SDA 952

SEISMIC INTERPRETATION REPORT - VIC/P21 (GS88A SURVEY AND ASSOCIATED REPROCESSING)

By

SOUTHERN TEAM

SHELL COMPANY OF AUSTRALIA

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THE SHELL COMPANY OF AUSTRALIA LIMITED
1 Spring Street, Melbourne, 3001

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1.0 INTRODUCTION

This report documents the interpretation of the seismic survey GS88A and associated reprocessed seismic data in VIC/P21 carried out by Shell and its co-venturers, Western Mining Corporation. The GS88A survey was acquired by the GSI vessel M.V. Magnificent Creek during 1988.

2. SEISMIC DATA

VIC/P21 has an extensive 1.5 x 1 km grid of modern data covering the permit north of the Foster Fault (Fig. 1). On the Southern Platform, the grid is coarse and the data is generally older vintage ('69, 73 & 80). The bulk of the VIC/P21 data set is formed by the Aquitaine 1981 (GA81 series) survey, a large proportion (1138.4 km) of which has been reprocessed by the Joint Venture (Fig. 1).

A significant improvement in data quality has been achieved primarily through the use of K/F filtering, DMO and careful picking of velocities. Velocities have been picked in an horizon consistent manner for later use in depth conversion.

During 1988, the Joint Venture acquired a 273 km seismic survey in the east of the permit using the GSI vessel M.V. Magnificent Creek using acquisition parameters set out in Table 1 below:

TABLE 1. GS88A SURVEY - FIELD ACQUISITION PARAMETERS

Data shot by : GSI M/V Magnificent Creek
Date shot : June/July 1988

Recording Instruments	:	F.C.S. III
Digital Tape Format	:	SEGD, 6250 BPI
Record Length	:	6.0 seconds
Sample Period	:	2 milliseconds
Sample Filters - High	:	128 Hz / 72 dB/octave
- Low	:	8 Hz / 18 dB/octave
Recording Polarity	:	An increase in pressure on the hydrophone produces a negative number on tape
Energy Source	:	4 string VSX airgun array
Source Volume/Pressure	:	35.7 litres/ 13.1 MPa
Source Delay	:	51.2 milliseconds
Source Depth	:	6 metres
Source - Antenna	:	96.79 metres
Shotpoint Interval	:	25 metres
Near Trace Offset	:	125 metres
Streamer Type	:	GSI digital multiplexor streamer
Streamer Length	:	3750 metres
Streamer Depth	:	8.5 metres
Number of Groups	:	300
Group Interval	:	12.5 metres
Hydrophones per Group	:	40
Coverage	:	75 fold
Navigtion System		
- Primary	:	SYLEDIS
- Secondary	:	TRANSIT SATELLITE

The new data is a significant improvement on earlier data. The use of a 3750m digital streamer is responsible for the bulk of the improvement. The new data has increased resolution, improved signal to noise ratio and penetration and has improved multiple suppression.

3. MAPPING

A set of zero-phase synthetic seismograms was generated for all wells within VIC/P21, and for other relevant wells (Dolphin-1, Moray-1, Bream-2, -3, -5, Kingfish-1). These have been used to tie the wells into the various vintages of seismic data. The 1981 GA81 series reprocessed data has been chosen as the reference data set as it provides the most extensive coverage of the permit. The following bulk shifts were applied to tie the various surveys.

Data Series	Processing		Bulk Correction
GA81	Reprocessed, Shell	Datum	0 msec
GP81	Reprocessed, Shell		-15 msec
GA84	Reprocessed, Shell		0 msec
GS88A	Original		-15 msec
GA81	Original		-50 msec
GP81	Reprocessed, Petrofina		-15 msec

Regional interpretation has been completed at two main levels - Top Latrobe Group (Figs. 2, 3, Encl. 1a, 1b) and Top Golden Beach Group (Fig. 2, 3, Encl. 3a, 3b). In the east of the permit (i.e. east of Omeo-2) the top of the Latrobe Group is marked by the presence of an accoustically hard "carbonate" streak very near the base of the Lakes Entrance Formation. This streak is areally consistent and reliably reflects the form of the Top Latrobe surface (typically some 5-10 m below this event). West of Omeo-2, the interval between the "carbonate" streak and the Latrobe Group thickens significantly and the top of the Latrobe Group can be picked separately with confidence.

The Top Golden Beach Group is often recognised as a subtle unconformity (Fig. 3) and is easily picked in the Pike-1/Moray-1 area. However, the interpretation of this event in the north of the permit (ie. around Speke-1, Gurnard-1 and Nannygai-1) is less reliable, due to heavy faulting and a degradation in data quality. Well control adjacent to the Darriman and Foster Faults is limited to only four wells (Omeo-1, -2, Moray-1, Dolphin-1). The Golden Beach Group is not present on the southern Strzelecki Terrace west of Omeo-2. Where the Golden Beach Group is absent, the top of the Strzelecki Group has been mapped (Encl. 3a, 3b).

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4. DEPTH CONVERSION

The eastern area of VIC/P21 is dissected by the N-S trending Gurnard Channel (Encl. 6). The channel has a high velocity fill which results in a significant pull-up, creating apparent time structure. Indeed two exploration wells, Gurnard-1 and Nannygai-1, have been drilled on valid time closures at Top Latrobe without success. The Gurnard Channel poses a significant depth conversion problem. Three distinct velocity intervals were recognised:

i) Gurnard Channel fill
ii) Upper Gippsland Limestone Interval
iii) Lower Gippsland Limestone Interval

As a first attempt at depth conversion, the tops of the various velocity units were mapped. A set of linear best-fit velocity-depth functions of the form V=Vo+kz (with z referenced to sea floor) were derived using the Pike-1, Moray-1, Tarra-1, Omeo-1, Omeo-2, Edina-1, Gurnard-1 and Nannygai-1 wells. The functions found are as follows:

N.B. Use only in areas of control!

Interval	Vo	k	Datum
Gurnard Channel fill	2150	0.957	Sea floor
Upper Gippsland Limestone	1610	1.547	" "
Lower Gippsland Limestone	2493	0.096	" "
Lakes Entrance	2493	0.096	" "
Latrobe Group	1850	0.797	" "

These functions were used to generate preliminary depth maps which fit the well data to within ±30m. Using the depth map and the time map to Top Latrobe, an average velocity map was then generated for later use.

Final depth conversion has been made using a combination of smoothed stacking velocities and the average velocity map derived from linear velocity-depth functions. The procedure used is as follows:

1. The stacking velocities for all lines were loaded into Shell's proprietary velocity manipulation package, SEIVEL.

2. The stacking velocity at Top Latrobe was gridded and contoured with little or no smoothing.

3. Bad data values were readily identified and edited, or removed from the data set. Editing and contouring of the data was performed iteratively.

4. Once the bad data points had been suppressed, a smoothed stacking velocity map was generated and compared with the average velocity map derived from linear velocity-depth functions.

5. The two maps compared favourably. The trends of the contours are very similar (although the absolute values are obviously different). A composite average velocity map was made, honouring the average velocities in the wells and merging the velocity trends from the two maps. The composite average velocity map was used for the final depth conversion (Enclosures 5a, 5b). The Top Golden Beach depth map (Encl. 4) was generated using the final Top Latrobe depth map (Encl. 2a, 3) and the Latrobe Group linear velocity-depth function.

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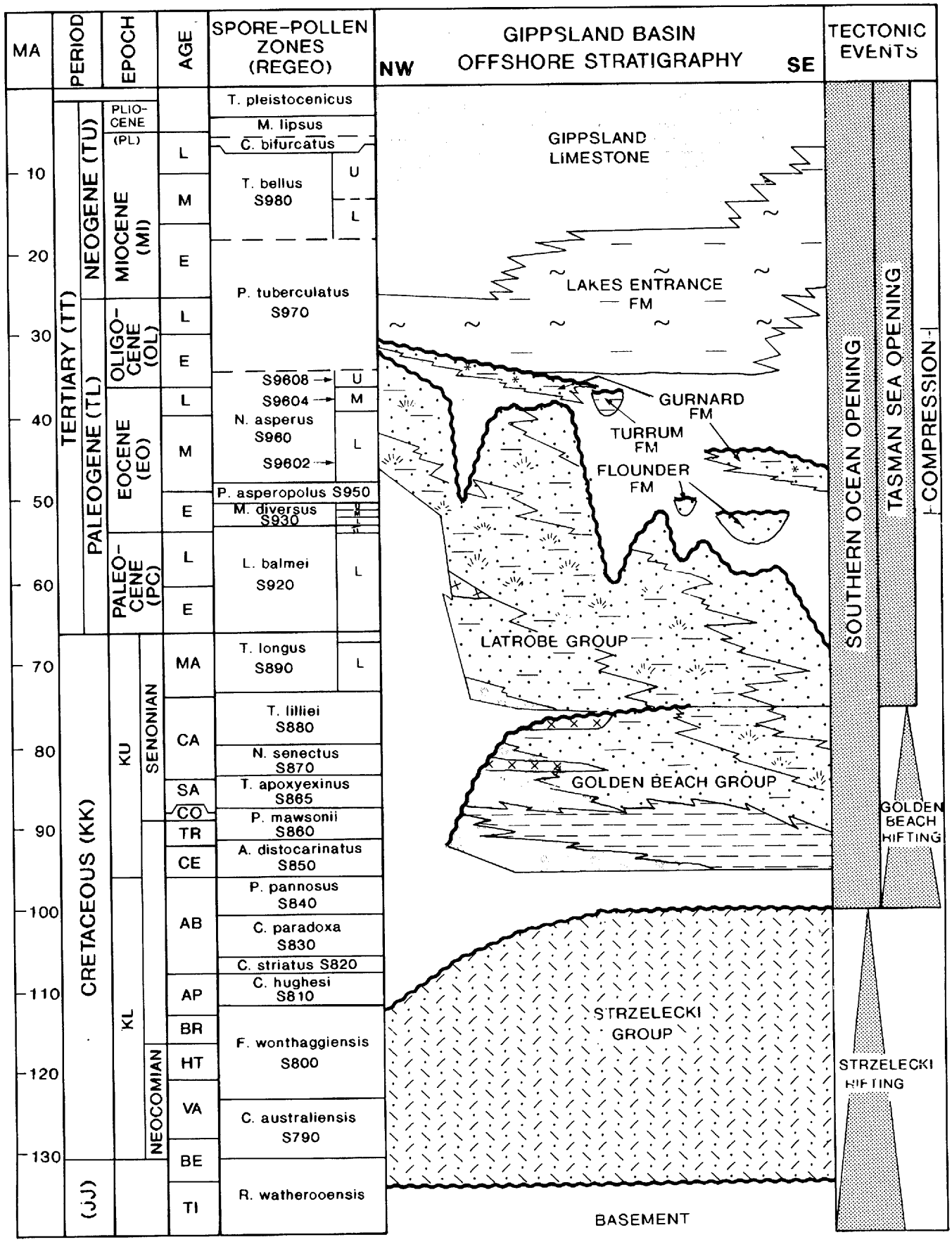

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GIPPSLAND BASIN

OFFSHORE STRATIGRAPHY

Figure 2

Author: EXO | Report No.: SDA 952 | Date: JAN.1990 | Drawing No.: 25630

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PE806298

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The enclosure PE806298 is enclosed within the container PE806297 at this location in this document.

The enclosure PE806298 has the following characteristics:

ITEM_BARCODE	PE806298
CONTAINER_BARCODE	PE806297
NAME	Time Structure Map
BASIN	GIPPSLAND
ONSHORE?	N
DATA_TYPE	SEISMIC
DATA_SUB_TYPE	ISOCHRON_MAP
DESCRIPTION	Time Structure Map- Top Latrobe Group/ Near Base Lakes Enterence (East) (Enclosure 1a in: Seismic Interpretation Report), VIC/P21, GS88A, G 260, Gippsland Basin. By Shell Australia, E. & P. Oil and Gas. March 1989, Scale 1:50000 .
REMARKS	
DATE_WRITTEN	31-MAR-1989
DATE_PROCESSED	
DATE_RECEIVED	27-JUL-1990
RECEIVED_FROM	Shell Australia Exploration and Production Oil and Gas
WELL_NAME	
CONTRACTOR	
AUTHOR	
ORIGINATOR	
TOP_DEPTH	
BOTTOM_DEPTH	
ROW_CREATED_BY	EC00_SW

(Inserted by DNRE - Vic Govt Mines Dept)

PE806299

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The enclosure PE806299 is enclosed within the container PE806297 at this location in this document.

The enclosure PE806299 has the following characteristics:

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CONTAINER_BARCODE	PE806297
NAME	Time Structure Map
BASIN	GIPPSLAND
ONSHORE?	N
DATA_TYPE	SEISMIC
DATA_SUB_TYPE	ISOCHRON_MAP
DESCRIPTION	Time Structure Map- Top Latrobe Group/ Near Base Lakes Enterence (West) (Enclosure 1b in: Seismic Interpretation Report), VIC/P21, GS88A, G 260, Gippsland Basin. By Shell Australia, E. & P. Oil and Gas. March 1989, Scale 1:50000 .
REMARKS	
DATE_WRITTEN	31-MAR-1989
DATE_PROCESSED	
DATE_RECEIVED	27-JUL-1990
RECEIVED_FROM	Shell Australia Exploration and Production Oil and Gas
WELL_NAME	
CONTRACTOR	
AUTHOR	
ORIGINATOR	
TOP_DEPTH	
BOTTOM_DEPTH	
ROW_CREATED_BY	EC00_SW

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PE806300

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The enclosure PE806300 is enclosed within the container PE806297 at this location in this document.

The enclosure PE806300 has the following characteristics:

ITEM_BARCODE	PE806300
CONTAINER_BARCODE	PE806297
NAME	Depth Structure Map
BASIN	GIPPSLAND
ONSHORE?	N
DATA_TYPE	SEISMIC
DATA_SUB_TYPE	HRZN_CONTR_MAP
DESCRIPTION	Depth Structure Map- Top Latrobe Group/ Near Base Lakes Enterence (East) (Enclosure 2a in: Seismic Interpretation Report), VIC/P21, GS88A, G 260, Gippsland Basin. By Shell Australia, E. & P. Oil and Gas. March 1989, Scale 1:50000 .
REMARKS	
DATE_WRITTEN	31-MAR-1989
DATE_PROCESSED	
DATE_RECEIVED	27-JUL-1990
RECEIVED_FROM	Shell Australia Exploration and Production Oil and Gas
WELL_NAME	
CONTRACTOR	
AUTHOR	
ORIGINATOR	
TOP_DEPTH	
BOTTOM_DEPTH	
ROW_CREATED_BY	EC00_SW

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PE806301

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The enclosure PE806301 has the following characteristics:

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CONTAINER_BARCODE	PE806297
NAME	Depth Structure Map
BASIN	GIPPSLAND
ONSHORE?	N
DATA_TYPE	SEISMIC
DATA_SUB_TYPE	HRZN_CONTR_MAP
DESCRIPTION	Depth Structure Map- Top Latrobe Group/ Near Base Lakes Enterence (West) (Enclosure 2b in: Seismic Interpretation Report), VIC/P21, GS88A, G 260, Gippsland Basin. By Shell Australia, E. & P. Oil and Gas. March 1989, Scale 1:50000 .
REMARKS	
DATE_WRITTEN	31-MAR-1989
DATE_PROCESSED	
DATE_RECEIVED	27-JUL-1990
RECEIVED_FROM	Shell Australia Exploration and Production Oil and Gas
WELL_NAME	
CONTRACTOR	
AUTHOR	
ORIGINATOR	
TOP_DEPTH	
BOTTOM_DEPTH	
ROW_CREATED_BY	EC00_SW

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CONTAINER_BARCODE	PE806297
NAME	Time Structure Map
BASIN	GIPPSLAND
ONSHORE?	N
DATA_TYPE	SEISMIC
DATA_SUB_TYPE	ISOCHRON_MAP
DESCRIPTION	Time Structure Map- Top Golden Beach Group/ Top Strzelecki Group (East) (Enclosure 3a in: Seismic Interpretation Report), VIC/P21, GS88A, G 260, Gippsland Basin. By Shell Australia, E. & P. Oil and Gas. March 1989, Scale 1:50000 .
REMARKS	
DATE_WRITTEN	31-MAR-1989
DATE_PROCESSED	
DATE_RECEIVED	27-JUL-1990
RECEIVED_FROM	Shell Australia Exploration and Production Oil and Gas
WELL_NAME	
CONTRACTOR	
AUTHOR	
ORIGINATOR	
TOP_DEPTH	
BOTTOM_DEPTH	
ROW_CREATED_BY	EC00_SW

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CONTAINER_BARCODE	PE806297
NAME	Time Structure Map
BASIN	GIPPSLAND
ONSHORE?	N
DATA_TYPE	SEISMIC
DATA_SUB_TYPE	ISOCHRON_MAP
DESCRIPTION	Time Structure Map- Top Golden Beach Group/ Top Strzelecki Group (West) (Enclosure 3a in: Seismic Interpretation Report), VIC/P21, GS88A, G 260, Gippsland Basin. By Shell Australia, E. & P. Oil and Gas. March 1989, Scale 1:50000 .
REMARKS	
DATE_WRITTEN	31-MAR-1989
DATE_PROCESSED	
DATE_RECEIVED	27-JUL-1990
RECEIVED_FROM	Shell Australia Exploration and Production Oil and Gas
WELL_NAME	
CONTRACTOR	
AUTHOR	
ORIGINATOR	
TOP_DEPTH	
BOTTOM_DEPTH	
ROW_CREATED_BY	EC00_SW

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PE806304

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CONTAINER_BARCODE	PE806297
NAME	Depth Structure Map
BASIN	GIPPSLAND
ONSHORE?	N
DATA_TYPE	SEISMIC
DATA_SUB_TYPE	HRZN_CONTR_MAP
DESCRIPTION	DepthStructure Map- Top Golden Beach Group (East) (Enclosure 4 in: Seismic Interpretation Report), VIC/P21, GS88A, G 260, Gippsland Basin. By Shell Australia, E. & P. Oil and Gas. March 1989, Scale 1:50000 .
REMARKS	
DATE_WRITTEN	31-MAR-1989
DATE_PROCESSED	
DATE_RECEIVED	27-JUL-1990
RECEIVED_FROM	Shell Australia Exploration and Production Oil and Gas
WELL_NAME	
CONTRACTOR	
AUTHOR	
ORIGINATOR	
TOP_DEPTH	
BOTTOM_DEPTH	
ROW_CREATED_BY	EC00_SW

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PE806305

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CONTAINER_BARCODE	= PE806297
NAME	= Average Velocity Map
BASIN	= GIPPSLAND
ONSHORE?	= N
DATA_TYPE	= SEISMIC
DATA_SUB_TYPE	= VEL_CONTR
DESCRIPTION	= Average Velocity to Top of Latrobe Group/ Near Base Lakes Entrance (East) (Enclosure 5a in: Seismic Interpretation Report), VIC/P21, GS88A, G260, Gippsland Basin. By Shell Australia, E. & P. Oil and Gas. March 1989, Scale 1:50000 .
REMARKS	=
DATE_WRITTEN	= 31-MAR-1989
DATE_PROCESSED	=
DATE_RECEIVED	= 27-JUL-1990
RECEIVED_FROM	= Shell Australia Exploration and Production Oil and Gas
WELL_NAME	=
CONTRACTOR	=
AUTHOR	=
ORIGINATOR	=
TOP_DEPTH	=
BOTTOM_DEPTH	=
ROW_CREATED_BY	= EC00_SW

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PE806306

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The enclosure PE806306 has the following characteristics:

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CONTAINER_BARCODE	PE806297
NAME	Average Velocity Map
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ONSHORE?	N
DATA_TYPE	SEISMIC
DATA_SUB_TYPE	VEL_CONTR
DESCRIPTION	Average Velocity to Top of Latrobe Group/ Near Base Lakes Entrance (West) (Enclosure 5b in: Seismic Interpretation Report), VIC/P21, GS88A, G 260, Gippsland Basin. By Shell Australia, E. & P. Oil and Gas. March 1989, Scale 1:50000 .
REMARKS	
DATE_WRITTEN	31-MAR-1989
DATE_PROCESSED	
DATE_RECEIVED	27-JUL-1990
RECEIVED_FROM	Shell Australia Exploration and Production Oil and Gas
WELL_NAME	
CONTRACTOR	
AUTHOR	
ORIGINATOR	
TOP_DEPTH	
BOTTOM_DEPTH	
ROW_CREATED_BY	EC00_SW

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BASIN	GIPPSLAND
ONSHORE?	N
DATA_TYPE	SEISMIC
DATA_SUB_TYPE	ISOCHRON_MAP
DESCRIPTION	Time Structure Map Base Gurnard Channel (Enclosure 6 in: Seismic Interpretation Report), VIC/P21, GS88A, G 260, Gippsland Basin. By Shell Australia, E. & P. Oil and Gas. March 1989, Scale 1:50000 .
REMARKS	
DATE_WRITTEN	31-MAR-1989
DATE_PROCESSED	
DATE_RECEIVED	27-JUL-1990
RECEIVED_FROM	Shell Australia Exploration and Production Oil and Gas
WELL_NAME	
CONTRACTOR	
AUTHOR	
ORIGINATOR	
TOP_DEPTH	
BOTTOM_DEPTH	
ROW_CREATED_BY	EC00_SW

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BASIN	= GIPPSLAND
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DATA_TYPE	= SEISMIC
DATA_SUB_TYPE	= LOCATION_MAP
DESCRIPTION	= Shot Point Location Map, West VIC/P21 (Enclosure in: Seismic Interpretation Report), VIC/P21, GS88A, G 260, Gippsland Basin. By Shell Australia, E. & P. Oil and Gas. 24-Jan- 1989, Scale 1:50000 .
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DATE_RECEIVED	= 27-JUL-1990
RECEIVED_FROM	= Shell Australia Exploration and Production Oil and Gas
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ORIGINATOR	=
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ROW_CREATED_BY	= EC00_SW

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CONTAINER_BARCODE	PE806297
NAME	Shot Point Location Map
BASIN	GIPPSLAND
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DATA_TYPE	SEISMIC
DATA_SUB_TYPE	LOCATION_MAP
DESCRIPTION	Shot Point Location Map, East VIC/P21 (Enclosure in: Seismic Interpretation Report), VIC/P21, GS88A, G 260, Gippsland Basin. By Shell Australia, E. & P. Oil and Gas. 25-Jan- 1989, Scale 1:50000 .
REMARKS	
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DATE_PROCESSED	
DATE_RECEIVED	27-JUL-1990
RECEIVED_FROM	Shell Australia Exploration and Production Oil and Gas
WELL_NAME	
CONTRACTOR	
AUTHOR	
ORIGINATOR	
TOP_DEPTH	
BOTTOM_DEPTH	
ROW_CREATED_BY	EC00_SW

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