Review of the Hydrocarbon Potential of PEL 77A and Surrounds

Introduction

Central Petroleum has PEL 77A under application in northern South Australia. The area was most recently discussed by Middleton et al (2007) following on from earlier studies by the SA Government (Carne and Alexander, 1997, Alexander and Jensen-Schmidt, 1995). Since this time Central has drilled two exploration wells (Simpson-1 and Blamore-1) to the north in the NT, the latter intersecting 142 m of coal and establishing a regional coal resource which exceeds 2.5 trillion tonnes in total. The coal basin extends into the southern Eringa Trough which is segmented from the northern Eringa Trough by a major transform fault, the Camelot Fault. Subsequently Central drilled 9 exploration holes targeting the Purni coal measures in the NT which are discussed in detail in Ambrose and Heugh (2012) which is complimented by more regional studies of play types (Ambrose and Heugh,2010, Ambrose et al 2007). This study is an over view of the coal and hydrocarbon potential of the southern Eringa Trough and surrounds and geological details can be found in the aforementioned reports.

Regional Geology

The region is basically a composite of three sedimentary basins; namely the Cambrian to Carboniferous Warburton Basin, the Permo/Carboniferous-Triassic Pedirka Basin and the Early Jurassic-Cretaceous Eromanga Basin. During the Cambrian to Early Carboniferous PELA 77 was covered by marine and clastic sediments of the western Warburton Basin which have only been intersected in full in McDills -1, but this section tested a major palaeohigh and the sequence is condensed and dominated by quartz clastics. However, a thick dark grey dolomite sequence, including a medial limestone was intersected at the base of the section and is dated as Early Cambrian; the unit probably correlates with the Todd River Dolomite of the Amadeus Basin. Unconformably overlying this section is a thick sequence of molasse style clastics which are not comparable directly with the Amadeus Basin even though they have a temporal relationship. The other Warburton Basin sequence which has proved attractive from an exploration standpoint includes a facies mosaic of carbonate platform and ancillary facies closely related to a giant barrier reef buildup with associated fore reef and back reef developments. These are developed to the northeast on the margins of the Hale River Block and are probably of Devonian age but may in fact be early Palaeozoic. These sediments have never been penetrated by the drill but they include attractive petroleum targets based on evidence from indirect seismic indicators (HRDZ's, gas chimneys).

The Alice Springs Orogeny intervened prior to deposition in the Pedirka Basin which was originally believed to span the Carboniferous – Early Permian, being unconformably overlain by the Triassic Simpson Basin. However, recognition of Late Permian coal measures on the Andado Shelf, probably in depositional continuum with the overlying Triassic sequence, suggests the Pedirka Basin sequence comprises Early Permian-Carboniferous glacials overlain by Early to Late Permian coal measures in turn conformably overlain by an Early to Late Triassic sequence. Major uplift and erosion at the end of the Triassic (Fitzroy Movement) preceded deposition of an Early Jurassic to Late Cretaceous sediments deposited in the Eromanga Basin. Major uplift and erosion preceded deposition of Palaeocene to Miocene sediments with major structural rejuvenation occurring in the Miocene as a result of plate tectonics on the northwestern margin of the Australian plate.

Much of the following discussion related to PEL 77 A and surrounds is drawn from Alexander and Jensen-Schmidt (1995).

Warburton Basin (Cambrian – Carboniferous)

Although the Ordovician-Silurian-Devonian clastics in McDills-1 only offer very tentative correlations with the Amadeus Basin the basal carbonate section (425 m thick) can be correlated, on the basis of fossil evidence, with the early Cambrian Todd River Dolomite of the Amadeus Basin. The top of this carbonate probably marks a major unconformity

corresponding to the final phase of the Petermann Ranges Orogeny. Alexander and Jensen-Schmidt (1995) suggest the overlying stratigraphy comprises the Arcoeillina Sandstone which is a sequence of continental sediments intersected in AFMECO Cur 3 and Cur 5; proximal feldspathic sandstones(fluvial–alluvial) grade to distal mudstones (lacustrine) with minor aeolian

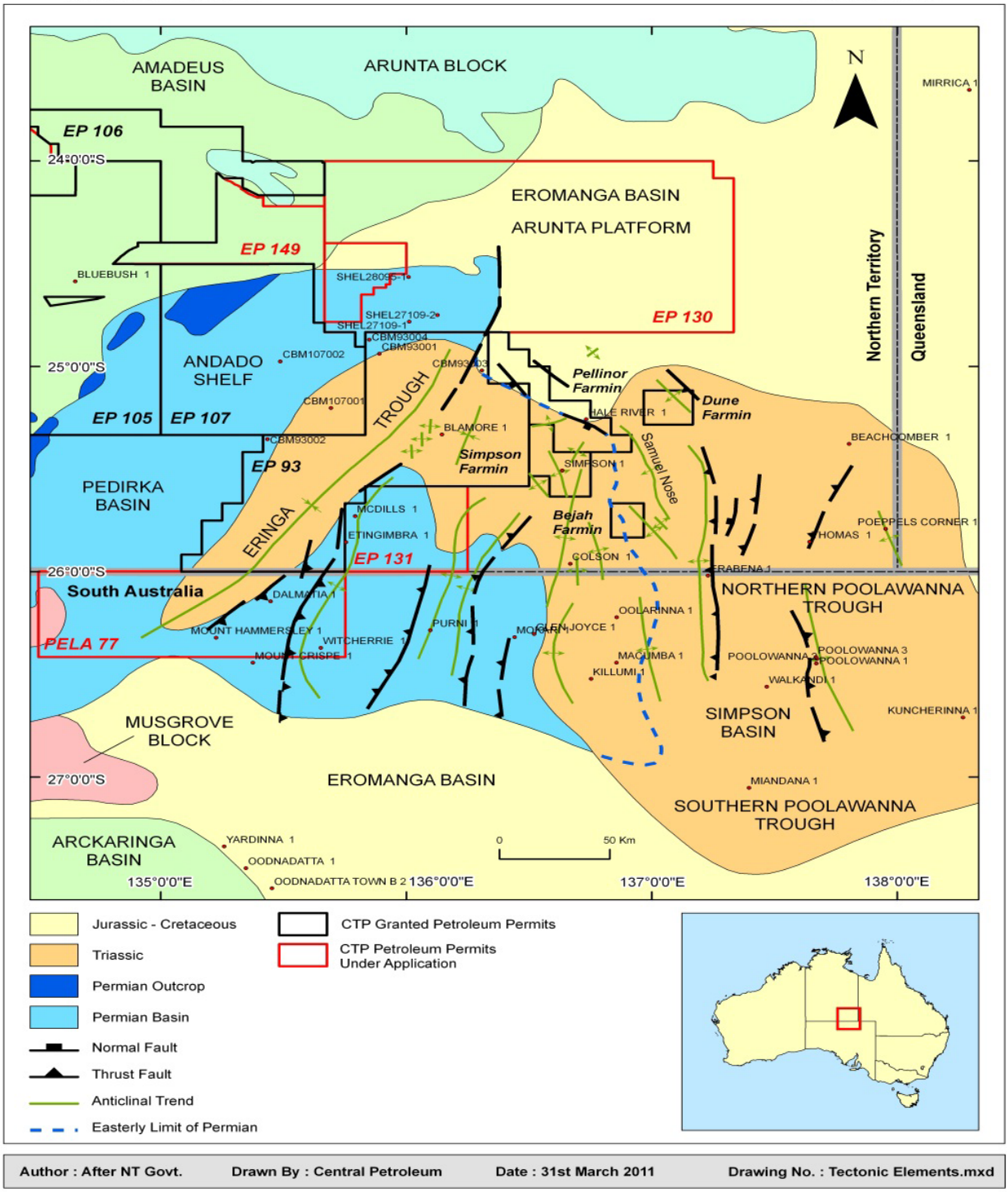
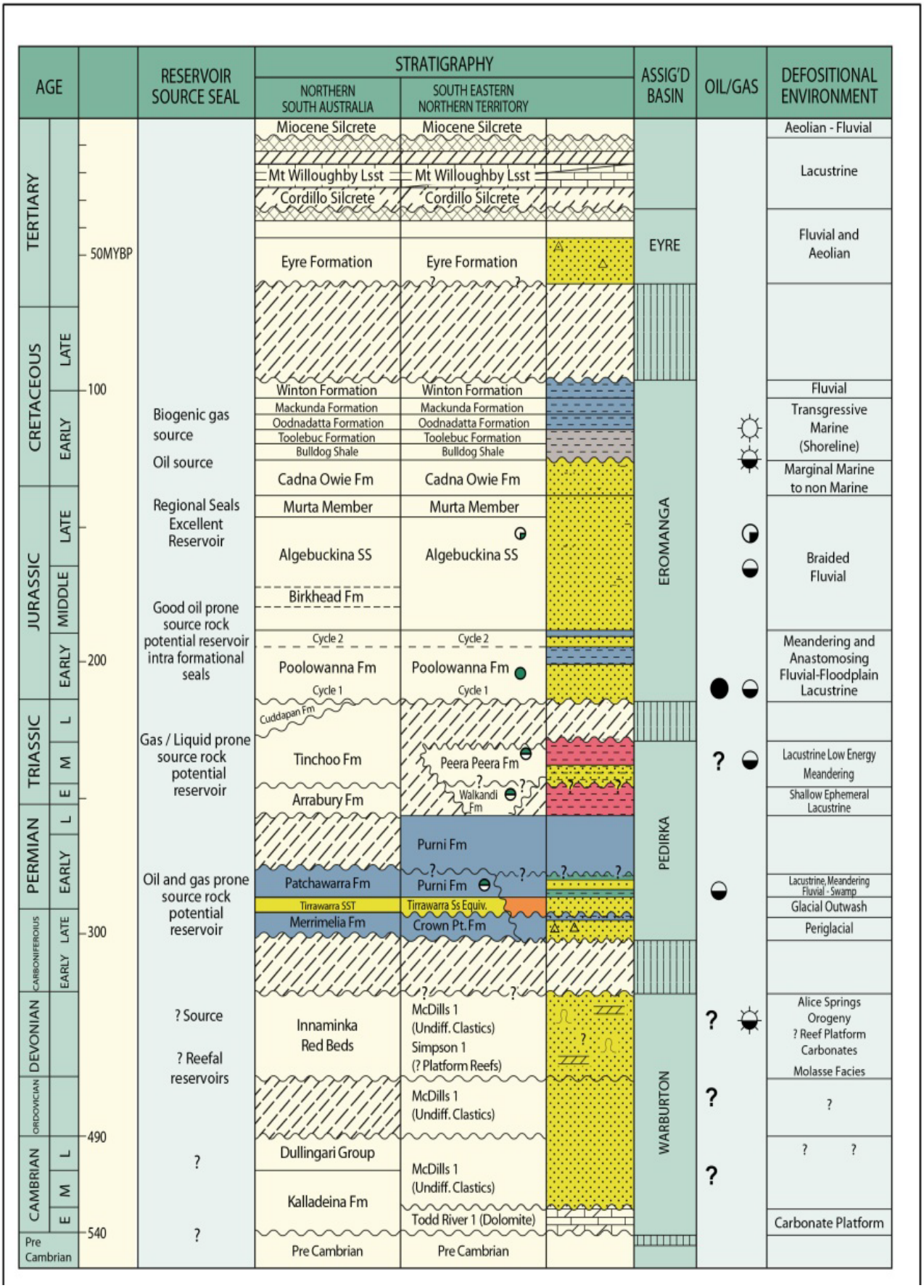


Figure 1a Regional Location Diagram and Tectonic Elements

Figure 2b Stratigraphic Table Simpson Desert Area



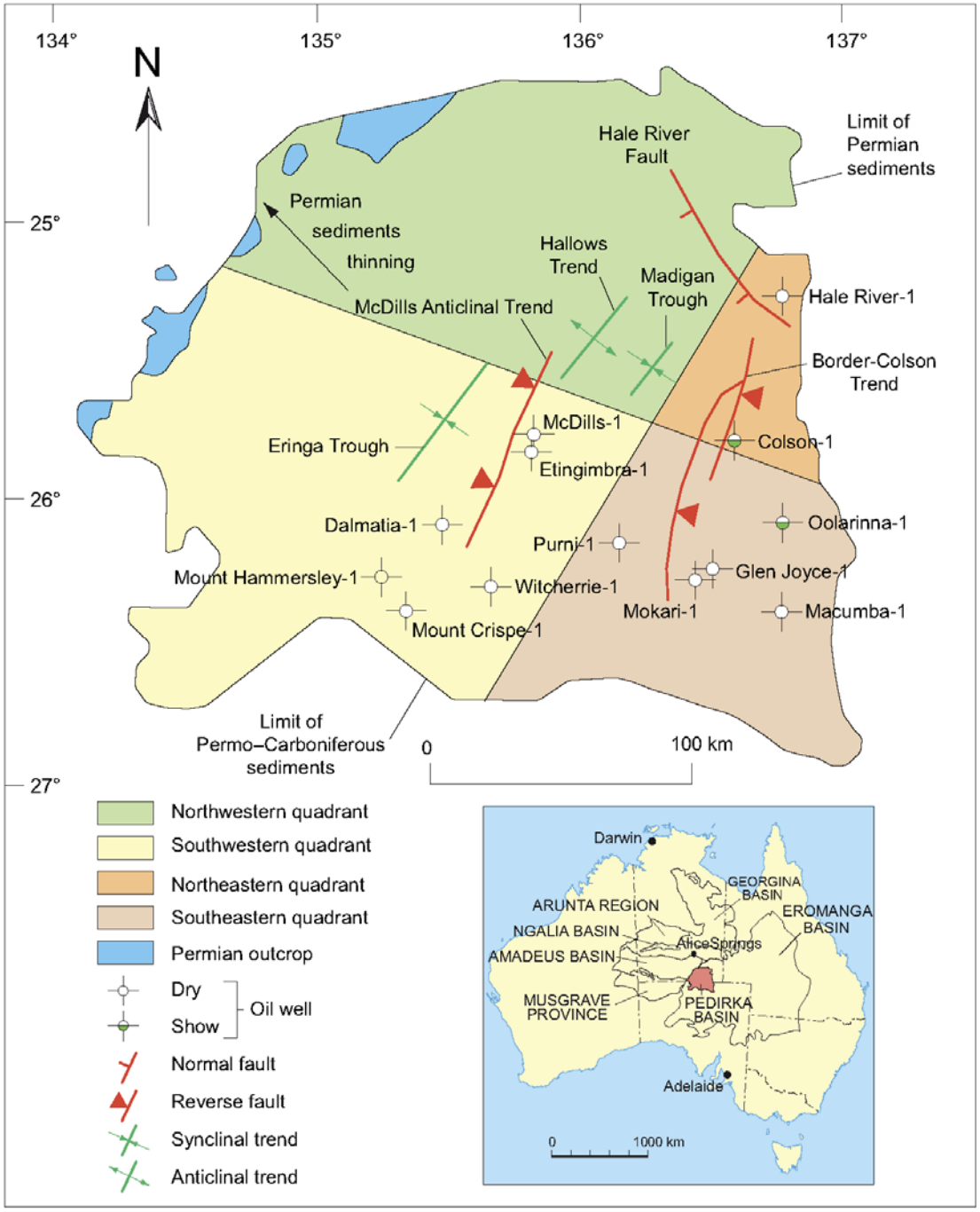


Figure 2 Dominant Structural Trends (after Middleton et al, 2007)

influences (Gravestock and Sansome,1994). Unconformably overlying this unit is an unnamed sequence of red-brown Lower Cambrian sandstone (50m thick) which is faulted against Ordovician Pacoota or Stairway Sandstone in turn overlain by porous cross-bedded sandstone believed to be equivalent to the Mereenie Sandstone (343 m thick). Coarse conglomeratic sandstone molasse facies of the Polly Conglomerate, Langra Sandstone and Horshoe Bend Shale (1004 m thick) are equivalent to the Pertnjara Group of the Amadeus Basin (Devonian-Carboniferous).

Possible Ordovician clastics comprising fine to coarse-grained, bioturbated quartz sandstone with rare heavy minerals occur in McDills-1, Mount Crispe-1, Witcherie-1 and Colson-1. Achritarch biostratigraphy of this unit in Mt Crispe -1 indicates a late Early to Middle

Ordovician age (Zang, 1995); these clastics may well correlate with Ordovician Pacoota Sandstone of the Amadeus Basin.

In PEL 77 there is a correlative of the Horn Valley Siltstone (Amadeus Basin) although there is no indication of this unit in McDills-1 which is dominated by clastics and conglomerate at this level. However, recent regional Ordovician palaeogeographic reconstructions indicate the western Warburton Basin was located on the southern edge of the Larapintine Seaway (Webby, 1978). Indeed, possible correlatives occur in the Purni-1 and Mokari-1 wells where steeply dipping dark grey-black laminated siltstone and shale were recorded. Turbiditic shale-silt couplets and slump folding suggest slope deposition and this facies has been recorded as far south as the Dullingari field in the Cooper Basin (Dr. John Gorter, pers comm.).

The Rodingan Movement is generally regarded as the first phase of the Devonian – Carboniferous Alice Springs Orogeny. Moussavi-Harami and Gravestock (1995) estimate 500 m of erosion occurred at this time in the western Warburton Basin. In the Amadeus Basin sheet like aeolian sandstones of the Mereenie Sandstone were deposited on this unconformity surface and possible correlatives occur in Witcherrie -1 and McDills-1 drill holes. Fluvial-alluvial-molasse facies of the Finke Group were deposited contemporaneously with tectonism associated with the Alice Springs Orogeny and this unit correlates with the Pertnjara Group of the Amadeus Basin. Uplift and and erosion occurred during the final stages of the Alice Springs Orogeny although compressional tectonism continued into the Early Carboniferous. Relaxation of compressional folds and renewed subsidence, with some reactivation of Devonian thrust faults, facilitated generation of accommodation space for Early Permian deposition of glacial sediments and overlying Purni Formation coal measures.

Pedirka Basin (L. Carboniferous to Late Permian)

The Eringa Trough was initiated in the middle to late Carboniferous during the final NW-SE phase of the Alice Springs Orogeny. The Eringa Trough is believed to be segmented into northern and southern components by a major NW-SE trending transform fault named the Camelot Fault. North of this fault the Permian sequence appears quite disparite from that intersected to the south in PELA77 in that :

- To the north the Crown Point Formation generally comprises diamictite, conglomerate and outwash sandstones usually less than 200 m in thickness. The overlying Tirrawarra Sandstone equivalent is a sheet-like unit of glacial outwash sandstones usually less than 20m thick. The apparent equivalent to the south in Mt. Hammersley-1 is 197m thick indicating a major change in the depositional regime.
- The Crown Point Formation in Mt Hammersley-1 is also disparitely thick (505 m thick) and comprises a top most silty shale unit at the top (? Stuart Range Formation) which is 157 m thick ; this unit is not recognised in drill holes to the north. The thick coal measures seen to the north on the flanks of the Eringa Trough (Andado Shelf) have not been intersected as yet south of Camelot Fault although maximum thickness in both northern and southern depocentres is about 600 m. It is noteworthy the Stuart Range Formation includes rich algal source rocks in the Arckaringa Basin to the south (Menpes et al; 2008).
- The tectonic style also differs to some extent to the south where robust inverted structures such as Mt Hammersley prospect are recognised whereas to the north this style of structuring is apparently absent.

The basal sequence, the Crown Point Formation, comprises sandstone and extensive diamictite deposited in periglacial, interglacial, fluvioglacial and glaciolacustrine settings (Giuliano, 1988). The sequence to the south in Mt. Hammersley -1 differs from that seen to the north mainly in terms of its thickness (504 m) and the presence of a silty–shaly sequence at the top which could equate to the Stuart Range Formation of the Arckaringa Formation (157 m thick). The glacial sequence here seems quite different from that seen to the north and overlying this unit is a thick sandstone unit believed to be equivalent to the Tirrawarra Sandstone. Basin subsidence during Purni Formation time was more subdued and the thick coal measures intersected on the Andado Shelf to the north to date have not been intersected

by drilling to the south at this point in time but seismic indicates at least some coal development in the southern Eringa Trough.

Ambrose and Heugh (2012) have suggested there is an unconformity separating the Early and Late Permian on the Andado Shelf (as seen in the Cooper Basin) while Alexander and Jensen-Schmidt (1995) refer to compressional reactivation of older fault systems during the Early to Late Permian. The evidence for this is equivocal and it seems more probable that the massive truncation of the Permian coal measure sequence, especially along the Mc Dills Trend, occurred during uplift and erosion at the end of the Triassic. No Triassic sediments have been intersected in the western Pedirka Basin but Alexander and Jensen-Schmidt (1995) refer to seismic interpretations over the Dalhousie McDills Trend showing onlap of ? Triassic sediments onto the underlying Permian sequence . However, these may indeed be Late Permian or Early Jurassic strata but severe erosion along this trend saw a thick sequence of Triassic sediments (300m) shed into the Poolowanna Trough to the southeast.

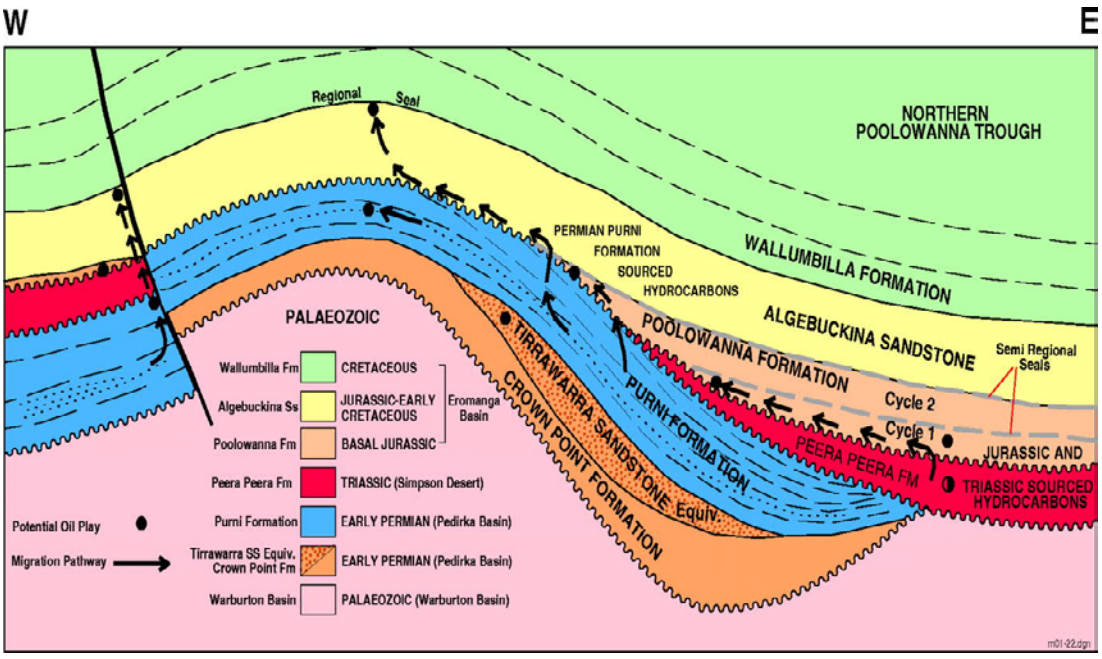


Figure 4 Model showing hydrocarbon migration pathways and salient reservoir/seal couplets

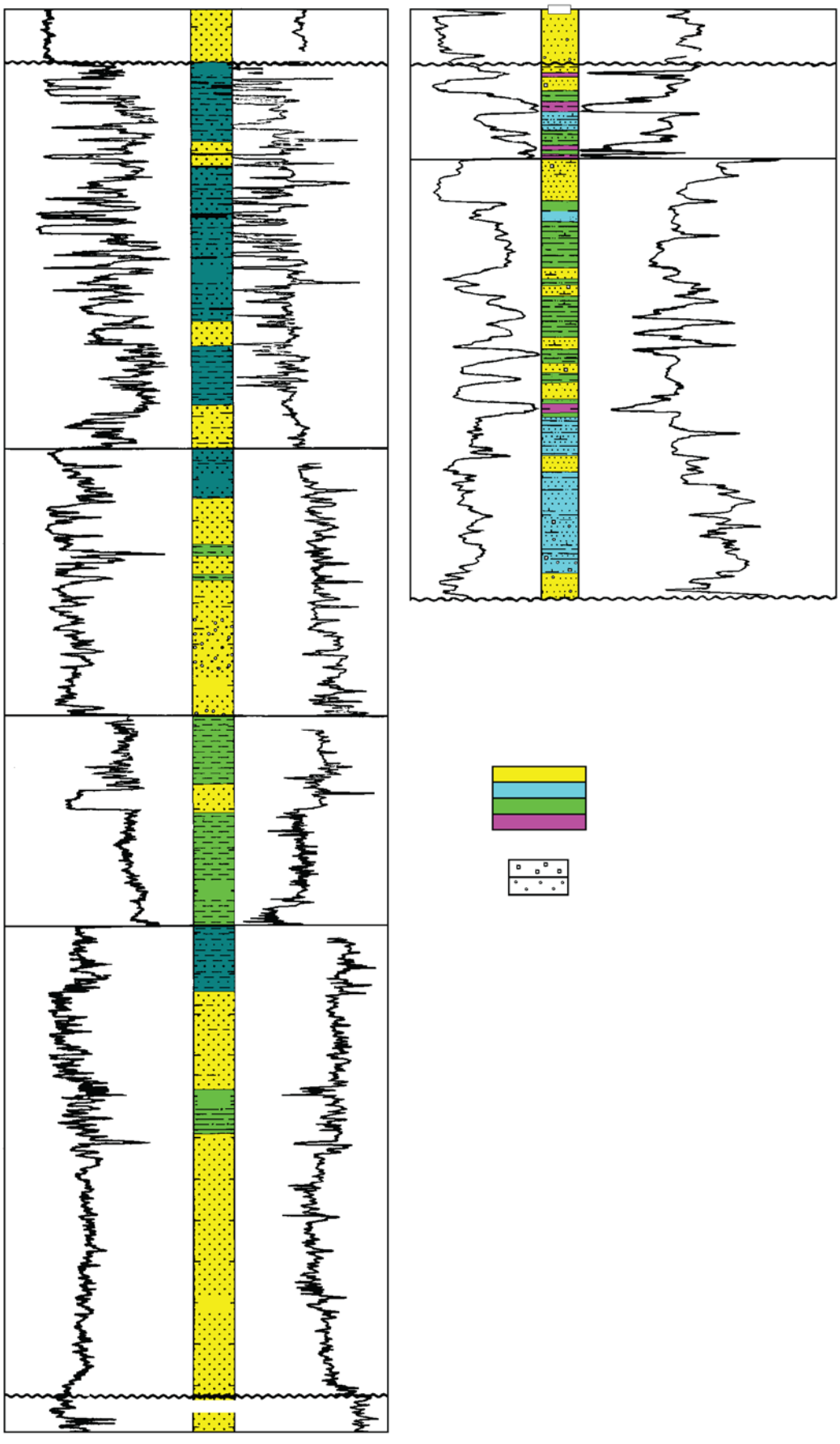


Figure 5 Mt Hammersley-1 GR-Sonic over the Permian Section

Petroleum Potential PEL77A and Surrounds

Warburton Basin

There is only one significant intersection of Warburton Basin stratigraphy in the basin viz McDills-1. The main target petroleum systems in the section are potentially: 1) Early-Middle Cambrian algal/bacterial source rocks which are very important in the Georgina Basin and also show scattered development in the Amadeus Basin; these may be developed in basinal downwarps in PEL77A. 2) The Ordovician Horn Valley Siltstone equivalent (HVS). The main possibilities relate to steeply dipping dark grey to black siltstones and shales occurring in the base of the Purni-1 and Mokari-1 wells, 3) There is some evidence of Devonian source rocks occurring in a carbonate platform/barrier reef facies mosaic (Ambrose et al, 2012) as mapped out in the Simpson Block (EP 97); potential carbonate buildups may also be developed along the Dalhousie-McDills Trend but investigation of this petroleum system is in its infancy, hence it is possible similar facies occur in PEL77-A.

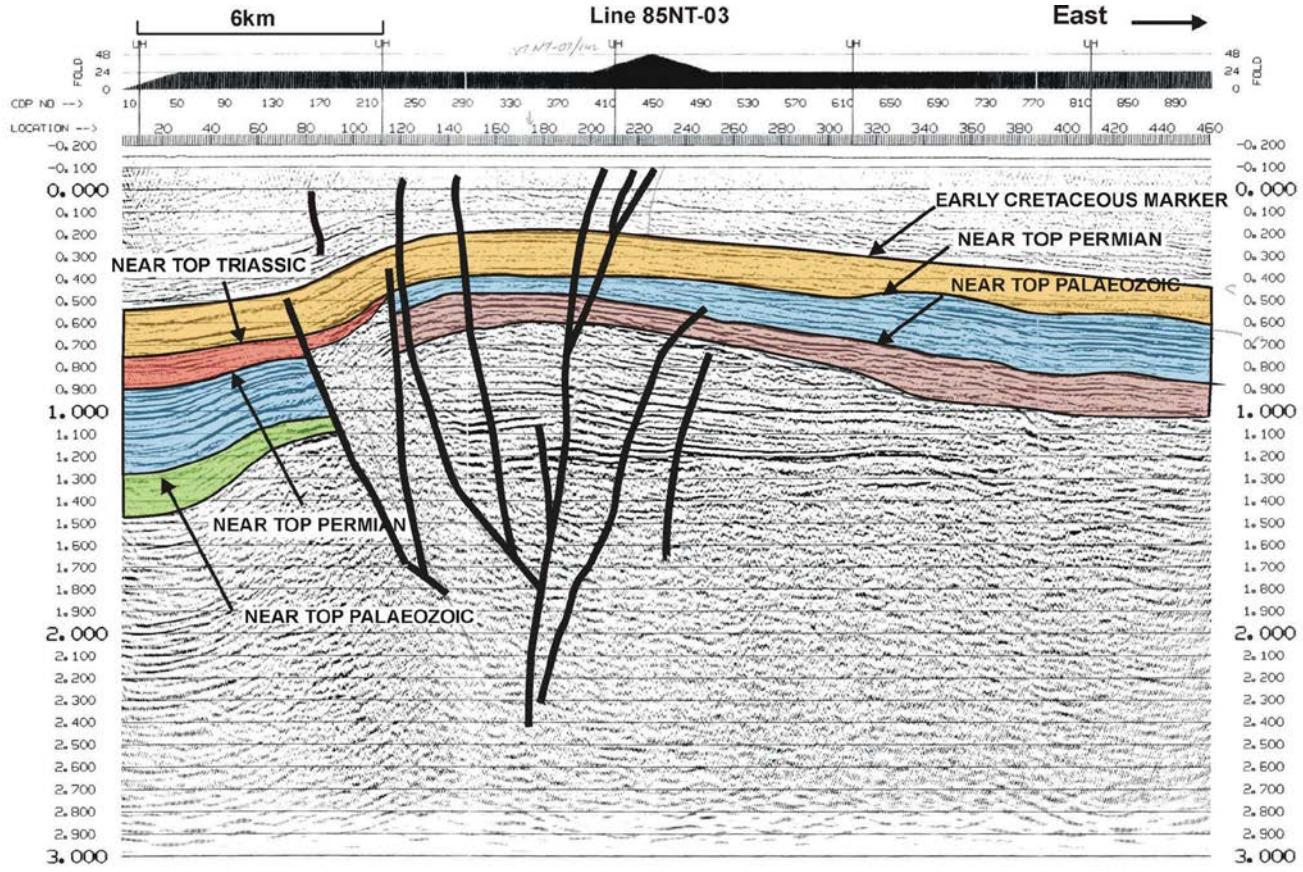


Figure 6 W-E Seismic line over the McDills Trend; note possible carbonate buildup in the Palaeozoic

Hydrocarbon gas chimneys and associated HRDZ's are associated with major fault zones controlling basinal facies down dip from Devonian platform/reefal complexes in EP 93 and EP 97 (Ambrose et al;2012). The charge is most likely coming from Devonian source rocks which were probably generative during the Cretaceous. This is encouraging from a charge perspective and it is well known from other drilled Devonian carbonate basins that associated

facies can provide excellent oil/gas source potential (eg back-reef/basinal and fore-reef facies). For example, the Duvernay Fm shales of western Canada are the source rocks

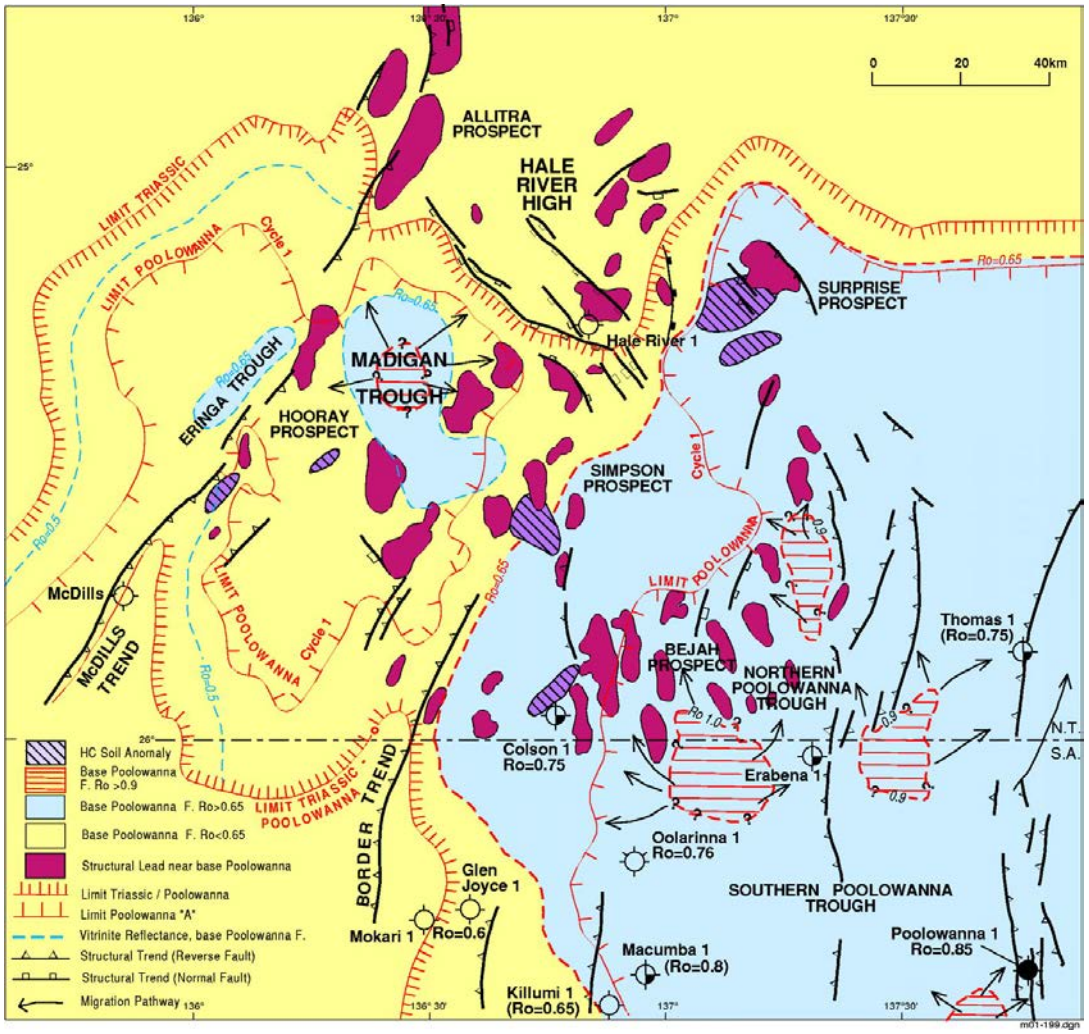


Figure 7 Poolowanna Formation; structural leads and source kitchens

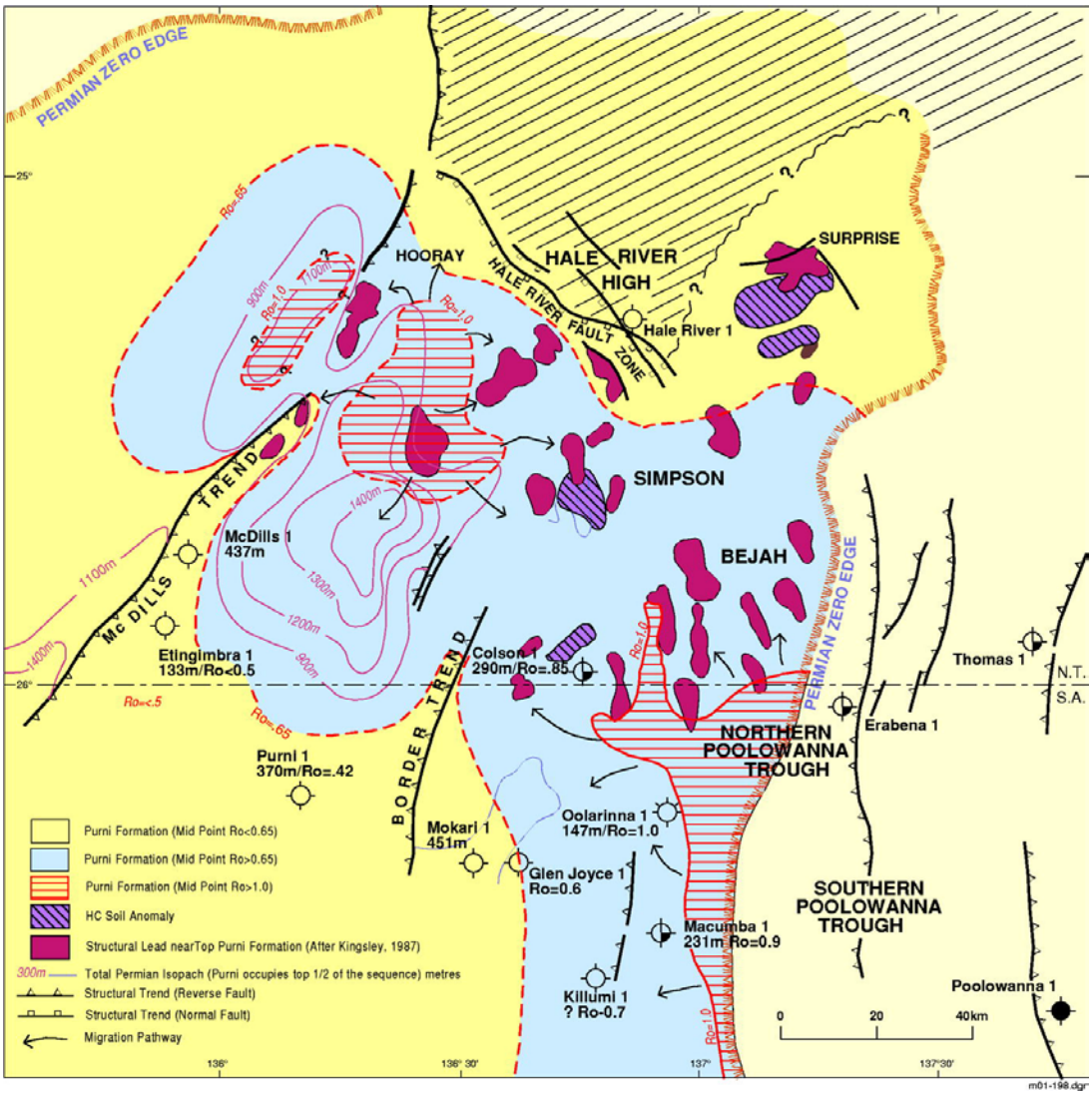


Figure 8 Purni Formation; structural leads and source kitchens

for a number of upper Devonian Alberta oil and gas fields. It has been predicted the Duvernay shales are at the precipice of being a timeless unconventional resource play and significant gas and liquids production has already been established.

The Devonian facies mosaic mapped out in EP 97 and surrounds includes similar basinal facies to the Duvernay shales found in Alberta although there have been no drill hole penetrations as yet. The unconventional play is high risk at this point, but it would compliment conventional targets. Similar facies could be developed in PEL77A.

The Ordovician siltstones and shales deemed equivalent to the Horn Valley Siltstone are only poorly quantified in the study area and additional geochemical and seismic studies are warranted. Basin thermal modelling can ensue given the regional thermal models already established for the Amadeus Basin where the HVS is a very important source rock. Other Palaeozoic source rocks could exist basinward of McDills-1 (the Early-Middle Cambrian sequence is productive in the Georgina Basin in particular) but seismic studies should be carried out initially.

Pedirka Basin

The dominant petroleum system in the late Carboniferous to late Triassic Pedirka Basin sequence pertains to the Purni Formation coal measures where sub-bituminous coals contain various hydrogen rich macerals averaging about 10% TOC by weight but this can reach as high as 25%; associated shales also have source rock potential and more details occur in Ambrose and Heugh (2011, 2012). The principal conclusions to be drawn for this potentially important petroleum system are:

1) The oil/gas prone coals are extremely widespread but the extent of thermal maturation is a major caveat in terms of effective expulsion of hydrocarbons.
2) No significant hydrocarbon shows were evident in the Andado Shelf drilling of recent years, indicating the Eringa Trough is not a viable Permian oil source “kitchen” as indicated to some extent by regional basin models (Ambrose et al., 2002). To the south in SA the trough rises slightly and it is unlikely the thermal regime was sufficient to induce expulsion of hydrocarbons.
3) The Madigan Trough to the northeast is deeper than the Eringa Trough and thermal modelling suggests oil prone coals/shales would reside in the Middle-Late oil window and expulsion of Cooper Basin style crude oils could be expected. This is supported by oil staining in the top Algebuckina Sandstone in Blamore-1, which on the basis of isotope analysis, is thought to be a late Palaeozoic oil probably of Permian origin and most likely derived from the Madigan Trough.

Figure x portrays the perceived Purni Formation source “kitchens” with the Madigan Trough being the most attractive but with additional potential in the SE portion of the basin beneath the northern Poolowanna Trough (Mesozoic) although the section is quite thin in this area.

One new avenue for exploration pertains to potential oil shales within the Early Permian Stuart Range Formation. The equivalent sequence is recognised in Mt Hammersley -1 but has not been recorded in the northern Eringa Trough, Andado Shelf, Madigan Trough or Simpson Shelf. Recently oil shales have been intersected in exploration drill holes targeting the Stuart Range Formation to the south in the Phillipson Trough (Arckaringa Basin). The discovery well, Arkeeta-1, intersected 1270 m of Permian sediments comprising early Permian glacials at the base (Boorthanna Formation) overlain by Stuart Range Formation (lacustrine-brackish siltstones and shales), in turn succeeded by the Lower and Upper Mount Toondina Fm which is lacustrine to brackish in the lower part with coals in the upper section. High TOC shales were intersected over 50-100m of the upper Stuart Range/Lower Mt Toondina Formations (TOC’s up to 7.5%, HI> 400); the richest source rocks were capable of generating 57 litres oil/tonne. Follow up drilling proved the concept of oil shales occurring at this level at other locations and details occur below. The important conclusion remains that the southern Eringa Trough, unlike the northern Eringa Trough, could host oil shales.

Arkaringa Basin Oil Shales (Early Permian)

Linc Energy's Arck-1 exploration well was a follow-up to the Arkeeta-1 discovery well. The target Stuart Range Formation was intersected between 854m and 978m (124m thick) with 70 m of prospective black shale intersected between 899-970m. TOC contents average 5.4% in the upper sequence and 7.7% for the lower interval of the Stuart Range Fm; individual samples recorded TOC's of >10%. The potential yield lies between 25-45 litres/tonne.

Current studies indicate that the target shales will be in the oil window below 700 metres and the currently known dimensions of the oil shale deposit are 93.5 km x12.3 km (1150 km2). Linc Energy indicate modern technologies will make it possible to process the shale oil underground (in situ processing). The company believes that the resulting oil could be used as a fuel or as oil refinery feedstock.

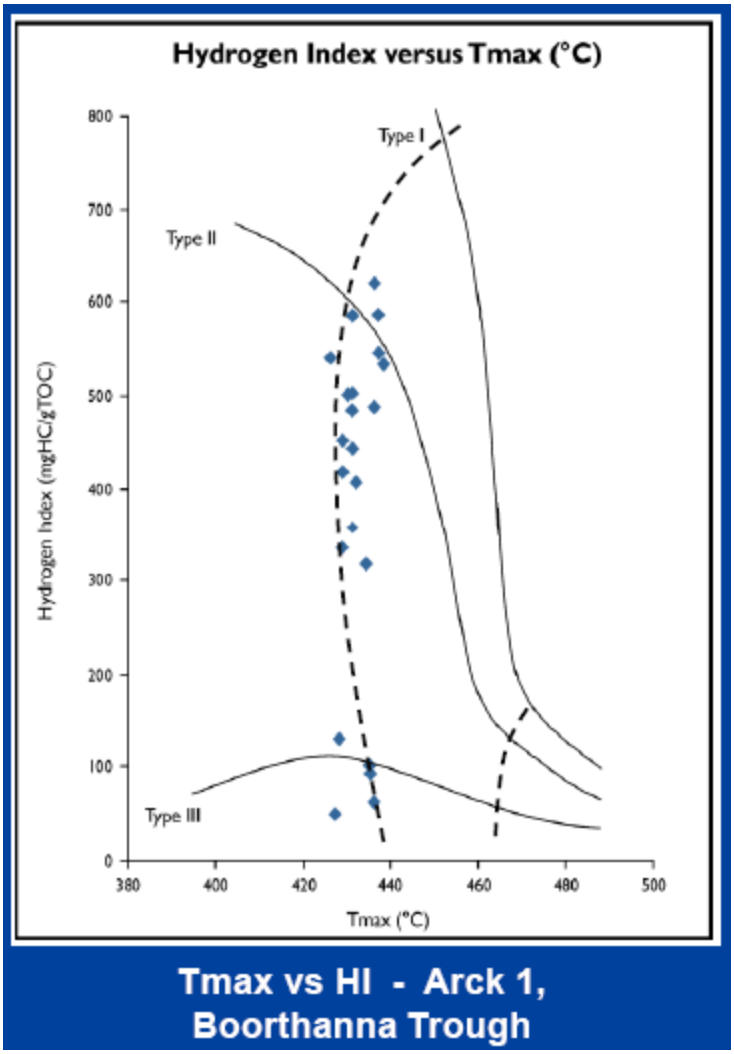


Figure 9

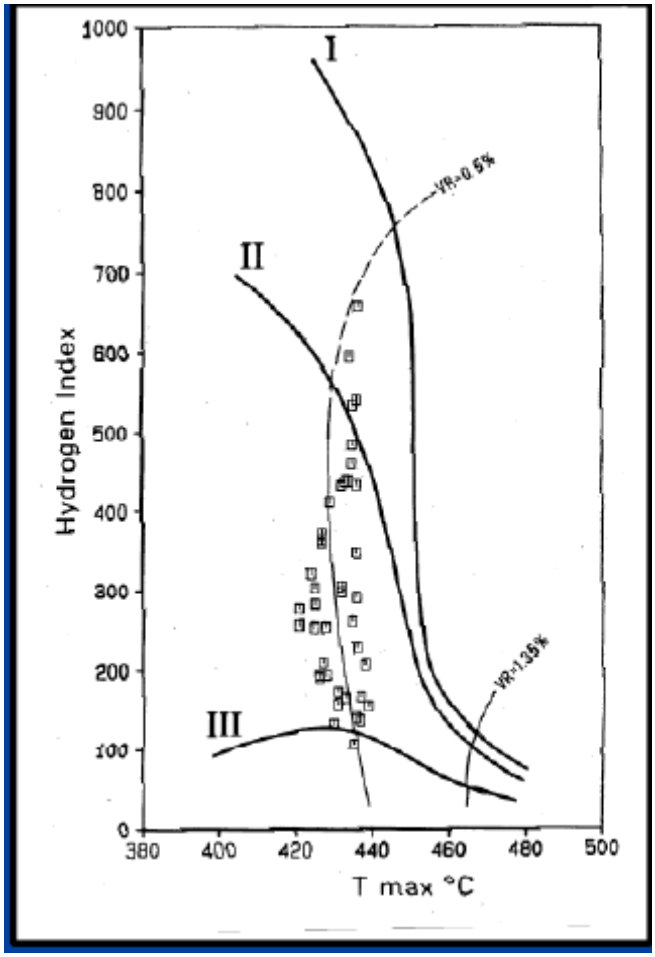


Figure 10

The only potential source rocks in the Triassic (viz. the Peera Peera Fm) are absent in the Eringa Trough and surrounds but are mature for gas/condensate generation to the east in the Poolowanna Trough and surrounds (Ambrose et al, 2007). A small amount of gas and condensate was recovered on test from the Peera Peera Fm in Poolowanna-1 and excellent oil shows occur in the same sequence in Walkandi-1 (Figure 15). Certainly the Poolowanna Trough, with its thick Cretaceous cover, hosted active petroleum systems at the levels of the Peera Peera and Poolowanna formations as evidenced by the recovery of petroleum from both these horizons in Poolowanna-1 (Analyses in Appendix-1).

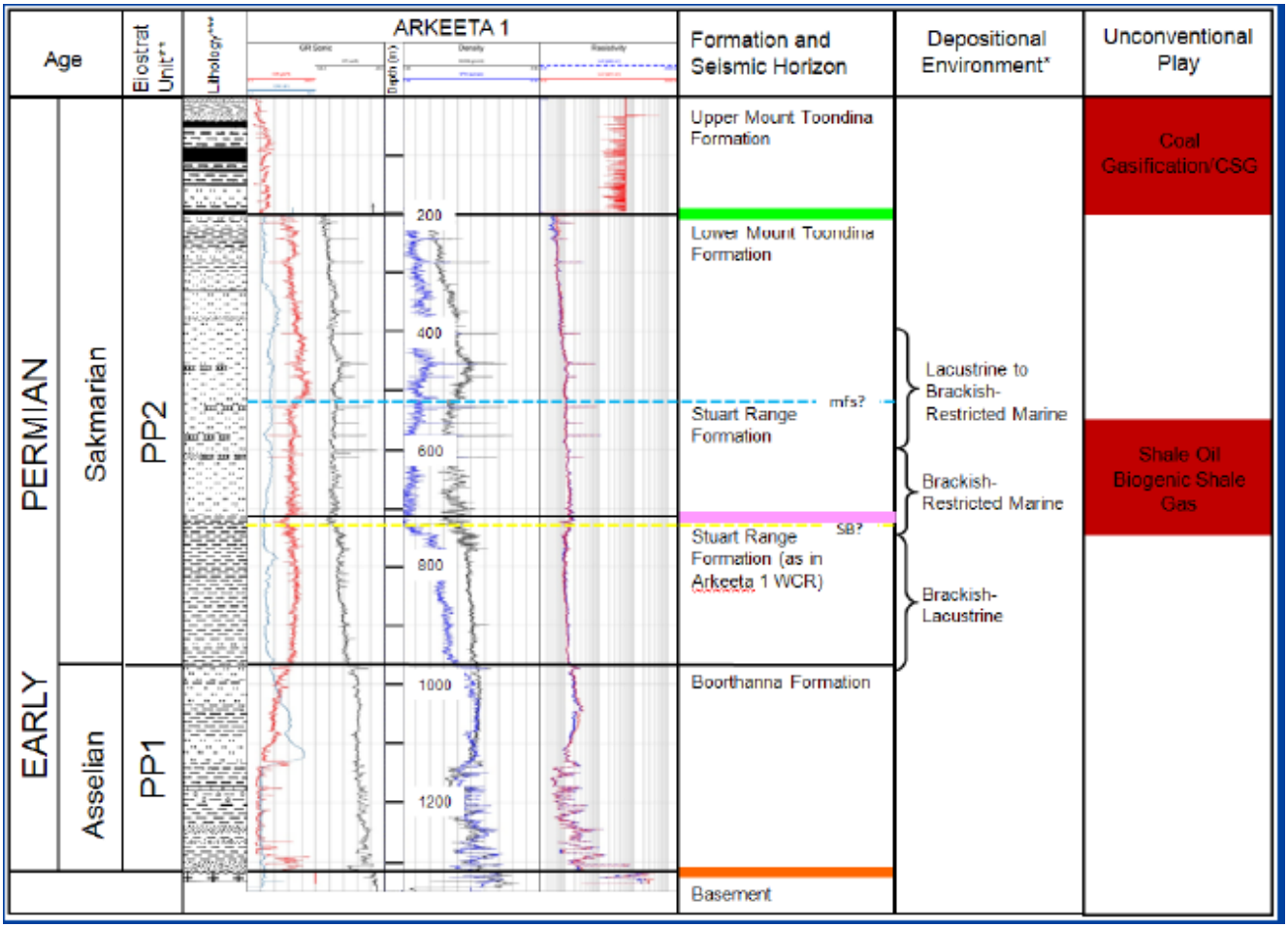


Figure 11 Oil shale in Arkeeta-1, Arkaringa Basin

Eromanga Basin

The main target petroleum systems in the general area are the Poolowanna Formation, the Birkhead Formation, and possibly the Toolebuc / Oodnadatta Formations which has potential to provide biogenic gas charge to overlying sandstones in the Oodnadatta Formation eg in Simpson-1.

Poolowanna Formation

The Poolowanna Formation comprises two upward fining transgressive cycles separated by an intervening seal. The lacustrine/flood plain carbonaceous sediments are the source of the significant oil recoveries in Poolowanna -1. The Poolowanna Trough is a viable hydrocarbon 'kitchen' at the levels of the Poolowanna Fm and the Peera Peera Fm. A full description of these petroleum systems occurs in Ambrose et al. (2007).

Birkhead Formation

The Birkhead Fm comprises Middle-Late Jurassic siltstone , coal and sandstone which was previously thought to occur only west of the Birdsville Track Ridge but this section, which interfingers with the Algebuckina Sandstone,occurs 100 km SW of the southern Eringa

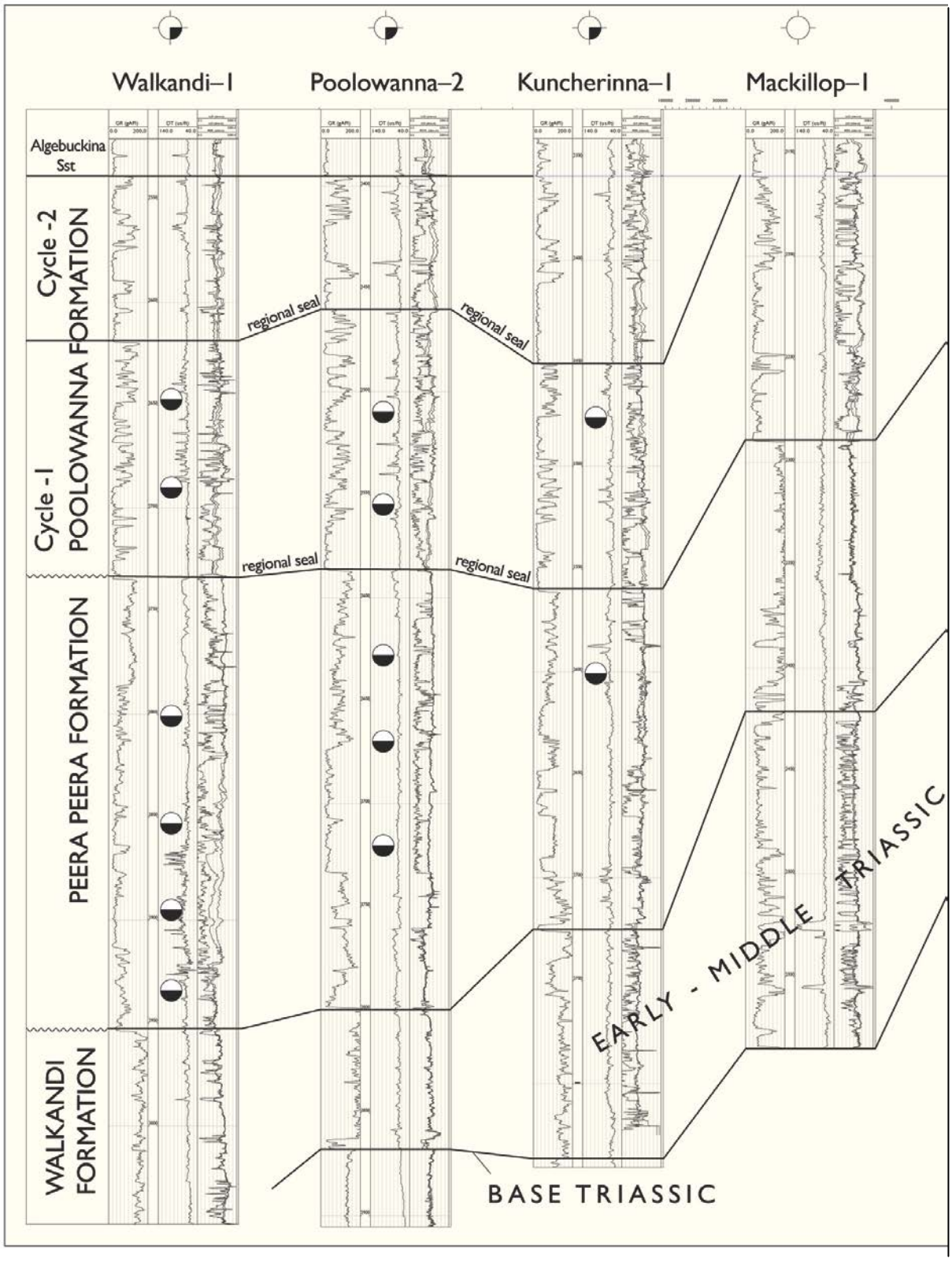


Figure 12 Triassic Stratigraphic Cross-section : Walkandi-1 to Mac Killop-1

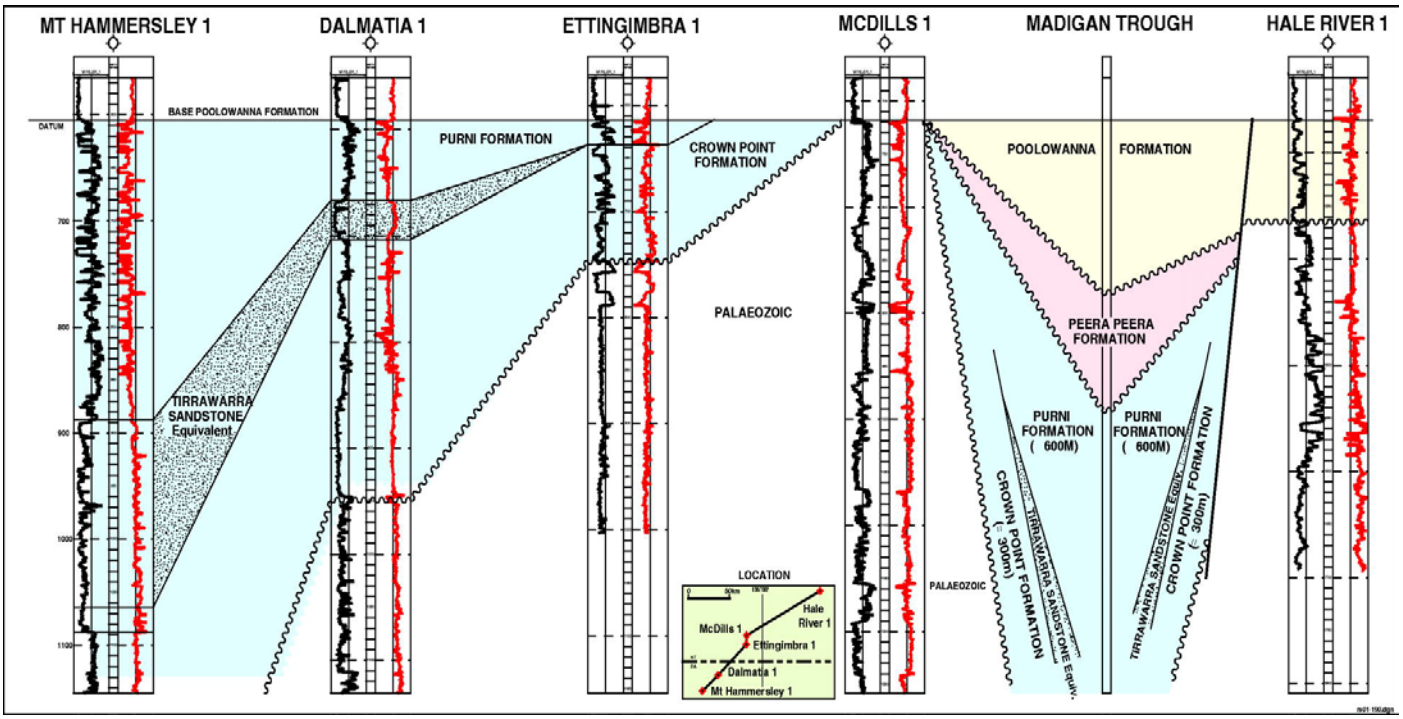


Figure 13 : Stratigraphic Cross-section Mt Hammersley-1 to Hale River-1

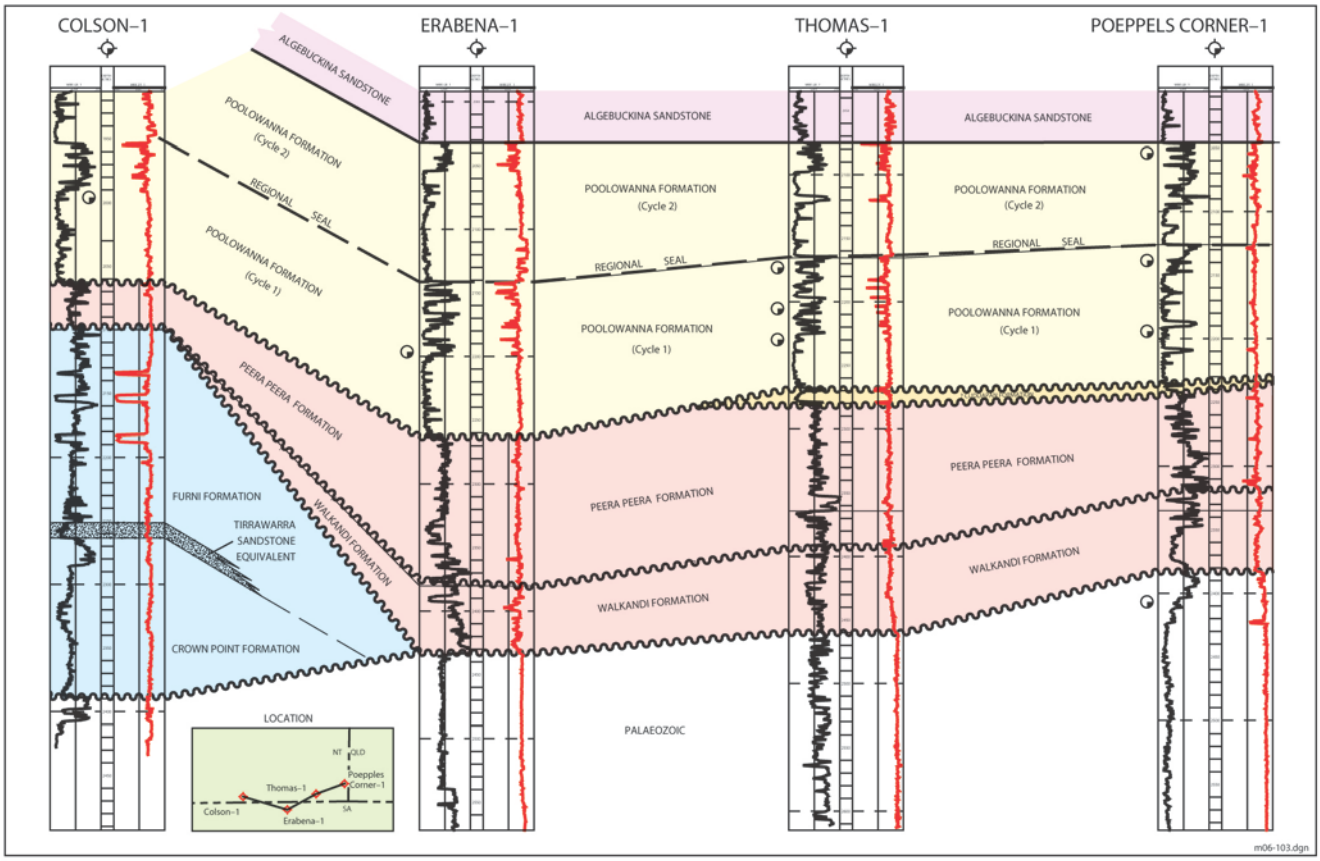
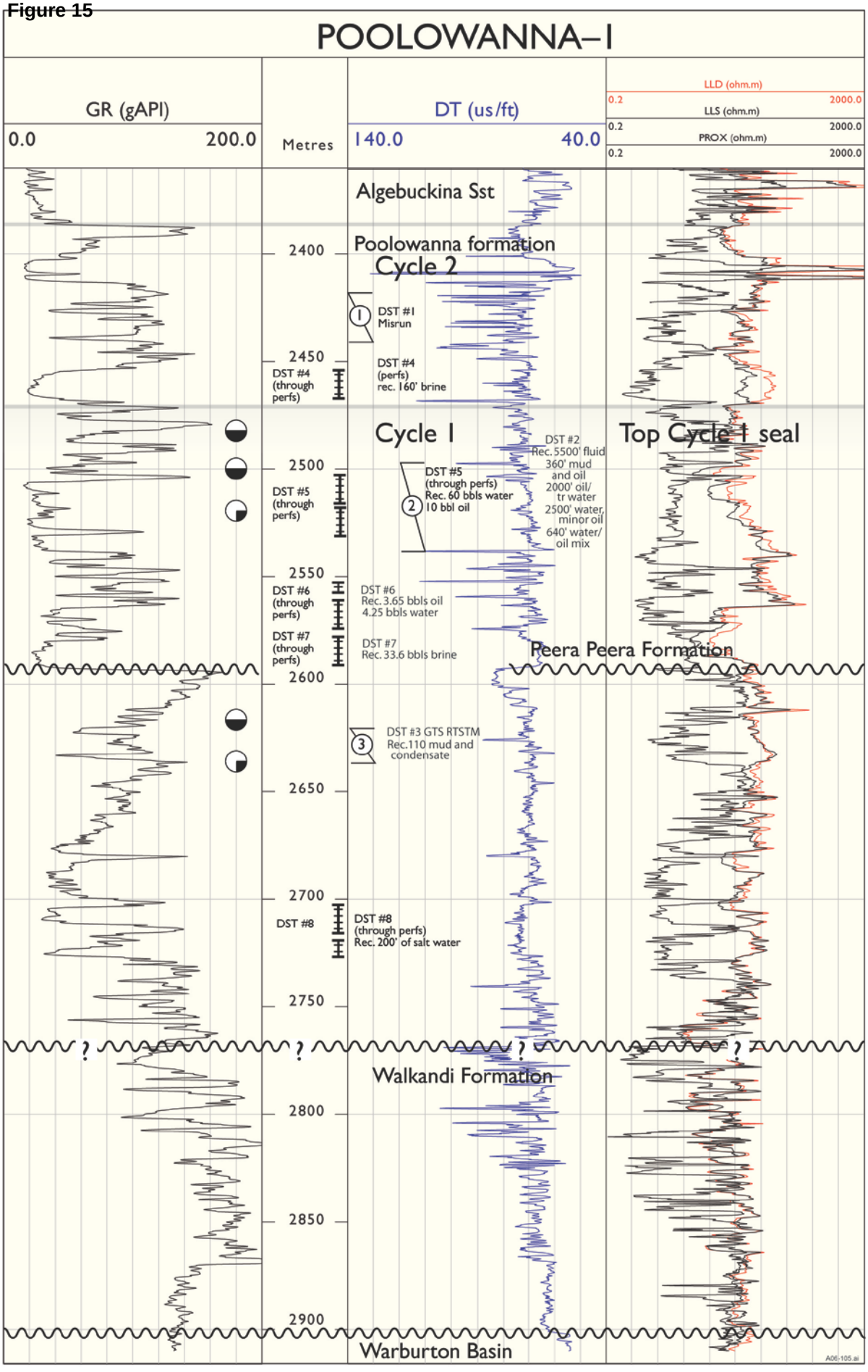


Figure 14 Stratigraphic Cross-section Colson-1 to Poepells Corner-1

Figure 15


POOLOWANNA–1
GR (gAPI)
0.0
200.0
Metres
DT (us/ft)
140.0
40.0
LLD (ohm.m)
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LLS (ohm.m)
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PROX (ohm.m)
0.2
2000.0
Algebuckina Sst
Poolowanna formation
Cycle 2
2400
DST #1
Misrun
2450
DST #4
(through perfs)
DST #4
(perfs)
rec. 160' brine
Cycle 1
Top Cycle 1 seal
DST #2
Rec. 5500' fluid
360' mud and oil
2000' oil/ tr water
2500' water, minor oil
640' water/ oil mix
2500
DST #5
(through perfs)
DST #5
(through perfs)
Rec. 60 bbls water
10 bbl oil
2550
DST #6
(through perfs)
DST #6
Rec. 3.65 bbls oil
4.25 bbls water
DST #7
(through perfs)
DST #7
Rec. 33.6 bbls brine
Peera Peera Formation
2600
DST #3 GTS RTSTM
Rec.110 mud and condensate
2650
2700
DST #8
DST #8
(through perfs)
Rec. 200' of salt water
2750
Walkandi Formation
2800
2850
2900
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A06-105.ai

Trough in AFMECO CUR 1 to 5. Coals consist of vitrinite, minor inertinite and abundant resinite,sporonite, cutinite and fluorinate (Staples et al, 1995), similar to the Walloon Coal Measures developed to the east in the Surat Basin which are a major source of biogenic coal seam gas. Even considering that Birkhead coals can generate light napthenic oil at low maturity levels (Cook and Struckmeyer, 1986), it is likely this source rock probably lacks sufficient maturity to allow oil expulsion in the southern Eringa Trough. However, biogenic gas production can occur at very low maturities and the analogy with the Walloon Coal Measures implies some prospective CSG potential. Certainly the close association of this unit with nutrient rich fresh aquifer waters of the Algebuckina Sandstone is an advantage. A thin silty sandy facies of the Birkhead Formation occurs in Mt Hammersley-1, Witcherie-1 and Etingimbra-1 but there is no evidence of significant coal in these units. At this stage the presence of Jurassic coals in the southern Eringa Trough remains uncertain but it should be classified as a secondary target for coal seam gas (biogenic) although it is unlikey to have sourced liquid hydrocarbons.

Toolebuc Formation/Oodnadatta Formation

The Toolebuc Fm is an enigmatic source rock in the Simpson Desert area where this unit hosts sparse, weak gas shows (sometimes with a minor component of heavy hydrocarbon molecules) but it appears thermally immature on a regional basis. However, a possible explanation may be that the methane component is of biogenic origin while the heavy molecules result from early – mature oil extracts residing in the rock and being released during the drilling process.

The gas noted in the lower Oodnadatta Formation in Simpson -1 is probably sourced from the Toolebuc Formation and is probably of biogenic origin. This type of gas show is rare thus far and may relate to the fact that the trap is conventional; ie viable sandstone reservoirs reside in structural closure immediately above the Toolebuc Fm. Interbedded thick claystones appear to provide vertical seal. The potential of the play is reliant on the authenticity of these assertions which could be confirmed by testing Oodnadatta Fm sandstones through casing. However, it may be the reservoir is tight in which case consideration of lateral fracture stimulation could be considered. In addition, the best prospect targeting the " Cooper Eromanga " style plays is the Madigan Prospect ; this prospect should be mapped at this structural level to determine the extent and crestal location of potential 4 way dip closures. The well should be carefully monitored through the Cretaceous section, particularly over the Toolebuc / Oodnadatta sequence and these zones should be covered by a full suite of elogs with testing to follow-up on any encouragement.

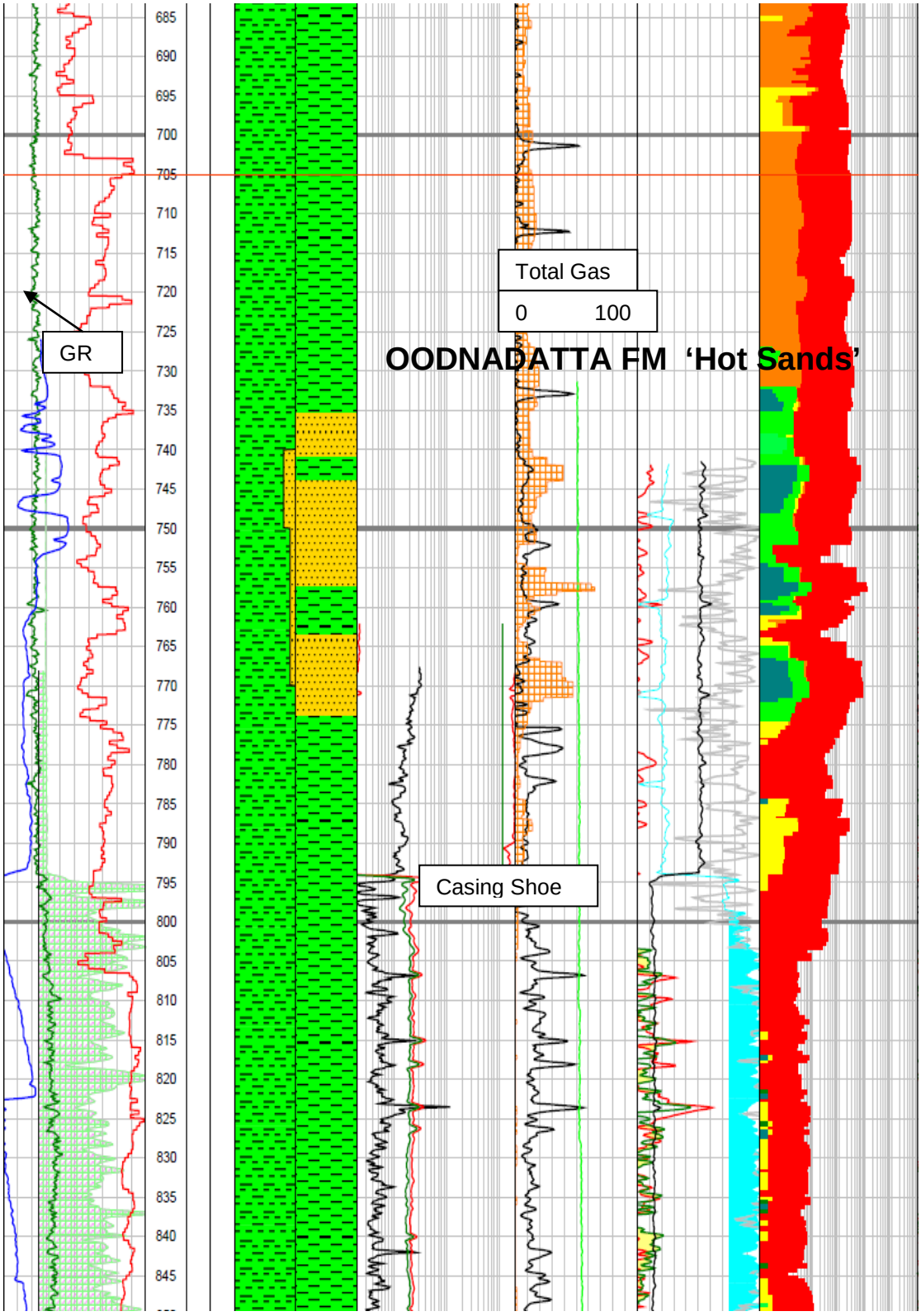

Figure 14 Simpson -1 Mudlog; ? gas pay in the Oodnadatta Formation

Eromanga Basin (Tristar Farmin)

The area to the south, west and east of PEL77A may possibly become available for farmin ; it includes the following exploration wells: Oolarinna-1, Macumba-1, Mokari-1, Killumni-1, Glen Joyce-1, Witcherie-1, Purni-1, Poolowanna-1, Walkandi-1 and Mokari-1. Most of these wells targeted the Permo-Mesozoic section with the main targets being the Poolowanna Formation, Algebuckina Sandstone and Purni Formation. In the farmout blocks the Poolowanna and Purni Fm petroleum systems are probably mature for early oil generation but would not have reached the gas window. Both the Peera Peera and Poolowanna formations are in the oil-gas window in the Poolowanna Trough but this area has been set aside as a national park. As described earlier, the aforementioned petroleum systems could be complimented by source sequences in the Ordovician (?Horn Valley Siltstone equivalent), Birkhead Formation and Toolebuc/Oodnadatta Formations, the latter three being unconventional biogenic gas targets. A summary of exploration well results occurs below:

Glen Joyce-1: The well was considered a valid crestal structural test but closure may have post-dated oil migration. Also peak oil generation may not have been reached in the drainage area. Weak gas peaks in the Purni coals militate against sufficient thermal maturation and no oil shows were recorded.

Killumi-1: The well was considered a valid near crestal structural test. The general conclusion regarding failure of the well is attributed to one or both of the following factors; structural timing and/or access to oil mature Purni /Poolowanna Fm source kitchens.

Mokari-1: No valid trap is present, however there is updip potential on this structure.

Oolarinna-1: Triassic sealing lithologies may have impeded migration of Permian sourced hydrocarbons to the Jurassic reservoir/seal couplets.

Purni-1: This was a stratigraphic test.

Mt. Crispe-1: This was a stratigraphic test.

Witcherie-1: This was a stratigraphic test.

Walkandi-1 : The Poolowanna and Peera Peera formations recorded good oil shows suggesting these are the respective petroleum systems active in the Poolowanna Trough; the Permian zero edge occurs some distance to the west.

Poolowanna-1: The Poolowanna Formation and Peera Peera Fm recorded good oil/gas shows suggesting these are the respective petroleum systems active in the Poolowanna Trough. Some significant oil recoveries were recorded from the Poolowanna Fm and minor condensate and gas were recorded in the Peera Peera Formation. Analysis of these occurs in Appendix-1. An earlier formed pool is interpreted ; massive Miocene uplift basically destroyed the pre-existing oil pool.

Macumba-1 : The well was drilled outside closure and failed to record significant oil shows but there is updip potential at the Algebuckina level.

Conclusions

The most attractive area for Jurassic/Triassic oil and gas is the Poolowanna Trough but this ground is unavailable. Here two low risk petroleum systems are the late Triassic and Early Jurassic sequences which provide the best oil/gas shows/recoveries in Poolowanna-1 and Walkandi-1. Both these structures appear to be valid crestal structural tests although seismic isochrons indicate only the Poolowanna structure was valid at the time of oil migration in the late Cretaceous; the Walkandi

structure was presumably on a migration pathway which spilt updip to the northwest at this time (Ambrose et al., 2007).

In contrast ,Tristar's permits lie to the west and south of the Poolowanna Trough and there is considerable doubt re the veracity of the two main petroleum systems; the Peera Peera Fm is largely missing as are the lower Poolowanna Formation shales which provide key source and seal. The Permian coal based petroleum system does thicken to the west but although thermal maturity for oil is indicated in several basinal areas there is a complete dearth of oil and gas shows in the region between the Poolowanna Trough and the southern Eringa Trough.

Whether or not the adjacent permit to the west (PELA 160) was sufficiently proximal to receive charge from the Poolowanna "kitchen" is debatable but the wells in this permit (Mokari-1, Killumi-1, Oolarinna-1, Macumba-1, Purni -1, Glen Joyce-1) were all drilled on reasonable (1980's vintage) seismic grids and three appeared to be valid structural tests, but all were characterised by a dearth of oil shows.

Very sparse exploration coverage cautions against overriding negativity, and completely unexplored petroleum systems, both conventional and unconventional have been described herein. However, the most attractive permit,apart from the Poolowanna Trough, appears to be PELA 77. This together with CTP'S large exposure to green fields exploration ground in this general area, militate against a farmin into Tristar's tenements at this point considering CTP's acute funding constraints and large expenditure commitments elsewhere.

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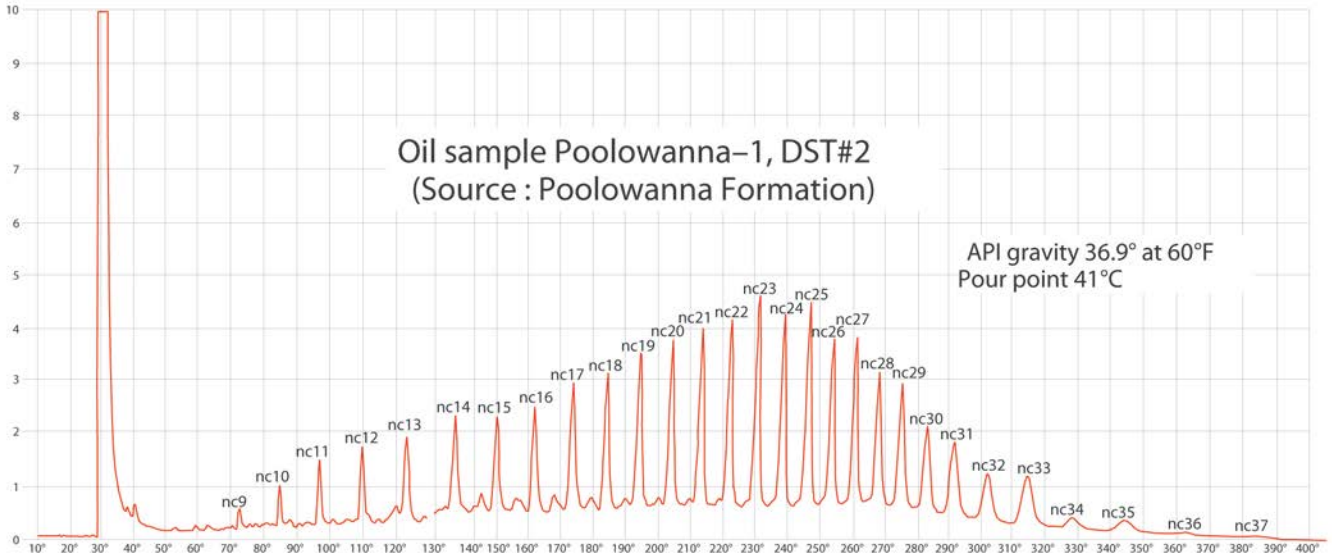
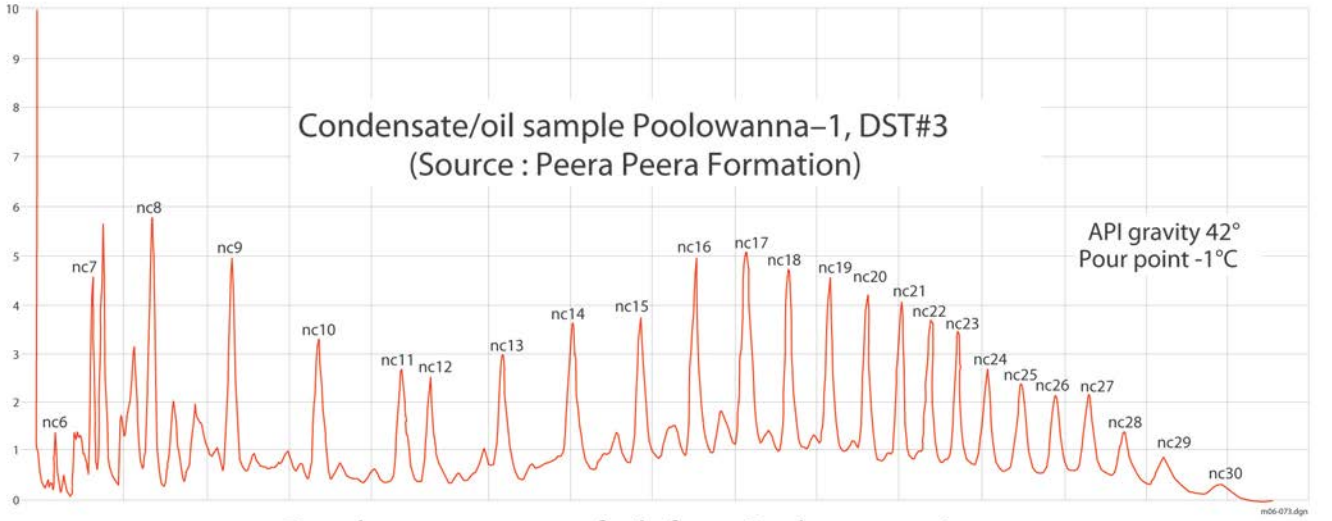
Appendix-1





Gas chromatograms of oils from Poolowanna–1