Data Processing Report

for

EXoil Ltd

Area: Bazzard 3D, VIC/P53
Gippsland Basin

WG Contract Number: AS33
Client Project Number: GAP04E
Date: October 2005

WesternGeco

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Table of Contents

1.0 Introduction

This report details the data processing of Bazzard 3D, VIC/P53 (Gippsland Basin) Marine Seismic Survey carried out by WesternGeco (WG) in Perth. The project was conducted in Bass Strait, Victoria, Australia under client project number GAP04E by Apache Energy Northwest Pty Ltd for Bass Strait Oil Company Limited (BSOC) and for Exoil limited. The Processing of the data was managed by Bass Strait Oil Company on behalf of Exoil Ltd. The objective of the project was to improve the structural definition of the leads identify in VIC/P53.

The project consisted of approximately 470 full fold km^2 or 21002.4 linear CMP kilometres of data. The area of coverage is shown in **Section 6.3,** Acquisition Line Listing. The field data were acquired by WesternGeco (m/v Western Trident) in March 2005. Data processing was carried out between 10th of May and 03rd October 2005. The entire processing was performed and coordinated in Perth office.

The processing parameters and sequences were optimized and established with BSOC representative Ian Reid on behalf of Exoil Ltd. The project was managed for WesternGeco by Ken Jayan with geophysical support from Richard Patenall and supervised by Tony DeLorenzo.

The data were processed through a prestack sequence consisting of 3 passes of SWATT, Tau-p linear noise attenuation, DBS, 3D bin regularisation by interpolation, 3D PreStack Time Migration and Radon multiple attenuation. On the whole, four passes of velocity analyses were performed; 1st pass at 1 km x 1 km grid, 2nd and 3rd pass were at 0.5 km x 0.5 km grid and the final analysis was performed on a Dense Velocity grid of 100m x 100m . The data were full offset stacked and angle stacked with final (3rd pass) picked velocities which were then followed by poststack crossline trace interpolation from 25 m to 12.5 m.

Line GAP04E1424P1011 were chosen by BSOC as primary test line. This primary test line was generally tested for all the processing sequences, additional testing for additional test lines were carried out to further improve the data quality when necessary. Testing was performed concurrently with the production. **Section 4** lists the significant tests that were run.

2.0 Project Management

2.1 Reporting Procedure

Project progress reporting was done on a weekly basis covering the period Monday to Friday. This was accomplished each Friday via e-mail and included the following:

- Estimated completion date
- Action for client / processing group to date
- Data received to date
- Status summary with completion % to date
- Tests / confirmation to date
- Data sent to date

2.2 SuperVision

WesternGeco had setup a SuperVision website for this project in order to upload and download data. This was primarily utilised as for verification of production processing and to provide quality control examples that have been carried out during production, namely, noise analysis plot files, fold of coverage plot files and data quality examples. BSOC has access to this SuperVision site.

3.0 Seismic Data Processing

3.1 Reformat

The 8x 384 trace (52 accepted sequences) demultiplexed field data were reformatted from SEGD 8058 to an in-house source-gathered seismic file omega format.

Diagnostics from the transcription program list input and output record numbers, plus parity and block length errors. Each printout was checked against the observer logs to ensure that all the data had been correctly transcribed. Every 100th shot record and near trace sections were displayed for quality control on each sail-line (or all 16 sub-surface lines). All data were output to 5120 ms record length at 2 ms sample rate.

3.2 Navigation and Seismic Data Merge

The navigation data (UKOOA P1/90 format) supplied by field crew have the following information:

Projection type : Universal Transverse Mercator (UTM) Southern Hemisphere
Projection zone : 55 South
Geodetic datum : GDA94
Spheroid : GRS80
Central meridian : 147 Deg East

The navigation source & receiver XY co-ordinates were merged with the seismic data traces. Navigation and seismic data were matched using unique Field Shot Identifier (FSID), unique trace number and cable number.

3.3 Deterministic Designature

The conversion to minimum phase of the source signature embedded within the seismic dataset is often a prerequisite to the application of spiking or predictive deconvolution. Alternatively, converting the source signature to zero phase can be performed as the first stage in the process of converting the recorded seismic data to zero phase, particularly when long-gapped or no predictive deconvolution is being applied. The objective of dephase is to obtain an operator that will convert the recorded or model far field source signature to its minimum or zero phase equivalent.
In the conventional marine acquisition case, the far field source signature is assumed to be an accurate measure of the down-going source wavelet produced by the airgun array. The source signature can be determined either by measuring the far field airgun response, or by generating a synthetic signature using known source and array parameters.

The derivation of the dephase filter operator that applied to seismic data has the following sequence:

1) Far field source signature at 2 ms sample rate
2) Add cable ghost to (1)
3) Zero phase equivalent of (2)
4) Zero phasing operator to shape (2) into (3)

Parameter values:

Far field source signature	: Supplied by field crew
Desired output wavelet	: Zero phase equivalent
Number of coefficients	: 540
Sample index of time-zero of operator	: 270
Sample interval	: 2 ms

Coefficients: Refer to **Appendix 6.6**

3.4 Resample

An anti-alias filter was applied to whole survey and the data were re-sampled.

Parameter values:

Input trace length	: 5120 ms
Output trace length	: 5120 ms
Input sampling interval	: 2 ms
Output sampling interval	: 4 ms
Anti-alias filter:	
Phase type	: Zero
Cutoff frequency	: 105 Hz
Cutoff slope	: 60 dB/Octave

3.5 Trace Edits

Records flagged as bad in the observer's logs or as displayed in the near trace gathers and shot records were edited from the processing sequence.

3.6 Amplitude Recovery

A Time Squared Function Gain (with exponential value of 2) was applied to whole survey. Trace samples were scaled by the time of the sample raised to a user specified exponential value.

$$A_o(t) = A_i(t) * t^n$$

where:

$A_o(t)$	=	Amplitude of output sample at time t
$A_i(t)$	=	Amplitude of input sample at time t
t	=	Time in seconds
n	=	User supplied exponential value

3.7 Low Cut Filter

A zero phase band-pass filter described by low-cut frequencies and associated dB/octave cutoff slopes were applied to seismic data. The specified cutoff frequencies are located at the half-power (-3dB in amplitude) response points and the slopes at these frequencies are equal to the respective dB/octave values. The slope is an approximate cosine squared function in the amplitude domain. The filter was normalized so that output amplitudes were the same as input amplitudes for frequency components within the pass-band.

Parameter values:

Output phase	: Zero
Low cut frequency	: 3 Hz
Low cut slope	: 12 dB/octave

3.8 Swell Noise Attenuation (SWATT)

Swell noise is caused by data acquisition in rough sea conditions, particularly when the cables are being towed at a relatively shallow depth. SWATT aims to attenuate this noise by transforming the processing gather into the frequency domain and applying a spatial median filter. Frequency bands that deviate from the median amplitude by a specified threshold are either zeroed, or replaced by good frequency bands interpolated from neighbouring traces.

By applying the process in different domains improved noise attenuation can be achieved because the noise to signal relations are different in different domains. This means that noise might be anomalous in one domain, but not in another.

Three iterations of SWATT in shot domain were carried out as shown in the table below.

Parameter values:

Processing Domain: 3-Pass (Iteration); Shot Domain Swatt

Each iteration had the following Swatt parameters,
And each iteration consisted of two passes of Swatt.

Iteration 1, 2 and 3:

SWATT1

Width of Spatial Median Filter:	23 traces
Frequency Range Processed:	0 – 30 Hz
Width of Frequency Bands to Process:	6 Hz

Threshold Values:

Time (ms)	Threshold (%)
0	700
1500	500
4000	200
5120	200

Offset Control Window:

Offset (m)	Start Time (ms)	Stop Time (ms)
250	600	5120
5038	4300	5120

Relative Gate Window :

Start of window:	Water Bottom plus 200 ms
Length of Window:	300ms
Window Overlap:	100 ms

SWATT2

Width of Spatial Median Filter:	25 traces
Frequency Range Processed:	0 – 125 Hz
Width of Frequency Bands to Process:	5 Hz

Threshold Values:

Time (ms)	Threshold (%)
0	700
2000	500
4000	300
5120	200

Offset Control Window:

Offset (m)	Start Time (ms)	Stop Time (ms)

250	600	5120
5038	4300	5120

Relative Gate Window :
Start of window: Water Bottom plus 200 ms
Length of Window: 300ms
Window Overlap: 100 ms

3.9 First Pass Velocity Analysis

Velocity analysis was performed using WesternGeco's Interactive Velocity Analysis (InVa) system. This is an integrated velocity interpretation and QC system.

Pre-processed CMP gathers were selected across the whole survey at a regular interval before input to velocity analysis. From this data Multi-Velocity Function Stacks (MVFS) and velocity semblance displays were computed. For each velocity location, the gathers, MVFS data and semblances are displayed interactively allowing stacking velocities to be interpreted. Changes made to one window are automatically applied to all other windows. Velocities can be picked from either the MVFS or semblance display. When velocities are interpreted at a location a velocity database is updated and the CMP gather is displayed with the NMO correction.

The interpreted velocities, were QC'd using a range of tools available in InVa, including iso-velocity displays and horizontal contours, they were then used to generate a velocity model for subsequent processing.

First pass velocity analyses created at 1 km x 1 km grid were picked by WG and a general review was performed by BSOC.

These velocities were used for the Targeted PSTM Velocity Lines with a 3 km smoothing function applied. Both the interpolated stacking velocity field and interpolated/smoothed migration velocity field (in original WesternGeco VELF format) were archived to a CD-ROM (#CD001) for sent out to BSOC on 12 Oct 2005.

The input to first pass velocity analyses has the following steps applied concurrently with the production flow in order to obtain an appropriate set of picked velocities ready for subsequent processing: K-filter/Trace reduction/DBS (36ms gap,200ms operator length,1 window)/3D CMP Sort

Parameter values:

Central fan function : Single velocity (derived from 2D velocities supplied by BSOC)
Number of fan functions : 15
Fan separation: Time (ms) / Separation (%)
0 / 4
5000 / 4
Analysis interval : 1 km
Number of CMPs per analysis (MVFS display) : 15
Number of CMPs per analysis (Semblance display) : 7

3.10 Tau-p Linear Noise Attenuation

To eliminate linear noise within the data the source gathers were transformed into the Tau-p domain where unwanted linear noise was removed (muted). The resulting signal only Tau-p gathers were then subtracted from the original Tau-p gathers to produce noise only Tau-p gathers which were then transformed back to the T-X domain. The noise only T-X gathers were then subtracted from the original input gathers to result in noise filtered NMO corrected gathers.

This convoluted description of double subtraction (in the Tau-p and then the T-X domain) is based on the principal of only modeling the unwanted signal and not allowing the primary signal to be transformed into Tau-p space. This is due to the imperfection of the radon transform that will never return 100% of Tau-p transformed data back to T-X space.

Shot records were preconditioned prior to the transform. The gathers were applied with removable AGC to prevent transform aliasing gathers that were spatially interpolated then followed by linear moveout correction using velocity of 1510 m/s.

Parameter values:

Processing domain	: Tau-p
Removable AGC window length	: 500 ms
Moveout type	: Linear
Reference offset	: 4990 m
Moveout lower limit at reference offset	: -3500 ms
Moveout upper limit at reference offset	: 500 ms
Maximum frequency	: 125 Hz
Number of p-traces	: 800
Moveout type	: Pass
Moveout mute (low to high)	: -1800 ms to 300 ms
Moveout taper	: 32 ms

3.11 K-Filter

A seismic section such as a shot gather, CMP gather or stack section is a two-dimensional array of samples representing the amplitude of the seismic signal as a function of reflection time (t) and trace position (x). A Fourier transform can be used to convert trace position to the spatial frequency or wavenumber (k) domain. The filter can then pass a specified range of wavenumbers and a taper also applied to the filter boundaries to smooth the transition between the pass and the reject regions.

Later in the processing sequence, due to the application of K-filtering, the shot records can be reduced in size by dropping alternate traces in **Section 3.14 (Trace Reduction)**. Consequently, the k-filter was chosen to act as an anti-aliasing filter in the wavenumber domain, attenuating energy that would otherwise have become aliased when the trace separation was doubled by the dropping of alternate traces.

For convenience, the k-filter was implemented in the f-k domain. A 2-D Fourier transform was used to convert trace position to the wavenumber domain and reflection time to the frequency (f) domain. After implementation of the k-filter the data were inverse Fourier transformed back to the t-x domain.

Prior to the f-k transform, shot records were NMO corrected using first pass velocity (FPV) field and a data dependent scaling (typically AGC 120 ms) was applied to the data. This has the effect of reducing the impact on the transform of high amplitude events, particularly at the edges of the gather. After transformation back to the t-x domain the inverse of the scaling was applied, so largely preserving relative amplitudes. The NMO correction was also removed from the data.

Parameter values:

Processing domain	: Shot records (NMO corrected using FPV)
Pass wavenumber (k) values	: +/- 0.45
Taper	: 0.1

3.12 Deconvolution Before Stack (DBS)

A Wiener-Levinson least-squares, predictive deconvolution operators was designed from autocorrelations of a window within each trace and were applied on a trace-by-trace basis. Start-times were used to control the location of the design window so that high amplitude such as first break energy were excluded. However, the application included all data earlier than the start time to the end of the trace. The relevant DBS design and application parameters used were as follows:

Parameter values:

Deconvolution type	: Trace-by-trace
Autocorrelation window number	: 1
Window near trace start time	: WB + 400 ms
Window length	: 2500 ms
Predictive distance	: 24 ms
Operator length	: 240 ms
White noise	: 0.01 %

3.13 Tidal Static Correction

The data were corrected for tidal variations throughout the acquisition period. The compensation was corrected based on tidal information for the area supplied by company GEMS (Global Environmental Modelling Systems Pty Ltd). The data were merged with the seismic data based on time of day.

3.14 Trace Reduction

The data volume was reduced in size by decimating the shot gathers. The near offset was retained and every second trace (even number) was removed. This was possible due to the application of a K-Filter in **Section 3.11** to prevent spatial aliasing.

The effective group interval was doubled to 25 m after trace reduction.

3.15 Trace Edits

Second round trace edits based on DBS noise analysis was carried out prior to subsequent major processes like 3D bin regularisation by interpolation and 3D prestack time migration.

3.16 3D Grid Definition (PreStack)

The 4 corner points of Processing Master Grid are defined as follows:

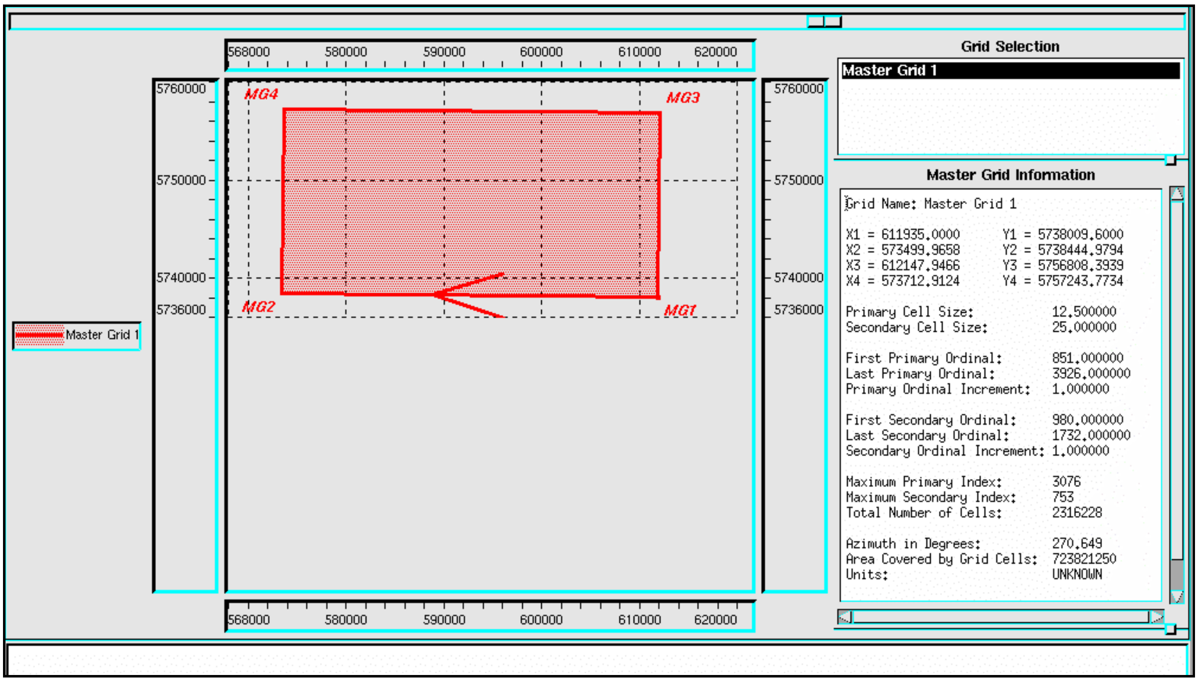
PreStack output grid = 12.5 m x 25 m, crosslines 851-3926 incr 1
inlines 980-1732 incr 1

	X-Coordinates	Y-Coordinates	Crossline	Inline
P1	611935.0000	5738009.6000	851	980
P2	573499.9658	5738444.9794	3926	980
P3	612147.9466	5756808.3939	851	1732
P4	573712.9124	5757243.7734	3926	1732

Crossline cell size: 12.5 m
Inline cell size: 25.0 m
Crossline increment: 1

Inline increment: 1

Primary axis azimuth: 270.649 degrees



3.17 Common Offset Sort

The data were sorted into 64 common offset planes and traces within each offset plane were then sorted into inline order. Prior to common offset sort, the inverse of time squared function gain was applied for later PSTM processing.

3.18 3D Bin Regularisation By Interpolation

This process is a seismic interpolation and regularisation tool for prestack 3D data that are irregularly sampled in space. It provides an improved method of regularising 3D fold coverage relative to the conventional flex binning approach of copy and move employed to fill gaps in coverage. The process also allows for the prestack regularisation of traces to move them (via interpolation) to their respective cell-centre positions.

In partial regularisation, the original data remain unaltered and traces are only interpolated to fill empty cells. Such partial regularisation can be useful prior to Prestack Time or Depth Migration where irregular subsurface fold can result in undesired amplitude variations.

Each interpolated output trace was calculated from a cluster of nearby input traces using adaptive interpolation. An optional dip map was computed to guide the interpolation and thus enable it to handle steeply dipping events. At each sample, the data were scanned over a range of dips to determine the local dominant dip. The dip-search was accomplished by computing the unnormalised semblance (correlation) between nearby traces for the range of dips of interest; peaks in the semblance indicate local dominant dips. The interpolated trace was then constructed by a weighted sum of input traces along the local dominant dip for each output sample.

The interpolation process was performed on common offset planes using a time-space (t-x) sinc interpolation that adapted to the local input cluster density and dominant dip. The traces were corrected with a differential moveout function which enabled data continuity without the over stretching involved with a full NMO correction. Limits were set for the maximum number of traces in an output cell. To accomplish this, redundancy editing was applied and the two traces closest to the cell centre were kept. This redundancy was based on full fold of the cell. After binning, the data were then inverse differential moveout with the same first pass velocity (FPV) field.

Parameter values:

Processing domain	: Common offset
Total common offset planes	: 64
Moveout correction	: Differential moveout using FPV
Operation mode	: Infill holes / trace regularisation
Maximum number of nearest trace in input cell	: 2
Interpolation length (inline x crossline)	: 11 x 11 cells
Maximum number of dip scans	: 11
Dip range	: -1 ms/cell to +1 ms/cell
Correlation width	: 31 cells
Correlation time length	: 48 ms
Maximum number of trace in output cell	: 1

3.19 Targeted PSTM Velocity Lines

Targeted 3D PreStack Time Migration (PSTM) to every 500 m velocity lines were processed for subsequent velocity analyses. The migrated data was obtained using the same parameters outlined in **Section 3.21 (3D PreStack Time Migration)**.

3.20 Second Pass Velocity Analysis

Most of the analysis parameters were identical to the first pass velocity analyses as detailed in **Section 3.9** except the critical change was to use the first pass velocity function as the centre velocity reference and a tighter fan separation.

Second pass velocity analyses created at 500 m x 500 m grid were picked by WG and a general review was performed by BSOC.

These velocities were used for the final 3D Prestack Time Migration with a 3 km smoothing function applied. This set of interpolated/smoothed migrated velocity field was reformatted to BSOC preferred format for Petrosys loading (The inline numbering was doubled at BSOC request and inline & crossline fields were switched in the text file) for archiving to the CD-ROM (#CD001) prior sending to BSOC on 12 Oct 2005. In addition, the same set of final migrated velocity field (in WesternGeco VELF format with original inline/crossline numbering) was also archived to a CD-ROM (#CD002) and sent to BSOC in the same shipment.

The input to second pass velocity analyses has applied mild Radon multiple attenuation in order to assist with the velocity picking.

Parameter values:

Central fan function : First pass velocity field
Number of fan functions : 15

Fan separation: Time (ms)	/ Separation (%)
1	/ 2
1500	/ 3
3000	/ 4
5000	/ 4

Analysis interval	: 500 m
Number of CMPs per analysis (MVFS display)	: 15
Number of CMPs per analysis (Semblance display)	: 7

3.21 3D PreStack Time Migration (PSTM)

The Kirchhoff Time Migration Seismic Function Module (SFM) performs seismic time migration using the Kirchhoff summation method. The migrated image is constructed by summing weighted amplitudes along diffraction curves or curved surfaces for the 3D case. These diffraction curves are determined by two-way travel times from the surface to subsurface scatters that are computed from the user-supplied velocity field. In prestack mode, migration is performed on common offset volumes for 3D data.

Theoretical basis Kirchhoff Migration is based on Green's theorem, a mathematical equation that states a relationship between the observations of a wave field on a closed surface and the wave field at any point inside that surface (see Schneider, W.A., 1978). The name of Gustav Kirchhoff is associated with the method because of his work in 1882 on optical diffraction. The formula for migration that is derived from Green's theorem has the form of an integral (or a summation in the case of discretely sampled data) over observations made on the surface of the earth. The migrated image calculated by that summation represents the acoustic reflectance throughout a section of the earth beneath the surface observations.

Key parameters to the migration process are the maximum dip filter angle and spatial anti-aliasing factors. Kirchhoff Migration typically provides a better migration solution, compared with other time migration algorithms, when the velocities vary both laterally and temporally. One feature of the WesternGeco's Kirchhoff Migration is the ability to define an output location, line or volume independently of the input data. This allows the user to target the output of selected lines or locations that are fully 3D migrated without the associated time/cost of migrating the whole volume. This target output option is particularly useful when processing 3D prestack as it allows the generation of targeted velocity analyses prior to running the full migration. Under such circumstances, the process does not waste time migrating those input traces that do not contribute to the output profile.

Prestack time migration is achieved by migrating the sorted common-offset panels into individual zero-offset panels. During migration the traces are effectively NMO-corrected; however, inverse NMO using the migration velocity is typically applied prior to output of the data. This allows a final (third pass) velocity analyses and moveout to be performed on the data prior to final stacking the whole volume.

Parameter values:

Processing domain	: Common offset
Total common offset planes	: 64
Migration algorithm	: 3D Kirchhoff Migration
Travel time computation	: Ray bending
Maximum aperture radius	: 3000 m
Maximum dip limit	: 60 degrees
Migration velocity field	: 100% second pass velocity field smoothed over 3 km

3.22 3D CMP Sort

The PSTM data were re-sorted back to 3D Common Mid Point (CMP) gathers for subsequent processing.

3.23 Third Pass Velocity Analysis

Most of the analysis parameters were identical to the first and second pass velocity analyses in **Section 3.9 (First Pass Velocity Analysis) & Section 3.20 (Second Pass Velocity Analysis)** except the critical changes were to use the second pass velocity function as the centre velocity reference and a tighter fan separation.

Third (final) pass velocity analyses created at 500 m x 500 m grid were picked by WG.

The final set of stacking velocities was used for subsequent processes such as Radon multiple attenuation, final full offset stack and stacking of the angle gathers. This set of interpolated stacking velocity field was reformatted to BSOC preferred format for Petrosys loading (The inline numbering was doubled at BSOC request and inline & crossline fields were switched in the text file) for archiving to the CD-ROM (#CD001) prior sending to BSOC on 1 Sept 2005. In addition, the same set of final stacking velocity field (in WesternGeco VELF format with original inline/crossline numbering) was also archived to the CD-ROM (#CD002) for sending out to BSOC on 29 Sept 2005.

The input to third pass velocity analyses has applied with mild Radon multiple attenuation in order to assist with the velocity picking.

Parameter values:

Central fan function : Second pass velocity field
Number of fan functions : 15

Fan separation: Time (ms)	/ Separation (%)
2	/ 2
1500	/ 3
3000	/ 4
5000	/ 4

Analysis interval : 500 m
Number of CMPs per analysis (MVFS display) : 15
Number of CMPs per analysis (Semblance display) : 3

3.24 Dense Velocity Analysis

3D velocity analysis is typically performed on a sparse grid of data with 500x500m spacing. Whilst this analysis density is generally adequate to determine the general velocity trends in quite high detail, the Dense Velocity Analysis process (DVA) is a semi-automated approach to generate a velocity field with a higher spatial resolution. This velocity field can then be used to perform final NMO correction.

3.24.1 Dense velocity analyses generation

Velocity Analysis control points for Semblances and Gathers were generated at a dense spatial sampling interval in preparation for running the Automatic Velocity Picker. Adjacent CMP Summing was performed in the generation of cross-correlation matrices that were sampled in time and velocity.

Parameter values:

Velocity Analysis Density	:	100x100m
Velocity Trace Sampling	:	8m/s
Time Sampling	:	8ms
Output Trace Length	:	5000ms

Automatic Velocity Picking

The Automatic Velocity Picker generated time-velocity picks from input coherence tables plus additional velocity information that was used to determine the starting velocity functions for the iterative velocity picking algorithm. It was also used for constraining the final interval velocity models and for deleting unacceptable RMS velocities from the computations.

The algorithm is based upon the work of J.L Toldi (1985). A significant feature of Toldi's technique is that velocities are picked under the constraint of a realistic interval velocity model, ensuring that picked RMS velocities do not imply absurd interval velocity functions. The algorithm works best for horizontally stratified geology, with mild lateral velocity variations. Toldi's method also performs automatic stacking velocity analysis by finding the observed stacking velocity that maximises the data semblance. The resultant algorithm simultaneously maximises the semblance and minimises the stacking velocity differences.

In order to prevent unrealistic picking of VRMS values, the following constraints, or penalty functions, may be included to guide the auto picking algorithm:

- Temporal smoothness weighting to reduce the effect of rapid fluctuations in interval velocity.
- Deviation tolerance from the initial model.
- Weight accorded to surrounding velocity functions.
- Maximum and minimum allowable interval velocity.

Parameter values:

Steering Velocity Field Density	:	500x500m
Interval Velocity Range Limits	:	1400-6000m/s
Output Velocity Field Density	:	100x100m

3.25 Radon Multiple Attenuation

Radon Multiple Attenuation is principally a modeling and subtraction process. CMP gathers are transformed to the Radon (Tau-p) domain, unwanted coherent noise is isolated in this domain, transformed back to the time-offset (t-x) domain, and then subtracted from the original data. The transform separates events according to moveout (or velocity), and hence multiple energy can be isolated in the Tau-p domain (by means of a mute) provided it has a different velocity to that of the primaries.

Effective separation of coherent signal (primaries) and noise (multiples) requires that both are adequately focused in the Radon domain. Conventionally this is achieved in two steps. For a parabolic Radon transform, the first step is to condition coherent signal and noise events such that their moveout is approximately parabolic, and their amplitude and phase are approximately constant across all offsets. The second step is to apply a geometry compensation filter during the transform, which attempts to reduce artefacts caused by the input gather geometry. A least-squares geometry compensation filter requires the moveout range for the transform to be adequate to model all coherent events. The transform minimizes the difference between the input and the forward and reverse transformed data (the residual) and if a significant amount of coherent energy lies outside the modeled moveout range, artefacts will result.

In Radon Multiple Attenuation, normally two velocity fields are required:

- An estimate of the stacking velocity field, V_s.
- A maximum velocity for multiple attenuation, V_m. This is usually a percentage of V_s.

CMP gather data are conditioned prior to the transform. Typically the gathers are moveout corrected with velocity V_s, which ideally results in flattened primary reflections and under corrected multiples. For convenience we refer to over-corrected data as having negative dip (decreasing time with increasing offset), under-corrected data as having positive dip (increasing time with increasing offset) and flat data as having no discernible change in time with offset. To prevent transform aliasing the gathers can be spatially interpolated and the amplitudes may also be preconditioned, for example by using a reversible AGC.

The data are then transformed into the Tau-p (Radon) domain using a parabolic Radon transform. After hyperbolic normal moveout (or higher-order moveout correction), residual moveout has an approximately parabolic shape and hence a parabolic Radon transform is appropriate.

The range of moveouts to transform, measured in ms at a reference offset (X_{ref}), is chosen to cover the range of both primary and multiple energy. Following this, parts of Tau-p domain representing primary energy are zeroed by application of a mute. For this purpose ‘primary energy’ is usually assumed to be any data with a velocity faster than V_m. This allows for time-variance in the separation of primary and multiple events. V_m does not need to be the actual velocity of the multiples but rather a velocity that is as fast or faster than multiples of interest while being slower than the primary velocity. Primary energy is protected at late times by imposing a minimum moveout (p) value on the mute. Note that for some deep-water datasets, the mute may be safely defined by use of the minimum p value alone, without reference to V_m. The boundary between the zeroed and preserved regions is tapered in the p direction.

Inverse Tau-p transform and removal of the pre-transform conditioning produces a model of the multiple energy. This is subtracted from the original data to produce the multiple-attenuated output.

In the Bazzard 3D processing, the method used for the subtraction of the modelled multiples from the primary data was to use time-variant reductions of the primary NMO velocity field as detailed below. This is referred to as a velocity mute method. The energy which is output from the multiple model in Tau-p domain with RMS velocities lower than these percentages of the primary velocity was considered to be multiple energy and was subtracted from the data. In this case, three velocity fields were required:

- An estimate of the stacking velocity field,$V_{s.}$
- An upper boundary reduced version of the stacking velocity field, called V_H as below, and
- A lower boundary reduced version of the stacking velocity field, called $V_{L,}$ which was 10% of V_s

Parameter values:

Pre-transform conditioning	: NMO with primary velocity (final velocity field) 500 ms AGC
Reference offset (X_{ref})	: 5020 m
Moveouts (Δt) at the reference offset (X_{ref}):	
Minimum moveout (i.e. for the first p-trace)	: -400 ms
Maximum moveout (i.e. for the last p-trace)	: 3000 ms
Moveout type	: Parabolic
Number of p-traces	: 480
Maximum frequency	: 100 Hz
Multiple mute velocity (V_m)	: Low velocity field 10 % 0f final field High velocity field 90 % of final velocity field
Velocity mute taper	: 32 ms

Note: Moveouts used in making intermediate p-traces were linearly interpolated between the minimum and maximum moveouts.

3.26 Normal Moveout Correction / Outer Mute / Stack

Normal Moveout (NMO) correction was performed using final set of 3D velocity field.

After NMO, an outer trace mute was applied to remove first break noise, refractions and wide angle reflections and any data which NMO had stretched beyond acceptable limits. To prevent a rapid amplitude change between the muted and live parts of the trace in trace mute process, a typical 64 ms taper was applied from zero amplitude to full amplitude. This prevents distortion to the frequency spectrum of the stacked data, which would otherwise by introduced by an abrupt boundary.

The data were stacked and normalized sample by sample using the following function:

$$s(t) = \frac{1}{w(t)}$$

Where *w(t)* is the summed weight function for a given output trace

The nominal CMP fold was 64. Selected stack monitors (NMO-CMP gathers) at every 500 m interval were QC'd with final outer trace mute patterns over-laid. Similarly, every 500 m interval of inline stacks were QC'd prior to loading the raw stack cube to OmegaVu for inline / crossline / time-slice QC.

The final outer trace mute patterns applied to the data are as follows:

Parameter values

WB time (ms)	: Offset (m) - Time (ms) in pairs
4	: 238-004, 400-010, 600-200, 750-500, 1500-1000, 2400-1700, 3200-2400, 5100-3700
160	: 238-004, 400-020, 600-300, 750-500, 1500-1100, 2400-1800, 3200-2500, 5100-3800
400	: 238-180, 400-200, 600-500,1020-800,1695-1400, 2595-2100, 3345-2800, 5100-4000
700	: 238-480, 400-500, 750-600,1245-950,2000-1700, 2700-2200, 3750-3100, 5100-4000

Mute times were linearly interpolated between the specified offsets and extrapolated for the offsets larger than the last offset specified.

3.27 Near, Mid and Far Angle Stacks

The velocity functions used to derive the angle mutes were calculated from the smoothed final velocity field. The mutes were calculated using bending rays, to compensate for refraction, with interval velocities calculated using Dix approximation. The resulting velocity function was finally modified by a Least Squares fit to prevent oscillations in interval velocities causing unstable mute patterns.

The 3 angle stack volumes generated were:

- Near 0^O - 14^O
- Mid 14^O - 28^O
- Far 28^O - 42^O

For the mid angle range, the water bottom dependent final outer trace mute patterns as specified above were incorporated to mute off some of the noisy data below 3 seconds. Similarly, for the far angle range, the water bottom dependent outer trace mute patterns were designed to mute off some of the noisy data below 2 seconds.

The traces within each angle-muted gather are stacked to form a single output trace. The resultant trace is normalized sample by sample using the following function:

$$s(t) = \frac{1}{w(t)}$$

Where *w(t)* is the summed weight function for a given output trace

3.28 3D F-K Footprint Removal

Spatially periodic artefacts (footprint) caused by recording geometry in the 3D input volume (t-x-y) are transformed into peaks in frequency slices in the transform domain (f-k_x-k_y). These peaks are suppressed by use of notch filters. For a given geometry, the peaks occur at different locations depending on structural dip, and footprint character may change in the time direction, hence the data is spatially and temporally windowed into regions of similar structural dip and footprint character. The windowed regions are overlapped sufficiently to avoid windowing artefacts.

The notch filters can either be defined by the user or can be automatically derived. The automatic derivation works by summing the k_x-k_y slices over frequency then detecting peaks over a threshold percentage of the peak at the origin (which corresponds to flat events). In the case of a dominant structural dip within the t-x-y window, the slices are shifted before summation to compensate for that dip. The detected peaks are then suppressed on each frequency slice by application of tapered elliptical notch filters.

Parameter values:

In-line window width	: 100 traces
In-line window overlap	: 20 traces
Cross-line window width	: 132 traces
Cross-line window overlap	: 20 traces
Time window length	: 1000 ms
Time overlap	: 500 ms
Notch filter derivation	: Automatic

3.29 Post-Stack Crossline Trace Interpolation

A frequency-space (f-x-y) 3D interpolation algorithm is used to generate interpolated traces within each offset plane to yield the desired output trace spacing.

The stack volume is windowed in all 3 directions to create sub-volumes within which the interpolation takes place. These sub-volumes are overlapped to allow for blending of the interpolation results. This is done in order to conform to the premise of the algorithm that seismic events are linear or planar within each sub-volume.

Each sub-volume is Fourier transformed in time to form a cube of f-x-y data with each frequency slice then being interpolated separately.

The interpolated output data was re-grid to reflect the new bin size. The original inline numbers were doubled after interpolation at BSOC request.

Parameter values:

Input trace spacing (inline x crossline)	: 12.5 m x 25.0 m
Output trace spacing (inline x crossline)	: 12.5 m x 12.5 m
Time window length	: 1000 ms
Window width (inline x crossline)	: 21 x 21 traces
Operator width (inline x crossline)	: 5 x 5 traces

3.30 3D Grid Definition (PostStack)

The above poststack 3D interpolated data were re-grid to reflect the new bin size as follows:
(The inline numbering was doubled at BSOC request)

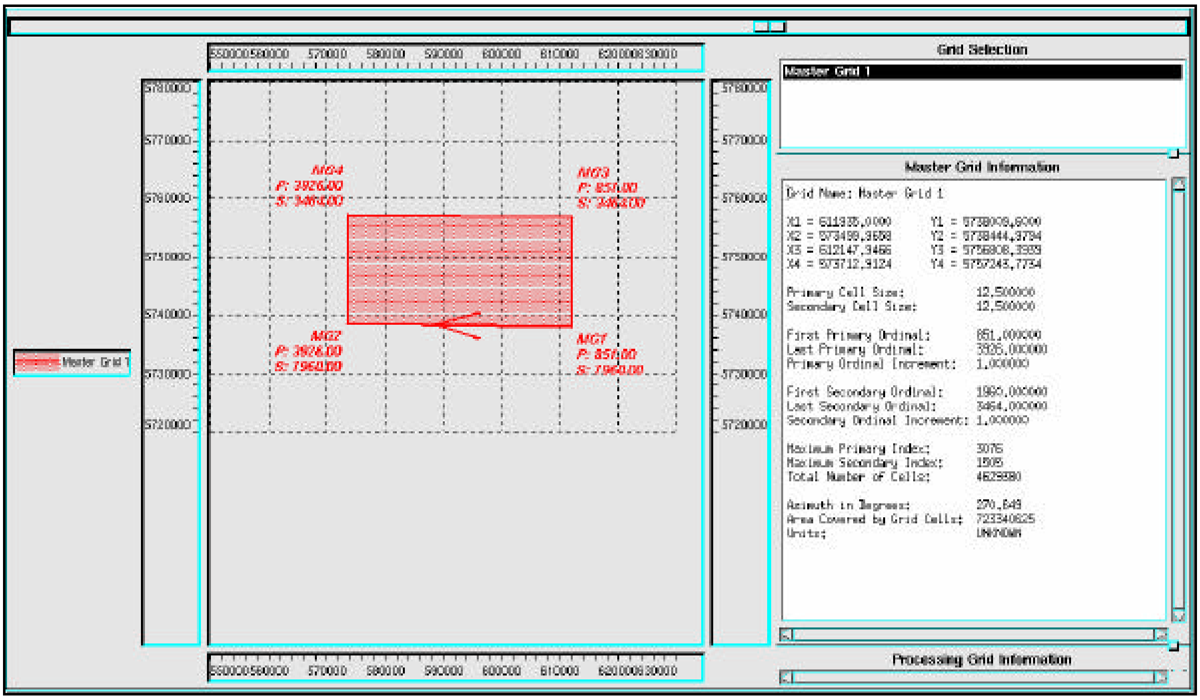
PostStack output grid = 12.5 m x 12.5 m, crosslines 851-3926 incr 1
inlines 1960-3464 incr 1

	X-Coordinates	Y-Coordinates	Crossline	Inline
P1	611935.0000	5738009.6000	851	1960
P2	573499.9658	5738444.9794	3926	1960
P3	612147.9466	5756808.3939	851	3464
P4	573712.9124	5757243.7734	3926	3464

Crossline cell size: 12.5 m
Inline cell size: 12.5 m

Crossline increment: 1
Inline increment: 1

Primary axis azimuth: 270.649 degrees



3.31 Gun and Cable Static Correction

The gun and cable depth corrections to mean sea level were applied to all final migrated full offset & angle stack volumes. With the averaged gun depth of 7 m & cable depth of 8 m and using the water velocity of 1500 m/s, a static correction of 10 ms was calculated and applied.

3.32 Single-Trace Predictive Deconvolution Processing

One model of the seismic trace is that of a convolution of source, receiver, instrument, geology and noise terms. Data processing attempts to reduce the impact on the seismic trace of all terms except the geology term. Weiner-Levinson deconvolution is particularly good at reducing the effect of source, receiver and instrument responses. It is also very effective against certain types of noise, particularly reverberation trains.

Deconvolution operators were designed from autocorrelations of windows within the trace and were applied on a trace-by-trace basis. Application was over windows separately defined from the design windows.

3.32.1 Analysis Window Specification

The start time of the first window for each trace was obtained by adding a constant to the start time read from the trace header. The start time of the second window was obtained by subtracting a constant from the stop time of the first window.

The window stop times for each trace were obtained by adding a constant window length to the window start times.

Parameter values:

Window 1 Start Time : Water Bottom + 200 ms
Window 1 Length: 200 ms

3.32.2 Predictive Deconvolution Operator Design

A Wiener-Levinson predictive deconvolution operator trace was designed for each trace from the autocorrelations of the analysis windows.

Parameter values:

Total Operator Length for window : WB * 1.2 ms
Active Operator Length for both windows : 240ms
Prediction Distance for both windows : WB * 0.8 ms

3.33 Time Variant Spectral Shaping (TVSS)

The primary purpose of spectral shaping is to modify the wavelet to achieve maximum vertical resolution. Optimum wavelet resolution is achieved by shaping the wavelet's amplitude spectrum to become broad and flat. The extent to which this may be usefully undertaken is limited by the signal to noise ratio of the data.

It is assumed prior processing has converted the data to zero-phase. This is maintained by making the spectral shaping operators also zero-phase.

The wavelet spectrum cannot be directly estimated from the data, without knowledge of the reflectivity spectrum. Spectra measured from seismic data are the combination of the wavelet spectrum and the earth reflectivity spectrum. To separate the earth reflectivity from the trace spectra a measurement of the reflectivity has to be made. This can be computed from well bore data. If this is ignored, general spectral shaping programs assume the reflectivity to be "white" or random - an unrealistic assumption. A reflectivity trace is constructed from well data utilizing the p-wave velocity and density logs and is converted to the time domain. A highly smoothed reflectivity spectrum is constructed which describes the overall trend of the earth's reflectivity spectrum. This is then used in the shaping operator design.

A spectral shaping operator is then derived that will produce an output trace spectrum with a spectrum equal to the well reflectivity trend. Having applied such an operator the trace spectrum is coloured, but the wavelet spectrum is flat, thus achieving maximum vertical resolution.
The beta factor specified below is a control on the 'flatness' of the coloured output trace spectrum. A larger beta value allows more whitening of the higher frequencies and less to the lower frequencies. A smaller beta factor gives a flatter trace spectrum with more equivalent boosting at both the low and high frequency ends of the trace spectrum. The output trace spectrum was also controlled between 10 and 40 Hz where no gain, or spectral boosting, was applied. This frequency range was determined by estimating the dominant frequency of the signal at target depth.

Parameter values:

Filter specification : Automatic
Number of filters generated : 9

Passband Corner frequencies (Hz)	Passband Amplitudes
1 8 60 85	0.001 1 1 0.001

Gain window length : 512 ms
Percent white noise : 10

Beta factor : 0.5
Number time coefficients : 128
No-gain low frequency : 10 Hz
No-gain high frequency : 40 Hz

3.34 Time Variant Filter (TVF)

A zero-phase Time Variant Filter (TVF) was applied to the data. The filter passbands were described by low- and high-cut frequencies and associated dB/octave cutoff slopes. The specified cutoff frequencies are located at the half-power (-3 dB in amplitude) response points and the slopes at these frequencies are equal to the respective dB/octave values. The slope is an approximate cosine squared function in the amplitude domain. The filters were normalized so that the output amplitudes were the same as the input amplitudes for frequency components within the passband.

Parameter values:

Filter centre time (ms)	Low-cut frequency (Hz)	Low-cut slope (dB/octave)	High-cut frequency (Hz)	High-cut slope (dB/octave)
WB+ 4	6	36	80	72
WB+ 1500	6	36	70	72
WB+ 3000	4	36	50	72
WB+ 5000	4	36	45	72

Note: The times are those at the centre of the filter where the full effect of the filter is attained.
The first filter was applied from the beginning of the trace to the first filter centre time.
Intermediate filters were linearly tapered and blended with the preceding and succeeding filter between the filter centre times.
The last filter was applied from the last filter centre time to the end of the data.

3.35 Exponential Gain

The data were scaled with a time variant exponential gain function (that is, the trace sample at 2 seconds is multiplied by a value a specified amount higher in dB than the trace sample at 1 second). This scaling was applied from the trace's first time sample down to a time of t_{stop} after which the gain was held constant, according to the formulae:

$A_o (t) = A_i (t)$ t £ 0

$A_o (t) = A_i (t)\, e^{(t * PWR)}$ $t > 0$, t £ t_{stop}

$A_o (t) = A_i (t)\, e^{(t_{stop} * PWR)}$ $t > t_{stop}$

where:

$A_o (t)$ is the output trace sample at time t

$A_i (t)$ is the input trace sample at time t

t is the time in seconds

PWR is the exponential gain function

Parameter values:

Exponential Gain Function : 3 dB/s
t_{stop} : 3000 ms

3.36 Polygon Select Of Input Area

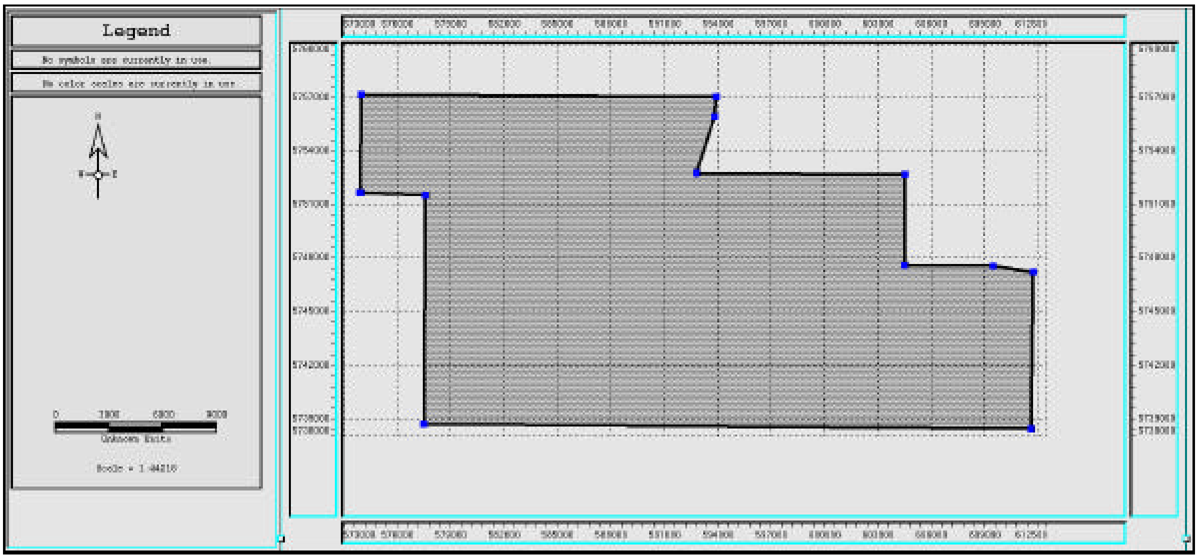
All full offset and angle stack volumes and the final set of prestack gathers were cut according to the polygon select of input area given below.

The 13 corner points of this polygon are as follows:

	Primary Ordinal.	Secondary Ordinal.	X Coordinate.	Y Coordinate.
1	3604.9290	1981.3998	577516.125000	5738667.000000
2	3608.7029	3008.0229	577614.312500	5751499.500000
3	3899.4165	3015.9705	573981.750000	5751640.000000
4	3905.0261	3015.9070	573911.625000	5751640.000000
5	3903.2803	3456.3950	573995.812500	5757145.500000
6	2308.8657	3463.2554	593925.687500	5757005.500000
7	2314.6226	3376.8645	593841.500000	5755926.500000
8	2392.5210	3121.5657	592831.687500	5752746.500000
9	1455.6199	3125.4583	604542.750000	5752662.500000
10	1452.1316	2718.6316	604528.750000	5747577.000000
11	1057.1434	2717.5056	609465.625000	5747507.000000
12	875.0806	2692.6863	611737.750000	5747171.000000
13	874.9882	1991.0422	611639.562500	5738401.000000

Where:

Primary Ordinal = Cross line
Secondary Ordinal = Inline after (Cross line interpolation, i.e. 12.5m x 12.5m bin sizes)



4.0 Parameter Testing

To maintain the agreed delivery date the testing was performed concurrently with production stages.

Primary test line: GAP04E1168P1012
Verification line: GAP04E1424P1011

4.1 Deterministic Designature

Selected 6 shot records from test lines 1168P1 & 1424P1:

- No designature
- Zero phase designature

4.2 Amplitude Recovery

Selected 6 shot records from test lines 1168P1 & 1424P1 with desig/resample applied:

- Raw shots
- Time squared function gain

4.3 Low Cut Filter

Selected 6 shot records from test lines 1168P1 & 1424P1 with desig/resample/T**2 gain applied:

- No low cut filter
- 3 Hz zero phase low cut filter
- 4 Hz zero phase low cut filter
- 5 Hz zero phase low cut filter

4.4 Swell Noise Attenuation (SWATT)

Selected test lines 1168P1 & 1424P1 with desig/resample/T**2 gain/LCF applied:

- No SWATT

<first Pass>

- SWATT with 23 tr filter width, 300 ms window length and 0-30Hz maximum Frequency to process and
- SWATT with 25 tr filter width, 300 ms window length with 0-125Hz

Two passes of the above parameters were then tested and a further 3 passes of the above were carried out. Best results were obtained after 3 passes of SWATT in the shot domain.

Compared brute stacks / nmo-cmps / shot records and their difference plots.
Decision: Apply 3 passes of SWATT in shot domain only.

4.5 Tau-p Linear Noise Attenuation

Selected test lines 1168P1 & 1424P1 with desig/resample/T**2 gain/LCF/SWATT applied:
• No Tau-p LNA
<Tau-p LNA (LMO half shot record)>
• Moveout range –3500to500 ms, 961 p-tr, moveout mute –1800to300 ms, white noise 10% (**)
<Tau-p LNA (reversible AGC, LMO full shot record, white noise 10%, p-tr tests)>
Compared selected shot records and their difference plots.
<Tau-p LNA + shot F-K filter>
• Tau-p LNA (**) + shot F-K filter (pass dips +-6.5 ms/tr, taper 3.25 ms/tr)
Compared selected shot records, stacks / nmo-cmps (with first pass velocity) and their diff. plots.
Decision: Apply Tau-p LNA only (ie. No second pass of FK-LNA).

4.6 K-Filter

Selected few shot records from test lines 1168P1 & 1424P1 with desig/resample/T**2 gain/LCF/SWATT/Tau-p LNA applied:
• No K-filter
• K-filter: pass wavenumber of +-0.45, taper 0.1
Decision: Apply K-filter before trace reduction.

4.7 Tau-p / T-X Deconvolution Before Stack

Selected test lines 1168P1 & 1424P1 with desig/resample/T**2 gain/LCF/SWATT/Tau-p LNA/K-filter applied:
• No T-X decon
<Tau-p decon: p-dependent gap-30 ms, operator length*2.2, 1 window>
• Moveout range –1200to3700 ms, 980 p-tr, moveout mute –1200to1650 ms
<T-X decon (tr-by-tr)>
• 240 ms operator length, 1 window, gap tests 12, 24, 28, 32ms and 36ms ---- for 1168P1 (SP 2326)
• 160 ms operator length, 1 window, gap 24ms
• 240 ms operator length, 1 window, gap 24ms
• 320 ms operator length, 1 window, gap 24ms
• 160 ms operator length, 1 window, gap 28ms
• 240 ms operator length, 1 window, gap 28ms
• 320 ms operator length, 1 window, gap 28ms
Compared selected shot records, stacks / nmo-cmps and their difference plots. All qc have 500 ms autocorrelations appended below shot / stack / nmo-cmp.
Decision: Apply T-X predictive deconvolution tr-by-tr using 240 ms operator, 24ms Gap.

4.8 3D Bin Regularisation By Interpolation

Selected near/mid/far common offset (OFF) planes with DBS/tidal static correction/trace reduction applied:
• OFF01, OFF30, OFF64 without 3D bin regularisation by interpolation
• OFF01, OFF30, OFF64 with 3D bin regularisation by interpolation:
Dip range tests +- 1, +-4, +-6, +-8 ms/cell
Compared selected inlines, crosslines & time slices.
Applied 3D bin regularisation by interpolation with dip range of +- 4 ms/cell.

4.9 Radon Multiple Attenuation After PSTM

Selected PSTM CMP gathers from vel-lines VL1428:

- No Radon multiple attenuation
- Radon multiple attenuation (reversible AGC): velocity mute 80% of final velocity field
- Radon multiple attenuation (reversible AGC): velocity mute 86% of final velocity field
- Radon multiple attenuation (reversible AGC): velocity mute 90% of final velocity field
- Radon multiple attenuation (reversible AGC): velocity mute 90% of final velocity field - no velocity mute
- Radon multiple attenuation (reversible AGC): velocity mute 94% of final velocity field
- Radon multiple attenuation (reversible AGC): velocity mute time variant 86-90% of final vel field
- Radon multiple attenuation (reversible AGC): velocity mute time variant 86-90% of final vel field - no velocity mute

Compared selected inlines, crosslines & time slices.
Applied Radon multiple attenuation after PSTM using velocity mute 90% of final velocity field.

4.10 Outer Mute

Selected KPSTM CMP gathers from lines 1143, 1443 and 1643:

- Outer mute patterns overlaid on the above cmp gathers

Final outer mute patterns were created for reviewing. Stacks were also produced and compared.

4.11 3D F-K Acquisition Footprint Removal

Selected a small test cube (IL1100-1400, XL 1700-2700) from final stack volume:

- No 3D F-K acquisition footprint removal
- 3D F-K acquisition footprint removal: IL/XL window width 100x132 traces
- 3D F-K acquisition footprint removal: IL/XL window width 150x198 traces

The test cubes were loaded into OmegaVu for reviewing.
Applied 3D F-K acquisition footprint removal to the final stack volume, IL/XL window width 100x132 traces.

4.12 Post-Stack Crossline Trace Interpolation

Selected the same test cube (IL1100-1400, XL 1700-2700) from final stack volume with 3D F-K acquisition footprint removal applied:

- No poststack crossline trace interpolation
- Poststack crossline trace interpolation

The test cube was loaded into OmegaVu for reviewing.
Applied poststack crossline trace interpolation (& re-grid with inline numbering doubled at BSOC request) after 3D F-K acquisition footprint removal.

4.13 Exponential Gain

Selected IL1400 from the Radon Stack:

- No exponential gain
- Exponential gain tests: 2, 3, 4, 5 db/sec
- Exponential gain tests: 2, 3, 4, 5 db/sec and hold constant below 4sec
- No exponential gain
- Exponential gain: 3 db/sec
- Exponential gain: 3 db/sec and hold constant below 4sec

Exponential gain not applied.

4.14 Deconvolution After Stack (DAS)

Selected inline 2286, 2886 and 3286 (originally IL 1143, 1443 and 1643) with crossline interpolation applied:

- No DAS
- DAS: 48 ms gap, 180 ms operator length, 1 window from WB+200 ms, 2000 ms window length

Selected whole line IL 2286, 2886 and 3286 with crossline interpolation applied:

- No DAS
- DAS (trace by trace): 48 ms gap, 180 ms operator
- DAS (15 trace rolling mix): WB*0.8 ms gap and WB*1.2 ms length.

Decision: Apply DAS to the whole survey with last test parameter applied.

4.15 Time Variant Spectral Shaping (TVSS)

Selected the same test lines (IL 2286, 2886 and 3286) from the above test i.e with crossline interpolation applied:

- No TVSS
- TVSS: 9 automated filters & beta factor tests of 0.3, 0.4, 0.5, 0.6

Decision: Apply TVSS to the whole survey.

4.16 Filter Tests

Selected the same test lines (IL 2286, 2886 and 3286) with crossline interpolation DAS and TVSS applied:

- No filter (applied AGC 2000 ms)
- Filter high-cut tests out : 30, 40, 50, 60, 70, 80, 90, 100, 110, 125 Hz
- Filter low-cut tests out : 2, 3, 4, 5, 6, 7, 8 Hz –

Decision to apply: Final time variant filter (TVF) [time(ms)/freq(Hz)]:
WB+0 / 6-80, WB+1500 / 6-70, WB+3000 / 4-50, WB+5000 / 4-45

4.17 Scaling Tests

Selected stack from IL3286 (XL 2678-3177) with crossline interpolation/TVSS/TVF applied:

- Raw stack
- AGC scaling tests: AGC 2000, 1500, 1000, 500 ms gate
- RMS scaling tests: RMS 2000, 1500, 1000, 500 ms gate

Decision to apply AGC: Apply AGC 500 ms to Final Migrated Stack volume.

4.18 Angle Mutes / Stacks

Selected a few final PSTM/Radon NMO-CMP gathers with various water bottom levels:

- Angle (5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60 deg) & final outer mutes overlay
- Angle 0-14 deg & final outer mutes overlay
- Angle 14-28 deg & final outer mutes overlay
- Angle 28-42 deg & final outer mutes (adjusted to suit this angle range) overlay
- Angle 0-14 deg & final outer mutes applied
- Angle 14-28 deg & final outer mutes applied
- Angle 28-42 deg & final outer mutes (adjusted to suit this angle range) applied

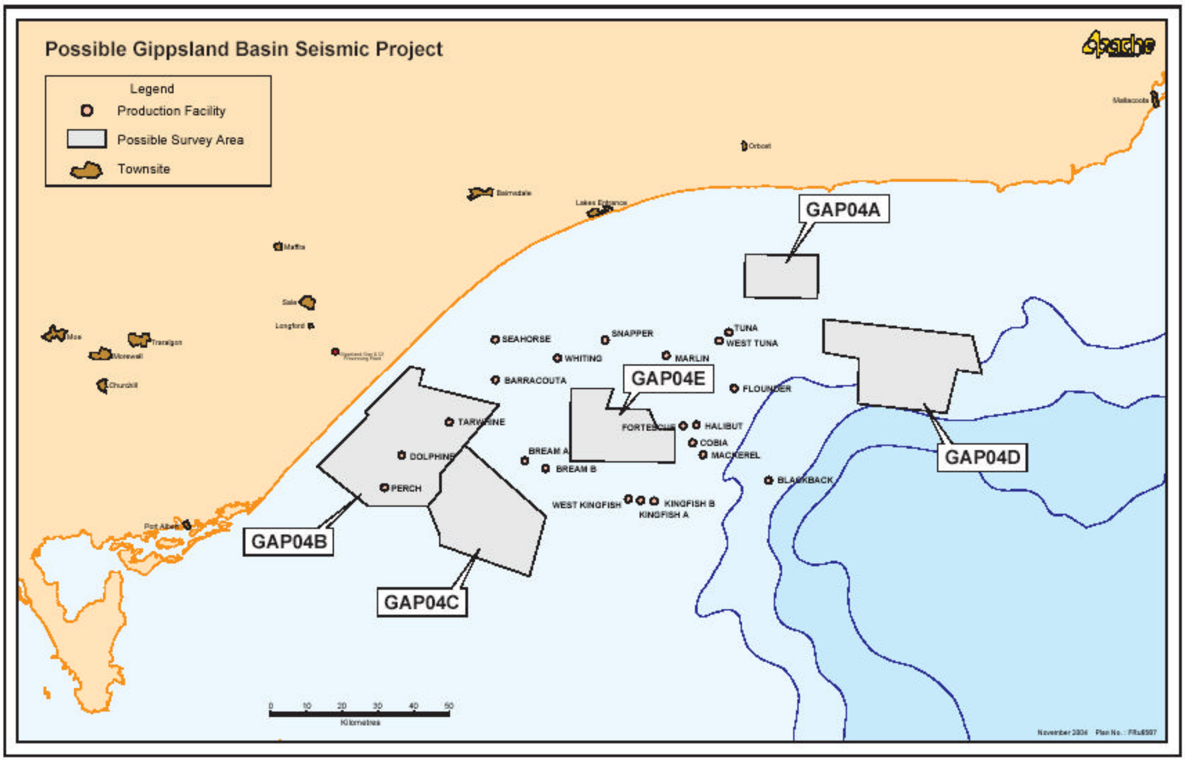
Decision to: Produce 3 near/mid/far angle stack volumes (without TVSS) for final deliverables as per contract.

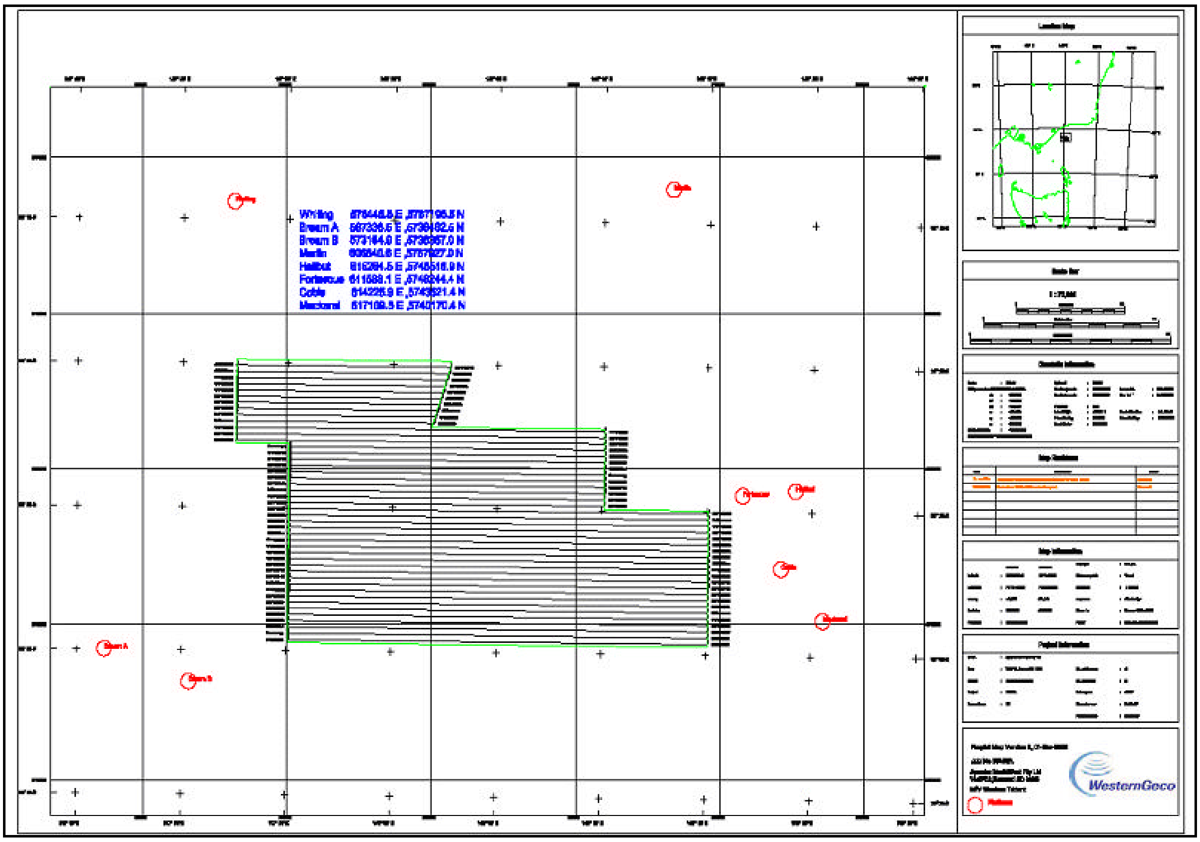
5.0 Personnel

Perth Personnel	
Paul Tredgett ptredgett@perth.westerngeco.slb.com	Data Processing Manager
Tony DeLorenzo delorenzo1@perth.westerngeco.slb.com	Processing Supervisor
Kenneth Jayan kjayan@perth.westerngeco.slb.com	Project Leader
Richard Patenall rpatenall@perth.westerngeco.slb.com	Geo-Support Geophysicist
BSOC Representatives	
Ian Reid ian.reid@bassoil.com.au	General Manager, Exploration
EXOIL Representatives	
Geoff Geary geoff.geary@exoil.net	General Manager

6.0 Appendices

6.1 Map of Survey Location





6.2 Acquisition Parameters

General

Client	Apache Energy Northwest Pty Ltd
Contractor	WesternGeco
Vessel	M/V Western Trident
Location	Bazzard 3D, VIC/P53, Gippsland Basin, Australia
Total km^2 acquired	470
Date shot	02 March - 17 March 2005

Recording

Recording type	MSX
Recording medium, format	3590B cartridge, SEGD 8058, Revision 1
Record length	5120 ms
Sample rate	2 ms
Low cut filter	2 Hz, 12 dB/octave
High cut filter	206 Hz, 264 dB/octave

Source

Source type	Tuned sleevegun array
Number of source arrays	2
Source array separation	50 m
Shotpoint interval	18.75 m flip/flop (37.5 m/array)

Array volume per source	3000 cu in
Operating pressure	2000 psi
Source depth	7 m
Number of sub-arrays/source	4
Sub-array separation	6 m
Number of airguns/sub-array	8
Sub-array length	15.1 m
Nominal CMP fold	64

Streamer

Streamer type	MSX solid streamer
Number of streamers	8
Group length	17.75 m
Number of hydrophones/group	14
Group interval	12.5 m
Hydrophone sensitivity	13.8 v / bar
Streamer length	4800 m
Streamer depth	8 m
Streamer separation	100 m
Number of groups/streamer	384
Nearest offset (nominal)	238 m

Navigation

Primary navigation system	Cnav
Secondary navigation system	Fugro Multifix 4
Tertiary navigation system	Trinav GPS 2.

6.3 Acquisition Line Listing

No	Seq	GAP04E	FGSP	LGSP	# shots	FFILE	LFILE	DIR	CMPKMs
001	033	1008P1	2552	874	1679	50	1728	090°	503.7
002	031	1024J1	2552	874	1679	90	1768	090°	503.7
003	029	1024P1	2552	874	1679	49	1727	090°	503.7
004	036	1040A1	1140	874	267	90	356	090°	80.1
005	027	1040P1	2552	874	1679	100	1044	090°	503.7
006	025	1056P1	2552	874	1679	42	1720	090°	503.7
007	023	1072P1	2552	874	1679	128	1806	090°	503.7
008	021	1088P1	2552	874	1679	44	1722	090°	503.7
009	019	1104P1	2552	874	1679	120	1798	090°	503.7
010	017	1120P1	2552	874	1679	30	1708	090°	503.7
011	015	1136P1	2552	874	1679	102	1780	090°	503.7
012	013	1152P1	2552	873	1680	67	1744	090°	504
013	035	1168A1	1729	873	857	112	968	090°	257.1
014	012	1168P1	2552	1720	833	89	921	090°	249.9
015	010	1184P1	2552	886	1667	44	1710	090°	500.1
016	008	1200P1	2552	1001	1552	118	1669	090°	465.6
017	006	1216P1	2552	1001	1552	60	1611	090°	465.6
018	004	1232P1	2552	1001	1552	102	1653	090°	465.6
019	002	1248P1	2552	873	1680	16	1695	090°	504
020	040	1264J1	2552	873	1680	100	1779	090°	504
021	037	1264P1	1001	2680	1680	55	1734	270°	504

022	034	1280P1	1001	2680	1680	49	1728	270°	504
023	032	1296P1	1001	2680	1680	100	1779	270°	504
024	030	1312P1	1001	2680	1680	59	1738	270°	504
025	028	1328P1	1001	2680	1680	100	1779	270°	504
026	026	1344P1	1001	2680	1680	108	1787	270°	504
027	024	1360J1	1388	2680	1293	53	1345	270°	387.9
028	022	1360P1	1388	2680	1293	91	1372	270°	387.9
029	020	1376J1	1388	2680	1293	52	1344	270°	387.9
030	018	1376P1	1388	2680	1293	125	1417	270°	387.9
031	016	1392P1	1387	2680	1294	56	1349	270°	388.2
032	014	1408P1	1387	2680	1294	105	1398	270°	388.2
033	011	1424P1	1387	2680	1294	57	1350	270°	388.2
034	009	1440P1	1387	2680	1294	95	1388	270°	388.2
035	007	1456P1	1387	2680	1294	62	1355	270°	388.2
036	005	1472P1	1387	2680	1294	55	1348	270°	388.2
037	003	1488P1	1387	2680	1294	109	1402	270°	388.2
038	001	1504P1	1387	2680	1294	109	1402	270°	388.2
039	038	1520P1	2750	1259	1492	34	1524	090°	447.6
040	042	1536P1	2750	1259	1492	53	1544	090°	447.6
041	048	1584P1	2750	1885	866	100	965	090°	259.8
042	044	1552P1	2750	1259	1492	104	1595	090°	447.6
043	046	1568P1	2750	1892	859	64	922	090°	257.7
044	050	1600P1	2780	2750	031	74	104	090°	DNP
045	051	1600P2	2750	1878	873	53	925	090°	261.9
046	039	1616P1	1999	2878	880	98	977	270°	264
047	041	1632P1	1993	2878	886	50	935	270°	265.8
048	043	1648P1	1986	2878	893	82	974	270°	267.9
049	045	1664P1	1979	2878	900	104	1003	270°	270
050	047	1680P1	1972	2878	907	53	959	270°	272.1
051	049	1696P1	1965	2878	914	100	1013	270°	274.2
052	052	1712P1	1959	2878	920	2878	972	270°	276
053	053	1712P2	2750	1831	920	100	1019	090°	276
								Total km^2	**21002.4**

6.4 Field Tape Listing and Supporting Data

A set of original field tapes (278 x 3590B media) for Bazzard 3D survey (VIC/P53) was sent to Kestrel Information Management in Melbourne for permanent storage on 17 January 2006. Storage request was made on behalf of Exoil Limited

Address: Kestrel Information Management
582-600 Somerville Road
Sunshine West
Victoria 3020

Attention: Diana Giordano (Account Manager)

The following supporting data were included in the same shipment:
1) 1 x CD with Omega edits
2) 1 x 3590B tape with navigation data in P1/90 format
3) 1 x 3590B tape with navigation data in P2/94 format
4) 1 x CD with digital observer's logs, tape log
5) 1 x CD with navigation VSE records

Line Name	DIR	Field Tapes	FSP	LSP	FFile	LFile	Recorded Date
GAP04E1504P1001	270	V30957	1357	1600	79	322	2-Mar-2005
GAP04E1504P1001	270	V30958	1601	1915	323	637	2-Mar-2005
GAP04E1504P1001	270	V30959	1916	2230	638	952	2-Mar-2005
GAP04E1504P1001	270	V30960	2231	2545	953	1267	2-Mar-2005
GAP04E1504P1001	270	V30961	2546	2686	1268	1408	2-Mar-2005
GAP04E1248P1002	90	V30962	2565	2253	3	315	2-Mar-2005
GAP04E1248P1002	90	V30963	2252	1938	316	630	2-Mar-2005
GAP04E1248P1002	90	V30964	1937	1623	631	945	2-Mar-2005
GAP04E1248P1002	90	V30965	1622	1308	946	1260	2-Mar-2005
GAP04E1248P1002	90	V30966	1307	993	1261	1575	2-Mar-2005
GAP04E1248P1002	90	V30967	992	866	1576	1697	2-Mar-2005
GAP04E1488P1003	270	V30968	1357	1612	79	334	2-Mar-2005
GAP04E1488P1003	270	V30969	1613	1927	335	649	2-Mar-2005
GAP04E1488P1003	270	V30970	1928	2242	650	964	2-Mar-2005
GAP04E1488P1003	270	V30971	2243	2557	965	1279	3-Mar-2005
GAP04E1488P1003	270	V30972	2558	2684	1280	1406	3-Mar-2005
GAP04E1232P1004	90	V30973	2582	2338	72	316	3-Mar-2005
GAP04E1232P1004	90	V30974	2337	2023	317	631	3-Mar-2005
GAP04E1232P1004	90	V30975	2022	1708	632	946	3-Mar-2005
GAP04E1232P1004	90	V30976	1707	1393	947	1261	3-Mar-2005
GAP04E1232P1004	90	V30977	1392	1078	1262	1576	3-Mar-2005
GAP04E1232P1004	90	V30978	1077	998	1577	1655	3-Mar-2005
GAP04E1472P1005	270	V30979	0	0	0	0	3-Mar-2005
GAP04E1472P1005	270	V30980	1357	1660	25	328	3-Mar-2005
GAP04E1472P1005	270	V30981	1661	1975	329	643	3-Mar-2005
GAP04E1472P1005	270	V30982	1976	2290	644	958	3-Mar-2005
GAP04E1472P1005	270	V30983	2291	2605	959	1273	3-Mar-2005
GAP04E1472P1005	270	V30984	2606	2690	1274	1350	3-Mar-2005
GAP04E1216P1006	90	V30985	2582	2291	30	321	3-Mar-2005
GAP04E1216P1006	90	V30986	2290	1976	322	636	3-Mar-2005
GAP04E1216P1006	90	V30987	1975	1661	637	951	3-Mar-2005
GAP04E1216P1006	90	V30988	1660	1346	952	1266	3-Mar-2005
GAP04E1216P1006	90	V30989	1345	1031	1267	1581	3-Mar-2005
GAP04E1216P1006	90	V30990	1030	999	1582	1613	3-Mar-2005
GAP04E1456P1007	270	V30991	1357	1641	32	316	3-Mar-2005
GAP04E1456P1007	270	V30992	1642	1956	317	631	3-Mar-2005
GAP04E1456P1007	270	V30993	1957	2271	632	946	3-Mar-2005
GAP04E1456P1007	270	V30994	2272	2586	947	1261	4-Mar-2005
GAP04E1456P1007	270	V30995	2587	2684	1262	1359	4-Mar-2005
GAP04E1200P1008	90	V30996	2582	2354	88	316	4-Mar-2005
GAP04E1200P1008	90	V30997	2353	2039	317	631	4-Mar-2005
GAP04E1200P1008	90	V30998	2038	1724	632	946	4-Mar-2005
GAP04E1200P1008	90	V30999	1723	1409	947	1261	4-Mar-2005
GAP04E1200P1008	90	V31000	1408	1094	1262	1576	4-Mar-2005
GAP04E1200P1008	90	V31001	1093	993	1577	1672	4-Mar-2005
GAP04E1440P1009	270	V31002	1357	1608	65	316	4-Mar-2005
GAP04E1440P1009	270	V31003	1609	1923	317	631	4-Mar-2005
GAP04E1440P1009	270	V31004	1924	2238	632	946	4-Mar-2005

GAP04E1440P1009	270	V31005	2239	2553	947	1261	4-Mar-2005
GAP04E1440P1009	270	V31006	2554	2683	1262	1391	4-Mar-2005
GAP04E1184P1010	90	V31007	2582	2280	14	316	4-Mar-2005
GAP04E1184P1010	90	V31008	2279	1965	317	631	4-Mar-2005
GAP04E1184P1010	90	V31009	1964	1650	632	946	4-Mar-2005
GAP04E1184P1010	90	V31010	1649	1335	947	1261	4-Mar-2005
GAP04E1184P1010	90	V31011	1334	1020	1262	1576	4-Mar-2005
GAP04E1184P1010	90	V31012	1019	869	1577	1725	4-Mar-2005
GAP04E1424P1011	270	V31013	1357	1646	27	316	4-Mar-2005
GAP04E1424P1011	270	V31014	1647	1961	317	631	4-Mar-2005
GAP04E1424P1011	270	V31015	1962	2276	632	946	5-Mar-2005
GAP04E1424P1011	270	V31016	2277	2591	947	1261	5-Mar-2005
GAP04E1424P1011	270	V31017	2592	2684	1262	1352	5-Mar-2005
GAP04E1168P1012	90	V31018	2582	2325	59	316	5-Mar-2005
GAP04E1168P1012	90	V31019	2324	2010	317	631	5-Mar-2005
GAP04E1168P1012	90	V31020	2009	1695	632	946	5-Mar-2005
GAP04E1168P1012	90	V31021	1694	1523	947	1118	5-Mar-2005
GAP04E1152P1013	90	V31022	2582	2309	37	310	7-Mar-2005
GAP04E1152P1013	90	V31023	2308	1998	311	619	7-Mar-2005
GAP04E1152P1013	90	V31024	1997	1689	620	928	7-Mar-2005
GAP04E1152P1013	90	V31025	1688	1380	929	1237	7-Mar-2005
GAP04E1152P1013	90	V31026	1379	1071	1238	1546	7-Mar-2005
GAP04E1152P1013	90	V31027	1070	872	1547	1745	7-Mar-2005
GAP04E1408P1014	270	V31028	1357	1598	75	316	8-Mar-2005
GAP04E1408P1014	270	V31029	1599	1913	317	631	8-Mar-2005
GAP04E1408P1014	270	V31030	1914	2228	632	946	8-Mar-2005
GAP04E1408P1014	270	V31031	2229	2543	947	1261	8-Mar-2005
GAP04E1408P1014	270	V31032	2544	2683	1262	1401	8-Mar-2005
GAP04E1136P1015	90	V31033	2582	2338	72	316	8-Mar-2005
GAP04E1136P1015	90	V31034	2337	2023	317	631	8-Mar-2005
GAP04E1136P1015	90	V31035	2022	1708	632	946	8-Mar-2005
GAP04E1136P1015	90	V31036	1707	1393	947	1261	8-Mar-2005
GAP04E1136P1015	90	V31037	1392	1078	1262	1576	8-Mar-2005
GAP04E1136P1015	90	V31038	1077	869	1577	1783	8-Mar-2005
GAP04E1392P1016	270	V31039	1357	1647	26	316	8-Mar-2005
GAP04E1392P1016	270	V31040	1648	1962	317	631	8-Mar-2005
GAP04E1392P1016	270	V31041	1963	2277	632	946	8-Mar-2005
GAP04E1392P1016	270	V31042	2278	2592	947	1261	8-Mar-2005
GAP04E1392P1016	270	V31043	2593	2682	1262	1351	8-Mar-2005
GAP04E1120P1017	90	V31044	0	0	1	2	8-Mar-2005
GAP04E1120P1017	90	V31045	2578	2264	4	318	8-Mar-2005
GAP04E1120P1017	90	V31046	2263	1949	319	633	8-Mar-2005
GAP04E1120P1017	90	V31047	1948	1634	634	948	8-Mar-2005
GAP04E1120P1017	90	V31048	1633	1319	949	1263	8-Mar-2005
GAP04E1120P1017	90	V31049	1318	1004	1264	1578	8-Mar-2005
GAP04E1120P1017	90	V31050	1003	873	1579	1709	8-Mar-2005
GAP04E1376P1018	270	V31051	1358	1579	95	316	9-Mar-2005
GAP04E1376P1018	270	V31052	1580	1894	317	631	9-Mar-2005
GAP04E1376P1018	270	V31053	1895	2209	632	946	9-Mar-2005
GAP04E1376P1018	270	V31054	2210	2524	947	1261	9-Mar-2005
GAP04E1376P1018	270	V31055	2525	2682	1262	1419	9-Mar-2005

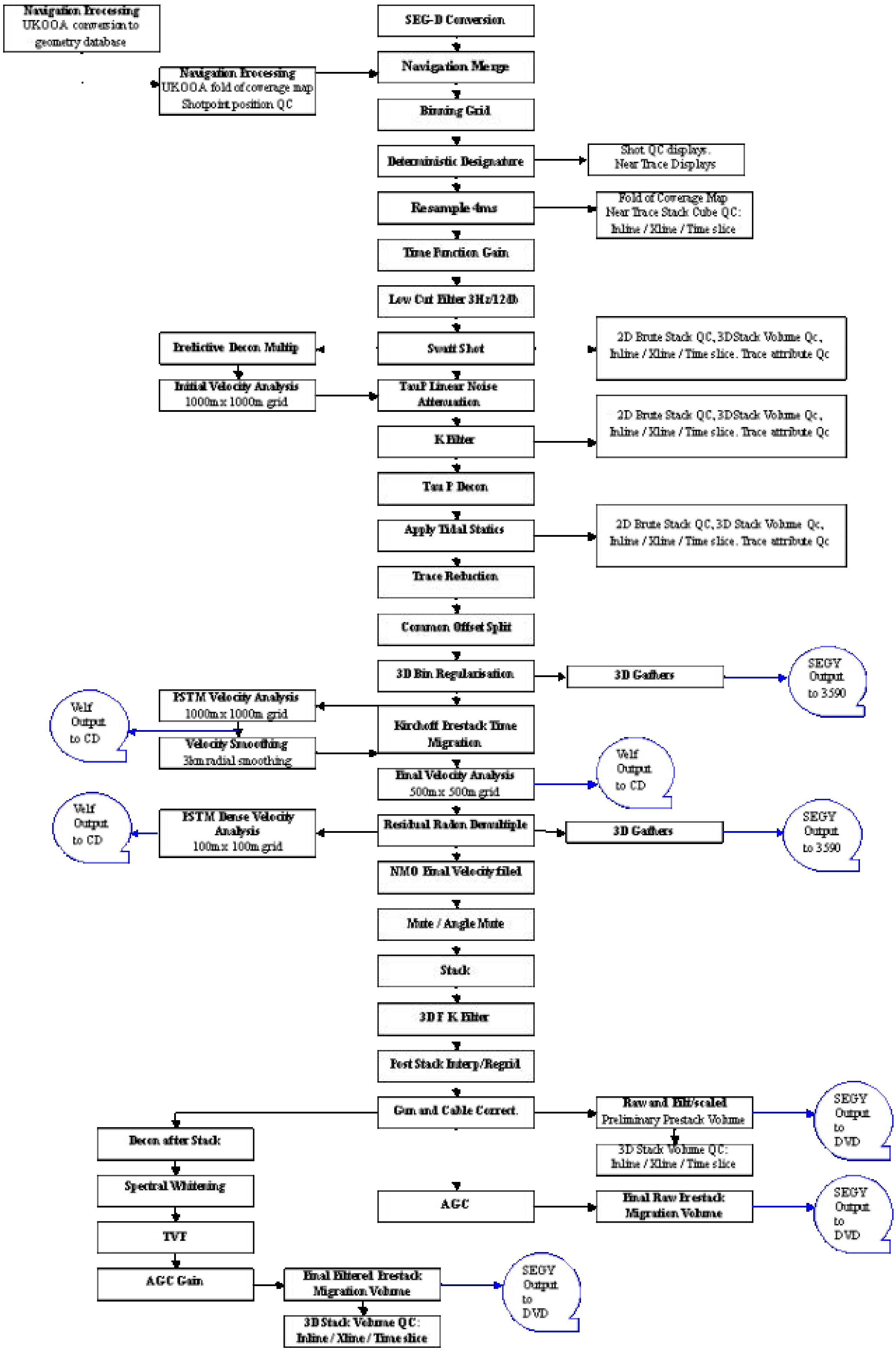
GAP04E1104P1019	90	V31056	2582	2356	90	316	9-Mar-2005
GAP04E1104P1019	90	V31057	2355	2041	317	631	9-Mar-2005
GAP04E1104P1019	90	V31058	2040	1726	632	946	9-Mar-2005
GAP04E1104P1019	90	V31059	1725	1411	947	1261	9-Mar-2005
GAP04E1104P1019	90	V31060	1410	1096	1262	1576	9-Mar-2005
GAP04E1104P1019	90	V31061	1095	869	1577	1803	9-Mar-2005
GAP04E1376J1020	270	V31062	1358	1652	22	316	9-Mar-2005
GAP04E1376J1020	270	V31063	1653	1967	317	631	9-Mar-2005
GAP04E1376J1020	270	V31064	1968	2282	632	946	9-Mar-2005
GAP04E1376J1020	270	V31065	2283	2597	947	1261	9-Mar-2005
GAP04E1376J1020	270	V31066	2598	2685	1262	1346	9-Mar-2005
GAP04E1088P1021	90	V31067	2582	2280	14	316	9-Mar-2005
GAP04E1088P1021	90	V31068	2279	1965	317	631	9-Mar-2005
GAP04E1088P1021	90	V31069	1964	1650	632	946	9-Mar-2005
GAP04E1088P1021	90	V31070	1649	1335	947	1261	9-Mar-2005
GAP04E1088P1021	90	V31071	1334	1020	1262	1576	9-Mar-2005
GAP04E1088P1021	90	V31072	1019	864	1577	1724	10-Mar-2005
GAP04E1360P1022	270	V31073	1358	1625	61	317	10-Mar-2005
GAP04E1360P1022	270	V31074	1626	1940	318	632	10-Mar-2005
GAP04E1360P1022	270	V31075	1941	2254	633	946	10-Mar-2005
GAP04E1360P1022	270	V31076	2255	2569	947	1261	10-Mar-2005
GAP04E1360P1022	270	V31077	2570	2683	1262	1375	10-Mar-2005
GAP04E1072P1023	90	V31078	2582	2364	98	316	10-Mar-2005
GAP04E1072P1023	90	V31079	2363	2049	317	631	10-Mar-2005
GAP04E1072P1023	90	V31080	2048	1734	632	946	10-Mar-2005
GAP04E1072P1023	90	V31081	1733	1419	947	1261	10-Mar-2005
GAP04E1072P1023	90	V31082	1418	1104	1262	1576	10-Mar-2005
GAP04E1072P1023	90	V31083	1103	869	1577	1811	10-Mar-2005
GAP04E1360J1024	270	V31084	1358	1362	23	27	10-Mar-2005
GAP04E1360J1024	270	V31085	1363	1677	28	342	10-Mar-2005
GAP04E1360J1024	270	V31086	1678	1992	343	657	10-Mar-2005
GAP04E1360J1024	270	V31087	1993	2307	658	972	10-Mar-2005
GAP04E1360J1024	270	V31088	2308	2622	973	1287	10-Mar-2005
GAP04E1360J1024	270	V31089	2623	2682	1288	1347	10-Mar-2005
GAP04E1056P1025	90	V31090	2582	2278	12	316	10-Mar-2005
GAP04E1056P1025	90	V31091	2277	1963	317	631	10-Mar-2005
GAP04E1056P1025	90	V31092	1962	1648	632	946	10-Mar-2005
GAP04E1056P1025	90	V31093	1647	1333	947	1261	10-Mar-2005
GAP04E1056P1025	90	V31094	1332	1018	1262	1576	10-Mar-2005
GAP04E1056P1025	90	V31095	1017	864	1577	1738	10-Mar-2005
GAP04E1344P1026	270	V31096	971	1209	78	316	11-Mar-2005
GAP04E1344P1026	270	V31097	1210	1524	317	631	11-Mar-2005
GAP04E1344P1026	270	V31098	1525	1839	632	946	11-Mar-2005
GAP04E1344P1026	270	V31099	1840	2154	947	1261	11-Mar-2005
GAP04E1344P1026	270	V31100	2155	2469	1262	1576	11-Mar-2005
GAP04E1344P1026	270	V31101	2470	2689	1577	1794	11-Mar-2005
GAP04E1040P1027	90	V31102	2582	2336	70	316	11-Mar-2005
GAP04E1040P1027	90	V31103	2335	2021	317	631	11-Mar-2005
GAP04E1040P1027	90	V31104	2020	1991	632	661	11-Mar-2005
GAP04E1040P1027	90	V31105	0	0	0	0	11-Mar-2005
GAP04E1040P1027	90	V31106	1990	1676	662	976	11-Mar-2005

GAP04E1040P1027	90	V31107	1675	1361	977	1291	11-Mar-2005
GAP04E1040P1027	90	V31108	1360	1046	1292	1606	11-Mar-2005
GAP04E1040P1027	90	V31109	1045	1045	1607	1607	11-Mar-2005
GAP04E1040P1027	90	V31110	943	871	34	1047	11-Mar-2005
GAP04E1040P1027	90	V31111	1044	988	1608	1664	11-Mar-2005
GAP04E1328P1028	270	V31112	971	1217	70	316	11-Mar-2005
GAP04E1328P1028	270	V31113	1218	1532	317	631	11-Mar-2005
GAP04E1328P1028	270	V31114	1533	1847	632	946	11-Mar-2005
GAP04E1328P1028	270	V31115	1848	2162	947	1261	11-Mar-2005
GAP04E1328P1028	270	V31116	2163	2477	1262	1576	11-Mar-2005
GAP04E1328P1028	270	V31117	2478	2684	1577	1780	11-Mar-2005
GAP04E1024P1029	90	V31118	2582	2286	19	315	11-Mar-2005
GAP04E1024P1029	90	V31119	2285	1971	316	630	11-Mar-2005
GAP04E1024P1029	90	V31120	1970	1656	631	945	11-Mar-2005
GAP04E1024P1029	90	V31121	1655	1341	946	1260	11-Mar-2005
GAP04E1024P1029	90	V31122	1340	1026	1261	1575	11-Mar-2005
GAP04E1024P1029	90	V31123	1025	873	1576	1728	11-Mar-2005
GAP04E1312P1030	270	V31124	971	1258	29	316	11-Mar-2005
GAP04E1312P1030	270	V31125	1259	1573	317	631	12-Mar-2005
GAP04E1312P1030	270	V31126	1574	1888	632	946	12-Mar-2005
GAP04E1312P1030	270	V31127	1889	2203	947	1261	12-Mar-2005
GAP04E1312P1030	270	V31128	2204	2518	1262	1576	12-Mar-2005
GAP04E1312P1030	270	V31129	2519	2684	1577	1742	12-Mar-2005
GAP04E1024J1031	90	V31130	2582	2326	60	316	12-Mar-2005
GAP04E1024J1031	90	V31131	2325	2011	317	631	12-Mar-2005
GAP04E1024J1031	90	V31132	2010	1696	632	946	12-Mar-2005
GAP04E1024J1031	90	V31133	1695	1381	947	1261	12-Mar-2005
GAP04E1024J1031	90	V31134	1380	1066	1262	1576	12-Mar-2005
GAP04E1024J1031	90	V31135	1065	870	1577	1772	12-Mar-2005
GAP04E1296P1032	270	V31136	971	1217	70	316	12-Mar-2005
GAP04E1296P1032	270	V31137	1218	1532	317	631	12-Mar-2005
GAP04E1296P1032	270	V31138	1533	1847	632	946	12-Mar-2005
GAP04E1296P1032	270	V31139	1848	2162	947	1261	12-Mar-2005
GAP04E1296P1032	270	V31140	2163	2477	1262	1576	12-Mar-2005
GAP04E1296P1032	270	V31141	2478	2686	1577	1781	12-Mar-2005
GAP04E1008P1033	90	V31142	2582	2286	20	316	12-Mar-2005
GAP04E1008P1033	90	V31143	2285	1971	317	631	12-Mar-2005
GAP04E1008P1033	90	V31144	1970	1656	632	946	12-Mar-2005
GAP04E1008P1033	90	V31145	1655	1341	947	1261	12-Mar-2005
GAP04E1008P1033	90	V31146	1340	1026	1262	1576	12-Mar-2005
GAP04E1008P1033	90	V31147	1025	865	1577	1737	12-Mar-2005
GAP04E1280P1034	270	V31148	971	1268	19	316	12-Mar-2005
GAP04E1280P1034	270	V31149	1269	1583	317	631	12-Mar-2005
GAP04E1280P1034	270	V31150	1584	1898	632	946	13-Mar-2005
GAP04E1280P1034	270	V31151	1899	2213	947	1261	13-Mar-2005
GAP04E1280P1034	270	V31152	2214	2528	1262	1576	13-Mar-2005
GAP04E1280P1034	270	V31153	2529	2686	1577	1732	13-Mar-2005
GAP04E1168A1035	90	V31154	1759	1525	82	316	13-Mar-2005
GAP04E1168A1035	90	V31155	1524	1210	317	631	13-Mar-2005
GAP04E1168A1035	90	V31156	1209	895	632	946	13-Mar-2005
GAP04E1168A1035	90	V31157	894	869	947	972	13-Mar-2005

GAP04E1040A1036	90	V31158	1170	914	60	316	13-Mar-2005
GAP04E1040A1036	90	V31159	913	866	317	359	13-Mar-2005
GAP04E1264P1037	270	V31160	971	1262	25	316	13-Mar-2005
GAP04E1264P1037	270	V31161	1263	1297	317	351	13-Mar-2005
GAP04E1264P1037	270	V31162	1298	1612	352	666	13-Mar-2005
GAP04E1264P1037	270	V31163	1613	1927	667	981	13-Mar-2005
GAP04E1264P1037	270	V31164	1928	2242	982	1296	13-Mar-2005
GAP04E1264P1037	270	V31165	2243	2557	1297	1611	13-Mar-2005
GAP04E1264P1037	270	V31166	2558	2682	1612	1736	13-Mar-2005
GAP04E1520P1038	90	V31167	2780	2467	4	316	13-Mar-2005
GAP04E1520P1038	90	V31168	2466	2152	317	631	13-Mar-2005
GAP04E1520P1038	90	V31169	2151	1837	632	946	14-Mar-2005
GAP04E1520P1038	90	V31170	1836	1522	947	1261	14-Mar-2005
GAP04E1520P1038	90	V31171	1521	1256	1262	1527	14-Mar-2005
GAP04E1520P1038	90	V31172	0	0	0	0	14-Mar-2005
GAP04E1520P1038	90	V31173	0	0	0	0	14-Mar-2005
GAP04E1520P1038	90	V31174	0	0	0	0	14-Mar-2005
GAP04E1616P1039	270	V31175	1969	2219	68	318	14-Mar-2005
GAP04E1616P1039	270	V31176	2220	2534	319	633	14-Mar-2005
GAP04E1616P1039	270	V31177	2535	2849	634	948	14-Mar-2005
GAP04E1616P1039	270	V31178	2850	2881	949	980	14-Mar-2005
GAP04E1264J1040	90	V31179	2582	2336	70	316	14-Mar-2005
GAP04E1264J1040	90	V31180	2335	2021	317	631	14-Mar-2005
GAP04E1264J1040	90	V31181	2020	1706	632	946	14-Mar-2005
GAP04E1264J1040	90	V31182	1705	1391	947	1261	14-Mar-2005
GAP04E1264J1040	90	V31183	1390	1076	1262	1576	14-Mar-2005
GAP04E1264J1040	90	V31184	1075	871	1577	1781	14-Mar-2005
GAP04E1632P1041	270	V31185	1963	2259	20	316	14-Mar-2005
GAP04E1632P1041	270	V31186	2260	2574	317	631	14-Mar-2005
GAP04E1632P1041	270	V31187	2575	2884	632	936	14-Mar-2005
GAP04E1536P1042	90	V31188	2780	2487	23	316	14-Mar-2005
GAP04E1536P1042	90	V31189	2486	2172	317	631	14-Mar-2005
GAP04E1536P1042	90	V31190	2171	1857	632	946	14-Mar-2005
GAP04E1536P1042	90	V31191	1856	1542	947	1261	14-Mar-2005
GAP04E1536P1042	90	V31192	1541	1249	1262	1549	14-Mar-2005
GAP04E1648P1043	270	V31193	1956	2220	52	316	15-Mar-2005
GAP04E1648P1043	270	V31194	2221	2535	317	631	15-Mar-2005
GAP04E1648P1043	270	V31195	2536	2850	632	946	15-Mar-2005
GAP04E1648P1043	270	V31196	2851	2880	947	976	15-Mar-2005
GAP04E1552P1044	90	V31197	2780	2538	74	316	15-Mar-2005
GAP04E1552P1044	90	V31198	2537	2223	317	631	15-Mar-2005
GAP04E1552P1044	90	V31199	2222	1908	632	946	15-Mar-2005
GAP04E1552P1044	90	V31200	1907	1593	947	1261	15-Mar-2005
GAP04E1552P1044	90	V31201	1592	1278	1262	1576	15-Mar-2005
GAP04E1552P1044	90	V31202	1277	1255	1577	1599	15-Mar-2005
GAP04E1664P1045	270	V31203	1949	2191	74	316	15-Mar-2005
GAP04E1664P1045	270	V31204	2192	2506	317	631	15-Mar-2005
GAP04E1664P1045	270	V31205	2507	2821	632	946	15-Mar-2005
GAP04E1664P1045	270	V31206	2822	2884	947	1005	15-Mar-2005
GAP04E1568P1046	90	V31207	2780	2498	34	316	15-Mar-2005
GAP04E1568P1046	90	V31208	2497	2183	317	631	15-Mar-2005

GAP04E1568P1046	90	V31209	2182	1886	632	924	15-Mar-2005
GAP04E1680P1047	270	V31210	1942	2235	23	316	15-Mar-2005
GAP04E1680P1047	270	V31211	2236	2550	317	631	15-Mar-2005
GAP04E1680P1047	270	V31212	2551	2865	632	946	15-Mar-2005
GAP04E1680P1047	270	V31213	2866	2887	947	962	16-Mar-2005
GAP04E1584P1048	90	V31214	2780	2534	70	316	16-Mar-2005
GAP04E1584P1048	90	V31215	2533	2219	317	631	16-Mar-2005
GAP04E1584P1048	90	V31216	2218	1904	632	946	16-Mar-2005
GAP04E1584P1048	90	V31217	1903	1880	947	970	16-Mar-2005
GAP04E1696P1049	270	V31218	1935	2181	70	316	16-Mar-2005
GAP04E1696P1049	270	V31219	2182	2496	317	631	16-Mar-2005
GAP04E1696P1049	270	V31220	2497	2811	632	946	16-Mar-2005
GAP04E1696P1049	270	V31221	2812	2880	947	1015	16-Mar-2005
GAP04E1600P1050	90	V31222	2780	2722	74	132	16-Mar-2005
GAP04E1600P2051	90	V31223	2780	2488	23	315	16-Mar-2005
GAP04E1600P2051	90	V31224	2487	2173	316	630	16-Mar-2005
GAP04E1600P2051	90	V31225	2172	1869	631	934	16-Mar-2005
GAP04E1712P1052	270	V31226	1929	2222	23	316	16-Mar-2005
GAP04E1712P1052	270	V31227	2223	2537	317	631	16-Mar-2005
GAP04E1712P1052	270	V31228	2538	2852	632	946	16-Mar-2005
GAP04E1712P1052	270	V31229	2853	2883	947	974	17-Mar-2005
GAP04E1712P2053	90	V31230	2780	2534	70	316	17-Mar-2005
GAP04E1712P2053	90	V31231	2533	2219	317	631	17-Mar-2005
GAP04E1712P2053	90	V31232	2218	1904	632	946	17-Mar-2005
GAP04E1712P2053	90	V31233	1903	1900	947	950	17-Mar-2005
GAP04E1712P2053	90	V31234	1899	1827	951	1022	17-Mar-2005

6.5 Data Processing Flow



Navigation Processing
UKOOA conversion to geometry database
SEG-D Conversion
Navigation Processing
UKOOA fold of coverage map
Shotpoint position QC
Navigation Merge
Binning Grid
Deterministic Designature
Shot QC displays.
Near Trace Displays
Resample 4ms
Fold of Coverage Map
Near Trace Stack Cube QC:
Inline / Xline / Time slice
Time Function Gain
Low Cut Filter 3Hz/12db
Predictive Decon Multip
Swell Shot
2D Brute Stack QC, 3D Stack Volume Qc,
Inline / Xline / Time slice. Trace attribute Qc
Initial Velocity Analysis
1000m x 1000m grid
TauP Linear Noise Attenuation
K Filter
2D Brute Stack QC, 3D Stack Volume Qc,
Inline / Xline / Time slice. Trace attribute Qc
Tau P Decon
Apply Tidal Statics
2D Brute Stack QC, 3D Stack Volume Qc,
Inline / Xline / Time slice. Trace attribute Qc
Trace Reduction
Common Offset Split
3D Bin Regularisation
3D Gathers
SEGY Output to 3590
PSTM Velocity Analysis
1000m x 1000m grid
Kirchoff Prestack Time Migration
Velf Output to CD
Velocity Smoothing
3km radial smoothing
Final Velocity Analysis
500m x 500m grid
Velf Output to CD
Velf Output to CD
PSTM Dense Velocity Analysis
100m x 100m grid
Residual Radon Demultiple
3D Gathers
SEGY Output to 3590
NMO Final Velocity filed
Mute / Angle Mute
Stack
3D F K Filter
Post Stack Interp/Regrid
Gun and Cable Correct.
Raw and Filt/scaled
Preliminary Prestack Volume
SEGY Output to DVD
3D Stack Volume QC:
Inline / Xline / Time slice
Decon after Stack
Spectral Whitening
AGC
Final Raw Prestack Migration Volume
SEGY Output to DVD
TVF
AGC Gain
Final Filtered Prestack Migration Volume
SEGY Output to DVD
3D Stack Volume QC:
Inline / Xline / Time slice

6.6 Coefficients of Zero Phasing Filter Operator

Time coefficients for the zero phasing filter derived from source signature, are as follows:

	Coefficients		Coefficients		Coefficients		Coefficients		Coefficients		Coefficients
1	0.000694357	91	-0.0025247	181	0.0120337	271	-0.0805515	361	0.00599496	451	-0.0028381
2	-0.00219574	92	0.00638742	182	0.0135619	272	0.135954	362	0.00350092	452	-0.005011
3	0.00583011	93	0.00663555	183	0.0021281	273	0.124708	363	0.00169097	453	-0.0075675
4	0.00594792	94	0.00278493	184	-0.00342117	274	-0.140092	364	-0.00501822	454	-0.0032162
5	0.00315448	95	-0.00483749	185	0.00536758	275	-0.0163955	365	0.000575189	455	-0.0014539
6	-0.00124261	96	-0.00060708	186	0.0152194	276	-0.0447667	366	0.00101432	456	-0.0017245
7	0.00268215	97	0.00564486	187	0.0106669	277	0.108249	367	0.00108184	457	-0.0056105
8	0.0050555	98	0.00491002	188	-0.00145423	278	0.0448023	368	-0.00429778	458	-0.0049938
9	0.00648851	99	-0.00157659	189	-0.00267195	279	-0.0695524	369	-0.00608676	459	-0.0012491
10	0.00254824	100	-0.00660912	190	0.00918101	280	-0.0537138	370	-0.00120193	460	-0.0001039
11	0.000601862	101	0.00132103	191	0.0145368	281	-0.0145593	371	-0.0020018	461	-0.0017372
12	0.0040559	102	0.00436475	192	0.00553361	282	0.0696961	372	-3.91E-05	462	-0.0055381
13	0.00771515	103	0.00334264	193	-0.00610902	283	0.00637913	373	-0.00715149	463	-0.0022709
14	0.0134819	104	-0.00685131	194	-0.00118486	284	-0.0398765	374	-0.00221164	464	-0.0001949
15	0.005978	105	-0.00494218	195	0.0103162	285	-0.0588806	375	-0.00401123	465	0.00148076
16	0.00697063	106	0.000856206	196	0.0109093	286	0.00234215	376	-0.00123908	466	-0.0030295
17	0.0101585	107	0.00470361	197	-0.00293826	287	0.0280074	377	-0.00667797	467	-0.0035573
18	0.0155376	108	-0.00166359	198	-0.0108578	288	-0.0062151	378	-0.00883753	468	-0.0011181
19	0.0107514	109	-0.00899781	199	-0.00164755	289	-0.0341981	379	-0.0078261	469	0.00153153
20	0.00751973	110	-0.00407457	200	0.00726987	290	-0.0405732	380	-0.010051	470	0.000798
21	0.00794266	111	0.00122441	201	0.00105212	291	0.00282221	381	-0.0026655	471	-0.0037895
22	0.0133845	112	0.00378074	202	-0.017922	292	0.00295967	382	-0.0064431	472	-0.0021479
23	0.0154758	113	-0.00738931	203	-0.0226789	293	-0.0141001	383	-0.0043627	473	-0.0005587
24	0.00887452	114	-0.00829545	204	-0.0153165	294	-0.0291979	384	-0.0094553	474	0.00296509
25	0.008553	115	-0.0047337	205	-0.00978953	295	-0.0206483	385	0.00042512	475	-0.0014945
26	0.00871465	116	0.00379243	206	-0.0217522	296	-0.00296228	386	-0.0059135	476	-0.0027897
27	0.017265	117	-0.00147124	207	-0.0321288	297	-0.0113601	387	-0.0049699	477	-0.0022439
28	0.0124612	118	-0.00939235	208	-0.0238129	298	-0.0221421	388	-0.0054774	478	0.0015344
29	0.0102251	119	-0.00946406	209	-0.00658464	299	-0.0206888	389	-0.0086927	479	0.0020176
30	0.00682034	120	-0.00246131	210	-0.00245726	300	-0.00807495	390	0.00239208	480	-0.0023975
31	0.0133038	121	0.00337808	211	-0.019821	301	-0.00642415	391	-0.0112905	481	-0.0023306
32	0.0163962	122	-0.00650429	212	-0.0291872	302	-0.0205063	392	-0.0019993	482	-0.0017658
33	0.0121698	123	-0.010348	213	-0.022133	303	-0.0242912	393	-0.0107358	483	0.0034033
34	0.00904568	124	-0.0106496	214	-0.00597478	304	-0.0112392	394	-0.002674	484	-0.0003525
35	0.00799903	125	0.00209317	215	-0.00945123	305	0.00101593	395	-0.0030839	485	-0.001618
36	0.0168367	126	-0.00166428	216	-0.0201233	306	-0.00670005	396	-0.0104476	486	-0.0034196
37	0.0150893	127	-0.00732478	217	-0.0181413	307	-0.022561	397	-0.0038582	487	0.0009119
38	0.0130795	128	-0.0146444	218	0.00153841	308	-0.0181163	398	-0.0119966	488	0.0023456
39	0.0069653	129	-0.00558033	219	0.0136295	309	0.00196811	399	0.00079708	489	-0.0009408
40	0.0125193	130	0.00131993	220	0.000326315	310	0.016066	400	-0.0097549	490	-0.0022707
41	0.0167057	131	-0.00310916	221	-0.0128671	311	0.00591235	401	-0.0068389	491	-0.0031788
42	0.0160008	132	-0.0107175	222	-0.0085459	312	-0.00557939	402	-0.0096303	492	0.002849
43	0.0106222	133	-0.0150567	223	0.0131171	313	-0.00048187	403	-0.0074652	493	1.87E-05
44	0.00802158	134	0.000400624	224	0.0137639	314	0.015792	404	-0.002262	494	-0.0004859

45	0.0147479	135	-0.00223077	225	-0.00114528	315	0.017253	405	-0.0109117	495	-0.0047476
46	0.016767	136	-7.48E-05	226	-0.0113831	316	0.000905881	406	-0.0069063	496	-0.000472
47	0.0153237	137	-0.0202844	227	0.00534728	317	-0.008084	407	-0.0117467	497	0.0012166
48	0.0079872	138	-0.0029877	228	0.0232487	318	0.00423132	408	-0.0034211	498	-0.0002184
49	0.0103858	139	-0.00658322	229	0.0158763	319	0.0237237	409	-0.0066643	499	-0.0025604
50	0.015062	140	0.00942223	230	-0.00259125	320	0.0229848	410	-0.0087653	500	-0.0050145
51	0.0173142	141	-0.0146607	231	-0.00346275	321	0.00784815	411	-0.0096469	501	0.0009322
52	0.0120224	142	-0.0088915	232	0.02391	322	-0.00246793	412	-0.008634	502	-0.0008943
53	0.00744428	143	-0.00805358	233	0.0338253	323	0.00545128	413	-0.0033076	503	3.17E-05
54	0.0114406	144	0.00457748	234	0.0184567	324	0.0112368	414	-0.0073415	504	-0.0063425
55	0.0157917	145	0.00626033	235	-0.00454372	325	0.00450787	415	-0.0081472	505	-0.0024262
56	0.01604	146	-0.0164762	236	0.0120601	326	-0.00906029	416	-0.009663	506	-0.0011013
57	0.00878575	147	-0.00127293	237	0.0427606	327	-0.00891488	417	-0.0050242	507	7.60E-05
58	0.00768679	148	-0.0105089	238	0.047587	328	0.00288935	418	-0.003815	508	-0.0026941
59	0.0119991	149	0.0193832	239	0.0164098	329	0.00807916	419	-0.0064303	509	-0.006332
60	0.0162356	150	-0.0180653	240	-0.0024508	330	0.00168947	420	-0.008609	510	-0.0012007
61	0.0129251	151	-0.00848448	241	0.0275364	331	-0.00737054	421	-0.007245	511	-0.0017171
62	0.00646266	152	-0.0145809	242	0.0617225	332	-0.00146944	422	-0.0035067	512	0.0028477
63	0.00786495	153	0.00190296	243	0.0576793	333	0.00615101	423	-0.0034243	513	-0.0031121
64	0.012687	154	0.0067227	244	0.0082723	334	0.00848493	424	-0.006772	514	-0.0007522
65	0.0155536	155	-0.0151631	245	0.00245212	335	-0.00131607	425	-0.0075437	515	0.0009957
66	0.00910733	156	-0.00657866	246	0.0371088	336	-0.00341004	426	-0.0049345	516	0.0057645
67	0.00521648	157	-0.0124614	247	0.0836043	337	0.00245499	427	-0.0016932	517	0.0018641
68	0.00792438	158	0.0135763	248	0.0582269	338	0.00893042	428	-0.0033036	518	-0.0061491
69	0.013524	159	-0.00601718	249	0.00278142	339	0.00567425	429	-0.0066675	519	-0.0002779
70	0.0131401	160	-0.00465796	250	0.00367712	340	-0.00271074	430	-0.0061538	520	0.0009428
71	0.00567161	161	-0.0164009	251	0.0459681	341	-0.00049566	431	-0.0033763	521	0.0036914
72	0.00449486	162	0.00364614	252	0.0957591	342	0.00518799	432	-0.0010427	522	-0.0037627
73	0.00814612	163	0.0037241	253	0.051142	343	0.0102432	433	-0.0048133	523	-0.0035172
74	0.0139592	164	-0.00097803	254	-0.00081879	344	0.00198525	434	-0.0062747	524	-0.001035
75	0.00905909	165	-0.0118227	255	-0.0023428	345	-0.00119597	435	-0.0055428	525	0.002485
76	0.00359945	166	-0.00744073	256	0.0483554	346	0.00102827	436	-0.0012903	526	0.0017473
77	0.00331916	167	0.0053843	257	0.0638729	347	0.00930012	437	-0.0019328	527	-0.0018223
78	0.00952763	168	0.00448894	258	0.0169408	348	0.00871649	438	-0.0053859	528	-0.0021403
79	0.0121742	169	-0.0037423	259	-0.0374081	349	0.00162995	439	-0.0067059	529	2.80E-05
80	0.00531345	170	-0.0115821	260	0.0256482	350	0.000202083	440	-0.0047015	530	0.004759
81	0.00163638	171	-0.00033659	261	0.074223	351	0.00421876	441	-0.0012226	531	-0.00089
82	0.0027898	172	0.00737144	262	-0.273273	352	0.0119818	442	-0.004123	532	-0.0017989
83	0.0108275	173	0.00572657	263	-0.568311	353	0.0066085	443	-0.0063876	533	-0.002111
84	0.00821065	174	-0.00626635	264	-0.11064	354	0.00283318	444	-0.0075636	534	0.0032126
85	0.00271465	175	-0.00525141	265	0.118087	355	-0.00013316	445	-0.0030415	535	0.003271
86	-0.00134181	176	0.00592061	266	-0.223467	356	0.00759814	446	-0.002435	536	-0.0008553
87	0.00438281	177	0.0124382	267	0.260794	357	0.00869834	447	-0.0047007	537	-0.0017224
88	0.00940808	178	0.00475229	268	0.239797	358	0.00442406	448	-0.0075459	538	-0.0006276
89	0.00494117	179	-0.00463795	269	-0.203221	359	-0.00078694	449	-0.0060833	539	0.0059126
90	-0.00057294	180	0.00067589	270	0.044445	360	-0.00087937	450	-0.0019985	540	0.0010273

6.7 List of Final Deliverables

Summary of SEGY archived data (5 sec trace length, 4 ms sample rate) to various medias, bin centre XY-coordinates, final velocities & final processing report sent to BSOC office in Melbourne is as follows:

No.	Process & Filename	First Inline	Last Inline	Format	Media Type & No.	Date Sent/TO
1	**Raw PSTM Stack Volume**	**1986**	**2286**	**SEGY**	**5 x DVD**	**22 Sept 2005**
	Bazzard_SEGY_RAWSTK_IL1986_2286				DVD001	BSOC
	Bazzard_SEGY_RAWSTK_IL2287_2586				DVD002	
	Bazzard_SEGY_RAWSTK_IL2587_2886				DVD003	
	Bazzard_SEGY_RAWSTK_IL2887_3125				DVD004	
	Bazzard_SEGY_RAWSTK_IL3126_3457				DVD005	
2	**Final PSTM Stack Volume**	**1986**	**2286**	**SEGY**	**5 x DVD**	**03 Oct 2005**
	Bazzard_SEGY_FINALSTK_IL1986_2286				DVD006	BSOC
	Bazzard_SEGY_FINALSTK_IL2287_2586				DVD007	
	Bazzard_SEGY_FINALSTK_IL2587_2886				DVD008	
	Bazzard_SEGY_FINALSTK_IL2887_3125				DVD009	
	Bazzard_SEGY_FINALSTK_IL3126_3457				DVD010	
3	**4 Sets of Stacking/Migration Velocities**				**1 x CD**	**12 Oct 2005**
	BSOCformat_Bazzard3D_FinalMigVels_500m	1986	2286	BSOC	CD001	BSOC
	BSOCformat_Bazzard3D_FinalStkVels_500m	1986	2286	BSOC	CD001	
	WGformat_Bazzard3D_FirstPassMigVels_1km	993	1143	WG VELF	CD001	
	WGformat_Bazzard3D_FirstPassStkVels_1km	993	1143	WG VELF	CD001	
	2 Sets of Stacking/Migration Velocities				**1 x CD**	**12 Oct 2005**
	WGformat_Bazzard3D_FinalMigVels_500m	993	1143	WG VELF	CD002	BSOC
	Wgformat_Bazzard3D_FinalStkVels_500m	993	1143	WG VELF	CD002	
	1 Bin Center XY Coordinate file				1 X CD	**12 Oct 2005** BSOC
	Bazzard3D_Bin_Center_XY_modUKOOA_Format			Text File	CD003	
4	**Filtered PSTM Angle Stack Volumes**	**1986**	**2286**	**SEGY**	**5 x DVD per vol**	**18 Oct 2005**
	BAZZARD_SEGY_ANGSTK00_14_IL1986_2286				DVD011	BSOC
	BAZZARD_SEGY_ANGSTK00_14_IL2287_2586				DVD012	
	BAZZARD_SEGY_ANGSTK00_14_IL2587_2886				DVD013	
	BAZZARD_SEGY_ANGSTK00_14_IL2887_3125				DVD014	
	BAZZARD_SEGY_ANGSTK00_14_IL3126_3457				DVD015	
	BAZZARD_SEGY_ANGSTK14_28_IL1986_2286				DVD016	
	BAZZARD_SEGY_ANGSTK14_28_IL2287_2586				DVD017	
	BAZZARD_SEGY_ANGSTK14_28_IL2587_2886				DVD018	

	BAZZARD_SEGY_ANGSTK14_28_IL2887_3125 BAZZARD_SEGY_ANGSTK14_28_IL3126_3457				DVD019 DVD020	
	BAZZARD_SEGY_ANGSTK28_42_IL1986_2286 BAZZARD_SEGY_ANGSTK28_42_IL2287_2586 BAZZARD_SEGY_ANGSTK28_42_IL2887_2886 BAZZARD_SEGY_ANGSTK28_42_IL2887_3125 BAZZARD_SEGY_ANGSTK28_42_IL3126_3457				DVD021 DVD022 DVD023 DVD024 DVD025	
5	**DVA velocity files** BSOCformat_Bazzard3D_DVA_Vels_100m WGformat_Bazzard3D_DVA_Vels_100m	**1986**	**2286**	BSOC WG VELF	**DVD026**	**02 Dec 2005** BSOC
6	**DVA velocity files and gathers** BSOCformat_Bazzard3D_DVA_Vels_100m WGformat_Bazzard3D_DVA_Vels_100m 3 x 3590E Bazzard Vic/P53 PSTM Gathers Q53548 > Q53550 30 x 3590E Bazzard Vic/P53 PSTM Gathers Q53551 > Q53580	**1986**	**2286**		**DVD026**	**20 Dec 2005** Exoil
7	**Final PSTM Stack Volume** Bazzard_SEGY_FINALSTK_IL1986_2286 Bazzard_SEGY_FINALSTK_IL2287_2586 Bazzard_SEGY_FINALSTK_IL2587_2886 Bazzard_SEGY_FINALSTK_IL2887_3125 Bazzard_SEGY_FINALSTK_IL3126_3457	**1986**	**2286**	**SEGY**	**DLT**	**21 Dec 2005** Apache
8	**PreSTM CMP Gathers** Bazzard Pre-STM Gathers Q53582 - Q53611 Please refer to table 6.7.1 for a complete list of these tapes.	993	1728	**SEGY**	**33 X 3590 E**	**04 Jan 2006** Exoil
9	**Various files for Apache** Water Bottom time extracted from FINAL PSTM					
10	**Final Processing Report** Final_Processing_Report_Bazzard.pdf	**N/A**	**N/A**	**Adobe Acrobat**	**1 x CD** CD004 and bound hard copy	**04 Apr 2006**

6.7.1 List of PreSTM gathers

Tape	Dataset	Survey	Area	Project No.	Client	Inline	Xline	Tape No.	Data length	Date	Tape prt	Format
1	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	993-1012	851-3926	O53582	5000 ms, 4 ms/sample	December 23rd, 2005	1/33	3590E SEG-Y
2	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1013-1032	851-3926	O53583	5000 ms, 4 ms/sample	December 23rd, 2005	2/33	3590E SEG-Y
3	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1033-1052	851-3926	O53584	5000 ms, 4 ms/sample	December 23rd, 2005	3/33	3590E SEG-Y
4	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1053-1072	851-3926	O53585	5000 ms, 4 ms/sample	December 23rd, 2005	4/33	3590E SEG-Y
5	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1073-1092	851-3926	O53586	5000 ms, 4 ms/sample	December 23rd, 2005	5/33	3590E SEG-Y
6	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1093-1112	851-3926	O53587	5000 ms, 4 ms/sample	December 23rd, 2005	6/33	3590E SEG-Y
7	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1113-1132	851-3926	O53588	5000 ms, 4 ms/sample	December 23rd, 2005	7/33	3590E SEG-Y
8	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1133-1152	851-3926	O53589	5000 ms, 4 ms/sample	December 23rd, 2005	8/33	3590E SEG-Y
9	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1153-1172	851-3926	O53590	5000 ms, 4 ms/sample	December 23rd, 2005	9/33	3590E SEG-Y
10	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1173-1192	851-3926	O53591	5000 ms, 4 ms/sample	December 23rd, 2005	10/33	3590E SEG-Y
11	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1193-1212	851-3926	O53592	5000 ms, 4 ms/sample	December 23rd, 2005	11/33	3590E SEG-Y
12	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1213-1232	851-3926	O53593	5000 ms, 4 ms/sample	December 23rd, 2005	12/33	3590E SEG-Y
13	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1233-1252	851-3926	O53594	5000 ms, 4 ms/sample	December 23rd, 2005	13/33	3590E SEG-Y
14	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1253-1272	851-3926	O53595	5000 ms, 4 ms/sample	December 23rd, 2005	14/33	3590E SEG-Y
15	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1273-1292	851-3926	O53596	5000 ms, 4 ms/sample	December 23rd, 2005	15/33	3590E SEG-Y
16	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1293-1312	851-3926	O53597	5000 ms, 4 ms/sample	December 23rd, 2005	16/33	3590E SEG-Y
17	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1313-1332	851-3926	O53598	5000 ms, 4 ms/sample	December 23rd, 2005	17/33	3590E SEG-Y
18	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1333-1352	851-3926	O53599	5000 ms, 4 ms/sample	December 23rd, 2005	18/33	3590E SEG-Y
19	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1353-1375	851-3926	O53600	5000 ms, 4 ms/sample	December 23rd, 2005	19/33	3590E SEG-Y
20	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1376-1397	851-3926	O53601	5000 ms, 4 ms/sample	December 23rd, 2005	20/33	3590E SEG-Y
21	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1398-1419	851-3926	O53602	5000 ms, 4 ms/sample	December 23rd, 2005	21/33	3590E SEG-Y
22	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1420-1441	851-3926	O53603	5000 ms, 4 ms/sample	December 23rd, 2005	22/33	3590E SEG-Y
23	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1442-1463	851-3926	O53604	5000 ms, 4 ms/sample	December 23rd, 2005	23/33	3590E SEG-Y
24	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1464-1485	851-3926	O53605	5000 ms, 4 ms/sample	December 23rd, 2005	24/33	3590E SEG-Y
25	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1486-1506	851-3926	O53606	5000 ms, 4 ms/sample	December 23rd, 2005	25/33	3590E SEG-Y
26	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1507-1527	851-3926	O53607	5000 ms, 4 ms/sample	December 23rd, 2005	26/33	3590E SEG-Y
27	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1528-1548	851-3926	O53608	5000 ms, 4 ms/sample	December 23rd, 2005	27/33	3590E SEG-Y
28	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1549-1569	851-3926	O53609	5000 ms, 4 ms/sample	December 23rd, 2005	28/33	3590E SEG-Y
29	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1570-1601	851-3926	O53610	5000 ms, 4 ms/sample	December 23rd, 2005	29/33	3590E SEG-Y
30	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1602-1633	851-3926	O53611	5000 ms, 4 ms/sample	December 23rd, 2005	30/33	3590E SEG-Y
31	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1634-1665	851-3926	O53612	5000 ms, 4 ms/sample	December 23rd, 2005	31/33	3590E SEG-Y
32	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1666-1697	851-3926	O53613	5000 ms, 4 ms/sample	December 23rd, 2005	32/33	3590E SEG-Y
33	Pre-PSTM gathers	Bazzard	Vic/P53	AS33	Exoil	1698-1728	851-3926	O53614	5000 ms, 4 ms/sample	December 23rd, 2005	33/33	3590E SEG-Y

Table 6.7.1 Complete list of Pre-STM gathers delivered de livered as item 7.

6.8 PostStack / PreStack Data Load Sheet

Post Stack Data Load Sheet

Project:	AS33
Area:	Bazzard 3D, VIC/P53
Client:	Bass Strait Oil Company
Data:	3D PSTM Stack Volume
Projection System:	UTM South
Spheroid:	GRS80
Datum:	GDA94
Central Meridian:	147 degrees East
Tape Number:	PSTM Gathers — Media : PSTM 5x DVDs (DVD006-01 Ang. STK 5x DVDs (DVD011-02
Number of Inlines:	1472
Number of Crosslines:	3018
Total number live traces:	approx. 3,412,000
Inline spacing (interval):	12.500 m
Crossline spacing (interval):	12.500 m
Record Length:	5.000 secs
Sample Rate:	4 ms
Azimuth:	270.649 degrees

(from due North clockwise)

Trace Header Byte Locations		**Bytes**
Inline	Integer	9
Crossline	Integer	13
CMP	Integer	21
Offset distance	Integer	37
Water depth at source	Integer	61
Cell Center X-Coordinates	Integer	73
Cell Center Y-Coordinates	Integer	77
Cell Center X-Coordinates	Real	81
Cell Center Y-Coordinates	Real	85
Inline	Integer	197
Crossline	Integer	201
Water bottom time at midpoint	Integer	205

Inline = 3457	Inline = 3457
Crossline = 3900	Crossline = 883
X = 574036.9	X = 611746.98
Y = 5757152.6	Y = 5756725.43

Inline = 1986	Inline = 1986
Crossline = 3900	Crossline = 883
X = 573828.63	X = 611538.71
Y = 5738766.28	Y = 5738339.11

PreStack Data Load Sheet

Project:	AS33	
Area:	Bazzard 3D, VIC/P53	
Client:	Bass Strait Oil Company	
Data:	3D PreSTM CMP Gathers	
Projection System:	UTM South	
Spheroid:	GRS80	
Datum:	GDA94	
Central Meridian:	147 degrees East	
Tape Number:	Pre-PSTM Gathers	3590E (Q53582 - Q53611)

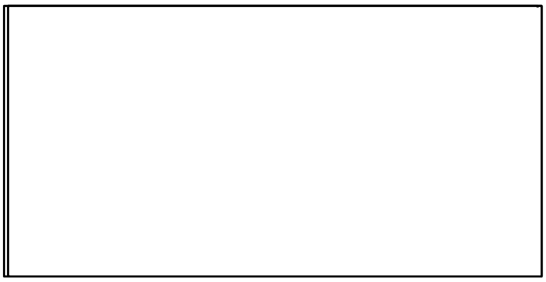
Number of Inlines:	1472
Number of Crosslines:	3018
Total number live traces:	approx. 3,412,000

Inline spacing (interval):	12.500	m
Crossline spacing (interval):	12.500	m
Record Length:	5.000	secs
Sample Rate:	4	ms
Azimuth:	270.649	degrees
(from due North clockwise)		

Trace Header Byte Locations		**Bytes**
Inline	Integer	9
Crossline	Integer	13
CMP	Integer	21
Offset distance	Integer	37
Water depth at source	Integer	61
Cell Center X-Coordinates	Integer	73
Cell Center Y-Coordinates	Integer	77
Cell Center X-Coordinates	Real	81
Cell Center Y-Coordinates	Real	85
Inline	Integer	197
Crossline	Integer	201
Water bottom time at midpoint	Integer	205

Inline = 3457
Crossline = 3900
X = 574036.9
Y = 5757152.6

Inline = 3457
Crossline = 883
X = 611746.98
Y = 5756725.43

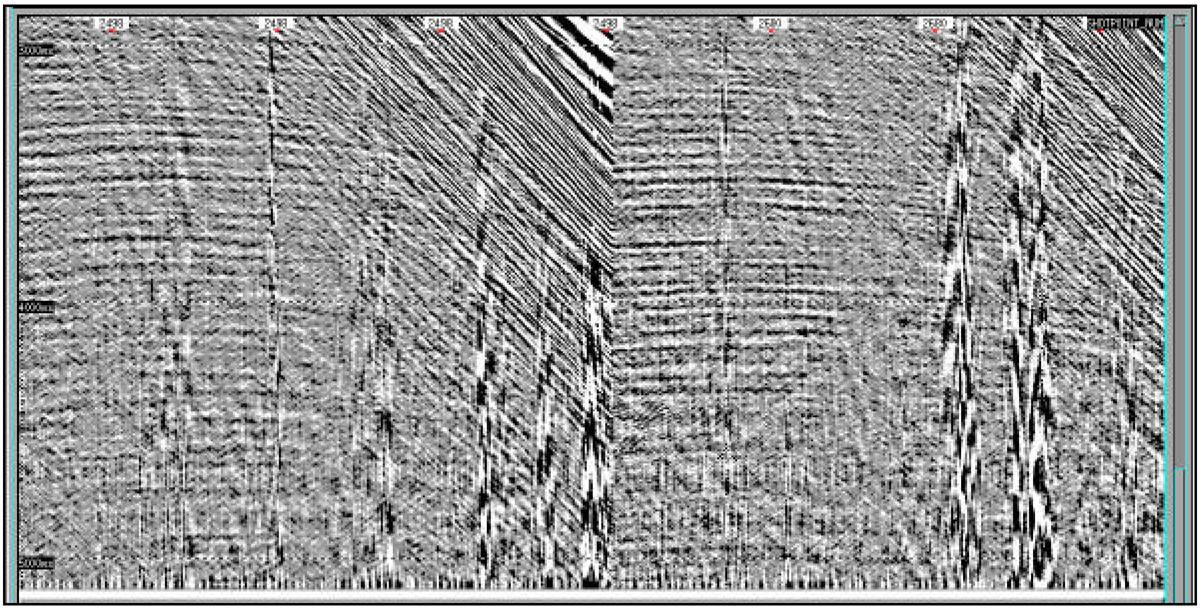


Inline = 1986
Crossline = 3900
X = 573828.63
Y = 5738766.28

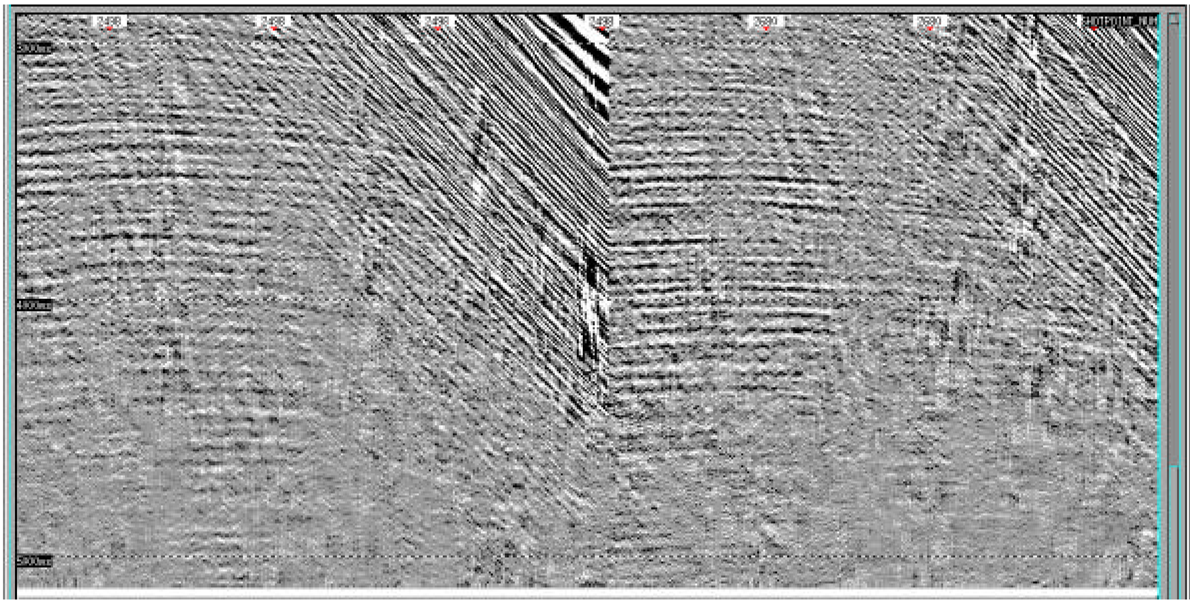
Inline = 1986
Crossline = 883
X = 611538.71
Y = 5738339.11

7.0 Enclosures

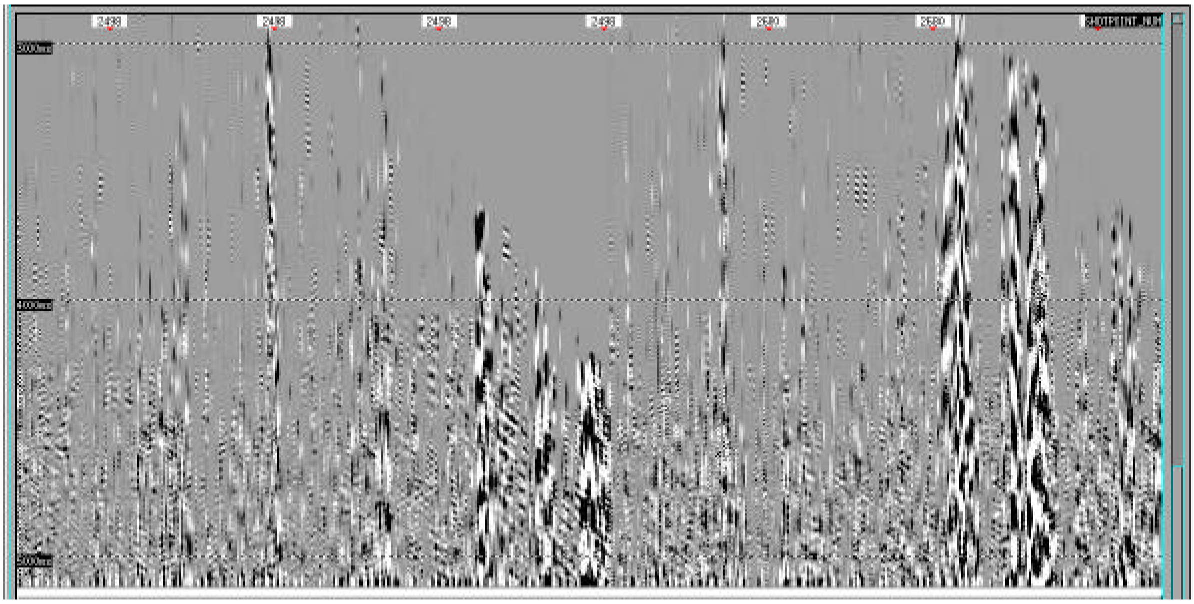
7.1 Shot records before SWATT applied



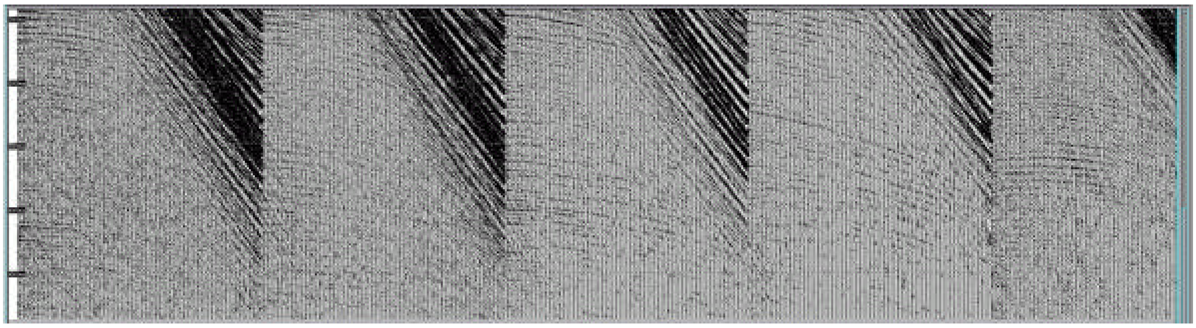
7.2 Shot records after SWATT applied



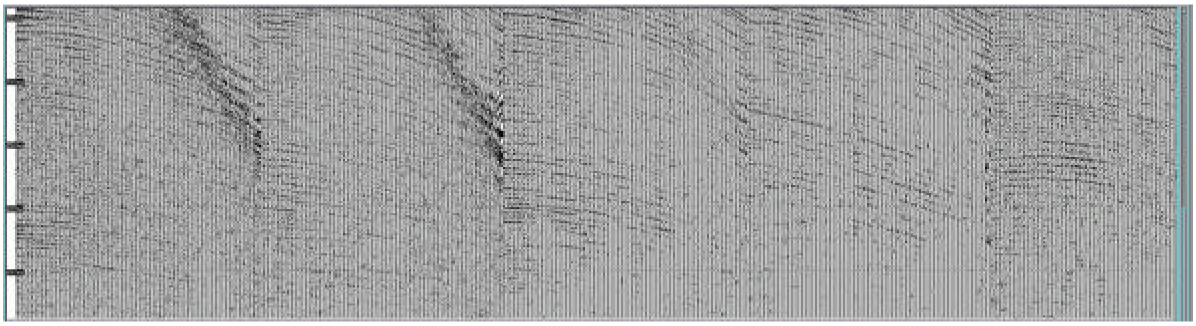
7.3 Shot records SWATT difference plot



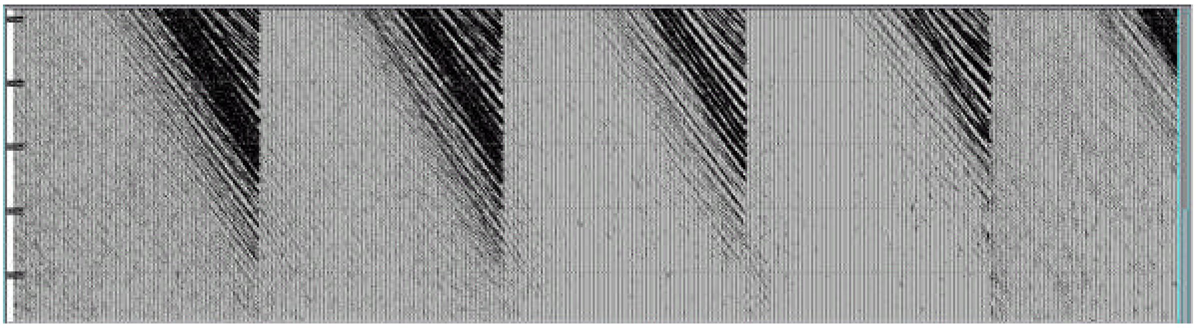
7.4 Shot records beforeTau-p linear noise attenuation (LNA)



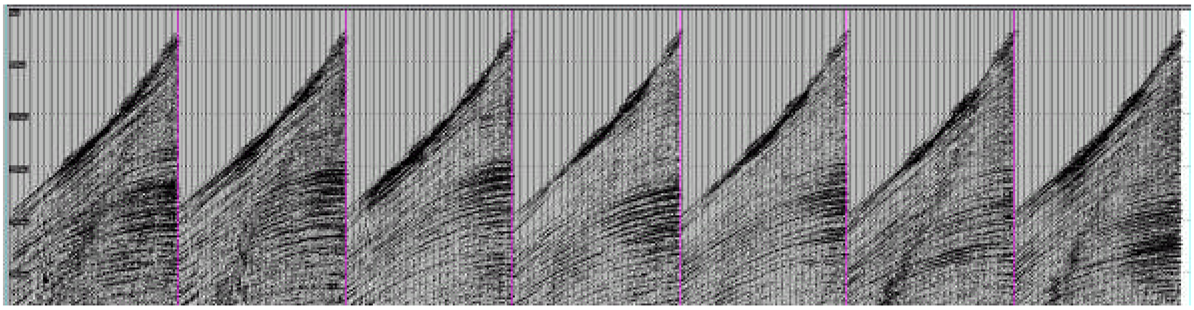
7.5 Shot records with Tau-p linear noise attenuation (LNA) applied



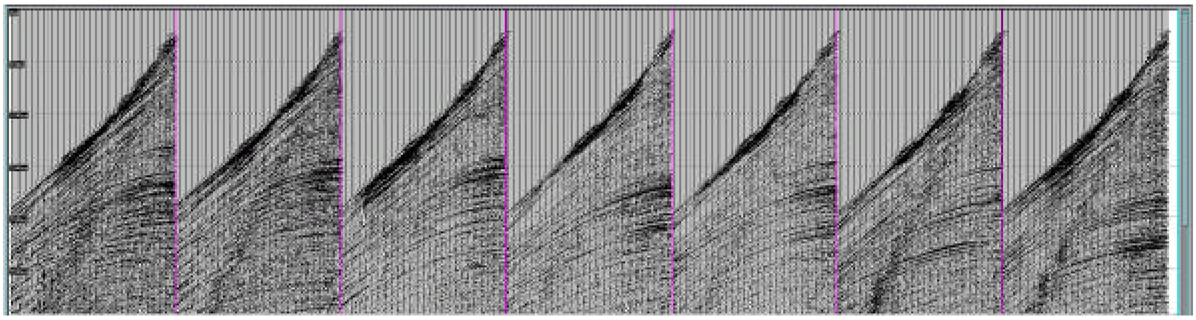
7.6 Shot records Tau-p LNA difference plot



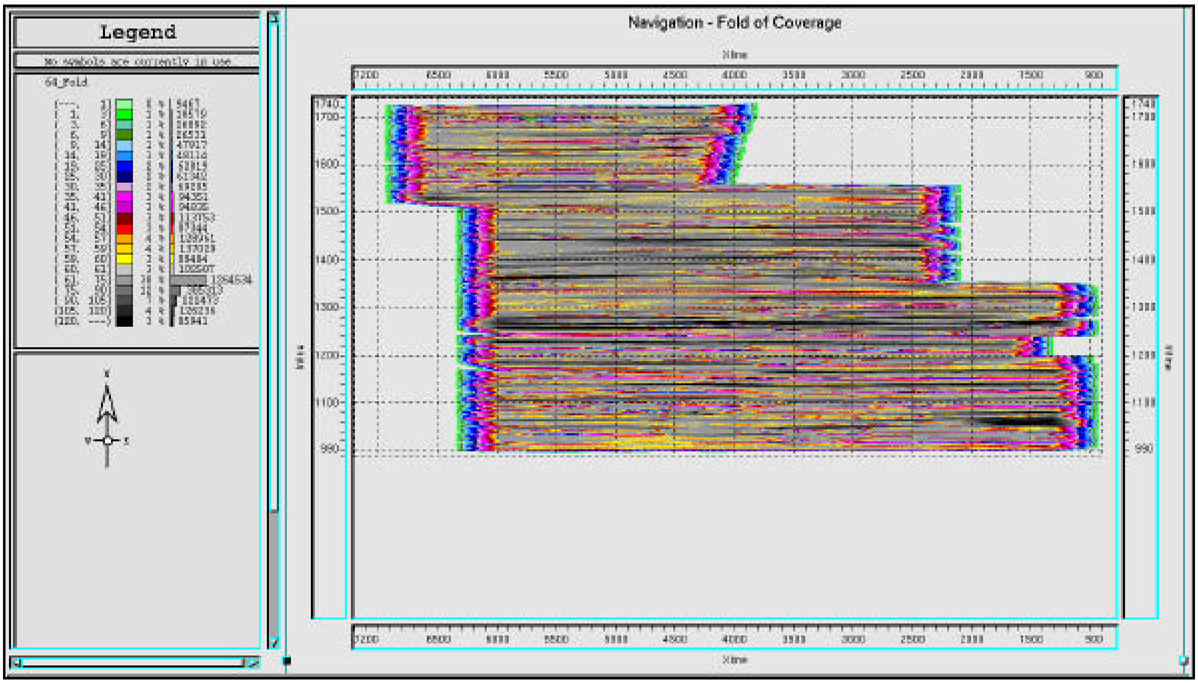
7.7 Shot records without DBS applied



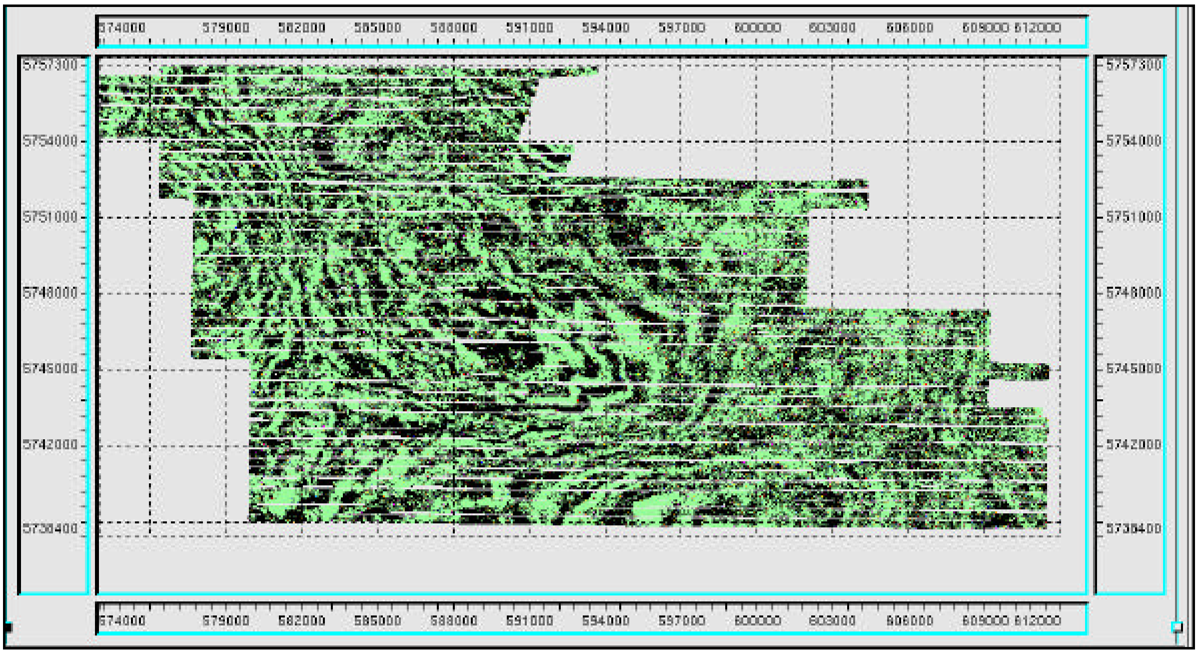
7.8 Shot records with DBS applied



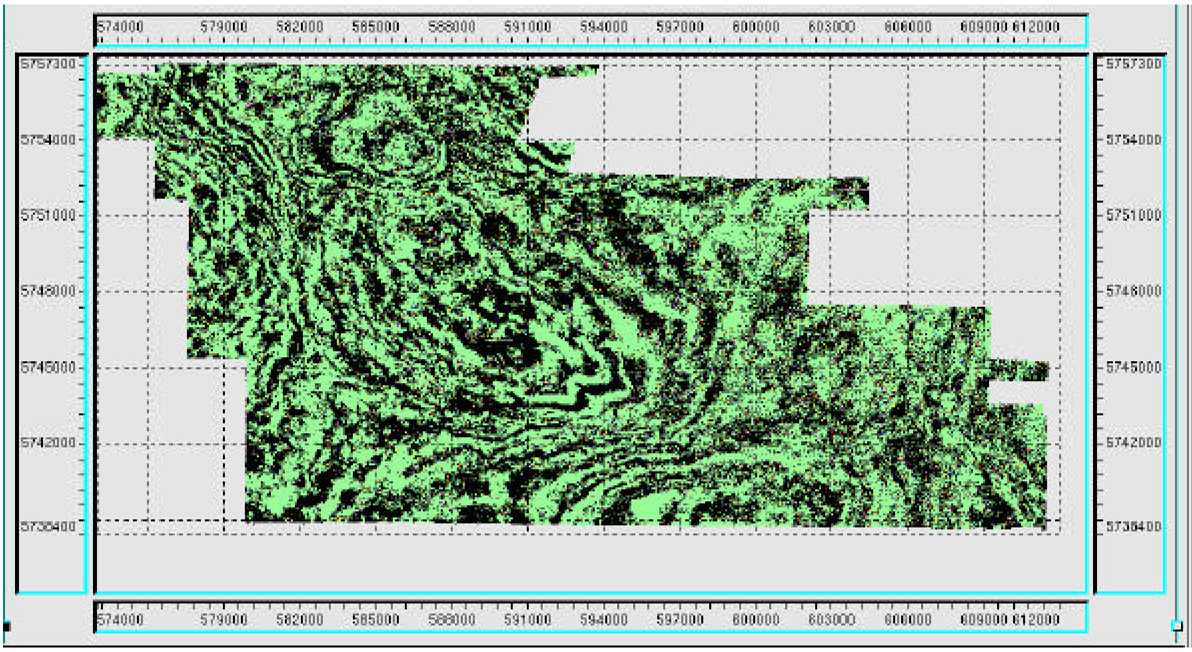
7.9 Fold of coverage plot



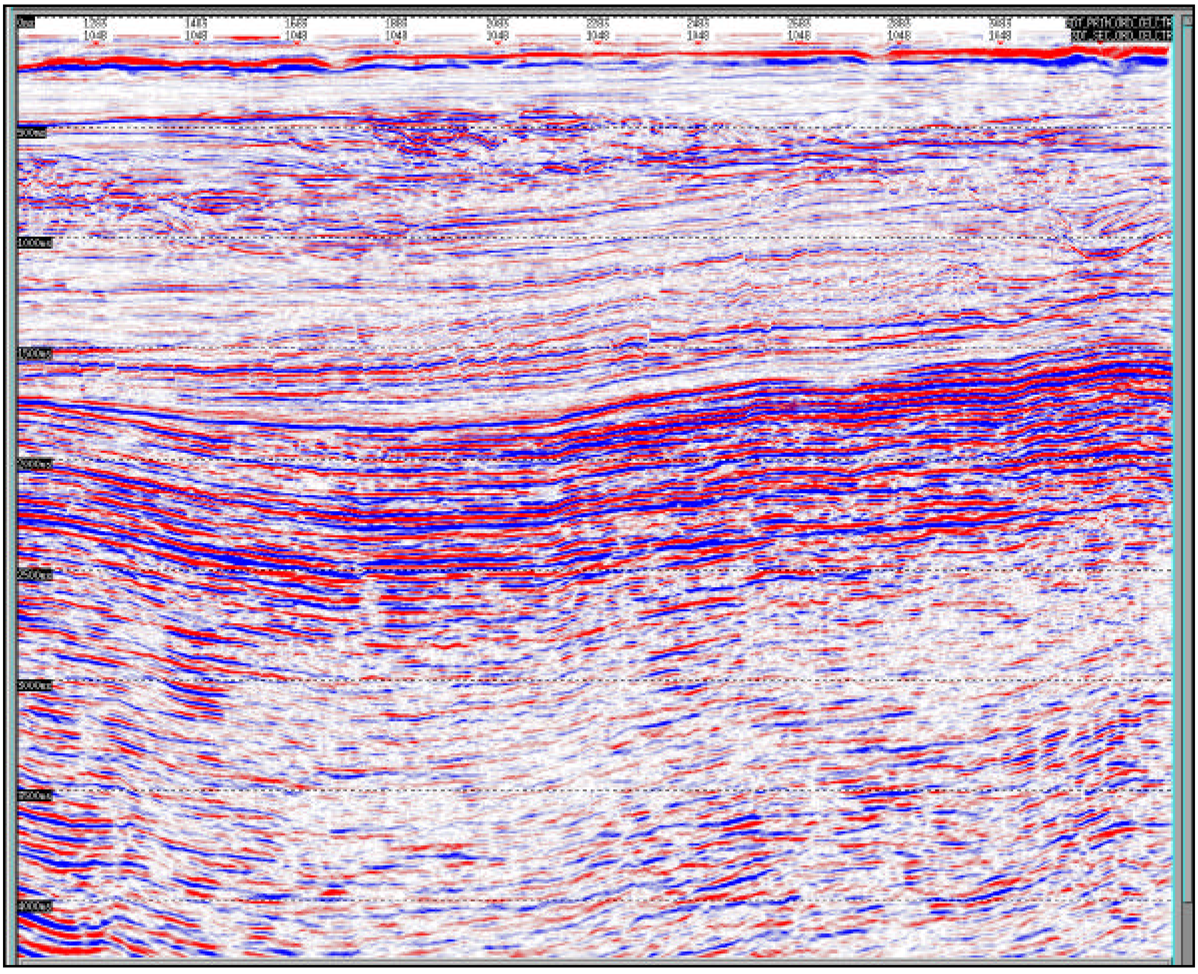
7.10 Time Slice plot before 3D bin regularisation by interpolation: Offset Group01 (representative offset = 346.5m) at time 2000ms



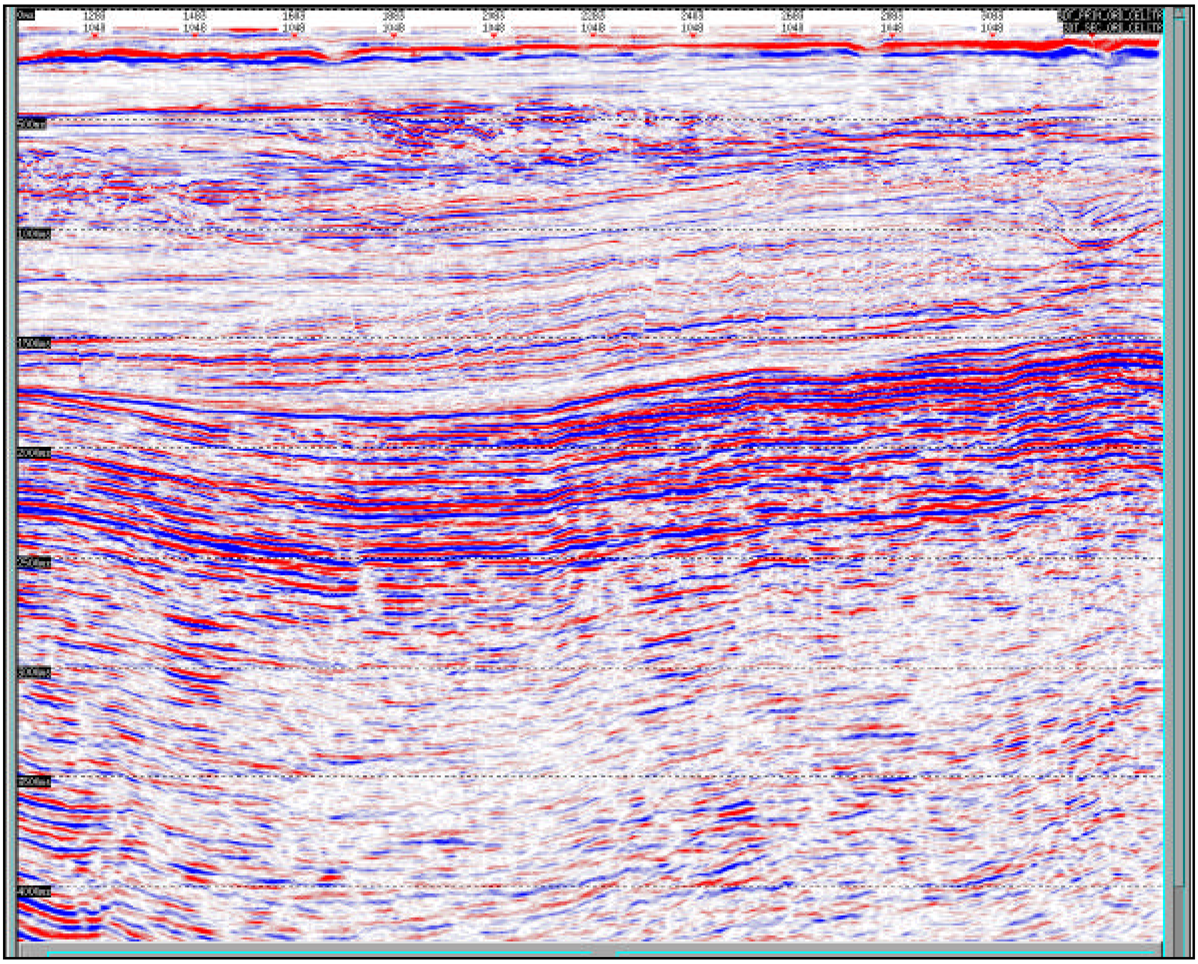
7.11 Time Slice plot after 3D bin regularisation by interpolation: Offset Group01 (representative offset = 346.5m) at time 2000ms



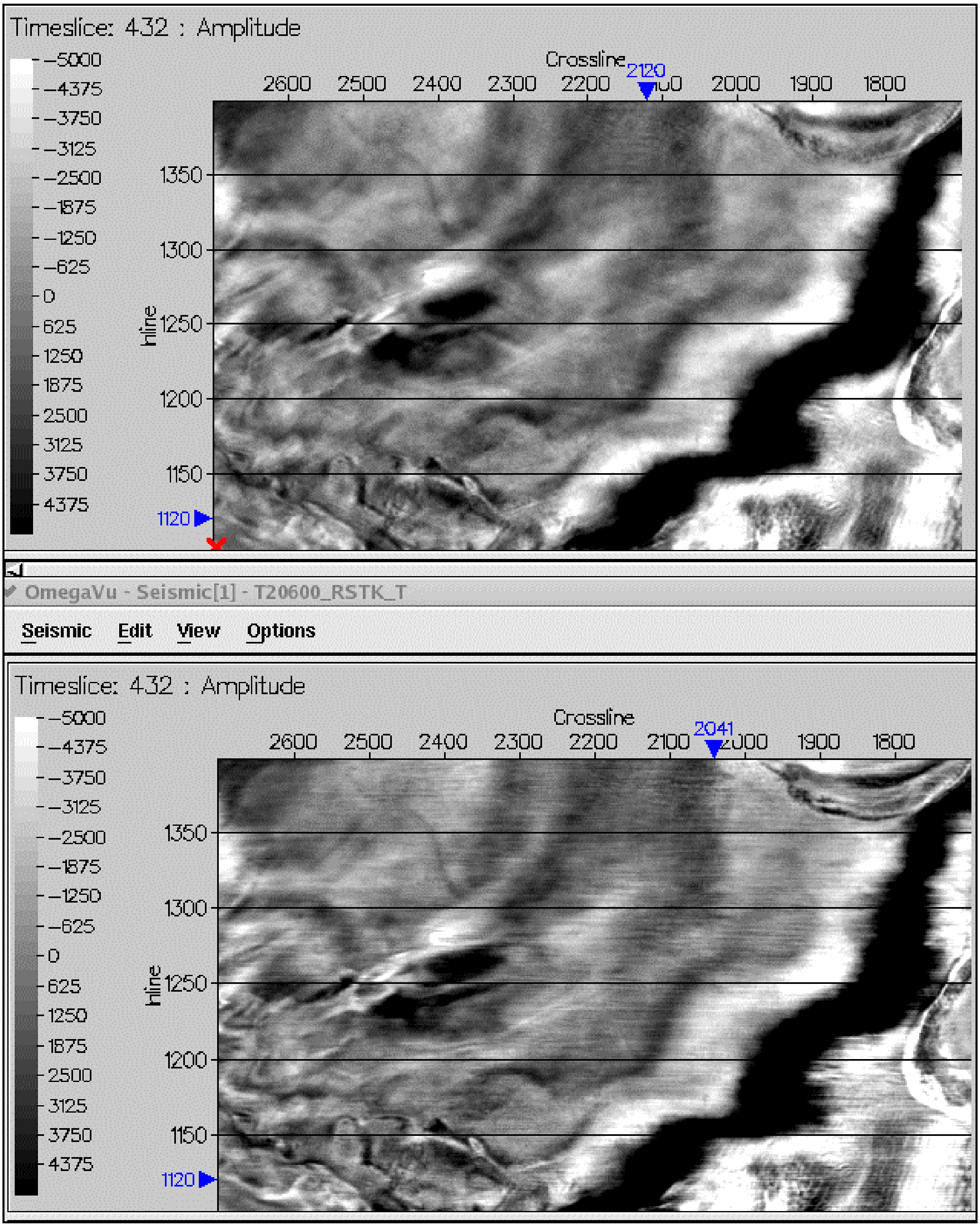
7.12 Stack before Radon multiple attenuation



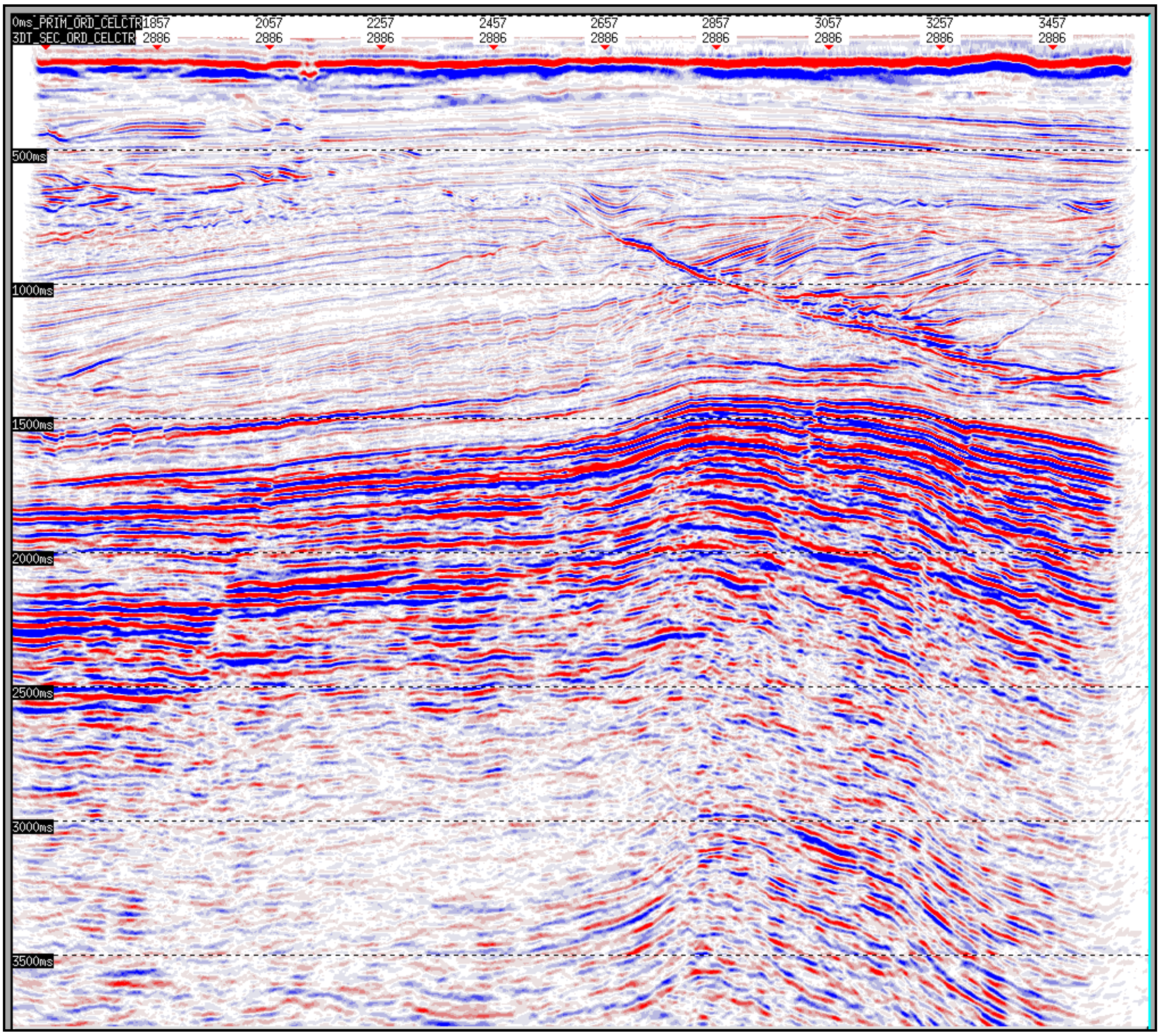
7.13 Stack after Radon multiple attenuation



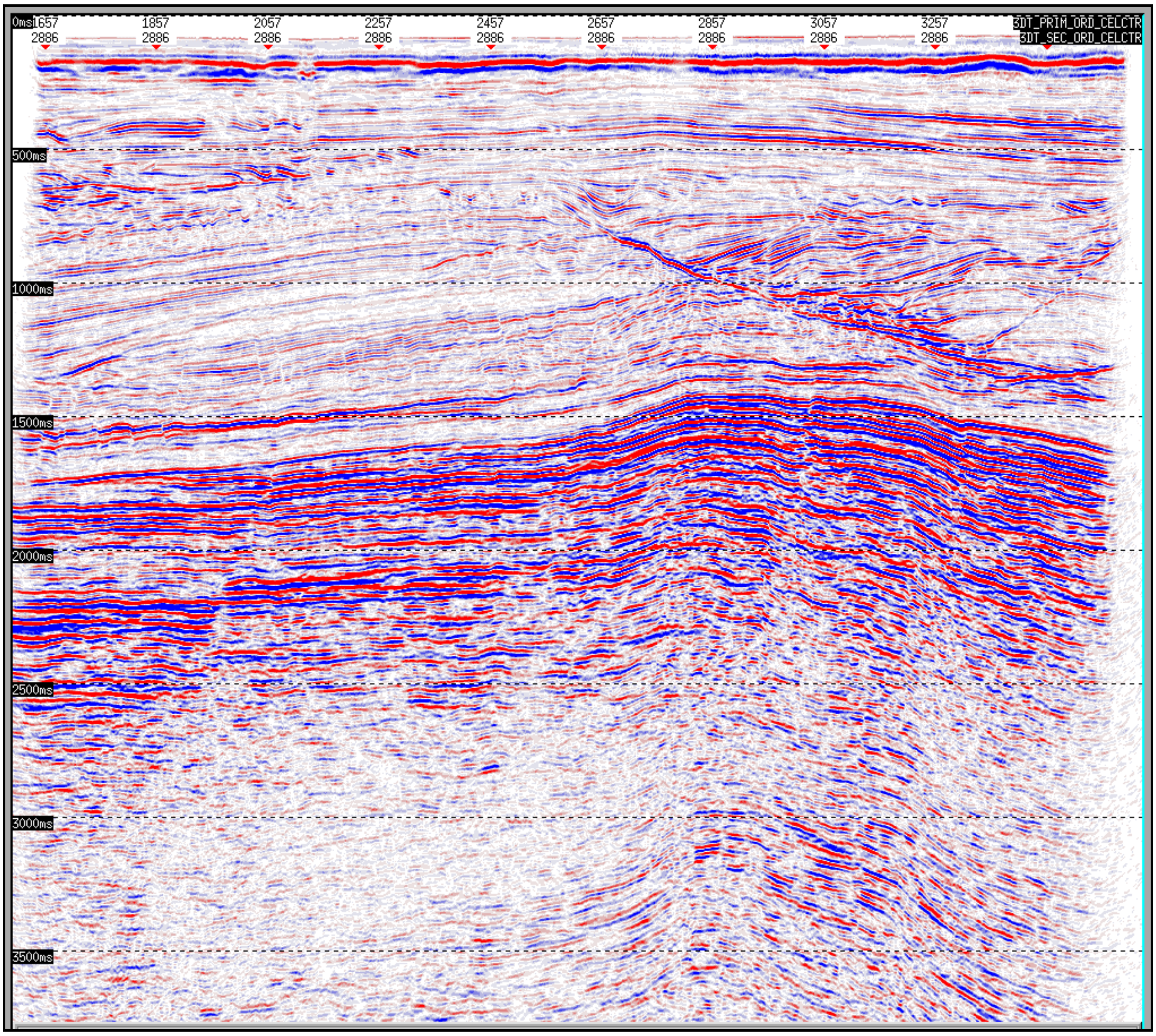
7.14 Time slice at 432 ms before acquisition footprint removal (lower image) and after 3D F-K acquisition footprint removal (upper image)



7.15 Stack without time variant spectral shaping (TVSS) applied



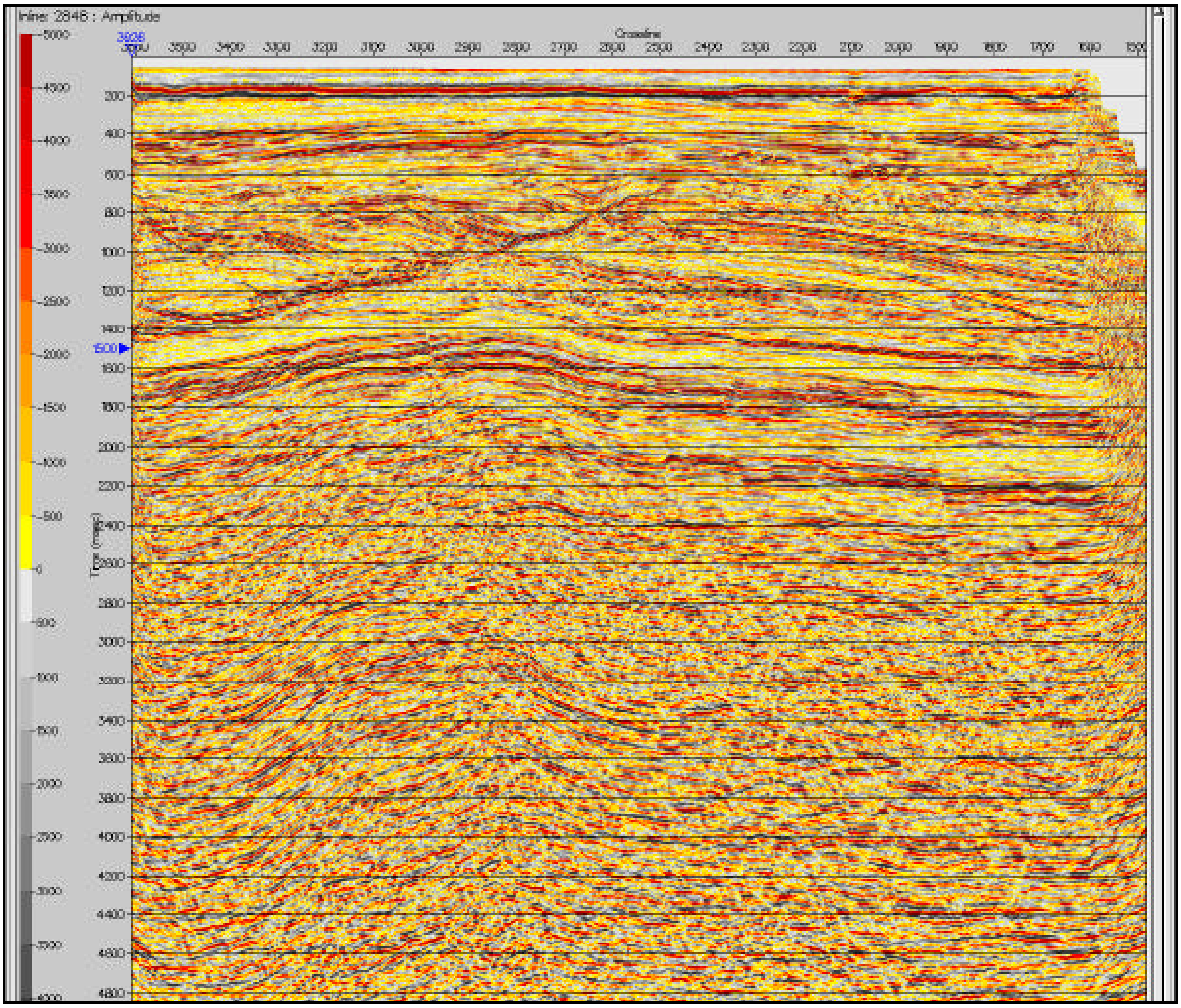
7.16 Stack with time variant spectral shaping (TVSS) applied



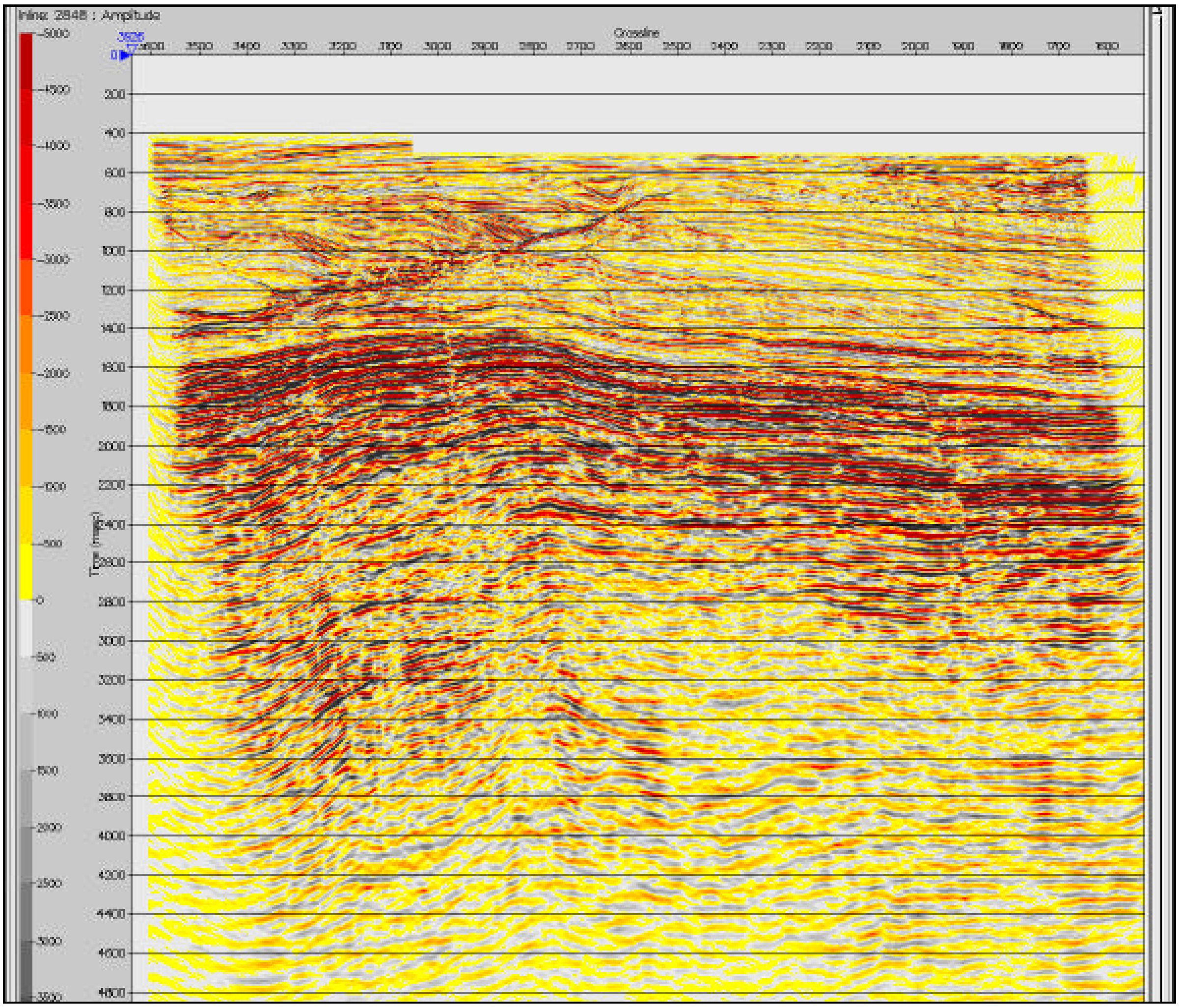
7.17 Final NMO-CMP gathers overlaid with angle & final outer mute patterns

(angle 5-60 deg with every 5 deg increment)

7.18 Near angle (0-14 deg) stack



7.19 Mid angle (14-28 deg) stack



7.20 Far angle (28-42 deg) stack