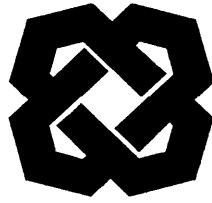


DEPT. NAT. RES & ENV



PE907483



BASIN OIL N.L.

ACN 000 628 017

WELL COMPLETION REPORT

IRREWARRA-1

(PEP 133B)

28 JAN 1999

PETROLEUM DIVISION

**Compiled By: Cultus Petroleum
Exploration Department
November, 1998**

TABLE OF CONTENTS

Page

LOCATION MAP

WELL DATA CARD

1.0 INTRODUCTION

2.0 PRE-DRILLING SUMMARY

2.1 Regional Geology

2.2 Previous Drilling

2.3 Drilling Rationale

3.0 POST-DRILLING SUMMARY

3.1 Stratigraphic and Geophysical Prognosis

3.2 Stratigraphic Summary

3.3 Hydrocarbons

3.4 Geochemistry

4.0 CONCLUSIONS

5.0 REFERENCES

FIGURES

1. Otway Basin - PEP 133 Location Map
2. Structural Elements Map - Otway Basin
3. Otway Basin Schematic Stratigraphic Table
4. Seismic Section Line IR96-04
5. Pre-Drill Irrewarra Prospect, Base Tertiary TWT Structure Map

TABLES

1. Proximal Well Data
2. Predicted vs. Actual Depths

APPENDICES

1. Lithological Descriptions
2. Electric Logging Report Sheet
3. Log Analysis Results
4. Water Analysis Reports
5. Wellsite Sample Manifest
6. Well Location Survey Data
7. Drilling Report

ENCLOSURES

- | | |
|--------------------------|---------|
| 1. Composite Log | (1:500) |
| 2. Mudlog | (1:200) |
| 3. Electric Log Analysis | (1:500) |

WELL:	IRREWARRA #1	SPUD:	29-04-1998
WELL TYPE:	EXPLORATION	TD REACHED:	6-05-1998
BLOCK/LICENCE::	PEP 133B Onshore Otway Basin Vic.	RIG RELEASED:	7-05-1998
RIG:	Slimdrill HTA 3000	COMPLETED:	
LATITUDE:	38 17' 59.47" S	STATUS::	Plugged & abandoned exploration well with no shows
LONGITUDE:	143 40' 47.49" E	TYPE COMPLETION::	Plugged & abandoned
X co-ordinate:	734 344.00 mE	TYPE STRUCTURE:	Wangerrip Group Sandstones
Y co-ordinate:	5 757 502.00 mN	Tertiary aged anticline on downthrown side of the Otway Ranges High	
SEISMIC STATION:	IR96-04 SP330	ZONE(S):	
ELEVATION GL:	124.36 m AHD	REMARKS:	
RT:	128.76 m	CASING SIZE	SHOE DEPTH
TD:	553 m MD (Logr Extrapolated)		mRT
	552 m MD (Drlr)	9.625"	9.0
		7"	200
			TYPE

AGE	FORMATION OR ZONE TOPS	DEPTH (m)			HIGH (H) LOW (L)	TWT (msec)
		LOGGERS MD	SUBSEA TVD	THICKNESS (metres)		
Quaternary	RECENT VOLCANICS	4.3	+124	17		
Oligocene-E. Miocene	HEYTESBURY GROUP *	21	+108	237	3 HIGH	
Lower Eocene	NIRRANDA GROUP *	258	-129	50	3 HIGH	
Middle Eocene	WANGERRIP GROUP *	308	-179	47	52 HIGH	
Early Cretaceous	EUMERALLA FORMATION *	355	-226	198+	81 HIGH	
	T.D. (LOGR EXTRAP)	553	-423	197	2 HIGH	
* Geophysical prognosis						

LOG INTERPRETATION (Interval Averages)						PERFORATIONS (4 shots/ft)				
ZONE	INTERVAL m MD	THICKNESS	NP m	POR %	SW %	ZONE			INTERVAL m MD	
No pay mapped						Not completed				
						ZONE	NO.	INTERVAL m MD	CUT m	REC m
						No Cores				

LOG (Schlum)	RUN	INTERVAL mRT	BHT/TIME	LOG	RUN	INTERVAL mRT	BHT/TIME
HILT-MCFL-SDT-ML-SP-CAL	1	545-198	38°C/9.25 hours				
GR	1	545-surface					
TNPB-RHOZ-PEFZ	1	545-198					

FORMATION TESTS									
NO.	INTERVAL (mRT)	FORMATION	FLOW (mins)	SHUT IN (mins)	BOTTOM GAUGE IP/FP (psia)	SIP	MAX SURF PRESS (psia)	FLUID TO SURF (mins)	TC/ BC
		No DST's were run.							

SUMMARY:

Irrewarra-1 was drilled as an exploration well in Victoria, onshore Otway Basin, PEP 133B. It was located approximately 10 km east of the township of Colac, with the closest wells being Ingleby-1 and Nalingal-1. Irrewarra-1 was designed to test the hydrocarbon bearing potential of a Tertiary aged anticlinal feature on the downthrown side of the major Otway Ranges High. The well targeted sandstones of the Wangerrip Group with secondary targets being sandstones of the Nirranda Group and the Heytesbury Group.

A 9 5/8" conductor was set at 9m RT prior to rig arrival. Irrewarra-1 was spudded at 2030 hrs on the 29th April, 1998, with 8.5" hole and gel spud mud. Drilling of the 8.5" hole continued to 202m. After conditioning the hole 7" casing was run to 200m, cemented and the Braden Head installed. The BOP's were then nipped up and pressure tested. A 6" BHA was made up and run in hole. After drilling out shoe track a leak off test was conducted to 13.0 lb/gal EMW.

The well reached a total depth of 552m (driller), 198 metres into the Eumeralla Formation. During the drilling of Irrewarra-1 a total gas system was operative from spud to total depth without registering any measurable gas readings. No oil fluorescence was observed in the cuttings samples.

Geophysical prognosis was based upon the 1996 Irrewarra Seismic Survey with only a single line tie to earlier vintage regional seismic surveys. Depth maps were produced for all the principal geologic horizons. The prognosis for Irrewarra 1 is considered to be reasonable (given the lack of well control) with the primary target, top Wangerrip Group being intersected 52 metres high to prognosis.

Schlumberger's platform express logging tool was run at total depth. A resistivity anomaly was observed in the primary target Wangerrip Group over the interval 344-355 mRT. Electric log analysis indicates that the anomaly is a porosity effect. 11.9 metres of net reservoir was intersected in the Wangerrip Group immediately below a volcanic sequence. All net reservoir sands are interpreted to be water saturated consequently Irrewarra 1 was plugged and abandoned.

Post well analysis indicates that Irrewarra-1 was a valid structural test of the Irrewarra Prospect, but the well is believed to have failed as the prospect did not have access to mature source rocks.

AUTHOR: G. O'Neill**DATE:** September, 1998

1.0 INTRODUCTION

The Irrewarra Prospect is located in Victoria, onshore Otway Basin, PEP 133B, approximately 10 km east of the township of Colac. The closest wells are Ingleby-1 and Nalingal-1.

The Irrewarra structure was first highlighted by the 1994 Gellibrand seismic survey. Lines G94-09 and G94-11 showed a roll over at the Base Tertiary level along the crest of a Tertiary aged anticline. Due to the 5 km line spacing it was impossible to establish the validity or extent of the possible structure. The structural integrity of the Irrewarra prospect was confirmed by the 1996 Irrewarra seismic survey.

Irrewarra-1 was designed to test the hydrocarbon bearing potential of a Tertiary aged anticlinal feature on the downthrown side of the major Otway Ranges High. The well targeted sandstones of the Wangerrip Group (areal closure 7.5 km²) with secondary targets being sandstones of the Nirranda Group and the Heytesbury Group.

2.0 PRE-DRILLING SUMMARY

2.1 Regional Geology

The Otway Basin is a Late Jurassic to Recent basin on the southern margin of Australia, straddling the states of South Australia and Victoria (Figure 2). It was formed as a result of Mesozoic tensional forces that rifted apart continental Australia and Antarctica, thereby producing a complex of localised intra-cratonic sub-basins (GFE, 1994). The break-up involved two main tectonic phases, a Late Jurassic to Early Cretaceous rift phase marked by extension and rapid subsidence, and a Late Cretaceous to Recent post-rift phase characterised by slower subsidence, and at times compressional forces (Abele *et al*, 1995).

The pre-Mesozoic basement rocks consist of Palaeozoic intrusives and metasediments associated with the Lachlan Fold Belt. The basement reflector is a high amplitude, low frequency event showing strong angular unconformity onto an erosional or faulted surface (Cockshell *et al.*, 1994).

The Otway Basin was initiated as a series of half grabens (Sprigg, 1986), separated by basement highs. The basement topography and geometry of the half grabens has clearly affected, and thus controlled, the distribution and thickness of the overlying sediments of the Casterton Formation and the Crayfish Group.

The Otway Basin consists of four major sedimentary sequences (Figure 4), each deposited during different phases of separation of southern Australia from Antarctica.

The earliest sequence consists of terrestrial sediments deposited in localised intra-cratonic grabens and half grabens, during the Late Jurassic to Early Cretaceous while extension was active. Organic-rich non marine sediments were deposited in the deeper

parts of the grabens or more marginal low energy settings, and are classed into the Casterton and Laira formations.

The second major sequence, which also contained non marine sediments, was deposited in an intra-cratonic sag basin, without significant extension. The Eumeralla Formation constitutes a widespread development of undifferentiated shales and lithic sandstones, and includes coaly deposits thought to represent the source for the oil and gas discovered throughout the basin.

The third sequence developed towards the beginning of the Late Cretaceous and entailed major extension, leading to the eventual separation of Australia from Antarctic. Although terrestrial sediments continued to be deposited, marine rocks formed an important part of the sequence for the first time, represented by the thick deltaic sequence, with marine influence, of the Sherbrook Group. At the base of the group, lies the Waarre Formation, one of the key reservoir units in the Otway Basin.

A major period of erosion followed uplift in the Late Cretaceous, forming an unconformity surface regionally mappable throughout the basin. Sedimentation resumed with the deposition of largely non marine sediments, with minor marine influences. Further marine sedimentation and the outbuilding of coastal plain and submarine shelf deposits occurred, as more rapid separation of the continental masses took place during the Tertiary (GFE, 1994). This process is continuing to the present day.

2.2 Previous Drilling

The Otway Basin has been recognised as a potential petroleum province since the 1860s and was the location for Australia's first oil exploration well, Salt Creek, at Alfred Flat, South Australia, in 1866 (Sprigg, 1986). Discovery of bitumen strandings, seepages and oil scums led to the onset of exploration in the basin. Over 150 wells have since been drilled in the Otway Basin, both onshore and offshore, with the greatest number of discoveries of hydrocarbons in the coastal region between Port Campbell, Victoria, in the east and Mt. Gambier, South Australia, in the west.

Mapping of anticlinal structures and intermittent drilling of shallow wells took place between the early 1890s and late 1950s, however no discoveries were made during this period. The first discovery in the basin was Port Campbell-1, drilled in 1959, by Frome-Broken Hill. It flowed gas from the Late Cretaceous Waarre Formation at an initial rate of 1.5 mmcf/d, however, it was deemed non commercial as the rate declined rapidly. Shell initiated drilling offshore in the Victorian section of the basin in 1967, followed closely by Esso, though there were no large successes. It wasn't until 1979 that the first commercial hydrocarbon gas, from the Waarre Formation, was discovered by Beach Petroleum at North Paaratte-1. The field was brought on stream in 1986. Following North Paaratte-1, Wallaby Creek and Grumby were two more fields discovered by Beach, (also the Waarre Formation) in 1981. Subsequent exploration resulted in the establishment, by Beach, of the Iona gas field in 1988, then the Boggy Creek CO₂ field, by GFE Resources, in late 1991.

The first offshore success was with BHP Petroleum's Minerva-1, in 1993, just off Port Campbell. The Mylor (Bridge/GFE) and Langley (GFE) fields were discovered in 1994, with Mylor marking the first recovery of oil from the Waarre Formation (Foster and Hodgson, 1995). The most recent discovery (March 1997) in the area was made by the Santos/Cultus Joint Venture in PEP-108. DST 2 in Fenton Creek 1 flowed gas to surface 6.0 mmcf/d accompanied by 43 bbl condensate per day from the Waarre Sandstone.

In the western portion of the Otway Basin, South Australia, all of the commercial discoveries, except Katnook-1 (in the basal Eumeralla Formation), have been made within the Early Cretaceous Crayfish Group, mainly in the Pretty Hill Formation. The most prospective region encompasses the Penola Trough, in which the Katnook, Ladbroke Grove, Caroline and Haselgrove fields are located. In the past decade, approximately 24 wells have penetrated the Crayfish Group, resulting in the discovery of five commercial gas fields, three non commercial gas fields and two significant oil shows.

All of the commercial discoveries in the eastern, Victorian section of the Otway Basin are located within the Port Campbell region.

The closest wells to the Irrewarra prospect include Ingleby-1 and Nalingal-1. Ingleby-1 (10 km east) was drilled by GFE in 1990 and Nalingal -1 (10 km east) was drilled by XXXXX in 1990. Both wells were plugged & abandoned with xxxxxxxx.

TABLE 1

PROXIMAL WELL DATA

Well Name	Year	Target	TD	Operator	Results	Status
Ingleby-1	1990	Pebble Point Fm	331.2 m	GFE	No shows	P & A
Nalingal-1			xxx	xxx	xxx	P & A

2.3 Drilling Rationale

Structure

Interpretation of the Irrewarra Prospect was based on a 1 km x 3 km seismic grid of fair to good quality seismic data. Seismic data ranging from 1994 to 1996 vintages were recorded in the prospect area.

The Irrewarra Prospect is a Tertiary aged anticline on the downthrown side of the major Otway Ranges high (Figures XXXX). Three horizons were interpreted and mapped in the prospect area:

- (1) Base Tertiary,
- (2) Base Eumeralla; and
- (3) Top Pretty Hill Sandstone.

Structural mapping of the Base Eumeralla and the Top Pretty Hill Sandstone indicates that at both of these levels there is no structural closure.

A pre-drill structural closure of 7.5 sq km was mapped at Base Tertiary level (Figure XX). This seismic pick was tied to the exploration wells Ingleby-1 and Nalingal-1.

Reservoir

The primary objective of the well were sandstones of the Wangerrip Group with estimated porosity of 30%. Hydrocarbon shows in similar sandstones have been intersected to the west of PEP-133B in the wells such as Lindon-1 and Wilson-1.

Secondary objectives of the well were are the sandstones of the Nirranda Group and the Heytesbury Group.

Seal

The Pember Mudstone provides top and lateral seal for the sandstones of the Wangerrip Group. The Pember Mudstone is a proven seal in Lindon-1 and Wilson-1.

Seal for both the secondary objective sandstones will be the claystones of the Nirranda and Heytesbury Groups

HIP Estimate

Irrewarra-1 was designed to address the hydrocarbon potential of the Wangerrip Group prognosed at 356mGL. Hydrocarbon potential of the Irrewarra Prospect was estimated as 24 BCF OGIP (gas charge) and 39 mmstb (oil charge).

3.0 POST-DRILLING SUMMARY

3.1 Stratigraphic and Geophysical Prognosis

The Irrewarra structure was first highlighted by the 1994 Gellibrand seismic survey. Lines G94-09 and G94-11 showed a roll over at the Base Tertiary level along the crest of a Tertiary aged anticline. Due to the 5 km line spacing it was impossible to establish the validity or extent of the possible structure. The structural integrity of the Irrewarra prospect was confirmed by the 1996 Irrewarra seismic survey.

Three horizons were interpreted and mapped in the prospect area:

- (1) Base Tertiary,
- (2) Base Eumeralla; and
- (3) Top Pretty Hill Sandstone.

Given the lack of well control in the region and only a single line tie to earlier vintage regional seismic surveys the geophysical prognosis for Irrewarra 1 is considered to be reasonable. The primary target, top Wangerrip Group being intersected 52 metres or XX msec high to prognosis (Table XXX). This discrepancy has been attributed to XXXXX a geophysical error of pre-drill pick almost half a cycle too deep and an error of 19 milliseconds too fast. This was confirmed by the synthetic seismogram.

TABLE 2

Predicted vs Actual Depths

Formation/Group	Actual Depth (m)	SS (m)	Predicted SS (m)	Difference High (H) Low (L)	Actual Thickness (m)	Predicted Thickness (m)	Difference Thickness (m)	Actual TWT (ms)	Predicted TWT (ms)
Volcanics	4	+124	+124	As prog	17	20	-3		
Heytsbury Group	21	+108	+104	4 m high	237	237	As prog		
Niranda Group	258	-129	-132	3 m high	50	99	+49		
Wangerrip Group	308	-179	-231	52 m high	47	76	-29		
Otway Group									
Eumeralla Formation	355	-226	-307	81 m high	198 +	118 +			
Total Depth	563	-423	-425						1990

3.2 Stratigraphic Summary

Irrewarra 1 was terminated 197 metres into the Early Cretaceous aged Eumeralla Formation at a depth of 553 metres (logger extrapolated). Sidewall cores were not shot in Irrewarra 1 and so no age dating was undertaken. Formation tops were selected based on cuttings descriptions and electric log correlation with the offset wells Ingleby-1 & Nalingal-1.

OTWAY GROUP

The Early Cretaceous aged Eumeralla Formation of the Otway Group comprises medium grey/brown claystone & siltstone with minor interbedded sandstone and trace coal. At the Irrewarra location, the Eumeralla Formation is believed to have been deposited in an overbank to lacustrine environment.

WANGERRIP GROUP (EASTERN VIEW FORMATION)

The Eumeralla Formation is unconformably overlain by 47 metres of middle Eocene aged Eastern View Formation sediments. These sediments are dominantly siltstone with minor interbedded sandstone (primary target) and contain injected older volcanic horizons which are up to 5 metres thick.

The volcanic sequences were quartzose with up to 20% crypto-crystalline mafic minerals.

NIRRANDA GROUP (DEMONS BLUFF FORMATION)

Sediments of the Late Eocene aged Demons Bluff Formation overlie the middle Eocene aged Eastern View Formation. The Demons Bluff Formation comprises interbedded argillaceous siltstone and poorly sorted fine to pebbly grained sandstone.

POST HEYTESBURY GROUP

The Port Heytesbury Group comprises a lower sequence of dominantly claystone with trace very fine grained sandstone (150 m to 258 m) and an upper sequence of interbedded claystone, siltstone and fine grained sandstone.

The Port Heytesbury Group is overlain by 21 metres of oxidised surficial claystone.

3.3 Hydrocarbon Shows

Mudlogging services on Irrewarra 1 were provided by Collin Higgins & Associates. Cuttings gas levels were monitored using a Minipac 2100 total gas detector. Cuttings were examined under ultra-violet light to detect any hydrocarbon fluorescence.

The well targeted sandstones of the Wangerrip Group with the secondary targets being sandstones of the Nirranda Group and the Heytesbury Group.

The well reached a total depth of 552m (driller), 198 metres into the Eumeralla Formation. While Irrewarra-1 was drilled a total gas system was operative from spud to total depth without registering any measurable gas readings. No oil fluorescence was observed in the cuttings samples.

Schlumberger's platform express logging tool was run at total depth. A resistivity anomaly was observed in the primary target Wangerrip Group over the interval 344-355 mRT. Electric log analysis indicates that the anomaly is a porosity effect. 11.9 metres of net reservoir was intersected in the Wangerrip Group immediately below a volcanic sequence. The net reservoir sands are interpreted to be water saturated.

4.0 CONCLUSIONS

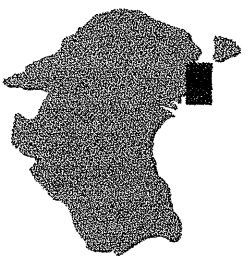
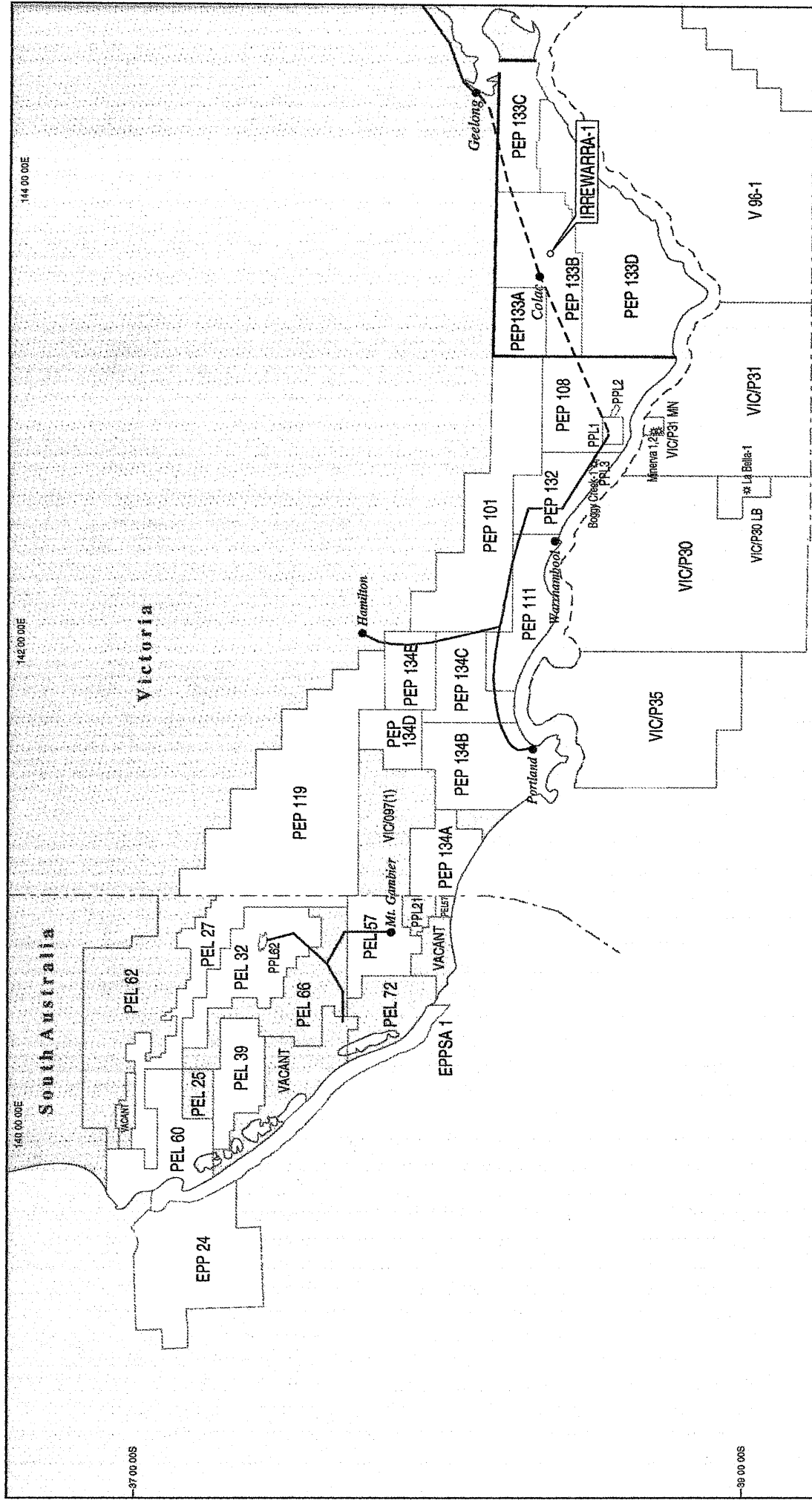
Irrewarra-1 intersected a sandstone sequence in the primary target Wangerrip Group as predicted but these sandstones were devoid of hydrocarbon shows and are interpreted to be water saturated.

There were no other significant reservoir/seal pairs intersected in Irrewarra-1. No hydrocarbon shows were recorded, consequently the well was plugged and abandoned.

Post well analysis indicates that Irrewarra-1 was a valid structural test of the Irrewarra Prospect, but the well is believed to have failed as the prospect did not have access to mature source rocks.

5.0 REFERENCES

- Abele, C., et al., 1995 The Stratigraphy, Structure, Geophysics, and Hydrocarbon Potential of the Eastern Otway Basin. Department of Agriculture, Energy and Minerals of Victoria. Geological Survey of Victoria, Geological Survey Report 103.
- Basin Oil NL, 1998 Irrewarra-1 Drilling & Evaluation Programme. Unpublished Report.
- Basin Oil NL, 1998 Irrewarra-1 Preliminary Data Report. Unpublished Report.
- Blake, W.J.R. 1990 Geology and Hydrogeology of Early Tertiary sediments of the Otway Basin. M.Sc. Thesis, Latrobe University, Melbourne (unpublished)
- Foster J, Hodgson A, 1995 Port Campbell Reviewed: Methane and Champagne. APEA Journal 35(1), pp. 418-435
- GFE Resources Ltd., 1994 Otway Basin Regional Study. Volumes 1 and 3a. Confidential Report.
- Sprigg, R.C., 1986 A history of the search for commercial hydrocarbons in the Otway Basin complex. In R.C. Glenie (ed.) Second Southeastern Australia Oil Exploration Symposium. PESA Symposium, Melbourne, 1985 pp. 173-200
- Tabassi A., 1993 Ingleby-1 Well Completion Report. Gas & Fuel Exploration NL.
- WW Holdings, 1998 East Avenue-1 Well Completion Report. Gas & Fuel Exploration NL.



CULTUS PETROLEUM N.L.
OTWAY BASIN
PEP 133 LOCATION MAP

LEGEND

- Cultus tenement
- Pipeline
- Proposed Pipeline

0 100
km

AGD66

otway/pep133/area-loc.dgn

FIGURE 1

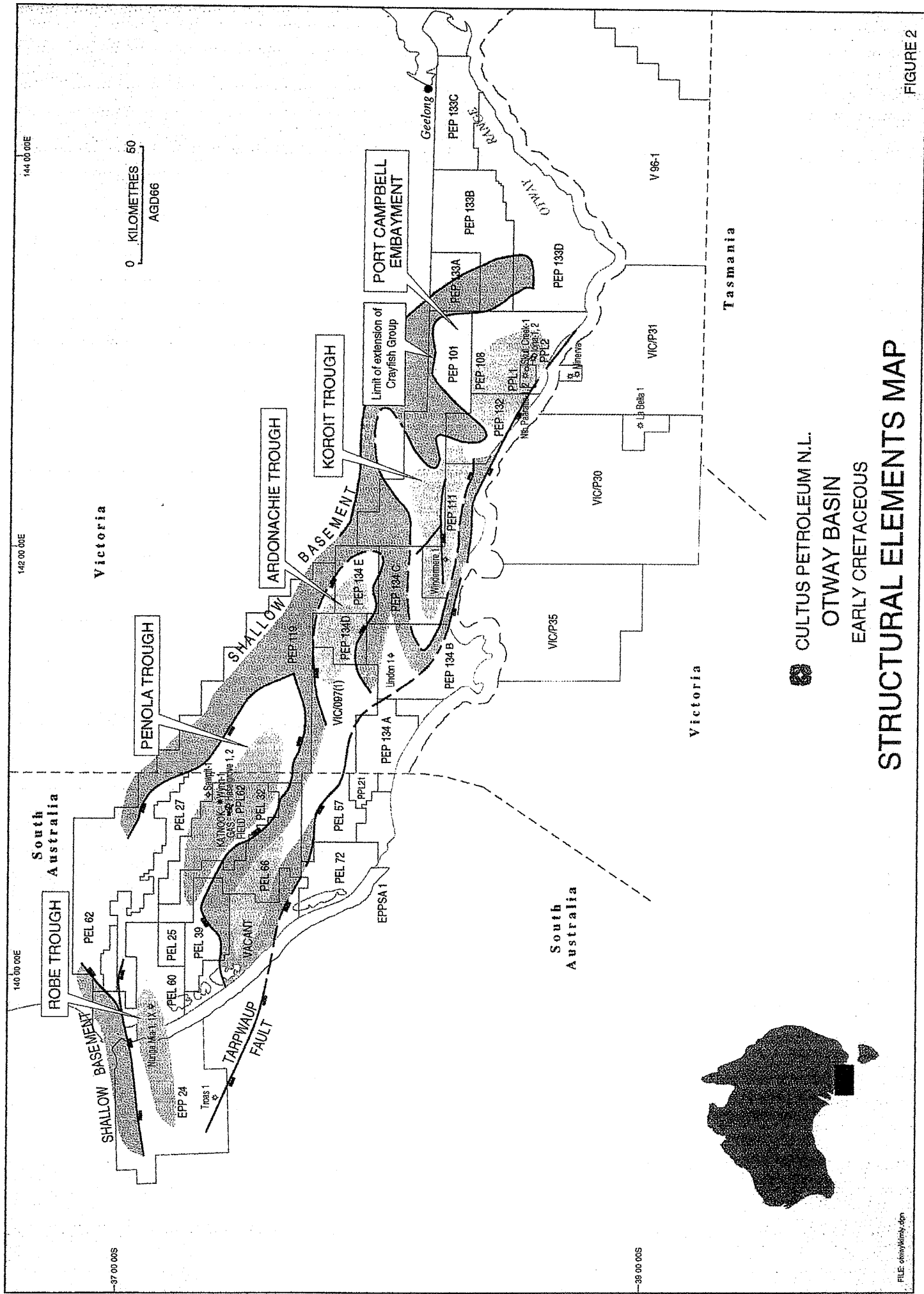
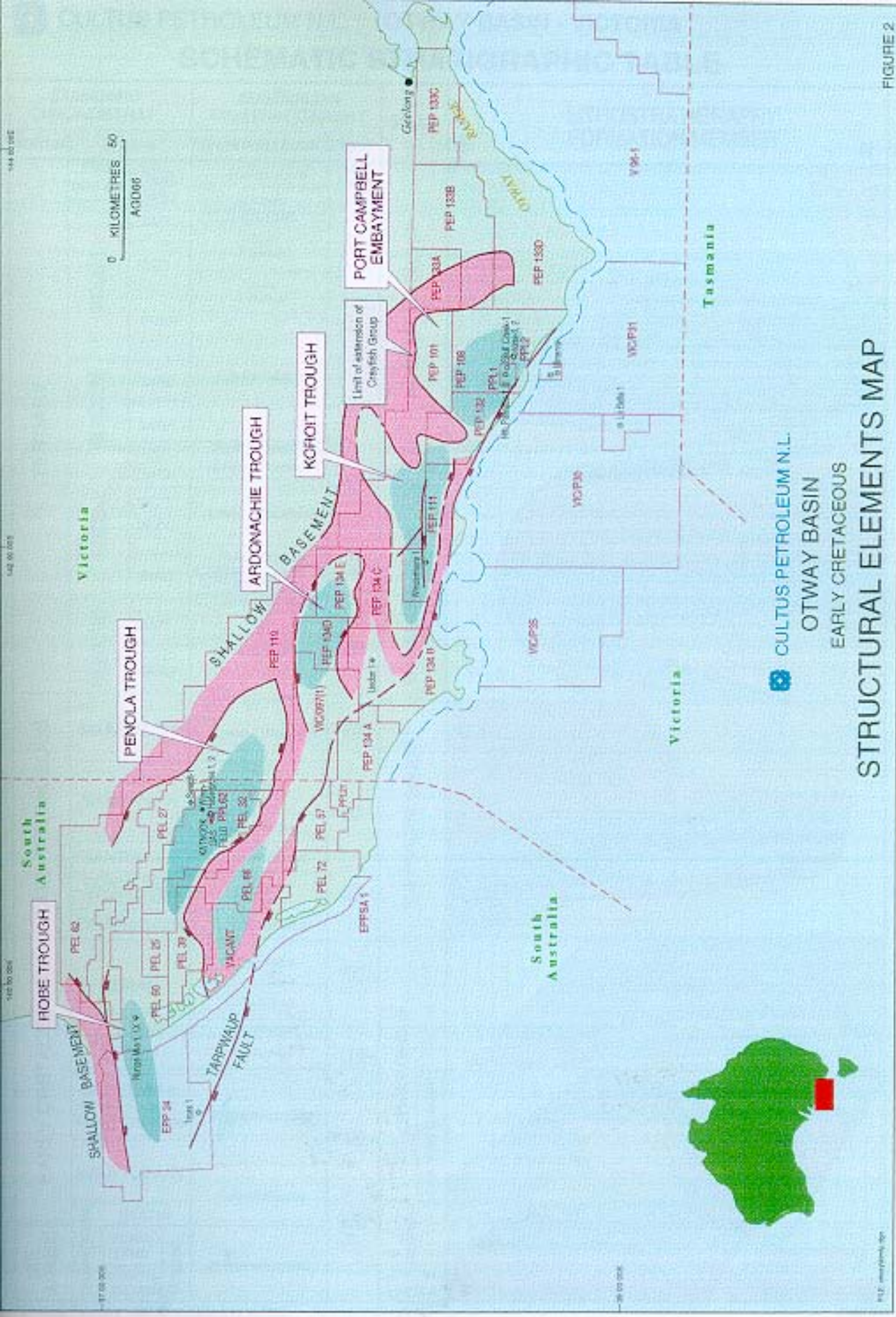


FIGURE 2

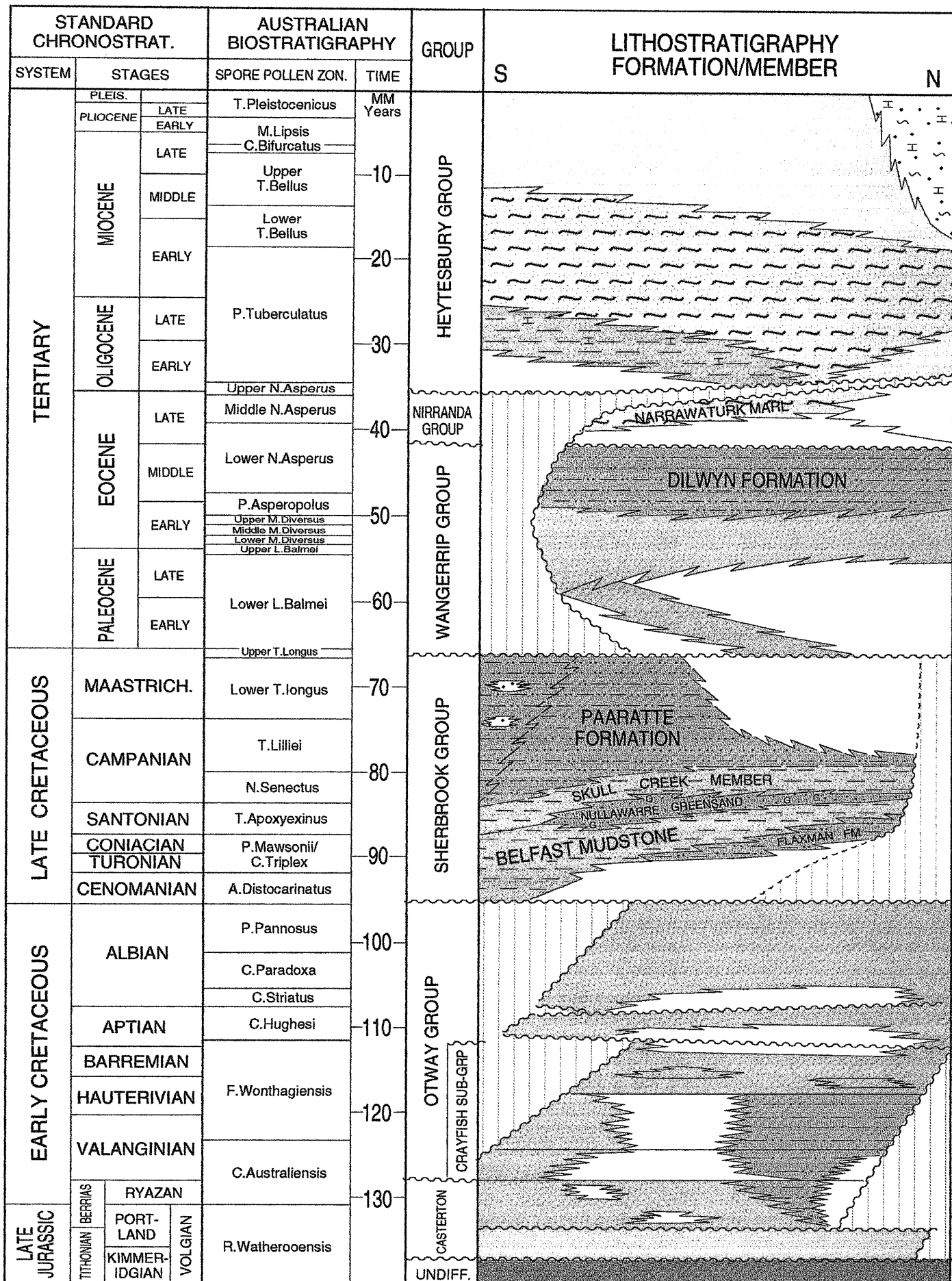
CULTUS PETROLEUM N.L.
OTWAY BASIN
EARLY CRETACEOUS

STRUCTURAL ELEMENTS MAP

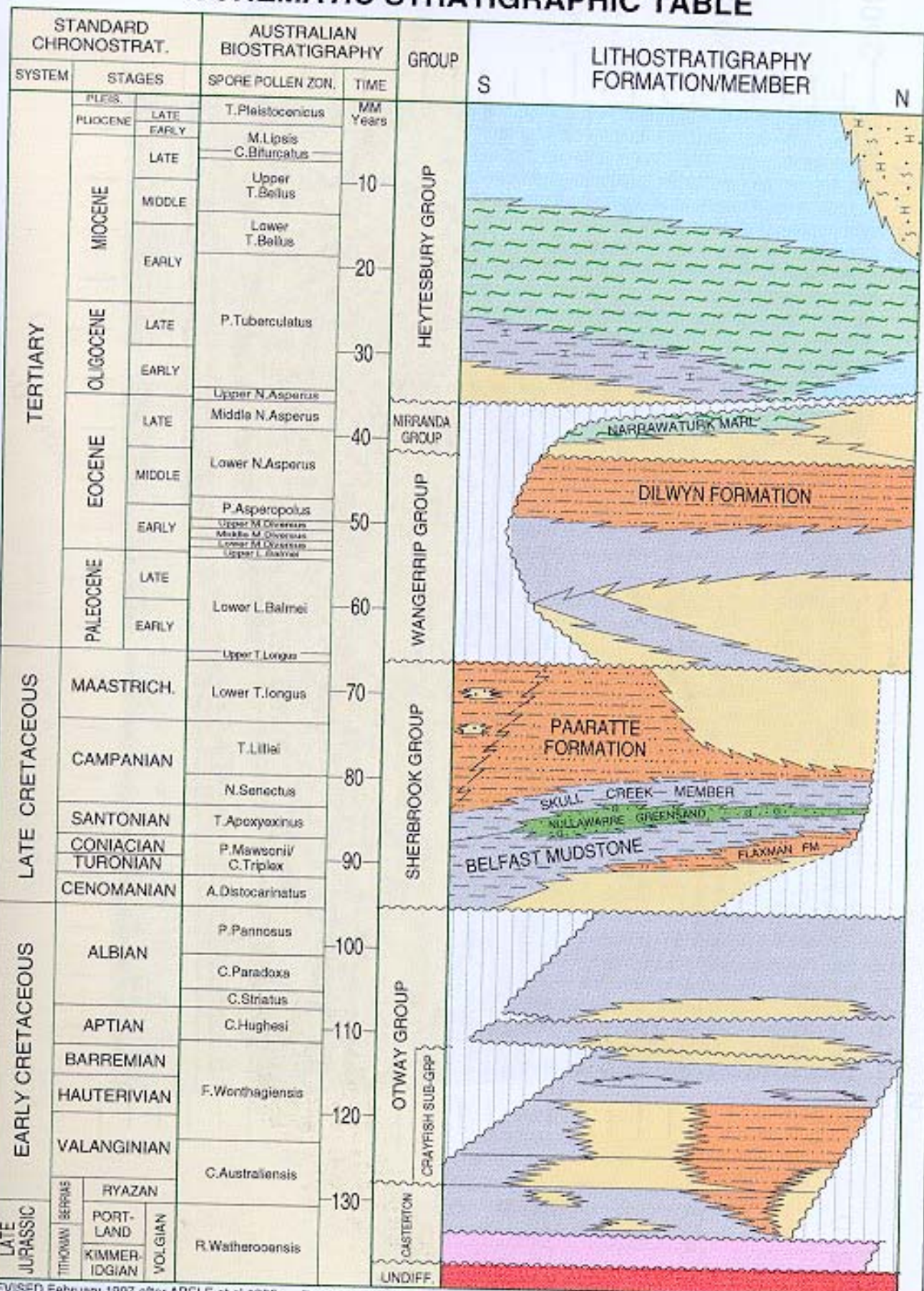




SCHEMATIC STRATIGRAPHIC TABLE



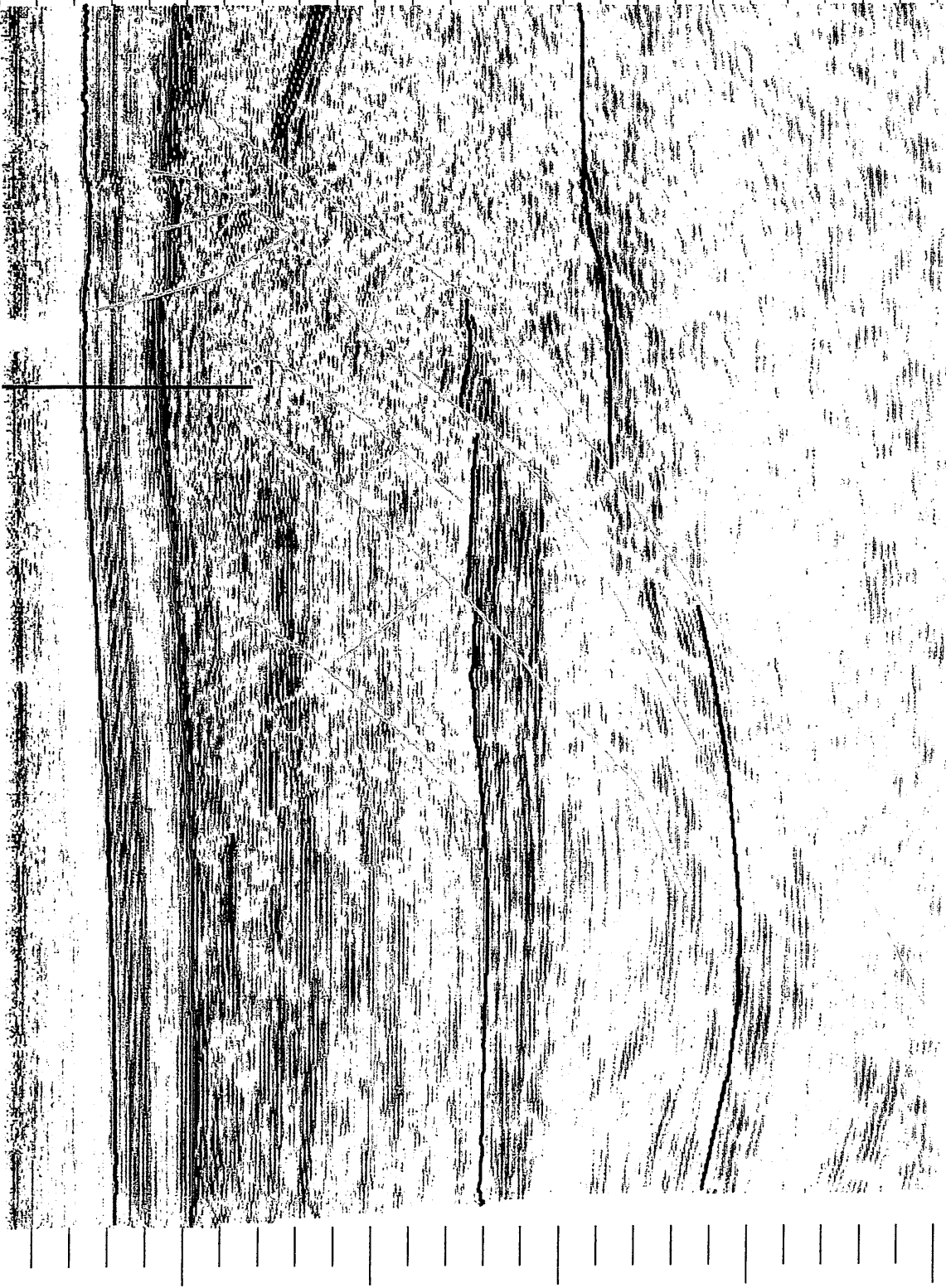
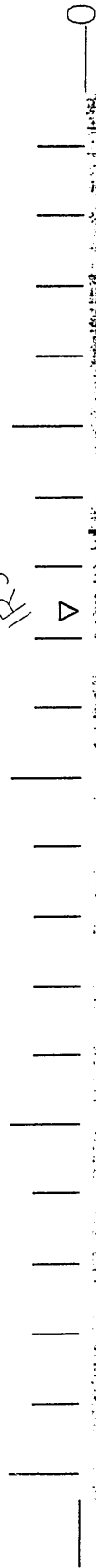
SCHEMATIC STRATIGRAPHIC TABLE



IHKWAKKA-T

IR96-01

600 500 400 300 0



Base Tertiary
500

1000 1500 2000 2500

mig080002

N

472m

IR96-04

S

IHEWAKHA-T

IR96-01

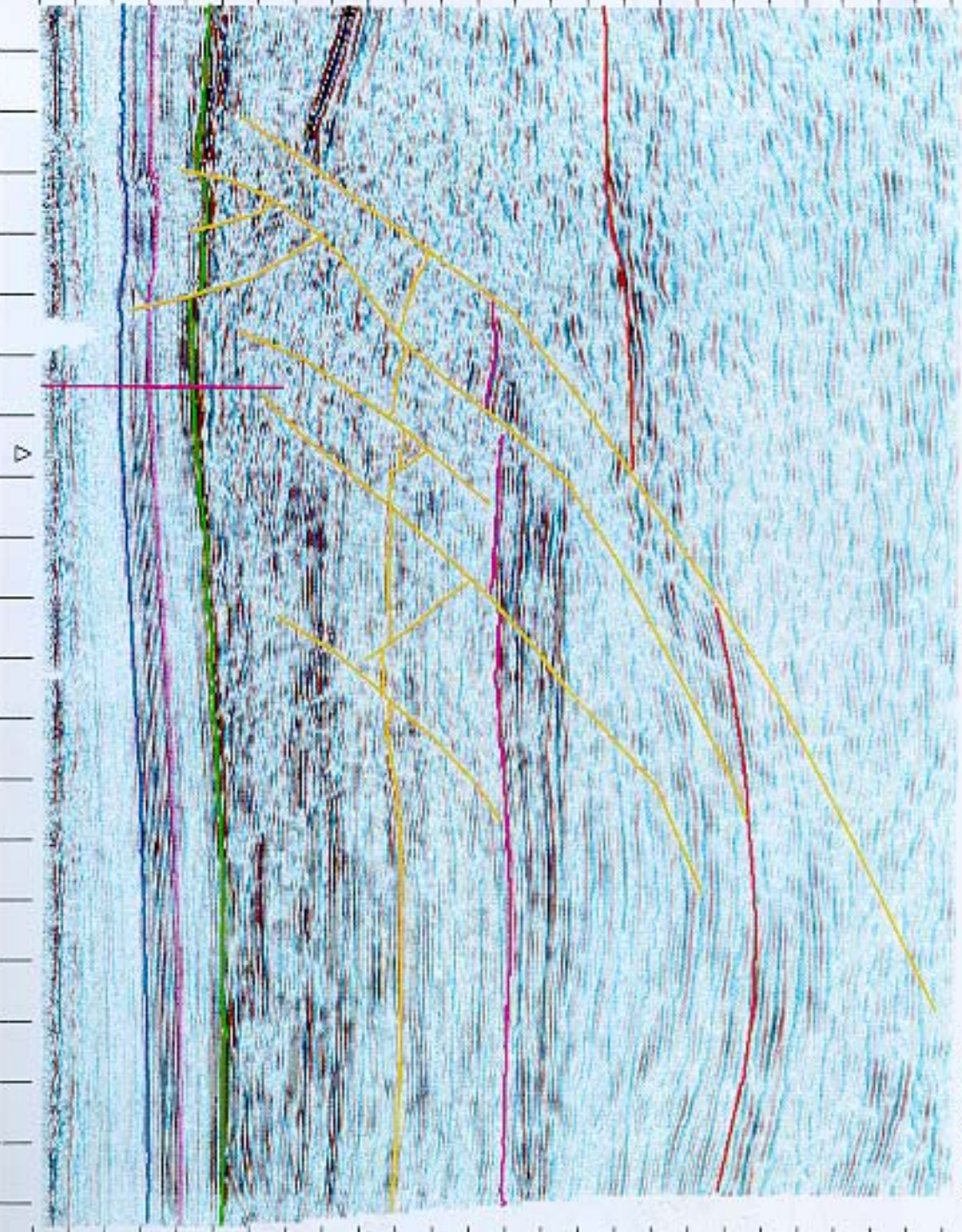
300

400

500

600

0 500 1000 1500 2000 2500



Base Tertiary

500

1000

1500

2000

2500

mig080002

N

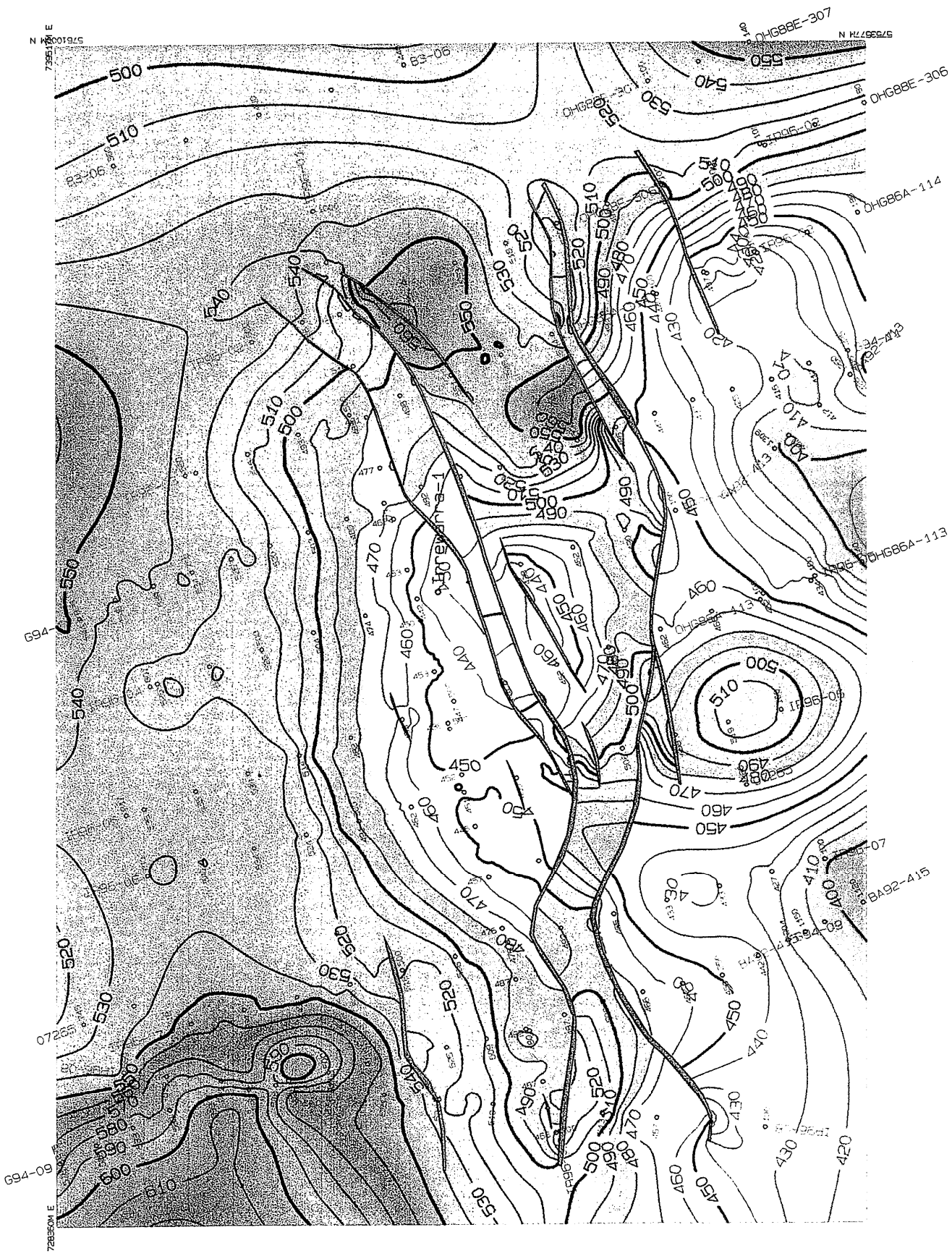
472m

IR96-04

S

Figure 4

PEP 133 IRREWARRA PROSPECT



381
400
425
450
475
500
525
550
575
600
625

N
TRUE NORTH IS SHOWN
FOR THE CENTRE OF THE MAP

1:50000
KILOMETRES

UNIVERSAL TRANSVERSE MERCATOR PROJECTION
AUSTRALIAN NATIONAL SPHEROID
CENTRAL MERIDIAN 141 00 00E
AG096

BASIN OIL NL.
PEP 133
IRREWARRA PROSPECT
TWT STRUCTURE MAP
BASE HEIGHT 100M
(AS AT 1980)

Figure 5

PEP 133 IRREWARRA PROSPECT

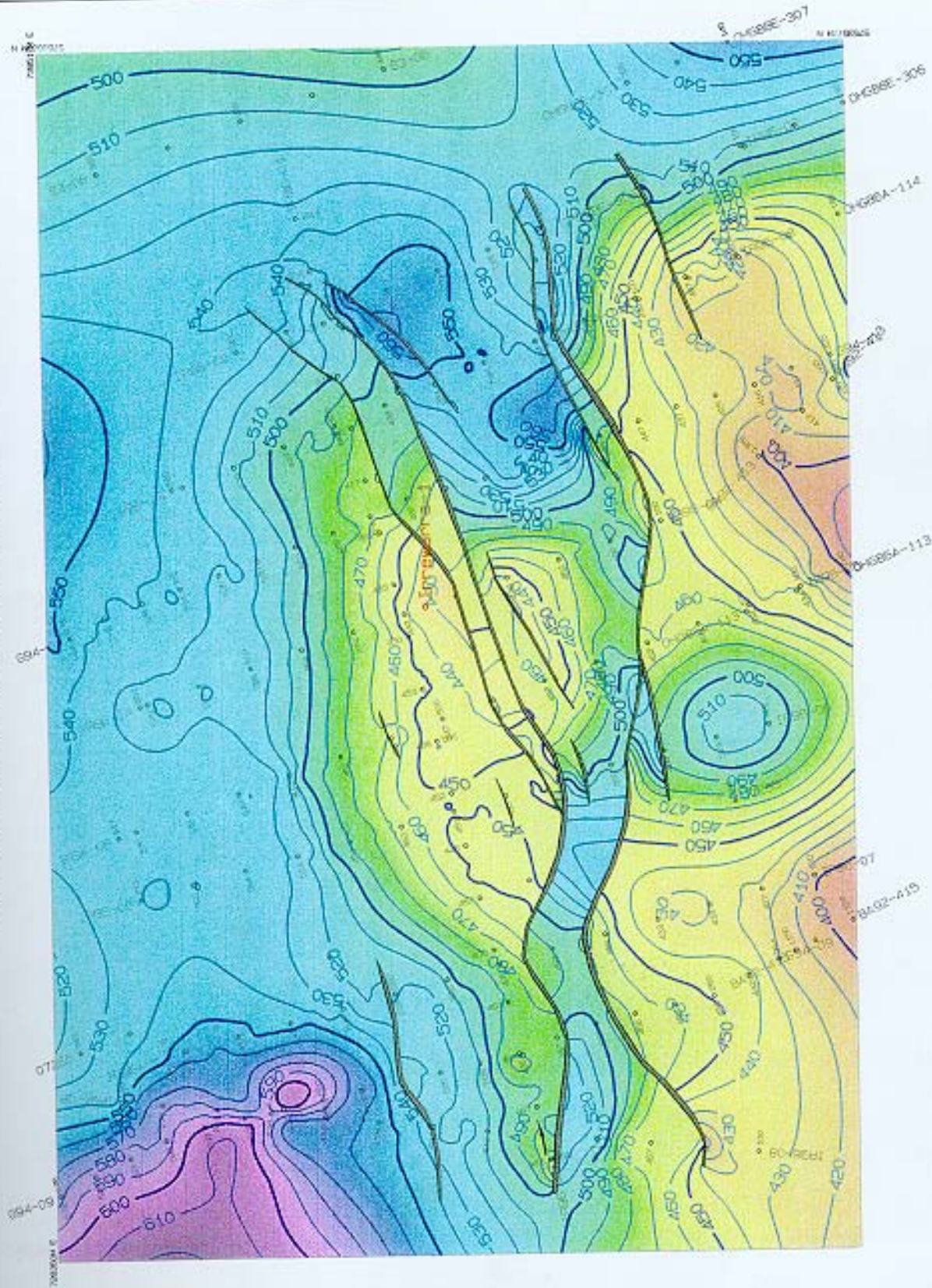


Figure 5.7

APPENDIX 1: LITHOLOGICAL DESCRIPTIONS

WELL NAME:	Irrewarra-1	DATE:	30-4-98
GEOLOGIST:	David Horner	PAGE:	25

Interval (m)	%	Description
9-10	100	Claystone: off white to light yellow to orange, very silty in part, slightly calcareous in part, common to abundant dispersed very fine to coarse subrounded to rounded clear quartz grains, very soft, sticky, non fissile.
10-20	100	Claystone: off white to medium yellow to orange brown, very silty, rarely slightly calcareous, occasionally iron oxide rich, common to abundant dispersed very fine to coarse subrounded to rounded clear quartz grains, very soft, sticky, non fissile.
	Trace	Sandstone: off white to yellow brown, very fine to fine, occasional medium to coarse clear to translucent grains, dominantly very fine, subrounded to rounded, poor to moderate sorting, weak iron oxide cement, abundant off white to yellow brown argillaceous and silt matrix, trace black to red brown carbonaceous material, friable, very poor visual porosity, no oil fluorescence.
20-30	80	Siltstone: medium to dark brown grey, moderately argillaceous, abundant dispersed very fine quartz sand grains - grading to sandstone, moderately calcareous, common very fine muscovite flakes, trace bryozoa fragments, trace forams, occasionally dark grey and moderately carbonaceous, very soft, non fissile.
	20	Sandstone: medium to dark brown grey, very fine, subangular to subrounded, well sorted, no visible cement, abundant dark brown grey argillaceous and silt matrix - matrix supported, clear to translucent quartz grains, unconsolidated to friable, very poor visual porosity, no oil fluorescence.
30-40	100	Siltstone: medium to dark brown grey, moderately argillaceous, abundant dispersed very fine quartz sand grains - grading to sandstone, moderately calcareous, common very fine muscovite flakes, trace bryozoa fragments, trace forams, occasionally dark grey and moderately carbonaceous, very soft, non fissile.
	trace	Sandstone: medium to dark brown grey, very fine, rare fine to coarse grains, subangular to subrounded, well sorted, no visible cement, abundant dark brown grey argillaceous and silt matrix - matrix supported, clear to translucent quartz grains, unconsolidated to friable, very poor visual porosity, no oil fluorescence.
40-50	90	Claystone: medium to dark brown grey to dark grey, very silty in part, occasionally very finely arenaceous, slightly carbonaceous in part, slightly calcareous, trace bryozoa and forams, trace very fine muscovite flakes, very soft, sticky, non fissile.

WELL NAME:	Irrewarra-1	DATE:	30-4-98
GEOLOGIST:	David Horner	PAGE:	2

Interval (m)	%	Description
	10	Siltstone: medium to dark brown grey, very argillaceous, abundant dispersed very fine quartz sand grains - grading to sandstone, moderately calcareous, common very fine muscovite flakes, trace bryozoa fragments, trace forams, occasionally dark grey and moderately carbonaceous, very soft, non fissile.
50-60	90	Claystone: medium brown grey, very silty in part, rarely very finely arenaceous, slightly calcareous, trace fossil fragments, very soft, sticky, non fissile.
	10	Siltstone: medium brown grey, very argillaceous, occasionally abundant dispersed very fine quartz sand grains, slightly calcareous, trace fossil fragments, very soft, non fissile.
60-70	100	Claystone: medium to dark brown, very silty grading to siltstone, occasionally very finely arenaceous, slightly calcareous, trace fossil fragments, very soft, sticky, non fissile.
70-80	20	Claystone: medium to dark brown, very silty grading to siltstone, occasionally very finely arenaceous, slightly calcareous, trace fossil fragments, very soft, sticky, non fissile.
	60	Siltstone: medium brown, moderately to very argillaceous - grades to claystone, often very finely arenaceous - grades to sandstone, moderately calcareous, trace fossil fragments, rare glauconite, very soft, non fissile.
	20	Sandstone: medium brown, very fine, subangular to subrounded, well sorted, very weak calcareous cement, abundant medium brown argillaceous and silt matrix, trace fossil fragments, friable, very poor visual porosity, no oil fluorescence.
80-90	50	Claystone: medium to dark brown, very silty grading to siltstone, occasionally very finely arenaceous, slightly calcareous, trace fossil fragments, very soft, sticky, non fissile.
	40	Siltstone: medium brown, moderately to very argillaceous - grades to claystone, often very finely arenaceous - grades to sandstone, moderately calcareous, trace fossil fragments, rare glauconite, very soft, non fissile.
	10	Sandstone: medium brown, very fine, subangular to subrounded, well sorted, very weak calcareous cement, abundant medium brown argillaceous and silt matrix, trace fossil fragments, friable, very poor visual porosity, no oil fluorescence.
90-100	40	Claystone: medium to dark brown, very silty grading to siltstone, occasionally very finely arenaceous, slightly calcareous, trace fossil fragments, very soft, sticky, non fissile.

WELL NAME:	Irrewarra-1	DATE:	30-4-98
GEOLOGIST:	David Horner	PAGE:	3

Interval (m)	%	Description
	10	Siltstone: medium brown, moderately to very argillaceous - grades to claystone, often very finely arenaceous - grades to sandstone, moderately calcareous, trace fossil fragments, rare glauconite, very soft, non fissile.
	50	Sandstone: medium brown, very fine to occasionally fine, subangular to subrounded, well sorted, very weak calcareous cement, abundant medium brown argillaceous and silt matrix, trace fossil fragments, trace glauconite, friable, very poor visual porosity, no oil fluorescence.
100-110	20	Claystone: medium green grey to medium brown grey, moderately silty, occasionally very finely arenaceous with quartz and partially altered feldspar grains, slightly to moderately calcareous, trace fossil fragments, trace glauconite, trace black carbonaceous flecks, soft - firm, sticky, non fissile.
	20	Siltstone: medium brown, moderately to very argillaceous - grades to claystone, often very finely arenaceous - grades to sandstone, moderately calcareous, trace fossil fragments, rare glauconite, very soft, non fissile.
	60	Sandstone: medium brown, very fine to fine, subangular to subrounded, well sorted, strong calcareous cement, trace to common medium brown argillaceous and silt matrix, common to abundant shell and other fossil fragments, trace glauconite, friable to hard, very poor visual porosity, no oil fluorescence.
110-120	40	Siltstone: medium brown, moderately argillaceous, often very finely arenaceous - grades to sandstone, moderately calcareous, trace fossil fragments, rare glauconite, very soft, non fissile.
	60	Sandstone: medium brown, very fine, subangular to subrounded, well sorted, very weak calcareous cement, abundant medium brown argillaceous and silt matrix - matrix supported, common fossil fragments, trace glauconite, friable, very poor visual porosity, no oil fluorescence.
120-130	50	Siltstone: medium brown, moderately argillaceous, abundant dispersed very fine quartz sand grains - grades to sandstone, moderately calcareous, trace fossil fragments, rare glauconite, very soft, non fissile.
	50	Sandstone: medium brown, very fine, subangular to subrounded, well sorted, very weak calcareous cement, abundant medium brown argillaceous and silt matrix - matrix supported, clear to translucent quartz grains, trace red lithics, trace fossil fragments, friable, very poor visual porosity, no oil fluorescence.

WELL NAME:	Irrewarra-1	DATE:	30-4-98
GEOLOGIST:	David Horner	PAGE:	4

Interval (m)	%	Description
130-140	60	Siltstone: medium brown, moderately argillaceous, abundant dispersed very fine quartz sand grains - grades to sandstone, moderately calcareous, trace fossil fragments, rare glauconite, very soft, non fissile.
	40	Sandstone: medium brown, very fine, subangular to subrounded, well sorted, very weak calcareous cement, abundant medium brown argillaceous and silt matrix - matrix supported, clear to translucent quartz grains, trace red lithics, trace fossil fragments, trace glauconite, friable, very poor visual porosity, no oil fluorescence.
140-150	20	Claystone: medium brown, very silty - grades to siltstone, abundant dispersed very fine quartz sand grains in part, moderately calcareous, trace fossil fragments, rare glauconite, very soft, non fissile.
	60	Siltstone: medium brown, moderately argillaceous, abundant dispersed very fine quartz sand grains - grades to sandstone, moderately calcareous, trace fossil fragments, rare glauconite, very soft, non fissile.
	20	Sandstone: medium brown, very fine to rarely fine, subangular to subrounded, well sorted, very weak calcareous cement, abundant medium brown argillaceous and silt matrix - matrix supported, clear to translucent quartz grains, trace red lithics, trace fossil fragments, trace glauconite, friable, very poor visual porosity, no oil fluorescence.
150-160	40	Claystone: medium brown to dark brown grey, very silty - grades to siltstone, abundant dispersed very fine quartz sand grains in part, moderately calcareous, trace fossil fragments, rare glauconite, very soft, non fissile.
	50	Siltstone: medium brown to dark brown grey, moderately argillaceous, abundant dispersed very fine quartz sand grains - grades to sandstone, moderately calcareous, trace fossil fragments, rare glauconite, very soft, non fissile.
	10	Sandstone: medium brown, very fine to rarely fine, subangular to subrounded, well sorted, very weak calcareous cement, abundant medium brown argillaceous and silt matrix - matrix supported, clear to translucent quartz grains, trace red lithics, trace fossil fragments, trace glauconite, friable, very poor visual porosity, no oil fluorescence.

WELL NAME:	Irrewarra-1	DATE:	30-4-98
GEOLOGIST:	David Horner	PAGE:	5

Interval (m)	%	Description
160-170	60	Claystone: dark brown grey, very silty, common dispersed very fine quartz sand grains, slightly calcareous, trace fossil fragments, very soft, sticky, non fissile.
	40	Siltstone: dark brown grey, very argillaceous grading to claystone, very finely arenaceous - grades to sandstone, slightly to moderately calcareous, trace fossil fragments, rare glauconite, very soft, non fissile.
	trace	Sandstone: medium brown, very fine, subangular to subrounded, well sorted, very weak calcareous cement, abundant dark brown grey argillaceous and silt matrix - matrix supported, clear to translucent quartz grains, trace red lithics, trace fossil fragments, trace glauconite, friable, no visual porosity, no oil fluorescence.
170-180	70	Claystone: dark brown grey, very silty, common dispersed very fine quartz sand grains, slightly calcareous, trace fossil fragments, trace micromica, very soft, sticky, non fissile.
	30	Siltstone: dark brown grey, very argillaceous grading to claystone, very finely arenaceous - grades to sandstone, slightly calcareous, trace fossil fragments, rare glauconite, trace micromica, very soft, non fissile.
	trace	Sandstone: medium brown, very fine, subangular to subrounded, well sorted, very weak calcareous cement, abundant dark brown grey argillaceous and silt matrix - matrix supported, clear to translucent quartz grains, trace red lithics, trace fossil fragments, trace glauconite, friable, no visual porosity, no oil fluorescence.
180-190	90	Claystone: dark brown grey, moderately to very silty, trace dispersed very fine quartz sand grains, trace fossil fragments, trace glauconite, trace micromica, very soft, sticky, non fissile.
	10	Siltstone: dark brown grey, very argillaceous grading to claystone, occasionally common very fine dispersed quartz sand grains, slightly calcareous, trace fossil fragments, trace glauconite, trace micromica, very soft, non fissile.
190-200	90	Claystone: dark brown grey, moderately to very silty, trace dispersed very fine quartz sand grains, trace fossil fragments, trace to common glauconite, trace micromica, very soft, sticky, non fissile.
	10	Siltstone: dark brown grey, very argillaceous grading to claystone, occasionally common very fine dispersed quartz sand grains, slightly calcareous, trace fossil fragments, trace glauconite, trace micromica, very soft, non fissile.
200-210	100	Claystone: medium to dark grey to medium brown grey, very silty, rarely very finely arenaceous, trace fossil fragments, rare glauconite, rare pyrite, soft, non fissile.

WELL NAME:	Irrewarra-1	DATE:	30-4-98
GEOLOGIST:	David Horner	PAGE:	6

Interval (m)	%	Description
210-220	100	Claystone: medium to dark grey to medium brown grey to rarely medium green grey, very silty, rarely very finely arenaceous, trace fossil fragments, rare glauconite, soft, non fissile.
220-230	100	Claystone: medium to dark grey to medium brown grey to rarely medium green grey, very silty, trace to common dispersed very fine to rarely coarse quartz sand grains, trace fossil fragments, trace glauconite, soft, non fissile.
230-240	70	Claystone: medium grey to medium brown grey medium green grey, very silty, slightly to moderately calcareous, occasionally very finely arenaceous, trace fossil fragments, trace glauconite, soft, non fissile.
	30	Siltstone: light brown grey, very argillaceous, often very finely arenaceous, slightly to moderately calcareous, trace fossil fragments, trace glauconite, trace micromica, soft, non fissile.
240-250	70	Claystone: medium grey to medium brown grey medium green grey, moderately to very silty, moderately calcareous, common fossil fragments, trace glauconite, soft, non fissile.
	30	Siltstone: light to medium green grey to medium brown grey, very argillaceous, occasionally very finely arenaceous, moderately to very calcareous, trace fossil fragments, trace glauconite, trace micromica, soft, non fissile.
250-255	80	Claystone: medium grey to medium brown grey medium green grey, moderately to very silty, moderately calcareous, common fossil fragments, trace to common glauconite, soft, non fissile.
	20	Siltstone: light to medium green grey to medium brown grey, very argillaceous, occasionally very finely arenaceous, moderately to very calcareous, trace fossil fragments, trace glauconite, trace micromica, soft, non fissile.
255-260	50	Siltstone: medium to dark brown, moderately to very argillaceous, abundant dispersed very fine to rarely coarse quartz sand grains - grades to sandstone, trace glauconite, slightly calcareous, trace fossil fragments, trace pyrite, soft, non fissile.
	50	Sandstone: medium brown, very fine to fine, minor medium to coarse grains, subrounded to rounded, moderately sorted, very weak calcareous cement, abundant medium brown argillaceous and silt matrix - matrix supported, clear to translucent quartz grains often with brown staining, common fossil fragments, trace glauconite, trace pyrite, friable to unconsolidated, very poor inferred porosity, no oil fluorescence.

WELL NAME:	Irrewarra-1	DATE:	30-4-98
GEOLOGIST:	David Horner	PAGE:	7

Interval (m)	%	Description
260-270	40	Siltstone: medium to dark brown, moderately to very argillaceous, abundant dispersed very fine to coarse quartz sand grains - grades to sandstone, trace glauconite, slightly calcareous, common fossil fragments, common pyrite, soft, non fissile.
	60	Sandstone: medium brown, very fine to very coarse, dominantly fine to medium, subrounded to rounded, poorly sorted, very weak calcareous cement, abundant medium brown argillaceous and silt matrix - matrix supported, clear to translucent quartz grains often with brown staining, common fossil fragments, trace carbonaceous material, trace glauconite, common pyrite, friable to unconsolidated, very poor inferred porosity, no oil fluorescence.
270-275	30	Siltstone: medium to dark brown, moderately to very argillaceous, abundant dispersed very fine to coarse quartz sand grains - grades to sandstone, trace glauconite, slightly calcareous, common fossil fragments occasionally replaced by pyrite, common pyrite, soft, non fissile.
	70	Sandstone: medium brown, very fine to very coarse, dominantly fine to medium, subrounded to rounded, poorly sorted, very weak calcareous cement, abundant medium brown argillaceous and silt matrix - matrix supported, clear to translucent quartz grains often with brown staining, common fossil fragments, trace carbonaceous material, trace glauconite, common pyrite, friable to unconsolidated, very poor inferred porosity, no oil fluorescence.
275-285	40	Siltstone: medium to dark brown, moderately to very argillaceous, abundant dispersed very fine to coarse quartz sand grains - grades to sandstone, trace glauconite, slightly calcareous, common fossil fragments occasionally replaced by pyrite, common pyrite, soft, non fissile.
	60	Sandstone: medium brown to rarely off white, very fine to very coarse, dominantly fine to medium, subrounded to rounded, poorly sorted, very weak calcareous cement, common to dominantly abundant medium brown argillaceous and silt matrix - mainly matrix supported, clear to translucent quartz grains often with brown staining, common fossil fragments, trace carbonaceous material, trace glauconite, common pyrite, friable to unconsolidated, very poor to poor inferred porosity, no oil fluorescence.
285-295	20	Siltstone: medium to dark brown, moderately to very argillaceous, abundant dispersed very fine to coarse quartz sand grains - grades to sandstone, trace glauconite, slightly calcareous, common fossil fragments occasionally replaced by pyrite, common pyrite, soft, non fissile.

	80	Sandstone: medium brown, very fine to very coarse, dominantly very fine to fine, subrounded to rounded, very poorly sorted, very weak calcareous cement in part, common to dominantly abundant medium to dark brown argillaceous and silt matrix - mainly matrix supported, clear to translucent quartz grains often with weak brown staining, trace red brown argillaceous lithics, common fossil fragments, trace carbonaceous material, trace glauconite, common pyrite, friable to unconsolidated, very poor to poor inferred porosity, no oil fluorescence.
--	----	--

WELL NAME:	Irrewarra-1	DATE:	30-4-98
GEOLOGIST:	David Horner	PAGE:	8

Interval (m)	%	Description
295-305	30	Siltstone: medium to dark brown, moderately to very argillaceous, abundant dispersed very fine to coarse quartz sand grains - grades to sandstone, trace glauconite, common fossil fragments occasionally replaced by pyrite, common pyrite, soft, non fissile.
	70	Sandstone: medium brown, very fine to very coarse, dominantly very fine to fine, subrounded to rounded, very poorly sorted, very weak calcareous cement in part, common to dominantly abundant medium to dark brown argillaceous and silt matrix - mainly matrix supported, clear to translucent quartz grains often with weak brown staining, trace red brown argillaceous lithics, common fossil fragments, trace carbonaceous material, trace glauconite, common pyrite, friable to unconsolidated, poor inferred porosity, no oil fluorescence.
305-310	60	Siltstone: medium to dark brown, moderately to very argillaceous, abundant dispersed very fine to coarse quartz sand grains - grades to sandstone, trace glauconite, trace fossil fragments, trace pyrite, soft, non fissile.
	40	Sandstone: medium brown, very fine to very coarse, dominantly very fine, subrounded to rounded, very poorly sorted, very weak calcareous cement in part, common to dominantly abundant medium to dark brown argillaceous and silt matrix - mainly matrix supported, clear to translucent quartz grains often with weak brown staining, trace red brown argillaceous lithics, trace fossil fragments, trace carbonaceous material, trace glauconite, trace pyrite, friable to unconsolidated, poor inferred porosity, no oil fluorescence.
310-315	50	Siltstone: medium to dark brown, moderately to very argillaceous, abundant dispersed very fine to coarse quartz sand grains - grades to sandstone, trace glauconite, trace fossil fragments, trace pyrite, soft, non fissile.
	50	Sandstone: medium brown, very fine to very coarse, dominantly very fine, subrounded to rounded, very poorly sorted, very weak calcareous cement in part, common to dominantly abundant medium to dark brown argillaceous and silt matrix - mainly matrix supported, clear to translucent quartz grains often with weak brown staining, trace red brown argillaceous lithics, trace fossil fragments, trace carbonaceous material, trace glauconite, trace pyrite, friable to unconsolidated, poor inferred porosity, no oil fluorescence.
315-320	40	Siltstone: medium to dark brown, moderately to very argillaceous, abundant dispersed very fine to coarse quartz sand grains - grades to sandstone, trace glauconite, trace fossil fragments, trace pyrite, soft, non fissile.

	60	Sandstone: medium brown, very fine to pebble, dominantly very fine, subrounded to rounded, very poorly sorted, very weak calcareous cement in part, common to dominantly abundant medium to dark brown argillaceous and silt matrix - mainly matrix supported, clear to translucent quartz grains often with weak brown staining, trace red brown argillaceous lithics, trace fossil fragments, trace carbonaceous material, trace glauconite, trace pyrite, friable to unconsolidated, poor inferred porosity, no oil fluorescence.
--	----	---

WELL NAME:	Irrewarra-1	DATE:	30-4-98
GEOLOGIST:	David Horner	PAGE:	9

Interval (m)	%	Description
320-325	50	Siltstone: medium to dark brown, moderately to very argillaceous, abundant dispersed very fine to coarse quartz sand grains - grades to sandstone, trace glauconite, trace fossil fragments, trace pyrite, soft, non fissile.
	50	Sandstone: medium brown, very fine to pebble, dominantly very fine, subrounded to rounded, very poorly sorted, very weak calcareous cement in part, common to dominantly abundant medium to dark brown argillaceous and silt matrix - mainly matrix supported, clear to translucent quartz grains often with weak brown staining, trace red brown argillaceous lithics, trace fossil fragments, trace carbonaceous material, trace to common glauconite, trace pyrite, friable to unconsolidated, poor inferred porosity, no oil fluorescence.
325-330	20	Siltstone: medium to dark brown, moderately to very argillaceous, abundant dispersed very fine to coarse quartz sand grains - grades to sandstone, trace glauconite, trace fossil fragments, trace pyrite, soft, non fissile.
	80	Sandstone: medium brown, very fine to pebble, dominantly very fine, subrounded to rounded, very poorly sorted, very weak calcareous cement in part, common to dominantly abundant medium to dark brown argillaceous and silt matrix - mainly matrix supported, clear to translucent quartz grains often with weak brown staining, trace red brown argillaceous lithics, trace fossil fragments, trace carbonaceous material, trace to common glauconite, trace pyrite, friable to unconsolidated, poor inferred porosity, no oil fluorescence.
330-335	10	Siltstone: medium grey to dark brown, moderately to very argillaceous, abundant dispersed very fine to coarse quartz sand grains - grades to sandstone, slightly calcareous, common glauconite, trace fossil fragments, trace pyrite, soft, non fissile.
	90	Sandstone: medium brown, very fine to pebble, dominantly very fine, subrounded to rounded, very poorly sorted, very weak to rarely moderate calcareous cement, common to dominantly abundant medium to dark brown argillaceous and silt matrix - mainly matrix supported, clear to translucent quartz grains often with weak brown staining, trace red brown argillaceous lithics, trace fossil fragments, trace carbonaceous material, trace to common glauconite, trace pyrite, friable to unconsolidated, poor inferred porosity, no oil fluorescence.
335-340	30	Siltstone: medium grey to dark brown, moderately to very argillaceous, abundant dispersed very fine to coarse quartz sand grains - grades to sandstone, slightly calcareous, common to abundant glauconite, trace fossil fragments, trace pyrite, soft, non fissile.

	70	Sandstone: medium brown, very fine to pebble, dominantly very fine, subrounded to rounded, very poorly sorted, very weak to rarely moderate calcareous cement, common to dominantly abundant medium to dark brown argillaceous and silt matrix - mainly matrix supported, clear to translucent quartz grains often with weak brown staining, trace red brown argillaceous lithics, trace fossil fragments, trace carbonaceous material, common glauconite, trace pyrite, friable to unconsolidated, poor inferred porosity, no oil fluorescence.
--	----	--

WELL NAME:	Irrewarra-1	DATE:	30-4-98
GEOLOGIST:	David Horner	PAGE:	370

Interval (m)	%	Description
340-345	20	Siltstone: medium grey to dark brown, moderately to very argillaceous, abundant dispersed very fine to coarse quartz sand grains - grades to sandstone, slightly calcareous, common to abundant glauconite, trace fossil fragments, trace pyrite, soft, non fissile.
	80	Sandstone: medium brown, very fine to pebble, dominantly very fine, subrounded to rounded, very poorly sorted, very weak to rarely moderate calcareous cement, common to dominantly abundant medium to dark brown argillaceous and silt matrix - mainly matrix supported, clear to translucent quartz grains often with weak brown staining, trace red brown argillaceous lithics, trace fossil fragments, trace carbonaceous material, common glauconite, trace pyrite, friable to unconsolidated, poor inferred porosity, no oil fluorescence.
345-350	NR	No sample - bypass shaker screens due to blinding.
350-355	100	Volcanics: 80% clear to milky very coarse angular fractured quartz with 20% dark green to black cryptocrystalline to coarsely crystalline mafic minerals, hard, no inferred porosity, no oil fluorescence.
355-360	100	Volcanics: 90% clear to milky very coarse angular fractured quartz with 10% dark green to black cryptocrystalline to coarsely crystalline mafic minerals, hard, no inferred porosity, no oil fluorescence.
360-365	100	Volcanics: 80% clear to milky very coarse angular fractured quartz with 20% dark green to black cryptocrystalline to coarsely crystalline mafic minerals - in part weathered to off white to medium brown with minor orange pink chert and medium brown cryptocrystalline dolomite, hard, no inferred porosity, no oil fluorescence.
365-370	NR	No sample - bypass shaker screens due to blinding.
370-375	100	Sandstone: light to medium green grey, fine to coarse, dominantly medium, subangular to subrounded, moderately sorted, weak calcareous cement, common to abundant off white to light green grey argillaceous matrix, abundant green to grey lithics, common red brown lithics, trace black coaly detritus, trace pyrite, friable, poor to fair visual porosity, no oil fluorescence.
375-380	20	Claystone: off white to light brown to light green grey, trace black coaly detritus, very soft, sticky, non fissile
	80	Sandstone: light to medium green grey, fine to coarse, dominantly medium, subangular to subrounded, moderately sorted, weak calcareous cement, common to abundant off white to light green grey argillaceous matrix, abundant green to grey lithics, common red brown lithics, trace black coaly detritus, trace pyrite, friable, poor to fair visual porosity, no oil fluorescence.
380-385	30	Claystone: off white to light brown to light green grey, trace black coaly detritus, very soft, sticky, non fissile

	70	Sandstone: light to medium green grey, fine to coarse, dominantly medium, subangular to subrounded, moderately sorted, weak calcareous cement, common to abundant off white to light green grey argillaceous matrix, abundant green to grey lithics, common red brown lithics, trace black coaly detritus, trace coarse green mica flakes, trace pyrite, friable, poor to fair visual porosity, no oil fluorescence.
--	----	--

WELL NAME:	Irrewarra-1	DATE:	30-4-98
GEOLOGIST:	David Horner	PAGE:	391

Interval (m)	%	Description
385-395	40	Claystone: off white to light brown to light green grey, moderately silty in part, trace black coaly detritus, very soft, sticky, non fissile
	60	Sandstone: light to medium green grey, fine to coarse, dominantly medium, subangular to subrounded, moderately sorted, weak calcareous cement, common to abundant off white to light green grey argillaceous matrix, abundant green to grey lithics, common red brown lithics, trace black coaly detritus, trace coarse green mica flakes, trace pyrite, friable, poor to fair visual porosity, no oil fluorescence.
395-400	20	Claystone: off white to light brown to light green grey, moderately silty in part, trace black coaly detritus, very soft, sticky, non fissile
	80	Sandstone: light to medium green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately sorted, weak calcareous cement, common to abundant off white to light green grey argillaceous matrix, abundant green to grey lithics, common red brown lithics, trace black coaly detritus, trace coarse green mica flakes, trace pyrite, friable, poor to fair visual porosity, no oil fluorescence.
400-405	60	Claystone: light grey to light green grey to light brown grey, moderately to very silty, trace very fine partially altered feldspar grains, trace black carbonaceous flecks and fine detritus, rare pyrite, very soft, sticky, non fissile
	40	Sandstone: light to medium green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately sorted, weak calcareous cement, common to abundant off white to light green grey argillaceous matrix, abundant green to grey lithics, common red brown lithics, trace black coaly detritus, trace coarse green and clear mica flakes, trace pyrite, friable, poor visual porosity, no oil fluorescence.
405-410	80	Claystone: light grey to light green grey to light brown grey, moderately to very silty, trace very fine partially altered feldspar grains, trace black carbonaceous flecks and fine detritus, rare pyrite, very soft, sticky, non fissile
	20	Sandstone: light to medium green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately sorted, weak calcareous cement, common to abundant off white to light green grey argillaceous matrix, abundant green to grey lithics, common red brown lithics, trace black coaly detritus, trace coarse green and clear mica flakes, trace pyrite, friable, poor visual porosity, no oil fluorescence.
NOTE		from 405 to 430m samples contain from trace to 5% volcanics (as above) - probably cavings.

WELL NAME:	Irrewarra-1	DATE:	30-4-98
GEOLOGIST:	David Horner	PAGE:	402

Interval (m)	%	Description
410-415	70	Claystone: light grey to light green grey to light brown grey, moderately to very silty, trace very fine partially altered feldspar grains, trace black carbonaceous flecks and fine detritus, rare pyrite, very soft, sticky, non fissile
	20	Siltstone: medium grey to medium brown grey, moderately to very argillaceous, often very finely arenaceous with altered feldspar and quartz grains, common black carbonaceous flecks and fine detritus, firm, non fissile.
	10	Sandstone: light to medium green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately sorted, weak calcareous cement, common to abundant off white to light green grey argillaceous matrix, abundant green to grey lithics, common red brown lithics, trace black coaly detritus, trace coarse green and clear mica flakes, trace pyrite, friable, poor visual porosity, no oil fluorescence.
415-420	60	Claystone: light grey to light green grey to light brown grey, moderately to very silty, trace very fine partially altered feldspar grains, trace black carbonaceous flecks and fine detritus, rare pyrite, very soft, sticky, non fissile
	10	Siltstone: medium grey to medium brown grey, moderately to very argillaceous, often very finely arenaceous with altered feldspar and quartz grains, common black carbonaceous flecks and fine detritus, firm, non fissile.
	30	Sandstone: light to medium green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately sorted, weak calcareous cement, common to abundant off white to light green grey argillaceous matrix, abundant green to grey lithics, common red brown lithics, trace black coaly detritus, trace coarse green and clear mica flakes, trace pyrite, friable, poor visual porosity, no oil fluorescence.
420-425	90	Claystone: light grey to light green grey to light brown grey, moderately to very silty, trace very fine partially altered feldspar grains, common black coaly detritus, rare pyrite, very soft, sticky, non fissile
	10	Sandstone: light to medium green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately sorted, weak calcareous cement, common to abundant off white to light green grey argillaceous matrix, abundant green to grey lithics, common red brown lithics, trace black coaly detritus, trace coarse green and clear mica flakes, trace pyrite, friable, poor visual porosity, no oil fluorescence.
425-430	40	Claystone: light grey to light green grey to light brown grey, moderately to very silty, trace very fine partially altered feldspar grains, trace black coaly flecks and detritus, very soft, sticky, non fissile

	30	Siltstone: medium grey, moderately to very argillaceous, often very finely arenaceous with altered feldspar and quartz grains, common black carbonaceous flecks and fine detritus, firm, non fissile.
	30	Sandstone: light green grey, very fine to coarse, dominantly medium, subangular to subrounded, moderately sorted, weak calcareous cement, abundant off white argillaceous matrix, abundant green to grey and red brown lithics, trace black coaly detritus, trace coarse green and clear mica flakes, friable, very poor visual porosity, no oil fluorescence.
WELL NAME:		Irrewarra-1
DATE:		30-4-98
GEOLOGIST:	David Horner	PAGE: 413

Interval (m)	%	Description
430-435	20	Claystone: light grey to light green grey to light brown grey, moderately to very silty, trace very fine partially altered feldspar grains, trace black coaly flecks and detritus, very soft, sticky, non fissile
	30	Siltstone: medium grey, moderately to very argillaceous, often very finely arenaceous with altered feldspar and quartz grains, common black carbonaceous flecks and fine detritus, firm, non fissile.
	50	Sandstone: light green grey, very fine to coarse, dominantly fine, subangular to subrounded, moderately sorted, weak calcareous cement, abundant off white argillaceous matrix, abundant green to grey and red brown lithics, trace black coaly detritus, trace coarse green and clear mica flakes, friable, very poor visual porosity, no oil fluorescence.
435-440	50	Claystone: light grey to light green grey to light brown grey, moderately to very silty, trace very fine partially altered feldspar grains, trace black coaly flecks and detritus, very soft, sticky, non fissile
	30	Siltstone: medium grey, moderately to very argillaceous, often very finely arenaceous with altered feldspar and quartz grains, common black carbonaceous flecks and fine detritus, firm, non fissile.
	20	Sandstone: light green grey, very fine to coarse, dominantly fine, subangular to subrounded, moderately sorted, weak calcareous cement, abundant off white argillaceous matrix, abundant green to grey and red brown lithics, trace black coaly detritus, trace coarse green and clear mica flakes, friable, very poor visual porosity, no oil fluorescence.
440-445	40	Claystone: light grey to light green grey to light brown grey, moderately to very silty, trace very fine partially altered feldspar grains, trace black coaly flecks and detritus, very soft, sticky, non fissile
	50	Siltstone: medium grey, moderately to very argillaceous, often very finely arenaceous with altered feldspar and quartz grains, common black carbonaceous flecks and fine detritus, firm, non fissile.
	10	Sandstone: light green grey, very fine to coarse, dominantly fine, subangular to subrounded, moderately sorted, weak calcareous cement, abundant off white argillaceous matrix, abundant green to grey and red brown lithics, trace black coaly detritus, trace coarse green and clear mica flakes, friable, very poor visual porosity, no oil fluorescence.

Well Completion Report - Irrewarra 1

445-460	70	Claystone: light to medium grey to medium brown grey, moderately to very silty, trace to common black carbonaceous flecks, abundant black coal detritus in part, trace micromica, very soft, sticky, non fissile
	20	Siltstone: light to medium grey to medium brown, moderately to very argillaceous, very finely arenaceous with altered feldspar and quartz grains in part, non to moderately calcareous, trace to common black carbonaceous flecks and detritus, firm, non fissile.
	10	Sandstone: off white to light green grey, very fine to coarse, dominantly fine to medium, subangular to subrounded, moderately sorted, moderate calcareous cement, abundant off white argillaceous matrix - matrix supported, abundant green to grey and red brown lithics, common black coaly detritus, friable, very poor visual porosity, no oil fluorescence.
	trace	Coal: black, earthy texture, platy to irregular fracture, moderately hard.

WELL NAME:	Irrewarra-1	DATE:	30-4-98
GEOLOGIST:	David Horner	PAGE:	434

Interval (m)	%	Description
460-470	50	Claystone: light to medium grey to medium brown grey, moderately to very silty, trace to common black carbonaceous flecks, abundant black coal detritus in part, trace micromica, very soft, sticky, non fissile
	20	Siltstone: light to medium grey to medium brown, moderately to very argillaceous, very finely arenaceous with altered feldspar and quartz grains in part, non to moderately calcareous, trace to common black carbonaceous flecks and detritus, firm, non fissile.
	30	Sandstone: off white to light green grey, very fine to coarse, dominantly fine to medium, subangular to subrounded, moderately sorted, moderate calcareous cement, abundant off white argillaceous matrix - matrix supported, abundant green to grey and red brown lithics, common black coaly detritus, friable, very poor visual porosity, no oil fluorescence.
470-480	70	Claystone: light to medium grey to medium brown grey, moderately to very silty, trace to common black carbonaceous flecks, abundant black coal detritus in part, trace micromica, very soft, sticky, non fissile
	20	Siltstone: light to medium grey to medium brown, moderately to very argillaceous, very finely arenaceous with altered feldspar and quartz grains in part, non to moderately calcareous, trace to common black carbonaceous flecks and detritus, firm, non fissile.
	10	Sandstone: off white to light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately sorted, moderate calcareous cement, abundant off white argillaceous matrix - matrix supported, abundant green to grey and red brown lithics, common black coaly detritus, friable, very poor visual porosity, no oil fluorescence.
	trace	Coal: black, occasionally dark brown and very argillaceous, earthy texture, platy to irregular fracture, moderately hard.
480-485	80	Claystone: light to medium grey to medium brown grey, moderately to very silty, trace to common black carbonaceous flecks, abundant black coal detritus in part, trace micromica, very soft, sticky, non fissile
	20	Siltstone: light to medium grey to medium brown, moderately to very argillaceous, very finely arenaceous with altered feldspar and quartz grains in part, non to moderately calcareous, trace to common black carbonaceous flecks and detritus, firm, non fissile.
	trace	Sandstone: off white to light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately sorted, moderate calcareous cement, abundant off white argillaceous matrix - matrix supported, abundant green to grey and red brown lithics, common black coaly detritus, friable, very poor visual porosity, no oil fluorescence.

WELL NAME:	Irrewarra-1	DATE:	30-4-98
GEOLOGIST:	David Horner	PAGE:	445

Interval (m)	%	Description
485-495	80	Claystone: light to medium grey to medium brown grey, moderately to very silty, trace to common black carbonaceous flecks, abundant black coal detritus in part, trace micromica, very soft, sticky, non fissile
	20	Siltstone: light to medium grey to medium brown, moderately to very argillaceous, very finely arenaceous with altered feldspar and quartz grains in part, non to moderately calcareous, trace to common black carbonaceous flecks and detritus, firm, non fissile.
	trace	Sandstone: off white to light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately sorted, moderate calcareous cement, abundant off white argillaceous matrix - matrix supported, abundant green to grey and red brown lithics, common black coaly detritus, friable, very poor visual porosity, no oil fluorescence.
	trace	Coal: black, occasionally dark brown and very argillaceous, earthy texture, platy to irregular fracture, moderately hard.
495-505	70	Claystone: light to medium grey to medium brown grey, moderately to very silty, trace to common black carbonaceous flecks, abundant black coal detritus in part, trace micromica, very soft, sticky, non fissile
	20	Siltstone: light to medium grey to medium brown, moderately to very argillaceous, very finely arenaceous with altered feldspar and quartz grains in part, non to moderately calcareous, trace to common black carbonaceous flecks and detritus, firm, non fissile.
	10	Sandstone: off white to light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately sorted, moderate calcareous cement, abundant off white argillaceous matrix - matrix supported, abundant green to grey and red brown lithics, common black coaly detritus, friable, very poor visual porosity, no oil fluorescence.
	trace	Coal: black, occasionally dark brown and very argillaceous, earthy texture, platy to irregular fracture, moderately hard.
505-510	80	Claystone: light to medium grey to medium brown grey to medium green grey, moderately to very silty, trace to common black carbonaceous flecks, common black coal detritus in part, trace micromica, very soft, sticky, non fissile
	20	Siltstone: light to medium grey, moderately to very argillaceous, very finely arenaceous with altered feldspar and quartz grains in part, slightly calcareous in part, trace to common black carbonaceous flecks and detritus, trace micromica, firm, non fissile.
510-520	100	Claystone: light to medium grey to medium brown grey to medium green grey, very silty in part, trace black carbonaceous flecks, trace black coal detritus, trace micromica, very soft, sticky, non fissile

WELL NAME:	Irrewarra-1	DATE:	30-4-98
GEOLOGIST:	David Horner	PAGE:	456

Interval (m)	%	Description
520-525	90	Claystone: light to medium grey to medium brown grey to medium green grey, very silty in part, trace black carbonaceous flecks, trace black coal detritus, trace micromica, very soft, sticky, non fissile
	10	Sandstone: off white to light green grey, very fine to medium, dominantly fine, subangular to subrounded, moderately sorted, very weak calcareous and silica cement, abundant off white argillaceous matrix - matrix supported, abundant altered feldspar grains, common green to grey and red brown lithics, trace to common black coaly detritus, friable, very poor visual porosity, no oil fluorescence.
525-530	100	Claystone: light to medium grey to medium brown grey to medium green grey, very silty in part, trace black carbonaceous flecks, trace black coal detritus, trace micromica, very soft, sticky, non fissile
530-535	90	Claystone: light to medium grey to medium brown grey to medium green grey, very silty in part, trace black carbonaceous flecks, trace black coal detritus, trace micromica, very soft, sticky, non fissile
	10	Sandstone: off white to light green grey, very fine to fine, subangular to subrounded, moderately sorted, very weak calcareous and silica cement, abundant off white argillaceous matrix - matrix supported, abundant altered feldspar grains, common green to grey and red brown lithics, trace to common black coaly detritus, friable, very poor visual porosity, no oil fluorescence.
535-540	70	Claystone: light to medium grey to medium brown grey to medium green grey, very silty in part, trace black carbonaceous flecks, trace black coal detritus, trace micromica, very soft, sticky, non fissile
	30	Sandstone: off white, very fine to fine, subangular to subrounded, moderately sorted, very weak calcareous and silica cement, abundant off white argillaceous matrix - matrix supported, abundant altered feldspar grains, common green to grey and red brown lithics, trace to common black coaly detritus, friable, very poor visual porosity, no oil fluorescence.
540-545	100	Claystone: light to medium grey to medium greenish grey, very silty in part, trace black carbonaceous flecks, trace black coal detritus, trace micromica, very soft, sticky, non fissile
	trace	Sandstone: off white, very fine to fine, subangular to subrounded, moderately sorted, very weak calcareous and silica cement, abundant off white argillaceous matrix - matrix supported, abundant altered feldspar grains, common green to grey and red brown lithics, trace black coaly detritus, friable, very poor visual porosity, no oil fluorescence.
545-552	90	Claystone: light to medium grey to medium greenish grey, very silty in part, trace black carbonaceous flecks, trace black coal detritus, trace micromica, very soft, sticky, non fissile

Well Completion Report - Irrewarra 1

	10	Sandstone: off white, very fine to fine, subangular to subrounded, moderately sorted, very weak calcareous and silica cement, abundant off white argillaceous matrix - matrix supported, abundant altered feldspar grains, common green to grey and red brown lithics, trace black coaly detritus, friable, very poor visual porosity, no oil fluorescence.
		T.D. 552m reached 0600hrs, 6th May, 1998.

APPENDIX 2: ELECTRIC LOGGING REPORT SHEET

**CULTUS PETROLEUM N.L.
ELECTRIC LOGGING REPORT SHEET**

Well Name: Irrewarra-1 Permit: PEP 133 Observer: D. Horner Date: 6-5-98

TIME	OPERATION
1630	Rig up for logging
1645	Start repeat section
1700	Finished repeat section
1713	Began main log
1758	Finished main log, begin GR to surface
1845	Finished GR to surface, began after survey calibrations
1930	Rig down

APPENDIX 3: LOG ANALYSIS RESULTS

KEY EVALUATION PARAMETERS & TECHNIQUES

PEP 133B

Irrewarra 1

	Heytesbury Group Nirrandra Group Wangerrip Group	Source
Interval	200 - 420 mRT	
Vsh equation	GR	
GR matrix	10 API	Xplot
GR shale	140 API	Xplot
Porosity equation	Density	
Rho matrix	2.65 g/cc	quartz
Rho fluid	1.0 g/cc	fresh water
Rho shale	2.55 g/cc	Xplot
Bad hole Porosity	Wyllie	
DT fluid	189 us/ft	
DT matrix	55.5 us/ft	quartz
DT shale	150 us/ft	Xplot
Sw equation	Archie	
Rw	3 ohm-m @ 80F	Pickett Plot
a	1	standard
m	1.8	uncompacted sst
n	2	standard
Cutoff Parameters		
Vsh cutoff	0.3	
Net sand porosity cutoff	0.03	
Net res porosity cutoff	0.10	
Sw cutoff	0.7	
Min net sand	0.5 metre	
Min net reservoir	0.5 metre	
Min net pay	0.5 metre	

IRREWARRA 1 LOG INTERPRETATION SUMMARY

Formation	Interval (metres)	Gross Thick (metres)	Net	Net Interval (metres)	Net Thickness (metres)	Net/Gross	Vsh Ave %	Phit Ave %	Swt Ave %
Heytesbury Gp	200 - 258	58	Reservoir	247.6 - 249.2	1.5	3%	26.9	38.6	100
Nirrandra Gp	258 - 308	50	Reservoir	nil					
Wangerrip Gp	308 - 421	113	Reservoir	341.6 - 355.2	11.85	29%	19.2	23.1	98

APPENDIX 4: WATER ANALYSIS REPORTS

22 JUN 1998

Amdel Limited
A.C.N. 008 127 802Petroleum Services
PO Box 338
Torrensville Plaza SA 5031Telephone: (08) 8416 5240
Facsimile: (08) 8234 2933

16 June 1998

Cultus Petroleum NL
Basin Oil NL
Level 4, 828 Pacific Highway
GORDON NSW 2072

Attention: Greg O'Neill

REPORT LQ6922

CLIENT REFERENCE: 00230

WELL NAME/RE: Irrewarra-1

MATERIAL: Water Samples

WORK REQUIRED: Water Analysis

Please direct technical enquiries regarding this work to the signatory below under whose supervision the work was carried out. This report relates specifically to the sample or samples submitted for testing.



Brian L. Watson
Manager
Petroleum Services

Amdel Limited shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Amdel Limited be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested.

1. INTRODUCTION

Two (2) samples were received on 13th May 1998 for standard water analysis (WA-10-01). All analyses were performed according to APHA methods (19th Edition). This report is a formal presentation of results forwarded by facsimile on 11th June 1998.

2. RESULTS

Results are presented on the following pages.

TABLE 1 - WATER ANALYSIS
JOB NUMBER: LQ6922

WELL / ID: IRREWARRA-1
 SAMPLE TYPE: Make Up Water
 SAMPLE POINT:
 DATE COLLECTED: 19/03/98, 2400h
 DATE RECEIVED: 13/05/98

FORMATION:
 INTERVAL:
 COLLECTED BY: Client

PROPERTIES:

pH (measured) = 7.53
 Resistivity (Ohm.M @ 25°C) = 20.83
 Electrical Conductivity (µS/cm @ 25°C) = 480
 Specific Gravity (S.G. @ 20°C) = na
 Measured Total Dissolved Solids(Evap@180°C) mg/L = na
 Measured Total Suspended Solids mg/L = na

CHEMICAL COMPOSITION

CATIONS				ANIONS			
		mg/L	meq/L			mg/L	meq/L
Ammonium	as NH ₄	na	na	Bromide	as Br	na	na
Potassium	as K	85	2.17	Chloride	as Cl	103	2.90
Sodium	as Na	45	1.96	Fluoride	as F	na	na
Barium	as Ba	na	na	Hydroxide	as OH	nd	nd
Calcium	as Ca	26	1.30	Nitrite	as NO ₂	na	na
Iron	as Fe	na	na	Nitrate	as NO ₃	1	0.02
Magnesium	as Mg	4	0.33	Sulphide	as S	na	na
Strontium	as Sr	na	na	Bicarbonate	as HCO ₃	119	1.95
Boron	as B	na	na	Carbonate	as CO ₃	nd	nd
				Sulphite	as SO ₃	na	na
				Sulphate	as SO ₄	11	0.23
Total Cations		160	5.76	Total Anions		234	5.10

DERIVED PARAMETERS

a) Ion Balance (Diff*100/Sum) (%) = 6.08
 b) Total Alkalinity (calc as CaCO₃) (mg/L) = 98
 c) Total of Cations + Anions = 394
 (measured dissolved salts)

d) Theoretical Total dissolved salts = 307.2
 (From Electrical Conductivity)

QUALITY CONTROL COMMENTS

Item	Actual Value	Acceptance Criteria	Satisfactory? (Yes/No)
Ion Balance (%) =	6.08	5%	No - Recommend further testing
Undetected ions % =	-28.26	10%	Yes
(from comparison of measured vs theoretical salts derived from measured conductivity)			
Expected pH range		< 8.3	Yes
% difference between measured total dissolved solids and calc total dissolved salts (from ionic comp) =	na	5%	na
na = not applicable			If No - what action is recommended by Amdel
nd = not detected			
is = insufficient sample			

TABLE 1 - WATER ANALYSIS
JOB NUMBER: LQ9922

WELL / ID: IRREWARRA-1
 SAMPLE TYPE: Filtrate
 SAMPLE POINT:
 DATE COLLECTED: 18/03/98, 2400h
 DATE RECEIVED: 13/05/98

FORMATION:
 INTERVAL:
 COLLECTED BY: Client

PROPERTIES:

pH (measured) = 9.55
 Resistivity (Ohm.M @ 25°C) = 1.58
 Electrical Conductivity (µS/cm @ 25°C) = 6340
 Specific Gravity (S.G. @ 20°C) = na
 Measured Total Dissolved Solids (Evap@180°C) mg/L = na
 Measured Total Suspended Solids mg/L = na

CHEMICAL COMPOSITION

CATIONS		mg/L	meq/L	ANIONS		mg/L	meq/L
Ammonium	as NH ₄	na	na	Bromide	as Br	na	na
Potassium	as K	256	6.55	Chloride	as Cl	391	11.01
Sodium	as Na	1420	61.77	Fluoride	as F	na	na
Barium	as Ba	na	na	Hydroxide	as OH	nd	nd
Calcium	as Ca	110	5.49	Nitrite	as NO ₂	na	na
Iron	as Fe	na	na	Nitrate	as NO ₃	2	0.03
Magnesium	as Mg	nd	nd	Sulphide	as S	na	na
Strontium	as Sr	na	na	Bicarbonate	as HCO ₃	413	6.77
Boron	as B	na	na	Carbonate	as CO ₃	313	10.43
				Sulphite	as SO ₃	na	na
				Sulphate	as SO ₄	1875	39.04
Total Cations		1786	73.80	Total Anions		2994	67.29

DERIVED PARAMETERS

a) Ion Balance (Diff*100/Sum) (%) = 4.62
 b) Total Alkalinity (calc as CaCO₃) (mg/L) = 344
 c) Total of Cations + Anions = 4780
 (measured dissolved salts)

d) Theoretical Total dissolved salts = 4057.6
 (From Electrical Conductivity)

QUALITY CONTROL COMMENTS

Item	Actual Value	Acceptance Criteria	Satisfactory? (Yes/No)
Ion Balance (%) =	4.62	5%	Yes
Undetected ions % =	-17.80	10%	Yes
(from comparison of measured vs theoretical salts derived from measured conductivity)			
Expected pH range		< 8.3	Yes
% difference between measured total dissolved solids and calc total dissolved salts (from ionic comp) =	na	5%	na

na = not applicable
 nd = not detected
 is = insufficient sample

If No - what action is recommended by Amdel

APPENDIX 5: WELLSITE SAMPLE MANIFEST

IRREWARRA-1
CUTTINGS SAMPLES TRANSMITTAL
COLIN HIGGINS & ASSOCIATES

DATE: 7-5-98

CUTTINGS SAMPLES:

VDME samples: 1 box containing:

10m W&D spud-250m
5m W&D 250-552m (T.D.)

CULTUS samples: 1 box containing:

10m W&D spud-250m
5m W&D 250-552m (T.D.)

Hand carried : Luke Scarsbrook

1 set samples for samplex trays:

10m W&D spud-250m
5m W&D 250-552m (T.D.)

1 glass phial mud filtrate

1 glass phial make-up water

Schlumberger log prints, films

Well programs etc

Mudlog charts (gas/rop)

Mudlog print

APPENDIX 6: WELL LOCATION SURVEY DATA

Alan Simpson
B. App. Sc. (Survey), L.S., M.L.S.

Trevor McDowell
B. App. Sci. (Survey), L.S., M.L.S.

ALAN H. SIMPSON

LAND SURVEYOR - WARRNAMBOOL

A.C.N. 062 912 510

LICENSED SURVEYORS • PLANNING CONSULTANTS • DEVELOPMENT MANAGERS

P.O. Box 421,
Warrnambool, 3280
(125A Kepler Street,)

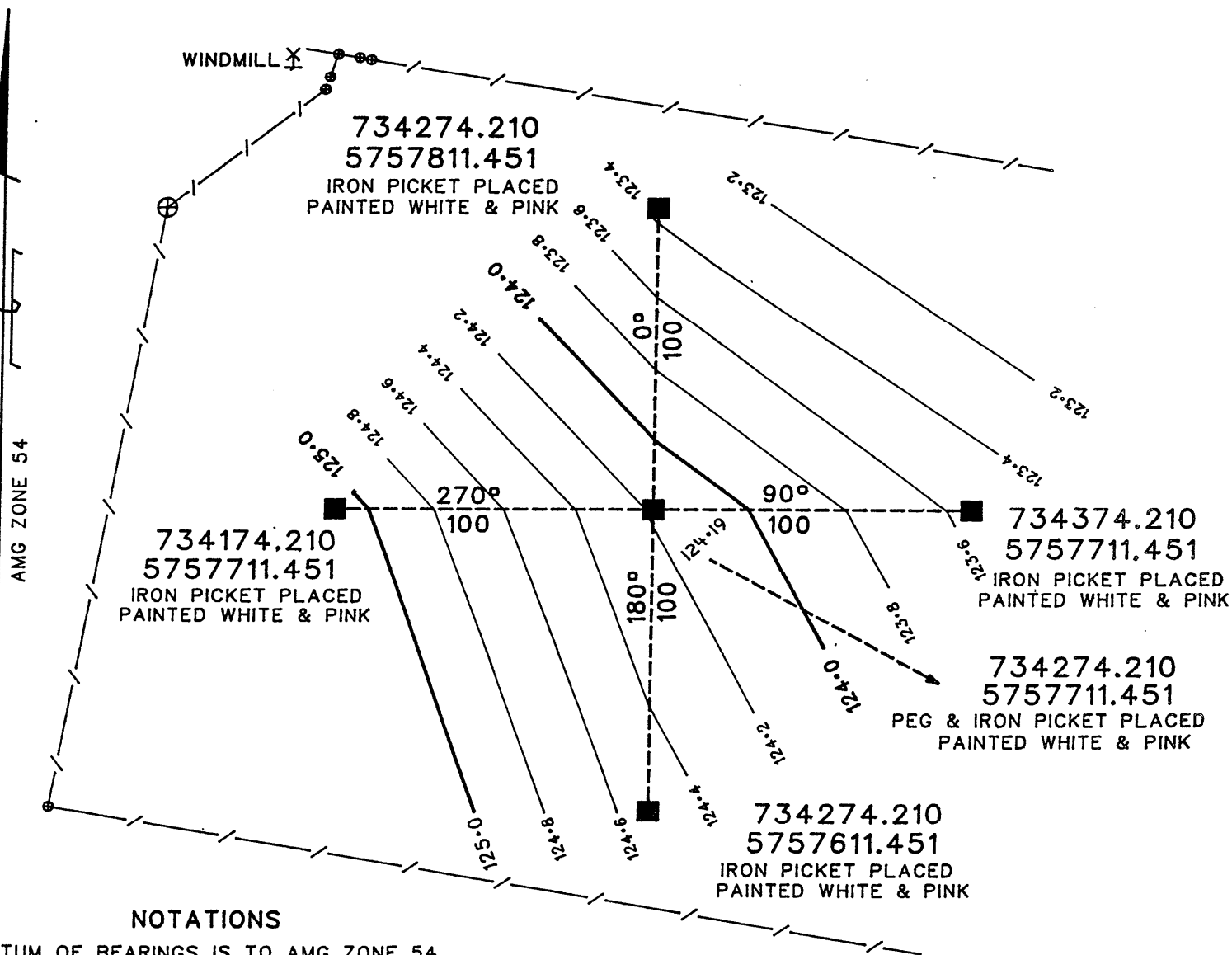
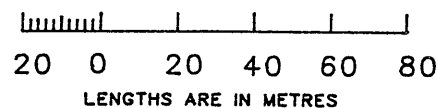
Ph: (03) 5561 1846
Fax: (03) 5562 1775

IRREWARRA-1

EASTING **734274.210**
NORTHING **5757711.451**
LATITUDE **38° 17' 52.75" S**
LONGITUDE **143° 40' 44.37 E**

OUR REF: 670

SCALE 1:2000



NOTATIONS

DATUM OF BEARINGS IS TO AMG ZONE 54
LEVEL DATUM IS APPROXIMATE AHD +/- 2 METRES FOR TRUE AHD DATUM
MARKS WITH LEVELS ARE NOT AVAILABLE WITHIN THE VICINITY OF THE IRREWARRA-1 WELLSITE.
CONTOUR INTERVAL IS 0.2 METRE
DATE OF SURVEY : 19/12/1997

Alan Simpson
B App. Sc. (Survey), L.S., M.L.S.

Trevor McDowell
B App. Sc. (Survey), L.S., M.L.S.

ALAN H. SIMPSON
LAND SURVEYOR - WARRNAMBOOL

A.C.N. 062 912 510

LICENSED SURVEYORS • PLANNING CONSULTANTS • DEVELOPMENT MANAGERS

P.O. Box 421,
Warrnambool, 3280
(125A Kepler Street,)

Ph: (03) 5561 1846
Fax: (03) 5562 1775

Ref: 670B

23rd April, 1998

The Manager,
CULTUS PETROLEUM NL,
Level 4,
828 Pacific Highway,
GORDON, 2072

Attn: Mr Graham Brumby,

RE: IRREWARRA - 1
COLAC AREA

We have carried out the required survey work and computations to mark the revised well site position in accordance with your fax and have determined an approximate elevation for the peg as marked. As before level datum is approximately to the A.H.D. but with expected accuracy's of +/- 2 metres. No registered bench marks are available within reasonable distance from which to determine accurate levels. We have used the ground elevation at these points to determine an approximate datum.

The well site has been marked with a wooden peg at the well site and an iron picket placed beside to identify. Iron pickets have been placed on cardinal bearings 100 metres distant from the well site as recovery and orientation marks. Observed levels to these points and the location of nearby fences have been shown on the sketch. Note the location in relation to the old site.

We enclose our account for this work and would like to thank you for your instructions with this matter. If you have any queries please do not hesitate to contact me.

Yours faithfully


Alan H. Simpson
LICENSED SURVEYOR

Alan Simpson
B. App. Sci. (Survey), L.S., M.L.S.

Trevor McDowell
B. App. Sci. (Survey), L.S., M.L.S.

ALAN H. SIMPSON

LAND SURVEYOR - WARRNAMBOOL

A.C.N. 062 912 510

LICENSED SURVEYORS • PLANNING CONSULTANTS • DEVELOPMENT MANAGERS

P.O. Box 421,
Warrnambool, 3280
(125A Kepler Street,)

Ph: (03) 5561 1846
Fax: (03) 5562 1775

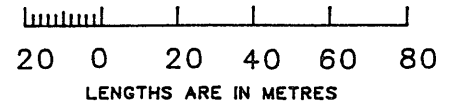
IRREWARRA-1

REVISED CO-ORDINATES

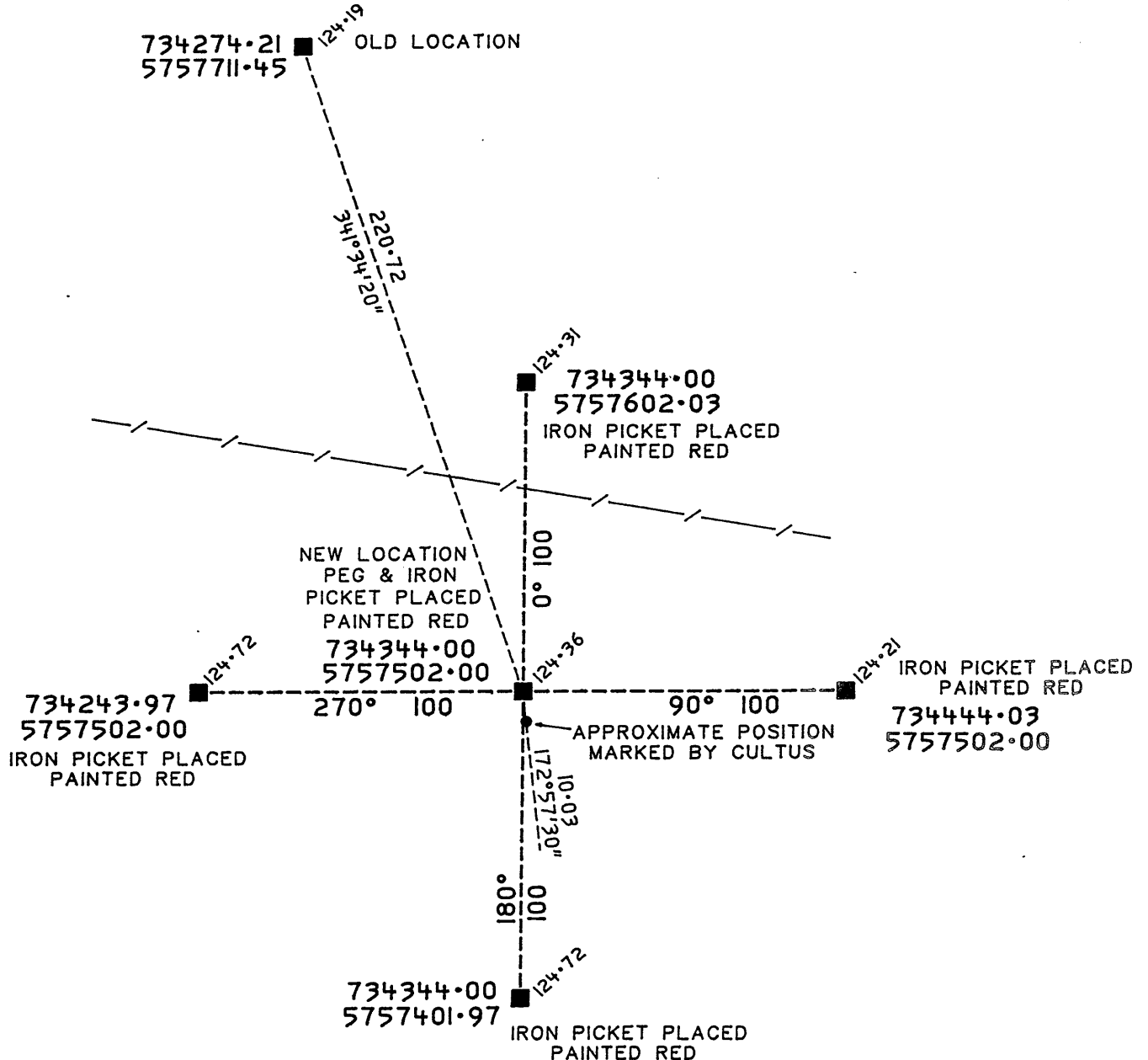
EASTING 734344.00
NORTHING 5757502.00
LATITUDE 38° 17' 59.47" S
LONGITUDE 143° 40' 47.49" E

OUR REF: 670

SCALE 1:2000



AMG ZONE 54



NOTATIONS

- DATUM OF BEARINGS IS TO AMG ZONE 54
- LEVEL DATUM IS APPROXIMATE AHD +/- 2 METRES FOR TRUE AHD DATUM
- MARKS WITH LEVELS ARE NOT AVAILABLE WITHIN THE VICINITY OF THE IRREWARRA-1 WELLSITE.
- CONTOUR INTERVAL IS 0.2 METRE
- DATE OF SURVEY : 21-4-1998

APPENDIX 7: DRILLING REPORT

CULTUS PETROLEUM NL

IRREWARRA #1

The location of the well is X: 734 344.47 E, Y: 5 757 501.53 N in Block PEP 133B, Onshore Otway Basin, Victoria. Irrewarra #1 was an exploration well, spudded at 20:30 hours on 29th April 1996 by Slimdrill's Rig HTA 3000. RT was 4.3m.

8-1/2" hole was drilled into the Heytesbury Formation to 202m RT using fresh water gel mud. Equipment repairs accounted for 6 hours delay. Ran a wiper trip with the hole in good condition. Prior to running 7" casing the hole was circulated and conditioned and the pipe strapped out of the hole. One survey was ran over the interval with the deviation of 0.0° at 154m RT.

Ran 7" casing with the shoe set at 200.0m RT. 160sx Class A cement at 15.8ppg was displaced and pumped to surface. The plug was bumped, the casing tested to 3000psi and the float held when pressure was released. WOC and slacked off 7" casing. Attempted to install Bradenhead but the weld twice failed the pressure test. Removed Bradenhead, redressed casing and waited for replacement Bradenhead. Re-installed Bradenhead and nipped up BOP's and Choke manifold. Pressure tested BOP's, choke manifold, inside BOP, HCR, casing, Kelly cocks and standpipe to 200/2100psi. Tested annular to 200/1500psi.

Made up 6" BHA, RIH and tagged cement at 179m RT. Drilled out cement, shoe and 2m of open hole to 204m RT. Displaced hole with a Gel / Polymer mud at 8.5ppg. Ran FIT to 150psi with 8.5ppg mud equating to 13.0 ppg EMW. Leak off at 261psi was seen on the chart recorder.

6" hole was drilled from 204m RT out of the Heytesbury Formation, through the Nirranda and Wangerrip Formations and into the Eumeralla Formation where poorly sorted sands caused large mud losses over the shakers due to sand blinding. TD at 552m RT was reached on day 8 at 06:00 hours on 6th May 1998. Circulated hole clean, ran a wiper trip to the shoe with no excessive drag or tight spots. Conditioned well and strapped out of hole. . Two surveys were ran over the interval with the deviation of 0.0° at 400m RT.

Ran electric log#1 PEX (AITH) BHT.38 Deg.

Ran open ended drillpipe to 232m RT. Set abandonment plug #1 from 232m to 170m RT with 75sx Class A cement at 15.6ppg with 2% CaCl₂. Pulled 9 stands and circulated pipe clean. POH and layed out excess pipe. RIH and tagged plug #1 at 165m RT with 10K. Layed down remaining drillpipe. Recovered wellhead and set abandonment plug #2 used 20sx Class A cement. Installed plate and erected well marker post. The rig was released at 12:00 hours on 7th May 1998.

The well was completed in 7.65 days at an estimated cost of \$0.643 mm at an average cost of \$1164/m plugged and abandoned. The wellhead was later removed, with the cellar filled and a marker set.

ENCLOSURE 1: COMPOSITE LOG

PE605504

This is an enclosure indicator page.
The enclosure PE605504 is enclosed within the
container PE907483 at this location in this
document.

The enclosure PE605504 has the following characteristics:

ITEM_BARCODE = PE605504
CONTAINER_BARCODE = PE907483
NAME = Composite Log
BASIN = OTWAY
PERMIT = PEP 133B
TYPE = WELL
SUBTYPE = COMPOSITE_LOG
DESCRIPTION = Composite Log, Geoframe Processes
Interpretation, Scale 1:500, (Enclosure
1 from WCR vol.1) for Irrewarra-1
REMARKS = Colour enclosure
DATE_CREATED = 06/05/98
DATE_RECEIVED =
W_NO = W1239
WELL_NAME = IRREWARRA-1
CONTRACTOR =
CLIENT_OP_CO = BASIN OIL N.L.

(Inserted by DNRE - Vic Govt Mines Dept)

ENCLOSURE 2: MUDLOG

PE605505

This is an enclosure indicator page.
The enclosure PE605505 is enclosed within the
container PE907483 at this location in this
document.

The enclosure PE605505 has the following characteristics:

ITEM_BARCODE = PE605505
CONTAINER_BARCODE = PE907483
NAME = Mud Log
BASIN = OTWAY
PERMIT = PEP 133B
TYPE = WELL
SUBTYPE = Mud_LOG
DESCRIPTION = Mud Log, Scale 1:200, by Colin Higgin
& Associates for Basin Oil N.L.
(Enclosure 2 from WCR vol.1) for
Irrewarra-1
REMARKS =
DATE_CREATED = 07/05/98
DATE_RECEIVED =
W_NO = W1239
WELL_NAME = IRREWARRA-1
CONTRACTOR = COLIN HIGGIN & ASSOCIATES
CLIENT_OP_CO = BASIN OIL N.L.

(Inserted by DNRE - Vic Govt Mines Dept)

ENCLOSURE 3: ELECTRIC LOG ANALYSIS

PE605506

This is an enclosure indicator page.
The enclosure PE605506 is enclosed within the
container PE907483 at this location in this
document.

The enclosure PE605505 has the following characteristics:

ITEM_BARCODE = PE605506
CONTAINER_BARCODE = PE907483
NAME = Electric Log Analysis
BASIN = OTWAY
PERMIT = PEP 133B
TYPE = WELL
SUBTYPE = WELL_LOG
DESCRIPTION = Electric Log Analysis, Scale 1:200,
Cultus Petroleum N.L., (Enclosure 3 from
WCR vol.1) for Irrewarra-1
REMARKS =
DATE_CREATED = 06/05/98
DATE_RECEIVED =
W_NO = W1239
WELL_NAME = IRREWARRA-1
CONTRACTOR =
CLIENT_OP_CO = CULTUS PETROLEUM N.L

(Inserted by DNRE - Vic Govt Mines Dept)