

VICTORIA PETROLEUM N.L.

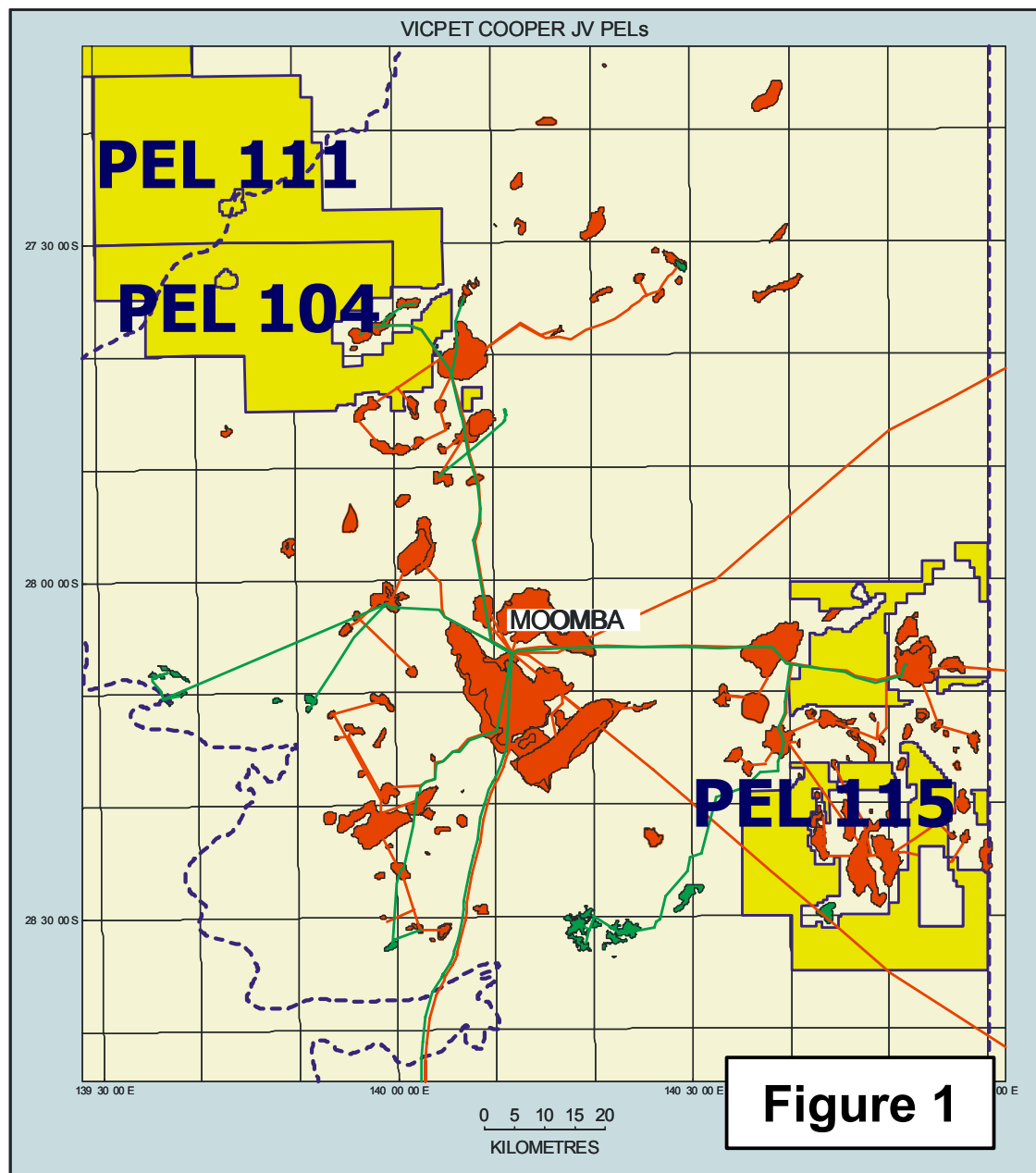
**PEL 111 / PEL 104 COOPER BASIN,
SOUTH AUSTRALIA**



**REGIONAL PROSPECTIVITY REVIEW AND
RECOMMENDED FORWARD
GEOTECHNICAL STUDIES**

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NOVEMBER, 2004



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A. SUMMARY

The purpose of this report was to provide an audit for the Joint Venture of current understanding of prospectivity and to recommend the necessary geotechnical studies required which will contribute to the discovery and exploitation of oil and gas within PEL 104 & 111.

The possibility exists within PEL's 104 & 111 to discover potentially large Permian oil and/or gas fields within a liquids rich corridor on the Patchawarra Shelf near the basin margin of the Cooper Basin. There are eight oil pools and thirty gas fields that have been discovered to date in the adjacent acreage to PEL 104/111 that have up to 168 MMbbls of oil in place and 1.4 Tcf of gas in place.

These fields have been sourced from a proven thick, rich Patchawarra Formation source kitchen, referred to variously in this report as the Spectre Low and Spectre Source Kitchen. This kitchen has sourced the large Tirrawarra, FlyLake, Brolga and Moorari oil fields and is interpreted to have at least co-contributed to the Merrimelia oil field. PEL's 104 and 111 are adjacent to this source kitchen.

A number of petroleum plays are possible within the acreage dependent upon migration from the source kitchen, the placement of regional seals and the existence of favourable reservoir.

The Permian section provides oil exploration plays where the oil has been partially or totally unable to migrate up into the overlying Eromanga section. By far the greatest potential for large Permian oil accumulations occurs within fault and stratigraphic traps. The oil within these Permian traps will quite often be in marginal reservoir rocks but they are amenable to fracture stimulation and enhanced oil recovery techniques. These Permian plays consist of Merrimelia, Tirrawarra and Patchawarra formation targets. A number of Patchawarra Formation intra-formational seals exist and this review describes the development by Victoria Petroleum of a working chronostratigraphy that is consistent with prior operators in the basin that allows the mapping of these Patchawarra stratigraphic plays. Five stratigraphic units have been identified within the Patchawarra Formation and reservoir quality sands are known to exist within each unit. The Operator has now established the chronostratigraphic framework, it now remains to map it across the existing well control and then translate it through the seismic to develop prospects and leads within the defined plays. It also is possible that a large Permian stratigraphically trapped tight oil and/or gas resource exists in the area largely independent of good reservoir that would be amenable to some form of unconventional development.

PEL's 104 and 111 straddle the basin margin on the Patchawarra Shelf and there is a favourable absence of regional seals that allows Patchawarra/Tirrawarra source and carrier beds access to feed Jurassic reservoirs in the NW sector of the permits. These Jurassic prospects and leads will be more modest in size compared to the Permian prospects and leads.

Another play that may exist within PEL 104/111 that should not be ignored is a basement play. In the proximity of this prolific source kitchen and within the continual onlap and truncation of this Permian section onto the Patchawarra Shelf, a fractured and weathered basement play may exist within the Warburton Basin sequence.

The review discusses also that the Cooper Basin, despite its relative exploration maturity, still has the capability of producing stratigraphic surprises like the discovery of an highly productive aeolian Merrimelia Formation facies at the Pondrinie Field (56Km east of PEL's 104/111). Such a facies in the JV acreage alongside the Spectre Source kitchen would of course be outstanding. This could be regarded as the maximum upside of the permits.

One of the principal challenges for the area is obtaining closure to the north west against the continual monoclinal NW to SE dip from the Birdsville Track Ridge into the Patchawarra Trough. This closure may be provided by stratigraphic pinch out, faulting and local dip reversal. It is believed that each of these are linked to the configuration, tectonic development and differential erosion of the underlying Warburton Basin. For this reason, one of the recommendations of this review is that a study be conducted of the available AGSO magnetics to assist in the seismic mapping of basement.

The full list of recommended geotechnical studies is discussed in the next section.

B. RECOMMENDATIONS

The following geotechnical studies are recommended to the Joint Venture:

1. Complete the Patchawarra Formation chronostratigraphic study in order to define Patchawarra stratigraphic plays.
2. PEL's 104/111 are covered by high quality magnetics that are available as a free download from the Geoscience Australia web site. It is proposed that Peter Gunn, a Consulting Geophysicist who specializes in potential field interpretation, conduct an initial study of the magnetic data to see if anything useful can be extracted from the magnetics to aid seismic interpretation of basement. The initial review would only take 3 days costing approximately \$2640. If there are encouraging signs from the initial 3 days of work a more expanded study could be commissioned. The goal of such work is to define possible NE-SW trending basement lineaments that could reflect either faulting or contrasting lithologies that may have been differentially eroded and provide change of slope that could have controlled either Permian or Jurassic stratigraphy and facies. Alternatively it may provide more direct evidence of a basement play as discussed in sections A & 4.8.
3. Engage a Geophysicist to work alongside the Geologist to interpret seismic horizons that relate to the chronostratigraphy. This mapping process is the key to defining the stratigraphic play potential of the permits.
4. Geologist to continue and expand on this preliminary review by examining a comprehensive set of well completion reports to identify further reservoir/seal elements of plays. This will include further preparation of key cross-sections and documentation of shows & tests within wells. (Note here the difference between Enclosures 14 & 15 and Enclosures 19 & 20. Enclosures 14 & 15 were developed with the sole purpose of developing the regional chronostratigraphic control. They have not been annotated with shows and drill stem tests. Enclosures 19 & 20 were developed to support the Jurassic play petroleum system and the Hellcat 1 Proposal to Drill. They have has shows and drill stem tests added. Developing the well data base with these shows and DST's added enhances understanding and play development. Ongoing work of this nature is recommended).
5. From the above work plays will be clearly defined and then within these plays prospects and leads will be developed. The prospects and leads inventory will be continually reviewed and updated as work progresses.
6. Once a clear focus has been attained it is recommended that certain reservoir quality and reservoir facies studies be undertaken. This will involve examination of core in PIRSA core store and rock typing studies of cuttings in certain key wells. Incorporated in this certain reservoir engineering studies may assist in understanding some of our plays.

1. PURPOSE OF REVIEW

This review was undertaken in order to provide a focus and direction to the exploration effort within the PEL 111 and PEL 104 permits.

The primary goals were to;

- Review the prospectivity and possible plays within the acreage.
- Review examples of some of these plays by examining the existing fields in close proximity to the acreage.
- Where possible review the hydrocarbon in place and reserves of the existing fields.
- Report on geological activities undertaken to date.
- Recommend future geotechnical studies that need to be conducted in order to mature plays, prospects and leads.

This review is not meant to be exhaustive and inclusive of all possible aspects of the acreage. It should be regarded as a preliminary report which outlines potential. That potential can only be realized by pursuing the ongoing and recommended studies.

2. WORK CONDUCTED TO DATE

The following activities have been undertaken as part of this review:

- Review of pertinent geotechnical literature (refer Section 7).
- Review of a limited number of relevant Well Completion Reports.
- In order to calibrate size expectations of likely discoveries, the oil in place and reserves of oil and gas fields in the vicinity of PEL 111 and PEL 104 have been tabulated and also presented as maps (refer Tables 1 & 2 and Enclosures 1 & 2). Data source - PIRSA.
- Development of a Pre-Permian subcrop map (Enclosure 3).
- A Patchawarra Formation Isopach map which combines well and seismic data has been recovered from a PIRSA data package (Enclosure 5).
- Two regional maps depicting the liquids richness (condensate and LPG) of Patchawarra Formation gas reservoirs were developed from Heath (1989). As liquids content adds great value in this wet gas province it is highly significant to economic valuation of drilling prospects (refer Enclosures 6 and 7).
- The review has used the Apak et al (1993) reference quite extensively as it described the partition of the Patchawarra Formation section into five units with (poorly well controlled only) zero edges. The Apak maps were drafted at a common presentation scale in order to put them in the context of PEL 111 and PEL 104 (refer Enclosures 9 to 13).
- Through the literature established a working chronostratigraphy that is consistent with the stratigraphy that has already been established by the dominant Operator in the basin, Santos (refer Figures 3 & 4 and Enclosure 14).
- Four regional cross-sections were constructed in order to explain the plays that are possible within PEL 111 and PEL 104 (refer Enclosures 15,16,19 & 20).
- Through the application of these regional cross-sections and the Apak maps the expected location of the various Patchawarra Formation stratigraphic plays are forecast (refer Enclosure 17).

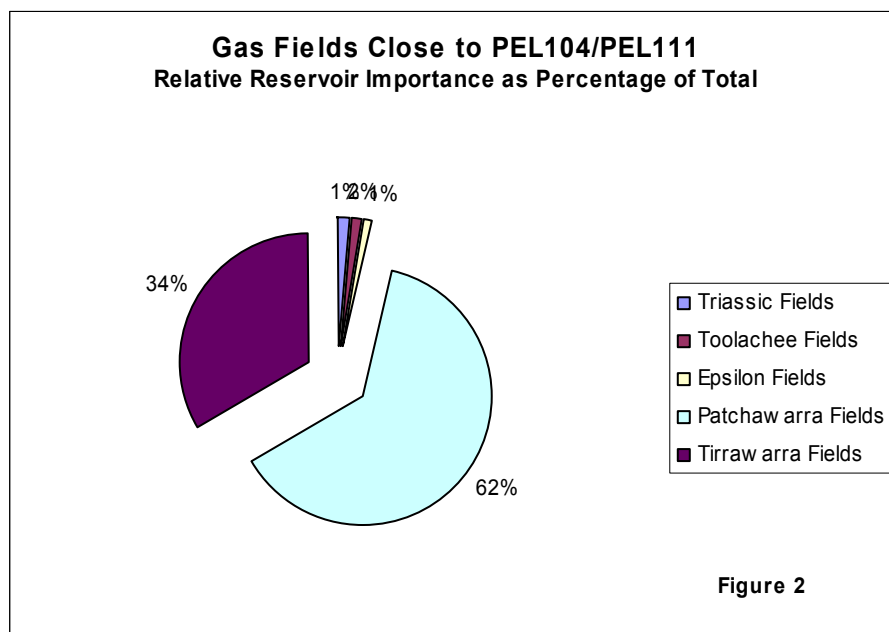
- Preliminary review has been made of the detail of some of the existing fields as a precursor to more extensive work that will need to be conducted in order to better define the potential and prospectivity of the acreage. In particular papers by Yew (1989) and (Seggie (1994) were most helpful.

3. RESERVES AND HYDROCARBONS IN PLACE – OIL AND GAS FIELDS CLOSE TO PEL104/111

In this review, an area was selected in the Patchawarra Trough within which the size distribution of the known oil and gas fields were examined. The fields on the GMI trend, the Deramooka Platform, the southern Patchawarra trough and the most northerly Patchawarra trough immediately south of the Deramooka Platform were excluded (refer Enclosures 1 & 2). This was deliberate in order to establish a local size expectation of undiscovered resource in the PEL 104/111 acreage. This may have to be revisited if either Triassic or Epsilon plays are defined within the acreage. If such is the case the Triassic fields on the Deramooka Platform and the Epsilon fields in the northern Patchawarra Trough, especially the Cuttapirrie field, become relevant.

Tables 1 and 2 show that adjacent to PEL's 104 and 111 there are eight oil pools with up to 168 MMbbls of original oil in place and thirty gas pools with up to 1.4 Tcf of original gas in place. With respect to the oil pools, 98.9% are reservoirised in the Tirrawarra Sandstone with the balance consisting of Jurassic Birkhead Formation reservoirised oil. With respect to the gas pools, 96% are reservoirised in either the Tirrawarra Sandstone (34%) or the Patchawarra Formation (62%) (refer Figure 2).

As will be discussed in a subsequent section of the report, from a prospectivity point of view, to this mix should be added the potential of Merrimelia Formation and Basement hosted fields.



However, it is quite clear from the evidence of the existing fields that the main potential of the area lies within the Patchawarra Formation and the Tirrawarra Sandstone.

Table 1 Oil Fields Close to PEL 104/PEL111					
Oil Field Number	Field	Reservoir	OOIP (MMbbl)	Recovery Factor	Recoverable Reserves (Mmbbl)
(A) Permian Fields					
1	Tirrawarra	Tirrawarra Sandstone	127.170	0.30	37.761
2	Moorari	Tirrawarra Sandstone	16.510	0.25	4.203
3	Brolga	Tirrawarra Sandstone	11.620	0.05	0.624
4	Fly Lake	Tirrawarra Sandstone	9.910	0.08	0.758
5	Woolkina	Tirrawarra Sandstone	1.000	0.20	0.198
Sub-Total			166.210		43.544
(A) Jurassic Fields					
6	Moorari	Birkhead	1.200	0.10	0.120
7	Calabonna	Birkhead	0.456	0.00	0.000
8	Charo	Birkhead	0.265	0.00	0.000
Sub-Total			1.921		0.120
TOTAL			168.131		43.664

Table 2 Gas Fields Close to PEL 104/PEL111					
Gas Field Number	Field	Reservoir	OGIP (Bcf)	Recovery Factor	Recoverable Reserves (Bcf)
(1) Triassic Fields					
1	Moorari	Nappamerri Group	11.5	0.64	7.400
2	Coonatie	Nappamerri Group	6.8	0.85	5.800
	Sub-Total		18.3		13.200
(2) Permian Fields					
(A) Toolachee Fields					
3	Tirrawarra	Toolachee Formation	9.2	0.60	5.500
4	Moolion	Toolachee Formation	6.8	0.75	5.100
5	Moorari/Woolkina	Toolachee Formation	2.8	0.82	2.300
6	Kudrieke	Toolachee Formation	1.6	0.69	1.100
7	Lake McMillan	Toolachee Formation	1.3	0.69	0.900
	Sub-Total		21.7		14.900
(B) Epsilon Fields					
8	Coonatie	Epsilon Formation	14.7	0.50	7.400
9	Moolion	Epsilon Formation	0.1	0.50	0.050
	Sub-Total		14.8		7.450
(C) Patchawarra Fields					
10	Tirrawarra	Patchawarra Formation	386.6	0.59	229.600
11	Andree/Leleptian	Patchawarra Formation	139.0	0.25	34.500
12	Fly Lake SW	Patchawarra Formation	100.8	0.67	67.600
13	Kanowana	Patchawarra Formation	95.8	0.61	58.700
14	Brolga	Patchawarra Formation	40.3	0.34	13.900
15	Varanus	Patchawarra Formation	29.0	0.54	15.600
16	Gooranie	Patchawarra Formation	27.3	0.35	9.600
17	Fly Lake NE	Patchawarra Formation	27.2	0.46	12.400
18	Moorari/Woolkina	Patchawarra Formation	14.8	0.39	5.700
19	Narie	Patchawarra Formation	4.5	0.13	0.600
20	Coonatie	Patchawarra Formation	4.3	0.09	0.400
21	Nulla	Patchawarra Formation	1.7	0.88	1.500
22	Rakoona	Patchawarra Formation	0.2	0.50	0.100
23	Cooba	Patchawarra Formation	15.1	0.40	6.000
24	Coopers Creek	Patchawarra Formation	0.2	0.50	0.100
	Sub-Total		886.8		456.300
(D) Tirrawarra Fields					
25	Tirrawarra Oil Field Associated Gas	Tirrawarra Sandstone	345.1	0.43	149.000
26	Moorari/Woolkina Associated Gas	Tirrawarra Sandstone	45.9	0.31	14.400
27	Coonatie	Tirrawarra Sandstone	42.9	0.07	3.100
28	Fly Lake Associated Gas	Tirrawarra Sandstone	20.4	0.08	1.700
29	Narie	Tirrawarra Sandstone	14.0	0.16	2.200
30	Kanowana Associated Gas	Tirrawarra Sandstone	6.3	0.00	0.000
	Sub-Total		474.6		170.4
	(Total Permian)		1397.9		649.1
	TOTAL		1416.2		662.3

Observe from both the tables and the enclosures that there are a number of fields that have multiple pools. Multiple pool fields exist at Tirrawarra, Moorari, Fly Lake, Kanowana, Coonatie and Moolion. The Moorari field is quite exceptional in containing pools in five different formations (refer Table 3).

Oil & Gas Field No.	Field	Reservoir	OGIP (Bcf)	Recovery Factor	Recoverable Reserves (Bcf)	OOIP (MMbbl)	Recovery Factor	Recoverable Reserves (MMbbl)
(A) Gas Fields								
1	Moorari	Nappamerri Group	11.5	0.64	7.400			
5	Moorari/Woolkina	Toolachee Formation	2.8	0.82	2.300			
18	Moorari/Woolkina	Patchawarra Formation	14.8	0.39	5.700			
26	Moorari/Woolkina Associated Gas	Tirrawarra Sandstone	45.9	0.31	14.400			
		Sub Total	75.0		29.8			
(B) Oil Fields								
2	Moorari	Tirrawarra Sandstone				16.510	0.25	4.203
6	Moorari	Birkhead Formation				1.200	0.10	0.120
		Sub Total				17.710		4.323
TOTAL (MMbbl)						30.210		

Another important observation from the tables is that the Tirrawarra Sandstone oil fields have a very high GOR resulting in very significant gas reserves being recovered along with the oil. Similarly, as has already been discussed in Section 2, this is a wet gas province and the gas is associated with significant liquids.

Having made these observations on the distribution of hydrocarbons adjacent to PEL 104/111, the next section analyses the geological reasons for their distribution.

4. GEOLOGY

4.1 Stratigraphy

Figures 3 and 4 (after E.Alexander, 1998 PIRSA) summarises the relevant stratigraphy of PEL 104 & 111. Three basinal sequences are superimposed. The Lower Palaeozoic Warburton Basin is overlain by the Permo-Triassic Cooper Basin which in turn is overlain by the Jurassic-Cretaceous Eromanga Basin. Carboniferous granites intrude the Warburton Basin sequence prior to Cooper Basin deposition.

4.2 Structural and Tectonic Framework

As indicated on the stratigraphic tables, Figures 3 and 4, the three major basins, the Warburton, Cooper and Eromanga are separated from each other by unconformity surfaces reflecting major tectonic events.

The structural grain of the Lower Palaeozoic Warburton Basin is NE-SW as seen on the Pre-Permian Subcrop Map (Enclosure 3). This Pre-Permian basement grain along with basement faulting has controlled the structural and tectonic development of the overlying Cooper Basin.

AGE		ROCK UNIT	GROUP		
SYSTEM	SERIES				
QUAT.		Millyera Formation and equivalent Yandruwantha Sand Namba Formation Eyre Formation		LAKE EYRE BASIN	
TERTIARY					
CRETACEOUS	Late	Mount Howie Sandstone Winton Formation			MARREE SUBGROUP
	Early	Mackunda Formation Oodnadatta Formation Coorikiana Sst. Bulldog Shale	Allaru Mudstone Toolebuc Formation Wallumbilla Formation		
	JURASSIC	Late	Cadna-owie Formation Murta Formation McKinlay Member Namu Sandstone Westbourne Formation Adori Sandstone		
Middle		Algebuckina Sandstone Birkhead Formation Hutton Sandstone			
Early		Poolowanna Formation			

Figure3

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Fig. 6.33 Stratigraphic summary of the Eromanga and Lake Eyre Basins, South Australia.

The Permian Cooper Basin was instigated as an intracratonic downwarp over this basement configuration and the NE-SW structural grain is reflected in the overlying Cooper Basin. Permian sediments are contained within three major troughs, the Patchawarra, Nappamerri and Tennaperra Troughs which are separated by two major structural highs, the Gidgealpa-Merrimelia-Innaminka (GMI) trend and the Nappacoongee-Murteree (NM) trend. These highs have had both a syn-depositional and post-depositional, through activation, effect on the sedimentation. Observe on Enclosure 1 that the Carboniferous granites intruding the Warburton Basin sequence are confined to the Nappamerri trough and are absent from the Patchawarra Trough. This is supported by drill intersection

data and also the analysis of magnetic data conducted by Meixner, et al (2000). Due to their radioactive mineral content these Carboniferous granites cause a high heat flow gradient in the overlying sediments resulting in different oil/gas maturity in the Patchawarra and Nappamerri troughs (discussed further below).

PEL's 104 and 111 are located to the west of the GMI trend and cover parts of the central Patchawarra Trough and the Patchawarra Shelf. The most significant unit of deposition within the Cooper Basin was the Lower Patchawarra Formation with over 900m of sediments deposited. Other Permian units are of much lesser thickness, the next thickest unit being the Toolachee Formation which attains just over 180m in thickness. So it is appropriate to relate tamework of PEL's 104 and 111 by describing the structural and tectonic elements of the top Patchawarra structure map (Enclosure 4). In simple terms the Patchawarra Trough near PEL 104/111 can be described as an asymmetric synclinal with its deep axis located near the faulted boundary with the structural and tectonic fr GMI trend. The axis of the syncline roughly coincides with a NE-SW trend through Spectre 1 and Toonman 1.

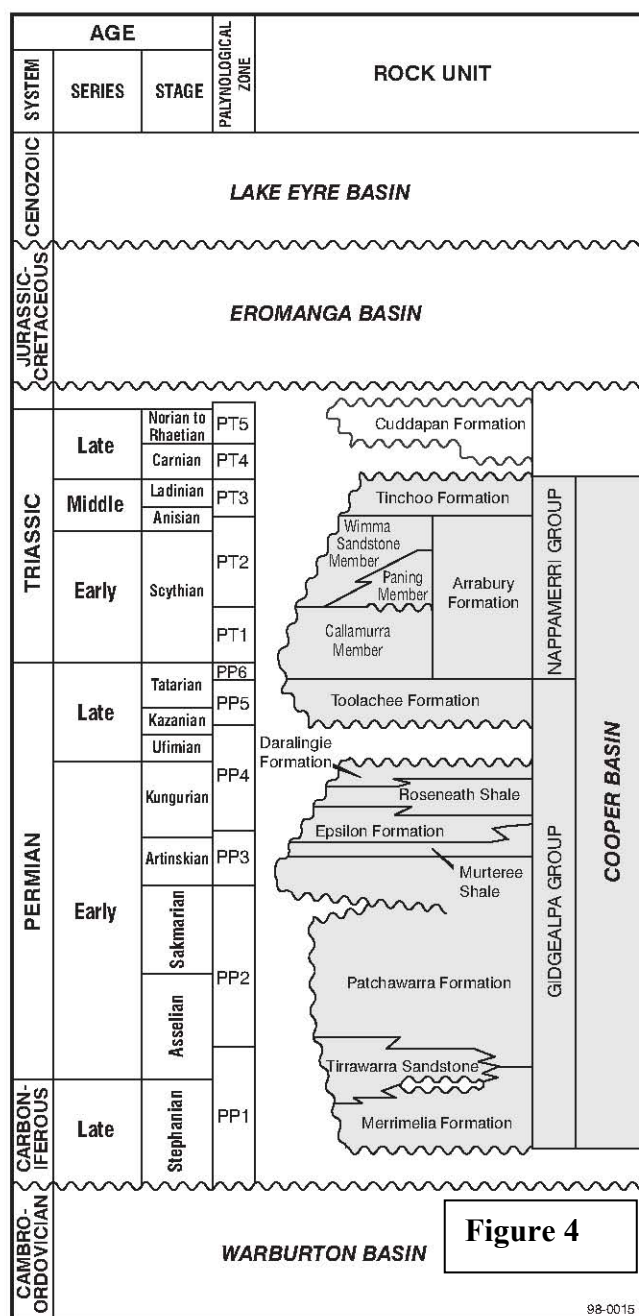


Fig. 6.1 Stratigraphic summary of the Cooper Basin, South Australia.

Within this trough are some anticlinal trends, the Tirrawarra - Moorari trend and the Fly Lake – Brolga trend. The Patchawarra Formation progressively onlaps and pinches out towards the basinal shelf margin to the north west, and this shelf is referred to as the Patchawarra Shelf.

It can be observed from Enclosure 4 that the Patchawarra Formation is becoming deeper to the north along the Spectre-Toonman axial trend. This is due to the increasing wedge of Triassic and Cretaceous sediments in that direction. However, Enclosure 5, a Patchawarra Formation isopach map, shows that there is an overall thinning of the Patchawarra in the same direction. Importantly from a source rock aspect there is thick Patchawarra Formation in a low referred to as the Spectre Low (or Spectre Kitchen) in close proximity to PEL's 104 and 111 (refer Enclosure 5).

4.3 Source Rocks

Based on numerous industry studies predominantly the coals, supplemented by the carboniferous shales, of the Patchawarra Formation have

been deemed the major source rock within the Cooper / Eromanga Basin. Coals of the Toolachee Formation may have generated hydrocarbons and should not be dismissed, however the great volume of hydrocarbons have been generated by the Patchawarra Formation.

On several of the enclosures (Enclosures 5, and 9 to 13) the regional 0.85, 1.1 and 2.00 vitrinite reflectance (Vr) contours have been superimposed. These Vr contours have the the following significance;

$V_r = 0.85$	beginning of the significant oil generation
$V_r = 1.10$	beginning of wet gas generation (oil/gas boundary)
$V_r = 2.00$	supermature / dry gas boundary

Empirical evidence from the Cooper Basin indicates that while hydrocarbons may commence generation below $V_r = 0.70$ they generally do not accumulate in commercial quantities until a maturity of $0.9 - 1.0 V_r$ (Heath (1989)).

On Enclosure 5 the thickest Patchawarra Formation depopods have been labeled as favourable source rock kitchens. Of particular relevance to PEL 104/111 is the “Spectre Kitchen” which contains up to 500m of oil generative Patchawarra Formation. This rich source rock kitchen is interpreted to have been the supply of the large Tirrawarra, Fly Lake, Brolga and Moorari oil fields and may have contributed to the Merrimelia oil field (possibly co-sourced from Tindilpie North Kitchen). Note, in further detail, the most favoured oil source rocks are considered to be both the VC coal and the shaley basal Patchawarra section beneath the thick VC coal. Most wells in this area intersect Patchawarra section which displays fluorescence and cut through this section and there are associated oil shows within the Tirrawarra Sandstone as well.

The source rock kitchens of Enclosure 5 only partly tell the generative story as do the regional V_r contours. Generation is not confined to the stipulated kitchens but it is felt that the great bulk of hydrocarbons will come from these kitchens. PEL’s 104 and 111 are adjacent to an adequate supply of mature oil generative rock.

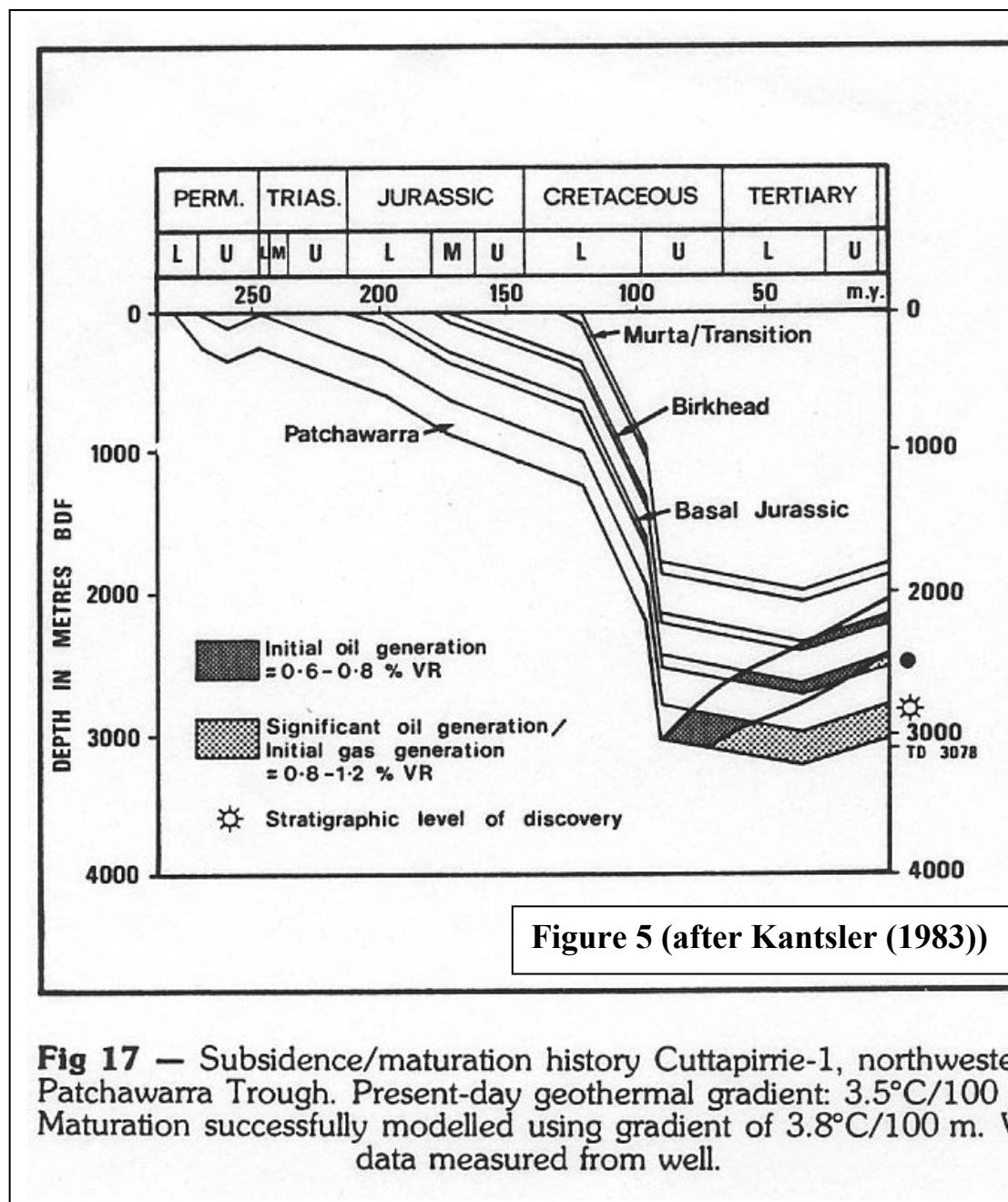
Two regional maps depicting the liquids richness (condensate and LPG) of Patchawarra Formation gas reservoirs were developed from Heath (1989). As liquids content adds great value in this wet gas province it is highly significant to economic valuation of drilling prospects (refer Enclosures 6 and 7). These liquid yield maps naturally reflect the above source rock discussion and also the differing geohistories of the Patchawarra Trough and the Nappamerri Trough as explained in the next section.

4.4 Timing of Hydrocarbon Generation

Maturation modeling studies show that most hydrocarbon generation followed rapid subsidence and sediment loading during the Cretaceous, particularly in the Upper Cretaceous with deposition of the Winton Formation (refer Figure 3).

Lopatin modeling of a key Nappamerri well, Big Lake well, and a key Patchawarra Trough well, Cuttapirrie 1, demonstrates that the source rocks are not generative until Upper Cretaceous loading (refer Figures 5 and 6 –after Kantsler (1983).

Figures 5 and 6 allow a further comparison between the Nappamerri and Patchawarra troughs. In the Nappamerri trough the Permian source rocks are oil generative for only a brief time and pass into a predominantly gas generative epoch. In the Patchawarra trough the Permian source rocks remain in the oil window for a longer time and the gas generative epoch is briefer with lesser volumes of gas generated.



This contrasts with the position of the Birkhead Formation between the two troughs. In the Nappamerri trough the Birkhead Formation is mature and oil generative during Upper Cretaceous (Winton) loading and remains in the oil window right through to the present day. In the Patchawarra trough the Birkhead Formation enters the oil window a good deal later in late Lower and Upper Tertiary times. From this we might deduce that Birkhead generated oil makes only a minor contribution in the Patchawarra trough but could be very significant in the Nappamerri trough. This is a significant issue to the interpretation of the geohistory of existing fields and towards prospectivity.

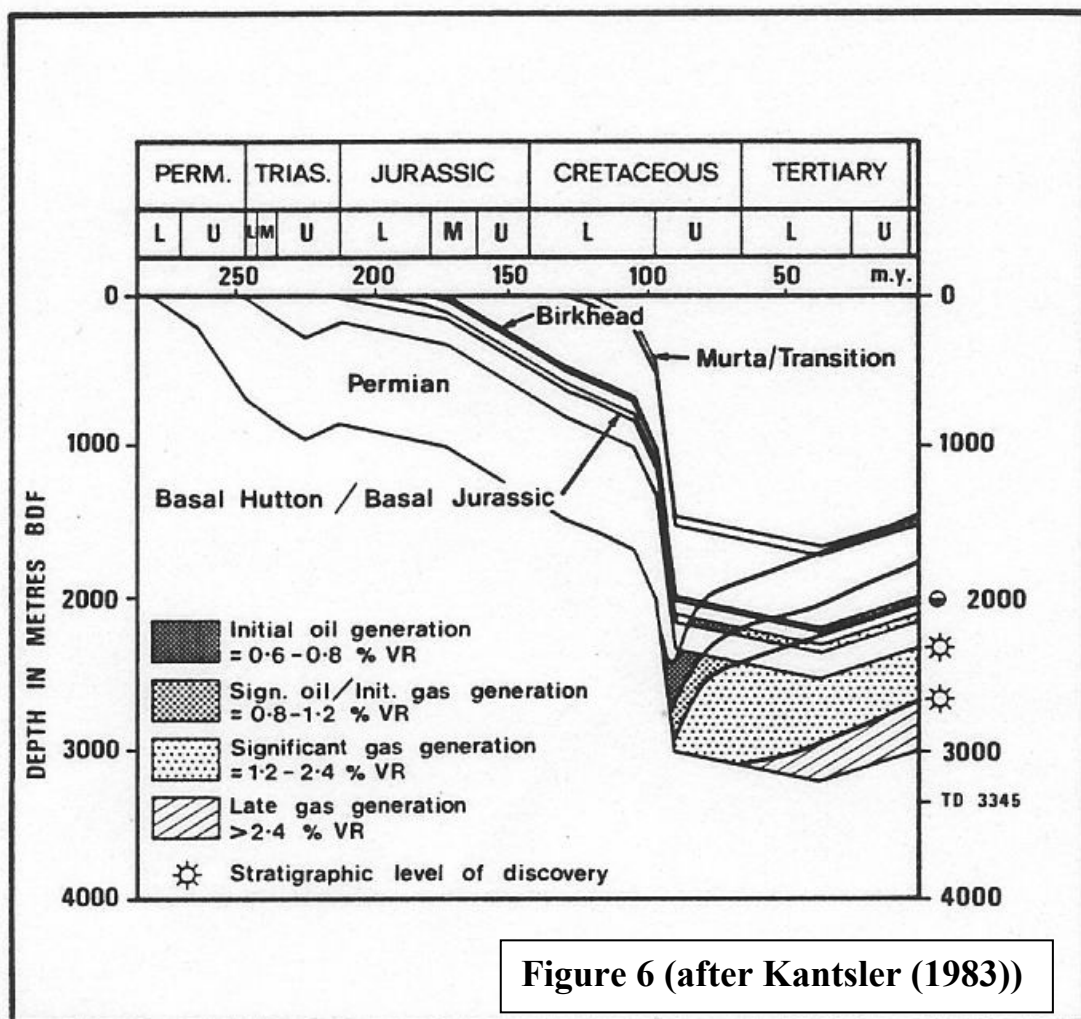


Fig. 16 — Subsidence/maturation history Big Lake area, southern Nappamerri Trough. Present-day geothermal gradient: 5.6°C/100 m. Maturation successfully modelled with “dog-leg” temperature gradients up to 7.0°C/100 m (see Lopatin (1971) and Waples (1980) for details of model technique). VR data measured from well.

4.5 Seals

Major regional seals exist within the basin which control the migration and trapping of hydrocarbons towards the basin margin. Within the Permian both the Roseneath Shale and the Murteree Shale act as regional seals. Above the Permian the Triassic Nappamerri Group provides a further regional seal. Further migration pathways may be provided by faults that penetrate these regional seals. In addition effective intra-formational seals are present within the Patchawarra Formation (Detailed chronostratigraphic work is required within PEL 104 and 111) to delineate these seals).

On Enclosure 8 , a zero edges map generated on well control only, it can be observed that the Roseneath Shale is absent from and does not play a part in PEL 104 / 111 prospectivity. The Murteree Shale zero edge is between Mingana 1 and Yarma 1 within PEL 104. Accordingly hydrocarbons may migrate from the Patchawarra Formation into younger units to the NW of this edge. The Nappamerri edge is just to the west of Yarma 1 and Darter 1 but to the east of the Patchawarra zero edge over PEL 104 and 111 which provides for a favourable migration fairway whereby Patchawarra sourced hydrocarbons can feed Jurassic reservoirs (refer Enclosure 8).

4.6 Detailed Stratigraphy

An objective of the Operator was to establish a working chronostratigraphy that is consistent with the stratigraphy that has already been established by the dominant Operator in the basin, Santos (refer Figures 3 & 4). There are many reasons for this philosophy. Firstly, the Santos chronostratigraphy has been developed using the complete Cooper Basin data base and a palynologist over the life of the exploration effort in the basin. Secondly, when conducting data review of the available open file well completion reports it is self evident that the “reason for drilling” section of these reports describes many of the drilling prospects in terms of that chronostratigraphy. So, review of past drilling results is enhanced through adopting a consistent stratigraphy.

Further, it was known that there are two important intra-formational unconformities within the Patchawarra Formation that are vital to understanding the possible stratigraphic plays within the Patchawarra. This review has used the Apak et al (1993) reference quite extensively as it described the partition of the Patchawarra Formation section into five units with (poorly well controlled only) zero edges. The Apak maps were drafted at a common presentation scale in order to put them in the context of PEL 111 and PEL 104 (refer Enclosures 9 to 13). The stratigraphic and palynostratigraphic control of these five units within the Apak report is represented in Figure 7. The Cowralli 1 log contained in Figure 7 is treated as the type log for these Patchawarra Formation units. Reference to Enclosure 5 shows that Cowralli 1 is drilled in the Tindilpie North Kitchen of the Patchawarra Trough and is therefore a good well to use as a type well.

It became possible to relate the Apak five unit subdivision to a colour-coded description of units used by Santos, that again is mentioned throughout numerous Well Completion Reports. Namely from top to bottom of Patchawarra Formation;

Apak Units	Santos Units
Unit 1	Brown Unit
Unit 2	Yellow Unit
Unit 3	Blue Unit
Unit 4	Red Unit
Unit 5	Green Unit

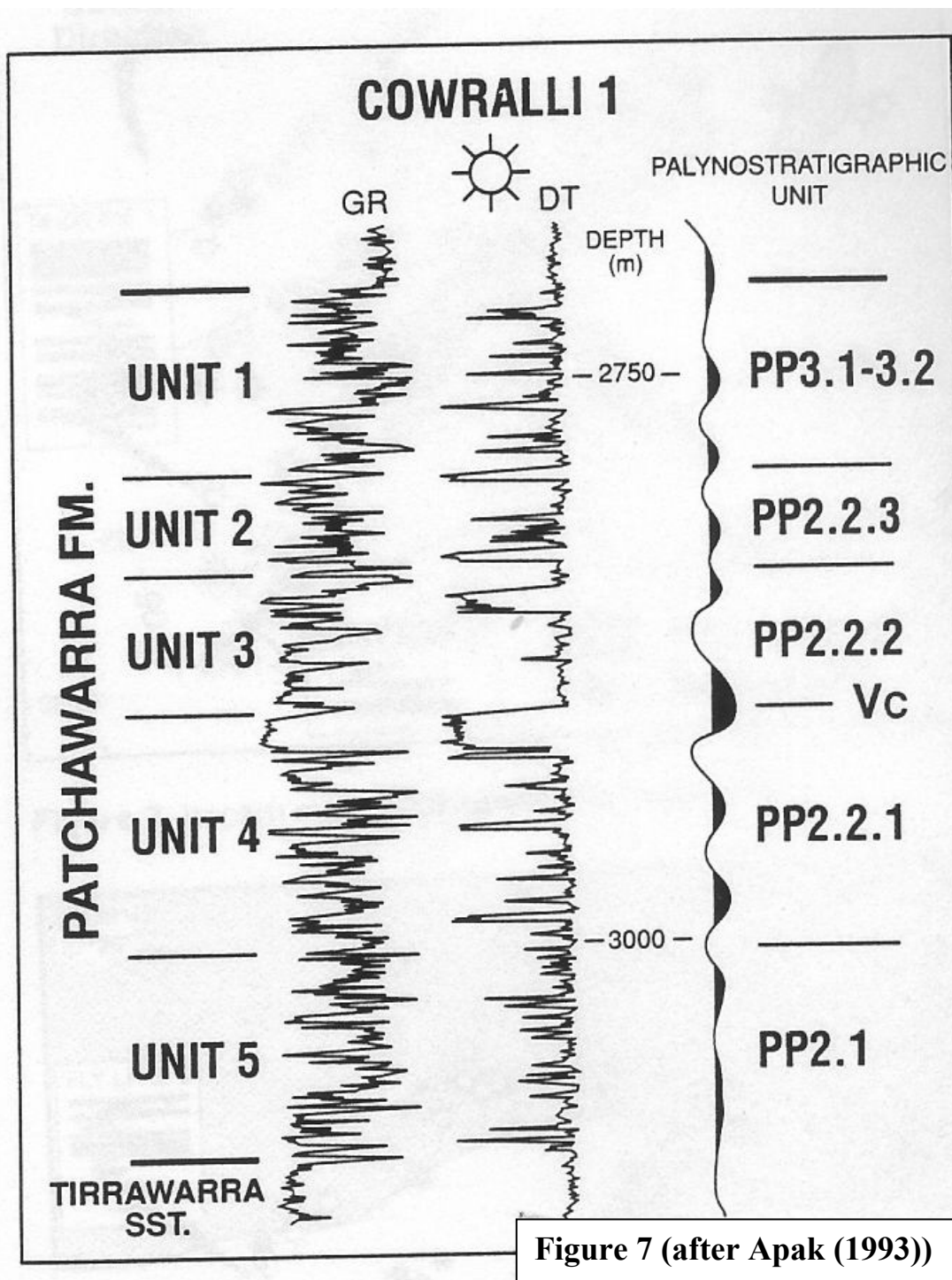


Figure 5. Chronostratigraphic subdivision of the Patchawarra Formation at Cowralli-1.

It can be seen from figure 7 that the key chronostratigraphic markers that define these five units are:

- the VU75 – referred to as the Lower Patchawarra unconformity, this separates the green from the red unit
- the VC coal marker – the thick coal particularly well developed in this area, this separates the red from the blue unit

- the VU45 - referred to as the Upper Patchawarra unconformity, this separates the yellow from the blue unit
- the VC30 – a maximum flooding surface sometimes associated with a thin coal (the V6 coal), this separates the brown from the yellow unit

Further chronostratigraphic detail was then added within this framework on the selection of maximum flooding surfaces (high gamma ray picks) (refer Enclosure 14).

This high resolution chronostratigraphy was then carried into the PEL 104 / PEL 111 acreage by constructing two regional cross-sections (Enclosures 15 and 16).

Important observations to be made on these cross-sections are:

- the pinch out of the blue unit between Gooranie 1 and Tirrawarra 40
- the pinch out of the green unit between Tirrawarra 40 and Brolga 3
- the pinch out of the yellow unit between Brolga 3 and Darter 1
- the pinch out of the yellow unit between Tirrawarra 40 and Pelican 5
- onlap and/or angular unconformity truncation of the red and brown units by the Daralingie unconformity between Darter 1 and Yanta 1
- Onlap and/or angular unconformity truncation of the green and red units on the flank of the GMI high (*important observation but does not contribute to PEL 104/111 prospectivity*).

So this preliminary work has established the control and framework for the detailed chronostratigraphic correlation studies that must be conducted in order to assess the Patchawarra stratigraphic play opportunities within PEL 104/111. Based on these two regional cross-sections and the Apak unit maps (Enclosures 9 to 13) the expected location of the various Patchawarra stratigraphic plays are forecast on Enclosure 17 (These will be further discussed below).

4.7 Reservoirs

The lithostratigraphy of the Cooper/Eromanga Basin has been adequately defined by many authors and it is not the place of this report to try and repeat these works. What follows are brief comments on the reservoirs believed to be pertinent to the assessment of plays and prospectivity, the main purpose of this report.

4.7.1 Merrimelia Aeolian Facies

An aeolian facies, presumed to be Merrimelia Formation age equivalent, has been discovered and developed, partly with high angle wells, in the Pondrinie Field. When discovered this was a totally new facies in the Cooper Basin with excellent poro-perm attributes and therefore high productivity. The following is quoted verbatim from the Pondrinie 13 WCR, *“The aeolian facies of the Merrimelia Formation carries the highest booked reserves for the field and produces at the highest rate (initial production rates exceeding 25MMscfd), and has been penetrated by three wells: Pondrinie 5, 6, and 8. These wells encountered 482’, 386’ and 528’ respectively of high net: gross sandstone. The wells contain 180’, 139’ and 189’ of net gas pay respectively to the GWC at -7092”.*

Three high angle production wells were subsequently successfully drilled on this reservoir. The Operator, Santos, differentiated four units a,b,c,d within the Merrimelia and subsequently referred to the unit as the “Tirramelia” because of its uncertain age and as it had affinities with both the Tirrawarra and Merrimelia Formations. The same, or at least equivalent, aeolian facies has also been recognized near the Merrimelia field which is over 60km SW of the Pondrinie field.

There is no evidence that such a facies exists within the Merrimelia Formation in proximity to PEL 104/111 but it is mentioned here as it illustrates:

- (a) Unknown prospectivity – presumptions on reservoir quality can be quite false particularly when based on a limited well density.
- (b) That the Cooper Basin is still capable of producing new reservoir and stratigraphy.
- (c) The Merrimelia Formation has been classically considered of consisting of fluvio-glacial outwash plain facies.
- (d) Lithotypes within the known formational sub-division are probably a lot more complex than we sometimes simplistically describe for reasons of convenience.
- (e) More detailed reflection on sedimentary facies through examination of cores and cuttings may pay dividends. However, such studies need to be well focused .

On a cursory examination of a limited number of WCR’s in the vicinity of PEL 104/111, there a number of hydrocarbon shows within the Merrimelia Formation (this is only a lead at present and needs more detailed review).

4.7.2 Tirrawarra Sandstone

The Tirrawarra Sandstone is a relatively clean, quartzose massive sandstone interpreted to be deposited in a braided stream regime. Or at least that is the classic interpretation due to its blocky gamma ray character. However Seggie, et al describe it as follows on the evidence of close drilling on the Tirrawarra Field : “ *The reservoir is interpreted to have been deposited as a braid delta, which has been reworked by a lacustrine shoreface transgressing and regressing across the area in response to rapid and frequent changes in lake level*”.

Another example of the comments made in the preceding section.

The importance of the Tirrawarra Sandstone in adjacent fields to PEL 104/111 from a reserves aspect was discussed in Section 3. This review has concentrated on the Patchawarra Formation but the Tirrawarra Sandstone is one of the favoured reservoir targets within PEL 104/111.

4.7.3 Patchawarra Formation

Sands of reservoir quality exist in all five of the main chronostratigraphic units of the Patchawarra Formation that have been described in Section 4.6.

It can be inferred from Enclosure 18 after Heath (1989) that the Patchawarra reservoir porosity decrease is strongly depth related. In the deepest portions of the Nappamerri and Patchawarra troughs porosity is of the order of 7% to 9%. However of importance to PEL's 104 and 111 porosities of 13% to 15% are attained over the Patchawarra Shelf towards the basin margin. This is excellent from a hydrocarbon storage capacity aspect but does not necessarily relate to reservoir permeability. Permeability has a multitude of variables and cannot be mapped as simple regional trends. *Ipsa facto* the regional porosity map cannot be used to predict permeability as there is a complex relationship between porosity and permeability.

In the limited well completion reports examined to date in this review there are numerous references to poor and tight reservoirs both within the Patchawarra and the Tirrawarra formations. More detailed work needs to be conducted on reservoir quality in relation to these two primary targets (refer Section B).

4.7.4 Other Formations

Secondary reservoir targets, Epsilon, Toolachee, Triassic and Jurassic formational units, exist of course but they are not discussed in this review which concentrates on the primary Permian prospectivity.

4.8 Plays

The principal play within PEL's 104 and 111 is considered to be stratigraphically trapped Patchawarra and Tirrawarra oil and liquids rich gas. As was related in Section 4.6, this preliminary review has identified the likely Patchawarra stratigraphic plays and their likely location within the permits (refer Enclosure 17). These stratigraphic plays will involve both onlap and unconformity plays. Anticlinal and fault structural plays also exist but the larger plays will be stratigraphic.

This review has concentrated on the definition and development of the Patchawarra stratigraphic plays. Little attention has been paid to the Tirrawarra play to date. This is a time issue not through any lack of potential or belief in the play.

A Jurassic oil play exists on the flank of the Cooper Basin. A petroleum system model is conceived whereby the Patchawarra sourced oil migrates from the Spectre-Toonman source kitchen through carrier beds, the Tirrawarra Sandstone being favored, towards the basin margins. At the basin margin there is an angular unconformity across which Jurassic Eromanga Basin sediments overlie the truncated Permian (in particular Tirrawarra Sandstone but also favoured Patchawarra Formation sands) carrier beds. Oil is then free to migrate into reservoir/seal pairs in Jurassic traps. The stratigraphic cross-sections, Enclosures 19 and 20, illustrate the principles of the Jurassic play.

Triassic plays akin to those that resulted in the Triassic oil fields on the Deramooka Platform may also exist in the acreage. Further studies are required to define the potential of the Triassic.

Other plays that may provide upside to the PEL 104/111 acreage are:

- Merrimelia Formation stratigraphic play. This was discussed above in Section 4.7.1. The Merrimelia Aeolian facies is the best reservoir in terms of reservoir quality, thickness and average porosity that has been discovered in the entire Cooper Basin to date. Pondrinie 8 for instance has an average log porosity of 17.8% and flowed gas at a rate of 8.7MMcfd from a net pay column of 55.8m (refer Figure 8).
- Basement play. With Merrimelia, Tirrawarra and Patchawarra petroleum source and carrier beds onlapping onto basement rocks of the Patchawarra Shelf fractured and weathered basement plays may exist within the Warburton Basin sequence. Taylor, et al (1991) discuss this play and there are other references within PIRSA's Petroleum Geology of South Australia – Volume 4 Cooper Basin.
- Tight oil and/or gas stratigraphically entrapped in any of the Merrimelia, Tirrawarra and Patchawarra formations that may be produced through fracture stimulation.

4.9 Discussion Tirrawarra Oil Field

The following is a brief summary of some aspects of the Tirrawarra oil field gleaned from Yew et al (2989) and Seggie et al (1994). Further literature review would assist in understanding the field and therefore the likely nature of Tirrawarra prospects within PEL 104/111.

The main oil reservoir is 27.4 to 54.9 m thick and comprises the Tirrawarra Sandstone, the uppermost Merrimelia Formation and the basal Patchawarra Formation. The field was discovered in 1970. Tirrawarra 1 intersected liquids rich gas in several Patchawarra sandstones and oil in the Tirrawarra. The Tirrawarra Sandstone in Tirrawarra 1 tested only gas on open hole test. Subsequent production tests over several intervals flowed oil at rates of up to 650 bopd.

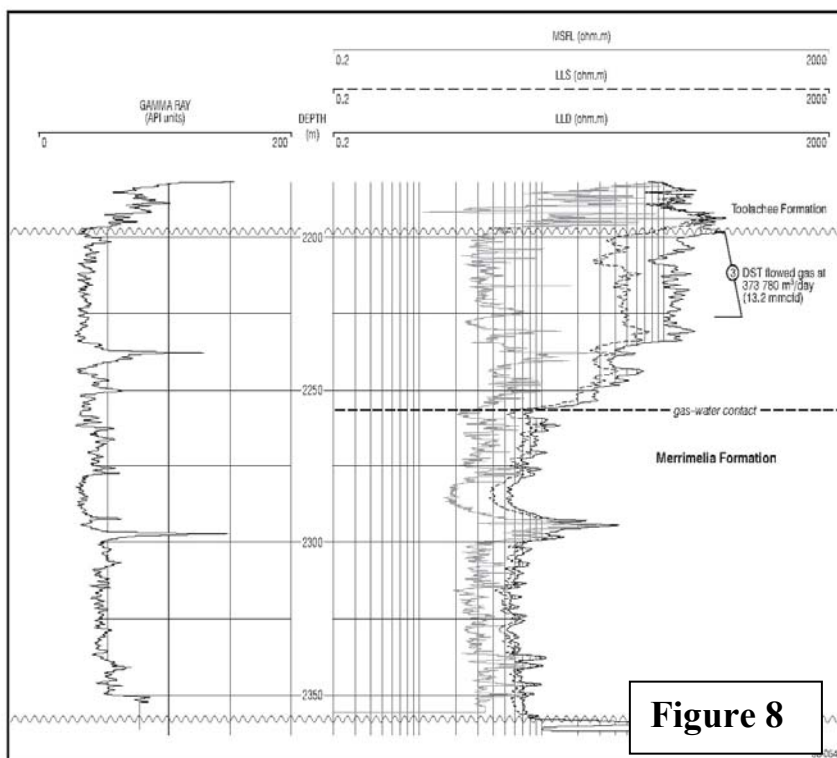


Fig. 6.14 Wireline logs of the Merrimelia Formation illustrating the low gamma ray values of the aeolianite facies, Pondrinie 8.

The field commenced oil production in 1983 at an initial rate of 4500 bopd from 8 producers and in December 1988 was producing at 5720 bopd from 31 Tirrawarra oil completions supported by 5 injectors (Yew). By 1994 there were 49 Tirrawarra completions (Seggie). “Early reviews and production trends indicated a low recovery without some method of enhanced recovery. Laboratory and screening studies indicated that a miscible flood would be effective so a pilot seven- spot pattern was started in 1984 using separator gas. After production decline was largely arrested, seven more patterns were added from late 1984 to 1992 and injection of ethane, piped from the Moomba plant, commenced in 1987. The Tirrawarra Field (and the nearby Moorari Field) remains the only commercial scale EOR project in Australia. Recent analysis of individual patterns has indicated a high recovery in the good productivity areas (up to 50%). Other patterns, while less mature, appear not to be performing as well. Outside the flood patterns, recovery to date is quite low (about 3%) and expansion of the flood or other options need to be considered to improve recovery (Seggie).”

Tirrawarra reservoirs are characterized by relatively low porosities, 9% to 12% and low permeabilities in the range 0.1 to 15 mD (in situ). This results in low productivity in the range 25 to 600 bopd. The oil is highly volatile, 51⁰ API gravity at 60⁰ F with solution GOR of 2700 SCF / STB. Reservoir drive is mainly by solution gas drive with little water support.

These reservoir and production characteristics have necessitated the drilling of relatively closely spaced wells (average drainage per well in the Tirrawarra field is approximately 195 acres). Fracture stimulation enhances production and oil recovery is maximized through gas injection to maintain reservoir pressure (as described above). The problem of low flow rate due to poor reservoir quality is common in many of the surrounding Tirrawarra Sandstone reservoirs such as at Kudrieke, Fly Lake, Brolga, Moorari and Kanowana fields.

However, the thickness of the Tirrawarra Sandstone (generally 15 to 46m) and the potentially thick gross oil columns of between 32 to 163m (from crest to OWC) suggests the possibility that large volumes of oil may be discovered. Also because of its thickness the Tirrawarra Sandstone is suitable for fracture stimulation.

5. GEOPHYSICS

5.1 Seismic Mapping

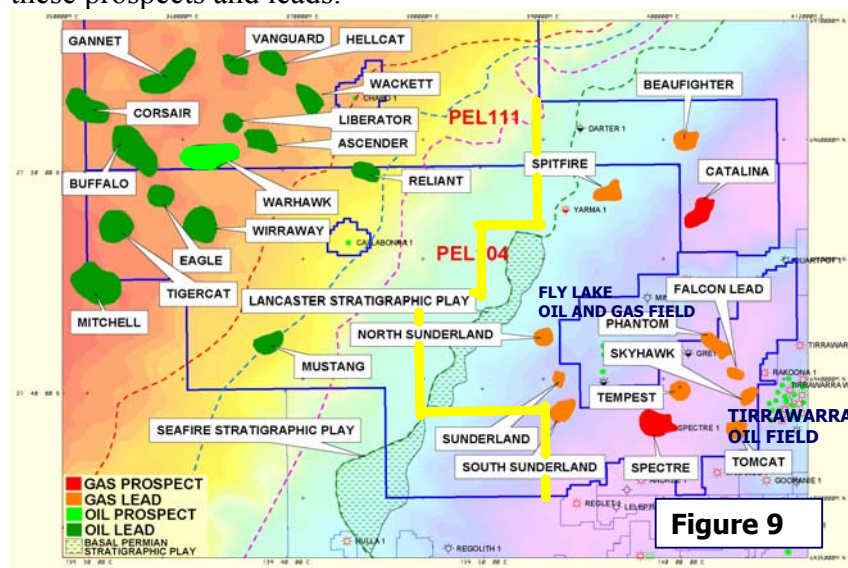
Preliminary regional seismic mapping has been completed by Consultant Mike Swift on behalf of the Joint Venture. This mapping has to be revisited once the regional chronostratigraphic correlations have been completed by the geologist so that the mapping of possible stratigraphic prospects may be pursued. The seismic base map, Enclosure 21, shows a moderate density of seismic exists within the Patchawarra trough which becomes more sparse towards the basin margin.

5.2 Spectral Attenuation Results

Some limited spectral attenuation work has been carried out within PEL 104/111. A spectral anomaly has been detected which supports the Catalina Prospect (tabled at the August, 2004 JV meeting).

6. PROSPECTS AND LEADS

Table 4 gives the oil and gas reserve estimates for the PEL 104/111 prospects and leads. These are indicative only and are continually being reviewed and will change over time as our understanding and ideas mature. Figure 9 presents the location of these prospects and leads.



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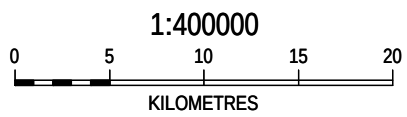
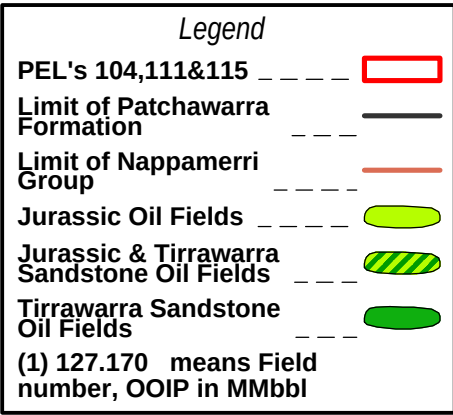
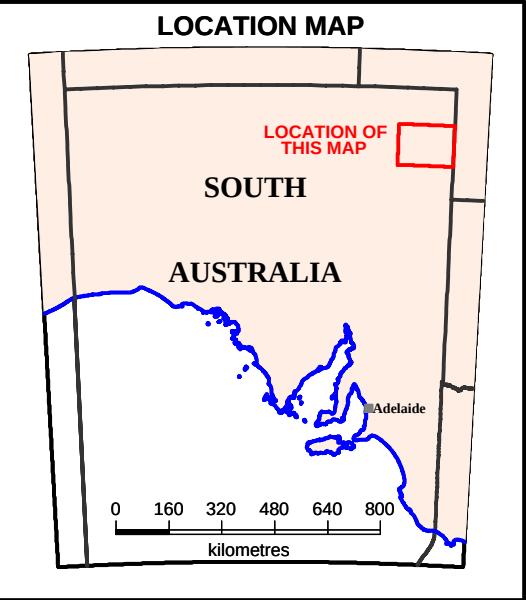
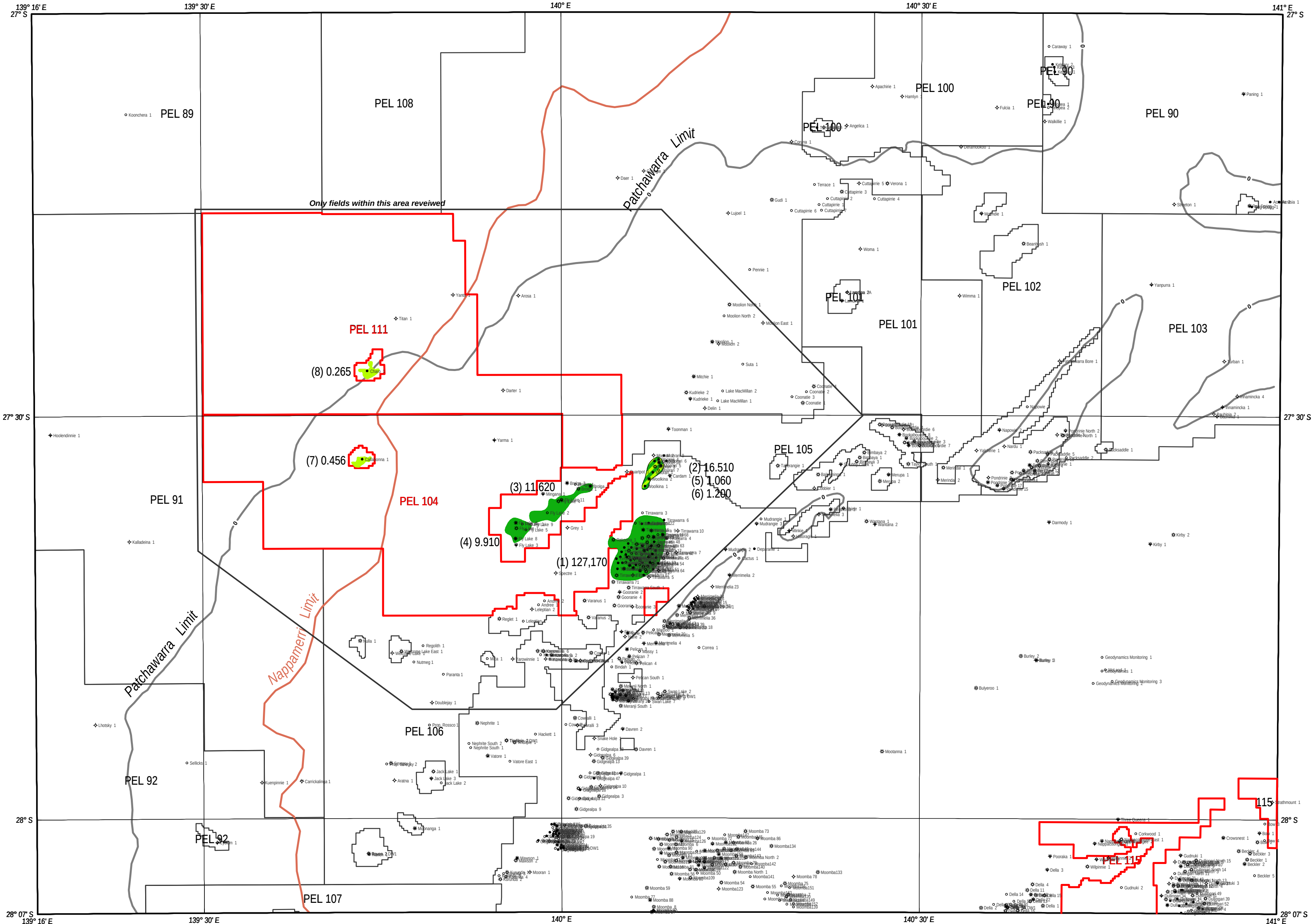
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TABLE 4 PEL104/111 - PROSPECTS AND LEADS - Oil and Gas Estimates																																					
Apr-04				2.5%				Low = 20% less than most likely (size and pay) High= 20% more than most likely (size and pay)																2.5% of closure for Hutton and Tirrawarra plays													
Name	Permit /Area	Prospect or Lead	Target Reservoir	Size (hec)			Net Pay (m)			Oil/Gas Sat (%)			Porosity (%)			Exp Factor			Rec (%)			Geometric Corr			Bbls/mmcft			Recoverable Gas			Recoverable Oil			High			
				Low	Best	High	Low	Best	High	Low	Best	High	Low	Best	High	Low	Best	High	Low	Best	High	Low	Best	High	Low	Best	High	Low	Best	High	Low	Best	High				
Oil Prospects - Assumes Permian in SW areas of PEL 115 are oil prone																																					
Reliant	PEL 104	Lead	Hutton/Poolawanna	237	296	355	5.9	7.4	8.9	60%	65%	70%	14%	18%	20%	1.2	1.15	1.1	30%	40%	45%	30%	35%	40%									0.56	1.57	3.79		
Mustang	PEL 104	Lead	Hutton/Poolawanna	272	340	408	6.8	8.5	10.2	60%	65%	70%	14%	18%	20%	1.2	1.15	1.1	30%	40%	45%	30%	35%	40%									0.73	2.59	5.99		
Mitchell	PEL 104	Lead	Hutton/Poolawanna	834	1042	1260	20.8	26.1	31.3	60%	65%	70%	14%	18%	20%	1.2	1.15	1.1	30%	40%	45%	30%	35%	40%									6.88	24.31	56.30		
Tigercat	PEL 104	Lead	Hutton/Poolawanna	486	608	730	12.2	15.2	18.2	60%	65%	70%	14%	18%	20%	1.2	1.15	1.1	30%	40%	45%	30%	35%	40%									2.34	8.28	19.17		
Wirraway	PEL 104	Prospect	Hutton/Poolawanna	614	768	922	15.4	19.2	23.0	60%	65%	70%	14%	18%	20%	1.2	1.15	1.1	30%	40%	45%	30%	35%	40%									3.74	13.21	30.59		
Eagle	PEL 104	Lead	Hutton/Poolawanna	268	335	402	6.7	8.4	10.1	60%	65%	70%	14%	18%	20%	1.2	1.15	1.1	30%	40%	45%	30%	35%	40%									0.71	2.51	5.82		
Buffalo	PEL 111	Lead	Hutton/Poolawanna	798	998	1198	20.0	25.0	29.9	60%	65%	70%	14%	18%	20%	1.2	1.15	1.1	30%	40%	45%	30%	35%	40%									6.31	22.30	51.65		
Corsair	PEL 111	Lead	Hutton/Poolawanna	553	691	829	13.8	17.3	20.7	60%	65%	70%	14%	18%	20%	1.2	1.15	1.1	30%	40%	45%	30%	35%	40%									3.03	10.69	24.76		
Gannet	PEL 111	Lead	Hutton/Poolawanna	699	874	1049	17.5	21.9	26.2	60%	65%	70%	14%	18%	20%	1.2	1.15	1.1	30%	40%	45%	30%	35%	40%									4.84	17.10	39.61		
Vanguard	PEL 111	Lead	Hutton/Poolawanna	221	276	331	5.5	6.9	8.3	60%	65%	70%	14%	18%	20%	1.2	1.15	1.1	30%	40%	45%	30%	35%	40%									0.48	1.71	3.95		
Helicat	PEL 111	Lead	Hutton/Poolawanna	290	362	434	7.2	9.1	10.9	60%	65%	70%	14%	18%	20%	1.2	1.15	1.1	30%	40%	45%	30%	35%	40%									0.83	2.93	6.80		
Wackett	PEL 111	Lead	Hutton/Poolawanna	292	365	438	7.3	9.1	11.0	60%	65%	70%	14%	18%	20%	1.2	1.15	1.1	30%	40%	45%	30%	35%	40%									0.84	2.98	6.91		
Liberator	PEL 111	Lead	Hutton/Poolawanna	163	204	245	4.1	5.1	6.1	60%	65%	70%	14%	18%	20%	1.2	1.15	1.1	30%	40%	45%	30%	35%	40%									0.26	0.93	2.16		
Ascender	PEL 111	Lead	Hutton/Poolawanna	320	400	480	8.0	10.0	12.0	60%	65%	70%	14%	18%	20%	1.2	1.15	1.1	30%	40%	45%	30%	35%	40%									1.01	3.58	8.30		
Warhawk	PEL 111	Prospect	Hutton/Poolawanna	568	710	852	14.2	17.8	21.3	60%	65%	70%	14%	18%	20%	1.2	1.15	1.1	30%	40%	45%	30%	35%	40%									3.20	11.29	26.14		
Catalina	PEL 111	Prospect	Tirrawarra	414	517	620	10.3	12.9	15.5	60%	65%	70%	10%	12%	14%	1.2	1.152	1.1	30%	40%	42%	30%	35%	40%									1.21	3.98	9.06		
Spectre	PEL 104	Prospect	Tirrawarra	250	312	374	6.2	7.8	9.4	60%	65%	70%	10%	12%	14%	1.2	1.152	1.1	30%	40%	42%	30%	35%	40%									0.44	1.45	3.30		
Tempest	PEL 104	Lead	Tirrawarra	114	142	170	2.8	3.6	4.3	60%	65%	70%	10%	12%	14%	1.2	1.152	1.1	30%	40%	42%	30%	35%	40%									0.09	0.30	0.68		
Tomcat	PEL 104	Lead	Tirrawarra	90	112	134	2.2	2.8	3.4	60%	65%	70%	10%	12%	14%	1.2	1.152	1.1	30%	40%	42%	30%	35%	40%									0.06	0.19	0.42		
Phantom	PEL 104	Lead	Tirrawarra	262	328	394	6.6	8.2	9.8	60%	65%	70%	10%	12%	14%	1.2	1.152	1.1	30%	40%	42%	30%	35%	40%									0.49	1.60	3.64		
Skyhawk	PEL 104	Lead	Tirrawarra	129	161	193	3.2	4.0	4.8	60%	65%	70%	10%	12%	14%	1.2	1.152	1.1	30%	40%	42%	30%	35%	40%									0.12	0.39	0.88		
Beaufighter	PEL 111	Lead	Tirrawarra	90	112	134	2.2	2.8	3.4	60%	65%	70%	10%	12%	14%	1.2	1.152	1.1	30%	40%	42%	30%	35%	40%									0.06	0.19	0.42		
Spitfire	PEL 104	Lead	Tirrawarra	236	295	354	5.9	7.4	8.9	60%	65%	70%	10%	12%	14%	1.2	1.152	1.1	30%	40%	42%	30%	35%	40%									0.39	1.30	2.95		
North Sunderland	PEL 104	Lead	Tirrawarra	158	197	236	3.9	4.9	5.9	60%	65%	70%	10%	12%	14%	1.2	1.152	1.1	30%	40%	42%	30%	35%	40%									0.18	0.58	1.31		
Sunderland	PEL 104	Lead	Tirrawarra	83	104	125	2.1	2.6	3.1	60%	65%	70%	10%	12%	14%	1.2	1.152	1.1	30%	40%	42%	30%	35%	40%									0.05	0.16	0.37		
South Sunderland	PEL 104	Lead	Tirrawarra	170	213	256	4.3	5.3	6.4	60%	65%	70%	10%	12%	14%	1.2	1.152	1.1	30%	40%	42%	30%	35%	40%									0.21	0.68	1.54		
Falcon	PEL 104	Lead	Tirrawarra	94	118	142	2.4	3.0	3.5	60%	65%	70%	10%	12%	14%	1.2	1.152	1.1	30%	40%	42%	30%	35%	40%									0.06	0.21	0.47		
Recoverable Oil Potential Totals																																					
Gas and Petroleum Liquids Prospects																																					
Catalina	PEL 111M	Prospect	Patchawarra	414	517	620	12	15	18	60%	65%	70%	11%	12%	14%	250	260	280	65%	70%	75%	60%	65%	70%	20	30	40	11.3	25.3	56.8	0.2	0.8	2.3				
Spectre	PEL 104M	Prospect	Patchawarra	250	312	374	12	15	18	60%	65%	70%	11%	12%	14%	250	260	280	65%	70%	75%	60%	65%	70%	20	30	40	6.8	15.2	34.3	0.1	0.5	1.4				
Tempest	PEL 104M	Lead	Patchawarra	114	142	170	12	15	18	60%	65%	70%	11%	12%	14%	250	260	280	65%	70%	75%	60%	65%	70%	20	30	40	3.1	6.9	15.6	0.1	0.2	0.6				
Tomcat	PEL 104M	Lead	Patchawarra	90	112	134	12	15	18	60%	65%	70%	11%	12%	14%	250	260	280	65%	70%	75%	60%	65%	70%	20	30	40	2.4	5.5	12.3	0.0	0.2	0.5				
Phantom	PEL 104M	Lead	Patchawarra	262	328	394	12	15	18	60%	65%	70%	11%	12%	14%	250	260	280	65%	70%	75%	60%	65%	70%	20	30	40	7.2	16.0	36.0	0.1	0.5	1.4				
Skyhawk	PEL 104M	Lead	Patchawarra	129	161	193	12	15	18	60%	65%	70%	11%	12%	14%	250	260	280	65%	70%	75%	60%	65%	70%	20	30	40	3.5	7.9	17.7	0.1	0.2	0.7				
Beaufighter	PEL 111M	Lead	Patchawarra	90	112	134	12	15	18	60%	65%	70%	11%	12%	14%	250	260	280	65%	70%	75%	60%	65%	70%	20	30	40	2.4	5.5	12.3	0.0	0.2	0.5				
Spitfire	PEL 104M	Lead	Patchawarra	236	295	354	12	15	18	60%	65%	70%	11%	12%	14%	250	260	280	65%	70%	75%	60%	65%	70%	20	30	40	6.4	14.4	32.4	0.1	0.4	1.3				
North Sunderland	PEL 104M	Lead	Patchawarra	158	197	236	12	15	18	60%	65%	70%	11%	12%	14%	250	260	280	65%	70%	75%	60%	65%	70%	20	30	40	4.3	9.6	21.6	0.1	0.3	0.9				
Sunderland	PEL 104M	Lead	Patchawarra	83	104	125	12	15	18	60%	65%	70%	11%	12%	14%	250	260	280	65%	70%	75%	60%	65%	70%	20	30	40	2.3	5.1	11.4	0.0	0.2	0.5				
South Sunderland	PEL 104M	Lead	Patchawarra	170	213	256	12	15	18	60%	65%	70%	11%	12%	14%	250	260	280	65%	70%	75%	60%	65%	70%	20	30	40	4.6	10.4	23.4	0.1	0.3	0.9				
Falcon	PEL 104M	Lead	Patchawarra	94	118	142	12	15	18	60%	65%	70%	11%	12%	14%	250	260	280	65%	70%	75%	60%	65%	70%	20	30	40	2.6	5.8	13.0	0.1	0.2	0.5				
Recoverable Gas and Liquids Potential Totals																																					

PEL 104 & 111

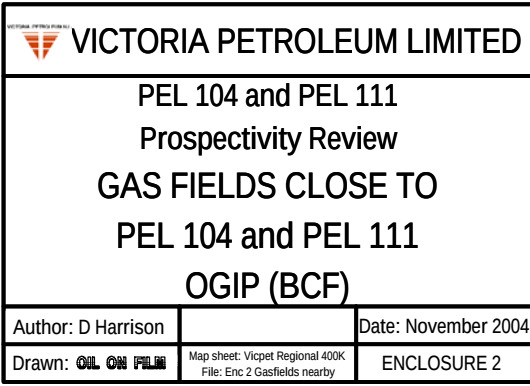
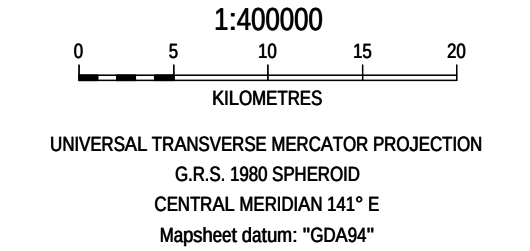
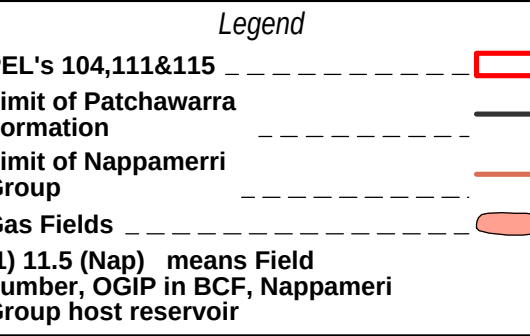
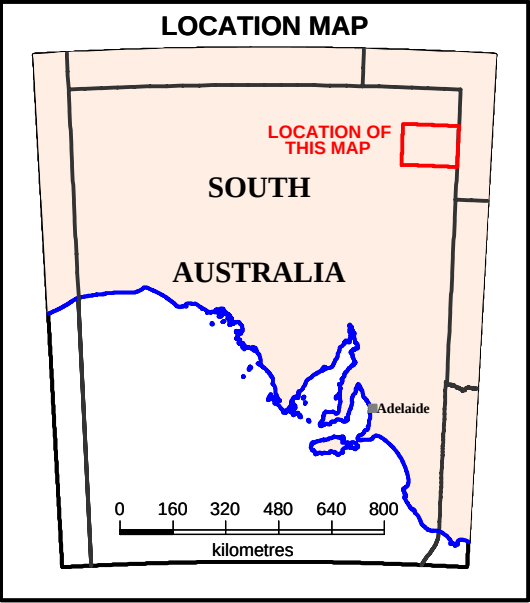
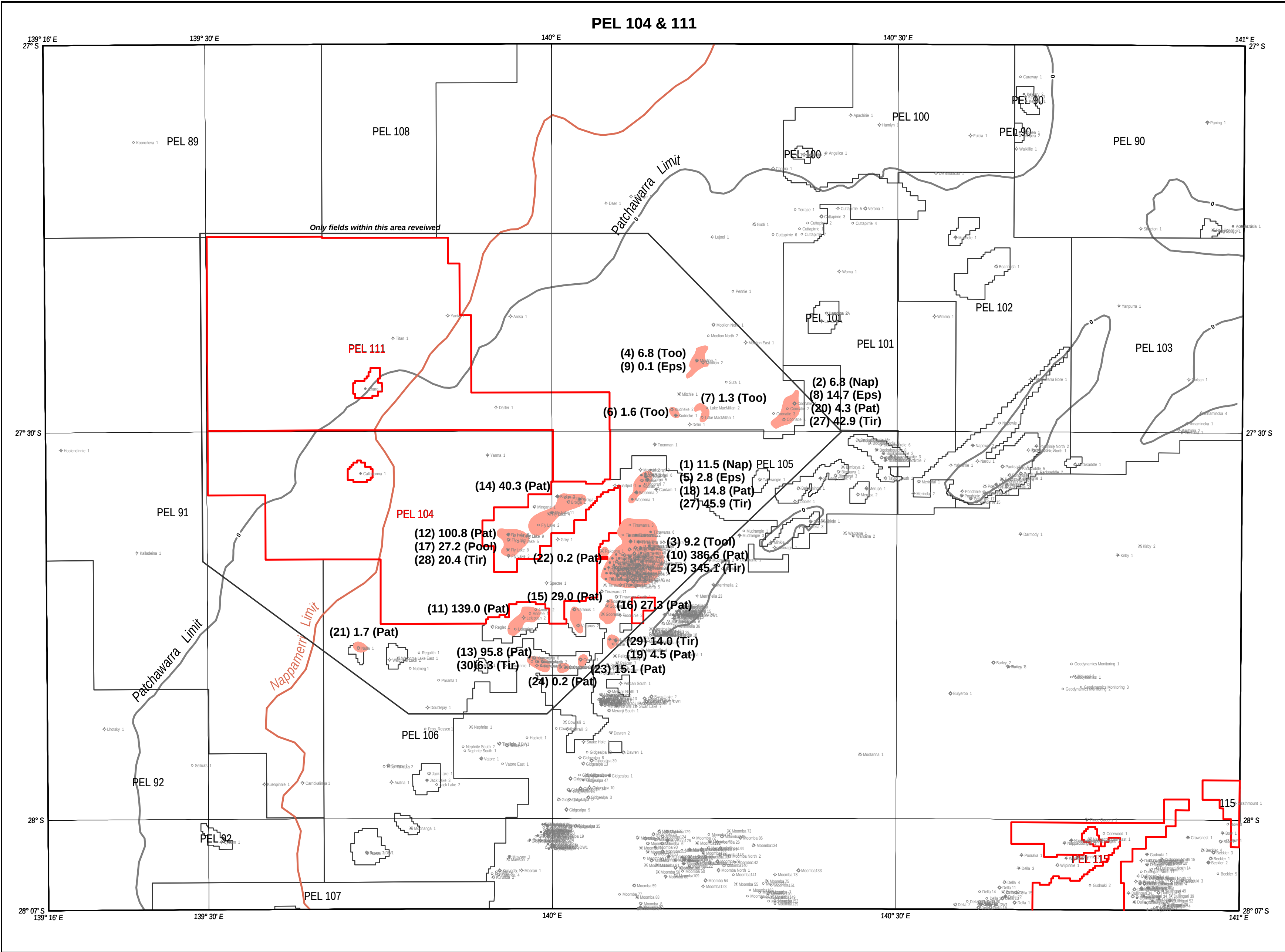


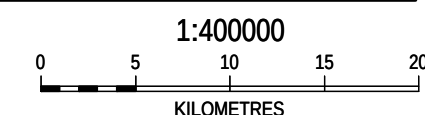
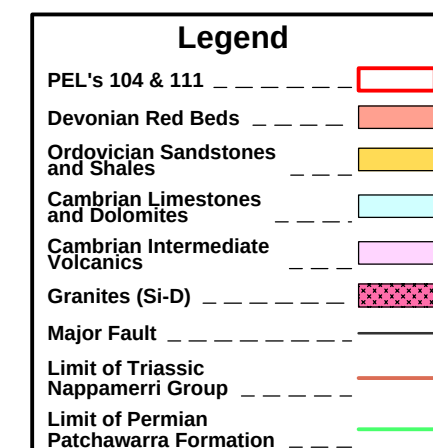
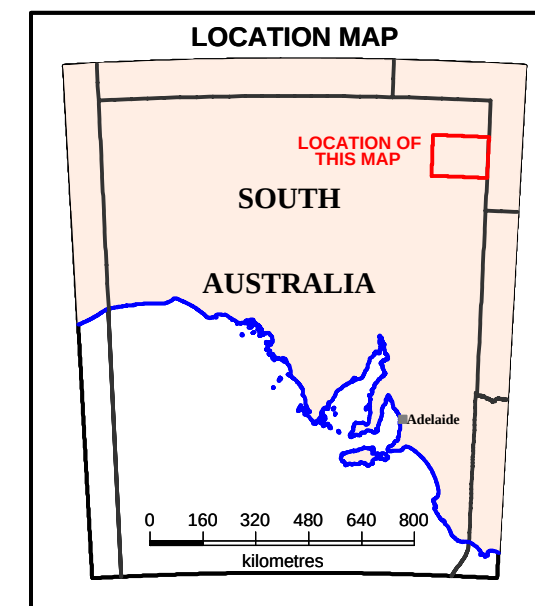
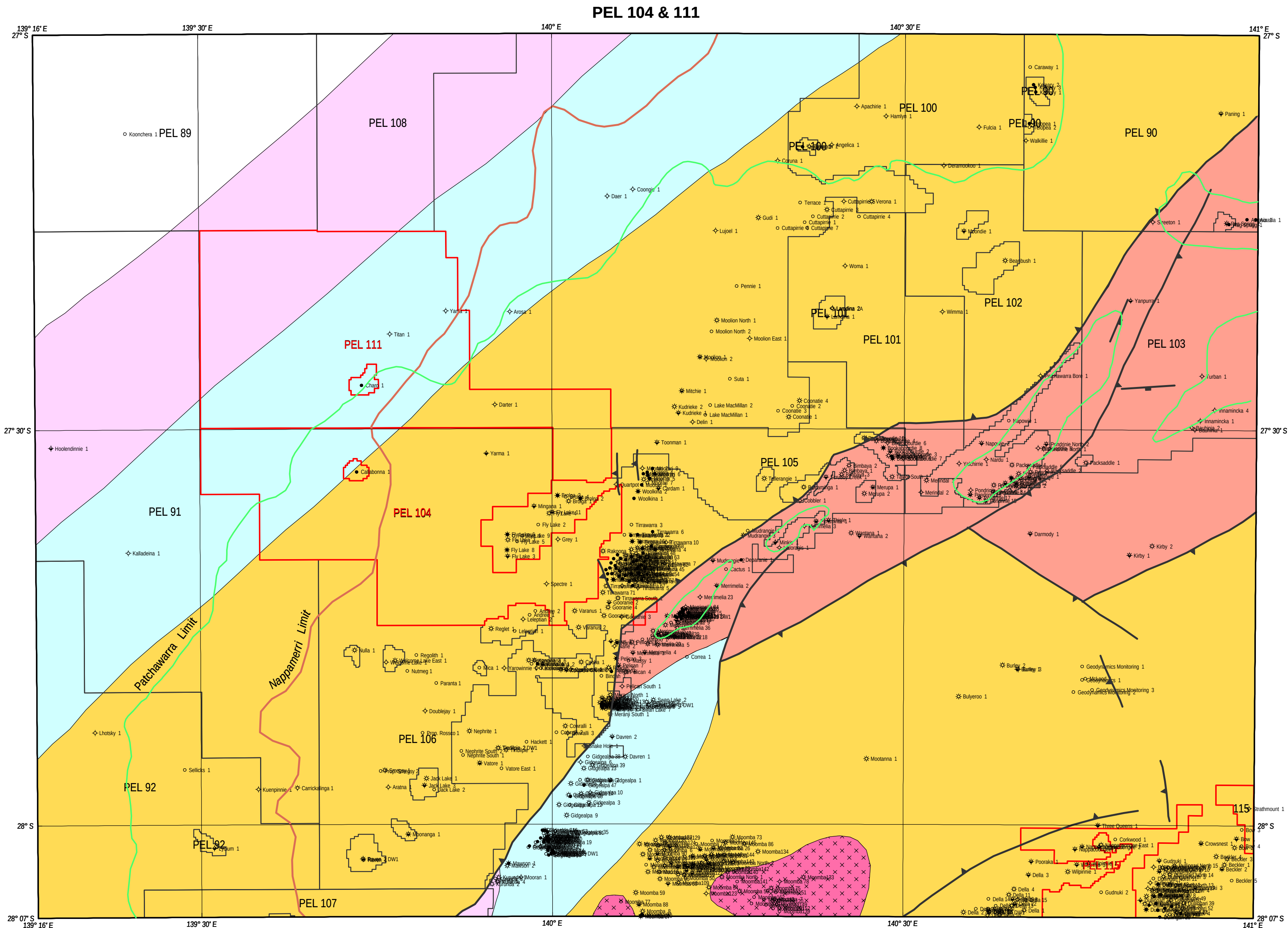
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G.R.S. 1980 SPHEROID
CENTRAL MERIDIAN 141° E
Mapsheet datum: "GDA94"

VICTORIA PETROLEUM LIMITED

PEL 104 and PEL 111
Prospectivity Review
OIL FIELDS CLOSE TO
PEL 104 and PEL 111
OOIP (MMBBL)

Author: D Harrison	Map sheet: Vicpet Regional 400K File: Enc 1 Oilfields nearby	Date: November 2004
Drawn: GIL CH FLE		ENCLOSURE 1





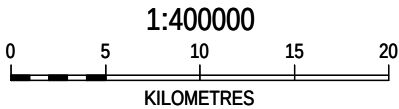
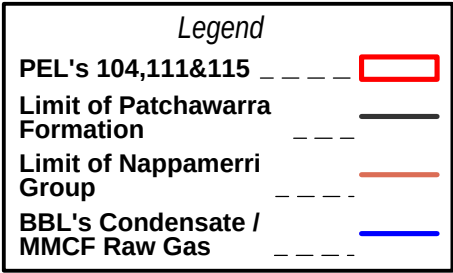
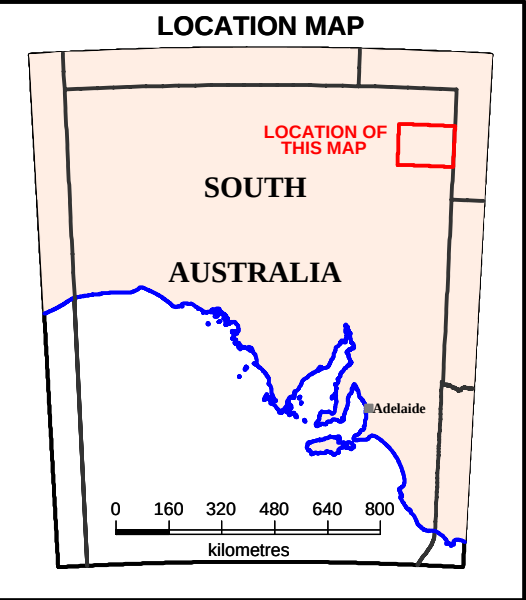
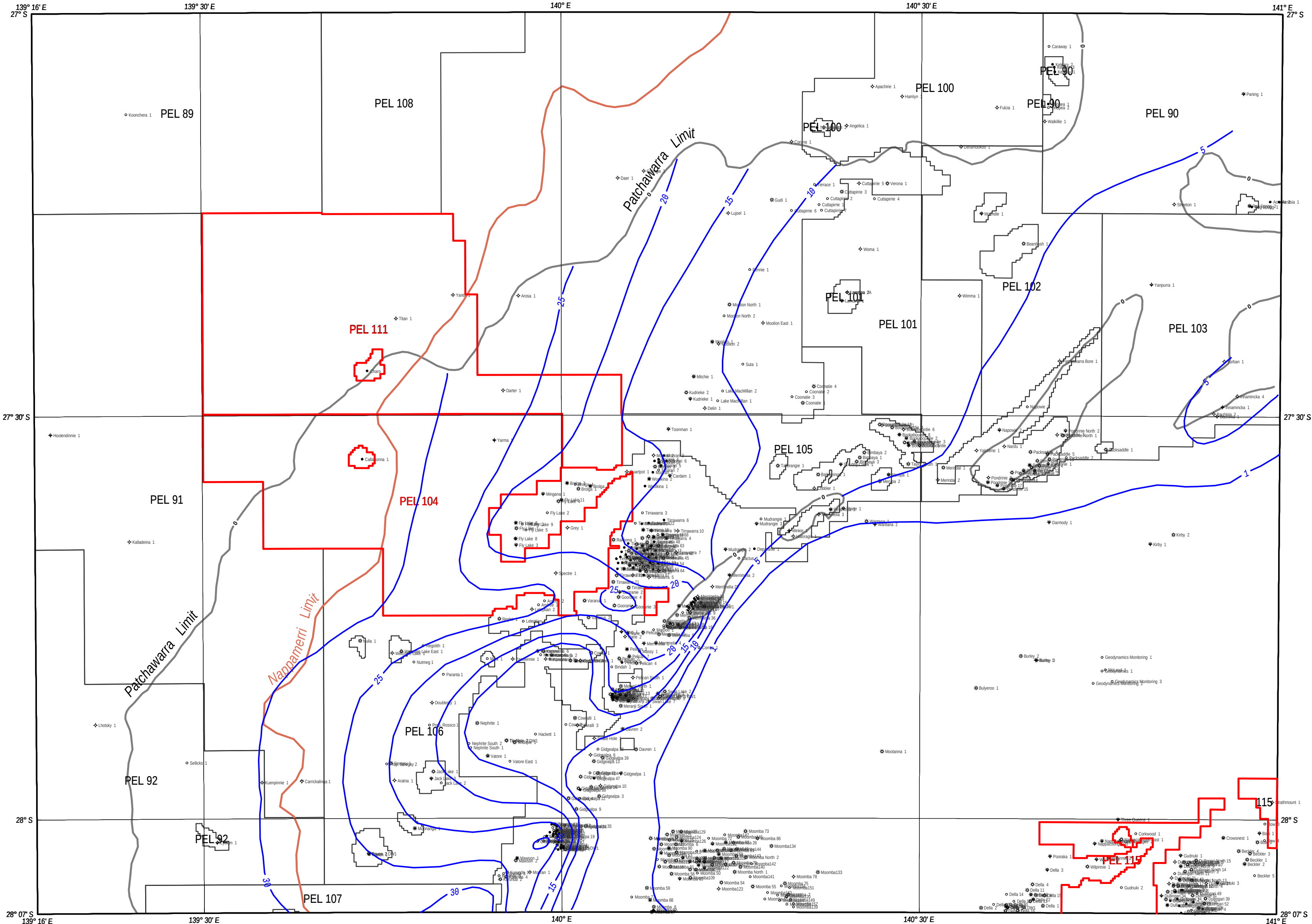
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G.R.S. 1980 SPHEROID
CENTRAL MERIDIAN 141° E
Mapsheets datum: "GDA94"


VICTORIA PETROLEUM LIMITED

PEL 104 and PEL 111
 Prospectivity Review
 PRE PERMIAN SUBCROP MAP

Author: D. Harrison		Date: October 2004
Drawn: ~~OIL ON FILM~~	Map Sheet: Vicpet Regional 400K File: Pre Perm Subcrop.map	Enclosure 3

PEL 104 & 111



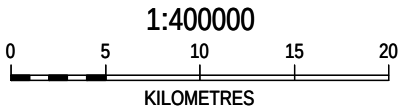
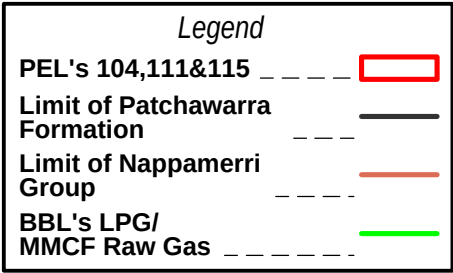
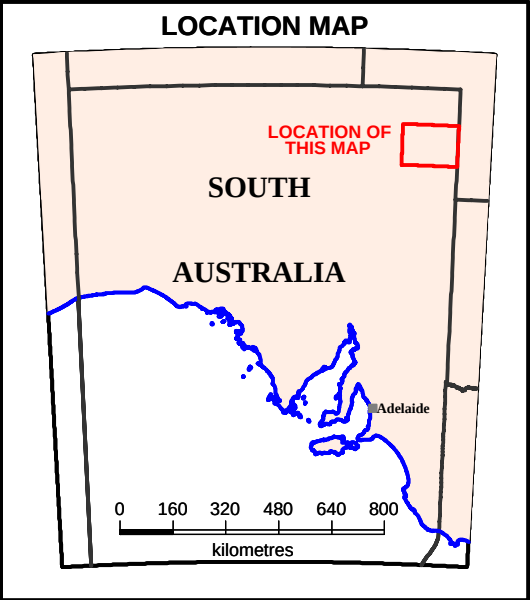
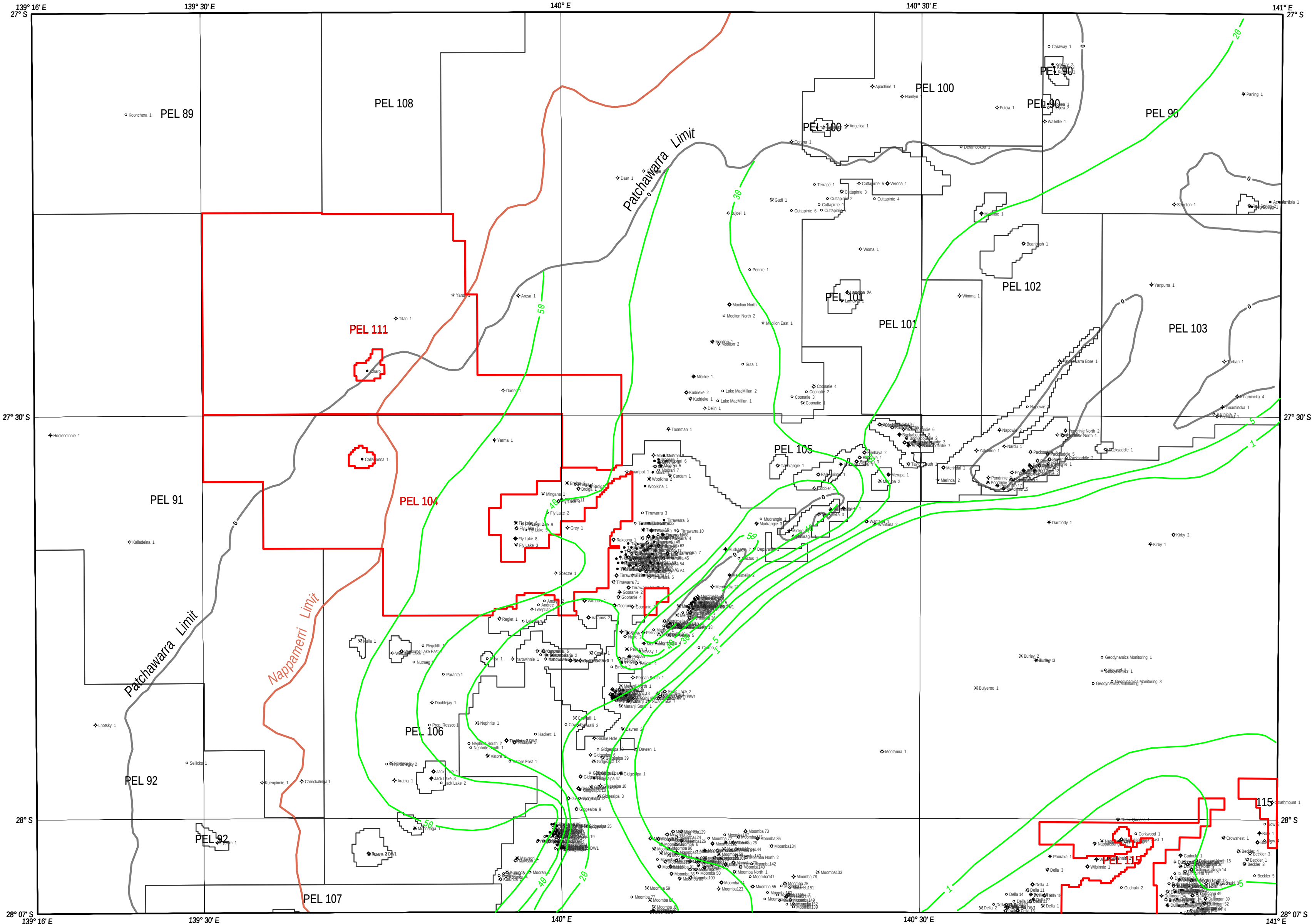
UNIVERSAL TRANSVERSE MERCATOR PROJECTION
G.R.S. 1980 SPHEROID
CENTRAL MERIDIAN 141° E
Mapsheet datum: "GDA94"

VICTORIA PETROLEUM LIMITED

PEL 104 and PEL 111
Prospectivity Review
PATCHAWARRA FORMATION
RESERVOIRS BBL's OF
CONDENSATE / MMCF RAW GAS

Author: D Harrison	Contour Interval 5m	Date: November 2004
Drawn: GIL CH FLE	Map sheet: Vicpet Regional 400K File: Enc 4 Cond. Gas	ENCLOSURE 6

PEL 104 & 111

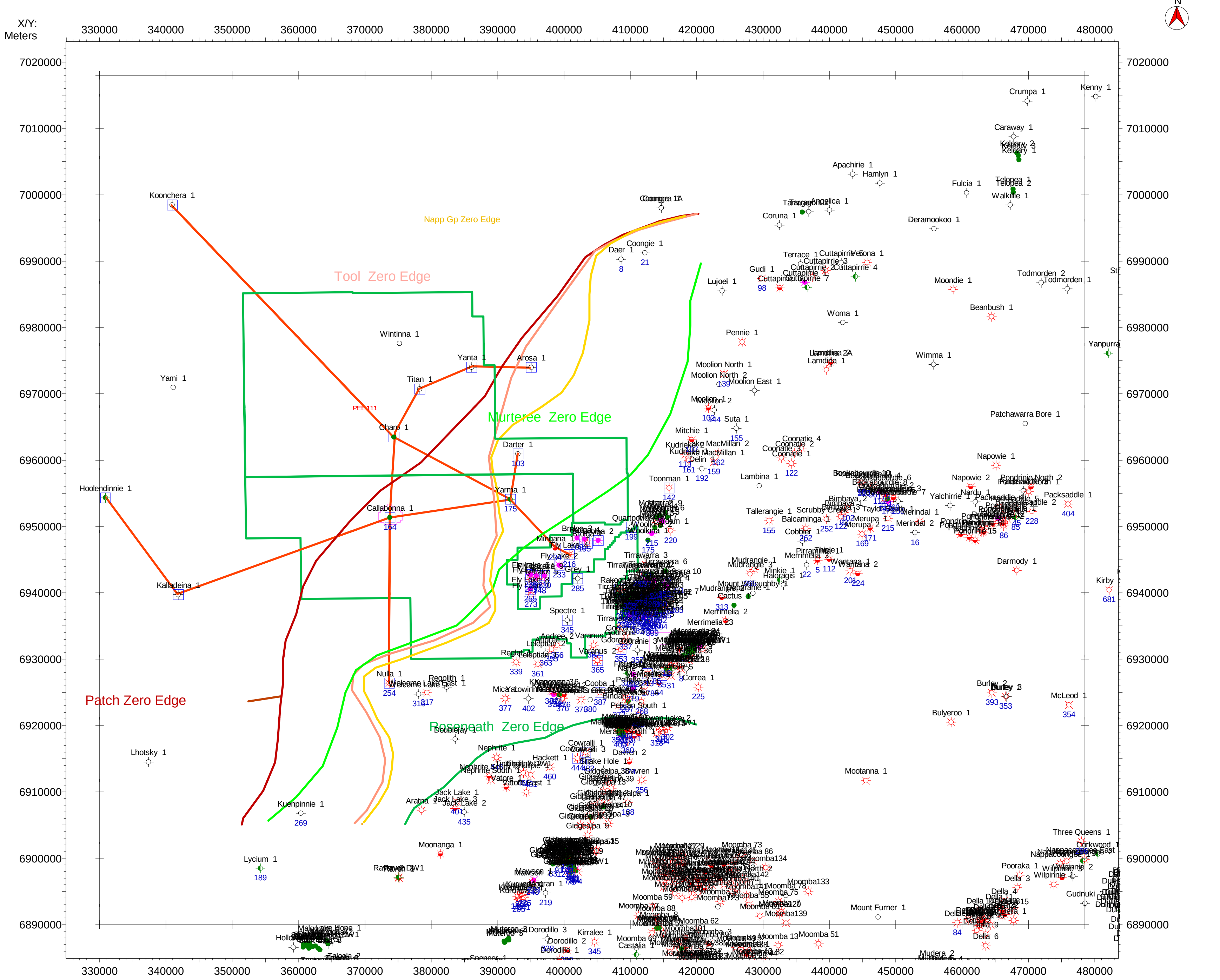


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G.R.S. 1980 SPHEROID
CENTRAL MERIDIAN 141° E
Mapsheet datum: "GDA94"

VICTORIA PETROLEUM LIMITED

PEL 104 and PEL 111
Prospectivity Review
PATCHAWARRA FORMATION
RESERVOIRS BBL's OF
LPG / MMCF RAW GAS

Author: D Harrison	Contour Interval 10m	Date: November 2004
Drawn: GIL CH FLE	Map sheet: Vicpet Regional 400K File: Enc 7 LPG_Gas	ENCLOSURE 7



Victoria Petroleum N.L.

PEL 104/111 Regional Prospectivity Review

Project Location:

Scale = 1:400000

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Group: Customized Coordinate System

System: UTM Defined By User

Datum: Datum Defined By User

Ellipsoid: Australian National

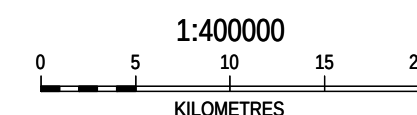
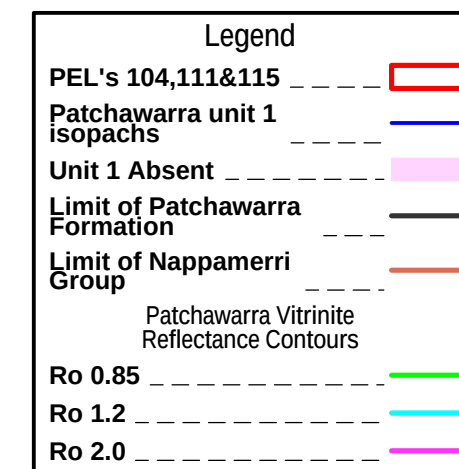
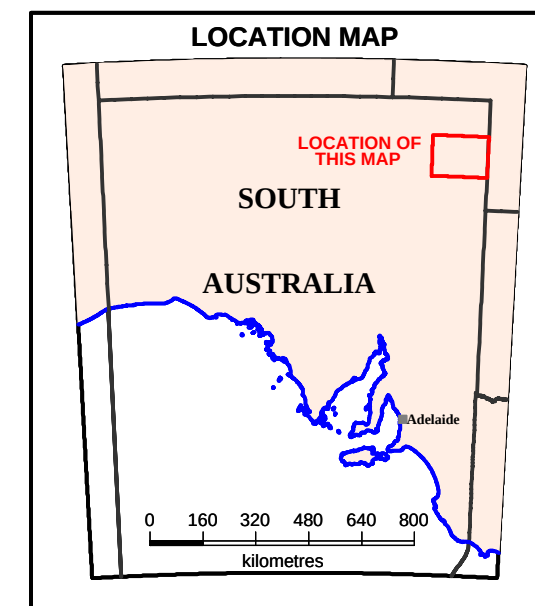
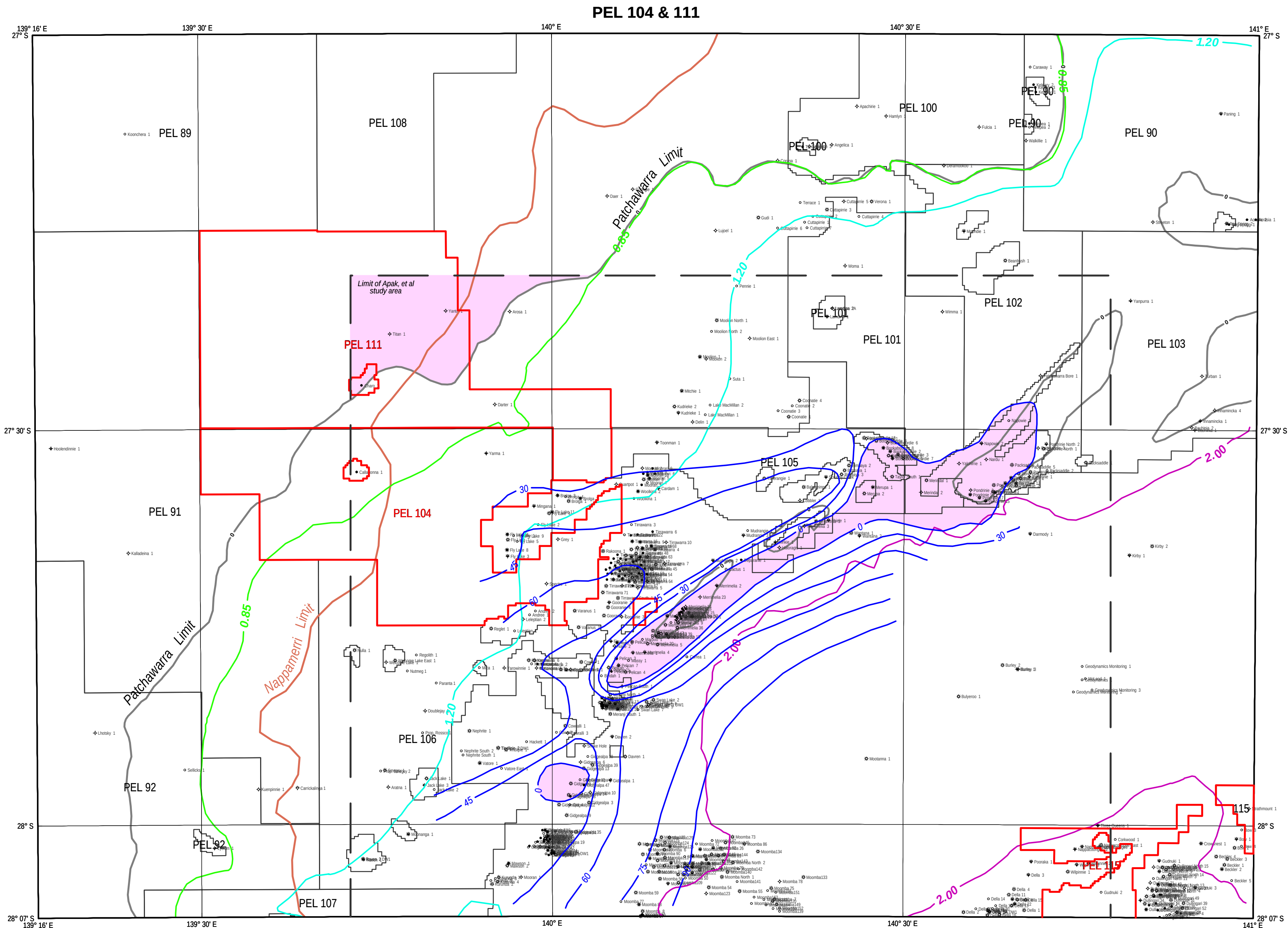
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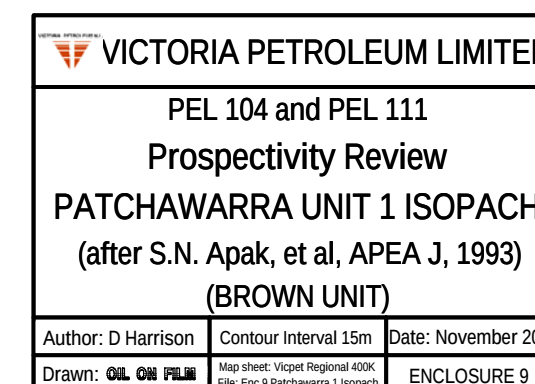
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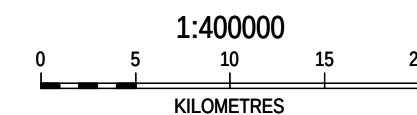
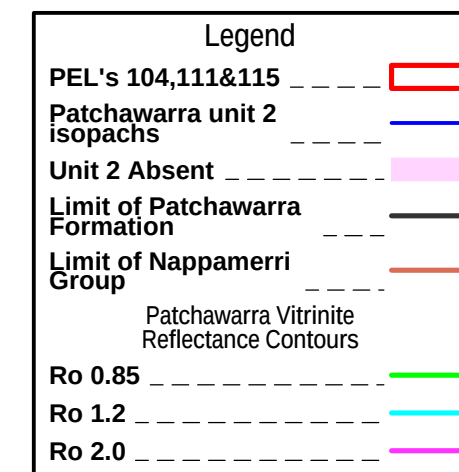
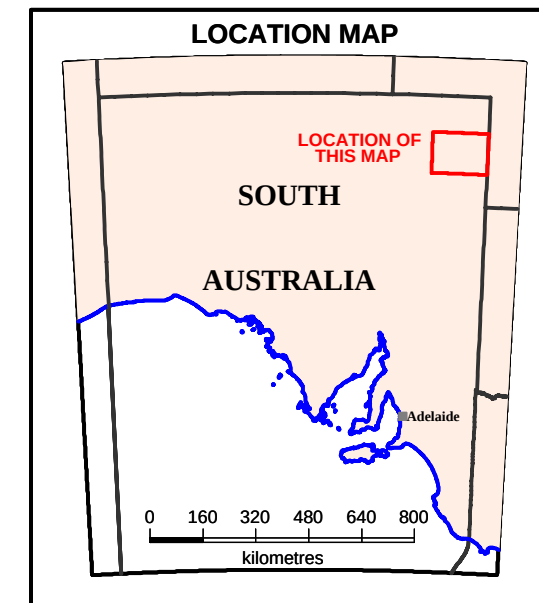
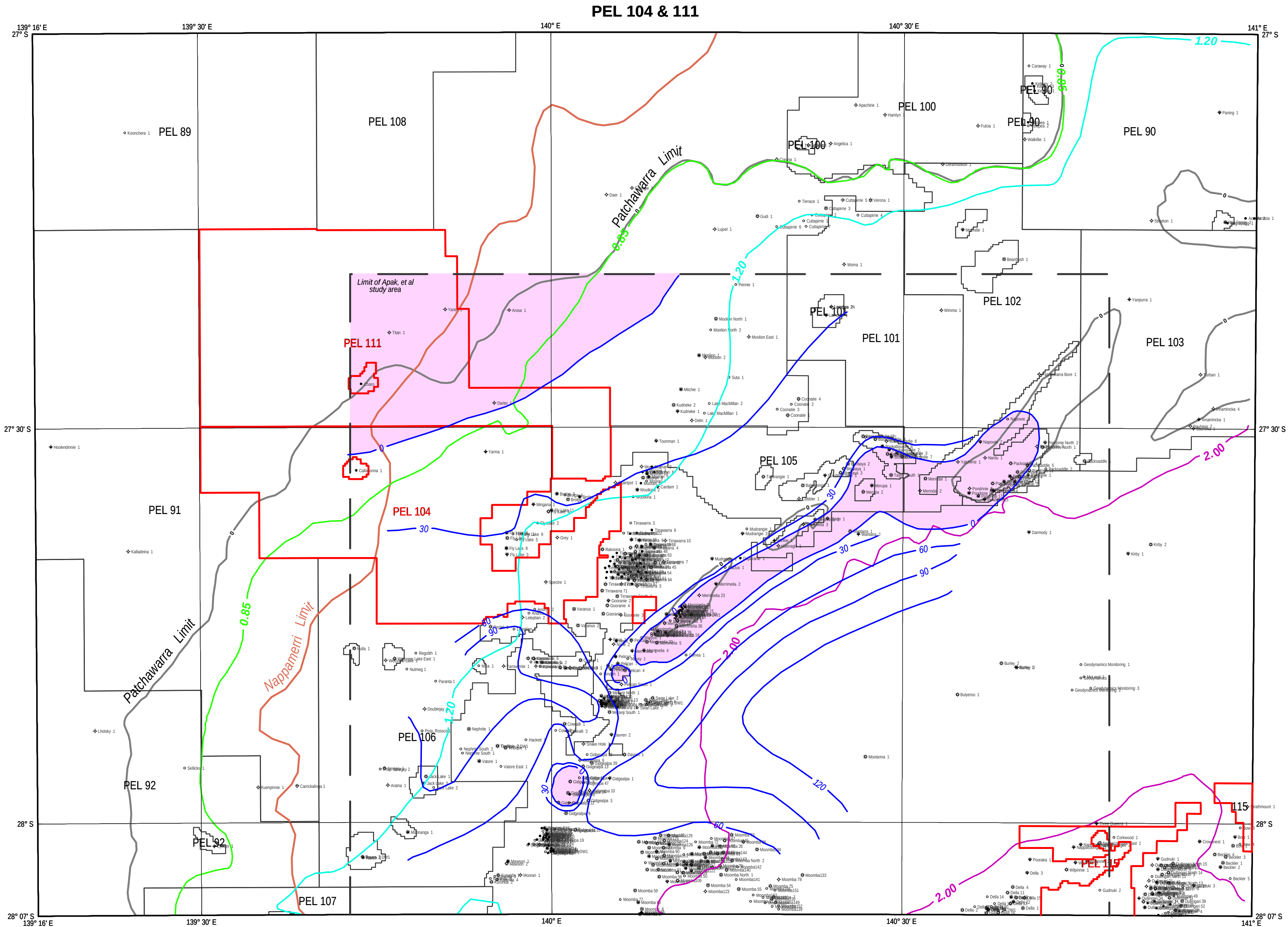
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ENCLOSURE 8
ZERO EDGES MAP
(based on well control)

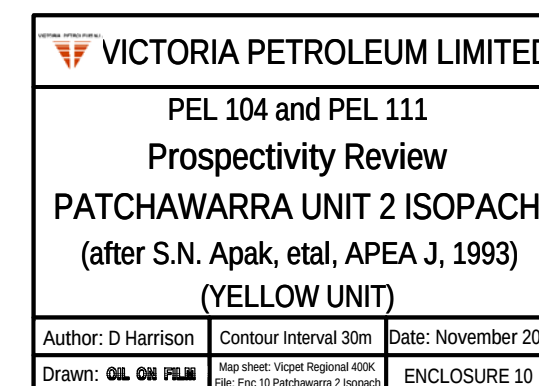


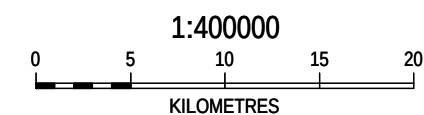
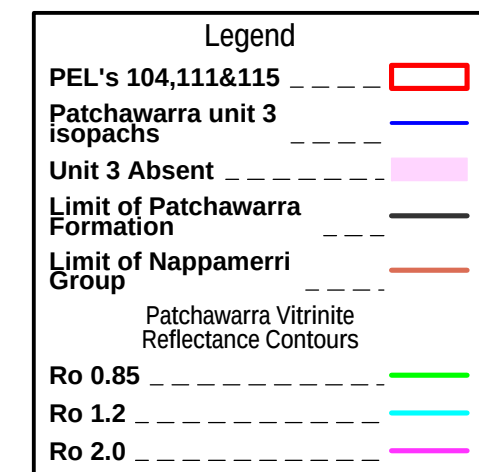
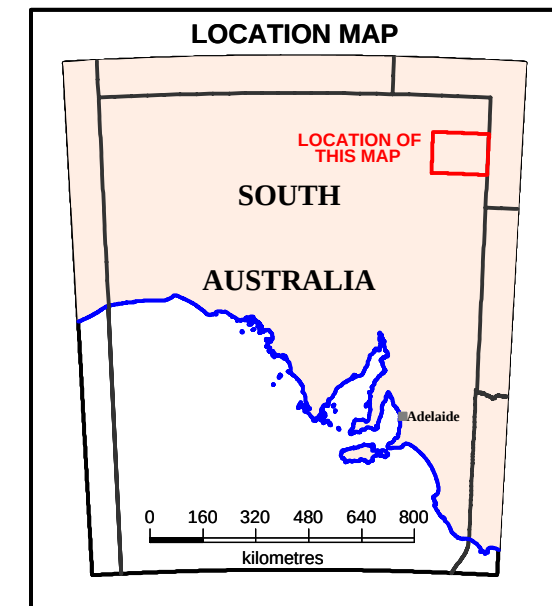
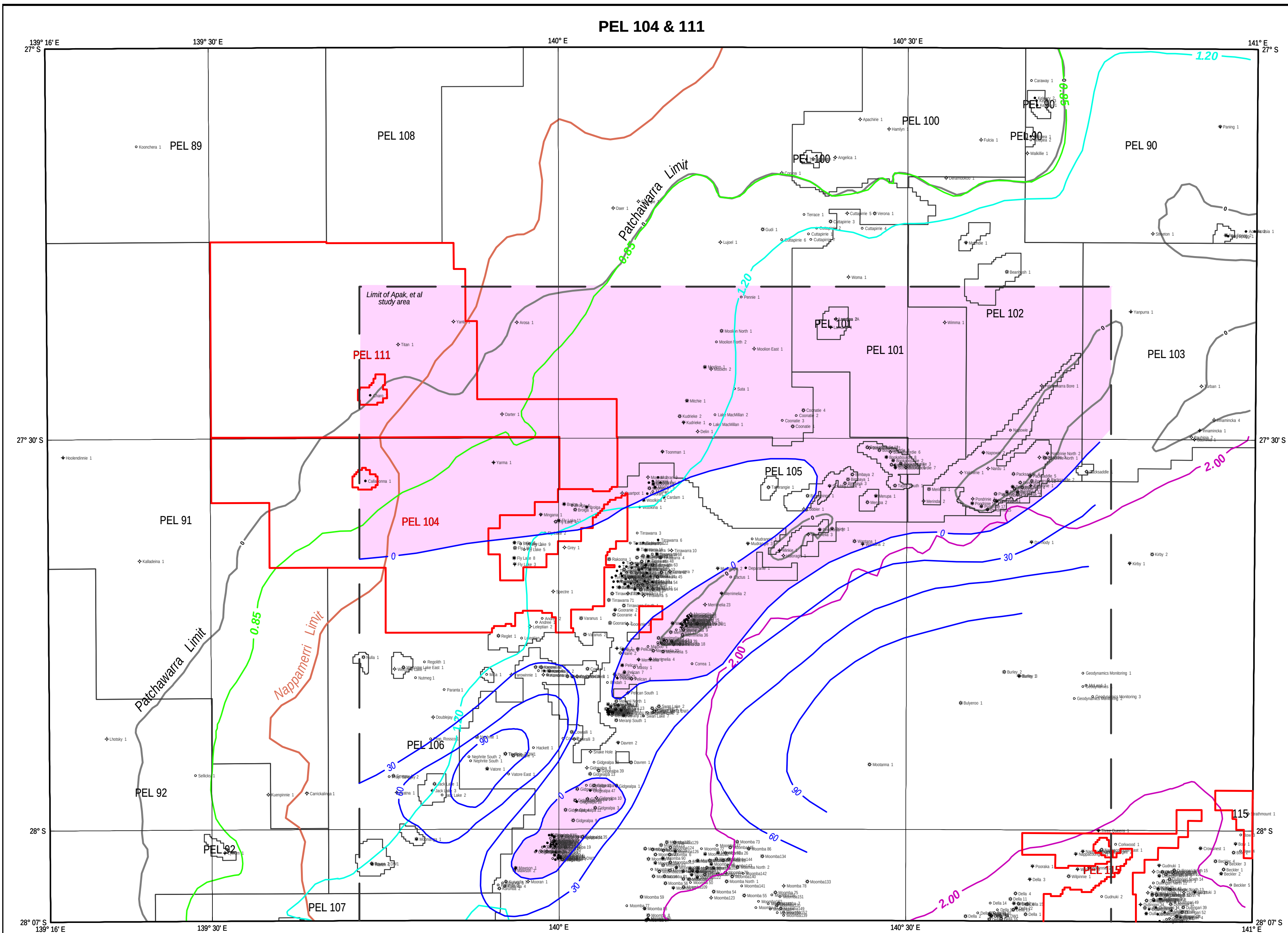
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CENTRAL MERIDIAN 141° E
Mapsheets datum: "GDA94"



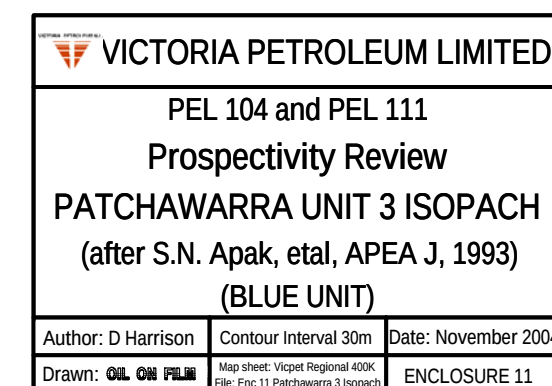


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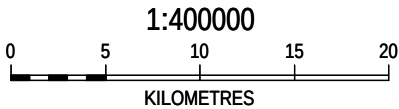
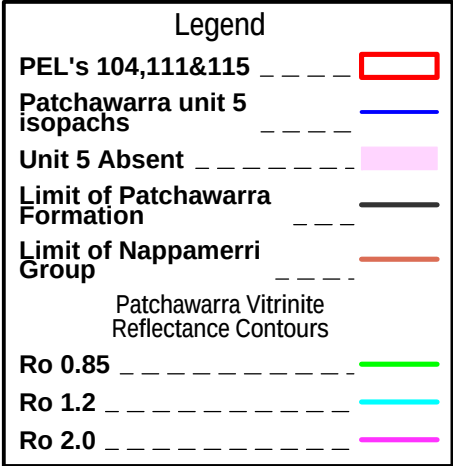
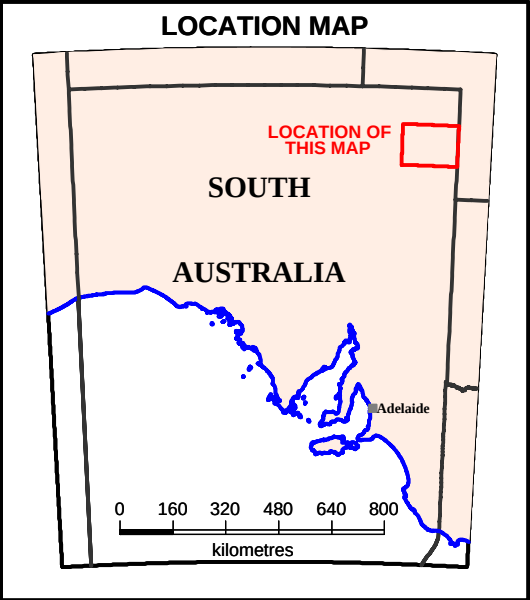
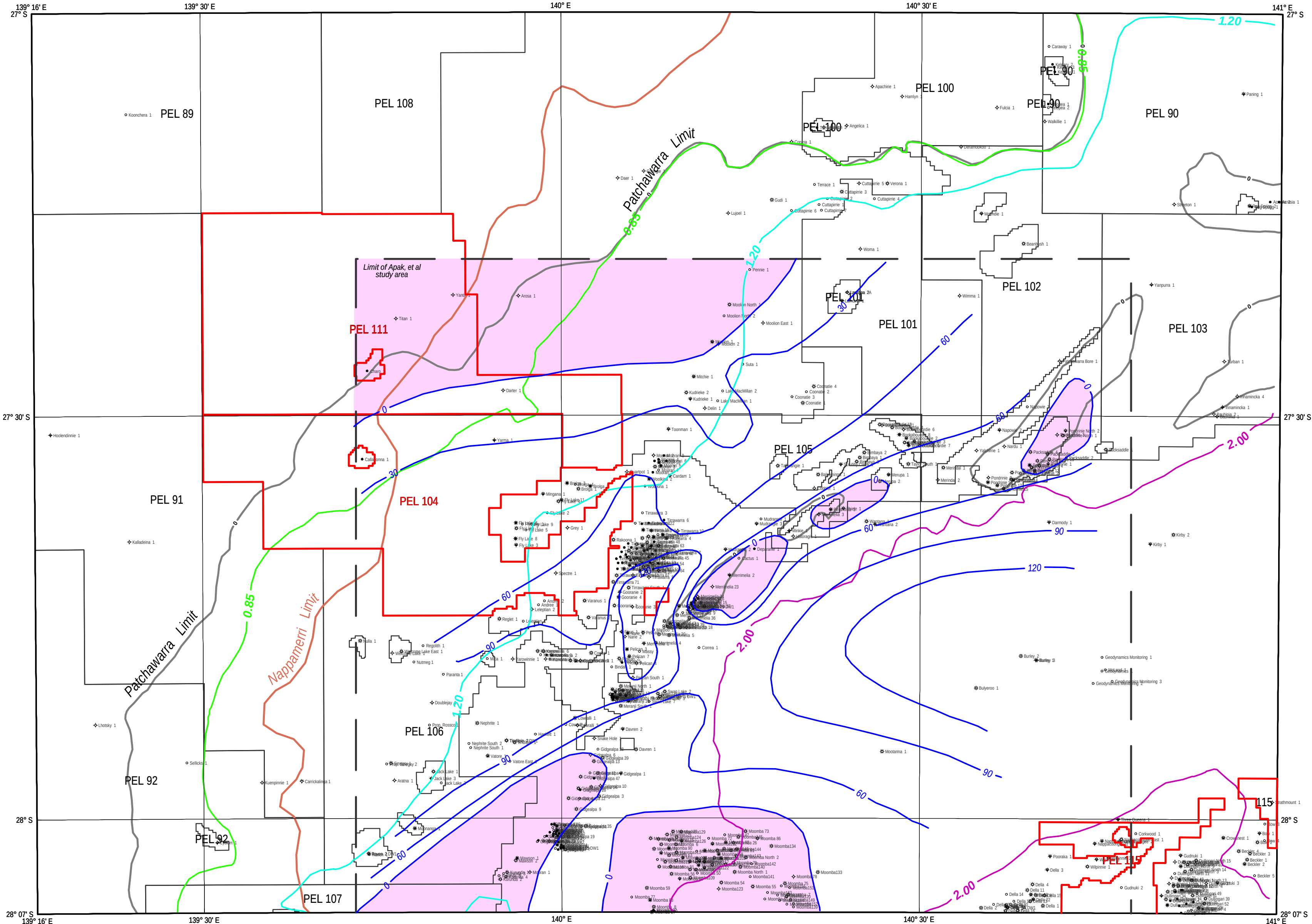




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Mapsheet datum: "GDA94"



PEL 104 & 111



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CENTRAL MERIDIAN 141° E
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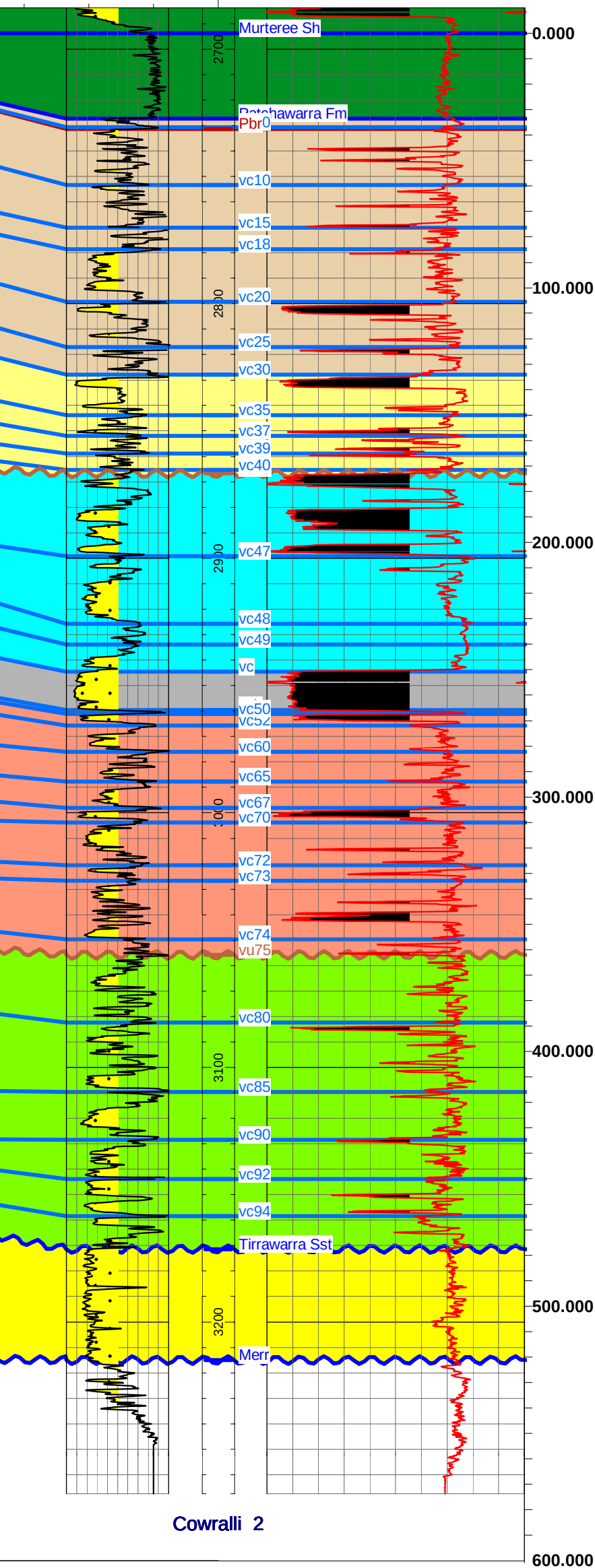
VICTORIA PETROLEUM LIMITED

PEL 104 and PEL 111
Prospectivity Review
PATCHAWARRA UNIT 5 ISOPACH
(after S.N. Apak, et al, APEA J, 1993)
(GREEN UNIT)

Author: D Harrison	Contour Interval 30m	Date: November 2004
Drawn: GIL CH FLE	Map sheet: Viscet Regional 400K File: Enc 13 Patchawarra 5 isopach	ENCLOSURE 13



5.



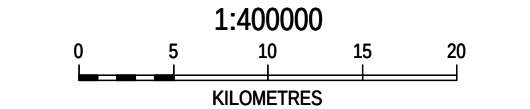
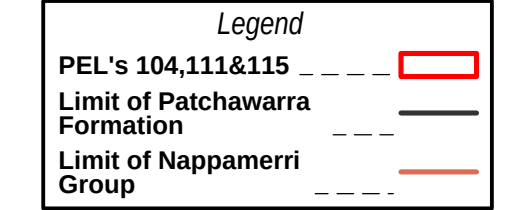
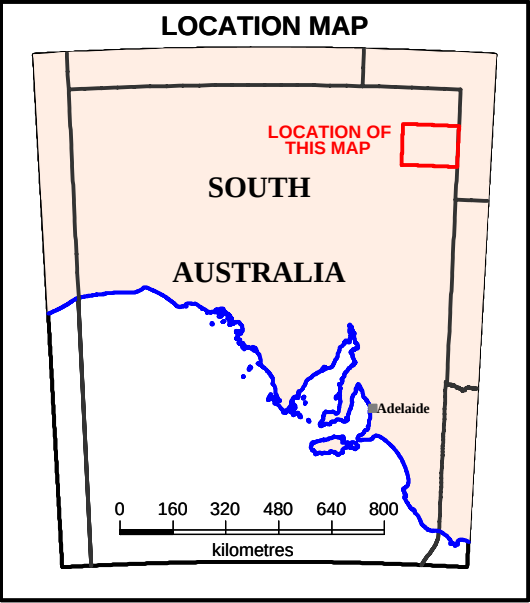
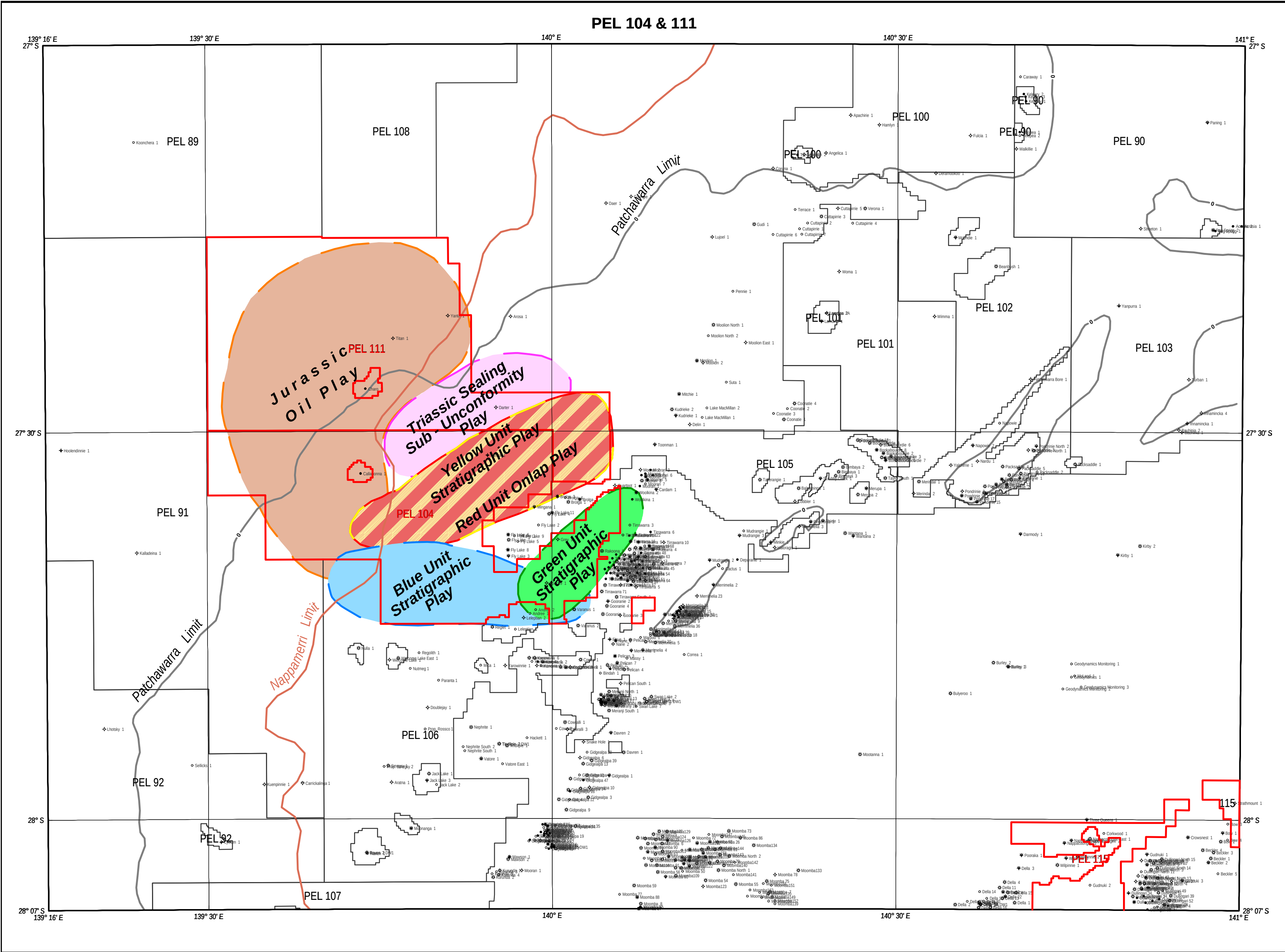
Cowralli 2

Victoria Petroleum N.L.

PEL 104/111 Regional Prospectivity Review

Project Location:

ENCLOSURE 14
COWRALLI 2
STRATIGRAPHIC and PALYNOSTRATIGRAPHIC UNITS

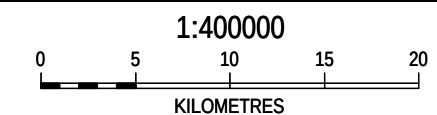
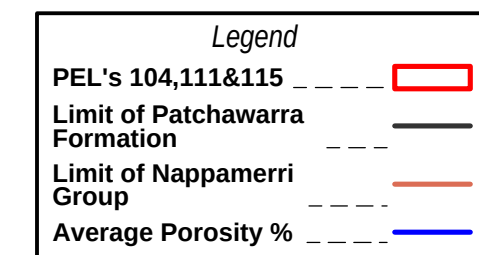
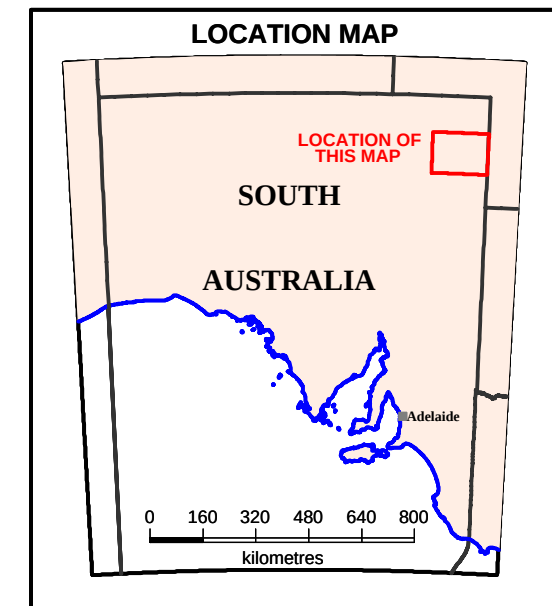
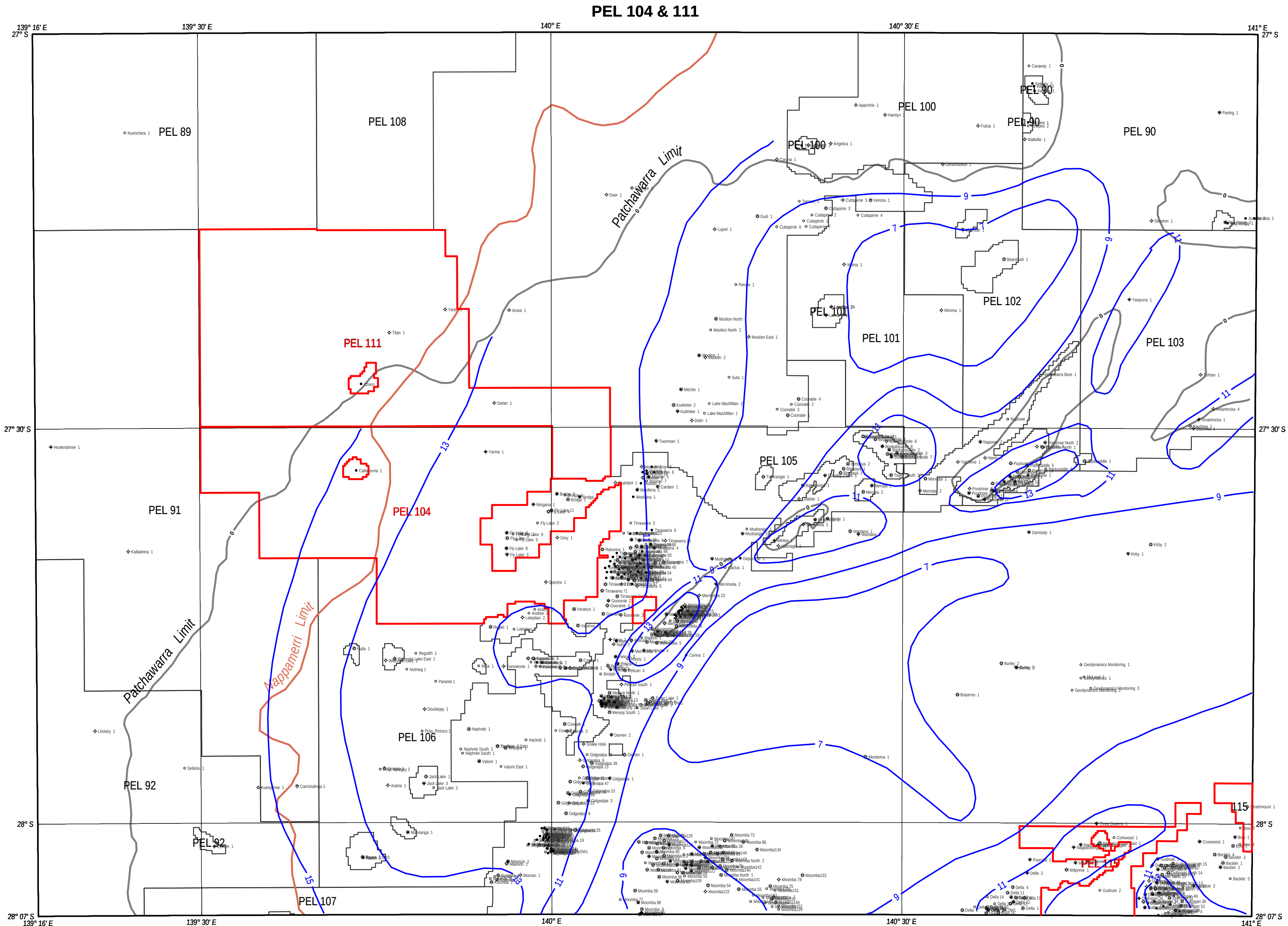


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CENTRAL MERIDIAN 141° E
Mapsheet datum: "GDA94"

VICTORIA PETROLEUM LIMITED

PEL 104 and PEL 111
Prospectivity Review
EXPECTED LOCATIONS OF
PATCHAWARRA STRATIGRAPHIC
PLAYS

Author: D Harrison	Date: November 2004
Drawn: GIL CH FLE	ENCLOSURE 17



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G.R.S. 1980 SPHEROID
CENTRAL MERIDIAN 141° E
Mapsheet datum: "GDA94"

 **VICTORIA PETROLEUM LIMITED**

PEL 104 and PEL 111
 Prospectivity Review
 PATCHAWARRA FORMATION
 RESERVOIRS AVERAGE POROSITY

Author: D Harrison	Contour Interval 2% porosity units	Date: November 2004
Drawn: OIL ON FILE	Map sheet: Vicpet Regional 400K File: Eng 18 Porosity	ENCLOSURE 18

