



CANADIAN FOREST OIL LTD.

FINAL PLAN REPORT

Area of Exploration: **EL 380 2D**
(Lines: 99-EL380-10, 12, 14, 16, 18, 20)

Operated by: **Canadian Forest Oil Ltd.**

Operation Number: **9229-C131-2E**

Land Use Permit: **9180-C831-4**

Type of Operation: **2D Seismic Acquisition**

Location: **NWT Liard**
60.18408 -123.35688
60.52840 -123.68720

Duration of Operation: **July 16, 1999 to September 9, 1999**

Principle Contractor: **Schlumberger Geco Prakla of Calgary**

Sub Contractors: **Polaris Explorer Ltd of Calgary**

Interest Owners:	Canadian Forest Oil Ltd	40%
	Berkley Petroleum Corporation	30%
	Paramount Resources Ltd	30%
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	Canadian Forest Oil Ltd.	
Date of Report:	March 31, 2000	

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4f 99-EL380-20	
4g 99EL380-003 **	
4h FVL-FTL-13 **	
4i FTL-51 **	
Interpreted Map	Enclosure 5
F-25	Enclosure 6

** (lines included only because they are referenced on map. They are not part of the final submission.)

Abstract

A 2D acquisition program in the Maxhamish, B.C. - Fort Liard, N.W.T. was conducted by Canadian Forest Oil Ltd. in conjunction with its partners over EL 380. Approximately 54 km of 2D Dynamite data was acquired under this seismic program approval.

In this summer season program, heliportable acquisition techniques were employed in conjunction with hand cut, avoidance line clearing methods to achieve efficient, safe and low-impact operations. Canadian Forest Oil Ltd. assigned Jack Bull of Synterra Technologies Ltd and Geco-Prakla (Schlumberger) to oversee the entire program. Impact Exploration Services Inc. were contracted to secure necessary regulatory approvals. Geco-Prakla was the principle acquisition contractor, however due to weather considerations and timely crew availability, Polaris Explorer Ltd were hired to assist in completing the shooting phase of the program. Beaver Enterprises were hired to do the line clearing and provide camp services. Double R Drilling provided heli shot-hole services. Deh Cho Air was the supplier of helicopter support on all aspects of the job. The approximate time taken to complete the program was 56 days.

The seismic source was 20kg charge of dynamite loaded at a 20 m depth. The fold was 4000 with shotpoint interval of 90 m and group interval of 15 m. The six-geophone strings were individually spaced at 3 m, and group length was 15 m. Geophones used for this job had a 10 hz configuration. Sample Rate was 2 ms and record length was 6 sec.

The data quality for this program was fair to good. Many of the lines exhibit noise interference attributable to rugged topography, multiples and near surface effects. The seismic raypaths were subjected to distortion by compressional tectonic structures (both near surface and deep subsurface) and near surface velocity variations. Only some of this distortion could be corrected through seismic processing. In addition, gravel deposits located by the Liard River created considerable signal to noise loss through poor coupling and raypath scattering. As is common in the Ft Liard area, the Nahanni reflector exhibits spurious end-of-line effects, especially at the west end of the program. The low fold portion of these lines, terminating in rugged topography are prone to poor resolution of dips. Despite these issues, an interpretation of the Devonian Nahanni time structure has been generated with reasonable confidence.

Processing was completed by Kelman Seismic Processing of Calgary. Data was then transferred to a SeisX workstation for in-house interpretation.

The following Portions of lines were deemed to be within 3 kilometers of EL 380 and would qualify for DIANDS work bonus program:

<u>Line Name</u>	<u>Work Bonus S.P. Range</u>	<u>Actual S.P. Range</u>	<u>Work Bonus Mileage</u>	<u>Actual Mileage</u>
99-EL380-10	s.p. 191 - 765	s.p. 191 - 977	8.9 km	11.79 km
99-EL380-12	s.p. 106 - 605	s.p. 101 - 605	7.7 km	7.56 km
99-EL380-14	s.p. 89 - 533	s.p. 89 - 533	6.7 km	6.66 km
99-EL380-16	s.p. 98 - 875	s.p. 101 - 947	12.0 km	12.69 km
99-EL380-18	s.p. 47 - 691	s.p. 47 - 545	7.0 km	7.47 km
99-EL380-20	s.p. 101 - 557	s.p. 83 - 605	7.4 km	7.83 km
Approximately Total Mileage			50.0 km	54.0 km

Significant Dates and Statistics Summary

A summary of the significant dates are chronologically listed below with the increase / decrease of personnel noted alongside. Others requested statistics are quoted as requested.

April 1, 1999 Application for several lines submitted under N1998B0934

May 17, 1999 Revision 5 applied for by Impact Exploration Services no individual lines listed

May 31, 1999 Amendment for Land Use 1998B0934 authorized to conduct seismic revision dates April 21, 1999
No line names listed

June 1, 1999 Preliminary screening notification from NEB 9229-C131-2E

July 21, 1999 A copy of authorization received space Lines 99-EL380-1, 2,3,4a, 4,45a were revised and the line names were changed to 99-EL-380-10, 12, 14, 16, 18 and 20 plus the addition of the 3D

July 16, 1999 Surveying Starts

July 16, 1999 DC Surveys – catpush/survey started

July 24, 1999 Geco Prakla Advance Party Manager starts on Project #310537 (Till Sept 2)

July 26, 1999 Beaver Enterprises started clearing / slashing

July 28, 1999 Survey Crew arrived, start up beginning with line 99-EL380-18.

July 29, 1999 moved line 14, sent Revision plots to Synterra

July 30, 1999 slashing started on line 16 (4 crews) and one crew on line 12 (5 Crews)

August 11, 1999 Flight with Rick Turner from NEB to inspect Maxhamish

August 22, 1999 Beaver Enterprises complete clearing (42 Slashers used for this job)

August 25, 1999 Eagle Surveys Ltd line completed (4 surveyors used)

August 25, 1999 Layout Crew started for Line 20

August 26, 1999 Geco Records line 20

September 1, 1999 Mobilized Dynamite Crew from Calgary to Ft. Liard (Polaris Exploration Ltd)

September 1, 1999 Started Drilling

September 9, 1999 Demobilized Dynamite Crew from Ft. Liard to Calgary (Polaris Exploration Ltd)

November 3, 1999 Inspection completed by Indian and Northern Affairs

Weather Summary and Topographic Conditions

July 24, 1999 dense fog in am work delayed
July 28, 1999 Heavy Rain in morning, very low cloud cleared at 11:00 am. Steep terrain on 99-EL380-18 sp 373-499 and Line 20 sp 379-493
July 29, 1999 Rain, cool, overcast. Very dangerous cliff on Line 20 sp 493-605
July 30, 1999 Warm and sunny. Very rough terrain and cliff needed hang ropes on line 20
July 31, 1999 Sunny, late start due to safety meeting. Very rough terrain thru creek area on line 20 sp 401-469
August 1, 1999 Very hot waited on beach for helicopter. Good day working in river flats
August 2, 1999 Hot, worked on line 99-EL380-16
August 3, 1999 Survey crew found steep terrain and weather conditions were hot, working on line 14 and 16
August 4, 1999 Weather is warm
August 7, 1999 Weather is warm, had a bear encounter
August 8, 1999 Thunder storms and heavy rain overnight, low cloud and rain in morning, stand by till 10:30 weather day declared
August 9, 1999 Shut down due to fog and rain
August 10, 1999 Stand by due to weather, heavy fog in morning, cleared off in late afternoon
August 11, 1999 Clearing and warm, working on 99-EL380-10 very wet
August 12, 1999 Weather was good – escaped bear valley with no sightings
August 13, 1999 Scout large swamp on line 10 and river crossing on line 16
August 15, 1999 Weather is great, conquered big hill on 99-EL380-10, lots of bugs no bears
August 18, 1999 Finish surveying line 99-EL380-16 weather is good

August 26, 1999 Fogged in crews, stand by, drill crew got out late p.m., intermittent rain throughout day
August 27, 1999 Heavy fog till mid p.m., crew eventually got out
August 29, 1999 Drill crews could not get out till noon due to fog
Sept 8, 1999 Standby – overcast conditions – no production

General Description of Operation and Acquisition

Seismic Equipment Used

Geco-Prakla (Schlumberger) employed an I/O System II for acquisition of Line 99-EL380-20 only. This system is an advanced delta sigma technology data acquisition system offering numerous advanced recording and signal processing features found on no other recording system. Amongst these features are

- Full 24 bit analog to digital recording
- Spectral Shaping Filter (SSF)
- Enhanced Hi-Line Pickup Eliminator
- Total Self Calibration Testing
- Increased Spatial Sampling
- Reduced field battery power requirements
- 32 available low cut frequencies and appropriate low cut filters

Polaris Explorer Ltd. shot the remaining lines of this survey using an ARAM24 Central Recording Unit. ARAM24 24-bit Delta-Sigma analog to digital converters to ensure quality system response. The system also offers integrated "Positive Operation Lights", indicate remote unit function at the moment of deployment. This involves the deployment crew in troubleshooting, further improving overall deployment time.

Survey Equipment Used

The Geco-Prakla survey equipment employed was a combination of conventional survey methods and real time GPS. The equipment includes Wild T1, T16 and DI-41 theodolites or Topcon GTS-3B Total Stations with integral infra-red distomats and electronic data recorders. Data reduction was assisted by the Proseis positioning software which produced SEGPI formatted survey. The GPS equipment was a Trimble 4000SE/Sac receiver with an antenna, radio modem and supporting software. The software enables upload and download of preplots as well as transformation from WGS-84 to a local datum (NAD 27) and map projection (UTM).

The system configuration features a reference receiver located at a known point that broadcasts via the Radio modem, the code and carrier phase data in a compressed format to rover receivers. The rover receivers receive the broadcast to enable computation of a refined position. The real time GPS crew used 1 master GPS unit and rover GPS units complete with modem and radio link. The results of this survey methodology provided spatial accuracy approximately +/-1 meter.

Acquisition Parameters

The principle energy source for these lines were dynamite. The program configuration and instruments are listed below:

Configuration: 3600—15-*—15—3600m
1—240-*—241—480

Instruments

Make/model: Aram 24 Mark I
S.R.: 2ms
Length: 6 sec
Filter: 3—164 hz
Notch: out
Format: Seg-Y

Geophones

Type: OYO GS30
Frequency: 10 hz
Damping:
Number/Group: 6
Spacing: 3m
Group Length: 15 m

Source

Type: Dynamite
Charge: 20 kg
Depth: 20 m
No inline: 1

Spread

Fold: 4000 pct
S.P. Int: 90 m
Grp. Int: 15 m

Geophysical Data Processing

The data was processed by Kelman Seismic Processing of Calgary employing a standard, structural processing runstream. (See section side labels for full detail.) Surface consistent spiking deconvolution was applied, followed by GLI refraction static analysis and correction. Normal moveout velocity analysis and corrections were run. Two passes of residual statics were run, the last followed a moveout velocity update. An FK noise attenuation filter was applied. A full Pre-Stack Migration using Kirchhoff summation was used on the data. The resulting product was then archived to tape and loaded onto a Seis-X workstation for interpretation purposes. Copies of the processing procedures are found in enclosure 1.

Geophysical Interpretation

Copies of interpreted seismic data from the program are located in enclosure 4 of this report. Although this program only included the lines 99-EL380-10,12,14,16,18,20, the following additional lines are included in this report: 99-EL380-003, FTL-51, FTL-13. All of these lines contribute to the mapping presented in enclosure 5. Detail of the acquisition of 99-EL380-003 was reported to the NEB previously in CFOL's report on Operation Number 9229-C131-1E. FTL-51 and FTL-13 are part of a speculative seismic survey database owned by EXPLOR Data Ltd, that was purchased by CFOL.

This survey was designed to provide data for mapping of the Devonian Nahanni Formation. Interpreted seismic lines provide the correlation of this reflector, as tied to the well F25/F-25a, the original Nahanni discovery well on SDL99.

The Nahanni is observed to be broken by east verging thrust faults. These thrust structures can be prospective if they demonstrate three-way closure against the fault. The most attractive of these prospective structures are observed on the SDL99 trend, where Nahanni gas was discovered in the mid 1980's. Recent development drilling on SDL99 has "discovered" high-deliverability gas and created much new interest in the area.

Other, smaller, east-bounded-fault closures are recognized on EL380, and these are significantly lower in time structure than the structures to the west.

The map of the Nahanni demonstrates a scallop-style plan view of the faulting that is common in the Ft Liard area. These scallops tend to coalesce into several, larger scale fault traces that define the main structural trends in the area.

The 2D seismic data, alone, cannot predict reservoir quality of these structures. However, it is anticipated that the best relative permeability on any of these structures will occur where the Nahanni is located closest to the leading edge of a thrust fault. Here, open fractures will be relatively most intense and therefore should enhance reservoir quality.