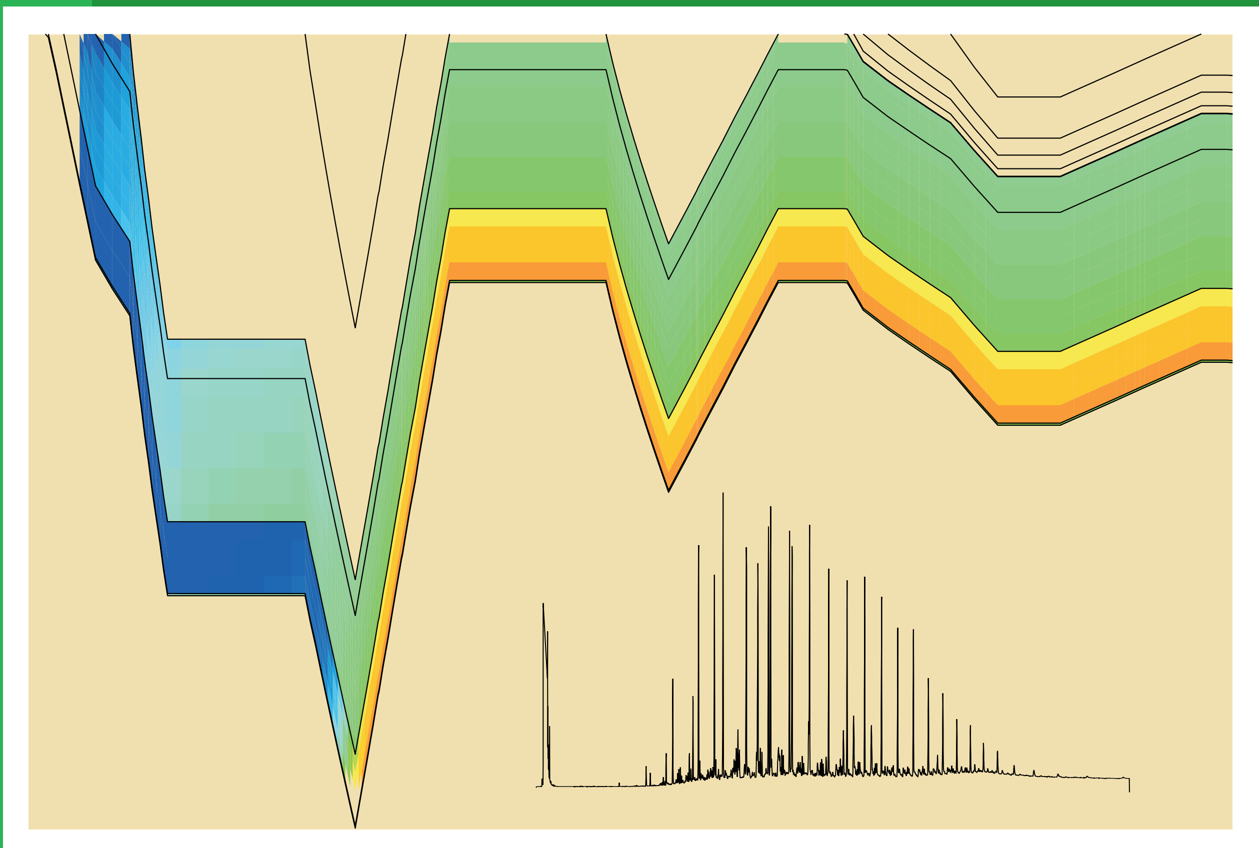
REPORT 72

GOVERNMENT OF WESTERN AUSTRALIA

# SILURIAN–DEVONIAN PETROLEUM SOURCE-ROCK POTENTIAL AND THERMAL HISTORY CARNARVON BASIN WESTERN AUSTRALIA

by K. A. R. Ghori



GEOLOGICAL SURVEY OF WESTERN AUSTRALIA

DEPARTMENT OF MINERALS AND ENERGY

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# SILURIAN–DEVONIAN PETROLEUM SOURCE-ROCK POTENTIAL AND THERMAL HISTORY CARNARVON BASIN WESTERN AUSTRALIA

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K. A. R. Ghori

Perth 1999

**MINISTER FOR MINES**
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## **Digital dataset** (in pocket)

# Silurian–Devonian petroleum source-rock potential and thermal history, Carnarvon Basin, Western Australia

by

**K. A. R. Ghori**

## Abstract

Detailed geochemical analyses confirm the presence of mature Silurian and Upper Devonian source-rock intervals within the Carnarvon Basin. The analyses included total organic carbon (TOC), Rock-Eval pyrolysis, pyrolysis-gas chromatography, extraction, liquid and gas chromatography, organic petrology, and apatite fission-track analysis.

Oil-prone source beds within the Silurian Dirk Hartog Group on the Gascoyne Platform have fair to good generating potential. These source beds are present in Coburn 1 and Pendock 1, where they have TOC values up to 2.1%, potential yields up to 6.3 mg/g rock, and are within the early to main phase of oil generation.

Oil- and gas-prone source beds within the Upper Devonian Gneudna Formation have fair to excellent generating potential. These source beds have excellent generating potential in Barrabiddy 1A on the Gascoyne Platform, where they have TOC values up to about 14%, potential yields up to 40 mg/g rock, and are within the main phase of oil generation. These are the best oil and gas source-beds reported from the Palaeozoic succession of the Carnarvon Basin.

On the eastern margin of the Merlinleigh Sub-basin, organic-rich beds with good generating potential are present in Gneudna 1 and Uranerz CDH 8, where they have TOC values up to 3.2% and potential yields up to 8.8 mg/g rock, but are immature. The Gneudna Formation is deeply buried and overmature along the western margin of the sub-basin.

Oil and gas source-beds with fair generating potential are also present within the Gneudna Formation in Kybra 1 and Peedamullah 1, on the Peedamullah Shelf of the Northern Carnarvon Basin.

Apatite fission-track analysis, vitrinite reflectance measurements, and basin modelling indicate that the levels of maximum burial, palaeotemperatures, and maturation attained across the Carnarvon Basin vary greatly within the Silurian and Devonian successions. However, the timing for the maximum rate of petroleum expulsion across the basin peaked during the late Palaeozoic for the Dirk Hartog Group and Gneudna Formation. Therefore, Palaeozoic traps, if present, will be the most prospective in the region.

**KEYWORDS:** petroleum geochemistry, source rock, basin modelling, Silurian, Devonian, Dirk Hartog Group, Gneudna Formation, Carnarvon Basin, Western Australia

## Introduction

This Report provides a regional evaluation of the source-rock potential and maturation history of the Silurian–Devonian successions in the Carnarvon Basin. The evaluation is based on first-hand geochemical analyses of samples from petroleum, mineral, and water boreholes incorporated with open-file analytical data from the archives of the Geological Survey of Western Australia (GSWA).

Numerous commercial petroleum systems of the world are charged by Silurian and Upper Devonian – Lower Carboniferous source rocks (Klemme and Ulmishek, 1991), including the Larapintine 3 Petroleum System (Canning Basin) of Australia charged by Upper Devonian source rocks (Bradshaw et al., 1994). However, the thick Silurian–Devonian section of fine-grained siliciclastic and carbonate rocks in the Carnarvon Basin has yet to yield evidence of effective petroleum systems, even though potentially attractive source, reservoir, and caprocks are present. Additionally, those parts of the succession, where there are no geochemical data or the limited data available suggest low potential, could contain potential source rocks; for example, Warris (1994).

The aims of the study are firstly, to identify and characterize the source-rock intervals in the Silurian–Devonian succession of the Carnarvon Basin, and secondly, to develop geologically plausible maturity models for existing wells by combining measured maturity values and present-day formation temperatures with burial, erosional, and thermal information. The maturity models are used to reconstruct the process of hydrocarbon generation as a function of the type and amount of kerogen, as inferred from the geochemical data. The purpose is to estimate the timing of generation and, consequently, indicate the timing of trap formation required for the charge of hydrocarbons from Silurian–Devonian source rocks. Maturity and petroleum-generation modelling were carried out using the BasinMod UNIX Version 5.24 one-dimensional basin-modelling software package of Platte River Associates, U.S.A.

# Geology

In the Carnarvon Basin, the Silurian–Devonian succession has been penetrated in four tectonic units: the Gascoyne Platform, Merlinleigh Sub-basin, Peedamullah Shelf, and Coolcalalaya Sub-basin. The age of the basin fill is predominantly Ordovician to Devonian in the Gascoyne Platform, Devonian to Late Permian in the Merlinleigh Sub-basin, Permian–Mesozoic in the Peedamullah Shelf, and ?Ordovician–Permian in the Coolcalalaya Sub-basin.

The Palaeozoic geology of the Carnarvon Basin is described in a number of reports and papers, the most significant being Hocking et al. (1987) and Warris (1993, 1994) for the Palaeozoic; Gorter et al. (1994), Mory et al. (1998b), and Iasky and Mory (1999) for the lower Palaeozoic; Gorter et al. (1998) for the Devonian; Percival and Cooney (1985), Crostella (1995), and Mory and Iasky (1997) for the Merlinleigh Sub-basin; Bentley (1988) for the Peedamullah Shelf; and Mory et al. (1998a) for the Coolcalalaya Sub-basin.

The Gascoyne Platform is the largest tectonic unit of the Southern Carnarvon Basin and contains mainly Silurian–Devonian rocks unconformably overlain by a thin Cretaceous and Cainozoic section. The platform is an elongate, north-northwesterly trending region that is structurally elevated in comparison with the adjoining sub-basins. In the Merlinleigh Sub-basin, the Silurian–Devonian succession is overlain by a thick Permo-Carboniferous succession, except along the eastern margin. In this sub-basin, the Upper Devonian unconformably overlies Ordovician–Silurian rocks or, to the east, granitic basement. The Gascoyne Platform is separated from the Merlinleigh Sub-basin by the Cardabia Transfer Zone to the northeast (Crostella and Iasky, 1997), and the Wandagee–Kennedy–Ajana fault trend to the east (Iasky and Mory, 1999). The Peedamullah Shelf north of the Merlinleigh Sub-basin contains mainly Mesozoic–Permian strata. The subsurface geology of the Coolcalalaya Sub-basin, south of the Merlinleigh and Byro Sub-basins, is poorly known, but a limited number of shallow mineral exploration drillholes and waterbores penetrated pre-Permian strata in the southwest. Figure 1 shows the location of tectonic units and wells on the Carnarvon Basin, Appendix 1 summarizes the information on wells that penetrated the Silurian–Devonian successions, and Appendix 2 provides formation tops for petroleum and other selected wells used in this study. The generalized stratigraphy of the Gascoyne Platform, Merlinleigh Sub-basin, and Peedamullah Shelf is summarized in Figure 2.

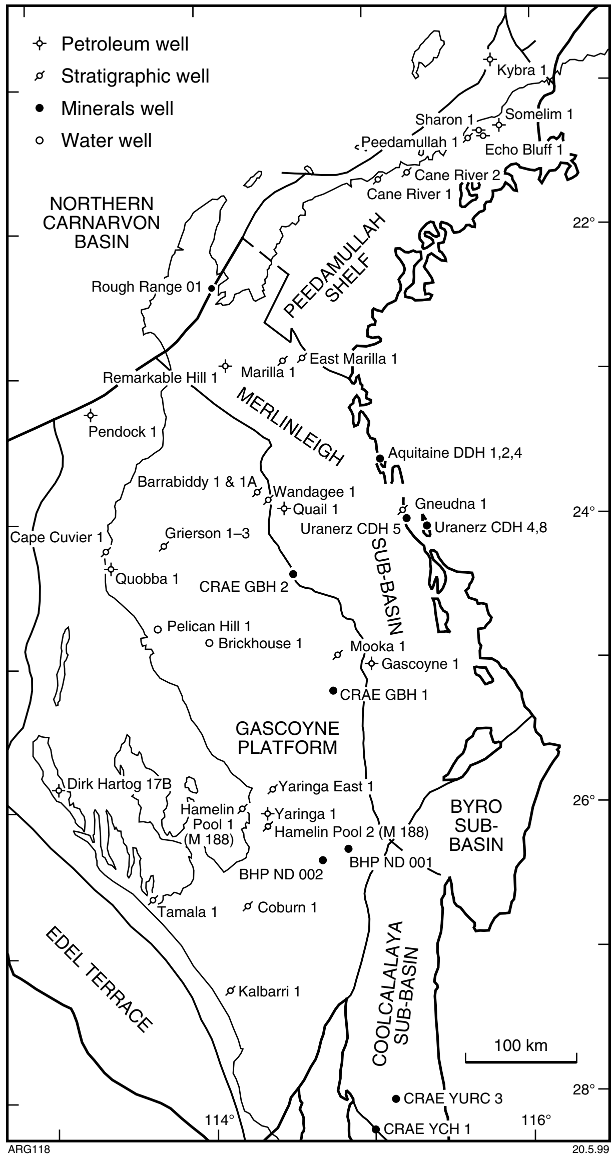


**Figure 1. Location of tectonic units and wells of the Carnarvon Basin**

There are two main depositional cycles relevant to this study: Ordovician to Early Devonian, and Middle Devonian to Early Carboniferous.

## Ordovician to Early Devonian depositional cycle

Deposition began in the Ordovician with predominantly fluvial to tidal high-energy conditions (Tumblagooda Sandstone) followed by Silurian shallow-marine carbonates and evaporites (Ajana, Yaringa, and Coburn Formations of the Dirk Hartog Group). After a short hiatus at the end of the Silurian, carbonate and siliciclastic deposition recommenced in the Early Devonian (Faure Formation), and was followed by the deposition of coarse-grained siliciclastic rocks (Kopke Sandstone) and a mixed carbonate, clastic, and evaporite unit (Sweeney Mia Formation). Ordovician – Early Devonian deposition was widespread in the Gascoyne Platform and extended into the western part of the Merlinleigh Sub-basin and possibly the Coolcalalaya Sub-basin. The stratigraphy of this cycle was described by Gorter et al. (1994) and Mory et al. (1998b).

The source-rock potential of the Ordovician – Early Devonian succession is important for the prospectivity of the southern Gascoyne Platform because there are no younger Palaeozoic strata, and overlying Mesozoic and younger rocks are immature (Ghori, 1998).

## Middle Devonian to Early Carboniferous depositional cycle

Following a significant middle Devonian break, deposition in the Carnarvon Basin recommenced in the Givetian with shallow-marine transgressive sandy sediments (Nannyarra Sandstone) followed by Givetian–Frasnian shallow-marine to intertidal carbonates and fine-grained siliciclastic rocks (Gneudna Formation). During the Famennian, clastic deposition (Munabia and Willaradie Formations) was re-established, but by the Early Carboniferous, carbonate deposition (Moogooree Limestone) was again dominant. In the late Tournaisian to Visean, siliciclastic and carbonate deposition alternated (Williambury, Yindagindy, and Quail Formations). Deposition in this period is documented only in the northern part of the Gascoyne Platform and Merlinleigh Sub-basin, as well as across the Peedamullah Shelf. There is also some evidence of Upper Devonian deposition in the Coolcalalaya Sub-basin. A sequence-stratigraphic model of the Middle–Late Devonian part of this cycle was provided by Gorter et al. (1998).

The petroleum prospectivity of this succession is regarded as good, with marine shale within carbonates of the Gneudna Formation expected to act as both the source and seal for the Nannyarra Sandstone in the Gascoyne Platform, and also possibly in the northeastern Merlinleigh Sub-basin (Ghori, 1998).

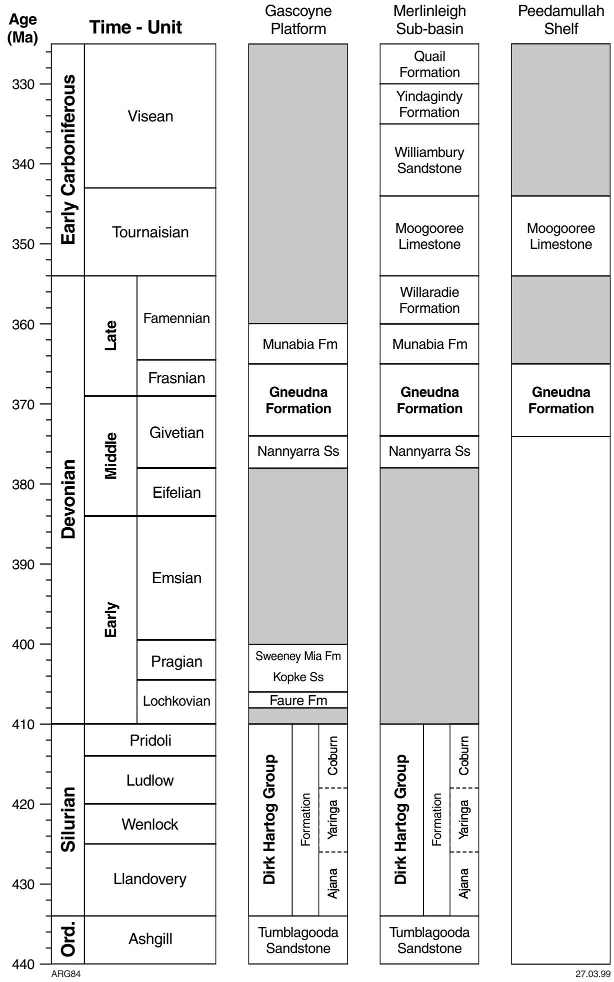


**Figure 2. Generalized stratigraphy for three major components of the Carnarvon Basin**

# Petroleum geochemistry

## Database

New analyses performed on 334 samples from six new and 26 existing wells have been incorporated with available open-file data (Fig. 3; Appendix 3). The depths, formations, and type of analyses carried out for new samples are listed in Appendix 4.

The new source-rock analyses were carried out by Geotechnical Services, maturity assessment by Keiraville Konsultants, and determination of maximum palaeo-temperatures and their timing by Geotrack International.

A comprehensive dataset was complied for this study, including total organic carbon and Rock-Eval pyrolysis data (Appendix 5), pyrolysis-gas chromatography data (Appendix 6), extraction, liquid and gas chromatography data (Appendix 7), organic petrology and vitrinite reflectance data (Appendix 8), and apatite fission-track analysis data (Appendix 9). Samples that appeared to be contaminated, on the basis of geochemical analyses in the dataset, have been excluded from the interpretation, but not from the database.

## Evaluation parameters

The petroleum-generating capacity of a source rock depends on four factors: organic richness (amount of kerogen), organic facies (type of kerogen), organic maturity (kerogen to petroleum transformation ratio), and expulsion efficiency. Total organic carbon (TOC) content is a measure of organic richness. Potential yield ($S_1 + S_2$) from Rock-Eval analysis quantifies the hydrocarbon-generating potential. Rock-Eval, pyrolysis-gas chroma-

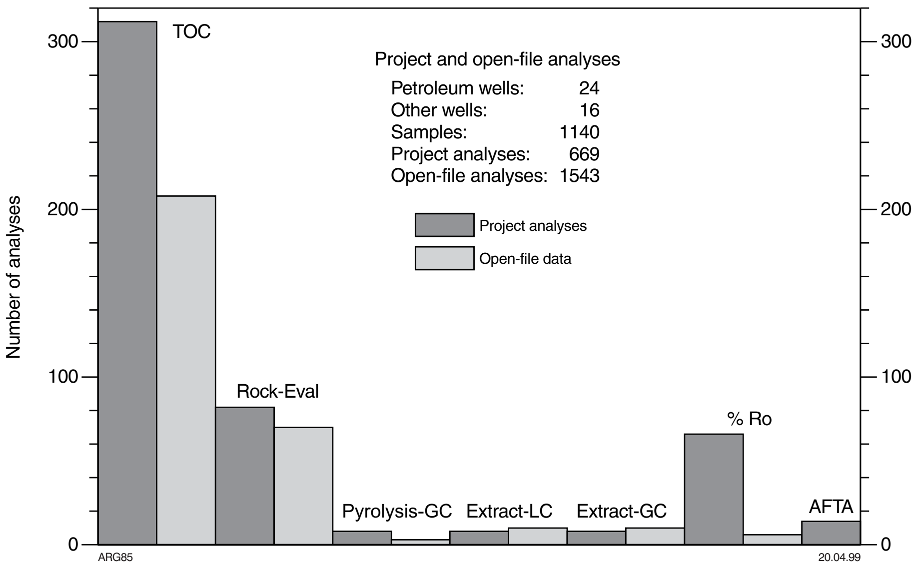


**Figure 3. Geochemical database**

tography (PGC), and extraction of organic matter and its liquid and gas chromatography (extract-GC) identify the type of kerogen or organic facies. Vitrinite reflectance (VR) data and $T_{max}$ from Rock-Eval analyses indicate thermal maturity, whereas apatite fission-track analysis (AFTA) indicates maximum palaeotemperatures and their timing. Finally, organic maturity and timing of oil and gas generation from source rocks can be estimated from basin modelling. No direct method is available to measure expulsion efficiency. The source-rock characterization typically used by the petroleum industry (Baskin, 1997) was followed for this study, albeit with some modifications listed below.

**Organic richness:** A TOC content of over 0.5% is considered to represent fair organic richness; between 1 and 2% is regarded as good; between 2 and 4%, very good; and over 4%, excellent.

**Generating potential:** Thermal and pyrolysate yield of organic compounds from Rock-Eval is expressed as $S_1 + S_2$ or potential yield. $S_1$ represents existing indigenous or migrated hydrocarbons in a rock, and is approximately equivalent to the extractable organic matter (bitumen). $S_2$ represents the organic compounds generated from kerogens during pyrolysis. Rocks whose potential yield is 2–5 milligrams in a gram of rock (mg/g rock) are classified as fair; those with 5–10 mg/g rock, good; those with 10–20 mg/g rock, very good; and those over 20 mg/g rock, excellent.

**Organic facies or kerogen type:** Hydrogen index (HI), PGC, and extract-GC are used to define the kerogen type. The HI from Rock-Eval corresponds to the quantity of pyrolyzable organic compounds relative to the total organic carbon (mg HC/g TOC). Source rocks with HI values less than 150 are classified as gas generating, and source rocks with HI values over 150 are classified as oil and gas generating.

PGC is a more precise technique for defining the type of kerogen because it directly monitors specific chemical compounds in a kerogen pyrolysate. The type of kerogen depends on the amount of aliphatic, aromatic, and phenolic components, of which the aliphatic carbon content is the most critical for the generation of hydrocarbons. The most important parameters from such analyses include:

- Gas–oil generation index (GOGI) = $(C_1 - C_5)/C_{6+}$ abundance;
- Oil yield = $C_5 - C_{31}$ (alkenes + alkanes);
- Aromaticity or type index (R) = (m + p-xylene/n-octene).

**Maturity modelling:** The BasinMod package was used to model the thermal maturity and timing of oil and gas generation from source rocks. Firstly, the geological history was reconstructed from available time stratigraphy and lithologic and structural data. The thermal histories were then constructed by adjusting thermal conductivities and heat flow to constrained maturity models against measured data. Present-day and palaeotemperatures were constrained by corrected bottomhole temperatures (BHTs), $T_{max}$, and VR values. Predicted maturity and oil windows are based on Lawrence Livermore National Laboratory (LLNL) vitrinite and kerogen kinetics respectively.

## Petroleum-generating potential

A total of 430 TOC and 137 Rock-Eval analyses are available to evaluate the petroleum-generating potential of the succession (Appendix 5). Of these, 11 from the Ordovician to Early Devonian and 22 from the Middle Devonian to Early Carboniferous have TOC values over 0.5% (Table 1) as well as potential yields over 1 mg/g

**Table 1. TOC and Rock-Eval data of source-rock samples**

| *Well* | *Depth (m)* | | *Sample type* | *TOC* | $T_{max}$ | $S_1$ | $S_2$ | $S_3$ | $S_1 + S_2$ | *PI* | *HI* | *OI* | *Formation* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *From* | *To* | | *(%)* | *(°C)* | *(mg/g rock)* | | | | | | | |
| **Gascoyne Platform** | | | | | | | | | | | | | |
| Barrabiddy 1A | 218.5 | – | core | 0.96 | 431 | 0.08 | 1.1 | 0.04 | 1.18 | 0.07 | 115 | 4 | Munabia Sandstone |
| Barrabiddy 1A | 655.4 | – | core | 9.88 | 444 | 3.27 | 19.53 | 0.18 | 22.80 | 0.14 | 198 | 2 | Gneudna Formation |
| Barrabiddy 1A | 663.8 | – | core | 2.27 | 443 | 0.59 | 2.35 | 0.22 | 2.94 | 0.20 | 104 | 10 | Gneudna Formation |
| Barrabiddy 1A | 678.2 | – | core | 5.22 | 444 | 1.66 | 10.78 | 0.33 | 12.44 | 0.13 | 207 | 6 | Gneudna Formation |
| Barrabiddy 1A | 679.2 | – | core | 13.56 | 443 | 3.93 | 36.16 | 0.70 | 40.09 | 0.10 | 267 | 5 | Gneudna Formation |
| Barrabiddy 1A | 682.6 | – | core | 1.20 | 444 | 0.31 | 1.57 | 0.36 | 1.88 | 0.16 | 131 | 30 | Gneudna Formation |
| Barrabiddy 1A | 705.5 | – | core | 7.53 | 446 | 2.58 | 14.58 | 0.65 | 17.16 | 0.15 | 194 | 9 | Gneudna Formation |
| Barrabiddy 1A | 713.4 | – | core | 5.78 | 448 | 1.84 | 9.01 | 0.41 | 10.85 | 0.17 | 156 | 7 | Gneudna Formation |
| Barrabiddy 1A | 726.5 | – | core | 1.12 | 444 | 0.17 | 1.31 | 0.41 | 1.48 | 0.11 | 117 | 37 | Gneudna Formation |
| BHP ND 001 | 191.9 | – | core | 0.70 | 411 | 0.16 | 1.23 | 0.21 | 1.39 | 0.12 | 176 | 30 | Dirk Hartog Group |
| Brickhouse 1 | 772.7 | 792.8 | core | 2.12 | 417 | 0.21 | 1.06 | 1.70 | 1.27 | 0.17 | 50 | 80 | Tumblagooda Sandstone |
| Cape Cuvier 1 | 335.3 | – | core 9 | 1.90 | 428 | 0.34 | 1.70 | 1.01 | 2.04 | 0.17 | 89 | 53 | Gneudna Formation |
| Coburn 1 | 606.2 | – | core | 1.23 | 426 | 0.86 | 4.23 | 0.67 | 5.09 | 0.17 | 344 | 54 | Dirk Hartog Group |
| Coburn 1 | 623.9 | – | core | 2.06 | 424 | 0.86 | 5.43 | 0.08 | 6.29 | 0.14 | 264 | 4 | Dirk Hartog Group |
| Coburn 1 | 633.5 | – | core | 0.51 | 427 | 0.29 | 1.36 | 1.59 | 1.65 | 0.18 | 267 | 312 | Dirk Hartog Group |
| Coburn 1 | 839.4 | – | core | 0.53 | 429 | 0.19 | 1.05 | 1.19 | 1.24 | 0.15 | 198 | 225 | Dirk Hartog Group |
| Coburn 1 | 853.2 | – | core | 0.59 | 433 | 0.26 | 1.30 | 1.03 | 1.56 | 0.17 | 220 | 175 | Dirk Hartog Group |
| Mooka 1 | 339.0 | – | core | 0.61 | 414 | 0.09 | 1.25 | 0.38 | 1.34 | 0.07 | 205 | 62 | Dirk Hartog Group |
| Pendock 1 | 1 722.5 | – | core | 0.97 | 440 | 0.49 | 2.49 | 0.11 | 2.98 | 0.16 | 257 | 11 | Faure Formation |
| Pendock 1 | 1 722.8 | – | – | 1.93 | 429 | 0.41 | 4.09 | 0.25 | 4.50 | 0.09 | 212 | 13 | Faure Formation |
| Quobba 1 | 1 118.0 | – | SWC | 0.83 | 440 | 0.57 | 1.61 | 2.00 | 2.18 | 0.26 | 194 | 241 | Gneudna Formation |
| Quobba 1 | 1 130.0 | 1 160.0 | cuttings | 1.02 | 446 | 0.42 | 3.20 | 0.39 | 3.62 | 0.12 | 314 | 38 | Gneudna Formation |
| Quobba 1 | 1 534.5 | – | SWC | 0.96 | 435 | 0.44 | 1.2 | 1.36 | 1.64 | 0.27 | 255 | 289 | Faure Formation |
| **Merlinleigh Sub-basin** | | | | | | | | | | | | | |
| Aquitaine DDH 1 | 71.0 | – | CC | 2.42 | 421 | 0.06 | 1.47 | 1.00 | 1.53 | 0.04 | 61 | 41 | Gneudna Formation |
| Gneudna 1 | 117.2 | 117.2 | core | 1.55 | 434 | 0.05 | 1.63 | 0.30 | 1.68 | 0.03 | 105 | 19 | Gneudna Formation |
| Gneudna 1 | 264.0 | 264.0 | core | 0.81 | 431 | 0.07 | 1.28 | 0.14 | 1.35 | 0.05 | 158 | 17 | Gneudna Formation |
| Gneudna 1 | 289.0 | 289.0 | core | 0.67 | 427 | 0.05 | 1.19 | 0.12 | 1.24 | 0.04 | 178 | 18 | Gneudna Formation |
| Gneudna 1 | 300.4 | 300.4 | core | 2.46 | 433 | 0.24 | 8.53 | 0.51 | 8.77 | 0.03 | 347 | 21 | Gneudna Formation |
| Gneudna 1 | 315.6 | 315.6 | core | 0.76 | 434 | 0.03 | 1.51 | 0.14 | 1.54 | 0.02 | 199 | 18 | Gneudna Formation |
| Uranerz CDH 8 | 112.2 | – | CC | 1.25 | 430 | 0.12 | 1.97 | 0.71 | 2.09 | 0.06 | 158 | 57 | Gneudna Formation |
| Uranerz CDH 8 | 121.0 | – | CC | 3.16 | 429 | 0.2 | 5.83 | 1.12 | 6.03 | 0.03 | 184 | 35 | Gneudna Formation |
| **Peedamullah Shelf** | | | | | | | | | | | | | |
| Kybra 1 | 2 264.0 | – | SWC | 1.25 | 435 | 0.55 | 1.80 | 1.01 | 2.35 | 0.23 | 144 | 81 | Moogooree Limestone |
| Peedamullah 1 | 213.0 | 232.0 | DC | 1.33 | 424 | 0.60 | 1.65 | 4.41 | 2.25 | 0.27 | 124 | 332 | Gneudna Formation |

**NOTES:**
CC: conventional core
SWC: side wall core
TOC: total organic carbon
$T_{max}$: temperature of maximum pyrolytic yield ($S_2$)
$S_1$: existing hydrocarbons (HC)
$S_2$: pyrolytic yield (HC)
$S_3$: organic carbon dioxide
$S_1 + S_2$: potential yield
PI: production index
HI: hydrogen index
OI: oxygen index
DC: ditch cutting

rock. The TOC versus Rock-Eval $S_1 + S_2$ plot for samples from the Ordovician to Lower Devonian succession shows organic-rich shale samples from the Dirk Hartog Group in six wells. The petroleum-generating potential for two samples from Coburn 1 are classified as good, and for two samples from Pendock 1 as fair, whereas samples from BHP ND 001, Brickhouse 1, Mooka 1, and Quobba 1 have poor petroleum-generating potential (Fig. 4a).

Within the Middle Devonian to Lower Carboniferous succession, source rocks have been identified in the Devonian Gneudna Formation from the following wells: Barrabiddy 1A, Cape Cuvier 1, Gneudna 1, Quobba 1, and Uranerz CDH 8. The petroleum-generating potential of the Gneudna Formation is classified as excellent in Barrabiddy 1A, fair in Cape Cuvier 1 and Quobba 1 on the Gascoyne Platform, fair to good in Gneudna 1 and Uranerz CDH 8 in the Merlinleigh Sub-basin, and fair in Kybra 1 and Peedamullah 1 on the Peedamullah Shelf (Fig. 4b).

Organic richness, generating potential, kerogen type, and maturity from the available geochemical data are shown for the Silurian succession in Coburn 1 (Fig. 5), Mooka 1 (Fig. 6), Dirk Hartog 17B (Fig. 7), Yaringa 1 (Fig. 8), and Yaringa East 1 (Fig. 9); for Silurian and Devonian strata in Pendock 1 (Fig. 10), Quobba 1 (Fig. 11), Quail 1 (Fig. 12), and Wandagee 1 (Fig 13); and for Devonian rocks in Barrabiddy 1A (Fig. 14), Gneudna 1 (Fig. 15), Kybra 1 (Fig. 16), and Peedamullah 1 (Fig 17).

# Kerogen type

## Rock-Eval pyrolysis

Hydrogen index, one of the Rock-Eval parameters, is a kerogen quality indicator with a direct relationship to the atomic hydrogen to carbon ratio (Espitalie et al., 1977; Tissot and Welte, 1978). The HI is calculated from $S_2$ hydrocarbons in milligram per gram of TOC and can be used to estimate the type of kerogen present when plotted against $T_{max}$. $T_{max}$ is a maturity indicator and represents the temperature at which the maximum amount of $S_2$ hydrocarbons is generated. High HI values commonly indicate oil-prone kerogen; however, samples with high levels of inertinite do not have high HI values (Horstman, 1994).

A total of 18 samples have source-rock characteristics with fair to excellent hydrocarbon-generating potential (Fig. 4), and plots of HI versus $T_{max}$ values indicate that the kerogen is oil- and gas-generating type II for samples from both the Silurian Dirk Hartog Group (Fig. 18a) and the Devonian Gneudna Formation (Fig. 18b).

## Pyrolysis-gas chromatography

A total of nine PGC analyses are available, from which the detailed molecular configuration of kerogen and its oil- versus gas-generating potential can be evaluated (Larter, 1985). Of these analyses, two are from samples within the Silurian Dirk Hartog Group and seven are from

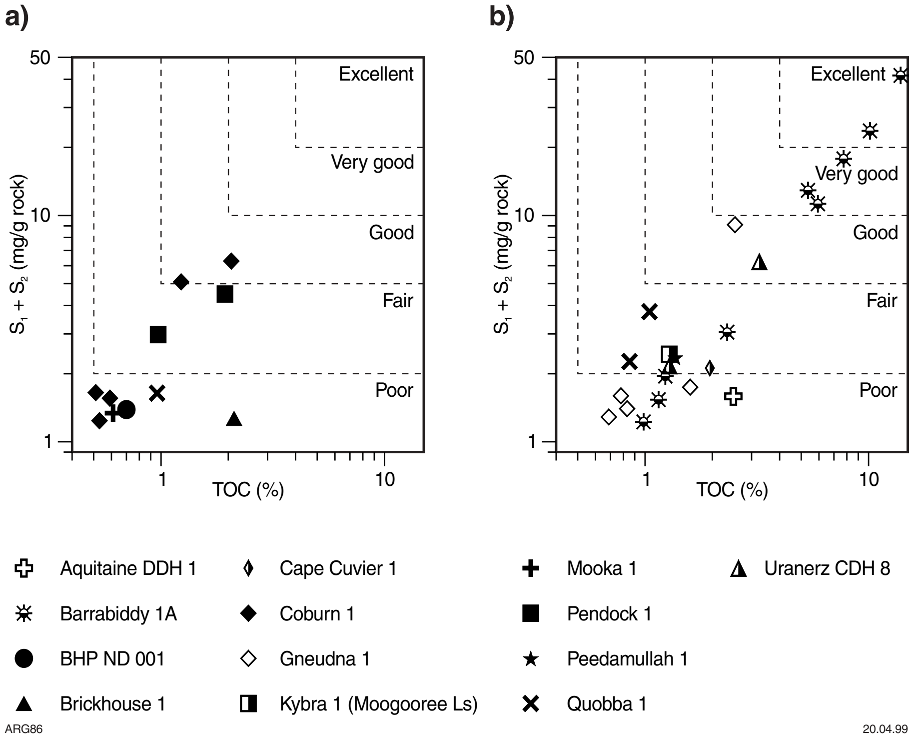


**Figure 4. Petroleum-generating potential of rocks: a) Silurian; b) Devonian**

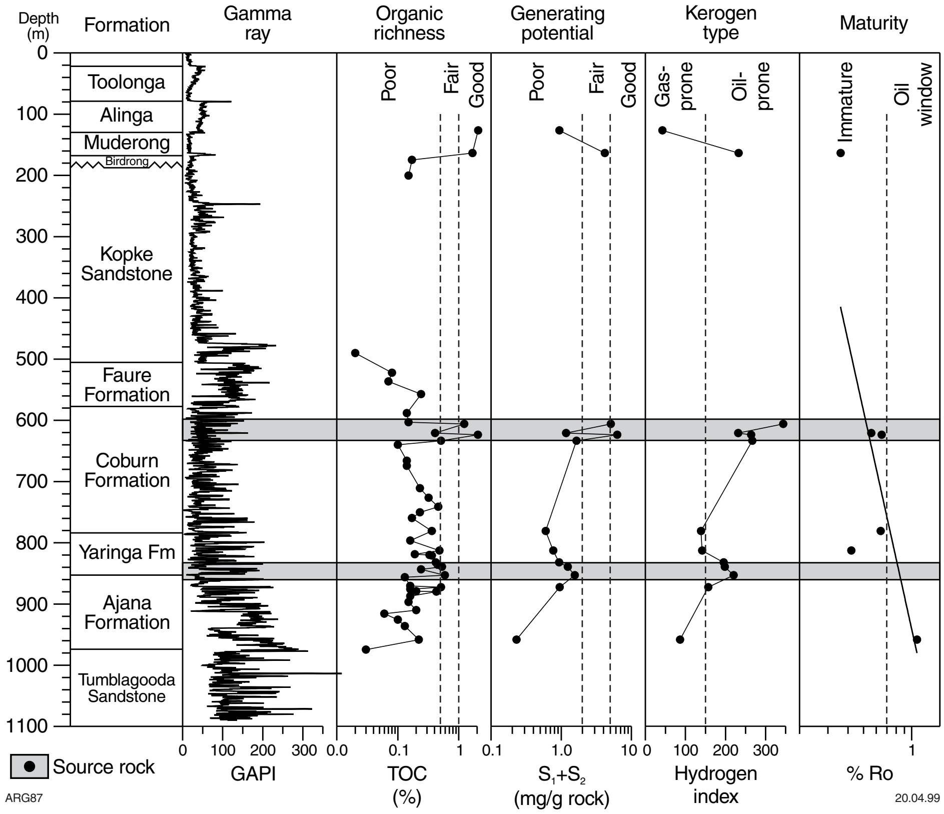


**Figure 5. Geochemical log of Coburn 1**

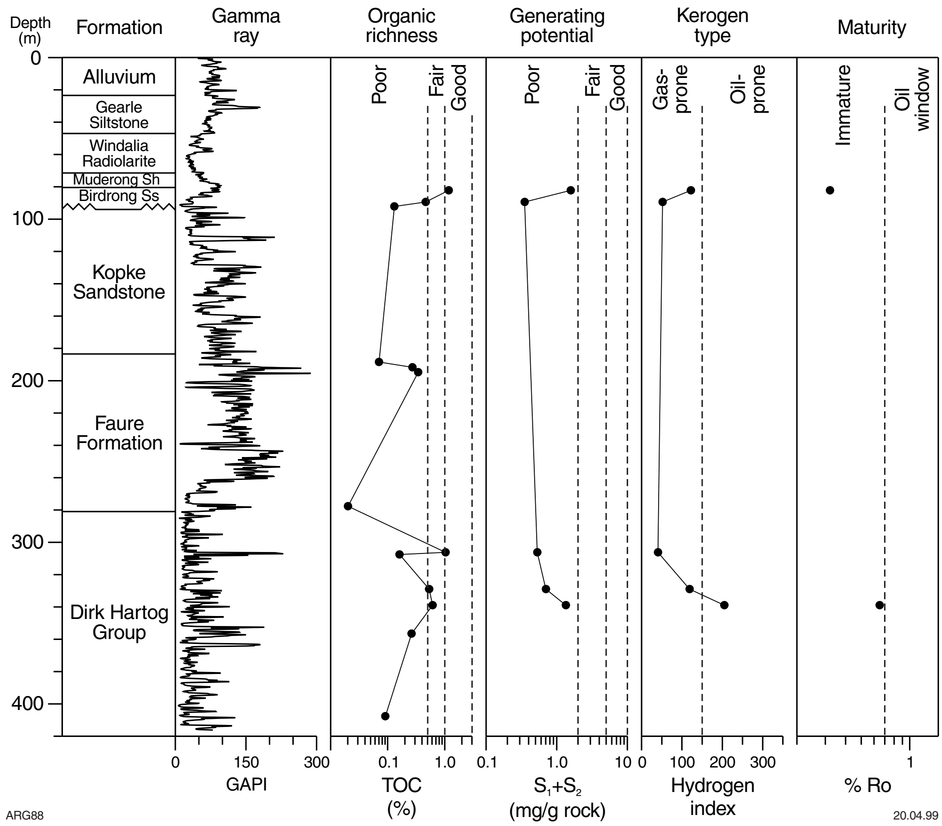


**Figure 6. Geochemical log of Mooka 1**

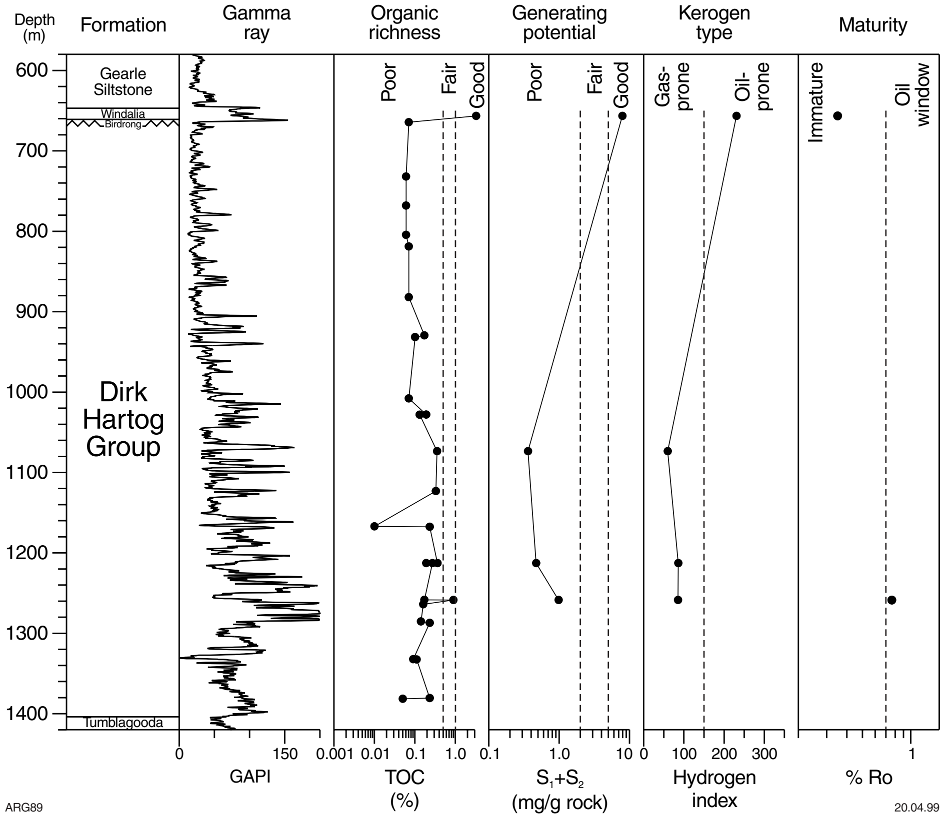


**Figure 7. Geochemical log of Dirk Hartog 17B**

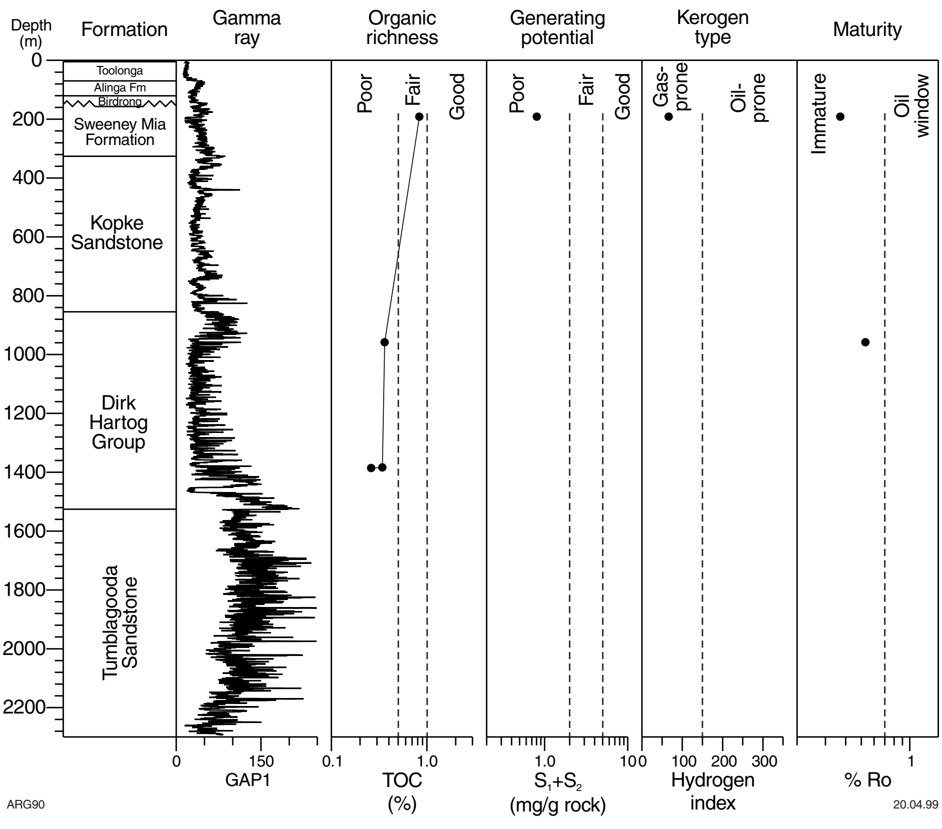


**Figure 8. Geochemical log of Yaringa 1**

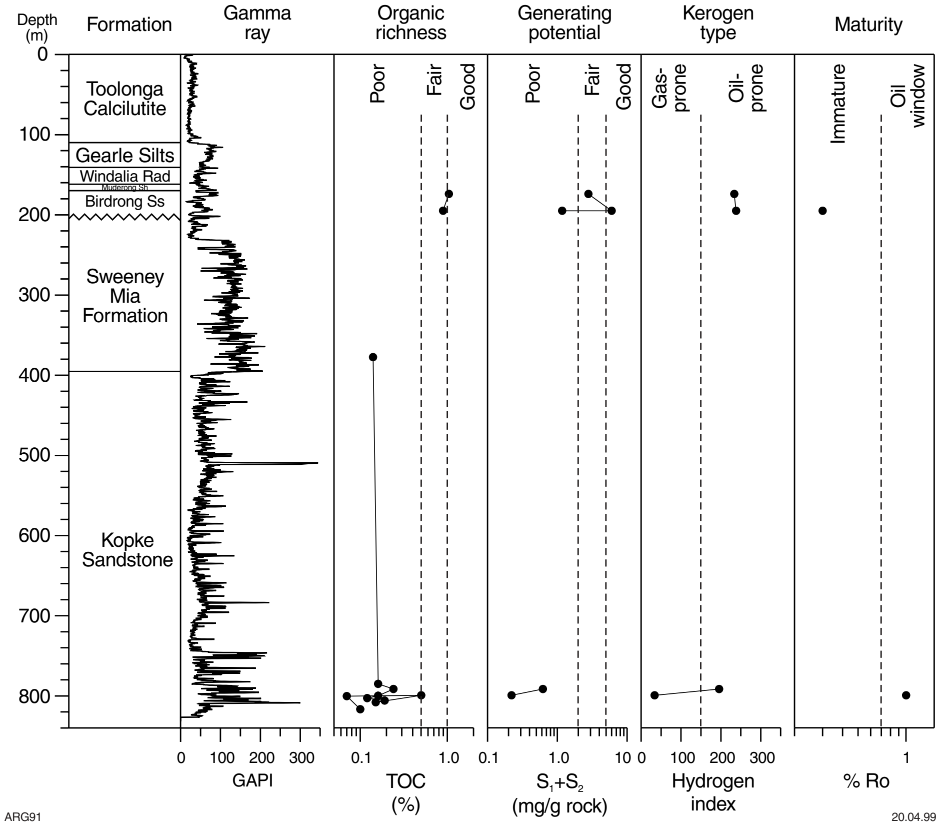


**Figure 9. Geochemical log of Yaringa East 1**

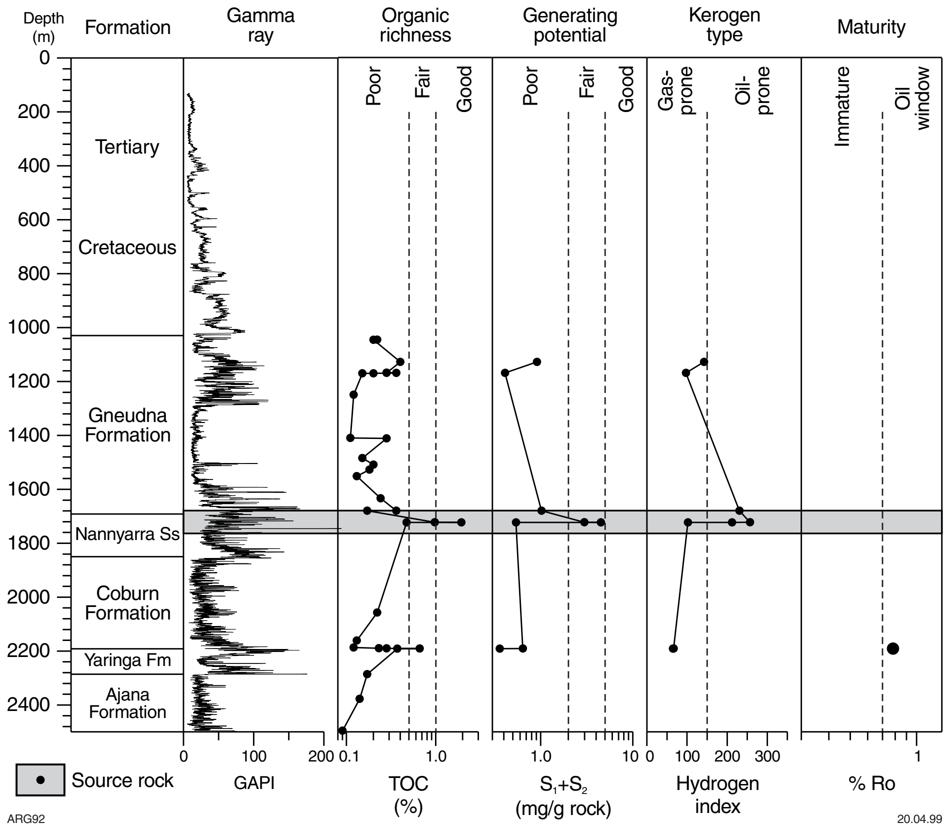


**Figure 10. Geochemical log of Pendock 1**

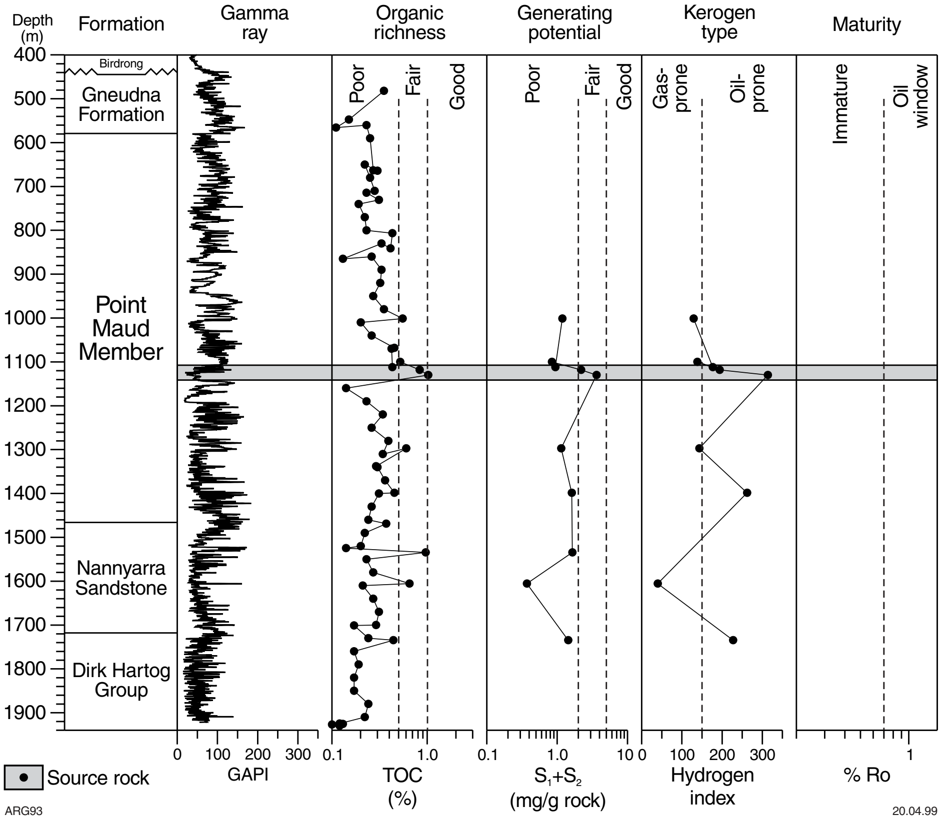


**Figure 11. Geochemical log of Quobba 1**

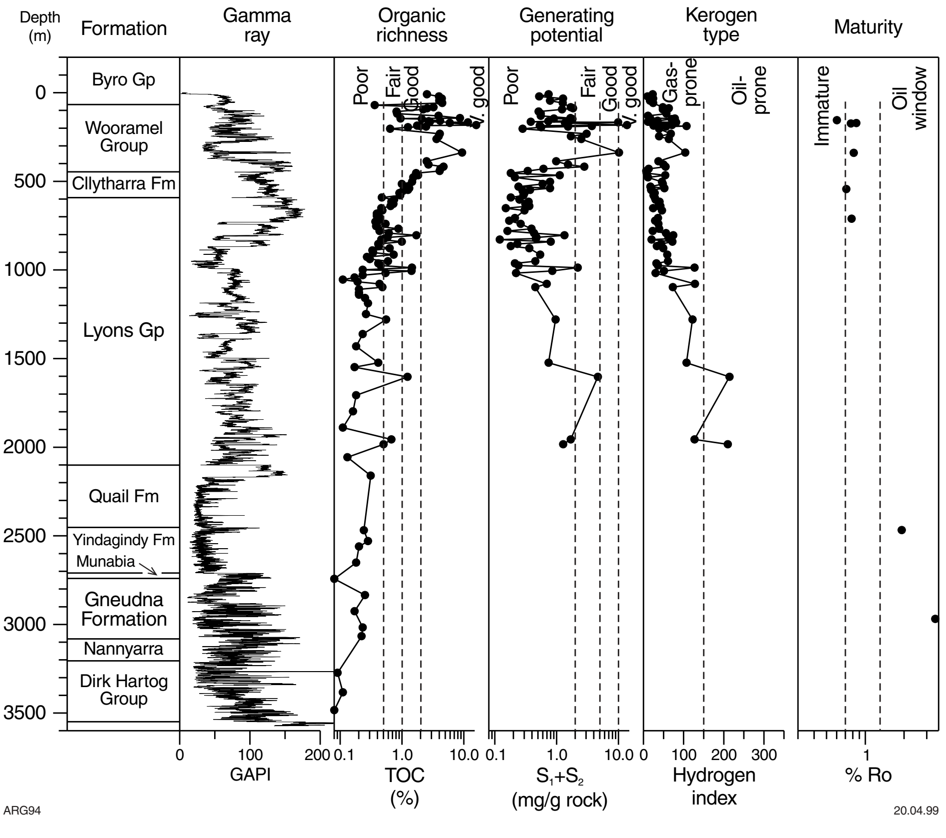


**Figure 12. Geochemical log of Quail 1**

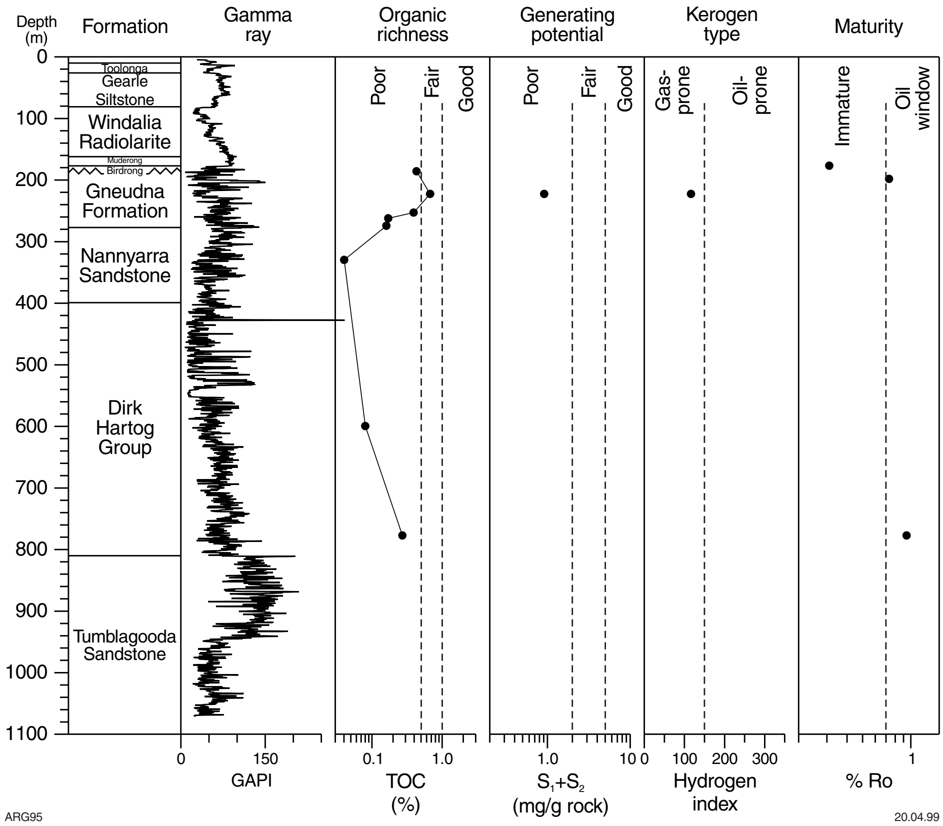


**Figure 13. Geochemical log of Wandagee 1**

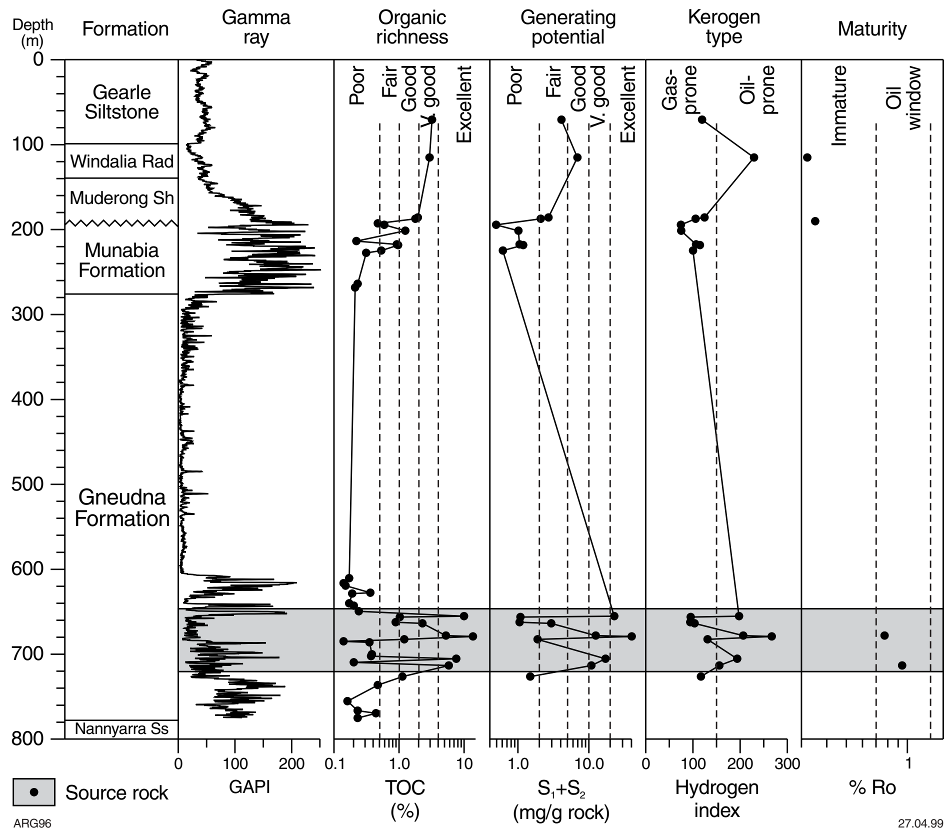


**Figure 14. Geochemical log of Barrabiddy 1A**

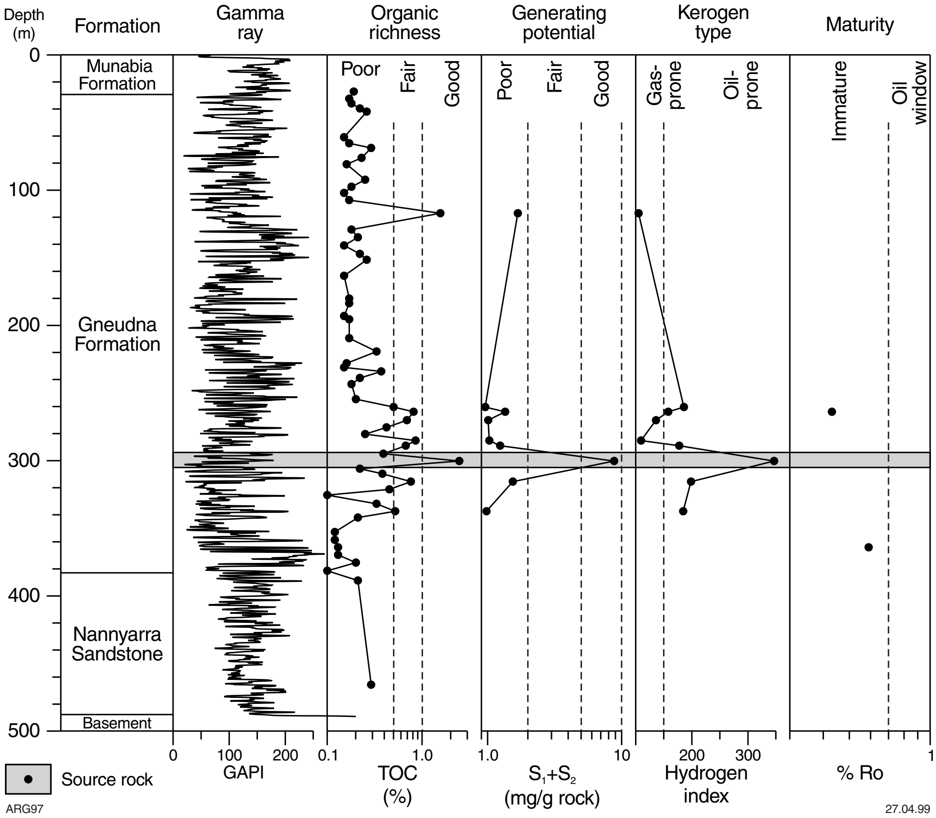


**Figure 15. Geochemical log of Gneudna 1**

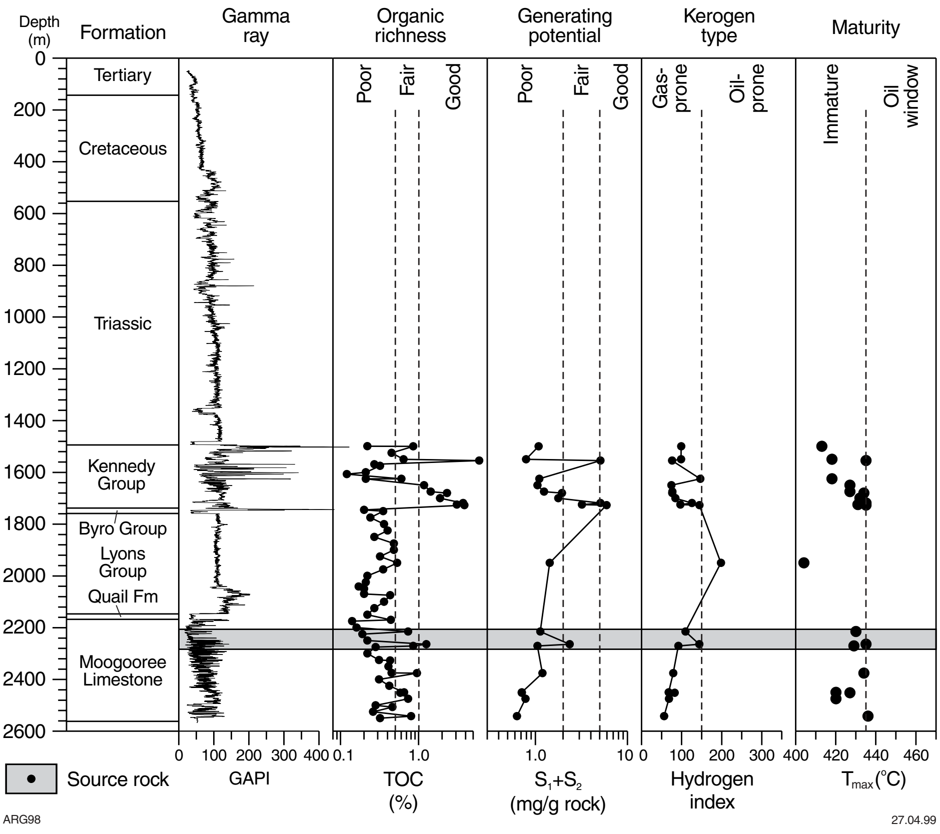


**Figure 16. Geochemical log of Kybra 1**

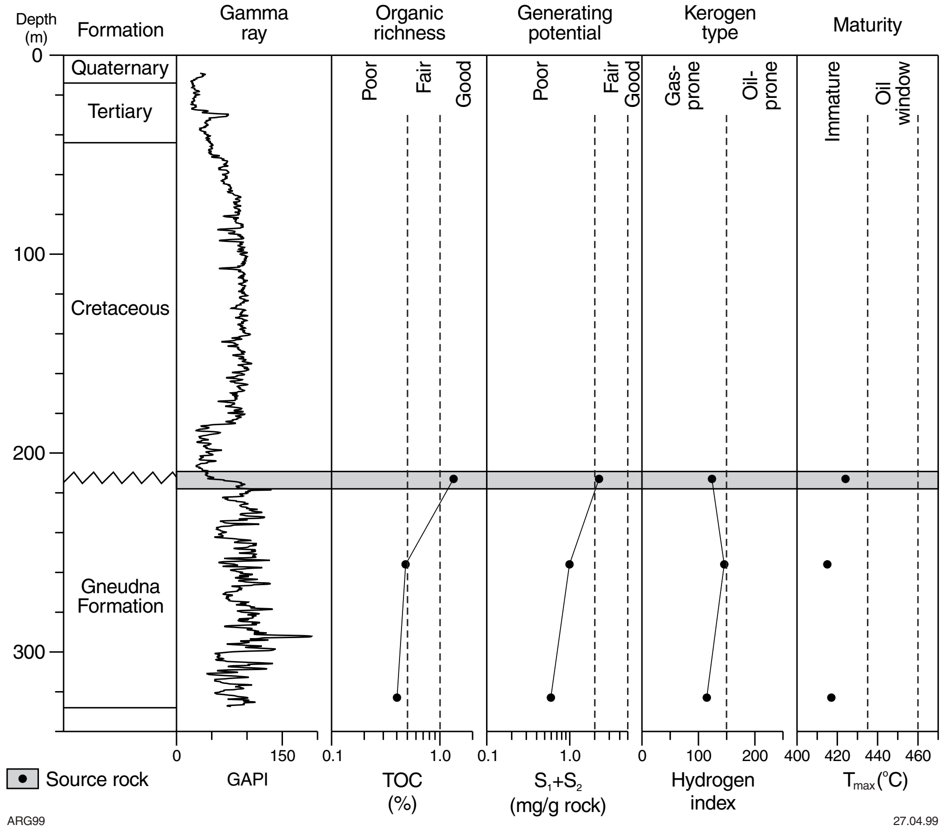


**Figure 17. Geochemical log of Peedamullah 1**

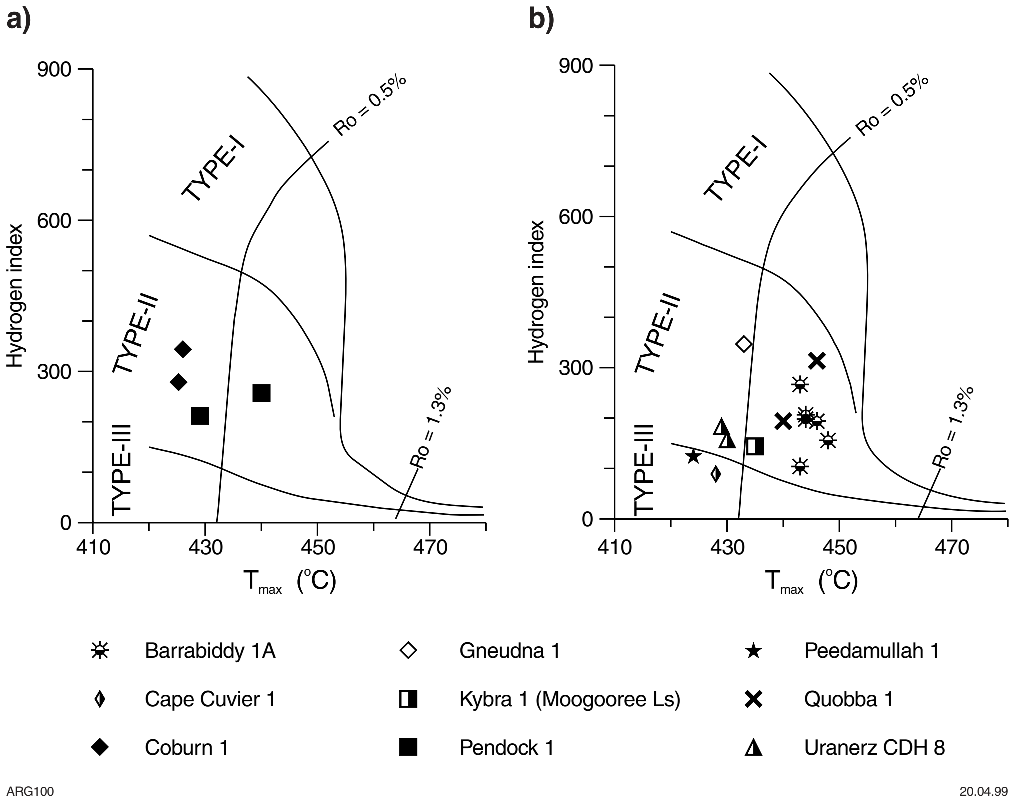


**Figure 18. Rock-Eval kerogen typing of source rocks: a) Silurian; b) Devonian**

the Devonian Gneudna Formation. PGC data are listed in Appendix 6 and pyrograms of the samples are shown in Figure 19. The normalized composition of pyrolysate indicates that there is a high concentration of predominantly aliphatic hydrocarbons (Fig. 20a), and hydrogen-rich kerogen is capable of generating hydrocarbons. The aliphatic compounds (alkane + alkene) in the pyrolysate have between 6 and 14 carbon atoms, which indicate that they are predominantly from the gasoline to kerosene range of hydrocarbons (Fig. 20b). The aliphatic carbon content of a kerogen and its distribution within various structural elements dictate the type of product; that is, oil versus gas. In Figure 20c, oil proneness, expressed as $C_5 – C_{31}$ alkanes plus alkenes (values as a percentage of $S_2$ from Rock-Eval), is plotted against the gas–oil generation index (GOGI), expressed as $(C_1 – C_5)/C_{6+}$, and confirms that the type of kerogen is oil and gas generating. A core sample at 606.2 m depth from Coburn 1 (Coburn Formation, Dirk Hartog Group) is the best oil-prone source rock amongst the analysed samples.

## Extraction, liquid and gas chromatography

The liquid hydrocarbon-generating potential of Silurian and Devonian samples was confirmed with the extraction of organic matter and their liquid and gas chromatography from six samples. Extract analysis data are listed in Appendix 7 and the gas chromatograms are shown in Figure 21. Extract concentration and composition, and the distribution of normal paraffins and isoprenoids can be used to evaluate source richness, organic type, environment of deposition, and thermal maturity. These parameters are, however, sensitive to secondary processes, thermal maturity, and the type of organic matter (Peters and Moldowan, 1993).

All the analysed samples had high extract values, indicating very good to excellent generating potential, including the two samples from the Dirk Hartog Group (1877 and 2059 ppm) and the four samples from the Gneudna Formation (2698–4836 ppm). Chromatograms

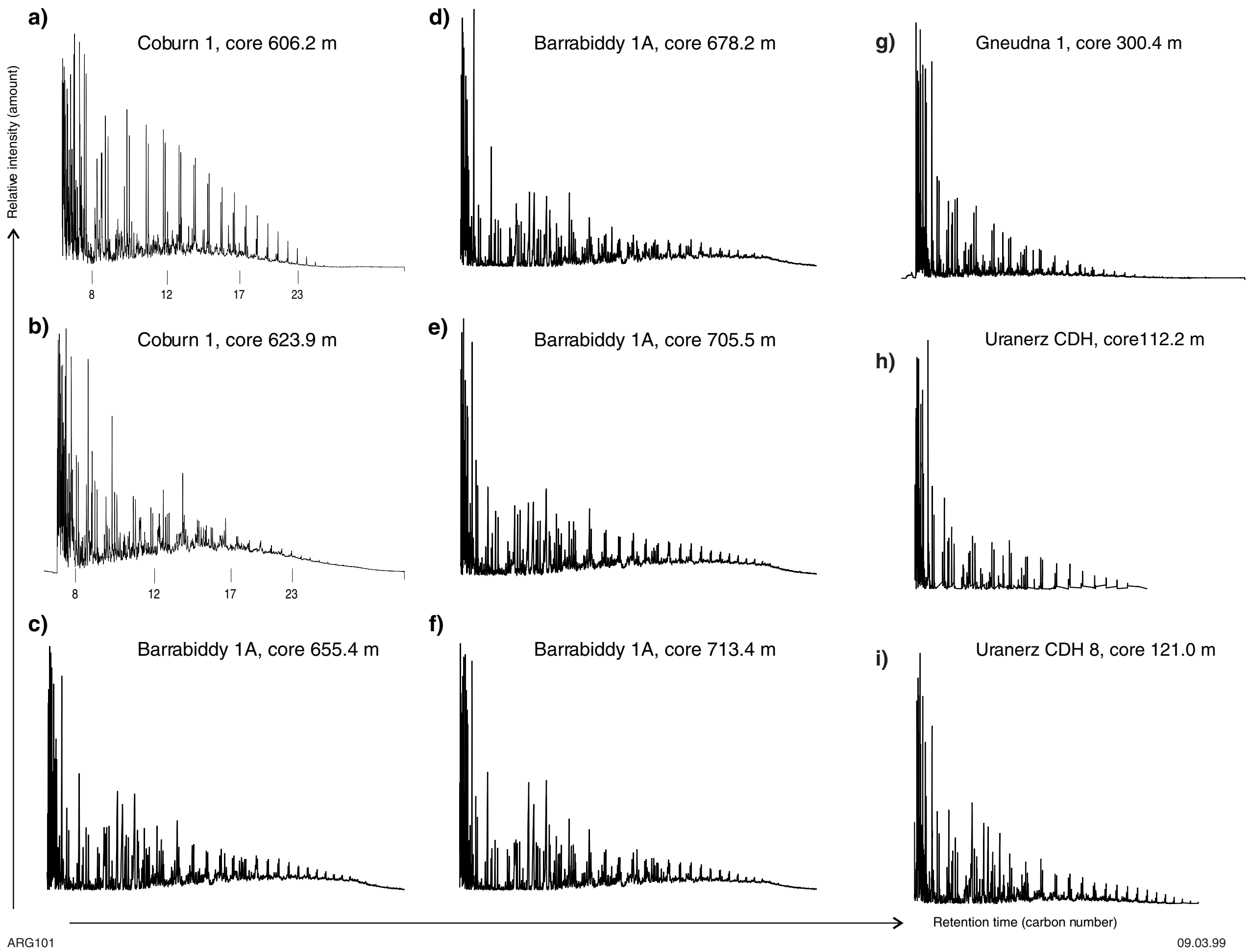


**Figure 19. Pyrolysis-gas chromatograms of source rocks: a, b) Silurian; c to i) Devonian**

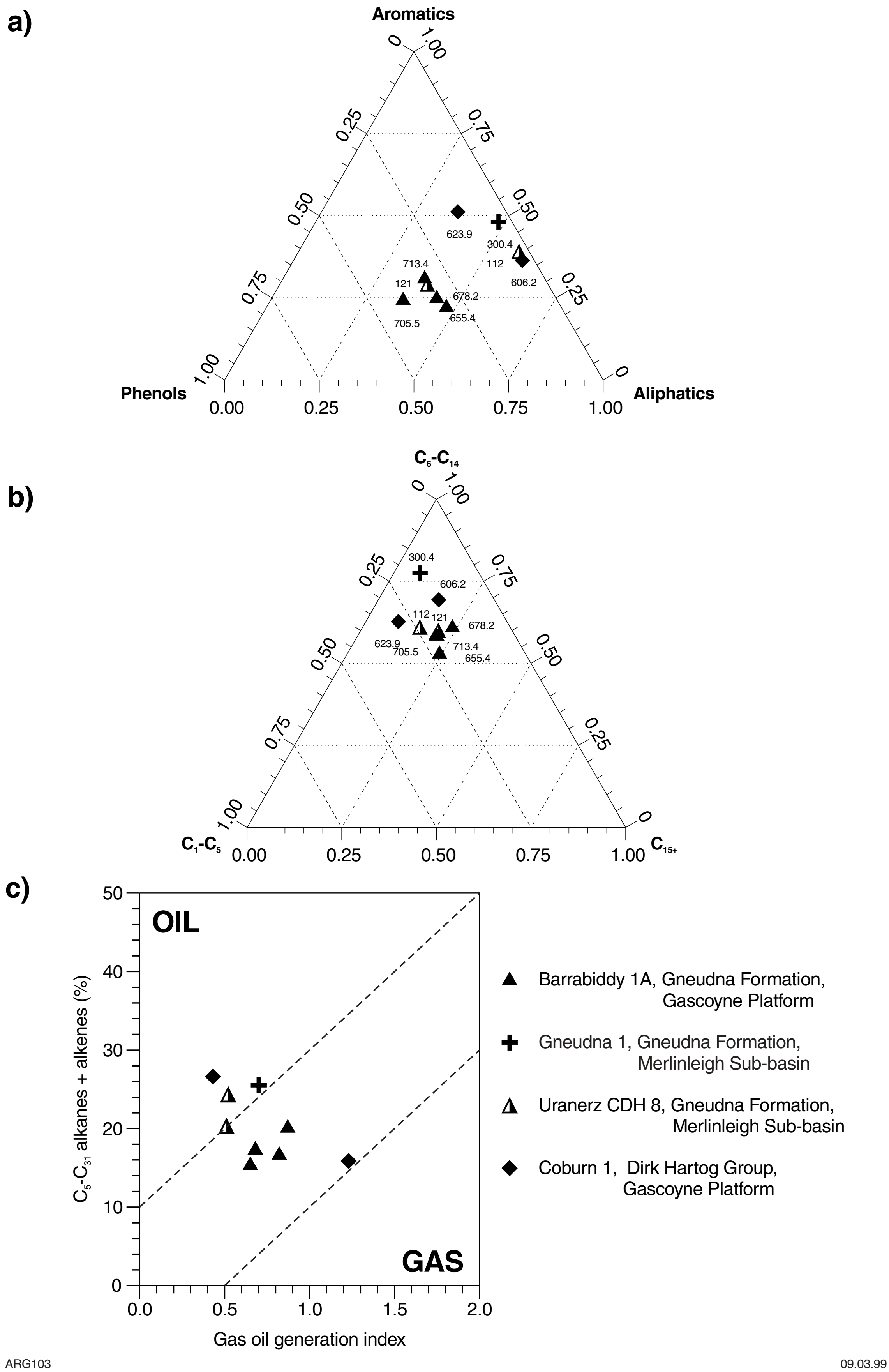


**Figure 20. Pyrolysate composition of Silurian and Devonian source rocks: a) normalized phenolic, aromatic, and aliphatic compounds; b) normalized alkane and alkene compounds; c) gas-oil generation index versus $C_5$–$C_{31}$ alkanes + alkenes plot**

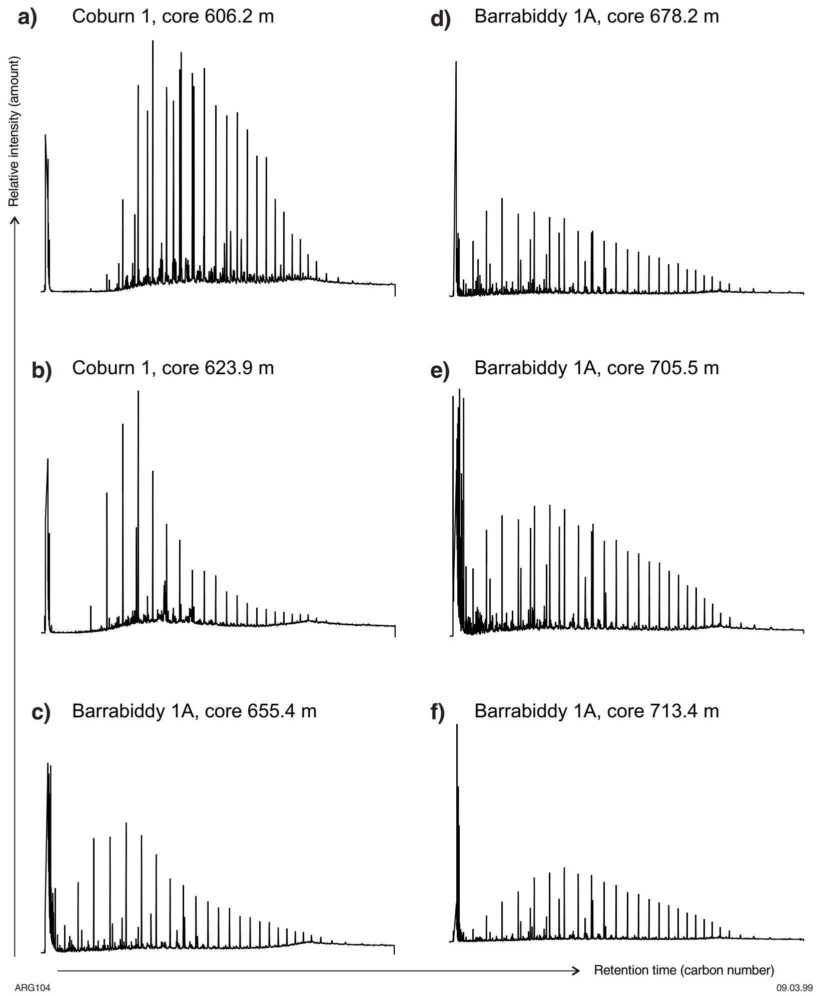


**Figure 21. Gas chromatograms of source rocks: a, b) Silurian; c to f) Devonian**

of the saturate fraction show the oil-generating potential of samples from the Dirk Hartog Group (Figs 21a and b) and Gneudna Formation (Figs 21c to f), and confirm that the sample at 606.2 m depth from the Coburn Formation (Dirk Hartog Group) in Coburn 1 is the best oil-prone source rock in the dataset, and that it is composed mainly of algal organic matter (Fig. 22a). A plot of TOC content versus $C_{12+}$ hydrocarbons for the Gneudna samples also indicates their oil- and gas-generating potential (Fig. 22b).

The low pristane to phytane ratios for the Dirk Hartog Group samples (1.23 and 1.13) indicate deposition under reducing conditions, whereas the ratios for the Gneudna Formation (2.57 – 3.03) imply mixed reducing–oxidizing conditions (Peters and Moldowan, 1993). The n-alkane distribution reflects hydrocarbons generated from marine–algal organic matter, which are presently within the oil window. This interpretation is also supported by n-alkane ratio values for $(C_{21} + C_{22})/(C_{28} + C_{29})$ between 2.04 and 3.38. A plot of isoprenoid to normal paraffin ratios (Fig. 22c) indicates type II kerogen within the Dirk Hartog Group and mixed type II–III kerogen within the Gneudna Formation (Hunt, 1996). In many cases, the mixed type II–III organic facies is deposited under mixed reducing–oxidizing conditions. The lower part of the Gneudna Formation consists of interbedded shale and fossiliferous limestone (Fig. 14) indicating rapid alternation between oxic and anoxic environments, which is consistent with this organic facies.

## Measured maturity

The Rock-Eval parameters, $T_{max}$ and VR, are used to evaluate thermal stress, or the effect of temperature and time on the maturation of rocks, whereas AFTA is used to evaluate maximum palaeotemperatures and their timing.

### Rock-Eval pyrolysis

$T_{max}$ is an indicator of organic maturity obtained from Rock-Eval. $T_{max}$ values in the 435–470°C range commonly characterize the oil generative window, but this may vary depending on the type of kerogen (Peters and Moldowan, 1993). $T_{max}$ values of 424 and 426°C for

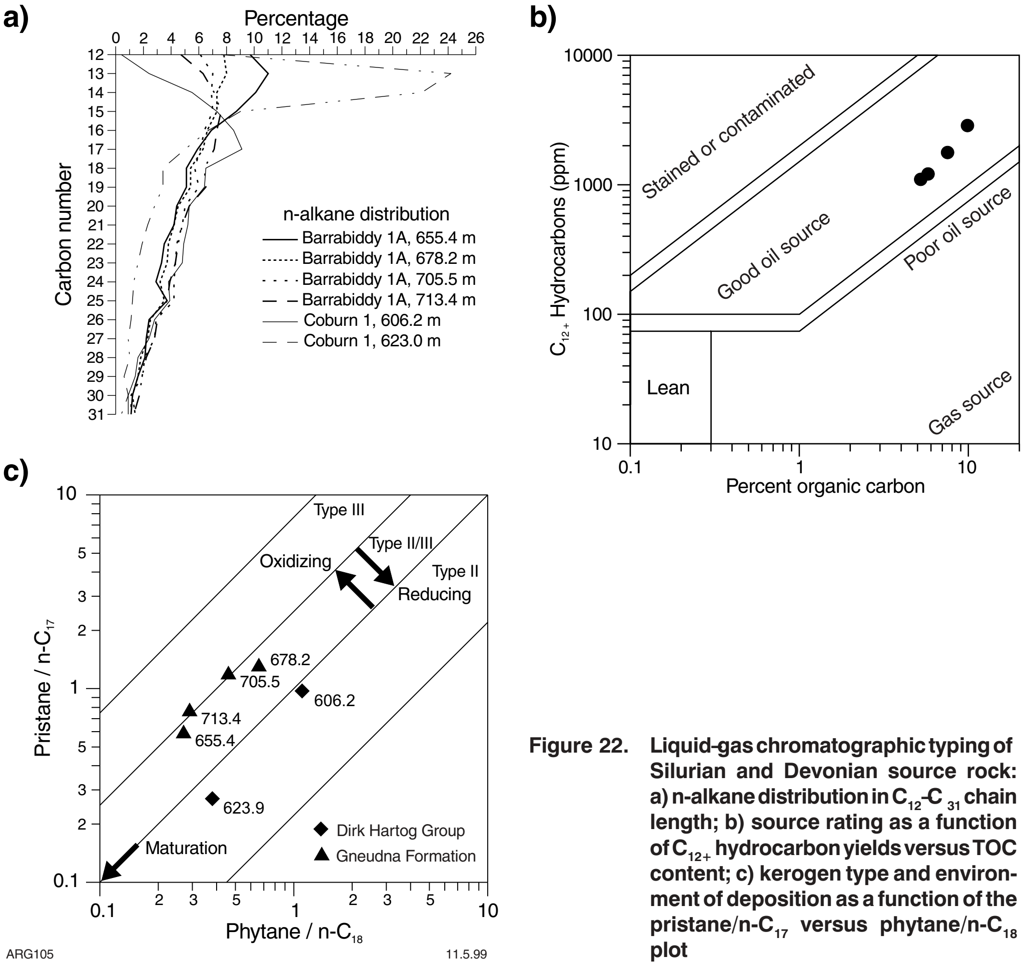


**Figure 22. Liquid-gas chromatographic typing of Silurian and Devonian source rock: a) n-alkane distribution in $C_{12}$-$C_{31}$ chain length; b) source rating as a function of $C_{12+}$ hydrocarbon yields versus TOC content; c) kerogen type and environment of deposition as a function of the pristane/n-$C_{17}$ versus phytane/n-$C_{18}$ plot**

the source-rock samples from the Coburn Formation in Coburn 1 indicate that the source rocks are immature in this well. In comparison, $T_{max}$ values between 443 and 448°C for source-rock samples from the Gneudna Formation in Barrabiddy 1A indicate that the source rocks are within the oil window. For the Devonian Gneudna Formation in Barrabiddy 1A, thermal stress parameters (% Ro and $T_{max}$ values) and kerogen conversion parameters (extract levels and the ratio of $S_1$ to TOC) are consistent in characterizing the section as fully mature for oil generation (Fig. 23).

## Organic petrology

Vitrinite reflectance is commonly a reliable maturity indicator, although there are problems with different populations of vitrinite (Buiskool Toxopeus, 1983), interlaboratory calibrations (Dembicki, 1984), and vitrinite suppression (Wilkins et al., 1992). The VR data are regarded as providing the most reliable maturity assessment for this study area, with $T_{max}$ considered less reliable.

A plot of depth versus percent reflectance from the ten wells with organic petrological data for the Silurian succession indicates that the Dirk Hartog Group is mature for oil generation in Dirk Hartog 17B and Pendock 1 in the western region of the Gascoyne Platform, but immature to marginally mature in all the other wells (Fig. 24a).

Organic petrological data for the Devonian section are available from six wells. The data indicate that the Gneudna Formation is mature in Barrabiddy 1A and Pendock 1 in the northern and northwestern regions of the Gascoyne Platform respectively. The Devonian section is overmature within Quail 1 in the westernmost part of the Merlinleigh Sub-basin and immature in all the remaining wells (Fig. 24b).

## Apatite fission-track analysis

Fission-track annealing in apatite is a function of temperature, time, and chlorine content of apatite — tracks in chlorapatite are more resistant to annealing than in fluorapatite (Green et al., 1986). Fission-track age is largely a function of track annealing in response to increasing temperature between about 50 and 120°C, whereas track length reflects the style of cooling. Therefore, AFTA is useful in understanding the geothermal history of the host rocks.

A total of 13 AFTA (Appendix 9) are available to constrain the geothermal history of the Southern

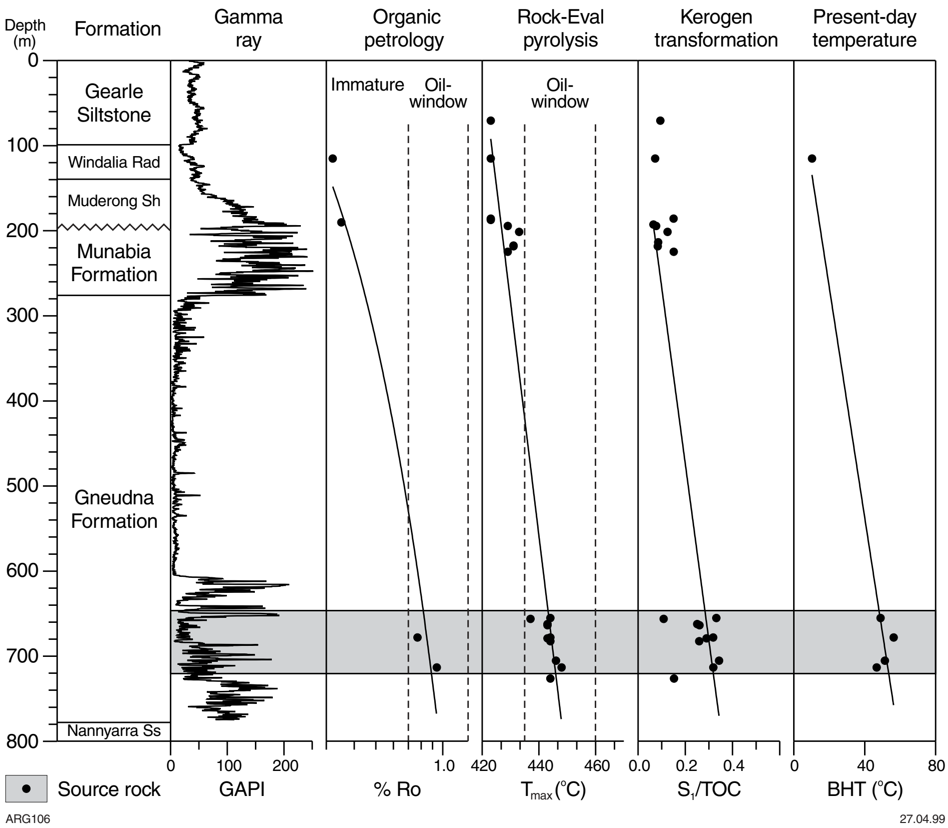


**Figure 23. Maturity parameters versus depth plot for Barrabiddy 1A**

Carnarvon Basin; ten are from the Gascoyne Platform and four are from the Merlinleigh Sub-basin (Gibson et al., 1998; Hegarty et al., 1998). Figure 25 shows the chlorine content and fission-track length and age for the analysed samples. The AFTA and VR data from the Gascoyne Platform show three major, regionally synchronous, palaeothermal episodes, with cooling beginning at some time between 280 and 250 Ma (Permian), 180 and 145 Ma (Jurassic), and 55 and 10 Ma (Tertiary). In comparison, AFTA and VR data from the Merlinleigh Sub-basin provide evidence for two palaeothermal episodes, with cooling beginning at some time between 140 and 110 Ma (Early Cretaceous) and 20 and 5 Ma (late Tertiary). Figure 26 shows the constraints on the timing for four regional palaeothermal episodes (Permo-Carboniferous, Jurassic, Early Cretaceous, and late Tertiary) suggested by the AFTA data. Table 2 provides present-day geothermal gradients, and Figure 27 compares present-day temperatures estimated from the BHTs recorded during wireline logging, with palaeotemperatures indicated from VR and AFTA data.

According to the AFTA and VR data, the maximum palaeotemperatures in the Silurian and Devonian section were reached before or during the Permian because the onset of the first cooling episode occurred during the Permian, some time between 280 and 250 Ma. However, the levels of maximum palaeotemperature attained in these successions were quite different in different parts of the Carnarvon Basin.

For the Silurian section in Coburn 1, in the southern Gascoyne Platform, the first indicated maximum palaeotemperature peak was greater than 105°C, which cooled during the Permian, some time between 280 and 250 Ma; the second peak of 80–90°C cooled during the Jurassic, some time between 180 and 145 Ma. These two heating episodes are based on direct AFTA evidence from two cores in the Dirk Hartog Group combined with AFTA data from other drillholes and outcrop (Fig. 26). Finally, the subsequent Tertiary peak temperatures were less than 80°C and are based on direct evidence from VR data (Gibson et al., 1998).

Palaeotemperatures for the Devonian section in Barrabiddy 1A on the northern Gascoyne Platform were higher than for the Silurian section to the south. The first palaeotemperature peak was before or during the Permian and was greater than 110°C, probably in the range between 110 and 140°C. The second palaeotemperature peak between 85 and 105°C was during the Jurassic. The last event recorded was in the late Tertiary with peak temperatures of less than 85°C.

For the Merlinleigh Sub-basin, AFTA and VR data are available only from Quail 1, and show that palaeotemperatures within the Devonian Gneudna Formation were greater than 240°C, as indicated by a VR value of 3.48% Ro. The data suggest two cooling events from maximum palaeotemperatures, some time during the Early Cretaceous (140–110 Ma) and late Tertiary (20–5 Ma; Hegarty et al., 1998).

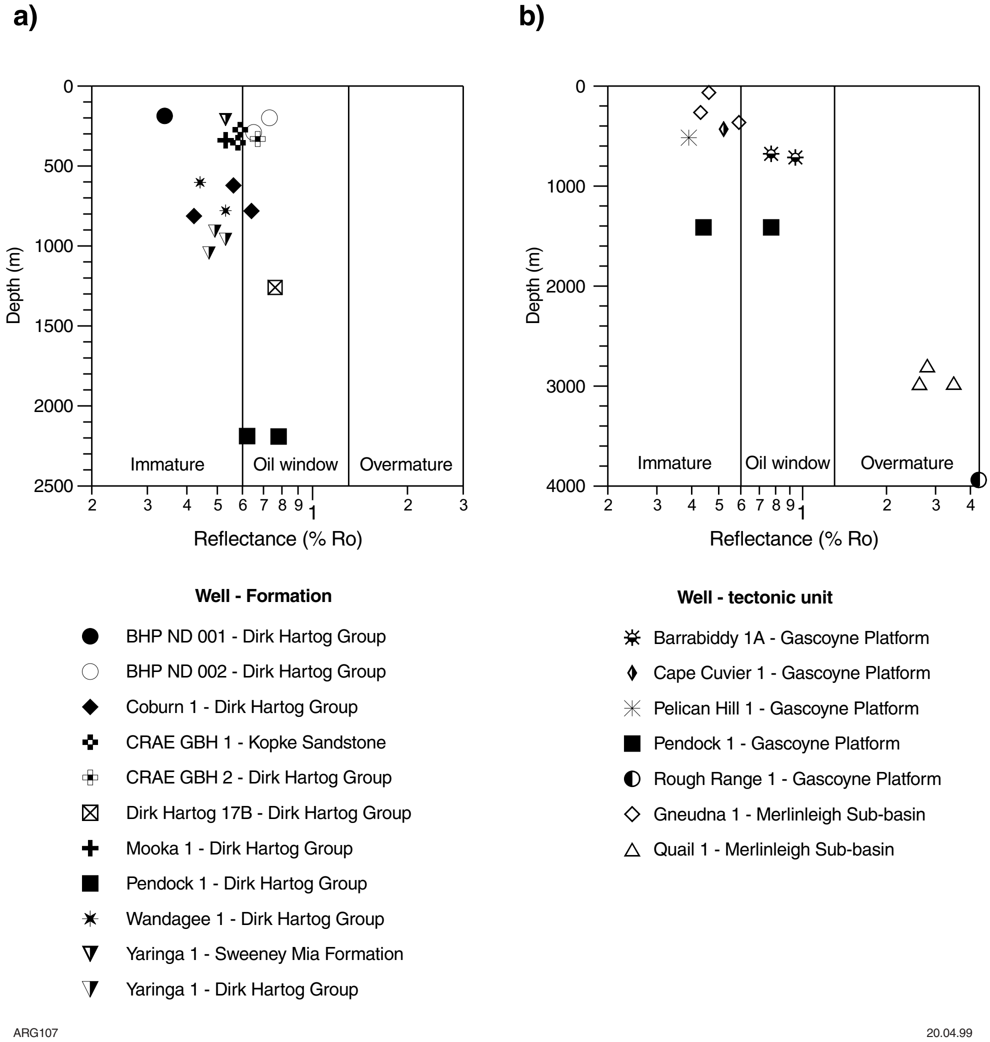


**Figure 24. Percent reflectance versus depth plot for samples: a) Silurian; b) Devonian**

## Petroleum-generation modelling

Kinetic modelling of petroleum generation, as a function of geothermal history and the type and amount of kerogen, was used to determine the oil window, using the BasinMod software. The depth of the oil window is believed to be equivalent to the burial depths necessary for the conversion of 10–90% of the available kerogen to petroleum. On the basis of the geochemical data, Silurian and Devonian source rocks are assumed to contain 50% type II kerogen and 50% type III. The thermal histories were constructed by adjusting thermal conductivities and heat flow to constrain maturity models against measured data. Corrected BHTs, % Ro, $T_{max}$, and AFTA data were used to constrain present and palaeo-temperatures. Predicted maturity and oil windows are based on LLNL vitrinite and kerogen kinetics respectively.

In this study, basin modelling was carried out for the three wells that had the most amount of maturity data from Rock-Eval pyrolysis, organic petrology, and AFTA to best constrain maximum palaeotemperatures and times of burial and erosion. These wells are Coburn 1 (southern Gascoyne Platform), Barrabiddy 1A (northern Gascoyne Platform), and Quail 1 (western Merlinleigh Sub-basin).

The maturation and hydrocarbon-generation modelling of Coburn 1 are summarized in Figure 28, which shows that the source beds within the Dirk Hartog Group are presently at the early stages of oil generation, and the maximum rate of oil generation was during the Permian. Figure 28a shows the calibration of the maturity model by comparing measured temperatures and maturity with calculated values, whereas Figure 28b shows the calibration of temperatures as a function of burial and erosional histories. Modelling using a constant surface temperature of 20°C requires a transient heatflow of 86.4 $mW/m^2$ and indicates that about 1750 m was eroded from the Coburn area after attaining the maximum palaeotemperatures indicated from VR and AFTA data. In the model illustrated, 1050 m was eroded during the Permo-Carboniferous based on AFTA data and regional geology, 500 m before the Early Cretaceous, and 200 m

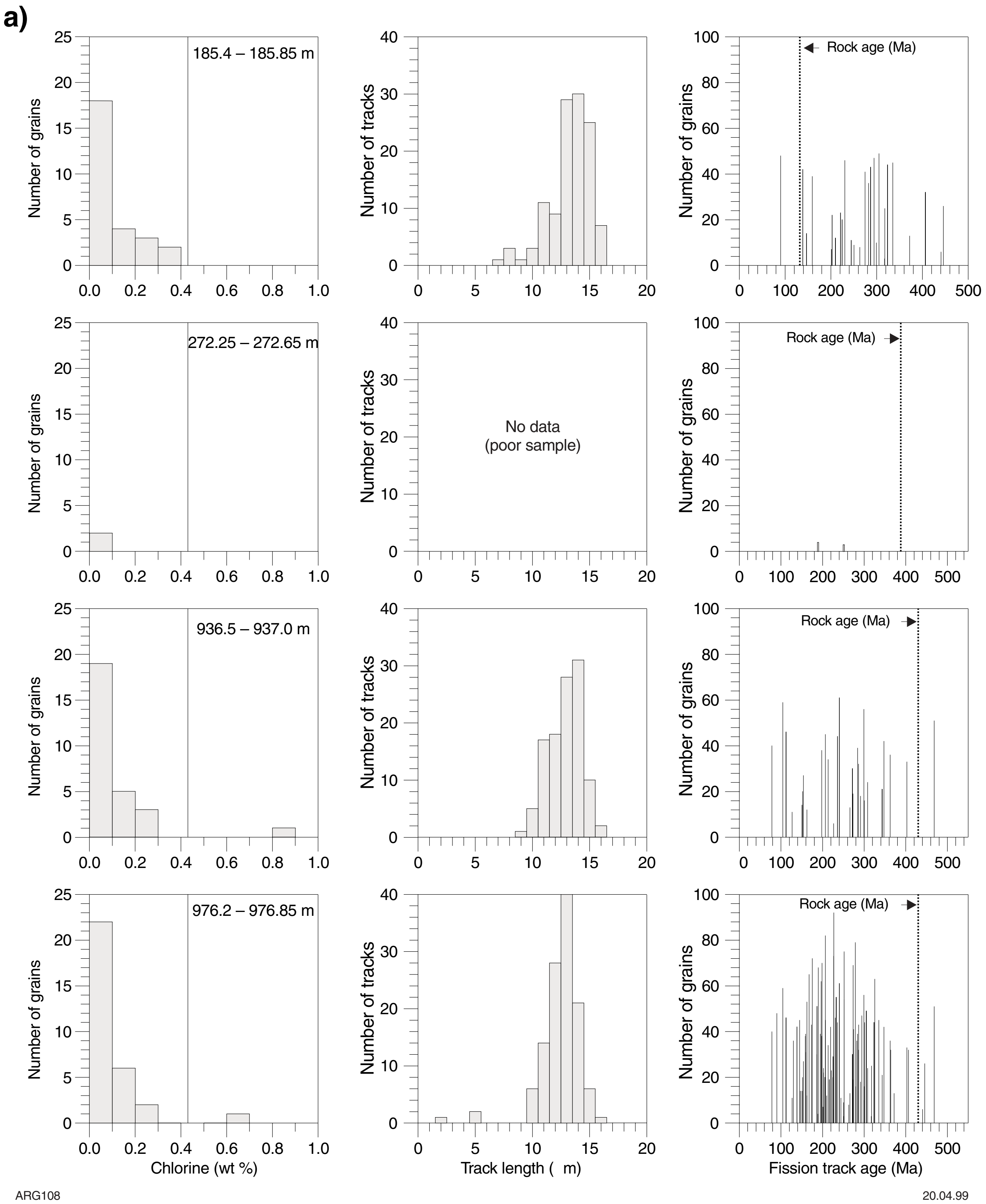


**Figure 25. Chlorine content, fission-track length, and fission-track age from AFTA: a) Coburn 1; b) Barrabiddy 1A; c) Yaringa East 1; d) Quail 1; e) Tumblagooda Sandstone outcrop**

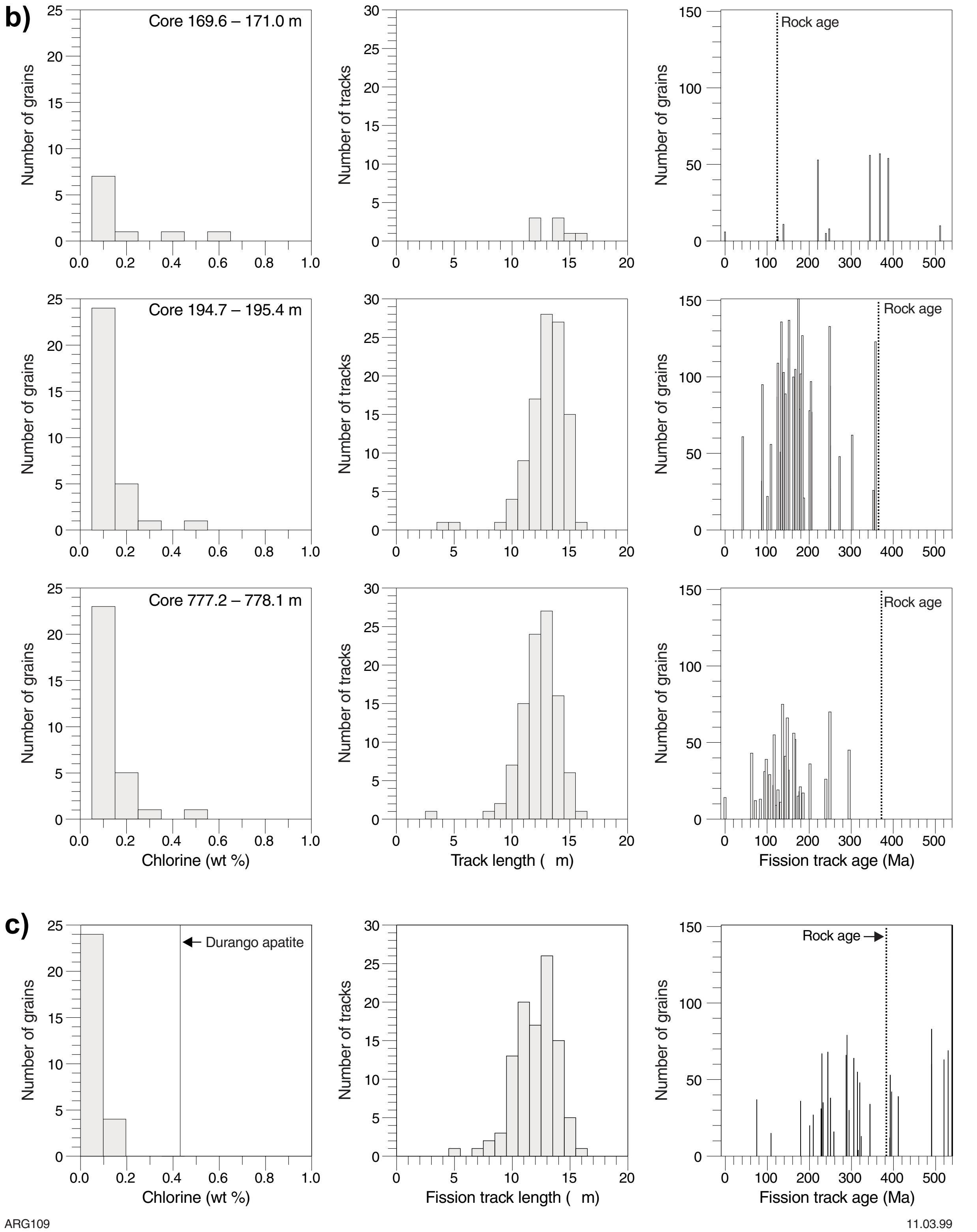


**Figure 25.** (continued)

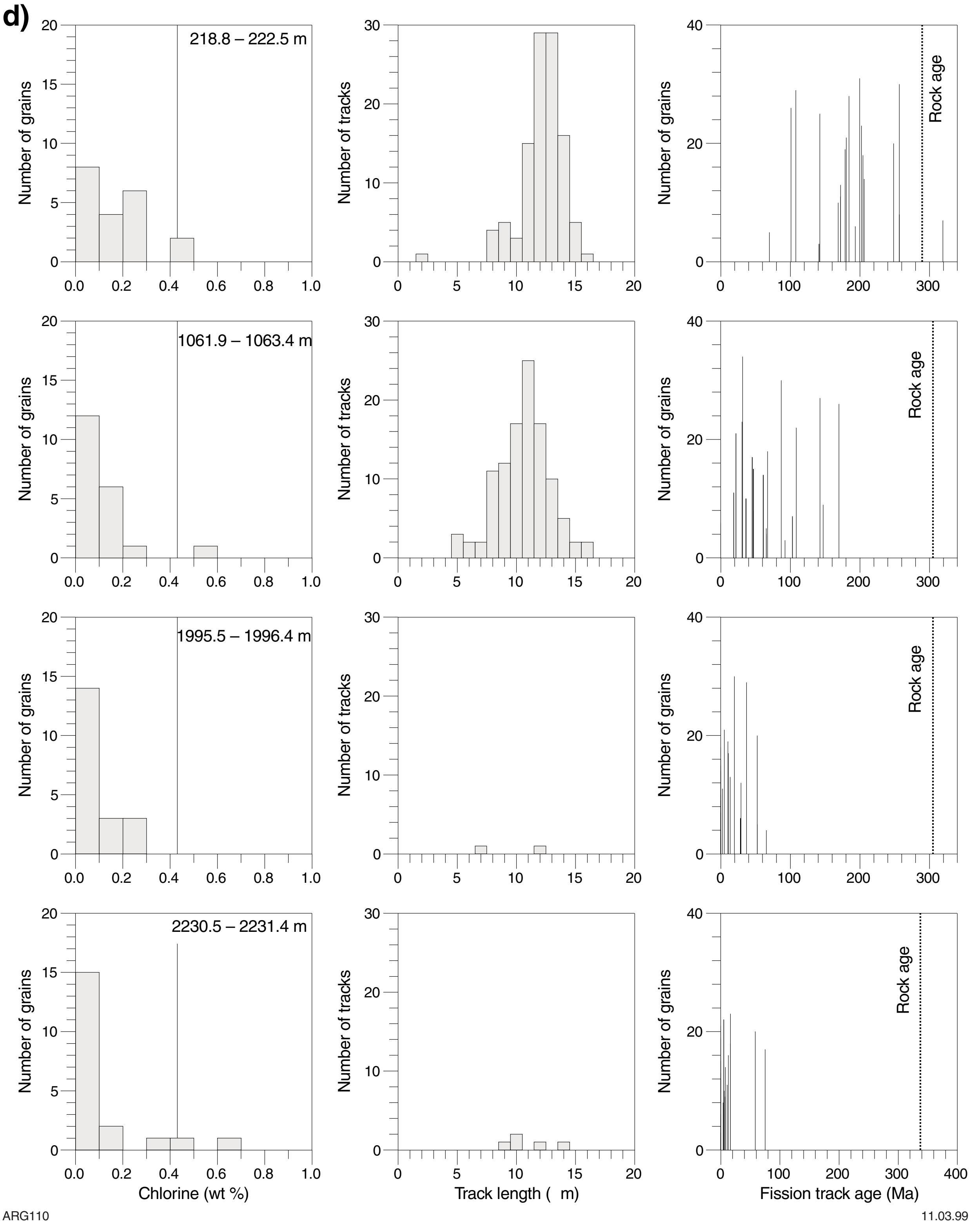


**Figure 25.** (continued)

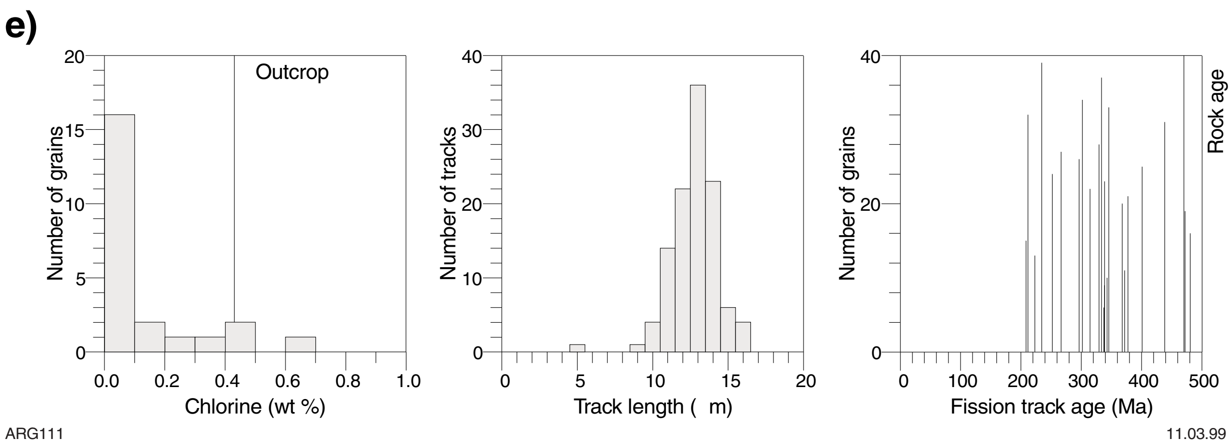


**Figure 25.** (continued)

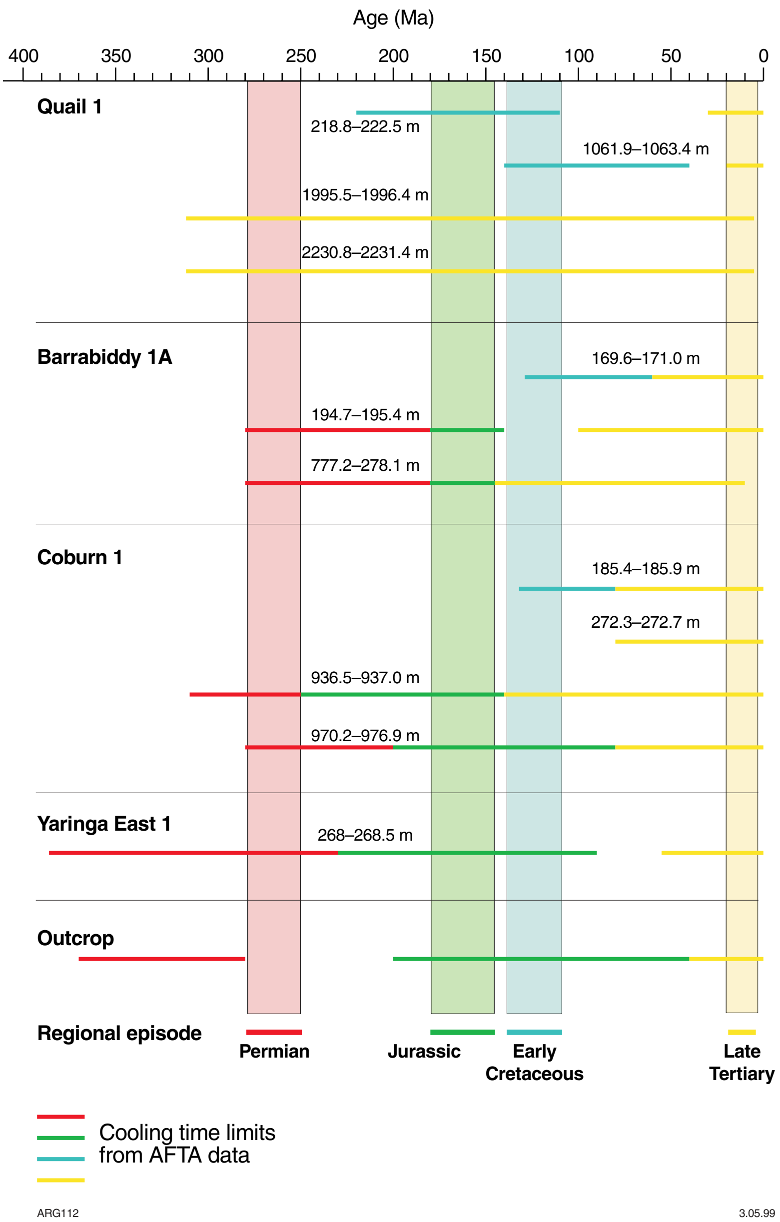


**Figure 26. Timing of palaeothermal episodes from AFTA**

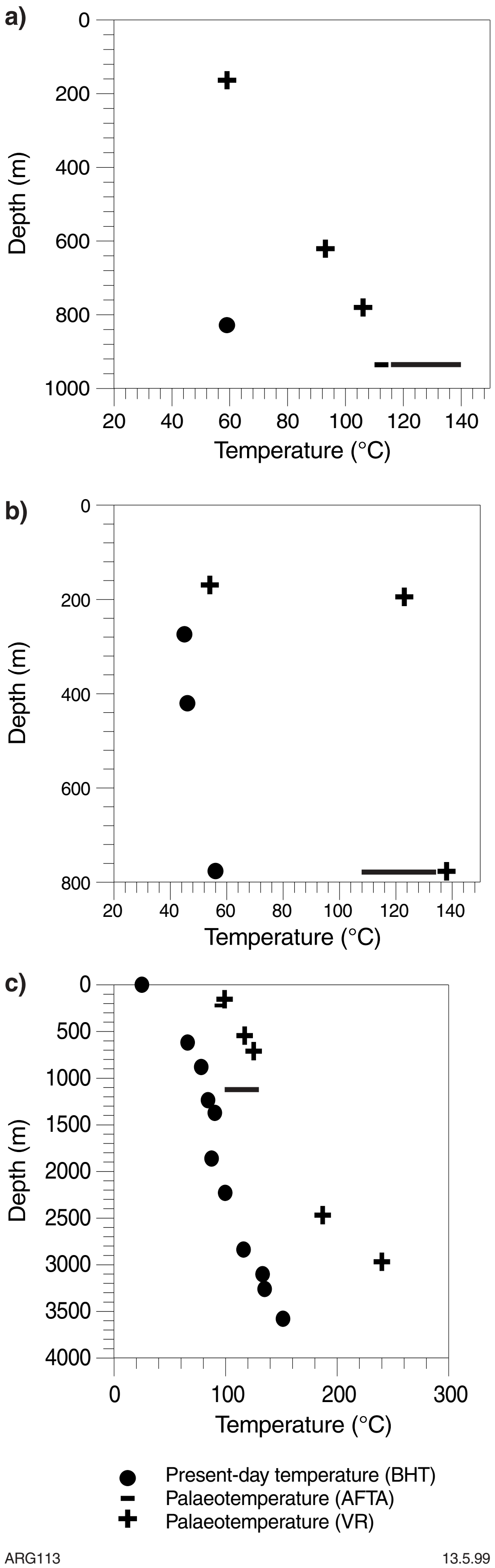


**Figure 27. Comparison of present-day temperatures and palaeotemperatures: a) Coburn 1; b) Barrabiddy 1A; c) Quail 1**

during the late Tertiary (Fig. 28b) based on VR and AFTA data. However, the available geological information does not indicate post-Carboniferous and pre-Early Jurassic deposition and subsequent uplift. Figure 28c shows the oil window as a function of the transformation ratio of kerogen to petroleum and indicates that the oil source-beds within the Dirk Hartog Group are at an early stage of oil generation with ratios up to 0.3 (fraction %). The timing of petroleum generation is a function of kerogen conversion to petroleum and shown as rate of generation versus time in Figure 28d.

The maturation and hydrocarbon-generation modelling of Barrabiddy 1A are summarized in Figure 29, which shows that the source beds within the Gneudna Formation are at the late stages of oil generation, and peak generation was during the Permian. Figure 29a compares observed present-day temperature and maturity with modelled temperature and maturity, whereas Figure 29b compares modelled palaeotemperatures with the palaeotemperature determined from VR and AFTA data. Modelling using a constant surface temperature of 20°C requires a transient heatflow of 105 mW/m$^2$, which indicates that about 2000 m was eroded from the Barrabiddy area after attaining the maximum palaeotemperatures indicated from VR and AFTA data. In the model illustrated, 1300 m was eroded during the Permo-Carboniferous, 500 m before the Early Cretaceous, and 200 m during the late Tertiary (Fig. 29b). Again, regional geology does not indicate post-Carboniferous and pre-Early Jurassic deposition and subsequent uplift. Figure 29c shows the oil window as a function of the kerogen transformation ratio, and Figure 29d shows the time of peak hydrocarbon generation for the source-rock interval (655–714 m).

The maturation and hydrocarbon-generation modelling of Quail 1 are summarized in Figure 30, which shows that the Gneudna Formation is overmature for oil generation and peak generation was during the late Palaeozoic – early Mesozoic. Figure 30a compares measured temperature and maturity with modelled values, and Figure 30b compares observed palaeotemperatures with modelled values. Modelling using a constant surface temperature of 20°C, and transient heatflow of 75 mW/m$^2$ indicates that about 2000 m was eroded from the Quail area to attain the maximum palaeotemperatures indicated by VR and AFTA data. In the model illustrated, 1800 m was eroded during the Early Cretaceous and 200 m during the late Tertiary (Fig. 30b). Figure 30c shows the oil window as a function of the kerogen transformation ratio, and Figure 30d shows the timing of peak hydrocarbon generation.

## Petroleum systems

Figure 31 summarizes the essential elements of petroleum systems (following Magoon and Dow, 1994) for the Silurian and Devonian sections of the Carnarvon Basin. The best possibility of a petroleum system is within the Upper Devonian succession in the northern part of the Gascoyne Platform and possibly in the eastern part of the Merlinleigh Sub-basin. The succession could

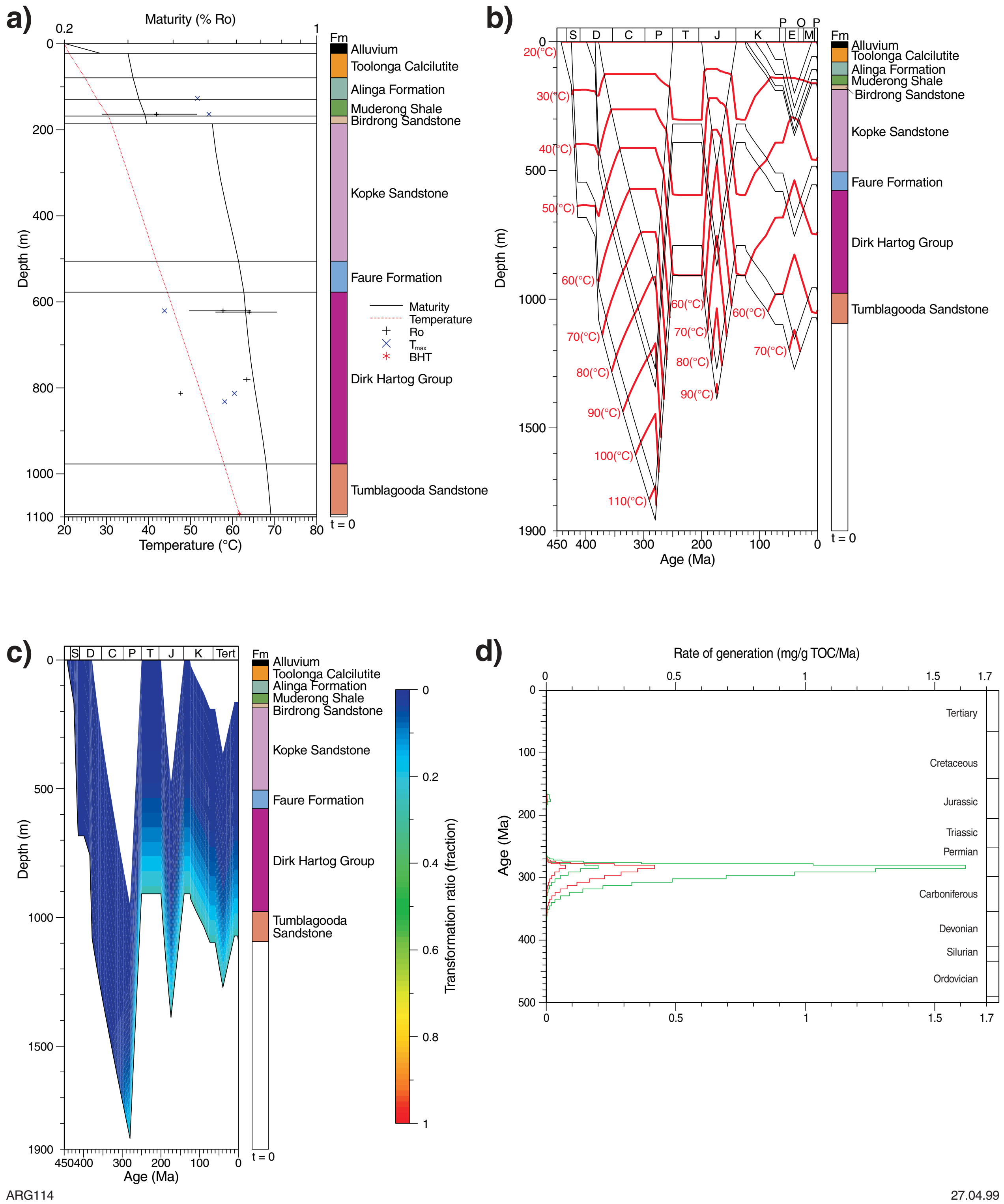


**Figure 28. Basin modelling of Coburn 1: a) maturity calibration; b) temperature calibration; c) oil window; d) rate of oil and gas generation**

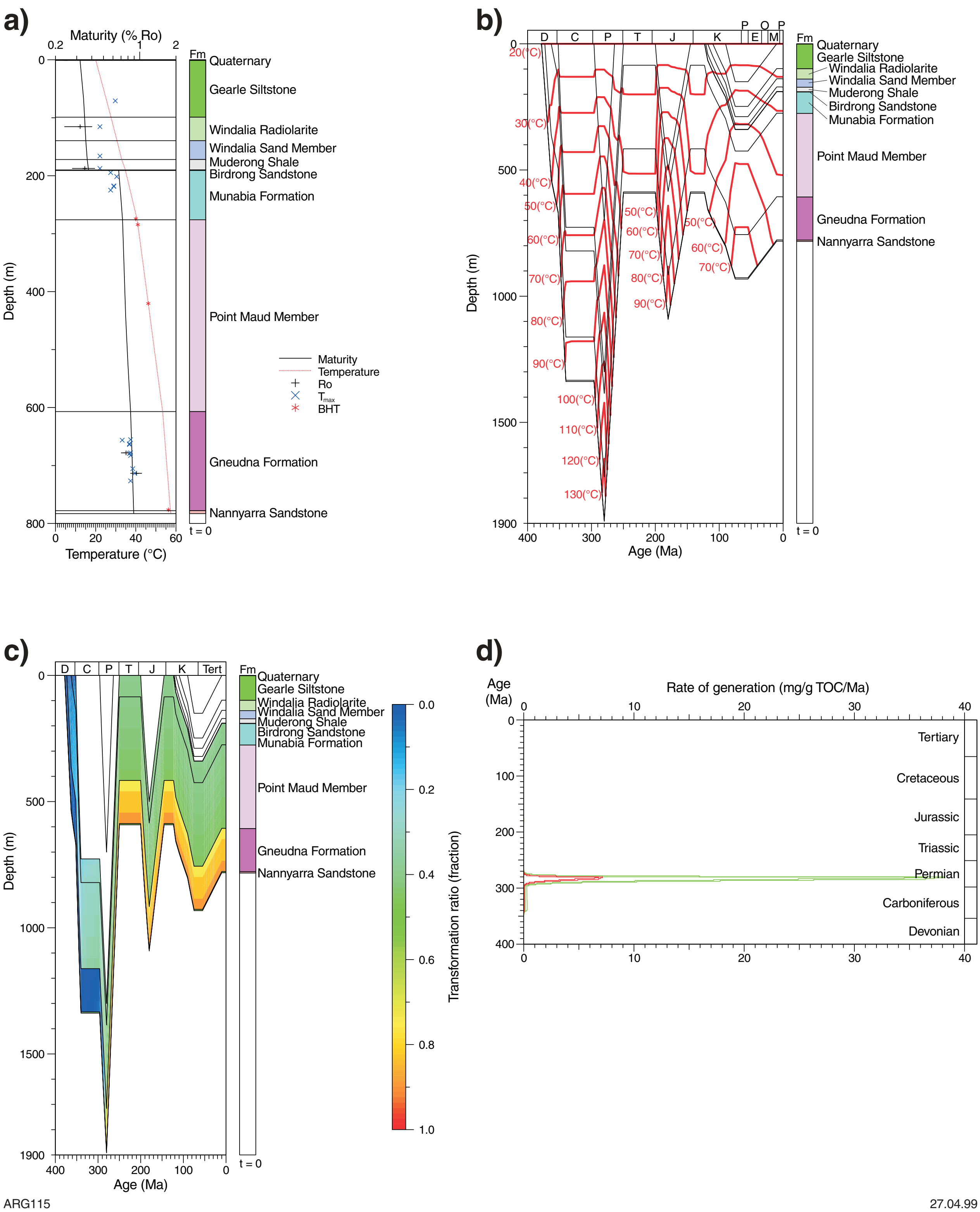


**Figure 29. Basin modelling of Barrabiddy 1A: a) maturity calibration; b) temperature calibration; c) oil window; d) rate of oil and gas generation**

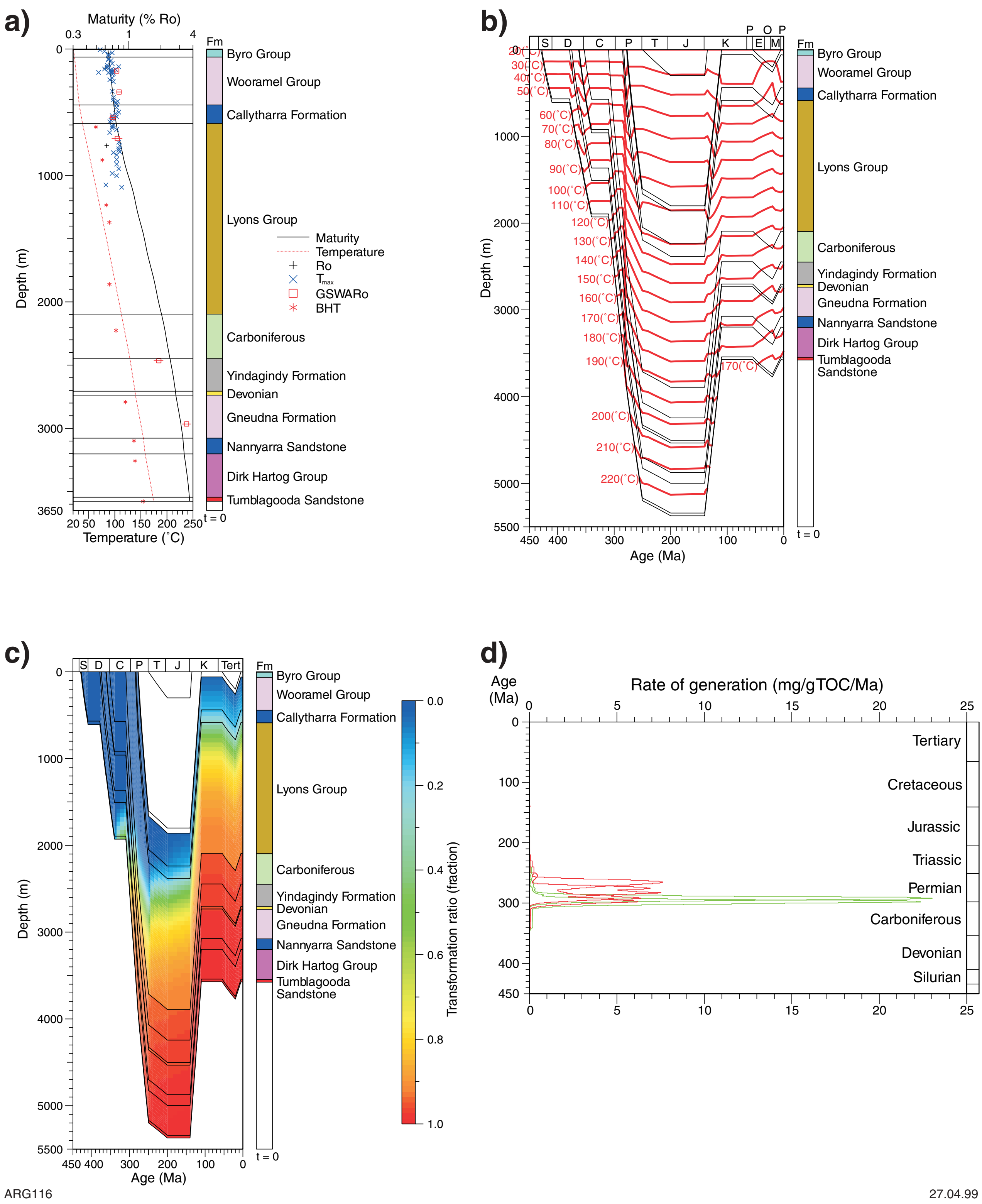


**Figure 30. Basin modelling of Quail 1: a) maturity calibration; b) temperature calibration; c) oil window; d) rate of oil and gas generation**

**Table 2. Present-day geothermal gradients in selected wells of the Carnarvon Basin**

| *Well* | *Depth (mKB)* | *Depth (mGL)* | *Recorded BHT (°C)* | *Estimated BHT (°C + 10%)* | *Surface temperature (°C applied)* | *Recorded gradient (°C/100 m)* | *Estimated gradient (°C/100 m)* | *BHT data source* | *Date* | *Time since circulation (hours)* |
|---|---|---|---|---|---|---|---|---|---|---|
| Barrabiddy 1 | 182.0 | 181.7 | 36 | 39.6 | 25 | 6.0 | 8.0 | Gamma ray, sonic, resistivity | 08/11/96 | 1.5 |
| Barrabiddy 1A | 275.0 | 274.5 | 41 | 45.1 | 25 | 5.8 | 7.3 | Gamma ray, neutron | 22/11/96 | na |
| Barrabiddy 1A | 421.0 | 420.5 | 42 | 46.2 | 25 | 4.0 | 5.0 | Gamma ray, neutron | 22/11/96 | na |
| Barrabiddy 1A | 777.0 | 776.5 | 51 | 56.1 | 25 | 3.3 | 4.0 | Gamma ray, neutron | 22/11/96 | na |
| Coburn 1 | 1 093.0 | 1 093.0 | 56 | 61.6 | 25 | 2.8 | 3.3 | Gamma ray, sonic, resistivity | 16/06/97 | 5.5 |
| Mooka 1 | 160.0 | 159.7 | 34 | 37.4 | 25 | 5.6 | 7.8 | Gamma ray, density, neutron | 25/10/96 | 2.0 |
| Mooka 1 | 160.0 | 159.7 | 34 | 37.4 | 25 | 5.6 | 7.8 | Gamma ray, density, neutron | 25/10/96 | 1.0 |
| Mooka 1 | 418.9 | 418.6 | 42 | 46.2 | 25 | 4.1 | 5.1 | Gamma ray, resistivity, sonic | 25/10/96 | 11.5 |
| Mooka 1 | 418.9 | 418.6 | 42 | 46.2 | 25 | 4.1 | 5.1 | Gamma ray, density, neutron | 25/10/96 | 17.5 |
| Yaringa 1 | 2 289.35 | 2 283.9 | 74.44 | 81.9 | 25 | 2.2 | 2.5 | Gamma ray, neutron | 15/08/66 | – |
| Yaringa 1 | 741.27 | 735.8 | 59.99 | 66.0 | 25 | 4.7 | 5.6 | Gamma ray, sonic | 13/07/66 | 2.5 |
| Yaringa 1 | 868.98 | 863.5 | 62.22 | 68.4 | 25 | 4.3 | 5.0 | Gamma ray, neutron | 29/07/66 | 4.5 |
| Yaringa 1 | 854.05 | 848.6 | 62.77 | 69.0 | 25 | 4.4 | 5.2 | Temperature | 28/07/66 | – |
| Yaringa East 1 | 829.8 | 828.8 | 49 | 53.9 | 25 | 2.9 | 3.5 | Gamma ray, neutron, density | 19/05/97 | 10.0 |
| Yaringa East 1 | 829.8 | 828.8 | 49 | 53.9 | 25 | 2.9 | 3.5 | Gamma ray, sonic, resistivity | 19/05/97 | 13.0 |

**NOTES:** Barrabiddy 1A was unstable below 425 m, lost circulation, and no returns were obtained. Therefore, no circulation time was recorded.
GL: ground level
KB: kelly bushing
BHT: bottomhole temperature
na: not available

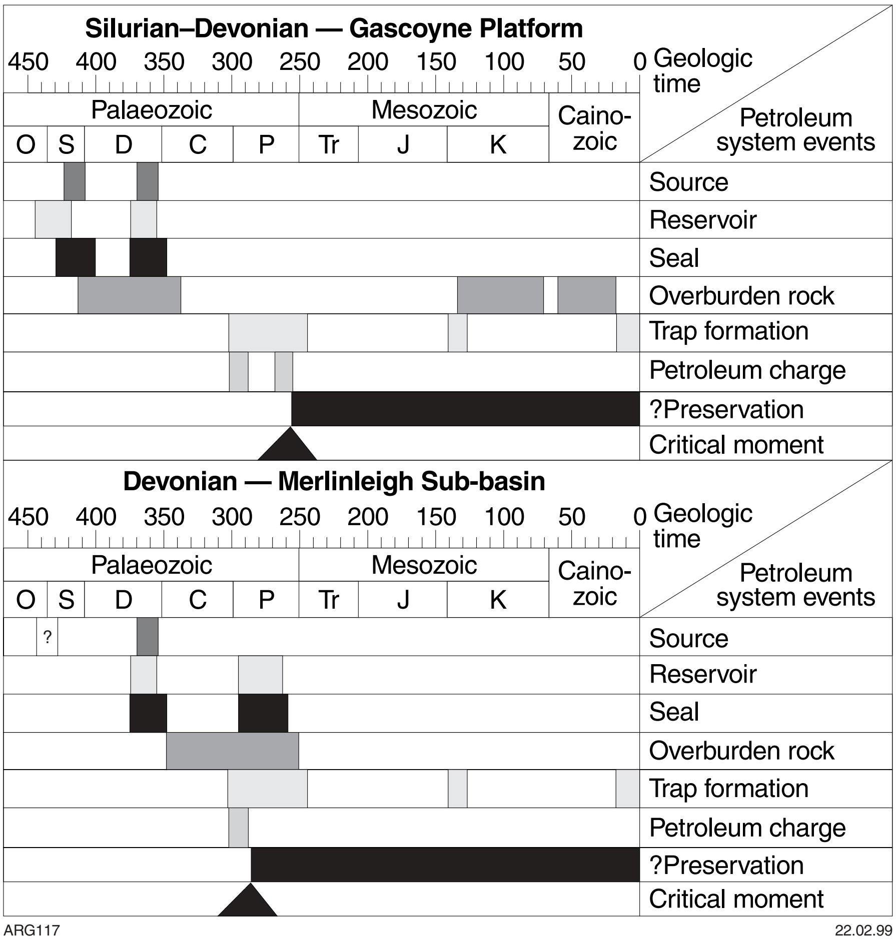


**Figure 31. Potential petroleum systems for Silurian and Devonian successions**

form a petroleum system with the seal, source, and reservoir in the Gneudna Formation, and a secondary reservoir in the underlying Nannyarra Sandstone.

Although a Silurian petroleum system may exist within the Gascoyne Platform, it cannot be confirmed by the available dataset. The succession may incorporate both seal and source in the Dirk Hartog Group and reservoirs in the underlying Tumblagooda Sandstone, or source and reservoir in the Dirk Hartog Group sealed by the overlying Devonian Faure Formation.

AFTA and VR data from the Gascoyne Platform and Merlinleigh Sub-basin indicate that the region was affected by at least four palaeothermal episodes, or palaeoburial followed by uplift and erosion. These episodes occurred before or during the Permian, Middle–Late Jurassic, Early Cretaceous, and late Tertiary (Gibson et al., 1998; Hegarty et al., 1998). Iasky and Mory (1999) suggested comparable significant tectonic events for the Merlinleigh Sub-basin and Gascoyne Platform during the Late Carboniferous – Early Permian, Early Cretaceous, and Tertiary. Of these events, the Upper Carboniferous – Lower Permian rifting appears to be the most significant for the formation of prospective traps; structures of this age immediately preceded hydrocarbon expulsion during the Permian–Triassic from the Silurian and Devonian source rocks. However, the presence of effective traps of this age has yet to be proven.

# Discussion

## Silurian source rocks

Globally, the presence of significant oil-prone marine shale and carbonate source-rocks in the Silurian has been proven in platform and circular sag basins (Klemme and Ulmishek, 1991). These source rocks contain type II kerogen, but the majority of hydrocarbons produced are gaseous due to high maturity of many Silurian source rocks. Some of the proven Silurian shale source-rocks are present in North Africa — graptolitic source facies of the Hamada Basin in Libya (Ghori, 1989), Algeria and Tunisia (Halbouty et al., 1970); Middle East — Gahkum and Tabuk Formations of the Arabian and Iranian basins (Ala et al., 1980; al-Laboun, 1986); and America–Canada — Silurian marine shales of the Permian and Anadarko Basins of U.S.A. (Klemme and Ulmishek, 1991). Examples of Silurian carbonate source-rocks include carbonaceous, laminated, inter-reef Salina A-1 carbonates of the Niagaran reefs of the Michigan Basin, U.S.A. (Gardner and Bray, 1984); and an organic-rich, inter-reefal dolomite unit of the Silurian Eramosa Formation, southwestern Ontario, Canada (Powell et al., 1984).

Within the Carnarvon Basin, thin, marginally mature to mature, oil source beds with fair to good oil-generating potential are present on the Gascoyne Platform in Coburn 1 and Pendock 1 (Figs 4a, 5, 10, and 18a). The good oil-prone source beds in Coburn 1 are laminated organic-rich mud within the dolomites of the Coburn Formation of the Dirk Hartog Group (Fig. 5), which was deposited over a shallow-marine platform (Mory et al., 1998b; Yasin and Mory, in prep.). The Dirk Hartog Group has a wide distribution across the Gascoyne Platform and Merlinleigh Sub-basin and was intersected by 17 wells (Appendix 1). The geochemical data presently available from these wells are, however, limited and the source beds so far recognized are too thin to be capable of generating commercial quantities of hydrocarbons.

## Devonian source rocks

Globally, as well as regionally, the Middle Devonian to Early Carboniferous was an important time for the development of oil source-rocks within organic-rich siliceous mud, marl, and carbonate, mainly in a platform setting, but also, to a lesser extent, in circular sag and rift basins. Most of the proven source rocks contain type II kerogen and the majority of the hydrocarbons generated are liquid hydrocarbons (Klemme and Ulmishek, 1991). Some of the best Devonian black shale source facies in the world are found in North Africa — Devonian shales of the Hamada Basin in Libya (Ghori, 1989) and Illizi Basin in Algeria (Tissot et al., 1984); South America —the Madre de Dios Basin in northern Bolivia (Peters and Wagner, 1997a,b) and black shales of the Solimões Basin in northern Brazil (Mello et al., 1994); and North America — organic-rich shales of the Late Devonian are distributed over a vast area, including the Chattanooga Shale of Nebraska, Kansas, and eastern Oklahoma; Woodford Shales of the Anadarko Basin in western Oklahoma, Permian Basin in western Texas, and southeastern New Mexico; Bakken Formation of the Williston Basin in Dakota, Montana, Saskatchewan, and Manitoba; and the New Albany Shale of the Illinois Basin in Illinois, Indiana, and western Kentucky (Lambert, 1993). The source rocks for the oils in the pinnacle-reef reservoirs in the Rainbow and Zama fields in western Canada are an example of carbonate source-rocks of the Upper Devonian (Powell, 1984).

Regionally, oil-prone organic source facies of the Upper Devonian in Australia are part of the Larapintine 3 Petroleum System defined by Bradshaw (1993) and Bradshaw et al. (1994). In the Canning Basin, source rocks are present within the marine basinal and intraplatform calcareous mudstone of the Gogo Formation, and lagoonal–sabkha facies (Mirbella Dolomite) of the Mellinjerie–Pillara Formation. These source-rock facies are part of the basal transgressive succession of the Devonian reef complex. Possibly, such source facies are also present in the Bonaparte Basin (Bonaparte Formation or Ningbing Group reef complex), where oils recovered from onshore mineral wells show a carbonate-source signature (Edwards and Summons, 1996). Devonian organic-rich shales are also present in the Arafura Basin (Edwards et al. 1997).

The best oil and gas source-rocks of the Southern Carnarvon Basin are present in the Gneudna Formation. The source beds in Barrabiddy 1A on the Gascoyne Platform have excellent oil- and gas-generating potential, and are presently within the main phase of oil generation (Figs 4b, 14, 18b, and 29). These source beds are thin, shaly units within the dolomitic carbonate succession associated with transgressive system tracts of Sequence 1, as defined by Gorter et al. (1998). Within the Merlinleigh Sub-basin, thin, but good quality, immature oil source-rocks are present on the eastern margin of the sub-basin in Gneudna 1 (297–303 m) and Uranerz CDH 8 (Figs 4b, 15, and 18b). On the deeply buried western margin of the Merlinleigh Sub-basin, the Gneudna Formation is not an effective source rock because it is organically lean (<0.25% TOC; Fig. 12) and overmature (>2.5% Ro; Fig. 30a) as shown by Quail 1. Within the Merlinleigh Sub-basin, the Gneudna Formation varies from immature in the outcrop belt along the eastern margin of the sub-basin, to overmature in Quail 1 on the western side of the sub-basin, implying that the unit should be mature for oil generation in the central area of the sub-basin, provided it is an effective source rock.

Oil and gas source-beds with fair generating potential are also present within the Gneudna Formation in Kybra 1 and Peedamullah 1 on the Peedamullah Shelf in the Northern Carnarvon Basin. The distribution of Devonian rocks suggests that source rocks are present on the northern Gascoyne Platform, at least in the eastern part of the Merlinleigh Sub-basin and within the Peedamullah Shelf.

# Conclusions

The Silurian–Devonian successions in the Carnarvon Basin contain excellent to fair source-rock intervals in the Silurian Dirk Hartog Group and Upper Devonian Gneudna Formation.

In the Gascoyne Platform, good quality, but thin, oil source beds are present in the Dirk Hartog Group within Coburn 1 and Pendock 1. In the southern Gascoyne Platform, these source beds are marginally mature for oil generation in Coburn 1, whereas in the northwestern Gascoyne Platform they are fully mature in Pendock 1. The organic richness of these beds is up to 2.06% TOC, with the best potential yield ($S_1 + S_2$) of 6.29 mg/g rock from Coburn 1 (623.9 m). In that well, the source beds are thin mudstone laminae within shallow-marine dolomite of the Coburn Formation (Dirk Hartog Group). Based on the available dataset, the effective source-rock potential of the Dirk Hartog Group is uncertain, even though organic-rich source beds have been identified, because they are volumetrically limited.

The Upper Devonian Gneudna Formation contains thin shale beds with the best Palaeozoic oil- and gas-source characteristics measured in the basin. In Barrabiddy 1A, within the northern Gascoyne Platform, the organic richness of these beds is between 5.2 and 13.6% TOC, potential yields vary between 10.9 and 40.1 mg/g rock, extract concentrations are between 2698 and 4836 ppm, and the type of kerogen is oil and gas generating. These source beds are within the oil window, with vitrinite reflectance values between 0.77 and 0.94% Ro, and Rock-Eval derived $T_{max}$ values between 443 and 448°C. The individual source beds are 20–70 cm thick and have a cumulative thickness of 6 m within the shallow-marine carbonate succession of the Gneudna Formation.

Good quality, but immature, oil and gas source-beds are also recognized within the Gneudna Formation in Gneudna 1 and Uranerz CDH 8 on the eastern margin of the Merlinleigh Sub-basin. In comparison, the formation is overmature in Quail 1 near the western margin of the sub-basin. Fair quality oil and gas source-beds are present within the Gneudna Formation in Kybra 1 and Peedamullah 1 on the Peedamullah Shelf. In the Coolcalalaya Sub-basin, the available dataset is extremely limited and no source rocks are recognized at present.

According to the available dataset, source beds in the Gneudna Formation are thin and their potential and maturity vary considerably, both vertically and laterally in the Carnarvon Basin.

Petroleum-generation modelling of Coburn 1, Barrabiddy 1A, and Quail 1 constrained by AFTA and VR data indicate that different levels of maximum burial, maturation, and palaeotemperatures were reached within the Silurian–Devonian successions in the southern and northern Gascoyne Platform and western Merlinleigh Sub-basin. The maximum rate of petroleum generation attained by the Silurian and Upper Devonian source beds was during the late Palaeozoic. Therefore, in terms of hydrocarbon charge, the most prospective traps are Palaeozoic in age.

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## Appendix 1

# Wells that penetrated the Silurian and Devonian successions

| Well | TD (m) | TD formation | Exploration | Tectonic unit | Year | Company |
|---|---|---|---|---|---|---|
| Aquitaine DDH 1 | 152 | Basement | Minerals | Merlinleigh Sub-basin | 1973 | Aquitaine Minerals |
| Aquitaine DDH 2 | 250 | Basement | Minerals | Merlinleigh Sub-basin | 1973 | Aquitaine Minerals |
| Aquitaine DDH 4 | 137 | Devonian | Minerals | Merlinleigh Sub-basin | 1973 | Aquitaine Minerals |
| Barrabiddy 1 | 238 | Munabia Formation | Stratigraphic | Gascoyne Platform | 1996 | GSWA |
| Barrabiddy 1A | 783 | Nannyarra Sandstone | Stratigraphic | Gascoyne Platform | 1996 | GSWA |
| BHP ND 001 | 376 | Tumblagooda Sandstone | Minerals | Gascoyne Platform | 1993 | BHP Minerals |
| BHP ND 002 | 439 | Tumblagooda Sandstone | Minerals | Gascoyne Platform | 1993 | BHP Minerals |
| Brickhouse 1 | 803 | Kopke Sandstone | Water | Gascoyne Platform | 1905 | – |
| Cane River 1 | 670 | Lower Carboniferous | Stratigraphic | Gascoyne Platform | 1971 | Hematite Petroleum |
| Cane River 2 | 688 | Lower Carboniferous | Stratigraphic | Gascoyne Platform | 1971 | Hematite Petroleum |
| Cape Cuvier 1 | 451 | Moogooree Limestone | Stratigraphic | Gascoyne Platform | 1955 | WAPET |
| Coburn 1 | 1 093 | Tumblagooda Sandstone | Stratigraphic | Gascoyne Platform | 1997 | GSWA |
| CRAE GBH 1 | 387 | Faure Formation | Minerals | Gascoyne Platform | 1982 | CRA Exploration |
| CRAE GBH 2 | 331 | Coburn Formation | Minerals | Gascoyne Platform | 1982 | CRA Exploration |
| CRAE YCH 1 | 299 | Devonian | Coal | Coolcalalaya Sub-basin | 1982 | CRA Exploration |
| CRAE YURC 3 | 300 | Lower Carboniferous | ?Coal | Coolcalalaya Sub-basin | 1982 | CRA Exploration |
| Dirk Hartog 17B | 1 523 | Tumblagooda Sandstone | Wildcat | Gascoyne Platform | 1957 | WAPET |
| Echo Bluff 1 | 1 204 | Devonian | Wildcat | Peedamullah Shelf | 1984 | AVON |
| East Marilla 1 | 638 | Moogooree Limestone | Stratigraphic | Merlinleigh Sub-basin | 1972 | WAPET |
| Gascoyne River 1 | 184 | Devonian | Water | Gascoyne Platform | 1970 | GSWA |
| Gneudna 1 | 492 | Basement | Stratigraphic | Merlinleigh Sub-basin | 1995 | GSWA |
| Grierson 1 | 438 | Devonian | Stratigraphic | Gascoyne Platform | 1955 | WAPET |
| Grierson 2 | 458 | Devonian | Stratigraphic | Gascoyne Platform | 1955 | WAPET |
| Grierson 3 | 441 | Devonian | Stratigraphic | Gascoyne Platform | 1955 | WAPET |
| Hamelin Pool 1 | 1 595 | Tumblagooda Sandstone | Stratigraphic | Gascoyne Platform | 1969 | Magellan |
| Hamelin Pool 2 | 1 219 | Tumblagooda Sandstone | Stratigraphic | Gascoyne Platform | 1969 | Magellan |
| Kalbarri 1 | 1 540 | Tumblagooda Sandstone | Stratigraphic | Gascoyne Platform | 1973 | Oceania Petroleum |
| Kybra 1 | 2 562 | Moogooree Limestone | Petroleum | Peedamullah Shelf | 1987 | Bond |
| Marilla 1 | 457 | Dirk Hartog Group | Stratigraphic | Merlinleigh Sub-basin | 1963 | WAPET |
| Mooka 1 | 418 | Dirk Hartog Group | Stratigraphic | Gascoyne Platform | 1996 | GSWA |
| Peedamullah 1 | 328 | Devonian | Stratigraphic | Peedamullah Shelf | 1967 | WAPET |
| Pelican Hill 1 | 918 | Tumblagooda Sandstone | Water | Gascoyne Platform | 1903 | – |
| Pendock 1 | 2 501 | Ajana Formation | Wildcat | Gascoyne Platform | 1969 | Canadian Superior |
| Quobba 1 | 1 931 | Yaringa Formation | Wildcat | Gascoyne Platform | 1984 | Canada North West |
| Quail 1 | 3 580 | Tumblagooda Sandstone | Wildcat | Merlinleigh Sub-basin | 1963 | WAPET |
| Remarkable Hill 1 | 3 206 | Moogooree Limestone | Petroleum | Merlinleigh Sub-basin | 1968 | Marathon |
| Rough Range 1 | 4 452 | Devonian | Wildcat | Gascoyne Platform | 1955 | WAPET |
| Sharon 1 | 259 | Devonian | Wildcat | Peedamullah Shelf | 1987 | AVON |
| Somelim 1 | 414 | Lower Carboniferous | Wildcat | Peedamullah Shelf | 1989 | Metana Energy |
| Tamala 1 | 1 225 | Tumblagooda Sandstone | Stratigraphic | Gascoyne Platform | 1973 | Oceania Petroleum |
| Uranerz CDH 4 | 48 | Devonian | Minerals | Merlinleigh Sub-basin | 1973 | Uranerz Australia [a] |
| Uranerz CDH 5 | 153 | Devonian | Minerals | Merlinleigh Sub-basin | 1973 | Uranerz Australia [a] |
| Uranerz CDH 8 | 122 | Devonian | Minerals | Merlinleigh Sub-basin | 1973 | Uranerz Australia [a] |
| Wandagee 1 | 1 073 | Tumblagooda Sandstone | Stratigraphic | Gascoyne Platform | 1962 | WAPET |
| Yaringa 1 | 2 288 | Tumblagooda Sandstone | Wildcat | Gascoyne Platform | 1966 | Continental |
| Yaringa East 1 | 826 | Kopke Sandstone | Stratigraphic | Gascoyne Platform | 1997 | Pace |

**NOTES:** (a): Uranerz Australia drilled a total of 34 shallow wells (5–250 m, only 4 deeper than 100 m) to assess the potential for uranium mineralization of the Gneudna Formation

AVON: Avon Engineering
GSWA: Geological Survey of Western Australia
Bond: Bond Corporation
Canadian Superior: Canadian Superior Oil (Australia)
Marathon: Marathon Petroleum Australia
WAPET: Western Australian Petroleum
Pace: Pace Petroleum
Continental: Continental Oil Company
TD: Total depth

## Appendix 2

# Formation tops for petroleum and other selected wells

| | *Kalbarri 1* | *Tamala 1* | *Coburn 1* | *BHP ND 002* | *BHP ND 001* | *Hamelin Pool 2* | *Yaringa 1* | *Hamelin Pool 1* | *Yaringa East 1* | *Dirk Hartog 17B* | *CRAE GBH 1* | *Mooka 1* | *CRAE GBH 2* | *Brickhouse 1 (w)* | *Pelican Hill 1 (w)* | *Barrabiddy 1A* | *Pendock 1* | *Wandagee 1* | *Quobba 1* | *Cape Cuvier 1* | *Grierson 1* | *Grierson 2* | *Grierson 3* | *Gneudna 1* | *Quail 1* | *Rough Range 1* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Datum | KB | KB | GL | GL | GL | KB | KB | KB | GL | KB | GL | GL | GL | GL | GL | GL | KB | KB | KB | KB | KB | KB | KB | GL | KB | KB |
| Datum (AHD) | 133 | 7 | 90 | 108 | 170 | 30 | 27 | 9 | 55 | 90 | ~105 | 120 | ~100 | 35 | 15 | 55 | 10 | 71 | 55 | 72 | 12 | 2 | 2 | 220 | 118 | 61 |
| base K | 182 | 398 | 186 | 183 | 161.8 | 197 | 146 | 209 | 204 | 665 | 121 | 93 | – | 424 | 429 | 191 | 1 030 | 180 | 436 | 423 | 436 | 443 | 437 | – | a | 1 106 |
| Lyons Group | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | 592 | 1 216 |
| ?Devonian–Carboniferous | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | 1 897f |
| Quail Formation | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | 2 101 | ? |
| Yindagindy Formation | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | 2 453 | ? |
| Munabia Formation | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | 2 710f | ? |
| Gneudna Formation | a | a | a | a | a | a | a | a | a | a | a | a | a | ?424 | 429 | 276 | 1 030 | 180 | 436 | 423 | ?436 | ?443 | ?437 | 29 | 2 741 | ? |
| Point Maud Member | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | 276–607 | 1 289–1 609 | a | a | np | ? | ? | ? | a | a | np |
| Nannyarra Sandstone | a | a | a | a | a | a | a | a | a | a | ?142 | a | a | a | a | 778 | 1 692 | 278 | 1 528 | np | np | np | np | 387 | 3 082 | np |
| Sweeney Mia Formation | a | a | a | a | a | 197 | 146 | 209 | 204 | a | ?356 | a | a | a | a | np | a | a | a | np | np | np | np | a | a | np |
| Kopke Sandstone | a | 398 | 186 | a | a | 325 | 326 | 346 | 395.5 | a | np | 93 | a | 592 | 720 | np | a | a | a | np | np | np | np | a | a | np |
| Faure Formation | a | 425 | 505.5 | a | a | 791 | 855 | 852 | np | a | np | 163.5 | a | np | np | np | a | a | a | np | np | np | np | a | a | np |
| Dirk Hartog Group | 182 | 574 | 577.5 | 183 | 161.8 | ~893 | 947 | 954 | np | 665 | np | 281 | 246 | np | np | np | 1 850 | 399 | 1 718 | np | np | np | np | a | 3 206 | np |
| Coburn Formation | a | 574 | 577.5 | 183 | 161.8 | ~893 | 947 | 954 | np | 665 | np | 281 | 246 | np | np | np | 1 850 | 399 | 1 718 | np | np | np | np | a | a | np |
| Yaringa Formation | a | 813 | 784 | a | a | 1 119 | 1 195 | 1 225 | np | 905 | np | np | a | np | np | np | 2 192 | 525 | 1 915 | np | np | np | np | a | a | np |
| Ajana Formation | 182 | 867 | 853 | 300 | 223 | 1 178 | 1 300 | 1 289 | np | 970 | np | np | ?300 | np | np | np | 2 286 | 587 | np | np | np | np | np | a | 3 206 | np |
| Marron Member | 210 | 1 027 | 912 | 300 | 223 | np | 1 425 | ~1 455 | np | 1 257 | np | np | np | np | np | np | np | 811 | np | np | np | np | np | a | ?3 480 | np |
| Tumblagooda Sandstone | 272 | 1 118 | 974 | 395.6 | 302 | np | 1 526 | 1 558 | np | 1 405 | np | np | np | np | np | np | np | 944 | np | np | np | np | np | a | 3 549 | np |
| Cambro-Ordovician | np | np | np | np | np | np | np | np | np | np | np | np | np | np | np | np | np | – | np | np | np | np | np | a | np | np |
| pre-Cambrian | np | np | np | np | np | np | np | np | np | np | np | np | np | np | np | np | np | np | np | np | np | np | np | 488 | np | np |
| **Total depth (TD)** | **1 540** | **1 225** | **1 093** | **438.6** | **375.5** | **1 219** | **2 288** | **1 595** | **829** | **1 523** | **387.3** | **418** | **331.4** | **803** | **918** | **782.9** | **2 501** | **–** | **1 931** | **457** | **438** | **450** | **442** | **492** | **3 580** | **4 452** |

**NOTES:**
- a: absent
- np: not penetrated
- base K: base Cretaceous
- GL: ground level
- KB: kelly bushing
- f: fault
- w: waterbore
- AHD: Australian Height Datum

## Appendix 3

# Type and number of analyses

| *Well* | *Type of exploration* | *Analysed by, for, and year* | *Interval (m)* | *TOC* | *Rock-Eval* | *Pyrolysis-GC* | *Extract-LC* | *Saturate-GC* | *GC–MS* | *Organic petrology* | *Visual kerogen analysis* | *Kerogen elemental analysis* | *AFTA* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Barrabiddy 1 | Stratigraphic | Geotech, GSWA, 1996–97 | 70–218 | 6 | 5 | 1 | 1 | 1 | – | – | – | – | – |
| Barrabiddy 1 | Stratigraphic | KK, GSWA, 1997 | 115 | – | – | – | – | – | – | 1 | – | – | – |
| Barrabiddy 1A | Stratigraphic | Geotech, GSWA, 1997 | 187–776 | 36 | 14 | 4 | 4 | 4 | | – | – | – | – |
| Barrabiddy 1A | Stratigraphic | Geotrack, GSWA, 1997 | 169–778 | – | – | – | – | – | – | – | – | – | 3 |
| Barrabiddy 1A | Stratigraphic | KK, GSWA, 1997 | 187–713 | – | – | – | – | – | – | 3 | – | – | – |
| BHP ND 001 | Minerals | Geotech, GSWA, 1995 | 178–271 | 12 | 3 | – | – | – | – | – | – | – | – |
| BHP ND 002 | Minerals | Geotech, GSWA, 1995 | 209–397 | 13 | – | – | – | – | – | – | – | – | – |
| Brickhouse 1 | Water | KK, GSWA, 1995 | 357–405 | – | – | – | – | – | – | 1 | – | – | – |
| CRAE YCH 1 | Minerals | Geotech, GSWA, 1995 | 185 | 1 | 1 | – | – | – | – | – | – | – | – |
| CRAE YCH 1 | Minerals | KK, GSWA, 1995 | 185 | – | – | – | – | – | – | 1 | – | – | – |
| CRAE YURC 3 | Minerals | Geotech, GSWA, 1995 | 44–265 | 5 | – | – | – | – | – | – | – | – | – |
| CRAE YURC 3 | Minerals | KK, GSWA, 1995 | 44–183 | – | – | – | – | – | – | 2 | – | – | – |
| Brickhouse 1 | Water | Analabs, CNA, 1983 | 357–793 | 2 | – | – | – | – | – | – | – | – | – |
| Cape Cuvier 1 | Stratigraphic | Geotech, GSWA, 1996 | 335–458 | 6 | 2 | – | – | – | – | – | – | – | – |
| Cape Cuvier 1 | Stratigraphic | KK, GSWA, 1996 | 335–431 | – | – | – | – | – | – | 2 | – | – | – |
| Coburn 1 | Stratigraphic | Geotech, GSWA, 1997 | 126–975 | 47 | 13 | 2 | 3 | 3 | – | – | – | – | – |
| Coburn 1 | Stratigraphic | KK, GSWA, 1997 | 163–959 | – | – | – | – | – | – | 6 | – | – | – |
| Coburn 1 | Stratigraphic | Geotrack, GSWA, 1997 | 185–977 | – | – | – | – | – | – | – | – | – | 4 |
| CRAE GBH 1 | Minerals | Geotech, GSWA, 1995 | 309–355 | 4 | 4 | – | – | – | – | – | – | – | – |
| CRAE GBH 1 | Minerals | KK, GSWA, 1995 | 272–355 | – | – | – | – | – | – | 3 | – | – | – |
| CRAE GBH 2 | Minerals | Geotech, GSWA, 1995 | 289–331 | 2 | – | – | – | – | – | – | – | – | – |
| CRAE GBH 2 | Minerals | KK, GSWA, 1995 | 200–331 | – | – | – | – | – | – | 3 | – | – | – |
| Dirk Hartog 17B | Petroleum | Geotech, GSWA, 1996 | 656 – 1 382 | 12 | 2 | – | – | – | – | – | – | – | – |
| Dirk Hartog 17B | Petroleum | KK, GSWA, 1996 | 656 – 1 259 | – | – | – | – | – | – | 3 | – | – | – |
| Dirk Hartog 17B | Petroleum | Dolan & Associates, 1991 | 664 – 1 386 | 16 | 2 | – | 1 | 1 | – | – | – | – | – |
| Grierson 3 | Stratigraphic | Geotech, GSWA, 1996 | 440 | 1 | – | – | – | – | – | – | – | – | – |
| Kalbarri 1 | Stratigraphic | KK, GSWA, 1997 | 184 | – | – | – | – | – | – | 1 | – | – | – |
| Marilla 1 | Stratigraphic | Geotech, GSWA, 1996 | 426–430 | 1 | – | – | – | – | – | – | – | – | – |
| Mooka 1 | Stratigraphic | Geotech, GSWA, 1996–97 | 82–408 | 13 | 5 | – | – | – | – | – | – | – | – |
| Mooka 1 | Stratigraphic | KK, GSWA, 1997 | 82–339 | – | – | – | – | – | – | 2 | – | – | – |
| Outcrop | Petroleum | Geotrack, GSWA, 1997 | Silurian | – | – | – | – | – | – | – | – | – | 1 |
| Pelican Hill 1 | Water | Geotech, GSWA, 1995 | 392–776 | 4 | 1 | – | – | – | – | – | – | – | – |
| Pelican Hill 1 | Water | KK, GSWA, 19975 | 392–776 | – | – | – | – | – | – | 4 | – | – | – |
| Pelican Hill 1 | Water | Analabs, CNA, 1983 | 486–776 | 5 | 1 | – | – | – | – | – | – | – | – |
| Pendock 1 | Petroleum | KK, GSWA, 1997 | 1 722 – 2 192 | – | – | – | – | – | – | 2 | – | – | – |
| Pendock 1 | Petroleum | Dolan & Associates, 1991 | 1 045 – 2 191 | 21 | 6 | 1 | 2 | 2 | 1 | – | – | – | – |
| Pendock 1 | Petroleum | Open-file | 1 410 – 2 189 | – | – | – | – | – | – | 6 | – | – | – |

## **Appendix 3** (continued)

| *Well* | *Type of exploration* | *Analysed by, for, and year* | *Interval (m)* | *TOC* | *Rock-Eval* | *Pyrolysis-GC* | *Extract-LC* | *Saturate-GC* | *GC–MS* | *Organic petrology* | *Visual kerogen analysis* | *Kerogen elemental analysis* | *AFTA* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Quobba 1 | Petroleum | Open-file | 482 – 1 930 | 72 | 10 | 2 | – | – | – | – | – | – | – |
| Rough Range 1 | Petroleum | Dolan & Associates, 1991 | 2 011 – 3 189 | 12 | 11 | – | 2 | 2 | 2 | – | – | – | – |
| Rough Range 1 | Petroleum | Metana | 2 981 – 4 004 | 24 | 18 | – | 3 | 3 | – | – | 7 | – | – |
| Rough Range 1 | Petroleum | Geotech, GSWA, 1996 | 2 970 – 3 942 | 7 | 4 | – | – | – | – | – | – | – | – |
| Rough Range 1 | Petroleum | KK, GSWA, 1996 | 3 141 – 3 942 | – | – | – | – | – | – | 2 | – | – | – |
| Tamala 1 | Stratigraphic | Open-file | 434 – 1 057 | – | – | – | – | – | – | – | 9 | – | – |
| Tamala 1 | Stratigraphic | KK,GSWA, 1997 | 524 | – | – | – | – | – | – | 1 | – | – | – |
| Tamala 1 | Stratigraphic | Dolan & Associates, 1991 | 868 – 1 057 | 1 | – | – | 2 | 2 | 2 | – | – | – | – |
| Wandagee 1 | Stratigraphic | Geotech, GSWA, 1995 | 185 – 778 | 8 | 1 | – | – | – | – | – | – | – | – |
| Yaringa 1 | Petroleum | Geotech, GSWA, 1996 | 192 – 1 387 | 4 | 1 | – | – | – | – | – | – | – | – |
| Yaringa East 1 | Stratigraphic | Geotrack, GSWA, 1997 | 174–817 | 12 | 5 | – | – | – | – | – | – | – | – |
| Yaringa East 1 | Stratigraphic | KK, GSWA, 1997 | 195–808 | – | – | – | – | – | – | 5 | – | – | – |
| Yaringa East 1 | Stratigraphic | Geotrack, GSWA, 1997 | 268–269 | – | – | – | – | – | – | – | – | – | 1 |
| Gascoyne River 1 | Water | CNA, Analabs, 1983 | 116–185 | 4 | 1 | – | – | – | – | – | – | – | – |
| Aquitaine DDH 1 | Minerals | Geotech, GSWA, 1996 | 41–87 | 9 | 1 | – | – | – | – | – | – | – | – |
| Aquitaine DDH 2 | Minerals | Geotech, GSWA, 1996 | 25–180 | 17 | – | – | – | – | – | – | – | – | – |
| Aquitaine DDH 4 | Minerals | Geotech, GSWA, 1996 | 34–133 | 10 | 2 | – | – | – | – | – | – | – | – |
| Gneudna 1 | Stratigraphic | Geotech, GSWA, 1995 | 27–466 | 58 | 9 | 1 | – | – | – | – | – | – | – |
| Gneudna 1 | Stratigraphic | KK, GSWA, 1995 | 65–466 | – | – | – | – | – | – | 5 | – | – | – |
| Quail 1 | Petroleum | KK, GSWA, 1995 | 154 – 3 402 | – | – | – | – | – | – | 7 | – | – | – |
| Quail 1 | Petroleum | Geotrack, GSWA, 1995 | 218 – 2 231 | – | – | – | – | – | – | – | – | – | 4 |
| Uranerz CDH 4 | Minerals | Geotech, GSWA, 1995 | 22–33 | 2 | 2 | – | – | – | – | – | – | – | – |
| Uranerz CDH 5 | Minerals | Geotech, GSWA, 1995 | 50–73 | 3 | 1 | – | – | – | – | – | – | – | – |
| Uranerz CDH 8 | Minerals | Geotech, GSWA, 1995 | 112–121 | 2 | 2 | – | – | – | – | – | – | – | – |
| Remarkable Hill 1 | Petroleum | – | 2 501 – 3 206 | 8 | 3 | – | – | – | – | – | – | – | – |
| Mardie 1 | Petroleum | – | 206–209 | 1 | – | – | – | – | – | – | – | – | – |
| Minderoo 1 | Petroleum | – | 413–540 | 3 | 3 | – | – | – | – | – | – | – | – |
| Peedamullah 1 | Stratigraphic | – | 213–329 | 3 | 3 | – | – | – | – | – | – | – | – |
| Somelim 1 | Petroleum | – | 265–413 | 10 | 3 | – | – | – | – | – | – | – | – |
| Wonangarra 1 | Petroleum | – | 575 | 1 | 1 | – | – | – | – | – | – | – | – |
| Kybra 1 | Petroleum | – | 2 170 – 2 550 | 25 | 8 | – | – | – | – | – | – | – | – |
| | | | **Total analyses** | **503** | **148** | **11** | **18** | **18** | **5** | **60** | **16** | **–** | **13** |

**NOTES:**

| | |
|---|---|
| CNA: | Canada North West, Australia Oil |
| Geotech: | Geotechnical Services |
| GSWA: | Geological Survey of Western Australia |
| KK: | Keiraville Konsultants |
| Dolan & Associates: | Dolan and Associates, Petroleum Geological Analysis Limited and WA Centre for Petroleum Exploration |
| Metana: | Metana Minerals |
| TOC: | total organic carbon |
| GC: | gas chromatography |
| LC: | liquid chromatography |
| MS: | mass spectrometry |
| AFTA: | apatite fission-track analysis |
| Geotrack: | Geotrack International |

## Appendix 4

# Project sample depths, analyses, and formations

| *Sample number* | *Well* | *Sample type* | *Depth (m) From* | *To* | *Source rock analysis* | *Maturity* | *Unit/age* |
|---|---|---|---|---|---|---|---|
| **Coolcalalaya Sub-basin** | | | | | | | |
| 1 | CRAE YCH 1 | core | 185.2 | – | TOC and Rock-Eval | % Ro | ?Upper Devonian |
| 2 | CRAE YCH 2 | core | 118.8 | – | TOC | % Ro | – |
| 3 | CRAE YCH 2 | core | 170.1 | – | | TOC | – – |
| 4 | CRAE YCH 2 | core | 231.5 | – | | TOC | – – |
| 5 | CRAE YURC 3 | core | 44.0 | – | TOC | % Ro | Lower Carboniferous |
| 6 | CRAE YURC 3 | core | 80.0 | – | TOC | – | Lower Carboniferous |
| 7 | CRAE YURC 3 | core | 183.0 | – | TOC | % Ro | Lower Carboniferous |
| 8 | CRAE YURC 3 | core | 233.4 | – | TOC | – | Lower Carboniferous |
| 9 | CRAE YURC 3 | core | 264.4 | – | TOC | – | Lower Carboniferous |
| **Gascoyne Platform** | | | | | | | |
| 10 | Barrabiddy 1 | core | 70.8 | – | TOC and Rock-Eval | – | Gearle Siltstone (Cretaceous) |
| 11 | Barrabiddy 1 | core | 115.4 | – | TOC, Rock-Eval, PGC, and Ext. | % Ro | Windalia Radiolarite (Cretaceous) |
| 12 | Barrabiddy 1 | core | 186.0 | – | TOC and Rock-Eval | – | Muderong Shale (Cretaceous) |
| 13 | Barrabiddy 1 | core | 192.9 | – | TOC | – | Munabia Formation (Devonian) |
| 14 | Barrabiddy 1 | core | 201.5 | – | TOC and Rock-Eval | – | Munabia Formation (Devonian) |
| 15 | Barrabiddy 1 | core | 217.6 | – | TOC and Rock-Eval | – | Munabia Formation (Devonian) |
| 16 | Barrabiddy 1A | core | 169.6 | 171.0 | – | AFTA | Windalia Radiolarite (Cretaceous) |
| 17 | Barrabiddy 1A | core | 190.4 | – | TOC and Rock-Eval | % Ro | Munabia Formation (Devonian) |
| 18 | Barrabiddy 1A | core | 194.7 | 195.4 | – | AFTA | Munabia Formation (Devonian) |
| 19 | Barrabiddy 1A | core | 197.6 | – | TOC and Rock-Eval | – | Munabia Formation (Devonian) |
| 20 | Barrabiddy 1A | core | 213.7 | – | TOC | – | Munabia Formation (Devonian) |
| 21 | Barrabiddy 1A | core | 218.5 | – | TOC and Rock-Eval | – | Munabia Formation (Devonian) |
| 22 | Barrabiddy 1A | core | 224.9 | – | TOC and Rock-Eval | – | Munabia Formation (Devonian) |
| 23 | Barrabiddy 1A | core | 227.6 | – | TOC | – | Munabia Formation (Devonian) |
| 24 | Barrabiddy 1A | core | 264.0 | – | TOC | – | Munabia Formation (Devonian) |
| 25 | Barrabiddy 1A | core | 268.4 | – | TOC | – | Munabia Formation (Devonian) |
| 26 | Barrabiddy 1A | core | 610.6 | – | TOC | – | Gneudna Formation (Devonian) |
| 27 | Barrabiddy 1A | core | 616.6 | – | TOC | – | Gneudna Formation (Devonian) |
| 28 | Barrabiddy 1A | core | 619.5 | – | TOC | – | Gneudna Formation (Devonian) |
| 29 | Barrabiddy 1A | core | 627.7 | – | TOC | – | Gneudna Formation (Devonian) |
| 30 | Barrabiddy 1A | core | 628.8 | – | TOC | – | Gneudna Formation (Devonian) |
| 31 | Barrabiddy 1A | core | 640.2 | – | TOC | – | Gneudna Formation (Devonian) |
| 32 | Barrabiddy 1A | core | 643.0 | – | TOC | – | Gneudna Formation (Devonian) |
| 28 | Barrabiddy 1A | core | 649.5 | – | TOC | – | Gneudna Formation (Devonian) |
| 29 | Barrabiddy 1A | core | 655.4 | – | TOC, Rock-Eval, PGC, and Ext. | – | Gneudna Formation (Devonian) |
| 30 | Barrabiddy 1A | core | 656.3 | – | TOC and Rock-Eval | – | Gneudna Formation (Devonian) |

**Appendix 4** (continued)

| *Sample number* | *Well* | *Sample type* | *Depth (m) From* | *To* | *Source rock analysis* | *Maturity* | *Unit/age* |
|---|---|---|---|---|---|---|---|
| 31 | Barrabiddy 1A | core | 662.5 | – | TOC and Rock-Eval | – | Gneudna Formation (Devonian) |
| 32 | Barrabiddy 1A | core | 663.8 | – | TOC and Rock-Eval | – | Gneudna Formation (Devonian) |
| 33 | Barrabiddy 1A | core | 678.2 | – | TOC, Rock-Eval, PGC, and Ext. | % Ro | Gneudna Formation (Devonian) |
| 34 | Barrabiddy 1A | core | 679.2 | – | TOC and Rock-Eval | – | Gneudna Formation (Devonian) |
| 35 | Barrabiddy 1A | core | 682.6 | – | TOC and Rock-Eval | – | Gneudna Formation (Devonian) |
| 36 | Barrabiddy 1A | core | 685.0 | – | TOC | – | Gneudna Formation (Devonian) |
| 37 | Barrabiddy 1A | core | 686.2 | – | TOC | – | Gneudna Formation (Devonian) |
| 38 | Barrabiddy 1A | core | 700.2 | – | TOC | – | Gneudna Formation (Devonian) |
| 39 | Barrabiddy 1A | core | 702.5 | – | TOC | – | Gneudna Formation (Devonian) |
| 40 | Barrabiddy 1A | core | 705.5 | – | TOC, Rock-Eval, PGC, and Ext. | – | Gneudna Formation (Devonian) |
| 41 | Barrabiddy 1A | core | 709.7 | – | TOC | – | Gneudna Formation (Devonian) |
| 42 | Barrabiddy 1A | core | 713.4 | – | TOC, Rock-Eval, PGC, and Ext. | % Ro | Gneudna Formation (Devonian) |
| 43 | Barrabiddy 1A | core | 726.5 | – | TOC and Rock-Eval | – | Gneudna Formation (Devonian) |
| 44 | Barrabiddy 1A | core | 736.4 | – | TOC | – | Gneudna Formation (Devonian) |
| 45 | Barrabiddy 1A | core | 755.4 | – | TOC | – | Gneudna Formation (Devonian) |
| 46 | Barrabiddy 1A | core | 766.6 | – | TOC | – | Gneudna Formation (Devonian) |
| 47 | Barrabiddy 1A | core | 766.6 | – | TOC | – | Gneudna Formation (Devonian) |
| 48 | Barrabiddy 1A | core | 769.7 | – | TOC | – | Gneudna Formation (Devonian) |
| 49 | Barrabiddy 1A | core | 775.2 | – | TOC | – | Gneudna Formation (Devonian) |
| 50 | Barrabiddy 1A | core | 777.2 | 778.1 | TOC | AFTA | Gneudna Formation (Devonian) |
| 51 | BHP ND 001 | core | 178.7 | – | TOC and Rock-Eval | – | Dirk Hartog Group (Silurian) |
| 52 | BHP ND 001 | core | 180.9 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 53 | BHP ND 001 | core | 186.7 | – | TOC | % Ro | Dirk Hartog Group (Silurian) |
| 54 | BHP ND 001 | core | 188.0 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 55 | BHP ND 001 | core | 191.9 | – | TOC and Rock-Eval | – | Dirk Hartog Group (Silurian) |
| 56 | BHP ND 001 | core | 200.7 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 57 | BHP ND 001 | core | 201.3 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 58 | BHP ND 001 | core | 220.3 | – | TOC and Rock-Eval | – | Dirk Hartog Group (Silurian) |
| 59 | BHP ND 001 | core | 225.2 | – | TOC | % Ro | Dirk Hartog Group (Silurian) |
| 60 | BHP ND 001 | core | 242.4 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 61 | BHP ND 001 | core | 252.8 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 62 | BHP ND 001 | core | 270.9 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 63 | BHP ND 002 | core | 158.1 | – | – | % Ro | Cretaceous |
| 64 | BHP ND 002 | core | 209.4 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 65 | BHP ND 002 | core | 221.0 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 66 | BHP ND 002 | core | 236.4 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 67 | BHP ND 002 | core | 244.7 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 68 | BHP ND 002 | core | 280.2 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 69 | BHP ND 002 | core | 290.3 | – | TOC | % Ro | Dirk Hartog Group (Silurian) |
| 70 | BHP ND 002 | core | 301.8 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 71 | BHP ND 002 | core | 306.8 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 72 | BHP ND 002 | core | 325.7 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 73 | BHP ND 002 | core | 329.5 | – | TOC | – | Dirk Hartog Group (Silurian) |

## Appendix 4 (continued)

| *Sample number* | *Well* | *Sample type* | *Depth (m) From* | *Depth (m) To* | *Source rock analysis* | *Maturity* | *Unit/age* |
|---|---|---|---|---|---|---|---|
| 74 | BHP ND 002 | core | 354.8 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 75 | BHP ND 002 | core | 376.0 | – | TOC | % Ro | Dirk Hartog Group (Silurian) |
| 76 | BHP ND 002 | core | 396.1 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 77 | Brickhouse 1 | core | 356.9 | 404.8 | – | % Ro | Cretaceous |
| 78 | Cape Cuvier 1 | core 9 | 335.3 | – | TOC and Rock-Eval | % Ro | Cretaceous |
| 79 | Cape Cuvier 1 | core 12 | 430.1 | – | TOC | % Ro | Gneudna Formation (Devonian) |
| 80 | Cape Cuvier 1 | core 13 | 448.4 | 449.9 | TOC | – | Gneudna Formation (Devonian) |
| 81 | Cape Cuvier 1 | core 14 | 449.9 | 452.3 | TOC and Rock-Eval | – | Gneudna Formation (Devonian) |
| 82 | Cape Cuvier 1 | core 15 | 453.5 | 453.8 | TOC | – | Gneudna Formation (Devonian) |
| 83 | Cape Cuvier 1 | core 16 | 455.4 | 457.2 | TOC | – | Gneudna Formation (Devonian) |
| 84 | Coburn 1 | core | 126.8 | – | TOC and Rock-Eval | – | Alinga Formation (Lower Cretaceous) |
| 85 | Coburn 1 | core | 163.7 | – | TOC and Rock-Eval | % Ro | Birdrong Sandstone (Lower Cretaceous) |
| 86 | Coburn 1 | core | 175.0 | – | TOC | – | Birdrong Sandstone (Lower Cretaceous) |
| 87 | Coburn 1 | core | 185.4 | 185.9 | TOC | AFTA | Birdrong Sandstone (Lower Cretaceous) |
| 88 | Coburn 1 | core | 200.4 | – | TOC | – | Kopke Sandstone (Early Devonian) |
| 89 | Coburn 1 | core | 272.3 | 272.7 | – | AFTA | Kopke Sandstone (Early Devonian) |
| 90 | Coburn 1 | core | 490.5 | – | TOC | – | Kopke Sandstone (Early Devonian) |
| 91 | Coburn 1 | core | 522.5 | – | TOC | – | Faure Formation (Early Devonian) |
| 92 | Coburn 1 | core | 536.6 | – | TOC | – | Faure Formation (Early Devonian) |
| 93 | Coburn 1 | core | 557.4 | – | TOC | – | Faure Formation (Early Devonian) |
| 94 | Coburn 1 | core | 588.5 | – | TOC | – | Faure Formation (Early Devonian) |
| 95 | Coburn 1 | core | 603.4 | – | TOC | – | Faure Formation (Early Devonian) |
| 96 | Coburn 1 | core | 606.2 | – | TOC, Rock-Eval, PGC, and GC | – | Faure Formation (Early Devonian) |
| 97 | Coburn 1 | core | 621.0 | – | TOC and Rock-Eval | % Ro | Faure Formation (Early Devonian) |
| 98 | Coburn 1 | core | 623.9 | – | TOC, Rock-Eval, PGC, and GC | % Ro | Faure Formation (Early Devonian) |
| 99 | Coburn 1 | core | 633.5 | – | TOC and Rock-Eval | – | Faure Formation (Early Devonian) |
| 99 | Coburn 1 | core | 640.1 | – | TOC | – | Faure Formation (Early Devonian) |
| 100 | Coburn 1 | core | 666.1 | – | TOC | – | Faure Formation (Early Devonian) |
| 101 | Coburn 1 | core | 674.5 | – | TOC | – | Faure Formation (Early Devonian) |
| 102 | Coburn 1 | core | 711.2 | – | TOC | – | Faure Formation (Early Devonian) |
| 103 | Coburn 1 | core | 726.8 | – | TOC | – | Faure Formation (Early Devonian) |
| 104 | Coburn 1 | core | 741.4 | – | TOC | – | Faure Formation (Early Devonian) |
| 105 | Coburn 1 | core | 750.5 | – | TOC | – | Faure Formation (Early Devonian) |
| 106 | Coburn 1 | core | 759.9 | – | TOC | – | Faure Formation (Early Devonian) |
| 107 | Coburn 1 | core | 781.0 | – | TOC and Rock-Eval | % Ro | Faure Formation (Early Devonian) |
| 108 | Coburn 1 | core | 796.6 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 109 | Coburn 1 | core | 812.8 | – | TOC and Rock-Eval | % Ro | Dirk Hartog Group (Silurian) |
| 110 | Coburn 1 | core | 818.9 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 111 | Coburn 1 | core | 820.1 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 112 | Coburn 1 | core | 820.9 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 113 | Coburn 1 | core | 832.1 | – | TOC and Rock-Eval | – | Dirk Hartog Group (Silurian) |
| 114 | Coburn 1 | core | 836.2 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 115 | Coburn 1 | core | 839.4 | – | TOC and Rock-Eval | – | Dirk Hartog Group (Silurian) |

## **Appendix 4** (continued)

| *Sample number* | *Well* | *Sample type* | *Depth (m) From* | *To* | *Source rock analysis* | *Maturity* | *Unit/age* |
|---|---|---|---|---|---|---|---|
| 116 | Coburn 1 | core | 843.5 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 117 | Coburn 1 | core | 853.2 | – | TOC and Rock-Eval | – | Dirk Hartog Group (Silurian) |
| 118 | Coburn 1 | core | 856.5 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 119 | Coburn 1 | core | 870.6 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 120 | Coburn 1 | core | 872.7 | – | TOC and Rock-Eval | – | Dirk Hartog Group (Silurian) |
| 121 | Coburn 1 | core | 876.0 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 122 | Coburn 1 | core | 879.2 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 123 | Coburn 1 | core | 879.8 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 124 | Coburn 1 | core | 887.3 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 125 | Coburn 1 | core | 896.9 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 126 | Coburn 1 | core | 910.2 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 127 | Coburn 1 | core | 916.0 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 128 | Coburn 1 | core | 925.8 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 129 | Coburn 1 | core | 936.3 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 130 | Coburn 1 | core | 936.4 | 937.0 | – | AFTA | Dirk Hartog Group (Silurian) |
| 131 | Coburn 1 | core | 958.3 | – | TOC and Rock-Eval | % Ro | Dirk Hartog Group (Silurian) |
| 132 | Coburn 1 | core | 974.7 | – | TOC | – | Tumblagooda Sandstone (Ordovician) |
| 133 | Coburn 1 | core | 976.2 | 976.9 | – | AFTA | Tumblagooda Sandstone (Ordovician) |
| 134 | CRAE GBH 1 | core | 272.7 | 272.8 | – | % Ro | ?Nannyarra Sandstone (Devonian) |
| 135 | CRAE GBH 1 | core | 309.3 | 309.5 | TOC and Rock-Eval | – | ?Nannyarra Sandstone (Devonian) |
| 136 | CRAE GBH 1 | core | 312.0 | 312.2 | TOC and Rock-Eval | – | ?Nannyarra Sandstone (Devonian) |
| 137 | CRAE GBH 1 | core | 344.2 | 344.4 | TOC and Rock-Eval | % Ro | ?Nannyarra Sandstone (Devonian) |
| 138 | CRAE GBH 1 | core | 354.2 | 354.6 | TOC and Rock-Eval | % Ro | ?Nannyarra Sandstone (Devonian) |
| 139 | CRAE GBH 2 | core | 220.0 | 220.1 | – | % Ro | – |
| 140 | CRAE GBH 2 | core | 289.6 | 289.8 | TOC | % Ro | Dirk Hartog Group (Silurian) |
| 141 | CRAE GBH 2 | core | 330.7 | 330.8 | TOC | % Ro | ?Ajana Formation (Silurian) |
| 142 | Dirk Hartog Group 17B | core 5 | 656.7 | – | TOC and Rock-Eval | % Ro | Muderong Shale (Lower Cretaceous) |
| 143 | Dirk Hartog Group 17B | core 12 | 882.1 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 144 | Dirk Hartog Group 17B | core 15 | 931.8 | – | TOC | – | Yaringa Formation (Silurian) |
| 145 | Dirk Hartog Group 17B | core 18 | 1 028.3 | – | TOC | – | Yaringa Formation (Silurian) |
| 146 | Dirk Hartog Group 17B | core 20 | 1 123.2 | – | TOC | % Ro | Yaringa Formation (Silurian) |
| 147 | Dirk Hartog Group 17B | core 21 | 1 167.6 | – | TOC | – | Yaringa Formation (Silurian) |
| 148 | Dirk Hartog Group 17B | core 22 | 1 212.9 | – | TOC | – | Yaringa Formation (Silurian) |
| 149 | Dirk Hartog Group 17B | core 23 | 1 258.8 | – | TOC and Rock-Eval | % Ro | Yaringa Formation (Silurian) |
| 150 | Dirk Hartog Group 17B | core 23 | 1 264.0 | – | TOC | – | Yaringa Formation (Silurian) |
| 151 | Dirk Hartog Group 17B | core 24 | 1 287.2 | – | TOC | – | Yaringa Formation (Silurian) |
| 152 | Dirk Hartog Group 17B | core 25 | 1 332.7 | – | TOC | – | Yaringa Formation (Silurian) |
| 153 | Dirk Hartog Group 17B | core 26 | 1 381.5 | – | TOC | – | Yaringa Formation (Silurian) |
| 154 | Grierson 3 | core 10 | 440.4 | – | TOC | – | ?Gneudna Formation (Devonian) |
| 155 | Kalbarri 1 | core 1 | 183.8 | – | TOC | % Ro | Ajana Formation (Silurian) |
| 156 | Marilla 1 | core 7 | 426.7 | 429.8 | TOC | – | – |
| 157 | Mooka 1 | core | 82.2 | – | TOC and Rock-Eval | % Ro | Birdrong Sandstone (Lower Cretaceous) |
| 158 | Mooka 1 | core | 89.4 | – | TOC and Rock-Eval | – | Birdrong Sandstone (Lower Cretaceous) |

## **Appendix 4** (continued)

| *Sample number* | *Well* | *Sample type* | *Depth (m) From* | *To* | *Source rock analysis* | *Maturity* | *Unit/age* |
|---|---|---|---|---|---|---|---|
| 159 | Mooka 1 | core | 92.2 | – | TOC | – | Birdrong Sandstone (Lower Cretaceous) |
| 160 | Mooka 1 | core | 188.5 | – | TOC | – | Faure Formation (Early Devonian) |
| 161 | Mooka 1 | core | 191.8 | – | TOC | – | Faure Formation (Early Devonian) |
| 162 | Mooka 1 | core | 194.8 | – | TOC | – | Faure Formation (Early Devonian) |
| 163 | Mooka 1 | core | 277.7 | – | TOC | – | Faure Formation (Early Devonian) |
| 164 | Mooka 1 | core | 306.3 | – | TOC and Rock-Eval | – | Dirk Hartog Group (Silurian) |
| 165 | Mooka 1 | core | 307.6 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 166 | Mooka 1 | core | 329.0 | – | TOC and Rock-Eval | – | Dirk Hartog Group (Silurian) |
| 167 | Mooka 1 | core | 339.0 | – | TOC and Rock-Eval | % Ro | Dirk Hartog Group (Silurian) |
| 168 | Mooka 1 | core | 356.6 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 169 | Mooka 1 | core | 407.7 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 170 | Pelican Hill 1 | core | 392.6 | 396.2 | TOC and Rock-Eval | % Ro | Gneudna Formation (Devonian) |
| 171 | Pelican Hill 1 | core | 516.9 | 532.2 | TOC | % Ro | Gneudna Formation (Devonian) |
| 172 | Pelican Hill 1 | core | 662.6 | 666.3 | TOC | % Ro | Gneudna Formation (Devonian) |
| 173 | Pelican Hill 1 | core | 773.0 | 775.7 | TOC | % Ro | Kopke Sandstone (Early Devonian) |
| 174 | Pendock 1 | core 3 | 1 168.0 | – | TOC | – | Gneudna Formation (Devonian) |
| 175 | Pendock 1 | core 3 | 1 170.0 | – | TOC | – | Gneudna Formation (Devonian) |
| 176 | Pendock 1 | core 5 | 1 722.8 | – | TOC and Rock-Eval | % Ro | Nannyarra Sandstone (Devonian) |
| 177 | Pendock 1 | core 6 | 2 187.9 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 178 | Pendock 1 | core 6 | 2 189.7 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 179 | Pendock 1 | core 6 | 2 191.5 | – | TOC and Rock-Eval | % Ro | Dirk Hartog Group (Silurian) |
| 180 | Pendock 1 | core 7 | 2 499.4 | – | TOC | – | – |
| 181 | Rough Range 1 | core 46 | 2 970.9 | 2 971.5 | TOC | – | ?Devonian–Carboniferous |
| 182 | Rough Range 1 | core 51 | 3 069.9 | 3 071.8 | TOC and Rock-Eval | – | ?Devonian–Carboniferous |
| 183 | Rough Range 1 | core 53 | 3 141.9 | 3 147.1 | TOC and Rock-Eval | % Ro | ?Devonian–Carboniferous |
| 184 | Rough Range 1 | core 56 | 3 329.0 | 3 329.9 | TOC and Rock-Eval | – | ?Devonian–Carboniferous |
| 185 | Rough Range 1 | core 59 | 3 599.1 | 3 602.4 | TOC and Rock-Eval | – | ?Devonian–Carboniferous |
| 186 | Rough Range 1 | core 62 | 3 846.3 | 3 848.4 | TOC | – | ?Devonian–Carboniferous |
| 187 | Rough Range 1 | core 63 | 3 940.5 | 3 941.7 | TOC | % Ro | ?Devonian–Carboniferous |
| 188 | Tamala 1 | core 2 | 523.5 | – | TOC and Rock-Eval | % Ro | Faure Formation (Early Devonian) |
| 189 | Tamala 1 | core 4 | 839.4 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 190 | Tamala 1 | core 5 | 957.9 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 191 | Tamala 1 | core 6 | 1 057.7 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 192 | Wandagee 1 | cuttings | 176.8 | 179.8 | – | % Ro | Birdrong Sandstone (Lower Cretaceous) |
| 193 | Wandagee 1 | cuttings | 185.9 | 189.0 | TOC | – | Gneudna Formation (Devonian) |
| 194 | Wandagee 1 | cuttings | 198.1 | 201.2 | – | % Ro | Gneudna Formation (Devonian) |
| 195 | Wandagee 1 | cuttings | 222.5 | 225.6 | TOC and Rock-Eval | – | Gneudna Formation (Devonian) |
| 196 | Wandagee 1 | cuttings | 253.0 | 256.0 | TOC | – | Gneudna Formation (Devonian) |
| 197 | Wandagee 1 | cuttings | 262.1 | 265.2 | TOC | – | Gneudna Formation (Devonian) |
| 198 | Wandagee 1 | cuttings | 274.3 | 277.4 | TOC | – | Gneudna Formation (Devonian) |
| 199 | Wandagee 1 | core 1 | 329.8 | – | TOC | % Ro | Nannyarra Sandstone (Devonian) |
| 200 | Wandagee 1 | core 4 | 599.5 | – | TOC | – | Dirk Hartog Group (Silurian) |
| 201 | Wandagee 1 | core 6 | 777.2 | – | TOC | % Ro | Dirk Hartog Group (Silurian) |

## Appendix 4 (continued)

| *Sample number* | *Well* | *Sample type* | *Depth (m) From* | *To* | *Source rock analysis* | *Maturity* | *Unit/age* |
|---|---|---|---|---|---|---|---|
| 202 | Yaringa 1 | core 2 | 192.0 | – | TOC and Rock-Eval | % Ro | Sweeney Mia Formation (Early Devonian) |
| 203 | Yaringa 1 | core 13 | 958.6 | – | TOC | % Ro | Dirk Hartog Group (Silurian) |
| 204 | Yaringa 1 | core 13 | 959.2 | – | TOC | – | Coburn Formation (Silurian) |
| 205 | Yaringa 1 | core 16 | 1 384.2 | – | TOC | – | Yaringa Formation (Silurian) |
| 206 | Yaringa 1 | core 16 | 1 386.2 | – | TOC | – | Yaringa Formation (Silurian) |
| 207 | Yaringa 1 | core 17 | 1 426.8 | – | TOC | – | Ajana Formation (Silurian) |
| 208 | Yaringa 1 | core 19 | 1 699.0 | – | TOC | – | Tumblagooda Sandstone (Ordovician) |
| 209 | Yaringa East 1 | cuttings | 174.0 | 177.0 | TOC and Rock-Eval | – | Birdrong Sandstone (Lower Cretaceous) |
| 210 | Yaringa East 1 | cuttings | 195.0 | 198.0 | TOC and Rock-Eval | % Ro | Birdrong Sandstone (Lower Cretaceous) |
| 211 | Yaringa East 1 | cuttings | 195.0 | 198.0 | TOC and Rock-Eval | – | Birdrong Sandstone (Lower Cretaceous) |
| 212 | Yaringa East 1 | core | 268.0 | 268.5 | – | AFTA | Sweeney Mia Formation (Early Devonian) |
| 213 | Yaringa East 1 | core | 377.8 | – | TOC | % Ro | Kopke Sandstone (Early Devonian) |
| 214 | Yaringa East 1 | core | 785.1 | – | TOC | – | Kopke Sandstone (Early Devonian) |
| 215 | Yaringa East 1 | core | 791.6 | – | TOC and Rock-Eval | % Ro | Kopke Sandstone (Early Devonian) |
| 216 | Yaringa East 1 | core | 799.4 | – | TOC and Rock-Eval | % Ro | Kopke Sandstone (Early Devonian) |
| 217 | Yaringa East 1 | core | 799.9 | – | TOC | – | Kopke Sandstone (Early Devonian) |
| 218 | Yaringa East 1 | core | 800.5 | – | TOC | – | Kopke Sandstone (Early Devonian) |
| 219 | Yaringa East 1 | core | 803.0 | – | TOC | – | Kopke Sandstone (Early Devonian) |
| 220 | Yaringa East 1 | core | 806.0 | – | TOC | – | Kopke Sandstone (Early Devonian) |
| 221 | Yaringa East 1 | core | 808.1 | – | TOC | % Ro | Kopke Sandstone (Early Devonian) |
| 222 | Yaringa East 1 | core | 816.8 | – | TOC | – | Kopke Sandstone (Early Devonian) |
| 223 | Outcrop | – | – | – | – | AFTA | Tumblagooda Sandstone (Ordovician) |
| **Merlinleigh Sub-basin** | | | | | | | |
| 224 | Aquitaine DDH 1 | core | 41.1 | – | TOC | – | Gneudna Formation (Devonian) |
| 225 | Aquitaine DDH 1 | core | 46.6 | – | TOC | – | Gneudna Formation (Devonian) |
| 226 | Aquitaine DDH 1 | core | 47.9 | – | TOC | – | Gneudna Formation (Devonian) |
| 227 | Aquitaine DDH 1 | core | 56.1 | – | TOC | – | Gneudna Formation (Devonian) |
| 228 | Aquitaine DDH 1 | core | 62.8 | – | TOC | – | Gneudna Formation (Devonian) |
| 229 | Aquitaine DDH 1 | core | 64.9 | – | TOC | – | Gneudna Formation (Devonian) |
| 230 | Aquitaine DDH 1 | core | 71.0 | – | TOC and Rock-Eval | – | Gneudna Formation (Devonian) |
| 231 | Aquitaine DDH 1 | core | 83.5 | – | TOC | – | Gneudna Formation (Devonian) |
| 232 | Aquitaine DDH 1 | core | 86.6 | – | TOC | – | Gneudna Formation (Devonian) |
| 233 | Aquitaine DDH 2 | core | 25.3 | – | TOC | – | Gneudna Formation (Devonian) |
| 234 | Aquitaine DDH 2 | core | 35.1 | – | TOC | – | Gneudna Formation (Devonian) |
| 235 | Aquitaine DDH 2 | core | 44.2 | – | TOC | – | Gneudna Formation (Devonian) |
| 236 | Aquitaine DDH 2 | core | 50.6 | – | TOC | – | Gneudna Formation (Devonian) |
| 237 | Aquitaine DDH 2 | core | 57.2 | – | TOC | – | Gneudna Formation (Devonian) |
| 238 | Aquitaine DDH 2 | core | 77.4 | – | TOC | – | Gneudna Formation (Devonian) |
| 239 | Aquitaine DDH 2 | core | 86.6 | – | TOC | – | Gneudna Formation (Devonian) |
| 240 | Aquitaine DDH 2 | core | 98.1 | – | TOC and Rock-Eval | – | Gneudna Formation (Devonian) |
| 241 | Aquitaine DDH 2 | core | 102.7 | – | TOC and Rock-Eval | – | Gneudna Formation (Devonian) |
| 242 | Aquitaine DDH 2 | core | 118.3 | – | TOC | – | Gneudna Formation (Devonian) |

**Appendix 4** (continued)

| *Sample number* | *Well* | *Sample type* | *Depth (m) From* | *To* | *Source rock analysis* | *Maturity* | *Unit/age* |
|---|---|---|---|---|---|---|---|
| 243 | Aquitaine DDH 2 | core | 131.1 | – | TOC | – | Gneudna Formation (Devonian) |
| 244 | Aquitaine DDH 2 | core | 141.4 | – | TOC | – | Gneudna Formation (Devonian) |
| 245 | Aquitaine DDH 2 | core | 155.8 | – | TOC | – | Gneudna Formation (Devonian) |
| 246 | Aquitaine DDH 2 | core | 160.3 | – | TOC | – | Gneudna Formation (Devonian) |
| 247 | Aquitaine DDH 2 | core | 171.3 | – | TOC | – | Gneudna Formation (Devonian) |
| 248 | Aquitaine DDH 2 | core | 177.4 | – | TOC | – | Gneudna Formation (Devonian) |
| 249 | Aquitaine DDH 2 | core | 179.8 | – | TOC | – | Gneudna Formation (Devonian) |
| 250 | Aquitaine DDH 4 | core | 34.1 | – | TOC | – | Gneudna Formation (Devonian) |
| 251 | Aquitaine DDH 4 | core | 40.2 | – | TOC | – | Gneudna Formation (Devonian) |
| 252 | Aquitaine DDH 4 | core | 56.7 | – | TOC and Rock-Eval | – | Gneudna Formation (Devonian) |
| 253 | Aquitaine DDH 4 | core | 58.8 | – | TOC | – | Gneudna Formation (Devonian) |
| 254 | Aquitaine DDH 4 | core | 89.3 | – | TOC | – | Gneudna Formation (Devonian) |
| 255 | Aquitaine DDH 4 | core | 99.1 | – | TOC | – | Gneudna Formation (Devonian) |
| 256 | Aquitaine DDH 4 | core | 104.2 | – | TOC | – | Gneudna Formation (Devonian) |
| 257 | Aquitaine DDH 4 | core | 117.0 | – | TOC and Rock-Eval | – | Gneudna Formation (Devonian) |
| 258 | Aquitaine DDH 4 | core | 131.1 | – | TOC | – | Gneudna Formation (Devonian) |
| 259 | Aquitaine DDH 4 | core | 132.9 | – | TOC | – | Gneudna Formation (Devonian) |
| 260 | Gneudna 1 | core | 27.2 | – | TOC | – | Munabia Formation (Devonian) |
| 261 | Gneudna 1 | core | 32.5 | – | TOC | – | Gneudna Formation (Devonian) |
| 262 | Gneudna 1 | core | 36.0 | – | TOC | – | Gneudna Formation (Devonian) |
| 263 | Gneudna 1 | core | 39.7 | – | TOC | – | Gneudna Formation (Devonian) |
| 264 | Gneudna 1 | core | 42.0 | – | TOC | – | Gneudna Formation (Devonian) |
| 265 | Gneudna 1 | core | 61.0 | – | TOC | – | Gneudna Formation (Devonian) |
| 266 | Gneudna 1 | core | 65.4 | – | TOC | % Ro | Gneudna Formation (Devonian) |
| 267 | Gneudna 1 | core | 68.9 | – | TOC | – | Gneudna Formation (Devonian) |
| 268 | Gneudna 1 | core | 76.2 | – | TOC | – | Gneudna Formation (Devonian) |
| 269 | Gneudna 1 | core | 81.0 | – | TOC | – | Gneudna Formation (Devonian) |
| 270 | Gneudna 1 | core | 92.4 | – | TOC | – | Gneudna Formation (Devonian) |
| 271 | Gneudna 1 | core | 97.6 | – | TOC | – | Gneudna Formation (Devonian) |
| 272 | Gneudna 1 | core | 102.1 | – | TOC | – | Gneudna Formation (Devonian) |
| 273 | Gneudna 1 | core | 107.4 | – | TOC | – | Gneudna Formation (Devonian) |
| 274 | Gneudna 1 | core | 117.2 | – | TOC, Rock-Eval, and PGC | – | Gneudna Formation (Devonian) |
| 275 | Gneudna 1 | core | 129.2 | – | TOC | – | Gneudna Formation (Devonian) |
| 276 | Gneudna 1 | core | 135.0 | – | TOC | – | Gneudna Formation (Devonian) |
| 277 | Gneudna 1 | core | 141.0 | – | TOC | – | Gneudna Formation (Devonian) |
| 278 | Gneudna 1 | core | 147.2 | – | TOC | – | Gneudna Formation (Devonian) |
| 279 | Gneudna 1 | core | 151.6 | – | TOC | – | Gneudna Formation (Devonian) |
| 280 | Gneudna 1 | core | 163.4 | – | TOC | % Ro | Gneudna Formation (Devonian) |
| 281 | Gneudna 1 | core | 180.2 | – | TOC | – | Gneudna Formation (Devonian) |
| 282 | Gneudna 1 | core | 183.7 | – | TOC | – | Gneudna Formation (Devonian) |
| 283 | Gneudna 1 | core | 193.2 | – | TOC | – | Gneudna Formation (Devonian) |
| 284 | Gneudna 1 | core | 195.6 | – | TOC | – | Gneudna Formation (Devonian) |
| 285 | Gneudna 1 | core | 209.6 | – | TOC | – | Gneudna Formation (Devonian) |

**Appendix 4** (continued)

| *Sample number* | *Well* | *Sample type* | *Depth (m) From* | *To* | *Source rock analysis* | *Maturity* | *Unit/age* |
|---|---|---|---|---|---|---|---|
| 286 | Gneudna 1 | core | 219.4 | – | TOC | – | Gneudna Formation (Devonian) |
| 287 | Gneudna 1 | core | 228.1 | – | TOC | – | Gneudna Formation (Devonian) |
| 288 | Gneudna 1 | core | 231.2 | – | TOC | – | Gneudna Formation (Devonian) |
| 289 | Gneudna 1 | core | 234.1 | – | TOC | – | Gneudna Formation (Devonian) |
| 290 | Gneudna 1 | core | 239.0 | – | TOC | – | Gneudna Formation (Devonian) |
| 291 | Gneudna 1 | core | 243.5 | – | TOC | – | Gneudna Formation (Devonian) |
| 292 | Gneudna 1 | core | 254.7 | – | TOC | – | Gneudna Formation (Devonian) |
| 293 | Gneudna 1 | core | 260.5 | – | TOC, Rock-Eval, and PGC | – | Gneudna Formation (Devonian) |
| 294 | Gneudna 1 | core | 264.0 | – | TOC, Rock-Eval, and PGC | % Ro | Gneudna Formation (Devonian) |
| 295 | Gneudna 1 | core | 270.2 | – | TOC, Rock-Eval, and PGC | – | Gneudna Formation (Devonian) |
| 296 | Gneudna 1 | core | 275.5 | – | TOC | – | Gneudna Formation (Devonian) |
| 297 | Gneudna 1 | core | 280.5 | – | TOC | – | Gneudna Formation (Devonian) |
| 298 | Gneudna 1 | core | 285.2 | – | TOC, Rock-Eval, and PGC | – | Gneudna Formation (Devonian) |
| 299 | Gneudna 1 | core | 289.0 | – | TOC, Rock-Eval, and PGC | – | Gneudna Formation (Devonian) |
| 300 | Gneudna 1 | core | 295.0 | – | TOC | – | Gneudna Formation (Devonian) |
| 301 | Gneudna 1 | core | 300.4 | – | TOC, Rock-Eval, and PGC | – | Gneudna Formation (Devonian) |
| 302 | Gneudna 1 | core | 306.1 | – | TOC | – | Gneudna Formation (Devonian) |
| 303 | Gneudna 1 | core | 309.8 | – | TOC | – | Gneudna Formation (Devonian) |
| 304 | Gneudna 1 | core | 315.6 | – | TOC, Rock-Eval, and PGC | – | Gneudna Formation (Devonian) |
| 305 | Gneudna 1 | core | 321.3 | – | TOC | – | Gneudna Formation (Devonian) |
| 306 | Gneudna 1 | core | 325.6 | – | TOC | – | Gneudna Formation (Devonian) |
| 307 | Gneudna 1 | core | 332.0 | – | TOC | – | Gneudna Formation (Devonian) |
| 308 | Gneudna 1 | core | 337.5 | – | TOC, Rock-Eval, and PGC | – | Gneudna Formation (Devonian) |
| 309 | Gneudna 1 | core | 342.2 | – | TOC | – | Gneudna Formation (Devonian) |
| 310 | Gneudna 1 | core | 352.9 | – | TOC | – | Gneudna Formation (Devonian) |
| 311 | Gneudna 1 | core | 358.7 | – | TOC | – | Gneudna Formation (Devonian) |
| 312 | Gneudna 1 | core | 364.2 | – | TOC | % Ro | Gneudna Formation (Devonian) |
| 313 | Gneudna 1 | core | 369.8 | – | TOC | – | Gneudna Formation (Devonian) |
| 314 | Gneudna 1 | core | 375.5 | – | TOC | – | Gneudna Formation (Devonian) |
| 315 | Gneudna 1 | core | 381.5 | – | TOC | – | Gneudna Formation (Devonian) |
| 316 | Gneudna 1 | core | 388.7 | – | TOC | – | Nannyarra Sandstone (Devonian) |
| 317 | Gneudna 1 | core | 465.8 | – | TOC | % Ro | Nannyarra Sandstone (Devonian) |
| 318 | Quail 1 | core 1 | 154.2 | 158.8 | – | % Ro | Wooramel Group (Permian) |
| 319 | Quail 1 | core 2 | 218.8 | 224.3 | – | AFTA | Wooramel Group (Permian) |
| 320 | Quail 1 | core 4 | 544.1 | 546.5 | – | % Ro | Callytharra Formation (Permian) |
| 321 | Quail 1 | core 5 | 711.1 | 713.5 | – | % Ro | Lyons Group (Permian) |
| 322 | Quail 1 | core 6 | 1 061.9 | 1 063.4 | – | AFTA | Lyons Group (Permian) |
| 323 | Quail 1 | core 7 | 1 430.4 | 1 432.3 | – | % Ro | Lyons Group (Permian) |
| 324 | Quail 1 | core 11 | 1 995.5 | 1 996.4 | – | AFTA | Lyons Group (Permian) |
| 324 | Quail 1 | core 12 | 2 230.8 | 2 231.4 | – | AFTA | Quail Formation (Early Carboniferous) |
| 325 | Quail 1 | core 13 | 2 468.3 | 2 470.4 | – | % Ro | Yindagindy Formation (Early Carboniferous) |
| 326 | Quail 1 | core 16 | 2 969.1 | 2 972.1 | – | % Ro | Gneudna Formation (Devonian) |

## Appendix 4 (continued)

| *Sample number* | *Well* | *Sample type* | *Depth (m) From* | *To* | *Source rock analysis* | *Maturity* | *Unit/age* |
|---|---|---|---|---|---|---|---|
| 327 | Quail 1 | core 19 | 3 401.6 | 3 403.7 | – | % Ro | Ajana Formation (Silurian) |
| 328 | Uranerz CDH 4 | core | 22.9 | – | TOC and Rock-Eval | – | Gneudna Formation (Devonian) |
| 329 | Uranerz CDH 4 | core | 33.2 | – | TOC and Rock-Eval | – | Gneudna Formation (Devonian) |
| 330 | Uranerz CDH 5 | core | 50.6 | – | TOC | – | Gneudna Formation (Devonian) |
| 331 | Uranerz CDH 5 | core | 58.2 | – | TOC and Rock-Eval | – | Gneudna Formation (Devonian) |
| 332 | Uranerz CDH 5 | core | 72.7 | – | TOC | – | Gneudna Formation (Devonian) |
| 333 | Uranerz CDH 8 | core | 112.2 | – | TOC, Rock-Eval, and PGC | – | Gneudna Formation (Devonian) |
| 334 | Uranerz CDH 8 | core | 121.0 | – | TOC, Rock-Eval, and PGC | – | Gneudna Formation (Devonian) |

**NOTES:**
Ext.: extraction
TOC: total organic carbon
PGC: pyrolysis gas chromatography
AFTA: apatite fission-track analysis
% Ro: vitrinite reflectance

## Appendix 5

# TOC and Rock-Eval pyrolysis data

| *Wells* | *Depth (m)* *From* | *To* | *Sample type* | *TOC (%)* | $T_{max}$ (°C) | $S_1$ (mg/g rock) | $S_2$ (mg/g rock) | $S_3$ (mg/g rock) | $S_1 + S_2$ (mg/g rock) | *PI* | *HI* | *OI* | *Formation* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Coolcalalaya Sub–basin** | | | | | | | | | | | | | |
| CRAE YCH 1 | 185.2 | – | core | 0.82 | 477 | 0.24 | 0.31 | 0.64 | 0.55 | 0.44 | 38 | 78 | Upper Devonian |
| CRAE YURC 3 | 44.0 | – | core | 0.24 | – | – | – | – | – | – | – | – | Lower Carboniferous |
| CRAE YURC 3 | 80.0 | – | core | 0.05 | – | – | – | – | – | – | – | – | Lower Carboniferous |
| CRAE YURC 3 | 183.0 | – | core | 0.11 | – | – | – | – | – | – | – | – | Lower Carboniferous |
| CRAE YURC 3 | 233.4 | – | core | 0.07 | – | – | – | – | – | – | – | – | Lower Carboniferous |
| CRAE YURC 3 | 264.4 | – | core | 0.07 | – | – | – | – | – | – | – | – | Lower Carboniferous |
| **Gascoyne Platform** | | | | | | | | | | | | | |
| Barrabiddy 1 | 70.8 | – | core | 3.18 | 423 | 0.30 | 3.79 | 1.05 | 4.09 | 0.07 | 119 | 33 | Gearle Siltstone |
| Barrabiddy 1 | 115.4 | – | core | 2.91 | 423 | 0.21 | 6.67 | 0.86 | 6.88 | 0.03 | 229 | 30 | Windalia Radiolarite |
| Barrabiddy 1 | 186.0 | – | core | 1.93 | 423 | 0.29 | 2.40 | 0.47 | 2.69 | 0.11 | 124 | 24 | Muderong Shale |
| Barrabiddy 1 | 192.9 | – | core | 0.47 | – | – | – | – | – | – | – | – | Munabia Formation |
| Barrabiddy 1 | 201.5 | – | core | 1.24 | 433 | 0.08 | 0.93 | 0.10 | 1.01 | 0.08 | 75 | 8 | Munabia Formation |
| Barrabiddy 1 | 217.6 | – | core | 0.92 | 431 | 0.07 | 0.98 | 0.01 | 1.05 | 0.07 | 107 | 1 | Munabia Formation |
| Barrabiddy 1A | 190.4 | – | core | 1.77 | 423 | 0.22 | 1.87 | 0.35 | 2.09 | 0.11 | 106 | 20 | Birdrong Sandstone |
| Barrabiddy 1A | 197.6 | – | core | 0.59 | 429 | 0.05 | 0.44 | 0.04 | 0.49 | 0.10 | 75 | 7 | Munabia Formation |
| Barrabiddy 1A | 213.7 | – | core | 0.22 | – | – | – | – | – | – | – | – | Munabia Formation |
| Barrabiddy 1A | 218.5 | – | core | 0.96 | 431 | 0.08 | 1.10 | 0.04 | 1.18 | 0.07 | 115 | 4 | Munabia Formation |
| Barrabiddy 1A | 224.9 | – | core | 0.53 | 429 | 0.08 | 0.53 | 0.01 | 0.61 | 0.13 | 100 | 2 | Munabia Formation |
| Barrabiddy 1A | 227.6 | – | core | 0.31 | – | – | – | – | – | – | – | – | Munabia Formation |
| Barrabiddy 1A | 264.0 | – | core | 0.23 | – | – | – | – | – | – | – | – | Munabia Formation |
| Barrabiddy 1A | 268.4 | – | core | 0.21 | – | – | – | – | – | – | – | – | Munabia Formation |
| Barrabiddy 1A | 610.6 | – | core | 0.17 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Barrabiddy 1A | 616.6 | – | core | 0.14 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Barrabiddy 1A | 619.5 | – | core | 0.15 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Barrabiddy 1A | 627.7 | – | core | 0.36 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Barrabiddy 1A | 628.8 | – | core | 0.19 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Barrabiddy 1A | 640.2 | – | core | 0.17 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Barrabiddy 1A | 643.0 | – | core | 0.20 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Barrabiddy 1A | 649.5 | – | core | 0.24 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Barrabiddy 1A | 655.4 | – | core | 9.88 | 444 | 3.27 | 19.53 | 0.18 | 22.80 | 0.14 | 198 | 2 | Gneudna Formation |
| Barrabiddy 1A | 656.3 | – | core | 1.02 | 437 | 0.11 | 0.97 | 0.20 | 1.08 | 0.10 | 95 | 20 | Gneudna Formation |
| Barrabiddy 1A | 662.5 | – | core | 0.88 | 443 | 0.22 | 0.83 | 0.19 | 1.05 | 0.21 | 94 | 22 | Gneudna Formation |
| Barrabiddy 1A | 663.8 | – | core | 2.27 | 443 | 0.59 | 2.35 | 0.22 | 2.94 | 0.20 | 104 | 10 | Gneudna Formation |
| Barrabiddy 1A | 678.2 | – | core | 5.22 | 444 | 1.66 | 10.78 | 0.33 | 12.44 | 0.13 | 207 | 6 | Gneudna Formation |
| Barrabiddy 1A | 679.2 | – | core | 13.56 | 443 | 3.93 | 36.16 | 0.70 | 40.09 | 0.10 | 267 | 5 | Gneudna Formation |
| Barrabiddy 1A | 682.6 | – | core | 1.20 | 444 | 0.31 | 1.57 | 0.36 | 1.88 | 0.16 | 131 | 30 | Gneudna Formation |
| Barrabiddy 1A | 685.0 | – | core | 0.14 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Barrabiddy 1A | 686.2 | – | core | 0.35 | – | – | – | – | – | – | – | – | Gneudna Formation |

## Appendix 5 (continued)

| Wells | Depth (m) From | Depth (m) To | Sample type | TOC (%) | $T_{max}$ (°C) | $S_1$ (mg/g rock) | $S_2$ (mg/g rock) | $S_3$ (mg/g rock) | $S_1 + S_2$ (mg/g rock) | PI | HI | OI | Formation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Barrabiddy 1A | 700.2 | – | core | 0.38 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Barrabiddy 1A | 702.5 | – | core | 0.37 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Barrabiddy 1A | 705.5 | – | core | 7.53 | 446 | 2.58 | 14.58 | 0.65 | 17.16 | 0.15 | 194 | 9 | Gneudna Formation |
| Barrabiddy 1A | 709.7 | – | core | 0.20 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Barrabiddy 1A | 713.4 | – | core | 5.78 | 448 | 1.84 | 9.01 | 0.41 | 10.85 | 0.17 | 156 | 7 | Gneudna Formation |
| Barrabiddy 1A | 726.5 | – | core | 1.12 | 444 | 0.17 | 1.31 | 0.41 | 1.48 | 0.11 | 117 | 37 | Gneudna Formation |
| Barrabiddy 1A | 736.4 | – | core | 0.47 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Barrabiddy 1A | 755.4 | – | core | 0.16 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Barrabiddy 1A | 766.6 | – | core | | – | – | – | – | – | – | – | – | Gneudna Formation |
| Barrabiddy 1A | 766.6 | – | core | 0.23 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Barrabiddy 1A | 769.7 | – | core | 0.44 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Barrabiddy 1A | 775.2 | – | core | 0.23 | – | – | – | – | – | – | – | – | Gneudna Formation |
| BHP ND 001 | 178.7 | – | core | 0.75 | 422 | 0.1 | 0.84 | 0.64 | 0.94 | 0.11 | 112 | 85 | Dirk Hartog Group |
| BHP ND 001 | 180.9 | – | core | 0.22 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| BHP ND 001 | 186.7 | – | core | 0.26 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| BHP ND 001 | 188.0 | – | core | 0.39 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| BHP ND 001 | 191.9 | – | core | 0.70 | 411 | 0.16 | 1.23 | 0.21 | 1.39 | 0.12 | 176 | 30 | Dirk Hartog Group |
| BHP ND 001 | 200.7 | – | core | 0.93 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| BHP ND 001 | 201.3 | – | core | 0.12 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| BHP ND 001 | 220.3 | – | core | 0.71 | 416 | 0.17 | 0.99 | 0.23 | 1.16 | 0.15 | 139 | 32 | Dirk Hartog Group |
| BHP ND 001 | 225.2 | – | core | 0.15 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| BHP ND 001 | 242.4 | – | core | 0.14 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| BHP ND 001 | 252.8 | – | core | 0.08 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| BHP ND 001 | 270.9 | – | core | 0.20 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| BHP ND 002 | 209.4 | – | core | 0.49 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| BHP ND 002 | 221.0 | – | core | 0.32 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| BHP ND 002 | 236.4 | – | core | 0.23 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| BHP ND 002 | 244.7 | – | core | 0.14 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| BHP ND 002 | 280.2 | – | core | 0.11 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| BHP ND 002 | 290.3 | – | core | 0.15 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| BHP ND 002 | 301.8 | – | core | 0.48 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| BHP ND 002 | 306.8 | – | core | 0.11 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| BHP ND 002 | 325.7 | – | core | 0.19 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| BHP ND 002 | 329.5 | – | core | 0.14 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| BHP ND 002 | 354.8 | – | core | 0.11 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| BHP ND 002 | 376.0 | – | core | 0.08 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| BHP ND 002 | 396.1 | – | core | 0.05 | – | – | – | – | – | – | – | – | Tumblagooda Sandstone |
| Brickhouse 1 | 356.9 | 404.8 | core | 0.59 | 386 | 0.12 | 0.14 | 0.93 | 0.26 | 0.46 | 24 | 158 | Cretaceous |
| Brickhouse 1 | 424.0 | 445.6 | core | 0.05 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Brickhouse 1 | 445.9 | 465.4 | core | 0.11 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Brickhouse 1 | 468.5 | 470.3 | core | 0.05 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Brickhouse 1 | 470.3 | – | core | 0.05 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Brickhouse 1 | 470.3 | 584.3 | core | 0.07 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Brickhouse 1 | 772.7 | – | core | 0.08 | – | – | – | – | – | – | – | – | Tumblagooda Sandstone |

## **Appendix 5** (continued)

| Wells | Depth (m) From | To | Sample type | TOC (%) | $T_{max}$ (°C) | $S_1$ (mg/g rock) | $S_2$ (mg/g rock) | $S_3$ (mg/g rock) | $S_1 + S_2$ (mg/g rock) | PI | HI | OI | Formation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Brickhouse 1 | 772.7 | 792.8 | core | 2.12 | 417 | 0.21 | 1.06 | 1.70 | 1.27 | 0.17 | 50 | 80 | Tumblagooda Sandstone |
| Cape Cuvier 1 | 335.3 | – | core 9 | 1.90 | 428 | 0.34 | 1.70 | 1.01 | 2.04 | 0.17 | 89 | 53 | Gneudna Formation |
| Cape Cuvier 1 | 430.1 | – | core 12 | 0.37 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Cape Cuvier 1 | 448.4 | 449.9 | core 13 | 0.16 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Cape Cuvier 1 | 449.9 | 452.3 | core 14 | 0.53 | 431 | 0.22 | 0.71 | 0.42 | 0.93 | 0.24 | 134 | 79 | Gneudna Formation |
| Cape Cuvier 1 | 453.5 | 453.8 | core 15 | 0.29 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Cape Cuvier 1 | 455.4 | 457.2 | core 16 | 0.27 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Coburn 1 | 126.8 | – | core | 2.08 | 423 | 0.06 | 0.88 | 0.64 | 0.94 | 0.06 | 42 | 31 | Alinga Formation |
| Coburn 1 | 163.7 | – | core | 1.68 | 425 | 0.27 | 3.91 | 0.43 | 4.18 | 0.06 | 233 | 26 | Muderong Shale |
| Coburn 1 | 175.0 | – | core | 0.17 | – | – | – | – | – | – | – | – | Birdrong Sandstone |
| Coburn 1 | 200.4 | – | core | 0.15 | – | – | – | – | – | – | – | – | Kopke Sandstone |
| Coburn 1 | 490.5 | – | core | 0.02 | – | – | – | – | – | – | – | – | Kopke Sandstone |
| Coburn 1 | 522.5 | – | core | 0.08 | – | – | – | – | – | – | – | – | Faure Formation |
| Coburn 1 | 536.6 | – | core | 0.07 | – | – | – | – | – | – | – | – | Faure Formation |
| Coburn 1 | 557.4 | – | core | 0.24 | – | – | – | – | – | – | – | – | Faure Formation |
| Coburn 1 | 588.5 | – | core | 0.14 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 603.4 | – | core | 0.15 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 606.2 | – | core | 1.23 | 426.00 | 0.86 | 4.23 | 0.67 | 5.09 | 0.17 | 344 | 54 | Dirk Hartog Group |
| Coburn 1 | 621.0 | – | core | 0.41 | 418 | 0.22 | 0.95 | 0.58 | 1.17 | 0.19 | 232 | 141 | Dirk Hartog Group |
| Coburn 1 | 623.9 | – | core | 2.06 | 424.00 | 0.86 | 5.43 | 0.08 | 6.29 | 0.14 | 264 | 4 | Dirk Hartog Group |
| Coburn 1 | 633.5 | – | core | 0.51 | 427.00 | 0.29 | 1.36 | 1.59 | 1.65 | 0.18 | 267 | 312 | Dirk Hartog Group |
| Coburn 1 | 640.1 | – | core | 0.10 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 666.1 | – | core | 0.14 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 674.5 | – | core | 0.14 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 711.2 | – | core | 0.23 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 726.8 | – | core | 0.32 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 741.4 | – | core | 0.46 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 750.5 | – | core | 0.23 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 759.9 | – | core | 0.17 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 781.0 | – | core | 0.36 | 405 | 0.10 | 0.50 | 1.36 | 0.60 | 0.17 | 139 | 378 | Dirk Hartog Group |
| Coburn 1 | 796.6 | – | core | 0.16 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 812.8 | – | core | 0.48 | 430 | 0.09 | 0.68 | 1.08 | 0.77 | 0.12 | 142 | 225 | Dirk Hartog Group |
| Coburn 1 | 818.9 | – | core | 0.19 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 820.1 | – | core | 0.33 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 820.9 | – | core | 0.36 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 832.1 | – | core | 0.42 | 428 | 0.11 | 0.82 | 0.41 | 0.93 | 0.12 | 195 | 98 | Dirk Hartog Group |
| Coburn 1 | 836.2 | – | core | 0.45 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 839.4 | – | core | 0.53 | 429.00 | 0.19 | 1.05 | 1.19 | 1.24 | 0.15 | 198 | 225 | Dirk Hartog Group |
| Coburn 1 | 843.5 | – | core | 0.24 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 853.2 | – | core | 0.59 | 433.00 | 0.26 | 1.30 | 1.03 | 1.56 | 0.17 | 220 | 175 | Dirk Hartog Group |
| Coburn 1 | 856.5 | – | core | 0.13 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 870.6 | – | core | 0.16 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 872.7 | – | core | 0.51 | 432.00 | 0.15 | 0.80 | 0.89 | 0.95 | 0.16 | 157 | 175 | Dirk Hartog Group |
| Coburn 1 | 876.0 | – | core | 0.16 | – | – | – | – | – | – | – | – | Dirk Hartog Group |

## Appendix 5 (continued)

| Wells | Depth (m) From | To | Sample type | TOC (%) | $T_{max}$ (°C) | $S_1$ (mg/g rock) | $S_2$ (mg/g rock) | $S_3$ (mg/g rock) | $S_1 + S_2$ (mg/g rock) | PI | HI | OI | Formation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Coburn 1 | 879.2 | – | core | 0.20 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 879.8 | – | core | 0.43 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 887.3 | – | core | 0.16 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 896.9 | – | core | 0.15 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 910.2 | – | core | 0.20 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 916.0 | – | core | 0.06 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 925.8 | – | core | 0.10 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 936.3 | – | core | 0.13 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Coburn 1 | 958.3 | – | core | 0.22 | 395 | 0.04 | 0.19 | 0.65 | 0.23 | 0.17 | 86 | 295 | Dirk Hartog Group |
| Coburn 1 | 974.7 | – | core | 0.03 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| CRAE GBH 1 | 309.3 | 309.5 | core | 0.51 | 436 | 0.06 | 0.49 | 0.26 | 0.55 | 0.11 | 96 | 51 | Kopke Sandstone |
| CRAE GBH 1 | 312.0 | 312.2 | core | 0.60 | 434 | 0.07 | 0.80 | 0.31 | 0.87 | 0.08 | 133 | 52 | Kopke Sandstone |
| CRAE GBH 1 | 344.2 | 344.4 | core | 1.76 |  | 0.08 | 0.17 | 0.57 | 0.25 | 0.32 | 10 | 32 | Kopke Sandstone |
| CRAE GBH 1 | 354.2 | 354.6 | core | 0.65 | 424 | 0.07 | 0.37 | 0.32 | 0.44 | 0.16 | 57 | 49 | Kopke Sandstone |
| CRAE GBH 2 | 289.6 | 289.8 | core | 0.17 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| CRAE GBH 2 | 330.7 | 330.8 | core | 0.32 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Dirk Hartog 17B | 664.5 | 670.0 | core 6 | 0.07 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Dirk Hartog 17B | 732.1 | 737.6 | core 9 | 0.06 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Dirk Hartog 17B | 768.1 | 769.6 | core 10 | 0.06 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Dirk Hartog 17B | 804.7 | 807.7 | core 11 | 0.06 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Dirk Hartog 17B | 819.0 | 823.3 | core 12 | 0.07 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Dirk Hartog 17B | 929.6 | 932.1 | core 13 | 0.17 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Dirk Hartog 17B | 1 008.0 | 1 008.4 | core 17 | 0.07 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Dirk Hartog 17B | 1 028.1 | 1 033.6 | core 18 | 0.19 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Dirk Hartog 17B | 1 073.5 | 1 078.4 | core 19 | 0.35 | 433 | 0.15 | 0.21 | 0.92 | 0.36 | 0.42 | 60 | 263 | Dirk Hartog Group |
| Dirk Hartog 17B | 1 167.1 | 1 172.3 | core 21 | 0.01 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Dirk Hartog 17B | 1 212.8 | 1 216.8 | core 22 | 0.36 | 451 | 0.16 | 0.31 | 0.16 | 0.47 | 0.34 | 86 | 44 | Dirk Hartog Group |
| Dirk Hartog 17B | 1 212.8 | 1 216.8 | core 22 | 0.19 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Dirk Hartog 17B | 1 258.5 | 1 264.0 | core 23 | 0.17 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Dirk Hartog 17B | 1 285.3 | 1 290.8 | core 24 | 0.14 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Dirk Hartog 17B | 1 332.3 | 1 336.9 | core 25 | 0.09 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Dirk Hartog 17B | 1 380.7 | 1 385.6 | core 26 | 0.23 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Dirk Hartog 17B | 656.7 | – | core 5 | 3.23 | 425 | 0.44 | 7.46 | 1.61 | 7.90 | 0.06 | 231 | 50 | Dirk Hartog Group |
| Dirk Hartog 17B | 882.1 | – | core 12 | 0.07 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Dirk Hartog 17B | 931.8 | – | core 15 | 0.10 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Dirk Hartog 17B | 1 028.3 | – | core 18 | 0.13 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Dirk Hartog 17B | 1 123.2 | – | core 20 | 0.33 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Dirk Hartog 17B | 1 167.6 | – | core 21 | 0.23 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Dirk Hartog 17B | 1 212.9 | – | core 22 | 0.27 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Dirk Hartog 17B | 1 258.8 | – | core 23 | 0.89 | 421 | 0.22 | 0.76 | 0.36 | 0.98 | 0.22 | 85 | 40 | Dirk Hartog Group |
| Dirk Hartog 17B | 1 264.0 | – | core 23 | 0.16 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Dirk Hartog 17B | 1 287.2 | – | core 24 | 0.23 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Dirk Hartog 17B | 1 332.7 | – | core 25 | 0.11 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Dirk Hartog 17B | 1 381.5 | – | core 26 | 0.05 | – | – | – | – | – | – | – | – | Dirk Hartog Group |

## Appendix 5 (continued)

| Wells | Depth (m) From | Depth (m) To | Sample type | TOC (%) | $T_{max}$ (°C) | $S_1$ (mg/g rock) | $S_2$ (mg/g rock) | $S_3$ (mg/g rock) | $S_1 + S_2$ (mg/g rock) | PI | HI | OI | Formation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gascoyne River 1 | 115.8 | – | cuttings | 0.12 | – | – | – | – | – | – | – | – | Cretaceous |
| Gascoyne River 1 | 118.9 | – | cuttings | 0.09 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gascoyne River 1 | 121.9 | – | cuttings | 0.21 | 327 | 0.05 | 0.05 | 0.50 | 0.10 | 0.50 | 24 | 238 | Gneudna Formation |
| Gascoyne River 1 | 184.4 | – | cuttings | 0.08 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Grierson 3 | 440.4 | – | core 10 | 0.04 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Marilla 1 | 426.7 | 429.8 | core 7 | 0.02 | – | – | – | – | – | – | – | – | Devonian–Carboniferous |
| Mooka 1 | 82.2 | – | core | 1.17 | 430 | 0.14 | 1.43 | 0.38 | 1.57 | 0.09 | 122 | 32 | Muderong Shale |
| Mooka 1 | 89.4 | – | core | 0.46 | 419 | 0.11 | 0.24 | 0.41 | 0.35 | 0.31 | 52 | 89 | Birdrong Sandstone |
| Mooka 1 | 92.2 | – | core | 0.13 | – | – | – | – | – | – | – | – | Birdrong Sandstone |
| Mooka 1 | 188.5 | – | core | 0.07 | – | – | – | – | – | – | – | – | Faure Formation |
| Mooka 1 | 191.8 | – | core | 0.27 | – | – | – | – | – | – | – | – | Faure Formation |
| Mooka 1 | 194.8 | – | core | 0.34 | – | – | – | – | – | – | – | – | Faure Formation |
| Mooka 1 | 277.7 | – | core | 0.02 | – | – | – | – | – | – | – | – | Faure Formation |
| Mooka 1 | 306.3 | – | core | 1.03 | 416 | 0.11 | 0.42 | 0.44 | 0.53 | 0.21 | 41 | 43 | Dirk Hartog Group |
| Mooka 1 | 307.6 | – | core | 0.16 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Mooka 1 | 329.0 | – | core | 0.53 | 410 | 0.07 | 0.63 | 0.46 | 0.70 | 0.10 | 119 | 87 | Dirk Hartog Group |
| Mooka 1 | 339.0 | – | core | 0.61 | 414 | 0.09 | 1.25 | 0.38 | 1.34 | 0.07 | 205 | 62 | Dirk Hartog Group |
| Mooka 1 | 356.6 | – | core | 0.26 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Mooka 1 | 407.7 | – | core | 0.09 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Pelican Hill 1 | 392.6 | 396.2 | core | 1.09 | 421 | 0.17 | 2.02 | 0.82 | 2.19 | 0.08 | 185 | 75 | Cretaceous |
| Pelican Hill 1 | 516.9 | 532.2 | core | 0.38 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Pelican Hill 1 | 662.6 | 666.3 | core | 0.21 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Pelican Hill 1 | 773.0 | 775.7 | core | 0.06 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Pelican Hill 1 | 486.5 | 501.7 | core | 0.16 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Pelican Hill 1 | 516.9 | 532.2 | core | 0.34 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Pelican Hill 1 | 624.8 | 640.1 | core | 0.35 | 419 | 0.08 | 0.25 | 0.85 | 0.33 | 0.24 | 71 | 243 | Gneudna Formation |
| Pelican Hill 1 | 662.6 | 666.3 | core | 0.23 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Pelican Hill 1 | 773.0 | 775.7 | core | 0.14 | – | – | – | – | – | – | – | – | Tumblagooda Sandstone |
| Pendock 1 | 1 045.4 | – | core 2 | 0.22 | 434 | – | – | – | – | – | – | – | Gneudna Formation |
| Pendock 1 | 1 045.9 | – | core 2 | 0.20 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Pendock 1 | 1 127.8 | 1 133.9 | DC | 0.40 | 433 | 0.34 | 0.57 | 0.64 | 0.91 | 0.37 | 143 | 160 | Gneudna Formation |
| Pendock 1 | 1 168.0 | – | core 3 | 0.28 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Pendock 1 | 1 168.1 | – | – | 0.28 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Pendock 1 | 1 168.5 | – | core 3 | 0.36 | – | 0.06 | 0.35 | 0.30 | 0.41 | 0.15 | 97 | 83 | Gneudna Formation |
| Pendock 1 | 1 169.8 | – | core 3 | 0.20 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Pendock 1 | 1 170.3 | – | – | 0.15 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Pendock 1 | 1 249.7 | 1 252.7 | DC | 0.12 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Pendock 1 | 1 410.0 | – | core 4 | 0.11 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Pendock 1 | 1 411.5 | – | – | 0.28 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Pendock 1 | 1 484.4 | 1 487.4 | – | 0.15 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Pendock 1 | 1 508.8 | 1 511.8 | – | 0.20 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Pendock 1 | 1 527.0 | 1 530.1 | – | 0.18 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Pendock 1 | 1 551.4 | 1 554.5 | – | 0.13 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Pendock 1 | 1 633.7 | 1 636.8 | DC | 0.24 | – | – | – | – | – | – | – | – | Gneudna Formation |

## Appendix 5 (continued)

| Wells | Depth (m) From | To | Sample type | TOC (%) | $T_{max}$ (°C) | $S_1$ (mg/g rock) | $S_2$ (mg/g rock) | $S_3$ (mg/g rock) | $S_1 + S_2$ (mg/g rock) | PI | HI | OI | Formation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pendock 1 | 1 679.4 | 1 682.5 | DC | 0.36 | 437 | 0.19 | 0.83 | 0.73 | 1.02 | 0.19 | 231 | 203 | Nannyarra Sandstone |
| Pendock 1 | 1 679.4 | 1 682.5 | DC | 0.17 | – | – | – | – | – | – | – | – | Nannyarra Sandstone |
| Pendock 1 | 1 722.5 | – | core 5 | 0.97 | 440 | 0.49 | 2.49 | 0.11 | 2.98 | 0.16 | 257 | 11 | Faure Formation |
| Pendock 1 | 1 722.8 | – | – | 1.93 | 429 | 0.41 | 4.09 | 0.25 | 4.50 | 0.09 | 212 | 13 | Faure Formation |
| Pendock 1 | 1 723.1 | – | core 5 | 0.47 | 429 | 0.06 | 0.48 | 0.26 | 0.54 | 0.11 | 102 | 55 | Faure Formation |
| Pendock 1 | 2 057.4 | 2 060.4 | DC | 0.22 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Pendock 1 | 2 161.0 | 2 164.1 | DC | 0.13 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Pendock 1 | 2 186.9 | – | core 6 | 0.12 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Pendock 1 | 2 189.6 | – | core 6 | 0.23 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Pendock 1 | 2 190.3 | – | – | 0.28 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Pendock 1 | 2 190.7 | – | – | 0.66 | 422 | 0.20 | 0.44 | 0.93 | 0.64 | 0.31 | 67 | 141 | Dirk Hartog Group |
| Pendock 1 | 2 191.3 | – | core 6 | 0.37 | 435 | 0.12 | 0.24 | 0.43 | 0.36 | 0.33 | 65 | 116 | Dirk Hartog Group |
| Pendock 1 | 2 286.0 | 2 289.0 | DC | 0.17 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Pendock 1 | 2 377.4 | 2 380.5 | DC | 0.14 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Pendock 1 | 2 495.4 | – | core 7 | 0.09 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Quobba 1 | 482.0 | – | SWC | 0.35 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 547.5 | – | SWC | 0.15 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 560.0 | 590.0 | cuttings | 0.23 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 565.5 | – | SWC | 0.11 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 590.0 | 620.0 | cuttings | 0.25 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 650.0 | 680.0 | cuttings | 0.22 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 663.0 | – | SWC | 0.27 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 664.0 | – | SWC | 0.30 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 680.0 | 710.0 | cuttings | 0.25 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 710.0 | 740.0 | cuttings | 0.28 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 714.2 | – | SWC | 0.23 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 730.5 | – | core | 0.31 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 740.0 | 770.0 | cuttings | 0.19 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 770.0 | 800.0 | cuttings | 0.22 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 800.0 | 830.0 | cuttings | 0.23 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 806.5 | – | SWC | 0.43 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 830.0 | 860.0 | cuttings | 0.33 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 841.0 | – | core | 0.41 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 860.0 | 890.0 | cuttings | 0.26 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 865.0 | – | SWC | 0.13 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 890.0 | 920.0 | cuttings | 0.33 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 920.0 | 950.0 | cuttings | 0.32 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 950.0 | 980.0 | cuttings | 0.27 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 980.0 | 1 010.0 | cuttings | 0.35 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 1 001.0 | – | SWC | 0.55 | 429 | 0.47 | 0.71 | 2.57 | 1.18 | 0.40 | 129 | 467 | Gneudna Formation |
| Quobba 1 | 1 010.0 | 1 040.0 | cuttings | 0.20 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 1 040.0 | 1 070.0 | cuttings | 0.26 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 1 068.0 | – | SWC | 0.45 | – | – | – | – | – | – | – | – | Gneudna Formation |

## **Appendix 5** (continued)

| Wells | Depth (m) From | Depth (m) To | Sample type | TOC (%) | $T_{max}$ (°C) | $S_1$ (mg/g rock) | $S_2$ (mg/g rock) | $S_3$ (mg/g rock) | $S_1 + S_2$ (mg/g rock) | PI | HI | OI | Formation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Quobba 1 | 1 070.0 | 1 100.0 | cuttings | 0.42 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 1 100.0 | 1 130.0 | cuttings | 0.52 | 441 | 0.12 | 0.72 | 0.52 | 0.84 | 0.14 | 138 | 100 | Gneudna Formation |
| Quobba 1 | 1 112.0 | – | SWC | 0.43 | 446 | 0.18 | 0.76 | 1.22 | 0.94 | 0.19 | 177 | 284 | Gneudna Formation |
| Quobba 1 | 1 118.0 | – | SWC | 0.83 | 440 | 0.57 | 1.61 | 2.00 | 2.18 | 0.26 | 194 | 241 | Gneudna Formation |
| Quobba 1 | 1 130.0 | 1 160.0 | cuttings | 1.02 | 446 | 0.42 | 3.20 | 0.39 | 3.62 | 0.12 | 314 | 38 | Gneudna Formation |
| Quobba 1 | 1 160.0 | 1 190.0 | cuttings | 0.14 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 1 190.0 | 1 220.0 | cuttings | 0.23 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 1 220.0 | 1 250.0 | cuttings | 0.34 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 1 250.0 | 1 280.0 | cuttings | 0.26 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 1 280.0 | 1 310.0 | cuttings | 0.39 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 1 297.0 | – | – | 0.60 | 432 | 0.28 | 0.86 | 1.16 | 1.14 | 0.25 | 143 | 193 | Gneudna Formation |
| Quobba 1 | 1 310.0 | 1 340.0 | cuttings | 0.34 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 1 338.0 | – | – | 0.29 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 1 340.0 | 1 370.0 | cuttings | 0.30 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 1 370.0 | 1 400.0 | cuttings | 0.36 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 1 398.5 | – | – | 0.45 | 411 | 0.43 | 1.18 | 1.22 | 1.61 | 0.27 | 262 | 271 | Gneudna Formation |
| Quobba 1 | 1 400.0 | 1 430.0 | cuttings | 0.31 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 1 430.0 | 1 460.0 | cuttings | 0.26 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 1 460.0 | 1 490.0 | cuttings | 0.24 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quobba 1 | 1 469.0 | – | SWC | 0.37 | – | – | – | – | – | – | – | – | Nannyarra Sandstone |
| Quobba 1 | 1 490.0 | 1 520.0 | cuttings | 0.22 | – | – | – | – | – | – | – | – | Nannyarra Sandstone |
| Quobba 1 | 1 520.0 | 1 550.0 | cuttings | 0.20 | – | – | – | – | – | – | – | – | Nannyarra Sandstone |
| Quobba 1 | 1 524.5 | – | SWC | 0.14 | – | – | – | – | – | – | – | – | Nannyarra Sandstone |
| Quobba 1 | 1 534.5 | – | SWC | 0.96 | 435 | 0.44 | 1.20 | 1.36 | 1.64 | 0.27 | 857 | 971 | Faure Formation |
| Quobba 1 | 1 550.0 | 1 580.0 | cuttings | 0.23 | – | – | – | – | – | – | – | – | Faure Formation |
| Quobba 1 | 1 580.0 | 1 610.0 | cuttings | 0.27 | – | – | – | – | – | – | – | – | Faure Formation |
| Quobba 1 | 1 605.6 | – | SWC | 0.65 | 426 | 0.11 | 0.26 | 0.38 | 0.37 | 0.30 | 40 | 58 | Faure Formation |
| Quobba 1 | 1 610.0 | 1 640.0 | cuttings | 0.21 | – | – | – | – | – | – | – | – | Faure Formation |
| Quobba 1 | 1 640.0 | 1 670.0 | cuttings | 0.27 | – | – | – | – | – | – | – | – | Faure Formation |
| Quobba 1 | 1 670.0 | 1 700.0 | cuttings | 0.31 | – | – | – | – | – | – | – | – | Faure Formation |
| Quobba 1 | 1 700.0 | 1 730.0 | cuttings | 0.29 | – | – | – | – | – | – | – | – | Faure Formation |
| Quobba 1 | 1 701.0 | – | SWC | 0.17 | – | – | – | – | – | – | – | – | Faure Formation |
| Quobba 1 | 1 730.0 | 1 760.0 | cuttings | 0.24 | | | | | | | | | Dirk Hartog Group |
| Quobba 1 | 1 734.5 | – | SWC | 0.44 | 437 | 0.43 | 1.00 | 0.29 | 1.43 | 0.30 | 227 | 66 | Dirk Hartog Group |
| Quobba 1 | 1 760.0 | 1 790.0 | cuttings | 0.17 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Quobba 1 | 1 790.0 | 1 820.0 | cuttings | 0.19 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Quobba 1 | 1 820.0 | 1 850.0 | cuttings | 0.17 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Quobba 1 | 1 850.0 | 1 880.0 | cuttings | 0.17 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Quobba 1 | 1 880.0 | 1 910.0 | cuttings | 0.24 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Quobba 1 | 1 910.0 | 1 940.0 | cuttings | 0.22 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Quobba 1 | 1 924.7 | – | – | 0.12 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Quobba 1 | 1 925.7 | – | – | 0.13 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Quobba 1 | 1 926.9 | – | – | 0.10 | – | – | – | – | – | – | – | – | Dirk Hartog Group |

**Appendix 5** (continued)

| *Wells* | *Depth (m) From* | *To* | *Sample type* | *TOC (%)* | $T_{max}$ (°C) | $S_1$ (mg/g rock) | $S_2$ (mg/g rock) | $S_3$ (mg/g rock) | $S_1 + S_2$ (mg/g rock) | *PI* | *HI* | *OI* | *Formation* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Quobba 1 | 1 929.9 | – | – | 0.12 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Rough Range 1 | 2 011.7 | 2 020.8 | DC | 2.24 | 432 | 0.53 | 1.52 | 0.56 | 2.05 | 0.26 | 68 | 25 | Lyons Group |
| Rough Range 1 | 2 124.5 | 2 130.6 | DC | 0.41 | 430 | 0.50 | 0.30 | 0.29 | 0.80 | 0.63 | 73 | 71 | Lyons Group |
| Rough Range 1 | 2 776.7 | 2 779.8 | DC | 0.27 | – | – | – | – | – | – | – | – | Lyons Group |
| Rough Range 1 | 2 801.1 | 2 803.2 | core 44 | 0.28 | – | – | – | – | – | – | – | – | Quail Formation |
| Rough Range 1 | 2 904.7 | 2 907.8 | DC | 0.25 | – | – | – | – | – | – | – | – | Quail Formation |
| Rough Range 1 | 2 970.9 | 2 971.5 | core 46 | 0.70 | – | 0.07 | 0.09 | 0.11 | 0.16 | 0.44 | 13 | 16 | Quail Formation |
| Rough Range 1 | 2 970.9 | 2 971.5 | core 46 | 0.13 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Rough Range 1 | 2 980.9 | 2 984.0 | – | 0.27 | – | – | – | – | – | – | – | – | Quail Formation |
| Rough Range 1 | 2 989.5 | 2 990.1 | – | 0.23 | – | – | – | – | – | – | – | – | Quail Formation |
| Rough Range 1 | 3 016.9 | 3 023.3 | – | 0.35 | – | – | – | – | – | – | – | – | Quail Formation |
| Rough Range 1 | 3 025.1 | 3 029.7 | DC | 1.60 | 355 | 0.55 | 0.66 | 0.74 | 1.21 | 0.45 | 41 | 46 | Quail Formation |
| Rough Range 1 | 3 048.0 | 3 054.1 | DC | 2.05 | 364 | 0.28 | 0.23 | 0.30 | 0.51 | 0.55 | 11 | 15 | Quail Formation |
| Rough Range 1 | 3 063.5 | 3 065.1 | core 50 | 0.52 | – | 0.01 | 0.02 | 0.26 | 0.03 | 0.33 | 4 | 50 | Quail Formation |
| Rough Range 1 | 3 069.9 | 3 071.8 | core 51 | 1.74 | – | 0.03 | 0.08 | 0.06 | 0.11 | 0.27 | 5 | 3 | Quail Formation |
| Rough Range 1 | 3 069.9 | 3 071.8 | core 51 | 0.68 | – | 0.07 | 0.00 | 0.14 | 0.07 | 1.00 | 0 | 21 | Gneudna Formation |
| Rough Range 1 | 3 120.2 | 3 125.4 | core 52 | 1.28 | – | 0.04 | 0.08 | 0.07 | 0.12 | 0.33 | 6 | 5 | Quail Formation |
| Rough Range 1 | 3 133.3 | 3 137.9 | – | 0.61 | – | 0.18 | 0.11 | 0.26 | 0.29 | 0.62 | 18 | 43 | Quail Formation |
| Rough Range 1 | 3 141.9 | 3 146.5 | core 53 | 0.48 | – | – | – | – | – | – | – | – | Quail Formation |
| Rough Range 1 | 3 141.9 | 3 147.1 | core 53 | 0.62 | 319 | 0.10 | 0.20 | 0.10 | 0.30 | 0.33 | 32 | 16 | Gneudna Formation |
| Rough Range 1 | 3 154.7 | 3 157.7 | DC | 0.39 | – | 0.03 | 0.06 | 0.39 | 0.09 | 0.33 | 15 | 100 | Quail Formation |
| Rough Range 1 | 3 185.2 | 3 188.2 | DC | 0.28 | – | – | – | – | – | – | – | – | Quail Formation |
| Rough Range 1 | 3 185.2 | 3 194.3 | – | 0.40 | – | – | – | – | – | – | – | – | Quail Formation |
| Rough Range 1 | 3 185.2 | 3 188.2 | DC | | 440 | 0.82 | 0.45 | 0.64 | 1.27 | 0.65 | – | – | Quail Formation |
| Rough Range 1 | 3 205.6 | 3 208.9 | core 54 | 0.10 | – | – | – | – | – | – | – | – | Quail Formation |
| Rough Range 1 | 3 264.1 | 3 265.0 | core 55 | 0.77 | – | 0.07 | 0.06 | 0.36 | 0.13 | 0.54 | 8 | 47 | Gneudna Formation |
| Rough Range 1 | 3 329.0 | 3 329.9 | core 56 | 0.72 | – | 0.23 | 0.21 | 0.37 | 0.44 | 0.52 | 29 | 51 | Gneudna Formation |
| Rough Range 1 | 3 329.0 | 3 329.9 | core 56 | 0.63 | – | 0.10 | 0.00 | 0.17 | 0.10 | 1.00 | 0 | 27 | Gneudna Formation |
| Rough Range 1 | 3 438.4 | 3 439.7 | core 57 | 0.62 | – | 0.07 | 0.11 | 0.33 | 0.18 | 0.39 | 18 | 53 | Gneudna Formation |
| Rough Range 1 | 3 471.7 | 3 479.3 | – | 0.46 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Rough Range 1 | 3 498.8 | 3 501.5 | core 58 | 1.14 | – | 0.11 | 0.20 | 0.53 | 0.31 | 0.35 | 18 | 46 | Gneudna Formation |
| Rough Range 1 | 3 546.3 | 3 555.5 | – | 0.25 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Rough Range 1 | 3 595.1 | 3 602.7 | – | 0.28 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Rough Range 1 | 3 599.1 | 3 602.4 | core 59 | 0.69 | – | 0.16 | 0.29 | 0.37 | 0.45 | 0.36 | 42 | 54 | Gneudna Formation |
| Rough Range 1 | 3 599.1 | 3 602.4 | core 59 | 0.90 | – | 0.10 | 0.01 | 0.37 | 0.11 | 0.91 | 1 | 41 | Gneudna Formation |
| Rough Range 1 | 3 672.8 | 3 675.3 | core 60 | 0.36 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Rough Range 1 | 3 742.3 | 3 744.2 | core 61 | 0.29 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Rough Range 1 | 3 815.8 | 3 848.4 | core 62 | 0.32 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Rough Range 1 | 3 846.3 | 3 848.4 | core 62 | 0.29 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Rough Range 1 | 3 940.5 | 3 941.7 | core 63 | 0.36 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Rough Range 1 | 4 001.7 | 4 003.5 | core 64 | 0.21 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Tamala 1 | 1 056.7 | – | core 6 | 0.11 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Wandagee 1 | 185.9 | 189.0 | cuttings | 0.43 | – | – | – | – | – | – | – | – | Gneudna Formation |

## **Appendix 5** (continued)

| *Wells* | *Depth (m)* *From* | *To* | *Sample type* | *TOC (%)* | $T_{max}$ *(°C)* | $S_1$ | $S_2$ | $S_3$ | $S_1 + S_2$ | *PI* | *HI* | *OI* | *Formation* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | *(mg/g rock)* | | | | | | | |
| Wandagee 1 | 222.5 | 225.6 | cuttings | 0.67 | 433 | 0.13 | 0.78 | 0.32 | 0.91 | 0.14 | 116 | 48 | Gneudna Formation |
| Wandagee 1 | 253.0 | 256.0 | cuttings | 0.39 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Wandagee 1 | 262.1 | 265.2 | cuttings | 0.17 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Wandagee 1 | 274.3 | 277.4 | cuttings | 0.16 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Wandagee 1 | 329.8 | – | core 1 | 0.04 | – | – | – | – | – | – | – | – | Nannyarra Sandstone |
| Wandagee 1 | 332.5 | – | – | 0.04 | 266 | 0.05 | 0.01 | 0.17 | 0.06 | 0.83 | 25 | 425 | Nannyarra Sandstone |
| Wandagee 1 | 424.9 | – | – | 0.05 | 266 | 0.03 | 0.00 | 0.28 | 0.03 | 1.00 | 0 | 560 | Dirk Hartog Group |
| Wandagee 1 | 519.1 | – | – | 0.25 | 437 | 0.09 | 0.13 | 0.56 | 0.22 | 0.41 | 52 | 224 | Dirk Hartog Group |
| Wandagee 1 | 599.5 | – | core 4 | 0.08 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Wandagee 1 | 602.6 | – | – | 0.25 | 324 | 0.05 | 0.00 | 0.09 | 0.05 | 1.00 | 0 | 36 | Dirk Hartog Group |
| Wandagee 1 | 707.8 | – | – | 0.12 | 275 | 0.07 | 0.13 | 0.47 | 0.20 | 0.35 | 108 | 392 | Dirk Hartog Group |
| Wandagee 1 | 777.2 | – | core 6 | 0.27 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Wandagee 1 | 778.8 | – | – | 0.45 | – | 0.00 | 0.39 | 0.10 | 0.39 | 0.00 | 87 | 22 | Dirk Hartog Group |
| Yaringa 1 | 182.9 | 189.0 | – | 0.62 | 394 | 0.11 | 0.18 | 0.47 | 0.29 | 0.38 | 29 | 76 | Sweeney Mia Formation |
| Yaringa 1 | 192.0 | – | core 2 | 0.83 | 419 | 0.25 | 0.55 | 0.62 | 0.80 | 0.31 | 66 | 75 | Sweeney Mia Formation |
| Yaringa 1 | 926.6 | 932.7 | – | 0.11 | – | – | – | – | – | – | – | – | Faure Formation |
| Yaringa 1 | 958.6 | – | core 13 | 0.36 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Yaringa 1 | 1 121.7 | 1 127.8 | – | 0.25 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Yaringa 1 | 1 243.6 | 1 252.7 | – | 0.23 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Yaringa 1 | 1 325.9 | 1 335.0 | – | 0.21 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Yaringa 1 | 1 384.2 | – | core 16 | 0.34 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Yaringa 1 | 1 386.2 | – | core 16 | 0.26 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Yaringa 1 | 1 389.9 | 1 396.0 | – | 0.21 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Yaringa 1 | 1 426.8 | – | – | 0.17 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Yaringa 1 | 1 487.4 | 1 496.6 | – | 0.10 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Yaringa East 1 | 174.0 | 177.0 | cuttings | 1.04 | 422 | 0.36 | 2.43 | 2.31 | 2.79 | 0.13 | 234 | 222 | Birdrong Sandstone |
| Yaringa East 1 | 195.0 | 198.0 | cuttings | 0.89 | 416 | 3.89 | 2.12 | 1.36 | 6.01 | 0.65 | 238 | 153 | Birdrong Sandstone |
| Yaringa East 1 | 195.0 | 198.0 | cuttings | – | 431 | 0.12 | 1.05 | 0.87 | 1.17 | 0.10 | – | – | Birdrong Sandstone |
| Yaringa East 1 | 377.8 | – | core | 0.14 | – | – | – | – | – | – | – | – | Sweeney Mia Formation |
| Yaringa East 1 | 785.1 | – | core | 0.16 | – | – | – | – | – | – | – | – | Kopke Sandstone |
| Yaringa East 1 | 791.6 | – | core | 0.24 | 388 | 0.15 | 0.47 | 0.28 | 0.62 | 0.24 | 196 | 117 | Kopke Sandstone |
| Yaringa East 1 | 799.4 | – | core | 0.50 | – | 0.05 | 0.17 | 1.40 | 22.00 | 0.23 | 34 | 280 | Kopke Sandstone |
| Yaringa East 1 | 799.9 | – | core | 0.16 | – | – | – | – | – | – | – | – | Kopke Sandstone |
| Yaringa East 1 | 800.5 | – | core | 0.07 | – | – | – | – | – | – | – | – | Kopke Sandstone |
| Yaringa East 1 | 803.0 | – | core | 0.12 | – | – | – | – | – | – | – | – | Kopke Sandstone |
| Yaringa East 1 | 806.0 | – | core | 0.19 | – | – | – | – | – | – | – | – | Kopke Sandstone |
| Yaringa East 1 | 808.1 | – | core | 0.15 | – | – | – | – | – | – | – | – | Kopke Sandstone |
| Yaringa East 1 | 816.8 | – | core | 0.10 | – | – | – | – | – | – | – | – | Kopke Sandstone |
| **Merlinleigh Sub–basin** | | | | | | | | | | | | | |
| Aquitaine DDH 1 | 41.1 | – | CC | 0.17 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 1 | 46.6 | – | CC | 0.16 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 1 | 47.9 | – | CC | 0.18 | – | – | – | – | – | – | – | – | Gneudna Formation |

## **Appendix 5** (continued)

| *Wells* | *Depth (m)* *From* | *To* | *Sample type* | *TOC (%)* | $T_{max}$ *(°C)* | $S_1$ | $S_2$ *(mg/g rock)* | $S_3$ | $S_1 + S_2$ | *PI* | *HI* | *OI* | *Formation* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aquitaine DDH 1 | 56.1 | – | CC | 0.24 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 1 | 62.8 | – | CC | 0.19 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 1 | 64.9 | – | CC | 0.19 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 1 | 71.0 | – | CC | 2.42 | 421 | 0.06 | 1.47 | 1.00 | 1.53 | 0.04 | 61 | 41 | Gneudna Formation |
| Aquitaine DDH 1 | 83.5 | – | CC | 0.23 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 1 | 86.6 | – | CC | 0.04 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 2 | 25.3 | – | CC | 0.19 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 2 | 35.1 | – | CC | 0.24 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 2 | 44.2 | – | CC | 0.25 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 2 | 50.6 | – | CC | 0.32 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 2 | 57.2 | – | CC | 0.39 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 2 | 77.4 | – | CC | 0.39 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 2 | 86.6 | – | CC | 0.39 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 2 | 98.1 | – | CC | 1.12 | 431 | 0.08 | 0.89 | 0.32 | 0.97 | 0.08 | 79 | 29 | Gneudna Formation |
| Aquitaine DDH 2 | 102.7 | – | CC | 0.55 | 425 | 0.03 | 0.29 | 0.29 | 0.32 | 0.09 | 53 | 53 | Gneudna Formation |
| Aquitaine DDH 2 | 118.3 | – | CC | 0.11 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 2 | 131.1 | – | CC | 0.17 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 2 | 141.4 | – | CC | 0.16 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 2 | 155.8 | – | CC | 0.28 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 2 | 160.3 | – | CC | 0.31 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 2 | 171.3 | – | CC | 0.13 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 2 | 177.4 | – | CC | 0.26 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 2 | 179.8 | – | CC | 0.27 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 4 | 34.1 | – | CC | 0.49 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 4 | 40.2 | – | CC | 0.32 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 4 | 56.7 | – | CC | 0.65 | 425 | 0.11 | 0.65 | 0.31 | 0.76 | 0.14 | 100 | 48 | Gneudna Formation |
| Aquitaine DDH 4 | 58.8 | – | CC | 0.39 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 4 | 89.3 | – | CC | 0.19 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 4 | 99.1 | – | CC | 0.14 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 4 | 104.2 | – | CC | 0.40 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 4 | 117.0 | – | CC | 1.33 | 424 | 0.05 | 0.49 | 0.66 | 0.54 | 0.09 | 37 | 50 | Gneudna Formation |
| Aquitaine DDH 4 | 131.0 | – | CC | 0.30 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Aquitaine DDH 4 | 132.9 | – | CC | 0.38 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 27.2 | 27.2 | core | 0.19 | – | – | – | – | – | – | – | – | Munabia Formation |
| Gneudna 1 | 32.5 | 32.5 | core | 0.17 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 36.0 | 36.0 | core | 0.18 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 39.7 | 39.7 | core | 0.22 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 42.0 | 42.0 | core | 0.26 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 61.0 | 61.0 | core | 0.15 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 65.4 | 65.4 | core | 0.17 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 68.9 | 68.9 | core | 0.29 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 76.2 | 76.2 | core | 0.23 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 81.0 | 81.0 | core | 0.16 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 92.4 | 92.4 | core | 0.25 | – | – | – | – | – | – | – | – | Gneudna Formation |

## **Appendix 5** (continued)

| *Wells* | *Depth (m)* *From* | *To* | *Sample type* | *TOC (%)* | $T_{max}$ *(°C)* | $S_1$ (mg/g rock) | $S_2$ | $S_3$ | $S_1 + S_2$ | *PI* | *HI* | *OI* | *Formation* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gneudna 1 | 97.6 | 97.6 | core | 0.18 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 102.1 | 102.1 | core | 0.15 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 107.4 | 107.4 | core | 0.17 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 117.2 | 117.2 | core | 1.55 | 434 | 0.05 | 1.63 | 0.3 | 1.68 | 0.03 | 105 | 19 | Gneudna Formation |
| Gneudna 1 | 129.2 | 129.2 | core | 0.18 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 135.0 | 135.0 | core | 0.21 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 141.0 | 141.0 | core | 0.15 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 147.2 | 147.2 | core | 0.22 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 151.6 | 151.6 | core | 0.26 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 163.4 | 163.4 | core | 0.15 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 180.2 | 180.2 | core | 0.17 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 183.7 | 183.7 | core | 0.17 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 193.2 | 193.2 | core | 0.15 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 195.6 | 195.6 | core | 0.17 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 209.6 | 209.6 | core | 0.17 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 219.4 | 219.4 | core | 0.33 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 228.1 | 228.1 | core | 0.16 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 231.2 | 231.2 | core | 0.15 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 234.1 | 234.1 | core | 0.37 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 239.0 | 239.0 | core | 0.22 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 243.5 | 243.5 | core | 0.18 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 254.7 | 254.7 | core | 0.20 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 260.5 | 260.5 | core | 0.50 | 428 | 0.03 | 0.93 | 0.12 | 0.96 | 0.03 | 186 | 24 | Gneudna Formation |
| Gneudna 1 | 264.0 | 264.0 | core | 0.81 | 431 | 0.07 | 1.28 | 0.14 | 1.35 | 0.05 | 158 | 17 | Gneudna Formation |
| Gneudna 1 | 270.2 | 270.2 | core | 0.69 | 429 | 0.07 | 0.94 | 0.21 | 1.01 | 0.07 | 136 | 30 | Gneudna Formation |
| Gneudna 1 | 275.5 | 275.5 | core | 0.42 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 280.5 | 280.5 | core | 0.25 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 285.2 | 285.2 | core | 0.85 | 426 | 0.1 | 0.93 | 0.23 | 1.03 | 0.10 | 109 | 27 | Gneudna Formation |
| Gneudna 1 | 289.0 | 289.0 | core | 0.67 | 427 | 0.05 | 1.19 | 0.12 | 1.24 | 0.04 | 178 | 18 | Gneudna Formation |
| Gneudna 1 | 295.0 | 295.0 | core | 0.39 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 300.4 | 300.4 | core | 2.46 | 433 | 0.24 | 8.53 | 0.51 | 8.77 | 0.03 | 347 | 21 | Gneudna Formation |
| Gneudna 1 | 306.1 | 306.1 | core | 0.22 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 309.8 | 309.8 | core | 0.38 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 315.6 | 315.6 | core | 0.76 | 434 | 0.03 | 1.51 | 0.14 | 1.54 | 0.02 | 199 | 18 | Gneudna Formation |
| Gneudna 1 | 321.3 | 321.3 | core | 0.45 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 325.6 | 325.6 | core | 0.10 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 332.0 | 332.0 | core | 0.33 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 337.5 | 337.5 | core | 0.52 | 434 | 0.02 | 0.96 | 0.1 | 0.98 | 0.02 | 185 | 19 | Gneudna Formation |
| Gneudna 1 | 342.2 | 342.2 | core | 0.21 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 352.9 | 352.9 | core | 0.12 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 358.7 | 358.7 | core | 0.12 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 364.2 | 364.2 | core | 0.13 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 369.8 | 369.8 | core | 0.13 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 375.5 | 375.5 | core | 0.20 | – | – | – | – | – | – | – | – | Gneudna Formation |

## **Appendix 5** (continued)

| *Wells* | *Depth (m) From* | *Depth (m) To* | *Sample type* | *TOC (%)* | $T_{max}$ *(°C)* | $S_1$ *(mg/g rock)* | $S_2$ *(mg/g rock)* | $S_3$ *(mg/g rock)* | $S_1 + S_2$ *(mg/g rock)* | *PI* | *HI* | *OI* | *Formation* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gneudna 1 | 381.5 | 381.5 | core | 0.10 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Gneudna 1 | 388.7 | 388.7 | core | 0.21 | – | – | – | – | – | – | – | – | Nannyarra Sandstone |
| Gneudna 1 | 465.8 | 465.8 | core | 0.29 | – | – | – | – | – | – | – | – | Nannyarra Sandstone |
| Quail 1 | 2 161.0 | 2 164.1 | DC | 0.31 | – | – | – | – | – | – | – | – | Quail Formation |
| Quail 1 | 2 231.4 | – | – | 0.37 | 0 | 0.09 | 0.28 | | 0.37 | 0.24 | 76 | 0 | Quail Formation |
| Quail 1 | 2 468.9 | 2 471.9 | DC | 0.24 | – | – | – | – | – | – | – | – | Yindagindy Formation |
| Quail 1 | 2 470.4 | – | – | 0.11 | – | – | – | – | – | – | – | – | Yindagindy Formation |
| Quail 1 | 2 529.8 | 2 532.9 | DC | 0.28 | – | – | – | – | – | – | – | – | Yindagindy Formation |
| Quail 1 | 2 560.3 | 2 563.4 | DC | 0.20 | – | – | – | – | – | – | – | – | Yindagindy Formation |
| Quail 1 | 2 639.0 | – | – | 0.12 | – | – | – | – | – | – | – | – | Yindagindy Formation |
| Quail 1 | 2 651.8 | 2 654.8 | DC | 0.18 | – | – | – | – | – | – | – | – | Yindagindy Formation |
| Quail 1 | 2 743.2 | 2 746.3 | DC | 0.08 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quail 1 | 2 792.1 | – | – | 0.52 | 299 | 0.24 | 0.03 | 0.45 | 0.27 | 0.89 | 6 | 87 | Gneudna Formation |
| Quail 1 | 2 795.6 | – | – | 0.22 | – | 0.04 | 0.02 | 0.33 | 0.06 | 0.67 | 9 | 150 | Gneudna Formation |
| Quail 1 | 2 834.6 | 2 837.7 | DC | 0.25 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quail 1 | 2 926.1 | 2 929.1 | DC | 0.17 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Quail 1 | 3 017.5 | 3 020.6 | DC | 0.23 | – | – | – | – | – | – | – | – | Nannyarra Sandstone |
| Quail 1 | 3 066.3 | 3 069.3 | DC | 0.22 | – | – | – | – | – | – | – | – | Nannyarra Sandstone |
| Quail 1 | 3 112.0 | – | – | 0.12 | – | 0.07 | 0.10 | 0.44 | 0.17 | 0.41 | 83 | 367 | Nannyarra Sandstone |
| Quail 1 | 3 273.6 | 3 276.6 | DC | 0.09 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Quail 1 | 3 383.3 | 3 386.3 | DC | 0.11 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Quail 1 | 3 483.9 | 3 486.9 | DC | 0.08 | – | – | – | – | – | – | – | – | Dirk Hartog Group |
| Remarkable Hill 1 | 2 501.8 | – | core 9 | 0.07 | 231 | 0.04 | 0.00 | 0.01 | 0.04 | 1.00 | 0 | 14 | Devonian–Carboniferous |
| Remarkable Hill 1 | 2 748.4 | 2 749.3 | – | 0.04 | – | – | – | – | – | – | – | – | Devonian–Carboniferous |
| Remarkable Hill 1 | 2 749.9 | 2 750.2 | – | 0.11 | – | – | – | – | – | – | – | – | Devonian–Carboniferous |
| Remarkable Hill 1 | 3 086.4 | – | core 11 | 0.17 | 384 | 0.04 | 0.01 | 0.00 | 0.05 | 0.80 | 6 | 0 | Devonian–Carboniferous |
| Remarkable Hill 1 | 3 086.4 | – | – | 0.18 | – | – | – | – | – | – | – | – | Devonian–Carboniferous |
| Remarkable Hill 1 | 3 201.9 | 3 204.7 | – | 0.12 | – | – | – | – | – | – | – | – | Devonian–Carboniferous |
| Remarkable Hill 1 | 3 205.0 | 3 209.2 | – | 0.13 | – | – | – | – | – | – | – | – | Devonian–Carboniferous |
| Remarkable Hill 1 | 3 205.9 | – | core 12 | 0.15 | 218 | 0.11 | 0.02 | 0.00 | 0.13 | 0.85 | 13 | 0 | Devonian–Carboniferous |
| Uranerz CDH 4 | 22.9 | – | CC | 1.23 | 422 | 0.13 | 0.97 | 0.58 | 1.10 | 0.12 | 79 | 47 | Gneudna Formation |
| Uranerz CDH 4 | 33.2 | – | CC | 1.17 | 422 | 0.09 | 0.62 | 0.57 | 0.71 | 0.13 | 53 | 49 | Gneudna Formation |
| Uranerz CDH 5 | 50.6 | – | CC | 0.16 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Uranerz CDH 5 | 58.2 | – | CC | 1.63 | 429 | 0.15 | 0.84 | 0.51 | 0.99 | 0.15 | 52 | 31 | Gneudna Formation |
| Uranerz CDH 5 | 72.7 | – | CC | 0.20 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Uranerz CDH 8 | 112.2 | – | CC | 1.25 | 430 | 0.12 | 1.97 | 0.71 | 2.09 | 0.06 | 158 | 57 | Gneudna Formation |
| Uranerz CDH 8 | 121.0 | – | CC | 3.16 | 429 | 0.20 | 5.83 | 1.12 | 6.03 | 0.03 | 184 | 35 | Gneudna Formation |
| Mardie 1 | 205.7 | 208.8 | DC | 0.10 | – | – | – | – | – | – | – | – | Gneudna Formation |
| Minderoo 1 | 413.0 | – | DC | 0.21 | 420 | 0.12 | 0.03 | 0.07 | 0.15 | 0.80 | 14 | 33 | Quail Formation |
| Minderoo 1 | 502.9 | – | DC | 0.50 | 423 | 0.16 | 0.22 | 0.06 | 0.38 | 0.42 | 44 | 12 | Quail Formation |
| Minderoo 1 | 540.4 | – | DC | 0.07 | 433 | 0.21 | 0.01 | 0.15 | 0.22 | 0.95 | 14 | 214 | Quail Formation |
| Peedamullah 1 | 213.0 | 232.0 | DC | 1.33 | 424 | 0.60 | 1.65 | 4.41 | 2.25 | 0.27 | 124 | 332 | Gneudna Formation |
| Peedamullah 1 | 256.0 | 268.0 | DC | 0.48 | 415 | 0.29 | 0.70 | 2.89 | 0.99 | 0.29 | 146 | 602 | Gneudna Formation |
| Peedamullah 1 | 323.0 | 329.0 | DC | 0.40 | 417 | 0.13 | 0.46 | 3.29 | 0.59 | 0.22 | 115 | 823 | Gneudna Formation |

## Appendix 5 (continued)

| Wells | Depth (m) From | To | Sample type | TOC (%) | $T_{max}$ (°C) | $S_1$ | $S_2$ | $S_3$ | $S_1 + S_2$ | PI | HI | OI | Formation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | (mg/g rock) | | | | | | | |
| **Peedamullah Shelf** | | | | | | | | | | | | | |
| Somelim 1 | 265.0 | – | DC | 0.18 | – | – | – | – | – | – | – | – | Moogooree Limestone |
| Somelim 1 | 277.0 | – | DC | 0.20 | – | – | – | – | – | – | – | – | Moogooree Limestone |
| Somelim 1 | 328.0 | – | DC | 0.48 | 413 | 0.06 | 0.15 | 1.63 | 0.21 | 0.29 | 31 | 340 | Moogooree Limestone |
| Somelim 1 | 340.0 | – | DC | 0.60 | 413 | 0.08 | 0.28 | 1.57 | 0.36 | 0.22 | 47 | 262 | Moogooree Limestone |
| Somelim 1 | 352.0 | – | DC | 0.35 | – | – | – | – | – | – | – | – | Moogooree Limestone |
| Somelim 1 | 364.0 | – | DC | 0.29 | – | – | – | – | – | – | – | – | Moogooree Limestone |
| Somelim 1 | 376.0 | – | DC | 0.15 | – | – | – | – | – | – | – | – | Moogooree Limestone |
| Somelim 1 | 388.0 | – | DC | 0.40 | 407 | 0.09 | 0.16 | 2.10 | 0.25 | 0.36 | 40 | 525 | Moogooree Limestone |
| Somelim 1 | 400.0 | – | DC | 0.22 | – | – | – | – | – | – | – | – | Moogooree Limestone |
| Somelim 1 | 413.0 | – | DC | 0.13 | – | – | – | – | – | – | – | – | Moogooree Limestone |
| Wonangarra 1 | 574.5 | – | core 3 | 0.50 | 421 | 0.04 | 0.22 | 0.02 | 0.26 | 0.15 | 44 | 4 | Moogooree Limestone |
| Kybra 1 | 2 170.0 | – | SWC | 0.44 | – | – | – | – | – | – | – | – | Moogooree Limestone |
| Kybra 1 | 2 175.0 | – | DC | 0.14 | – | – | – | – | – | – | – | – | Moogooree Limestone |
| Kybra 1 | 2 200.0 | – | DC | 0.16 | – | – | – | – | – | – | – | – | Moogooree Limestone |
| Kybra 1 | 2 215.0 | – | SWC | 0.73 | 430 | 0.33 | 0.8 | 1.09 | 1.13 | 0.29 | 110 | 149 | Moogooree Limestone |
| Kybra 1 | 2 225.0 | – | DC | 0.19 | – | – | – | – | – | – | – | – | Moogooree Limestone |
| Kybra 1 | 2 250.0 | – | DC | 0.22 | – | – | – | – | – | – | – | – | Moogooree Limestone |
| Kybra 1 | 2 264.0 | – | SWC | 1.25 | 435 | 0.55 | 1.8 | 1.01 | 2.35 | 0.23 | 144 | 81 | Moogooree Limestone |
| Kybra 1 | 2 271.0 | – | SWC | 0.85 | 429 | 0.27 | 0.78 | 0.98 | 1.05 | 0.26 | 92 | 115 | Moogooree Limestone |
| Kybra 1 | 2 275.0 | – | DC | 0.28 | – | – | – | – | – | – | – | – | Moogooree Limestone |
| Kybra 1 | 2 300.0 | – | DC | 0.22 | – | – | – | – | – | – | – | – | Moogooree Limestone |
| Kybra 1 | 2 325.0 | – | DC | 0.31 | – | – | – | – | – | – | – | – | Moogooree Limestone |
| Kybra 1 | 2 327.0 | – | SWC | 0.43 | – | – | – | – | – | – | – | – | Moogooree Limestone |
| Kybra 1 | 2 350.0 | – | DC | 0.41 | – | – | – | – | – | – | – | – | Moogooree Limestone |
| Kybra 1 | 2 375.0 | – | DC | 0.45 | – | – | – | – | – | – | – | – | Moogooree Limestone |
| Kybra 1 | 2 376.0 | – | SWC | 0.95 | 434 | 0.44 | 0.75 | 0.61 | 1.19 | 0.37 | 79 | 64 | Moogooree Limestone |
| Kybra 1 | 2 400.0 | – | DC | 0.31 | – | – | – | – | – | – | – | – | Moogooree Limestone |
| Kybra 1 | 2 425.0 | – | SWC | 0.42 | – | – | – | – | – | – | – | – | Moogooree Limestone |
| Kybra 1 | 2 450.0 | – | DC | 0.65 | 420 | 0.27 | 0.44 | 3.05 | 0.71 | 0.38 | 68 | 469 | Moogooree Limestone |
| Kybra 1 | 2 452.0 | – | DC | 0.58 | 427 | 0.23 | 0.48 | 1.01 | 0.71 | 0.32 | 83 | 174 | Moogooree Limestone |
| Kybra 1 | 2 475.0 | – | DC | 0.73 | 420 | 0.28 | 0.5 | 3.46 | 0.78 | 0.36 | 68 | 474 | Moogooree Limestone |
| Kybra 1 | 2 500.0 | – | DC | 0.28 | – | – | – | – | – | – | – | – | Moogooree Limestone |
| Kybra 1 | 2 507.0 | – | SWC | 0.46 | – | – | – | – | – | – | – | – | Moogooree Limestone |
| Kybra 1 | 2 525.0 | – | DC | 0.26 | – | – | – | – | – | – | – | – | Moogooree Limestone |
| Kybra 1 | 2 542.0 | – | SWC | 0.8 | 436 | 0.18 | 0.45 | 0.42 | 0.63 | 0.29 | 56 | 53 | Moogooree Limestone |
| Kybra 1 | 2 550.0 | – | DC | 0.32 | – | – | – | – | – | – | – | – | Moogooree Limestone |

**NOTES:**

TOC: total organic carbon
$T_{max}$: temperature of maximum pyrolytic yield ($S_2$)
$S_1$: existing hydrocarbons (HC)
$S_2$: pyrolytic yield (HC)
$S_3$: organic carbon dioxide
$S_1 + S_2$: potential yield
PI: production index
HI: hydrogen index
OI: oxygen index
CC: conventional core
DC: ditch cuttings
SWC: side wall core

## Appendix 6

# Pyrolysis-gas chromatography data

**Table 6.1. Alkane and alkene component**

| *Well* | *Depth (m)* | *Carbon no.* | *Alkane A* | *Alkane B* | *Alkane C* | *Alkene A* | *Alkene B* | *Alkene C* | *Alkane + Alkene A* | *Alkane + Alkene B* | *Alkane + Alkene C* | *Alkane/ Alkene* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Barrabiddy 1 | 115.4 | 1 | – | – | – | – | – | – | – | – | – | – |
| | core | 2 | – | – | – | – | – | – | – | – | – | – |
| | | 3 | – | – | – | – | – | – | – | – | – | – |
| | | 4 | – | – | – | – | – | – | – | – | – | – |
| | | 5 | 2.760 | 0.184 | 0.063 | 2.619 | 0.175 | 0.060 | 5.379 | 0.359 | 0.123 | 1.05 |
| | | 6 | 1.328 | 0.089 | 0.030 | 1.801 | 0.120 | 0.041 | 3.129 | 0.209 | 0.072 | 0.74 |
| | | 7 | 1.343 | 0.090 | 0.031 | 1.256 | 0.084 | 0.029 | 2.599 | 0.173 | 0.060 | 1.07 |
| | | 8 | 0.949 | 0.063 | 0.022 | 0.931 | 0.062 | 0.021 | 1.880 | 0.125 | 0.043 | 1.02 |
| | | 9 | 0.528 | 0.035 | 0.012 | 0.659 | 0.044 | 0.015 | 1.187 | 0.079 | 0.027 | 0.80 |
| | | 10 | 0.414 | 0.028 | 0.009 | 0.911 | 0.061 | 0.021 | 1.325 | 0.088 | 0.030 | 0.45 |
| | | 11 | 0.478 | 0.032 | 0.011 | 0.559 | 0.037 | 0.013 | 1.037 | 0.069 | 0.024 | 0.86 |
| | | 12 | 0.273 | 0.018 | 0.006 | 0.434 | 0.029 | 0.010 | 0.707 | 0.047 | 0.016 | 0.63 |
| | | 13 | 0.308 | 0.021 | 0.007 | 0.256 | 0.017 | 0.006 | 0.564 | 0.038 | 0.013 | 1.20 |
| | | 14 | 0.219 | 0.015 | 0.005 | 0.398 | 0.027 | 0.009 | 0.617 | 0.041 | 0.014 | 0.55 |
| | | 15 | 0.337 | 0.022 | 0.008 | 0.161 | 0.011 | 0.004 | 0.498 | 0.033 | 0.011 | 2.09 |
| | | 16 | 0.184 | 0.012 | 0.004 | 0.112 | 0.007 | 0.003 | 0.296 | 0.020 | 0.007 | 1.64 |
| | | 17 | 0.247 | 0.016 | 0.006 | 0.045 | 0.003 | 0.001 | 0.292 | 0.019 | 0.007 | 5.49 |
| | | 18 | 0.159 | 0.011 | 0.004 | 0.090 | 0.006 | 0.002 | 0.249 | 0.017 | 0.006 | 1.77 |
| | | 19 | 0.130 | 0.009 | 0.003 | 0.073 | 0.005 | 0.002 | 0.203 | 0.014 | 0.005 | 1.78 |
| | | 20 | 0.092 | 0.006 | 0.002 | 0.054 | 0.004 | 0.001 | 0.146 | 0.010 | 0.003 | 1.70 |
| | | 21 | 0.119 | 0.008 | 0.003 | 0.034 | 0.002 | 0.001 | 0.153 | 0.010 | 0.004 | 3.50 |
| | | 22 | 0.094 | 0.006 | 0.002 | 0.000 | 0.000 | 0.000 | 0.094 | 0.006 | 0.002 | – |
| | | 23 | 0.069 | 0.005 | 0.002 | 0.000 | 0.000 | 0.000 | 0.069 | 0.005 | 0.002 | – |
| | | 24 | 0.045 | 0.003 | 0.001 | 0.000 | 0.000 | 0.000 | 0.045 | 0.003 | 0.001 | – |
| | | 25 | 0.032 | 0.002 | 0.001 | 0.000 | 0.000 | 0.000 | 0.032 | 0.002 | 0.001 | – |
| | | 26 | 0.021 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.021 | 0.001 | 0.000 | – |
| | | 27 | 0.019 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.019 | 0.001 | 0.000 | – |
| | | 28 | 0.012 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.012 | 0.001 | 0.000 | – |
| | | 29 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | – |
| | | 30 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | – |
| | | 31 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | – |
| Barrabiddy 1A | 655.4 | 1 | – | – | – | – | – | – | – | – | – | – |
| | core | 2 | – | – | – | – | – | – | – | – | – | – |
| | | 3 | – | – | – | – | – | – | – | – | – | – |
| | | 4 | – | – | – | – | – | – | – | – | – | – |
| | | 5 | 2.084 | 0.407 | 0.041 | 2.084 | 0.407 | 0.041 | 4.168 | 0.814 | 0.082 | 1.00 |
| | | 6 | 1.123 | 0.219 | 0.022 | 1.185 | 0.231 | 0.023 | 2.308 | 0.451 | 0.046 | 0.95 |
| | | 7 | 0.916 | 0.179 | 0.018 | 0.937 | 0.183 | 0.019 | 1.853 | 0.362 | 0.037 | 0.98 |
| | | 8 | 0.679 | 0.133 | 0.013 | 0.764 | 0.149 | 0.015 | 1.443 | 0.282 | 0.029 | 0.89 |
| | | 9 | 0.554 | 0.108 | 0.011 | 0.617 | 0.121 | 0.012 | 1.171 | 0.229 | 0.023 | 0.90 |
| | | 10 | 0.588 | 0.115 | 0.012 | 0.566 | 0.111 | 0.011 | 1.154 | 0.225 | 0.023 | 1.04 |
| | | 11 | 0.494 | 0.096 | 0.010 | 0.549 | 0.107 | 0.011 | 1.043 | 0.204 | 0.021 | 0.90 |
| | | 12 | 0.543 | 0.106 | 0.011 | 0.552 | 0.108 | 0.011 | 1.095 | 0.214 | 0.022 | 0.98 |
| | | 13 | 0.424 | 0.083 | 0.008 | 0.582 | 0.114 | 0.012 | 1.006 | 0.196 | 0.020 | 0.73 |
| | | 14 | 0.343 | 0.067 | 0.007 | 0.613 | 0.120 | 0.012 | 0.956 | 0.187 | 0.019 | 0.56 |
| | | 15 | 0.382 | 0.075 | 0.008 | 0.257 | 0.050 | 0.005 | 0.639 | 0.125 | 0.013 | 1.49 |
| | | 16 | 0.320 | 0.062 | 0.006 | 0.217 | 0.042 | 0.004 | 0.537 | 0.105 | 0.011 | 1.47 |
| | | 17 | 0.430 | 0.084 | 0.008 | 0.158 | 0.031 | 0.003 | 0.588 | 0.115 | 0.012 | 2.72 |
| | | 18 | 0.175 | 0.034 | 0.003 | 0.172 | 0.034 | 0.003 | 0.347 | 0.068 | 0.007 | 1.02 |
| | | 19 | 0.164 | 0.032 | 0.003 | 0.143 | 0.028 | 0.003 | 0.307 | 0.060 | 0.006 | 1.15 |
| | | 20 | 0.146 | 0.029 | 0.003 | 0.111 | 0.022 | 0.002 | 0.257 | 0.050 | 0.005 | 1.32 |
| | | 21 | 0.179 | 0.035 | 0.004 | 0.135 | 0.026 | 0.003 | 0.314 | 0.061 | 0.006 | 1.33 |
| | | 22 | 0.160 | 0.031 | 0.003 | 0.090 | 0.018 | 0.002 | 0.250 | 0.049 | 0.005 | 1.78 |
| | | 23 | 0.144 | 0.028 | 0.003 | 0.070 | 0.014 | 0.001 | 0.214 | 0.042 | 0.004 | 2.06 |
| | | 24 | 0.090 | 0.018 | 0.002 | 0.085 | 0.017 | 0.002 | 0.175 | 0.034 | 0.003 | 1.06 |

**Table 6.1.** (continued)

| Well | Depth (m) | Carbon no. | Alkane A | Alkane B | Alkane C | Alkene A | Alkene B | Alkene C | Alkane + Alkene A | Alkane + Alkene B | Alkane + Alkene C | Alkane/ Alkene |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Barrabiddy 1A (cont.) | 655.4 core | 25 | 0.084 | 0.016 | 0.002 | 0.050 | 0.010 | 0.001 | 0.134 | 0.026 | 0.003 | 1.68 |
| | | 26 | 0.066 | 0.013 | 0.001 | 0.041 | 0.008 | 0.001 | 0.107 | 0.021 | 0.002 | 1.61 |
| | | 27 | 0.067 | 0.013 | 0.001 | 0.030 | 0.006 | 0.001 | 0.097 | 0.019 | 0.002 | 2.23 |
| | | 28 | 0.038 | 0.007 | 0.001 | 0.027 | 0.005 | 0.001 | 0.065 | 0.013 | 0.001 | 1.41 |
| | | 29 | 0.030 | 0.006 | 0.001 | 0.022 | 0.004 | 0.000 | 0.052 | 0.010 | 0.001 | 1.36 |
| | | 30 | 0.024 | 0.005 | 0.000 | 0.011 | 0.002 | 0.000 | 0.035 | 0.007 | 0.001 | 2.18 |
| | | 31 | 0.016 | 0.003 | 0.000 | 0.009 | 0.002 | 0.000 | 0.025 | 0.005 | 0.000 | 1.78 |
| Barrabiddy 1A | 678.2 core | 1 | – | – | – | – | – | – | – | – | – | – |
| | | 2 | – | – | – | – | – | – | – | – | – | – |
| | | 3 | – | – | – | – | – | – | – | – | – | – |
| | | 4 | – | – | – | – | – | – | – | – | – | – |
| | | 5 | 1.272 | 0.137 | 0.026 | 1.272 | 0.137 | 0.026 | 2.544 | 0.274 | 0.053 | 1.00 |
| | | 6 | 0.690 | 0.074 | 0.014 | 1.068 | 0.115 | 0.022 | 1.758 | 0.190 | 0.036 | 0.65 |
| | | 7 | 0.771 | 0.083 | 0.016 | 0.860 | 0.093 | 0.018 | 1.631 | 0.176 | 0.034 | 0.90 |
| | | 8 | 0.532 | 0.057 | 0.011 | 0.652 | 0.070 | 0.013 | 1.184 | 0.128 | 0.024 | 0.82 |
| | | 9 | 0.440 | 0.047 | 0.009 | 0.548 | 0.059 | 0.011 | 0.988 | 0.107 | 0.020 | 0.80 |
| | | 10 | 0.513 | 0.055 | 0.011 | 0.529 | 0.057 | 0.011 | 1.042 | 0.112 | 0.022 | 0.97 |
| | | 11 | 0.465 | 0.050 | 0.010 | 0.512 | 0.055 | 0.011 | 0.977 | 0.105 | 0.020 | 0.91 |
| | | 12 | 0.386 | 0.042 | 0.008 | 0.524 | 0.056 | 0.011 | 0.910 | 0.098 | 0.019 | 0.74 |
| | | 13 | 0.357 | 0.038 | 0.007 | 0.528 | 0.057 | 0.011 | 0.885 | 0.095 | 0.018 | 0.68 |
| | | 14 | 0.289 | 0.031 | 0.006 | 0.709 | 0.076 | 0.015 | 0.998 | 0.108 | 0.021 | 0.41 |
| | | 15 | 0.383 | 0.041 | 0.008 | 0.251 | 0.027 | 0.005 | 0.634 | 0.068 | 0.013 | 1.53 |
| | | 16 | 0.099 | 0.011 | 0.002 | 0.217 | 0.023 | 0.004 | 0.316 | 0.034 | 0.007 | 0.46 |
| | | 17 | 0.462 | 0.050 | 0.010 | 0.162 | 0.017 | 0.003 | 0.624 | 0.067 | 0.013 | 2.85 |
| | | 18 | 0.194 | 0.021 | 0.004 | 0.190 | 0.020 | 0.004 | 0.384 | 0.041 | 0.008 | 1.02 |
| | | 19 | 0.147 | 0.016 | 0.003 | 0.150 | 0.016 | 0.003 | 0.297 | 0.032 | 0.006 | 0.98 |
| | | 20 | 0.130 | 0.014 | 0.003 | 0.102 | 0.011 | 0.002 | 0.232 | 0.025 | 0.005 | 1.27 |
| | | 21 | 0.176 | 0.019 | 0.004 | 0.157 | 0.017 | 0.003 | 0.333 | 0.036 | 0.007 | 1.12 |
| | | 22 | 0.159 | 0.017 | 0.003 | 0.105 | 0.011 | 0.002 | 0.264 | 0.028 | 0.005 | 1.51 |
| | | 23 | 0.123 | 0.013 | 0.003 | 0.079 | 0.009 | 0.002 | 0.202 | 0.022 | 0.004 | 1.56 |
| | | 24 | 0.084 | 0.009 | 0.002 | 0.098 | 0.011 | 0.002 | 0.182 | 0.020 | 0.004 | 0.86 |
| | | 25 | 0.077 | 0.008 | 0.002 | 0.061 | 0.007 | 0.001 | 0.138 | 0.015 | 0.003 | 1.26 |
| | | 26 | 0.065 | 0.007 | 0.001 | 0.042 | 0.005 | 0.001 | 0.107 | 0.012 | 0.002 | 1.55 |
| | | 27 | 0.059 | 0.006 | 0.001 | 0.034 | 0.004 | 0.001 | 0.093 | 0.010 | 0.002 | 1.74 |
| | | 28 | 0.037 | 0.004 | 0.001 | 0.029 | 0.003 | 0.001 | 0.066 | 0.007 | 0.001 | 1.28 |
| | | 29 | 0.030 | 0.003 | 0.001 | 0.029 | 0.003 | 0.001 | 0.059 | 0.006 | 0.001 | 1.03 |
| | | 30 | 0.025 | 0.003 | 0.001 | 0.011 | 0.001 | 0.000 | 0.036 | 0.004 | 0.001 | 2.27 |
| | | 31 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | – |
| Barrabiddy 1A | 705.5 core | 1 | – | – | – | – | – | – | – | – | – | – |
| | | 2 | – | – | – | – | – | – | – | – | – | – |
| | | 3 | – | – | – | – | – | – | – | – | – | – |
| | | 4 | – | – | – | – | – | – | – | – | – | – |
| | | 5 | 1.940 | 0.283 | 0.038 | 2.000 | 0.292 | 0.039 | 3.940 | 0.574 | 0.076 | 0.97 |
| | | 6 | 0.861 | 0.126 | 0.017 | 0.946 | 0.138 | 0.018 | 1.807 | 0.263 | 0.035 | 0.91 |
| | | 7 | 0.677 | 0.099 | 0.013 | 0.727 | 0.106 | 0.014 | 1.404 | 0.205 | 0.027 | 0.93 |
| | | 8 | 0.514 | 0.075 | 0.010 | 0.620 | 0.090 | 0.012 | 1.134 | 0.165 | 0.022 | 0.83 |
| | | 9 | 0.434 | 0.063 | 0.008 | 0.510 | 0.074 | 0.010 | 0.944 | 0.138 | 0.018 | 0.85 |
| | | 10 | 0.487 | 0.071 | 0.009 | 0.482 | 0.070 | 0.009 | 0.969 | 0.141 | 0.019 | 1.01 |
| | | 11 | 0.412 | 0.060 | 0.008 | 0.475 | 0.069 | 0.009 | 0.887 | 0.129 | 0.017 | 0.87 |
| | | 12 | 0.414 | 0.060 | 0.008 | 0.530 | 0.077 | 0.010 | 0.944 | 0.138 | 0.018 | 0.78 |
| | | 13 | 0.388 | 0.057 | 0.008 | 0.421 | 0.061 | 0.008 | 0.809 | 0.118 | 0.016 | 0.92 |
| | | 14 | 0.301 | 0.044 | 0.006 | 0.162 | 0.024 | 0.003 | 0.463 | 0.068 | 0.009 | 1.86 |
| | | 15 | 0.410 | 0.060 | 0.008 | 0.267 | 0.039 | 0.005 | 0.677 | 0.099 | 0.013 | 1.54 |
| | | 16 | 0.094 | 0.014 | 0.002 | 0.212 | 0.031 | 0.004 | 0.306 | 0.045 | 0.006 | 0.44 |
| | | 17 | 0.304 | 0.044 | 0.006 | 0.170 | 0.025 | 0.003 | 0.474 | 0.069 | 0.009 | 1.79 |
| | | 18 | 0.212 | 0.031 | 0.004 | 0.200 | 0.029 | 0.004 | 0.412 | 0.060 | 0.008 | 1.06 |
| | | 19 | 0.170 | 0.025 | 0.003 | 0.204 | 0.030 | 0.004 | 0.374 | 0.055 | 0.007 | 0.83 |
| | | 20 | 0.130 | 0.019 | 0.003 | 0.128 | 0.019 | 0.002 | 0.258 | 0.038 | 0.005 | 1.02 |
| | | 21 | 0.175 | 0.026 | 0.003 | 0.161 | 0.023 | 0.003 | 0.336 | 0.049 | 0.007 | 1.09 |
| | | 22 | 0.179 | 0.026 | 0.003 | 0.117 | 0.017 | 0.002 | 0.296 | 0.043 | 0.006 | 1.53 |
| | | 23 | 0.165 | 0.024 | 0.003 | 0.099 | 0.014 | 0.002 | 0.264 | 0.038 | 0.005 | 1.67 |
| | | 24 | 0.088 | 0.013 | 0.002 | 0.130 | 0.019 | 0.003 | 0.218 | 0.032 | 0.004 | 0.68 |
| | | 25 | 0.094 | 0.014 | 0.002 | 0.083 | 0.012 | 0.002 | 0.177 | 0.026 | 0.003 | 1.13 |
| | | 26 | 0.082 | 0.012 | 0.002 | 0.058 | 0.008 | 0.001 | 0.140 | 0.020 | 0.003 | 1.41 |
| | | 27 | 0.062 | 0.009 | 0.001 | 0.044 | 0.006 | 0.001 | 0.106 | 0.015 | 0.002 | 1.41 |

**Table 6.1.** (continued)

| Well | Depth (m) | Carbon no. | Alkane A | Alkane B | Alkane C | Alkene A | Alkene B | Alkene C | Alkane + Alkene A | Alkane + Alkene B | Alkane + Alkene C | Alkane/ Alkene |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Barrabiddy 1A | 705.5 | 28 | 0.037 | 0.005 | 0.001 | 0.033 | 0.005 | 0.001 | 0.070 | 0.010 | 0.001 | 1.12 |
| (cont.) | | 29 | 0.037 | 0.005 | 0.001 | 0.014 | 0.002 | 0.000 | 0.051 | 0.007 | 0.001 | 2.64 |
| | | 30 | 0.025 | 0.004 | 0.000 | 0.020 | 0.003 | 0.000 | 0.045 | 0.007 | 0.001 | 1.25 |
| | | 31 | 0.014 | 0.002 | 0.000 | 0.010 | 0.001 | 0.000 | 0.024 | 0.003 | 0.000 | 1.40 |
| Barrabiddy 1A | 713.4 | 1 | – | – | – | – | – | – | – | – | – | – |
| | core | 2 | – | – | – | – | – | – | – | – | – | – |
| | | 3 | – | – | – | – | – | – | – | – | – | – |
| | | 4 | – | – | – | – | – | – | – | – | – | – |
| | | 5 | 1.590 | 0.143 | 0.025 | 1.590 | 0.143 | 0.025 | 3.180 | 0.287 | 0.050 | 1.00 |
| | | 6 | 0.712 | 0.064 | 0.011 | 0.882 | 0.079 | 0.011 | 1.594 | 0.144 | 0.025 | 0.81 |
| | | 7 | 0.706 | 0.064 | 0.011 | 1.336 | 0.120 | 0.016 | 2.042 | 0.184 | 0.032 | 0.53 |
| | | 8 | 0.458 | 0.041 | 0.007 | 0.522 | 0.047 | 0.006 | 0.980 | 0.088 | 0.015 | 0.88 |
| | | 9 | 0.356 | 0.032 | 0.006 | 0.435 | 0.039 | 0.005 | 0.791 | 0.071 | 0.012 | 0.82 |
| | | 10 | 0.426 | 0.038 | 0.007 | 0.399 | 0.036 | 0.005 | 0.825 | 0.074 | 0.013 | 1.07 |
| | | 11 | 0.347 | 0.031 | 0.005 | 0.389 | 0.035 | 0.005 | 0.736 | 0.066 | 0.011 | 0.89 |
| | | 12 | 0.384 | 0.035 | 0.006 | 0.418 | 0.038 | 0.005 | 0.802 | 0.072 | 0.013 | 0.92 |
| | | 13 | 0.406 | 0.037 | 0.006 | 0.559 | 0.050 | 0.007 | 0.965 | 0.087 | 0.015 | 0.73 |
| | | 14 | 0.208 | 0.019 | 0.003 | 0.231 | 0.021 | 0.003 | 0.439 | 0.040 | 0.007 | 0.90 |
| | | 15 | 0.312 | 0.028 | 0.005 | 0.196 | 0.018 | 0.002 | 0.508 | 0.046 | 0.008 | 1.59 |
| | | 16 | 0.092 | 0.008 | 0.001 | 0.144 | 0.013 | 0.002 | 0.236 | 0.021 | 0.004 | 0.64 |
| | | 17 | 0.454 | 0.041 | 0.007 | 0.118 | 0.011 | 0.001 | 0.572 | 0.052 | 0.009 | 3.85 |
| | | 18 | 0.101 | 0.009 | 0.002 | 0.142 | 0.013 | 0.002 | 0.243 | 0.022 | 0.004 | 0.71 |
| | | 19 | 0.118 | 0.011 | 0.002 | 0.141 | 0.013 | 0.002 | 0.259 | 0.023 | 0.004 | 0.84 |
| | | 20 | 0.098 | 0.009 | 0.002 | 0.212 | 0.019 | 0.003 | 0.310 | 0.028 | 0.005 | 0.46 |
| | | 21 | 0.144 | 0.013 | 0.002 | 0.108 | 0.010 | 0.001 | 0.252 | 0.023 | 0.004 | 1.33 |
| | | 22 | 0.182 | 0.016 | 0.003 | 0.068 | 0.006 | 0.001 | 0.250 | 0.023 | 0.004 | 2.68 |
| | | 23 | 0.173 | 0.016 | 0.003 | 0.060 | 0.005 | 0.001 | 0.233 | 0.021 | 0.004 | 2.88 |
| | | 24 | 0.044 | 0.004 | 0.001 | 0.044 | 0.004 | 0.001 | 0.088 | 0.008 | 0.001 | 1.00 |
| | | 25 | 0.068 | 0.006 | 0.001 | 0.044 | 0.004 | 0.001 | 0.112 | 0.010 | 0.002 | 1.55 |
| | | 26 | 0.058 | 0.005 | 0.001 | 0.000 | 0.000 | 0.000 | 0.058 | 0.005 | 0.001 | – |
| | | 27 | 0.097 | 0.009 | 0.002 | 0.000 | 0.000 | 0.000 | 0.097 | 0.009 | 0.002 | – |
| | | 28 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | – |
| | | 29 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | – |
| | | 30 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | – |
| | | 31 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | – |
| Coburn 1 | 606.2 | 1 | – | – | – | – | – | – | – | – | – | – |
| | core | 2 | – | – | – | – | – | – | – | – | – | – |
| | | 3 | – | – | – | – | – | – | – | – | – | – |
| | | 4 | – | – | – | – | – | – | – | – | – | – |
| | | 5 | 2.108 | 0.089 | 0.072 | 1.812 | 0.077 | 0.062 | 3.920 | 0.166 | 0.135 | 1.16 |
| | | 6 | 1.193 | 0.050 | 0.041 | 2.017 | 0.085 | 0.069 | 3.210 | 0.136 | 0.110 | 0.59 |
| | | 7 | 1.565 | 0.066 | 0.054 | 1.642 | 0.069 | 0.056 | 3.207 | 0.136 | 0.110 | 0.95 |
| | | 8 | 1.243 | 0.053 | 0.043 | 1.272 | 0.054 | 0.044 | 2.515 | 0.106 | 0.086 | 0.98 |
| | | 9 | 0.840 | 0.036 | 0.029 | 1.071 | 0.045 | 0.037 | 1.911 | 0.081 | 0.066 | 0.78 |
| | | 10 | 0.957 | 0.040 | 0.033 | 0.958 | 0.041 | 0.033 | 1.915 | 0.081 | 0.066 | 1.00 |
| | | 11 | 0.768 | 0.032 | 0.026 | 0.999 | 0.042 | 0.034 | 1.767 | 0.075 | 0.061 | 0.77 |
| | | 12 | 0.667 | 0.028 | 0.023 | 0.886 | 0.037 | 0.030 | 1.553 | 0.066 | 0.053 | 0.75 |
| | | 13 | 0.749 | 0.032 | 0.026 | 0.712 | 0.030 | 0.024 | 1.461 | 0.062 | 0.050 | 1.05 |
| | | 14 | 0.526 | 0.022 | 0.018 | 0.450 | 0.019 | 0.015 | 0.976 | 0.041 | 0.034 | 1.17 |
| | | 15 | 0.564 | 0.024 | 0.019 | 0.340 | 0.014 | 0.012 | 0.904 | 0.038 | 0.031 | 1.66 |
| | | 16 | 0.459 | 0.019 | 0.016 | 0.247 | 0.010 | 0.008 | 0.706 | 0.030 | 0.024 | 1.86 |
| | | 17 | 0.402 | 0.017 | 0.014 | 0.252 | 0.011 | 0.009 | 0.654 | 0.028 | 0.022 | 1.60 |
| | | 18 | 0.344 | 0.015 | 0.012 | 0.217 | 0.009 | 0.007 | 0.561 | 0.024 | 0.019 | 1.59 |
| | | 19 | 0.261 | 0.011 | 0.009 | 0.105 | 0.004 | 0.004 | 0.366 | 0.015 | 0.013 | 2.49 |
| | | 20 | 0.257 | 0.011 | 0.009 | 0.073 | 0.003 | 0.003 | 0.330 | 0.014 | 0.011 | 3.52 |
| | | 21 | 0.210 | 0.009 | 0.007 | 0.045 | 0.002 | 0.002 | 0.255 | 0.011 | 0.009 | 4.67 |
| | | 22 | 0.148 | 0.006 | 0.005 | 0.021 | 0.001 | 0.001 | 0.169 | 0.007 | 0.006 | 7.05 |
| | | 23 | 0.180 | 0.008 | 0.006 | 0.000 | 0.000 | 0.000 | 0.180 | 0.008 | 0.006 | – |
| | | 24 | 0.070 | 0.003 | 0.002 | 0.000 | 0.000 | 0.000 | 0.070 | 0.003 | 0.002 | – |
| | | 25 | 0.036 | 0.002 | 0.001 | 0.000 | 0.000 | 0.000 | 0.036 | 0.002 | 0.001 | – |
| | | 26 | 0.016 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 | 0.016 | 0.001 | 0.001 | – |
| | | 27 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | – |
| | | 28 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | – |
| | | 29 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | – |

**Table 6.1.** (continued)

| Well | Depth (m) | Carbon no. | Alkane A | Alkane B | Alkane C | Alkene A | Alkene B | Alkene C | Alkane + Alkene A | Alkane + Alkene B | Alkane + Alkene C | Alkane/ Alkene |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Coburn 1 | 606.2 | 30 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | – |
| (cont.) | core | 31 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | – |
| Coburn 1 | 623.9 | 1 | – | – | – | – | – | – | – | – | – | – |
| | core | 2 | – | – | – | – | – | – | – | – | – | – |
| | | 3 | – | – | – | – | – | – | – | – | – | – |
| | | 4 | – | – | – | – | – | – | – | – | – | – |
| | | 5 | 1.365 | 0.074 | 0.036 | 3.181 | 0.173 | 0.084 | 4.546 | 0.247 | 0.120 | 0.43 |
| | | 6 | 0.921 | 0.050 | 0.024 | 1.199 | 0.065 | 0.032 | 2.120 | 0.115 | 0.056 | 0.77 |
| | | 7 | 1.029 | 0.056 | 0.027 | 0.970 | 0.053 | 0.026 | 1.999 | 0.109 | 0.053 | 1.06 |
| | | 8 | 0.696 | 0.038 | 0.018 | 0.695 | 0.038 | 0.018 | 1.391 | 0.076 | 0.037 | 1.00 |
| | | 9 | 0.450 | 0.024 | 0.012 | 0.514 | 0.028 | 0.014 | 0.964 | 0.052 | 0.025 | 0.88 |
| | | 10 | 0.707 | 0.038 | 0.019 | 0.381 | 0.021 | 0.010 | 1.088 | 0.059 | 0.029 | 1.86 |
| | | 11 | 0.545 | 0.030 | 0.014 | 0.439 | 0.024 | 0.012 | 0.984 | 0.053 | 0.026 | 1.24 |
| | | 12 | 0.301 | 0.016 | 0.008 | 0.354 | 0.019 | 0.009 | 0.655 | 0.036 | 0.017 | 0.85 |
| | | 13 | 0.239 | 0.013 | 0.006 | 0.225 | 0.012 | 0.006 | 0.464 | 0.025 | 0.012 | 1.06 |
| | | 14 | 0.183 | 0.010 | 0.005 | 0.090 | 0.005 | 0.002 | 0.273 | 0.015 | 0.007 | 2.03 |
| | | 15 | 0.053 | 0.003 | 0.001 | 0.074 | 0.004 | 0.002 | 0.127 | 0.007 | 0.003 | 0.72 |
| | | 16 | 0.175 | 0.010 | 0.005 | 0.174 | 0.009 | 0.005 | 0.349 | 0.019 | 0.009 | 1.01 |
| | | 17 | 0.203 | 0.011 | 0.005 | 0.106 | 0.006 | 0.003 | 0.309 | 0.017 | 0.008 | 1.92 |
| | | 18 | 0.063 | 0.003 | 0.002 | 0.086 | 0.005 | 0.002 | 0.149 | 0.008 | 0.004 | 0.73 |
| | | 19 | 0.082 | 0.004 | 0.002 | 0.044 | 0.002 | 0.001 | 0.126 | 0.007 | 0.003 | 1.86 |
| | | 20 | 0.032 | 0.002 | 0.001 | 0.021 | 0.001 | 0.001 | 0.053 | 0.003 | 0.001 | 1.52 |
| | | 21 | 0.056 | 0.003 | 0.001 | 0.024 | 0.001 | 0.001 | 0.080 | 0.004 | 0.002 | 2.33 |
| | | 22 | 0.031 | 0.002 | 0.001 | 0.009 | 0.000 | 0.000 | 0.040 | 0.002 | 0.001 | 3.44 |
| | | 23 | 0.037 | 0.002 | 0.001 | 0.012 | 0.001 | 0.000 | 0.049 | 0.003 | 0.001 | 3.08 |
| | | 24 | 0.022 | 0.001 | 0.001 | 0.011 | 0.001 | 0.000 | 0.033 | 0.002 | 0.001 | 2.00 |
| | | 25 | 0.014 | 0.001 | 0.000 | 0.006 | 0.000 | 0.000 | 0.020 | 0.001 | 0.001 | 2.33 |
| | | 26 | 0.015 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.015 | 0.001 | 0.000 | – |
| | | 27 | 0.010 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.010 | 0.001 | 0.000 | – |
| | | 28 | 0.004 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.004 | 0.000 | 0.000 | – |
| | | 29 | 0.008 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.008 | 0.000 | 0.000 | – |
| | | 30 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | – |
| | | 31 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | – |
| Gneudna 1 | 300.4 | 1 | – | – | – | – | – | – | – | – | – | – |
| | core | 2 | – | – | – | – | – | – | – | – | – | – |
| | | 3 | – | – | – | – | – | – | – | – | – | – |
| | | 4 | – | – | – | – | – | – | – | – | – | – |
| | | 5 | 1.969 | 0.168 | 0.068 | 2.000 | 0.171 | 0.069 | 3.969 | 0.339 | 0.138 | 0.98 |
| | | 6 | 1.572 | 0.134 | 0.055 | 2.363 | 0.202 | 0.082 | 3.935 | 0.336 | 0.136 | 0.67 |
| | | 7 | 1.768 | 0.151 | 0.061 | 1.839 | 0.157 | 0.064 | 3.607 | 0.308 | 0.125 | 0.96 |
| | | 8 | 1.567 | 0.134 | 0.054 | 1.513 | 0.129 | 0.052 | 3.080 | 0.263 | 0.107 | 1.04 |
| | | 9 | 1.144 | 0.098 | 0.040 | 1.119 | 0.095 | 0.039 | 2.263 | 0.193 | 0.078 | 1.02 |
| | | 10 | 1.225 | 0.104 | 0.042 | 0.972 | 0.083 | 0.034 | 2.197 | 0.187 | 0.076 | 1.26 |
| | | 11 | 0.851 | 0.073 | 0.030 | 0.752 | 0.064 | 0.026 | 1.603 | 0.137 | 0.056 | 1.13 |
| | | 12 | 0.727 | 0.062 | 0.025 | 0.679 | 0.058 | 0.024 | 1.406 | 0.120 | 0.049 | 1.07 |
| | | 13 | 0.513 | 0.044 | 0.018 | 0.488 | 0.042 | 0.017 | 1.001 | 0.085 | 0.035 | 1.05 |
| | | 14 | 0.368 | 0.031 | 0.013 | 0.310 | 0.026 | 0.011 | 0.678 | 0.058 | 0.024 | 1.19 |
| | | 15 | 0.282 | 0.024 | 0.010 | 0.133 | 0.011 | 0.005 | 0.415 | 0.035 | 0.014 | 2.12 |
| | | 16 | 0.262 | 0.022 | 0.009 | 0.120 | 0.010 | 0.004 | 0.382 | 0.033 | 0.013 | 2.18 |
| | | 17 | 0.128 | 0.011 | 0.004 | 0.174 | 0.015 | 0.006 | 0.302 | 0.026 | 0.010 | 0.74 |
| | | 18 | 0.113 | 0.010 | 0.004 | 0.119 | 0.010 | 0.004 | 0.232 | 0.020 | 0.008 | 0.95 |
| | | 19 | 0.099 | 0.008 | 0.003 | 0.041 | 0.003 | 0.001 | 0.140 | 0.012 | 0.005 | 2.41 |
| | | 20 | 0.082 | 0.007 | 0.003 | 0.020 | 0.002 | 0.001 | 0.102 | 0.009 | 0.004 | 4.10 |
| | | 21 | 0.062 | 0.005 | 0.002 | 0.017 | 0.001 | 0.001 | 0.079 | 0.007 | 0.003 | 3.65 |
| | | 22 | 0.036 | 0.003 | 0.001 | 0.010 | 0.001 | 0.000 | 0.046 | 0.004 | 0.002 | 3.60 |
| | | 23 | 0.021 | 0.002 | 0.001 | 0.005 | 0.000 | 0.000 | 0.026 | 0.002 | 0.001 | 4.20 |
| | | 24 | 0.014 | 0.001 | 0.000 | 0.008 | 0.001 | 0.000 | 0.022 | 0.002 | 0.001 | 1.75 |
| | | 25 | 0.009 | 0.001 | 0.000 | 0.003 | 0.000 | 0.000 | 0.012 | 0.001 | 0.000 | – |
| | | 26 | 0.007 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.007 | 0.001 | 0.000 | – |
| | | 27 | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 | 0.000 | 0.000 | – |
| | | 28 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | – |
| | | 29 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | – |
| | | 30 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | – |
| | | 31 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | – |

**Table 6.1.** (continued)

| *Well* | *Depth (m)* | *Carbon no.* | *Alkane* | | | *Alkene* | | | *Alkane + Alkene* | | | *Alkane/ Alkene* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | |
| Uranerz CDH 8 | 112.2 | 1 | – | – | – | – | – | – | – | – | – | – |
| | core | 2 | – | – | – | – | – | – | – | – | – | – |
| | | 3 | – | – | – | – | – | – | – | – | – | – |
| | | 4 | – | – | – | – | – | – | – | – | – | – |
| | | 5 | 5.202 | 0.102 | 0.082 | 0.607 | 0.012 | 0.010 | 5.809 | 0.368 | 0.048 | 8.57 |
| | | 6 | 0.933 | 0.018 | 0.015 | 1.905 | 0.038 | 0.030 | 2.838 | 0.180 | 0.023 | 0.49 |
| | | 7 | 1.154 | 0.023 | 0.018 | 1.383 | 0.027 | 0.022 | 2.537 | 0.161 | 0.021 | 0.83 |
| | | 8 | 0.852 | 0.017 | 0.013 | 1.048 | 0.021 | 0.017 | 1.900 | 0.120 | 0.016 | 0.81 |
| | | 9 | 0.620 | 0.012 | 0.010 | 0.817 | 0.016 | 0.013 | 1.437 | 0.091 | 0.012 | 0.76 |
| | | 10 | 0.776 | 0.015 | 0.012 | 0.715 | 0.014 | 0.011 | 1.491 | 0.095 | 0.012 | 1.09 |
| | | 11 | 0.669 | 0.013 | 0.011 | 0.651 | 0.013 | 0.010 | 1.320 | 0.084 | 0.011 | 1.03 |
| | | 12 | 0.667 | 0.013 | 0.011 | 0.834 | 0.016 | 0.013 | 1.501 | 0.095 | 0.012 | 0.80 |
| | | 13 | 0.560 | 0.011 | 0.009 | 0.482 | 0.009 | 0.008 | 1.042 | 0.066 | 0.009 | 1.16 |
| | | 14 | 0.446 | 0.009 | 0.007 | 0.345 | 0.007 | 0.005 | 0.791 | 0.050 | 0.007 | 1.29 |
| | | 15 | 0.439 | 0.009 | 0.007 | 0.215 | 0.004 | 0.003 | 0.654 | 0.041 | 0.005 | 2.04 |
| | | 16 | 0.415 | 0.008 | 0.007 | 0.180 | 0.004 | 0.003 | 0.595 | 0.038 | 0.005 | 2.31 |
| | | 17 | 0.311 | 0.006 | 0.005 | 0.270 | 0.005 | 0.004 | 0.581 | 0.037 | 0.005 | 1.15 |
| | | 18 | 0.262 | 0.005 | 0.004 | 0.120 | 0.002 | 0.002 | 0.382 | 0.024 | 0.003 | 2.18 |
| | | 19 | 0.245 | 0.005 | 0.004 | 0.089 | 0.002 | 0.001 | 0.334 | 0.021 | 0.003 | 2.75 |
| | | 20 | 0.216 | 0.004 | 0.003 | 0.080 | 0.002 | 0.001 | 0.296 | 0.019 | 0.002 | 2.70 |
| | | 21 | 0.181 | 0.004 | 0.003 | 0.050 | 0.001 | 0.001 | 0.231 | 0.015 | 0.002 | 3.62 |
| | | 22 | 0.138 | 0.003 | 0.002 | 0.030 | 0.001 | 0.000 | 0.168 | 0.011 | 0.001 | 4.60 |
| | | 23 | 0.116 | 0.002 | 0.002 | 0.019 | 0.000 | 0.000 | 0.135 | 0.009 | 0.001 | 6.11 |
| | | 24 | 0.085 | 0.002 | 0.001 | 0.027 | 0.001 | 0.000 | 0.112 | 0.007 | 0.001 | 3.15 |
| | | 25 | 0.064 | 0.001 | 0.001 | 0.010 | 0.000 | 0.000 | 0.074 | 0.005 | 0.001 | 6.40 |
| | | 26 | 0.052 | 0.001 | 0.001 | 0.000 | 0.000 | 0.000 | 0.052 | 0.003 | 0.000 | – |
| | | 27 | 0.029 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.029 | 0.002 | 0.000 | – |
| | | 28 | 0.017 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.017 | 0.001 | 0.000 | – |
| | | 29 | 0.014 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.014 | 0.001 | 0.000 | – |
| | | 30 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | – |
| | | 31 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | – |
| Uranerz CDH 8 | 121.0 | 1 | – | – | – | – | – | – | – | – | – | – |
| | core | 2 | – | – | – | – | – | – | – | – | – | – |
| | | 3 | – | – | – | – | – | – | – | – | – | – |
| | | 4 | – | – | – | – | – | – | – | – | – | – |
| | | 5 | 2.057 | 0.120 | 0.038 | 1.907 | 0.111 | 0.035 | 3.964 | 0.231 | 0.073 | 1.08 |
| | | 6 | 0.752 | 0.044 | 0.014 | 1.415 | 0.082 | 0.026 | 2.167 | 0.126 | 0.040 | 0.53 |
| | | 7 | 0.857 | 0.050 | 0.016 | 1.081 | 0.063 | 0.020 | 1.938 | 0.113 | 0.036 | 0.79 |
| | | 8 | 0.666 | 0.039 | 0.012 | 0.897 | 0.052 | 0.017 | 1.563 | 0.091 | 0.029 | 0.74 |
| | | 9 | 0.534 | 0.031 | 0.010 | 0.720 | 0.042 | 0.013 | 1.254 | 0.073 | 0.023 | 0.74 |
| | | 10 | 0.556 | 0.032 | 0.010 | 0.612 | 0.036 | 0.011 | 1.168 | 0.068 | 0.022 | 0.91 |
| | | 11 | 0.450 | 0.026 | 0.008 | 0.615 | 0.036 | 0.011 | 1.065 | 0.062 | 0.020 | 0.73 |
| | | 12 | 0.516 | 0.030 | 0.010 | 0.742 | 0.043 | 0.014 | 1.258 | 0.073 | 0.023 | 0.70 |
| | | 13 | 0.406 | 0.024 | 0.007 | 0.682 | 0.040 | 0.013 | 1.088 | 0.063 | 0.020 | 0.60 |
| | | 14 | 0.329 | 0.019 | 0.006 | 0.373 | 0.022 | 0.007 | 0.702 | 0.041 | 0.013 | 0.88 |
| | | 15 | 0.341 | 0.020 | 0.006 | 0.243 | 0.014 | 0.004 | 0.584 | 0.034 | 0.011 | 1.40 |
| | | 16 | 0.323 | 0.019 | 0.006 | 0.306 | 0.018 | 0.006 | 0.629 | 0.037 | 0.012 | 1.06 |
| | | 17 | 0.327 | 0.019 | 0.006 | 0.230 | 0.013 | 0.004 | 0.557 | 0.032 | 0.010 | 1.42 |
| | | 18 | 0.207 | 0.012 | 0.004 | 0.170 | 0.010 | 0.003 | 0.377 | 0.022 | 0.007 | 1.22 |
| | | 19 | 0.209 | 0.012 | 0.004 | 0.140 | 0.008 | 0.003 | 0.349 | 0.020 | 0.006 | 1.49 |
| | | 20 | 0.202 | 0.012 | 0.004 | 0.144 | 0.008 | 0.003 | 0.346 | 0.020 | 0.006 | 1.40 |
| | | 21 | 0.172 | 0.010 | 0.003 | 0.096 | 0.006 | 0.002 | 0.268 | 0.016 | 0.005 | 1.79 |
| | | 22 | 0.154 | 0.009 | 0.003 | 0.078 | 0.005 | 0.001 | 0.232 | 0.014 | 0.004 | 1.97 |
| | | 23 | 0.139 | 0.008 | 0.003 | 0.072 | 0.004 | 0.001 | 0.211 | 0.012 | 0.004 | 1.93 |
| | | 24 | 0.113 | 0.007 | 0.002 | 0.066 | 0.004 | 0.001 | 0.179 | 0.010 | 0.003 | 1.71 |
| | | 25 | 0.100 | 0.006 | 0.002 | 0.043 | 0.003 | 0.001 | 0.143 | 0.008 | 0.003 | 2.33 |
| | | 26 | 0.079 | 0.005 | 0.001 | 0.021 | 0.001 | 0.000 | 0.100 | 0.006 | 0.002 | 3.76 |
| | | 27 | 0.057 | 0.003 | 0.001 | 0.020 | 0.001 | 0.000 | 0.077 | 0.004 | 0.001 | 2.85 |
| | | 28 | 0.034 | 0.002 | 0.001 | 0.007 | 0.000 | 0.000 | 0.041 | 0.002 | 0.001 | 4.86 |
| | | 29 | 0.039 | 0.002 | 0.001 | 0.000 | 0.000 | 0.000 | 0.039 | 0.002 | 0.001 | – |
| | | 30 | 0.018 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.018 | 0.001 | 0.000 | – |
| | | 31 | 0.013 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.013 | 0.001 | 0.000 | – |

**NOTES:** A: % of resolved compounds in $S_2$
B: mg/g rock (Rock-Eval)
C: (mg/g rock)/TOC

TOC: total organic carbon

**Table 6.2. Aromatic and phenolic component**

| *Well* | *Depth (m)* | *Sample type* | *Key* | *Compound type* | *Value A* | *Value B* | *Value C* |
|---|---|---|---|---|---|---|---|
| Barrabiddy 1 | 115.4 | core | aromatic | Benzene | 2.179 | 0.145 | 0.050 |
| | | | | Toluene | 3.487 | 0.233 | 0.080 |
| | | | | Ethylbenzene | 1.032 | 0.069 | 0.024 |
| | | | | m- + p-xylene | 2.094 | 0.140 | 0.048 |
| | | | | Styrene | 0.460 | 0.031 | 0.011 |
| | | | | o-xylene | 0.857 | 0.057 | 0.020 |
| | | | phenolic | Phenol | 0.581 | 0.039 | 0.013 |
| | | | | o-cresol | 0.417 | 0.028 | 0.010 |
| | | | | m- + p-cresol | 0.319 | 0.021 | 0.007 |
| | | | | $C_2$ phenol | 0.370 | 0.025 | 0.008 |
| | | | | $C_2$ phenol | 0.457 | 0.030 | 0.010 |
| Barrabiddy 1A | 655.4 | core | aromatic | Benzene | 1.060 | 0.207 | 0.021 |
| | | | | Toluene | 1.625 | 0.317 | 0.032 |
| | | | | Ethylbenzene | 0.354 | 0.069 | 0.007 |
| | | | | m- + p-xylene | 1.333 | 0.260 | 0.026 |
| | | | | Styrene | 0.300 | 0.059 | 0.006 |
| | | | | o-xylene | 0.398 | 0.078 | 0.008 |
| | | | phenolic | Phenol | 1.136 | 0.222 | 0.022 |
| | | | | o-cresol | 1.463 | 0.286 | 0.029 |
| | | | | m- + p-cresol | 1.839 | 0.359 | 0.036 |
| | | | | $C_2$ phenol | 1.763 | 0.344 | 0.035 |
| | | | | $C_2$ phenol | 0.535 | 0.104 | 0.011 |
| Barrabiddy 1A | 678.2 | core | aromatic | Benzene | 1.108 | 0.119 | 0.023 |
| | | | | Toluene | 2.096 | 0.226 | 0.043 |
| | | | | Ethylbenzene | 0.300 | 0.032 | 0.006 |
| | | | | m- + p-xylene | 1.556 | 0.168 | 0.032 |
| | | | | Styrene | 0.337 | 0.036 | 0.007 |
| | | | | o-xylene | 0.321 | 0.035 | 0.007 |
| | | | phenolic | Phenol | 1.029 | 0.111 | 0.021 |
| | | | | o-cresol | 0.913 | 0.098 | 0.019 |
| | | | | m- + p-cresol | 2.450 | 0.264 | 0.051 |
| | | | | $C_2$ phenol | 2.041 | 0.220 | 0.042 |
| | | | | $C_2$ phenol | 0.620 | 0.067 | 0.013 |
| Barrabiddy 1A | 705.5 | core | aromatic | Benzene | 1.195 | 0.174 | 0.023 |
| | | | | Toluene | 2.305 | 0.336 | 0.045 |
| | | | | Ethylbenzene | 0.366 | 0.053 | 0.007 |
| | | | | m- + p-xylene | 1.982 | 0.289 | 0.038 |
| | | | | Styrene | 0.355 | 0.052 | 0.007 |
| | | | | o-xylene | 0.407 | 0.059 | 0.008 |
| | | | phenolic | Phenol | 1.756 | 0.256 | 0.034 |
| | | | | o-cresol | 2.655 | 0.387 | 0.051 |
| | | | | m- + p-cresol | 2.745 | 0.400 | 0.053 |
| | | | | $C_2$ phenol | 2.836 | 0.413 | 0.055 |
| | | | | $C_2$ phenol | 0.784 | 0.114 | 0.015 |
| Barrabiddy 1A | 713.4 | core | aromatic | Benzene | 0.850 | 0.077 | 0.013 |
| | | | | Toluene | 2.779 | 0.250 | 0.043 |
| | | | | Ethylbenzene | 0.413 | 0.037 | 0.006 |
| | | | | m- + p-xylene | 1.769 | 0.159 | 0.028 |
| | | | | Styrene | 0.366 | 0.033 | 0.006 |
| | | | | o-xylene | 0.405 | 0.036 | 0.006 |
| | | | phenolic | Phenol | 0.917 | 0.083 | 0.014 |
| | | | | o-cresol | 1.582 | 0.143 | 0.025 |
| | | | | m- + p-cresol | 1.938 | 0.175 | 0.030 |
| | | | | $C_2$ phenol | 1.301 | 0.117 | 0.020 |
| | | | | $C_2$ phenol | 0.861 | 0.078 | 0.013 |
| Coburn 1 | 606.2 | core | aromatic | Benzene | 2.068 | 0.087 | 0.071 |
| | | | | Toluene | 2.099 | 0.089 | 0.072 |
| | | | | Ethylbenzene | 0.580 | 0.025 | 0.020 |
| | | | | m- + p-xylene | 1.598 | 0.068 | 0.055 |
| | | | | Styrene | 0.969 | 0.041 | 0.033 |
| | | | | o-xylene | 1.017 | 0.043 | 0.035 |
| | | | phenolic | Phenol | 0.729 | 0.031 | 0.025 |
| | | | | o-cresol | 0.000 | 0.000 | 0.000 |
| | | | | m- + p-cresol | 0.000 | 0.000 | 0.000 |
| | | | | $C_2$ phenol | 0.000 | 0.000 | 0.000 |
| | | | | $C_2$ phenol | 0.000 | 0.000 | 0.000 |

**Table 6.2.** (continued)

| *Well* | *Depth (m)* | *Sample type* | *Key* | *Compound type* | *Value* | | |
|---|---|---|---|---|---|---|---|
| | | | | | *A* | *B* | *C* |
| Coburn 1 | 623.9 | core | aromatic | Benzene | 1.597 | 0.087 | 0.042 |
| | | | | Toluene | 2.762 | 0.150 | 0.073 |
| | | | | Ethylbenzene | 0.818 | 0.044 | 0.022 |
| | | | | m- + p-xylene | 1.854 | 0.101 | 0.049 |
| | | | | Styrene | 0.481 | 0.026 | 0.013 |
| | | | | o-xylene | 0.730 | 0.040 | 0.019 |
| | | | phenolic | Phenol | 0.979 | 0.053 | 0.026 |
| | | | | o-cresol | 0.197 | 0.011 | 0.005 |
| | | | | m- + p-cresol | 0.439 | 0.024 | 0.012 |
| | | | | $C_2$ phenol | 0.252 | 0.014 | 0.007 |
| | | | | $C_2$ phenol | 0.204 | 0.011 | 0.005 |
| Gneudna 1 | 300.4 | core | aromatic | Benzene | 3.475 | 0.296 | 0.120 |
| | | | | Toluene | 3.371 | 0.288 | 0.117 |
| | | | | Ethylbenzene | 0.826 | 0.070 | 0.029 |
| | | | | m- + p-xylene | 1.504 | 0.128 | 0.052 |
| | | | | Styrene | 0.809 | 0.069 | 0.028 |
| | | | | o-xylene | 0.891 | 0.076 | 0.031 |
| | | | phenolic | Phenol | 0.818 | 0.070 | 0.028 |
| | | | | o-cresol | 0.000 | 0.000 | 0.000 |
| | | | | m- + p-cresol | 0.000 | 0.000 | 0.000 |
| | | | | $C_2$ phenol | 0.000 | 0.000 | 0.000 |
| | | | | $C_2$ phenol | 0.000 | 0.000 | 0.000 |
| Uranerz CDH 8 | 112.2 | – | aromatic | Benzene | 5.352 | 0.339 | 0.044 |
| | | | | Toluene | 3.166 | 0.062 | 0.050 |
| | | | | Ethylebenzene | 0.744 | 0.015 | 0.012 |
| | | | | m- + p-xylene | 1.765 | 0.035 | 0.028 |
| | | | | Styrene | 0.746 | 0.015 | 0.012 |
| | | | | o-xylene | 0.741 | 0.015 | 0.012 |
| | | | phenolic | Phenol | 0.817 | 0.016 | 0.013 |
| | | | | o-cresol | 0.000 | 0.000 | 0.000 |
| | | | | m- + p-cresol | 0.000 | 0.000 | 0.000 |
| | | | | $C_2$ phenol | 0.337 | 0.007 | 0.005 |
| | | | | $C_2$ phenol | 0.500 | 0.010 | 0.008 |
| Uranerz CDH 8 | 121.0 | – | aromatic | Benzene | 2.411 | 0.141 | 0.044 |
| | | | | Toluene | 2.260 | 0.132 | 0.042 |
| | | | | Ethylebenzene | 0.608 | 0.035 | 0.011 |
| | | | | m- + p-xylene | 1.608 | 0.094 | 0.030 |
| | | | | Styrene | 0.518 | 0.030 | 0.010 |
| | | | | o-xylene | 0.603 | 0.035 | 0.011 |
| | | | phenolic | Phenol | 3.029 | 0.177 | 0.056 |
| | | | | o-cresol | 1.668 | 0.097 | 0.031 |
| | | | | m- + p-cresol | 2.221 | 0.129 | 0.041 |
| | | | | $C_2$ phenol | 1.513 | 0.088 | 0.028 |
| | | | | $C_2$ phenol | 0.326 | 0.019 | 0.006 |

**NOTES:** A: % of resolved compounds in $S_2$
B: mg/g rock (Rock-Eval)
C: (mg/g rock)/TOC
TOC: total organic carbon
$S_2$: pyrolytic yield

**Table 6.3. Parameter summary**

| *Well* | *Depth (m)* | *Sample type* | *Parameter* | *A* | *B* | *C* | *D* |
|---|---|---|---|---|---|---|---|
| Barrabiddy 1 | 115.4 | core | $C_1$–$C_4$ abundance (all compounds) | 23.53 | 1.57 | 0.54 | – |
| | | | $C_5$–$C_8$ abundance (all resolved compounds) | 36.38 | 2.43 | 0.83 | – |
| | | | $C_5$–$C_8$ abundance (alkanes + alkenes) | 12.99 | 0.87 | 0.30 | – |
| | | | $C_9$–$C_{14}$ abundance (all resolved compounds) | 35.39 | 2.36 | 0.81 | – |
| | | | $C_9$–$C_{14}$ abundance (alkanes + alkenes) | 5.44 | 0.36 | 0.12 | – |
| | | | $C_{15}$–$C_{31}$ abundance (all resolved compounds) | 4.70 | 0.31 | 0.11 | – |
| | | | $C_{15}$–$C_{31}$ abundance (alkanes + alkenes) | 2.13 | 0.14 | 0.05 | – |
| | | | $C_9$–$C_{31}$ abundance (all resolved compounds) | 40.09 | 2.67 | 0.92 | – |
| | | | $C_9$–$C_{31}$ abundance (alkanes + alkenes) | 7.57 | 0.50 | 0.17 | – |
| | | | $C_5$–$C_{31}$ abundance (all resolved compounds) | 76.47 | 5.10 | 1.75 | – |
| | | | $C_5$–$C_{31}$ abundance (alkanes + alkenes) | 20.55 | 1.37 | 0.47 | – |
| | | | $C_5$–$C_{31}$ alkane abundance | 10.16 | 0.68 | 0.23 | – |
| | | | $C_5$–$C_{31}$ alkene abundance | 10.39 | 0.69 | 0.24 | – |
| | | | $C_5$–$C_8$ alkane/alkene | – | – | – | 0.97 |
| | | | $C_9$–$C_{14}$ alkane/alkene | – | – | – | 0.69 |
| | | | $C_{15}$–$C_{31}$ alkane/alkene | – | – | – | 2.74 |
| | | | $C_5$–$C_{31}$ alkane/alkene | – | – | – | 0.98 |
| | | | $(C_1$–$C_5)/C_{6+}$ | – | – | – | 0.47 |
| | | | R (m + p-xylene/n-octene) | – | – | – | 2.25 |
| Barrabiddy 1A | 655.4 | core | $C_1$–$C_4$ abundance (all compounds) | 39.77 | 7.77 | 0.79 | – |
| | | | $C_5$–$C_8$ abundance (all resolved compounds) | 23.20 | 4.53 | 0.46 | – |
| | | | $C_5$–$C_8$ abundance (alkanes + alkenes) | 9.77 | 1.91 | 0.19 | – |
| | | | $C_9$–$C_{14}$ abundance (all resolved compounds) | 29.19 | 5.70 | 0.58 | – |
| | | | $C_9$–$C_{14}$ abundance (alkanes + alkenes) | 6.43 | 1.26 | 0.13 | – |
| | | | $C_{15}$–$C_{31}$ abundance (all resolved compounds) | 7.84 | 1.53 | 0.15 | – |
| | | | $C_{15}$–$C_{31}$ abundance (alkanes + alkenes) | 4.14 | 0.81 | 0.08 | – |
| | | | $C_9$–$C_{31}$ abundance (all resolved compounds) | 37.03 | 7.23 | 0.73 | – |
| | | | $C_9$–$C_{31}$ abundance (alkanes + alkenes) | 10.57 | 2.06 | 0.21 | – |
| | | | $C_5$–$C_{31}$ abundance (all resolved compounds) | 60.23 | 11.76 | 1.19 | – |
| | | | $C_5$–$C_{31}$ abundance (alkanes + alkenes) | 20.34 | 3.97 | 0.40 | – |
| | | | $C_5$–$C_{31}$ alkane abundance | 10.26 | 2.00 | 0.20 | – |
| | | | $C_5$–$C_{31}$ alkene abundance | 10.08 | 1.97 | 0.20 | – |
| | | | $C_5$–$C_8$ alkane/alkene | – | – | – | 0.97 |
| | | | $C_9$–$C_{14}$ alkane/alkene | – | – | – | 0.85 |
| | | | $C_{15}$–$C_{31}$ alkane/alkene | – | – | – | 1.55 |
| | | | $C_5$–$C_{31}$ alkane/alkene | – | – | – | 1.02 |
| | | | $(C_1$–$C_5)/C_{6+}$ | – | – | – | 0.87 |
| | | | R (m + p-xylene/n-octene) | – | – | – | 1.74 |
| Barrabiddy 1A | 678.2 | core | $C_1$–$C_4$ abundance (all compounds) | 40.64 | 4.38 | 0.84 | – |
| | | | $C_5$–$C_8$ abundance (all resolved compounds) | 20.12 | 2.17 | 0.42 | – |
| | | | $C_5$–$C_8$ abundance (alkanes + alkenes) | 7.12 | 0.77 | 0.15 | – |
| | | | $C_9$–$C_{14}$ abundance (all resolved compounds) | 31.13 | 3.36 | 0.64 | – |
| | | | $C_9$–$C_{14}$ abundance (alkanes + alkenes) | 5.80 | 0.63 | 0.12 | – |
| | | | $C_{15}$–$C_{31}$ abundance (all resolved compounds) | 8.10 | 0.87 | 0.17 | – |
| | | | $C_{15}$–$C_{31}$ abundance (alkanes + alkenes) | 3.97 | 0.43 | 0.08 | – |
| | | | $C_9$–$C_{31}$ abundance (all resolved compounds) | 39.24 | 4.23 | 0.81 | – |
| | | | $C_9$–$C_{31}$ abundance (alkanes + alkenes) | 9.77 | 1.05 | 0.20 | – |
| | | | $C_5$–$C_{31}$ abundance (all resolved compounds) | 59.36 | 6.40 | 1.23 | – |
| | | | $C_5$–$C_{31}$ abundance (alkanes + alkenes) | 16.88 | 1.82 | 0.35 | – |
| | | | $C_5$–$C_{31}$ alkane abundance | 7.97 | 0.86 | 0.16 | – |
| | | | $C_5$–$C_{31}$ alkene abundance | 8.92 | 0.96 | 0.18 | – |
| | | | $C_5$–$C_8$ alkane/alkene | – | – | – | 0.85 |
| | | | $C_9$–$C_{14}$ alkane/alkene | – | – | – | 0.73 |
| | | | $C_{15}$–$C_{31}$ alkane/alkene | – | – | – | 1.31 |
| | | | $C_5$–$C_{31}$ alkane/alkene | – | – | – | 0.89 |
| | | | $(C_1$–$C_5)/C_{6+}$ | – | – | – | 0.82 |
| | | | R (m + p-xylene/n-octene) | – | – | – | 2.39 |
| Barrabiddy 1A | 705.5 | core | $C_1$–$C_4$ abundance (all compounds) | 34.38 | 5.01 | 0.67 | – |
| | | | $C_5$–$C_8$ abundance (all resolved compounds) | 22.78 | 3.32 | 0.44 | – |
| | | | $C_5$–$C_8$ abundance (alkanes + alkenes) | 8.29 | 1.21 | 0.16 | – |
| | | | $C_9$–$C_{14}$ abundance (all resolved compounds) | 32.78 | 4.78 | 0.63 | – |
| | | | $C_9$–$C_{14}$ abundance (alkanes + alkenes) | 5.02 | 0.73 | 0.10 | – |
| | | | $C_{15}$–$C_{31}$ abundance (all resolved compounds) | 10.07 | 1.47 | 0.19 | – |
| | | | $C_{15}$–$C_{31}$ abundance (alkanes + alkenes) | 4.23 | 0.62 | 0.08 | – |
| | | | $C_9$–$C_{31}$ abundance (all resolved compounds) | 42.84 | 6.25 | 0.83 | – |
| | | | $C_9$–$C_{31}$ abundance (alkanes + alkenes) | 9.24 | 1.35 | 0.18 | – |
| | | | $C_5$–$C_{31}$ abundance (all resolved compounds) | 65.62 | 9.57 | 1.27 | – |

**Table 6.3.** (continued)

| *Well* | *Depth (m)* | *Sample type* | *Parameter* | *A* | *B* | *C* | *D* |
|---|---|---|---|---|---|---|---|
| Barrabiddy 1A (cont.) | 705.5 | core | $C_5$–$C_{31}$ abundance (alkanes + alkenes) | 17.53 | 2.56 | 0.34 | – |
| | | | $C_5$–$C_{31}$ alkane abundance | 8.71 | 1.27 | 0.17 | – |
| | | | $C_5$–$C_{31}$ alkene abundance | 8.82 | 1.29 | 0.17 | – |
| | | | $C_5$–$C_8$ alkane/alkene | – | – | – | 0.93 |
| | | | $C_9$–$C_{14}$ alkane/alkene | – | – | – | 0.94 |
| | | | $C_{15}$–$C_{31}$ alkane/alkene | – | – | – | 1.17 |
| | | | $C_5$–$C_{31}$ alkane/alkene | – | – | – | 0.99 |
| | | | $(C_1$–$C_5)/C_{6+}$ | – | – | – | 0.68 |
| | | | R (m + p-xylene/n-octene) | – | – | – | 3.20 |
| Barrabiddy 1A | 713.4 | core | $C_1$–$C_4$ abundance (all compounds) | 34.20 | 3.08 | 0.53 | – |
| | | | $C_5$–$C_8$ abundance (all resolved compounds) | 23.38 | 2.11 | 0.36 | – |
| | | | $C_5$–$C_8$ abundance (alkanes + alkenes) | 7.80 | 0.70 | 0.12 | – |
| | | | $C_9$–$C_{14}$ abundance (all resolved compounds) | 32.73 | 2.95 | 0.51 | – |
| | | | $C_9$–$C_{14}$ abundance (alkanes + alkenes) | 4.56 | 0.41 | 0.07 | – |
| | | | $C_{15}$–$C_{31}$ abundance (all resolved compounds) | 9.69 | 0.87 | 0.15 | – |
| | | | $C_{15}$–$C_{31}$ abundance (alkanes + alkenes) | 3.22 | 0.29 | 0.05 | – |
| | | | $C_9$–$C_{31}$ abundance (all resolved compounds) | 42.42 | 3.82 | 0.66 | – |
| | | | $C_9$–$C_{31}$ abundance (alkanes + alkenes) | 7.78 | 0.70 | 0.12 | – |
| | | | $C_5$–$C_{31}$ abundance (all resolved compounds) | 65.80 | 5.93 | 1.03 | – |
| | | | $C_5$–$C_{31}$ abundance (alkanes + alkenes) | 15.57 | 1.40 | 0.24 | – |
| | | | $C_5$–$C_{31}$ alkane abundance | 7.54 | 0.68 | 0.12 | – |
| | | | $C_5$–$C_{31}$ alkene abundance | 8.04 | 0.72 | 0.13 | – |
| | | | $C_5$–$C_8$ alkane/alkene | – | – | – | 0.80 |
| | | | $C_9$–$C_{14}$ alkane/alkene | – | – | – | 0.87 |
| | | | $C_{15}$–$C_{31}$ alkane/alkene | – | – | – | 1.52 |
| | | | $C_5$–$C_{31}$ alkane/alkene | – | – | – | 0.94 |
| | | | $(C_1$–$C_5)/C_{6+}$ | – | – | – | 0.65 |
| | | | R (m + p-xylene/n-octene) | – | – | – | 3.39 |
| Coburn 1 | 606.2 | core | $C_1$–$C_4$ abundance (all compounds) | 21.72 | 0.92 | 0.75 | – |
| | | | $C_5$–$C_8$ abundance (all resolved compounds) | 42.05 | 1.78 | 1.45 | – |
| | | | $C_5$–$C_8$ abundance (alkanes + alkenes) | 12.85 | 0.54 | 0.44 | – |
| | | | $C_9$–$C_{14}$ abundance (all resolved compounds) | 28.88 | 1.22 | 0.99 | – |
| | | | $C_9$–$C_{14}$ abundance (alkanes + alkenes) | 9.58 | 0.41 | 0.33 | – |
| | | | $C_{15}$–$C_{31}$ abundance (all resolved compounds) | 7.35 | 0.31 | 0.25 | – |
| | | | $C_{15}$–$C_{31}$ abundance (alkanes + alkenes) | 4.18 | 0.18 | 0.14 | – |
| | | | $C_9$–$C_{31}$ abundance (all resolved compounds) | 36.23 | 1.53 | 1.25 | – |
| | | | $C_9$–$C_{31}$ abundance (alkanes + alkenes) | 13.76 | 0.58 | 0.47 | – |
| | | | $C_5$–$C_{31}$ abundance (all resolved compounds) | 78.28 | 3.31 | 2.69 | – |
| | | | $C_5$–$C_{31}$ abundance (alkanes + alkenes) | 26.61 | 1.13 | 0.92 | – |
| | | | $C_5$–$C_{31}$ alkane abundance | 13.49 | 0.57 | 0.46 | – |
| | | | $C_5$–$C_{31}$ alkene abundance | 13.12 | 0.55 | 0.45 | – |
| | | | $C_5$–$C_8$ alkane/alkene | – | – | – | 0.91 |
| | | | $C_9$–$C_{14}$ alkane/alkene | – | – | – | 0.89 |
| | | | $C_{15}$–$C_{31}$ alkane/alkene | – | – | – | 2.21 |
| | | | $C_5$–$C_{31}$ alkane/alkene | – | – | – | 1.03 |
| | | | $(C_1$–$C_5)/C_{6+}$ | – | – | – | 0.43 |
| | | | R (m + p-xylene/n-octene) | – | – | – | 1.26 |
| Coburn 1 | 623.9 | core | $C_1$–$C_4$ abundance (all compounds) | 45.74 | 2.48 | 1.21 | – |
| | | | $C_5$–$C_8$ abundance (all resolved compounds) | 31.74 | 1.72 | 0.84 | – |
| | | | $C_5$–$C_8$ abundance (alkanes + alkenes) | 10.06 | 0.55 | 0.27 | – |
| | | | $C_9$–$C_{14}$ abundance (all resolved compounds) | 18.95 | 1.03 | 0.50 | – |
| | | | $C_9$–$C_{14}$ abundance (alkanes + alkenes) | 4.43 | 0.24 | 0.12 | – |
| | | | $C_{15}$–$C_{31}$ abundance (all resolved compounds) | 3.56 | 0.19 | 0.09 | – |
| | | | $C_{15}$–$C_{31}$ abundance (alkanes + alkenes) | 1.37 | 0.07 | 0.04 | – |
| | | | $C_9$–$C_{31}$ abundance (all resolved compounds) | 22.52 | 1.22 | 0.59 | – |
| | | | $C_9$–$C_{31}$ abundance (alkanes + alkenes) | 5.80 | 0.31 | 0.15 | – |
| | | | $C_5$–$C_{31}$ abundance (all resolved compounds) | 54.26 | 2.95 | 1.43 | – |
| | | | $C_5$–$C_{31}$ abundance (alkanes + alkenes) | 15.86 | 0.86 | 0.42 | – |
| | | | $C_5$–$C_{31}$ alkane abundance | 7.24 | 0.39 | 0.19 | – |
| | | | $C_5$–$C_{31}$ alkene abundance | 8.62 | 0.47 | 0.23 | – |
| | | | $C_5$–$C_8$ alkane/alkene | – | – | – | 0.66 |
| | | | $C_9$–$C_{14}$ alkane/alkene | – | – | – | 1.21 |
| | | | $C_{15}$–$C_{31}$ alkane/alkene | – | – | – | 1.42 |
| | | | $C_5$–$C_{31}$ alkane/alkene | – | – | – | 0.84 |
| | | | $(C_1$–$C_5)/C_{6+}$ | – | – | – | 1.23 |
| | | | R (m + p-xylene/n-octene) | – | – | – | 2.67 |

**Table 6.3.** (continued)

| *Well* | *Depth (m)* | *Sample type* | *Parameter* | *A* | *B* | *C* | *D* |
|---|---|---|---|---|---|---|---|
| Gneudna 1 | 300.4 | core | $C_1$–$C_4$ abundance (all compounds) | 32.62 | 2.78 | 1.13 | – |
| | | | $C_5$–$C_8$ abundance (all resolved compounds) | 38.20 | 3.26 | 1.32 | – |
| | | | $C_5$–$C_8$ abundance (alkanes + alkenes) | 14.59 | 1.24 | 0.51 | – |
| | | | $C_9$–$C_{14}$ abundance (all resolved compounds) | 25.69 | 2.19 | 0.89 | – |
| | | | $C_9$–$C_{14}$ abundance (alkanes + alkenes) | 9.15 | 0.78 | 0.32 | – |
| | | | $C_{15}$–$C_{31}$ abundance (all resolved compounds) | 3.49 | 0.30 | 0.12 | – |
| | | | $C_{15}$–$C_{31}$ abundance (alkanes + alkenes) | 1.77 | 0.15 | 0.06 | – |
| | | | $C_9$–$C_{31}$ abundance (all resolved compounds) | 29.18 | 2.49 | 1.01 | – |
| | | | $C_9$–$C_{31}$ abundance (alkanes + alkenes) | 10.92 | 0.93 | 0.38 | – |
| | | | $C_5$–$C_{31}$ abundance (all resolved compounds) | 67.38 | 5.75 | 2.34 | – |
| | | | $C_5$–$C_{31}$ abundance (alkanes + alkenes) | 25.51 | 2.18 | 0.88 | – |
| | | | $C_5$–$C_{31}$ alkane abundance | 12.82 | 1.09 | 0.44 | – |
| | | | $C_5$–$C_{31}$ alkene abundance | 12.69 | 1.08 | 0.44 | – |
| | | | $C_5$–$C_8$ alkane/alkene | – | – | – | 0.89 |
| | | | $C_9$–$C_{14}$ alkane/alkene | – | – | – | 1.12 |
| | | | $C_{15}$–$C_{31}$ alkane/alkene | – | – | – | 1.72 |
| | | | $C_5$–$C_{31}$ alkane/alkene | – | – | – | 1.01 |
| | | | $(C_1$–$C_5)/C_{6+}$ | – | – | – | 0.70 |
| | | | R (m + p-xylene/n-octene) | – | – | – | 0.99 |
| Uranerz CDH 8 | 112.2 | core | $C_1$–$C_4$ abundance (all compounds) | 25.47 | 0.50 | 0.40 | – |
| | | | $C_5$–$C_8$ abundance (all resolved compounds) | 40.00 | 0.79 | 0.63 | – |
| | | | $C_5$–$C_8$ abundance (alkanes + alkenes) | 13.08 | 0.26 | 0.21 | – |
| | | | $C_9$–$C_{14}$ abundance (all resolved compounds) | 28.72 | 0.57 | 0.45 | – |
| | | | $C_9$–$C_{14}$ abundance (alkanes + alkenes) | 7.58 | 0.15 | 0.12 | – |
| | | | $C_{15}$–$C_{31}$ abundance (all resolved compounds) | 5.81 | 0.11 | 0.09 | – |
| | | | $C_{15}$–$C_{31}$ abundance (alkanes + alkenes) | 3.67 | 0.07 | 0.06 | – |
| | | | $C_9$–$C_{31}$ abundance (all resolved compounds) | 34.53 | 0.68 | 0.54 | – |
| | | | $C_9$–$C_{31}$ abundance (alkanes + alkenes) | 11.26 | 0.22 | 0.18 | – |
| | | | $C_5$–$C_{31}$ abundance (all resolved compounds) | 74.53 | 1.47 | 1.17 | – |
| | | | $C_5$–$C_{31}$ abundance (alkanes + alkenes) | 24.34 | 0.48 | 0.38 | – |
| | | | $C_5$–$C_{31}$ alkane abundance | 14.46 | 0.28 | 0.23 | – |
| | | | $C_5$–$C_{31}$ alkene abundance | 9.88 | 0.19 | 0.16 | – |
| | | | $C_5$–$C_8$ alkane/alkene | – | – | – | 1.65 |
| | | | $C_9$–$C_{14}$ alkane/alkene | – | – | – | 0.97 |
| | | | $C_{15}$–$C_{31}$ alkane/alkene | – | – | – | 2.37 |
| | | | $C_5$–$C_{31}$ alkane/alkene | – | – | – | 1.46 |
| | | | $(C_1$–$C_5)/C_{6+}$ | – | – | – | 0.52 |
| | | | R (m + p-xylene/n-octene) | – | – | – | 1.68 |
| Uranerz CDH 8 | 121.0 | core | $C_1$–$C_4$ abundance (all compounds) | 27.38 | 1.60 | 0.51 | – |
| | | | $C_5$–$C_8$ abundance (all resolved compounds) | 27.90 | 1.63 | 0.51 | – |
| | | | $C_5$–$C_8$ abundance (alkanes + alkenes) | 9.63 | 0.56 | 0.18 | – |
| | | | $C_9$–$C_{14}$ abundance (all resolved compounds) | 33.10 | 1.93 | 0.61 | – |
| | | | $C_9$–$C_{14}$ abundance (alkanes + alkenes) | 6.54 | 0.38 | 0.12 | – |
| | | | $C_{15}$–$C_{31}$ abundance (all resolved compounds) | 11.62 | 0.68 | 0.21 | – |
| | | | $C_{15}$–$C_{31}$ abundance (alkanes + alkenes) | 4.16 | 0.24 | 0.08 | – |
| | | | $C_9$–$C_{31}$ abundance (all resolved compounds) | 44.72 | 2.61 | 0.83 | – |
| | | | $C_9$–$C_{31}$ abundance (alkanes + alkenes) | 10.70 | 0.62 | 0.20 | – |
| | | | $C_5$–$C_{31}$ abundance (all resolved compounds) | 72.62 | 4.23 | 1.34 | – |
| | | | $C_5$–$C_{31}$ abundance (alkanes + alkenes) | 20.33 | 1.19 | 0.38 | – |
| | | | $C_5$–$C_{31}$ alkane abundance | 9.65 | 0.56 | 0.18 | – |
| | | | $C_5$–$C_{31}$ alkene abundance | 10.68 | 0.62 | 0.20 | – |
| | | | $C_5$–$C_8$ alkane/alkene | – | – | – | 0.82 |
| | | | $C_9$–$C_{14}$ alkane/alkene | – | – | – | 0.75 |
| | | | $C_{15}$–$C_{31}$ alkane/alkene | – | – | – | 1.54 |
| | | | $C_5$–$C_{31}$ alkane/alkene | – | – | – | 0.90 |
| | | | $(C_1$–$C_5)/C_{6+}$ | – | – | – | 0.51 |
| | | | R (m + p-xylene/n-octene) | – | – | – | 1.79 |

**NOTES:**
A: % of resolved compounds in $S_2$
B: mg/g rock (Rock-Eval)
C: (mg/g rock)/TOC
D: ratio, no unit
TOC: total organic carbon
$S_2$: pyrolytic yield

## Appendix 7

# Extraction, liquid and gas chromatography data

**Table 7.1. Extract concentrations**

| Well | Depth (m) | Sample type | Rock extracted (g) | Total extract (ppm) | Loss on column (ppm) | Hydrocarbons (HC) Saturates (ppm) | Hydrocarbons (HC) Aromatics (ppm) | Total HC (ppm) | Non-HCs NSOs (ppm) | Total non-HCs (ppm) |
|---|---|---|---|---|---|---|---|---|---|---|
| Barrabiddy 1 | 115.4 | core | 20.2 | 296.6 | – | – | – | – | – | – |
| Barrabiddy 1A | 655.4 | core | 6.7 | 4 835.8 | 0.0 | 1 119.4 | 1 746.3 | 2 865.7 | 1 970.1 | 1 970.1 |
| | 678.2 | core | 13.2 | 2 940.7 | 683.9 | 152.0 | 949.8 | 1 101.8 | 1 155.0 | 1 155.0 |
| | 705.5 | core | 14.8 | 3 861.8 | 487.8 | 474.3 | 1 300.8 | 1 775.1 | 1 598.9 | 1 598.9 |
| | 713.4 | core | 14.0 | 2 698.1 | 435.4 | 199.9 | 1 013.6 | 1 213.4 | 1 049.3 | 1 049.3 |
| Coburn 1 | 606.2 | core | 5.2 | 1 877.4 | – | – | – | – | – | – |
| | 606.2 | core | 5.2 | 1 877.4 | – | – | – | – | – | – |
| | 623.9 | core | 1.7 | 2 058.8 | – | – | – | – | – | – |

**NOTES:** ppm: parts per million
HC: hydrocarbons
NSOs: nitrogen, sulfur, and oxygen compounds

**Table 7.2. Extract composition**

| Well | Depth (m) | Sample type | Sat. (%) | Arom. (%) | HCs (%) | NSOs (%) | Non-HCs (%) | EOM (mg)/ TOC (g) | Sat. (mg)/ TOC (g) | Sat./ Arom. | HCs/ Non-HCs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Barrabiddy 1 | 115.4 | core | – | – | – | – | – | 10.2 | – | – | – |
| Barrabiddy 1A | 655.4 | core | 23.1 | 36.1 | 59.3 | 40.7 | 40.7 | 48.9 | 11.3 | 0.6 | 1.5 |
| | 678.2 | core | 6.7 | 42.1 | 48.8 | 51.2 | 51.2 | 56.3 | 2.9 | 0.2 | 1.0 |
| | 705.5 | core | 14.1 | 38.6 | 52.6 | 47.4 | 47.4 | 51.3 | 6.3 | 0.4 | 1.1 |
| | 713.4 | core | 8.8 | 44.8 | 53.6 | 46.4 | 46.4 | 46.7 | 3.5 | 0.2 | 1.2 |
| Dirk Hartog 17B | – | core 12 | 29.0 | 19.6 | 48.2 | 51.8 | 51.8 | – | – | 1.5 | 0.9 |
| Pendock 1 | 1 409.7 | cuttings | 35.9 | 27.0 | 62.9 | 37.1 | 37.1 | – | – | 1.3 | 1.7 |
| | 1 716.0 | cuttings | 77.8 | 11.1 | 88.9 | 11.1 | 11.1 | – | – | 7.0 | 8.0 |
| Tamala 1 | 868.7 | cuttings | 54.3 | 13.3 | 67.6 | 32.4 | 32.4 | – | – | 4.1 | 2.1 |
| | 880.9 | cuttings | 48.6 | 15.3 | 63.9 | 36.1 | 36.1 | – | – | 3.2 | 1.8 |

**NOTES:** HC: hydrocarbons
Sat.: saturates
Arom.: aromatics
NSOs: nitrogen, sulfur, and oxygen compounds
TOC: total organic carbon
EOM: extractable organic matter

**Table 7.3. Alkane composition**

| *Well* | *Depth (m) From* | *To* | *Sample type* | *Pristane/ Phytane* | *Pristane/ n-$C_{17}$* | *Phytane/ n-$C_{18}$* | *CPI (1)* | *CPI (2)* | *($C_{21}$ + $C_{22}$)/ ($C_{28}$ + $C_{29}$)* |
|---|---|---|---|---|---|---|---|---|---|
| Barrabiddy 1 | 115.4 | – | core | 1.34 | 1.31 | 0.95 | – | 1.90 | 1.51 |
| Barrabiddy 1A | 655.4 | – | core | 2.57 | 0.60 | 0.27 | 1.12 | 1.12 | 2.04 |
| | 678.2 | – | core | 2.35 | 1.33 | 0.66 | 1.14 | 1.12 | 2.23 |
| | 705.5 | – | core | 2.84 | 1.21 | 0.46 | 1.13 | 1.10 | 2.39 |
| | 713.4 | – | core | 3.03 | 0.78 | 0.29 | 1.05 | 1.06 | 2.26 |
| Coburn 1 | 606.2 | – | core | nd | 0.84 | nd | 1.13 | 1.13 | 2.83 |
| | 606.2 | – | core | 1.23 | 0.97 | 1.12 | 1.16 | 1.15 | 3.38 |
| | 623.9 | – | core | 1.13 | 0.27 | 0.38 | 0.85 | 0.92 | 2.54 |
| Dirk Hartog 17B | – | – | – | 1.16 | 0.60 | 0.47 | 1.02 | 1.07 | 0.94 |
| Pendock 1 | 1 409.7 | – | cuttings | 0.53 | 0.17 | 0.27 | 0.91 | 0.88 | 1.01 |
| | 1 716.0 | 1 722.1 | cuttings | 0.53 | 0.31 | 0.34 | 1.10 | 1.12 | 8.58 |
| Rough Range 1 | 2 983.7 | 2 984.0 | cuttings | 1.07 | 0.54 | 0.46 | 1.06 | 1.02 | 1.69 |
| | 2 989.5 | 2 990.1 | cuttings | 1.06 | 0.36 | 0.24 | 1.02 | 0.98 | 1.48 |
| | 3 016.9 | 3 023.3 | cuttings | 0.74 | 0.48 | 0.42 | 1.03 | 0.99 | 0.96 |
| Tamala 1 | 868.7 | 871.7 | cuttings | 2.61 | 0.99 | 0.30 | 1.12 | 1.14 | 3.00 |
| | 880.9 | 883.9 | cuttings | 1.85 | 0.80 | 0.36 | 1.07 | 1.22 | 7.18 |

**NOTES:** CPI: carbon preference index
nd: not determined

$$\text{CPI (1)} = \frac{(C_{23} + C_{25} + C_{27} + C_{29})\ \text{wt\%} + (C_{25} + C_{27} + C_{29} + C_{31})\ \text{wt\%}}{2 \times (C_{25} + C_{26} + C_{28} + C_{30})\ \text{wt\%}}$$

$$\text{CPI (2)} = \frac{(C_{23} + C_{25} + C_{27})\ \text{wt\%} + (C_{25} + C_{27} + C_{29})\ \text{wt\%}}{2 \times (C_{24} + C_{26} + C_{28})\ \text{wt\%}}$$

## Table 7.4. N-alkane distributions

| *Well* | *Depth (m)* | *Sample type* | *n-C12* | *n-C13* | *n-C14* | *n-C15* | *n-C16* | *n-C17* | *i-C19* | *n-C18* | *i-C20* | *n-C19* | *n-C20* | *n-C21* | *n-C22* | *n-C23* | *n-C24* | *n-C25* | *n-C26* | *n-C27* | *n-C28* | *n-C29* | *n-C30* | *n-C31* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Percentage** | | | | | | | | | | | | | |
| Barrabiddy 1 | 115.4 | core | 6.4 | 11.2 | 12.3 | 7.3 | 5.6 | 4.0 | 5.2 | 4.1 | 3.9 | 6.4 | 5.4 | 3.8 | 3.6 | 4.1 | 2.4 | 3.0 | 1.7 | 2.7 | 1.0 | 3.9 | 2.0 | – |
| Barrabiddy 1A | 655.4 | core | 9.7 | 11.0 | 10.1 | 8.7 | 6.9 | 5.9 | 3.6 | 5.1 | 1.4 | 5.1 | 4.4 | 4.2 | 3.5 | 3.3 | 2.9 | 3.7 | 2.4 | 2.2 | 2.1 | 1.6 | 1.2 | 1.1 |
| | 678.2 | core | 7.8 | 8.0 | 7.3 | 7.3 | 6.6 | 6.3 | 8.3 | 5.4 | 3.6 | 5.4 | 4.5 | 4.2 | 3.8 | 3.7 | 3.2 | 3.5 | 2.5 | 2.3 | 1.8 | 1.6 | 1.2 | 1.4 |
| | 705.5 | core | 6.1 | 7.0 | 6.9 | 7.0 | 6.4 | 6.1 | 7.5 | 5.7 | 2.6 | 6.0 | 5.0 | 4.8 | 4.4 | 4.3 | 4.2 | 4.2 | 2.9 | 2.8 | 2.1 | 1.9 | 1.1 | 1.1 |
| | 713.4 | core | 4.7 | 6.3 | 7.1 | 7.6 | 7.3 | 7.1 | 5.5 | 6.4 | 1.8 | 6.5 | 5.3 | 4.8 | 4.5 | 4.3 | 3.9 | 3.7 | 3.0 | 2.8 | 2.2 | 1.9 | 1.7 | 1.3 |
| Coburn 1 | 606.2 | core | 0.7 | 3.2 | 8.4 | 11.1 | – | 12.1 | 10.1 | – | nd | 7.6 | 6.4 | 6.3 | 5.9 | 5.8 | 4.8 | 4.5 | 3.3 | 3.2 | 2.2 | 2.1 | 1.4 | 1.0 |
| | 606.2 | core | 0.4 | 2.4 | 5.5 | 7.3 | 8.5 | 9.1 | 8.9 | 6.5 | 7.2 | 6.4 | 5.3 | 5.2 | 4.9 | 4.8 | 3.8 | 3.9 | 2.8 | 2.4 | 1.6 | 1.4 | 0.9 | 0.9 |
| | 623.0 | core | 7.6 | 24.2 | 22.1 | 9.0 | 6.7 | 5.0 | 1.4 | 3.4 | 1.2 | 3.4 | 2.8 | 2.3 | 1.9 | 1.6 | 1.3 | 1.2 | 1.1 | 0.9 | 1.0 | 0.6 | 0.9 | 0.4 |

**NOTES:** n: normal
i: iso
nd: not determined

## Appendix 8

# Organic petrology data

| *Well* | *Depth (m) From* | *To* | *Sample type* | *Maceral* | *Mean (% Ro)* | *Minimum (% Ro)* | *Maximum (% Ro)* | *Number of readings* | *Description including liptinite fluorescence characteristics* |
|---|---|---|---|---|---|---|---|---|---|
| Barrabiddy 1 | 115.4 | – | core | – | 0.32 | 0.17 | 0.47 | 20 | Abundant lamalginite and sporinite, yellowish orange to orange, common liptodetrinite, yellow to orange. Claystone, calcareous. DOM abundant, L>I>V. Liptinite abundant, inertinite spare, and vitrinite rare. Grains of reworked vitrinite, ?coal, with $R_v$max of 0.58 and 0.72%. Common calcareous gastropods, pyritized gastropods, and other unidentified form. Mineral fluorescence pervasive, very weak dull orange. Pyrite abundant) |
| Barrabiddy 1A | 187.4 | – | core | – | 0.35 | 0.23 | 0.47 | 15 | Abundant lamalginite and sporinite, yellowish orange to orange, common liptodetrinite, yellow to orange. (Claystone. DOM abundant, L>I>V. Liptinite abundant, inertinite and reworked vitrinite spare, and vitrinite rare. Grains of reworked vitrinite, ?coal, with Rv of 0.56 and 0.90%. Mineral fluorescence variable, very weak dull orange. Pyrite abundant to major) |
| Barrabiddy 1A | 678.2 | – | core | – | 0.77 | 0.67 | 0.93 | 31 | Spare sporinite, dull orange, spare liptodetrinite, dull orange, rare lamalginite, dull orange, rare ?telalginite derived from *Botrycococcus*, orange. (Siltstone argillaceous. DOM abundant, V>I>L. Vitrinite abundant, inertinite and liptinite sparse. The vitrinite appears to be derived from the root tissue of *Leptophloeum* sp. Mineral fluorescence pervasive, very weak dull orange. Pyrite abundant) |
| Barrabiddy 1A | 713.4 | – | core | – | 0.94 | 0.72 | 1.10 | 28 | Rare sporinite, orange to dull orange, rare liptodetrinite, orange to dull orange, rare lamalginite, orange. (Siltstone argillaceous calcareous. DOM major, V>L, I absent. Vitrinite major, liptinite rare, inertinite rare. The vitrinite is probably derived from *Leptophloeum* sp., mainly root tissue. Mineral fluorescence pervasive, weak dull orange. Pyrite abundant) |
| | | | | | | | | | The presumed Cretaceous section is of very low maturity but contains abundant liptinite, largely algal-sourced although some sporinite also appears to be present. The fluorescence colour and intensity of the liptinite in these samples is relatively orange biased and low respectively for the maturation level evident from the vitrinite reflectance. Reworked vitrinite is present, probably coals suggesting the presence of coals of bituminous rank in the source provenance |
| | | | | | | | | | The Devonian section is mid- to late-mature with good control being available from the vitrinite probably sourced from *Leptophloeum* sp. The lithologies sampled appear to represent soil horizon, but show very strong marine influence. Sporinite is present and shows orange to dull orange fluorescence. Source potential of the Devonian is good to very good for oil and the lithologies sampled would be excellent for gas at the higher levels of maturation |

## **Appendix 8** (continued)

| *Well* | *Depth (m) From* | *To* | *Sample type* | *Maceral* | *Mean (% Ro)* | *Minimum (% Ro)* | *Maximum (% Ro)* | *Number of readings* | *Description including liptinite fluorescence characteristics* |
|---|---|---|---|---|---|---|---|---|---|
| Mooka 1 | 82.2 | – | core | – | 0.32 | 0.22 | 0.41 | 5 | Abundant lamalginite, yellow to orange. (Claystone. DOM abundant, L>I>V. Liptinite abundant, inertinite and vitrinite rare. Rare reworked vitrinite, 0.58%. Mineral fluorescence pervasive moderate orange. Pyrite abundant) |
| Mooka 1 | 339.0 | – | core | – | ?0.53 | 0.45 | 0.65 | ?5 | Sparse lamalginite, bright yellow to bright orange. Sparse liptodetrinite, yellow to orange. (Siltstone, calcareous. DOM common, L>?V>I. Liptinite common, ?vitrinite rare, inertinite rare. The liptinite may represent thucholitic bitumen, but the core is not zircon as is normally the case, and zonation of reflectance is weak. One more typical thucholite shows a core reflectance of 0.92, but the mineral core of this occurrence is not visible. Mineral fluorescence is moderate orange and shows moderate positive alteration in fluorescence mode in standing. Pyrite abundant, commonly as acicular aggregates) |
| | | | | | | | | | Vitrinite is rare within the samples from Mooka 1. The Cretaceous sample is clearly immature from the reflectance of the few phytoclasts of vitrinite that were found. The maturation level of the Devonian sample is more problematical. Material is present that is 'vitrinite like' but may be related to bitumens. The mean value 0.53% may underestimate the maturation level, but the liptinite fluorescence characteristics suggest that if a normal vitrinite population were present, then the mean reflectance would not be greater than 0.65%, and would probably be about 0.60% or marginally less |
| Coburn 1 | 163.7 | – | core | –<br>$R_I$max | 0.36<br>0.98 | 0.23<br>0.64 | 0.56<br>148 | 8<br>12 | Common liptodetrinite, yellow to orange, common lamalginite, yellow, sparse sporinite, yellow to orange, rare tasmanitid-related telanginite, bright yellow. (DOM abundant, L>I>V. Liptinite abundant, inertinite and vitrinite rare. Mineral fluorescence pervasive, moderate orange. Pyrite common) |
| Coburn 1 | 620.95 | – | core | – | [a]0.56 | 0.31 | 0.88 | 26 | Common liptodetrinite, yellow, sparse lamalginite, yellow, sparse tasmanitid-related telalginite, bright yellow. (Silstone, micaceous, with some sandy lenses. DOM common, L only. Liptinite common inertinite and vitrinite rare. [a]Thucholites sparse, orange fluorescing bitumens sparse. The thucholites bitumens are most abundant near the edges of some of the sandy lenses. The orange fluorescing bitumens may also be thucholitic in character having a similar spatial distribution to the thucholites. Oil drops, yellow, sparse. Mineral fluorescence pervasive, bright to moderate orange. Pyrite common) |
| Coburn 1 | 781.00 | – | core | –<br>?NFL | [a]0.64<br>1.25 | 0.62<br>– | 0.65<br>– | 2<br>?1 | Sparse lamalginite, yellowish orange. (Micaceous siltstone. DOM sparse, L sparse, L only. Liptinite sparse, inertinite and vitrinite rare. A single thin layer of possible non-fluorescing lamalginite was found associated with a thucholitic bitumen. Sparse to common diffuse organic matter, non-fluorescing and opaque. [a]Thucholites rare, orange fluorescence on the rims. Mineral fluorescence pervasive, week orange. Pyrite common) |

## Appendix 8 (continued)

| *Well* | *Depth (m) From* | *To* | *Sample type* | *Maceral* | *Mean (% Ro)* | *Minimum (% Ro)* | *Maximum (% Ro)* | *Number of readings* | *Description including liptinite fluorescence characteristics* |
|---|---|---|---|---|---|---|---|---|---|
| Coburn 1 | 812.80 | – | core | – | [a]0.42 | – | – | 1 | Sparse lamalginite, yellow, rare tasmanitid, bright yellow. (Micaceous fine- and medium-grained siltstone. DOM sparse, L only. Liptinite sparse, inertinite and vitrinite rare. [a]?Thucholitic bitumen rare, orange fluorescence most intense on the rim. Mineral fluorescence pervasive, moderate orange to dull orange. Pyrite abundant) |
| Coburn 1 | 958.30 | – | core | –<br>?NFL | –<br>1.08 | –<br>– | –<br>– | –<br>?1 | Fluorescing liptinite absent. (Micaceous siltstone, with some claystone interbeds. DOM rare, ?non-fluorescing lamalginite only. ?Liptinite sparse, inertinite and vitrinite rare. Mineral fluorescence very weak dull brown to absent. Iron oxides common. Pyrite sparse) |
| | | | | | | | | | The Cretaceous is immature but presents good source potential. The ?Silurian section shows some source potential in the shallowest sample where a large number of reflectance readings were obtained on thucholitic bitumens. These indicate that the Silurian section is probably early- to mid-oil mature. Deeper in the section, liptinite fluorescence remains relatively intense and thucholitic bitumen reflectances do not rise markedly. Mineral fluorescence decreases markedly in intensity down-section. This could be associated with increasing maturity but is more probably associated with larger amounts of iron oxides. These cause quenching of fluorescence emission and may be associated with contemporary oxidation of the organic matter |
| | | | | | | | | | Timing of oil generation is likely to be important. The Silurian section clearly has generated oil, but this has probably occurred prior to the pre-Cretaceous erosion and reservoirs within the Silurian could have been breached |
| Yaringa East 1 | 195.98 | – | cuttings | – | 0.26 | 0.22 | 0.34 | 12 | Sparse liptodetrinite, yellow to orange. (Sandstone, silty. DOM sparse, L>V>I. Liptinite sparse, vitrinite and inertinite rare. Mineral fluorescence variable, weak indeterminate from sand grains, weak dull orange from clay-rich matrix. Pyrite sparse) |
| Yaringa East 1 | 377.75 | – | core | – | – | – | – | – | Rare lamalginite, yellow. (Siltstone with sandy layers, micaceous. DOM rare, L only. Liptinite rare, vitrinite and inertinite absent. Mineral fluorescence pervasive, weak dull orange to very weak dull orange. Sparse detrital graphite. Pyrite sparse) |
| Yaringa East 1 | 791.55 | – | core | – | – | – | – | – | Rare lamalginite, orange, tending dull orange. (Sandy siltstone, micaceous. DOM rare, L only. Liptinite rare, vitrinite and inertinite absent. Mineral fluorescence slightly patchy moderate to weak dull orange. Sparse detrital iron oxides. Pyrite rare) |
| Yaringa East 1 | 808.05 | – | core | – | – | – | – | – | Rare lamalginite, yellow to orange. (Siltstone, claystone lenses, micaceous. DOM rare, L only. Liptinite rare, vitrinite and inertinite absent. Sparse yellow fluorescing oil drops as inclusion within a small proportion of |

## **Appendix 8** (continued)

| *Well* | *Depth (m) From* | *To* | *Sample type* | *Maceral* | *Mean (% Ro)* | *Minimum (% Ro)* | *Maximum (% Ro)* | *Number of readings* | *Description including liptinite fluorescence characteristics* |
|---|---|---|---|---|---|---|---|---|---|
| Yaringa East 1 (cont.) | 808.05 | – | core | – | – | – | – | – | moderate grains. Mineral fluorescence patchy moderate to weak dull orange. Pyrite common)<br><br>The Cretaceous section is immature. The samples from the ?Silurian proved to be relatively barren. Small amounts of lamalginite are present — probably derived from acritarchs — and these indicate that the section is probably mid-mature. Iron oxides are present in some of the samples and these probably indicate oxidizing conditions contemporaneous with sedimentation. The presence of oil inclusions within the deepest sample indicates that some oil generation has taken place. The amount of organic matter in the sample appears to be too low for the oil to be indigenous, so it can be interpreted as a migrated phase<br><br>Compare with a suite of samples previously examined from Yaringa 1, the Yaringa East samples contain much less organic matter. The Yaringa 1 sample suite was dominated by carbonates whereas the present sample suite consists entirely of siltstone. On the basis of the liptinite fluorescence colours, the Yaringa East suite may be more mature than that examined in Yaringa 1, but the differences could also be due, in part, to more oxidizing conditions during deposition of the Yaringa East section |
| Cape Cuvier 1 | 3 353 | – | core 9 | –<br>$R_I$max | 0.49<br>0.84 | 0.38<br>0.70 | 0.60<br>1.18 | 8<br>16 | Sparse lamalginite, yellow to orange, sparse lipodetrinite, yellow to orange. (Claystone. DOM common, L>I>V. Liptinite common, inertinite sparse and vitrinite rare. Mineral fluorescence pervasive, moderate to weak dull orange. Pyrite abundant) |
| Cape Cuvier 1 | 430.1 | – | core 13 | –<br>$R_I$max | 0.52<br>0.4 | 0.42<br>0.88 | 0.64<br>1.20 | 9<br>2 | Sparse lamalginite, yellow to orange, rare sporinite, orange to dull orange. (Calcareous siltstone. DOM sparse, L>I>V. Liptinite sparse, vitrinite and inertinite rare. Mineral fluorescence patchy, moderate orange to moderate dull orange. Pyrite abundant) |
| Dirk Hartog 17B | 656.7 | – | core 5 | – | 0.35 | 0.22 | 0.56 | 29 | Abundant lamalginite, yellow to orange, dominantly orange. (Silty claystone. DOM abundant, L>I>V. Liptinite abundant, inertinite and vitrinite sparse. Mineral fluorescence pervasive, moderate dull orange and showing rapid negative alteration in fluorescence. Pyrite abundant) |
| Dirk Hartog 17B | 1 123.2 | – | core 20 | – | – | – | – | – | Abundant lamalginite, rare yellow, mostly orange. (Carbonate. DOM abundant, L only. Liptinite abundant, inertinite and vitrinite absent. Lamalginite occurs as thin anastomosing lamellae that appear dark in white light. Mineral fluorescence patchy, moderate orange to weak dull orange. Pyrite common) |
| Dirk Hartog 17B | 1 258.8 | – | core 23 | – | 0.76 | 0.69 | 0.89 | 20 | Fluorescing liptinite absent. (Siltstone, calcareous. DOM abundant, diffuse organic matter >V>I. Diffuse organic matter abundant, vitrinite sparse, fluorescing liptinite absent. The diffuse organic matter has an appearance consistent with an origin from lamalginite, the reason for the absence of |

## Appendix 8 (continued)

| *Well* | *Depth (m) From* | *To* | *Sample type* | *Maceral* | *Mean (% Ro)* | *Minimum (% Ro)* | *Maximum (% Ro)* | *Number of readings* | *Description including liptinite fluorescence characteristics* |
|---|---|---|---|---|---|---|---|---|---|
| Dirk Hartog 17B (cont.) | 1 258.8 | – | core 23 | – | 0.76 | 0.69 | 0.89 | 20 | fluorescing liptinite is not clear. The lithology appears generally similar to 1 123.3 m but generally lacks fluorescence. Rare oil inclusions, yellow. Mineral fluorescence weak to absent. Pyrite common) |
| Rough Range 1 | 3 141.9 | 3 147.1 | core 53 | –<br>$R_I$ max | 2.32<br>2.81 | 1.96<br>2.44 | 2.67<br>3.88 | 15<br>12 | Fluorescing liptinite absent. (Siltstone. DOM sparse, I>V, liptinite absent. Inertinite sparse, vitrinite sparse, liptinite absent. Mineral fluorescence pervasive, absent. Pyrite abundant) |
| Rough Range 1 | 3 940.5 | 3 941.7 | core 63 | $R_I$ max | 4.28<br>5.19 | 3.90<br>4.31 | 5.39<br>6.16 | 6<br>5 | Fluorescing liptinite absent. (Calcareous claystone. DOM: I>V, L absent. Inertinite and vitrinite rare, liptinite absent. Mineral fluorescence absent except for sparse orange dolomite crystals. Pyrite abundant) |
| Kalbarri 1 | 183.8 | – | core 1 | – | – | – | – | – | Rare lamalginite, bright yellow, rare liptodetrinite, yellow to orange. (Fine-grained carbonate, argillaceous. DOM rare, L only. Liptinite rare, inertinite and vitrinite absent. Elongate grains of coke or graphitic coke, detrital in origin sparse, mean R 6.62%. Liptinite fluorescence colours indicate a relatively low level of maturation, with $R_v$ estimated at <0.7%. Mineral fluorescence pervasive bright yellow to orange. Pyrite common) |
| Pendock 1 | 1 722.8 | – | core 5 | – | – | – | – | – | Common lamalginite/bituminite, weak brown rapidly altering to dull orange, rare lamalginite/liptodetrinite, bright yellow. (Fine-grained carbonate, argillaceous with carbonaceous laminae and sparry vughs. DOM common, L only. Liptinite common, inertinite and vitrinite absent. The weakly fluorescing liptinite occurs concentrated in argillaceous layers with evidence of some recrystalization. The more strongly fluorescing liptinite occurs disseminated through the mass of the rock. If the more abundant form of liptinite is interpreted as lamalginite, the Rv is estimated at 0.7 to 0.85%. and the other liptinite presuambly represents fragments of telalginite. If the more abundant liptinite is assumed to be bituminite, a lower level of maturation is more probable. Common interstitial bright-yellow fluorescence from probable dead oil. Mineral fluorescence pervasive bright-yellow to orange. Pyrite common overall, abundant in the organic-rich layers) |
| Pendock 1 | 2 191.5 | – | core 6 | – | 0.78 | 0.53 | 0.98 | 17 | Sparse lamalginite, bright yellow. (Siltstone, argillaceous and sandy. DOM sparse, L>'V', I absent. 'Vitrinite' may include two population but these are not well separated. The overall mean is likely to be representative of the level of maturation. Liptinite sparse, 'vitrinite' rare, inertinite absent. Rare thucholitic bitumens with dull orange fluorescing rims, rim reflectance could not be measured. Common oil drops within quartz grains, bright yellow fluorescence. Mineral fluorescence patchy bright yellow to weak dull orange. Pyrite abundant) |

## **Appendix 8** (continued)

| *Well* | *Depth (m) From* | *To* | *Sample type* | *Maceral* | *Mean (% Ro)* | *Minimum (% Ro)* | *Maximum (% Ro)* | *Number of readings* | *Description including liptinite fluorescence characteristics* |
|---|---|---|---|---|---|---|---|---|---|
| Tamala 1 | 523.5 | – | core 2 | Population I | 1.26 | 1.07 | 1.44 | 2 | Rare lamalginite, bright yellow, rare liptodetrinite, bright yellow, rare ?telalginite, dull orange. (Siltstone, pyritic. DOM sparse, L>'V'=I. 'Vitrinite' occurs as two population but distinction of these is difficult due to the paucity of this component. Micrinite occurs as small lenses with background fluorescence, and is thought to have been developed from bitumens. Sparse oil drops, bright yellow, typically present as small droplets on the rims of quartz grains. Rare bitumens, yellowish orange to dull brown in fluorescence. The maturation level is probably best indicated by a value between populations I and II but closer to II, and the thucholite bitumen rim reflectance. This value is consistent between the various reflectance values and with the weak fluorescence of the ?telalginite, but the presence of brightly fluorescing lamalginite at this level of maturation is unusual. It may be associated with retention of oil within some of the liptinite. The range of bitumen fluorescence and reflectances is similar to that found in some non-equilibrium assemblages. Rare thucholitic bitumens with dull orange fluorescing rims. Mineral fluorescence patchy bright yellow to weak dull orange. Pyrite major. The pyrite may have replaced organic matter during early diagenesis, the textures present in the pyrite-rich layers being similar to that of some algal-rich lithologies). See individual description for assessments of maturation levels |
| | | | | Population II | 0.94 | 0.89 | 0.99 | 7 | |
| | | | | R bitumens | 0.63 | 0.52 | 0.76 | 4 | |
| | | | | R thucholite rims | 0.96 | 0.92 | 1.00 | 3 | |
| Pelican Hill 1 | 392.6 | 396.2 | core | – | 0.35 | 0.25 | 0.44 | 13 | Sparse lamalginite and liptodetrinite, greenish yellow to orange. (Calcareous claystone. DOM common, L>I>>V. Liptinite common, inertinite sparse, vitrinite rare. Mineral fluorescence pervasive, moderate green. Fossil fragments rare. Iron oxides sparse. Pyrite abundant) |
| Pelican Hill 1 | 516.9 | 532.2 | core | – | 0.39 | 0.32 | 0.47 | 25 | Abundant tasmanitid telalginite, bright yellow, sparse lamalginite, yellow, rare liptodetrinite, yellow. (Carbonate. DOM sparse, L>V>>I. Liptinite and vitrinite sparse, inertinite rare. Mineral fluorescence pervasive, greenish yellow. Iron oxides rare. Pyrite abundant) |
| Pelican Hill 1 | 662.6 | 666.3 | core | – | 0.61 | 0.45 | 0.76 | 16 | Rare lamalginite and liptodetrinite, yellow to dull orange, rare sporinite, orange to dull orange. (Claystone. DOM sparse, L>V>I. Liptinite sparse, inertinite sparse, vitrinite rare. Mineral fluorescence patchy, dark green. Glauconite sparse. Pyrite common) |
| Pelican Hill 1 | 773.0 | 775.7 | core | – | – | – | – | – | Fluorescing liptinite absent. (Red ferruginous siltstone > claystone. DOM rare, I only. Mineral fluorescence patchy, dark green to yellow. Iron oxides major. Pyrite abundant) |
| | | | | $R_I$max | 2.42 | 2.12 | 2.72 | 2 | |
| CRAE GBH 1 | 272.6 | 272.7 | core | – | 0.59 | 0.47 | 0.69 | 26 | Rare cutinite and sporinite, moderate yellow to dull orange. (Sandstone >> coal. Coal abundant, vitrinite >> inertinite. Mineral-free maceral group composition of the coal: vitrinite — 98%, inertinite — 2%, liptinite — traces. DOM abundant, V>>I>L. Vitrinite abundant, inertinite and liptinite |

## **Appendix 8** (continued)

| *Well* | *Depth (m) From* | *To* | *Sample type* | *Maceral* | *Mean (% Ro)* | *Minimum (% Ro)* | *Maximum (% Ro)* | *Number of readings* | *Description including liptinite fluorescence characteristics* |
|---|---|---|---|---|---|---|---|---|---|
| CRAE GBH 1 (cont.) | 272.6 | 272.7 | core | – | 0.59 | 0.47 | 0.69 | 26 | rare. Mineral fluorescence pervasive, moderate green. Iron oxides common. Pyrite abundant) |
| CRAE GBH 1 | 344.1 | 344.3 | core | – | 1.23 | 0.90 | 1.51 | 27 | Fluorescing liptinite absent. (Sandstone > claystone > igneous rock fragments. Coal abundant, vitrinite. Mineral-free maceral group composition of the coal: vitrinite — 100%, inertinite — traces, liptinite — traces. DOM abundant, V>>I. Vitrinite abundant, inertinite rare, liptinite absent. Mineral fluorescence pervasive, moderate green to yellow. Iron oxides abundant. Pyrite common) |
| CRAE GBH 1 | 354.16 | 354.60 | core | – | 0.58 | 0.44 | 0.75 | 6 | Sparse lamalginite, yellow. (Claystone >> siltstone. DOM sparse, L>V>I. Liptinite sparse, inertinite and liptinite rare. Mineral fluorescence pervasive, moderate yellow. Iron oxides sparse. Pyrite sparse) |
| CRAE GBH 2 | 200.0 | 220.1 | core | –<br>$R_I$max | 0.36<br>0.91 | 0.27<br>0.78 | 0.41<br>1.05 | 11<br>6 | Sparse lamalginite, bright yellow to orange, rare liptodetrinite, yellow. (DOM sparse, L>L>V. Liptinite sparse, inertinite and liptinite rare. Mineral fluorescence pervasive, moderate green to yellow. Glauconite rare. Pyrite common) |
| CRAE GBH 2 | 289.6 | 289.8 | core | –<br>$R_I$max | –<br>1.43 | –<br>– | –<br>– | –<br>1 | Rare liptodetrinite, orange. (Clayey carbonate > igneous rock fragments. DOM rare, I>L. Inertinite and liptinite rare, vitrinite absent. Mineral fluorescence pervasive, yellow. Pyrite common) |
| CRAE GBH 2 | 330.7 | 330.80 | core | –<br>$R_I$max | 0.67<br>1.32 | 0.59<br>– | 0.82<br>– | 3<br>1 | Rare lamalginite and liptodetrinite, yellow to orange. (Siltstone. DOM rare, L>V>I. All three maceral groups rare. Mineral fluorescence pervasive, moderate yellow. Pyrite abundant) |
| Brickhouse 1 | 356.10 | 404.77 | core | –<br>$R_I$max | 0.71<br>1.05 | 0.54<br>0.66 | 0.79<br>2.94 | 4<br>8 | Sparse lamalginite, bright yellow to orange. (Calcareous claystone. DOM abundant, L> I>V. Liptinite and inertinite spare, vitrinite rare. Mineral fluorescence pervasive, dark yellow to orange. Pyrite common) |
| Yaringa 1 | 192.0 | – | core 2 | –<br>$R_I$max | 0.37<br>1.05 | 0.23<br>0.66 | 0.60<br>2.94 | 14<br>8 | Abundant lamalginite, yellow, rare sporinite, yellow to orange. (Siltstone, sandy,calcareous. DOM abundant, L>I>V. Liptinite abundant, inertinite and vitrinite rare. Mineral fluorescence pervasive, moderate orange. Sample proved difficult to mount, the plastic was inhibited from setting, but the cause of this is not clear. Pyrite sparse) |
| Yaringa 1 | 958.6 | – | core 13 | NFL<br>R thucholite | 0.53<br>0.63 | 0.45<br>0.56 | 0.60<br>0.70 | 2<br>2 | Sparse liptodetrinite, orange. (Siltstone > carbonate. DOM sparse, L>?V, no I. Liptinite sparse, 'vitrinite' rare, inertinite rare. Mineral fluorescence patchy, moderate orange to weak dull orange, Pyrite sparse) |

**NOTES:**

DOM: dispersed organic matter
L: liptinite
V: vitrinite
I inertinite

$R_I$max: average inertinite
NFL: non fluorescing
$R_v$max: average vitrinite reflectance
$R_v$: estimated $R_v$max

## Appendix 9

# Apatite fission-track analysis data

**Table 9.1. Analytical data**

| *Well* | *Depth (m) From* | *To* | *Grain* | *Ns* | *Ni* | *Na* | *RHOs ($10^6$)* | *RHOi ($10^6$)* | *Ratio* | *U (ppm)* | *Cl (wt%)* | *Fission-track age (Ma)* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Barrabiddy 1A | 169.6 | 171 | 3 | 3 | 6 | 12 | 0.3973 | 0.7945 | 0.500 | 6.8 | 0.30 | 125.2 ± 88.6 |
| Barrabiddy 1A | 169.6 | 171 | 5 | 29 | 30 | 20 | 2.3040 | 2.3840 | 0.967 | 20.6 | 0.04 | 239.9 ± 62.8 |
| Barrabiddy 1A | 169.6 | 171 | 6 | 0 | 2 | 8 | 0.0000 | 0.3973 | 0.000 | 3.4 | 0.00 | 0.0 ± 0.0 |
| Barrabiddy 1A | 169.6 | 171 | 8 | 6 | 6 | 23 | 0.4145 | 0.4145 | 1.000 | 3.6 | 0.06 | 248.0 ± 143.3 |
| Barrabiddy 1A | 169.6 | 171 | 10 | 40 | 19 | 14 | 4.5400 | 2.1570 | 2.105 | 18.6 | 0.00 | 511.5 ± 143.1 |
| Barrabiddy 1A | 169.6 | 171 | 11 | 10 | 18 | 20 | 0.7945 | 1.4300 | 0.556 | 12.3 | 0.13 | 139.0 ± 54.9 |
| Barrabiddy 1A | 169.6 | 171 | 53 | 8 | 9 | 12 | 1.0590 | 1.1920 | 0.889 | 10.3 | 0.02 | 220.9 ± 107.5 |
| Barrabiddy 1A | 169.6 | 171 | 54 | 19 | 12 | 24 | 1.2580 | 0.7945 | 1.583 | 6.8 | 0.54 | 388.4 ± 143.6 |
| Barrabiddy 1A | 169.6 | 171 | 56 | 7 | 5 | 12 | 0.9270 | 0.6621 | 1.400 | 5.7 | 0.00 | 344.6 ± 202.0 |
| Barrabiddy 1A | 169.6 | 171 | 57 | 18 | 12 | 15 | 1.9070 | 1.2710 | 1.500 | 11.0 | 0.00 | 368.5 ± 137.7 |
| Barrabiddy 1A | 194.6 | 195.4 | 21 | 3 | 4 | 12 | 0.3973 | 0.5297 | 0.750 | 4.5 | 0.01 | 187.6 ± 143.4 |
| Barrabiddy 1A | 194.6 | 195.4 | 22 | 2 | 5 | 12 | 0.2648 | 0.6621 | 0.400 | 5.7 | 0.01 | 100.8 ± 84.3 |
| Barrabiddy 1A | 194.6 | 195.4 | 26 | 10 | 7 | 12 | 1.3240 | 0.9270 | 1.429 | 8.0 | 0.00 | 352.8 ± 174.1 |
| Barrabiddy 1A | 194.6 | 195.4 | 27 | 13 | 13 | 14 | 1.4760 | 1.4760 | 1.000 | 12.7 | 0.12 | 249.0 ± 97.9 |
| Barrabiddy 1A | 194.6 | 195.4 | 32 | 13 | 37 | 13 | 1.5890 | 4.5230 | 0.351 | 38.8 | 0.01 | 88.6 ± 28.7 |
| Barrabiddy 1A | 194.6 | 195.4 | 48 | 34 | 31 | 35 | 1.5440 | 1.4070 | 1.097 | 12.1 | 0.02 | 272.6 ± 68.1 |
| Barrabiddy 1A | 194.6 | 195.4 | 51 | 9 | 17 | 21 | 0.6810 | 1.2860 | 0.529 | 11.0 | 0.01 | 133.0 ± 54.9 |
| Barrabiddy 1A | 194.6 | 195.4 | 55 | 7 | 7 | 12 | 0.9270 | 0.9270 | 1.000 | 8.0 | 0.06 | 249.0 ± 133.2 |
| Barrabiddy 1A | 194.6 | 195.4 | 56 | 36 | 83 | 20 | 2.8600 | 6.5950 | 0.434 | 56.6 | 0.02 | 109.2 ± 22.0 |
| Barrabiddy 1A | 194.6 | 195.4 | 61 | 6 | 36 | 18 | 0.5297 | 3.1780 | 0.167 | 27.3 | 0.00 | 42.2 ± 18.6 |
| Barrabiddy 1A | 194.6 | 195.4 | 62 | 61 | 50 | 12 | 8.0780 | 6.6210 | 1.220 | 56.9 | 0.09 | 302.5 ± 58.2 |
| Barrabiddy 1A | 194.6 | 195.4 | 77 | 46 | 56 | 15 | 4.8730 | 5.9330 | 0.821 | 50.9 | 0.00 | 205.2 ± 41.2 |
| Barrabiddy 1A | 194.6 | 195.4 | 78 | 25 | 31 | 9 | 4.4140 | 5.4730 | 0.806 | 47.0 | 0.16 | 201.5 ± 54.4 |
| Barrabiddy 1A | 194.6 | 195.4 | 79 | 12 | 17 | 12 | 1.5890 | 2.2510 | 0.706 | 19.3 | 0.42 | 176.8 ± 66.8 |
| Barrabiddy 1A | 194.6 | 195.4 | 87 | 3 | 6 | 12 | 0.3973 | 0.7945 | 0.500 | 6.8 | 0.00 | 125.7 ± 88.9 |
| Barrabiddy 1A | 194.6 | 195.4 | 89 | 24 | 42 | 16 | 2.3840 | 4.1710 | 0.571 | 35.8 | 0.11 | 143.5 ± 36.9 |
| Barrabiddy 1A | 194.6 | 195.4 | 94 | 8 | 8 | 10 | 1.2710 | 1.2710 | 1.000 | 10.9 | 0.02 | 249.0 ± 124.7 |
| Barrabiddy 1A | 194.6 | 195.4 | 95 | 12 | 34 | 18 | 1.0590 | 3.0020 | 0.353 | 25.8 | 0.00 | 89.0 ± 30.0 |
| Barrabiddy 1A | 194.6 | 195.4 | 97 | 9 | 11 | 18 | 0.7945 | 0.9711 | 0.818 | 8.3 | 0.06 | 204.4 ± 92.0 |
| Barrabiddy 1A | 194.6 | 195.4 | 100 | 37 | 57 | 28 | 2.1000 | 3.2350 | 0.649 | 27.8 | 0.00 | 162.7 ± 34.6 |
| Barrabiddy 1A | 194.6 | 195.4 | 102 | 31 | 43 | 16 | 3.0790 | 4.2710 | 0.721 | 36.7 | 0.27 | 180.5 ± 42.8 |
| Barrabiddy 1A | 194.6 | 195.4 | 103 | 5 | 9 | 16 | 0.4966 | 0.8938 | 0.556 | 7.7 | 0.03 | 139.5 ± 77.9 |
| Barrabiddy 1A | 194.6 | 195.4 | 105 | 20 | 30 | 35 | 0.9080 | 1.3620 | 0.667 | 11.7 | 0.11 | 167.1 ± 48.4 |
| Barrabiddy 1A | 194.6 | 195.4 | 109 | 4 | 8 | 16 | 0.3973 | 0.7945 | 0.500 | 6.8 | 0.00 | 125.7 ± 77.0 |
| Barrabiddy 1A | 194.6 | 195.4 | 112 | 23 | 38 | 27 | 1.3540 | 2.2360 | 0.605 | 19.2 | 0.00 | 151.8 ± 40.3 |
| Barrabiddy 1A | 194.6 | 195.4 | 123 | 29 | 20 | 12 | 3.8400 | 2.6480 | 1.450 | 22.7 | 0.07 | 358.0 ± 104.5 |
| Barrabiddy 1A | 194.6 | 195.4 | 127 | 25 | 34 | 30 | 1.3240 | 1.8010 | 0.735 | 15.5 | 0.00 | 184.0 ± 48.7 |
| Barrabiddy 1A | 194.6 | 195.4 | 133 | 5 | 5 | 18 | 0.4414 | 0.4414 | 1.000 | 3.8 | 0.02 | 249.0 ± 157.6 |
| Barrabiddy 1A | 194.6 | 195.4 | 136 | 16 | 30 | 12 | 2.1190 | 3.9730 | 0.533 | 34.1 | 0.03 | 134.0 ± 41.6 |
| Barrabiddy 1A | 194.6 | 195.4 | 137 | 17 | 28 | 16 | 1.6880 | 2.7810 | 0.607 | 23.9 | 0.12 | 152.3 ± 47.0 |
| Barrabiddy 1A | 194.6 | 195.4 | 151 | 23 | 33 | 16 | 2.2840 | 3.2770 | 0.697 | 28.1 | 0.00 | 174.5 ± 47.6 |
| Barrabiddy 1A | 777.2 | 778.1 | 9 | 22 | 46 | 70 | 0.4994 | 1.0440 | 0.478 | 8.9 | 0.00 | 120.5 ± 31.4 |
| Barrabiddy 1A | 777.2 | 778.1 | 10 | 4 | 8 | 60 | 0.1059 | 0.2119 | 0.500 | 1.8 | 0.02 | 125.9 ± 77.2 |
| Barrabiddy 1A | 777.2 | 778.1 | 11 | 90 | 171 | 42 | 3.4050 | 6.4700 | 0.526 | 55.4 | 0.02 | 132.5 ± 17.6 |
| Barrabiddy 1A | 777.2 | 778.1 | 12 | 2 | 7 | 60 | 0.0530 | 0.1854 | 0.286 | 1.6 | 0.14 | 72.3 ± 58.0 |
| Barrabiddy 1A | 777.2 | 778.1 | 13 | 1 | 3 | 30 | 0.0530 | 0.1589 | 0.333 | 1.4 | 0.02 | 84.2 ± 97.3 |
| Barrabiddy 1A | 777.2 | 778.1 | 14 | 0 | 4 | 50 | 0.0000 | 0.1271 | 0.000 | 1.1 | 0.13 | 0.0 ± 0.0 |
| Barrabiddy 1A | 777.2 | 778.1 | 15 | 41 | 59 | 30 | 2.1720 | 3.1250 | 0.695 | 26.8 | 0.04 | 174.4 ± 35.7 |
| Barrabiddy 1A | 777.2 | 778.1 | 16 | 46 | 119 | 15 | 4.8730 | 12.6100 | 0.387 | 108.0 | 0.09 | 97.6 ± 17.1 |
| Barrabiddy 1A | 777.2 | 778.1 | 17 | 91 | 123 | 50 | 2.8920 | 3.9090 | 0.740 | 33.5 | 0.03 | 185.5 ± 26.1 |
| Barrabiddy 1A | 777.2 | 778.1 | 18 | 74 | 104 | 31 | 3.7930 | 5.3310 | 0.712 | 45.7 | 0.06 | 178.5 ± 27.5 |
| Barrabiddy 1A | 777.2 | 778.1 | 19 | 4 | 8 | 35 | 0.1816 | 0.3632 | 0.500 | 3.1 | 0.01 | 125.9 ± 77.2 |
| Barrabiddy 1A | 777.2 | 778.1 | 20 | 23 | 40 | 20 | 1.8270 | 3.1780 | 0.575 | 27.2 | 0.11 | 144.6 ± 38.0 |
| Barrabiddy 1A | 777.2 | 778.1 | 21 | 15 | 21 | 18 | 1.3240 | 1.8540 | 0.714 | 15.9 | 0.19 | 179.2 ± 60.8 |
| Barrabiddy 1A | 777.2 | 778.1 | 22 | 6 | 13 | 42 | 0.2270 | 0.4919 | 0.462 | 4.2 | 0.42 | 116.3 ± 57.5 |
| Barrabiddy 1A | 777.2 | 778.1 | 25 | 55 | 84 | 20 | 4.3700 | 6.6740 | 0.655 | 57.2 | 0.00 | 164.4 ± 28.8 |
| Barrabiddy 1A | 777.2 | 778.1 | 26 | 24 | 25 | 36 | 1.0590 | 1.1040 | 0.960 | 9.5 | 0.09 | 239.7 ± 68.8 |
| Barrabiddy 1A | 777.2 | 778.1 | 29 | 8 | 19 | 20 | 0.6356 | 1.5100 | 0.421 | 12.9 | 0.00 | 106.2 ± 44.9 |
| Barrabiddy 1A | 777.2 | 778.1 | 31 | 6 | 16 | 50 | 0.1907 | 0.5085 | 0.375 | 4.4 | 0.03 | 94.7 ± 45.4 |
| Barrabiddy 1A | 777.2 | 778.1 | 32 | 43 | 72 | 20 | 3.4160 | 5.7210 | 0.597 | 49.0 | 0.26 | 150.2 ± 29.2 |

**Table 9.1.** (continued)

| Well | Depth (m) From | Depth (m) To | Grain | Ns | Ni | Na | RHOs ($10^6$) | RHOi ($10^6$) | Ratio | U (ppm) | Cl (wt%) | Fission-track age (Ma) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Barrabiddy 1A | 777.2 | 778.1 | 36 | 21 | 26 | 20 | 1.6690 | 2.0660 | 0.808 | 17.7 | 0.01 | 202.2 ± 59.6 |
| Barrabiddy 1A | 777.2 | 778.1 | 39 | 14 | 36 | 42 | 0.5297 | 1.3620 | 0.389 | 11.7 | 0.01 | 98.2 ± 31.0 |
| Barrabiddy 1A | 777.2 | 778.1 | 41 | 20 | 35 | 16 | 1.9860 | 3.4760 | 0.571 | 29.8 | 0.09 | 143.7 ± 40.5 |
| Barrabiddy 1A | 777.2 | 778.1 | 43 | 11 | 44 | 50 | 0.3496 | 1.3980 | 0.250 | 12.0 | 0.01 | 63.3 ± 21.4 |
| Barrabiddy 1A | 777.2 | 778.1 | 45 | 19 | 16 | 20 | 1.5100 | 1.2710 | 1.188 | 10.9 | 0.13 | 295.2 ± 100.5 |
| Barrabiddy 1A | 777.2 | 778.1 | 52 | 31 | 47 | 28 | 1.7590 | 2.6600 | 0.660 | 22.9 | 0.05 | 165.6 ± 38.6 |
| Barrabiddy 1A | 777.2 | 778.1 | 55 | 13 | 28 | 80 | 0.2582 | 0.5562 | 0.464 | 4.8 | 0.09 | 117.0 ± 39.4 |
| Barrabiddy 1A | 777.2 | 778.1 | 56 | 41 | 63 | 32 | 2.0360 | 3.1280 | 0.651 | 26.8 | 0.09 | 163.5 ± 33.1 |
| Barrabiddy 1A | 777.2 | 778.1 | 66 | 66 | 112 | 32 | 3.2770 | 5.5620 | 0.589 | 47.7 | 0.00 | 148.2 ± 23.3 |
| Barrabiddy 1A | 777.2 | 778.1 | 70 | 65 | 65 | 30 | 3.4430 | 3.4430 | 1.000 | 29.5 | 0.00 | 249.5 ± 44.2 |
| Barrabiddy 1A | 777.2 | 778.1 | 75 | 31 | 57 | 30 | 1.6420 | 3.0190 | 0.544 | 25.9 | 0.00 | 136.9 ± 30.8 |
| Coburn 1 | 185.4 | 185.85 | 3 | 28 | 22 | 80 | 0.5562 | 0.4370 | 1.273 | 3.7 | 0.00 | 317.1 ± 90.7 |
| Coburn 1 | 185.4 | 185.85 | 6 | 25 | 14 | 24 | 1.6550 | 0.9270 | 1.785 | 7.9 | 0.02 | 440.6 ± 147.5 |
| Coburn 1 | 185.4 | 185.85 | 7 | 4 | 5 | 18 | 0.3531 | 0.4414 | 0.800 | 3.8 | 0.09 | 201.1 ± 135.0 |
| Coburn 1 | 185.4 | 185.85 | 8 | 183 | 174 | 40 | 7.2700 | 6.9120 | 1.052 | 59.0 | 0.05 | 263.2 ± 28.7 |
| Coburn 1 | 185.4 | 185.85 | 9 | 38 | 38 | 50 | 1.2080 | 1.2080 | 1.000 | 10.3 | 0.02 | 250.5 ± 57.8 |
| Coburn 1 | 185.4 | 185.85 | 10 | 6 | 5 | 20 | 0.4767 | 0.3973 | 1.200 | 3.4 | 0.03 | 299.4 ± 181.5 |
| Coburn 1 | 185.4 | 185.85 | 11 | 39 | 40 | 40 | 1.5490 | 1.5890 | 0.975 | 13.6 | 0.05 | 244.3 ± 55.3 |
| Coburn 1 | 185.4 | 185.85 | 12 | 56 | 67 | 20 | 4.4490 | 5.3230 | 0.836 | 45.4 | 0.09 | 210.0 ± 38.4 |
| Coburn 1 | 185.4 | 185.85 | 13 | 12 | 8 | 32 | 0.5959 | 0.3973 | 1.500 | 3.4 | 0.11 | 372.1 ± 170.1 |
| Coburn 1 | 185.4 | 185.85 | 20 | 34 | 38 | 70 | 0.7718 | 0.8626 | 0.895 | 7.4 | 0.13 | 224.6 ± 53.3 |
| Coburn 1 | 185.4 | 185.85 | 22 | 25 | 31 | 60 | 0.6621 | 0.8210 | 0.806 | 7.0 | 0.06 | 202.7 ± 54.8 |
| Coburn 1 | 185.4 | 185.85 | 23 | 59 | 67 | 80 | 1.1720 | 1.3310 | 0.881 | 11.4 | 0.23 | 221.1 ± 39.9 |
| Coburn 1 | 185.4 | 185.85 | 25 | 111 | 87 | 40 | 4.4100 | 3.4560 | 1.276 | 29.5 | 0.21 | 317.9 ± 46.3 |
| Coburn 1 | 185.4 | 185.85 | 26 | 103 | 57 | 35 | 4.6760 | 2.5880 | 1.807 | 22.1 | 0.00 | 445.7 ± 74.5 |
| Coburn 1 | 185.4 | 185.85 | 32 | 23 | 14 | 50 | 0.7310 | 0.4449 | 1.643 | 3.8 | 0.30 | 406.5 ± 138.2 |
| Coburn 1 | 185.4 | 185.85 | 36 | 61 | 54 | 45 | 2.1540 | 1.9070 | 1.130 | 16.3 | 0.00 | 282.2 ± 53.2 |
| Coburn 1 | 185.4 | 185.85 | 39 | 12 | 19 | 49 | 0.3892 | 0.6162 | 0.632 | 5.3 | 0.11 | 159.3 ± 58.9 |
| Coburn 1 | 185.4 | 185.85 | 41 | 67 | 61 | 60 | 1.7740 | 1.6160 | 1.098 | 13.8 | 0.06 | 274.6 ± 49.1 |
| Coburn 1 | 185.4 | 185.85 | 42 | 17 | 31 | 35 | 0.7718 | 1.4070 | 0.549 | 12.0 | 0.12 | 138.6 ± 42.0 |
| Coburn 1 | 185.4 | 185.85 | 43 | 108 | 94 | 80 | 2.1450 | 1.8670 | 1.149 | 15.9 | 0.00 | 286.9 ± 41.2 |
| Coburn 1 | 185.4 | 185.85 | 44 | 117 | 90 | 35 | 5.3120 | 4.0860 | 1.300 | 34.9 | 0.01 | 323.7 ± 46.2 |
| Coburn 1 | 185.4 | 185.85 | 45 | 124 | 92 | 50 | 3.9410 | 2.9240 | 1.348 | 25.0 | 0.05 | 335.3 ± 47.0 |
| Coburn 1 | 185.4 | 185.85 | 46 | 228 | 248 | 60 | 6.0380 | 6.5680 | 0.919 | 56.1 | 0.02 | 230.6 ± 22.0 |
| Coburn 1 | 185.4 | 185.85 | 47 | 171 | 145 | 30 | 9.0580 | 7.6800 | 1.179 | 65.6 | 0.25 | 294.4 ± 34.1 |
| Coburn 1 | 185.4 | 185.85 | 48 | 16 | 45 | 40 | 0.6356 | 1.7880 | 0.355 | 15.3 | 0.02 | 90.2 ± 26.4 |
| Coburn 1 | 185.4 | 185.85 | 49 | 290 | 237 | 50 | 9.2100 | 7.5320 | 1.223 | 64.3 | 0.38 | 305.2 ± 27.9 |
| Coburn 1 | 185.4 | 185.85 | 14 | 25 | 43 | 50 | 0.7945 | 1.3670 | 0.581 | 11.7 | 0.00 | 146.8 ± 37.1 |
| Coburn 1 | 272.25 | 272.65 | 3 | 4 | 4 | 12 | 0.5297 | 0.5297 | 1.000 | 4.5 | 0.00 | 251.0 ± 177.6 |
| Coburn 1 | 272.25 | 272.65 | 4 | 3 | 4 | 30 | 0.1589 | 0.2119 | 0.750 | 1.8 | 0.00 | 189.1 ± 144.5 |
| Coburn 1 | 936.5 | 937 | 6 | 9 | 10 | 12 | 1.1920 | 1.3240 | 0.900 | 11.3 | 0.07 | 226.7 ± 104.3 |
| Coburn 1 | 936.5 | 937 | 11 | 1 | 2 | 12 | 0.1324 | 0.2648 | 0.500 | 2.3 | 0.17 | 126.9 ± 155.5 |
| Coburn 1 | 936.5 | 937 | 12 | 34 | 53 | 24 | 2.2510 | 3.5090 | 0.641 | 29.8 | 0.07 | 162.4 ± 35.9 |
| Coburn 1 | 936.5 | 937 | 13 | 18 | 17 | 16 | 1.7880 | 1.6880 | 1.059 | 14.4 | 0.00 | 265.9 ± 90.2 |
| Coburn 1 | 936.5 | 937 | 14 | 75 | 126 | 70 | 1.7030 | 2.8600 | 0.595 | 24.3 | 0.00 | 150.8 ± 22.3 |
| Coburn 1 | 936.5 | 937 | 16 | 12 | 10 | 21 | 0.9080 | 0.7567 | 1.200 | 6.4 | 0.09 | 300.6 ± 128.9 |
| Coburn 1 | 936.5 | 937 | 18 | 43 | 37 | 40 | 1.7080 | 1.4700 | 1.162 | 12.5 | 0.00 | 291.3 ± 65.8 |
| Coburn 1 | 936.5 | 937 | 19 | 86 | 79 | 60 | 2.2780 | 2.0920 | 1.089 | 17.8 | 0.01 | 273.3 ± 43.2 |
| Coburn 1 | 936.5 | 937 | 20 | 3 | 5 | 12 | 0.3973 | 0.6621 | 0.600 | 5.6 | 0.24 | 152.0 ± 111.1 |
| Coburn 1 | 936.5 | 937 | 21 | 11 | 8 | 14 | 1.2490 | 0.9080 | 1.376 | 7.7 | 0.23 | 343.3 ± 159.8 |
| Coburn 1 | 936.5 | 937 | 24 | 85 | 69 | 100 | 1.3510 | 1.0960 | 1.233 | 9.3 | 0.15 | 308.4 ± 50.6 |
| Coburn 1 | 936.5 | 937 | 27 | 14 | 23 | 15 | 1.4830 | 2.4370 | 0.609 | 20.7 | 0.00 | 154.2 ± 52.4 |
| Coburn 1 | 936.5 | 937 | 30 | 13 | 12 | 8 | 2.5820 | 2.3840 | 1.083 | 20.3 | 0.06 | 272.0 ± 109.1 |
| Coburn 1 | 936.5 | 937 | 32 | 48 | 42 | 30 | 2.5420 | 2.2250 | 1.142 | 18.9 | 0.24 | 286.6 ± 61.0 |
| Coburn 1 | 936.5 | 937 | 33 | 94 | 58 | 15 | 9.9580 | 6.1440 | 1.621 | 52.2 | 0.01 | 402.7 ± 68.1 |
| Coburn 1 | 936.5 | 937 | 34 | 11 | 13 | 28 | 0.6243 | 0.7378 | 0.846 | 6.3 | 0.13 | 213.4 ± 87.6 |
| Coburn 1 | 936.5 | 937 | 36 | 16 | 11 | 40 | 0.6356 | 0.4370 | 1.454 | 3.7 | 0.16 | 362.6 ± 142.3 |
| Coburn 1 | 936.5 | 937 | 38 | 91 | 116 | 90 | 1.6070 | 2.0480 | 0.785 | 17.4 | 0.03 | 198.1 ± 28.2 |
| Coburn 1 | 936.5 | 937 | 39 | 93 | 82 | 16 | 9.2360 | 8.1440 | 1.134 | 69.2 | 0.08 | 284.4 ± 43.7 |
| Coburn 1 | 936.5 | 937 | 40 | 4 | 13 | 35 | 0.1816 | 0.5902 | 0.308 | 5.0 | 0.00 | 78.4 ± 44.9 |
| Coburn 1 | 936.5 | 937 | 42 | 39 | 28 | 12 | 5.1640 | 3.7080 | 1.393 | 31.5 | 0.86 | 347.6 ± 86.6 |
| Coburn 1 | 936.5 | 937 | 44 | 15 | 16 | 40 | 0.5959 | 0.6356 | 0.938 | 5.4 | 0.02 | 236.0 ± 85.0 |
| Coburn 1 | 936.5 | 937 | 45 | 100 | 122 | 40 | 3.9730 | 4.8400 | 0.821 | 41.2 | 0.10 | 206.8 ± 28.4 |
| Coburn 1 | 936.5 | 937 | 46 | 23 | 52 | 24 | 1.5230 | 3.4430 | 0.442 | 29.3 | 0.03 | 112.4 ± 28.3 |
| Coburn 1 | 936.5 | 937 | 51 | 36 | 19 | 40 | 1.4300 | 7.5480 | 0.189 | 6.4 | 0.01 | 468.4 ± 133.4 |

**Table 9.1.** (continued)

| *Well* | *Depth (m)* *From* | *To* | *Grain* | *Ns* | *Ni* | *Na* | *RHOs* *($10^6$)* | *RHOi* *($10^6$)* | *Ratio* | *U* *(ppm)* | *Cl* *(wt%)* | *Fission-track age* *(Ma)* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Coburn 1 | 936.5 | 937 | 56 | 55 | 46 | 18 | 4.8550 | 4.0610 | 1.196 | 34.5 | 0.03 | 299.5 ± 60.4 |
| Coburn 1 | 936.5 | 937 | 59 | 37 | 90 | 50 | 1.1760 | 2.8600 | 0.411 | 243.0 | 0.00 | 104.6 ± 20.6 |
| Coburn 1 | 936.5 | 937 | 61 | 65 | 68 | 36 | 2.8690 | 3.0020 | 0.956 | 25.5 | 0.00 | 240.6 ± 42.2 |
| Coburn 1 | 976.2 | 976.85 | 16 | 50 | 45 | 9 | 8.8280 | 7.9450 | 1.111 | 67.4 | 0.30 | 279.3 ± 57.9 |
| Coburn 1 | 976.2 | 976.85 | 19 | 18 | 21 | 18 | 1.5890 | 1.8540 | 0.857 | 15.7 | 0.00 | 216.5 ± 69.8 |
| Coburn 1 | 976.2 | 976.85 | 20 | 22 | 27 | 28 | 1.2490 | 1.5320 | 0.815 | 13.0 | 0.63 | 206.0 ± 59.4 |
| Coburn 1 | 976.2 | 976.85 | 24 | 4 | 5 | 15 | 0.4238 | 0.5297 | 0.800 | 4.5 | 0.03 | 202.3 ± 135.8 |
| Coburn 1 | 976.2 | 976.85 | 29 | 182 | 204 | 35 | 8.2630 | 9.2620 | 0.892 | 78.6 | 0.00 | 225.2 ± 23.7 |
| Coburn 1 | 976.2 | 976.85 | 30 | 14 | 19 | 40 | 0.5562 | 0.7548 | 0.737 | 6.4 | 0.07 | 186.6 ± 65.9 |
| Coburn 1 | 976.2 | 976.85 | 31 | 44 | 70 | 20 | 3.4960 | 5.5620 | 0.629 | 47.2 | 0.03 | 159.5 ± 31.0 |
| Coburn 1 | 976.2 | 976.85 | 32 | 51 | 35 | 16 | 5.0650 | 3.4760 | 1.457 | 29.5 | 0.01 | 363.9 ± 80.4 |
| Coburn 1 | 976.2 | 976.85 | 36 | 24 | 47 | 28 | 1.3620 | 2.6670 | 0.511 | 22.6 | 0.02 | 129.9 ± 32.8 |
| Coburn 1 | 976.2 | 976.85 | 38 | 10 | 16 | 14 | 1.1350 | 1.8160 | 0.625 | 15.4 | 0.04 | 158.6 ± 64.1 |
| Coburn 1 | 976.2 | 976.85 | 39 | 20 | 26 | 16 | 1.9860 | 2.5820 | 0.769 | 21.9 | 0.03 | 194.7 ± 58.1 |
| Coburn 1 | 976.2 | 976.85 | 42 | 33 | 38 | 16 | 3.2770 | 3.7740 | 0.868 | 32.0 | 0.05 | 219.3 ± 52.5 |
| Coburn 1 | 976.2 | 976.85 | 43 | 13 | 19 | 18 | 1.1480 | 1.6770 | 0.685 | 14.2 | 0.01 | 173.4 ± 62.6 |
| Coburn 1 | 976.2 | 976.85 | 44 | 12 | 10 | 12 | 1.5890 | 1.3240 | 1.200 | 11.2 | 0.02 | 301.2 ± 129.2 |
| Coburn 1 | 976.2 | 976.85 | 45 | 4 | 7 | 12 | 0.5297 | 0.9270 | 0.571 | 7.9 | 0.14 | 145.2 ± 91.1 |
| Coburn 1 | 976.2 | 976.85 | 51 | 45 | 61 | 40 | 1.7880 | 2.4230 | 0.738 | 20.6 | 0.05 | 186.8 ± 37.0 |
| Coburn 1 | 976.2 | 976.85 | 53 | 16 | 25 | 16 | 1.5890 | 2.4830 | 0.640 | 21.1 | 0.00 | 162.4 ± 52.2 |
| Coburn 1 | 976.2 | 976.85 | 54 | 10 | 10 | 16 | 0.9932 | 0.9932 | 1.000 | 8.4 | 0.14 | 251.9 ± 112.9 |
| Coburn 1 | 976.2 | 976.85 | 55 | 12 | 13 | 12 | 1.5890 | 1.7210 | 0.923 | 14.6 | 0.00 | 232.9 ± 93.4 |
| Coburn 1 | 976.2 | 976.85 | 62 | 42 | 54 | 25 | 2.6700 | 3.4320 | 0.778 | 29.1 | 0.13 | 196.8 ± 40.8 |
| Coburn 1 | 976.2 | 976.85 | 63 | 52 | 40 | 24 | 3.4430 | 2.6480 | 1.300 | 22.5 | 0.03 | 325.6 ± 69.0 |
| Coburn 1 | 976.2 | 976.85 | 65 | 43 | 65 | 24 | 2.8470 | 4.3040 | 0.661 | 36.5 | 0.09 | 167.8 ± 33.3 |
| Coburn 1 | 976.2 | 976.85 | 68 | 3 | 4 | 60 | 0.0795 | 0.1059 | 0.750 | 0.9 | 0.20 | 189.9 ± 145.1 |
| Coburn 1 | 976.2 | 976.85 | 69 | 37 | 34 | 28 | 2.1000 | 1.9300 | 1.088 | 16.4 | 0.21 | 273.7 ± 65.4 |
| Coburn 1 | 976.2 | 976.85 | 70 | 11 | 14 | 15 | 1.1650 | 1.4830 | 0.786 | 12.6 | 0.03 | 198.8 ± 80.3 |
| Coburn 1 | 976.2 | 976.85 | 72 | 9 | 13 | 50 | 0.2860 | 0.4132 | 0.692 | 3.5 | 0.00 | 175.5 ± 76.2 |
| Coburn 1 | 976.2 | 976.85 | 73 | 89 | 99 | 50 | 2.8290 | 3.1460 | 0.899 | 26.7 | 0.00 | 226.9 ± 33.7 |
| Coburn 1 | 976.2 | 976.85 | 75 | 10 | 10 | 8 | 1.9860 | 1.9860 | 1.000 | 16.9 | 0.05 | 251.9 ± 112.9 |
| Coburn 1 | 976.2 | 976.85 | 79 | 51 | 46 | 16 | 5.0650 | 4.5690 | 1.109 | 38.8 | 0.20 | 278.7 ± 57.1 |
| Coburn 1 | 976.2 | 976.85 | 82 | 36 | 44 | 50 | 1.1440 | 1.3980 | 0.818 | 11.9 | 0.03 | 206.9 ± 46.8 |
| Coburn 1 | 976.2 | 976.85 | 92 | 72 | 80 | 50 | 2.2880 | 2.5420 | 0.900 | 21.6 | 0.14 | 227.2 ± 37.4 |
| Quail 1 | 218.8 | 222.5 | 3 | 6 | 11 | 42 | 0.2270 | 0.4162 | 0.545 | 3.6 | 0.14 | 141.3 ± 71.8 |
| Quail 1 | 218.8 | 222.5 | 5 | 11 | 41 | 30 | 0.5827 | 2.1720 | 0.268 | 18.6 | 0.00 | 69.9 ± 23.8 |
| Quail 1 | 218.8 | 222.5 | 6 | 21 | 28 | 12 | 2.7810 | 3.7080 | 0.750 | 31.7 | 0.25 | 193.5 ± 56.1 |
| Quail 1 | 218.8 | 222.5 | 7 | 15 | 12 | 36 | 0.6621 | 0.5297 | 1.250 | 4.5 | 0.00 | 319.4 ± 124.0 |
| Quail 1 | 218.8 | 222.5 | 8 | 2 | 2 | 15 | 0.2119 | 0.2119 | 1.000 | 1.8 | 0.00 | 256.8 ± 256.9 |
| Quail 1 | 218.8 | 222.5 | 10 | 32 | 49 | 21 | 2.4210 | 3.7080 | 0.653 | 31.7 | 0.28 | 168.8 ± 38.7 |
| Quail 1 | 218.8 | 222.5 | 11 | 8 | 12 | 42 | 0.3027 | 0.4540 | 0.667 | 3.9 | 0.08 | 172.3 ± 78.8 |
| Quail 1 | 218.8 | 222.5 | 13 | 38 | 57 | 35 | 1.7250 | 2.5880 | 0.667 | 22.1 | 0.29 | 172.3 ± 36.4 |
| Quail 1 | 218.8 | 222.5 | 14 | 28 | 35 | 20 | 2.2250 | 2.7810 | 0.800 | 23.8 | 0.17 | 206.2 ± 52.6 |
| Quail 1 | 218.8 | 222.5 | 18 | 88 | 111 | 50 | 2.7970 | 3.5280 | 0.793 | 30.2 | 0.12 | 204.4 ± 29.8 |
| Quail 1 | 218.8 | 222.5 | 19 | 9 | 13 | 30 | 0.4767 | 0.6886 | 0.692 | 5.9 | 0.20 | 178.8 ± 77.7 |
| Quail 1 | 218.8 | 222.5 | 20 | 29 | 30 | 28 | 1.6460 | 1.7030 | 0.967 | 14.6 | 0.46 | 248.4 ± 65.1 |
| Quail 1 | 218.8 | 222.5 | 21 | 44 | 63 | 32 | 2.1850 | 3.1280 | 0.698 | 26.7 | 0.40 | 180.4 ± 35.8 |
| Quail 1 | 218.8 | 222.5 | 23 | 40 | 51 | 36 | 1.7660 | 2.2510 | 0.784 | 19.2 | 0.19 | 202.2 ± 43.1 |
| Quail 1 | 218.8 | 222.5 | 25 | 11 | 20 | 21 | 0.8324 | 1.5130 | 0.550 | 12.9 | 0.04 | 142.5 ± 53.6 |
| Quail 1 | 218.8 | 222.5 | 26 | 7 | 18 | 50 | 0.2250 | 0.5721 | 0.389 | 4.9 | 0.09 | 101.1 ± 45.1 |
| Quail 1 | 218.8 | 222.5 | 28 | 15 | 21 | 9 | 2.6480 | 3.7080 | 0.714 | 31.7 | 0.00 | 184.4 ± 62.6 |
| Quail 1 | 218.8 | 222.5 | 29 | 47 | 113 | 64 | 1.1670 | 2.8060 | 0.416 | 24.0 | 0.07 | 108.0 ± 19.0 |
| Quail 1 | 218.8 | 222.5 | 30 | 12 | 12 | 24 | 0.7945 | 0.7945 | 1.000 | 6.8 | 0.28 | 256.8 ± 105.1 |
| Quail 1 | 218.8 | 222.5 | 31 | 24 | 31 | 30 | 1.2710 | 1.6420 | 0.774 | 14.0 | 0.21 | 199.7 ± 54.6 |
| Quail 1 | 1 061.9 | 1 063.4 | 3 | 17 | 48 | 20 | 1.3510 | 3.8140 | 0.354 | 32.5 | 0.04 | 92.4 ± 26.2 |
| Quail 1 | 1 061.9 | 1 063.4 | 4 | 2 | 8 | 30 | 0.1059 | 0.4238 | 0.250 | 3.6 | 0.11 | 65.4 ± 51.7 |
| Quail 1 | 1 061.9 | 1 063.4 | 5 | 4 | 16 | 20 | 0.3178 | 1.2710 | 0.250 | 10.8 | 0.12 | 65.4 ± 36.6 |
| Quail 1 | 1 061.9 | 1 063.4 | 6 | 0 | 10 | 40 | 0.0000 | 0.3973 | 0.000 | 3.4 | 0.01 | 0.0 ± 0.0 |
| Quail 1 | 1 061.9 | 1 063.4 | 7 | 17 | 43 | 12 | 2.2510 | 5.6940 | 0.395 | 48.5 | 0.12 | 103.1 ± 29.7 |
| Quail 1 | 1 061.9 | 1 063.4 | 8 | 11 | 61 | 36 | 0.4855 | 2.6930 | 0.180 | 23.0 | 0.03 | 47.2 ± 15.5 |
| Quail 1 | 1 061.9 | 1 063.4 | 9 | 17 | 30 | 12 | 2.2510 | 3.9730 | 0.567 | 33.9 | 0.07 | 147.2 ± 44.9 |
| Quail 1 | 1 061.9 | 1 063.4 | 10 | 5 | 36 | 16 | 0.4966 | 3.5750 | 0.139 | 30.5 | 0.07 | 36.4 ± 17.4 |
| Quail 1 | 1 061.9 | 1 063.4 | 11 | 1 | 14 | 30 | 0.0530 | 0.7416 | 0.071 | 6.3 | 0.00 | 18.7 ± 19.4 |
| Quail 1 | 1 061.9 | 1 063.4 | 14 | 11 | 47 | 14 | 1.2490 | 5.3350 | 0.234 | 45.5 | 0.18 | 61.2 ± 20.6 |
| Quail 1 | 1 061.9 | 1 063.4 | 15 | 23 | 128 | 30 | 1.2180 | 6.7800 | 0.180 | 57.8 | 0.02 | 47.0 ± 10.7 |
| Quail 1 | 1 061.9 | 1 063.4 | 17 | 19 | 110 | 16 | 1.8870 | 10.9200 | 0.173 | 93.1 | 0.10 | 45.2 ± 11.3 |

**Table 9.1.** (continued)

| *Well* | *Depth (m) From* | *To* | *Grain* | *Ns* | *Ni* | *Na* | *RHOs ($10^6$)* | *RHOi ($10^6$)* | *Ratio* | *U (ppm)* | *Cl (wt%)* | *Fission-track age (Ma)* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Quail 1 | 1 061.9 | 1 063.4 | 18 | 25 | 97 | 20 | 1.9860 | 7.7070 | 0.258 | 65.7 | 0.00 | 67.4 ± 15.2 |
| Quail 1 | 1 061.9 | 1 063.4 | 21 | 4 | 48 | 18 | 0.3531 | 4.2380 | 0.083 | 36.1 | 0.00 | 21.9 ± 11.4 |
| Quail 1 | 1 061.9 | 1 063.4 | 22 | 30 | 72 | 35 | 1.3620 | 3.2690 | 0.417 | 27.9 | 0.17 | 108.6 ± 23.8 |
| Quail 1 | 1 061.9 | 1 063.4 | 23 | 7 | 60 | 50 | 0.2225 | 1.9070 | 0.117 | 16.3 | 0.05 | 30.6 ± 12.2 |
| Quail 1 | 1 061.9 | 1 063.4 | 26 | 19 | 29 | 28 | 1.0780 | 1.6460 | 0.655 | 14.0 | 0.59 | 169.9 ± 50.4 |
| Quail 1 | 1 061.9 | 1 063.4 | 27 | 28 | 51 | 10 | 4.4490 | 8.1040 | 0.549 | 69.1 | 0.24 | 142.7 ± 33.8 |
| Quail 1 | 1 061.9 | 1 063.4 | 30 | 1 | 3 | 9 | 0.1766 | 0.5297 | 0.333 | 4.5 | 0.00 | 87.0 ± 100.5 |
| Quail 1 | 1 061.9 | 1 063.4 | 34 | 3 | 25 | 9 | 0.5297 | 4.4140 | 0.120 | 37.6 | 0.01 | 31.5 ± 19.2 |
| Quail 1 | 1 995.5 | 1 996.4 | 3 | 0 | 7 | 35 | 0.0000 | 0.3178 | 0.000 | 2.7 | 0.00 | 0.0 ± 0.0 |
| Quail 1 | 1 995.5 | 1 996.4 | 4 | 1 | 4 | 48 | 0.0331 | 0.1324 | 0.250 | 1.1 | 0.00 | 65.6 ± 73.3 |
| Quail 1 | 1 995.5 | 1 996.4 | 5 | 1 | 5 | 16 | 0.0993 | 0.4966 | 0.200 | 4.2 | 0.00 | 52.5 ± 57.5 |
| Quail 1 | 1 995.5 | 1 996.4 | 6 | 4 | 37 | 48 | 0.1324 | 1.2250 | 0.108 | 10.4 | 0.08 | 28.4 ± 15.0 |
| Quail 1 | 1 995.5 | 1 996.4 | 7 | 0 | 10 | 20 | 0.0000 | 0.7945 | 0.000 | 6.8 | 0.11 | 0.0 ± 0.0 |
| Quail 1 | 1 995.5 | 1 996.4 | 9 | 0 | 5 | 35 | 0.0000 | 0.2270 | 0.000 | 1.9 | 0.01 | 0.0 ± 0.0 |
| Quail 1 | 1 995.5 | 1 996.4 | 10 | 0 | 63 | 48 | 0.0000 | 2.0860 | 0.000 | 17.7 | 0.02 | 0.0 ± 0.0 |
| Quail 1 | 1 995.5 | 1 996.4 | 11 | 2 | 211 | 30 | 0.1059 | 11.1800 | 0.009 | 95.0 | 0.00 | 2.5 ± 1.8 |
| Quail 1 | 1 995.5 | 1 996.4 | 12 | 1 | 9 | 70 | 0.0227 | 0.2043 | 0.111 | 1.7 | 0.01 | 29.2 ± 30.8 |
| Quail 1 | 1 995.5 | 1 996.4 | 13 | 3 | 58 | 40 | 0.1192 | 2.3040 | 0.052 | 19.6 | 0.22 | 13.6 ± 8.1 |
| Quail 1 | 1 995.5 | 1 996.4 | 14 | 0 | 10 | 16 | 0.0000 | 0.9932 | 0.000 | 8.4 | 0.23 | 0.0 ± 0.0 |
| Quail 1 | 1 995.5 | 1 996.4 | 15 | 0 | 5 | 18 | 0.0000 | 0.4414 | 0.000 | 3.8 | 0.00 | 0.0 ± 0.0 |
| Quail 1 | 1 995.5 | 1 996.4 | 16 | 0 | 49 | 20 | 0.0000 | 3.8930 | 0.000 | 33.1 | 0.27 | 0.0 ± 0.0 |
| Quail 1 | 1 995.5 | 1 996.4 | 17 | 1 | 24 | 30 | 0.0530 | 1.2710 | 0.042 | 10.8 | 0.06 | 11.0 ± 11.2 |
| Quail 1 | 1 995.5 | 1 996.4 | 18 | 0 | 2 | 18 | 0.0000 | 0.1766 | 0.000 | 1.5 | 0.18 | 0.0 ± 0.0 |
| Quail 1 | 1 995.5 | 1 996.4 | 19 | 3 | 76 | 30 | 0.1589 | 4.0260 | 0.039 | 34.2 | 0.00 | 10.4 ± 6.1 |
| Quail 1 | 1 995.5 | 1 996.4 | 20 | 1 | 5 | 28 | 0.0568 | 0.2838 | 0.200 | 2.4 | 0.00 | 52.5 ± 57.5 |
| Quail 1 | 1 995.5 | 1 996.4 | 21 | 1 | 52 | 18 | 0.0828 | 4.5910 | 0.019 | 39.0 | 0.03 | 5.1 ± 5.1 |
| Quail 1 | 1 995.5 | 1 996.4 | 29 | 44 | 312 | 18 | 3.8840 | 2.7540 | 0.141 | 234.0 | 0.14 | 37.1 ± 6.1 |
| Quail 1 | 1 995.5 | 1 996.4 | 30 | 11 | 148 | 42 | 0.4162 | 5.6000 | 0.074 | 47.6 | 0.05 | 19.6 ± 6.1 |
| Quail 1 | 2 230.8 | 2 231.4 | 3 | 0 | 21 | 9 | 0.0000 | 3.7080 | 0.000 | 31.4 | 0.05 | 0.0 ± 0.0 |
| Quail 1 | 2 230.8 | 2 231.4 | 6 | 2 | 97 | 30 | 0.1059 | 5.1380 | 0.021 | 43.5 | 0.03 | 5.4 ± 3.9 |
| Quail 1 | 2 230.8 | 2 231.4 | 6 | 0 | 16 | 25 | 0.0000 | 1.0170 | 0.000 | 8.6 | 0.03 | 0.0 ± 0.0 |
| Quail 1 | 2 230.8 | 2 231.4 | 7 | 1 | 34 | 35 | 0.0454 | 1.5440 | 0.029 | 13.1 | 0.00 | 7.8 ± 7.9 |
| Quail 1 | 2 230.8 | 2 231.4 | 8 | 1 | 66 | 24 | 0.0662 | 4.3700 | 0.015 | 37.0 | 0.00 | 4.0 ± 4.0 |
| Quail 1 | 2 230.8 | 2 231.4 | 9 | 1 | 35 | 27 | 0.0589 | 2.0600 | 0.029 | 17.4 | 0.00 | 7.5 ± 7.7 |
| Quail 1 | 2 230.8 | 2 231.4 | 10 | 1 | 45 | 16 | 0.0993 | 4.4690 | 0.022 | 37.9 | 0.05 | 5.9 ± 5.9 |
| Quail 1 | 2 230.8 | 2 231.4 | 11 | 3 | 73 | 16 | 0.2980 | 7.2500 | 0.041 | 61.4 | 0.14 | 10.9 ± 6.4 |
| Quail 1 | 2 230.8 | 2 231.4 | 12 | 0 | 105 | 35 | 0.0000 | 4.7670 | 0.000 | 40.4 | 0.00 | 0.0 ± 0.0 |
| Quail 1 | 2 230.8 | 2 231.4 | 13 | 0 | 24 | 30 | 0.0000 | 1.2710 | 0.000 | 10.8 | 0.06 | 0.0 ± 0.0 |
| Quail 1 | 2 230.8 | 2 231.4 | 14 | 5 | 168 | 20 | 0.3973 | 13.3500 | 0.030 | 113.1 | 0.13 | 7.9 ± 3.6 |
| Quail 1 | 2 230.8 | 2 231.4 | 15 | 0 | 16 | 20 | 0.0000 | 1.2710 | 0.000 | 10.8 | 0.00 | 0.0 ± 0.0 |
| Quail 1 | 2 230.8 | 2 231.4 | 16 | 2 | 41 | 42 | 0.0757 | 1.5510 | 0.049 | 13.1 | 0.04 | 12.9 ± 9.3 |
| Quail 1 | 2 230.8 | 2 231.4 | 17 | 2 | 7 | 20 | 0.0159 | 0.5562 | 0.286 | 4.7 | 0.32 | 75.1 ± 60.3 |
| Quail 1 | 2 230.8 | 2 231.4 | 18 | 1 | 16 | 15 | 0.1059 | 1.6950 | 0.062 | 14.4 | 0.47 | 16.5 ± 17.0 |
| Quail 1 | 2 230.8 | 2 231.4 | 19 | 0 | 8 | 12 | 0.0000 | 1.0590 | 0.000 | 9.0 | 0.01 | 0.0 ± 0.0 |
| Quail 1 | 2 230.8 | 2 231.4 | 20 | 2 | 9 | 20 | 0.1589 | 0.7150 | 0.222 | 6.1 | 0.61 | 58.5 ± 45.8 |
| Quail 1 | 2 230.8 | 2 231.4 | 21 | 0 | 9 | 50 | 0.0000 | 0.2860 | 0.000 | 2.4 | 0.00 | 0.0 ± 0.0 |
| Quail 1 | 2 230.8 | 2 231.4 | 22 | 1 | 51 | 28 | 0.0568 | 2.8940 | 0.020 | 24.5 | 0.01 | 5.2 ± 5.2 |
| Quail 1 | 2 230.8 | 2 231.4 | 23 | 1 | 16 | 32 | 0.0497 | 0.7945 | 0.062 | 6.7 | 0.04 | 16.5 ± 17.0 |
| Yaringa East 1 | 268.0 | 268.5 | 4 | 113 | 89 | 35 | 5.1300 | 4.0410 | 1.269 | 34.6 | 0.03 | 315.8 ± 45.5 |
| Yaringa East 1 | 268.0 | 268.5 | 12 | 19 | 12 | 9 | 3.3550 | 2.1190 | 1.583 | 18.1 | 0.13 | 391.4 ± 144.7 |
| Yaringa East 1 | 268.0 | 268.5 | 13 | 13 | 10 | 18 | 1.1480 | 0.8828 | 1.300 | 7.6 | 0.12 | 323.1 ± 136.2 |
| Yaringa East 1 | 268.0 | 268.5 | 15 | 3 | 7 | 16 | 0.2980 | 0.6952 | 0.429 | 5.9 | 0.00 | 108.3 ± 74.8 |
| Yaringa East 1 | 268.0 | 268.5 | 16 | 31 | 30 | 12 | 4.1050 | 3.9730 | 1.033 | 34.0 | 0.01 | 258.1 ± 66.5 |
| Yaringa East 1 | 268.0 | 268.5 | 20 | 20 | 25 | 21 | 1.5130 | 1.8920 | 0.800 | 16.2 | 0.00 | 200.7 ± 60.5 |
| Yaringa East 1 | 268.0 | 268.5 | 27 | 20 | 24 | 30 | 1.0590 | 1.2710 | 0.833 | 10.9 | 0.04 | 209.0 ± 63.5 |
| Yaringa East 1 | 268.0 | 268.5 | 30 | 157 | 133 | 28 | 8.9100 | 7.5480 | 1.180 | 64.6 | 0.06 | 294.1 ± 35.5 |
| Yaringa East 1 | 268.0 | 268.5 | 31 | 20 | 22 | 12 | 2.6480 | 2.9130 | 0.909 | 24.9 | 0.00 | 227.6 ± 70.6 |
| Yaringa East 1 | 268.0 | 268.5 | 34 | 61 | 44 | 32 | 3.0290 | 2.1850 | 1.386 | 18.7 | 0.08 | 344.0 ± 68.6 |
| Yaringa East 1 | 268.0 | 268.5 | 35 | 13 | 14 | 32 | 0.6456 | 0.6952 | 0.929 | 5.9 | 0.02 | 232.4 ± 89.7 |
| Yaringa East 1 | 268.0 | 268.5 | 36 | 42 | 59 | 16 | 4.1710 | 5.8600 | 0.712 | 50.1 | 0.03 | 178.9 ± 36.4 |
| Yaringa East 1 | 268.0 | 268.5 | 37 | 5 | 17 | 14 | 0.5675 | 1.9300 | 0.294 | 16.5 | 0.00 | 74.5 ± 38.0 |
| Yaringa East 1 | 268.0 | 268.5 | 38 | 68 | 68 | 30 | 3.6020 | 3.6020 | 1.000 | 30.8 | 0.02 | 250.0 ± 43.4 |
| Yaringa East 1 | 268.0 | 268.5 | 39 | 15 | 9 | 28 | 0.6513 | 0.5108 | 1.275 | 4.4 | 0.04 | 411.4 ± 173.8 |
| Yaringa East 1 | 268.0 | 268.5 | 42 | 8 | 5 | 25 | 0.5085 | 0.3178 | 1.600 | 2.7 | 0.05 | 395.4 ± 225.7 |
| Yaringa East 1 | 268.0 | 268.5 | 48 | 9 | 7 | 17 | 0.8413 | 0.6543 | 1.286 | 5.6 | 0.04 | 319.6 ± 161.3 |

**Table 9.1.** (continued)

| *Well* | *Depth (m) From* | *To* | *Grain* | *Ns* | *Ni* | *Na* | *RHOs ($10^6$)* | *RHOi ($10^6$)* | *Ratio* | *U (ppm)* | *Cl (wt%)* | *Fission-track age (Ma)* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Yaringa East 1 | 268.0 | 268.5 | 53 | 46 | 29 | 24 | 3.0460 | 1.9200 | 1.586 | 16.4 | 0.01 | 392.1 ± 93.5 |
| Yaringa East 1 | 268.0 | 268.5 | 55 | 24 | 19 | 16 | 2.3840 | 1.8870 | 1.263 | 16.1 | 0.01 | 314.2 ± 96.8 |
| Yaringa East 1 | 268.0 | 268.5 | 60 | 70 | 35 | 12 | 9.2700 | 4.6350 | 2.000 | 39.6 | 0.07 | 490.6 ± 102.4 |
| Yaringa East 1 | 268.0 | 268.5 | 63 | 68 | 32 | 28 | 3.8590 | 1.8160 | 2.125 | 15.5 | 0.04 | 520.1 ± 112.3 |
| Yaringa East 1 | 268.0 | 268.5 | 64 | 27 | 22 | 28 | 1.5320 | 1.2490 | 1.227 | 10.7 | 0.02 | 305.5 ± 88.1 |
| Yaringa East 1 | 268.0 | 268.5 | 66 | 53 | 46 | 21 | 4.0100 | 3.4810 | 1.152 | 29.8 | 0.09 | 287.2 ± 58.4 |
| Yaringa East 1 | 268.0 | 268.5 | 67 | 11 | 12 | 18 | 0.9711 | 10.5900 | 0.092 | 9.1 | 0.03 | 229.5 ± 96.0 |
| Yaringa East 1 | 268.0 | 268.5 | 68 | 38 | 39 | 12 | 5.0320 | 5.1640 | 0.974 | 44.2 | 0.01 | 243.7 ± 55.9 |
| Yaringa East 1 | 268.0 | 268.5 | 69 | 13 | 6 | 20 | 1.0330 | 0.4767 | 2.167 | 4.1 | 0.01 | 529.9 ± 261.9 |
| Yaringa East 1 | 268.0 | 268.5 | 79 | 36 | 31 | 24 | 2.3840 | 2.0530 | 1.161 | 17.6 | 0.12 | 289.4 ± 71.3 |
| Yaringa East 1 | 268.0 | 268.5 | 83 | 36 | 18 | 18 | 3.1780 | 1.5890 | 2.000 | 13.6 | 0.20 | 490.6 ± 142.2 |
| Outcrop | – | – | 6 | 14 | 11 | 70 | 0.3178 | 0.2497 | 1.273 | 2.0 | 0.41 | 337.2 ± 136.1 |
| Outcrop | – | – | 9 | 92 | 72 | 100 | 1.4620 | 1.1440 | 1.278 | 9.2 | 0.00 | 338.5 ± 54.0 |
| Outcrop | – | – | 10 | 132 | 102 | 35 | 5.9930 | 4.6310 | 1.294 | 37.1 | 0.06 | 342.7 ± 46.0 |
| Outcrop | – | – | 11 | 76 | 54 | 70 | 1.7250 | 1.2260 | 1.407 | 9.8 | 0.07 | 371.9 ± 66.9 |
| Outcrop | – | – | 13 | 25 | 30 | 12 | 3.3110 | 3.9730 | 0.833 | 31.8 | 0.03 | 222.8 ± 60.6 |
| Outcrop | – | – | 15 | 14 | 18 | 10 | 2.2250 | 2.8600 | 0.778 | 22.9 | 0.14 | 208.2 ± 74.4 |
| Outcrop | – | – | 16 | 44 | 24 | 20 | 3.4960 | 1.9070 | 1.833 | 15.3 | 0.49 | 480.4 ± 122.5 |
| Outcrop | – | – | 19 | 9 | 5 | 15 | 0.9534 | 0.5297 | 1.800 | 4.2 | 0.69 | 471.9 ± 263.5 |
| Outcrop | – | – | 21 | 60 | 42 | 20 | 4.7670 | 3.3370 | 1.429 | 26.7 | 0.31 | 377.3 ± 76.5 |
| Outcrop | – | – | 22 | 103 | 87 | 56 | 2.9230 | 2.4690 | 1.184 | 19.8 | 0.09 | 314.3 ± 46.5 |
| Outcrop | – | – | 23 | 23 | 18 | 30 | 1.2180 | 0.9534 | 1.278 | 7.6 | 0.00 | 338.5 ± 106.9 |
| Outcrop | – | – | 24 | 68 | 72 | 45 | 2.4010 | 2.5420 | 0.944 | 20.4 | 0.02 | 251.9 ± 43.1 |
| Outcrop | – | – | 25 | 38 | 25 | 80 | 0.7548 | 0.4966 | 1.520 | 4.0 | 0.21 | 400.7 ± 103.7 |
| Outcrop | – | – | 26 | 88 | 79 | 70 | 1.9980 | 1.7930 | 1.114 | 14.4 | 0.01 | 296.1 ± 46.5 |
| Outcrop | – | – | 27 | 28 | 28 | 40 | 1.1120 | 1.1120 | 1.000 | 8.9 | 0.19 | 266.4 ± 71.5 |
| Outcrop | – | – | 28 | 154 | 124 | 50 | 4.8940 | 3.9410 | 1.242 | 31.6 | 0.08 | 329.3 ± 40.6 |
| Outcrop | – | – | 20 | 64 | 46 | 30 | 3.3900 | 2.4370 | 1.391 | 19.5 | 0.02 | 367.8 ± 71.7 |
| Outcrop | – | – | 31 | 5 | 3 | 6 | 1.3240 | 0.7945 | 1.667 | 6.4 | 0.00 | 438.1 ± 320.2 |
| Outcrop | – | – | 32 | 15 | 19 | 24 | 0.9932 | 1.2580 | 0.789 | 10.1 | 0.01 | 211.3 ± 73.2 |
| Outcrop | – | – | 33 | 30 | 23 | 20 | 2.3840 | 1.8270 | 1.304 | 14.6 | 0.08 | 345.4 ± 96.1 |
| Outcrop | – | – | 34 | 109 | 96 | 40 | 4.3300 | 3.8140 | 1.135 | 30.6 | 0.03 | 301.7 ± 42.9 |
| Outcrop | – | – | 37 | 117 | 93 | 50 | 3.7180 | 2.9560 | 1.258 | 23.7 | 0.02 | 333.4 ± 47.1 |
| Outcrop | – | – | 39 | 64 | 73 | 24 | 4.2380 | 4.8330 | 0.877 | 38.7 | 0.05 | 234.2 ± 40.5 |

**NOTES:**
Ns: number of spontaneous tracks
Ni: number of induced tracks
Na: number of grid squares counted in each grain
RHOs: spontaneous track density
RHOi: induced track density
U: uranium
ppm: parts per million
Cl: Chlorine
wt: weight
Ma: million years before present

**Table 9.2. Summary of analytical data for Barrabiddy 1A**

| *Parameter* | *Unit* | *Sample 1* | *Sample 2* | *Sample 3* |
|---|---|---|---|---|
| Depth | m | 169.6 – 171.0 | 194.7 – 195.4 | 777.2 – 778.1 |
| Formation | | Muderong Shale | Munabia Formation | Gneudna Formation |
| Stratigraphic age | | Early Cretaceous | Late Devonian | Late Devonian |
| Time | Ma | 123–121 | 363–352 | 373–363 |
| Present-day temperature | °C | 37 | 39 | 56 |
| Chi squared (freedom) | $\chi^2$ | 14.342 (9°) | 55.242 (30°) | 45.515 (29°) |
| P(chi squared) | P ($\chi^2$) | 11.1 | 0.3 | 2.6 |
| Correlation coefficient | | 0.785 | 0.787 | 0.934 |
| Variance of SQR(Ns) | | 3.36 | 2.63 | 6.42 |
| Variance of SQR(Ni) | | 1.45 | 3.54 | 8.69 |
| Age dispersion | % | 26.621 | 28.565 | 17.426 |
| Ns/Ni | | 1.176 ± 0.147 | 0.684 ± 0.037 | 0.603 ± 0.026 |
| Mean ratio | | 1.050 ± 0.195 | 0.731 ± 0.055 | 0.568 ± 0.043 |
| RHOd (ND = 2097) | $\times 10^6$ | 1.322 | 1.328 | 1.330 |
| RHOs (Ns) | $\times 10^6$ | 1.390 (140) | 1.693 (568) | 1.306 (887) |
| RHOi (Ni) | $\times 10^6$ | 1.182 (119) | 2.475 (830) | 2.166 (1471) |
| Pooled age | Ma | 290.8 ± 37.0 | 171.4 ± 10.4 | 151.6 ± 7.6 |
| Central age | Ma | 277.9 ± 44.5 | 170.4 ± 14.2 | 150.0 ± 9.4 |
| Mean track length | µm | 13.26 ± 0.43 | 12.46 ± 0.16 | 11.82 ± 0.17 |
| Standard deviation | µm | 1.21 | 1.63 | 1.74 |
| Default mean track length | µm | 13.8 | 13.6 | 12.4 |
| Apatite fission-track age | Ma | 290.8 ± 37.0 | 171.4 ± 10.4 | 151.6 ± 7.6 |
| Default fission-track age | Ma | 282 | 569 | 708 |
| Maximum palaeotemperature[(a)] | °C | na | >110 | >110 |
| Onset of cooling[(a)] | Ma | na | 280–180 | 280–180 |
| Maximum palaeotemperature[(b)] | °C | na | <100 | 85–105 |
| Onset of cooling[(b)] | Ma | na | 180–140 | 180–145 |
| Maximum palaeotemperature[(c)] | °C | <85 | 55–80 | 70–85 |
| Onset of cooling[(c)] | Ma | 60–0 | 100–0 | 145–10 |

**SOURCES:** Gibson et al. (1988); Hegarty et al. (1988)

**NOTES:**
(a) first episode
(b) second episode
(c) third episode
SQR: square root
Ns: number of spontaneous tracks
Ni: number of induced tracks
RHOd: track density from uranium standard glass
RHOs: spontaneous track density
RHOi: induced track density
na: not applicable
Ma: million years before present
ND: total number of tracks counted
Mean ratio: mean of (Ns/Ni) for individual grains
P(chi squared): probability of obtaining observed chi squared values

**Table 9.3. Summary of analytical data for Coburn 1**

| *Parameter* | *Unit* | *Sample 1* | *Sample 2* | *Sample 3* | *Sample 4* |
|---|---|---|---|---|---|
| Depth | m | 185.40 – 185.85 | 272.25 – 272.65 | 936.50 – 937.00 | 976.20 – 976.85 |
| Formation | | Birdrong Sandstone | Kopke Sandstone | Dirk Hartog Group | Dirk Hartog Group |
| Stratigraphic age | | Early Cretaceous | Early Devonian | Silurian | Silurian |
| Time | Ma | 132–129 | 388–381 | 430–410 | 430–410 |
| Present-day temperature | °C | 31 | 34 | 57 | 58 |
| Chi squared (freedom) | $\chi^2$ | 61.923 (26°) | 0.077 (1°) | 81.493 (27°) | 27.903 (30°) |
| P(chi squared) | P ($\chi^2$) | 0.0 | 78.2 | 0.0 | 57.6 |
| Correlation coefficient | | 0.969 | 1.000 | 0.861 | 0.972 |
| Variance of SQR(Ns) | | 15.93 | 0.04 | 7.50 | 6.31 |
| Variance of SQR(Ni) | | 13.00 | 0.00 | 8.18 | 6.76 |
| Age dispersion | % | 21.791 | 0.000 | 31.097 | 6.875 |
| Ns/Ni | | 1.085 ± 0.035 | 0.875 ± 0.453 | 0.922 ± 0.038 | 0.865 ± 0.037 |
| Mean ratio | | 1.081 ± 0.069 | 0.875 ± 0.125 | 0.978 ± 0.073 | 0.858 ± 0.039 |
| RHOd (ND = 2097) | $\times10^6$ | 1.336 | 1.338 | 1.341 | 1.344 |
| RHOs (Ns) | $\times10^6$ | 253.4 (1982) | 0.265 (7) | 1.958 (1131) | 2.114 (1039) |
| RHOi (Ni) | $\times10^6$ | 2.334 (1826) | 0.303 (8) | 2.124 (1227) | 2.444 (1201) |
| Pooled age | Ma | 271.4 ± 11.3 | 220.1 ± 114.1 | 232.1 ± 11.3 | 218.5 ± 10.9 |
| Central age | Ma | 261.9 ± 16.7 | 220.1 ± 114.1 | 234.9 ± 19.3 | 218.0 ± 11.4 |
| Mean track length | µm | 12.85 ± 0.17 | No confined tracks | 12.32 ± 0.13 | 11.93 ± 0.17 |
| Standard deviation | µm | 1.81 | – | 1.42 | 1.82 |
| Default mean track length | µm | 14.1 | 0.0 | 12.4 | 12.3 |
| Apatite fission-track age | Ma | 261.9 ± 16.7 | 220.1 ± 114.1 | 234.9 ± 19.3 | 218.5 ± 10.9 |
| Default fission-track age | Ma | 125.9 | 356.6 | 359.3 | 357.6 |
| Maximum palaeotemperature[(a)] | °C | na | unconstrained | >105 | <100 |
| Onset of cooling[(a)] | Ma | – | – | 310–250 | 280–200 |
| Maximum palaeotemperature[(b)] | °C | – | – | 80–90 | <100 |
| Onset of cooling[(b)] | Ma | – | – | 250–140 | 200–80 |
| Maximum palaeotemperature[(c)] | °C | – | – | <80 | 140–0 |
| Onset of cooling[(c)] | Ma | – | – | <75 | 80–0 |

**SOURCES:** Gibson et al. (1988); Hegarty et al. (1988)

**NOTES:**
(a) first episode
(b) second episode
(c) third episode
SQR: square root
Ns: number of spontaneous tracks
Ni: number of induced tracks
RHOd: track density from uranium standard glass
RHOs: spontaneous track density
RHOi: induced track density
na: not applicable
Ma: million years before present
ND: total number of tracks counted
Mean ratio: mean of (Ns/Ni) for individual grains
P(chi squared): probability of obtaining observed chi squared values

**Table 9.4. Summary of analytical data for Yaringa East 1**

| *Parameter* | *Unit* | *Sample 1* |
|---|---|---|
| Depth | m | 268.0 – 268.5 |
| Formation | | Sweeney Mia Formation |
| Stratigraphic age | | Early Devonian |
| Time | Ma | 405–399 |
| Present-day temperature | °C | 34 |
| Chi squared (freedom) | $\chi^2$ | 47.462 (27°) |
| P(chi squared) | P ($\chi^2$) | 0.9 |
| Correlation coefficient | | 0.940 |
| Variance of SQR(Ns) | | 6.38 |
| Variance of SQR(Ni) | | 4.81 |
| Age dispersion | % | 20.710 |
| Ns/Ni | | 1.203 ± 0.055 |
| Mean ratio | | 1.242 ± 0.090 |
| RHOd (ND = 2097) | $\times 10^6$ | 1.333 |
| RHOs (Ns) | $\times 10^6$ | 2.770 (1039) |
| RHOi (Ni) | $\times 10^6$ | 2.304 (864) |
| Pooled age | Ma | 299.4 ± 15.8 |
| Central age | Ma | 295.9 ± 20.7 |
| Mean track length | µm | 11.49 ± 0.18 |
| Standard deviation | µm | 1.83 |
| Default mean track length | µm | 13.8 |
| Apatite fission-track age | Ma | 295.9 ± 20.7 |
| Default fission-track age | Ma | 356.4 |
| Maximum palaeotemperature[(a)] | °C | <95 |
| Onset of cooling[(a)] | Ma | 386–230 |
| Maximum palaeotemperature[(b)] | °C | 85–95 |
| Onset of cooling[(b)] | Ma | 230–90 |
| Maximum palaeotemperature[(c)] | °C | 55–75 |
| Onset of cooling[(c)] | Ma | 55–0 |

**SOURCES:** Gibson et al. (1988); Hegarty et al. (1988)

**NOTES:**
(a) first episode
(b) second episode
(c) third episode
SQR: square root
Ns: number of spontaneous tracks
Ni: number of induced tracks
RHOd: track density from uranium standard glass
RHOs: spontaneous track density
RHOi: induced track density
Ma: million years before present
ND: total number of tracks counted
Mean ratio: mean of (Ns/Ni) for individual grains
P(chi squared): probability of obtaining observed chi squared values

**Table 9.5. Summary of analytical data for Tumblagooda outcrop sample**

| *Parameter* | *Unit* | *Sample 1* |
|---|---|---|
| Depth | m | Surface |
| Formation | | Tumblagooda Sandstone |
| Stratigraphic age | | Ordovician |
| Time | Ma | ?445–434 |
| Present-day temperature | °C | 25 |
| Chi squared (freedom) | $\chi^2$ | 18.490 (22°) |
| P(chi squared) | P ($\chi^2$) | 67.7 |
| Correlation coefficient | | 0.975 |
| Variance of SQR(Ns) | | 8.60 |
| Variance of SQR(Ni) | | 7.17 |
| Age dispersion | % | 0.277 |
| Ns/Ni | | 1.199 ± 0.048 |
| Mean ratio | | 1.245 ± 0.061 |
| RHOd (ND = 2097) | $\times 10^6$ | 1.423 |
| RHOs (Ns) | $\times 10^6$ | 2.378 (11372) |
| RHOi (Ni) | $\times 10^6$ | 1.982 (1144) |
| Pooled age | Ma | 318.2 ± 15.1 |
| Central age | Ma | 318.2 ± 15.1 |
| Mean track length | µm | 13.27 ± 0.15 |
| Standard deviation | µm | 1.57 |
| Default mean track length | µm | 14.3 |
| Apatite fission-track age | Ma | 318.2 ± 15.1 |
| Default fission-track age | Ma | 445.4 |
| Maximum palaeotemperature[(a)] | °C | 100–110 |
| Onset of cooling[(a)] | Ma | 370–280 |
| Maximum palaeotemperature[(b)] | °C | 60–75 |
| Onset of cooling[(b)] | Ma | 200–40 |
| Maximum palaeotemperature[(c)] | °C | <60 |
| Onset of cooling[(c)] | Ma | 40–0 |

**SOURCES:** Gibson et al. (1988); Hegarty et al. (1988)

**NOTES:**
(a) first episode
(b) second episode
(c) third episode
SQR: square root
Ns: number of spontaneous tracks
Ni: number of induced tracks
RHOd: track density from uranium standard glass
RHOs: spontaneous track density
RHOi: induced track density
Ma: million years before present
ND: total number of tracks counted
Mean ratio: mean of (Ns/Ni) for individual grains
P(chi squared): probability of obtaining observed chi squared values

**Table 9.6. Summary of analytical data for Quail 1**

| *Parameter* | *Unit* | *Sample 1* | *Sample 2* | *Sample 3* | *Sample 4* |
|---|---|---|---|---|---|
| Depth | m | 218.8 – 222.5 | 1 061.9 – 1 063.4 | 1 995.5 – 1 996.4 | 2 230.8 – 2 231.4 |
| Formation | | Billidee Formation | Lyons Group | Lyons Group | Quail Formation |
| Stratigraphic age | | Early Cretaceous | Late Carboniferous | Late Carboniferous | Early Carboniferous |
| Time | Ma | 293–286 | 312–298 | 312–298 | 350–325 |
| Present-day temperature | °C | 33 | 63 | 96 | 104 |
| Chi squared (freedom) | $\chi^2$ | 26.259 (19°) | 60.384 (19°) | 50.867 (19°) | 60.384 (19°) |
| P(chi squared) | P ($\chi^2$) | 12.3 | 0.0 | 0.0 | 0.0 |
| Age dispersion | % | 17.007 | 49.627 | 74.509 | 49.627 |
| Ns/Ni | | 0.667 ± 0.039 | 0.261 ± 0.019 | 0.067 ± 0.008 | 0.261 ± 0.019 |
| Mean ratio | | 0.719 ± 0.051 | 0.266 ± 0.040 | 0.062 ± 0.018 | 0.266 ± 0.040 |
| RHOd (ND = 2097) | $\times 10^6$ | 1.333 | 1.337 | 1.342 | 1.346 |
| RHOs (Ns) | $\times 10^6$ | 1.234 (487) | 0.852 (244) | 0.185 (73) | 0.072 (23) |
| RHOi (Ni) | $\times 10^6$ | 1.850 (730) | 3.269 (936) | 2.763 (1092) | 2.691 (857) |
| Pooled age | Ma | 172.4 ± 11.2 | 68.1 ± 5.3 | 17.6 ± 2.2 | 68.1 ± 5.3 |
| Central age | Ma | 173.6 ± 13.8 | 67.2 ± 9.6 | 13.8 ± 3.6 | 67.2 ± 9.6 |
| Mean track length | µm | 11.60 ± 0.20 | 10.12 ± 0.21 | 9.40 ± 2.59 | 10.29 ± 0.93 |
| Standard deviation | µm | 20.5 | 2.20 | 3.67 | 2.07 |
| Default mean track length | µm | 13.9 | 11.9 | 9.3 | 9.3 |
| Apatite fission-track age | Ma | 172.4 ± 11.3 | 67.2 ± 9.6 | 13.8 ± 3.6 | 7.1 ±.1.5 |
| Default fission-track age | Ma | 263.0 | 237.2 | 9.7 | 4.8 |
| Maximum palaeotemperature[(a)] | °C | 90–100 | >100 | – | – |
| Onset of cooling[(a)] | Ma | 220–110 | 140–40 | – | – |
| Maximum palaeotemperature[(b)] | °C | 70080 | 90–100 | >110 | <110 |
| Onset of cooling[(b)] | Ma | 30–0 | 20–0 | 312–5 | 350–5 |

**SOURCES:** Gibson et al. (1988); Hegarty et al. (1988)

**NOTES:**
(a) first episode
(b) second episode
Ns: number of spontaneous tracks
ND: total number of tracks counted
Ni: number of induced tracks
RHOs: spontaneous track density
RHOi: induced track density
P(chi squared): probability of obtaining observed chi squared values
Ma: million years before present
RHOd: track density from uranium standard glass
Mean ratio: mean of (Ns/Ni) for individual grains

# References


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