MAR 19680051: ALBERTA

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REPORT ON
ALBERTA SULPHUR PERMIT #48

The reconnaissance of sulphur permit #48 has been conducted in two steps.

I. Step One - Macro-fracture analysis and Terrain Analysis.

Stereoscopic, near-order infrared photographs taken for the Alberta Government in 1964 were used in this study.

The study was made for the specific purpose of delineating criteria which may indicate potential areas of sulphur occurrence. A variety of possible mechanisms are available with which to form native sulphur in the area. Major faults trending from the Precambrian Shield to the Peace River Arch may provide a conduit for escaping H_2S gases. The decay of organic matter, the backing of probably high sulphate containing bedrock and glacial till by ground water with subsequent deposition of sulphate salts could also generate sulphur deposits.

The purpose of the fracture analysis was to delineate areas of concentrated faulting. Permit 48 is mostly covered by low lineament density which means a small amount of fracturing, except north of the river in the north-west corner of the permit.

The purpose of the terrain analysis was essentially to delineate areas with poor vegetation because it was empirically assumed that the areas of high sulphurous soils will not support extensive vegetation.

The results of the study of the aerial photographs are summarized in the map joined herewith.

II. Step Two

A field trip was undertaken in order to collect samples with a hand-auger. Investigations were concentrated in areas where there is a lack of vegetation and along major lineaments. A series of hand-auger test holes were dug in all the dry clearings and along the major lineaments. At each sampling

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location (see map) a series of soil samples were taken as the auger progressed downwards. The depth of the holes varied from two to six feet. Samples were collected from the bottom of the green vegetation until the auger became difficult to pull up, or until the auger tip struck rock. A total of 241 soil profile samples were collected from 43 different sampling locations. 158 samples were analyzed for elemental sulphur on a percentage dry weight by Chemical and Geological Laboratories Ltd., in Calgary. The assay sheets resulting from the analysis are attached to this report.

SOIL PROFILE DETAILS

Clearing A

Clearing A is a floating bog with almost all the area conteining water and high grass (up to three feet high). Most of the area smelled strongly of H_2S due to decaying vegetation and stagnant water.

		% Sulphur (dry wt.)	T = trace
Sampling Location F1			
	A 8"	0.68%	
	B 8"	0.14%	
	C 8"	T	
	D 1'	T	
	E 1'	T	
	F 1'	T	
Sample Location F2 (Not assayed)			
	A 8"		
	B 8"		
	C 8"		
	D 1'		
	E 1'		
	F 1'		
Sample Location F 3			
	A 8"	T	
	B 8"	T	
	C 8"	T	
	D 1'	T	
	E 1'	T	
	F 1'	1.87%	
	G 1'	0.98%	
	H 1'	0.36%	
Sample Location F 4 (Not assayed)	15" water		
	A 4"		
	B 8"		
	C 8"		
	D 1'		
	E 1'		

Clearing B

Clearing B is quite swampy on either side of the stagnant stream. This area also had a strong H_2S smell. The grass grows up to five feet high.

		% Sulphur (dry wt.)
Sample Location F 5		T = trace.
	A 8"	T
	B 8"	T
	C 8"	T
	D 1'	T
	E 1'	T
	F 1'	T
	G 1'	T
Sample Location F 6 (Not assayed)		
	A 8"	
	B 8"	
	C 8"	
	D 1'	
	E 1'	
	F 1'	
Sample Location F 7 (Not assayed)		
	A 8"	
	B 8"	
	C 8"	
	D 1'	
	E 1'	
Sample Location F 8		
	A 8"	T
	B 8"	T
	C 8"	T
	D 1'	0.12%
	E 1'	T
	F 1'	T
	G 1'	T

		% Sulphur (dry wt.)	T = trace.
Sample Location F 13 (Not assayed)			
	A 8"		
	B 8"		
	C 8"		
	D 1'		
	E 1'		
	F 1'		
Sample Location F 14			
	A 8"	T	
	B 8"	T	
	C 8"	T	
	D 1'	T	
	E 1'	T	
	F 1'	T	
Sample Location F 15 (Not assayed)			
	A 8"		
	B 8"		
	C 8"		
	D 1'		
	E 1'		
	F 6"		
Sample Location F 16 (Not assayed)			
	A 8"		
	B 8"		
	C 8"		
	D 1'		
	E 1'		

Clearing C

Clearing C is a floating bog containing much water; the area smelled strongly of H_2S due to rotting vegetation and stagnant water.

Sample Location F 9		
	A 8"	1.78%
	B 8"	T
	C 8"	T
	D 1'	T
	E 1'	T
	F 6"	T

Sample Location F 10 (Not assayed)		% Sulphur (dry wt.)	T = trace.
	A 8"		
	B 8"		
	C 8"		
	D 1'		
	E 1'		
	F 1'		
Sample Location F 11			
	A 8"	T	
	B 8"	T	
	C 8"	T	
	D 1'	T	
	E 1'	0.04%	
	F 1'	T	
Sample Location F 12 (Not assayed)			
	A 8"		
	B 8"		
	C 8"		
	D 1'		
	E 1'		
	F 1'		
	G 1'		

Clearing D

This area is a dry clearing with tall grass.

Sample Location F 17 (Not assayed)		
	A 1'	
	B 1'	
	C 1'	
	D 1'	
	E 4"	
Sample Location F 18		
	A 8"	T
	B 8"	0.80%
	C 8"	0.82%
	D 1'	T
	E 1'	1.12%

Clearing E

Clearing E is a dry clearing with one to two feet high grass.

Sample Location F 19		% Sulphur (dry wt.)
	A 8"	10.68%
	B 8"	T
	C 8"	T
	D 1'	T
	E 1'	0.67%
Sample Location F 20		
	A 8"	T
	B 8"	T
	C 8"	T
	D 1'	T
	E 1'	T

T = trace.

Clearing F

Clearing F is a dry clearing with grass one to two feet high.

Sample Location F 21		
	A 8"	T
	B 8"	3.94%
	C 8"	T
	D 1'	0.74%
	E 1'	0.45%
Sample Location F 22 (Not assayed)		
	A 8"	
	B 8"	
	C 8"	
	D 1'	
	E 1'	

Clearing G

Clearing G is a small clearing containing grass two feet high. The clearing has a few large trees in the center.

Sample Location F 23

	% Sulphur (dry wt.)
A 8"	T
B 8"	T
C 8"	T
D 1'	T
E 1'	0.37%
F 1'	T

T = trace

Clearing H

This small clearing is a partially filled-in floating bog (quite wet) containing high grass.

Sample Location F 24

A 8"	T
B 8"	17.38%
C 8"	9.71%
D 1'	7.63%
E 1'	T
F 1'	0.35%

Clearing I

Clearing I is a dry clearing with grass one to three feet high.

Sample Location F 25

A 8"	0.24%
B 8"	T
C 8"	0.84%
D 1'	0.24%
E 1'	T
F 4"	T

Sample Location F 26
(Not assayed)

A 8"
B 8"
C 8"
D 1'
E 1'

Clearing J

This clearing is not of the open type - it is overgrown with 25 feet high trees and low bushes.

Sample Location F 27

	% Sulphur (dry wt.)
A 8"	T
B 8"	T
C 8"	T
D 1'	T
E 1'	T

T = trace

Clearing K

This is a small dry clearing containing one foot high grass and a few trees in the center.

Sample Location F 28

A 8"	T
B 8"	T
C 8"	T
D 1'	T
E 1'	1.17%

Clearing L

Clearing L is a dry clearing with low, grassy vegetation.

Sample Location F 29
(Not assayed)

A 8"
B 8"
C 8"
D 1'
E 1'

Sample Location F 30

A 8"	T
B 8"	T
C 8"	T
D 1'	T
E 1'	T

Clearing M

Clearing M is a pair of small clearings that were slightly wet and contained two to three feet high grass.

Sample Location F 31		% Sulphur (dry wt.)	T = trace
	A 8"	T	
	B 8"	T	
	C 8"	T	
	D 1'	T	
	E 1'	T	
	F 1'	0.36%	
Sample Location F 32			
	A 8"	0.52%	
	B 8"	T	
	C 8"	T	
	D 1'	T	
	E 1'	T	
	F 1'	0.38%	

Clearing N

Clearing N is a large sized dry clearing with grass two feet high.

Sample Location F 33 (Not assayed)		
	A 8"	
	B 8"	
	C 8"	
	D 1'	
	E 1'	
	F 1'	
Sample Location F 34		
	A 8"	0.38%
	B 8"	0.27%
	C 8"	T
	D 1'	T
	E 1'	T
	F 1'	T

Sample Location F 35 — % Sulphur (Dry wt). T = trace

A	8"
B	8"
C	8"
D	1'
E	1'
F	1'

Clearing O

Clearing O is a large floating bog with grass two feet high.

Sample Location F 36

	A 8"	3.19%
	B 8"	5.69%
	C 8"	8.26%
	D 1'	2.76%
(had to stop sampling - hit rocks)	E 1'	1.50%

Sample Location F 37

	A 8"	T
	B 8"	4.16%
	C 8"	2.32%
	D 1'	1.23%
(had to stop sampling - hit rocks)	E 4"	T

Sample Location F 38

	A 8"	2.13%
	B 8"	1.24%
(had to stop sampling - hit rocks)	C 8"	1.16%

Sample Location F 39

	A 8"	T
	B 8"	0.55%
	C 8"	1.06%
	D 1'	T
(hit sandy material) -	E 1'	0.28%

			% Sulphur (dry wt.)	T = trace
Sample Location F 40				
		A 8"	T	
		B 8"	T	
		C 8"	T	
		D 1'	T	
(hit sandy material)	-	E 1'	0.18%	
Sample Location F 41				
		A 8"	T	
		B 8"	T	
		C 8"	T	
		D 1'	T	
		E 1'	0.38%	
(hit rocks)	-	F 8"	T	
Sample Location F 42				
		A 8"	T	
		B 8"	2.59%	
		C 8"	T	
		D 1'	1.13%	
		E 1'	0.53%	
(hit rocks)	-	F 8"	T	
Sample Location F 43				
		A 8"	T	
		B 8"	T	
		C 8"	T	
		D 1'	T	
		E 1'	T	
(hit rocks)	-	F 6"	Sample destroyed at assay lab.	

APPENDIX 2

CHEMICAL & GEOLOGICAL LABORATORIES LTD.

14240 - 115 AVENUE, EDMONTON, ALBERTA

Date Reported: October 10, 1968

Laboratory Report Number: C68-4128

GEOPHOTO SERVICES LTD.

Kind of Sample: Soil

Date Received: September 30, 1968

SAMPLE NUMBER	ELEMENTAL SULFUR % DRY WEIGHT
F1-A	0.68
F1-B	0.14
F1-C	Trace
F1-D	Trace
F1-E	Trace
F1-F	Trace
F3-A	Trace
F3-B	Trace
F3-C	Trace
F3-D	Trace
F3-E	Trace
F3-F	1.87
F3-G	0.98
F3-H	0.36
F5-A	Trace
F5-B	Trace
F5-C	Trace
F5-D	Trace
F5-E	Trace
F5-F	Trace
F5-G	Trace
F8-A	Trace
F8-B	Trace
F8-C	Trace
F8-D	0.12
F8-E	Trace
F8-F	Trace
F8-G	Trace
F14-A	Trace
F14-B	Trace
F14-C	Trace
F14-D	Trace
F14-E	Trace
F14-F	Trace
F9-A	1.78
F9-B	Trace
F9-C	Trace
F9-D	Trace
F9-E	Trace
F9-F	Trace
F11-A	Trace
F11-B	Trace
F11-C	Trace
F11-D	Trace
F11-E	0.04
F11-F	Trace
F18-A	Trace
F18-B	0.80
F18-C	0.82
F18-D	Trace
F18-E	1.12
F19-A	10.68
F19-B	Trace
F19-C	Trace
F19-D	Trace
F19-E	0.67
F21-A	Trace
F21-B	3.94
F21-C	Trace
F21-D	0.74

continued.....

Geophoto Services Ltd.

Laboratory Report Number: C68-4128

SAMPLE NUMBER	ELEMENTAL SULFUR % DRY WEIGHT
F21-E	0.45
F23-A	Trace
F23-B	Trace
F23-C	Trace
F23-D	Trace
F23-E	0.37
F23-F	Trace
F24-A	Trace
F24-B	17.38
F24-C	9.71
F24-D	7.63
F24-E	Trace
F24-F	0.35
F25-A	0.24
F25-B	Trace
F25-C	0.84
F25-D	0.24
F25-E	Trace
F25-F	Trace
F27-A	Trace
F27-B	Trace
F27-C	Trace
F27-D	Trace
F27-E	Trace
F28-A	Trace
F28-B	Trace
F28-C	Trace
F28-D	Trace
F28-E	1.17
F30-A	Trace
F30-B	Trace
F30-C	Trace
F30-D	Trace
F30-E	Trace
F31-A	Trace
F31-B	Trace
F31-C	Trace
F31-D	Trace
F31-E	Trace
F31-F	0.36

SAMPLE NUMBER	ELEMENTAL SULFUR % DRY WEIGHT
F32-A	0.52
F32-B	Trace
F32-C	Trace
F32-D	Trace
F32-E	Trace
F32-F	0.38
F34-A	0.38
F34-B	0.27
F34-C	Trace
F34-D	Trace
F34-E	Trace
F34-F	Trace
F36-A	3.19
F36-B	5.69
F36-C	8.26
F36-D	2.76
F36-E	1.50
F39-A	Trace
F39-B	0.55
F39-C	1.06
F39-D	Trace
F39-E	0.28
F42-A	Trace
F42-B	2.59
F42-C	Trace
F42-D	1.13
F42-E	0.53
F42-F	Trace

CHEMICAL & GEOLOGICAL LABORATORIES LTD.

14240 - 115 AVENUE, EDMONTON, ALBERTA

Date Reported: October 28, 1968 Laboratory Report Number: C68-4177

GEOPHOTO SERVICES LTD.

Kind of Sample: Soil Date Received: October 16, 1968

SAMPLE NUMBER	ELEMENTAL SULFUR % DRY WEIGHT		SAMPLE NUMBER	ELEMENTAL SULFUR % DRY WEIGHT
F20-A	Trace		F41-A	Trace
F20-B	Trace		F41-B	Trace
F20-C	Trace		F41-C	Trace
F20-D	Trace		F41-D	Trace
F20-E	Trace		F41-E	0.38
F37-A	Trace		F41-F	Trace
F37-B	4.16		F43-A	Trace
F37-C	2.32		F43-B	Trace
F37-D	1.23		F43-C	Trace
F37-E	Trace		F43-D	Trace
F38-A	2.13	(2:00 P.M.)	F43-E	Trace
F38-B	1.24		F43-F	Sample Destroyed
F38-C	1.16			
F40-A	Trace			
F40-B	Trace			
F40-C	Trace			
F40-D	Trace			
F40-E	0.18			

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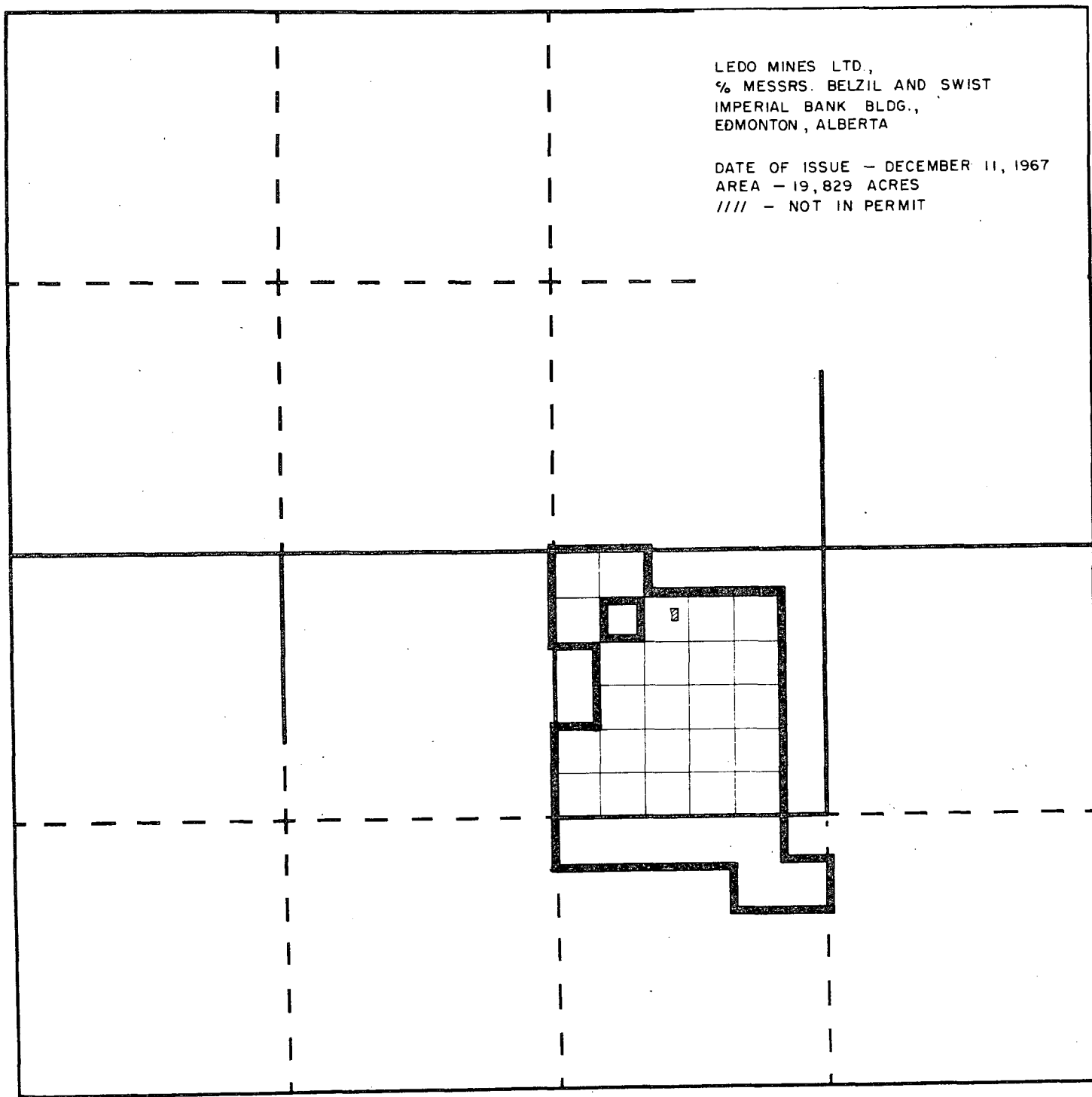
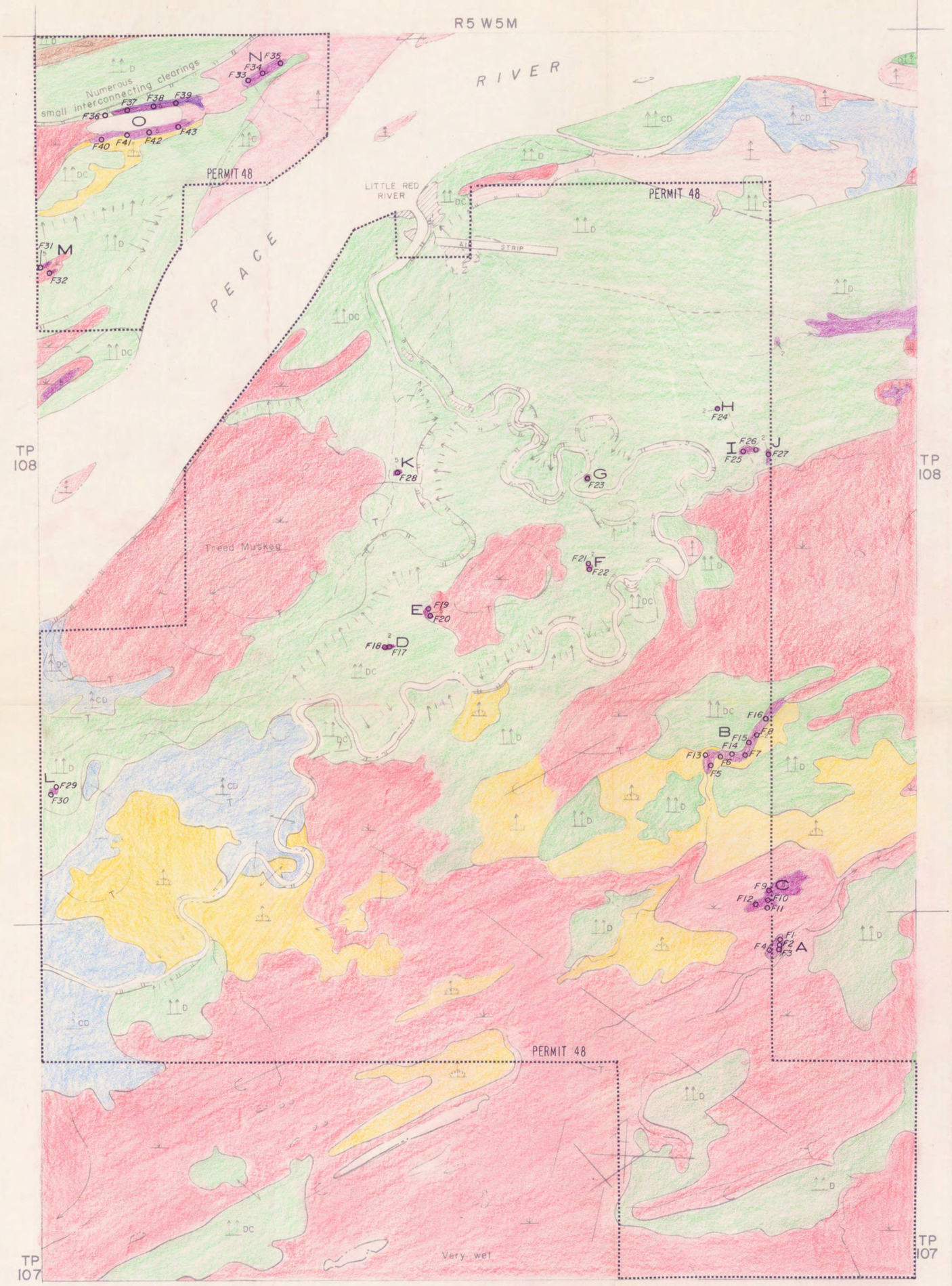
SULPHUR PROSPECTING PERMIT NO. 48





TERRAIN ANALYSIS

of

SULPHUR PERMIT 48

Prepared for

CANADIAN FINA OIL LIMITED

GEOPHOTO SERVICES LTD. CALGARY ALBERTA CANADA

SCALE:

Two inches = one mile or 1: 31,680

1/2 0 1/2 1 MILE

OCTOBER 1968

EXPLANATION

C — Primarily tall trees, generally fully stocked; trees average over 40 feet in height; moderate to good drainage.

DC — Primarily trees of medium or less height, generally fully stocked; trees average less than 40 feet in height; moderate to fair relief, moderate to fair drainage.

CD — Primarily scattered groves of trees, moderately stocked, with brush, grassland and minor areas of muskeg. Trees average less than 40 feet in height. Moderate to low relief, fair to poor drainage.

Brush and meadows with minor muskeg areas; moderate to low relief, fair to poor drainage. Includes old burn regrowth areas of low trees and dense underbrush.

Muskeg or marsh with minor brush areas and scattered trees; low relief, water table at or near surface.

Undifferentiated vegetation associated with river flats, bottomlands and pediments; cover may range from muskeg to tall trees.

Moderate escarpment 15-50 feet.

Prominent escarpment over 50 feet.

Moderate slope. Arrows indicate direction of slope.

Steep slope. Arrows indicate direction of slope.

Stream or river

Lake or pond

Road or trail

1. Clearing, devoid of vegetation, possibly grass covered, surrounded by deciduous trees.

2. Clearing, single or clumps of trees in clearing, or pot-hole in center, surrounded by deciduous trees.

3. Clearing, devoid of vegetation, possibly grass covered, surrounded by coniferous trees.

4. Clearing, single or clumps of trees in clearing, or pot-hole in center, surrounded by coniferous trees.

5. Clearings surrounded by mixed vegetation, may or may not contain clumps of trees or pot-holes.

Photo lineation, generally with topographic relief, may be fault controlled.

T — Anomalous tonal pattern

Glacial grooves. Direction of glacial movement indicated.

Forest clearing.

oF17 — Sample Location

D - Deciduous

C - Coniferous

DC, CD - Mixed conifers and deciduous (First letter indicates predominant type).