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FORT LIARD N.W.T.

1987

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1 REA

PROJECT ACTION SHEET

RESOURCE EVALUATION BRANCH

PROJECT NUMBER 9229-S6-3E

COMPANY SHELL CANADA

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FORT LAIRD N.W.T.

THE FOLLOWING ACTION HAS BEEN TAKEN

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REPORTS AND MAPS DATE STAMPED YES

REPORTS FOR REVIEW LIST EDITED YES

INVENTORY SHEET MADE YES

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REVIEW AND APPROVAL MADE BY

COMMENTS THREE COPIES OF REPORT AND TWO COPIES OF
MAPS

*****RETURN APPROVED REPORTS TO MIKE MCLINTON*****

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-SHOT POINT MAP

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NUMBER 1

-ENCLOSURE # 2, CORRELATED SEISMIC LINE 65-2

SEISMIC SECTIONS

NUMBER 1

A006500002

MIGRATED STACK

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FORT LIARD, N.W.T.

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SHELL CANADA LIMITED

REFLECTION SEISMIC PROGRESS REPORT

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Fort Liard

YEAR OF WORK

1987

OPERATOR

Shell Canada Ltd.

CONTRACTOR

Sonics Exploration Ltd.

SHELL E.A.

None

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LIST OF ENCLOSURES

<i>ENCLOSURE 1</i>	<i>1:100,000 scale shot-point map</i>
<i>ENCLOSURE 2</i>	<i>Correlated seismic line 65-2</i>

61° 00'



Fig. 1

INTRODUCTION

This report describes the acquisition, processing, and interpretation of seismic data shot during Feb. 1987 by Sonics Exploration Ltd for Shell Canada Ltd, near Fort Liard, N.W.T. A single 12-km VIBROSEIS line (line number 65-2) was acquired partly on crown land and partly on Pan Canadian E.A. 218, as shown in the locality map, fig. 1. A statistical summary of the program is shown in Table 1.

ACQUISITION

The acquisition parameters are summarized in Table 2. An 'end-on' shooting geometry was employed, to allow the use of close station spacing (20 m) as well as sufficiently far shooting distances (2400 m). The VIBROSEIS records were correlated in the field; refraction data were not recorded.

Survey control was established from the 'Sun Netia C-07' well, surveyed in from Geodetic Control. Instruments used were EDMs, minute reading theodolodites, and tellurometers. Relative accuracies of 1:500 for the horizontal and 1:2500 for the vertical were maintained.

PROCESSING

The processing runstream applied to line 65-2 is shown in Table 3. Some comments to supplement Table 3 follow.

- The only 'field' statics applied were elevation corrections; statics due to weathering were assumed to be obtainable with the automatic statics routines.
- KF filters were applied in both shot and receiver domains due to strong direct and back-scattered ground-roll energy. The pre-KF AVC multipliers were stored to allow for their removal after application of the filters.
- The velocity analyses consisted of semblance measurements on common-velocity stacks of adjacent CDPs.
- The automatic statics routines employ cross-correlations in the CDP domain; in the non-surface-consistent case, a smoothed mean of the correlations are applied to the traces, regardless of shot or receiver station considerations.
- To bring out high frequencies in the zone of interest, pre-stack and post-stack zero phase whitening filters were applied.

INTERPRETATION

The exploration objectives in the Fort Liard area are Middle Devonian carbonates. Line 65-2 was shot in a position likely to encounter the Slave Point/Presquile platform edge, and was intended to evaluate the VIBROSEIS source as a tool in exploring the Slave Point/Presquile carbonates. In view of this aim and lacking previous data, no interpretative maps were prepared. A correlated version of line 65-2 is enclosed.

The overall quality of line 65-2 is considered excellent. The four events colored on the enclosed section are top Mississippian, top Devonian, top carbonate (Devonian Hume or Slave Point formations), and top Precambrian clastics. The Slave Point/Presquile platform edge is interpreted at SP 674, and the top Slave Point event shows irregular relief back of the platform edge. The middle and lower Devonian carbonates are apparently underlain by a thick package of Precambrian sediments, and early faulting is evident. A late Paleozoic normal fault near SP 760 cannot be easily traced through the top Slave Point reflection; the movement perhaps erased rather than created structure at Slave Point level.

It was concluded that VIBROSEIS is a satisfactory source for exploring Middle Devonian carbonates in the Fort Liard area.

TABLE 1 STATISTICAL SUMMARY

MOBILIZATION	Mar. 9 1987
COMMENCEMENT	Mar. 10 1987
TERMINATION	Mar. 26 1987
DEMOBILIZATION	Mar. 27 1987
# TECHNICAL PERSONNEL	1 (Alberta resident)
# NON-TECHNICAL PERSONNEL	31 (19 Alberta, 12 N.W.T. res.)
DISTANCE SURVEYED	16 km
TIME LOST	None
WEATHER	Normal for time of year

TABLE 2 ACQUISITION PARAMETERS

<i>Instrument</i>	MDS 10 120 channel
<i>Instrument Filter</i>	Anti-alias only (125 hz, 72 db/oct)
<i>Record Length</i>	3 sec
<i>Sample Interval</i>	2 ms
<i>Station Spacing</i>	20 m
<i>Geophones</i>	LRS 14 hz
<i>Geophone Array</i>	9 phones over 20 m, center takeouts

Typical Spread



<i>VP Spacing</i>	20 m
<i>Vibe Electronics</i>	Pelton Model V
<i>Correlator</i>	DC 6000
<i>Vibrators</i>	Litton LRS-315
<i># Of Vibrators</i>	4
<i>Sweeps Per VP</i>	4
<i>Sweep Length</i>	16 sec
<i>Sweep Frequencies</i>	8-83 hz upswing
<i>Taper</i>	.3 sec
<i>Listen Time</i>	3 sec
<i>High-Freq. Emphasis</i>	3 dB/oct
<i>Source Array</i>	40 m centered at VP

TABLE 2 ACQUISITION PARAMETERS

TABLE 3 PROCESSING RUNSTREAM

Demultiplex
Apply Anti-alias Filter min phase, 85 hz, 72 dB/oct
Resample to 4 ms
Append Idents and Edit Bad Traces
A/C 200 ms gate length
KF Filter shot domain, +/- 2000 m/s
Sort to Receivers
KF Filter receiver domain, +/- 2000 m/s
A/C Removal
Sort to CDPs
Exponential Gain Correction $G(t) = (t**1.2) (e**-.8t)$
Spiking Deconvolution gate 570 to 1650 ms at 10 m
820 to 1900 ms at 2400 m
Compute Surface-Consistent Statics gate 400-1600 ms
max shift 44 ms
Velocity Analysis
Compute Non-Surface-Consistent Statics gate 400-1600 ms
max shift 12 ms
RMS Trace Normalization gate 200-1800 ms
Apply Statics, NMO Correction, Mute Pattern
Apply Zero-Phase Whitening Filter gate 0-2000 ms
Stack 6000%
Deabsorption Whitening alpha = .15 dB/hz/sec
Migration Kirchhoff, 100% stacking velocities
2:1 CDP Sum
Bandpass Filter zero phase, 8-70 hz
Display horiz. scale 1:10,000 vert. scale 7.5 ips

TABLE 3 PROCESSING RUNSTREAM

TABLE 3 PROCESSING RUNSTREAM CONTINUED

MUTE PATTERN

X1 = 175 m T1 = 4 ms
 X2 = 185 m T2 = 200 ms
 X3 = 2450 m T3 = 1500 ms

DATUM 600 ft CORRECTION VELOCITY 2850 m/s

STACKING VELOCITIES LINE 65-2

SSP	10000		9000		8000		7600		7175		7000	
	V	T	V	T	V	T	V	T	V	T	V	T
1962	42	2079	141	1929	50	1969	50	1988	46	1911	55	
2300	211	2459	252	2473	323	2717	300	2150	145	2386	256	
2742	444	2611	295	2607	433	2870	532	2388	278	2731	511	
3177	650	2833	534	2854	545	3236	707	2783	505	3278	721	
3503	845	3025	631	3230	735	3522	1236	3275	763	3513	1200	
3798	1126	3296	749	3502	1140	5000	2000	3520	1208	5000	2000	
5000	2000	3528	1264	3525	1251			5000	2000			
		5000	2000	5000	2000							

SSP	6500		6350		6000		5000		4500	
	V	T	V	T	V	T	V	T	V	T
1959	49	1930	35	1944	65	2045	87	1970	74	
2288	196	2403	361	2198	198	2675	473	2363	326	
2811	419	2813	507	2773	444	2909	579	2694	453	
2885	508	3278	723	2894	550	3292	735	2999	625	
3287	708	3565	1245	3297	709	3519	1231	3285	698	
3509	1200	5000	2000	3566	1255	5000	2000	3634	1268	
5000	2000			5000	2000			5000	2000	