressure (psia)

# APPENDIX 5

APPENDIX 5

GEOCHEMICAL REPORT

GEOCHEMICAL REPORT

SUNFISH-2 WELL, GIPPSLAND BASIN

VICTORIA

by

J.K. EMMETT

Sample handling and analyses by:

- J. Maccoll )
- D.M. Hill ) Esso Australia Ltd.
- D.M. Ford )
- Exxon Production Research Company
- Geochem Laboratories

Esso Australia Ltd
Geochemical Report

May 1984

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APPENDICES:

1. Detailed $C_{4-7}$ Data Sheets

2. Detailed Vitrinite Reflectance and Exinite Fluorescence Data

   - by A.C. Cook

SUNFISH-2

INTRODUCTION:

Samples of wet canned cuttings and sidewall cores collected during drilling of Sunfish-2 were subjected to various geochemical analyses. Canned cuttings composited over 15-metre intervals were collected from 220m (KB) down to total depth (T.D.) at 2647.5m (KB). Light hydrocarbon ($C_{1-4}$) headspace gases were determined on alternate 15-metre intervals from 1355m (KB) down to T.D. Succeeding alternate 15-metre intervals were analysed for $C_{4-7}$ gasoline range hydrocarbons between 1490m (KB) and 2630m (KB). Samples were then hand-picked for more detailed analyses such as Total Organic Carbon (T.O.C.), Rock-Eval pyrolysis, kerogen isolation and elemental analysis, and $C_{15+}$ liquid and gas chromatography. Vitrinite reflectance measurements were performed by A.C. Cook of Wollongong.

An oil sample, RFT 2/10 at 1616.8m (KB) was analysed for API gravity, % sulphur, $C_{4-7}$ and "whole oil" gas chromatography, $C_{15+}$ liquid and gas chromatography and mass spectrometry, and carbon isotopes were determined on the saturate and aromatic fractions.

DISCUSSION OF RESULTS:

The detailed headspace $C_{1-4}$ cuttings gas data are presented in Table 1. This data is more conveniently represented in log form in Figures 1(a) and 1(b). Total cuttings gas values in the Gippsland and Lakes Entrance Formations are generally moderately rich only (fig. 1(a)), and indicate at best, a fair hydrocarbon source potential for dry gas for these formations.

The underlying Latrobe Group sediments on the other hand, have uniformly rich cuttings gas values indicating very good hydrocarbon source potential. The uniform nature of the total $C_{1-4}$ as values is due in part to "smearing" of light hydrocarbon material as a result of migration through the sand/siltsone/shale sequence of the Latrobe Group. The marked reduction in cuttings gas values between about 1625m (KB) and 1685m (KB) (fig. 1(a) and Table 1), is probably due to flushing in the very sandy section in this part of the well. The amount of wet ($C_2$+) gas components present is relatively low (usually less than 30% - Table 1 and fig. 1(b)) for most of the section penetrated, indicating predominantly gas - prone organic matter, although the occurrence of a few wet gas values above 30%, below about 2435m (KB) indicates that the Latrobe Group sediments are approaching the top of organic maturity in the vicinity of T.D.

The detailed $C_{4-7}$ gasoline-range hydrocarbon data sheets are given in Appendix-1 and pertinent information has been plotted in Figure 2 for easier interpretation. Total gasoline contents in the Lakes Entrance Formation vary from lean to moderately rich confirming a fair only hydrocarbon source potential. In the Latrobe Group sediments, gasoline-range hydrocarbon contents vary from moderately rich to very rich, the latter usually obtained from coaly sediments or those stained by insitu oil shows. A significant proportion of $C_{6-7}$ hydrocarbons was also present in about half the samples analysed, including all the samples below about 2400m (KB). This indicates that where the Latrobe Group is mature, it has good potential to source gas, condensate and oil.

Total Organic Carbon values (Table 2) in the Gippsland Limestone (av. T.O.C. = 0.53%) and the Lakes Entrance Formation (av. T.O.C. = 0.42%)

are fair and poor respectively, compared to the Latrobe Group sediments which are rich in T.O.C. (av. T.O.C. = 1.37%) and therefore are a good potential source of hydrocarbons.

Vitrinite reflectance ($\bar{R}_v$ max) data are presented in Table 3 and ($\bar{R}_v$ max) has been plotted with depth in Figure 3. The maturation profile conforms fairly well to a straight line as shown in figure 3. The entire section penetrated is presently immature for significant hydrocarbon generation; although the top of organic maturity (taken to be $\bar{R}_v$ max = 0.65%) probably occurs at T.D. Detailed vitrinite reflectance and exinite fluorescence data are given in Appendix 2 - Report by A.C. Cook.

Table 4 lists elemental analyses of selected kerogen concentrates isolated from Latrobe Group sidewall cores. Approximate Hydrogen:Carbon (H/C), Oxygen:Carbon (O/C) and Nitrogen:Carbon (N/C) atomic ratios are given in Table 5. These ratios are labelled 'approximate' since the oxygen % is calculated by difference, and the naturally occurring organic sulphur % (which may be upto a few %) was not determined. Atomic H/C ratio has been plotted against atomic O/C ratio on a modified Van Krevelen Plot (figure 4) to define the basic kerogen types present. Comparison of Figure 4 with Figure 5, a similar plot showing the principal products of kerogen evolution, shows that the organic matter in the Latrobe Group sediments varies from modal Type III to intermediate Type II-III (ie. predominantly woody-coaly-herbaceous kerogen), and this again supports a good gas plus oil source potential for this unit.

Rock-Eval pyrolysis results for samples with T.O.C. values of 0.5% or more are listed in Table 6. In Figure 6 Hydrogen Index has been plotted against Tmax ($^{o}$C), and fields delineating the basic kerogen types and their degree of maturation (indicated by equivalent vitrinite reflectance curves) have also been outlined. The Rock-Eval data confirms the previous organic matter typing and consequent very good gas plus oil source potential for the Latrobe Group sediments, and also verifies that the section penetrated is basically immature.

The $C_{15+}$ liquid chromatography results for selected canned cuttings are listed in Table 7. Total extract values vary from poor to rich, but all the samples are composed predominantly of non-hydrocarbon (ie. Asphaltenes and N.S.O. resins) material which testifies to the present day immaturity of the sequence penetrated. The corresponding $C_{15+}$ chromatograms are shown in Figures 7-12. With the exception of Figure 7 (from a combined Lakes Entrance Formation and Latrobe Group cuttings sample, 1610-1625m (KB)) which shows an immature mixture of marine (Lakes Entrance Formation component) and terrestrial (Latrobe Group component) derived organic matter, the remaining chromatograms show hydrocarbon distributions typical of immature to marginally mature, terrestrial organic matter, indicated primarily by a strong odd/even predominance in the high molecular weight waxy n-alkanes.

In Tables 8, 9 and 10 respectively, $C_{4-7}$ gasoline-range hydrocarbon; liquid chromatography; and A.P.I. gravity, % sulphur and saturate and aromatic fraction carbon isotope data are listed for a top of Latrobe Group oil show, RFT 2/10 at 1616.8m (KB). A "whole oil" chromatogram with sulphur compound trace, and a $C_{15+}$ saturate hydrocarbon chromatogram are shown in Figures 13 and 14 respectively. The Sunfish-2 oil is a reasonably light ($48^{o}$ API - Table 10) mature, paraffinic based crude (refer Table 8, Figures 13 and 14) composed predominantly of gasoline - range hydrocarbons (Table 8). The "whole oil" and $C_{15+}$ saturate chromatograms, and in particular the high pritane : phytane ratio, indicates that the Sunfish-2 oil is most probably generated from a source rock containing non-marine/terrestrial organic matter.

CONCLUSION:

1. The entire penetrated section in Sunfish-2 is presently immature for significant hydrocarbon generation. The top of organic maturation occurs at T.D.

2. The Latrobe Group sediments have a very good gas plus oil source potential.

3. Oil located in the top of Latrobe Group reservoir section is a reasonably light, mature, paraffinic-based crude of non-marine origin.

## C1-C4 HYDROCARBON ANALYSES

REPORT A - HEADSPACE GAS

BASIN - GIPPSLAND
WELL - SUNFISH 2

| SAMPLE NO. | DEPTH | METHANE C1 | ETHANE C2 | PROPANE C3 | IBUTANE IC4 | NBUTANE C4 | WET C2-C4 | TOTAL C1-C4 | WET/TOTAL PERCENT | TOTAL GAS M | TOTAL GAS E | TOTAL GAS P | TOTAL GAS IB | TOTAL GAS NB | WET GAS E | WET GAS P | WET GAS IB | WET GAS NB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GAS CONCENTRATION (VOLUME GAS PER MILLION VOLUMES CUTTINGS) | | | | | | | | GAS COMPOSITION (PERCENT) | | | | | | | | |
| 72748 B | 1370.00 | 2157 | 63 | 62 | 32 | 15 | 172 | 2329 | 7.39 | 93. | 3. | 3. | 1. | 1. | 37. | 36. | 19. | 9. |
| 72748 D | 1400.00 | 2821 | 85 | 93 | 40 | 19 | 237 | 3058 | 7.75 | 92. | 3. | 3. | 1. | 1. | 36. | 39. | 17. | 8. |
| 72748 F | 1430.00 | 3555 | 124 | 85 | 68 | 22 | 299 | 3854 | 7.76 | 92. | 3. | 2. | 2. | 1. | 41. | 28. | 23. | 7. |
| 72748 H | 1460.00 | 1468 | 58 | 38 | 22 | 11 | 129 | 1597 | 8.08 | 92. | 4. | 2. | 1. | 1. | 45. | 29. | 17. | 9. |
| 72748 J | 1490.00 | 2834 | 39 | 27 | 12 | 6 | 84 | 2918 | 2.88 | 97. | 1. | 1. | 0. | 0. | 46. | 32. | 14. | 7. |
| 72748 L | 1520.00 | 4136 | 126 | 87 | 31 | 19 | 263 | 4399 | 5.98 | 94. | 3. | 2. | 1. | 0. | 48. | 33. | 12. | 7. |
| 72748 N | 1550.00 | 2839 | 132 | 80 | 33 | 18 | 263 | 3102 | 8.49 | 92. | 4. | 3. | 1. | 1. | 50. | 30. | 13. | 7. |
| 72748 P | 1580.00 | 2131 | 165 | 100 | 26 | 21 | 312 | 2443 | 12.77 | 87. | 7. | 4. | 1. | 1. | 53. | 32. | 8. | 7. |
| 72748 R | 1610.00 | 3445 | 422 | 315 | 68 | 88 | 893 | 4338 | 20.59 | 79. | 10. | 7. | 2. | 2. | 47. | 35. | 8. | 10. |
| 72748 T | 1640.00 | 266 | 67 | 65 | 28 | 27 | 187 | 453 | 41.28 | 59. | 15. | 14. | 6. | 6. | 36. | 35. | 15. | 14. |
| 72748 V | 1685.00 | 230 | 51 | 27 | 33 | 13 | 124 | 354 | 35.03 | 65. | 14. | 8. | 9. | 4. | 41. | 22. | 27. | 10. |
| 72748 X | 1715.00 | 15344 | 1602 | 565 | 101 | 69 | 2337 | 17681 | 13.22 | 87. | 9. | 3. | 1. | 0. | 69. | 24. | 4. | 3. |
| 72748 Z | 1745.00 | 40368 | 5069 | 484 | 69 | 23 | 5645 | 46013 | 12.27 | 88. | 11. | 1. | 0. | 0. | 90. | 9. | 1. | 0. |
| 72749 B | 1775.00 | 15017 | 1603 | 126 | 18 | 4 | 1751 | 16768 | 10.44 | 90. | 10. | 1. | 0. | 0. | 92. | 7. | 1. | 0. |
| 72749 D | 1805.00 | 39028 | 2676 | 408 | 64 | 22 | 3170 | 42198 | 7.51 | 92. | 6. | 1. | 0. | 0. | 84. | 13. | 2. | 1. |
| 72749 F | 1835.00 | 36182 | 2440 | 333 | 52 | 15 | 2840 | 39022 | 7.28 | 93. | 6. | 1. | 0. | 0. | 86. | 12. | 2. | 1. |
| 72749 H | 1865.00 | 48100 | 4145 | 529 | 71 | 30 | 4775 | 52875 | 9.03 | 91. | 8. | 1. | 0. | 0. | 87. | 11. | 1. | 1. |
| 72749 J | 1895.00 | 26784 | 3550 | 985 | 181 | 111 | 4827 | 31611 | 15.27 | 85. | 11. | 3. | 1. | 0. | 74. | 20. | 4. | 2. |
| 72749 L | 1925.00 | 23409 | 5329 | 2457 | 371 | 433 | 8590 | 31999 | 26.84 | 73. | 17. | 8. | 1. | 1. | 62. | 29. | 4. | 5. |
| 72749 N | 1955.00 | 135933 | 29340 | 9501 | 1126 | 1105 | 41072 | 177005 | 23.20 | 77. | 17. | 5. | 1. | 1. | 71. | 23. | 3. | 3. |
| 72749 P | 1985.00 | 33226 | 4850 | 1484 | 176 | 193 | 6703 | 39929 | 16.79 | 83. | 12. | 4. | 0. | 0. | 72. | 22. | 3. | 3. |
| 72749 R | 2015.00 | 9705 | 1518 | 571 | 87 | 100 | 2276 | 11981 | 19.00 | 81. | 13. | 5. | 1. | 1. | 67. | 25. | 4. | 4. |
| 72749 T | 2045.00 | 6447 | 1148 | 378 | 54 | 48 | 1628 | 8075 | 20.16 | 80. | 14. | 5. | 1. | 1. | 71. | 23. | 3. | 3. |
| 72749 V | 2075.00 | 9592 | 1273 | 202 | 24 | 12 | 1511 | 11103 | 13.61 | 86. | 11. | 2. | 0. | 0. | 84. | 13. | 2. | 1. |
| 72749 X | 2105.00 | 25615 | 3632 | 951 | 108 | 111 | 4802 | 30417 | 15.79 | 84. | 12. | 3. | 0. | 0. | 76. | 20. | 2. | 2. |
| 72749 Z | 2135.00 | 7554 | 1825 | 572 | 69 | 66 | 2532 | 10086 | 25.10 | 75. | 18. | 6. | 1. | 1. | 72. | 23. | 3. | 3. |
| 72750 B | 2165.00 | 6942 | 1344 | 395 | 50 | 50 | 1839 | 8781 | 20.94 | 79. | 15. | 4. | 1. | 1. | 73. | 21. | 3. | 3. |
| 72750 D | 2195.00 | 10282 | 2194 | 960 | 101 | 83 | 3338 | 13620 | 24.51 | 75. | 16. | 7. | 1. | 1. | 66. | 29. | 3. | 2. |
| 72750 F | 2225.00 | 87720 | 8246 | 1380 | 125 | 76 | 9827 | 97547 | 10.07 | 90. | 8. | 1. | 0. | 0. | 84. | 14. | 1. | 1. |
| 72750 H | 2255.00 | 22954 | 2582 | 732 | 95 | 65 | 3474 | 26428 | 13.15 | 87. | 10. | 3. | 0. | 0. | 74. | 21. | 3. | 2. |
| 72750 J | 2285.00 | 8771 | 1412 | 498 | 81 | 59 | 2050 | 10821 | 18.94 | 81. | 13. | 5. | 1. | 1. | 69. | 24. | 4. | 3. |
| 72750 L | 2315.00 | 6680 | 1776 | 754 | 146 | 90 | 2766 | 9446 | 29.28 | 71. | 19. | 8. | 2. | 1. | 64. | 27. | 5. | 3. |
| 72750 N | 2345.00 | 3773 | 496 | 153 | 26 | 18 | 693 | 4466 | 15.52 | 84. | 11. | 3. | 1. | 0. | 72. | 22. | 4. | 3. |
| 72750 P | 2375.00 | 830 | 143 | 69 | 22 | 13 | 247 | 1077 | 22.93 | 77. | 13. | 6. | 2. | 1. | 58. | 28. | 9. | 5. |
| 72750 R | 2405.00 | 10225 | 2699 | 1069 | 167 | 196 | 4131 | 14356 | 28.78 | 71. | 19. | 7. | 1. | 1. | 65. | 26. | 4. | 5. |
| 72750 T | 2435.00 | 7133 | 2069 | 997 | 212 | 157 | 3435 | 10568 | 32.50 | 67. | 20. | 9. | 2. | 1. | 60. | 29. | 6. | 5. |
| 72750 V | 2465.00 | 12577 | 2405 | 1089 | 201 | 163 | 3858 | 16435 | 23.47 | 77. | 15. | 7. | 1. | 1. | 62. | 28. | 5. | 4. |
| 72750 X | 2495.00 | 3352 | 968 | 563 | 139 | 120 | 1790 | 5142 | 34.81 | 65. | 19. | 11. | 3. | 2. | 54. | 31. | 8. | 7. |
| 72750 Z | 2525.00 | 4542 | 1130 | 638 | 164 | 162 | 2094 | 6636 | 31.56 | 68. | 17. | 10. | 2. | 2. | 54. | 30. | 8. | 8. |
| 72751 B | 2555.00 | 2884 | 1006 | 409 | 295 | 145 | 1855 | 4739 | 39.14 | 61. | 21. | 9. | 6. | 3. | 54. | 22. | 16. | 8. |
| 72751 D | 2585.00 | 9157 | 872 | 227 | 31 | 32 | 1162 | 10319 | 11.26 | 89. | 8. | 2. | 0. | 0. | 75. | 20. | 3. | 3. |
| 72751 F | 2615.00 | 10038 | 1479 | 556 | 85 | 88 | 2208 | 12246 | 18.03 | 82. | 12. | 5. | 1. | 1. | 67. | 25. | 4. | 4. |
| 72751 H | 2645.00 | 396 | 160 | 73 | 14 | 14 | 261 | 657 | 39.73 | 60. | 24. | 11. | 2. | 2. | 61. | 28. | 5. | 5. |

04/05/84 ESSO AUSTRALIA LTD. Table 2 PAGE

## TOTAL ORGANIC CARBON REPORT

BASIN - GIPPSLAND
WELL - SUNFISH 2

| SAMPLE NO. | DEPTH | AGE | FORMATION | AN | TOC% | AN | TOC% | AN | T/CO3 | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|
| 72739 Q | 1039.10 | MID-LATE MIOCENE | GIPPSLAND LIMESTONE | 1 | .56 | | | 1 | 31.84 | OLIVE GRY CLYST.V CALC. |
| 72739 M | 1118.30 | MID-LATE MIOCENE | GIPPSLAND LIMESTONE | 1 | .54 | | | 1 | 57.32 | MED DK/LT OL GRY SLTST. |
| 72737 W | 1160.70 | MID-LATE MIOCENE | GIPPSLAND LIMESTONE | 1 | .51 | | | 1 | 46.89 | OLIVE GRY SLTST.V CALC. |
| 72737 V | 1180.60 | MID-LATE MIOCENE | GIPPSLAND LIMESTONE | 1 | .52 | | | 1 | 49.40 | OLIVE GRY SLTST.V CALC. |
| 72737 S | 1234.00 | MID-LATE MIOCENE | GIPPSLAND LIMESTONE | 1 | .54 | | | 1 | 44.02 | OLIVE GRY SLTST.V CALC. |
| 72737 P | 1283.00 | MID-LATE MIOCENE | GIPPSLAND LIMESTONE | 1 | .45 | | | 1 | 38.28 | MED DK GRY SLTST.V CALC. |
| 72737 N | 1314.90 | MID-LATE MIOCENE | GIPPSLAND LIMESTONE | 1 | .53 | | | 1 | 45.61 | MED DK GRY SLTST.V CALC. |
| 72737 L | 1345.10 | MID-LATE MIOCENE | GIPPSLAND LIMESTONE | 1 | .58 | | | 1 | 43.69 | MED DK GRY SLTST.V CALC. |
| 72737 J | 1396.90 | MID-LATE MIOCENE | GIPPSLAND LIMESTONE | 1 | .64 | | | 1 | 37.35 | M.OL.GY SLTY CLYST;V CAL |
| 72739 K | 1425.20 | MID-LATE MIOCENE | GIPPSLAND LIMESTONE | 1 | .44 | | | 1 | 48.32 | MED DK GY SLTY SH.V CALC |
| ===> DEPTH : .00 TO 1457.50 METRES. <=== I ===> AVERAGE TOC : .53 % EXCLUDING VALUES GREATER THAN 10.00 % <=== | | | | | | | | | | |
| 72748 K | 1505.00 | EARLY-MID MIOCENE | LAKES ENTRANCE | 2 | .42 | | | | | LT OL GY-MED GRN GY SH. |
| 72738 P | 1514.50 | EARLY-MID MIOCENE | LAKES ENTRANCE | 1 | .40 | | | 1 | 49.17 | OLIVE GRY SLTST.V CALC. |
| 72748 M | 1535.00 | EARLY-MID MIOCENE | LAKES ENTRANCE | 2 | .37 | | | | | GRN-GY CLAYSTONE,V.CALC. |
| 72738 N | 1550.40 | EARLY-MID MIOCENE | LAKES ENTRANCE | 1 | .38 | | | 1 | 37.28 | MED DK GRY SLTST.V CALC. |
| 72748 O | 1565.00 | EARLY-MID MIOCENE | LAKES ENTEANCE | 2 | .42 | | | | | GRN-GY CLAYSTONE,CALC. |
| 72738 L | 1568.70 | EARLY-MID MIOCENE | LAKES ENTRANCE | 1 | .28 | | | 1 | 61.11 | OLIVE GRY SLTST.V CALC. |
| 72738 J | 1590.00 | EARLY-MID MIOCENE | LAKES ENTRANCE | 1 | .36 | | | 1 | 38.33 | MED DK GRY SLTST.V CALC. |
| 72748 Q | 1595.00 | EARLY-MID MIOCENE | LAKES ENTRANCE | 2 | .43 | | | | | GRN-GY CLAYSTONE |
| 72738 H | 1602.70 | EARLY-MID MIOCENE | LAKES ENTRANCE | 1 | .51 | | | 1 | 30.97 | OLIVE GRY SLTST.V CALC. |
| 72738 D | 1613.90 | EARLY-MID MIOCENE | LAKES ENTRANCE | 1 | .65 | | | 1 | 10.27 | MED DK GRY SLTST.V CALC. |
| ===> DEPTH : 1457.50 TO 1615.00 METRES. <=== I ===> AVERAGE TOC : .42 % EXCLUDING VALUES GREATER THAN 10.00 % <=== | | | | | | | | | | |
| 72748 S | 1625.00 | EARLY MIOCENE-EOCENE | LAKES ENTRANCE/LATROBE GP | 2 | .43 | | | | | GRN-GY CLAYST.+SH,CALC. |
| ===> DEPTH : 1615.00 TO 1625.00 METRES. <=== I ===> AVERAGE TOC : .43 % EXCLUDING VALUES GREATER THAN 10.00 % <=== | | | | | | | | | | |
| 72748 U | 1655.00 | EOCENE | LATROBE GROUP | 2 | .46 | | | | | GRN-GY CLAYST.+SH ,CALC. |
| 72748 Y | 1730.00 | EOCENE | LATROBE GROUP | 2 | 44.50 | | | | | COAL |
| 72749 A | 1760.00 | EOCENE | LATROBE GROUP | 2 | .42 | | | | | MED.LT GY-GRN GY SH.CALC |
| 72749 C | 1790.00 | EOCENE | LATROBE GROUP | 2 | .46 | | | | | MED.LT GY-GRN GY SH.CALC |
| 72749 E | 1820.00 | EOCENE | LATROBE GROUP | 2 | 53.80 | | | | | COAL |
| 72738 Y | 1838.40 | PALEOCENE | LATROBE GROUP | 1 | 2.76 | | | 1 | 3.52 | DK GRY SLTST. N CALC. |
| 72749 G | 1850.00 | PALEOCENE | LATROBE GROUP | 2 | .59 | | | | | MED.GRN GY CLAYST.+SH. |
| 72738 W | 1867.50 | PALEOCENE | LATROBE GROUP | 1 | 2.40 | | | | | DK-MED DK GRY SLTST.CALC |
| 72749 I | 1880.00 | PALEOCENE | LATROBE GROUP | 2 | .52 | | | | | MED.GRN GY-LT OL GY SH. |
| 72738 U | 1898.10 | PALEOCENE | LATROBE GROUP | 1 | 2.94 | | | | | DK GRY SLTST.MICA.N CALC |
| 72749 K | 1910.00 | PALEOCENE | LATROBE GROUP | 2 | .46 | | | | | |

# TOTAL ORGANIC CARBON REPORT

BASIN - GIPPSLAND
WELL - SUNFISH 2

| SAMPLE NO. | DEPTH | AGE | FORMATION | AN | TOC% | AN | TOC% | AN | T/CO3 | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|
| 72738 T | 1915.00 | PALEOCENE | LATROBE GROUP | 1 | 2.64 | | | | | OLIVE GRY SLTST.N CALC. |
| 72738 S | 1934.00 | PALEOCENE | LATROBE GROUP | 1 | 2.24 | | | | | DK GRY SLTST. N CALC. |
| 72749 M | 1940.00 | PALEOCENE | LATROBE GROUP | 2 | 50.60 | | | | | COAL |
| 72737 I | 1943.30 | PALEOCENE | LATROBE GROUP | 1 | 1.85 | | | 1 | 3.69 | OL GY CARB SLTST..N CALC |
| 72749 O | 1970.00 | PALEOCENE | LATROBE GROUP | 2 | .67 | | | | | MED.GY-GRN GY SH,CALC. |
| 72737 G | 1978.00 | PALEOCENE | LATROBE GROUP | 1 | 1.47 | | | 1 | 1.47 | MED DK GRY SHALE.N CALC. |
| 72738 Q | 1999.70 | PALEOCENE | LATROBE GROUP | 1 | .38 | | | | | OLIVE GRY SLTST.V CALC. |
| 72749 N | 2000.00 | PALEOCENE | LATROBE GROUP | 2 | .36 | | | | | MED.GY SL.CALC.SHALE |
| 72749 S | 2030.00 | PALEOCENE | LATROBE GROUP | 2 | .45 | | | | | GRN GY-MED GRN GY SHALE |
| 72737 B | 2057.80 | PALEOCENE | LATROBE GROUP | 1 | 1.65 | | | 1 | 3.80 | MED LT GRY CARB SLTST.NC |
| 72749 U | 2060.00 | PALEOCENE | LATROBE GROUP | 2 | .37 | | | | | MED.LT GY-LT GY SH.CALC. |
| 72736 Z | 2073.00 | PALEOCENE | LATROBE GROUP | 1 | 2.76 | | | 1 | 1.52 | DK GRY SLTST.CARB.N CALC |
| 72749 W | 2090.00 | PALEOCENE | LATROBE GROUP | 2 | 37.40 | | | | | COAL |
| 72736 X | 2102.70 | LATE CRETACEOUS | LATROBE GROUP | 1 | 5.88 | | | 1 | 1.81 | DK GRY SLTST.COALY LAMIN |
| 72749 Y | 2120.00 | LATE CRETACEOUS | LATROBE GROUP | 2 | 3.70 | | | | | MED DK GY SST.+SLST. |
| 72736 V | 2135.10 | LATE CRETACEOUS | LATROBE GROUP | 1 | 2.99 | | | 1 | 1.45 | DK GRY SLST.SL COALY.NC. |
| 72750 A | 2150.00 | LATE CRETACEOUS | LATROBE GROUP | 2 | .78 | | | | | MED.LT GY-LT GY SST+SLST |
| 72736 U | 2150.20 | LATE CRETACEOUS | LATROBE GROUP | 1 | 2.04 | | | 1 | 3.02 | MED GRY SLTST. N CALC. |
| 72750 C | 2180.00 | LATE CRETACEOUS | LATROBE GROUP | 2 | .71 | | | | | SST+SLTST,POORLY SORTED |
| 72736 S | 2195.20 | LATE CRETACEOUS | LATROBE GROUP | 1 | .59 | | | 1 | 1.44 | DK GRY SLTST. N CALC. |
| 72750 E | 2210.00 | LATE CRETACEOUS | LATROBE GROUP | 2 | .61 | | | | | GRN GY-MED GRN GY SHALE |
| 72736 Q | 2224.80 | LATE CRETACEOUS | LATROBE GROUP | 1 | 2.78 | | | 1 | 2.58 | DK GY SLST/LT GY SDYSLST |
| 72750 G | 2240.00 | LATE CRETACEOUS | LATROBE GROUP | 2 | 1.53 | | | | | MED.LT GY SH+COAL DEBRIS |
| 72736 O | 2254.60 | LATE CRETACEOUS | LATROBE GROUP | 1 | 2.55 | | | 1 | 3.15 | MED DK GRY SLTST.N CALC. |
| 72736 N | 2268.10 | LATE CRETACEOUS | LATROBE GROUP | 1 | 3.26 | | | 1 | 1.91 | OL GY SLTST.COALY SPECKS |
| 72750 I | 2270.00 | LATE CRETACEOUS | LATROBE GROUP | 2 | .76 | | | | | MED GRN GY SHALE,CALC. |
| 72736 L | 2284.90 | LATE CRETACEOUS | LATROBE GROUP | 1 | 4.17 | | | 1 | 1.91 | DK GRY SLTST.COAL LAMIN. |
| 72750 K | 2300.00 | LATE CRETACEOUS | LATROBE GROUP | 2 | 1.44 | | | | | MED.GRN GY SHALE,CALC. |
| 72750 M | 2330.00 | LATE CRETACEOUS | LATROBE GROUP | 2 | .81 | | | | | MED.DK GY-MED.LT GY SH. |
| 72750 O | 2360.00 | LATE CRETACEOUS | LATROBE GROUP | 2 | .46 | | | | | GRN GY-MED GRN GY SH,CO3 |
| 72750 Q | 2390.00 | LATE CRETACEOUS | LATROBE GROUP | 2 | .09 | | | | | MED DK GY SILTSTONE |
| 72736 D | 2414.70 | LATE CRETACEOUS | LATROBE GROUP | 1 | 1.15 | | | 1 | 1.68 | OLIVE GREY SLTST. N CALC |
| 72750 S | 2420.00 | LATE CRETACEOUS | LATROBE GROUP | 2 | .54 | | | | | MED.GY-MED.GRN GY SH,CO3 |
| 72736 B | 2437.00 | LATE CRETACEOUS | LATROBE GROUP | 1 | .74 | | | 1 | .82 | MED DK GRY SLTST. N CALC |
| 72750 U | 2450.00 | LATE CRETACEOUS | LATROBE GROUP | 2 | .35 | | | | | SST,V.LT.GY+DK GY BANDS |
| 72750 W | 2480.00 | LATE CRETACEOUS | LATROBE GROUP | 2 | .87 | | | | | MED.LT GY-GRN GY SH.CALC |
| 72750 Y | 2510.00 | LATE CRETACEOUS | LATROBE GROUP | 2 | .51 | | | | | LT OL GY SHALE+CLAYSTONE |
| 72735 X | 2520.70 | LATE CRETACEOUS | LATROBE GROUP | 1 | .73 | | | 1 | 2.17 | BRN GRY SLTST. N CALC. |
| 72735 T | 2530.80 | LATE CRETACEOUS | LATROBE GROUP | 1 | .44 | | | 1 | 1.07 | OLIVE GREY CLYST. N CALC |
| 72751 A | 2540.00 | LATE CRETACEOUS | LATROBE GROUP | 2 | .30 | | | | | LT-V.LT GYSST+SLTST+CLAY |
| 72735 J | 2564.00 | LATE CRETACEOUS | LATROBE GROUP | 1 | .95 | | | 1 | 1.17 | LY GRY SDY SLTST. N CALC |
| 72751 C | 2570.00 | LATE CRETACEOUS | LATROBE GROUP | 2 | .11 | | | | | LT-V.LT GY SST+SLST+CLAY |
| 72735 I | 2581.50 | LATE CRETACEOUS | LATROBE GROUP | 1 | 2.00 | | | 1 | 1.27 | MED DK GRY SLTST.COALY. |
| 72735 H | 2599.60 | LATE CRETACEOUS | LATROBE GROUP | 1 | 56.23 | | | 1 | .00 | 50% COAL.50% CARB SHALE. |
| 72751 E | 2600.00 | LATE CRETACEOUS | LATROBE GROUP | 2 | .67 | | | | | LT OL GY-MED GRN GY SH. |
| 72735 G | 2611.00 | LATE CRETACEOUS | LATROBE GROUP | 1 | 1.42 | | | 1 | 2.15 | MED DK GRY SDY SLTST.NC. |
| 72735 E | 2621.10 | LATE CRETACEOUS | LATROBE GROUP | 1 | 2.33 | | | 1 | 1.90 | MED DK GRY SDY SLTST.NC. |

## TOTAL ORGANIC CARBON REPORT

BASIN - GIPPSLAND
WELL - SUNFISH 2

| SAMPLE NO. | DEPTH | AGE | FORMATION | AN | TOC% | AN | TOC% | AN | T/CO3 | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|
| 72751 G | 2630.00 | LATE CRETACEOUS | LATROBE GROUP | 2 | .55 | | | | | GRN GY SHALE,MOD CALC. |
| 72735 B | 2636.00 | LATE CRETACEOUS | LATROBE GROUP | 1 | 1.09 | | | 1 | 1.63 | BRN SANDY SLTST. N CALC. |
| 72735 A | 2639.00 | LATE CRETACEOUS | LATROBE GROUP | 1 | 1.19 | | | 1 | 2.19 | LT BRN SDY SLTST.MICA.NC |

===> DEPTH : 1625.00 TO 2639.00 METRES. <=== I ===> AVERAGE TOC : 1.37 % EXCLUDING VALUES GREATER THAN 10.00 % <===

# VITRINITE REFLECTANCE REPORT

BASIN - GIPPSLAND
WELL - SUNFISH 2

| SAMPLE NO. | DEPTH | AGE | FORMATION | AN | MAX. RO | FLUOR. COLOUR | NO.CNTS. | MACERAL TYPE |
|---|---|---|---|---|---|---|---|---|
| 72738 W | 1602.70 | MIOCENE-OLIGOCENE | LAKES ENTRANCE | 5 | .41 | DULL YEL | 8 | V>I>E,DOM RARE-SPARSE |
| 72738 Y | 1838.40 | PALEOCENE | LATROBE GROUP | 5 | .41 | YEL-OR | 20 | V>E>I,DOM ABUNDANT |
| 72736 Z | 2073.00 | PALEOCENE | LATROBE GROUP | 5 | .49 | YEL-OR | 25 | V>E>I,DOM ABUNDANT |
| 72736 K | 2295.10 | LATE CRETACEOUS | LATROBE GROUP | 5 | .55 | YEL-WEAK BRN | 25 | V>E>I,DOM ABUNDANT |
| 72736 A | 2477.70 | LATE CRETACEOUS | LATROBE GROUP | 5 | .40 | YEL-WEAK BRN | 28 | I>V>OR=E,DOM ABUNDANT |
| 72735 H | 2599.60 | LATE CRETACEOUS | LATROBE GROUP | 5 | .60 | YEL-WEAK BRN | 29 | V>E>I,DOM ABUNDANT |
| 72735 A | 2639.00 | LATE CRETACEOUS | LATROBE GROUP | 5 | .67 | OR-DULL OR | 27 | V>I>E,DOM ABUNDANT |

Table 4



# KEROGEN ELEMENTAL ANALYSIS REPORT

BASIN - GIPPSLAND
WELL - SUNFISH 2

| SAMPLE NO. | DEPTH | SAMPLE TYPE | N% | C% | H% | S% | O% | ASH% | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|
| | | | --- ELEMENTAL % (ASH FREE) --- | | | | | | |
| 72738 C | 1615.70 | SWC | 1.11 | 60.59 | 5.16 | .00 | 33.14 | 6.83 | |
| 72738 B | 1618.20 | SWC | 1.22 | 66.79 | 5.49 | .00 | 26.50 | 11.51 | HIGH ASH |
| 72737 Y | 1634.60 | SWC | .90 | 68.15 | 5.62 | .00 | 25.33 | 11.53 | HIGH ASH |
| 72739 G | 1683.80 | SWC | 1.86 | 75.59 | 5.75 | .00 | 16.80 | 3.20 | |
| 72739 E | 1721.20 | SWC | 1.33 | 71.31 | 5.11 | .00 | 22.25 | 3.40 | |
| 72738 Z | 1619.50 | SWC | 1.32 | 68.18 | 4.69 | .00 | 25.80 | 2.38 | |
| 72738 Y | 1636.40 | SWC | 1.61 | 69.51 | 4.76 | .00 | 24.12 | 7.59 | |
| 72738 X | 1653.10 | SWC | 1.32 | 71.15 | 4.84 | .00 | 22.68 | 10.60 | HIGH ASH |
| 72738 W | 1667.50 | SWC | 1.30 | 69.50 | 4.70 | .00 | 24.49 | 4.78 | |
| 72738 V | 1682.90 | SWC | 1.21 | 66.05 | 4.54 | .00 | 28.20 | 9.07 | |
| 72738 U | 1698.10 | SWC | 1.32 | 71.38 | 5.09 | .00 | 22.20 | 8.44 | |
| 72738 T | 1915.00 | SWC | 1.19 | 71.32 | 4.86 | .00 | 22.63 | 7.75 | |
| 72738 S | 1934.00 | SWC | 1.14 | 69.10 | 4.68 | .00 | 25.08 | 6.72 | |
| 72737 I | 1943.30 | SWC | 1.09 | 70.96 | 4.51 | .00 | 23.44 | 7.54 | |
| 72737 G | 1978.00 | SWC | 1.19 | 73.08 | 4.65 | .00 | 21.08 | 10.77 | HIGH ASH |
| 72737 C | 2045.20 | SWC | 1.14 | 79.56 | 4.52 | .00 | 14.78 | 2.76 | |
| 72737 D | 2057.60 | SWC | .94 | 75.97 | 4.37 | .00 | 18.73 | 3.14 | |
| 72736 Z | 2073.00 | SWC | 1.14 | 75.18 | 5.47 | .00 | 18.21 | 2.36 | |
| 72736 Y | 2089.00 | SWC | 1.32 | 73.53 | 4.74 | .00 | 20.40 | 9.32 | |
| 72736 X | 2102.70 | SWC | 1.22 | 73.18 | 4.92 | .00 | 20.69 | 6.41 | |
| 72736 W | 2116.70 | SWC | 1.33 | 76.26 | 3.91 | .00 | 18.49 | 3.91 | |
| 72736 V | 2135.10 | SWC | 1.25 | 78.78 | 6.28 | .00 | 13.69 | 3.94 | |
| 72736 U | 2150.20 | SWC | 1.28 | 79.95 | 3.90 | .00 | 14.87 | 2.87 | |
| 72736 T | 2165.00 | SWC | 1.30 | 78.20 | 3.56 | .00 | 16.94 | 2.89 | |
| 72736 S | 2195.20 | SWC | 1.59 | 75.63 | 4.98 | .00 | 17.80 | 3.80 | |
| 72736 Q | 2224.80 | SWC | 1.29 | 77.67 | 5.05 | .00 | 15.98 | 8.01 | |
| 72736 P | 2241.90 | SWC | 1.31 | 78.95 | 4.72 | .00 | 15.01 | 2.60 | |
| 72736 O | 2254.60 | SWC | 1.52 | 80.79 | 4.84 | .00 | 12.84 | 6.18 | |
| 72736 N | 2268.10 | SWC | 1.43 | 78.27 | 5.41 | .00 | 14.90 | 4.94 | |
| 72736 M | 2269.50 | SWC | 1.42 | 80.27 | 4.09 | .00 | 14.22 | 2.74 | |
| 72736 L | 2284.90 | SWC | 1.20 | 78.03 | 7.07 | .00 | 13.71 | 7.16 | |
| 72736 K | 2295.10 | SWC | 1.05 | 69.74 | 5.67 | .00 | 23.54 | 8.04 | |
| 72736 J | 2296.00 | SWC | 1.41 | 79.30 | 4.79 | .00 | 14.50 | 1.47 | |
| 72736 E | 2393.60 | SWC | 1.42 | 76.79 | 6.02 | .00 | 15.77 | 5.68 | |
| 72736 C | 2412.20 | SWC | .98 | 51.84 | 3.30 | .00 | 43.88 | 5.90 | |
| 72736 B | 2437.00 | SWC | 1.45 | 79.89 | 6.30 | .00 | 12.36 | 6.18 | |
| 72736 A | 2477.70 | SWC | 1.69 | 81.10 | 6.20 | .00 | 11.01 | 4.59 | |
| 72735 V | 2523.10 | SWC | 2.02 | 81.75 | 5.22 | .00 | 11.01 | 4.96 | |
| 72735 Q | 2546.10 | SWC | 1.45 | 79.36 | 5.64 | .00 | 13.55 | 6.74 | |
| 72735 O | 2549.50 | SWC | 1.48 | 80.50 | 5.16 | .00 | 12.85 | 5.01 | |
| 72735 J | 2564.00 | SWC | 1.27 | 74.87 | 4.93 | .00 | 18.93 | 5.93 | |
| 72735 I | 2581.50 | SWC | 1.63 | 82.02 | 6.52 | .00 | 9.83 | 5.56 | |
| 72735 G | 2611.00 | SWC | 1.78 | 82.48 | 5.27 | .00 | 10.47 | 3.23 | |
| 72735 E | 2621.10 | SWC | 2.00 | 80.68 | 5.08 | .00 | 12.23 | 1.59 | |
| 72735 C | 2630.50 | SWC | 1.86 | 81.00 | 5.50 | .00 | 11.65 | 3.05 | |

KEROGEN ELEMENTAL ANALYSIS REPORT

BASIN - GIPPSLAND
WELL - SUNFISH 2

| SAMPLE NO. | DEPTH | SAMPLE TYPE | --- ELEMENTAL % (ASH FREE) --- | | | | | | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|
| | | | N% | C% | H% | S% | O% | ASH% | |
| 72735 B | 2636.00 | SWC | 2.00 | 81.91 | 5.40 | .00 | 10.68 | 1.91 | |
| 72735 A | 2639.00 | SWC | 1.89 | 79.02 | 5.51 | .00 | 13.57 | 2.32 | |

# KEROGEN ELEMENTAL ANALYSIS REPORT

BASIN - GIPPSLAND
WELL - SUNFISH 2

| SAMPLE NO. | DEPTH | SAMPLE TYPE | AGE | FORMATION | ATOMIC RATIOS H/C | ATOMIC RATIOS O/C | ATOMIC RATIOS N/C | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| 72738 C | 1615.70 | SWC | EOCENE | LATROBE GROUP | 1.02 | .41 | .02 | |
| 72738 B | 1618.20 | SWC | EOCENE | LATROBE GROUP | .99 | .30 | .02 | HIGH ASH |
| 72737 Y | 1634.60 | SWC | EOCENE | LATROBE GROUP | .99 | .28 | .01 | HIGH ASH |
| 72739 G | 1683.80 | SWC | EOCENE | LATROBE GROUP | .91 | .17 | .02 | |
| 72739 E | 1721.20 | SWC | EOCENE | LATROBE GROUP | .86 | .23 | .02 | |
| 72738 Z | 1819.50 | SWC | EOCENE | LATROBE GROUP | .83 | .28 | .02 | |
| 72738 Y | 1838.40 | SWC | PALEOCENE | LATROBE GROUP | .82 | .26 | .02 | |
| 72738 X | 1853.10 | SWC | PALEOCENE | LATROBE GROUP | .82 | .24 | .02 | HIGH ASH |
| 72738 W | 1867.50 | SWC | PALEOCENE | LATROBE GROUP | .81 | .26 | .02 | |
| 72738 V | 1882.90 | SWC | PALEOCENE | LATROBE GROUP | .83 | .32 | .02 | |
| 72738 U | 1898.10 | SWC | PALEOCENE | LATROBE GROUP | .86 | .23 | .02 | |
| 72738 T | 1915.00 | SWC | PALEOCENE | LATROBE GROUP | .82 | .24 | .01 | |
| 72738 S | 1934.00 | SWC | PALEOCENE | LATROBE GROUP | .81 | .27 | .01 | |
| 72737 I | 1943.30 | SWC | PALEOCENE | LATROBE GROUP | .76 | .25 | .01 | |
| 72737 G | 1978.00 | SWC | PALEOCENE | LATROBE GROUP | .76 | .22 | .01 | HIGH ASH |
| 72737 C | 2045.20 | SWC | PALEOCENE | LATROBE GROUP | .68 | .14 | .01 | |
| 72737 B | 2057.80 | SWC | PALEOCENE | LATROBE GROUP | .69 | .18 | .01 | |
| 72736 Z | 2073.00 | SWC | PALEOCENE | LATROBE GROUP | .87 | .18 | .01 | |
| 72736 Y | 2089.00 | SWC | LATE CRETACEOUS | LATROBE GROUP | .77 | .21 | .02 | |
| 72736 X | 2102.70 | SWC | LATE CRETACEOUS | LATROBE GROUP | .81 | .21 | .01 | |
| 72736 W | 2116.70 | SWC | LATE CRETACEOUS | LATROBE GROUP | .62 | .18 | .01 | |
| 72736 V | 2135.10 | SWC | LATE CRETACEOUS | LATROBE GROUP | .96 | .13 | .01 | |
| 72736 U | 2150.20 | SWC | LATE CRETACEOUS | LATROBE GROUP | .59 | .14 | .01 | |
| 72736 T | 2165.00 | SWC | LATE CRETACEOUS | LATROBE GROUP | .55 | .16 | .01 | |
| 72736 S | 2195.20 | SWC | LATE CRETACEOUS | LATROBE GROUP | .79 | .18 | .02 | |
| 72736 R | 2224.80 | SWC | LATE CRETACEOUS | LATROBE GROUP | .78 | .15 | .01 | |
| 72736 P | 2241.90 | SWC | LATE CRETACEOUS | LATROBE GROUP | .72 | .14 | .01 | |
| 72736 O | 2254.60 | SWC | LATE CRETACEOUS | LATROBE GROUP | .72 | .12 | .02 | |
| 72736 N | 2268.10 | SWC | LATE CRETACEOUS | LATROBE GROUP | .83 | .14 | .02 | |
| 72736 M | 2269.50 | SWC | LATE CRETACEOUS | LATROBE GROUP | .61 | .13 | .02 | |
| 72736 L | 2284.90 | SWC | LATE CRETACEOUS | LATROBE GROUP | 1.09 | .13 | .01 | |
| 72736 K | 2295.10 | SWC | LATE CRETACEOUS | LATROBE GROUP | .97 | .25 | .01 | |
| 72736 J | 2296.00 | SWC | LATE CRETACEOUS | LATROBE GROUP | .72 | .14 | .02 | |
| 72736 E | 2393.60 | SWC | LATE CRETACEOUS | LATROBE GROUP | .94 | .15 | .02 | |
| 72736 C | 2412.20 | SWC | LATE CRETACEOUS | LATROBE GROUP | .77 | .63 | .02 | |
| 72736 B | 2437.00 | SWC | LATE CRETACEOUS | LATROBE GROUP | .95 | .12 | .02 | |
| 72736 A | 2477.70 | SWC | LATE CRETACEOUS | LATROBE GROUP | .92 | .10 | .02 | |
| 72735 V | 2523.10 | SWC | LATE CRETACEOUS | LATROBE GROUP | .77 | .10 | .02 | |
| 72735 N | 2546.10 | SWC | LATE CRETACEOUS | LATROBE GROUP | .85 | .13 | .02 | |
| 72735 O | 2549.50 | SWC | LATE CRETACEOUS | LATROBE GROUP | .77 | .12 | .02 | |
| 72735 J | 2564.00 | SWC | LATE CRETACEOUS | LATROBE GROUP | .79 | .19 | .01 | |
| 72735 I | 2581.50 | SWC | LATE CRETACEOUS | LATROBE GROUP | .95 | .09 | .02 | |
| 72735 G | 2611.00 | SWC | LATE CRETACEOUS | LATROBE GROUP | .77 | .10 | .02 | |
| 72735 E | 2621.10 | SWC | LATE CRETACEOUS | LATROBE GROUP | .76 | .11 | .02 | |
| 72735 C | 2630.50 | SWC | LATE CRETACEOUS | LATROBE GROUP | .81 | .11 | .02 | |

Table 5 cont



KEROGEN ELEMENTAL ANALYSIS REPORT

BASIN - GIPPSLAND
WELL - SUNFISH 2

| SAMPLE NO. | DEPTH | SAMPLE TYPE | AGE | FORMATION | ATOMIC RATIOS H/C | ATOMIC RATIOS O/C | ATOMIC RATIOS N/C | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| 72735 B | 2636.00 | SWC | LATE CRETACEOUS | LATROBE GROUP | .79 | .10 | .02 | |
| 72735 A | 2639.00 | SWC | LATE CRETACEOUS | LATROBE GROUP | .84 | .13 | .02 | |

ROCK EVAL ANALYSES

BASIN - GIPPSLAND
WELL - SUNFISH 2

REPORT A - SULPHUR & PYROLYZABLE CARBON

| SAMPLE NO. | DEPTH | SAMPLE TYPE | AGE | TMAX | S1 | S2 | S3 | PI | S2/S3 | PC | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 72739 O | 1039.1 | SWC | MID-LATE MIOCENE | 399. | .25 | .30 | .45 | .46 | .67 | .05 | |
| 72739 N | 1118.3 | SWC | MID-LATE MIOCENE | 401. | .18 | .54 | .43 | .25 | 1.27 | .06 | |
| 72737 W | 1160.7 | SWC | MID-LATE MIOCENE | 399. | .19 | .29 | .38 | .40 | .76 | .04 | |
| 72737 V | 1180.6 | SWC | MID-LATE MIOCENE | 399. | .20 | .34 | .43 | .36 | .80 | .04 | |
| 72737 S | 1234.0 | SWC | MID-LATE MIOCENE | 393. | .27 | .36 | .43 | .42 | .86 | .05 | |
| 72737 N | 1314.9 | SWC | MID-LATE MIOCENE | 404. | .13 | .28 | .24 | .31 | 1.16 | .03 | |
| 72737 L | 1345.1 | SWC | MID-LATE MIOCENE | 408. | .06 | .33 | .26 | .14 | 1.28 | .03 | |
| 72737 J | 1396.9 | SWC | MID-LATE MIOCENE | 440. | .00 | .02 | .09 | .00 | .21 | .00 | |
| 72739 K | 1425.2 | SWC | MID-LATE MIOCENE | 407. | .09 | .39 | .23 | .18 | 1.73 | .04 | |
| 72738 P | 1514.5 | SWC | EARLY-MID MIOCENE | 407. | .05 | .18 | .09 | .20 | 1.94 | .02 | |
| 72738 H | 1602.7 | SWC | EARLY-MID MIOCENE | 410. | .12 | .18 | .24 | .40 | .74 | .02 | |
| 72738 D | 1613.9 | SWC | EARLY-MID MIOCENE | 400. | .16 | .36 | .38 | .31 | .95 | .04 | |
| 72738 Y | 1838.4 | SWC | PALEOCENE | 423. | .40 | 1.83 | .67 | .18 | 2.73 | .18 | |
| 72738 W | 1867.5 | SWC | PALEOCENE | 414. | .84 | 3.23 | .75 | .21 | 4.30 | .33 | |
| 72738 U | 1898.1 | SWC | PALEOCENE | 411. | .36 | 4.22 | .81 | .08 | 5.20 | .38 | |
| 72738 T | 1915.0 | SWC | PALEOCENE | 413. | .24 | 2.71 | .76 | .08 | 3.56 | .24 | |
| 72738 S | 1934.0 | SWC | PALEOCENE | 418. | .25 | 1.62 | .93 | .00 | .00 | .00 | |
| 72737 I | 1943.3 | SWC | PALEOCENE | 412. | .30 | 2.05 | .72 | .13 | 2.84 | .20 | |
| 72737 G | 1978.0 | SWC | PALEOCENE | 413. | .32 | 1.38 | .23 | .19 | 6.09 | .14 | |
| 72737 B | 2057.8 | SWC | PALEOCENE | 420. | .50 | 1.18 | .50 | .30 | 2.37 | .14 | |
| 72736 Z | 2073.0 | SWC | PALEOCENE | 427. | .61 | 5.91 | .55 | .09 | 10.71 | .54 | |
| 72736 X | 2102.7 | SWC | LATE CRETACEOUS | 423. | .82 | 13.10 | .74 | .06 | 17.79 | 1.16 | |
| 72736 V | 2135.1 | SWC | LATE CRETACEOUS | 429. | .75 | 8.67 | .46 | .08 | 18.72 | .78 | |
| 72736 U | 2150.2 | SWC | LATE CRETACEOUS | 424. | .82 | 3.04 | .32 | .21 | 9.48 | .32 | |
| 72736 S | 2195.2 | SWC | LATE CRETACEOUS | 430. | .22 | .13 | .34 | .63 | .37 | .03 | |
| 72736 Q | 2224.8 | SWC | LATE CRETACEOUS | 432. | .54 | 3.69 | .44 | .13 | 8.42 | .35 | |
| 72736 O | 2254.6 | SWC | LATE CRETACEOUS | 423. | .66 | 3.82 | .26 | .15 | 14.59 | .37 | |
| 72736 N | 2268.1 | SWC | LATE CRETACEOUS | 427. | .77 | 8.06 | .35 | .09 | 22.83 | .73 | |
| 72736 L | 2284.9 | SWC | LATE CRETACEOUS | 426. | 1.39 | 18.47 | .87 | .07 | 21.16 | 1.65 | |
| 72736 D | 2414.7 | SWC | LATE CRETACEOUS | 425. | .51 | 1.21 | .63 | .30 | 1.92 | .14 | |
| 72736 B | 2437.0 | SWC | LATE CRETACEOUS | 423. | .28 | 1.30 | .26 | .18 | 5.04 | .13 | |
| 72735 X | 2520.7 | SWC | LATE CRETACEOUS | 417. | .26 | .29 | .24 | .47 | 1.20 | .05 | |
| 72735 J | 2564.0 | SWC | LATE CRETACEOUS | 430. | .48 | .75 | .31 | .39 | 2.45 | .10 | |
| 72735 I | 2581.5 | SWC | LATE CRETACEOUS | 436. | 1.11 | 3.70 | .35 | .23 | 10.71 | .40 | |
| 72735 H | 2599.6 | SWC | LATE CRETACEOUS | 424. | 35.92 | 170.68 | 1.79 | .17 | 95.35 | 17.21 | |
| 72735 G | 2611.0 | SWC | LATE CRETACEOUS | 434. | .69 | 1.12 | .23 | .38 | 4.96 | .15 | |
| 72735 E | 2621.1 | SWC | LATE CRETACEOUS | 442. | .95 | 2.90 | .28 | .25 | 10.21 | .32 | |
| 72735 B | 2636.0 | SWC | LATE CRETACEOUS | 432. | .42 | .79 | .20 | .35 | 4.00 | .10 | |
| 72735 A | 2639.0 | SWC | LATE CRETACEOUS | 438. | .54 | 1.17 | .06 | .31 | 20.00 | .14 | |

PI=PRODUCTIVITY INDEX PC=PYROLYZABLE CARBON TC=TOTAL CARBON HI=HYDROGEN INDEX OI=OXYGEN INDEX

## ROCK EVAL ANALYSES

BASIN - GIPPSLAND
WELL - SUNFISH 2

REPORT B - TOTAL CARBON,H/O INDICES

| SAMPLE NO. | DEPTH | SAMPLE TYPE | FORMATION | TC | HI | OI | HI/OI | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| 72739 O | 1039.1 | SWC | GIPPSLAND LIMESTONE | .56 | 54. | 80. | .67 | |
| 72739 N | 1118.3 | SWC | GIPPSLAND LIMESTONE | .54 | 100. | 79. | 1.27 | |
| 72737 W | 1160.7 | SWC | GIPPSLAND LIMESTONE | .51 | 56. | 74. | .76 | |
| 72737 V | 1180.6 | SWC | GIPPSLAND LIMESTONE | .52 | 66. | 83. | .80 | |
| 72737 S | 1234.0 | SWC | GIPPSLAND LIMESTONE | .54 | 67. | 79. | .86 | |
| 72737 N | 1314.9 | SWC | GIPPSLAND LIMESTONE | .53 | 53. | 46. | 1.16 | |
| 72737 L | 1345.1 | SWC | GIPPSLAND LIMESTONE | .58 | 57. | 45. | 1.28 | |
| 72737 J | 1396.9 | SWC | GIPPSLAND LIMESTONE | .64 | 3. | 14. | .21 | |
| 72739 K | 1425.2 | SWC | GIPPSLAND LIMESTONE | .44 | 89. | 52. | 1.73 | |
| 72738 P | 1514.5 | SWC | LAKES ENTRANCE | .40 | 44. | 23. | 1.94 | |
| 72738 H | 1602.7 | SWC | LAKES ENTRANCE | .51 | 35. | 47. | .74 | |
| 72738 D | 1613.9 | SWC | LAKES ENTRANCE | .65 | 55. | 58. | .95 | |
| 72738 Y | 1838.4 | SWC | LATROBE GROUP | 2.76 | 66. | 24. | 2.75 | |
| 72738 W | 1867.5 | SWC | LATROBE GROUP | 2.40 | 134. | 31. | 4.32 | |
| 72738 U | 1898.1 | SWC | LATROBE GROUP | 2.94 | 143. | 27. | 5.30 | |
| 72738 T | 1915.0 | SWC | LATROBE GROUP | 2.64 | 102. | 28. | 3.64 | |
| 72738 S | 1934.0 | SWC | LATROBE GROUP | 2.24 | 0. | 0. | .00 | |
| 72737 I | 1943.3 | SWC | LATROBE GROUP | 1.85 | 111. | 39. | 2.84 | |
| 72737 G | 1978.0 | SWC | LATROBE GROUP | 1.47 | 94. | 15. | 6.09 | |
| 72737 B | 2057.8 | SWC | LATROBE GROUP | 1.65 | 72. | 30. | 2.37 | |
| 72736 Z | 2073.0 | SWC | LATROBE GROUP | 2.76 | 214. | 20. | 10.71 | |
| 72736 X | 2102.7 | SWC | LATROBE GROUP | 5.88 | 223. | 13. | 17.79 | |
| 72736 V | 2135.1 | SWC | LATROBE GROUP | 2.99 | 290. | 15. | 18.72 | |
| 72736 U | 2150.2 | SWC | LATROBE GROUP | 2.04 | 149. | 16. | 9.48 | |
| 72736 S | 2195.2 | SWC | LATROBE GROUP | .59 | 22. | 58. | .37 | |
| 72736 Q | 2224.8 | SWC | LATROBE GROUP | 2.78 | 133. | 16. | 8.42 | |
| 72736 O | 2254.6 | SWC | LATROBE GROUP | 2.55 | 150. | 10. | 14.59 | |
| 72736 N | 2268.1 | SWC | LATROBE GROUP | 3.26 | 247. | 11. | 22.83 | |
| 72736 L | 2284.9 | SWC | LATROBE GROUP | 4.17 | 443. | 21. | 21.16 | |
| 72736 D | 2414.7 | SWC | LATROBE GROUP | 1.15 | 105. | 55. | 1.92 | |
| 72736 B | 2437.0 | SWC | LATROBE GROUP | .74 | 176. | 35. | 5.04 | |
| 72735 X | 2520.7 | SWC | LATROBE GROUP | .73 | 40. | 34. | 1.20 | |
| 72735 J | 2564.0 | SWC | LATROBE GROUP | .95 | 79. | 32. | 2.45 | |
| 72735 I | 2581.5 | SWC | LATROBE GROUP | 2.00 | 185. | 17. | 10.71 | |
| 72735 H | 2599.6 | SWC | LATROBE GROUP | 56.23 | 303. | 3. | 101.00 | |
| 72735 G | 2611.0 | SWC | LATROBE GROUP | 2.33 | 48. | 10. | 4.96 | |
| 72735 E | 2621.1 | SWC | LATROBE GROUP | 2.33 | 125. | 12. | 10.21 | |
| 72735 B | 2636.0 | SWC | LATROBE GROUP | 1.09 | 72. | 18. | 4.00 | |
| 72735 A | 2639.0 | SWC | LATROBE GROUP | 1.19 | 99. | 5. | 20.00 | |

**T.O.C.** = Total organic carbon, wt. %
**S1** = Free hydrocarbons, mg HC/g of rock
**S2** = Residual hydrocarbon potential (mg HC/g of rock)
**S3** = CO2 produced from kerogen pyrolysis (mg CO2/g of rock)
**PC*** = 0.083 $(S_1 + S_2)$
**Hydrogen Index** = mg HC/g organic carbon
**Oxygen Index** = mg CO2/g organic carbon
**PI** = S1/S1+S2
**Tmax** = Temperature Index, degrees C.

PI=PRODUCTIVITY INDEX PC=PYROLYZABLE CARBON TC=TOTAL CARBON HI=HYDROGEN INDEX OI=OXYGEN INDEX

## C15+ EXTRACT ANALYSES

BASIN - GIPPSLAND
WELL - SUNFISH 2

REPORT A - EXTRACT DATA (PPM)

| SAMPLE NO. | DEPTH | TYPE | AN | AGE | TOTAL EXTRACT | HYDROCARBONS SATS. | HYDROCARBONS AROMS. | HYDROCARBONS TOTAL H/CARBS | NON-HYDROCARBONS ASPH. | NON-HYDROCARBONS ELUTED NSO | NON-HYDROCARBONS NON-ELT NSO | NON-HYDROCARBONS TOTAL NSO | SULPHUR | TOTAL NON/HC: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72748 S | 1625.00 | CTS | 2 | EARLY MIOCENE-EOCENE | 235. | 20. | 25. | 45. | 126. | 50. | 1. | 51. | 13. | 190 |
| 72749 K | 1910.00 | CTS | 2 | PALEOCENE | 512. | 27. | 78. | 105. | 288. | 82. | 32. | 114. | 5. | 407 |
| 72749 S | 2030.00 | CTS | 2 | PALEOCENE | 285. | 23. | 27. | 50. | 154. | 45. | 28. | 73. | 8. | 235 |
| 72749 Y | 2120.00 | CTS | 2 | LATE CRETACEOUS | 2842. | 174. | 532. | 706. | 1340. | 520. | 267. | 787. | 9. | 2136 |
| 72750 O | 2360.00 | CTS | 2 | LATE CRETACEOUS | 258. | 0. | 0. | -0. | 163. | 0. | 0. | 0. | 0. | 163 |
| 72751 G | 2630.00 | CTS | 2 | LATE CRETACEOUS | 735. | 67. | 146. | 213. | 375. | 105. | 29. | 134. | 13. | 522 |

## C15+ EXTRACT ANALYSES

BASIN - GIPPSLAND
WELL - SUNFISH 2

REPORT B - EXTRACTS % OF TOTAL

| SAMPLE NO. | DEPTH | FORMATION | HYDROCARBONS SAT. % | HYDROCARBONS AROM.% | NON-HYDROCARBONS NSO. % | NON-HYDROCARBONS ASPH.% | NON-HYDROCARBONS SULPH% | SAT/AR | HC/NHC | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|
| 72748 S | 1625.00 | LAKES ENTRANCE/LATROBE GP | 8.5 | 10.6 | 21.7 | 53.6 | 5.5 | .8 | .2 | IMMATURE,MARINE+TERREST |
| 72749 K | 1910.00 | LATROBE GROUP | 5.3 | 15.2 | 22.3 | 56.3 | 1.0 | .3 | .3 | IMMATURE,TERRESTRIAL |
| 72749 S | 2030.00 | LATROBE GROUP | 8.1 | 9.5 | 25.6 | 54.0 | 2.8 | .9 | .2 | IMMATURE,TERRESTRIAL |
| 72749 Y | 2120.00 | LATROBE GROUP | 6.1 | 18.7 | 27.7 | 47.1 | .3 | .3 | .3 | IMMATURE,TERRESTRIAL |
| 72750 O | 2360.00 | LATROBE GROUP | .0 | .0 | .0 | 63.2 | .0 | .0 | .0 | IMMATURE,TERRESTRIAL |
| 72751 G | 2630.00 | LATROBE GROUP | 9.1 | 19.9 | 18.2 | 51.0 | 1.8 | .5 | .4 | IMMATURE,TERRESTRIAL |

C4-C7 OIL    Table 8    01 NOV 83

77008 AUSTRALIA, SUNFISH-2, RFT 2/40, 1616.8 M.

| | TOTAL PERCENT | NORM PERCENT | | TOTAL PERCENT | NORM PERCENT |
|---|---|---|---|---|---|
| METHANE | 0.000 | | CHEX | 1.054 | 5.14 |
| ETHANE | 0.133 | | 33-DMP | 0.000 | 0.00 |
| PROPANE | 2.143 | | 11-DMCP | 0.096 | 0.47 |
| IBUTANE | 1.286 | 6.27 | 2-MHEX | 0.377 | 1.84 |
| NBUTANE | 3.164 | 15.44 | 23-DMP | 0.132 | 0.64 |
| IPENTANE | 2.014 | 9.83 | 3-MHEX | 0.363 | 1.77 |
| NPENTANE | 2.384 | 11.63 | 1C3-DMCP | 0.216 | 1.06 |
| 22-DMB | 0.053 | 0.26 | 1T3-DMCP | 0.186 | 0.91 |
| CPENTANE | 0.208 | 1.01 | 1T2-DMCP | 0.311 | 1.52 |
| 23-DMB | 0.208 | 1.01 | 3-EPENT | 0.000 | 0.00 |
| 2-MP | 0.958 | 4.68 | 224-TMP | 0.000 | 0.00 |
| 3-MP | 0.505 | 2.46 | NHEPTANE | 1.065 | 5.20 |
| NHEXANE | 1.480 | 7.22 | 1C2-DMCP | 0.035 | 0.17 |
| MCP | 0.870 | 4.24 | MCH | 1.836 | 8.96 |
| 22-DMP | 0.000 | 0.00 | ECP | 0.167 | 0.82 |
| 24-DMP | 0.065 | 0.32 | BENZENE | 0.222 | 1.09 |
| 223-TMB | 0.000 | 0.00 | TOLUENE | 1.239 | 6.05 |

TOTALS

| | |
|---|---|
| ALL COMP | 22.770 |
| GASOLINE | 20.495 |

SIG COMP RATIOS

| | |
|---|---|
| C1/C2 | 2.08 |
| A /D2 | 7.01 |
| D1/D2 | 4.03 |
| C1/D2 | 9.26 |
| PENT/IPENT | 1.18 |
| CH/MCP | 1.21 |

| | |
|---|---|
| PARAFFIN INDEX 1 | 1.038 |
| PARAFFIN INDEX 2 | 18.899 |

INTERPRETER - R.E. METTER
ANALYST - H.M. FRY

## TABLE : 9

LIQUID CHROMATOGRAPHY DATA (INSOLUBLE AND LOSS FREE BASIS)

SUNFISH-2 OIL, RFT 2/10 at 1616.8m(KB)

| | | |
|---|---|---|
| % Saturates | = | 66.5 |
| % Aromatics | = | 8.4 |
| % N.S.O. | = | 2.7 |
| % Non Eluted N.S.O. | = | 21.8 |
| % Asphaltenes | = | 0.6 |

Table 10



## OIL - API GRAVITY,POUR POINT & SULPHUR %

BASIN - GIPPSLAND
WELL - SUNFISH 2

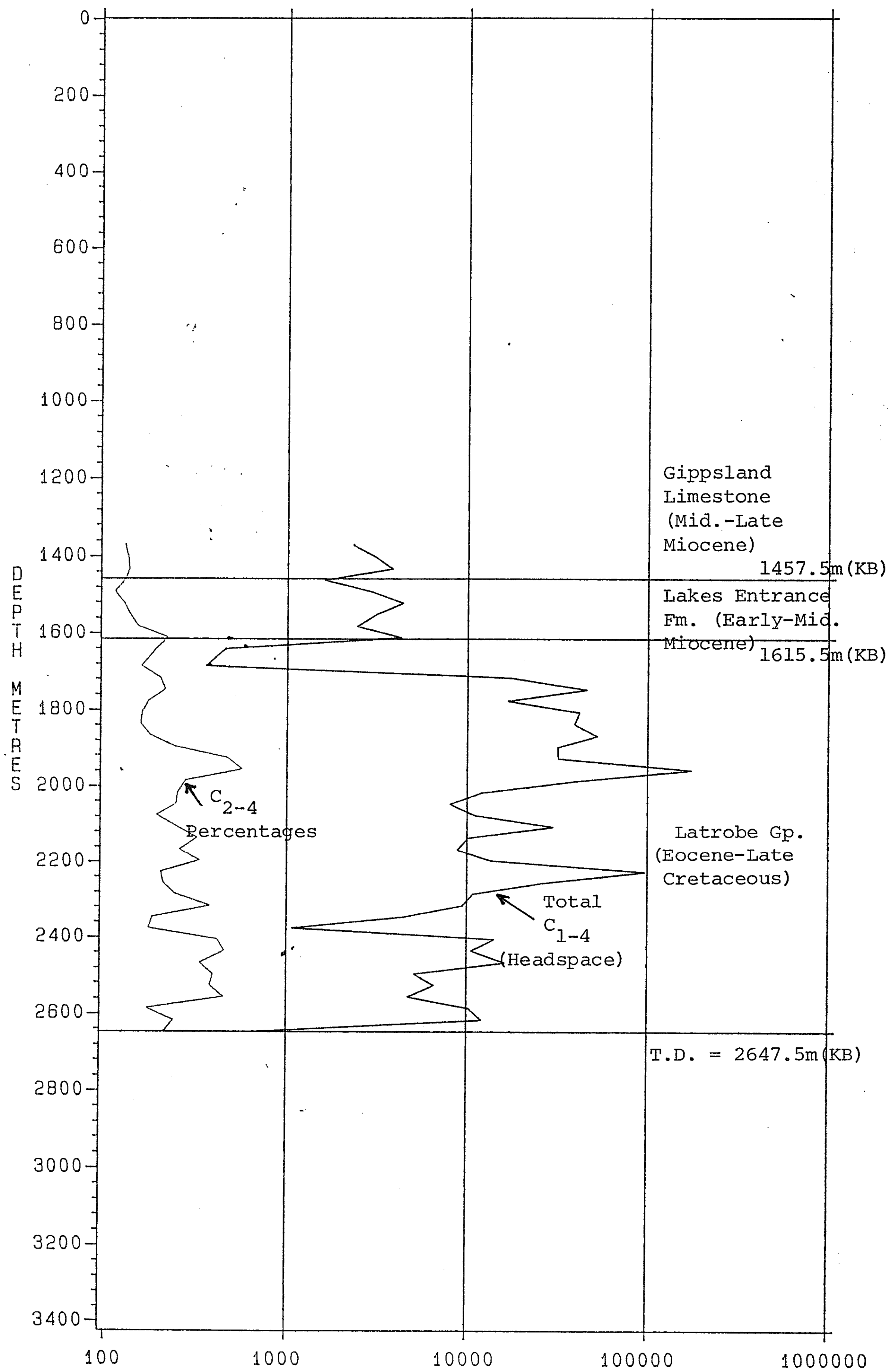
| SAMPLE NO. | DEPTH | AGE | FORMATION | API GRAVITY | POUR PT.(OF) | SULPHUR % | COMMENTS |
|---|---|---|---|---|---|---|---|
| 77008 | 1616.80 | MIOCENE-OLIGOCENE | LATROBE GROUP | 48.00 | .00 | .04 | |

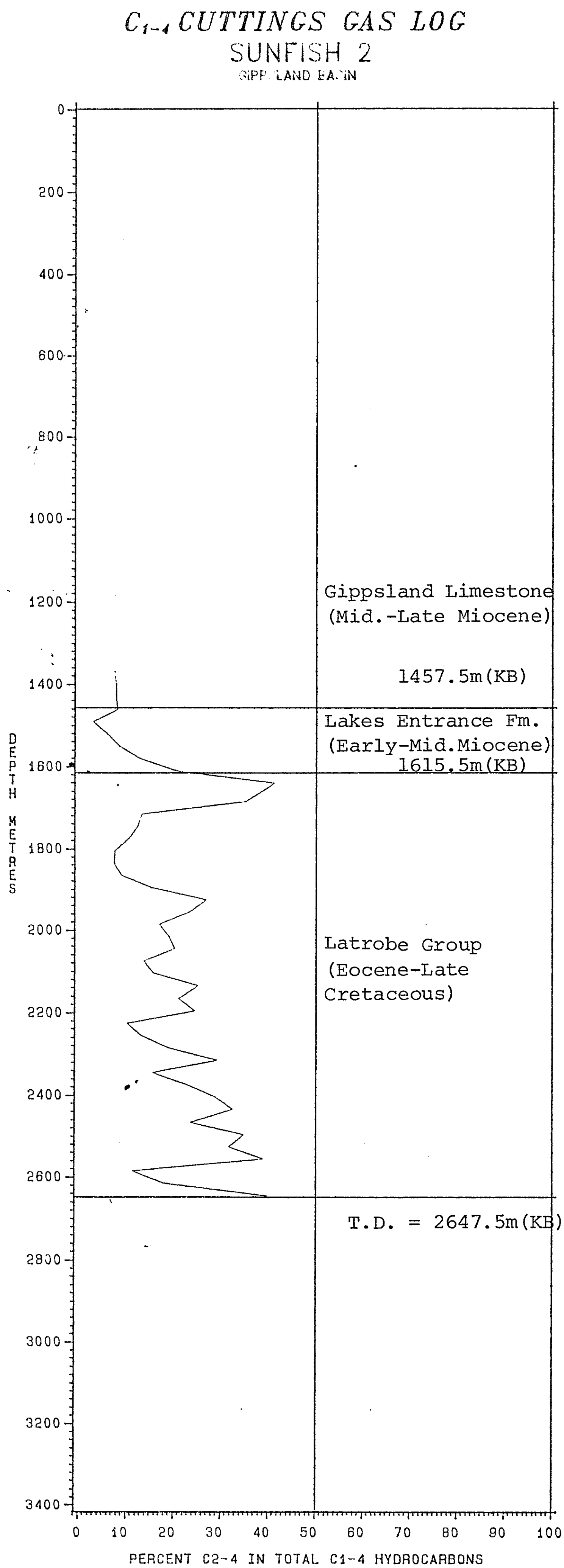
## CARBON ISOTOPES _ (OIL,CONDENSATES,ROCK EXTRACT)

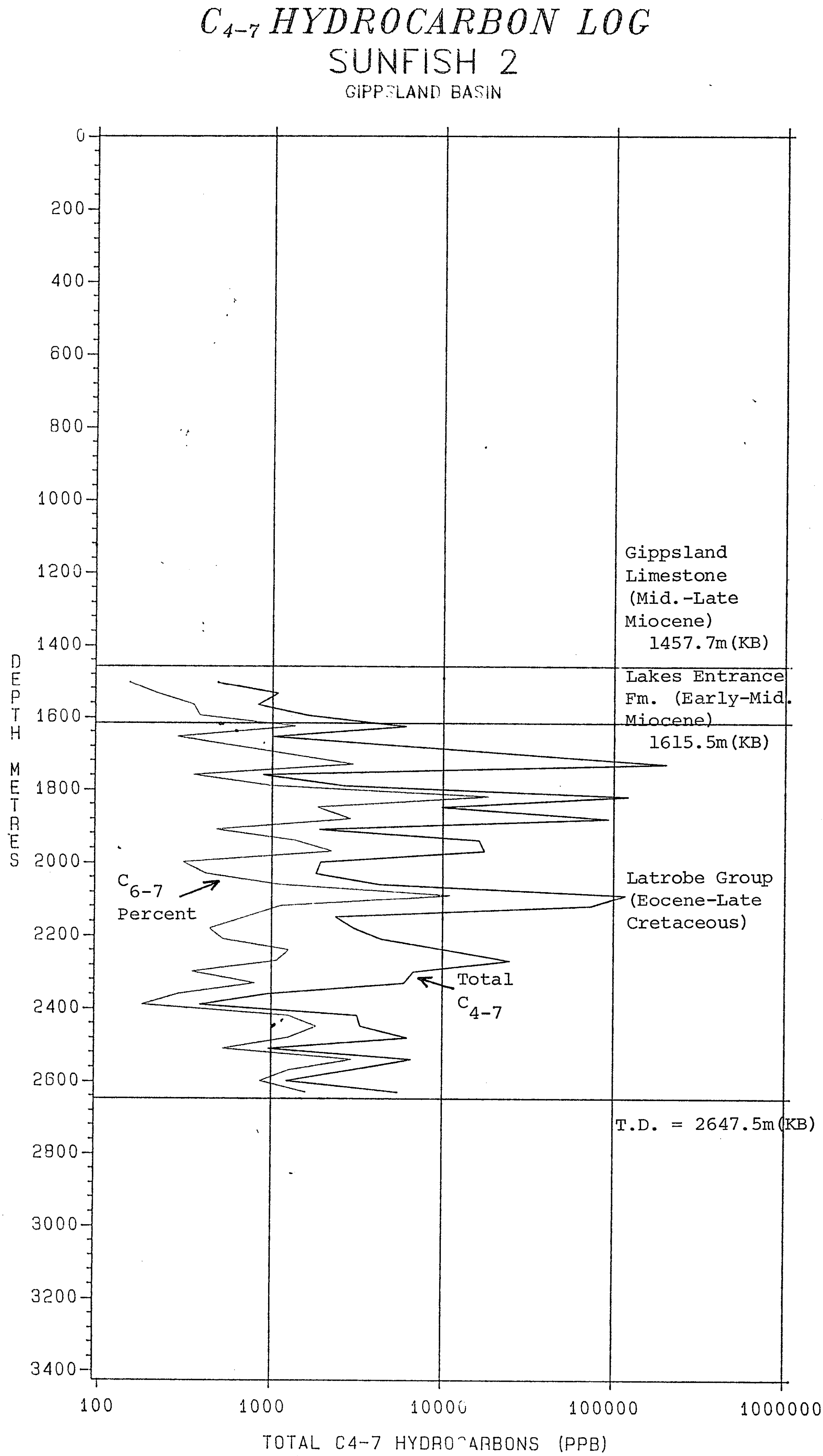
BASIN - GIPPSLAND
WELL - SUNFISH 2

| SAMPLE NO. | DEPTH | SAMPLE TYPE | AGE | FORMATION | ----- PDB &C13 SATS. | 0/00 ----- &C13 AROM. | COMMENTS |
|---|---|---|---|---|---|---|---|
| 77008 | 1616.80 | OIL | MIOCENE-OLIGOCENE | LATROBE GROUP | -26.40 | -25.30 | OIL |

# C1-4 CUTTINGS GAS LOG
## SUNFISH 2
GIPPSLAND BASIN

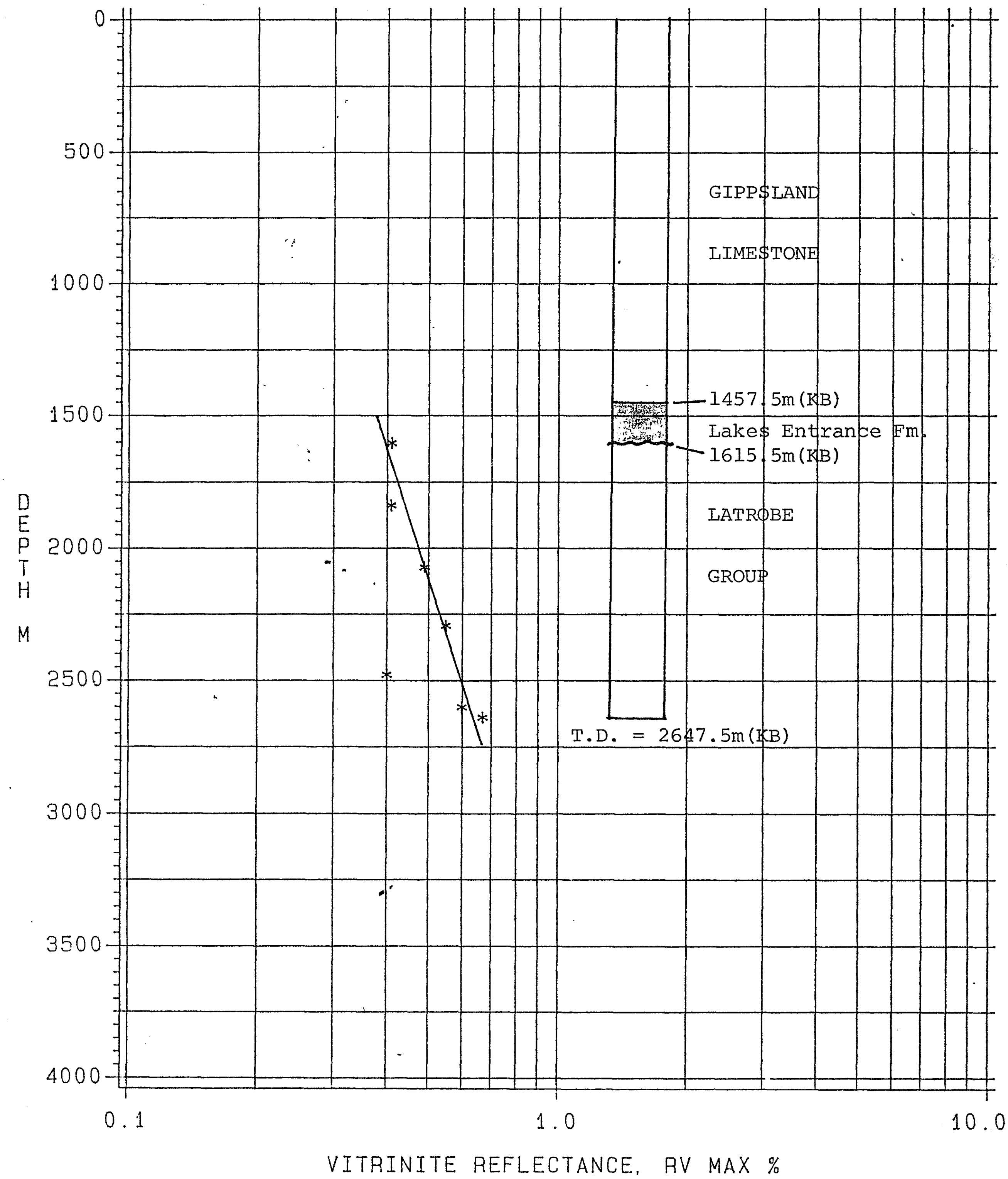


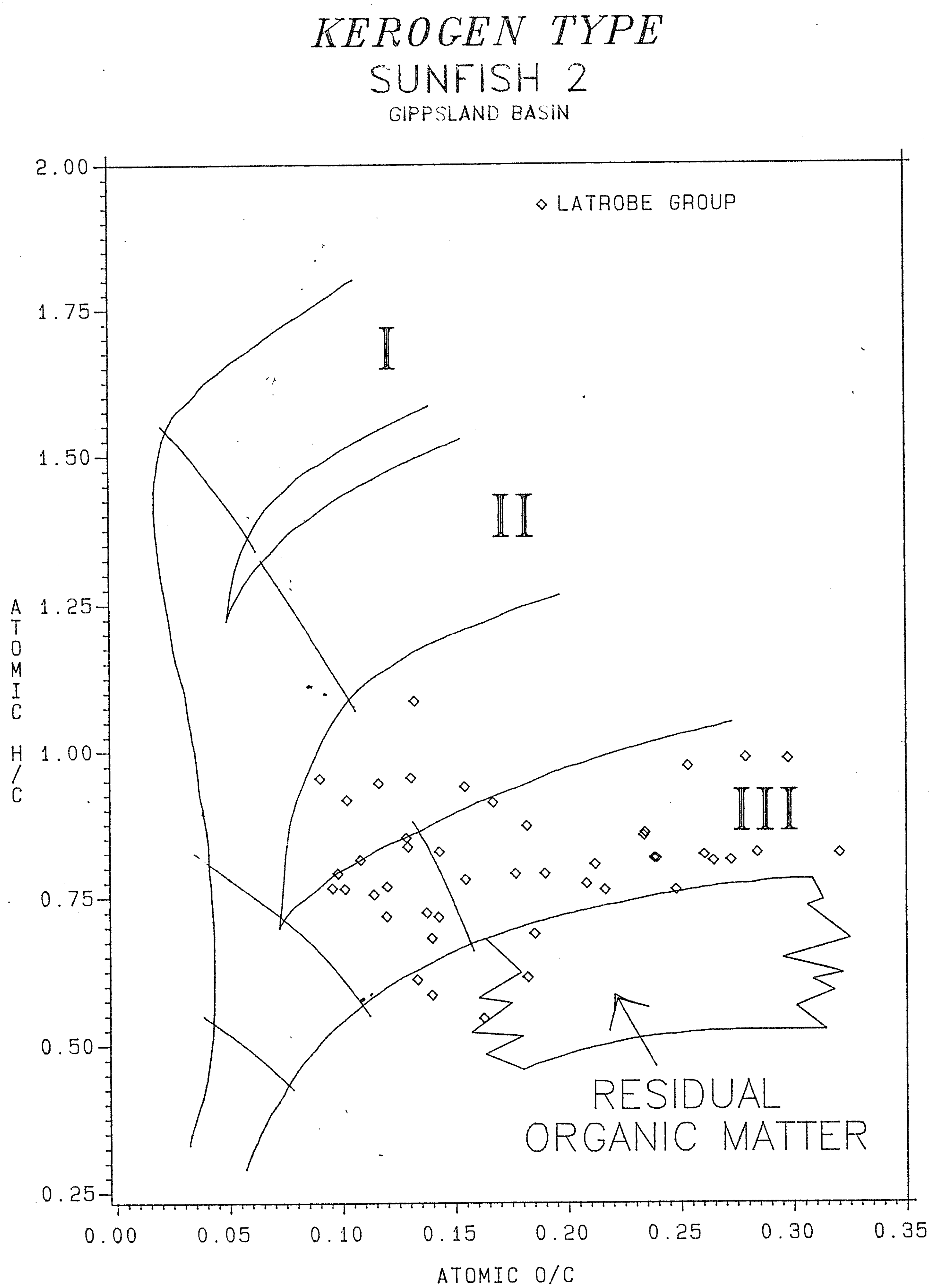

C1-4 CUTTINGS GAS LOG
SUNFISH 2
GIPPSLAND BASIN
DEPTH METRES
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
Gippsland Limestone
(Mid.-Late Miocene)
1457.5m(KB)
Lakes Entrance Fm.
(Early-Mid.Miocene)
1615.5m(KB)
Latrobe Group
(Eocene-Late
Cretaceous)
T.D. = 2647.5m(KB)
0
10
20
30
40
50
60
70
80
90
100
PERCENT C2-4 IN TOTAL C1-4 HYDROCARBONS

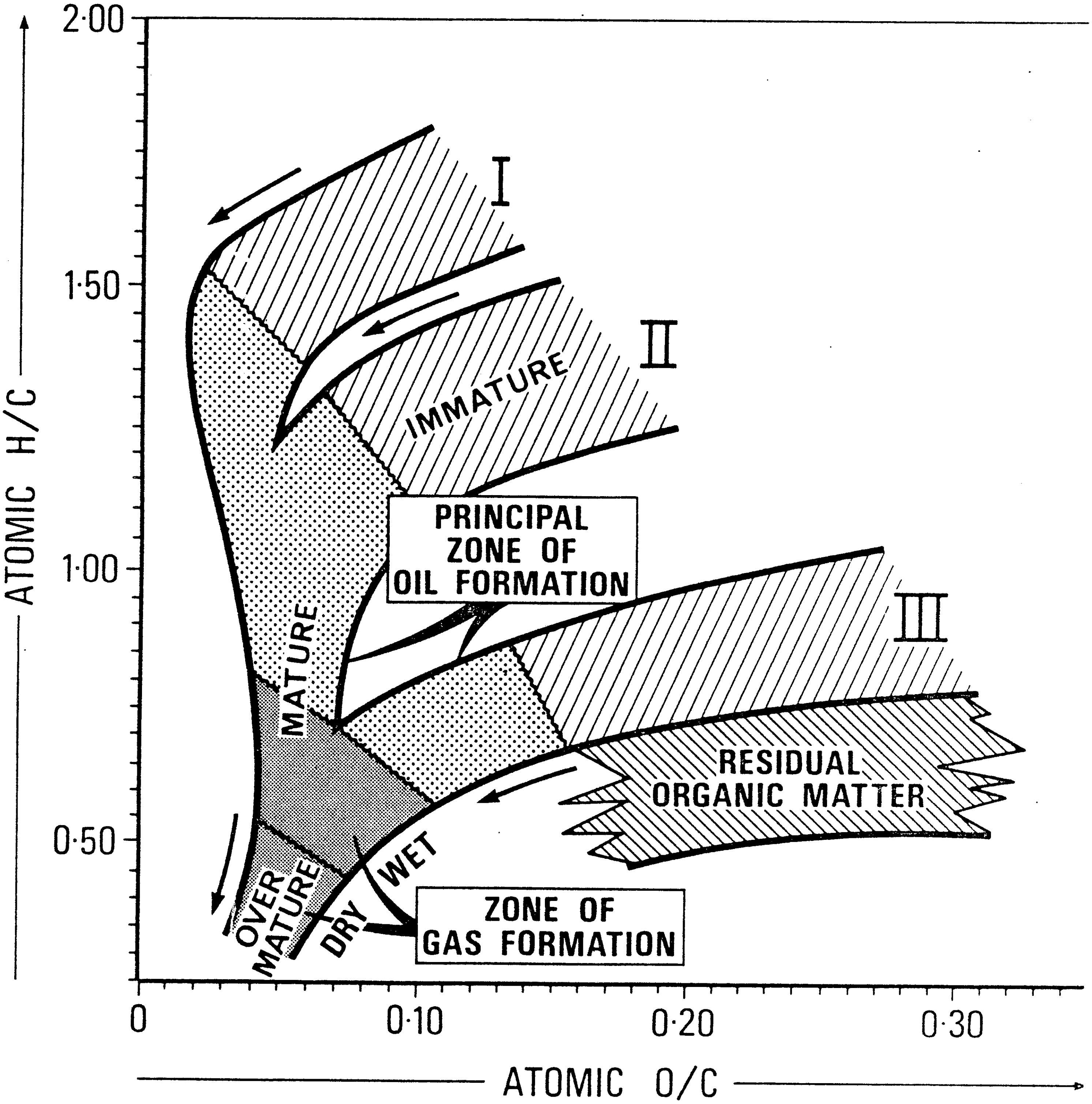


$C_{4-7}$ HYDROCARBON LOG
SUNFISH 2
GIPPSLAND BASIN
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
DEPTH METRES
Gippsland Limestone (Mid.-Late Miocene)
1457.7m(KB)
Lakes Entrance Fm. (Early-Mid. Miocene)
1615.5m(KB)
Latrobe Group (Eocene-Late Cretaceous)
C6-7 Percent
Total C4-7
T.D. = 2647.5m(KB)
100
1000
10000
100000
1000000
TOTAL C4-7 HYDROCARBONS (PPB)

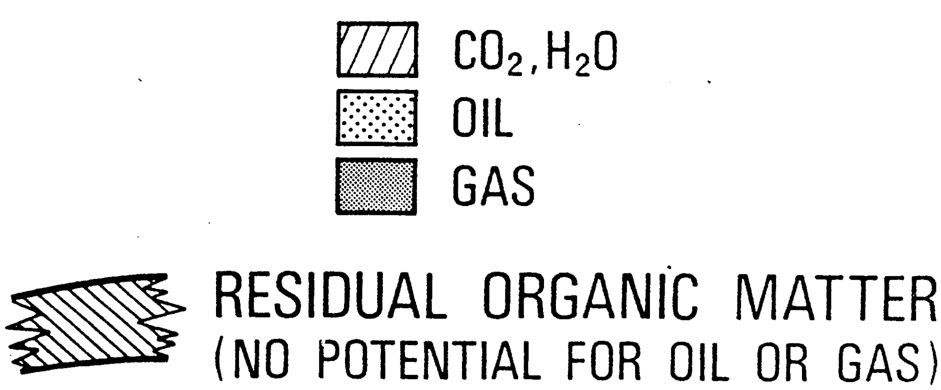
# *VITRINITE REFLECTANCE vs. DEPTH*
## SUNFISH 2
GIPPSLAND BASIN



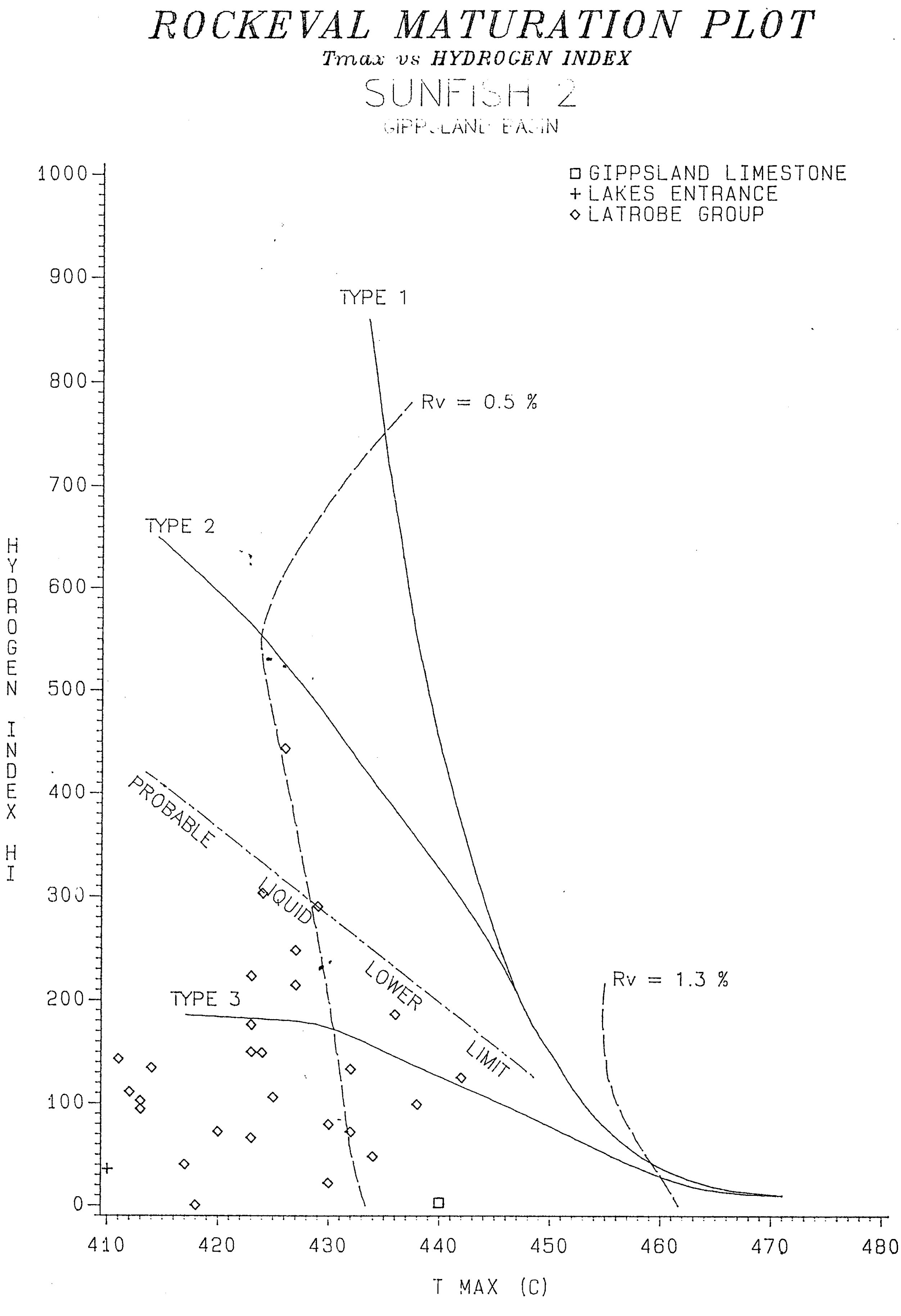

KEROGEN TYPE
SUNFISH 2
GIPPSLAND BASIN
◇ LATROBE GROUP
I
II
III
RESIDUAL ORGANIC MATTER
ATOMIC H/C
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
ATOMIC O/C




PRINCIPAL PRODUCTS OF KEROGEN EVOLUTION




1380/BS/75


ROCKEVAL MATURATION PLOT
Tmax vs HYDROGEN INDEX
SUNFISH 2
GIPPSLAND BASIN
GIPPSLAND LIMESTONE
LAKES ENTRANCE
LATROBE GROUP
TYPE 1
TYPE 2
TYPE 3
Rv = 0.5 %
Rv = 1.3 %
PROBABLE LIQUID LOWER LIMIT
HYDROGEN INDEX HI
T MAX (C)
0
100
200
300
400
500
600
700
800
900
1000
410
420
430
440
450
460
470
480

Rock Extract

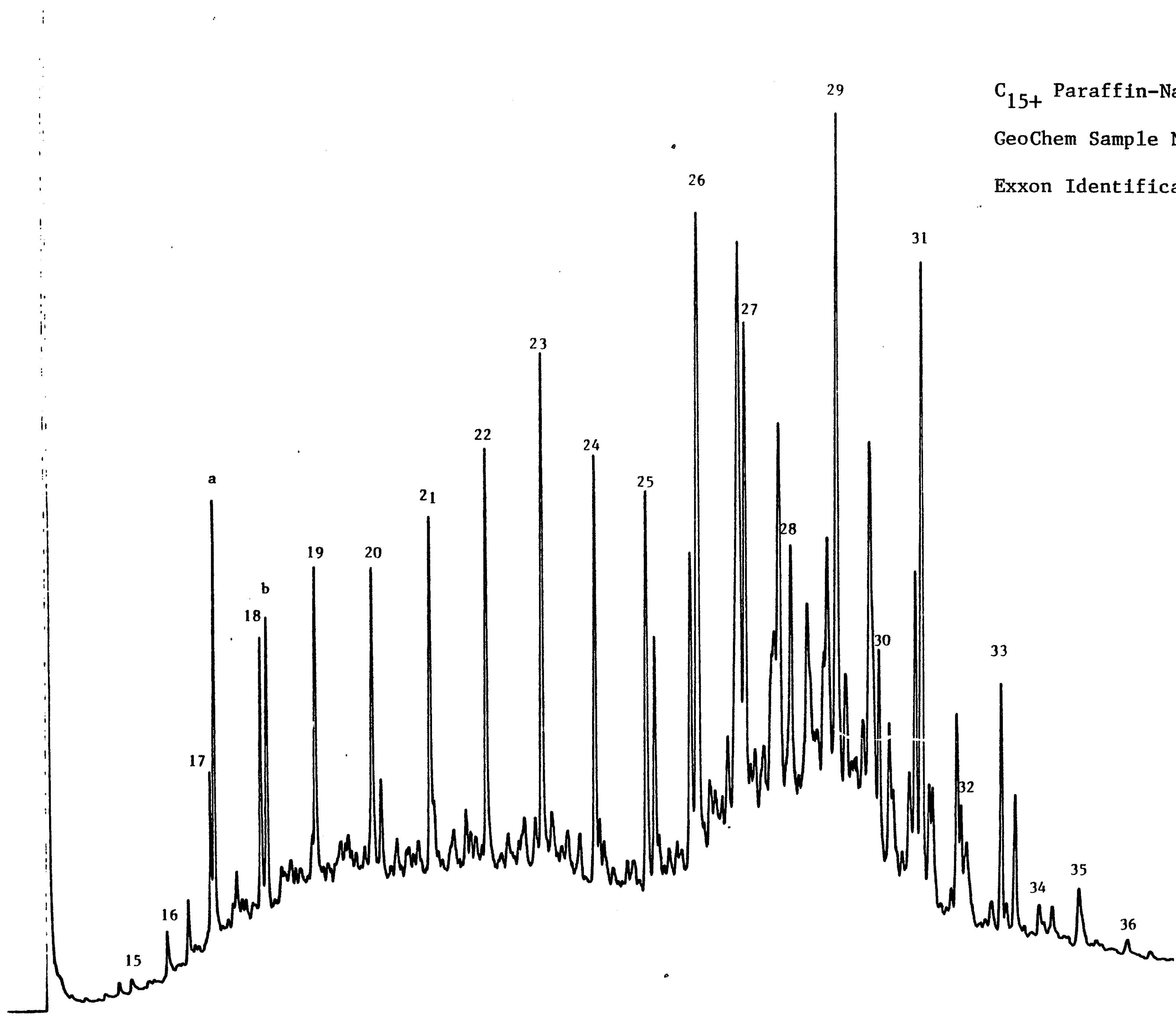



Figure 7, Sunfish-2, Cuttings Extract, 1610-1625m(KB), Lakes Entrance Fm./Latrobe Group

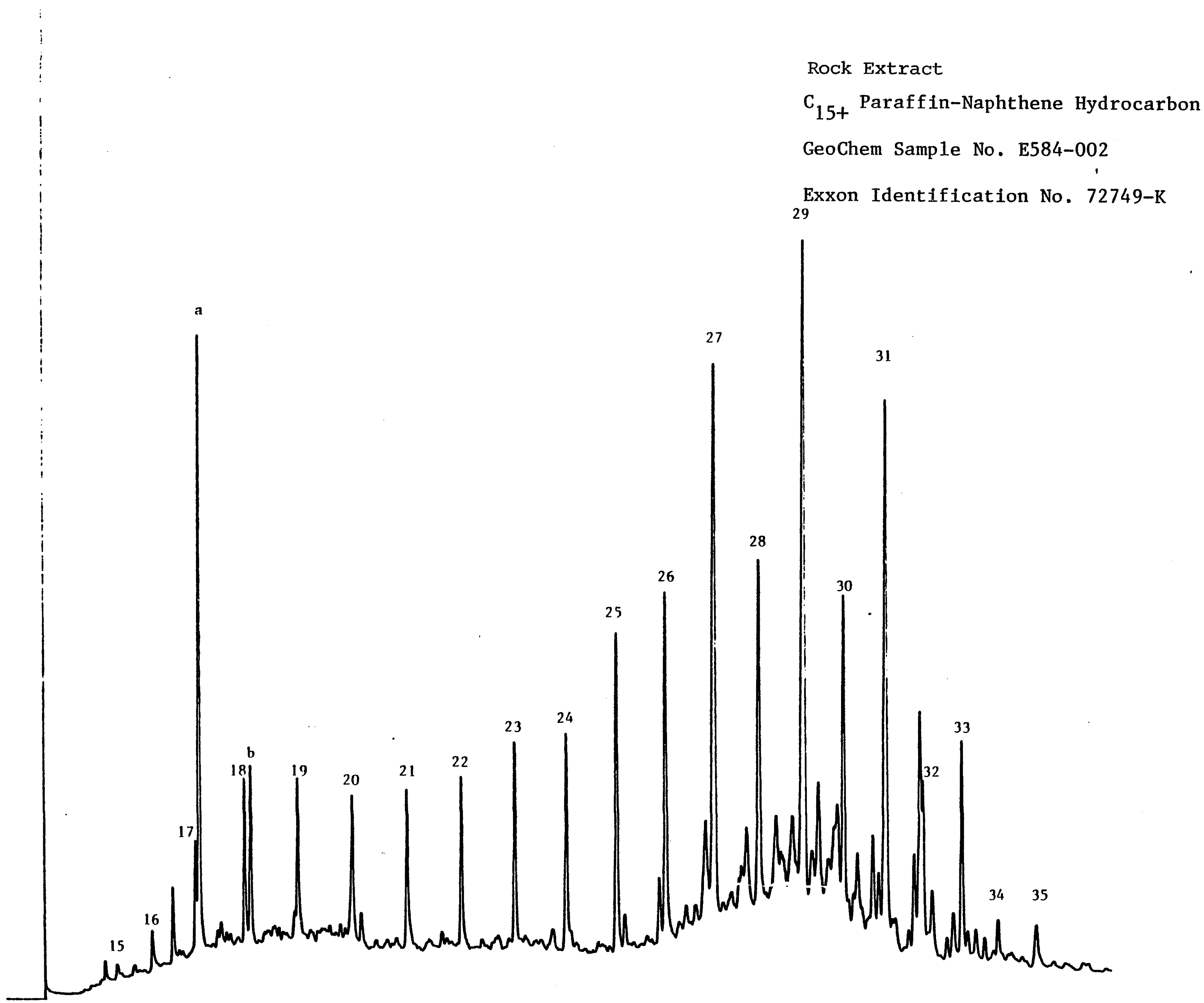



Figure 8, Sunfish-2, Cuttings Extract, 1895-1910m(KB), Latrobe Group

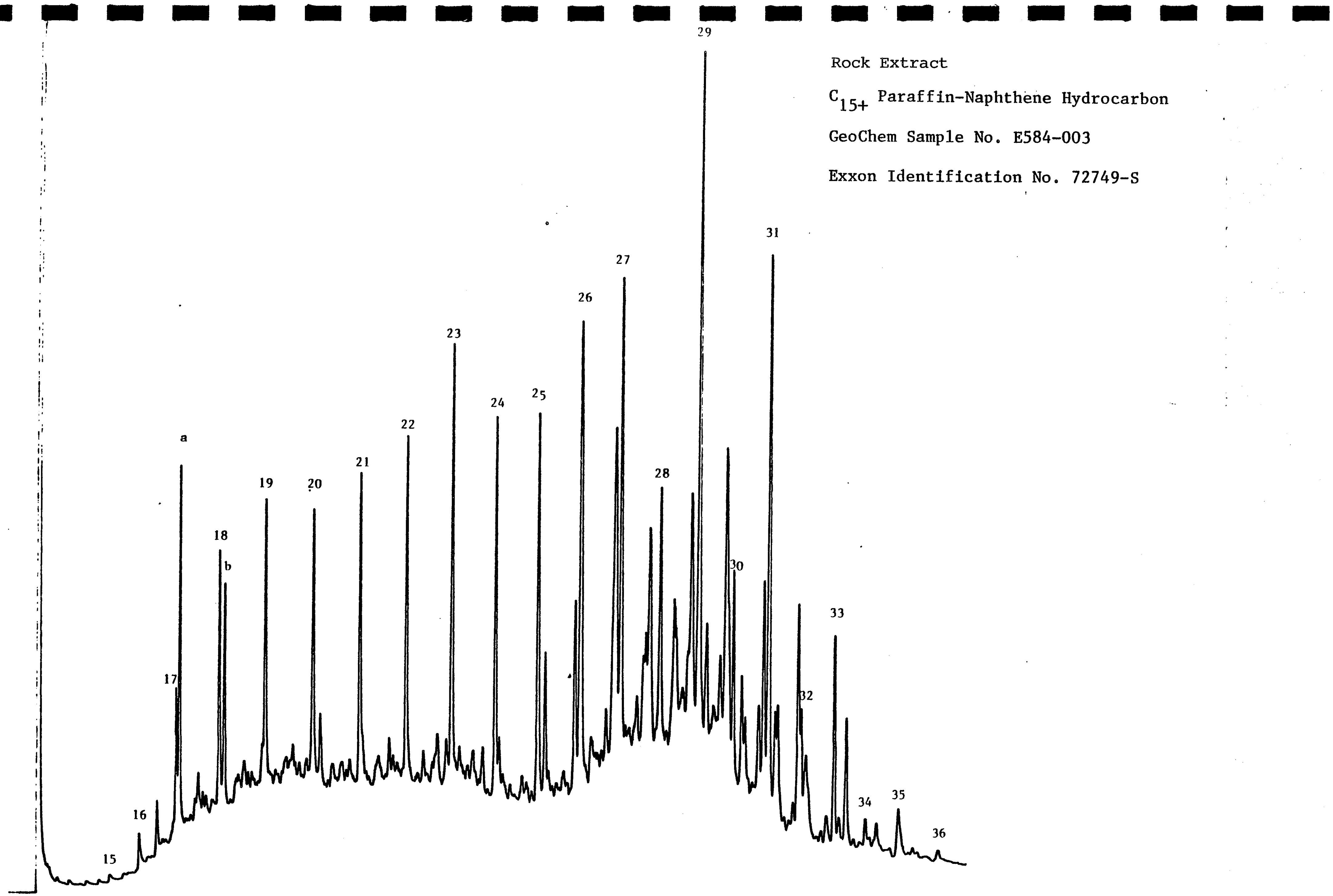



Figure 9 : Sunfish-2, Cuttings Extract, 2015-2030m(KB), Latrobe Group

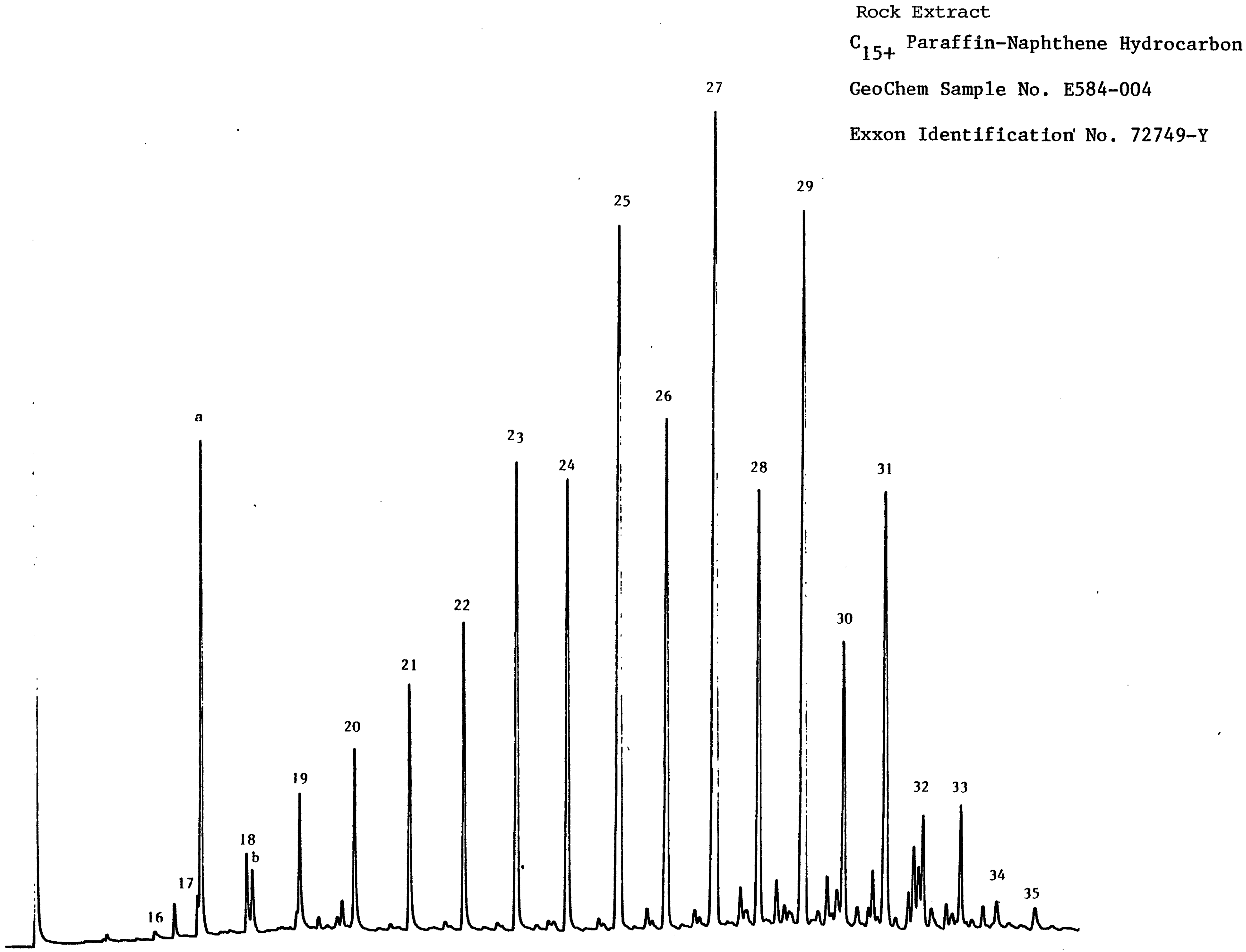



Figure 10 : Sunfish-2, Cuttings Extract, 2105-2120m(KB), Latrobe Group

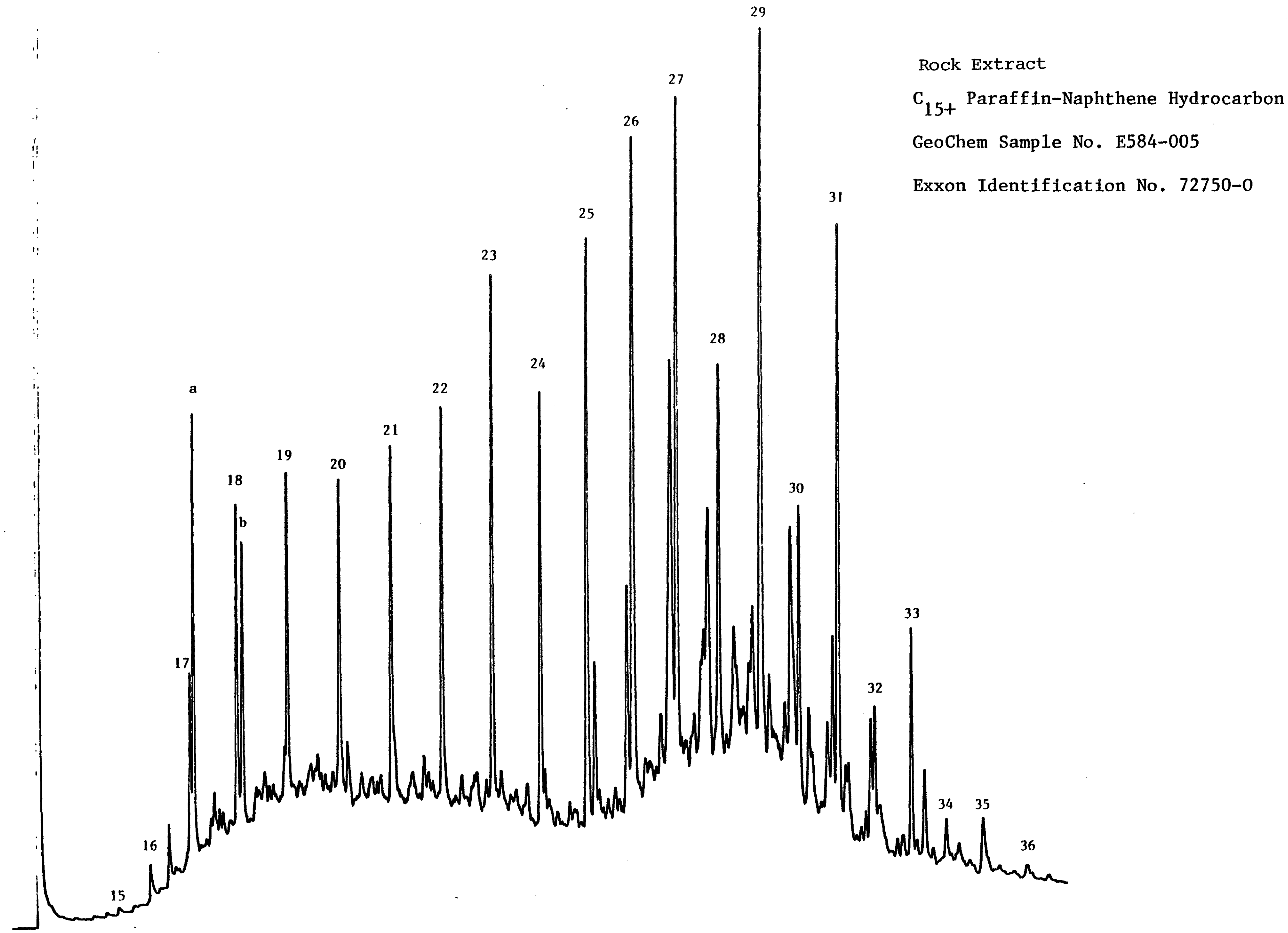



Figure 11 : Sunfish-2, Cuttings Extract, 2345-2360m(KB), Latrobe Group

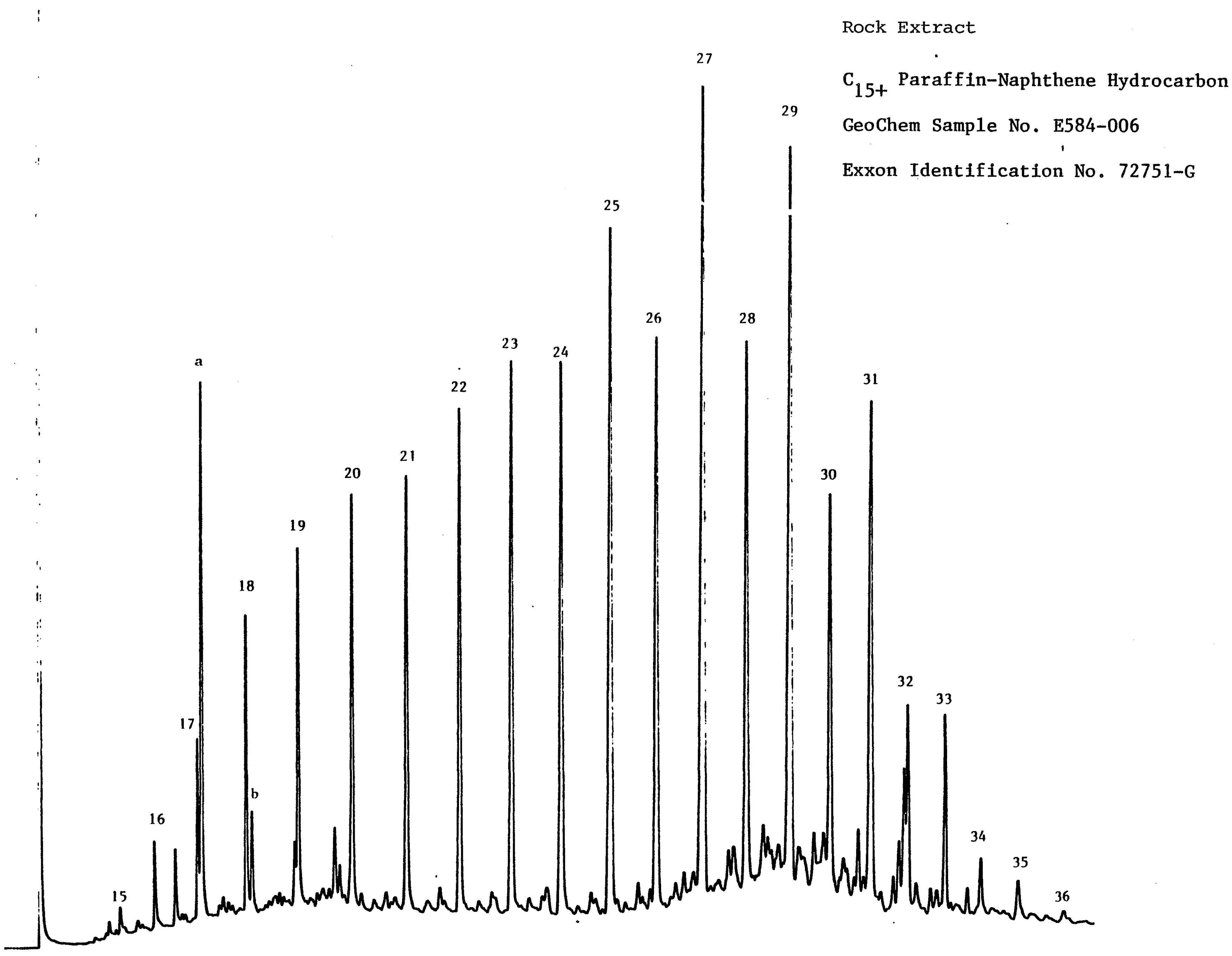



Figure 12 : Sunfish-2, Cuttings Extract, 2615-2630m(KB), Latrobe Group

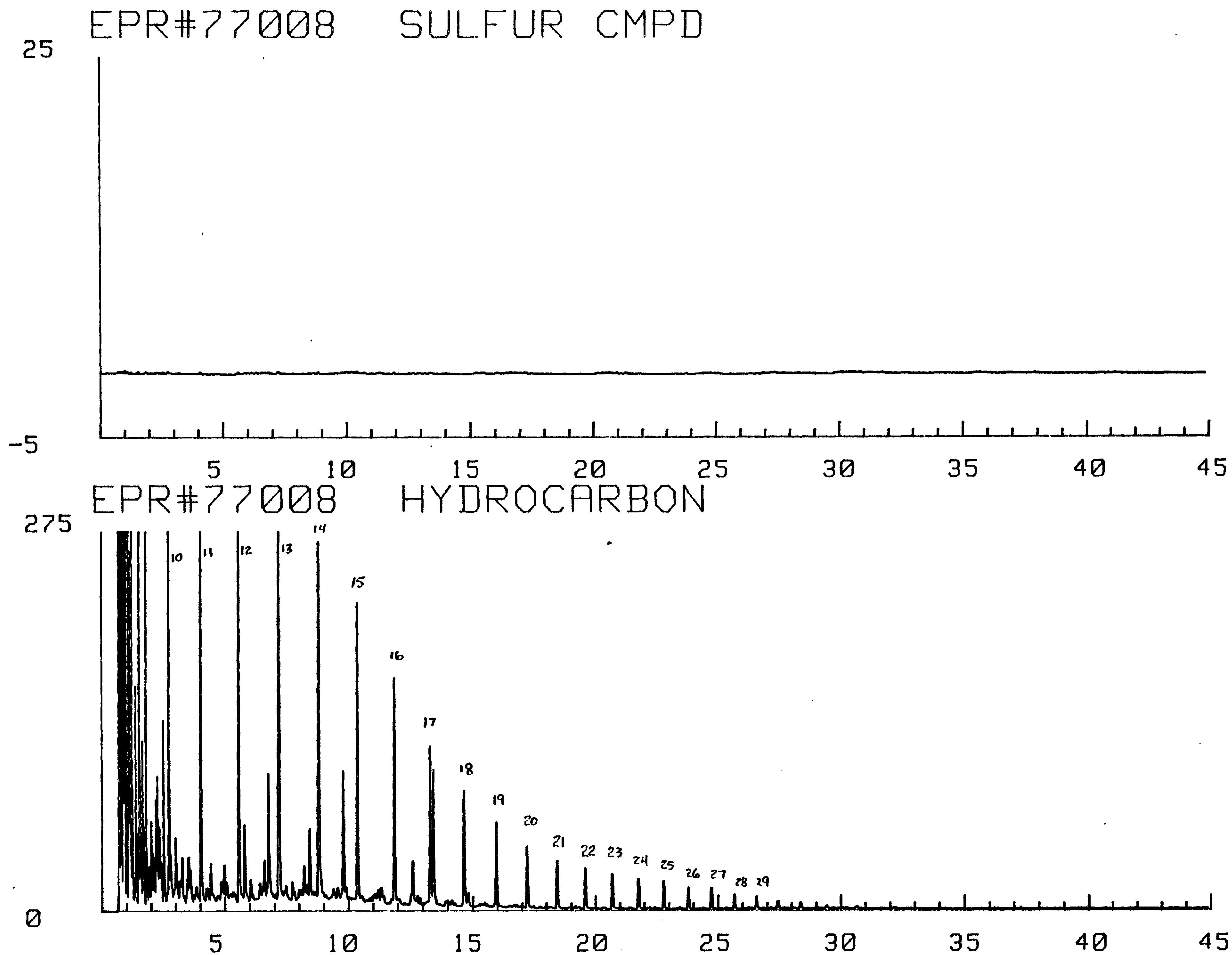



Figure 13 : Sunfish-2 Oil, RFT 2/40, 1616.8m, "Whole Oil" Gas Chromatogram

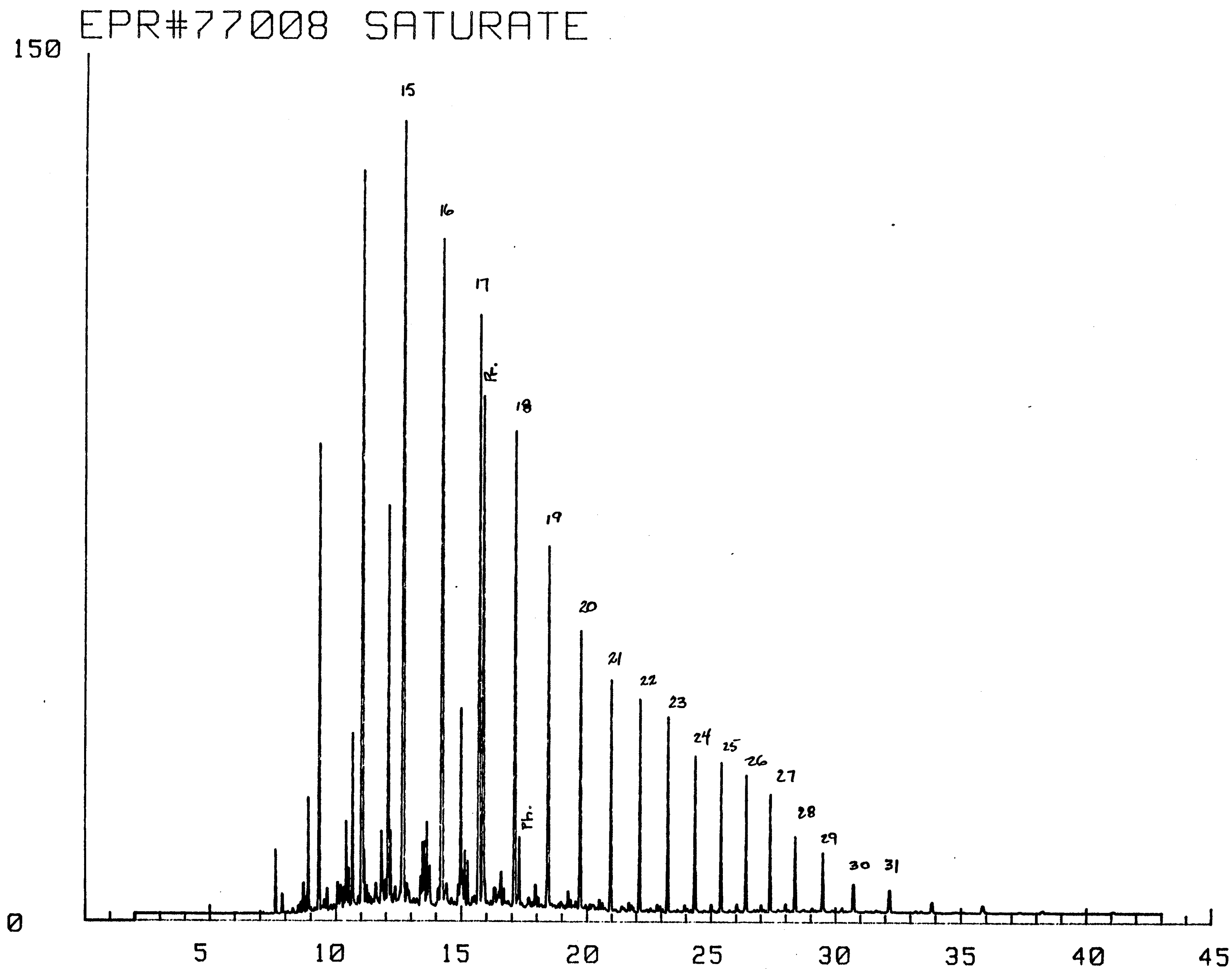



Figure 14 : Sunfish-2 Oil, RFT 2/10, 1616.8m, $C_{15+}$ Saturate Chromatogram

# APPENDIX-1

## Detailed $C_{4-7}$ Data Sheets

18 JAN 84

72748K SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 1505 M

| | TOTAL PPB | NORM PERCENT | | TOTAL PPB | NORM PERCENT |
|---|---|---|---|---|---|
| METHANE | 0.0 | | 1T3-DMCP | 0.0 | 0.00 |
| ETHANE | 0.0 | | 1T2-DMCP | 0.0 | 0.00 |
| PROPANE | 0.0 | | 3-EPENT | 0.0 | 0.00 |
| IBUTANE | 23.3 | 4.86 | 224-TMP | 0.0 | 0.00 |
| NBUTANE | 45.1 | 9.43 | NHEPTANE | 1.9 | 0.40 |
| IPENTANE | 158.1 | 33.01 | 1C2-DMCP | 0.0 | 0.00 |
| NPENTANE | 59.0 | 12.31 | MCH | 20.4 | 4.27 |
| 22-DMB | 0.3 | 0.06 | | | |
| CPENTANE | 7.0 | 1.46 | | | |
| 23-DMB | 4.8 | 1.00 | | | |
| 2-MP | 48.1 | 10.04 | | | |
| 3-MP | 15.7 | 3.27 | | | |
| NHEXANE | 41.7 | 8.71 | | | |
| MCP | 41.3 | 8.62 | | | |
| 22-DMP | 0.0 | 0.00 | | | |
| 24-DMP | 0.0 | 0.00 | | | |
| 223-TMB | 0.0 | 0.00 | | | |
| CHEXANE | 12.3 | 2.57 | | | |
| 33-DMP , | 0.0 | 0.00 | | | |
| 11-DMCP | 0.0 | 0.00 | | | |
| 2-MHEX , | 0.0 | 0.00 | | | |
| 23-DMP , | 0.0 | 0.00 | | | |
| 3-MHEX , | 0.0 | 0.00 | | | |
| 1C3-DMCP | 0.0 | 0.00 | | | |

| | TOTALS PPB | NORM PERCENT | SIG COMP RATIOS | |
|---|---|---|---|---|
| ALL COMP | 479. | | C1/C2 | 0.79 |
| GASOLINE | 479. | | A /D2 | 999.99 |
| NAPHTHENES | 81. | 16.92 | C1/D2 | 999.99 |
| C6-7 | 118. | 24.56 | CH/MCP | 0.30 |
| | | | PENT/IPENT, | 0.37 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 41.3 | 55.7 |
| CH | 12.3 | 16.6 |
| MCH | 20.4 | 27.6 |
| TOTAL | 74.0 | 100.0 |

PARAFFIN INDEX 1 0.000
PARAFFIN INDEX 2 5.491

18 JAN 84

72748M SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 1535 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 45.9 | 4.27 |
| NBUTANE | 120.2 | 11.18 |
| IPENTANE | 297.0 | 27.62 |
| NPENTANE | 111.3 | 10.35 |
| 22-DMB | 2.9 | 0.27 |
| CPENTANE | 10.5 | 0.98 |
| 23-DMB | 11.5 | 1.07 |
| 2-MP | 94.0 | 8.74 |
| 3-MP | 37.2 | 3.46 |
| NHEXANE | 91.6 | 8.52 |
| MCP | 54.1 | 5.03 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 1.7 | 0.16 |
| 223-TMB | 0.0 | 0.00 |
| CHEXANE | 12.6 | 1.17 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 17.9 | 1.67 |
| 23-DMP , | 10.6 | 0.98 |
| 3-MHEX , | 15.7 | 1.46 |
| 1C3-DMCP | 10.8 | 1.00 |

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| 1T3-DMCP | 7.6 | 0.71 |
| 1T2-DMCP | 6.8 | 0.64 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 79.0 | 7.35 |
| 1C2-DMCP | 0.0 | 0.00 |
| MCH | 36.3 | 3.38 |

| | TOTALS PPB | NORM PERCENT | SIG COMP RATIOS | |
|---|---|---|---|---|
| ALL COMP | 1075. | | C1/C2 | 0.84 |
| GASOLINE | 1075. | | A /D2 | 10.90 |
| NAPHTHENES | 139. | 12.91 | C1/D2 | 4.27 |
| C6-7 | 345. | 32.06 | CH/MCP | 0.23 |
| | | | PENT/IPENT, | 0.37 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 54.1 | 52.5 |
| CH | 12.6 | 12.2 |
| MCH | 36.3 | 35.3 |
| TOTAL | 103.0 | 100.0 |

PARAFFIN INDEX 1 1.331
PARAFFIN INDEX 2 40.055

18 JAN 84

727480 SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 1565 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 28.1 | 3.43 |
| NBUTANE | 24.5 | 2.99 |
| IPENTANE | 105.9 | 12.93 |
| NPENTANE | 52.1 | 6.36 |
| 22-DMB | 0.0 | 0.00 |
| CPENTANE | 3.3 | 0.40 |
| 23-DMB | 8.4 | 1.03 |
| 2-MP | 77.3 | 9.43 |
| 3-MP | 30.8 | 3.76 |
| NHEXANE | 63.8 | 7.79 |
| MCP | 67.0 | 8.17 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 3.5 | 0.43 |
| 223-TMB | 0.0 | 0.00 |
| CHEXANE | 9.4 | 1.15 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 24.2 | 2.96 |
| 23-DMP , | 17.5 | 2.13 |
| 3-MHEX , | 26.4 | 3.22 |
| 1C3-DMCP | 24.3 | 2.97 |
| 1T3-DMCP | 30.9 | 3.78 |
| 1T2-DMCP | 15.4 | 1.88 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 84.3 | 10.29 |
| 1C2-DMCP | 8.1 | 0.99 |
| MCH | 114.0 | 13.91 |

| | TOTALS PPB | NORM PERCENT |
|---|---|---|
| ALL COMP | 819. | |
| GASOLINE | 819. | |
| NAPHTHENES | 272. | 33.25 |
| C6-7 | 489. | 59.67 |

| SIG COMP RATIOS | |
|---|---|
| C1/C2 | 1.01 |
| A /D2 | 5.62 |
| C1/D2 | 5.60 |
| CH/MCP | 0.14 |
| PENT/IPENT, | 0.49 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 67.0 | 35.2 |
| CH | 9.4 | 5.0 |
| MCH | 114.0 | 59.9 |
| TOTAL | 190.4 | 100.0 |

PARAFFIN INDEX 1 0.716
PARAFFIN INDEX 2 24.327

18 JAN 84

727480 SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 1595 M

| | TOTAL PPB | NORM PERCENT | | TOTAL PPB | NORM PERCENT |
|---|---|---|---|---|---|
| METHANE | 0.0 | | 1T3-DMCP | 15.0 | 0.93 |
| ETHANE | 0.0 | | 1T2-DMCP | 21.4 | 1.32 |
| PROPANE | 0.0 | | 3-EPENT | 0.0 | 0.00 |
| IBUTANE | 20.6 | 1.27 | 224-TMP | 0.0 | 0.00 |
| NBUTANE | 72.4 | 4.48 | NHEPTANE | 121.1 | 7.49 |
| IPENTANE | 278.6 | 17.24 | 1C2-DMCP | 0.0 | 0.00 |
| NPENTANE | 240.8 | 14.89 | MCH | 118.5 | 7.33 |
| 22-DMB | 4.9 | 0.30 | | | |
| CPENTANE | 20.5 | 1.27 | | | |
| 23-DMB | 23.0 | 1.42 | | | |
| 2-MP | 132.0 | 8.17 | | | |
| 3-MP | 50.3 | 3.11 | | | |
| NHEXANE | 131.3 | 8.12 | | | |
| MCP | 166.9 | 10.32 | | | |
| 22-DMP | 0.0 | 0.00 | | | |
| 24-DMP | 4.4 | 0.27 | | | |
| 223-TMB | 0.0 | 0.00 | | | |
| CHEXANE | 111.1 | 6.87 | | | |
| 33-DMP , | 0.0 | 0.00 | | | |
| 11-DMCP | 0.0 | 0.00 | | | |
| 2-MHEX , | 21.9 | 1.35 | | | |
| 23-DMP , | 24.9 | 1.54 | | | |
| 3-MHEX , | 17.8 | 1.10 | | | |
| 1C3-DMCP | 19.2 | 1.19 | | | |

| | TOTALS PPB | NORM PERCENT | SIG COMP RATIOS | |
|---|---|---|---|---|
| ALL COMP | 1617. | | C1/C2 | 1.13 |
| GASOLINE | 1617. | | A /D2 | 14.19 |
| NAPHTHENES | 473. | 29.23 | C1/D2 | 14.14 |
| C6-7 | 773. | 47.84 | CH/MCP | 0.67 |
| | | | PENT/IPENT, | 0.86 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 166.9 | 42.1 |
| CH | 111.1 | 28.0 |
| MCH | 118.5 | 29.9 |
| TOTAL | 396.5 | 100.0 |

| | |
|---|---|
| PARAFFIN INDEX 1 | 0.714 |
| PARAFFIN INDEX 2 | 25.730 |

18 JAN 84

727488 SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 1625 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 58.7 | 0.97 |
| NBUTANE | 250.0 | 4.12 |
| IPENTANE | 494.9 | 8.15 |
| NPENTANE | 624.6 | 10.29 |
| 22-DMB | 13.1 | 0.22 |
| CPENTANE | 70.3 | 1.16 |
| 23-DMB | 60.6 | 1.00 |
| 2-MP | 395.5 | 6.51 |
| 3-MP | 214.3 | 3.53 |
| NHEXANE | 705.9 | 11.62 |
| MCP | 548.3 | 9.03 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 11.1 | 0.18 |
| 223-TMB | 3.4 | 0.06 |
| CHEXANE | 609.4 | 10.03 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 123.6 | 2.03 |
| 23-DMP , | 73.6 | 1.21 |
| 3-MHEX , | 133.9 | 2.21 |
| 1C3-DMCP | 83.8 | 1.38 |
| 1T3-DMCP | 79.3 | 1.31 |
| 1T2-DMCP | 142.6 | 2.35 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 368.4 | 6.07 |
| 1C2-DMCP | 14.4 | 0.24 |
| MCH | 992.7 | 16.35 |

| | TOTALS PPB | NORM PERCENT |
|---|---|---|
| ALL COMP | 6073. | |
| GASOLINE | 6073. | |
| NAPHTHENES | 2541. | 41.84 |
| C6-7 | 3890. | 64.06 |

| SIG COMP RATIOS | |
|---|---|
| C1/C2 | 1.99 |
| A /D2 | 8.02 |
| C1/D2 | 12.89 |
| CH/MCP | 1.11 |
| PENT/IPENT, | 1.26 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 548.3 | 25.5 |
| CH | 609.4 | 28.3 |
| MCH | 992.7 | 46.2 |
| TOTAL | 2150.4 | 100.0 |

PARAFFIN INDEX 1 0.842
PARAFFIN INDEX 2 14.132

18 JAN 84

72748U SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 1655 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 44.3 | 4.37 |
| NBUTANE | 90.1 | 8.89 |
| IPENTANE | 176.5 | 17.40 |
| NPENTANE | 124.0 | 12.22 |
| 22-DMB | 1.5 | 0.15 |
| CPENTANE | 17.8 | 1.75 |
| 23-DMB | 10.3 | 1.02 |
| 2-MP | 68.9 | 6.80 |
| 3-MP | 29.9 | 2.95 |
| NHEXANE | 95.7 | 9.44 |
| MCP | 69.1 | 6.81 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 2.1 | 0.21 |
| 223-TMB | 0.0 | 0.00 |
| CHEXANE | 70.1 | 6.92 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 15.6 | 1.54 |
| 23-DMP , | 10.5 | 1.03 |
| 3-MHEX , | 11.4 | 1.12 |
| 1C3-DMCP | 7.8 | 0.76 |
| 1T3-DMCP | 5.8 | 0.57 |
| 1T2-DMCP | 10.5 | 1.03 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 67.0 | 6.61 |
| 1C2-DMCP | 0.0 | 0.00 |
| MCH | 85.1 | 8.39 |

| | TOTALS PPB | NORM PERCENT | SIG COMP RATIOS | |
|---|---|---|---|---|
| ALL COMP | 1014. | | C1/C2 | 1.84 |
| GASOLINE | 1014. | | A /D2 | 14.27 |
| NAPHTHENES | 266. | 26.25 | C1/D2 | 14.99 |
| C6-7 | 451. | 44.45 | CH/MCP | 1.02 |
| | | | PENT/IPENT, | 0.70 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 69.1 | 30.8 |
| CH | 70.1 | 31.3 |
| MCH | 85.1 | 37.9 |
| TOTAL | 224.3 | 100.0 |

PARAFFIN INDEX 1 1.123
PARAFFIN INDEX 2 23.626

18 JAN 84

72748Y SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 1730 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 21989.1 | 10.81 |
| NBUTANE | 29612.6 | 14.55 |
| IPENTANE | 27280.2 | 13.41 |
| NPENTANE | 12464.8 | 6.13 |
| 22-DMB | 300.2 | 0.15 |
| CPENTANE | 2830.2 | 1.39 |
| 23-DMB | 2755.8 | 1.35 |
| 2-MP | 10704.6 | 5.26 |
| 3-MP | 4441.4 | 2.18 |
| NHEXANE | 4756.1 | 2.34 |
| MCP | 28722.7 | 14.11 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 476.5 | 0.23 |
| 223-TMB | 35.7 | 0.02 |
| CHEXANE | 4134.4 | 2.03 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 1140.8 | 0.56 |
| 23-DMP , | 2448.7 | 1.20 |
| 3-MHEX , | 2349.2 | 1.15 |
| 1C3-DMCP | 6560.3 | 3.22 |
| 1T3-DMCP | 6010.8 | 2.95 |
| 1T2-DMCP | 16150.0 | 7.94 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 4186.1 | 2.06 |
| 1C2-DMCP | 2394.8 | 1.18 |
| MCH | 11751.1 | 5.77 |

| | TOTALS PPB | NORM PERCENT |
|---|---|---|
| ALL COMP | 203496. | |
| GASOLINE | 203496. | |
| NAPHTHENES | 78554. | 38.60 |
| C6-7 | 91117. | 44.78 |

| SIG COMP RATIOS | |
|---|---|
| C1/C2 | 0.28 |
| A /D2 | 3.81 |
| C1/D2 | 7.25 |
| CH/MCP | 0.14 |
| PENT/IPENT, | 0.46 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 28722.7 | 64.4 |
| CH | 4134.4 | 9.3 |
| MCH | 11751.1 | 26.3 |
| TOTAL | 44608.2 | 100.0 |

PARAFFIN INDEX 1 0.122
PARAFFIN INDEX 2 7.648

18 JAN 84

72749A SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 1760 M

| | TOTAL PPB | NORM PERCENT | | TOTAL PPB | NORM PERCENT |
|---|---|---|---|---|---|
| METHANE | 0.0 | | 1T3-DMCP | 23.7 | 2.69 |
| ETHANE | 0.0 | | 1T2-DMCP | 39.5 | 4.48 |
| PROPANE | 0.0 | | 3-EPENT | 0.0 | 0.00 |
| IBUTANE | 23.6 | 2.68 | 224-TMP | 0.0 | 0.00 |
| NBUTANE | 43.2 | 4.90 | NHEPTANE | 61.3 | 6.94 |
| IPENTANE | 119.8 | 13.57 | 1C2-DMCP | 5.9 | 0.66 |
| NPENTANE | 56.6 | 6.42 | MCH | 85.8 | 9.72 |
| 22-DMB | 0.0 | 0.00 | | | |
| CPENTANE | 8.9 | 1.01 | | | |
| 23-DMB | 13.0 | 1.47 | | | |
| 2-MP | 81.1 | 9.19 | | | |
| 3-MP | 32.6 | 3.69 | | | |
| NHEXANE | 60.3 | 6.83 | | | |
| MCP | 136.3 | 15.44 | | | |
| 22-DMP | 0.0 | 0.00 | | | |
| 24-DMP | 3.7 | 0.42 | | | |
| 223-TMB | 0.0 | 0.00 | | | |
| CHEXANE | 14.2 | 1.61 | | | |
| 33-DMP , | 0.0 | 0.00 | | | |
| 11-DMCP | 0.0 | 0.00 | | | |
| 2-MHEX , | 15.0 | 1.70 | | | |
| 23-DMP , | 15.7 | 1.78 | | | |
| 3-MHEX , | 16.2 | 1.83 | | | |
| 1C3-DMCP | 26.1 | 2.96 | | | |

| | TOTALS PPB | NORM PERCENT | SIG COMP RATIOS | |
|---|---|---|---|---|
| ALL COMP | 883. | | C1/C2 | 0.50 |
| GASOLINE | 883. | | A /D2 | 7.51 |
| NAPHTHENES | 340. | 38.57 | C1/D2 | 7.10 |
| C6-7 | 504. | 57.07 | CH/MCP | 0.10 |
| | | | PENT/IPENT, | 0.47 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 136.3 | 57.7 |
| CH | 14.2 | 6.0 |
| MCH | 85.8 | 36.3 |
| TOTAL | 236.3 | 100.0 |

PARAFFIN INDEX 1 0.349
PARAFFIN INDEX 2 20.589

18 JAN 84

72749C SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 1790 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 40.3 | 1.52 |
| NBUTANE | 48.3 | 1.83 |
| IPENTANE | 236.1 | 8.93 |
| NPENTANE | 164.5 | 6.22 |
| 22-DMB | 3.0 | 0.11 |
| CPENTANE | 13.1 | 0.50 |
| 23-DMB | 25.2 | 0.95 |
| 2-MP | 178.4 | 6.75 |
| 3-MP | 73.7 | 2.79 |
| NHEXANE | 196.2 | 7.42 |
| MCP | 239.2 | 9.05 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 12.0 | 0.45 |
| 223-TMB | 1.4 | 0.05 |
| CHEXANE | 74.5 | 2.82 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 112.1 | 4.24 |
| 23-DMP , | 48.1 | 1.82 |
| 3-MHEX , | 121.8 | 4.61 |
| 1C3-DMCP | 59.9 | 2.27 |

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| 1T3-DMCP | 57.8 | 2.19 |
| 1T2-DMCP | 117.1 | 4.43 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 385.7 | 14.59 |
| 1C2-DMCP | 0.0 | 0.00 |
| MCH | 434.6 | 16.45 |

| | TOTALS PPB | NORM PERCENT | SIG COMP RATIOS | |
|---|---|---|---|---|
| ALL COMP | 2643. | | C1/C2 | 1.31 |
| GASOLINE | 2643. | | A /D2 | 4.78 |
| NAPHTHENES | 996. | 37.70 | C1/D2 | 5.10 |
| C6-7 | 1860. | 70.39 | CH/MCP | 0.31 |
| | | | PENT/IPENT, | 0.70 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 239.2 | 32.0 |
| CH | 74.5 | 10.0 |
| MCH | 434.6 | 58.1 |
| TOTAL | 748.3 | 100.0 |

PARAFFIN INDEX 1 0.996
PARAFFIN INDEX 2 27.324

18 JAN 84

72749E SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 1820 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 3524.9 | 2.90 |
| NBUTANE | 2183.1 | 1.80 |
| IPENTANE | 10609.2 | 8.74 |
| NPENTANE | 2769.1 | 2.28 |
| 22-DMB | 4.6 | 0.00 |
| CPENTANE | 1391.2 | 1.15 |
| 23-DMB | 1121.0 | 0.92 |
| 2-MP | 6746.5 | 5.56 |
| 3-MP | 3459.1 | 2.85 |
| NHEXANE | 2567.7 | 2.11 |
| MCP | 28553.2 | 23.52 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 0.0 | 0.00 |
| 223-TMB | 0.0 | 0.00 |
| CHEXANE | 1109.6 | 0.91 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 1369.5 | 1.13 |
| 23-DMP , | 1447.4 | 1.19 |
| 3-MHEX , | 1512.8 | 1.25 |
| 1C3-DMCP | 7225.7 | 5.95 |

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| 1T3-DMCP | 8542.0 | 7.04 |
| 1T2-DMCP | 12549.9 | 10.34 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 2898.6 | 2.39 |
| 1C2-DMCP | 3563.6 | 2.94 |
| MCH | 18262.8 | 15.04 |

| | TOTALS PPB | NORM PERCENT | SIG COMP RATIOS | |
|---|---|---|---|---|
| ALL COMP | 121411. | | C1/C2 | 0.34 |
| GASOLINE | 121411. | | A /D2 | 3.61 |
| NAPHTHENES | 81198. | 66.88 | C1/D2 | 13.71 |
| C6-7 | 89603. | 73.80 | CH/MCP | 0.04 |
| | | | PENT/IPENT, | 0.26 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 28553.2 | 59.6 |
| CH | 1109.6 | 2.3 |
| MCH | 18262.8 | 38.1 |
| TOTAL | 47925.6 | 100.0 |

PARAFFIN INDEX 1 0.102
PARAFFIN INDEX 2 5.278

18 JAN 84

727490 SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 1850 M

| | TOTAL PPB | NORM PERCENT | | TOTAL PPB | NORM PERCENT |
|---|---|---|---|---|---|
| METHANE | 0.0 | | 1T3-DMCP | 378.5 | 3.89 |
| ETHANE | 0.0 | | 1T2-DMCP | 895.4 | 9.19 |
| PROPANE | 0.0 | | 3-EPENT | 0.0 | 0.00 |
| IBUTANE | 430.5 | 4.42 | 224-TMP | 0.0 | 0.00 |
| NBUTANE | 403.4 | 4.14 | NHEPTANE | 352.0 | 3.61 |
| IPENTANE | 1227.9 | 12.61 | 1C2-DMCP | 235.4 | 2.42 |
| NPENTANE | 355.4 | 3.65 | MCH | 1192.4 | 12.24 |
| 22-DMB | 3.9 | 0.04 | | | |
| CPENTANE | 110.5 | 1.13 | | | |
| 23-DMB | 92.8 | 0.95 | | | |
| 2-MP | 602.2 | 6.18 | | | |
| 3-MP | 312.5 | 3.21 | | | |
| NHEXANE | 278.4 | 2.86 | | | |
| MCP | 1876.1 | 19.26 | | | |
| 22-DMP | 0.0 | 0.00 | | | |
| 24-DMP | 9.0 | 0.09 | | | |
| 223-TMB | 1.9 | 0.02 | | | |
| CHEXANE | 122.2 | 1.25 | | | |
| 33-DMP , | 0.0 | 0.00 | | | |
| 11-DMCP | 0.0 | 0.00 | | | |
| 2-MHEX , | 135.5 | 1.39 | | | |
| 23-DMP , | 112.6 | 1.16 | | | |
| 3-MHEX , | 200.9 | 2.06 | | | |
| 1C3-DMCP | 411.0 | 4.22 | | | |

| | TOTALS PPB | NORM PERCENT | SIG COMP RATIOS | |
|---|---|---|---|---|
| ALL COMP | 9740. | | C1/C2 | 0.38 |
| GASOLINE | 9740. | | A /D2 | 3.14 |
| NAPHTHENES | 5221. | 53.61 | C1/D2 | 7.22 |
| C6-7 | 6201. | 63.67 | CH/MCP | 0.07 |
| | | | PENT/IPENT, | 0.29 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 1876.1 | 58.8 |
| CH | 122.2 | 3.8 |
| MCH | 1192.4 | 37.4 |
| TOTAL | 3190.7 | 100.0 |

PARAFFIN INDEX 1 0.200
PARAFFIN INDEX 2 9.261

18 JAN 84

727491 SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 1880 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 5382.8 | 5.78 |
| NBUTANE | 13151.2 | 14.13 |
| IPENTANE | 8870.9 | 9.53 |
| NPENTANE | 10225.9 | 10.99 |
| 22-DMB | 134.4 | 0.14 |
| CPENTANE | 1819.3 | 1.95 |
| 23-DMB | 727.0 | 0.78 |
| 2-MP | 4597.2 | 4.94 |
| 3-MP | 2190.0 | 2.35 |
| NHEXANE | 6699.2 | 7.20 |
| MCP | 7373.5 | 7.92 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 61.3 | 0.07 |
| 223-TMB | 15.1 | 0.02 |
| CHEXANE | 8929.5 | 9.59 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 881.1 | 0.95 |
| 23-DMP , | 694.9 | 0.75 |
| 3-MHEX , | 952.5 | 1.02 |
| 1C3-DMCP | 1061.0 | 1.14 |

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| 1T3-DMCP | 888.5 | 0.95 |
| 1T2-DMCP | 1554.6 | 1.67 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 3839.4 | 4.12 |
| 1C2-DMCP | 518.3 | 0.56 |
| MCH | 12520.3 | 13.45 |

| | TOTALS PPB | NORM PERCENT |
|---|---|---|
| ALL COMP | 93088. | |
| GASOLINE | 93088. | |
| NAPHTHENES | 34665. | 37.24 |
| C6-7 | 45989. | 49.40 |

SIG COMP RATIOS

| | |
|---|---|
| C1/C2 | 1.96 |
| A /D2 | 11.06 |
| C1/D2 | 23.44 |
| CH/MCP | 1.21 |
| PENT/IPENT, | 1.15 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 7373.5 | 25.6 |
| CH | 8929.5 | 31.0 |
| MCH | 12520.3 | 43.4 |
| TOTAL | 28823.3 | 100.0 |

PARAFFIN INDEX 1 0.523
PARAFFIN INDEX 2 12.258

18 JAN 84

72749K SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 1910 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 41.7 | 2.22 |
| NBUTANE | 88.2 | 4.70 |
| IPENTANE | 349.6 | 18.63 |
| NPENTANE | 117.6 | 6.26 |
| 22-DMB | 2.3 | 0.12 |
| CPENTANE | 25.1 | 1.34 |
| 23-DMB | 23.6 | 1.26 |
| 2-MP | 154.4 | 8.22 |
| 3-MP | 77.4 | 4.12 |
| NHEXANE | 82.5 | 4.39 |
| MCP | 305.1 | 16.26 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 3.6 | 0.19 |
| 223-TMB | 1.0 | 0.05 |
| CHEXANE | 48.5 | 2.58 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 44.4 | 2.36 |
| 23-DMP , | 26.1 | 1.39 |
| 3-MHEX , | 38.5 | 2.05 |
| 1C3-DMCP | 60.0 | 3.20 |

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| 1T3-DMCP | 73.3 | 3.91 |
| 1T2-DMCP | 40.3 | 2.15 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 73.9 | 3.94 |
| 1C2-DMCP | 19.8 | 1.06 |
| MCH | 180.0 | 9.59 |

| | TOTALS PPB | NORM PERCENT | SIG COMP RATIOS | |
|---|---|---|---|---|
| ALL COMP | 1877. | | C1/C2 | 0.55 |
| GASOLINE | 1877. | | A /D2 | 4.07 |
| NAPHTHENES | 752. | 40.08 | C1/D2 | 7.09 |
| C6-7 | 997. | 53.12 | CH/MCP | 0.16 |
| | | | PENT/IPENT, | 0.34 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 305.1 | 57.2 |
| CH | 48.5 | 9.1 |
| MCH | 180.0 | 33.7 |
| TOTAL | 533.6 | 100.0 |

PARAFFIN INDEX 1 0.477

PARAFFIN INDEX 2 12.629

18 JAN 84

72749M SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 1940 M

| | TOTAL PPB | NORM PERCENT | | TOTAL PPB | NORM PERCENT |
|---|---|---|---|---|---|
| METHANE | 0.0 | | 1T3-DMCP | 415.0 | 2.56 |
| ETHANE | 0.0 | | 1T2-DMCP | 872.5 | 5.37 |
| PROPANE | 0.0 | | 3-EPENT | 0.0 | 0.00 |
| IBUTANE | 962.9 | 5.93 | 224-TMP | 0.0 | 0.00 |
| NBUTANE | 886.9 | 5.46 | NHEPTANE | 738.0 | 4.55 |
| IPENTANE | 2859.9 | 17.62 | 1C2-DMCP | 104.1 | 0.64 |
| NPENTANE | 968.2 | 5.96 | MCH | 1279.1 | 7.88 |
| 22-DMB | 0.0 | 0.00 | | | |
| CPENTANE | 204.4 | 1.26 | | | |
| 23-DMB | 178.6 | 1.10 | | | |
| 2-MP | 1227.4 | 7.56 | | | |
| 3-MP | 590.5 | 3.64 | | | |
| NHEXANE | 791.9 | 4.88 | | | |
| MCP | 2809.0 | 17.30 | | | |
| 22-DMP | 0.0 | 0.00 | | | |
| 24-DMP | 22.0 | 0.14 | | | |
| 223-TMB | 0.0 | 0.00 | | | |
| CHEXANE | 202.2 | 1.25 | | | |
| 33-DMP , | 0.0 | 0.00 | | | |
| 11-DMCP | 0.0 | 0.00 | | | |
| 2-MHEX , | 217.4 | 1.34 | | | |
| 23-DMP , | 205.2 | 1.26 | | | |
| 3-MHEX , | 233.3 | 1.44 | | | |
| 1C3-DMCP | 465.9 | 2.87 | | | |

| | TOTALS PPB | NORM PERCENT | SIG COMP RATIOS | |
|---|---|---|---|---|
| ALL COMP | 16234. | | C1/C2 | 0.36 |
| GASOLINE | 16234. | | A /D2 | 6.56 |
| NAPHTHENES | 6352. | 39.13 | C1/D2 | 7.28 |
| C6-7 | 8356. | 51.47 | CH/MCP | 0.07 |
| | | | PENT/IPENT, | 0.34 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 2809.0 | 65.5 |
| CH | 202.2 | 4.7 |
| MCH | 1279.1 | 29.8 |
| TOTAL | 4290.3 | 100.0 |

PARAFFIN INDEX 1 0.257
PARAFFIN INDEX 2 15.944

18 JAN 84

727490 SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 1970 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 358.3 | 2.05 |
| NBUTANE | 1108.4 | 6.36 |
| IPENTANE | 1439.7 | 8.26 |
| NPENTANE | 1842.6 | 10.57 |
| 22-DMB | 29.6 | 0.17 |
| CPENTANE | 278.2 | 1.60 |
| 23-DMB | 157.2 | 0.90 |
| 2-MP | 1098.3 | 6.30 |
| 3-MP | 552.7 | 3.17 |
| NHEXANE | 1779.4 | 10.20 |
| MCP | 1592.4 | 9.13 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 23.8 | 0.14 |
| 223-TMB | 4.2 | 0.02 |
| CHEXANE | 1961.2 | 11.25 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 267.9 | 1.54 |
| 23-DMP , | 189.7 | 1.09 |
| 3-MHEX , | 274.6 | 1.57 |
| 1C3-DMCP | 225.9 | 1.30 |

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| 1T3-DMCP | 201.7 | 1.16 |
| 1T2-DMCP | 324.4 | 1.86 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 997.8 | 5.72 |
| 1C2-DMCP | 27.8 | 0.16 |
| MCH | 2701.2 | 15.49 |

| | TOTALS PPB | NORM PERCENT | SIG COMP RATIOS | |
|---|---|---|---|---|
| ALL COMP | 17437. | | C1/C2 | 2.08 |
| GASOLINE | 17437. | | A /D2 | 10.11 |
| NAPHTHENES | 7313. | 41.94 | C1/D2 | 17.96 |
| C6-7 | 10572. | 60.63 | CH/MCP | 1.23 |
| | | | PENT/IPENT, | 1.28 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 1592.4 | 25.5 |
| CH | 1961.2 | 31.4 |
| MCH | 2701.2 | 43.2 |
| TOTAL | 6254.8 | 100.0 |

PARAFFIN INDEX 1 0.721
PARAFFIN INDEX 2 13.966

18 JAN 84

727490 SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 2000 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 121.4 | 6.37 |
| NBUTANE | 349.9 | 18.34 |
| IPENTANE | 229.4 | 12.03 |
| NPENTANE | 237.3 | 12.44 |
| 22-DMB | 2.5 | 0.13 |
| CPENTANE | 61.3 | 3.21 |
| 23-DMB | 19.9 | 1.04 |
| 2-MP | 112.9 | 5.92 |
| 3-MP | 51.1 | 2.68 |
| NHEXANE | 122.2 | 6.41 |
| MCP | 178.9 | 9.38 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 3.1 | 0.16 |
| 223-TMB | 0.0 | 0.00 |
| CHEXANE | 141.7 | 7.43 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 21.4 | 1.12 |
| 23-DMP , | 16.4 | 0.86 |
| 3-MHEX , | 18.3 | 0.96 |
| 1C3-DMCP | 17.0 | 0.89 |

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| 1T3-DMCP | 13.6 | 0.71 |
| 1T2-DMCP | 18.3 | 0.96 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 70.0 | 3.67 |
| 1C2-DMCP | 0.0 | 0.00 |
| MCH | 100.9 | 5.29 |

| | TOTALS PPB | NORM PERCENT | SIG COMP RATIOS | |
|---|---|---|---|---|
| ALL COMP | 1908. | | C1/C2 | 1.16 |
| GASOLINE | 1908. | | A /D2 | 10.49 |
| NAPHTHENES | 532. | 27.87 | C1/D2 | 14.41 |
| C6-7 | 722. | 37.84 | CH/MCP | 0.79 |
| | | | PENT/IPENT, | 1.03 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 178.9 | 42.4 |
| CH | 141.7 | 33.6 |
| MCH | 100.9 | 23.9 |
| TOTAL | 421.5 | 100.0 |

PARAFFIN INDEX 1 0.812
PARAFFIN INDEX 2 16.757

18 JAN 84

72749S SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 2030 M

| | TOTAL PPB | NORM PERCENT | | TOTAL PPB | NORM PERCENT |
|---|---|---|---|---|---|
| METHANE | 0.0 | | 1T3-DMCP | 20.2 | 1.12 |
| ETHANE | 0.0 | | 1T2-DMCP | 32.7 | 1.81 |
| PROPANE | 0.0 | | 3-EPENT | 0.0 | 0.00 |
| IBUTANE | 46.6 | 2.59 | 224-TMP | 0.0 | 0.00 |
| NBUTANE | 163.0 | 9.05 | NHEPTANE | 63.4 | 3.52 |
| IPENTANE | 228.1 | 12.66 | 1C2-DMCP | 0.0 | 0.00 |
| NPENTANE | 206.6 | 11.47 | MCH | 163.4 | 9.07 |
| 22-DMB | 3.8 | 0.21 | | | |
| CPENTANE | 27.7 | 1.54 | | | |
| 23-DMB | 21.6 | 1.20 | | | |
| 2-MP | 140.0 | 7.77 | | | |
| 3-MP | 71.7 | 3.98 | | | |
| NHEXANE | 175.9 | 9.76 | | | |
| MCP | 190.2 | 10.55 | | | |
| 22-DMP | 0.0 | 0.00 | | | |
| 24-DMP | 1.9 | 0.11 | | | |
| 223-TMB | 0.0 | 0.00 | | | |
| CHEXANE | 140.8 | 7.81 | | | |
| 33-DMP , | 0.0 | 0.00 | | | |
| 11-DMCP | 0.0 | 0.00 | | | |
| 2-MHEX , | 35.6 | 1.97 | | | |
| 23-DMP , | 18.5 | 1.03 | | | |
| 3-MHEX , | 28.8 | 1.60 | | | |
| 1C3-DMCP | 21.5 | 1.19 | | | |

| | TOTALS PPB | NORM PERCENT | SIG COMP RATIOS | |
|---|---|---|---|---|
| ALL COMP | 1802. | | C1/C2 | 1.28 |
| GASOLINE | 1802. | | A /D2 | 8.31 |
| NAPHTHENES | 597. | 33.10 | C1/D2 | 11.79 |
| C6-7 | 893. | 49.55 | CH/MCP | 0.74 |
| | | | PENT/IPENT, | 0.91 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 190.2 | 38.5 |
| CH | 140.8 | 28.5 |
| MCH | 163.4 | 33.1 |
| TOTAL | 494.4 | 100.0 |

PARAFFIN INDEX 1 0.865
PARAFFIN INDEX 2 12.075

18 JAN 84

72749U SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 2060 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 84.5 | 1.97 |
| NBUTANE | 166.1 | 3.87 |
| IPENTANE | 325.8 | 7.60 |
| NPENTANE | 352.1 | 8.21 |
| 22-DMB | 7.4 | 0.17 |
| CPENTANE | 50.3 | 1.17 |
| 23-DMB | 49.3 | 1.15 |
| 2-MP | 337.1 | 7.86 |
| 3-MP | 160.8 | 3.75 |
| NHEXANE | 371.1 | 8.65 |
| MCP | 510.0 | 11.89 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 9.0 | 0.21 |
| 223-TMB | 2.7 | 0.06 |
| CHEXANE | 342.2 | 7.98 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 95.4 | 2.22 |
| 23-DMP , | 68.7 | 1.60 |
| 3-MHEX , | 119.2 | 2.78 |
| 1C3-DMCP | 95.5 | 2.23 |

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| 1T3-DMCP | 92.0 | 2.15 |
| 1T2-DMCP | 143.0 | 3.33 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 221.2 | 5.16 |
| 1C2-DMCP | 15.8 | 0.37 |
| MCH | 669.7 | 15.61 |

| | TOTALS PPB | NORM PERCENT | SIG COMP RATIOS | |
|---|---|---|---|---|
| ALL COMP | 4289. | | C1/C2 | 1.29 |
| GASOLINE | 4289. | | A /D2 | 4.97 |
| NAPHTHENES | 1919. | 44.73 | C1/D2 | 9.29 |
| C6-7 | 2756. | 64.25 | CH/MCP | 0.67 |
| | | | PENT/IPENT, | 1.08 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 510.0 | 33.5 |
| CH | 342.2 | 22.5 |
| MCH | 669.7 | 44.0 |
| TOTAL | 1521.9 | 100.0 |

PARAFFIN INDEX 1 0.649
PARAFFIN INDEX 2 11.978

18 JAN 84

72749W SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 2090 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 2711.1 | 2.33 |
| NBUTANE | 4410.0 | 3.79 |
| IPENTANE | 10328.6 | 8.87 |
| NPENTANE | 2044.4 | 1.76 |
| 22-DMB | 140.6 | 0.12 |
| CPENTANE | 4128.9 | 3.55 |
| 23-DMB | 839.6 | 0.72 |
| 2-MP | 8765.4 | 7.53 |
| 3-MP | 5038.3 | 4.33 |
| NHEXANE | 8111.3 | 6.96 |
| MCP | 23223.9 | 19.94 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 125.7 | 0.11 |
| 223-TMB | 26.1 | 0.02 |
| CHEXANE | 5624.5 | 4.83 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 1793.1 | 1.54 |
| 23-DMP , | 2066.7 | 1.77 |
| 3-MHEX , | 2337.5 | 2.01 |
| 1C3-DMCP | 4953.7 | 4.25 |

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| 1T3-DMCP | 3855.5 | 3.31 |
| 1T2-DMCP | 5872.2 | 5.04 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 5597.9 | 4.81 |
| 1C2-DMCP | 1078.7 | 0.93 |
| MCH | 13395.8 | 11.50 |

| | TOTALS PPB | NORM PERCENT |
|---|---|---|
| ALL COMP | 116469. | |
| GASOLINE | 116469. | |
| NAPHTHENES | 62133. | 53.35 |
| C6-7 | 78063. | 67.02 |

| SIG COMP RATIOS | |
|---|---|
| C1/C2 | 0.53 |
| A /D2 | 5.87 |
| C1/D2 | 8.90 |
| CH/MCP | 0.24 |
| PENT/IPENT, | 0.20 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 23223.9 | 55.0 |
| CH | 5624.5 | 13.3 |
| MCH | 13395.8 | 31.7 |
| TOTAL | 42244.2 | 100.0 |

PARAFFIN INDEX 1 0.281
PARAFFIN INDEX 2 12.304

18 JAN 84

72749Y SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 2120 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 4980.5 | 6.87 |
| NBUTANE | 13052.8 | 18.00 |
| IPENTANE | 10163.4 | 14.02 |
| NPENTANE | 9801.5 | 13.52 |
| 22-DMB | 122.7 | 0.17 |
| CPENTANE | 1871.1 | 2.58 |
| 23-DMB | 672.5 | 0.93 |
| 2-MP | 3560.1 | 4.91 |
| 3-MP | 1597.1 | 2.20 |
| NHEXANE | 3252.0 | 4.48 |
| MCP | 6028.2 | 8.31 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 20.1 | 0.03 |
| 223-TMB | 6.5 | 0.01 |
| CHEXANE | 5950.7 | 8.21 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 370.4 | 0.51 |
| 23-DMP , | 457.7 | 0.63 |
| 3-MHEX , | 439.4 | 0.61 |
| 1C3-DMCP | 875.6 | 1.21 |

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| 1T3-DMCP | 696.4 | 0.96 |
| 1T2-DMCP | 1160.6 | 1.60 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 1557.2 | 2.15 |
| 1C2-DMCP | 280.2 | 0.39 |
| MCH | 5601.0 | 7.72 |

| | TOTALS PPB | NORM PERCENT |
|---|---|---|
| ALL COMP | 72518. | |
| GASOLINE | 72518. | |
| NAPHTHENES | 22464. | 30.98 |
| C6-7 | 26696. | 36.81 |

| SIG COMP RATIOS | |
|---|---|
| C1/C2 | 1.32 |
| A /D2 | 10.94 |
| C1/D2 | 27.13 |
| CH/MCP | 0.99 |
| PENT/IPENT, | 0.96 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 6028.2 | 34.3 |
| CH | 5950.7 | 33.8 |
| MCH | 5601.0 | 31.9 |
| TOTAL | 17579.9 | 100.0 |

PARAFFIN INDEX 1 0.296
PARAFFIN INDEX 2 9.101

18 JAN 84

72750A SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 2150 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 48.2 | 2.06 |
| NBUTANE | 62.2 | 2.66 |
| IPENTANE | 89.8 | 3.84 |
| NPENTANE | 314.9 | 13.46 |
| 22-DMB | 7.9 | 0.34 |
| CPENTANE | 38.1 | 1.63 |
| 23-DMB | 27.4 | 1.17 |
| 2-MP | 190.8 | 8.16 |
| 3-MP | 102.4 | 4.38 |
| NHEXANE | 225.5 | 9.64 |
| MCP | 306.4 | 13.10 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 0.0 | 0.00 |
| 223-TMB | 0.0 | 0.00 |
| CHEXANE | 351.3 | 15.02 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 23.5 | 1.00 |
| 23-DMP , | 25.7 | 1.10 |
| 3-MHEX , | 27.4 | 1.17 |
| 1C3-DMCP | 33.7 | 1.44 |

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| 1T3-DMCP | 52.3 | 2.24 |
| 1T2-DMCP | 38.5 | 1.65 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 102.2 | 4.37 |
| 1C2-DMCP | 0.0 | 0.00 |
| MCH | 271.0 | 11.59 |

| | TOTALS PPB | NORM PERCENT | SIG COMP RATIOS | |
|---|---|---|---|---|
| ALL COMP | 2339. | | C1/C2 | 1.50 |
| GASOLINE | 2339. | | A /D2 | 11.94 |
| NAPHTHENES | 1091. | 46.65 | C1/D2 | 23.54 |
| C6-7 | 1458. | 62.31 | CH/MCP | 1.15 |
| | | | PENT/IPENT, | 3.51 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 306.4 | 33.0 |
| CH | 351.3 | 37.8 |
| MCH | 271.0 | 29.2 |
| TOTAL | 928.7 | 100.0 |

PARAFFIN INDEX 1 0.409
PARAFFIN INDEX 2 11.043

18 JAN 84

72750C SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 2180 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 102.7 | 3.36 |
| NBUTANE | 379.2 | 12.42 |
| IPENTANE | 376.1 | 12.32 |
| NPENTANE | 464.8 | 15.23 |
| 22-DMB | 6.8 | 0.22 |
| CPENTANE | 80.9 | 2.65 |
| 23-DMB | 38.5 | 1.26 |
| 2-MP | 197.1 | 6.46 |
| 3-MP | 90.8 | 2.98 |
| NHEXANE | 228.5 | 7.48 |
| MCP | 256.4 | 8.40 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 2.5 | 0.08 |
| 223-TMB | 0.0 | 0.00 |
| CHEXANE | 248.4 | 8.14 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 30.7 | 1.01 |
| 23-DMP , | 29.9 | 0.98 |
| 3-MHEX , | 30.6 | 1.00 |
| 1C3-DMCP | 32.7 | 1.07 |

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| 1T3-DMCP | 44.2 | 1.45 |
| 1T2-DMCP | 34.8 | 1.14 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 115.9 | 3.80 |
| 1C2-DMCP | 4.2 | 0.14 |
| MCH | 257.0 | 8.42 |

| | TOTALS PPB | NORM PERCENT |
|---|---|---|
| ALL COMP | 3053. | |
| GASOLINE | 3053. | |
| NAPHTHENES | 958. | 31.40 |
| C6-7 | 1316. | 43.10 |

SIG COMP RATIOS

| | |
|---|---|
| C1/C2 | 1.44 |
| A /D2 | 11.24 |
| C1/D2 | 17.50 |
| CH/MCP | 0.97 |
| PENT/IPENT, | 1.24 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 256.4 | 33.7 |
| CH | 248.4 | 32.6 |
| MCH | 257.0 | 33.7 |
| TOTAL | 761.8 | 100.0 |

PARAFFIN INDEX 1 0.549
PARAFFIN INDEX 2 14.063

18 JAN 84

72750E SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 2210 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 208.7 | 4.73 |
| NBUTANE | 509.8 | 11.55 |
| IPENTANE | 616.7 | 13.97 |
| NPENTANE | 547.1 | 12.40 |
| 22-DMB | 7.8 | 0.18 |
| CPENTANE | 104.0 | 2.36 |
| 23-DMB | 52.8 | 1.20 |
| 2-MP | 296.0 | 6.71 |
| 3-MP | 130.6 | 2.96 |
| NHEXANE | 278.2 | 6.30 |
| MCP | 472.3 | 10.70 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 5.3 | 0.12 |
| 223-TMB | 0.0 | 0.00 |
| CHEXANE | 311.9 | 7.07 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 46.2 | 1.05 |
| 23-DMP , | 48.6 | 1.10 |
| 3-MHEX , | 43.8 | 0.99 |
| 1C3-DMCP | 57.5 | 1.30 |

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| 1T3-DMCP | 70.6 | 1.60 |
| 1T2-DMCP | 64.9 | 1.47 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 185.0 | 4.19 |
| 1C2-DMCP | 9.6 | 0.22 |
| MCH | 345.7 | 7.83 |

| | TOTALS PPB | NORM PERCENT |
|---|---|---|
| ALL COMP | 4413. | |
| GASOLINE | 4413. | |
| NAPHTHENES | 1436. | 32.55 |
| C6-7 | 1939. | 43.95 |

| SIG COMP RATIOS | |
|---|---|
| C1/C2 | 1.04 |
| A /D2 | 10.58 |
| C1/D2 | 16.08 |
| CH/MCP | 0.66 |
| PENT/IPENT, | 0.89 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 472.3 | 41.8 |
| CH | 311.9 | 27.6 |
| MCH | 345.7 | 30.6 |
| TOTAL | 1129.9 | 100.0 |

PARAFFIN INDEX 1 0.466
PARAFFIN INDEX 2 15.755

18 JAN 84

72750G SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 2240 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 410.6 | 3.93 |
| NBUTANE | 867.8 | 8.30 |
| IPENTANE | 1131.0 | 10.81 |
| NPENTANE | 877.3 | 8.39 |
| 22-DMB | 4.3 | 0.04 |
| CPENTANE | 285.3 | 2.73 |
| 23-DMB | 95.2 | 0.91 |
| 2-MP | 716.9 | 6.85 |
| 3-MP | 348.5 | 3.33 |
| NHEXANE | 571.9 | 5.47 |
| MCP | 1602.5 | 15.32 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 0.0 | 0.00 |
| 223-TMB | 0.0 | 0.00 |
| CHEXANE | 414.7 | 3.97 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 141.5 | 1.35 |
| 23-DMP , | 103.2 | 0.99 |
| 3-MHEX , | 193.9 | 1.85 |
| 1C3-DMCP | 243.2 | 2.33 |

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| 1T3-DMCP | 236.1 | 2.26 |
| 1T2-DMCP | 398.2 | 3.81 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 420.4 | 4.02 |
| 1C2-DMCP | 93.4 | 0.89 |
| MCH | 1303.5 | 12.46 |

| | TOTALS PPB | NORM PERCENT |
|---|---|---|
| ALL COMP | 10459. | |
| GASOLINE | 10459. | |
| NAPHTHENES | 4577. | 43.76 |
| C6-7 | 5722. | 54.71 |

SIG COMP RATIOS

| | |
|---|---|
| C1/C2 | 0.72 |
| A /D2 | 5.12 |
| C1/D2 | 9.59 |
| CH/MCP | 0.26 |
| PENT/IPENT, | 0.78 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 1602.5 | 48.3 |
| CH | 414.7 | 12.5 |
| MCH | 1303.5 | 39.3 |
| TOTAL | 3320.7 | 100.0 |

PARAFFIN INDEX 1 0.382

PARAFFIN INDEX 2 12.168

18 JAN 84

727501 SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 2270 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 2862.8 | 11.51 |
| NBUTANE | 3855.7 | 15.50 |
| IPENTANE | 2437.2 | 9.80 |
| NPENTANE | 2298.6 | 9.24 |
| 22-DMB | 31.9 | 0.13 |
| CPENTANE | 1088.5 | 4.38 |
| 23-DMB | 27.3 | 0.11 |
| 2-MP | 1052.4 | 4.23 |
| 3-MP | 519.1 | 2.09 |
| NHEXANE | 1625.8 | 6.54 |
| MCP | 1582.2 | 6.36 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 3.4 | 0.01 |
| 223-TMB | 42.1 | 0.17 |
| CHEXANE | 1135.7 | 4.57 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 510.7 | 2.05 |
| 23-DMP , | 123.9 | 0.50 |
| 3-MHEX , | 315.6 | 1.27 |
| 1C3-DMCP | 360.6 | 1.45 |
| 1T3-DMCP | 251.1 | 1.01 |
| 1T2-DMCP | 532.2 | 2.14 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 1004.0 | 4.04 |
| 1C2-DMCP | 314.6 | 1.27 |
| MCH | 2896.8 | 11.65 |

| | TOTALS PPB | NORM PERCENT | SIG COMP RATIOS | |
|---|---|---|---|---|
| ALL COMP | 24872. | | C1/C2 | 1.49 |
| GASOLINE | 24872. | | A /D2 | 8.33 |
| NAPHTHENES | 8162. | 32.82 | C1/D2 | 14.39 |
| C6-7 | 10699. | 43.02 | CH/MCP | 0.72 |
| | | | PENT/IPENT, | 0.94 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 1582.2 | 28.2 |
| CH | 1135.7 | 20.2 |
| MCH | 2896.8 | 51.6 |
| TOTAL | 5614.7 | 100.0 |

PARAFFIN INDEX 1 0.722
PARAFFIN INDEX 2 14.080

18 JAN 84

72750K SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, ~~2230~~ 2300? M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 746.0 | 11.09 |
| NBUTANE | 1152.3 | 17.12 |
| IPENTANE | 1081.9 | 16.08 |
| NPENTANE | 845.2 | 12.56 |
| 22-DMB | 11.3 | 0.17 |
| CPENTANE | 128.9 | 1.92 |
| 23-DMB | 66.0 | 0.98 |
| 2-MP | 491.3 | 7.30 |
| 3-MP | 223.4 | 3.32 |
| NHEXANE | 410.8 | 6.10 |
| MCP | 557.9 | 8.29 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 0.0 | 0.00 |
| 223-TMB | 0.0 | 0.00 |
| CHEXANE | 187.3 | 2.78 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 55.0 | 0.82 |
| 23-DMP , | 39.9 | 0.59 |
| 3-MHEX , | 47.6 | 0.71 |
| 1C3-DMCP | 66.3 | 0.99 |

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| 1T3-DMCP | 90.6 | 1.35 |
| 1T2-DMCP | 78.7 | 1.17 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 113.2 | 1.68 |
| 1C2-DMCP | 7.7 | 0.11 |
| MCH | 328.2 | 4.88 |

| | TOTALS PPB | NORM PERCENT |
|---|---|---|
| ALL COMP | 6730. | |
| GASOLINE | 6730. | |
| NAPHTHENES | 1446. | 21.48 |
| C6-7 | 1983. | 29.47 |

| SIG COMP RATIOS | |
|---|---|
| C1/C2 | 0.71 |
| A /D2 | 11.01 |
| C1/D2 | 11.99 |
| CH/MCP | 0.34 |
| PENT/IPENT, | 0.78 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 557.9 | 52.0 |
| CH | 187.3 | 17.5 |
| MCH | 328.2 | 30.6 |
| TOTAL | 1073.4 | 100.0 |

PARAFFIN INDEX 1 0.435
PARAFFIN INDEX 2 11.240

18 JAN 84

72750M SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, ~~2330~~ 2330 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 164.0 | 2.78 |
| NBUTANE | 464.8 | 7.88 |
| IPENTANE | 738.9 | 12.52 |
| NPENTANE | 650.3 | 11.02 |
| 22-DMB | 6.5 | 0.11 |
| CPENTANE | 135.2 | 2.29 |
| 23-DMB | 58.2 | 0.99 |
| 2-MP | 431.3 | 7.31 |
| 3-MP | 217.4 | 3.68 |
| NHEXANE | 421.5 | 7.14 |
| MCP | 708.2 | 12.00 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 253.5 | 4.30 |
| 223-TMB | 0.0 | 0.00 |
| CHEXANE | 253.5 | 4.30 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 73.5 | 1.25 |
| 23-DMP , | 55.4 | 0.94 |
| 3-MHEX , | 72.4 | 1.23 |
| 1C3-DMCP | 120.7 | 2.05 |

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| 1T3-DMCP | 95.2 | 1.61 |
| 1T2-DMCP | 161.4 | 2.74 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 209.1 | 3.54 |
| 1C2-DMCP | 15.0 | 0.25 |
| MCH | 594.9 | 10.08 |

| | TOTALS PPB | NORM PERCENT | SIG COMP RATIOS | |
|---|---|---|---|---|
| ALL COMP | 5901. | | C1/C2 | 0.84 |
| GASOLINE | 5901. | | A /D2 | 8.72 |
| NAPHTHENES | 2084. | 35.32 | C1/D2 | 12.74 |
| C6-7 | 3034. | 51.42 | CH/MCP | 0.36 |
| | | | PENT/IPENT, | 0.88 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 708.2 | 45.5 |
| CH | 253.5 | 16.3 |
| MCH | 594.9 | 38.2 |
| TOTAL | 1556.6 | 100.0 |

PARAFFIN INDEX 1 0.387
PARAFFIN INDEX 2 12.780

18 JAN 84

727500 SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 2360 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 30.4 | 3.21 |
| NBUTANE | 66.2 | 6.99 |
| IPENTANE | 164.4 | 17.36 |
| NPENTANE | 93.2 | 9.84 |
| 22-DMB | 1.8 | 0.19 |
| CPENTANE | 12.8 | 1.35 |
| 23-DMB | 12.4 | 1.31 |
| 2-MP | 84.2 | 8.89 |
| 3-MP | 34.4 | 3.64 |
| NHEXANE | 72.6 | 7.67 |
| MCP | 81.3 | 8.59 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 4.2 | 0.44 |
| 223-TMB | 0.0 | 0.00 |
| CHEXANE | 39.9 | 4.21 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 20.0 | 2.11 |
| 23-DMP , | 12.2 | 1.28 |
| 3-MHEX , | 17.8 | 1.88 |
| 1C3-DMCP | 17.5 | 1.85 |
| 1T3-DMCP | 12.8 | 1.36 |
| 1T2-DMCP | 17.2 | 1.81 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 65.6 | 6.93 |
| 1C2-DMCP | 0.0 | 0.00 |
| MCH | 86.0 | 9.08 |

| | TOTALS PPB | NORM PERCENT |
|---|---|---|
| ALL COMP | 947. | |
| GASOLINE | 947. | |
| NAPHTHENES | 267. | 28.25 |
| C6-7 | 447. | 47.21 |

| SIG COMP RATIOS | |
|---|---|
| C1/C2 | 1.13 |
| A /D2 | 7.77 |
| C1/D2 | 8.20 |
| CH/MCP | 0.49 |
| PENT/IPENT, | 0.57 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 81.3 | 39.3 |
| CH | 39.9 | 19.3 |
| MCH | 86.0 | 41.5 |
| TOTAL | 207.2 | 100.0 |

PARAFFIN INDEX 1 0.795
PARAFFIN INDEX 2 22.701

18 JAN 84

72750Q SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 2390 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 8.4 | 2.23 |
| NBUTANE | 55.3 | 14.57 |
| IPENTANE | 29.3 | 7.74 |
| NPENTANE | 74.4 | 19.63 |
| 22-DMB | 0.0 | 0.00 |
| CPENTANE | 6.5 | 1.72 |
| 23-DMB | 2.7 | 0.72 |
| 2-MP | 22.5 | 5.93 |
| 3-MP | 16.5 | 4.35 |
| NHEXANE | 33.2 | 8.76 |
| MCP | 45.0 | 11.87 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 0.0 | 0.00 |
| 223-TMB | 0.0 | 0.00 |
| CHEXANE | 18.2 | 4.81 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 0.0 | 0.00 |
| 23-DMP , | 0.0 | 0.00 |
| 3-MHEX , | 4.8 | 1.26 |
| 1C3-DMCP | 3.0 | 0.80 |

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| 1T3-DMCP | 0.0 | 0.00 |
| 1T2-DMCP | 6.9 | 1.82 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 12.1 | 3.19 |
| 1C2-DMCP | 0.0 | 0.00 |
| MCH | 40.1 | 10.59 |

| | TOTALS PPB | NORM PERCENT | SIG COMP RATIOS | |
|---|---|---|---|---|
| ALL COMP | 379. | | C1/C2 | 1.06 |
| GASOLINE | 379. | | A /D2 | 9.46 |
| NAPHTHENES | 120. | 31.62 | C1/D2 | 12.19 |
| C6-7 | 163. | 43.10 | CH/MCP | 0.41 |
| | | | PENT/IPENT, | 2.54 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 45.0 | 43.5 |
| CH | 18.2 | 17.6 |
| MCH | 40.1 | 38.8 |
| TOTAL | 103.3 | 100.0 |

PARAFFIN INDEX 1 0.481

PARAFFIN INDEX 2 14.195

18 JAN 84

72750S SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 2420 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 14.1 | 0.45 |
| NBUTANE | 38.3 | 1.21 |
| IPENTANE | 150.0 | 4.72 |
| NPENTANE | 183.0 | 5.76 |
| 22-DMB | 4.8 | 0.15 |
| CPENTANE | 45.5 | 1.43 |
| 23-DMB | 31.2 | 0.98 |
| 2-MP | 238.3 | 7.50 |
| 3-MP | 138.6 | 4.37 |
| NHEXANE | 257.3 | 8.10 |
| MCP | 428.0 | 13.48 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 8.0 | 0.25 |
| 223-TMB | 2.9 | 0.09 |
| CHEXANE | 267.7 | 8.43 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 85.4 | 2.69 |
| 23-DMP , | 52.1 | 1.64 |
| 3-MHEX , | 103.0 | 3.24 |
| 1C3-DMCP | 73.7 | 2.32 |
| 1T3-DMCP | 74.6 | 2.35 |
| 1T2-DMCP | 137.0 | 4.31 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 157.7 | 4.97 |
| 1C2-DMCP | 10.9 | 0.34 |
| MCH | 673.6 | 21.21 |

| | TOTALS PPB | NORM PERCENT | SIG COMP RATIOS | |
|---|---|---|---|---|
| ALL COMP | 3176. | | C1/C2 | 1.42 |
| GASOLINE | 3176. | | A /D2 | 4.03 |
| NAPHTHENES | 1711. | 53.87 | C1/D2 | 9.97 |
| C6-7 | 2332. | 73.43 | CH/MCP | 0.63 |
| | | | PENT/IPENT, | 1.22 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 428.0 | 31.3 |
| CH | 267.7 | 19.6 |
| MCH | 673.6 | 49.2 |
| TOTAL | 1369.3 | 100.0 |

PARAFFIN INDEX 1 0.661
PARAFFIN INDEX 2 9.706

18 JAN 84

72750U SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 2450 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 69.5 | 2.10 |
| NBUTANE | 49.3 | 1.49 |
| IPENTANE | 30.7 | 0.93 |
| NPENTANE | 87.0 | 2.63 |
| 22-DMB | 0.0 | 0.00 |
| CPENTANE | 58.6 | 1.77 |
| 23-DMB | 19.2 | 0.58 |
| 2-MP | 140.4 | 4.24 |
| 3-MP | 94.8 | 2.86 |
| NHEXANE | 285.4 | 8.62 |
| MCP | 543.2 | 16.42 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 1.6 | 0.05 |
| 223-TMB | 0.0 | 0.00 |
| CHEXANE | 448.4 | 13.55 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 72.3 | 2.18 |
| 23-DMP , | 40.7 | 1.23 |
| 3-MHEX , | 72.9 | 2.20 |
| 1C3-DMCP | 94.2 | 2.85 |

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| 1T3-DMCP | 76.3 | 2.31 |
| 1T2-DMCP | 132.0 | 3.99 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 388.9 | 11.75 |
| 1C2-DMCP | 10.1 | 0.31 |
| MCH | 593.2 | 17.93 |

| | TOTALS PPB | NORM PERCENT | SIG COMP RATIOS | |
|---|---|---|---|---|
| ALL COMP | 3309. | | C1/C2 | 1.30 |
| GASOLINE | 3309. | | A /D2 | 9.25 |
| NAPHTHENES | 1956. | 59.12 | C1/D2 | 15.28 |
| C6-7 | 2759. | 83.39 | CH/MCP | 0.83 |
| | | | PENT/IPENT, | 2.83 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 543.2 | 34.3 |
| CH | 448.4 | 28.3 |
| MCH | 593.2 | 37.4 |
| TOTAL | 1584.8 | 100.0 |

PARAFFIN INDEX 1 0.480
PARAFFIN INDEX 2 20.267

18 JAN 84

72750W SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 2480 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 126.9 | 2.03 |
| NBUTANE | 298.7 | 4.77 |
| IPENTANE | 587.9 | 9.40 |
| NPENTANE | 522.7 | 8.35 |
| 22-DMB | 6.7 | 0.11 |
| CPENTANE | 136.5 | 2.18 |
| 23-DMB | 63.2 | 1.01 |
| 2-MP | 465.1 | 7.43 |
| 3-MP | 224.2 | 3.58 |
| NHEXANE | 456.2 | 7.29 |
| MCP | 947.3 | 15.14 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 5.4 | 0.09 |
| 223-TMB | 0.0 | 0.00 |
| CHEXANE | 402.0 | 6.43 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 85.7 | 1.37 |
| 23-DMP , | 71.2 | 1.14 |
| 3-MHEX , | 104.0 | 1.66 |
| 1C3-DMCP | 147.1 | 2.35 |

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| 1T3-DMCP | 140.6 | 2.25 |
| 1T2-DMCP | 237.8 | 3.80 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 107.9 | 1.73 |
| 1C2-DMCP | 26.9 | 0.43 |
| MCH | 1092.1 | 17.46 |

| | TOTALS PPB | NORM PERCENT |
|---|---|---|
| ALL COMP | 6256. | |
| GASOLINE | 6256. | |
| NAPHTHENES | 3130. | 50.04 |
| C6-7 | 3824. | 61.13 |

SIG COMP RATIOS

| | |
|---|---|
| C1/C2 | 1.05 |
| A /D2 | 5.42 |
| C1/D2 | 15.18 |
| CH/MCP | 0.42 |
| PENT/IPENT, | 0.89 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 947.3 | 38.8 |
| CH | 402.0 | 16.5 |
| MCH | 1092.1 | 44.7 |
| TOTAL | 2441.4 | 100.0 |

PARAFFIN INDEX 1 0.361
PARAFFIN INDEX 2 4.519

18 JAN 84

72750Y SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 2510 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 13.7 | 1.43 |
| NBUTANE | 25.7 | 2.68 |
| IPENTANE | 46.3 | 4.83 |
| NPENTANE | 56.0 | 5.84 |
| 22-DMB | 2.4 | 0.25 |
| CPENTANE | 8.4 | 0.88 |
| 23-DMB | 8.6 | 0.90 |
| 2-MP | 64.5 | 6.73 |
| 3-MP | 32.6 | 3.40 |
| NHEXANE | 62.7 | 6.54 |
| MCP | 102.0 | 10.64 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 4.4 | 0.46 |
| 223-TMB | 0.0 | 0.00 |
| CHEXANE | 64.0 | 6.68 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 29.6 | 3.08 |
| 23-DMP , | 18.0 | 1.88 |
| 3-MHEX , | 34.1 | 3.56 |
| 1C3-DMCP | 23.7 | 2.47 |

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| 1T3-DMCP | 24.7 | 2.58 |
| 1T2-DMCP | 34.7 | 3.62 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 94.9 | 9.90 |
| 1C2-DMCP | 5.1 | 0.53 |
| MCH | 202.5 | 21.12 |

| | TOTALS PPB | NORM PERCENT |
|---|---|---|
| ALL COMP | 959. | |
| GASOLINE | 959. | |
| NAPHTHENES | 465. | 48.52 |
| C6-7 | 700. | 73.07 |

| SIG COMP RATIOS | |
|---|---|
| C1/C2 | 1.56 |
| A /D2 | 4.62 |
| C1/D2 | 8.67 |
| CH/MCP | 0.63 |
| PENT/IPENT, | 1.21 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 102.0 | 27.7 |
| CH | 64.0 | 17.4 |
| MCH | 202.5 | 55.0 |
| TOTAL | 368.5 | 100.0 |

PARAFFIN INDEX 1 0.767
PARAFFIN INDEX 2 18.040

18 JAN 84

72751A SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 2540 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 46.7 | 0.71 |
| NBUTANE | 167.1 | 2.53 |
| IPENTANE | 200.3 | 3.03 |
| NPENTANE | 312.2 | 4.73 |
| 22-DMB | 10.9 | 0.17 |
| CPENTANE | 45.9 | 0.69 |
| 23-DMB | 41.4 | 0.63 |
| 2-MP | 276.3 | 4.18 |
| 3-MP | 145.6 | 2.20 |
| NHEXANE | 490.2 | 7.42 |
| MCP | 364.3 | 5.51 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 27.4 | 0.42 |
| 223-TMB | 4.9 | 0.07 |
| CHEXANE | 619.0 | 9.37 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 244.3 | 3.70 |
| 23-DMP , | 132.5 | 2.01 |
| 3-MHEX , | 267.5 | 4.05 |
| 1C3-DMCP | 87.3 | 1.32 |

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| 1T3-DMCP | 89.8 | 1.36 |
| 1T2-DMCP | 172.4 | 2.61 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 904.2 | 13.69 |
| 1C2-DMCP | 18.1 | 0.27 |
| MCH | 1938.2 | 29.34 |

| | TOTALS PPB | NORM PERCENT | SIG COMP RATIOS | |
|---|---|---|---|---|
| ALL COMP | 6607. | | C1/C2 | 3.83 |
| GASOLINE | 6607. | | A /D2 | 5.21 |
| NAPHTHENES | 3335. | 50.48 | C1/D2 | 10.47 |
| C6-7 | 5360. | 81.13 | CH/MCP | 1.70 |
| | | | PENT/IPENT, | 1.56 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 364.3 | 12.5 |
| CH | 619.0 | 21.2 |
| MCH | 1938.2 | 66.3 |
| TOTAL | 2921.5 | 100.0 |

PARAFFIN INDEX 1 1.464
PARAFFIN INDEX 2 20.295

18 JAN 84

72751C SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 2570 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 40.1 | 1.40 |
| NBUTANE | 86.0 | 2.99 |
| IPENTANE | 77.2 | 2.68 |
| NPENTANE | 272.7 | 9.48 |
| 22-DMB | 3.2 | 0.11 |
| CPENTANE | 24.5 | 0.85 |
| 23-DMB | 14.7 | 0.51 |
| 2-MP | 113.7 | 3.95 |
| 3-MP | 66.4 | 2.31 |
| NHEXANE | 227.5 | 7.91 |
| MCP | 181.1 | 6.30 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 8.1 | 0.28 |
| 223-TMB | 0.0 | 0.00 |
| CHEXANE | 258.2 | 8.98 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 98.3 | 3.42 |
| 23-DMP , | 36.3 | 1.26 |
| 3-MHEX , | 80.8 | 2.81 |
| 1C3-DMCP | 34.7 | 1.21 |

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| 1T3-DMCP | 49.1 | 1.71 |
| 1T2-DMCP | 48.4 | 1.68 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 353.3 | 12.28 |
| 1C2-DMCP | 5.3 | 0.18 |
| MCH | 796.6 | 27.69 |

| | TOTALS PPB | NORM PERCENT | SIG COMP RATIOS | |
|---|---|---|---|---|
| ALL COMP | 2876. | | C1/C2 | 3.62 |
| GASOLINE | 2876. | | A /D2 | 7.19 |
| NAPHTHENES | 1398. | 48.60 | C1/D2 | 14.27 |
| C6-7 | 2178. | 75.71 | CH/MCP | 1.43 |
| | | | PENT/IPENT, | 3.53 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 181.1 | 14.7 |
| CH | 258.2 | 20.9 |
| MCH | 796.6 | 64.5 |
| TOTAL | 1235.9 | 100.0 |

PARAFFIN INDEX 1 1.354
PARAFFIN INDEX 2 20.124

18 JAN 84

72751E SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 2600 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 0.0 | 0.00 |
| NBUTANE | 0.0 | 0.00 |
| IPENTANE | 0.0 | 0.00 |
| NPENTANE | 0.0 | 0.00 |
| 22-DMB | 0.0 | 0.00 |
| CPENTANE | 23.4 | 1.91 |
| 23-DMB | 13.9 | 1.13 |
| 2-MP | 89.7 | 7.31 |
| 3-MP | 45.6 | 3.72 |
| NHEXANE | 103.3 | 8.42 |
| MCP | 152.2 | 12.41 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 2.9 | 0.24 |
| 223-TMB | 0.0 | 0.00 |
| CHEXANE | 181.9 | 14.83 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 28.0 | 2.28 |
| 23-DMP , | 23.5 | 1.91 |
| 3-MHEX , | 24.9 | 2.03 |
| 1C3-DMCP | 23.9 | 1.95 |
| 1T3-DMCP | 22.9 | 1.86 |
| 1T2-DMCP | 35.0 | 2.85 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 90.3 | 7.36 |
| 1C2-DMCP | 0.0 | 0.00 |
| MCH | 365.3 | 29.78 |

| | TOTALS PPB | NORM PERCENT | SIG COMP RATIOS | |
|---|---|---|---|---|
| ALL COMP | 1227. | | C1/C2 | 2.46 |
| GASOLINE | 1227. | | A /D2 | 7.77 |
| NAPHTHENES | 805. | 65.59 | C1/D2 | 23.07 |
| C6-7 | 1054. | 85.93 | CH/MCP | 1.19 |
| | | | PENT/IPENT, | 999.99 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 152.2 | 21.8 |
| CH | 181.9 | 26.0 |
| MCH | 365.3 | 52.2 |
| TOTAL | 699.4 | 100.0 |

PARAFFIN INDEX 1 0.647
PARAFFIN INDEX 2 11.348

18 JAN 84

727516 SUNFISH-2, GIPPSLAND BASIN, AUSTRALIA, 2630 M

| | TOTAL PPB | NORM PERCENT |
|---|---|---|
| METHANE | 0.0 | |
| ETHANE | 0.0 | |
| PROPANE | 0.0 | |
| IBUTANE | 91.8 | 1.67 |
| NBUTANE | 374.4 | 6.80 |
| IPENTANE | 321.9 | 5.84 |
| NPENTANE | 429.6 | 7.80 |
| 22-DMB | 6.5 | 0.12 |
| CPENTANE | 84.3 | 1.53 |
| 23-DMB | 36.6 | 0.66 |
| 2-MP | 226.9 | 4.12 |
| 3-MP | 112.3 | 2.04 |
| NHEXANE | 337.1 | 6.12 |
| MCP | 427.2 | 7.76 |
| 22-DMP | 0.0 | 0.00 |
| 24-DMP | 7.3 | 0.13 |
| 223-TMB | 0.0 | 0.00 |
| CHEXANE | 599.0 | 10.87 |
| 33-DMP , | 0.0 | 0.00 |
| 11-DMCP | 0.0 | 0.00 |
| 2-MHEX , | 76.2 | 1.38 |
| 23-DMP , | 54.4 | 0.99 |
| 3-MHEX , | 71.8 | 1.30 |
| 1C3-DMCP | 649.0 | 11.78 |
| 1T3-DMCP | 90.1 | 1.64 |
| 1T2-DMCP | 87.9 | 1.60 |
| 3-EPENT | 0.0 | 0.00 |
| 224-TMP | 0.0 | 0.00 |
| NHEPTANE | 256.5 | 4.66 |
| 1C2-DMCP | 13.5 | 0.24 |
| MCH | 1154.0 | 20.95 |

| | TOTALS PPB | NORM PERCENT |
|---|---|---|
| ALL COMP | 5508. | |
| GASOLINE | 5508. | |
| NAPHTHENES | 3105. | 56.37 |
| C6-7 | 3824. | 69.42 |

| SIG COMP RATIOS | |
|---|---|
| C1/C2 | 1.44 |
| A /D2 | 8.26 |
| C1/D2 | 25.47 |
| CH/MCP | 1.40 |
| PENT/IPENT, | 1.33 |

| | PPB | NORM PERCENT |
|---|---|---|
| MCP | 427.2 | 19.6 |
| CH | 599.0 | 27.5 |
| MCH | 1154.0 | 52.9 |
| TOTAL | 2180.2 | 100.0 |

PARAFFIN INDEX 1 0.179
PARAFFIN INDEX 2 8.440

# APPENDIX-2

Detailed Vitrinite Reflectance and Exinite

Fluorescence Date - Report by A.C. Cook

SUNFISH NO. 1

| KK No. | Esso No. | Depth m | $\bar{R}_v$ max % | Range $R_v$ max % | N | Exinite fluorescence (Remarks) |
|---|---|---|---|---|---|---|
| 19076 | 72738 -H | 1602.7 SWC | 0.41 | 0.34-0.53 | 8 | Rare sporinite and phytoplankton, dull yellow. (Claystone, partly calcareous. D.o.m. rare to sparse, V>I>E. Vitrinite rare to sparse, inertinite and exinite rare. Abundant foraminiferal tests. Sparse pyrite.) |
| 19077 | 72738 -Y | 1834.4 SWC | 0.41 | 0.33-0.49 | 20 | Sparse sporinite and phytoplankton, yellow to orange, rare cutinite, dull yellow and orange. (Siltstone. D.o.m. abundant, V>E>I. Vitrinite abundant, exinite common and inertinite sparse to common. Abundant pyrite.) |
| 19078 | 72736 -Z | 2073 SWC | 0.49 | 0.36-0.58 | 25 | Common cutinite and liptodetrinite, yellow to orange, sparse to common sporinite, yellow to orange, rare resinite, bright yellow, abundant desmocollinite, weak brown. (Siltstone. D.o.m. abundant, V>E>I. Vitrinite and exinite abundant, inertinite common. Common pyrite.) |
| 19079 | 72736 -K | 2295.1 SWC | 0.55 | 0.45-0.63 | 25 | Abundant sporinite and liptodetrinite, yellow to orange, common cutinite, yellow to orange, sparse suberinite, dull orange, rare bitumen, yellow, abundant vitrinite, weak brown. (Shaly coal>coal>siltstone. Coal is vitrite>clarite. D.o.m. abundant, V>E>I. Vitrinite and exinite abundant, inertinite common. Abundant pyrite.) |
| 19080 | 72736 -A | 2477.7 SWC | 0.40 | 0.30-0.64 | 28 | Common cutinite and liptodetrinite, yellow to orange, sparse sporinite, yellow, rare resinite, orange, rare suberinite, dull orange, abundant desmocollinite, weak brown. (Siltstone. D.o.m. abundant, I>V>or=E. Inertinite abundant, vitrinite and exinite common to abundant. Sparse pyrite.) |
| 19081 | 72735 -H | 2599.6 SWC | 0.60 | 0.48-0.67 | 29 | Abundant cutinite and sporinite, yellow to dull orange, common liptodetrinite, yellow to dull orange, sparse resinite, greenish yellow and yellow, sparse suberinite, dull orange, abundant desmocollinite, weak brown. (Siltstone, shaly coal and coal. Coal is vitrite>inertite, V>I>E. D.o.m. abundant, V>E>I. Vitrinite and exinite abundant, inertinite common. Sparse pyrite.) |
| 19082 | 72735 -A | 2639 SWC | 0.67 | 0.53-0.76 | 27 | Sparse liptodetrinite, orange to dull orange, rare to sparse sporinite and cutinite, orange to dull orange, rare to sparse suberinite, dull orange, rare resinite, yellow, rare ?phytoplankton, yellow. (Sandstone and siltstone. D.o.m. abundant, V>I>E. Vitrinite common to abundant, inertinite common, exinite sparse.) |

# APPENDIX 6

# APPENDIX 6

## SYNTHETIC SEISMIC TRACE

## SYNTHETIC SEISMIC TRACE

### PARAMETERS

| | |
|---|---|
| WELL: | Sunfish-2 |
| TD: | 2647 metres KB |
| KB: | 21 metres |
| WATER DEPTH: | 59 metres |
| POLARITY: | Trough represents acoustic impedance increase. |
| PULSE TYPE: | Zero phase, second devirative, Gaussian function. |
| PEAK FREQUENCY: | 40 Hz to 1000m, 28 Hz to 1900m, 20 Hz to 2750m |
| SAMPLE INTERVAL: | 3 metres |
| CHECKSHOT CORRECTIONS: | Yes |
| COMMENTS: | Sonic and density logs were edited as follows: |

Sonic: Readings at depths shallower than 795m KB deleted.
Readings at depths greater than 2635m KB held constant at 272 us/m

Density: Readings at depths shallower than 1610m KB held constant at 2.20 gm/cc.

Sonic and density logs were filtered with DESPIKE as follows:

Sonic: Window length - 5 metres
Spike width - 2 metres
Threshold - 100%

Density: Window length - 5 metres
Spike width - 2 metres
Threshold - 100%

0929L

PE902519

This is an enclosure indicator page.
The enclosure PE902519 is enclosed within the container PE902518 at this location in this document.

The enclosure PE902519 has the following characteristics:

ITEM_BARCODE = PE902519
CONTAINER_BARCODE = PE902518
NAME = Time Depth Curve - Seismic Trace
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = VELOCITY_CHART
DESCRIPTION = Time Depth Curve - Seismic trace
REMARKS =
DATE_CREATED = 4/05/84
DATE_RECEIVED = 5/10/84
W_NO = W833
WELL_NAME = Sunfish-2
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

# APPENDIX 7

# APPENDIX 7

## PETROLOGICAL DESCRIPTION

SUNFISH-2 VOLCANICS SAMPLE - Recovered from junk basket at T.D. of 2647m KB.

## Petrographic Description

### 1. Mineralogy

Composition of sample determined from point counts (500 points)

| | |
|---|---|
| Plagioclase | 45% |
| Pyroxene | 29% |
| Chlorite | 17% |
| Magnetite | 8% |

### 2. Texture

This sample displays characteristic ophitic texture - a xenomorphic granular texture with a distinctive relationship between the plagioclase and pyroxene crystals. Equigranular, and randomly oriented laths of labradorite ($An_{68}$) are enclosed in plates of clinopyroxene. This, together with magnetite, constitutes the finer-grained groundmass in which larger, euhedral augite crystals occur. These larger augite crystals considered to be early-form, display marginal actionlite alteration at the periphery or along the cleavages. This alteration occurs as a result of hydrothermal alteration, and produces a mottled texture. The core of these augite crystals is chloritized.

Spectacular vermicular chlorite is a common alteration product with extensive distribution throughout the sample. Some evidence of open-space filling by chlorite is also observed. Chloritization is attributed to synatectic alteration. The plagioclase and finer grained clinopyroxenes show little evidence for alteration, although the plagioclase laths have suffered some chloritization.

### 3. Name

Altered Dolerite.

# ENCLOSURES

PE604509

This is an enclosure indicator page.
The enclosure PE604509 is enclosed within the container PE902518 at this location in this document.

The enclosure PE604509 has the following characteristics:

| | |
|---|---|
| ITEM_BARCODE = | PE604509 |
| CONTAINER_BARCODE = | PE902518 |
| NAME = | Well Completion Log |
| BASIN = | GIPPSLAND BASIN |
| PERMIT = | VIC/P1 |
| TYPE = | WELL |
| SUBTYPE = | COMPLETION_LOG |
| DESCRIPTION = | Completion Log (enclosure from WCR vol.2) for Sunfish-2 |
| REMARKS = | |
| DATE_CREATED = | 14/10/83 |
| DATE_RECEIVED = | |
| W_NO = | W833 |
| WELL_NAME = | SUNFISH-2 |
| CONTRACTOR = | |
| CLIENT_OP_CO = | ESSO EXPLORATION AND PRODUCTION AUSTRALIA INC |

(Inserted by DNRE - Vic Govt Mines Dept)

PE905992

This is an enclosure indicator page.
The enclosure PE905992 is enclosed within the container PE902518 at this location in this document.

The enclosure PE905992 has the following characteristics:

ITEM_BARCODE = PE905992
CONTAINER_BARCODE = PE902518
NAME = Geological Cross Section A-A'
BASIN = GIPPSLAND BASIN
PERMIT = VIC/P1
TYPE = WELL
SUBTYPE = CROSS_SECTION
DESCRIPTION = Geological Cross Section A-A' (enclosure 1 from WCR vol.2) for Sunfish-2
REMARKS =
DATE_CREATED = 31/10/84
DATE_RECEIVED =
W_NO = W833
WELL_NAME = SUNFISH-2
CONTRACTOR =
CLIENT_OP_CO = ESSO EXPLORATION AND PRODUCTION AUSTRALIA INC

(Inserted by DNRE - Vic Govt Mines Dept)

PE904259

This is an enclosure indicator page.
The enclosure PE904259 is enclosed within the container PE902518 at this location in this document.

The enclosure PE904259 has the following characteristics:

| | |
|---|---|
| ITEM_BARCODE = | PE904259 |
| CONTAINER_BARCODE = | PE902518 |
| NAME = | Geological Cross Section |
| BASIN = | GIPPSLAND |
| PERMIT = | VIC/P1 |
| TYPE = | WELL |
| SUBTYPE = | CROSS_SECTION |
| DESCRIPTION = | Geological Cross Section (post-drill) for Sunfish-2 |
| REMARKS = | |
| DATE_CREATED = | 31/10/84 |
| DATE_RECEIVED = | 25/01/85 |
| W_NO = | W833 |
| WELL_NAME = | SUNFISH-2 |
| CONTRACTOR = | |
| CLIENT_OP_CO = | ESSO AUSTRALIA LIMITED |

(Inserted by DNRE - Vic Govt Mines Dept)

PE902520

This is an enclosure indicator page.
The enclosure PE902520 is enclosed within the container PE902518 at this location in this document.

The enclosure PE902520 has the following characteristics:

| | |
|---|---|
| ITEM_BARCODE = | PE902520 |
| CONTAINER_BARCODE = | PE902518 |
| NAME = | Top of Latrobe Group Structure Map |
| BASIN = | GIPPSLAND |
| PERMIT = | |
| TYPE = | SEISMIC |
| SUBTYPE = | HRZN_CNTR_MAP |
| DESCRIPTION = | Top of Latrobe Group Structure Map, Most Likely Case (enclosure from WCR) for Sunfish-2 |
| REMARKS = | |
| DATE_CREATED = | 1/06/84 |
| DATE_RECEIVED = | 25/01/85 |
| W_NO = | W833 |
| WELL_NAME = | Sunfish-2 |
| CONTRACTOR = | ESSO |
| CLIENT_OP_CO = | ESSO |

(Inserted by DNRE - Vic Govt Mines Dept)

PE902521

This is an enclosure indicator page.
The enclosure PE902521 is enclosed within the container PE902518 at this location in this document.

The enclosure PE902521 has the following characteristics:

ITEM_BARCODE = PE902521
CONTAINER_BARCODE = PE902518
NAME = M.diversus Structure Map
BASIN = GIPPSLAND
PERMIT =
TYPE = SEISMIC
SUBTYPE = HRZN_CNTR_MAP
DESCRIPTION = M.diversus Structure Map, Most Likely Case (enclosure from WCR) for Sunfish-2
REMARKS =
DATE_CREATED = 1/07/84
DATE_RECEIVED = 25/01/85
W_NO = W833
WELL_NAME = Sunfish-2
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

PE902522

This is an enclosure indicator page.
The enclosure PE902522 is enclosed within the container PE902518 at this location in this document.

The enclosure PE902522 has the following characteristics:

| | |
|---|---|
| ITEM_BARCODE = | PE902522 |
| CONTAINER_BARCODE = | PE902518 |
| NAME = | Lower L balmei Structure Map |
| BASIN = | GIPPSLAND |
| PERMIT = | |
| TYPE = | SEISMIC |
| SUBTYPE = | HRZN_CNTR_MAP |
| DESCRIPTION = | Lower L balmei Structure Map, Most Likely Case (enclosure from WCR) for Sunfish-2 |
| REMARKS = | |
| DATE_CREATED = | 1/06/84 |
| DATE_RECEIVED = | 25/01/85 |
| W_NO = | W833 |
| WELL_NAME = | Sunfish-2 |
| CONTRACTOR = | ESSO |
| CLIENT_OP_CO = | ESSO |

(Inserted by DNRE - Vic Govt Mines Dept)

PE604650

This is an enclosure indicator page.
The enclosure PE604650 is enclosed within the container PE902518 at this location in this document.

The enclosure PE604650 has the following characteristics:

| | |
|---|---|
| ITEM_BARCODE = | PE604650 |
| CONTAINER_BARCODE = | PE902518 |
| NAME = | Well Completion Log |
| BASIN = | GIPPSLAND |
| PERMIT = | VIC/P1 |
| TYPE = | WELL |
| SUBTYPE = | COMPLETION_LOG |
| DESCRIPTION = | Well Completion Log for Sunfish-2 |
| REMARKS = | |
| DATE_CREATED = | 14/10/83 |
| DATE_RECEIVED = | 25/01/85 |
| W_NO = | W833 |
| WELL_NAME = | SUNFISH-2 |
| CONTRACTOR = | |
| CLIENT_OP_CO = | ESSO AUSTRALIA LIMITED |

(Inserted by DNRE - Vic Govt Mines Dept)