Data Processing Report

for

Survey: GAP04B Sue 3D
Area: Vic / P58

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Table of Contents

1.0 Introduction 1
2.0 Project Management 1
2.1 Personnel 1
2.2 Reporting Procedure 2
3.0 Seismic Data Processing 2
3.1 Reformat 2
3.2 Navigation/Seismic Data Merge 2
3.3 Assign Nominal Geometry 3
3.4 Shot and Trace Edits 3
3.5 Dephase (Deterministic designature) 3
3.6 Temporal Resample 3
3.7 Low-cut Filter 4
3.8 Time Function Gain 4
3.9 Swell Noise Attenuation (SWATT) (where applicable) 4
3.10 Low-Frequency Random Noise Removal (where applicable) 5
3.11 Mud Roll Attenuation (conventional lines) 5
3.12 Mud Roll Attenuation (undershoot lines) 6
3.13 Cable Strike Attenuation (where applicable) 7
3.14 Linear Noise Attenuation (LNA) 7
3.14.1 Tau-P domain linear noise filtering 8
3.15 K-Filter 8
3.16 Preliminary Velocity Analysis 8
3.17 Deterministic Water-Layer Deconvolution (DWD) 9
3.18 3D Surface Related Multiple Elimination (3D SRME) 9
3.18.1 3D Surface Multiple Prediction (3D SMP) 9
3.18.2 Adaptive Filter and Subtract 10
3.19 Tau-p Deconvolution (with near and far offset extrapolation) 11
3.20 Inverse Q-Filter 12
3.21 Prestack Shot Interpolation (2.5 D) 12
3.22 Weighted Least Squares Radon Multiple Attenuation 13
3.23 Trace Reduction 14
3.24 3D Prestack Fold Interpolation and Regularization (FIRE 3D) 15
3.25 Migration Velocity Analysis 16
3.26 Time Function Gain Removal 16
3.27 Kirchhoff Pre-Stack Time Migration 16
3.28 Anisotropic (eta) Analysis 17
3.29 Spatial Residual Amplitude Conditioning (SRAC) 18
3.30 Final RMS (Vn) Analysis & Moveout Correction 18
3.31 Residual Weighted Least-Squares Radon Demultiple 18
3.32 Post-Radon Isolating Multiple Algorithm (PRIMAL) 19
3.33 Angle Stack 20
3.34 Gun and Cable Correction 20
3.35 Residual Amplitude Analysis/Compensation (RAAC) 21
3.36 Survey Matching and Merging 21
3.36.1 Cross-equalisation spectral analysis 21
3.36.2 Cross-equalisation filter design 22
3.36.3 Amplitude level matching 22
3.36.4 Survey Merging 22
3.37 Time Variant Filtering 22
4.0 Appendices 24
4.1 Location Information 24
4.2 Grid Information 24
4.3 Acquisition Line Listing 25
4.4 Acquisition Parameters 27
4.5 Lines With Swell Noise 28
4.6 FIRE3D Offset Binning 28

4.7 Processing Flowchart 30
4.8 Testing 32
4.9 Parameter Decisions 62
4.10 Signatures/Wavelets/Functions 64
4.10.1 Dephase Operator 64
4.10.2 Sue 3D Stack Polygon 66
4.10.3 Example XT representation of Angle mutes (example location only) 67
4.10.4 Post-Stack Scaling Function 68
4.10.5 Northern Fields Scaling Function 68
4.11 Archive Products 69
4.11.1 Final Products Summary 69
4.11.2 Example EBCDIC header 71
4.11.3 Undershoot Shot Gathers (Time-break corrected) 71
4.11.4 Field Tape Shot Gathers 72
4.11.5 Tau-P DBS Shot Gathers 83
4.11.6 Raw PreSTM CMP Gathers (no NMO applied) 89
4.11.7 Final PreSTM CMP Gathers (NMO + eta applied) 93
4.11.8 Raw Stack Archives 95
4.11.9 Final Stack Archives 95
4.11.10 Merged Stack Archives 96
4.12 Enclosures 97
4.12.1 Noise Attenuation 97
4.12.2 DWD and 3DSRME 103
4.12.3 Fold of Coverage (FOC) Displays 105
4.12.4 Velocity & Anisotropy Displays 107
4.12.5 Signal Enhancement Displays 118
4.12.6 Angle Mute Displays 120
4.12.7 Post-Stack Scaling 122
4.12.8 Final Stack Displays 123
4.12.9 Sue / Northern Fields Merge Displays 125

Table of Figures

Figure 1 : Survey Location Map 24
Figure 2 : Data Processing Master Grid 24
Figure 3 : Dephase Operator 66
Figure 4 : Shots before noise attenuation 97
Figure 5 : Shots after noise attenuation 97
Figure 6 : Shot FK for mud-roll (before/after/difference) 98
Figure 7 : Linear Tau-p filter for mud-roll (before/after/difference) 99
Figure 8 : Section of a shot gather before/after cable-strike attenuation 100
Figure 9 : No Shot-FK, Shot-FK, LNA shot 101
Figure 10 : Undershoot shot before and after LNA (cable-strum circled) 102
Figure 11 : Shot gather after LNA and 3DSRME 103
Figure 12 : Stack section after DWD and 3DSRME 104
Figure 13 : FOC map before FIRE3D 105
Figure 14 : FOC map after FIRE3D 106
Figure 15 : Final Interval-eta field at TOL 107
Figure 16 : Final Vn analysis locations (Refined locations in blue) 108
Figure 17 : Final Vn velocity at 500ms 109
Figure 18 : Final Vn velocity at 1500ms 110
Figure 19 : Final Vn velocity at 2500ms 111
Figure 20 : Final Vn velocity at 3500ms 112
Figure 21 : Final Vn velocity at 4500ms 113
Figure 22 : InVA display – Anisotropic moveout correction with unrefined Vn 114
Figure 23 : InVA display – Anisotropic correction embedded in data, refined Vn 115
Figure 24 : Example CMPS with isotropic moveout correction 116
Figure 25 : Example CMPS with anisotropic moveout correction 117
Figure 26 : SRAC before/after/difference (near offset plane) 118
Figure 27 : Corrected gathers before/after Residual Radon and PRIMAL (5-50deg mute shown) 119
Figure 28 : Near/Mid/Far angle-mute overlays showing modification to inside angle-mute 120
Figure 29 : Example angle mute representation for a single location 121
Figure 29 : Amplitude analysis before/after single-function scaling (black line) 122
Figure 30 : Final Stacks - IL2000 near/mid/far stack 123
Figure 31 : Final Stacks – XL3800 near/mid/far stack 124
Figure 32 : Survey Map showing Sue & Northern Fields area 125
Figure 33 : Example inlines over merge area (centre of panels) 126

1.0 Introduction

This report details the data processing by WesternGeco of the Sue 3D marine seismic survey in block Vic/P-58. The survey was acquired in Gippsland Basin offshore Victoria in the Bass Strait. The survey consisted of approximately 1050 sqkm of data and was processed from field tape through Kirchhoff pre-stack time migration to final stack. Acquisition parameters can be found in Appendix 4.4.

The main objectives for data processing were to

A. Preserve high resolution of shallow Top Latrobe (TOL) target and preserve amplitude and phase for potential DHI / AVO analysis.
B. Improve imaging below coal sequence of deep target compared to various vintages of 2D data.

Line 1232P1036 was chosen as the main test line by Apache as it passes close to a well in the survey area. Other lines were chosen as required for specific parameter testing because of the different types of noise they exhibited. These other test lines included 1632P1014, 2032P1046, 2048P1048, and 2160P1089.

A horizon following the Top Latrobe (TOL) was supplied by Apache. This was often used in the design of analysis &/or application windows for some processes.

Along with conventional off-end line acquisition, several sequences were acquired using separate source and receiver boats producing undershoot data. This was required due to the presence of two production platforms within the survey area. As much as possible, these sequences went through the same processing sequence as the conventional data. These eight sail lines had varying crossline offsets and in several cases, the distance from source to receiver actually decreased from the first receiver to the next, before increasing again. The large near-offsets also resulted in little shallow data being recorded. As many of the steps in the processing flow were highly dependant on geometry, the difference in geometry of these lines to that of the conventional lines made confirmation testing difficult and usually required slight setup modifications to enable the same result as achieved on the conventional lines.

As a final step, stack data from the nearby Northern Fields survey was phase and amplitude matched before being merged to the full-angle stack Sue data.

2.0 Project Management

2.1 Personnel

Key individuals involved in the project were:

For Apache:

Laurence Hansen	Senior Staff Geophysicist
John Cant	Consultant Geophysicist

For WesternGeco:

Paul Tredgett	Processing Manager
Alison Keighley	Supervisor
Richard Bisley	Area Geophysicist
Lee Horn	Project Leader

2.2 Reporting Procedure

Project progress reporting was done on a weekly basis. This was accomplished each Friday via e-mail and included the following in a Microsoft word document:

- estimated completion dates
- action for client / processing group
- data received / sent
- production status summary with completion percentages
- tests run and parameter decisions
- history of previous weeks comments

The following were supplied at periodic project meetings with Apache

- test QC using QCViewer, SeisView, or InVA
- production QC using QCViewer or SeisView
- Test data supplied in SEG-Y format

3.0 Seismic Data Processing

3.1 Reformat

The 3072 seismic trace demultiplexed field data were reformatted from SEG-D to an in-house source-gathered seismic file format.

Diagnostics from the transcription programme 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. Shot record displays and a near trace section were displayed for quality control on each line. QC stacks and cmps were also produced on one sub-surface line (ssl) for each sail line.

For the undershoot data it was necessary to apply time-break corrections to account for a mismatch between source and receiver boat recording systems. SEG-Y data after these corrections were produced and delivered to Apache. See Appendix 4.11.3 for a tape listing.

3.2 Navigation/Seismic Data Merge

The navigation geometry information was used to update the seismic trace header literals with that information. The two sets of data were matched using unique time-of-day identifiers.

The following QC products were produced pre-stack to check the navigation and seismic data merge:

- Fold of coverage of supplied UKOOA navigation data
- Fold of coverage after navigation/seismic merge
- Near trace stack cube (6 fold) displays of:
  - QC inlines
  - QC crosslines
  - QC time slices
- Full fold inlines - 1 km grid
- Full fold crosslines - 2 km grid
- Shot point position map

- LMO displays

Shot gathers at this stage were archived to 3590B cartridge (see Field Tape Shot Gathers).

3.3 Assign Nominal Geometry

In addition to assigning the genuine 3D navigation geometry, a simple regular 2D geometry was also assigned. The geometry used the nominal acquisition values as given in the acquisition parameters.

3.4 Shot and Trace Edits

Field Shot edits were deleted. Field trace edits were flagged in the trace header but not deleted at this stage. They were deleted after SWATT if they were still contaminated with noise.

3.5 Dephase (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 'Deterministic Signature Deconvolution' is to obtain an operator that will convert the recorded or modelled far field source signature to its minimum or zero phase equivalent, or to another target wavelet.

- Source and receiver ghosting
- Earth attenuation, Q
- Hydrophone impulse response
- Recording instrument impulse response

Often, supplied far field source signatures have a number of the above components 'built-in'. If, however, these components have not been applied but are known or can be determined, then it is possible to apply them to the signature during the signature deconvolution procedure. Commonly, the earth attenuation, Q, is not compensated for during deterministic signature deconvolution as it is time variant in nature. Processes applied later in the processing sequence, such as predictive deconvolution and inverse Q compensation, may be designed to accommodate for this.

Parameter values:

Far-field Signature	: Supplied by client
Desired Output Wavelet	: Zero Phase Equivalent
Coefficients of Signature Deconvolution Operator:	
Number of Coefficients	: 201
Sample Index of Time-zero of Operator	: 101
Sample Interval	: 2 ms
Coefficients:	
(see Appendix 4.10.1)	

3.6 Temporal Resample

An antialias filter was applied and the data were resampled.

Parameter values:	
Input Sampling Interval	: 2.0 ms
Output Sampling Interval	: 4.0 ms
Antialias Filter:	
Phase	: Zero
Cut-off Frequency	: 100 Hz
Cut-off Slope	: 72 dB/oct

3.7 Low-cut Filter

A low-cut filter was applied to the data.

Parameter values:	
Phase	: Zero
Low-cut Frequency	: 2 Hz
Slope	: 18 dB/octave

3.8 Time Function Gain

This process scales trace samples by first raising the time (in seconds) to a user-supplied exponential value, then multiplying the result by the amplitude of the sample at that time. That is:

$$A_o(t) = A_i(t)\ t^x$$

where:

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

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

t is the time in seconds

x is the value of gain exponent

Parameter values:	
Exponent Value	:2

3.9 Swell Noise Attenuation (SWATT) (where applicable)

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.

The same parameters were used for both the conventional and undershoot lines.

Parameter values: (pass1 / pass2)

Processing Domain	Rcvr / Shot
Width of Spatial Median Filter	: 21 / 41 Traces
Frequency Range Processed	: 0-10 / 0-20 Hz
Width of Frequency Bands to Process	: 5 Hz
Window length, overlap (ms)	: 1000 ,100 / 500, 100ms

Threshold Values:

Time (ms)	Threshold (Ratio)
0	7 / 20
5000	7 / 20

Processing Window:

Offset (m)	Start Time (ms)	Stop Time (ms)
230	500	5200
5000	4000	5200

3.10 Low-Frequency Random Noise Removal (where applicable)

2-D RNA (Random Noise Attenuation) enhances coherent linear events relative to random noise by using an f-x filtering technique that automatically selects the range of dips to enhance based on the dips in the data. The process operates on windows of data having the axes of time (t) and width (x) which are 1-D Fourier transformed from time to frequency yielding a window of f-x data. Operating separately on each frequency, a Wiener prediction-error filter is computed from and applied to the data in the x direction. The process assumes that the predicted energy in the x direction is signal and the remaining energy is random noise (which is rejected from the output).

Adjacent windows of data are blended spatially before inverse transform and temporally after inverse transform to arrive at the output.

This process was applied to the low frequency components of uncorrected shot gathers. It was used to generate a noise model which was then subtracted from the original data. It was applied to lines with medium to heavy swell noise only (see Appendix 4.5).

Parameter values:

Frequency Range	: 0-16Hz
Window Width	: 80 traces
Operator Width	: 20 traces
Trace Overlap	: 20 traces
Time Window Length	: 1000 ms
Time Overlap	: 100ms

Note: The window size was chosen so that the coherent events within the window were approximately linear

3.11 Mud Roll Attenuation (conventional lines)

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). Dipping events (including linear noise) which overlap in this time-offset (t-x) domain cannot often be easily separated. However, a Fourier transform can be used to

convert the seismic signal to the f-k domain, that is, to a function of temporal frequency (f) and spatial frequency or wavenumber (k). In this domain, dipping events plot along straight lines radiating outwards from the point of zero frequency and zero wavenumber. Gently dipping events plot closer to the frequency (vertical) axis (horizontal events actually plot along this axis), while steeply dipping events plot closer to the wavenumber (horizontal) axis. Events with a positive dip (that is, where the reflection time increases as the trace position increases) have positive wavenumbers and events with negative dips have negative wavenumbers. The events are therefore more easily separated in the f-k domain and unwanted events such as linear noise rejected by applying a user-specified filter. The data are then inverse Fourier transformed to the t-x domain.

This process was applied to shot gathers. Near and far offset padding was used to decrease transform artefacts.

(Note: The term dip refers only to the apparent dip of an event measured in time (ms/trace) or velocity ((ft or m)/s) and not to the actual spatial dip of the geologic structure.)

Parameter values:

Dips (that is, seismic dip in ms/trace) were used to specify a fan-shaped region of f-k space. This region was passed.
A taper was also applied to the filter boundaries to smooth the transition between the pass and reject zones.

Low Dip Cutoff	: -12 ms/trace
High Dip Cutoff	: 12 ms/trace
Low Dip Taper (centred on the low dip cutoff)	: 12 ms/trace
High Dip Taper (centred on the high dip cutoff)	: 12 ms/trace
Taper Type	: Hanning
Near / Far Padding	: 125m
Fan Origin	: Zero Frequency + Zero Wavenumber

The dips were therefore attenuated by the same factor for all frequencies.

See Figure 6 for example shots before and after mud-roll attenuation has been applied.

3.12 Mud Roll Attenuation (undershoot lines)

Because of the irregular offset sampling of these shot gathers, conventional FK filtering did not perform well enough in attenuating mud roll on the undershoot lines. A linear tau-p filter was used to attenuate mud roll energy for these lines. Refer to 3.14 for details on this process.

Parameter values:

Reference offset	: 5000m
Number of p traces generated	: 539
Transform moveout range	: -3000ms to +14250ms
Signal moveout range	: -3500ms to +3500ms

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

3.13 Cable Strike Attenuation (where applicable)

An additional pass of SWATT was used to attenuate high-frequency cable-strike noise.

Parameter values:

Processing Domain : Rcvr

Width of Spatial Median Filter : 41 Traces
Frequency Range Processed : 40-90 Hz
Width of Frequency Bands to Process : 5 Hz
Window length, overlap (ms) : 500, 100ms

Threshold Values:

Time (ms)	Threshold (Ratio)
0	50
5000	50

Processing Window:

Offset (m)	Start Time (ms)	Stop Time (ms)
230	500	5200
5000	3900	5200

See Figure 8 for an example shot before and after cable-strike attenuation has been applied.

3.14 Linear Noise Attenuation (LNA)

The data were forward transformed into the Tau-P (or slant-stack) domain. In this domain certain types of coherent noise can be isolated and thence inverse-transformed and subtracted. Geometry compensation is needed to reduce artefacts due to gather geometry and so improve separation of transformed events whilst maintaining acceptable invertability for the noise being modelled. Preconditioning steps may be required to reduce other artefacts that may hinder separation of noise from signal; Such artefacts can be caused by things such as data aliasing, event truncation at gather boundaries, high amplitude incoherent noise (e.g. swell noise).

Parameter Values:

Gather type : Shots
Pre-transform conditioning: i) 2048ms reversible instantaneous gain wrap
ii) 20 trace far offset extrapolation (dropped after)
iii) Reversible far-offset cosine taper wrap
scalars 1.0 @ tnum 192 : 0.18 @ tnum 404

Pass 1:
Geometry compensation : Least Squares (Conjugate Gradient)
Reference offset(m) : 5000
Max frequency (Hz) : 12
Number p traces : 375
Minimum p value(msec @ Ref) : -6000
Maximum p value : +6000

Pass 2:
Geometry compensation : Least Squares (Conjugate Gradient)
Reference offset(m) : 5000
Max frequency (Hz) : 125
Number p traces : 1401
Minimum p value(msec @ Ref) : -3200
Maximum p value : +3800
Note: Aliasing frequencies from water velocity events are filtered off negative moveout traces

3.14.1 Tau-P domain linear noise filtering

High-energy linear and near-linear noise, which contaminated primary in the zone of interest, was suppressed by muting in the tau-p domain. Either the noise zone is inverse-transformed and subtracted from the data in the t-x domain (DIFFERENCE method) or the signal zone is inverse-transformed to replace the data in the t-x domain (REPLACEMENT method).

Parameter values:

Pass 1:

Method	:DIFFERENCE
Mute definition	: signal zone -3500 to 3500 (msec @ Ref)
Taper definition	: p-direction 1000 (msec @ Ref)

Pass 2:

Method	:REPLACEMENT
Mute definition	: Symmetrical mute derived from regional velocities
	: Mute is approximately max moveout of
	i) 65 deg primary incidence angle
	ii) Far offset primary intercept plus 10 deg
	iii) 1500 msec @ Ref
Taper definition	: p-direction 1000 (msec @ Ref)
	: tau-direction 128 msec

This filter also removed some cable-strum noise where present (see Figure 10).

3.15 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. A range of wavenumbers was specified to be passed by the filter and a taper was also applied to the filter boundaries to smooth the transition between the pass and the reject regions.

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. A NMO wrap-around was used for this process.

Parameter values:

High Wavenumber Cutoff	: 0.5 of k-Nyquist (relative to input trace separation)
Velocity Field for wrap-around	: Regional velocity field

3.16 Preliminary Velocity Analysis

Velocity analysis was performed using WesternGeco's Interactive Velocity Analysis (INVA) package. At regular intervals across the survey CMP gather data were selected. From this data Multi-Velocity Function (MVF) stacks and velocity semblance values were computed. For each velocity location, MVF data, semblances and gathers are displayed interactively allowing stacking velocities to be interpreted.

2DSRME and a mild weighted least-squares radon demultiple was applied to aid velocity analysis. A regional 3D field provided by Apache was used for the NMO in the radon demultiple.

MVF stacks were decimated to every 2nd location to enhance dipping events in InVA.

Parameter Values:

Analysis Spacing	:	1000m
Number of CMPs per Analysis (MVF Stack)	:	15 (post decimation)
Number of CMPs per Analysis (Semblance Display)	:	3

3.17 Deterministic Water-Layer Deconvolution (DWD)

Deterministic Water-layer Demultiple is a WesternGeco technique designed for application in shallow marine environments. In these conditions, other demultiple approaches can suffer due to the lack of near offset information, and are unable to adequately predict water layer multiples.

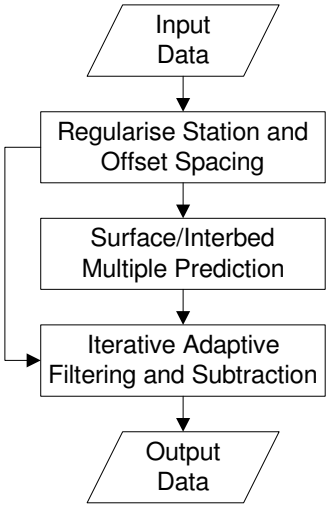
Deterministic Water-layer Demultiple employs a model-driven, non-linear multiple prediction approach and accurately derives both first and higher-order multiple amplitudes (including peglegs). This provides significant improvements in the quality of multiple model and reduced primary attenuation compared to more conventional tau-p deconvolution techniques.

In shallow water environments, it can be incorporated into a 3D SMP workflow to provide an improved demultiple solution.

3.18 3D Surface Related Multiple Elimination (3D SRME)

SRME is performed by modelling surface multiples followed by adaptive subtraction of the modelled multiples from the data.

3.18.1 3D Surface Multiple Prediction (3D SMP)



By definition, the raypath for every surface multiple includes a downward reflection at the surface, and can therefore be decomposed into an event which is not a surface multiple, and a lower order surface multiple by breaking the raypath at the downward reflection point (DRP) nearest to the source. Combination of these two events using a Kirchhoff integral operator provides an accurate prediction of the surface multiple without requiring a velocity or structural model.
The prediction can be done entirely from the multiple contaminated data themselves, though it may be necessary to iterate the process as a consequence of not having an initial multiple-free dataset. It is necessary to deconvolve the source wavelet from the predicted multiples after each iteration and hence an estimate of the source wavelet is required.
The algorithm requires that the input data have uniform station spacing and uniform offset distribution down to zero offset. Therefore it is usual to pre-condition the data to achieve this prior to running SMP. The prediction can be done in 3-D, 2-D or 1-D, with the 3-D results being theoretically more accurate in the presence of arbitrary dip. However, 3-D prediction requires adequately sampled areal shot and receiver gathers; since these are not recorded in conventional surveys they must be simulated from recorded data by interpolation and extrapolation methods. 3-D prediction also requires a very high computational effort. 2-D prediction will be accurate where there is no cross-line dip. The 1-D results suffer less from end-

of-line effects, and pose less stringent geometrical constraints, requiring only that the offset distribution within each gather be regular.
Once the multiple model has been generated, an adaptive matching filter is applied to the model to improve the match with multiples corresponding to those predicted by the SMP process (see SMP process flow diagram).

SRME can be problematic for marine surface seismic where the minimum incidence angle of shallow events is too high (typically shallow water with long tow setback). Moveout stretch results in poor extrapolation to zero offset of these events. In this case it is desirable to remove associated shallow surface multiple by other means, then mute out these events prior to SRME.

Simply put, 3D SMP for one shot-receiver trace requires convolution of trace pairs from a full, well sampled areal shot gather located at the source point and a full, well sampled areal receiver gather located at the receiver point. These gathers must be sufficiently large to include the physical DRP's of multiples of interest. Conventional surface seismic data falls well short of this geometry requirement, so traces with the required midpoint, inline- and crossline- offset must be simulated from the recorded data. Marine surface seismic is particularly poorly sampled in crossline offset, and far crossline offsets must be extrapolated from what midpoint coverage is available.

The crossline distance from the target midpoint to the furthest contributing DRP is referred to as the crossline half-aperture. Logically, this is twice the crossline midpoint half-aperture. The aperture has a large impact on the cost of SMP as it linearly affects the number of trace pair convolutions required and the I/O requirement. The aperture must be large enough to include all DRP's of interest. However, large apertures results in long run times and risk introducing noise types in the model such as aliasing.

SMP uses a Kirchhoff integral and is therefore vulnerable to aliasing artefacts. For 3D SMP, the integral is over an areal gather of convolved trace pairs called a multiple contribution gather (MCG). Typical marine surface seismic is much better sampled spatially in the inline direction than the crossline. It is usual that the MCG is first summed in the inline direction where sampling is adequate to prevent aliasing artefacts, followed by dealiasing of the crossline MCG prior to final sum.

Parameter Values:

Preconditioning	: DWD to remove water layer multiple 200ms mute prior to modeling Extrapolation to zero offset Offset regularization On-the-fly crossline extrapolation
Crossline DRP/midpoint total aperture	: 2500m./1250m.
Crossline MCG dealiasing	: 3:1 interpolation
Post-conditioning	: Offset deregularization to target

3.18.2 Adaptive Filter and Subtract

In many situations we have noise contaminated data and attempt to make an estimate of the noise those data contain. However, the noise estimate contains small amplitude, timing or phase errors, which may be slowly time and/or space variant. Filtering the noise to improve the match with the input data before subtracting it can greatly improve the noise attenuation.
Given two time series, it is possible to construct a filter that makes the best possible match, in a least-squares sense, between the two series. The adaptive filtering process generates a series of time- and spatially-varying matching filters that adapt as the characteristics of the time series change. It is sometimes necessary to iterate through the matching process using progressively smaller windows to arrive at the optimum match.

Parameter Values:

Number of iterations : 1

	Design Window Length (ms)	Design Window Width (traces)	Match Filter Length (no. of samples)
Iteration 1	500	50	11

An example shot before and after 3DSRME can seen in Figure 11. A stack section after DWD and after 3DSRME is shown in Figure 12.

3.19 Tau-p Deconvolution (with near and far offset extrapolation)

When the offset is zero and the reflectors are horizontal, a first-order multiple has a two-way time that is twice the period of the primary. However, for non-zero offset this is not the case – the multiple time is less than twice the time of the primary. Consequently, the ability of conventional Wiener-Levinson deconvolution to attenuate longer period multiples, particularly on longer offset traces, is very limited. A regular periodicity for the multiples can be imposed on the data by applying normal moveout (NMO) with the multiple velocity, but this distorts the frequency spectrum of events so that, while the periodicity may be regular, the wavelet shape between successive repeats of the multiple is not. The deconvolution, therefore, is still only partially effective.

An alternative way of restoring a regular periodicity is via a linear tau-p transform of the shot-ordered data. As the intention is to apply deconvolution in the tau-p domain, only limited or no scaling is applied to this data to ensure that the amplitude relationship between successive repeats of a multiple is preserved. High amplitude, first-break energy is muted.

Wiener-Levinson least-squares predictive deconvolution operators were designed from autocorrelations of windows within each p-trace and were applied on a trace-by-trace basis. Start times were used to control the location of the design windows but application included all data earlier than the start time of the first window and later than the end time of the last window.

Two alternatives allow the final deconvolved (multiple attenuated) data to be produced. In “Full Modelling”, all useful data in the time-space (t-x) domain is tau-p transformed – inverse tau-p transform of deconvolved data then yields the final output gather. In “Multiple Modelling”, the tau-p transform can be limited to cover only the dips within the multiples. After deconvolution, while still in the tau-p domain, a subtraction of the deconvolved data from the input tau-p data yields ‘multiple only’ data – inverse tau-p transform and subtraction from the time-space input data yields the final output gather.

The advantage of extrapolating near traces before the application of Tau-p Deconvolution
In order to predict a multiple in the Tau-p domain at a given offset, you need to have recorded the primary or previous order multiple at a nearer offset. In general, this is only the case if we have receiver groups sampling the wavefield right up to zero the offset. In practice, this is never the case, and the shallow multiples on the near traces will not have the corresponding primary or lower order multiple reflections recorded. The deconvolution operator is therefore unable to predict and remove that multiple. A solution to this problem is to extrapolate additional traces such that the near offset trace is as close to zero offset as possible. By extrapolating extra near offset traces you should see an improved Tau-p demultiple result. The offset extrapolation of the gather is applied with a cosine taper to further prevent any transform artefacts.

Parameter Values:

Method	: Multiple Modelling
Number of p-traces	: 700
Transform Type	: Linear
Reference Offset	: 5000m
Moveout at Reference Offset – Lower Limit	: -1800 ms
Moveout at Reference Offset – Upper Limit	: 3800 ms
Deconvolution Window(s) start/length	: 100ms/TOL, TOL-300ms/3000ms
Deconvolution Operator – Minimum Predictive Lag	: 36 ms
Deconvolution Operator – Total Operator Length	: 240 ms

Shot gathers at this stage were archived to DLT and 3590B cartridge (see Tau-P DBS Shot Gathers).

3.20 Inverse Q-Filter

To compensate for the earth Q-filter, that is, attenuation of higher frequencies and the frequency dependent variation of propagation velocity, a time-variant compensation was applied using an algorithm based on the Futterman frequency-constant Q model of earth attenuation.

Amplitude compensation was applied by inverse filtering within short windows of data. The higher frequencies within these inverse filters were gain-limited in order to prevent noise from being unduly amplified. That is, the amplitude spectrum of the filters was clipped at a maximum gain level, held flat until twice that frequency, then rolled off with a linear taper in dB. Limiting the spectrum in this manner has the effect of restricting the amplitude treatment at a particular time to the range of frequencies over which the signal is believed to dominate data noise.

Parameter values:

Compensation Type	: Phase only
Q Value	: 100
Maximum Gain Level	: 40dB
Source of Q Value	: Apache supplied

3.21 Prestack Shot Interpolation (2.5 D)

Input shot gathers are read and stored in the form of a cube where the x direction is receiver station number, the y direction is shot station number and the third direction is time. Interpolated shot gathers are then created by a ‘2.5 D’ interpolation.

The cube of data 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.
NMO is also applied prior to interpolation to further conform to this assumption

In the ‘2.5 D’ method, interpolation is then only carried out in the shot (or common detector) direction, after Fourier transform to the f-x-Ky domain. The operator used is then an average for all the receivers in the time-space window, which should produce more reliable operators than a simple 2D receiver domain interpolator.

Parameter values:

Input source spacing	: 37.5m
Output source spacing	: 12.5m
Time window length	: 512 ms
Time overlap	: 256 ms
Maximum dip	: 20 ms/trace
Window width in the detector direction	: 20 traces
Window width in the source direction	: 20 traces
Window overlap in the detector direction	: 6 traces
Window overlap in the source direction	: 6 traces

3.22 Weighted Least Squares Radon Multiple Attenuation

Radon Multiple Attenuation is principally a modelling 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 minimises 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 modelled moveout range, artefacts will result.

Weighted Least-Squares Radon transforms seek to improve the focusing of events in the Radon domain over that provided by the conventional transform. Prior information (derived from the data themselves) is used to create weights that improve the sparseness of the transform domain whilst still modelling all of the data. Improved focusing in the Radon domain improves identification and separation of signal and noise trends, with reduced artefact levels. For multiple attenuation, improved focusing allows the Radon domain mute to be moved closer to the primary events than with the conventional transform, and primary and multiple events with very little moveout discrimination can be separated.

Weighted Least-Squares Radon transforms can also reduce artefacts caused by data aliasing. Aliased input data lead to dispersed energy in the transform when a conventional transform is used. The weights for the weighted transform are derived in such a way that they are only significant in the correct (un-aliased) parts of the transform domain. Consequently high frequencies that would be free to alias in the conventional transform tend to model in the correct part of the weighted transform domain. This improved handling of aliased data may be sufficient to remove or reduce the level of interpolation that would be required by a conventional transform.

In Radon Multiple Attenuation, 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. 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.

Parameter values:

Pre-transform conditioning	: NMO with primary velocity, 500ms AGC
Reference offset(X_{ref})	: 5025 m
Moveouts (Δt) at the reference offset (X_{ref}):	
Minimum moveout (i.e. for the first p-trace)	: -1400 ms
Maximum moveout (i.e. for the last p-trace)	: 2600 ms
Number of p-traces generated	: 666
Frequency range of multiple model	: 0 Hz - NYQUIST
Multiple Mute Velocity (V_m)	: 90% of the primary velocity field
Mute minimum moveout limit	: 240 ms
Mute taper (p direction)	: 32 ms

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

3.23 Trace Reduction

The data volume was reduced in size by decimating the 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 step 3.15 to prevent spatial aliasing.

Parameter values:

Input Shot Records	:	384 traces
Output Shot Records	:	192 traces

3.24 3D Prestack Fold Interpolation and Regularization (FIRE 3D)

This process is a seismic interpolation and regularization tool for prestack 3D data that are irregularly sampled in space. It provides an improved method of regularizing 3D fold of 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 regularization of traces to move them (via interpolation) to their respective cell-centre positions.

In partial regularization, 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. Two (2) traces closest to the output cell centre were output and further redundancy editing applied resulting in only one final trace per cell.

Data from offset group 65 onwards were deleted as these offsets only came from undershoot lines. Nominal output coverage is 64-fold.

Parameter Values:

Operation Mode:	Infill holes / Trace Regularization
Maximum number of traces in output cell*:	1
Sinc Interpolation length (inline x crossline):	9x9
Number of Dip Scans:	11
Dip Range:	+/- 6ms/trace
Correlation Width:	5 bins
Correlation Length:	52ms

*Note: Redundancy editing was accomplished by adding weights based on the following criteria:

i) If nominal 2D CMP fold <50% i.e. taper zones where there is a potentially poor result from SMP/Tau-P/Radon.
ii) If trace is flagged by observer as an edit i.e. could still be anomalous after SWATT.
iii) If original sail line length <10km i.e. reduce potential poor application of 3DSRME on such a short line
iv) If original sail line is an undershoot line. This is so data from conventional lines takes preference.

The weighting is cumulative, thus a trace is more than likely to be rejected if it meets all four criteria. The combination of weight and distance from cell centre is used to determine which traces are redundancy edits.

A table showing the offset binning can be found in Appendix 4.6.

3.25 Migration Velocity Analysis

Targeted Kirchhoff PreSTM was applied and MVF stacks were decimated to every 4th location to enhance dipping events in InVA.

This field was then interpolated to a 500x500m field and spatially smoothed for use in migration.

Parameter Values:

Analysis Spacing	:	2000m
Number of CMPs per Analysis (MVF Stack)	:	15 (post decimation)
Number of CMPs per Analysis (Semblance Display)	:	3

The velocities were interpolated to a 500x500m field and spatially smoothed for use in migration.

Smoothing Parameters

Time (ms)	Radius
0	2000
1500	2000
2500	4000
5184	4000

Linear interpolation between above control points was used. A Cosine Bell function was used in the above spatial filter.

3.26 Time Function Gain Removal

The t-gain previously applied (Time Function Gain) was removed.

3.27 Kirchhoff Pre-Stack Time Migration

The Kirchhoff Time Migration Seismic Function Module 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 scatterers 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 pre-stack 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.

The traveltimes calculation used by WesternGeco's Kirchhoff Prestack Time Migration can be derived by a variety of methods. However, the most common approach now is ray traced using a gridded interval velocity model. This method uses the WesternGeco proprietary "RTFM" method (Recursive Traveltimes by Fermat Minimisation) . This can be implemented in an Isotropic mode - comprehending ray bending (curved ray) due to Snells law at the interval velocity boundaries, or VTI Anisotropic mode. In the Anisotropic mode, the traveltime calculation requires both vertical and horizontal Interval velocity models (Vz and Vx) to be provided. These two velocity fields are normally computed from the Vrms velocity and effective eta fields determined in a pass of interactive velocity analysis using a similar gridded moveout method in the velocity analysis tool (InVA). RTFM does not use high order formula algorithmic calculations to derive travel times. RTFM uses ray tracing "on the fly" during the execution of the migration. Pre-computed travel time tables are not used.

Prestack 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 velocity analyses and moveout to be performed on the data prior to stacking it.

Parameter values:

Traveltime computation	: Isotropic RTFM
Aperture computation type	: Ray Bending
Aperture	: 4000m
Dip limit	: 70°

Time variant frequency limits:

Time (ms)	Frequency (Hz)
0	119
1000	119
2000	105
3000	91
5000	63

CMP gathers at this stage were archived to DLTIV and 3590B cartridge (Raw PreSTM CMP Gathers (no NMO applied)).

3.28 Anisotropic (eta) Analysis

Analyses were generated on a 500x500m grid. Vertical velocity (Vn) was refined and Interval-eta picked on an approximate 4x4km grid. The highest values for eta was generally found below the top-Latrobe (TOL) horizon, amongst the strong coal reflectors. This coarse interval-eta field was then interpolated, extrapolated and smoothed along the TOL horizon to generate a smooth and ‘geologic’ interval-eta field correlated to the TOL.

The original workflow included loading the smooth eta field back into InVA for possible refinement while Vn was refined at the same time. However, it was found that in the current InVA version this was not possible as and change to Vn would change interval-eta in order to keep effective-eta constant. An alternate workflow was used : Anisotropic correction using the smooth interval-eta field only was applied to the velocity analysis data - thereby embedding the anisotropic correction into the gathers. This was followed by conventional isotropic Vn analysis. InVA versions now allow either interval-eta or effective-eta to be fixed while Vn is refined.

3.29 Spatial Residual Amplitude Conditioning (SRAC)

To remove any non-geologic artefacts, residual amplitude scaling was applied to the data in the common offset domain.

For each trace, the RMS amplitude in a sliding window was computed. These values were smoothed in time and space within common offset gathers. Scalars were derived by dividing the smoothed values by the actual RMS values, and then applied to the data.

Parameter Values:

Pre-transform conditioning	: 256ms AGC
Temporal window length	: 500ms
Spatial window length	: 91 trc
Spatial trim amount	: 50%

3.30 Final RMS (Vn) Analysis & Moveout Correction

After the anisotropic corrections were embedded in the 500x500m velocity analysis data, conventional isotropic velocity analysis was performed.

Due to time constraints the picking and QC of every location was not an option. Instead, an initial 500x500m Vn field was generated automatically using the unsmoothed 2x2km migration field and the refined 4x4km picks as seed functions. Semblance data was used to generate the 'auto-picks'. These locations were QC'd and refined were applicable. Due to geology, it was found that more changes were required in the north western part of the survey, An image showing refined locations in blue is shown here in Figure 16

Final anisotropic moveout correction (Vn and interval-eta) was then applied to the full dataset and these moveout corrected gathers were further processed and stacked.

Example images of the final interval-eta and velocity fields are included in the Appendix 4.12.4. InVA and gather displays before and after anisotropic moveout are also shown here.

3.31 Residual Weighted Least-Squares Radon Demultiple

This pass of Weighted Least Squares Radon Multiple Attenuation was used to attenuate residual multiple energy. The improved velocity control available from performing the velocity analysis after migration, allowed a more severe mute to be applied than that used in the first pass of Radon Multiple Attenuation.

A 3:1 trace interpolation was used to decrease the trace spacing within the CMP gathers from 75m to 25m. This helps to eliminate aliasing problems in the radon multiple attenuation. The interpolated traces were removed prior to output.

Parameter values:

Pre-transform conditioning	: 256ms AGC
Reference offset (X_{ref})	: 5000m
Moveouts (Δt) at the reference offset (X_{ref}) :	
Minimum moveout (i.e. for the first p-trace)	: -1800 ms
Maximum moveout (i.e. for the last p-trace)	: 2300 ms
Number of p-traces generated	: 512

Frequency range of multiple model	: 0 Hz - NYQUIST
Multiple Mute Velocity (V_m)	: Scaled primary field (see below)
Mute minimum moveout limit	: 60 ms

Primary Field Scaling Parameters:

Time (ms)	% Primary Field
0	90
TOL	90
TOL+ 300	94
TOL+ 700	94
TOL+1000	92
TOL+1500	90
5000	85

3.32 Post-Radon Isolating Multiple Algorithm (PRIMAL)

Primal is a proprietary WesternGeco seismic data processing process that is designed to attenuate "remnant" multiple energy from CMP gathers that have previously been passed through a demultiple process that relies on velocity for multiple discrimination such as the radon transform method. These gathers are often characterised as having "remnant" multiple in several forms, such as:

- Energy concentrated on the near traces where the velocity discrimination between primary and multiple is too small for the radon transform to separate the primary from multiple energy.
- Small amounts of aliased energy that may have been too steep or high frequency to have been sampled correctly in the radon transform (This phenomena should be properly treated by adequate TX sampling or interpolation prior to Radon but occasionally is not, due to cost and or turnaround constraints)
- Diffracted multiple energy that does not follow the assumptions of conventional radon demultiple, that is they do not describe a parabola with the apex at (or close to) zero offset. These multiples will be partially attenuated by a conventional Radon process but will leave substantial energy with negative or no dip at offsets away from zero.

Primal uses a spectral decomposition process to identify and then attenuate these forms of remnant multiple.

If these "remnants" are generally transient, this process is effective. If these "remnants" are strong and spatially consistent, then more sophisticated forms of demultiple such as SRME, IMP (various forms), Non Zero Offset Apex Radon (NZOAR) should be considered as alternatives to a conventional Radon demultiple.

Parameter Values:

Application frequency band	: 20-80 Hz

CMP gathers at this stage were archived to DLTIV cartridge (see Final PreSTM CMP Gathers (NMO + eta applied)).

Example images of post-migration signal enhancement are shown in Appendix 4.12.5

3.33 Angle Stack

In certain depositional settings, the amplitude variation dependent on offset between source and receiver can provide an important clue to the presence of hydrocarbons. The reflection coefficient for an incident plane P-wave can increase or decrease (and even change polarity) with reflection angle, depending on changes in elastic parameters across a reflecting boundary. Conventional CMP stacking suppresses this information because the amplitude of each event in the stack represents an average over all offsets. Consequently, reflection character, event amplitude and continuity on conventional CMP stacks can differ from a zero-offset recorded section.

Several methods exist which allow seismic traces to be generated that, unlike conventionally stacked traces, exploit information about the dependence of amplitude on reflection angle.

With AVO Angle Decomposition traces recorded at fixed offsets are transformed into traces characterized by their angles of incidence. Traces with reflection angles within a desired range are then stacked to produce an angle trace. Repeating this process for different reflection angles produces an angle-trace gather. This partial stacking improves the signal-to-noise ratio and is consistent with the Fresnel-zone concept. The Reflection Angles are computed from offset-time by either a straight-ray or a bending-ray approximation, with velocities derived from the rms velocities.

Parameter values:

Angle Computation Option	:Higher Order – 4th order Taner-Koehler expansion
Velocity Field	:Mute field - smoothed migration velocities
Angle ranges applied	: 7-19º, 16-28º, 25-37º, 5-30º

The 5-30º (full-offset) stack was a conventional angle-stack as described above. The angle mutes for the other three volumes were modified such that the inside angle mute was held at a constant offset from where the 37º mute hits the maximum offset of the gather. This modification was requested by Apache.

All stack products were limited by an output polygon supplied by Apache. The polygon coordinates can be found in Appendix 4.10.2.

An example image showing mute patterns can be seen in Angle Mute Displays. Example stack images are shown in Appendix 4.12.8. An example xt representation of the angle mutes for a single location can be found in Appendix 4.10.3. An image of this can be seen in Figure 29.

3.34 Gun and Cable Correction

A gun and cable static correction was calculated using the following equation and then applied to the data:

Correction = (Gun depth + Cable depth)/Water velocity

Parameter values:

Gun Depth	: 7m
Cable Depth	: 8m
Water Velocity	: 1500 m/s
Static Correction	: 10.0 m

3.35 Residual Amplitude Analysis/Compensation (RAAC)

Where true-amplitude information needs to be retained in the data, the application of data dependent scaling is undesirable; yet the failure to apply scaling can result in data which is difficult to display due to the range of amplitudes (dynamic range) present. The RAAC process uses statistical means to retain anomalous amplitude information, such as bright spots, while allowing the data to be scaled.

The analysis step of RAAC computes, for each trace, the amplitudes of multiple windows using a rms-amplitude criterion. The Residual Amplitude Compensation (RAC) value of each window is then the reciprocal of this computed amplitude. The centre of each time window defines the position of its associated RAC value. Knowing the X-Y location and time of each RAC value allows both spatial and temporal smoothing to be applied to the RAC values. The analysis was run on several inlines within the survey. The resulting RAC values were averaged and smoothed to produce a smoothly varying single function which would balance the data.

Parameter values:

Analysis Window Start	: first live sample
Window Length	: 500ms
Window Advance	: Half the window length
Amplitude Analysis Type	: RMS
Note: If the amount of live data within a window is not equal to at least one-half the window advance, then the RAC value for the previous window is used.	
Temporal Smoothing at Top of Data	: 3
Temporal Smoothing at Bottom of Data	: 3

Appendix 4.10.4 contains a listing of this function which is displayed in Appendix 4.12.7.

Data at this stage were archived to DLT and 3590B cartridge (see Raw Stack Archives).

3.36 Survey Matching and Merging

Where datasets from multiple surveys are to be merged together it is first necessary to compare the datasets to derive a filter to match the datasets in terms of their phase and amplitude spectra, amplitude level and event timing. This comparison requires that the two surveys (the source and target surveys) overlap each other so that coincident trace locations can be extracted. A cross-equalisation filter is derived that performs the matching of the source data to the target data. Either a single or space-variant cross-equalisation filter can be designed.

3.36.1 Cross-equalisation spectral analysis

Autocorrelations are generated on all coincident traces over a time window around the main zone of interest.

The coincident source- and target-traces are also cross correlated over the same time window. The peaks of the cross correlation traces are time aligned and then either spatially averaged or summed together depending on whether a single or space-variant cross-equalisation filter is required. The time shifts required to align the individual cross correlation traces indicate the timing differences between the source and target datasets. QC plots can be made to show how these time shift values vary over the overlap area and anomalous traces discarded prior to the averaging.

The averaged or summed autocorrelation and cross correlation trace provides spectral estimates that are used to generate the cross-equalisation filter or filters.

3.36.2 Cross-equalisation filter design

The cross-equalisation filter design process uses either a polynomial or least squares fitting method to derive a filter that matches the source to the target over a defined frequency range. The autocorrelation and cross correlation functions may be tapered prior to filter design.

3.36.3 Amplitude level matching

If the source and target datasets have been processed through similar processing sequences then it is likely that a single fixed scalar is all that's required to bring the amplitude levels together. If however, the datasets have been processed independently then it may be necessary to perform a time-variant amplitude analysis, on the coincident traces, and derive a single time-variant scalar to match the two.

The provided Northern Fields stack data already had an exponential gain function applied. To match the amplitude level to that of Sue, a single time-variant scaling function was derived and applied to this data prior to survey matching and merging. This function is listed in Appendix 4.10.5

Parameter Values:

Source survey name	: Sue 3D
Target survey name	: Northern Fields
Cross-equalisation analysis window	: 1000-2000 ms
Matching filter type	: Phase and amplitude

3.36.4 Survey Merging

After the Northern Fields data was matched to Sue, traces within the Sue-Northern Fields overlap zone were weighted in order to achieve a smooth transition between the two surveys. The weighting was based on both fold and the distance from the input trace to the nearest defined survey boundary. These boundaries (polygons) can be seen in Figure 33. Only full-angle stack data was merged.

Data at this stage were archived to DLT and 3590B cartridge (see Merged Stack Archives)

3.37 Time Variant Filtering

A zero-phase TVF (Time Variant Filter) was applied to the data. The filter pass bands 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 pass band.

Parameter values:

Filter Centre Time (ms)	Low-cut Frequency (Hz)	Low-cut Slope (dB/octave)	High-cut Frequency (Hz)	High-cut Slope (dB/octave)
0	Out	n/a	65	48
1000	Out	n/a	65	48
2000	Out	n/a	50	48
3000	Out	n/a	40	42
4000	Out	n/a	35	42
5000	Out	n/a	30	42

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

Data at this stage were archived to DLT and 3590B cartridge (see Final Stack Archives)

4.0 Appendices

4.1 Location Information

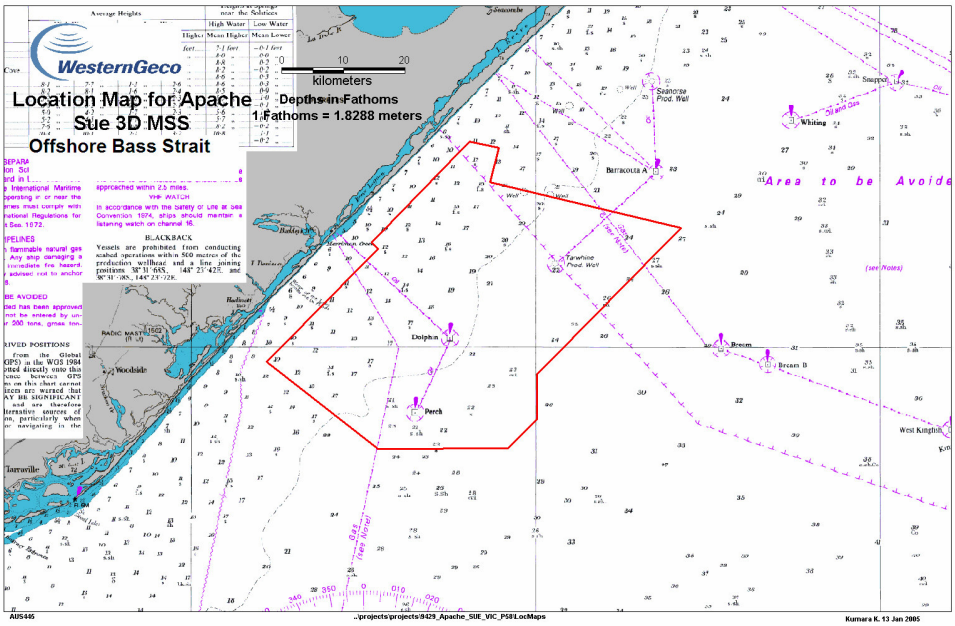


Figure 1 : Survey Location Map

4.2 Grid Information

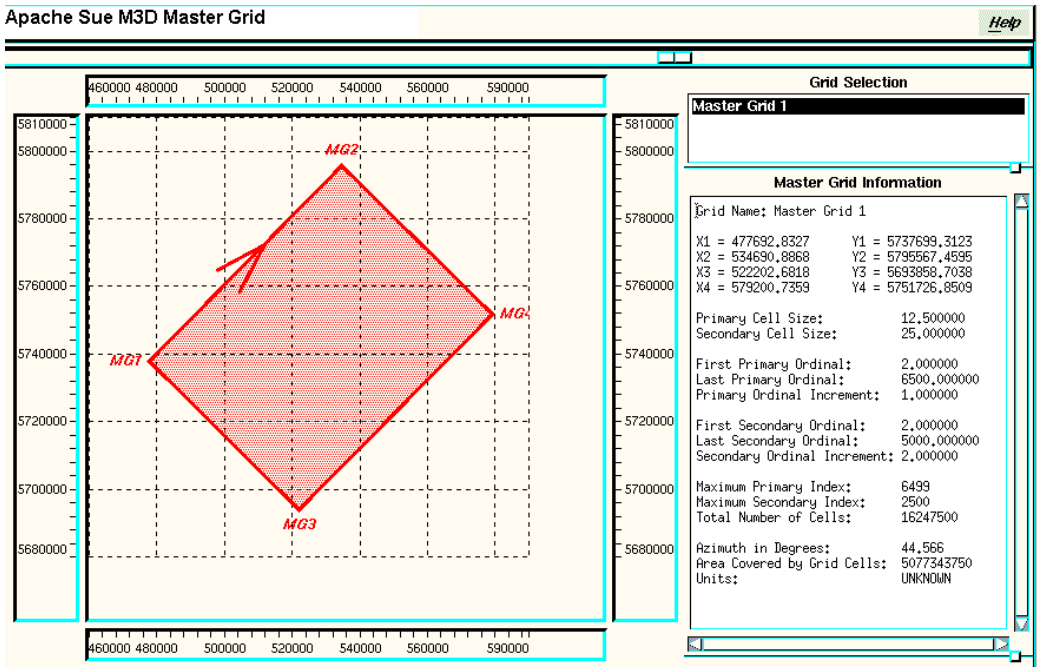


Figure 2 : Data Processing Master Grid

Master Grid:

Grid Point	Inline	Crossline	X Coordinate	Y Coordinate
MG1	2	2	477692.8327	5737699.3123
MG2	2	6500	534690.8868	5795567.4595
MG3	5000	2	522202.6818	5693858.7038
MG4	5000	6500	579200.7359	5751726.8509

NB: Inline numbering increments by 2, crossline numbering by 1

4.3 Acquisition Line Listing

Full Line Name	Line	Sequence	Dir	Date	FGSP	LGSP	SP KM
1536P1001	1536P	001	224.2	15-Jan-05	3185	944	42.0
1808P1002	1808P	002	44.4	16-Jan-05	1161	3528	44.4
1824P1003	1824P	003	44.4	16-Jan-05	1182	3541	44.3
1552P1004	1552P	004	224.2	17-Jan-05	3198	947	42.2
1840P1005	1840P	005	44.4	17-Jan-05	1203	3554	44.1
1568P1006	1568P	006	224.2	17-Jan-05	3210	949	42.4
1856P1007	1856P	007	44.4	17-Jan-05	1224	3566	43.9
1584P1008	1584P	008	224.2	18-Jan-05	3223	951	42.6
1872P1009	1872P	009	44.4	18-Jan-05	1245	3579	43.8
1600P1010	1600P	010	224.2	18-Jan-05	3236	954	42.8
1888P1011	1888P	011	44.4	19-Jan-05	1266	3591	43.6
1616P1012	1616P	012	224.2	19-Jan-05	3248	956	43.0
1904P1013	1904P	013	44.4	19-Jan-05	1287	3604	43.5
1632P1014	1632P	014	224.2	20-Jan-05	3261	959	43.2
1920P1015	1920P	015	44.4	20-Jan-05	1308	3617	43.3
1648P1016	1648P	016	224.2	20-Jan-05	3266	961	43.2
1936P1017	1936P	017	44.4	21-Jan-05	1329	3629	43.1
1664P1018	1664P	018	224.2	21-Jan-05	3286	963	43.6
1680P1019	1680P	019	44.4	21-Jan-05	1866	3427	29.3
1952P1020	1952P	020	224.2	21-Jan-05	3514	1222	43.0
1696P1021	1696P	021	44.4	22-Jan-05	1096	3440	44.0
1968P1022	1968P	022	224.2	22-Jan-05	3527	1243	42.8
1712P1023	1712P	023	44.4	22-Jan-05	1098	3452	44.2
2080P1024	2080P	024	224.3	23-Jan-05	2215	1390	15.5
1792P1025	1792P	025	44.4	23-Jan-05	1140	3516	44.6
1984P1026	1984P	026	224.1	23-Jan-05	3539	1264	42.7
1776P1027	1776P	027	44.4	24-Jan-05	1119	3503	44.7
2000P1028	2000P	028	224.1	24-Jan-05	3552	1285	42.5
1520P1029	1520P	029	44.4	24-Jan-05	1070	3300	41.8
1280P1030	1280P	030	224.3	25-Jan-05	2982	907	38.9
1504P1031	1504P	031	44.4	25-Jan-05	1068	3288	41.6
1264P1032	1264P	032	224.3	25-Jan-05	2970	904	38.8
1488P1033	1488P	033	44.4	25-Jan-05	1172	3275	39.5
1248P1034	1248P	034	224.3	26-Jan-05	2957	902	38.6
1472P1035	1472P	035	44.4	26-Jan-05	1063	3262	41.3
1232P1036	1232P	036	224.3	26-Jan-05	2944	899	38.4
1456P1037	1456P	037	44.4	27-Jan-05	1061	3250	41.1
1296P1038	1296P	038	224.3	27-Jan-05	2980	909	38.9
1440P1039	1440P	039	44.4	27-Jan-05	1058	3237	40.9
1216P1040	1216P	040	224.3	28-Jan-05	2953	897	38.6
1728P1041	1728P	041	44.4	28-Jan-05	1101	3465	44.3
2000J1042	2000J	042	224.1	28-Jan-05	3552	1285	42.5
1744P1043	1744P	043	44.4	29-Jan-05	1382	3478	39.3
2016P044	2016P	044	224.1	29-Jan-05	3565	1306	42.4

Full Line Name	Line	Sequence	Dir	Date	FGSP	LGSP	SP KM
1760P1045	1760P	045	44.4	29-Jan-05	1098	3490	44.9
2032P1046	2032P	046	224.1	30-Jan-05	3577	1327	42.2
1760J1047	1760J	047	44.4	30-Jan-05	1098	3490	44.9
2048P1048	2048P	048	224.1	30-Jan-05	3590	1348	42.1
1424P1049	1424P	049	44.5	30-Jan-05	1056	3224	40.7
2064P1050	2064P	050	224.1	31-Jan-05	3530	1369	40.5
1680A1051	1680A	051	44.4	1-Feb-05	1094	1875	14.7
1712A1052	1712A	052	44.4	1-Feb-05	2694	2746	1.0
1408P1053	1408P	053	44.5	2-Feb-05	1053	3212	40.5
1200P1054	1200P	054	224.3	3-Feb-05	2990	895	39.3
1392P1055	1392P	055	44.5	3-Feb-05	1051	3199	40.3
1184P1056	1184P	056	224.3	3-Feb-05	3028	892	40.1
1376P1057	1376P	057	44.5	4-Feb-05	1049	3186	40.1
1168P1058	1168P	058	224.3	4-Feb-05	3065	890	40.8
1360P1059	1360P	059	44.5	4-Feb-05	1046	3174	39.9
1152P1060	1152P	060	224.3	5-Feb-05	3103	888	41.6
1344P1061	1344P	061	44.5	5-Feb-05	1044	3161	39.7
1136P1062	1136P	062	224.3	5-Feb-05	3140	885	42.3
1328P1063	1328P	063	44.5	6-Feb-05	1042	3148	39.5
1120P1064	1120P	064	224.3	6-Feb-05	3134	883	42.2
1312P1065	1312P	065	44.5	6-Feb-05	1039	3136	39.3
1104P1066	1104P	066	224.3	6-Feb-05	2484	881	30.1
1056P1067	1056P	067	44.5	7-Feb-05	1001	2934	36.3
1088P1068	1088P	068	224.3	7-Feb-05	3107	878	41.8
1072P1069	1072P	069	44.5	7-Feb-05	1004	2988	37.2
1104A1070	1104A	070	224.3	8-Feb-05	3120	1955	21.9
1040P1071	1040P	071	44.4	8-Feb-05	2074	2934	16.1
1296A1072	1296A	072	224.3	8-Feb-05	2028	1857	3.2
1024P1073	1024P	073	44.4	8-Feb-05	2075	2948	16.4
1008P1074	1008P	074	44.4	8-Feb-05	2075	2909	15.7
2064J1075	2064J	075	224.1	9-Feb-05	3603	1369	41.9
2224P1076	2224P	076	44.3	9-Feb-05	1707	2145	8.2
2096P1077	2096P	077	224.3	9-Feb-05	2193	1411	14.7
2208P1078	2208P	078	44.3	9-Feb-05	1686	2167	9.0
2112P1079	2112P	079	224.3	10-Feb-05	2171	1432	13.9
2192P1080	2192P	080	44.3	10-Feb-05	1665	2189	9.8
2128P1081	2128P	081	224.3	10-Feb-05	2149	1453	13.1
1488A1082	1488A	082	44.4	10-Feb-05	1065	1798	13.8
2064A1083	2064A	083	224.1	10-Feb-05	1983	1791	3.6
2176P1084	2176P	084	44.3	10-Feb-05	1644	2211	10.7
2144P1085	2144P	085	224.3	11-Feb-05	2127	1474	12.3
1408A1086	1408A	086	44.5	11-Feb-05	1533	1790	4.8
1440A1087	1440A	087	44.4	11-Feb-05	2329	2586	4.8
1984J1088	1984J	088	224.1	11-Feb-05	3539	1264	42.7
2160P1089	2160P	089	44.3	11-Feb-05	1623	2233	11.5
2144J1090	2144J	090	224.3	12-Feb-05	2127	1474	12.3
1632U1091	1632U1	091	224.2	13-Feb-05	2630	959	31.4
1744U1092	1744U1	092	44.4	14-Feb-05	1103	2210	20.8
1632U2093	1632U2	093	224.2	14-Feb-05	2630	1175	27.3
1744U2094	1744U2	094	44.4	14-Feb-05	1103	2160	19.8
1632U3095	1632U3	095	224.2	15-Feb-05	2660	1210	27.2
1744U3096	1744U3	096	44.4	15-Feb-05	1103	2250	21.5
1632U4097	1632U4	097	224.2	15-Feb-05	2630	1250	25.9
1744U4098	1744U4	098	224.2	15-Jan-05	1103	2000	16.8
						TOTAL	**3251.8**

4.4 Acquisition Parameters

Contractor WesternGeco

Source Vessel (conventional lines) : MV Western Trident

Source Vessel (undershoot lines) : MV Pacific Titan

Recording Vessel MV Western Trident

Streamers
8 x Solid Sentry/Guardian streamers
12.5 meter group interval
Total active cable length : 4800 meters
Number of seismic channels : 8 x 384 (3072 total)
Nominal depth : 8 +/- 1 meters
Nominal near offset : 237.5 meters
Nominal far offset : 5025 meters

Energy source (conventional lines)
8 Sleeve Airgun per string x 4 strings per array
18.75 meter shot interval (flip/flop, dual array)
Array separation : 50 meters
Source volume : 3000 cu. in
Operating pressure : 2000 psi
Source depth : 7 +/-1 meters

Energy source (undershoot lines)
Bolt Airgun array
18.75 meter shot interval(single array)
Source volume : 3040 cu. in
Operating pressure : 2000 psi
Source depth : 7 +/-1 meters

Recording System
MSX / CRS
Low cut filter : 2 Hz @ 12 dB/oct
High cut filter : 206 Hz @ 264 dB/oct
Recording delay : none

Data Format
SEG-D (4 byte)
Sample rate : 2 milliseconds
Record length : 5 seconds

Acquisition Geodetic Parameters
Work datum name: GDA 94
Work datum: Spheroid name: GRS80
Semi major axis (m): 6378137.0
Inverse flattening (1/f) (m): 298.257222
Datum Transformation from WGS 84 to Local Datum (Bursa Wolf Convention):
dX (m): 0.0
dY (m): 0.0
dZ (m): 0.0
rZ (arc secs): 0.0
rY (arc secs): 0.0
rX (arc secs): 0.0
scale (ppm): 0.0

Projection type: UTM
Zone: 55S
Central meridian: 147° 0' 0.0" E
Scale factor: 0.9996
False easting (m): 500000
False northing (m): 10000000
Latitude of origin: 0° 0' 0.0" N

Navigation Systems

Primary navigation system : Cnav
Secondary navigation system : Fugro Multifix 4
Tertiary navigation system : Trinav GPS 2.6

4.5 Lines With Swell Noise

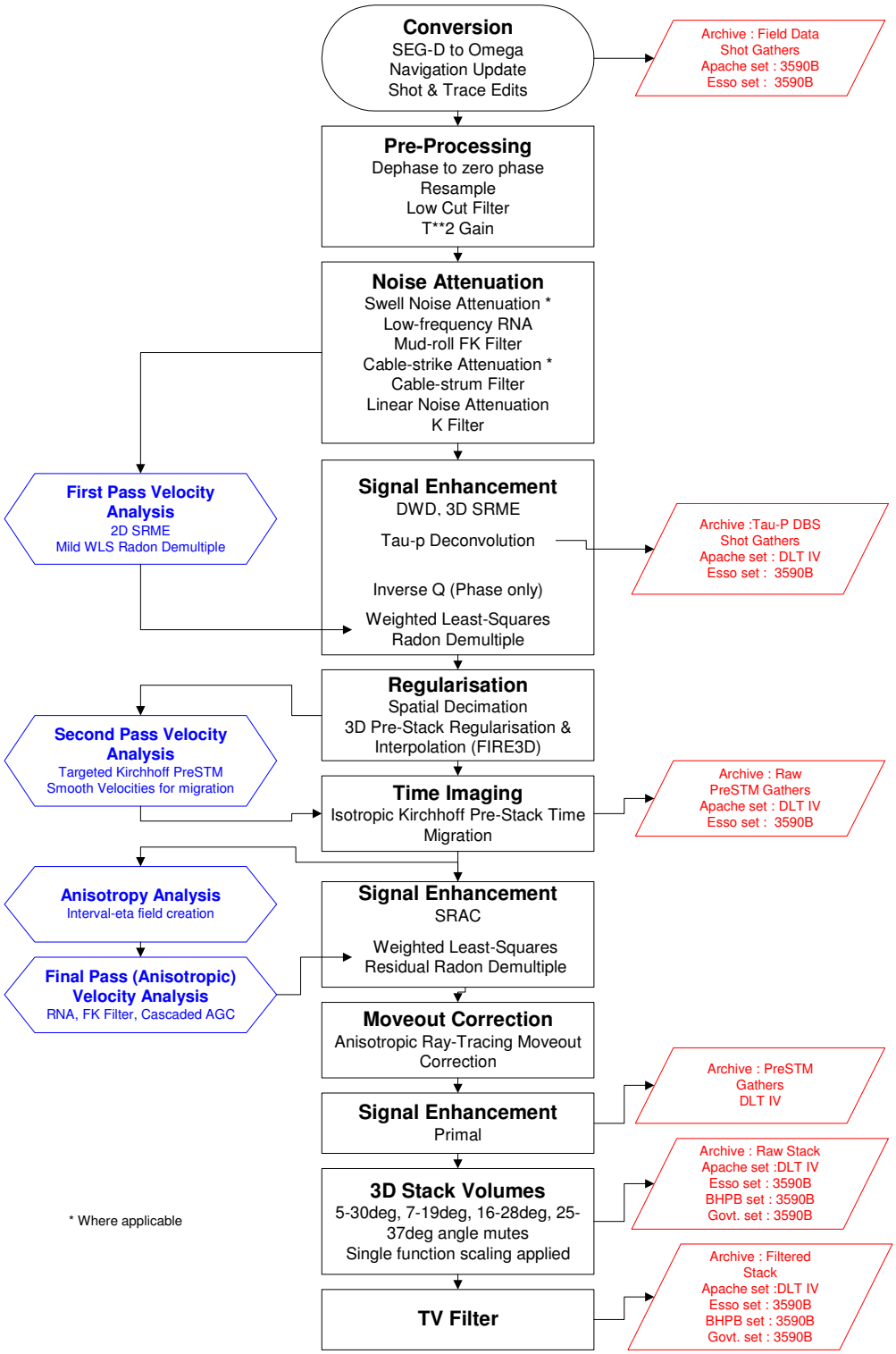
Line	Seq. No.	FGSP	LGSP	KM	Amount of swell
1024P	073	2075	2948	16.39	medium
1392P	055	1051	3199	40.29	medium
1408P	053	1053	3212	40.50	medium
1424P	049	1056	3224	40.67	heavy
1440P	039	1058	3237	40.88	medium
1456P	037	1061	3250	41.06	medium
1472P	035	1063	3262	41.25	heavy
1488A	082	1065-1322	1541-1798	9.68	medium
1488P	033	1172	3275	39.45	medium
1504P	031	1068	3288	41.64	medium
1632U3	095	2660	1210	27.21	medium
1664P	018	3286	963	43.58	medium
1744U2	094	1103	2160	19.84	medium
1744U3	096	1103	2250	21.53	medium
1744U4	098	1103	2000	16.84	medium
1760J	047	1098	3490	44.87	heavy
1808P	002	1161	3528	44.40	heavy
1936P	017	1329	3629	43.14	medium
1984J	088	3539	1264	42.68	heavy
2000J	042	3552	1285	42.53	medium
2016P	044	3565	1306	42.38	medium
2032P	046	3577	1327	42.21	medium
2048P	048	3590	1348	42.06	heavy
2064P	050	3530	1369	40.54	medium
2144J	090	2127	1474	12.26	heavy
2160P	089	1623	2233	11.46	heavy

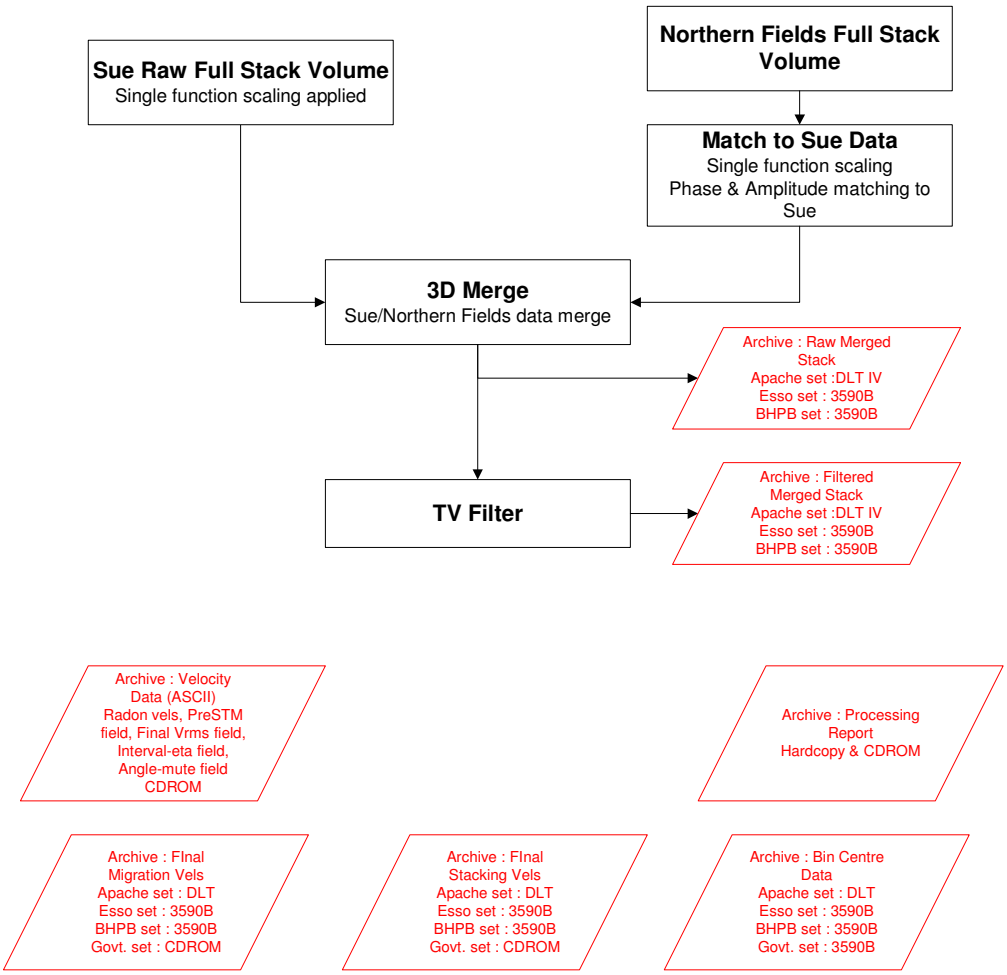
4.6 FIRE3D Offset Binning

Offset Bin	Min Offset	Max Offset	Output Offset
1	237.5	312.5	275
2	312.5	387.5	350
3	387.5	462.5	425
4	462.5	537.5	500
5	537.5	612.5	575
6	612.5	687.5	650
7	687.5	762.5	725
8	762.5	837.5	800
9	837.5	912.5	875

Offset Bin	Min Offset	Max Offset	Output Offset
10	912.5	987.5	950
11	987.5	1062.5	1025
12	1062.5	1137.5	1100
13	1137.5	1212.5	1175
14	1212.5	1287.5	1250
15	1287.5	1362.5	1325
16	1362.5	1437.5	1400
17	1437.5	1512.5	1475
18	1512.5	1587.5	1550
19	1587.5	1662.5	1625
20	1662.5	1737.5	1700
21	1737.5	1812.5	1775
22	1812.5	1887.5	1850
23	1887.5	1962.5	1925
24	1962.5	2037.5	2000
25	2037.5	2112.5	2075
26	2112.5	2187.5	2150
27	2187.5	2262.5	2225
28	2262.5	2337.5	2300
29	2337.5	2412.5	2375
30	2412.5	2487.5	2450
31	2487.5	2562.5	2525
32	2562.5	2637.5	2600
33	2637.5	2712.5	2675
34	2712.5	2787.5	2750
35	2787.5	2862.5	2825
36	2862.5	2937.5	2900
37	2937.5	3012.5	2975
38	3012.5	3087.5	3050
39	3087.5	3162.5	3125
40	3162.5	3237.5	3200
41	3237.5	3312.5	3275
42	3312.5	3387.5	3350
43	3387.5	3462.5	3425
44	3462.5	3537.5	3500
45	3537.5	3612.5	3575
46	3612.5	3687.5	3650
47	3687.5	3762.5	3725
48	3762.5	3837.5	3800
49	3837.5	3912.5	3875
50	3912.5	3987.5	3950
51	3987.5	4062.5	4025
52	4062.5	4137.5	4100
53	4137.5	4212.5	4175
54	4212.5	4287.5	4250
55	4287.5	4362.5	4325
56	4362.5	4437.5	4400
57	4437.5	4512.5	4475
58	4512.5	4587.5	4550
59	4587.5	4662.5	4625
60	4662.5	4737.5	4700
61	4737.5	4812.5	4775
62	4812.5	4887.5	4850
63	4887.5	4962.5	4925
64	4962.5	5037.5	5000

4.7 Processing Flowchart




Sue Raw Full Stack Volume
Single function scaling applied
Northern Fields Full Stack Volume
Match to Sue Data
Single function scaling
Phase & Amplitude matching to Sue
3D Merge
Sue/Northern Fields data merge
Archive : Raw Merged Stack
Apache set :DLT IV
Esso set : 3590B
BHPB set : 3590B
TV Filter
Archive : Filtered Merged Stack
Apache set :DLT IV
Esso set : 3590B
BHPB set : 3590B
Archive : Velocity Data (ASCII)
Radon vels, PreSTM field, Final Vrms field, Interval-eta field, Angle-mute field
CDROM
Archive : Processing Report
Hardcopy & CDROM
Archive : FInal Migration Vels
Apache set : DLT
Esso set : 3590B
BHPB set : 3590B
Govt. set : CDROM
Archive : FInal Stacking Vels
Apache set : DLT
Esso set : 3590B
BHPB set : 3590B
Govt. set : CDROM
Archive : Bin Centre Data
Apache set : DLT
Esso set : 3590B
BHPB set : 3590B
Govt. set : 3590B

4.8 Testing

TESTING LOG

WG CODE **: AP04**	***CLIENT*** **: Apache**	***SURVEY / AREA*** **: GAP04B (Sue M3D)**
PHASE **: LNA**	***DIRECTORY*** **: /data1/ESSO/wg_20050314**	***DATE*** **: 14/03/05**

NOTES:

DISPLAY / TEST NO.	DESCRIPTION	COMMENT
APCH_01P-01_CBL05_lna_LH_ip_segy		
APCH_01P-01_CBL05_lna_LH_taup_segy	TauP domain LNA, 2D Trial parameters	Client had concern with low freq artifact noise at transform margin, and far offset truncation artefact
APCH_01P-01_CBL05_lna_LH_taup_muted_segy		Client wanted symmetrical filtering, and longer mute tapers
APCH_01P-01_CBL05_lna_LH_op_segy		

TESTING LOG

***WG CODE* : AP04**	***CLIENT* : Apache**	***SURVEY / AREA* : GAP04B (Sue M3D)**
***PHASE* : LNA**	***DIRECTORY* : /data1/ESSO/wg_200500401**	***DATE* : 01/04/05**

NOTES:

DISPLAY / TEST NO.	DESCRIPTION	COMMENT
APCH_01P-10_CBL05_lna_LH_ip_segy		
APCH_01P-10_CBL05_lna_LH_taup_segy		
APCH_01P-10_CBL05_lna_LH_taup_muted_segy		
APCH_01P-10_CBL05_lna_LH_op_segy	Cable strum noise removal (low freq lna) <12Hz only, from +15ms/trace to -15ms/trace	
APCH_01P-20_CBL05_lna_LH_taup_segy	Extended tfrm range +9.5ms/trace to -8ms/trace Improved extrapolation and tapering preconditioning (over 01P-01). changed to Conj Gradient LS to further reduce lf artefact	
APCH_01P-21_CBL05_lna_LH_taup_mute_no_taper_segy	raw taup symmetrical mute pattern	128ms
APCH_01P-22_CBL05_lna_LH_taup_muted_orig_taper_segy	#taup mute taper tests	
APCH_01P-22_CBL05_lna_LH_op_segy		
APCH_01P-23_CBL05_lna_LH_taup_muted_1s_outside_taper_segy		
APCH_01P-23_CBL05_lna_LH_op_segy		
APCH_01P-24_CBL05_lna_LH_taup_muted_1s_centred_taper_segy		
APCH_01P-24_CBL05_lna_LH_op_segy		

APCH_01P-25_CBL05_lna_LH_taup_muted_2s_75pc_outside_taper_segy		
APCH_01P-25_CBL05_lna_LH_op_segy		test 24 preferred by client, but additional vertical mute taper requested

TESTING LOG

***WG CODE* : AP04**	***CLIENT* : Apache**	***SURVEY / AREA* : GAP04B (Sue M3D)**
***PHASE* : LNA**	***DIRECTORY* : /data1/ESSO/wg_200500426**	***DATE* : 26/04/05**

NOTES:

DISPLAY / TEST NO.	DESCRIPTION	COMMENT
APCH_01P-30_CBL05_ip_segy	as per 01P-24, plus vertical mute tapering, and at 2ms	
APCH_01P-30_CBL05_lna_op_segy		
APCH_01P-30_CBL05_lna_taup_keep_segy		
APCH_01P-30_CBL05_lna_taup_reject_segy		
APCH_01P-30_CBL05_lna_taup_scalars_segy		
APCH_01P-40_CBL05_lna_taup_p_dependant_filter_segy	P-dependant band pass filtering aliasing frequencies from 1500m/s events filtered from –ve side of transform in a p-variant manner	
APCH_01P-40_CBL05_lna_filtered_segy		
APCH_03P-40_CBL05_2ms_srme_segy	sample rate testing	
APCH_03P-40_CBL05_4ms_srme_segy		no benefit seen from 2ms processing (d.t. source + cable notches)

TESTING LOG

PROPOSAL:	AP23	CLIENT:	Apache	AREA:	Sue		
TESTING PHASE:		3D SRME		DIRECTORY:	/data1/ESSO/	DATE:	7th July 05

Test Lines: L1200P, subsurface line 9 (inner cable) to L1216P, subsurface line 8 (inner cable)	Notes:	Comments: Input has had swatt, designature (using WG's filter) 4ms time resample applied, t-squared gain, All tests NMO-kfilter-iNMO trace drop, prior to NMO, mute, 3D stack.
DISPLAY / TEST NO.	**DESCRIPTION**	**COMMENT**
C209_510_LNA_3d_stack.sgy	LNA stack with NO SRME	taup domain linear noise attenuation.
C209_520_TAUPDBS_3d_stack.sgy	LNA, TAUPDBS,	Taupdbs illustrative, not finalized
C209_521_TAUPDBS_PRTmild_3d_stack.sgy	LNA, TAUPDBS, mild radon	radon illustrative, not finalized
C209_522_TAUPDBS_PRTstrong_3d_stack.sgy	LNA, TAUPDBS, aggressive radon	Radon illustrative, not finalized
C209_610_WLMSRME_3d_stack.sgy	LNA, WLMSRME	WLMSRME only targets water layer multiples / pegleg
C209_611_WLMSRME_3d_stack_model.sgy	LNA, WLMSMP, predicted water layer multiples	
C209_612_WLMSRME_3d_stack_difference.sgy	LNA,WLMSRME minus LNA	Difference due to WLMSRME
C209_710_3DSRME_3d_stack.sgy	LNA, WLMSRME, 3D SRME	
C209_711_3DSRME_3d_stack_model.sgy	LNA, WLMSRME, 3D SMP (surface multiple prediction)	Process does not include prediction of water layer multiples
C209_712_3DSRME_3d_stack_difference.sgy	LNA, WLMSRME, 3D SRME minus LNA, WLMSRME	Difference due to 3D SRME
C209_720_3DSRME_TAUPDBS_3d_stack.sgy	LNA, WLMSRME, 3D SRME, TAUPDBS	
C209_721_3DSRME_TAUPDBS_PRTmild_3d_stack.sgy	LNA, WLMSRME, 3D SRME, TAUPDBS, mild radon	
C209_722_3DSRME_TAUPDBS_PRTstrong_3d_stack.sgy	LNA, WLMSRME, 3D SRME, TAUPDBS, aggressive radon	
C209_810_2DSRME_3d_stack.sgy	LNA, WLMSRME, 2D SRME	

C209_820_2DSRME_TAUPDBS_3d_stack.sgy	LNA, WLMSRME, 2D SRME, TAUPDBS	
C209_821_2DSRME_TAUPDBS_PRTmild_3d_stack.sgy	LNA, WLMSRME, 2D SRME, TAUPDBS, mild radon	
C209_822_2DSRME_TAUPDBS_PRTstrong_3d_stack.sgy	LNA, WLMSRME, 2D SRME, TAUPDBS, aggressive radon	

TESTING LOG

***WG CODE* : AP23**	***CLIENT* : Apache**	***SURVEY / AREA* : GAP04B (Sue M3D)**
***PHASE* : Tau-P Deconvolution**	***DIRECTORY* : /data1/ESSO/wg_20050805**	***DATE* : 02/08/05**

NOTES:
Locations : IL 2240 (southern end) → Line 1232P_12, XL 1580-3400 IL 3365, XL 3800-4400 (Torsk-1) → 1808P_14 IL 2166, XL 4100-4700 (Snook-1) → 1200P_06
Input : Production 3DSRME data. Stack data has single fn scaling applied post-stack.
* win 1 modified from original request (200ms to 1500ms following NMO curve with offset) as the original window is not possible for far offsets

DISPLAY / TEST NO.	DESCRIPTION	COMMENT
T20934_####_3Dsrme_stk_raac_ac1_segy	Stack+AC	win A : 200ms to top Latrobe (TOL)
T20934_####_3Dsrme_stk_raac_ac2_segy	Stack+AC	win B : top Latrobe to 3000ms
T20934_####_3Dsrme_stk_raac_ac3_segy	Stack+AC	win C : 200ms to 3000ms
T20935_####_3Dsrme_shots_ac1_segy	Selected Shot gathers+AC	win 1 : tx domain, ~200ms to 1500ms, following NMO curve with offset *
T20935_####_3Dsrme_shots_ac2_segy	Selected Shot gathers+AC	win 2 : tx domain, TOL-200ms to 3000ms, following NMO curve with offset
T20935_####_3Dsrme_ptraces_ac3_segy	Selected Shot gathers+AC	win 3 : taup domain, 100ms to 3800ms
where #### = 1200P_06 (~IL2166), 1232P_12 (~IL2240), 1808P_14 (~IL 3365)		

TESTING LOG

***WG CODE* : AP23**	***CLIENT* : Apache**	***SURVEY / AREA* : GAP04B (Sue M3D)**
***PHASE* : Deconvolution before stack**	***DIRECTORY* :n/a**	***DATE* : 10/08/05**

NOTES:
Locations :
IL 2240 (southern end) → Line 1232P_12, XL 1580-3400
IL 3365, XL 3800-4400 (Torsk-1) → 1808P_14
IL 2166, XL 4100-4700 (Snook-1) → 1200P_06

Input :
Production 3DSRME data.
Stack data has single fn scaling applied post-stack.

Deconvolution windows :
ac3 window : 100ms to 3800ms (in tau-p domain)
ac4 windows : 2 windows : win1 : ~200ms to 1500ms, win2 : top Latrobe (TOL) to 3000ms, hyperbolic, designed in xt domain
ac5 windows : 2 windows : win1 : 100ms to (modified) TOL, win2 : (win1 end)-100ms to 3000ms, follows TOL hrz, designed in tau-p domain

Tau-P Tapering :
High p value traces have a smooth taper applied (in tau-p domain), and high p value traces are not deconvolved as there is insufficient data to design operators from.

Post-stack autocorrelation windows:
win A : 200ms to top Latrobe (TOL) : compare to T20934_####_3Dsrme_stk_raac_ac1_segy (sent 02/08)
win B : top Latrobe to 3000ms : compare to T20934_####_3Dsrme_stk_raac_ac2_segy (sent 02/08)
win C : 200ms to 3000ms : compare to T20934_####_3Dsrme_stk_raac_ac3_segy (sent 02/08)

DISPLAY / TEST NO.	DESCRIPTION	COMMENT
T20946_####_3Dsrme_shots_ac4_segy	Selected shots+AC	no DBS

T20946_####_2win_xtdbs_36_120ms_shots_ac4_segy	Selected shots+AC	xt DBS : 36ms gap, 120ms total operator, 2 window design/apply
T20946_####_2win_xtdbs_36_240ms_shots_ac4_segy	Selected shots+AC	xt DBS : 36ms gap, 240ms total operator, 2 window design/apply
T20946_####_3Dsrme_ptraces_ac3_segy	Selected p-traces+AC	no DBS *(replaces T20935 – this had incorrect SP value in header)*
T20946_####_1win_taupdbs_36_120ms_ptraces_ac3_segy	Selected p-traces+AC	tau-p DBS : 36ms gap, 120ms total operator, 1 window design/apply
T20946_####_1win_taupdbs_36_240ms_ptraces_ac3_segy	Selected p-traces+AC	tau-p DBS : 36ms gap, 240ms total operator, 1 window design/apply
T20946_####_3Dsrme_ptraces_ac5_segy	Selected p-traces+AC	no DBS
T20946_####_2win_taupdbs_36_120ms_ptraces_ac5_segy	Selected p-traces+AC	tau-p DBS : 36ms gap, 120ms total operator, 2 window design/apply
T20946_####_2win_taupdbs_36_240ms_ptraces_ac5_segy	Selected p-traces+AC	tau-p DBS : 36ms gap, 240ms total operator, 2 window design/apply
T20947_####_2win_xtdbs_36_120ms_stk_raac_ac1_segy	Stack+AC	xt DBS : 2window, 36ms gap, 120ms total operator, AC winA (*)
T20947_####_2win_xtdbs_36_120ms_stk_raac_ac2_segy	Stack+AC	xt DBS : 2window, 36ms gap, 120ms total operator, AC winB
T20947_####_2win_xtdbs_36_120ms_stk_raac_ac3_segy	Stack+AC	xt DBS : 2window, 36ms gap, 120ms total operator, AC winC
T20947_####_2win_xtdbs_36_240ms_stk_raac_ac1_segy	Stack+AC	xt DBS : 2window, 36ms gap, 240ms total operator, AC winA
T20947_####_2win_xtdbs_36_240ms_stk_raac_ac2_segy	Stack+AC	xt DBS : 2window, 36ms gap, 240ms total operator, AC winB
T20947_####_2win_xtdbs_36_240ms_stk_raac_ac3_segy	Stack+AC	xt DBS : 2window, 36ms gap, 240ms total operator, AC winC
T20947c_####_1win_taupdbs_36_120ms_stk_raac_ac1_segy	Stack+AC	tau-p DBS : 1window, 36ms gap, 120ms total operator, AC winA
T20947c_####_1win_taupdbs_36_120ms_stk_raac_ac2_segy	Stack+AC	tau-p DBS : 1window, 36ms gap, 120ms total operator, AC winB
T20947c_####_1win_taupdbs_36_120ms_stk_raac_ac3_segy	Stack+AC	tau-p DBS : 1window, 36ms gap, 120ms total operator, AC winC
T20947c_####_1win_taupdbs_36_240ms_stk_raac_ac1_segy	Stack+AC	tau-p DBS : 1window, 36ms gap, 240ms total operator, AC winA
T20947c_####_1win_taupdbs_36_240ms_stk_raac_ac2_segy	Stack+AC	tau-p DBS : 1window, 36ms gap, 240ms total operator, AC winB
T20947c_####_1win_taupdbs_36_240ms_stk_raac_ac3_segy	Stack+AC	tau-p DBS : 1window, 36ms gap, 240ms total operator, AC winC
T20947b_####_2win_taupdbs_36_120ms_stk_raac_ac1_segy	Stack+AC	tau-p DBS : 2window, 36ms gap, 120ms total operator, AC winA
T20947b_####_2win_taupdbs_36_120ms_stk_raac_ac2_segy	Stack+AC	tau-p DBS : 2window, 36ms gap, 120ms total operator, AC winB
T20947b_####_2win_taupdbs_36_120ms_stk_raac_ac3_segy	Stack+AC	tau-p DBS : 2window, 36ms gap, 120ms total operator, AC winC

T20947b_####_2win_taupdbs_36_240ms_stk_raac_ac1_segy	Stack+AC	tau-p DBS : 2window, 36ms gap, 240ms total operator, AC winA
T20947b_####_2win_taupdbs_36_240ms_stk_raac_ac2_segy	Stack+AC	tau-p DBS : 2window, 36ms gap, 240ms total operator, AC winB
T20947b_####_2win_taupdbs_36_240ms_stk_raac_ac3_segy	Stack+AC	tau-p DBS : 2window, 36ms gap, 240ms total operator, AC winC
where #### = 1200P_06 (~IL2166), 1232P_12 (~IL2240), 1808P_14 (~IL 3365)		(*) After DBS, low-frequency noise evident on first gather of 1232P_12 data. Trace-mixing of spectral estimates or a longer gap may reduce this.
WG Recommendation : Overall the 2 window tau-p dbs looks to be performing better than the 1 window tau-p dbs and the 2 window xtdbs.		

TESTING LOG

***WG CODE* : AP23**	***CLIENT* : Apache**	***SURVEY / AREA* : GAP04B (Sue M3D)**
***PHASE* : Deconvolution before stack**	***DIRECTORY* :/data1/ESSO/wg_20050812/**	***DATE* : 12/08/05**

NOTES:
Locations :
SL 1744P, ssl 08 xl 2309-4776 (This line passes near the Tarwhine-1 well)

Input :
Production 3DSRME data.
Stack data has single fn scaling applied post-stack.

Deconvolution windows :
ac3 window : 100ms to 3800ms (in tau-p domain)
ac4 windows : 2 windows : win1 : ~200ms to 1500ms, win2 : top Latrobe (TOL) to 3000ms, hyperbolic, designed in xt domain
ac5 windows : 2 windows : win1 : 100ms to (modified) TOL, win2 : (win1 end)-100ms to 3000ms, follows TOL hrz, designed in tau-p domain
ac6 windows : 2 windows : win1 : 100ms to (modified) TOL, win2 : (win1 end)-300ms to 3000ms, follows TOL hrz, designed in tau-p domain (*)

Tau-P Tapering :
High p value traces have a smooth taper applied (in tau-p domain), and high p value traces are not deconvolved as there is insufficient data to design operators from.

Post-stack autocorrelation windows:
win A : 200ms to top Latrobe (TOL) : compare to T20934_1744P_08_3Dsrme_stk_raac_ac1_segy
win B : top Latrobe to 3000ms : compare to T20934_1744P_08_3Dsrme_stk_raac_ac2_segy
win C : 200ms to 3000ms : compare to T20934_1744P_08_3Dsrme_stk_raac_ac3_segy

DISPLAY / TEST NO.	DESCRIPTION	COMMENT
T20946_1744P_08_3Dsrme_shots_ac1_segy	Selected shots+AC	no DBS
T20946_1744P_08_3Dsrme_shots_ac2_segy	Selected shots+AC	no DBS

T20946_1744P_08_3Dsrme_shots_ac4_segy	Selected shots+AC	no DBS
T20946_1744P_08_2win_xtdbs_36_120ms_shots_ac4_segy	Selected shots+AC	xt DBS : 36ms gap, 120ms total operator, 2 window design/apply
T20946_1744P_08_2win_xtdbs_36_240ms_shots_ac4_segy	Selected shots+AC	xt DBS : 36ms gap, 240ms total operator, 2 window design/apply
T20946_1744P_08_3Dsrme_ptraces_ac3_segy	Selected p-traces+AC	no DBS *(replaces T20935 – this had incorrect SP value in header)*
T20946_1744P_08_1win_taupdbs_36_120ms_ptraces_ac3_segy	Selected p-traces+AC	tau-p DBS : 36ms gap, 120ms total operator, 1 window design/apply
T20946_1744P_08_1win_taupdbs_36_240ms_ptraces_ac3_segy	Selected p-traces+AC	tau-p DBS : 36ms gap, 240ms total operator, 1 window design/apply
T20946_1744P_08_3Dsrme_ptraces_ac5_segy	Selected p-traces+AC	no DBS
T20946_1744P_08_2win_taupdbs_36_120ms_ptraces_ac5_segy	Selected p-traces+AC	tau-p DBS : 36ms gap, 120ms total operator, 2 window design/apply
T20946_1744P_08_2win_taupdbs_36_240ms_ptraces_ac5_segy	Selected p-traces+AC	tau-p DBS : 36ms gap, 240ms total operator, 2 window design/apply
T20951b_1744P_08_2win_taupdbs_36_240ms_ptraces_ac6_segy	Selected p-traces+AC	tau-p DBS : 36ms gap, 240ms total operator, 2 window design/apply (*)
T20934_1744P_08_3Dsrme_stk_raac_ac1_segy	Stack+AC	no DBS, AC win A
T20934_1744P_08_3Dsrme_stk_raac_ac2_segy	Stack+AC	no DBS, AC winB
T20934_1744P_08_3Dsrme_stk_raac_ac3_segy	Stack+AC	no DBS, AC winC
T20949_1744P_08_2win_xtdbs_36_120ms_stk_raac_ac1_segy	Stack+AC	xt DBS : 2window, 36ms gap, 120ms total operator, AC winA
T20949_1744P_08_2win_xtdbs_36_120ms_stk_raac_ac2_segy	Stack+AC	xt DBS : 2window, 36ms gap, 120ms total operator, AC winB
T20949_1744P_08_2win_xtdbs_36_120ms_stk_raac_ac3_segy	Stack+AC	xt DBS : 2window, 36ms gap, 120ms total operator, AC winC
T20949_1744P_08_2win_xtdbs_36_240ms_stk_raac_ac1_segy	Stack+AC	xt DBS : 2window, 36ms gap, 240ms total operator, AC winA
T20949_1744P_08_2win_xtdbs_36_240ms_stk_raac_ac2_segy	Stack+AC	xt DBS : 2window, 36ms gap, 240ms total operator, AC winB
T20949_1744P_08_2win_xtdbs_36_240ms_stk_raac_ac3_segy	Stack+AC	xt DBS : 2window, 36ms gap, 240ms total operator, AC winC
T20950_1744P_08_1win_taupdbs_36_240ms_stk_raac_ac1_segy	Stack+AC	tau-p DBS : 1window, 36ms gap, 240ms total operator, AC winA
T20950_1744P_08_1win_taupdbs_36_240ms_stk_raac_ac2_segy	Stack+AC	tau-p DBS : 1window, 36ms gap, 240ms total operator, AC winB
T20950_1744P_08_1win_taupdbs_36_240ms_stk_raac_ac3_segy	Stack+AC	tau-p DBS : 1window, 36ms gap, 240ms total operator, AC winC
T20950_1744P_08_2win_taupdbs_36_240ms_stk_raac_ac1_segy	Stack+AC	tau-p DBS : 2window, 36ms gap, 240ms total operator, AC winA

T20950_1744P_08_2win_taupdbs_36_240ms_stk_raac_ac2_segy	Stack+AC	tau-p DBS : 2window, 36ms gap, 240ms total operator, AC winB
T20950_1744P_08_2win_taupdbs_36_240ms_stk_raac_ac3_segy	Stack+AC	tau-p DBS : 2window, 36ms gap, 240ms total operator, AC winC
T20952_1744P_08_2win_taupdbs_36_240ms_stk_raac_ac1_segy	Stack+AC	tau-p DBS : 2window, 36ms gap, 240ms total operator, AC winA (*)
T20952_1744P_08_2win_taupdbs_36_240ms_stk_raac_ac2_segy	Stack+AC	tau-p DBS : 2window, 36ms gap, 240ms total operator, AC winB (*)
T20952_1744P_08_2win_taupdbs_36_240ms_stk_raac_ac3_segy	Stack+AC	tau-p DBS : 2window, 36ms gap, 240ms total operator, AC winC (*)
Decision : 2 window tau-p dbs, using 300ms overlap. Decision received Thursday 11/08/05		

TESTING LOG

***WG CODE* : AP23**	***CLIENT* : Apache**	***SURVEY / AREA* : GAP04B (Sue M3D)**
***PHASE* : Deconvolution before stack**	***DIRECTORY* :/data1/ESSO/wg_20050819**	***DATE* : 1908/05**

NOTES:
Locations :
Undershoot line 1644U4_04

Input :
Production 3DSRME data.
Stack data has single fn scaling applied post-stack.

Deconvolution windows :
ac5 windows : 2 windows : win1 : 100ms to (modified) TOL, win2 : (win1 end)-300ms to 3000ms, follows TOL hrz, designed in tau-p domain
ac6 windows : 1 window : win : TOL(modified)-100ms, 3000ms length, follows TOL hrz, designed in tau-p domain (*)

Tau-P Tapering :
High p value traces have a smooth taper applied (in tau-p domain), and high p value traces are not deconvolved as there is insufficient data to design operators from.

Post-stack autocorrelation windows:
ac2 : top Latrobe to 3000ms
ac3 : 200ms to 3000ms

DISPLAY / TEST NO.	DESCRIPTION	COMMENT
T20962c_1632U4_04_3Dsrme_shots_segy	Selected shots	no DBS
T20962c_1632U4_04_2win_taupdbs_shots_segy	Selected shots	2win TauP DBS :
T20962c_1632U4_04_1win_taupdbs_shots_segy	Selected shots	1win TauP DBS :
T20962c_1632U4_04_3Dsrme_ptraces_ac5_segy	Selected p-traces+AC	no DBS : 2win AC

T20962c_1632U4_04_2win_taupdbs_ptraces_ac5_segy	Selected p-traces+AC	tau-p DBS :2win AC
T20962c_1632U4_04_3Dsrme_ptraces_ac6_segy	Selected p-traces+AC	no DBS : 1win AC
T20962c_1632U4_04_1win_taupdbs_ptraces_ac6_segy	Selected p-traces+AC	Taup DBS : 1win AC
T20962c_1632U4_04_3Dsrme_stk_raac_ac2_segy	Stack+AC	no DBS, AC win2
T20962c_1632U4_04_1win_taupdbs_stk_raac_ac2_segy	Stack+AC	1win TauP DBS, AC win2
T20962c_1632U4_04_2win_taupdbs_stk_raac_ac2_segy	Stack+AC	2 win TauP DBS, AC win2
T20962c_1632U4_04_3Dsrme_stk_raac_ac3_segy	Stack+AC	no DBS, AC win3
T20962c_1632U4_04_1win_taupdbs_stk_raac_ac3_segy	Stack+AC	1win TauP DBS, AC win3
T20962c_1632U4_04_2win_taupdbs_stk_raac_ac3_segy	Stack+AC	2 win TauP DBS, AC win3
T10506_1632U3_05_lna_stk_raac_segy	*Line 1632U3_05, LNA 2D Stack*	*For comparison to data on CD sent 12/08/05*
T10506_1632U3_05_lna_stkmon_segy	*Line 1632U3_05, LNA 2D Cmps*	
WG Recommendation : 1 window tau-p dbs for undershoot lines		

TESTING LOG

***WG CODE* : AP23**	***CLIENT* : Apache**	***SURVEY / AREA* : GAP04B (Sue M3D)**
***PHASE* : Radon Demultiple**	***DIRECTORY* :/data1/ESSO/wg_20050825**	***DATE* : 25/08/05**

NOTES:
Locations : Test Line 1232P_12
Input : Production TauP DBS data.
Other : 3:1 shot interpolation applied prior to fk*/radon. Interpolated traces dropped after radon demultiple. NMO (1st pass vels) applied. Weighted Least-squares radon used. 5-90% velocity mute.

DISPLAY / TEST NO.	DESCRIPTION	COMMENT
T21234_1232P_12_taupdbs_cmps_segy	Selected cmps	input
T21234_1232P_12_taupdbs_radon_240ms__cmps_segy	Selected cmps	WLS radon applied. 240ms moveout protection
T21234_1232P_12_taupdbs_radoon_400ms_cmps_segy	Selected cmps	WLS radon applied. 400ms moveout protection
T21234_1232P_12_taupdbs_fk_cmps_segy	Selected cmps	input + fk*
T21234_1232P_12_taupdbs_fk_radon_240ms_cmps_segy	Selected cmps	input + fk* + WLS radon, 240ms moveout protection
		fk* : low-freq linear noise is modelled and subtracted from data. noise modelled over 0-15Hz only and very high dips 15-65ms/trc, 10ms/trc taper. This process applied on non-NMO'd cmps.

TESTING LOG

***WG CODE* : AP23**	***CLIENT* : Apache**	***SURVEY / AREA* : GAP04B (Sue M3D)**
***PHASE* : Inverse Q Compensation**	***DIRECTORY* :/data1/ESSO/wg_20050905**	***DATE* : 05/09/05**

NOTES:
Locations : Test Line 1232P_12
Input : Production TauP DBS data.

DISPLAY / TEST NO.	DESCRIPTION	COMMENT
T21238_1232P_12_sel_taupdbs_shots_segy	Selected shots	input
T21238_1232P_12_sel_taupdbs_invQ_shots_segy	Selected cmps	phase-only inverse Q applied. Q value = 100, ref freq = 35Hz.

TESTING LOG

***WG CODE* : AP23**	***CLIENT* : Apache**	***SURVEY / AREA* : GAP04B (Sue M3D)**
***PHASE* : 2D Stack +/- Radon**	***DIRECTORY* :/data1/ESSO/wg_20051003**	***DATE* : 03/10/05**

NOTES:
Locations : 1760P (IL3294), XL3855-4895
Input : Production TaupDBS data and production Radon Demultiple data.
Other : Revised Stacking vels used (picked on IL3294, XL3855-4895 only). Post-stack single fn scaling applied from 4ms
Revised stack mute used (slightly more open than production QC mute)

DISPLAY / TEST NO.	DESCRIPTION	COMMENT
T21950_taupdbs_stk_IL3294_portion_segy	Stack	
T21950_radon_stk_IL3294_portion_segy	Stack	
T21950_radon_lcf_stk_IL3294_portion_segy	Stack	Field filter 3(18) Hz(dB/oct) re-applied
T21950_sel_taupdbs_cmps_IL3294_moISO_segy	Corrected cmps	
T21950_sel_radon_cmps_IL3294_moISO_segy	Corrected cmps	
T21950_sel_radon_lcf_cmps_IL3294_moISO_segy	Corrected cmps	Field filter 3(18) Hz(dB/oct) re-applied

TESTING LOG

***WG CODE* : AP23**	***CLIENT* : Apache**	***SURVEY / AREA* : GAP04B (Sue M3D)**
***PHASE* : 2D Stack +/- Radon**	***DIRECTORY* :/data1/ESSO/wg_20050928**	***DATE* : 28/09/05**

NOTES:
Locations : 1712P_08 and 1744U4_08
Input : Production Radon Demultiple data.
Other : Post-stack single fn scaling applied from 4ms

DISPLAY / TEST NO.	DESCRIPTION	COMMENT
T21708b_1712P_08_radon_0-15_deg_stk_segy	Angle stk	approx 0-15 deg
T21708b_1712P_08_radon_0-25_deg_stk_segy	Angle stk	approx 0-25 deg
T21708b_1712P_08_radon_0-35_deg_stk_segy	Angle stk	approx 0-35 deg
T21708b_1712P_08_radon_0-45_deg_stk_segy	Angle stk	approx 0-45 deg
T21708b_1712P_08_radon_0-55_deg_stk_segy	Angle stk	approx 0-55 deg
T21708b_1744U4_08_radon_0-15_deg_stk_segy	Angle stk	approx 0-15 deg
T21708b_1744U4_08_radon_0-25_deg_stk_segy	Angle stk	approx 0-25 deg
T21708b_1744U4_08_radon_0-35_deg_stk_segy	Angle stk	approx 0-35 deg
T21708b_1744U4_08_radon_0-45_deg_stk_segy	Angle stk	approx 0-45 deg
T21708b_1744U4_08_radon_0-55_deg_stk_segy	Angle stk	approx 0-55 deg

TESTING LOG

***WG CODE* : AP23**	***CLIENT* : Apache**	***SURVEY / AREA* : GAP04B (Sue M3D)**
***PHASE* : Aniso/Isotropic Mig Tests**	***DIRECTORY* :/data1/ESSO/wg_20051026**	***DATE* : 26/10/05**

NOTES: *Locations* : IL2160, xl 3380-4220, XL4180, il2040-2320
Input : Production FIRE3D data *Other* : 5dB/sec exponential gain applied post stack/NMO. Offsets every 525m

DISPLAY / TEST NO.	DESCRIPTION	COMMENT
T21634_isomig_#####_5km_aptr_isomout_full_stk_segy	0-45deg stk	isotropic migration, isotropic moveout
T21634_isomig_#####_5km_aptr_anisomout_full_stk_segy	0-45deg stk	isotropic migration, anisotropic moveout
T21634_anisomig_#####_5km_aptr_isomout_full_stk_segy	0-45deg stk	anisotropic migration, isotropic moveout
T21633_isomig_#####_5km_aptr_isomout_far_stk_segy	30-45deg stk	isotropic migration, isotropic moveout
T21633_isomig_#####_5km_aptr_anisomout_far_stk_segy	30-45deg stk	isotropic migration, anisotropic moveout
T21633_anisomig_#####_5km_aptr_isomout_far_stk_segy	30-45deg stk	anisotropic migration, isotropic moveout
T21633_isomig_#####_5km_aptr_isomout_offsets_segy	offsets planes	isotropic migration, isotropic moveout
T21633_isomig_#####_5km_aptr_anisomout_offsets_segy	offsets planes	isotropic migration, anisotropic moveout
T21633_anisomig_#####_5km_aptr_isomout_offsets_segy	offsets planes	anisotropic migration, isotropic moveout
##### = IL2160, XL4180		
T21820_raw_Vz_RMS_migvels.velf	Vertical vels (RMS)	Used in moveout correction*
T21820_raw_Vx_int_migvels.ivef	Horizontal vels (interval)	Used in moveout correction*
		* (smooth vrsn used in migration)

Decision : Isotropic migration

TESTING LOG

WG CODE **: AP23**	***CLIENT*** **: Apache**	***SURVEY / AREA*** **: GAP04B (Sue M3D)**
PHASE **: Migration Aperture Tests**	***DIRECTORY*** **:/data1/ESSO/wg_20051026_2**	***DATE*** **: 26/10/05**

NOTES:
Locations : IL2160, xl 3380-4220, XL4180, il2040-2320
Input : Production FIRE3D data.
Other : Isotropic migration, Anisotropic moveout correction. 5dB/sec exponential gain applied post stack/NMO. Offsets every 525m

DISPLAY / TEST NO.	DESCRIPTION	COMMENT
T21632_isomig_#####_3km_aptr_anisomout_full_stk_segy	0-45deg stk	
T21632_isomig_#####_3km_aptr_anisomout_far_stk_segy	30-45deg stk	
T21632_isomig_#####_3km_aptr_anisomout_offsets_segy	offsets planes	
T21633_isomig_#####_4km_aptr_anisomout_full_stk_segy	0-45deg stk	
T21633_isomig_#####_4km_aptr_anisomout_far_stk_segy	30-45deg stk	
T21633_isomig_#####_4km_aptr_anisomout_offsets_segy	offsets planes	
T21634_isomig_#####_5km_aptr_anisomout_full_stk_segy	0-45deg stk	
T21633_isomig_#####_5km_aptr_anisomout_far_stk_segy	30-45deg stk	
T21633_isomig_#####_5km_aptr_anisomout_offsets_segy	offsets planes	
##### = IL2160, XL4180		

Decision :4km aperture

TESTING LOG

***WG CODE* : AP23**	***CLIENT* : Apache**	***SURVEY / AREA* : GAP04B (Sue M3D)**
***PHASE* : Migration Dip Limit Tests**	***DIRECTORY* :/data1/ESSO/wg_20051028**	***DATE* : 28/10/05**

NOTES: *Locations* : IL2160 & IL1960, xl 3380-4220, *Input* : Production FIRE3D data.
Other : Isotropic migration (4km aperture), Anisotropic moveout correction. 5dB/sec exponential gain applied post stack/NMO. Offsets every 525m

DISPLAY / TEST NO.	DESCRIPTION	COMMENT
T21633_isomig_IL2160_4km_aptr_anisomout_full_stk_segy	0-45deg stk	60deg dip limit
T21633_isomig_IL2160_4km_aptr_anisomout_far_stk_segy	30-45deg stk	60deg dip limit
T21633_isomig_IL2160_4km_aptr_anisomout_offsets_segy	offsets planes	60deg dip limit
T21633b_isomig_IL2160_anism_4km_70_full_stk_segy	0-45deg stk	70deg dip limit
T21633b_isomig_IL2160_anism_4km_70_far_stk_segy	30-45deg stk	70deg dip limit
T21633b_isomig_IL2160_anism_4km_70_offsets_segy	offsets planes	70deg dip limit
T21633c_isomig_IL2160_anism_4km_80_full_stk_segy	0-45deg stk	80deg dip limit
T21633c_isomig_IL2160_anism_4km_80_far_stk_segy	30-45deg stk	80deg dip limit
T21633c_isomig_IL2160_anism_4km_80_offsets_segy	offsets planes	80deg dip limit
T21642_isomig_IL1960_im_4km_##deg_full_stk_segy	0-45deg stk	## = 60, 70, 80
T21642_isomig_IL1960_im_4km_##deg_far_stk_segy	30-45deg stk	
T21642_isomig_IL1960_im_4km_##deg_offsets_segy	offsets planes	

Decision :

TESTING LOG

***WG CODE* : AP23**	***CLIENT* : Apache**	***SURVEY / AREA* : GAP04B (Sue M3D)**
***PHASE* : Migration Dip Limit Tests**	***DIRECTORY* :/data1/ESSO/wg_20051031**	***DATE* : 31/10/05**

NOTES:
Locations : IL3266, xl2120-5080
Input : Production FIRE3D data.
Other : Isotropic migration (4km aperture), NMO correction. 5dB/sec exponential gain applied post stack/NMO. Offsets every 525m

DISPLAY / TEST NO.	DESCRIPTION	COMMENT
T21646c_IL3266_isomig_nmo_4km_##deg_full_stk_segy	0-45deg stk	## = 60, 70, 80
T21646c_IL3266_isomig_nmo_4km_##deg_far_stk_segy	30-45deg stk	
T21646d_IL3266_isomig_nmo_4km_##deg_offsets_segy	offsets planes	

Decision :70deg

TESTING LOG

PROPOSAL:	**AP23**	**CLIENT:**	**Apache**	**AREA:**	**Sue**		
TESTING PHASE:		**Residual Radon & Footprint Removal**		**DIRECTORY:**	/data1/ESSO/wg_20060220	**DATE:**	20th Feb 2006

Test Lines:	Notes:	Comments:
DISPLAY / FILE / TEST NO.	**DESCRIPTION**	**COMMENT**
Apache_Sue3D_test_resid_radon.ppt	Initial Residual Radon Test results	Further testing ongoing
Apache_Sue3D_test_footprint_removal.ppt	Initial Footprint removal test results	
Apache_Sue3D_test_footprint_removal_v2.ppt	Final Footprint removal test results	

TEST LOG

PROPOSAL:	AP23	**CLIENT:**	Apache	**AREA:**	Sue		
TESTING PHASE:		Primal (Noise Reduction)		**DIRECTORY:**	N/A	**DATE:**	9 Mar 2006

Test Lines: IL2600 IL3240	Notes: Primal applied to remove residual aliased linear noise in order to extend useful angle range on CMP gathers	
DESCRIPTION		**COMMENT**
T22501	Test gathers, no primal applied	Residual radon applied
T22505	Test gathers, primal applied	Primal applied from TOL+300ms, trace ratio of 5, 5-80Hz. Result: taking out too much low frequency energy but not enough noise.
T22506	Test gathers, primal applied	Primal applied from TOL+500ms, trace ratio of 2, 20-80Hz. Result: noise modeled ok but taking out too much primary at near offset
T22507	Test gathers, primal applied	As T22506 but double subtraction method used to prevent primary data from being attenuated. Result: Looks ok – results sent to Apache
T22508	Test gathers, primal applied	Apache test request - as T22507 but primal applied from WB. Results too harsh, removing primary energy
T22509	Test gathers, primal applied	2 passes of primal: a) applied from TOL+400ms, trace ratio of 2, 20-80Hz b) applied from TOL+400ms, trace ratio of 5, 30-80Hz. Results: no improvement over single pass of primal

T22510	Test gathers primal applied	Primal applied from TOL+400ms, trace ratio of 2, 20-80Hz, double subtraction method. Gathers displayed +/- primal with 33-45 degree angle mutes annotated
Decision: Application of primal from TOL+400ms, trace ratio of 2 on 20-80Hz. Double subtraction method to preserve primary. Apply to gathers prior to archive and stacking.		

TESTING LOG

PROPOSAL:	AP23	**CLIENT:**	Apache	**AREA:**	Sue		
TESTING PHASE:		Angle Stack Scan		**DIRECTORY:**	/data1/ESSO/wg_20060302	**DATE:**	02 Mar 2006

Test Lines: IL2600 IL3240	Notes: Residual Radon applied Single function scaling applied post-stack Shallow and deep data preserved.	
DISPLAY / FILE / TEST NO.	**DESCRIPTION**	**COMMENT**
T21740_radon_##-##deg_stk_raac_IL@@@@_segy	Angle stack	
##-## : 0-5, 5-10, 10-15…55-60		
@@@@ : 2600, 3240		
T21740b_radon_##-##deg_stk_raac_IL3240_segy	Angle stack	includes migration-only energy traces
36 files total.		

TESTING LOG

PROPOSAL:	AP23	**CLIENT:**	Apache	**AREA:**	Sue		
TESTING PHASE:		Angle Stacks		**DIRECTORY:**	/data1/ESSO/wg_20060315	**DATE:**	15 Mar 2006

Test Lines: IL2600 IL3240	Notes: Residual Radon applied (migration only traces removed on line 2600 and kept on line 3240) Primal applied from TOL+400ms Single function scaling applied post-stack	Mute pattern as requested by Apache: angle mutes from 400ms-3200ms, then constant from 3200ms.
DISPLAY / FILE / TEST NO.	**DESCRIPTION**	**COMMENT**
T22516_primal_5-30mute_stack_IL****_segy	Angle stack, 5-30 degree mute	
T22516_primal_7-16mute_stack_IL****_segy	Angle stack, 7-16 degree mute	
T22516_primal_17-27mute_stack_IL****_segy	Angle stack, 17-27 degree mute	
T22516_primal_28-45mute_stack_IL****_segy	Angle stack, 28-45 degree mute	Compare to radon far angle stack (below) to see effect of noise removal
T22516_radon_28-45mute_stack_IL****_segy	Angle stack, 28-45 degree mute, no primal applied	
****: 2600, 3240		
10 files total		

TESTING LOG

PROPOSAL:	AP23	**CLIENT:**	Apache	**AREA:**	Sue		
TESTING PHASE:		Angle Stacks		**DIRECTORY:**	/data1/ESSO/wg_20060316	**DATE:**	16 Mar 2006

Test Lines: IL2600 IL3240	Notes: Residual Radon applied (migration only traces removed on line 2600 and kept on line 3240) Primal applied from TOL+400ms Single function scaling applied post-stack	Revised mute pattern as requested by Apache: angle mutes from 400ms-2800ms, then constant from 2800ms.
DISPLAY / FILE / TEST NO.	**DESCRIPTION**	**COMMENT**
T22518_primal_7-16mute_stack_IL****_segy	Angle stack, 7-16 degree mute	
T22518_primal_17-27mute_stack_IL****_segy	Angle stack, 17-27 degree mute	
T22518_primal_28-45mute_stack_IL****_segy	Angle stack, 28-45 degree mute	
****: 2600, 3240		
6 files total		

TESTING LOG

PROPOSAL:	AP23	**CLIENT:**	Apache	**AREA:**	Sue		
TESTING PHASE:		Angle Stacks		**DIRECTORY:**	/data1/ESSO/wg_20060321	**DATE:**	21 Mar 2006

Test Lines: IL2600 IL3240	Notes: Residual Radon applied (migration only traces removed on line 2600 and kept on line 3240) Primal applied from TOL+400ms Single function scaling applied post-stack	Revised mute pattern as requested by Apache: angle mutes from 400ms to where 37 degree mute crosses max offset, then constant from this time.

DISPLAY / FILE / TEST NO.	DESCRIPTION	COMMENT
T22523_primal_7-19mute_stack_IL****_segy	Angle stack, 7-19 degree mute	
T22523_primal_16-28mute_stack_IL****_segy	Angle stack, 16-28 degree mute	
T22523_primal_25-37mute_stack_IL****_segy	Angle stack, 25-37 degree mute	
****: 2600, 3240		
6 files total		

TESTING LOG

PROPOSAL:	AP23	**CLIENT:**	Apache	**AREA:**	Sue		
TESTING PHASE:		Post-stack Frequency Enhancement		**DIRECTORY:**	/data1/ESSO/wg_20060501	**DATE:**	01 May 2006

Test Lines: IL2000,2200,…3800 (set 1) IL2740,3254, XL4512 (set 2)	Notes:	
DISPLAY / FILE / TEST NO.	**DESCRIPTION**	**COMMENT**
1) T22823_raw_fullstk__QCinlines_Survey_segy	Raw full-stk, PGC applied as per archive	Set 1 test lines
2) T22823_raw_fullstk_invQ__QCinlines_Survey_segy	Inverse Q (100) applied, new residual PGC applied.	Set 1 test lines
3) T22854b_raw_fullstk_tvsw__QCinlines_Survey_segy	TV Spectral whitening applied	Set 1 test lines
4) T22855b_raw_fullstk_sbd__QCinlines_Survey_segy	Stochastic Beta Deconvolution applied	Set 1 test lines
5) T22823_raw_fullstk_tvf__QCinlines_Survey_segy	as in 1) plus preliminary TVF	Set 1 test lines
6) T22823_raw_fullstk_invQ_tvf__QCinlines_Survey_segy	as in 2) plus preliminary TVF	Set 1 test lines
7) T22854b_raw_fullstk_tvsw_tvf__QCinlines_Survey_segy	as in 3) plus preliminary TVF	Set 1 test lines
8) T22855b_raw_fullstk_sbd_QCinlines_Survey_segy	as in 4) plus preliminary TVF	Set 1 test lines
9) T22857_raw_fullstk__QCinlines2_Survey_segy	Raw full-stk, PGC applied as per archive	Set 2 test lines (inlines)
10) T22857_raw_fullstk_invQ__QCinlines2_Survey_segy	Inverse Q (100) applied, new residual PGC applied.	Set 2 test lines (inlines)
11) T22859_raw_fullstk_tvsw__QCinlines2_Survey_segy	TV Spectral whitening applied	Set 2 test lines (inlines)
12) T22858_raw_fullstk_sbd__QCinlines2_Survey_segy	Stochastic Beta Deconvolution applied	Set 2 test lines (inlines)
13) T22857_raw_fullstk_tvf__QCinlines2_Survey_segy	as in 9) plus preliminary TVF	Set 2 test lines (inlines)

14) T22857_raw_fullstk_invQ_tvf__QCinlines2_Survey_segy	as in 10) plus preliminary TVF	Set 2 test lines (inlines)
15) T22859_raw_fullstk_tvsw_tvf__QCinlines2_Survey_segy	as in 11) plus preliminary TVF	Set 2 test lines (inlines)
16) T22858_raw_fullstk_sbd_tvf__QCinlines2_Survey_segy	as in 12) plus preliminary TVF	Set 2 test lines (inlines)
17) T22857_raw_fullstk__QCxline_Survey_segy	Raw full-stk, PGC applied as per archive	Set 2 test lines (xline)
18) T22857_raw_fullstk_invQ__QCxline_Survey_segy	Inverse Q (100) applied, new residual PGC applied.	Set 2 test lines (xline)
19) T22859_raw_fullstk_tvsw__QCxline_Survey_segy	TV Spectral whitening applied	Set 2 test lines (xline)
20) T22858_raw_fullstk_sbd__QCxline_Survey_segy	Stochastic Beta Deconvolution applied	Set 2 test lines (xline)
21) T22857_raw_fullstk_tvf__QCxline_Survey_segy	as in 9) plus preliminary TVF	Set 2 test lines (xline)
22) T22857_raw_fullstk_invQ_tvf__QCxline_Survey_segy	as in 10) plus preliminary TVF	Set 2 test lines (xline)
23) T22859_raw_fullstk_tvsw_tvf__QCxline_Survey_segy	as in 11) plus preliminary TVF	Set 2 test lines (xline)
24) T22858_raw_fullstk_sbd_tvf__QCxline_Survey_segy	as in 12) plus preliminary TVF	Set 2 test lines (xline)

TESTING LOG

PROPOSAL:	AP23	**CLIENT:**	Apache	**AREA:**	Sue		
TESTING PHASE:		PRIMAL cmps		**DIRECTORY:**	/data1/ESSO/wg_20060519	**DATE:**	19 May 2006

Test Lines: IL2798, 3218, 3308	Notes: high-fold and alternate cmps.	Production PRIMAL cmp gathers. Final moveout correction applied.

DISPLAY / FILE / TEST NO.	DESCRIPTION	COMMENT
T22540_primal_cmps_segy_IL2798	Example PRIMAL cmps	
T22540_primal_cmps_segy_IL3218	Example PRIMAL cmps	
T22540_primal_cmps_segy_IL3308	Example PRIMAL cmps	

4.9 Parameter Decisions

Date:	*Decision:*
21/04/05	2Hz low-cut filter for production
23/04/05	FK filter (+/- 12ms/tr, taper +/- 6ms/tr) to remove mud roll* * confirmed by Apache. Still to be agreed by Esso (see decision on 06/05/05)
28/04/05	SWATT/Random Noise Modelled Subtraction approved for lines affected by swell
28/04/05	4ms resample to be applied after debubble
28/04/05	LNA to use taup variant filters and scalars
06/05/05	FK filter to be applied using +/- 12ms/tr, taper +/- 6ms/tr to remove mud roll prior to LNA. Near 20 traces copied and flipped prior to FK filter to avoid artefacts on near traces.
7/05/05	Esso dephase filter confirmed.
11/05/05	Confirmation of above parameters after application of Esso's filter confirmed by Apache.
14/05/05	Approval of APACHE Seis-Nav ebcdic/trace header updates for Seis-Nav archive to 3590B
18/05/05	Approval of Esso Seis-Nav ebcdic/trace header updates for Seis-Nav archive to 3590B
30/05/05	Approval for extra pass of swatt for cable-strike affected lines
01/06/05	Approval for WLMSRME and 3D SRME for use in production
07/06/05	New 3D velocity field for use in velocity analysis supplied.
14/07/05	Approval for taup mudroll filter and LNA for undershoot lines
26/07/05	Approval to use T2 gain rather than geospreading using an Apache supplied velocity function
11/08/05	Approval for 2window tau-p deconvolution using 300ms overlap.
19/08/05	Approval for 1window tau-p deconvolution on undershoot lines
22/08/05	Decision not to apply shot and channel scalars
30/08/05	Decision not to apply tidal statics correction. Decision not to apply FK before radon. Decision to apply Radon demultiple as tested (using 240ms moveout protection)
02/08/05	First pass velocity field approved for Radon demultiple.
06/09/05	Phase-only Inverse Q (Q=100, ref freq=35Hz) approved
02/11/05	Taup decon shot gathers to be archived instead of the pre-stack regularised CMPs
31/10/05	Full migration using 4km aperture, 70 degree dip
03/11/05	Migration velocity smoothing – 2km from 0-1500ms, 4km from 2500ms

07/11/05	Sue 3D not to be interpolated post-stack to 12.5m x 12.5m bin. Northern Fields to interpolate to match Sue 3D
06/12/05	2km velocity field to be used for full migration production
11/01/06	Radon Demultiple approved for velocity ananlysis (final 500m).
16/02/06	Amplitude Footprint removal using WesternGeco's SRAC method, 91 trace filter width, 500ms time windows.
02/03/06	Radon demultiple, using scaled final velocity field and 60ms moveout protection
16/03/06	PRIMAL process to be applied from TOL+400ms. This will be on the final gather archive.
22/03/06	Angle-mutes confirmed (7-19, 16-28, 25-37). Mutes are kept constant from the time where the 37 degree mute crosses the maximum offset.
05/05/06	Post-stack processing to include TVF only: time/low-high cut/slope 0/out-65/48, 1000/out-65/48, 2000/out-50/48, 3000/out-40/42, 4000/out-35/42, 5000/out-30/42
05/05/06	Post-stack merge between Sue and Northern Fields Survey approved after NF has phase and amplitude matching applied. Raw and filtered merged full angle stacks archive required for Apache, Esso and BHPB.

4.10 Signatures/Wavelets/Functions

4.10.1 Dephase Operator

count	Time (ms)	Coefficient	count	Time (ms)	Coefficient
1	-200	0.010435	102	2	0.299585
2	-198	0.005280	103	4	-0.035055
3	-196	-0.012155	104	6	-0.181811
4	-194	-0.004285	105	8	-0.118822
5	-192	0.012238	106	10	0.250110
6	-190	0.012312	107	12	0.209939
7	-188	-0.002421	108	14	0.052629
8	-186	-0.019016	109	16	-0.178059
9	-184	-0.000280	110	18	-0.045232
10	-182	0.014649	111	20	0.121733
11	-180	0.013068	112	22	0.150623
12	-178	-0.012580	113	24	0.032020
13	-176	-0.021631	114	26	-0.110498
14	-174	0.001178	115	28	-0.021664
15	-172	0.016576	116	30	0.049411
16	-170	0.008757	117	32	0.058300
17	-168	-0.019725	118	34	0.014774
18	-166	-0.022886	119	36	-0.059237
19	-164	0.003216	120	38	0.005064
20	-162	0.012081	121	40	-0.019819
21	-160	0.003857	122	42	-0.005348
22	-158	-0.027390	123	44	-0.013176
23	-156	-0.016202	124	46	0.006052
24	-154	-0.002752	125	48	0.021347
25	-152	0.008031	126	50	-0.046945
26	-150	-0.010684	127	52	-0.040811
27	-148	-0.023740	128	54	-0.030444
28	-146	-0.012014	129	56	0.049163
29	-144	-0.006347	130	58	0.000754
30	-142	-0.005964	131	60	-0.062998
31	-140	-0.024265	132	62	-0.086395
32	-138	-0.016159	133	64	-0.031035
33	-136	-0.004473	134	66	0.047669
34	-134	-0.011781	135	68	-0.008338
35	-132	-0.025999	136	70	-0.069528
36	-130	-0.036587	137	72	-0.085663
37	-128	-0.004603	138	74	-0.012742
38	-126	0.006297	139	76	0.052103
39	-124	-0.017372	140	78	-0.005016
40	-122	-0.048388	141	80	-0.044701
41	-120	-0.046892	142	82	-0.054939
42	-118	0.010230	143	84	0.029869
43	-116	0.015557	144	86	0.050373
44	-114	-0.016974	145	88	0.008925
45	-112	-0.075536	146	90	-0.029528
46	-110	-0.045708	147	92	-0.023529
47	-108	0.014928	148	94	0.042711
48	-106	0.032957	149	96	0.027731

count	Time (ms)	Coefficient	count	Time (ms)	Coefficient
49	-104	-0.020702	150	98	0.007677
50	-102	-0.087356	151	100	-0.018641
51	-100	-0.044911	152	102	0.025467
52	-98	0.017568	153	104	0.070732
53	-96	0.044397	154	106	0.056239
54	-94	-0.019388	155	108	0.041202
55	-92	-0.081307	156	110	0.017689
56	-90	-0.042321	157	112	0.040555
57	-88	0.014448	158	114	0.021244
58	-86	0.044104	159	116	-0.016737
59	-84	-0.007013	160	118	-0.031265
60	-82	-0.052089	161	120	-0.022431
61	-80	-0.031909	162	122	0.013460
62	-78	-0.003408	163	124	-0.017455
63	-76	0.036146	164	126	-0.037525
64	-74	0.006713	165	128	-0.043086
65	-72	0.019318	166	130	-0.004412
66	-70	-0.030822	167	132	0.016960
67	-68	-0.014302	168	134	-0.019594
68	-66	-0.007700	169	136	-0.033888
69	-64	0.055121	170	138	-0.031523
70	-62	0.099014	171	140	0.020440
71	-60	0.005027	172	142	0.017722
72	-58	-0.052254	173	144	-0.012947
73	-56	-0.050614	174	146	-0.028809
74	-54	0.101043	175	148	-0.011300
75	-52	0.204529	176	150	0.033959
76	-50	0.061176	177	152	0.016528
77	-48	-0.091103	178	154	-0.004685
78	-46	-0.104263	179	156	-0.017239
79	-44	0.151132	180	158	0.014588
80	-42	0.316690	181	160	0.040759
81	-40	0.164659	182	162	0.017002
82	-38	-0.111741	183	164	0.001906
83	-36	-0.174944	184	166	-0.005255
84	-34	0.199600	185	168	0.031735
85	-32	0.372498	186	170	0.031315
86	-30	0.358898	187	172	0.010499
87	-28	-0.166817	188	174	-0.003503
88	-26	-0.167442	189	176	0.003925
89	-24	0.165430	190	178	0.033746
90	-22	0.538038	191	180	0.016092
91	-20	0.475162	192	182	-0.000145
92	-18	-0.391296	193	184	-0.010917
93	-16	-0.988248	194	186	0.009210
94	-14	-1.000000	195	188	0.022514
95	-12	-0.395326	196	190	-0.005315
96	-10	0.276003	197	192	-0.017917
97	-8	0.445682	198	194	-0.024179
98	-6	-0.025365	199	196	0.006157
99	-4	-0.099690	200	198	-0.001329
100	-2	-0.077324	201	200	-0.023246
101	0	0.343735			

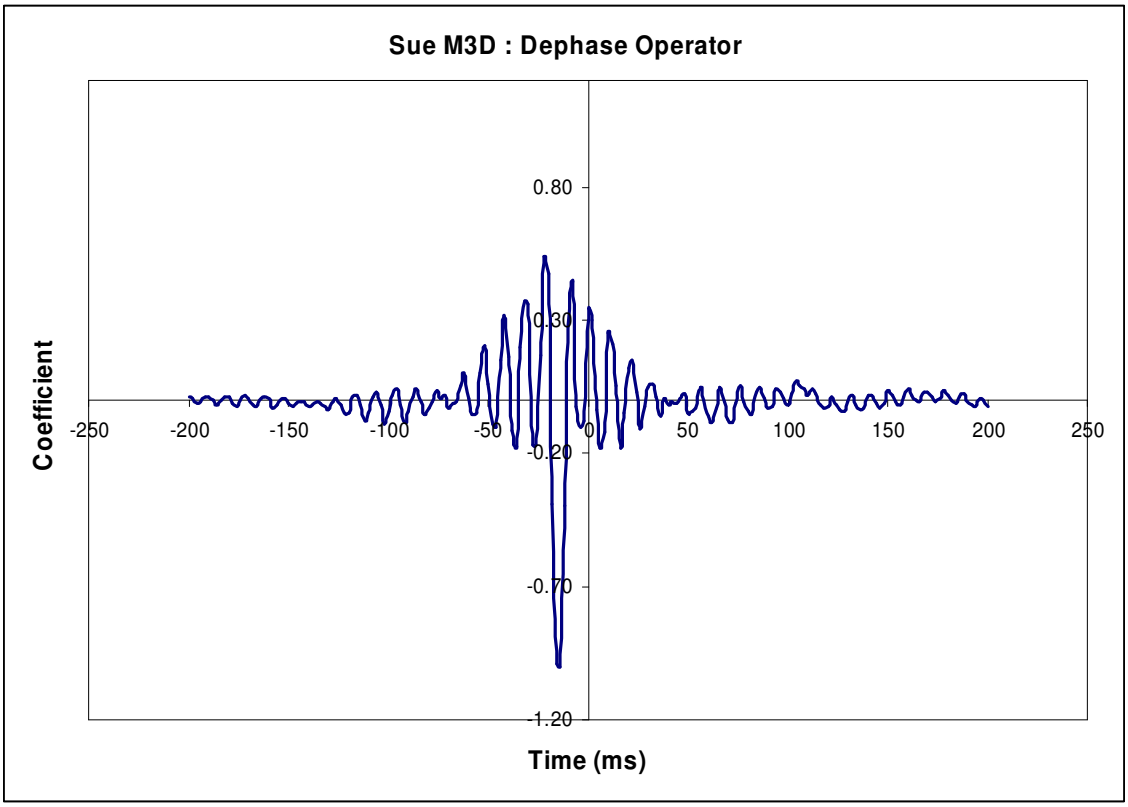


Figure 3 : Dephase Operator

4.10.2 Sue 3D Stack Polygon

X coordinate	Y coordinate
532143.0000	5761575.0000
522768.0000	5752057.0000
523271.0000	5751524.0000
522598.0000	5750666.0000
522830.0000	5750388.0000
513622.0000	5740948.0000
511256.0000	5738211.0000
509888.0000	5736541.0000
509400.0000	5735300.0000
513100.0000	5732000.0000
514208.7500	5733102.0000
514208.7500	5733102.0000
519331.5625	5729089.5000
518200.0000	5728000.0000
520300.0000	5726300.0000
521500.0000	5727400.0000
523500.0000	5725800.0000
530500.0000	5725820.0000
529600.0000	5724800.0000
535860.0000	5724800.0000
536900.0000	5725830.0000
540138.0000	5725833.0000

X coordinate	Y coordinate
543660.0000	5729410.5000
543698.1875	5734817.5000
561967.0000	5753668.0000
537871.5625	5759619.5000
539020.9375	5763949.0000
539396.0000	5764988.0000
535900.0000	5762000.0000
533000.0000	5762400.0000
532143.0000	5761575.0000

4.10.3 Example XT representation of Angle mutes (example location only)

	Near Angle Stack		Mid Angle Stack		Far Angle Stack	
	7 deg	19 deg	16 deg	28 deg	25 deg	37 deg
Offset (m)	Time (ms)	Time (ms)	Time (ms)	Time (ms)	Time (ms)	Time (ms)
275	0	0	0	0	0	0
350	1212	0	600	0	408	0
425	1520	0	712	0	476	0
500	1772	700	808	492	544	384
575	1964	784	904	552	616	428
650	2136	864	1000	616	684	472
725	2288	944	1104	676	748	516
800	2436	1024	1216	732	808	560
875	2584	1116	1340	788	868	604
950	2736	1208	1472	840	928	652
1025	5200	1312	1592	892	988	696
1100	5200	1420	1704	944	1052	736
1175	5200	1528	1800	996	1116	776
1250	5200	1628	1884	1056	1188	812
1325	5200	1716	1964	1116	1264	852
1400	5200	1800	2040	1176	1348	888
1475	5200	1872	2112	1244	1432	924
1550	5200	1940	2180	1316	1512	964
1625	5200	2004	2248	1392	1592	1004
1700	5200	2064	2312	1468	1664	1044
1775	5200	2124	2376	1540	1728	1088
1850	5200	2180	2440	1608	1788	1132
1925	5200	2236	2504	1668	1844	1180
2000	5200	2292	2568	1728	1900	1232
2075	5200	2344	2632	1780	1948	1284
2150	5200	2400	5200	1832	1996	1344
2225	5200	2452	5200	1880	2044	1400
2300	5200	2504	5200	1924	2088	1460
2375	5200	2560	5200	1968	2132	1516
2450	5200	5200	5200	2012	2176	1572
2525	5200	5200	5200	2052	2216	1620
2600	5200	5200	5200	2092	2256	1668
2675	5200	5200	5200	2132	2296	1712
2750	5200	5200	5200	2168	2336	1752
2825	5200	5200	5200	2204	2376	1792
2900	5200	5200	5200	2240	2416	1828
2975	5200	5200	5200	2276	2456	1864
3050	5200	5200	5200	2312	2496	1900
3125	5200	5200	5200	2348	2536	1932
3200	5200	5200	5200	2380	2576	1964

	Near Angle Stack		Mid Angle Stack		Far Angle Stack	
	7 deg	19 deg	16 deg	28 deg	25 deg	37 deg
Offset (m)	Time (ms)	Time (ms)	Time (ms)	Time (ms)	Time (ms)	Time (ms)
3275	5200	5200	5200	2416	2612	1996
3350	5200	5200	5200	2452	5200	2024
3425	5200	5200	5200	2488	5200	2056
3500	5200	5200	5200	2524	5200	2084
3575	5200	5200	5200	2556	5200	2112
3650	5200	5200	5200	2592	5200	2140
3725	5200	5200	5200	5200	5200	2164
3800	5200	5200	5200	5200	5200	2192
3875	5200	5200	5200	5200	5200	2220
3950	5200	5200	5200	5200	5200	2244
4025	5200	5200	5200	5200	5200	2272
4100	5200	5200	5200	5200	5200	2296
4175	5200	5200	5200	5200	5200	2320
4250	5200	5200	5200	5200	5200	2348
4325	5200	5200	5200	5200	5200	2372
4400	5200	5200	5200	5200	5200	2396
4475	5200	5200	5200	5200	5200	2424
4550	5200	5200	5200	5200	5200	2448
4625	5200	5200	5200	5200	5200	2472
4700	5200	5200	5200	5200	5200	2500
4775	5200	5200	5200	5200	5200	2524
4850	5200	5200	5200	5200	5200	2548
4925	5200	5200	5200	5200	5200	2576
5000	5200	5200	5200	5200	5200	2600

4.10.4 Post-Stack Scaling Function

TWT (ms)	Value	TWT (ms)	Value	TWT (ms)	Value
0	0.0014	2020	3.3226	4036	15.0414
256	0.1420	2272	5.0866	4288	17.3786
508	0.1995	2524	6.4164	4540	19.8629
760	0.3121	2776	7.3771	4792	24.8571
1012	0.3448	3028	8.7550	5044	36.6829
1264	0.3456	3280	10.2173	5112	36.6829
1516	0.7072	3532	11.6343		
1768	1.8546	3784	13.1157		

4.10.5 Northern Fields Scaling Function

TWT (ms)	Value	TWT (ms)	Value	TWT (ms)	Value
256	3.25	2272	15.28	4288	12.00
508	3.74	2524	16.51	4540	14.10
760	3.82	2776	15.02	4792	19.85
1012	3.57	3028	12.46	5044	23.62
1264	4.22	3280	10.81	5296	27.64
1516	6.95	3532	9.71	5548	36.67
1768	10.30	3784	9.61	5800	48.28
2020	13.43	4036	10.87	6004	61.46

4.11 Archive Products

4.11.1 Final Products Summary

ITEM	DESCRIPTION	MEDIA	FORMAT	COMMENTS	DATE SENT	MEDIA NUMBERS	NO. MEDIA
G1	Field Tape Data (Seis-Nav merged) (no NMO)	3590B	SEG-Y	All sail lines. Apache set	12-Aug-05	Q05321-Q05938*	616
G1b	Field Tape Data (Seis-Nav merged) (no NMO)	3590B	SEG-Y	All sail lines. Esso set	12-Aug-05	Q05940-Q06591*	616
G2	Tau-P DBS Shot Gathers (no NMO)	3590B	SEG-Y	All sail lines. Apache set	29-Dec-05	Q07522-Q07845	324
G2b	Tau-P DBS Shot Gathers (no NMO)	3590B	SEG-Y	All sail lines. Esso set	29-Dec-05	Q07198-Q07521	324
G3	Raw PreSTM CMP Gathers (no NMO)	DLT IV	tar SEG-Y	All inlines. Apache set	09-Feb-06	DL1119-DL1158	40
G3b	Raw PreSTM CMP Gathers (no NMO)	3590B	SEG-Y	All inlines. Esso set	10-Feb-06	Q07846-Q08001	156
G4	Final CMP Gathers (with NMO + eta)	DLT IV	tar SEGY	Apache set	09-Apr-06	DL1189-DL1235#	51
S1	Raw Full-Angle Stack Volume	DLT IV	tar SEG-Y	Apache set	31-Mar-06	DL1174	1
S1b	Raw Near-Angle Stack Volume	DLT IV	tar SEG-Y	Apache set	05-Apr-06	DL1175	1
S1c	Raw Mid-Angle Stack Volume	DLT IV	tar SEG-Y	Apache set	31-Mar-06	DL1176	1
S1d	Raw Far-Angle Stack Volume	DLT IV	tar SEG-Y	Apache set	31-Mar-06	DL1177	1
S1e	Raw Full-Angle Stack Volume	3590B	SEG-Y	Esso set	11-Apr-06	Q08373-Q08374	2
S1f	Raw Near-Angle Stack Volume	3590B	SEG-Y	Esso set	11-Apr-06	Q08375-Q08376	2
S1g	Raw Mid-Angle Stack Volume	3590B	SEG-Y	Esso set	11-Apr-06	Q08377-Q08378	2
S1h	Raw Far-Angle Stack Volume	3590B	SEG-Y	Esso set	11-Apr-06	Q08379-Q08380	2
S1i	Raw Full-Angle Stack Volume	3590B	SEG-Y	BHPB set	11-Apr-06	Q08381-Q08382	2
S1j	Raw Near-Angle Stack Volume	3590B	SEG-Y	BHPB set	11-Apr-06	Q08383-Q08384	2
S1k	Raw Mid-Angle Stack Volume	3590B	SEG-Y	BHPB set	11-Apr-06	Q08385-Q08386	2
S1l	Raw Far-Angle Stack Volume	3590B	SEG-Y	BHPB set	11-Apr-06	Q08387-Q08388	2
S1m	Raw Full-Angle Stack Volume	3590B	SEG-Y	Govt. set	11-Apr-06	Q08389-Q08390	2
S1n	Raw Near-Angle Stack Volume	3590B	SEG-Y	Govt. set	11-Apr-06	Q08391-Q08392	2
S1o	Raw Mid-Angle Stack Volume	3590B	SEG-Y	Govt. set	11-Apr-06	Q08393-Q08394	2
S1p	Raw Far-Angle Stack Volume	3590B	SEG-Y	Govt. set	11-Apr-06	Q08395-Q08396	2
S2	Filtered Full-Angle Stack Volume	3590B	SEG-Y	Govt. set	12-May-06	Q08002-Q08003	2
S2b	Filtered Near-Angle Stack Volume	DLT IV	tar SEGY	Apache set	12-May-06	DL1181	1
S2c	Filtered Mid-Angle Stack Volume	DLT IV	tar SEGY	Apache set	12-May-06	DL1182	1
S2d	Filtered Far-Angle Stack Volume	DLT IV	tar SEGY	Apache set	12-May-06	DL1183	1
S2e	Filtered Near-Angle Stack Volume	3590B	SEG-Y	Esso set	16-May-06	Q08004-Q08005	2
S2f	Filtered Mid-Angle Stack Volume	3590B	SEG-Y	Esso set	16-May-06	Q08006-Q08007	2

ITEM	DESCRIPTION	MEDIA	FORMAT	COMMENTS	DATE SENT	MEDIA NUMBERS	NO. MEDIA
S2g	Filtered Far-Angle Stack Volume	3590B	SEG-Y	Esso set	16-May-06	Q08008-Q08009	2
S2h	Filtered Near-Angle Stack Volume	3590B	SEG-Y	BHPB set	16-May-06	Q08010-Q08011	2
S2i	Filtered Mid-Angle Stack Volume	3590B	SEG-Y	BHPB set	16-May-06	Q08012-Q08013	2
S2j	Filtered Far-Angle Stack Volume	3590B	SEG-Y	BHPB set	16-May-06	Q08014-Q08015	2
S2k	Filtered Near-Angle Stack Volume	3590B	SEG-Y	Govt. set	12-May-06	Q08016-Q08017	2
S2l	Filtered Mid-Angle Stack Volume	3590B	SEG-Y	Govt. set	12-May-06	Q08018-Q08019	2
S2m	Filtered Far-Angle Stack Volume	3590B	SEG-Y	Govt. set	12-May-06	Q08020-Q08021	2
S3	Raw Merged Full-Angle Stack Volume	DLT IV	tar SEGY	Apache set	18-May-06	DL1184	1
S3b	Raw Merged Full-Angle Stack Volume	3590B	SEG-Y	Esso set	18-May-06	Q08022-Q08024	3
S3c	Raw Merged Full-Angle Stack Volume	3590B	SEG-Y	BHPB set	18-May-06	Q08025-Q08027	3
S4	Filtered Merged Full-Angle Stack Volume	DLT IV	tar SEGY	Apache set	18-May-06	DL1185	1
S4b	Filtered Merged Full-Angle Stack Volume	3590B	SEG-Y	Esso set	18-May-06	Q08028-Q08030	3
S4c	Filtered Merged Full-Angle Stack Volume	3590B	SEG-Y	BHPB set	18-May-06	Q08031-Q08033	3
V1	Final Fields	CDROM	Apache ASCII	Final Vrms velocity, Mute field, Eta field	04-Apr-06	CD01	1
V1b	Velocity Fields	CDROM	Apache ASCII	Radon & migration vels	18-May-06	CD02	1
V2	Final Migration Velocity Field	DLT IV	tar SEG-Y	Apache copy – every bin	18-May-06	DL1159	1
V2b	Final Migration Velocity Field	3590B	SEG-Y	Esso set – every bin	18-May-06	Q08034-Q08035	2
V2c	Final Migration Velocity Field	3590B	SEG-Y	BHPB set – every bin	18-May-06	Q08036-Q08037	2
V2d	Final Migration Velocity Field	CDROM	Apache ASCII	Govt. set	18-May-06	CD03	1
V3	Final Stacking Velocity Field	DLT IV	tar SEGY	Apache copy –every bin	18-May-06	DL1160	1
V3b	Final Stacking Velocity Field	3590B	SEG-Y	Esso set – every bin	18-May-06	Q08038-Q08039	2
V3c	Final Stacking Velocity Field	3590B	SEG-Y	BHPB set – every bin	18-May-06	Q08040-Q08041	2
V3d	Final Stacking Velocity Field	CDROM	Apache ASCII	Govt. set	18-May-06	CD03	0
N1	Bin Centre Navigation Data	DLT IV	UKOOA	Apache set	18-May-06	DL1261	1
N1b	Bin Centre Navigation Data	3590B	UKOOA	Esso set	18-May-06	Q08042	1
N1c	Bin Centre Navigation Data	3590B	UKOOA	BHPB set	18-May-06	Q08043	1
N1d	Bin Centre Navigation Data	3590B	UKOOA	Govt. set	18-May-06	Q08044	1
M1	Undershoot Field Data (8 lines)	3590B	SEG-Y	Time fix applied	29-Apr-05	Q05266-Q05318*	36
M2	3DSRME Multiple Model Stack	DLT IV	tar SEGY	Stack of near-offsets only	05-Apr-06	DL1178	1
R1	Final Data Processing Report	CDROM	PDF	5 copies	19-Jun-06	CD04-08	5
R1b	Final Data Processing Report	Hardcopy	PDF	5 copies	19-Jun-06	n/a	n/a

Notes :

- All SEG-Y data in 32 bit floating point format
- * not continuous, # + DL1179, DL1180

4.11.2 Example EBCDIC header

```
C01 CLIENT:APACHE      AREA: VIC/P-58    SURVEY: GAP04B/SUE M3D 2005 PROCESSING
C02 INLINE RANGE: 1766-4226      PROCESS: FILTERED FULL-ANGLE STACK VOLUME
C03 CONVENTIONAL ACQ: SRC BOAT/ARRAYS/VOL: WESTERN TRIDENT/2/3000 CU IN
C04 SRC INTVL/DPTH : 18.75M(FLIP/FLOP) / 7M(+/-0.5M)
C05 RCR BOAT: WESTERN TRIDENT      CABLES: 8x4800M SOLID STREAMERS
C06 CBL DPTH/CHANN PER CBL/SEPARATION: 8M(+/-1M) / 384 / 100M
C07 SAMP INTVL: 2MS         REC FILT: 2(12)-206(264)  Hz(dB/oct)
C08 PROJECTION TYPE: UTM      UTM ZONE: 55 S   GEODETIC DATUM: GDA94
C09 UNDERSHOOT ACQ: SRC BOAT/ARRAYS/VOL: PACIFIC TITAN/1/3040 CU IN
C10 ----- PROCESSING SEQUENCE -----
C11 CONVERSION. NAV UPDATE. EDITS. DEPHASE TO ZERO PHASE. RESAMPLE TO 4MS. LCF
C12 2(18) HZ(DB/OCT). T**2 GAIN. SWATT WHERE APPLICABLE. MUD-ROLL/CABLE-STRIKE/
C13 STRUM FILTERS. LNA. K-FILTER. 1ST PASS VELAN (2D-SRME. MILD RADON DEMULT
C14 APPLIED). DWD. 3D-SRME. TAU-P DBS. WLS-RADON DEMULT. INV Q (PHASE ONLY):
C15 Q=100, REF FREQ=35HZ. ALT TRC DROP. FIRE3D. INV T**2 GAIN.
C16  TARGET 500M KPSTM, VELS PICKED ON APPROX 2KM GRID. FULL KIRCHHOFF
C17 PRESTM: 64 OFFSETS, 4KM APERTURE, 70DEG DIP, ISOTROPIC, USING TV
C18 SMOOTHED VEL FIELD. INV MOVEOUT. 3D CMP SORT. FOOTPRINT REMOVAL (SRAC).
C19 MOVEOUT USING SMOOTH ETA FIELD AND RMS FIELD PICKED ON APPROX 500M GRID.
C20 RESIDUAL WLS-RADON DEMULTIPLE. RESIDUAL NOISE REMOVAL (PRIMAL).
C21 ANGLE-STACK 5-30DEG (NOMINAL). SINGLE FN TV SCALING.
C22 (ms/scalar): 0/0.014, 256/0.14, 508/0.2, 760/0.31, 1012/0.34, 1264/0.35,
C23 1516/0.71, 1768/1.85, 2272/5.09, 2776/7.38, 3280/10.22 3784/13.12,
C24 4288/17.38, 4792/24.86, 5044/36.68. GUN AND CABLE STATIC (+10MS)
C25 TV FILTER (ms/Hz): 0/65, 1000/65, 2000/50, 3000/40, 4000/35, 5000/30
C26
C27 ----- GRID INFORMATION -----
C28 COORDINATE UNITS : METERS, PROCESSED DATUM : MSL
C29 BINNING ORIGIN(E,N) : 477692.83, 5737699.31
C30 BINNING ORIGIN (XLINE,INLINE) : (2/2)
C31 NO. XLINES/INLINES : 6499/2500, XLINE/INLINE INT : 12.5M/25M
C32 GRID MIN/MAX XLINE : 2/6500, GRID MIN/MAX INLINE : 2/5000
C33 CELL INCREMENT XLINE/INLINE : 1/2
C34 ROTATION ANGLE 44.566 (DEGR) (CLOCKWISE=POSITIVE)
C35 ----- POLARITY AND HEADER INFORMATION -----
C36 POLARITY: SEG NEGATIVE (INCREASE IN AC IMPEDANCE IS -VE NUMBER ON TAPE)
C37 BYTE 17-20(4I):XLINE NO. / 13-16(4I):INLINE NO. / 21-24(4I):CMP
C38 BYTE 73-76(4I):XCORD MIDPT, BYTE 77-80(4I):YCORD MIDPT
C39 BYTE 81-84(FP):XCORD MIDPT, BYTE 85-88(FP):YCORD MIDPT
C40 END EBCDIC
```

4.11.3 Undershoot Shot Gathers (Time-break corrected)

Line Name	First SP	Last SP	Apache Tape No.
1632U1091	2630	2331	Q05266
1632U1091	2330	2031	Q05267
1632U1091	2030	1729	Q05268
1632U1091	1728	1429	Q05269
1632U1091	1428	1122	Q05270
1632U1091	1121	959	Q05271
1632U2093	2630	2331	Q05273
1632U2093	2330	2031	Q05274
1632U2093	2030	1731	Q05275
1632U2093	1730	1431	Q05276
1632U2093	1430	1175	Q05277
1632U3095	2630	2331	Q05279
1632U3095	2330	2031	Q05280
1632U3095	2030	1731	Q05281
1632U3095	1730	1431	Q05282
1632U3095	1430	1210	Q05283
1632U4097	2630	2331	Q05285
1632U4097	2330	2031	Q05286

1632U4097	2030	1731	Q05287
1632U4097	1730	1431	Q05288
1632U4097	1430	1250	Q05289
1744U1092	1103	1402	Q05291
1744U1092	1403	1702	Q05292
1744U1092	1703	2004	Q05293
1744U1092	2005	2210	Q05294
1744U2094	1103	1402	Q05297
1744U2094	1403	1702	Q05298
1744U2094	1703	2002	Q05299
1744U2094	2003	2160	Q05300
1744U3096	1103	1402	Q05311
1744U3096	1403	1702	Q05312
1744U3096	1703	2002	Q05313
1744U3096	2003	2250	Q05314
1744U4098	1103	1402	Q05316
1744U4098	1403	1702	Q05317
1744U4098	1703	2000	Q05318

4.11.4 Field Tape Shot Gathers

Line Name	First SP	Last SP	Apache Tape No.	Esso Tape No.
1008P1074	2075	2376	Q05321	Q05940
1008P1074	2377	2681	Q05322	Q05941
1008P1074	2682	2909	Q05323	Q05942
1024P1073	2075	2375	Q05324	Q05943
1024P1073	2376	2676	Q05325	Q05944
1024P1073	2677	2948	Q05326	Q05945
1040P1071	2074	2374	Q05327	Q05946
1040P1071	2375	2674	Q05328	Q05947
1040P1071	2675	2934	Q05329	Q05948
1056P1067	1001	1300	Q05330	Q05949
1056P1067	1301	1600	Q05331	Q05950
1056P1067	1601	1900	Q05332	Q05951
1056P1067	1901	2200	Q05333	Q05952
1056P1067	2201	2500	Q05334	Q05953
1056P1067	2501	2801	Q05335	Q05954
1056P1067	2802	2934	Q05336	Q05955
1072P1069	1004	1304	Q05337	Q05956
1072P1069	1305	1606	Q05338	Q05957
1072P1069	1607	1907	Q05339	Q05958
1072P1069	1908	2207	Q05340	Q05959
1072P1069	2208	2508	Q05341	Q05960
1072P1069	2509	2808	Q05342	Q05961
1072P1069	2809	2988	Q05343	Q05962
1088P1068	3107	2808	Q05344	Q05963
1088P1068	2807	2507	Q05345	Q05964
1088P1068	2506	2206	Q05346	Q05965
1088P1068	2205	1904	Q05347	Q05966
1088P1068	1903	1604	Q05348	Q05967
1088P1068	1603	1303	Q05349	Q05968
1088P1068	1302	1101	Q05350	Q05969
1088P1068	1000	878	Q05351	Q05970
1104A1070	3120	2820	Q05352	Q05971
1104A1070	2819	2519	Q05353	Q05972

Line Name	First SP	Last SP	Apache Tape No.	Esso Tape No.
1104A1070	2518	2218	Q05354	Q05973
1104A1070	2217	1955	Q05355	Q05974
1104P1066	2484	2184	Q05356	Q05975
1104P1066	2183	1883	Q05357	Q05976
1104P1066	1882	1579	Q05358	Q05977
1104P1066	1578	1273	Q05359	Q05978
1104P1066	1272	969	Q05360	Q05979
1104P1066	968	881	Q05361	Q05980
1120P1064	3134	2834	Q05362	Q05981
1120P1064	2833	2534	Q05363	Q05982
1120P1064	2533	2233	Q05364	Q05983
1120P1064	2232	1927	Q05365	Q05984
1120P1064	1926	1626	Q05366	Q05985
1120P1064	1625	1326	Q05367	Q05986
1120P1064	1325	1025	Q05368	Q05987
1120P1064	1024	883	Q05369	Q05988
1136P1062	3140	2838	Q05370	Q05989
1136P1062	2837	2538	Q05371	Q05990
1136P1062	2537	2238	Q05372	Q05991
1136P1062	2237	1935	Q05373	Q05992
1136P1062	1934	1634	Q05374	Q05993
1136P1062	1633	1333	Q05375	Q05994
1136P1062	1332	1031	Q05376	Q05995
1136P1062	1030	885	Q05377	Q05996
1152P1060	3103	2804	Q05378	Q05997
1152P1060	2803	2502	Q05379	Q05998
1152P1060	2501	2198	Q05380	Q05999
1152P1060	2197	1898	Q05381	Q06000
1152P1060	1897	1598	Q05382	Q06001
1152P1060	1597	1298	Q05383	Q06002
1152P1060	1297	998	Q05384	Q06003
1152P1060	997	888	Q05385	Q06004
1168P1058	3065	2766	Q05386	Q06005
1168P1058	2765	2466	Q05387	Q06006
1168P1058	2465	2166	Q05388	Q06007
1168P1058	2165	1866	Q05389	Q06008
1168P1058	1865	1566	Q05390	Q06009
1168P1058	1565	1265	Q05391	Q06010
1168P1058	1264	965	Q05392	Q06011
1168P1058	964	890	Q05393	Q06012
1184P1056	3028	2729	Q05394	Q06013
1184P1056	2728	2429	Q05395	Q06014
1184P1056	2428	2126	Q05396	Q06015
1184P1056	2125	1825	Q05397	Q06016
1184P1056	1824	1524	Q05398	Q06017
1184P1056	1523	1209	Q05399	Q06018
1184P1056	1208	909	Q05400	Q06019
1184P1056	908	892	Q05401	Q06020
1200P1054	2988	2688	Q05402	Q06021
1200P1054	2687	2388	Q05403	Q06022
1200P1054	2387	2088	Q05404	Q06023
1200P1054	2087	1788	Q05405	Q06024
1200P1054	1787	1488	Q05406	Q06025
1200P1054	1487	1188	Q05407	Q06026
1200P1054	1187	895	Q05408	Q06027

Line Name	First SP	Last SP	Apache Tape No.	Esso Tape No.
1216P1040	2953	2654	Q05409	Q06028
1216P1040	2653	2354	Q05410	Q06029
1216P1040	2353	2054	Q05411	Q06030
1216P1040	2053	1754	Q05412	Q06031
1216P1040	1753	1454	Q05413	Q06032
1216P1040	1453	1149	Q05414	Q06033
1216P1040	1148	897	Q05415	Q06034
1232P1036	2944	2645	Q05416	Q06035
1232P1036	2644	2345	Q05417	Q06036
1232P1036	2344	2045	Q05418	Q06037
1232P1036	2044	1745	Q05419	Q06038
1232P1036	1744	1445	Q05420	Q06039
1232P1036	1444	1145	Q05421	Q06040
1232P1036	1144	899	Q05422	Q06041
1248P1034	2957	2657	Q05423	Q06042
1248P1034	2656	2357	Q05424	Q06043
1248P1034	2356	2057	Q05425	Q06044
1248P1034	2056	1757	Q05426	Q06045
1248P1034	1756	1457	Q05427	Q06046
1248P1034	1456	1157	Q05428	Q06047
1248P1034	1156	902	Q05429	Q06048
1264P1032	2970	2670	Q05430	Q06049
1264P1032	2669	2370	Q05431	Q06050
1264P1032	2369	2070	Q05432	Q06051
1264P1032	2069	1765	Q05433	Q06052
1264P1032	1764	1459	Q05434	Q06053
1264P1032	1458	1151	Q05435	Q06054
1264P1032	1150	904	Q05436	Q06055
1280P1030	2982	2683	Q05437	Q06056
1280P1030	2682	2383	Q05438	Q06057
1280P1030	2382	2083	Q05439	Q06058
1280P1030	2082	1783	Q05440	Q06059
1280P1030	1782	1483	Q05441	Q06060
1280P1030	1482	1183	Q05442	Q06061
1280P1030	1182	907	Q05443	Q06062
1296A1072	2028	1857	Q05444	Q06063
1296P1038	2980	2680	Q05445	Q06064
1296P1038	2679	2380	Q05446	Q06065
1296P1038	2379	2080	Q05447	Q06066
1296P1038	2079	1628	Q05448	Q06067
1296P1038	1627	1325	Q05449	Q06068
1296P1038	1324	1024	Q05450	Q06069
1296P1038	1023	909	Q05451	Q06070
1312P1065	1039	1342	Q05452	Q06071
1312P1065	1343	1644	Q05453	Q06072
1312P1065	1645	1945	Q05454	Q06073
1312P1065	1946	2245	Q05455	Q06074
1312P1065	2246	2547	Q05456	Q06075
1312P1065	2548	2853	Q05457	Q06076
1312P1065	2854	3136	Q05458	Q06077
1328P1063	1042	1342	Q05459	Q06078
1328P1063	1343	1642	Q05460	Q06079
1328P1063	1643	1943	Q05461	Q06080
1328P1063	1944	2243	Q05462	Q06081
1328P1063	2244	2543	Q05463	Q06082

Line Name	First SP	Last SP	Apache Tape No.	Esso Tape No.
1328P1063	2544	2843	Q05464	Q06083
1328P1063	2844	3143	Q05465	Q06084
1328P1063	3144	3148	Q05466	Q06085
1344P1061	1044	1343	Q05467	Q06086
1344P1061	1344	1646	Q05468	Q06087
1344P1061	1647	1946	Q05469	Q06088
1344P1061	1947	2246	Q05470	Q06089
1344P1061	2247	2546	Q05471	Q06090
1344P1061	2547	2848	Q05472	Q06091
1344P1061	2849	3150	Q05473	Q06092
1344P1061	3151	3161	Q05474	Q06093
1360P1059	1046	1351	Q05475	Q06094
1360P1059	1352	1652	Q05476	Q06095
1360P1059	1653	1953	Q05477	Q06096
1360P1059	1954	2255	Q05478	Q06097
1360P1059	2256	2555	Q05479	Q06098
1360P1059	2556	2857	Q05480	Q06099
1360P1059	2858	3158	Q05481	Q06100
1360P1059	3159	3174	Q05482	Q06101
1376P1057	1049	1349	Q05483	Q06102
1376P1057	1350	1649	Q05484	Q06103
1376P1057	1650	1950	Q05485	Q06104
1376P1057	1951	2250	Q05486	Q06105
1376P1057	2251	2550	Q05487	Q06106
1376P1057	2551	2850	Q05488	Q06107
1376P1057	2851	3150	Q05489	Q06108
1376P1057	3151	3186	Q05490	Q06109
1392P1055	1051	1350	Q05491	Q06110
1392P1055	1351	1650	Q05492	Q06111
1392P1055	1651	1950	Q05493	Q06112
1392P1055	1951	2250	Q05494	Q06113
1392P1055	2251	2550	Q05495	Q06114
1392P1055	2551	2850	Q05496	Q06115
1392P1055	2851	3150	Q05497	Q06116
1392P1055	3151	3199	Q05498	Q06117
1408A1086	1533	1790	Q05499	Q06118
1408P1053	1053	1352	Q05500	Q06119
1408P1053	1353	1658	Q05501	Q06120
1408P1053	1659	1958	Q05502	Q06121
1408P1053	1959	2258	Q05503	Q06122
1408P1053	2259	2558	Q05504	Q06123
1408P1053	2559	2859	Q05505	Q06124
1408P1053	2860	3159	Q05506	Q06125
1408P1053	3160	3212	Q05507	Q06126
1424P1049	1056	1356	Q05508	Q06127
1424P1049	1357	1659	Q05509	Q06128
1424P1049	1660	1964	Q05510	Q06129
1424P1049	1965	2267	Q05511	Q06130
1424P1049	2268	2568	Q05512	Q06131
1424P1049	2569	2869	Q05513	Q06132
1424P1049	2870	3169	Q05514	Q06133
1424P1049	3170	3224	Q05515	Q06134
1440A1087	2329	2586	Q05516	Q06135
1440P1039	1058	1360	Q05517	Q06136
1440P1039	1361	1660	Q05518	Q06137

Line Name	First SP	Last SP	Apache Tape No.	Esso Tape No.
1440P1039	1661	1960	Q05519	Q06138
1440P1039	1961	2261	Q05520	Q06139
1440P1039	2262	2611	Q05521	Q06140
1440P1039	2612	2912	Q05522	Q06141
1440P1039	2913	3212	Q05523	Q06142
1440P1039	3213	3237	Q05524	Q06143
1456P1037	1061	1361	Q05525	Q06144
1456P1037	1362	1665	Q05526	Q06145
1456P1037	1666	1968	Q05527	Q06146
1456P1037	1969	2269	Q05528	Q06147
1456P1037	2270	2571	Q05529	Q06148
1456P1037	2572	2873	Q05530	Q06149
1456P1037	2874	3173	Q05531	Q06150
1456P1037	3174	3250	Q05532	Q06151
1472P1035	1063	1362	Q05533	Q06152
1472P1035	1364	1664	Q05534	Q06153
1472P1035	1665	1964	Q05535	Q06154
1472P1035	1965	2264	Q05536	Q06155
1472P1035	2265	2564	Q05537	Q06156
1472P1035	2565	2865	Q05538	Q06157
1472P1035	2866	3165	Q05539	Q06158
1472P1035	3166	3262	Q05540	Q06159
1488A1082	1065	1568	Q05541	Q06160
1488A1082	1569	1798	Q05542	Q06161
1488P1033	1172	1471	Q05544	Q06163
1488P1033	1472	1800	Q05545	Q06164
1488P1033	1801	2101	Q05546	Q06165
1488P1033	2102	2401	Q05547	Q06166
1488P1033	2402	2703	Q05548	Q06167
1488P1033	2704	3003	Q05549	Q06168
1488P1033	3004	3275	Q05550	Q06169
1504P1031	1068	1367	Q05552	Q06205
1504P1031	1368	1667	Q05553	Q06206
1504P1031	1668	1967	Q05554	Q06207
1504P1031	1968	2267	Q05555	Q06208
1504P1031	2268	2567	Q05556	Q06209
1504P1031	2568	2867	Q05557	Q06210
1504P1031	2868	3168	Q05558	Q06211
1504P1031	3169	3288	Q05559	Q06212
1520P1029	1070	1369	Q05560	Q06213
1520P1029	1370	1669	Q05561	Q06214
1520P1029	1670	1969	Q05562	Q06215
1520P1029	1970	2269	Q05563	Q06216
1520P1029	2270	2569	Q05564	Q06217
1520P1029	2570	2869	Q05565	Q06218
1520P1029	2870	3169	Q05566	Q06219
1520P1029	3170	3300	Q05567	Q06220
1536P1001	3185	2885	Q05568	Q06221
1536P1001	2884	2584	Q05569	Q06222
1536P1001	2583	2282	Q05570	Q06223
1536P1001	2281	1980	Q05571	Q06224
1536P1001	1979	1680	Q05572	Q06225
1536P1001	1679	1378	Q05573	Q06226
1536P1001	1377	1077	Q05574	Q06227
1536P1001	1076	944	Q05575	Q06228

Line Name	First SP	Last SP	Apache Tape No.	Esso Tape No.
1552P1004	3197	2887	Q05576	Q06229
1552P1004	2886	2571	Q05577	Q06230
1552P1004	2570	2256	Q05578	Q06231
1552P1004	2255	1943	Q05579	Q06232
1552P1004	1942	1643	Q05580	Q06233
1552P1004	1642	1343	Q05581	Q06234
1552P1004	1342	1039	Q05582	Q06235
1552P1004	1038	947	Q05583	Q06236
1568P1006	3210	2911	Q05584	Q06237
1568P1006	2910	2611	Q05585	Q06238
1568P1006	2610	2311	Q05586	Q06239
1568P1006	2310	2009	Q05587	Q06240
1568P1006	2008	1709	Q05588	Q06241
1568P1006	1708	1408	Q05589	Q06242
1568P1006	1407	1108	Q05590	Q06243
1568P1006	1107	949	Q05591	Q06244
1584P1008	3223	2924	Q05592	Q06245
1584P1008	2923	2619	Q05593	Q06246
1584P1008	2618	2316	Q05594	Q06247
1584P1008	2315	2016	Q05595	Q06248
1584P1008	2015	1716	Q05596	Q06249
1584P1008	1715	1415	Q05597	Q06250
1584P1008	1414	1115	Q05598	Q06251
1584P1008	1114	951	Q05599	Q06252
1600P1010	3236	2937	Q05600	Q06253
1600P1010	2936	2637	Q05601	Q06254
1600P1010	2636	2337	Q05602	Q06255
1600P1010	2336	2037	Q05603	Q06256
1600P1010	2036	1737	Q05604	Q06257
1600P1010	1736	1437	Q05605	Q06258
1600P1010	1436	1137	Q05606	Q06259
1600P1010	1136	954	Q05607	Q06260
1616P1012	3248	2949	Q05608	Q06261
1616P1012	2948	2649	Q05609	Q06262
1616P1012	2648	2349	Q05610	Q06263
1616P1012	2348	2049	Q05611	Q06264
1616P1012	2048	1749	Q05612	Q06265
1616P1012	1748	1448	Q05613	Q06266
1616P1012	1447	1148	Q05614	Q06267
1616P1012	1147	956	Q05615	Q06268
1632P1014	3261	2962	Q05616	Q06269
1632P1014	2961	2662	Q05617	Q06270
1632P1014	2661	2359	Q05618	Q06271
1632P1014	2358	2059	Q05619	Q06272
1632P1014	2058	1758	Q05620	Q06273
1632P1014	1757	1454	Q05621	Q06274
1632P1014	1453	1153	Q05622	Q06275
1632P1014	1152	960	Q05623	Q06276
1632U1091	2630	2331	Q05624	Q06277
1632U1091	2330	2031	Q05625	Q06278
1632U1091	2030	1729	Q05626	Q06279
1632U1091	1728	1429	Q05627	Q06280
1632U1091	1428	1122	Q05628	Q06281
1632U1091	1121	959	Q05629	Q06282
1632U2093	2630	2331	Q05630	Q06283

Line Name	First SP	Last SP	Apache Tape No.	Esso Tape No.
1632U2093	2330	2031	Q05631	Q06284
1632U2093	2030	1731	Q05632	Q06285
1632U2093	1730	1431	Q05633	Q06286
1632U2093	1430	1175	Q05634	Q06287
1632U3095	2630	2331	Q05635	Q06288
1632U3095	2330	2031	Q05636	Q06289
1632U3095	2030	1731	Q05637	Q06290
1632U3095	1730	1431	Q05638	Q06291
1632U3095	1430	1210	Q05639	Q06292
1632U4097	2630	2331	Q05640	Q06293
1632U4097	2330	2031	Q05641	Q06294
1632U4097	2030	1731	Q05642	Q06295
1632U4097	1730	1431	Q05643	Q06296
1632U4097	1430	1250	Q05644	Q06297
1648P1016	3266	2967	Q05645	Q06298
1648P1016	2966	2666	Q05646	Q06299
1648P1016	2665	2366	Q05647	Q06300
1648P1016	2365	2066	Q05648	Q06301
1648P1016	2065	1764	Q05649	Q06302
1648P1016	1763	1460	Q05650	Q06303
1648P1016	1459	1156	Q05651	Q06304
1648P1016	1155	961	Q05652	Q06305
1664P1018	3286	2986	Q05653	Q06306
1664P1018	2985	2685	Q05654	Q06307
1664P1018	2684	2385	Q05655	Q06308
1664P1018	2384	2083	Q05656	Q06309
1664P1018	2082	1783	Q05657	Q06310
1664P1018	1782	1483	Q05658	Q06311
1664P1018	1482	1182	Q05659	Q06312
1664P1018	1181	963	Q05660	Q06313
1680A1051	1094	1395	Q05661	Q06314
1680A1051	1396	1696	Q05662	Q06315
1680A1051	1697	1875	Q05663	Q06316
1680P1019	1866	2168	Q05664	Q06317
1680P1019	2169	2471	Q05665	Q06318
1680P1019	2472	2772	Q05666	Q06319
1680P1019	2773	3072	Q05667	Q06320
1680P1019	3073	3372	Q05668	Q06321
1680P1019	3373	3427	Q05669	Q06322
1696P1021	1096	1395	Q05670	Q06323
1696P1021	1396	1695	Q05671	Q06324
1696P1021	1696	1995	Q05672	Q06325
1696P1021	1996	2295	Q05673	Q06326
1696P1021	2296	2596	Q05674	Q06327
1696P1021	2597	2896	Q05675	Q06328
1696P1021	2897	3196	Q05676	Q06329
1696P1021	3197	3440	Q05677	Q06330
1712A1052	2694	2745	Q05678	Q06331
1712P1023	1101	1400	Q05679	Q06332
1712P1023	1401	1701	Q05680	Q06333
1712P1023	1702	2001	Q05681	Q06334
1712P1023	2002	2301	Q05682	Q06335
1712P1023	2302	2601	Q05683	Q06336
1712P1023	2602	2934	Q05684	Q06337
1712P1023	2935	3234	Q05685	Q06338

Line Name	First SP	Last SP	Apache Tape No.	Esso Tape No.
1712P1023	3235	3452	Q05686	Q06339
1728P1041	1101	1400	Q05687	Q06340
1728P1041	1401	1701	Q05688	Q06341
1728P1041	1702	2001	Q05689	Q06342
1728P1041	2002	2301	Q05690	Q06343
1728P1041	2302	2601	Q05691	Q06344
1728P1041	2602	2901	Q05692	Q06345
1728P1041	2902	3201	Q05693	Q06346
1728P1041	3202	3465	Q05694	Q06347
1744P1043	1382	1681	Q05695	Q06348
1744P1043	1682	1981	Q05696	Q06349
1744P1043	1982	2281	Q05697	Q06350
1744P1043	2282	2581	Q05698	Q06351
1744P1043	2582	2881	Q05699	Q06352
1744P1043	2882	3186	Q05700	Q06353
1744P1043	3187	3478	Q05701	Q06354
1744U1092	1103	1402	Q05702	Q06355
1744U1092	1403	1702	Q05703	Q06356
1744U1092	1703	2004	Q05704	Q06357
1744U1092	2005	2210	Q05705	Q06358
1744U2094	1103	1402	Q05706	Q06359
1744U2094	1403	1702	Q05707	Q06360
1744U2094	1703	2002	Q05708	Q06361
1744U2094	2003	2160	Q05709	Q06362
1744U3096	1103	1402	Q05710	Q06363
1744U3096	1403	1702	Q05711	Q06364
1744U3096	1703	2002	Q05712	Q06365
1744U3096	2003	2250	Q05713	Q06366
1744U4098	1103	1402	Q05714	Q06367
1744U4098	1403	1702	Q05715	Q06368
1744U4098	1703	2000	Q05716	Q06369
1760J1047	1098	1397	Q05717	Q06370
1760J1047	1398	1699	Q05718	Q06371
1760J1047	1700	1999	Q05719	Q06372
1760J1047	2000	2299	Q05720	Q06373
1760J1047	2300	2599	Q05721	Q06374
1760J1047	2600	2902	Q05722	Q06375
1760J1047	2903	3209	Q05723	Q06376
1760J1047	3210	3490	Q05724	Q06377
1760P1045	1098	1397	Q05725	Q06378
1760P1045	1398	1697	Q05726	Q06379
1760P1045	1698	1997	Q05727	Q06380
1760P1045	1998	2303	Q05728	Q06381
1760P1045	2304	2603	Q05729	Q06382
1760P1045	2604	2903	Q05730	Q06383
1760P1045	2904	3204	Q05731	Q06384
1760P1045	3205	3490	Q05732	Q06385
1776P1027	1119	1418	Q05733	Q06386
1776P1027	1419	1719	Q05734	Q06387
1776P1027	1720	2019	Q05735	Q06388
1776P1027	2020	2319	Q05736	Q06389
1776P1027	2320	2619	Q05737	Q06390
1776P1027	2620	2919	Q05738	Q06391
1776P1027	2920	3222	Q05739	Q06392
1776P1027	3223	3503	Q05740	Q06393

Line Name	First SP	Last SP	Apache Tape No.	Esso Tape No.
1792P1025	1140	1439	Q05741	Q06394
1792P1025	1440	1739	Q05742	Q06395
1792P1025	1740	2039	Q05743	Q06396
1792P1025	2040	2339	Q05744	Q06397
1792P1025	2340	2639	Q05745	Q06398
1792P1025	2640	2939	Q05746	Q06399
1792P1025	2940	3239	Q05747	Q06400
1792P1025	3240	3516	Q05748	Q06401
1808P1002	1161	1463	Q05749	Q06402
1808P1002	1464	1771	Q05750	Q06403
1808P1002	1772	2071	Q05751	Q06404
1808P1002	2072	2375	Q05752	Q06405
1808P1002	2376	2679	Q05753	Q06406
1808P1002	2680	2983	Q05754	Q06407
1808P1002	2984	3284	Q05755	Q06408
1808P1002	3285	3528	Q05756	Q06409
1824P1003	1182	1483	Q05757	Q06410
1824P1003	1484	1791	Q05758	Q06411
1824P1003	1792	2101	Q05759	Q06412
1824P1003	2102	2404	Q05760	Q06413
1824P1003	2405	2710	Q05761	Q06414
1824P1003	2711	3014	Q05762	Q06415
1824P1003	3015	3321	Q05763	Q06416
1824P1003	3322	3541	Q05764	Q06417
1840P1005	1203	1506	Q05765	Q06418
1840P1005	1507	1807	Q05766	Q06419
1840P1005	1808	2108	Q05767	Q06420
1840P1005	2109	2408	Q05768	Q06421
1840P1005	2409	2709	Q05769	Q06422
1840P1005	2710	3009	Q05770	Q06423
1840P1005	3010	3309	Q05771	Q06424
1840P1005	3310	3554	Q05772	Q06425
1856P1007	1224	1523	Q05773	Q06426
1856P1007	1524	1823	Q05774	Q06427
1856P1007	1824	2124	Q05775	Q06428
1856P1007	2125	2427	Q05776	Q06429
1856P1007	2428	2728	Q05777	Q06430
1856P1007	2729	3028	Q05778	Q06431
1856P1007	3029	3329	Q05779	Q06432
1856P1007	3330	3556	Q05780	Q06433
1872P1009	1245	1550	Q05781	Q06434
1872P1009	1551	1852	Q05782	Q06435
1872P1009	1853	2157	Q05783	Q06436
1872P1009	2158	2458	Q05784	Q06437
1872P1009	2459	2759	Q05785	Q06438
1872P1009	2760	3070	Q05786	Q06439
1872P1009	3071	3371	Q05787	Q06440
1872P1009	3372	3579	Q05788	Q06441
1888P1011	1266	1568	Q05789	Q06442
1888P1011	1569	1868	Q05790	Q06443
1888P1011	1869	2170	Q05791	Q06444
1888P1011	2171	2472	Q05792	Q06445
1888P1011	2473	2773	Q05793	Q06446
1888P1011	2774	3077	Q05794	Q06447
1888P1011	3078	3377	Q05795	Q06448

Line Name	First SP	Last SP	Apache Tape No.	Esso Tape No.
1888P1011	3378	3591	Q05796	Q06449
1904P1013	1287	1588	Q05797	Q06450
1904P1013	1589	1889	Q05798	Q06451
1904P1013	1890	2191	Q05799	Q06452
1904P1013	2192	2491	Q05800	Q06453
1904P1013	2492	2791	Q05801	Q06454
1904P1013	2792	3098	Q05802	Q06455
1904P1013	3099	3398	Q05803	Q06456
1904P1013	3399	3604	Q05804	Q06457
1920P1015	1308	1611	Q05805	Q06458
1920P1015	1612	1913	Q05806	Q06459
1920P1015	1914	2214	Q05807	Q06460
1920P1015	2215	2515	Q05808	Q06461
1920P1015	2516	2815	Q05809	Q06462
1920P1015	2816	3118	Q05810	Q06463
1920P1015	3119	3420	Q05811	Q06464
1920P1015	3421	3617	Q05812	Q06465
1936P1017	1329	1640	Q05813	Q06466
1936P1017	1641	1949	Q05814	Q06467
1936P1017	1950	2251	Q05815	Q06468
1936P1017	2252	2551	Q05816	Q06469
1936P1017	2552	2851	Q05817	Q06470
1936P1017	2852	3152	Q05818	Q06471
1936P1017	3153	3452	Q05819	Q06472
1936P1017	3453	3629	Q05820	Q06473
1952P1020	3514	3215	Q05821	Q06474
1952P1020	3214	2915	Q05822	Q06475
1952P1020	2914	2615	Q05823	Q06476
1952P1020	2614	2315	Q05824	Q06477
1952P1020	2314	2014	Q05825	Q06478
1952P1020	2013	1714	Q05826	Q06479
1952P1020	1713	1414	Q05827	Q06480
1952P1020	1413	1222	Q05828	Q06481
1968P1022	3527	3228	Q05829	Q06482
1968P1022	3227	2927	Q05830	Q06483
1968P1022	2926	2627	Q05831	Q06484
1968P1022	2626	2327	Q05832	Q06485
1968P1022	2326	2025	Q05833	Q06486
1968P1022	2024	1722	Q05834	Q06487
1968P1022	1721	1421	Q05835	Q06488
1968P1022	1420	1243	Q05836	Q06489
1984J1088	3539	3240	Q05837	Q06490
1984J1088	3239	2939	Q05838	Q06491
1984J1088	2938	2639	Q05839	Q06492
1984J1088	2638	2337	Q05840	Q06493
1984J1088	2336	2036	Q05841	Q06494
1984J1088	2035	1736	Q05842	Q06495
1984J1088	1735	1436	Q05843	Q06496
1984J1088	1435	1264	Q05844	Q06497
1984P1026	3539	3240	Q05845	Q06498
1984P1026	3239	2940	Q05846	Q06499
1984P1026	2939	2639	Q05847	Q06500
1984P1026	2638	2339	Q05848	Q06501
1984P1026	2338	2039	Q05849	Q06502
1984P1026	2038	1739	Q05850	Q06503

Line Name	First SP	Last SP	Apache Tape No.	Esso Tape No.
1984P1026	1738	1439	Q05851	Q06504
1984P1026	1438	1264	Q05852	Q06505
2000J1042	3552	3253	Q05853	Q06506
2000J1042	3252	2953	Q05854	Q06507
2000J1042	2952	2651	Q05855	Q06508
2000J1042	2650	2351	Q05856	Q06509
2000J1042	2350	2051	Q05857	Q06510
2000J1042	2050	1751	Q05858	Q06511
2000J1042	1750	1450	Q05859	Q06512
2000J1042	1449	1285	Q05860	Q06513
2000P1028	3552	3253	Q05861	Q06514
2000P1028	3252	2953	Q05862	Q06515
2000P1028	2952	2653	Q05863	Q06516
2000P1028	2652	2353	Q05864	Q06517
2000P1028	2352	2053	Q05865	Q06518
2000P1028	2052	1753	Q05866	Q06519
2000P1028	1752	1453	Q05867	Q06520
2000P1028	1452	1285	Q05868	Q06521
2016P044	3565	3266	Q05869	Q06522
2016P044	3265	2966	Q05870	Q06523
2016P044	2965	2660	Q05871	Q06524
2016P044	2659	2360	Q05872	Q06525
2016P044	2359	2060	Q05873	Q06526
2016P044	2059	1758	Q05874	Q06527
2016P044	1757	1458	Q05875	Q06528
2016P044	1457	1306	Q05876	Q06529
2032P1046	3577	3278	Q05877	Q06530
2032P1046	3277	2977	Q05878	Q06531
2032P1046	2976	2677	Q05879	Q06532
2032P1046	2676	2377	Q05880	Q06533
2032P1046	2376	2077	Q05881	Q06534
2032P1046	2076	1777	Q05882	Q06535
2032P1046	1776	1474	Q05883	Q06536
2032P1046	1473	1327	Q05884	Q06537
2048P1048	3590	3290	Q05885	Q06538
2048P1048	3289	2989	Q05886	Q06539
2048P1048	2988	2686	Q05887	Q06540
2048P1048	2685	2386	Q05888	Q06541
2048P1048	2385	2083	Q05889	Q06542
2048P1048	2082	1780	Q05890	Q06543
2048P1048	1779	1479	Q05891	Q06544
2048P1048	1478	1348	Q05892	Q06545
2064A1083	1983	1791	Q05893	Q06546
2064J1075	3603	3303	Q05894	Q06547
2064J1075	3302	3003	Q05895	Q06548
2064J1075	3002	2699	Q05896	Q06549
2064J1075	2698	2399	Q05897	Q06550
2064J1075	2398	2099	Q05898	Q06551
2064J1075	2098	1763	Q05899	Q06552
2064J1075	1762	1457	Q05900	Q06553
2064J1075	1456	1369	Q05901	Q06554
2064P1050	3530	3228	Q05902	Q06555
2064P1050	3227	2927	Q05903	Q06556
2064P1050	2926	2627	Q05904	Q06557
2064P1050	2626	2327	Q05905	Q06558

Line Name	First SP	Last SP	Apache Tape No.	Esso Tape No.
2064P1050	2326	2026	Q05906	Q06559
2064P1050	2025	1726	Q05907	Q06560
2064P1050	1725	1426	Q05908	Q06561
2064P1050	1425	1369	Q05909	Q06562
2080P1024	2215	1916	Q05910	Q06563
2080P1024	1915	1615	Q05911	Q06564
2080P1024	1614	1390	Q05912	Q06565
2096P1077	2193	1893	Q05913	Q06566
2096P1077	1892	1589	Q05914	Q06567
2096P1077	1588	1411	Q05915	Q06568
2112P1079	2171	1871	Q05916	Q06569
2112P1079	1870	1570	Q05917	Q06570
2112P1079	1569	1432	Q05918	Q06571
2128P1081	2149	1850	Q05919	Q06572
2128P1081	1849	1549	Q05920	Q06573
2128P1081	1548	1453	Q05921	Q06574
2144J1090	2127	1827	Q05922	Q06575
2144J1090	1826	1525	Q05923	Q06576
2144J1090	1524	1474	Q05924	Q06577
2144P1085	2127	1822	Q05925	Q06578
2144P1085	1821	1517	Q05926	Q06579
2144P1085	1516	1474	Q05927	Q06580
2160P1089	1623	1923	Q05928	Q06581
2160P1089	1924	2223	Q05929	Q06582
2160P1089	2224	2233	Q05930	Q06583
2176P1084	1644	1947	Q05931	Q06584
2176P1084	1948	2211	Q05932	Q06585
2192P1080	1665	1964	Q05933	Q06586
2192P1080	1965	2189	Q05934	Q06587
2208P1078	1686	1986	Q05935	Q06588
2208P1078	1987	2167	Q05936	Q06589
2224P1076	1707	2007	Q05937	Q06590
2224P1076	2008	2145	Q05938	Q06591

4.11.5 Tau-P DBS Shot Gathers

Line Name	First SP	Last SP	Apache Tape No.	Esso Tape No.
1008P1074	2075	2681	Q07522	Q07198
1008P1074	2682	2909	Q07523	Q07199
1024P1073	2075	2676	Q07524	Q07200
1024P1073	2677	2942	Q07525	Q07201
1040P1071	2074	2674	Q07526	Q07202
1040P1071	2675	2932	Q07527	Q07203
1056P1067	1001	1600	Q07528	Q07204
1056P1067	1601	2200	Q07529	Q07205
1056P1067	2201	2801	Q07530	Q07206
1056P1067	2802	2932	Q07531	Q07207
1072P1069	1004	1606	Q07532	Q07208
1072P1069	1607	2207	Q07533	Q07209
1072P1069	2208	2808	Q07534	Q07210
1072P1069	2809	2985	Q07535	Q07211
1088P1068	3107	2507	Q07536	Q07212

Line Name	First SP	Last SP	Apache Tape No.	Esso Tape No.
1088P1068	2506	1904	Q07537	Q07213
1088P1068	1903	1303	Q07538	Q07214
1088P1068	1302	878	Q07539	Q07215
1104A1070	3120	2519	Q07540	Q07216
1104A1070	2518	1955	Q07541	Q07217
1104P1066	2484	1883	Q07542	Q07218
1104P1066	1882	1273	Q07543	Q07219
1104P1066	1272	881	Q07544	Q07220
1120P1064	3134	2534	Q07545	Q07221
1120P1064	2533	1927	Q07546	Q07222
1120P1064	1926	1326	Q07547	Q07223
1120P1064	1325	883	Q07548	Q07224
1136P1062	3140	2538	Q07549	Q07225
1136P1062	2537	1935	Q07550	Q07226
1136P1062	1934	1333	Q07551	Q07227
1136P1062	1332	885	Q07552	Q07228
1152P1060	3103	2502	Q07553	Q07229
1152P1060	2501	1898	Q07554	Q07230
1152P1060	1897	1298	Q07555	Q07231
1152P1060	1297	888	Q07556	Q07232
1168P1058	3065	2466	Q07557	Q07233
1168P1058	2465	1866	Q07558	Q07234
1168P1058	1865	1265	Q07559	Q07235
1168P1058	1264	890	Q07560	Q07236
1184P1056	3028	2429	Q07561	Q07237
1184P1056	2429	1825	Q07562	Q07238
1184P1056	1824	1209	Q07563	Q07239
1184P1056	1208	892	Q07564	Q07240
1200P1054	2988	2388	Q07565	Q07241
1200P1054	2387	1788	Q07566	Q07242
1200P1054	1787	1188	Q07567	Q07243
1200P1054	1187	895	Q07568	Q07244
1216P1040	2953	2354	Q07569	Q07245
1216P1040	2353	1754	Q07570	Q07246
1216P1040	1753	1149	Q07571	Q07247
1216P1040	1148	897	Q07572	Q07248
1232P1036	2944	2345	Q07573	Q07249
1232P1036	2344	1745	Q07574	Q07250
1232P1036	1744	1145	Q07575	Q07251
1232P1036	1144	899	Q07576	Q07252
1248P1034	2957	2357	Q07577	Q07253
1248P1034	2356	1757	Q07578	Q07254
1248P1034	1756	1157	Q07579	Q07255
1248P1034	1156	902	Q07580	Q07256
1264P1032	2970	2370	Q07581	Q07257
1264P1032	2369	1765	Q07582	Q07258
1264P1032	1764	1151	Q07583	Q07259
1264P1032	1150	904	Q07584	Q07260
1280P1030	2982	2383	Q07585	Q07261
1280P1030	2382	1783	Q07586	Q07262
1280P1030	1782	1183	Q07587	Q07263
1280P1030	1182	907	Q07588	Q07264
1296A1072	2028	1857	Q07589	Q07265
1296P1038	2980	2380	Q07590	Q07266
1296P1038	2379	1628	Q07591	Q07267

Line Name	First SP	Last SP	Apache Tape No.	Esso Tape No.
1296P1038	1627	1024	Q07592	Q07268
1296P1038	1023	909	Q07593	Q07269
1312P1065	1039	1644	Q07594	Q07270
1312P1065	1645	2245	Q07595	Q07271
1312P1065	2246	2853	Q07596	Q07272
1312P1065	2854	3136	Q07597	Q07273
1328P1063	1042	1642	Q07598	Q07274
1328P1063	1643	2243	Q07599	Q07275
1328P1063	2244	2843	Q07600	Q07276
1328P1063	2844	3148	Q07601	Q07277
1344P1061	1044	1646	Q07602	Q07278
1344P1061	1647	2246	Q07603	Q07279
1344P1061	2247	2848	Q07604	Q07280
1344P1061	2849	3161	Q07605	Q07281
1360P1059	1046	1652	Q07606	Q07282
1360P1059	1653	2255	Q07607	Q07283
1360P1059	2256	2857	Q07608	Q07284
1360P1059	2858	3174	Q07609	Q07285
1376P1057	1049	1649	Q07610	Q07286
1376P1057	1650	2250	Q07611	Q07287
1376P1057	2251	2850	Q07612	Q07288
1376P1057	2851	3186	Q07613	Q07289
1392P1055	1051	1650	Q07614	Q07290
1392P1055	1651	2250	Q07615	Q07291
1392P1055	2251	2850	Q07616	Q07292
1392P1055	2851	3199	Q07617	Q07293
1408A1086	1533	1790	Q07618	Q07294
1408P1053	1053	1666	Q07619	Q07295
1408P1053	1667	2266	Q07620	Q07296
1408P1053	2267	2867	Q07621	Q07297
1408P1053	2868	3212	Q07622	Q07298
1424P1049	1056	1659	Q07623	Q07299
1424P1049	1660	2267	Q07624	Q07300
1424P1049	2268	2869	Q07625	Q07301
1424P1049	2870	3224	Q07626	Q07302
1440A1087	2329	2586	Q07627	Q07303
1440P1039	1058	1660	Q07628	Q07304
1440P1039	1661	2261	Q07629	Q07305
1440P1039	2262	2912	Q07630	Q07306
1440P1039	2913	3237	Q07631	Q07307
1456P1037	1061	1665	Q07632	Q07308
1456P1037	1666	2269	Q07633	Q07309
1456P1037	2270	2873	Q07634	Q07310
1456P1037	2874	3250	Q07635	Q07311
1472P1035	1063	1664	Q07636	Q07312
1472P1035	1665	2264	Q07637	Q07313
1472P1035	2265	2865	Q07638	Q07314
1472P1035	2866	3262	Q07639	Q07315
1488A1082	1065	1798	Q07640	Q07316
1488P1033	1172	1800	Q07641	Q07317
1488P1033	1801	2401	Q07642	Q07318
1488P1033	2402	3003	Q07643	Q07319
1488P1033	3004	3275	Q07644	Q07320
1504P1031	1068	1668	Q07645	Q07321
1504P1031	1669	2268	Q07646	Q07322

Line Name	First SP	Last SP	Apache Tape No.	Esso Tape No.
1504P1031	2269	2869	Q07647	Q07323
1504P1031	2870	3288	Q07648	Q07324
1520P1029	1070	1669	Q07649	Q07325
1520P1029	1670	2270	Q07650	Q07326
1520P1029	2271	2870	Q07651	Q07327
1520P1029	2871	3300	Q07652	Q07328
1536P1001	3185	2584	Q07653	Q07329
1536P1001	2583	1980	Q07654	Q07330
1536P1001	1979	1378	Q07655	Q07331
1536P1001	1377	944	Q07656	Q07332
1552P1004	3197	2570	Q07657	Q07333
1552P1004	2569	1942	Q07658	Q07334
1552P1004	1941	1342	Q07659	Q07335
1552P1004	1341	947	Q07660	Q07336
1568P1006	3210	2611	Q07661	Q07337
1568P1006	2610	2009	Q07662	Q07338
1568P1006	2008	1408	Q07663	Q07339
1568P1006	1407	949	Q07664	Q07340
1584P1008	3223	2619	Q07665	Q07341
1584P1008	2618	2016	Q07666	Q07342
1584P1008	2015	1415	Q07667	Q07343
1584P1008	1414	951	Q07668	Q07344
1600P1010	3236	2637	Q07669	Q07345
1600P1010	2636	2037	Q07670	Q07346
1600P1010	2036	1437	Q07671	Q07347
1600P1010	1436	954	Q07672	Q07348
1616P1012	3248	2649	Q07673	Q07349
1616P1012	2648	2049	Q07674	Q07350
1616P1012	2048	1448	Q07675	Q07351
1616P1012	1447	956	Q07676	Q07352
1632P1014	3261	2662	Q07677	Q07353
1632P1014	2661	2059	Q07678	Q07354
1632P1014	2058	1454	Q07679	Q07355
1632P1014	1453	960	Q07680	Q07356
1632U1091	2630	2031	Q07681	Q07357
1632U1091	2030	1429	Q07682	Q07358
1632U1091	1428	959	Q07683	Q07359
1632U2093	2630	2029	Q07684	Q07360
1632U2093	2028	1428	Q07685	Q07361
1632U2093	1427	1175	Q07686	Q07362
1632U3095	2630	2031	Q07687	Q07363
1632U3095	2030	1431	Q07688	Q07364
1632U3095	1430	1210	Q07689	Q07365
1632U4097	2630	2031	Q07690	Q07366
1632U4097	2030	1431	Q07691	Q07367
1632U4097	1430	1250	Q07692	Q07368
1648P1016	3266	2666	Q07693	Q07369
1648P1016	2665	2066	Q07694	Q07370
1648P1016	2065	1460	Q07695	Q07371
1648P1016	1459	961	Q07696	Q07372
1664P1018	3286	2685	Q07697	Q07373
1664P1018	2684	2083	Q07698	Q07374
1664P1018	2082	1483	Q07699	Q07375
1664P1018	1482	963	Q07700	Q07376
1680A1051	1094	1696	Q07701	Q07377

Line Name	First SP	Last SP	Apache Tape No.	Esso Tape No.
1680A1051	1697	1874	Q07702	Q07378
1680P1019	1866	2471	Q07703	Q07379
1680P1019	2472	3072	Q07704	Q07380
1680P1019	3073	3427	Q07705	Q07381
1696P1021	1096	1695	Q07706	Q07382
1696P1021	1696	2295	Q07707	Q07383
1696P1021	2296	2896	Q07708	Q07384
1696P1021	2897	3440	Q07709	Q07385
1712A1052	2694	2745	Q07710	Q07386
1712P1023	1101	1701	Q07711	Q07387
1712P1023	1702	2301	Q07712	Q07388
1712P1023	2302	2934	Q07713	Q07389
1712P1023	2935	3452	Q07714	Q07390
1728P1041	1101	1701	Q07715	Q07391
1728P1041	1702	2301	Q07716	Q07392
1728P1041	2302	2901	Q07717	Q07393
1728P1041	2902	3465	Q07718	Q07394
1744P1043	1382	1981	Q07719	Q07395
1744P1043	1982	2581	Q07720	Q07396
1744P1043	2582	3186	Q07721	Q07397
1744P1043	3187	3478	Q07722	Q07398
1744U1092	1103	1702	Q07723	Q07399
1744U1092	1703	2210	Q07724	Q07400
1744U2094	1103	1702	Q07725	Q07401
1744U2094	1703	2160	Q07726	Q07402
1744U3096	1103	1702	Q07727	Q07403
1744U3096	1703	2250	Q07728	Q07404
1744U4098	1103	1702	Q07729	Q07405
1744U4098	1703	2000	Q07730	Q07406
1760J1047	1098	1699	Q07731	Q07407
1760J1047	1700	2299	Q07732	Q07408
1760J1047	2300	2902	Q07733	Q07409
1760J1047	2903	3490	Q07734	Q07410
1760P1045	1098	1697	Q07735	Q07411
1760P1045	1698	2303	Q07736	Q07412
1760P1045	2304	2903	Q07737	Q07413
1760P1045	2904	3490	Q07738	Q07414
1776P1027	1119	1719	Q07739	Q07415
1776P1027	1720	2319	Q07740	Q07416
1776P1027	2320	2919	Q07741	Q07417
1776P1027	2920	3503	Q07742	Q07418
1792P1025	1140	1740	Q07743	Q07419
1792P1025	1741	2341	Q07744	Q07420
1792P1025	2342	2941	Q07745	Q07421
1792P1025	2942	3516	Q07746	Q07422
1808P1002	1161	1771	Q07747	Q07423
1808P1002	1772	2375	Q07748	Q07424
1808P1002	2376	2983	Q07749	Q07425
1808P1002	2984	3528	Q07750	Q07426
1824P1003	1182	1791	Q07751	Q07427
1824P1003	1792	2404	Q07752	Q07428
1824P1003	2405	3014	Q07753	Q07429
1824P1003	3015	3541	Q07754	Q07430
1840P1005	1203	1807	Q07755	Q07431
1840P1005	1808	2408	Q07756	Q07432

Line Name	First SP	Last SP	Apache Tape No.	Esso Tape No.
1840P1005	2409	3009	Q07757	Q07433
1840P1005	3010	3554	Q07758	Q07434
1856P1007	1224	1824	Q07759	Q07435
1856P1007	1825	2429	Q07760	Q07436
1856P1007	2430	3030	Q07761	Q07437
1856P1007	3031	3556	Q07762	Q07438
1872P1009	1245	1852	Q07763	Q07439
1872P1009	1853	2458	Q07764	Q07440
1872P1009	2459	3070	Q07765	Q07441
1872P1009	3071	3579	Q07766	Q07442
1888P1011	1266	1868	Q07767	Q07443
1888P1011	1869	2472	Q07768	Q07444
1888P1011	2473	3077	Q07769	Q07445
1888P1011	3078	3591	Q07770	Q07446
1904P1013	1287	1889	Q07771	Q07447
1904P1013	1890	2491	Q07772	Q07448
1904P1013	2492	3098	Q07773	Q07449
1904P1013	3099	3604	Q07774	Q07450
1920P1015	1308	1913	Q07775	Q07451
1920P1015	1914	2515	Q07776	Q07452
1920P1015	2516	3118	Q07777	Q07453
1920P1015	3119	3617	Q07778	Q07454
1936P1017	1329	1949	Q07779	Q07455
1936P1017	1950	2551	Q07780	Q07456
1936P1017	2552	3152	Q07781	Q07457
1936P1017	3153	3629	Q07782	Q07458
1952P1020	3514	2915	Q07783	Q07459
1952P1020	2914	2315	Q07784	Q07460
1952P1020	2314	1714	Q07785	Q07461
1952P1020	1713	1222	Q07786	Q07462
1968P1022	3527	2927	Q07787	Q07463
1968P1022	2926	2327	Q07788	Q07464
1968P1022	2326	1722	Q07789	Q07465
1968P1022	1721	1243	Q07790	Q07466
1984J1088	3539	2939	Q07791	Q07467
1984J1088	2938	2337	Q07792	Q07468
1984J1088	2336	1736	Q07793	Q07469
1984J1088	1735	1264	Q07794	Q07470
1984P1026	3539	2940	Q07795	Q07471
1984P1026	2939	2339	Q07796	Q07472
1984P1026	2338	1739	Q07797	Q07473
1984P1026	1738	1264	Q07798	Q07474
2000J1042	3552	2953	Q07799	Q07475
2000J1042	2952	2351	Q07800	Q07476
2000J1042	2350	1751	Q07801	Q07477
2000J1042	1750	1285	Q07802	Q07478
2000P1028	3552	2953	Q07803	Q07479
2000P1028	2952	2353	Q07804	Q07480
2000P1028	2352	1753	Q07805	Q07481
2000P1028	1752	1285	Q07806	Q07482
2016P044	3565	2966	Q07807	Q07483
2016P044	2965	2360	Q07808	Q07484
2016P044	2359	1758	Q07809	Q07485
2016P044	1757	1306	Q07810	Q07486
2032P1046	3577	2977	Q07811	Q07487

Line Name	First SP	Last SP	Apache Tape No.	Esso Tape No.
2032P1046	2976	2377	Q07812	Q07488
2032P1046	2376	1777	Q07813	Q07489
2032P1046	1776	1327	Q07814	Q07490
2048P1048	3590	2989	Q07815	Q07491
2048P1048	2988	2386	Q07816	Q07492
2048P1048	2385	1780	Q07817	Q07493
2048P1048	1779	1348	Q07818	Q07494
2064A1083	1983	1791	Q07819	Q07495
2064J1075	3603	3003	Q07820	Q07496
2064J1075	3002	2399	Q07821	Q07497
2064J1075	2398	1759	Q07822	Q07498
2064J1075	1758	1369	Q07823	Q07499
2064P1050	3530	2927	Q07824	Q07500
2064P1050	2926	2327	Q07825	Q07501
2064P1050	2326	1726	Q07826	Q07502
2064P1050	1725	1369	Q07827	Q07503
2080P1024	2215	1615	Q07828	Q07504
2080P1024	1614	1390	Q07829	Q07505
2096P1077	2193	1589	Q07830	Q07506
2096P1077	1588	1411	Q07831	Q07507
2112P1079	2171	1570	Q07832	Q07508
2112P1079	1569	1432	Q07833	Q07509
2128P1081	2149	1549	Q07834	Q07510
2128P1081	1548	1453	Q07835	Q07511
2144J1090	2127	1525	Q07836	Q07512
2144J1090	1524	1474	Q07837	Q07513
2144P1085	2127	1517	Q07838	Q07514
2144P1085	1516	1474	Q07839	Q07515
2160P1089	1623	2223	Q07840	Q07516
2160P1089	2224	2233	Q07841	Q07517
2176P1084	1644	2211	Q07842	Q07518
2192P1080	1665	2189	Q07843	Q07519
2208P1078	1686	2167	Q07844	Q07520
2224P1076	1707	2145	Q07845	Q07521

4.11.6 Raw PreSTM CMP Gathers (no NMO applied)

Apache copies :

First Inline	Last Inline	Tape No.
1756	1880	DL1119
1882	1946	DL1120
1948	2002	DL1121
2004	2058	DL1122
2060	2114	DL1123
2116	2170	DL1124
2172	2226	DL1125
2228	2282	DL1126
2284	2338	DL1127
2340	2394	DL1128
2396	2450	DL1129
2452	2506	DL1130
2508	2562	DL1131
2564	2618	DL1132

First Inline	Last Inline	Tape No.
2620	2674	DL1133
2676	2730	DL1134
2732	2786	DL1135
2788	2842	DL1136
2844	2898	DL1137
2900	2952	DL1138
2954	3006	DL1139
3008	3060	DL1140
3062	3114	DL1141
3116	3168	DL1142
3170	3222	DL1143
3224	3276	DL1144
3278	3330	DL1145
3332	3384	DL1146
3386	3438	DL1147
3440	3492	DL1148
3494	3546	DL1149
3548	3600	DL1150
3602	3654	DL1151
3656	3708	DL1152
3710	3758	DL1153
3760	3810	DL1154
3812	3864	DL1155
3866	3920	DL1156
3922	4044	DL1157
4046	4234	DL1158

Esso copies :

First Inline	Last Inline	Tape No.
1756	1796	Q07846
1798	1832	Q07847
1834	1860	Q07848
1862	1880	Q07849
1882	1898	Q07850
1900	1914	Q07851
1916	1930	Q07852
1932	1946	Q07853
1948	1962	Q07854
1964	1978	Q07855
1980	1994	Q07856
1996	2010	Q07857
2012	2026	Q07858
2028	2042	Q07859
2044	2058	Q07860
2060	2074	Q07861
2076	2090	Q07862
2092	2106	Q07863
2108	2122	Q07864
2124	2138	Q07865
2140	2154	Q07866
2156	2170	Q07867
2172	2186	Q07868
2188	2202	Q07869
2204	2218	Q07870
2220	2234	Q07871

First Inline	Last Inline	Tape No.
2236	2250	Q07872
2252	2266	Q07873
2268	2282	Q07874
2284	2298	Q07875
2300	2314	Q07876
2316	2330	Q07877
2332	2346	Q07878
2348	2362	Q07879
2364	2378	Q07880
2380	2394	Q07881
2396	2410	Q07882
2412	2426	Q07883
2428	2442	Q07884
2444	2458	Q07885
2460	2474	Q07886
2476	2490	Q07887
2492	2506	Q07888
2508	2522	Q07889
2524	2538	Q07890
2540	2554	Q07891
2556	2570	Q07892
2572	2586	Q07893
2588	2602	Q07894
2604	2618	Q07895
2620	2634	Q07896
2636	2650	Q07897
2652	2666	Q07898
2668	2682	Q07899
2684	2698	Q07900
2700	2714	Q07901
2716	2730	Q07902
2732	2746	Q07903
2748	2762	Q07904
2764	2778	Q07905
2780	2794	Q07906
2796	2810	Q07907
2812	2826	Q07908
2828	2842	Q07909
2844	2858	Q07910
2860	2874	Q07911
2876	2890	Q07912
2892	2906	Q07913
2908	2922	Q07914
2924	2938	Q07915
2940	2952	Q07916
2954	2964	Q07917
2966	2976	Q07918
2978	2988	Q07919
2990	3000	Q07920
3002	3012	Q07921
3014	3024	Q07922
3026	3036	Q07923
3038	3048	Q07924
3050	3060	Q07925
3062	3072	Q07926
3074	3084	Q07927

First Inline	Last Inline	Tape No.
3086	3096	Q07928
3098	3108	Q07929
3110	3120	Q07930
3122	3132	Q07931
3134	3144	Q07932
3146	3156	Q07933
3158	3168	Q07934
3170	3180	Q07935
3182	3192	Q07936
3194	3204	Q07937
3206	3216	Q07938
3218	3228	Q07939
3230	3240	Q07940
3242	3252	Q07941
3254	3264	Q07942
3266	3276	Q07943
3278	3288	Q07944
3290	3300	Q07945
3302	3312	Q07946
3314	3324	Q07947
3326	3336	Q07948
3338	3348	Q07949
3350	3360	Q07950
3362	3372	Q07951
3374	3384	Q07952
3386	3396	Q07953
3398	3408	Q07954
3410	3420	Q07955
3422	3432	Q07956
3434	3444	Q07957
3446	3456	Q07958
3458	3468	Q07959
3470	3480	Q07960
3482	3492	Q07961
3494	3504	Q07962
3506	3516	Q07963
3518	3528	Q07964
3530	3540	Q07965
3542	3552	Q07966
3554	3564	Q07967
3566	3576	Q07968
3578	3588	Q07969
3590	3600	Q07970
3602	3612	Q07971
3614	3624	Q07972
3626	3636	Q07973
3638	3648	Q07974
3650	3660	Q07975
3662	3672	Q07976
3674	3684	Q07977
3686	3696	Q07978
3698	3708	Q07979
3710	3720	Q07980
3722	3732	Q07981
3734	3744	Q07982
3746	3758	Q07983

First Inline	Last Inline	Tape No.
3760	3774	Q07984
3776	3788	Q07985
3790	3802	Q07986
3804	3818	Q07987
3820	3832	Q07988
3834	3848	Q07989
3850	3864	Q07990
3866	3880	Q07991
3882	3896	Q07992
3898	3912	Q07993
3914	3928	Q07994
3930	3960	Q07995
3962	4000	Q07996
4002	4044	Q07997
4046	4092	Q07998
4094	4146	Q07999
4148	4206	Q08000
4208	4234	Q08001

4.11.7 Final PreSTM CMP Gathers (NMO + eta applied)

First Inline	Last Inline	Tape No.
1748	1866	DL1187
1868	1926	DL1188
1928	1986	DL1189
1988	2046	DL1190
2048	2106	DL1191
2108	2166	DL1192
2168	2226	DL1193
2228	2286	DL1194
2288	2346	DL1195
2348	2406	DL1196
2408	2466	DL1197
2468	2526	DL1198
2528	2586	DL1199
2588	2646	DL1200
2648	2706	DL1201
2708	2766	DL1202
2768	2826	DL1203
2828	2886	DL1204
2888	2946	DL1205
2948	2976	DL1206
2978	3006	DL1207
3008	3036	DL1208
3038	3066	DL1209
3068	3096	DL1210
3098	3126	DL1211
3128	3156	DL1212
3158	3186	DL1213
3188	3216	DL1214
3218	3246	DL1215
3248	3276	DL1216
3278	3306	DL1217
3308	3336	DL1218
3338	3366	DL1219
3368	3396	DL1220

3398	3426	DL1221
3428	3456	DL1222
3458	3486	DL1223
3488	3516	DL1224
3518	3546	DL1225
3548	3576	DL1226
3578	3606	DL1227
3608	3636	DL1228
3638	3666	DL1229
3668	3696	DL1230
3698	3726	DL1231
3728	3756	DL1232
3758	3816	DL1233
3818	3876	DL1234
3878	3936	DL1235
3938	4116	DL1179
4118	4240	DL1180

4.11.8 Raw Stack Archives

Stack	IL Range	Volser	Copy	Tape No.	Format	Media
Raw Full-Angle	1766-4226	DL1174	Apache	1 of 1	tar SEG-Y	DLTIV
Raw Near-Angle	1766-4226	DL1175	Apache	1 of 1	tar SEG-Y	DLTIV
Raw Mid-Angle	1766-4226	DL1176	Apache	1 of 1	tar SEG-Y	DLTIV
Raw Full-Angle	1766-4226	DL1177	Apache	1 of 1	tar SEG-Y	DLTIV
Raw Full-Angle	1766-3068	Q08373	Esso	1 of 2	SEG-Y	3590B
Raw Full-Angle	3070-4226	Q08374	Esso	2 of 2	SEG-Y	3590B
Raw Near-Angle	1766-3068	Q08375	Esso	1 of 2	SEG-Y	3590B
Raw Near-Angle	3070-4226	Q08376	Esso	2 of 2	SEG-Y	3590B
Raw Mid-Angle	1766-3068	Q08377	Esso	1 of 2	SEG-Y	3590B
Raw Mid-Angle	3070-4226	Q08378	Esso	2 of 2	SEG-Y	3590B
Raw Far-Angle	1766-3068	Q08379	Esso	1 of 2	SEG-Y	3590B
Raw Far-Angle	3070-4226	Q08380	Esso	2 of 2	SEG-Y	3590B
Raw Full-Angle	1766-3068	Q08381	BHPB	1 of 2	SEG-Y	3590B
Raw Full-Angle	3070-4226	Q08382	BHPB	2 of 2	SEG-Y	3590B
Raw Near-Angle	1766-3068	Q08383	BHPB	1 of 2	SEG-Y	3590B
Raw Near-Angle	3070-4226	Q08384	BHPB	2 of 2	SEG-Y	3590B
Raw Mid-Angle	1766-3068	Q08385	BHPB	1 of 2	SEG-Y	3590B
Raw Mid-Angle	3070-4226	Q08386	BHPB	2 of 2	SEG-Y	3590B
Raw Far-Angle	1766-3068	Q08387	BHPB	1 of 2	SEG-Y	3590B
Raw Far-Angle	3070-4226	Q08388	BHPB	2 of 2	SEG-Y	3590B
Raw Full-Angle	1766-3068	Q08389	Govt.	1 of 2	SEG-Y	3590B
Raw Full-Angle	3070-4226	Q08390	Govt.	2 of 2	SEG-Y	3590B
Raw Near-Angle	1766-3068	Q08391	Govt.	1 of 2	SEG-Y	3590B
Raw Near-Angle	3070-4226	Q08392	Govt.	2 of 2	SEG-Y	3590B
Raw Mid-Angle	1766-3068	Q08393	Govt.	1 of 2	SEG-Y	3590B
Raw Mid-Angle	3070-4226	Q08394	Govt.	2 of 2	SEG-Y	3590B
Raw Far-Angle	1766-3068	Q08395	Govt.	1 of 2	SEG-Y	3590B
Raw Far-Angle	3070-4226	Q08396	Govt.	2 of 2	SEG-Y	3590B

4.11.9 Final Stack Archives

Stack	IL Range	Volser	Copy	Tape No.	Format	Media
Final Full-Angle	1766-3068	Q08002	Govt.	1 of 2	SEG-Y	3590B
Final Full-Angle	3070-4226	Q08003	Govt.	2 of 2	SEG-Y	3590B
Final Near-Angle	1766-4226	DL1181	Apache	1 of 1	tar SEG-Y	DLTIV
Final Mid-Angle	1766-4226	DL1182	Apache	1 of 1	tar SEG-Y	DLTIV
Final Far-Angle	1766-4226	DL1183	Apache	1 of 1	tar SEG-Y	DLTIV
Final Near-Angle	1766-3068	Q08004	Esso	1 of 2	SEG-Y	3590B
Final Near-Angle	3070-4226	Q08005	Esso	2 of 2	SEG-Y	3590B
Final Mid-Angle	1766-3068	Q08006	Esso	1 of 2	SEG-Y	3590B
Final Mid-Angle	3070-4226	Q08007	Esso	2 of 2	SEG-Y	3590B
Final Far-Angle	1766-3068	Q08008	Esso	1 of 2	SEG-Y	3590B
Final Far-Angle	3070-4226	Q08009	Esso	2 of 2	SEG-Y	3590B
Final Near-Angle	1766-3068	Q08010	BHPB	1 of 2	SEG-Y	3590B
Final Near-Angle	3070-4226	Q08011	BHPB	2 of 2	SEG-Y	3590B
Final Mid-Angle	1766-3068	Q08012	BHPB	1 of 2	SEG-Y	3590B
Final Mid-Angle	3070-4226	Q08013	BHPB	2 of 2	SEG-Y	3590B
Final Far-Angle	1766-3068	Q08014	BHPB	1 of 2	SEG-Y	3590B
Final Far-Angle	3070-4226	Q08015	BHPB	2 of 2	SEG-Y	3590B
Final Near-Angle	1766-3068	Q08016	Govt.	1 of 2	SEG-Y	3590B

Stack	IL Range	Volser	Copy	Tape No.	Format	Media
Final Near-Angle	3070-4226	Q08017	Govt.	2 of 2	SEG-Y	3590B
Final Mid-Angle	1766-3068	Q08018	Govt.	1 of 2	SEG-Y	3590B
Final Mid-Angle	3070-4226	Q08019	Govt.	2 of 2	SEG-Y	3590B
Final Far-Angle	1766-3068	Q08020	Govt.	1 of 2	SEG-Y	3590B
Final Far-Angle	3070-4226	Q08021	Govt.	2 of 2	SEG-Y	3590B

4.11.10 Merged Stack Archives

Stack	IL Range	Volser	Copy	Tape No.	Format	Media
Raw Merged Full-Angle	1766-4226	DL1184	Apache	1 of 1	tar SEG-Y	DLTIV
Raw Merged Full-Angle	1766-2776	Q08022	Esso	1 of 3	SEG-Y	3590B
Raw Merged Full-Angle	2778-3788	Q08023	Esso	2 of 3	SEG-Y	3590B
Raw Merged Full-Angle	3790-4226	Q08024	Esso	3 of 3	SEG-Y	3590B
Raw Merged Full-Angle	1766-2776	Q08025	BHPB	1 of 3	SEG-Y	3590B
Raw Merged Full-Angle	2778-3788	Q08026	BHPB	2 of 3	SEG-Y	3590B
Raw Merged Full-Angle	3790-4226	Q08027	BHPB	3 of 3	SEG-Y	3590B
Final Merged Full-Angle	1766-4226	DL1185	Apache	1 of 1	tar SEG-Y	DLTIV
Final Merged Full-Angle	1766-2776	Q08028	Esso	1 of 3	SEG-Y	3590B
Final Merged Full-Angle	2778-3788	Q08029	Esso	2 of 3	SEG-Y	3590B
Final Merged Full-Angle	3790-4226	Q08030	Esso	3 of 3	SEG-Y	3590B
Final Merged Full-Angle	1766-2776	Q08031	BHPB	1 of 3	SEG-Y	3590B
Final Merged Full-Angle	2778-3788	Q08032	BHPB	2 of 3	SEG-Y	3590B
Final Merged Full-Angle	3790-4226	Q08033	BHPB	3 of 3	SEG-Y	3590B

4.12 Enclosures

4.12.1 Noise Attenuation

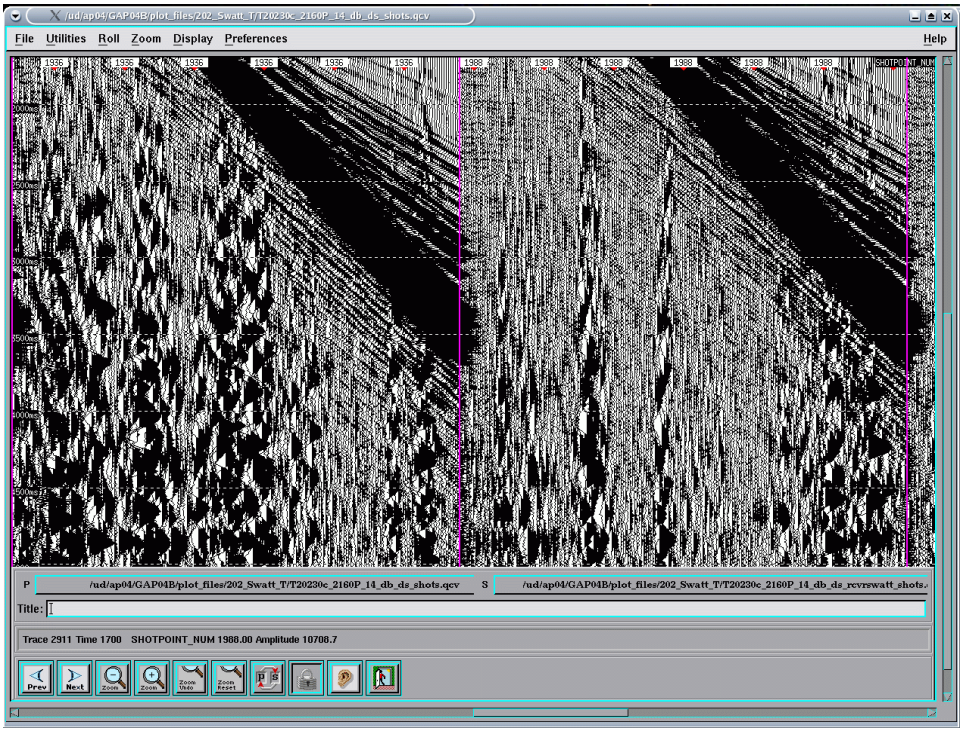


Figure 4 : Shots before noise attenuation

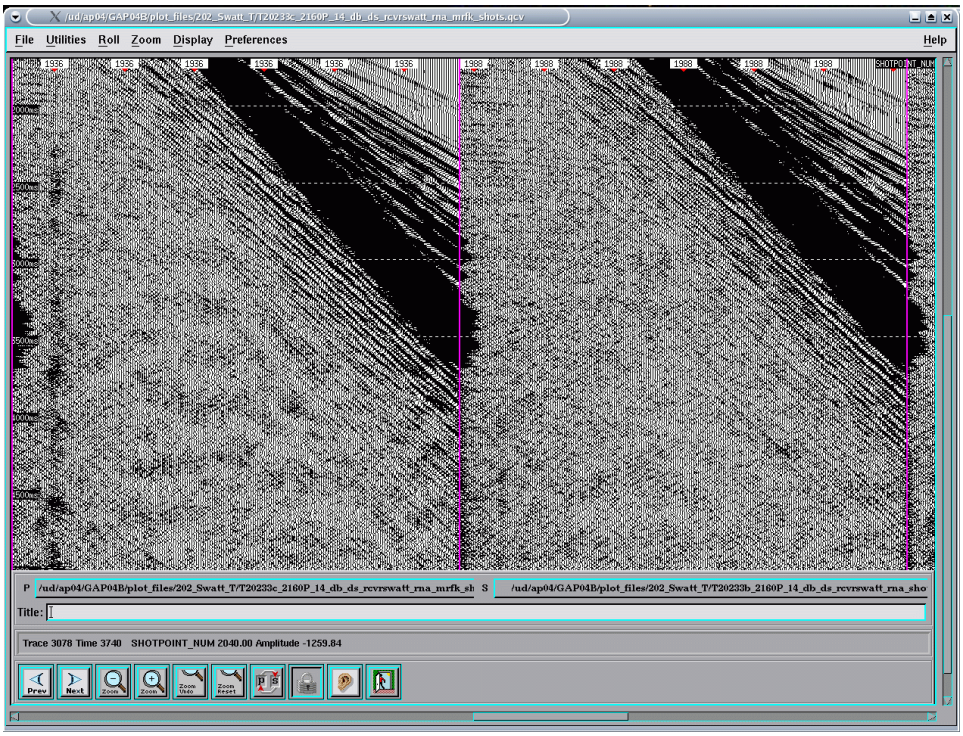


Figure 5 : Shots after noise attenuation

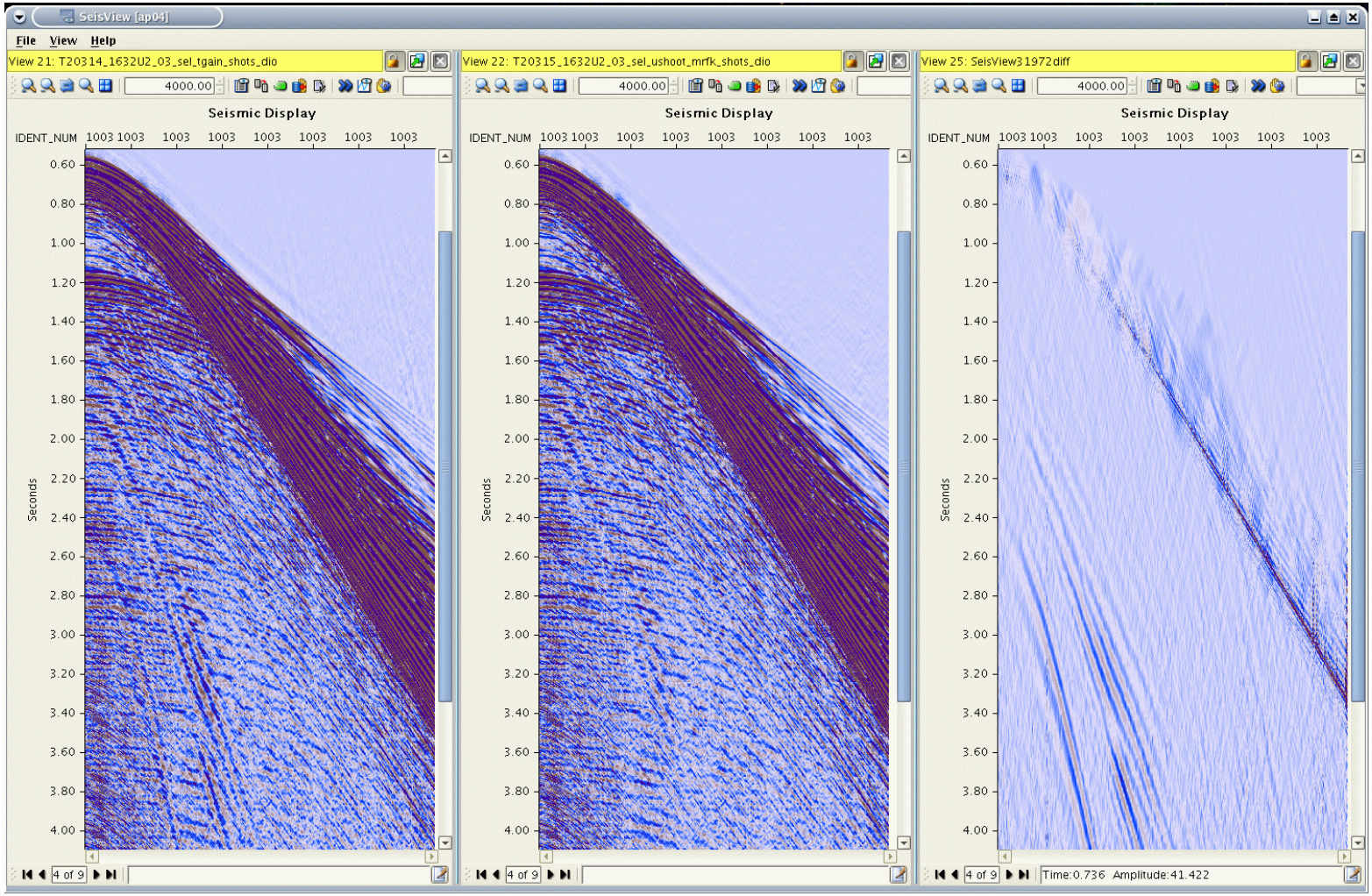


Figure 6 : Shot FK for mud-roll (before/after/difference)

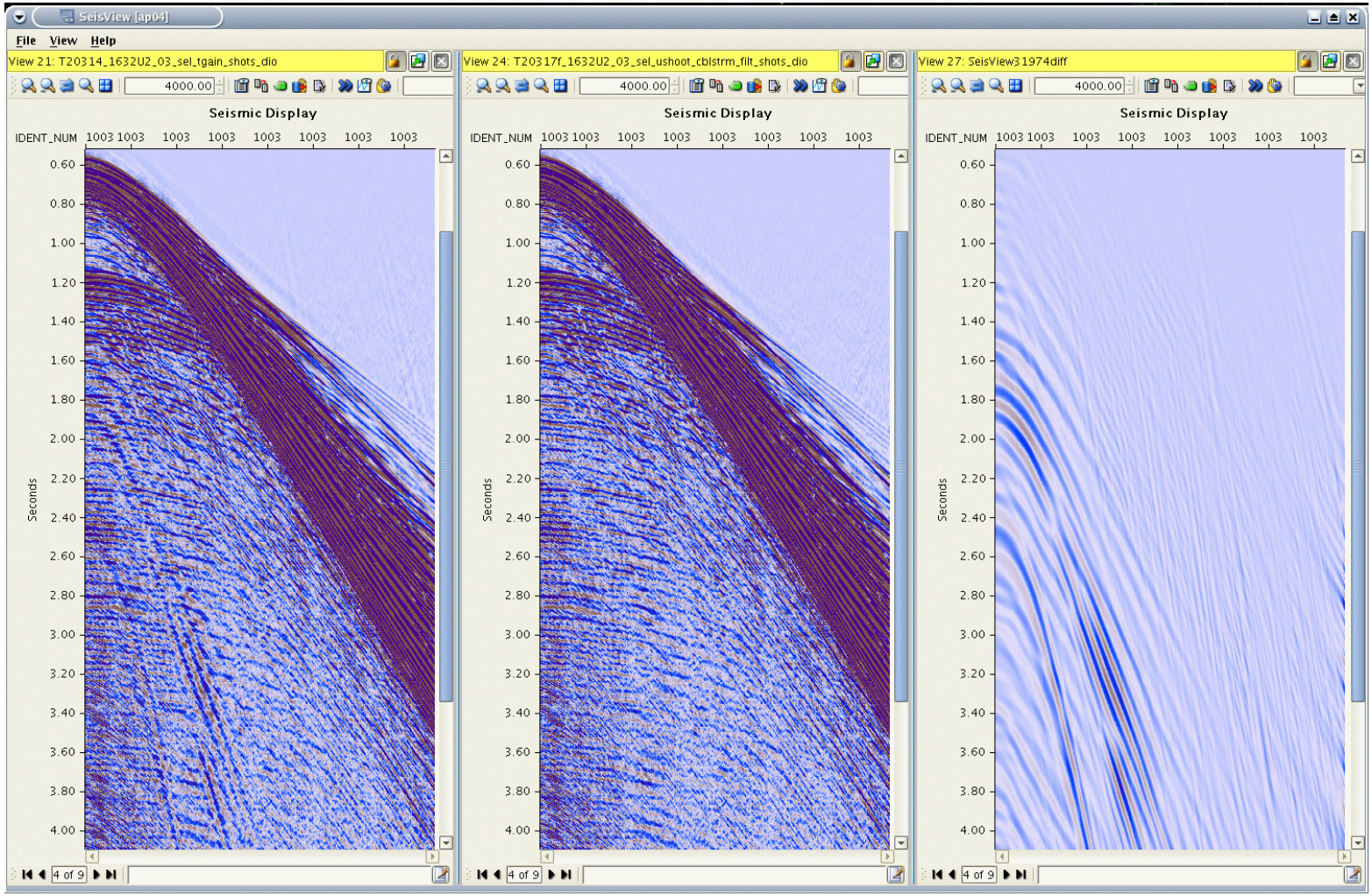


Figure 7 : Linear Tau-p filter for mud-roll (before/after/difference)

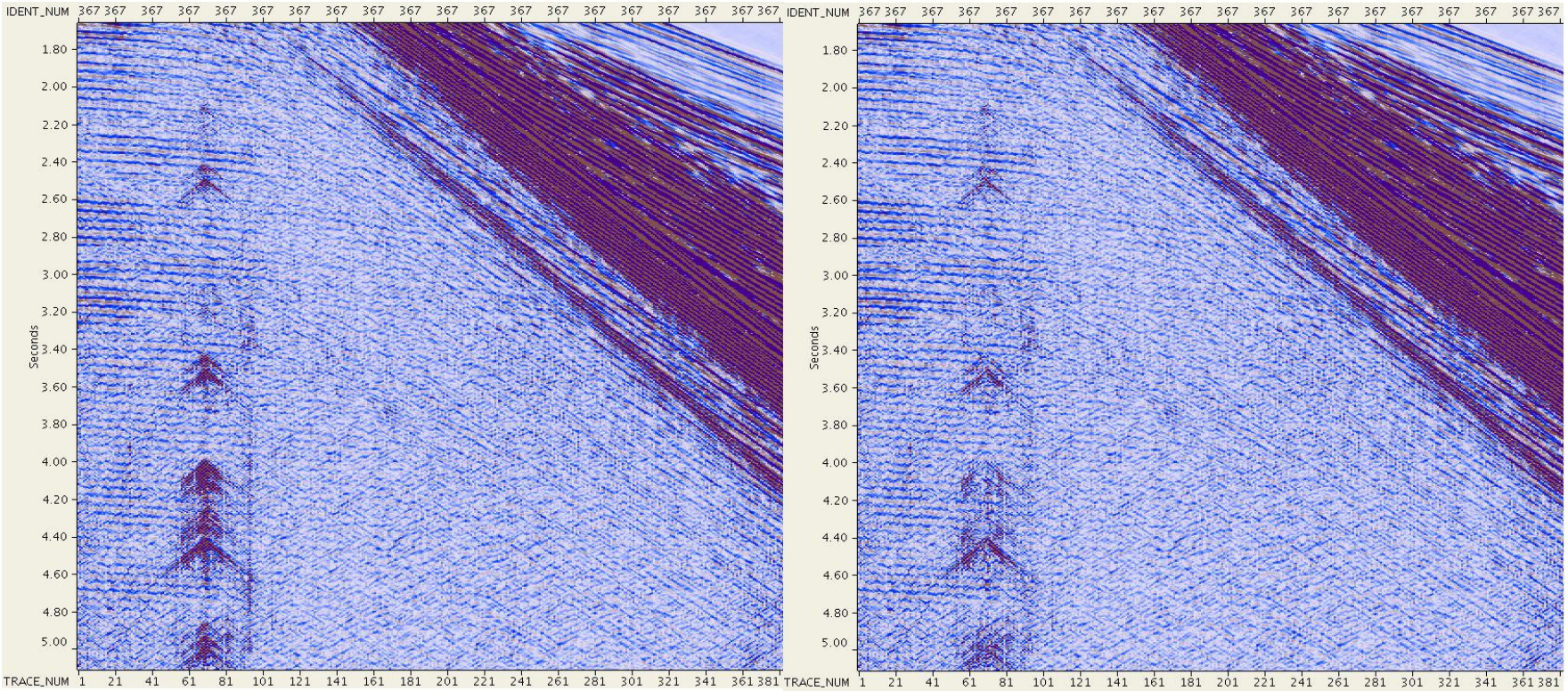


Figure 8 : Section of a shot gather before/after cable-strike attenuation

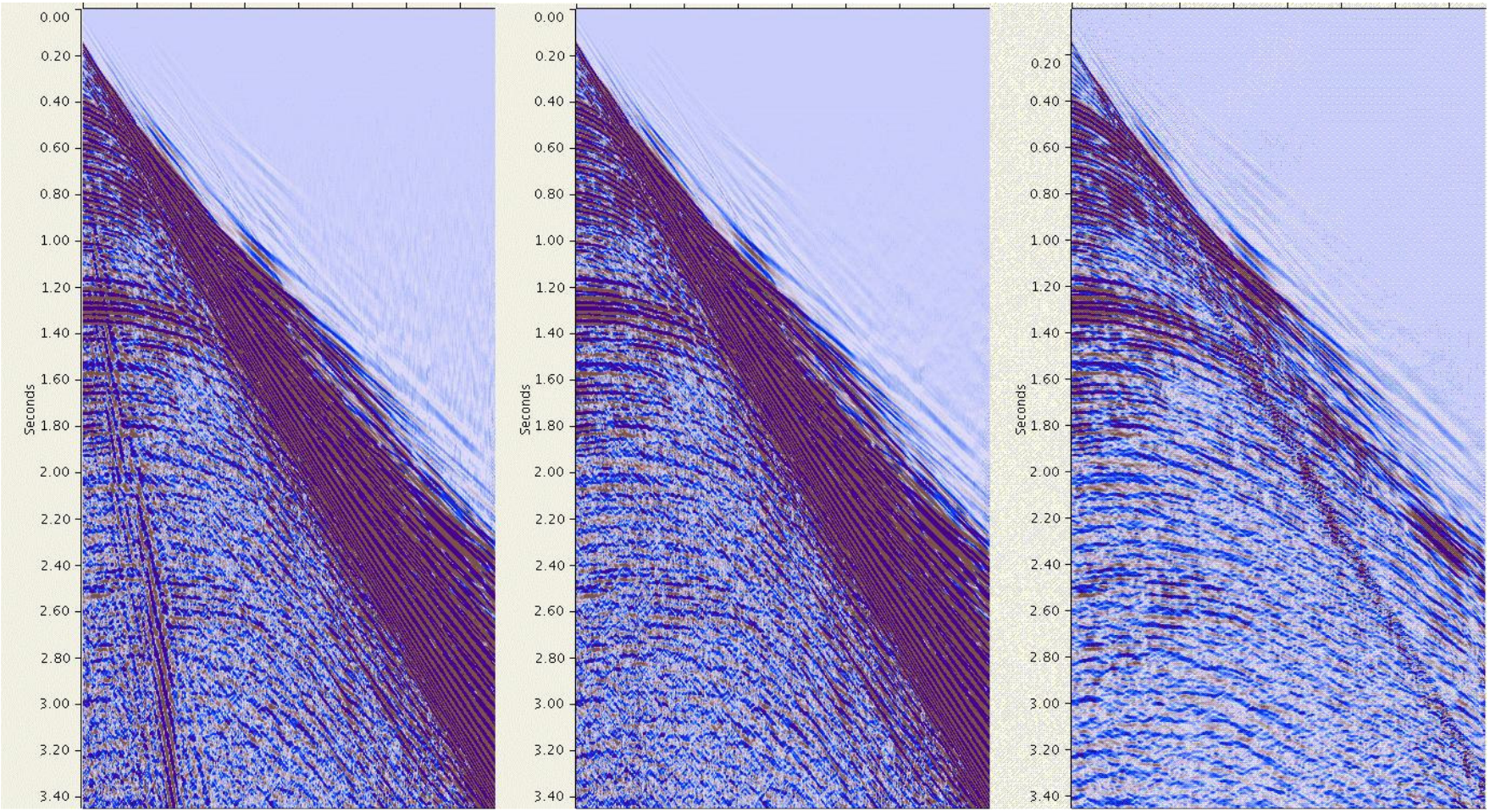


Figure 9 : No Shot-FK, Shot-FK, LNA shot

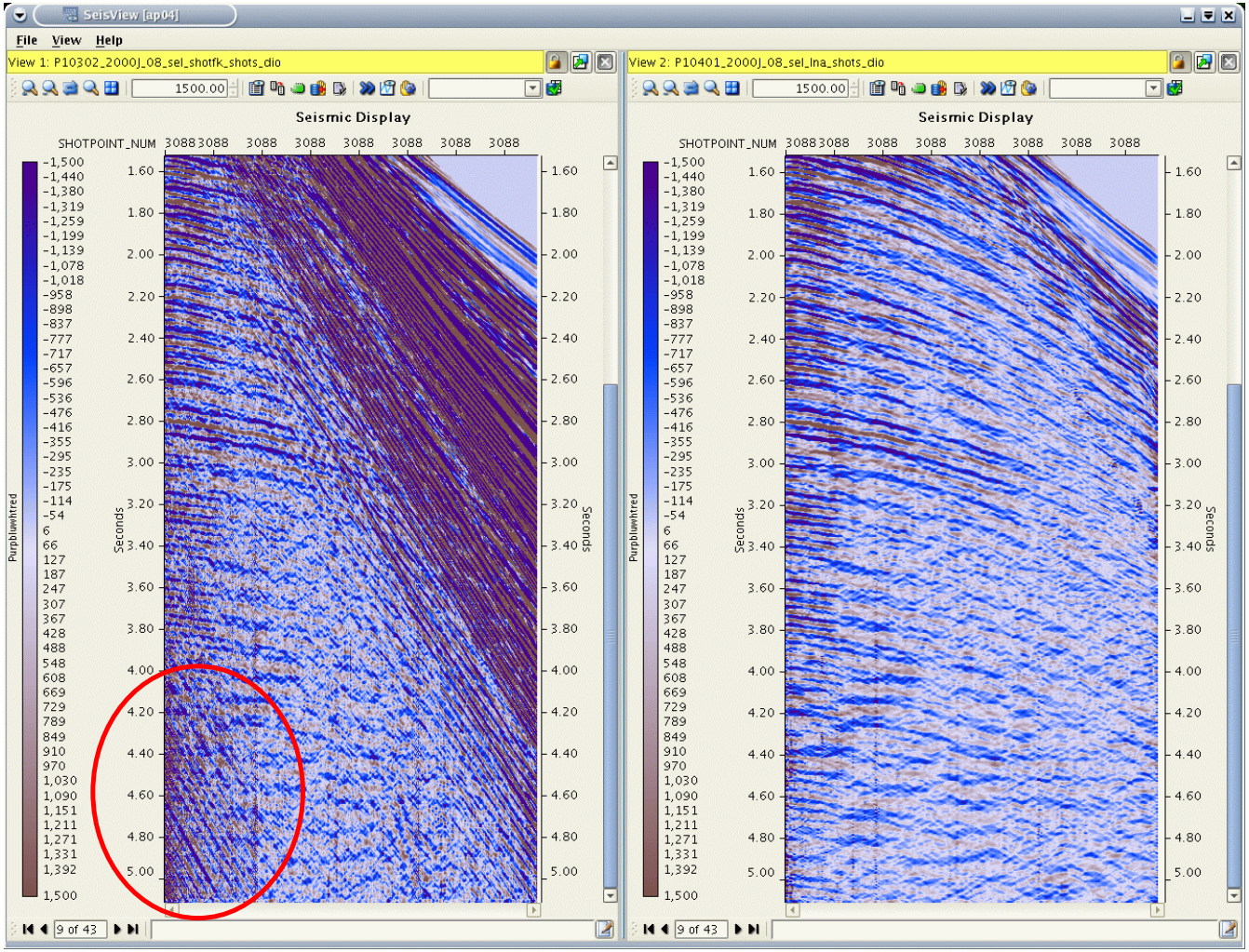


Figure 10 : Undershoot shot before and after LNA (cable-strum circled)

4.12.2 DWD and 3DSRME

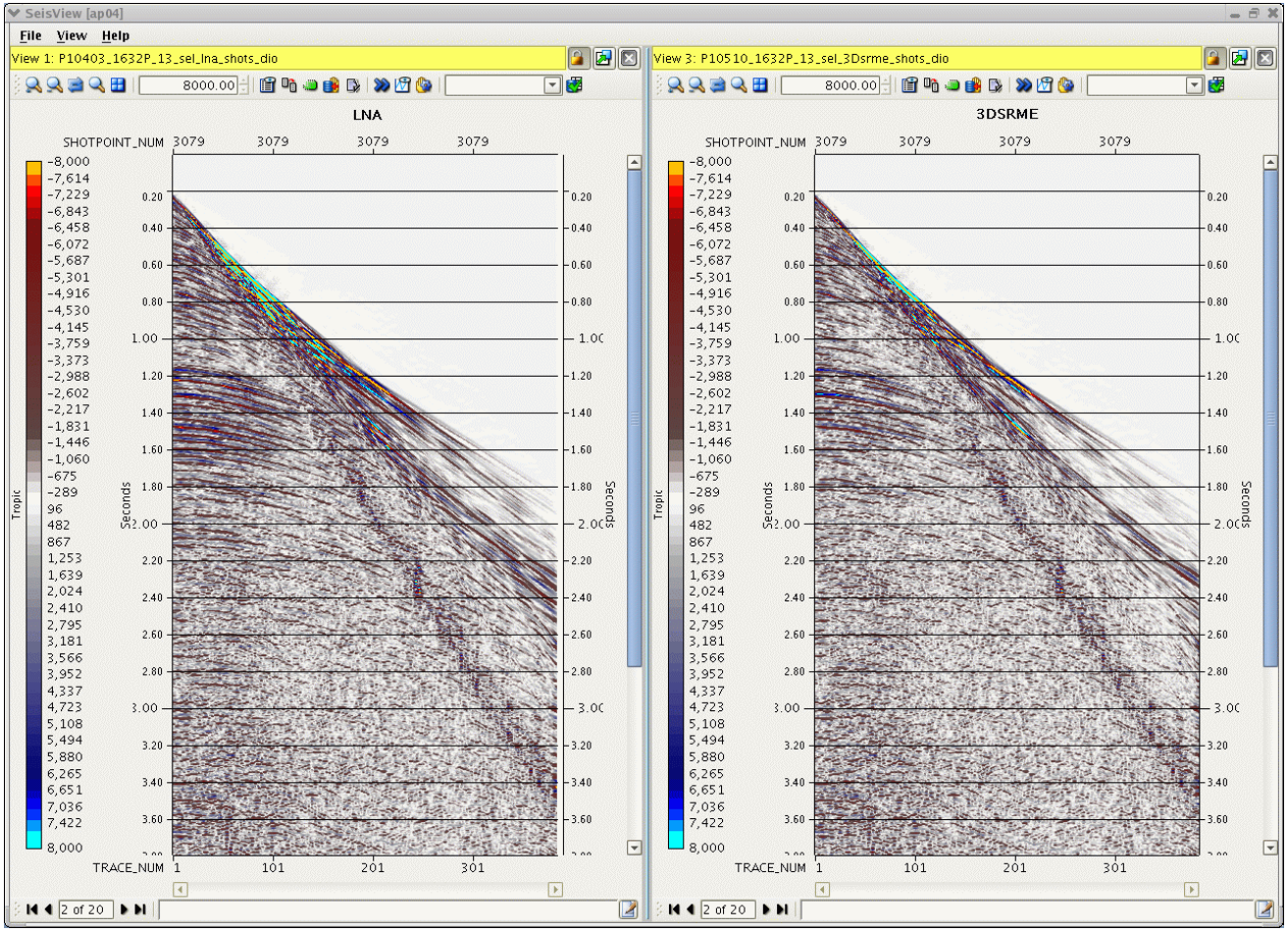


Figure 11 : Shot gather after LNA and 3DSRME

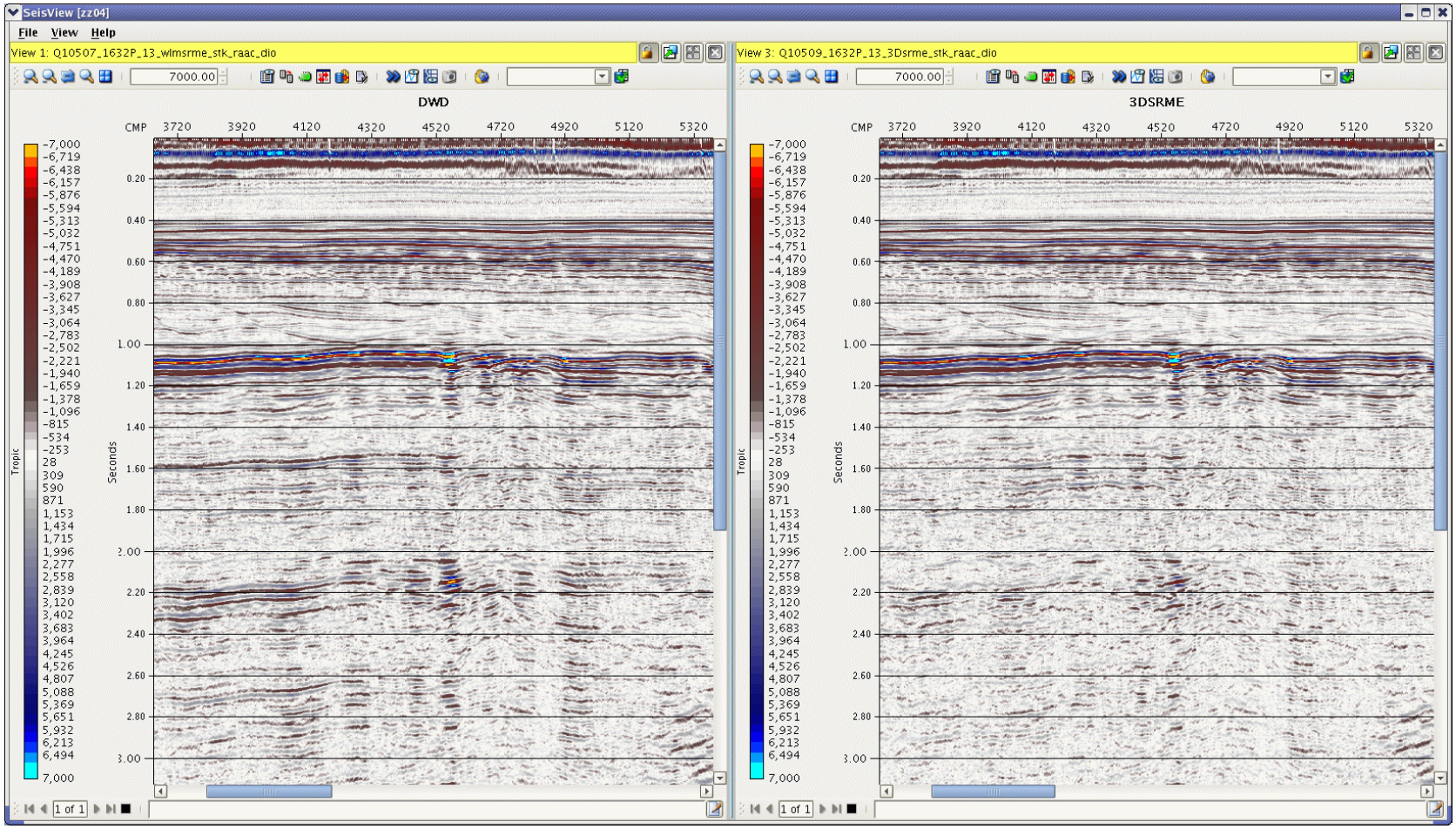


Figure 12 : Stack section after DWD and 3DSRME

4.12.3 Fold of Coverage (FOC) Displays

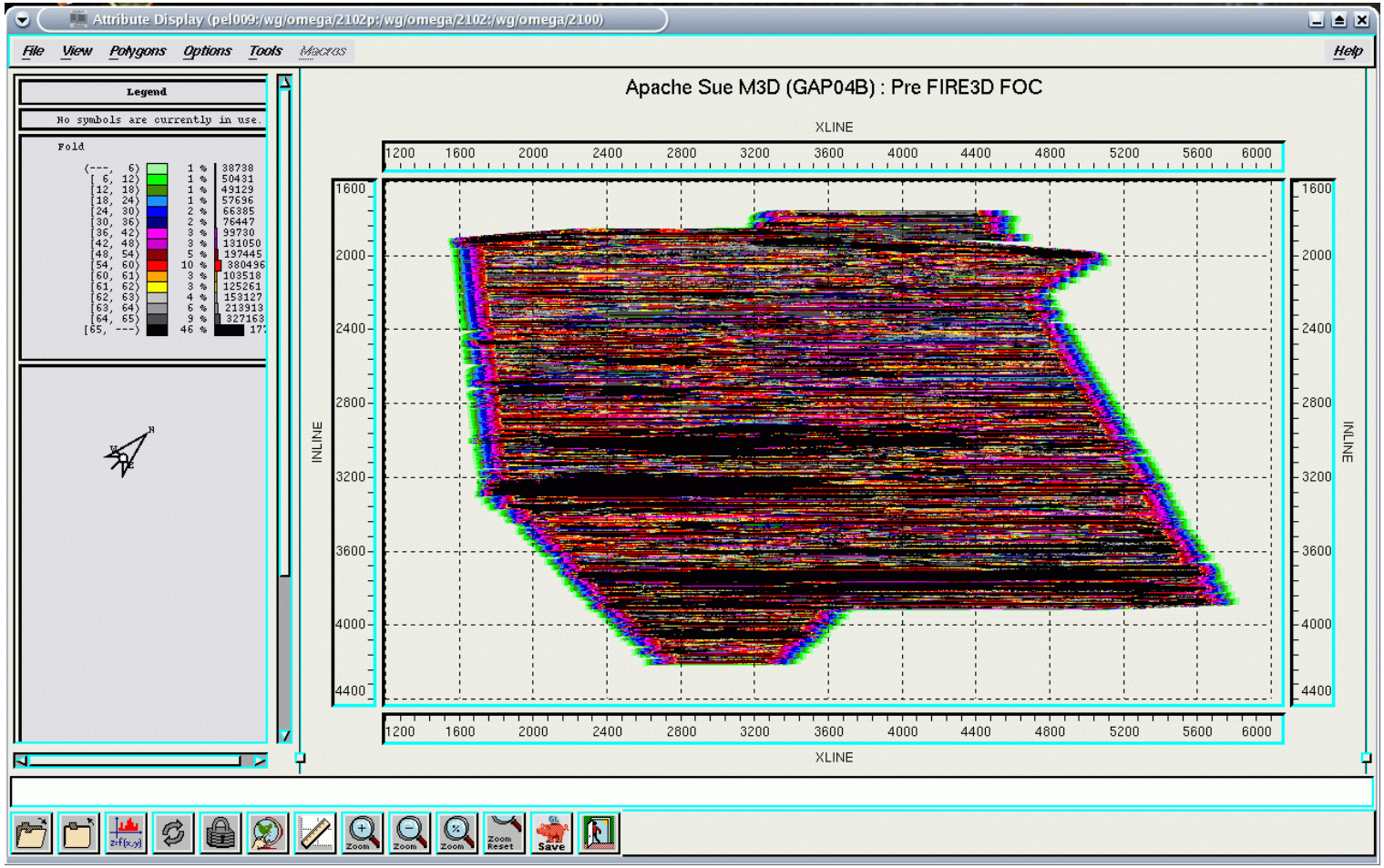


Figure 13 : FOC map before FIRE3D

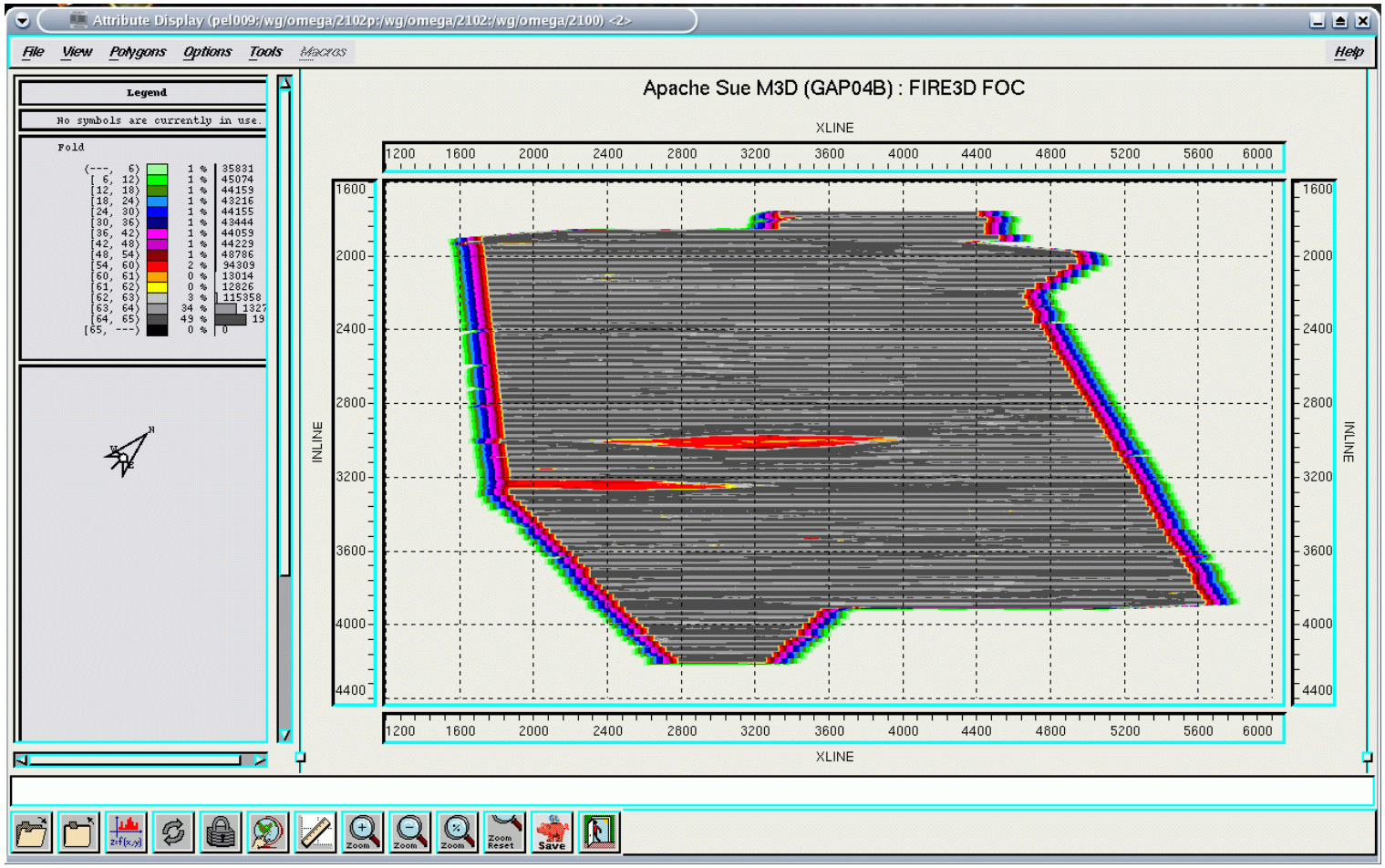


Figure 14 : FOC map after FIRE3D

4.12.4 Velocity & Anisotropy Displays

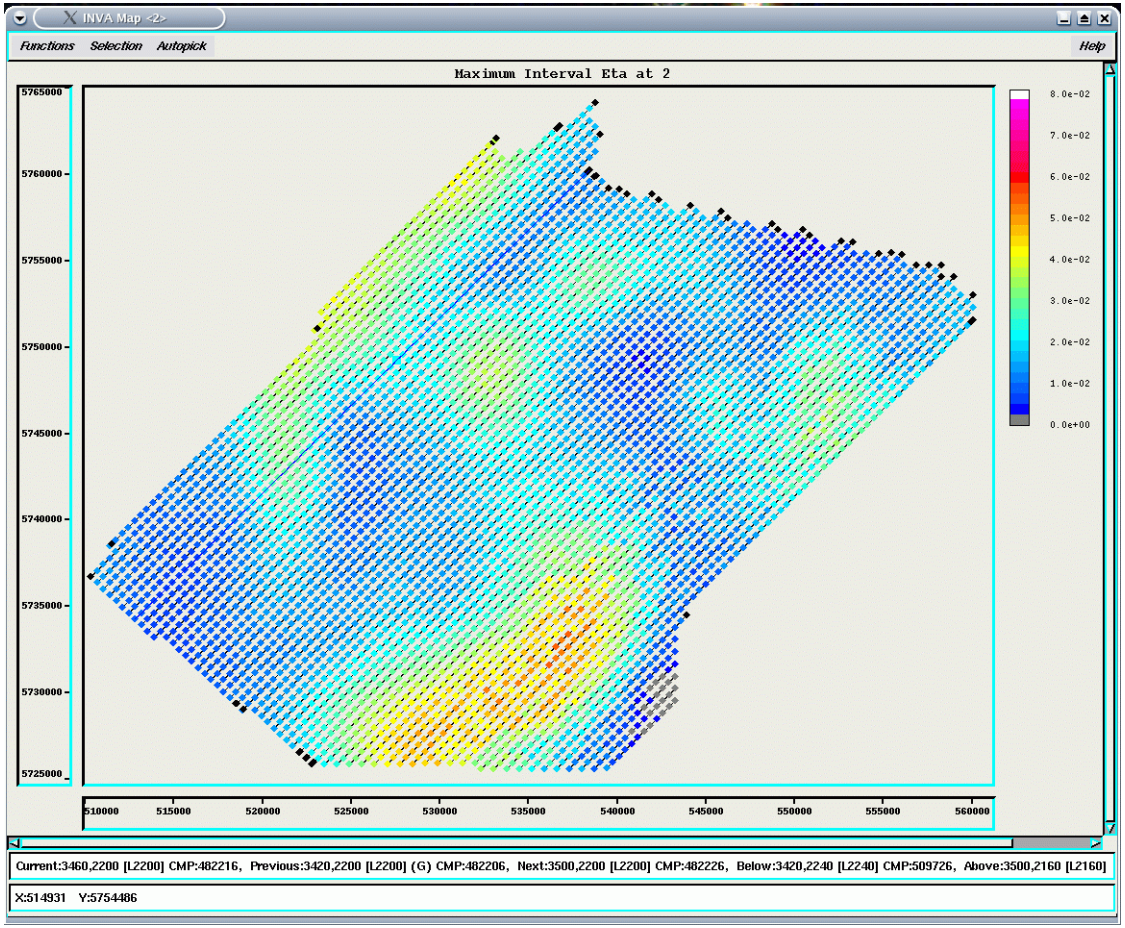


Figure 15 : Final Interval-eta field at TOL

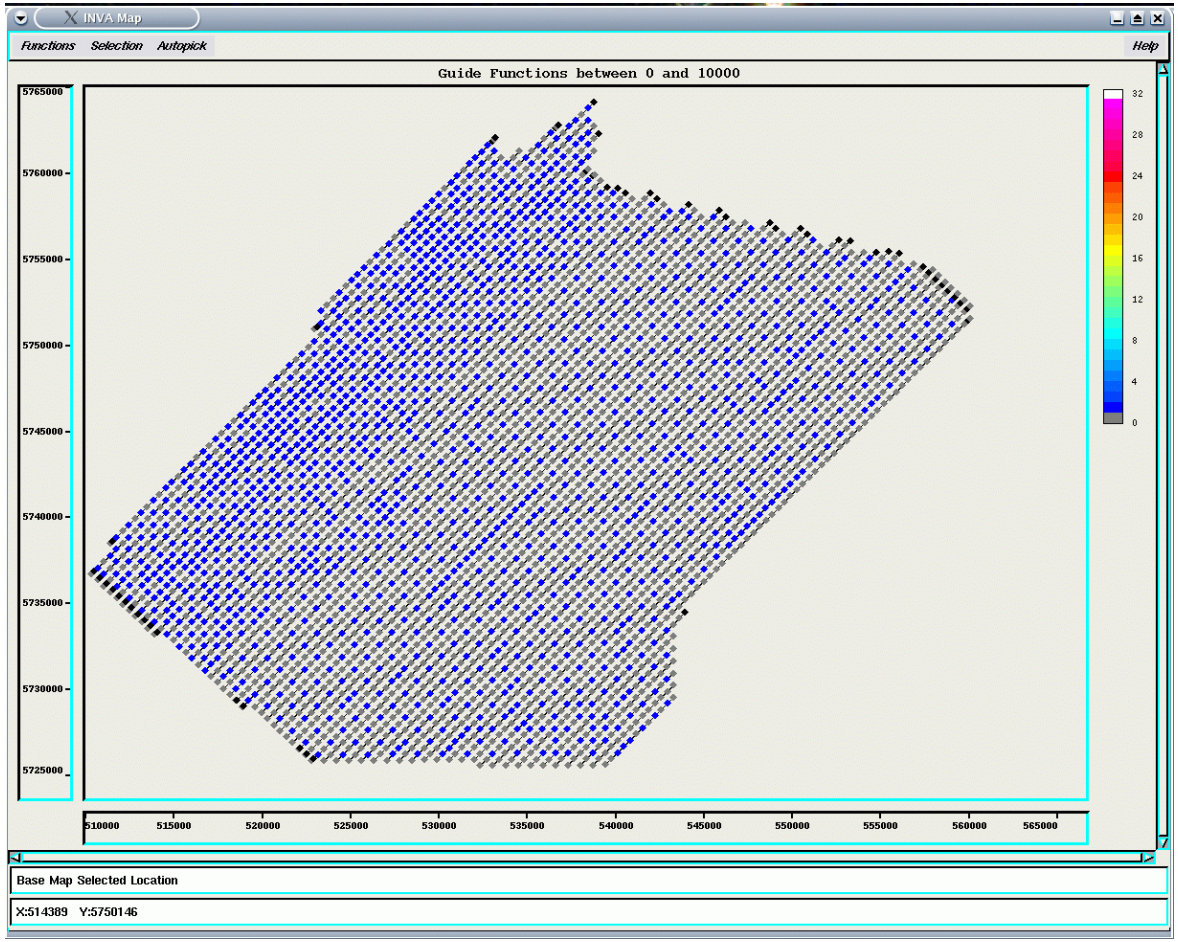


Figure 16 : Final Vn analysis locations (Refined locations in blue)

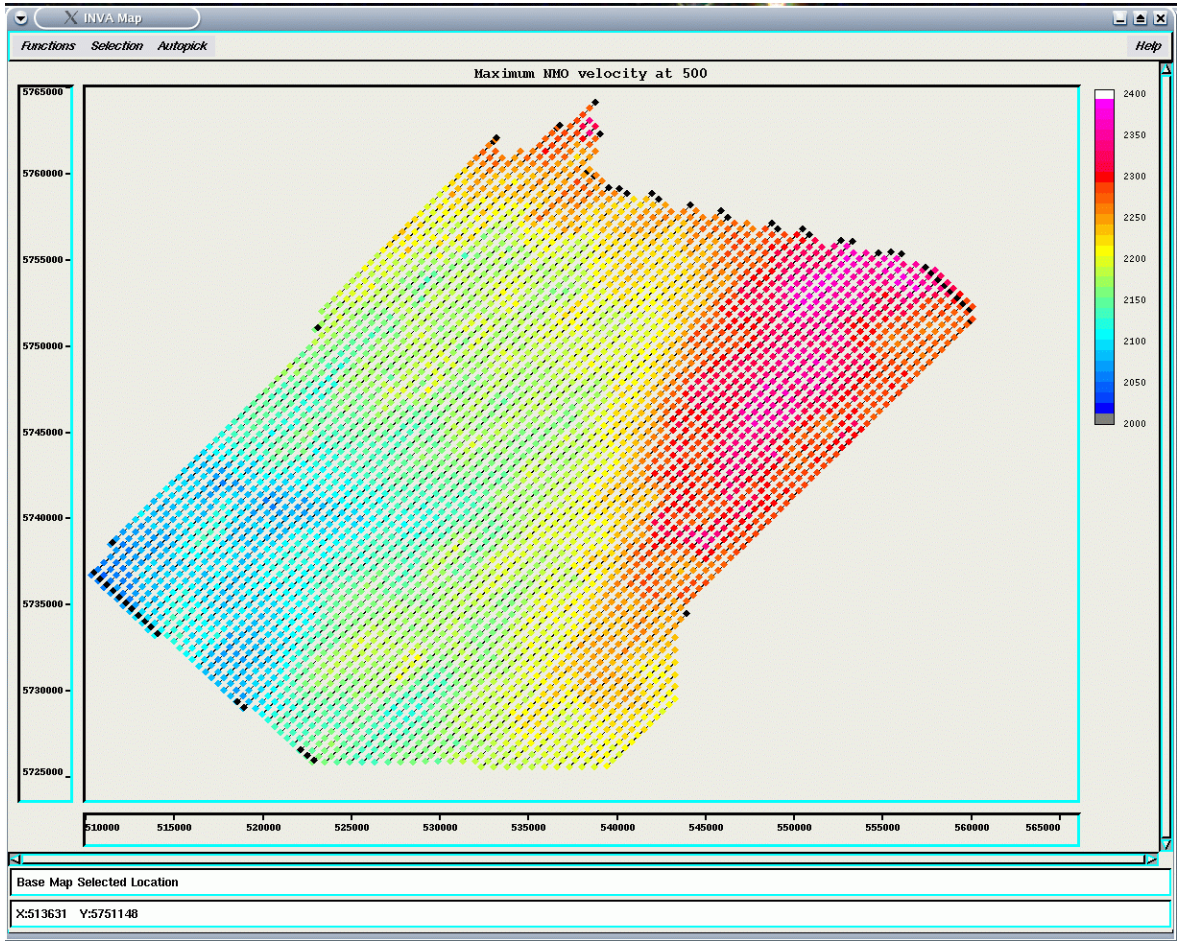


Figure 17 : Final Vn velocity at 500ms

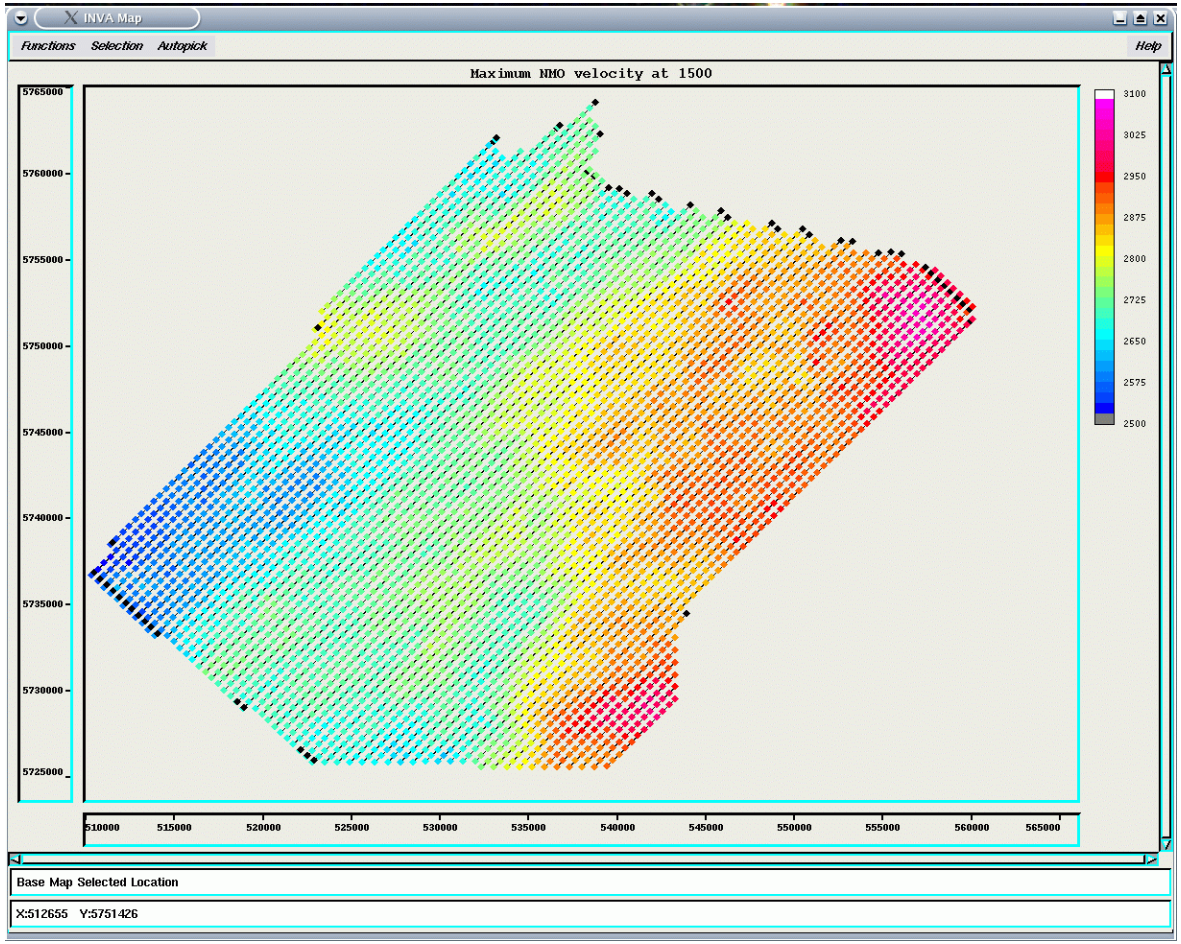


Figure 18 : Final Vn velocity at 1500ms

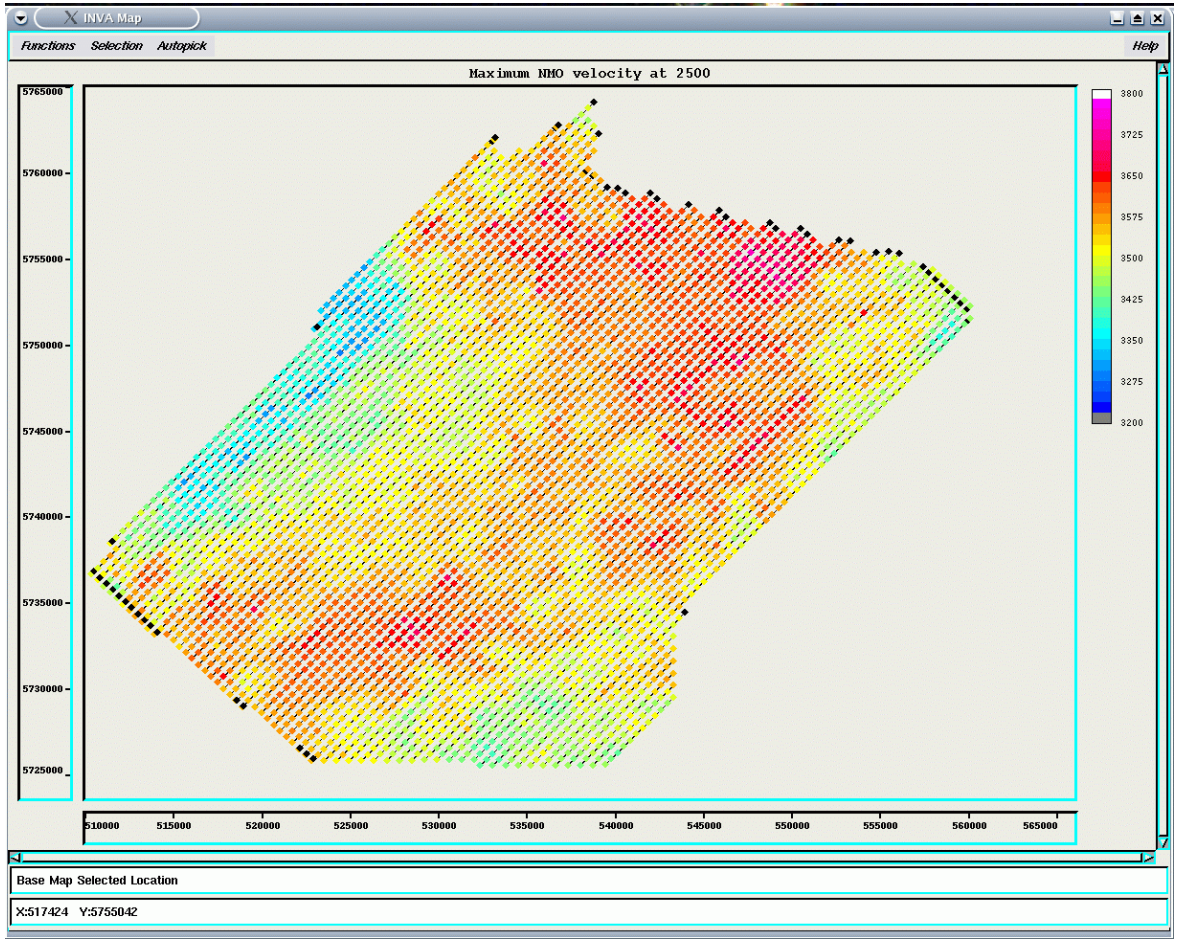


Figure 19 : Final Vn velocity at 2500ms

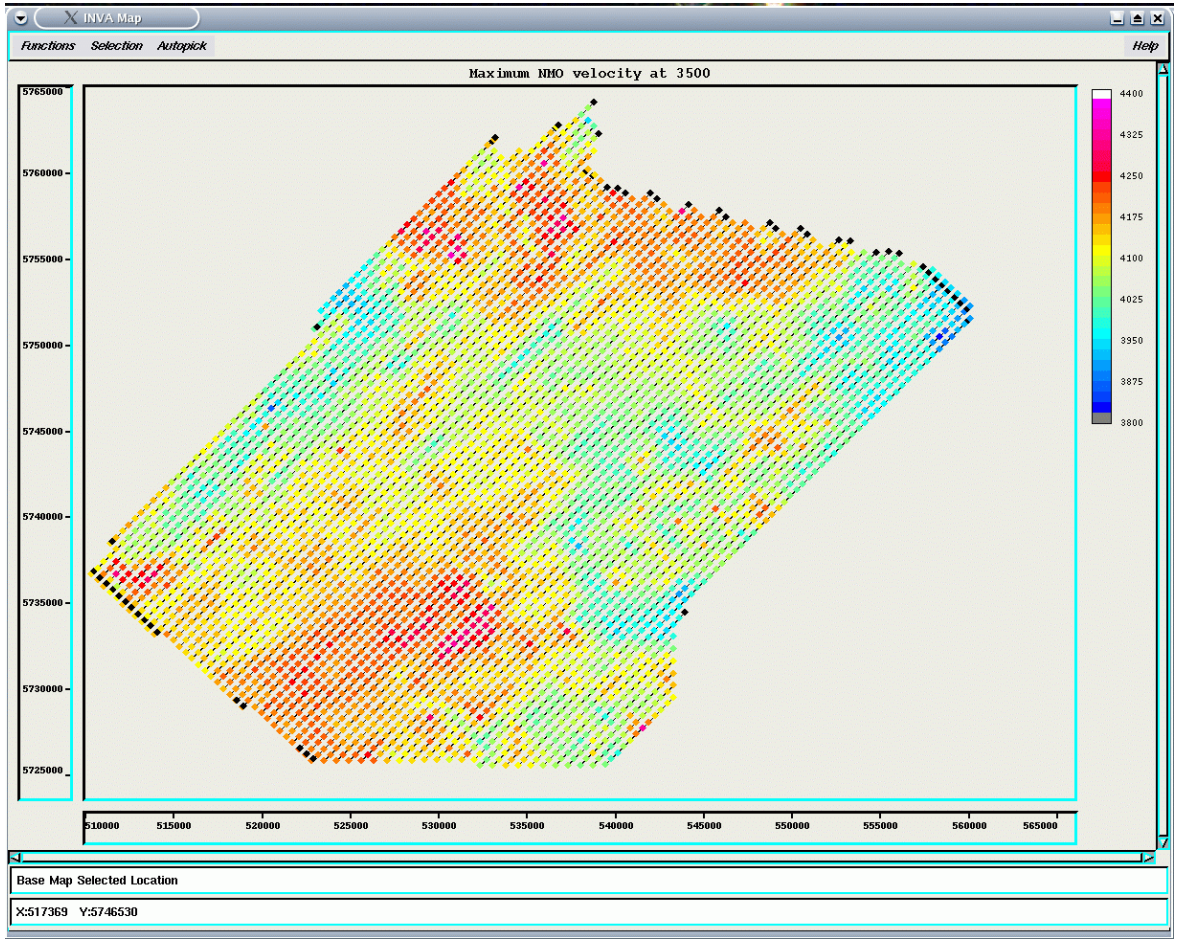


Figure 20 : Final Vn velocity at 3500ms

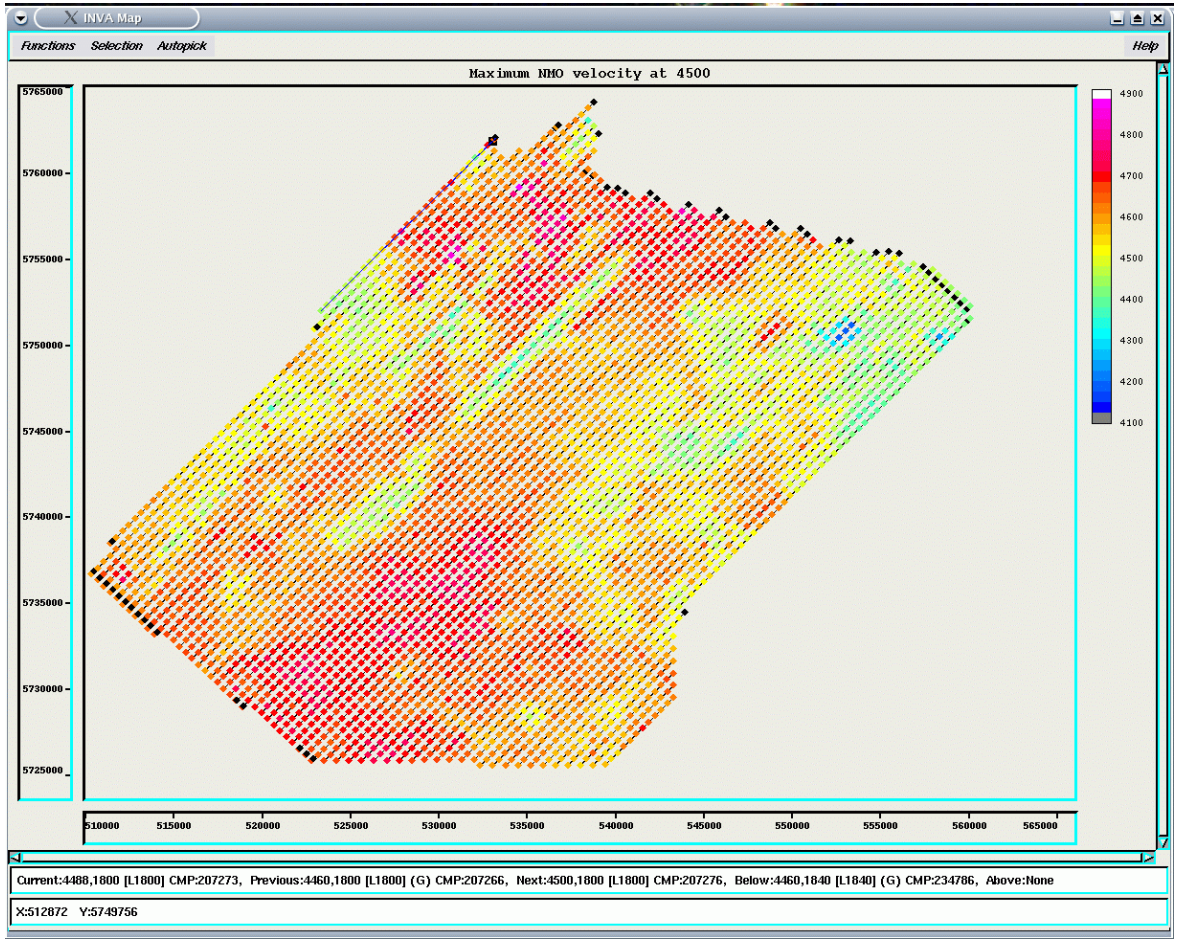


Figure 21 : Final Vn velocity at 4500ms

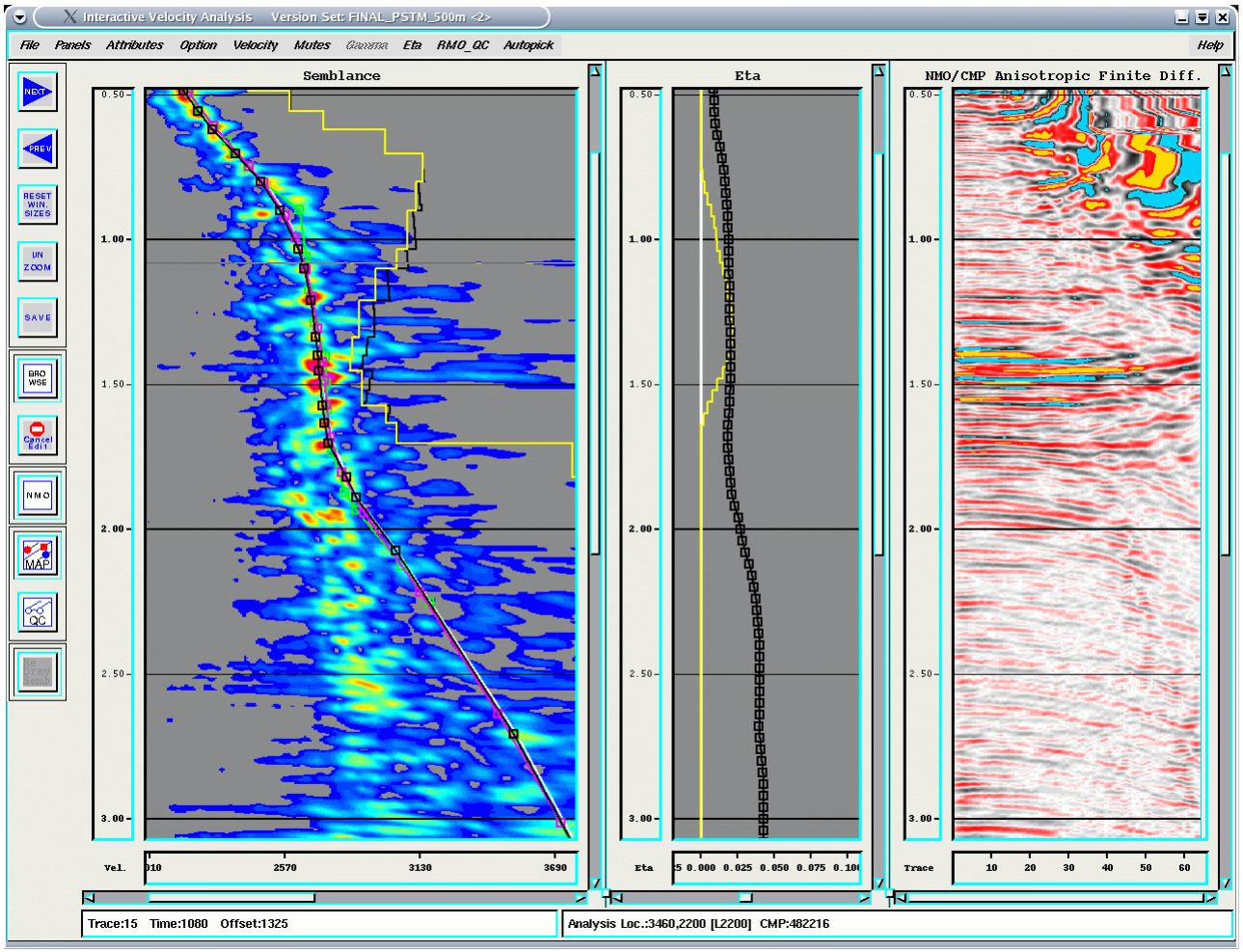


Figure 22 : InVA display – Anisotropic moveout correction with unrefined Vn

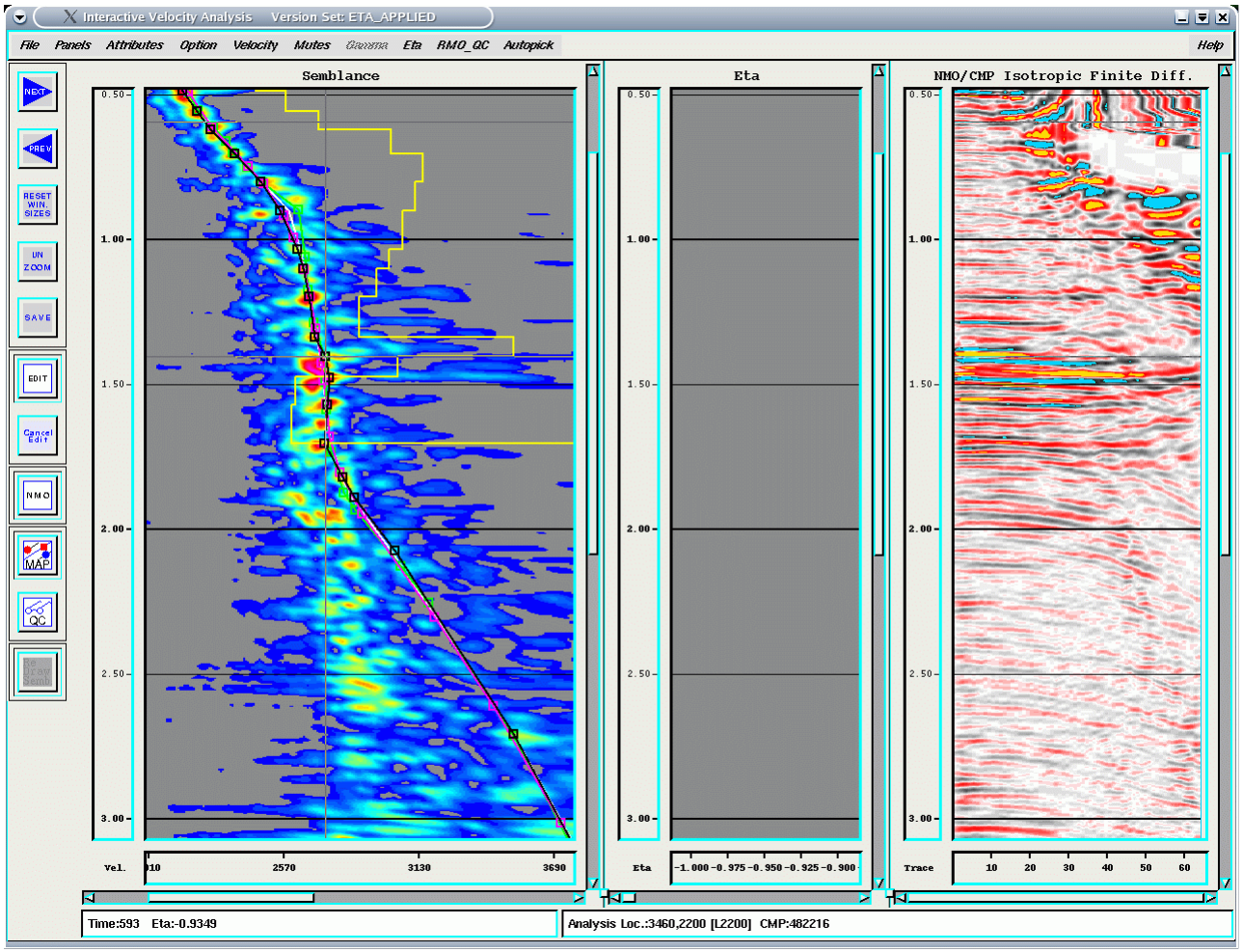


Figure 23 : InVA display – Anisotropic correction embedded in data, refined Vn

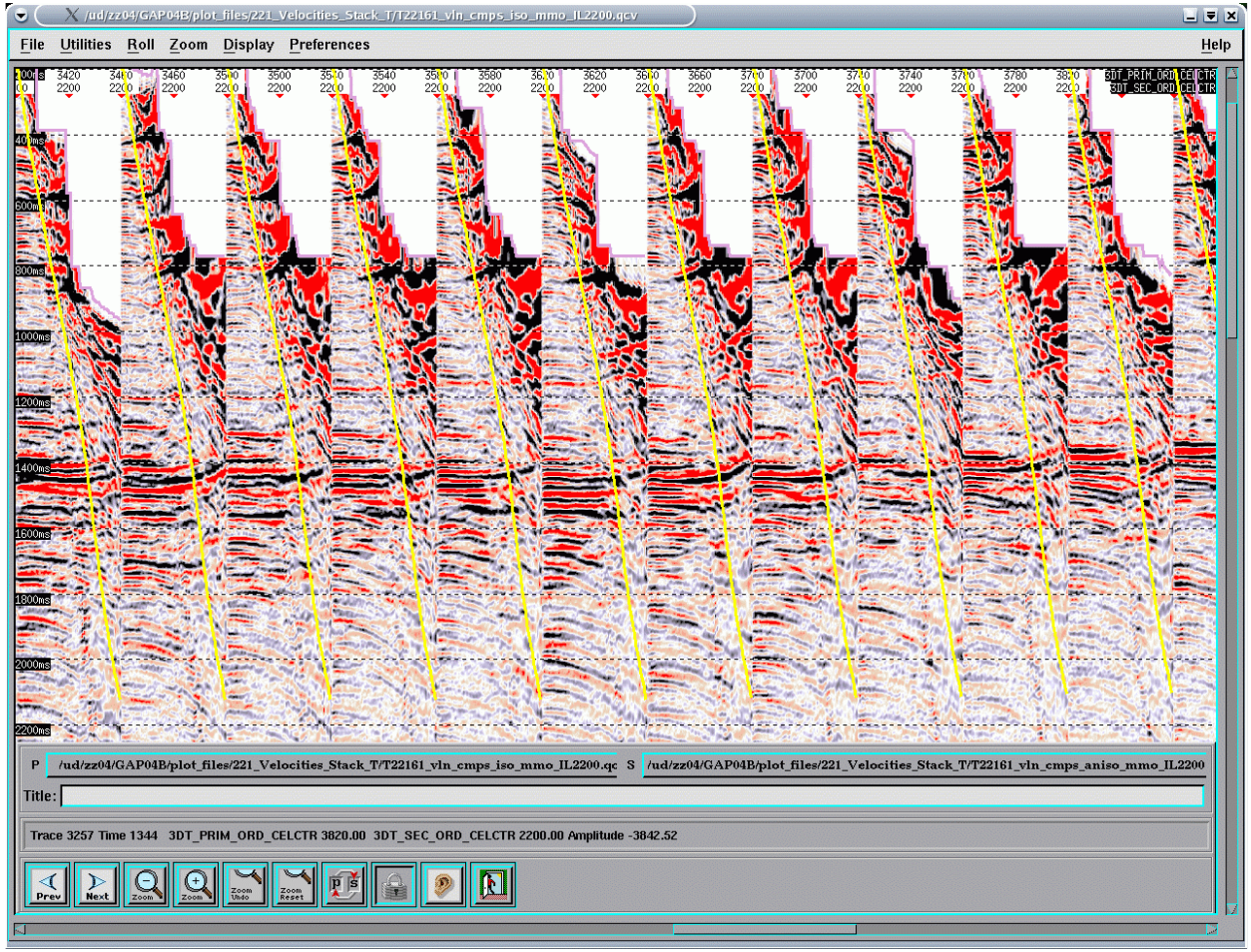


Figure 24 : Example CMPS with isotropic moveout correction

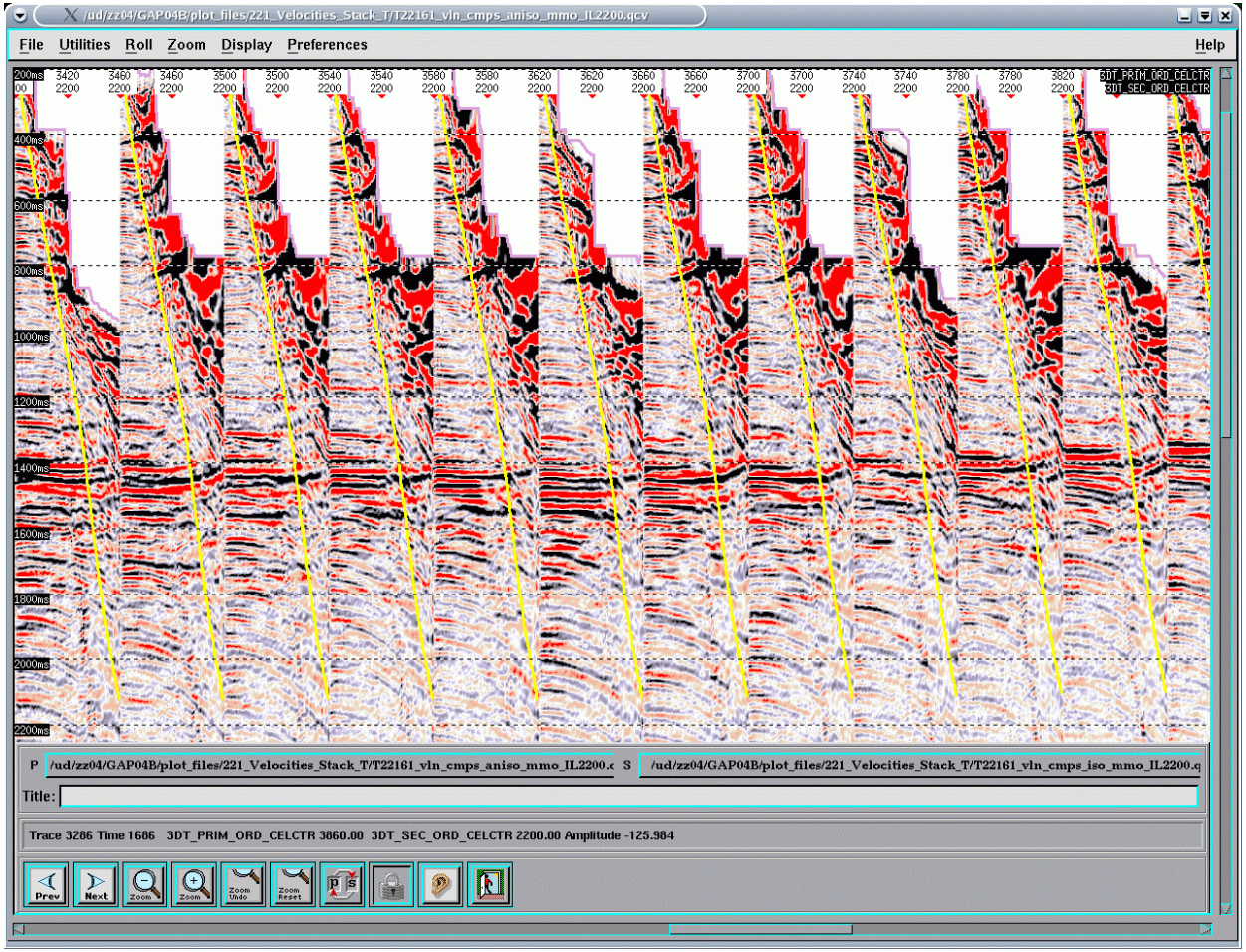


Figure 25 : Example CMPS with anisotropic moveout correction

4.12.5 Signal Enhancement Displays

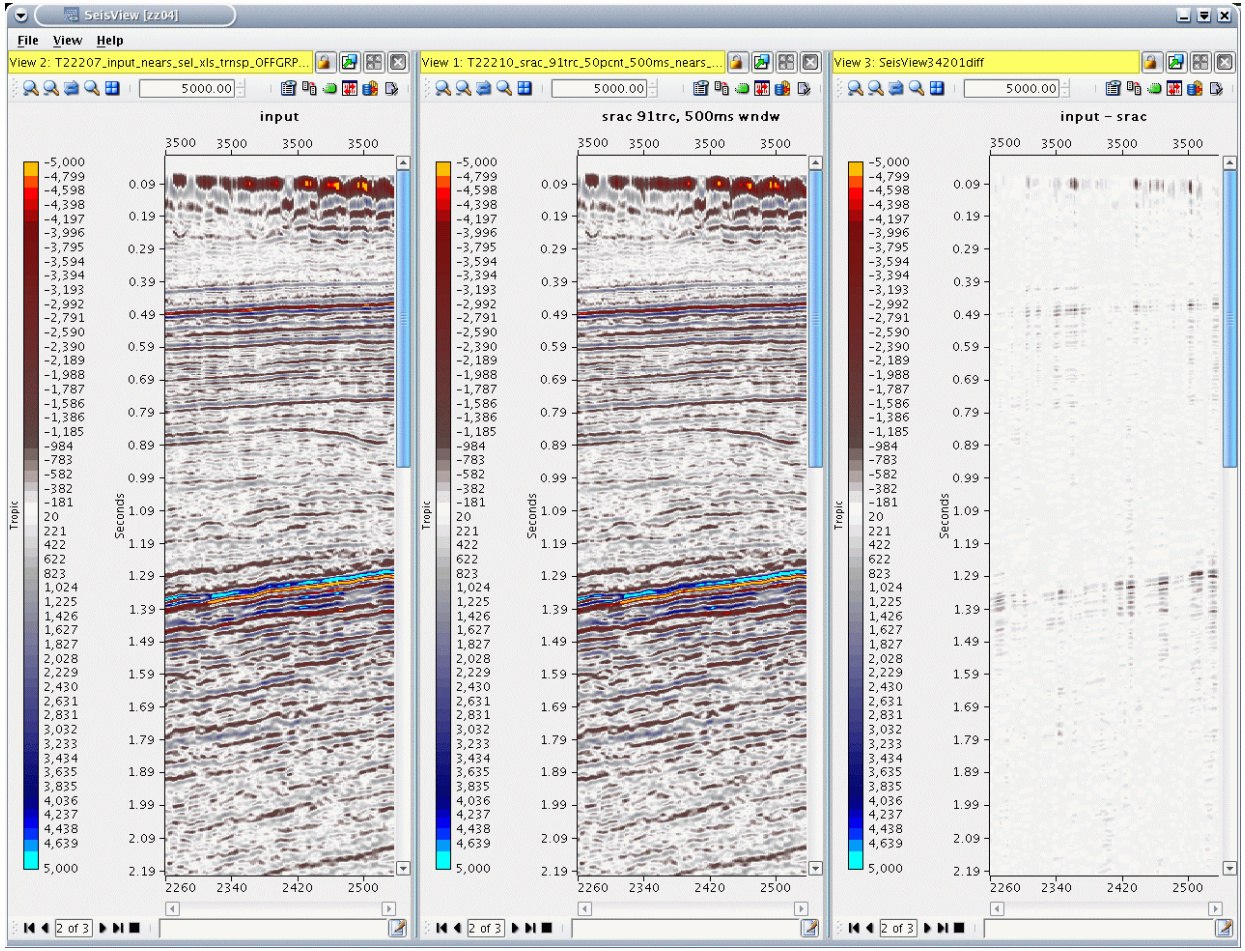


Figure 26 : SRAC before/after/difference (near offset plane)

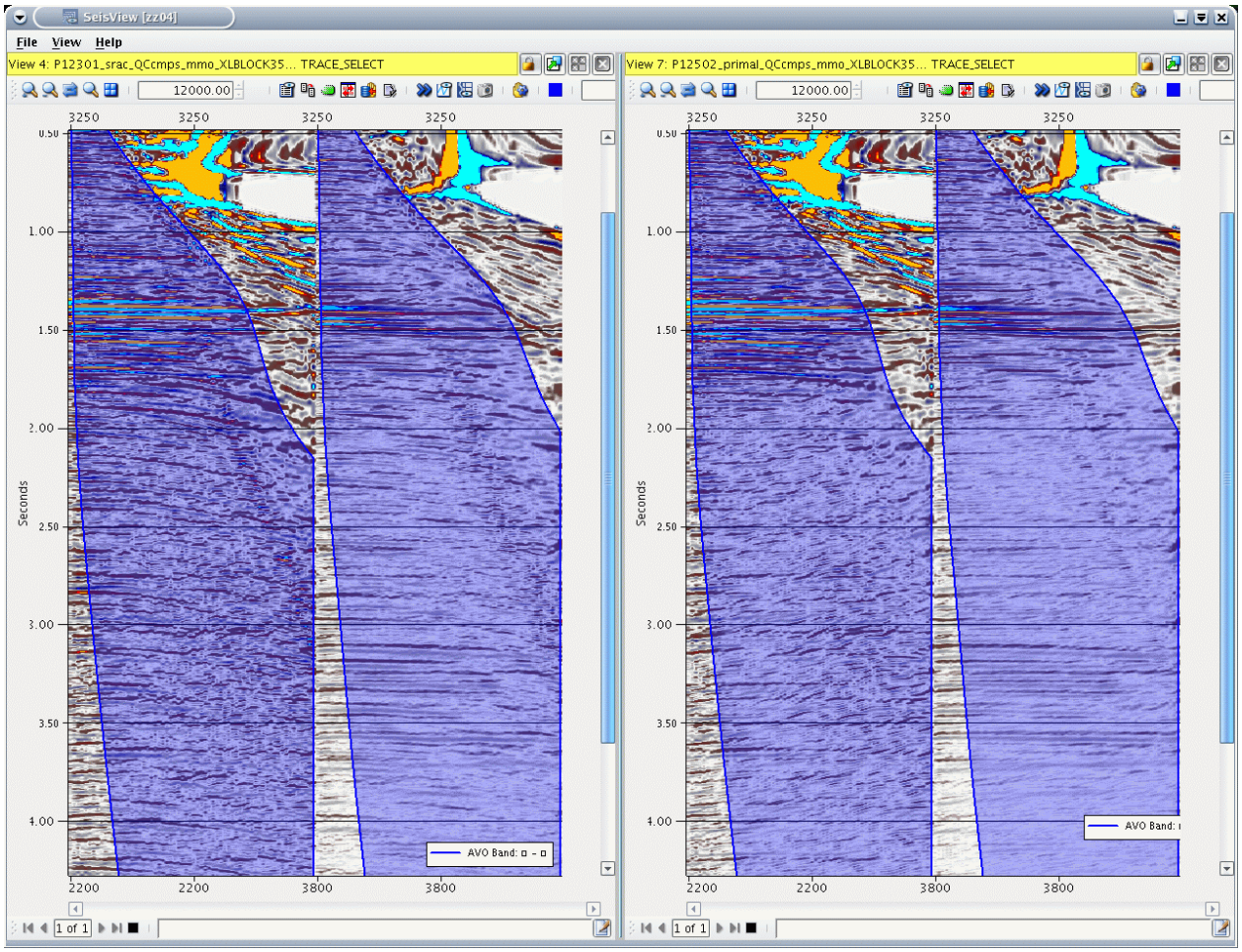


Figure 27 : Corrected gathers before/after Residual Radon and PRIMAL (5-50deg mute shown)

4.12.6 Angle Mute Displays

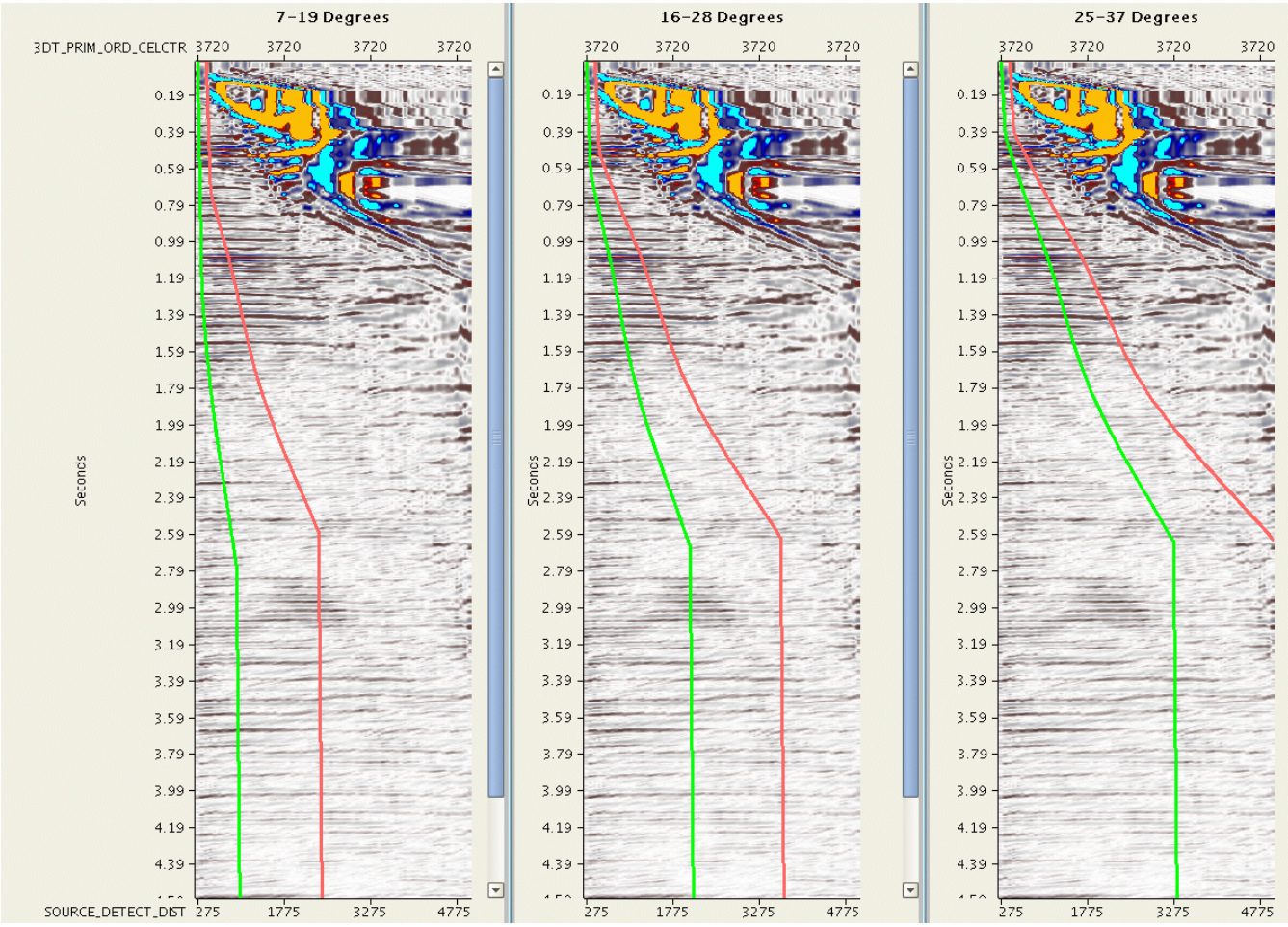


Figure 28 : Near/Mid/Far angle-mute overlays showing modification to inside angle-mute

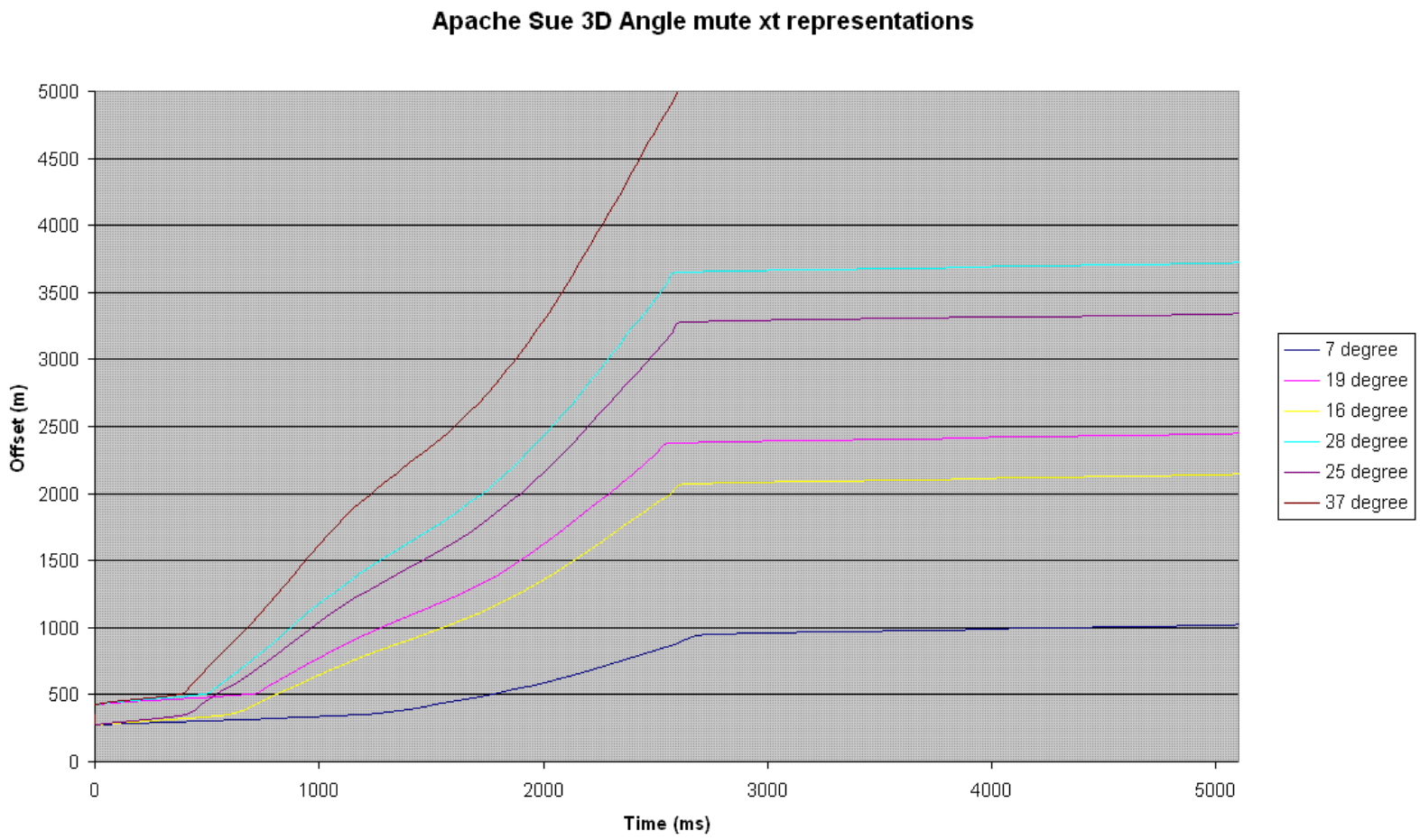


Figure 29 : Example angle mute representation for a single location

4.12.7 Post-Stack Scaling

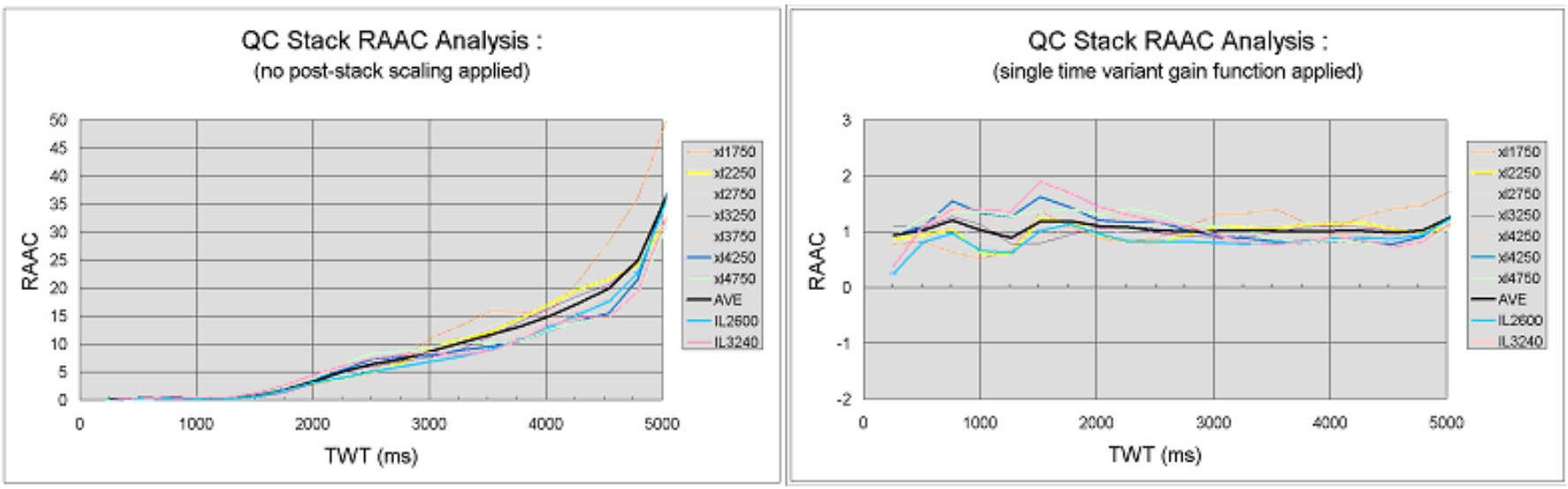


Figure 30 : Amplitude analysis before/after single-function scaling (black line)

4.12.8 Final Stack Displays

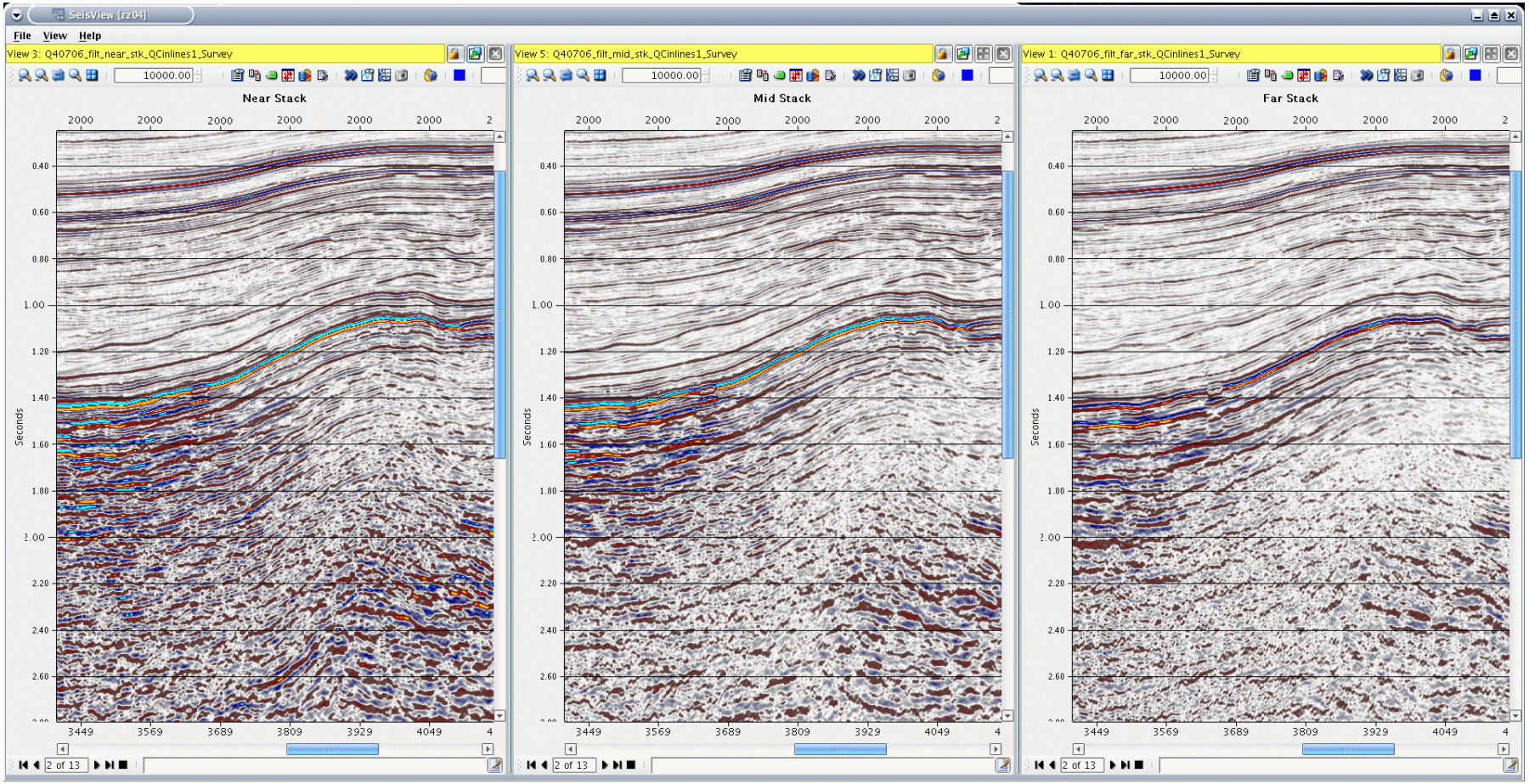


Figure 31 : Final Stacks - IL2000 near/mid/far stack

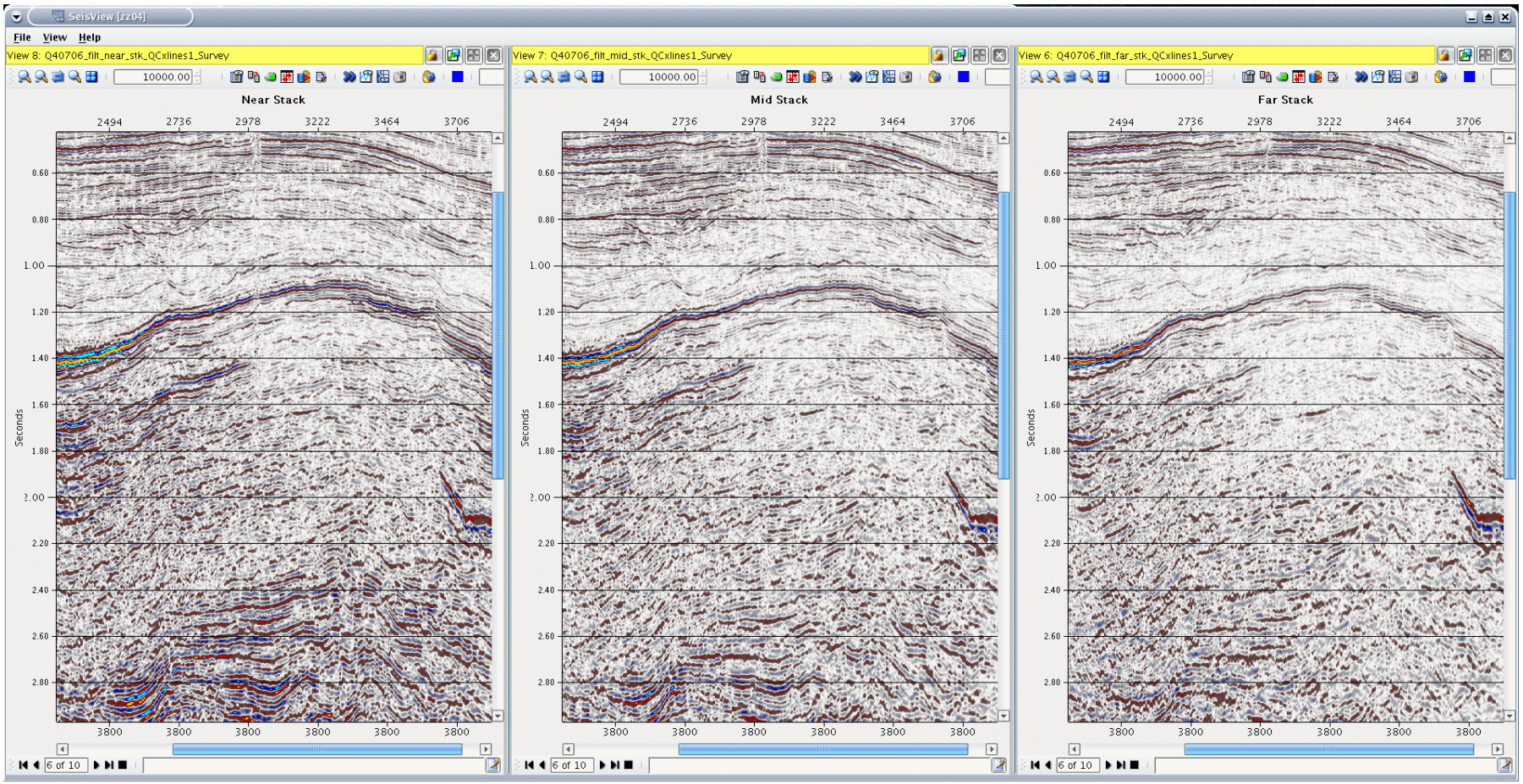


Figure 32 : Final Stacks – XL3800 near/mid/far stack

4.12.9 Sue / Northern Fields Merge Displays

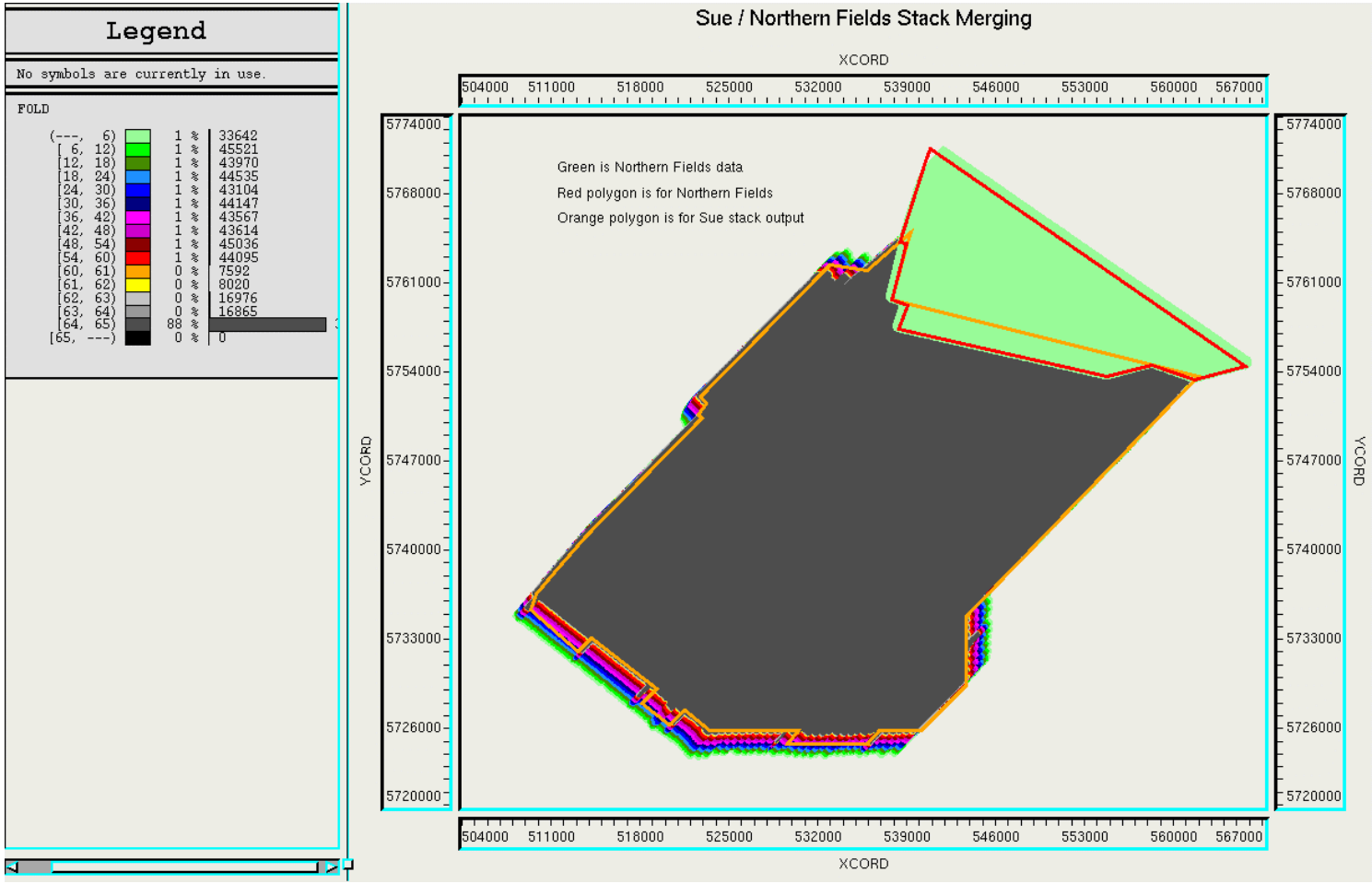


Figure 33 : Survey Map showing Sue & Northern Fields area

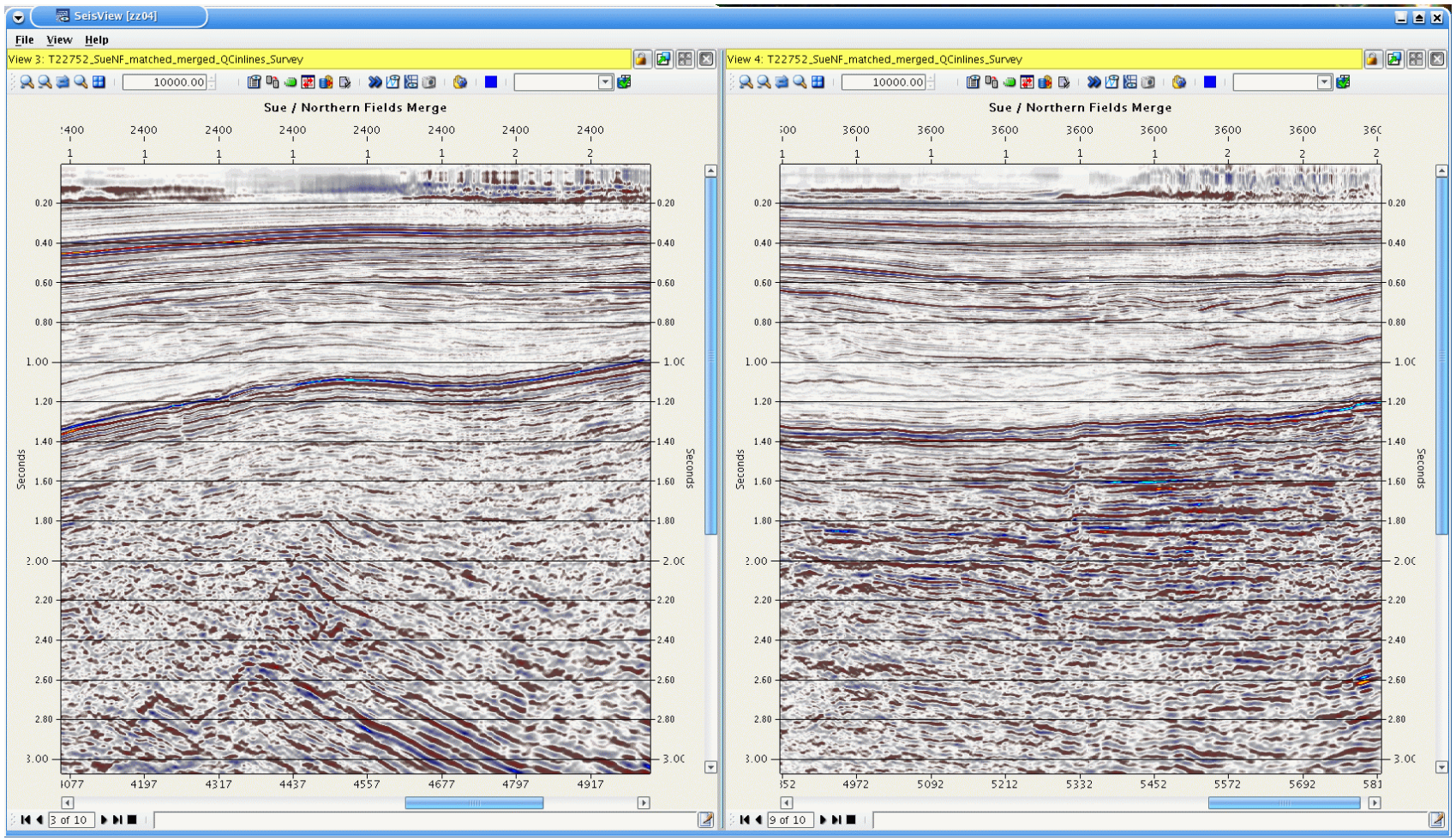


Figure 34 : Example inlines over merge area (centre of panels)