WCR VOL 2

GUDGEON-1

W1120

# WELL COMPLETION REPORT



# GUDGEON 1

## VOLUME 2

INTERPRETATIVE DATA

GIPPSLAND BASIN, VICTORIA

ESSO AUSTRALIA LTD

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November 1995

# WELL COMPLETION REPORT

## *VOLUME 2: INTERPRETATIVE DATA*

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## 1. *SUMMARY OF WELL RESULTS*

Gudgeon 1 was spudded on 10 March 1995. A deviated well was drilled from an optimal sea floor location in 279m water depth to intersect offset structural crests at the primary and secondary target levels. The primary target at Top of Latrobe Group was intersected at 3051 m MD KB (Measured Depth from Kelly Bushing) some 23m low to prognosis. Hydrocarbon shows were recorded in the primary target and a total of two cores were cut and recovered from the Late Cretaceous (Upper T. Longus) section of the Latrobe Group. Core 1 was cut from 3063-3081 m MD KB with a total of 17.1 m recovered. Core 2 was cut from 3081-3088 m MD KB, with some 4 m recovered. Formation tops are summarised in Table 1.

The well was drilled to 3283 m MD KB and as a result of drilling problems, the first logging suite was recorded, comprising gamma, resistivity, neutron and density tools. The well was then drilled to a total depth of 3837 m MD KB in Late Cretaceous (Lower T. Longus) age section on 24 April 1995. A second electric logging suite consisting of resitivity, gamma, neutron, density, sonic and dip meter tools was run together with a pressure survey, vertical incidence VSP and sidewall core runs.

Log interpretation, pressure data and core analyses indicated that a 31 m TVT (True Vertical Thickness) gross oil column was present in the primary target at the Top of Latrobe Group. The gross hydrocarbon column consisted of an upper 9.9 m TVT net oil pay zone (shoreface reservoir) separated by low net/gross section (coastal plain) from a lower 5.4 m TVT net oil pay zone (shoreface reservoir), with an oil/water contact interpreted at 3088 m MD KB. A further 2.2 m TVT net oil pay was mapped in the low net/gross coastal plain section. The oil/water contact was intersected at -2862 mss TVD (True Vertical Depth from seal level datum) and is some 28 m metres deeper than the nearby Blackback/Terakihi oil/water contact at -2834 mss TVD. Both secondary target reservoirs (Terracotta and Bronze seismic markers) were water saturated with no hydrocarbons encountered. The well was cased as a Top of Latrobe Group oil discovery and suspended on 9 May 1995.

**Table 1 : Prognosed vs Actual Formation Tops**

| Formation/Horizon | Predicted Depth (mss TVD) | Actual Depth (mss TVD) | Actual Depth (m MD KB) |
|---|---|---|---|
| Sea Floor | -280 | -279 | 305 |
| Base High Velocity Limestone | Not Prognosed | -2474 | 2622 |
| Lakes Entrance Formation | -2525 | -2517 | 2674 |
| Oligocene Wedge | Not Prognosed | -2814 | 3029.5 |
| Top of Latrobe Group Unconformity | -2808 | -2831 | 3051 |
| Chrome Seismic Marker | Not Prognosed | -2971 | 3222 |
| Terracotta Seismic Marker (downlap surface) | -3090 | -3096 | 3375 |
| Terracotta Seismic Marker (sequence boundary) | -3100 | -3107 | 3388 |
| Bronze Seismic Marker (high amplitude) | -3318 | -3342 | 3666 |
| **Total Depth** | **-3500** | **-3493** | **-3837** |

KB Height = 25 m

## 2. *INTRODUCTION*

Gudgeon 1 is an exploration well located in VIC/L6 in some 279m water depth. The well was sited primarily to test a NW-SE trending Top of Latrobe Group erosional remnant, some 7km west of the Blackback and Terakihi oil discoveries in VIC/P24 (Figure 1). Secondary targets were identified within the Terracotta and Bronze seismic marker sequences (T. Longus age), within the Latrobe Group. Both secondary targets were associated with lowside rollover against the NW-SE trending, north easterly dipping Gudgeon fault system.

Gudgeon 1 was the first exploration well of three drilled during the 1995 drilling programme and incorporated structure mapping from the 1992 South Marlin Channel 3D grid and depth conversion, reservoir, seal and migration models from the Collaborative Research Project, completed in 1994

## 3. *STRUCTURE*

At a regional scale, the Gudgeon feature is situated to the south of the main Latrobe Group rift axis which formed during an extensional structural phase, associated with the opening of the Tasman Sea some 80 million years before present. The southern side of the Latrobe Group rift basin is dominated by a series of major NW-SE trending, north easterly dipping basement involved extensional faults. The "floor" of the rift basin occurs some 10km to the northeast of the Gudgeon 1 location and is largely unstructured and coincides with the Eocene age South Marlin Channel canyon axis. The northern side of the Latrobe Group rift basin is also dominated by NW-SE trending extensional faults but they dip to the south west instead.

These faults exhibit both 'dogleg' and relay patterns in map view, typical of extensional, basins, and show evidence of structural growth during Latrobe Group deposition. Due to their orientation parallel to the main post-Latrobe Group compressional stress field (NW-SE), they have not reactivated and inverted as do the older more favourably orientated E-W and NE-SW trending Golden Beach Group faults, on the northern margin.

The Gudgeon feature is situated to the south of the Latrobe Group rift axis, on the lowside of the last major northeast dipping basement involved extensional fault, The latter fault is fundamental to formation of structural closure at Gudgeon-1. The Gudgeon fault has two main characteristics. The first being decreasing fault heave to the SE towards Blackback Field and the second being a local shallowing of the northeasterly dipping fault plain along a local 'dogleg', adjacent to the Gudgeon feature. This change in fault plain dip produces a typical fault bend fold geometry. When combined with adequate fault throw (170m at the Terracotta seismic marker level) in the vicinity of the Gudgeon feature, a prominent structural rollover is generated within the Intra-Latrobe Group strata. Later erosion associated with the Eocene age South Marlin Channel and Tuna/Flounder Channel incise valleys removed the northeast limb of the antiform at the level of the Terracotta (Lower T. Longus age) seismic marker. Structural integrity remained intact at the deeper Bronze (Lower T. Longus age) seismic marker level.

Further erosion at the Top of Latrobe Group resulted in preferential loss of section on the lowside of the fault, progressively cutting deeper to the north and east towards the South Marlin Channel canyon axis. Following this erosional event, the Lakes Entrance Formation deposited during an Oligocene to Miocene age base level rise. Erosional relief established at the Top of Latrobe Group was progressively onlapped and buried by deepwater mudstones. By Mid Miocene time, the Gudgeon feature was a northwest plunging elongate, erosional topographic high, with a local closed Mid Miocene Datum to Top of Latrobe Group thin at the Gudgeon location.

Structural closure was enhanced by the Mid Miocene to Recent age regional tilt down to the east of the Gippsland Basin. The latter is attributed to compressional reactivation of the northern and western margins of the basin, as well as loading of a thick depositional wedge of Gippsland Limestone (Mid Miocene to Recent) on the eastern side of the basin.

The Gudgeon feature has a mapped Top of Latrobe Group crest at 2828 mss TVD some 3m updip of the drilled location at Gudgeon 1 and a structural spill point at 2862 mss TVD, at the southeastern end of the structure towards Blackback Field. The spill point corresponds to the interpreted field oil/water contact at 2862 mss TVD.

Closure is only minor (10-15m) at the Terracotta seismic maker level due to erosion of the eastern limb of the antiform by Eocene age erosion. At the deeper Bronze level structural closure is present but a lack of seal downgrades the prospectivity of this zone.

## 4. *STRATIGRAPHY*

A thick succession (2238m) of Gippsland Limestone (Mid Miocene to Recent age) was penetrated by Gudgeon 1 (Figure 2). No cuttings were collected down to 1133 m MD KB as this section was drilled without a riser and cuttings were ejected at the sea floor. Below this depth, the Gippsland Limestone comprised light grey to olive grey fossiliferous calcilutite with interbeds of micritic calcarenite. The limestone changes to a marl with depth due to progressive increase in clastic content.

The Lakes Entrance Formation (Oligocene to Middle Miocene age) is 314 m thick and comprises light grey to light brown calcareous claystone with traces of fossil fragments and carbonaceous detritus. At the base of the Lakes Entrance Formation, is some 17m of high density and high velocity claystone (P. Tuberculatus spore-pollen zone) similar to the 35m section penetrated at Blackback-3 and informally referred to as the Oligocene Wedge.

The Latrobe Group (Late Cretaceous age) is some 662m+ thick in Gudgeon-1 and the youngest section confirmed by palynological data, is Late Cretaceous in age, corresponding to the Upper T. Longus spore-pollen zone (Appendix 1). A 1m thick glauconitic siltstone was penetrated directly under the Top of Latrobe Group Unconformity and although not dated, the log character resembles Gurnard Facies and may be Eocene age. The chronostatigraphic section encountered was as predicted from the Collaborative Research Project, with the partially eroded Mid Chrome to Oriental Blue sequence penetrated directly under the Top of Latrobe Group Unconformity (Enclosure 1).

The lithology of the Latrobe Group at Gudgeon 1 is dominated by sandstones with only minor mudstone and occasional thin coals. Much of the sandstone units are upper and lower shoreface facies associated with stacked highstand systems tracts of Lake Cretaceous age, particularly in the Upper T. Longus section above the Terracotta seismic marker sequence boundary.

Near the Top of Latrobe Group, a thin section of coastal plain facies was proposed within the stacked shoreface sandstones of the Mid Chrome to Oriental Blue seismic marker sequence and a total of 12m of interbedded mudstone, sandstone with minor coal was penetrated in the well.

Marine mudstones were poorly developed within the Latrobe Group and generally silt prone. A 22m gross thickness of marine siltstone/mudstone was intersected within the Terracotta to Chrome seismic marker sequence as predicted from the pre-drill Collaborative Research Project. Unfortunately, only 1.5m of this silt prone unit, achieved a shaliness in excess of 50%, suggesting limited seal potential within this unit.

The Lower T. Longus section and in particular below the Rose seismic marker sequence boundary was expected to be mainly coastal plain mudstones, which could potentially seal estuarine sandstones at the Bronze seismic marker secondary target. Post drill results indicate this section to be sand prone (either shoreface of stacked channel sandstones), with poor seal development.

Although no electric logs were available below 3744 m MD KB (due to junk in the hole), the mudlog indicated high sand content, which decreases and is replaced by siltstone towards the base of the well. The oldest section penetrated in the well is late Cretaceous age and belongs to the Lower T. Longus spore-pollen zone.

## 5. *HYDROCARBONS*

No significant hydrocarbon shows were encountered within the Gippsland Limestone or Lakes Entrance Formation in Gudgeon 1. Background gas levels within this section varied typically from 0.5-25 units, with one broad peak of 100 units at 2007 m MD KB.

In the basal Lakes Entrance mudstones (3025-3051 m MD KB) which are the key seal unit to the underlying Top of Latrobe Group reservoirs, background gas varied from 0.7-3.5 units and typically comprised 97% methane, 2% ethane and 1% propane.

Below the Top of Latrobe Group unconformity from 3051 - 3063 m MD KB a broad gas peak was observed varying from 10-45 units with a composition of 68% methane, 13% ethane, 9% propane and 10% butane and pentane (combined). Hydrocarbon fluorescence was noted from 3051-3063 m MD KB, with 10% pale yellow, pin point to patchy fluorescence, giving a slow cut and no residue.

Core 1 was cut from 3063-3081 m MD KB and recovered 18 m of interbedded mudstone and siltstone with minor sandstone and a thin coal. Gas was not circulated to surface after coring but oil shows were recorded from sandstones within the core. Typically 50-60% bright pale yellow, patchy fluorescence was noted giving an instant cut with a thick residue ring.

Core 2 was cut from 3081-3088 m MD KB and recovered 4 m of sandstone exhibiting 20-40% moderately bright, pale yellow patchy fluorescence with an instant cut and a thick residue ring. A combination of log interpretation, pressure data and core analyses indicates a 31 m (True Vertical Thickness) gross oil column within the zone from 3051-3088 m MD KB at the Top of Latrobe Group. The reservoir properties and net pay are summarised in Table 2. The oil column is divided into 3 main zones. The upper zone is mainly shoreface sandstone and contains a total of 9.9 m TVT net oil pay with weighted mean porosity of 17%. Core data indicated 12-817 md permeability in the basal section (Appendix 4). The middle zone is mainly coastal plain with 2.2 m TVT net oil pay and weighted mean porosity of 15%. Core permeability varied from 31-1036 md. The lower zone comprises 5.4 m TVT net oil pay and 17% porosity with an oil/water contact interpreted at 2862 mss TVD. Core permeability varied from 12 md up to as high as 11 darcy's. The oil/water contact is some 28 m deeper than the Blackback and Terakihi oil fields contact at 2834 mss TVD and indicates a separate hydrocarbon accumulation at Gudgeon 1. Pressure data and downhole samples confirmed the hydrocarbon zones and a 46 degree API crude oil sample was collected from the upper zone (Volume 1, Appendix 4). The hydrocarbon zones are discussed in detail in Appendix 2.

Below the field oil/water contact at 3088 m MD KB gas readings returned to background levels of 0.5-3 units comprising 94% methane, 4% ethane and 2% propane.

A small gas peak of 4 units over a background of 2 units was recorded below the Terracotta seismic marker sequence marine mudstone unit from 3375-3379 m MD KB and comprised predominantly methane with minor ethane and propane. No fluorescence was observed. Only background gas was recorded down to total depth at 3837 m MD KB. Typically, 0.5-2.0 units were recorded comprising 96% methane, 3% ethane and 1% propane. No hydrocarbon fluorescence was noted in this section.

# Table 2 : Gudgeon 1 Summary of Reservoir Properties

| | Measured Depth | | | | | True Vertical Thickness |
|---|---|---|---|---|---|---|
| Reservoir | Interval (m MD KB) | Gross Thickness (m) | Net Thickness (m) | Ave N/G (%) | Ave Por (%) | Net Pay (m) |
| Upper | 3051.0-3052.5 | 1.5 | 0 | 0 | - | 9.9 |
| | 3052.5-3057.4 | 4.9 | 3.5 | 72 | 16 | |
| | 3057.0-3066.0 | 8.5 | 8.5 | 100 | 18 | |
| Middle | 3068.2-3073.5 | 5.4 | 1.2 | 23 | 14 | 2.2 |
| | 3074.5-3076.6 | 2.2 | 0 | 0 | - | |
| | 3077.2-3080.3 | 3.1 | 1.3 | 42 | 15 | |
| Lower | 3080.8-3088.0 | 7.2 | 6.4 | 88 | 17 | 5.4 |
| | | | | | | 17.5 |

OWC @ 3088 m MD KB (-2862 mss TVD).

For detail refer to Quantitative Log Interpretation In Appendix 2.

## 6. *GEOPHYSICAL DISCUSSION*

The Gudgeon feature was defined as a drillable prospect using the 1992 South Marlin Channel 3D grid. Data coverage was excellent over the prospect but decreased to the north at the edge of the grid.

The seismic pick for the Top of Latrobe Group primary target was interpreted to be at the lower zero crossing of the lead trough for quadrature phase data. The pick assumed that low impedance Lakes Entrance Formation would directly overlie high impedance Latrobe Group, with the high impedance Oligocene Wedge (penetrated at the nearby Blackback-3 well) expected to be absent.

Depth conversion was recognised as a problem (pre-drill) due to the present day sea floor canyon which incised from west to east across the inferred Top of Latrobe Group spill point for the Gudgeon Prospect. Associated time sag caused by this canyon as well as low velocity canyon fill sediment complicated depth conversion. Three independent methods of depth conversion were used pre-drill including, smooth stacking velocities, well interval velocities and isopach from Mid Miocene datum. All methods indicated valid structural closure for Gudgeon Prospect but a variable trap size. The most likely pre-drill case was derived from the stacking velocities method (using dense velocity analyses) and indicated a feature of some 2.5 $km^2$ areal extent with 57m vertical closure. The crest was interpreted at 2808 mss TVD with a spill point on the south western flank at 2865 mss TVD (Enclosure 2).

Post drill analysis indicated the Top of Latrobe Group was intersected at 2831 mss TVD some 23m low to prognosis, representing a depth error of less than 1%. In fact, much of the depth error at the well was a function of the time pick at Top of Latrobe Group, rather than the interval velocity used for depth conversion. The presence of an unexpected 17m thick high density (and high velocity) Oligocene wedge directly overlying the Top of Latrobe Group unconformity resulted in a shift in the time pick from the standard lower zero crossing on the lead trough (for quadrature phase data), to the middle of the following peak.. This resulted in a time shift of some 8 ms TWT and is demonstrated on the synthetic seismogram for Gudgeon 1 shown in Enclosure 3. The pre-drill vs post-drill interpretation at Top of Latrobe Group is shown on Crossline 1366 in Enclosure 4. The actual depth prognosis error attributed to interval velocity was minimal. In fact, the pre-drill time pick which was to the top of the Oligocene wedge was intersected 6m low.

Whilst depth conversion was generally successful at the drilled crest, problems are apparent at the southeastern end of the structure which is most effected by the sea floor canyon. Here an unstable velocity field results from unreliable stacking velocities which are due to raypath distortion. The latter is caused by rugose water bottom and low velocity sediment fill in the sea floor canyon.

There is a close correspondence between the pre-drill and post-drill mapped spill point depths at 2865 and 2862 mss TVD respectively. This appears to be a coincidence because post-drill structural analyses indicates that the spillpoint is at the southeastern end of the structure rather than the south western flank as indicated on the pre-drill map. In fact, pre-drill mapping indicated a lowest closing contour to the southeast at 2890 mss TVD, some 28m deeper than the true spillpoint at 2862 mss TVD. This suggests that structural sag from the sea floor canyon remained in the final pre-drill depth map. The apparent pre-drill spill point on the western flank is unlikely because preferential erosion at the Top of Latrobe Group occurred here, along the lowside of the Gudgeon fault. The Mid Miocene datum to Top of Latrobe Group isochron indicates a prominent thick, ensuring closure along this flank, with a clear spill point at the southeastern end of the Gudgeon feature (Enclosure 5).

Post-drill mapping utilises the Mid Miocene datum to Top of Latrobe Group isopach which is added to the Mid Miocene datum depth map (based on well control) to give depth to Top of Latrobe Group. This method has the advantage that it is independent of sea floor canyons and short period high or low velocity layers which effect seismic stacking velocities used for depth conversion. Whilst the depth map to the Mid Miocene datum lacks spatial control due to limited wells, this surface is relatively unstructured other than for local drape and compaction effects and a post Mid Miocene regional tilt to the east (Enclosure 6). Two depth maps to Top of Latrobe Group were produced using this method. The maps differ in that the time pick was varied to allow a constant thickness (Enclosure 7) and a variable thickness (Enclosure 8) of the Oligocene high impedance layer. The two maps are similar except that the constant Top of Latrobe Group pick results in more closure at the southeastern end of the prospect. Structural cross sections across the Gudgeon feature were generated for each case and are in Enclosures 9 and 10. Recent drilling results indicate that this isopach based depth conversion method can provide greater precision for mapping Top of Latrobe Group remnant structures in areas of rugose water bottom and velocity anomalies, compared to conventional stacking velocity based depth conversion.

Depth conversion for intra-Latrobe Group horizons was based on an isopach from Top of Latrobe Group to the intra-Latrobe Group horizon. This was added to the Top of Latrobe Group depth to give depth to the intra-Latrobe horizon. Minor structural closure (10-15 m) was evident post-drill at the level of the Terracotta seismic marker sequence but failure of this secondary objective was probably due to an inadequate marine mudstone seal (Enclosure 11).

Whilst structural closure was evident at the deeper Bronze seismic marker level, no seal was developed.

Possible hydrocarbon related amplitude anomalies were noted pre-drill within structural closure at the Terracotta and the Bronze seismic markers but proved to be associated with changes from low impedance porous sandstones to high impedance silica cemented sandstones.

## 7. *GEOLOGICAL DISCUSSION*

Reservoir properties were predicted pre-drill using regional correlations from the Gippsland Collaborative Study.

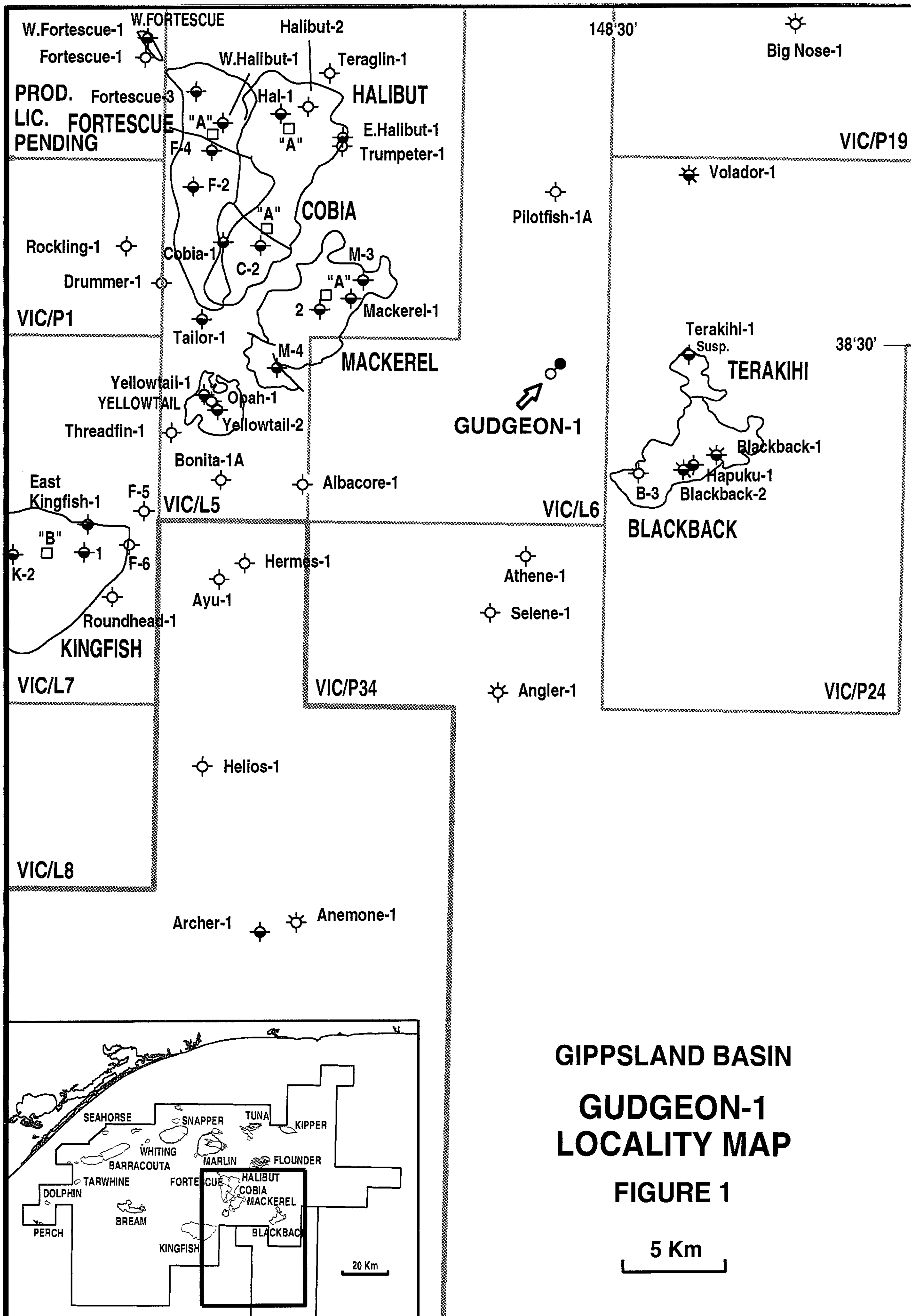
For the Top of Latrobe Group primary target the reservoir section was predicted to be the highstand systems tract of the Mid Chrome to Oriental Blue seismic marker sequence. Seismic facies mapping indicated the well should penetrate mainly upper shoreface facies with thin interbeds of coastal plain at the depositional shelf slope break. The pre-drill estimate of net/gross = 0.8 for the expected 57m gross hydrocarbon column was interpolated from the surrounding Pilotfish-1A, Athene-1 and Terakihi-1 wells. This assumed a progressive increase from low net/gross at Pilotfish-1A in the coastal plain, to high net/gross at Athene-1 and Terakihi-1 in the upper and lower shoreface facies respectively. The actual net/gross at Gudgeon-1 was 0.64 for an equivalent 57m column due to 12m of coastal plain mudstones and siltstones and some thin marine siltstones within this interval. The actual post-drill closure height is only 31 metres at the well and the 12m thick coastal plain section reduced the total net/gross down to only 0.49. The nearby wells are shown on the stratigraphic cross section in Enclosure 12.

Pre-drill estimates suggested average porosity of 0.21 could be expected within the postulated 57m gross column based on depth/porosity trends from the nearby Terakihi-1 and Athene-1 wells. Post-drill results indicated average porosity of only 0.17 within the interval due to the presence of siliceous cement within the sandstones. This cement is pervasive with depth reducing average porosity to 0.15 in the Bronze to Terracotta seismic marker interval. Gudgeon-1 has anomalously low porosity compared to nearby wells which indicates caution is required when applying regional well based porosity trends.

The presence of local amplitude anomalies within the intra-Latrobe Group section at Gudgeon-1 appears to correlate with cemented sandstone layers and may indicate that porosity reduction is localised around the active portion of the Gudgeon Fault which has the most heave.

The secondary target at the Terracotta to Mid Chrome seismic marker sequence relied on the presence of a marine mudstone to seal the lowside rollover trap. Pre-drill estimates of some 20m of gross marine mudstone were accurate with 22m intersected in the well. Unfortunately, the majority of this unit was silt prone with only 1.5m (encompassing the dowlap surface) having a shaliness in excess of 50%. Minor antithetic faulting on the lowside roll over structure with throws <10m are not detectable on this 3D data set and would readily contribute to seal failure. Also post-drill structural mapping indicates minimal closure (10-15m) at this target.

The deeper Bronze seismic marker secondary objective required coastal plain mudstones to seal a possible estuarine sandstone reservoir. This section proved highly sand prone and one possible cause of failure for this target is lack of seal.




GIPPSLAND BASIN

GUDGEON-1 LOCALITY MAP

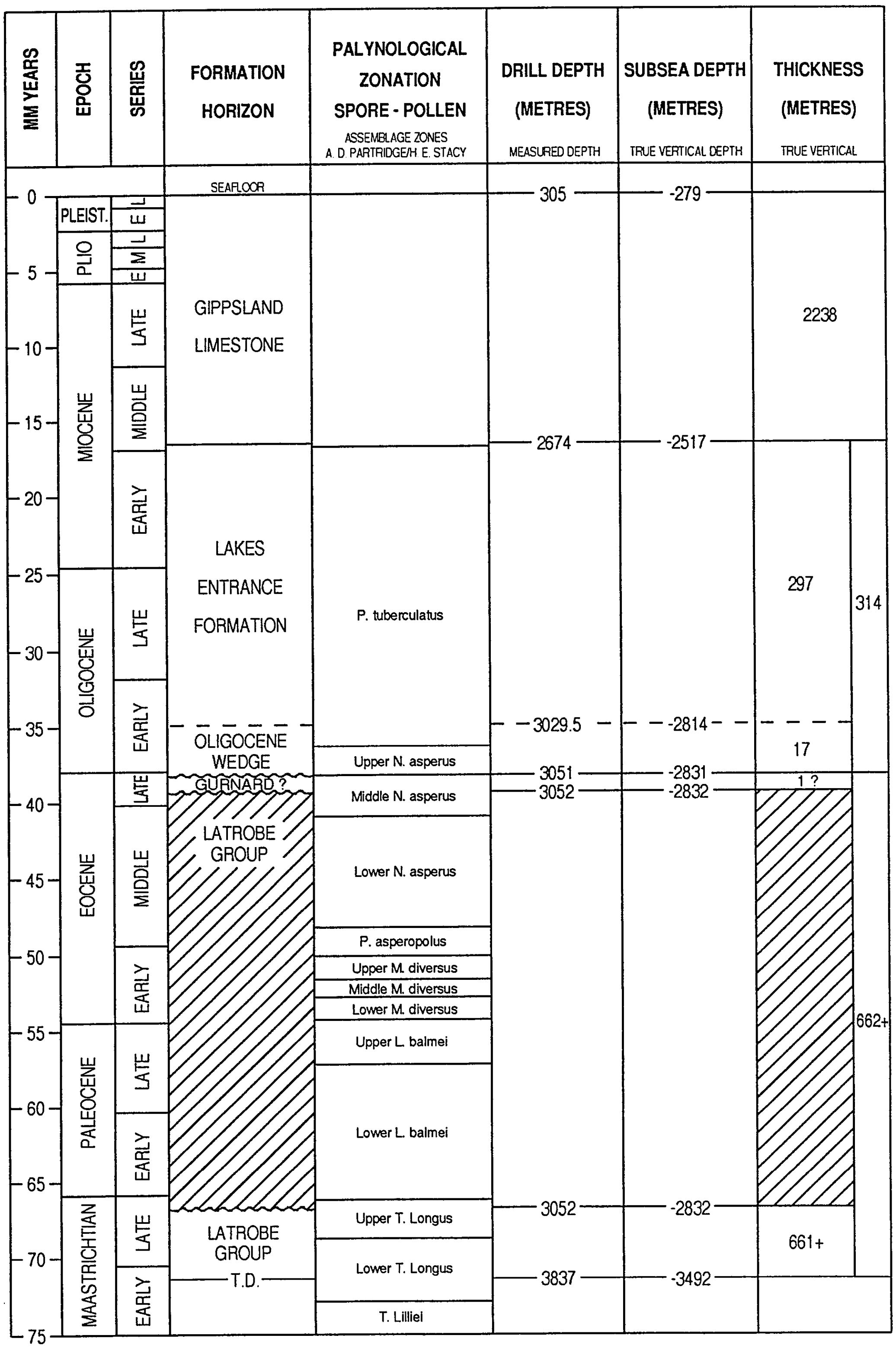
FIGURE 1

6 Nov '95 GPB00140

## GIPPSLAND BASIN

# GUDGEON-1 STRATIGRAPHIC SECTION

## FIGURE 2




K.B. = 25.3m

# Appendix 1

# APPENDIX 1

# GUDGEON 1

## Palynological Analysis

# Palynological Analysis of Core and Cuttings Near Top of Latrobe in Gudgeon-1, Gippsland Basin.

by

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Biostrata Report 1995/8

8 May 1995

## INTERPRETATIVE DATA



## BASIC DATA

# INTERPRETATIVE DATA

## Summary

While the well Gudgeon-1 was still drilling seven samples from core-1 and one cuttings interval were analysed to check the age at the Top of Latrobe. The following results were obtained:

| | | |
|---|---|---|
| Cuttings | 3045-3055m | **CAVED Oligocene- Miocene ASSEMBLAGE.** *P. tuberculatus* Spore-pollen Zone and *Operculodinium* Microplankton Superzone with assemblage all caved from overlying Seaspray Group. Although a few rare Eocene fossils were recorded they are not zone diagnostic. |
| Core-1 | 3064-3078m | **Maastrichtian.** Upper *T. longus* Spore-pollen Zone and *M. druggii* Microplankton Zone (only at 3072m) |


## Introduction

The samples were shipped to Laola Pty Ltd on Friday 31 March 1995, processed the next day and collected and analysed on Sunday 2 April. The initial verbal report on that day was followed by a written Provisional Report sent as a facsimile on 3 April. Additional palynological slides were prepared upon a subsequent request to confirm the age dating in the core samples and a revised provisional report was provided on 20 April 1995.

Approximately 15 grams of the samples were processed for palynological analysis. Residue yields from the cuttings was very low although palynomorph concentration was high. In contrast the cores gave high yields with low to occasionally very low palynomorph concentrations. Preservation of palynomorphs was generally poor to fair in rushed palynological slides but improved to fair to occasionally good in second batch of slides. Spore-pollen diversity was generally moderate whilst the only significant microplankton diversity was recorded in the cuttings and most of those species were caved.

The interpretative data with zone identification and Confidence Ratings are recorded in Table-1 and basic data on residue yields, preservation and diversity are recorded on Tables-2. Species identified in the samples are listed on Tables-3 & 4. Relinquishment list for palynological slides and residues from samples analysed are provided at the end of the report.

Zone and age determinations are based on the zonation schemes described by Stover & Partridge (1973) and Helby, Morgan & Partridge (1987), with the addition of the *Operculodinium* Superzone which is a modification of the dinoflagellate zonation scheme discussed in outline by Partridge (1975, 1976). Author citations for most spore-pollen species can be sourced from Stover & Partridge (1973, 1982) and Helby, Morgan & Partridge (1987), and those for dinoflagellates from the indexes of Lentin & Williams (1985, 1989). Species names followed by "ms" are unpublished manuscript names.

**_P. tuberculatus_ Spore-pollen Zone and**
**_Operculodinium_ Microplankton Superzone**

The assemblage from the cuttings is dominated by dinoflagellates the great majority of which are caved from the overlying Seaspray Group. Although the assemblage is highly diverse the species recorded have been restricted to the common or index species sufficient to adequately demonstrate the caved origin of the assemblage. The restricted species is necessary because the Oligocene and Miocene assemblages in the Gippsland Basin are still largely undocumented. Typical of long ranging species found throughout most of the Seaspray Group are *Operculodinium centrocarpum*, *Lingulodinium machaerophorum*, *Hystrichokolpoma rigaudae*, *Systematophora placacantha* and the ubiquitous *Spiniferites* spp. In addition there are species typical of the basal Oligocene part of the Seaspray Group most of which are unpublished manuscript species. These include *Pyxidinopsis pontus* ms, *Protoellipsodinium simplex* ms, *P. mamilatus* ms and *Tectatodinium marlum* ms. Then there are a number of species are restricted or more common in the Miocene part of the group, including *Melitasphaeridium choanophorum* and *Tuberculodinium vancompoae*. The possibility of some Eocene component in the sample in suggested by the observation of single specimens of *Areosphaeridium capricornum* and *Wetzeliella articulata* in the slides. Unfortunately, these species are not diagnostic of a single zone and because of their rarity they could just as easily be reworked like a number of the spore-pollen recorded. The assemblage of the latter consists mainly of long ranging species except for the frequent occurrence of the spore *Cyatheacidites annulatus* which is diagnostic of the *P. tuberculatus* Zone.

**Upper _T. longus_ Spore-pollen Zone and**
**_M. druggii_ Microplankton Zone**

The seven core sample have an average diversity of 19+ species and a composite diversity of 49+ species including interpreted reworked species and microplankton. The assemblage treated as a composite of all seven samples is no older than the Upper *T. longus* Zone based on the common occurrence of *Gambierina rudata* and presence of *Stereisporites (Tripunctisporis)* spp. in most samples. An age no younger than this zone is based on at least eleven species considered not to range above this zone, unless as reworked specimens. Described species are *Battenipollis sectilis, Beaupreaidites orbiculatus, Forcipites* (al. *Tricolpites*) *longus, Quadraplanus brossus, Tricolpites confessus* and *Tricolporites lilliei*. Manuscript species are *Camarozonosporites horrendus, Propylipollis crotonoides, Proteacidites clinei* and *P. reticuloconcavus*. The presence of *Grapnelispora evansii* in five of the seven samples suggests a position low within the zone as this form is not consistent or not present in the upper part of the zone.

Several of the samples contained organic fragments suggestive of *Manumiella*-like microplankton but only the sample at 3072m contained identifiable specimens. Although poorly preserved *Manumiella conorata* was confidently identified enabling assignment of that sample to the *M. druggii* Zone. The only other fossil identified as a microplankton is *Amosopollis cruciformis* now considered a algal cyst following Helby, Morgan & Partridge (1987, p.55).

## References

HELBY, R., MORGAN, R. & PARTRIDGE, A.D., 1987. A palynological zonation of the Australian Mesozoic. *Mem. Ass. Australas. Palaeontols 4*, 1-94.

LENTIN, J.K. & WILLIAMS, G.L., 1985. Fossil Dinoflagellates: Index to genera and species, 1985 Edition. *Canadian Tech. Rep. Hydrog. Ocean Sci. 60*, 1-451.

LENTIN, J.K. & WILLIAMS, G.L., 1989. Fossil Dinoflagellates: Index to genera and species, 1989 Edition. *AASP Contribution Series No. 20*, 1-473.

PARTRIDGE, A.D., 1975. Palynological zonal scheme for the Tertiary of the Bass Strait Basin (Introducing Paleogene Dinoflagellate Zones and Late Neogene Spore-Pollen Zones). *Geol. Soc. Aust. Symposium on the Geology of Bass Strait and Environs, Melbourne*, November, 1975. *Esso Aust. Ltd. Palaeo. Rept. 1975/17* (unpubl.).

PARTRIDGE, A.D., 1976. The geological expression of eustacy in the early Tertiary of the Gippsland Basin. *APEA J. 16* (1), 73-79.

STOVER, L.E. & PARTRIDGE, A.D., 1973. Tertiary and late Cretaceous spores and pollen from the Gippsland Basin, southeastern Australia. *Proc. R. Soc. Vict. 85*, 237-286.

STOVER, L.E. & PARTRIDGE, A.D., 1982. Eocene spore-pollen from the Werillup Formation, Western Australia. *Palynology 6*, 69-95.

**Table-1: Interpretative Palynological Data for Gudgeon-1, Gippsland Basin.**

| Sample Type | Depth (m) | Spore-Pollen Zone | *CR | Microplankton Zone | *CR | Comments or Key Species |
|---|---|---|---|---|---|---|
| Cuttings | 3045-3055 | *P. tuberculatus* | D3 | *Operculodinium* Superzone | D3 | Assemblages overwhelmed by cavings from the Lakes Entrance Formation. Zones not accurate to depth. |
| Core-1 | 3064.0 | Upper *T. longus* | A1 | | | Several specimens of *Stereisporites (Tripunctisporis)* spp. and common *Gambierina rudata* recorded. |
| Core-1 | 3066.0 | *T. longus* | A3 | | | No species diagnostic of Upper subzone recorded. |
| Core-1 | 3067.0 | Upper *T. longus* | A1 | | | A single specimens of *Stereisporites (Tripunctisporis)* spp. and common *Gambierina rudata* recorded. |
| Core-1 | 3071.0 | Indeterminate | | | | Palynomorph concentration too low. |
| Core-1 | 3072.0 | Upper *T. longus* | A1 | *M. druggii* | | *G. rudata* common. Poorly preserved *Manumiella conorata* confirms microplankton zone. |
| Core-1 | 3074.0 | Upper *T. longus* | A1 | | | *Stereisporites (Tripunctisporis)* spp. and common *Gambierina rudata* confirm Upper subzone. |
| Core-1 | 3078.0 | Upper *T. longus* | A2 | | | A single specimen of *Stereisporites (Tripunctisporis)* spp. recorded. |

## *Confidence Ratings

**Alpha codes:** Linked to sample type

| | |
|---|---|
| **A** | Core |
| **B** | Sidewall core |
| **C** | Coal cuttings |
| **D** | Ditch cuttings |
| **E** | Junk basket |
| **F** | Miscellaneous/unknown |
| **G** | Outcrop |

**Numeric codes:** Linked to fossil assemblage

| | | |
|---|---|---|
| 1 | **Excellent confidence:** | High diversity assemblage recorded with key zone species. |
| 2 | **Good confidence:** | Moderately diverse assemblage recorded with key zone species. |
| 3 | **Fair confidence:** | Low diversity assemblage recorded with key zone species. |
| 4 | **Poor confidence:** | Moderate to high diversity assemblage recorded without key zone species. |
| 5 | **Very low confidence:** | Low diversity assemblage recorded without key zone species. |

# BASIC DATA

**Table 2: Basic Palynomorph Data for Gudgeon-2, Gippsland Basin.**

| Sample Type | Depth (m) | Residue Yield | Palynomorph Concentration | Palynomorph Preservation | Number S-P Species | Number MP Species |
|---|---|---|---|---|---|---|
| Cuttings | 3045-3055 | Low | High | Poor-good | 14+ | 18+ |
| Core | 3064 | High | Moderate | Poor-fair | 29+ | 1? |
| Core | 3066 | High | Low | Poor-fair | 15+ | 1 |
| Core | 3067 | High | Low | Poor-fair | 21+ | 1 |
| Core | 3071 | High | Very low | Poor | 5+ | |
| Core | 3072 | High | Low | Poor | 21+ | 1 |
| Core | 3074 | High | Low | Poor-fair | 27+ | |
| Core | 3078 | High | Low | Poor | 16+ | |

**Table 3: Species list for Gudgeon-1**

| SPECIES | Core depths in metres | | | | | | |
|---|---|---|---|---|---|---|---|
| | 3064 | 3066 | 3067 | 3071 | 3072 | 3074 | 3078 |
| **SPORE-POLLEN** | | | | | | | |
| *Araucariacites australis* | X | X | X | | X | X | X |
| *Baculatisporites* spp. | F | | X | | X | X | X |
| *Battenipollis sectilis* | | | | | | X | |
| *Beaupreaidites orbiculatus* | X | | | | | | |
| *Camarozonosporites australiensis* | X | | X | X | | X | |
| *Camarozonosporites heskermensis* | X | | | | X | | |
| *Camarozonosporites horrendus* ms | X | | | | | X | |
| *Cicatricosisporites australiensis* | X | | | | | X | |
| *Cyathidies australis* **RW** | X | | X | | F | X | |
| *Cyathidites paleospora* | | | | | | X | |
| *Cyathidites splendens* | X | X | X | | F | X | |
| *Dilwynites granulatus* | | | X | | | | |
| *Forcipites longus* | X | | X | | X | X | |
| *Gambierina rudata* | C | C | C | X | C | C | F |
| *Gleicheniidites circinidites* | | X | | | X | X | X |
| *Grapnelispora evansii* | X | X | X | | X | | X |
| *Herkosporites elliottii* | X | | X | | | | |
| *Klukisporites scaberis* **RW** | | | | | | | X |
| *Laevigatosporites major* | | X | | | | | |
| *Laevigatosporites ovatus* | X | X | X | X | X | X | X |
| *Latrobosporites amplus* | X | | X | | X | X | X |
| *Latrobosporites ohaiensis* | | | | | X | | |
| *Lygistepollenites balmei* | F | | F | | X | F | X |
| *Lygistepollenites florinii* | X | | X | | | | |

## Table 3: Species list for Gudgeon-1 Cont...

| SPECIES | Core depths in metres | | | | | | |
|---|---|---|---|---|---|---|---|
| | 3064 | 3066 | 3067 | 3071 | 3072 | 3074 | 3078 |
| *Microcachryidites antarcticus* | X | | | | | X | |
| *Peninsulapollis askiniae* | X | | | | | | |
| *Peninsulapollis gillii* | X | X | | | | X | |
| *Periporopellenites polyoratus* | | X | | | | | |
| *Phyllocladidites mawsonii* | X | F | F | | X | F | F |
| *Phyllocladidites verrucosus* | | | | | | X | X |
| *Pilosisporites notensis* **RW** | X | | | | | | |
| *Podocarpidites* spp. | F | X | X | | X | F | |
| *Podosporites microsaccatus* | | | | F | | | |
| *Propylipollis crotonoides* ms | X | X | | | X | X | X |
| *Proteacidites clinei* ms | | | | | X | | |
| *Proteacidites palisadus* | | | | | | X | |
| *Proteacidites reticuloconcavus* ms | F | X | | | | | |
| *Proteacidites reticuloscabratus* | | | | | X | | |
| *Proteacidites* spp. | F | F | | C | F | C | F |
| *Quadraplanus brossus* | | | | | | X | |
| *Retitriletes* spp. | X | X | X | | X | X | X |
| *Stereisporites (Tripunctisporis)* spp. | C | | X | | | F | X |
| *Stereisporites antiquisporites* | X | X | X | | | F | X |
| *Tricolpites confessus* | | | X | | | | |
| *Tricolpites waiparaensis* | X | | | | | | |
| *Tricolporites lilliei* | X | | | | X | X | |
| *Tricolporites marginatus* ms. | | | X | | | | |
| **MICROPLANKTON** | | | | | | | |
| *Amosopollis cruciformis* | | X | X | | | | |
| *Manumiella conoratum* | | | | | X | | |
| *Manumiella* sp. indet. | | | | | X | | |

X = Present/Rare
F = Frequent
C = Common
cf = Compare with
ms = Manuscript name
**RW** = Reworked

## Table 4: Species list for Gudgeon-1

| SPECIES | Cuttings at 3045-55m |
|---|---|
| **SPORE-POLLEN** | |
| *Araucariacites australis* | X |
| *Cyatheacidites annulatus* | F |
| *Cyathidites paleospora* | X |
| *Cyathidites splendens* | X |
| *Granulatisporites trisinus* **RW** | X |
| *Haloragacidites harrisii* | X |
| *Ischyosporites gremius* | X |
| *Ischyosporites irregularis* ms | X |
| *Laevigatosporites major* | X |
| *Lygistepollenites florinii* | X |
| *Microbaculatisporites nodosa* **RW** | X |
| *Matonisporites ornamentalis* | X |
| *Nothofagidites asperus* | X |
| *Phyllocladidites mawsonii* | X |
| *Podocarpidites* spp. | F |
| *Verrucatosporites alienus* | X |
| **MICROPLANKTON** | |
| *Achomosphaera alcicornu* | X |
| ***Areosphaeridium capricorum**** | **X** |
| *Apteodinium australiense* | X |
| *Cyclopsiella vieta* | X |
| *Dapsilidinium pseudocolligerum* | C |
| *Hystrichokolpoma rigaudae* | F |
| *Impagidinium* spp. | X |
| *Lingulodinium machaerophorum* | X |
| *Meliasphaeridium choanophorum* | X |
| *Nematosphaeropsis rhizoma ms.* | X |
| *Operculodinium centrocarpum* | F |
| *Pentadinium laticinctum* | X |
| *Protoellipsodinium mamilatus* ms. | X |
| *Protoellipsodinium simplex* ms. | C |
| *Pyxidinopsis pontus* ms. | C |
| *Spiniferites ramosus* | X |
| *Systematophora placacantha* | X |
| *Tectatodinium marlum* ms. | X |
| *Tuberculodinium vancampoae* | X |
| ***Wetzeliella articulata**** | **X** |
| **OTHERS** | |
| Microforaminiferal liners | C |

**Bold*** = Probable **insitu** species

## RELINQUISHMENT LIST - PALYNOLOGY SLIDES

**WELL NAME & NO:** GUDGEON-1

**PREPARED BY:** A.D. PARTRIDGE

**DATE:** 26 APRIL 1995 Sheet 1 of 2

| SAMPLE TYPE | DEPTH (M) | CATALOGUE NUMBER | DESCRIPTION |
|---|---|---|---|
| Cuttings | 3045-55 | P196658 | Kerogen slide HCl sieved |
| Cuttings | 3045-55 | P196659 | Kerogen slide |
| Core-1 | 3064 | P196660 | Kerogen slide |
| Core-1 | 3064 | P196661 | Oxidised slide 2 |
| Core-1 | 3064 | P196662 | Oxidised slide 3 |
| Core-1 | 3064 | P196663 | Oxidised slide 4 |
| Core-1 | 3066 | P196664 | Kerogen slide |
| Core-1 | 3066 | P196665 | Oxidised slide 2 |
| Core-1 | 3066 | P196666 | Oxidised slide 3 |
| Core-1 | 3066 | P196667 | Oxidised slide 4 |
| Core-1 | 3067 | P196668 | Kerogen slide |
| Core-1 | 3067 | P196669 | Oxidised slide 2 |
| Core-1 | 3067 | P196670 | Oxidised slide 3 |
| Core-1 | 3067 | P196671 | Oxidised slide 4 |
| Core-1 | 3071 | P196672 | Oxidised slide 2 |
| Core-1 | 3071 | P196673 | Oxidised slide 3 |
| Core-1 | 3071 | P196674 | Oxidised slide 4 |
| Core-1 | 3071 | P196675 | Oxidised slide 5 |
| Core-1 | 3072 | P196676 | Kerogen slide |
| Core-1 | 3072 | P196677 | Oxidised slide 2 |
| Core-1 | 3072 | P196678 | Oxidised slide 3 |
| Core-1 | 3072 | P196679 | Oxidised slide 4 |
| Core-1 | 3074 | P196680 | Kerogen slide |
| Core-1 | 3074 | P196681 | Oxidised slide 2 |
| Core-1 | 3074 | P196682 | Oxidised slide 3 |
| Core-1 | 3074 | P196683 | Oxidised slide 4 |
| Core-1 | 3078 | P196684 | Kerogen slide |
| Core-1 | 3078 | P196685 | Oxidised slide 2 |
| Core-1 | 3078 | P196686 | Oxidised slide 3 |
| Core-1 | 3078 | P196687 | Oxidised slide 4 |

## RELINQUISHMENT LIST - RESIDUES

**WELL NAME & NO:** GUDGEON-1

**PREPARED BY:** A.D. PARTRIDGE

**DATE:** 26 APRIL 1995 Sheet 2 of 2

| SAMPLE TYPE | DEPTH (M) | DESCRIPTION |
|---|---|---|
| Core-1 | 3064 | Kerogen residue |
| Core-1 | 3064 | Oxidised residue |
| Core-1 | 3066 | Kerogen residue |
| Core-1 | 3066 | Oxidised residue |
| Core-1 | 3067 | Kerogen residue |
| Core-1 | 3067 | Oxidised residue |
| Core-1 | 3071 | Kerogen residue |
| Core-1 | 3071 | Oxidised residue |
| Core-1 | 3072 | Oxidised residue |
| Core-1 | 3074 | Kerogen residue |
| Core-1 | 3074 | Oxidised residue |
| Core-1 | 3078 | Kerogen residue |
| Core-1 | 3078 | Oxidised residue |

# Palynological Analysis of Sidewall Cores between 3012.1m to 3057.1m in Gudgeon-1 Gippsland Basin

by

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**Biostrata Report 1995/10**

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# CONTENTS

## INTERPRETATIVE DATA



## BASIC DATA

# INTERPRETATIVE DATA

## Introduction

Nine sidewall cores between 3012.1m to 3057.1m from across the top of Latrobe in Gudgeon-1 have been analysed to compliment the results obtained from a cuttings sample at 3045-55m and core samples between 3064m to 3078m reported on by Partridge (1995). The following table summarises both sets of analyses.

### Palynological Summary of Gudgeon-1

| AGE | UNIT/FACIES | SPORE-POLLEN ZONES (DINOFLAGELLATE ZONES) | DEPTHS mKB |
|---|---|---|---|
| MIOCENE TO OLIGOCENE | SEASPRAY GROUP | *P. tuberculatus* (*F. leos*) | 3012.1-3036.1 (3036.1) |
| EOCENE? TO PALEOCENE | LATROBE GROUP Glauconitic sandstone | Indeterminate sample (*T. evittii*) | 3053.6 (3055.0) |
| MAASTRICHTIAN | LATROBE GROUP Undifferentiated | Indeterminate sample Upper *T. longus* (*M. druggii*) | 3057.1 3064.0-3078.0 (3072.0) |

An average of 10 grams of the sidewall cores were split, cleaned where practical, then forwarded to Laola Pty Ltd in Perth for processing to prepare the palynological slides for analysis. The material was forwarded to Laola Pty Ltd on 10 May, returned on 18 May and the provisional report on results provided on 22 May. The interpretative data with zone identification and Confidence Ratings are recorded in Table 1 and basic data on residue yields, preservation and diversity are recorded on Tables 2 and 3.

Overall the residue yields on the samples were low from the Seaspray Group and very low to barren from Latrobe Group. Palynomorph concentration in productive samples was moderate to high. Preservation of palynomorphs varied from poor to good. From the Seaspray Group total spore-pollen diversity was 42+ species with an average diversity of 17+ species per sample, whilst total microplankton diversity was 24+ species with an average of 14+ species per sample. Diversity of the samples from the Latrobe Groups is much lower because of the lower recoveries. All species which have been identified with binomial names are tabulated in the text or on Table 4. The relinquishment list for palynological slides is provided at the end of the report. No palynological residues remained after preparation of the slides.

## Geological Comments

1. Of the nine samples analysed six are from the Seaspray Group. These are Early Oligocene in age and are referred to the *P. tuberculatus* Zone and *Operculodinium* Superzone. The other three samples are from the underlying Latrobe Group but only the middle sample contained a diagnostic assemblage assigned to the *T. evittii* microplankton Zone giving an Early Paleocene (Danian) age.

2. The *Fromea leos* microplankton Zone originally erected in Blackback-3 has been found in the deepest available sidewall sample from the Seaspray Group indicating the presence of the "Early Oligocene wedge" in Gudgeon-1. The sample at 3036.1m also contains the spore *Cyatheacidites annulatus* indicative of the *P. tuberculatus* Zone which suggests a position high in the *F. leos* Zone. As previously discussed by Partridge (1994) *Fromea leos* is considered to characterises a part of the Early Oligocene which appears to be only rarely preserved in the offshore portion of the Gippsland Basin.

3. Of the two samples of glauconitic sandstone supplied from the top of the Latrobe Group at 3053.6m and 3055m only the deeper sample contained an assemblage which is both *insitu* and datable. The *T. evittii* Zone assemblage recorded from this sample can be correlated to the Cretaceous/Tertiary boundary shale which forms the seal to the Flounder field reservoirs. In the adjacent Pilotfish-1A well the upper part of the this shale between approximately 2915m to 2935m becomes significantly glauconitic and contains both the *T. evittii* and the younger *P. pyrophorum* microplankton Zones (Macphail 1983, and subsequent analysis).

4. Although the shallower glauconitic sandstone at 3053.6m did not yield a reliable assemblage it shows greater lithological similarity to the Gurnard Formation than the deeper sample. Considering that a few typical Eocene dinoflagellates were recorded from the cuttings analysed over the interval 3045-55m (Partridge 1995, table 4) it is possible that a thin sliver (<2 metres) of Eocene may have been deposited at the Gudgeon-1 location.

5. The new age datings on the sidewall cores now leave an undated gap of only 9 metres between the *T. evittii* Zone top of the Upper *T. longus* zone identified in the cores from 3064m.

## Biostratigraphy

Zone and age determinations are based on the spore-pollen zonation scheme proposed by Stover & Partridge (1973), subsequently modified by Helby, Morgan & Partridge (1987), and a dinoflagellate zonation scheme which has only been published in outline by Partridge (1975, 1976).

Author citations for most spore-pollen species can be sourced from Stover & Partridge (1973, 1982), Helby, Morgan & Partridge (1987) or other references cited herein. Author citations for dinoflagellates can be found in the index of Lentin & Williams (1993) or other references cited herein. Species names followed by "ms" are unpublished manuscript names.

***Proteacidites tuberculatus* Spore-Pollen Zone: 3012.1-3036.1 metres**
**Early Oligocene.**

The six samples assigned to the zone all contain the key index species *Cyatheacidites annulatus*. Other index species are rare but include an as yet undescribed species of *Densoisporites* and *Foveotriletes lacunosus* at 3020m. This latter species suggests a generally younger Late Oligocene age but is interpreted as a contaminant as the sample also contains the notably younger dinoflagellate *Tuberculodinium vancampoae*. Overall the assemblages are of moderate diversity dominated by long ranging spores and pollen. *Nothofagidites* spp. dominates most counts with *Araucariacites australis* and *Podocarpidites* spp. the next most frequent types.

***Operculodinium* Microplankton Superzone: 3012.1-3036.1 metres**
**Oligocene-Miocene.**

All samples analysed from the Seaspray Group are dominated by dinoflagellates characteristic of the *Operculodinium* Superzone which has a broad Oligocene to Miocene age range. Total microplankton abundance ranges from 60% to 82% with an average of 74% indicating an open marine environment. The assemblages are all dominated by *Spiniferites* spp. and *Operculodinium centrocarpum* (Table 4). Unfortunately most of the key species in the microflora are still undocumented and are identified by manuscript names. Currently only two zones have been formally defined from the base of the superzone and of these only the *F. leos* Zone is recorded in Gudgeon-1.

***Fromea leos* Microplankton Zone:** **3036.1 metres**
**Early Oligocene.**

This is a new zone defined by Partridge (1994) as the interval above the acme of *Phthanoperidinium comatum* to the Last Appearance Datum (LAD) of *Fromea leos* ms. The assemblages recorded is similar compositionally to those in Blackback-3 with abundant *Spiniferites* spp. (55%) and *Operculodinium centrocarpum* (21%) but only frequent *Fromea leos* (4%). The assemblages is distinguished from the more usual *Operculodinium* Superzone microfloras found in the basal Seaspray Group in lacking the consistent and often common occurrence of the species *Dapsilidinium pseudocolligerum*, *Protoellipsodinium simplex* ms and *Pyxidinopsis pontus* ms. Additional taxonomic descriptive work needs to be done to fully document the microplankton assemblages in this zone.

**SWC 24 at 3053.6 metres.**

Residue recovery from this glauconitic sandstone was sufficient to make only one kerogen slide and one half coverslip oxidised slide. The kerogen slide contained what was interpreted as poorly preserved biodegraded terrestrially derived kerogen whilst the oxidised slide contained what appeared to be the indeterminate reaction product from the chemical processing. The recorded assemblage listed below was very limited and considering the sample was originally poorly cleaned and mud penetrated it is not believed the assemblage is either zone or age diagnostic.

| | |
|---|---|
| **Spore-Pollen** | |
| *Araucariacites australis* | 1 specimen |
| *Foraminisporis* sp. cf. *F. dailyi* | (reworked?) |
| **Microplankton** | |
| *Cyclopsiella vieta* | 1 specimen |
| *Operculodinium centrocarpum* | 1 specimen |
| *Spiniferites* spp. | 3+ specimens |

***Trithyrodinium evittii*** **Microplankton Zone:** **3055.0 metres**
**Early Paleocene.**

Only sufficient residue was recovered from the sample to prepare small filtered and unfiltered fractions of the residue for a single kerogen slide.
The assemblage contained the following species:

| | |
|---|---|
| **Spore-Pollen** | |
| *Araucariacites australis* | 1 specimen |
| *Cupressacites* pollen | 3 specimens (contaminants?) |
| *Dilwynites granulatus* | 2+ specimens |
| *Gleicheniidites circinidites* | 1 specimen |
| *Latrobosporites amplus* | 1 specimen |
| *Lygistepollenites florinii* | 1 specimen |
| *Nothofagidites emarcidus* | 1 specimen |
| *Nothofagidites endurus* | 1 specimen |
| *Phyllocladidites mawsonii* | 2+ specimens |
| *Podocarpidites* spp. | 3+ specimens |
| *Proteacidites* spp. | 3+ specimens |
| *Stereisporites antiquisporites* | 1 specimen |
| **Microplankton** | |
| *Areoligera senonensis* | 4 fragmented specimens |
| *Deflandrea speciosus* | 1 fragmented specimen |
| *Histiocysta* sp. | 2 specimens |
| *Operculodinium* sp. cf. *O. centrocarpum* | 1 specimen |
| *Palaeoperidinium pyrophorum* | 1 specimen |
| *Palambages* sp. | 1 specimen |
| *Spinidinium* sp. | 1 specimen |
| *Spiniferites ramosus* | 1 specimen |
| *Trithyrodinium evittii* | 12+ specimens |

This limited assemblage of between 50-60 specimens can be assigned to the *T. evittii* Zone on the abundance of the eponymous species (>20% of assemblage) supported by the occurrence of a single specimen of *Palaeoperidinium pyrophorum*. The associated spore-pollen assemblage is not zone diagnostic.

**SWC 22 at 3057.1 metres.**

The 6.2 grams of the sidewall core processed gave a meagre yield sufficent to prepare only a single 1/2 coverslip kerogen slide. The slide contained mainly large (50-200$\mu$m diameter) irregular black opaque to semitransulcent kerogen mixed with fine (<10$\mu$m diameter) irregular blebs which looked like chemical reaction product, together with very minor (<5% of total kerogen on slide) terrestrial kerogen including palynomorphs. The following limited assemblage was recorded:

| | |
|---|---|
| **Spore-Pollen** | |
| *Araucariacites australis* | 1 specimen |
| *Haloragacidites harrisii* | 1 specimen |
| *Lygistepollenites balmei* | 1 specimen |
| *Proteacidites clinei* ms | 1 specimen |
| *Stereisporites antiquisporites* | 1 specimen |
| **Microplankton** | |
| *Operculodinium* sp. cf. *O. centrocarpum* | 1 specimen |
| *Spiniferites* sp. | 1 specimen |

As this assemblage is a mixture of typical Oligocene, Eocene, Paleocene and Maastrichtian species it is very likely most, if not all, specimens are introduced contaminants from the mud penetrating the friable and poorly cleaned sample. No reliable age determination is possible based on this assemblage.

## References

HELBY, R., MORGAN, R. & PARTRIDGE, A.D., 1987. A palynological zonation of the Australian Mesozoic. *Mem. Ass. Australas. Palaeontols 4,* 1-94.

LENTIN, J.K. & WILLIAMS, G.L., 1993. Fossil Dinoflagellates: Index to genera and species, 1993 Edition. *AASP Contribution Series No. 28,* 1-856.

MACPHAIL, M.K., 1983. Palynological analysis of Pilotfish-1A, Gippsland Basin. *Esso Aust. Ltd. Palaeo. Rept. 1983/20*, 1-14.

PARTRIDGE, A.D., 1975. Palynological zonal scheme for the Tertiary of the Bass Strait Basin (Introducing Paleogene Dinoflagellate Zones and Late Neogene Spore-Pollen Zones). *Geol. Soc. Aust. Symposium on the Geology of Bass Strait and Environs, Melbourne*, November, 1975. *Esso Aust. Ltd. Palaeo. Rept. 1975/17* (unpubl.).

PARTRIDGE, A.D., 1976. The geological expression of eustacy in the early Tertiary of the Gippsland Basin. *APEA J. 16* (1), 73-79.

PARTRIDGE, A.D., 1994. Palynological analysis of sidewall cores from Blackback-3, Gippsland Basin. *Biostrata Report 1994/6*, 1-23.

PARTRIDGE, A.D., 1995. Palynological analysis of core and cuttings near top of Latrobe in Gudgeon-1, Gippsland Basin. *Biostrata Report 1995/8*, 1-10.

STOVER, L.E. & PARTRIDGE, A.D., 1973. Tertiary and late Cretaceous spores and pollen from the Gippsland Basin, southeastern Australia. *Proc. R. Soc. Vict. 85*, 237-286.

## Table 1: Interpretative Palynomorph Data for Gudgeon-1.

| Sample | Depth Metres | Spore-Pollen Zone (Microplankton Zone) | *CR | Comments and Key Species Present |
|---|---|---|---|---|
| SWC 59 | 3012.1 | *P. tuberculatus* (*Operculodinium* Superzone) | B2 | Microplankton 76%. Several specimens of spore *Cyatheacidites annulatus* recorded. |
| SWC 57 | 3014.0 | *P. tuberculatus* (*Operculodinium* Superzone) | B2 | Microplankton 78%. |
| SWC 52 | 3020.0 | *P. tuberculatus* (*Operculodinium* Superzone) | B2 | Microplankton 66%. *Foveotriletes lacunosus* and *Tuberculodinium vancampoae* present but possible contaminants. |
| SWC 48 | 3024.1 | *P. tuberculatus* (*Operculodinium* Superzone) | B2 | Microplankton 82%. *Protoellipsodinium simplex* 4%. |
| SWC 44 | 3030.1 | *P. tuberculatus* (*Operculodinium* Superzone) | B2 | Microplankton 82%. *Pyxidinopsis pontus* ms recorded with *P. simplex* at 3%. |
| SWC 39 | 3036.1 | *P. tuberculatus* (*Fromea leos*) | B2 | Microplankton 60%. *Cyatheacidites annulatus* still present. |
| SWC 24 | 3053.6 | Indeterminate | | Very low yield sample with all recorded palynomorphs being derived from drilling mud contamination. |
| SWC 23 | 3055.0 | (*T. evittii*) | B2 | Common *Trithyrodinium evittii* with very rare *Palaeoperidinium pyrophorum* in very low recovery sample. |
| SWC 22 | 3057.1 | Indeterminate | | Very low yield sample with only seven fossils recorded and all are likely contaminants. |

### *Confidence Ratings

**Alpha codes:** Linked to sample type

| | |
|---|---|
| **A** | Core |
| **B** | Sidewall core |
| **C** | Coal cuttings |
| **D** | Ditch cuttings |
| **E** | Junk basket |
| **F** | Miscellaneous/unknown |
| **G** | Outcrop |

**Numeric codes:** Linked to fossil assemblage

| | | |
|---|---|---|
| 1 | **Excellent confidence:** | High diversity assemblage recorded with key zone species. |
| 2 | **Good confidence:** | Moderately diverse assemblage recorded with key zone species. |
| 3 | **Fair confidence:** | Low diversity assemblage recorded with key zone species. |
| 4 | **Poor confidence:** | Moderate to high diversity assemblage recorded without key zone species. |
| 5 | **Very low confidence:** | Low diversity assemblage recorded without key zone species. |

# BASIC DATA

**Table 2: Basic Sample Data for Gudgeon-1, Gippsland Basin.**

| Sample Type | Depth (Metres) | Rec (cm) | Lithology | Sample Wt (g) | Residue Yield |
|---|---|---|---|---|---|
| SWC 59 | 3012.1 | 4.5 | Medium grey claystone. Sample badly broken with salt efflorescence and some mud penetration. Approx. 15mm split off, poorly cleaned. | 8.4 | Low |
| SWC 57 | 3104.0 | 4.0 | Light grey brittle claystone with white flecks (foraminifera?). Sample broken, approx. 10mm of sample split, moderately well cleaned. | 9.5 | Low |
| SWC 52 | 3020.0 | 4.0 | Medium grey claystone. Sample broken into small pieces and powder, which could not be cleaned. Approx. 1/3 split for processing. | 11.9 | Low |
| SWC 48 | 3024.1 | 5.0 | Medium grey brittle claystone. Sample partially broken and mud penetrated, poorly cleaned. Approx. 20mm split for processing. | 12.9 | Moderate |
| SWC 44 | 3030.1 | <4.0 | Light-medium grey soft claystone. Sample partially broken, minor mud penetration, moderately well cleaned. Approx. 20mm of mainly broken pieces split for processing. | 10.8 | Very low |
| SWC 39 | 3036.1 | <4.0 | Medium grey claystone. Sample broken, could not be cleaned. Approx. 1/3 split for processing. | 8.8 | Low |
| SWC 24 | 3053.6 | >2.5 | Glauconitic sandstone with approx. 50% glauconite and 5-10% disseminated pyrite including pyrite nodules. Approx. 1/2 sample split, avoiding pyrite - well cleaned. | 7.8 | Very low |
| SWC 23 | 3055.0 | <4.0 | Friable glauconitic sandstone with <20% glauconite. Sample all broken-up and could not be cleaned. Approx. 1/3 taken for processing. | 13.2 | Very low |
| SWC 22 | 3057.1 | <2.5 | Light-medium grey sandstone with clay matrix. Most of sample broken, poorly cleaned. Approx 1/2 taken for processing. | 6.2 | Very low |

**Table 3: Basic Palynomorph Data for Gudgeon-1, Gippsland Basin.**

| Sample Type | Depth (Metres) | Palynomorph Concentration | Palynomorph Preservation | Number S-P Species | Microplankton Abundance | Number MP Species |
|---|---|---|---|---|---|---|
| SWC 59 | 3012.1 | High | Poor-good | 16+ | Abundant | 14+ |
| SWC 57 | 3104.0 | Moderate | Poor-fair | 17+ | Abundant | 13+ |
| SWC 52 | 3020.0 | High | Poor-good | 19+ | Abundant | 14+ |
| SWC 48 | 3024.1 | High | Poor-fair | 15+ | Abundant | 15+ |
| SWC 44 | 3030.1 | Moderate | Poor | 12+ | Abundant | 13+ |
| SWC 39 | 3036.1 | High | Poor-good | 25+ | Abundant | 14+ |
| SWC 24 | 3053.6 | Very low | Poor | 1+ | Rare | 3+ |
| SWC 23 | 3055.0 | Low | Very poor-fair | 12+ | Moderate | 9+ |
| SWC 22 | 3057.1 | Very low | Poor-good | 5+ | Rare | 2+ |

**Table 4: Species List for Gudgeon-1, Gippsland Basin.**

| | SWC 59 | SWC 57 | SWC 52 | SWC 48 | SWC 44 | SWC 39 |
|---|---|---|---|---|---|---|
| Species | 3012.1 | 3014.0 | 3020.0 | 3024.1 | 3030.1 | 3036.1 |
| **SPORE-POLLEN** | | | | | | |
| *Araucariacites australis* | C | >15% | <5% | F | >10% | 10% |
| *Baculatisporites* spp. | X | X | | X | | X |
| *Cyatheacidites annulatus* | X | X | X | X | X | 8% |
| *Cyathidites paleospora* | F | X | >5% | X | 15% | 8% |
| *Dacrycarpites australiensis* | | | | | X | |
| *Densoisporites* n.sp. | | X | | | | X |
| *Dictyophyllidites arcuatus* | | | X | | | |
| *Didecitriletes ericianus* RW | | X | | | | |
| *Dilwynites granulatus* | F | <10% | <5% | F | X | 6% |
| *Dilwynites tuberculatus* | | | | X | | |
| *Ericipites crassiexinus* | | | X | | | |
| *Foveotriletes lacunosus* | | | X | | | |
| *Gleicheniidites circinidites* | X | | X | X | >10% | X |
| *Granulatisporites trisinus* RW | | | | | | X |
| *Haloragacidites harrisii* | | 5% | >5% | X | | 2% |
| *Ischyosporites irregularis* ms | X | X | | X | X | |
| *Laevigatosporites ovatus* | X | | | | | 4% |
| *Lycopodiumsporites* spp. | | X | | | | |
| *Lygistepollenites florinii* | X | X | >20% | X | | 4% |
| *Malvacipollis subtilis* | | | X | | | X |
| *Matonisporites ornamentalis* | | X | X | X | | X |
| *Microcachryidites antacticus* | X | | | | | |
| *Milfordia homeopunctatus* | | | X | | | |
| *Myrtaceidites parvus/mesonesus* | X | | | | | |
| *Nothofagidites asperus* | | | | | | X |
| *Nothofagidites brachyspinulosus* | | | | X | | 4% |
| *Nothofagidites deminutus* | X | | X | | | |
| *Nothofagidites emarcidus/heturus* | A | X | >10% | >30% | >10% | 33% |
| *Nothofagidites falcatus* | X | | | | | X |
| *Nothofagidites flemingii* | | | | X | | |
| *Periporopollenites polyoratus* | | | | | | X |
| *Peromonolites vellosus* | | | | | | X |
| *Phyllocladidites mawsonii* | C | <10% | X | | X | |
| *Podocarpidites* spp. | C | >15% | >15% | | X | 6% |
| *Podosporites microsaccatus* | | | | | | X |
| *Proteacidites* spp. | | 5% | >5% | | | |
| *Pseudowinterapollis couperi* | | | | | X | |

**Table 4: Species List for Gudgeon-1, Gippsland Basin cont...**

| | SWC 59 | SWC 57 | SWC 52 | SWC 48 | SWC 44 | SWC 39 |
|---|---|---|---|---|---|---|
| **Species** | 3012.1 | 3014.0 | 3020.0 | 3024.1 | 3030.1 | 3036.1 |
| *Stereisporites antiquisporites* | | X | >5% | | | X |
| *Stereisporites australis* | | | | | | X |
| *Tricolpites* spp. | | | | | | 4% |
| *Triletes tuberculiformis* | | | | X | | X |
| **TOTAL SPORE-POLLEN COUNT** | **27** | **24** | **42** | **24** | **26** | **52** |
| | | | | | | |
| **MICROPLANKTON** undiff. | 4% | 3% | <2% | 9% | <3% | 5% |
| *Achomosphaera alcicornu* | | | | | | X |
| *Achomosphaera ramulifera* | 2% | 4% | <2% | 2% | X | 6% |
| *Apteodinium australiense* | 11% | X | | | X | |
| *Botryococcus* sp. | | | X | | | X |
| *Crassosphaera concinnia* | X | | | <1% | | X |
| *Cyclonephelium* n.sp. | | X | | 11% | X | X |
| *Dapsilidinium pseudocolligerum* | 5% | 11% | 7% | 9% | >1% | |
| *Fromea leos* ms | | | | | | 4% |
| *Hystrichokolpoma rigaudae* | 12% | | 3% | <1% | 2% | |
| *Impagidinium* spp. | | X | | X | 1% | |
| *Lejeunecysta* sp. | | | | | | X |
| *Lingulodinium machaerophorum* | <1% | X | 3% | <1% | 6% | <2% |
| *Lingulodinium solarum* | | | X | X | X | |
| *Nematosphaeropsis balcombiana* | X | 1.5% | 4% | 1% | | X |
| *Nematosphaeropsis rhizoma* ms | 4% | 6% | X | 1% | | <2% |
| *Operculodinium centrocarpum* | 11% | 11% | 16% | 6% | 62% | 21% |
| *Protoellipsodinium clavatus* ms | X | | | | | |
| *Protoellipsodinium simplex* ms. | <3% | | | 4% | 3% | |
| *Pyxidinopsis pontus* ms | | | | | X | |
| *Selemophemphix nephroides* | | | | | | X |
| *Spiniferites* spp. | 46% | 59% | 62% | 54% | 21% | 55% |
| *Systematophora placacantha* | | | | <1% | | |
| *Tectatodinium scabroellipticus* ms | <3% | X | X | | | |
| *Tectatodinium* spp. | | X | X | | | X |
| *Tuberculodinium vancampoae* | | | X | | | |
| **TOTAL MICROPLANKTON COUNT** | **114** | **123** | **128** | **139** | **162** | **108** |
| **OTHER PALYNOMORPHS** | | | | | | |
| Fungal spores & hyphae | 1% | | 3% | | | |
| Microforaminiferal liners | 5% | | 8% | | | X |
| Scolecodonts | 1% | | <1% | | X | |
| **TOTAL COUNT** | **149** | **157** | **192** | **169** | **198** | **179** |

## RELINQUISHMENT LIST - PALYNOLOGY SLIDES

**WELL NAME & NO:** GUDGEON-1
**PREPARED BY:** A.D. PARTRIDGE
**DATE:** 30 MAY 1995

Sheet 1 of 1

| SAMPLE TYPE | DEPTH (M) | CATALOGUE NUMBER | DESCRIPTION |
|---|---|---|---|
| SWC 59 | 3012.1 | P196688 | Kerogen slide filtered/unfiltered fractions |
| SWC 59 | 3012.1 | P196689 | Oxidised slide 2 - 1/2 cover slip |
| SWC 57 | 3014.0 | P196690 | Kerogen slide filtered/unfiltered fractions |
| SWC 57 | 3014.0 | P196691 | Oxidised slide 2 - 1/2 cover slip |
| SWC 52 | 3020.0 | P196692 | Kerogen slide filtered/unfiltered fractions |
| SWC 52 | 3020.0 | P196693 | Oxidised slide 2 - 1/2 cover slip |
| SWC 48 | 3024.1 | P196694 | Kerogen slide filtered/unfiltered fractions |
| SWC 48 | 3024.1 | P196695 | Oxidised slide 2 |
| SWC 48 | 3024.1 | P196696 | Oxidised slide 3 |
| SWC 44 | 3030.1 | P196697 | Kerogen slide filtered/unfiltered fractions |
| SWC 39 | 3036.1 | P196698 | Kerogen slide filtered/unfiltered fractions |
| SWC 39 | 3036.1 | P196699 | Oxidised slide 2 |
| SWC 24 | 3053.6 | P196700 | Kerogen slide filtered/unfiltered fractions |
| SWC 24 | 3053.6 | P196701 | Oxidised slide 2 - 1/2 cover slip |
| SWC 23 | 3055.0 | P196702 | Kerogen slide filtered/unfiltered fractions |
| SWC 22 | 3057.1 | P196703 | Kerogen slide filtered fraction - 1/2 cover slip |

APPENDIX 2

# Appendix 2

# APPENDIX 2

## GUDGEON 1

### Quantitative Formation Evaluation

Esso Australia Ltd
Exploration Department

# GUDGEON 1
## Quantitative Formation Evaluation

Petrophysicist: J.M. Phillips
October 1995

Prepared by: J.M.Phillips
Reviewed by: L.J.Finlayson
W.S.Dodge

# GUDGEON 1
## QUANTITATIVE FORMATION EVALUATION

Gudgeon 1 is an exploration well located in the Vic/L6 License area of the Gippsland Basin, offshore Victoria.The well is situated some 6 km ESE of the Mackerel Platform in approximately 270m of water. The primary objective of the well was the clastic reservoir section at the top of Latrobe Group, whilst secondary potential was attributed to the intra-Latrobe section.
The well was drilled by the Ocean Bounty semi-submersible drilling rig with the well path deviated to an average 33 degrees to facilitate intersection of the primary and secondary targets in near crestal structural positions.
The top of Latrobe Group was intersected at 3051m MDKB some 28m low to prognosis. Based on cuttings shows, two cores were cut over the interval 3063.0-3088.0m MDKB. The well was drilled to 3283m MDKB at which point drilling problems were encountered. A basic suite of open hole wireline logs (DLL-MSFL-LDL-CNL-NGT) was run from this depth up to 13 3/8" casing shoe (1160m). The well was subsequently drilled to a total depth of 3836m MDKB.
An attempt to run an FMI-DSI-DLL-MSFL-AMS-GR combination tool as the first log in the total depth logging run resulted in sticking of the tool in the hole. All fishing attempts were unsuccessful. The tool string was pushed to bottom, with the subsequent logging runs restricted to a maximum depth of 3738m MDKB.
The well was drilled using an 8% KCl polymer (prehydrated polyacrylamide) mud system with 4% Glycol added for control of the Lakes Entrance Formation. The impact (if any) of Glycol on the wettability characteristics of the core cut at Gudgeon 1 has, at this stage, not been resolved.

All depths quoted are Measured Depth KB.

## DATA

*Logs Acquired*

| | | | |
|---|---|---|---|
| Schlumberger MAXIS | Suite 1:- | AS-LDT-GR | 1126-341m |
| | Suite 2:- | DLL-MSFL-LDL-CNL-NGT | 3279-1117m |
| | Suite 3:- | SLS-DLL-MSFL-GR | 3737-3200m |
| | | VSP Survey | 17 levels |
| | | MDT-GR | 25 pretests<br>3 samples |
| | | SHDT-GR | 3250-2945m |
| | | CST-GR | 60 shots |
| | | LDL-CNL-NGT | 3734-3200m |

*Core Acquired*

Core 1 : 3063m - 3081m (drillers depths) :- Log depth = core depth + 2.54m
Cut 18m; Recovered 17.1m
Core 2 : 3081m - 3088m (drillers depth) :- Log depth = core depth + 2.54m
Cut 7m; Recovered 4.0m

*Log Quality*

The well bore between 13 3/8" casing shoe and the top of Latrobe Group remained open for a considerable length of time due to the target total depth (some 800m below the top Latrobe) and time spent rectifying drilling problems and fishing operations. Consequently, the Lakes Entrance Formation proved troublesome with respect to rugosity and ledge development. The well bore over the Lakes Entrance Formation exhibited a pronounced ovoid character. Hole conditions throughout the Latrobe Group section however, were generally good to excellent with only minor overgauge zones and minor ledges (evident within the upper Latrobe section and providing numerous zones of uneven tension). Consequently, log quality is generally good throughout the Latrobe Group section, with the exception of portions of the near top of Latrobe Group where tension pulls infer the data ( Resistivity measurements in particular) is less than optimum. For this reason, the repeat section resistivity curves were spliced into the main log over the interval 3100m to 3075m.
Neutron/density data was recorded in high resolution mode from 3734m to 3000m . Both MSFL and Caliper data are invalid from 3661m to total depth due to poor tool orientation in the deviated borehole from pickup point. The tool realigned itself in the long axis above 3661m and returned valid data from this depth.

*Log Processing*

- Suite 2 and 3 data (both resistivity and neutron/density) were spliced at 3258m to provide continuous curve data for the intended interpretted interval.

- LLD and LLS resistivity curves from both suites were environmentally corrected for borehole and invasion effects using Esso's SOLAR Environmental Correction package. The micro resistivity log (MSFL) was corrected at the wellsite (MSFC) and needed no further corrections.

- The high resolution wellsite density data was processed in house using SOLAR ALPHA processing as a filter.

- Suite 2 and 3 NGT data was acquired at the wellsite using barite corrections (CBAR) of 0.93 and 0.84 respectively. Later processing of these data in Schlumberger's computing centre used barite corrections of 0.962 and 0.96 for Suites 2 and 3 respectively. Kalman filtering was also applied to the NGT data

## INTERPRETATION

### *Logs Used*

GR, HNRHOB, HNPO, MSFC, LLDC,LLSC, NGT, HPEF

### *Analysis Parameters*

| | |
|---|---|
| a | 1 |
| m | 1.85 |
| n | 2 |
| Apparent Shale Porosity (PHISH) | 0.15 |
| Shale Resistivity (RSH) | 15 ohmm |
| Formation Water Resistivity (RW) | 0.07 ohmm |
| Bottom Hole Temperature | 89 DEGC |

### *Mineralog*

Chip samples at metre intervals were taken from Cores 1 and 2 at the wellsite and forwarded to Corelab (Perth) for Mineralog analysis (The Mineralog analytical technique is based on the infrared absorption of a finely ground sample dispersed in a potassium bromide matrix). The results ( listed in Table 2 ) were used to confirm mineralogies used in the SOLAR generated Total Porosity model. In addition, 9 side wall core samples from the Latrobe Group section were sent to Exxon Production Research Co. in Houston for mineralogical analysis (using Exxon's proprietary Minquant technique), as a further quality control (results listed in Table 3). In summary, the main minerals present within the cored interval were identified by Mineralog to be Quartz, Plagioclase, Potassium Feldspar, Kaolinite, Illite/Smectite and minor amounts of Pyrite. Up to 23 volume% of Potassium Feldspar was identified together with up to 50 volume% of Illite/Smectite and up to 15 volume% Kaolinite. Total clay values of between 4 to 61 volume % and calculated for the cored interval.

### *Porosity*

Total porosity was derived from the LASER programme using a 5 mineral porosity model based on Quartz, Potassium Feldspar, Iillite, Kaolinite and Pyrite over the interval 3052m to 3270m. Dolomite was added to the model below 3270m (see Table 5 for petrophysical resposes of these minerals). Effective porosity was derived from total porosity using the clay bound water volume data generated from the LASER model.
Comparison of Core porosity with Log porosity (PHIT - from LASER) shows a reasonable match (+/- 4 P.U. - see Figure 3). There is no apparent pattern to the

variability observed, with log porosity reading both high and low to core porosity, although, a better match is observed within the cleaner sand intervals (further comparison with a PHIT from the CLAM programme did not yield a significantly better match). The drying method used in the core analysis suggests that core porosity should be measuring something less than total porosity, particularly in the shaley sections of core, therefore an exact match should not be expected. The effect on core porosity and permeability of whole mud invasion (which has been identified from thin section work conducted on the Gudgeon cores) may also be contributing to the imperfect match of core and log porosities.

### *Shale Volume vs Clay Volume*

Shale volume was not derived from the LASER programme. LASER solves the log response equations based on formation mineralogy. Shale is a term which indicates grainsize but not mineralogy (clay vs silt). LASER computes both wet clay volume and clay bound water pore volume from modelled mineral responses using the neutron, density, NGT and HPEF log responses. The wet clay volume was used in the Total Water Saturation estimation whilst clay bound water pore volume was used to derive Effective Porosity and Effective Water Saturation.

### *Free Formation Water Resistivity*

Free formation water resistivity was derived from RWA calculations in clean water sands. The value selected (Rw = 0.07 ohmm) equates to a salinity of 35,000 ppm NaCl (equiv) and is consistent with produced water in the region. No fresh water flushing is interpretted to occur at this location.

### *Water Saturations*

Total water saturation was calculated using Laser derived total porosity in the Dual Water programme DWGP. Effective porosity and effective water saturation were calculated using the Laser generated Clay Bound Water Volume.

## RESULTS

**1.** The Top of Latrobe Group (primary objective) was intersected at 3051m MDKB some 28m low to prognosis. The Top of Latrobe Gp was marked by the occurrence of hydrocarbon fluorescence, described as 10% pinpoint to patchy, moderately bright pale yellow and together with higher than background gas levels was the basis for cutting two cores. The upper 5m of Latrobe Gp consisted of fine to medium grained quartz sand with common glauconite and trace to common kaolinitic matrix. This was underlain by a predominantly coarse to granule sized quartz sand with common glauconite, kaolinite and feldspar (from mineralog analysis). Below this interval (3055m to 3066m (Log) a low net to gross section consisting of shale, minor coal and thin sands was encountered.

A blocky coarse to granule sized sand is present at 3081m (Log), below the low net to gross coastal plain section.

**2.** Wireline samples were obtained from 3058.6m and 3084m KB (Log) and confirmed the presence of a 43.8 degree API oil column.

**3.** Log analysis identifies an OOWC at 3088m MDKB and total net oil pay of 20.9m (measured thickness) using a porosity cut off of 12% (see Table 1). The net pay is distributed primarily between the upper and lower coarse grained sand units described in section 1 above, with a minor amount of net pay identified within the low net to gross section separating the two main sands.

**4.** High average water saturations (above 60% Sw) are calculated in the uppermost portion of the reservoir (3052.5m-3057.4m) and are attributed to probable irreducible water contained within microporosity associated with the common glauconite and kaolinite exhibited by this interval. As the sand cleans up, as seen on density-neutron separation over the interval 3057.5m - 3066m, the average water saturation decreases to 28% (see Table 1).

**5.** No hydrocarbons are interpretted within the section below 3088m MDKB to total depth

Attached are the following presentations of results:

Table 1 - Summary of Results
Table 2 - Mineralog Analysis
Table 3 - Minquant Analysis
Table 4 - Well data listing (Log analysis listing each metre)
Table 5 - LASER Modelling Parameters
Figure 1 - Density-Neutron Crossplot
Figure 2 - Log Analysis Graphical Summary
Figure 3 - Core to Log porosity comparison
Appendix 1 - Desription of LASER forward modelling
Attachment 1 - Gudgeon 1 Log Analysis Depthplot
Attachment 2 - Gudgeon 1 Laser Mineral Model Output

TABLE 1

# GUDGEON 1 LOG ANALYSIS

## Summary Of Results

Depths are in metres Measured Depth

Net Porosity Cut Off = 12%

| GROSS INTERVAL | GROSS METRES | NET METRES | NET:GROSS | MEAN VWCLAY | MEAN POROSITY | MEAN Sw | FLUID TYPE |
|---|---|---|---|---|---|---|---|
| 3052.5-3057.4 | 4.9 | 3.5 | 72% | 0.13 | 0.16 | 0.66 | oil |
| 3057.5-3066.0 | 8.5 | 8.5 | 100% | 0.04 | 0.18 | 0.28 | oil |
| 3068.2-3073.5 | 5.4 | 1.2 | 23% | 0.19 | 0.14 | 0.75 | oil |
| 3074.5-3076.6 | 2.2 | 0 | 0% | 0.00 | 0.00 | 0.00 | |
| 3077.2-3080.3 | 3.1 | 1.3 | 42% | 0.14 | 0.15 | 0.59 | oil |
| 3080.8-3088.0 | 7.2 | 6.4 | 88% | 0.04 | 0.17 | 0.37 | oil |
| **GUDGEON 1 OOWC = 3088m** | | | | | | | |
| 3088.1-3095.6 | 7.5 | 7.5 | 100% | 0.03 | 0.20 | 1.00 | water |
| 3098.1-3108.3 | 10.2 | 9.7 | 95% | 0.06 | 0.18 | 1.00 | water |
| 3109.6-3222.0 | 112.4 | 106.8 | 95% | 0.04 | 0.17 | 1.00 | water |
| 3224.4-3229.2 | 4.8 | 3.3 | 68% | 0.13 | 0.17 | 1.00 | water |
| 3236.3-3246.8 | 10.6 | 10 | 94% | 0.13 | 0.16 | 0.98 | water |

## CORE LABORATORIES
## MINERALOG ANALYSIS
## VOLUME %*

COMPANY: ESSO AUSTRALIA LTD.
WELL NAME: GUDGEON #1
WELL LOCATION: AUSTRALIA
SAMPLE TYPE: CORE CHIPS

FILE NO.: PRP-95013
DATE: 21-Apr-95
ANALYST: D. BEER

| DEPTH | GRAIN DENS. INDEX | QUARTZ | PLAGIOCLASE | K-FELDSPAR | CALCITE | DOLOMITE | PYRITE | TOTAL CLAY | KAOLINITE | CHLORITE | ILL + SMEC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CORE 1 | | | | | | | | | | | |
| 3063.00 | 2.63 | 71 | 0 | 22 | 0 | 0 | 0 | 7 | 0 | 0 | 7 |
| 3064.00 | 2.69 | 42 | 0 | 16 | 0 | 0 | 1 | 41 | 14 | 0 | 27 |
| 3065.00 | 2.66 | 42 | 4 | 13 | 0 | 0 | 0 | 41 | 16 | 0 | 25 |
| 3066.00 | 2.69 | 40 | 6 | 15 | 0 | 0 | 1 | 38 | 14 | 0 | 24 |
| 3067.00 | 2.70 | 42 | 0 | 15 | 0 | 0 | 2 | 41 | 11 | 0 | 30 |
| 3068.00 | 2.70 | 43 | 0 | 24 | 0 | 0 | 2 | 31 | 6 | 0 | 25 |
| 3069.00 | 2.67 | 54 | 0 | 23 | 0 | 0 | 1 | 22 | 3 | 0 | 19 |
| 3070.00 | 2.70 | 47 | 0 | 23 | 0 | 0 | 2 | 28 | 5 | 0 | 23 |
| 3070.40 | 2.66 | 75 | 0 | 18 | 0 | 0 | 1 | 6 | 0 | 0 | 6 |
| 3072.00 | 2.68 | 54 | 0 | 10 | 0 | 0 | 1 | 35 | 9 | 0 | 26 |
| 3073.00 | 2.63 | 41 | 22 | 9 | 0 | 0 | 0 | 28 | 2 | 0 | 26 |
| 3074.00 | 2.73 | 23 | 12 | 3 | 0 | 0 | 2 | 60 | 11 | 0 | 49 |
| 3075.00 | 2.64 | 47 | 17 | 6 | 0 | 0 | 0 | 30 | 1 | 0 | 29 |
| 3076.00 | 2.67 | 69 | 0 | 17 | 0 | 0 | 1 | 13 | 0 | 0 | 13 |
| 3077.00 | 2.69 | 61 | 0 | 14 | 0 | 0 | 1 | 24 | 5 | 0 | 19 |
| 3078.00 | 2.74 | 42 | 0 | 11 | 0 | 0 | 3 | 44 | 13 | 0 | 31 |
| 3079.00 | 2.67 | 75 | 0 | 16 | 0 | 0 | 1 | 8 | 0 | 0 | 8 |
| 3080.10 | 2.64 | 76 | 0 | 16 | 1 | 0 | 0 | 7 | 0 | 0 | 7 |
| CORE 2 | | | | | | | | | | | |
| 3081.00 | 2.64 | 67 | 0 | 18 | 5 | 0 | 0 | 10 | 0 | 0 | 10 |
| 3082.00 | 2.65 | 76 | 0 | 15 | 0 | 0 | 1 | 8 | 0 | 0 | 8 |
| 3083.00 | 2.65 | 76 | 0 | 16 | 0 | 0 | 1 | 7 | 0 | 0 | 7 |
| 3084.00 | 2.67 | 77 | 0 | 16 | 0 | 0 | 1 | 6 | 0 | 0 | 6 |
| 3084.50 | 2.64 | 78 | 0 | 17 | 1 | 0 | 0 | 4 | 0 | 0 | 4 |

* Values calculated using mineral densities supplied by ESSO Aust. Ltd.

Core Laboratories - Perth

TABLE 2 MINERALOG ANALYSIS

# MINQUANT ANALYSIS

| well | Gudgeon-1 | Gudgeon-1 | Gudgeon-1 | Gudgeon-1 | Gudgeon-1 |
|---|---|---|---|---|---|
| depth | 3060.1 | 3136 | 3236 | 3257.5 | 3305.5 |
| plug # | 21 | 19 | 17 | 16 | 14 |
| XRD# | G95A01 | G95A02 | G95A03 | G95A04 | G95A05 |
| phases | | | | | |
| quartz | 83 | 86 | 64 | 55 | 49 |
| K-feldspar | 8 | 4 | 4 | 6 | 7 |
| plagioclase | 2 | 1 | 3 | 3 | 3 |
| pyrite | trace | 1 | 1 | 2 | 4 |
| hematite | 2 | 1 | 1 | 1 | 2 |
| siderite | | | | | |
| calcite | trace | trace | trace | 1 | trace |
| dolomite | | 1 | trace | | |
| apatite | | | | | |
| anatase | trace | trace | trace | trace | 1 |
| barite | trace | trace | trace | trace | trace |
| sylvite | trace | 2 | 6 | 5 | 3 |
| halite | trace | | | | |
| total non-clay | 95 | 96 | 79 | 73 | 69 |
| kaolinite | 1 | 2 | 4 | 10 | 11 |
| chlorite | | 1 | 1 | 3 | 4 |
| illite | 1 | 1 | 7 | 7 | 8 |
| smectite | 2 | 1 | 8 | 7 | 8 |
| illite/smectite | | | | | |
| total clay | 4 | 5 | 20 | 27 | 31 |
| SUM | 99 | 101 | 99 | 100 | 100 |

TABLE 3

# MINQUANT ANALYSIS

| well | Gudgeon-1 | Gudgeon-1 | Gudgeon-1 | Gudgeon-1 |
|---|---|---|---|---|
| depth | 3503 | 3522 | 3525.1 | 3566.1 |
| plug # | 11 | 8 | 7 | 4 |
| XRD# | G95A06 | G95A07 | G95A08 | G95A09 |
| phases | | | | |
| quartz | 46 | 67 | 71 | 66 |
| K-feldspar | 8 | 7 | 9 | 8 |
| plagioclase | 5 | 3 | 3 | 2 |
| pyrite | 1 | | trace | 3 |
| hematite | | 1 | 1 | 2 |
| siderite | | | | |
| calcite | 1 | 4 | 1 | trace |
| dolomite | | trace | 3 | 1 |
| apatite | | | | |
| anatase | trace | trace | trace | trace |
| barite | trace | 1 | trace | trace |
| sylvite | 9 | 3 | 3 | 2 |
| halite | | | | |
| total non-clay | 70 | 86 | 91 | 84 |
| kaolinite | 9 | trace | 1 | 5 |
| chlorite | 8 | 5 | trace | 2 |
| illite | 7 | 1 | trace | 6 |
| smectite | 7 | 7 | 8 | 4 |
| illite/smectite | | | | |
| total clay | 31 | 13 | 9 | 17 |
| SUM | 101 | 99 | 100 | 101 |

TABLE 3A

# TABLE 4

GUDGEON_1

Well Data Listing

| DEPTH (mRKB) | GR api | RT ohmm | RHOB g/cc | NPHI frac | VSH frac | PHIE frac | SWE frac |
|---|---|---|---|---|---|---|---|
| 3050.0 | 46 | N | 2.567 | 0.165 | Nul | 0.000 | 0.000 |
| 3051.0 | 45 | N | 2.723 | 0.164 | Nul | 0.000 | 0.000 |
| 3052.0 | 47 | 1.9 | 3.207 | 0.185 | Nul | 0.000 | 0.000 |
| 3053.0 | 90 | 2.6 | 2.593 | 0.202 | 0.214 | 0.076 | 1.000 |
| 3054.0 | 72 | 3.4 | 2.453 | 0.194 | 0.142 | 0.168 | 0.687 |
| 3055.0 | 49 | 4.6 | 2.415 | 0.171 | 0.080 | 0.170 | 0.598 |
| 3056.0 | 51 | 4.7 | 2.449 | 0.145 | 0.068 | 0.157 | 0.646 |
| 3057.0 | 66 | 12.1 | 2.530 | 0.123 | 0.103 | 0.108 | 0.522 |
| 3058.0 | 38 | 24.0 | 2.353 | 0.145 | 0.020 | 0.187 | 0.245 |
| 3059.0 | 37 | 33.9 | 2.368 | 0.136 | 0.036 | 0.171 | 0.216 |
| 3060.0 | 31 | 31.7 | 2.424 | 0.086 | 0.028 | 0.135 | 0.284 |
| 3061.0 | 45 | 30.7 | 2.318 | 0.118 | 0.026 | 0.182 | 0.219 |
| 3062.0 | 54 | 23.4 | 2.302 | 0.156 | 0.023 | 0.197 | 0.237 |
| 3063.0 | 60 | 14.4 | 2.320 | 0.154 | 0.036 | 0.190 | 0.309 |
| 3064.0 | 63 | 14.5 | 2.250 | 0.183 | 0.039 | 0.219 | 0.269 |
| 3065.0 | 72 | 9.6 | 2.329 | 0.193 | 0.082 | 0.179 | 0.384 |
| 3066.0 | 63 | 6.8 | 2.502 | 0.107 | 0.087 | 0.117 | 0.676 |
| 3067.0 | 139 | 15.5 | 2.606 | 0.189 | 0.434 | 0.000 | 1.000 |
| 3068.0 | 125 | 12.0 | 2.529 | 0.199 | 0.412 | 0.000 | 1.000 |
| 3069.0 | 95 | 5.4 | 2.461 | 0.203 | 0.245 | 0.062 | 0.888 |
| 3070.0 | 95 | 4.8 | 2.450 | 0.193 | 0.236 | 0.071 | 0.825 |
| 3071.0 | 93 | 4.3 | 2.452 | 0.212 | 0.209 | 0.096 | 0.786 |
| 3072.0 | 92 | 4.2 | 2.404 | 0.186 | 0.182 | 0.124 | 0.719 |
| 3073.0 | 85 | 3.7 | 2.464 | 0.221 | 0.168 | 0.112 | 0.864 |
| 3074.0 | 39 | 5.7 | 1.744 | 0.312 | Coal | | |
| 3075.0 | 89 | 12.5 | 2.491 | 0.219 | Coal | | |
| 3076.0 | 77 | 8.9 | 2.488 | 0.225 | 0.231 | 0.062 | 0.843 |
| 3077.0 | 100 | 11.1 | 2.589 | 0.270 | 0.365 | 0.000 | 1.000 |
| 3078.0 | 77 | 12.1 | 2.533 | 0.158 | 0.221 | 0.057 | 0.894 |
| 3079.0 | 43 | 5.5 | 2.429 | 0.153 | 0.077 | 0.164 | 0.563 |
| 3080.0 | 77 | 6.9 | 2.503 | 0.187 | 0.240 | 0.064 | 0.832 |
| 3081.0 | 80 | 8.6 | 2.533 | 0.239 | 0.244 | 0.062 | 0.844 |
| 3082.0 | 37 | 10.1 | 2.422 | 0.117 | 0.050 | 0.156 | 0.440 |
| 3083.0 | 33 | 25.8 | 2.385 | 0.111 | 0.046 | 0.156 | 0.266 |
| 3084.0 | 21 | 24.7 | 2.396 | 0.111 | 0.040 | 0.158 | 0.272 |
| 3085.0 | 20 | 27.0 | 2.401 | 0.107 | 0.019 | 0.168 | 0.256 |
| 3086.0 | 14 | 14.7 | 2.422 | 0.110 | 0.018 | 0.164 | 0.358 |
| 3087.0 | 16 | 6.9 | 2.388 | 0.159 | 0.022 | 0.194 | 0.449 |
| 3088.0 | 17 | 2.0 | 2.385 | 0.129 | 0.018 | 0.183 | 0.890 |
| 3089.0 | 17 | 1.4 | 2.403 | 0.125 | 0.010 | 0.181 | 1.000 |
| 3090.0 | 20 | 1.8 | 2.371 | 0.105 | 0.016 | 0.187 | 0.931 |
| 3091.0 | 18 | 1.2 | 2.357 | 0.161 | 0.042 | 0.195 | 1.000 |
| 3092.0 | 14 | 1.2 | 2.356 | 0.141 | 0.026 | 0.196 | 1.000 |
| 3093.0 | 15 | 1.1 | 2.320 | 0.166 | 0.020 | 0.223 | 1.000 |
| 3094.0 | 17 | 1.0 | 2.350 | 0.172 | 0.023 | 0.220 | 1.000 |
| 3095.0 | 8 | 1.2 | 2.350 | 0.130 | -0.000 | 0.206 | 1.000 |
| 3096.0 | 41 | 1.1 | 2.451 | 0.127 | 0.104 | 0.131 | 1.000 |
| 3097.0 | 61 | 4.1 | 2.477 | 0.114 | 0.130 | 0.109 | 0.920 |
| 3098.0 | 68 | 5.6 | 2.534 | 0.202 | 0.169 | 0.113 | 0.694 |
| 3099.0 | 30 | 2.0 | 2.395 | 0.107 | 0.044 | 0.161 | 0.984 |
| 3100.0 | 26 | 1.7 | 2.360 | 0.150 | 0.033 | 0.194 | 0.915 |
| 3101.0 | 30 | 1.7 | 2.317 | 0.162 | 0.033 | 0.214 | 0.833 |
| 3102.0 | 41 | 1.8 | 2.411 | 0.129 | 0.053 | 0.156 | 1.000 |
| 3103.0 | 26 | 1.3 | 2.319 | 0.160 | 0.028 | 0.214 | 0.971 |

| DEPTH (mRKB) | GR api | RT ohmm | RHOB g/cc | NPHI frac | VSH frac | PHIE frac | SWE frac |
|---|---|---|---|---|---|---|---|
| 3104.0 | 24 | 1.1 | 2.355 | 0.142 | 0.015 | 0.204 | 1.000 |
| 3105.0 | 31 | 1.2 | 2.357 | 0.140 | 0.025 | 0.192 | 1.000 |
| 3106.0 | 33 | 1.4 | 2.320 | 0.184 | 0.045 | 0.196 | 0.980 |
| 3107.0 | 30 | 1.9 | 2.418 | 0.113 | 0.023 | 0.153 | 1.000 |
| 3108.0 | 41 | 2.2 | 2.431 | 0.132 | 0.076 | 0.156 | 0.960 |
| 3109.0 | 104 | 7.2 | 2.534 | 0.277 | 0.351 | 0.000 | 1.000 |
| 3110.0 | 47 | 2.3 | 2.183 | 0.508 | 0.144 | 0.299 | 0.498 |
| 3111.0 | 23 | 1.0 | 2.299 | 0.168 | 0.017 | 0.227 | 1.000 |
| 3112.0 | 23 | 1.0 | 2.380 | 0.167 | 0.005 | 0.216 | 1.000 |
| 3113.0 | 21 | 1.2 | 2.372 | 0.138 | 0.012 | 0.196 | 1.000 |
| 3114.0 | 22 | 1.0 | 2.357 | 0.165 | 0.006 | 0.226 | 1.000 |
| 3115.0 | 23 | 1.0 | 2.361 | 0.141 | 0.014 | 0.200 | 1.000 |
| 3116.0 | 25 | 1.1 | 2.371 | 0.174 | 0.012 | 0.220 | 1.000 |
| 3117.0 | 30 | 1.8 | 2.439 | 0.111 | 0.043 | 0.142 | 1.000 |
| 3118.0 | 24 | 1.8 | 2.396 | 0.113 | 0.040 | 0.157 | 1.000 |
| 3119.0 | 25 | 1.5 | 2.394 | 0.127 | 0.035 | 0.170 | 1.000 |
| 3120.0 | 19 | 1.1 | 2.510 | 0.173 | 0.017 | 0.197 | 1.000 |
| 3121.0 | 20 | 1.2 | 2.386 | 0.143 | 0.018 | 0.189 | 1.000 |
| 3122.0 | 26 | 1.3 | 2.483 | 0.138 | 0.032 | 0.167 | 1.000 |
| 3123.0 | 32 | 1.0 | 2.288 | 0.156 | 0.016 | 0.213 | 1.000 |
| 3124.0 | 35 | 1.2 | 2.378 | 0.134 | 0.027 | 0.186 | 1.000 |
| 3125.0 | 33 | 1.7 | 2.411 | 0.115 | 0.024 | 0.170 | 1.000 |
| 3126.0 | 21 | 1.0 | 2.443 | 0.137 | -0.000 | 0.205 | 1.000 |
| 3127.0 | 26 | 1.0 | 2.339 | 0.151 | 0.023 | 0.202 | 1.000 |
| 3128.0 | 26 | 1.1 | 2.350 | 0.163 | 0.009 | 0.223 | 1.000 |
| 3129.0 | 24 | 0.9 | 2.391 | 0.171 | 0.024 | 0.206 | 1.000 |
| 3130.0 | 28 | 1.1 | 2.375 | 0.156 | 0.027 | 0.201 | 1.000 |
| 3131.0 | 24 | 1.0 | 2.476 | 0.153 | 0.017 | 0.192 | 1.000 |
| 3132.0 | 28 | 1.1 | 2.456 | 0.155 | 0.001 | 0.210 | 1.000 |
| 3133.0 | 23 | 1.0 | 2.402 | 0.158 | 0.027 | 0.196 | 1.000 |
| 3134.0 | 26 | 1.1 | 2.377 | 0.166 | 0.023 | 0.208 | 1.000 |
| 3135.0 | 23 | 1.1 | 2.421 | 0.140 | 0.018 | 0.184 | 1.000 |
| 3136.0 | 21 | 1.2 | 2.431 | 0.124 | 0.012 | 0.179 | 1.000 |
| 3137.0 | 19 | 1.0 | 2.464 | 0.159 | 0.021 | 0.188 | 1.000 |
| 3138.0 | 25 | 1.0 | 2.503 | 0.147 | 0.031 | 0.173 | 1.000 |
| 3139.0 | 24 | 1.1 | 2.425 | 0.137 | 0.009 | 0.201 | 1.000 |
| 3140.0 | 47 | 1.1 | 2.396 | 0.153 | 0.075 | 0.177 | 1.000 |
| 3141.0 | 71 | 1.3 | 2.382 | 0.199 | 0.121 | 0.172 | 1.000 |
| 3142.0 | 83 | 1.5 | 2.374 | 0.184 | 0.167 | 0.140 | 1.000 |
| 3143.0 | 84 | 1.8 | 2.330 | 0.153 | 0.151 | 0.152 | 1.000 |
| 3144.0 | 68 | 1.3 | 2.350 | 0.187 | 0.071 | 0.181 | 1.000 |
| 3145.0 | 51 | 1.4 | 2.354 | 0.185 | 0.050 | 0.187 | 1.000 |
| 3146.0 | 25 | 1.5 | 2.393 | 0.105 | 0.015 | 0.167 | 1.000 |
| 3147.0 | 24 | 1.0 | 2.345 | 0.149 | 0.018 | 0.208 | 1.000 |
| 3148.0 | 20 | 0.9 | 2.340 | 0.150 | 0.010 | 0.216 | 1.000 |
| 3149.0 | 23 | 0.8 | 2.309 | 0.165 | 0.011 | 0.230 | 1.000 |
| 3150.0 | 23 | 0.9 | 2.347 | 0.149 | 0.017 | 0.204 | 1.000 |
| 3151.0 | 27 | 1.0 | 2.349 | 0.155 | 0.026 | 0.203 | 1.000 |
| 3152.0 | 28 | 1.1 | 2.395 | 0.134 | 0.040 | 0.167 | 1.000 |
| 3153.0 | 21 | 1.2 | 2.406 | 0.130 | 0.000 | 0.203 | 1.000 |
| 3154.0 | 24 | 1.2 | 2.367 | 0.150 | 0.030 | 0.180 | 1.000 |
| 3155.0 | 25 | 1.3 | 2.366 | 0.122 | 0.020 | 0.181 | 1.000 |
| 3156.0 | 24 | 1.2 | 2.348 | 0.123 | 0.011 | 0.186 | 1.000 |
| 3157.0 | 27 | 1.1 | 2.346 | 0.134 | 0.015 | 0.190 | 1.000 |
| 3158.0 | 30 | 1.3 | 2.375 | 0.129 | 0.027 | 0.174 | 1.000 |
| 3159.0 | 33 | 1.2 | 2.353 | 0.132 | 0.028 | 0.181 | 1.000 |

| DEPTH (mRKB) | GR api | RT ohmm | RHOB g/cc | NPHI frac | VSH frac | PHIE frac | SWE frac |
|---|---|---|---|---|---|---|---|
| 3160.0 | 35 | 1.1 | 2.331 | 0.158 | 0.029 | 0.195 | 1.000 |
| 3161.0 | 35 | 1.2 | 2.307 | 0.147 | 0.021 | 0.203 | 1.000 |
| 3162.0 | 23 | 1.1 | 2.346 | 0.129 | 0.009 | 0.190 | 1.000 |
| 3163.0 | 21 | 1.2 | 2.373 | 0.118 | 0.016 | 0.177 | 1.000 |
| 3164.0 | 24 | 1.4 | 2.446 | 0.101 | 0.010 | 0.164 | 1.000 |
| 3165.0 | 22 | 1.2 | 2.369 | 0.130 | 0.016 | 0.185 | 1.000 |
| 3166.0 | 25 | 1.5 | 2.406 | 0.099 | 0.027 | 0.153 | 1.000 |
| 3167.0 | 25 | 1.4 | 2.373 | 0.137 | 0.029 | 0.173 | 1.000 |
| 3168.0 | 20 | 1.5 | 2.383 | 0.115 | 0.021 | 0.168 | 1.000 |
| 3169.0 | 18 | 1.6 | 2.384 | 0.098 | 0.032 | 0.161 | 1.000 |
| 3170.0 | 19 | 1.4 | 2.528 | 0.116 | 0.049 | 0.134 | 1.000 |
| 3171.0 | 22 | 1.3 | 2.587 | 0.117 | 0.002 | 0.168 | 1.000 |
| 3172.0 | 24 | 1.4 | 2.523 | 0.098 | 0.029 | 0.137 | 1.000 |
| 3173.0 | 31 | 1.7 | 2.391 | 0.096 | 0.021 | 0.162 | 1.000 |
| 3174.0 | 21 | 1.7 | 2.502 | 0.106 | 0.038 | 0.140 | 1.000 |
| 3175.0 | 20 | 1.5 | 2.467 | 0.094 | 0.058 | 0.126 | 1.000 |
| 3176.0 | 27 | 2.0 | 2.461 | 0.101 | 0.020 | 0.152 | 1.000 |
| 3177.0 | 49 | 1.9 | 2.433 | 0.090 | 0.035 | 0.127 | 1.000 |
| 3178.0 | 46 | 1.6 | 2.348 | 0.120 | 0.014 | 0.170 | 1.000 |
| 3179.0 | 53 | 1.1 | 2.265 | 0.184 | 0.030 | 0.219 | 1.000 |
| 3180.0 | 48 | 1.1 | 2.251 | 0.182 | 0.024 | 0.223 | 0.996 |
| 3181.0 | 49 | 1.0 | 2.275 | 0.188 | 0.029 | 0.219 | 1.000 |
| 3182.0 | 51 | 1.1 | 2.322 | 0.160 | 0.029 | 0.203 | 1.000 |
| 3183.0 | 46 | 1.0 | 2.302 | 0.181 | 0.037 | 0.208 | 1.000 |
| 3184.0 | 56 | 1.4 | 2.350 | 0.164 | 0.054 | 0.185 | 1.000 |
| 3185.0 | 67 | 1.9 | 2.482 | 0.129 | 0.102 | 0.126 | 1.000 |
| 3186.0 | 65 | 1.7 | 2.371 | 0.149 | 0.066 | 0.159 | 1.000 |
| 3187.0 | 69 | 1.4 | 2.339 | 0.157 | 0.067 | 0.167 | 1.000 |
| 3188.0 | 68 | 1.6 | 2.361 | 0.156 | 0.067 | 0.174 | 1.000 |
| 3189.0 | 71 | 2.1 | 2.435 | 0.144 | 0.085 | 0.149 | 1.000 |
| 3190.0 | 71 | 1.9 | 2.363 | 0.153 | 0.074 | 0.163 | 0.981 |
| 3191.0 | 59 | 1.6 | 2.327 | 0.169 | 0.040 | 0.194 | 0.946 |
| 3192.0 | 67 | 1.7 | 2.369 | 0.133 | 0.039 | 0.165 | 1.000 |
| 3193.0 | 64 | 1.6 | 2.384 | 0.133 | 0.044 | 0.158 | 1.000 |
| 3194.0 | 62 | 2.3 | 2.457 | 0.098 | 0.031 | 0.129 | 1.000 |
| 3195.0 | 64 | 1.5 | 2.366 | 0.153 | 0.035 | 0.173 | 1.000 |
| 3196.0 | 53 | 1.3 | 2.298 | 0.154 | 0.019 | 0.201 | 1.000 |
| 3197.0 | 57 | 1.3 | 2.323 | 0.164 | 0.029 | 0.195 | 1.000 |
| 3198.0 | 63 | 1.5 | 2.376 | 0.145 | 0.056 | 0.160 | 1.000 |
| 3199.0 | 68 | 1.7 | 2.347 | 0.148 | 0.066 | 0.163 | 1.000 |
| 3200.0 | 62 | 1.7 | 2.370 | 0.150 | 0.073 | 0.151 | 1.000 |
| 3201.0 | 73 | 1.8 | 2.377 | 0.136 | 0.088 | 0.143 | 1.000 |
| 3202.0 | 64 | 1.9 | 2.382 | 0.130 | 0.063 | 0.156 | 1.000 |
| 3203.0 | 74 | 1.9 | 2.362 | 0.128 | 0.059 | 0.155 | 1.000 |
| 3204.0 | 67 | 2.0 | 2.394 | 0.122 | 0.044 | 0.149 | 1.000 |
| 3205.0 | 57 | 2.1 | 2.367 | 0.132 | 0.027 | 0.162 | 0.977 |
| 3206.0 | 58 | 2.0 | 2.391 | 0.119 | 0.030 | 0.153 | 1.000 |
| 3207.0 | 47 | 2.5 | 2.433 | 0.108 | 0.031 | 0.136 | 1.000 |
| 3208.0 | 20 | 2.4 | 2.449 | 0.073 | 0.025 | 0.125 | 1.000 |
| 3209.0 | 23 | 2.0 | 2.434 | 0.093 | 0.043 | 0.129 | 1.000 |
| 3210.0 | 24 | 1.6 | 2.372 | 0.105 | 0.036 | 0.168 | 1.000 |
| 3211.0 | 21 | 3.0 | 2.485 | 0.064 | 0.028 | 0.111 | 1.000 |
| 3212.0 | 23 | 2.5 | 2.464 | 0.075 | 0.024 | 0.118 | 1.000 |
| 3213.0 | 22 | 2.7 | 2.511 | 0.065 | 0.027 | 0.108 | 1.000 |
| 3214.0 | 20 | 2.1 | 2.453 | 0.093 | 0.032 | 0.136 | 1.000 |
| 3215.0 | 15 | 2.3 | 2.455 | 0.085 | 0.030 | 0.131 | 1.000 |

GUDGEON_1 ( page 4 of data listing)

| DEPTH (mRKB) | GR api | RT ohmm | RHOB g/cc | NPHI frac | VSH frac | PHIE frac | SWE frac |
|---|---|---|---|---|---|---|---|
| 3216.0 | 17 | 2.3 | 2.486 | 0.088 | 0.037 | 0.122 | 1.000 |
| 3217.0 | 19 | 2.5 | 2.459 | 0.062 | 0.018 | 0.127 | 1.000 |
| 3218.0 | 22 | 2.7 | 2.414 | 0.079 | 0.019 | 0.137 | 1.000 |
| 3219.0 | 22 | 2.7 | 2.432 | 0.078 | 0.016 | 0.136 | 1.000 |
| 3220.0 | 19 | 2.6 | 2.469 | 0.070 | 0.040 | 0.110 | 1.000 |
| 3221.0 | 31 | 2.0 | 2.396 | 0.101 | 0.037 | 0.149 | 1.000 |
| 3222.0 | 93 | 2.0 | 2.495 | 0.095 | 0.228 | 0.044 | 1.000 |
| 3223.0 | 98 | 2.7 | 2.442 | 0.147 | 0.250 | 0.049 | 1.000 |
| 3224.0 | 98 | 3.4 | 2.462 | 0.130 | 0.224 | 0.043 | 1.000 |
| 3225.0 | 67 | 2.2 | 2.383 | 0.157 | 0.118 | 0.146 | 0.990 |
| 3226.0 | 66 | 1.7 | 2.377 | 0.174 | 0.109 | 0.168 | 1.000 |
| 3227.0 | 64 | 1.5 | 2.313 | 0.172 | 0.073 | 0.190 | 0.959 |
| 3228.0 | 92 | 1.8 | 2.442 | 0.146 | 0.181 | 0.103 | 1.000 |
| 3229.0 | 98 | 2.3 | 2.392 | 0.156 | 0.190 | 0.107 | 1.000 |
| 3230.0 | 114 | 3.2 | 2.464 | 0.150 | 0.303 | 0.021 | 1.000 |
| 3231.0 | 121 | 2.8 | 2.372 | 0.176 | 0.319 | 0.018 | 1.000 |
| 3232.0 | 103 | 2.4 | 2.412 | 0.172 | 0.256 | 0.056 | 1.000 |
| 3233.0 | 99 | 3.2 | 2.439 | 0.155 | 0.217 | 0.078 | 0.955 |
| 3234.0 | 109 | 4.5 | 2.514 | 0.155 | 0.267 | 0.033 | 1.000 |
| 3235.0 | 102 | 3.0 | 2.450 | 0.158 | 0.239 | 0.059 | 1.000 |
| 3236.0 | 114 | 2.2 | 2.436 | 0.117 | 0.251 | 0.044 | 1.000 |
| 3237.0 | 79 | 1.5 | 2.324 | 0.164 | 0.095 | 0.177 | 1.000 |
| 3238.0 | 77 | 1.5 | 2.376 | 0.130 | 0.077 | 0.163 | 1.000 |
| 3239.0 | 88 | 1.6 | 2.366 | 0.174 | 0.130 | 0.165 | 1.000 |
| 3240.0 | 88 | 1.8 | 2.383 | 0.160 | 0.134 | 0.153 | 1.000 |
| 3241.0 | 86 | 2.1 | 2.401 | 0.152 | 0.143 | 0.140 | 1.000 |
| 3242.0 | 93 | 2.6 | 2.410 | 0.139 | 0.157 | 0.125 | 1.000 |
| 3243.0 | 80 | 1.6 | 2.378 | 0.183 | 0.096 | 0.175 | 1.000 |
| 3244.0 | 49 | 1.8 | 2.347 | 0.121 | 0.042 | 0.175 | 0.956 |
| 3245.0 | 73 | 2.4 | 2.411 | 0.159 | 0.098 | 0.153 | 0.923 |
| 3246.0 | 68 | 2.2 | 2.428 | 0.157 | 0.092 | 0.158 | 0.935 |
| 3247.0 | 104 | 3.4 | 2.419 | 0.176 | 0.273 | 0.036 | 1.000 |
| 3248.0 | 112 | 4.1 | 2.428 | 0.157 | 0.291 | 0.030 | 1.000 |
| 3249.0 | 110 | 3.4 | 2.467 | 0.173 | 0.305 | 0.024 | 1.000 |
| 3250.0 | 112 | 3.5 | 2.480 | 0.171 | 0.336 | 0.007 | 1.000 |
| 3251.0 | 97 | 3.9 | 2.445 | 0.167 | 0.254 | 0.051 | 0.999 |
| 3252.0 | 90 | 3.7 | 2.448 | 0.165 | 0.244 | 0.059 | 0.976 |
| 3253.0 | 102 | 3.1 | 2.412 | 0.162 | 0.231 | 0.088 | 0.863 |
| 3254.0 | 104 | 3.8 | 2.494 | 0.163 | 0.281 | 0.035 | 1.000 |
| 3255.0 | 102 | 3.2 | 2.418 | 0.184 | 0.225 | 0.087 | 0.871 |
| 3256.0 | 108 | 4.9 | 2.450 | 0.167 | 0.232 | 0.071 | 0.832 |
| 3257.0 | 126 | 4.4 | 2.566 | 0.185 | 0.360 | 0.000 | 1.000 |
| 3258.0 | 83 | 3.1 | 2.435 | 0.143 | 0.172 | 0.108 | 0.989 |
| 3259.0 | 62 | 1.7 | 2.392 | 0.137 | 0.081 | 0.145 | 1.000 |
| 3260.0 | 52 | 1.6 | 2.351 | 0.145 | 0.058 | 0.167 | 1.000 |
| 3261.0 | 20 | 1.5 | 2.350 | 0.127 | 0.028 | 0.181 | 1.000 |
| 3262.0 | 41 | 1.8 | 2.442 | 0.132 | 0.089 | 0.141 | 1.000 |
| 3263.0 | 27 | 1.4 | 2.365 | 0.118 | 0.016 | 0.174 | 1.000 |
| 3264.0 | 31 | 1.5 | 2.372 | 0.122 | 0.023 | 0.168 | 1.000 |
| 3265.0 | 41 | 1.8 | 2.440 | 0.098 | 0.024 | 0.135 | 1.000 |
| 3266.0 | 61 | 2.7 | 2.478 | 0.132 | 0.088 | 0.139 | 0.962 |
| 3267.0 | 77 | 2.2 | 2.334 | 0.211 | 0.098 | 0.186 | 0.794 |
| 3268.0 | 70 | 2.3 | 2.452 | 0.194 | 0.105 | 0.142 | 1.000 |
| 3269.0 | 69 | 1.8 | 2.327 | 0.150 | 0.057 | 0.176 | 0.955 |
| 3270.0 | 76 | 1.6 | 2.355 | 0.162 | 0.074 | 0.170 | 1.000 |
| 3271.0 | 80 | 1.4 | 2.332 | 0.166 | 0.063 | 0.173 | 1.000 |

| DEPTH (mRKB) | GR api | RT ohmm | RHOB g/cc | NPHI frac | VSH frac | PHIE frac | SWE frac |
|---|---|---|---|---|---|---|---|
| 3272.0 | 82 | 1.5 | 2.318 | 0.174 | 0.073 | 0.182 | 1.000 |
| 3273.0 | 91 | 1.7 | 2.385 | 0.154 | 0.109 | 0.151 | 1.000 |
| 3274.0 | 75 | 1.5 | 2.284 | 0.182 | 0.059 | 0.201 | 0.935 |
| 3275.0 | 103 | 1.6 | 2.372 | 0.167 | 0.138 | 0.149 | 1.000 |
| 3276.0 | 62 | 1.6 | 2.300 | 0.154 | 0.043 | 0.194 | 0.928 |
| 3277.0 | 78 | 1.8 | 2.518 | 0.115 | 0.160 | 0.092 | 1.000 |
| 3278.0 | 85 | 4.5 | 2.566 | 0.187 | 0.253 | 0.040 | 1.000 |
| 3279.0 | 78 | 4.5 | 2.440 | 0.197 | 0.187 | 0.102 | 0.786 |
| 3280.0 | 83 | 5.0 | 2.552 | 0.213 | 0.258 | 0.052 | 0.984 |
| 3281.0 | 78 | 4.6 | 2.594 | 0.139 | 0.193 | 0.063 | 1.000 |
| 3282.0 | 88 | 5.2 | 2.508 | 0.230 | 0.199 | 0.096 | 0.747 |
| 3283.0 | 65 | 1.2 | 2.246 | 0.166 | 0.037 | 0.218 | 0.957 |
| 3284.0 | 52 | 1.3 | 2.321 | 0.164 | 0.008 | 0.224 | 0.919 |
| 3285.0 | 59 | 1.6 | 2.404 | 0.155 | 0.046 | 0.173 | 1.000 |
| 3286.0 | 67 | 2.5 | 2.396 | 0.195 | 0.071 | 0.170 | 0.836 |
| 3287.0 | 70 | 3.0 | 2.387 | 0.158 | 0.078 | 0.178 | 0.722 |
| 3288.0 | 85 | 4.2 | 2.485 | 0.204 | 0.187 | 0.114 | 0.756 |
| 3289.0 | 63 | 2.2 | 2.472 | 0.187 | 0.114 | 0.154 | 0.947 |
| 3290.0 | 69 | 3.1 | 2.440 | 0.183 | 0.124 | 0.139 | 0.865 |
| 3291.0 | 46 | 2.2 | 2.398 | 0.129 | 0.041 | 0.169 | 0.901 |
| 3292.0 | 49 | 2.9 | 2.471 | 0.085 | 0.062 | 0.113 | 1.000 |
| 3293.0 | 59 | 2.9 | 2.473 | 0.099 | 0.096 | 0.115 | 1.000 |
| 3294.0 | 54 | 2.5 | 2.393 | 0.158 | 0.089 | 0.157 | 0.879 |
| 3295.0 | 49 | 2.9 | 2.447 | 0.103 | 0.074 | 0.127 | 0.997 |
| 3296.0 | 59 | 2.3 | 2.391 | 0.156 | 0.071 | 0.156 | 0.930 |
| 3297.0 | 85 | 5.7 | 2.536 | 0.171 | 0.226 | 0.057 | 0.960 |
| 3298.0 | 92 | 6.8 | 2.535 | 0.218 | 0.299 | 0.027 | 1.000 |
| 3299.0 | 86 | 4.0 | 2.467 | 0.166 | 0.229 | 0.074 | 0.862 |
| 3300.0 | 90 | 2.8 | 2.438 | 0.222 | 0.210 | 0.094 | 0.924 |
| 3301.0 | 86 | 3.5 | 2.559 | 0.177 | 0.235 | 0.055 | 1.000 |
| 3302.0 | 67 | 3.8 | 2.472 | 0.135 | 0.125 | 0.110 | 0.965 |
| 3303.0 | 67 | 3.8 | 2.426 | 0.125 | 0.102 | 0.134 | 0.812 |
| 3304.0 | 90 | 6.3 | 2.507 | 0.152 | 0.236 | 0.051 | 0.996 |
| 3305.0 | 96 | 6.6 | 2.519 | 0.182 | 0.263 | 0.041 | 1.000 |
| 3306.0 | 78 | 2.1 | 2.460 | 0.191 | 0.167 | 0.135 | 1.000 |
| 3307.0 | 50 | 1.4 | 2.338 | 0.141 | 0.030 | 0.182 | 1.000 |
| 3308.0 | 43 | 1.4 | 2.329 | 0.147 | 0.031 | 0.187 | 1.000 |
| 3309.0 | 44 | 1.5 | 2.369 | 0.139 | 0.032 | 0.172 | 1.000 |
| 3310.0 | 48 | 2.1 | 2.435 | 0.103 | 0.053 | 0.132 | 1.000 |
| 3311.0 | 44 | 2.0 | 2.391 | 0.124 | 0.047 | 0.155 | 1.000 |
| 3312.0 | 47 | 2.1 | 2.408 | 0.113 | 0.056 | 0.143 | 1.000 |
| 3313.0 | 51 | 2.1 | 2.375 | 0.119 | 0.052 | 0.156 | 1.000 |
| 3314.0 | 52 | 2.0 | 2.398 | 0.119 | 0.061 | 0.149 | 1.000 |
| 3315.0 | 57 | 2.4 | 2.454 | 0.096 | 0.073 | 0.123 | 1.000 |
| 3316.0 | 51 | 1.9 | 2.375 | 0.112 | 0.045 | 0.159 | 1.000 |
| 3317.0 | 50 | 1.6 | 2.340 | 0.154 | 0.054 | 0.183 | 0.975 |
| 3318.0 | 55 | 1.6 | 2.381 | 0.138 | 0.066 | 0.150 | 1.000 |
| 3319.0 | 62 | 4.3 | 2.503 | 0.076 | 0.112 | 0.083 | 1.000 |
| 3320.0 | 53 | 2.8 | 2.442 | 0.086 | 0.078 | 0.121 | 1.000 |
| 3321.0 | 50 | 2.0 | 2.400 | 0.098 | 0.066 | 0.137 | 1.000 |
| 3322.0 | 56 | 2.4 | 2.440 | 0.090 | 0.069 | 0.121 | 1.000 |
| 3323.0 | 54 | 2.9 | 2.492 | 0.092 | 0.093 | 0.097 | 1.000 |
| 3324.0 | 55 | 2.9 | 2.479 | 0.093 | 0.086 | 0.113 | 1.000 |
| 3325.0 | 52 | 2.4 | 2.461 | 0.092 | 0.072 | 0.118 | 1.000 |
| 3326.0 | 49 | 2.4 | 2.430 | 0.106 | 0.063 | 0.129 | 1.000 |
| 3327.0 | 52 | 2.5 | 2.460 | 0.086 | 0.071 | 0.111 | 1.000 |

| DEPTH (mRKB) | GR api | RT ohmm | RHOB g/cc | NPHI frac | VSH frac | PHIE frac | SWE frac |
|---|---|---|---|---|---|---|---|
| 3328.0 | 54 | 3.2 | 2.503 | 0.089 | 0.090 | 0.099 | 1.000 |
| 3329.0 | 51 | 2.8 | 2.475 | 0.096 | 0.078 | 0.113 | 1.000 |
| 3330.0 | 51 | 3.1 | 2.474 | 0.091 | 0.080 | 0.107 | 1.000 |
| 3331.0 | 47 | 2.8 | 2.478 | 0.089 | 0.082 | 0.105 | 1.000 |
| 3332.0 | 49 | 3.2 | 2.463 | 0.086 | 0.077 | 0.112 | 1.000 |
| 3333.0 | 48 | 3.4 | 2.512 | 0.085 | 0.082 | 0.102 | 1.000 |
| 3334.0 | 48 | 2.8 | 2.478 | 0.107 | 0.077 | 0.115 | 1.000 |
| 3335.0 | 49 | 2.4 | 2.447 | 0.100 | 0.065 | 0.123 | 1.000 |
| 3336.0 | 51 | 2.5 | 2.446 | 0.096 | 0.062 | 0.121 | 1.000 |
| 3337.0 | 49 | 2.0 | 2.409 | 0.119 | 0.064 | 0.142 | 1.000 |
| 3338.0 | 50 | 2.5 | 2.423 | 0.093 | 0.058 | 0.129 | 1.000 |
| 3339.0 | 49 | 2.7 | 2.453 | 0.098 | 0.068 | 0.122 | 1.000 |
| 3340.0 | 48 | 2.7 | 2.468 | 0.089 | 0.076 | 0.108 | 1.000 |
| 3341.0 | 49 | 3.0 | 2.464 | 0.082 | 0.085 | 0.105 | 1.000 |
| 3342.0 | 50 | 3.6 | 2.511 | 0.083 | 0.104 | 0.091 | 1.000 |
| 3343.0 | 54 | 4.1 | 2.519 | 0.077 | 0.106 | 0.082 | 1.000 |
| 3344.0 | 44 | 2.6 | 2.461 | 0.094 | 0.051 | 0.123 | 1.000 |
| 3345.0 | 48 | 2.8 | 2.452 | 0.091 | 0.054 | 0.123 | 1.000 |
| 3346.0 | 50 | 2.3 | 2.442 | 0.109 | 0.057 | 0.131 | 1.000 |
| 3347.0 | 56 | 2.5 | 2.471 | 0.092 | 0.062 | 0.126 | 1.000 |
| 3348.0 | 46 | 2.7 | 2.484 | 0.087 | 0.081 | 0.108 | 1.000 |
| 3349.0 | 63 | 3.2 | 2.413 | 0.082 | 0.082 | 0.142 | 0.852 |
| 3350.0 | 100 | 5.6 | 2.521 | 0.169 | 0.298 | 0.019 | 1.000 |
| 3351.0 | 99 | 5.1 | 2.540 | 0.167 | 0.288 | 0.022 | 1.000 |
| 3352.0 | 101 | 4.0 | 2.505 | 0.160 | 0.269 | 0.036 | 1.000 |
| 3353.0 | 108 | 5.2 | 2.567 | 0.168 | 0.334 | 0.005 | 1.000 |
| 3354.0 | 103 | 5.1 | 2.511 | 0.161 | 0.297 | 0.023 | 1.000 |
| 3355.0 | 108 | 5.2 | 2.526 | 0.175 | 0.312 | 0.015 | 1.000 |
| 3356.0 | 96 | 3.6 | 2.443 | 0.151 | 0.250 | 0.053 | 0.995 |
| 3357.0 | 100 | 5.2 | 2.507 | 0.164 | 0.262 | 0.043 | 1.000 |
| 3358.0 | 91 | 3.9 | 2.476 | 0.170 | 0.237 | 0.062 | 0.955 |
| 3359.0 | 97 | 4.1 | 2.506 | 0.163 | 0.250 | 0.046 | 1.000 |
| 3360.0 | 98 | 4.6 | 2.534 | 0.151 | 0.266 | 0.031 | 1.000 |
| 3361.0 | 101 | 5.4 | 2.509 | 0.176 | 0.286 | 0.027 | 1.000 |
| 3362.0 | 94 | 4.2 | 2.523 | 0.144 | 0.272 | 0.031 | 1.000 |
| 3363.0 | 102 | 5.5 | 2.528 | 0.163 | 0.300 | 0.018 | 1.000 |
| 3364.0 | 99 | 4.1 | 2.468 | 0.149 | 0.252 | 0.046 | 1.000 |
| 3365.0 | 93 | 3.5 | 2.469 | 0.161 | 0.233 | 0.063 | 0.979 |
| 3366.0 | 91 | 3.1 | 2.461 | 0.179 | 0.233 | 0.065 | 0.996 |
| 3367.0 | 119 | 7.2 | 2.637 | 0.215 | 0.361 | 0.000 | 1.000 |
| 3368.0 | 105 | 4.2 | 2.478 | 0.177 | 0.296 | 0.026 | 1.000 |
| 3369.0 | 111 | 6.8 | 2.601 | 0.200 | 0.337 | 0.004 | 1.000 |
| 3370.0 | 115 | 2.8 | 2.388 | 0.174 | 0.208 | 0.095 | 0.934 |
| 3371.0 | 112 | 3.4 | 2.446 | 0.131 | 0.177 | 0.104 | 0.918 |
| 3372.0 | 114 | 3.2 | 2.442 | 0.182 | 0.218 | 0.082 | 0.927 |
| 3373.0 | 129 | 5.6 | 2.581 | 0.165 | 0.326 | 0.006 | 1.000 |
| 3374.0 | 115 | 6.9 | 2.585 | 0.224 | 0.314 | 0.016 | 1.000 |
| 3375.0 | 110 | 4.4 | 2.687 | 0.195 | 0.221 | 0.067 | 0.916 |
| 3376.0 | 91 | 4.1 | 2.541 | 0.136 | 0.168 | 0.084 | 1.000 |
| 3377.0 | 97 | 2.0 | 2.382 | 0.152 | 0.132 | 0.160 | 0.949 |
| 3378.0 | 78 | 2.3 | 2.416 | 0.139 | 0.117 | 0.153 | 0.937 |
| 3379.0 | 86 | 1.4 | 2.343 | 0.185 | 0.144 | 0.169 | 1.000 |
| 3380.0 | 77 | 2.8 | 2.437 | 0.112 | 0.087 | 0.124 | 1.000 |
| 3381.0 | 48 | 1.5 | 2.340 | 0.133 | 0.035 | 0.180 | 1.000 |
| 3382.0 | 47 | 1.6 | 2.349 | 0.123 | 0.032 | 0.170 | 1.000 |
| 3383.0 | 47 | 1.5 | 2.360 | 0.115 | 0.018 | 0.167 | 1.000 |

| DEPTH (mRKB) | GR api | RT ohmm | RHOB g/cc | NPHI frac | VSH frac | PHIE frac | SWE frac |
|---|---|---|---|---|---|---|---|
| 3384.0 | 43 | 1.2 | 2.310 | 0.152 | 0.027 | 0.197 | 1.000 |
| 3385.0 | 42 | 1.2 | 2.311 | 0.155 | 0.025 | 0.195 | 1.000 |
| 3386.0 | 47 | 1.3 | 2.336 | 0.137 | 0.022 | 0.185 | 1.000 |
| 3387.0 | 47 | 1.4 | 2.351 | 0.126 | 0.026 | 0.170 | 1.000 |
| 3388.0 | 54 | 1.4 | 2.342 | 0.109 | 0.031 | 0.171 | 1.000 |
| 3389.0 | 78 | 1.4 | 2.395 | 0.170 | 0.099 | 0.173 | 1.000 |
| 3390.0 | 85 | 2.3 | 2.427 | 0.168 | 0.130 | 0.151 | 0.937 |
| 3391.0 | 79 | 2.0 | 2.396 | 0.166 | 0.126 | 0.157 | 0.973 |
| 3392.0 | 69 | 1.4 | 2.339 | 0.180 | 0.092 | 0.183 | 1.000 |
| 3393.0 | 47 | 1.8 | 2.389 | 0.132 | 0.047 | 0.168 | 1.000 |
| 3394.0 | 44 | 1.7 | 2.393 | 0.124 | 0.039 | 0.160 | 1.000 |
| 3395.0 | 39 | 1.3 | 2.385 | 0.129 | 0.024 | 0.176 | 1.000 |
| 3396.0 | 40 | 1.4 | 2.411 | 0.123 | 0.038 | 0.163 | 1.000 |
| 3397.0 | 40 | 1.4 | 2.348 | 0.138 | 0.037 | 0.181 | 1.000 |
| 3398.0 | 41 | 1.5 | 2.389 | 0.115 | 0.019 | 0.165 | 1.000 |
| 3399.0 | 38 | 1.6 | 2.408 | 0.107 | 0.019 | 0.154 | 1.000 |
| 3400.0 | 45 | 1.6 | 2.367 | 0.130 | 0.036 | 0.170 | 1.000 |
| 3401.0 | 38 | 1.8 | 2.392 | 0.108 | 0.029 | 0.152 | 1.000 |
| 3402.0 | 37 | 2.0 | 2.425 | 0.093 | 0.027 | 0.137 | 1.000 |
| 3403.0 | 38 | 1.8 | 2.428 | 0.112 | 0.028 | 0.148 | 1.000 |
| 3404.0 | 44 | 1.8 | 2.400 | 0.105 | 0.033 | 0.144 | 1.000 |
| 3405.0 | 70 | 2.6 | 2.439 | 0.087 | 0.049 | 0.114 | 1.000 |
| 3406.0 | 44 | 2.1 | 2.404 | 0.096 | 0.033 | 0.142 | 1.000 |
| 3407.0 | 43 | 2.2 | 2.426 | 0.093 | 0.035 | 0.132 | 1.000 |
| 3408.0 | 46 | 2.0 | 2.404 | 0.095 | 0.037 | 0.140 | 1.000 |
| 3409.0 | 50 | 1.9 | 2.413 | 0.100 | 0.036 | 0.138 | 1.000 |
| 3410.0 | 43 | 2.1 | 2.416 | 0.094 | 0.027 | 0.137 | 1.000 |
| 3411.0 | 41 | 2.1 | 2.400 | 0.090 | 0.021 | 0.143 | 1.000 |
| 3412.0 | 41 | 2.0 | 2.431 | 0.101 | 0.032 | 0.139 | 1.000 |
| 3413.0 | 39 | 2.1 | 2.418 | 0.100 | 0.024 | 0.145 | 1.000 |
| 3414.0 | 36 | 2.0 | 2.417 | 0.095 | 0.034 | 0.137 | 1.000 |
| 3415.0 | 30 | 2.1 | 2.418 | 0.091 | 0.027 | 0.144 | 1.000 |
| 3416.0 | 34 | 2.2 | 2.434 | 0.086 | 0.025 | 0.134 | 1.000 |
| 3417.0 | 44 | 3.2 | 2.532 | 0.052 | 0.039 | 0.085 | 1.000 |
| 3418.0 | 37 | 2.3 | 2.388 | 0.108 | 0.034 | 0.155 | 0.959 |
| 3419.0 | 29 | 1.7 | 2.360 | 0.127 | 0.019 | 0.178 | 0.991 |
| 3420.0 | 29 | 2.0 | 2.418 | 0.102 | 0.022 | 0.145 | 1.000 |
| 3421.0 | 26 | 1.9 | 2.402 | 0.116 | 0.017 | 0.159 | 1.000 |
| 3422.0 | 59 | 2.0 | 2.404 | 0.087 | 0.011 | 0.141 | 1.000 |
| 3423.0 | 78 | 2.3 | 2.472 | 0.107 | 0.068 | 0.115 | 1.000 |
| 3424.0 | 44 | 2.1 | 2.426 | 0.086 | 0.028 | 0.133 | 1.000 |
| 3425.0 | 33 | 3.8 | 2.493 | 0.049 | 0.023 | 0.096 | 1.000 |
| 3426.0 | 29 | 5.4 | 2.565 | 0.037 | 0.033 | 0.059 | 1.000 |
| 3427.0 | 25 | 3.9 | 2.535 | 0.051 | 0.033 | 0.080 | 1.000 |
| 3428.0 | 36 | 3.2 | 2.353 | 0.105 | 0.020 | 0.163 | 0.778 |
| 3429.0 | 34 | 2.1 | 2.428 | 0.098 | 0.022 | 0.152 | 1.000 |
| 3430.0 | 35 | 3.3 | 2.460 | 0.065 | 0.018 | 0.113 | 1.000 |
| 3431.0 | 37 | 3.0 | 2.444 | 0.072 | 0.015 | 0.126 | 1.000 |
| 3432.0 | 52 | 2.8 | 2.477 | 0.135 | 0.042 | 0.148 | 0.912 |
| 3433.0 | 31 | 3.7 | 2.483 | 0.078 | 0.014 | 0.120 | 0.973 |
| 3434.0 | 30 | 9.0 | 2.592 | 0.020 | 0.020 | 0.052 | 1.000 |
| 3435.0 | 34 | 4.8 | 2.521 | 0.058 | 0.045 | 0.084 | 1.000 |
| 3436.0 | 31 | 5.3 | 2.531 | 0.047 | 0.031 | 0.084 | 1.000 |
| 3437.0 | 35 | 5.8 | 2.528 | 0.038 | 0.037 | 0.072 | 1.000 |
| 3438.0 | 41 | 4.4 | 2.474 | 0.058 | 0.040 | 0.095 | 1.000 |
| 3439.0 | 61 | 2.6 | 2.455 | 0.080 | 0.048 | 0.110 | 1.000 |

| DEPTH (mRKB) | GR api | RT ohmm | RHOB g/cc | NPHI frac | VSH frac | PHIE frac | SWE frac |
|---|---|---|---|---|---|---|---|
| 3440.0 | 38 | 3.6 | 2.469 | 0.070 | 0.029 | 0.109 | 1.000 |
| 3441.0 | 33 | 3.9 | 2.517 | 0.053 | 0.025 | 0.088 | 1.000 |
| 3442.0 | 31 | 3.9 | 2.475 | 0.066 | 0.021 | 0.109 | 1.000 |
| 3443.0 | 43 | 4.0 | 2.487 | 0.063 | 0.023 | 0.101 | 1.000 |
| 3444.0 | 40 | 4.1 | 2.499 | 0.057 | 0.019 | 0.098 | 1.000 |
| 3445.0 | 40 | 4.4 | 2.498 | 0.050 | 0.028 | 0.088 | 1.000 |
| 3446.0 | 38 | 4.1 | 2.472 | 0.056 | 0.025 | 0.101 | 1.000 |
| 3447.0 | 50 | 4.3 | 2.485 | 0.072 | 0.031 | 0.100 | 1.000 |
| 3448.0 | 42 | 3.9 | 2.512 | 0.064 | 0.028 | 0.094 | 1.000 |
| 3449.0 | 43 | 4.0 | 2.472 | 0.064 | 0.028 | 0.107 | 1.000 |
| 3450.0 | 44 | 4.2 | 2.509 | 0.062 | 0.036 | 0.089 | 1.000 |
| 3451.0 | 46 | 4.3 | 2.521 | 0.062 | 0.038 | 0.085 | 1.000 |
| 3452.0 | 44 | 4.9 | 2.520 | 0.054 | 0.032 | 0.088 | 1.000 |
| 3453.0 | 64 | 5.4 | 2.523 | 0.047 | 0.034 | 0.076 | 1.000 |
| 3454.0 | 60 | 6.4 | 2.554 | 0.034 | 0.032 | 0.057 | 1.000 |
| 3455.0 | 63 | 5.0 | 2.523 | 0.057 | 0.031 | 0.080 | 1.000 |
| 3456.0 | 62 | 4.6 | 2.496 | 0.054 | 0.021 | 0.090 | 1.000 |
| 3457.0 | 66 | 6.6 | 2.538 | 0.053 | 0.045 | 0.073 | 1.000 |
| 3458.0 | 60 | 10.1 | 2.568 | 0.031 | 0.043 | 0.050 | 1.000 |
| 3459.0 | 56 | 7.3 | 2.521 | 0.042 | 0.028 | 0.071 | 1.000 |
| 3460.0 | 59 | 5.2 | 2.469 | 0.058 | 0.029 | 0.094 | 1.000 |
| 3461.0 | 55 | 5.1 | 2.492 | 0.059 | 0.024 | 0.097 | 1.000 |
| 3462.0 | 49 | 5.4 | 2.503 | 0.055 | 0.032 | 0.086 | 1.000 |
| 3463.0 | 43 | 5.7 | 2.533 | 0.040 | 0.027 | 0.076 | 1.000 |
| 3464.0 | 41 | 7.1 | 2.537 | 0.034 | 0.025 | 0.070 | 1.000 |
| 3465.0 | 49 | 6.5 | 2.513 | 0.039 | 0.018 | 0.079 | 1.000 |
| 3466.0 | 50 | 4.9 | 2.520 | 0.053 | 0.016 | 0.090 | 1.000 |
| 3467.0 | 38 | 8.2 | 2.575 | 0.032 | 0.045 | 0.053 | 1.000 |
| 3468.0 | 40 | 6.1 | 2.522 | 0.052 | 0.014 | 0.092 | 0.959 |
| 3469.0 | 63 | 4.4 | 2.430 | 0.070 | 0.007 | 0.120 | 0.895 |
| 3470.0 | 72 | 4.5 | 2.467 | 0.097 | 0.038 | 0.116 | 0.893 |
| 3471.0 | 55 | 4.6 | 2.467 | 0.082 | 0.024 | 0.116 | 0.893 |
| 3472.0 | 53 | 4.8 | 2.489 | 0.071 | 0.033 | 0.104 | 0.959 |
| 3473.0 | 38 | 6.8 | 2.554 | 0.046 | 0.052 | 0.061 | 1.000 |
| 3474.0 | 31 | 6.9 | 2.530 | 0.046 | 0.045 | 0.077 | 1.000 |
| 3475.0 | 29 | 6.5 | 2.530 | 0.041 | 0.050 | 0.070 | 1.000 |
| 3476.0 | 28 | 8.2 | 2.545 | 0.036 | 0.027 | 0.064 | 1.000 |
| 3477.0 | 40 | 6.6 | 2.528 | 0.048 | 0.045 | 0.070 | 1.000 |
| 3478.0 | 39 | 6.0 | 2.513 | 0.045 | 0.030 | 0.077 | 1.000 |
| 3479.0 | 43 | 5.4 | 2.513 | 0.049 | 0.042 | 0.076 | 1.000 |
| 3480.0 | 45 | 5.7 | 2.473 | 0.080 | 0.042 | 0.109 | 0.830 |
| 3481.0 | 39 | 5.1 | 2.477 | 0.074 | 0.039 | 0.103 | 0.930 |
| 3482.0 | 38 | 4.6 | 2.489 | 0.066 | 0.040 | 0.099 | 1.000 |
| 3483.0 | 29 | 13.9 | 2.608 | 0.028 | 0.065 | 0.034 | 1.000 |
| 3484.0 | 29 | 5.1 | 2.518 | 0.059 | 0.041 | 0.095 | 1.000 |
| 3485.0 | 29 | 18.2 | 2.629 | 0.006 | 0.031 | 0.021 | 1.000 |
| 3486.0 | 33 | 12.7 | 2.499 | 0.023 | -0.000 | 0.087 | 0.709 |
| 3487.0 | 34 | 13.2 | 2.586 | 0.017 | 0.025 | 0.043 | 1.000 |
| 3488.0 | 35 | 16.7 | 2.561 | 0.024 | 0.029 | 0.056 | 0.971 |
| 3489.0 | 38 | 9.4 | 2.550 | 0.039 | 0.039 | 0.067 | 1.000 |
| 3490.0 | 37 | 11.0 | 2.585 | 0.026 | 0.042 | 0.039 | 1.000 |
| 3491.0 | 37 | 9.8 | 2.556 | 0.026 | 0.035 | 0.058 | 1.000 |
| 3492.0 | 48 | 4.5 | 2.501 | 0.061 | 0.044 | 0.092 | 1.000 |
| 3493.0 | 61 | 5.3 | 2.544 | 0.047 | 0.055 | 0.061 | 1.000 |
| 3494.0 | 78 | 4.9 | 2.458 | 0.100 | 0.076 | 0.112 | 0.853 |
| 3495.0 | 83 | 3.8 | 2.446 | 0.096 | 0.077 | 0.105 | 1.000 |

| DEPTH (mRKB) | GR api | RT ohmm | RHOB g/cc | NPHI frac | VSH frac | PHIE frac | SWE frac |
|---|---|---|---|---|---|---|---|
| 3496.0 | 79 | 4.1 | 2.442 | 0.091 | 0.044 | 0.117 | 0.915 |
| 3497.0 | 78 | 3.8 | 2.464 | 0.085 | 0.042 | 0.111 | 1.000 |
| 3498.0 | 89 | 3.0 | 2.442 | 0.111 | 0.054 | 0.124 | 1.000 |
| 3499.0 | 100 | 3.0 | 2.443 | 0.118 | 0.078 | 0.119 | 1.000 |
| 3500.0 | 110 | 3.2 | 2.447 | 0.113 | 0.091 | 0.112 | 1.000 |
| 3501.0 | 111 | 3.0 | 2.398 | 0.120 | 0.088 | 0.128 | 0.969 |
| 3502.0 | 115 | 3.6 | 2.472 | 0.118 | 0.099 | 0.111 | 1.000 |
| 3503.0 | 118 | 6.3 | 2.495 | 0.111 | 0.099 | 0.097 | 0.831 |
| 3504.0 | 51 | 4.4 | 2.478 | 0.081 | 0.049 | 0.105 | 0.978 |
| 3505.0 | 46 | 3.1 | 2.509 | 0.097 | 0.059 | 0.103 | 1.000 |
| 3506.0 | 38 | 7.6 | 2.572 | 0.031 | 0.023 | 0.065 | 1.000 |
| 3507.0 | 35 | 6.7 | 2.499 | 0.042 | 0.019 | 0.088 | 0.951 |
| 3508.0 | 41 | 5.4 | 2.498 | 0.048 | 0.024 | 0.089 | 1.000 |
| 3509.0 | 46 | 4.8 | 2.519 | 0.067 | 0.032 | 0.095 | 1.000 |
| 3510.0 | 34 | 5.7 | 2.512 | 0.055 | 0.023 | 0.094 | 0.966 |
| 3511.0 | 36 | 6.2 | 2.547 | 0.048 | 0.028 | 0.082 | 1.000 |
| 3512.0 | 39 | 7.4 | 2.559 | 0.033 | 0.031 | 0.065 | 1.000 |
| 3513.0 | 37 | 11.1 | 2.561 | 0.031 | 0.031 | 0.057 | 1.000 |
| 3514.0 | 36 | 11.8 | 2.581 | 0.020 | 0.022 | 0.048 | 1.000 |
| 3515.0 | 42 | 12.4 | 2.594 | 0.027 | 0.046 | 0.041 | 1.000 |
| 3516.0 | 86 | 3.2 | 2.414 | 0.080 | 0.068 | 0.113 | 1.000 |
| 3517.0 | 112 | 1.9 | 2.363 | 0.148 | 0.131 | 0.144 | 1.000 |
| 3518.0 | 121 | 3.8 | 2.468 | 0.128 | 0.179 | 0.081 | 1.000 |
| 3519.0 | 98 | 4.7 | 2.500 | 0.114 | 0.145 | 0.082 | 1.000 |
| 3520.0 | 78 | 7.6 | 2.540 | 0.043 | 0.081 | 0.049 | 1.000 |
| 3521.0 | 72 | 5.1 | 2.471 | 0.065 | 0.034 | 0.091 | 1.000 |
| 3522.0 | 48 | 5.9 | 2.546 | 0.044 | 0.050 | 0.061 | 1.000 |
| 3523.0 | 44 | 5.5 | 2.495 | 0.050 | 0.025 | 0.089 | 1.000 |
| 3524.0 | 43 | 5.2 | 2.502 | 0.054 | 0.018 | 0.094 | 1.000 |
| 3525.0 | 47 | 4.5 | 2.471 | 0.069 | 0.025 | 0.104 | 0.995 |
| 3526.0 | 46 | 4.1 | 2.448 | 0.072 | 0.008 | 0.122 | 0.907 |
| 3527.0 | 49 | 3.6 | 2.447 | 0.096 | 0.027 | 0.128 | 0.923 |
| 3528.0 | 56 | 2.8 | 2.419 | 0.081 | 0.025 | 0.124 | 1.000 |
| 3529.0 | 58 | 5.2 | 2.493 | 0.061 | 0.038 | 0.088 | 1.000 |
| 3530.0 | 49 | 23.6 | 2.545 | 0.024 | 0.037 | 0.052 | 0.975 |
| 3531.0 | 49 | 11.6 | 2.561 | 0.044 | 0.059 | 0.060 | 0.985 |
| 3532.0 | 53 | 9.4 | 2.509 | 0.038 | 0.034 | 0.075 | 0.909 |
| 3533.0 | 59 | 20.6 | 2.600 | 0.032 | 0.049 | 0.037 | 1.000 |
| 3534.0 | 70 | 5.2 | 2.496 | 0.076 | 0.038 | 0.094 | 1.000 |
| 3535.0 | 68 | 4.6 | 2.467 | 0.072 | 0.022 | 0.105 | 0.984 |
| 3536.0 | 61 | 4.9 | 2.516 | 0.050 | 0.016 | 0.087 | 1.000 |
| 3537.0 | 63 | 4.1 | 2.485 | 0.102 | 0.022 | 0.122 | 0.900 |
| 3538.0 | 48 | 29.0 | 2.654 | -0.003 | 0.020 | 0.002 | 1.000 |
| 3539.0 | 40 | 17.7 | 2.602 | 0.025 | 0.037 | 0.049 | 1.000 |
| 3540.0 | 54 | 6.6 | 2.571 | 0.039 | 0.106 | 0.047 | 1.000 |
| 3541.0 | 51 | 7.2 | 2.589 | 0.021 | 0.064 | 0.044 | 1.000 |
| 3542.0 | 48 | 5.1 | 2.512 | 0.082 | 0.059 | 0.104 | 0.908 |
| 3543.0 | 43 | 8.9 | 2.617 | 0.055 | 0.067 | 0.058 | 1.000 |
| 3544.0 | 41 | 8.1 | 2.562 | 0.043 | 0.044 | 0.071 | 1.000 |
| 3545.0 | 45 | 6.2 | 2.506 | 0.062 | 0.042 | 0.098 | 0.875 |
| 3546.0 | 51 | 5.2 | 2.469 | 0.074 | 0.043 | 0.103 | 0.915 |
| 3547.0 | 44 | 12.0 | 2.599 | 0.019 | 0.033 | 0.042 | 1.000 |
| 3548.0 | 56 | 5.5 | 2.505 | 0.057 | 0.032 | 0.091 | 1.000 |
| 3549.0 | 56 | 5.6 | 2.513 | 0.063 | 0.043 | 0.084 | 1.000 |
| 3550.0 | 49 | 7.0 | 2.517 | 0.036 | 0.027 | 0.077 | 1.000 |
| 3551.0 | 38 | 18.7 | 2.644 | 0.009 | 0.053 | 0.009 | 1.000 |

| DEPTH (mRKB) | GR api | RT ohmm | RHOB g/cc | NPHI frac | VSH frac | PHIE frac | SWE frac |
|---|---|---|---|---|---|---|---|
| 3552.0 | 43 | 10.7 | 2.553 | 0.041 | 0.047 | 0.067 | 0.937 |
| 3553.0 | 39 | 7.0 | 2.538 | 0.044 | 0.046 | 0.068 | 1.000 |
| 3554.0 | 40 | 7.6 | 2.508 | 0.050 | 0.040 | 0.081 | 0.943 |
| 3555.0 | 41 | 9.8 | 2.558 | 0.030 | 0.047 | 0.054 | 1.000 |
| 3556.0 | 39 | 21.5 | 2.703 | 0.009 | 0.040 | 0.002 | 1.000 |
| 3557.0 | 35 | 58.3 | 2.668 | 0.009 | 0.039 | 0.005 | 1.000 |
| 3558.0 | 65 | 5.8 | 2.449 | 0.093 | 0.058 | 0.111 | 0.795 |
| 3559.0 | 46 | 12.8 | 2.642 | 0.059 | 0.067 | 0.037 | 1.000 |
| 3560.0 | 42 | 43.0 | 2.635 | -0.002 | 0.055 | 0.020 | 1.000 |
| 3561.0 | 61 | 2.3 | 2.416 | 0.119 | 0.097 | 0.133 | 1.000 |
| 3562.0 | 128 | 10.3 | 2.590 | 0.240 | 0.409 | 0.000 | 1.000 |
| 3563.0 | 84 | 3.5 | 2.535 | 0.160 | 0.211 | 0.073 | 0.998 |
| 3564.0 | 58 | 2.3 | 2.397 | 0.159 | 0.083 | 0.169 | 0.864 |
| 3565.0 | 60 | 3.2 | 2.473 | 0.110 | 0.063 | 0.131 | 0.934 |
| 3566.0 | 74 | 6.1 | 2.590 | 0.107 | 0.128 | 0.070 | 1.000 |
| 3567.0 | 49 | 4.7 | 2.510 | 0.069 | 0.080 | 0.094 | 1.000 |
| 3568.0 | 48 | 4.0 | 2.477 | 0.079 | 0.061 | 0.104 | 1.000 |
| 3569.0 | 48 | 2.5 | 2.451 | 0.113 | 0.053 | 0.135 | 1.000 |
| 3570.0 | 55 | 5.3 | 2.587 | 0.078 | 0.084 | 0.076 | 1.000 |
| 3571.0 | 49 | 1.9 | 2.420 | 0.107 | 0.062 | 0.138 | 1.000 |
| 3572.0 | 72 | 4.3 | 2.490 | 0.148 | 0.096 | 0.136 | 0.751 |
| 3573.0 | 53 | 2.5 | 2.447 | 0.132 | 0.055 | 0.150 | 0.939 |
| 3574.0 | 46 | 2.1 | 2.402 | 0.117 | 0.046 | 0.145 | 1.000 |
| 3575.0 | 42 | 1.8 | 2.404 | 0.118 | 0.043 | 0.155 | 1.000 |
| 3576.0 | 42 | 2.5 | 2.481 | 0.082 | 0.053 | 0.113 | 1.000 |
| 3577.0 | 42 | 1.3 | 2.305 | 0.165 | 0.032 | 0.203 | 1.000 |
| 3578.0 | 40 | 1.2 | 2.281 | 0.174 | 0.020 | 0.214 | 1.000 |
| 3579.0 | 42 | 1.3 | 2.297 | 0.168 | 0.033 | 0.203 | 1.000 |
| 3580.0 | 44 | 1.3 | 2.317 | 0.163 | 0.032 | 0.198 | 1.000 |
| 3581.0 | 43 | 1.3 | 2.328 | 0.149 | 0.027 | 0.191 | 1.000 |
| 3582.0 | 26 | 1.6 | 2.407 | 0.127 | 0.011 | 0.177 | 1.000 |
| 3583.0 | 54 | 1.2 | 2.291 | 0.179 | 0.019 | 0.213 | 1.000 |
| 3584.0 | 49 | 1.2 | 2.295 | 0.163 | 0.017 | 0.204 | 1.000 |
| 3585.0 | 32 | 1.4 | 2.351 | 0.142 | 0.017 | 0.186 | 1.000 |
| 3586.0 | 61 | 1.4 | 2.297 | 0.162 | 0.024 | 0.202 | 0.967 |
| 3587.0 | 52 | 1.9 | 2.408 | 0.123 | 0.037 | 0.153 | 1.000 |
| 3588.0 | 48 | 2.1 | 2.420 | 0.099 | 0.045 | 0.134 | 1.000 |
| 3589.0 | 57 | 1.7 | 2.373 | 0.129 | 0.045 | 0.160 | 1.000 |
| 3590.0 | 58 | 1.4 | 2.330 | 0.155 | 0.034 | 0.192 | 1.000 |
| 3591.0 | 61 | 1.5 | 2.358 | 0.137 | 0.043 | 0.170 | 1.000 |
| 3592.0 | 37 | 1.9 | 2.407 | 0.098 | 0.026 | 0.149 | 1.000 |
| 3593.0 | 46 | 1.8 | 2.372 | 0.109 | 0.030 | 0.160 | 1.000 |
| 3594.0 | 48 | 2.0 | 2.404 | 0.113 | 0.029 | 0.156 | 1.000 |
| 3595.0 | 43 | 3.0 | 2.523 | 0.066 | 0.037 | 0.100 | 1.000 |
| 3596.0 | 25 | 9.9 | 2.672 | -0.003 | 0.035 | 0.009 | 1.000 |
| 3597.0 | 29 | 5.5 | 2.480 | 0.076 | 0.030 | 0.109 | 0.854 |
| 3598.0 | 31 | 6.6 | 2.535 | 0.052 | 0.028 | 0.089 | 0.945 |
| 3599.0 | 30 | 7.0 | 2.509 | 0.043 | 0.032 | 0.081 | 0.995 |
| 3600.0 | 31 | 10.9 | 2.582 | 0.026 | 0.027 | 0.060 | 1.000 |
| 3601.0 | 26 | 13.1 | 2.580 | 0.022 | 0.037 | 0.049 | 1.000 |
| 3602.0 | 27 | 15.4 | 2.600 | 0.017 | 0.037 | 0.039 | 1.000 |
| 3603.0 | 28 | 8.8 | 2.558 | 0.032 | 0.039 | 0.060 | 1.000 |
| 3604.0 | 38 | 6.9 | 2.529 | 0.039 | 0.038 | 0.079 | 1.000 |
| 3605.0 | 46 | 4.6 | 2.498 | 0.085 | 0.060 | 0.100 | 0.993 |
| 3606.0 | 45 | 6.2 | 2.512 | 0.065 | 0.041 | 0.092 | 0.932 |
| 3607.0 | 64 | 10.0 | 2.560 | 0.052 | 0.075 | 0.052 | 1.000 |

| DEPTH (mRKB) | GR api | RT ohmm | RHOB g/cc | NPHI frac | VSH frac | PHIE frac | SWE frac |
|---|---|---|---|---|---|---|---|
| 3608.0 | 55 | 5.8 | 2.483 | 0.040 | 0.037 | 0.085 | 1.000 |
| 3609.0 | 57 | 3.5 | 2.449 | 0.096 | 0.050 | 0.120 | 0.974 |
| 3610.0 | 57 | 3.7 | 2.440 | 0.111 | 0.048 | 0.133 | 0.860 |
| 3611.0 | 66 | 4.0 | 2.436 | 0.104 | 0.049 | 0.130 | 0.848 |
| 3612.0 | 70 | 4.5 | 2.438 | 0.098 | 0.087 | 0.113 | 0.871 |
| 3613.0 | 80 | 6.1 | 2.515 | 0.099 | 0.139 | 0.084 | 0.939 |
| 3614.0 | 79 | 5.2 | 2.474 | 0.081 | 0.067 | 0.101 | 0.918 |
| 3615.0 | 64 | 6.2 | 2.544 | 0.064 | 0.062 | 0.088 | 0.952 |
| 3616.0 | 52 | 4.3 | 2.488 | 0.065 | 0.042 | 0.100 | 1.000 |
| 3617.0 | 37 | 7.3 | 2.544 | 0.039 | 0.055 | 0.068 | 1.000 |
| 3618.0 | 30 | 14.2 | 2.624 | 0.036 | 0.057 | 0.045 | 1.000 |
| 3619.0 | 36 | 4.9 | 2.505 | 0.054 | 0.035 | 0.088 | 1.000 |
| 3620.0 | 45 | 4.1 | 2.462 | 0.088 | 0.063 | 0.113 | 0.938 |
| 3621.0 | 48 | 8.1 | 2.519 | 0.068 | 0.079 | 0.080 | 0.891 |
| 3622.0 | 28 | 7.9 | 2.735 | -0.006 | 0.024 | 0.001 | 1.000 |
| 3623.0 | 28 | 57.0 | 2.711 | -0.012 | 0.020 | 0.001 | 1.000 |
| 3624.0 | 31 | 47.0 | 2.631 | 0.010 | 0.032 | 0.022 | 1.000 |
| 3625.0 | 27 | 62.7 | 2.685 | 0.002 | 0.015 | 0.002 | 1.000 |
| 3626.0 | 54 | 10.6 | 2.602 | 0.032 | 0.110 | 0.027 | 1.000 |
| 3627.0 | 48 | 4.2 | 2.471 | 0.080 | 0.060 | 0.106 | 0.986 |
| 3628.0 | 97 | 10.9 | 2.633 | 0.091 | 0.228 | 0.020 | 1.000 |
| 3629.0 | 63 | 4.9 | 2.482 | 0.085 | 0.086 | 0.105 | 0.909 |
| 3630.0 | 90 | 7.8 | 2.534 | 0.107 | 0.153 | 0.079 | 0.845 |
| 3631.0 | 65 | 5.8 | 2.504 | 0.089 | 0.064 | 0.101 | 0.874 |
| 3632.0 | 57 | 6.1 | 2.505 | 0.075 | 0.047 | 0.102 | 0.851 |
| 3633.0 | 52 | 6.5 | 2.524 | 0.062 | 0.035 | 0.095 | 0.886 |
| 3634.0 | 56 | 6.2 | 2.568 | 0.080 | 0.057 | 0.087 | 0.969 |
| 3635.0 | 47 | 5.7 | 2.466 | 0.061 | 0.029 | 0.107 | 0.856 |
| 3636.0 | 61 | 5.3 | 2.576 | 0.086 | 0.082 | 0.079 | 1.000 |
| 3637.0 | 65 | 6.9 | 2.580 | 0.085 | 0.101 | 0.070 | 1.000 |
| 3638.0 | 51 | 9.1 | 2.579 | 0.043 | 0.055 | 0.063 | 1.000 |
| 3639.0 | 59 | 7.8 | 2.553 | 0.064 | 0.072 | 0.079 | 0.919 |
| 3640.0 | 54 | 4.6 | 2.512 | 0.077 | 0.058 | 0.103 | 0.973 |
| 3641.0 | 55 | 4.6 | 2.499 | 0.090 | 0.065 | 0.109 | 0.917 |
| 3642.0 | 46 | 7.8 | 2.678 | 0.019 | 0.060 | 0.008 | 1.000 |
| 3643.0 | 27 | 112.7 | 2.695 | 0.006 | 0.022 | 0.002 | 1.000 |
| 3644.0 | 26 | 174.1 | 2.706 | -0.009 | 0.017 | 0.001 | 1.000 |
| 3645.0 | 29 | 59.9 | 2.661 | 0.020 | 0.060 | 0.011 | 1.000 |
| 3646.0 | 38 | 28.1 | 2.521 | 0.038 | 0.042 | 0.075 | 0.505 |
| 3647.0 | 44 | 11.5 | 2.536 | 0.040 | 0.052 | 0.073 | 0.828 |
| 3648.0 | 47 | 7.4 | 2.521 | 0.084 | 0.045 | 0.108 | 0.728 |
| 3649.0 | 54 | 14.9 | 2.554 | 0.032 | 0.052 | 0.052 | 0.997 |
| 3650.0 | 50 | 24.2 | 2.630 | 0.028 | 0.063 | 0.024 | 1.000 |
| 3651.0 | 42 | 43.2 | 2.533 | 0.034 | 0.040 | 0.063 | 0.649 |
| 3652.0 | 34 | 137.2 | 2.640 | -0.004 | 0.035 | 0.005 | 1.000 |
| 3653.0 | 38 | 56.9 | 2.611 | 0.005 | 0.009 | 0.034 | 1.000 |
| 3654.0 | 40 | 80.3 | 2.618 | 0.005 | 0.021 | 0.022 | 1.000 |
| 3655.0 | 31 | 44.2 | 2.598 | 0.014 | 0.035 | 0.048 | 1.000 |
| 3656.0 | 31 | 105.6 | 2.664 | -0.006 | 0.027 | 0.002 | 1.000 |
| 3657.0 | 28 | 222.4 | 2.696 | -0.009 | 0.011 | 0.001 | 1.000 |
| 3658.0 | 30 | 115.0 | 2.669 | -0.003 | 0.028 | 0.005 | 1.000 |
| 3659.0 | 29 | 235.6 | 2.684 | -0.004 | 0.020 | 0.001 | 1.000 |
| 3660.0 | 29 | 183.3 | 2.697 | -0.004 | 0.019 | 0.002 | 1.000 |
| 3661.0 | 40 | 131.1 | 2.670 | 0.003 | 0.014 | 0.001 | 1.000 |
| 3662.0 | 39 | 103.3 | 2.684 | 0.008 | 0.028 | 0.003 | 1.000 |
| 3663.0 | 37 | 112.4 | 2.668 | 0.000 | 0.028 | 0.010 | 1.000 |

GUDGEON_1 ( page 12 of data listing)

| DEPTH (mRKB) | GR api | RT ohmm | RHOB g/cc | NPHI frac | VSH frac | PHIE frac | SWE frac |
|---|---|---|---|---|---|---|---|
| 3664.0 | 41 | 122.9 | 2.653 | 0.015 | 0.066 | 0.022 | 1.000 |
| 3665.0 | 41 | 117.4 | 2.650 | 0.022 | 0.059 | 0.024 | 1.000 |
| 3666.0 | 47 | -18.3 | 2.537 | 0.084 | 0.028 | 0.102 | 1.000 |
| 3667.0 | 73 | 4.2 | 2.519 | 0.084 | 0.085 | 0.096 | 1.000 |
| 3668.0 | 66 | 4.5 | 2.534 | 0.089 | 0.082 | 0.086 | 1.000 |
| 3669.0 | 48 | 3.3 | 2.427 | 0.094 | 0.038 | 0.131 | 0.932 |
| 3670.0 | 51 | 3.2 | 2.406 | 0.099 | 0.050 | 0.140 | 0.885 |
| 3671.0 | 113 | 8.6 | 2.553 | 0.170 | 0.364 | 0.000 | 1.000 |
| 3672.0 | 53 | 3.2 | 2.448 | 0.129 | 0.075 | 0.145 | 0.836 |
| 3673.0 | 49 | 2.6 | 2.375 | 0.139 | 0.063 | 0.164 | 0.847 |
| 3674.0 | 53 | 2.3 | 2.368 | 0.137 | 0.065 | 0.165 | 0.885 |
| 3675.0 | 56 | 2.5 | 2.376 | 0.148 | 0.075 | 0.161 | 0.875 |
| 3676.0 | 107 | 6.3 | 2.578 | 0.187 | 0.363 | 0.000 | 1.000 |
| 3677.0 | 106 | 11.5 | 2.629 | 0.160 | 0.330 | 0.005 | 1.000 |
| 3678.0 | 98 | 8.5 | 2.545 | 0.181 | 0.285 | 0.030 | 1.000 |
| 3679.0 | 104 | 7.1 | 2.552 | 0.190 | 0.302 | 0.020 | 1.000 |
| 3680.0 | 86 | 6.4 | 2.506 | 0.175 | 0.203 | 0.083 | 0.744 |
| 3681.0 | 70 | 4.5 | 2.477 | 0.118 | 0.093 | 0.123 | 0.816 |
| 3682.0 | 68 | 2.2 | 2.408 | 0.148 | 0.084 | 0.160 | 0.924 |
| 3683.0 | 70 | 5.3 | 2.497 | 0.148 | 0.093 | 0.141 | 0.651 |
| 3684.0 | 60 | 2.4 | 2.377 | 0.145 | 0.075 | 0.167 | 0.862 |
| 3685.0 | 58 | 2.5 | 2.356 | 0.126 | 0.082 | 0.157 | 0.884 |
| 3686.0 | 60 | 2.7 | 2.394 | 0.149 | 0.087 | 0.157 | 0.842 |
| 3687.0 | 65 | 3.0 | 2.455 | 0.133 | 0.089 | 0.141 | 0.878 |
| 3688.0 | 97 | 2.9 | 2.476 | 0.125 | 0.177 | 0.092 | 1.000 |
| 3689.0 | 89 | 4.1 | 2.442 | 0.149 | 0.167 | 0.113 | 0.823 |
| 3690.0 | 85 | 5.2 | 2.403 | 0.185 | 0.150 | 0.153 | 0.583 |
| 3691.0 | 83 | 4.2 | 2.437 | 0.152 | 0.137 | 0.138 | 0.732 |
| 3692.0 | 99 | 9.3 | 2.572 | 0.203 | 0.277 | 0.032 | 1.000 |
| 3693.0 | 82 | 4.1 | 2.487 | 0.208 | 0.149 | 0.163 | 0.625 |
| 3694.0 | 61 | 4.4 | 2.425 | 0.181 | 0.100 | 0.166 | 0.617 |
| 3695.0 | 55 | 2.0 | 2.357 | 0.116 | 0.043 | 0.167 | 0.962 |
| 3696.0 | 92 | 4.4 | 2.535 | 0.122 | 0.148 | 0.102 | 0.941 |
| 3697.0 | 58 | 2.6 | 2.401 | 0.138 | 0.047 | 0.162 | 0.865 |
| 3698.0 | 69 | 3.5 | 2.549 | 0.151 | 0.111 | 0.116 | 0.969 |
| 3699.0 | 50 | 4.3 | 2.550 | 0.155 | 0.099 | 0.120 | 0.843 |
| 3700.0 | 35 | 2.4 | 2.418 | 0.107 | 0.025 | 0.149 | 0.984 |
| 3701.0 | 35 | 1.5 | 2.331 | 0.134 | 0.019 | 0.184 | 1.000 |
| 3702.0 | 35 | 1.6 | 2.381 | 0.120 | 0.029 | 0.160 | 1.000 |
| 3703.0 | 30 | 2.0 | 2.438 | 0.093 | 0.027 | 0.140 | 1.000 |
| 3704.0 | 31 | 2.0 | 2.424 | 0.091 | 0.026 | 0.137 | 1.000 |
| 3705.0 | 37 | 1.8 | 2.485 | 0.093 | 0.027 | 0.140 | 1.000 |
| 3706.0 | 32 | 2.5 | 2.484 | 0.079 | 0.047 | 0.115 | 1.000 |
| 3707.0 | 32 | 3.3 | 2.480 | 0.065 | 0.032 | 0.110 | 1.000 |
| 3708.0 | 34 | 2.9 | 2.506 | 0.083 | 0.037 | 0.118 | 1.000 |
| 3709.0 | 37 | 2.2 | 2.429 | 0.099 | 0.042 | 0.142 | 1.000 |
| 3710.0 | 75 | 4.0 | 2.521 | 0.136 | 0.161 | 0.098 | 0.980 |
| 3711.0 | 75 | 5.6 | 2.482 | 0.145 | 0.121 | 0.129 | 0.671 |
| 3712.0 | 72 | 3.3 | 2.437 | 0.146 | 0.101 | 0.146 | 0.812 |
| 3713.0 | 64 | 3.9 | 2.487 | 0.120 | 0.105 | 0.125 | 0.847 |
| 3714.0 | 49 | 3.8 | 2.478 | 0.125 | 0.059 | 0.138 | 0.811 |
| 3715.0 | 61 | 3.2 | 2.474 | 0.103 | 0.063 | 0.123 | 0.990 |
| 3716.0 | 53 | 2.2 | 2.388 | 0.160 | 0.059 | 0.175 | 0.867 |
| 3717.0 | 71 | 3.0 | 2.518 | 0.183 | 0.173 | 0.122 | 0.878 |
| 3718.0 | 63 | 3.7 | 2.552 | 0.213 | 0.140 | 0.143 | 0.754 |
| 3719.0 | 29 | 1.4 | 2.331 | 0.140 | 0.019 | 0.195 | 1.000 |

| DEPTH (mRKB) | GR api | RT ohmm | RHOB g/cc | NPHI frac | VSH frac | PHIE frac | SWE frac |
|---|---|---|---|---|---|---|---|
| 3720.0 | 30 | N | 2.373 | 0.111 | Nul | 0.171 | 0.991 |
| 3721.0 | 20 | N | 2.401 | 0.098 | Nul | 0.000 | 0.000 |
| 3722.0 | 20 | N | 2.366 | 0.119 | Nul | 0.000 | 0.000 |
| 3723.0 | 31 | N | 2.420 | 0.098 | Nul | 0.000 | 0.000 |
| 3724.0 | | N | 2.371 | 0.103 | Nul | 0.000 | 0.000 |
| 3725.0 | | N | 2.403 | 0.094 | Nul | 0.000 | 0.000 |

# TABLE 5

## Petrophysical Response of Common Minerals
## LASER Modelling Parameters
## Gippsland Basin Australia

by

Wm Scott Dodge Snr

| Mineral Classification | Mineral Name | Chemical Elements | RHOB Litho Density (gm/cm3) | PEF Photoelectric Factor barns/electron | U Volumetric Photoelectric Factor (barns/cm3) | NPOR Thermal Neutron Porosity (p.u.) | SIGMA Capture Cross Section (c.u.) | DT Compressional Transit Time (us/metre) | TPL Electromag Propagation Time (nsec/m) (@ 100 deg) | GR Gamma Ray (API) | POTA Potassium (wt %) | THOR Thorium (ppm) | URAN Uranium (ppm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Silica*** | Quartz | SiO2 | 2.64 | 1.81 | 4.79 | -2.1 | 4.55 | 165.3 | 7.2 | 0.0 | 0.00 | 0.5 -> 6.0 | 0.1 -> 5.0 |
| | Sphene | CaTiOSiO4 | 3.48 | 7.12 | 24.40 | 3.6 | 71.94 | | | > 10000 | 0.00 | 100 -> 600 | 100 -> 700 |
| | Tourmaline | NaMg3Al6B3Si6O27(OH)4 | 3.03 | 1.43 | 4.30 | 37.4 | 4347.00 | | | 0.0 | 0.00 | 0.0 | 0.0 |
| | Zircon | ZrSiO4 | 4.51 | 70.04 | 307.43 | 0.9 | 5.52 | 314.3 | | > 2800 | 0.00 | 50 -> 4000 | 1450 -> 4600 |
| ***Feldspars*** | Orthoclase | KAlSi3O8 | 2.54 | 2.86 | 7.29 | -1.1 | 15.82 | 175.5 | 7 -> 8.2 | 235 -> 275 | 10.50 | 0.0 | 1.2 -> 2.6 |
| | Plagioclase | NaAlSi3O8 | 2.58 | 1.68 | 4.34 | -1.3 | 7.64 | 154.9 | 7 -> 8.2 | 4 -> 57 | 0.30 | 0.0 | 1.9 -> 6.0 |
| ***Micas*** | Muscovite | KAl2(AlSi3O10)(OH)2 | 2.83 | 2.40 | 6.77 | 16.5 | 17.06 | 154.9 | 8.3 -> 9.4 | 270.0 | 8.70 | 0.0 | 8.1 |
| | Biotite | K(Mg,Fe)3(AlSi3O10)(OH)2 | 3.20 | 8.70 | 27.54 | 22.5 | 35.09 | 162.1 | 7.2 -> 8.1 | 275.0 | 6.95 | 0.0 | 2.6 -> 48 |
| ***Carbonates*** | Calcite | CaCO3 | 2.71 | 5.08 | 13.76 | 0.0 | 7.08 | 156.0 | 9.1 | 0.0 | 0.00 | 0.0 | 0.0 |
| | Dolomite | CaMg(CO3)2 | 2.85 | 3.14 | 8.91 | 0.5 | 4.70 | 149.3 | 8.7 | 0.0 | 0.00 | 0.0 | 0.0 |
| | Siderite | FeCO3 | 3.91 | 14.51 | 55.56 | 12.9 | 52.80 | 143.7 | 8.7 | < 5.0 | 0.00 | 0.0 | 0.0 |
| | Ankerite | Ca(Fe,Mg)(CO3)2 | 3.08 | 8.44 | 25.77 | 5.7 | 26.90 | 144.3 | | 0.0 | 0.00 | 0.0 | 0.0 |
| ***Sulphides*** | Pyrite | FeS2 | 5.00 | 16.97 | 82.25 | -1.9 | 90.52 | 123.3 | | 0.0 | 0.00 | 0.0 | 0.0 |
| ***Phosphates*** | Fluorapatite | Ca5(PO4)3F | 3.21 | 5.82 | 18.48 | -0.2 | 10.23 | 147.0 | | 120 -> SAT | 0.00 | 0.0 | 47 -> 62 |
| ***Coals*** | Lignite | C H0.849 N0.015 O0.211 | 1.23 | 0.20 | 0.27 | 54.2 | 12.90 | 525.0 | | 10 -> 25 | 0.00 | 0.0 | 0 |
| ***Clays*** | Kaolinite | Al4(Si4O10)(OH)8 | 2.62 | 1.70 | 4.46 | 45.1 | 13.04 | 694.6 | 8.0 | 80 -> 130 | 0.49 | 7 -> 47 | 1 -> 12 |
| *Illites* | Illite | K.8(Al1.6Fe.2Mg.2)(Si3.4Al.6)O10(OH)2 | 2.77 | 3.03 | 8.37 | 15.8 | 16.74 | | 8.0 | 130 -> 235 | 4.91 | 8 -> 25 | 1 -> 5 |
| | Glauconite | K.7(Fe.7Al1.3)(Si3.3Al.7)O10(OH)2 | 2.85 | 4.79 | 13.60 | 17.5 | 20.89 | | 8.0 | 155 -> 210 | 5.10 | 2 -> 8 | 0.0 |
| *Smectites* | Montmorillonite | Na.33(Al1.67Mg.33)(Si4O10)(OH)2 + 4H2O | 2.11 | 2.11 | 4.53 | 50.0 | 13.97 | | 8.0 | 140.0 | 0.38 | 10 -> 22 | 1 -> 4 |
| *Chlorites* | Mg Chlorite | (Mg5Al)Si3AlO10(OH)8 | 2.67 | 1.39 | 3.71 | 42.8 | 11.34 | | 8.0 | 180 -> 250 | 0.00 | 3 -> 8 | 0.0 |
| | Fe Chlorite | (Fe5Al)Si3AlO10(OH)8 | 3.40 | 12.36 | 41.43 | >60 | 47.44 | | 8.0 | 180 -> 250 | 0.00 | 3 -> 8 | 0.0 |
| ***Fluids*** | Water (0 ppm) | H2 O | 1.00 | 0.44 | 0.40 | | 22.00 | 620.0 | 26 | 0 | 0.00 | 0.0 | 0 |
| | Water (35 kppm) | H2O(0.965) NaCl(0.035) | 1.02 | 0.61 | 0.54 | | 32.00 | 620.0 | 42 | 0 | 0.00 | 0.0 | 0 |
| | Water (70 kppm) | H2O(0.93) NaCl(0.07) | 1.05 | 0.85 | 0.74 | | 46.00 | 620.0 | 53 | 0 | 0.00 | 0.0 | 0 |

Notes:

Reference: Schlumberger 1990 Element Mineral Rock Catalog
Reservoir sands primary constituent is quartz with secondary potassium feldspar grains.
Muscovite and Biotite are present and commonly decompose to form authigenic clays (i.e. chlorite).
Micro porous clays assosciated with micas are Chlorite, Illite, Illite-Smectite, Glauconite-Smectite mixtures.
Biotite is usually associated with Pyrite from the decomposition of this mica mineral with kaolinite and illite.
Detrital heavy minerals of Zircon and Tourmaline are visible in clean reservoir sands.
Feldspar dissolution develops micro/secondary porosity. Kaolin is formed during dissolution.
Granitic trace minerals causing saturated GR responses: Zircon, Sphene
Radioactive isotopes: Potassium 40, Thorium 232, Uranium 238

| Common LASER Model |
|---|
| ***Structural Grains*** |
| Quartz |
| Potassium Feldspar |
| ***Structural & Authigenic Clays*** |
| Kaolinite |
| Mixed layer Illite-Smectite |
| Glauconite |
| ***Diagenetic Cements/Precipitates*** |
| Dolomite |
| Calcite |
| Pyrite |
| Siderite |

Version 1: 16/11/92
Version 2: 18/04/94
Version 3: 22/12/94
Version 4: 14/07/95 (EXCEL)

24/07/95 GIPPSMIN.XLS

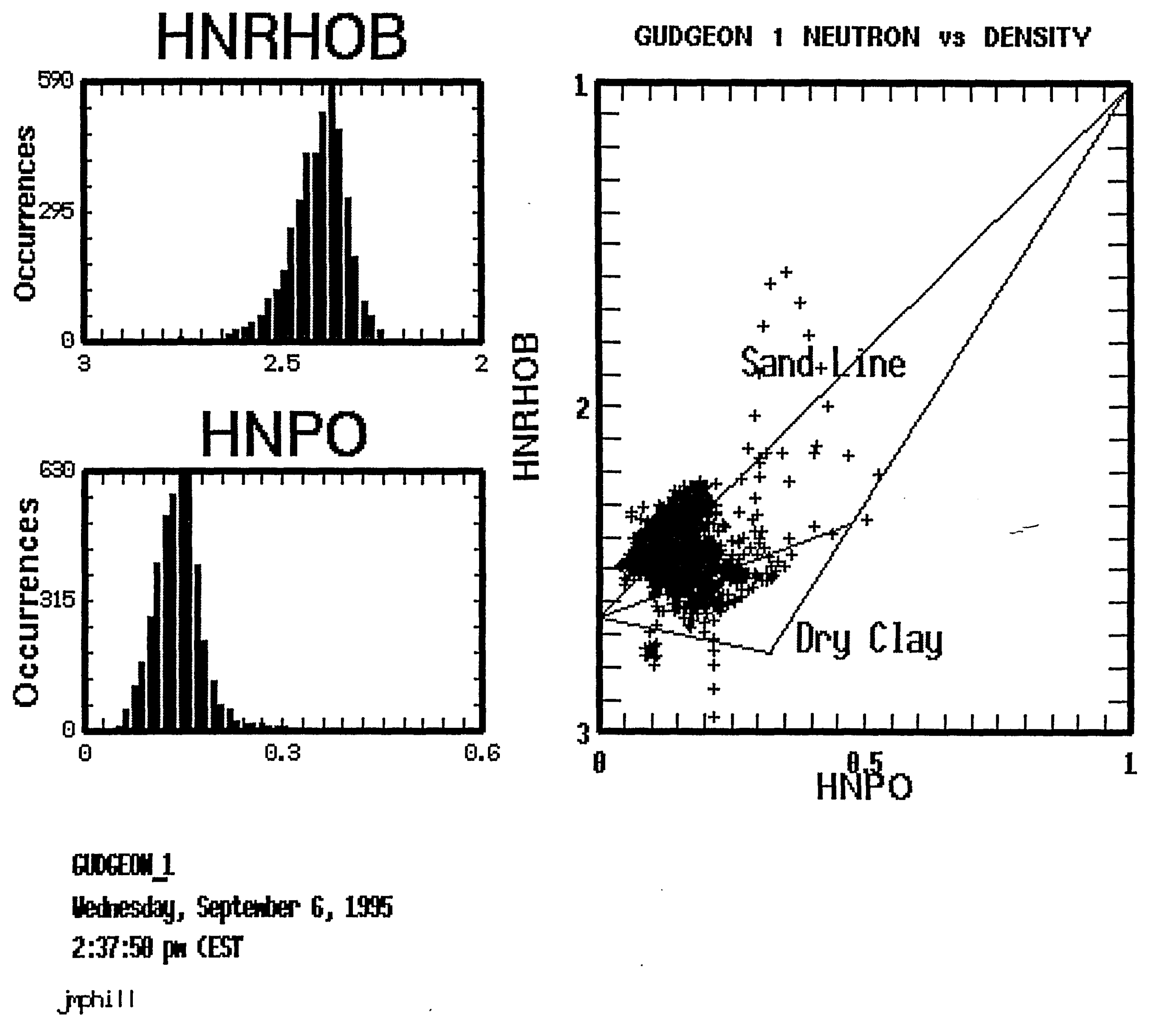
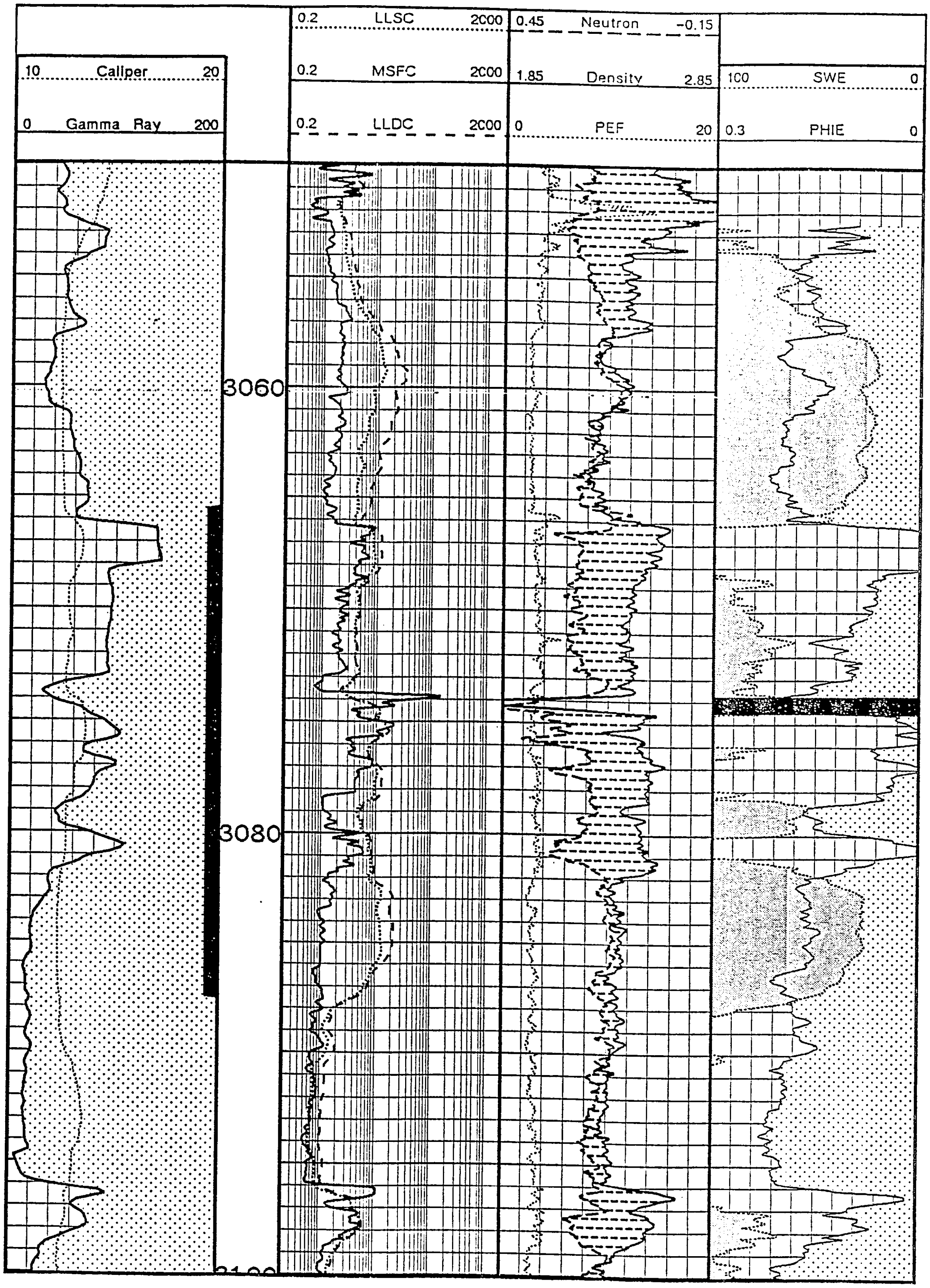



FIGURE 1

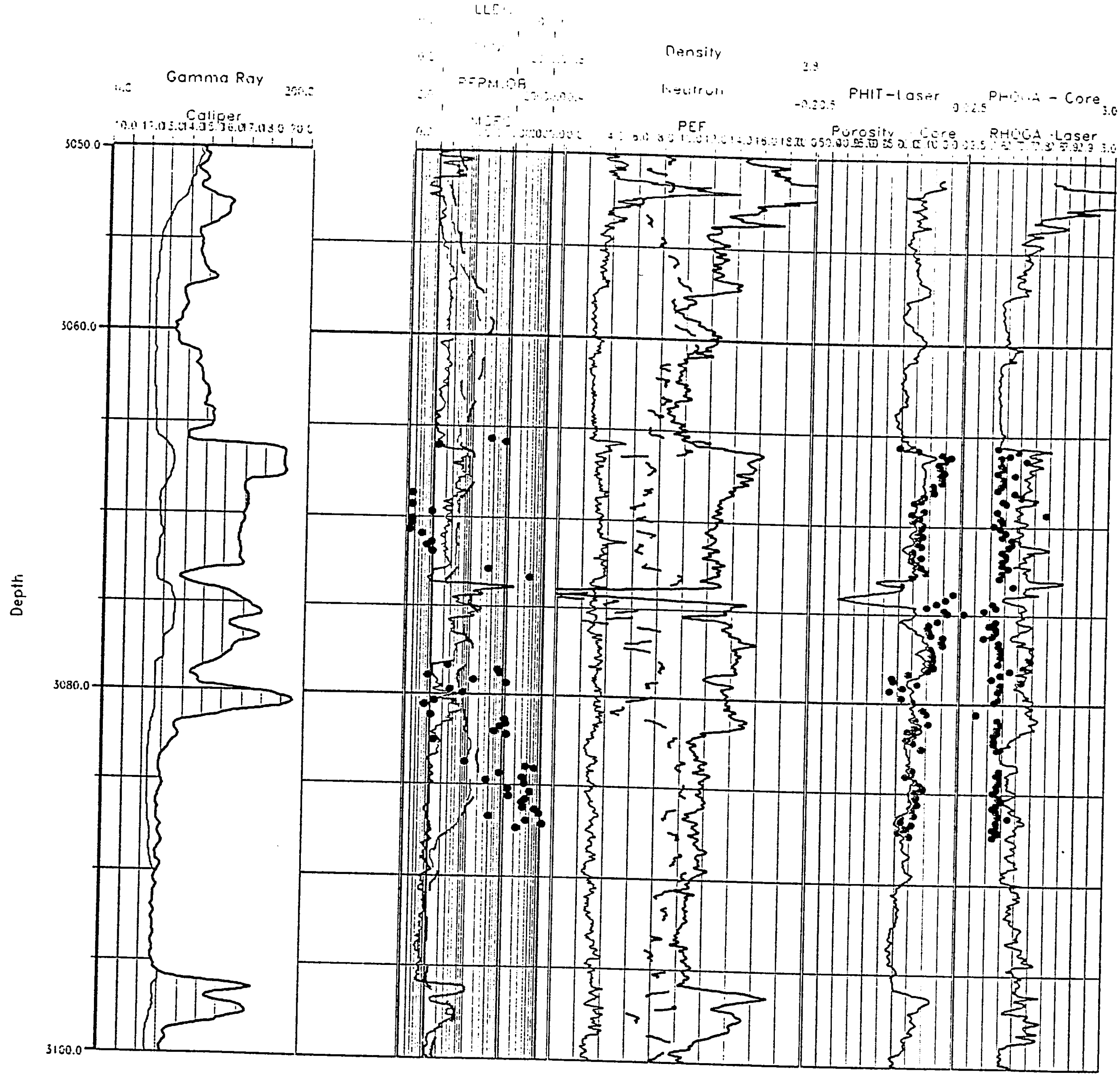
DENSITY - NEUTRON CROSSPLOT




# LOG ANALYSIS GRAPHICAL SUMMARY

FIGURE 2

FIGURE 3




CORE/LOG POROSITY COMPARISON

# *APPENDIX 1*

## *Description of LASER Forward Modelling*

## Description of LASER Forward Modelling

The Log Analysis Statistical Evaluation Resource (LASER) is a tool in the Exxon System Of Log Analysis Resources (SOLAR) which performs log analyses for porosity, fluid saturations and mineralogy. Any combination of open and or cased hole logs can be incorporated into a LASER analysis model. LASER allows the petrophysicist to build a model as simple or complex as the problem requires.

LASER operates on principles similar to those found in several commercial log analysis programmes. The first of these is GLOBAL, introduced by Schlumberger in 1980. These programmes use the method of least-squares inversion, an advanced data analysis technique that has been used extensively in geophysical applications.

The LASER forward model is built using results from petrology, x-ray diffraction and scanning electron micrographs which measure the mineralogy within the Gudgeon reservoirs.

### *Log Response Equations*

Each log is considered separately and detailed equations are used to relate the log responses to formation properties. Answers are obtained by solving the equations simultaneously.

### *Formation Description*

In LASER models, the formation is described in terms of a set of bulk volume fractions of pore fluids and matrix constituents. Reservoir properties such as porosity and saturations are calculated from these bulk volume variables.

### *Model Consistency and Quality Control*

Every complex log analysis technique sometimes distorts log data to produce physically meaningful answers. For example, when a computer programme calculates a water saturation greater than 100 percent and then restricts the answer to 100 percent, the effective resistivity has been increased relative to the measured resistivity. LASER computes these effective values as reconstructed logs that are plotted along side the measured logs to check the consistency of the model.

### *LASER Model*

LASER models are files maintained in the SOLAR database. Each model consists of six tables that completely describe a set of formation variables and a set of log response equations.

The primary formation variables are the unknowns of the LASER analysis. Solutions for these variables are the main outputs of the analysis. The variables for most LASER models include a set of bulk volume fractions of matrix solids and pore fluids that together, make up the total formation bulk volume.

Reservoir properties such as porosity and water saturation may not be included among the primary variables however, such properties can be computed as auxiliary variables from the primary variables.

The equations used to solve the primary variables are called constraint equations. Every constraint equation needed to solve the variables in a LASER model must be defined explicitly. Each log used in the analysis imposes one constraint (the forward model equation). The number of constraints must be greater than or equal to the number of primary variables. Each constraint equation contains a number of parameters. For example, the parameters for the density constraint is the density of each formation and fluid variable.

Constraint uncertainty is associated with every forward model function, since these functions can never predict the logs they represent with complete accuracy. In LASER these uncertainties are taken into account in the least-squares solution procedure and they can also be used to estimate the error in the solutions.

PE603428

This is an enclosure indicator page.
The enclosure PE603428 is enclosed within the container PE900910 at this location in this document.

The enclosure PE603428 has the following characteristics:

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|---|---|
| ITEM_BARCODE = | PE603428 |
| CONTAINER_BARCODE = | PE900910 |
| NAME = | Mineral Abundance Log |
| BASIN = | GIPPSLAND |
| PERMIT = | VIC/L6 |
| TYPE = | WELL |
| SUBTYPE = | WELL_LOG |
| DESCRIPTION = | Laser Mineral Model Output log for Gudgeon-1. Attachment 2 to Appendix 2 of WCR Vol 2. |
| REMARKS = | |
| DATE_CREATED = | 31/10/1995 |
| DATE_RECEIVED = | 13/11/1995 |
| W_NO = | W1120 |
| WELL_NAME = | GUDGEON-1 |
| CONTRACTOR = | |
| CLIENT_OP_CO = | ESSO AUSTRALIA LIMITED |

(Inserted by DNRE - Vic Govt Mines Dept)

PE600731

This is an enclosure indicator page.
The enclosure PE600731 is enclosed within the container PE900910 at this location in this document.

The enclosure PE600731 has the following characteristics:

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CONTAINER_BARCODE = PE900910
NAME = Computer Generated Log
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = WELL_LOG
DESCRIPTION = Computer Generated Log (enclosure from WCR) for Gudgeon-1
REMARKS =
DATE_CREATED = 08/11/1995
DATE_RECEIVED = 13/11/1995
W_NO = W1120
WELL_NAME = Gudgeon -1
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

# Appendix 3

APPENDIX 3

# APPENDIX 3

## GUDGEON 1

## MDT Analysis

# Gudgeon-1 MDT Interpretation

VIC/L6 Bass Strait
Ocean Bounty
2nd & 3rd May 1995

Mike Scott
Reservoir Technology
Production Department

ResTech/MTS/GD_1_REP.DOC.

## Contents

## 1.0 Summary

Gudgeon-1 was drilled during March/April 1995 and evaluated in April/May 1995. The well is located in VIC production licence L6 at 5735998.2 m North and 627987.5 m East (Longitude: 148 28' 4.97"E, Latitude: 38 30' 54.26"S) and lies approximately 12 km south-east of MKA in 279.4 metres of water.

Gudgeon-1 is a deviated well with a maximum well deviation of 36.2 degrees. The well encountered hydrocarbons at 3053.8 m MDRKB ( 2833.3 m TVDSS) and preliminary log analysis demonstrated that there is an OWC at 3087.7 m MDRKB (2861.3 m TVDSS). Within the 33.9 m MD reservoir zone there are three distinctive intervals; an upper sandstone reservoir (12.1 m MD), a middle shaly interval (15.5 m MD) and a lower sandstone reservoir (6.3 m MD). The upper and lower sandstone reservoirs are good clean sandstones with 13-19% porosity and 100-1000+ md permeability (demonstrated from onsite core plugs and MDT). The middle shaly interval has less than 10% effective porosity, high clay content and a variable permeability profile; generally tight and less than 50 md.

The MDT obtained 25 pressure survey points during Run #1 (22 apparently good, 1 tight but acceptable, 1 tight and aborted and 1 potentially supercharged) and 3 hydrocarbon fluid samples during Run #2 (2x1 gallon and 1x6 gallon).

The conclusions of the MDT survey are:

1. The two main reservoir sands in Gudgeon-1 appear not to be in full pressure communication. The lower sand is 14 psi higher pressure than the upper sand.

2. The log OWC of 3054 m MDRKB (2861.3 m TVDSS) in the lower reservoir sand is confirmed by the MDT pressure survey.

3. No OWC can be determined for the upper reservoir sand.

4. Pressures taken within the middle shaly interval lie between the upper and lower reservoir pressures.

5. Gudgeon-1 appears to be 100 psi drawn down when compared to the original aquifer gradient and approximately 20 psi drawn down when compared to the Blackback-3 aquifer gradient obtained in 1993.

6. Offsite fluid analysis reports the GOR of the preserved fluid samples from the upper and lower reservoir intervals to be 39 scf/stb and 29 scf/stb respectively. Compared to other reservoirs in the Bass Strait this reported GOR is very low. There is no data from the sampling or laboratory analysis to suggest that the fluid samples are anomalous.

7. Offsite fluid analysis also suggests that there is zero $H_2S$ in the upper reservoir sand and 260 ppm of $H_2S$ in the lower reservoir sand. The 1 gallon fluid sample chambers were made from titanium alloy and the tested fluid is considered to be representative of the fluids in the reservoir. Although the quantities of gas liberated from the 1 gallon oil samples is small (approximately 0.7 cuft) the results of the laboratory analysis are considered to be valid.

   Onsite $H_2S$ analysis via drager tubes, on the gas liberated from the 6 gallon sample chamber, confirms the zero $H_2S$ concentration in the upper reservoir. The 6 gallon chamber is constructed from 17.4 pH stainless steel.

8. The preliminary offsite laboratory fluid analysis may suggest that the upper and lower reservoir hydrocarbons vary slightly in composition. The upper sand hydrocarbon composition would appear to have a higher gas content and lower wax content than the lower sand. These differences are not thought to be due to sampling error.

## 2.0 Pressure Survey (Run #1)

The MDT pressure survey was run on 2nd May 1995. From a total of 25 survey points, 22 were apparently good, 1 tight but acceptable, 1 tight and aborted and 1 potentially supercharged. The full pressure dataset is shown in Figure 1 and the hydrocarbon zone interpretation in Figure 2.

Figure 1 shows that there is good vertical aquifer communication with an average 1.415 psi/m gradient established over approximately 150 m. A 1.415 psi/m gradient may be considered slightly too low for this area (Blackback=1.43 psi/m, Mackerel=1.42 psi/m) and may indicate that the upper aquifer sands are at a slightly higher pressure than the lower aquifer sands, when compared at the same datum depth. If a gradient of 1.42 psi/m was adopted instead of the calculated 1.415 psi/m this would not have an impact on the Gudgeon-1 MDT interpretation.

As can be seen from Figure 2, the log OWC at 3054 m MDRKB (2861.3 m TVDSS) is confirmed by the pressure interpretation in the lower reservoir sand.

As can also been seen from Figure 2, the upper oil sand is at a lower pressure than the aquifer pressure. Because of this, no OWC can be determined for the upper oil sand.

The middle shaly interval of the reservoir generally demonstrates pressures between the upper and lower reservoir pressure systems.

Figure 3 demonstrates the MDT tool configuration for Run #1. As can be seen from Figure 3, the tool was run in pressure sampling mode only. An onsite decision was made to run the tool in this mode because of poor and deteriorating hole conditions.

The pressure survey sheets are detailed in Appendix B.

## 3.0 Fluid Sampling (Run #2)

Because of deteriorating hole conditions, the MDT tool experienced a 1600 lbs overpull whilst pulling out of the hole on Run #1. Because of this overpull, the tool had to be carefully configured for Run #2 and a limitation had to be placed on the number of sample chambers that the tool could carry. The weight limitation was imposed so that the weak point would not be overstressed if a similar overpull occurred whilst sampling. Onsite tool weight calculations demonstrated that two 1 gallon chambers, one 6 gallon chamber plus the additional MDT sampling accessories (pump out sub and optical fluid analyser) would take the tool weakpoint up to it's maximum safe working limit if an overpull was experienced during the sampling run. The final tool configuration for Run #2 is demonstrated in Figure 4.

Three samples were therefore obtained in the Gudgeon-1 well. The tool was initially set at 3084 m MDRKB (2858.3 m TVDSS) and a one gallon chamber was filled. The tool was then set at 3058.6 m MDRKB (2837.3 m TVDSS) and a 6 gallon chamber and then a 1 gallon chamber was filled. All samples are considered to be valid and representative of the reservoir fluids.

The MDT pump out module and optical fluid analyser were used successfully during the sampling operations to ensure that mud filtrate was flushed from the formation and high quality hydrocarbon samples were obtained. Appendix B details the sample pressure data history.

The one gallon samples were preserved for offsite PVT analysis.

The six gallon sample was transferred on-site to a 20 litre sample bottle for further potential off-site rheology tests. To ensure that the sample was transferred above the pour point with no wax drop-out, a hot water bath was constructed for the MDT tool from scrap rig tubulars. The MDT tool was immersed in the hot water bath vertically and heated to 45 degC. The tool was then removed from the hot bath and the fluids transferred to the 20 litre sample bottles via a positive displacement Spraque hand pump.

## 4.0 Preliminary Fluid Analysis Results

Because of the low GOR in the hydrocarbon samples, no on-site Tutweiler or Orsat tests could be performed. However, from the small amount of gas that was liberated from the 6 gallon cylinder, drager tubes indicated that there was zero concentrations of H2S and low concentrations (<1%) of CO2.

A summary of the onsite analysis by Core Laboratories is shown in Appendix B.

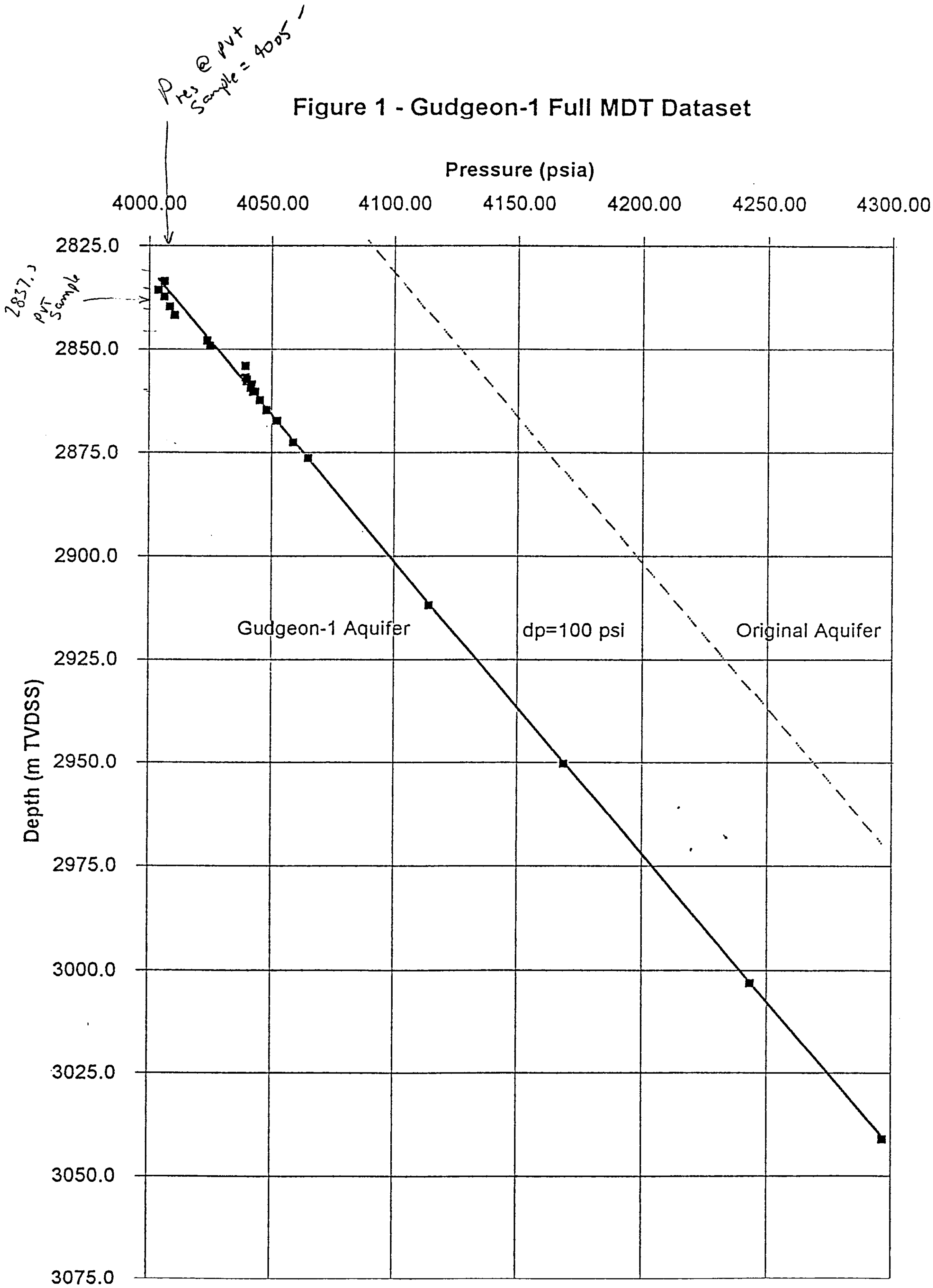
The preliminary results of the offsite PVT analysis by Core Laboratories in Perth provides the following data:

| Indicator | Units | MDT#19 | MDT#71 |
|---|---|---|---|
| Depth | m MDRKB | 3084.0 | 3058.6 |
| API | degrees | 44.7 | 43.3 |
| GOR | scf/stb | 39.0 | 29.0 |
| Bo | rb/stb | 1.066 | 1.06 |
| $H_2S$ | ppm | 260 | 0 |
| $CO_2$ | MOL% | 0.26 | 0.15 |
| Pour Point | Degrees C | 24 | 29 |
| Wax | wt% | 12.97 | 23.35 |
| Fingerprint analysis | see Figure 5 | more light ends when compared to MDT#71 | more heavy ends when compared to MDT#19 |

As can be seen from the above table, the GOR of the two 1 gallon samples is very low. However, there were no indications during the reservoir sampling to suggest that the samples may be anamolous. In addition, discussions with Core Laboratories in Perth reveal that there were no fluid handling or laboratory problems which would invalidate the data. As a comparison; Mackerel, 12 km to the north-west, has a GOR of 190 scf/stb and Blackback, 8 km to the south-east, has a GOR of 1750 scf/stb. The central fields, Halibut, Cobia and Fortescue have GOR's of approximately 50 scf/stb and Kingfish is approximately 250 scf/stb.

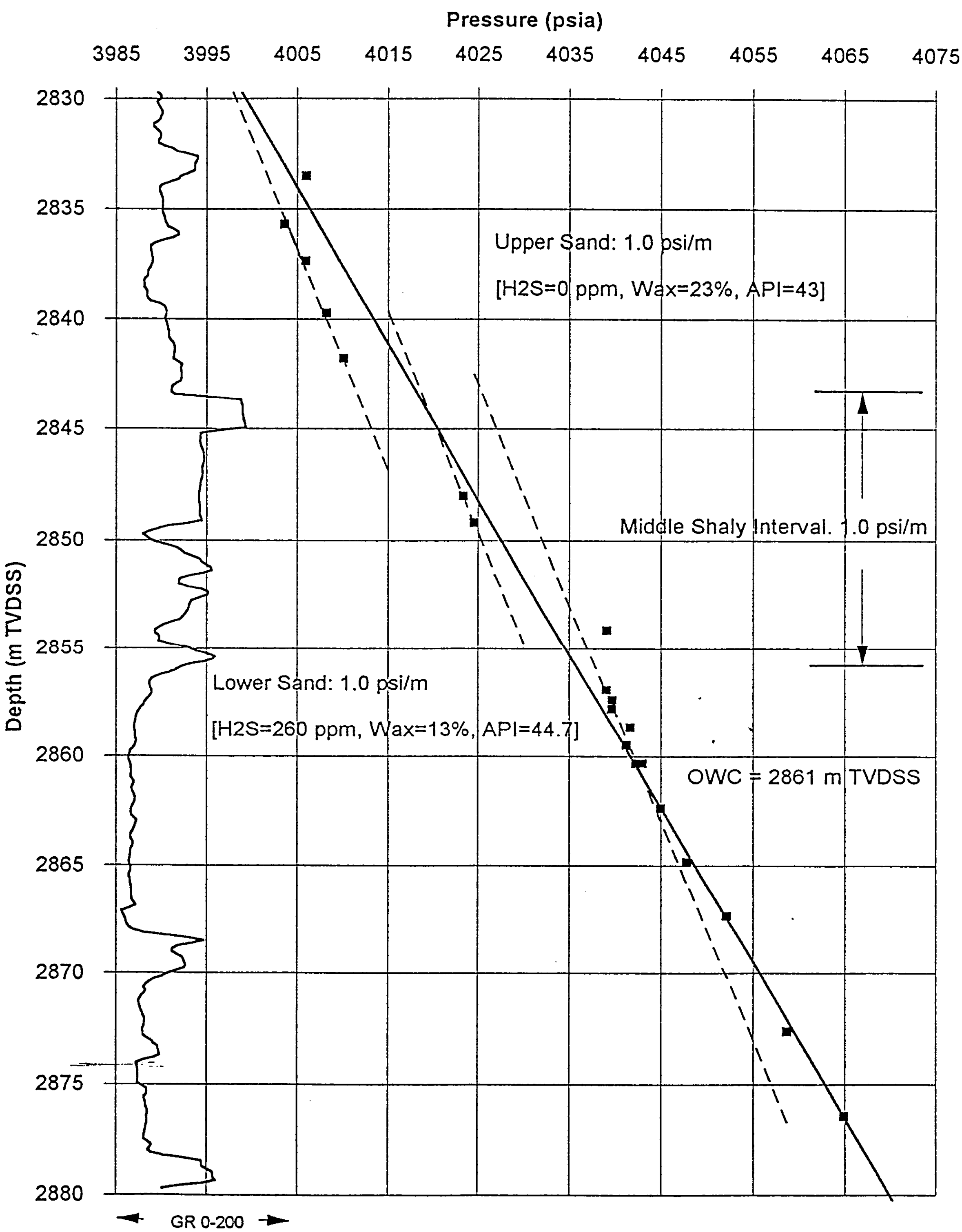
Because of the low GOR in the Gudgeon crude, only a small volume of gas could be liberated from each of the 1 gallon MDT chambers (approximately 0.7 cuft). Discussions with Corelab reveal that this small volume did not cause a problem during the $H_2S$ testing. Tutweiler and Drager tests only require 100cc of gas and therefore the $H_2S$ results are considered to be valid.

## Figure 1 - Gudgeon-1 Full MDT Dataset




(mts/restech/GD1_PLOT.XLS Chart 1/3:33 PM/26/06/95)

## Figure 2 - Gudgeon-1 Hydrocarbon Sands

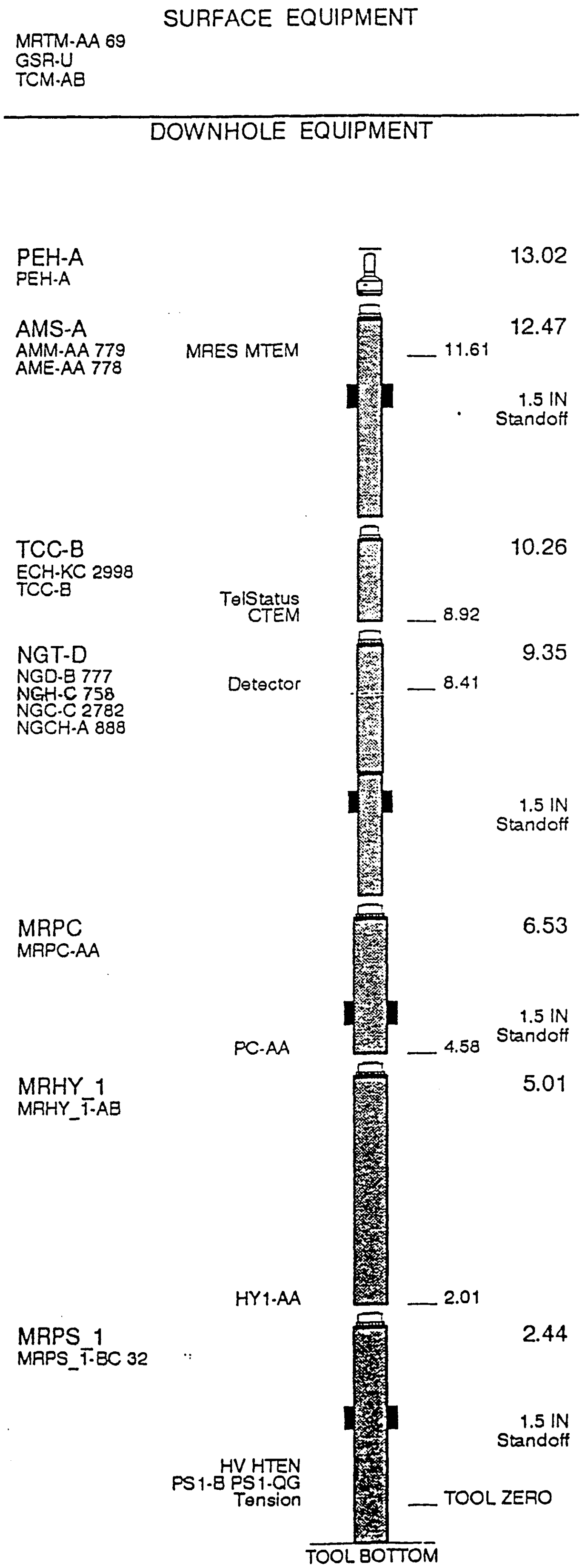



(mts/restech/GD1_PLOT.XLS Chart 3/12:24 PM/3/07/95)

# Figure 3 - MDT Run 1-

## Pressure Sampling Only

## Probe Type: Long Nose



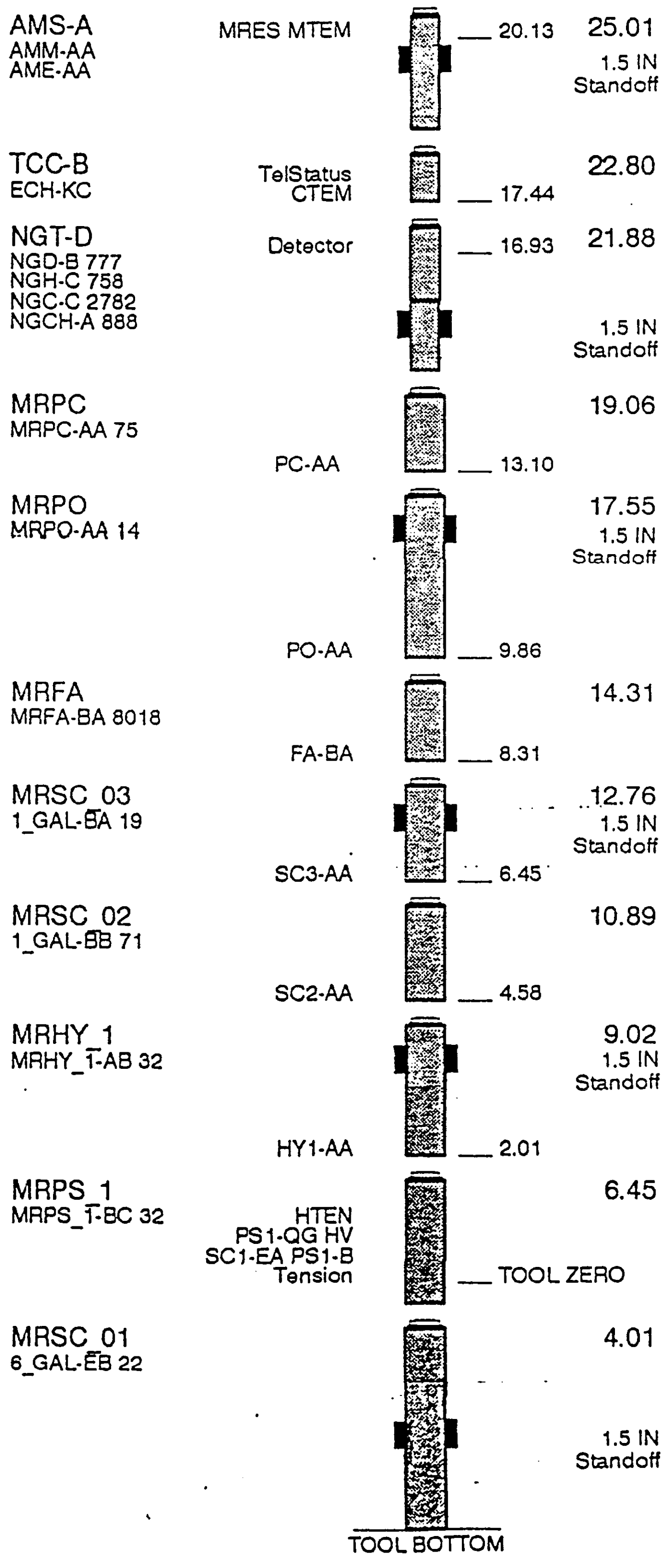

MAXIMUM STRING DIAMETER 7.75 IN
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN METERS

# Figure 4 - MDT Run 2
## Fluid Sampling Only
## Probe Type: Martineau

SURFACE EQUIPMENT

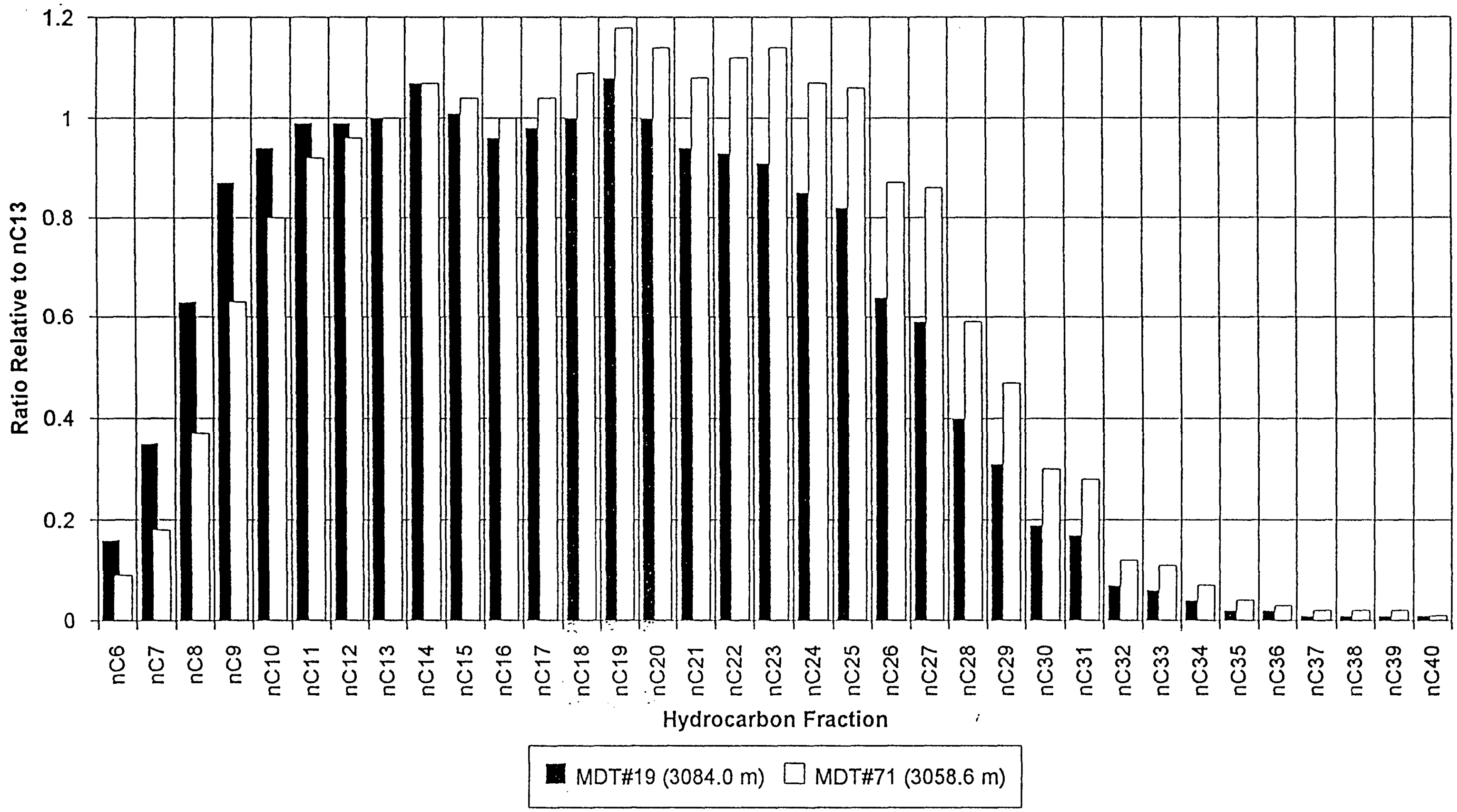
MRTM-AA
GSR-U
TCM-AB

DOWNHOLE EQUIPMENT




MAXIMUM STRING DIAMETER 5.00 IN
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN METERS

## Figure 5 - Gudgeon-1 Fingerprint Analysis




(mts/ResTech/GD_1FING.XLS Chart 1/11:16 AM/28/06/95)

# Appendix 2:

MDT Pressure Data Sheets

MDT Sampling Sheets

Onsite sample analysis summary

# ESSO AUSTRALIA LTD - PRESSURE DATA FORM

| | | | |
|---|---|---|---|
| Well | Gudgeon-1 | Page | 1 of 4 |
| Date | 2-May-95 | Geologist-Engineer | Mike Scott/John Phillips/Jon Elliott |
| Tool Type (MDT, RFT) | Schlumberger MDT | KB (metres): | 25.3 (12-1/4" hole) |
| Gauge Type | CQG/Sapphire | Probe type | Long nose |
| Pressure units (psia, psig) | PSIA | Temperature units (degF, degC) | degC |

| Run-Seat Number | P=Pretest S=Sample | Depth m MDRKB | Depth m TVDSS | Initial Hydrostatic Pressure | PPg | Time Set (HH:MM) | Minimum Flowing Pressure | Formation Pressure | PPg | Temp | Time Retract (HH:MM) | Final Hydrostatic Pressure | PPg | Delta Time (MM:SS) | Comments Including Test Quality and Fluid Type. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/1 | P | 3058.6 | 2837.3 | 5231.0 | 10.72 | 13:21 | 4001.7 | 4005.90 | 8.21 | 77.4 | 13:24 | 5227.3 | 10.72 | 03:00 | 20cc pre-test volume Good MD/CP=1340.6 |
| 1/2 | P | 3061.5 | 2839.7 | 5233.5 | 10.73 | 13:28 | 3930.1 | 4008.21 | 8.22 | 77.6 | 13:33 | 5231.8 | 10.73 | 05:00 | Good MD/CP=89.4 |
| 1/3 | P | 3064.0 | 2841.8 | 5236.5 | 10.74 | 13:36 | 3869.3 | 4010.12 | 8.22 | 77.8 | 13:40 | 5235.2 | 10.73 | 04:00 | Good MD/CP=66.4 |
| 1/4 | P | 3082.4 | 2857.0 | 5266.3 | 10.80 | 13:47 | 4036.3 | 4039.02 | 8.28 | 78.2 | 13:50 | 5262.7 | 10.79 | 03:00 | Good MD/CP=379.8 |
| 1/5 | P | 3084.5 | 2858.7 | 5269.3 | 10.80 | 13:56 | 4031.6 | 4041.63 | 8.29 | 78.7 | 14:00 | 5266.6 | 10.80 | 04:00 | Good MD/CP=285.8 |
| 1/6 | P | 3086.5 | 2860.3 | 5271.3 | 10.81 | 14:05 | 4041.1 | 4042.93 | 8.29 | 79.2 | 14:09 | 5269.6 | 10.80 | 04:00 | Good MD/CP=5225.4 |
| 1/7 | P | 3089.0 | 2862.4 | 5274.9 | 10.81 | 14:14 | 4039.4 | 4044.94 | 8.29 | 79.7 | 14:19 | 5273.3 | 10.81 | 05:00 | Good MD/CP=809.7 |
| 1/8 | P | 3083.0 | 2857.4 | 5265.7 | 10.79 | 14:25 | 4009.1 | 4039.64 | 8.28 | 80.2 | 14:28 | 5264.3 | 10.79 | 03:00 | Good MD/CP=312.8 |
| 1/9 | P | 3095.0 | 2867.3 | 5284.5 | 10.83 | 14:33 | 3422.7 | 4052.14 | 8.31 | 80.7 | 14:38 | 5282.2 | 10.83 | 05:00 | Good MD/CP=18.7 |
| 1/10 | P | 3106.0 | 2876.4 | 5300.9 | 10.87 | 14:43 | 4064.5 | 4064.88 | 8.33 | 81.5 | 14:47 | 5298.9 | 10.86 | 04:00 | Good MD/CP=20919.1 |

# ESSO AUSTRALIA LTD - PRESSURE DATA FORM

| | | | |
|---|---|---|---|
| Well | Gudgeon-1 | Page | 2 of 4 |
| Date | 2-May-95 | Geologist-Engineer | Mike Scott/John Phillips/Jon Elliott |
| Tool Type (MDT, RFT) | Schlumberger MDT | KB (metres): | 25.3 (12-1/4" hole) |
| Gauge Type | CQG/Sapphire | Probe type | Long nose |
| Pressure units (psia, psig) | PSIA | Temperature units (degF, degC) | degC |

| Run-Seat Number (P=Pretest S=Sample) | Depth m MDRKB | Depth m TVDSS | Initial Hydrostatic Pressure | PPg | Time Set (HH:MM) | Minimum Flowing Pressure | Formation Pressure | PPg | Temp | Time Retract (HH:MM) | Final Hydrostatic Pressure | PPg | Delta Time (MM:SS) | Comments Including Test Quality and Fluid Type. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/11 P | 3149.0 | 2912.0 | 5365.1 | 11.00 | 15:06 | 4022.8 | 4114.25 | 8.43 | 84.0 | 15:09 | 5362.1 | 10.99 | 03:00 | Re-correlate depth Good MD/CP=54.7 |
| 1/12 P | 3196.0 | 2950.4 | 5439.8 | 11.15 | 15:17 | 4159.3 | 4168.65 | 8.55 | 85.0 | 15:21 | 5431.7 | 11.14 | 04:00 | Good MD/CP=571.6 |
| 1/13 P | 3261.0 | 3003.1 | 5537.0 | 11.35 | 15:29 | 4166.3 | 4243.35 | 8.70 | 85.2 | 15:33 | 5527.1 | 11.33 | 04:00 | Good MD/CP=33.2 |
| 1/14 P | 3308.0 | 3041.2 | 5602.5 | 11.49 | 15:42 | 4290.5 | 4296.62 | 8.81 | 85.4 | 15:47 | 5595.2 | 11.47 | 05:00 | Good MD/CP=1213.4 |
| 1/15 P | 3101.4 | 2872.6 | 5294.2 | 10.85 | 16:11 | 3431.1 | 4058.70 | 8.32 | 86.2 | 16:15 | 5292.0 | 10.85 | 04:00 | Return to TOL Good MD/CP=10.6 |
| 1/16 P | 3092.0 | 2864.9 | 5278.1 | 10.82 | 16:22 | 3294.1 | 4047.82 | 8.30 | 86.2 | 16:26 | 5277.8 | 10.82 | 04:00 | Good MD/CP=9.8 |
| 1/17 P | 3083.5 | 2857.9 | 5265.7 | 10.79 | 16:32 | 3905.2 | 4039.60 | 8.28 | 86.0 | 16:36 | 5265.5 | 10.79 | 04:00 | Good MD/CP=51.2 |
| 1/18 P | 3085.5 | 2859.5 | 5268.9 | 10.80 | 16:42 | 3955.2 | 4041.23 | 8.28 | 85.6 | 16:46 | 5268.8 | 10.80 | 04:00 | Good MD/CP=166 |
| 1/19 P | 3086.5 | 2860.3 | 5270.4 | 10.80 | 16:52 | 3476.2 | 4042.27 | 8.29 | 85.5 | 16:55 | 5270.5 | 10.80 | 03:00 | Good MD/CP=67.8 |
| 1/20 P | 3078.0 | 2853.3 | 5257.8 | 10.78 | 17:02 | 18.0 | n/a | n/a | 84.5 | 17:07 | 5257.5 | 10.78 | 05:00 | Tight-Aborted MD/CP=0 |

# ESSO AUSTRALIA LTD - PRESSURE DATA FORM

| | | | |
|---|---|---|---|
| Well | Gudgeon-1 | Page | 3 of 4 |
| Date | 2-May-95 | Geologist-Engineer | Mike Scott/John Phillips/Jon Elliott |
| Tool Type (MDT, RFT) | Schlumberger MDT | KB (metres): | 25.3 (12-1/4" hole) |
| Gauge Type | CQG/Sapphire | Probe type | Long nose |
| Pressure units (psia, psig) | PSIA | Temperature units (degF, degC) | degC |

| Run-Seat Number (P=Pretest, S=Sample) | Depth m MDRKB | Depth m TVDSS | Initial Hydrostatic Pressure | Initial Hydrostatic PPg | Time Set (HH:MM) | Minimum Flowing Pressure | Formation Pressure | Formation PPg | Temp | Time Retract (HH:MM) | Final Hydrostatic Pressure | Final Hydrostatic PPg | Delta Time (MM:SS) | Comments Including Test Quality and Fluid Type. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/21 P | 3079.0 | 2854.1 | 5259.5 | 10.78 | 17:11 | 1009.3 | 4039.10 | 8.28 | 85.0 | 17:17 | 5258.7 | 10.78 | 06:00 | 10cc pre-test volume set<br>Tight - Good Test<br>MD/CP=1.8 |
| 1/22 P | 3073.0 | 2849.2 | 5250.0 | 10.76 | 17:23 | 2038.6 | 4024.54 | 8.25 | 84.3 | 17:28 | 5249.7 | 10.76 | 05:00 | Good<br>MD/CP=4.7 |
| 1/23 P | 3071.5 | 2848.0 | 5248.2 | 10.76 | 17:33 | 2904.2 | 4023.33 | 8.25 | 84.0 | 17:39 | 5247.8 | 10.76 | 06:00 | Good<br>MD/CP=2.8 |
| 1/24 P | 3056.6 | 2835.7 | 5226.2 | 10.71 | 17:47 | 2461.0 | 4003.54 | 8.21 | 83.6 | 17:51 | 5226.1 | 10.71 | 04:00 | Good<br>MD/CP=4.6 |
| 1/25 P | 3054.4 | 2833.5 | 5223.6 | 10.71 | 17:56 | 3487.7 | 4005.98 | 8.21 | 83.4 | 18:00 | 5222.9 | 10.71 | 04:00 | Good - potentially s\c<br>MD/CP=5.0 |

# ESSO AUSTRALIA LTD - PRESSURE DATA FORM

| | | | |
|---|---|---|---|
| Well | Gudgeon-1 | Page | 4 of 4 |
| Date | 3-May-95 | Geologist-Engineer | Mike Scott/John Phillips/Jon Elliott |
| Tool Type (MDT, RFT) | Schlumberger MDT | KB (metres): | 25.3 (12-1/4" hole) |
| Gauge Type | CQG/Sapphire | Probe type | Martineau |
| Pressure units (psia, psig) | PSIA | Temperature units (degF, degC) | degC |

| Run-Seat Number | P=Pretest S=Sample | Depth m MDRKB | Depth m TVDSS | Initial Hydrostatic Pressure | PPg | Time Set (HH:MM) | Minimum Flowing Pressure | Formation Pressure | PPg | Temp | Time Retract (HH:MM) | Final Hydrostatic Pressure | PPg | Delta Time (MM:SS) | Comments Including Test Quality and Fluid Type. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2/1 | P | 3084.0 | 2858.3 | 5270.8 | 10.81 | 1:18 | 3919.0 | 4040.50 | 8.28 | 85.9 | 1:24 | - | - | 06:00 | Martineau Probe 20cc pretest |
| Pump out sub operation | - | | | - | - | 1:24 | 3517.9 | - | - | 86.1 | 1:28 | - | - | 04:00 | OFA=Green R=22.5 ohm.m Pump volume=2340cc |
| Open 1 gallon chamber | S | | | - | - | 1:29 | 789.0 | 4040.00 | 8.28 | 87.1 | 1:38 | - | - | 09:00 | R=22.5 ohm.m 1 gallon filled and sealed |
| Retract tool | - | | | - | - | 1:38 | - | - | - | 87.1 | 1:39 | 5270.0 | 10.80 | 01:00 | Good sample MD/CP=76.1 |
| 2/2 | P | 3058.6 | 2837.3 | 5233.2 | 10.73 | 1:48 | 3865.3 | 4005.32 | 8.21 | 87.1 | 1:51 | - | - | 03:00 | Martineau Probe 200cc pretest |
| Pump out sub operation | - | | | - | - | 1:52 | 3672.1 | - | - | 87.2 | 1:54 | - | - | 02:00 | OFA=Green R=22.0 ohm.m Pump volume=1170cc |
| Open 6 gallon chamber | S | | | - | - | 1:56 | 1679.4 | 4004.38 | 8.21 | 86.9 | 2:10 | - | - | 14:00 | R=23.2 ohm.m 6 gallon filled and sealed |
| Open 1 gallon chamber | S | | | - | - | 2:11 | 2709.2 | 4005.25 | 8.21 | 86.2 | 2:21 | - | - | 10:00 | R=22.1 ohm.m 1 gallon filled and sealed |
| Retract tool | - | | | - | - | 2:21 | - | - | - | 86.2 | 2:24 | 5232.4 | 10.73 | 03:00 | Good samples MD/CP=108.8 |

## ESSO AUSTRALIA LTD

WELL: GUDGEON-1

OBSERVER: MIKE SCOTT

DATE: 03 MAY 1995

RUN No.: 2/1

| (PUMP OUT SUB + OFA USED). | CHAMBER 1 ( ~~lit~~) 1 GALLON | | ~~CHAMBER 2 ( lit)~~ | |
|---|---|---|---|---|
| SEAT NO. | 2/1 | | | |
| DEPTH | 3084.0 | m | | m |
| A. RECORDING TIMES | | | | |
| Tool Set | 01:18 | hrs | | hrs |
| Pretest Duration | 6.0 | mins | | mins |
| Chamber Open | 01:29 | hrs | | hrs |
| Chamber Full | 01:38 | mins | | mins |
| Seal Chamber | 01:38 | hrs | | hrs |
| Fill Time | 9.0 | mins | | mins |
| Finish Build Up | 01:38 | hrs | | hrs |
| Build Up Time | 9.0 | mins | | mins |
| Tool Retract | 01:39 | hrs | | hrs |
| Total Time | 21.0 | mins | | mins |
| B. SAMPLE PRESSURE | | | | |
| Initial Hydrostatic | 5270.8 | psia | | psia |
| Initial Formation Pressure (Pretest) | 4040.5 | psia | | psia |
| MIN ~~Initial~~ Flowing Pressure | 789.04 | psia | | psia |
| ~~Final Flowing Pressure~~ | — | psia | | psia |
| Final Form'n Pressure | 4040.0 | psia | | psia |
| Final Hydrostatic | 5270.0 | psia | | psia |
| C. TEMPERATURE | | | | |
| Temp. @ Sample Depth (AMS) | 86.4 | deg C | | deg C |
| Rm @ Sample Depth (AMS) | 0.04 | ohm-m | | ohm-m |
| D. SAMPLE RECOVERY | | | | |
| Surface Pressure | | psia | | psia |
| Volume Gas | | cu ft | | cu ft |
| Volume Oil | | lit | | lit |
| Volume Condensate | | lit | | lit |
| Volume Water (Total) | | lit | | lit |
| E. SAMPLE PROPERTIES | | | | |
| Gas Composition | | | | |
| C1 | | ppm | | ppm |
| C2 | | ppm | | ppm |
| C3 | | ppm | | ppm |
| C4 | | ppm | | ppm |
| C5 | | ppm | | ppm |
| C6+ | | ppm | | ppm |
| CO2/H2S | %/ | ppm | %/ | ppm |
| Oil/Cond. Properties | deg API @ | deg C | deg API @ | deg C |
| Colour | | | | |
| Fluorescence | | | | |
| GOR | | | | |
| Pour Point | | | | |
| Water Properties | | | | |
| Resistivity | ohm-m @ | deg C | ohm-m @ | deg C |
| NaCl Equivalent | | ppm | | ppm |
| Cl-titrated | | ppm | | ppm |
| Tritium | | DPM | | DPM |
| pH | | | | |
| Est. Water Type | | | | |
| F. MUD FILTRATE PROPERTIES | | | | |
| Resistivity | ohm-m @ | deg C | ohm-m @ | deg C |
| NaCl Equivalent | | ppm | | ppm |
| Cl-titrated | | ppm | | ppm |
| pH | | | | |
| Tritium (in Mud) | | DPM | | DPM |
| G. GENERAL CALIBRATION | | | | |
| Mud Weight | 10.7-10.8 | ppg | | ppg |
| Calc. Hydrostatic | 5271 | psiA | | psi |
| Serial No. (Preserved) | MRSC #19 (1 GALLON) | | | |
| Choke Size/Probe Type | MDT VARIABLE-100%=1/4" / MARTINEAU | | | |
| REMARKS | PRESERVED<br>MIN FBHP=3400psi VIA THROTTLE. | | | |

SAMPLE PRESERVED FOR PVT

Dwg: 1107/OP/429 08/1992

# ESSO AUSTRALIA LTD

WELL: GUDGEON - 1

OBSERVER: MIKE SCOTT    DATE: 03 MAY 1995    RUN No.: 2/2

| (PUMPOUT SUB + OFA USED) | CHAMBER 1 (~~lt~~) 6 GALLON | | CHAMBER 2 (~~lt~~) 1 GALLON | |
|---|---|---|---|---|
| SEAT NO. | 2/2 | | 2/2 | |
| DEPTH | 3058.6 | m | 3058.6 | m |
| **A. RECORDING TIMES** | | | | |
| Tool Set | 01:48 | hrs | — | hrs |
| Pretest Duration | 3.0 | mins | — | mins |
| Chamber Open | 01:56 | hrs | 02:11 | hrs |
| Chamber Full | 02:10 | mins | 02:21 | mins |
| Seal Chamber | 02:10 | hrs | 02:21 | hrs |
| Fill Time | 14.0 | mins | 10.0 | mins |
| Finish Build Up | 02:10 | hrs | 02:21 | hrs |
| Build Up Time | 14.0 | mins | 10.0 | mins |
| Tool Retract | — | hrs | 02:24 | hrs |
| Total Time | — | mins | 36.0 | mins |
| **B. SAMPLE PRESSURE** | | | | |
| Initial Hydrostatic | 5233.2 | psia | — | psia |
| Initial Formation Pressure (Pretest) | 4005.3 | psia | — | psia |
| MIN ~~Initial~~ Flowing Pressure | 1679.4 | psia | 2709.2 | psia |
| ~~Final Flowing Pressure~~ | — | psia | — | psia |
| Final Form'n Pressure | 4004.38 | psia | 4005.26 | psia |
| Final Hydrostatic | — | psia | 5232.35 | psia |
| **C. TEMPERATURE** | | | | |
| Temp. @ Sample Depth (AMS) | 87.2 | deg C | 86.2 | deg C |
| Rm @ Sample Depth (AMS) | 0.04 | ohm-m | 0.04 | ohm-m |
| **D. SAMPLE RECOVERY** | | | | |
| Surface Pressure | 100 | psia | | psia |
| Volume Gas (VOLUMES REMAINING | N/A | cu ft | | cu ft |
| Volume Oil (AFTER TRANSFER | 150CC OIL | ~~lit~~ | | lit |
| Volume Condensate (TO 20 LITRE | — | lit | | lit |
| Volume Water (Total) (BOTTLE) | 150CC MUD | ~~lit~~ | | lit |
| **E. SAMPLE PROPERTIES** | | | | |
| Gas Composition | N/A | | | |
| C1 | INSUFFICIENT GAS | ppm | | ppm |
| C2 | — | ppm | | ppm |
| C3 | — | ppm | | ppm |
| C4 | — | ppm | | ppm |
| C5 | — | ppm | | ppm |
| C6+ | — | ppm | | ppm |
| CO2/H2S | < 1 % / 0 | ppm | % / | ppm |
| Oil/Cond. Properties | 43.8 deg API @ 60°F | ~~deg C~~ | deg API @ | deg C |
| Colour | DARK BROWN | | | |
| Fluorescence | N/A | | | |
| GOR | N/A | | | |
| Pour Point | 27.0°C | | | |
| Water Properties | NO WATER RECOVERED | | SAMPLE PRESERVED FOR PVT | |
| Resistivity | ohm-m @ | deg C | ohm-m @ | deg C |
| NaCl Equivalent | | ppm | | ppm |
| Cl-titrated | | ppm | | ppm |
| Tritium | | DPM | | DPM |
| pH | | | | |
| Est. Water Type | | | | |
| **F. MUD ~~FILTRATE~~ PROPERTIES** | | | | |
| Resistivity | 0.25 ohm-m @ 29.0 | deg C | ohm-m @ | deg C |
| NaCl Equivalent | 50,000 | ppm | | ppm |
| Cl-titrated | — | ppm | | ppm |
| pH | 8.0 | | | |
| ~~Tritium (in Mud)~~ KCL | 7.9 % | ~~DPM~~ | | DPM |
| **G. GENERAL CALIBRATION** | | | | |
| Mud Weight | 10.7 – 10.8 | ppg | 10.7 – 10.8 | ppg |
| Calc. Hydrostatic | 5233.2 | psiA | 5233.2 | psiA |
| Serial No. (Preserved) | MRSC #22 | | MRSC #71 | |
| Choke Size/Probe Type | MDT VARIABLE - 100% = 1/4" / MARTINEAU | | MDT VARIABLE - 100% = 1/4" / MARTINEAU | |
| REMARKS 6 GALLON CHAMBER HEATED TO 45°C IN WATER BATH PRIOR TO TRANSFER. | SAMPLE "SEMI - PRESERVED" FOR PIPELINE RHEOLOGY WORK. + CORELAB ONSITE ANALYSIS. | | PRESERVED. MIN FBHP = 3400 psi VIA THROTTLE | |

# SAMPLING DATA SHEET
## CORE LABORATORIES

| | |
|---|---|
| CLIENT | : ESSO AUSTRALIA LTD. |
| WELL | : GUDGEON 1 |
| LOCATION | : OFFSHORE BASS STRAIT, VICTORIA |
| SAMPLING POINT | : 6 GAL. CHAMBER - MDT RUN 2 |
| SAMPLED BY | : THOMAS A. SAMUEL |
| DATE | : 3rd MAY 1995 |

| ANALYSIS # | TUTWEILER | ORSAT | DRAGER TUBES | REMARKS |
|---|---|---|---|---|
| MDT RUN 2 | - NO GAS | - NO GAS - | 1. $CO_2$ < 1 % | *OPENING PRESSURE |
| (6 GAL. CHAMBER) | | | 2. $CO_2$ < 1 % | OF MDT CHAMBER |
| | | | | AT RIG FLOOR 100 PSIG.* |
| | | | 1. $H_2S$ 0 ppm | |
| | | | 2. $H_2S$ 0 ppm | |
| | | | | |
| | | | | |
| | | | | |

| ANALYSIS # | API GRAVITY | POUR POINT | CLOUD POINT | REMARKS |
|---|---|---|---|---|
| MDT RUN 2 | 43.8 @ 60°F | 27.0°C | — | |
| (6 GAL CHAMBER) | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

**REMARKS:**

TRANSFERED ALL SAMPLE FROM MDT RUN 2, 6 GAL. CHAMBER INTO ONE CORE LAB 20 Lt. CYLINDER S/N 3475A USING SPRAGUE PUMP. BALANCE OF 300 cc FLUID COLLECTED FROM MDT CHAMBER - 150 cc CRUDE OIL AND 150 cc MUD.
PRESSURE OF 20 Lt CYLINDER 500 PSIG @ 15 °C

C:\RFL\JOBS\ SAMP_CO2.XLS

# Appendix 4

APPENDIX 4

# APPENDIX 4

## GUDGEON 1

## Core Analysis

**ROUTINE CORE ANALYSIS REPORT**
**of**
***GUDGEON NO. 1***
**for**
***ESSO AUSTRALIA LTD***
**by**
**ACS LABORATORIES PTY LTD**

20 July, 1995

ACS LABORATORIES PTY. LTD.

Esso Australia Ltd
360 Elizabeth Street
MELBOURNE VIC 3000

Attention: A. Mills

**REPORT: 002-212 - WELL NAME: GUDGEON NO. 1**

**CLIENT REFERENCE:** Contract No. 2710080 RFS No. 5

**MATERIAL:** Core Plugs

**LOCALITY:** Gippsland Basin, VIC-L-6

**WORK REQUIRED:** Routine Core Analysis

Please direct technical enquiries regarding this work to the signatory below under whose supervision the work was carried out.

for

**W J (Bill) DERKSEMA**
Laboratory Supervisor
on behalf of ACS Laboratories Pty. Ltd.



Address: P.O. Box 396, Chermside, Qld. 4032 Australia
Telephone: 61 7 3350 1222 Facsimile: 61 7 3359 0666
ACS Laboratories Pty Ltd
ACN: 008 273 005

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PAGE



# PLOTS

20 July, 1995

ACS LABORATORIES PTY. LTD.

Esso Australia Ltd
360 Elizabeth Street
MELBOURNE VIC 3000

Attention: A. Mills

# FINAL DATA REPORT - ROUTINE CORE ANALYSIS

## REPORT: 002-212 WELL NAME: GUDGEON NO. 1

## LOGISTICS

112 core plugs were delivered to ACS Laboratories, Brisbane on 16 May 1995. The plugs (including vertical plugs) arrived stored in vials and consisted of 89 plugs from Core No. 1 and 23 plugs from Core No. 2.

## INTRODUCTION

The following report includes tabular data of permeability to air, helium injection porosity and density determinations. Data presented graphically includes a core log plot of the above and a porosity versus permeability to air plot.

## STUDY AIMS

The analyses were performed with the following aims:

1. To provide overburden air permeability, helium injection porosity and density data.

Samples were prepared and analysed as follows:

## 1. SAMPLE EXTRACTION

Plugs from Core Nos. 1 and 2 were extracted initially in a Soxhlet with toluene solvent, followed by solvent Soxhlet extraction using 3:1 chloroform/methanol, providing a second clean to remove any remaining oil and salt. core plugs were removed and checked under ultraviolet light to ensure all hydrocarbons had been removed.

## 2. SAMPLE DRYING

After cleaning, all plugs were dried in a controlled humidity environment at 50°C and 50% relative humidity. The plugs were stored in an airtight plastic container and allowed to cool to room temperature before analysis.

## 3. OVERBURDEN AIR PERMEABILITY

The plugs are placed in a heavy duty Hassler sleeve. The assembly is loaded into a thick walled hydrostatic cell capable of withstanding the simulated reservoir overburden stress. The overburden pressure used, as supplied by Esso, was 4700 psi.

During the measurement a known air pressure is applied to the upstream face of the sample, creating a flow of air through the sample. Permeability for each sample is then calculated using Darcy's Law through knowledge of the upstream pressure and flow rate during the test, the viscosity of air and the plug dimensions.

## 4. OVERBURDEN HELIUM INJECTION POROSITY

Overburden Helium Injection Porosities are determined indirectly by the following method:

The apparent grain volume of each sample was measured by expansion of helium into the sample loaded in a matrix cup. The grain volume is derived by application of Boyle's law. The bulk volume of the sample is determined by mercury immersion. The sample is then loaded into a hydrostatic cell where the pore volume reduction, from ambient to the applied overburden stress is determined by measuring changes in the helium pressure within the pore space and applying Boyle's law. The reduction in the bulk volume is assumed to be equivalent to a reduction in the pore volume. Grain volume remains constant. Where samples are sleeved, corrections are made to account for the weight and volume of sleeves and screens.

5. **APPARENT GRAIN DENSITY**

The apparent grain density is determined by dividing the weight of the plug by the grain volume determined from the helium injection porosity measurement.

6. **ABSOLUTE GRAIN DENSITY**

A plug offcut, uncleaned and oven dried, is used for this measurement. The sample is crushed to approximately grain size or a little coarser and the granular material weighed. The volume of the grains is determined by pyconometry. By this means the actual density of the grains is determined.

On completion of the analysis the plug samples were re-wrapped in gladwrap and tissue, and are presently stored at ACS Laboratories for possible future studies.

We have enjoyed working for Esso and look forward to working with you in the near future.

**END OF REPORT**

## *OVERBURDEN ANALYSIS PRELIMINARY REPORT*

**Company** ESSO AUSTRALIA LTD.
**Well** GUDGEON No.1

**Core Interval** Core 1: 3063.00-3081.00m
**Core Interval** Core 2: 3081.00-3088.00m

**Overburden Pressure** 4700 psi

| Sample Number | | Depth (meters) | Permeability to Air (milliDarcy's) | Porosity (percent) | Grain Density Calculated (g/cm$^3$) | Grain Density Absolute (g/cm$^3$) | Remarks |
|---|---|---|---|---|---|---|---|
| 1 | R | 3063.10 | 330 | 20.6 | 2.63 | 2.62 | |
| 4 | R | 3063.30 | 817 | 14.1 | 2.62 | 2.69 | Sleeved |
| 6 | R | 3063.50 | 12.3 | 6.1 | 2.99 | 2.66 | |
| 7 | R | 3063.60 | <0.01 | 3.2 | 2.63 | 2.63 | |
| 9 | R | 3063.80 | <0.01 | 5.1 | 2.63 | 2.72 | |
| 11 | V | 3063.95 | <0.01 | 6.3 | 2.69 | 2.64 | |
| 12 | R | 3064.03 | <0.01 | 7.3 | 2.64 | 2.63 | |
| 14 | R | 3064.20 | <0.01 | 7.0 | 2.65 | 2.64 | |
| 16 | R | 3064.47 | <0.01 | 5.3 | 2.65 | 2.62 | |
| 18 | R | 3064.60 | <0.01 | 6.4 | 2.63 | 2.68 | |
| 20 | R | 3064.80 | <0.01 | 6.3 | 2.63 | 2.64 | |
| 22 | V | 3064.95 | <0.01 | 5.2 | 2.63 | 2.61 | |
| 23 | R | 3065.03 | 0.01 | 6.3 | 2.65 | 2.64 | |
| 25 | R | 3065.20 | 0.02 | 9.3 | 2.63 | 2.63 | |
| 27 | R | 3065.45 | 0.01 | 9.2 | 2.63 | 2.62 | |
| 29 | R | 3065.60 | 0.02 | 8.6 | 2.66 | 2.68 | |
| 31 | R | 3065.80 | 0.11 | 12.1 | 2.67 | 2.70 | |
| 33 | V | 3065.95 | 0.02 | 12.2 | 2.64 | 2.60 | |
| 34 | R | 3066.06 | 0.18 | 13.0 | 2.65 | 2.64 | |
| 36 | R | 3066.17 | 2.61 | 15.3 | 2.66 | 2.65 | |
| 40 | R | 3066.60 | 0.08 | 12.1 | 2.62 | 2.62 | |
| 42 | R | 3066.80 | 2.63 | 16.1 | 2.77 | 2.79 | |
| 45 | R | 3067.03 | 0.16 | 13.4 | 2.60 | 2.63 | |
| 47 | R | 3067.20 | 8.92 | 15.8 | 2.64 | 2.64 | |
| 49 | R | 3067.40 | 0.89 | 12.3 | 2.61 | 2.61 | |
| 51 | R | 3067.55 | 2.55 | 12.9 | 2.65 | 2.63 | |
| 57 | R | 3067.80 | 2.56 | 13.8 | 2.65 | 2.65 | |
| 60 | R | 3068.03 | 0.50 | 12.5 | 2.64 | 2.64 | |
| 62 | R | 3068.20 | 2.33 | 13.8 | 2.64 | 2.67 | |
| 64 | R | 3068.40 | 4.79 | 14.2 | 2.65 | 2.67 | |
| 66 | R | 3068.60 | 1.01 | 12.8 | 2.65 | 2.66 | |
| 70 | R | 3068.85 | 8.89 | 15.6 | 2.64 | 2.64 | |
| 72 | V | 3068.95 | 0.01 | 13.9 | 2.63 | 2.63 | |
| 73 | R | 3069.03 | 6.83 | 15.7 | 2.65 | 2.65 | |
| 75 | R | 3069.20 | 0.44 | 12.8 | 2.63 | 2.65 | |
| 77 | R | 3069.40 | 9.63 | 16.2 | 2.64 | 2.64 | |
| 79 | R | 3069.60 | 1.45 | 14.3 | 2.65 | 2.64 | |
| 83 | V | 3069.72 | 0.12 | 12.9 | 2.65 | 2.62 | |
| 81 | R | 3069.80 | 0.71 | 12.9 | 2.65 | 2.66 | |
| 84 | R | 3070.08 | 0.17 | 11.3 | 2.65 | 2.64 | |

## *OVERBURDEN ANALYSIS PRELIMINARY REPORT*

**Company** ESSO AUSTRALIA LTD.
**Well** GUDGEON No.1

**Core Interval** Core 1: 3063.00-3081.00m
**Core Interval** Core 2: 3081.00-3088.00m

**Overburden Pressure** 4700 psi

| Sample Number | Depth (meters) | Permeability to Air (milliDarcy's) | Porosity (percent) | Grain Density Calculated ($g/cm^3$) | Grain Density Absolute ($g/cm^3$) | Remarks |
|---|---|---|---|---|---|---|
| 88 R | 3070.34 | 314 | 16.2 | 2.62 | 2.63 | |
| 92 R | 3070.80 | 3928 | 19.3 | 2.65 | 2.68 | |
| 96 R | 3071.25 | 0.02 | 1.7 | 1.89 | 1.86 | |
| 100 R | 3071.60 | 0.02 | 4.2 | 2.32 | 2.27 | |
| 102 R | 3071.80 | 0.01 | 7.3 | 2.62 | 2.61 | |
| 104 V | 3071.95 | <0.01 | 8.1 | 2.61 | 2.62 | |
| 105 R | 3072.03 | 0.04 | 10.7 | 2.63 | 2.62 | |
| 107 R | 3072.20 | 0.02 | 4.7 | 2.57 | 2.58 | |
| 109 R | 3072.40 | <0.01 | 3.7 | 2.52 | 2.51 | |
| 115 R | 3072.80 | 0.02 | 7.1 | 2.63 | 2.62 | |
| 117 V | 3072.95 | 0.17 | 12.3 | 2.64 | 2.64 | |
| 118 R | 3073.04 | 0.02 | 9.9 | 2.62 | 2.60 | |
| 120 R | 3073.20 | 0.09 | 10.2 | 2.62 | 2.62 | |
| 122 R | 3073.40 | 0.14 | 9.8 | 2.62 | 2.62 | |
| 124 R | 3073.60 | 0.03 | 9.0 | 2.62 | 2.61 | |
| 126 R | 3073.75 | 0.01 | 5.1 | 2.61 | 2.58 | |
| 128 V | 3073.95 | <0.01 | 6.5 | 2.66 | 2.64 | |
| 129 R | 3074.03 | 0.03 | 5.3 | 2.66 | 2.63 | |
| 131 R | 3074.20 | <0.01 | 5.2 | 2.64 | 2.63 | |
| 133 R | 3074.40 | 0.02 | 9.1 | 2.64 | 2.64 | |
| 135 R | 3074.60 | 0.01 | 8.7 | 2.64 | 2.64 | |
| 137 R | 3074.80 | 0.02 | 8.3 | 2.64 | 2.64 | |
| 139 V | 3074.95 | 0.02 | 7.8 | 2.64 | 2.63 | |
| 140 R | 3075.03 | 0.01 | 8.4 | 2.64 | 2.74 | |
| 142 R | 3075.20 | 0.01 | 8.7 | 2.65 | 2.63 | |
| 144 R | 3075.40 | 0.01 | 8.1 | 2.63 | 2.72 | |
| 146 R | 3075.60 | 0.70 | 9.9 | 2.64 | 2.67 | |
| 150 V | 3075.72 | 0.07 | 12.3 | 2.65 | 2.65 | |
| 148 R | 3075.80 | 26.7 | 16.5 | 2.67 | 2.64 | |
| 151 R | 3076.03 | 623 | 22.0 | 2.66 | 2.61 | |
| 153 R | 3076.20 | 707 | 21.7 | 2.69 | 2.71 | |
| 155 R | 3076.40 | 8.10 | 13.6 | 2.65 | 2.64 | |
| 157 R | 3076.60 | 137 | 18.1 | 2.66 | 2.64 | |
| 159 R | 3076.80 | 1036 | 22.7 | 2.65 | 2.63 | |
| 161 V | 3076.95 | 0.06 | 14.8 | 2.65 | 2.62 | |
| 166 R | 3077.20 | 31.8 | 18.6 | 2.66 | 2.63 | |
| 168 R | 3077.35 | 69 | 14.8 | 2.67 | 2.62 | |
| 176 R | 3077.80 | 12.3 | 11.8 | 2.56 | 2.48 | |
| 179 R | 3078.03 | 6.83 | 10.4 | 2.52 | 2.56 | |
| 183 R | 3078.35 | 0.25 | 13.7 | 2.63 | 2.63 | |

# *OVERBURDEN ANALYSIS PRELIMINARY REPORT*

**Company** ESSO AUSTRALIA LTD.
**Well** GUDGEON No.1

**Core Interval** Core 1: 3063.00-3081.00m
**Core Interval** Core 2: 3081.00-3088.00m

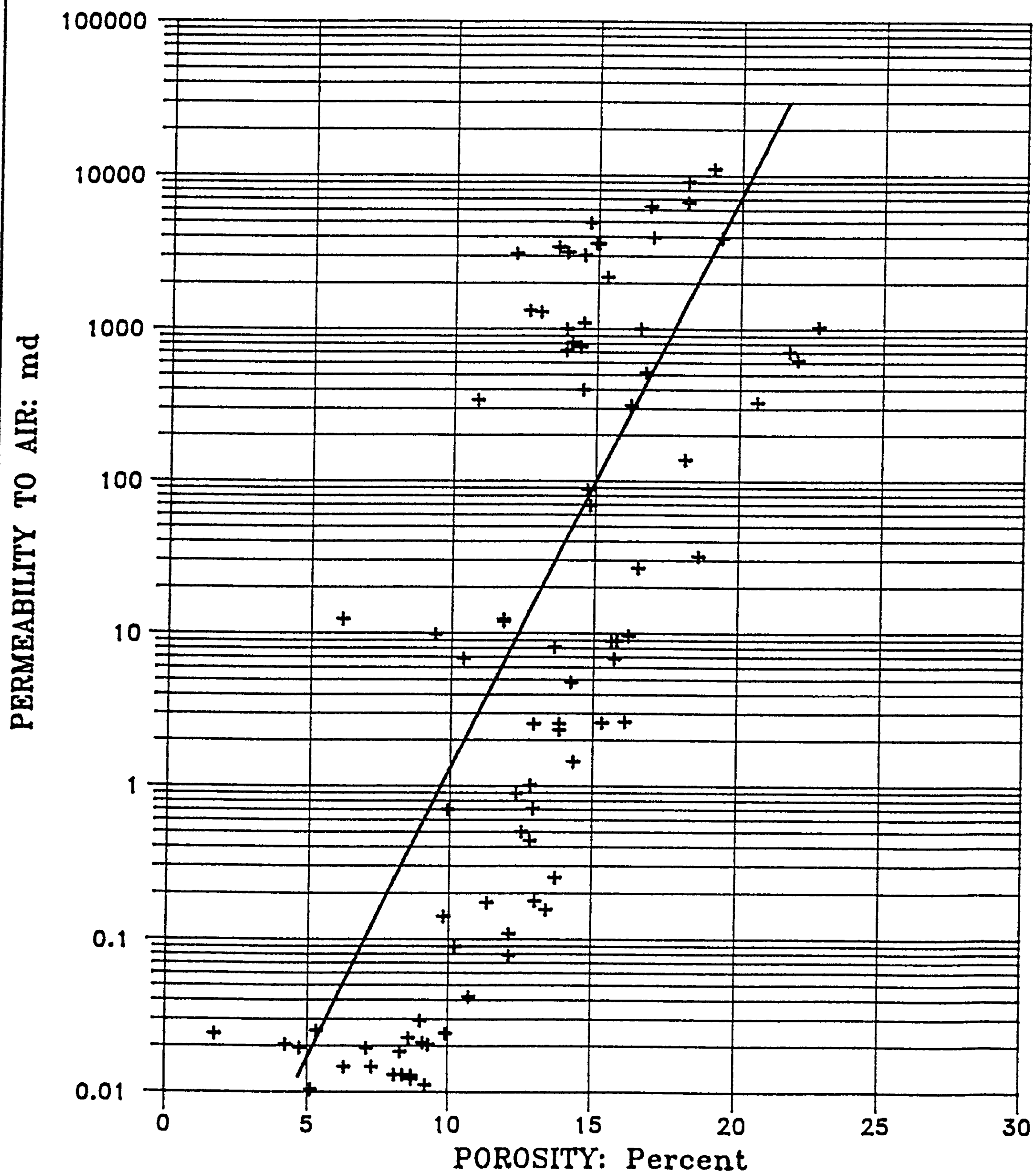
**Overburden Pressure** 4700 psi

| Sample Number | Depth (meters) | Permeability to Air (milliDarcy's) | Porosity (percent) | Grain Density Calculated ($g/cm^3$) | Grain Density Absolute ($g/cm^3$) | Remarks |
|---|---|---|---|---|---|---|
| 187 R | 3078.60 | 9.78 | 9.4 | 2.68 | 2.64 | |
| 189 R | 3078.80 | 998 | 13.9 | 2.64 | 2.63 | Sleeved |
| 191 V | 3078.95 | 729 | 15.2 | 2.63 | 2.63 | Sleeved |
| 192 R | 3079.03 | 1005 | 16.5 | 2.64 | 2.63 | Sleeved |
| 194 R | 3079.20 | 760 | 14.4 | 2.63 | 2.62 | |
| 196 R | 3079.48 | 517 | 16.7 | 2.63 | 2.62 | |
| 198 R | 3079.65 | 1089 | 14.5 | 2.63 | 2.62 | |
| 206 V | 3079.72 | 310 | 13.1 | 2.64 | 2.64 | |
| 204 R | 3080.00 | 11.9 | 11.8 | 2.64 | 2.63 | |
| 210 R | 3081.19 | 88 | 14.7 | 2.65 | 2.64 | |
| 212 R | 3081.40 | 3616 | 15.0 | 2.64 | 2.63 | Sleeved |
| 214 R | 3081.53 | 6321 | 16.8 | 2.65 | 2.64 | Sleeved |
| 218 R | 3081.80 | 722 | 13.9 | 2.64 | 2.64 | Sleeved |
| 220 V | 3081.95 | 3309 | 14.9 | 2.63 | 2.63 | Sleeved |
| 221 R | 3082.05 | 3096 | 12.1 | 2.64 | 2.63 | Sleeved |
| 223 R | 3082.20 | 339 | 10.8 | 2.64 | 2.63 | Sleeved |
| 225 R | 3082.40 | 3415 | 13.6 | 2.63 | 2.62 | Sleeved |
| 227 R | 3082.63 | 1284 | 13.0 | 2.64 | 2.64 | Sleeved |
| 230 R | 3082.80 | 4914 | 14.7 | 2.64 | 2.65 | Sleeved |
| 231 V | 3082.95 | 1136 | 14.5 | 2.63 | 2.64 | Sleeved |
| 232 R | 3083.03 | 1314 | 12.6 | 2.64 | 2.63 | Sleeved |
| 236 R | 3083.25 | 3603 | 14.9 | 2.63 | 2.62 | Sleeved |
| 238 R | 3083.40 | 3034 | 14.5 | 2.64 | 2.63 | Sleeved |
| 242 R | 3083.65 | 3161 | 13.9 | 2.65 | 2.64 | Sleeved |
| 244 R | 3083.80 | 6706 | 18.1 | 2.64 | 2.67 | Sleeved |
| 246 V | 3083.95 | 3595 | 17.1 | 2.64 | 2.65 | Sleeved |
| 247 R | 3084.04 | 9084 | 18.1 | 2.64 | 2.63 | Sleeved |
| 249 R | 3084.20 | 397 | 14.5 | 2.63 | 2.63 | Sleeved |
| 251 R | 3084.40 | 3951 | 16.9 | 2.62 | 2.62 | Sleeved |
| 253 R | 3084.60 | 11052 | 19.0 | 2.63 | 2.64 | Sleeved |
| 255 R | 3084.80 | 2177 | 15.3 | 2.62 | 2.62 | Sleeved |
| 257 V | 3084.95 | 883 | 13.9 | 2.64 | 2.63 | Sleeved |

# POROSITY vs PERMEABILITY CROSSPLOT

# POROSITY vs PERMEABILITY
## At Overburden Pressure

Company: ESSO AUSTRALIA LTD.
Well: GUDGEON No.1
Depth: 3063.10 – 3084.80 Metres
OB Press: 4700



# CORE PLOT

PE603429

This is an enclosure indicator page.
The enclosure PE603429 is enclosed within the container PE900910 at this location in this document.

The enclosure PE603429 has the following characteristics:

ITEM_BARCODE = PE603429
CONTAINER_BARCODE = PE900910
NAME = Core Plot
BASIN = GIPPSLAND
PERMIT = VIC/L6
TYPE = WELL
SUBTYPE = WELL_LOG
DESCRIPTION = Core Plot for Gudgeon-1(from appendix 4 of WCR)
REMARKS =
DATE_CREATED = 20/07/1995
DATE_RECEIVED = 13/11/1995
W_NO = W1120
WELL_NAME = GUDGEON-1
CONTRACTOR = ACS LABORATORIES PTY LTD
CLIENT_OP_CO = ESSO AUSTRALIA LIMITED

(Inserted by DNRE - Vic Govt Mines Dept)

# Enclosures

5th Cut
A4 Dividers
Re-order Code 97052

ENCLOSURES

ENCLOSURE 1

GUDGEON 1

Chronostratigraphy of the Gippsland Basin

PE 902041

PE902041

This is an enclosure indicator page.
The enclosure PE902041 is enclosed within the container PE900910 at this location in this document.

The enclosure PE902041 has the following characteristics:

ITEM_BARCODE = PE902041
CONTAINER_BARCODE = PE900910
NAME = Chronostratigraphy of Gippsland Basin
BASIN = GIPPSLAND
PERMIT =
TYPE = GENERAL
SUBTYPE = GEOL_MAP
DESCRIPTION = Chronostratigraphy of Gippsland Basin
REMARKS =
DATE_CREATED = 03/11/1995
DATE_RECEIVED = 13/11/1995
W_NO = W1120
WELL_NAME = Gudgeon -1
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

**ENCLOSURE 2**

**GUDGEON 1**

**Top of Latrobe Group Depth Structure (Pre-Drill)**

~~PE900992~~ 2

PE900918

PE900918

This is an enclosure indicator page.
The enclosure PE900918 is enclosed within the container PE900910 at this location in this document.

The enclosure PE900918 has the following characteristics:

ITEM_BARCODE = PE900918
CONTAINER_BARCODE = PE900910
NAME = Top of Latrobe Group Depth Structure (Pre drill)
BASIN = GIPPSLAND
PERMIT =
TYPE = SEISMIC
SUBTYPE = HRZN_CONTR_MAP
DESCRIPTION = Top of Latrobe Group Depth Structure (Pre drill)
REMARKS =
DATE_CREATED = 06/11/1995
DATE_RECEIVED = 13/11/1995
W_NO = W1120
WELL_NAME = Gudgeon -1
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

# ENCLOSURE 3

## GUDGEON 1

## Synthetic Seismogram

PE900922

PE900922

This is an enclosure indicator page.
The enclosure PE900922 is enclosed within the container PE900910 at this location in this document.

The enclosure PE900922 has the following characteristics:

| | |
|---|---|
| ITEM_BARCODE = | PE900922 |
| CONTAINER_BARCODE = | PE900910 |
| NAME = | Synthetic Seismogram |
| BASIN = | GIPPSLAND |
| PERMIT = | |
| TYPE = | WELL |
| SUBTYPE = | SYNTH_SEISMOGRAM |
| DESCRIPTION = | Synthetic Seismogram |
| REMARKS = | |
| DATE_CREATED = | 06/11/1995 |
| DATE_RECEIVED = | 13/11/1995 |
| W_NO = | W1120 |
| WELL_NAME = | Gudgeon -1 |
| CONTRACTOR = | ESSO |
| CLIENT_OP_CO = | ESSO |

(Inserted by DNRE - Vic Govt Mines Dept)

**ENCLOSURE 4**

**GUDGEON 1**

**Seismic Crossline 1366**

PE 900912

PE900912

This is an enclosure indicator page.
The enclosure PE900912 is enclosed within the container PE900910 at this location in this document.

The enclosure PE900912 has the following characteristics:

| | |
|---|---|
| ITEM_BARCODE = | PE900912 |
| CONTAINER_BARCODE = | PE900910 |
| NAME = | Seismic Crossline 1366 |
| BASIN = | GIPPSLAND |
| PERMIT = | |
| TYPE = | SEISMIC |
| SUBTYPE = | SECTION |
| DESCRIPTION = | Seismic Crossline 1366 |
| REMARKS = | |
| DATE_CREATED = | 06/11/1995 |
| DATE_RECEIVED = | 13/11/1995 |
| W_NO = | W1120 |
| WELL_NAME = | Gudgeon -1 |
| CONTRACTOR = | ESSO |
| CLIENT_OP_CO = | ESSO |

(Inserted by DNRE - Vic Govt Mines Dept)

**ENCLOSURE 5**

**GUDGEON 1**

**Mid Miocene to Top of Latrobe Group Isochron**

PE 900913

PE900913

This is an enclosure indicator page.
The enclosure PE900913 is enclosed within the container PE900910 at this location in this document.

The enclosure PE900913 has the following characteristics:

ITEM_BARCODE = PE900913
CONTAINER_BARCODE = PE900910
NAME = Mid Miocene - Top of Latrobe Group Isochron
BASIN = GIPPSLAND
PERMIT =
TYPE = SEISMIC
SUBTYPE = ISOCHRON_MAP
DESCRIPTION = Mid Miocene - Top of Latrobe Group Isochron, Post Drill Constant Pick,(enclosure from WCR) for Gudgeon-1
REMARKS =
DATE_CREATED = 06/11/1995
DATE_RECEIVED = 13/11/1995
W_NO = W1120
WELL_NAME = Gudgeon -1
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

**ENCLOSURE 6**

**GUDGEON 1**

**Mid Miocene Depth Structure (From Well Data)**

PE 900914

PE900914

This is an enclosure indicator page.
The enclosure PE900914 is enclosed within the container PE900910 at this location in this document.

The enclosure PE900914 has the following characteristics:

| | |
|---|---|
| ITEM_BARCODE = | PE900914 |
| CONTAINER_BARCODE = | PE900910 |
| NAME = | Mid Miocene Depth Structure (from wells) |
| BASIN = | GIPPSLAND |
| PERMIT = | |
| TYPE = | SEISMIC |
| SUBTYPE = | HRZN_CONTR_MAP |
| DESCRIPTION = | Mid Miocene Depth Structure (from wells) |
| REMARKS = | |
| DATE_CREATED = | 06/11/1995 |
| DATE_RECEIVED = | 13/11/1995 |
| W_NO = | W1120 |
| WELL_NAME = | Gudgeon -1 |
| CONTRACTOR = | ESSO |
| CLIENT_OP_CO = | ESSO |

(Inserted by DNRE - Vic Govt Mines Dept)

ENCLOSURE 7

GUDGEON 1

Top of Latrobe Group Depth Structure
(Constant Pick Post Drill)

PE900915

PE900915

This is an enclosure indicator page.
The enclosure PE900915 is enclosed within the container PE900910 at this location in this document.

The enclosure PE900915 has the following characteristics:

| | |
|---|---|
| ITEM_BARCODE = | PE900915 |
| CONTAINER_BARCODE = | PE900910 |
| NAME = | Top of Latrobe depth Structure (Post drill constant pick) |
| BASIN = | GIPPSLAND |
| PERMIT = | |
| TYPE = | SEISMIC |
| SUBTYPE = | HRZN_CONTR_MAP |
| DESCRIPTION = | Top of Latrobe depth Structure (Post drill constant pick) |
| REMARKS = | |
| DATE_CREATED = | 06/11/1995 |
| DATE_RECEIVED = | 13/11/1995 |
| W_NO = | W1120 |
| WELL_NAME = | Gudgeon -1 |
| CONTRACTOR = | ESSO |
| CLIENT_OP_CO = | ESSO |

(Inserted by DNRE - Vic Govt Mines Dept)

# ENCLOSURE 8

## GUDGEON 1

**Top of Latrobe Group Depth Structure**
**(Variable Pick Post Drill)**

PE 900916

PE900916

This is an enclosure indicator page.
The enclosure PE900916 is enclosed within the container PE900910 at this location in this document.

The enclosure PE900916 has the following characteristics:

ITEM_BARCODE = PE900916
CONTAINER_BARCODE = PE900910
NAME = Top of Latrobe depth Structure (Post drill variable pick)
BASIN = GIPPSLAND
PERMIT =
TYPE = SEISMIC
SUBTYPE = HRZN_CONTR_MAP
DESCRIPTION = Top of Latrobe depth Structure (Post drill variable pick)
REMARKS =
DATE_CREATED = 06/11/1995
DATE_RECEIVED = 13/11/1995
W_NO = W1120
WELL_NAME = Gudgeon -1
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

# ENCLOSURE 9

## GUDGEON 1

## Structural Cross Section (Constant Pick)

PE 900917

PE900917

This is an enclosure indicator page.
The enclosure PE900917 is enclosed within the container PE900910 at this location in this document.

The enclosure PE900917 has the following characteristics:

| | |
|---|---|
| ITEM_BARCODE = | PE900917 |
| CONTAINER_BARCODE = | PE900910 |
| NAME = | Structural Cross Section Constant top of Latrobe Group pick |
| BASIN = | GIPPSLAND |
| PERMIT = | |
| TYPE = | WELL |
| SUBTYPE = | CROSS_SECTION |
| DESCRIPTION = | Structural Cross Section Constant top of Latrobe Group pick |
| REMARKS = | |
| DATE_CREATED = | 06/11/1995 |
| DATE_RECEIVED = | 13/11/1995 |
| W_NO = | W1120 |
| WELL_NAME = | Gudgeon -1 |
| CONTRACTOR = | ESSO |
| CLIENT_OP_CO = | ESSO |

(Inserted by DNRE - Vic Govt Mines Dept)

# ENCLOSURE 10

## GUDGEON 1

### Structural Cross Section (Variable Pick)

PE900919

PE900919

This is an enclosure indicator page.
The enclosure PE900919 is enclosed within the container PE900910 at this location in this document.

The enclosure PE900919 has the following characteristics:

ITEM_BARCODE = PE900919
CONTAINER_BARCODE = PE900910
NAME = Structural Cross Section Variable top of latrobe group pick
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = CROSS_SECTION
DESCRIPTION = Structural Cross Section Variable top of latrobe group pick
REMARKS =
DATE_CREATED = 30/10/1995
DATE_RECEIVED = 13/11/1995
W_NO = W1120
WELL_NAME = Gudgeon -1
CONTRACTOR = ESSO
CLIENT_OP_CO = ESSO

(Inserted by DNRE - Vic Govt Mines Dept)

# ENCLOSURE 11

## GUDGEON 1

### Terracotta Depth Structure (Post Drill)

PE900920

PE900920

This is an enclosure indicator page.
The enclosure PE900920 is enclosed within the container PE900910 at this location in this document.

The enclosure PE900920 has the following characteristics:

| | |
|---|---|
| ITEM_BARCODE = | PE900920 |
| CONTAINER_BARCODE = | PE900910 |
| NAME = | Terracotta Depth Structure |
| BASIN = | GIPPSLAND |
| PERMIT = | |
| TYPE = | SEISMIC |
| SUBTYPE = | HRZN_CONTR_MAP |
| DESCRIPTION = | Terracotta Depth Structure |
| REMARKS = | |
| DATE_CREATED = | 23/10/1995 |
| DATE_RECEIVED = | 13/11/1995 |
| W_NO = | W1120 |
| WELL_NAME = | Gudgeon -1 |
| CONTRACTOR = | ESSO |
| CLIENT_OP_CO = | ESSO |

(Inserted by DNRE - Vic Govt Mines Dept)

ENCLOSURE 12

GUDGEON 1

Stratigraphic Cross Section

PE900921

PE900921

This is an enclosure indicator page.
The enclosure PE900921 is enclosed within the container PE900910 at this location in this document.

The enclosure PE900921 has the following characteristics:

| | |
|---|---|
| ITEM_BARCODE = | PE900921 |
| CONTAINER_BARCODE = | PE900910 |
| NAME = | Stratigraphic Correlation Section |
| BASIN = | GIPPSLAND |
| PERMIT = | |
| TYPE = | WELL |
| SUBTYPE = | CROSS_SECTION |
| DESCRIPTION = | Stratigraphic Correlation Section of Upper latrobe Group (enclosure from WCR) for Gudgeon-1 |
| REMARKS = | |
| DATE_CREATED = | 06/11/1995 |
| DATE_RECEIVED = | 13/11/1995 |
| W_NO = | W1120 |
| WELL_NAME = | Gudgeon -1 |
| CONTRACTOR = | ESSO |
| CLIENT_OP_CO = | ESSO |

(Inserted by DNRE - Vic Govt Mines Dept)

ATTACHMENTS

# Attachments

# ATTACHMENT 1

## GUDGEON 1

## Composite Well Log

PE 600733

PE600733

This is an enclosure indicator page.
The enclosure PE600733 is enclosed within the container PE900910 at this location in this document.

The enclosure PE600733 has the following characteristics:

| | |
|---|---|
| ITEM_BARCODE = | PE600733 |
| CONTAINER_BARCODE = | PE900910 |
| NAME = | Well Completion Log |
| BASIN = | GIPPSLAND |
| PERMIT = | |
| TYPE = | WELL |
| SUBTYPE = | COMPOSITE_LOG |
| DESCRIPTION = | Well Completion Log (enclosure from WCR) for Gudgeon-1 |
| REMARKS = | |
| DATE_CREATED = | 06/11/1995 |
| DATE_RECEIVED = | 13/11/1995 |
| W_NO = | W1120 |
| WELL_NAME = | Gudgeon -1 |
| CONTRACTOR = | ESSO |
| CLIENT_OP_CO = | ESSO |

(Inserted by DNRE - Vic Govt Mines Dept)