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NUMBER 8079

PEL 42

EROMANGA, SIMPSON AND PEDIRKA BASINS

PROGRESS AND TECHNICAL REPORTS FOR THE
PERIOD SEPTEMBER 1989 TO FEBRUARY 1993

Submitted by

Anzoil NL
1993

© 16/8/95

MINES AND ENERGY
SOUTH AUSTRALIA 

This report was supplied as part of the requirement to hold a mineral or petroleum exploration tenement in the State of South Australia.
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Mines and Energy South Australia, PO Box 151, Eastwood, SA 5063

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Mines and Energy South Australia
191 Greenhill Road, Parkside 5063
Telephone: (08) 274 7687
Facsimile: (08) 272 7597

ENVELOPE 8079

TENEMENT: PEL 42; Eromanga, Simpson and Pedirka Basins

TENEMENT HOLDER: Anzoil NL (operator) and Fossil Cliff Oil Pty Ltd

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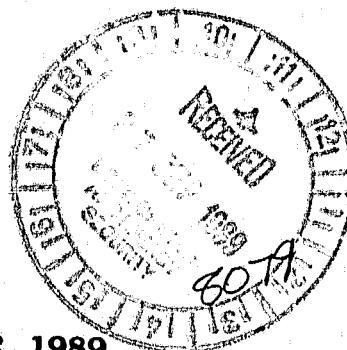
ANZOIL N.L.

**SUITE 41A/10 NASH STREET
EAST PERTH, WESTERN AUSTRALIA, 6000
P.O. BOX 8183, STIRLING STREET
PERTH, WESTERN AUSTRALIA, 6000**

**TELEPHONE: (09) 227-7574
FACSIMILE: (09) 221-3146**

**APPLICATION FOR A
PETROLEUM EXPLORATION LICENCE
PORTION OF AREA B
EASTERN PEDIRKA BASIN
SOUTH AUSTRALIA**

**as made available by
The Department of Mines & Energy
South Australia
1ST MAY, 1989 - 30TH SEPTEMBER, 1989**



SEPTEMBER, 1989

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APPLICATION FOR PORTION OF AREA B EASTERN PEDIRKA BASIN
SOUTH AUSTRALIA

WE, ANZOIL N.L. AND FOSSIL CLIFF OIL PTY LTD HEREBY MAKE
APPLICATION FOR THE GRANT OF PETROLEUM EXPLORATION
LICENCE IN RESPECT OF AREA DESCRIBED HEREIN.

DATED AT Perth THIS *26th* DAY OF *September* 1989

SIGNED:

1. *[Signature]* (DIRECTOR)

..... (DIRECTOR)

FOR ANZOIL N.L.



SIGNED:

2. *[Signature]* (DIRECTOR)

..... (SECRETARY)

FOR FOSSIL CLIFF OIL PTY LTD



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AREA APPLIED FOR PORTION OF AREA B.
EASTERN PEDIRKA BASIN, SOUTH AUSTRALIA

ADVERTISED AREA:

"EXPLORATION OPPORTUNITY"
EASTERN PEDIRKA BASIN
AREA B
DATA PACKAGE BROCHURE
ENVELOPE 8079
SR 27/2/90
MARCH, 1989

THE APPLICATION AREA

AREA APPLIED FOR IS THE EASTERN PORTION OF
AREA B

DESCRIPTION OF AREA APPLIED FOR:

THE EASTERN PORTION OF AREA B. THE WESTERN BOUNDARY FROM LATITUDE 136°40' LONGITUDE 26°00' DUE SOUTH TO 27° LATITUDE THENCE ALONG THE GAZETTED BOUNDARY OF AREA B TO 27°35' THENCE DUE EAST TO 137°30'/27°35' THENCE DUE NORTH ALONG THE EASTERN BOUNDARY OF GAZETTED AREA B AND ALONG THE WESTERN BOUNDARY SIMPSON DESERT CONS PARK WHEREBY THAT PORTION OF THE SIMPSON DESERT CONSERVATION PARK IS EXCLUDED FROM THE APPLICATION AREA.

LOGISTICAL DATA:

AREA EXTENT	11,354 KM ²
ANNUAL RENT	\$1,800.00
MINIMUM ANNUAL COMMITMENT	\$180,000
EXPLORATION BOND	\$4,000

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MINIMUM PROPOSED WORK PROGRAMME

YEAR 1:

- | | |
|--|------------------|
| (I) REVIEW OF ALL THE AVAILABLE DATA FROM PREVIOUS WORK UNDERTAKEN WITHIN THE BOUNDARIES OF THE APPLICATION AREA INCLUDING SEISMIC INTERPRETATIONS AND THE MAPPING OF SEISMIC HORIZONS | \$50,000 |
| (II) BASIN STUDIES INCLUDING RE-INTERPRETATION OF GRAVITY AND MAGNETIC DATA IF REQUIRED. LANDSAT IMAGERY AND ENHANCEMENT STUDIES WILL BE CO-INCIDENT WITH MAGNETIC AND GRAVITY DATA EVALUATION | \$20,000 |
| (III) REPROCESSING OF SELECTIVE SEISMIC LINES WHERE REQUIRED. THIS REPROCESSING WILL ASSIST IN THE PARAMETERS FOR ACQUIRING NEW SEISMIC DATA IN YEAR 2. | \$60,000 |
| | ----- |
| | <u>\$130,000</u> |

YEAR 2:

- | | |
|---|------------------|
| (I) 100 LINE KILOMETRES OF HIGH RESOLUTION SEISMIC SURVEY | \$350,000 |
| (II) PROCESSING AN INTERPRETATION | \$50,000 |
| | ----- |
| | <u>\$400,000</u> |

YEAR 3:

- | | |
|--------------|-----------|
| (I) ONE WELL | \$500,000 |
|--------------|-----------|

YEAR 4:

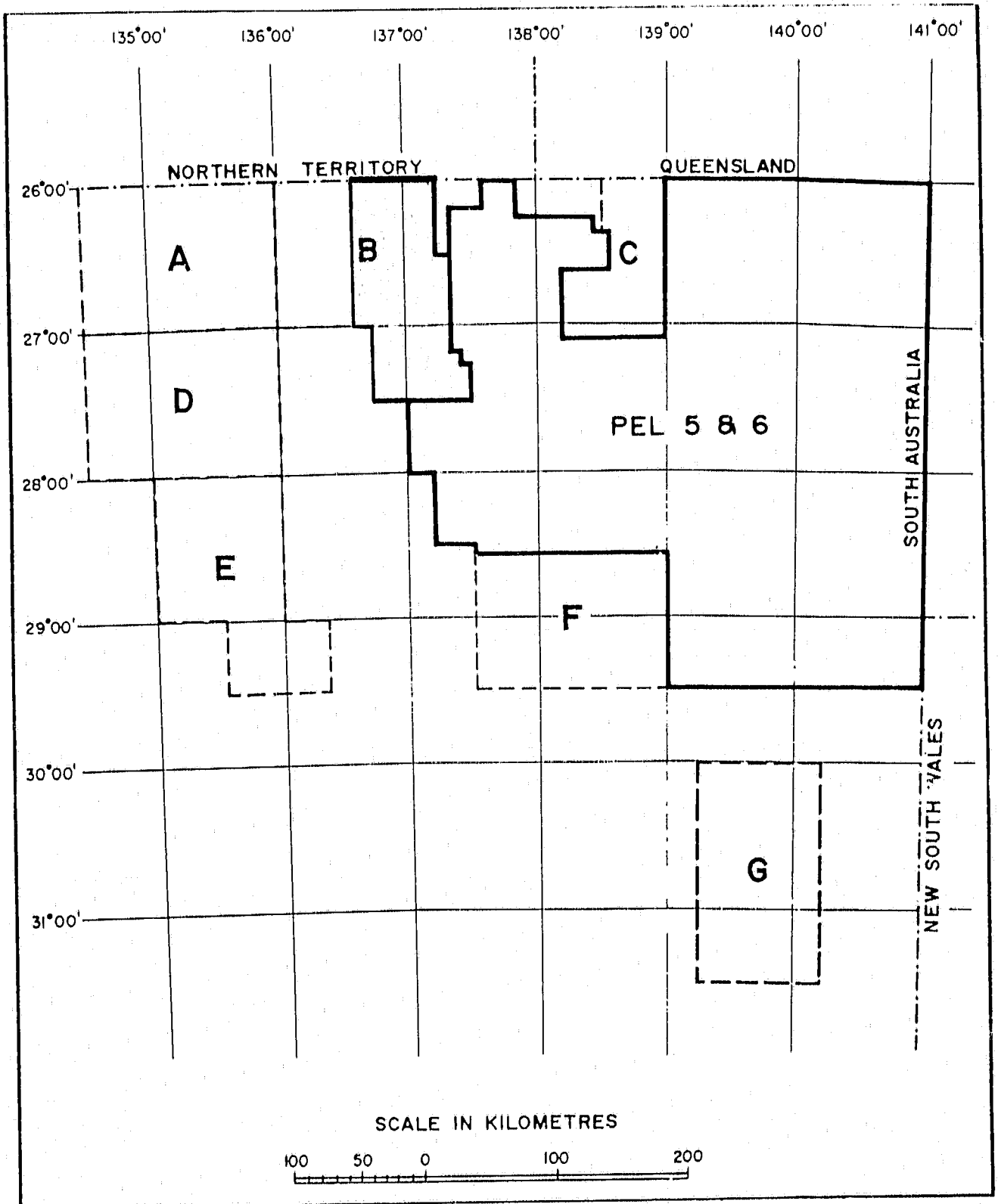
- | | |
|-------------------------|-----------|
| (I) ONE WELL OR SEISMIC | \$500,000 |
|-------------------------|-----------|

YEAR 5:

- | | |
|------------|------------------|
| (I) REVIEW | <u>\$100,000</u> |
|------------|------------------|

TOTAL MINIMUM EXPENDITURE	<u>\$1,630,000</u>
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**PORTION OF AREA B APPLIED FOR EX PEL 5 & 6
EASTERN PEDIRKA BASIN, SOUTH AUSTRALIA**

ANZOIL N.L.
September 1989

EXPLORATION PHILOSOPHY

While we have preconceived notions as to prospectivity of the application area, we believe that careful evaluation of all the existing data, including re-processing of selected data, is an essential first step of exploration, so that subsequent exploration expenditure can be best be directed to defining drilling prospects in the most prospective part of the application area.

We see the main objectives of exploration as follows:

1. Northern Part of the Application Area

The principle reservoir objective is recognised to be the sands of the Poolowanna Formation. Why there has been little exploration success in exploring this objective since the initial success of Poolowanna No. 1 has to be assessed with care. Sands of the upper part of the Eromanga sequence, the structure of which is defined by mapping the "c" seismic horizon are secondary objectives in the northern part of the application area.

2. Southern Part of the Application Area

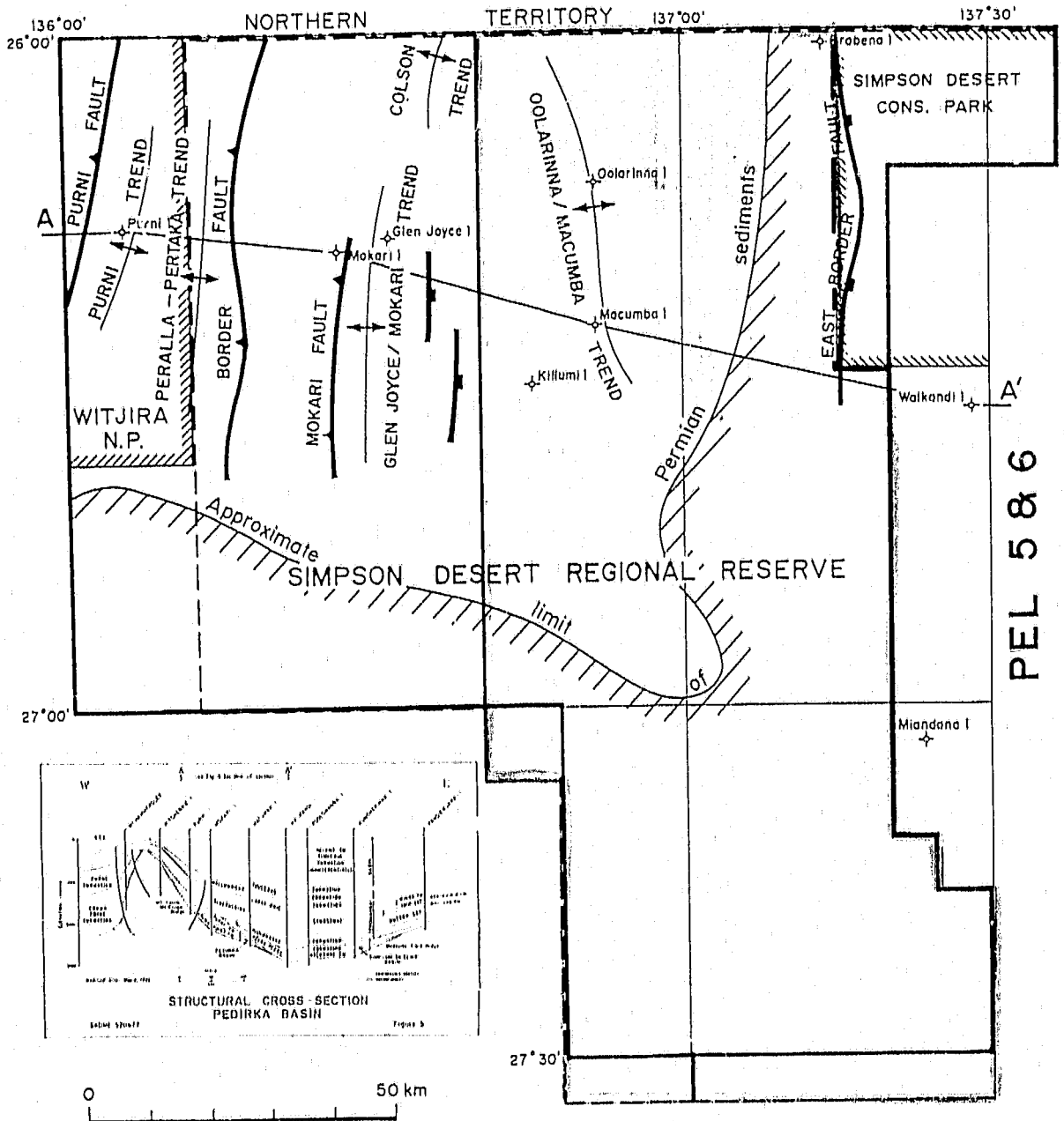
It is expected in this area that preserved Cambrian sediments will be present below the Base Jurassic. The prospectivity of these sediments, despite encouraging oil shows, has largely been ignored since the very early exploration wells drilled by Santos in the mid 1950's. A great deal can be achieved towards isolating such areas of greater Cambro-Ordovician potential, by the evaluation of pre-Jurassic seismic reflections, enhancement of these by seismic reprocessing, then analysing the structural history of subcropping sub-basins so indentified. Potentially large structures could be present in the application area.

In the north the Jurassic sequence is represented by a sandpile known as the Algebuckina Sandstone. Further to the south there is a greater tendency for seal development within the Jurassic sequence, particularly the shales of the Birkhead Formation. As we head south, however, the Lower and Middle Jurassic section is expected to onlap and ultimately only a thin sequence of reservoir

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will be present above the Base Jurassic horizon. Careful assessment of all the available data should be made, to establish the sub-surface distributions of various Jurassic sediments prior to proceeding with further exploration.

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PEL 5 & 6

PORTION OF AREA B APPLIED FOR EX PEL 5 & 6
EASTERN PEDIRKA BASIN, SOUTH AUSTRALIA

ANZOIL N.L.
September 1989

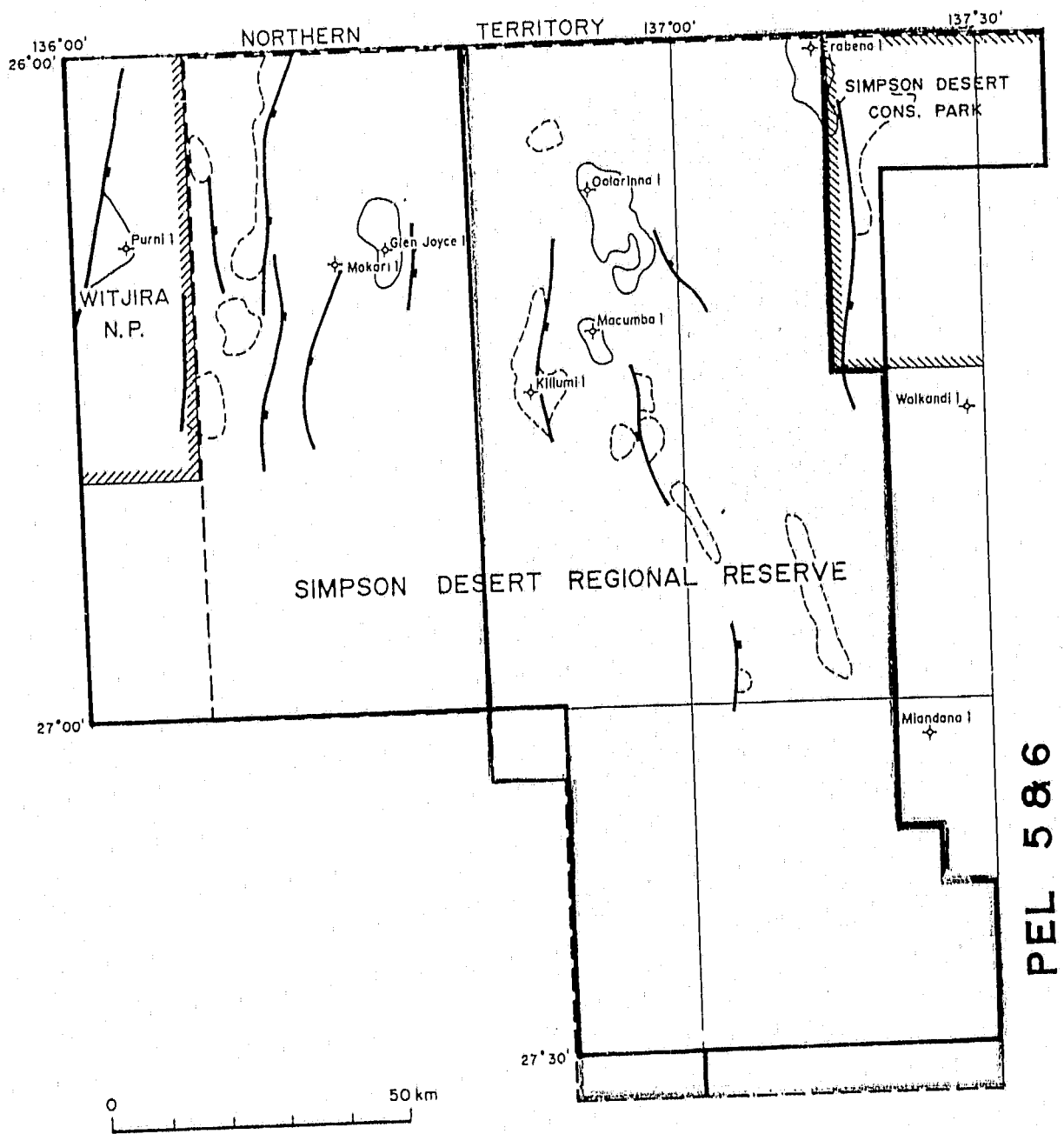
STRUCTURAL SETTING

The application area has been subjected to a number of orogenic episodes, and the development of successive intra cratonic basins as follows:


- Lake Eyre Basin - (Tertiary - Quaternary)
- Eromanga Basin - (Jurassic - Cretaceous)
- Simpson Desert Basin - (Triassic)
- Pedirka Basin - (Permo - Carboniferous)
- Amadeus Basin - (Adelaidian - Devonian)
- Warburton Basin - (Adelaidian - Ordovician)


The most obvious present day structural grain is north - south with several strong trends in the area so far defined. Most prominent of these is the Oolarinna/Macumba trend. Timing and development of the trend should be assessed with care. Cambro-Ordovician structure is liable to be divergent from these trends.

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PEL 5&6

Drilled prospects 

Undrilled prospects 

**PORTION OF AREA B APPLIED FOR EX PEL 5 & 6
EASTERN PEDIRKA BASIN, SOUTH AUSTRALIA**

ANZOIL N.L.
September 1989

HYDROCARBON POTENTIAL

Our interest in this area is directed to the potential of three stratigraphic sequences, in order of merit as we see them:

1. The Jurassic Sequence
2. The Cambrian Sequence
3. The Permian Sequence

1. THE JURASSIC SEQUENCE

INTRODUCTION

In the northern part of the application area the principal reservoir objective is the Basal Jurassic, Poolowanna Beds. In the southern part of the application area towards the Middle Jurassic margin of the basin we would expect to develop prospects at several stratigraphic horizons, the Cadna-Owie Formation the Mooga Formation and Hutton Sandstone.

SOURCE

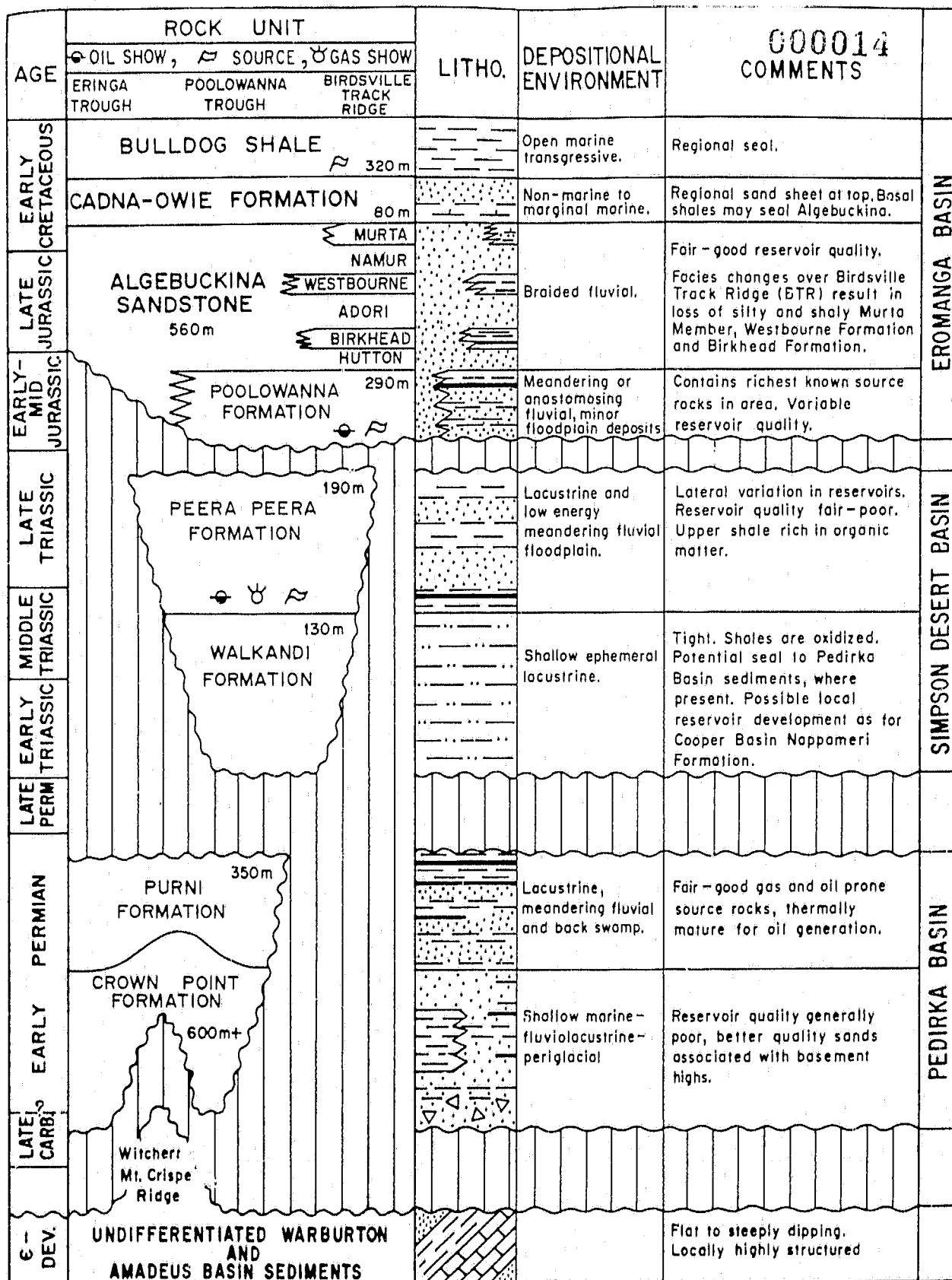
Poolowanna Beds

In the northern part of the application area these Basal Jurassic sediments are recognised as the prime source sediments for oil. T.O.C. values of up to 15% have been recorded from this formation. Numerous wells in the area have recorded oil shows in this sequence but only one well, Poolowanna No. 1 has recovered significant oil in this Simpson Desert region, flowing at an estimated rate of 180 B.O.P.D. in 1977.

The Triassic Peera Peera Formation is also recognised as a reasonable oil source and may charge Basal Jurassic reservoirs.

The Birkhead Formation

In the north of the application area, medium to high energy sandstones prevail throughout the Middle Jurassic. It is



350m Max. known thickness.

ERINGA TROUGH, PEDIRKA AND SIMPSON DESERT BASINS

expected that lower energy conditions would have prevailed during Birkhead Formation times in the southern part of the area. As indicated elsewhere, for example in the Poolowanna No 1 well, further south east of the application area, low energy overbank and swamp faces predominated during Birkhead Formation times, and these sediments have excellent oil source potential.

The Cadna Owle and Mooga Formation

In many areas in the Eromanga Basin these horizons have demonstrated oil source potential.

2. THE CAMBRIAN SEQUENCE

Cambrian sediments with affinities to the Warburton Basin or Amadeus Basin are expected to underlie the Eromanga sequence. Throughout Australia extensive Cambrian and Ordovician sedimentation prevailed, often rich source rock horizons have been intersected by drilling, the Amadeus Basin producing province being the most obvious example. Limited intersections in the region of the application area suggest that the organic rich dark limey shales of the Middle Cambrian, as well as the Lower Cambrian section will be preserved in the application area below the Eromanga Basin cover.

3. THE PERMIAN SEQUENCE

Exploration for the Permian sequence is expected to have limited scope within the application area. Nevertheless potential for gas sourcing from the Purni Formation will be considered.

SOURCE SEDIMENT MATURITY

From the point of view of exploring for Eromanga Basin reservoirs the maturity of source sediments is a prime consideration and may be a large contributing factor responsible for the dry holes of Oolarinna No.1 and Macumba

No. 1 drilled along the Oolarinna/Macumba trend. This is an aspect requiring consideration during future exploration.

To the south towards the margin of the Middle Jurassic, maturity of source sediments may be achieved at much shallower depth. In Poolarunna No. 1 (to the south east of the application area, maturity of Birkhead shales was reasonable. VR = 0.65%). The reason for making this positive assessment is that these sediments are in closer proximity to crystalline basement and the heat flow should be good. More and more evidence available suggests that much oil in the Eromanga sequence has been generated at a maturity level considered to be immature in the past.

Maturity of potential Cambrian source rocks is assured. An assessment of where these source rocks have been preserved, that is not eroded away prior to the Jurassic period, should be made. We can only speculate at this time as to what concepts can be developed from the limited seismic and well information available to date.

RESERVOIRS

The Eromanga Sequence

Within the Eromanga sequence reservoirs at the depth range in the application area can be expected to be of good quality with a porosity range of 15 - 23% and permeabilities of up to 3000 darcies. Good water drive is a favourable aspect with respect to oil production. The extent of the Hutton Sandstone towards the south of the area applied for will be considered at an early stage of exploration.

The Cambro-Ordovician Sequence

Middle and Lower Cambrian limestones and dolomites have been intersected in many Australian Basins, often showing a vuggy porosity.

Potential of these reservoirs has been demonstrated at depth. In the Cooper Sector of PEL 5 and 6, Gidgealpa No. 1 recorded a good water flow on DST (water to the surface in 85 minutes) from Middle Cambrian, vuggy dolomites tested below 12,000' (4,000m). Primary porosities are liable to be enhanced by fracturing.

The Permian Sequence

Good reservoir potential has been recognised from tests of both Triassic and Permian clastic reservoirs.

SEALS

The Eromanga Sequence

The Poolowanna Formation has demonstrated good top and intraformational seals. The Birkhead Formation is expected to develop as a potential seal in the southern part of the application area. The Cadna Owie Formation has a well developed regional seal in its lower part and the thick marine Bulldog Shale is considered the ultimate seal of the Eromanga reservoir sequence.

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CORPORATE PROFILE

**FOSSIL CLIFF OIL PTY LTD
c/- SUITE 41A/10 NASH STREET
EAST PERTH, WESTERN AUSTRALIA, 6000**

Fossil Cliff Oil Pty Ltd is a company incorporated in Western Australia and is under the control of Mr Mike Harrison (Petroleum Exploration Consultant). The principal aim of the company is to provide superior professional advice pertaining to petroleum exploration. There are a number of consultants associated with Mr Harrison whom he can call for expert advice, with respect to a range of geophysical and geological aspects of petroleum exploration. The company has attracted and is actively seeking further investment capital.

Mike Harrison B.Sc.(Hons) Geology - London

Mr Harrison has 15 years experience in the Petroleum Exploration Industry, the first 6 of which were spent as a Logging Geologist/Wellsite Geologist mainly working in the South East Asian region. During this time he was involved with numerous oil discovery and development wells.

In 1980 he joined Magnet Petroleum which, at the time, had very extensive acreage holdings in many Australian Basins. During this period he developed skills related to play and basin assessment and was involved in seismic interpretation in several exploration areas.

In 1983 he joined Beach Petroleum N.L. as a Senior Geologist. He was involved directly in the exploration planning over the Bodalla South Prospect, which was to be the first oil discovery in ATP 269P south West Queensland.

In 1985 he was promoted to Chief Geologist - Non Operating Areas and was responsible for overseeing activity in the ATP 269P area (LASMO operated) which was yielding 5,000 B.O.P.D. from several oilfields. He was responsible for new ventures and had the opportunity of reviewing most Australian basins and producing fields.

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In 1988 he left Beach Petroleum N.L. Later that year he worked for Dr Reg. Sprigg AO at his tourist/conservation venture, 'Arkaroola' in the Northern Flinders Ranges, in the capacity of tour driver prior to moving to Western Australia and working as a consultant geologist.

In 1989 Fossil Cliff Oil Pty Ltd was formed as a consultancy firm and petroleum explorer.

A handwritten signature in dark ink, consisting of stylized, cursive letters that appear to read 'J. De'.

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CURRICULUM VITAE

Zlad Sas B.Sc.(Hons) M.Aust.I.M.M.

Mr Sas is an experienced geologist with 15 years experience in the mining and oil industry having majored in sedimentology and graduated in 1974 with Honours from the University of Western Australia.

His experience in sedimentology has been applied in the evaluation of basinal interpretation studies for the petroleum industry and stratigraphic and stratabound mineralisation for the mining industry. Mr Sas was part of the technical team involved in the first wholly funded Western Australian oil offshore exploratory well, Bruce No. 1 which was drilled by Stirling Petroleum N.L. in 1977.

Mr Sas has been involved in the search for oil/gas, stratabound copper and gold mineralisation, roll-front uranium mineralisation, coal deposits, placer deposits, diamond deposits, and gold/base metals mineralisation.

He has been employed as a consultant over the last 10 years and has been associated with a large number of petroleum and mining exploration companies, including Stirling Petroleum N.L., Monarch Petroleum N.L., Magnet Petroleum N.L., Lennard Oil N.L., Magnet Metals Ltd, Gem Exploration and Minerals N.L., Griffin Coal Mining Company Ltd, Australian Consolidated Minerals Ltd, Anzoil N.L., Max Resources N.L. and Dry Creek Mining N.L.

CURRICULUM VITAE

JOHN LLOYD CRAIG MARSHALL

Date of Birth : 6 August, 1953
Nationality : Australian
Qualifications : B.Sc.(Hons) Geology
University of Wales, U.K.
Present Position : Consultant Petroleum Geologist/Company
Director

Work Experience

1968 - 1970 : Hancock & Wright - Geological mapping and evaluation, drilling iron ore prospects, Pilbara, W.A.
1970 - 1971 : Sheen Laboratories - Geochemical analysis for base metals, gold bauxite
1971 - 1972 : Jennings Mining - Geological exploration for heavy mineral sands, Eneabba, W.A.
1972 : Don Rhodes - Manganese Exploration, Pilbara, W.A.
1972 - 1975 : Western Australian Institute of Technology - Associateship in Applied Geology
1975 - 1976 : Tanganyika Holdings/Conzinc Rio Tinto (now the Argyle Joint Venture) Diamond exploration in the Kimberleys, W.A.
1976 - 1978 : University of Wales, Cardiff, U.K. - Geology Degree with Honours majoring in petrology and geophysics
1978 : British Institute of Geophysical Science, subsurface mapping of the Pembrokeshire Coast, U.K.
1979 - 1982 : The Magnet Group of Companies, Petroleum Geologist, geological evaluation of Australian basins, seismic acquisition, wellsite evaluation of both onshore and offshore drilling. Compilation and interpretation of well data.

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- 1982 - 1983 : Phoenix Oil and Gas N.L. - Chief Geologist, geological and geophysical evaluation of the company's petroleum permits, seismic acquisition, evaluation and interpretation, geological prognoses of drillable prospects, wellsite evaluation, writing the completion report and wellsite geologist, Perth Basin/Eromanga Basin
- 1984 : Consultant Petroleum Geologist, geological basin studies, wellsite evaluation, wellsite geologist and completion reporting
- 1985 - 1989 : Founder and director of public companies - Australian United Gold N.L., Dry Creek Mining N.L., Max Resources N.L., Kiwi gold N.L. Consultant geologist in petroleum and mining industry.
- Member : Member of the Australian Institute of Mining and Metallurgy and the Petroleum Exploration Society of Australia.
: Member of the Australian Institute of Mining and Metallurgy Petroleum Exploration Society of Australia.



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26th September, 1989

The Director General
South Australian Department of Mines & Energy
P.O. Box 151
EASTWOOD, S.A., 5063

Dear Sir,

Anzoil N.L. is a wholly owned subsidiary of Max Resources N.L. and as such its performance in the application is supported by Max Resources N.L., a public listed company on the New Zealand Stock Exchange.

Yours faithfully,
MAX RESOURCES N.L.

A handwritten signature in dark ink, appearing to read "J.L. Craig Marshall".

J.L. Craig Marshall
CHAIRMAN



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26th September, 1989

The Director General
Department of Mines and Energy
P.O. Box 151
EASTWOOD, S.A., 5063

Dear Sir,

Max Resources N.L. is a public listed resource company on the New Zealand Stock Exchange. The Company currently has a number of mining projects in Australia and New Zealand which are at an advanced stage of development.

In the proceeding 12 month period the Company will be further developing two of these projects together with substantial joint venture partners, where Max Resources N.L. will be reimbursed certain costs and carried through the development of -

1. Nullagine Alluvial Diamond Project
2. New Zealand Mineral Sands Project

Max Resources N.L. is currently in the process of raising additional working capital by a share issue to fund the Company's wholly owned subsidiary Anzoil N.L. in the exploration for oil and gas in Australia and New Zealand.

Yours faithfully,
MAX RESOURCES N.L.


J.L. Craig Marshall
CHAIRMAN

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PETROLEUM ACT, 1940

PETROLEUM EXPLORATION LICENCE No. 42

I, JOHN HEINZ CORNELIS KLUNDER, Minister of Mines and Energy in the State of South Australia pursuant to the provisions of the Petroleum Act, 1940 HEREBY GRANT to:-

ANZOIL N.L. and Fossil Cliff Oil Pty Ltd, the registered office of both which is situated at Suite 41A, 10 Nash Street East Perth, Western Australia 6000, (hereinafter referred to as the "Licensees") a Petroleum Exploration Licence in respect of the area set out below, to have effect for a period of five years and to expire on 24th SEPTEMBER 1991 but carrying the rights of renewal conferred by the Petroleum Act, 1940.

Description of Area

COMMISSIONER OF STAMPS
S.A. STAMP DUTY
ORIGINAL DULY STAMPED
26/07/90 12:51

The land comprised in this licence is that part of the State of South Australia described in the Schedule hereto.

Conditions

1. The Licensees shall at all times comply with:-
 - (a) the provisions of the Petroleum Act, 1940 and of any regulations for the time being and from time to time in force under the Act; and
 - (b) all directions given to it under the Act or the regulations for the time being and from time to time in force under that Act.
2. During the term of the licence, the Licensees shall carry out or cause to be carried out exploratory operations on the area comprised in the licence in accordance with such work programmes as are approved by the Minister from time to time. These exploratory operations shall include but not necessarily be limited to:-
 - (a) in the first year of the term of the licence, a data review and reprocessing of existing seismic data at an estimated total cost of \$130,000 (one hundred and thirty thousand dollars);

- (b) in the second year of the term of the licence the acquisition, processing and interpretation of 100 line kilometres of seismic surveying at an estimated cost of \$400,000 (four hundred thousand dollars);
 - (c) in the third year of the term of the licence the drilling of one exploration well to economic basement at an estimated total cost of \$500,000 (five hundred thousand dollars);
 - (d) the fourth year of the term of the licence the drilling of one exploration well to economic basement at an estimated total cost of \$500,000 (five hundred thousand dollars);
 - (e) in the fifth year of the term of the licence a review of all data at an estimated total cost of \$100,000 (one hundred thousand dollars).
3. Within sixty days after the end of each year (being the period of twelve calendar months ending on the anniversary of the date upon which this licence comes into force), the Licensees shall submit to the Minister a full and complete written statement of expenditures actually made or caused to be made by the Licensees during that year upon approved exploratory operations. This statement of expenditures shall be accompanied by a written opinion on the veracity of the statement from an auditor whose qualifications and independence from the Licensees are acceptable to the Minister.
4. In the event that the Licensees during any year of the term of this licence (a year being the period of twelve calendar months ending on the anniversary of the date upon which this licence comes into force) fail to comply with the exploratory operations requirements of this licence, it is an express term of this licence that the Minister then may at his discretion either cancel this licence or authorize such variation to these requirements as the Minister thinks fit.

5. (a) Not less than thirty days before the commencement of each year (being the period of twelve calendar months ending on the anniversary of the date upon which this licence comes into force), the Licensees must arrange to meet in person with the Director-General or his representative to review the progress of the programme of exploration for the current licence year, and to present a proposal for the programme of exploration for the forthcoming year;
- (b) if at any time the work being carried out or intended to be carried out by, or at the cause of, the Licensees is in the opinion of the Director-General not in accordance with the sound principles and practices of petroleum exploration, he may give the Licensees written directions as to the work being carried out or intended to be carried out, and the Licensees shall comply with those directions.
6. In addition to the quarterly reports specified in the Petroleum Regulations 1989, the Licensees shall promptly prepare and submit to the Director-General in a form acceptable to him, detailed reports on all exploratory operations done or caused to be done by or on behalf of the Licensees within and in relation to the licence area.
7. An application to drill a well within the area comprised in the licence shall include written proposals of the Licensees in relation to the bringing under control of the well, in the event that effective control of the well is lost, and to the clean-up of oil spills, including financial proposals such as well control insurance or other means to cover the costs involved in such operations.

SIGNED SEALED AND DELIVERED
by the said MINISTER OF MINES
AND ENERGY at ADELAIDE this

...25.....day of SEPTEMBER.....1990.....

MINISTER OF MINES AND
ENERGY



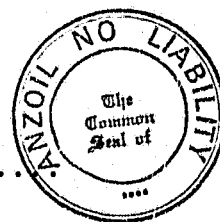
SIGNED SEALED AND DELIVERED
by the said LICENSEES at

.....PERTH..... this
.....16th..... day of JULY..... 1990

THE COMMON SEAL of ANZOIL NL
was hereto affixed in the presence of:-

.....[Signature].....
(Director)

.....Kayethnasev.....
(Secretary)



THE COMMON SEAL OF FOSSIL CLIFF OIL PTY LTD
was hereto affixed in the presence of:-

.....[Signature].....
(Director)

.....[Signature].....
(Secretary)



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PEL 42

The Schedule

DESCRIPTION OF AREA

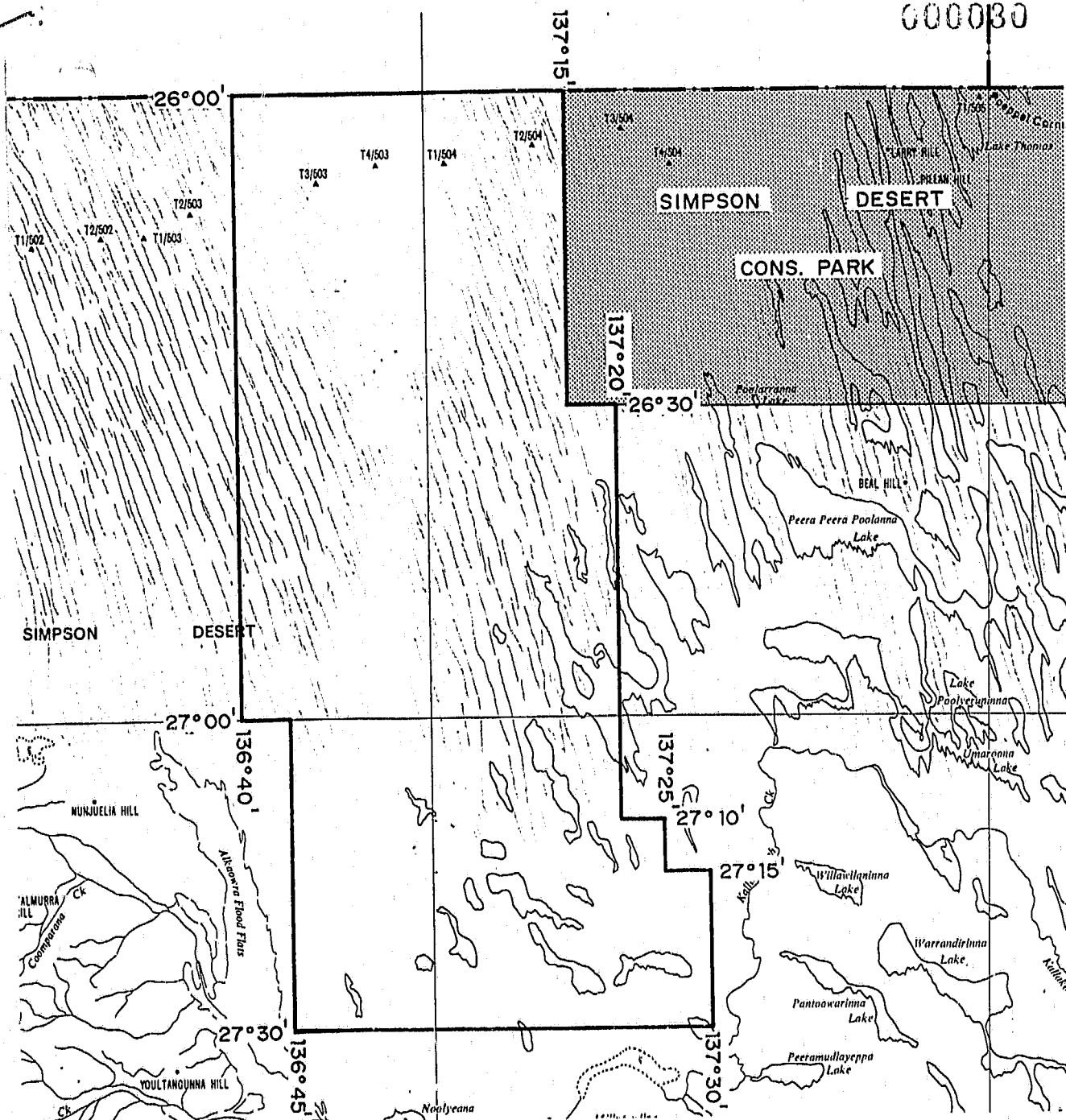
All that part of the State of South Australia, bounded as follows:

Commencing at a point being the intersection of the northern border of the State of South Australia and longitude 136°40' east, thence east along the said border to longitude 137°15' east, south to latitude 26°30' south, east to longitude 137°20' east, south to latitude 27°10' south, east to longitude 137°25' east, south to latitude 27°15' south, east to longitude 137°30' east, south to latitude 27°30' south, west to longitude 136°45' east, north to latitude 27°00' south, west to longitude 136°40' east and north to the point of commencement.

All the within latitudes and longitudes are geodetic and expressed in terms of the Australian Geodetic Datum as defined on p.4984 of Commonwealth Gazette number 84 dated October 6, 1966.

AREA: 10 638 square kilometres approximately

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NOTE: There is no warranty that the boundary of this Licence is correct in relation to other features on the map. The boundary is to be ascertained by reference to the Australian Geodetic Datum and the schedule.

THE PLAN HEREINBEFORE REFERRED TO

ANZOIL N.L.
FOSSIL CLIFF OIL PTY. LTD.

PETROLEUM EXPLORATION LICENCE NO. 42

DEPARTMENT OF MINES AND ENERGY - S.A.

SR 27/2/90

AREA 10638 km² (approx.)

000031

MEMORANDUM

Petroleum Exploration Licence No. 42
Anzoil NL and Fossil Cliff Oil Pty Ltd.

1. This licence granted on 25. SEPTEMBER 1990 is hereby entered on the Petroleum Register.
2. A security in the sum of \$4,000 bank guarantee has been lodged with respect to this licence.
3. Interests in the licence are:-
 - . Anzoil NL - 95%
 - . Fossil Cliff Oil Pty Ltd - 5%

25/9/90
SR 27/2/90


JOHN KLUNDER
MINISTER OF MINES AND ENERGY

SR. 27/2/90

000032

ANZOIL N.L.

(PRINCIPAL AUSTRALIAN OFFICE)
2 COLIN GROVE, WEST PERTH, WESTERN AUSTRALIA, 6005
P.O. BOX 1278, WEST PERTH, WESTERN AUSTRALIA, 6005
TELEPHONE 61/9/321-2933 FACSIMILE 61/9/321-3616

22nd April, 1991
Ref./474

Director General
Department of Mines and Energy
P.O. Box 151
EASTWOOD, S.A., 5063

Attention - **MR BOB LAWS**

Dear Sir,

re: **HALF YEARLY REPORT - PEL 42 TO 23RD FEBRUARY, 1991**

1. Geological and Geophysical Review:

- i) An extensive data base has been acquired as a result of the purchase of Adelaide Petroleum N.L.'s data base.
- ii) Dry Hole Analysis and Prospect review are being undertaken in the northern half of the permit. The aim is to compare past results with remaining seismically defined prospects and leads with the view of considering drilling of prospects indicated to have better potential than those thusfar drilled.
- iii) The southern part of the permit is considered prospective potentially at three Eromanga Basin horizons.
 - a) The Basal Jurassic Horizon
 - b) The Birkhead Formation Horizon
 - c) The Top Algebuckina Sandstone/Murta Horizon

With respect to the Basal Jurassic Horizon, previous work undertaken is being assessed with respect to the distribution and development of the Basal Jurassic in terms of reservoir and seal horizons. Seismically, Jurassic isochrons are being examined to clarify Basal Jurassic distribution. The Birkhead Formation is expected to develop as a seal and potential source in the southern part of PEL 42. The Algebuckina/Murta Horizon is sealed by the most extensive

Eromanga Basin Shales, however, structure at this horizon is subtle if Late (post oil migration) elements of structure are accounted for.

The work we are proceeding with is designed to define where new seismic acquisition should be undertaken.

- iv) A detailed review of the Source Rock Potential and factors influencing the source rock maturity and timing of oil generation has been undertaken. This included an analysis of temperature data from water bores and exploration wells and an evaluation of pre-existing source rock analysis undertaken in existing well.

This review tended to support the concept that higher geothermal gradients can be expected in the southern part of PEL 42 supporting the proposal to record new seismic in this area.

2. Seismic Reprocessing Programme

Reprocessing of seismic was planned in the area. Due, however, to the continued downturn of the exploration industry, in particular the difficulty in securing risk capital, this programme has had to be deferred for the present time. We do, however, intend proceeding with seismic reprocessing at the earliest time.

3. Permit Expenditure

Following is a breakdown of PEL 42 expenditure for the first half of Year 1.

i)	Data Purchase	\$10,000
ii)	Seismic Reprocessing Programme	3,100
iii)	Manpower -	
	a) Reprocessing Programme	6,320
	b) Geological and Geological Review	9,000
	c) Permit Management	2,000
iv)	Overheads/Miscellaneous	<u>3,642</u>
	TOTAL	<u>\$34,062</u>

Yours faithfully,
ANZOIL N.L.



M.R. HARRISON
EXPLORATION DIRECTOR

000034

SOUTH AUSTRALIA



FARMIN OPPORTUNITIES

The following information is provided by the holders of Petroleum Exploration Licences in South Australia who are interested in obtaining partners to join them in exploration.

NOVEMBER 1991

000035

SOUTH AUSTRALIAN PETROLEUM EXPLORATION LICENCE - FARMIN OPPORTUNITY

Licence:	Petroleum Exploration Licence No. 42
Area:	10,638 km ²
Basin:	Simpson, Eromanga and Warburton Basins
Licencees:	ANZOIL NL (100%)
Address:	2 Colin Grove WEST PERTH, WESTERN AUSTRALIA, 6005
Phone:	(09) 321-2933 61/9/321-2933 (International)
Facsimile:	(09) 321-3616 61/9/321-3616 (International)
Exploration Manager:	Mr Michael Harrison
Stratigraphy:	PEL 42 is located on the western flank of the Poolowanna Trough. Greater than 2,800 m of Mesozoic sediments have been deposited in this Trough. Fluvial and flood plane deposits of the Triassic Peera Peera Formation and early Jurassic, Poolowanna Formation are the most prospective horizons. Succeeding these sand shale deposits is the Jurassic Algebuckina Sandstone, a thick sequence of fluvio-acolian sands. Within this sequence the lacustrine Birkhead Formation develops as a source/seal horizon in the southern part of the licence. Thick marine shales were deposited in the Cretaceous.
Tectonics:	The Permian Pedirka Basin develops to the west of PEL 42 and Triassic Simpson Basin develops in the east and to the east of PEL 42, centred on the main regional low, the Poolowanna Trough. These intracratonic depocentres were succeeded by widespread Jurassic Cretaceous sedimentation. Reactivation of more ancient faultlines occurred in this broad intracratonic setting as Australia gradually separated from Antarctica following initial Jurassic rifting. A late structural episode post dated oil generation, and therefore careful assessment of the structural history of prospects is required.
Nearest Field:	PEL 42 is located approximately 250 km west of the main Cooper/Eromanga Basin Producing province.

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Main Plays:

Future exploration will be directed towards re-evaluation of structural trends in order to define prospects close to the Poolowanna Trough "kitchen" area.

The Poolowanna Formation is the primary reservoir objective and is rich in organic matter (up to 15% TOC). Poolowanna No 1 (1977) recorded a flow of 4 barrels per hour of oil (although after a few hours the oil became mixed with water) from this sequence. Poolowanna was a late structure and studies have determined the oil was tertiary migrated.

The Peera Peera Formation is an objective. Minor anomalous zones were detected on logs within this unit in Killumi No 1 but were not tested.

The Top Algebuckina sandstone is a reservoir objective and to the south where the Birkhead Formation develops the underlying Hutton Sandstone is prospective. High heat flow, 5°C/100 m plus, are likely in the southern part of the permit where the Eromanga sequence onlaps the Cambro-Ordovician Warburton Basin, this is a similar Eromanga setting to the ATP 269/ATP 299 oil province of South West Queensland where oil has been generated at shallow depth.

Exploration Commitment:

Record 100 kms of seismic by September 1992.
Drill two exploration wells by September 1995.

Licence Term:

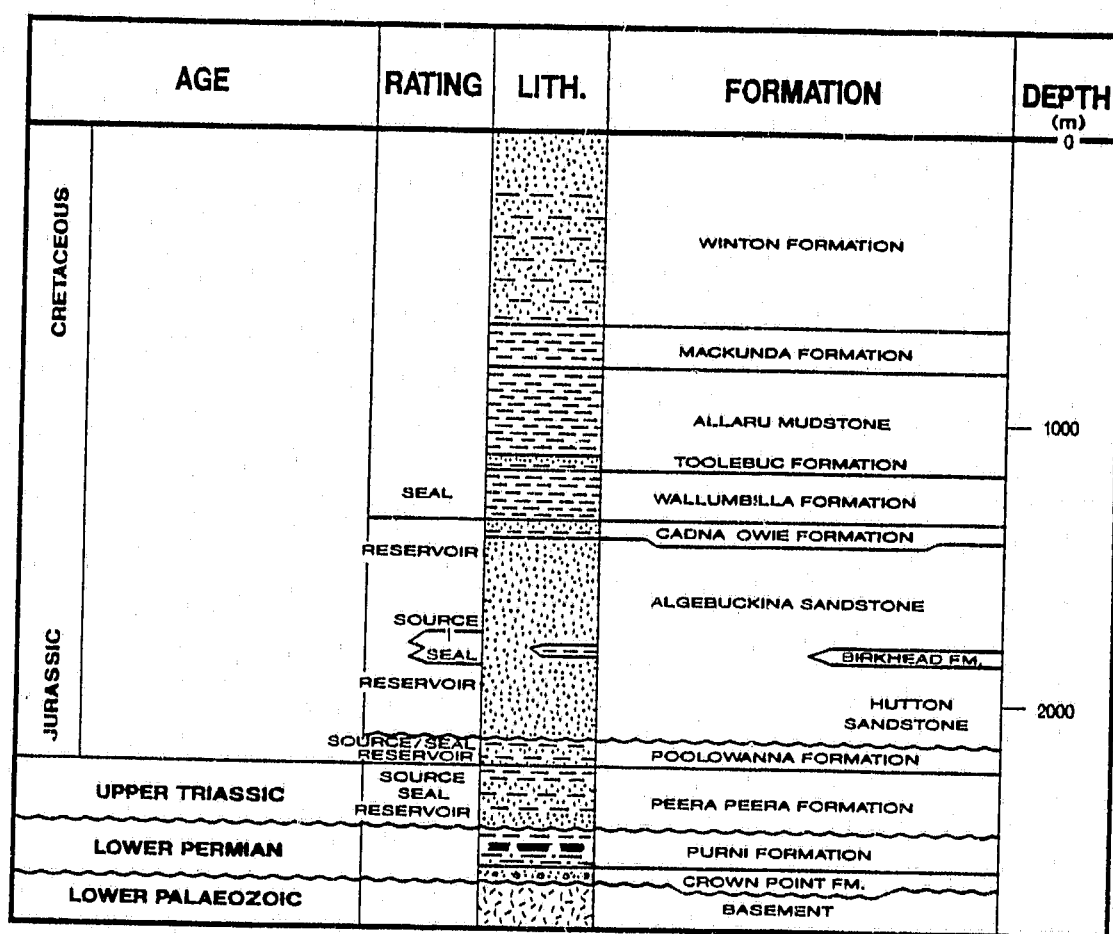
Current term expires September 1995.
May be renewed for a further 3 x 5 year term.

Exploration to Date:

Three exploration wells, 2,200 kms of seismic.

000037

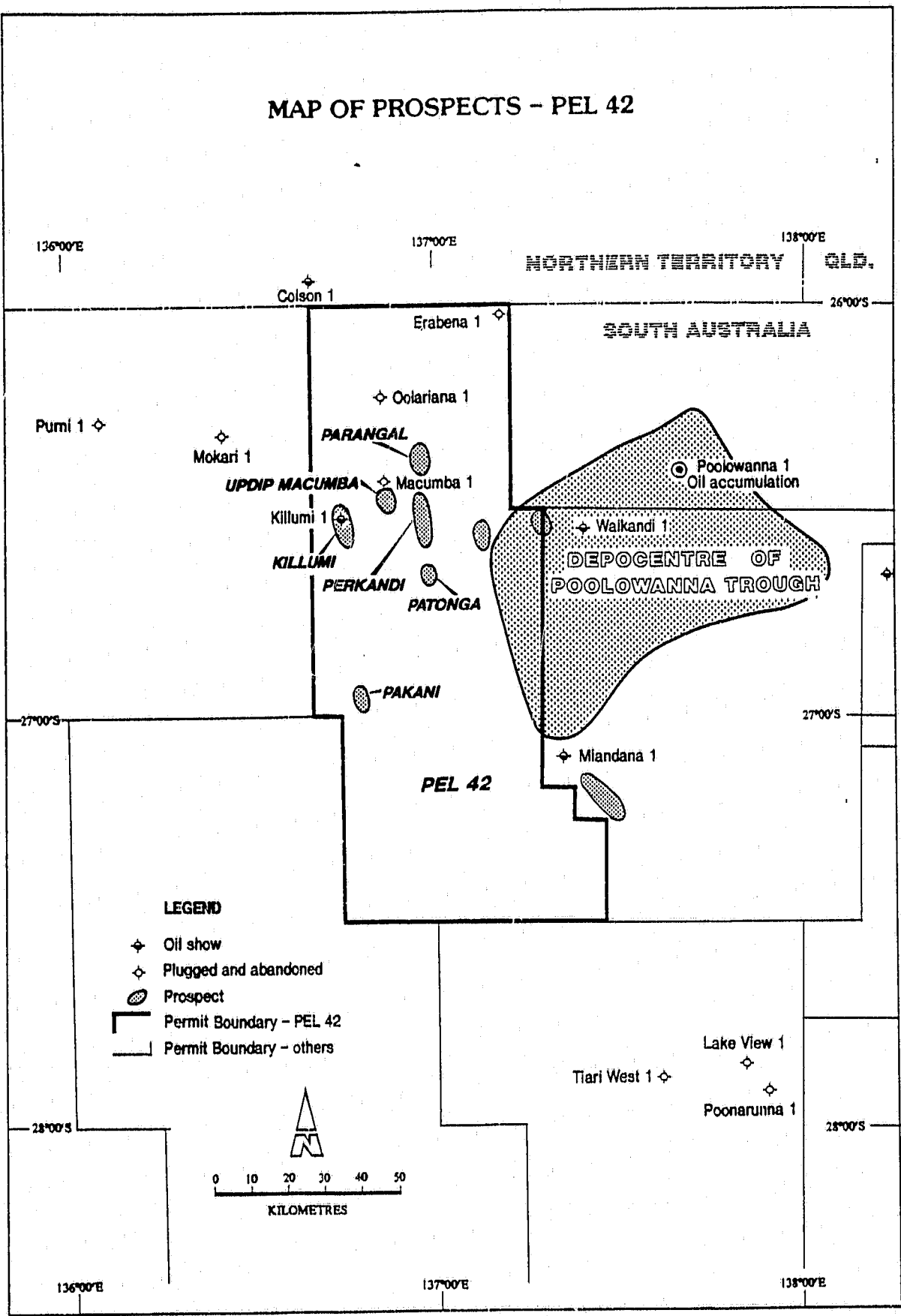
GENERALISED STRATIGRAPHY - PEL 42



LEGEND

	Sandstone		Coal
	Shale		Conglomerate
	Siltstone		Basement

000033



SR 27/2/90
WA 27/2/95

000039

ANZOIL N.L.

(PRINCIPAL AUSTRALIAN OFFICE)
2 COLIN GROVE, WEST PERTH, WESTERN AUSTRALIA, 6005
P.O. BOX 1278, WEST PERTH, WESTERN AUSTRALIA, 6005
TELEPHONE: 61/9/321-2933. FACSIMILE: 61/9/321-3616
(A.R.B.N. 009 475 423)

30 January, 1992
Ref./620

Mr Bob Laws
Director Oil, Gas and Coal Division
Department of Mines and Energy
191 Greenhill Road
EASTWOOD, S.A., 5063

Dear Sir,

re: PEL 42 AND PEL 47

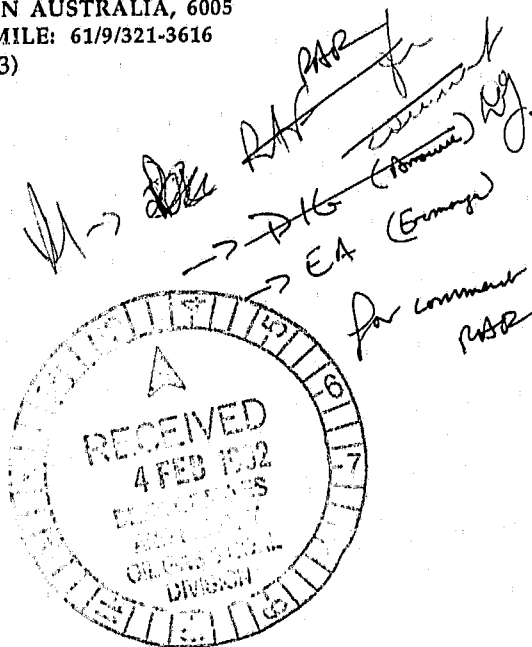
Please find enclosed permit montages for PEL 42 and PEL 47. These are designed for presentation to brokers to secure underwriting for our capital raising which is expected to be concluded by the end of February, 1992.

PEL 47

As stated in previous correspondence our first priority will be to drill the Poverty Lake Prospect. Our feeling is that previous interpretation of this prospect has not indicated its true potential. In particular interpretation of the northern part of the prospect is suspect. I enclose a map detailing the reprocessing programme to commence as soon as our capital raising is concluded.

The existing 1985 and 1986 seismic processing is substandard and lacks the frequency content necessary to accurately pick unconformities. The interpretation of line 85 - ZDB is the weakest point of the Santos mapping and will be the first line to be reprocessed, followed by line 86 - AHT. This priority is selected because it may prove necessary to record additional seismic in the northern part of the prospect. (see enclosed map)

Our interpretation suggests that vertical closure of the Poverty Lake Prospect is approximately 70ms at Near Base Billy Creek Formation. Areal closure of the prospect is approximately 30 square kilometres. Wrenching which formed the



prospect occurred during Billy Creek Seal deposition and our interpretation shows a pronounced thin of this unit over the structure in all directions. The strong seismic event at Near Base Billy Creek suggests a limestone reservoir will be intersected below the Billy Creek Seal. Development of vuggy porosity can be inferred and the Tertiary re-activation of the structure will ensure that fracture porosity and more importantly permeability will be present. Our preliminary assessment suggests a thick Hawker Group sequence is present beneath the Base Billy Creek horizons which contrasts with the Moorowie No. 1 intersection.

The Daily prospect also has its merits.

PEL 42

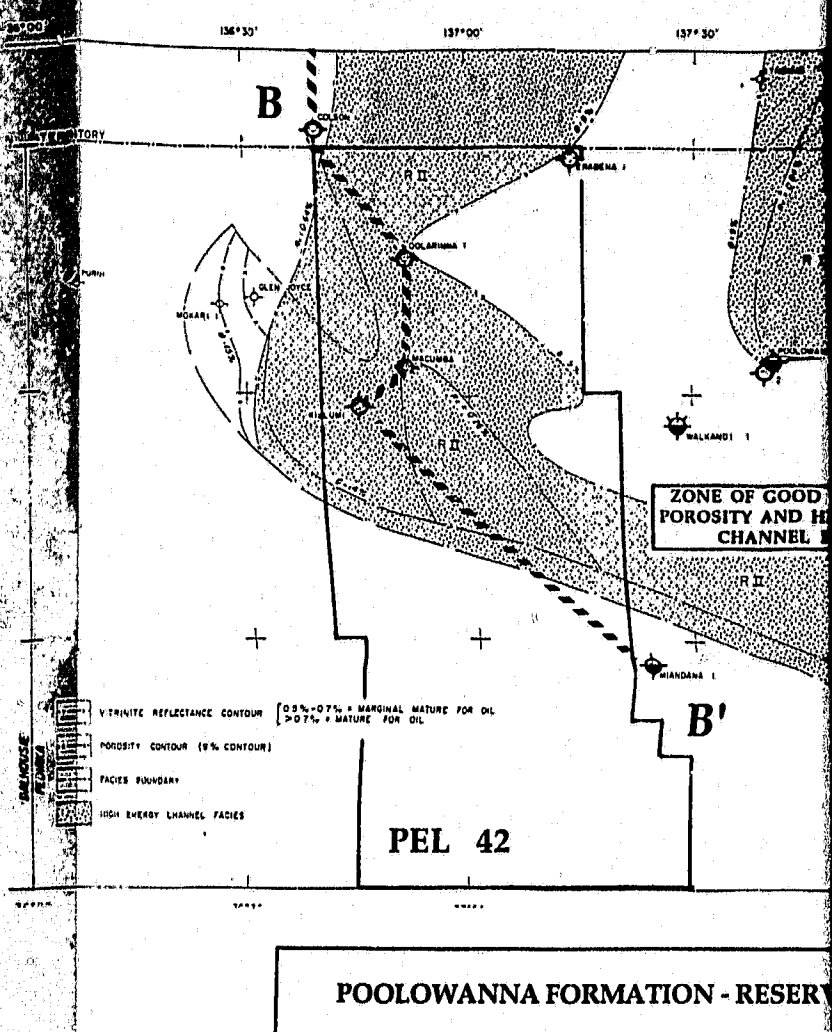
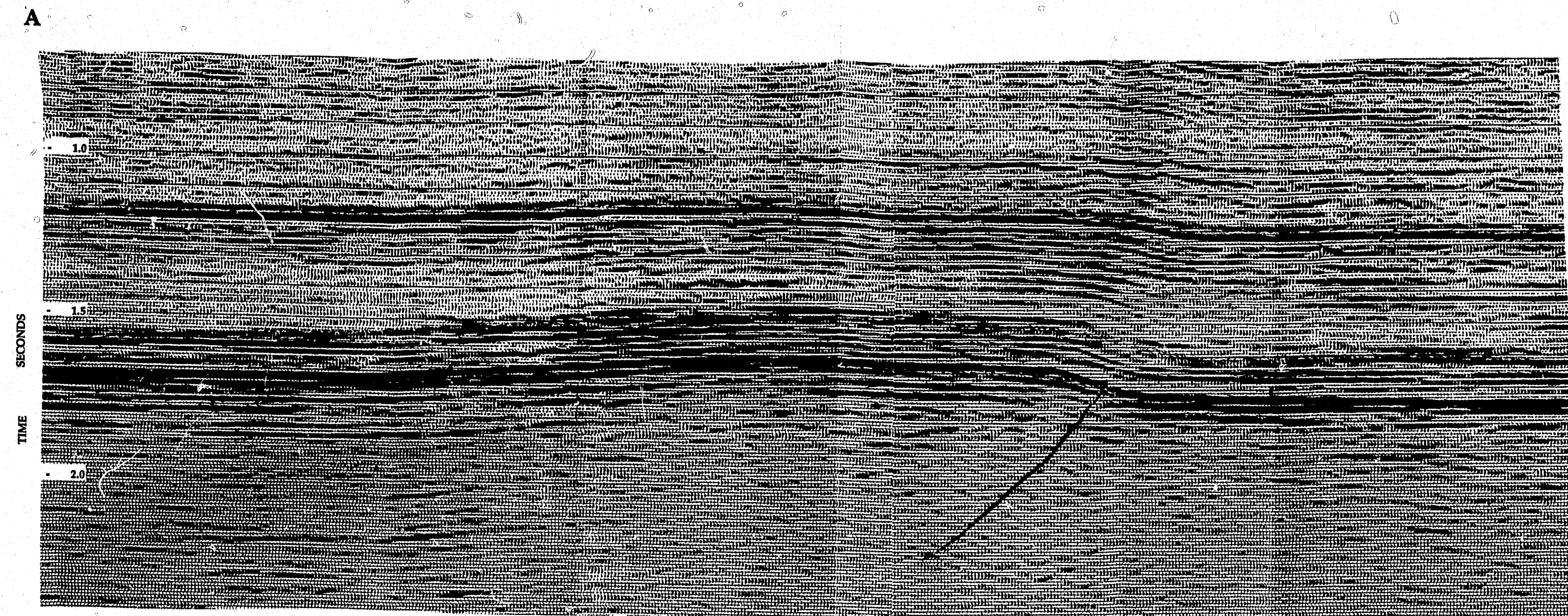
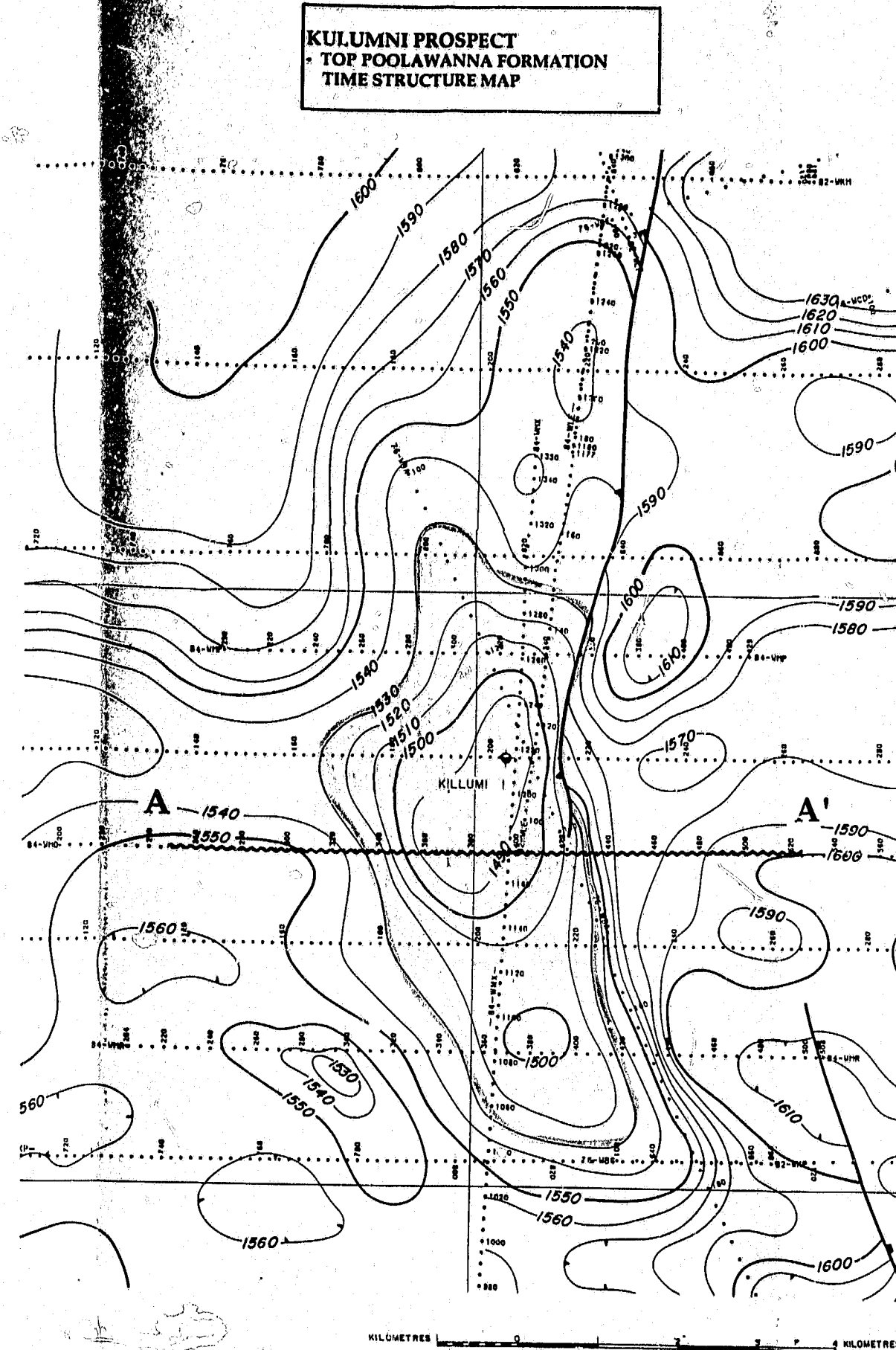
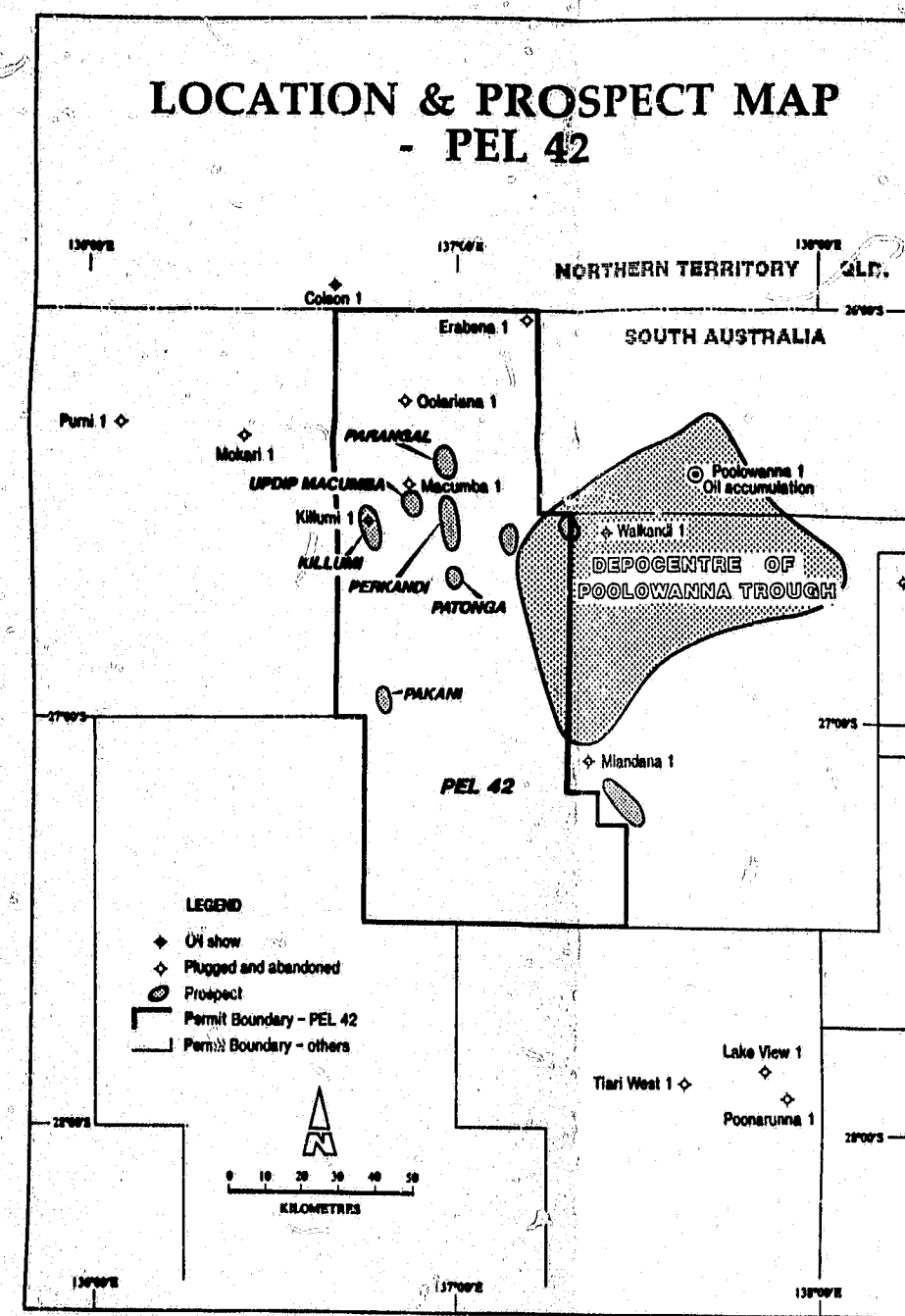
The montage for PEL 42 tells the story of the Killumi Prospect. The high velocities through the Algebuckina Sandstone at the Killumi No. 1 location are suggested to have distorted time structure. The depth culmination of the prospect is suggested to be further south as indicated by time interval mapping of the Algebuckina interval.

Our aim in the permit is to upgrade the data set in key areas and to prepare drilling locations at the earliest opportunity.

Yours faithfully,
ANZOIL N.L.



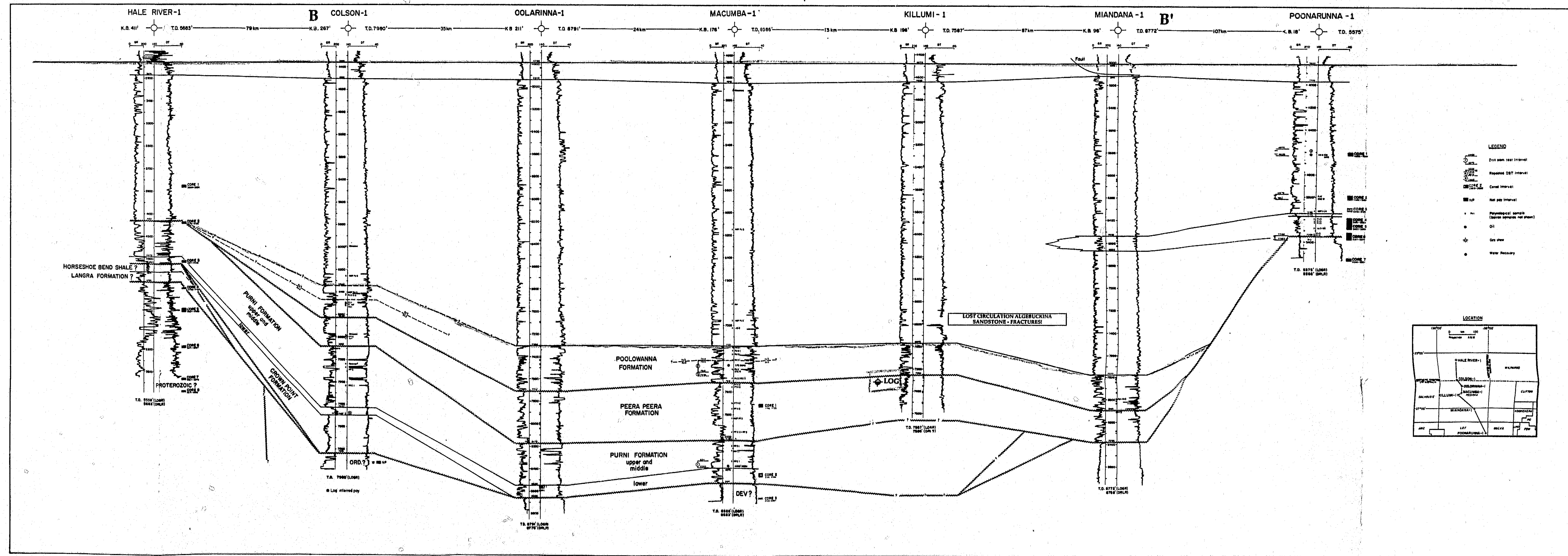
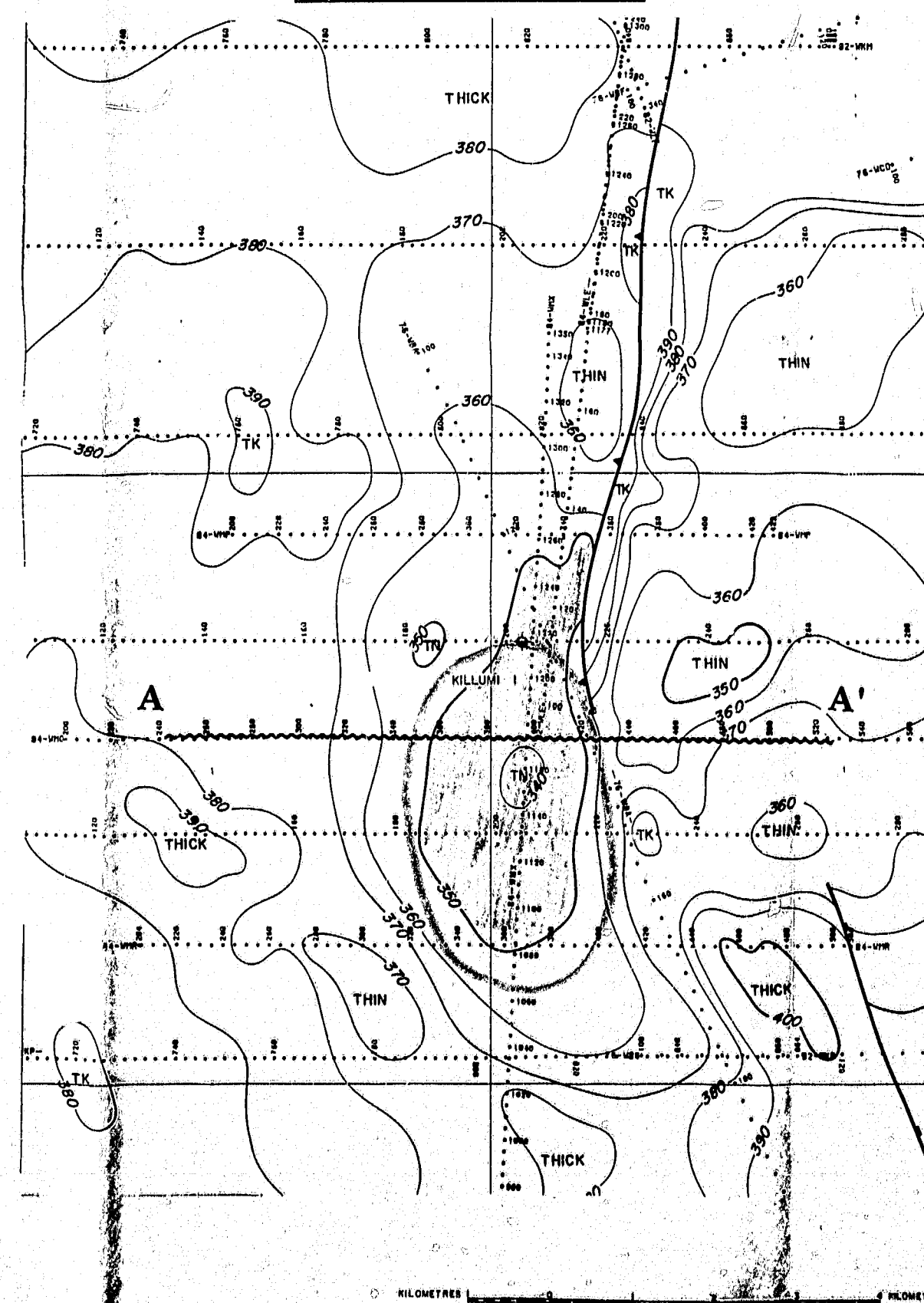
M. HARRISON
EXPLORATION DIRECTOR



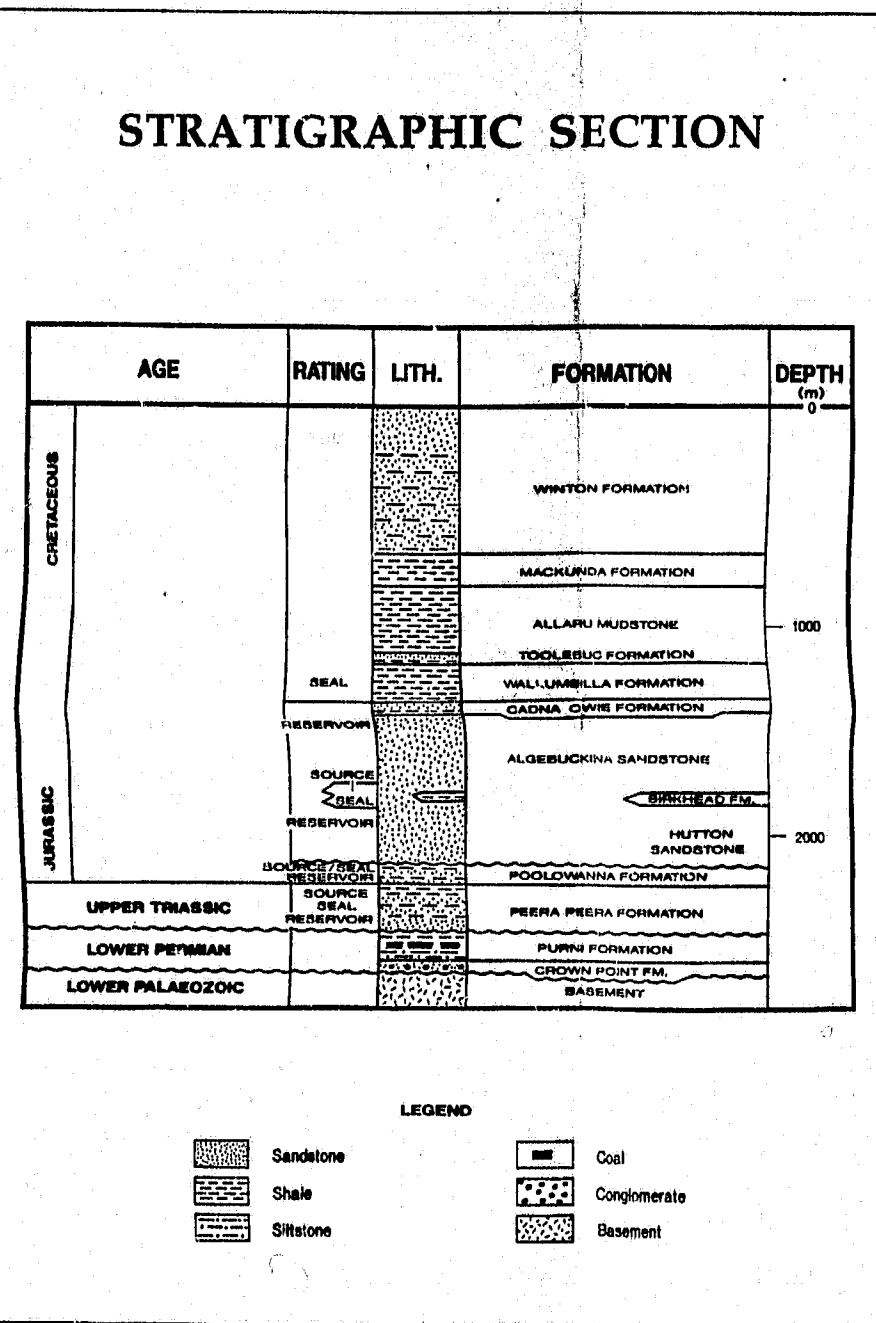
FORMATION	PROG. DEPTH K.B.	ACTUAL DEPTH K.B.	DEPT. C.F.	PROG. THICK. C.F.	ACTUAL THICK. C.F.	THICK. C.F.
Surficial & Winsom	20'	20'	0'	2666'	2189'	-477'
Mackunda	2686'	2209'	477'H	340'	483'	+143'
Allaru Mudstone	3025'	2992'	334'H	570'	1057'	+487'
Toolbuc	3595'	3749'	155'L	90'	101'	+11'
Hallumbilla	3686'	3850'	164'L	720'	629'	-91'
Cadma-chile	4406'	4479'	73'L	160'	163'	+3'
Algeuckina Sandstone	4566'	4642'	76'L	1910'	2328'	+418'
Poolowanna	6476'	6970'	494'L	420'	284'	-136'
Peera-Peera	6896'	7254'	358'L	480'	332'	-148'
Total Depth	8176'	7586'	590'H			

KILLUMI NO. 1, PROGNOSSED (PRE-DRILL) VERSUS ACTUAL DRILL DEPTHS OF STRATIGRAPHIC HORIZONS

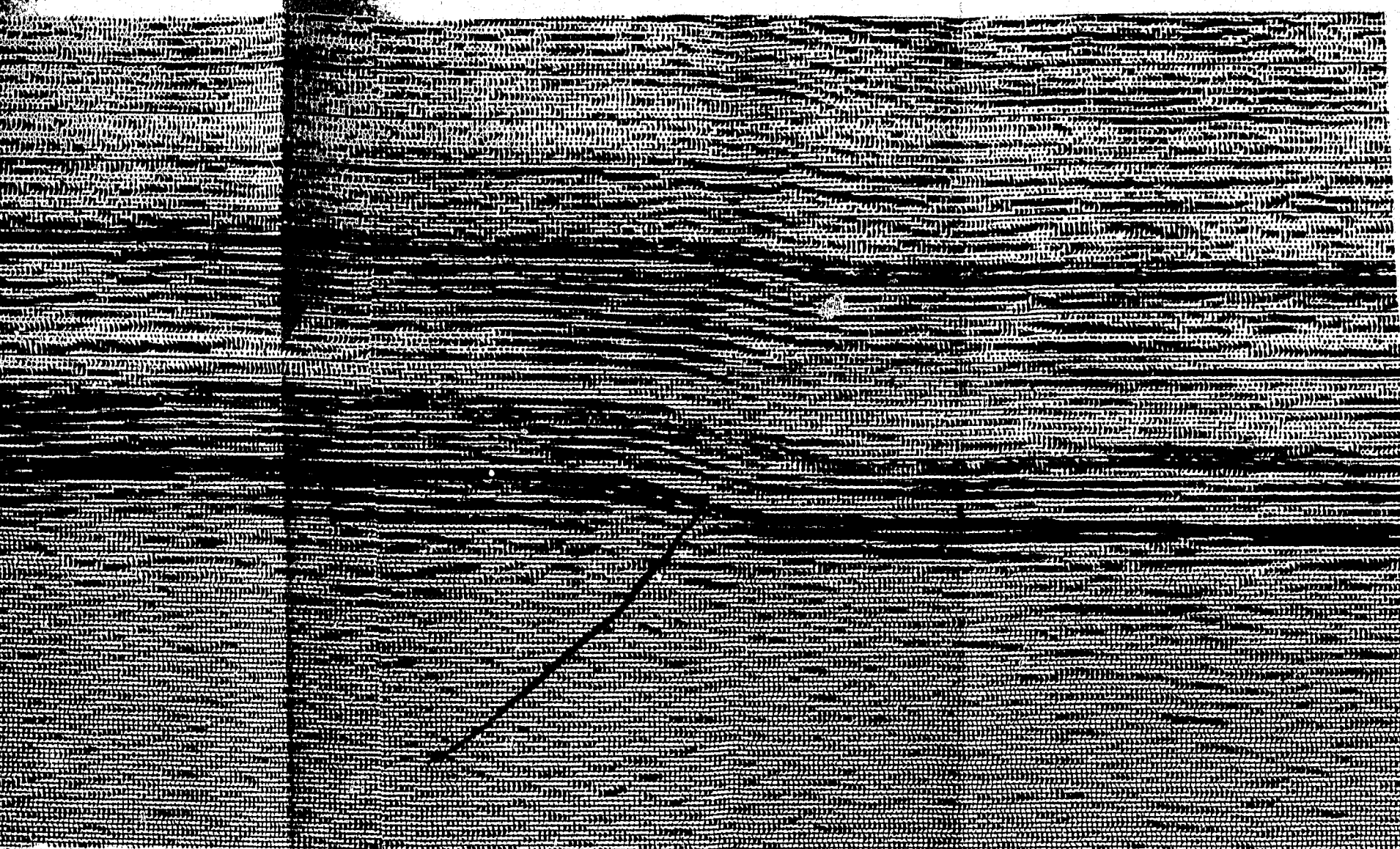
KULUMNI PROSPECT
ISOPACH MAP SHOWING C-J-L
TIME INTERVAL THICKNESS



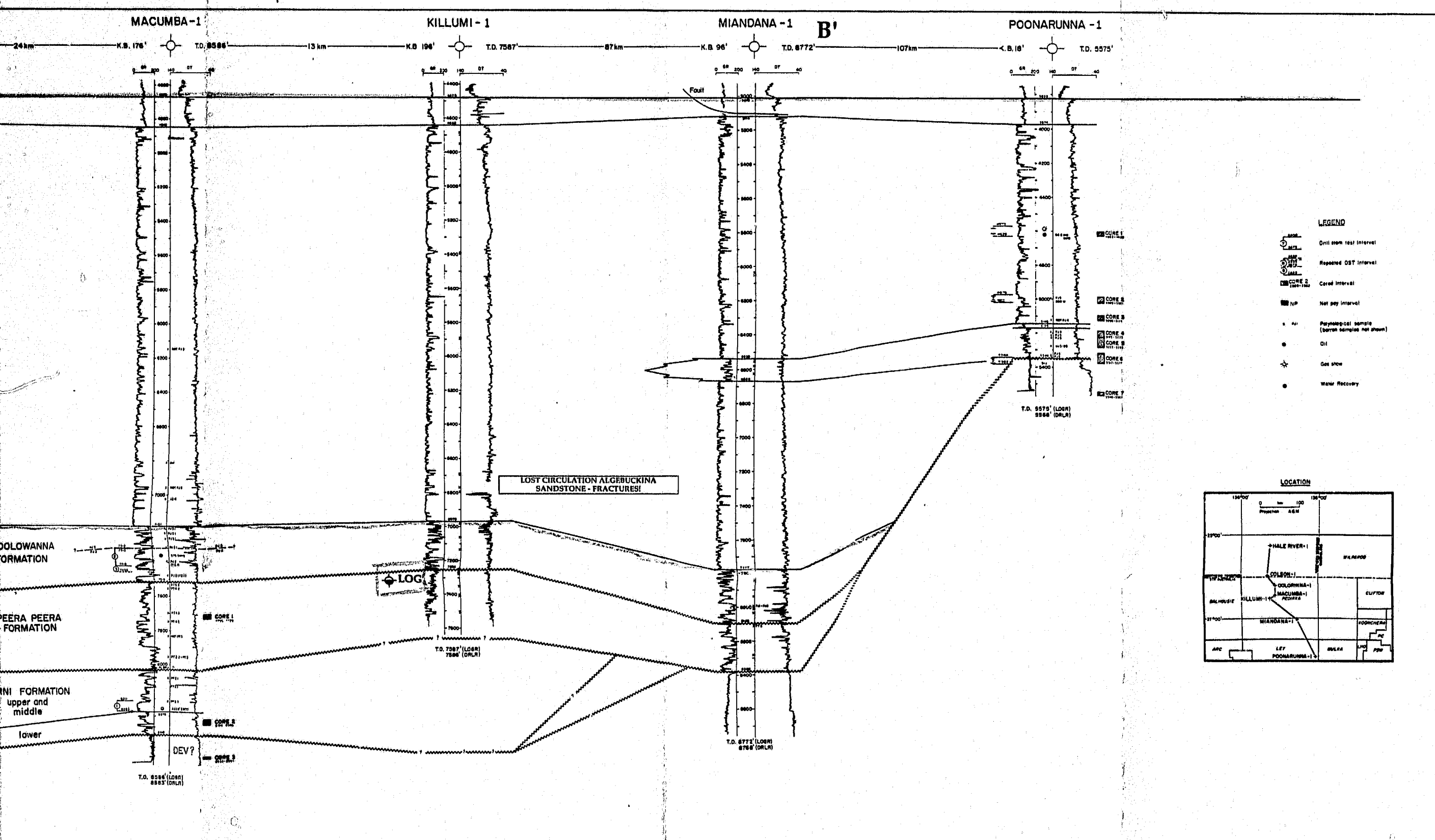
WELL CORRELATION ACROSS PEL - 42



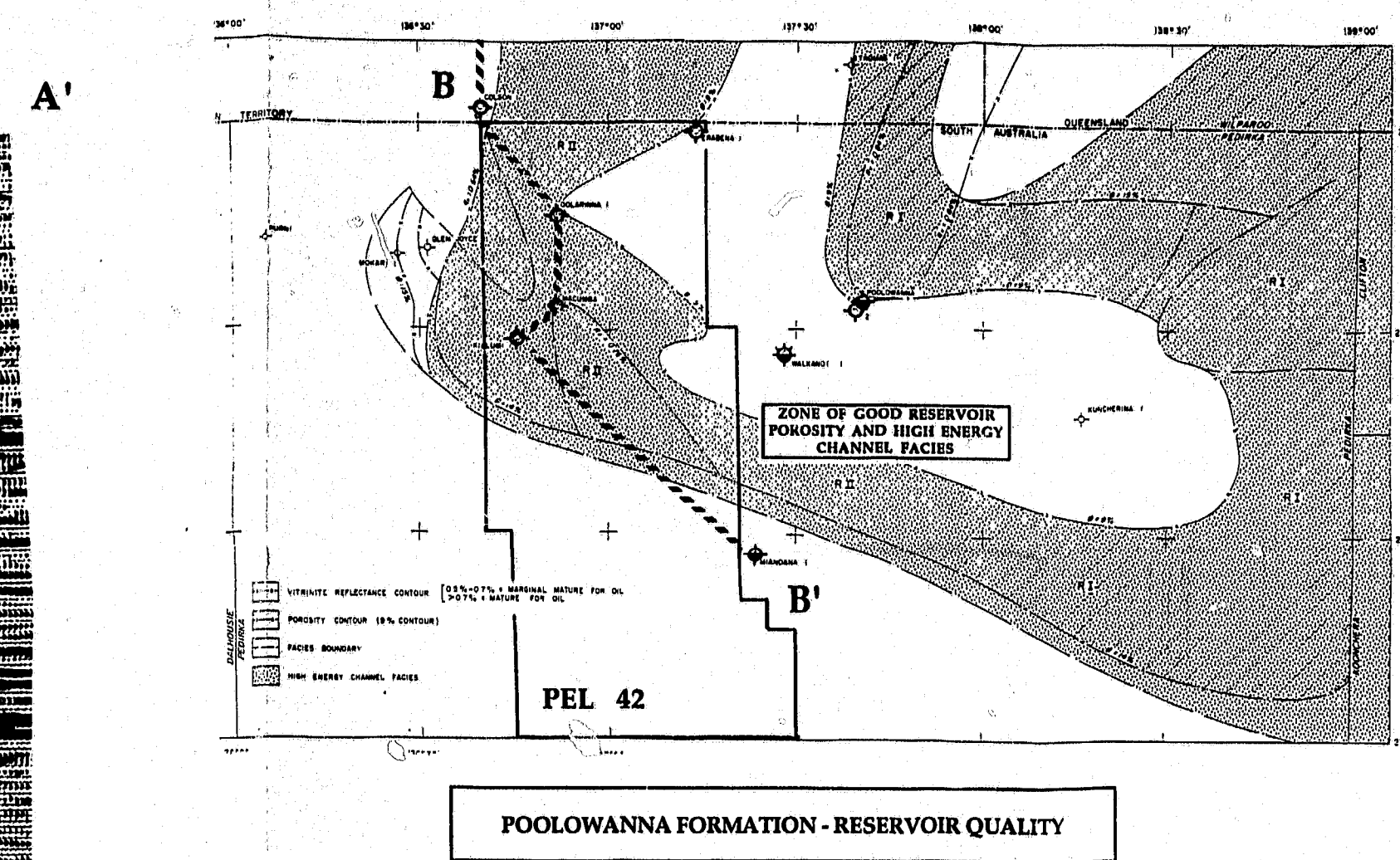
8079-1



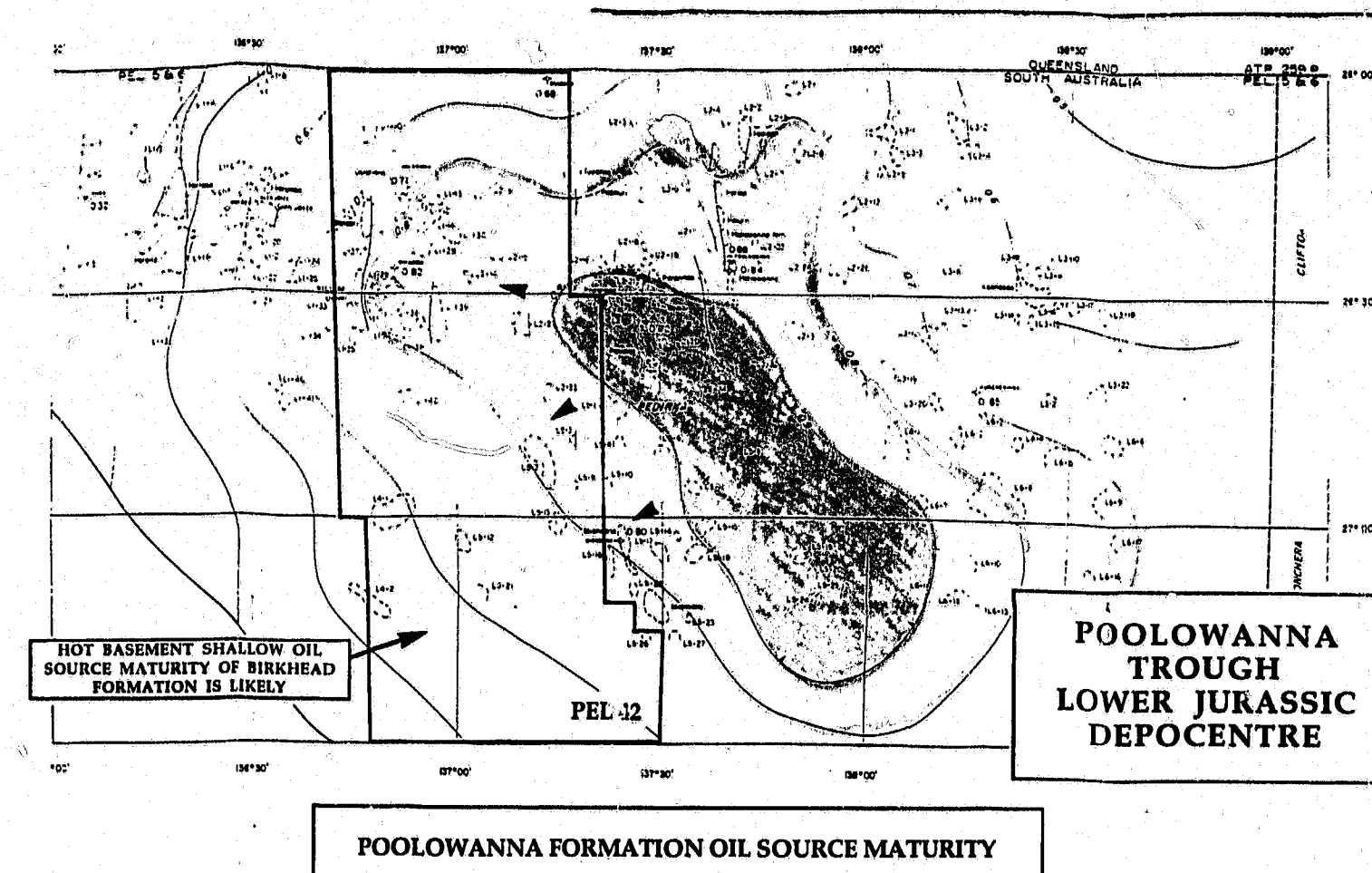
LINE 84 WMQ ACROSS KULUMNI PROSPECT



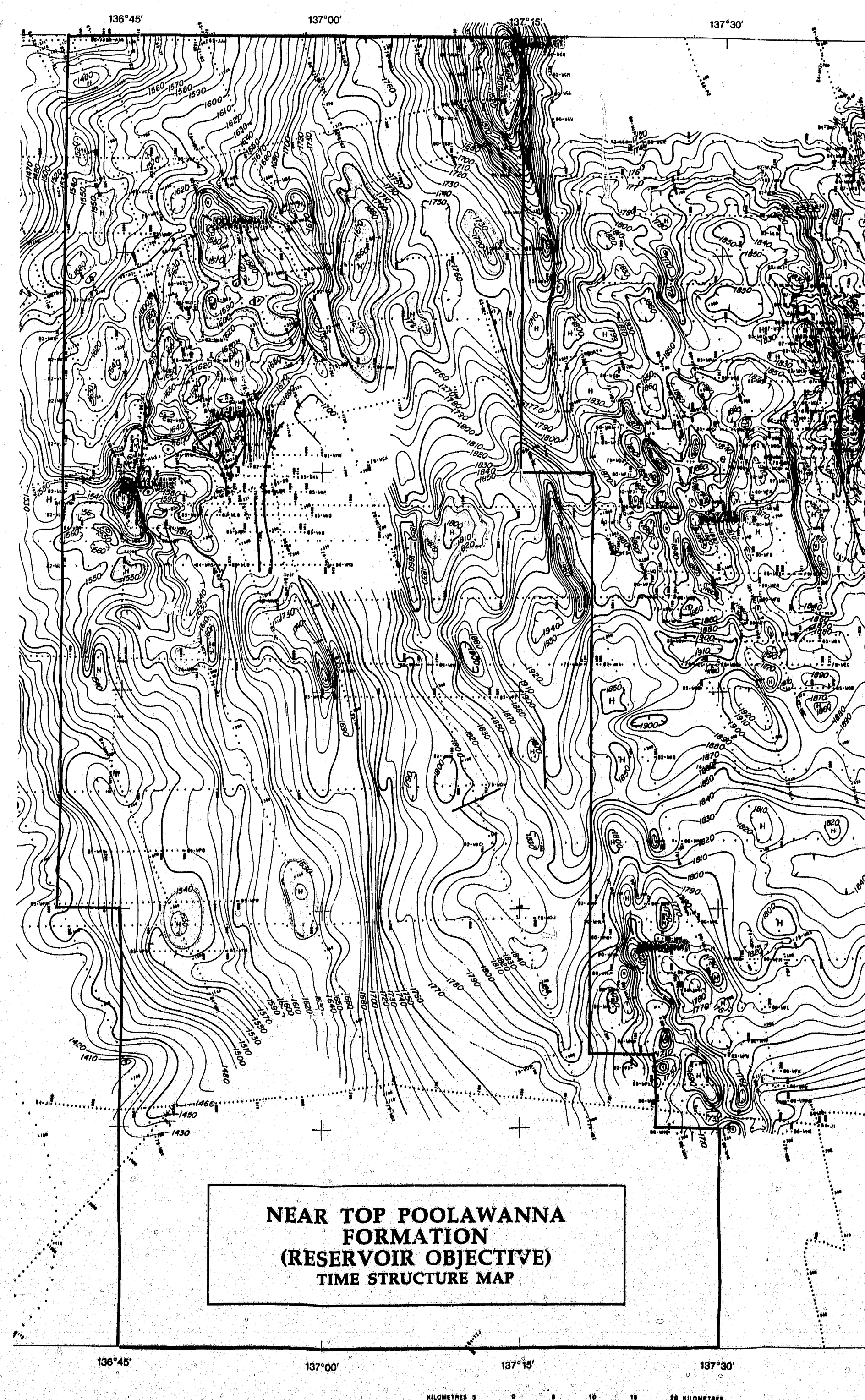
CORRELATION ACROSS PEL - 42



POOLOWANNA FORMATION - RESERVOIR QUALITY



POOLOWANNA FORMATION OIL SOURCE MATURITY



NEAR TOP POOLAWANNA FORMATION (RESERVOIR OBJECTIVE) TIME STRUCTURE MAP

LOGISTICAL

BASIN: Simpson Desert/Eromanga

PERMIT AREA: 11,354 square kilometres

WELLS DRILLED: 4 Exploration wells

SEISMIC COVERAGE: 2,200 kilometres. Fair quality multifold data. Substantial reprocessing required.

NEAREST PIPELINE: Moomba Pipeline 300km east.

TERRAIN: Desert, low scrubs and small dunes.

NEAREST PRODUCTION: Main Cooper Basin oil and gas province is located 200km east.

GEOLOGICAL

BASIN: Intra-cratonic to marginal marine.

RESERVOIR: L. Jurassic Poolowanna Fm. sandstones
U. Triassic Peera Peera Fm. sandstones
Secondary objective is the Jurassic Hutton sandstones.

SOURCE: Intraformational shales within the Poolowanna and Peera Peera formations.
Jurassic Birkhead Fm. shales.

SEAL: As above for source rocks.

PROSPECTS: Perkandi, Farangal & Macumba
- mature Jurassic/Triassic objectives
- est. TD's 2500m
Killumi No. 1
- potential oil bearing Triassic sands require re-evaluation.

PLAY TYPES: I Broad anticlines controlled by early basement faults.
II Drape folded anticlines
III Hutton Sandstone stratigraphic plays in the southern part of the permit.

SIGNIFICANT SHOWS: Poolowanna No. 1
- flowed 96 BOFPD.
Killumi No. 1
- log evaluation indicates possible Triassic oil zones undetected due to severe lost circulation.

PEL 42 : SIMPSON DESERT - EROMANGA BASIN
SOUTH AUSTRALIA



000041



ANZOIL NL A.C.N. 009 171 846
1 COLIN GROVE, WEST PERTH, WESTERN AUSTRALIA 6001
PO BOX 1276, WEST PERTH, WESTERN AUSTRALIA 6872
TELEPHONE: (09) 321 2933 FACSIMILE: (09) 321 2616

8th May, 1992

The Director General
Department of Mines and Energy
P.O. Box 151
EASTWOOD, S.A., 5063

Attention - MR BOB LAWS

Dear Sir,

re: **ANNUAL REPORT PEL 42**
25 SEPTEMBER 1990 - 24 SEPTEMBER 1991

A. Geological and Geophysical Review

A review of the prospectivity of the permit indicates prospects are present in the permit which could be considered for immediate drilling.

Dry Hole Analysis

The conclusions of a review of structures drilled to date indicate that consideration of two factors are critical in considering selections of new drilling prospects -

1. **Timing of structuring.** The Tertiary to Recent episode of structuring appears to have post-dated oil generation.

The oil recovered from Poolowanna No. 1 was re-mobilised from an earlier trap. The Poolowanna structure shows strong "late" structuring.

Oolarinna No. 1 was a dry hole which drilled a structure of good size and showing strong early growth and could be regarded as the most conclusive "dry hole". The Oolarinna structure may be beyond the reach of migrated oil from the Poolowanna Trough.

000042

2. Velocity Anomalies

These appear to be common. The Killumi No. 1 well for example intersected the top Poolowanna Formation some 494' low to prognosis. The overlying Algebuckina Formation was 418' thicker than prognosed. The Algebuckina was apparently silicious towards the base and circulation was lost during drilling.

Examination of seismic and consideration of the above results suggests that the Killumi well may have been located on anomalous time structure culmination. A substantial depth structure could be present south of the Killumi well location.

Other aspects of geology are well covered by previous reports compiled by Santos and partners.

B. Future Programme

Given the uncertainties of time structure and structural timing it is recommended that a soil geochemistry programme should be considered in the permit in order to high grade prospects.

C. Permit Expenditure

First six months (previously reported)	\$34,062.00
Second six months -	
i) Data Purchase	3,723.00
ii) Geological and Geophysical Review	10,500.00
iii) Management/Overheads/Miscellaneous	<u>6,510.00</u>
TOTAL EXPENDITURE FOR YEAR ONE	<u>\$54,795.00</u>

Yours faithfully,
ANZOIL (N.Z.) N.L.



MIKE HARRISON
EXPLORATION DIRECTOR

000043

SR 27/2/90

MEMORANDUM

PETROLEUM EXPLORATION LICENCE NO. 42

This memorandum will certify that on*1st September*.....1992, I gave my consent to surrender portion of the PEL 42 licence area reducing the licence area to 7945 km², to take effect from the abovementioned date.

A Variation of Licence Conditions to take effect from the above mentioned date is hereby entered upon the Petroleum Register.



JOHN KLUNKER MP

MINISTER OF MINES & ENERGY

119 1992

000044

PETROLEUM ACT 1940

I, JOHN HEINZ CORNELIS KLUNDER, Minister of Mines and Energy in the State of South Australia pursuant to the provisions of the Petroleum Act, 1940, HEREBY VARY THE CONDITIONS of Petroleum Exploration Licence No. 42, of which the licensees are:

ANZOIL NL and Fossil Cliff Oil Pty Ltd both of 24 Colin Street, West Perth WA 6005.

PEL 42 - VARIED CONDITIONS

The Licensees shall comply with all the conditions specified in Petroleum Exploration Licence No. 42 dated 25/9/90, except that in accordance with Section 17(3) of the Petroleum Act, 1940 Condition 2(a), 2(b) and 2(c) is hereby cancelled and is replaced by:

- (a) in the first year of the term of the licence, a geological and geophysical review at a total estimated cost of \$54 795 (fifty four thousand, seven hundred and ninety five dollars).
- (b) in the second year of the term of the licence, carry out a geochemical survey by 31 December 1992 at a total estimated cost of \$50 000 (fifty thousand dollars).
- (c) in the third year of the term of the licence, the drilling of one exploration well to be spudded by 25 March 1993 at a total estimated cost of \$500 000 (five hundred thousand dollars).

SIGNED, SEALED AND DELIVERED
by the said MINISTER OF MINES
AND ENERGY at ADELAIDE THIS

..... *First* day of *September* 19*92*

J. Klunder
MINISTER OF MINES AND ENERGY



000045



ANZOIL NL ACN 009 171 046
24 COLIN STREET, WEST PERTH, WESTERN AUSTRALIA 6005
PO BOX 222, WEST PERTH, WESTERN AUSTRALIA 6072
TELEPHONE: (09) 481 4777 FACSIMILE: (09) 481 2661

4 January 1993

Mr Ross Fardon
Director General
The Department of Mines and Energy
PO Box 151
EASTWOOD SA 5063

Dear Sir

RE: APPLICATION TO SURRENDER PEL 42

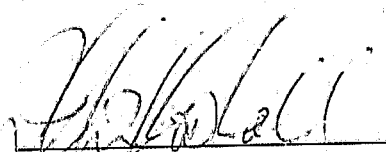
Pursuant to a variation of the licence terms of PEL 42 which requires drilling of an exploration well by 25 March 1993, we hereby advise that we have been unable to secure the required joint venture participation to drill a well and see no prospect of achieving this end by the date stated. Anzoil NL is not in a position to fund a well 100%.

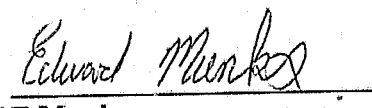
Anzoil NL hereby make formal request to relinquish PEL 42 forthwith.

THE COMMON SEAL OF
ANZOIL (NZ) NL (ARBN 009 475 423)
WAS AFFIXED IN ACCORDANCE
WITH ITS ARTICLES OF ASSOCIATION
IN THE PRESENCE OF:

)
)
)
)
)




JLC Marshall
MANAGING DIRECTOR


E Munks
COMPANY SECRETARY

000048


SR 27/2/90

MEMORANDUM

Surrender of PEL 42

This memorandum will confirm that on ...23 FEBRUARY..... 1993 I gave my consent to the surrender of the above licence.

My consent is effective at the end of licence year 3 ending 24th September 1993.



FRANK BLEVINS MP
MINISTER OF MINERAL RESOURCES

23/2/93