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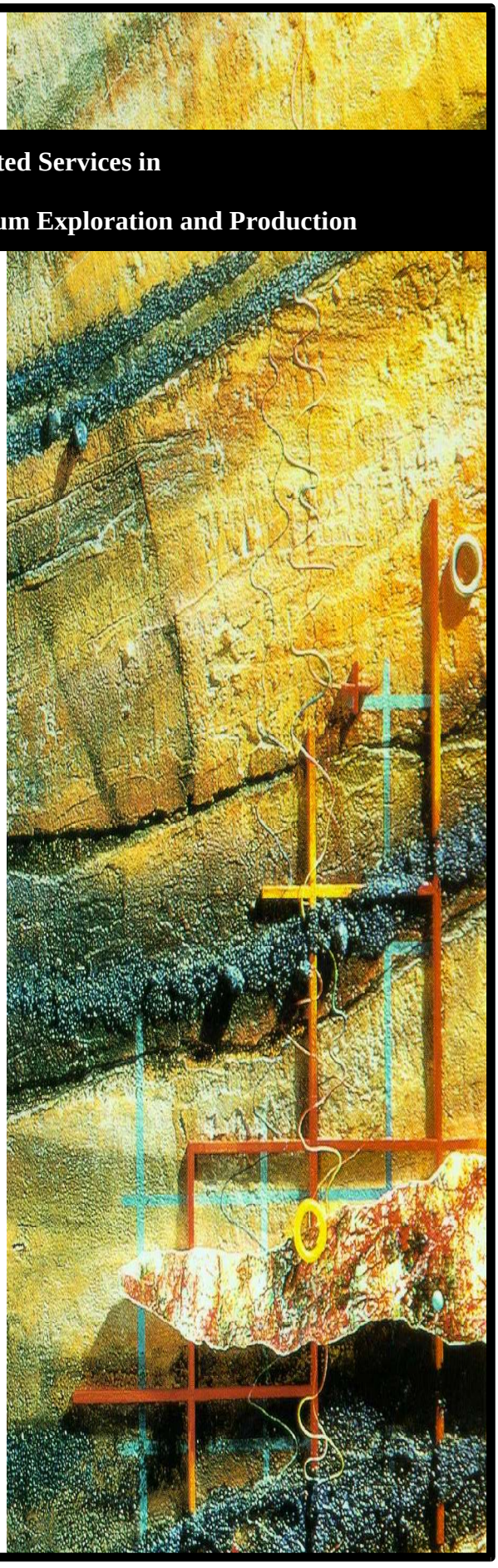

Processing Report

for

2004 T/36P
2D Reprocessing

Area:
Sorell Basin
T/36P

September 2004

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1 INTRODUCTION

The 2004 T/36P 2D Reprocessing consisted of 49 lines totalling 1489km. The data covered permit T/36P in the Sorell Basin and consisted of 2 vintages. Processing began in May 2004 and was completed in September 2004.

Water depths varied across the two surveys surveys from 100ms to 1400ms. Processing parameters were modified to deal with this varying water bottom. Processing parameters for the two vintages were consistent, with variations due to different cable lengths and shooting geometries only. The W81 vintage did have an extra trace interpolation phase prior to the Tau-P deconvolution so as to have sufficient spatial sampling to avoid aliasing after the Tau-P transform.

1.1 PERSONNEL

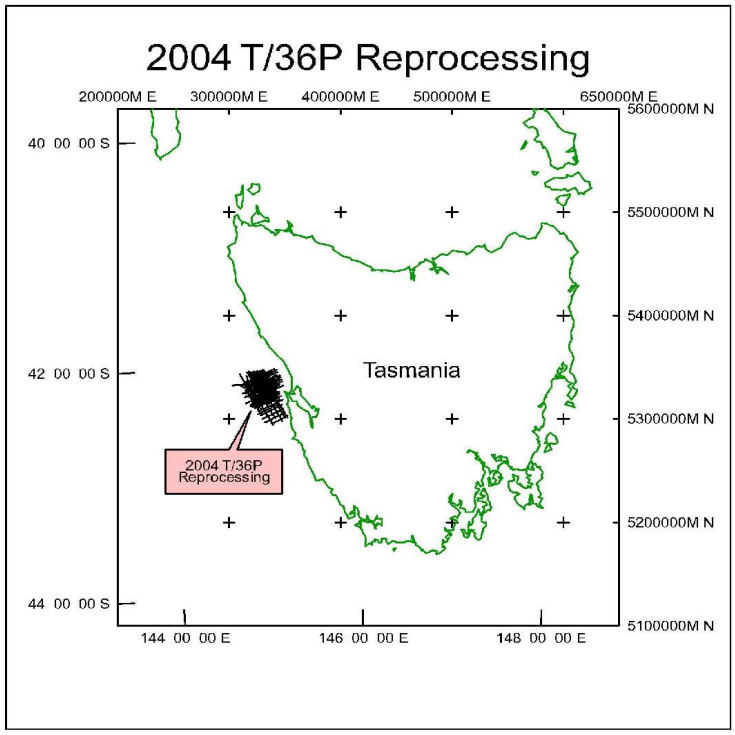
Robertson Research Australia

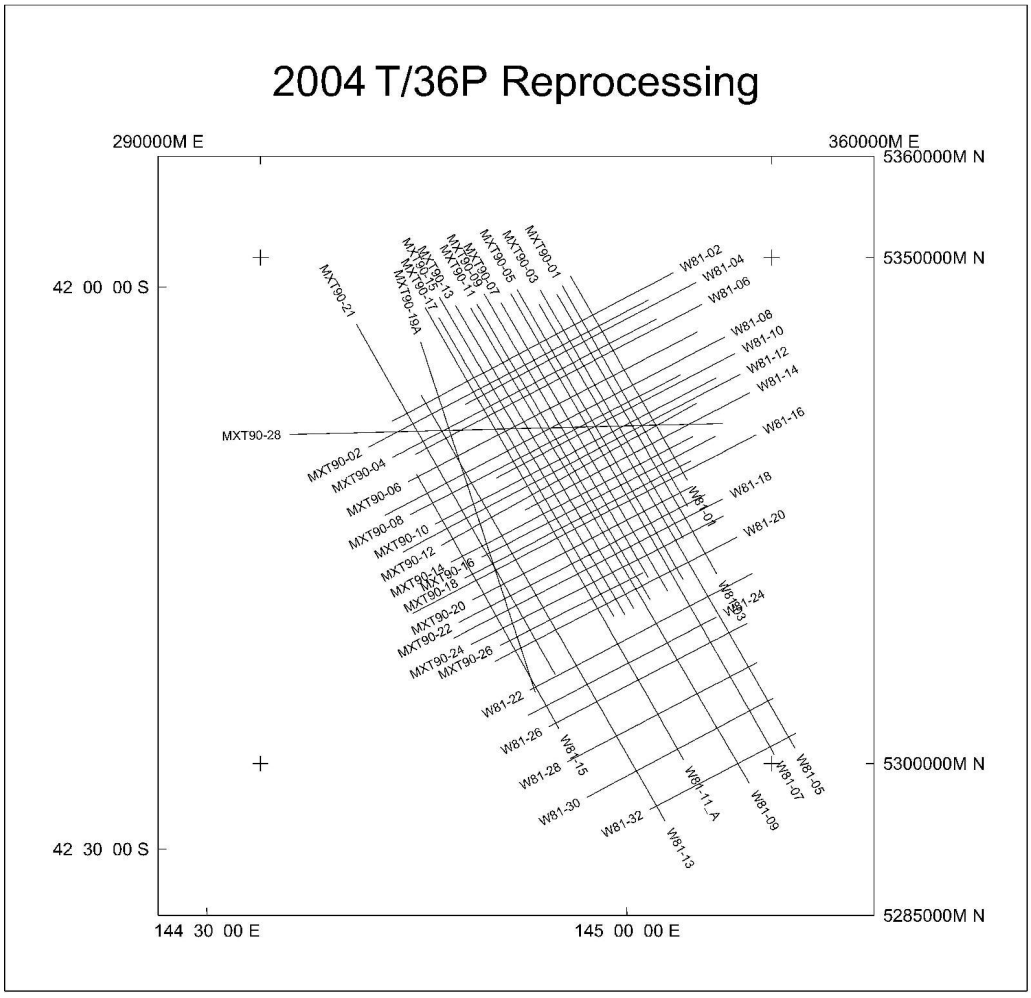
Simon Stewart	Marine 2D Manager
Paul Phythian	Geophysicist
Heidi Best	Geophysicist

Santos Limited

Stuart Brew	Senior Staff Geophysicist
John Cant	Consultant
Bruce Hawkes	Consultant

1.2 LOCATION MAP





2 PARAMETER TESTING

One line from each vintage was selected by Santos for testing purposes. MXT90-28 was used for the MXT vintage and W81-12 was used for the W81 vintage.

The following table provides a succinct list of tests performed:

Description	***Format***
Raw displays	Shot
F-K analysis	Shot
Gain recovery	Shot
FK filter	Shot/Stack
Linear Tau-P Noise Removal	Shot/Stack
Tau-P Deconvolution	Shot/Stack
Signature Deconvolution	Shot/Stack
F-K and Radon demultiple	Gather/Stack
Predictive deconvolution (before stack)	Gather/Stack
Pre stack migration velocity field smoothing	Velocity profile
Pre stack migration aperture	Stack
Stack mutes (outer and inner trace)	Gather/Stack
Pre stack scaling	Gather/Stack
Predictive deconvolution after stack	Stack
Relative amplitude	Stack
Zero Phasing	Stack
Post stack scaling	Stack
Phase Rotation	Stack

Parameter tests were presented as paper displays, or ftp'd to Santos in SEGY format for evaluation on screen.

3 COMMENTS & CONCLUSION

The 2004 T/36P Reprocessing began in May 2004 and was completed in September 2004. The project was ready to be archived in August however we were waiting on updated navigation so that both surveys had navigation that was at the same datum. This navigation wasn't available in the end and the archives were done without any x/y's in the headers. Both vintages gave good ties within the same vintage, but the two vintages did not tie.

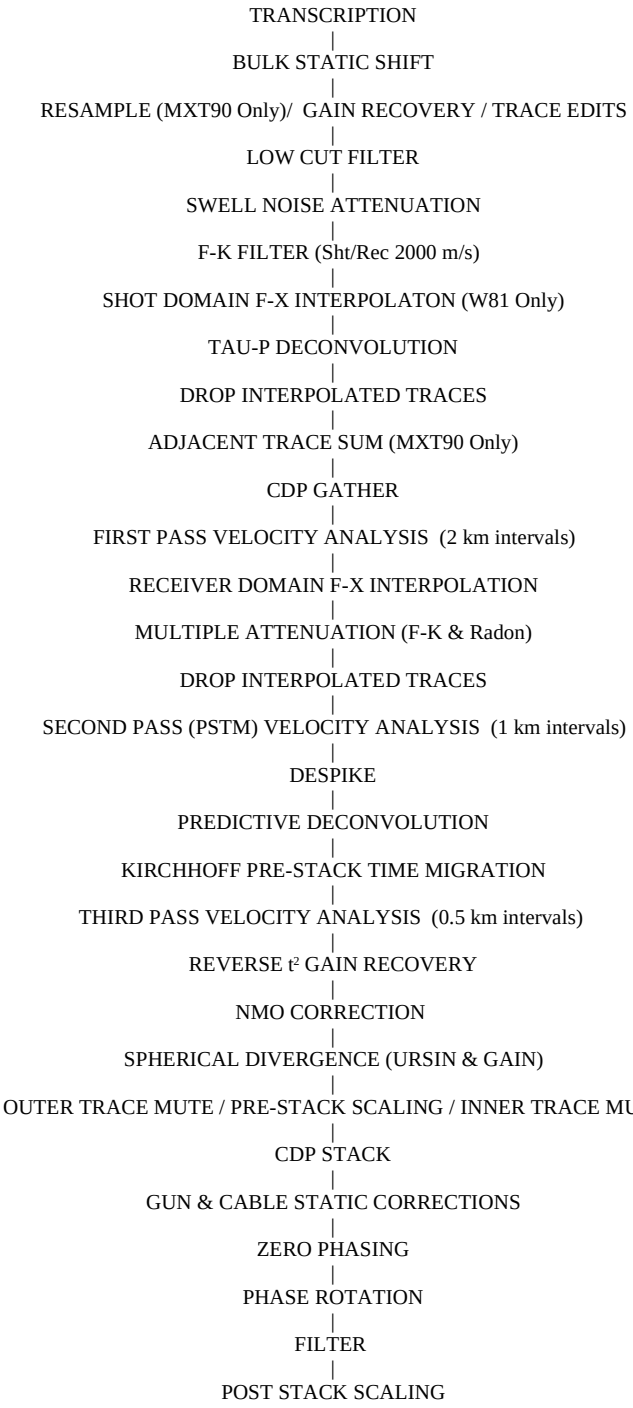
The processing flow was chosen after testing of the 2 test lines mentioned in the previous section, with the flow varying only slightly across the two vintages. This difference was the extra trace interpolation done for the W81 vintage so as to have sufficient spatial sampling for the Tau-P transform.

The final data was zero phased, using a Weiner-Levinson double inversion method, with the resultant data then phase rotated to produce the best zero phase trough (Seg -ve) at the water bottom.

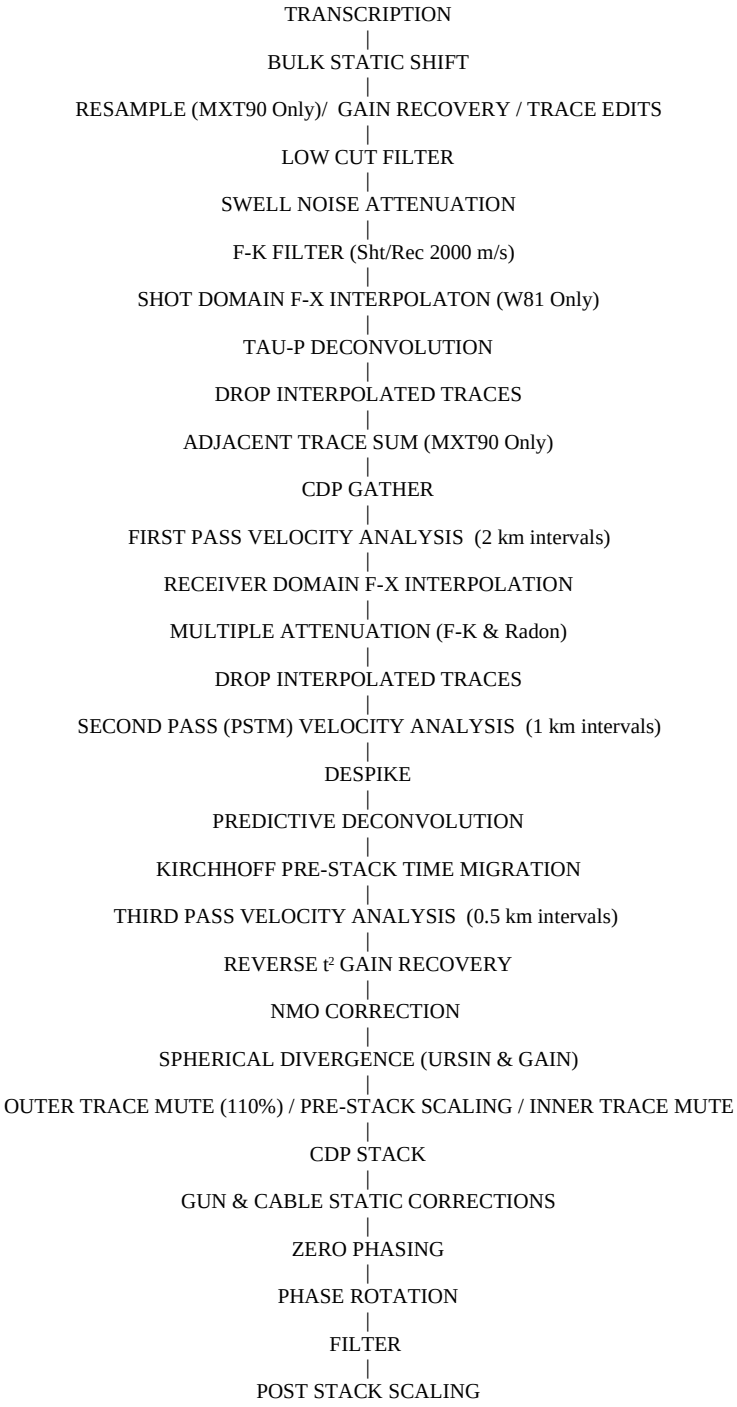
All processing parameters have been detailed in Section 5 – Processing Description.

4 PROCESSING SEQUENCE

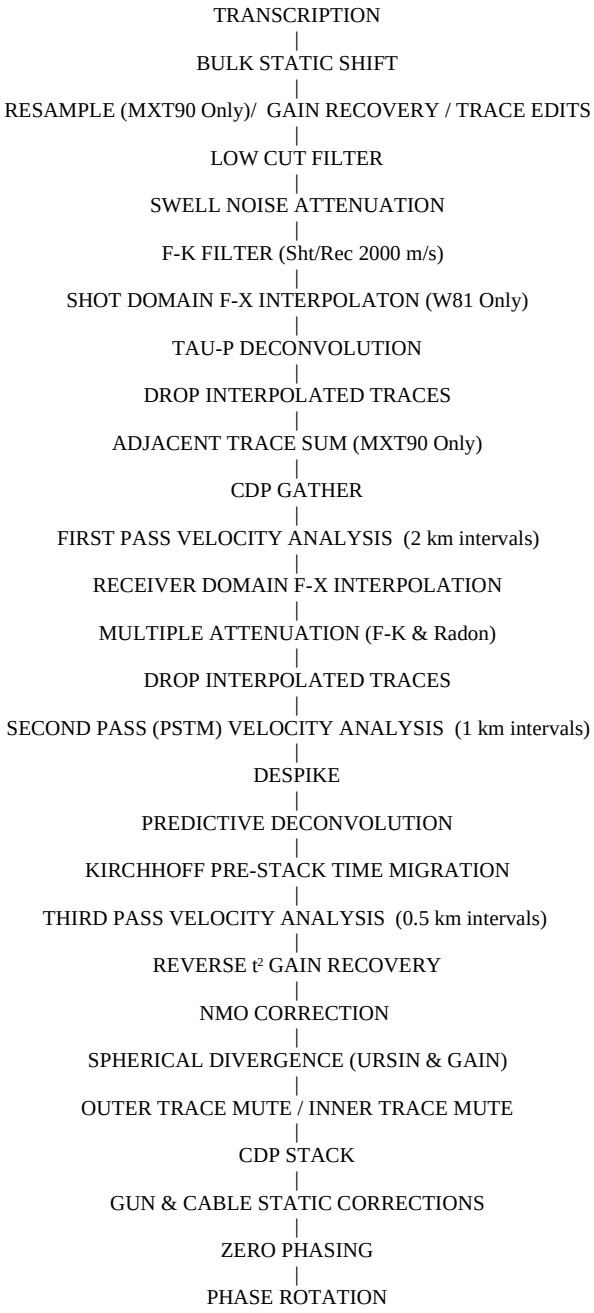
4.1 PSTM (FILTERED & SCALED)



4.2 PSTM ANGLE STACKS (FILTERED & SCALED)



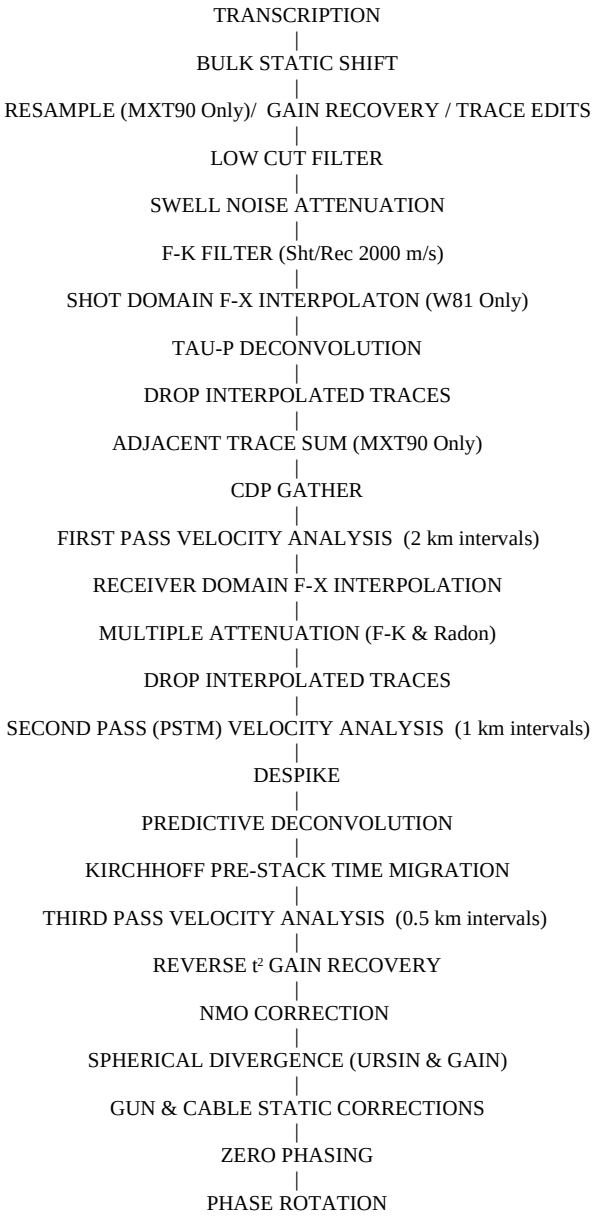
4.3 PSTM (RAW)


TRANSCRIPTION
BULK STATIC SHIFT
RESAMPLE (MXT90 Only)/ GAIN RECOVERY / TRACE EDITS
LOW CUT FILTER
SWELL NOISE ATTENUATION
F-K FILTER (Sht/Rec 2000 m/s)
SHOT DOMAIN F-X INTERPOLATON (W81 Only)
TAU-P DECONVOLUTION
DROP INTERPOLATED TRACES
ADJACENT TRACE SUM (MXT90 Only)
CDP GATHER
FIRST PASS VELOCITY ANALYSIS (2 km intervals)
RECEIVER DOMAIN F-X INTERPOLATION
MULTIPLE ATTENUATION (F-K & Radon)
DROP INTERPOLATED TRACES
SECOND PASS (PSTM) VELOCITY ANALYSIS (1 km intervals)
DESPIKE
PREDICTIVE DECONVOLUTION
KIRCHHOFF PRE-STACK TIME MIGRATION
THIRD PASS VELOCITY ANALYSIS (0.5 km intervals)
REVERSE t² GAIN RECOVERY
NMO CORRECTION
SPHERICAL DIVERGENCE (URSIN & GAIN)
OUTER TRACE MUTE / INNER TRACE MUTE
CDP STACK
GUN & CABLE STATIC CORRECTIONS
ZERO PHASING
PHASE ROTATION

4.4 PSTM ANGLE STACKS (RAW)

TRANSCRIPTION
|
BULK STATIC SHIFT
|
RESAMPLE (MXT90 Only)/ GAIN RECOVERY / TRACE EDITS
|
LOW CUT FILTER
|
SWELL NOISE ATTENUATION
|
F-K FILTER (Sht/Rec 2000 m/s)
|
SHOT DOMAIN F-X INTERPOLATON (W81 Only)
|
TAU-P DECONVOLUTION
|
DROP INTERPOLATED TRACES
|
ADJACENT TRACE SUM (MXT90 Only)
|
CDP GATHER
|
FIRST PASS VELOCITY ANALYSIS (2 km intervals)
|
RECEIVER DOMAIN F-X INTERPOLATION
|
MULTIPLE ATTENUATION (F-K & Radon)
|
DROP INTERPOLATED TRACES
|
SECOND PASS (PSTM) VELOCITY ANALYSIS (1 km intervals)
|
DESPIKE
|
PREDICTIVE DECONVOLUTION
|
KIRCHHOFF PRE-STACK TIME MIGRATION
|
THIRD PASS VELOCITY ANALYSIS (0.5 km intervals)
|
REVERSE t^2 GAIN RECOVERY
|
NMO CORRECTION
|
SPHERICAL DIVERGENCE (URSIN & GAIN)
|
OUTER TRACE MUTE (110%) / INNER TRACE MUTE
|
CDP STACK
|
GUN & CABLE STATIC CORRECTIONS
|
ZERO PHASING
|
PHASE ROTATION

4.5 PSTM GATHERS



5 PROCESSING DESCRIPTION

5.1 TRANSCRIPTION

The field data was converted to Robertson Research Australia's internal seismic data format (UNISEIS). UNISEIS format is trace sequential, with samples stored as 32 bit IEEE floating point. At intermediate processing stages the data samples are written as sixteen-bit integer on magnetic tape, with a 32 bit floating point gain ranging scalar for each trace. When reading the SEGD and SEGY format shot records, strategic header values related to acquisition were preserved (where available).

5.2 STATICS

A -51.2ms static shift was applied to the MXT90 vintage to compensate for the system delay. After comparing water bottoms times between the two vintages it was deduced that a -18ms static shift be applied to the W81 vintage. As well as producing a good correlation between the near offset and the observed direct arrival, it meant the water bottom would stack in at a more appropriate velocity (approximately 1510m/s).

5.3 RESAMPLE

The MXT90 data was resampled in the frequency domain from 2ms to a 4ms sample period. The W81 vintage was already at 4ms sample rate.

5.4 GAIN RECOVERY

A t^2 gain correction was applied to all vintages as an initial approximate compensation for spherical spreading amplitude losses.

5.5 TRACE EDITS

Noisy and bad traces were identified from both observers logs and near trace displays / shot displays, and were removed prior to further processing.

5.6 LOW-CUT FILTER

A low-cut filter of 4/12 Hz/dB/Octave was applied.

5.7 SWELL NOISE ATTENUATION

Swell noise attenuation is achieved by shaping the amplitude spectra of selected "swell noise affected" traces.

Analysis and attenuation are performed in the FX domain, processing one source position at a time. For analysis, the amplitude spectra are normalised, considering only the higher frequency range which is less influenced by swell noise. After normalisation the swell noise traces are recognised by their relatively high amplitude, low frequency component. The shallow portion

of each shot record is muted before analysis, removing the high amplitude shallow reflections and direct arrivals.

The user nominates a frequency range for analysis, and for spectral scaling. Typically this frequency range is from 0 to 32 Hz. Scalars are calculated to shape the spectra of individual swell noise affected traces to the mean of the non swell noise affected traces. The scalars are fully applied from 0 to one half the defined frequency range, after which the scalars are tapered to zero application at the maximum defined frequency. No modification is made to other traces.

The mechanism of swell noise recognition is not influenced by change in source energy, or by systematic variation in trace amplitude levels. Shots not affected by swell noise will not present any traces for swell noise attenuation.

The swell noise attenuation is monitored by recording the number of channels flagged as being affected by swell noise.

After application of swell noise attenuation, some high frequency noise was evident on the shot records. These spikes were attenuated with a mild 'despike' process. Amplitudes were measured in windows of 80ms length. The matrix was composed of seven consecutive time windows across 39 adjacent channels. The amplitude of the centre window is compared to the rest of the matrix and the centre window is defined as containing a spike if the peak to median ratio is greater than 10, or if the centre window median value exhibits more than 5.5 units of standard deviation from the average median. Spike affected windows are scaled to the mean of the matrix.

Despike was only performed in deeper parts of the shot record – commencing at seafloor two way time plus 3 seconds on the nearest offset, and with despike start times following a 1500m.s^{-1} parabolic 'NMO' curve on longer offsets.

5.8 MULTI CHANNEL FILTER (SHOT & RECEIVER 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. Filtering was applied in both the short and receiver domains. The input data was conditioned with a 300ms 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 both the shot and receiver F-K in the filter design and NMO was applied before and removed after the filter.

5.9 F-X INTERPOLATION

The W81 vintage, having only 96 channels at 25m trace spacing, required F-X interpolation (shot domain) prior to Tau-P Deconvolution to ensure adequate spatial sampling. Processing was performed by interpolating a single trace in the centre of two original traces, using a window length of 750ms.

5.10 TAU-P DECONVOLUTION

The data was transformed into the Tau-P domain using a transform of +/- 3000ms at an increment of 10ms using a reference offset of 3894m (MXT90) & 2576m (W81).
Predictive deconvolution was performed in Tau-P space to target water layer reverberations. Design windons varied according to the water bottom. A 300ms operator with gap length varied by wb -40ms.

Application of the Tau-P deconvolution varied according to the apparent seafloor slope. In areas of steep slope the deconvolution was only applied for water bottom times of less than 400ms and tapered off at 600ms.
Interpolated traces were dropped after the Tau-P Deconvolution.

5.11 ADJACENT TRACE SUM

A 2:1 adjacent trace sum was applied only to the MXT90 vintage. A trace mix was also applied during the summation process.

Summation details:

Vintage	*Input Traces*	*Input Trace Interval*	*Output Traces*	*Output Trace Interval*
MXT90	300	12.5m	150	25m

Trace Mix Details:

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

5.12 CDP GATHER

Shot records were sorted into common depth point gathers. Nominal Fold is as follows:

Vintage	MXT90	W81
Fold	75	48

5.13 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 -25% at 10000ms. 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.

5.14 F-X INTERPOLATION

All data underwent F-X interpolation (receiver domain) with a window length of 1000ms. Processing was performed by interpolating a single trace in the centre of two original traces.

5.15 RADON MULTIPLE ATTENUATION

Attenuation of multiples was achieved by modelling and subtraction using a least squares, parabolic Radon transform. Normal moveout corrections were performed using the first pass velocities, and the CDP gathers transformed into the parabolic Tau-P domain. The segment of the Tau-P domain corresponding to primary reflections is muted, leaving the multiple energy to be transformed back into the T-X domain and subtracted from the original CDP gather.

Reference offset	Far offset of the respective vintage
Frequency range	4-90 Hz
Minimum p	-1000 *(parabolic moveout, Delta-t, at reference offset)*
Maximum p	+3500
Number of p traces	450
Multiple p cut	MXT90 0ms/200;1000ms/200;2000ms/75;6144ms/50 W81 0ms/132;1000ms/132;2000ms/50;6144ms/33
Demultiple start time	Water bottom time + 800ms.

5.16 FK MULTIPLE ATTENUATION

F-K demultiple was used to attenuate a strong multiple train evident in the near surface. Normal moveout correction was performed using the picked first pass velocities, slowed by the percentages listed below. When NMO corrections are performed with these slowed velocities the primary events are over corrected and show negative dip, and the multiples will have positive dip. After FK transform the multiples and primaries will appear in different quadrants. Multiple attenuation can then be effected by filtering the positive quadrant before applying the inverse transform. FK demultiple was fully applied from 0ms to 700ms with zero application at 1200ms.

Time (ms)	***Velocity %***
0	94
800	94
3500	90
6000	86

Application times are with respect to gathers without NMO corrections.
A 300ms AGC was applied before the FK transform, and the scalars preserved for later removal. All interpolated traces were dropped after demultiple.

5.17 SECOND PASS VELOCITY ANALYSIS

Second pass velocity analysis was performed on Pre-stack migrated gathers. The first pass velocity field was used as centre functions for Robertson Research's interactive velocity analysis package, MGIVA.

Analysis was performed at 1 km intervals. A suite of 14 pre computed stack panels were displayed with +20%, +/-16%, +/-12%, +/-8%, +/-6%, +/-4%, +/-2% and 0% velocity variation from the central function. The MGIVA velocity analysis is a 'map driven' package, where the

user can instantly see modifications to the velocity field in map or section view. Neighbouring velocity functions are superimposed on the current location for easy recognition of velocity trends. Velocity interpretation is performed on the pre-computed stack suite, or on a colour contoured semblance display. Semblance interpretation is assisted with markers illustrating the position of potential water layer peg-leg multiples, and with an interval velocity curve.

5.18 DESPIKE

Despike was performed on all data. Amplitudes were measured in a matrix of time windows of 80ms length. The matrix was composed of seven consecutive time windows across 39 adjacent channels. The amplitude of the centre window is compared to the rest of the matrix and the centre window is defined as containing a spike if the peak to median ratio is greater than 10, or if the centre window median value exhibits more than 5.5 units of standard deviation from the average median. Spike affected windows are scaled to the mean of the matrix.

5.19 PREDICTIVE DECONVOLUTION

Predictive deconvolution was utilised to attenuate short period reverberations, and to broaden the amplitude spectrum. Deconvolution was applied using two windows with the design and application parameters spatially varied according to water depth.

Deconvolution parameters;

Operator plus gap:	248ms / 260ms
Gap length:	48ms / 60ms
White noise:	0.10%
Trace Averaging:	7 Trace

5.20 KIRCHHOFF PRE STACK MIGRATION

Full Pre-Stack Kirchhoff migration was applied using the azimuth cognizant migration algorithm in straight ray mode, with a 7500m half aperture. Apertures were muted with a 50% stretch mute to avoid operator aliasing. The velocity field was constructed by smoothing the second pass velocities. Migration was performed on all offset planes.

5.21 THIRD PASS VELOCITY ANALYSIS

The third pass velocity analysis was performed on the Pre-stack migrated gathers. The second pass velocity field was used as centre functions for Robertson Research's interactive velocity analysis package, MGIVA.

Analysis were performed at 500m intervals. A suite of 14 pre computed stack panels were displayed with +20%, +/-16%, +/-12%, +/-8%, +/6%, +/-4%, +/-2% and 0% velocity variation from the central function.

5.22 REVERSING OF GAIN RECOVERY

The t^2 gain correction applied in section 5.4 to compensate for spherical spreading amplitude losses was reversed for both vintages.

5.23 NMO CORRECTION

NMO correction was performed using the third pass (final) PSTM velocities.

5.24 SPHERICAL DIVERGENCE (URSIN & GAIN)

With the previously applied t^2 gain function removed, it was then replaced with an offset and velocity dependent spherical divergence approximation as described by Bjorn Ursin (GEOPHYSICS Vol.55 No.4, pp492-496 1990).

$$\sqrt{\frac{T0\times V^4}{V0^2}+(2\times(\frac{V}{V0})^2-1)\times X^2+\frac{X^4\times(\frac{1}{V0^2}-\frac{1}{V^2})}{t0^2}}$$

Where T0 is the two way travel time, V is the RMS velocity at T0, and V0 is the velocity in the first layer. Although this method is applicable to uncorrected data as a moveout tracking divergence correction, for algorithmic ease it is applied to NMO corrected CDP gathers.

Along with the URSIN spherical divergence, water bottom dependent dB scaling was also applied.

Scaling was as follows:

Time (ms)	***Scalar (dB)***
WB	0
WB+1000	0
WB+2000	12
WB+3000	12
WB+5000	12
WB+6000	12

5.25 OUTER TRACE MUTE

A post NMO outer trace mute was applied to remove any coherent noise on the outer traces and to reduce contamination from the effect of NMO stretch on the far offsets. Muting parameters were spatially varied according to seafloor two way time.

WB Time = 100ms		***WB Time = 1500ms***	
Offset (m)	***Time (ms)***	***Offset (m)***	***Time (ms)***
156	0	156	1300
256	0	856	1300
856	800	1856	2300
3956	3200	3956	3500

5.26 PRE-STACK SCALING

Amplitude balance was performed with a two window AGC with control over the strength of application.

Window Lengths	400ms / 1200ms
Equalisation	60%

Note: Scaling was only applied to the Final Filtered and Scaled PSTM stack datasets. No pre-stack scaling was applied to the archived Raw PSTM stacks nor the gathers.

5.27 INNER TRACE MUTE

An inner trace mute was designed and applied for each vintage for two main reasons :

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

Vintage	***WB Time = 100ms Offset (m) / Application time (ms)***	***WB Time = 1500ms Offset (m) / Application time (ms)***
MXT90	150/1000-6144 600/2000-6144	150/2000-6144 800/2500-6144
W81	150/1000-5000 600/2000-5000	150/2000-5000 800/2500-5000

5.28 CDP STACK

The traces within each CDP bin were summed using a 1/root(N) stack compensation. The angle stacks were summed using 1/N stack compensation.

5.29 GUN AND CABLE DEPTH CORRECTION

A static correction was applied to correct for the source and streamer depth across all vintages as per observers logs.

Vintage	***Static Correction (ms)***
MXT90	12
W81	12

5.30 CONVERSION TO ZERO PHASE

The data was converted from minimum phase data to zero phase, using the Weiner-Levinson double inversion method to derive an operator based on the amplitude spectrum.

5.31 PHASE ROTATION

All lines were phase matched to produce the best looking zero phase water bottom. All estimations were calculated by Robertson and confirmed by Santos.

Vintage	Rotation (degrees)	Shift (ms)
MXT90	180	0
W81	180	0

5.32 FILTER

Unwanted noise that lay outside the frequency range of the desired reflection data was attenuated with application of a series of zero phase time variant filters. These filters employed cosine squared tapers between the limiting frequency pairs.

Application time (ms)	*Frequency limits (Hz)*
1200	6 / 10 – 60 \ 70
2000	4 / 8 – 40 \ 50
3000	4 / 6 – 30 \ 40
5000	3 / 5 – 20 \ 30
6000	3 / 5 – 15 \ 25

5.33 POST STACK SCALING

Amplitude balance was performed with a two window AGC with control over the strength of application.

Window Lengths	400ms / 1200ms
Equalisation	60%

Note: Scaling was only applied to the Final Filtered and Scaled PSTM stack datasets. No post-stack scaling was applied to the Raw PSTM stacks that were archived nor the gathers.

5.34 ANGLE STACKS

Using the full inner trace mute and 110% of the outer trace mutes, the remaining 'live' data was split 50% / 50% to produce near and far angle stacks on both the raw and the filtered/scaled PSTM data.

6 APPENDICES

6.1 LINE LISTING

Test lines have been highlighted in red.

LINE	First SP	Last SP	Shot Int	CDP	KMS
MXT90-01	100	1054	25	2058	23.88
MXT90-02	100	1265	25	2480	29.15
MXT90-03	1082	26	25	2262	26.43
MXT90-04	1117	25	25	2334	27.33
MXT90-05	100	1357	25	2664	31.45
MXT90-06	100	1302	25	2554	30.08
MXT90-07	100	1338	25	2626	30.98
MXT90-08	1143	25	25	2386	27.98
MXT90-09	1242	25	25	2584	30.45
MXT90-10	100	1266	25	2482	29.18
MXT90-11	1301	26	25	2700	31.90
MXT90-12	100	1170	25	2290	26.78
MXT90-13	100	1414	25	2778	32.88
MXT90-14	1019	25	25	2138	24.88
MXT90-15	100	1478	25	2906	34.48
MXT90-16	100	1058	25	2066	23.98
MXT90-17	1317	25	25	2734	32.33
MXT90-18	950	25	25	2000	23.15
MXT90-19A	1419	26	25	2936	34.85
MXT90-20	100	998	25	1946	22.48
MXT90-21	100	1613	25	3176	37.85
MXT90-22	1040	25	25	2180	25.40
MXT90-24	100	1134	25	2218	25.88
MXT90-26	580	25	25	1260	13.90
MXT90-28	1643	24	25	3388	40.50
W81-01	1	932	25	1958	23.30
W81-02	1	1255	25	2604	31.38
W81-03	1	1269	25	2632	31.73
W81-04	1	1001	25	2096	25.03
W81-05	1	2025	25	4144	50.63
W81-06	1	1270	25	2634	31.75
W81-07	1	2097	25	4288	52.43
W81-08	1	1503	25	3100	37.58
W81-09	1	2175	25	4444	54.38
W81-10	1	1060	25	2214	26.50
W81-11_A	1	2055	25	4204	51.38
W81-12	1	1496	25	3086	37.40
W81-13	1	1946	25	3986	48.65
W81-14	1	995	25	2084	24.88
W81-15	1	1151	25	2396	28.78
W81-16	200	1523	25	2742	33.10
W81-18	1	1190	25	2474	29.75
W81-20	1	1068	25	2230	26.70
W81-22	1	990	25	2074	24.75
W81-24	223	1058	25	1766	20.90
W81-26	1	877	25	1848	21.93
W81-28	1	838	25	1770	20.95
W81-30	2	827	25	1746	20.65
W81-32	1	645	25	1384	16.13

Total Kms	1488.68

6.2 ACQUISITION PARAMETERS

Vintage: MXT90	
DESCRIPTION	***DETAILS***
Data recorded by:	GSI
Date recorded:	1990
Vessel:	M/V Magnificent Creek
General:-	
Field CMP Interval	6.25m
Nominal Fold	75
Seismic source:-	
Type	VSX Sleeve
Volume	2180 Cubic In
Pressure:	2000 Psi
Depth:	8 m
Shot interval:	25 m
Gun Delay	51.2 ms
Recording system:-	
Format:	SEGD
Record length:	6 s
Sample interval:	2 ms
Number of Channels	316 (1-300 Data channels)
Near Channel	300
Polarity	
Filters	8 Hz @ 18 db/octave
	180 Hz @ 72 dB/octave
Receivers:-	
Centre near group to centre far group:	3737.5 m
Streamer depth:	10 m
Number of groups:	300
Group interval:	12.5 m
Centre source to center near group:	149-158m

Vintage: W81	
DESCRIPTION	***DETAILS***
Data recorded by:	Western Geophysical
Date recorded:	1981
Vessel:	
General:-	
Field CMP Interval	12.5m
Nominal Fold	48
Seismic source:-	
Type	DFS 5
Volume	555 Cubic In
Pressure:	4500 Psi
Depth:	6 m
Shot interval:	25 m
Gun Delay	0 ms
Recording system:-	
Format:	SEGB
Record length:	5 s
Sample interval:	4 ms
Number of Channels	96
Near Channel	96
Polarity	
Filters	
	128 Hz @ 70 dB/octave
Receivers:-	
Centre near group to centre far group:	2375 m
Streamer depth:	12 m
Number of groups:	96
Group interval:	25 m
Centre source to center near group:	200.7 m

6.3 DELIVERABLES

Item	*Format*	*Media*	*Tape No.*
Final Filtered/Scaled Migrations (Original) Zero Phase & Phase Matched Full, Near and Far Datasets	SEGY	Exabyte	337FM001E
Final Filtered/Scaled Migrations (Copy 1) Zero Phase & Phase Matched Full, Near and Far Datasets	SEGY	Exabyte	337FM002E
Final Filtered/Scaled Migrations (Copy 2) Zero Phase & Phase Matched Full Datasets Only	SEGY	Exabyte	337FM003E
Raw Migrations (Original) Full, Near and Far Datasets	SEGY	Exabyte	337RM004E
Raw Migrations (Copy 1) Full Datasets Only	SEGY	Exabyte	337RM005E
Raw Migrations (Copy 1) Full Datasets Only	SEGY	Exabyte	337RM008E
Raw Pre-Stack Time Migration gathers	SEGY	DLT	337GA006L 337GA007L
Final Stacking Velocities (PSTM) 0.5km Intervals (Original)	Western	CD	337FV009CD
Final Stacking Velocities (PSTM) 0.5km Intervals (Copy 1)	Western	CD	337FV010CD
Final CDP Co-ordinates	ASCII	CD	337XY011CD
Final Processing Report (Original)	PDF	CD	337FR012CD
Final Procesing Report (Copy 1)	PDF	CD	337FR013CD
Final Processing Report (Copy 2)	PDF	CD	337FR014CD
Final Processing Report	Paper Copy		

6.4 SEGY TRACE HEADERS (STACK)

Type	*Offset*	*Description*
I32	0	Trace number within line.
I32	4	Trace number within reel.
I32	8	Sequential record number.
I32	8	Original field record number.
I32	12	Trace number.
I32	16	Shot point number.
I32	20	CDP number.
I32	24	Trace no. within the CDP.
I16	28	Trace identification code.
I16	30	No. of summed traces.
I16	32	Total number of traces in CDP.
I16	34	Data use 1=production, 2=test.
I32	36	Trace offset (integer).
I32	40	Elevation at receiver.
I32	44	Elevation at source.
I32	60	Water depth at source.
I32	64	Water depth at receiver.
I16	68	Scaler to be applied to elevations
I16	70	Scaler to be applied to coordinates
I32	72	Source easting.
I32	76	Source northing.
I32	80	Receiver easting.
I32	84	Receiver northing.
I16	88	Coordinate units (m/arc)
I16	98	Source static correction.
I16	100	Receiver static correction.
I16	102	Total static applied.
I16	108	Delay recording time (ms).
I16	110	Mute time start.
I16	112	Mute time end.
I16	114	No. of samples.
I16	116	Samp interval in microseconds.
I16	156	Year of recording
I16	158	Julian day number (1-366)
I16	160	Hour of day (24 hour clock)
I16	162	Minute of hour
I16	164	Second of minute
I16	166	Time base code 1.local,2.gmt,3.?
I16	180	Seqn record no. (pre-stack only)
I32	180	3D Line number.
I32	184	CDP no. within 3D line.
I32	188	2D shotpoint number (Maersk)
I32	192	Easting of CDP.
I32	196	Northing of CDP.
I16	200	Scaler to be applied to SPNO.