642001

REPORT ON SEISMIC DATA REPROCESSING

MAXUS MXT-90 MARINE SEISMIC SURVEY

T/31P

STRAHAN SUB BASIN

SORELL BASIN

TASMANIA

ROMA PETROLEUM NL
R A MEANEY & ASSOCIATES
JULY 2001

542002

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ROMA PETROLEUM NL

ACN 066 018 979

Level 1, Commerce House, 462 Queen Street
Brisbane, Queensland, Australia, 4000

MEMORANDUM

TO: C W SILLER

FROM: R A MEANEY

SUBJECT: **T/31P – TRIAL REPROCESSING**

DATE: 16 JULY 2001

The trial reprocessing of three seismic lines from the MAXUS MXT-90 Marine Seismic Survey is completed. A significant improvement in data quality has been achieved for each of the three lines which were selected as they are crestal lines over the, Braddon Point Table Head and Trial Harbour Prospects. They were reprocessed primarily to obtain velocity information to make depth predictions for drilling proposals for test wells on these prospects.

Very significant improvements in amplitude, continuity and resolution have been achieved by the reprocessing. Fault plane resolution is also markedly sharper. The improvements result from:

- Better and closer velocity analysis;
- Radon demultiple procedures;
- Dip movement; and
- FX domain migration.

Similar improved sections could be improved for all the remaining lines of the MXT-90 survey as well as the W81 – Amoco Marine Seismic Survey.

Out of plan energy or sideswipe will remain a complication as 2D migration operators can not handle energy coming in from off the line given the nature of the basin architecture. Consideration should be given to acquiring a 3D data set, should additional recording be undertaken.

A very interesting amplitude anomaly in the tilted fault block of the Braddon Point Prospect at SP 450 on line MXT90-16 is evident at just above two seconds. The amplitude anomaly is a peak or a rarefaction corresponding to the seismic wave passing from a high to a low acoustic impedance contrast. It may be indicating the presence of hydrocarbons. The anomaly is contained at both ends by faults. It would be near the level of the Waare Sandstone. Hydrocarbon chimneys are also evident on lines MXT90-10 and MXT90-08 on the perimeter of the large Braddon Point Prospect. Braddon Point is the largest prospect and it has the most indications of hydrocarbons and a test well there would penetrate more of the untested Cretaceous section. The possibility of hydrocarbons being reservoired in the channelled Lower Tertiary section can not be ruled out.

R A Meaney
Exploration Manager

REF: R03004.DOC

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FIGURES & ENCLOSURES

APPENDICES

1.0 ABSTRACT

Roma Petroleum NL selected three lines from the MXT90 Marine Seismic Survey for test reprocessing in an endeavour to improve 'interpretability' of the difficult data. The test reprocessing was successful with appreciable improvements being obtained in reflector amplitude, continuity and in lateral and vertical resolution. Much better fault plane delineation has also been achieved. As a result of the better amplitude balancing a very strong possible direct hydrocarbon indicator has been identified on one of these lines. Interestingly, this amplitude anomaly which is restricted to a tilted fault block, is at the approximate level of the Waare Sandstone, the pay zone in the recent Thylacine 1 and Geographe 1 discoveries.

2.0 INTRODUCTION

The seismic data from the MXT90 Marine Seismic Survey which was acquired for Maxus Energy Corporation (MAXUS) by Geophysical Service International (GSI) is of quite ordinary quality. Maxus had the data processed by Western Geophysical (Western) in their Dallas Processing Centre. As is usually the case for Australian data processed in the USA the final and migrated sections are of less than optimal quality. A further complication is the difficult and complex geology of the areally restricted depocentres of the Strahan Sub-basin which induces much out of plane energy. A significant amount of multiple energy is also present.

The result of recording data in a noisy environment and inappropriately processed data is that the data is extremely difficult to interpret. To investigate if data quality could be improved Roma Petroleum NL (Roma) commissioned Velseis Processing (Velseis) of Brisbane to conduct test reprocessing of the three selected lines from the survey. These lines are over located identified prospects. The original field tapes and observer's log were recovered from the archives of the Australian Geological Survey Organisation (AGSO) and forwarded to Velseis.

A second reason for this reprocessing was to recover velocity information to enable depth predictions be made for the prospects identified in remapping of the Maxus data.

The lines are located in permit T/31P, the location of which is shown in Figure 1. The lines selected for reprocessing are shown, highlighted, on Figure 2, a shot point base map.

3.0 REPROCESSING

Velseis performed detailed testing on the data during their reprocessing. A fairly standard routine was utilised. The details of their testing and production reprocessing is detailed in their 'Data Processing Report Strahan Reprocessing T/31P Offshore Tasmania' which is included as Appendix 1.

4.0 PRODUCTION PROCESSING

After selecting the appropriate operators from the testing sequence production processing of the three selected lines was undertaken. The production processing suite is fully detailed in Appendix 1, the contractors report.

5.0 RESULTS OF REPROCESSING

A significant improvement in data quality has been achieved. A comparison of the original version of lines MXT90-05, MXT90-12 and MXT90-16 with the reprocessed sections is included as Enclosures 1a & b, 2a & b, 3a & b respectively.

Improvements of a significant nature have been obtained in resolution, amplitude and reflector continuity. This results mainly from increased noise attenuation, both random and coherent. Much better multiple suppression has also been achieved. The newer and more effective migration operator has markedly increased resolution, particularly that of the many fault planes.

The reprocessed lines have much better amplitude balance. This is particularly evident in seismic line MXT90-16 where a very strong amplitude anomaly restricted to rotated fault block. This possible direct hydrocarbon indicator is present around shot point 450 on this line just above 2.0 seconds two way time. Interestingly this anomaly is at the approximate level of the Waare Sandstone within the structural closure at the Braddon Point Prospect.

6.0 RECOMMENDATION

Even though a significant improvement in data quality has been achieved by Velseis' reprocessing it is recommended that, at this stage that the entire MXT and W81 Tasmania Marine Seismic Survey which was also reprocessed by Maxus in Dallas, not be reprocessed. The reason for this is that there are many out of plane reflections resulting from the Basin architecture. Any further detail seismic recording in T/31P should be 3D grid to overcome this problem. Such a survey would result in further improved lateral resolution due to the more accurate 3D migration operator which can migrate out of plane reflections back to their origin. Two dimensional operators can not achieve this.

However the recording of 2D regional lines would be appropriate in the western portion of the block in which there is little existing data.

7.0 CONCLUSION

The trial reprocessing of three lines from the MXT90 Marine Seismic Survey has been successful. Data quality is significantly improved, particularly lateral resolution. A better balancing of amplitudes has highlighted a possible direct hydrocarbon indication on the Braddon Point Prospect. Similarly, improvement in the W81 Tasmanian Marine Seismic Survey acquired by AMOCO Australia Petroleum Company Pty Ltd could be expected after reprocessing. However the basin architecture with interconnected depocentres and basement highs generates much out of plane signal which cannot be handled by the 2D processing stream. Any further recording except for regional lines should be 3D seismic.

642006

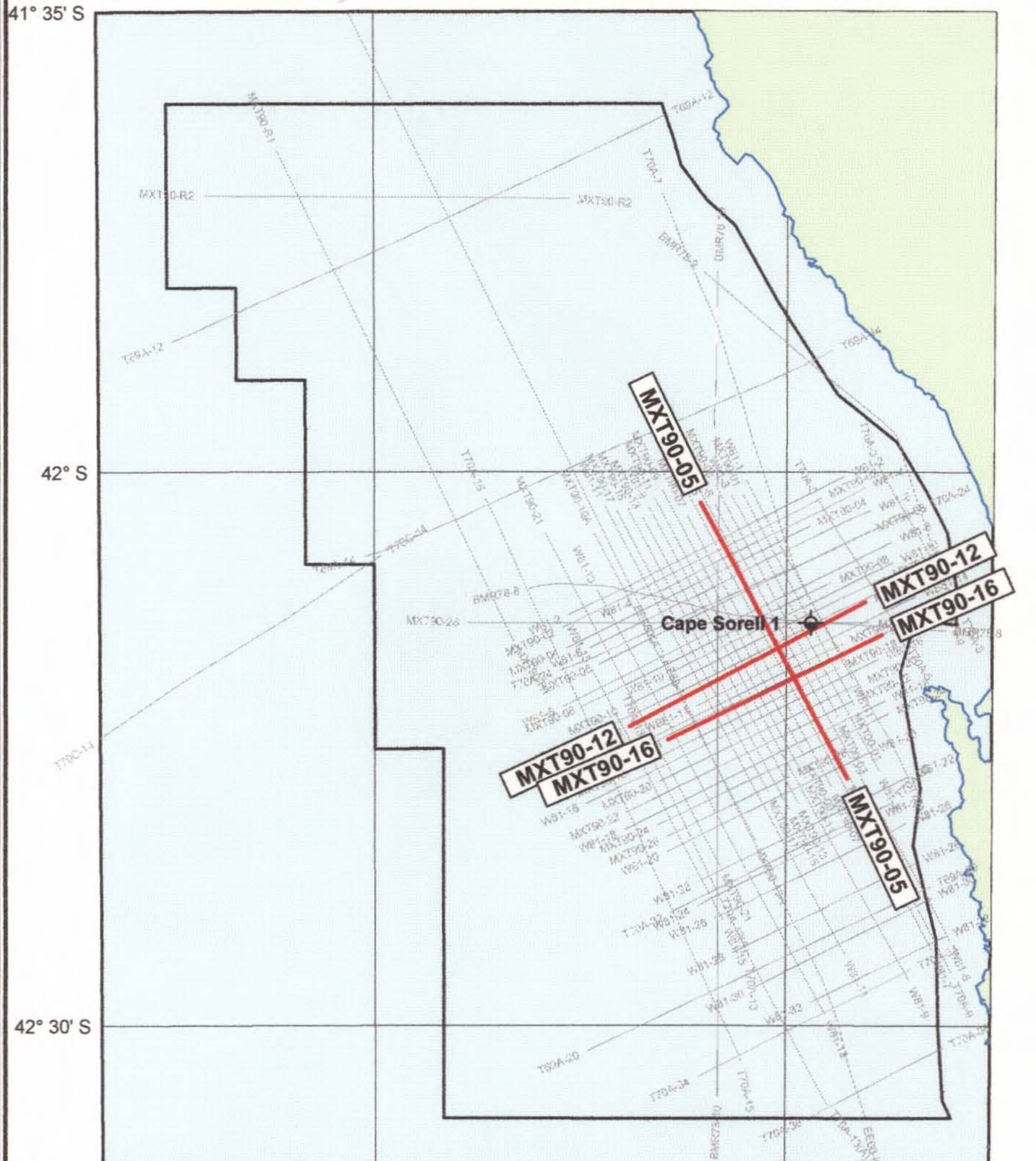
5 cm

Map Sheet: Roma_Tas_5M
File: Roma_Tas\Gen_Location.map5M

Figure 1

TASMANIA T/31P

642007



0 5 10 15 20
KILOMETRES

5 cm

ROMA PETROLEUM NL

TASMANIA T/31P
STRAHAN SUB-BASIN
SORELL BASIN
SHOTPOINT BASEMAP
SHOWING 2001 REPROCESSING

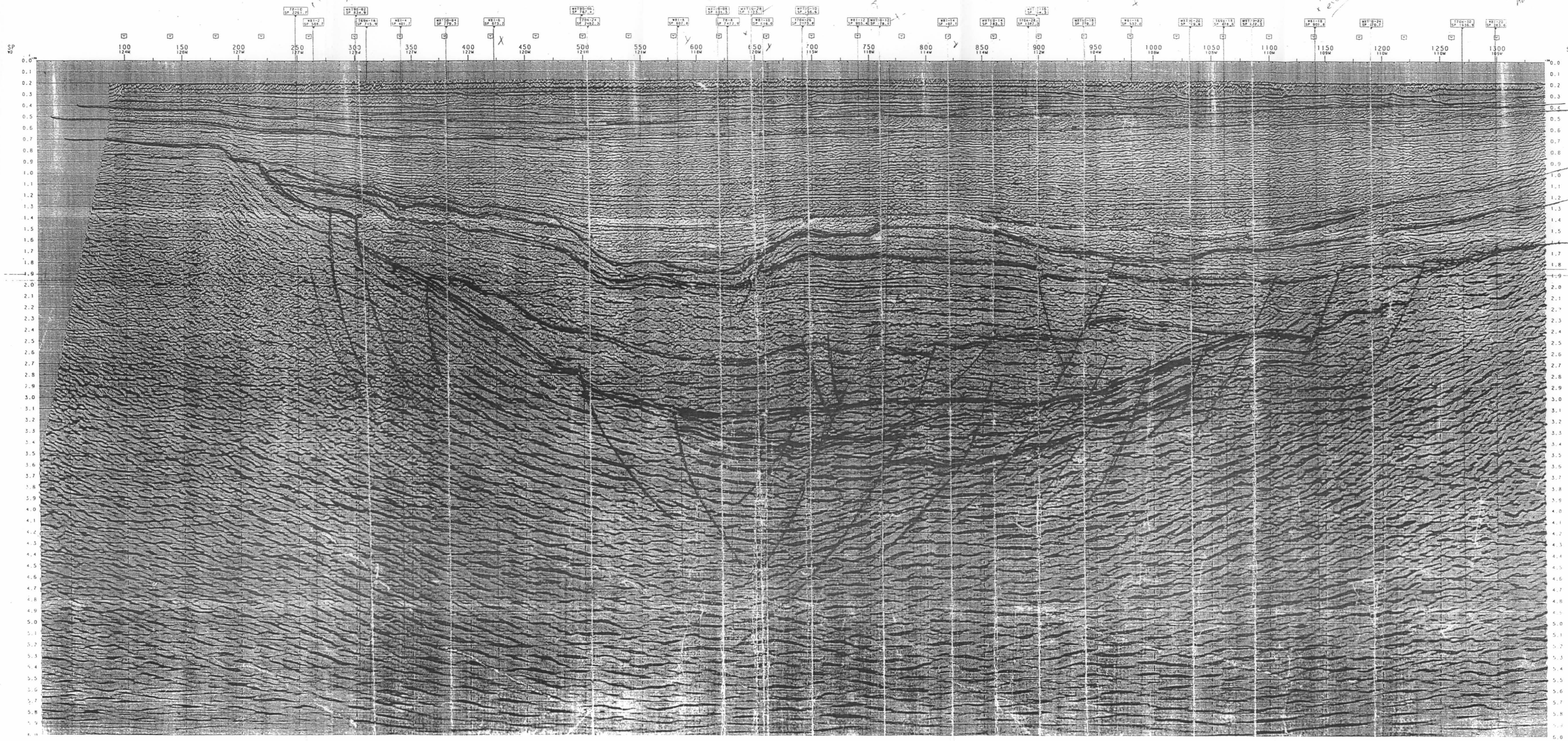
Author: R.A.Meaney	File: Repro seismic A4.map	Date: August 2001
Data: OIL ON FILM	Mapsheet: Tas Seimic A4	Fig. 2

642008

PSLA-90/37 Enclosure 1a

TPR OR-483

LINE: MXT90-05
SHOT PTS. 100 - 1346
1X7500% TVF
RPF MIGRATION
POSITIVE POLARITY



LINE: MXT90-05
SHOT PTS. 100-1346
I X 7500 % TVF
RPF MIGRATION
POSITIVE POLARITY

NORTHWEST

MAXUS ENERGY CORPORATION

AREA: OFFSHORE TASMANIA
PROSPECT: T/24P

DALLAS DIGITAL CENTER:	JOB # 5382
PROCESSING DATE:	JULY 1991
DATUM PLANE:	SEA LEVEL
APPROVED BY:	DW/HH

RECORDING INFORMATION:

RECORDED FOR:	MAXUS ENERGY CORP
ACQUISITION BY:	HALLIBURTON/GSI
	VESSEL: MV MAGNIFICENT CREEK
	DATE: DECEMBER, 1990

SOURCE:

ENERGY SOURCE:	AIRGUN ARRAY
TOTAL GUN VOLUME:	2180 CU IN
GUN PRESSURE:	2000 PSI
GUN DEPTH:	6 M
SHOTPOINT INTERVAL:	25 M
SOURCE TO NAV POINT:	NOT AVAILABLE

INSTRUMENTS:

SYSTEM:	TITAN 1000
FILTER:	[illegible]

CABLE:

WESTERN GEOPHYSICAL

PROCESSING SEQUENCE:

1. SEG-D CONVERT
2. PREPROCESSING
3. VELOCITY ANALYSIS
4. BEAM STEERING
5. DECON/DSI/STACK
6. VELOCITY ANALYSIS
7. 3800Z OPTIMUM FOLD REDUCTION
8. F-K DEMULTIPLE
9. DIP MOVEOUT CORRECTION
10. VELOCITY ANALYSIS
11. 3800Z MOVEOUT AND STACK
12. HIGH DIP MIGRATION
13. RADIAL PREDICTIVE FILTER
14. TIME VARIANT FILTER
15. GAIN

LEGEND

DISPLAY:

NOTATIONS:

HORIZONTAL SCALE: 1 CM = 250 M

LINE LOCATION MAP

MXT90-05 MIGRATION

ENCL 1b 642009

SE

152°

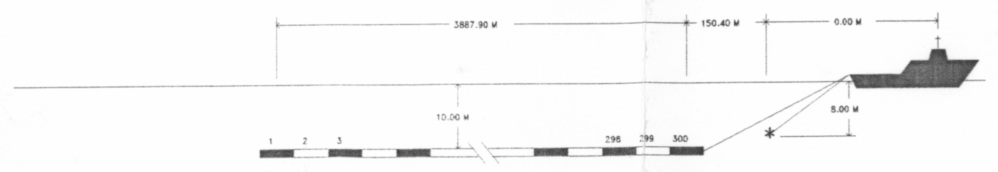
TPR
OR-483

Roma Petroleum NL

Line MXT90-05
Stns 100-1357
Migrated Stack

Strahan T/31P

FIELD INFORMATION



Recorded by: Halliburton G.S.I.
Party: 2993 M/V Magnificant Creek
Date Shot: December 1990
Number of Groups: 300
Instruments: Titan 1000
Shotpoint Interval: 25m
Sample Rate: 2ms
Record Length: 6000ms
Filters:
Lo-Cut: 8Hz at 18 dB/Oct
Hi-Cut: 180Hz at 72 dB/Oct

Source Array: Tuned Airgun
Timing Delay: 51.2ms
Array Volume: 2180 cu in
Array Pressure: 2000 Psi
Offsets: As above diagram
Group Interval: 12.5m
Coverage: 75 Fold

PROCESSING SEQUENCE

Reformat:	Input to ProMAX internal format
Edit:	Removal of bad traces from shot records
Geometry:	Application of survey coordinate information
Static:	−51.2ms gun delay correction
Amplitude Recovery:	Spherical divergence based on a function of travel time and velocity
AGC Wrap:	Application and removal of 500ms AGC around FK filter
F K Velocity Filtering:	Reject data falling within the following bounds: −1500m/s to −3000m/s and +1500m/s to +3000m/s
Data reduction:	Adjacent trace summation to 25m group interval
Deconvolution:	Designature wavelet estimation and shaping
Deconvolution:	Predictive shot ensemble 36ms gap 280ms operator
Velocity Analyses:	At intervals of 2000m
Dip Moveout:	FK DMO applied in offset domain
Velocity Analyses:	At intervals of 1000m after application of Radon Demultiple at velocity locations
Multiple Attenuation:	Radon Demultiple was applied to the whole line using second pass velocities as control
Mute:	Water bottom referenced Time in ms Offset in m −100 208 40 233 2580 3883
Balance:	AGC 500ms
Stack	
Static:	+12.2ms gun and cable depth correction
Migration:	Explicit Finite Difference: 100% velocity model
Final Filter:	T/V Ormsby Zero phase bandpass: 10/15−90/110 Hz at 0ms 10/15−90/110 Hz at 1000ms 10/15−70/90 Hz at 2000ms 8/12−50/60 Hz at 3000ms
Balance:	500ms AGC
Display polarity:	A positive number on tape is represented by a black peak on the display.

DISPLAY PARAMETERS

Hor. Scale − Traces/Cm:	20.0000
Vert. Scale − Cm/Second:	5.0000
Gain − db:	0.0000
Display Mode:	WVA
Plot Direction:	L
Brisbane Processing Centre	Website:www.velpro.com.au

VELSEIS PROCESSING

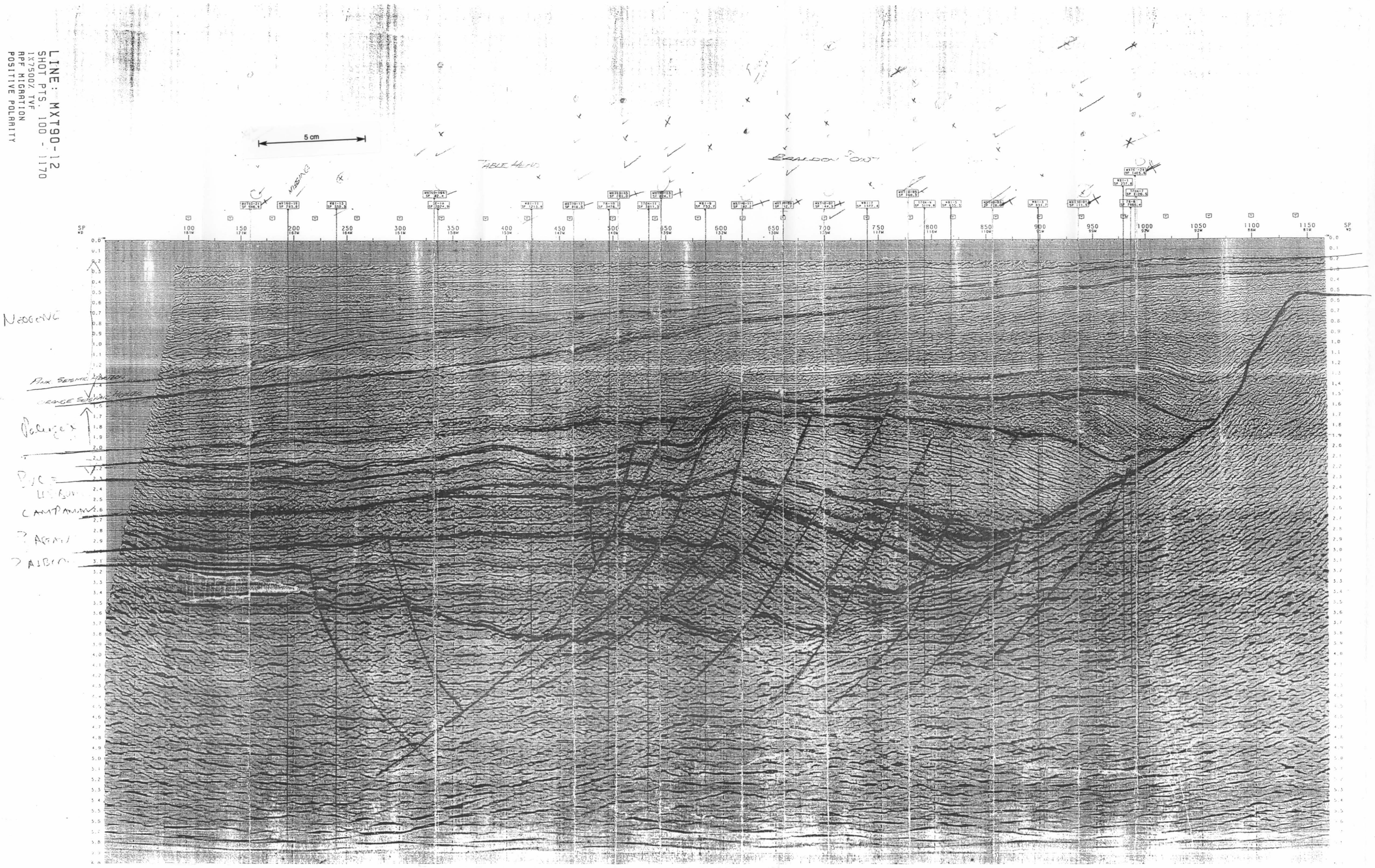
642010

Enclosure 2a

LINE: MXT90-12
SHOT PTS. 100 - 1170
1X7500% TVF
RPF MIGRATION
POSITIVE POLARITY

PSLA- 90/37.

TPR
OR-483



-SOUTHWEST

MAXUS
ENERGY CORPORATION

AREA: OFFSHORE TASMANIA
PROSPECT: T/24P

DALLAS DIGITAL CENTER:	JOB # 5382
PROCESSING DATE:	JULY 1991
DATUM PLANE:	SEA LEVEL
APPROVED BY:	DW/MH

RECORDING INFORMATION:

SOURCE:

INSTRUMENTS:

CABLE:

WESTERN GEOPHYSICAL

PROCESSING SEQUENCE:

1. SEG-D CONVERT:
2. PREPROCESSING:

MXT90-12
MIGRATION

ENCL 2 b 642011

NE

62 °

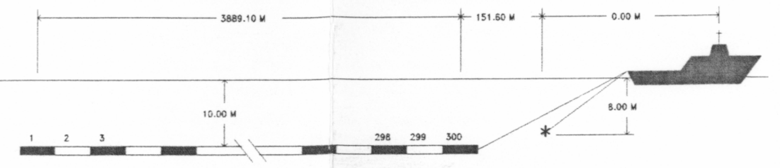
TPR
OR-483

Roma Petroleum NL

Line MXT90-12
Stns 100-1170
Migrated Stack

Strahan T/31P

FIELD INFORMATION



Recorded by: Halliburton G.S.I.
Party: 2993 M/V Magnificant Creek
Date Shot: November 1990
Number of Groups: 300
Instruments: Titan 1000
Shotpoint Interval: 25m
Sample Rate: 2ms
Record Length: 6000ms
Filters:
Lo-Cut: 8Hz at 18 dB/Oct
Hi-Cut: 180Hz at 72 dB/Oct

Source Array: Tuned Airgun
Timing Delay: 51.2ms
Array Volume: 2180 cu in
Array Pressure: 2000 Psi
Offsets: As above diagram
Group Interval: 12.5m
Coverage: 75 Fold

PROCESSING SEQUENCE

Reformat:	Input to ProMAX internal format
Edit:	Removal of bad traces from shot records
Geometry:	Application of survey coordinate information
Static:	-51.2ms gun delay correction
Amplitude Recovery:	Spherical divergence based on a function of travel time and velocity
AGC Wrap:	Application and removal of 500ms AGC around FK filter
F K Velocity Filtering:	Reject data falling within the following bounds: -1500m/s to -3000m/s and +1500m/s to +3000m/s
Data reduction:	Adjacent trace summation to 25m group interval
Deconvolution:	Designature wavelet estimation and shaping
Deconvolution:	Predictive shot ensemble 36ms gap 280ms operator
Velocity Analyses:	At intervals of 2000m
Dip Moveout:	FK DMO applied in offset domain
Velocity Analyses:	At intervals of 1000m after application of Radon Demultiple at velocity locations
Multiple Attenuation:	Radon Demultiple was applied to the whole line using second pass velocities as control
Mute:	Water bottom referenced

Time in ms	Offset in m
-100	208
40	233
2580	3883

Balance:	AGC 500ms
Stack	
Static:	+12.2ms gun and cable depth correction
Migration:	Explicit Finite Difference: 100% velocity model
Final Filter:	T/V Ormsby Zero phase bandpass: 10/15-90/110 Hz at 0ms; 10/15-90/110 Hz at 1000ms; 10/15-70/90 Hz at 2000ms; 8/12-50/60 Hz at 3000ms
Balance:	500ms AGC
Display polarity:	A positive number on tape is represented by a black peak on the display.

DISPLAY PARAMETERS

Hor. Scale - Traces/Cm:	20.0000
Vert. Scale - Cm/Second:	5.0000
Gain - db:	0.0000
Display Mode:	WVA
Plot Direction:	L
Brisbane Processing Centre	Website:www.velpro.com.au

VELSEIS PROCESSING

5 cm

TIME	RMSV
00224	01481
00417	01658
00602	01764
00745	01845
00926	01952
01055	02047
01246	02084
01404	02119
01598	02250
01815	02390
02013	02547
02157	02731
02547	02940
02690	03045
02863	03229
03190	03508
03439	03692
03834	03901
04967	04225
05996	04397

TIME	RMSV
00202	01479
00323	01623
00437	01650
00608	01794
00773	01893
00928	01970
01138	02084
01279	02198
01376	02215
01530	02311
01747	02486
01965	02643
02243	02818
02638	03194
02904	03377
03106	03517
03249	03622
03490	03832
03828	04015
04055	04085
04458	04172
04901	04286
05296	04338
05988	04469

TIME	RMSV
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00317	01604
00420	01644
00566	01771
00707	01858
00944	02014
01110	02102
01275	02189
01486	02320
01646	02460
01817	02530
01988	02661
02119	02835
02359	03063
02583	03159
02969	03465
03133	03526
03309	03639
03528	03893
03743	04094
04034	04190
04366	04277
04747	04364
05041	04391
05988	04557

TIME	RMSV
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00570	01785
00750	01910
00866	01991
01104	02128
01237	02171
01380	02285
01555	02416
01737	02495
02015	02739
02157	02818
02275	03019
02420	03115
02617	03202
02952	03508
03260	03674
03458	03901
03749	04102
03969	04198
04245	04286
04576	04373
04798	04426
05108	04496
05990	04696

TIME	RMSV
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00452	01717
00574	01822
00701	01901
00821	01948
00994	02023
01110	02093
01338	02233
01511	02399
01680	02451
01773	02547
01971	02678
02243	02914
02479	03115
02690	03307
02844	03412
03060	03491
03203	03587
03437	03866
03914	04146
04205	04242
04564	04356
04828	04434
05988	04670

TIME	RMSV
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00501	01786
00646	01927
00851	02014
01066	02102
01235	02151
01418	02311
01560	02390
01686	02495
01942	02687
02123	02774
02410	03010
02614	03220
02840	03368
03034	03508
03309	03709
03501	03814
03739	03998
04121	04198
04553	04347
04838	04452
05994	04641

TIME	RMSV
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00323	01621
00486	01802
00596	01974
00682	02026
00819	02026
01013	02078
01180	02190
01437	02379
01566	02491
01752	02612
01887	02698
02032	03000
02399	03405
02885	03508
03087	03560
03503	03879
04095	04287
04283	04482
04549	04878
04760	05033
05980	05364

TIME	RMSV
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00321	01599
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00555	01931
00663	02017
00781	02052
00975	02121
01197	02302
01433	02440
01693	02646
01868	02784
02036	02888
02351	03094
02598	03232
02920	03439
03195	03680
03376	03827
03743	04163
04043	04396
04395	04672
05034	04921
05988	05189

TIME	RMSV
00138	01479
00304	01626
00378	01766
00492	01888
00627	01922
00741	01966
00935	02095
01085	02198
01340	02310
01585	02569
01818	02739
01971	02853
02144	02974
02355	03086
02473	03258
02614	03319
02882	03560
03412	03965
03553	04086
03842	04275
03977	04491
04264	04592
04855	04818
05990	05102

TIME	RMSV
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00277	01671
00401	01871
00555	01905
00714	01957
00901	02026
01051	02103
01319	02293
01558	02517
01809	02733
02007	02948
02201	03017
02513	03275
02971	03637
03222	04051
03321	04215
03663	04430
03832	04577
04121	04697
04397	04784
04828	04904
05110	04956
05986	05154

TIME	RMSV
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00328	01836
00431	01905
00562	01905
00690	01957
00849	02060
01110	02224
01309	02293
01494	02474
01741	02629
02022	02827
02302	03086
02553	03344
02739	03500
02990	03724
03243	03965
03448	04111
03684	04310
03974	04554
04376	04749
04707	04861
05986	05145

TIME	RMSV
00099	01481
00254	01706
00338	01849
00450	01897
00625	01930
00739	01991
00866	02026
01007	02121
01125	02164
01304	02259
01448	02414
01604	02534
01836	02775
02030	03000
02184	03103
02431	03453
02604	03586
02830	03732
03005	03905
03121	04060
03344	04206
03825	04939
04178	05085
04473	05137
05321	05318
05990	05413

TIME	RMSV
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00344	01840
00475	01931
00674	02017
00828	02112
00990	02233
01256	02310
01412	02353
01585	02517
01800	02982
02013	03232
02260	03439
02441	03568
02787	03741
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03488	04292
03644	04508
04051	04878
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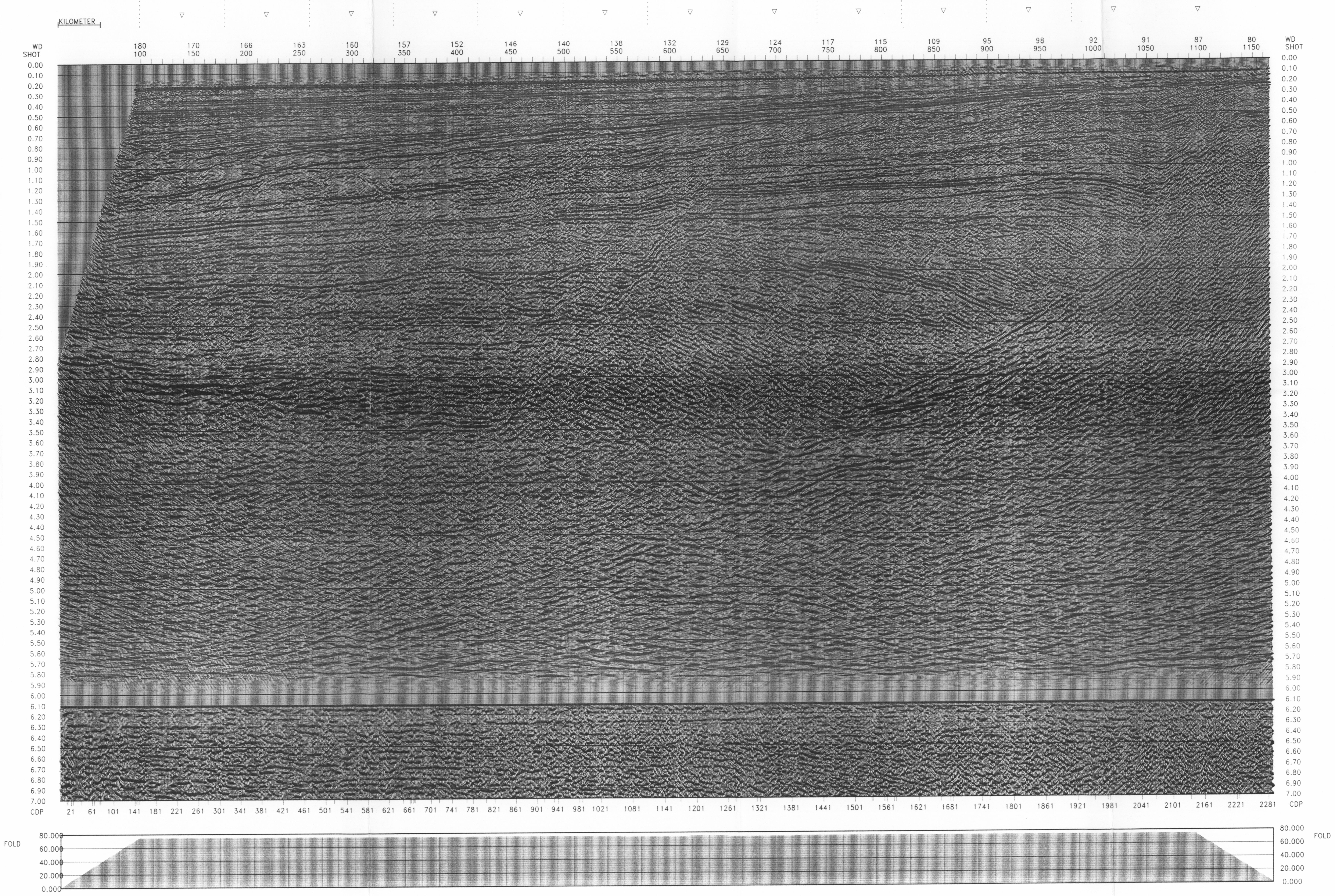
05317	05154
05990	05344



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642012 Enclosure 3a

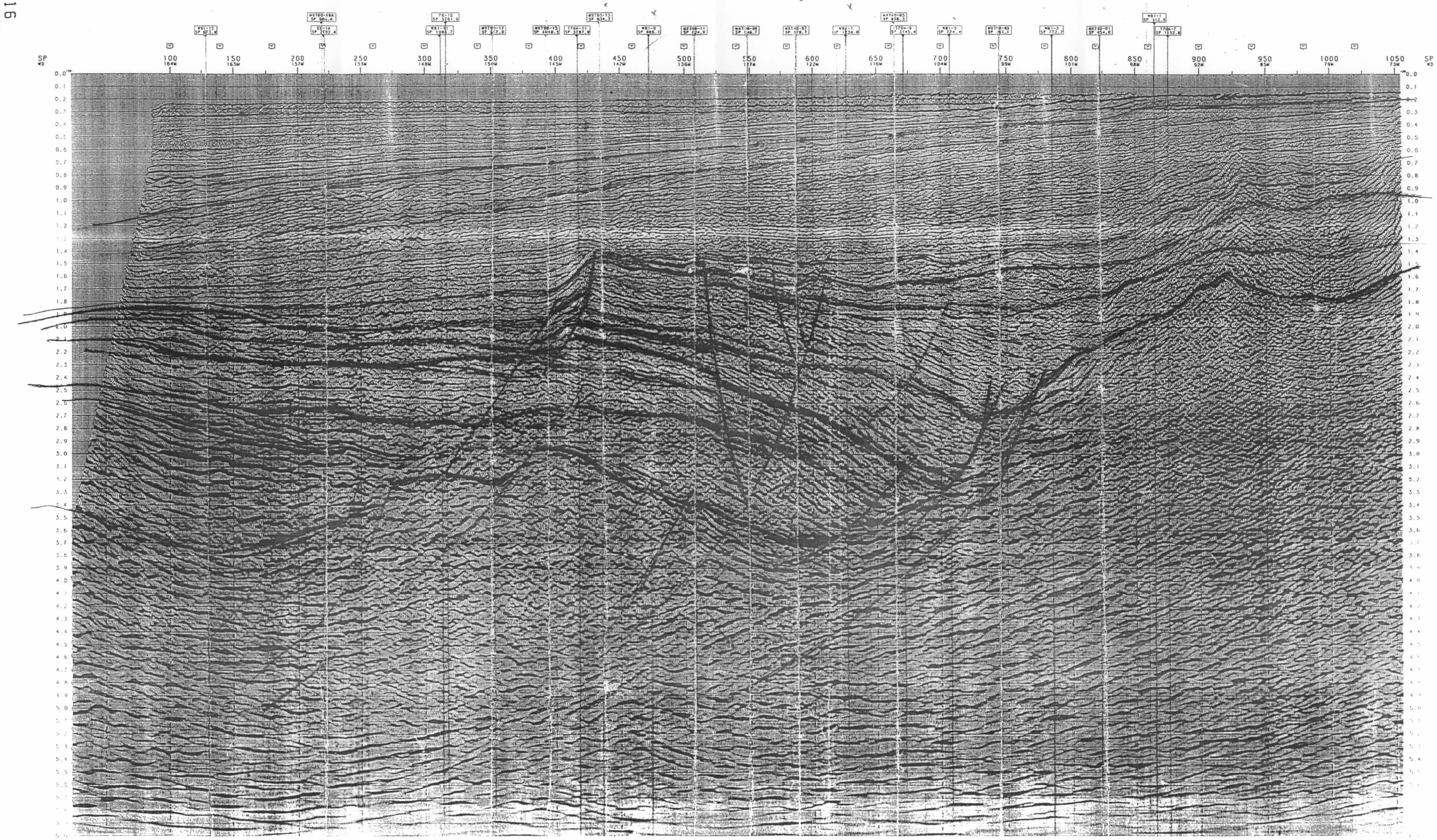
PSLA-90/37.

TPR 02-483

LINE: MXT90-16
SHOT PTS. 100 - 1058
1X7500% TVF
RPF MIGRATION
POSITIVE POLARITY

SOUTHWEST

5 cm



MAXUS
ENERGY CORPORATION

AREA: OFFSHORE TASMANIA
PROSPECT: T/24P

DALLAS DIGITAL CENTER:	JOB # 5382
PROCESSING DATE:	JULY 1991
DATUM PLANE:	SEA LEVEL
APPROVED BY:	DW/HH

RECORDING INFORMATION:

RECORDED FOR:	MAXUS ENERGY CORP
ACQUISITION BY:	HALLIBURTON/GSI
	VESSEL: MV MAGNIFICENT CREEK
	DATE: NOVEMBER, 1990
SOURCE:	
ENERGY SOURCE:	AIRGUN ARRAY
TOTAL GUN VOLUME:	2180 CU IN
GUN PRESSURE:	2000 PSI
GUN DEPTH:	8 M
SHOTPOINT INTERVAL:	25 M
SOURCE TO NAV POINT:	NOT AVAILABLE
INSTRUMENTS:	
SYSTEM:	TITAN 1000
SAMPLING INTERVAL:	2MS
RECORD LENGTH:	6 SECS
FORMAT:	SEG-D 315 CHANNEL
CABLE:	
TYPE OF CABLE:	STREAMER
CABLE LENGTH:	3750 M
CABLE DEPTH:	10 M
NO. GROUPS RECORDED	300

WESTERN GEOPHYSICAL

PROCESSING SEQUENCE:

1. SEG-D CONVERT:
   PROCESS SAMPLE RATE: 4 MS
   PROCESS RECORD LENGTH: 6.144 SEC
   NO. OF TRACES PROCESSED: 300
2. PREPROCESSING
   SPHERICAL SPREADING CORRECTION
3. VELOCITY ANALYSIS
4. BEAM STEERING:
5. DECONVOLUTION:
   TYPE: SHOT/OFFSET CONSISTENT
   PREDICTIVE DISTANCE: 4 MS
   OPERATOR LENGTH: 240 MS
6. VELOCITY ANALYSIS:
7. 3600% OPTIMUM FOLD REDUCTION:
   TYPE: EQUAL MOVEOUT BINS
8. F-K DEMULTIPLE:
   TYPE: PASS POS AND ZERO DIPS
9. DIP MOVEOUT CORRECTION
10. VELOCITY ANALYSIS:
11. 3600% MOVEOUT AND STACK
12. HIGH DIP MIGRATION:
   RESIDUAL METHOD
   100% VELOCITIES
13. RADIAL PREDICTIVE FILTER
14. TIME VARIANT FILTER:

TIME ZONE SEC	LOW CUT HZ DB/OCT		HIGH CUT HZ DB/OCT	
0.0-1.2	8	18	70	72
-2.2	6	18	50	56
-3.2	6	18	35	48

FILTER TIMES VARY WITH TIME STRUCTURE

15. GAIN: BLENDED (2 PASS) TRACE EQUALIZATION

LEGEND

ENERGY SOURCE: AIRGUN

DISPLAY:

NOTATIONS:

LINE LOCATION MAP

MXT90-16 MIGRATED.

ENCL 3 b   642613

NE

64 °

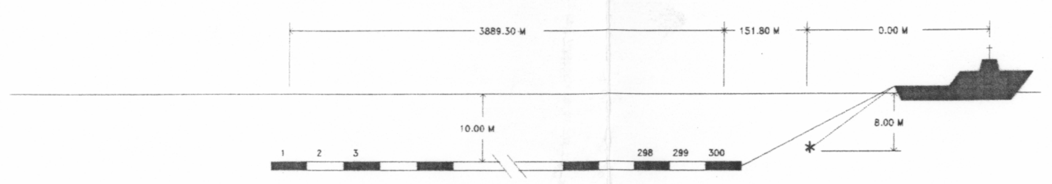
Roma Petroleum NL

TPR
OR-483

Line MXT90-16
Stns 100-1058
Migrated Stack

Strahan T/31P

FIELD INFORMATION



Recorded by: Halliburton G.S.I.
Party: 2993 M/V Magnificant Creek
Date Shot: November 1990
Number of Groups: 300
Instruments: Titan 1000
Shotpoint Interval: 25m
Sample Rate: 2ms
Record Length: 6000ms
Filters:
Lo-Cut: 8Hz at 18 dB/Oct
Hi-Cut: 180Hz at 72 dB/Oct

Source Array: Tuned Airgun
Timing Delay: 51.2ms
Array Volume: 2180 cu in
Array Pressure: 2000 Psi
Offsets: As above diagram
Group Interval: 12.5m
Coverage: 75 Fold

PROCESSING SEQUENCE

Reformat:	Input to ProMAX internal format
Edit:	Removal of bad traces from shot records
Geometry:	Application of survey coordinate information
Static:	-51.2ms gun delay correction
Amplitude Recovery:	Spherical divergence based on a function of travel time and velocity
AGC Wrap:	Application and removal of 500ms AGC around FK filter
F K Velocity Filtering:	Reject data falling within the following bounds: -1500m/s to -3000m/s and +1500m/s to +3000m/s
Data reduction:	Adjacent trace summation to 25m group interval
Deconvolution:	Designature wavelet estimation and shaping
Deconvolution:	Predictive shot ensemble 36ms gap 280ms operator
Velocity Analyses:	At intervals of 2000m
Dip Moveout:	FK DMO applied in offset domain
Velocity Analyses:	At intervals of 1000m after application of Radon Demultiple at velocity locations
Multiple Attenuation:	Radon Demultiple was applied to the whole line using second pass velocities as control
Mute:	Water bottom referenced Time in ms Offset in m -100 208 40 233 2580 3883
Balance:	AGC 500ms
Stack	
Static:	+12.2ms gun and cable depth correction
Migration:	Explicit Finite Difference: 100% velocity model
Final Filter:	T/V Orsmby Zero phase bandpass: 10/15-90/110 Hz at 0ms 10/15-90/110 Hz at 1000ms 10/15-70/90 Hz at 2000ms 8/12-50/60 Hz at 3000ms
Balance:	500ms AGC
Display polarity:	A positive number on tape is represented by a black peak on the display.

DISPLAY PARAMETERS

Hor. Scale - Traces/Cm:	20.0000
Vert. Scale - Cm/Second:	5.0000
Gain - db:	0.0000
Display Mode:	WVA
Plot Direction:	L
Brisbane Processing Centre	Website:www.velpro.com.au

VELSEIS PROCESSING

5 cm

TIME	RMSV
00195	01481
00368	01604
00530	01673
00670	01813
00751	01857
00851	01920
00979	02036
01053	02128
01280	02180
01458	02285
01644	02442
01766	02638
02020	02832
02172	02982
02296	03086
02458	03239
02761	03566
02904	03752
03161	03884
03425	03999
03773	04132
04014	04371
04707	04630
05321	04890
05967	05052

TIME	RMSV
00195	01481
00368	01620
00542	01717
00679	01850
00772	01912
00882	01971
01068	02058
01247	02142
01454	02285
01662	02478
01894	02655
02168	02956
02417	03168
02562	03301
02811	03566
03055	03681
03331	03893
03553	04035
03788	04371
04283	04574
04764	04698
05285	04873
05986	05050

TIME	RMSV
00178	01479
00318	01604
00428	01664
00542	01735
00689	01868
00801	01947
00916	02014
01131	02119
01328	02171
01512	02345
01705	02504
01936	02761
02110	02938
02274	03035
02410	03115
02622	03283
02869	03460
03014	03743
03215	03893
03481	04105
03897	04336
04146	04453
04612	04604
05114	04789
05963	05122

TIME	RMSV
00176	01479
00293	01621
00473	01740
00695	01921
00913	02071
01079	02128
01241	02233
01417	02390
01612	02460
01826	02637
02016	02832
02180	02991
02355	03062
02647	03247
02863	03495
03105	03698
03389	04026
03812	04273
04146	04453
04410	04556
04739	04655
05114	04789
05965	05140

TIME	RMSV
00165	01479
00290	01621
00424	01717
00571	01824
00687	01947
00913	02018
01183	02160
01338	02319
01660	02558
02012	02814
02232	02911
02599	03186
02821	03451
02986	03681
03437	04105
03833	04318
04248	04583
04740	04751
05190	04892
05965	05131

TIME	RMSV
00157	01479
00283	01621
00428	01717
00532	01877
00639	01974
00805	02018
00934	02080
01104	02213
01255	02292
01425	02381
01560	02531
01712	02673
01846	02805
02151	03062
02257	03186
02452	03247
02632	03380
02950	03690
03311	03937
03589	04167
03931	04397
04199	04596
04625	04756
05036	04919
05965	05237

TIME	RMSV
00144	01479
00264	01631
00390	01762
00509	01859
00670	01956
00855	01992
01011	02109
01189	02248
01438	02398
01637	02513
01877	02673
02116	02956
02307	03071
02541	03168
02867	03433
03097	03672
03288	03831
03582	04114
03879	04371
04159	04592
04576	04769
04990	04899
05963	05202

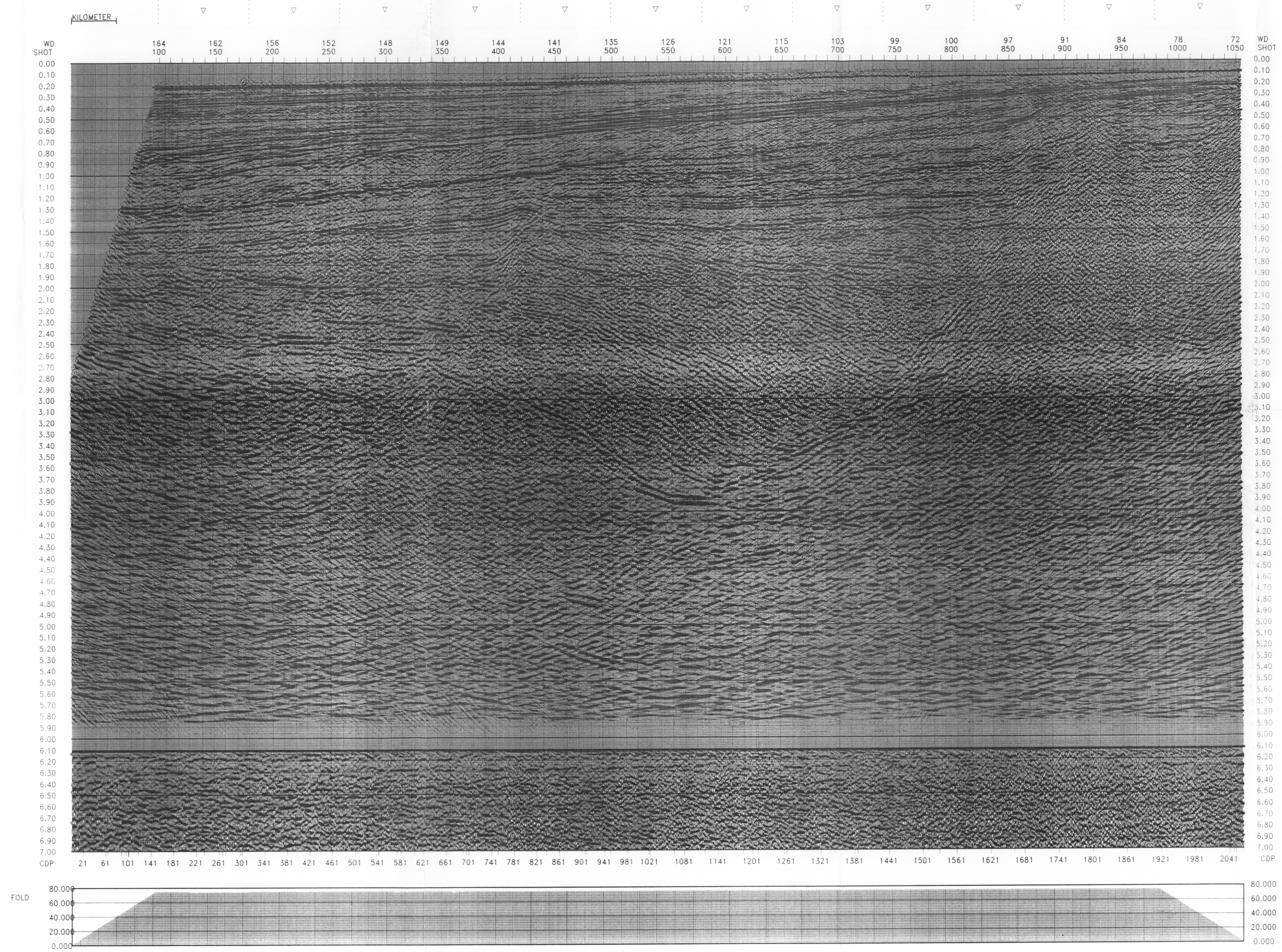
TIME	RMSV
00136	01481
00277	01642
00351	01814
00420	01880
00562	01899
00764	02003
00927	02059
01058	02117
01201	02210
01429	02369
01620	02469
01826	02628
02002	02814
02168	03044
02313	03132
02562	03332
02791	03530
03074	03787
03248	04017
03443	04318
03682	04513
03891	04630
04057	04707
04368	04822
04809	04924
05969	05193

TIME	RMSV
00106	01480
00249	01651
00337	01859
00509	01894
00670	01983
00928	02080
01067	02168
01220	02243
01386	02336
01543	02462
01712	02602
02039	02858
02193	03062
02317	03168
02496	03336
02753	03628
03101	03840
03321	04150
03566	04300
04016	04486
04364	04742
04908	04932
05990	05151

TIME	RMSV
00106	01480
00258	01654
00341	01764
00444	01832
00588	01850
00774	02177
00903	02107
01089	02230
01273	02319
01465	02336
01610	02460
01720	02571
01938	02796
02413	03398
02527	03575
03014	04043
03387	04353
03993	04618
04509	04857
05167	05057
05967	05193

TIME	RMSV
00090	01480
00245	01617
00328	01714
00409	01779
00561	01903
00654	02053
00753	02107
00905	02186
01185	02354
01409	02531
01622	02673
01940	02929
02309	03285
02553	03692
02925	04017
03325	04436
03663	04554
04194	04786
04600	04924
05988	05235

TIME	RMSV
00077	01479
00249	01641
00308	01709
00471	01850
00590	02036
00695	02089
00858	02239
00975	02292
01193	02443
01384	02540
01643	02708
01875	02876
02294	03194
02498	03566
02743	03865
03051	04167
03247	04378
03566	04601
04005	04756
04473	04890
04607	04946
05969	05237



USER=oil PROSPECT=Myall LINE=MY00-07 CREATED=7/19/ 1 7:42: BY ProMAX 7.0

642014 APPENDIX 1

DATA PROCESSING REPORT

STRAHAN REPROCESSING

T/31P

OFFSHORE TASMANIA

PREPARED FOR
ROMA PETROLEUM NL
BY
VELSEIS PROCESSING
25 JULY 2001

OR-483

Disclaimer

This report has been prepared in good faith and with all due care and diligence. It is based on the seismic and other geophysical data presented and referred to, in combination with the author's experience with the seismic technique, and as tempered by the geological and stratigraphic evidence presented in various forms and through discussions with client representatives.

As such, the report represents a collation of opinions, conclusions and recommendations, the majority of which remain untested at the time of preparation. In the light of these facts it must be clearly understood that Velseis Processing Pty. Ltd., its proprietors and employees cannot take responsibility for any consequences arising from this report.

Table of Contents

Sections

Introduction

Velseis Processing Pty. Ltd. processed approximately 82 km of marine seismic data from the Strahan T/31P Seismic Survey for Roma Petroleum NL from June to July 2001.

Line Summary for Reprocessed lines

Line	First Shotpoint	Last Shotpoint	Group Interval	Length (km)
MXT90-05	100	1357	12.5	31.43
MXT90-12	100	1170	12.5	26.75
MXT90-16	100	1058	12.5	23.95
TOTALS				82.13

Acquisition Parameters for Strahan T/31P Marine Seismic Survey

Recorded By	Halliburton G.S.I.
Vessel	MV Magnificant Creek
Date Shot	November 1990
Source	Tuned Airgun VSX Sleeve
Instruments	Titan 1000
Hydrophones	Multiplex streamer
Tape format	SEGD
Sample Rate	2 ms
Data Length	6 seconds
Filters	8/18 - 180/72 Hz/dB per octave
Source Array	2180 Cubic Inch ; 2000 Psi; Depth 8m
Timing Delay	51.2ms
Hydrophone Array	300 groups in streamer; Depth 10m
Offsets	Near Trace - 151m; Far Trace - 3888.5m
Group Spacing	12.5m
Shot Spacing	25m
Coverage	7500%

Testing

Near Trace Display

Plots were produced consisting of just the near trace only of all records. These are a good quality control measure showing the time breaks of all records and the water bottom profile at a glance.

Amplitude Recovery

A series of spherical divergence and gain recovery tests were produced in order to compensate for amplitude decay due to wavefront spreading and inelastic attenuation.
The following functions were tested:

1. No Gain – Raw record
2. Spherical Divergence
3. Spherical Divergence plus 1dB/sec
4. Spherical Divergence plus 2dB/sec
5. Spherical Divergence plus 3dB/sec
6. Time * Power constant 1.6
7. Time * Power constant 2.0
8. Time * Power constant 2.4

Panel #3 was chosen to best balance amplitudes down and across the record.

It was discovered that there were numerous traces with high amplitude noise towards the bottom of the records ie. 4–6s. Particularly bad traces and spikes were edited out at this stage.

Frequency Filters

A series of overlapping and expanding Ormsby filters were applied to a shot record to verify the frequency content and determine where noise problems may be. Displays were output directly after the bandpass filters (relative amplitudes) and following a 500ms AGC. The following panels were tested:

1. Raw Record
2. 2-5 - 10-20 Hz
3. 5-10 - 20-30 Hz
4. 10-15 - 30-40 Hz
5. 10-20 - 40-50 Hz
6. 15-25 - 50-60 Hz
7. 20-30 - 60-80 Hz
8. 25-35 - 70-90 Hz
9. 30-40 - 80-100 Hz
10. 40-50 - 100-120 Hz
11. 50-60 - 120-140 Hz
12. 60-70 - 140-160 Hz
13. 70-80 - 160-180 Hz
14. 80-90 - 180-200 Hz
15. 90-100 - 200-220 Hz
16. 100-110 - 220-240 Hz
17. 110-120 - 240-260 Hz

Frequency panels revealed little energy after 80-90Hz and then only in the very shallow.
Strong first break and reverberation energy was visible in all filter slices.
Frequency panels were also run on a portion of the final migrated stack for line MXT90-12 to determine the final display filter.

F-K Filter

A raw record was filtered with various F-K velocity fan or pie-slice filters in order to attenuate the first break and reverberation energy. The following filter panels were produced:

1. No F-K filter
2. F-K Velocity Fan Filter: -1500 to -2700m/s
3. F-K Velocity Fan Filter: -1500 to -2800m/s
4. F-K Velocity Fan Filter: -1500 to -2900m/s
5. F-K Velocity Fan Filter: -1500 to -3000m/s
6. F-K Velocity Fan Filter: -1500 to -3100m/s
7. F-K Velocity Fan Filter: -1500 to -3200m/s
8. F-K Velocity Fan Filter: -1500 to -3300m/s
9. F-K Velocity Fan Filter: -1500 to -3400m/s

It was felt that panel #5 (−1500 to −3000m/s) was satisfactory in attenuating a great deal of the noise but mild enough to not harm real dipping data. It allowed data to be seen much further out in the offset direction.

Brute stacks as outlined further on were produced showing that the F−K filter was of benefit to the data. However, the F−K brute stack also revealed that it would be beneficial to F−K filter reject a velocity slice in the other half of the F−K domain to attenuate backward dipping noise which was bleeding through in the stack. A test panel was produced on the test record with an additional cascaded F−K filter (with another AGC wrap). This showed good results pre−stack and even more so on the stack.

Deconvolution Before Stack

An initial set of velocity analyses were produced following a test application of designature and predictive ensemble decon. These velocities were picked at a 2km interval then used to stack all of the following deconvolution and brute stack methods. All stacks have a bandpass display filter of 8−12 − 80−100Hz followed by a 500ms AGC. Line MXT90−12 was used for all testing and the processing test sequences were as follows:

Trace Editing
Geometry Application
Static: −51.2ms Gun Delay correction
Amplitude Recovery: Spherical Divergence + 1dB/s

1. Raw Stack (No Deconvolution) after adjacent trace summation
2. F−K velocity filter reject −1500 to −3000m/s then adjacent trace sum
3. F−K filter, trace sum, Designature then Predictive 36ms Gap shot ensemble decon
4. F−K filters −1500 to −3000, +1500 to *3000m/s, trace sum, Desig, Gap 36ms
5. F−K filters −1500 to −3000, +1500 to +3000m/s, trace sum, Desig, Gap 8ms
6. F−K filters −1500 to −3000, +1500 to +3000m/s, trace sum, Predictive Gap 36ms

All Predictive deconvolution operators are shot ensemble−averaged except for panel #6 which was a single trace by trace decon.

Tests were primarily carried out to demonstrate the cumulative effects of adding on the extra processing steps. It was felt the Designature decon did a good job of shaping and whitening the wavelet, while producing a stack with stable phase. Events were more clearly defined and continuous. The follow−up predictive ensemble decon helped attenuate some of the multiple energy in the section.

Scaling

Numerous combinations of pre and post stack single gate and varying gate length AGC scalars were tested. A 500ms AGC pre and post stack provided the most desired appearance.

PROCESSING PARAMETERS

Reformat

Input is reformatted to ProMAX internal data format.

Trace Edit

Remove bad or noisy traces from shot records interactively.

Geometry

Assign geometry information to trace headers. Information assigned to each trace includes source, receiver and CDP locations along with offsets and CDP fold.

Static

Application of bulk static correction of −51.2ms to compensate for gun delay..

Gain

Amplitude Recovery with spherical divergence based on function of travel time and velocity with a 1dB per second correction constant to 6 seconds.

Removeable AGC (AGC Wrap)

Data can have highly varying amplitudes, the highest of which will dominate the F−K spectrum. Filtering will cause artefacts of these high amplitudes to be spread to other regions of the data in the time domain. Compressing the amplitudes and saving the scalars before F−K, then decompressing or reversing the scalars afterwards, prevents these artefacts from contaminating the time domain data.

A 500ms AGC wrap was applied (and de−applied) to the shot records before and after F−K filtering.

F−K Velocity Filter

Linear noise was rejected from shot records using standard pie−slice or velocity filters. The slopes of the reject ranges of velocities were:

−1500 to −3000 and 1500 to 3000 m/s.

Data Reduction

Adjacent traces in shot records were summed together after normal moveout to produce a 25m group interval and according 12.5m cdp interval. This provides a degree of random noise attenuation and decimates the data volume.

Designature Deconvolution

A minimum phase estimated wavelet of the shot ensemble is calculated using the averaged power spectrum. From this an inverse filter is computed and applied to the shot ensemble removing the source signature and outputting a zero phase wavelet.

Deconvolution

As designature decon does not attenuate multiple energy, a predicitve or gap deconvolution was applied at this stage. A shot ensemble-averaged decon operator of 280ms with a gap of 36ms was employed to attenuate ringing multiple energy.
The design gates were referenced to the water bottom as follows:

Offset (m)	Start (ms)	End (ms)
Near	200	3500
Far	3000	4500

Velocity Analyses (1st Pass)

Velocities were picked using the ProMAX interactive velocity picking package (IVA). IVA uses velocity spectra, moved out gathers and stacked panels to assist in a careful interpretation of stacking velocities. As the velocity function is altered, revised gathers and stacks are produced until optimized stacking velocities are achieved.

Velocities were picked at locations at 2km intervals. Each panel consisted of 11 CDPs stacked using 11 velocity functions centred around the regional velocity function.

Normal Moveout Correction

An NMO correction was applied to the data using 1st pass velocities, allowing a brute stack to be generated.

Dynamic corrections are applied to the data using the following formula.

$$TX = T0^2 + \frac{X^2}{V^2}$$

TX = time at offset X
T0 = time at zero offset
X = offset of the trace
V = velocity at time T

Dip Moveout

An F−K DMO correction or dip−dependant partial migration was applied to moved out common offset gathers transforming them from non−zero to zero offset. This allows for improved velocity estimates, lateral resolution and attenuation of coherent noise.

Velocity Analysis (2nd Pass)

Velocities were picked again using the interactive picking package, following Radon demultiple applied to location cdps. Removal of multiple energy with a delta−t range of 150−1200ms at the far offset, facilitated more reliable picking of primary energy.
Velocities were picked at locations at 1km intervals.

Normal Moveout Correction

An inverse NMO correction was applied to remove the first pass velocities from the gathers, followed by a forward NMO correction utilising the 2nd pass velocity picks.

Dynamic corrections were applied to the data using the formula described above.

Multiple Attenuation

CDP data were transformed into the Radon domain and an interactive filter was designed and applied to remove energy with a delta−t range of approximately 40 to 1200ms on the far offset.

Mute

A front mute was applied to eliminate refractors and stretch caused by normal moveout corrections. The mute was designed interactively from common offset stacks of the lines. The mute was referenced to the water bottom and is described as follows:

Time (ms)	Offset
−100	208
40	233
2 [illegible]	3890

Amplitude Balance (AGC)

Trace amplitude balancing scalars were calculated for each sample at the centre of a sliding balance window. The scaling factor is the ratio of the absolute average amplitude of the window and the average amplitude of the entire trace. Before this is calculated, the average amplitude of the entire trace is made equal to a requested value.
A scaling window of 500 ms was used.

Stack

Add traces within a common midpoint gather. The post stack trace was scaled by the square root of the sum of fold for each sample in the trace.

Static

A gun and cable depth correction static of +12.2ms was applied to the stacked data.

Migration

Stacks were migrated using a steep dip explicit finite difference algorithm. Migration used 100% of the smoothed stacking velocities calculated at datum.

Frequency Filter

The following Ormsby time variant digital Zero phase bandpass filter was applied to the data to remove high and low frequency noise.

Time (ms)	Frequency (Hz)
0	10/15-90/110
1000	10/15-90/110
2000	10/15-70/90
3000	8/12-50/60

Amplitude Balance (AGC)

A scaling window of 500 ms was used.

Display

Migrated and final stacks are displayed at a horizontal scale of 20 traces per cm and a vertical scale of 10 cm per second. A second set of squash plots were created at 20 traces per cm (alternate traces only) and 5 cm per second. Products were produced on paper and film for archival purposes.

Displayed with the traces are Shotpoint and CDP annotation, velocity information, fold and autocorrelations. A side panel outlining the acquisition and processing parameters is attached.

Quality Control

The following is a summary of the quality control steps taken throughout this production project.

- Near Trace displays to QC water depth and water bottom profile
- Interactive display of all shot records for trace editing
- Geometry QC displays of cdp fold, SP/cdp relationship and water depths
- Brute stack displays with FK, decons and 2km velocities
- Stack with DMO using DMO velocities at 1km interval
- Stack with Radon demultiple after DMO
- Migrated stack
- Final Displays with final filter and scaling

Conclusions

Overall data quality was good although frequency content was not near the upper limits of the field filters. First break noise and reverberations, and cable jerk, were attenuated reasonably well with the pre-decon F-K filtering. Multiple energy was also present but handled OK with the application of the Radon transform filter. When comparing the final product with the previous processing it appears improvement was made overall in terms of data resolution and continuity.

Archiving

Digital Data:
Raw and filtered-scaled final stacks and migrated stacks were archived in SEGY format on a 8mm Exabyte tape #CPT362. CDP gathers of data with DMO, Radon and NMO applied were also produced in SEGY format:

Line Number	Tape No.
MXT90-05	CPT364
MXT90-12	CPT365
MXT90-16	CPT366

Appendix

This data were processed by Velseis Processing Pty Ltd., Brisbane Australia.

Velseis Processing utilizes ProMAX 2D processing software. This is a totally interactive system allowing the user to view data processing at each stage, producing a final result of the highest quality.

The software executes on a dual processor Sparc 20 Sun workstation. Each processor is rated at 400 MHz and the system is configured with 1024 Mbytes of memory. Data is viewed via X terminals networked to the main system, each terminal has a high definition monitor to enable accurate representation of the digital data in pixel form.

The overall efficiency of the system enabled processing to be completed within the allotted time frame.

Plots were generated via a 300 dpi thermal plotter. This was used to generate paper plots for QC purposes as well as providing final filmed copies.

Velseis Processing is committed to offering a premium product, the software development undertaken by ProMAX resulting in processing algorithms which are state of the art. Velseis Processing is not limited to 2D seismic - we have access to a full suite of 3D Algorithms via **ProMAX 3D**.