

# 1996 HUMMOCK MARINE SEISMIC SURVEY

## FINAL REPORT PART B SEISMIC INTERPRETATION T/18P AND T/25P BASS BASIN

*OR-428*

AR WALDRON  
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## 1 INTRODUCTION

The 1996 Hummock Marine Seismic Survey consists of two separate grids in the Bass Basin, offshore Tasmania: one in T/18P (BHB96) and the other in T/25P (BHA96), as shown in Figure 1.

The T/18P portion of the survey comprised 568.27 kilometres of data in 28 lines, and in T/25P there were 665.13 kilometres of data acquired over 36 lines (figure 2). These data fulfil the third and fifth year work commitments of 500 kilometres of seismic acquisition in both the T/18P and T/25P exploration permits respectively.

The objectives of the survey in T/18P were to detail the Ibis and Trefoil prospects and bring them up to drillable status. Infill data were also acquired over the Chappell and Aroo East leads to aid further in their evaluation.

In T/25P the Hummock data were designed to detail the Veridian prospect in the north-eastern corner of the permit, along with several fault closed prospects along the flanks of the Pelican Trough, namely Tourville on the eastern side and the Grindstone/Eddystone complex to the west (figure 2).

The current permit interest holders for each permit are tabled below:

### T/18P

Boral Energy Resources Limited	85% (Operator)
Santos Limited	15%

### T/25P

Boral Energy Resources Limited	100% (Operator)
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## 2 INTERPRETATION

### 2.1 Tectonic Evolution

The intracratonic Bass Basin is one of a series of basins formed along the southern margin of Australia during the Early Cretaceous - early tertiary rifting between Australia and Antarctica. The Bass Basin is a failed rift basin as breakup and the formation of oceanic crust did not occur after initial rifting.

The basic basin architecture is characterised by northwesterly trending normal faults, initiated by northeast-southwest extension during the Early Cretaceous. These major fault systems separate three trough areas that have dominated sediment accumulation until the mid-late Eocene (see figure 3).

The predominant structural mechanism since initial rifting has been simple drape and compaction, associated with general basin subsidence, and with faults exhibiting growth throughout the deposition of the Eastern View Coal Measures (EVCM) sequence, but dying out by the early Eocene.

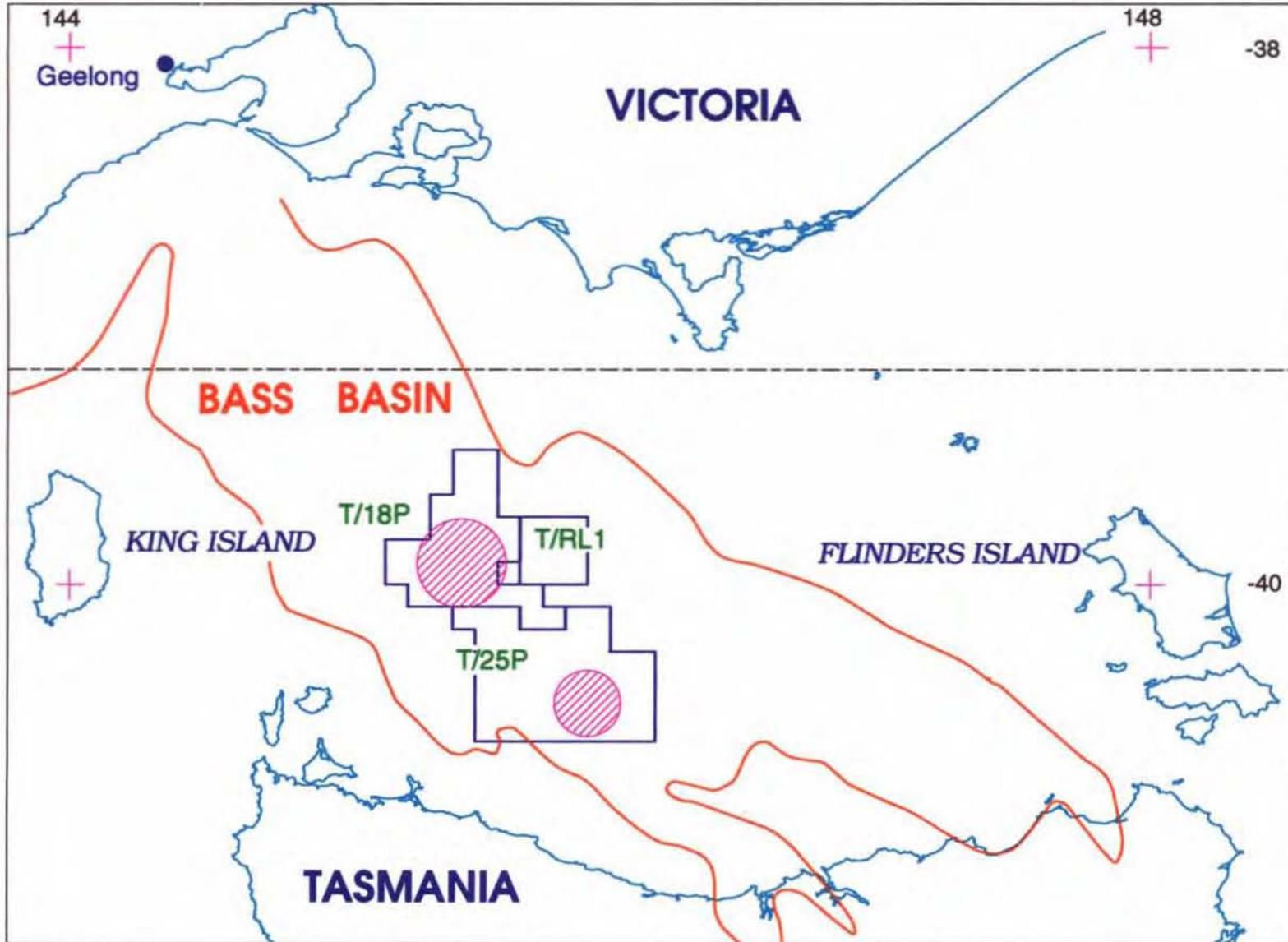
A structurally quiet period commenced at this time and continued through the deposition of the Demons Bluff Formation, a widespread marine shale sequence, and the early part of the Torquay Group limestones, until the time of the



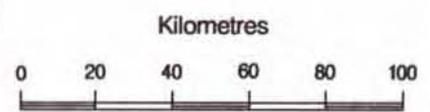
# HUMMOCK SEISMIC SURVEY - LOCATION MAP

## BASS BASIN - TASMANIA

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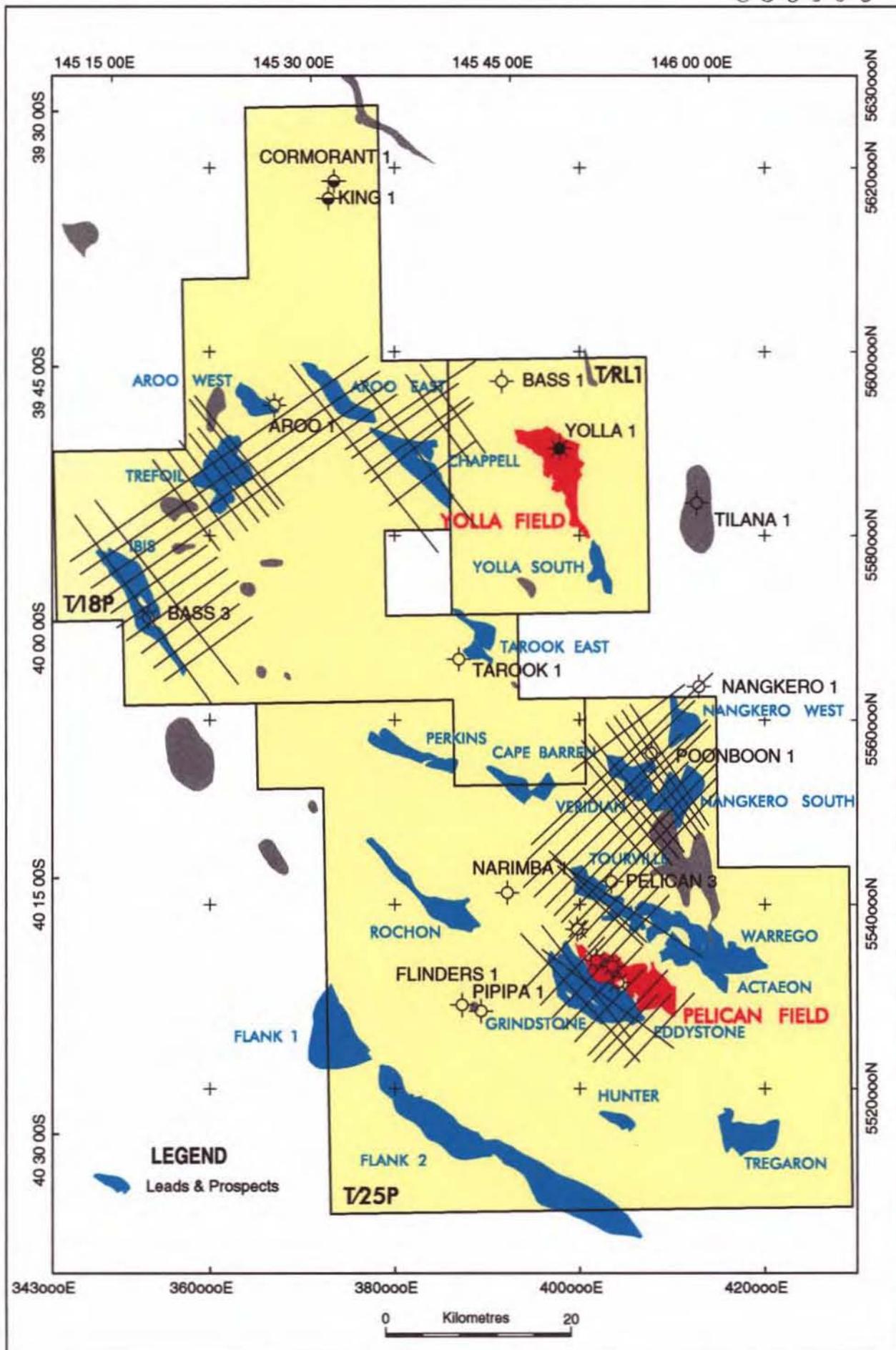
Outline of Survey



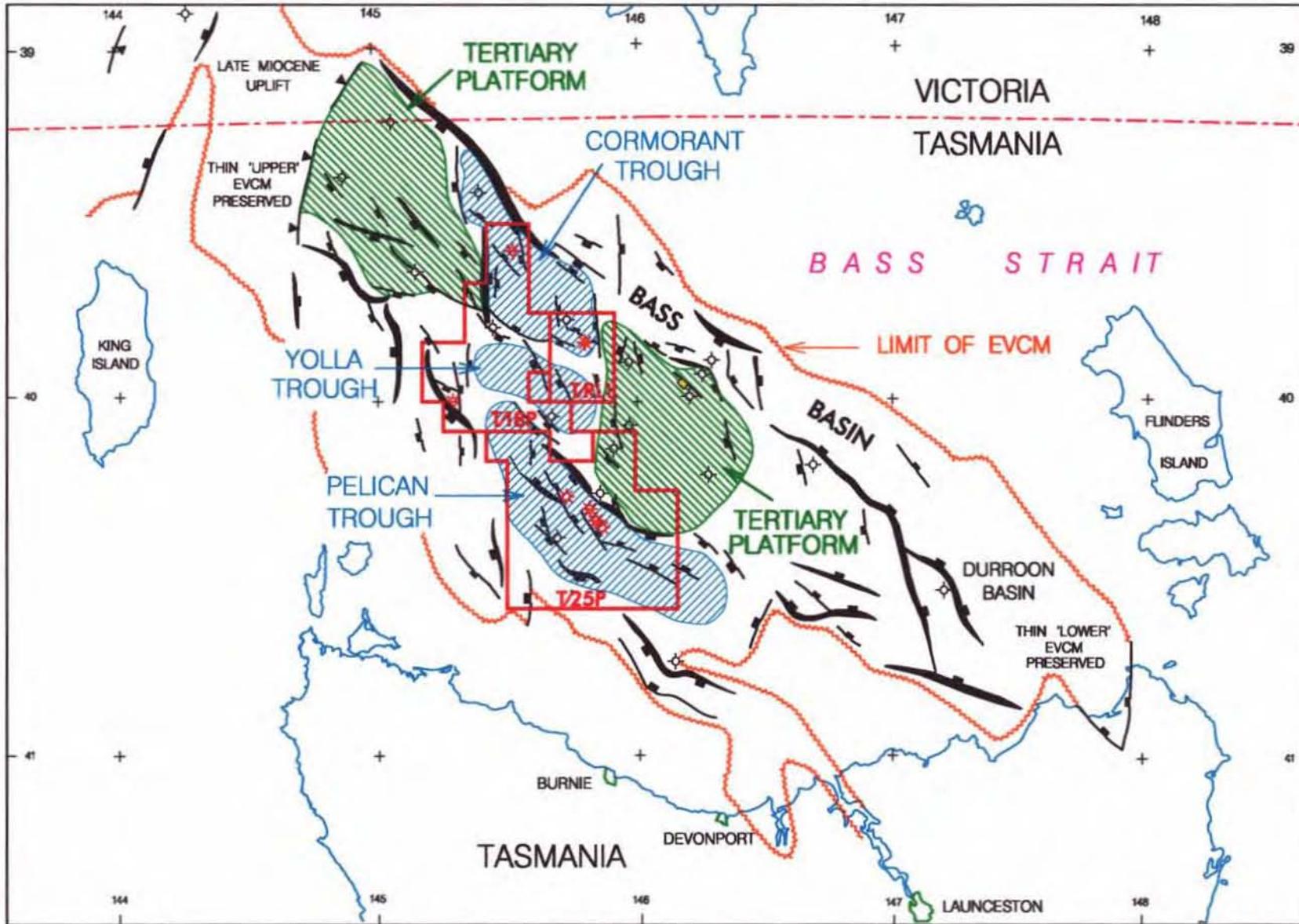
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# BASS BASIN HUMMOCK SEISMIC SURVEY



**BASS BASIN - TASMANIA  
TECTONIC ELEMENTS  
MAP**

Oligocene/Miocene volcanic episode. This episode is characterised by basin-wide expulsion of igneous material either as extrusives and forming complex overlapping volcanic cones and flows, or as doleritic intrusives that penetrate horizontally through the stratigraphy. The extrusives occur mainly on the eastern flanks of the Cormorant and Yolla Troughs, while the intrusives occur dominantly in the western parts of T/18P and T/25P.

This period is coincident with the basin inversion of the Cormorant Trough.

The structural mechanism for this episode has previously been explained as a late stage tertiary compressional event. There is no doubt that there are some minor wrench-related features of this age scattered throughout the basin, for example the north-south trending fault system in the Yolla area that only became apparent on the 3D seismic data, and which is thought to be responsible for sourcing most of the extrusives in the area (Waldron, 1995). However, there is a significant lack of major reversals or thrusts, whilst crestal collapse structures are more common. Even in a divergent wrench system there should be more signs of lateral offsets of earlier faults or structural features. The strain ellipsoid also suggests that such a system will produce folds with a strike perpendicular to the major normal faults, but this is not the case. Indeed folds with a parallel strike are common.

For these reasons, and because of the coincident basin inversion in the Cormorant Trough and large amounts of igneous material being injected into the stratigraphic record, it is suggested that the mechanism for this episode is thermal doming due to a massive rising magma chamber that during its pre-expulsion phase simply uplifted the trough.

Gunn et al., 1997 present evidence for the presence of major magma chambers at depths of approximately 15 kilometres beneath the basin depocentres and their relevance to the basin's formation. A late stage reactivation of one of these magma chambers would provide the mechanism for the Oligocene/Miocene tectonic episode.

## **2.2 Stratigraphy**

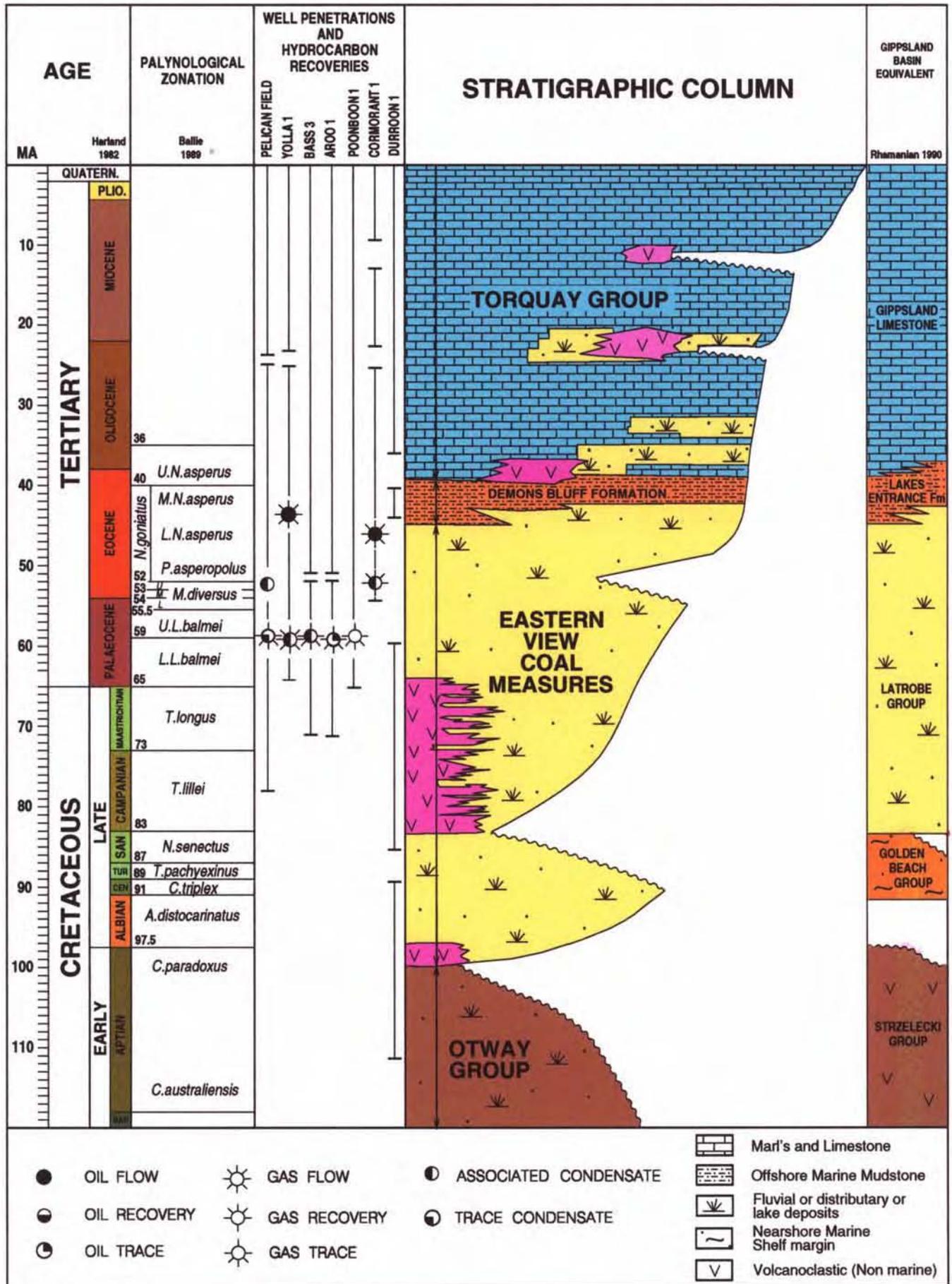
A generalised stratigraphic column for the Bass Basin is shown in Figure 4. A detailed Stratigraphy discussion was presented by Knowles et al, 1994, and is paraphrased below:

The stratigraphy of the central Bass Basin is only known from well control, however this together with the available regional seismic data allows correlation with subcropping rocks and well bores from the generically similar Otway and Gippsland Basins.

Basement in the Bass Basin is slightly metamorphosed, and the oldest dated sediments are 589 my old (Cambrian). Bass 2 drilled through low-angled, altered tuffaceous mudstone radiometrically dated as Early Palaeozoic or Cambrian. Bass 3 reached TD in 40 degree dipping, silicified blackshale and quartzite sandstone and siltstone, believed to be Early Palaeozoic in age.

A 1200 m lower Cretaceous section similar to the Otway Group of the Otway Basin and the Strzelecki Group of the Gippsland Basin was drilled at Durroon 1 (Brown, 1976) the only Bass Basin well to intersect this Early Cretaceous stratigraphy. The north west extension of the Tertiary Bass Basin overlaps the Otway Basin in the

# BASS BASIN - TASMANIA STRATIGRAPHIC COLUMN



5 cm

area of the "Torquay Embayment". There the Otway Group was penetrated by Shell's Nerita 1 (thickness 580m) and Haematite's Snail 1 (349 thick).

The Early Cretaceous Basin received rapidly deposited and generally poorly sorted argillaceous and arenaceous terrigenous detritus from the Tasmanian provenance to the south. Major fault movements produced rapidly subsiding depressions, some of which are estimated to contain up to 3000m of lower Cretaceous section. Subsequent erosion produced an unconformity which apparently marks the boundary between the Upper and Lower Cretaceous (Brown, 1976). This also marks the base of the Eastern View Coal Measures. The Late Cretaceous section is almost unknown as few wells have penetrated it, but should infill linear deep basins present by the end of the Early Cretaceous. The uppermost part of the Late Cretaceous section has been penetrated by Aroo 1, Bass 3, Poonboon 1, Pelican 5 and Konkon 1 while at Durroon 1 a condensed sequence was encountered before the well drilled through to the Early Cretaceous section. The lithologies of the Late Cretaceous were sand, silt, shale and coal typical of the rest of the EVCM. These sediments were mainly sourced from the south (Tasmania) but subsidiary provenance areas were the "Bassian Rise" (Wilson's Promotory to Flinders Island) as well as the Australian Continent to the north (Brown, 1976).

The Palaeocene provenance was still to the south as evidenced by coarse sandstone development at Durroon 1. The Palaeocene basin was a land locked wave-dominated deltaic plain extending into an extensive lacustrine environment which occupied the northern part of the basin (Suttill, 1995). The lacustrine and strand plain deposits in the north (T/18P) result in mappable seismic packages in that area which contrast with the less resolvable seismic signature of the lower delta plain sequences in the south (T/25P). Structurally the Palaeocene was quiescent with relatively uniform thicknesses of sediments observed away from the Basin margins. Thick coals developed in the Eocene, particularly in the Pelican area, but by the end of the Early Eocene structural movements intensified with extensive normal faulting aligned with and reactivating the basin forming NW-SE Cretaceous faults. Relief at any one time was not great so depositional patterns of environment remained generally constant with a similar distribution of facies to that described for the Palaeocene.

Extensive erosion occurred at the end of middle *M.diversus* time peneplaning the faulted topography and marking an end of the "Lower EVCM" (Brown, 1976; Baillie & Bacon, 1989). Up to 2000 m of Lower EVCM may have been deposited. The basin depocentres became independent from the Cretaceous synrift basins at this time and the basin axis is longitudinally focussed in the Poonboon 1 area and trending NW-SE until the present day. The "Upper EVCM" commenced deposition in this new sag basin with the coaly upper *M.diversus*. Sometime after deposition of the upper *M.diversus* and possibly as late as middle *P.asperopolus* time, another regional unconformity occurred. This did not result in any change in the basin framework and probably is more accurately described as a sequence boundary resulting from a relative eustatic lowstand. The effect of this is minor subcrop of the upper *M.diversus* sediments over many of the older highs and at the basin margins. Some growth faulting persisted after this time but almost all fault movement had ceased by the time of the Demon's Bluff flooding event. The upper EVCM below the Demon's Bluff may be up to 1000m thick in parts.

The Demon's Bluff Formation was deposited at the conclusion of the Eocene and was transgressive over a vast area. The basin thereafter continued to subside and mostly fine-grained marine sediments of the Torquay Group were deposited in the low relief topography. Thinning of Oligocene sediments, apparently due to subcrop at the Oligocene/Miocene boundary, suggests a reversal of the stress regime from

extensional to compressional at this time. This is recognised in the Gippsland Basin and a S-SE compression has been suggested (Davidson, 1980). Early Oligocene uplift is seen in the Torquay Basin and the Otway Ranges probably underwent a major compression in the late Early Miocene.

### 2.3 Method

The seismic interpretation was completed using a GEOQUEST interpretation system. A large reprocessing effort over the past few years has resulted in migrated stacks for most post-1969 seismic lines, contributing approximately 10,000 kilometres of data to the set being interpreted here in conjunction with the Hummock Survey data.

#### 2.3.1 Seismic Data Quality

The Hummock Seismic Survey data is generally of excellent quality and provides very good control over the targeted prospects and leads (eg figure 7).

However, data quality suffers from poor signal to noise in areas of complex faulting or extensive igneous activity. This is particularly a problem on shorter lines of less than 10-15 kilometres in length, as in for example the 1994 Rocky Cape seismic data. The thick coal-dominated sequence of the middle *M.diversus* section of the EVCM also acts as a sink for reflection energy, and consequently interpretation of the deeper seismic events suffers further from the lack of strong continuous reflectors and disruption by shallower features.

#### 2.3.2 Misties

Misties were handled within the GEOQUEST system, prior to mapping using Petrosys. Internally within each vintage of data misties were generally small, although greater variability did exist in the pre-1980's data. During data loading, vintage-consistent bulk shifts were applied to bring the data in line with the basin wide TQH5 data. Following interpretation, a three step mistie correction was applied:

1. A bulk shift was applied to pre-1992 data on a line-by-line basis, to correct to the more modern data.
2. This was followed by a bulk shift correction calculated using all vintages of data.
3. A final round of residual mistie adjustment was applied to reduce all misties to zero.

The raw data mistie distribution for the mapped Top Palaeocene event is shown in Figure 5. A mean value of 7.3 milliseconds is indicated, with approximately 65% of the data with less than a 10 millisecond mistie. This is a very good result considering the variety and quantity of data present. Figure 6 shows a histogram plot of the mistie distribution following the application of the bulk shifts to pre-1992 data. A slight improvement is shown with approximately 75% of the data now with misties of less than 10 milliseconds.

2.3,3 Mapped Events

Three seismic events were carried regionally over the basin:-

1. Top Eastern View Coal Measures
2. Top Middle *M. diversus*
3. Near Top Palaeocene (Top Upper *L. balmei*)

The Top EVCM marker was identified as a peak on the seismic data and represents an increasing velocity boundary between the shales of the overlying Demon's Bluff Formation and the sandy section of the uppermost EVCM.

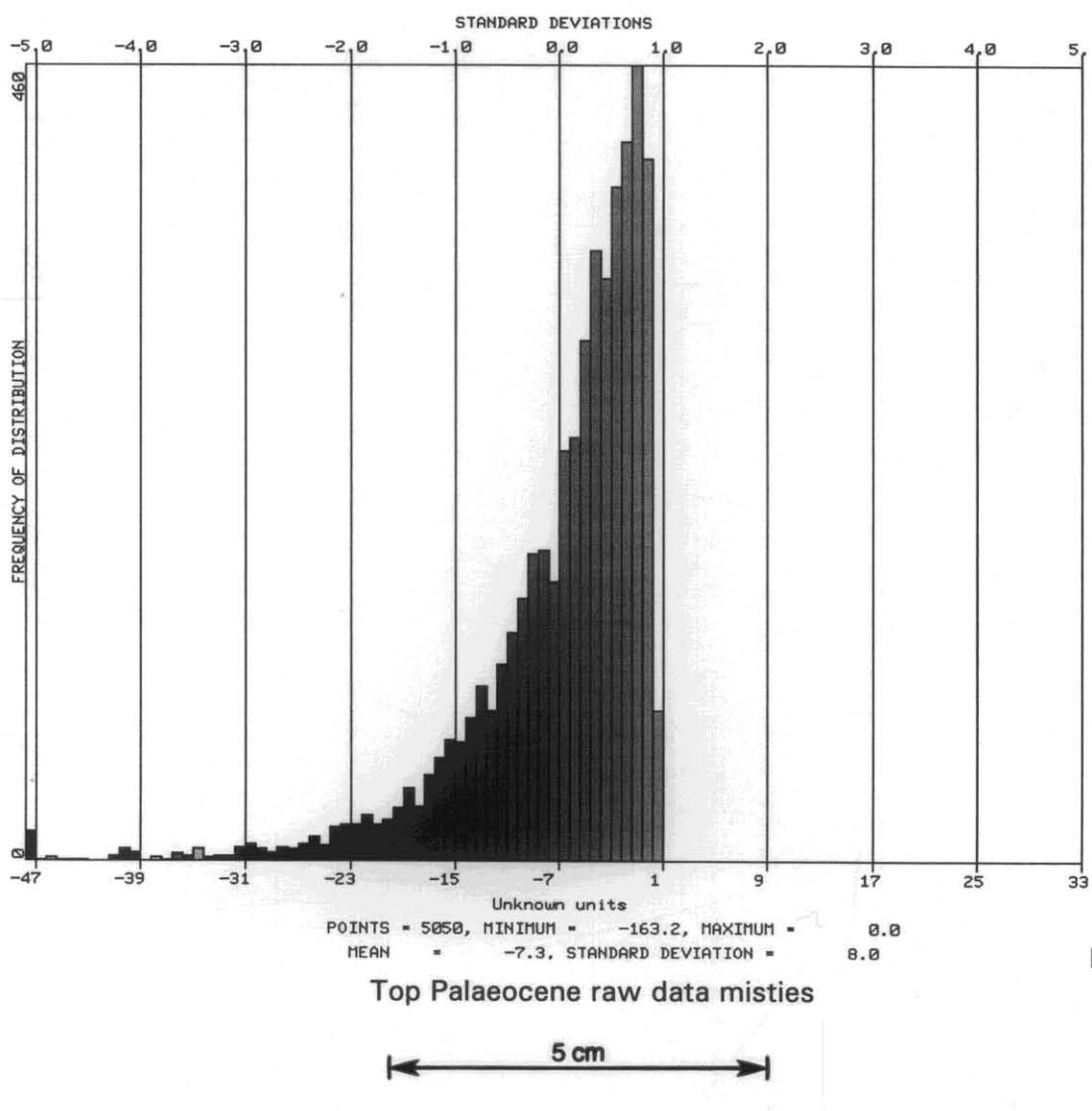


Figure 5

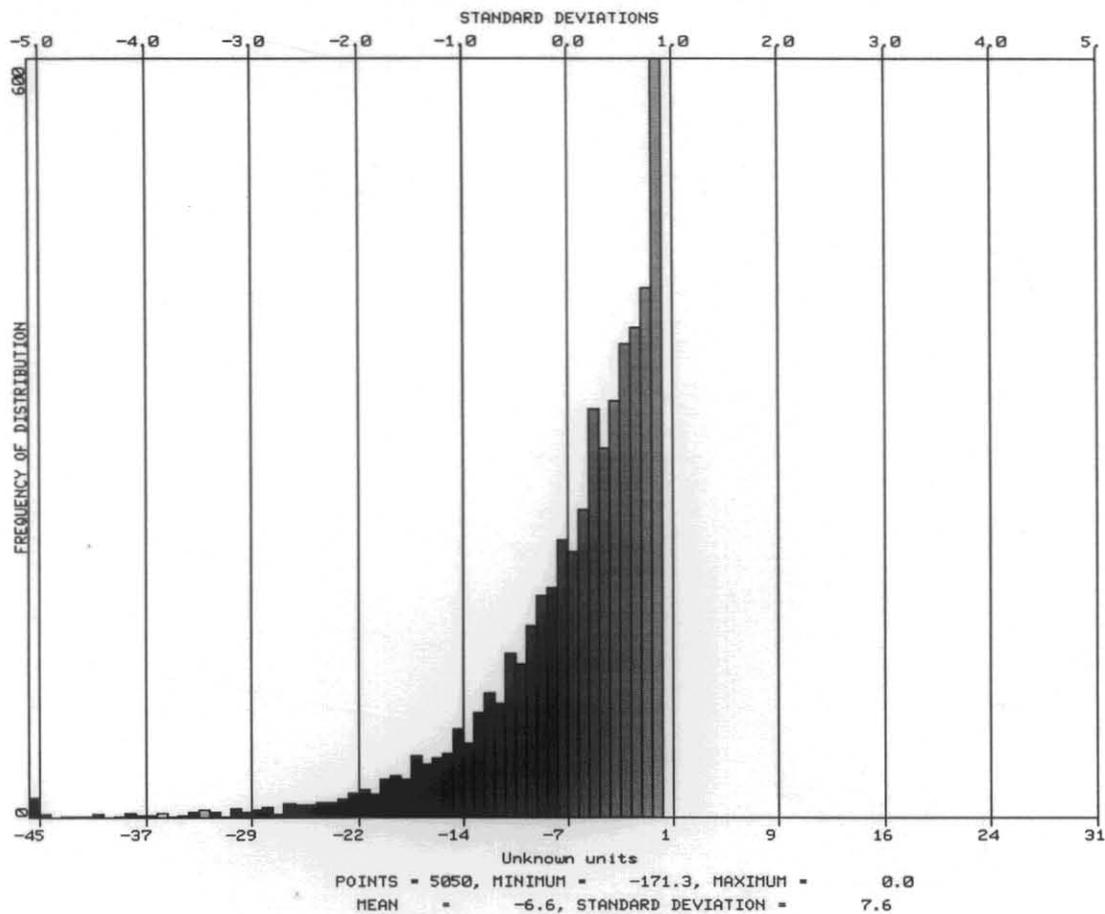


Figure 6 Top Palaeocene misties after first bulk shift correction

For the most part the Top EVCM marker is a robust and readily correlatable seismic event over the entire dataset. There is some distortion of the event beneath the extrusives of the Yolla 1 - Bass 1 area, and complete disruption by intrusives in other areas, particularly along the southwestern flank of the basin.

The Top Middle *M. diversus* lies close to the base of the major coaly sequence of the Upper *M. diversus* section of the EVCM. This seismic marker is consequently a high amplitude and continuous event. Correlation across faults is generally straight forward with good seismic character ties.

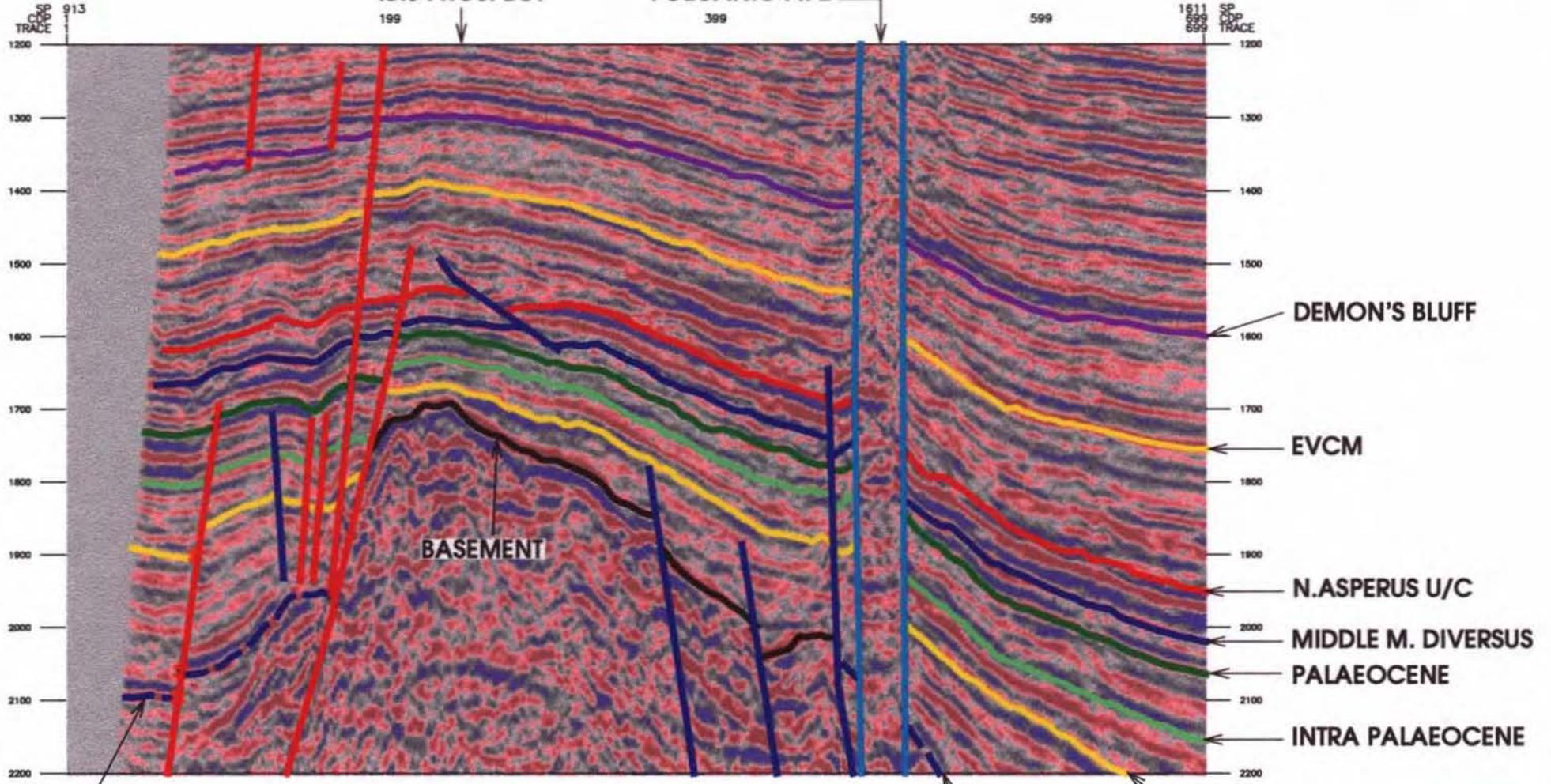
The Near Top Palaeocene event corresponds to the Top *L. balmei* palynological zone and is the least reliable event of the three, but represents the most likely target for exploration drilling. A seismic marker at this level can be correlated with fair confidence within any particular fault compartment but its less continuous character and varying amplitude make it difficult to carry confidently over some of the major faults systems. Figure 7 shows dip line BHB96-107 over the Ibis Prospect, and indicates the mapped seismic events.

Time structure maps at a scale of 1:100,000 were produced at each mapped level with and without data points annotated, and are presented here in Enclosures 1-6. Time interval maps were produced for the Top EVCM-Top Palaeocene and the Top Middle *M. diversus*-Top Palaeocene intervals and these are shown in Enclosures 7 and 8.

5 cm

A

A'



LATE CRETACEOUS  
(*N.senectus* ?)

LATE CRETACEOUS  
(*N.senectus* ?)

LATE CRETACEOUS  
(*T.longus, T.lillei*)

**IBIS DIP LINE BHB96 - 107**

### 3 RESULTS

Three regional composite seismic sections are presented in Enclosures 9-11. These sections trend northeasterly perpendicular to the general basin strike direction, and illustrate the basic structural architecture of the key trough areas to the basin margins.

#### 3.1 Top Eastern View Coal Measures

The Top EVCM time structure map of Enclosure 1 shows a broad basinal shape with a northwesterly strike. As shown by the time interval map of the Top EVCM-Near Top Palaeocene (Enclosure 7), the main depocentre of the Tertiary-aged part of the EVCM is within the Cormorant Trough. The deepest part of the EVCM however, occurs in the Yolla Trough southeast of the Aroo 1 well. This anomaly is caused by the late stage inversion of the Cormorant Trough during the Late Oligocene/Early Miocene period. Faulting is generally minor at this level with the basin-margin related faults predominating.

The Hummock seismic data has matured several key leads and prospects. The Trefoil and Chappell prospects appear to be simple four-way dip closures at this level with 10-15 milliseconds of vertical relief. There is a small fault-bounded structure at Aroo East with 15 milliseconds of relief, and a larger fault-closed feature at Ibis.

In T/25P the Veridian prospect is interpreted to be a low relief anticline updip of the Poonboon 1 well.

Enclosure 2 shows the annotated data points at this level.

#### 3.2 Top Middle *M.diversus*

Structure at this level is dominated by long linear northwesterly trending fault systems, and large areas of igneous intrusive disrupted section particularly along the western margins of the basin (Enclosures 3, 4). The Pelican Trough is clearly separated structurally from the Yolla/Cormorant Trough complex, and the seismic event onlaps older section to the southwest.

The deep fault architecture of the EVCM is well established by this stage, and the prospects are reflecting the structural geometry identified at the deeper mapped reservoir level. The Aroo East and Chappell prospects of T/18P have developed as downthrown side fault closures with between 50 and 90 milliseconds of vertical relief. Trefoil is a larger anticlinal feature at this level, bounded to the east by a northerly trending fault. Ibis is slightly larger areally with 25 milliseconds of vertical closure updip of the Bass 3 well.

The Top Middle *M.diversus*-Top Palaeocene time interval map of Enclosure 8, highlights the Cormorant and Pelican Troughs as being the most active depocentres during this time. Structurally the Middle *M.diversus* event is deepest to the south in the Yolla Trough, due again to the late inversion episode.

In T/25P the Veridian prospect only exists as a small fault-bounded structure coincident with the rollover at the shallower level.

### 3.3 Near Top Palaeocene (Top Upper *L.balmei*)

The northwesterly trending fault systems continue to dominate at this level (Enclosures 5, 6). The amount of igneous intrusive activity is less obvious or disruptive of the seismic data. The three major troughs are clearly separated structurally, with the Cormorant Trough being the most distinct.

The Chappell, Trefoil and Ibis structures are well developed. The Chappell structure is a tilted horst block culminating at the intersection of two prominent faults. Vertical relief is approximately 120 milliseconds. Trefoil is a large and gently dipping rollover with 20 milliseconds of relief. Ibis is a large fault closed structure (figure 7) with approximately 50 milliseconds of vertical relief structurally above the Bass 3 well.

The Aroo East structure, while distinct at the Middle *M.diversus* level, lies within an area of complex and intersecting faults at the Palaeocene level. Further work needs to be done in this area to fully understand the structural geometry of this feature.

In T/25P the fault closed structures on the flanks of the Pelican Trough have developed. The Tourville prospect extends over a large faulted terrace downdip of the Pelican 3 well. The Eddystone and Grindstone prospects are smaller in size, but not as complexly faulted as Tourville. The Veridian prospect is a broad, shallow relief (approx 25 milliseconds) structure that is heavily dissected by small faults that appear to occur randomly in this area.

## 4 CONCLUSIONS

The 1996 Hummock Marine Seismic Survey was generally excellent quality data and allowed a more thorough understanding of the deeper structure which is particularly poorly imaged on most of the earlier vintages of seismic data.

The survey was successful in that it provided detailed and infill data over 8 key leads and prospects, and for the most part bringing them all to a mature drillable status in terms of structural definition.

Additional seismic may be required over the Chappell and Aroo East prospects prior to drilling.

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Gunn P.J., Mitchell J., and Meixner A., 1997. "The structure and Evolution of the Bass Basin as Delineated by Aeromagnetic data." Exploration Geophysics **28**, 214-219.

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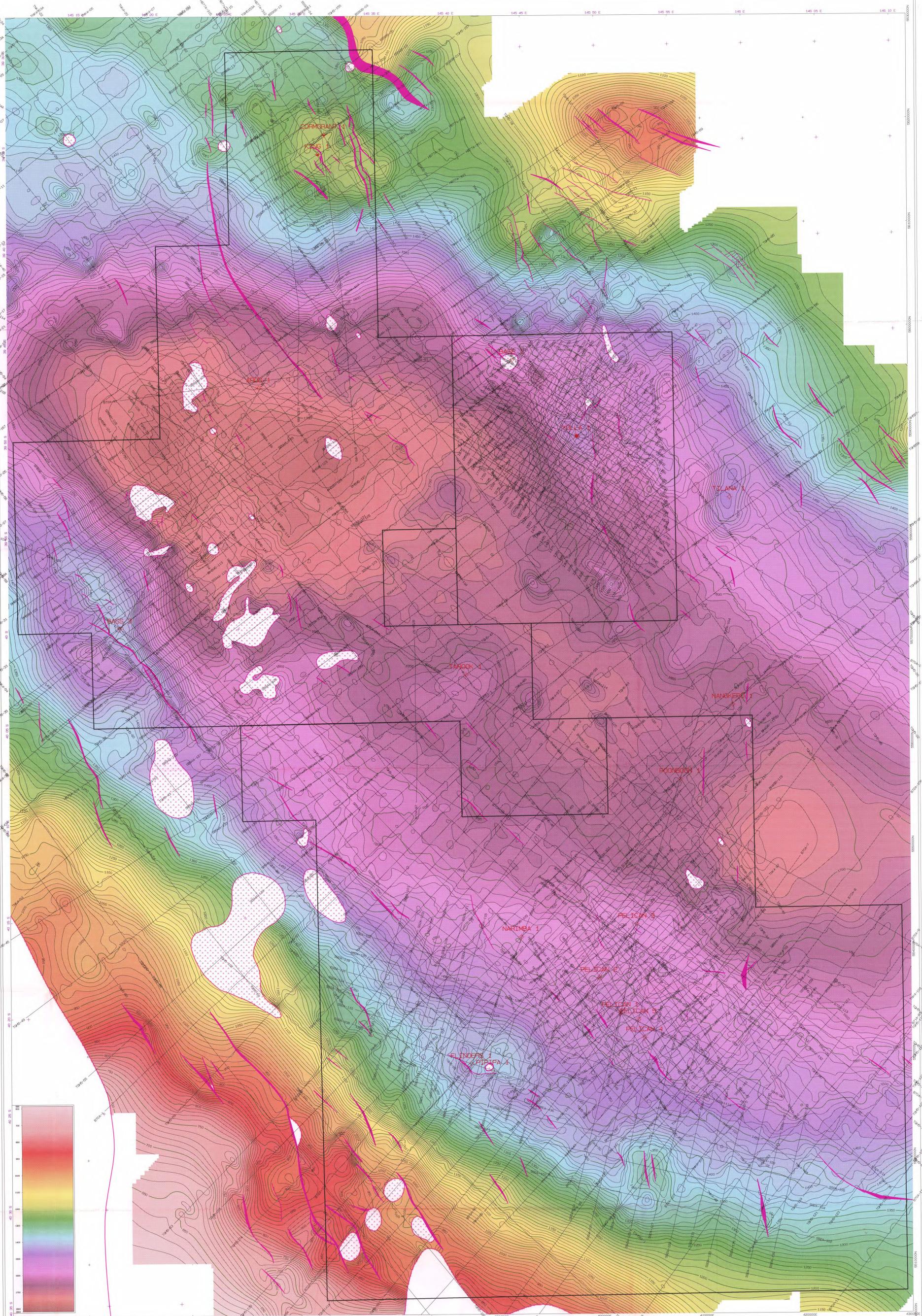
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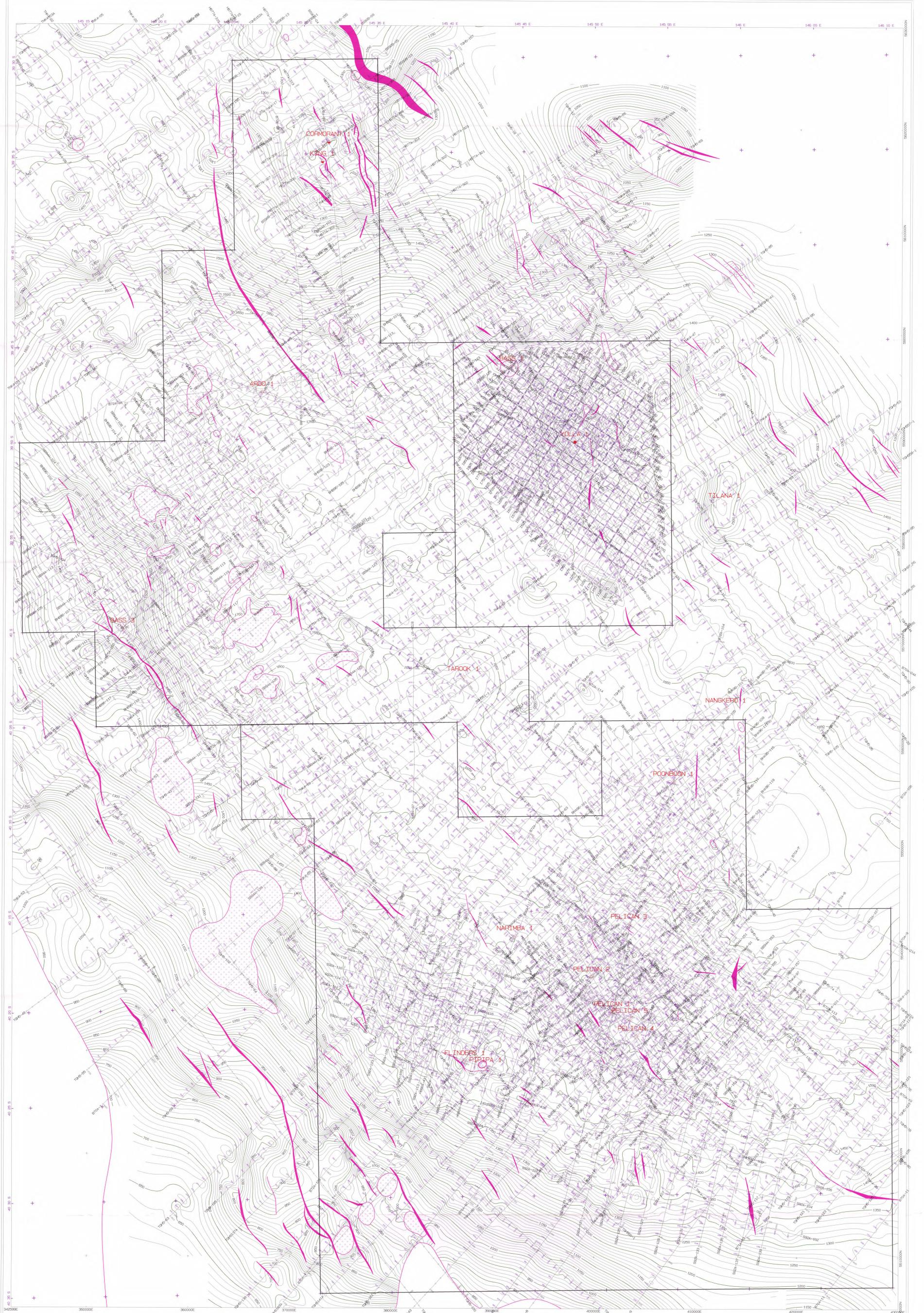


UNIVERSAL TRANSVERSE MERCATOR PROJECTION  
 AUSTRALIAN NATIONAL SPHEROID  
 CENTRE MERIDIAN 150° E

**BORAL ENERGY**

BASS BASIN (T18P, T28P)  
 HUMMOCK SEISMIC SURVEY  
 TOP EASTERNVIEW COAL MEASURES  
 TIME STRUCTURE

Author	Drawn	Checked	Approved
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...	...	...	...
...	...	...	...

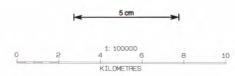


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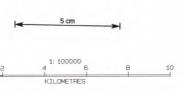
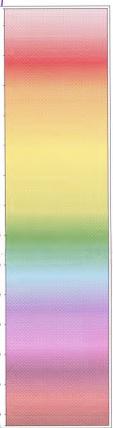
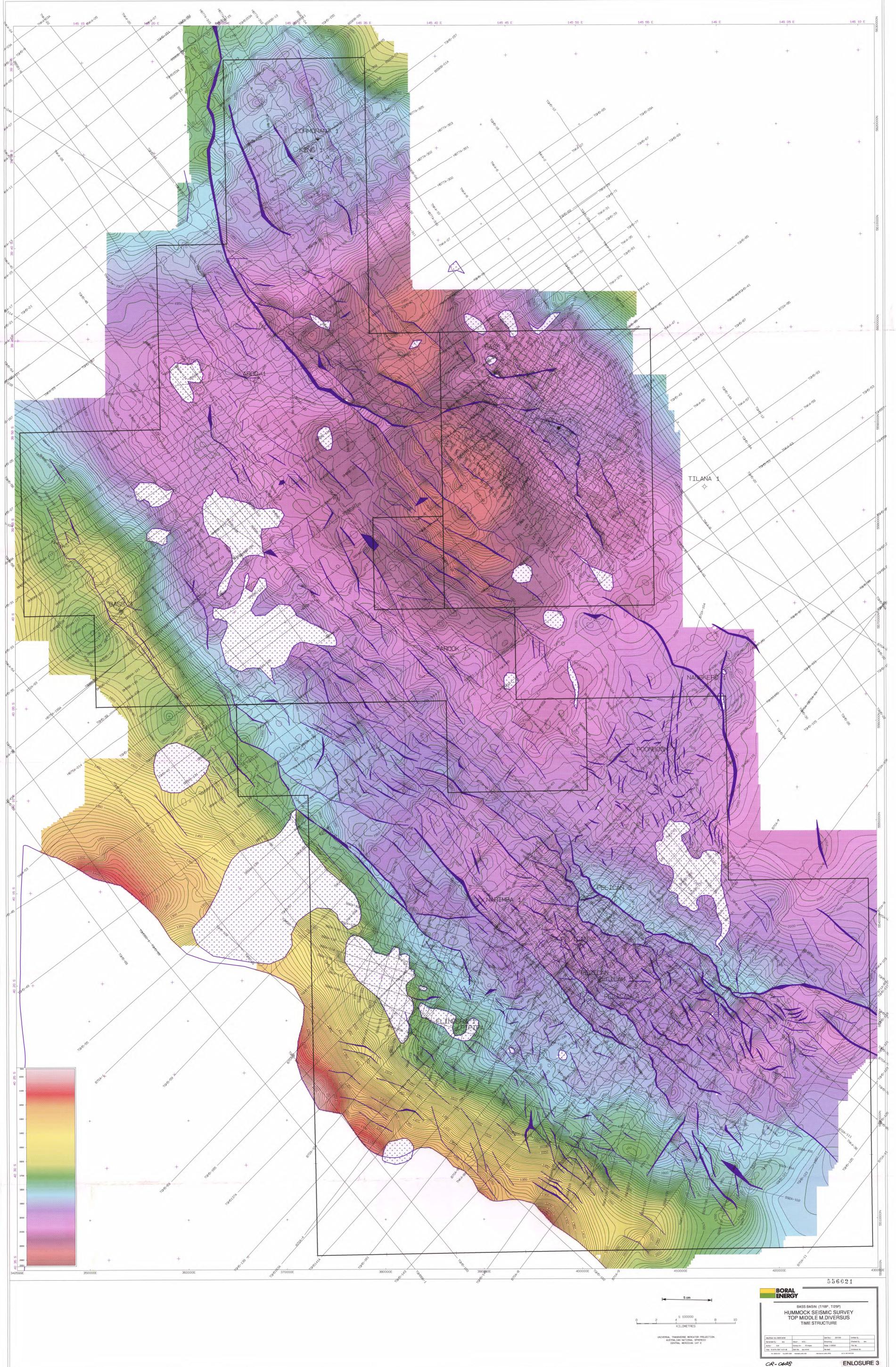
**BORAL ENERGY**

BASS BASIN (T18P, T19P)  
 HUMMOCK SEISMIC SURVEY  
 TOP EASTERNVIEW COAL MEASURES  
 TIME STRUCTURE

DATE	BY	REVISION	DESCRIPTION
10/01/2018	...	1	...
10/01/2018	...	2	...
10/01/2018	...	3	...
10/01/2018	...	4	...
10/01/2018	...	5	...
10/01/2018	...	6	...
10/01/2018	...	7	...
10/01/2018	...	8	...
10/01/2018	...	9	...
10/01/2018	...	10	...



UTM ZONE 55S  
 DATUM: GDA94  
 EPOCH: 2011.0  
 REFERENCE POINT: 556620



**BORAL ENERGY**

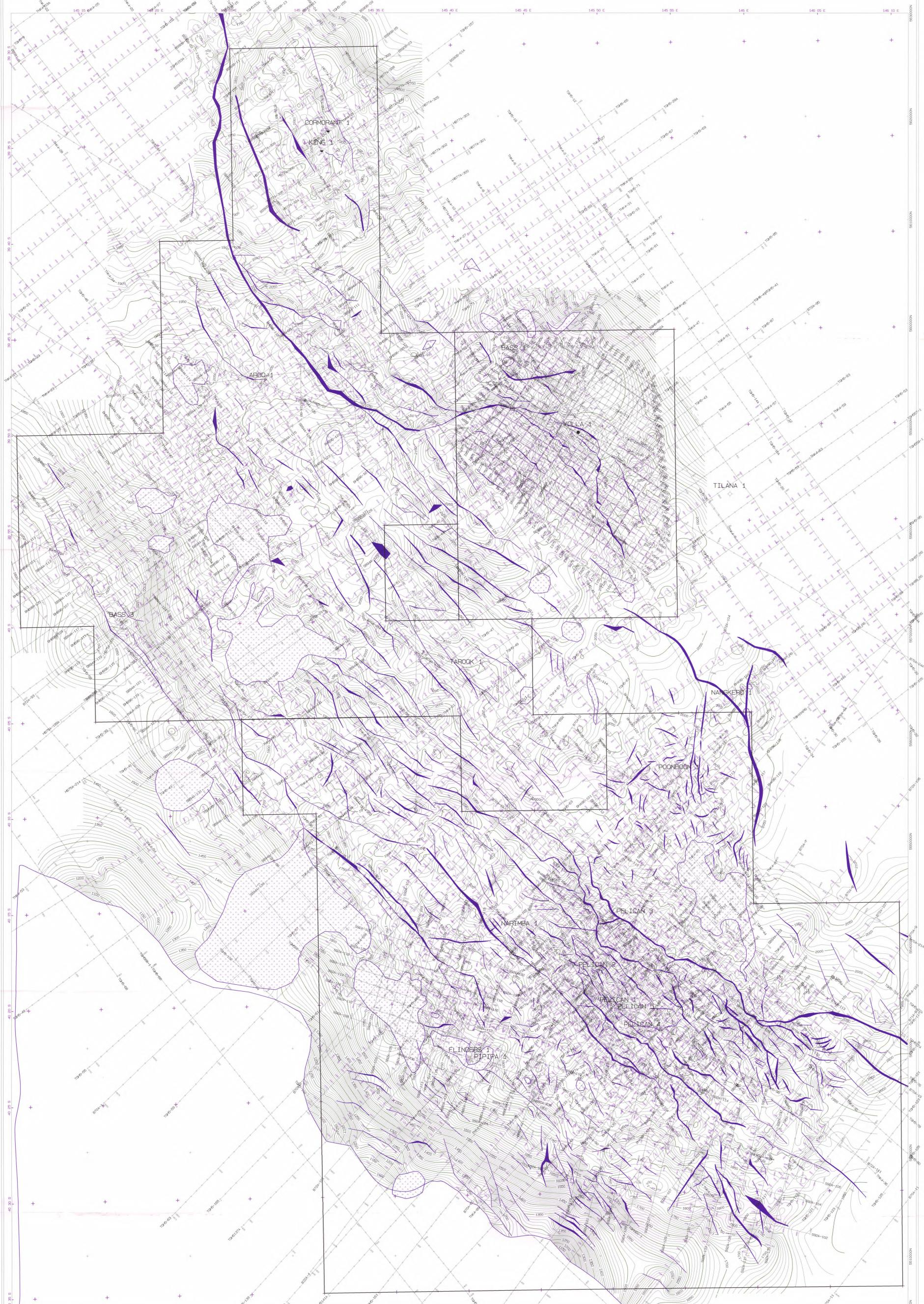
BASS BASIN (T18P, T19P)  
 HUMMOCK SEISMIC SURVEY  
 TOP MIDDLE M.DIVERSUS  
 TIME STRUCTURE

Author	Date	Scale	Sheet No.	Sheet No.

UNIVERSAL TRANSVERSE MERCATOR PROJECTION  
 AUSTRALIAN NATIONAL GRID (MGRS)  
 CENTRAL MERIDIAN 147 E

CR-0488 ENCLASURE 3

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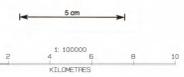


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BASS BASIN (T18P, T28P)  
**HUMMOCK SEISMIC SURVEY**  
 TOP MIDDLE M.DIVERSUS  
 TIME STRUCTURE

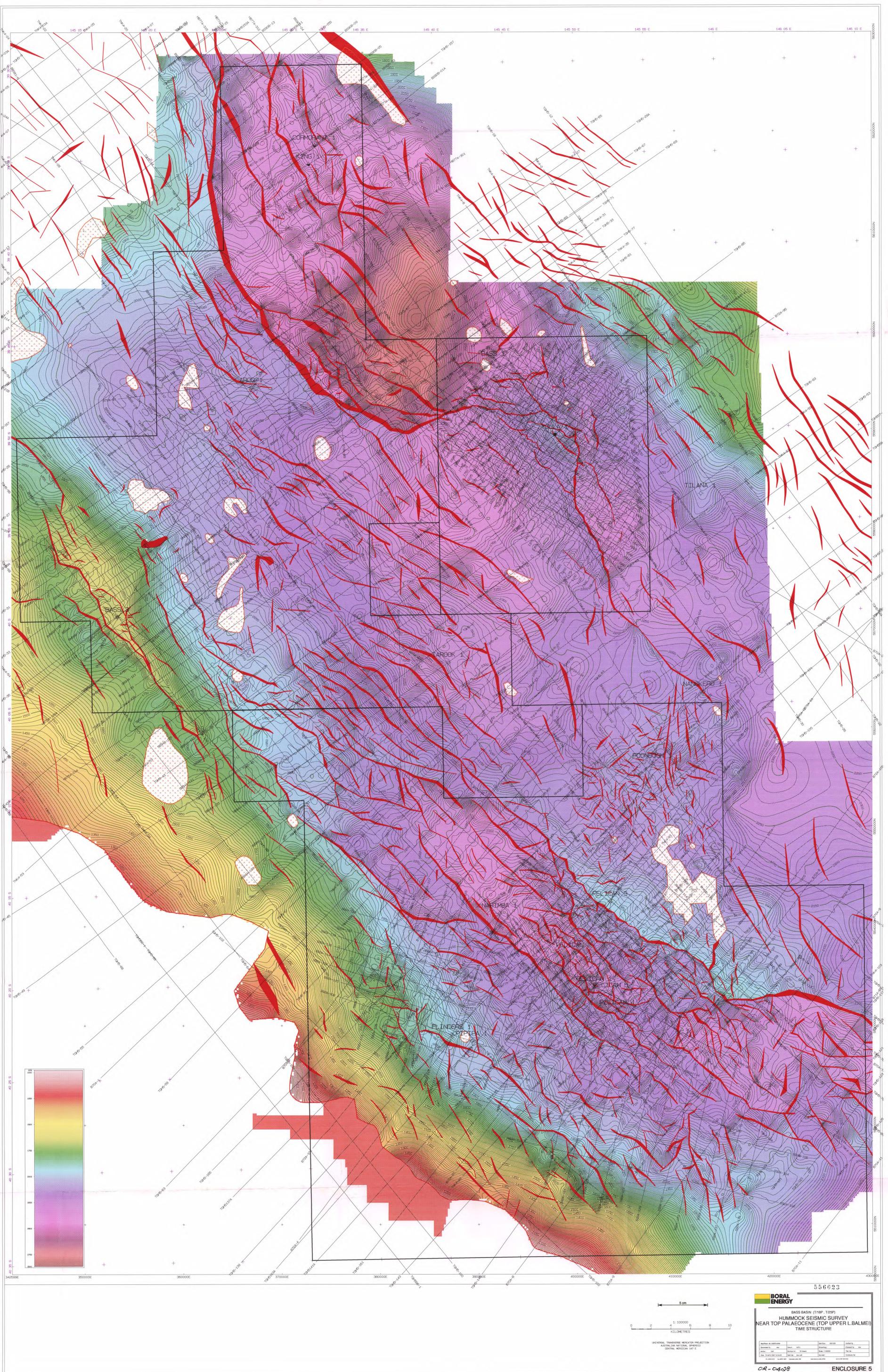
Name	Position	Date	Scale	Author	Checked	Drawn	Revised



UNIVERSAL TRANSVERSE MERCATOR PROJECTION  
 AUSTRALIAN NATIONAL GRID  
 DATUM: AUSTRALIAN AD 83

04-0439

ENCLOSURE 4



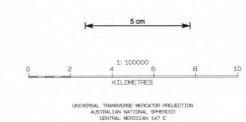
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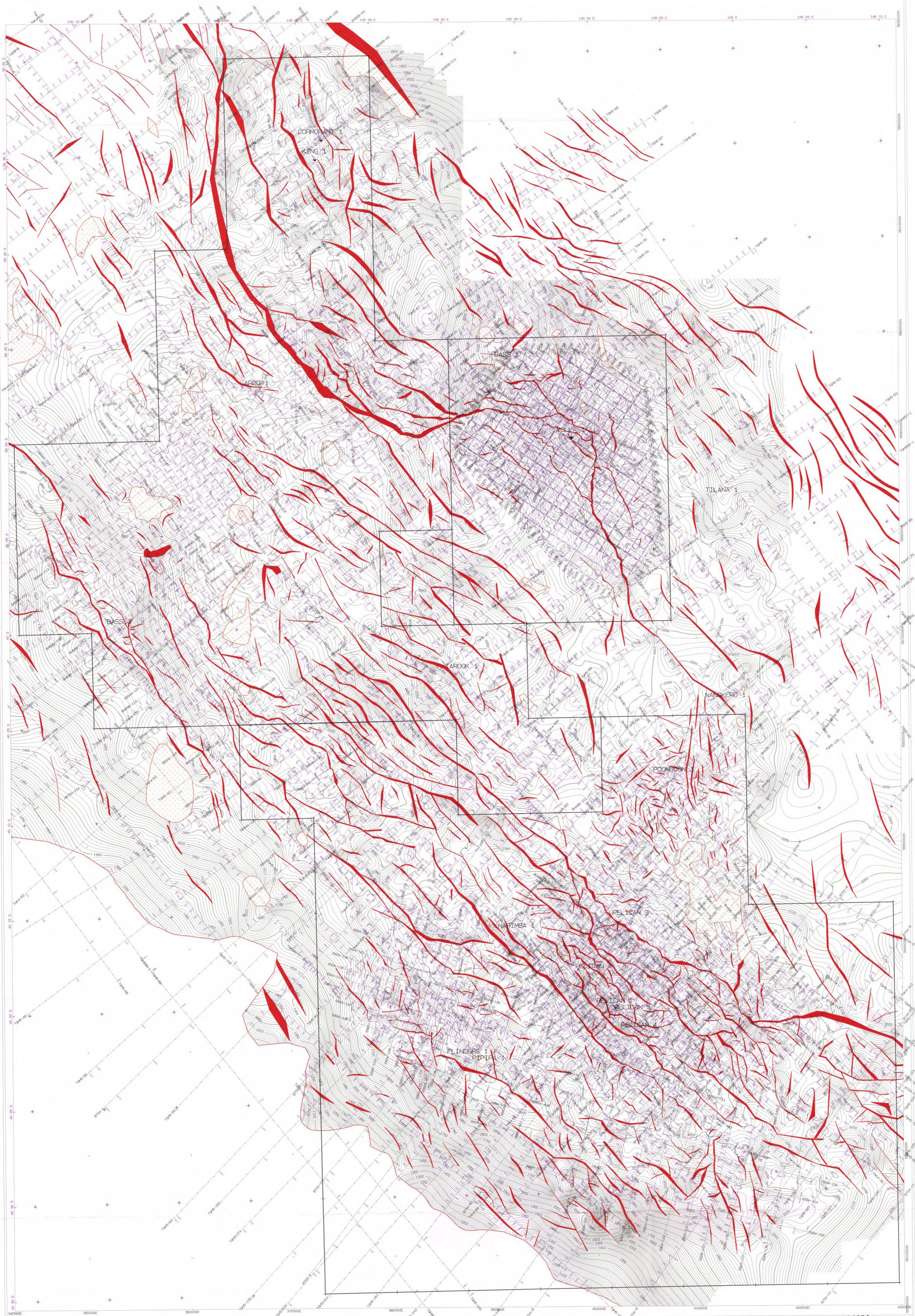
**BORAL ENERGY**

BASS BASIN (T18P, T28P)  
 HUMMOCK SEISMIC SURVEY  
 NEAR TOP PALAEOCENE (TOP UPPER L.BALME)  
 TIME STRUCTURE

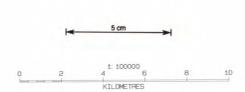
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OR-0408 ENCLOSURE 5





556024

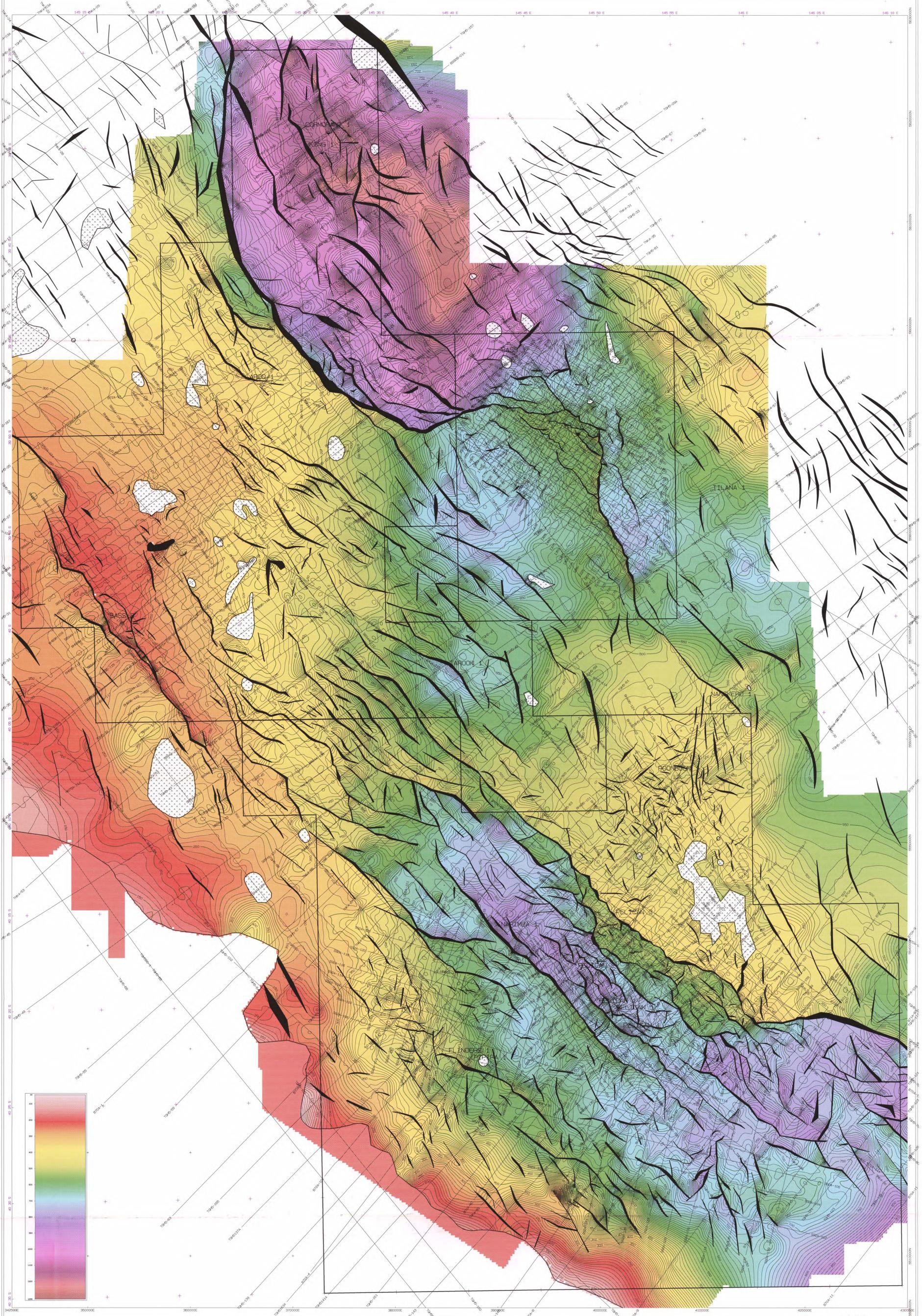


**BORAL ENERGY**

BASS BASIN (T18P, T25P)  
 HUMMOCK SEISMIC SURVEY  
 NEAR TOP PALAEOCENE (TOP UPPER L.BALMEI)  
 TIME STRUCTURE

Author	Checked	Date	Version	Scale	Sheet No.	Total No.

CA-0488 ENCLOSURE 6



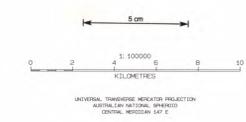
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**BORAL ENERGY**

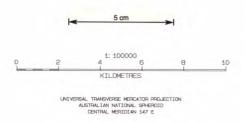
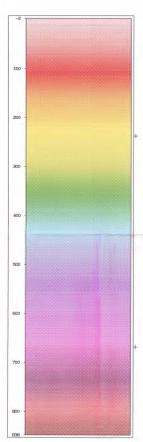
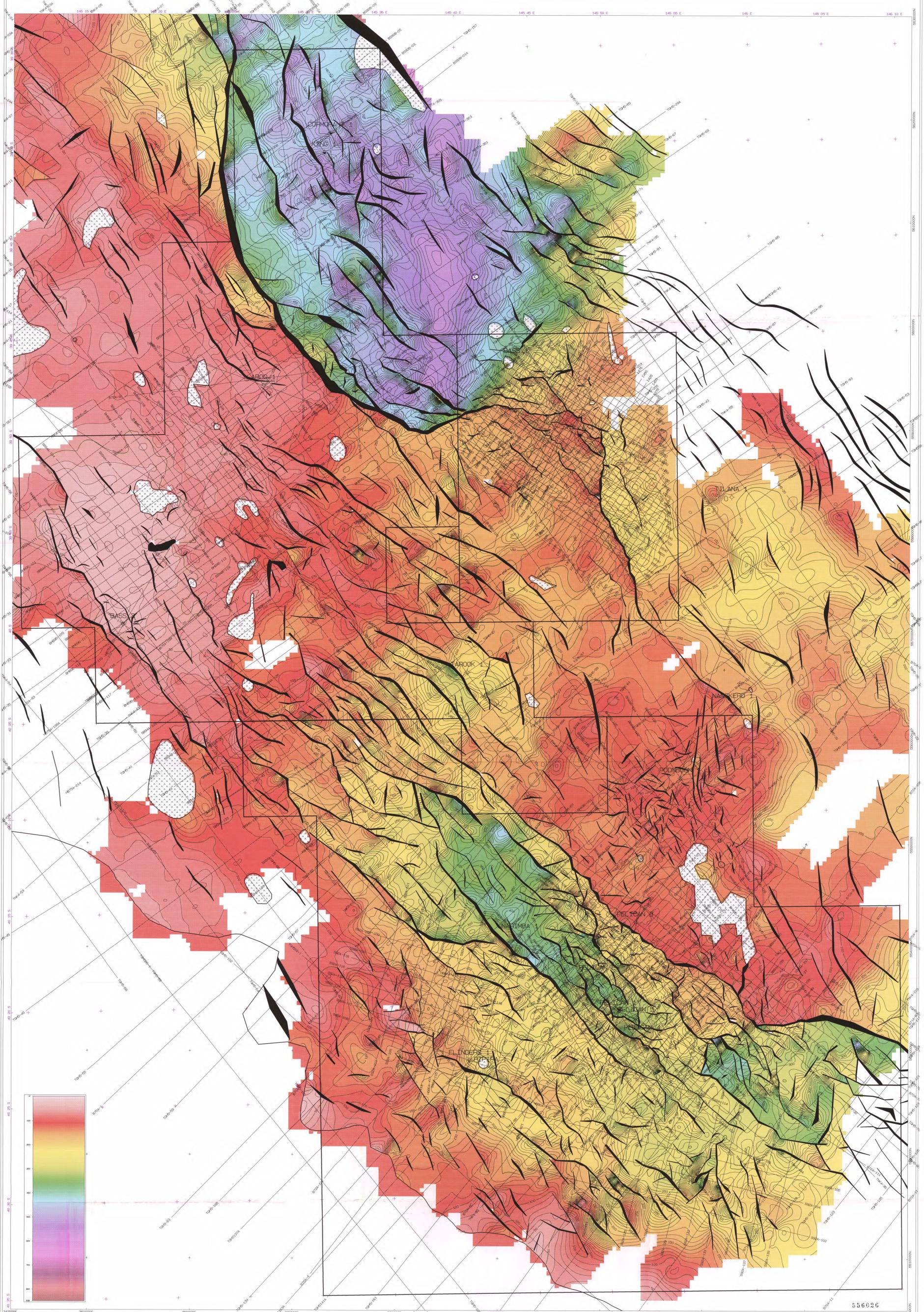
BASS BASIN (118P) 112P  
 HUMMOCK SEISMIC SURVEY  
 TOP EVCM - NEAR TOP PALAEOCENE  
 TIME ISOCHRON

Author	Editor	Drawn	Checked

CR-0889 ENCLOSURE 7



UNIVERSAL TRANSVERSE MERCATOR PROJECTION  
 AUSTRALIAN NATIONAL SPHEROID  
 CENTRAL MERIDIAN 145° E



**BORAL ENERGY**

BASS BASIN (118P 112P)  
**HUMMOCK SEISMIC SURVEY**  
 TOP MIDDLE M.DIVERSUS -NEAR TOP PALAEOGENE  
 TIME ISOCHRON

Author	Editor	Reviewer	Checker

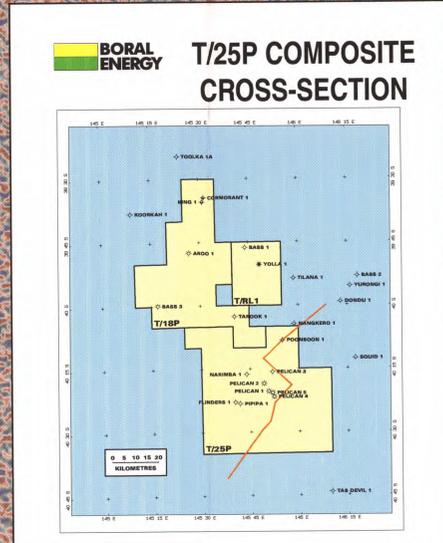
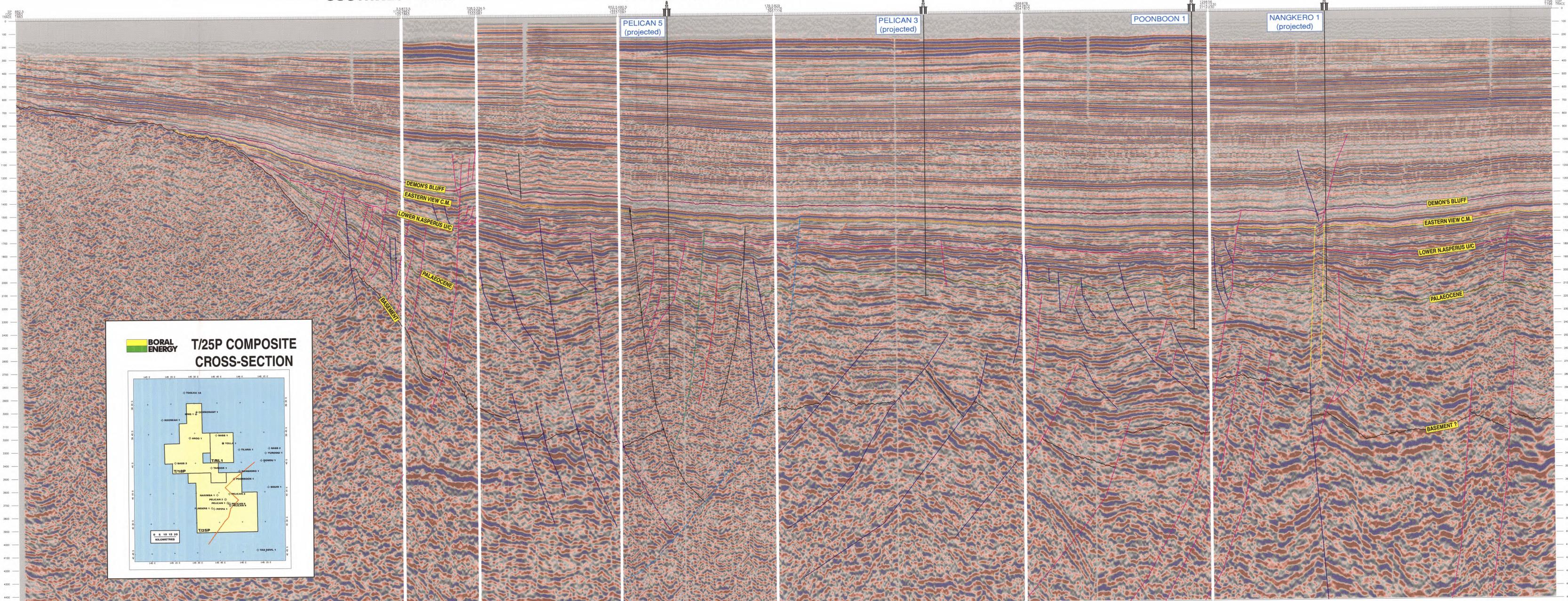
UNIVERSAL TRANSVERSE MERCATOR PROJECTION  
 AUSTRALIAN NATIONAL GRID  
 CENTRAL MERIDIAN 145° E

CR- 0488 **ENCLOSURE 8**

SOUTHWEST RAMP

PELICAN TROUGH

POONBOON PLATFORM



125p cross-section	
Company:	BORAL ENERGY RESOURCES
Created:	2-May-09 14:45:39
Prepared by:	BUS
ES User:	11AP/SE
ES Project:	7
Number:	04/24/96
ES Plotting Release Date:	

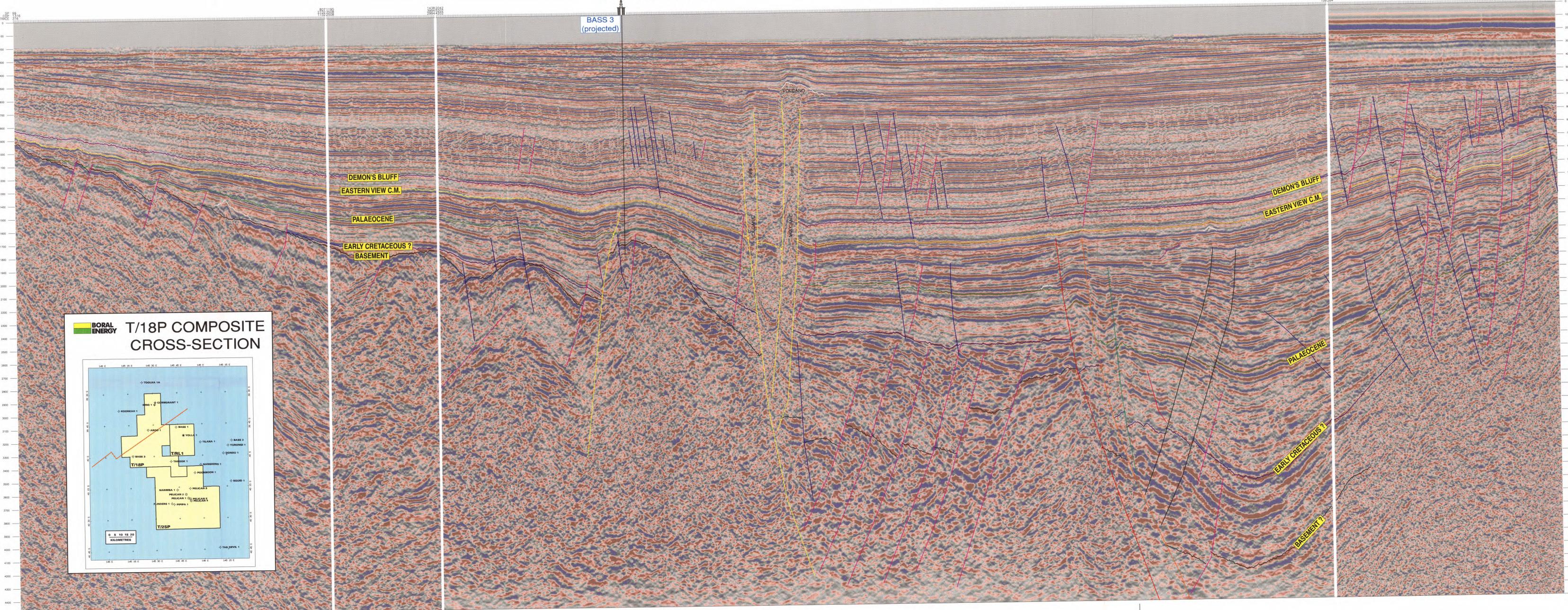
  

Panel Number	Line	Line Type	2-D Line	Object ID	Version	SP
1	1045-145	2-D Line	125-1863	1045-145	3.5	882.5
2	1044-95	2-D Line	153-1863	1044-95	5	873.5
3	1044-123	2-D Line	487-1233	1044-123	1	882.5
4	1044-91	2-D Line	390-1097	1044-91	4	892.5
5	1044-32	2-D Line	654-1776	1044-32	1	829
6	1044-75	2-D Line	1872-2712	1044-75	1	128
7	1045-99	2-D Line	1230-1796	1045-99	1	839

ENCLOSURE 9 CR-0493 556027

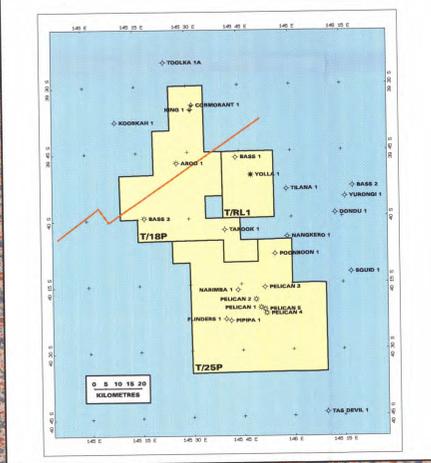
PERMIT T/25P

← IBS HIGH →
← TREFOIL PLATFORM →
← CORMORANT TROUGH →



T/18P CROSS-SECTION	
Company:	BORAL ENERGY RESOURCES
Created:	11-May-14 09:37:33
Prepared by:	ES 12481
ES Unit:	ES 12481
Survey:	T/18P-C
Number of panels:	4
ES Plotting Release Date:	04/26/15
<b>BORAL ENERGY</b>	
<p>Panel Number: 1</p> <p>Line: T/18P-27 Line Type: 2-D Line Track: 1314-1332 Approx: 20.00 Destination: 1314-1332 Map Distance Across Panel: 6 Time Spacing: 501.541 Display Scale: 1000.00 Scale Mode is Line Scale Value is 3000.00</p> <p>Panel Number: 2</p> <p>Line: T/18P-42 Line Type: 2-D Line Track: 2529-2544 Approx: 20.00 Destination: 2529-2544 Map Distance Across Panel: 6 Time Spacing: 144.8 Display Scale: 1000.00 Scale Mode is Line Scale Value is 3000.00</p> <p>Panel Number: 3</p> <p>Line: T/18P-31 Line Type: 2-D Line Track: 158-402 Approx: 20.00 Destination: 158-402 Map Distance Across Panel: 6 Time Spacing: 236.8 Display Scale: 1000.00 Scale Mode is Line Scale Value is 3000.00</p> <p>Panel Number: 4</p> <p>Line: T/18P-29 Line Type: 2-D Line Track: 284-316 Approx: 20.00 Destination: 284-316 Map Distance Across Panel: 6 Time Spacing: 362.614 Display Scale: 1000.00 Scale Mode is Line Scale Value is 3000.00</p>	

**BORAL ENERGY**  
**T/18P COMPOSITE CROSS-SECTION**

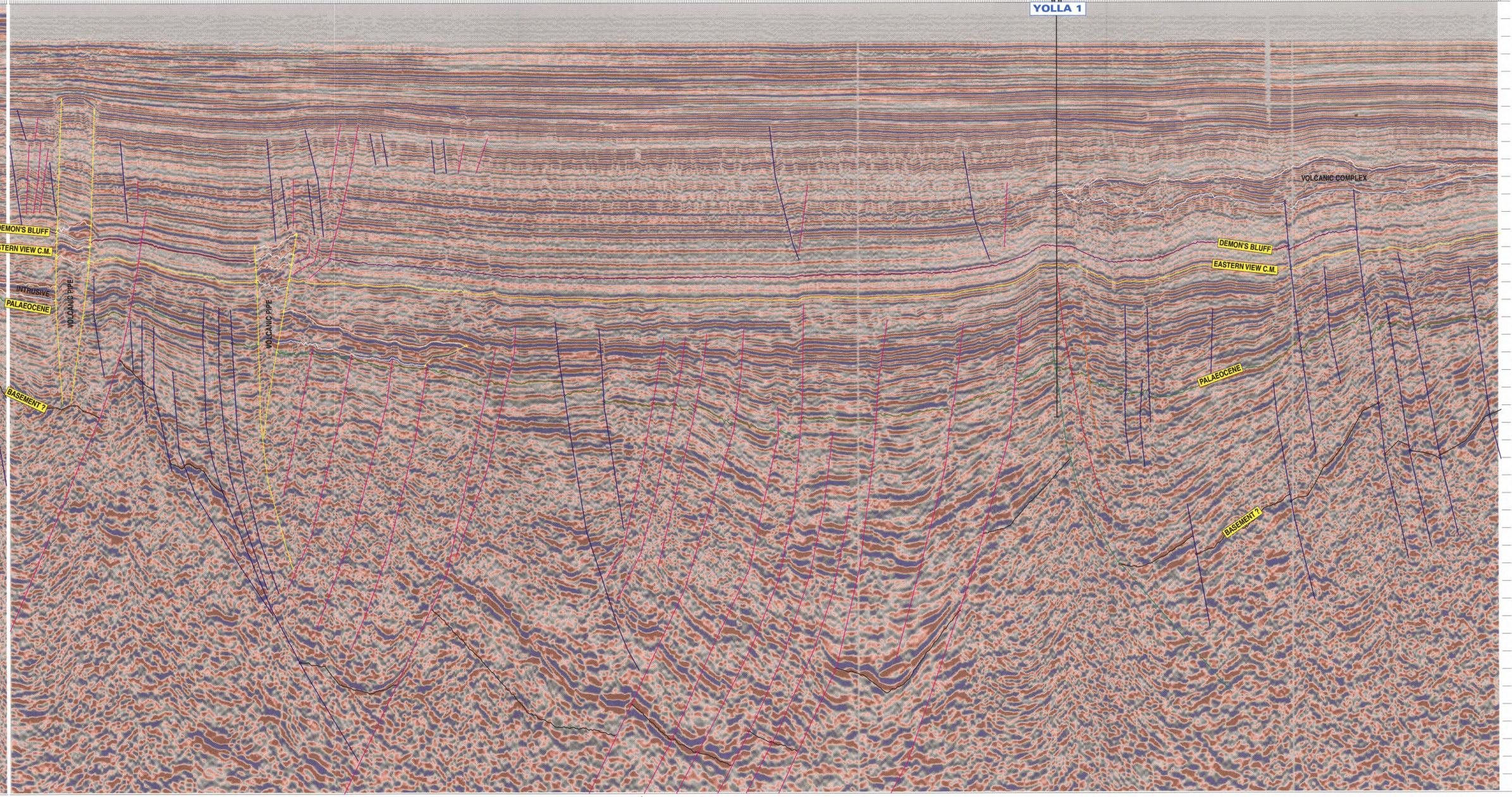
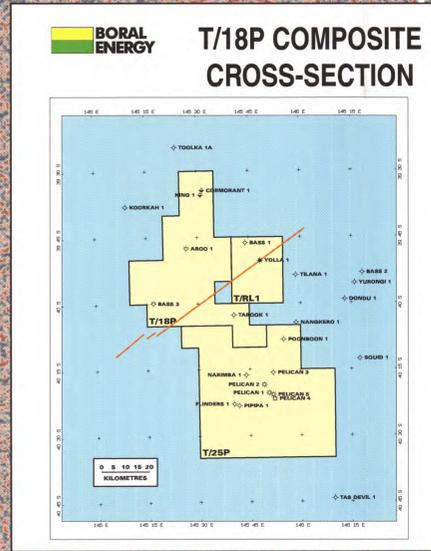


← PERMIT T/18P →

IBIS HIGH      YOLLA TROUGH      YOLLA HIGH      CORMORANT TROUGH

YOLLA 1

T/18P CROSS-SECTION	
Company:	BORAL ENERGY SERVICES
Client:	2-Way-98 10-27-00
ES User:	CS
ES Project:	118C_02
Survey:	3
Number of panels:	3
ES Posting Release Date:	04/26/99
<b>Schumberger</b> GeoQuest	
<b>Panel Number: 1</b> Line: T/18P-43A    2-D Line    Object ID: T/18P-43A    Version: 1 Line Type: 532-1022    CDP: 804-1194    SP: 200.5-695.5 Trace: 20.00    Priority: Normal    Inches/Second Azimuth: 233.3    Traces/Trch: 5.00 Declination: 3497985.23inches    6 Map Distance Across Panel: 3533.33inches Trace Spacing: 7066.67    inches/ft Trace Range: 100m/ft Scale Made in Line: Scale Value is 300.00    0-4500 Milliseconds	
<b>Panel Number: 2</b> Line: H/175A-214    2-D Line    Object ID: H/175A-214    Version: 11 Line Type: 689-809    CDP: 740-860    SP: 219.3-379.5 Trace: 20.00    Priority: Normal    Inches/Second Azimuth: 233.3    Traces/Trch: 5.00 Declination: 928985.31inches    6 Map Distance Across Panel: 1724.54inches Trace Spacing: 15480.89    inches/ft Trace Range: 100m/ft Scale Made in Line: Scale Value is 300.00    0-4500 Milliseconds	
<b>Panel Number: 3</b> Line: T/18P-41    2-D Line    Object ID: T/18P-41    Version: 3 Line Type: 120-8186    CDP: 1120-8186    SP: 1-2528 Trace: 20.00    Priority: Normal    Inches/Second Azimuth: 233.3    Traces/Trch: 5.00 Declination: 1797610.20inches    6 Map Distance Across Panel: 3641.47inches Trace Spacing: 7066.67    inches/ft Trace Range: 100m/ft Scale Made in Line: Scale Value is 300.00    0-4500 Milliseconds	



ENCLOSURE 11 CR-C438 556629

PERMIT T/18P

PERMIT T/RL1

5 km