N.E.B. COPY

ZERO OFFSET VSP

AND

ACOUSTIC LOG CALIBRATION

REPORT FOR

PARAMOUNT RESOURCES LTD.

WELL: PARAMOUNT ET AL LIARD F-36

BY

BAKER ATLAS

DOWNHOLE SEISMIC SERVICES

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CALGARY ALBERTA

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MICROFILMED
SUR MICROFILM:

FEBRUARY 1999

PROCESSING GEOPHYSICIST: SALIM MOUICI

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In the processing and interpretation of the data, Downhole Seismic Services (DSS) employees have relied on experience and have exercised their best judgment. However since all interpretations are opinions based on inferences from acoustical or other measurements, we cannot and we do not guarantee the accuracy or the correctness of any interpretations. As such, we shall not be liable for any loss, damages or expenses resulting from reliance on such interpretation.

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1. ACQUISITION AND PROCESSING

Baker Atlas
GEOScience

1.1 INTRODUCTION

Baker Atlas Downhole Seismic Services conducted a **Zero Offset VSP Survey** for **Paramount Resources Ltd** in their **Paramount Et Al Liard F-36** well, located in the Northwest Territories. The wireline logging was provided by Baker Atlas Logging Services.

The Survey began at 0635 hrs on 24 January 1999 and finished at 1803 hrs of the same day.

All measured depths were referenced to the Kelly Bushing (KB) elevation of 470.3 m above MSL. At the time of the survey the well had been drilled to a depth of 1968.0 m and cased to a depth of 1494.0 m.

Data for the VSP survey consisted of 695 files which were recorded on DAT tape. They were gathered from 92 levels ranging from 128 m to 1965 m measured depth below KB.

Section 3 of this report contains a copy of the field engineer's report for the survey.

Polarity

For data after deconvolution and synthetics, normal polarity shows a positive reflection coefficient as a trough.

1.2 DATA ACQUISITION

Downhole Seismic Services crew and equipment arrived at the well on January 23, 1999. All equipment was tested on site prior to the survey. DSS employed standard techniques for the VSP survey.

The Baker Atlas engineer operated two Vibroseis sources at an offset of 64 m and an azimuth of 175.0 degrees from the wellhead. The elevation of the source was 464.80 m above MSL. *Figure 1* shows the Survey Geometry and *Figure 2* shows the nomenclature for the acquisition parameters.

At the start of the survey, the wireline depth sensor was zeroed at the KB elevation and the geophone was lowered down the well. During the downtrip the geophone was stopped at a number of depths to check the equipment performance and lowered to the deepest station depth of 1965 m, from where the VSP data recording commenced. Recording then proceeded as the geophone was raised up to the shallowest station depth of 128 m. The accuracy of the depth sensor was checked by comparing the first arrival times of the same levels occupied during the down and up-going runs of the survey. Less than 1 ms was noted. Up-going first arrival times were used for the final calculations.

At each downhole station, the wireline cable was stopped, the geophone firmly clamped to the borehole wall with a mechanical locking arm activated at the surface and the data were recorded. An average of six shots were recorded for each set of depth levels. The data was recorded for 24 seconds at a 1 ms sample rate using a 20 second 10 – 130 Hz linear up sweep.

1.3 DATA PROCESSING

1.3.1 Velocity Survey Computations

The digital data were reformatted and displayed. The downhole geophone traces for each depth level were then stacked using a median summation technique and first-trough arrival times picked from these stacked traces. *Figures 3 (Enclosure 3.1)* displays the stacked data for all levels for the vertical component in normal polarity.

The observed first arrival times at each depth were converted to vertical times, using the cosine method and then referenced to the datum of 500 m above sea level using a 3250 m/sec as velocity replacement. These time-depth pairs were then used as the input data for the final velocity survey computations, which produced the average, RMS and interval velocities listed in Section 2 and displayed on *Enclosure1.1*. The levels not used are denoted on the time/depth listing with an "*" and on the display by a green box.

1.3.2 Acoustic Log Calibration

The well was originally drilled to TD of 1968m, at which depth the VSP was acquired. After VSP acquisition, the well was drilled and logged to a depth of 2113.18 m. This log data was merged and is included in this report. The merged input log data consisted on a composite data set of acoustic, density, gamma-ray and deep resistivity logs over the interval 25.91 - 2113.18 m true vertical depth below depth KB. Noise spikes were edited out where necessary on the acoustic log and the density. The acoustic log was then calibrated using the corrected arrival times from the checkshot / VSP data.

For the calibration, the acoustic log is integrated to produce a time-log, which is depth indexed. The difference between the corrected checkshot time of the shallowest checkshot level (within the logged interval) and the corresponding log derived time is then computed. The time-log is then shifted by adding this value to all the time-log values, which ties the log to the shallowest checkshot.

A drift curve is then generated, showing the difference between the corrected checkshot times and the corresponding times from the shifted time-log. The calibration points are specified along this drift curve. These points define the intervals over which the log values will be forced to match the checkshot times. A smoothing filter is applied before calibration to avoid creating false reflection coefficients. The calibration points are indicated with triangular marks on the drift curve displayed on *Enclosure 1.1*.

After calibration, the calibrated time-log is computed by integrating the calibrated acoustic log, which is then tied to the shallowest checkshot. The residual drift curve, shown on *Enclosure 1.1*, is generated using the corrected checkshot times and the calibrated time-log.

Section 2 contains tabulated depth-time values computed from the calibrated acoustic log listed in linear depth, interpolated every 5m. The calibrated acoustic log and associated logs are displayed on *Enclosure 1.2* at 1:240 scale.

1.3.3 Synthetic Seismogram Generation

The acoustic impedance curve was computed by multiplication of the calibrated acoustic log with the density log and reflectivity series for Primaries.

These reflectivity series were then convolved with:

10(18) - 40(36) Hz(dB/oct) zero phase bandpass filter.
10(18) - 50(36) Hz(dB/oct) zero phase bandpass filter.
10(18) - 60(36) Hz(dB/oct) zero phase bandpass filter.
10(18) - 70(36) Hz(dB/oct) zero phase bandpass filter.
10(18) - 80(36) Hz(dB/oct) zero phase bandpass filter
10(18) - 90(36) Hz(dB/oct) zero phase bandpass filter.
10(18) - 100(36) Hz(dB/oct) zero phase bandpass filter.
10(18) - 110(36) Hz(dB/oct) zero phase bandpass filter

The above mentioned Synthetic Seismograms and logs (Acoustic, Density, Gamma Ray, Resistivity, ...) are displayed at 7.5 as *Enclosure 2.1*. *Enclosure 2.2* displays synthetic seismograms at 10(18)-50(36) Hz(dB/oct) with a 30 Deg Phase rotation from 0 to 330 Deg.

1.3.4 VSP Processing

Enclosure 3.1 displays all the processing sequence. All the displays are on normal polarity. For data after deconvolution, normal polarity shows a positive reflection coefficient as a trough

Total Wavefield (*Figure 4*)

The vertical geophone component trace data were edited, stacked, the first arrival times picked and the traces sorted on depth. A compensation for amplitude decay due to spherical divergence was then applied using an exponential gain function of T**1.7, where T is the recorded time.

Downgoing Waves (*Figure 5*)

The direct arrivals on the total wavefield data were aligned at 200 ms. Each trace was then cross-correlated with a selected reference trace using a time window around the first arrival, and the first arrival times were subsequently shifted to ensure maximum coherency of the downgoing waves. A 15-point median pass-mode filter was applied to separate out the downgoing wavefield. A zero phase 10(18) - 130(36) Hz(dB/oct) bandpass filter was then applied.

Deconvolved Downwaves (*Figure 6*)

VSP downwave deconvolution was performed on the downgoing wavefield by computing operators from the first 700 ms of each trace of the downgoing wavefield, thereby collapsing the first 700 ms of the wavefield into a spike. A zero phase 10(18) - 130(36) Hz(dB/oct) bandpass filter was then applied.

Upgoing Wavefield (*Figure 7*)

A 15-point median reject-mode filter was applied to the total wavefield to remove the compressional downgoing wavefield. A zero phase 10(18) - 130(36) Hz(dB/oct) bandpass filter applied to the upwaves.
The upgoing wavefield was shifted to two-way time, to align the reflection data, by doubling the corrected vertical times. *Figure 7* displays the upwaves before deconvolution.

Deconvolved Upgoing Wavefield (*Figure 8*)

The operators derived from the downwave deconvolution were applied to the corresponding levels of the upgoing wavefield, followed by a zero phase 10(18)-130(36) Hz(dB/oct) bandpass filter.
The continuity of the upgoing wavefield was improved by applying a 5-point median filter, followed by a zero phase 10(18) - 110(36) Hz(dB/oct) bandpass filter.

Corridor Mute & Stack (*Figure 9 to 10* and *Enclosures 3.1 & 3.2*)

A mute was applied to the enhanced deconvolved upgoing wave data and a corridor stack extracted, followed by a zero phase 10(18) - 110(36) Hz(dB/oct) bandpass filter. The corridor stack was then phase rotated in 30 degree increments and displayed as *Enclosure 3.2*. Then, the corridor stack was filtered with a suite of zero phase bandpass filters from 10(18)-40(36) to 10(18)-100(36) Hz(dB/oct), in 10 Hz increments and displayed as *Enclosure 3.2*.

To facilitate the interpretation, *Enclosures 4.1 & 4.2* show a correlation display (time and depth) between the enhanced deconvolved upwaves, logs, synthetic seismogram and corridor stack.

1.3.5 Formation Tops

The formation tops measured below KB (m) supplied by Paramount Resources Ltd. are:

SCATTER	790
GARBUTT	927
CHINKEH SAND	1110.5
TRIASSIC	1124
BELLOY	1225
FANTASQUE	1280
FANTASQUE FRACT. CHERT	1344
MATTSON	1398
GOLATA	1945
FLETT	2085

1.4 ACQUISITION PARAMETERS

Client	: PARAMOUNT RESOURCES LTD.
Well	: PARAMOUNT ET AL LIARD F-36
Rig	: PRECISION 373
Location	: 1841 F36 60DEG 5' 123DEG 22'
Survey Type	: ZERO OFFSET VSP
Date Survey Completed	: 24 JANUARY 1999
VSP Contractor	: Baker Atlas – Downhole Seismic Services
Wireline Logging Contractor	: Baker Atlas – Downhole Seismic Services

Personnel:

Seismic Engineer	: Rob Duthie / Lloyd hicks
Client Representative	: Brian Kallweit

Well:

Casing	: 177.8 mm @ 1494.0 m
TD (at time of VSP)	: 1968 m md below KB
TD	: 2113.18

Elevations:

Kelly Bushing (KB)	: 470.3 m above MSL
Ground Level	: 464.8 m above MSL
Seismic Datum	: 500.0 m above MSL
Replacement Velocity	: 3250 m/sec

SURVEY

Recording System:

Type	: WTS/SUN
Sample Rate	: 1ms
Record Length.	: 4000ms

Source:

Type	: Two Vibroseis (Pelton Advance II)
Offset	: 64.0 m from Wellhead
Azimuth	: N 175 deg
Elevation	: Surface (Ground Level @ 464.80 m above MSL)
Sweep length	: 20 sec
Sweep Frequency	: 10 - 130 Hz

Downhole Geophone:

Model	: AWS 1300 GM 3-Component
Number of levels occupied	: 92
Shallowest level recorded	: 128 m md below KB
Deepest level recorded	: 1965 m md below KB

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2. VELOCITY SURVEY COMPUTATIONS

VELOCITY SURVEY

CLIENT	Paramount Res. Ltd.
WELL	Paramount et Al Liard F-36
AREA	Northwest territories
CONTRACTOR	Baker Atlas
SURVEY DATE	01/25/1999
SURVEY UNITS	M
RCVR REF. ELEVATION	470.30 M ABOVE SEA LEVEL
DATUM ELEVATION	500.00 M ABOVE SEA LEVEL
KB ELEVATION	470.30 M ABOVE SEA LEVEL
WELL ELEVATION	464.80 M ABOVE SEA LEVEL
DATUM CORRECT. VELOCITY	3250.00 M /SEC
SOURCE TYPE	Vibroseis Pelton II
GEOPHONE TYPE	
SAMPLE RATE	1.00 MSEC
WELL CASING	

SOURCE / RECEIVER GEOMETRY TABLE

Paramount Res. Ltd.
WELL Paramount et Al Liard F-36

RECEIVER REFERENCE ELEVATION = 470.30 M ABOVE SEA LEVEL
SOURCE / RECEIVER COORDINATES ARE REFERENCED TO WELLHEAD
SOURCE / RECEIVER (S-R) OFFSET IS PLAN VIEW

---------- RECEIVER ----------				--------- SOURCE ----------				OFFSET
MEASURED DEPTH (DGM) (M)	VERT. DEPTH (M)	X COORD. (M)	Y COORD. (M)	ELEV (ES) (M)	DEPTH (DS) (M)	X COORD. (M)	Y COORD. (M)	(S-R) (M)
128.0	128.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
200.0	200.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
300.0	300.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
391.0	391.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
518.0	518.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
553.0	553.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
600.0	600.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
700.0	700.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
790.0	790.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
899.0	899.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
950.0	950.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
965.0	965.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
969.0	969.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
980.0	980.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
995.0	995.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1010.0	1010.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1025.0	1025.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1040.0	1040.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1055.0	1055.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1070.0	1070.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1085.0	1085.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1100.0	1100.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1110.0	1110.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1115.0	1115.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1124.0	1124.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1130.0	1130.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1145.0	1145.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1154.0	1154.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1160.0	1160.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1175.0	1175.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1190.0	1190.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1205.0	1205.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1220.0	1220.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1225.0	1225.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0

---------- RECEIVER ----------				--------- SOURCE ----------				OFFSET
MEASURED DEPTH (DGM) (M)	VERT. DEPTH (M)	X COORD. (M)	Y COORD. (M)	ELEV (ES) (M)	DEPTH (DS) (M)	X COORD. (M)	Y COORD. (M)	(S-R) (M)
1235.0	1235.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1250.0	1250.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1265.0	1265.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1280.0	1280.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1295.0	1295.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1310.0	1310.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1325.0	1325.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1340.0	1340.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1344.0	1344.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1355.0	1355.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1365.0	1365.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1370.0	1370.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1385.0	1385.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1398.0	1398.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1400.0	1400.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1415.0	1415.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1430.0	1430.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1445.0	1445.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1455.0	1455.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1460.0	1460.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1475.0	1475.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1490.0	1490.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1505.0	1505.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1520.0	1520.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1535.0	1535.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1550.0	1550.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1565.0	1565.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1580.0	1580.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1595.0	1595.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1610.0	1610.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1625.0	1625.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1640.0	1640.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1655.0	1655.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1670.0	1670.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1685.0	1685.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1700.0	1700.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1715.0	1715.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1730.0	1730.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1745.0	1745.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1760.0	1760.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1775.0	1775.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1790.0	1790.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1805.0	1805.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0

---------- RECEIVER ----------				--------- SOURCE ----------				OFFSET
MEASURED DEPTH (DGM) (M)	VERT. DEPTH (M)	X COORD. (M)	Y COORD. (M)	ELEV (ES) (M)	DEPTH (DS) (M)	X COORD. (M)	Y COORD. (M)	(S-R) (M)
1820.0	1820.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1835.0	1835.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1850.0	1850.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1865.0	1865.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1880.0	1880.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1895.0	1895.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1910.0	1910.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1925.0	1925.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1940.0	1940.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1955.0	1955.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0
1965.0	1965.0	0.0	0.0	464.8	0.0	5.6	-63.8	64.0

TIME / DEPTH INFORMATION TABLE

Paramount Res. Ltd.
WELL Paramount et Al Liard F-36

ALL TIMES ARE ONE-WAY TIMES
* = NOT USED IN VELOCITY COMPUTATIONS

DATUM ELEVATION 500.00 M ABOVE SEA LEVEL
DATUM CORRECT. VELOCITY 3250.00 M /SEC

MEASURED GEOPHONE DEPTH (DGM)	RAW TIME PICK	SRC-REC DIST. PLAN-VIEW (SRC_REC)	COS(I)	TIME CORRECTION COS	TIME CORRECTION DATUM	VERTICAL TIME (TGD)
(M)	(MS)	(M)		(MS)	(MS)	(MS)
128.0	72.1	64.0	0.886	-8.2	10.8	74.7
200.0	91.5	64.0	0.950	-4.6	10.8	97.7
300.0	123.5	64.0	0.977	-2.8	10.8	131.5
391.0	155.5	64.0	0.986	-2.1	10.8	164.3
518.0	193.7	64.0	0.992	-1.5	10.8	203.0
553.0	204.9	64.0	0.993	-1.4	10.8	214.3
600.0	218.3	64.0	0.994	-1.3	10.8	227.9
700.0	245.4	64.0	0.996	-1.0	10.8	255.2
790.0	272.4	64.0	0.997	-0.9	10.8	282.4
899.0	300.0	64.0	0.997	-0.8	10.8	310.0
950.0	313.9	64.0	0.998	-0.7	10.8	324.0
965.0	317.1	64.0	0.998	-0.7	10.8	327.3
969.0	318.1	64.0	0.998	-0.7	10.8	328.3
980.0	321.1	64.0	0.998	-0.7	10.8	331.2
995.0	326.0	64.0	0.998	-0.7	10.8	336.1
1010.0	330.6	64.0	0.998	-0.7	10.8	340.7
1025.0	335.3	64.0	0.998	-0.7	10.8	345.4
1040.0	339.8	64.0	0.998	-0.6	10.8	349.9
1055.0	344.0	64.0	0.998	-0.6	10.8	354.2
1070.0	349.2	64.0	0.998	-0.6	10.8	359.4
1085.0	354.2	64.0	0.998	-0.6	10.8	364.4
1100.0	359.1	64.0	0.998	-0.6	10.8	369.3
1110.0	362.2	64.0	0.998	-0.6	10.8	372.4
1115.0	363.7	64.0	0.998	-0.6	10.8	373.9
1124.0	365.9	64.0	0.998	-0.6	10.8	376.1
1130.0	367.5	64.0	0.998	-0.6	10.8	377.7
1145.0	371.3	64.0	0.998	-0.6	10.8	381.5
1154.0	373.5	64.0	0.998	-0.6	10.8	383.7
1160.0	375.3	64.0	0.998	-0.6	10.8	385.5
1175.0	379.6	64.0	0.999	-0.6	10.8	389.9
1190.0	383.8	64.0	0.999	-0.6	10.8	394.0
1205.0	387.8	64.0	0.999	-0.6	10.8	398.1

MEASURED GEOPHONE DEPTH (DGM)	RAW TIME PICK	SRC-REC DIST. PLAN-VIEW (SRC_REC)	COS(I)	TIME CORRECTION COS	DATUM	VERTICAL TIME (TGD)
(M)	(MS)	(M)		(MS)	(MS)	(MS)
1220.0	391.9	64.0	0.999	-0.5	10.8	402.2
1225.0	393.4	64.0	0.999	-0.5	10.8	403.6
1235.0	395.3	64.0	0.999	-0.5	10.8	405.6
1250.0	398.7	64.0	0.999	-0.5	10.8	409.0
1265.0	402.4	64.0	0.999	-0.5	10.8	412.7
1280.0	405.3	64.0	0.999	-0.5	10.8	415.6
1295.0	408.6	64.0	0.999	-0.5	10.8	418.9
1310.0	411.6	64.0	0.999	-0.5	10.8	422.0
1325.0	414.5	64.0	0.999	-0.5	10.8	424.9
1340.0	417.5	64.0	0.999	-0.5	10.8	427.9
1344.0	418.8	64.0	0.999	-0.5	10.8	429.1 *
1355.0	420.6	64.0	0.999	-0.5	10.8	430.9
1365.0	422.5	64.0	0.999	-0.5	10.8	432.8
1370.0	423.5	64.0	0.999	-0.5	10.8	433.8
1385.0	426.4	64.0	0.999	-0.5	10.8	436.7
1398.0	429.0	64.0	0.999	-0.5	10.8	439.4
1400.0	430.0	64.0	0.999	-0.5	10.8	440.4 *
1415.0	432.1	64.0	0.999	-0.4	10.8	442.5
1430.0	436.0	64.0	0.999	-0.4	10.8	446.4
1445.0	439.0	64.0	0.999	-0.4	10.8	449.4
1455.0	441.6	64.0	0.999	-0.4	10.8	452.0
1460.0	442.7	64.0	0.999	-0.4	10.8	453.1
1475.0	446.4	64.0	0.999	-0.4	10.8	456.8
1490.0	449.4	64.0	0.999	-0.4	10.8	459.8
1505.0	453.1	64.0	0.999	-0.4	10.8	463.5
1520.0	456.3	64.0	0.999	-0.4	10.8	466.7
1535.0	459.9	64.0	0.999	-0.4	10.8	470.3
1550.0	462.8	64.0	0.999	-0.4	10.8	473.2
1565.0	465.4	64.0	0.999	-0.4	10.8	475.9
1580.0	468.8	64.0	0.999	-0.4	10.8	479.3
1595.0	472.9	64.0	0.999	-0.4	10.8	483.4 *
1610.0	474.4	64.0	0.999	-0.4	10.8	484.8
1625.0	477.3	64.0	0.999	-0.4	10.8	487.8
1640.0	480.9	64.0	0.999	-0.4	10.8	491.4
1655.0	483.7	64.0	0.999	-0.4	10.8	494.2
1670.0	487.1	64.0	0.999	-0.4	10.8	497.6
1685.0	490.1	64.0	0.999	-0.4	10.8	500.6
1700.0	493.0	64.0	0.999	-0.4	10.8	503.5
1715.0	495.8	64.0	0.999	-0.3	10.8	506.3
1730.0	498.7	64.0	0.999	-0.3	10.8	509.2
1745.0	501.8	64.0	0.999	-0.3	10.8	512.3
1760.0	504.7	64.0	0.999	-0.3	10.8	515.2
1775.0	508.1	64.0	0.999	-0.3	10.8	518.6

MEASURED GEOPHONE DEPTH (DGM)	RAW TIME PICK	SRC-REC DIST. PLAN-VIEW (SRC_REC)	COS(I)	TIME CORRECTION COS	TIME CORRECTION DATUM	VERTICAL TIME (TGD)
(M)	(MS)	(M)		(MS)	(MS)	(MS)
1790.0	510.9	64.0	0.999	-0.3	10.8	521.4
1805.0	514.6	64.0	0.999	-0.3	10.8	525.1
1820.0	517.3	64.0	0.999	-0.3	10.8	527.8
1835.0	520.8	64.0	0.999	-0.3	10.8	531.3
1850.0	523.7	64.0	0.999	-0.3	10.8	534.3
1865.0	527.3	64.0	0.999	-0.3	10.8	537.8
1880.0	530.2	64.0	0.999	-0.3	10.8	540.8
1895.0	533.2	64.0	0.999	-0.3	10.8	543.7
1910.0	536.2	64.0	0.999	-0.3	10.8	546.7
1925.0	539.5	64.0	0.999	-0.3	10.8	550.0
1940.0	546.5	64.0	0.999	-0.3	10.8	557.0 *
1955.0	546.0	64.0	0.999	-0.3	10.8	556.5
1965.0	548.4	64.0	0.999	-0.3	10.8	559.0

VELOCITY TABLE

Paramount Res. Ltd.
WELL Paramount et Al Liard F-36

RECEIVER REFERENCE ELEVATION = 470.30 M ABOVE SEA LEVEL

DATUM ELEVATION 500.00 M ABOVE SEA LEVEL
DATUM CORRECT. VELOCITY 3250.00 M /SEC

MEASURED GEOPHONE DEPTH (DGM) (M)	DEPTH CORR. TO DATUM (DGD) (M)	TIME CORR. TO DATUM (TGD) (MS)	AVERAGE VELOCITY (M /SEC)	RMS VELOCITY (M /SEC)	INTERVAL DEPTH (DELDGD) (M)	INTERVAL TIME (DELDGT) (MS)	INTERVAL VELOCITY (M /SEC)
					157.7	74.7	2110.4
128.0	157.7	74.7	2110.4	2110.4			
					72.0	23.0	3129.2
200.0	229.7	97.7	2350.2	2389.6			
					100.0	33.8	2961.4
300.0	329.7	131.5	2507.2	2548.7			
					91.0	32.8	2777.1
391.0	420.7	164.3	2561.0	2595.9			
					127.0	38.8	3275.9
518.0	547.7	203.0	2697.5	2738.8			
					35.0	11.3	3103.2
553.0	582.7	214.3	2718.9	2759.2			
					47.0	13.5	3472.5
600.0	629.7	227.9	2763.6	2806.6			
					100.0	27.4	3651.7
700.0	729.7	255.2	2858.9	2909.1			
					90.0	27.1	3318.5
790.0	819.7	282.4	2903.0	2950.9			
					109.0	27.7	3937.3
899.0	928.7	310.0	2995.4	3051.9			
					51.0	13.9	3659.4
950.0	979.7	324.0	3024.0	3080.5			
					15.0	3.3	4549.2
965.0	994.7	327.3	3039.3	3098.8			
					4.0	1.0	3988.6
969.0	998.7	328.3	3042.2	3101.9			
					11.0	3.0	3716.1
980.0	1009.7	331.2	3048.2	3107.9			
					15.0	4.9	3077.2
995.0	1024.7	336.1	3048.7	3107.5			
					15.0	4.6	3247.0
1010.0	1039.7	340.7	3051.4	3109.4			

MEASURED GEOPHONE DEPTH (DGM) (M)	DEPTH CORR. TO DATUM (DGD) (M)	TIME CORR. TO DATUM (TGD) (MS)	AVERAGE VELOCITY (M /SEC)	RMS VELOCITY (M /SEC)	INTERVAL DEPTH (DELDGD) (M)	INTERVAL TIME (DELDGT) (MS)	INTERVAL VELOCITY (M /SEC)
					15.0	4.7	3185.8
1025.0	1054.7	345.4	3053.2	3110.5			
					15.0	4.5	3330.0
1040.0	1069.7	349.9	3056.8	3113.4			
					15.0	4.3	3498.4
1055.0	1084.7	354.2	3062.1	3118.3			
					15.0	5.1	2918.0
1070.0	1099.7	359.4	3060.0	3115.6			
					15.0	5.0	3007.6
1085.0	1114.7	364.4	3059.3	3114.1			
					15.0	4.9	3046.6
1100.0	1129.7	369.3	3059.1	3113.2			
					10.0	3.1	3176.8
1110.0	1139.7	372.4	3060.1	3113.8			
					5.0	1.4	3451.2
1115.0	1144.7	373.9	3061.7	3115.1			
					9.0	2.2	4059.5
1124.0	1153.7	376.1	3067.5	3121.5			
					6.0	1.6	3714.7
1130.0	1159.7	377.7	3070.3	3124.3			
					15.0	3.8	3932.0
1145.0	1174.7	381.5	3078.9	3133.4			
					9.0	2.2	4083.6
1154.0	1183.7	383.7	3084.7	3139.7			
					6.0	1.8	3369.8
1160.0	1189.7	385.5	3086.0	3140.8			
					15.0	4.4	3428.8
1175.0	1204.7	389.9	3089.9	3144.2			
					15.0	4.2	3607.6
1190.0	1219.7	394.0	3095.3	3149.4			
					15.0	4.0	3721.8
1205.0	1234.7	398.1	3101.7	3155.7			
					15.0	4.2	3607.9
1220.0	1249.7	402.2	3106.9	3160.7			
					5.0	1.4	3546.3
1225.0	1254.7	403.6	3108.4	3162.2			
					10.0	1.9	5130.4
1235.0	1264.7	405.6	3118.1	3174.6			
					15.0	3.4	4437.9
1250.0	1279.7	409.0	3129.1	3187.1			
					15.0	3.7	4028.2
1265.0	1294.7	412.7	3137.2	3195.6			

MEASURED GEOPHONE DEPTH (DGM) (M)	DEPTH CORR. TO DATUM (DGD) (M)	TIME CORR. TO DATUM (TGD) (MS)	AVERAGE VELOCITY (M /SEC)	RMS VELOCITY (M /SEC)	INTERVAL DEPTH (DELDGD) (M)	INTERVAL TIME (DELDGT) (MS)	INTERVAL VELOCITY (M /SEC)
					15.0	2.9	5203.4
1280.0	1309.7	415.6	3151.5	3213.9			
					15.0	3.3	4524.1
1295.0	1324.7	418.9	3162.4	3226.3			
					15.0	3.1	4860.4
1310.0	1339.7	422.0	3174.8	3241.3			
					15.0	2.9	5159.2
1325.0	1354.7	424.9	3188.4	3258.2			
					15.0	3.0	5027.3
1340.0	1369.7	427.9	3201.2	3273.9			
					15.0	3.1	4915.4
1355.0	1384.7	430.9	3213.3	3288.4			
					10.0	1.9	5236.8
1365.0	1394.7	432.8	3222.3	3299.5			
					5.0	1.0	4929.3
1370.0	1399.7	433.8	3226.2	3304.3			
					15.0	2.9	5206.1
1385.0	1414.7	436.7	3239.3	3320.4			
					13.0	2.7	4858.3
1398.0	1427.7	439.4	3249.2	3331.9			
					17.0	3.1	5523.8
1415.0	1444.7	442.5	3265.0	3352.1			
					15.0	3.9	3846.2
1430.0	1459.7	446.4	3270.1	3356.7			
					15.0	3.0	4945.0
1445.0	1474.7	449.4	3281.4	3370.0			
					10.0	2.6	3869.5
1455.0	1484.7	452.0	3284.7	3373.0			
					5.0	1.1	4676.1
1460.0	1489.7	453.1	3288.0	3376.7			
					15.0	3.8	3976.5
1475.0	1504.7	456.8	3293.7	3382.1			
					15.0	3.0	5030.1
1490.0	1519.7	459.8	3305.0	3395.4			
					15.0	3.7	4059.0
1505.0	1534.7	463.5	3311.0	3401.2			
					15.0	3.2	4746.6
1520.0	1549.7	466.7	3320.7	3412.1			
					15.0	3.6	4116.0
1535.0	1564.7	470.3	3326.9	3418.1			
					15.0	2.9	5163.5
1550.0	1579.7	473.2	3338.1	3431.5			

MEASURED GEOPHONE DEPTH (DGM) (M)	DEPTH CORR. TO DATUM (DGD) (M)	TIME CORR. TO DATUM (TGD) (MS)	AVERAGE VELOCITY (M /SEC)	RMS VELOCITY (M /SEC)	INTERVAL DEPTH (DELDGD) (M)	INTERVAL TIME (DELDGT) (MS)	INTERVAL VELOCITY (M /SEC)
					15.0	2.6	5687.7
1565.0	1594.7	475.9	3351.2	3448.1			
					15.0	3.4	4426.0
1580.0	1609.7	479.3	3358.8	3455.9			
					30.0	5.6	5388.9
1610.0	1639.7	484.8	3382.1	3484.2			
					15.0	3.0	5032.0
1625.0	1654.7	487.8	3392.1	3495.8			
					15.0	3.6	4160.5
1640.0	1669.7	491.4	3397.8	3501.1			
					15.0	2.8	5377.4
1655.0	1684.7	494.2	3409.0	3514.5			
					15.0	3.4	4410.1
1670.0	1699.7	497.6	3415.8	3521.4			
					15.0	3.0	4990.0
1685.0	1714.7	500.6	3425.3	3532.1			
					15.0	2.9	5234.3
1700.0	1729.7	503.5	3435.5	3544.1			
					15.0	2.8	5329.3
1715.0	1744.7	506.3	3446.1	3556.5			
					15.0	2.9	5165.7
1730.0	1759.7	509.2	3455.9	3567.7			
					15.0	3.1	4846.8
1745.0	1774.7	512.3	3464.3	3576.8			
					15.0	3.0	5076.8
1760.0	1789.7	515.2	3473.5	3587.2			
					15.0	3.4	4461.1
1775.0	1804.7	518.6	3479.9	3593.5			
					15.0	2.8	5306.2
1790.0	1819.7	521.4	3489.8	3605.0			
					15.0	3.6	4117.8
1805.0	1834.7	525.1	3494.2	3608.8			
					15.0	2.7	5504.5
1820.0	1849.7	527.8	3504.6	3621.2			
					15.0	3.5	4298.8
1835.0	1864.7	531.3	3509.8	3626.0			
					15.0	3.0	5034.1
1850.0	1879.7	534.3	3518.3	3635.4			
					15.0	3.5	4236.7
1865.0	1894.7	537.8	3523.0	3639.7			
					15.0	3.0	5078.0
1880.0	1909.7	540.8	3531.5	3649.1			

MEASURED GEOPHONE DEPTH (DGM) (M)	DEPTH CORR. TO DATUM (DGD) (M)	TIME CORR. TO DATUM (TGD) (MS)	AVERAGE VELOCITY (M /SEC)	RMS VELOCITY (M /SEC)	INTERVAL DEPTH (DELDGD) (M)	INTERVAL TIME (DELDGT) (MS)	INTERVAL VELOCITY (M /SEC)
					15.0	3.0	5034.4
1895.0	1924.7	543.7	3539.8	3658.1			
					15.0	3.0	4991.9
1910.0	1939.7	546.7	3547.7	3666.7			
					15.0	3.3	4601.5
1925.0	1954.7	550.0	3554.0	3673.0			
					30.0	6.5	4601.7
1955.0	1984.7	556.5	3566.3	3685.2			
					10.0	2.5	4065.9
1965.0	1994.7	559.0	3568.4	3687.0			

DEPTH / TIME LISTING

Paramount Res. Ltd.
WELL Paramount et Al Liard F-36

DATUM ELEVATION 500.00 M ABOVE SEA LEVEL
DATUM CORRECT. VELOCITY 3250.00 M /SEC

DATA INTERPOLATED FROM CALIBRATED ACOUSTIC EVERY 5.00 M BELOW DATUM

DATUM DEPTH (DGD)	TIME 1 WAY (TGD)	TIME 2 WAY	VELOCITY AVERAGE	VELOCITY INTERVAL	VELOCITY RMS
5.0	4.0	8.0	1242.3	1242.3	1242.3
10.0	8.0	16.1	1242.3	1242.3	1242.3
15.0	12.1	24.1	1242.3	1242.3	1242.3
20.0	16.1	32.2	1242.3	1242.3	1242.3
25.0	20.1	40.2	1242.3	1242.3	1242.3
30.0	24.1	48.3	1242.3	1242.3	1242.3
35.0	28.2	56.3	1242.3	1242.3	1242.3
40.0	32.2	64.4	1242.3	1242.3	1242.3
45.0	36.2	72.4	1242.3	1242.3	1242.3
50.0	40.2	80.5	1242.3	1242.3	1242.3
55.0	44.3	88.5	1242.3	1242.3	1242.3
60.0	46.0	92.0	1303.7	2857.8	1339.8
65.0	47.6	95.1	1366.3	3224.2	1440.6
70.0	48.8	97.7	1433.3	3948.8	1557.5
75.0	49.9	99.8	1502.6	4656.8	1685.3
80.0	51.5	103.0	1553.1	3130.6	1748.1
85.0	52.6	105.2	1615.9	4580.8	1851.5
90.0	53.6	107.1	1680.2	5199.0	1962.6
95.0	54.6	109.1	1740.9	4976.0	2058.3
100.0	55.6	111.3	1797.7	4724.4	2140.3
105.0	56.9	113.9	1843.8	3785.9	2192.5
110.0	58.7	117.4	1873.5	2829.3	2214.3
115.0	60.3	120.7	1905.9	3077.5	2241.9
120.0	62.0	124.1	1934.6	2959.7	2264.5
125.0	63.7	127.3	1963.5	3062.2	2288.4
130.0	65.3	130.5	1992.3	3145.9	2313.1
135.0	66.8	133.7	2019.9	3154.2	2336.5
140.0	68.4	136.8	2047.2	3226.4	2360.4
145.0	70.0	140.0	2071.9	3128.4	2380.7
150.0	71.7	143.5	2091.0	2854.3	2393.4
155.0	73.7	147.3	2104.0	2586.0	2398.7
160.0	75.6	151.2	2116.8	2608.4	2404.2
165.0	77.4	154.8	2132.1	2776.5	2413.5
170.0	79.1	158.3	2148.3	2863.9	2424.4
175.0	80.9	161.7	2164.5	2911.0	2435.7
180.0	82.6	165.2	2179.6	2886.4	2446.0
185.0	84.3	168.6	2194.9	2938.1	2456.9
190.0	85.9	171.8	2211.8	3090.4	2470.4

DATUM DEPTH (DGD)	TIME 1 WAY (TGD)	TIME 2 WAY	VELOCITY AVERAGE	VELOCITY INTERVAL	VELOCITY RMS
195.0	87.5	174.9	2229.7	3220.6	2485.7
200.0	89.2	178.4	2242.7	2904.6	2494.4
205.0	90.9	181.7	2256.1	2963.1	2503.9
210.0	92.6	185.2	2268.2	2906.6	2512.0
215.0	94.3	188.6	2279.5	2884.7	2519.3
220.0	96.1	192.2	2289.7	2832.1	2525.4
225.0	97.9	195.7	2299.3	2820.6	2531.1
230.0	99.6	199.3	2308.3	2798.7	2536.1
235.0	101.4	202.8	2317.6	2848.8	2541.9
240.0	103.0	206.1	2329.1	3035.9	2550.5
245.0	104.8	209.5	2338.8	2924.9	2557.1
250.0	106.5	212.9	2348.3	2930.6	2563.5
255.0	108.1	216.2	2359.0	3051.7	2571.6
260.0	109.8	219.6	2367.7	2917.6	2577.3
265.0	111.5	223.0	2376.2	2919.7	2582.9
270.0	113.2	226.5	2384.3	2916.5	2588.3
275.0	114.8	229.5	2396.4	3292.5	2598.9
280.0	116.2	232.3	2410.6	3587.2	2612.9
285.0	117.6	235.2	2423.6	3466.5	2625.1
290.0	118.9	237.7	2439.6	3912.3	2642.3
295.0	120.6	241.1	2446.7	2945.0	2646.8
300.0	122.3	244.7	2452.3	2835.3	2649.6
305.0	124.2	248.3	2456.4	2727.2	2650.7
310.0	126.1	252.2	2458.8	2616.9	2650.2
315.0	127.9	255.8	2462.7	2729.2	2651.4
320.0	129.8	259.7	2464.6	2591.0	2650.5
325.0	131.8	263.5	2466.4	2585.0	2649.5
330.0	133.5	267.0	2471.7	2873.1	2652.6
335.0	135.3	270.6	2476.4	2833.3	2655.0
340.0	137.2	274.5	2477.5	2555.9	2653.6
345.0	139.2	278.4	2478.8	2570.5	2652.5
350.0	141.1	282.3	2480.0	2568.4	2651.3
355.0	143.1	286.2	2480.8	2537.1	2649.8
360.0	145.1	290.2	2481.0	2494.1	2647.7
365.0	147.1	294.2	2481.4	2513.2	2645.9
370.0	149.1	298.1	2482.2	2536.3	2644.5
375.0	151.0	302.0	2483.4	2577.8	2643.7
380.0	152.8	305.6	2486.5	2743.9	2644.9
385.0	154.7	309.4	2488.3	2631.7	2644.7
390.0	156.7	313.3	2489.3	2570.4	2643.8
395.0	158.6	317.2	2490.3	2570.7	2642.9
400.0	160.3	320.6	2495.2	2952.2	2646.4
405.0	161.6	323.2	2506.6	3945.1	2659.1
410.0	162.7	325.4	2519.8	4399.1	2675.1
415.0	164.4	328.9	2523.9	2909.5	2677.7
420.0	166.4	332.7	2524.6	2587.9	2676.7

DATUM DEPTH (DGD)	TIME 1 WAY (TGD)	TIME 2 WAY	VELOCITY AVERAGE	VELOCITY INTERVAL	VELOCITY RMS
425.0	167.9	335.9	2530.6	3162.5	2681.6
430.0	169.6	339.1	2536.0	3095.5	2685.9
435.0	171.2	342.3	2541.4	3113.3	2690.2
440.0	172.7	345.4	2547.6	3231.3	2695.5
445.0	173.9	347.8	2559.1	4253.0	2709.1
450.0	175.4	350.8	2565.2	3254.3	2714.3
455.0	176.8	353.7	2573.0	3541.8	2721.9
460.0	178.4	356.8	2578.7	3235.8	2726.8
465.0	179.9	359.8	2584.8	3299.8	2732.1
470.0	181.0	362.1	2596.3	4426.7	2746.0
475.0	182.1	364.2	2608.2	4571.6	2760.5
480.0	183.5	367.1	2615.1	3502.7	2767.1
485.0	184.7	369.5	2625.5	4239.7	2778.9
490.0	185.8	371.7	2636.8	4517.0	2792.5
495.0	187.0	374.0	2647.0	4278.5	2804.2
500.0	188.3	376.6	2655.4	3861.3	2812.9
505.0	189.5	379.1	2664.3	4020.6	2822.5
510.0	190.7	381.4	2674.4	4329.6	2834.0
515.0	192.1	384.3	2680.4	3470.1	2839.3
520.0	193.8	387.6	2683.2	3011.0	2840.8
525.0	195.4	390.9	2686.2	3040.7	2842.6
530.0	197.1	394.2	2688.8	2995.3	2843.9
535.0	198.8	397.5	2691.7	3037.8	2845.5
540.0	200.4	400.8	2694.7	3054.6	2847.3
545.0	202.0	404.1	2697.4	3028.5	2848.8
550.0	203.6	407.2	2701.6	3246.4	2852.1
555.0	205.2	410.3	2705.3	3182.7	2854.7
560.0	206.6	413.1	2711.0	3542.4	2860.0
565.0	208.2	416.3	2714.2	3125.2	2862.1
570.0	209.9	419.7	2716.0	2936.8	2862.7
575.0	211.4	422.9	2719.5	3198.2	2865.4
580.0	213.0	426.1	2722.5	3111.0	2867.3
585.0	214.6	429.1	2726.5	3296.1	2870.6
590.0	216.0	432.0	2731.8	3526.0	2875.3
595.0	217.4	434.7	2737.5	3631.8	2880.8
600.0	218.8	437.5	2742.7	3548.9	2885.6
605.0	220.2	440.4	2747.7	3511.9	2890.0
610.0	221.6	443.1	2753.2	3639.5	2895.3
615.0	222.9	445.9	2758.7	3644.6	2900.5
620.0	224.3	448.6	2764.4	3693.7	2905.9
625.0	225.7	451.3	2769.7	3644.2	2911.0
630.0	227.1	454.1	2774.7	3586.1	2915.6
635.0	228.5	456.9	2779.5	3552.8	2920.0
640.0	229.9	459.8	2783.9	3491.2	2923.9
645.0	231.3	462.5	2789.1	3662.3	2928.8
650.0	232.6	465.2	2794.3	3681.5	2933.7

DATUM DEPTH (DGD)	TIME 1 WAY (TGD)	TIME 2 WAY	VELOCITY AVERAGE	VELOCITY INTERVAL	VELOCITY RMS
655.0	234.0	468.0	2799.2	3620.5	2938.3
660.0	235.4	470.7	2804.3	3671.1	2943.0
665.0	236.7	473.4	2809.4	3696.1	2947.9
670.0	238.1	476.2	2814.2	3659.6	2952.4
675.0	239.4	478.8	2819.3	3711.5	2957.3
680.0	240.8	481.6	2824.0	3656.8	2961.7
685.0	242.2	484.3	2828.8	3661.7	2966.1
690.0	243.6	487.2	2832.3	3412.7	2969.0
695.0	245.0	490.1	2836.4	3551.3	2972.7
700.0	246.4	492.9	2840.5	3562.6	2976.4
705.0	247.9	495.7	2844.3	3482.4	2979.5
710.0	249.3	498.6	2848.2	3531.0	2983.0
715.0	250.7	501.4	2851.9	3509.5	2986.2
720.0	252.1	504.2	2856.0	3590.7	2989.9
725.0	253.5	507.0	2859.9	3561.8	2993.4
730.0	254.9	509.8	2863.6	3532.4	2996.6
735.0	256.3	512.7	2867.4	3544.2	2999.9
740.0	257.8	515.6	2870.4	3388.0	3002.3
745.0	259.3	518.5	2873.5	3434.9	3004.9
750.0	260.7	521.4	2876.6	3425.6	3007.4
755.0	262.2	524.4	2879.6	3397.6	3009.7
760.0	263.6	527.2	2883.1	3537.9	3012.8
765.0	265.1	530.3	2885.3	3262.0	3014.3
770.0	266.7	533.4	2887.4	3251.5	3015.7
775.0	268.2	536.4	2889.6	3276.4	3017.3
780.0	269.7	539.5	2891.8	3277.2	3018.8
785.0	271.2	542.5	2894.2	3324.0	3020.6
790.0	272.7	545.5	2896.7	3344.2	3022.4
795.0	274.2	548.5	2899.0	3330.2	3024.2
800.0	275.8	551.6	2900.7	3200.9	3025.2
805.0	277.3	554.7	2902.6	3240.6	3026.5
810.0	278.9	557.8	2904.1	3158.2	3027.2
815.0	280.4	560.9	2906.1	3284.0	3028.7
820.0	281.9	563.7	2909.3	3546.9	3031.5
825.0	283.1	566.3	2913.9	3905.7	3036.0
830.0	284.4	568.9	2918.0	3801.0	3040.0
835.0	285.8	571.5	2922.1	3827.4	3044.1
840.0	287.0	574.1	2926.3	3859.6	3048.2
845.0	288.4	576.7	2930.3	3795.7	3052.1
850.0	289.7	579.4	2934.3	3800.2	3055.9
855.0	291.0	582.0	2938.2	3800.4	3059.7
860.0	292.3	584.6	2942.0	3789.8	3063.3
865.0	293.6	587.2	2946.0	3838.8	3067.2
870.0	294.9	589.8	2949.9	3827.1	3071.0
875.0	296.2	592.4	2954.0	3890.9	3075.0
880.0	297.5	594.9	2958.2	3953.8	3079.3

DATUM DEPTH (DGD)	TIME 1 WAY (TGD)	TIME 2 WAY	VELOCITY AVERAGE	VELOCITY INTERVAL	VELOCITY RMS
885.0	298.7	597.4	2962.7	4019.1	3083.8
890.0	300.0	599.9	2967.0	4006.5	3088.2
895.0	301.2	602.4	2971.6	4100.6	3093.0
900.0	302.4	604.8	2976.0	4038.9	3097.4
905.0	303.7	607.4	2980.1	3985.7	3101.6
910.0	304.9	609.9	2984.2	3955.7	3105.7
915.0	306.2	612.4	2988.0	3911.8	3109.5
920.0	307.5	615.0	2991.8	3871.2	3113.0
925.0	308.8	617.6	2995.5	3902.7	3116.7
930.0	310.1	620.1	2999.3	3905.0	3120.4
935.0	311.3	622.7	3003.3	3983.9	3124.4
940.0	312.6	625.1	3007.4	4056.2	3128.6
945.0	313.8	627.6	3011.5	4062.6	3132.8
950.0	315.1	630.3	3014.6	3734.5	3135.6
955.0	316.4	632.8	3018.3	3918.8	3139.1
960.0	317.7	635.4	3021.7	3874.2	3142.5
965.0	319.1	638.1	3024.4	3633.1	3144.8
970.0	320.3	640.7	3028.1	3969.8	3148.4
975.0	321.6	643.1	3032.0	4057.0	3152.4
980.0	322.8	645.6	3036.1	4098.6	3156.5
985.0	324.0	648.0	3040.1	4094.9	3160.6
990.0	325.2	650.5	3044.0	4088.4	3164.6
995.0	326.5	652.9	3047.8	4039.7	3168.3
1000.0	327.8	655.6	3050.7	3764.3	3171.0
1005.0	329.2	658.5	3052.6	3491.2	3172.5
1010.0	330.7	661.4	3054.0	3361.5	3173.3
1015.0	332.3	664.7	3054.2	3100.7	3173.0
1020.0	334.0	668.0	3054.0	3009.8	3172.2
1025.0	335.7	671.3	3053.6	2984.2	3171.3
1030.0	337.3	674.6	3053.6	3051.5	3170.7
1035.0	339.0	677.9	3053.4	3006.2	3169.9
1040.0	340.6	681.2	3053.3	3031.5	3169.3
1045.0	342.2	684.5	3053.4	3084.0	3168.9
1050.0	343.8	687.6	3054.0	3165.0	3168.8
1055.0	345.3	690.7	3054.9	3265.2	3169.3
1060.0	346.9	693.8	3055.8	3271.2	3169.7
1065.0	348.4	696.8	3056.7	3249.3	3170.1
1070.0	349.9	699.9	3057.7	3291.5	3170.6
1075.0	351.4	702.8	3059.1	3399.0	3171.6
1080.0	352.9	705.8	3060.5	3375.0	3172.5
1085.0	354.5	709.0	3060.5	3065.9	3172.0
1090.0	356.2	712.5	3059.8	2916.7	3170.8
1095.0	358.0	715.9	3059.1	2909.4	3169.6
1100.0	359.6	719.3	3058.7	2968.5	3168.7
1105.0	361.3	722.6	3058.5	3030.5	3168.1
1110.0	363.0	726.0	3058.0	2948.0	3167.1

DATUM DEPTH (DGD)	TIME 1 WAY (TGD)	TIME 2 WAY	VELOCITY AVERAGE	VELOCITY INTERVAL	VELOCITY RMS
1115.0	364.6	729.2	3058.2	3101.5	3166.8
1120.0	366.3	732.6	3057.7	2957.5	3165.9
1125.0	368.0	735.9	3057.3	2968.6	3165.0
1130.0	369.6	739.2	3057.2	3030.0	3164.4
1135.0	371.3	742.5	3057.2	3058.5	3164.0
1140.0	372.8	745.6	3057.9	3212.7	3164.2
1145.0	374.1	748.2	3060.6	3828.1	3166.7
1150.0	375.4	750.7	3063.8	4044.1	3170.0
1155.0	376.6	753.2	3066.8	3947.1	3173.0
1160.0	377.9	755.9	3069.4	3817.9	3175.4
1165.0	379.2	758.4	3072.2	3925.7	3178.2
1170.0	380.4	760.7	3076.0	4305.6	3182.3
1175.0	381.5	763.1	3079.6	4224.1	3186.0
1180.0	382.7	765.4	3083.3	4310.9	3190.1
1185.0	383.9	767.8	3086.7	4187.6	3193.6
1190.0	385.3	770.5	3088.7	3651.8	3195.4
1195.0	386.7	773.4	3090.2	3491.9	3196.5
1200.0	388.1	776.2	3091.9	3537.2	3197.8
1205.0	389.5	779.0	3093.7	3622.5	3199.4
1210.0	390.8	781.6	3096.1	3795.9	3201.6
1215.0	392.2	784.3	3098.3	3730.6	3203.6
1220.0	393.6	787.1	3099.8	3529.1	3204.8
1225.0	395.0	790.0	3101.3	3508.7	3206.0
1230.0	396.4	792.8	3102.7	3496.6	3207.1
1235.0	397.9	795.7	3104.0	3458.6	3208.0
1240.0	399.4	798.7	3105.0	3355.2	3208.6
1245.0	400.8	801.7	3106.0	3372.9	3209.2
1250.0	402.3	804.6	3107.0	3401.3	3209.9
1255.0	403.8	807.6	3108.2	3414.9	3210.7
1260.0	404.9	809.8	3112.0	4500.7	3214.9
1265.0	406.0	812.0	3116.0	4597.2	3219.4
1270.0	407.1	814.2	3119.7	4462.7	3223.5
1275.0	408.2	816.4	3123.6	4584.6	3227.9
1280.0	409.4	818.8	3126.6	4152.6	3231.0
1285.0	410.6	821.1	3129.9	4295.8	3234.5
1290.0	411.7	823.4	3133.4	4399.7	3238.3
1295.0	412.7	825.4	3137.8	4927.4	3243.6
1300.0	413.7	827.4	3142.5	5145.7	3249.3
1305.0	414.8	829.5	3146.4	4600.8	3253.6
1310.0	415.9	831.9	3149.4	4222.8	3256.8
1315.0	417.0	834.0	3153.5	4766.9	3261.5
1320.0	418.1	836.2	3157.2	4579.9	3265.6
1325.0	419.2	838.4	3160.8	4536.6	3269.6
1330.0	420.3	840.6	3164.4	4502.2	3273.5
1335.0	421.4	842.7	3168.4	4757.8	3278.0
1340.0	422.4	844.9	3172.1	4639.3	3282.2

DATUM DEPTH (DGD)	TIME 1 WAY (TGD)	TIME 2 WAY	VELOCITY AVERAGE	VELOCITY INTERVAL	VELOCITY RMS
1345.0	423.4	846.8	3176.7	5216.8	3287.8
1350.0	424.4	848.8	3180.9	4873.9	3292.6
1355.0	425.4	850.9	3184.9	4846.6	3297.3
1360.0	426.5	853.0	3188.8	4778.9	3301.7
1365.0	427.5	855.1	3192.8	4826.8	3306.2
1370.0	428.6	857.2	3196.6	4760.9	3310.6
1375.0	429.6	859.3	3200.4	4733.5	3314.8
1380.0	430.7	861.3	3204.3	4809.2	3319.3
1385.0	431.7	863.4	3208.3	4896.7	3323.9
1390.0	432.7	865.4	3212.3	4930.2	3328.5
1395.0	433.7	867.4	3216.3	4929.9	3333.2
1400.0	434.8	869.5	3220.1	4773.3	3337.4
1405.0	435.8	871.7	3223.7	4727.2	3341.5
1410.0	436.8	873.6	3228.0	5120.5	3346.5
1415.0	437.8	875.6	3232.2	5128.8	3351.5
1420.0	438.8	877.6	3236.0	4842.8	3355.8
1425.0	439.9	879.7	3239.6	4722.2	3359.8
1430.0	440.8	881.7	3243.7	5114.7	3364.7
1435.0	441.8	883.5	3248.4	5510.7	3370.5
1440.0	442.7	885.4	3252.9	5381.5	3376.0
1445.0	443.7	887.3	3256.9	5095.2	3380.7
1450.0	444.8	889.6	3259.7	4335.7	3383.6
1455.0	445.8	891.6	3263.8	5077.3	3388.2
1460.0	446.9	893.9	3266.7	4448.5	3391.3
1465.0	448.2	896.3	3268.9	4074.8	3393.4
1470.0	449.2	898.3	3272.7	4924.7	3397.6
1475.0	450.2	900.4	3276.2	4799.6	3401.5
1480.0	451.5	902.9	3278.3	4031.2	3403.4
1485.0	452.5	905.0	3281.9	4846.9	3407.4
1490.0	453.5	907.0	3285.4	4834.8	3411.3
1495.0	454.8	909.6	3287.1	3894.8	3412.8
1500.0	455.8	911.5	3291.3	5275.5	3417.7
1505.0	456.9	913.9	3293.6	4200.9	3420.0
1510.0	458.0	916.0	3297.0	4768.5	3423.7
1515.0	459.0	918.0	3300.6	4930.2	3427.7
1520.0	460.0	920.0	3304.4	5079.1	3432.1
1525.0	461.1	922.2	3307.5	4598.0	3435.3
1530.0	462.2	924.5	3309.9	4258.6	3437.7
1535.0	463.4	926.9	3312.2	4226.6	3439.9
1540.0	464.5	928.9	3315.7	4899.1	3443.8
1545.0	465.7	931.3	3317.9	4177.2	3445.9
1550.0	466.7	933.5	3321.0	4614.8	3449.1
1555.0	467.8	935.5	3324.3	4868.1	3452.8
1560.0	468.9	937.8	3327.0	4439.0	3455.5
1565.0	469.9	939.9	3330.1	4706.3	3458.9
1570.0	471.0	942.0	3333.3	4729.7	3462.2

DATUM DEPTH (DGD)	TIME 1 WAY (TGD)	TIME 2 WAY	VELOCITY AVERAGE	VELOCITY INTERVAL	VELOCITY RMS
1575.0	472.0	944.0	3336.9	5051.5	3466.3
1580.0	473.0	946.0	3340.3	4894.5	3470.1
1585.0	474.1	948.1	3343.4	4743.3	3473.4
1590.0	475.0	950.0	3347.3	5373.9	3478.1
1595.0	476.0	952.0	3351.0	5115.8	3482.3
1600.0	477.1	954.1	3353.8	4580.4	3485.2
1605.0	478.0	956.1	3357.5	5227.2	3489.6
1610.0	479.0	958.1	3361.0	4998.6	3493.4
1615.0	480.0	960.0	3364.7	5254.5	3497.8
1620.0	480.9	961.9	3368.5	5251.5	3502.1
1625.0	481.9	963.8	3372.1	5227.3	3506.4
1630.0	482.8	965.6	3376.3	5589.7	3511.4
1635.0	483.8	967.5	3379.7	5095.2	3515.3
1640.0	484.7	969.5	3383.2	5089.6	3519.2
1645.0	485.7	971.3	3387.1	5412.3	3523.8
1650.0	486.7	973.4	3390.3	4919.1	3527.3
1655.0	487.8	975.6	3392.8	4528.2	3529.8
1660.0	488.9	977.8	3395.4	4496.2	3532.3
1665.0	490.1	980.1	3397.5	4304.7	3534.4
1670.0	491.1	982.3	3400.3	4681.5	3537.3
1675.0	492.1	984.2	3403.8	5202.4	3541.3
1680.0	493.1	986.2	3406.9	4909.1	3544.7
1685.0	494.2	988.4	3409.6	4630.1	3547.4
1690.0	495.2	990.4	3412.7	4934.5	3550.8
1695.0	496.3	992.6	3415.3	4563.9	3553.3
1700.0	497.3	994.6	3418.4	4947.6	3556.7
1705.0	498.3	996.6	3421.8	5166.7	3560.6
1710.0	499.3	998.7	3424.5	4685.6	3563.3
1715.0	500.3	1000.7	3427.6	5008.6	3566.8
1720.0	501.3	1002.6	3431.0	5186.8	3570.6
1725.0	502.4	1004.9	3433.3	4434.7	3572.8
1730.0	503.5	1006.9	3436.2	4879.1	3575.9
1735.0	504.4	1008.9	3439.4	5090.3	3579.5
1740.0	505.5	1010.9	3442.4	4921.9	3582.7
1745.0	506.4	1012.9	3445.6	5087.6	3586.2
1750.0	507.4	1014.8	3448.9	5166.2	3589.9
1755.0	508.4	1016.8	3452.0	5069.9	3593.4
1760.0	509.4	1018.7	3455.3	5214.0	3597.1
1765.0	510.3	1020.6	3458.6	5192.5	3600.8
1770.0	511.4	1022.7	3461.3	4780.4	3603.6
1775.0	512.4	1024.7	3464.3	5002.6	3606.9
1780.0	513.3	1026.6	3467.7	5280.7	3610.7
1785.0	514.4	1028.7	3470.3	4770.6	3613.4
1790.0	515.4	1030.8	3473.1	4858.8	3616.3
1795.0	516.3	1032.7	3476.4	5229.2	3620.0
1800.0	517.4	1034.9	3478.7	4579.9	3622.3

DATUM DEPTH (DGD)	TIME 1 WAY (TGD)	TIME 2 WAY	VELOCITY AVERAGE	VELOCITY INTERVAL	VELOCITY RMS
1805.0	518.5	1037.0	3481.1	4616.0	3624.6
1810.0	519.5	1039.1	3483.9	4922.2	3627.6
1815.0	520.5	1041.0	3486.9	5070.2	3630.9
1820.0	521.7	1043.3	3488.9	4415.0	3632.8
1825.0	522.7	1045.3	3491.7	4937.6	3635.8
1830.0	523.6	1047.2	3495.0	5324.0	3639.5
1835.0	524.7	1049.4	3497.1	4492.2	3641.5
1840.0	525.7	1051.4	3500.2	5201.9	3645.0
1845.0	526.7	1053.4	3502.8	4801.3	3647.6
1850.0	527.8	1055.7	3504.9	4503.6	3649.6
1855.0	529.0	1057.9	3506.9	4456.5	3651.5
1860.0	530.1	1060.3	3508.6	4250.1	3653.0
1865.0	531.1	1062.2	3511.7	5215.8	3656.4
1870.0	532.1	1064.2	3514.2	4843.6	3659.1
1875.0	533.1	1066.2	3517.2	5104.0	3662.2
1880.0	534.1	1068.2	3519.9	4991.2	3665.2
1885.0	535.2	1070.4	3521.9	4486.3	3667.1
1890.0	536.2	1072.4	3524.7	5037.2	3670.1
1895.0	537.2	1074.5	3527.3	4864.6	3672.7
1900.0	538.3	1076.6	3529.7	4762.2	3675.2
1905.0	539.3	1078.6	3532.2	4836.7	3677.8
1910.0	540.3	1080.7	3534.8	4896.3	3680.4
1915.0	541.3	1082.7	3537.5	5027.0	3683.4
1920.0	542.4	1084.7	3540.0	4822.5	3685.9
1925.0	543.4	1086.9	3542.3	4690.0	3688.1
1930.0	544.5	1089.0	3544.7	4820.5	3690.6
1935.0	545.5	1091.0	3547.2	4885.5	3693.2
1940.0	546.5	1093.0	3549.9	5017.8	3696.1
1945.0	547.5	1095.1	3552.2	4749.5	3698.4
1950.0	548.6	1097.3	3554.2	4567.9	3700.3
1955.0	549.7	1099.4	3556.5	4717.0	3702.5
1960.0	550.8	1101.6	3558.4	4521.2	3704.4
1965.0	551.9	1103.9	3560.2	4466.5	3706.1
1970.0	553.0	1106.1	3562.2	4514.0	3707.9
1975.0	554.1	1108.1	3564.6	4914.5	3710.4
1980.0	555.1	1110.3	3566.7	4621.2	3712.4
1985.0	556.4	1112.8	3567.6	3960.2	3713.0
1990.0	557.6	1115.3	3568.6	4039.4	3713.8
1995.0	558.9	1117.8	3569.4	3896.9	3714.2
2000.0	560.1	1120.2	3570.9	4278.5	3715.5
2005.0	561.3	1122.6	3572.0	4095.8	3716.3
2010.0	553.2	1106.4	3633.3	-617.4	3742.7
2015.0	554.4	1108.9	3634.3	4080.1	3743.5
2020.0	555.6	1111.3	3635.5	4158.0	3744.4
2025.0	556.7	1113.4	3637.4	4625.9	3746.3
2030.0	548.5	1097.0	3700.9	-609.9	3773.5

DATUM DEPTH (DGD)	TIME 1 WAY (TGD)	TIME 2 WAY	VELOCITY AVERAGE	VELOCITY INTERVAL	VELOCITY RMS
2035.0	549.7	1099.5	3701.7	4071.4	3774.2
2040.0	551.1	1102.1	3702.0	3809.9	3774.3
2045.0	552.5	1104.9	3701.6	3574.6	3773.8
2050.0	554.0	1108.0	3700.5	3290.9	3772.5
2055.0	555.8	1111.7	3697.2	2704.8	3769.5
2060.0	557.5	1114.9	3695.4	3071.5	3767.6
2065.0	558.9	1117.7	3694.9	3522.4	3767.0
2070.0	560.3	1120.6	3694.4	3496.8	3766.4
2075.0	561.7	1123.5	3693.9	3485.1	3765.7
2080.0	563.1	1126.2	3693.9	3685.8	3765.5
2085.0	564.4	1128.7	3694.4	3944.2	3765.9
2090.0	565.6	1131.2	3695.1	3985.0	3766.4
2095.0	567.0	1134.1	3694.6	3492.9	3765.7
2100.0	568.3	1136.7	3694.9	3850.5	3765.9
2105.0	569.8	1139.6	3694.2	3399.0	3765.0
2110.0	571.5	1143.1	3691.8	2904.1	3762.7
2115.0	572.9	1145.7	3692.0	3804.9	3762.8
2120.0	573.8	1147.5	3694.8	5443.6	3766.1
2125.0	575.0	1150.1	3695.3	3926.4	3766.5
2130.0	576.2	1152.4	3696.5	4246.3	3767.5
2135.0	577.2	1154.4	3698.8	5026.1	3770.1
2140.0	578.2	1156.4	3701.0	5013.8	3772.6

3

3. FIELD ENGINEER'S REPORT

BOREHOLE SEISMIC ANALYSIS

FOR

PARAMOUNT RESOURCES LTD.

PREPARED BY

WESTERN ATLAS

LOGGING SERVICES

WELL : PARAMOUNT ET AL LIARD F-36

LOCATION: 1841 F36 60DEG 5} 123DEG 22}

ENGINEER: ROB DUTHIE / LLOYD HICKS

DATE : 24-JAN-99

FIELD ENGINEER'S LOG

WESTERN ATLAS

SURVEY INFORMATION

CLIENT: PARAMOUNT RESOURCES LTD.

CLIENT REP: BRIAN KALLWEIT

WELL NAME: PARAMOUNT ET AL LIARD F-36

WELL LOCATION: 1841 F36 60DEG 5} 123DEG 22}

FIELD NAME: UNDEFINED

RIG NAME: PRECISION 373

ENGINEER: ROB DUTHIE / LLOYD HICKS

TYPE OF SERVICE: VSP

WIRELINE CO. AND DISTRICT: WALS/NISKU

WIRELINE OPERATOR: KIRKORIAN

RUN NUMBER: 1 TOTAL TRIPS THIS RUN: 1

WEATHER/SEAS: COLD DATE: 24-JAN-99

LINEID: PAR3620 FILENAME: RAW SERVICE ORDER NO.: 973247

WELL INFORMATION

WELLHEAD COORDINATES: 1841 F-36

RIG HEADING:

ELEV K.B.: 470.3 OPEN HOLE DIAMETER: 156.0MM

ELEV D.F.: MAX. TEMPERATURE: 76

GROUND ELEVATION: 464.8 FLUID TYPE: INVERT

WATER DEPTH: CASING:(DIAMETER/DEPTH)

WELL T.D.: 1968.0 1 177.8MM / 1494.0M

REFERENCE DATUM: MSL 2

DEVIATED WELL: NO 3

MAXIMUM DEVIATION: 1 4

DOWNHOLE RECEIVERS

RECEIVER TYPE: 6204XB ARM LENGTH: STANDARD PREAMP GAIN: 60DB

SENSOR TYPE: 1025 SENSOR FREQUENCY: 10HZ GIMBAL: NO

GIMBAL TYPE: 1011 RECEIVER SPACING: N/A ZERO POINT: KB

DEPTH ERROR: 0.1M ASSET NO RCV-1: 166203 ASSET NO RCV-2:

ASSET NO RCV-3: ASSET NO RCV-4: ASSET NO RCV-5:

LOGGING TOOLS USED

WESTERN ATLAS

FIELD ENGINEER'S LOG

RECORDING SYSTEM

RECORDING UNIT ASSET NUMBER 98721

SURFACE A/D TYPE & NUMBER 160679

DOWNHOLE A/D TYPE & ASSET NUMBER

SURFACE A/D TOTAL CHANNELS 16 DOWNHOLE A/D TOTAL CHANNELS N/A

FLASK TYPE N/A

SAMPLE RATE 1MS RECORD LENGTH 24S (4S CORRELATED)

SWEEP LENGTH 20S TRANSMIT OFFSET 1005

TIME FROM START OF RECORD TO TIME BREAK 100

LOW CUT FILTER 0 HIGH CUT FILTER 300

TAPE TYPE DAT TAPE FORMAT SEGY & TAR

CHANNELS ASSIGNMENT & GAIN:

CH 1	VERTICAL	/32 DB	CH 2	HORIZONTAL1	/32 DB	CH 3	HORIZONTAL2	/32 DB
CH 4	SOURCE SIGNATURE	/20 DB	CH 5	NOT USED	/0 DB	CH 6	NOT USED	/0 DB
CH 7	NOT USED	/0 DB	CH 8	NOT USED	/0 DB	CH 9	NOT USED	/0 DB
CH 10	NOT USED	/0 DB	CH 11	NOT USED	/0 DB	CH 12	NOT USED	/0 DB
CH 13	NOT USED	/0 DB	CH 14	NOT USED	/0 DB	CH 15	NOT USED	/0 DB
CH 16	NOT USED	/0 DB	CH 17	NOT USED	/0 DB	CH 18	NOT USED	/0 DB
CH 19	NOT USED	/0 DB	CH 20	NOT USED	/0 DB	CH 21	NOT USED	/0 DB
CH 22	NOT USED	/0 DB	CH 23	NOT USED	/0 DB	CH 24	NOT USED	/0 DB
CH 25	NOT USED	/0 DB	CH 26	NOT USED	/0 DB	CH 27	NOT USED	/0 DB
CH 28	NOT USED	/0 DB	CH 29	NOT USED	/0 DB	CH 30	NOT USED	/0 DB
CH 31	NOT USED	/0 DB	CH 32	NOT USED	/0 DB			

WIRELINE & WTS PANEL

WIRELINE ASSET NO WIRELINE TYPE DATEX

WIRELINE LENGTH 7173 WTS TYPE/ASSET NO N/A

TRANSMIT GAIN N/A MODE 2 GAIN 1 N/A MODE 2 GAIN 2 N/A

MODE 2 EQN. 1 N/A MODE 2 EQN. 2 N/A MODE 5 GAIN 1 N/A

MODE 5 GAIN 2 N/A MODE 5 EQN. 1 N/A MODE 5 EQN. 1 N/A

INTERCONNECTS

LENGTH N/A ASSET NO INC-1 N/A ASSET NO INC-2 N/A

ASSET NO INC-3 N/A ASSET NO INC-4 N/A ASSET NO INC-5 N/A

SPECIAL FEATURES

TEST FREQUENCY RESPONSE HIGH END AND SWEEP DURATION.

PROCESSING INSTRUCTION

WESTERN ATLAS

SEISMIC DATUM: 500.0 CORRECTION VELOCITY 3250.0

LOGS AVAILABLE ON SITE: CBL ACOUSTIC CALIPER

PROCESSING INSTRUCTIONS RECEIVED

(Y) PRIORITY
(Y) CALIBRATION
(Y) SYNTHETIC
(Y) VSP
(Y) VELOCITY
(N) INVERSION
(N) OFFSET VSP
(N) WALKAWAY
(N) PROXIMITY
(N) NORMAL INCIDENCE
(N) 3 COMPONENTS
(N) 3D
(N) NAVIGATION
(N) GYRO

VIBROSEIS SURVEY

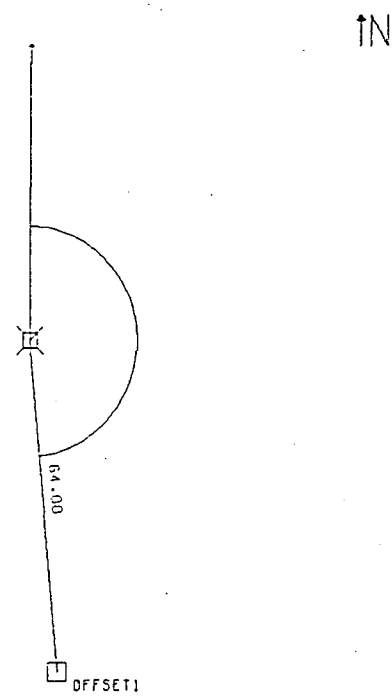
WESTERN ATLAS

VIBRATORS

OFFSET NO. 1		OFFSET NO. 2	
DISTANCE FROM WELL	64	DISTANCE FROM WELL	
AZIMUTH FROM WELL	175	AZIMUTH FROM WELL	
ELEVATION	464.8	ELEVATION	
NO. OF VIBRATORS	2	NO. OF VIBRATORS	
ELECTRONICS	PELTON ADVANCE II	ELECTRONICS	
SWEEP LENGTH	20 S	SWEEP LENGTH	
FREQUENCY RANGE	10-130 HZ	FREQUENCY RANGE	
UP/DOWN SWEEP	NONLINEAR 3DB/OCT UPSWEEP	UP/DOWN SWEEP	
TAPER	0.2S	TAPER	
DRIVE	FULL	DRIVE	
VIBRATOR TYPE	LRS 315	VIBRATOR TYPE	
VIBRATOR UNIT NO.	4502 / 4503	VIBRATOR UNIT NO.	
PHASE LOCKING	GROUND FORCE	PHASE LOCKING	GROUND FORCE
ENCODER PHASE	270 DEGREE	ENCODER PHASE	0 DEGREE
VIBRATOR PHASE	0 DEGREE	VIBRATOR PHASE	0 DEGREE
DOWNHOLE WAVELET PHASE	0 DEGREE	DOWNHOLE WAVELET PHASE	0 DEGREE
TIME PICK	TROUGH	TIME PICK	PEAK
REFERENCE PHONES			
TYPE		TYPE	
DISTANCE FROM SOURCE	N/A	DISTANCE FROM SOURCE	
AZIMUTH FROM SOURCE	N/A	AZIMUTH FROM SOURCE	
DEPTH	N/A	DEPTH	
FREQ	N/A	FREQ	

SURVEY CONFIGURATION

LABEL	DISTANCE	AZIMUTH	ELEVATION
OFFSET1	64.00	175.00	464.80



TOOL STATIONS FOR OFFSET 1

WESTERN ATLAS

CLIENT PARAMOUNT RESOURCES LTD. WELL NAME PARAMOUNT ET AL LIARD F-36

SOURCE TYPE VIBROSEIS ENGINEER ROB DUTHIE / LLOYD HICKS SERVICE VSP

LEVEL NO.	TOOL STATION DEPTH	FILE NUMBER		STATION NO.	TOOL NO.	VERTICAL CHAN TIME PICK (MSEC)	TIME AT COMPLETION OF LEVEL	CABLE SLACK	PRE-AMP GAIN	REMARKS (COMMENTS,UM TIME,CHARGE SIZE/DEPTH,ETC)
1	1460	1	5	1	1	442.0	SUN 07:01 JAN 24/99	0	32	MEDIAN STACK.
2	1461	6	10	2	1	442.0	SUN 07:08 JAN 24/99	0	32	MEDIAN STACK.
3	1965	12	18	3	1	549.0	SUN 08:46 JAN 24/99	0	32	KILL FILE 12. MEDIAN STACK.
4	1950	19	32	4	1	547.0	SUN 08:57 JAN 24/99	0	32	KILL FILES 19 20 21 22 23 24 25 27. MEDIAN STACK.
5	1940	33	43	5	1	546.0	SUN 09:06 JAN 24/99	0	32	KILL FILES 33 34 35 36. MEDIAN STACK.
6	1925	44	55	6	1	540.0	SUN 09:15 JAN 24/99	0	32	KILL FILES 45 48 49 50. MEDIAN STACK.
7	1910	56	75	7	1	536.0	SUN 09:29 JAN 24/99	0	32	KILL FILES 56 57 58 59 60 61 62 63 64 66 67 68 69 75. MEDIAN STACK.
8	1895	76	84	8	1	533.0	SUN 09:36 JAN 24/99	0	32	KILL FILES 77 80 84. MEDIAN STACK.
9	1880	85	94	9	1	530.0	SUN 09:44 JAN 24/99	0	32	KILL FILES 87 90. MEDIAN STACK.
10	1865	95	103	10	1	528.0	SUN 09:52 JAN 24/99	0	32	KILL FILES 95 100. MEDIAN STACK.
11	1850	104	113	11	1	524.0	SUN 10:01 JAN 24/99	0	32	KILL FILES 105 106 107 113. MEDIAN STACK.
12	1835	114	121	12	1	521.0	SUN 10:08 JAN 24/99	0	32	KILL FILE 114. MEDIAN STACK.
13	1820	122	130	13	1	518.0	SUN 10:14 JAN 24/99	0	32	KILL FILES 124 129 130. MEDIAN STACK.
14	1805	131	142	14	1	515.0	SUN 10:23 JAN 24/99	0	32	KILL FILES 131 132 133 138 139 142. MEDIAN STACK.
15	1790	143	151	15	1	511.0	SUN 10:30 JAN 24/99	0	32	KILL FILES 143 144 145. MEDIAN STACK.
16	1775	152	163	16	1	508.0	SUN 10:39 JAN 24/99	0	32	KILL FILES 152 153 155 158. MEDIAN STACK.
17	1760	164	175	17	1	505.0	SUN 10:48 JAN 24/99	0	32	KILL FILES 164 167 168 169 175. MEDIAN STACK.
18	1745	176	187	18	1	502.0	SUN 10:57 JAN 24/99	0	32	KILL FILES 179 180 182 184 186. MEDIAN STACK.
19	1730	188	199	19	1	500.0	SUN 11:06 JAN 24/99	0	32	KILL FILES 189 194 195 197. MEDIAN STACK.
20	1715	200	211	20	1	496.0	SUN 11:15 JAN 24/99	0	32	KILL FILES 201 202 206 208 209 211. MEDIAN STACK.
21	1700	212	219	21	1	493.0	SUN 11:22 JAN 24/99	0	32	KILL FILES 213 215. MEDIAN STACK.
22	1685	220	231	22	1	490.0	SUN 11:31 JAN 24/99	0	32	KILL FILES 220 221 223 225 226 229. MEDIAN STACK.
23	1670	232	239	23	1	487.0	SUN 11:39 JAN 24/99	0	32	KILL FILES 237 238. MEDIAN STACK.
24	1655	240	245	24	1	484.0	SUN 11:44 JAN 24/99	0	32	MEDIAN STACK.
25	1640	246	253	25	1	481.0	SUN 11:50 JAN 24/99	0	32	KILL FILES 246 247 249. MEDIAN STACK.
26	1625	254	260	26	1	476.0	SUN 11:56 JAN 24/99	0	32	MEDIAN STACK.
27	1610	261	272	27	1	475.0	SUN 12:04 JAN 24/99	0	32	KILL FILES 261 262 264 268 270 272. MEDIAN STACK.
28	1595	273	283	28	1	473.0	SUN 12:13 JAN 24/99	0	32	KILL FILES 273 274 278. MEDIAN STACK.
29	1580	284	292	29	1	468.0	SUN 12:21 JAN 24/99	0	32	KILL FILES 284 287 288. MEDIAN STACK.
30	1565	293	302	30	1	465.0	SUN 12:29 JAN 24/99	0	32	KILL FILES 293 298 299 301. MEDIAN STACK.
31	1550	303	309	31	1	463.0	SUN 12:35 JAN 24/99	0	32	KILL FILES 303 305. MEDIAN STACK.
32	1535	310	319	32	1	459.0	SUN 12:42 JAN 24/99	0	32	KILL FILES 310 311 313 315 317. MEDIAN STACK.
33	1520	320	328	33	1	456.0	SUN 12:49 JAN 24/99	0	32	KILL FILES 321 323 325. MEDIAN STACK.

TOOL STATIONS FOR OFFSET 1

WESTERN ATLAS

CLIENT PARAMOUNT RESOURCES LTD. WELL NAME PARAMOUNT ET AL LIARD F-36

SOURCE TYPE VIBROSEIS ENGINEER ROB DUTHIE / LLOYD HICKS SERVICE VSP

LEVEL NO.	TOOL STATION DEPTH	FILE NUMBER		STATION NO.	TOOL NO.	VERTICAL CHAN TIME PICK (MSEC)	TIME AT COMPLETION OF LEVEL	CABLE SLACK	PRE-AMP GAIN	REMARKS (COMMENTS,UH TIME,CHARGE SIZE/DEPTH,ETC)
34	1505	329	336	34	1	453.0	SUN 12:55 JAN 24/99	0	32	KILL FILES 329 336. MEDIAN STACK.
35	1490	337	342	35	1	450.0	SUN 13:00 JAN 24/99	0	32	MEDIAN STACK.
36	1475	343	348	36	1	447.0	SUN 13:05 JAN 24/99	0	32	MEDIAN STACK.
37	1460	349	357	37	1	442.0	SUN 13:13 JAN 24/99	0	32	KILL FILES 352 353 355. MEDIAN STACK.
38	1455	358	366	38	1	442.0	SUN 13:20 JAN 24/99	0	32	KILL FILES 358 359 360. MEDIAN STACK.
39	1445	367	374	39	1	440.0	SUN 13:26 JAN 24/99	0	32	KILL FILES 367 371. MEDIAN STACK.
40	1430	375	383	40	1	436.0	SUN 13:33 JAN 24/99	0	32	KILL FILES 375 379 380. MEDIAN STACK.
41	1415	384	399	41	1	432.0	SUN 13:46 JAN 24/99	0	32	KILL FILES 384 385 386 387 388 389 391 392 3 93 395. MEDIAN STACK.
42	1400	400	407	42	1	430.0	SUN 13:52 JAN 24/99	0	32	KILL FILES 400 407. MEDIAN STACK.
43	1398	408	415	43	1	430.0	SUN 13:59 JAN 24/99	0	32	KILL FILES 410 412. MEDIAN STACK.
44	1385	416	422	44	1	426.0	SUN 14:05 JAN 24/99	0	32	KILL FILES 418 421. MEDIAN STACK.
45	1370	423	430	45	1	424.0	SUN 14:11 JAN 24/99	0	32	KILL FILES 426 428. MEDIAN STACK.
46	1365	431	438	46	1	423.0	SUN 14:18 JAN 24/99	0	32	KILL FILES 431 438 436. MEDIAN STACK.
47	1355	439	444	47	1	421.0	SUN 14:22 JAN 24/99	0	32	MEDIAN STACK.
48	1344	445	453	48	1	418.0	SUN 14:29 JAN 24/99	0	32	KILL FILES 445 446 447 450. MEDIAN STACK.
49	1340	454	461	49	1	418.0	SUN 14:35 JAN 24/99	0	32	KILL FILES 454 458. MEDIAN STACK.
50	1325	462	467	50	1	415.0	SUN 14:41 JAN 24/99	0	32	KILL FILE 462. MEDIAN STACK.
51	1310	468	473	51	1	412.0	SUN 14:46 JAN 24/99	0	32	KILL FILE 468. MEDIAN STACK.
52	1295	474	479	52	1	409.0	SUN 14:50 JAN 24/99	0	32	KILL FILE 474. MEDIAN STACK.
53	1280	480	485	53	1	406.0	SUN 14:56 JAN 24/99	0	32	KILL FILE 482. MEDIAN STACK.
54	1265	486	491	54	1	403.0	SUN 15:01 JAN 24/99	0	32	KILL FILE 487. MEDIAN STACK.
55	1250	492	497	55	1	399.0	SUN 15:06 JAN 24/99	0	32	MEDIAN STACK.
56	1235	498	503	56	1	396.0	SUN 15:10 JAN 24/99	0	32	MEDIAN STACK.
57	1225	504	509	57	1	394.0	SUN 15:16 JAN 24/99	0	32	MEDIAN STACK.
58	1220	511	519	58	1	391.0	SUN 15:23 JAN 24/99	0	32	KILL FILES 511 515 519. MEDIAN STACK.
59	1205	520	525	59	1	388.0	SUN 15:28 JAN 24/99	0	32	MEDIAN STACK.
60	1190	526	531	60	1	383.0	SUN 15:33 JAN 24/99	0	32	MEDIAN STACK.
61	1175	532	537	61	1	380.0	SUN 15:38 JAN 24/99	0	32	MEDIAN STACK.
62	1160	538	543	62	1	375.0	SUN 15:43 JAN 24/99	0	32	MEDIAN STACK.
63	1154	544	549	63	1	373.0	SUN 15:48 JAN 24/99	0	32	MEDIAN STACK.
64	1145	550	555	64	1	372.0	SUN 15:54 JAN 24/99	0	32	MEDIAN STACK.
65	1130	556	561	65	1	367.0	SUN 15:58 JAN 24/99	0	32	MEDIAN STACK.
66	1124	562	567	66	1	365.0	SUN 16:03 JAN 24/99	0	32	MEDIAN STACK.

TOOL STATIONS FOR OFFSET 1

WESTERN ATLAS

CLIENT PARAMOUNT RESOURCES LTD. WELL NAME PARAMOUNT ET AL LIARD F-36

SOURCE TYPE VIBROSEIS ENGINEER ROB DUTHIE / LLOYD HICKS SERVICE VSP

LEVEL NO.	TOOL STATION DEPTH	FILE NUMBER		STATION NO.	TOOL NO.	VERTICAL CHAN TIME PICK (MSEC)	TIME AT COMPLETION OF LEVEL	CABLE SLACK	PRE-AMP GAIN	REMARKS (COMMENTS,UH TIME,CHARGE SIZE/DEPTH,ETC)
67	1115	568	573	67	1	364.0	SUN 16:08 JAN 24/99	0	32	MEDIAN STACK.
68	1110	574	579	68	1	363.0	SUN 16:13 JAN 24/99	0	32	MEDIAN STACK.
69	1100	580	585	69	1	359.0	SUN 16:18 JAN 24/99	0	32	MEDIAN STACK.
70	1085	586	591	70	1	355.0	SUN 16:23 JAN 24/99	0	32	MEDIAN STACK.
71	1070	592	597	71	1	350.0	SUN 16:28 JAN 24/99	0	32	MEDIAN STACK.
72	1055	598	603	72	1	345.0	SUN 16:33 JAN 24/99	0	32	MEDIAN STACK.
73	1040	604	609	73	1	341.0	SUN 16:38 JAN 24/99	0	32	KILL FILE 604. MEDIAN STACK.
74	1025	610	615	74	1	335.0	SUN 16:43 JAN 24/99	0	32	MEDIAN STACK.
75	1010	616	621	75	1	331.0	SUN 16:48 JAN 24/99	0	32	MEDIAN STACK.
76	995	622	627	76	1	326.0	SUN 16:52 JAN 24/99	0	32	MEDIAN STACK.
77	980	628	633	77	1	321.0	SUN 16:58 JAN 24/99	0	32	MEDIAN STACK.
78	969	634	639	78	1	318.0	SUN 17:03 JAN 24/99	0	32	MEDIAN STACK.
79	965	640	645	79	1	318.0	SUN 17:08 JAN 24/99	0	32	MEDIAN STACK.
80	950	646	651	80	1	313.0	SUN 17:13 JAN 24/99	0	32	MEDIAN STACK.
81	899	652	659	81	1	300.0	SUN 17:20 JAN 24/99	0	32	KILL FILES 655 658. MEDIAN STACK.
82	790	660	663	82	1	272.0	SUN 17:26 JAN 24/99	0	32	MEDIAN STACK.
83	700	664	667	83	1	245.0	SUN 17:30 JAN 24/99	0	32	MEDIAN STACK.
84	600	668	671	84	1	218.0	SUN 17:34 JAN 24/99	0	32	MEDIAN STACK.
85	553	672	675	85	1	205.0	SUN 17:38 JAN 24/99	0	32	MEDIAN STACK.
86	518	676	679	86	1	194.0	SUN 17:42 JAN 24/99	0	32	MEDIAN STACK.
87	391	680	683	87	1	155.0	SUN 17:48 JAN 24/99	0	32	MEDIAN STACK.
88	300	684	687	88	1	124.0	SUN 17:52 JAN 24/99	0	32	MEDIAN STACK.
89	200	688	691	89	1	92.0	SUN 17:57 JAN 24/99	0	32	MEDIAN STACK.
90	128	692	695	90	1	71.0	SUN 18:03 JAN 24/99	0	32	MEDIAN STACK.

WESTERN ATLAS

Client: Paramount Resources Ltd | Well: Paramount et al Liard F-36

Service: ZVSP | Source: Vib | Engineer(s): Hicks/Duthie | Date: 24 JAN 99

LineID: p2r | TD: 1968

Tool Station Depth	File Number	Offset #	Cable Slack (m)	First Arrival Time	Level Completion Time	Comments
518	3 -10			194	635	* 16s, 10-130Hz, linear
1460	11-15			442	651	
	* changing to 20sec (new lineid)					
1460	1-5			442	701	* 20s, 10-130Hz, linear
1461	6-10			442	708	* 20s, 10-130Hz, non linear +3dB/oct
	* changing to 24 sec (new lineid)					
1460	1-10			442	731	* 24s, 10-130Hz, non linear +3dB/oct
	* changing to 16 sec					
1461	10-21			442	745	* 16s, 10-130Hz, non linear +3dB/oct
1835	22-			520	808	
	TD @ 1967					
1965				549		~noisy (925?)
	* changing to 20sec, 10-130Hz, +3dB/oct boost					
1965	12-18			549	845	
1955	19-32			547.0	857	* depth error → 1950 (All)
1940	33-43			546	906	* depth error → 1935 (33-34)
1925	44-55			540	915	
1910	56-75			536	929	
1895	76-84			533	936	
1880	85-94			530	944	
1865	95-103		2	528	952	
1850	104-113		2	524	1001	
1835	114-121			521	1008	
1820	122-130			518	1014	
1805	131-142			515	1023	
1790	143-151			511	1030	
1775	144-163			508	1038	
1760	164-175			505	1048	

WESTERN ATLAS

Client: Paramount Resources Ltd	Well: Paramount et al Liard F-36		
Service: 2VSP	Source: Vib	Engineer(s): Hicks / Duthie	Date: 24-Jan-99

LineID: | TD: 1968

Tool Station Depth	File Number	Offset #	Cable Stack (m)	First Arrival Time	Level Completion Time	Comments
1745	176 - 187			502	1057	many shots
1730	188 - 199			500	1106	
1715	200 - 211			496	1115	
1700	212 - 219			493	1122	extra shots
1685	220 - 231			490	1131	- random noise
1670	232 - 239			487	1139	
1655	240 - 245			484	1144	
1640	246-253			481	1150	
1625	254 - 260			476	1156	
1610	261 - 272			475	1204	Noisy
1595	273 - 283			473	1213	
1580	284 - 292			468	1221	
1565	293 - 302			465	1229	
1550	303 - 309			463	1235	
1535	310 - 319			459	1242	
1520	320 - 328			456	1249	
1505	329 - 336			453	1255	
1490	337 - 342			450	1300	
1475	343 - 348			447	1305	
1460	349 - 357			442	1313	
1455	358 - 366			442	1320	Trace 358 Header Error (1445)
1445	367 - 374			440	1326	
1430	375 - 383			436	1333	
1415	384 - 399			432	1346	Noisy
1400	400 - 407			430	1352	
1398	408 - 415			430	1359	
1385	416-422			426	1405	
1370	423 - 430			424	1411	
1365	431 - 438			423	1417	
1355	439 - 444			421	1422	
1344	445 - 453			418	1427	
1340	454 - 461			418	1435	
1325	462 - 467			415	1441	
1310	468 - 473			412	1446	
1295	474 - 479			409	1450	
1280	480 - 485			406	1505	
1265	486 - 491			403	1501	
1250	492 - 497			399	1506	
1235	498 - 503			396	1510	
1225	504 - 509			394	1516	
1220	510 - 519			391	1523	
1205	520 - 525			388	1528	

WESTERN ATLAS

Client: Paramount Resources | Well: Paramount et al Liard F-36

Service: VSP | Source: vib | Engineer(s): Hicks/Dahnie | Date: 24 JAN 99

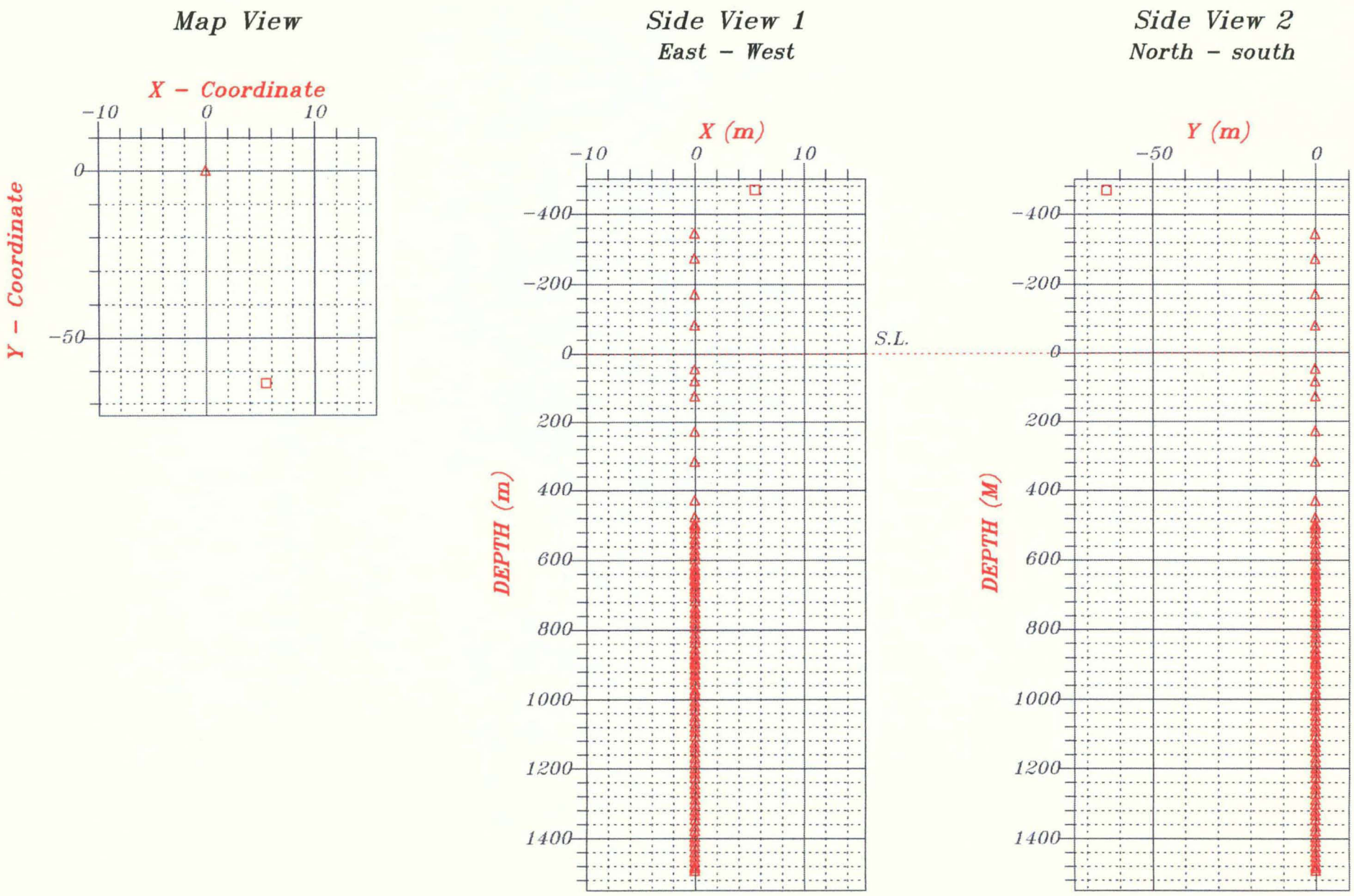
LineID: | TD:

Tool Station Depth	File Number	Offset #	Cable Stack (m)	First Arrival Time	Level Completion Time	Comments
1190	526-530			383	1533	
1175	531-537			380	1538	
1160	538-543			375	1543	
1154	544-549			373	1548	
1145	550-555			372	1553	
1130	556-561			367	1558	
1124	562-567			365	1603	
1115	568-573			364	1608	
1110	574-579			363	1613	
1100	580-585			359	1618	
1085	586-591			355	1623	
1070	592-597			350	1628	
1055	598-603			345	1633	
1040	604-609			341	1638	
1025	610-615			335	1643	
1010	616-621			331	1648	
995	622-627			326	1652	
980	628-633			321	1658	
969	634-639			318	1703	
965	640-645			318	1708	
950	646-651			313	1713	
899	652-659			300	1720	
790	660-663			272	1726	
700	664-667			245	1730	
600	668-671			218	1734	
553	672-675			205	1738	
518	676-679			194	1742	
391	680-683			155	1748	
300	684-687			124	1752	
200	688-691			92	1757	
128	692-695			71	1803	

4

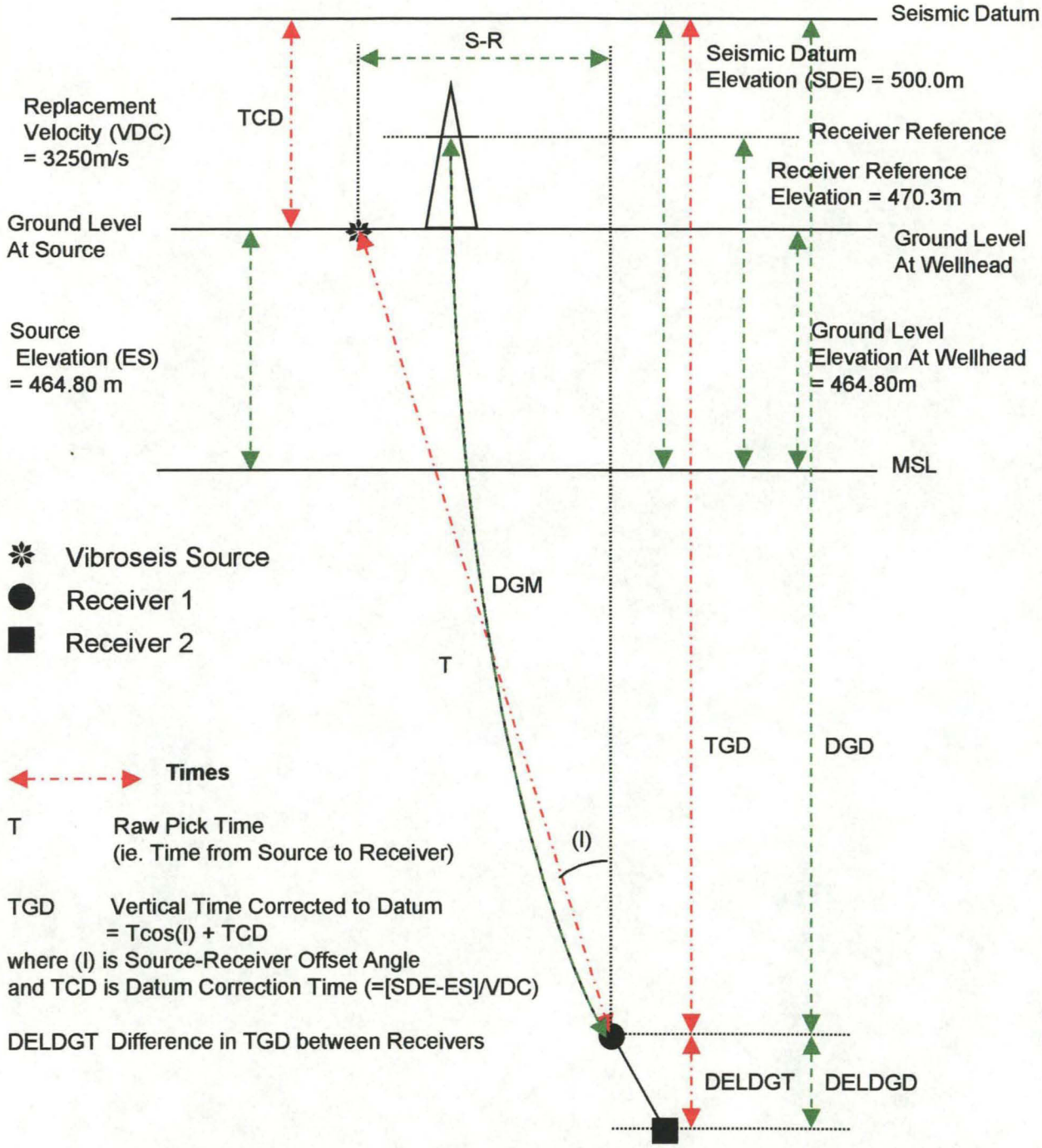
4. FIGURES

FIGURE 1
SURVEY GEOMETRY
Well: Paramount Et Al Liard F-36



WELL: PARAMOUNT ET AL LIARD F-36

Figure 2: Onshore Acquisition Parameters



Times

T Raw Pick Time
(ie. Time from Source to Receiver)

TGD Vertical Time Corrected to Datum
= Tcos(I) + TCD
where (I) is Source-Receiver Offset Angle
and TCD is Datum Correction Time (=[SDE-ES]/VDC)

DELDGT Difference in TGD between Receivers

Distances

S-R Source-Receiver Offset (SRC_REC)
ES Elevation of Source above MSL
DGM Measured Depth of Receiver below Reference
DGD True Vertical Depth of Receiver below Datum
DELDGD Difference in DGD between Receivers

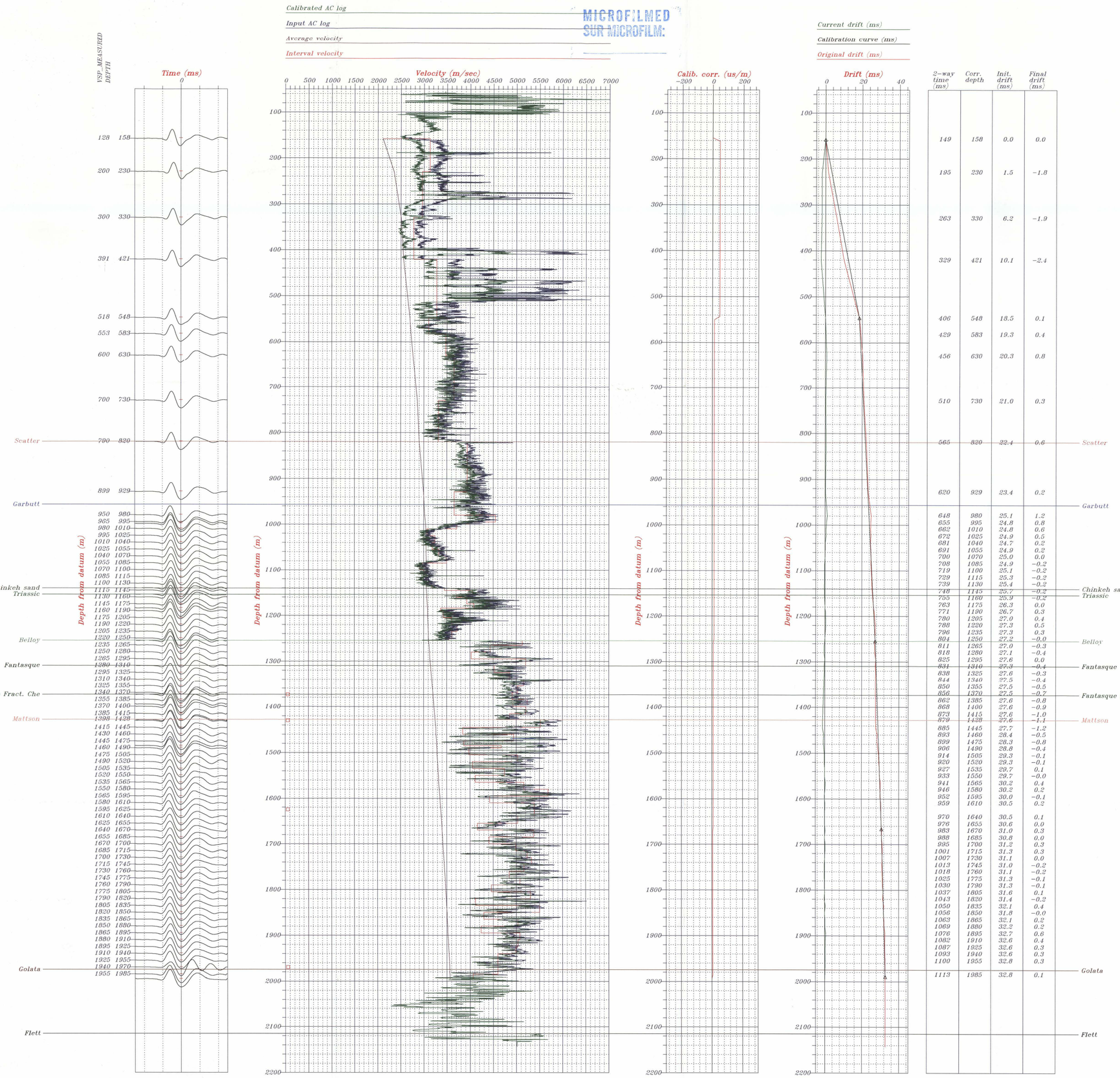
Velocity

VDC Datum Correction Velocity

5. ENCLOSURES

ENCLOSURE 1.1: VELOCITY SURVEY & ACOUSTIC LOG CALIBRATION
PARAMOUNT RESOURCES Ltd.
Well: Paramount Et Al Liard F-36
KB Elevation = 470.3 m, GL Elevation = 464.8 m, Datum Elevation = 500 m

MICROFILMED
SUR MICROFILM:



2-way time (ms)	Corr. depth	Init. drift (ms)	Final drift (ms)
149	158	0.0	0.0
195	230	1.5	-1.8
263	330	6.2	-1.9
329	421	10.1	-2.4
406	548	18.5	0.1
429	583	19.3	0.4
456	630	20.3	0.8
510	730	21.0	0.3
565	820	22.4	0.6
620	929	23.4	0.2
648	980	25.1	1.2
655	995	24.8	0.8
662	1010	24.8	0.6
672	1025	24.9	0.5
681	1040	24.7	0.2
691	1055	24.9	0.2
700	1070	25.0	0.0
708	1085	24.9	-0.2
719	1100	25.1	-0.2
729	1115	25.3	-0.2
739	1130	25.4	-0.2
748	1145	25.7	-0.2
755	1160	25.9	-0.2
763	1175	26.3	0.0
771	1190	26.7	0.3
780	1205	27.0	0.4
788	1220	27.3	0.5
796	1235	27.3	0.3
804	1250	27.2	-0.0
811	1265	27.0	-0.3
818	1280	27.1	-0.4
825	1295	27.6	0.0
831	1310	27.3	-0.4
838	1325	27.6	-0.3
844	1340	27.5	-0.4
850	1355	27.5	-0.5
856	1370	27.5	-0.7
862	1385	27.6	-0.8
868	1400	27.6	-0.9
873	1415	27.6	-1.0
879	1428	27.6	-1.1
885	1445	27.7	-1.2
893	1460	28.4	-0.5
899	1475	28.3	-0.6
906	1490	28.8	-0.4
914	1505	29.3	-0.1
920	1520	29.3	-0.1
927	1535	29.7	0.1
933	1550	29.7	-0.0
941	1565	30.2	0.4
946	1580	30.2	0.2
952	1595	30.0	-0.1
959	1610	30.5	0.2
970	1640	30.5	0.1
976	1655	30.6	0.0
983	1670	31.0	0.3
988	1685	30.8	0.0
995	1700	31.2	0.3
1001	1715	31.3	0.3
1007	1730	31.1	0.0
1013	1745	31.0	-0.2
1018	1760	31.1	-0.2
1025	1775	31.3	-0.1
1030	1790	31.3	-0.1
1037	1805	31.6	0.1
1043	1820	31.4	-0.2
1050	1835	32.1	0.4
1056	1850	31.8	-0.0
1063	1865	32.1	0.2
1069	1880	32.2	0.2
1076	1895	32.7	0.6
1082	1910	32.6	0.4
1087	1925	32.6	0.3
1093	1940	32.6	0.3
1100	1955	32.8	0.3
1113	1985	32.8	0.1

Baker Atlas

ENCLOSURE 1.2: ACOUSTIC LOG

BAKER HUGHES

Baker Atlas

ACOUSTIC LOG CALIBRATION

FILE NO:	COMPANY	PARAMOUNT RESOURCES LTD.
	WELL	PARAMOUNT ET AL LIARD F-36
API NO:	FIELD	UNDEFINED
	PROVINCE	NORTHWEST TERRITORIES

LOCATION:
WID: 1841
F36 60 DEG 05' 123DEG 22'

SEC _____ TWP _____ RGE _____

OTHER SERVICES
HDIL-GR
CN-ZDL-GR-XY
CBIL-GR, HDIP-GR
CVL,VSP,LOGSTAR

PERMANENT DATUM 500 M ELEVATION _____
LOG MEASURED FROM KB _____ ABOVE P.D.
DRILL. MEAS. FROM KELLY BUSHING

ELEVATIONS
KB 470.5 M
DF
GL 464.8 M

DATE	20-JAN-1999			
RUN				
SERVICE ORDER	968846			
DEPTH DRILLER	2113.08 M			
DEPTH LOGGER	2113.08 M			
BOTTOM LOGGED INTERVAL	2113.08 M			
TOP LOGGED INTERVAL	25.96 M			
CASING - DRILLER	177.8 MM	@1494.0 M		
CASING LOGGER	1494.0 M			
BIT SIZE	156 MM			
TYPE OF FLUID IN HOLE	INVERT			
DENSITY / VISCOSITY	1110 G/C3	53 S		
PH / FLUID LOSS				
SOURCE OF SAMPLE	[illegible]	N		
RM AT MEAS. TEMP.		@		@
RMF AT MEAS. TEMP		@		@
RMC AT MEAS. TEMP		@		@
SOURCE OF RMF / RMC.				
RM AT BHT		@		@
TIME SINCE CIRCULATION	15 HRS			
MAX. RECORDED TEMP.	76 DEGC			
EQUIP. NO. / LOCATION	HL6544	G.P.		
RECORDED BY	R.KHAFIZOU			
WITNESSED BY	B.CLATTENBURG			

BAKER HUGHES
Baker Atlas

ACOUSTIC LOG CALIBRATION

FILE NO:
API NO:
COMPANY PARAMOUNT RESOURCES LTD.
WELL PARAMOUNT ET AL LIARD F-36
FIELD UNDEFINED
PROVINCE NORTHWEST TERRITORIES

LOCATION:

OTHER SERVICES

ELEVATIONS

PERMANENT DATUM
LOG MEASURED FROM
DRILL. MEAS. FROM KELLY BUSHING

DATE 20-JAN-1999
RUN
SERVICE ORDER
DEPTH DRILLER 2113.0 M
DEPTH LOGGER 2113.0 M
BOTTOM LOGGED INTERVAL 2113.0 M
TOP LOGGED INTERVAL
CASING - DRILLER
CASING LOGGER
BIT SIZE
TYPE OF FLUID IN HOLE
DENSITY / VISCOSITY
PH / FLUID LOSS
SOURCE OF SAMPLE
RM AT MEAS. TEMP.
RMF AT MEAS. TEMP.
RMC AT MEAS. TEMP.
SOURCE OF RMF / RMC
RM AT BHT
TIME SINCE CIRCULATION
MAX. RECORDED TEMP.
EQUIP. NO. / LOCATION
RECORDED BY
WITNESSED BY

MICROFILMED

FOLD HERE

IN MAKING INTERPRETATIONS OF LOGS OUR EMPLOYEES WILL GIVE CUSTOMER THE BENEFIT OF THEIR BEST JUDGEMENT. BUT SINCE ALL INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS, WE CANNOT, AND WE DO NOT GUARANTEE THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATION. WE SHALL NOT BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COST, DAMAGES, OR EXPENSES WHATSOEVER INCURRED OR SUSTAINED BY THE CUSTOMER RESULTING FROM ANY INTERPRETATION MADE BY ANY OF OUR EMPLOYEES.

BOREHOLE RECORD		
BIT SIZE	FROM	TO

CASING RECORD				
SIZE	WEIGHT	GRADE	FROM	TO

REMARKS

RUN 1: VERTICAL SEISMIC PROFILE CALIBRATED ACOUSTIC LOG

EQUIPMENT DATA					
RUN	TRIP	TOOL	SERIES NO.	SERIAL NO.	POSITION

CURVE MEASURE POINT OFFSET

CURVE	OFFSET (m)	CURVE	OFFSET (m)	CURVE	OFFSET (m)	CURVE	OFFSET (m)
cacm	0.00	cal	0.00	edtc	0.00	gr	0.00

MICROFILMED
FOR PARAMOUNT

WESTERN ATLAS

PARAMOUNT RESOURCES LTD.

Well: PARAMOUNT ET AL LIARD F-36
ZERO OFFSET VSP - NORMAL & REVERSE POLARITY

ENCLOSURE 4.2: L-PLOT COMPOSITE DISPLAY

TIME SCALE: 15 IN/S

AREA:	NORTHWEST TERRITORIES
LOCATION:	1841 FSL 0860E 05° 12DEG 22'
FIELD:	UNDEFINED
DATE SURVEY COMPLETED:	24 JANUARY 1989
DATE RIG RELEASED:	24 JAN 1989
DRILLING MEASURED DATUM:	500. - N AMSL
GROUND ELEVATION:	464.0 M AMSL
DRILLING CONTRACTOR:	PRO-TECH
DATE PROCESSED:	FEBRUARY 1989

ACQUISITION

ENERGY SOURCE:	VIBROSEIS
SOURCE:	4 X 250 HP HH
SOURCE OFFSET:	54 M
SOURCE AZIMUTH:	175 DEG
SOURCE ELEVATION:	0.0 M DIFFERENCE
DOWNHOLE RECEIVER:	ARI 2500 SR 3-COMPONENT GEOPHONE
RECORDING SYSTEM:	WTA/DCS
SAMPLE INTERVAL:	1 MS
RECORD LENGTH:	2.048 MS
TAPE FORMAT:	SEG-Y SIMPTE

PROCESSING

LOG DEPTH SAMPLE INTERVAL:	0.15 M
LOG DEPTH RANGE:	50.45 - 2142.98 M TVD B DATUM

ACOUSTIC LOG CALIBRATION

Log edit
Refinement of checkshot first break times
Calibration using checkshot times (sonic log times)
Calibration using linear fit to drift curve

VSP ENHANCED DECONVOLVED UPGOING WAVE

Refracted
RMS, stack and pick first arrival times
Correction for geometric spreading (T**1.7
Trace balance - 5000 RMS [Direct Arrival Window]
Refracted Arrival Muting
First breaks aligned at 200 ms
15-point median filter
Subtract median from traces
Zero phase bandpass filter 10[10]-100[90] Hz(dB/oct)
Shift to corrected two-way time to align upgoing waves
VSP Deconvolution Operator Design
Use an operator derived from designing p-waves
Zero phase bandpass filter 10[10]-100[90] Hz(dB/oct)
Balance spectrum of deconvolved upgoing waves
5-point median filter
Zero phase bandpass filter 10[10]-110[90] Hz(dB/oct)
Zero phase bandpass filter 10[10]-110[90] Hz(dB/oct)
Zero phase bandpass filter 10[10]-80[90] Hz(dB/oct)
Zero phase bandpass filter 10[10]-80[90] Hz(dB/oct)

LOG DATA

Logs Displayed in Time and Depth
Calibrated Acoustic (sonic/m)
Composite Density (gm/cm3)
Gamma Ray (API Units)
Logs Displayed in Time
Acoustic (sec/m)
Velocity (m/s)
Acoustic Impedance (m/s*G/cm3)
Reflection Coefficient (sec-m)
Caliper (inch)

SYNTHETIC SEISMOGRAM

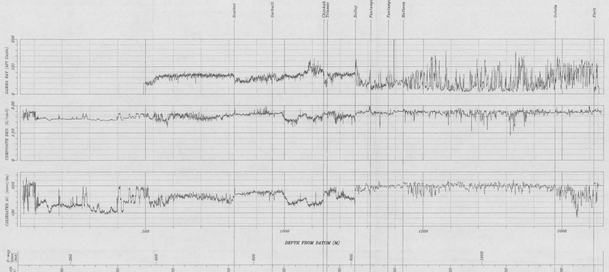
Generation of reflectivity series at 1 ms sample interval
Primaries Without Transmission Loss
Convolution
Zero phase bandpass filter: 10[10]-80[90] Hz(dB/oct)
10[10]-80[90] Hz(dB/oct)
10[10]-110[90] Hz(dB/oct)

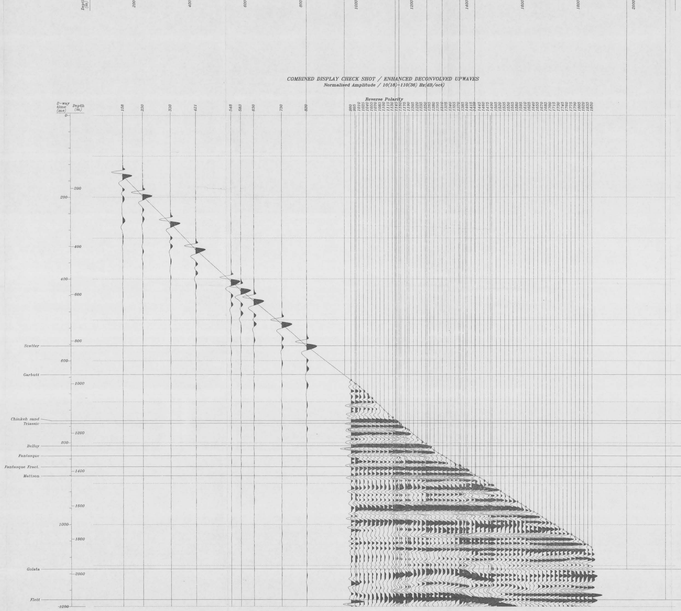
DISPLAY

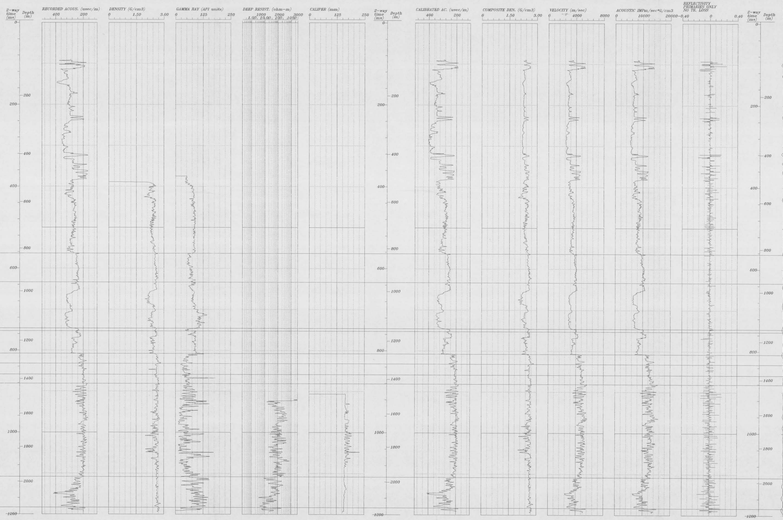
TWO-WAY TIME REFERENCED TO SEISMIC DATUM OF 500 m.
TRUE VERTICAL DEPTH REFERENCED TO DATUM OF 500 m.
RELATIVE AMPLITUDES PRESERVED

TIMESCALE:	15 IN/SEC
DEPTHSCALE:	100 M/IN

NORMAL POLARITY
AN INCREASE IN ACOUSTIC IMPEDANCE IS DISPLAYED AS A TROUGH







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WESTERN ATLAS

PARAMOUNT RESOURCES LTD.

Well: PARAMOUNT ET AL LIARD F-38
ZERO OFFSET VSP – NORMAL & REVERSE POLARITY

ENCLOSURE 4.1: L-PLOT COMPOSITE DISPLAY

TIME SCALE: 7.5 IN/S

AREA:	NORTHWEST TERRITORIES
LOCATION:	60 DEG 12 MINS 15 - 123DEG 51
FIELD:	UNDESIGNED
DATE SURVEY COMPLETED:	24 JANUARY 1990
DATE OF ACQUISITION:	24 JAN 1990
SELECT REFERENCE DATUM:	500. M AMSL
GROUND ELEVATION:	484.0 M AMSL
DATUM VELOCITY(V):	4000 M/S
DATE PROCESSED:	FEBRUARY 1990

ACQUISITION

ENERGY SOURCE:	VIBROSEIS
SWEEP:	8 TO 130 HZ
SOURCE STATE:	24.M
SOURCE ALIMUTH:	170 DEG
SOURCE OFFSET:	0.0 M REFERENCE
HORMONIC REJECTION:	4TH: 120DB OR
	5-COMPONENT GEOPHONE
RECORDING SYSTEM:	WESTERN
SAMPLE INTERVAL:	2 MS
RECORD LENGTH:	4000 MS
TAPE FORMAT:	SEG-Y EXABYTE

PROCESSING

LOG DEPTH SAMPLE INTERVAL:	0.15 M
LOG DEPTH RANGE:	35.62 - 2142.88 M TVD S DATUM

ACOUSTIC LOG CALIBRATION

Log edit
Refinement of checkshot first break times
Drift curve computation (checkshot time - log time)
Calibration using linear fit to drift curve

VSP ENHANCED RECONVOLVED UPGOING WAVE

Refiltered
RMS, stack and pick first arrival times
Generation of Time and Depth Scales
Trace Balance = 2000 RMS [Direct Arrival Window]
Estimation of downgoing p-wave:
Median filter [Window = 200 ms
10-point median filter
Subtraction of downgoing p-wave
Shift to common two-way time to align upgoing wave
Shift to controlled two-way time to align upgoing wave
VSP reconvolution of upgoing wave:
Zero phase bandpass filter 10(20)-120(30) Hz(dB/oct)
Estimation of downgoing p-wave
Enhancement of deconvolved upgoing wave:
Shift to controlled two-way time
Zero phase bandpass filter 10(20)-120(30) Hz(dB/oct)
Corridor stack of enhanced deconvolved upgoing wave
Shift to controlled two-way time to align stack
Zero phase bandpass filter 10(20)-90(30) Hz(dB/oct)

LOG DATA

Logs Displayed in Time and Depth
Gamma Ray (API units)
Compositie Density (gm/cm3)
Sonnine Ray (API Units)
Velocity (m/s) (Sonic m/s)
Logs Displayed in Time
Density (gm/cm3)
Velocity (m/s)
Acoustic Impedance (m/s.G/cm3)
Caliper (inch)

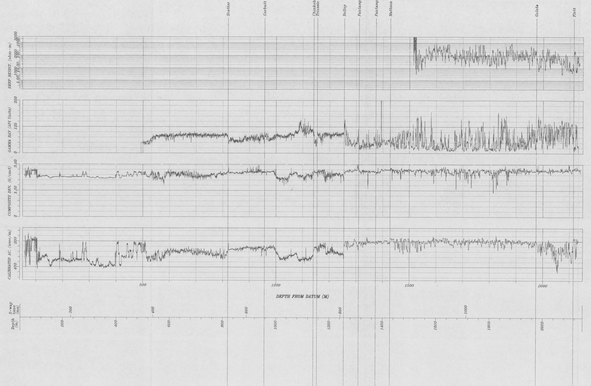
SYNTHETIC SEISMOGRAM

Generation of reflectivity series at 1 ms sample interval:
Convolution of Parameter Wellcard Transmissions lose
Convolution
Zero phase bandpass filter 10(30)-50(30) Hz(dB/oct)
Generation of Synthetic Seismogram
10(20)-110(30) Hz(dB/oct)

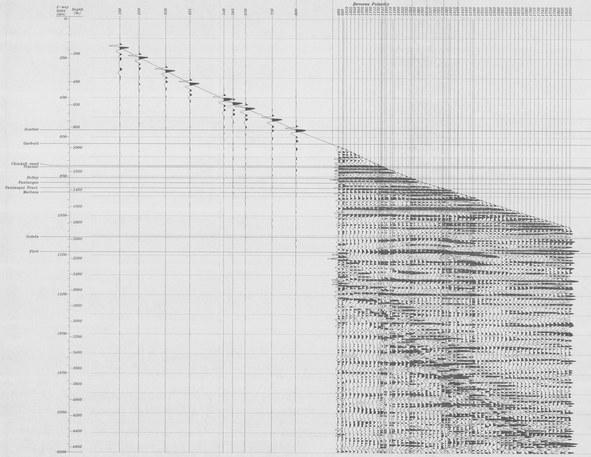
DISPLAY

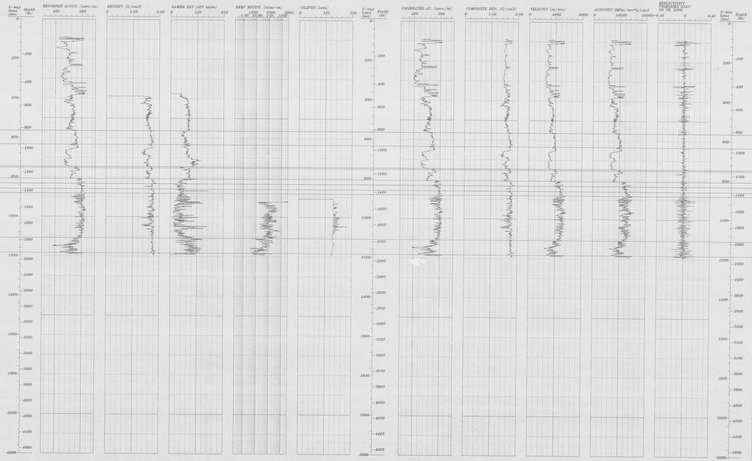
TWO-WAY TIME REFERENCED TO DATUM: DATUM OF 500 m	
TRUE VERTICAL DEPTH REFERENCED TO DATUM OF 500 m	
RELATIVE AMPLITUDE PRESERVED	
TIMESCALE:	7.5 IN/SEC
DEPTHSCALE:	100 M/IN

NORMAL POLARITY
AN INCREASE IN ACOUSTIC IMPEDANCE IS REPRESENTED BY A TROUGH



COMBINED DISPLAY CHECK SHOT / ENHANCED DECONVOLVED UPWAVES
Normalized Amplitude / 10(30)-110(30) Hz(dB/oct)





MICROFILMED
SUB-MICROFILM:

WESTERN ATLAS

PARAMOUNT RESOURCES LTD.

Well: PARAMOUNT ET AL LIARD F-36
ZERO OFFSET VSP – NORMAL & REVERSE POLARITY

ENCLOSURE 3.2: VSP FREQUENCY & PHASE DISPLAY

TIME SCALE: 7.5 IN/S

AREA:	NORTHWEST TERRITORIES
LOCATION:	1841 F36 60DEG 05' 123DEG 22'
FIELD:	UNDEFINED
DATE SURVEY COMPLETED:	24 JANUARY 1999
KB ELEVATION:	470.3 M AMSL
SEISMIC REFERENCE DATUM:	500 M AMSL
GROUND ELEVATION:	464.8 M AMSL
REPLACEMENT VELOCITY:	3250 M/s
DATE PROCESSED:	JANUARY 1999

ACQUISITION

ENERGY SOURCE:	VIBROSEIS
SWEEP:	10 – 130 HZ
SOURCE OFFSET:	64 M
SOURCE AZIMUTH:	175 DEG
SOURCE MONITOR:	TRUE REFERENCE
DOWNHOLE RECEIVER:	AWS 1300 GM 3-COMPONENT GEOPHONE
RECORDING SYSTEM:	WTS/SUN
SAMPLE INTERVAL:	1 MS
RECORD LENGTH:	4000 MS
TAPE FORMAT:	SEG-Y EXABYTE

PROCESSING

Reformat
Edit, stack and pick first arrival times
Correction for geometric spreading: t**1.7
Trace balance – 2000 RMS (Direct Arrival Window)
Estimation of downgoing p-waves:
First breaks aligned at 200 ms
15-point median filter
Subtraction of downgoing p-waves
Zero phase bandpass filter: 10(18)–130(36) Hz(dB/oct)
Shift to corrected two-way time to align upgoing waves
VSP deconvolution of upgoing waves:
700 ms operator derived from downgoing p-waves
Zero phase bandpass filter: 10(18)–130(36) Hz(dB/oct)
Enhancement of deconvolved upgoing waves:
5-point median filter
Zero phase bandpass filter: 10(18)–110(36) Hz(dB/oct)
Corridor stack of enhanced deconvolved upgoing waves
Zero phase bandpass filter applied on corr. stack:
10(18)–110(36) Hz(dB/oct) to 10(18)–40(36) Hz(dB/oct)
30 Deg phase rotation on corr. stack 10(18)–50(36) Hz(dB/oct)

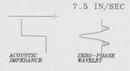
DISPLAY

TWO-WAY TIME REFERENCED TO SEISMIC DATUM OF 500 M
RELATIVE AMPLITUDE PRESERVED

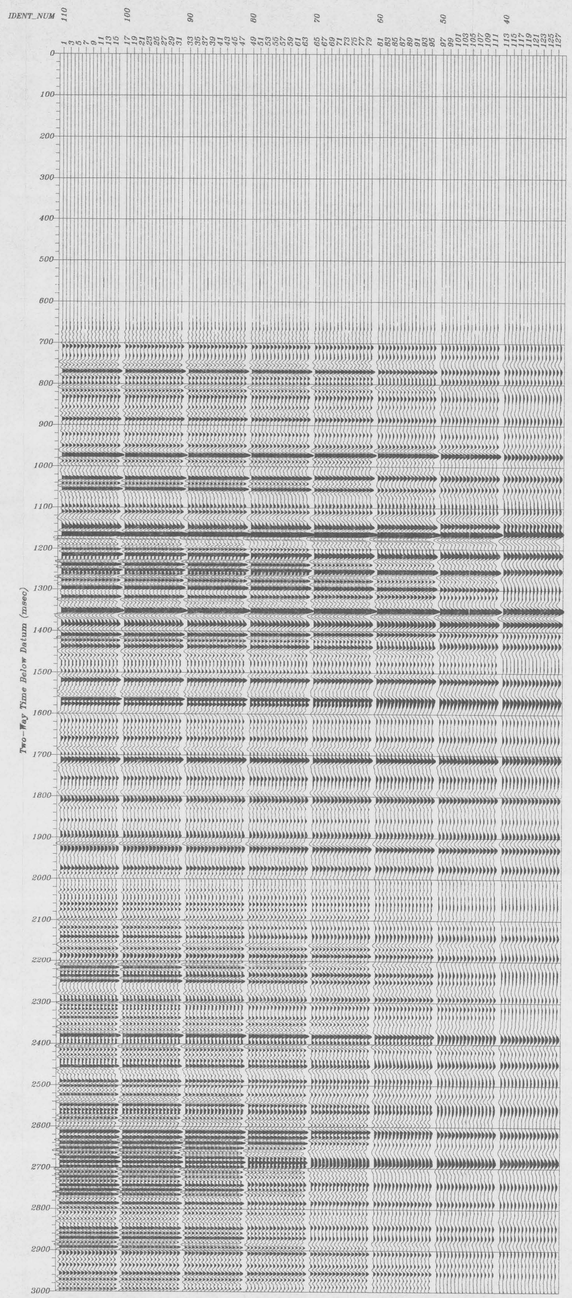
TIMESCALE: 7.5 IN/SEC

NORMAL POLARITY

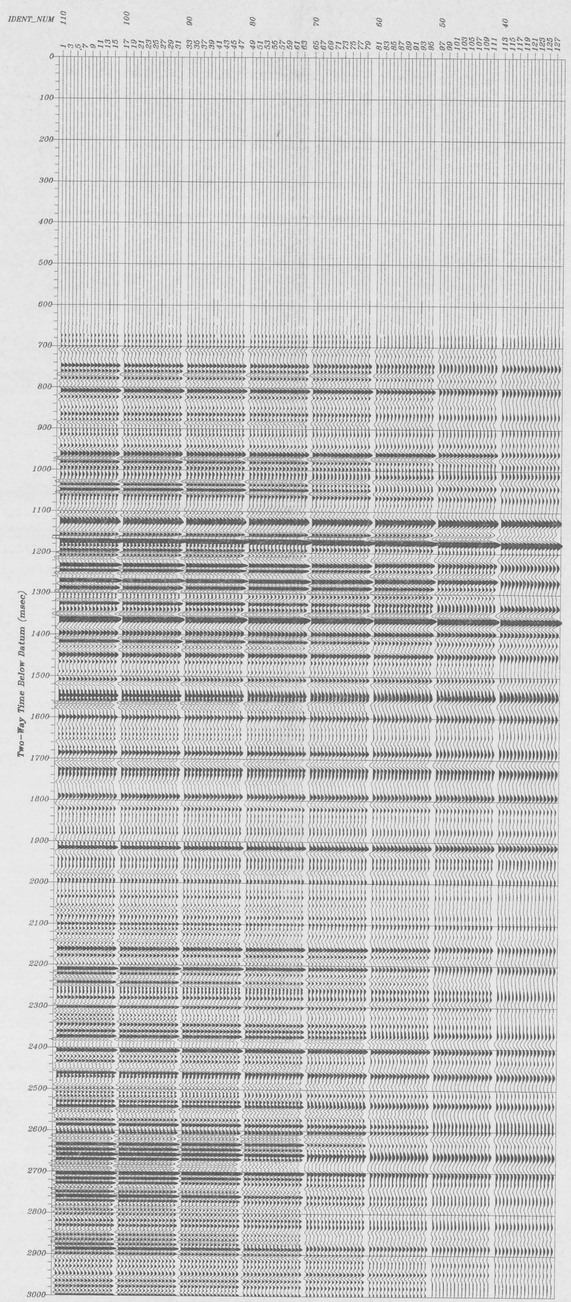
AN INCREASE IN ACOUSTIC IMPEDANCE IS DISPLAYED AS A TROUGH



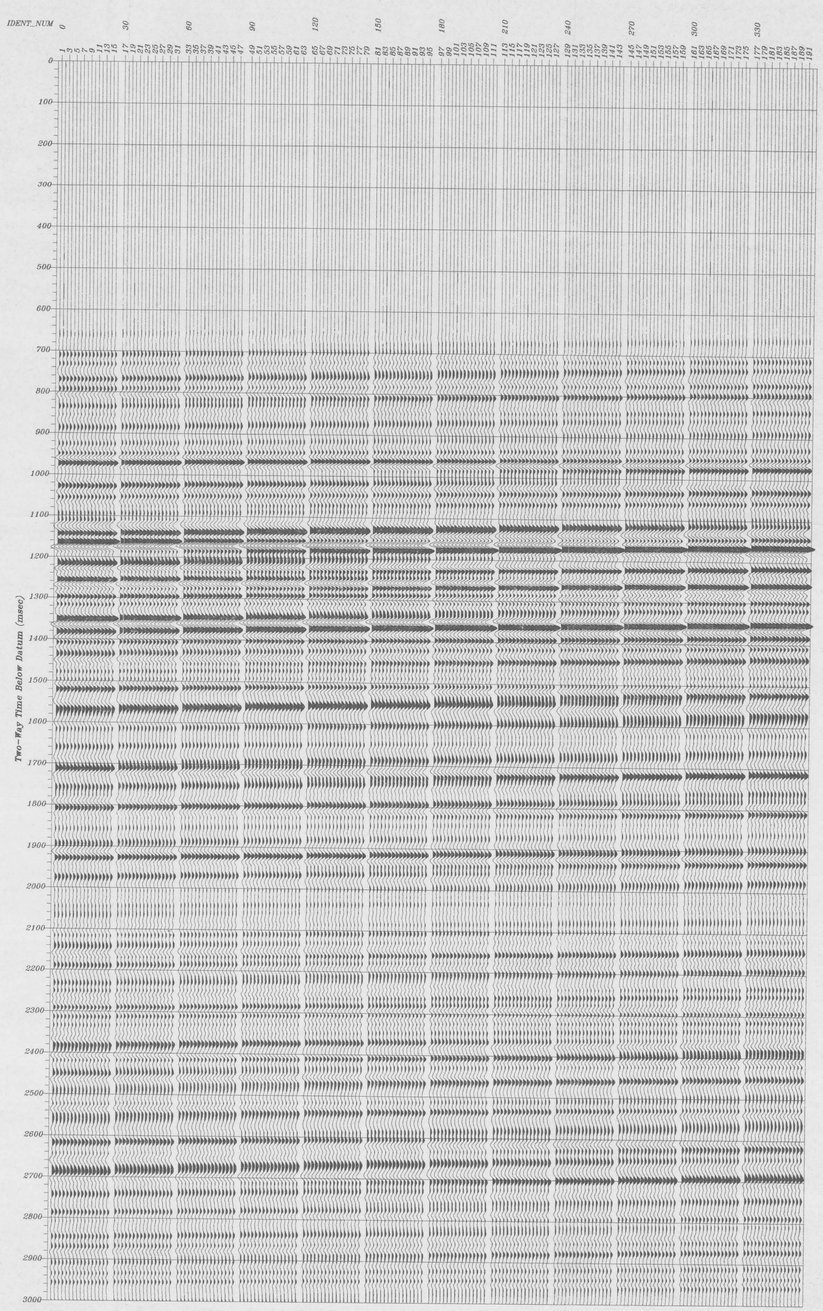
CORRIDOR STACK – NORMAL POLARITY
FREQUENCY PANEL – 10(18)–110(36) To 10(18)–40(36) Hz(dB/oct)



CORRIDOR STACK – REVERSE POLARITY
FREQUENCY PANEL – 10(18)–110(36) To 10(18)–40(36) Kz(dB/oct)



CORRIDOR STACK – NORMAL POLARITY
30 DEG PHASE ROTATION DISPAL – 10(18)–50(36) Hz(dB/oct)



WESTERN ATLAS

PARAMOUNT RESOURCES LTD.

Well: PARAMOUNT ET AL LIARD F-36
ZERO OFFSET VSP – NORMAL POLARITY

ENCLOSURE 3.1: PROCESSING DISPLAY
TIME SCALE: 7.5 IN/S

AREA:	NORTHWEST TERRITORIES
LOCATION:	1841 F36 60DEG 05' 123DEG 22'
FIELD:	UNDEFINED
DATE SURVEY COMPLETED:	24 JANUARY 1999
ELEVATION:	500 M AMSL
SEISMIC REFERENCE DATUM:	500 M AMSL
GROUND ELEVATION:	464.8 M AMSL
REPLACEMENT VELOCITY:	5250 M/s
DATE PROCESSED:	JANUARY 1999

ACQUISITION

ENERGY SOURCE:	VIBROSEIS
SWEEP:	10 – 150 HZ
SOURCE OFFSET:	54 M
SOURCE ATTACHE:	1 VIB
SOURCE MONITOR:	TRIM REFERENCE
DOWNHOLE RECEIVER:	ABO 1500 GM
	3-COMPONENT GEOPHONE
RECORDING SYSTEM:	WTS.3KN
SAMPLE INTERVAL:	1 MS
RECORD LENGTH:	2.048 MS
TAPE FORMAT:	SEG-Y EXABYTE

PROCESSING

Referenced
EDIT, stack and pick first arrival times
Correction for geometric spreading: t**1.7
Trace balance – 2000 ms (Direct Arrival Window)
Estimation of downgoing p-wave:
Aligned at 200 ms
15-point median filter
Subtraction of downgoing p-waves
Zero phase bandpass filter: 10(18)-150(36) Hz(dB/oct)
Shift to corrected two-way time to align upgoing waves
VSP deconvolution of upgoing waves:
Operator derived from downgoing p-waves
Zero phase bandpass filter: 10(18)-110(36) Hz(dB/oct)
Enhancement of deconvolved upgoing waves:
5-point median filter
Zero phase bandpass filter: 10(18)-110(36) Hz(dB/oct)
Corridor stack of enhanced deconvolved upgoing waves

DISPLAY

TWO-WAY TIME REFERENCED TO SEISMIC DATUM OF 500 M
RELATIVE AMPLITUDE PRESERVED

TIMESCALE: 7.5 IN/SEC

NORMAL POLARITY

AN INCREASE IN ACOUSTIC IMPEDANCE IS DISPLAYED AS A TROUGH

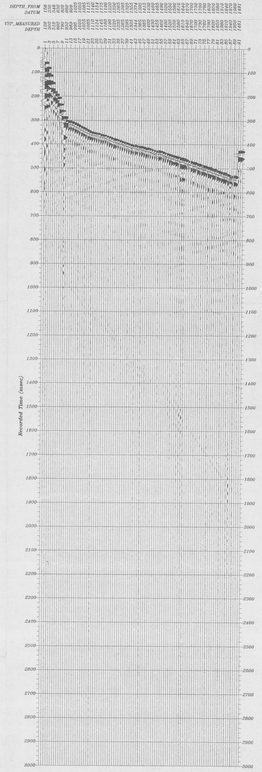


FIGURE 3: STACKED DATA – VERTICAL COMPONENT

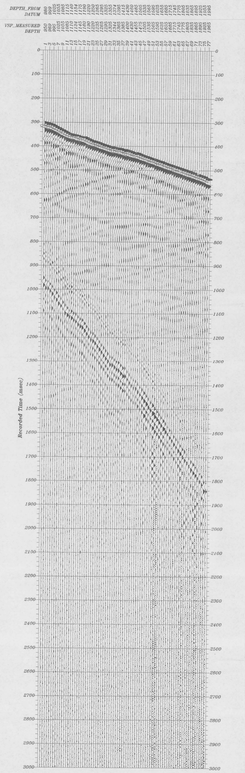


FIGURE 4: TOTAL WAVEFIELD
T Gain = 1.7

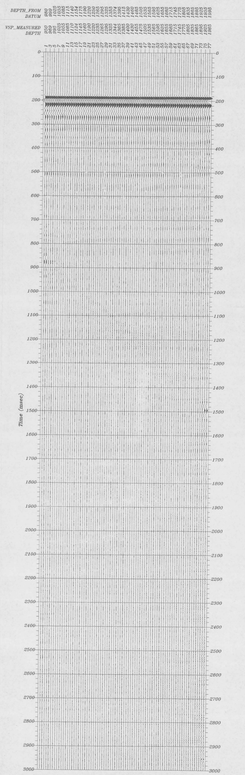


FIGURE 5: DOWNWAVES BEFORE DECONVOLUTION
Aligned At 200 msec

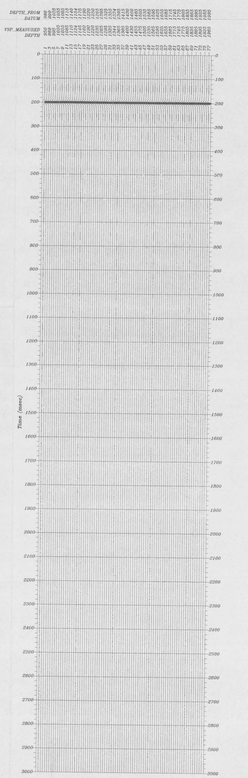


FIGURE 6: DOWNWAVES AFTER DECONVOLUTION
Aligned At 200 msec

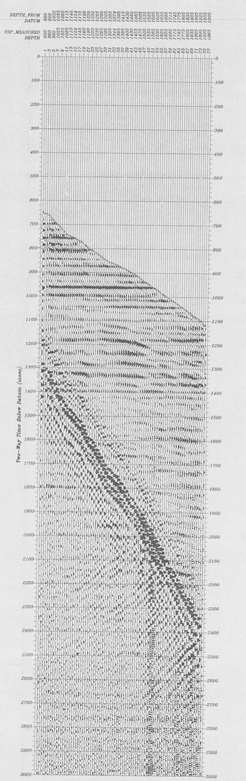


FIGURE 7: UPWAVES BEFORE DECONVOLUTION
Aligned At Two-Way Time

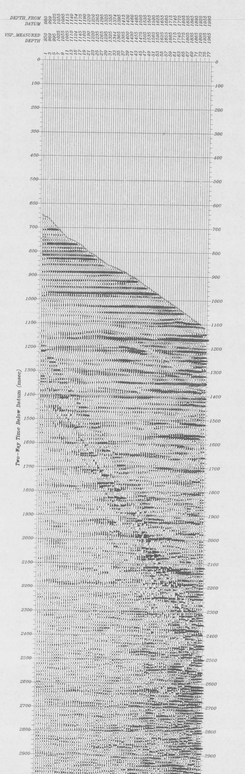


FIGURE 8: UPWAVES AFTER DECONVOLUTION
Aligned At Two-Way Time

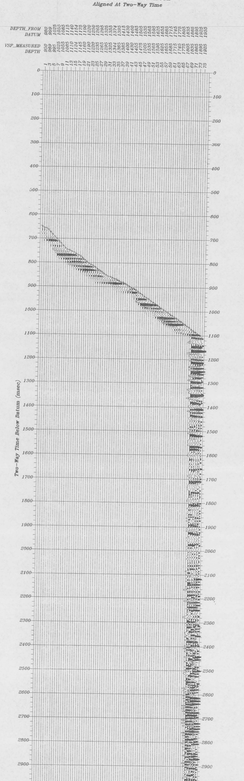


FIGURE 9: CORRIDOR MUTE
Aligned At Two-Way Time

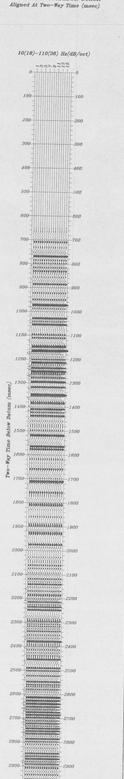


FIGURE 10: CORRIDOR STACK
Aligned At Two-Way Time (msec)

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ZERO OFFSET VSP

ENCLOSURE 2.2: SYNTHETIC SEISMOGRAMS (PHASE ROT.)

7.5 IN/S - NORMAL & REVERSE POLARITY

PROVINCE:	NORTHWEST TERRITORIES
LOCATION:	1641 F36 60DEG 05' 123DEG 22'
FIELD:	UNDEFINED
DATE SURVEY COMPLETED:	24 JANUARY 1999
SEISMIC REFERENCE DATUM:	500 M AMSL
KB ELEVATION:	470.3 M AMSL
GROUND ELEVATION:	464.6 M AMSL
REPLACEMENT VELOCITY:	3250 M/S
DATE PROCESSED:	FEBRUARY 1999

ACQUISITION

ENERGY SOURCE:	VIBROSEIS
SWEEP:	10 - 130 HZ
SOURCE OFFSET:	64 M
SOURCE AZIMUTH:	175 DEG
SOURCE ELEVATION:	464.8
SOURCE MONITOR:	TRUE REFERENCE
DOWNHOLE RECEIVER:	AWS 1300 GM 3-COMPONENT GEOPHONE
RECORDING SYSTEM:	WTS/SUN
SAMPLE INTERVAL:	1 MS
RECORD LENGTH:	4000 MS
TAPE FORMAT:	SEG-Y EXABYTE

PROCESSING

LOG DEPTH SAMPLE INTERVAL:	0.15 M
LOG DEPTH RANGE:	55.61 - 2142.88 M TVD B DATUM

ACOUSTIC LOG CALIBRATION

Log edit
Refinement of checkshot first break times
Drift curve computation (checkshot time - log time)
Calibration using linear fit to drift curve

SYNTHETIC SEISMOGRAM

Generation of reflectivity series at 1 ms sample interval:
Primaries Without Transmission Loss
Convolution:
Zero phase bandpass filter:
10(18)-50(36) Hz(dB/oct)
30 DEG step phase rotation from 0 to 330 DEG

DISPLAY

TWO-WAY TIME REFERENCED TO SEISMIC DATUM OF 500 m
TRUE VERTICAL DEPTH REFERENCED TO DATUM OF 500 m

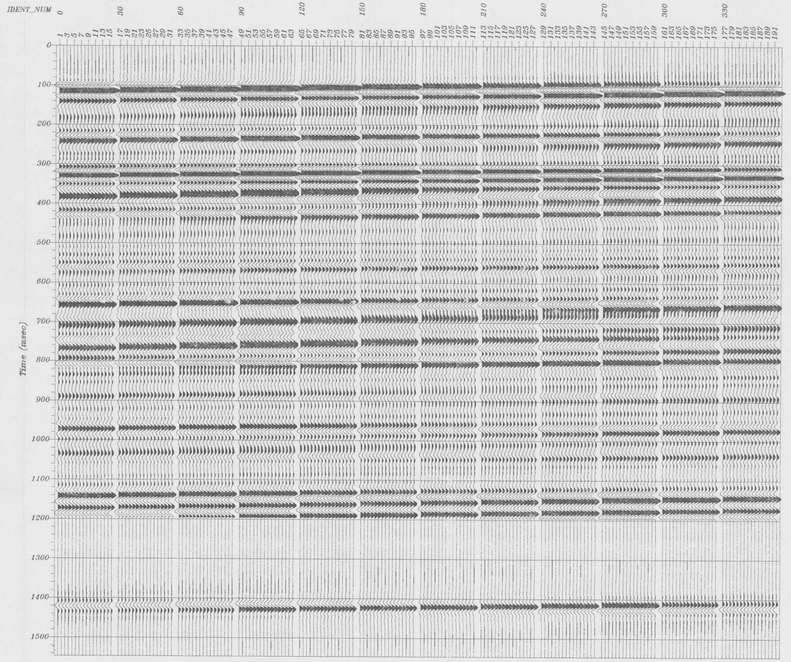
LINEAR TIMESCALE: 7.5 IN/SEC

Polarity Convention

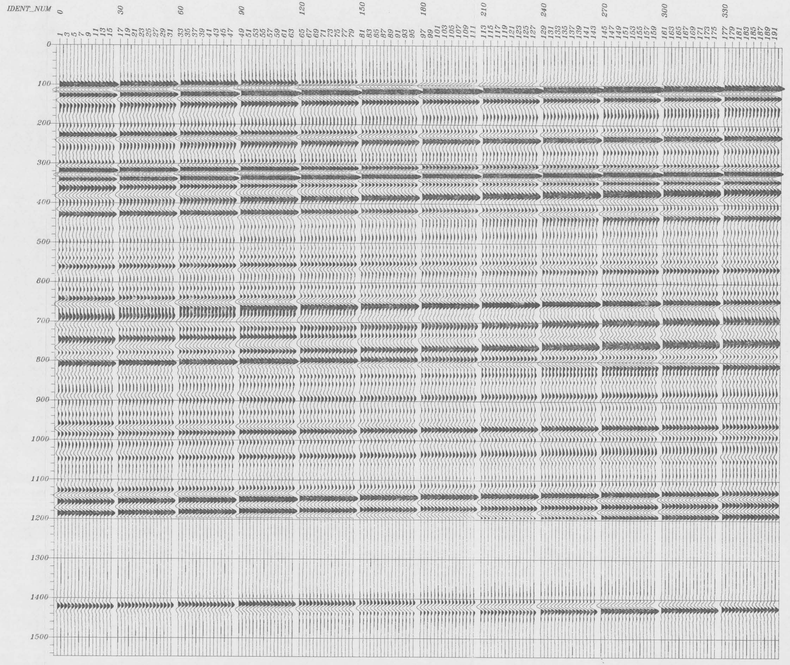
NORMAL POLARITY

AN INCREASE IN ACOUSTIC IMPEDANCE IS DISPLAYED AS A TROUGH

SYNTHETIC 10(18)-50(36) Hz(dB/oct) - PHASE ROTATION PANEL - NORMAL POLARITY
30 Deg Phase Rotation From 0 Deg To 330 Deg



SYNTHETIC 10(18)-50(36) Hz(dB/oct) - PHASE ROTATION DISPLAY - REVERSE POLARITY
30 Deg Phase Rotation From 0 Deg TO 330 Deg



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PARAMOUNT RESOURCES LTD.

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ZERO OFFSET VSP

ENCLOSURE 2.1: SYNTHETIC SEISMOGRAMS (ZERO PHASE)

& ASSOCIATED TIME-INDEXED LOGS

7.5 IN/S – NORMAL & REVERSE POLARITY

PROVINCE:	NORTHWEST TERRITORIES
LOCATION:	1841 FSL 6080A 65° 13'06N 22°
FIELD:	UNDEFINED
DATE SURVEY COMPLETED:	24 JANUARY 1999
DATUM: REFERENCE DATUM:	500 M AMSL
GROUND ELEVATION:	464.0 M AMSL
ABOVE ELEVATION:	464.0 M AMSL
REPLACEMENT VELOCITY:	3150 M/S
DATE PROCESSED:	FEBRUARY 1999

ACQUISITION

ENERGY SOURCE:	VIBROSEIS
SWEEP:	10 – 150 HZ
SOURCE OFFSET:	64 M
SOURCE AZIMUTH:	175 DEG
SOURCE ELEVATION:	464.0
SOURCE MONITOR:	TIME REFERENCE
DOWNHOLE RECEIVER:	ARS 1500 SN
	3 COMPONENT GEOPHONE
RECORDING SYSTEM:	WT/SGN
SAMPLE INTERVAL:	1 MS
RECORD LENGTH:	4000 MS
TAPE FORMAT:	SEG-Y EXAFYTE

PROCESSING

LOG DEPTH SAMPLE INTERVAL:	0.15 M
LOG DEPTH RANGE:	55.61 ~ 2142.68 M TVD D DATUM

ACOUSTIC LOG CALIBRATION

Log edit
Refinement of checkshot first break times
Drift curve computation (checkshot time - log time)
Calibration using linear fit to drift curve

LOG DATA

Calibrated Acoustic (usec/m)
Density (G/cm3)
Composite Density (G/cm3)
Caliper (mm)
Velocity (m/s)
Acoustic Log (usec/m)
Gamma Ray (API)
Deep Resistivity (ohm.m)

SYNTHETIC SEISMOGRAM

Generation of reflectivity series at 1 ms sample interval:
Primaries Without Transmission Loss
Convolution:
Zero phase bandpass filter;
10(18~40)30(Hz.dB/oct) 75 18(18)-110(38) Hz(dB/oct)
With a step of 10 Hz

DISPLAY

TWO-WAY TIME REFERENCED TO SEISMIC DATUM OF 500 m
TRUE VERTICAL DEPTH REFERENCED TO DATUM OF 500 m

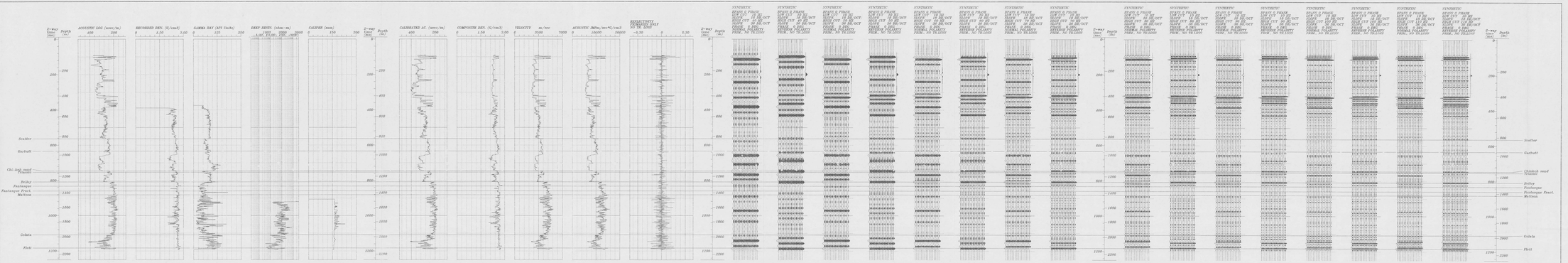
LINEAR TIMESCALE: 7.5 IN/SEC

Polarity Convention

NORMAL POLARITY

AN INCREASE IN ACOUSTIC IMPEDANCE IS DISPLAYED AS A TROUGH

ACOUSTIC IMPEDANCE — SEISMIC TRACE DISPLAY



MICROFILMED JANUARY 2000