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OR-470.



T31P

West Coast Tasmania
An Exploration Opportunity in the
southern margins of Australia – Oil
Province

Roma Petroleum Company Pty Ltd

Level 1 Commerce Building
462 Queen St.
Brisbane
QLD 4000
Australia

January 2000

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PERMIT SUMMARY AND GEOLOGY

Roma Petroleum Company Pty Ltd in conjunction with Guinness Peat plc was awarded exploration permit T31P off the west coast of Tasmania on 25 March 1999 for an initial 6 year period.

MAXUS Energy Corporation held this permit area in the early 1990's. MAXUS, though enthused by the targets they mapped in a 2D seismic survey in 1990, relinquished the area due to changes in their corporate directives and general downsizing of their worldwide exploration program in 1994.

Since this time much attention has been focused on the deep-water oil potential of large Cretaceous deltas in and along the southern margin of Australia particularly in the Great Australian Bight Region, which is up for competitive bids in April 2000.

The T31P permit area is located in the southeastern arm of this extensive southern margin oil province. Separation of the Australian and Antarctic Continents due to rifting in the early Cretaceous formed a series of graben which were the site for the accumulation of potentially very rich lacustrine and restricted marine source rocks. Evidence for the distribution of these source rocks is based on the presence of numerous active oil slicks and bitumen strandings as well as the occurrence of residual oil columns in the very few wells that have been drilled within the province (such as Jerboa-1, Greenly-1, Cape Sorell-1).

Cape Sorell-1 well lies within the T31P permit, in a position proximal to the Tasmanian hinterland, but on a migration pathway from potential Cretaceous source rocks lying in deeper water in the Sorell Basin to the west.

The presence of mature source rocks beneath the west Tasmanian continental margin has also been substantiated by the occurrence of the hydrocarbons in cores taken from surficial sediments on the continental slope near the T31P permit. The distribution of oil slicks, as observed from Radar Satellite Photography; ALF anomalies; bitumen strandings; key oil show wells; and, these surficial core sites are shown on the enclosed regional map of the southern margin.

Of particular importance is the occurrence of stranded bitumens along the coast margin from south Australia to the west coast of Tasmania. The stranded bitumens all belong to a single family of oils. They are aromatic-asphaltic oils, rich in sulphur (3-4%). They have maturities that fall within the conventional early oil window. Their molecular geochemical biomarkers indicate that they originate from late Jurassic – Cretaceous marine shales containing sulphur – rich Type II Kerogen deposited in anoxic/sulphidic conditions.

No similarity to any other Australian crude oil with these bitumen strandings had been identified until late 1999 when it was found that these oils are identical to the oils generated by the Albian age Toolebuc shales of the onshore Great Artesian Basin. This discovery is significant as it establishes a definite Australian affinity for the oils we expect to find in the many untested traps that exist along the Australian southern margin, including those in the T31P permit.

CAPE SORELL NO.1

Age	Envir.	Depth (Ft.)	Lithology	Shows	Comments
Miocene/ Oligocene		1000	Limestone, reefal and argillaceous.		30" csg 693'
		2000	Sandstone; f-mg. subang-subrnd. dom clr qtz.		20" csg 1393'
Early Eocene	Middle Sublittoral	3000	WANGERRIP GROUP		
		4000	Mudstone and Shale Pember Mudstone		13 3/8" csg 4144'
Paleocene	Very Shallow Marine	5000			
		7000	Sandstone; f-mg. occ cg. poorly sorted ang-subrnd. dom qtz. tr lith frags incl mafic volcs. tr kaolinite chlorite, calc		
Maastrichtian	Littoral - Shallow Inner Sublittoral	8000	TIMBOON SANDSTONE		
		9000	Conglomerate and Congl Sandstone. f-vcg v poorly sorted, sharp-ang frags of qtz-mica schist, acid volcs and qtzites. var abund Kaolin, chlorite		9 5/8" csg 9002'
	10,000	Interbedded Sandstones and Claystones	Trace free oil		
	11,000	Interbedded Shales, Siltstones and Sandstones Sandstone and Congl Sandstone; sharp frags of qtzite, qtz-chlorite-sericite schist, chalcedony, micropyrritic aggregates, occ garnetiferous qtz, gneissic.	Trace to good tr med golden brown, fluorescing free oil. Residual oil count decreasing Slight tr free dead oil. Good to excel crush cuts in shales		
	Littoral	TD ,576 12,000			

5 cm

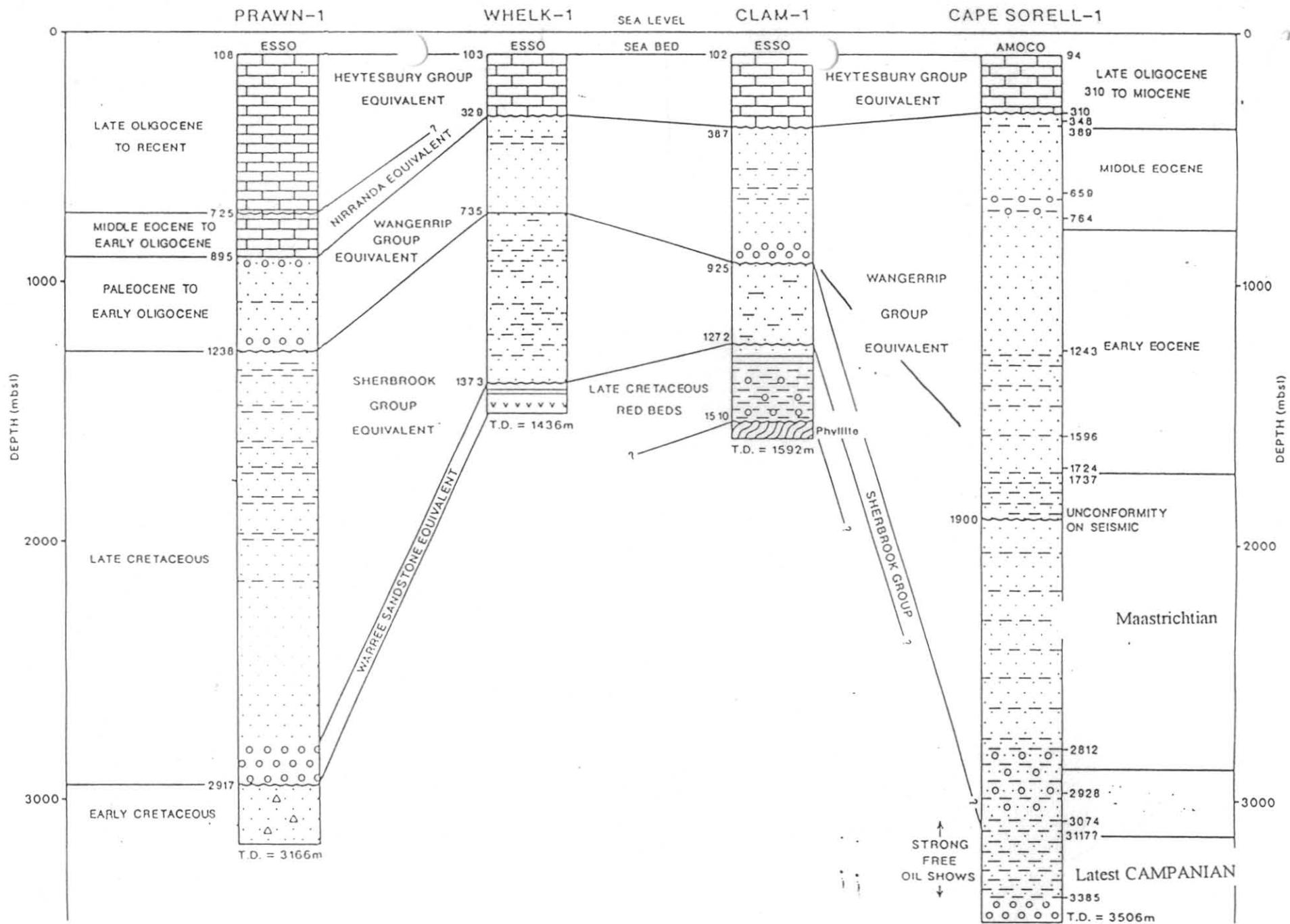


Table 1

5 cm

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One large and important portion of this margin is the Sorell Basin located in the west coast of Tasmania. When sediment thickness maps are drawn for the Sorell Basin, it can be easily seen that the T31P permit sits updip from potential source grabens within the Sorell Basin. Two regional maps illustrate the T31P the relative position of the T31P permit to potential source areas.

The residual crush-cut and fluorescence oil found in the basal 300m of sands in the Cape Sorell-1 well most probably represents migration of Cretaceous oil from the Sorell Basin updip and eastwards into the T31P area.

Reservoir sands in the T31P region are derived from the west Tasmanian hinterland which is a complex of folded early Paleozoic quartzose rocks intruded by granites. Not surprisingly the sands in the Cape Sorell-1 well are characteristically quartzose and potentially excellent reservoirs.

The sequence of rocks penetrated by the Cape Sorell-1 well can be correlated with similar sequences in offshore wells in the Sorell Basin (CLAM-1) and Otway Basin (WHELK-1, PRAWN-1) to the North (Table 1).

A recent review of the palaeontology of the Cape Sorell-1 well by Alan Partridge (see Appendix 3) suggests that the basal 1600m of massive sandstone and conglomerates in the well are Maastrichtian in age. The major unconformity surface seen on seismic at a depth of 1900m probably represents the main break-up unconformity of Palaeocene age.

The Palaeocene sequence also is sandy as in the Eocene sequence. Several mudstone and shale intervals occur throughout the Palaeocene sequence which could form seals. The entire Cape Sorell-1 sequence was deposited in a marine environment. There are no coals and no evidence for fluvial environments.

The paleogeographic setting for the proximal (eastern) shelf of the T31P permit was characterised by a rugged and high Tasmanian hinterland with fairly steep marine canyons feeding westwards into the slowly-sinking and spreading Sorell Rift Valley.

A sequence of seismic lines shot by ESSO in 1969 (enclosures 3 and 4) across the current Tasmanian shelf from near King Island in the North to south of T31P illustrates the nature of the sediment fill on basement. In general erosion has cut down through a gently dipping peneplane surface of basement rocks. The deepest erosional cuts contain 2 seconds (2 way time) of sediment suggesting that the relief of the canyons and gorges cut into the basement rocks in the Cretaceous was up to 2km in the deepest cuts.

The orientation of these canyons is illustrated by the enclosure showing sediment thickness on basement. The valleys extend westwards away from the Tasmanian hinterland and also northwards towards Otway Basin.

Maximum flooding of the Australia Continent occurred during the early Cretaceous (late Aptian to Albian – 110 to 120 million years ago). Large areas of the Australian Craton (Artesian Basin, the Toolebuc Shale) experienced marine inundation. During

the late Cretaceous Australia became progressively exposed with a flooding minimum in the Campanian. Parts of the eastern Australian continent, in particular, were out of phase with much of the rest of the world with uplift in the upper Cretaceous instead of flooding. This is true of the west Tasmanian margin which underwent uplift and erosion starting in the mid Cretaceous with large volumes of downcutting and sedimentation occurring in the Maastrichtian in the T31P permit area near the Cape Sorell-1 well.

The T31P area is one of the largest gorge-cutting areas developed along the west Tasmanian margin in the mid to upper Cretaceous. The sedimentary gorges were mostly formed by marine canyons lying against the coast of Tasmania. The position of these canyons was controlled by the faulting pattern developed during the early Cretaceous separation of the Australian-Antarctic continents. Some evidence of tilted early Cretaceous fault blocks can be seen on the seismic shot by MAXUS in the T31P region.

Further marine canyon-cutting occurred in the T31P area in the Palaeocene and Eocene. This canyon-cutting topography has created a maze of unconformities, which makes detailed mapping extremely difficult without 3D seismic coverage. The Neogene section is characterised by a shallow marine shelf limestone-shale facies forming a simple regional seal over the shallower Palaeocene/Eocene section.

PROSPECTS IN T31P

PETROLEUM SYSTEM OUTLINE

1. **Source:** Albian age lacustrine – restricted marine, oil rich shales, deposited in rift valleys in the Sorell Basin immediately west of T31P.
2. **Reservoirs:** Cretaceous, Palaeocene or Eocene quartzose sands deposited in a marine environment.
3. **Seals:** Cretaceous intraformational shale seals, Paleogene shales deposited on the side of canyon walls, and/or regional shale seals of the Tertiary marine section.
4. **Traps:** Structural, drape, fault, canyon wall, and stratigraphic traps combinations.
Several prospects were mapped by MAXUS in the early 1990's. The seismic database remains the same today.

The best of the MAXUS Prospects are:

1. **Braddon Point Prospect, and**
2. **Trial Harbour Prospect.**

Both Prospects are formed by tilting of fault blocks with consequent drape and structural closure with the top Cretaceous sand interval as the main interval target. Detailed descriptions of each Prospect as mapped by MAXUS are enclosed. Both Prospects have potential recoverable reserves of about 200 million barrels.

Details of the Prospects are as follows:

BRADDON POINT PROSPECT

The Braddon Point Prospect lies in the central 'valley' in T31P about 10km southwest of the Cape Sorell-1 well. It is a large structure formed on the eastern flank of a major north-south fault (refer to figures, map and seismic sections). This main bounding fault was formed by downdip movement of the entire Cretaceous sequence against the main eastern basement wall of the basin. Subsequent compression has caused the sediments on both sides of the main bounding fault to move to some degree vertically on both sides of the fault enhancing the structural closure at levels mapped near 1500 to 1600 milliseconds (Two Way Time). At this level the structural surface has been sculptured to some degree by marine channelling, probably during a low stand sea-level in the Palaeocene. The canyon walls so formed should be lined with marine silts and shales and form a good seal. The underlying sequence is Palaeocene and believed to be sandy as it is in the Cape Sorell-1 well.

The main structural closure has up to 7800 acres of closure (as mapped by MAXUS – see enclosed maps). With 100 feet of potential pay and a recovery factor of 258 bbls/acre feet, this feature would have over 200,000 million barrels of recoverable oil. Oil could migrate into this feature during the past 5 million years from oil mature source rocks located in the Sorell Basin, located immediately to the west. There is a direct migration pathway from this source region into the Braddon Point Prospect area.

TRIAL HARBOUR PROSPECT

This prospect is a closure formed by uplift of the Cretaceous sequence against a northern bounding basement wall. This basement wall was formed by channelling and erosion during the mid to late Cretaceous, in response to the uplift of the adjacent Tasmanian hinterland.

The Trial Harbour Prospect is located about 15km northwest of the Cape Sorell-1 well. The structural closure (as mapped by MAXUS) occurs at depths of 1500 to 1600 milliseconds (Two Way Time – see maps and seismic sections).

At this level the main reservoirs should be upper Cretaceous sands (called the Sherbrook Group by MAXUS). The estimated recoverable reserves are about 200 million barrels of oil, using 70 feet of pay (Table 2).

RESERVE ESTIMATES

The estimated recoverable reserves in Table-2, have been calculated for prospects thus far defined, in order to provide a measure of the Strahan Sub-basin's exploration potential.

Table-2

Estimated Recoverable Reserves By Prospect

PROSPECT	Most Likely Acreage	Potential Pay (Ft.)	BBL/Ac.Ft.	Est. Recov. Rsrvs. (BBLs)
Braddon Point Wangerrip	7,800	100	258	201,240,000.
Trial Harbour Sherbrook	11,000	70	258	198,660,000.

MARIS
T/24P, WEST TASMANIA
INTRA-WANGERRIP REFLECTOR
TIME STRUCTURE

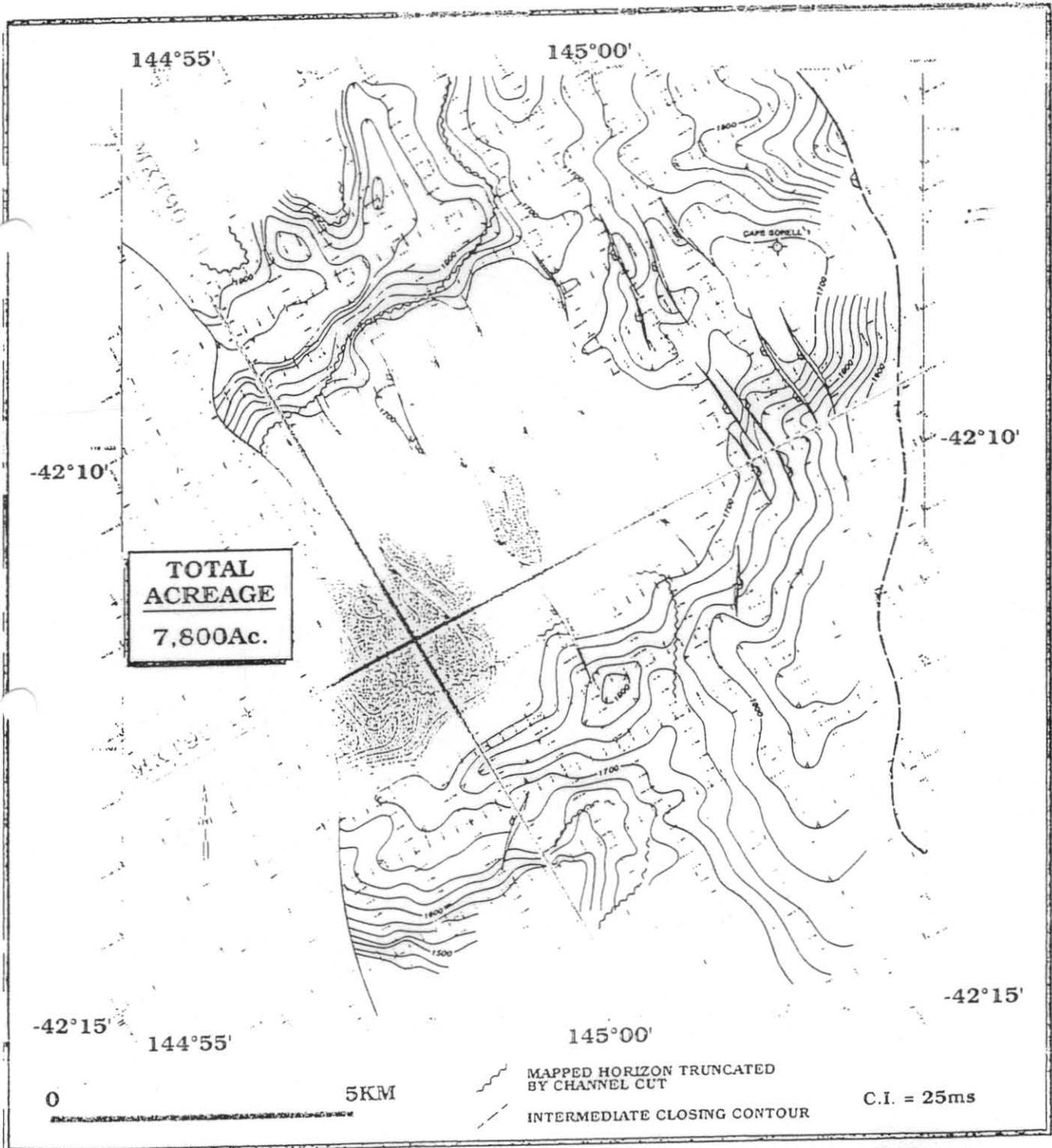
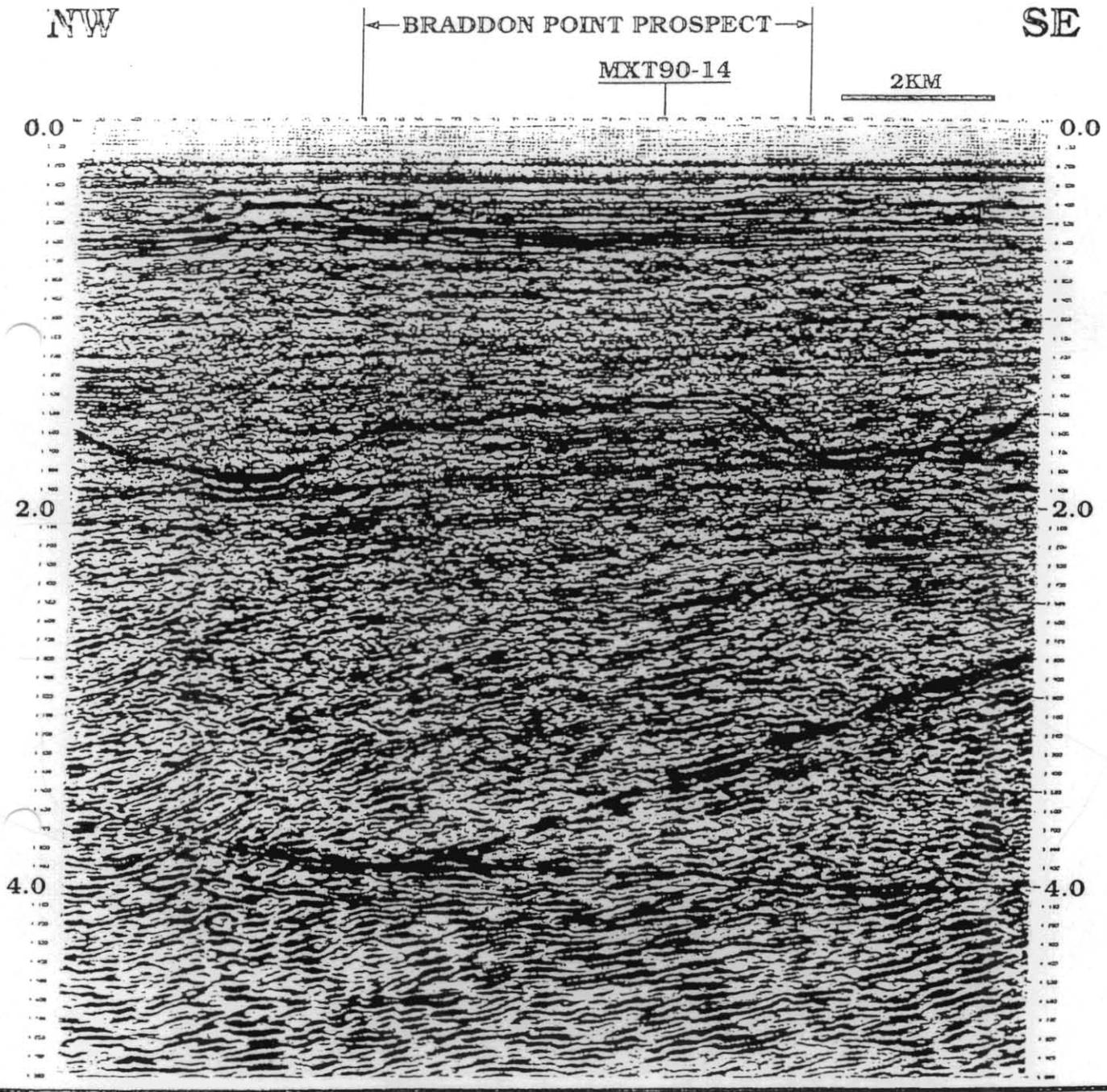


FIGURE 2.

5 cm

BRADDON POINT PROSPECT

MAXUS T/24P WEST TASMANIA MXT90-11



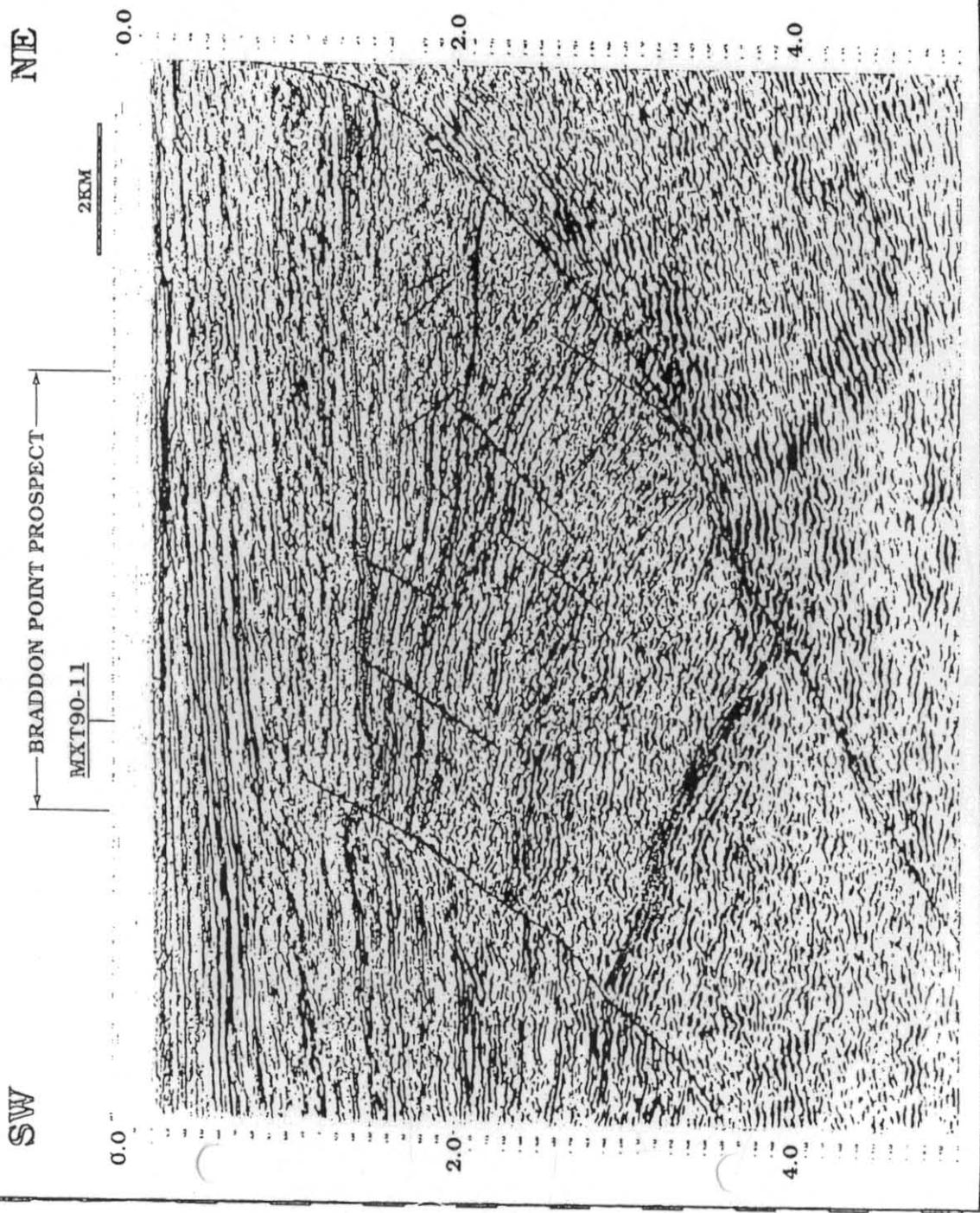
MAPPED HORIZON = PINK, OTHERWISE ORANGE WHERE PINK TRUNCATED

FIGURE 3.

5 cm

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MAXIS
T/24P WEST TASMANIA
MXT90-14

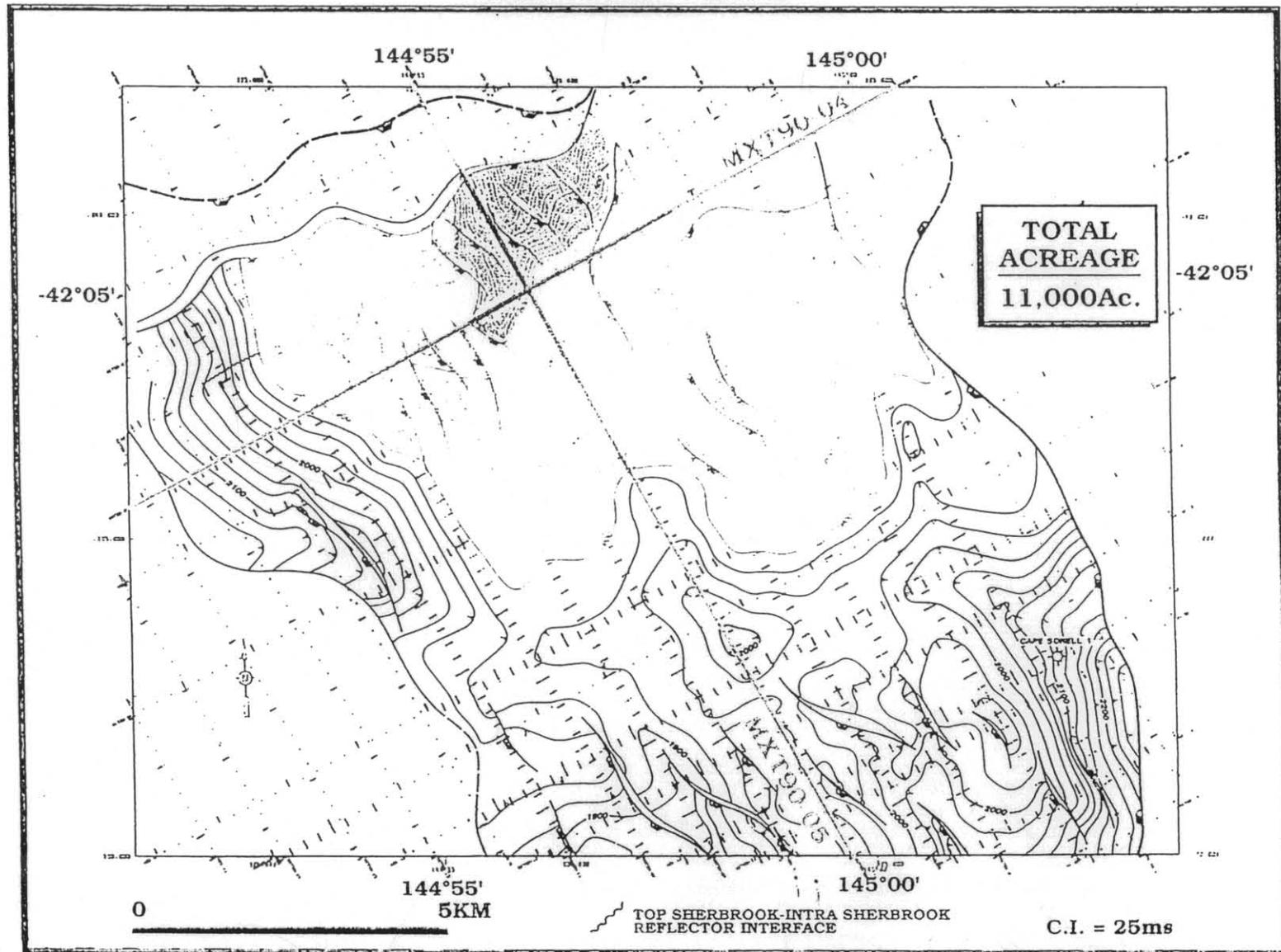


MAPPED HORIZON = PINK

FIGURE 4.

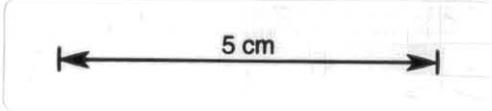
5 cm

INTRA US
T/24P, WEST TASMAN
**TOP SHERBROOK/
 INTRA SHERBROOK REFLECTOR
 TIME STRUCTURE**



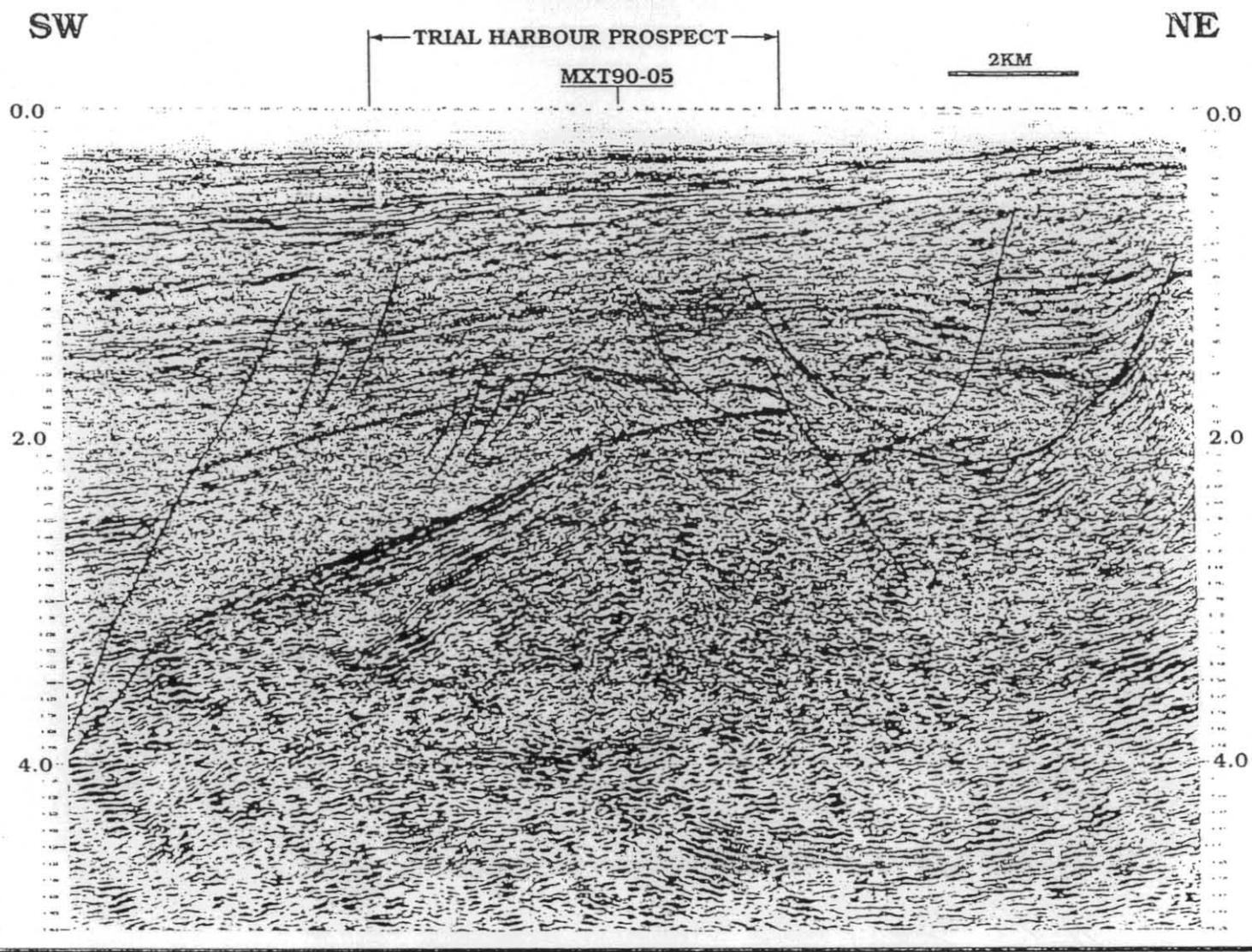
TRIAL HARBOUR PROSPECT

FIGURE 5.



600017

MAXUS
T/24P WEST TASMANIA
MXT90-04



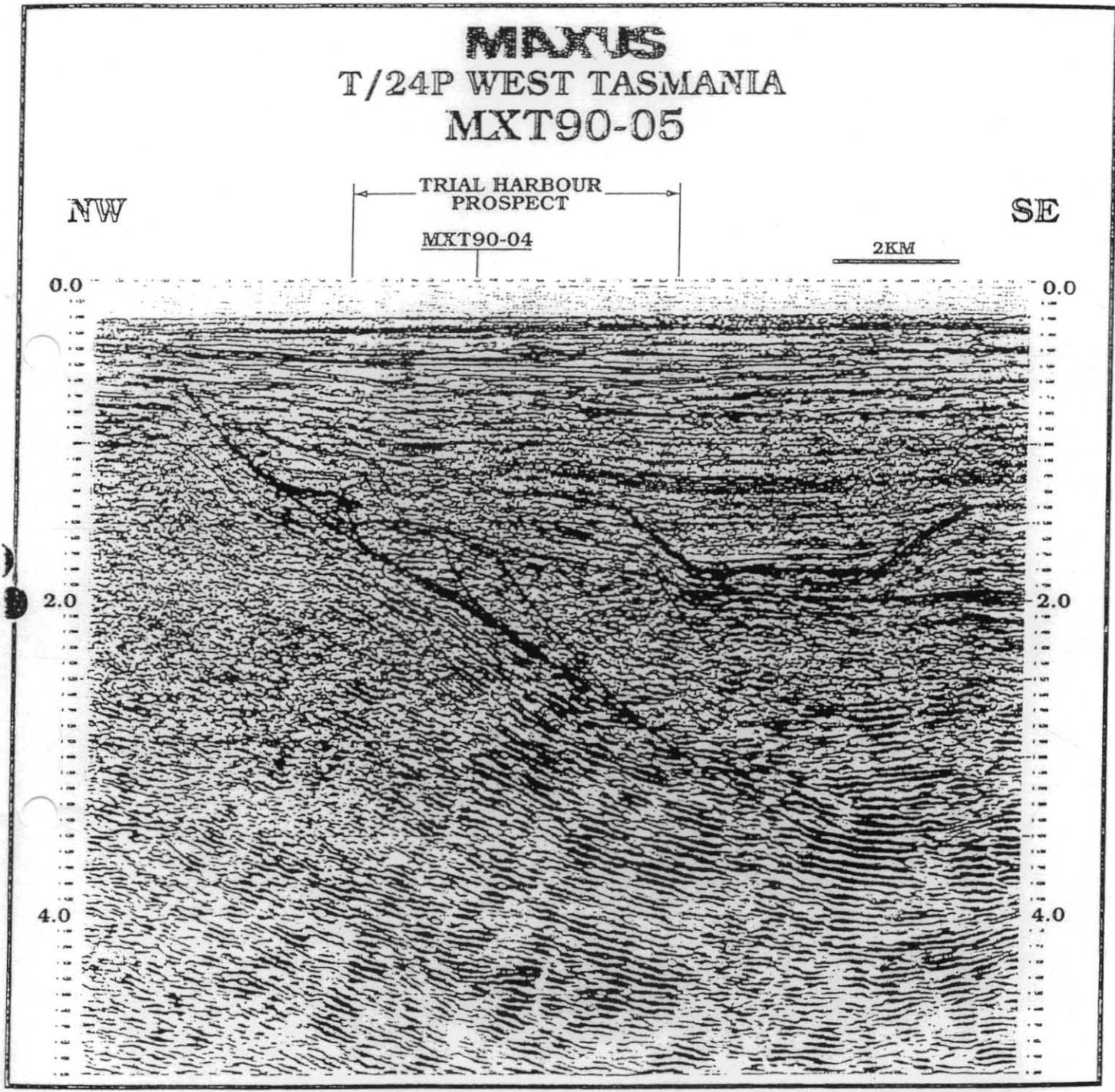
MAPPED HORIZON = BLUE

FIGURE 6.

5 cm

600018

MAXUS
T/24P WEST TASMANIA
MXT90-05



MAPPED HORIZON = BLUE

FIGURE 7.

5 cm

Fig. 24

COMMONWEALTH OF AUSTRALIA

*Petroleum (Submerged Lands) Act 1967***EXPLORATION PERMIT FOR PETROLEUM T/31P**

I, PAUL LENNON, the Designated Authority in respect of the adjacent area in respect of Tasmania and on behalf of the Commonwealth - Tasmania Offshore Petroleum Joint Authority, hereby grant to

Roma Petroleum Company Pty Ltd and Guinness Peat plc
C/- Level 10, 97 Creek Street, BRISBANE QLD 4000

An exploration permit for petroleum in respect of the blocks described hereunder, being blocks within the abovementioned adjacent area, subject to the conditions set out hereunder, to have effect for a period of six (6) years from and including the date hereof.

INTERPRETATION

In this permit "the Act" means the *Petroleum (Submerged Lands) Act 1967* and includes any Act with which that Act is incorporated and words used in this document have the same respective meanings as in the Act.

The permittee shall at all times comply with –

- (a) the provisions of the Act and of any regulations for the time being in force under the Act; and
- (b) all directions given to him under the Act or the regulations for the time being in force under the Act.

DESCRIPTION OF BLOCKS

The reference hereunder is to the name of the map sheet of the 1:1,000,000 series published by the Designated Authority and the numbers of graticular sections shown thereon.

MAP SHEET SK-55 (TASMANIA)

| Block No. |
|-----------|-----------|-----------|-----------|-----------|
| 1444 | 1445 | 1446 | 1447 | 1448 |
| 1449 | 1450 | 1451 part | 1516 | 1517 |
| 1518 | 1519 | 1520 | 1521 | 1522 |
| 1523 part | 1524 part | 1589 | 1590 | 1591 |
| 1592 | 1593 | 1594 | 1595 | 1596 part |
| 1597 part | 1662 | 1663 | 1664 | 1665 |
| 1666 | 1667 | 1668 | 1669 part | 1670 part |
| 1734 | 1735 | 1736 | 1737 | 1738 |
| 1739 | 1740 | 1741 | 1742 part | 1743 part |
| 1807 | 1808 | 1809 | 1810 | 1811 |
| 1812 | 1813 | 1814 part | 1815 part | 1879 |
| 1880 | 1881 | 1882 | 1883 | 1884 |
| 1885 | 1886 part | 1952 | 1953 | 1954 |
| 1955 | 1956 | 1957 | 1958 part | 2024 |
| 2025 | 2026 | 2027 | 2028 | 2029 |
| 2030 part | 2031 part | 2096 | 2097 | 2098 |
| 2099 | 2100 | 2101 | 2102 | 2103 part |
| 2168 | 2169 | 2170 | 2171 | 2172 |
| 2173 | 2174 | 2175 part | | |

ASSESSED TO CONTAIN 93 BLOCKS.

CONDITIONS

1. (1) Subject to sub-clause (2), during a year of the term of the permit set out in the first column of the following table, the permittee:
 - (a) shall carry out in or in relation to the permit area, to a standard acceptable to the Designated Authority (or Delegate), the work specified in the minimum work requirements set out opposite that year or those years in the second column of the table;
 - (b) may carry out in or in relation to permit area, to a standard acceptable to the Designated Authority (or Delegate), all or part of the work specified in the minimum work requirements of a subsequent year or years of that term set out opposite that year or those years in the second column of the table; and

- (c) may carry out in or in relation to the permit area, to a standard acceptable to the Designated Authority (or Delegate), work in addition to the work specified in the minimum work requirements set out opposite that year and in the subsequent year or years, if any, of that term in the second column of the table.
- (2) The permittee shall not commence any works or petroleum exploration operations in the permit area except with, and in accordance with the approval in writing of the Designated Authority (or Delegate).
- (3) For the purposes of this clause, any work carried out in accordance with clause (1)(b) shall, if the Designated Authority (or Delegate) in his discretion by instrument in writing so approves, be treated as if it were to be carried out or had been carried out in the subsequent year or years or the term of the permit specified by the Designated Authority in that instrument.

Year of Term of Permit	Minimum Work Requirements	Estimated Expenditure in Constant Dollars (Australian) (indicative only)
Year 1	Remap all existing seismic, including reprocessing of 300 line km.	\$250,000
Year 2	Preparation of prospect and drilling proposals.	\$250,000
Year 3	Drill 2 wells.	\$15,000,000
Year 4	Geological and geophysical studies.	\$250,000
Year 5	Conduct new 500 line km 2D seismic survey.	\$1,000,000
Year 6	Drill two wells.	\$16,000,000

- 1A. During the first three (3) year period of the term of the permit, the permittee must complete the work specified in the minimum work requirements for the years in that period.

Dated this 25th day of March 1999.

and made under the *Petroleum (Submerged Lands) Act, 1967* of the Commonwealth of Australia.



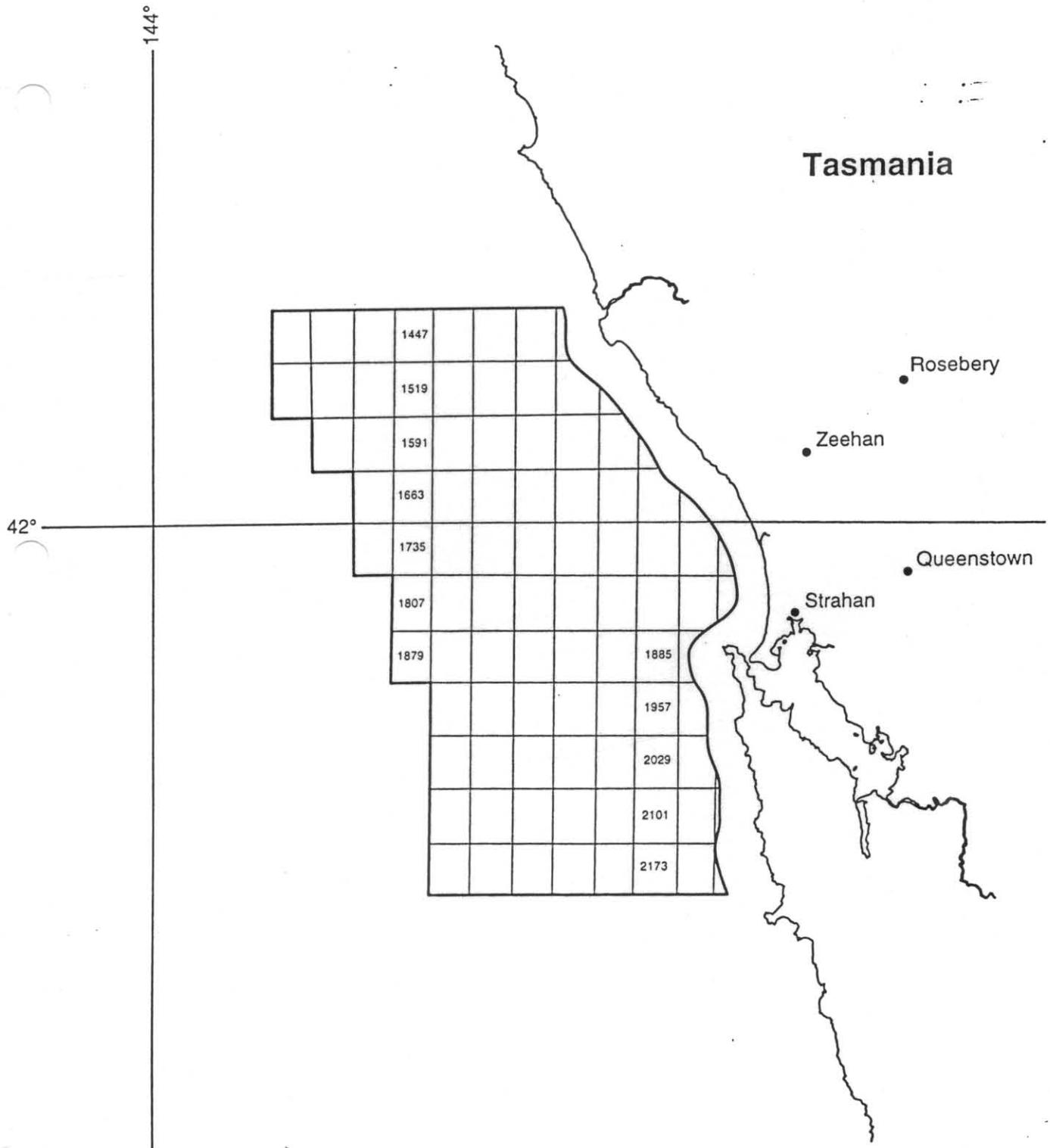
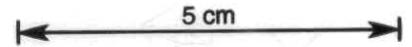
DESIGNATED AUTHORITY FOR AND ON
BEHALF OF THE COMMONWEALTH-TASMANIA
OFFSHORE PETROLEUM JOINT AUTHORITY

BLOCK DIAGRAM

SHEET SK-55

T/31P (93 blocks)

SCALE 1 : 1 000 000



THIS AGREEMENT is made the _____ day of _____ 1999

BETWEEN

ROMA PETROLEUM NL (A.C.N. 066 018 979) of Level 1, Commerce House, 462 Queen Street, Brisbane, Australia ('Disclosing Party').

AND

('Receiving Party').

- 1 In connection with the possible farmin to Tasmanian Permit (T/31P) (the "Contract Area"), the Receiving Party has requested access to the Disclosing Party's proprietary and confidential information and data relating to the Contract Area. The Disclosing Party is willing to disclose to the Receiving Party certain geological, geophysical, technical, commercial, contractual and financial information and data, together with certain interpretations therefrom relating to the Contract Area (which information, data and interpretations are hereinafter referred to as the '**Confidential Information**'), in accordance with the terms and conditions of this Agreement.
- 2 In consideration of the disclosure referred to in Clause 1, the Receiving Party agrees that the Confidential Information shall be kept strictly confidential and shall not be sold, traded, published or otherwise disclosed to anyone in any manner whatsoever, or photocopied or reproduced in any way without the Disclosing Party's prior written consent, except as provided in Clauses 3, 4 and 5. The Receiving Party acknowledges that any unauthorised use or disclosure of the Confidential Information or any part of it may cause material damage to the Disclosing Party and that damages will be an inadequate remedy for a breach of this Agreement and agrees that the Disclosing Party will be entitled to injunctive relief to restrain any breach or threatened breach or to obtain specific performance of this Agreement in addition to any claim for damages.
- 3 Information disclosed by a Disclosing Party shall not be deemed Confidential Information to the extent that such information:
 - (a) is already known to the Receiving Party on the date of disclosure hereunder;
 - (b) is already in the possession of the public or becomes available to the public other than through the act or omission of the Receiving Party or any Related Body Corporate or any of the directors, officers or employees of either of them;
 - (c) is required to be disclosed under applicable law, by order of a court of competent jurisdiction or by a governmental order, decree, regulation or rule, including, without limitation, any regulation or rule of any regulatory agency, securities commission or stock exchange on which the Receiving Party or the Receiving Party's ultimate parent company are or are to be listed if the Receiving Party first consults with the Disclosing Party on the proposed form, nature and purpose of the disclosure; or
 - (d) is acquired independently from a third party whom the Receiving Party reasonably believed was under no obligation of confidentiality relating thereto.

'Related Body Corporate' means:-

- (a) in relation to the Receiving Party, a body corporate that is deemed to be related to it pursuant to Section 50 of the Corporations Law; and
- (b) in relation to the Disclosing Party also means:- Roma Petroleum Company Pty Ltd.

For the purpose of this definition, a company is directly controlled by another company or companies holding shares carrying the majority of votes exercisable at a general meeting of the first mentioned company; and a particular company is indirectly controlled by a company or companies (the 'parent company or companies') if a series of companies can be specified, beginning with the parent company or companies and ending with the particular company, so related that each company in the series, except the parent company or companies, is directly controlled by one or more of the companies earlier in the series.

4 The Receiving Party may disclose the Confidential Information to any of the following persons who have a clear need to know in order to evaluate the proposed farmin to the Venture:

- (a) employees, officers and directors of the Receiving Party;
- (b) employees, officers and directors of a Related Body Corporate;
- (c) any professional consultant or agent retained by the Receiving Party for the purpose of evaluating the Confidential Information;
- (d) any bank financing the receiving Party's participation in the Venture, including any professional consultant retained by that bank for the purpose of evaluating the Confidential Information.

The Receiving Party may disclose the Confidential Information to persons under paragraphs (a) and (b), subject in the case of paragraph (b) to the Receiving Party complying with Clause 5 and taking customary precautions to ensure that the data and information disclosed is kept confidential. Prior to making any disclosure to a person under paragraph (c) or (d), the Receiving Party shall obtain a written undertaking of confidentiality in favour of the Disclosing Party, in the same form and content as this agreement, from that person.

5 The Receiving Party may disclose the Confidential Information without the Disclosing Party's prior written consent to a Related Body Corporate, but by so doing the Receiving Party becomes responsible for the adherence of that Related Body Corporate to the terms of this Agreement.

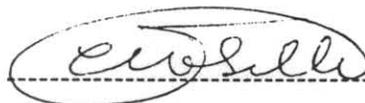
6 The Receiving Party is responsible for ensuring that all persons to whom the Confidential Information is disclosed under this Agreement keep that information confidential and do not disclose it to any unauthorised person. Neither Party is liable in any action initiated by one against the other for special, indirect or consequential damages resulting from or arising out of this Agreement, including, without limitation, loss of profit or business interruptions, however caused.

7 The Receiving Party and its Related Bodies Corporate, if any, shall only use or permit the use of the Confidential information disclosed under this Agreement to evaluate the contract Area.

- 8 The Confidential Information remains the property of the Disclosing Party and the Disclosing Party may demand the return thereof upon giving written notice to the Receiving Party.
- 9 The Disclosing Party represents and warrants that it has the right and authority to disclose the Confidential Information to the Receiving Party, but makes no representations or warranties, express or implied, as to the quality, accuracy and completeness of the Confidential Information disclosed hereunder, and the Receiving Party expressly acknowledges the inherent risk of error in the acquisition, processing and interpretation of geological and geophysical data. The Receiving Party acknowledges that it is making an independent assessment of the Confidential Information and will verify all information on which it intends to rely to its own satisfaction. The Disclosing Party has no liability whatsoever with respect to the use of or reliance upon the Confidential Information by the Receiving Party.
- 10 This Agreement terminates two (2) year from the date of this Agreement or upon the date of execution of a Farmin Agreement, whichever is the earlier.
- 11 An amendment to this Agreement is not valid unless it is in writing and signed by a duly authorised representative of each of the Parties.
- 12 This Agreement comprises the full and complete agreement of the Parties, whether written or oral, expressed or implied, relating to the subject matter of this Agreement.
- 13 This Agreement is governed by and shall be construed in accordance with the law in force in Queensland and the parties hereby submit to the jurisdiction of the Courts of Queensland and, if applicable, the Commonwealth of Australia.

IN WITNESS WHEREOF, the duly authorised representatives of the Parties have caused this Agreement to be executed.

SIGNED for and on behalf of)
ROMA PETROLEUM NL)
in the presence of)





WITNESS

SIGNED for and on behalf of)
[Recipient])
in the presence of)

WITNESS

**Review of biostratigraphic data
from Cape Sorell-1,
Sorell Basin.**

by

Alan D. Partridge

Biostrata Pty Ltd
A.C.N. 053 800 945

Biostrata Report 1999/11

20 December 1999

Review of biostratigraphic data from Cape Sorell-1, Sorell Basin.

by Alan D. Partridge

Summary

- Confident and detailed interpretation of the age of the stratigraphic section penetrated in the Amoco Cape Sorell-1 well is hampered by the fact that all available biostratigraphic reports have been prepared by overseas palaeontologists. The results presented in these reports clearly indicate that the individual palaeontologists had little prior experience in the analysis of the fossil floral and faunal assemblages from southeastern Australia.
- Confidence is further reduced by the availability of only cuttings samples through most of the well, and the interpretation that the fossil assemblages from these cuttings are badly contaminated by down-hole cavings.
- Sidewall cores were only shot between 2922 and 3467 metres, but of the 44 bullets recovered, fossil assemblages are only reported from the 8 samples analysed by Robertson Research. The other SWCs are reported in the WCR to have been shipped to the Amoco Research Centre in Tulsa, Oklahoma for palynological and geochemical studies. Unfortunately, comprehensive reports on these studies have never been submitted to the Tasmanian Mines Department. *
- Only one core was cut in the well between 3481 and 3483 metres, close to T.D. at 3528m. Sadly the coarse conglomerate recovered from this core did not yield a reliable palynological assemblage.
- The preferred interpretation of the age and stratigraphy of the section penetrated in Cape Sorell-1 is presented in Table 1. The suggested correlations to stratigraphic units in the Otway Basin is based on recent studies of that basin by Partridge (1997) and Gallagher & Holdgate (in press).
- Key characteristics of the revised interpretation is that Cape Sorell-1 well contains an extremely thick Early Eocene to Paleocene section equivalent to the Wangerrip Group, and that the underlying massive sandstone and conglomerates, over the basal 1600 metres in the well, are best correlated with Timboon Sandstone to possibly uppermost Paaratte Formation.
- This review also suggests that substantial improvements to the overall age dating in the well could be achieved by as few as 10 to 20 new palynological samples.

S. Miller
1999

Table-1: Stratigraphic summary for Cape Sorell-1

AGE	LITHOLOGICAL UNITS	FOSSIL ZONES	DEPTHS mKB
EARLY MIOCENE	Bioclastic limestone equivalent to GAMBIER LIMESTONE From casing at 211m to ~300m	NN4 to NN1 nannofossil zones	210-302m
OLIGOCENE	Argillaceous limestone with glauconite equivalent to CLIFTON & NARAWATURK FM. ~300 to ~332m (~984 to ~1090 ft)	NP24 to NP23 nannofossil zones NP22 nannofossil zones	Top 302m then caved to 375m Caved to between 375-410m
Basal OLIGOCENE to MIDDLE EOCENE	Sandstones and red-brown siltstones/mudstones equivalent to MEPUNGA FORMATION ~332 to 683m (~1090 to 2240 ft)	Undifferentiated <i>N. asperus</i> SP Zone	Top possibly as high as 380m then caved down to 715m
EARLY EOCENE	Brown to black mudstones and interbedded sandstones equivalent to undifferentiated WANGERRIP GROUP 683-1620m (2240-5315 ft)	<i>P. asperopolus</i> SP Zone to <i>M. diversus</i> SP Zone	Top at 740m then caved to 1235m Top possibly as high as 1035m down to 1585m
Early EOCENE to Late PALEOCENE	Mudstone and interbedded sandstones equivalent to PEMBER MUDSTONE 1620-1906m (5315-6255 ft)	<i>M. diversus</i> SP Zone to <i>L. balmei</i> SP Zone	1645-1705m 1760-1880m
Early PALEOCENE	PEBBLE POINT FORMATION 1906-1913m (6255-6275 ft)	<i>L. balmei</i> SP Zone	By superposition
Basal DANIAN to latest MAASTRICHTIAN	K/T Boundary Shale 1913-1923m (6275-6310 ft)	Top of <i>T. longus</i> SP Zone	Top at 1920m
MAASTRICHTIAN	Massive sandstone section equivalent to TIMBOON SANDSTONE 1923-2835m (6310-9300 ft)	<i>T. longus</i> SP Zone and <i>M. druggii</i> MP Zone	Depth limits on assemblages uncertain.
MAASTRICHTIAN	Upper conglomeratic section (NO Otway Basin equivalent!) 2835-3098m (9300-10,164 ft)	INDETERMINATE no reliable palynological assemblages	
MAASTRICHTIAN to possibly latest CAMPANIAN	Interbedded claystones, sandstones and minor conglomerates equivalent to PAARATTE FORMATION 3098-3446m (10,164-11,306 ft)	Lower <i>F. longus</i> to <i>T. lilliei</i> Zone	3191-3423m
MAASTRICHTIAN to possibly latest CAMPANIAN	Lower conglomeratic section (NO Otway Basin equivalent!) 3446-3528m T.D. (11,306-11,576 ft T.D.)	No older than <i>T. lilliei</i> Zone	down to 3527m

Discussion of Reports

In the well completion report (WCR) only provisional initial results are presented of the foraminiferal, nannofossil and palynological studies by Robertson Research. This initial report comprises of a single Table extending over four pages that provides very abridged species assemblage lists for 43 cuttings samples. These limited fossil species listed confirms only that the well penetrated a Miocene to latest Cretaceous section.

Subsequently, the comprehensive stratigraphic report by Robertson Research (Hughes *et al.*, 1983) was released to the Tasmanian Mines Department when the acreage was relinquished. This report analyses >425 cuttings and 8 SWCs for foraminifera, 186 cuttings for calcareous nannofossil and 122 cuttings and 8 SWCs for palynology, each between ~900 ft and T.D. at 11,576 ft (211-3528m). Of the 433 samples examined for foraminifera 30% are barren, whilst of the 189 samples examined for calcareous nannofossils 78% are barren. In contrast of the 130 samples palynologically analysed only 5 (<4%) were barren of palynomorphs.

The critical feature to note about the range charts is that the foraminiferal assemblages are only common to abundant down to the 20" casing shoe at 425m (1393 ft), then are generally rare down to the 13 ³/₈" casing shoe at 1263m (4144 ft), and finally are extremely rare deeper in the well where >50% of the 247 samples examined are barren of foraminifera. Similarly, calcareous nannofossils are only common above the 20" casing shoe, are rare down to 783m (2570 ft), and absent from all but 9 of the 154 samples examined below 783m.

Examining the species assemblage lists it is my opinion that the calcareous microfossils may only be providing reliable ages for the shallowest ~130 metres (211-346m) analysed in the well, down to the base of the "limestones" at ~346m. I am extremely suspicious that the underlying sandstones and red-brown siltstones¹ described between 356m and the bottom of the 20" casing shoe at 425m (1393 ft) are lean to barren in calcareous microfossils, and that the faunas recovered from this interval are essentially all derived from cavings. My reservations are based on many frustrating and usually unsuccessful attempts at using cuttings to age date sands immediately underlying the Oligocene to Miocene carbonates in both the Gippsland and Otway Basins. Regardless of

¹ Included in these siltstones are red-brown argillaceous limestone described from 1169 to 1230 ft

which fossil group is used it only requires a small amount of cavings from the carbonate section to completely mask the age of the underlying clastics. With these reservations in mind my analysis the microfossil assemblage (in conjunction with the detailed cuttings description and electric logs) suggests the limestone section between 211 and ~300m (693 to 990 ft) represents the Gambier Limestone (or equivalent Gellibrand Marl) of the Heytesbury Group, and is most likely Early Miocene to Late Oligocene in age (GSV, 1995; Gallagher & Holdgate, in press). The underlying argillaceous limestone with variable abundance of glauconite between ~300 and ~346m (990 to 1137 ft) is in turn equated to the Clifton Formation (Heytesbury Group) and Narrawaturk Marl (Nirranda Group). The underlying sandstones and red-brown siltstones between 356 and 425m, in turn represent the Mepunga Formation (Nirranda Group) and could include both Early Oligocene and Late Eocene ages. The Robertson Research report suggests the presence of a significant unconformity at 411 metres (1350 ft) based on missing nannofossil zones (Hughes *et al.*, 1983; p.19-20). However, as this supposed unconformity is close to the casing point and not associated with a marked change in either the lithologies, or electric log character, the most likely explanation is that the missing age interval is present but masked by down-hole cavings.

For the ~840 metre interval between the 20" and 13 ³/₈" casing shoes (425-1263m) where the cuttings contain markedly reduced numbers of both calcareous foraminifera and nannofossils the section appears to contain Eocene ages, but identification of zones and their precise depth limits are difficult to impossible to specify. The way that the calcareous foraminifera (and many key palynomorphs) abruptly decline at the 13 ³/₈" casing shoe strongly suggests that this whole interval is badly caved. The biggest break in the faunas is the downhole incoming of the consistent occurrence of the arenaceous foraminifera *Ammodiscus incertus*, *Cyclamina incisa* and *C. rotundata* associated with simple corals below 730m (~2400 ft). As this faunal change corresponds to a lithological change in the finer clastics from red-brown mudstones and siltstones above to dark brown to black mudstones below (picked at 683m or 2240 ft on the electric logs), it is interpreted to mark the top of the Early Eocene Wangerrip Group. Unfortunately, examination of the lithological descriptions of the cuttings does not reveal any notable change in the character of the associated sandstones. This break in the succession can also be identified on the palynological range chart by a downhole increase in the abundance of *Triporopollenites* spp. (interpreted here to be a

misidentification of *Haloragacidites harrisii*) and by the highest consistent occurrence of *Proteacidites pachypolus*, and is best equated with the top of the Early Eocene (= top *P. asperopolus* Zone). The overlying 258 metre interval from the 20" casing shoe at 425m to top of Wangerrip Group at 683m, on the current stratigraphic nomenclature can only be placed in Nirranda Group (Mepunga Formation) and would by superposition be largely Middle to Late Eocene in age.

Below the 13 ³/₈" casing shoe at 1263m (4144 ft) the almost complete absence of nannofossils (rare in only 6 samples out of 122 samples analysed), and rarity and low diversity of the foraminiferal faunas means that the age dating for the bottom ~2250 metres in Cape Sorell-1 is reliant exclusively on palynology.

The basic palynological data consists of a range chart in the Robertson Research report prepared by W.P. Seymour and Y.C. Chow, a short Amoco memorandum listing meaningless abridged assemblages over just three composite intervals (Hedland, 1983), and a later report, prepared for the subsequent permit holder Maxus Energy Corporation, by the Houston based consulting company MICRO-STRAT Inc. This 1989 report does not specify the palynologist who did the microscope analysis, but provides a range chart for 37 samples analysed between 1554 and 3526m.

Analysis of all three data sources indicates to me that none of the palynologists doing the work had any prior experience of working on Southeastern Australian palynofloras, nor did any of the palynologists appear to have access to a full suite of Australian palynological papers. Because of this lack of both previous experience and critical literature all three reports contain omissions and misidentifications, and the type of data presented is very uneven. For example, although the Robertson Research chart indicates the presence and abundance of microplankton/dinoflagellates no species are identified. In contrast, 35% of the taxa identified in MICRO-STRAT Inc report are microplankton. Unfortunately, with this latter report over 66% of the 107 taxa recorded (excluding reworked Permian species) are questionably or tentatively identified and therefore cannot be confidently interpreted. The Amoco report by Hedland (1983) also used mainly informal nomenclature, but does, tantalizingly record the presence of the key Australian taxa *Kenleyia lophophora* and *Homotryblum tasmaniense* which were not recorded in the other two reports. Both these species should be present in the

Eocene section as they are recorded in the Clam-1 and Whelk-1 wells to the north of Cape Sorell-1.

Other glaring anomalies are the identification of the *Lygistepollenites balmei* Zone in the Robertson Research report without the identification of the eponymous species in the range chart (even though the species is common to abundant in the Paleocene in all three Bass Strait basins and should biogeographically be present in western Tasmania), and the presence of the tropical species *Barringtonia* (a modern mangrove) and *Verrucatosporites usmensis* on the range chart even though they have never been identified in Bass Strait by any Australian palynologist! The first anomaly reflects a lack of knowledge of local Australian palynomorphs, the second anomaly is interpreted as cross-contamination in the Singapore laboratory of Robertson Research where they were mainly preparing samples from wells in tropical Southeast Asia.

Given the above limitations there ends up being very few species on the range charts that can be confidently relied on. Starting from the top of the well the high abundances of *Nothofagidites* pollen between ~210 and 510m is consistent with the *P. tuberculatus* and *N. asperus* spore-pollen Zones as identified in the Robertson Research report. Between 510m and the top of the *P. asperopolus* Zone at about 750m the palynological assemblages are not diagnostic. As discussed above the downhole increase in the abundance of *Triporopollenites* spp.

(= *Haloragacidites harrisii*) and highest consistent occurrence of *Proteacidites pachyplus* from ~750m probably represents top of the Early Eocene *P. asperopolus* Zone. Unfortunately the base of this zone and boundaries of the Upper, Middle and Lower subzones of the *M. diversus* Zone cannot be identified on the recorded assemblages.

The highest occurrence of *Gambierina edwardsii* at ~1760m and *G. rudata* at ~1830m, which also corresponds to an increase in abundance of gymnosperm pollen (notably *Dacrydiumites* spp. 1 & 2 which may equate to *Lygistepollenites balmei*), is a reasonable pick for the boundary between the *M. diversus* and *L. balmei* Zones in agreement with the choice in the Robertson Research report. In the Otway Basin the *M. diversus* to *L. balmei* Zone boundary lies in the Pember Mudstone (see GSV, 1995), and the gamma log character of the shaly interval from ~1620 to 1906m (5315–6255 ft) in Cape Sorell-1 shows a general similarity (see GSV, 1995).

The Robertson Research suggests the *L. balmei* Zone extends to a least 2185m (7170 ft), and assigns the thick interval between 2185 and 3130m (7170 to 10,270 ft) to a composite *L. balmei/T. longus* Zone. In contrast my choice would be to push the *T. longus* Zone as high as ~1920m based on their highest record of *Tricolpites confessus*, and the identification of a number of dinoflagellate species assigned to *Manumiella* and *Isabelidinium* in cuttings below 2040m in the MICRO-STRAT (1989) report. Such a choice would make the thin shale between 1913 and 1923m (6275–6310 ft) equivalent to the K/T boundary shale, the thin sandstone between 1906 and 1913m (6255–6275 ft) equivalent to the Pebble Point Formation, and the massive sandstone section between 1923–2835m (6310–9300 ft) equivalent to the Timboon Sandstone, according to my latest revisions of the stratigraphy of the Otway Basin (Partridge, 1997).

Reservations must also be expressed about how reliable are any of the palynological assemblages in the cuttings from the 900 metres of massive sandstone assigned to the Timboon Sandstone. As this appears to represent the best continuous sandstone interval on the electric logs in the well, the fact that it contains any palynomorphs at all is highly suspicious. The decline in recovery of palynomorphs immediately below the 9 ⁵/₈" casing shoe at 2743m (9002 ft) near the base of the unit suggest that most of the recorded species are caved.

The next change in the palynological assemblages is the shallowest downhole occurrence of *Tricolporites lilliei* and *Triporopollenites sectilis* in the interbedded claystone, sandstone and conglomerate facies between 3098 and 3446m (10,164 to 11,306 ft). These species indicate an age no older than the Late Campanian *T. lilliei* Zone, but the occurrence of *Quadruplanus brossus* in a SWC at 3191m suggests the whole section may be no older than the Lower *T. longus* Zone. Unfortunately, other key index species such as *Forcipites longus*, *F. sabulosus* and *Tetracolporites verrucosus* which would resolve this conflict were not recorded.

The upper and lower conglomeratic sections between 2835–3098m (9300 to 10,164 ft) and 3446–3528m T.D. (11,306 to 11,576 ft) do not appear to contain distinctive palynomorph species and indeed may be essentially barren. These conglomerates do not have any clear lithological equivalence to formations identified in the Sherbrook Group in the Otway Basin, but the ages assigned suggest they are still equivalent to the Timboon Sandstone as interpreted by Partridge (1997). However, the interbedded claystone, sandstone and

conglomerate facies from 3098 to 3446m, shows a general similarity in log character to some sections assigned to the Paaratte Formation, and this similarity is enhanced by the increase in the abundance of arenaceous foraminifera assigned to *Trochammina* recovered from the interbedded claystones (Hughes *et al.*, 1983), as such foraminiferal assemblages are characteristic of the Paaratte.

Assuming that the ages and formational equivalence suggested above are approximately correct the stratigraphic section in Cape Sorell-1 differs from the better known sequences in the Otway Basin by having a much thicker Wangerrip Group of 1242 metres (681-1923m), compared to a maximum thickness of only 500 metres in the eastern Otway Basin (GSV, 1995; p.20). The well also has an extremely thick Maastrichtian (to possibly latest Campanian) section of >1600 metres (1923m to T.D.). Although the preferred correlation is to the Timboon Sandstone and Paaratte Formations the thickness is four to five times greater. An alternative comparison would be with the Gippsland Basin where the Maastrichtian has a maximum thickness of >1000 metres.

Conclusions & Recommendations

A feature of the Cape Sorell-1 well is that a high number of samples have been examined for biostratigraphy, for results that in the end are extremely poor. The Robertson Research report was prepared at the height of the oil boom in the early 1980s, and it is speculated that the consulting company was maximising their income by doing a large numbers of samples at a fixed sample rate². Better results would have undoubtedly have been obtained if as few as a half or a quarter of the samples had been examined, but in far greater detail.

More effort should have also been put into the palynology and less effort expended on the foraminifer and nannofossils. The palynology should have given the best results over most of the section penetrated in Cape Sorell-1, based on what is known in the other Bass Strait basins. It is clear however that none of the palynologists doing the analyses had any local experience, or any local knowledge other than what was available in the most widely available papers (eg. Stover & Partridge, 1973; Helby *et al.*, 1987). Further, none of the reports makes any genuine attempt to integrate the biostratigraphic data with the

² A total of 749 samples were examined by Robertson Research across all microfossil groups.

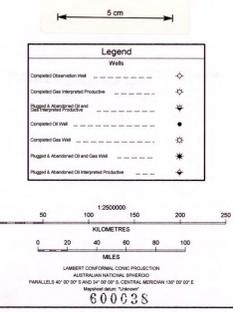
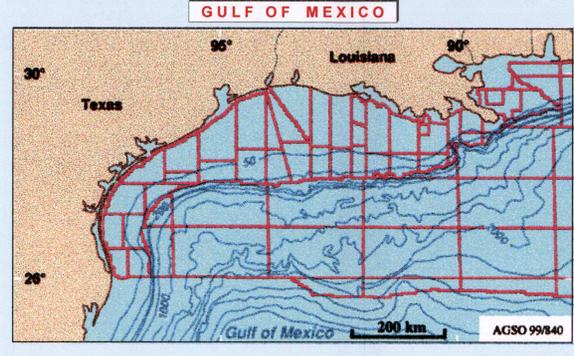
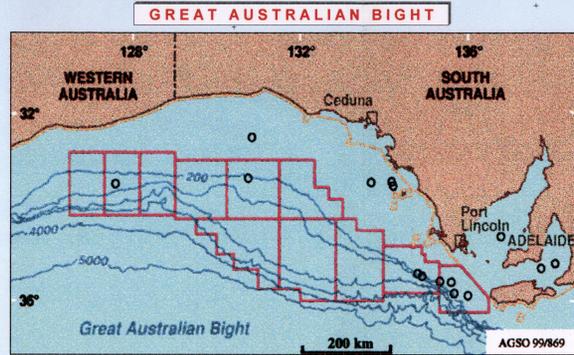
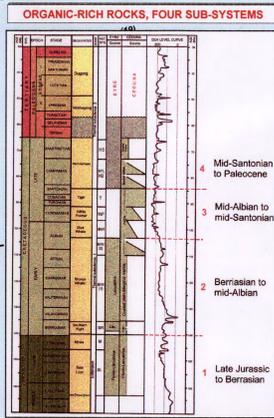
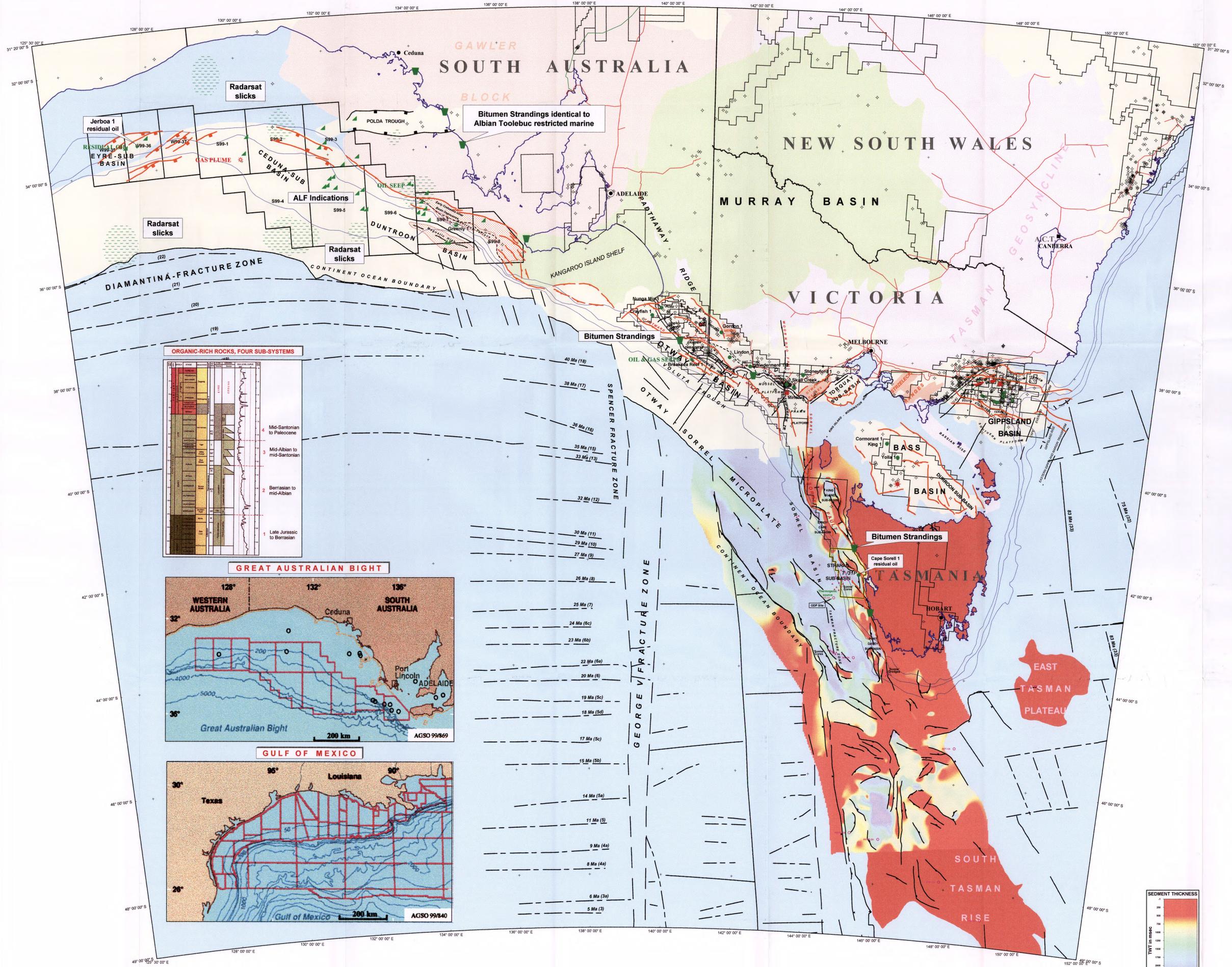
lithologies or electric logs, and any comparison to the local stratigraphy in the adjacent Otway and Bass Basins is totally avoided.

However, based on this review of the available data, attempted integration with the electric logs and comparison to the stratigraphy in the Otway Basin I believe that the age dating of the section penetrated in Cape Sorell-1 could be substantially improved by as few as 10 to 20 new palynological samples.

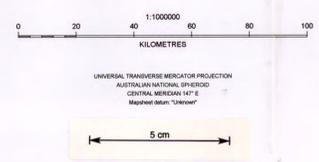
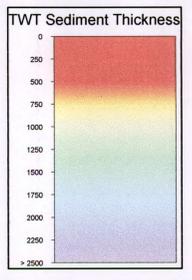
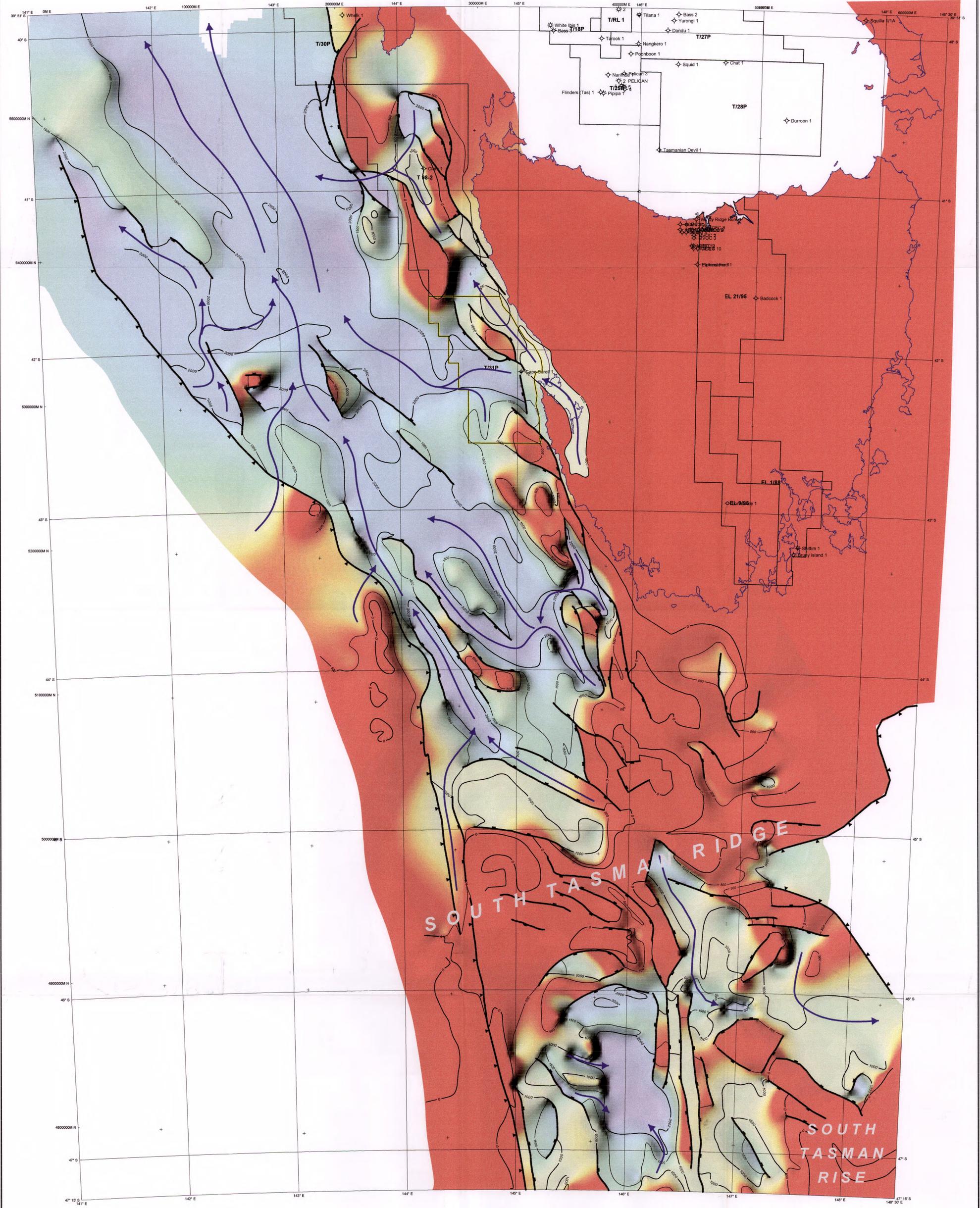
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AUSTRALIA - SOUTH EAST MARGINS



ROMA PETROLEUM N.L.
**REGIONAL FRAMEWORK
 SOUTHERN MARGINS
 OF AUSTRALIA**
 Author: J. Connolly, J. Thompson, J. Smith, J. Jones
 Date: Dec. 1999
 Data: OIL ON FILM, MapROMA L.E. version 3.0a, Enclosure 1



600039

ROMA PETROLEUM N.L.

**TASMANIA T/31P
 STRUCTURAL AND
 SEDIMENT THICKNESS
 MAP IN TWO-WAY TIME**

Author: J.R.Conolly File: Sediment_thickness_gisdat18 Date: December 1999
 Data: DL 06 FLM Map Sheet: T/31P Sediment TM Enclosure 2

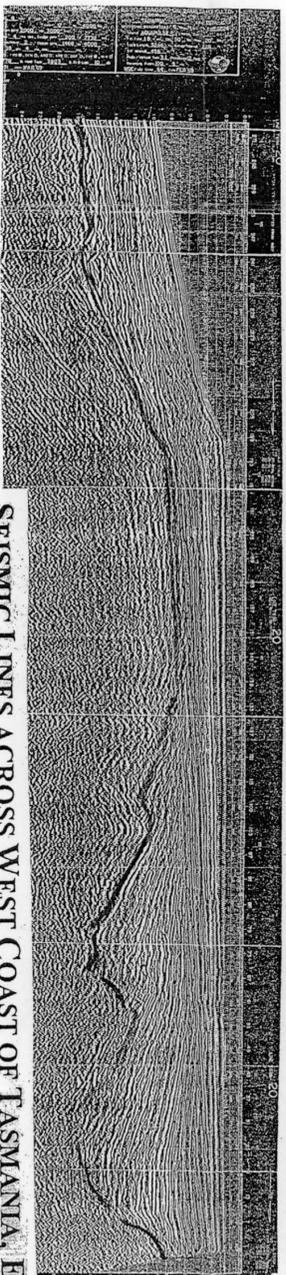
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SEISMIC LINES ACROSS WEST COAST OF TASMANIA, ESSO 1969

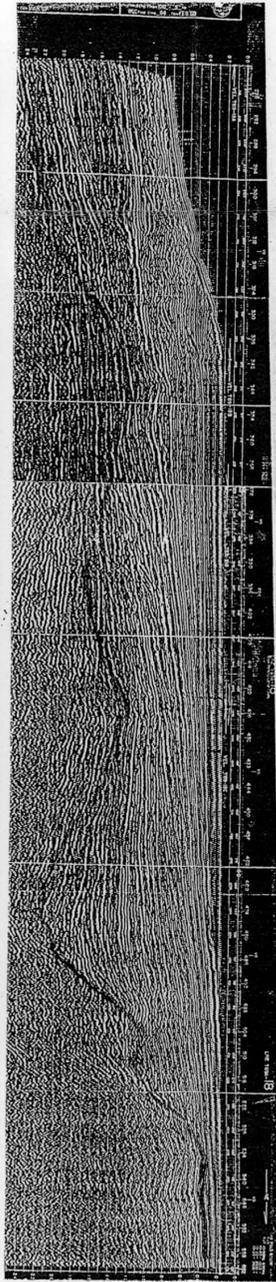
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ENCLOSURE 5.

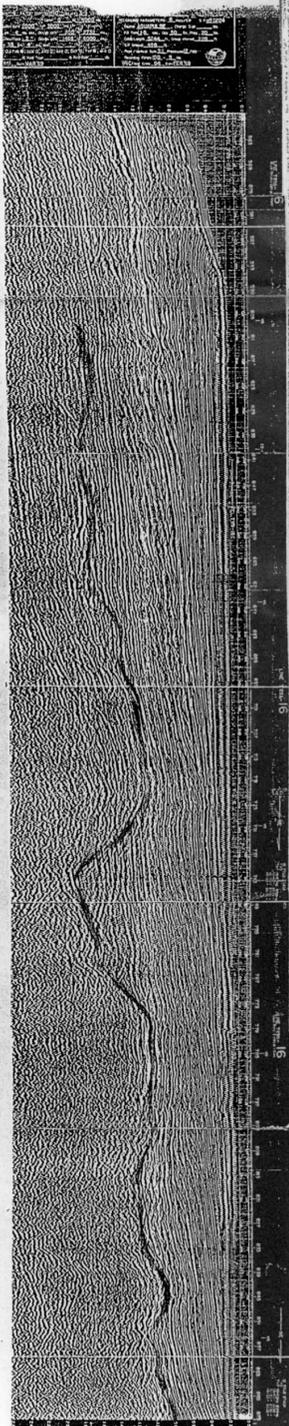
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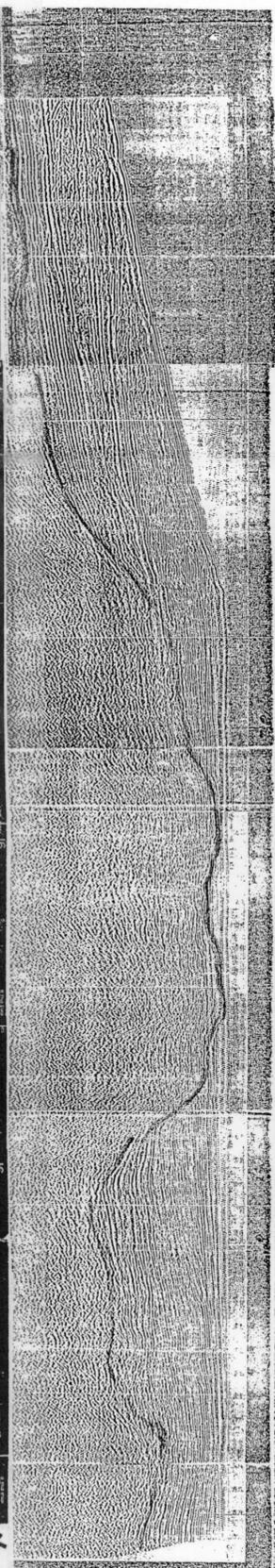
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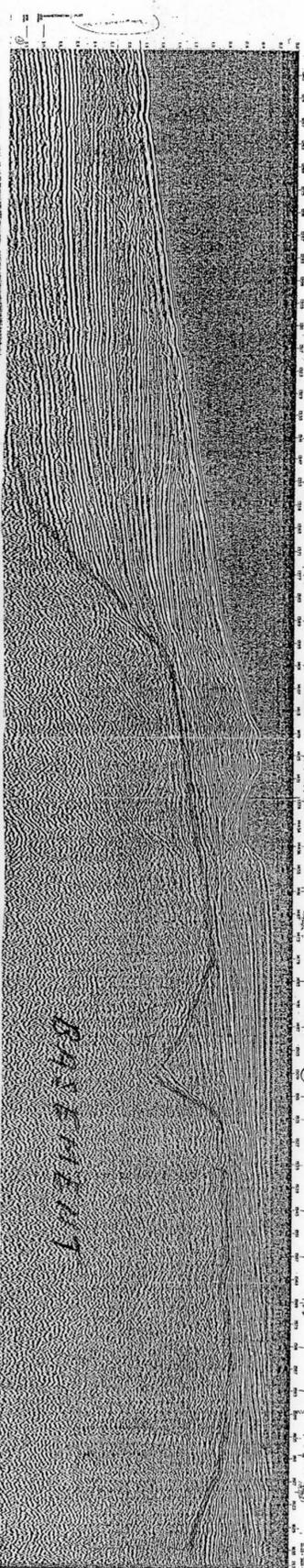
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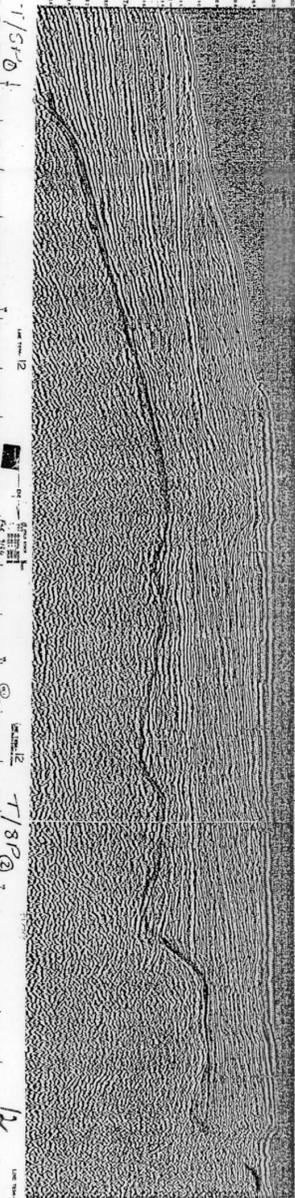
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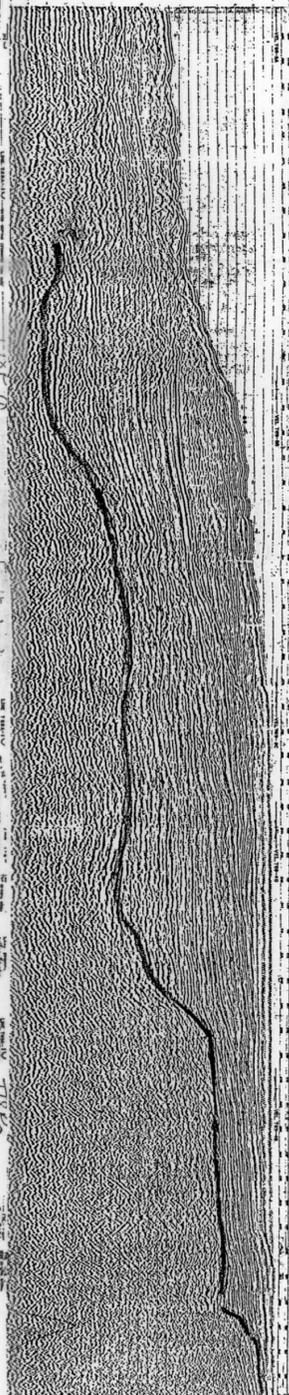
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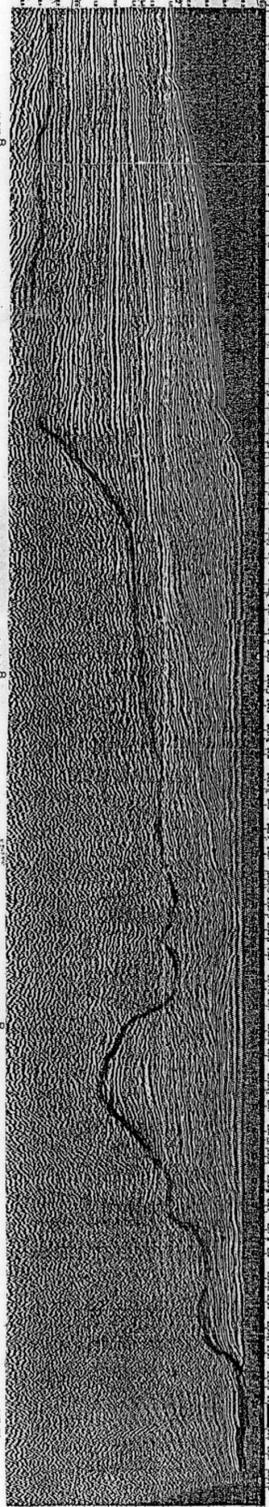
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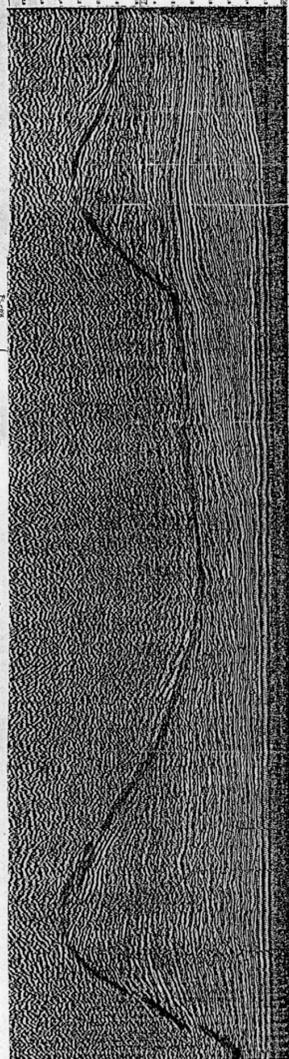
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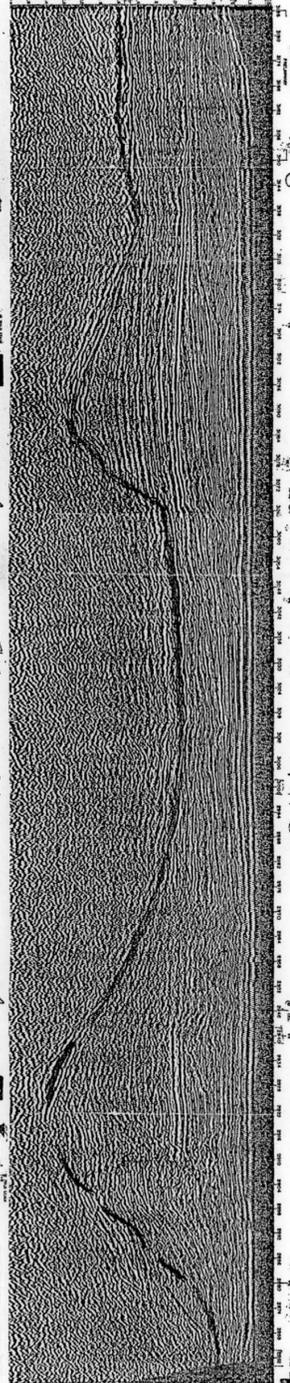
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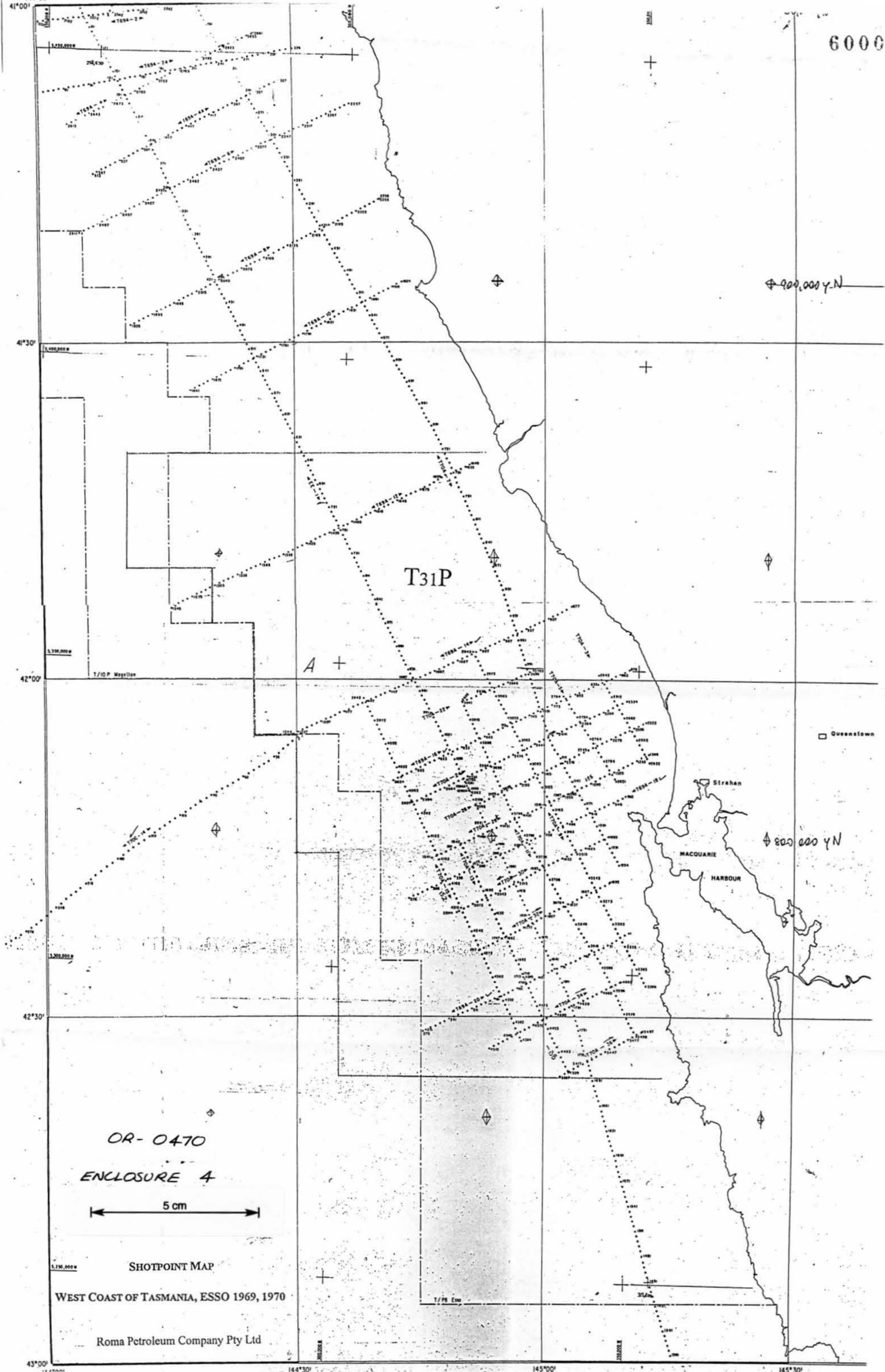
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ESSO STANDARD OIL (AUSTRALIA) PVT LTD
 SEISMIC PROCESSING CENTRE
 1000 WILSON ROAD, HOBART, TASMANIA
 AUSTRALIA

ESSO STANDARD OIL (AUSTRALIA) PVT LTD
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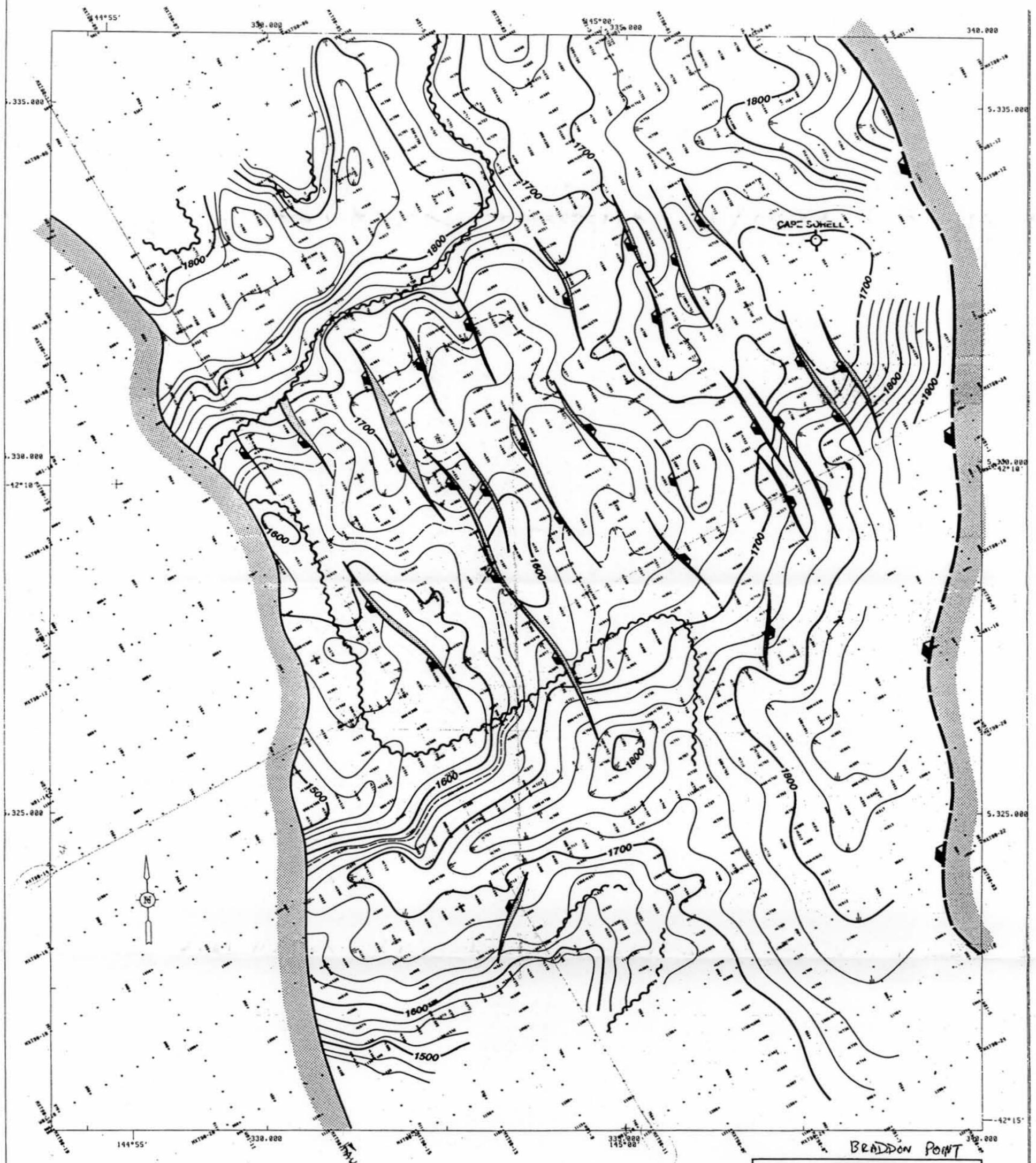


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ENCLOSURE 4

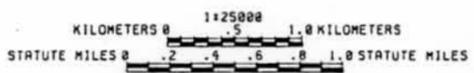
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SHOTPOINT MAP
WEST COAST OF TASMANIA, ESSO 1969, 1970
Roma Petroleum Company Pty Ltd

600042



OR-0470

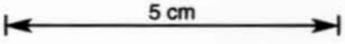


NOTE: INTER SURVEY MISTIES UNCOMPENSATED

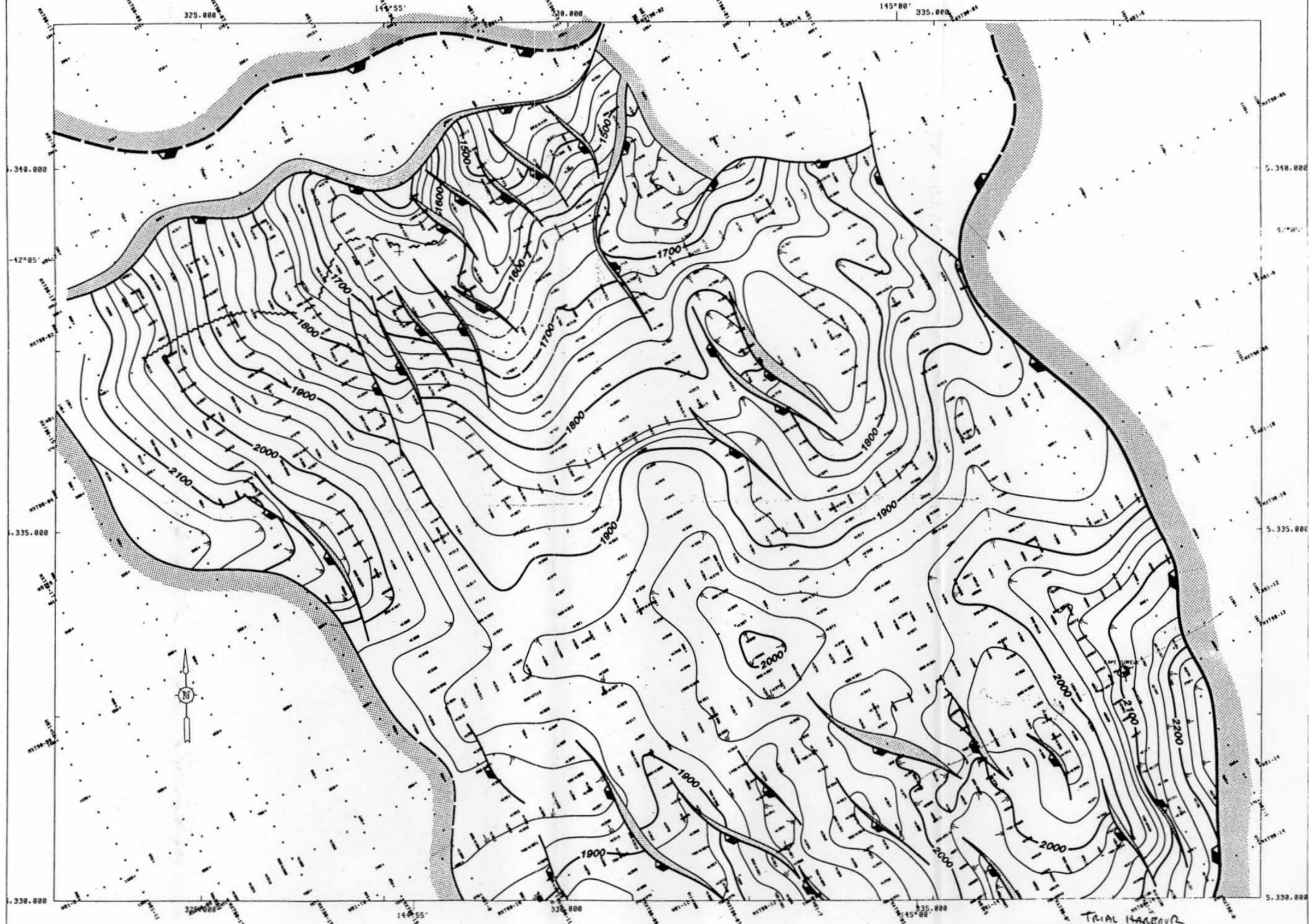
 MAPPED HORIZON TRUNCATED BY CHANNEL CUT
 INTERMEDIATE CLOSING CONTOUR

BRADDON POINT PROSPECT

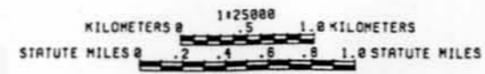
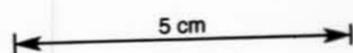
MAXUS ENERGY CORPORATION			
T/24P, WEST TASMANIA			
INTRA-WANGERRIP REFLECTOR			
TIME STRUCTURE			
C.I.=25MS			
SCALE:	INTERPRETATION BY:	DRAFTED BY:	INDEX NO.:
	EJK	PAR	
ENCLOSURE 5			



600043



OR-0470



NOTE: INTER SURVEY MISTIES UNCOMPENSATED

ENCLOSURE 6

TOP SHERBROOK - INTRA SHERBROOK REFLECTOR INTERFACE

TRIAL HARBOUR PROSPECT

2075

MAXUS
ENERGY CORPORATION

T/24P, WEST TASMANIA

**TOP SHERBROOK/
INTRA SHERBROOK REFLECTOR
TIME STRUCTURE**

C.I.=25MS

SCALE 1	DATE 1
INTERPRETATION BY E.K.	DRAWN BY PAR
SHEET NO.	FILE NO.