Integrated Services in
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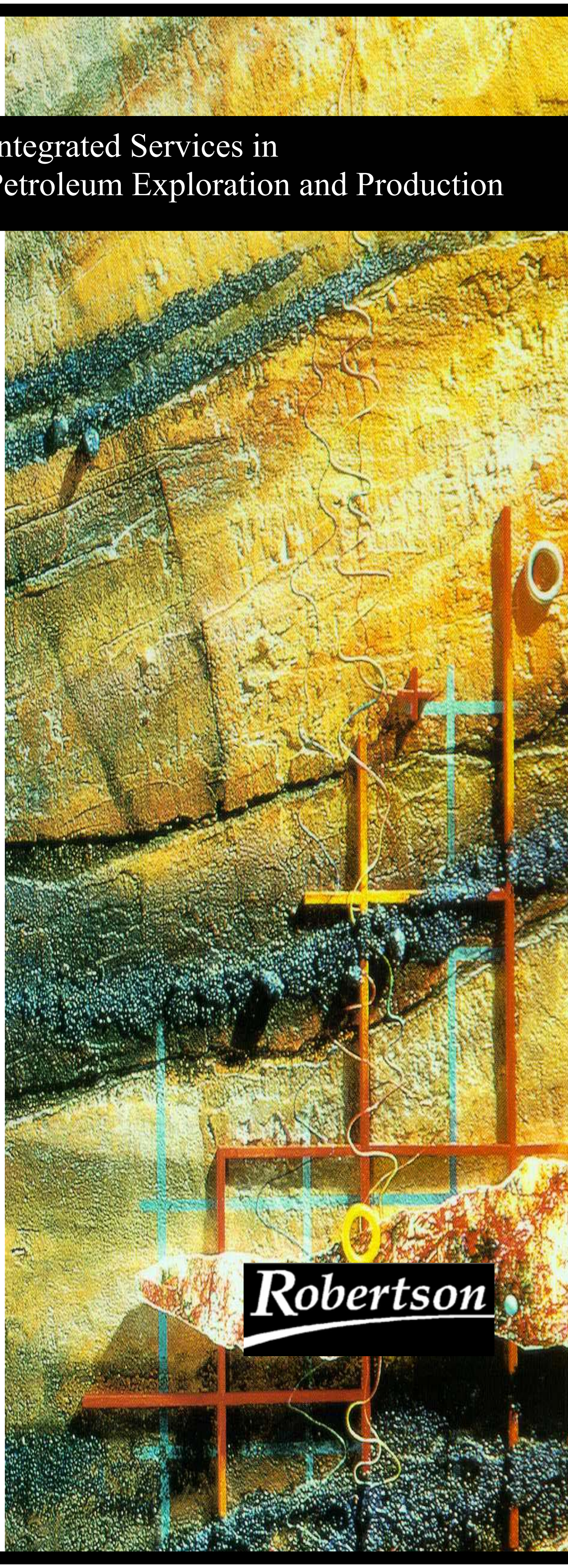

Processing Report

for

2002 Otway Basin Processing Survey OEP02 2D

Area:
Otway Basin, VIC/P46

March 2003

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APPENDICES

1.0 INTRODUCTION

The 2002 Otway Basin Processing consisted of 26 lines, totalling 803 km. The water bottom times for the survey ranged from approximately 50ms to 500ms, with the majority of the data restricted to water bottom times no greater than 100ms. The data was recorded in November 2002 with the processing being completed in March 2003.

1.1 PERSONNEL

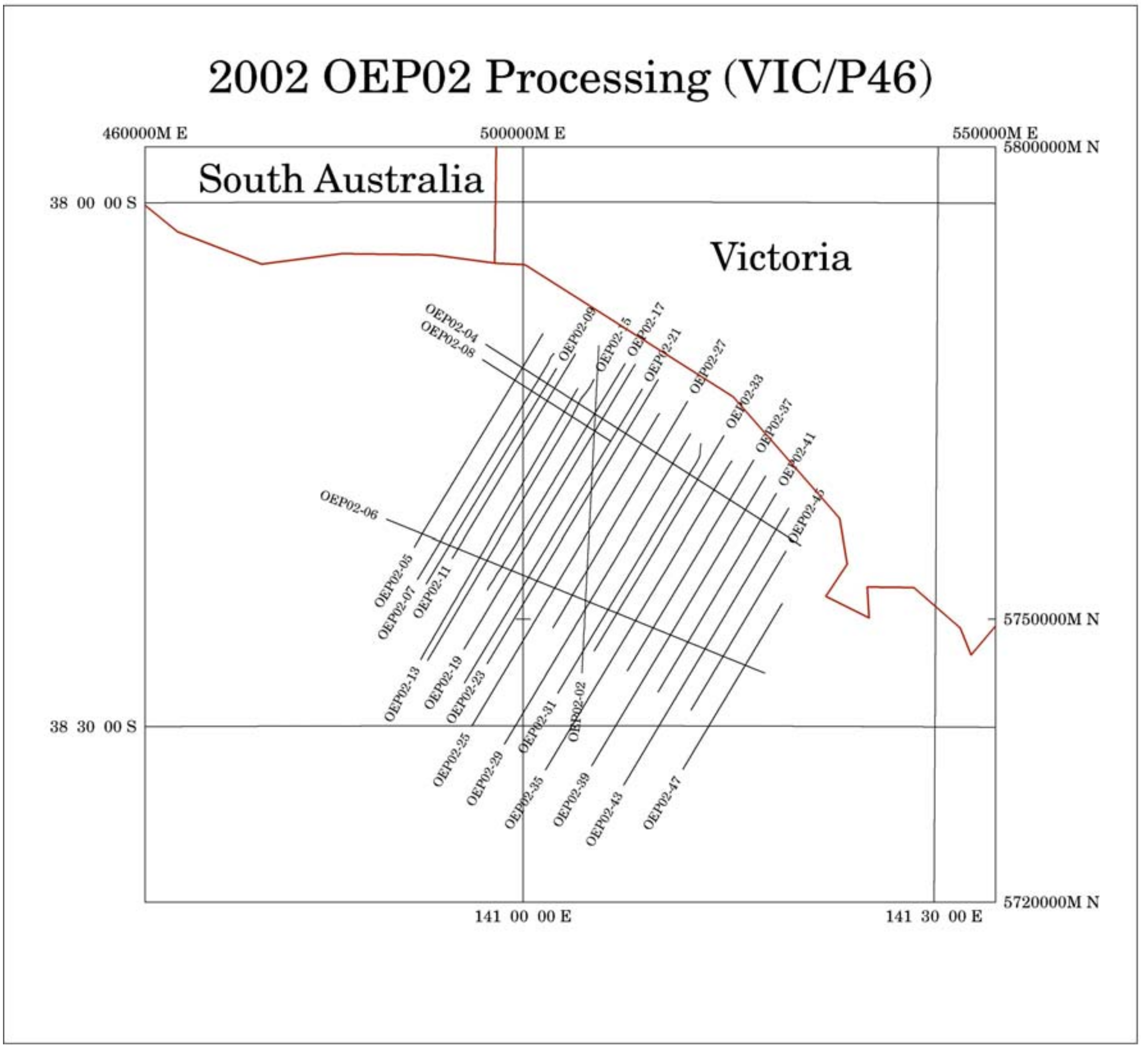
Robertson Research Australia

Kelly Beauglehole	Processing Manager
Simon Stewart	Marine Processing Manager
Paul Phythian	Geophysicist
Mark Brailey	Interpretive Processing Manager

Seismic Australia

Bill Lodwick	Exploration Manager (Essential)
Stuart Brew	Senior Staff Geophysicist (Santos)
John Cant	Consulting Geophysicist

1.2 SURVEY MAP



2.0 PARAMETER TESTING

Line OEP02-02 was selected as the test line, with all pre stack testing done on this line. Due to geological interest, line OEP02-07 was chosen as the test line for the post stack parameter decisions.

Please refer to the table below for further details of the tests performed.

Test	Format		
	Shot Record	CDP Gather	STACK
Shot record displays	✔		
Gain recovery: Amplitude decay analysis	✔		
Gain recovery: exponential gain	✔		
F-K filter (shot domain, various cuts)	✔		✔
F-K filter with NMO (shot domain, various cuts)	✔		✔
F-K filter (shot and receiver domain)	✔		✔
F-K filter with NMO (shot and receiver domain)	✔		✔
Signature deconvolution	✔		✔
Tau-P deconvolution	✔		✔
Multiple attenuation: F-K method		✔	✔
Multiple attenuation: Radon method		✔	✔
Predictive deconvolution (before stack)			✔
Outer and inner trace mutes		✔	✔
True Amplitude Preservation		✔	✔
Predictive deconvolution (after stack)			✔
Bandpass filter and Post stack scaling			✔
Noise attenuation (Tau-P Filter)			✔

3.0 COMMENTS & CONCLUSION

The processing was completed in March 2003. Final Migrations in SEGY format along with the final 0.5km interval PSTM velocities were the initial deliverables sent out. Following this, a SEGY archive of the Pre-Stack Time Migrated gathers (NMO corrected with the final 0.5km velocities) was also produced. Final Migration paper displays and CGM+ files, displayed at 1:50,000 horizontal scale and 10cm/sec vertical scale followed the tape archives.

The data as a whole was well recorded with only one line (OEP02-04) needing to be shot in multiple segments. The data did however suffer from quite substantial swell noise and random spiking. All lines responded well to the Swell Noise attenuation and de-spiking processing and as such this didn't pose any extra problems during processing (eg: spikes producing migration artefacts) or to the final product.

On a whole the testing gave rise to what you might call a "standard" Pre-Stack Time Migration flow. However there were some notable results from the testing. A hard water bottom in shallow depths gave rise to quite bad reverberation problems. Some sort of deconvolution was necessary on this data. It was anticipated that Tau-P deconvolution would produce a superior result to both the signature deconvolution and the conventional predictive (gapped) deconvolution. After extensive Tau-P deconvolution testing this wasn't to be the case. Improvements were seen after the Tau-P, however degradation of the fault planes and attenuation of the continuity of some horizons of interest also resulted. A combination of signature deconvolution and predictive (gap) deconvolution was incorporated.

Fault definition, especially in the shallow part of the data, was the standout improvement over the previous processing in this area. Along with this, there were some notable "bright" spots on several lines and consistent across intersecting lines.

AVO analysis highlighted some potential hydrocarbon-bearing zones between 1000 and 2500 ms which correlated with bright spots seen on the regular seismic. The strongest deeper anomaly is most obvious at approximately 2000 ms on line OEP02-04 and it's intersection with OEP02-15. The Delta Rp stack displayed a strong blue over red character, while the Product stack produced a weak red over red. For sands at this depth we do not expect the Product stack to be very diagnostic.
There are a number of small Delta Rp anomalies (strong blue over red) between 1000 and 1500 ms, which are most likely associated with changes in lithology. Occasionally however, an anomaly appears to be possibly hydrocarbon-related. Eg. On line OEP02-17 there is a strong anomaly at Shotpoint 1425 at 1240 ms on both the Delta Rp and Product stacks.

The Delta Rp (similar to Fluid Factor) stack was the most useful attribute in identifying the potential hydrocarbon-bearing zones, which are interpreted to be Class II AVO sands in the deeper section and class III AVO sands in the shallow. While the Product (Intercept times Gradient) Stack added a small degree of confidence to the identification of the deeper sands it was most useful for shallow targets.

4.0 PROCESSING SEQUENCE

TRANSCRIPTION
|
LOW CUT FILTER
|
GAIN RECOVERY (t^2)
|
SWELL NOISE ATTENUATION / DE-SPIKING
|
F-K FILTER (shot domain +/- 2000 m/s)
|
SIGNATURE DECONVOLUTION (5/18-80/45, Hz/dB/Octave)
|
ADJACENT TRACE SUM
|
CDP GATHER
|
FIRST PASS VELOCITY ANALYSIS (2 km intervals)
|
MULTIPLE ATTENUATION (FK & Radon)
|
PREDICTIVE DECONVOLUTION
|
SECOND PASS (PSTM) VELOCITY ANALYSIS (1 km intervals)
|
KIRCHHOFF PRE-STACK TIME MIGRATION
|
THIRD PASS VELOCITY ANALYSIS (0.5 km intervals) (+)
| → AVO Analysis (@) (See Section 6.0)
GATHER ARCHIVE (*)
|
NMO CORRECTION & MUTES
|
CDP STACK
|
GUN & CABLE STATIC CORRECTIONS (#)
|
ZERO PHASING & PHASE MATCHED TO NORMANBY-1 WELL
|
TAU-P FILTER
|
BAND-PASS FILTER
| → Angle Stacks (&) (See Section 5.0)
POST STACK SCALING (%)

(*) Pre Stack Time Migration gather archive. NMO corrected with the final 0.5km velocities. T squared scaling backed off and Ursin spherical divergence, with dB gain, applied. See section 5 for parameter details.

(+) Final 0.5km velocities (Western format). See section 5 for parameter details.

(@) Delta Rp and Product (IxG) stack archives. See section 5 for parameter details.

(#) Raw PSTM stack archive. See section 5 for parameter details.

(&) Near, Mid and Far angle PSTM stack archive. T squared scaling backed off and Ursin spherical divergence, with dB gain, applied. See section 5 for parameter details.

(%) Final Filtered and Scaled Pre Stack Time Migration. See section 5 for parameter details.

5.0 PROCESSING TECHNIQUES

A brief description of each of the processes used in the processing sequence follows:

5.1 TRANSCRIPTION

Field data were converted to Robertson's internal format for processing. RRA's internal processing format is trace sequential, with samples in 32 bit IEEE floating point. At intermediate processing stages the data is stored on magnetic tape in sixteen-bit integer with a gain ranging scalar for each trace.

5.2 LOW-CUT FILTER

A low-cut filter of 4/18 Hz/dB/Octave was applied to the shot records.

5.3 GAIN RECOVERY

A gain function was applied to the data set to compensate for inelastic attenuation and spherical divergence losses.

Gain functions applied were as follows:

Survey	Gain Function (dB)
All	t^2

where t = two way travel time in milliseconds.

5.4 SWELL NOISE ATTENUATION

A symmetrical "velocity" filter was designed in the F-K domain to preserve the Swell noise attenuation is achieved by normalization of the amplitude spectra of selected "swell" traces.

To determine which traces are affected by swell noise the shot record is passed through an fx transform after an appropriate gain function has been applied to the data. Although swell noise is predominantly low frequency it also has a significant proportion of high frequency energy which can be more successfully predicted. The user can limit the range of frequencies they wish to perform analysis on by defining a low cut frequency with the upper limit being restricted to 3/4 of the nyquist frequency. For this data a low cut of 32 hz was defined and analysis performed up to 187.5 hz.

Swell traces are then chosen as those whose amplitude are greater than double a user defined percentile less the minimum amplitude. For this data a value of

30% was used for the user defined percentile. A scalar is then computed to normalize frequencies of the "swell" traces to the mean of the "non swell" traces. None of the calculated scalars are allowed to exceed 1 and they are smoothed with a user defined n point filter before application. For these data a nine point filter was used. The scalar is then fully applied to the amplitude spectra of the "swell" trace up to 1/2 of the user defined low cut frequency. For these data the scalar was fully applied from 0 to 16 hz. The scalar is then tapered to no scaling at the cut off frequency (32hz). The data is then passed on for further processing.

For data that exhibits strong swell noise the scalar values applied will be small, significantly changing the low frequency end of the amplitude spectra for the selected "swell" traces. For data with minimal swell noise the scalars will be close to 1 and result in little change to the low frequency end of the amplitude spectra for the selected "swell" traces. Only the selected "swell" traces are altered, all other traces are passed on for further processing unchanged.

5.5 MULTI CHANNEL FILTER (SHOT DOMAIN)

A symmetrical “velocity” filter was designed in the F-K domain to preserve the primary reflection signal and to discriminate against coherent dipping noise trains. The filter employs a cosine-squared taper from k = 0 to the velocity intercept at each frequency. The input data was conditioned with a 300 ms AGC, and the scalars preserved for removal subsequent to the application of the F-K filter. A cut off velocity of 2000 m/sec was used for the shot domain. All F-K filtering had NMO applied.

5.6 SIGNATURE DECONVOLUTION

Robertson Research's signature deconvolution routine is based on Tanner's method for estimating a minimum phase signature from a mixed phase record. The method involves the application of an inverse exponential gain to the data to force the essentially mixed phase data to minimum phase before the Wiener double inverse method (which presumes minimum phase input) is used to derive the minimum phase source signature. However, as this gain will affect the shape of the derived wavelet, it is then removed before deconvolving with the original un-gained data.

A data derived 300 ms wavelet, designed using all offsets was chosen for the sequence. An exponential gain function of -6 dB/sec was applied and removed in the wavelet estimation in accordance with Taner's method of minimum phase conditioning. The output minimum phase wavelets were generally shaped to a bandwidth of 5-80 Hz with filter slopes of 18 dB/oct for the low-cut and 45 dB/oct for the high-cut.

5.7 ADJACENT TRACE SUM

A 2:1 adjacent trace sum was applied to form a 25m shot/group interval geometry. This was applied after NMO correcting the shots with a water bottom dependent regional velocity function. A trace mix was also applied during the summation process:

Trace Mix Details :

Time (ms)	Trace Mix
0 - 3000	0 - 1 - 2 – 1 - 0
6000 - 6144	1 - 2 - 3 – 2 - 1

Summation Details :

Input Traces	Input Trace Interval	Output Traces	Output Trace Interval
444	12.5m	222	25m

5.8 CDP GATHER

The shot records were sorted into common depth point gathers.

5.9 FIRST PASS VELOCITY ANALYSIS

First pass velocities were determined using Robertson's "MGIVA" interactive velocity analysis program. Each velocity analysis comprised a semblance display, a 30 CDP stacked panel repeated 14 times with a suite of velocity functions, and a central CDP gather. The suite of functions were generated using 0%, +/-4 %, +/-8%, +/-13%, +/-19 %, +/-25%, +/-32%, and +40% increments from a central velocity function. The central function was derived from a brute velocity that varied according to water depth.

A mild F-K multiple attenuation was applied to enhance the primary energy of the data before the analyses using the following percentages of the brute velocity function: -8% at 0ms, -10% at 800ms, -12% at 2500, -18% at 4500 and -20% at 6000ms. This was applied for the purpose of the analyses only.

The velocity analysis incorporated a map of all velocity locations, and the semblance display included functions from proximate lines. This enabled the velocities to be picked with knowledge of areal velocity trends. Velocity QC could be performed more effectively when discordant velocities could be recognised on the map.

5.10 DEMULTIPLE (FK / Radon Combination)

Due to the low fold and therefore potential instability and ineffectiveness of Radon in the shallow section, F-K demultiple was employed. Multiple attenuation was performed in the F-K domain, using NMO corrected gathers with scaled primary velocity functions. F-K demultiple was fully applied from 0ms to 900ms, with zero application at 1700ms.

Time (ms)	*Velocity Percentage*
0	95
400	94
1300	92
3500	90
5000	88

In the deeper part of the data, multiples were attenuated with a parabolic Radon transform. Normal moveout corrections were performed using 100% first pass velocities. The CDP gathers were then transformed into the Tau-P domain (using 300 p values between maximum offset delta t values of -1000 ms and +3000 ms. In the Tau-p domain the primaries were muted out, leaving the multiple energy to be transformed back into the T-X domain before subtraction from the original CDP gather. Moveouts greater than 190ms (reference offset approx. 5665m) were modelled and subtracted from the data. The commencement time of multiple modelling and subtraction was 850 ms.

Adjacent CDP's were merged to form supergathers (thus reducing the potential for aliasing). After demultiple the supergathers were split back to their original component CDP's. A 300ms AGC was applied prior to, and removed after, multiple attenuation.

5.11 PREDICTIVE DECONVOLUTION

In order to attenuate the shorter period reverberations in the data, especially evident beneath areas of shallow water depth and hard water bottom, predictive (gap) deconvolution was applied. It was a two-window application with varying operator lengths and gaps. Parameter details:

Operator:		324 ms	348 ms
Gap:		24 ms	48 ms
Design Windows:	140 m	400-2400 ms	800-3500 ms
	5665 m	2500-4500 ms	2200-4700 ms
Application Windows:	140 m	0 ms	1300 ms
	5665 m	0 ms	1800 ms

7 Trace Average & White Noise: 0.1%

5.12 SECOND PASS VELOCITY ANALYSIS

The second pass of velocities were picked at 1km intervals on fully Pre-stack Time Migrated gathers using Robertson's "MGIVA" interactive velocity analysis program. Each velocity analysis comprised a semblance display, a 30 CDP stacked panel repeated 13 times with a suite of velocity functions, and a central CDP gather. The suite of functions were generated using 0%, +/-2 %, +/-4%, +/-7%, +/-11 %, +/-15% and +/-20% increments from a central velocity function. The first pass of velocities were used as the central function for this suite of velocity variant functions.

5.13 PRE-STACK TIME MIGRATION

Kirchhoff PreSTM was applied using a maximum half aperture of 300 traces (3750m). Apertures were muted with a 50% stretch mute to avoid operator aliasing. 100% smoothed second pass velocities were used in the migration. Migration was performed on all 111 offset planes.

5.14 THIRD PASS VELOCITY ANALYSIS

The third and final pass of velocities, picked at 0.5km intervals on the final Pre-stack Time Migrated gathers were again determined using Robertson's "MGIVA" interactive velocity analysis program. Each velocity analysis comprised a semblance display, a 30 CDP stacked panel repeated 13 times with a suite of velocity functions, and a central CDP gather. The suite of functions were generated using 0%, +/-2 %, +/-4%, +/-7%, +/-11 %, +/-15% and +/-20% increments from a central velocity function. The central function was derived from the second pass velocities picked earlier.

5.15 NMO CORRECTION

Fourth order NMO correction was performed using the final picked 0.5km PSTM velocity functions.

5.16 OUTER TRACE MUTE

A post-NMO outer trace mute was applied for two main reasons:

- to remove any coherent noise on the outer traces and
- to reduce contamination from the effect of NMO stretch on the far offsets.

Offset distance (m)	*Application times (ms)*
178	0
278	254
528	537

1228	909
1878	1291
3700	2700
5628	2900

5.17 PRE-STACK SCALING

A post-NMO outer trace mute was applied for two main reasons:
General Parameter Summary

Window lengths of 1200 ms and 400 ms
Equalization applied: 60
Short window stopped 4000 ms
Note: Only applied to the Raw and Final Filtered/Scaled Pre Stack Time Migrations.

5.18 INNER TRACE MUTE

A post NMO inner trace mute was applied to help remove remnant multiple energy still apparent on the inner traces following the demultiple.

Offset distance (m)	*Application times (ms)*
100	1000-tmax
600	2000-tmax

5.19 GATHER ARCHIVE

The final Pre Stack Time Migrated gathers had the t^2 scaling (applied at the beginning of the processing) backed off, were NMO corrected with the final 0.5km PSTM velocities, and an Ursin spherical divergence, with dB gain, was then applied. The Pre Stack Scaling (5.17) was not applied to the archived gathers. The dB scaling was as follows:

Constant dB Scaling

Time (ms)	*Scalar (dB)*
0	0
1000	8
2000	16
6144	16

Water bottom dependent dB Scaling

Time (ms)	*Scalar (dB)*
WB	0
WB+2000	0
WB+3000	5
WB+6000	10

5.20 COMMON DEPTH POINT STACK

The traces within each common depth point gather were summed using 1/root(N) stack compensation. Nominal fold is 111.

5.21 STATICS

A static compensation for gun and cable depths was applied. The static value applied was calculated using average gun and cable depths supplied in the observer's reports. A 9ms static correction was applied to all lines.

5.22 PHASE MATCHING

All OEP02 lines had a phase rotation of –40 degrees applied to match the wells in the area (Normanby 1 and Discovery Bay 1). Only the Final Migrations (Filtered and Scaled) were phase rotated. The raw PSTM stacks and PSTM gathers that were archived were not phase matched.

5.23 BAND PASS FILTER

Unwanted noise that lay outside the frequency range of the desired reflection and diffraction data was removed by the application of a series of zero phase time variant cosine squared tapered filters.

General parameter summary:

Application times (ms)	Frequency limits (Hz)
0	6-10-90-100
1200	6-10-90-100
2000	4-8-70-80
3000	4-6-60-70
5000	3-5-50-60
6000	3-5-45-55

5.24 ANGLE STACKS

Using the full fold inner and outer trace mutes, the remaining “live” data was split into three (equal fold) to produce near, mid and far angle stack datasets. The Pre Stack Scaling (5.17), Phase Matching (5.21) and Post Stack Scaling (5.24) were omitted from the angle stack flow. The T squared scaling was backed off (prior to NMO correction) and an Ursin spherical divergence , with constant dB scaling and a water bottom dependent scaling, was applied. Scaling was as follows:

Constant dB Scaling

Time (ms)	*Scalar (dB)*
0	0
1000	8
2000	16
6144	16

Water bottom dependent dB Scaling

Time (ms)	*Scalar (dB)*
WB	0
WB+2000	0
WB+3000	5
WB+6000	10

5.25 POST STACK SCALING

A dual window, time variant AGC method was used for post stack scaling. The negative effects normally associated with AGC are avoided by employing two different length windows to determine the amplitude model (using the minimum of the two mean amplitudes determined at each sample), then conditioning the model by a weighted mix with the amplitude model derived from a single window per trace.

General parameter summary

Window lengths of 1200 ms and 400 ms
Equalization applied: 60
Short window stopped 4000 ms
Note: Only applied to the Final Filtered/Scaled Pre Stack Time Migration. No post stack scaling was applied to the Pre Stack Time Migrated angle stacks.

6.0 AVO PROCESSING

The AV0 processing sequence was identical to the regular processing up to and including pre-stack migration. The subsequent processing is described below.

6.1 NMO CORRECTION

Fourth order NMO correction was performed using the final picked 0.5km PSTM velocity functions.

6.2 SPHERICAL DIVERGENCE

Removal of t-squared gain (prior to NMO) and application of spherical divergence using the Ursin (Geophysics, 1990) approximation. In addition an 8 dB/s gain was applied.

6.3 TRACE MIX

A1-1-1 running trace mix was applied to the CDP gathers.

6.4 PHASE ROTATION

A phase rotation of –40 degrees was applied to the data to achieve SEG positive polarity.

6.5 PRE-STACK SCALING

A single trace, long window Equalisation was applied to the data. We assume that the average overall AVO effect over the window of data will be negligible since it contains reflections from a large number of interfaces with both amplitude increases and decreases with offset.

6.6 INNER TRACE MUTE

A post NMO inner trace mute was applied to help remove remnant multiple energy still apparent on the inner traces following the demultiple.

Offset distance (m)	*Application times (ms)*
100	1000-tmax
600	2000-tmax

6.7 BAND PASS FILTER

Unwanted noise that lay outside the frequency range of the desired reflection and diffraction data was removed by the application of a series of zero phase time variant cosine squared tapered filters.

General parameter summary:

Application times (ms)	Frequency limits (Hz)
0	6-10-90-100
1200	6-10-90-100
2000	4-8-70-80
3000	4-6-60-70
5000	3-5-50-60
6000	3-5-45-55

6.8 AVO ANALYSIS

AVO analysis was then applied using the Shuey Approximation. A velocity function was used to calculate the angle of incidence at each layer boundary and then interpolated to produce the angle of incidence at each time sample and offset. A robust linear regression was used to calculate the intercept and gradient of the amplitudes at each time sample (Walden, 1991). Angle ranges in the order of 0 to 45 degrees were examined. Two types of attributes were produced from this analysis; Product (Intercept times Gradient) and Delta Rp (based on cross-plotting intercept and gradient). These attributes are plotted with SEG positive standard polarity.

6.9 COMMON DEPTH POINT STACK

The attribute generated for each gather was stacked using 1/N stack compensation.

6.10 STATICS

A static compensation for gun and cable depths was applied. The static value applied was calculated using average gun and cable depths supplied in the observer's reports. A 9ms static correction was applied to all lines.

6.11 DISPLAY

The two types of attribute displays are explained below.

Delta Rp

This method is based on the concept of cross plotting AVO measurements. Data input to the cross plot are Rp (or Intercept) and the Gradient measurement from the seismic gathers. The Robertson Research algorithm calculates a lithological trend from the Rp and Gradient data. This trend represents the average response of brine-filled rocks in the analysis window. Unusual rocks, like gas-filled sands are displaced from this wet trend. The Delta Rp calculation is the reflectivity separation between a data point with anomalous reflectivity and the trend. The top of a class III hydrocarbon saturated sand unit is displayed as a blue anomaly, whereas the base is a red anomaly. All anomalous points to the left of the lithological trend in the cross-plot are plotted in blue while all anomalous points to the right of the lithological trend are plotted in red.

Product (Intercept times Gradient)

I represents intercept, which is the zero offset reflection coefficient and G represents gradient, which is essentially the change in amplitude with offset at any particular time sample within a CDP gather. This plot style tends to give the largest anomalies at the top and base of gas sands with low acoustic impedance. This plot normally serves to highlight events in the CDP gather with either high intercepts or high gradients. The calculation uses the sign of both the intercept and gradient as the sign of the product is used in the interpretation of the results.

7.0 ACQUISITION PARAMETERS

Data recorded by:	Multiwave Geophysical Company
Date recorded:	2002
Vessel:	R/V Polar Duke
Seismic Source:	
Type:	Sleeve Airgun
Pressure/Volume:	2000 psi / 3500 cu.in.
Depth:	5m
Shot interval:	25m
Gun delay:	0
Recording System:	
Record length:	6144 ms
Sample interval:	2 ms
Filters:Low	3 Hz - 6 dB / Octave
:High	206 Hz – 276 dB / Octave
Streamer:	
Streamer length:	5537.5 m
Streamer depth:	9 m
No. of groups:	444
Near group no:	444
Group interval:	12.5 m
Near group offset:	140 m
Antenna-source:	130.4 m
SP annotation:	SHOTPOINT

APPENDICES

A.1 LINE LISTING

Line	1st SP	Lst SP	SP Int	Kms
OEP02-02	1001	2388	25	34.70
OEP02-04	1001	2585	25	39.63
OEP02-05	1001	2056	25	26.40
OEP02-06	2611	882	25	43.25
OEP02-07	1999	882	25	27.95
OEP02-08	1638	994	25	16.13
OEP02-09	1947	882	25	26.65
OEP02-11	1001	2010	25	25.25
OEP02-13	2207	882	25	33.15
OEP02-15	2265	882	25	34.60
OEP02-17	1001	2122	25	28.05
OEP02-19	1001	2408	25	35.20
OEP02-21	2335	882	25	36.35
OEP02-23	1001	2405	25	35.13
OEP02-25	2426	882	25	38.63
OEP02-27	1001	2116	25	27.90
OEP02-29	2414	882	25	38.33
OEP02-31	2100	882	25	30.48
OEP02-33	1001	2065	25	26.63
OEP02-35	2410	882	25	38.23
OEP02-37	1001	2040	25	26.00
OEP02-39	1001	2432	25	35.80
OEP02-41	1001	1978	25	24.45
OEP02-43	2246	882	25	34.13
OEP02-45	1001	1786	25	19.65
OEP02-47	1701	882	25	20.50
			Total Kms	803.13

A.2 DELIVERABLES

Item	Format	Media	Tape No.
Raw Migration and Final Filtered/Scaled Migrations (Original)	SEGY	Exabyte	225FM001E
Raw Migration and Final Filtered/Scaled Migrations (Copy 1)	SEGY	Exabyte	225FM002E
Raw Migration and Final Filtered/Scaled Migrations (Copy 2)	SEGY	Exabyte	225FM003E
Near, Mid & Far Filtered Migrations (Original)	SEGY	Exabyte	225FM005E
Near, Mid & Far Filtered Migrations (Copy 1)	SEGY	Exabyte	225FM006E
Near, Mid & Far Filtered Migrations (Copy 2)	SEGY	Exabyte	225FM007E
Final (PSTM) Velocities 0.5km Intervals (Original plus 3 copies)	Western	CD	225FV050CD - 225FV053CD
Final Processing Report (Original plus 3 Copies)	PDF	CD	225FR054CD - 225FR057CD
Pre-Stack Time Migration gathers (Original)	SEGY	DVD	225GA042DVD - 225GA068DVD
Pre-Stack Time Migration gathers (Original)	SEGY	3590	225GA009C - 225GA019C
Pre-Stack Time Migration gathers (Copy 1)	SEGY	3590	225GA020C - 225GA030C
Pre-Stack Time Migration gathers (Copy 2)	SEGY	3590	225GA031C - 225FA041C
AVO Attribute Analysis Delta Rp (1 of 2) (Original)	SEGY	CD	225AV042CD - 225AV043CD
AVO Attribute Analysis Delta Rp (2 of 2) (Copy 1)	SEGY	CD	225AV046CD - 225AV047CD
AVO Attribute Analysis Product (1 of 2) (Original)	SEGY	CD	225AV044CD - 225AV045CD
AVO Attribute Analysis Product (2 of 2) (Copy 1)	SEGY	CD	225AV048CD - 225AV049CD
Final Migration Digital Files (Original plus 3 Copies)	CGM+	CD	225FD058CD - 225FD061CD
Final Migrations (Paper displays)	Paper Print (1:50,000 scale, 10cm/sec)		

A.3 POLARITY

Dataset	Output Polarity	Comments
Raw Migrations	SEG -ve	Minimum Phase
PSTM Angle Stacks	SEG -ve	Minimum Phase
Final Filtered/Scaled Migrations	SEG -ve	Zero Phase (Matched to Wells)
Pre-Stack Time Migrated gathers	SEG -ve	Minimum Phase
Delta Rp Stack	SEG +ve	Zero Phase (Matched to Wells)
Product (I x G) Stack	SEG +ve	Zero Phase (Matched to Wells)