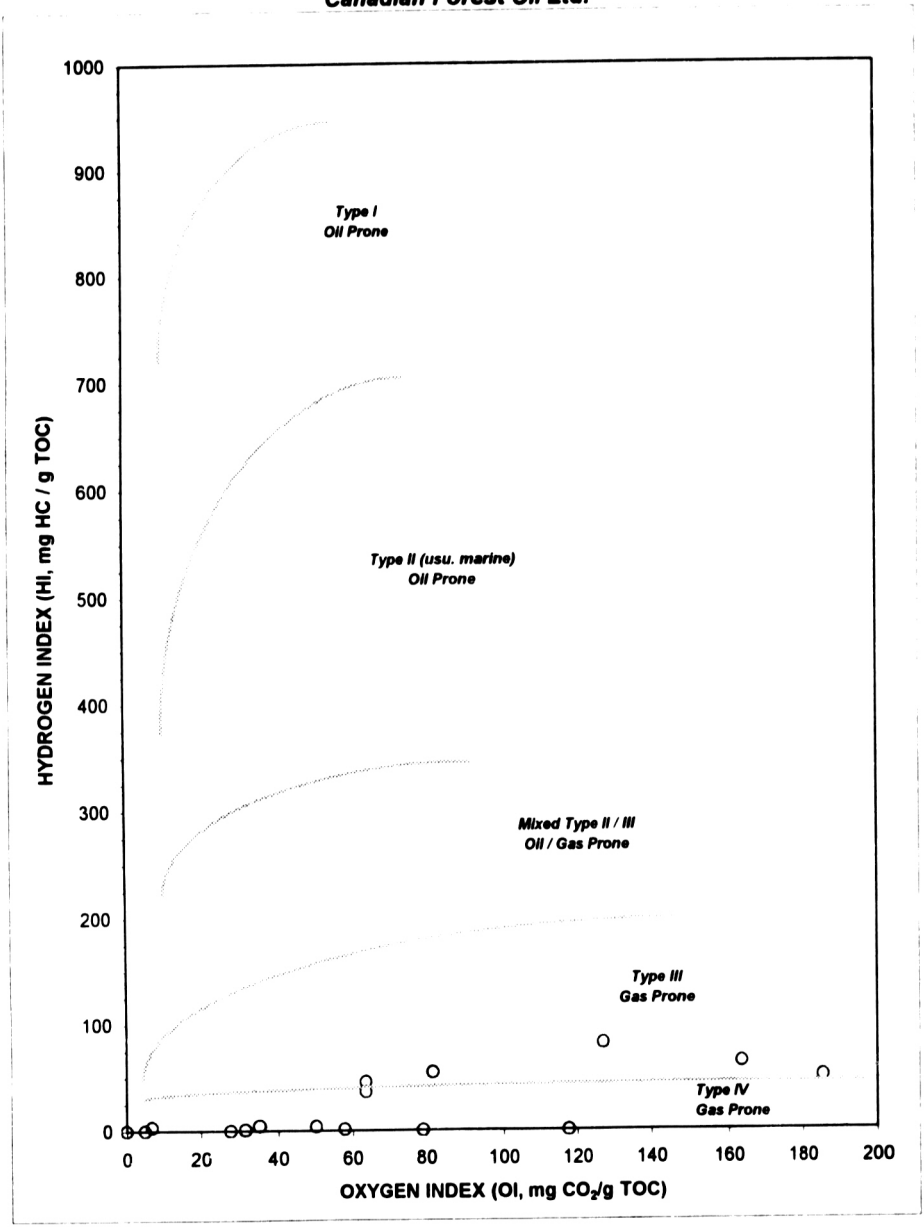
KEROGEN TYPE

Canadian Forest Oil Ltd.



Humble Geochemical Services Division

APPENDIX 4

Conodont Study

Centre for Earth and Ocean Research
UNIVERSITY OF VICTORIA
PO BOX 3055 STN CSC VICTORIA BC V8W 3P6 CANADA
TELEPHONE (250) 721-8848, FAX (250) 472-4100

February 21, 2000

Dr. James R. (Jim) Taylor
Senior Geological Specialist
Exploration
Canadian Forest Oil Ltd.
Ste. 600, 800–6th Ave. SW
Calgary, AB T2P 3G3

Dear Jim:

This week I sent you a copy of my report as an e-mail attachment, as well as by fax. I am also sending you this hard copy by courier (as a clear copy).

I will arrange an invoice to be sent to you in the next week or two to complete the contract.

Should you wish all or part of the remaining samples to be processed for conodonts, I trust that you will advise me in due course. Likewise, there may be other sample sets in the future that you wished to be processed.

With kind regards,

Chris Barnes

Christopher R. Barnes, C.M., F.R.S.C., Ph.D., P.Geol.
Director & Professor
CEOR/SEOS

CRB/klw

enclosures

Report to Canadian Forest Oil Company: conodonts from samples of carbonates from the Mount Kindle Formation, NWT

Submitted by : Dr. Christopher R. Barnes, Centre for Earth and Ocean Research, University of Victoria, P. O. Box 3055, Victoria, B. C. V8w 3P6

Thirty samples of carbonate (mainly calcareous dolostone) was received from Canadian Forest Oil Company in October 1999. They were processed using standard techniques as outlined in the contract. The samples were difficult to dissolve, being dolostone, and some undissolved residue was left for most samples as shown below in Table 1. The insoluble residues for the samples were voluminous, being rich in dolomite rhombs; the latter have a specific gravity similar to conodonts and this makes separation by heavy liquids difficult and time-consuming and more especially results in considerable time to pick through the residues to recover any conodonts.

The samples were picked for conodonts but most samples were barren and also had no other organic/fossil material. Five of the 30 samples yielded conodonts, the details of the taxa and an age assignment is given below. The number of individual conodont specimens (elements) is given in parentheses.

Sample F99-c1-2120:

Panderodus unicostatus (Branson and Mehl)	(1)
Ramiform element (Sa, cordylodontiform)	(1)
Age: Silurian to Lower Devonian	

Sample F99-C2-20

Panderodus unicostatus (Branson and Mehl)	(5)
Ramiform element (Sb, zygognathiform)	(1)
Indeterminate fragments	(6)
Age: Silurian to Lower Devonian	

Sample F99-C2-120

Oulodus? kentuckyensis Branson and Branson	(9)
Panderodus unicostatus (Branson and Mehl)	(1)
Indeterminate fragments	(5)

Age: Lower to Middle Llandovery (Rhuddanian to mid Aeronian), Lower Silurian

Sample F99-C2-420

Oulodus? kentuckyensis Branson and Branson	(9)
Panderodus unicostatus (Branson and Mehl)	(10)

Age: Lower to Middle Llandovery (Rhuddanian to mid Aeronian), Lower Silurian

Sample F99-C2-470

Panderodus unicostatus (Branson and Mehl)	(3)
Ramiform element (Sa, cordylodontiform)	(1)

Age: Silurian to Lower Devonian

Summary

The faunas are similar in the five samples that yielded conodonts. Panderodus unicostatus is a long-ranging and relatively ubiquitous species. Oulodus? kentuckyensis has a short range within the Lower Siluruan (i.e. lower half of the Lower Silurian) and does not extend down into the Ordovician. The ages are compatible with the age of the upper part of the Mount Kindle Formation (e.g. B. S. Norford (Compiler), 1997, Correlation Chart and biostratigraphy of the Silurian rocks of Canada, IUGS Publication 35, 77p)

Table 1: List of samples processed with initial and undissolved weights.

Sample	Original Mass (g)/ Undissolved Residue(g)
F99-C-1-10	2300/776
F99-C-1-110	1800/408
F99-C-1-210	2600/682
F99-C-1-430	2000/550
F99-C-1-920	2200/545

Sample	Original Mass (g)/ Undissolved Residue(g)
F99-C-1-1000	1900/485
F99-C-1-1120	2200/851
F99-C-1-1220	1800/637
F99-C-1-1320	2200/1000
F99-C-1-1420	1800/640
F99-C-1-1520	2000/770
F99-C-1-1660	1900/600
F99-C-1-1720	1900/360
F99-C-1-1820	2500/1034
F99-C-1-1920	2100/769
F99-C-1-2020	2400/826
F99-C-1-2120A	1700/219
F99-C-1-2120B	1300/495
F99-C-1-2220A	1800/409
F99-C-1-2220B	1700/208
F99-C-1-2320A	1500/2320
F99-C-1-2320B	1300/532
F99-C-1-2410	2100/429
F99-C-1-2470	2300/851
F99-C-2-20	2300/630
F99-C-2-120	2200/79
F99-C-2-200	2100/135
F99-C-2-320	2300/441
F99-C-2-370A	1400/520
F99-C-2-370B	1300/357
F99-C-2-420	2300/630
F99-C-2-470A	1400/16
F99-C-2-470B	1300/6
F99-C-2-520A	1300/113
F99-C-2-520B	1300/44
F99-C-2-580A	1500/125
F99-C-2-580B	1400/104

A & B indicate that the original sample was broken into two batches.

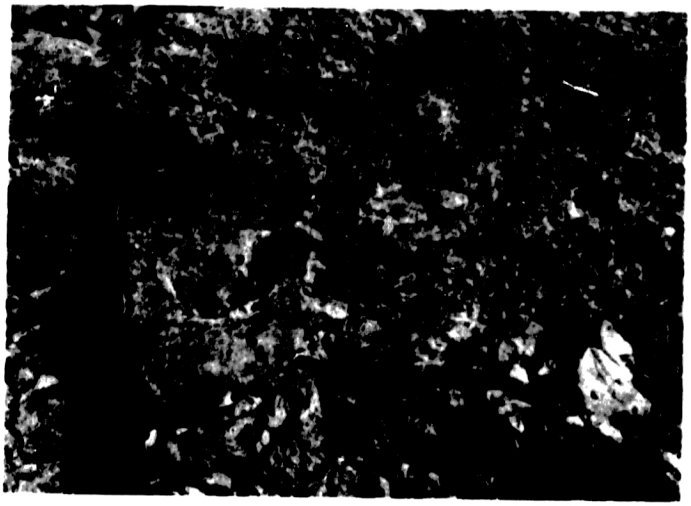
14 Feb 2000

APPENDIX 5

Photographs

1. Dusky (Location 1). A view looking north from the ridge located just south of the Mt. Kindle Dusky section, Dusky Ranges, Mackenzie Mountains. The beds strike 160° and dip 72° W at the top of the Mount Kindle (on the left of the photo). There are a few covered sections in the grassy saddle.

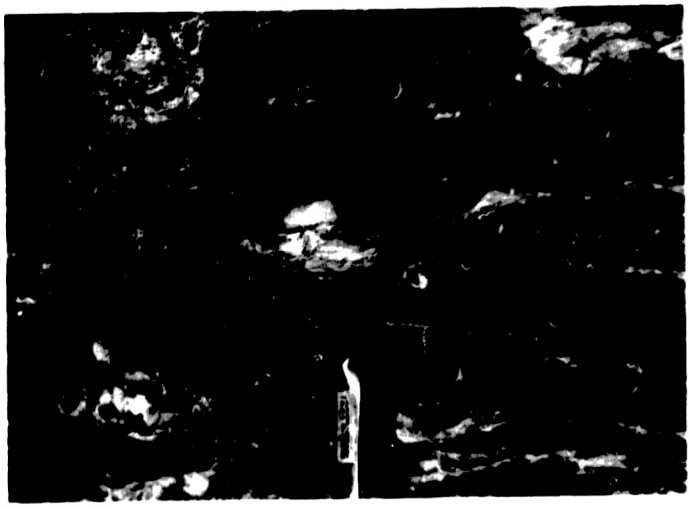
2. Dusky section. Mt. Kindle Dolomite near the top of the section. Large full bags of dolomite samples were collected for conodont identification (foreground). The high-energy carbonate depositional paleoenvironment was apparently not favourable for conodont occurrence. A single sample give a Devonian-Silurian age.



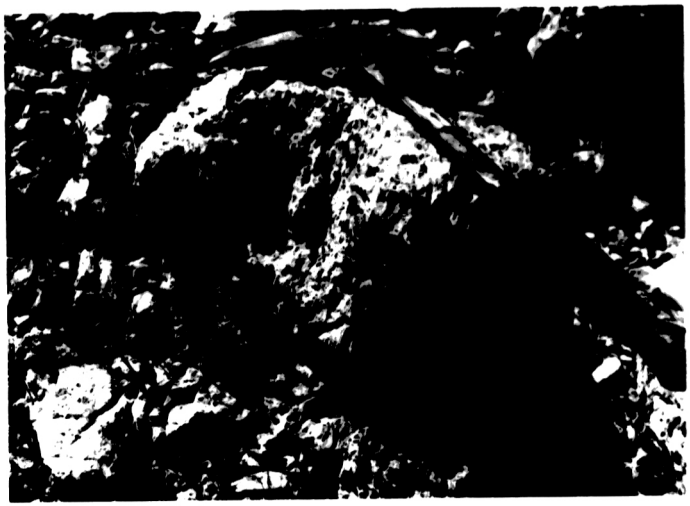
3. Dusky section. Close-up of dolomitized ghost-like fossils and vuggy porosity in the Mount Kindle Formation,

4. Dusky section. Massive bedded dolomite with vuggy and pinpoint porosity. Previous studies (Link Dowling Cook, 1961) described this section as "reef" facies. The 100s of feet of continuous, vuggy, moldic and intercrystalline porosity are a striking feature of Section 1.

5. Dusky section. A view looking north showing the alternating lighter coloured and darker coloured interlayered dolomite beds at the Dusky section. These beds strike north on the successive east-west ridges.



6. Dusky section. Silicified fossils in dark coloured dolomite of the Silurian Mount Kindle Formation.



7. Dusky section . Fossil coral head in dolomite in the Mount Kindle Formation.

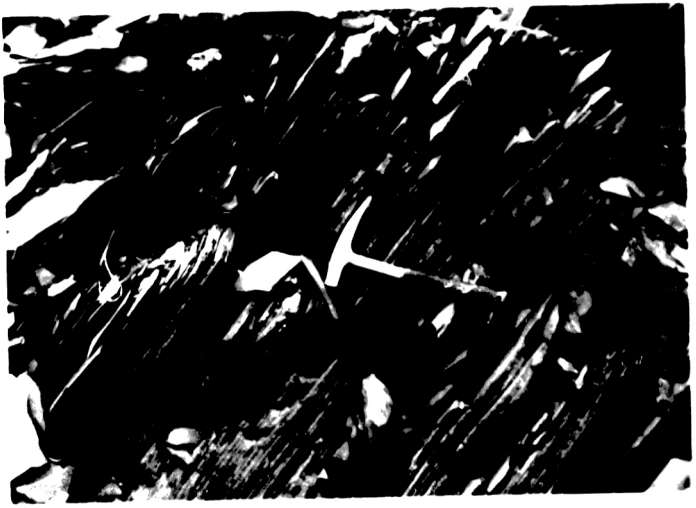
8. Red Rock Pass (Location 2). The dip slope of the Silurian sandstone. This unit marks the pre-Devonian unconformity. Note the elaborate joint pattern.

9. Red Rock Pass. Sampling bedded dolomites of the Mount Kindle Formation for conodont identification. This locality sits stratagraphically below the Silurian Sandstone in Photo 6

10. Red Rock Pass. Large bulbous stromatoporoids in dolomite of the Silurian Mount Kindle Formation. Conodont samples collected from the lower part of the Red Rock Pass, Section 2, gave Early Silurian ages.

11. North Prairie (Station 4). Silurian Road River Formation. The shale is platey, gray-coloured and barren of graptilites. The graptilites are preserved in the deeper water troughs that eventually filled with the very black shales.

10. Red Rock Pass. Large bulbous stromatoporoids in dolomite of the Silurian Mount Kindle Formation. Conodont samples collected from the lower part of the Red Rock Pass, Section 2, gave Early Silurian ages.



11. North Prairie (Station 4). Silurian Road River Formation. The shale is platey, gray-coloured and barren of graptilites. The graptilites are preserved in the deeper water troughs that eventually filled with the very black shales.

12. Tundra (Location 3). Measuring a section and collecting samples of the Devonian Funeral Formation. Fissile light gray shales are interbedded with rusty weathering limey siltstones. Subsequent laboratory analysis shows the Funeral is not a promising source rock.

13. Mine Airport (location 6). Black shales of the Silurian Road River Formation outcrop behind the airport buildings. A very black shale sample from this outcrop yielded a total organic carbon (TOC) value of 0.8. This value may be very significant given the deep burial and over thrusting the shale sample has been subjected to. Abundant graptilites have been reported nearby (David Morrow, personal communication).

14. Tetcela (Location 7). An outcrop of the Middle Devonian Horn River Black Shale west of the Tetcela River.

MAP POCKET

Surface Geology
Northwest Territories

Canadian Forest Oil Ltd.

Co-ordinates : 63° 15', 125° 20'W
Geographic Location : **STATION 1**

Geologists : **JIM TAYLOR / TODD BURLINGAME**
Date of Measurement : **AUGUST 05 - 07, 1999**

FOSSIL SYMBOLS

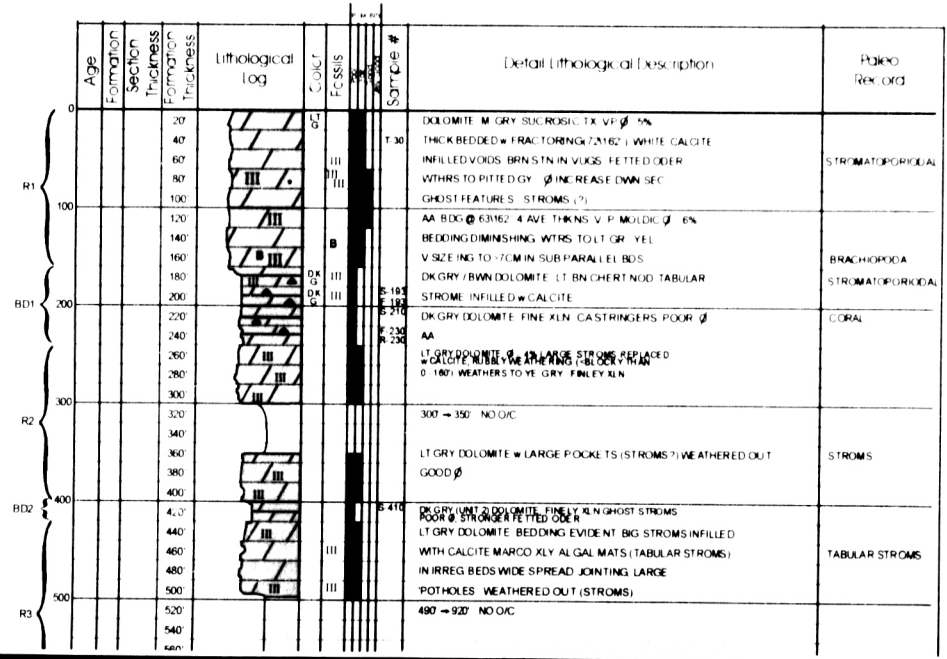
F Fossiliferous
B Brachiopoda
G Gastropoda
Coral
III Stromatopora
Foraminifera
Crinoid
Algae

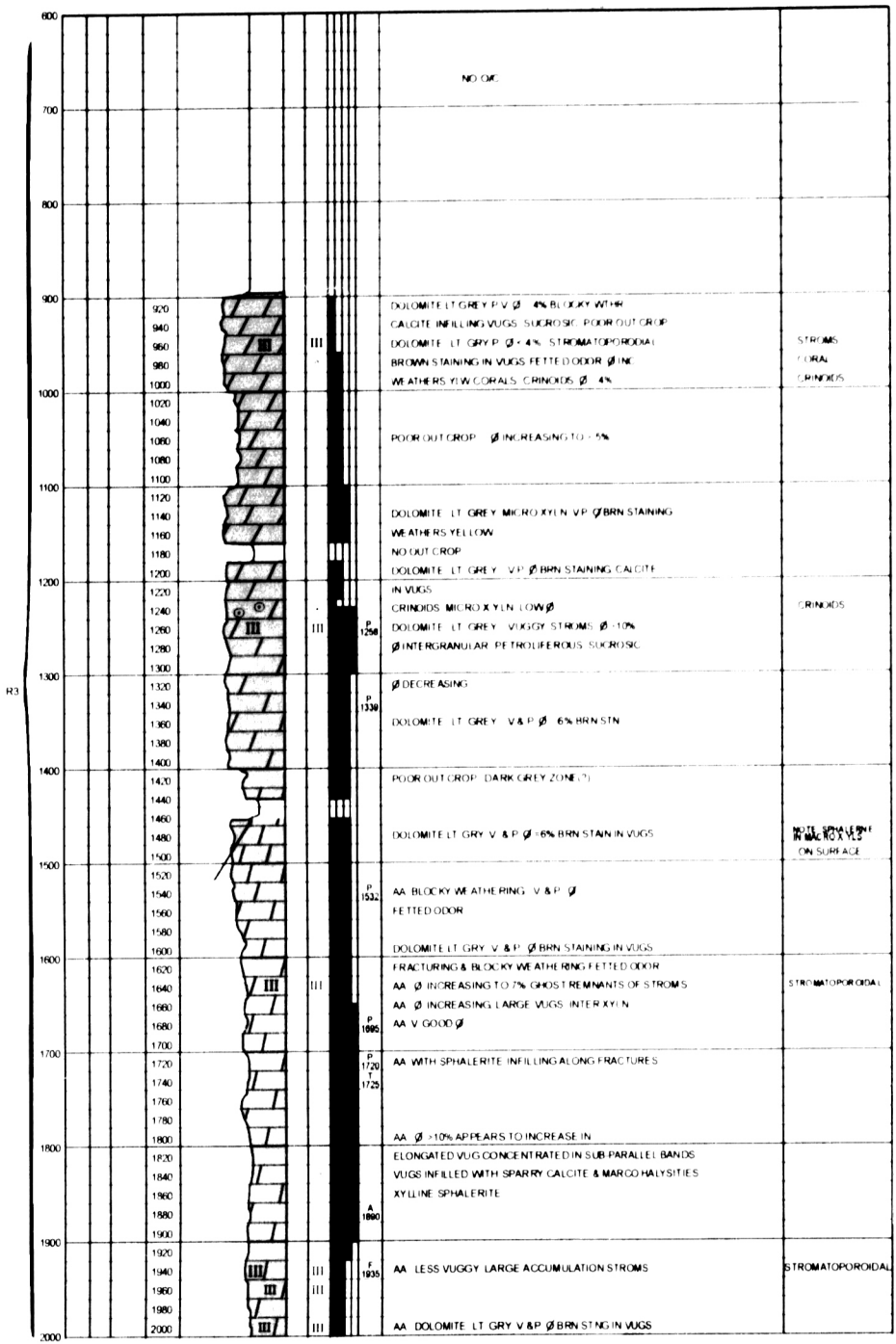
POROSITY SYMBOLS

x intergranular, intercrystalline, interfragmental
v vuggular (greater than 1/16 mm.)
f fractured
p pinpoint
o oil stained or petroliferous
● Dead oil stained (bitumin)

LITHOLOGICAL SYMBOLS

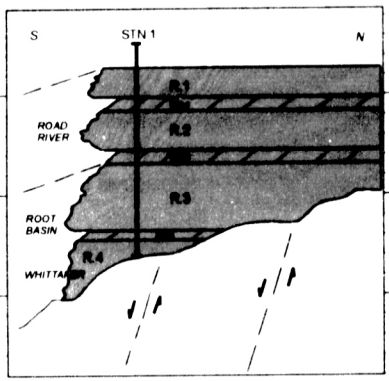
Limestone
Silty Limestone
Shale
Siliceous
Dolomite
Limestone Breccia
Calcareous Shale
Siltstone
Dolomitic Limestone
Dolomite Breccia
Anhydritic Shale
Ironstone
Argillaceous Limestone
Rugose to Rubbly
Salt Casts
Sandstone
Argillaceous Dolomite
Coarse Crystallization
Pyritic Micaceous
Chert, light or dark




NO O/C
DOLOMITE LT GREY P.V.Ø 4% BLOCKY WITHR
CALCITE INFILLING VUGS SUCROSIC POOR OUT CROP
DOLOMITE LT GRY P.Ø < 4% STROMATOPOROIDAL
BROWN STAINING IN VUGS FETTED ODOR Ø INC
WEATHERS YLW CORALS CRINOIDS Ø 4%
STROMS
CORAL
CRINOIDS
POOR OUT CROP Ø INCREASING TO < 5%
DOLOMITE LT GREY MICRO XYLN V.P.Ø BRN STAINING
WEATHERS YELLOW
NO OUT CROP
DOLOMITE LT GREY V.P.Ø BRN STAINING CALCITE
IN VUGS
CRINOIDS MICRO X YLN LOW Ø
DOLOMITE LT GREY VUGGY STROMS Ø <10%
Ø INTERGRANULAR PETROLIFEROUS SUCROSIC
CRINOIDS
Ø DECREASING
DOLOMITE LT GREY V.& P.Ø 6% BRN STN
POOR OUT CROP DARK GREY ZONE(?)
DOLOMITE LT GRY V. & P.Ø <6% BRN STAIN IN VUGS
NOTE SPHALERITE IN MACRO X YLS ON SURFACE
AA BLOCKY WEATHERING V.& P.Ø
FETTED ODOR
DOLOMITE LT GRY V.& P.Ø BRN STAINING IN VUGS
FRACTURING & BLOCKY WEATHERING FETTED ODOR
AA Ø INCREASING TO 7% GHOST REMNANTS OF STROMS
AA Ø INCREASING LARGE VUGS INTER XYLN
AA V GOOD Ø
STROMATOPOROIDAL
AA WITH SPHALERITE INFILLING ALONG FRACTURES
AA Ø >10% APPEARS TO INCREASE IN
ELONGATED VUG CONCENTRATED IN SUB PARALLEL BANDS
VUGS INFILLED WITH SPARRY CALCITE & MARCO HALYSITIES
XYLLINE SPHALERITE
AA LESS VUGGY LARGE ACCUMULATION STROMS
STROMATOPOROIDAL
AA DOLOMITE LT GRY V.&P.Ø BRN STNG IN VUGS
R3
P 1258
P 1330
P 1532
P 1695
P 1720
T 1725
A 1890
F 1935

9237-C131-1E

2000	2020		DOLOMITE LT GREY V & P Ø BRN STAINING	CORALS
	2040		CORALS, STROMS	STROMS
	2060			BRACHS
	2080		F 2080	
2100	2100			
	2120		AA	
R3	2140			
	2160			
	2180			
2200	2200			
	2220		DOLOMITE, LT BRN BLOCK WEATHERING V & P Ø	
	2240		DOLOMITE, LT BRN TABULAR WEATHERING V & P Ø	
	2260		AA WITH CHERTY SECTIONS RECESSING WTHR	
	2280			
	2300		DOLOMITE LT BRN TABULAR MED XYLLINE	
2300	2320			FAVOSITIES
	2340		CONTACT BTWN LT BRN & DK GRY BLK DOLOMITE FAVOSITES HAYSITES 60° \ 171	HALYSITES
	2360			
BD3	2380			
	2400		DK GREY BLK DOLOMITE CALCITE VEINING	
2400	2420		SF 2400 TD 2450 MICRO XYLLINE V POOR Ø RUBBLY WEATHERING	CRINOIDS
	2440		CRINOIDS - CONTACT BTWN BLK RUBBLE & MSV BLK UN	
	2460		GRADUAL CONTACT BTWN BLK & LT GREY UNIT	
	2480		LT GRY SUCROSIC DOL Ø >6% BLOCKY FRAC GHOST FOSSIL FEATURES	
R4				
			NOTE: CONODONT SAMPLES TAKEN AT 10' INTERVALS	



Surface Geology
Northwest Territories

Canadian Forest Oil Ltd

Co-ordinates **61° 43' N, 123° 17' W**
Geographic Location **STATION 2**

Geologists **JIM TAYLOR / TODD BURLINGAME**
Date of Measurement **AUGUST 10, 1999**

FOSSIL SYMBOLS

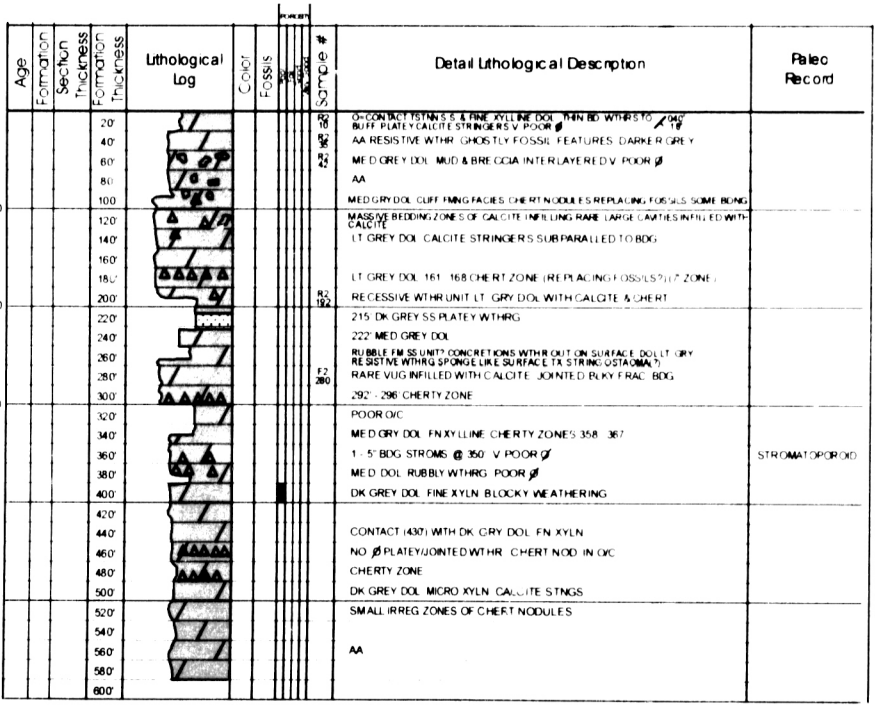
F Fossiliferous
B Brachiopoda
G Gastropoda
Coral
III Stromatopora
Foraminifera
Crinoid
Algae

POROSITY SYMBOLS

x intergranular, intercrystalline, interfragmental
v vuggular (greater than 1/16 mm)
f fractured
p pinpoint
oil stained or petroliferous
Dead oil stained (bitumin)

LITHOLOGICAL SYMBOLS

Limestone
Dolomite
Dolomitic Limestone
Argillaceous Limestone
Argillaceous Dolomite
Silty Limestone
Limestone Breccia
Dolomite Breccia
Rugose to Rubbly
Coarse Crystallization
Shale
Calcareous Shale
Anhydritic Shale
Salt Casts
Pyritic Micaceous
Siliceous
Siltstone
Ironstone
Sandstone
Chert, light or dark



Surface Geology
Northwest Territories

9287-0181-1E

Canadian Forest Oil Ltd.

Co-ordinates: **SEE BELOW**
Geographic Location: **STATION 3 - 4**

Geologists: **JIM TAYLOR / TODD BURLINGAME**
Date of Measurement: **AUGUST 11, 1999**

FOSSIL SYMBOLS

F Fossiliferous
B Brachiopoda
G Gastropoda
Coral
III Stromatopora
Foraminifera
Crinoid
Algae

POROSITY SYMBOLS

x intergranular, intercrystaline, interfragmental
v vuggular (greater than 1/16 mm)
f fractured
p pinpoint
oil stained or petroliferous
Dead oil stained (bitumin)

LITHOLOGICAL SYMBOLS

Limestone
Dolomite
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Argillaceous Dolomite
Silty Limestone
Limestone Breccia
Dolomite Breccia
Rugose to Rubbly
Coarse Crystallization
Shale
Calcareous Shale
Anhydritic Shale
Salt Casts
Pyritic Micaceous
Siliceous
Siltstone
Ironstone
Sandstone
Chert, light or dark

Age	Formation	Section Thickness	Formation Thickness	Lithological Log	Color	Fossils	Porosity	Sample	Detail Lithological Description	Paleo Record
									STATION 3 61° 41' 48" N 124° 48' 02" W	
0			5'					S2 10	BLACK FISSILE SHALE INTERBEDDED WITH	
10			10'						SILTSTONES. SILTSTONE WEATHERS	
			15'					S3 20	TO RUST. SILTSTONE MORE RESISTIVE UNIT	
20			20'					F3 25	FUNERAL FORMATION	
			25'					R3 25		
30			30'					R3 30		
0									**STATION 4 61° 44' 37" N 124° 52' 11" W**	
			5'					S4 10	POOR EXPOSURE OF ROAD RIVER SHALE. PLATEY	
10			10'					R4 10	WITH 5% LST BANDS. WEATHERS TO BUFF	
			15'					S4 20	DARK SHALE UNIT WITHRS RECESSIVE	
20			20'					S4 20		
0									**STATION 5 61° 44' 38" N 124° 52' 16" W**	
			5'					S5 10	GOOD OIC AA	
10			10'					R5 10		
			15'					S5 20		
20			20'					R5 20		CRINOIDS
			25'					F5 25		BRACHIOPODS
30			30'					S5 30		
								R5 30		
									STATION 6 61° 33.655 N 124° 48.955 W	
								S6	PRAIRIE CREEK MINE AIRPORT ROAD RIVER SHALE	
									STATION 7 61° 37' 47" N 123° 54' 15" W	
								S7 10	RAM PLATEAU	
								R7 10	DEVONIAN HORN RIVER SHALE - SILICEOUS, BLACK, POOR OIC	