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# DATA PROCESSING REPORT

# 1992 NGALIA BASIN

# SEISMIC SURVEY

# WALBIRI AND WEST REEF

**SEPTEMBER - 1992**

**PERMIT: EP15**

**NORTHERN TERRITORY, AUSTRALIA**

**for**

**MAGELLAN PETROLEUM AUSTRALIA LTD**

**LEVEL 10**

**145 EAGLE STREET**

**BRISBANE QLD 4000**

**by**

**DIGITAL EXPLORATION LIMITED**

**(A DIGICON COMPANY)**

**54-56 BROOKES STREET**

**BOWEN HILLS QLD 4006**





**ELL: SENIOR GEOPHYSICIST** **JANUARY 1993**

**A:KJF**

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<u>APPENDICES</u>



**DPR052A:KJF**

## 1.0 INTRODUCTION

This report presents an account of the processing sequence and techniques used for processing seismic data acquired in the Ngalia Basin, permit EP15, in the Northern Territory for Magellan Petroleum Australia Ltd.

Approximately 98 kms of Vibroseis data were recorded by Geosystems Corporation, Party 205 during the period September, 1992. The acquisition parameters used for the survey are described in section 2.

A list of line numbers, VP ranges and kilometre index is given in Appendix II.

Processing of the data by Digital Exploration Limited took place between October, 1992 - January, 1993 at our Brisbane processing centre.

The processing parameters were established by Digital Exploration Limited in close consultation with Magellan Petroleum Australia Ltd. Details of the processing sequence and parameters used are given in Section 4.

## 2.0 ACQUISITION PARAMETERS

The data were recorded by Geosystems Corporation, Party 205. A brief summary of the acquisition parameters is as follows:

### Recording

| | | |
|---|---|---|
| Date | : | September, 1992 |
| Instruments | : | Geocor IV (sign bit recording) |
| Tape Format | : | SEGY |
| Tape Density | : | 1600 BPI |
| Sample Rate | : | 2 msecs. |
| Record Length (Walbiri) | : | 8 secs. (uncorrelated) |
| | : | 4 secs. (correlated) |
| (West Reef) | : | 9 secs. (uncorrelated) |
| | : | 4 secs. (correlated) |
| Recording Filter | : | None |

### Source

| | | |
|---|---|---|
| Energy Source | : | Vibroseis X 3 |
| Vibrator Type | : | Litton LRS-311, Truck mounted |
| Sweep/VP | : | Varies with line |
| Sweep Frequency (Walbiri) | : | 10 - 90 Hz. |
| (West Reef) | : | 10 - 100 Hz |
| Sweep Type | : | Linear |
| Vibrator Spacing/Moveup | : | 12 m pad to pad, 2 m moveup |
| Source Interval | : | 30 m centred between pegs |

### Spread

| | | |
|---|---|---|
| Number Of Groups | : | 300 |
| Geophone Type | : | MARK L21A 10Hz |
| Number of Geophone/GRP | : | 12 |
| Geophone Array | : | Linear Over 30 m |
| Station Interval | : | 15 m |
| Spread Pattern | : | 2242.5 m - 7.5 m * 7.5 m - 2242.5 m |
| Coverage | : | 7500% |

## 3.0 THE DATA PROCESSING SYSTEM

Digicon's installation in Brisbane is based on one CONVEX C3220 supercomputer, and two Digital Equipment Corporation's VAX 8650's. A brief description of the computers and peripheral devices is as follows :-

Main processing system used on this survey.

1) System 1 (VAX1)

- 1 unit 8650 CPU
- 32 Mbyte physical memory
- 4 x 1.23 Gbyte SABRE disk drives
- 4 x FPS 100 Array Processor
- 2 x Numerix Vector Processor(*)
- 16 x Telex tri-density tape drives
- 1 x high speed line printer
- 1 x 36" Benson electrostatic plotter
- 1 x 22" Benson electrostatic plotter
- 1 x 36" thermal plotter.
- 1 x 2.5/5.0 Gbyte Exabyte drive.

2) System 2 (VAX2)

- 1 unit 8650 CPU
- 32 Mbyte physical memory
- 2 x 1.23 Gbyte SABRE disk drives
- 4 x 400 Mbyte Fujitsu disk drives
- 4 x FPS 100 Array Processor
- 1 x Numerix Vector Processor(*)
- 16 x Telex tri-density tape drives
- 1 x high speed line printer
- 1 x 36" Versatec electrostatic plotter
- 1 x 22" Versatec electrostatic plotter
- 1 x 2.5/5.0 Gbyte Exabyte drive.

3) Additional Hardware

- 1 x GEOSPACE high resolution (508 dots/inch) film plotter
- 2 x Summagraphic digitizer tables
- 1 x Tektronix graphic terminal and hard copy unit
- 1 x Sun Sparc Station 1
- 1 x Sun Sparc Station 2

(*) The Numerix Vector Processor has 16 Mbyte memory and offers computation power of 30Mflops.

## 4.0 PRODUCTION PROCESSING SEQUENCE

## WALBIRI SURVEY

1. Demultiplex
2. Zero To Minimum Phase Conversion
3. Amplitude Recovery
4. Trace Editing
5. Deconvolution
6. Common Mid Point Gather
7. Datum Static Computation and Application
8. Velocity Analysis
9. Automatic Surface-Consistent Residual Static Computation and Application
10. Dip Moveout Correction
11. Velocity Analysis
12. Normal Moveout Correction
13. Pre-stack Muting
14. Time Variant Scaling
15. Non-Surface Consistent Residual Static Computation And Application
16. Common Mid Point Stack
17. Deconvolution After Stack
18. Datum Correction
19. Finite Difference Wave Equation Migration
20. Tau-p Filtering
21. Time Variant Filtering
22. Time Variant Scaling
23. Display

## 4.0 PRODUCTION PROCESSING SEQUENCE

## WEST REEF SURVEY

1. Demultiplex
2. Zero To Minimum Phase Conversion
3. Amplitude Recovery
4. Trace Editing
5. Deconvolution
6. Common Mid Point Gather
7. Datum Static Computation and Application
8. Velocity Analysis
9. Automatic Surface-Consistent Residual Static Computation and Application
10. Dip Moveout Correction
11. Velocity Analysis
12. Normal Moveout Correction
13. Pre-stack Muting
14. Time Variant Scaling
15. Non-Surface Consistent Residual Static Computation And Application
16. Common Mid Point Stack
17. Datum Correction
18. Finite Difference Wave Equation Migration
19. Tau-p Filtering
20. Time Variant Filtering
21. Time Variant Scaling
22. Display

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## PROCESSING

### 4.1 DEMULTIPLEX

The data from the field tapes were decoded and converted to Digicon's internal 9 track, trace sequential format for subsequent processing. The output was to 3.0 secs, 4 msecs for all the lines.

### 4.2 ZERO TO MINIMUM PHASE CONVERSION

A minimum phase correction filter was applied to each shot record prior to deconvolution. This phase correction filter was designed to match the bandwidth of the recording instrument filter.

### 4.3 AMPLITUDE RECOVERY

Correction for amplitude decay was adequately compensated for by a linear gain function being 0dB at 0 sec to 12 dB at 4 sec.

### 4.4 TRACE EDIT

This option was used on some records to zero noisy traces which would not make a useful contribution to the stack. Information from the displayed reformatted field records and observer's logs were combined to determine the editing table.

### 4.5. DECONVOLUTION

Deconvolution is the process of designing and applying an inverse filter to remove from the recorded data the effects of the earth's filtering of the source wavelet. The deconvolution is accomplished by the application of one or more whitening filters designed from the auto-correlation of each data trace of the input records.

The filter is designed to whiten or broaden the frequency spectrum within a band pass having an allowable signal-to-noise ratio. By whitening the pass-band, the time transient (i.e. residual shot wavelet) is collapsed into a shorter interval thus providing more precise delineation of the seismic reflection events.

On the subject data a surface consistent 12 msec gap and operator length of 120 msec deconvolution filter (white noise = 1%) was designed on data within the window defined by the following offset-time pairs:

| | | |
|---|---|---|
| Near offset (7.5 m) | : | 200 - 2000 msec |
| Far offset (2242.5 m) | : | 800 - 2000 msec |

## 4.6 COMMON MID POINT GATHER

The seismic traces along a line are gathered into data sets on the basis of common mid point (CMP). Information such as offsets, surface and sub-surface co-ordinates and shot sequence numbers are stored in the trace headers for use in subsequent processing. CMP's are also referred to as common depth points (CDP's).

## 4.7 DATUM STATICS COMPUTATION

Datum static corrections were applied to correct for near surface irregularities such as changes in elevation, weathering velocity, weathering layer thickness and subweathering velocity.

For this project datum statics were computed using Digicon's STATICM routine. The input is digitised first breaks from the production records. Geometry information is drawn from the database and used with the input elevation listings to fully define the profile. Details of shot and receiver offsets, weathering velocity (Vo) and selected datum elevation are also provided. Weathering velocities were obtained from the deep uphole survey and ranged from 500 m/sec to 1300 m/sec.

The routine is iterative, and progressively adjusted first break times are submitted for updating of sub-weathering velocities (Vr) and delay times (Td) at each group location. Both of these are constrained by suitable smoothing filters to inhibit erratic variation.

After the final iteration, usually 3, the geophone statics (Tg); one way datum statics are computed as an elevation correction plus a weathering correction as follows:-

$$Tg = - \frac{[E + K.Td]}{[Vr]}$$

Where $$K = \sqrt{\frac{Vr - Vo}{Vr + Vo}}$$

E = elevation of the surface minus the elevation of the datum

Vr = replacement velocity which is assumed to be 90% of the calculated refractor velocity to account for the effect of anisotropy. The vertical travel time being somewhat less than the horizontal travel time.

Td = delay time at each station

As vibroseis is a surface source the shot static Ts is the same as the geophone static Tg at each surface location. After calculation, the shot and receiver statics are averaged within each CDP to produce a mean static and a residual shot and receiver static for each trace.

$$\text{Mean Static} = \frac{\text{Shot Static + Receiver Static}}{\text{Number Traces in CDP}}$$

$$\text{Residual Shot} = \frac{\text{Tg + Ts - Mean Static}}{2}$$

There is one mean static for each CDP. Residual shot and receiver statics are calculated for each trace within a CDP. The residual shot and receiver statics are usually quite small. Subsequent processing is performed on data with only the residual component applied. Effectively the data is referenced to surface or floating datum. The mean static is applied to the data after the final filtering process.

## 4.8 VELOCITY ANALYSIS

First pass velocity analyses were performed using the constant velocity stack (CVS) technique. The analyses were located at approximately 2 km intervals. 21 alternate CMP gathers were stacked with constant velocities such as:-

2000 m/sec incrementing by 100m/sec to
4400 m/sec incrementing by 200m/sec to
6000 m/sec

## 4.9 RESIDUAL STATICS

The routine assumes that the static variation from trace to trace is caused by velocity and thickness variations in the low-velocity weathering layer. It further assumes that the initial datum statics applied to the data are not precise and that the refined static corrections, based on statics computed from the reflection data itself, are desirable.

The automated statics analysis routine is conducted on NMO corrected gather records by utilizing all possible cross correlations between traces within and from adjacent mid points.

A dip model, representing the observed structure on one or more events within a specified gate or gates, is input to the program to facilitate dip correction within the set of CMP gathers being operated on. The model is interpreted from the previous stacked section in the processing sequence. For these data a design gate was employed which started at 400 msec and finished at 1500 msec, approximately.

The process iterates automatically and makes separate estimations of residual normal moveout and dip, then computes a set of surface consistent residual statics for all shot and receiver locations. The appropriate residuals may be output on tape for application at a later stage, or stored in the data-base.

The following correlation processing controls are generally followed while estimating residual statics and have some data dependence:

a. Static limits (± 12 msec. for these data).
b. Damping factor to prevent matrix instability.
c. Number of iterations (3 for these data).
d. The number of depth-points in the cross correlations. This was constant at 11, 9 and 7 through iterations 1, 2 and 3.

Residual geophone statics are applied in accordance with receiver surface location and residual shot statics with record or shot input sequence. Both are stored in the appropriate trace headers for application prior to DMO.

## 4.10 DIP MOVEOUT CORRECTION (DMO)

The data was processed through Digicon's Kirchhoff dip moveout routine.

The main benefits of including DMO in the processing sequence are:-

### 1. DIP-INDEPENDENT STACKING VELOCITIES

Stacking velocities after DMO are dip-independent, allowing both horizontal and dipping reflectors to be stacked with the same RMS velocity, i.e. the RMS velocity associated with the horizontal event. Thus flat-dip primary reflectors and steep-dip events (such as fault plane reflectors and diffraction limbs) may be optimumly stacked at the same time.

The dip used on all lines was +/- 10 msec/trace

**2. REMOVAL OF REFLECTION POINT SMEAR**

Data recorded at a finite offset is transformed to zero offset thus eliminating reflection point smear. Time varying multi-channel filters applied in the common-offset domain laterally shift the reflection points to their zero-offset position.

## 4.11 VELOCITY ANALYSIS (VELFAN)

VELFAN Velocity Analysis is an automatic production orientated technique designed to obtain stacking velocity information from seismic data input to the program in CMP-gather form. Stacking velocity approximates RMS velocity.

Based on pre-determined knowledge of the stacking velocities which might be expected in an area, a set of velocity ranges versus two-way reflection time is input to the program together with a number of consecutive CMP gathers, for each location at which a velocity study is required. Also input is a number, N, (usually 9 - 11, in this case 13), of velocity functions to be applied to the gathers.

The program takes the maximum and minimum functions as specified by the velocity ranges and times above, and evenly intersperses N-2 other functions between them. It applies these functions to the CMP-gathers which are subsequently stacked, filtered and displayed.

The VELFAN display consists of six parts:

a. The uncorrected central gather of the input group.
b. The central gather NMO corrected by the central velocity function.
c. The stacks formed by NMO-correcting, stacking and filtering the set of CMP gathers using the N functions.
d. A display of velocity versus reflection time showing the fan of N functions, and points of high coherence at preselected intervals, e.g. 50 milliseconds in this case.
e. A plot of relative coherence amplitude versus time.
f. A listing of velocities versus time of up to three velocities at any time level, based on coherence measurements.

For this survey the analyses were performed over 21 alternate common mid points with 13 velocity functions forming the fan. The velocities were run at 1 km. intervals with automatic residual statics applied to the input data.

## 4.12 NORMAL MOVEOUT (NMO) CORRECTION

This operation is performed by assuming that the energy travels in a straight ray path and utilizes the following equation:

$$T^2 \text{ (recorded)} = T^2 \text{ (corrected to zero offset)} + \left(\frac{X \times 1000}{VRMS}\right)^2$$

where T = time in milliseconds
X = offset in metres
VRMS = stacking velocity in metres/second

A space varying velocity function is utilized and the program computes a new space-varying function for each trace. By making floating point cubic interpolations between input control points, a high-fidelity NMO corrected gather is output.

Velocities, referenced to surface, are annotated on the final stack sections. Datum corrected velocities used for migration are annotated on the migrated stack sections.

## 4.13 PRESTACK MUTING

The function of this process is to mute the very shallow long offset traces where the signal to noise ratio is extremely poor.

In particular, the disproportionate stretching of traces with decreasing velocity and increasing offset, following NMO correction, contributes significantly to the poor S/N ratio.

Final mute values

| TIME (MSEC.) | OFFSET (METRES) |
|---|---|
| 0 | 100 |
| 200 | 400 |
| 400 | 820 |
| 600 | 1100 |
| 1000 | 1550 |
| 1400 | 2250 |

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**4.14 TIME VARIANT SCALING**

At this final stage of preparation of the trace, it is assumed that each has been statics and NMO corrected to a simulated zero offset condition, for the particular CMP. So that each may contribute equally over its full length, to the summed trace, a short gate (500 milliseconds) Automatic Gain Control scaling function was applied before stacking, to ensure that all traces were at optimum level.

**4.15 NON SURFACE CONSISTENT RESIDUAL STATIC COMPUTATION AND APPLICATION**

The following correlation processing controls were used in this second pass of automatic residual statics. In this pass, the residual statics were calculated in a non-surface consistent, i.e. CMP-consistent, manner.

a) static limits (± 8 msec)
b) number of mid-points used in the cross correlations (5 CMP's)

**4.16 COMMON MID POINT STACK**

After the completion of NMO-correction, prestack muting, balancing and CMP-consistent residual statics, the CMP data sets are summed algebraically. The resultant amplitude is divided by the number of normalised live samples contributing to the summation to produce the final unfiltered stacked sample.

The nominal fold for data was 7500%.

**4.17 DECONVOLUTION AFTER STACK**

On the Walbiri Survey a 24 msec gapped deconvolution with a 150 msec operator and 1% white noise was used.

**4.18 TIME VARIANT BANDPASS FILTERING**

The stacked data were filtered using time variant digital filters with passbands of:-

| TIME (MS) | BANDPASS (Hz) (6 dB down points) |
|---|---|
| 0 | 10 - 75 |
| 1000 | 15 - 70 |
| 2000 | 15 - 65 |
| 3000 | 15 - 50 |

**4.19 DATUM CORRECTION**

Prior to the datum correction from the floating surface datum to the processing datum, i.e. 580m AMSL, a positive bulk shift of 100 msec was applied. Subsequently the timing lines were adjusted by -100 msec to correctly denote the event times.

**4.20 MIGRATION**

The lines in the Walbiri area were migrated using the finite difference wave equation technique with a layer thickness of 40 msec and migration velocity of 90% of the smoothed stacking velocities.

In the West Reef area the velocity used was 110% of the smoothed stacking velocities.

**4.21 TAU-P FILTER**

All the migrated stacked data were input to the Tau-P filter program.

The program is a 2-D time and space dip filter that has two non-linear signal estimation options available: coherence masking and dip balancing. The dip pass given was ± 8.0 ms/trace. A percent of the input was added to the reconstructed signal trace to form the output trace.

The addbacks from surface were:-

| TIME (msec) | %ADDBACK |
|---|---|
| 0 - 3000 | 60 |

**4.22 TIME VARIANT SCALING**

A multi-gated balance was applied to the data after final filtering to bring the data to the desired amplitude level. The average absolute value (AABS) of the gate is computed and a scalar is applied to the centre point of the gate. This is repeated for each gate with the scalar interpolated between the gate centres.

The following gates were used for these data:

| GATE | TIME (msec) |
| --- | --- |
| 1 | 0 - 200 |
| 2 | 200 - 500 |
| 3 | 500 - 1000 |
| 4 | 1000 - 2000 |
| 5 | 2000 - 3000 |

**4.23 DISPLAY**

The final sections were displayed on film with the following plotting parameters:-

a) Final stacks and Migrated Stacks:

Horizontal scale (7.874 traces/cm or 20 traces/inch)

Vertical scale of 20 cm/sec per second or 7.874 msec/sec

The films were fitted with a side panel on the right hand side with a comprehensive tabulation of line, field and processing information. The location map was displayed on the right hand side of section. Along the top of the films, data relating to actual location along the line are displayed. This includes datum statics and residual statics, refractor velocities for layers 1 and 2, line intersection details, uphole and well locations, surface elevation and RMS velocity tables at their points of application. All films were in the wiggle-trace, variable-area mode, with timing lines every 100 milliseconds. Station annotation was at the beginning and end of each line, as well as at 1 km intervals.

**4.23 FINAL OUT-OUT STACK AND FINAL MIGRATED STACK TAPES**

Final out-out stack and final migrated data were concatenated and output in SEGY format, 6250 bpi. A list of tape numbers and line numbers is given in Appendix IV.

Respectfully submitted,

Allan Gell
SENIOR GEOPHYSICIST

Tony Spenceley
LAND PROCESSING SUPERVISOR

Nigel J. Fisher
TECHNICAL MANAGER

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# APPENDIX I

## PROCESSING PARAMETERS TESTS

Shot Record Tests Walbiri Area
M92-WA4 Shot 81, VP

A. Gain Recovery Tests

- i) Spherical divergence correction
- ii) Linear gain

B. Deconvolution before stack

- i) Spike deconvolution, 80, 120, 140 msec operator, 1% white noise.
- ii) Gap deconvolution, 120 msec operator, 1% white noise, gaps 8 msec, 12 msec, 16 msec and 20 msec.
- iii) Deconvolution before stack with F-K filter +/- 7 msec/trace, 11 msec/trace and 15 msec/trace.

C. F-K Filter

- i) Velocity cuts of 2140 m/s, 1360 m/s, 1000 m/s and 790 m/s

D. Band pass filter test

**Stack Panels Tests Walbiri Area**

1. Deconvolution before Stack

   a) Surface consistent deconvolution, 120 msec operator, single window, 4, 8, 12, 20, 24 and 32 msec gap with and without F-K filtering.

   b) Surface consistent deconvolution 120 mec operator, single window, spike, with and without F-K filtering.

   c) Trace deconvolution, 120 msec operator single window, 8, 12 and 16 msec gap, with and without F-K filtering.

   d) Trace deconvolution, 120 msec operator, single window, spike, with and without F-K filtering.

2. Velocity Filtering

   Velocity cuts of 2140 m/s, 1360 m/s, 1000 m/s and 790 m/s were tested.

3. Mute

   Mute tests were performed on 2 locations on line M92 - WA4. Outside mute was tested from VP 270 to VP 370. An inside mute was tested from VP 200 to VP 250.

4. Filter Test

   Octave band pass filter panels were run from VP 140 to VP 190.

5. Spectral whitening was tested on a panel of data from VP 120 to VP200.

6. Deconvolution after stack was tested from VP 120 to VP 200. These consisted of 8 msec, 12 msec, 20 msec, 24 msec and 32 msec gaps, single window, 120 msec operator.

7. Tau-P Filter

   2 panels were produced, on pre and post deconvolution after stack from VP 120 to VP 200.

8. FX Deconvolution was tested on the whole of line M92 - WA5.

9. Migration

   Finite difference migration was tested using 80%, 90%, 100% and 110% of the smoothed stacking velocities.

**<u>Shot Record Tests West Reef Area</u>**
**M92-WA4 Shot 221, VP 499.5**

A. Gain Recovery Tests

- i) Spherical divergence correction
- ii) Linear gain

B. Deconvolution before stack

- i) Spike deconvolution, 80, 120, 140 msec operator, 1% white noise.
- ii) Gap deconvolution, 120 msec operator, 1% white noise, gaps 8 msec, 12 msec, 16 msec and 20 msec.
- iii) Deconvolution before stack with F-K filter +/- 7 msec/trace, 11 msec/trace and 15 msec/trace.

C. F-K Filter

- i) Velocity cuts of 2140 m/s, 1360 m/s, 1000 m/s and 790 m/s

D. Band pass filter test

**<u>Stack Panel Tests West Reef Area</u>**

1. Deconvolution before Stack VP380 - 540

   a) Trace deconvolution
   Spike, 120 msec operator, 1 window gap, 8 msec, 12 msec, 16 msec, 120 msec operator, 1 window

   b) Surface consistent deconvolution
   Spike, 120 msec operator, 1 window, no FK

   c) Surface consistent, spike, 120 msec operator, 1 window, F-K filter, 2140 m/s

   d) Surface Consistent, spike, 12 msec operator, 1 window, F-K filter, 1360 m/s

2. Band pass filter

3. Tau-P Filter

   50%, 60% and 70% addback

4. Migration Tests

   90%, 100% and 110% of smoothed velocity field.

## APPENDIX II

## LIST OF LINES

| LINE NO. | VP RANGE | SHOTS PROCESSED | KMS | NO. TRACE |
|---|---|---|---|---|
| M92 - WA1 | 666 - 100 | 283 | 8.49 | 1133 |
| M92 - WA2 | 500 - 100 | 201 | 6.00 | 801 |
| M92 - WA3 | 272 - 382 | 581 | 16.65 | 2328 |
| M92 - WA4 | 100 - 474 | 187 | 5.61 | 749 |
| M92 - WA5 | 418 - 100 | 159 | 4.77 | 641 |
| M92 - WA6 | 614 - 100 | 260 | 7.71 | 1035 |
| M92 - WA8 | 100 - 700 | 301 | 9.00 | 1202 |
| M92 - WR1 | 1100 - 100 | 501 | 15.00 | 2001 |
| M92 - WR2 | 1036 - 100 | 1468 | 14.04 | 1873 |
| M92 - WR4 | 100 - 843 | 368 | 11.14 | 1469 |
| | | 4309 | 98.41 | |

## APPENDIX III

## LINE INTERSECTION LIST

| | | | |
|---|---|---|---|
| LINE M92-WA1 | VP168 | LINE M92-WA6 | VP580 |
| | VP459.5 | LINE M92-WA8 | VP583 |
| LINE M92-WA2 | VP311 | LINE M92-WA3 | VP454 |
| LINE M92-WA3 | VP454 | LINE M92-WA2 | VP310 + 12M |
| | VP671.5 | LINE M92-WA4 | VP409 + 7M |
| | VP921 | LINE M92-WA6 | VP387 |
| | VP1179.5 | LINE M92-WA8 | VP373 + 10M |
| LINE M92-WA4 | VP409.5 | LINE M92-WA3 | VP671 + 5M |
| LINE M92-WA5 | VP176.5 | LINE M92-WA8 | VP166 |
| | VP367 | LINE 1 | VP83.93 |
| LINE M92-WA6 | VP387 | LINE M92-WA3 | VP921 |
| | VP580 | LINE M92-WA1 | VP167 |
| LINE M92-WA8 | VP166 | LINE M92-WA5 | VP126 + 8M |
| | VP374 | LINE M92-WA3 | VP1184 + 8M |
| | VP583 | LINE M92-WA1 | VP459 + 7M |
| LINE M92-WR2 | VP180 | LINE M92-WR2 | VP920.87 |
| | VP469 | LINE NA | VP560.46 |
| | VP759 | LINE M92-WR4 | VP593.91 |
| | VP958 | LINE NT | VP537.86 |
| LINE M92-WR4 | VP163 | LINE NB | VP613 |
| | VP594 | LINE M92-WR1 | VP759.27 |

## APPENDIX IV

## SEGY TAPE INVENTORY

UNFILTERED FINAL STACKS

| TAPE NO. | LINE NO. | CDP RANGE | SEQUENTIAL TRACE NO. |
|---|---|---|---|
| CPT - 5508 | M92 - WA1 | 1332 - 200 | 1 - 1133 |
| | M92 - WA2 | 1000 - 200 | 1134 - 1934 |
| | M92 - WA3 | 436 - 2763 | 1935 - 4262 |
| | M92 - WA4 | 199 - 947 | 4263 - 5011 |
| | M92 - WA5 | 840 - 200 | 5012 - 5652 |
| | M92 - WA6 | 1234 - 200 | 5653 - 6687 |
| | M92 - WA8 | 199 - 1400 | 6688 - 7889 |
| | M92 - WR1 | 2200 - 200 | 7890 - 9890 |
| | M92 - WR2 | 2072 - 200 | 9891 - 11763 |
| | M92 - WR4 | 199 - 1667 | 11764 - 13232 |

MIGRATED STACKS

| | | | |
|---|---|---|---|
| CPT - 5509 | M92 - WA1 | 1332 - 200 | 1 - 1133 |
| | M92 - WA2 | 1000 - 200 | 1134 - 1934 |
| | M92 - WA3 | 436 - 2763 | 1935 - 4262 |
| | M92 - WA4 | 199 - 947 | 4263 - 5011 |
| | M92 - WA5 | 840 - 200 | 5012 - 5652 |
| | M92 - WA6 | 1234 - 200 | 5653 - 6687 |
| | M92 - WA8 | 199 - 1400 | 6688 - 7889 |
| | M92 - WR1 | 2200 - 200 | 7890 - 9890 |
| | M92 - WR2 | 2072 - 200 | 9891 - 11763 |
| | M92 - WR4 | 199 - 1667 | 11764 - 13232 |