

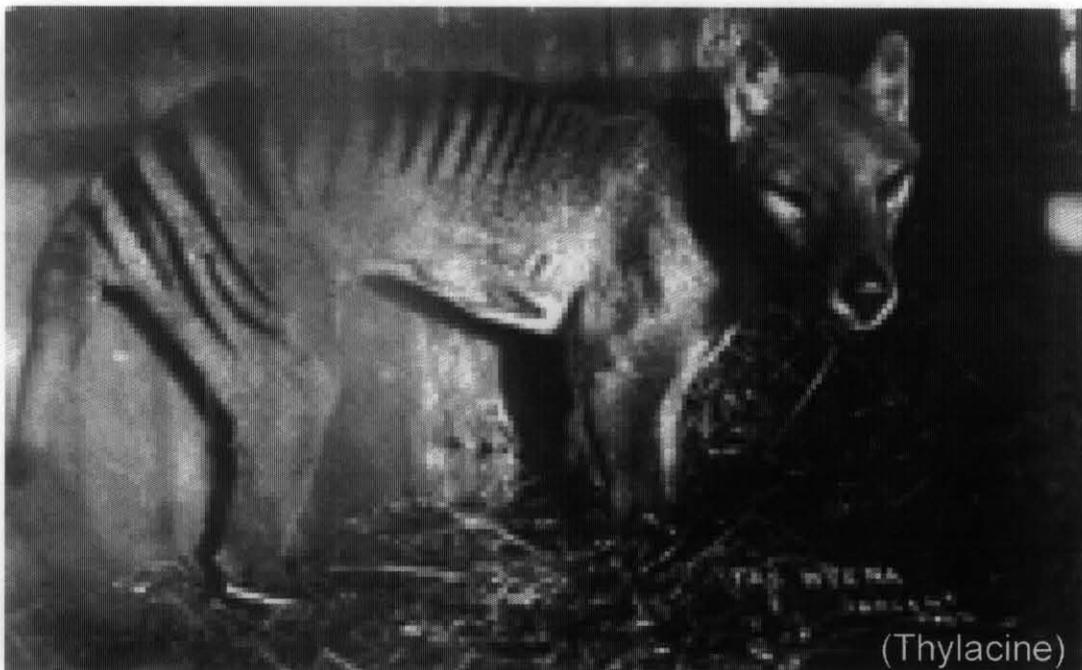


WELL PROPOSAL

THYLACINE 1

T/30P

OFFSHORE OTWAY BASIN



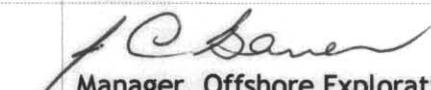
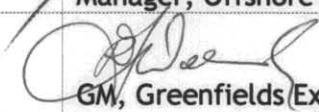
MARCH 2001

Origin Energy Resources
339 Coronation Drive
MILTON, 4064
Brisbane, Australia



Thylacine 1 Well Proposal

Version 1.0

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Approved:	 Manager, Offshore Exploration	8/3/01 Date
Approved	 GM, Greenfields/Exploration	8/3/01 Date

SUMMARY

WELL NAME	<i>Thylacine 1</i>
LOCATION	Seismic: Inline 700, CDP 1200 Latitude: 39°, 14', 27.52"S Longitude: 142°, 54', 43.90"E Northing: 5 654 724 m N Easting: 665 024 m E
PERMIT	T/30P Offshore Otway Basin
INTEREST HOLDERS	Origin Energy Resources Ltd (Operator) 30% Woodside Energy Ltd 50% Benaris International NV 20%
TYPE OF WELL	Exploration
ANTICIPATED SPUD	May 2001
ELEVATION	Water Depth: 97 m RT: 25 m
PLAY TYPE	Horst
PRIMARY OBJECTIVE	Upper Waarre Formation
SECONDARY OBJECTIVE	Lower Waarre Formation

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1. INTRODUCTION

1.1 Location

The proposed well, Thylacine 1, is to be drilled in the offshore Otway Basin in petroleum exploration permit T/30P approximately 240 km southwest of Melbourne, 70 km south of Port Campbell and 155 km southeast of Portland (Fig. 1). The nearest wells are Prawn A1 (22 km east) and La Bella 1 (30 km northwest). The pre-spud co-ordinates are presented in the summary table above.

1.2 Permit Details

Permit T/30P was originally granted to Benaris International NV on July 10, 1997. Origin Energy Resources Limited (OERL) acquired an 80% interest by farm-in effective July 6, 1999, and later farmed on a 50% interest to Woodside Energy Ltd effective December 10, 1999. T/30P is now held by a Joint Venture comprising Origin Energy Resources Ltd (Operator 30%), Woodside Energy Ltd (50%) and Benaris NV (20%). The drilling of Thylacine 1 is to be managed by Woodside Energy Ltd under the terms of the T/30P Offshore Operator Services Agreement between Origin Energy Resources Ltd and Woodside Energy Ltd.

Work commitments for T/30P are as follows:

Year 1:	Data review
Year 2:	Nil
Year 3:	600 km 2D seismic
Year 4:	Geological & Geophysical Studies
Year 5:	Geological & Geophysical Studies
Year 6:	1 well

The drilling of Thylacine 1 will fulfil the Year 6 obligation.

Well Location Map

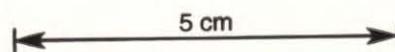
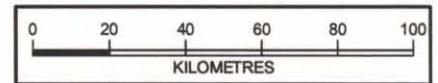
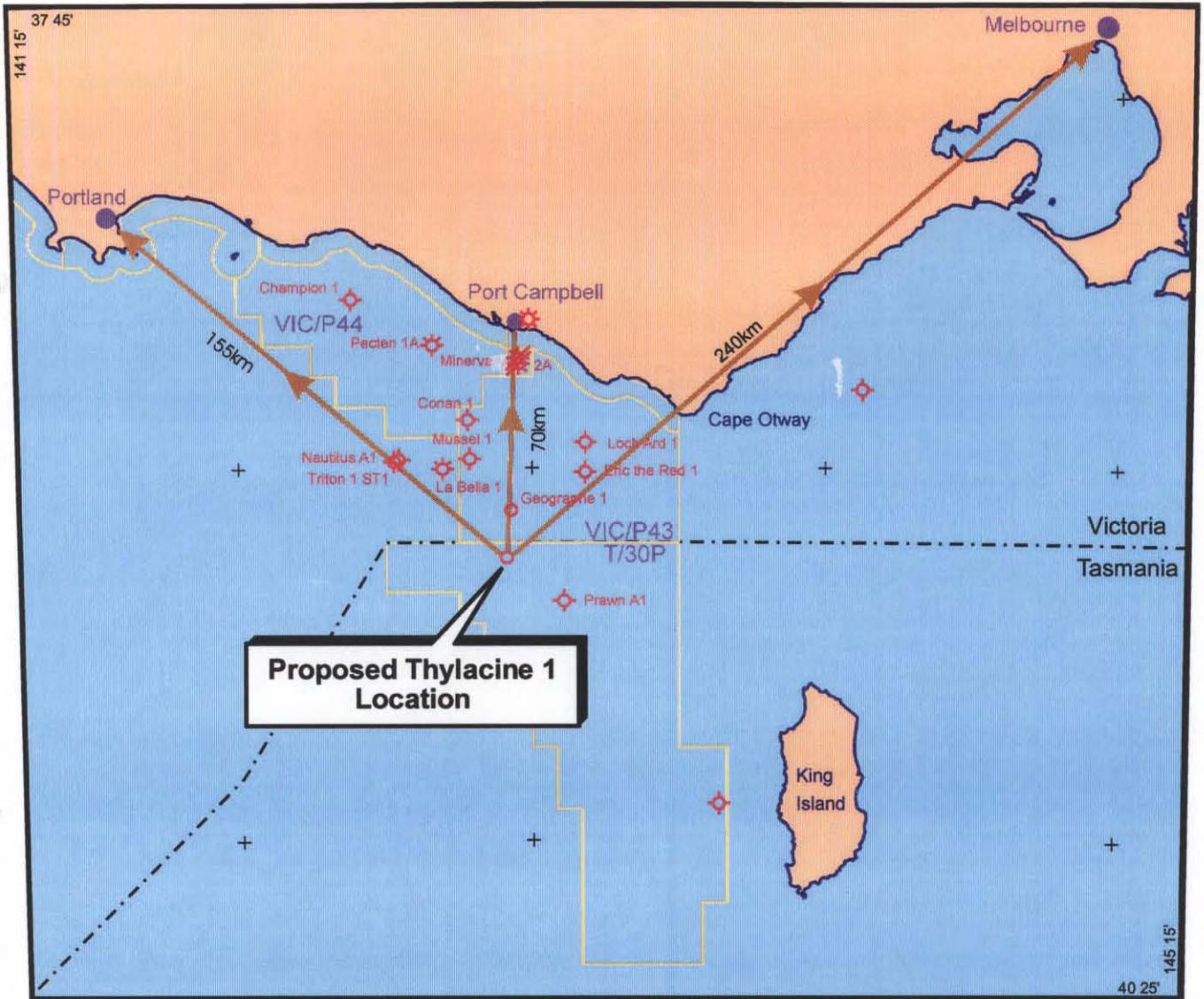


Figure 1

2. GEOLOGY & GEOPHYSICS

2.1 Previous Exploration

The earliest exploration in the Otway Basin was conducted by Frome-Broken Hill, with the first onshore well (Port Campbell 1) drilled in 1959. Oil shows were encountered and a non-commercial gas flow was recorded from the Waarre Formation. Frome-Broken Hill was granted the first offshore permits, which covered almost the entire Victorian portion of the basin. The extent of the basin was delineated by an extensive aeromagnetic survey conducted by the consortium in 1959 and 1961. This was followed by the acquisition of the Southwest Victoria Survey in 1963.

Pecten 1A, the first offshore well, was drilled by Shell in 1967. Pecten 1A encountered a 17.5 m gross hydrocarbon column that flowed gas at 145 mcf/d from poorly developed Waarre Formation sandstone reservoir. Esso drilled Prawn A1 in 1967, Nautilus 1 in 1968 and Mussel 1 in 1969. These wells were all plugged and abandoned.

Esso and Phillips acquired seismic surveys within the Victorian offshore Otway Basin during 1980-82. Esso drilled Triton 1 in 1982 in VIC/P15. This well was also plugged and abandoned. All permits were relinquished between 1986 and 1990.

BHP Petroleum conducted the most recent offshore exploration in two exploration permits, VIC/P30 and VIC/P31. These permits were awarded in 1990 and covered a large portion of the eastern offshore basin. In the following year BHP reprocessed 2,249 km of the 1980-82 Esso seismic data and recorded 2,284 km of new seismic data (OH91 series). Seven wells were drilled by BHP; La Bella 1, Eric the Red 1, Minerva 1, Minerva 2A, Loch Ard 1, Conan 1 and Champion 1. Minerva 1 and La Bella 1 were gas discoveries. Minerva 1 flowed gas during drill stem testing at a rig-limited rate of 28.8 mmcf/d from high quality sandstone reservoirs within the Waarre Formation. Gas-in-place is estimated at 575 bcf (Luxton et al., 1995). The La Bella gas discovery was evaluated by RFT (no DST was conducted). Gas-in-place was evaluated at 210 bcf (Luxton et al., 1995). BHP was granted Retention Leases over the discoveries in 1997/98.

Benaris was granted the exploration licence T/30P on October 10, 1997. The Benaris/Origin/Woodside Joint Venture acquired a 250 sq. km 3D seismic survey over the Thylacine Prospect (previously called the Lobster Lead) in early 2000.

Drilling history in the eastern offshore Otway Basin is summarized in Table 1.

Well	Year	Operator	TD(m)	Status	Result
<i>Pecten 1A</i>	1967	Shell	2850	P&A	Gas show ,145 mcf from 17 m of tight Waarre
<i>Prawn A1</i>	1967	Esso	3193	P&A	No valid closure, good reservoir, poor seal
<i>Nautilus 1A</i>	1968	Esso	2011	P&A	Tertiary wedge play, no reservoir found
<i>Mussel 1</i>	1969	Esso	2450	P&A	Not drilled in crestal location
<i>Triton 1</i>	1982	Esso	3545	P&A	Poor reservoir, no closure mapped to date
<i>La Bella 1</i>	1993	BHP	2710	GAS	Estimated 210 bcf OGIP
<i>Minerva 1</i>	1993	BHP	2425	GAS	Estimated 575 bcf OGIP
<i>Eric the Red 1</i>	1993	BHP	1875	P&A	No cross fault seal
<i>Minerva 2A</i>	1993	BHP	2170	GAS	Thick Waarre sand development
<i>Loch Ard 1</i>	1993	BHP	1397	P&A	No Top Seal for Waarre reservoir
<i>Conan 1</i>	1995	BHP	2175	P&A	Ineffective fault seal
<i>Champion 1</i>	1995	BHP	1882	P&A	Upper Waarre absent, no cross fault seal

Table 1: Drilling history in the eastern offshore Otway Basin.

2.2 Regional Geology

The Otway Basin is part of the passive margin that formed in response to rifting between Australia and Antarctica. Two Early and Late Cretaceous stages of rifting have been identified. The main period of rifting occurred at the end of the Cenomanian and continued to the Campanian. A dominant feature of the eastern Otway is the Shipwreck Trough (Fig. 2) set up by sinistral transtension along the Sorell Transfer Fault. Significant thickening of Late Cretaceous sediments is observed towards the axis of the Shipwreck Trough.

TECTONIC ELEMENTS - Otway Basin

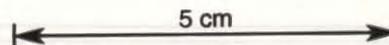
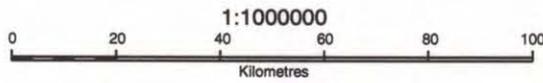
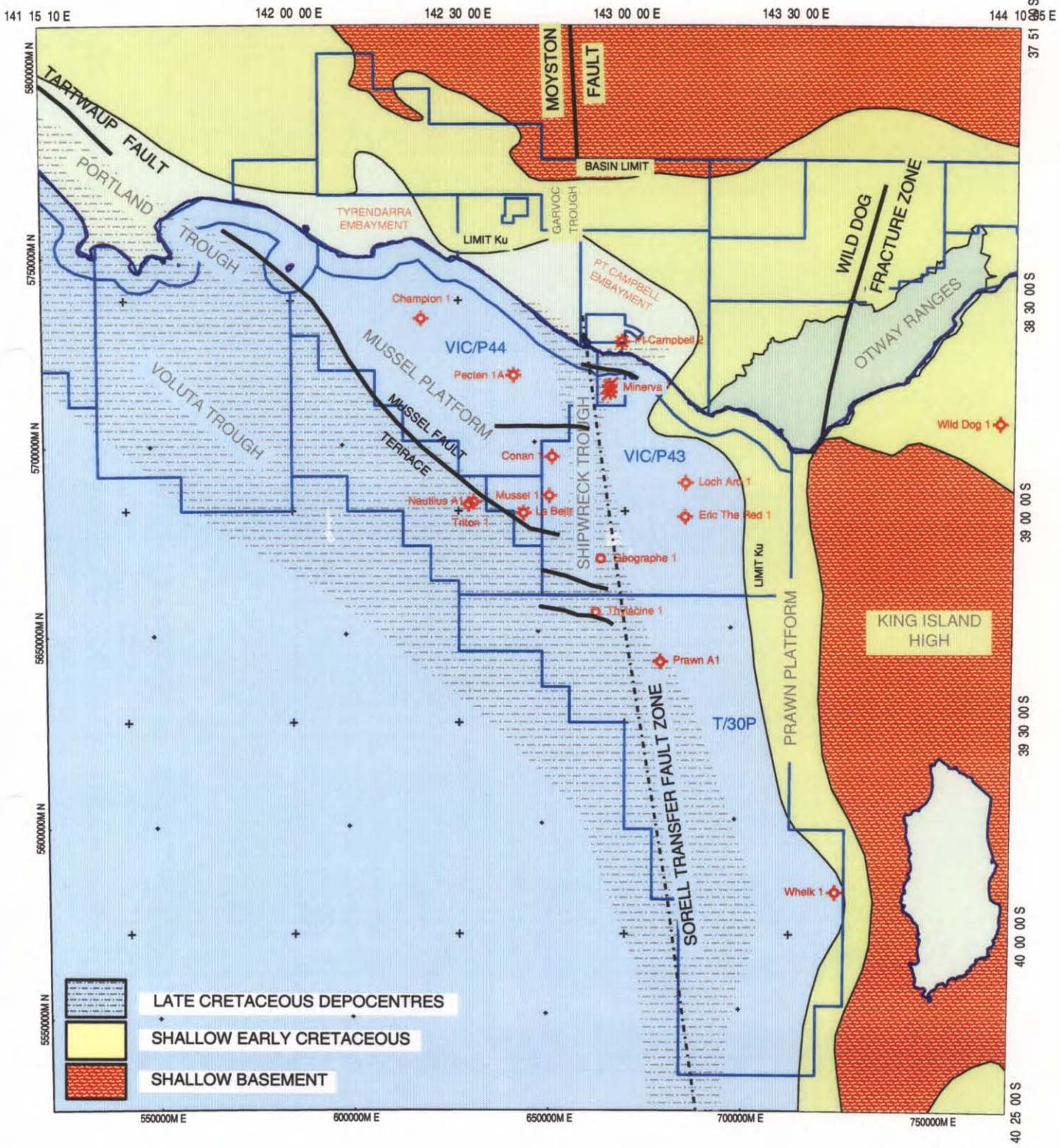


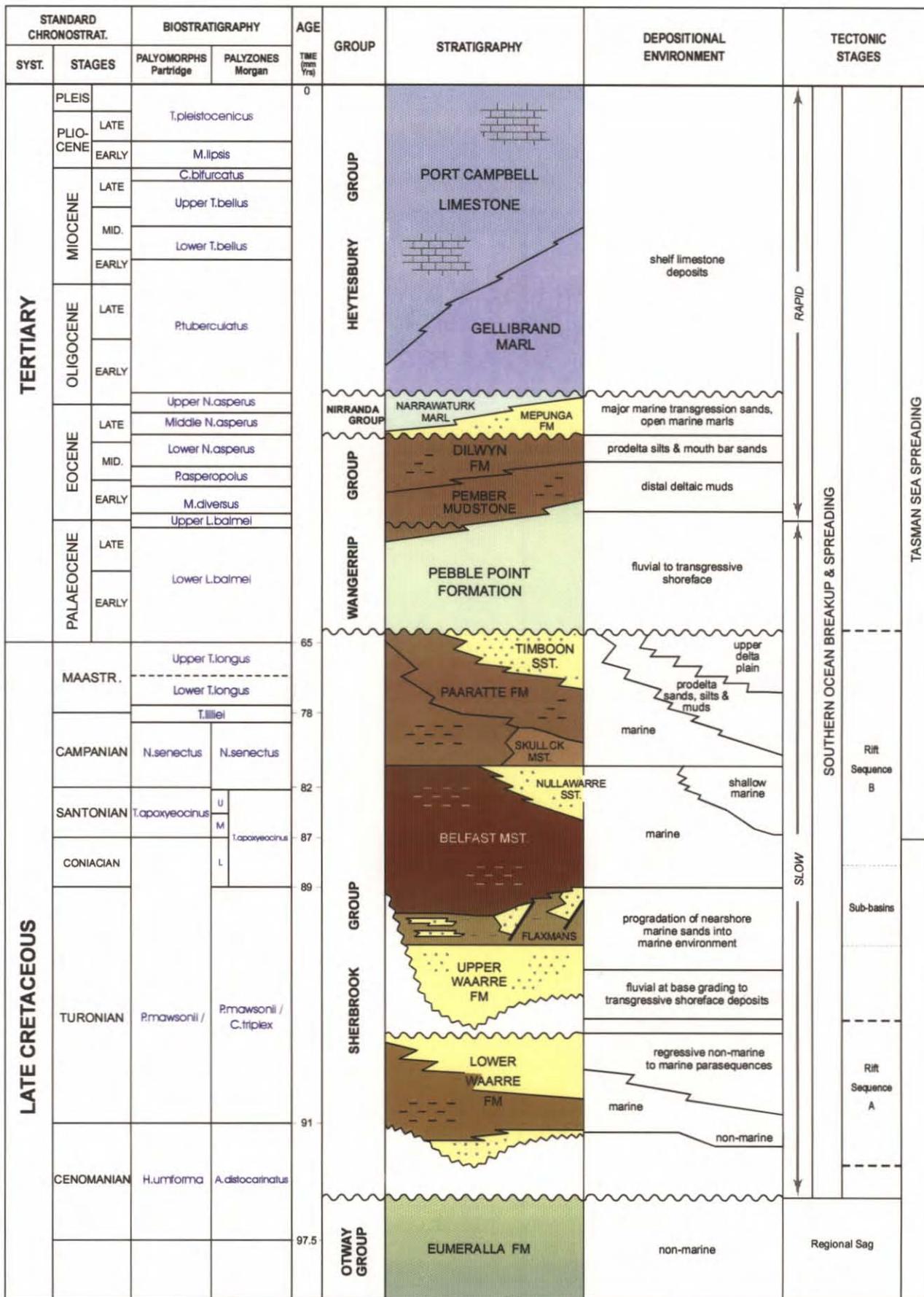
Figure 2

Economic basement for the eastern offshore Otway Basin is represented by the Late Albian, upper Eumeralla Formation, which is also regarded as the main source interval for the overlying Late Cretaceous sediments. Two distinct depositional sequences are interpreted in the overlying Late Cretaceous interval (Encl. 1 & 2; Fig. 3). The oldest sequence comprises the lower part of the Waarre Formation, deposited during the Cenomanian to Turonian. This sequence thickens significantly into the Trough and deposition and preservation is dependant on the palaeotopography of the basin. Sedimentation appears to have been focused west and south of the Cape Otway High. The rift climax of this sequence was associated with growth along the Mussel Fault Zone and the Tartwaup Hingeline and resulted in a shallow marine transgression across low areas of the basin. The base of the marine sequence marks a change from dominantly lithic to quartzose sediment provenance, which continues throughout the rest of the Late Cretaceous section. Potential reservoir facies exist in the lower and upper portions of this sequence.

A significant unconformity occurs within the Waarre Formation separating the upper and lower sequences (See Conan 1; Encl. 1). The best reservoir facies are intersected in the low stand tract at the base of this upper sequence. Sedimentological analysis of the Minerva 2A core shows this section to comprise high-energy fluvial facies. Palaeotopography within the Shipwreck Trough is interpreted to be the primary control upon deposition. Sediment was sourced from the north and possibly the east in the southern part of the Trough where predominantly non-marine facies have been intersected in Prawn A1, Eric the Red 1 and Loch Ard 1 on the Prawn Platform. There is evidence from seismic data that a hitherto unencountered unit was deposited in the southern part of the Shipwreck Trough. This unit displays a clear progradational, offlapping character that may indicate marine strandline deposition in the late stages of Waarre deposition.

The Waarre Formation is overlain by the Flaxmans Formation (transgressive facies) and the Belfast Mudstone, which represents the maximum flooding of the Shipwreck Trough during the main phase of rift climax. The Belfast Mudstone is preserved at its thickest within the Trough and forms an effective regional seal for hydrocarbons trapped within the Waarre Formation. The Belfast Mudstone is overlain by the thick fluvio-deltaic Paaratte Formation, which represents the post rift portion of the upper

OFFSHORE OTWAY BASIN STRATIGRAPHIC COLUMN



TASMAN SEA SPREADING

SOUTHERN OCEAN BREAKUP & SPREADING

Rift Sequence B

Sub-basins

Rift Sequence A

5 cm

Figure 3

sequence. The Paaratte Formation, in the Shipwreck Trough, consists entirely of distal marine shales up to the Maastrichtian where minor regressive interbedded sands occur.

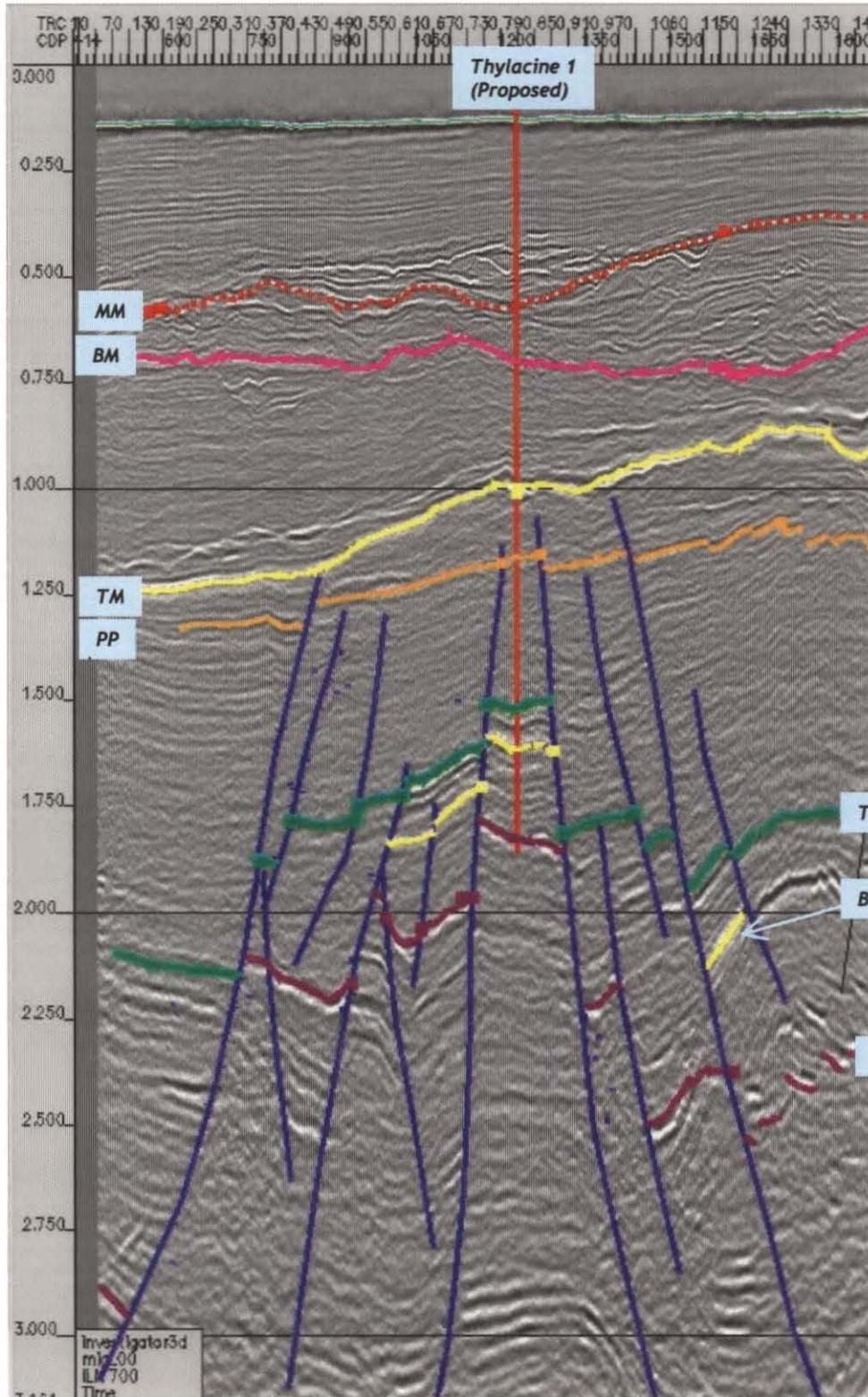
Above the Base Tertiary unconformity, Early Tertiary sediments consist of the progradational fluvio-deltaic Wangerrip Group. The Wangerrip Group is overlain by the transgressive marine sediments of the Nirranda Group. These sediments consist of coarse Mepunga Sandstone overlain by the Oligocene Narrawaturk Marl. Open marine carbonates of the Heytesbury Group overlie the Nirranda Group unconformably. The Gellibrand Marl consists of lower calcareous claystone/siltstone sequence overlain by marls and interbedded limestones. The Late Miocene to recent Port Campbell Limestone comprises the youngest sequence in the eastern offshore Otway Basin.

2.3 Seismic Interpretation

The seismic interpretation was carried out on the Investigator 3D cube with Investigator 2D and reprocessed 2D seismic data analyses restricted to southeast of the Thylacine Prospect to tie the Prawn A1 well.

3D data quality over the Thylacine Prospect area was generally good (Fig. 4). Excellent control on the spatial distribution of high density faulting was achieved. The Top Turonian objective was readily discernible over the prospect area. The presence of amplitude anomalies over the crestal and western areas at the Top Turonian horizon further enhanced this event.

Conversely, these seismic anomalies tend to extinguish subtle subjacent events. Locally the seismic data are affected by the presence of Miocene canyoning. This affects the easternmost tip of the Thylacine Prospect where events lose continuity and become diffuse. To the east of the Thylacine Prospect, the presence of two highly reflective intra-Belfast Mudstone prograding facies tend to dim the Top of Turonian reflector. Overall the data quality is more than adequate to interpret down to the Top Eumeralla reflector accurately.



- MM = Mid Miocene
- BM = Base Miocene
- TM = Top Mepunga Fm
- PP = Pebble Point Fm
(near Base Tertiary)
- TT = Top Turonian
- BW = Base Upper Waarre Reservoir
- Eu = Top Eumeralla Fm

THYLACINE 1 PROPOSED LOCATION AND MAPPED HORIZONS ILN 700



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Figure 4

5 cm

Seven horizons have been mapped throughout the Thylacine Prospect area (Fig. 4 & Table 2). These horizons have been tied to the northern wells via the VIC/P43 interpretation and to the Prawn A1 well located southeast of the Investigator 3D area.

Time structure and depth structure maps were produced for the Top Turonian (Fig. 5), Base Upper Waarre Reservoir and the Top Eumeralla Formation. Isochron and Isopach maps of the Top Turonian/Base Upper Waarre Reservoir and the Top Turonian/base Flatspot (anticipated gross pay) intervals were constructed.

3. THYLACINE PROSPECT

3.1 Introduction

The Thylacine Prospect is a structural closure developed on a major regional north-northeast trending ridge. The well will be drilled near the crest of closure targeting the Upper Waarre Formation. Water depth is 97 m.

The nearest well is Prawn A1 where the Upper Waarre Formation comprises predominantly non-marine, coarse clastic sediments. These facies are not expected in the more distal Thylacine Prospect area where shallow marine coarse clastics are predicted to be developed.

3.2 Structure

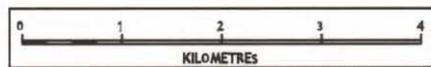
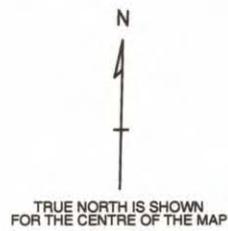
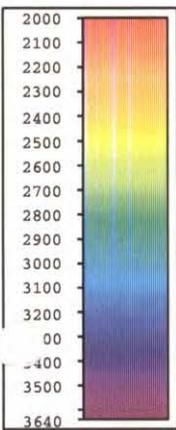
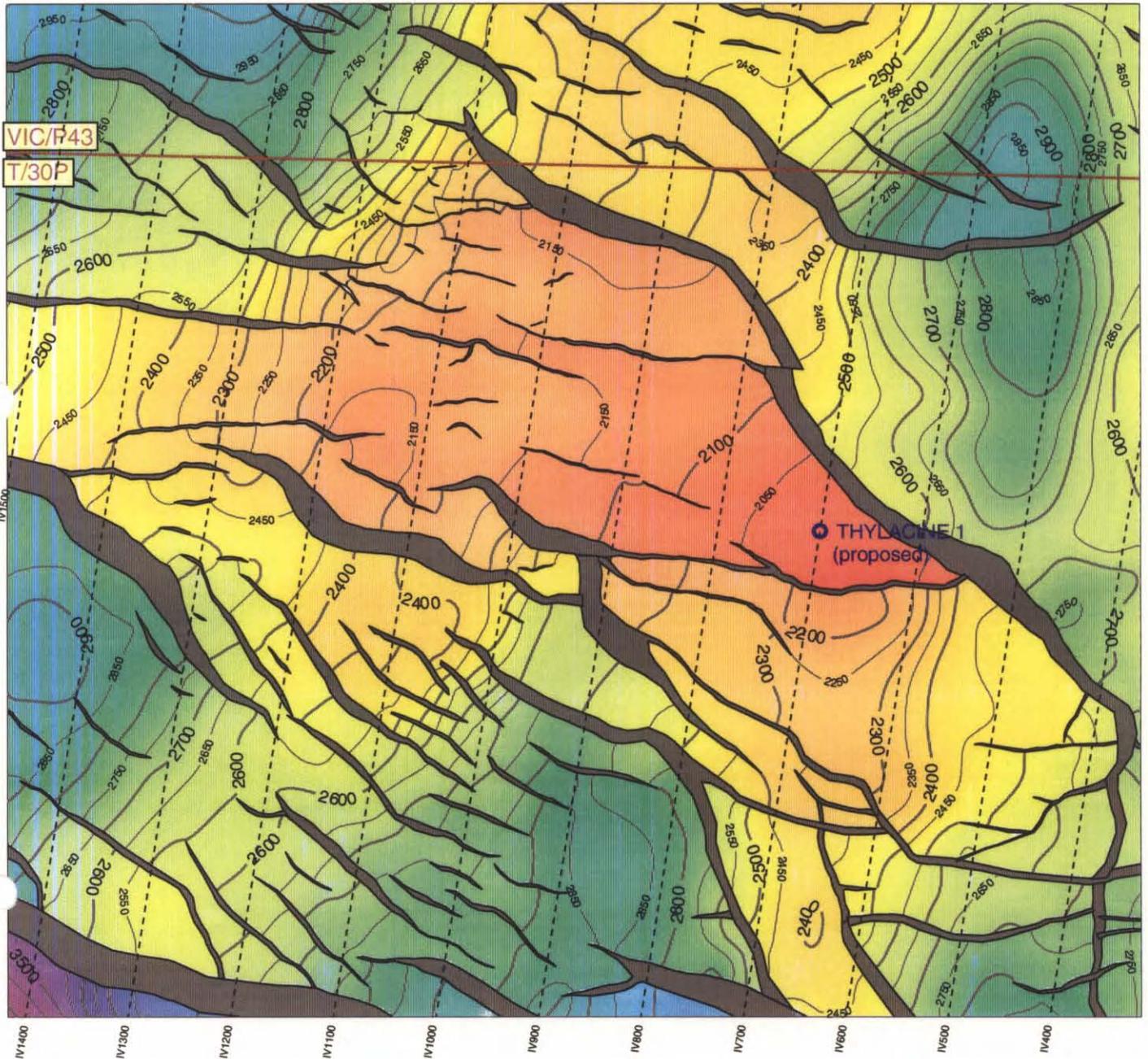
The Thylacine structure is a composite horst developed on a north-northwest trending ridge. The horst is bounded by reactivated Early Cretaceous, subvertical, east-west trending normal faults coupled with Late Cretaceous north-west trending listric normal faults. The structure is fault-bounded to the north, east and south and pitches to the west (Figs. 4, 5 & 6). The primary faults often penetrate up to the base of the Tertiary.

		Well	Thylacine-1		Origin energy		
		Water Depth	97 m		Inline 700 CDP 1200		
		RT	25 m ASL	Predicted Tops			
		Formation	Two-way time (ms)	Depth (RKB)	Depth (SS)	Thickness	Expected Lithology
TERTIARY		<i>Seabed/Port Campbell Lst/Channel fill</i>	127	122.0	97.0	518.0	Limestone, minor sandstone
		<i>Mid Miocene/Gellibrand Marl</i>	565	640.0	615.0	175.0	Marl
		<i>Mid Gellibrand Marl</i>	700	815.0	790.0	350.0	Calcareous Siltstone
		<i>Narrawaturk Marl</i>	964	1165.0	1140.0	50.0	Calcilutite, Marl
		<i>Mepunga Formation</i>	994	1215.0	1190.0	145.0	Sandstone
		<i>Dilwyn Formation</i>	1078	1360.0	1335.0	120.0	Siltstone
		<i>Pember Mudstone</i>		1480.0	1455.0	20.0	Shale
		<i>Base Tertiary</i>	1161	1500.0	1475.0	145.0	Shale with some minor Sandstone near Base Tertiary
	<i>Belfast Mudstone</i>	1256	1645.0	1620.0	410.0		
CRETACEOUS	Waarre	<i>Top Upper Waarre Formation</i>	1521	2055.0	2030.0	170.0	Interbedded Sandstone/Siltstone
		<i>Base Upper Waarre Reservoir</i>	1615	2225.0	2200.0	420.0	
		<i>Predicted GLC (Flat spot)</i>	1650	2265.0	2240.0	N/A	
		<i>Intra-Lower Waarre marker</i>	1728	2445.0	2420.0	N/A	
		<i>Top Eumeralla Formation</i>	1829	2645.0	2620.0	50.0	Lithic Sandstone, Coal
		<i>Italics = Interpreted Horizon</i>					
	TD		2695.0	2670.0			

Table 2: Prognosis Summary

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THYLACINE PROSPECT

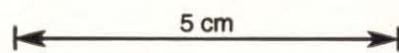


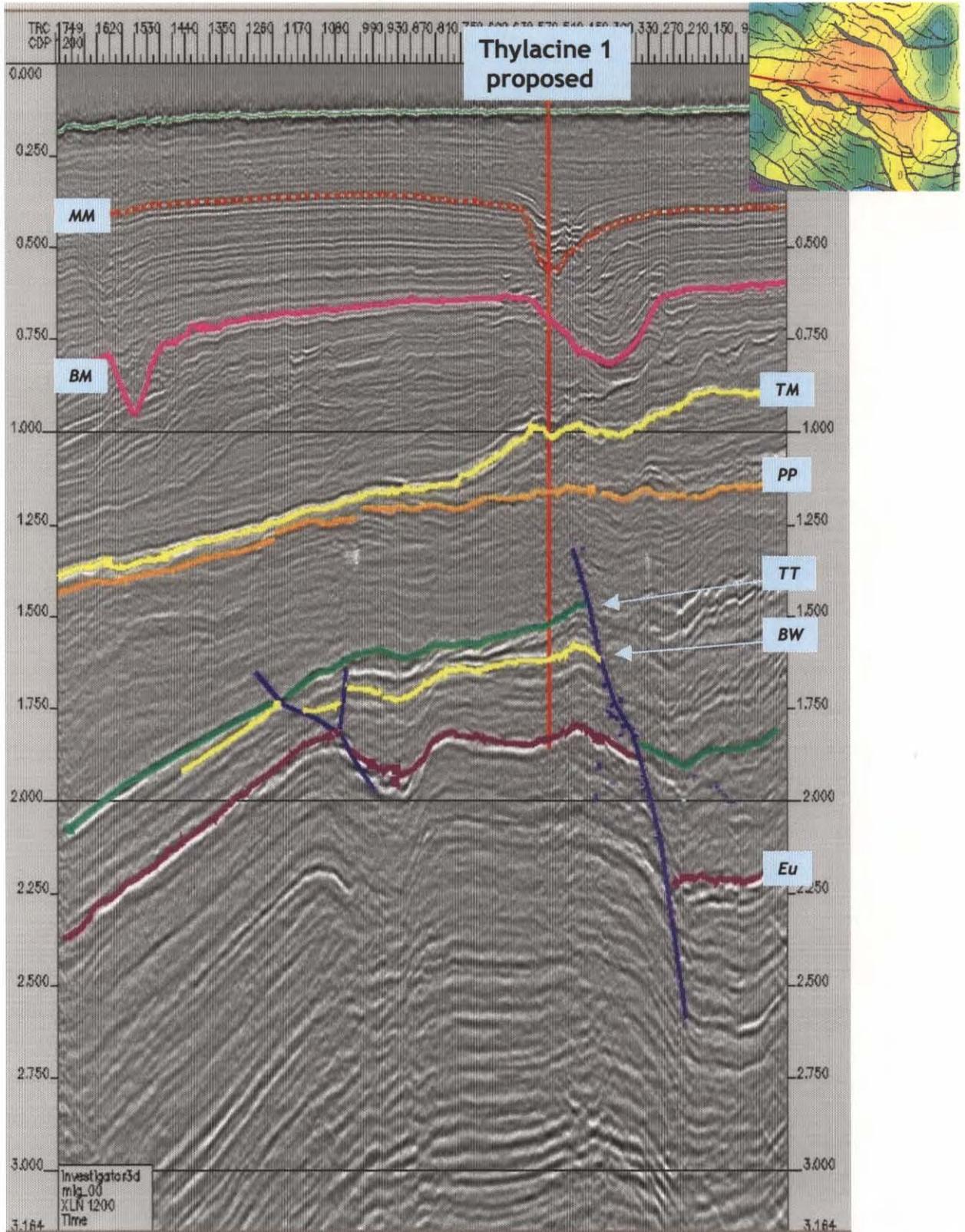
Origin
energy

Eastern Otway Basin
TOP TURONIAN DEPTH
(1 layer depth conversion WB to Ttur)

Author:	Datum: MSL	End No:
Date: 09/03/01	Contour Interval: 50m	
Map File:		
Map Sheet: THYLACINE 50K		

Figure 5



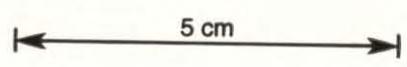


**THYLACINE 1 PROPOSED LOCATION
XLN 1200**



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Figure 6



The Top Turonian seismic marker is predicted to represent the top of the Upper Waarre reservoir section. The crest of the structure is at the eastern edge of the feature at a depth of 2020 m SS. The depth to the top of the Turonian at the proposed well location is 2030 m SS, 10 m below the crest. A major amplitude anomaly is developed at the top of the Turonian over the bulk of the structure with the development of a 'flatspot' over the central western area. This 'flatspot' is at 2240 m SS and is believed to represent a gas liquid contact (GLC). Ultimate structural closure extends to a depth of 2380 m SS. At the well location the base of predicted good quality reservoir is expected at 2200 m SS (above the predicted GLC). It is possible that gas shows will continue in non-net reservoir down to 2240 m SS.

A downfaulted block juxtaposed against the southeast side of the main horst appears to have been folded providing additional closure (Figs. 6 & 8). The presence of 'brightening' of seismic reflectors implies a base of expected hydrocarbon column at 2340 m SS (lower than in the primary horst). This indicates that this closure is not in communication with the main horst.

3.3 Reservoir

The primary reservoir section targeted by the well is the Upper Waarre Formation at a predicted depth of 2030 m SS. This formation comprises thick fluvial and marginal marine sediments in the Minerva Field and marine facies in La Bella 1. Seismic character of the Upper Waarre Formation at the Thylacine 1 location suggests that it is probably a shallow marine facies. The sediment provenance for the Waarre Formation at Thylacine probably lies to the east. This is suggested by the thick section of non-marine sediments present on the elevated Prawn Platform (intersected in Prawn A1).

Good reservoir is only anticipated in the Upper Waarre Formation with a thickness at the proposed well location of 170 m. There is no seismic evidence for any Flaxmans Formation to be present at this location. The potential reservoir is evident on seismic section as a west-southwest prograding facies. This facies consists of two lobes, the upper one displaying high-angle internal reflectors. The high angle nature of the internal reflectors suggests that the lobe is sand-dominated. The base of the

prograding facies and hence the predicted base of the Upper Waarre Formation reservoir is at 2200 m SS.

Seismic data indicate a thick Lower Waarre Formation with the top of the Eumeralla Formation at approximately 2620 m SS. The Lower Waarre appears to be dominated by fine-grained clastics based on the thin continuous reflectors evident in seismic data. Facies trends in the Shipwreck Trough area also support the fact that the Lower Waarre Formation is expected to contain fine-grained offshore marine siltstones and shales. Based on existing well data, there is a possibility that a thin non-marine coarse clastic section may be developed at the base of the Lower Waarre Formation.

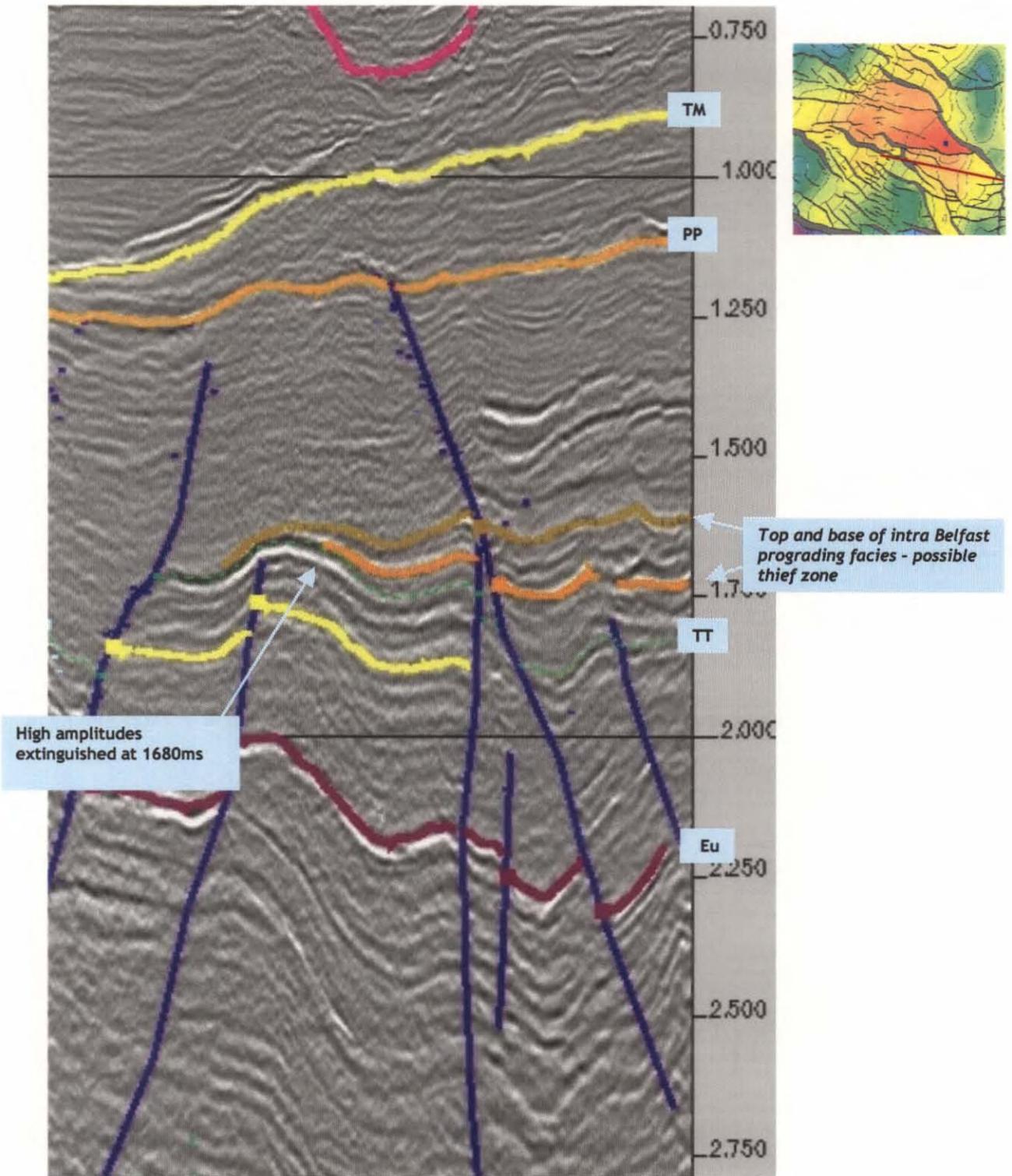
The presence of seismic anomalies that indicate different gas-liquid contacts between the main horst and the southeast lobe suggests that there is no communication across the bounding fault, and hence no effective reservoir below the prograding facies.

Overpressure within the Waarre Formation has been encountered at La Bella 1. The Lower Waarre section was overpressured with respect to the Upper Waarre section by approximately 410 psi. There is a strong possibility that the reservoir at Thylacine 1 may be overpressured as the reservoir may be isolated from surrounding aquifers by faulting to the north, east and south and by lack of permeable reservoir towards the west.

3.4 Seal

The Belfast Mudstone and Paaratte Formation provide thick extensive top seal at Thylacine 1. The top of the Belfast Mudstone at this location is at 1620 m SS with a thickness of 410 m.

Fault seal integrity is expected to be maintained as there is little evidence (only very minor brightening adjacent to faults in the eastern area) in seismic data of leakage into younger horizons. There is a risk of breaching of the southeastern buttress where intra-Belfast sandstones appear to onlap the flanks of this secondary closure (Fig. 7). The onlap appears to be coincident with the base of bright events suggesting that these sands may be acting as a thief zone.



THYLACINE PROSPECT - SE DOWN FAULTED BLOCK - POSSIBLE INTRA BELFAST COARSE CLASTIC THIEF ZONE



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Figure 7

5 cm

3.5 Source Rocks, Maturation and Migration

The Eumeralla Formation occurs immediately below the Waarre Formation and is considered to contain source rocks that are mature down dip and in adjacent downthrown fault blocks. The La Bella and Minerva gas discoveries are full to spill indicating a relatively late charge for the area. Additional source development is postulated in the lower Belfast Formation where there is some fault juxtaposition against the Waarre Formation sandstone reservoir. Sediments from the Belfast Formation only enter the maturity window beyond the shelf edge and, where penetrated, have been lean in kerogen content.

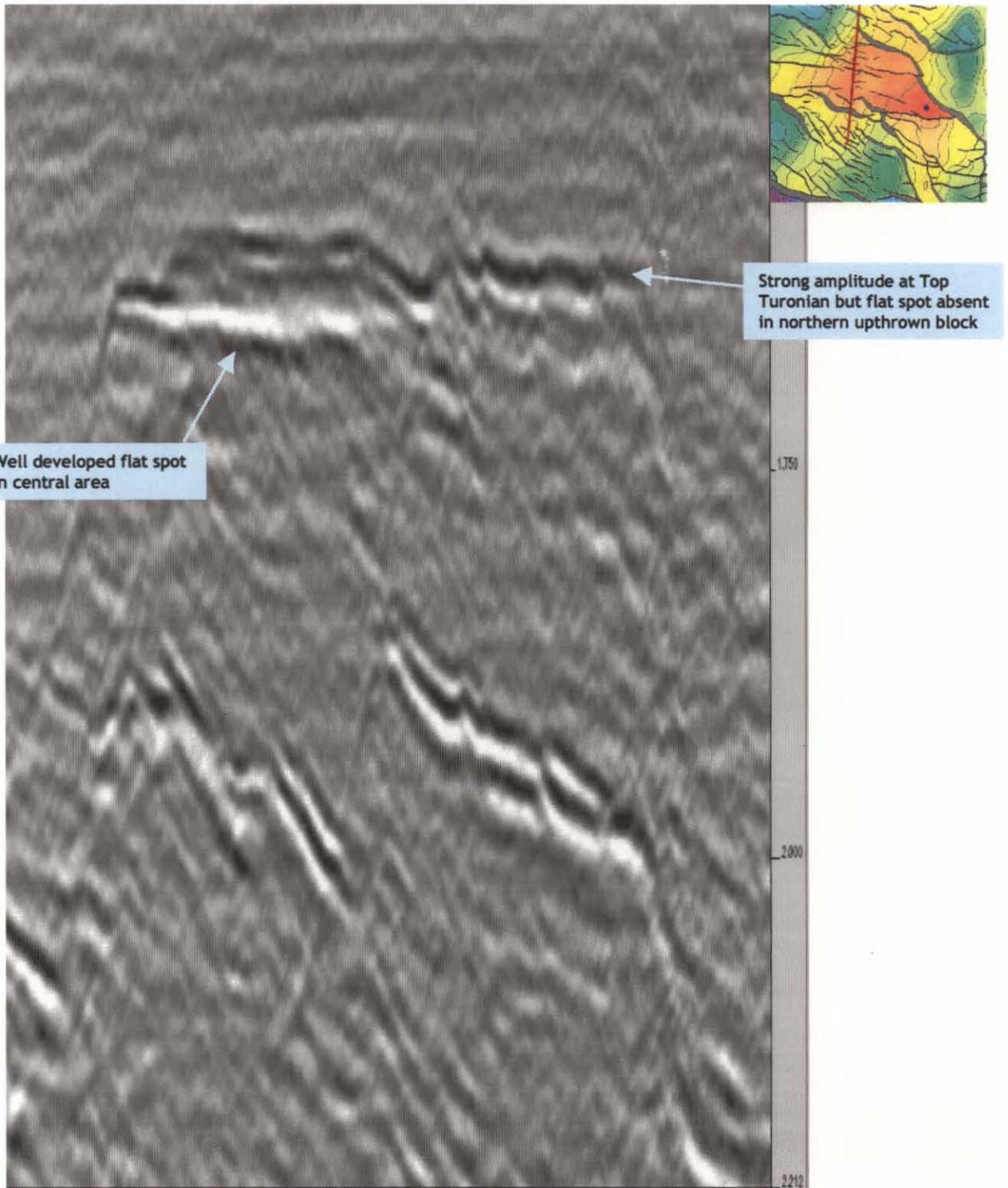
Additional source is postulated from lacustrine/marine Lower Waarre Formation, filling the lows of Cenomanian half grabens developed early in the Late Cretaceous rifting phase. *Botryococcus* algal assemblages identified in the lowermost Waarre nearer the shelf margin (La Bella 1, Eric the Red 1), indicate significant lacustrine influence.

The presence of seismic 'flat spots' and 'bright spots' in the main horst and 'bright spots' in the southeast downthrown block suggest that gas is trapped in the structure. A very strong amplitude persists at the Top Turonian event as the horst plunges towards the west, well below mapped structural closure or predicted GLC. It is suggested that this may represent migrated gas trapped in very low permeability reservoir.

Minor CO₂ was encountered in the Minerva (1.5-2.0%) and La Bella gas fields (13%). There is a chance of CO₂ charge at Thylacine 1 and this has been accounted for in the volumetric analysis for the prospect.

3.6 Amplitude Anomalies

On the central Thylacine horst the Top Turonian horizon is associated with a very strong peak in normal polarity seismic data. This has been interpreted as the top of gas charged reservoir. In the central western portion of the horst a prominent flatspot is developed (Fig. 8). This flatspot is interpreted to indicate the presence of a GLC and most likely a gas-water contact (GWC). This flatspot occurs at 2240 m and is absent



THYLACINE PROSPECT - FLAT SPOT

5 cm



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Figure 8

from the eastern area in the vicinity of the proposed well. It believed that the base of reservoir at this location is above the predicted GLC. The flatspot also deteriorates into the northern portion of the central horst. It is considered that the reservoir may be poorly developed in this relatively upthrown block. The strong amplitude at the Top Turonian continues to the west, well below the central flat spot and is considered to represent the presence of migrated gas trapped in very low permeability reservoir such as weathered fine grained clastics immediately below the Top Turonian event.

Unlike the central horst, the southeastern downthrown block lacks a distinctive flatspot on conventional seismic data. However, the Top Turonian is distinguished by a very strong peak on normal polarity seismic data. This strong amplitude is abruptly extinguished towards the southeast at 2340 m. Towards the west on this block the amplitude extinguishes at a deeper level. These amplitude data are interpreted to represent the presence of gas filled reservoir. The sudden extinguishment towards the southeast may be due to the onlap of intra Belfast Mudstone coarse clastics and consequent leakage of gas (Fig. 8).

3.7 Depth Conversion

Two depth conversion models were applied to the Thylacine Prospect. Both models utilized stacking velocities tied to well control. The wells utilized were Conan 1, Mussel 1, Prawn A1 and La Bella 1.

A single layer model was constructed from Water Bottom to the Top Turonian horizon. A multi-layer model was constructed using Dix and/or stacking velocity inversion. The following intervals were utilized:

Water Bottom to Mid Miocene

Mid Miocene to Top Mepunga

Top Mepunga to Near Base Tertiary (Pebble Point Formation)

Near Base Tertiary to Top Turonian

Both models resulted in identical predicted Top Turonian depths at the Thylacine 1 location (2030 m) with variation at the edges of the structure. An uncertainty of $\pm 50\text{m}$

to the Top Turonian is estimated from the range of depths that result from applying the time-depth curves from nearby wells (Figure 9).

The prognosis for Thylacine 1 (Table 2), is based on the multi-layer depth conversion, which yielded depths to the four main reflectors listed above. The depths to intermediate layers were derived from two-way time picks and interval velocities consistent with the time-depth curves from the adjacent wells.

4. WELL LOCATION

Thylacine 1 is located in the northernmost portion of T/30P. The location is 22 km west of Prawn A1 and 30 km southeast of La Bella 1 on Inline 700 CDP 1200. The coordinates are 665 024.28 E and 5 654 723.72 N.

The location has been positioned on the crest of the interpreted structure within the main fault compartment. The well has also been located away from interpreted faults to avoid production impairment.

4.1 Primary Objectives

The primary objective for Thylacine 1 is the Late Cretaceous Upper Waarre Formation (Fig. 10). Seismic data show that the targeted section has a distinctive progradational character, which may be indicative of marine strandline deposits. This unit has not previously been intersected within the Otway Basin. The objective is prognosed to be 170 m thick and intersected at a depth of 2030 m SS. The seal for the objective is interpreted to be the Belfast Mudstone, which is predicted to be approximately 410 m thick.

4.2 Secondary Objectives

The secondary objective for the well is sandstone units within the Lower Waarre Formation. Reservoir quality sands have been intersected within this interval at

TIME DEPTH CURVE - Thylacine 1

Two Way Time

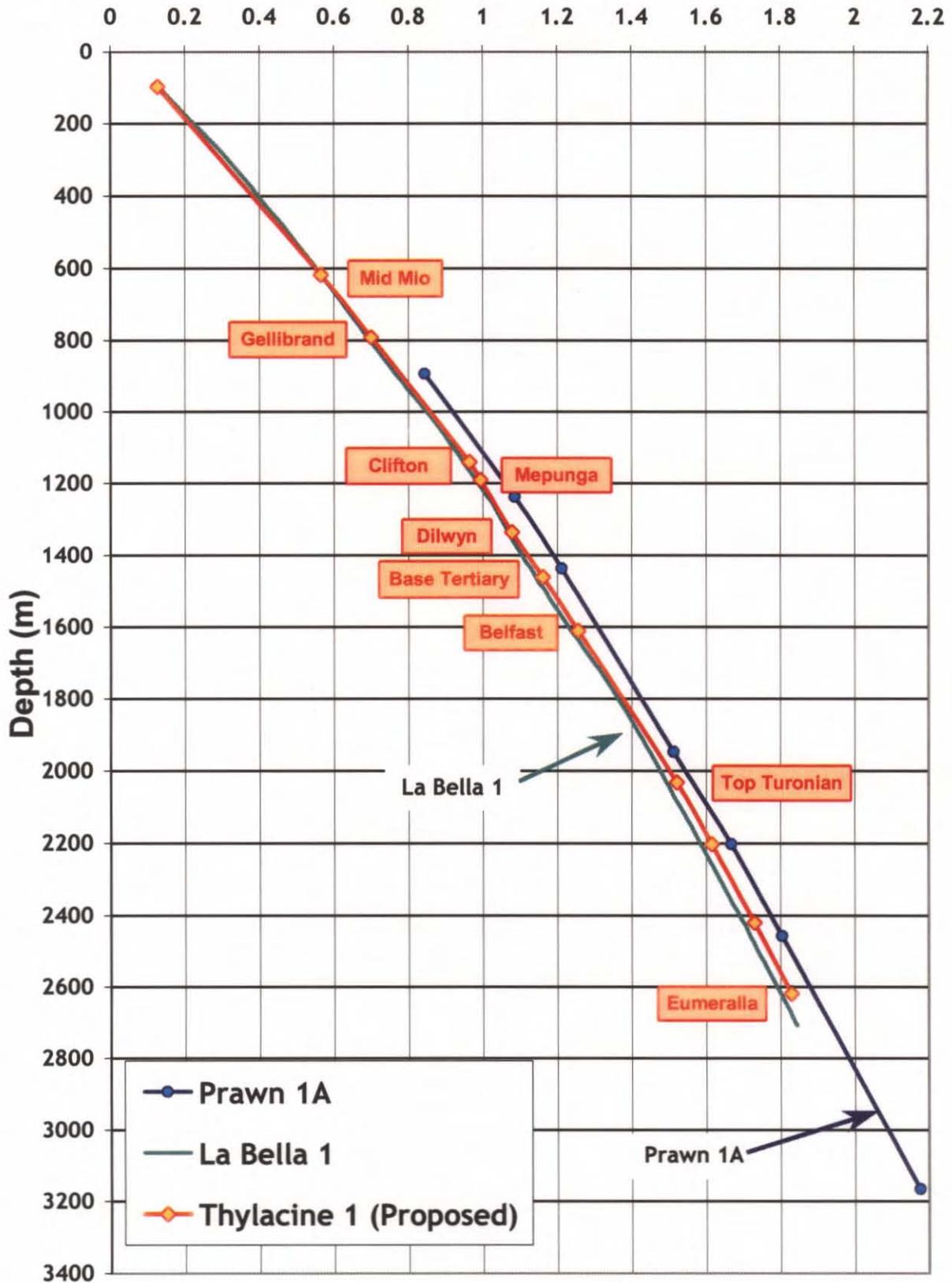


Figure 9

5 cm

Minerva 1, 2A and La Bella 1. Reservoir quality could potentially be intersected within the regressive upper part of the Lower Waarre (probably marine facies comprising interbedded sandstone and shale) and in the basal part of the Lower Waarre (non-marine and marginal marine facies).

4.3 Predicted TD

The predicted TD for Thylacine 1 should be set 50 m below the top Eumeralla Formation in order to fully appraise the potential of the Lower Waarre Formation. This would place the TD at a depth of 2670 m SS. If hydrocarbons continue to be intersected within the Lower Waarre or Eumeralla Formations at this depth then the TD should be extended to a point to be mutually agreed.

If no hydrocarbons are present within the Upper Waarre Formation then the TD should be set at 125 m below the base of the predicted GWC of 2240 m SS (Fig. 10; Table 2). This means a Dry Hole TD of 2365 m SS.

4.4 Predicted Stratigraphy

A summary of the prognosis and predicted stratigraphy is included as Table 2 and Figure 10 respectively.

Port Campbell Limestone (97 - 455 m SS)

Calcarenites of the Port Campbell Limestone are expected in the upper part of the Heytesbury Group. The calcarenite consists of light grey to white, medium hard, fine to coarse grains with abundant fossils (corals, bryozoans, foraminifera) and trace to 3% glauconite.

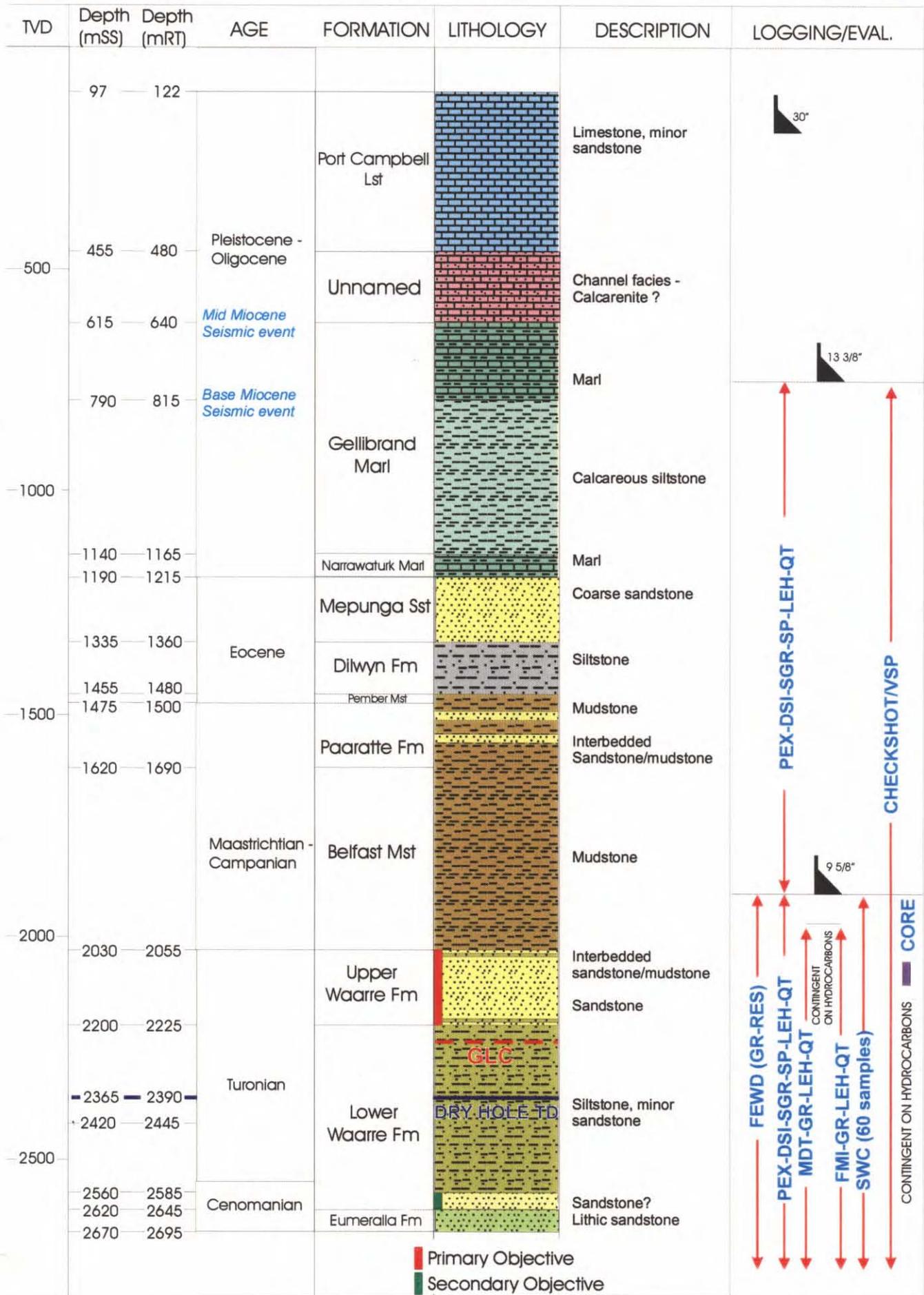
Channel Fill (unnamed) (455 - 615m SS)

Thylacine 1 is prognosed to intersect a new Tertiary unit that has not been intersected previously in other wells. The lithology is predicted to be calcarenite. The mid Miocene seismic event defines the base of this unit at Thylacine 1.

THYLACINE-1

Inline 700 CDP 1200

Easting: 665 024.28
 Northing: 5 654 723.72



5 cm

Figure 10: Predicted stratigraphy for Thylacine-1

Gellibrand Marl (615 - 1140 m SS)

The Gellibrand Marl consists of interbedded marl and limestone. The marl is light grey, soft and highly fossiliferous. The marl is interbedded with thin units of yellow to white skeletal limestone which is micritic to granular, non-porous and hard. The base Miocene seismic event defines the top of the lower Gellibrand Marl where calcareous claystones and siltstones are expected. This event is an unconformity surface that forms localised canyons. The claystone and siltstone are light grey to light tan or buff with trace coal, mica and trace fine-grained sandstone. The calcareous units are interbedded with carbonaceous claystone and siltstone that are dark grey to brown, firm, non-calcareous and carbonaceous.

Narrawaturk Marl (1140 - 1190 m SS)

The Narrawaturk Marl consists of interbedded marl and limestone, light to dark grey, medium-hard with abundant fossils. Interbeds of limestone are light brown to grey, micritic and fossiliferous, very hard and non porous.

Mepunga Formation (1190 - 1335 m SS)

The Mepunga Formation defines the top of prograding coarse clastic sequence in the Lower Tertiary. The Mepunga Formation consists of medium to coarse-grained, poorly to well-sorted, sub-angular to well rounded quartzose sandstone. The sandstone is unconsolidated with abundant calcareous fragments and up to 30% fossiliferous material. The sandstone has an argillaceous matrix, and good to very good porosity.

Dilwyn Formation (1335 - 1455 m SS)

The Dilwyn Formation represents the upper part of the Wangerrip Group. The Dilwyn Formation consists of greyish brown to light grey medium to coarse-grained fossiliferous sandstone, sub-rounded, moderately well-sorted with minor silty claystone. The sandstone has trace to common iron staining with iron oxide pellets and has good to very good porosity.

Pember Mudstone (1455 - 1475 m SS)

Dark brown, massive to subfissile, silty claystone. Non calcareous.

Pebble Point Formation

The Pebble Point is not predicted at Thylacine 1. The seismic event is mapped to closely approximate the base of the Tertiary section. The Pebble Point consists of variable lithologies ranging from medium to coarse-grained, subangular to rounded, well sorted quartz sandstone to dark brown, poorly sorted, lateritic conglomeratic claystone (KT Shale) and argillaceous, friable conglomerate with poor visible porosity.

Paaratte Formation (1475 - 1620 m SS)

The Paaratte Formation forms the upper part of the Sherbrook Group and the lower section herein includes the Skull Creek Mudstone. Dominantly claystone lithology is expected but may be interbedded with sandstone in the uppermost section. The claystone is dark to greenish grey and brownish grey, soft, dispersive and contains common glauconite. Minor sandstone units interbedded with the claystone are typically quartzose, light tan coloured, very fine to medium-grained with scattered coarse grains.

Belfast Mudstone (1620 - 2030 m SS)

The Belfast Mudstone is a monotonous section of shaley siltstone to silty shale. It consists of dark brown to black shale, non calcareous, medium hard with traces of pyrite and mica.

Upper Waarre Formation (2030 - 2200 m SS)

Flaxmans Formation is not predicted to be present at Thylacine 1 but it is possible that it could be intersected. The Flaxmans Formation typically comprises bioturbated interbedded sandstone and siltstone. The section intersected within the Upper Waarre Formation is inherently difficult to predict because of significant facies variability. The Upper Waarre Formation was cored in Minerva 2A where fluvial facies were intersected and dominantly comprised medium to coarse-grained, well-sorted

quartzose, porous sandstone with some interbeds of claystone and minor coal. In contrast the equivalent section at La Bella 1 was interpreted as marine facies and consists of highly bioturbated interbedded siltstone/claystone and quartzose sandstone. Seismic data suggest that the unit predicted to be intersected at Thylacine 1 is a new unit that has not been previously encountered. This interpretation is based on the distinctive dipping foreset character of the interval. The lithology of the unit is predicted to be sandstone deposited within a marine strandline environment but may be interbedded with minor siltstone or claystone. Bioturbation is expected to be present.

Lower Waarre Formation (2200 - 2620 m SS)

The Lower Waarre Formation comprises non-marine, deltaic and offshore marine facies. The Lower Waarre section at Thylacine is predicted to be dominantly shale with minor highly bioturbated sandstone units. The mudstone is grey to dark grey, firm with trace glauconite flecks in the upper part but grades to trace to common carbonaceous flecks and coaly fragments in the lower part of the sequence. The base of the Waarre Formation may contain a non-marine section where interbedded argillaceous sandstone and silty claystone may be intersected. The lithic content of the sequence may increase with depth due to increased reworking of the underlying Eumeralla Formation. The base of the Lower Waarre Formation may also contain minor coal.

Upper Eumeralla Formation (2620 - TD)

The Eumeralla Formation consists of dominantly argillaceous lithic sandstone, interbedded with minor claystone. The sandstone units are typically fine to medium-grained, sub-angular to sub-rounded and moderately to well-sorted. Carbonaceous material and coal are common within the section and the sandstone has poor porosity.

The predicted stratigraphy for Thylacine 1 is shown in Table 2 and Figure 10.

5. RESERVES & RISKING

Probabilistic volumetric calculations for the Upper Waarre primary objective indicate a mean potential OGIP of 1080 bcf.

Detailed risk assessment has been undertaken for the Thylacine Prospect. Total chance of success for the primary objective for the prospect is 40%. The primary risks are interpreted to be reservoir adequacy and seal. Risk justification for each component is outlined below and summarized in Table 3. The chance of success for the basal Lower Waarre secondary objective (4%) is significantly lower than for the preliminary objective due to inherent reservoir ^{and} seal risks. Volumetric analysis indicates mean potential OGIP of 240 bcf for this secondary target.

Closure Adequacy (100%)

Thylacine is a well-defined and robust structure. There is high confidence in horizon picking and the integrity of the structure will not be affected by erroneous depth conversion.

Reservoir Adequacy (52%)

Reservoir adequacy is the primary risk for the Thylacine prospect. There is high chance (85%) that the reservoir-bearing unit is present at the drilling location but there is considered significant risk that reservoir facies are absent (65%).

Charge Adequacy (95%)

There is a small chance that hydrocarbons were unable to access the structure due to the complex faulting associated with the structure. DHIs suggest that this is not the case.

Source Adequacy (100%)

Source adequacy of the Eumeralla Formation has already been established at La Bella 1 and the Minerva Field.

Seal Adequacy (81%)

The Belfast Mudstone is interpreted to be a thick and robust effective top seal for the prospect. There is minor risk that sandstone sequences within the Paaratte Formation at the eastern end of the structure are juxtaposed against reservoir across the bounding fault. There is also a minor risk that the bounding faults will not seal.

<i>Risk</i>		<i>Comment</i>
<i>Closure Adequacy</i>	100	Robust structure with good seismic control
<i>Reservoir Adequacy</i>	52	Primary risk, possibility of non-reservoir facies
<i>Charge Adequacy</i>	95	Low risk, close to kitchen areas, DHIs present
<i>Source Adequacy</i>	100	Proven
<i>Seal Adequacy</i>	81	Possibility of fault seal problems on eastern flank of structure
Total	40	

Table 3: Risking Summary for Upper Waarre primary objective

6. EVALUATION

6.1 Logging and Sampling

The proposed logging program for Thylacine 1 is summarised in Table 4. It is proposed to run wireline logging tools over the 12 ¼" hole section in order to detect hydrocarbons in the Base Tertiary units and to allow well synthetics to be constructed. No MWD is required for operational decisions in the 12¼" section of the well.

In the 8 ½" hole FEWD (GR-RES) will be run to assist with the determination of core point and TD. Wireline PEX-DSI will be Run 1 in the 8 ½" hole from TD to 9 5/8" casing shoe. Run 2 (MDT) and Run 3 (FMI) are contingent upon the presence of hydrocarbons in the Upper Waarre Formation.

	Tools	Interval	Comments
Wireline logging program	Run 1: PEX-DSI-SGR-SP-LEH- QT	Base of 12¼" section to 13 3/8" casing shoe	<ul style="list-style-type: none"> • Open hole wireline logs over 12¼" hole. • Essential for assessing presence of hydrocarbons and determining coring point in Waarre Formation
	Run 1: PEX-DSI-SGR-SP-LEH- QT	TD – 9 5/8" casing Shoe	
	Run 2: MDT-GR-LEH-QT	TD to approx 50 m above reservoir	Contingent upon hydrocarbons within reservoir
	Run 3: FMI-GR-LEH-QT	TD to approx 50 m above reservoir	Contingent upon hydrocarbons within reservoir
	Run 4: Checkshot/VSP	TD to loss of signal	
	Run 5: SWC (60 attempts)	Open Hole	Palynology/reservoir quality data

Table 4: Logging program for Thylacine 1

6.2 Coring

In the absence of a test at Thylacine 1 a core is viewed as crucial to obtain information on both reservoir quality and depositional facies. This information, combined with good MDT data will allow the economic feasibility of the prospect to be assessed. A core should only be obtained if hydrocarbons are present in the reservoir. Therefore the reservoir section must have been adequately penetrated to determine the following:

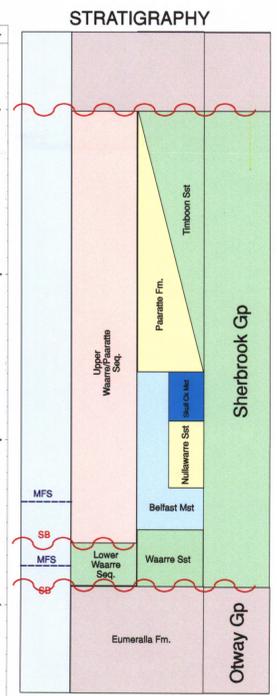
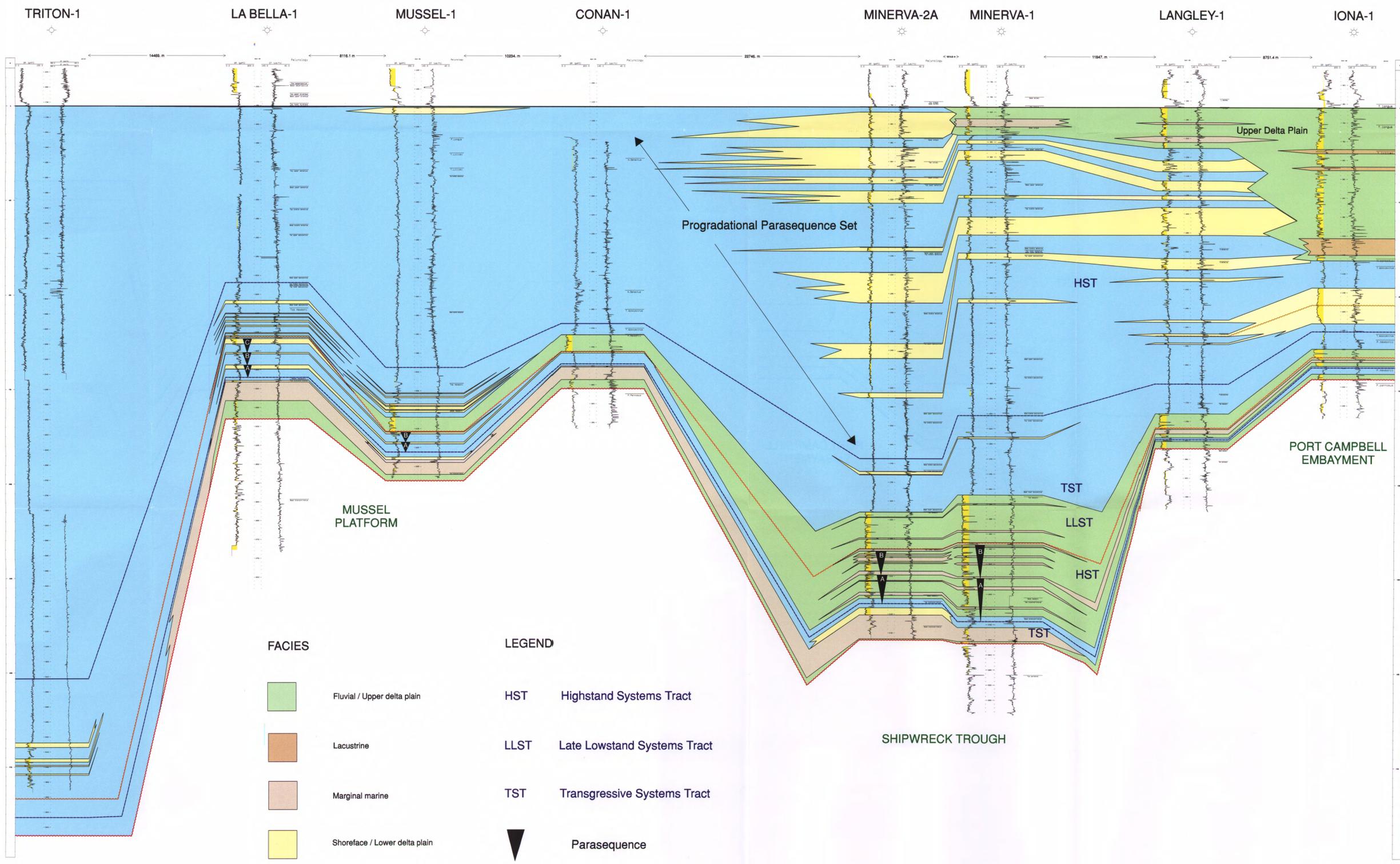
- That the Upper Waarre Formation has been intersected and not a thinner sandstone unit, more typical of the Flaxmans Formation e.g. Minerva 1.
- Determine presence of hydrocarbons via the MWD logging tools.

It is proposed to drill 15 m into the Upper Waarre primary objective before coring to meet the above criteria. The aim is to attempt to cut at least 27m of core in order to gain a thick representative interval within the reservoir section. It is also proposed that a minimum of 10m must be cut in adverse drilling conditions and that the full 36 m of core be obtained in favourable drilling conditions.

7. REFERENCES

LUXTON, C.W., HORAN, S.T., PICKAVANCE, D.L. & DURHAM, M'.S., 1995. The La Bella and Minerva gas discoveries, offshore Otway Basin. *Australian Petroleum Exploration Association Journal* 35(1), pp.405-417.

SHIPWRECK TROUGH: AXIAL CROSS-SECTION

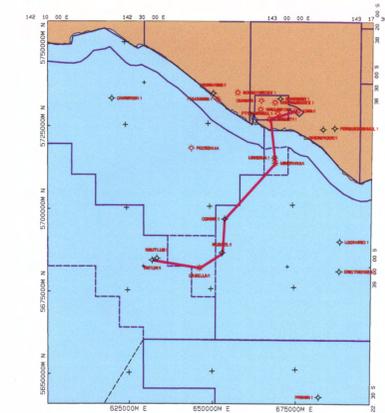


FACIES

- Fluvial / Upper delta plain
- Lacustrine
- Marginal marine
- Shoreface / Lower delta plain
- Offshore marine

LEGEND

- HST Highstand Systems Tract
- LLST Late Lowstand Systems Tract
- TST Transgressive Systems Tract
- Parasequence



648035

5 cm

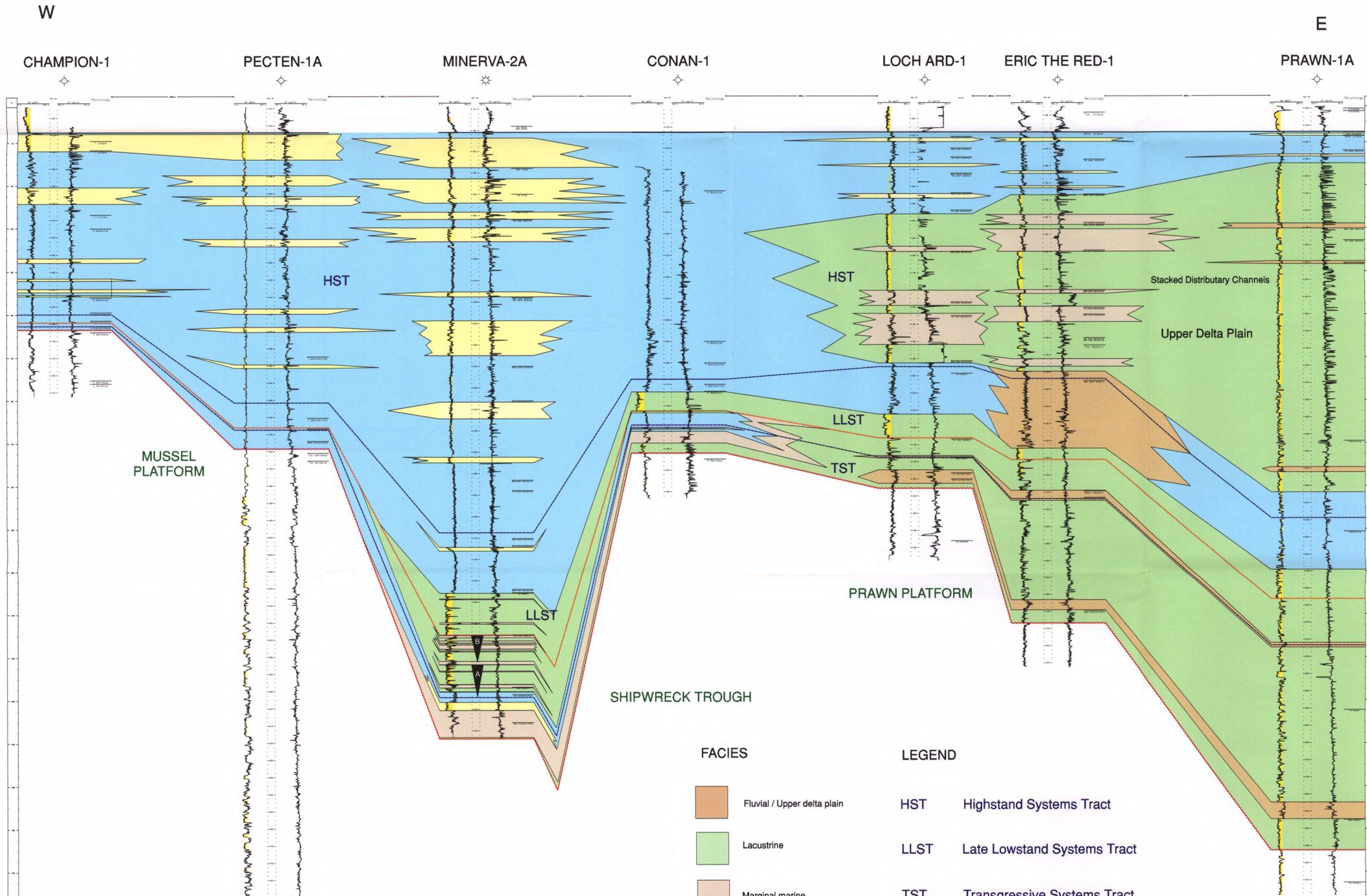
Origin
energy

VIC P&A & TOP
OFFSHORE OTWAY BASIN
Shipwreck Trough
Transverse Cross-section

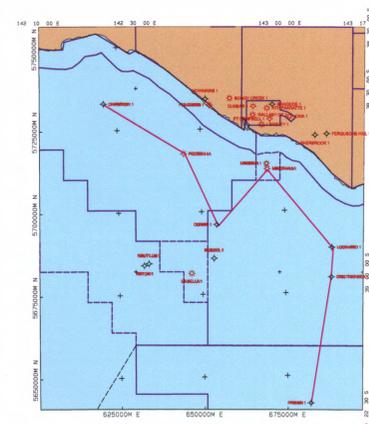
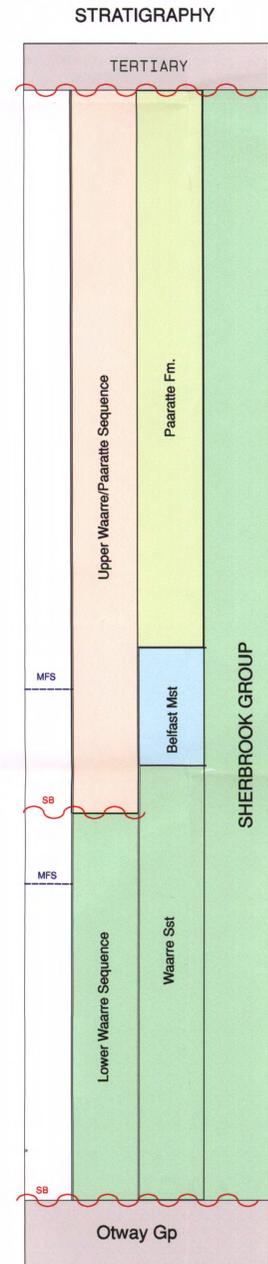
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ENCLOSURE 1

SHIPWRECK TROUGH: TRANSVERSE CROSS-SECTION



FACIES		LEGEND	
	Fluvial / Upper delta plain	HST	Highstand Systems Tract
	Lacustrine	LLST	Late Lowstand Systems Tract
	Marginal marine	TST	Transgressive Systems Tract
	Shoreface / Lower delta plain		Parasequence
	Offshore marine		



5 cm

648036

Origin
energy

VIC PGS 4138P
OFFSHORE OTWAY BASIN
Shipwreck Trough
Transverse Cross-section

Author: S. J. ...	Drawn: S. J. ...	Checked: S. J. ...	Scale: 1:50,000
Date: 2010	Project: ...	Revision: ...	Sheet: ...