



Seismic Interpretation Report

SS02 2D (T/33P) Seismic Survey

Southern Australia Exploration

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Introduction

The SS02 Seismic Survey was acquired by Santos in 2002 as part of the work commitment for the first permit year. Acquisition was completed on the 30th of December 2002, using Multiwave Geophysical Company's research vessel Polar Duke. Processing was undertaken by WesternGeco and was completed on the 13th of August 2003.

The SS02 2D seismic survey consisted of 1256 km of 2D seismic, over the T/32P and T/33P exploration permits (Figure 1 & 2). 721 km of this data was contained within permit T/33P and was focused primarily over the Jarver amplitude anomaly.

Permit History

Exploration Permit T/33P in the Otway Basin was awarded to Santos Ltd and Inpex Alpha Ltd on 22 August 2002 for an initial term of 6 years (Figure 1).

The permit consists of 77 whole, 5 minute by 5 minute graticular blocks covering an area of approximately 4955 km².

Santos Ltd is Operator of the Permit. The current interest holders in the permit are:

Company	Percentage Interest
Santos Ltd	80%
Inpex Alpha Ltd	20%

The work program for the primary commitment (Years 1 to 3) and the secondary contingent term (Years 4 to 6) is set out in the following table:

Year	Work Requirements
1	600 km 2D seismic survey Multiclient seismic uplift fee G & G studies
2	G & G studies
3	G & G studies
4	One well G & G studies
5	G & G studies
6	G & G studies

Exploration History

Described below are the results of the offshore wells closest to the T/33P exploration permit. Well completion reports issued by the Operator and the updated interpretation of seismic data provide the primary source of information for detailing the exploration history. No wells to date have been drilled on the permit.

Prawn-A1 (Esso, 1967). Intersected 712m of Waarre Formation equivalent. Measured porosities in the sandstone exceeded 20% with permeabilities up to 235 mD.

Clam-1 (Esso, 1969). Tested structural closure of the basal Tertiary and updip pinchout of Cretaceous sediments against the Clam High. Good reservoir sandstones with porosities up to 20% were intersected. Clam-1 reached a depth of only 1592m, intersecting Devonian conglomerates on Pre-Cambrian metamorphic basement. The penetrated sedimentary section is immature for hydrocarbon generation.

Whelk-1 (Esso, 1970). Drilled an anticlinal closure 120 km north of Clam in the southern Otway Basin to test anticipated Waarre Formation sandstones with good reservoir characteristics. Although 94m of Waarre Sandstone was intersected, top seal (Belfast Mudstone) lithologies were not developed.

Thylacine-1 (Origin, 2001). Successfully tested a mapped Waarre Formation closure, with associated amplitude anomaly. It encountered gas within the Thylacine/Flaxman/Waarre section.

Geographe-1 (Origin, 2001). This well was a successful test of a mapped Waarre Formation closure, with associated amplitude anomaly. It encountered gas within the Thylacine/Flaxman/Waarre section.

Geographe North-1 (Origin, 2001). This well drilled as a follow-up test of Geographe-1 was a dry hole (no full stack amplitude anomaly).

Thylacine-2 (Origin, 2001). This well was an appraisal to follow up success at Thylacine-1.

Cape Sorell-1 (Amoco, 1982). Planned to test a mapped Waarre closure however the section penetrated proved much younger in age and the well reached total depth at 3528m in Maastrichtian-aged sediments. Weak oil shows were reported near the base of the well.

Geology and Hydrocarbon Prospectivity

The Sorell Basin formed during oblique rifting between the Australian and Antarctic continents in the Late Cretaceous. While relatively open ocean conditions existed to the north and west in the Otway Basin, a restricted marine embayment was formed in the Sorell region, bounded to the southeast by a land-bridge between the two continents, which did not separate until the Eocene.

Late Cretaceous reservoir sandstones, belonging to the Waarre Formation, Flaxman Formation and Thylacine Sandstone Member (Figure 3), form the main productive zones within fields such as Casino (Santos-operated), Minerva, La Bella, Thylacine and Geographe, located north of the deep water acreage trend. These sandstones exhibit excellent reservoir quality with average log porosity in the range of 15-28% and permeabilities of up to 8 Darcies.

These sandstones are mapped extending southwards into Santos' deepwater permits. Deposition of coarse-grained siliciclastics in the Turonian-Santonian is associated with periodic fluvio-deltaic pulses into an overall upwards-deepening/fining section (Belfast Mudstone), providing an effective reservoir-seal couplet. Regional regression in the Campanian led to renewed coarse-grained, fluvio-deltaic input to the basin as the Paaratte

and Timboon sandstones. Potential sealing sequences of the Skull Creek and Timboon mudstones and the Massacre Shale are observed to thicken into the basin. Mild structural inversion in the latest Cretaceous was followed by rapid subsidence and transgression resulting in retrogradation of the deltaic systems and deposition of the Wangerrip Group in the Palaeogene. Eventually the marginal sedimentary systems were drowned and, in association with the opening of the seaway in the late Eocene and subsequent formation of the Circum-Antarctic current, deposition came to be dominated by cool-water carbonates that persist through to the present day.

Six offshore discoveries have been made to date proving in excess of 1.4 TCF recoverable gas. These discoveries have been full to spill, with liquids content increasing generally from north to south. Hydrocarbon charge in the basin is considered to come from Albian-aged, Eumeralla Formation source rocks.

Discussion of Seismic Record Quality

Seismic data is of good to adequate quality down to the base of the Belfast Formation. Below this point, the noise level becomes higher and imaging is much more difficult.

Basement is particularly difficult to pick and to tie from line to line. This is partly due to imaging problems in the rotated fault blocks caused by the poor orientation (oblique) of the seismic lines to the faults, as well as the often steep dips and what appears to be contamination by poorly-migrated fault reflectors. However, the angular unconformity near the base of the Belfast is clear and relatively easy to correlate within the permit.

In the east of the permit a Tertiary incised canyon also reduces the quality of the seismic data in its vicinity.

Seismic Mapping

Area and Data Mapped

The new SS02 seismic data infilled the existing (Fugro) multi-client DS01 data. This SS02 data was focussed around the Jarver lead, which was identified in the east of the permit during gazettal evaluation. The new data was incorporated into the existing interpretation of the multi-client DS01 seismic data.

Interpretation Methodology

Geoframe IESX was used in the structural interpretation of this seismic data. Well synthetics were created in Geoframe for the Thylacine, Geographe, Prawn, Whelk (Figure 4) and Clam (Figure 5) wells, and the correlations taken into T/33P using the DS01 multi-client and older regional seismic lines. Less continuous seismic events such as the Thylacine were interpreted by bracketing/constraining the formation with more consistent chronostratigraphic horizons such as the Belfast and Waarre sequence boundaries (K90 & K77) and using the typical character of the formation (eg. Thylacine deposited on an unconformity).

Seismic interpretation was undertaken using the all-offset pre-stack time migrated volumes. The new SS02 data was interpreted in conjunction with the multi-client DS01 data as well as various other regional lines required to tie the seismic to the wells.

Horizons Interpreted

Key horizons interpreted include the water bottom (WB), top Wangerrip Group (T20), base Tertiary (T1), top Belfast (K90), top Thylacine (K84LS) and top Waarre (K77). Other horizons

such as the top Otway group and basement have been mapped locally, but are hard to correlate on a regional basis.

Depth Conversion

Depth conversion was undertaken in Petrosys using constant interval velocities over the WB-T20, T20-K90 and K90-K84LS intervals. More detailed depth conversion will need to be undertaken prior to drilling of any of the prospects.

Structure Maps Prepared

Structure maps prepared include the water bottom (WB), top Thylacine (K84LS) and Top Waarre (K77) depth maps (Enclosures 1-3).

Play Types

The play types targeted in this permit are largely Cretaceous in age, with late-Cretaceous reservoirs (Thylacine/Flaxmans/Waarre equivalent) and top seals (Belfast or intra-formational shales), with hydrocarbons sourced from the Eumeralla or Waarre coals, within faulted structural traps. These plays have been proven in the Otway Basin fields to the north.

The Jarver prospect has dual targets; the conventional play described above and an additional play targeting the Paaratte Formation reservoirs. Although gas has been intersected in Paaratte reservoirs in some of the wells to the north, as yet no commercial accumulation has been discovered in this formation.

Leads and Prospects

The largest lead or prospect in the permit is the Jarver Prospect, which was identified as a lead during gazettal evaluation on the multi-client DS01 seismic data (Figure 6, Enclosure 2). The SS02 seismic infill was designed to further delineate this lead. Jarver is an amplitude-driven structural play, targeting Thylacine equivalent reservoirs within a four-way dip closure. Secondary reservoir targets are thought to be within the shallower Paaratte Formation. Both Thylacine and Paaratte targets have amplitude within a four-way dip closure, with an additional stratigraphic extension for the Paaratte Formation.

The Taylor lead in the north of the permit also targets the Thylacine-equivalent reservoir, but in an onlap trap against basement (Figure 7, Enclosure 2). This has an amplitude anomaly which conforms to three-way closure against the basement high.

Conclusions

The SS02 seismic data is substantially better quality than the DS01 seismic data. The main difference is higher frequency content and reduced noise in the SS02 data.

Interpretation of the SS02 seismic data and incorporation into the regional grid has led to a better understanding of the Jarver Prospect, reducing the risk, although we believe additional 2D seismic is required prior to drilling of the prospect.

Acquisition of further seismic data is also recommended for the Taylor lead, to better delineate the lead and reduce the risk. 2D seismic would likely be adequate for this purpose.

Figures

Survey Location Map

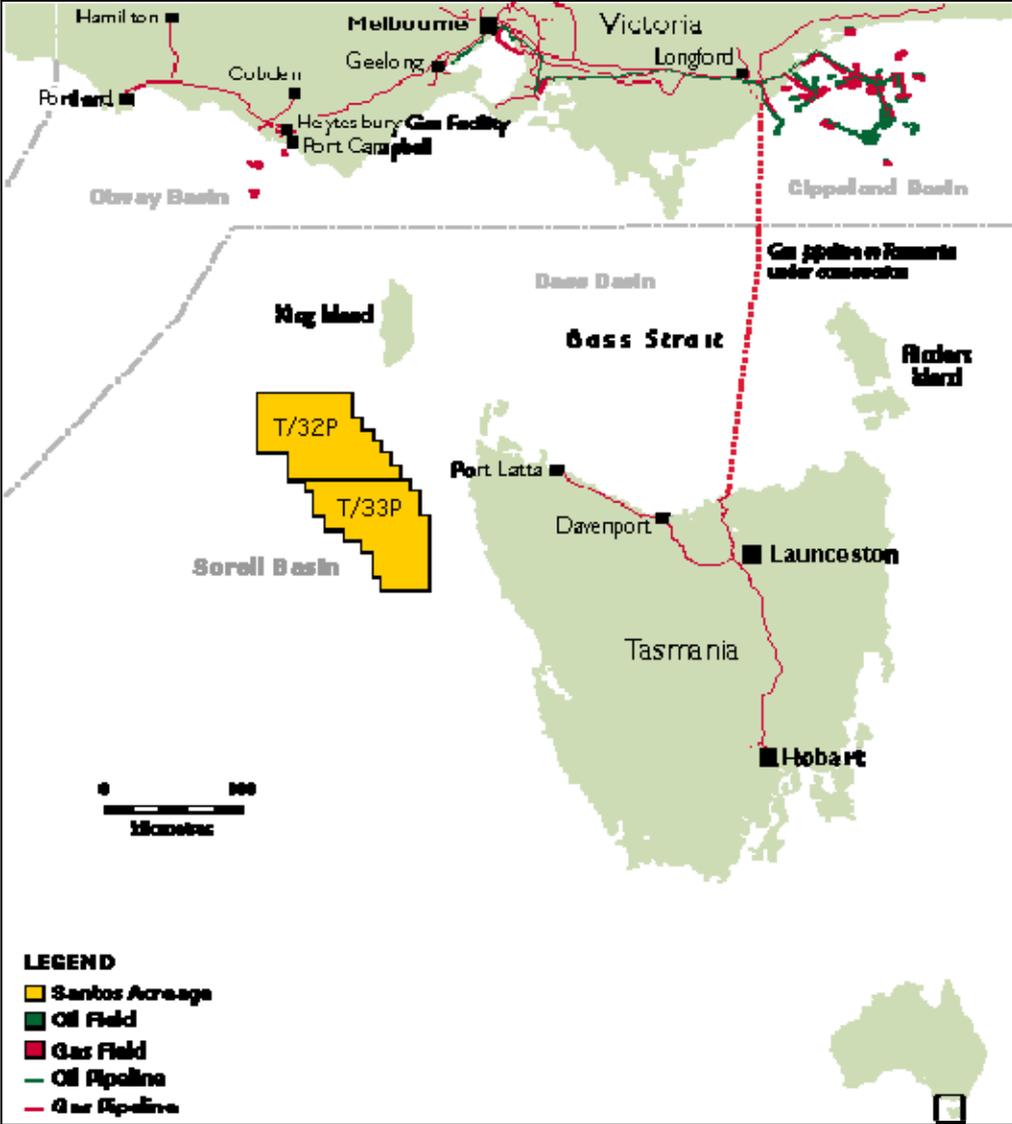


Figure 1. Seismic Survey Location Map

Data Location Map

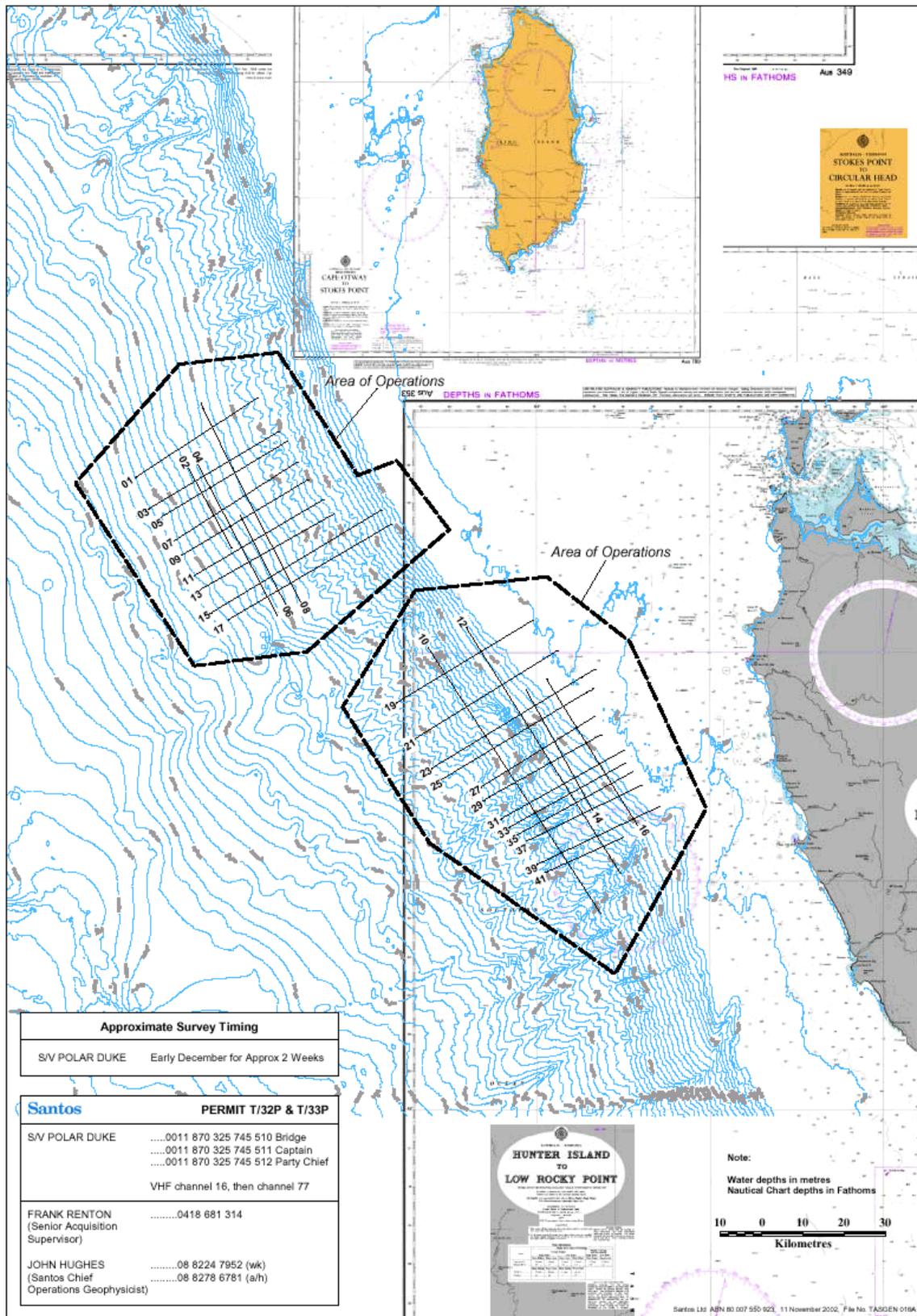


Figure 2. Seismic Line Location Map

Stratigraphic Chart

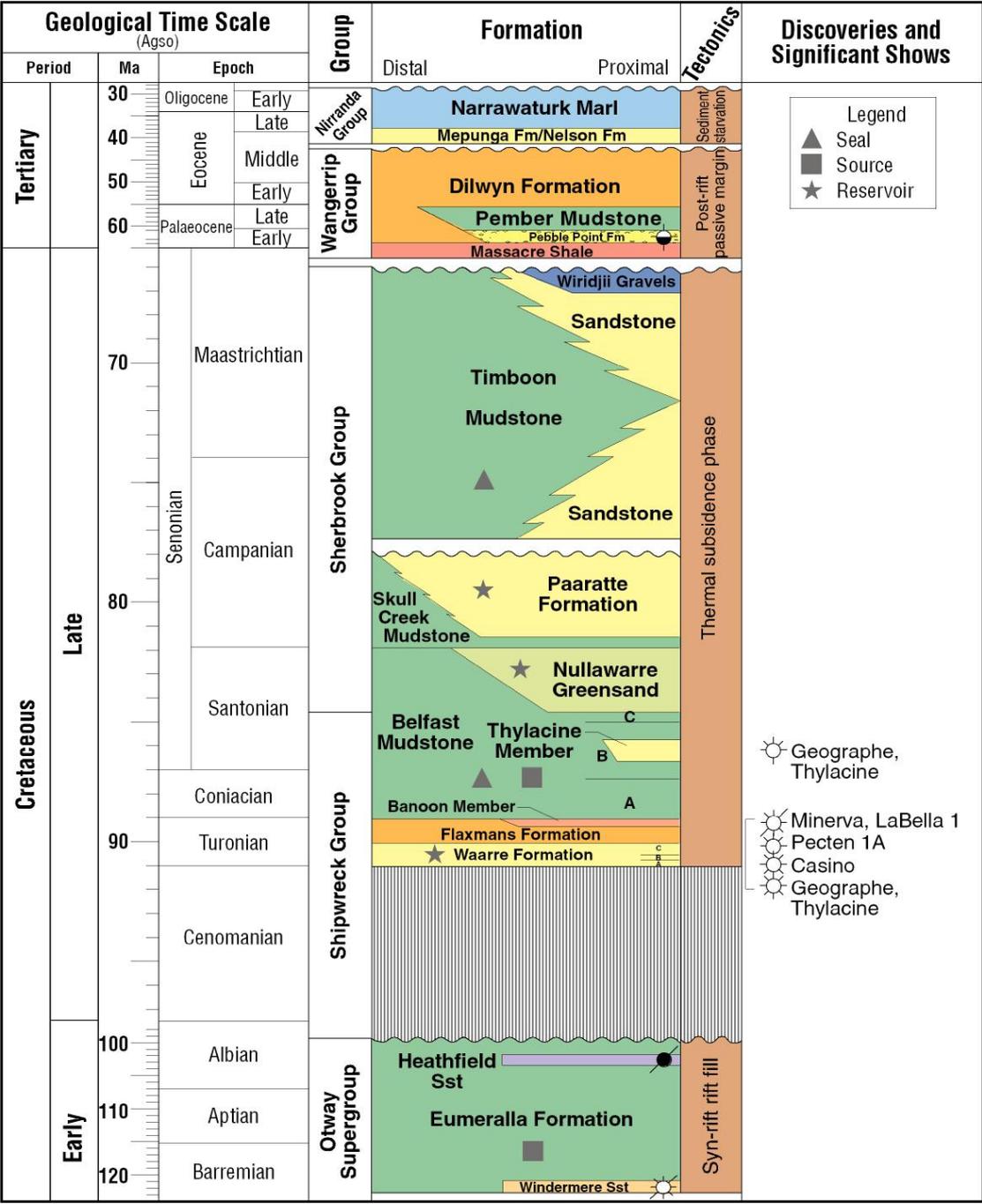


Figure 3. Stratigraphic Chart

Synthetic Seismograms

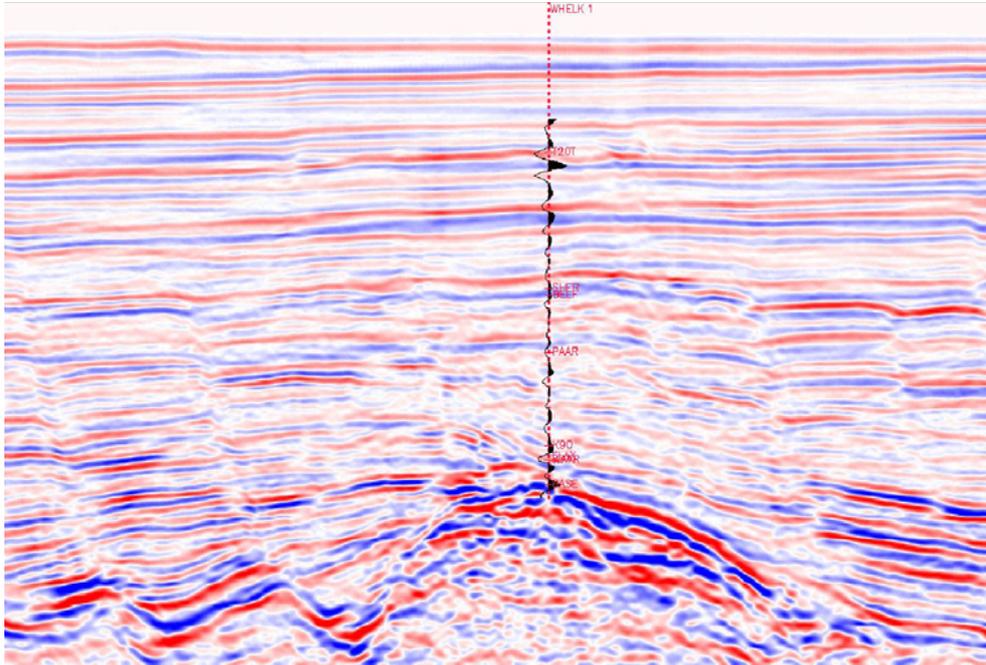


Figure 4. Synthetic seismogram at Whelk 1.

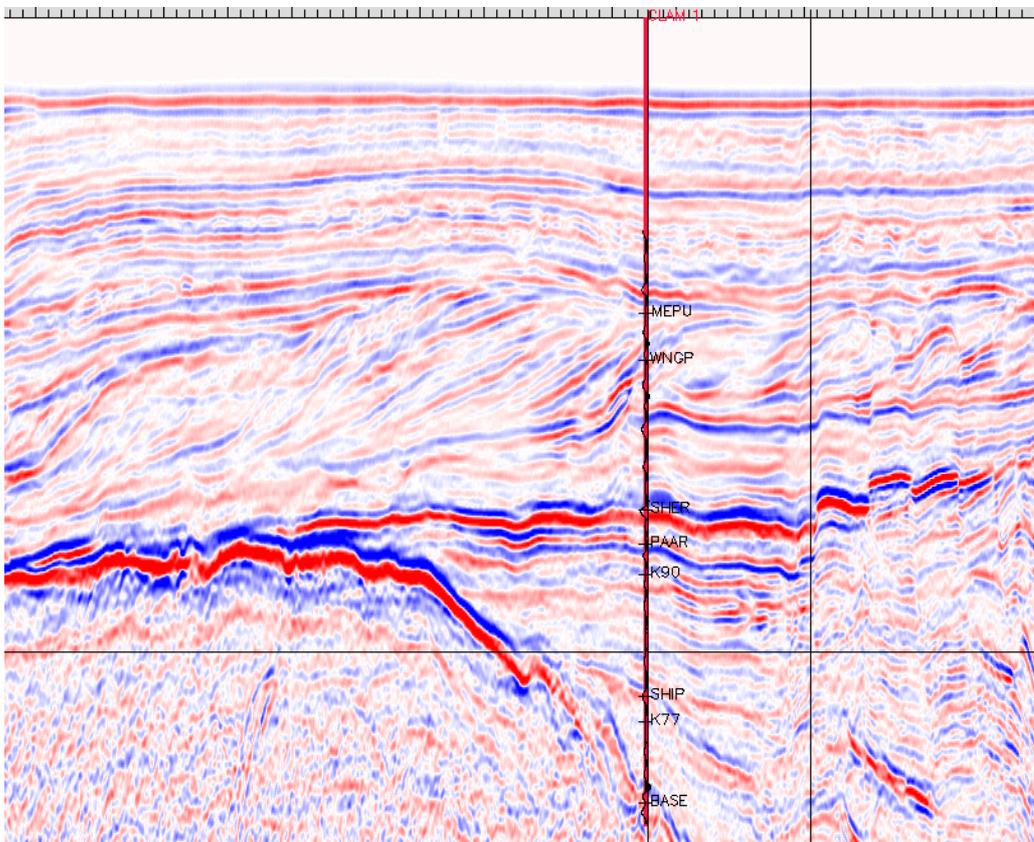


Figure 5. Synthetic seismogram at Clam 1.

Interpreted Seismic Sections

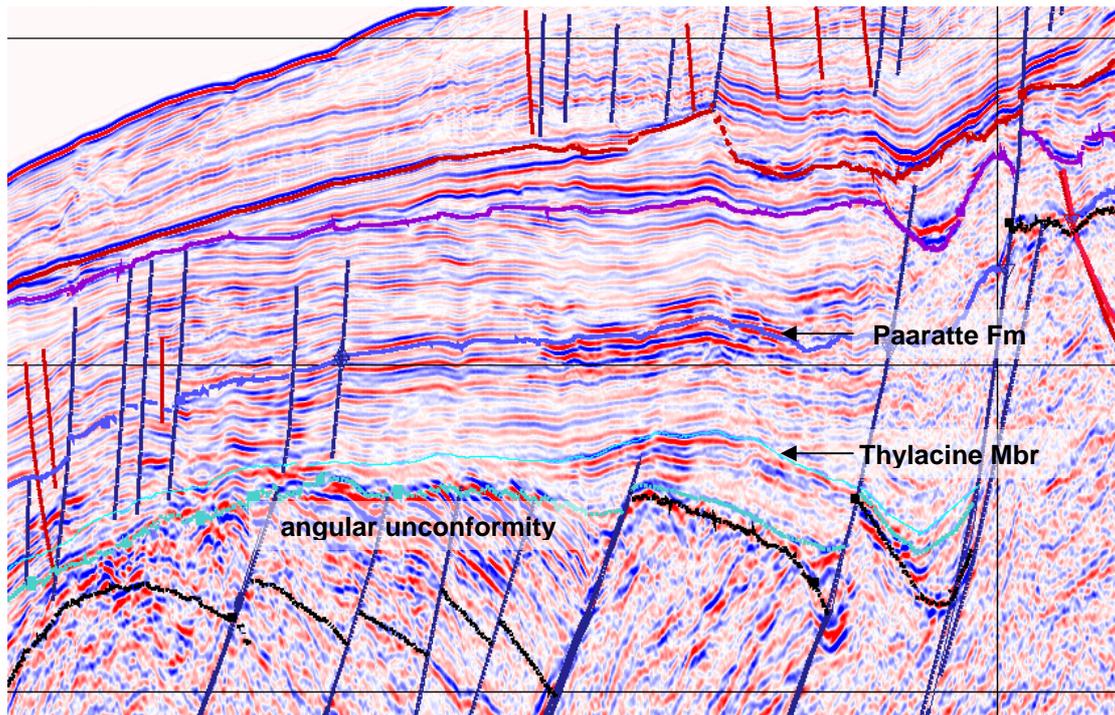


Figure 6. Seismic section (line DS01-142X) through the Jarver Prospect showing the amplitude anomaly at both Thylacine and Paaratte levels, as well as the truncation beneath the Belfast. This line is flattened on 0.4xWB to correct for the water depth.

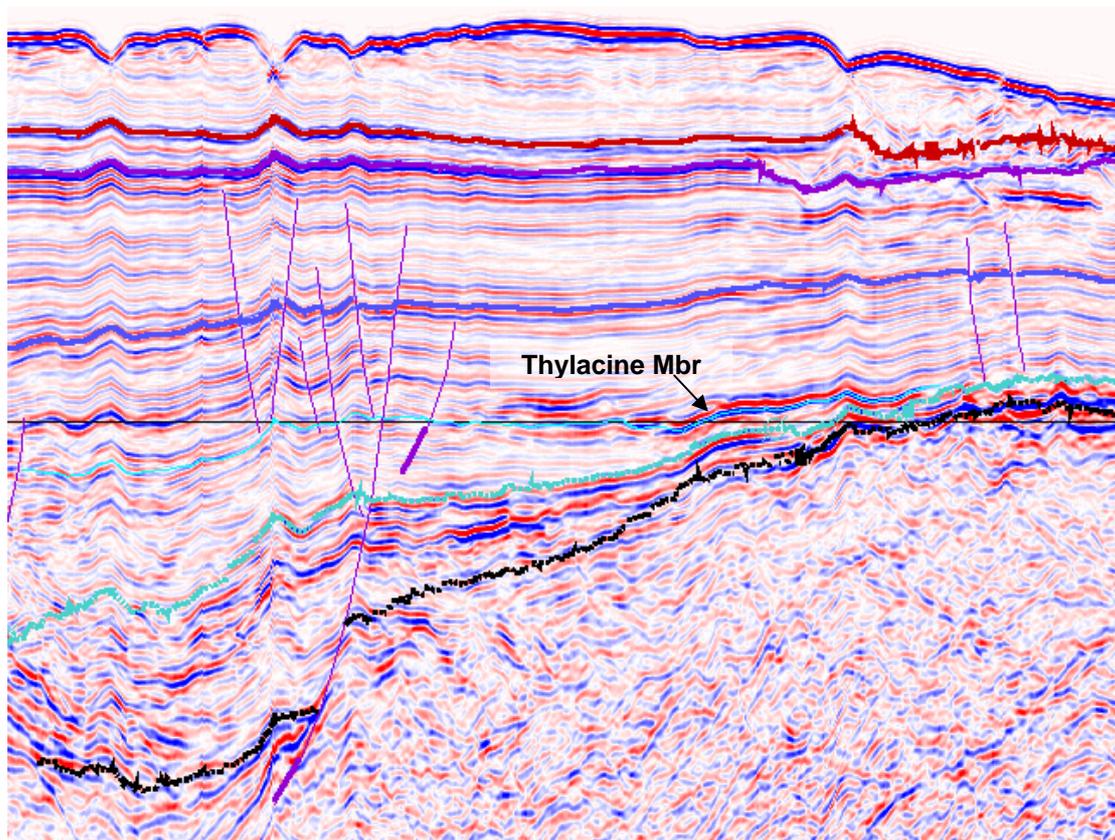


Figure 7. Seismic section (line SS02-10) through the Taylor Lead, showing high amplitudes in the Thylacine Mbr equivalent, as they onlap onto basement. This line is flattened on 0.4xWB to correct for the water depth.

Enclosures - Maps of Key Horizons

Enclosure 1. Water bottom (WB) depth structure map

Enclosure 2. Top Thylacine (K84LS) depth structure map

Enclosure 3. Top Waarre (K77) depth structure map