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A REVIEW OF ORDOVICIAN SOURCE ROCKS, CANNING BASIN, WESTERN AUSTRALIA

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PREFACE

This report is the main outcome of a 1991 scientific exchange agreement between BMR and CRA Exploration, ACT. For 3 months in 1991, Dr Dennis Taylor from CRA joined the BMR's Canning Basin Project and undertook a compilation of information on the Ordovician from the basin using published and unpublished reports held at the Bureau. This information was supplemented by geochemical analyses of samples from 11 additional wells. Because of the importance of the Ordovician as a potential source of hydrocarbons Dennis concentrated on analysing geological and geochemical data pertinent to source bed potential and possible maturation scenarios. Comparisons with similar aged organic matter-rich rocks in the Amadeus Basin are also made. The basic data is compiled into extensive tables, maps and graphs; the main conclusions and implications are presented in the text.

This report forms a valuable contribution to our knowledge on an important stratigraphic interval in the basin as well as a valuable addition to BMR's current Onshore Sedimentary and Petroleum Geology Program. It represents a good example of the benefits of close co-operation between public and private organisations in research.

M J Jackson, Project Leader,
Canning Basin Project

ABSTRACT

Petroleum source rocks are found at three levels in the Ordovician section in the Canning Basin and appear to be at similar stratigraphic levels and of similar organic facies to the source rocks which have produced the gas and gas-condensate fields in the Amadeus Basin. In both basins shallow intersections in drillholes have yielded material at a low level of thermal maturity. Samples have shown that these immature source rocks contain algal-sourced Type 1 kerogens with a high hydrogen index and a large capacity to generate oil (eg Hoffmann et al., 1987). Deeper wells in both basins encountered source rocks at higher levels of maturity associated in some cases with oil fluorescence and shows of live oil. By comparing the results of Rock-Eval pyrolysis analysis for these more mature source rocks with those of the immature rocks the degree of kerogen conversion to hydrocarbon (the Transformation Ratio of Espitalie et al., 1986) can be estimated. The results from 14 wells along the Broome Platform show a rapid downward increase in transformation ratio (TR) through the Ordovician section which can be correlated to the rapid downward increase in the conodont alteration index (CAI) previously documented by Nicoll & Gorter (1984). This correlation shows that the zone of peak oil generation lies between the end of CAI Zone 1 and the beginning of CAI Zone 2.

The Ordovician in the Canning Basin is known mainly from intersections in 22 drillholes. It is thickest in two sub-basins: the Willara, bounded to the north by the Admiral Bay Fault, and a larger unnamed sub-basin (roughly coincident with the later Fitzroy Trough), bounded to the north by the Oscar Range-Pinnacle fault system. Both fault systems appear to have been active during the deposition of the Ordovician. The best known source rocks occur along the southern side of the northern sub-basin; they appear to be poorly developed, or absent, in the Willara Sub-basin. Overmature source beds are locally preserved in fault remnants under the Lennard Shelf and may exist at great depth in the Fitzroy Trough.

Following deposition of the open-marine early Ordovician sequence, the basin became evaporitic and a major salt and red-bed sequence developed. This is preserved only in the Kidson Sub-basin, a structurally simple sub-basin gently warped and eroded between the Devonian and the Permian. The Kidson Sub-basin is presently characterised by low to moderate thermal gradients and normal thickness CAI zones, which probably indicate similar gradients in the past. To the north and east the Canning Basin was tectonically active in pre-Upper Devonian time and was differentiated into three zones - the Broome Platform, Lennard Shelf and Fitzroy Trough. Along the Broome Platform the evaporites and red-beds were largely stripped off by pre-Upper Devonian erosion and the underlying Ordovician was affected by a steep thermal gradient which produced very attenuated CAI Zones and strong maturation of the Lower Ordovician source units. On the Lennard Shelf almost the entire Ordovician section was removed by pre-Devonian erosion. Small parts of it are preserved in fault bounded half grabens along the Oscar Range-Pinnacle Fault system where evidence of formerly steep thermal gradients is also preserved in attenuated CAI zones. A

similar situation may be postulated to occur below the Fitzroy Trough where the Ordovician, if it occurs, is too deep to have been reached by drilling.

The thick Upper Devonian to Triassic sequence intersected by drilling within the Fitzroy Trough shows low present day thermal gradients, and small CAI and Vitrinite reflectance increases with depth, suggesting that it has also been cool since the Devonian. Along the Broome Platform, in contrast, present day thermal gradients are high and on the downfaulted Barbwire Terrace, between the Broome Platform and the Fitzroy Trough, the Upper Goldwyer source rocks have been brought to early oil generation by post-Devonian burial. On the arch itself the Devonian was either not deposited or was removed in pre-Grant Group time. The generally thin cover of late Carboniferous to Permian Grant Group has been insufficient to cause further maturation of the Ordovician source rocks.

Hydrocarbons sourced from the Ordovician have been encountered in non-porous parts of the Ordovician section on the Broome Platform. These appear to be remnants of oil generated in the pre-Devonian and preserved in non-reservoir rocks through subsequent episodes of uplift and erosion. More mobile oil, recoverable on DST, occurs in wells on the Barbwire Terrace and along the Admiral Bay Fault where post-Devonian maturation of Ordovician source rocks has taken place in zones of high thermal gradient.

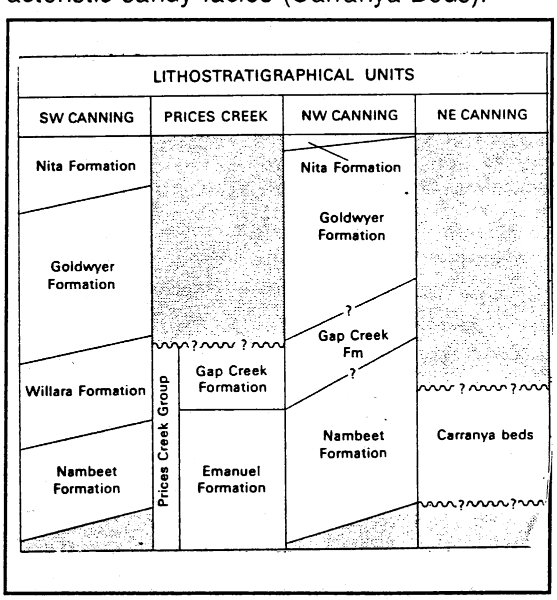
Ordovician-sourced hydrocarbons may also exist in undrilled parts of the Kidson Sub-basin, where maturation could have occurred either in Devonian or post-Permian time and a regional salt seal exists in the Carribuddy Group. Because of the low thermal gradients in this sub-basin oil could still be preserved in the sub-salt Ordovician section.

Oil and gas may also have been generated from Ordovician source rocks which were faulted down into the Fitzroy Trough. Because of the great thickness of Devonian to Triassic rocks deposited north of the Dampier-Fenton Fault System only gas would now be preserved in the undrilled pre-Devonian sequence in the trough, despite the low thermal gradients which have existed since Devonian times.

INTRODUCTION

The Canning Basin is a major intra-cratonic basin located in the northern part of Western Australia. The basin lies between the Proterozoic Kimberley Craton to the northeast and the Archaean and Proterozoic Pilbara Craton to the southwest, while to the south and east it is bounded by the largely Adelaidean Bangemall Basin, and the Proterozoic to Palaeozoic Officer and Amadeus Basins. To the northwest it passes offshore below the Mesozoic and Tertiary sequences of the NorthWest Shelf. The bulk of the basin fill ranges in age from Early Ordovician to Middle Triassic, but there is an extensive, though thin, cover of Jurassic - Early Cretaceous rocks in the central and southern parts of the basin. Most outcrops are deeply weathered and there are extensive saline lake deposits and aeolian dune-fields
(Yeates et al., 1984).

The oldest dated sedimentary sequence within the Canning Basin is Ordovician in age and clearly marine; it is known mainly in the sub-surface. Outcrop is minor and is restricted to the north-central Lennard Shelf, where a shaley carbonate sequence occurs, and to the northeast corner of the basin, where there is an uncharacteristic sandy facies (Carranya Beds).



Simplified stratigraphy of Ordovician, after Forman & Wales, 1981

Most of our knowledge of the Ordovician sequence derives from 54 oil wells which have intersected proven Ordovician rocks under much of the basin (Map 1). Of these wells 19 penetrated Precambrian basement below the Ordovician, confirming the presence of a major unconformity at the bottom of the Ordovician sequence. Along the northeast and southwest margins of the basin a number of wells penetrated Precambrian basement without encountering strata of Ordovician age, but in the central and southern parts of the basin all wells which have been sunk through the younger rocks have encountered an essentially similar, largely marine Ordovician sequence.

Wells drilled in the basin since 1980 have generally provided some organic geochemical data on the source rocks encountered. This review of all well completion reports available at BMR involved 26 wells for which some data was available (Table 9). To compliment this data analyses of a further 11 old wells, which had core or cuttings deposited with the BMR, was undertaken (Table 10). This total of 37 wells provided a much more comprehensive database than was available when Horstman (1984) last reviewed the source potential of the Ordovician of the Canning Basin. The complete TOC and Rock-Eval pyrolysis data is given in Appendixes 2 and 3, and forms the basis of this study.

Intersections of oil-prone source rocks and minor oil shows are quite common in the Ordovician of the Canning Basin, but commercial quantities of oil or gas have not so far been located. In the adjacent Amadeus Basin, a closely correlative Ordovician sequence also contains source rocks, and a significant production of gas and condensate has been established. A recent study of the source rocks from three wells in the Amadeus Basin has been published (Summons & Powell 1991), and this data (Table 1) can be used to elucidate the source characteristics of these productive Ordovician source rocks. This Amadeus Basin information provides a very useful comparison for the Canning Basin dataset, and in particular provide TOC and Rock-Eval pyrolysis results for approximately equivalent source unit over a significant maturation range.

ESTIMATION OF ORIGINAL SOURCE RICHNESS AND MATURITY LEVEL USING TOC AND ROCK-EVAL PYROLYSIS DATA.

Immature source rocks are characterised by the presence of organic matter with a high H/C ratio. The generative potential of immature source rocks is determined by the analysis of samples for total organic carbon (TOC) and by pyrolysis to yield a hydrocarbon fraction. Since its development in France the Rock-Eval Pyrolysis method has become the standard procedure for preliminary source rock evaluation (Espitalie et al., 1985 & 1986), and its terminology is now universally used in discussions of source rock quality and maturity.

In pyrolysis terms, immature source rocks are characterised by a high ratio of pyrolizable carbon (PC) to TOC, and by a low ratio of generated hydrocarbon (S1) to total hydrocarbon (S1 + S2). These are expressed as a high hydrogen index (HI) and a low production index (PI). As maturation proceeds in nature and the source rocks generate and expel hydrocarbons the value of HI falls rapidly and the value of PI rises slowly. In addition, as maturity increases the hydrogen bearing organic matter in the rocks (kerogen) becomes more refractory, and the temperature required to crack out the hydrocarbon component rises. This temperature is recorded during the pyrolysis of samples as Tmax (measured in degrees centigrade (°C)) and generally rises with increasing level of maturity.

These relationships mean that immature source rocks should be characterised by low values of Tmax, high values of HI and low values of PI. With increasing maturity Tmax will rise, PI will rise and HI will fall, allowing more mature samples to be recognised, and their degree of maturity to be assessed.

Though simple in theory there are many problems in practice in distinguishing variations in original source quality from maturation induced changes. The organic matter which is ultimately preserved as kerogen in the rocks is derived from a wide variety of organisms and has usually been subjected to major post-mortem alteration prior to lithification. For kerogens derived largely from lipid-rich algae (Type I in the standard nomenclature) there may be little or no change in Tmax during maturity, and the standard HI : Tmax crossplot will fail to show either the original source richness or the level of maturity of a source rock sample. Bitumens, whether locally sourced or migrated, may dominate some samples or zones and yield Tmax values which bear little or no relation to kerogen maturity. Further, PI values may be seriously distorted by migration effects, being raised in zones of accumulation and lowered in zones of depletion. An additional complication is produced by a process termed the 'mineral matrix effect' which results in an artificially depressed pyrolysis yield and thus HI value. Neglecting the 'mineral matrix effect' may produce erroneously high transformation ratios (C. Boreham, BMR, pers., comm., 25.6.92).

For these and other reasons, Rock-Eval analyses alone rarely yield unequivocal data for the estimation of either the original source richness or the degree of maturity reached. There are two ways of approaching the problem. Cooles et al., (1986) outline a method whereby partially matured source rocks are compared either to immature equivalents in other parts of the basin or, if these are not available, to source rocks of a similar type elsewhere. The degree of transformation of kerogen to hydrocarbon and the amount of oil expelled may then be estimated. A second approach is to find an independent measure of maturation and use this to assess the significance of the pyrolysis results. Both methods have been used in this study.

Data for the least mature Ordovician source rocks from the Amadeus and Canning Basins have been used to characterise the quality of the source rocks prior to the onset of maturation. The relationships of TOC to PC and of TOC to HI may be assessed directly from the Rock-Eval data. All of these parameters will fall with increasing maturation and the expulsion of hydrocarbon but that part of the TOC which is not linked to hydrogen will be unchanged by maturation. This residual carbon (RC) may be readily calculated from TOC and Rock-Eval results :

$$TOC - PC = RC$$

Graphs of RC against TOC and PC and of TOC against HI may be plotted which are characteristic of immature Ordovician source rocks. These graphs may then be used to estimate the original source richness of partly or fully matured samples of the same or similar source rocks by using the RC value (which does not change with maturation) to estimate the original TOC value (TOCo) by direct comparison with the relationship shown by the immature samples. The original pyrolizable carbon value (PCo) may be similarly estimated, while the original hydrogen index (HIo) may be estimated from TOCo. Hio is of particular value because it can be combined with the measured HI of a partly matured sample using the formulae in Espitalie et al (1986), to compute the Transformation Ratio (TR) which is a direct measure of the conversion of kerogen to bitumen. The actual loss of generated hydrocarbon from a source rock can also be estimated by using the estimate of Pco and the measured PC to estimate the amount of pyrolizable carbon lost

(PCy) by the formula:

Pco - PC = Pcy

The Migration Ratio (MR) is then simply calculated:

Pcy - Pco = MR

Critical to the correct evaluation of all of these parameters is the selection of an immature source rock which is both truly immature and strictly comparable to the more mature source rock being evaluated. Though the latter is less of a problem in pre-Devonian source rocks, which can contain only aquagene organic matter, than it is in younger rocks which may have a major input of hydrogen-poor organic matter derived from land plants, there are nonetheless likely to be significant differences between source rocks. These may be due to differences in the actual source organisms, or to differences in the chemistry of the water column and the diagenetic history.

The conodont alteration index (CAI) is an independent maturity indicator that has already been applied to the Ordovician of both the Canning and Amadeus Basins. Conodonts are widely reported from both the Ordovician and Devonian carbonates. The colour of the conodonts has been recorded in terms of the standard North American suite (Epstein et al., 1977) and shows a range from 1 (immature) to 4 (overmature) with most Ordovician material in the range from 1-2 corresponding approximately to the oil window. Most of the conodont data for the Canning Basin has been published by Nicoll (1984) and Nicoll and Gorter (1984, a & b). Additional unpublished results from Watson and Savage have been used in this record (see Appendix 3).
The conodont data provides a useful check on the maturity estimates based on the Rock-Eval data, and also provides maturity data for parts of the basin where no source rocks are found.

There is one reservation with the technique of Cooles et al., (1986) and that is the uncertainty as to the kerogen type represented in some of the overmature Canning Basin samples. Some of these samples may contain type II aswell as type I kerogens. If this is the case, estimates of TR quoted in this Record generally may be too high (R. Summons & C. Boreham, BMR, written comm., 25.6.92).

ORDOVICIAN SOURCE ROCKS

The Amadeus Basin

The three wells for which data is available were drilled on NW-SE structures consanguineous with the anticline hosting the Mereenie gas condensate field. These wells intersect the Horn Valley Siltstone, thought to be the source of the hydrocarbons at Mereenie, at depths ranging from 184 metres at Mt Winter in the northwest to 1200 metres at Tent Hill in the southeast. The source unit is less than 60 metres thick and therefore samples from any one well will have experienced an almost identical thermal history.

The Rock-Eval pyrolysis production index (PI) data suggests that the three intersections are at different levels of oil generation, with generation increasing from NW to SE in parallel with the increase in the present depth of burial (Table 1). The raw data shows a substantial range of TOC, Tmax and HI values for each intersection, and this internal variability obscures the trends in Tmax and HI which should accompany the changes in kerogen maturity which underlie this increase in PI. Grouping the samples from each well into classes of similar TOC content (Tables 1.1 - 1.3) leads to a considerable simplification of the data and to the identification of two important trends:
1) Tmax correlates positively with TOC, and
2) HI correlates positively with TOC.

Plotting the TOC class average values for Tmax and HI into a modified Van Krevelin diagram (Fig 1) shows that the highest TOC samples from the three wells define a very clear Type I kerogen maturation pathway. Maturity is clearly increasing from Mt Winter 2A (lowest) to Tempe Vale 1 (intermediate) and to Tent Hill 1 (highest), as is also indicated by the PI values, but a clear Tmax increase is only present in the Tent Hill 1 samples. At lower levels of TOC the position of samples from Mt Winter 2A and Tempe Vale 1 on the HI : Tmax plot has no unique significance in terms of maturation, but probably relates mainly to the quality of organic preservation during sedimentation and early diagenesis as suggested by Elphinstone (1989). It is therefore not possible to use Tmax and HI data from low TOC samples to determine either source richness or degree of maturation in the Horn Valley Siltstone or other similar Ordovician source rocks.

The value for residual carbon (RC) has been calculated for all samples and listed with the other pyrolysis parameters in Tables 1.1 - 1.4.

Plotting RC against TOC (Fig 2) or against pyrolizable carbon (PC) (Fig 3) allows trend lines to be distinguished down to values of RC of about 0.7 per cent. The three wells also provide clearly separate trends when TOC is plotted against hydrogen index (HI) as in figure 4. Any of these three plots provides a clearer estimate of the relative level of maturity of the three wells than does the HI : Tmax plot. They also provide a means whereby both the original source richness and the degree of maturation may be estimated, using the immature source rocks from the Canning Basin (see later) as a starting point.

Using the correlation lines for immature samples (Figs 6 - 8), the values of TOCo and HIo may be determined graphically from the known RC value, (Table 1.4). The value of the Transformation Ratio (TR) may then be calculated using Pelet's formula:

$$TR = \frac{1200\ (HIo - HIp)}{HIo\ (1200 - HIp)}$$

(where HIo is original HI, HIp is present HI)

The calculated value of TR for the higher TOC samples rises from 0.40 for Mt Winter 2A to 0.87 in Tempe Vale 1 and 0.94 in Tent Hill 1, in good agreement with the observed rise in PI. The high TR value shown by Tent Hill 1 at 1150-1200 metres below the present surface indicates that these source rocks are at or beyond the end of oil generation. This accords well with the level of maturity of the hydrocarbons reservoired at a similar depth in the Mereenie Field, where light oil is recovered from a depth of 1200-1400 metres from reservoir sands below the source rock.

The Canning Basin

Ordovician source rocks have been encountered in 17 wells in the Canning Basin and appear to display a wide range of maturity. The least mature source rocks are reported from the eastern end of the Broome Platform where Foster et al., (1986) document the presence of highly fluorescent and very hydrogen-rich bands within the uppermost Goldwyer Formation from a number of shallow wells. The data from three of these wells are summarised in Tables 2 & 2.1 and plotted in figures 5-8. Information from two deeper wells (WMC Dodonea 1 and Total Matches Springs 1) is presented in Tables 2.2 and 2.3 and also plotted in figure 5. It represents the same stratigraphic level, but appears to be slightly more mature.

When the Canning Basin data is compared to the Amadeus Basin data (as shown in Figs 5 & 8) it is clear that Dodonea 1 and Mt Winter 2A are at a similar level of maturity with comparable levels of organic richness, while the samples from the three shallow wells are significantly less mature. Therefore, Kunzea 1, Santalum 1 and Solanum 1 have been used to define the standard immature relationships of RC:TOC, RC:PC and TOC-:HI for the Ordovician source rocks of the Canning. The original source richness and degree of maturity of more mature Ordovician intersections, (eg Gulf Hedonia 1) is also plotted in Figs 6 & 7.

Not all Lower Palaeozoic source rocks are as hydrogen-rich as these Goldwyer Formation source rocks. Unpublished data in the BMR files from BMR stratigraphic drillholes Mt Isa 1 and Camooweal 2 which intersect the immature Cambrian source rocks of the Georgina Basin, show that at equivalent or higher TOC values, both HI and Tmax are significantly lower (Fig 5). These source rocks would classify as Type I/II or Type II in the standard kerogen classification. If some of the more mature Ordovician source rocks in the Canning Basin were in fact derived from a source facies of this type, and not from a Type I source of Upper Goldwyer type, then the estimates of TR and MR made in this report would be too high.

Source rocks are encountered at three main levels in the Ordovician section: Upper Goldwyer (6 wells), Lower Goldwyer (10 wells) and Nambeet (5 wells). Complete pyrolysis results are given in Appendices 1 and 2. TOC and Rock--Eval pyrolysis data are summarised in Tables 3.1 to 3.13. The pyrolysis results have been grouped and averaged into classes based on the TOC values. These averages, sometimes with the elimination of anomalous samples, provide trend lines which, when plotted, illustrate the similar behaviour of samples from the same stratigraphic interval in different wells (for example the 3 wells in Fig 9), despite a substantial scatter in the raw data.

Six of the wells intersecting the Lower Goldwyer source interval along the Broome Platform show very similar pyrolysis results (ie Fig 10). In this plot the three deepest intersections (Crystal Creek 1 2166-2247, Canopus 1 1630-1700 and Pictor 1 1430-1460) plot closer to the dead carbon line (where TOC = RC) than do the three slightly shallower sampled intervals (Hilltop 1 1052-1170, Aquila 1 1060-1170 and Hedonia 1 915-1046), but all samples are well removed from the immature line, and an overall high maturity level is indicated.

The average data in tables 2.2, 2.3 and 3.1-3.13 can be used to estimate the Transformation Ratio (TR) and the Migration Ratio (MR) by the use of the graphs incorporating the correlation lines for immature Goldwyer samples as drawn in figures 6,7 and 8 and as described on the previous page.

Sufficient data was available to provide estimates of TR & MR for three intersections of Upper Goldwyer source rocks, eleven intersections of lower Goldwyer source rocks, one intersection of the Emmanual Formation and one intersection of the Nambeet Formation. These estimates are listed in Table 4. An additional three intersections of apparent source rocks in the Nambeet Formation (in Hilltop 1, Pictor 1 and Edgar Range 1) contained no remaining hydrocarbon generative potential. TR values for those intersections are unity.

In six wells (Acacia 1, Pictor 1, Hilltop 1, Matches Springs 1, Edgar Range 1 and Hedonia 1) two separate source horizons were encountered. In all six cases the stratigraphically lower source horizon has the higher TR and MR value, and there is in fact an overall control by stratigraphic level on the value of TR and MR. This is particularly evident when the highest TOC samples only are considered, when all Upper Goldwyer samples show a TR range from 0-0.25, Middle Goldwyer samples range from 0.85-0.97 and all Nambeet samples range from 0.97-1.0. Lower TOC samples from the two Upper Goldwyer intersections which are deeper and seem to be more mature (Dodonea 1 and Matches Springs 1) show significantly higher TR & MR values, suggesting that the kerogens in the lower TOC samples are more mature with a higher level of generation than are the closely associated high TOC samples. Production Index (PI) values for Dodonea 1 (Table 2.2) show a clear inverse correlation of PI with TOC, PI rising from 0.04 in samples with more than 3 per cent TOC to 0.13 in samples with less than 1 per cent TOC, directly confirming the higher level of generation from the lower TOC samples. This may indicate that kerogen preserved in the lower TOC samples matures at a lower temperature that algal kerogen found in the richer samples.

The lack of high TOC samples in the intermediate range of maturity (i.e. with TR values between 0.25 and 0.85) suggests that drilling has so far only encountered the best quality source rocks in either an undermature or overmature condition. Since only 325 metres separates the bottom of the undermature Upper Goldwyer source unit from the top of the overmature Lower Goldwyer source unit in the Matches Springs 1 well (Table 5), this apparent lack of intermediate values indicates the presence of a very condensed maturation profile within the Ordovician section. This could be an expression of kerogen type, steep thermal gradient or stratigraphically controlled variation in organic matter type or degree of preservation. There is evidence that the two former factors have both contributed.

Firstly, the immature high TOC bands cut in the Upper Goldwyer by WMC wells Solanum 1, Kunzea 1, Santalum 1 and Acacia 1 have been shown to be dominated by the remains of a single organism (Foster et al., 1986). This organism is widespread in Ordovician organic-rich rocks worldwide, including the very rich Kukersite oil shales of Estonia where it was first described and named as *Glaeocapsamorpha prisca* (Zallessky, 1917). The Type I kerogen derived from this organism is likely to have a simple chemistry and a narrow range of activation energies. A study of the maturation of a younger kerogen of this general type in the Eocene Green River Formation in Utah (Sweeney, et al., 1987) showed that the transition from a TR of 0.20 to a TR of 0.90 required only 600 metres in a thermal gradient of 2.5°C per 100 metres. This is much less than the oil generation zone required by more complex kerogens with a wide range of activation energies, and provides at least a partial explanation for the condensed maturation profile observed in Matches Springs 1. Support for this interpretation is provided by the results of a single kinetic analysis of one G. Prisca-rich sample from Santalum 1A (C. Boreham, BMR, pers., comm., 26.6.92) where a very narrow range of activation energies is evident.

Secondly, there is evidence from the conodont colouration of the possibility of a steep thermal gradient within the Ordovician at the time of peak oil generation, at least locally in the Canning Basin.

Conodonts have been widely used to correlate the Ordovician and Devonian sequences, and the colour of the recovered conodonts has in many cases been determined in terms of the standard conodont alteration index (CAI). Compilations from Nicoll and Gorter (1984, a and b) and additional unpublished data from Watson (WMC) and Savage have been combined in Appendix 3.

The level of maturity indicated by the CAI value agrees very well with the level of oil generation given by the TR estimate. Table 5 lists the CAI values for the Ordovician source rocks in 11 wells where the value of TR is also available. CAI values of 1 (immature) are found only in the immature Upper Goldwyer intersections in the WMC wells Solanum 1, Kunzia 1, Santalum 1A and Acacia 1. Values of 2 and over are found in the Nambeet intersections in Hedonia 1 and Tappers Inlet 1 where TR values range from 0.97-1.00. CAI values of around 1-1.4 and around 1.5 contain TR values from 0.20-0.94, a very wide range covering the entire oil generation window, while CAI values of 1.5-2 show a narrow range from 0.87-0.94 only. These CAI results therefore indicate that all oil generation is confined to a narrow interval with CAI values above 1 and below 2, as shown in figure 11. Nicoll and Gorter, (1984a; 1984b) documented and figured the presence of four wells on the Broome Platform (McLarty 1, Edgar Range 1, Goldwyer 1 and Thangoo 1A) and two wells on the Lennard Shelf (Tappers Inlet 1 and Blackstone 1) where one or more of the intermediate CAI zones was very attenuated within the Ordovician section. When compared to wells in the Kidson Sub-basin to the south or to the standard Appalachian section the intervals between CAI 1 and CAI 3 (approximately 2500 metres in the Appalachians and at least 1950 metres in the Kidson sub-basin) is reduced to only 750 metres in Edgar Range 1. At present, eleven wells with very attenuated CAI zones are now known (Table 12). These attenuated CAI zones are most logically explained as a result of a high geothermal gradient which affected the Ordovician of the northern part of the Canning Basin but not the southern part. All the source rock intersections are in this northern part of the basin with attenuated CAI zones.

I conclude, therefore, that the rapid rate of increase in TR downwards through the Ordovician in the northern part of the Canning Basin is due to a combination of a kerogen type with a narrow range of activation energies and a high thermal gradient at the time of peak oil generation. It follows from this that the Lower Goldwyer Formation, and Nambeet Formation source rocks have generated the bulk of their hydrocarbons, while the Upper Goldwyer Formation has not. Provided that the deeper units had a similar source richness prior to maturation, as the immature upper unit still retains, then a major phase of oil generation has taken place at some time in the past. The timing of this major phase of generation relative to the timing of structuring and reservoir porosity availability is critical to any assessment of basin prospectivity for Ordovician-sourced oil.

GEOLOGICAL EVOLUTION OF THE CANNING BASIN AND IMPLICATIONS FOR THE MATURATION OF ORDOVICIAN SOURCE ROCKS.

The Canning is a polycyclic basin with two main phases of basin development separated by a structural break when the basin was partly inverted and part of the earlier basin fill was eroded off. The Ordovician source rocks are developed within the lowest part of the first cycle of basin fill and have therefore been uplifted and then reburied during the subsequent history of the basin. They have, therefore, had two opportunities for deep burial and maturation during normal basin evolution. The phase of uplift and extension, with higher heat flow, which separated the two main phases of subsidence may also represent an additional phase of maturation.

The first cycle of sedimentation: Ordovician and ?Silurian.

The first phase of sedimentation began with a strong marine transgression and the deposition of a fossiliferous Lower Ordovician sequence in a major transgressive - regressive cycle. Tables 6.1-6.6 list all the 54 wells which have intersected Ordovician rocks grouped into geological provinces, while Table 7 lists the 22 wells with the most extensive sections. Nine wells only provide complete sections of the Ordovician, but in three areas composite sections may be assembled from two closely-sited wells to give an estimate of the stratigraphic thickness. The remaining 9 wells either lack the top of the section, due to erosion, or failed to reach basement; these wells provide minimum thicknesses only.

These data are plotted in Maps 1 & 2, and broad isopachs for the Ordovician are drawn. The major features are:

(1) The Ordovician thins to less than 500 metres to the southwest in Frankenstein 1 and to the east in Percival 1 and possibly in Contention Heights 1.

(2) There are two sub-basins where more than 1500 metres of Ordovician were deposited, the Willara sub-basin (south of the Admiral Bay

Fault) and an unnamed basin in the north (south of the Oscar Range - Pinnacle Fault System).
(3) The Admiral Bay Fault was clearly a growth fault in the Ordovician. The sub-parallel Oscar Range - Pinnacle Fault System may also have been a growth fault, with thickest sediment deposited immediately adjacent to the faults, and gradually thinning to the southwest.

More information is available on the distribution and thickness of the upper two sub-divisions of the Ordovician, the Nita Formation (Map 3) and the Goldwyer Formation (Map 4). The Nita Formation, a distinctive evaporitic dolostone unit is absent, possibly due to non-deposition, in the southernmost part of the basin, but appears to be absent in the western part of the basin because of removal by pre-Grant Group (U.Carboniferous) erosion (Map 3). The 38 wells which intersect the Nita Formation show a pattern of thickening to the north to a maximum preserved thickness of 386 metres in Blackstone 1. There is no obvious change in thickness across the Admiral Bay Fault, suggesting that growth on the fault had ceased by the time the Nita Formation was being deposited. The underlying Goldwyer Formation (Map 4) is intersected in full in 22 wells, with thick unbottomed intersections in two more. It is thickest in the Willara sub-basin and in wells on both north (Blackstone 1) and south (Matches Springs 1) sides of the Fitzroy Trough. There is a large change in both thickness and sedimentary facies across the Admiral Bay Fault.

The best source rocks within the Ordovician are mainly at two levels within the Goldwyer Formation and these are restricted in their distribution to the area of the Broome Platform, especially the terraces south of the Dampier-Fenton Fault System (Map 4). Sufficient data exists to show that good source rocks are absent from the wells along the Admiral Bay Fault, in the Willara sub--basin, and over much of the Kidson sub-basin. Only one well, Blackstone 4, intersects the Goldwyer Formation to the north of the Dampier--Fenton Fault System. There are no source rocks in the 441m of Goldwyer Formation in this well. The Goldwyer appears to have been removed by pre-Devonian erosion from the other wells on the Lennard Shelf. However, minor amounts of mature to overmature source rocks are present in the lower part of the Ordovician section (Nambeet Formation and equivalents) in Tappers Inlet 1 and Gap Creek 1 (Tables 3.9 & 3.13). Source rock is also reported to occur in shallow BHP mineral drillholes north of Gap Creek 1.

As Ordovician source rocks can, therefore, be seen to have been present on both margins of the Fitzroy Trough, it is possible that any Ordovician preserved in the floor of the trough may also have contained source material. While it would now be very overmature, the timing of the main phase of maturation is important to the prospects for Ordovician-sourced hydrocarbons within the trough or its flanking terraces and shelves.

The Ordovician described above appears to have been deposited in two fault-controlled sub-basins, related to NE-SW extension during a major marine transgression. With the termination of extension in 'Nita time' the basin became strongly regressive and the Nita Formation carbonates become gypsum-rich and pass upwards, apparently conformably in most wells south of the Dampier-Fenton Fault System, into a sequence with major salt beds, the Carribuddy Group (Map 5). This is overlain in turn by a suite of red aeolian sands, the Tandalgoo Formation. The sequence from Goldwyer Formation to Tandalgoo Formation forms an overall regressive sequence. The lower part of the succession is well dated as Middle Ordovician, while the age of the top of the sequence is limited by the overlying, Middle Devonian Mellinjerie Limestone.

The Carribuddy Group thins to the east from Kidson 1 to Contention Heights 1 (Howell 1984) and the salt beds lens out, suggesting a depositional edge to the basin in this direction. The other margins are erosional, and the Carribuddy Group is overlain unconformably by the late Devonian in wells close to the Dampier-Fenton Fault System (ie. Matches Springs 1), and by the Grant Group along the northern and southeastern edges of the Kidson sub-basin (Map 5).

The first phase of basin inversion

The Carribuddy Group is only identified to the south of the Dampier-Fenton Fault System where it is broadly warped together with the underlying fossiliferous Ordovician into a structural basin. However the presence of a salt-cored diapir in Frome Rocks 1, and the presence of highly saline water within the Poulton Formation (which dips with the underlying Nita Formation in Blackstone 1) suggests that there may be equivalents of the Carribuddy Formation in at least the western half of the Fitzroy Trough. As noted earlier, remnants of the Ordovician in the Lennard Shelf wells (together with the Poulton Formation in Blackstone 1) are preserved in tilted half-grabens which are transgressed unconformably by flat-lying Famennian strata.

The Ordovician and Devonian show different structural relationships in the southern and northern parts of the basin. In the Kidson sub-basin the Ordovician sequence and overlying Middle Devonian rocks are structurally conformable, whereas in the Lennard Shelf there is a strong angular unconformity between these sequences. In an extensive area northeast of the Oscar Range-Pinnacle Fault Systems the Devonian rests directly on basement, (Map 6), while wells along the fault zone commonly show substantial removal of the Ordovician (Table 6.1).

This division of the basin into a stable, non--deformed southern sub-basin and a strongly deformed, uplifted and eroded zone to the northeast is marked by the line of the Dampier-Fenton Fault System. This fault separates a broad uplift along its SW side, the Broome Platform, from a zone of deep subsidence on the NE side, the Fitzroy Trough. The Upper Devonian and Early Carboniferous sediments extend for only a short distance onto the Broome Platform (Map 6), and much of the area to the southwest was being actively eroded during the Upper Devonian to Late Carboniferous interval.

The second cycle of sedimentation : Devonian to Triassic filling of the Fitzroy Trough.

Within the Fitzroy Trough an extremely thick clastic sequence ranging in age from Late Devonian to Middle Triassic has been drilled. Deep seismic profiles across this trough show that a thick sedimentary sequence underlies the drilled section, with a major detachment fault linked to the Dampier-Fenton Fault System as the controlling structure (Drummond et al., 1991).

There is no indication of an unconformity within the Late Devonian-Mid Triassic sequence in the Fitzroy Trough, but on both the Lennard Shelf and the Broome Platform the Late Devonian--Early Carboniferous carbonate sequences are separated from the Late Carboniferous-Permian Grant Group by a significant hiatus. The Grant Group cuts down through the stratigraphy to the west and southwest, coming to rest directly on the Ordovician in a broad arc south and southeast of Broome, where the Carribuddy Group had been removed by pre-Grant erosion (Map 7). The Grant has cut down to Middle Goldwyer in the wells due south of Broome (Map 3), while along the southwest margin of the basin the entire Ordovician sequence is absent and the Grant Group comes down to rest directly on the Pre-Cambrian. In this latter area the Grant Group buries an ancient topography, and significant subsurface salt dissolution has been recorded (Map 7).

The wrench inversion of the Fitzroy Trough

A phase of wrench faulting and uplift terminated sedimentation in the Fitzroy Trough in the late Triassic, and substantial uplift and erosion took place on large, surface-expressed folds (Brown et al., 1984). To the south sedimentation largely ceased by end Permian and the onshore basin stagnated. Major Mesozoic and Tertiary sedimentation offshore does not extend beyond the present coastal fringe. A thin skin of Jurassic-Cretaceous rocks, probably deposited during worldwide eustatic sealevel maxima, is extensively preserved in the south of the basin, confirming the lack of significant uplift and erosion in this area which remains at or near its maximum depth of burial (Brown et al., 1984). In the northeast of the basin a gentle uplift of the Kimberley Block has been followed by erosion, with progressively older units being exposed to the northeast across the Lennard Shelf.

Maturation histories of Ordovician source rocks

As a consequence of this regionally varied geological history any source rocks within the Ordovician will have been subjected to quite different maturation histories in different parts of the basin. The simplest history is in the south where the Kidson Sub-basin underwent two phases of subsidence and no major inversion. Source rocks could have been matured to some extent by the first subsidence to a peak in the mid-Devonian and then further matured during the Permian subsidence, with slow maturation continuing to the present day since the bottom hole temperature of 123°C in Kidson 1 is within the oil window. The most complex history is found north of the Dampier-Fenton Fault System. Maturation here could have occurred:

1) towards the end of deposition of the first sequence, peaking at the end of Carribuddy Formation time (probably late Ordovician),

2) during the period of rapid extension and uplift marking the inception of the Devonian Fitzroy Trough, or

3) during the subsequent phase of subsidence and filling in the Upper Devonian - Mid-Triassic.

Any Ordovician now present in the deeper parts of the Fitzroy Trough must be grossly overmature, but the timing of that maturation is not obvious from the regional geology.

The intervening Broome Platform subsided less during the Ordovician than the sub-basins on either side, and has acted as a generally positive element in all subsequent phases of basin evolution. Not only are the later phases of sedimentation notably thinner over the arch than in the adjacent basins, but each successive phase tends to be stripped prior to deposition of the next phase. Most of the arch has never been deeply buried, and immature Upper Goldwyer source rocks are locally preserved. The Nita Formation (where preserved) and the Upper Goldwyer also contain conodonts which are still in the first stage of alteration (CAI 1) in nine wells along the arch, confirming the low level of maturity preserved at the top of the Ordovician succession.

Most of the examples of attenuated CAI zones (Map 8) lie on the Broome Platform, with two examples in the Lennard Shelf. In both areas the steep CAI gradients within the Ordovician are overlain by thick zones with normal thickness CAI zones in Devonian to Triassic rocks. CAI zones within the Devonian and younger rocks have been established over much of the Lennard Shelf and along the terraces separating the Broome Platform from the deeps of the Fitzroy Trough. With the exception of a few wells in the Fitzroy Lamproite Province, such as Palm Springs 1 (Nicoll & Gorter, 1984) the Devonian shows normal to extended thickness CAI zones.

PRESENT-DAY THERMAL GRADIENTS AND THEIR GEOLOGICAL IMPLICATIONS

In a pioneer study Burne & Kanstler (1977) calculated thermal gradients for the wells then available in the Canning Basin. This data has been recalculated to a uniform surface temperature of 25°C and greatly augmented by data from newer wells to give the data in Table 8. A total of 70 wells provide data points of somewhat variable quality for use in Map 9. The data points are unevenly distributed, with a notable concentration in the northern part of the basin and very little data in the central part of the Kidson sub-basin.

The best defined features are a zone of notably low thermal gradients (20-25°C/km) coincident with the axis of the Fitzroy Trough, and a sub-parallel zone of high thermal gradients (35-45°C/km) along the Broome Platform. The Kidson Sub-basin has generally low gradients which decline to the south, while there is a small high on the Lennard Shelf roughly coincident with the Fitzroy Lamproite cluster.

The zone of high present day thermal gradients coincides quite well with an area of shallow basement, much of it shown by drilling to be granite. The low thermal gradient zone in the north is confined to the zone of very thick sediments in the Fitzroy Trough. The sparse data in the south and east of the basin is difficult to contour, but is compatible with a general correlation of low gradients with areas of thick sedimentation. Wells in the deeper parts of the Gregory & Kidson Sub-basins are cool, with thermal gradients in the 22-26°C/km range.

An exception to this rule is provided by the Willara Sub-basin with its largely Ordovician fill. The deep well within the sub-basin, Willara 1, has a thermal gradient of 30°C/km, while wells along the Admiral Bay Fault along the northern margin of the sub-basin show generally high gradients (Table 8.2).

While many of the wells with attenuated CAI zones in the Ordovician (Map 8) do lie within the area of high present day thermal gradients along the Broome Platform, there is no simple relationship. In particular, the two wells on the Lennard Shelf which preserve steep CAI zones in the Ordovician - Blackstone 1 and Tappers Inlet 1 - both have low present day thermal gradients of 24° and 23°C/km. These low present day gradients agree very well with the very extended CAI 1 zones found in the Devonian--Triassic part of the section, suggesting that the present low geothermal gradients in these two wells have been in existence since Devonian time. The high geothermal gradient imprinted on the Ordovician in these wells had evidently decayed by late Devonian time. The high thermal gradient which affected the now tilted Ordovician wedges preserved in half-grabens along the Oscar Range-Pinnacle Fault System may be related to the extension and rifting which led to inception of the Fitzroy Trough, with the overlying Devonian-Triassic section developing in the succeeding cool sag basin during the thermal contraction phase. The very low thermal gradients encountered in the Fitzroy Trough suggests that the Devonian to Triassic sequence was deposited in a cool sag basin.

In his study of the maturation history of a number of wells in the Fitzroy Trough and Lennard Shelf, Ellyard (1984) found that it was necessary to postulate lower temperature gradients in the past than the currently measured gradients of 29°C/km for Ellendale 1 and 30°C/km for Lake Betty 1. It seems likely therefore that the low thermal gradients of 20-25°C/km which presently characterise the Fitzroy Trough were already established in the Upper Palaeozoic.

In contrast to the cool Fitzroy Trough, the Broome Platform, particularly the western end, is an area of high present day thermal gradients. Wells reached granite basement at depths ranging from 1420 to 1730m and schist at depths ranging from 1438 to 2121m (Tables 6.2 & 6.3). Magnetic and gravity patterns suggest that granite is widely developed in the basement, and this may account for the high present day thermal gradients. The presence of hot, low density upper crust in this zone is probably also the principal reason for the presence of the arch, and its repeated rejuvenation as a positive feature.

The closely spaced wells along the Admiral Bay Fault Zone have generally high thermal gradients (Table 8.2) but considerable variation is apparent between adjacent wells. Substantial base metal mineralisation occurs along this zone, possibly due to heated solutions rising up the fault zone from the deep Willara sub-basin to the south. It is likely that, at the time of mineralisation, subsurface temperatures were higher than at present, with large local variations depending on proximity to fluid-flow systems. Minor oil shows within the Ordovician in some of the wells along this zone (Cudalgarra 1 & 2, Great Sandy 1) may have been generated during the mineralising episode from the small amounts of organic matter present in the Goldwyer Formation in this area. Limited CAI data from wells in this zone (Appendix 3) show values of 2-2.5, indicating palaeotemperatures sufficient to cause oil generation, and probably higher than those existing today.

OIL GENERATION FROM ORDOVICIAN SOURCE ROCKS: DIRECT EVIDENCE OF TIMING

The best Ordovician source rocks (Map 4) are confined to the area of attenuated CAI Zones (Map 8) and must have matured during the period of high thermal gradient which produced the conodont alteration. The most striking evidence for the timing of this event of high thermal gradient is provided by wells on opposite sides of the Fitzroy Trough. In both Blackstone 1 (to the north) and McLarty 1 (to the south) the top of the Nita Formation contains conodonts which are still within CAI Zone 1 at depths of 2220-2291 and 1758-1761 metres respectively. This thick Zone 1 is in accord with the current low thermal gradients of 24°C and 28°C. However, it immediately overlies a very attenuated Zone 1.5 (see Nicoll & Gorter 1984b, Figs 3 & 5). In Tappers Inlet 1, also to the north, Zone 2 is attenuated and cannot be more than 564 metres thick. The overlying CAI Zone 1.5 has only a 42 metre thickness preserved below the basal Devonian unconformity, while the overlying Devonian at a depth of 1936 metres below surface is within CAI Zone 1. Finally Nicoll & Gorter (op cit) show that for three wells on the Broome Platform (Goldwyer 1, Thangoo 1A and Thangoo 2) the bottom of CAI Zone 1 lies within the Ordovician from 930-1143 metres below surface while the underlying CAI Zone 1.5 is only 250-375 metres thick (Table 12).

Clearly the steep CAI gradient was imposed on the Ordovician prior to the episode of erosion which preceded the deposition of the overlying sequences, late Devonian to Triassic in the Lennard Shelf - Fitzroy Trough area, but as late as Late Carboniferous to Permian on the Broome Platform. It is important to note that the top of the Ordovician, normally has a CAI of 1.0 or 1.5 even when the underlying zones are highly attenuated (Table 12). This means either that it was not deeply buried at the time of maximum thermal gradient, or that the cover was a material with a high thermal conductivity. Salt is the obvious material for the latter role, and may well have been present in the pre-Devonian cover throughout the Broome Platform-Fitzroy Trough--Lennard Shelf area at the end of the Ordovician--Silurian depositional cycle.

It was shown earlier, that peak oil generation from the rich, type I kerogens took place in the interval between the end of CAI Zone 1 and the beginning of CAI Zone 2 (Fig 11). All of the Nambeet and Lower Goldwyer source rocks matured during the pre-Upper Devonian cycle of high thermal gradients, and post Devonian maturation has never reached a level sufficient to cause further generation. However, the Upper Goldwyer source, where present, was not matured beyond CAI 1 in wells on the Broome Platform. In wells which have not been subsequently deeply buried, for example WMC Solanum 1, this source unit is still in CAI Zone 1 and is immature. Where parts of this stratigraphy have been downfaulted into the structural terraces along the Dampier-Fenton Fault System these immature source rocks have been buried sufficiently deeply in post-Devonian time for maturation to have begun. In Matches Springs 1 the base of the CAI 1 zone is found within the Devonian section between 1224 & 1388 metres, and the Upper Goldwyer, at a CAI Zone of 1.5 has begun to generate, with a TR value of 0.24-0.51 (Table 4). The Upper Goldwyer is at a similar maturity level in WMC Dodonea 1, and an oil show from the DST conducted over the 1519-1553m interval in this well, and a similar show in BHP Pictor 1, may be due to this phase of post-Devonian maturation.

Post-Devonian maturation sufficient to cause oil generation is shown by the CAI results obtained from the Devonian section in WMC Dampiera 1, located 40km south of Dodonea 1 on the Barbwire Terrace (Map 6). Nicoll & Gorter (op cit) report CAI values of 1.5 between 1196-1427m, increasing to 2 between 1427-1679m. Temperatures sufficient to produce these effects on conodonts will cause substantial oil generation from the source rocks found in the Ordovician, and any immature Ordovician source rocks subjected to a post-Devonian thermal history similar to Dampiera 1 would generate oil. Other wells on the Barbwire Terrace do not show such high levels of maturity in the Devonian and Cassia 1, 25km east of Dampiera 1, remains in CAI Zone 1 to 1551 metres, the deepest sample taken. These variations in maturity within the Devonian require either highly variable thermal gradients at the local scale, or post-maturation displacement along the numerous faults which dissect the terrace.

There is little evidence of source rocks throughout the southern part of the Canning Basin. Within the Kidson Sub-basin seven wells have penetrated the Ordovician section. Two of these (Edgar Range 1 and Wilson Cliffs 1) were drilled through the Carribuddy Salt, and below, using an oil-based drilling mud. Samples from the Ordovician of both wells are heavily contaminated and unusable for source rock determinations. Visual inspection of core and cuttings, however, indicates that potential source rocks are present (ie dark, organic-rich looking shales).

Conodont alteration index values are known for six of the seven wells (Table 13), and the four deepest wells (Kidson 1, Wilson Cliffs 1, Pegasus 1 and Frankenstein 1) have values of two or more, indicating that any source rocks in the Ordovician would have matured. The depth to the top of CAI Zone 2 is between 2200 and 2500 metres below the present surface, while the bottom of Zone 1 varies from 1400 metres in Contention Heights 1 in the east to 2000 metres in Munro 1 in the west. This part of the basin is presently cool and may be presently at or close to its maximum depth of burial. If burial to depths between 1500 and 2500 metres is enough to generate oil, then the deepest part of the sub-basin around Wilson Cliffs 1 and Kidson 1 reached this depth during deposition of the Devonian Mellinjerie Limestone, and much of the Kidson sub-basin may have generated at that time.

THE POSSIBILITIES FOR ORDOVICIAN-SOURCED OIL OR GAS IN THE CANNING BASIN

Good quality Ordovician source rocks are shown by drilling to underlie a zone through the centre of the basin along the Broome Platform and its adjacent terraces, and they may extend under undrilled parts of the Kidson sub-basin, in the south, and extend at great depth below much of the Fitzroy Trough, in the north (Map 4). The Ordovician has been almost entirely removed by pre-Devonian erosion to the north of the Oscar--Pinnacle Fault System, but small amounts are preserved in fault-bounded wedges along the fault zone (Map 6). To the southeast of the Lennard Shelf there is a broad zone where the Ordovician is preserved, but the source facies is apparently not developed.

It can be concluded that there is little prospect of Ordovician-sourced oil in:

1) the southeastern part of the basin, where source material apparently was not deposited,

2) the Lennard Shelf, in the north, where, if it was deposited, it has since been largely removed by erosion.

In the remainder of the Kidson Sub-basin (ie north and east of Kidson 1), any source which may have been present within the Ordovician could have generated its oil during the deposition of the later members of the first cycle of deposition; the Mellinjeri Formation or later units subsequently being eroded. This part of the basin was not strongly inverted and structured in the Devonian or Carboniferous and was later buried and further matured during Grant time, but not to the level of hydrocarbon destruction. Conodonts from the Ordovician of Wilson Cliffs 1 are in CAI Zone 2 only, while in the deepest well (Kidson 1) Zone 3 is reached. The eastern part of the Kidson Sub-basin therefore retains some potential for Ordovician sourced oil, regionally sealed below the salt in the Carribuddy Group.

There is far more data available for the Broome Platform and its adjacent terraces than for any other part of the basin. Two widespread source intervals (Nambeet and lower Goldwyer) are preserved over most of the arch. The kerogens in these two source intervals were matured in the pre-Upper Devonian under the influence of a very steep thermal gradient, probably while sealed below the Carribuddy salt beds. The sequence was then largely stripped and any salt removed prior to the deposition of the possible reservoir sequences of Devonian or Permian age. Stripping was most extreme in the west, where post--Devonian erosion cut down to the Goldwyer Formation before the Grant Group was deposited over the whole of the Arch. Oil generated by this early phase of maturation is widely preserved as fluorescence and minor shows in tight, non--porous beds, mainly in the source beds themselves, but has not proved to be producible during drillstem testing.

If these Lower Goldwyer and Nambeet source beds were of comparable richness to the well-preserved, immature Upper Goldwyer source beds then large amounts of oil would have been generated during this early phase of maturation. Any oil reservoired within the Ordovician section in traps shielded from later erosion and meteoric water intrusion during the later Palaeozoic may still be preserved along the shallow parts of the Broome Platform where later burial maturation has not exceeded the original maturation level.

The Lower Goldwyer source unit retains both some free unexpelled hydrocarbons and some limited potential to generate more hydrocarbons on further maturation. It is probable that this source unit originally extended to the north of the Dampier-Fenton Fault system. If so then the residual generative potential of this unit would have been realised following its deep burial in the Fitzroy Trough. Existing hydrocarbons within the Ordovician would have been cracked to lighter fractions at the same time, and the Ordovician may have generated a significant second crop of hydrocarbons, probably mainly gas or gas--condensate, during the evolution of the Fitzroy Trough. The early history of the Fitzroy Trough is poorly known, and the timing of this possible second crop of hydrocarbons is unknown.

Source beds are present in the Upper Goldwyer, but are preserved over a much smaller area (Map 4). On the upthrown side of the faults separating the Broome Platform and the Barbwire Terrace this source unit is preserved at shallow depth below thin Grant Group cover in an immature condition (Foster et al., 1986). This source unit is found at an early oil generation stage of maturation in two wells (Matches Springs 1 and Dodonea 1) below Devonian cover. The observed level of maturation is post-Devonian. There is every likelihood that these Upper Goldwyer source rocks extended to the north of the Fenton Fault into what is now the Fitzroy Trough and possible that in this area also they did not mature until post-Devonian time. The greatly increased depth of burial by the thick Devonian to Triassic within the trough would have produced much more complete maturation within the trough than on the terraces, and hydrocarbons sourced from the Upper Goldwyer may have been generated below much of the southern margin of the Fitzroy Trough. Along the northern margin of the trough the Upper Goldwyer has either been stripped by pre-Devonian erosion, or is present in a non--source facies (eg Blackstone 1) and there is little prospect of Upper Goldwyer sourced oils along this northern margin.

The southeastern part of the Fitzroy Trough may therefore have experienced both oil generation from the Upper Goldwyer source rocks and gas generation from the Lower Goldwyer source rocks in Devonian to Triassic time, while the northwestern part, bordering the Lennard Shelf, would have experienced only a gas generation phase.

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FIGURE CAPTIONS

Figure 1 — Crossplot of Hydrogen Index and Tmax for three wells in the Amadeus Basin. HI and Tmax values are grouped on the basis of TOC content. Note:
1) TOC and HI are systematically correlated.
2) Tmax falls as TOC falls for each hole.
3) Tmax does not rise as HI falls with oil generation until generation is virtually complete.

Figure 2 — Correlation between TOC % and Residual Carbon (RC) % for three wells in the Amadeus Basin. When TOC = RC (steepest line) all the carbon in the sample is inert and no further hydrocarbon generation is possible.

Figure 3 — Correlation between Pyrolizable Carbon (PC) % and Residual Carbon (RC) % for three wells in the Amadeus Basin.

Figure 4 — Correlation between TOC% and Hydrogen Index for three wells in the Amadeus Basin. Note that the correlation lines flatten at high values of TOC.

Figure 5 — Crossplot of Hydrogen Index and Tmax for several selected wells from the Canning, Amadeus (right hand trend line) and Georgina (left most trend line) Basins. Note the near coincidence of the high TOC samples from Mt Winter 2A and Dodonea 1.

Figure 6 — Correlation between TOC % and Residual Carbon (RC) % for five wells in the Canning Basin. All data except for Hedonia 1 are for Upper Goldwyer source rocks.

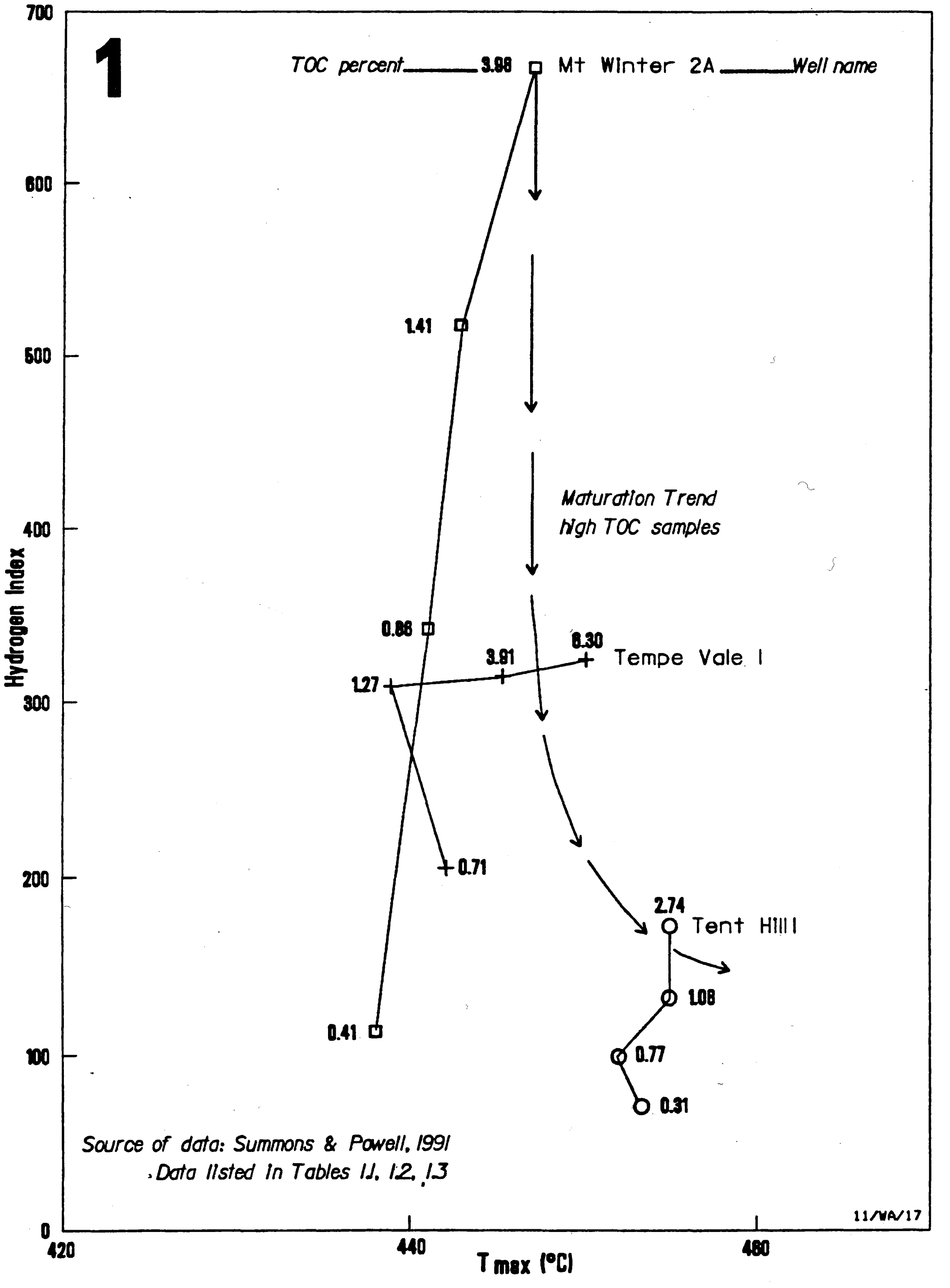
Figure 7 — Correlation between Pyrolizable Carbon (PC) % and Residual Carbon (RC) % for five wells in the Canning Basin.

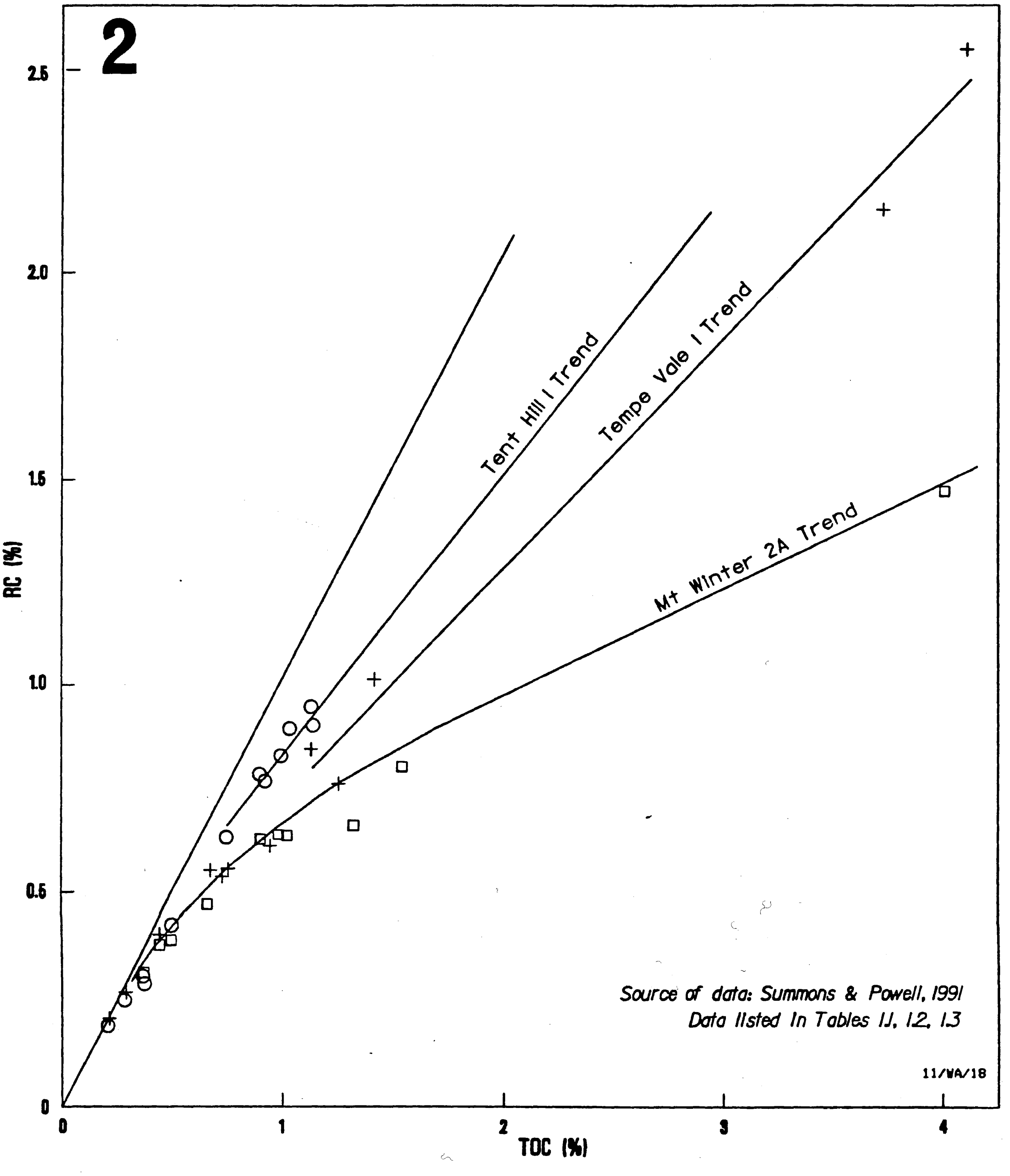
Figure 8 — Correlation between TOC % and Hydrogen Index for four wells from the Canning Basin, with Mt Winter 2A from the Amadeus Basin shown for comparison.

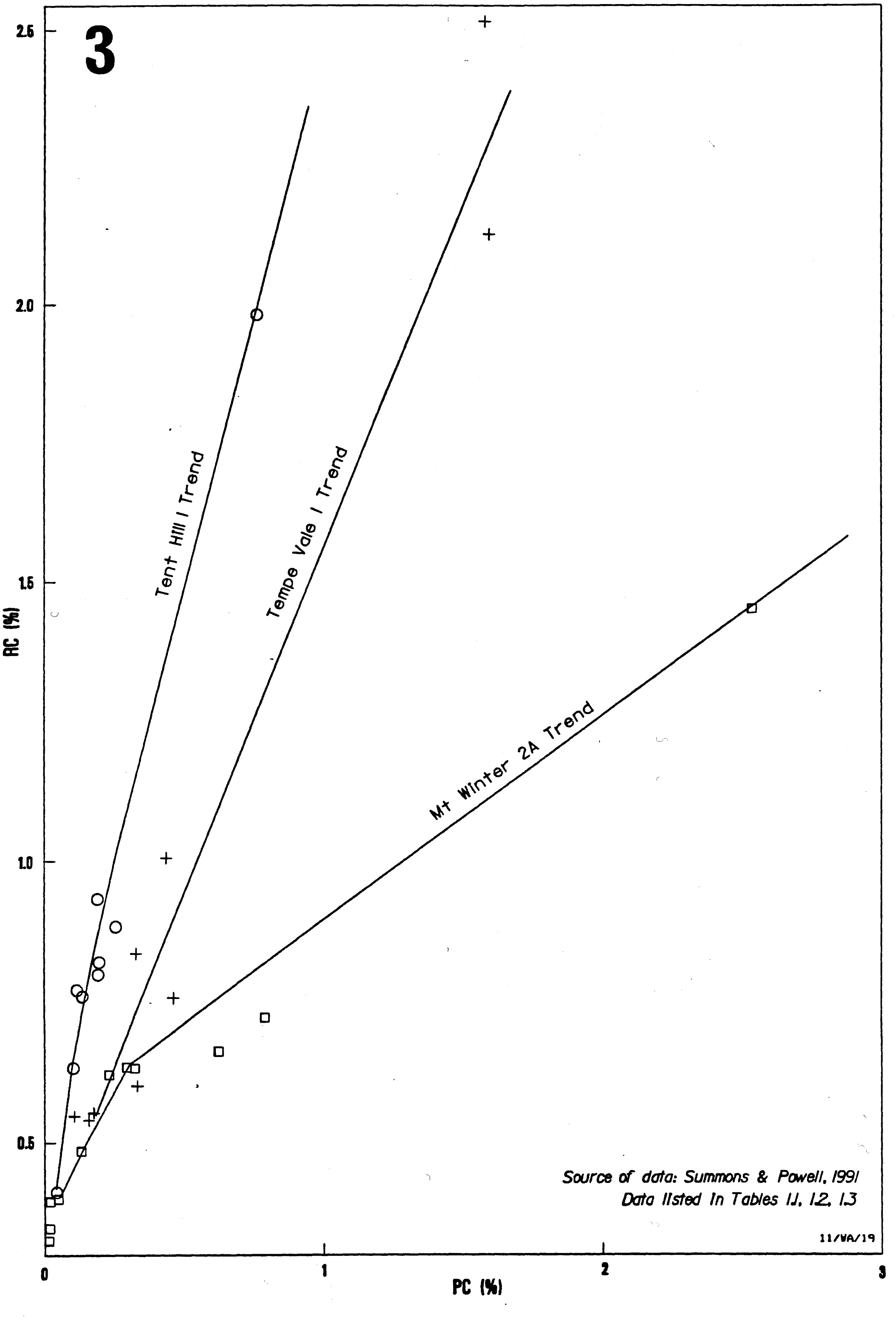
Figure 9 — Correlation between TOC % and Hydrogen Index for three wells cutting Lower Goldwyer source rocks from the Canning Basin.

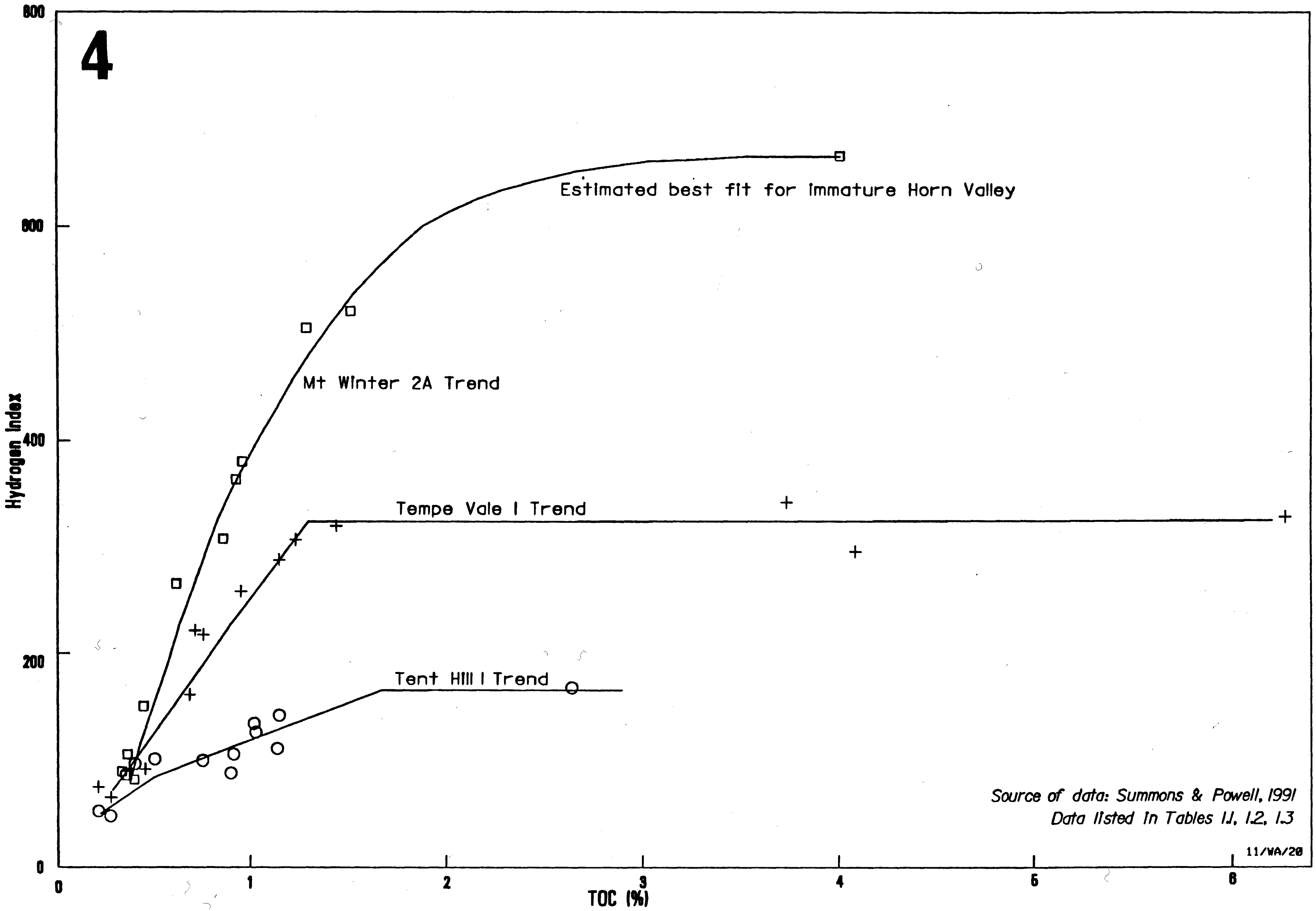
Figure 10 — Correlation between TOC % and Residual Carbon (RC) % for six wells cutting the Lower Goldwyer source rocks from the Canning Basin. All wells appear to be highly mature.

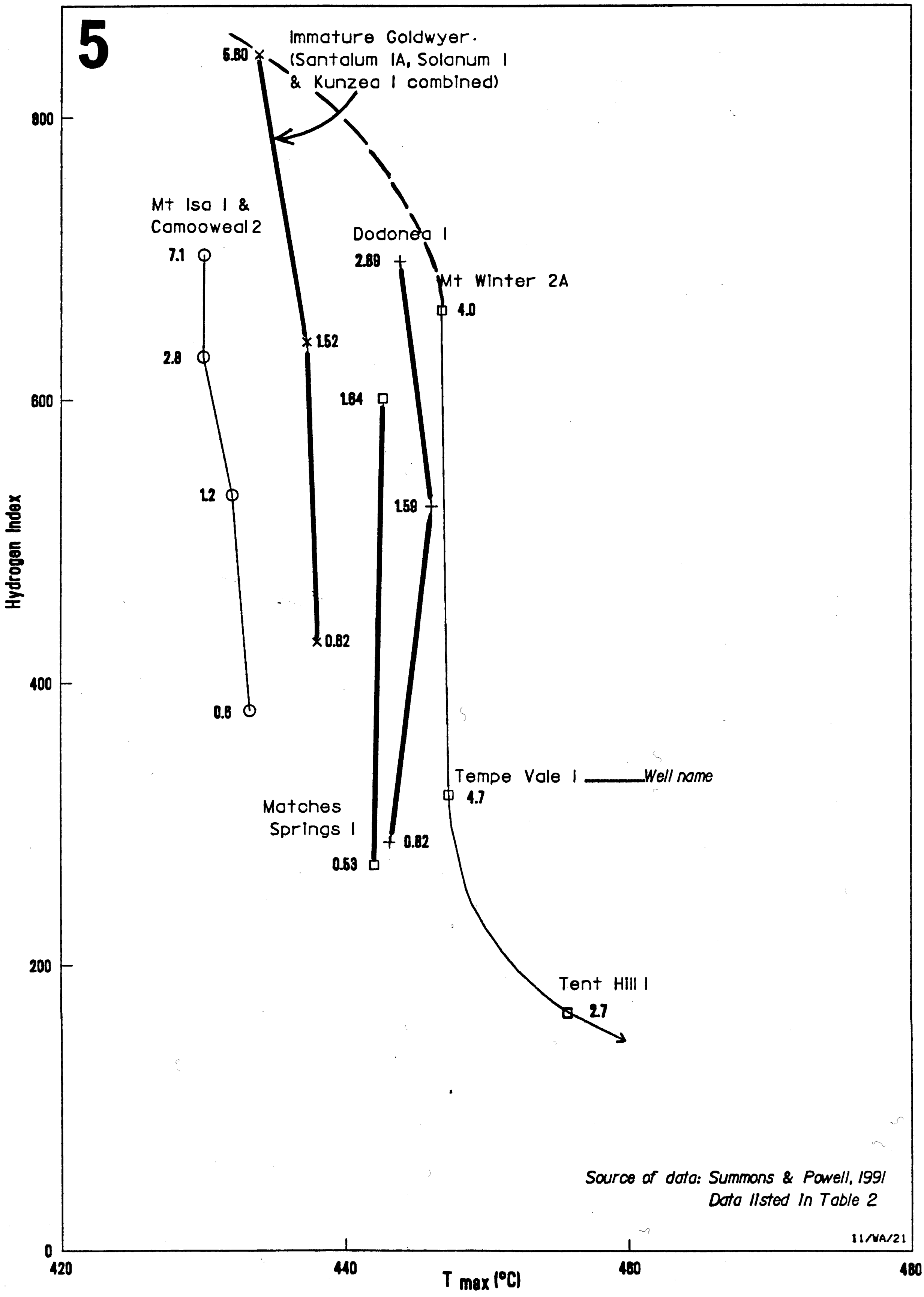
Figure 11 — Correlation between Conodont Alteration Index (CAI) values and Transformation Ratio (TR) calculated from Rock-Eval data for fifteen wells in the Canning Basin.

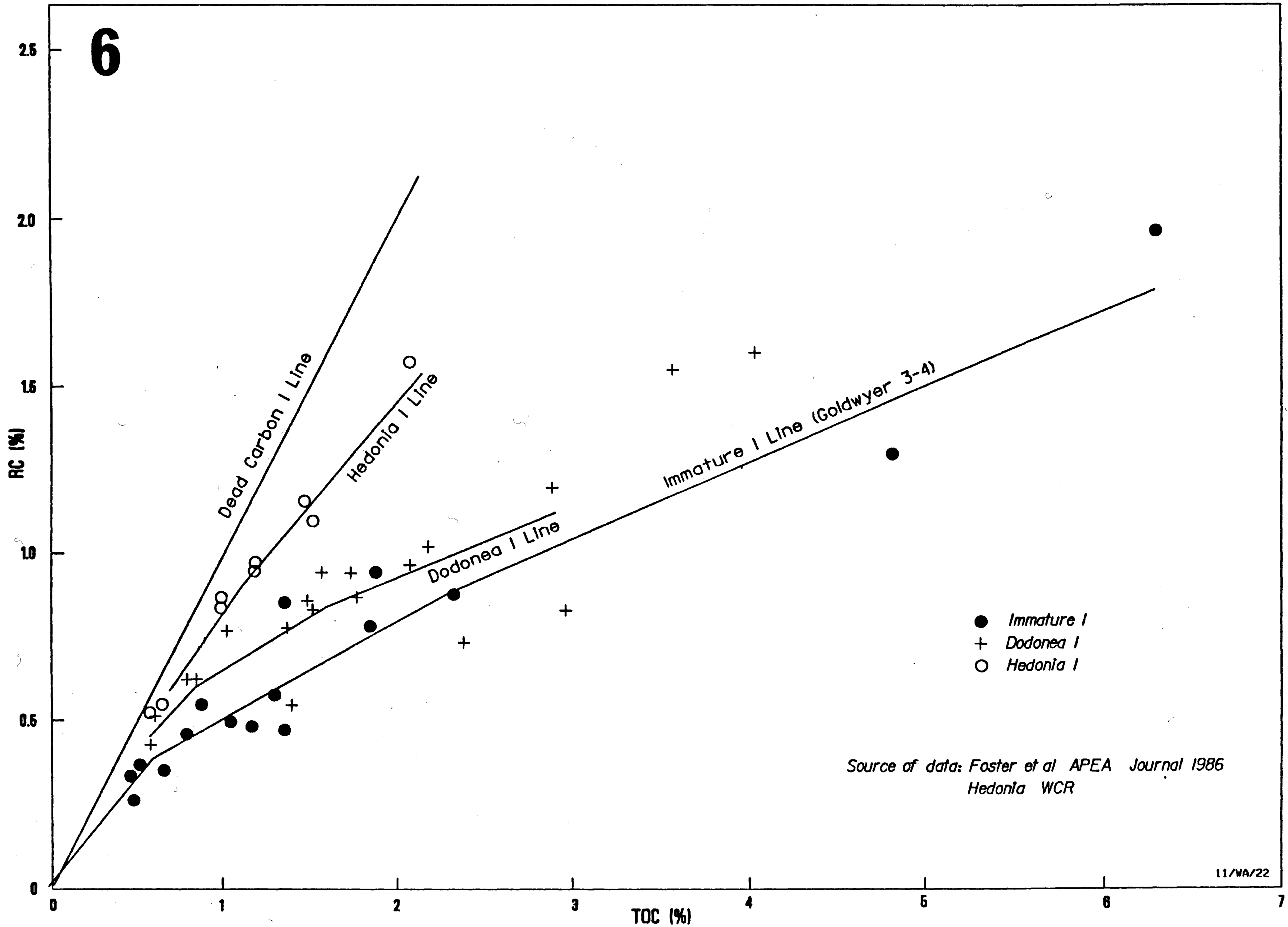

1
TOC percent
3.98
Mt Winter 2A
Well name
1.41
Maturation Trend
high TOC samples
0.86
8.30
3.91
Tempe Vale I
1.27
0.71
2.74
Tent Hill I
1.08
0.77
0.31
0.41
Source of data: Summons & Powell, 1991
Data listed in Tables 1.1, 1.2, 1.3
11/WA/17
Hydrogen Index
T max (°C)
700
600
500
400
300
200
100
0
420
440
460

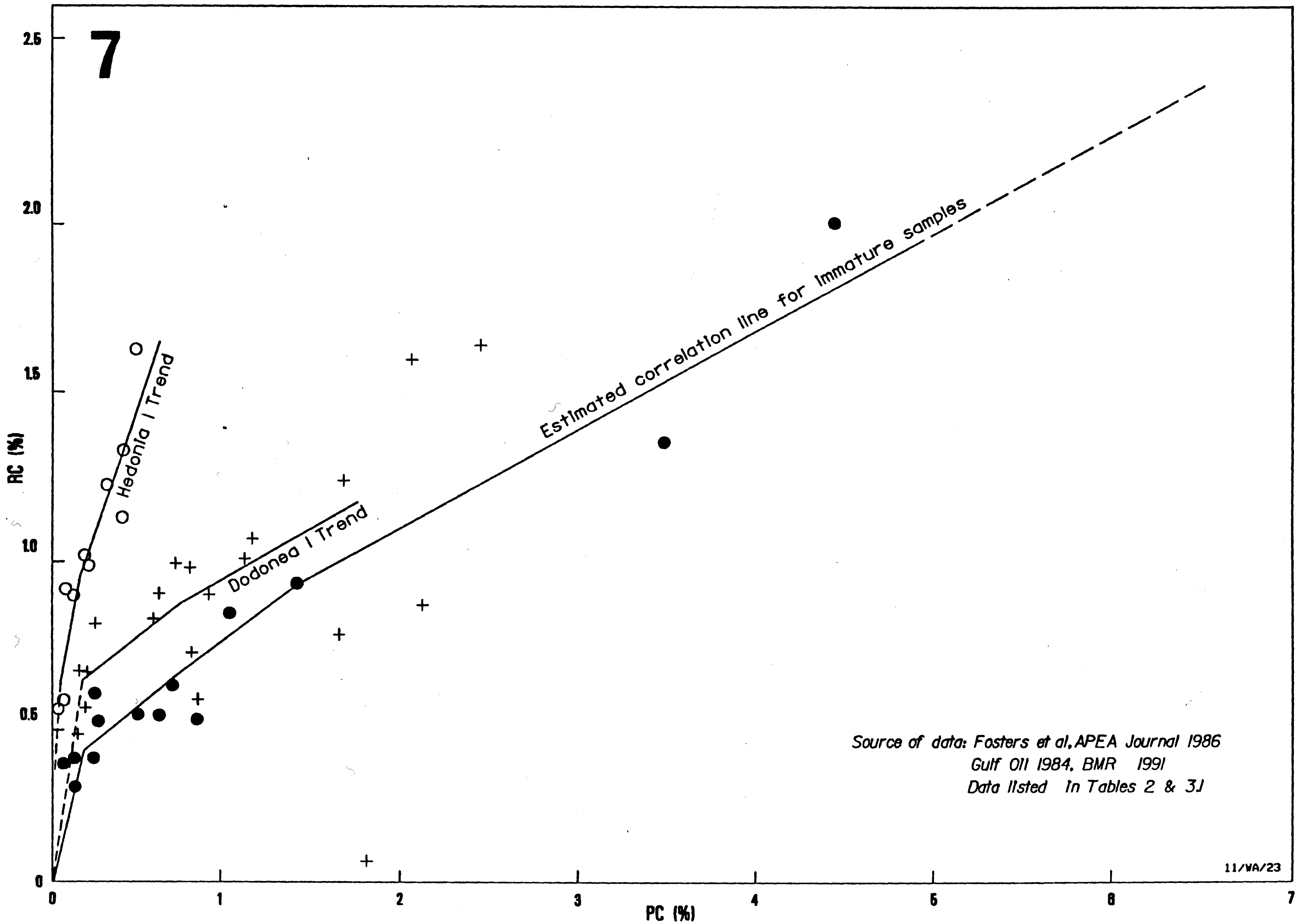

2
RC (%)
TOC (%)
0
0.5
1.0
1.5
2.0
2.5
0
1
2
3
4
Tent Hill I Trend
Tempe Vale I Trend
Mt Winter 2A Trend
Source of data: Summons & Powell, 1991
Data listed in Tables 1.1, 1.2, 1.3
11/WA/18

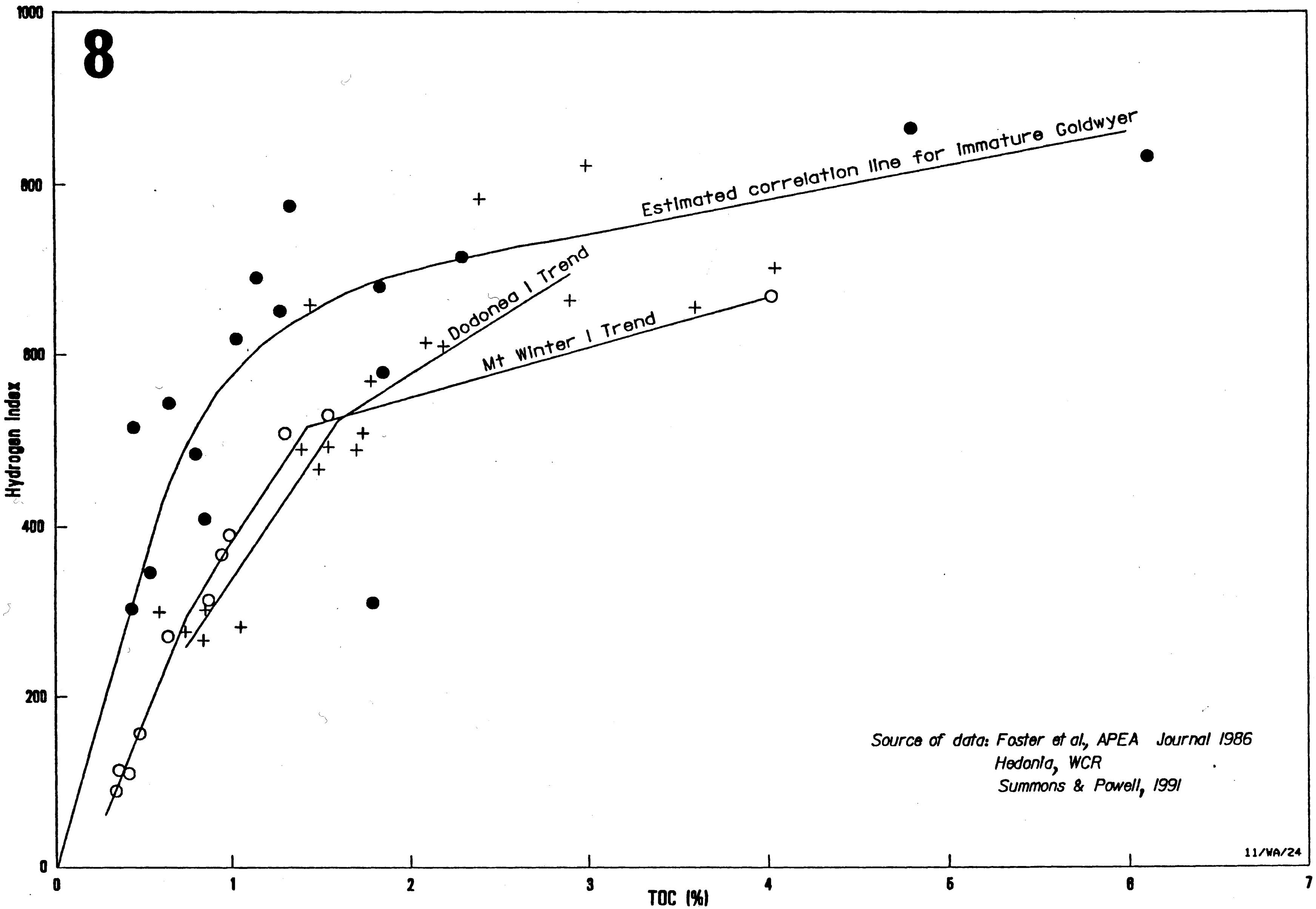

3
2.5
2.0
1.5
1.0
0.5
RC (%)
0
1
2
3
PC (%)
Tent Hill I Trend
Tempe Vale I Trend
Mt Winter 2A Trend
Source of data: Summons & Powell, 1991
Data listed in Tables I.1, I.2, I.3
11/WA/19

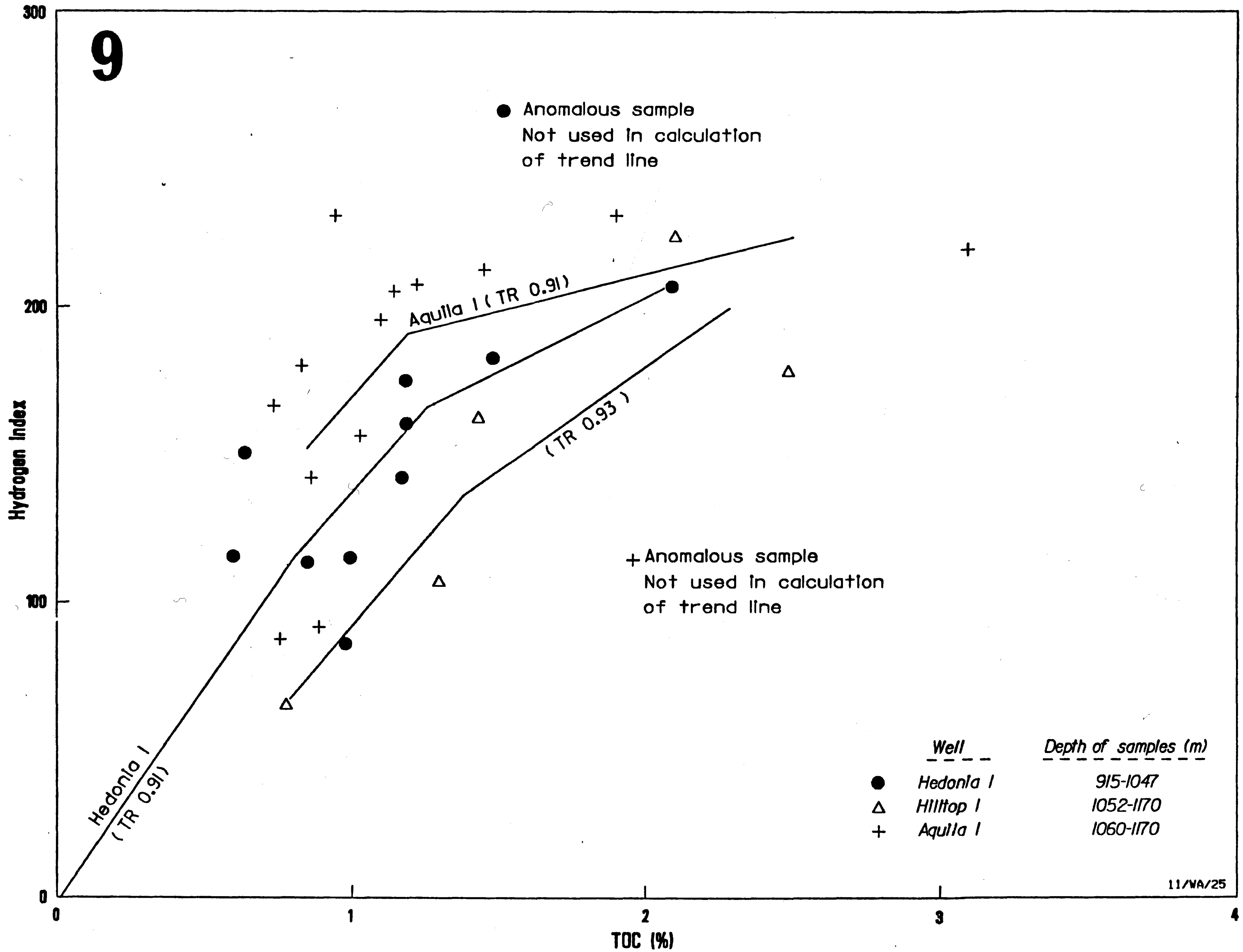

4
Hydrogen Index
TOC (%)
0
200
400
600
800
0
1
2
3
4
5
6
Estimated best fit for immature Horn Valley
Mt Winter 2A Trend
Tempe Vale I Trend
Tent Hill I Trend
Source of data: Summons & Powell, 1991
Data listed in Tables 1.1, 1.2, 1.3
11/WA/20

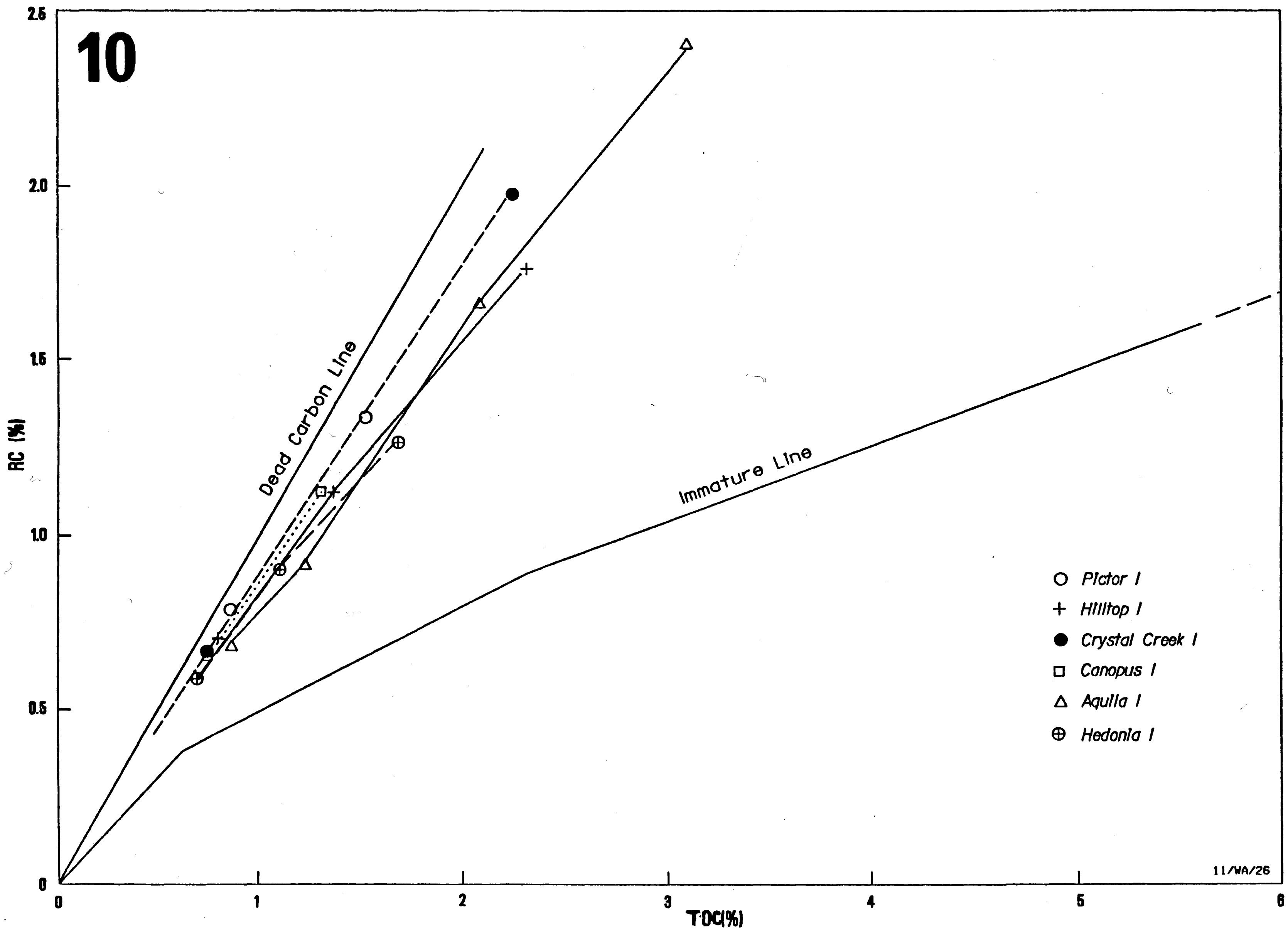

5
Immature Goldwyer·
(Santalum IA, Solanum I
& Kunzea I combined)
5.60
1.52
0.82
Mt Isa I &
Camooweal 2
7.1
2.8
1.2
0.6
Dodonea I
2.89
1.59
0.82
Mt Winter 2A
4.0
1.64
Matches
Springs I
0.53
Tempe Vale I
Well name
4.7
Tent Hill I
2.7
Source of data: Summons & Powell, 1991
Data listed in Table 2
11/WA/21
Hydrogen Index
800
600
400
200
0
420
440
460
480
T max (°C)

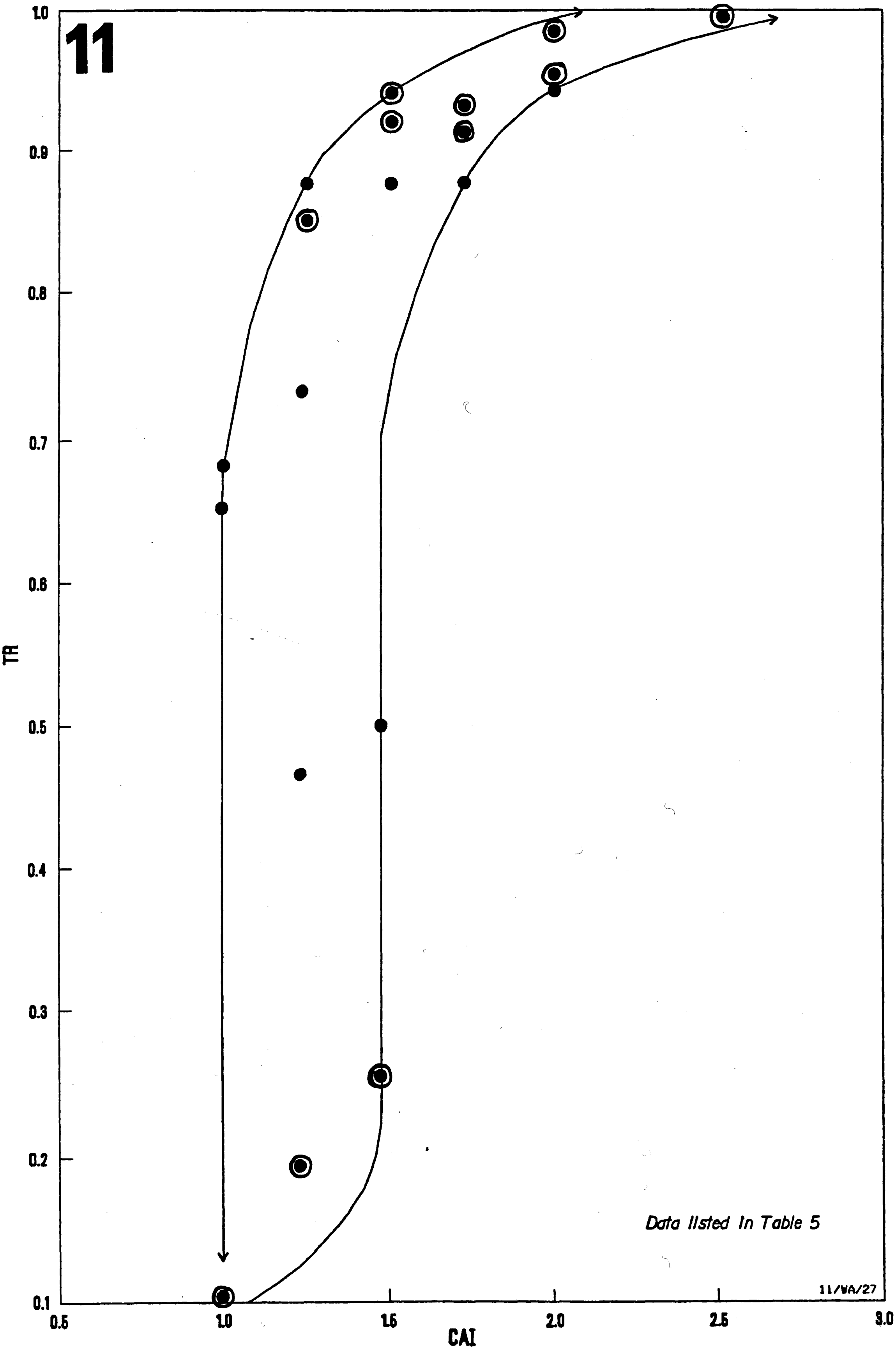

6
RC (%)
2.5
2.0
1.5
1.0
0.5
0
TOC (%)
0
1
2
3
4
5
6
7
Dead Carbon I Line
Hedonia I Line
Dodonea I Line
Immature I Line (Goldwyer 3-4)
Immature I
Dodonea I
Hedonia I
Source of data: Foster et al APEA Journal 1986
Hedonia WCR
11/WA/22


7
RC (%)
PC (%)
2.5
2.0
1.5
1.0
0.5
0
1
2
3
4
5
6
7
Hedonia I Trend
Dodonea I Trend
Estimated correlation line for immature samples
Source of data: Fosters et al, APEA Journal 1986
Gulf Oil 1984, BMR 1991
Data listed in Tables 2 & 3J
11/WA/23


8
Hydrogen Index
1000
800
600
400
200
0
TOC (%)
0
1
2
3
4
5
6
7
Estimated correlation line for Immature Goldwyer
Dodonea I Trend
Mt Winter I Trend
Source of data: Foster et al., APEA Journal 1986
Hedonia, WCR
Summons & Powell, 1991
11/WA/24


9
Anomalous sample
Not used in calculation
of trend line
Aquila I (TR 0.91)
(TR 0.93)
Hedonia I
(TR 0.91)
Anomalous sample
Not used in calculation
of trend line
Well
Depth of samples (m)
Hedonia I
915-1047
Hilltop I
1052-1170
Aquila I
1060-1170
11/VA/25
Hydrogen Index
TOC (%)
300
200
100
0
0
1
2
3
4


10
Dead Carbon Line
Immature Line
Pictor I
Hilltop I
Crystal Creek I
Canopus I
Aquila I
Hedonia I
RC (%)
TOC(%)
0
0.5
1.0
1.5
2.0
2.5
1
2
3
4
5
6
11/WA/26


11
TR
CAI
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.5
1.0
1.5
2.0
2.5
3.0
Data listed in Table 5
11/WA/27

CAPTIONS TO MAPS

1. Location of petroleum exploration wells in Canning Basin. Data points used in this study, that is wells containing information on Ordovician and wells that penetrated basement without intersecting Ordovician shown.

2. Generalised isopachs showing thickness variations of the Ordovician section in the Canning Basin, based on thickness information at wells indicated. Approximate locations of Ordovician growth faults also shown.

3. Generalised structure contours on the top of the Ordovician and isopachs showing thickness variations for the Nita Formation, based on information at wells indicated.

4. Isopachs of Goldwyer Formation and distribution of areas containing promising source rocks in upper and lower parts of the Formation.

5. Distribution, extent and thickness variations for some major units in the upper part of the Ordovician in the Canning Basin.

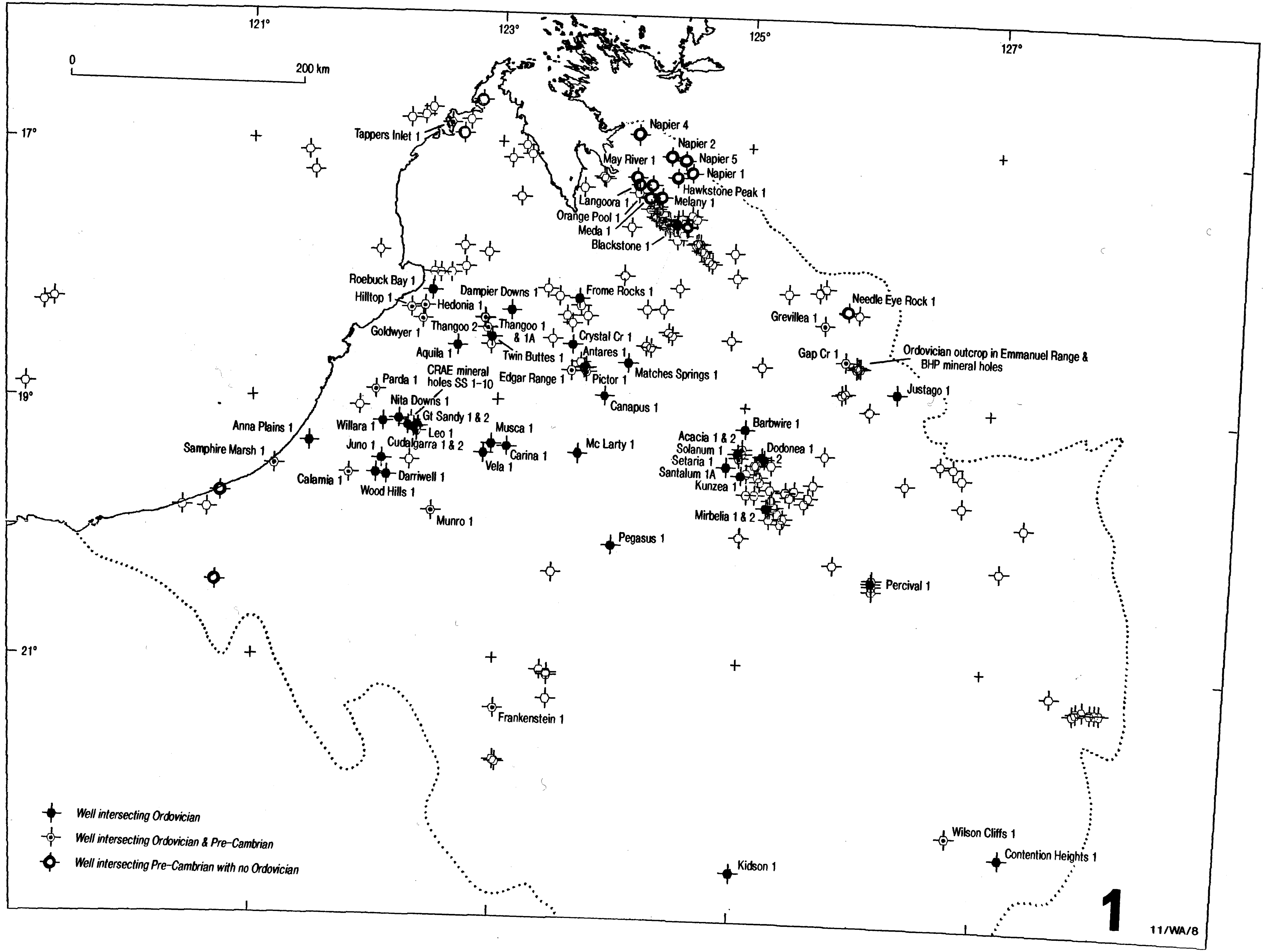
6. Maturation levels near base of Devonian sequence in wells flanking the Fitzroy Trough.

7. Generalised contours on pre-Grant Group unconformity.

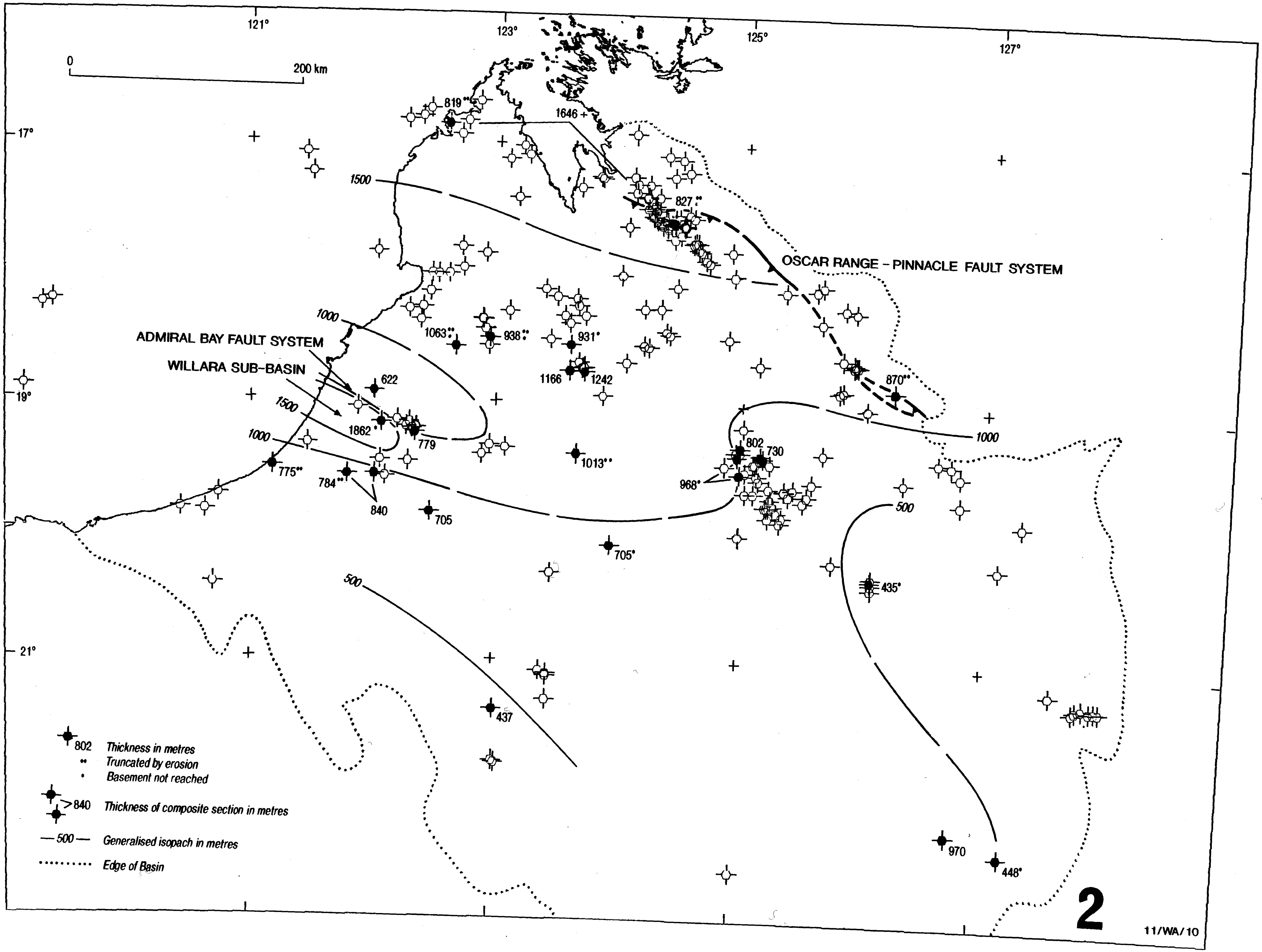
8. Conodont Alteration Index (CAI) zones.

9. Thermal gradients for deep wells

10. Simplified basin structure map showing approximate locations and extent of structural features referred to in text.



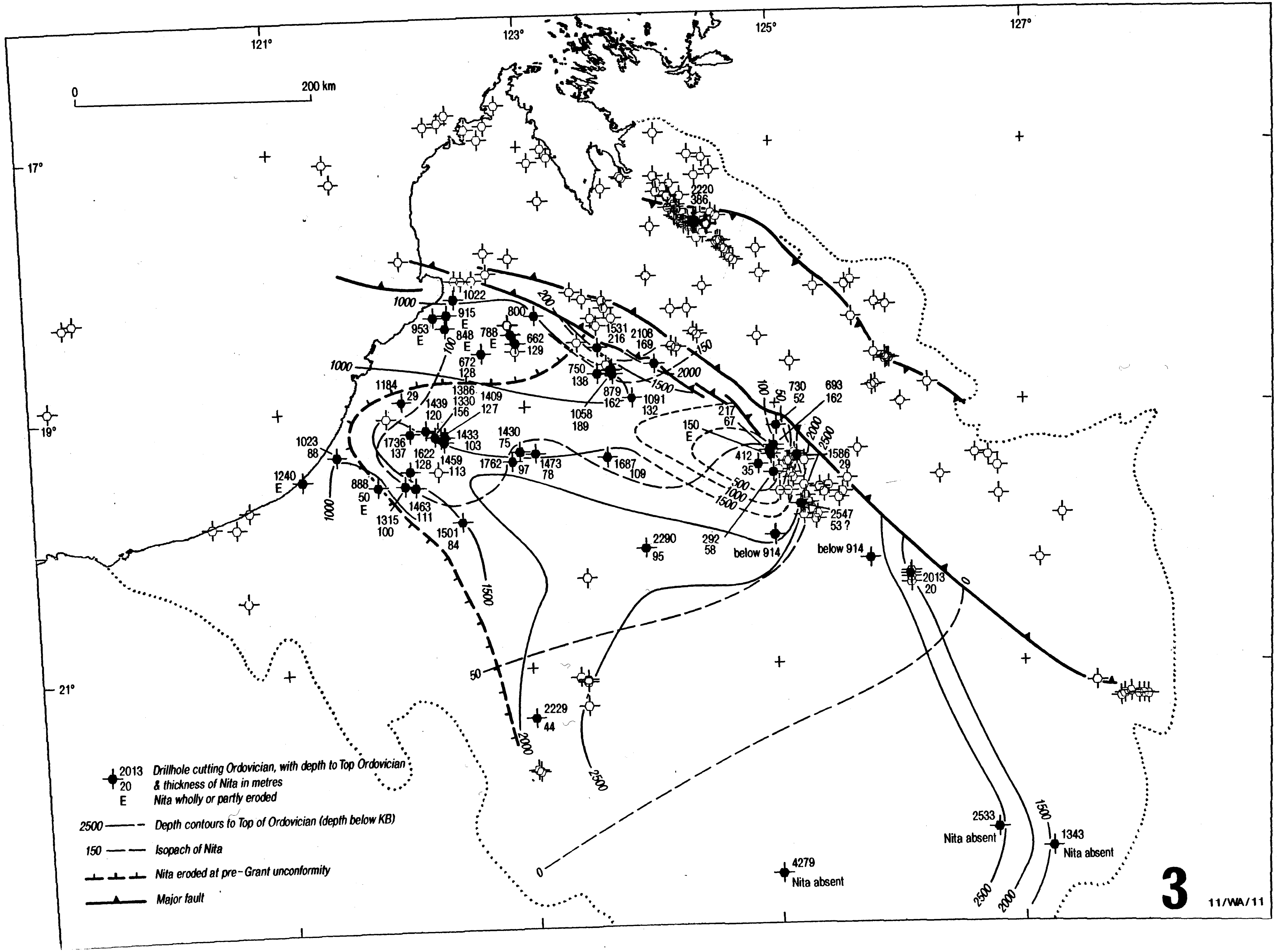
121°
123°
125°
127°
17°
19°
21°
0
200 km
Tappers Inlet 1
Napier 4
Napier 2
Napier 5
Napier 1
May River 1
Hawkstone Peak 1
Langoora 1
Melany 1
Orange Pool 1
Meda 1
Blackstone 1
Roebuck Bay 1
Hilltop 1
Hedonia 1
Dampier Downs 1
Frome Rocks 1
Thangoo 2
Thangoo 1 & 1A
Goldwyer 1
Crystal Cr 1
Aquila 1
Twin Buttes 1
Antares 1
Edgar Range 1
Pictor 1
Matches Springs 1
Parda 1
CRAE mineral holes SS 1-10
Nita Downs 1
Gt Sandy 1 & 2
Willara 1
Leo 1
Anna Plains 1
Juno 1
Cudalgarra 1 & 2
Musca 1
Carina 1
Vela 1
Samphire Marsh 1
Calamia 1
Darriwell 1
Wood Hills 1
Munro 1
Mc Larty 1
Canapus 1
Barbwire 1
Acacia 1 & 2
Solanum 1
Dodonea 1
2
Setaria 1
Santalum 1A
Kunzea 1
Mirbelia 1 & 2
Pegasus 1
Grevillea 1
Needle Eye Rock 1
Gap Cr 1
Ordovician outcrop in Emmanuel Range & BHP mineral holes
Justago 1
Percival 1
Frankenstein 1
Wilson Cliffs 1
Contention Heights 1
Kidson 1
Well intersecting Ordovician
Well intersecting Ordovician & Pre-Cambrian
Well intersecting Pre-Cambrian with no Ordovician
1
11/WA/8



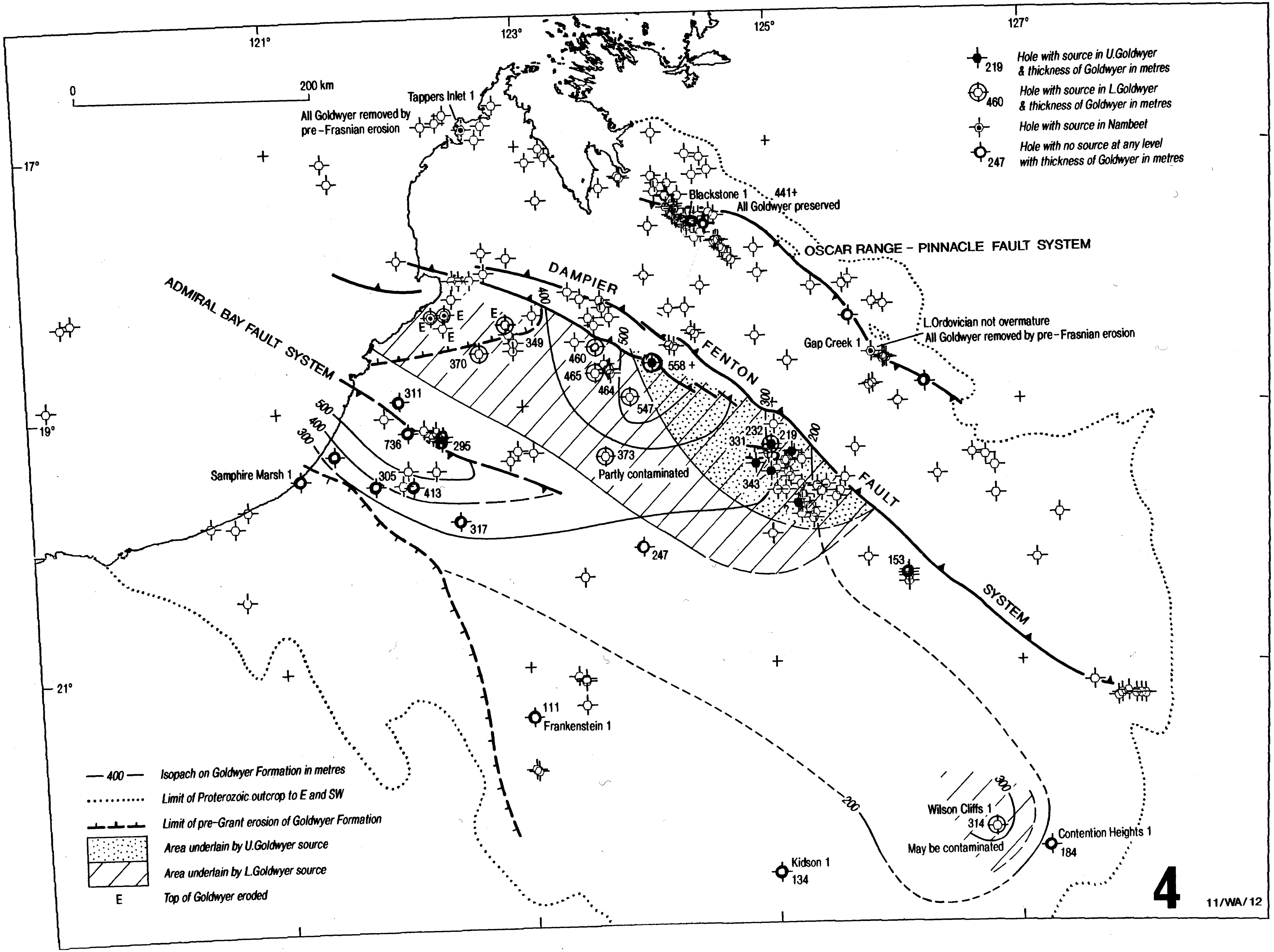
121°
123°
125°
127°
17°
19°
21°
0
200 km
819**
1646 +
827**
1500
OSCAR RANGE – PINNACLE FAULT SYSTEM
1000
1063**
938**
931*
ADMIRAL BAY FAULT SYSTEM
WILLARA SUB-BASIN
622
1166
1242
870**
1500
1862*
779
1000
775**
784**
840
705
1013**
802
730
968*
1000
500
705*
500
435*
437
970
448*
802 Thickness in metres
** Truncated by erosion
* Basement not reached
>840 Thickness of composite section in metres
— 500 — Generalised isopach in metres
Edge of Basin

2

11/WA/10



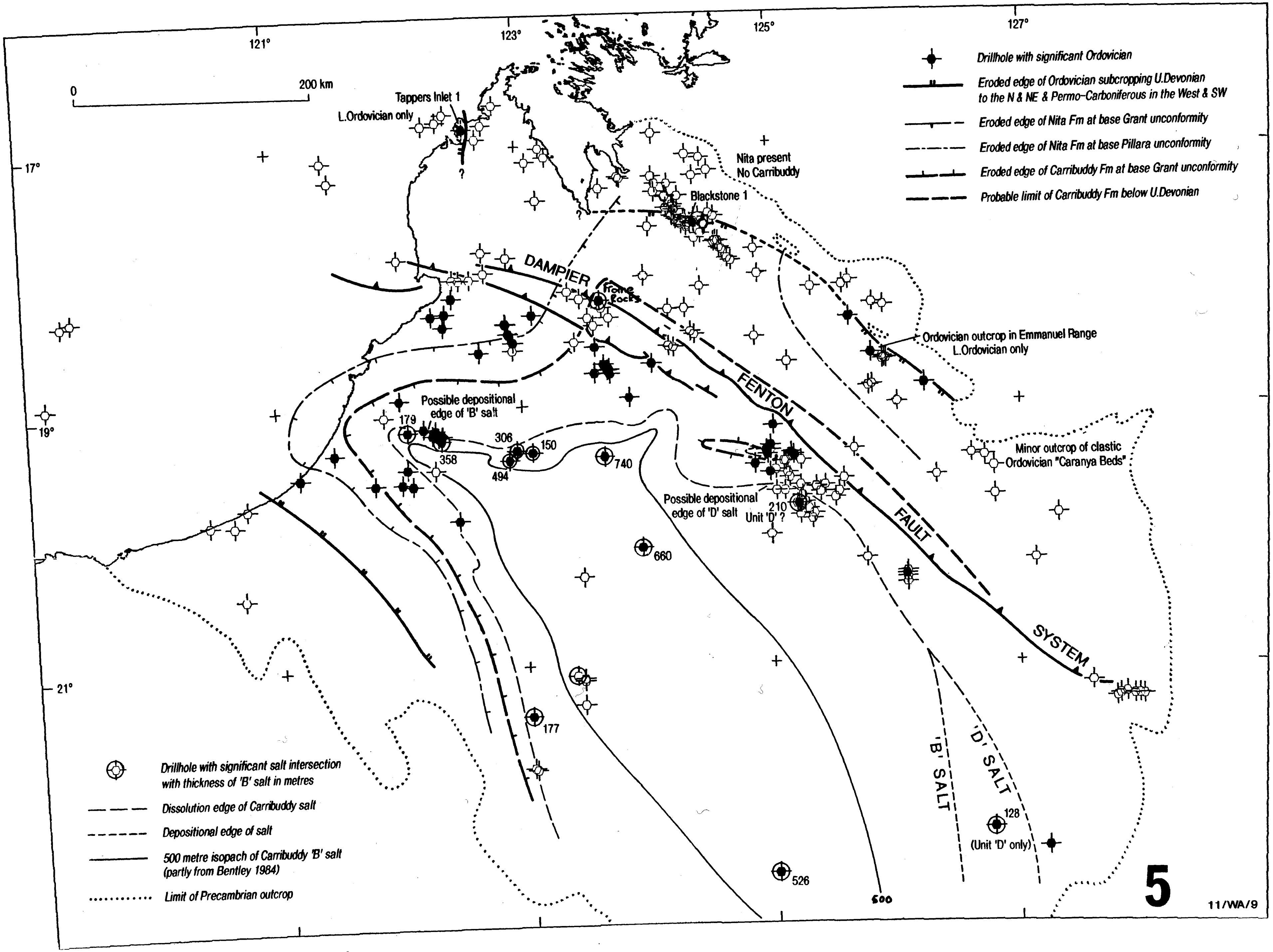
121°
123°
125°
127°
17°
19°
21°
0
200 km
2013
20
E
Drillhole cutting Ordovician, with depth to Top Ordovician & thickness of Nita in metres
Nita wholly or partly eroded
2500
Depth contours to Top of Ordovician (depth below KB)
150
Isopach of Nita
Nita eroded at pre-Grant unconformity
Major fault
Nita absent
below 914
3
11/WA/11



121°
123°
125°
127°
17°
19°
21°
0
200 km
Hole with source in U.Goldwyer & thickness of Goldwyer in metres
Hole with source in L.Goldwyer & thickness of Goldwyer in metres
Hole with source in Nambeet
Hole with no source at any level with thickness of Goldwyer in metres
Tappers Inlet 1
All Goldwyer removed by pre-Frasnian erosion
Blackstone 1
441+
All Goldwyer preserved
OSCAR RANGE - PINNACLE FAULT SYSTEM
DAMPIER
FENTON
FAULT
SYSTEM
ADMIRAL BAY FAULT SYSTEM
L.Ordovician not overmature
All Goldwyer removed by pre-Frasnian erosion
Gap Creek 1
Samphire Marsh 1
Partly contaminated
Frankenstein 1
Wilson Cliffs 1
May be contaminated
Contention Heights 1
Kidson 1
— 400 — Isopach on Goldwyer Formation in metres
Limit of Proterozoic outcrop to E and SW
Limit of pre-Grant erosion of Goldwyer Formation
Area underlain by U.Goldwyer source
Area underlain by L.Goldwyer source
E Top of Goldwyer eroded

4

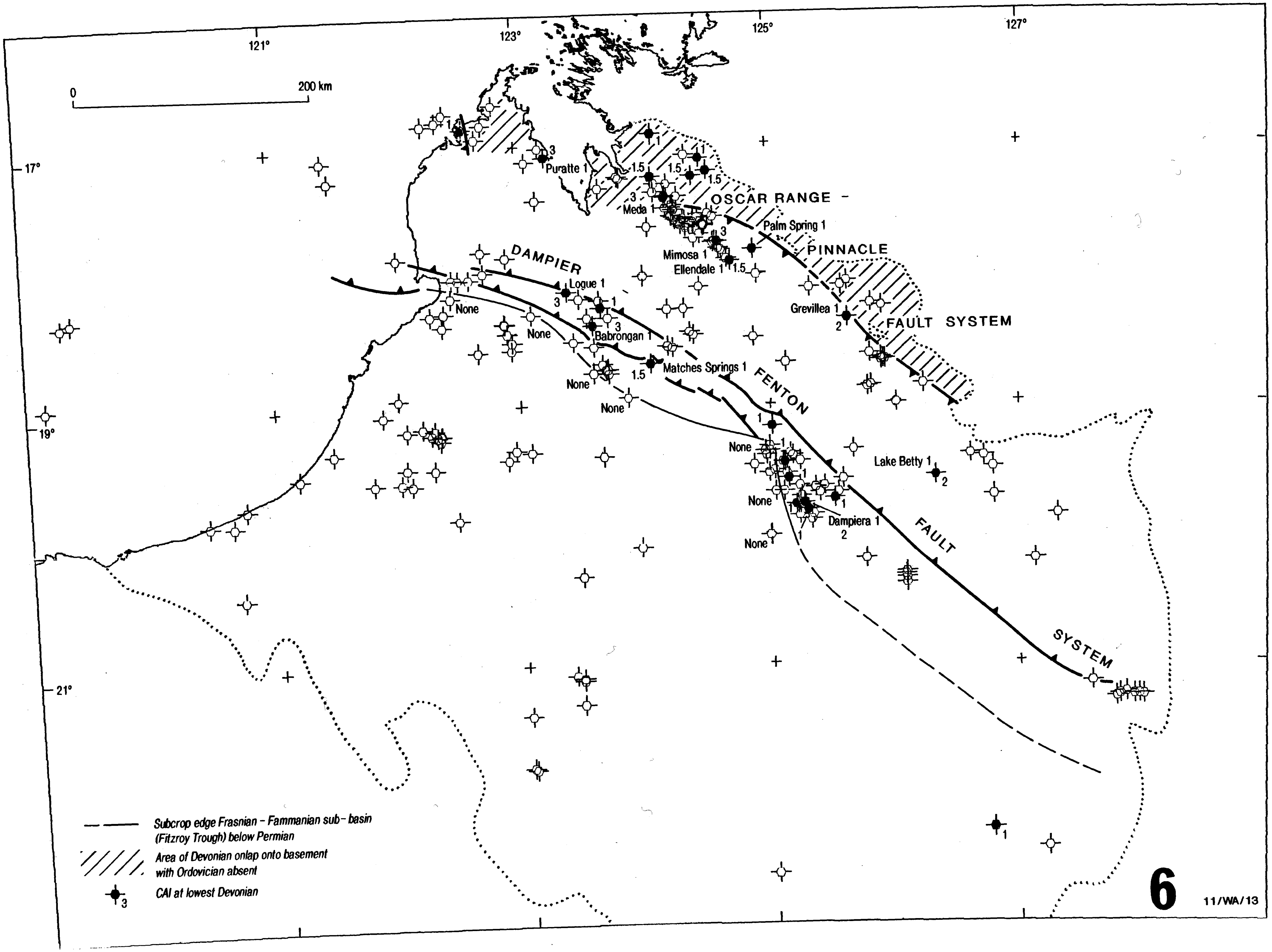
11/WA/12



121°
123°
125°
127°
17°
19°
21°
0
200 km
Tappers Inlet 1
L.Ordovician only
Nita present
No Carribuddy
Blackstone 1
DAMPIER
FENTON
FAULT
SYSTEM
Frome Rocks
Ordovician outcrop in Emmanuel Range
L.Ordovician only
Minor outcrop of clastic Ordovician "Caranya Beds"
Possible depositional edge of 'B' salt
Possible depositional edge of 'D' salt
Unit 'D' ?
179
358
306
150
494
740
660
210
177
526
128
(Unit 'D' only)
500
'B' SALT
'D' SALT
Drillhole with significant Ordovician
Eroded edge of Ordovician subcropping U.Devonian to the N & NE & Permo-Carboniferous in the West & SW
Eroded edge of Nita Fm at base Grant unconformity
Eroded edge of Nita Fm at base Pillara unconformity
Eroded edge of Carribuddy Fm at base Grant unconformity
Probable limit of Carribuddy Fm below U.Devonian
Drillhole with significant salt intersection with thickness of 'B' salt in metres
Dissolution edge of Carribuddy salt
Depositional edge of salt
500 metre isopach of Carribuddy 'B' salt (partly from Bentley 1984)
Limit of Precambrian outcrop

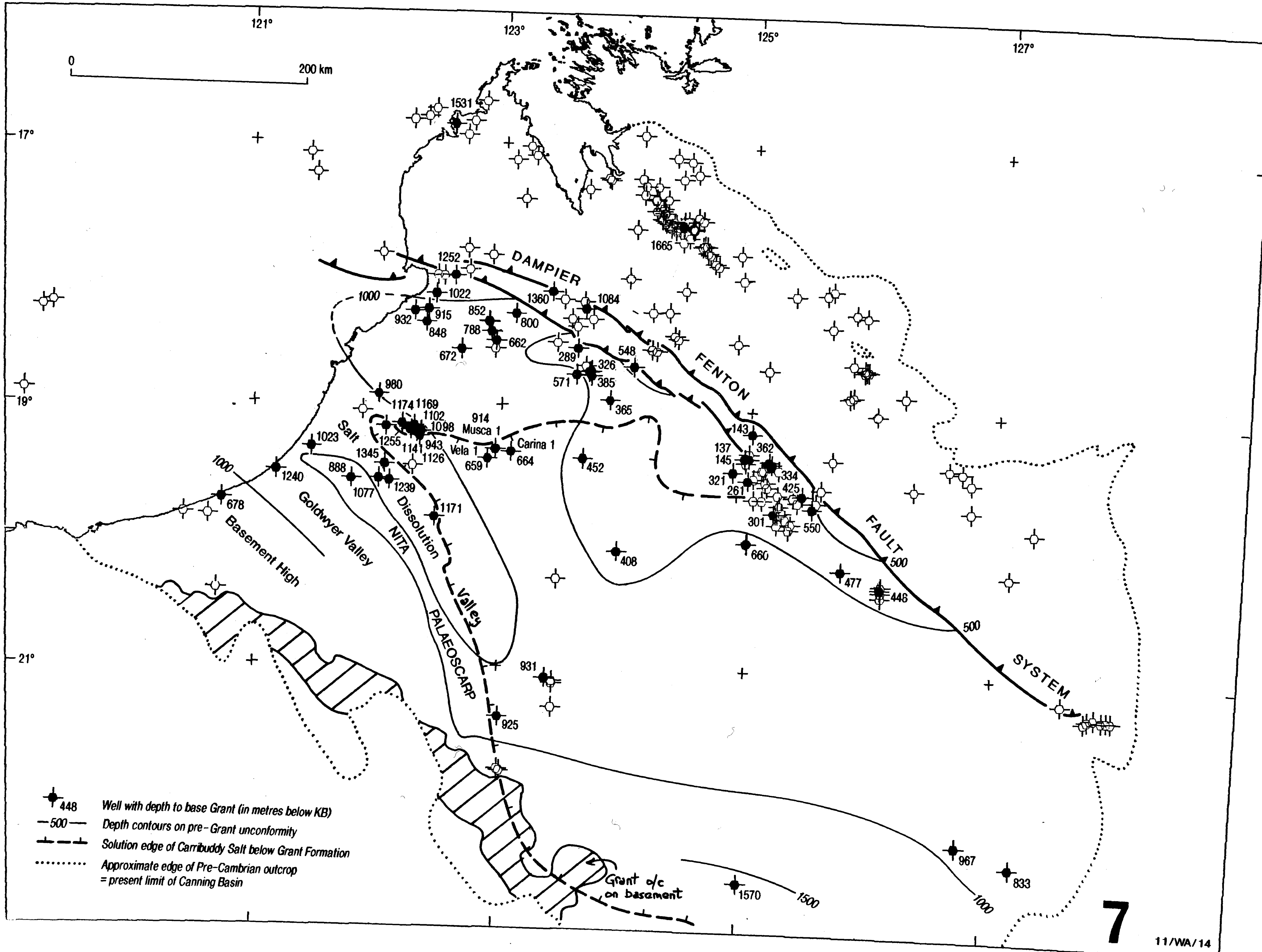
5

11/WA/9


121°
123°
125°
127°
17°
19°
21°
0
200 km
Puratte 1
Meda 1
OSCAR RANGE -
Palm Spring 1
PINNACLE
Mimosa 1
Ellendale 1
DAMPIER
Logue 1
Grevillea 1
FAULT SYSTEM
None
Babrongan 1
Matches Springs 1
FENTON
Lake Betty 1
Dampiera 1
FAULT
SYSTEM
Subcrop edge Frasnian - Fammanian sub-basin (Fitzroy Trough) below Permian
Area of Devonian onlap onto basement with Ordovician absent
CAI at lowest Devonian

6

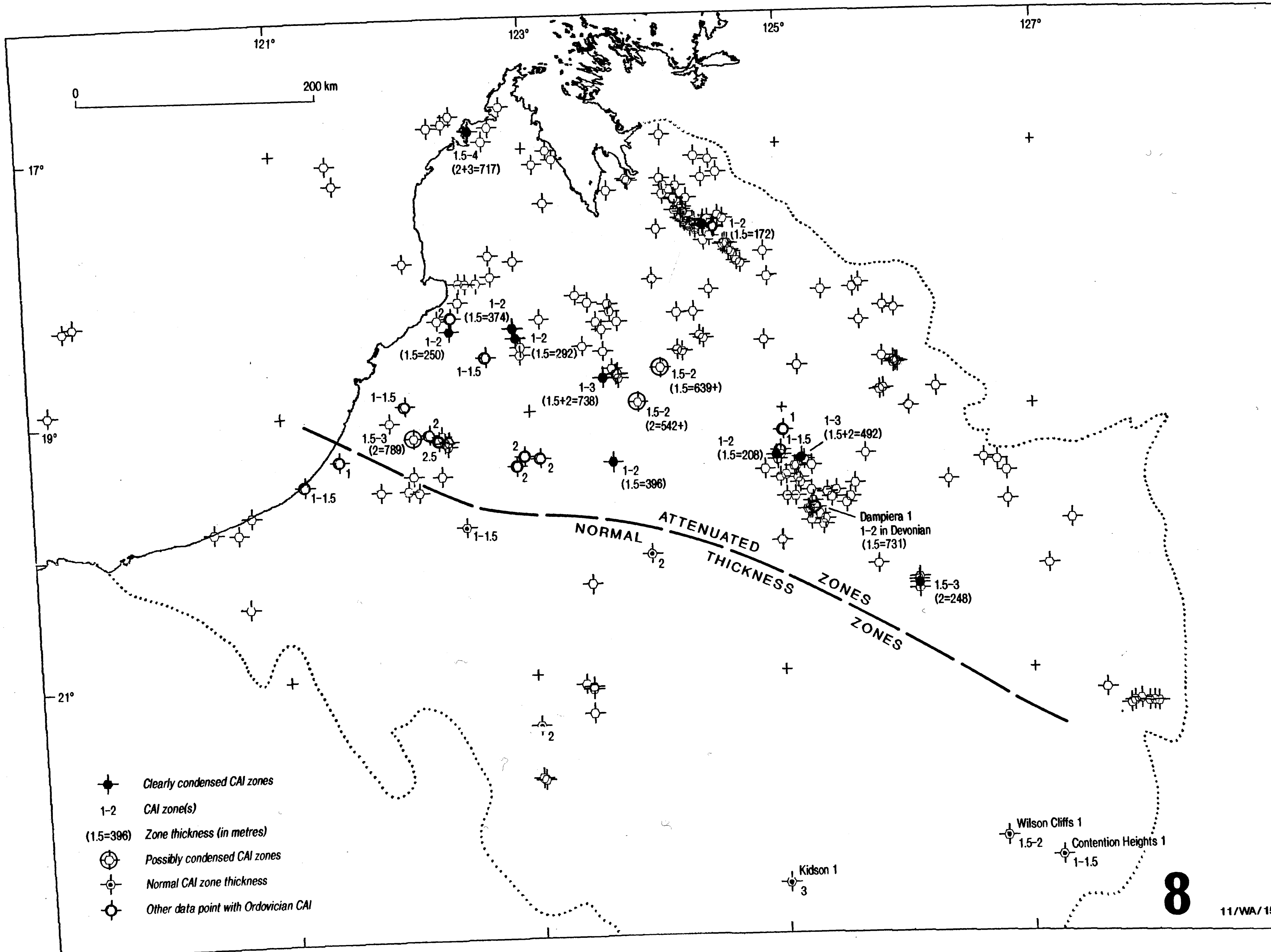
11/WA/13



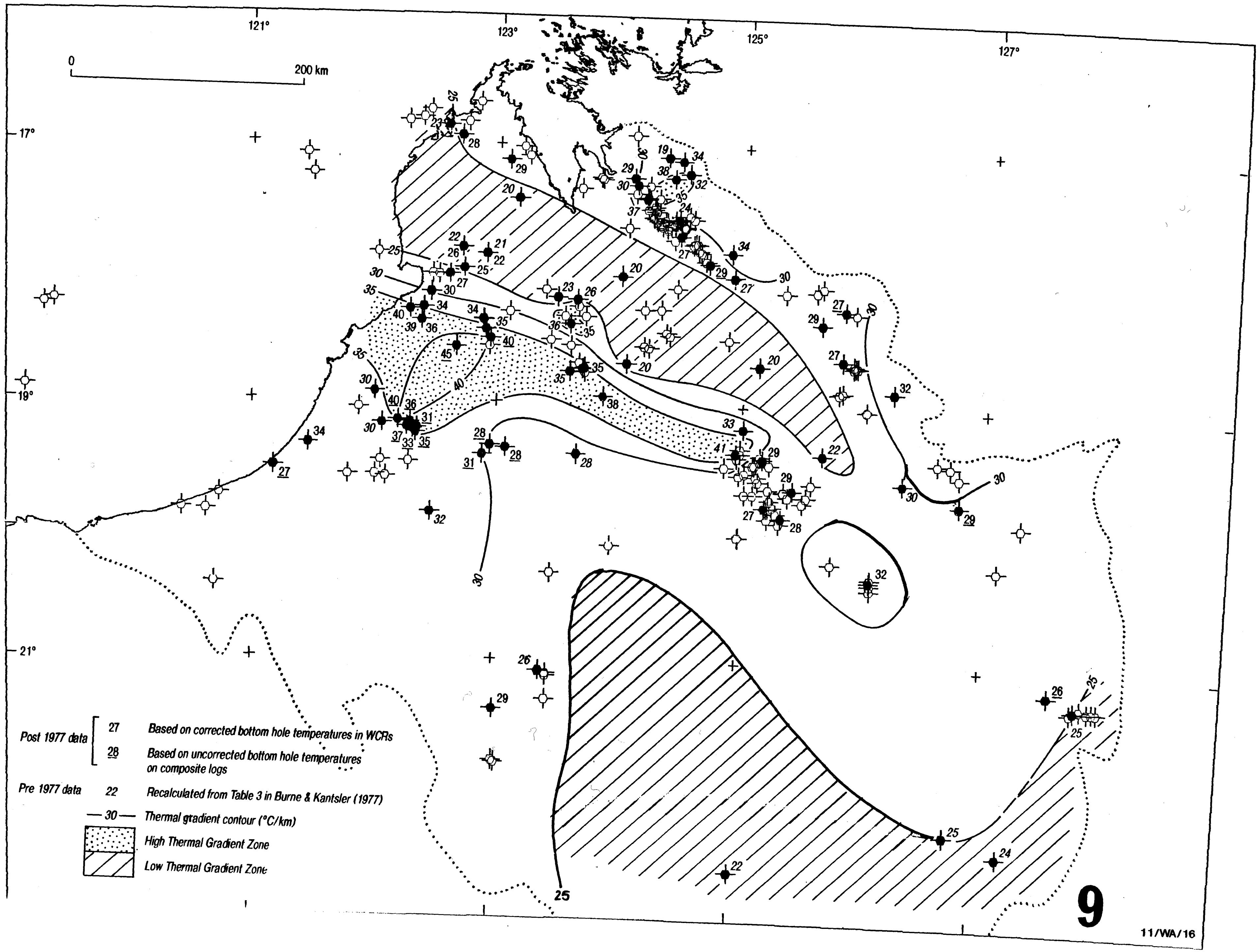
121°
123°
125°
127°
17°
19°
21°
0
200 km
DAMPIER
FENTON
FAULT
SYSTEM
Salt
Dissolution
Valley
Goldwyer Valley
Basement High
NITA
PALAEOSCARP
Musca 1
Carina 1
Vela 1
1000
500
1500
Grant o/c on basement
448 Well with depth to base Grant (in metres below KB)
—500— Depth contours on pre-Grant unconformity
Solution edge of Carribuddy Salt below Grant Formation
Approximate edge of Pre-Cambrian outcrop = present limit of Canning Basin

7

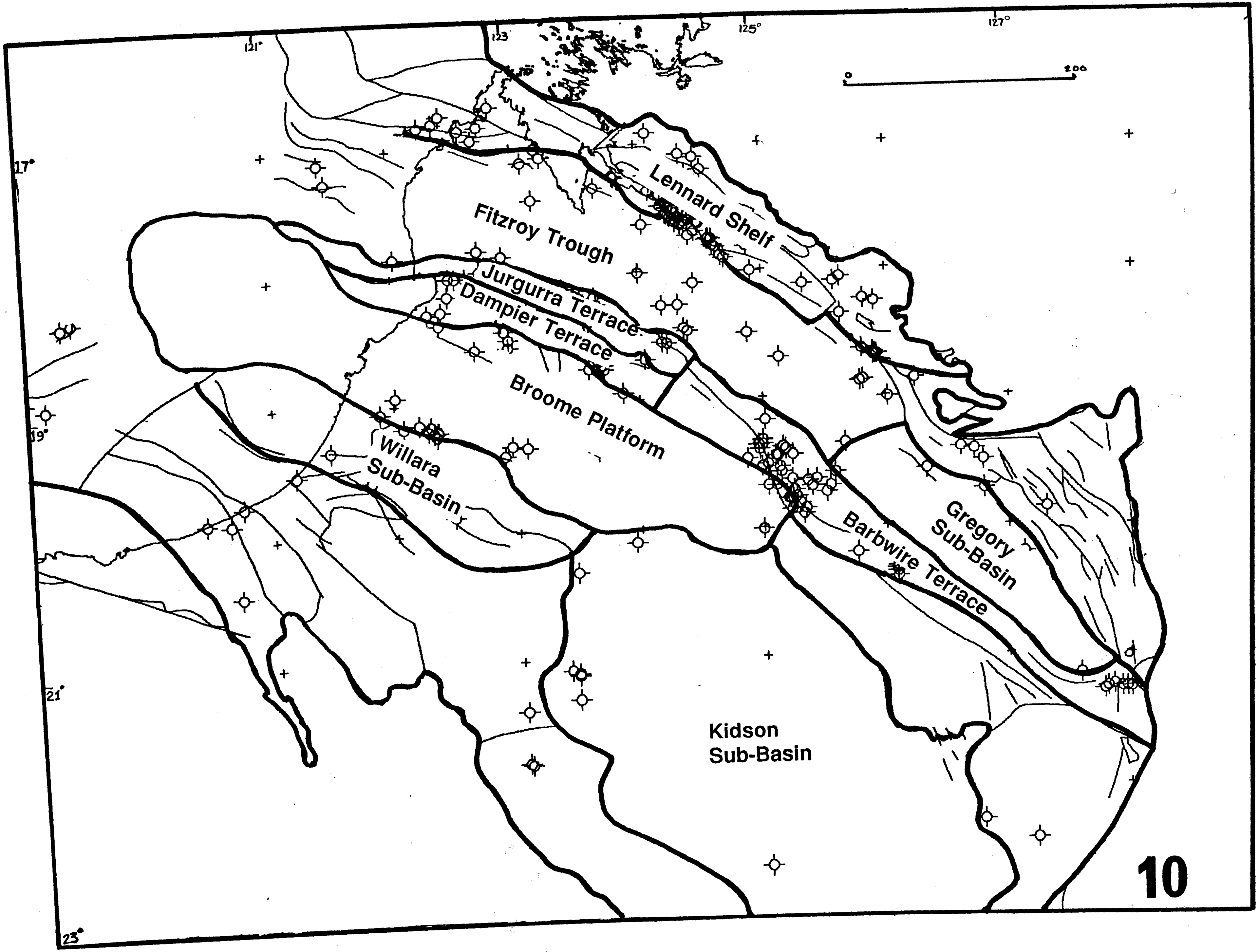
11/WA/14



121°
123°
125°
127°
17°
19°
21°
0
200 km
1.5–4
(2+3=717)
1–2
(1.5=172)
1–2
(1.5=374)
1–2
(1.5=250)
1–2
(1.5=292)
1–1.5
1.5–2
(1.5=639+)
1–3
(1.5+2=738)
1.5–2
(2=542+)
1–1.5
1.5–3
(2=789)
2.5
1–3
(1.5+2=492)
1–2
(1.5=208)
1–1.5
1–2
(1.5=396)
1–1.5
1–1.5
Dampiera 1
1–2 in Devonian
(1.5=731)
ATTENUATED
ZONES
NORMAL
THICKNESS
ZONES
1.5–3
(2=248)
Clearly condensed CAI zones
1–2 CAI zone(s)
(1.5=396) Zone thickness (in metres)
Possibly condensed CAI zones
Normal CAI zone thickness
Other data point with Ordovician CAI
Wilson Cliffs 1
1.5–2
Contention Heights 1
1–1.5
Kidson 1
3
8
11/WA/15



121°
123°
125°
127°
17°
19°
21°
0
200 km
Post 1977 data
27 Based on corrected bottom hole temperatures in WCRs
28 Based on uncorrected bottom hole temperatures on composite logs
Pre 1977 data
22 Recalculated from Table 3 in Burne & Kantsler (1977)
— 30 — Thermal gradient contour (°C/km)
High Thermal Gradient Zone
Low Thermal Gradient Zone
9
11/WA/16


121°
123
125°
127°
0
200
17°
19°
21°
23°
Lennard Shelf
Fitzroy Trough
Jurgurra Terrace
Dampier Terrace
Broome Platform
Willara
Sub-Basin
Gregory
Sub-Basin
Barbwire Terrace
Kidson
Sub-Basin
10

TABLES

Table 1
Organic content and Rock-Eval pyrolysis parameters for selected samples from the Amadeus Basin (from Summons & Powell 1991).

Average relationship of TOC to PC and HI, Amadeus Basin wells used for comparison in this study,

1.1 Mt Winter 2A, Horn Valley Siltstone

1.2 Tempe Vale 1, Horn Valley Siltstone and Stairway Sandstone

1.3 Tent Hill 1, Horn Valley Siltstone

Tables 2 & 3
Rock-Eval pyrolysis data for Ordovician source rocks. Samples listed by hole and Total Organic Carbon content.

Average relationship of TOC to PC and HI

2.1 Immature Upper Goldwyer Formation, WMC Kunzea 1, Santalum 1A and Solanum 1, 315-503 metres

2.2 Upper Goldwyer Formation, WMC Dodonea 1, 1537-1549 metres

2.3 Upper Goldwyer Formation, TOTAL Matches Springs 1, 2321-2408 metres

3.1a Lower Goldwyer Formation, GULF Hedonia 1, 915-1046 metres

3.1b Nambeet Formation, GULF Hedonia 1, 1298-1486 metres

3.2 Lower Goldwyer Formation, EAGLE Aquila 1, 1060-1170 metres

3.3 Lower Goldwyer Formation, GETTY Canopus 1, 1630-1700 metres

3.4 Lower Goldwyer Formation, KUFPEC Crystal Creek 1, 2166-2247 metres

3.5 Lower Goldwyer & Nambeet Formations, BRIDGE OIL Hilltop 1, 1052-1170 and 1420-1630 metres

3.6 Lower Goldwyer & Nambeet Formations, BHP Pictor 1, 1430-1460 and 1940-1985 metres

3.7 Lower Goldwyer Formation, TOTAL Matches Springs 1, 2732-2813 metres

3.8 Lower Goldwyer and Nambeet Formations, TOTAL Edgar Range 1, 1215-1350 and 1779-1785 metres

3.9 Nambeet Formation,
WAPET Tappers Inlet-1, 2170-2371 and 2600-2603 metres

3.10 Lower Goldwyer Formation,
WMC Solanum 1, and Acacia 1, 520-667 and 974-1033 metres

3.11 Upper Goldwyer Formation,
WMC Acacia 1, 779-786 metres

3.12 Lower Goldwyer Formation,
WMC Setaria 1, 453-454 metres

3.13 Emmanuel Formation,
KUFPEC Gap Creek 1, 1219-1340 metres

Table 4
Estimates of Migration Ratio (MR) and Transformation Ratio (TR) for Ordovician source rocks.

Table 5
Relationship between Migration Ratio (MR), Transformation Ratio (TR) and the Conodont Alteration Index (CAI).

Table 6
Ordovician intersections in drillholes

6.1 Wells intersecting Ordovician strata on the northern side of the Fitzroy Trough

6.2 Wells intersecting eroded Ordovician successions below the Grant Group on the Broome Platform

6.3 Wells intersecting Ordovician succession below the Carribuddy Group on the Broome Platform

6.4 Wells intersecting Ordovician strata in the Admiral Bay - Willara Sub-basin area

6.5 Wells intersecting Ordovician strata below Carribuddy Group in the Kidson Sub-basin.

6.6 Wells intersecting Ordovician strata on the Crossland Platform and Barbwire Terrace

Table 7
Complete or near complete and composite sections of the Ordovician

Table 8
Thermal Gradients for Canning Basin wells

8.1 Alphabetic list of wells

8.2 Wells along the Admiral Bay Fault

Table 9
Wells for which company data on TOC and Rock Eval pyrolysis are available

Table 10
Wells sampled as part of this study with TOC and Rock-Eval pyrolysis by BMR

Table 11
Wells for which gas chromatographs of oils recovered by DST or extracted from cores are available in well completion reports.

Table 12
Wells with condensed Conodont Alteration Index (CAI) zones in the Ordovician.

Table 13
Depth of CAI zones in the Kidson Sub-basin.

Table 1. - Organic content and Rock-Eval pyrolysis parameters for selected samples from the Amadeus Basin.
Data are for samples with highest organic contents from units where organic matter was detected.

Well	Sample number	Depth m	Tmax °C	S_1 Kg/t	S_2 Kg/t	TOC %	HI	OI	PI
Stairway Sandstone (9 samples)									
Tempe	2397	362.6	440	0.66	4.57	1.43	320	1	.13
Vale 1	2398	363.1	435	0.59	3.31	1.15	288	15	.15
	2406	367.8	441	0.58	1.6	0.72	222	31	.27
	2399	368.6	439	0.73	1.65	0.75	220	53	.31
Tent Hill 1	2338	1096.5	440	0.12	0.34	0.35	97	0	.26
Horn Valley Siltstone (81 samples)									
Mt	3860	184.2	435	0.16	1.74	0.64	272	0	.08
Winter	3861	185.0	440	0.78	8.08	1.53	528	0	.08
2A	3862	186.1	442	0.34	3.77	0.98	385	0	.08
	3863	187.5	442	0.34	3.5	0.95	368	5	.04
	3863ext	187.5	442	0.07	3.41				
	3865	190.6	438	0.05	0.73	0.46	159	0	.06
	3866	197.6	444	0.25	2.73	0.87	314	0	.08
	3868	201.4	438	0.05	0.44	0.39	113	0	.10
	3869	210.7	438	0.05	0.34	0.36	94	0	.13
	3870	216.7	447	4.46	26.44	3.98	664	2	.14
	3871	228.6	446	1.01	6.63	1.30	510	11	.13
	3871ext	228.6	441	0.05	4.92				
	3872	240.7	438	0.04	0.38	0.42	90	7	.09
Tempe	2400	368.7	443	6.81	12.75	3.73	342	23	.35
Vale	2400Ker	368.7	444						
1	2404	378.5	437	0.06	0.18	0.28	64	46	.25
	2407	380.5	448	0.16	0.41	0.45	91	38	.28
	2409	383.3	445	0.51	1.1	0.68	162	21	.32
	2410	384.5	439	0.09	0.15	0.22	68	91	.37
	2419	407.6	448	7.01	12.15	4.09	297	17	.36
	2419ext	407.6	449	0.36	9.54				
	2420	409.6	450	7.38	20.68	6.30	328	13	.26
	2420ext	409.6	451	0.26	18.18				
	2421	416.8	442	1.95	3.76	1.22	308	86	.34
	2422	417.1	435	1.8	2.47	0.95	260	133	.42
Tent	2370	1145.1	457	1.46	1.64	1.15	143	16	.47
Hill 1	2371	1146.9	450	0.49	0.52	0.50	104	74	.48
	2372	1148.9	453	0.28	0.38	0.40	95	45	.42
	2373	1150.9	454	1.14	1.38	1.01	137	15	.45
	2374	1151.2	451	0.41	0.31	0.36	86	83	.57
	2375	1157.6	455	4.14	4.67	2.74	170	19	.47
	2376	1160.7	451	0.61	0.8	0.90	89	52	.43
	2377	1163.2	456	1.08	1.34	1.03	130	46	.45
	2378	1165.3	450	0.63	0.78	0.76	103	47	.45
	2379	1166.6	456	0.73	0.98	0.91	108	38	.43
	2380	1168.1	455	1.09	1.3	1.14	114	23	.46
	2394	1196.6	455	0.06	0.14	0.28	50	0	.30
	2395	1198.5	437	0.05	0.12	0.21	57	0	.29

Data from Summons & Powell, 1991

Table 1.1 - Average relationship of TOC to PC and HI, Amadeus Basin

Mt Winter 2A   Horn Valley Siltstone

	TOC	S_2	PC	RC	HI	PI	Tmax
	0.36	0.34	.03	0.33	94	.13	438
	0.39	0.44	.04	0.35	113	.10	438
	0.42	0.38	.03	0.39	90	.09	438
	0.46	0.73	.06	0.40	159	.06	438
Av.	0.407	0.47	.04	0.367	116	.10	438
	0.64	1.74	.16	0.48	272	.08	435
	0.87	2.73	.24	0.63	314	.08	444
	0.95	3.50	.31	0.64	368	.04	442
	0.98	3.77	.34	0.64	385	.08	442
Av.	0.86	2.93	.26	0.60	341	.07	441
	1.30	6.63	.63	0.67	510	.13	446
	1.53	8.08	.73	0.80	528	.08	440
Av.	1.41	7.35	.68	0.73	520	.10	443
	3.98	26.44	2.53	1.45	664	.14	447

Source of Data : Summons & Powell, 1991

Table 1.2 - Average relationship of TOC to PC and HI, Amadeus Basin

Tempe Vale - 1 Horn Valley Siltstone and Stairway Sandstone (*)

	TOC	S_2	PC	RC	HI	PI	Tmax
	0.22	0.15	0.02	0.20	68	.37	439
	0.28	0.18	0.02	0.26	64	.25	437
	0.45	0.41	0.05	0.40	91	.28	448
	0.68	1.10	0.13	0.55	162	.32	445
*	0.72	1.60	0.18	0.54	222	.27	441
*	0.75	1.65	0.20	0.55	220	.31	439
	0.95	2.47	0.35	0.60	260	.42	435
Av.	0.71	1.45	0.18	0.53	204	.32	442
*	1.15	3.31	0.32	0.83	288	.15	435
	1.22	3.76	0.47	0.75	308	.34	442
*	1.43	4.57	0.43	1.00	320	.13	440
Av.	1.27	3.88	0.41	0.86	306	.21	439
	3.73	12.75	1.60	2.13	342	.35	443
	4.09	12.15	1.57	2.52	297	.36	448
Av.	3.91	12.45	1.58	2.32	318	.35	445
	6.30	20.68	2.30	4.00	328	.26	450

Source of data : Summons & Powell, 1991

Table 1.3 - Average relationship of TOC to PC and HI, Amadeus Basin

Tent Hill-1 Horn Valley Siltstone

	TOC	S2	PC	RC	HI	PI	Tmax
	0.21	0.12	0.01	0.20	57	.29	437*
	0.28	0.14	0.02	0.26	50	.30	455
	0.36	0.31	0.06	0.30	86	.57	451
	0.40	0.38	0.05	0.35	95	.42	453
Av.	0.31	0.24	0.04	0.28	76	.40	453
	0.50	0.52	0.08	0.42	104	.48	450
	0.76	0.78	0.12	0.64	103	.45	450
	0.90	0.80	0.12	0.78	89	.43	451
	0.91	0.98	0.14	0.77	108	.43	456
Av.	0.77	0.77	0.12	0.65	100	.45	452
	1.01	1.38	0.20	0.81	137	.45	454
	1.03	1.34	0.20	0.83	130	.45	456
	1.14	1.30	0.20	0.94	114	.46	455
	1.15	1.64	0.26	0.89	143	.47	457
Av.	1.08	1.41	0.21	0.87	131	.46	455
	2.74	4.67	0.73	1.99	170	.47	455

* Tmax not used in average.

Source of data : Summons & Powell, 1991

Table 1.4 - Calculated TR for Amadeus Basin samples

	RC	TOC	HIo	HIp	TR	PI
	0.60	1.35	640	341	0.65	.07
	0.73	1.80	685	520	0.42	.14
	1.45	4.80	810	664	0.40	.14
Mt Winter 2A						
	0.86	2.20	710	306	0.76	.21
	2.32	+7%	900	318	0.88	.35
	4.00	+7%	900	328	0.87	.26
Tempe Vale 1						
	0.65	1.50	660	100	0.92	.45
	0.87	2.25	715	131	0.92	.46
	1.99	7.00	900	170	0.94	.47
Tent Hill						

source of data: Summons & Powell, 1991

Table 2 - Rock-Eval pyrolysis data for Ordovician Source rocks, from wells Kunzea 1, Santalum 1A, and Solanum 1, grouped by Total Organic Carbon content.

	TOC%	PC%	RC%	HI	PI	Tmax	
1	0.46	0.19	0.27	513	0.01	440	
2	0.46	0.12	0.34	302	0.05	434	
3	0.52	0.15	0.37	348	0.03	440	
4	0.65	0.29	0.36	543	0.01	435	
5	0.78	0.31	0.47	478	0.03	438	
6	0.85	0.30	0.55	404	0.05	441	
1-6	0.62	0.23	0.39	431	0.03	438	Av
7	1.03	0.53	0.50	616	0.02	434	
8	1.15	0.66	0.49	690	0.01	435	
9	1.28	0.70	0.58	652	0.02	437	
10	1.34	0.86	0.48	767	0.01	436	
11	1.35	0.49	0.86	430	0.03	437	
7-11	1.23	0.65	0.58	631	0.02	436	Av
12	1.84	1.05	0.79	679	0.01	437	
13	1.86	0.91	0.95	577	0.02	438	
14	2.32	1.43	0.89	715	0.04	442	
12-14	2.01	1.13	0.88	657	0.02	439	Av
15	4.80	3.50	1.30	863	0.02	434	
16	6.40	4.45	1.95	828	0.01	433	
15-16	5.60	3.97	1.63	845	0.015	434	Av

Table 2.1 - Average relationship of TOC to PC and HI
Immature Upper Goldwyer, Kunzea 1, Santalum 1A and Solanum-1, 315-503 metres

(column headers as above)

1-6	0.62	0.23	0.39	431	0.03	438
7-14	1.52	0.83	0.69	641	0.02	437
15-16	5.60	3.97	1.63	845	0.015	434
1-16	1.69	1.00	0.69	588		

Data from Foster et al., APEA Journal, 1986.

Table 2.2 Average relationship of TOC to PC and HI
Depth interval 1537-1549 metres, Upper Goldwyer
WMC Dodonea - 1 1537-1549 metres

TOC%	S_2	PC	RC	HI	PI	Tmax
0.60	1.79	0.16	0.44	298	.09	443
0.74	2.06	0.22	0.52	278	.24	441
0.83	2.22	0.20	0.63	267	.10	443
0.87	2.64	0.24	0.63	303	.09	444
1.05	2.98	0.28	0.77	283	.11	442
0.82	2.34	0.22	0.66	286	.13	443
1.40	6.83	0.62	0.78	487	.08	444
1.42	9.33	0.87	0.55	657	.09	451
1.50	7.07	0.64	0.86	471	.08	443
1.53	7.60	0.69	0.84	497	.09	452
1.70	8.34	0.75	0.95	490	.08	442
1.75	8.96	0.81	0.94	512	.08	449
1.80	10.30	0.93	0.87	572	.08	442
1.59	8.35	0.76	0.83	526	.08	446
2.10	12.84	1.13	0.97	611	.06	441
2.20	13.39	1.18	1.02	608	.06	438
2.40	18.80	1.66	0.74	783	.06	447
2.89	19.29	1.69	1.20	667	.05	445
2.97	24.41	2.14	0.83	822	.05	454
3.60	23.56	2.05	1.55	654	.04	441
4.05	28.32	2.45	1.60	679	.04	440
2.89	20.09	1.76	1.13	696	.05	444

Data from Foster et al. APEA Journal 1986 and Hoffmann et al.. Geochém et Cosmochim, Acta, 1987.

Table 2.3 - Average relationship of TOC to PC and HI, Upper Goldwyer, Matches Springs No. 1 cuttings samples from 2321-2408 metres

TOC%	S_2	PC	RC	HI	PI	Tmax
0.53	1.44	.14	.39	272	.17	442
1.52	9.56	.97	.55	629	.19	443
1.77	9.93	.96	.81	561	.15	443
1.64	9.74	.965	.68	594	.17	443

Pyrolysis by BMR, 1991.

TABLE 3.1(a)
Average relationship of TOC to PC and HI, Hedonia-1
Lower Goldwyer Formation 915-1046 metres

TOC	S_2	PC	RC	HI	PI
0.60	.69	.08	.52	115	.30
0.64	.96	.10	.54	150	.21
0.84	.95	.12	.72	113	.34
0.69	.87	.10	.59	126	.28
0.99	.86	.12	.87	86	.40
1.00	1.14	.16	.84	114	.42
1.19	1.69	.22	.97	142	.20
1.19	1.93	.24	.95	162	.32
1.19	2.09	.24	.95	175	.36
1.11	1.54	.20	.91	139	.36
1.48	2.69	.33	1.15	181	.33
1.53	4.07	.44	1.09	266	.23
2.07	4.28	.50	1.57	206	.29
1.69	3.68	.42	1.27	217	.28

Depth interval 915-1046 metres Lower Goldwyer

Data from WCR (Gulf Oil)
This is all Lower Goldwyer (Units 1-2) since Units 3-4 and Nita have been removed at the Grant unconformity

TABLE 3.1 (b)
Average relationship of TOC to PC and HI, Nambeet Formation, Hedonia No. 1

TOC	PC	RC	HI	PI
0.44	0.01	.43	11	.67
0.48	0.02	.46	22	.59
0.49	0.03	.46	36	.57
0.51	0.03	.48	37	.46
0.52	0.04	.48	55	.45
0.53	0.02	.51	18	.62
0.55	0.03	.52	23	.67
0.56	0.04	.52	32	.58
0.57	0.03	.54	24	.61
0.59	0.02	.57	20	.54
0.60	0.03	.57	16	.74
0.53	.03	.50	27	.59
0.63	0.05	.58	53	.46
0.65	0.07	.58	75	.46
0.80	0.08	.72	55	.57
1.09	0.05	1.04	19	.62
0.79	.06	.73	50	.53

Depth interval 1298-1486 metres Nambeet Fm.

Data from WCR by Gulf Oil

TABLE 3.2
Average relationship of TOC to PC and HI, Aquila No. 1, Lower Goldwyer

TOC	S_2	PC	RC	HI	PI	Tmax
0.74	1.23	0.14	0.60	166	0.26	435
0.77	0.67	0.08	0.69	87	0.32	421 *
0.83	1.50	0.17	0.66	180	0.27	435
0.85	1.39	0.16	0.69	163	0.27	435
0.87	1.24	0.16	0.71	142	0.36	426
0.89	0.81	0.10	0.79	91	0.34	430
0.95	2.20	0.24	0.71	231	0.25	435
0.84	1.29	0.15	0.69	153	0.29	433**
1.04	1.65	0.21	0.83	158	0.35	430
1.11	2.17	0.24	0.87	195	0.24	437
1.16	2.38	0.30	0.86	205	0.34	426
1.18	1.92	0.25	0.93	162	0.36	429
1.23	2.55	0.30	0.93	207	0.29	436
1.46	3.10	0.38	1.08	212	0.33	431
1.19	2.29	0.28	0.91	192	0.31	431.5
1.91	4.42	0.47	1.44	231	0.22	436
2.22	2.75	0.32	1.90	123	0.29	433 *
2.06	3.58	0.39	1.67	173	0.25	434.5
3.20	7.02	0.81	2.39	219	0.28	436
2.55	5.72	0.64	1.91	224	0.25	436**

Depth interval 1060-1170 metres

* Sample excluded from average
** Average excluding * values

Source of data : WCR by Eagle Corp. 1983

TABLE 3.3
Average relationship of TOC to PC and HI, Canopus-1, Lower Goldwyer Fm

TOC	S_2	PC	RC	HI	PI	Tmax
0.70	0.63	0.09	0.61	90	.39	422
0.75	0.37	0.06	0.69	49	.48	434
0.81	0.77	0.11	0.70	95	.43	420
0.75	0.59	0.08	.66	78	.43	
1.16	1.01	0.16	1.00	87	.47	425
1.40	1.09	0.14	1.26	77	.36	430
1.28	1.05	.15	1.13	82	.41	

Depth interval 1630-1700 metres

Source of data : WCR by Getty Oil 1982

TABLE 3.4
Average relationship of TOC to PC and HI, Crystal Creek-1, Lower Goldwyer Fm.

TOC	S_2	PC	RC	HI	PI	Tmax
0.58	0.52	0.06	0.52	89	.32	418
0.69	0.46	0.06	0.63	66	.39	417
0.94	0.55	0.07	0.87	58	.38	429
0.73	0.51	0.06	0.67	70	.36	
1.08	1.34	0.15	0.93	124	.28	432
3.37	2.61	0.34	3.03	77	.37	453
2.22	1.97	0.24	1.98	89	.32	

Depth interval 2166-2247 metres

Source of data : WCR by Kufpec, 1988

TABLE 3.5
Average relationship of TOC to PC and HI, Hilltop-1, Goldwyer & Nambeet Fms

TOC	S_2	PC	RC	HI	PI	Tmax
0.80	0.54	0.08	0.72	67	.44	447
1.30	1.42	0.19	1.11	109	.39	438
1.45	2.37	0.29	1.16	163	.32	438
1.37	1.89	0.24	1.13	137	.35	
2.10	4.74	0.53	1.57	225	.26	433
2.50	4.51	0.56	1.94	180	.34	432
2.30	4.62	0.54	1.76	201	.30	

Depth Interval 1052-1170 metres, Lower Goldwyer Fm

0.43	0.07	0.01	0.42	16	.36	
0.47	0.02	0.00	0.47	4	.33	
0.59	0.05	0.01	0.58	8	.58	
0.60	0.04	0.00	0.60	6	.33	
0.64	0.18	0.03	0.61	28	.51	
0.72	0.05	0.01	0.71	6	.55	
0.73	0.17	0.03	0.70	23	.59	462
0.60	0.08	0.01	0.59	14	.46	

Depth Interval 1420-1630 metres Nambeet Fm

Source of data : WCR by Bridge Oil 1987

TABLE 3.6
Average relationship of TOC to PC and HI, Pictor-1, Lower Goldwyer and Nambeet Fm

TOC	S_2	PC	RC	HI	PI	S_1	Tmax
0.83	0.51	0.09	0.74	61	0.53	0.58	429
0.92	0.54	0.09	0.83	58	0.49	0.52	435
0.87	0.52	0.09	0.78	60	0.51	0.55	
1.54	1.31	0.20	1.34	85	0.47	1.15	434

Depth interval 1430-1460 metres Lower Goldwyer Fm

TOC	S_2	PC	RC	HI	PI	S_1	Tmax
O.52	0.06	0.01	0.51	11	0.54	0.07	
0.65	0.03	0.01	0.64	4	0.70	0.07	
0.65	0.07	0.01	0.64	10	0.56	0.09	
0.84	0.06	0.01	0.83	7	0.54	0.07	
0.66	0.05	0.01	0.65	8	0.58	0.07	

Depth interval 1940-1985 metres, Nambeet Fm

Source of data : WCR by BHP Petroleum 1984

TABLE 3.7
Average relationship of TOC to PC and HI, Matches Springs No. 1. (TOTAL 1970)

TOC	S_2	PC	RC	HI	PI	Tmax
0.62	0.91	.14	0.48	147	.46	430
0.82	0.93	.12	0.70	113	.38	445
0.72	0.92	.13	0.59	128	.42	
1.38	2.35	.28	1.10	170	.32	441
1.48	2.43	.28	1.20	164	.28	439
2.11	3.21	.37	1.74	152	.29	441
1.66	2.66	.31	1.38	160	.30	440

Depth interval 2732-2813 Lower Goldwyer Fm

Source of data : BMR 1991

TABLE 3.8
Average relationships of TOC to PC and HI, Edgar Range No. 1 (TOTAL 1970)

TOC	S_2	PC	RC	HI	PI	Tmax
0.65	.49	.08	0.57	75	.50	425
1.17	1.15	.17	1.00	98	.45	435
1.68	2.20	.28	1.40	131	.35	435
Depth interval 1215-1350 metres Lower Goldwyer						
1.32	.19	.03	1.29	14	.55	481
1.48	.23	.03	1.45	16	.45	486
1.52	.25	.04	1.48	16	.53	481
Depth interval 1779-1785 metres (core 13) Nambeet						

Source of data : BMR 1991

TABLE 3.9
Average relationships of TOC to PC and HI, Tappers Inlet No. 1

TOC	S_2	PC	RC	HI	PI	Tmax
0.60	0.29	.05	0.55	48	.56	425
0.51	0.29	0.05	0.46	57	.51	430
0.59	0.48	0.07	0.52	81	.46	438
0.86	0.34	0.06	0.80	40	.54	430
1.10	1.14	0.26	0.84	158	.45	377
2170-2371 metres		Nambeet				
0.65	0.13	0.02	0.63	20	.48	410
2600-2603 metres		Nambeet				

Source of data : BMR 1991

TABLE 3.10
Average relationship of TOC to PC and HI, WMC Solanum 1 & Acacia 1, Lower Goldwyer Fm.

TOC	S_2	PC	RC	HI	PI	
0.71	0.88	0.09	0.62	123	.20	
* 0.83	0.87	0.07	0.76	104	.07	
0.87	1.60	0.14	0.73	183	.08	
0.91	1.92	0.16	0.75	210	.05	
0.83	1.31	0.11	0.71	159	0.10	Av.
* 1.17	2.52	0.26	0.91	215	.21	

Depth interval 520-667 metres *Solanum-1
974-1033 metres Acacia-1

Source data : Foster et al. 1996

TABLE 3.11
Average relationship of TOC to PC and HI, WMC Acacia-1 Upper Goldwyer

TOC	S_2	PC	RC	HI	PI
0.96	3.09	0.34	0.62	321	.01
1.19	3.43	0.29	0.90	288	.03
1.69	8.52	0.71	0.98	504	.01
1.44	5.97	0.50	0.94	415	.02
4.03	36.34	3.07	0.96	901	.02

Source of data : Foster et al. 1986

TABLE 3.12
Setaria 1, Lower Goldwyer Formation

TOC	S_2	PC	RC	HI	PI
0.40	0.41	0.03	0.37	103	0.09
0.57	0.80	0.08	0.49	140	0.18
0.48	0.60	0.05	0.43	125	0.13

Depth interval 453-454

TABLE 3.13
Average relationship of TOC to PC and HI, Gap Creek No. 1, Emmanual Fm

TOC	S_2	PC	RC	HI	PI	Tmax
0.68	1.67	0.15	0.53	245	.09	436
0.75	1.39	0.15	0.60	185	.23	336
0.81	1.94	0.22	0.59	239	.28	336
0.74	1.66	.17	0.57	224	.20	

Depth interval 1219-1340 metres

Source of data : WCR by Kufpec 1988

In addition, the following sample is available from a BHP mineral hole

1.03	3.63	0.31	0.72	352	.03	435

TABLE 4
Estimates of Migration Ratio (MR) and Transformation Ratio (TR) for Ordovician source rocks in the Canning Basin

TOC	TOC_o	RC	PC_o	PC	PCy	MR	HI	HI_o	TR
AQUILA - 1 (Eagle Corporation)				L. Goldwyer					
0.84	1.66	0.69	0.94	0.15	0.79	.84	153	674	.88
1.19	2.40	0.91	1.50	0.28	1.22	.81	192	720	.87
2.55	7.00	1.91	5.10	0.64	4.46	.87	224	900	.92
CRYSTAL CREEK - 1 (KUFPEC)				L Goldwyer					
0.73	1.60	0.67	0.90	0.06	0.84	.93	70	665	.95
2.22	7.30	1.98	5.20	0.24	4.96	.95	89	900	.97
CANOPUS - 1 (Getty)				L Goldwyer					
0.75	1.55	0.66	0.86	0.08	0.78	.91	78	665	.94
1.28	3.42	1.13	2.27	0.15	2.12	.93	82	760	.96
HILLTOP - 1 (Bridge)				L Goldwyer					
0.80	1.74	0.72	1.00	0.08	0.92	.92	67	680	.95
1.37	3.42	1.13	2.26	0.24	2.02	.89	137	760	.92
2.30	6.56	1.76	4.44	0.54	3.90	.88	201	886	.93
PICTOR - 1 (BHP)				L Goldwyer					
0.87	1.96	0.78	1.16	0.09	1.07	.92	60	695	.96
1.54	4.34	1.34	2.98	0.20	2.78	.93	85	795	.96
SOLANUM - 1 + ACACIA - 1 (WMC) - L Goldwyer									
0.83	1.72	0.71	0.98	0.11	0.87	.89	159	680	.88
1.17	2.42	0.91	1.50	0.26	1.24	.83	215	720	.85
ACACIA - 1 (WMC)			Upper Goldwyer						
0.96	1.40	0.62	0.74	0.34	0.40	.54	321	645	.68
1.44	2.58	0.94	1.60	0.50	1.10	.69	415	725	.65
4.03	2.66	0.96	1.68	3.07	(1.39)	-	901	-	-
DODONEA - 1 (WMC)			Upper Goldwyer						
0.82	1.35	0.60	.70	0.22	0.48	.68	286	640	.73
1.59	2.18	0.83	1.30	0.76	0.54	.41	526	710	.46
2.89	3.40	1.13	2.30	1.76	0.54	.23	696	760	.20

SETARIA - 1 (WMC)			**Lower Goldwyer**						
0.48	0.75	0.43	0.32	0.05	0.27	.84	125	500	.84

TOC	TOC_0	RC	PC_0	PC	PCy	MR	HI	HI_0	TR
HEDONIA - 1 GULF			**Lower Goldwyer**						
0.81	1.70	0.70	0.96	0.12	0.84	.87	116	675	.92
1.26	2.84	1.00	1.82	0.26	1.56	.86	167	735	.90
2.07	5.25	1.57	3.78	0.50	3.28	.87	206	830	.91
			Nambeet Fm						
0.53	1.00	0.50	0.48	0.03	0.45	.94	27	575	.97
0.79	1.80	0.73	1.00	0.06	0.94	.94	50	685	.97
EDGAR RANGE - 1 TOTAL				**Lower Goldwyer**					
0.65	1.25	0.57	0.65	0.08	0.57	.88	75	625	.94
1.17	2.86	1.00	1.82	.17	1.65	.91	98	735	.94
1.68	4.60	1.40	3.20	.28	2.92	.91	131	805	.94
GAP CREEK - 1 KUFPEC			**Emmanual Fm**						
0.74	1.25	0.57	0.65	0.17	0.48	.74	224	625	.79
1.03	1.75	0.72	1.00	0.31	0.69	.69	352	680	.68
MATCHES SPRINGS - 1 TOTAL				**Lower Goldwyer**					
0.72	1.00	0.49	0.46	0.13	0.33	.72	128	575	.87
1.66	4.40	1.35	3.00	0.31	2.69	.89	160	795	.92
				Upper Goldwyer					
0.53	0.65	0.39	0.22	0.14	0.08	.36	272	450	.51
1.64	1.65	0.68	0.95	0.96	-	-	594	675	.24
THANGOO - 1				**Lower Goldwyer**					
2.98	8.60	2.28	6.30	0.70	5.60	.89	230	950	.94

Note: All values of TR are by Pelet's formula.

Table 5. **Relationship between Migration Ratio (MR), Transformation Ratio (TR) and the Conodont Alteration Index (CA1).**

Hole Name	Depth (Metres)	Stratigraphic Interval	TOC	MR	TR	CAI
AQUILA-1	1060 -	Lower	0.84	.84	.88	1.5
	1170	Goldwyer	1.19	.81	.87	
			2.55	.87	.92	
HEDONIA-1	915 -	Lower	0.81	.87	.92	
	1047	Goldwyer	1.26	.86	.90	
			2.07	.87	.91	
	1298 -	Nambeet	0.53	.94	.97	2
	1486		0.79	.94	.97	
HILLTOP-1	1052 -	Lower	0.80	.92	.95	
	1170	Goldwyer	1.37	.89	.92	
			2.30	.88	.93	
	1420 -	Nambeet	0.60	Overmature		
	1630			No hydrocarbon preserved		
EDGAR	1215 -	Lower	0.65	.88	.94	1.5 -
RANGE-1	1350	Goldwyer	1.17	.91	.94	2
			1.68	.91	.94	
	1779	Nambeet	1.44	Overmature		2 -
	1785		Little hydrocarbon preserved			3
THANGOO-1	960	Lower Goldwyer	2.98	.89	.94	1.5
MATCHES	2384	Upper	0.53	.36	.51	1.5
SPRINGS-1	2408	Goldwyer	1.64	00	.24	
	2732 -	Lower	0.72	.72	.87	1.5 -
	2813	Goldwyer	1.66	.89	.92	2
PICTOR-1	1430 -	Lower	0.87	.92	.96	
	1460	Goldwyer	1.54	.93	.96	
	1940 -	Nambeet	0.66	Overmature		
	1985			No hydrocarbon preserved		
CANOPUS-1	1630 -	Lower	0.75	.91	.94	2
	2247	Goldwyer	1.28	.93	.96	
CRYSTAL	2166 -	Lower	0.73	.93	.95	

CREEK-1	2247	Goldwyer	2.22	.95	.97	
GAP CK.-1	1219 - 1340	Emmanual (=Nambeet)	0.74	.74	.79	
SOLANUM-1 +ACACIA-1	520 - 667 974 - 1033	Lower Goldwyer	0.83 1.17	.89 .83	.88 .85	1 - 1.5
ACACIA-1	779 - 786	Upper Goldwyer	0.96 1.44 4.03	.54 .69 No generation	.68 .65	1
DODONEA-1	1537 - 1549	Upper Goldwyer	0.82 1.59 2.89	.68 .41 .23	.73 .46 .20	1 - 1.5
SOLANUM-1 KUNZEA -1 SANTALUM -1A	315 - 326 354 - 390 453 - 503	Upper Goldwyer	0.62) 1.52) No generation 5.60)			1 -
TAPPERS INLET-1	2170 - 2399	Nambeet	0.57) 0.86)	Kerogen exhausted Hydrocarbon preserved		2
	2600	Nambeet	0.65	Overmature		2 - 3

KEY TO ABBREVIATIONS AND SYMBOLS USED IN TABLES 4 & 5

TOCp	Present TOC, by analysis
PCp $= \frac{S_1 + S_2}{10} \times .83$	Present pyrolysable carbon
RC	Present TOC minus present pyrolysable carbon TOCp - PCp
PC_o	Original pyrolysable carbon derived from RC by graph 1
PCy	Pyrolysable carbon lost by migration PC_o - PCp
MR	Migration Ratio PCy ÷ PC_o
TOC_o	Original TOC derived by graph 2 from RC
HI_o	Original hydrogen index derived from TOC_o by graph 3
HIp	Present hydrogen index, by pyrolysis
TR(1)	Simple transformation ratio by the formula $\frac{HI_o - HIp}{HI_o}$
TR(2) $\frac{1200\ (HI_o - HIp)}{HI_o\ (1200 - HIp)}$	Pelet's transformation ratio by the formula

* Sample with anomalously low Tmax: TR will normally be too low.

PI	= Production Index by pyrolysis
CAI	= Conodont Alteration Index

TABLE 6.1
Wells intersecting Ordovician strata on the northern side of the Fitzroy Trough

WELL	STRAT. INTERVAL	THICKNESS (m)	TOTAL ORD. THICKNESS
Tappers Inlet-1	Willara (2016-2202)	186	
	Nambeet (2202-2835)	633	819
	Basement (2835-2856)		
Blackstone-1	Nita (2216-2602)	386	
	Goldwyer (2602-3043 (TD))	441	827
Grevillea-1	Emanuel (1953-2557)	604	604
	Basement (2557-2586)		
Gap Creek-1	Emanuel (1047-1528)	481	481
	Basement (1528-1541)		
Justago-1	Gap Creek (2240-2277)	37	
	Emanuel (2277-3050)	733	
	Basal Quartzite (3050-3150)	100	870

TABLE 6.2
Wells intersecting eroded Ordovician successions below the Grant Group on the Broome Platform

Well Name	Stratigraphic Intervals cut	Thickness Metres	Total Ordovician Thickness
Hilltop-1	Goldwyer (953-1180)	227	
	Willara (1180-1418)	238	
	Nambeet (1418-1736)	318	783
	Basement Granite (1736-1770)		
Hedonia-1	Goldwyer (915-1049)	134	
	Willara (1049-1289)	240	
	Nambeet (1289-1531)	242	616
	Basement Granite (1531-1543)		
Goldwyer-1	Goldwyer (848-1077)	229	
	Willara (1077-1260)	183	
	Nambeet (1260-1420)	160	572
	Basement Granite (1420-1439)		
Aquila-1	Nita (672-800)	128	
	Goldwyer (800-1169)	370	
	Willara (1169-1554)	384	
	Nambeet (1554-1735TD)	181	1063
Twin Buttes-1	Nita (662-791)	129	
	Goldwyer (791-1140)	349	
	Willara (1140-1358)	218	
	Nambeet(1358-1600 TD)	242	938
Thangoo-1	Goldwyer (852-1029)	177	
	Willara (1020-1059 TD)	30	207
Thangoo-1A	Goldwyer (848-1059)	212	
	Willara + (1059 -		
	Nambeet - 1554)	495	707
	Basement schist (1554-1655)		
Thangoo-2	Goldwyer (788-913)	125	
	Willara (913-1367)	454	
	Nambeet (1367-1438)	71	650
	Basement schist (1438-1472)		

TABLE 6.3
Wells intersecting Ordovician successions below Carribuddy Group on the Broome Platform

Well Name	Stratigraphic Intervals cut	Thickness Metres	Total Ordovician Thickness
Crystal Creek-1	Carribuddy (1437-1573)	136	
	Nita (1573-1789)	216	
	Goldwyer (1789-2249)	460	
	Willara (2249-2504 TD)	255	931
Antares-1	Carribuddy (920-1058)	138	
	Nita (1058-247)	189	
	Goldwyer (1247-1298 TD)	52	241
Canopus-1	Carribuddy (938-1091)	153	
	Nita (1091-1223)	132	
	Goldwyer (1223-1770)	547	
	Willara (1770-1779)	9	688
Pictor-1	Carribuddy (733-879)	146	
	Nita (879-1041)	162	
	Goldwyer (1041-1505)	464	
	Nillara (1505-1932)	427	
	Nambeet (1932-2121)	189	1242
	Basement schist (2121-2146)		
Edgar Range-1	Carribuddy (571-750)	179	
	Nita (750-888)	138	
	Goldwyer (888-1353)	465	
	Willara (1353-1754)	401	
	Nambeet (1754-1916)	162	1166
	Basement schist (1916-1968)		
Matches Springs-1	Carribuddy (1778-2108)	330	
	Nita (2108-2277)	169	
	Goldwyer (2277-2835 TD)	558	727

TABLE 6.4
Wells intersecting Ordovician strata in the Admiral Bay - Willara Sub-basin area

Well Name	Stratigraphic Intervals cut	Thickness Metres	Total Ordovician Thickness
Parda-1	Carribuddy (980-1155)	175	
	Nita (1155-1184)	29	
	Goldwyer (1184-1495)	311	
	Willara + (1485 -		
	Nambeet - 1777)	282	622
	Basement (1777-1907)		
Musca-1	Carribuddy (914-1431)	517	
	Nita (1431-1506)	75	104
	Goldwyer (1506-1535 TD)	29	
Carina-1	Carribuddy (694-1473)	778	
	Nita (1473-1551)	78	
	Goldwyer (1551-1603 TD)	52	130
Vela-1	Carribuddy (691-1762)	1071	
	Nita (1762-1859)	97	
	Goldwyer (1859-1909 TD)	50	147
Nita Downs-1	Carribuddy (1174-1438)	265	
	Nita (1439-1558)	120	
	Goldwyer (1559-1849 TD)	290	410
Cudalgarra-1	Carribuddy (1174-1330)	156	
	Nita (1330-1408)	78	
	Carbonate Group (1408-1703 TD)	275	373
Cudalgarra-2	Carribuddy (1141-1386)	245	
	Nita (1386-1501)	·115	
	Goldwyer (1501-1550 TD)	49	164
Great Sandy-1	Carribuddy (1145-1433)	288	
	Nita (1433-1536)	103	
	Goldwyer (1536-1673)	137	
	Willara (?)(1673-1771 TD)	98	338
Great Sandy-2	Carribuddy (1134-1409)	275	
	Nita (1409-1536)	127	
	Goldwyer (1535-1576 TD)	41	168
Leo-1	Carribuddy (1062-1459)	565	
	Nita (1459-1653)	113	
	Goldwyer (1653-1948)	295	
	Willara (1948-2253)	305	
	Nambeet (2253-2319)	66	779
	Basement (2319-2411)		
Willara-1	Carribuddy (1255-1736)	481	
	Nita (1736-1874)	137	
	Goldwyer (1874-2610)	736	
	Willara (2610-3142)	532	
	Nambeet (3142-3903 TD)	457	1862
Juno-1	Carribuddy (1344-1622)	278	
	Nita (1622-1750)	128	128

Munro-1	Carribuddy (1172-1501)	329	
	Nita (1501-1585)	84	
	Goldwyer (1585-1802)	317	
	Willara (1802-2013)	211	
	Nambeet (2013-2106)	93	705
	Basement Granite (2106-2116)		
Calamia-1	Nita (888-938)	50	
	Goldwyer (938-1243)	305	
	Willara (1243-1461)	219	
	Nambeet (1461-1671)	210	784
	Basement (1671-1697)		
Wood Hills-1	Carribuddy	238	
	Nita	100	
	Goldwyer	413	
	Willara	TD) 130	
Darriwell-1	Carribuddy (1239-1463)	224	
	Nita (1463-1574)	111	
	Goldwyer (1574-1595 TD)	21	
Anna Plains-1	Nita (1023-1111)	88	
	Goldwyer (1111-1161 TD)	50	
Samphire Marsh-1	Nambeet (?) (1240-2015)	775	775
	Granite (2015-2028)		

TABLE 6.5
Wells intersecting Ordovician strata below Carribuddy Group in the Kidson sub-basin and Ficus Low

Well Name	Stratigraphic Intervals cut	Thickness Metres	Total Ordovician Thickness
McLarty-1	Carribuddy (452-1578)	1126	
	(Including 'B' halite 675-1415 = 740)		
	Nita (1578-1687)	109	
	Goldwyer (1687-2060)	373	
	Willara (2060-2340)	280	
	Nambeet (2340-2591 TD)	251	1013
Pegasus-1	Carribuddy (1016-2290)	1274	
	(includes halite 1395-2055 = 660)		
	Nita (2290-2385)	95	
	Goldwyer (2385-2632)	247	
	Willara (2632-2920)	288	
	Nambeet (2920-2995 TD)	75	705
Mirbelia-2	Carribuddy (2289-2547)	258	
	Nita (2547-2600)	53	
	Goldwyer (2600-2819 TD)	219	272
Percival-1	Carribuddy (1868-2013)	145	
	Nita (2013-2033)	20	
	Goldwyer (2033-2186)	153	
	Willara (2186-2229)	43	
	Nambeet (2229-2448 TD)	219	435
Frankenstein-1	Carribuddy (1213-2229)	1016	
	(including halite 1580-1757 = 177)		
	Nita (2229-2273)	44	
	*Goldwyer (2273-2666)	393	437
	Basement (2666-2803)		
Kidson-1	Carribuddy (2570-4279)	170D	
	(includes 'B' halite 2941-3468 = 527)		
	Goldwyer (4279-4413)	134	
	Willara (4413-4431 TD)	18	152
Wilson Cliffs-1	Carribuddy (1778-2533)	755	
	Goldwyer (2533-2847)	314	
	Willara (2847-2963)	116	
	Nambeet (2963-3503)	540	970
	Proterozoic (3503-4018)		
Contention Heights-1	Carribuddy (911-1343)	432	
	Goldwyer (1343-1527)	184	448
	Willara-Nambeet (1527-1791 TD)	264	

* Probably includes Willara and Nambeet equivalents.

TABLE 6.6
Wells intersecting Ordovician strata on the Crossland Platform and Barbwire Terrace

Well Name	Stratigraphic Intervals cut	Thickness Metres	Total Ordovician Thickness
Barbwire-1	Carribuddy (458-730)	272	
	Nita (730-782)	52	
	Goldwyer (782-1071 TD)	289	341
Dodonea-1	Carribuddy		
	Goldwyer (1527-1746)	219	
	Willara (1746-1910)	164	
	Nambeet (1910-2155)	245	628
	Basement schist (2155-2215)		
Dodonea-2	Carribuddy		
	Nita (1586-1615)	29	
	Goldwyer (1615-1688 TD)	73	102
Acacia-1	Carribuddy (524-693)	160	
	Nita (693-855)	162	
	Goldwyer (855-1087)	232	
	Willara (1087-1209 TD)	122	516
Acacia-2	Carribuddy (523-700)	177	
	Nita (700-873)	173	
	Goldwyer (873-1040)	167	
	Willara (1040-1277)	237	
	Nambeet (1277-1502)	225	802
	Basement phyllite (1502-1573)		
Santalum 1A	Carribuddy (321-406)	85	
	Nita (406-441)	35	
	Goldwyer (441-629 TD)	188	223
Solanum 1	Carribuddy (137-217)	80	
	Nita (217-284)	67	
	Goldwyer (284-615)	331	
	Willara (615-806)	191	
	Nambeet (806-834 TD)	28	617
Kunzea 1	Carribuddy (261-292)	31	
	Nita (292-350)	58	
	Goldwyer (350-450 TD)	100	158
Setaria 1	Goldwyer (145-388)	243	
	Willara (388-627)	239	
	Nambeet (627-955 TD)	328	810

TABLE 7
Complete or near complete sections of Ordovician

Tapers Inlet 1 + Blackstone 1			
819 + 827	= 1646	No overlap	1646*
Aquila 1	1063	Basement not reached	1063*
Twin Buttes 1	938	Basement not reached	938*
Crystal Ck 1	931	Basement not reached	931*
Justago 1	870	Top missing	870*
Pictor 1	1242		1242
Edgar Range 1	1166		1166
Parda 1	622		622
Leo 1	779		779
Willara 1	1862	Basement not reached	1862*
Munro 1	705		705
Calamia 1	784	Nita truncated	784
McLarty 1	1013	Basement not reached	1013*
Pegasus 1	705	Basement not reached	705*
Frankenstein	437		437
Wilson Cliffs	970		970
Dodonea 1/2	730		730
Acacia 2	802		802
Percival	435	Basement not reached	435*
Setaria + Kunzea		Basement not reached	968*
810 + 158			

* Minimum thickness

Table 8
Thermal Gradients for Canning Basin wells (Estimated surface temperature 25°)C.

8.1 Alphabetic list of wells

Well Name	Depth	Latitutude	Longtitude	Geology	BHT	Gradient
Anna Plains	1145	19.34	121.47	Ordovician	59*	34
Antares	1299	18.73	123.69	Ordovician	70*	35
Aquila	1735	18.58	122.67	Ordovician	104	45
Babrongran	1875	18.39	123.59	Devonian	93	36
Barbwire	1073	19.18	125.02	Ordovician	61	33
Barlee	2467	17.81	122.71	Carboniferous	79	22
Bindi	2500	19.72	126.80	Carboniferus	97	29
Blackstone	2972	17.59	124.35	Ordovician	96	24
Boronia	3391	17.76	124.57	Devonian	123*	29
Canopus	1779	18.95	123.87	Ordovician	93	38
Carina	1603	19.36	123.08	Ordovician	70	28
Contention Heights	1672	22.43	127.22	Ordovician	66	24
Cow Bore	2940	17.97	122.72	Devonian	N/A	25
Crystal Creek	2388	18.56	123.60	Ordovician	98.5*	31
Dodonea 1	2215	19.39	125.16	Ordovician	89*	29
East Grab Creek	2813	18.02	122.61	Devonian	N/A	27
Edgar Range	1967	18.76	123.59	Ordovician	93	35
Frankenstein	2792	21.38	123.02	Precambrian	106*	29
Fraser River	3071	17.42	123.16	Carboniferous	86	20
Frome Rocks 1	1023	18.20	123.64	Salt Dome	62	36
Frome Rocks 2	2225	18.25	123.66	Devonian	83	26
Gap Creek	1541	18.63	125.81	Precambrian	67*	27
Goldwyer	1224	18.38	122.38	Precambrian	73	39
Grant Range	3407	18.01	124.01	Carboniferous	98	21
Grevillea	2562	18.35	125.63	Precambrian	99*	29
Hawkstone Peak	1187	17.25	124.41	Precambrian	71	38
Hedonia	1543	18.28	122.40	Precambrian	77*	34
Hibiscus	2393	19.64	125.43	Devonian	94	29
Hilltop	1734	18.29	122.29	Precambrian	94*	40
Jones Range	2540	19.36	125.67	Devonian	82	22
Justago	3150	18.87	126.24	Ordovician	126*	32
Kennedia	3382	17.75	124.60	Devonian	118	27

Kidson	4430	22.62	125.01	Ordovician	123	22
Lake Betty	3136	19.57	126.33	Devonian	120	30
Langoora	1617	17.30	124.11	Precambrian	73	30
Matches Springs	2833	18.69	124.05	Ordovician	83	20
McLarty	2590	19.40	123.66	Ordovician	90	28
May River	1678	17.25	124.08	Precambrian	73	29
Mirbelia 2	2819	19.65	125.36	Ordovician	104*	28
Moogana 1	2213	16.94	122.69	Precambrian	88*	28
Mt Hardman	3355	18.01	124.91	Devonian	116	27
Munro	2120	19.86	122.47	Precambrian	94	33
Musca	1535	19.34	122.95	Ordovician	68	28
Napier 1	1800	17.20	124.53	Precambrian	82	32
2	1606	17.08	124.36	Precambrian	62	19
3	1658	17.11	124.47	Precambrian	82	34
Needle Eye Rock	1661	18.24	125.82	Precambrian	70	27
Pandorea	2274	19.86	125.34	Devonian	89	28
Parda	1906	18.93	122.01	Precambrian	83	30
Percival	2446	20.33	126.08	Ordovician	103*	32
Point Moody	2134	21.26	127.81	Carboniferous	79	25
Puratte	3750	17.09	123.24	Devonian		29
Roebuck Bay	1219	18.16	122.46	Ordovician		30
Sahara	2077	21.08	123.39	Ordovician	79	26
Setaria	955	19.40	124.97	Precambrian	63	41
St Georges Range	4436	18.69	125.14	Carboniferous	117	20
Tappers Inlet	2853	16.86	122.59	Precambrian	91	23
Thangoo 1A	1655	18.36	122.88	Precambrian		34
Thangoo 2	1471	18.44	122.91	Precambrian	76	35
Twin Buttes	1599	18.51	122.94	Ordovician	89	40
Vela	1908	19.41	122.89	Ordovician	84	31
Willara	3904	19.18	122.07	Ordovician	143	30
Wilson Cliffs	3720	22.28	126.78	Proterozoic	120	25
Yulleroo	4575	17.85	122.91	Devonian	121	21

* **Corrected bottom hole temperature for post-1977 well.**

Table 8.2 **Thermal Gradients (TG) for wells along the Admiral Bay Fault**

Estimated surface temperature 25°c

WELL	DEPTH	LAT	LONG	GEOLOGY	BHT	TG
Nita Downs	1835	19.15	122.20	Ordovician	99	40
Cudalgarra 1	1703	19.22	122.32	Ordovician	82	33
2	1549	19.20	122.27	Ordovician	82	37
North	1215	19.17	122.30	Silurian	68	35
Great Sandy 1	1700	19.21	122.35	Ordovician	71	27
2	1568	19.21	122.35	Ordovician	75	32
Leo 1	2400	19.25	122.34	Precambrian	104	33

Table 9: Wells for which TOC & Rock-Eval data are available in Well completion reports.

Company	**Well Name**	**No. of TOC determinations**	**Maturity**	**Qual of Org.**
WMC	Acacia-1	12	Low	Good
Sydney Oil	Anna Plains	1	Mod	low
Bridge	Antares	15	ND	V. Low
Eagle	Aquila	30	High	Good
OCA	Calamia	26	low	L o w
Getty	Canopus	45	High	modlow
Getty	Carina	57	Mod-high	Low
Kufpec	Crystal Creek	23	High	Good
OCA	Darriwel	14	ND	V.low
WMC	Dodonia 1	17	Mod	Good
Kufpec	Gap Creek	13	Mod	Low
IEDC	Grevillea	17	ND	V.low
Gulf	Hedonia	88	Hig	Mod-good
Bridge	Hilltop	14	High	Mod-good
Royal	Juno	14	ND	V.low
IEDC	Justago	15	High	V.low
WMC	Kunzea	3	Low	Good
Command	Leo	49	Mod-low	Low
Getty	Musca	50	ND	V. low
Amoco	Pegasus	10	High	Low
WMC	Percival	1	High	Low
BHP	Pictor	38	High	Modlow
WMC	Santalum '1A'	9	Low	Good
WMC	Setaria	5	Mod	Low
WMC	Solanum	8	Low	Mod
Getty	Vela	7	ND	Low

No. of holes 26
No. of TOC determinations: 581
ND = not determinable

Table 10: List of Samples taken for TOC and Rock-Eval Pyrolysis
March 12, 1991

Hole No. 945

Name: Wilson Cliffs No. 1

Samples taken:	Core	16	9908
		16	9919
		17	9943
		17	9945
		18	9960
	Cuttings	9230 - 9240 (9)	
		9120 - 9125	
		9090 - 9100 (10)	
		8970 - 8980 (11)	
		8810 - 8820 (12)	
		8600 - 8610 (13)	

Hole No: 921
Name: McLarty No. 1

Samples taken:	Core	11	5459 (32)
		11	5465 (33)
		12	5771 (34)
		12	5773
		13	6211 (35)
		14	6571 (36)
		14	6575 (37)
		16	7079 (39)
		16	7079 (38)
		16	7083 (40)
		16	7083 (41)
	Cuttings	6220 - 6225 (16)	
		6290 - 6295 (17)	
		6435 - 6440 (18)	
		6475 - 6480 (19)	
		6555 - 6560 (20)	

Hole No: 1460
Name: Munro No. 1

Samples taken:	Cuttings	5270 - 5280
		5310 - 5320
		5370 - 5380
		5420 - 5430
		5610 - 5620
		5650 - 5660
		5730 - 5740
		5770 - 5780

Hole No: 172
Name: Thangoo No. 1

Samples taken:	Core	3	3153
		3	3148

Hole No. 527
Name: Kidson No. 1

Samples taken:	Core	21	14319 (55)
		21	14330 (56)
		21	14520 (57)

Hole No: 1866
Name: Contention Heights No. 1

Samples taken:	Core	1	5242-7
	Cuttings	4650 - 4660	
		4800 - 4810 (6)	

Hole No: 948
Name: Edgar Range No. 1

Samples taken:	Core	5	3112 - 3112.5
		6	3425.9 - 3426.3
		8	3900.6 - 3901.0
		12	5524.1 - 5524.7
		13	5836.9 - 5837.2
		13	5842.5 - 5843.1
		13	5856.11- 5857.2
	Cuttings		3035 - 3040 (8)
			3210 - 3215 (9)
			3320 - 3325 (10)
			3440 - 3445 (11)
			3545 - 3550 (12)
			3755 - 3760 (13)
			3985 - 3990 (14)
			4170 - 4175 (15)
			4285 - 4290 (16)
			4425 - 4430 (17)

Hole No: 1112
Hole Name: Matches Springs No. 1

Samples taken:	Core	15	7890 (49)
		15	7900 (50)
		16	9032 (51)
		16	9038 (52)
	Cuttings	7410 - 7415 (26)	
		7525 - 7530 (27)	
		7615 - 7620	
		7680 - 7685	
		7705 - 7710 (28)	
		7765 - 7770	
		7820 - 7825	
		7870 - 7875 (29)	
		8965 - 8970 (35)	
		9070 - 9075	
		9085 - 9090 (36)	
		9190 - 9195 (37)	
		9225 - 9230	

Hole No: 420
Hole Name: Willara No. 1
Samples taken:

	Core	6	6172
	Core	11	8808.3
		14	10454.4
		14	10458
Cuttings		6410-6420	
		6450-6460	
		6500-6510	
		6560-6570	
		6610-6620	
		6650-6660	
		10320-10330	
		10410-10420	
		10510-10520	
		10610-10620	
		10920-10930	
		11020-11030	

Hole No: 409
Hole Name: Parda No. 1
Samples taken:

Core 2	4316
2	4320
Cuttings	4220-4230
	4300-4310
	4370-4380

Hole No: 1334
Hole Name: Tappers Inlet No. 1
Samples Taken

Cuttings	7120-7130 (28)
	7260-7270 (29)
	7360-7370 (30)
	7530-7540 (31)
	7620-7630 (32)
	7770-7780 (33)
	7860-7870 (34)
	8000-8010 (35)
	8010-8020 (36)
	8110-8120
	8240-8250 (37)
	8410-8420 (38)
	8530-8540

TOTAL NUMBER OF SAMPLES: **111**

All depths are in feet below KB, decimals are inches.

Number in brackets following footage is Ron Surdam's number (sampling and analysis, 1982).

Table 11: Wells for which gas chromatographs of oils recovered by DST or extracted from cores are available in well completion reports.

ORDOVICIAN OIL SAMPLES WITH GC DATA

Well Name	Depth of DST		Reservoir
Great Sandy No. 1		1446-1525	Nita
Pictor No. 1	DST	940-965	Nita
Dodonea No. 1	DST1	1519-1553	Goldwyer
Cudalgarra No. 1	DST3	1350-1402	Nita
Cudalgarra No. 2	Oily mud	1462	Nita
Mirbelia-1	DST2	1837-1846.5	U. Dev. Mellinjerie

ORDOVICIAN EXTRACT SAMPLES WITH GC DATA

Well Name	Depth
SANTALUM 1A	470
ACACIA-1	707.6, 733.6, 779.3, 779.8, 783.1, 874.4, 935, 974, 1014, 1032.7, 1080.9, 1088.3, 1103.6, 1120, 1177.3, 1190.8
DODONEA-1	1537.8, 1538.3, 1540, 1540.1, 1548.4, 1548.5
PICTOR-1	1445
HEDONIA-1	916.2
AQUILA-1	942, 1069.5, 1118.5, 1164
CANOPUS-1	1670-1680, 1695
HILLTOP-1	1052.5, 1170, 1420
ANTARES-1	1113, 1131.7, 1134
FRANKENSTEIN-1	2285-2303, 2303-2321, 2321-2339, 2501-2519, 2519-2537
CUDALGARRA-2	1310, 1413, 1462, 1471, 1477

Table 12: Wells with condensed CAI zones in the Ordovician.

Hole Name	CAI Zone	Depth (m)	Thickness (max)	Author
Blackstone 1	1	2220-2292		
	1.5	2369-2378	164	Nicoll & Gorter
	2	2456-2465	-	
Dodonea 1	1-1.5	1544-1549		Watson (WMC)
	1.5	)		
	2	)	491	
	2.5	)		
	3	2040-2041	-	
Edgar Range 1	1-1.5	837-1045		
	1.5		311) 738	Nicoll & Gorter
	2	1356-1781	427)	
	3	1783-1786		
Edgar Range 1	1	837-1045	1045	Watson (WMC)
	1.5	1356-1359	504)	
	2	1549-1683	424) 738	
	3	1783-1785		
Goldwyer 1	1	910-1143	1143	
	1.5	1189-1373	248	Nicoll & Gorter
	2	1392-1411	-	
Goldwyer 1	1.5-2	910-1082	-	Watson (WMC)
	2	1084-1355	310	
	2.5-3	1392-1411	-	
McLarty 1	1+	1758-1761	1761	Nicoll & Gorter
	1-1.5	1893-1894	241	
	2	2002-2279	-	
Percival 1	1.5-2	2028-2068		Watson (WMC)
	2		248	
	3	2316-2317		
Solanum 1	1	225- 603		Watson (WMC)
	1.5	603- 670)		
	1.5-2	700- 760) 216		
	2	819- 833		

Tappers Inlet 1	1.5	2043-2088		Nicoll & Gorter
	2	2088-2591	549) 717	
	3	2637	214)	
	4	2805	-	
Thangoo 1A	1	1117-1119	1119	Nicoll & Gorter
	1.5	1190-1420	374	
	2	1493-1539	-	
Thangoo 2	1	796- 930	930	Nicoll & Gorter
	1.5	958-1067	292	
	2	1222-1265		
Canopus 1	1.5	1075-1225		Savage
	2	1235-1655	440	
	2.5	1665-1765		

Table 13: Depth of Conodont Alteration Index zones in the Kidson Sub-basin.

Well Name	Conodont Zones	Depth below KB	Depth below base Mellinjerie
Contention Heights 1	1	1341-1402	491- 552
	1-1.5	1402-1585	552- 735
Wilson Cliffs 1	1-2	2564-2686	1470-1592
	2	2686-3250	1592-2156
Kidson 1	3	4367-4370	2530-2533
Munro 1	1	1555-2027	
	1-1.5	2043	
Frankenstein 1	1	1795-1935	
	2	2279-2675	
Pegasus 1	2	2500-2950	

APPENDIX 1.

TOC AND ROCK-EVAL PYROLYSIS DATA EXTRACTED FROM WELL COMPLETION REPORTS AND PUBLISHED SOURCES.

(37 pages)

Rock-Eval data for samples from the Goldwyer Formation in EP 143 and EP 225, Western Mining Corporation wells. Ku 01 = Kunzea 1; Sa 01 = Santalum 1A; Do 01 = Dodonea 1; So 01 = Solanum 1; Ac 01 = Acacia 1. Rock-Eval parameters (see Tissot & Welte, 1978): T_{max} (°C), S_1, S_2, PI (production index), PC (pyrolysable carbon), TOC (total organic carbon), HI (hydrogen index). C = conversion factor, PC/TOC x 100. U = Rock units 1-4, N (Nita Formation, Goldwyer formation), W (Willara Formation).

Well	Depth (m)	T max	S^1	S^2	PI	PC	TOC	C	HI	U	RC
Ku 01	354.42	436	0.07	10.28	0.01	0.86	1.34	64	767	4	0.48
Ku 01	379.95	434	0.65	41.45	0.02	3.5	4.8	73	863	4	1.30
Ku 01	390.18	437	0.16	12.50	0.01	1.05	1.84	57	679	4	0.79
Sa 01	453.81	434	0.11	6.36	0.02	0.53	1.03	51	616	N	0.50
Sa 01	470	433	0.50	52.96	0.01	4.45	6.4	70	828	4	1.95
Sa 01	470.71	435	0.06	7.94	0.01	0.66	1.15	57	690	4	0.49
Sa 01	478.50	435	0.06	3.53	0.01	0.29	0.65	45	543	4	0.36
Sa 01	486.95	440	0.02	2.36	0.01	0.19	0.46	41	513	4	0.27
Sa 01	490.8	437	0.14	8.34	0.02	0.70	1.28	54.7	652	4	0.58
Sa 01	494.8	434	0.07	1.39	0.05	0.12	0.46	26	302	4	0.34
Sa 01	495.4	437	0.18	5.81	0.03	0.49	1.35	36	430	4	0.86
Sa 01	495.8	438	0.24	10.74	0.02	0.91	1.86	49	577	4	0.95
Sa 01	499.35	440	0.06	1.81	0.03	0.15	0.52	29	348	4	0.37
Sa 01	503.00	438	0.10	3.73	0.03	0.31	0.78	40	478	4	0.47
Do 01	1537.8	441	1.11	23.56	0.04	2.05	3.6	57	654	4	1.55
Do 01	1538.28	442	0.75	8.34	0.08	0.75	1.7	44	490	4	0.95
Do 01	1538.43	438	0.80	13.39	0.06	1.18	2.2	54	608	4	1.02
Do 01	1539.67	442	0.94	10.3	0.08	0.93	1.8	52	572	4	0.87
Do 01	1539.98	441	0.81	12.84	0.06	1.13	2.1	54	611	4	0.97
Do 01	1540.1	440	1.25	28.32	0.04	2.45	4.05	60	699	4	1.60
Do 01	1541.59	443	0.18	1.79	0.09	0.16	0.6	27	298	4	0.44
Do 01	1542.95	443	0.24	2.22	0.10	0.20	0.83	24	267	4	0.63
Do 01	1542.31	444	0.26	2.64	0.09	0.24	0.87	28	303	4	0.63
Do 01	1542.48	442	0.35	2.98	0.11	0.28	1.05	27	283	4	0.77
Do 01	1548.24	444	0.59	6.83	0.08	0.62	1.4	44	487	3	0.78
Do 01	1548.77	443	0.62	7.07	0.08	0.64	1.5	43	471	3	0.86
Do 01	1548.99	441	0.64	2.06	0.24	0.22	0.74	30	278	3	0.52
So 01	315.34	442	0.63	16.59	0.04	1.43	2.32	61	715	4	0.89
So 01	326.43	441	0.17	3.44	0.05	0.30	0.85	35	404	3	0.55
So 01	397.63	-	-	-	-	-	0.26	-	-	2	
So 01	406.1	-	-	-	-	-	0.14	-	-	2	
So 01	449.1	-	-	-	-	-	0.12	-	-	2	
So 01	519.58	437	0.67	2.52	0.21	0.26	1.17	22	215	1	
So 01	556.04	-	-	-	-	-	0.22	-	-	1	
So 01	667.2	427	0.06	0.87	0.07	0.07	0.83	8.4	104	1	
Ac 01	733.6	421	0.06	0.19	0.24	0.02	0.32	6	59	N	0.30
Ac 01	779.26	432	0.01	3.09	0.25	0.34	0.96	35	321	4	0.62
Ac 01	779.85	427	0.08	8.52	0.01	0.71	1.69	42	504	4	0.98
Ac 01	782.7	439	0.62	36.34	0.02	3.07	4.03	76	901	4	0.96
Ac 01	785.8	437	0.12	3.43	0.03	0.29	1.19	24	288	4	0.90
Ac 01	814	435	0.00	0.12	0.00	0.01	0.13	8	92	3	0.12
Ac 01	874.5	422	0.01	0.15	0.06	0.01	0.19	5	78	2	
Ac 01	935	425	0.01	0.14	0.07	0.01	0.19	5	73	2	
Ac 01	974	432	0.22	0.88	0.20	0.09	0.71	13	123	1	
Ac 01	1014.30	433	0.11	1.92	0.05	0.16	0.91	18	210	1	
Ac 01	1033	435	0.14	1.60	0.08	0.14	0.87	16	183	1	
Ac 01	1080.9	428	0.03	0.81	0.04	0.07	0.49	14	165	W	

ANNA PLAINS #1

ROCK-EVAL PYROLYSIS 15/01/88

Client SYDNEY OIL COMPANY

Well ANNA PLAINS-1

DEPTH	T MAX	S1	S2	S3	S1+S2	PI	S2/S3	PC	TOC	HI	OI
1143-1158	428	0.50	1.13	0.91	1.63	0.31	1.24	0.13	0.49	231	186

KEY TO ROCK-EVAL PYROLYSIS DATA SHEET

	PARAMETER	SPECIFICITY
T max	position of S_2 peak in temperature program (°C)	Maturity/Kerogen type
S_1	kg hydrocarbons (extractable)/tonne rock	Kerogen type/Maturity/Migrated oil
S_2	kg hydrocarbons (kerogen pyrolysate)/tonne rock	Kerogen type/Maturity
S_3	kg CO_2 (organic)/tonne rock	Kerogen type/Maturity*
S_1+S_2	Potential Yield	Organic richness/Kerogen type
PI	Production Index (S_1/S_1 + S_2)	Maturity/Migrated oil
PC	Pyrolysable Carbon (wt. percent)	Organic richness/Kerogen type/Maturity
TOC	Total Organic Carbon (wt. percent)	Organic richness
HI	Hydrogen Index (mg h'c (S_2)/g TOC)	Kerogen type/Maturity
OI	Oxygen Index (mg CO_2(S_3)/g TOC)	Kerogen type/Maturity*

*Also subject to interference by CO_2 from decomposition of carbonate minerals.

ANTARES #1

ROCK-EVAL PYROLYSIS DATA (one run)

WELLNAME = ANTARES 1 DATE OF JOB = MAY 1988

DEPTH(m)	TMAX	S1	S2	S3	S1+S2	S2/S3	PI	PC	TOC	HI	OI	
1053.9	nd	nd	nd	nd	nd	nd	nd	nd	0.13	nd	nd	CARRABUDDY
1072.4	nd	nd	nd	nd	nd	nd	nd	nd	0.13	nd	nd	
1085.0	nd	nd	nd	nd	nd	nd	nd	nd	0.10	nd	nd	
1086.5	nd	nd	nd	nd	nd	nd	nd	nd	0.07	nd	nd	
1101.0	nd	nd	nd	nd	nd	nd	nd	nd	0.09	nd	nd	
1152.2 shale	nd	nd	nd	nd	nd	nd	nd	nd	0.11	nd	nd	
1191.2	nd	nd	nd	nd	nd	nd	nd	nd	0.10	nd	nd	NITA
1210.5	nd	nd	nd	nd	nd	nd	nd	nd	0.12	nd	nd	
1226.0	nd	nd	nd	nd	nd	nd	nd	nd	0.14	nd	nd	
1239.5	nd	nd	nd	nd	nd	nd	nd	nd	0.16	nd	nd	
1255.0	nd	nd	nd	nd	nd	nd	nd	nd	0.18	nd	nd	
1260.5	nd	nd	nd	nd	nd	nd	nd	nd	0.13	nd	nd	
1278.0	nd	nd	nd	nd	nd	nd	nd	nd	0.13	nd	nd	GOLDWYER
1292.0	nd	nd	nd	nd	nd	nd	nd	nd	0.15	nd	nd	
1295.0	nd	nd	nd	nd	nd	nd	nd	nd	0.11	nd	nd	

TMAX = Max. temperature S2
S1+S2 = Potential yield
PC = Pyrolysable carbon
OI = Oxygen Index
S1 = Volatile hydrocarbons (HC)
S3 = Organic carbon dioxide
TOC = Total organic carbon
nd = no data
S2 = HC generating potential
PI = Production index
HI = Hydrogen index

WELLNAME = AQUILA NO.1 CUTTINGS

DATE OF JOB = DECEMBER 1982

ROCK-EVAL PYROLYSIS DATA

	8	2		4	3		5		1	6	7
DEPTH(m)	TMAX	S1	S2	S3	S1+S2	S2/S3	PI	PC	TOC	HI	OI
1020.0-1030.0	nd	nd	nd	nd	nd	nd	nd	nd	0.22	nd	nd
1030.0-1040.0	nd	nd	nd	nd	nd	nd	nd	nd	0.28	nd	nd
1040.0-1050.0	nd	nd	nd	nd	nd	nd	nd	nd	0.36	nd	nd
1050.0-1060.0	436	0.39	1.24	0.33	1.63	3.76	0.24	0.14	0.81	153	40
1060.0-1070.0	437	0.70	2.17	0.33	2.87	6.58	0.24	0.24	1.11	195	29
1070.0-1080.0	435	0.72	2.20	0.40	2.92	5.50	0.25	0.24	0.95	231	42
1080.0-1090.0	435	0.44	1.23	0.36	1.67	3.42	0.26	0.14	0.74	166	48
1090.0-1100.0	435	0.55	1.50	0.45	2.05	3.33	0.27	0.17	0.83	180	54
1100.0-1110.0	435	0.52	1.39	0.50	1.91	2.78	0.27	0.16	0.85	163	58
1110.0-1120.0	436	1.02	2.55	0.38	3.57	6.71	0.29	0.30	1.23	207	30
1120.0-1130.0	431	1.51	3.10	0.51	4.61	6.08	0.33	0.38	1.46	212	34
1130.0-1140.0	430	0.90	1.65	0.47	2.55	3.51	0.35	0.21	1.04	158	45
1140.0-1150.0	426	1.21	2.38	0.56	3.59	4.25	0.34	0.30	1.16	205	48
1150.0-1160.0	429	1.09	1.92	0.71	3.01	2.70	0.36	0.25	1.18	162	60
1160.0-1170.0	426	0.71	1.24	0.58	1.95	2.14	0.36	0.16	0.87	142	66
1170.0-1180.0	nd	nd	nd	nd	nd	nd	nd	nd	0.40	nd	nd

LOWER GOLDWYER SHALE 1020- 1170

AQUILA #1

WELLNAME = AQUILA NO.1 S.W.C. DATE OF JOB = NOVEMBER 1982

ROCK-EVAL PYROLYSIS DATA

	8	2		4	3		5		1	6	7
DEPTH(m)	TMAX	S1	S2	S3	S1+S2	S2/S3	PI	PC	TOC	HI	OI
859.0	nd	nd	nd	nd	nd	nd	nd	nd	0.22	nd	nd
893.0	nd	nd	nd	nd	nd	nd	nd	nd	0.23	nd	nd
942.0	434	0.11	0.68	0.26	0.79	2.62	0.14	0.07	0.56	121	46
956.0	nd	nd	nd	nd	nd	nd	nd	nd	0.27	nd	nd
976.5	nd	nd	nd	nd	nd	nd	nd	nd	0.25	nd	nd
1020 1020.5	nd	nd	nd	nd	nd	nd	nd	nd	0.30	nd	nd
1053.0	nd	nd	nd	nd	nd	nd	nd	nd	0.31	nd	nd
1069.5	436	1.25	4.42	0.56	5.67	7.89	0.22	0.47	1.91	231	29
1087.5	430	0.41	0.81	0.58	1.22	1.40	0.34	0.10	0.89	91	65
1118.5	436	2.71	7.02	0.82	9.73	8.56	0.28	0.81	3.20	219	25
1141.0	433	1.12	2.75	0.65	3.87	4.23	0.29	0.32	2.22	123	29
1164.0	421	0.31	0.67	0.42	0.98	1.60	0.32	0.08	0.77	87	54
1170											

LOWER GOLDWYER SHALE

AQUILA #1

CALAMIA - 1 GOLDWYER Middle Limestone Member

Depth	TOC	TMAX	S_1	S^2	S^3	S^1 & S^2	PI	PC	HI
1027	0.44	433	0.11	1.92	0.60	2.03	0.05	.17	436

Depth	TOC	VR Mean	Stratigraphic Unit
532	0.24		
572	0.40		
581	0.30		
599	0.10		
654	0.60	0.32	
697	0.60		
760	0.30		**Grant**
795	0.60		
807	<0.05		
860	0.30		
881	0.10	0.40	
887	0.05		
931	0.10		**Nita**
958	0.11		
979	<0.05		
1002	0.20		
1027	0.44		**Goldwyer**
1117	-		
1175	0.15		
1224	0.20		
1333	<0.05		
1368	0.10		**Willara**
1494	0.11		
1507	0.10		
1532	0.10		**Nambeet**
1591	0.10		

All samples are sidewall cores.

WELLNAME = CANOPUS NO.1 S.W.C. DATE OF JOB = SEPTEMBER 1982

ROCK-EVAL PYROLYSIS DATA

DEPTH(m)	TMAX	S1	S2	S3	S1+S2	S2/S3	PI	PC	TOC	HI	OI
1088.0	nd	nd	nd	nd	nd	nd	nd	nd	0.14	nd	nd
1135.8	nd	nd	nd	nd	nd	nd	nd	nd	0.09	nd	nd
1695.0	430	0.60	1.09	0.29	1.69	3.76	0.36	0.14	1.40	77	20

CANOPUS #1

WELLNAME = CANOPUS #1 DATE OF JOB = OCTOBER, 1982

ORGANIC CONTENT OF SEDIMENTS

DEPTH(m)	%SOM	%TOC	SOM(mg)/TOC(g)	SAT(mg)/TOC(g)	%SaOM
1670.0-1680.0	.182	1.16	156.9	123.4	.143
1695.0	.254	1.40	181.4	144.5	.202

WELLNAME = CANOPUS #1 DATE OF JOB = OCTOBER, 1982

COMPOSITIONAL DATA

DEPTH(m)	%SAT	%AROM	%NSO	PRIST/PHYT	PRIST/NC17	PHYT/NC18	PAP	AROM/SAT	CPI(1)	CPI(2)	21+22/28+29
1670.0-1680.0	78.6	15.3	6.0	2.11	.37	.22	nd	0.20	1.04	1.04	4.97
1695.0	79.6	13.3	7.1	1.55	.31	.24	nd	0.17	1.05	1.06	4.02

WELLNAME = CANOPUS #1 DATE OF JOB = OCTOBER, 1982

N-ALKANE DISTRIBUTIONS

DEPTH(m)	CN12	CN13	CN14	CN15	CN16	CN17	CN18	CN19	CN20	CN21	CN22	CN23	CN24	CN25	CN26	CN27	CN28	CN29	CN30	CN31
1670.0-1680.0	11.1	11.4	12.1	12.2	10.2	8.7	6.9	6.2	4.9	3.9	3.0	2.3	1.7	1.2	1.0	0.9	0.7	0.7	0.5	0.4
1695.0	5.1	8.3	11.3	12.9	11.5	10.2	8.6	6.5	5.2	4.2	3.4	2.7	2.0	1.7	1.6	1.3	1.0	0.9	0.8	0.7

CANOPUS #1

WELLNAME = CANOPUS NO. 1 CUTTINGS

DATE OF JOB = OCTOBER 1982

ROCK-EVAL PYROLYSIS DATA

DEPTH(m)	TMAX	S1	S2	S3	S1+S2	S2/S3	PI	PC	TOC	HI	OI	
170- 180	427	0.01	0.27	1.29	0.28	0.21	0.04	0.02	0.89	30	144	GRANT
290- 300	418	0.03	0.16	0.48	0.19	0.33	0.16	0.02	0.55	29	87	
310- 320	420	0.04	0.20	0.63	0.24	0.32	0.17	0.02	0.55	36	114	
330- 340	nd	nd	nd	nd	nd	nd	nd	nd	0.26	nd	nd	
350- 360	nd	nd	nd	nd	nd	nd	nd	nd	0.25	nd	nd	
360- 370	nd	nd	nd	nd	nd	nd	nd	nd	0.31	nd	nd	
960- 970	nd	nd	nd	nd	nd	nd	nd	nd	0.21	nd	nd	CARRA-BUDDY
990-1000	nd	nd	nd	nd	nd	nd	nd	nd	0.15	nd	Sh nd	
1020-1030	nd	nd	nd	nd	nd	nd	nd	nd	0.22	nd	nd	
1050-1060	nd	nd	nd	nd	nd	nd	nd	nd	0.22	nd	Dol. nd	
1080-1090	nd	nd	nd	nd	nd	nd	nd	nd	0.21	nd	nd	
1100-1120	nd	nd	nd	nd	nd	nd	nd	nd	0.16	nd	nd	NITA
1140-1150	nd	nd	nd	nd	nd	nd	nd	nd	0.25	nd	nd	
1170-1180	nd	nd	nd	nd	nd	nd	nd	nd	0.15	nd	nd	
1200-1210	nd	nd	nd	nd	nd	nd	nd	nd	0.16	nd	nd	
1220-1230	nd	nd	nd	nd	nd	nd	nd	nd	0.23	nd	nd	GOLDWYER
1240-1250	nd	nd	nd	nd	nd	nd	nd	nd	0.21	nd	nd	
1260-1270	nd	nd	nd	nd	nd	nd	nd	nd	0.23	nd	nd	
1280-1290	nd	nd	nd	nd	nd	nd	nd	nd	0.35	nd	nd	
1300-1310	nd	nd	nd	nd	nd	nd	nd	nd	0.26	nd	nd	
1320-1330	nd	nd	nd	nd	nd	nd	nd	nd	0.30	nd	nd	
1340-1350	nd	nd	nd	nd	nd	nd	nd	nd	0.33	nd	nd	
1360-1370	nd	nd	nd	nd	nd	nd	nd	nd	0.33	nd	nd	
1380-1390	nd	nd	nd	nd	nd	nd	nd	nd	0.34	nd	nd	
1400-1410	nd	nd	nd	nd	nd	nd	nd	nd	0.32	nd	nd	
1420-1430	nd	nd	nd	nd	nd	nd	nd	nd	0.36	nd	nd	
1440-1450	nd	nd	nd	nd	nd	nd	nd	nd	0.25	nd	nd	
1460-1470	nd	nd	nd	nd	nd	nd	nd	nd	0.34	nd	nd	
1480-1490	nd	nd	nd	nd	nd	nd	nd	nd	0.28	nd	nd	
1500-1510	nd	nd	nd	nd	nd	nd	nd	nd	0.23	nd	nd	
1520-1530	nd	nd	nd	nd	nd	nd	nd	nd	0.29	nd	nd	
1540-1550	nd	nd	nd	nd	nd	nd	nd	nd	0.32	nd	nd	
1560-1570	nd	nd	nd	nd	nd	nd	nd	nd	0.33	nd	nd	
1590-1600	nd	nd	nd	nd	nd	nd	nd	nd	0.38	nd	nd	
1610-1620	nd	nd	nd	nd	nd	nd	nd	nd	0.43	nd	nd	
1630-1640	422	0.41	0.63	0.56	1.04	1.13	0.39	0.09	0.70	90	80	WILLARA (Probably all L. Goldwyer)
1650-1660	420	0.57	0.77	0.55	1.34	1.40	0.43	0.11	0.81	95	67	
1670-1680	425	0.89	1.01	0.64	1.90	1.58	0.47	0.16	1.16	87	55	
1690-1700	434	0.34	0.37	0.62	0.71	0.60	0.48	0.06	0.75	49	82	
1710-1720	nd	nd	nd	nd	nd	nd	nd	nd	0.36	nd	nd	
1730-1740	nd	nd	nd	nd	nd	nd	nd	nd	0.40	nd	nd	
1760-1770	nd	nd	nd	nd	nd	nd	nd	nd	0.29	nd	nd	
CHECK 1 (A)	nd	nd	nd	nd	nd	nd	nd	nd	0.27	nd	nd	
CHECK 2 (B)	nd	nd	nd	nd	nd	nd	nd	nd	0.33	nd	nd	

CARINA #1

WELLNAME = CARINA NO.1 DATE OF JOB = DECEMBER 1982

ROCK-EVAL PYROLYSIS DATA

DEPTH(m)	TMAX	S1	S2	S3	S1+S2	S2/S3	PI	PC	TOC	HI	OI	
440.0	nd	nd	nd	nd	nd	nd	nd	nd	0.13	nd	nd	GRANT
460.0	421	0.01	0.16	0.67	0.17	0.24	0.06	0.01	0.56	28	119	
480.0	417	0.07	0.41	0.51	0.48	0.80	0.15	0.04	0.67	61	76	
500.0	nd	nd	nd	nd	nd	nd	nd	nd	0.40	nd	nd	
520.0	nd	nd	nd	nd	nd	nd	nd	nd	0.36	nd	nd	
540.0	nd	nd	nd	nd	nd	nd	nd	nd	0.36	nd	nd	
560.0	nd	nd	nd	nd	nd	nd	nd	nd	0.33	nd	nd	
580.0	nd	nd	nd	nd	nd	nd	nd	nd	0.23	nd	nd	
600.0	nd	nd	nd	nd	nd	nd	nd	nd	0.12	nd	nd	
610.0	nd	nd	nd	nd	nd	nd	nd	nd	0.24	nd	nd	
650.0	nd	nd	nd	nd	nd	nd	nd	nd	0.16	nd	nd	
680.0	nd	nd	nd	nd	nd	nd	nd	nd	0.18	nd	nd	
700.0	nd	nd	nd	nd	nd	nd	nd	nd	0.11	nd	nd	CARRIBUDDY
730.0	nd	nd	nd	nd	nd	nd	nd	nd	0.13	nd	nd	
750.0	nd	nd	nd	nd	nd	nd	nd	nd	0.16	nd	nd	
770.0	nd	nd	nd	nd	nd	nd	nd	nd	0.16	nd	nd	
800.0	nd	nd	nd	nd	nd	nd	nd	nd	0.14	nd	nd	
820.0	nd	nd	nd	nd	nd	nd	nd	nd	0.21	nd	nd	
840.0	nd	nd	nd	nd	nd	nd	nd	nd	0.20	nd	nd	
860.0	nd	nd	nd	nd	nd	nd	nd	nd	0.18	nd	nd	
880.0	nd	nd	nd	nd	nd	nd	nd	nd	0.21	nd	nd	
900.0	nd	nd	nd	nd	nd	nd	nd	nd	0.12	nd	nd	
920.0	nd	nd	nd	nd	nd	nd	nd	nd	0.14	nd	nd	
940.0	nd	nd	nd	nd	nd	nd	nd	nd	0.16	nd	nd	
960.0	nd	nd	nd	nd	nd	nd	nd	nd	0.16	nd	nd	
980.0	nd	nd	nd	nd	nd	nd	nd	nd	0.16	nd	nd	
1000.0	nd	nd	nd	nd	nd	nd	nd	nd	0.21	nd	nd	
1020.0	nd	nd	nd	nd	nd	nd	nd	nd	0.20	nd	nd	
1040.0	nd	nd	nd	nd	nd	nd	nd	nd	0.18	nd	nd	
1060.0	nd	nd	nd	nd	nd	nd	nd	nd	0.18	nd	nd	
1080.0	nd	nd	nd	nd	nd	nd	nd	nd	0.22	nd	nd	
1100.0	nd	nd	nd	nd	nd	nd	nd	nd	0.20	nd	nd	
1120.0	nd	nd	nd	nd	nd	nd	nd	nd	0.20	nd	nd	
1140.0	nd	nd	nd	nd	nd	nd	nd	nd	0.22	nd	nd	
1150.0	nd	nd	nd	nd	nd	nd	nd	nd	0.27	nd	nd	
1190.0	nd	nd	nd	nd	nd	nd	nd	nd	0.17	nd	nd	
1220.0	nd	nd	nd	nd	nd	nd	nd	nd	0.14	nd	nd	
1240.0	nd	nd	nd	nd	nd	nd	nd	nd	0.17	nd	nd	
1260.0	nd	nd	nd	nd	nd	nd	nd	nd	0.14	nd	nd	
1280.0	nd	nd	nd	nd	nd	nd	nd	nd	0.22	nd	nd	
1300.0	nd	nd	nd	nd	nd	nd	nd	nd	0.11	nd	nd	
1320.0	nd	nd	nd	nd	nd	nd	nd	nd	0.14	nd	nd	
1340.0	nd	nd	nd	nd	nd	nd	nd	nd	0.11	nd	nd	
1370.0	nd	nd	nd	nd	nd	nd	nd	nd	0.17	nd	nd	
1390.0	nd	nd	nd	nd	nd	nd	nd	nd	0.19	nd	nd	
1410.0	nd	nd	nd	nd	nd	nd	nd	nd	0.16	nd	nd	
1430.0	nd	nd	nd	nd	nd	nd	nd	nd	0.15	nd	nd	
1450.0	nd	nd	nd	nd	nd	nd	nd	nd	0.16	nd	nd	
1470.0	nd	nd	nd	nd	nd	nd	nd	nd	0.12	nd	nd	
1500.0	nd	nd	nd	nd	nd	nd	nd	nd	0.18	nd	nd	NITA
1520.0	nd	nd	nd	nd	nd	nd	nd	nd	0.21	nd	nd	
1540.0	nd	nd	nd	nd	nd	nd	nd	nd	0.24	nd	nd	
1560.0	nd	nd	nd	nd	nd	nd	nd	nd	0.36	nd	nd	GOLDWYER
1580.0	nd	nd	nd	nd	nd	nd	nd	nd	0.32	nd	nd	
1600.0	419	0.49	0.71	0.73	1.20	0.97	0.41	0.10	0.50	142	146	
0.0	nd	nd	nd	nd	nd	nd	nd	nd	0.18	nd	nd	
0.0	nd	nd	nd	nd	nd	nd	nd	nd	0.35	nd	nd	

CRYSTAL CREEK #1

ROCK-EVAL PYROLYSIS DATA (one run)

WELLNAME = CRYSTAL CREEK 1 DATE OF JOB = NOVEMBER 1988

SAMPLES	TMAX	S1	S2	S3	S1+S2	S2/S3	PI	PC	TOC	HI	OI	
1413.5	nd	nd	nd	nd	nd	nd	nd	nd	0.14	nd	nd	
1575.3	nd	nd	nd	nd	nd	nd	nd	nd	0.17	nd	nd	
1593.46 Core	nd	nd	nd	nd	nd	nd	nd	nd	0.05	nd	nd	
1596.81 Core	410	1.39	0.83	1.39	2.22	0.60	0.63	0.18	0.26	319	534	NITA (oil show)
1603.26 Core	410	2.74	1.07	1.03	3.81	1.04	0.72	0.32	0.32	334	321	
1607.46 Core	nd	nd	nd	nd	nd	nd	nd	nd	0.10	nd	nd	
1609.58 Core	nd	nd	nd	nd	nd	nd	nd	nd	0.12	nd	nd	
1610.06 Core	nd	nd	nd	nd	nd	nd	nd	nd	0.15	nd	nd	
1751.3	nd	nd	nd	nd	nd	nd	nd	nd	0.15	nd	nd	
1818.0	nd	nd	nd	nd	nd	nd	nd	nd	0.19	nd	nd	
1890.0	445	0.21	1.12	0.10	1.33	11.20	0.16	0.11	0.53	211	18	
1923.2	nd	nd	nd	nd	nd	nd	nd	nd	0.36	nd	nd	
1940.0	nd	nd	nd	nd	nd	nd	nd	nd	0.61	nd	nd	
1983.0	445	0.34	1.20	0.23	1.54	5.22	0.22	0.13	0.62	193	37	
2082.7	nd	nd	nd	nd	nd	nd	nd	nd	0.33	nd	nd	
2117.0	nd	nd	nd	nd	nd	nd	nd	nd	0.17	nd	nd	
2166.5	432	0.51	1.34	0.30	1.85	4.47	0.28	0.15	1.08	124	27	GOLDWYER
2181.0	453	1.51	2.61	0.05	4.12	52.20	0.37	0.34	3.37	77	1	
2202.5	418	0.24	0.52	0.05	0.76	10.40	0.32	0.06	0.58	89	8	
2230.5	417	0.29	0.46	0.23	0.75	2.00	0.39	0.06	0.69	66	33	
2246.5	429	0.34	0.55	0.26	0.89	2.12	0.38	0.07	0.94	58	27	
2265.0	nd	nd	nd	nd	nd	nd	nd	nd	0.16	nd	nd	
2357.9 Core	nd	nd	nd	nd	nd	nd	nd	nd	0.31	nd	nd	WILLARA

TMAX = Max. temperature S2
S1+S2 = Potential yield
PC = Pyrolysable carbon
OI = Oxygen Index

S1 = Volatile hydrocarbons (HC)
S3 = Organic carbon dioxide
TOC = Total organic carbon
nd = no data

S2 = HC generating potential
PI = Production index
HI = Hydrogen index

DARRIWELL - 1

Depth	TOC	VR Mean	Stratigraphic Unit
571	0.30	0.47	
611	0.60		
635	0.10	0.52	
652	0.30		
668	0.05		
721	0.20		Grant
773	0.08		
1010	<0.05		
1058	0		
1193	<0.05	0.84	
1451	<0.05		Carribuddy
1494	<0.05		Nita
1576	<0.05		Goldwyer
1588	0.13		

DODONEA #1

ROCK-EVAL PYROLYSIS DATA (one run)

DATE OF JOB = OCTOBER 1985

SAMPLES	TMAX	S1	S2	S3	S1+S2	S2/S3	PI	PC	TOC	HI	OI
Mellinjerie											
1033.12	426	0.92	12.11	0.61	13.03	19.85	0.07	1.08	4.00	302	15
Goldwyer											
1537.8	441	1.11	23.56	0.40	24.67	58.90	0.04	2.05	3.60	654	11
1538.28	442	0.75	8.34	1.07	9.09	7.79	0.08	0.75	1.70	490	62
1538.43	438	0.80	13.39	1.49	14.19	8.99	0.06	1.18	2.20	608	67
1539.67	442	0.94	10.30	1.23	11.24	8.37	0.08	0.93	1.80	572	68
1539.98	441	0.81	12.84	1.49	13.65	8.62	0.06	1.13	2.10	611	70
1540.1	440	1.25	28.32	1.24	29.57	22.84	0.04	2.45	4.05	699	30
1541.59	443	0.18	1.79	1.30	1.97	1.38	0.09	0.16	0.60	298	216
1542.95	443	0.24	2.22	1.00	2.46	2.22	0.10	0.20	0.83	267	120
1542.31	444	0.26	2.64	0.86	2.90	3.07	0.09	0.24	0.87	303	98
1542.48	442	0.35	2.98	0.88	3.33	3.39	0.11	0.28	1.05	283	83
1548.24	444	0.59	6.83	1.28	7.42	5.34	0.08	0.62	1.40	487	91
1548.77	443	0.62	7.07	1.82	7.69	3.88	0.08	0.64	1.50	471	121
1548.99	441	0.64	2.06	1.96	2.70	1.05	0.24	0.22	0.74	278	264
Nambeet											
2034.74	461	0.01	0.10	0.43	0.11	0.23	0.09	0.01	0.17	58	252
2038.02	491	0.02	0.15	0.15	0.17	1.00	0.12	0.01	0.24	62	62
2040.89	345	0.01	0.03	0.84	0.04	0.04	0.25	0.00	0.20	15	420

TMAX = Max. temperature S2
S1+S2 = Potential yield
PC = Pyrolysable carbon
OI = Oxygen Index

SI = Volatile hydrocarbons (HC)
S3 = Organic carbon dioxide
TOC = Total organic carbon
nd = No data

S2 = HC generating potential
PI = Production index
HI = Hydrogen index

FRANKENSTEIN #1

TOC CONTENTS

Depth (m)	TOC(%)	
434.54	0.23	
451.49	0.35	
475.04	0.21	
530.04	0.44	
603.97	0.64	
680.04	0.49	
650-670	0.43	
670-690	0.30	
690-710	0.19	
710-730	0.12	
730-750	0.17	
741.99	0.16	
750-770	0.10	
770-790	0.11	GRANT
790-810	0.08	
810-830	0.08	
830-850	0.09	
850-870	0.07	
870-890	0.15	M.
882.01	0.16	CARB.
890-910	0.11	
901.05	0.22	ANG. UNCON.
930-950	0.11	925m-
1120-1140	0.06	
1140-1160	0.06	WORRAL
1160-1180	0.05	WALDECK
1180-1200	0.04	
1200-1220	0.02	ELSA
1220-1240	0.04	
1240-1260	0.06	
1260-1280	0.05	
1280-1300	0.04	
1379.32	<0.05	
1880.04	<0.05	
1920-1940	0.13	
1940-1960	0.16	
1960-1980	0.16	
1980-2000	0.16	
2000-2015	0.14	
2015-2033	0.20	
2026.98	0.10	
2033-2051	0.12	
2051-2069	0.03	
2069-2087	0.08	
2087-2105	0.09	CARRIBUDDY
2100.55	0.17	
2105-2123	0.08	
2123-2141	0.07	
2141-2159	0.10	
2159-2177	0.07	
2166.73	0.15	
2177-2195	0.08	
2195-2218	0.07	
2186-2204	0.07	

Depth (m)	TOC(%)	
2203.15	0.16	
2213-2231	0.07	
2231-2249	0.08	
2233.52	0.11	
2249.47	0.10	NITA
2249-2267	0.08	
2259.40	0.18	
2267-2285	0.07	
2285-2303	0.18*	
2303-2321	0.25*	
2321-2339	0.32*	
2327.14	0.30	
2339-2357	0.25	U. GOLDWYER
2347.09	0.37	
2357-2375	0.25	
2375-2393	0.27	
2397.99	0.19	
2393-2411	0.26	SANDSTONE
2411-2429	0.27	INTRA
2429-2447	0.31	
2441.59	0.44	GOLDWYER
2447-2465	0.25	LIMESTONE
2454.51	0.21	
2465-2483	0.32	
2479.46	<0.05	
2483-2501	0.30	
2501-2519	0.22*	L. GOLDWYER
2517.88	0.26	
2519-2537	0.15*	
2537-2555	0.27	
2542.83	0.27	
2555-2573	0.15	
2571.25	0.22	
2573-2591	0.17	
2591-2609	0.19	
2601.20	0.23	
2609-2627	0.15	
2627-2645	0.16	
2645-2663	0.18	
2652.13	0.36	
2663-2681	0.08	
2681-2699	0.15	
2699-2717	0.16	METAMORPHIC
2717-2735	0.18	
2735-2753	0.11	
2753-2771	0.08	BASEMENT
2771-2789	0.11	
2789-2807	0.13	

* EOH ∝ GC

FRANKENSTEIN #1

Rock-Eval Pyrolysis 25/01/89

Client: COMMAND PETROLEUM

Well : FRANKENSTEIN-1

Depth (m)	T Max	S1	S2	S3	S1+S2	PI	S2/S3	PC	TOC	HI	OI	
530	392	0.01	0.17	0.36	0.18	0.06	0.47	0.01	0.44	38	81	GRANT
603	423	0.00	0.21	0.30	0.21	0.00	0.70	0.01	0.64	32	46	
650	430	0.00	0.09	0.13	0.09	0.00	0.69	0.00	0.43	20	30	
680	350	0.03	0.13	0.28	0.16	0.19	0.46	0.01	0.49	26	57	
2441	419	0.09	0.28	0.70	0.37	0.25	0.40	0.03	0.44	63	159	GOLDWYER

GAP CREEK #1

ROCK-EVAL PYROLYSIS DATA (one run)

WELLNAME = GAP CREEK 1 DATE OF JOB = SEPTEMBER 1988

SAMPLES	TMAX	S1	S2	S3	S1+S2	S2/S3	PI	PC	TOC	HI	OI	
425 swc 24	427	0.21	0.38	0.28	0.59	1.36	0.36	0.05	0.45	84	62	Go Go Fm
500 swc 23	nd	nd	nd	nd	nd	nd	nd	nd	0.15	nd	nd	
593 swc 17	nd	nd	nd	nd	nd	nd	nd	nd	0.21	nd	nd	
865 swc 16	nd	nd	nd	nd	nd	nd	nd	nd	0.27	nd	nd	
1015 swc 13	nd	nd	nd	nd	nd	nd	nd	nd	0.11	nd	nd	
1133.0-1136.0	nd	nd	nd	nd	nd	nd	nd	nd	0.19	nd	nd	GAP CREEK Fm. ORD.
1218 swc 12	436	0.16	1.67	0.18	1.83	9.28	0.09	0.15	0.68	245	26	
1244.0-1247.0	336	0.41	1.39	2.51	1.80	0.55	0.23	0.15	0.75	185	334	
1271.0-1274.0	nd	nd	nd	nd	nd	nd	nd	nd	0.40	nd	nd	
1337.0-1340.0	337	0.77	1.94	3.17	2.71	0.61	0.28	0.22	0.81	239	391	
1373.0-1376.0	nd	nd	nd	nd	nd	nd	nd	nd	0.37	nd	nd	
1400 swc 8	nd	nd	nd	nd	nd	nd	nd	nd	0.12	nd	nd	EMMANUEL Fm. ORD.
1455 swc 7	nd	nd	nd	nd	nd	nd	nd	nd	0.08	nd	nd	

TMAX = Max. temperature S2
S1 = Volatile hydrocarbons (HC)
S2 = HC generating potential
S1+S2 = Potential yield
S3 = Organic carbon dioxide
PI = Production index
PC = Pyrolysable carbon
TOC = Total organic carbon
HI = Hydrogen index
OI = Oxygen Index
nd = no data

PCD-158

17-Apr-91

O R G C H E M Database

Pcd 158 Australia Canning Basin
PEDIN number: File number:
************* CONFIDENTIAL ***************

Geology summary

Depth range(m)		Age	Formation	No
114.0	148.9	Lw Ordovician	Emmanuel Fm	3

Rock Eval data

BMR #	Depths (m)		Tmax	S1	S2	S3	PI	S2/S3	PC	TOC	HI	OI
4547			394			.71						
4548	114.0	114.0	435	.13	3.63	.82	.03	4.43	.31	1.03	352	80
4549	148.9	148.9	400	.38	.33	1.40	.54	.24	.06			

Note: PCD-158 is a "fair" to "poor" source rock. It is probably immature Type I bearing in mind its age.

GREAT SANDY #1

TOC DATA

Sample Depth (m)	%TOC	
1600-1615	0.23	
1615-1630	0.18	
1635-1645	0.23	GOLDWYER
1645-1660	0.25	
1660-1675	0.18	
1675-1690	0.20	
1690-1705	0.27	
1705-1720	0.35	WILLARA
1735-1740	0.24	

Meridian Oil NL

GREVILLEA #1

GREVILLEA TOTAL ORGANIC CARBON ANALYSES

DEPTH(m)	LITHOLOGY	FORMATION	% TOC	
1403.5	Claystone (SWC)	Pillara Slope Facies	0.13;	0.13R
1631.0	Limestone (SWC)	Pillara Limestone	0.14;	0.13R
1636.5	Limestone (SWC)	Pillara Limestone	0.13	
1638.9	Limestone (SWC)	Pillara Limestone	0.12	
1646.0	Limestone (SWC)	Pillara Limestone	0.23	
1653.0	Limestone (SWC)	Pillara Limestone	0.13	
1700.0	Limestone (SWC)	Pillara Limestone	0.12	
1714.5	Limestone (SWC)	Pillara Limestone	0.17	
1771.7	Limestone (SWC)	Pillara Limestone	0.19	
1800.0	Limestone (SWC)	Pillara Limestone	0.18	
2172.5-75	Limestone	Emanuel Formation	0.13	
2412.5-15	Siltstone Fraction	Emanuel Formation	0.24	
2425-27.5	Siltstone Fraction	Emanuel Formation	0.29	
2425-27.5	Dolostone Fraction	Emanuel Formation	0.10	
2435-37.5	Siltstone Fraction	Emanuel Formation	0.30	
2447.5-50	Siltstone Fraction	Emanuel Formation	0.29	
2465-67.5	Dolostone Fraction	Emanuel Formation	0.09	

HEDONIA #1

ROCK-EVAL PYROLYSIS DATA (one run)

WELLNAME = HEDONIA #1

DATE OF JOB = SEPTEMBER 1984

DEPTH(m)	TMAX	S1	S2	S3	S1+S2	S2/S3	PI	PC	TOC	HI	OI	PC/TOC
145.0- 150.0	nd	nd	nd	nd	nd	nd	nd	nd	0.07	nd	nd	
200.0	nd	nd	nd	nd	nd	nd	nd	nd	0.44	nd	nd	
243.5	421	0.05	0.65	0.46	0.70	1.41 0·77	0.07 0·12	0.06 0·035	0.84 1·005	77	54	0·06
288.3	406	0.15	0.69	8.93	0.84	0.08	0.18	0.07	1.17	58	763	
309.5	nd	nd	nd	nd	nd	nd	nd	nd	0.15	nd	nd	
328.2	nd	nd	nd	nd	nd	nd	nd	nd	0.10	nd	nd	
343.0	nd	nd	nd	nd	nd	nd	nd	nd	0.13	nd	nd	
378.6	nd	nd	nd	nd	nd	nd	nd	nd	0.14	nd	nd	
423.3	nd	nd	nd	nd	nd	nd	nd	nd	0.13	nd	nd	
459.2	417	0.46	3.98	0.64	4.44 6·16	6.22	0.10 0·09	0.37 0·51	2.05 2·30	194	31	0·22
476.4	421	0.60	7.28	0.89	7.88	8.18	0.08	0.65	2.55	285	34	
489.5	nd	nd	nd	nd	nd	nd	nd	nd	0.17	nd	nd	
492.7	429	0.08	0.22	1.54	0.30	0.14	0.27	0.02	0.53	41	290	
508.5	nd	nd	nd	nd	nd	nd	nd	nd	0.08	nd	nd	
516.0	nd	nd	nd	nd	nd	nd	nd	nd	0.13	nd	nd	
540.0- 555.0	nd	nd	nd	nd	nd	nd	nd	nd	0.08	nd	nd	
569.5	nd	nd	nd	nd	nd	nd	nd	nd	0.10	nd	nd	
570.0- 585.0	nd	nd	nd	nd	nd	nd	nd	nd	0.12	nd	nd	
585.0- 600.0	nd	nd	nd	nd	nd	nd	nd	nd	0.18	nd	nd	
595.0	nd	nd	nd	nd	nd	nd	nd	nd	0.10	nd	nd	
605.3	nd	nd	nd	nd	nd	nd	nd	nd	0.10	nd	nd	
600.0- 615.0	nd	nd	nd	nd	nd	nd	nd	nd	0.15	nd	nd	
610.0	447	0.06	0.24	0.13	0.30	1.85	0.20	0.02	0.55	43	23	
630.0- 645.0	nd	nd	nd	nd	nd 0·35	nd	nd 0·20	nd	0.15 0·63	nd	nd	0·44
638.3	420	0.08	0.32	0.33	0.40	0.97	0.20	0.03	0.71	45	46	
656.0	nd	nd	nd	nd	nd	nd	nd	nd	0.26	nd	nd	
660.0- 675.0	nd	nd	nd	nd	nd	nd	nd	nd	0.18	nd	nd	
674.6	nd	nd	nd	nd	nd	nd	nd	nd	0.38	nd	nd	
690.0- 705.0	nd	nd	nd	nd	nd	nd	nd	nd	0.22	nd	nd	
702.5	nd	nd	nd	nd	nd	nd	nd	nd	0.45	nd	nd	
705.0- 720.0	nd	nd	nd	nd	nd	nd	nd	nd	0.08	nd	nd	
729.3	nd	nd	nd	nd	nd	nd	nd	nd	0.47	nd	nd	
757.0	427	0.09	0.20	0.23	0.29	0.87	0.31	0.02	0.52	38	44	
750.0- 765.0	415	0.12	0.40	1.55	0.52	0.26	0.23 0·33	0.04 0·025	0.66 0·53	60	234	0·05
765.0- 780.0	403	0.09	0.08	1.37	0.17	0.06	0.53	0.01	0.45	17	304	
780.0- 795.0	425	0.09	0.27	0.51	0.36	0.53	0.25	0.03	0.49	55	104	
796.0	nd	nd	nd	nd	nd	nd	nd	nd	0.10	nd	nd	
795.0- 810.0	nd	nd	nd	nd	nd	nd	nd	nd	0.30	nd	nd	
808.2	nd	nd	nd	nd	nd	nd	nd	nd	0.21	nd	nd	
810.0- 825.0	nd	nd	nd	nd	nd	nd	nd	nd	0.14	nd	nd	
840.0- 855.0	nd	nd	nd	nd	nd	nd	nd	nd	0.11	nd	nd	
848.0	nd	nd	nd	nd	nd	nd	nd	nd	0.17	nd	nd	
873.0	nd	nd	nd	nd	nd	nd	nd	nd	0.11	nd	nd	
870.0- 885.0	nd	nd	nd	nd	nd	nd	nd	nd	0.30	nd	nd	
885.0- 900.0	nd	nd	nd	nd	nd	nd	nd	nd	0.06	nd	nd	
900.0- 915.0	nd	nd	nd	nd	nd	nd	nd	nd	0.10	nd	nd	
915.0- 930.0	433	1.19	4.07	0.35	5.26	11.63	0.23	0.44	1.53	266	22	

GRANT

TMAX = Max. temperature S2
S1+S2 = Potential yield
PC = Pyrolysable carbon (83% of S1+S2)
OI = Oxygen Index
S1 = Volatile hydrocarbons (HC)
S3 = Organic carbon dioxide
TOC = Total organic carbon
nd = no data
S2 = HC generating potential
PI = Production index
HI = Hydrogen index

HEDONIA #1

ROCK-EVAL PYROLYSIS DATA (one run)

WELLNAME = HEBONIA #1 DATE OF JOB = SEPTEMBER 1984

	DEPTH(m)	TMAX	S1	S2	S3	S1+S2		S2/S3	PI		PC		TOC		HI		OI	PC/TC
GOLDWYER	930.0- 945.0	439	0.26	0.96	0.27	1.22		3.56	0.21		0.10		0.64		150		42	
	935.4- 944.0	430	0.30	0.69	0.33	0.99		2.09	0.30		0.08		0.60		115		55	
	945.0- 960.0	430	0.84	2.09	0.42	2.93		4.98	0.29		0.24		1.19		175		35	
	960.0- 975.0	435	1.72	4.28	0.41	6.00		10.44	0.29		0.50		2.07		206		19	
	975.0- 990.0	427	1.30	2.69	0.62	3.99		4.34	0.33		0.33		1.48		181		41	
	990.0-1005.0	435	0.91	1.93	0.26	2.84	2.79	7.42	0.32	0.32	0.24		1.19		162	155	21	0.20
	1005.0-1020.0	427	0.95	1.69	0.37	2.64		4.57	0.36		0.22		1.19		142		31	
	1022.5	432	0.84	1.14	0.14	1.98		8.14	0.42		0.16		1.00		114		13	
	1020.0-1035.0	430	0.49	0.95	0.30	1.44		3.17	0.34		0.12		0.84		113		35	
	1046.7	428	0.58	0.86	0.62	1.44		1.39	0.40		0.12		0.99		86		62	
WILLARA	1075.8	nd	nd	nd	nd	nd		nd	nd		nd		0.37		nd		nd	
	1075.9	nd	nd	nd	nd	nd		nd	nd		nd		0.11		nd		nd	
	1122.0	nd	nd	nd	nd	nd		nd	nd		nd		0.16		nd		nd	
	1192.0	nd	nd	nd	nd	nd		nd	nd		nd		0.09		nd		nd	
	1201.0-1216.0	333	0.10	0.33	2.72	0.43		0.12	0.23		0.04		0.46		71		591	
	1219.0	nd	nd	nd	nd	nd		nd	nd		nd		0.29		nd		nd	
	1231.0-1246.0	nd	nd	nd	nd	nd		nd	nd		nd		0.16		nd		nd	
	1261.0-1276.0	nd	nd	nd	nd	nd		nd	nd		nd		0.22		nd		nd	
	1274.0	nd	nd	nd	nd	nd		nd	nd		nd		0.38		nd		nd	
NAMBEET	1298.0	402	0.58	0.44	0.62	1.02		0.71	0.57		0.08		0.80		55		77	
	1291.0-1306.0	390	0.41	0.49	0.92	0.90		0.53	0.46		0.07		0.65		75		141	
	1306.0-1321.0	407	0.24	0.18	0.99	0.42		0.18	0.57		0.03		0.49		36		202	
	1321.0-1336.0	419	0.29	0.34	0.62	0.63		0.55	0.46		0.05		0.63		53		98	
	1336.0-1351.0	416	0.25	0.18	0.95	0.43		0.19	0.58		0.04		0.56		32		169	
	1344.0	405	0.27	0.13	0.51	0.40		0.25	0.67		0.03		0.55		23		92	
	1351.0-1366.0	403	0.24	0.29	0.29	0.53		1.00	0.45		0.04		0.52		55		55	
	1369.5	405	0.28	0.10	0.62	0.38		0.16	0.74		0.03		0.60		16		103	
	1366.0-1381.0	402	0.22	0.14	0.48	0.36		0.29	0.61		0.03		0.57		24		84	
	1381.0-1396.0	430	0.16	0.19	0.38	0.35	0.46	0.50	0.46	0.57	0.03	0.04	0.51	0.60	37		74	0.07
	1396.0-1411.0	364	0.16	0.11	0.74	0.27		0.15	0.59		0.02		0.48		22		154	
	1411.0-1126.0	nd	nd	nd	nd	nd		nd	nd		nd		0.38		nd		nd	
	1441.0-1456.0	437	0.14	0.12	0.45	0.26		0.27	0.54		0.02		0.59		20		76	
	1450.6	464	0.34	0.21	0.30	0.55		0.70	0.62		0.05		1.09		19		27	
	1473.0	475	0.15	0.10	0.53	0.25		0.19	0.60		0.02		0.53		18		100	
	1471.0-1486.0	353	0.10	0.05	0.23	0.15		0.22	0.67		0.01		0.44		11		52	
	1486.0-1501.0	nd	nd	nd	nd	nd		nd	nd		nd		0.47		nd		nd	
	1501.0-1516.0	nd	nd	nd	nd	nd		nd	nd		nd		0.18		nd		nd	
	1516.0-1531.0	nd	nd	nd	nd	nd		nd	nd		nd		0.41		nd		nd	
GRANT	1531.0-1543.0	nd	nd	nd	nd	nd		nd	nd		nd		0.23		nd		nd	

TMAX = Max. temperature S2
S1+S2 = Potential yield
PC = Pyrolysable carbon
OI = Oxygen Index

S1 = Volatile hydrocarbons (HC)
S3 = Organic carbon dioxide
TOC = Total organic carbon
nd = no data

S2 = HC generating potential
PI = Production index
HI = Hydrogen index

HILLTOP #1

ROCK-EVAL PYROLYSIS DATA (one run)

WELLNAME = HILLTOP 1. DATE OF JOB = SEPTEMBER 1987

SAMPLES		TMAX	S1	S2	S3	S1+S2	S2/S3	PI	PC	TOC	HI	RC	OI	
1052.5	SWC 29	433	1.68	4.74	0.25	6.42	18.96	0.26	0.53	2.10	225	1·57	11	GOLDWYER
1079.1	SWC 28	438	1.10	2.37	0.31	3.47	7.65	0.32	0.29	1.45	163	1·16	21	
1098.0	SWC 27	432	2.29	4.51	0.34	6.80	13.26	0.34	0.56	2.50	180	1·94	13	
1128.1	SWC 26	438	0.92	1.42	0.28	2.34	5.07	0.39	0.19	1.30	109	1·11	21	
1170.0	SWC 25	447	0.42	0.54	0.31	0.96	1.74	0.44	0.08	0.80	67	0·72	38	
1286.1	SWC 20	399	0.03	0.02	0.40	0.05	0.05	0.60	0.00	0.06	33		666	WILLARA
1353.1	SWC 18	424	0.10	0.15	0.50	0.25	0.30	0.40	0.02	0.32	46		156	
1420.7	SWC 16	433	0.19	0.18	0.42	0.37	0.43	0.51	0.03	0.64	28		65	NAMBEET
1436.0	SWC 15	462	0.24	0.17	0.38	0.41	0.45	0.59	0.03	0.73	23		52	
1483.5	SWC 13	395	0.07	0.05	0.33	0.12	0.15	0.58	0.01	0.59	8		55	
1505.0	SWC 12	330	0.04	0.07	0.42	0.11	0.17	0.36	0.01	0.43	16		97	
1538.0	SWC 11	335	0.02	0.04	0.40	0.06	0.10	0.33	0.00	0.60	6		66	
1605.0	SWC 9	345	0.01	0.02	0.51	0.03	0.04	0.33	0.00	0.47	4		108	
1630.0	SWC 8	331	0.06	0.05	0.71	0.11	0.07	0.55	0.01	0.72	6		98	

TMAX = Max. temperature S2
S1+S2 = Potential yield
PC = Pyrolysable carbon
OI = Oxygen Index

S1 = Volatile hydrocarbons (HC)
S3 = Organic carbon dioxide
TOC = Total organic carbon
nd = no data

S2 = HC generating potential
PI = Production index
HI = Hydrogen index

JUNO #1

ROCK-EVAL PYROLYSIS DATA (one run)

WELLNAME = JUNO 1 DATE OF JOB = NOVEMBER 1985

DEPTH(m)	TMAX	S1	S2	S3	S1+S2	S2/S3	PI	PC	TOC	HI	OI	
630.0- 660.0	423	0.03	0.28	1.40	0.31	0.20	0.10	0.03	0.61	45	229	GRANT
660.0- 690.0	423	0.01	0.16	0.96	0.17	0.17	0.06	0.01	0.59	27	162	
690.0- 720.0	423	0.01	0.15	1.05	0.16	0.14	0.06	0.01	0.53	28	198	
720.0- 750.0	423	0.03	0.15	0.62	0.18	0.24	0.17	0.01	0.50	30	124	
750.0- 780.0	427	0.02	0.14	0.51	0.16	0.27	0.13	0.01	0.46	30	110	
780.0- 810.0	426	0.02	0.12	0.68	0.14	0.18	0.14	0.01	0.38	31	178	
1530.0-1560.0	nd	nd	nd	nd	nd	nd	nd	nd	0.14	nd	nd	CARRI-BUDDY
1560.0-1590.0	nd	nd	nd	nd	nd	nd	nd	nd	0.15	nd	nd	
1590.0-1620.0	nd	nd	nd	nd	nd	nd	nd	nd	0.14	nd	nd	
1620.0-1650.0	nd	nd	nd	nd	nd	nd	nd	nd	0.16	nd	nd	NITA
1650.0-1680.0	nd	nd	nd	nd	nd	nd	nd	nd	0.16	nd	nd	
1680.0-1710.0	nd	nd	nd	nd	nd	nd	nd	nd	0.09	nd	nd	
1710.0-1740.0	nd	nd	nd	nd	nd	nd	nd	nd	0.10	nd	nd	
1740.0-1770.0	nd	nd	nd	nd	nd	nd	nd	nd	0.10	nd	nd	

GOLDWYER @ 1750

TMAX = Max. temperature S2
S1+S2 = Potential yield
PC = Pyrolysable carbon
OI = Oxygen Index
S1 = Volatile hydrocarbons (HC)
S3 = Organic carbon dioxide
TOC = Total organic carbon
nd = no data
S2 = HC generating potential
PI = Production index
HI = Hydrogen index

JUSTAGO #1

ROCK-EVAL PYROLYSIS DATA (two run)

WELLNAME = JUSTAGO 1 DATE OF JOB = JULY 1985

DEPTH(m)	TMAX	S1	S2	S3	S1+S2	S2/S3	PI	PC	TOC	HI	OI	
215.0	nd	nd	nd	nd	nd	nd	nd	nd	0.17	nd	nd	
385.0	nd	nd	nd	nd	nd	nd	nd	nd	0.10	nd	nd	
681.0	nd	nd	nd	nd	nd	nd	nd	nd	0.08	nd	nd	
892.5	nd	nd	nd	nd	nd	nd	nd	nd	0.14	nd	nd	
910.0	nd	nd	nd	nd	nd	nd	nd	nd	0.13	nd	nd	
942.5	nd	nd	nd	nd	nd	nd	nd	nd	0.21	nd	nd	
942.5 picked	nd	nd	nd	nd	nd	nd	nd	nd	0.15	nd	nd	
1020.0	nd	nd	nd	nd	nd	nd	nd	nd	0.08	nd	nd	
1891.5	441	0.33	0.37	0.10	0.70	3.70	0.47	0.06	0.55	67	18	LOWER PILLARA PLATFORM
1950.0	443	0.19	0.38	0.17	0.57	2.24	0.33	0.05	0.42	90	40	
2027.0	443	0.25	0.49	0.20	0.74	2.45	0.34	0.06	0.55	89	36	
2450.1	nd	nd	nd	nd	nd	nd	nd	nd	0.19	nd	nd	
3047.5	nd	nd	nd	nd	nd	nd	nd	nd	0.18	nd	nd	ORD. (EMMANUAL)
3052.1	339	0.21	0.13	0.45	0.34	0.29	0.62	0.03	0.42	30	107	
3056.1	nd	nd	nd	nd	nd	nd	nd	nd	0.11	nd	nd	

TMAX = Max. temperature S2
S1 = Volatile hydrocarbons (HC)
S2 = HC generating potential
S1+S2 = Potential yield
S3 = Organic carbon dioxide
PI = Production index
PC = Pyrolysable carbon
TOC = Total organic carbon
HI = Hydrogen index
OI = Oxygen Index
nd = no data

LEO #1

TABLE : TOC VALUES

Depth (m)	TOC (%)		Depth (m)	TOC (%)	
660- 680	0.80		1260-1280	0.76	LOWER
680- 700	0.70		1280-1300	1.28	MALLEWA
700- 720	0.56		1300-1320	0.52	SALT
720- 740	0.58		1320-1340	0.28	
740- 760	0.52		1340-1360	0.16	
760- 780	0.46		1360-1380	0.15	
780- 800	0.56		1380-1400	0.09	
800- 820	0.51		1400-1420	0.13	
820- 840	0.92		1420-1440	0.21	
840- 860	0.28	GRANT	1440-1460	0.61	MINJOO
860- 880	0.29		1460-1475	0.24	SALT
880- 900	0.15		1475-1490	0.16	EQUIVALENT
900- 920	0.10		1490-1505	0.20	
920- 940	0.08		1505-1520	0.13	
940- 960	0.10		1520-1535	0.15	TOP NITA
960- 980	0.23		1535-1550	0.12	
980-1000	0.09	WORRAL	1550-1565	0.15	
1000-1020	0.10		1565-1580	0.41	
1020-1040	0.07		1580-1595	0.22	
1040-1060	0.04		1595-1610	0.08	NITA
1060-1080	0.03		1610-1625	0.10	
1080-1100	0.16		1625-1640	0.10	
1100-1120	0.09		1640-1655	0.11	
1120-1140	0.08	CARRIBUDDY	1655-1670	0.15	
1140-1160	0.17		1670-1685	0.16	
1160-1180	0.22		1685-1700	0.23	
1180-1200	0.09		1700-1715	0.20	GOLDWYER
1200-1220	0.16		1715-1730	0.14	
1220-1240	0.16		1730-1745	0.10	
1240-1260	0.22		1745-1760	0.12	

LEO #1

TABLE : (Continued)

Depth (m)	TOC (%)		Depth (m)	TOC (%)	
1760-1775	0.15		2060-2075	0.24	
1775-1790	0.12		2075-2090	0.16	
1790-1805	0.15		2090-2105	0.22	
1805-1820	0.14		2105-2120	0.18	
1820-1835	0.17		2120-2135	0.17	
1835-1850	0.19		2135-2150	0.16	
1850-1865	0.18		2150-2165	0.12	
1865-1880	0.22		2165-2180	0.14	
1880-1895	0.18	GOLDWYER	2180-2195	0.15	WILLARA
1895-1910	0.17		2195-2210	0.17	
1910-1925	0.21		2210-2225	0.17	
1925-1940	0.16		2225-2240	0.23	
1940-1955	0.23		2240-2255	0.16	
1955-1970	0.22		2255-2270	0.18	
1970-1985	0.21		2270-2285	0.20	NAM-BEET
1985-2000	0.10		2285-2300	0.15	
2000-2015	0.15	WILLARA	2300-2315	0.09	
2015-2030	0.18		2315-2330	0.11	BASEMENT
2030-2045	0.19		2330-2345	0.08	
2045-2060	0.19				

LEO #1

Rock-Eval Pyrolysis 08/09/88

Client: COMMAND PETROLEUM NL

Well: LEO-1

Depth (m)	T Max	S1	S2	S3	S1+S2	PI	S2/S3	PC	TOC	HI	OI	
660-680	426	0.04	0.30	0.40	0.34	0.12	0.75	0.02	0.80	37	50	
680-700	430	0.04	0.27	0.26	0.31	0.13	1.03	0.02	0.70	38	37	
700-720	305	0.07	0.21	0.60	0.28	0.25	0.35	0.02	0.56	37	107	
720-740	430	0.20	0.72	1.09	0.92	0.22	0.66	0.07	0.58	124	187	
740-760	426	0.11	0.38	0.63	0.49	0.23	0.60	0.04	0.52	73	121	GRANT
760-780	426	0.10	0.45	0.65	0.55	0.19	0.69	0.04	0.46	97	141	
780-800	322	0.06	0.25	0.52	0.31	0.20	0.48	0.02	0.56	44.	92	
800-820	275	0.05	0.12	0.53	0.17	0.31	0.22	0.01	0.51	23	103	
820-840	336	0.02	0.14	0.29	0.16	0.12	0.48	0.01	0.92	15	31	
1260-1280	427	0.99	3.03	1.44	4.02	0.25	2.10	0.33	0.76	398	189	
1280-1300	410	2.71	6.26	2.10	8.97	0.30	2.98	0.74	1.28	489	164	CARRI-BUDDY
1300-1320	426	0.53	1.30	1.13	1.83	0.29	1.15	0.15	0.52	250	217	
1440-1460	397	0.41	1.34	1.04	1.75	0.24	1.28	0.14	0.61	219	170	
1565-1580	403	0.30	1.80	0.31	2.10	0.14	5.80	0.17	0.41	439	75	NITA

Note: Oil show in Nita; T Max bimodal at 403 445 C

CRAE SS # 3,4,6

Rock-Eval Pyrolysis 23/08/88

Client: COMMAND PETROLEUM

Well: CRAE SS# 3,4,6

Depth (m)	T Max	S1	S2	S3	S1+S2	PI	S2/S3	PC	TOC	HI	OI
SS# 3											
CARRIBUDDY COAL											
1330.5	443	11.20	135.93	0.87	147.13	0.08	156.24	12.26	38.60	352	2
1335.4	440	13.75	174.79	0.83	188.54	0.07	210.59	15.71	54.30	321	1
1352.1	446	9.59	111.53	0.91	121.12	0.08	122.56	10.09	32.70	341	2
1355.2	444	12.54	146.17	0.68	158.71	0.08	214.95	13.22	35.00	417	1
1359.4	441	1.62	12.70	0.32	14.32	0.11	39.68	1.19	3.88	327	8
GOLDWYER FORMATION											
1719.8	418	0.09	0.01	0.11	0.10	0.90	0.09	0.00	0.25	4	44
SS# 4											
GOLDWYER FORMATION											
1460.2	433	0.19	0.57	0.21	0.76	0.25	2.71	0.06	0.44	129	47
1481.8	423	0.04	0.04	0.11	0.08	0.50	0.36	0.00	0.32	12	34
1500.8	434	0.04	0.29	0.02	0.33	0.12	14.50	0.02	0.40	72	5
SS# 6											
CARRIBUDDY COAL											
1415.8	408	0.20	0.25	0.07	0.45	0.45	3.57	0.03	0.92	27	7
GOLDWYER FORMATION											
1554.5	337	0.01	0.07	0.93	0.08	0.12	0.07	0.00	0.24	29	387
1585.8	260	0.02	0.02	0.01	0.04	0.50	2.00	0.00	0.33	6	3
1601.6	231	0.02	0.00	0.06	0.02	1.00	0.00	0.00	0.21	0	28
1610.5	235	0.01	0.00	0.53	0.01	0.01	0.00	0.00	0.15	0	353

MUSCA #1

WELLNAME = MUSCA NO.1 DATE OF JOB = DECEMBER 1982

ROCK-EVAL PYROLYSIS DATA

DEPTH(m)		TMAX	S1	S2	S3	S1+S2	S2/S3	PI	PC	TOC	HI	OI	
540.0		nd	nd	nd	nd	nd	nd	nd	nd	0.42	nd	nd	GRANT
560.0		nd	nd	nd	nd	nd	nd	nd	nd	0.44	nd	nd	
580.0		410	0.13	0.49	1.04	0.62	0.47	0.21	0.05	0.73	67	142	
600.0		421	0.05	0.22	0.32	0.27	0.69	0.19	0.02	0.54	40	59	
620.0		423	0.05	0.23	0.29	0.28	0.79	0.18	0.02	0.55	41	52	
621.0	SWC	430	0.03	0.17	1.30	0.20	0.13	0.15	0.02	0.56	30	232	
640.0		nd	nd	nd	nd	nd	nd	nd	nd	0.34	nd	nd	
660.0		nd	nd	nd	nd	nd	nd	nd	nd	0.25	nd	nd	
680.0		nd	nd	nd	nd	nd	nd	nd	nd	0.31	nd	nd	
700.0		nd	nd	nd	nd	nd	nd	nd	nd	0.46	nd	nd	
720.0		nd	nd	nd	nd	nd	nd	nd	nd	0.42	nd	nd	
740.0		nd	nd	nd	nd	nd	nd	nd	nd	0.14	nd	nd	
760.0		nd	nd	nd	nd	nd	nd	nd	nd	0.16	nd	nd	
840.0		nd	nd	nd	nd	nd	nd	nd	nd	0.17	nd	nd	
860.0		nd	nd	nd	nd	nd	nd	nd	nd	0.43	nd	nd	
880.0		nd	nd	nd	nd	nd	nd	nd	nd	0.28	nd	nd	
900.0		nd	nd	nd	nd	nd	nd	nd	nd	0.28	nd	nd	
914.6	SWC	nd	nd	nd	nd	nd	nd	nd	nd	0.11	nd	nd	CARRIBUDDY
920.0		nd	nd	nd	nd	nd	nd	nd	nd	0.20	nd	nd	
940.0		nd	nd	nd	nd	nd	nd	nd	nd	0.20	nd	nd	
960.0		nd	nd	nd	nd	nd	nd	nd	nd	0.15	nd	nd	
980.0		nd	nd	nd	nd	nd	nd	nd	nd	0.26	nd	nd	
1000.0		nd	nd	nd	nd	nd	nd	nd	nd	0.28	nd	nd	
1020.0		nd	nd	nd	nd	nd	nd	nd	nd	0.24	nd	nd	
1040.0		nd	nd	nd	nd	nd	nd	nd	nd	0.21	nd	nd	
1060.0		nd	nd	nd	nd	nd	nd	nd	nd	0.25	nd	nd	
1080.0		nd	nd	nd	nd	nd	nd	nd	nd	0.31	nd	nd	
1100.0		nd	nd	nd	nd	nd	nd	nd	nd	0.30	nd	nd	
1120.0		nd	nd	nd	nd	nd	nd	nd	nd	0.30	nd	nd	
1140.0		nd	nd	nd	nd	nd	nd	nd	nd	0.24	nd	nd	
1160.0		nd	nd	nd	nd	nd	nd	nd	nd	0.29	nd	nd	
1180.0		nd	nd	nd	nd	nd	nd	nd	nd	0.21	nd	nd	
1200.0		nd	nd	nd	nd	nd	nd	nd	nd	0.26	nd	nd	
1220.0		nd	nd	nd	nd	nd	nd	nd	nd	0.19	nd	nd	
1240.0		nd	nd	nd	nd	nd	nd	nd	nd	0.19	nd	nd	
1260.0		nd	nd	nd	nd	nd	nd	nd	nd	0.18	nd	nd	
1280.0		nd	nd	nd	nd	nd	nd	nd	nd	0.23	nd	nd	
1300.0		nd	nd	nd	nd	nd	nd	nd	nd	0.22	nd	nd	
1320.0		nd	nd	nd	nd	nd	nd	nd	nd	0.22	nd	nd	
1340.0		nd	nd	nd	nd	nd	nd	nd	nd	0.25	nd	nd	
1360.0		nd	nd	nd	nd	nd	nd	nd	nd	0.16	nd	nd	
1380.0		nd	nd	nd	nd	nd	nd	nd	nd	0.15	nd	nd	
1410.0		nd	nd	nd	nd	nd	nd	nd	nd	0.20	nd	nd	
1420.0		nd	nd	nd	nd	nd	nd	nd	nd	0.12	nd	nd	
1440.0		nd	nd	nd	nd	nd	nd	nd	nd	0.18	nd	nd	
1460.0		nd	nd	nd	nd	nd	nd	nd	nd	0.16	nd	nd	NITA
1480.0		nd	nd	nd	nd	nd	nd	nd	nd	0.16	nd	nd	
1500.0		nd	nd	nd	nd	nd	nd	nd	nd	0.16	nd	nd	
1520.0		nd	nd	nd	nd	nd	nd	nd	nd	0.24	nd	nd	
1530.0		nd	nd	nd	nd	nd	nd	nd	nd	0.29	nd	nd	GOLDWYER

PEGASUS - 1

Depth		TOC	S^1	S^2	$S^1 + S^2$	PI	PC	WI	
590		0.3							
2120	SWC	0.3							
2191	SWC	0.3							
2385		0.4	0.07	.21	.28		.25	.02	52
2392	SWC	0.4	0.05	.23	.28		.18	.02	57
2487	SWC	0.2							
2605	SWC	0.3							
2730	SWC	0.7	0.19	.30	.49		.39	.04	43
2752	SWC	0.9	0.22	.37	.59		.37	.05	41
2971	SWC	0.2							

A M O C O P R O D U C T I O N C O M P A N Y
R E S E A R C H C E N T E R

OFFICE ELAFE **DISTRICT ELAFE**
AUTHORIZED BY R. J. HUTSON
TECHNICAL SERVICE NUMBER 885179

SOURCE ROCK SUMMARY
TABLE 1.
DATE 11/09/88

STATE FOREIGN COUNTY AUSTRALIA WELL LOCATION CANNING BASIN API 970330507200
OPERATOR AMOCO AUSTRALIA LEASE PEGASUS #1

SAMPLE NUMBER	SMPL TYPE	FORMATION	AGE	LITHOLOGY	DEPTH IN METERS TOP***BOTTOM	PETROLEUM GENERATION CAPABILITY	TYPE	STAGE
C-4150	CT	MELLENJERI	DEVONIAN	LT GREY CALC SHALE	590.0	NONSOURCE		
C-4151	CR	CARRIBUDDY	SILUR-LOW DEV	RED + MED GREY CALC SHALE	2120.0	"		
C-4152	CR	"	"	TAN + MED GREY CALC SHALE	2191.0	"		
C-4153	CT	GOLDWYER	MID ORD	MED GREY CALC SHALE	2385.0	"		MATURE
C-4154	CR	"	"	TAN CALC SHALE	2392.5	"		MATURE
C-4155	CR	"	"	LT GREY CALC SHALE	2487.5	"		
C-4156	CR	"	"	LIGHT GREY CALC SHALE	2605.5	"		
C-4158	CR	WILLARA	"	MED GREY SHALE	2730.5	"		OVER MATURE
C-4157	CR	"	LOW ORD	MED GREY SHALE	2752.0	"		OVER MATURE
C-4159	CR	NAMBEET	LOW ORD	LT GREY SHALE	2971.0	"		

CR = CORE SAMPLE, CT = CUTTINGS SAMPLE

PEGASUS #1

A M O C O   P R O D U C T I O N   C O M P A N Y
R E S E A R C H   C E N T E R

OFFICE ELAFE   DISTRICT ELAFE
TECHNICAL SERVICE NUMBER 885179

ROCKEVAL PYROLYSIS DATA
TABLE 2.
DATE 11/09/88

STATE FOREIGN COUNTY AUSTRALIA WELL LOCATION API 970330507200
OPERATOR AMOCO AUSTRALIA LEASE PEGASUS #1

SAMPLE NUMBER	TOP OF INTERVAL METERS	FORMATION	TOTAL ORGANIC CARBON WT% TOC	PPM VOLATILE HYDROCARBONS (S1 X 1000)	VOL/ TOC	PPM GENERATED HYDROCARBONS (S2 X 1000)	GEN/ TOC	TEMP OF MAX GEN	VOL/ VOL + GEN
C-4150	590.0	MELLENJERI	0.3						
C-4151	2120.0	CARRIBUDDY	0.3						
C-4152	2191.0	"	0.3						
C-4153	2385.0	GOLDWYER	0.4	70	0.02	210	0.06	NR	0.25
C-4154	2392.5	"	0.4	50	0.01	230	0.06	NR	0.18
C-4155	2487.5	"	0.2						
C-4156	2605.5	"	0.3						
C-4158	2730.5	WILLARA	0.7	190	0.03	300	0.04	NR	0.39
C-4157	2752.0	"	0.9	220	0.03	370	0.04	NR	0.37
C-4159	2971.0	NAMBEET	0.2						

NR INDICATES "NOT RELIABLE" TMAX VALUES.

PEGASUS #1

Rock-Eval Pyrolysis Data

Sample No.	Depth	TMAX	S1	S2	S3	S1+S2	S2/S3	PI	PC	TOC	HI	OI
WM 3086	2067.95m	434	0.19	0.44	0.10	0.63	4.40	0.3	0.05	0.59	74	16

TMAX = Max. temperature S2

S1 = Volatile Hydrocarbons (HC)

S2 = HC generating potential

S1+S2 = Potential yield

S3 = Organic Carbon Dioxide

PI = Production Index

PC = Pyrolysable carbon.

TOC = Total Organic Carbon

HI = Hydrogen Index

OI = Oxygen Index

PERCIVAL #1

ROCK-EVAL PYROLYSIS DATA (one run)

WELLNAME = PICTOR #1 DATE OF JOB = NOVEMBER 1984

DEPTH(m)	TMAX	S1	S2	S3	S1+S2	S2/S3	PI	PC	TOC	HI	OI	Formation
620.0	nd	nd	nd	nd	nd	nd	nd	nd	0.24	nd	nd	TANDALGOO
710.0	nd	nd	nd	nd	nd	nd	nd	nd	0.09	nd	nd	
800.0	nd	nd	nd	nd	nd	nd	nd	nd	0.14	nd	nd	CARRIBUDDY
890.0	nd	nd	nd	nd	nd	nd	nd	nd	0.12	nd	nd	NITA
980.0	nd	nd	nd	nd	nd	nd	nd	nd	0.12	nd	nd	
1070.0	nd	nd	nd	nd	nd	nd	nd	nd	0.18	nd	nd	GOLDWYER
1160.0	nd	nd	nd	nd	nd	nd	nd	nd	0.31	nd	nd	
1250.0	nd	nd	nd	nd	nd	nd	nd	nd	0.22	nd	nd	
1340.0	nd	nd	nd	nd	nd	nd	nd	nd	0.21	nd	nd	
1355.0	nd	nd	nd	nd	nd	nd	nd	nd	0.20	nd	nd	
1370.0	nd	nd	nd	nd	nd	nd	nd	nd	0.20	nd	nd	
1385.0	nd	nd	nd	nd	nd	nd	nd	nd	0.20	nd	nd	
1400.0	nd	nd	nd	nd	nd	nd	nd	nd	0.32	nd	nd	
1415.0	nd	nd	nd	nd	nd	nd	nd	nd	0.46	nd	nd	
1430.0	429	0.58	0.51	0.56	1.09	0.91	0.53	0.09	0.83	61	67	
1445.0	434	1.15	1.31	0.30	2.46	4.37	0.47	0.20	1.54	85	19	
1460.0	435	0.52	0.54	0.24	1.06	2.25	0.49	0.09	0.92	58	26	
1475.0	nd	nd	nd	nd	nd	nd	nd	nd	0.46	nd	nd	
1490.0	nd	nd	nd	nd	nd	nd	nd	nd	0.32	nd	nd	
1505.0	nd	nd	nd	nd	nd	nd	nd	nd	0.42	nd	nd	
1520.0	nd	nd	nd	nd	nd	nd	nd	nd	0.32	nd	nd	WILLARA
1610.0	nd	nd	nd	nd	nd	nd	nd	nd	0.22	nd	nd	
1700.0	nd	nd	nd	nd	nd	nd	nd	nd	0.22	nd	nd	
1790.0	nd	nd	nd	nd	nd	nd	nd	nd	0.18	nd	nd	
1880.0	nd	nd	nd	nd	nd	nd	nd	nd	0.25	nd	nd	
1895.0	nd	nd	nd	nd	nd	nd	nd	nd	0.19	nd	nd	
1910.0	nd	nd	nd	nd	nd	nd	nd	nd	0.27	nd	nd	
1925.0	nd	nd	nd	nd	nd	nd	nd	nd	0.28	nd	nd	
1940.0	345	0.07	0.06	0.29	0.13	0.21	0.54	0.01	0.52	11	55	NAMBEET
1955.0	358	0.07	0.06	0.37	0.13	0.16	0.54	0.01	0.84	7	44	
1970.0	439	0.07	0.03	1.06	0.10	0.03	0.70	0.01	0.65	4	163	
1985.0	305	0.09	0.07	0.32	0.16	0.22	0.56	0.01	0.65	10	49	
2000.0	nd	nd	nd	nd	nd	nd	nd	nd	0.43	nd	nd	
2015.0	nd	nd	nd	nd	nd	nd	nd	nd	0.40	nd	nd	
2030.0	nd	nd	nd	nd	nd	nd	nd	nd	0.21	nd	nd	
2045.0	nd	nd	nd	nd	nd	nd	nd	nd	0.21	nd	nd	
2060.0	nd	nd	nd	nd	nd	nd	nd	nd	0.21	nd	nd	
2135.0	nd	nd	nd	nd	nd	nd	nd	nd	0.09	nd	nd	BASEMENT

TMAX = Max. temperature S2
S1 = Volatile hydrocarbons (HC)
S2 = HC generating potential
S1+S2 = Potential yield
S3 = Organic carbon dioxide
PI = Production index
PC = Pyrolysable carbon
TOC = Total organic carbon
HI = Hydrogen index
OI = Oxygen Index
nd = no data

Note: More logical base at Goldwyer @ 1515m

SETARIA #1

Rock-Eval Pyrolysis 29/06/89

Client: WMC

Well: SETARIA-1

Depth (m)	T Max	S1	S2	S3	S1+S2	PI	S2/S3	PC	TOC	HI	OI
453.4	422	0.04	0.41	0.07	0.45	0.09	5.85	0.03	0.40	103	18
453.95	414	0.17	0.80	0.09	0.97	0.18	8.88	0.08	0.57	140	16
457.29	370	0.05	0.30	0.07	0.35	0.15	4.28	0.02	0.37	81	19
458.71	275	0.03	0.09	0.10	0.12	0.25	0.90	0.01	0.31	29	32
460.6	275	0.00	0.06	0.32	0.06	0.00	0.18	0.00	0.28	21	114

WELLNAME = VELA NO.1 S.W.C. DATE OF JOB = DECEMBER 1982

ROCK-EVAL PYROLYSIS DATA

DEPTH(m)	TMAX	S1	S2	S3	S1+S2	S2/S3	PI	PC	TOC	HI	OI
340.0	429	0.01	0.26	0.52	0.27	0.50	0.04	0.02	0.67	38	77
380.0	430	0.01	0.12	0.39	0.13	0.31	0.08	0.01	0.55	21	70
460.0	nd	nd	nd	nd	nd	nd	nd	nd	0.33	nd	nd
1756.3	nd	nd	nd	nd	nd	nd	nd	nd	0.11	nd	nd
1772.0	nd	nd	nd	nd	nd	nd	nd	nd	0.07	nd	nd
1852.1	nd	nd	nd	nd	nd	nd	nd	nd	0.13	nd	nd
1867.0	nd	nd	nd	nd	nd	nd	nd	nd	0.23	nd	nd

GRANT

NITA

VELA #1

APPENDIX 2.

TOC AND ROCK-EVAL. PYROLYSIS DATA BY BMR, APRIL 1991.

(14 PAGES)

AMADEUS BASIN WELLS

Table . Organic content and Rock-Eval pyrolysis parameters for selected samples from the Amadeus Basin. The data are for samples with the highest organic contents from units where organic matter was detected.

Well	Sample #	Depth m	Tmax C	S1 Kg/tonne	S2 Kg/tonne	TOC %	HI	OI
Stairway Formation (9 samples)								
Tempe Vale 1	2397	362.6	440	0.66	4.57	1.43	320	1
	2398	363.1	435	0.59	3.31	1.15	288	15
	2406	367.8	441	0.58	1.6	0.72	222	31
	2399	368.6	439	0.73	1.65	0.75	220	53
Tent Hill 1	2338	1096.5	440	0.12	0.34	0.35	97	0
Horn Valley Formation (81 samples)								
Mt.Winter 2A	3860	184.2	435	0.16	1.74	0.64	272	0
	3861	185.0	440	0.78	8.08	1.53	528	0
	3862	186.1	442	0.34	3.77	0.98	385	0
	3863	187.5	442	0.34	3.5	0.95	368	5
	3863ext	187.5	442	0.07	3.41			
	3865	190.6	438	0.05	0.73	0.46	159	0
	3866	197.6	444	0.25	2.73	0.87	314	0
	3868	201.4	438	0.05	0.44	0.39	113	0
	3869	210.7	438	0.05	0.34	0.36	94	0
	3870	216.7	447	4.46	26.44	3.98	664	2
	3871	228.6	446	1.01	6.63	1.30	510	11
	3871ext	228.6	441	0.05	4.92			
	3872	240.7	438	0.04	0.38	0.42	90	7
Tempe Vale 1	2400	368.7	443	6.81	12.75	3.73	342	23
	2400Ker	368.7	444					
	2404	378.5	437	0.06	0.18	0.28	64	46
	2407	380.5	448	0.16	0.41	0.45	91	38
	2409	383.3	445	0.51	1.1	0.68	162	21
	2410	384.5	439	0.09	0.15	0.22	68	91
	2419	407.6	448	7.01	12.15	4.09	297	17
	2419ext	407.6	449	0.36	9.54			
	2420	409.6	450	7.38	20.68	6.30	328	13
	2420ext	409.6	451	0.26	18.18			
	2421	416.8	442	1.95	3.76	1.22	308	86
	2422	417.1	435	1.8	2.47	0.95	260	133
Tent Hill 1	2370	1145.1	457	1.46	1.64	1.15	143	16
	2371	1146.9	450	0.49	0.52	0.50	104	74
	2372	1148.9	453	0.28	0.38	0.40	95	45
	2373	1150.9	454	1.14	1.38	1.01	137	15
	2374	1151.2	451	0.41	0.31	0.36	86	83
	2375	1157.6	455	4.14	4.67	2.74	170	19
	2376	1160.7	451	0.61	0.8	0.90	89	52
	2377	1163.2	456	1.08	1.34	1.03	130	46
	2378	1165.3	450	0.63	0.78	0.76	103	47
	2379	1166.6	456	0.73	0.98	0.91	108	38
	2380	1168.1	455	1.09	1.3	1.14	114	23
	2394	1196.6	455	0.06	0.14	0.28	50	0
	2395	1198.5	437	0.05	0.12	0.21	57	0

AMADEUS BASIN WELLS

Table (continued)

Well	Sample #	Depth m	Tmax C	S1 Kg/tonne	S2 Kg/tonne	TOC %	HI	OI
Chandler Formation (7 samples)								
Hermannsburg 41	3290	395.4	437	0.37	0.72	1.15	63	0
	3291	399.3	472	0.18	0.34	0.20	170	45
	3288	401.3	389	0.65	1.02	0.98	104	3
Waterhouse 2	3294	620.0	441	0.13	0.22	0.20	110	0
E. Johnnys Ck 1	3292	1388.3	437	0.17	0.14	0.28	50	46
Pertatataka Formation (28 samples)								
Rodinga 4A	3780	128.3	367	0.02	0.04	0.18	22	0
	3781	145.4	390	0.04	0.06	0.22	27	0
	3782	153.8	391	0.01	0.04	0.20	20	0
	3783	169.5	343	0.03	0.03	0.19	16	0
Mt Charlotte 1	2459	1225.0	331	0.05	0.05	0.12	42	25
	2460	1535.0	304	0.05	0.01	0.22	5	300
Ooraminna 1	3596	624.8	446	0.01	0.32	0.11	291	0
	3608	625.5	332	0.01	0.23	0.11	209	0
	3609	718.4	286	0.38	0.18	0.13	138	0
	3610	823.2	375	0.03	0.13	0.86	15	25
	3486	823.2	375		-	0.94		
Bitter Springs Formation (20 samples)								
Alice Springs 3	3485	134.3				0.07		
	3345	176.1	458	0.05	0.09	0.09	100	371
Ooraminna 1	2457	1417.0	245	0.07	0	0.06	0	83
	2458	1690.0	221	0.03	0	0.10	0	400
Mt Charlotte 1	3339	1653.8	436	0.06	0.06	0.15	40	0
	3340	1654.5	430	0.27	0.21	0.31	68	461
Bluebush 1	3595	2089.4	404	0	0.13	0.13	100	0
Mt Winter 1	3592	2189.6	457	0.14	0.18	0.45	40	42

BLACKSTONE #1

19-Apr-91

O R G C H E M Database

Blackstone 1
PEDIN/File numbers:* 17.587222 S 124.35028 E Canning Basin

Geology summary

Depth range(m)	Age	Formation	No
2455.9 3045.8			6

Rock Eval data

BMR #	Depths (m)		Tmax	S1	S2	S3	PI	S2/S3	PC	TOC	HI	OI	
5354	2455.9	2455.9	426		.01	.64		.02	.00	.25	4	256	CORE 19
5355	2674.3	2674.3	335		.02	.09		.22	.00	.14	14	64	CORE 21
5356	2738.5	2738.5	252	.01	.01	.12	.50	.08	.00	.14	7	86	CORE 22
5357	2833.5	2833.7	247		.01				.00	.13	8		CORE 23
5358	3045.0	3045.0	275	.01	.02	.05	.33	.40	.00	.15	13	33	CORE 26
5359	3045.6	3045.8	275	.01	.01	.07	.50	.14	.00	.23	4	30	

CONTENTION HEIGHTS #1

15-Apr-91

O R G C H E M Database

Contention Heights 1 22.426667 deg 127.22528 deg Canning Basin
PEDIN number: W6730005 File number: 73/230
************* CONFIDENTIAL ***************

Rock Eval data

BMR #	Depths (m)		Tmax	S1	S2	S3	PI	S2/S3	PC	TOC	HI	OI
5594	1417.3	1420.4	407	.07	.08		.47		.01	.19	42	
5595	1463.1	1466.1	432	.20	.26	.05	.43	5.20	.04	.34	76	15
5593	1598.0	1598.0	429		.18					.26	69	

EDGAR RANGE #1

15-Apr-91

O R G C H E M Database

Edgar Range 1 18.756943 deg 123.59416 deg Canning Basin
PEDIN number: W6680019 File number: 68/2041
************* CONFIDENTIAL ***************

Rock Eval data

BMR #	Depths (m)		Tmax	S1	S2	S3	PI	S2/S3	PC	TOC	HI	OI
5583	925.1	926.6	371	1.04	1.02	.66	.50	1.55	.17	.71	144	93
5576	948.6	948.7	432	.03	.09	.06	.25	1.50	.01	.19	47	32
5584	978.4	979.9	404	.27	.25	.71	.52	.35	.04	.38	66	187
5585	1012.0	1013.5								.31		
5577	1044.2	1044.3	434	.05	.19		.21		.02	.30	63	
5586	1048.5	1050.1	432	.12	.18	.12	.40	1.50	.02	.32	56	38
5587	1080.5	1082.1	433	.11	.15	.02	.42	7.50	.02	.30	50	7
5588	1144.5	1146.1	426	.41	.39	.26	.51	1.50	.07	.43	91	60
5578	1188.9	1189.0	380	.04	.06	.20	.40	.30	.01	.40	15	50
5589	1214.6	1216.2	435	.12	.29	.05	.29	5.80	.03	.43	67	12
5590	1271.0	1272.6	435	1.19	2.20	.68	.35	3.24	.28	2.49	88	27
5591	1306.1	1307.6	435	.93	1.15	.83	.45	1.39	.17	1.66	69	50
5592	1348.8	1350.3	425	.49	.49	.82	.50	.60	.08	1.09	45	75
5579	1683.8	1683.9	274	.03	.03	.07	.50	.43	.00	.40	8	18
5580	1779.1	1779.2	481	.23	.19	.08	.55	2.38	.03	1.63	12	5
5581	1780.8	1781.0	486	.19	.23	.01	.45	23.00	.03	1.72	13	1
5582	1785.2	1785.3	481	.28	.25	.01	.53	25.00	.04	1.86	13	1

KIDSON #1

15-Apr-91

O R G C H E M Database

Kidson 1 22.624166 deg 125.00472 deg Canning Basin
PEDIN number: W6650006 File number: 65/4177

************* CONFIDENTIAL ***************

Rock Eval data

BMR #	Depths (m)		Tmax	S1	S2	S3	PI	S2/S3	PC	TOC	HI	OI
5596	4364.5	4364.5	380	.01		.10				.40		25
5597	4367.8	4367.8	364	.02	.04		.33		.00	.24	17	

MATCHES SPRINGS #1

15-Apr-91

O R G C H E M Database

Matches Springs 1 18.691111 deg 124.05306 deg Canning Basin
PEDIN number: W6690007 File number: 69/2023
************* CONFIDENTIAL ***************

Rock Eval data

BMR #	Depths (m)		Tmax	S1	S2	S3	PI	S2/S3	PC	TOC	HI	OI	RC	
5563	2258.6	2260.1	425	.11	.18	.01	.38	18.00	.02	.41	44	2		
5564	2293.7	2295.2	425	.29	.32		.48		.05	.36	89			
5565	2321.1	2322.6	438	.01	.21		.05		.02	.40	53			
5566	2340.9	2342.4	434	.08	.34		.19		.03	.46	74		0·43	
5567	2348.5	2350.0	434	.18	.40	.01	.31	40.00	.05	.46	87	2	0·41	
5568	2366.8	2368.3	436	.03	.26		.10		.02	.42	62		0·40	
5569	2383.6	2385.1	436	.09	.34	.03	.21	11.33	.04	72	47	4	0·68	
5570	2398.8	2400.3	442	.30	1.44	.01	.17	144.00	.14	.87	166	1	0·73	U. GOLDWYE
5559	2404.9	2404.9	443	2.30	9.56	.49	.19	19.51	.97	3.36	285	15	2·39	
5560	2408.0	2408.0	443	1.78	9.93	.85	.15	11.68	96	3.66	271	23	2·70	
5571	2732.6	2734.1	441	1.09	2.35	.68	.32	3.46	.28	2.35	100	29		
5561	2753.0	2753.0	369	.16	.07	.06	.70	1.17	.02	.60	12	10		L. GOLDWE
5562	2754.8	2754.8	430	.78	.91	.40	.46	2.28	14	1.21	75	33		
5572	2764.6	2766.1	439	.96	2.43	.60	.28	4.05	28	2 40	101	25		
5573	2769.1	2770.7	441	1.30	3.21	.83	.29	3.87	37	2.67	120	31		
5574	2801.2	2802.7	445	.56	.93	.72	.38	1.29	.12	1 39	67	52		
5575	2811.8	2813.3	443	.18	.18	.19	.50	.95	03	57	32	33		

RC = (TOC - PC)

McLARTY #1

15-Apr-91

O R G C H E M Database

McLarty 1 19.395833 deg 123.65834 deg Canning Basin
PEDIN number: W6680004 File number: 68/2009
************* CONFIDENTIAL ***************

Rock Eval data

BMR #	Depths (m)		Tmax	S1	S2	S3	PI	S2/S3	PC	TOC	HI	OI
5609	1663.9	1663.9	390	.08	.19	.92	.30	.21	.02	.86	22	107
5610	1665.8	1665.8	294	.15	.02	1.48	.88	.01	.01	.19	11	779
5611	1759.0	1759.0	338	.20	.10	.19	.67	.53	.02	.12	83	158
5612	1759.6	1759.6	442	.07	.26	.02	.21	13.00	.03	.23	113	9
5613	1893.1	1893.1	416	.34	.12	.20	.74	.60	.04	.25	48	80
5620	1895.9	1897.4	384	21.19	3.04	.75	.87	4.05	1.99	2.00	152	38
5621	1917.2	1918.7	428	16.91	3.91	1.80	.81	2.17	1.71	2.32	169	78
5622	1961.4	1962.9	428	12.95	3.10	2.29	.81	1.35	1.32	2.46	126	93
5623	1973.6	1975.1	429	16.80	3.55	1.84	.83	1.93	1.67	2.85	125	65
5624	1998.0	1999.5	428	19.14	3.92	1.97	.83	1.99	1.89	3.90	101	51
5614	2002.9	2002.9	433	3.43	2.65	.73	.56	3.63	.50	2.84	93	26
5615	2157.7	2157.7	427	1.72	1.37	1.18	.56	1.16	.25	2.00	69	59
5617	2157.7	2157.7	453	.01						.80		
5616	2157.7	2157.7	440	.87	.28	.75	.76	.37	.09	1.16	24	65
5618	2158.9	2158.9	365	.31	.03	.25	.91	.12	.03	1.10	3	23
5619	2158.9	2158.9	442	.87	.29	.85	.75	.34	.10	1.35	21	63

MUNRO #1

15-Apr-91

O R G C H E M Database

Munro 1 (WAPET) 19.863056 deg 122.47445 deg Canning Basin
PEDIN number: W6720002 File number: 72/846
************* CONFIDENTIAL ***************

Rock Eval data

BMR #	Depths (m)		Tmax	S1	S2	S3	PI	S2/S3	PC	TOC	HI	OI
5601	1606.3	1609.4	436	.05	.04	1.47	.56	.03	.01	.30	13	490
5602	1618.5	1621.6	354	.01	.04	1.06	.20	.04	.00	.21	19	505
5603	1636.8	1639.8	349	.02	.04	.65	.33	.06	.00	.22	18	295
5604	1652.0	1655.1	345	.01	.04	.70	.20	.06	.00	.19	21	368
5605	1710.0	1713.0	368	.02	.06	.53	.25	.11	.01	.25	24	212
5606	1722.1	1725.2	393	.02	.05	.33	.29	.15	.01	.22	23	150
5607	1746.5	1749.6	371	.02	.05	.38	.29	.13	.01	.23	22	165
5608	1758.7	1761.8	371	.01	.05	.47	.17	.11	.00	.20	25	235

PARDA #1

15-Apr-91

O R G C H E M Database

Parda 1 18.935556 deg 122.00944 deg Canning Basin
PEDIN number: W6650002 File number: 65/4137
************* CONFIDENTIAL ***************

Rock Eval data

BMR #	Depths (m)		Tmax	S1	S2	S3	PI	S2/S3	PC	TOC	HI	OI
5540	1286.3	1289.3	424		.04					.24	17	
5541	1310.7	1313.7	434	.03	.10		.23		.01	.22	45	
5538	1315.5	1315.5	426	.03	.15		.17		.01	.21	71	
5539	1316.8	1316.8	428	.03	.13		.19		.01	.22	59	
5542	1332.0	1335.0	430	.01	.07		.13		.01	.21	33	

THANGOO #1

15-Apr-91

O R G C H E M Database

Tangoo 1 Australia Canning Basin
PEDIN number: File number:
************* CONFIDENTIAL ***************

Rock Eval data

BMR #	Depths (m)		Tmax	S1	S2	S3	PI	S2/S3	PC	TOC	HI	OI
5599	959.5	959.5	441	1.43	5.88	.63	.20	9.33	.60	3.04	193	21
5600	961.1	961.1	443	1.86	7.86	1.03	.19	7.63	.80	3.94	199	26

TAPPERS INLET #1

15-Apr-91 | O R G C H E M Database

Tappers Inlet 1 16.859167 deg 122.58889 deg Canning Basin
PEDIN number: W6710009 File number: 71/301
************* CONFIDENTIAL **************

Rock Eval data

BMR #	Depths (m)		Tmax	S1	S2	S3	PI	S2/S3	PC	TOC	HI	OI
5525	2170.2	2173.3	424	.31	.25	.05	.55	5.00	.05	.92	27	5
5526	2212.9	2215.9	440	.37	.29	.01	.56	29.00	.05	1.19	24	1
5527	2243.4	2246.4	438	.41	.48		.46		.07	.93	52	
5528	2295.2	2298.2	430	.30	.29	.05	.51	5.80	.05	.86	34	6
5529	2322.6	2325.7	377	1.41	1.74	.70	.45	2.49	.26	1.40	124	50
5530	2368.3	2371.4	430	.40	.34	.06	.54	5.67	.06	1.07	32	6
5531	2395.8	2398.8	425	.37	.29	.09	.56	3.22	.05	.78	37	12
5532	2438.4	2441.5	355	.19	.15		.56		.03	.57	26	
5533	2441.5	2444.5	372	.16	.11		.59		.02	.50	22	
5534	2472.0	2475.0	401	.09	.11		.45		.02	.49	22	
5535	2511.6	2514.6	341	.22	.13		.63		.03	.34	38	
5536	2563.4	2566.5	387	.19	.13		.59		.03	.42	31	
5537	2600.0	2603.0	410	.12	.13		.48		.02	1.02	13	

WILLARA #1

15-Apr-91

O R G C H E M Database

Willara 1 (WAPET) 19.18 deg 122.07056 deg Canning Basin
PEDIN number: W6650003 File number: 65/4158
************* CONFIDENTIAL ***************

BMR #	Depths (m)		Rock Eval data Tmax	S1	S2	S3	PI	S2/S3	PC	TOC	HI	OI
5543	1881.3	1881.3	429	.09	.20	.05	.31	4.00	.02	.26	77	19
5547	1953.8	1956.8	231							.18		
5548	1966.0	1969.0	382	.02	.03		.40		.00	.17	18	
5549	1981.2	1984.3	359	.01	.04		.20		.00	.27	15	
5550	1999.5	2002.6	439	.02	.07	.02	.22	3.50	.01	.18	39	11
5551	2014.8	2017.8	408	.01	.05		.17		.00	.21	24	
5552	2026.9	2030.0	438	.02	.07		.22		.01	.17	41	
5544	2684.8	2684.8	248	.04						.70		
5553	3145.6	3148.6	385		.03					.26	12	
5554	3173.0	3176.1	436	.01						.25		
5545	3186.5	3186.5	228							.17		
5546	3187.6	3187.6	238							.19		
5555	3203.5	3206.5	268	.03	.01		.75		.00	.25	4	
5556	3234.0	3237.0	297	.02	.02		.50		.00	.23	9	
5557	3328.5	3331.5	396	.03	.01		.75		.00	.22	5	
5558	3358.9	3362.0	248	.02	.01		.67		.00	.14	7	

WILSON CLIFFS #1

15-Apr-91

O R G C H E M Database

Wilson Cliffs 1 22.2775 deg 126.78195 deg Canning Basin
PEDIN number: W6680005 File number: 68/2011
************* CONFIDENTIAL ***************

Rock Eval data

BMR #	Depths (m)		Tmax	S1	S2	S3	PI	S2/S3	PC	TOC	HI	OI
5635	2621.3	2624.4	411	1.15	.71	2.38	.62	.30	.15	.77	92	309
5634	2685.3	2688.4	419	1.45	.44	1.13	.77	.39	.15	.52	85	217
5633	2734.1	2737.1	415	2.22	.96	2.06	.70	.47	.26	.99	97	208
5632	2770.7	2773.7	411	.87	.41	1.13	.68	.36	.10	.62	66	182
5631	2779.8	2781.3	430	2.48	2.96	7.48	.46	.40	.45	4.54	65	165
5630	2813.3	2816.4	411	.64	.35	1.13	.65	.31	.08	.46	76	246
5625	3020.0	3020.0	432	.02	.03	.22	.40	.14	.00	.30	10	73
5626	3023.4	3023.4	433	.01		.07				.12		58
5627	3030.7	3030.7	295	.03						.05		
5628	3031.3	3031.3	303	.04	.03		.57		.01	.28	11	
5629	3035.8	3035.8	253	.02						.14		

APPENDIX 3

LIST OF CAI DETERMINATIONS ON CANNING BASIN MATERIAL

(10 pages)

Well, operator	Age of sample	Depth of sample (m)	Conodont elements	CAI	
Abutilon 1 (WMC)	Devonian	759-761	1	1	
	Devonian	761-763	1	1	
	Devonian	763-765	1	1	
	Devonian	765-767	2	1	
	Devonian	790-792	19	1	
	Devonian	792-794	4	1	
	Devonian	794-796	1	1	
	Devonian	796-798	19	1	
	Devonian	798-800	22	1	
	Devonian	840-842	39	1	
Acacia 1 (WMC)	Silurian?	511.64-514.24	4	1	
	Silurian?	519.7-522.53	3	1	
SOURCE UNIT	Ordovician	754.73-756.65	39	1	SOURCE UNIT
	Ordovician	756.65-758.7	29	1	
	Ordovician	758.7-760.79	18	1	
	Ordovician	760.79-763.0	26	1	
	Ordovician	763.0-765.02	13	1	
	Ordovician	818.0-820.33	2	1	
	Ordovician	820.33-823.13	23	1	
	Ordovician	824.99-827.8	24	1	
	Ordovician	896.02-897.8	1	1	
	Ordovician	897.98-900.75	6	1	
	Ordovician	906.06-908.29	83	1	
SOURCE UNIT	Ordovician	994.87-997.5	2	1	347
	Ordovician	997.5-999.7	3	1	
	Ordovician	999.7-1002.03	8	1	
	Ordovician	1002.03-1004.92	1	1	
	Ordovician	1004.92-1006.86	9	1	
	Ordovician	1043.3-1045.67	25	1	
	Ordovician	1045.67-1048.14	6	1	
	Ordovician	1048.41-1050.99	8	1	
	Ordovician	1050.99-1053.46	28	1	
	Ordovician	1053.46-1055.74	44	1	
	Ordovician	1098.91-1101.01	25	1	
	Ordovician	1101.01-1103.72	7	1-1.5	96
	Ordovician	1103.72-1106.17	8	1-1.5	
	Ordovician	1106.17-1108.66	1	1-1.5	
	Ordovician	1108.66-1111.36	9	1-1.5	
	Ordovician	1150.57-1153.09	33	1-1.5	
	Ordovician	1155.91-1158.1	12	1-1.5	

Well, operator	Age of sample	Depth of sample (m)	Conodont elements	CAI	
	Ordovician	1158.1-1160.9	9	1-1.5	
	Ordovician	1197.13-1199.45	33	1.5	
	Ordovician	1199.45-1202.02	5	1.5	
	Ordovician	1202.02-1205.09	12	1.5	
	Ordovician	1205.07-1207.42	19	1.5	
	Ordovician	1207.42-1208.47	27	1.5	
Babrongan 1 (WAPET)	Devonian	1676.52-1696.34	7	2	
	Devonian	1782.93-1785.67	20	2	
	Devonian	1874.70-1876.22	11	2	
	Devonian	1941.46-1943.29	31	3	
Barbwire 1 (WAPET)	Devonian	240.85-243.90	15	1	
	Devonian	271.34-274.39	5	1	
	Devonian	347.56-350.61	4	1	
	Devonian	423.78-426.83	1	1	
	Devonian	439.02-442.07	3	1	
	Ordovician	728.7-731.7	1	1	
	Ordovician	743.9-747.0	1	1	
	Ordovician	774.4-777.4	32	1	
	Ordovician	789.6-792.7	30	1	
	Ordovician	804.9-807.9	100 +	1	
	Ordovician	820.1-823.2	97	1.5	
	Ordovician	835.4-838.4	10	1	
	Ordovician	850.6-853.7	37	1.5	
	Ordovician	865.9-868.9	23	1.5	
	Ordovician	881.1-884.1	5	1.5	
	Ordovician	896.3-899.4	41	1	
	Ordovician	911.6-914.6	20	1	
	Ordovician	926.8-929.9	12	1	342
	Ordovician	942.1-945.1	7	1	
	Ordovician	972.6-975.6	17	1	
	Ordovician	987.8-990.0	32	1	
	Ordovician	1018.3-1021.3	21	1	
	Ordovician	1033.5-1036.6	17	1	
	Ordovician	1048.8-1054.9	15	1	
	Ordovician	1067.7-1068.0	200 +	1	
	Ordovician	1069.2-1069.5	74	1	
	Ordovician	1071.3	40	1	
Barlee 1 (WAPET)	Lower Carboniferous	698.6-703.2	5 +	1	
	Lower Carboniferous	703.5-708.7	5 +	1	
Blackstone 1 (WAPET)	Triassic	128.05-137.20	2	1	
	Triassic	155.49-164.63	1	1	
	Triassic	164.63-173.78	1	1	U
	Ordovician	2220.73-2229.27	14	1	
	Ordovician	2289.63-2291.77	8	1	
NITA	Ordovician	2368.90-2378.05	5	1.5	172
	Ordovician	2455.79-2464.63	14	1.5-2	
GOLDWYER TD. 3049.5					
Boab 1 (WMC)	Devonian	242.21-244.38	6	1	
	Devonian	293.11-296.5	2	1	
	Devonian	296.5-299.0	1	1	
	Devonian	299.0-301.04	2	1	
	Devonian	325.07-327.06	13	1	
	Devonian	323.0-325.07	8	1	
	Devonian	327.06-329.15	2	1	
	Devonian	329.15-331.18	2	1	
	Devonian	331.18-333.04	5	1	
	Devonian	376.25-378.23	11	1	
	Devonian	378.23-380.29	37	1	
	Devonian	380.29-382.22	11	1	
	Devonian	382.22-384.27	1	1	
	Devonian	384.27-386.38	2	1	
	Devonian	400.54-402.55	3	1	
	Devonian	402.55-404.5	3	1	
	Devonian	404.5-406.65	19	1	
	Devonian	406.65-408.6	21	1	

Well, operator	Age of sample	Depth of sample (m)	Conodont elements	CAI
	Devonian	408.6–410.56	4	1
	Devonian	456.7–458.78	14	1
	Devonian	570.81–572.96	2	1
	Devonian	579.04–581.05	1	1
Cassia 1 (WMC)	Devonian	810.02–812.02	1	1
	Devonian	818.30–820.09	14	1
	Devonian	889.92–892.04	1	1
	Devonian	896.30–898.0	1	1
	Devonian	941.39–943.13	10	1
	Devonian	945.59–947.89	6	1
	Devonian	947.89–950.01	2	1
	Devonian	973.50–975.81	8	1
	Devonian	975.81–978.0	2	1
	Devonian	978.0–980.11	5	1
	Devonian	1019.94–1022.0	4	1
	Devonian	1022.0–1024.02	1	1
	Devonian	1024.02–1026.04	5	1
	Devonian	1026–04–1028.05	8	1
	Devonian	1028.05–1030.0	3	1
	Devonian	1039.44–1042.09	7	1
	Devonian	1042.09–1044.04	4	1
	Devonian	1044.04–1046.02	3	1
	Devonian	1089.26–1091.30	2	1
	Devonian	1091.30–1093.53	2	1
	Devonian	1093.53–1095.87	10	1
	Devonian	1095.87–1097.98	6	1
	Devonian	1146.05–1148.0	3	1
	Devonian	1545.14–1547.14	1	1
	Devonian	1547.14–1549.14	2	1
	Devonian	1549.14–1551.14	2	1
Crosslands 1 (WAPET)	Devonian	605.18–614.63	4	1
Crosslands 3 (WAPET)	Devonian	510.98	2	1
	Devonian	659.76–668.6	1	1
	Devonian	914.94	13	1
Dampiera 1 (WMC)	Devonian	392–394	35	1
	Devonian	394–396	11	1
	Devonian	396–398	50	1
	Devonian	398–400	23	1
	Devonian	400–402	80	1
	Devonian	442–444	90	1
	Devonian	444–446	39	1
	Devonian	446–448	52	1
	Devonian	448–450	88	1
	Devonian	450–452	20	1
	Devonian	494–496	1	1
	Devonian	496–498	12	1
	Devonian	498–500	7	1
	Devonian	542–544	3	1
	Devonian	544–546	2	1
	Devonian	550–552	1	1
	Devonian	650–652	2	1
	Devonian	694–696	1	1
	Devonian	1169–1171	11	1.5
	Devonian	1171–1173	3	1.5
	Devonian	1173–1175	53	1.5
	Devonian	1175–1177	67	1.5
	Devonian	1177–1179	30	1.5
	Devonian	1221–1223	1	1.5
	Devonian	1225–1227	7	1.5
	Devonian	1271–1273	1	1.5
	Devonian	1273–1275	2	1.5
	Devonian	1277–1279	6	1.5
	Devonian	1319–1321	30	1.5
	Devonian	1321–1323	37	1.5
	Devonian	1323–1325	13	1.5
	Devonian	1325–1327	19	1.5
	Devonian	1369–1371	22	1.5

Well, operator	Age of sample	Depth of sample (m)	Conodont elements	CAI	
	Devonian	1371–1373	8	1.5	
	Devonian	1373–1375	42	1.5	
	Devonian	1375–1377	18	1.5	
	Devonian	1377–1379	15	1.5–2	
	Devonian	1419–1421	8	1.5–2	
	Devonian	1421–1423	11	1.5–2	
	Devonian	1423–1425	5	1.5–2	
	Devonian	1425–1427	21	1.5–2	
	Devonian	1427–1429	53	2	
	Devonian	1469–1471	51	2	
	Devonian	1473–1475	16	2	
	Devonian	1475–1477	12	2	
	Devonian	1477–1479	2	2	
	Devonian	1519–1521	1	2	
	Devonian	1619–1621	13	2	
	Devonian	1621–1623	3	2	
	Devonian	1623–1625	11	2	
	Devonian	1625–1627	35	2	
	Devonian	1627–1629	3	2	
	Devonian	1669–1671	5	2	
	Devonian	1671–1673	1	2	
	Devonian	1673–1675	39	2	
	Devonian	1675–1677	115	2	
	Devonian	1677–1679	18	2	
Doran 1 (WAPET)	Devonian	760.67	6	1	
Edgar Range 1 (Total)	Ordovician	8375–839.48	27	1–1.5	1
	Ordovician	842.29–843.60	8	1–1.5	
	Ordovician	1042.68–1045.43	2	1	1
	Ordovician	1356.71–1359.76	200	+ 2	1.5
	Ordovician	1549.39–1552.44	41	2	2
	Ordovician	1682.01–1685.06	84	2	2
	Ordovician	1778.96–1781.09	100	2	
	Ordovician	1783.38–1785.98	200 +	3	3
Eramophila 1 (WMC)	Devonian	378.0–379.56	1	1	
	Devonian	1090.45–1092	1	1	
	Devonian	1150–1152	1	1	
	Devonian	1152–1152.85	1	1	
	Devonian	1194–1196	1	1	
	Devonian	1196–1198	1	1	
	Devonian	1200–1202	1	1	
	Devonian	1202–1202.73	1	1	
Ficus 1 (WMC)	Devonian	492–494	3	1	
	Devonian	503.25–505	3	1	
	Devonian	505–507	8	1	
	Devonian	507–509	17	1	
	Devonian	509–511	1	1	
	Devonian	511–513	2	1	
	Devonian	513–515	1	1	
	Devonian	541–543	19	1	
	Devonian	543–545	10	1	
	Devonian	545–547	25	1	
	Devonian	596.99–599	13	1	
	Devonian	599–601	42	1	
	Devonian	601–603	33	1	
	Devonian	603–605	36	1	
	Devonian	611–613	6	1	
	Devonian	613–615	20	1	
	Devonian	615–617	21	1	
	Devonian	617–619	45	1	
	Devonian	619–621	28	1	
	Devonian	649–651	1		
	Devonian	651–653	5	1	
	Devonian	653–655	3	1	
	Devonian	655–657	15	1	
	Devonian	657–659	8	1	
	Devonian	659–661	2	1	
	Devonian	690.7–692	6	1	

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Well, operator	Age of sample	Depth of sample (m)	Conodont elements	CAI	
	Devonian	694-696	11	1	
	Devonian	696-698	2	1	
	Devonian	698-700	1	1	
	Devonian	917-919	1	1	
	Devonian	975-977	1	1	
Goldwyer 1	Ordovician	910.06-915.24	12	1	
(WAPET)	Ordovician	915.24-917.99	10	1	
	Ordovician	914.63-929.88	2	1	
	Ordovician	945.12-960.37	2	1	
	Ordovician	972.87-975.91	100	1	
	Ordovician	975.91-980.18	3	1	
	Ordovician	980.18-983.84	18	1	
	Ordovician	975.61-990.85	1	1	
	Ordovician	990.85-1006.10	2	1	
	Ordovician	1021.34-1036.59	3	1	
	Ordovician	1036.59-1051.83	5	1	233
	Ordovician	1051.83-1067.07	2	1	
	Ordovician	1082.32-1097.56	1	1	
	Ordovician	1102.44-1103.66	6	1.5	
	Ordovician	1112.80-1128.05	2	1	
	Ordovician	1128.05-1143.29	2	1	
	Ordovician	1189.02-1204.27	2	1-1.5	
	Ordovician	1217.99-1223.48	120	1.5	
	Ordovician	1223.48-1227.13	300	1.5	
	Ordovician	1234.76-1250	2	1-1.5	
	Ordovician	1250-1265.24	2	1.5	
	Ordovician	1265.24-1280.49	7	1.5	250 m
	Ordovician	1280.49-1295.73	2	1.5	
	Ordovician	1341.46-1356.71	1	1.5	
	Ordovician	1356.71-1371.95	1	1.5	
	Ordovician	1392.68-1394.51	8	2	
	Ordovician	1407.93-1411.28	35	2	
Grevillea 1	Devonian	800	9	1-1.5	
(IEDC)	Devonian	950	6	1.5	
	Devonian	1000	16	1.5	
	Devonian	1300	3	2	
	Devonian	1500	1	2	
	Devonian	1600	2	2	1100
	Devonian	1650	18	2	
	Devonian	1750	8	2	
	Ordovician	2100	9	2-3	
	Ordovician	2425	10	2-3	
Kemp Field 1	Devonian	568.60-570.12	4	1	
(Total)	Devonian	570.12-571.34	18	1	
Kidson 1 (WAPET)	Ordovician	4367.38-4370.12	43	3	
Kora 1 (Esso)	Lower Carboniferous	2570-2580	1	2	
Laurel Downs	Devonian	541.16-544.21	2	1	
2 (BMR)	Devonian	577.44	1	1	
Logue 1 (WAPET)	Devonian	2515.24	1	3	
Matches	Devonian	1220.73-1223.78	34	1	
Spring 1	Devonian	1388.11-1391.16	22	1.5	
(Total)	Ordovician	2199.70-2202.74	14	1.5	
	Ordovician	2754.27	2	1.5	634+
	Ordovician	2756.10	2	1.5	
	Ordovician	2834.45	10	2	
May River 1	Devonian	1354.57-1357.32	5	1-1.5	
(WAPET)	Devonian	1512.20-1514.02	11	1.5	
McLarty 1	Ordovician	1758.23-1760.06	300	+1	
(Total)	Ordovician	1760.37-1761.28	200	+1	
	Ordovician	1893.29-1894.51	4	1-1.5	396

Well, operator	Age of sample	Depth of sample (m)	Conodont elements	CAI	
	Ordovician	2002.74-2004.88	47	2	
	Ordovician	2065.55-2066.77	31	1.5-2	
	Ordovician	2157.93-2160.98	200 +	2	
	Ordovician	2276.83-2279.27	200 +	2	
Meda 1	Devonian	1890.24-1893.29	2	1.5	
(WAPET)	Devonian	2195.12-2198.17	7	2	
	Devonian	2201.22-2219.51	1	2	454
	Devonian	2323.17-2341.46	2	2	
	Devonian	2347.56-2350.61	3	3	
	Devonian	2378.05-2381.10	8	3	
Meda 2	Devonian	1676.83-1701.22	4	1.5+	
(WAPET)	Devonian	1705.79-1706.71	3	2	
	Devonian	1707.62-1708.84	3	2	
	Devonian	2018.60-	11	2	
	Devonian	2024.39-	35	2	
	Devonian	2032.62-2038.11	1	2	
	Devonian	2033.23	11	2	
	Devonian	2034.45	7	2	
	Devonian	2289.33-	2	2	
Mimosa 1	Lower Carboniferous	1200	3	1	
(WAPET)	Lower Carboniferous	1260	2	1	
	Lower Carboniferous	1290	1	1	
	Devonian	1500	1	1	
	Devonian	1620	2	1.5	
	Devonian	1920	1	2	
	Devonian	1950	1	2	
	Devonian	2400	9	2	
	Devonian	2430.5	1	3	
Munro 1	Ordovician	1554.88	10	1	
(WAPET)	Ordovician	1646.34	4	1	
	Ordovician	1661.59	30	1	
	Ordovician	1676.83	30	1	
	Ordovician	1692.07	40	1	
	Ordovician	1707.32	8	1	
	Ordovician	1722.56	55	1	
	Ordovician	1753.05	34	1	
	Ordovician	1768.29	6	1	
	Ordovician	1783.54	8	1	
	Ordovician	1798.78	30	1	
	Ordovician	1806.10	12	1	
	Ordovician	1814.02	3	1	
	Ordovician	1844.51	48	1	
	Ordovician	1875	5	1	
	Ordovician	1890.24	50	1	
	Ordovician	1905.49	13	1	
	Ordovician	1920.73	39	1	
	Ordovician	1935.98	4	1	
	Ordovician	1951.22	36	1	
	Ordovician	1966.46	50	1	
	Ordovician	1981.71	39	1	
	Ordovician	1996.95	14	1	
	Ordovician	2012.20	30	1	
	Ordovician	2027.44	17	1	
	Ordovician	2042.68	38	1-1.5	
Napier 1	Devonian	714.63-717.68	29	1	
(Lennard)	Devonian	779.88-782.93	3	1.5	
Napier 4	Devonian	578.96-581.40	8	1	
(Lennard)	Devonian	592.99-595.73	1	1	
Napier 5	Devonian	582.62-587.50	15	1	
(Lennard)	Devonian	611.89-621.34	19	1	
	Devonian	653.35-658.23	41	1	

Well, operator	Age of sample	Depth of sample (m)	Conodont elements	CAI	
Palm Springs 1	Devonian	521.34-524.39	1	1	
	Devonian	542.68-542.99	12	1	
	Devonian	545.43-545.73	25	1	
	Devonian	545.73-548.78	1	1	
	Devonian	547.56-547.86	36	1	
	Devonian	548.48-548.78	13	1	
	Devonian	621.95-625.00	1	1	
	Devonian	667.68-670.73	1	1	
	Devonian	743.90-746.95	4	1	
	Devonian	774.39-777.44	1	1	
	Devonian	789.63-792.68	5	1	
	Devonian	804.88-807.93	4	1	
	Devonian	820.12-823.17	1	1	
	Devonian	835.37-838.41	4	1	
	Devonian	865.85-868.90	2	1.5	
	Devonian	881.10-884.15	1	1.5	
	Devonian	896.34-899.39	2	1.5	93
	Devonian	911.59-914.63	8	1.5	
	Devonian	926.83-929.88	7	2	
	Devonian	942.07-945.12	5	2	
	Devonian	957.32-960.37	2	2	
	Devonian	972.56-975.61	2	1.5	
	Devonian	987.80-990.85	3	2	
	Devonian	1003.05-1006.10	5	2	
	Devonian	1033.54-1036.59	2	1.5	
	Devonian	1048.78-1051.83	1	2	
	Devonian	1062.50-1062.80	1	1.5+	
Parda 1 (WAPET)	Ordovician	1315.24-1318.29	90	1	
	Ordovician	1486.89-1490.55	25	1-1.5	
	Ordovician	1662.20-1663.41	200 +	1.5	
Puratte 1 (Esso)	Lower Carboniferous	3050-3100	4	2-3	
	Lower Carboniferous	3100-3150	1	2	
	?	3350-3400	1	3	
	?	3400-3450	3	3	
	Devonian	3500-3550	6	3	
	Devonian	3550-3600	6	3	
	Devonian	3600-3650	1	3	
	Devonian	3650-3700	2	3	
	Devonian	3700-3750	10	3	
Roebuck Bay 1 (WAPET)	~~Devonian~~	1164.02-1166.46	14	1	ORD.
	~~Devonian~~	1195.12-1198.17	100 +	1	
	~~Devonian~~	1214.33-1217.38	8	1	
Samphire Marsh 1 (WAPET)	Ordovician	1246.04-1249.09	11	1	
	Ordovician	1246.95-1250.00	160	1-1.5	
	Ordovician	1352.13-1355.18	21	1.5	
	Ordovician	1504.88-1507.01	17	1.5	
	Ordovician	1687.50-1691.16	8	1.5	
	Ordovician	1783.23-1786.28	22	1.5	
Tappers Inlet 1 (WAPET)	Permian	884.5-973	1	1	
	Devonian	1935.98	1	1	PILLARA
	~~Devonian~~	2042.68-2057.93	3	1.5	
	~~Devonian~~	2057.93-2073.17	2	1.5	U. ORD.
	~~Devonian~~	2073.17-2088.41	2	1.5-2	
	~~Devonian~~	2088.41	4	2	
	Ordovician	2088.41-2103.66	6	2	
	Ordovician	2103.66	1	2	
	Ordocician	2118.90	3	2	
	Ordovician	2134.15	2	2	
	Ordovician	2149.39	5	2	
	Ordovician	2164.63	5	1.5	564
	Ordovician	2179.88	7	1.5-2	
	Ordovician	2210.37	3	2	
	Ordovician	2310.98	1	2	

Well, operator	Age of sample	Depth of sample (m)	Conodont elements	CAI	
	Ordovician	2591.46	9	2	
	Ordovician	2637.20	5	3	
	Ordovician	2804.88	1	4	
Thangoo 1 (WAPET)	Ordovician	871.65-875.30	21	1-1.5	
	Ordovician	959.45-961.89	14	1	
	Ordovician	1033.84-1036.89	45	1.5	
Thangoo 1A (WAPET)	Ordovician	1117.38-1119.51	5	1	
	Ordovician	1190.85-1194.21	40	1.5	
	Ordovician	1261.59-1265.85	39	1.5	
	Ordovician	1339.33-1342.38	300 +	1.5-2	374
	Ordovician	1416.16-1419.82	70	1.5-2	
	Ordovician	1493.29-1496.34	300 +	2	
	Ordovician	1535.98-1539.02	5	2	
Thangoo 2 (WAPET)	Ordovician	795.73-798.78	1	1	
	Ordovician	850.61-853.66	4	1	
	Ordovician	865.85-868.90	2	1	
	Ordovician	881.10-884.15	7	1	
	Ordovician	911.59-914.63	1	1	
	Ordovician	926.83-929.88	9	1	
	Ordovician	958.54-	165	1.5-2	
	Ordovician	965.24-	28	1.5	
	Ordovician	969.21-	16	1.5	292
	Ordovician	1064.02-	160	1.5	
	Ordovician	1066.77-	70	1.5	
	Ordovician	1222.56-1225.61	9	2	
Willara 1 (WAPET)	Ordovician	1881.10-1884.15	76	1-1.5	
	Ordovician	2083.23-2086.89	140	1.5	
	Ordovician	2264.33-2267.38	137	2	
	Ordovician	2376.52-2380.49	65	2	789
	Ordovician	2685.37-2688.41	31	2	
	Ordovician	2876.52-2879.57	21	3	
	Ordovician	3018.29-3021.65	12	3-4	
Yulleroo 1 (Gewerk schaft Elwerath Inc.)	Lower Carboniferous	3686.59	32	3-4	
	Lower Carboniferous	3707.32	2	3-4	
	Lower Carboniferous	3728.66	5	3-4	

Well, operator	Age of sample	Depth of sample (m)	Conodonts elements	CAI	
Canopus 1 (Getty)	Ordovician	1075	1	1.5	
	"	1095	1	1.5	
	"	1105	1	1.5	
	"	1115	2	1.5	
	"	1125	2	1.5	
	"	1165	2	1.5	
	"	1175	2	1.5	
	"	1185	5	1.5	
	"	1205	16	1.5	
	"	1215	14	1.5	
	"	1225	2	1.5	
	"	1235	1	2	
	"	1275	4	2	
	"	1295	1	2	
	"	1305	4	2	
	"	1315	2	2	
	"	1335	1	2	
	"	1345	6	2	
	"	1365	1	2	
	"	1385	1	2	
	"	1395	5	2	
	"	1405	3	2	
	"	1415	1	2	
	"	1435	1	2	
	"	1455	1	2	
	"	1475	2	2	
	"	1495	5	2	
	"	1505	1	2	
	"	1515	2	2	
	"	1525	4	2	
	"	1535	2	2	
	"	1545	2	2	
	"	1555	1	—	
	"	1565	1	2	
	"	1575	2	2	
	"	1605	1	2	
	"	1615	4	2	
	"	1625	1	2	
	"	1635	1	2	
	"	1655	10	2	
	"	1665	2	2	SOURCE ROCK
	"	1675	4	2	
	"	1685	3	2	
	"	1705	5	2	
	"	1715	10	2	
	"	1725	6	2	
	"	1735	3	2	
	"	1745	2	2	
	"	1755	2	2	
	"	1765	4	2	

Well, operator	Age of sample	Depth of sample (m)	Conodonts elements	CAI
Carina 1	Ordovician	1500	1	2
(Getty)	”	1510	3	2
		1510-1520	2	2
	”	1550-1560	5	2
	”	1570-1580	2	2
	”	1580-1590	2	2
	”	1590-1600	5	2
	”	1670	7	2
Contention	Ordovician	1341.5-1372.0	5	1
Heights 1	”	1372.0-1402.4	2	1
(AAP)	”	1402.4-1432.9	25	1-1.5
	”	1432.9-1463.4	5	1-1.5
	”	1463.4-1493.9	75	1-1.5
	”	1524.4-1554.9	25	1-1.5
	”	1554.9-1585.4	8	1-1.5
Cycas 1	Lower	2372.5-2375.0	6	2
(IEDC)	Carboniferous	2397.5-2400.0	2	2
Ellendale 1	Lower	2005-2015	1	1-1.5
(Amax)	Carboniferous	2055-2065	2	1-1.5
	Devonian	2395-2405	3	1-1.5
	”	2745-2755	1	1-1.5
	”	2795-2805	1	1-1.5
	”	2845-2855	2	1-1.5
	”	2895-2905	2	1-1.5
	”	2990-3000	1	1-1.5
Fitzroy River 1	Lower	3010-3020	1	4
(Amax)	Carboniferous			
Frome Rocks 2	Permian	335.1-338.1	1	1
(WAPET)	Devonian	1234.8-1265.2	1	1
		1268.3-1298.9	1	1
		1417.7-1448.2	2	1
		1506.1-1530.5	5	1
		1561.0-1591.5	5	1
		1622.0-1655.5	7	1
		1655.5-1686.0	2	1
Grant Range 1	Lower	2445.1-2458.8	1	1
(WAPET)	Carboniferous	3664.6-3628.9	3	1

Well, operator	Age of sample	Depth of sample (m)	Conodonts elements	CAI
Hawkstone Peak 1 (WAPET)	Lower Caroniferous	228.7-259.1	1	1
		259.1-289.6	7	1
	,,	381.1-411.6	4	1
	,,	411.6-442.1	1	1-1.5
	Devonian	442.1-472.6	1	1.5
	,,	625.0-649.4	1	1.5
	,,	899.4-930.0	1	1.5
Jones Range 1 (WAPET)	Devonian	2515-2541	9	3
Lake Betty 1 (WAPET)	Devonian	3054.9-3064.0	3	2
	,,	3109.8-3118.9	3	2
Langoora 1 (WAPET)	Triassic	70.1-73.2	1	1
Musca 1 (Getty)	Ordovician	1430-1440	2	2
	,,	1460-1470	1	2
	,,	1470-1480	1	2
	,,	1480-1490	1	2
	,,	1500-1510	1	2
	,,	1510-1520	1	2
	,,	1520-1530	4	2
St. George Range 1 (Cont. Oil)	Lower Carboniferous	2743.9-2756.1	2	1-1.5
		3963.4-3972.6	1	1-1.5
Vela 1 (Getty)	Ordovician	1770	1	2
	,,	1780	2	2
	,,	1790-1800	3	2
	,,	1820-1830	1	2
	,,	1830-1840	2	2
	,,	1850-1860	1	2
	,,	1870-1880	5	2
	,,	1880-1890	6	2
	,,	1900-1908.64	1	2
Wilson Cliffs 1	Devonian	966.5-997.9	1	1
	Ordovician	2564.0-2594.5	2	1-2
	,,	2625.0-2655.5	5	1-2
	,,	2655.5-2686.0	4	1-2
	,,	2686.0-2716.5	3	2
	,,	2716.5-2747.0	24	1.5-2
	,,	2747.0-2777.4	1	2
	,,	2777.4-2807.9	2	2
	,,	2807.9-2838.4	7	2
	,,	2838.4-2868.9	7	2
	,,	2868.9-2899.4	6	2
	,,	2899.4-2929.9	1	2
	,,	2929.9-2960.4	20	2
	,,	2960.4-2990.9	5	2
	,,	3051.8-3079.3	3	2
	,,	3128.0-3158.5	3	2
	,,	3158.5-3189.0	4	2-3
	,,	3189.0-3219.5	15	2
	,,	3219.5-3250.0	5	2

Well (Operator)	**Age of Sample**	**Depth (Metres)**	**No. of elements**	**CAI**
Cudalgarra - 1	Willara	1660	8	2.5
(Sydney Oil)	"	1680	2	2.5
	"	1700	4	2.5
Nita Downs - 1	Goldwyer	1642	9	2
(Sydney Oil)	"	1837	2	2
Leo - 1	Middle Goldwyer	1739-1745	4	2
(Command)	Lower Goldwyer	1745-1750	3	2
	" "	1976-1982	47	2
	Willara	1994-2000	1	2
	"	2192-2196	24	2
Frankenstein - 1	Carribuddy	1795-1800	1	1
	"	1800-1805	1	1
	"	1930-1935	1	1
	Goldwyer	2279-2285	20	2
		2285-2291	31	2
		2291-2297	35	2
		2297-2303	73	2
		2303-2309	70	2
		2309-2315	44	2
		2315-2321	50	2
		2321-2327	54	2
		2327-2333	55	2
		2333-2339	83	2
		2345-2351	103	2
		2351-2357	104	2
		2393-2402	59	2
		2402-2408	22	2
		2408-2414	37	2
		2414-2420	54	2
		2420-2426	52	2
		2519-2525	178	2
		2537-2543	389+	2
		2645-2651	347	2
		2657-2663	237	2
		2663-2669	298	2
		2669-2675	83	2
Pegasus - 1	U Goldwyer	2500	116	2
(AMOCO)		2550	84	2
		2600	130	2
		2650	142	2
	L Goldwyer	2700	130	2
		2750	202	2
	Nambeet	2800	355	2
		2850	95	2
		2900	240	2
		2950	17	2

Well (Operator)	Age of Sample	Depth (Metres)	No. of elements	CAI
Aquila - 1	Nita	693	4	1
(EAGLE)	Nita	699	29	1
	Willara	1174	21	1.5
	"	1175	15	1.5
	"	1176	19	1.5
	"	1179	4	1.5
	"	1182	19	
Goldwyer - 1		909.8-812.6		1.5-2
(WAPET)		912.6-915.0		1.5-2
		915.0-917.7		1.5-2
		887-914		1.5-2
		914-930		1.5-2
		945-960		1.5-2
		972.6-975.7		1.5-2
		975.7-979.9		1.5-2
		979.9-983.6		1.5-2
		975-991		1.5-2
		991-1006		1.5-2
		1021-1036		1.5-2
		1036-1051		1.5-2
		1051-1067		1.5-2
		1067-1082		1.5-2
		1082-1097		1.5
		1083.6-1085.4		2
		1101.2-1104.6		2
		1189-1204		2
		1219-1234		1.5-2
		1234-1250		2
		1250-1265		2
		1265-1280		2
		1280-1295		2
		1217.6-1223.2		2
		1223.2-1226.8		2
		1352.7-1355.1		2
		1392.3-1394.1		2.5-3
		1407.6-1410.9		2.5-3
Edgar Range - 1	Nita	837.3-839.3		1
(TOTAL)	Goldwyer	1042.4-1045.1		1
	Willara	1356.4-1358.4		1.5
		1549.0-1552.0		2
		1681.6-1683.4		2
		1782.9-1785.5		3
Percival - 1	Nita	2028.5-2030.4		1.5-2
(WMC)	Goldwyer	2058.2-2060		1.5-2
	"	2067-2067.9		1.5-2
	Nambeet	2316-2316.6		3
Dodonea - 1	Goldwyer	1544.7-1545		1-1.5
(WMC)	"	1548.5-1549		1-1.5
		2040-2040.6		3
Solanum - 1	Nita	225-228		1
(WMC)	"	251-257		1
	Goldwyer (Unit 4)	300-306		1
	Goldwyer (Unit 3)	333		1
	Goldwyer (Unit 3)	352-353		1
	Goldwyer (Unit 2)	404-409		1
	" "	452-460		1

Goldwyer (Unit 1)	503-509	1
" "	550-560	1
" "	600-603	1+
" "	603-607	1.5?
" "	607-610	1.5
Acacia Sand	645-668	?
" "	668-670	1.5+
" "	700-708	1.5-2
Willara	750-760	1.5-2
"	819-815	2
"	831-832.5	2