# REPORT ON L.F. WEIR CLAIM GROUP

## (CLAIM P934031 NORTHWEST DELORO TOWNSHIP)

## TIMMINS AREA



November 7, 1987

R. J. McH. Clark, P. Eng.

# TABLE OF C(

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November 7, 1987

# L.F. WEIR CLAIM GROUP

## TIMMINS AREA

## INTRODUCTION

Claim P934031 is part of The Weir claim group located approximately 5.5 kilometres southeast of Timmins, Ontario. The group comprises four contiguous claims in the northwest quadrant of Deloro Township. The claims have good access with the city dump road located just to the north, as well as a number of former logging roads which transect the area.

The Timmins mining area (Porcupine Camp) lies within the Early Precambrian Abitibi greenstone belt of Northwestern Ontario. Timmins is situated approximately 700 kilometres north of Toronto, and 700 kilometres northwest of Ottawa.

Approximately 57 million troy ounces of gold have been produced from some 25 deposits in the Porcupine Camp. Of this amount, about 40% was derived from the Hollinger mine, and 20% each from the Dome and Mc Intyre mines.

The peak of gold production from the Timmins area was in the early 1940's and has steadily decreased since. Still, its annual production in 1985 accounted for 49% of Ontario's gold output and approximately 12% of Canada's total gold production. The Porcupine Camp ranks fourth in the world for gold production from rock of Precambrian age.

On a more localized scale, the Weir property lies within a township which contains several gold occurrences and past producers. The property itself lies to the east along the Destor-Porcupine fault from the Naybob Mine property (Kenilworth) which is located within neighbouring Ogden Township. Annex "A" contains a general map of past and current mining exploration activities in the area of the Weir claim group. Within Deloro Township several past producers and occurrences are situated adjacent to the north side of the Destor-Porcupine fault complex.

...2

## GEOLOGY

## REGIONAL GEOLOGY

The geology of the Timmins area comprises two groups of volcanic rocks having the older Deloro Group overlain by the Tisdale group. Both volcanic groups are composed of an ultramafic base, a mafic to intermediate middle unit, and a felsic upper sequence.

Sediments in this region are represented by a predominance of turbidites with a thin upper unit of fluvial sediments. These sediments are part of the Porcupine Group and are thought to be time equivalent to the Upper Deloro Group.

The Destor-Porcupine fault transects this region and has an observed regional spatial association to gold deposits. This structure appears to have localized clastic sedimentation and komatiitic volcanism and is interpreted as a major fracture system which was active in the Early Precambrian times.

## DETAILED GEOLOGY OF THE AREA SURROUNDING THE WEIR CLAIMS

### (a) AREA GEOLOGY

The best maps of the geology of the area are from the Ontario Department of Mines (ODM). Preliminary geological map number ODM P.342 Deloro Township, District of Cochrane, scale 1" equals 1/4 mile and ODM preliminary geological map number P.341, Ogden Township, District of Cochrane, scale 1" equals 1/4 mile. These maps indicate that the Destor-Porcupine fault runs along the northern edge of the Weir claim group (see compilation map 1.). The best information available on the economic potential of the claims is derived from the Naybob Gold Mine located 1/4 mile to the west of the Weir claims which is owned by the Kenilworth Mines Limited.

### (b) NAYBOB GOLD MINE (West of Weir claims)

**Production:**

The Naybob Mine last produced in 1964 according to the Northern Miner (February 16, 1984) and during its life approxiamately 1.8 million tons of ore were mined grading .21 ozs. per ton. However, actual metal produced according to Ferguson, S.A. et al 1971 "Gold Deposits of Ontario", Mineral Resources circular no. 13, part 1, Ministry of Natural Resources, Ontario Government, comprises only 50,731 ounces of gold which is less than a sixth of the 378,000 ounces of gold reported in the Northern Miner.

...3

**Ore Zones:**

There were two main ore zones in the mine. The most significant one is the north ore zone which was found in 1939 and is 400 feet long, 100 feet wide and has a 500 foot depth extent. It is a stockwork of quartz stringers with associated ankerite and bright green mica. Native gold and small amounts of galena occur in the stringers. This ore zone is surrounded by an envelope of carbonated rocks in the northern side of a porphyry intrusion.

The other principle ore zone is the south ore zone which is in basalt adjacent to the Destor-Porcupine fault. Mineralization consists of 3% to 10% disseminated pyrite with the "better" grade mineralization running 0.08 ounces per ton. Most of the production recorded came from the north ore zone. Since the higher grade zones within the south ore zone only have an overall sampled grade of 0.08 ounces per ton, it is doubtful whether it could have been mined economically at any time.

(c) COMSTATE RESOURCES PROPERTY (North and West of Weir Claims)

From 1981 to 1987 an integrated program of geophysics, overburden drilling and diamond drilling has been conducted by Comstate Resources on the above property through drilling option agreements with Placer and then Noranda. Placer spent $500,000 on this drilling program. Judging by the information filed for assessment from the first hole drilled by Placer the results must have been disappointing. However, it is understood from personal communication of information provided to the Weir group in informal discussions with Dr. Hillhouse of Placer in 1986 that the more southerly unrecorded deep drilling adjacent to the north border of the Weir claims found gold values at two levels. The extent of the gold mineralization could not be determined whereupon Placer gave-up its option on the property. Comstate then optioned the property to Noranda, who undertook to spend $300,000 on a drill progam which is still in progress. Results announced in the September 15, 1986 issue of the Northern Miner by Comstate (see annex B) stated that drilling had revealed an intersection giving " 0.10 ounces of gold per ton over a 1.4 foot core length".

....4

## WEIR CLAIM GROUP

### (a) GENERAL

This claim group currently comprises four claims (P451843, P451842, P452678 and P934031). The first three of the group are held under a 21 year lease. Claim P934031 was staked by Eldor on behalf of the Weir family. It is not a patented claim.

### (b) PREVIOUS EXPLORATION

The claim group formerly comprised part of the Russell Group and has been worked intermitently since the 1920's. In the ODM 1924 volume 33, part 2, page 37 Annual Report, it was reported that a dike of feldspar porphyry contained gold in quartz stringers on the Russell claims. The Weir claims appear to straddle the northern edge of the prospective Destor-Porcupine fault in Deloro Township, and are predominently underlain by magnesium tholeiites and tuffs. A portion of the felsic volcanics occurring on the southern side of this major fault are contained within the southern portion of the claims.

Drilling was carried out by Noranda on the Weir Group in the 1940's (then the northwest three claims of the Russell Group). Four diamond drill holes were completed at 1000 feet distances apart numbered from west to east 2, 1, 3 & 4. Hole number 2 was drilled at an angle of 34 1/2 degrees to the south to a downhole depth of 751.3 feet. It intersected the target zone of chlorite schist in contact with porphyry , but, the highest value obtained was only 0.01 ounces per ton. Hole number 1 drilled south at an angle of 40 degrees to a downhole depth of 631 feet intersected two zones of pophyry and had a highest value of 0.02 ounces per ton. Hole number 3 drilled at 37 degrees to the south to 823 feet intersected one zone of porphyry containing a maximum value of 0.02 ounces per ton. Hole number 4 at 40 degrees south to 454 feet intersected no porphyry and no gold values. The obvious conclusion from the drilling results is that the gold mineralization is concentrated in and adjacent to the porphyry on the Weir claims.

### (c) GEOLOGICAL RECONNAISSANCE

During the fall of 1985, a brief site visit was made to the Weir claims by R. Clark and D Panagapko. The claims were traversed on foot. The only area which had outcrop displaying any degree of alteration was along the north-south claim line between P451842 and P452678. A series of north-south orientated shallow trenches exposed moderately to slightly carbonated mafic volcanics. The area of the outcrop is designated as Vcc, a chlorite-carbonate schist and andesite on ODM map P342.

Four rock samples were taken from the north to south in the area of the trenches and analysed for gold (assays attached as annex C). The results of these analyses are tabulated below:

.....5

| SAMPLE NUMBER | LOCALITY | GEOLOGY | Gold Content (p.p.b.) |
|---|---|---|---|
| 2531 | south of first trench | Komatiite | nil |
| 2532 | first trench | Quartz vein | 120 (0.003 oz/T.) |
| 2533 | north of first trench | Pyroxenite | nil |
| 2534 | northernmost sample in third trench | Quartz vein in Komatiite | 150 (0.004 oz/T.) |

It should be emphasized that it was known at the time from the Noranda drilling that the weakly mineralized porphyry dike would subcroup to the north of the outcrop sampled. For the small claim group to host economic mineralization it was felt, however, that the gold values would have to extend beyond the confines of the porphyry dike.

## CONCLUSIONS

(a) From a study of data available on drill holes from the vicinity, existing maps and information on the underground workings of the Kenilworth Mine, it is concluded that the prospective Destor-Porcupine fault zone probably underlies a portion of the Weir claim group. Hodgson-1983 feels that the structure plays the most important role in the generation of the area's deposits.

(b) The brief examination of available data and the old trenches indicated that:

(i) Komatiitic basalts are present on the Weir claims. According to figure 3 of C.J. Hodgson-1983, the komatiites at the Naybob Mine (Kenilworth) to the north Destor-Porcupine fault belong to the Tisdale Group which hosts most of the economic gold mineralization in the Porcupine Camp. Workers, such as Pyke-1981(b), have described this host rock as an important source of gold.

(ii) Porphyritic felsic rocks were intersected in the holes drilled on the Weir Group by Noranda in the 1940's and contained values up to 0.02 ounces per ton of gold.

(c) From the above, the author concludes that the Weir claims contain all the necessary geological parameters for hosting an Archean "lode type" gold deposit as detailed below.

(i) Source rock for gold-Tisdale Komatiitic basalt,
(ii) Porphyritic felsic Intrusives,
(iii) Destor-Porcupine fault.

In the author's view the most important mechanism in the genesis of Archean lode gold deposits is the hydrothermal upgrading of original syngenetic deposits (see Clark R.J. McH. et al paper in annex D). On the Weir claims, we have suitable source rocks, the Destor-Porcupine fault along which hydrothermal solutions could move and the porphyritic intrusions which acted as a heat source and further source of gold.

(d) The gold is associated with quartz veins and if it is typical of other deposits in the Porcupine Camp should be easily recoverable.

....6

## RECOMMENDATIONS

Given the limited width of the Weir claims, any diamond drilling carried out would have to be undertaken only after careful geological remapping of the claims, and compilation and synthesis of all existing data. The Exploration Program given below is recommended prior to diamond drilling.

## PROPOSED EXPLORATION PROGRAM

(a) Geological mapping should be carried out along north-south lines 100 metres apart to accurately determine the distribution of the different rock types and the approximate location of the Destor-Porcupine fault.

(b) Lithogeochemical sampling of all outcrops. Sampling in overburden covered areas being carried out using a light percussion drill with a "flow-through" bit on a 100 X 100 metre grid. All samples obtained to be submitted for specialized "coarse gold" sample preparation prior to fire assay.

(c) A Max-Min I horizontal loop electromagnetic survey using all available frequencies to further define the position of elements of the Destor-Porcupine fault.

## PROPOSED BUDGET

| | |
|---|---|
| Drafting | $ 1000 |
| Reporting | $ 1000 |
| Geophysics | $ 4000 |
| Geology | $ 3000 |
| Linecutting | $ 7000 |
| Overburden drilling | $10,000 |
| Supervision | $ 1,000 |
| | $27,000 |
| Operator's feee @ 10% | $ 2,700 |
| | $29,700 |

Should the result of the above work give positive results, I would recommend deep drilling be carried out to intersect the Destor-Porcupine fault at a depth of at least 600 feet. This should be done in conjunction with adjacent mining rights holders given the narrow north-south dimensions of the Weir claim group and the uncertainty of the position of the Destor-Porcupine fault at depth.

R. J. McH. Clark, P. Eng.


27/11/87

...7

## CERTIFICATE OF QUALIFICATION

1. My name is ROBERT JOHN McHALFIE CLARK.

   My residence is 2751 Consul Avenue, Nepean, Ontario, K2H-7H8.

2. I am employed as a REGIONAL MANAGER EXPLORATION by Eldor Resources Ltd., 360 Albert Street, Ottawa, Ontario, K1R-7X7.

3. (i) I have practiced as a geologist continuously since November 1967 (20 years).

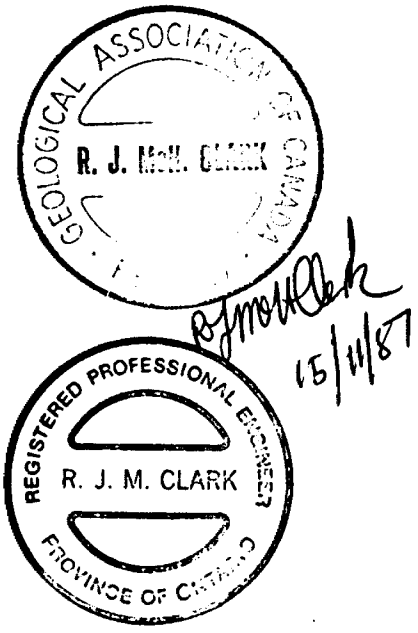
   (ii) My academic qualifications are Bachelor of Science, Bachelor of Science (Honours) and Masters of Science degrees in geology obtained at the University of the Witwatersrand in South Africa.

   (iii) I am a registered Professional Engineer in the Province of Ontario.

4. My observations and recommendations are based on personal examinations of the property; the most recent being on 20'th June 1986.

5. I hold no interest in the claims directly nor indirectly and have not received nor expect to receive any interest in any securities related to this property.

R. J. McH. Clark, P. Eng.



## ANNEXES

A - General maps of exploration activities in area of Weir claims.

B - Comstate drill results article, Northern Miner, September 15, 1986.

C - Assay reports, Swastika Laboratories Ltd., November 27, 1985.

D - R. J. McH. Clark et al paper on
"Gold mineralization associated with Archean stratabound sulphides in the Cheminis deposit near Larder Lake, Ontario".

E - Costs related to Weir claim property examination.

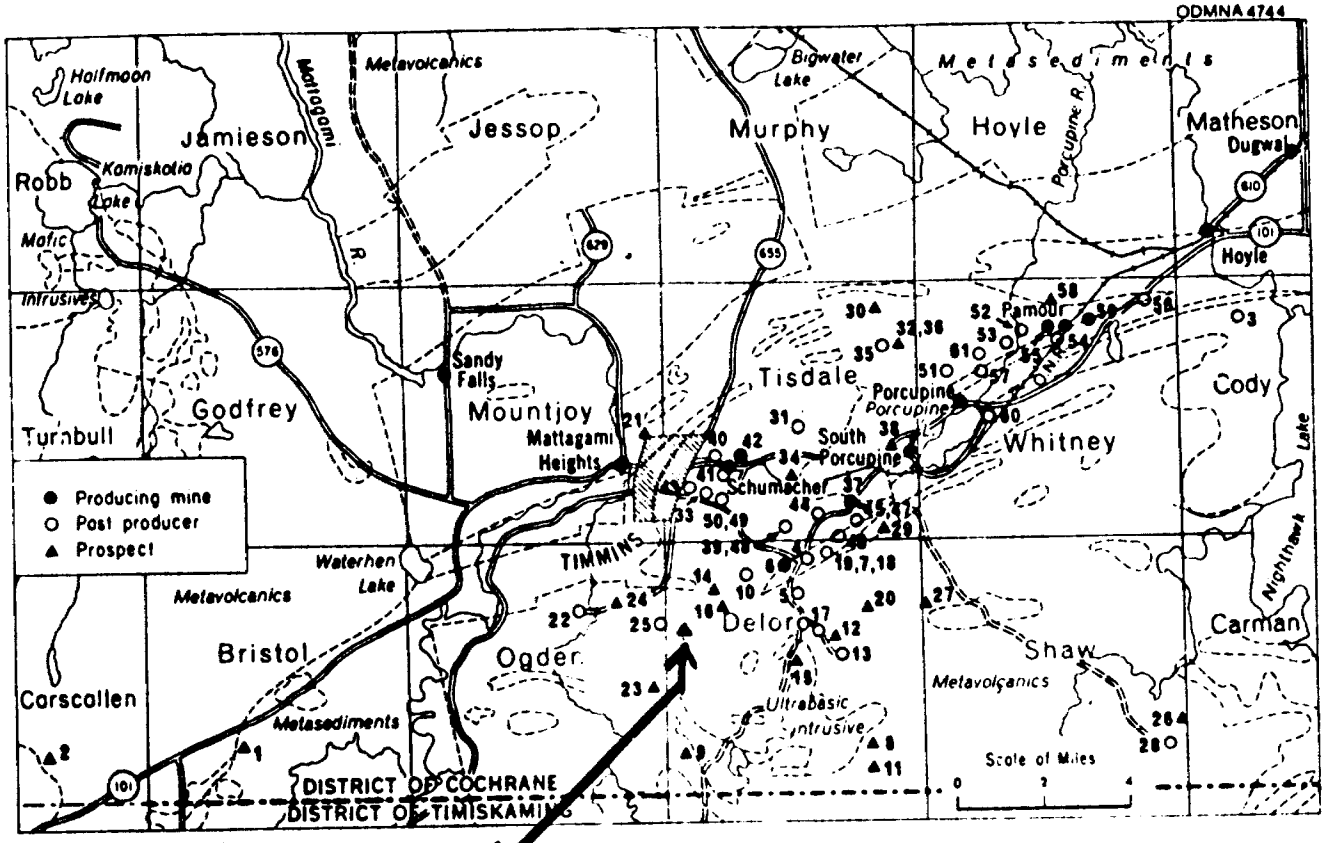
F - Geophysical-Geological-Geochemical
Technical Data Statement

# ANNEX A

- General maps of exploration activities in area of Weir claims.

Reference: page 46, "Gold Deposits of Ontario"; S.A. Ferguson, H.A. Groen, and R. Haynes; Mineral Resources Circular no. 13, 1971; Ministry of Natural Resources, Ontario Government.

ODMNA 4744




L.F. WEIR CLAIM GROUP

## POKCUPINE MINING AREA

### Index to Mines and Prospects

**Bristol Township**

1 ▲ Orpit Prospect

**Carscallen Township**

2 ▲ Jowsey Prospect

**Cody Township**

3 ○ J. Huddlestone Mine

**Deloro Township**

4 ○ Ankerite Mine
5 ○ Ankerite (March) Mine
6 ● Aunor Mine (Producer)
7 ○ Cincinnati Mine
8 ▲ Concordia Prospect
9 ▲ Dayton Prospect
10 ○ Delnite Mine
11 ▲ Delwin Prospect
12 ▲ Delwood Prospect
13 ○ Faymar Mine
14 ▲ Jasper Prospect
15 ▲ Jodelo Prospect
16 ▲ McBine Porcupine Prospect
17 ○ McLaren-Porcupine Mine
18 ○ Porcupine Pet Mine
19 ○ Porphyry Hill Mine
20 ▲ Powell Prospect

**Mountjoy Township**

21 ▲ Polaris Prospect

**Ogden Township**

22 ○ De Santis Mine
23 ▲ Gold Quill Prospect
24 ▲ McEnany Prospect
25 ○ Naybob Mine
26 ▲ Carshaw Prospect
27 ▲ Novell Prospect
28 ○ Tommy Burns Mine

**Tisdale Township**

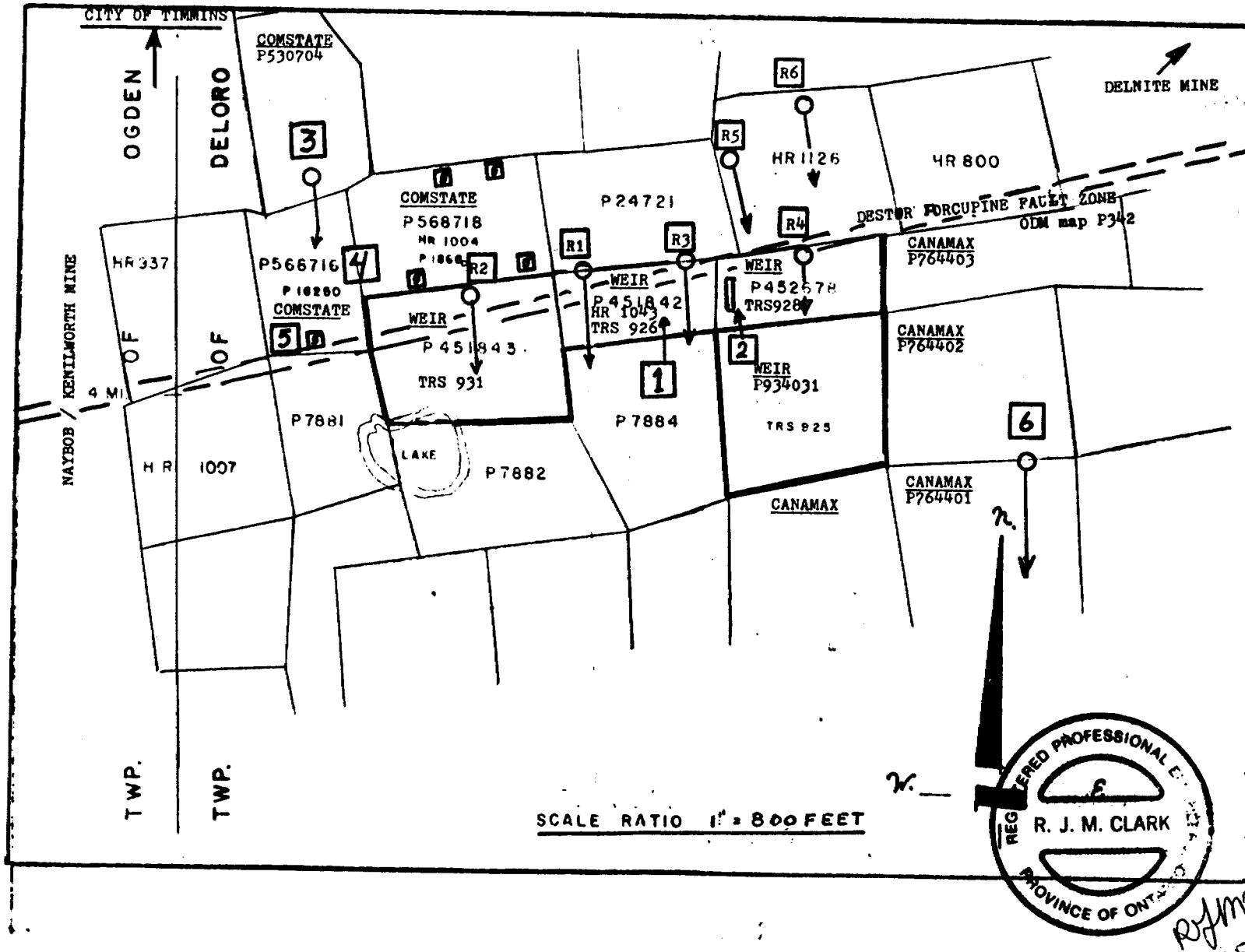
29 ▲ Augdome Prospect
30 ▲ Beaumont Prospect
31 ○ Coniaurum Mine
32 ▲ Crown Chartered Prospect
33 ○ Crown Mine
34 ▲ Central Porcupine Prospect
35 ○ Davidson Mine
36 ▲ Dobell Prospect
37 ● Dome Mine (Producer)
38 ▲ Foley-O'Brien Prospect
39 ○ Fuller Mine
40 ○ Gillies Lake Mine
41 ○ Hollinger Mine
42 ● McIntyre Mine (Producer)
43 ○ Moneta Mine
44 ○ Paymaster Mine
45 ○ Preston Mine
46 ○ Preston (Midcamp) Mine
47 ○ Preston (New York) Mine
48 ○ Tisdale Ankerite Mine
49 ▲ Triumph Prospect
50 ○ Vipond Mine

**Whitney Township**

51 ○ Banner Mine
52 ○ Bonetal Mine
53 ○ Bonwhit Mine
54 ○ Broulan Mine
55 ● Hallnor Mines (Producer)
56 ○ Hoyle Mine
57 ○ Hugh-Pam Mine
58 ▲ North Whitney Prospect
59 ● Pamour Mine (Producer)
60 ○ Porcupine Lake
61 ○ Reef Mine

PROFESSIONAL ENGINEER
J.M. CLARK
PROVINCE OF ONTARIO

15/11/87




EXPLORATION ACTIVITIES IN AREA OF WEIR CLAIMS GROUP

1924: O.D.M. GOLD REFERENCE vol. 33, part 2, pg.37 to showing on HR1043. [1]

1940: trenching work by Sylvanite Gold Mines [report T-418], and 1986 assays by Eldor [2]

1944: R1 to R6 drill holes by Noranda.

RESULTS:
R1-V6, 1BC, 4(Db)
R3-V7, V9i, 4(Db), 3G
R4-4(Db), V7
R5-V6/V7, V9i, 3G, 4(Db)
R6-V7, 1BC

Legend:

| | |
|---|---|
| V4 | Dacite |
| V6 | Andesite |
| V7 | Basalt |
| V9i | Intermediate Tuff |
| 1BC | Quartz-feldspar Porphyry |
| 3G | Gabbro |
| 4(Db) | Diabase |

1983: Placer/Comstate drill option; unrecorded drilling further south [3]

1986: Northern Miner article on Noranda/Comstate drill results [4]

1981: Overburden drilling by D. Pyke for Comstate. [5]

1986: Noranda/Comstate drill option report on Canamax claims. [6]

REFERENCES:
MAPS ODM 47a; P2079; P342
P2455.

November 7, 1987

REGISTERED PROFESSIONAL ENGINEER
R. J. M. CLARK
PROVINCE OF ONTARIO

15/11/87

CITY OF TIMMINS

OGDEN TOWNSHIP

DELNITE MINE

COMSTATE P530704

TOWN DUMP

Placer/Comstate drill option report Jan. 1983

unreported drilling to the south

COMSTATE P56718

KEMPTVILLE MINE (NAYBOB)

COMSTATE P568716

Overburden drilling D. Pyke, Aug. 1981

Noranda/Comstate drill option to 1987

drill result Northern Miner Sept 15, 1986

WEIR P451843 TRS931

Russel Group: drilled by Noranda 1944

R1: V6, 1BC, 4(Db)
R3: V7, V9i, 4(Db), 3G
R4: 4(Db), V7
R5: V6/V7, V9i, 3G, 4(Db)
R6: V7, 1BC3
*(see LEGEND)

WEIR P451842 TRS926

HR1043 Gold reference O.D.M. vol.33, Part 2, page 37

WEIR P452678 TRS928

WEIR P934031 TRS925

Trenching work Sylvanite Gold Mines Aug. 1940 report T-418

CANAMAX P764403

CANAMAX P764402

CANAMAX P764401

Noranda/Comstate drill report Nov. 1986

CANAMAX

DESTOR PORCUPINE

FAULT ZONE

Mcb

LEGEND

V4 Dacite
V6 Andesite
V7 Basalt
V9i Intermediate Tuff
1BC Quartz-feldspar Porphyry
3G Gabbro
4(Db) Diabase

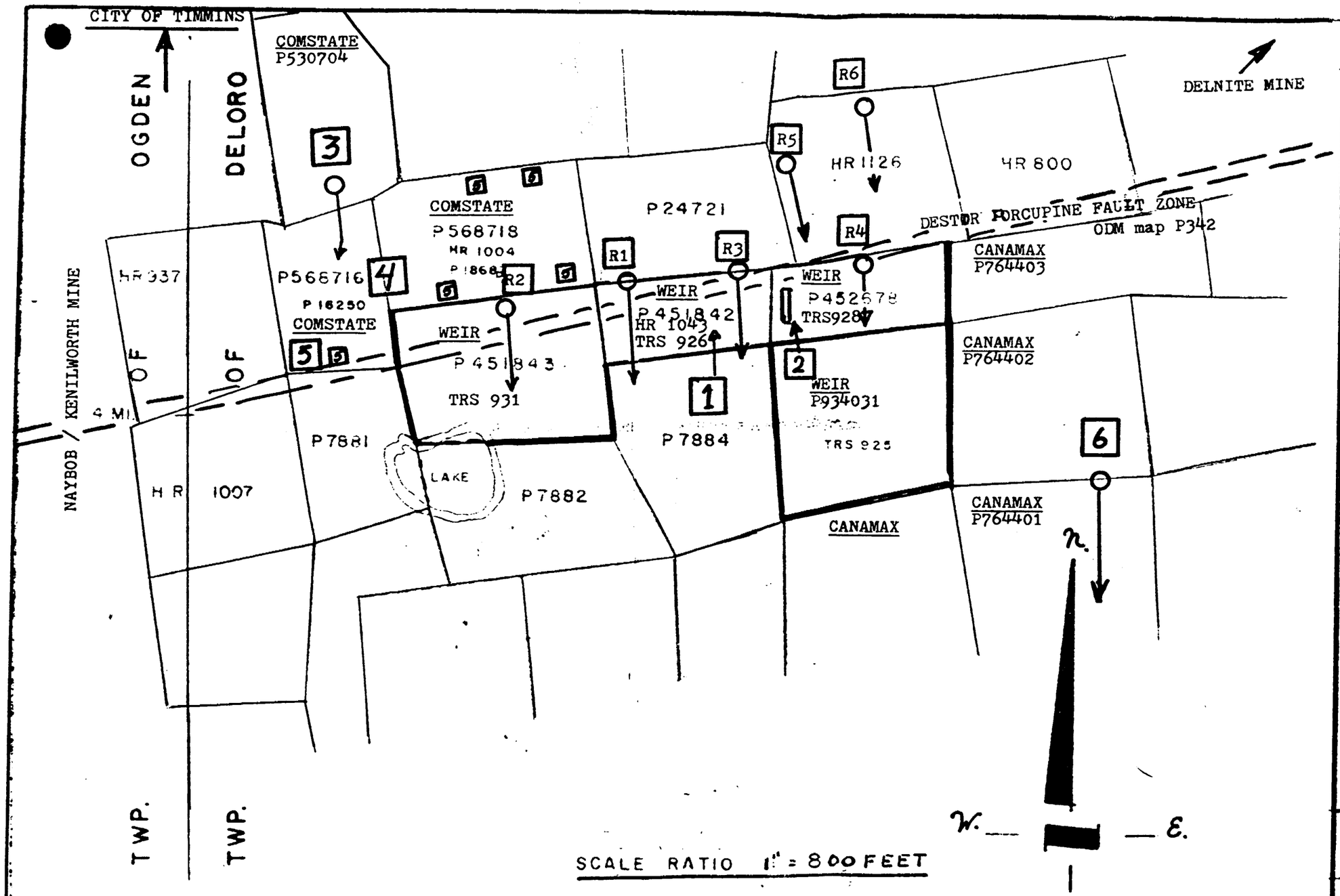
REGISTERED PROFESSIONAL ENGINEER R. J. M. CLARK PROVINCE OF ONTARIO

# DELORO TOWNSHIP NORTHWEST QUARTER

EXPLORATION ACTIVITIES IN AREA OF WEIR GROUP OF CLAIMS

MAP REFERENCES: O.D.M.#'s 47a, P2079, P342[illegible]
Scale : 1 inch=500 feet

Nov. 3, 1987

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RESULTS:
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R3-V7, V9i, 4(Db), 3G
R4-4(Db), V7
R5-V6/V7, V9i, 3G, 4(Db)
R6-V7, 1BC

Legend:

| | |
|---|---|
| V4 | Dacite |
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| V7 | Basalt |
| V9i | Intermediate Tuff |
| 1BC | Quartz-feldspar Porphyry |
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REFERENCES:
MAPS ODM 47a; P2079; P342
P2457

November 7, 1987

REGISTERED PROFESSIONAL ENGINEER
R. J. M. CLARK
PROVINCE OF ONTARIO
15/11/87

## ANNEX B

- Comstate drill results article, Northern Miner, September 15, 1986.

The Northern Miner
Founded 1915
Vol. 72 No. 27 CANADA'S MINERAL RESOURCES NEWSPAPER September 15, 1986

# Comstate still busy on Timmins-area bets

Comstate Resources says it expects results this month from overburden drilling by **Noranda Exploration** on Comstate's Mountjoy south property, and diamond drilling by **Falconbridge Ltd.**, on its Thorneloe property.

Both properties are in the Timmins area of Ontario, where Comstate holds six gold properties.

Comstate retains a 15% net profits interest in the Mountjoy, and an 18.75% carried working interest in the Thorneloe property.

On another Comstate holding in the area, the northwest Deloro property, Noranda has completed six holes and plans further diamond drilling later this year or in early 1987, Comstate says. The best reported intersection here gave 0.10 oz gold per ton, over a 1.4-ft core length.

On the southeast Deloro property, Falconbridge drilled six holes, but only geochemical anomalous concentrations of gold were found, and no further work is planned at present, says Comstate President George Fink.

Exploration programs are also planned this year on a property in the north half of Mountjoy Twp., where an option agreement has been signed with **Zahavy Minerals**, and on four claims in German Twp., under option to Noranda Exploration.

On the financial side, Comstate reports net income for the six months ended June 30 increased to $18,177, against a loss of $26,160 in the similar period last year. Cash flow for this year is $120,577, compared to $122,112 in 1985 and management expects modest increases in cash flow and profit in the second half this year.

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For the 6-month period ended June 30, **Tombill Mines** realized net income of $123,038 or 2.3¢ per share. This compares with earnings of $1.4 million in the same period last year. Working capital remains strong at $2 million.

## ANNEX C

- Assay reports, Swastika Laboratories Ltd., November 27, 1985.

# SWASTIKA LABORATORIES LIMITED

P.O. BOX 10, SWASTIKA, ONTARIO P0K 1T0
TELEPHONE: (705) 642-3244
ANALYTICAL CHEMISTS • ASSAYERS • CONSULTANTS


## Certificate of Analysis

Certificate No. 61787 Date: Nov. 27, 1985

Received Nov. 23, 1985 15 Samples of split core and ore

Submitted by Eldor Resources Ltd., Larder Lake, Ontario

proj#577-40 shipment #10106

| SAMPLE NO. | GOLD PBB | | |
|---|---|---|---|
| 2531 | Nil | Weir Claims | Komatiite |
| 2532 | 120 | Weir Claims | Quartz Vein #1 Trench |
| 2533 | Nil | Weir Claims | Pyroxenite |
| 2534 | 160<br>140 | Weir Claims | Quartz Vein in Komatiite |
| 2535 | 120 | Kenilworth Property | Fuchsitic Volcanic/ w/Quartz |

Per G. Lebel

G. Lebel, Manager

## ANNEX D

- R. J. McH. Clark et al paper on
  "Gold mineralization associated with Archean stratabound sulphides in the Cheminis deposit near Larder Lake, Ontario".

# Gold mineralization associated with archean stratabound sulphides in the Cheminis deposit near Larder Lake, Ontario

R.J.McH. CLARK
Eldor Resources Limited
Ottawa, Ontario
and
R. BONNAR
B.P. Canada Inc.
Calgary, Alberta

## ABSTRACT

*The Cheminis gold mineralization zone is approximately 6.5 km west of the Kerr Addison Mine along the Larder Lake Shear Zone, in the southern part of the Abitibi Greenstone Belt. The zone is very similar in appearance to the flow ore at the Kerr Addison Mine and occurs at the same stratigraphic position. Drilling has demonstrated that the gold mineralization at Cheminis persists to a depth of over 3000 ft.*

*The mineralization is hosted by a pyritic, tuffaceous sediment which occurs within a sequence of volcanics and sediments which have been pervasively carbonatized. The gold is largely enclosed within pyrite grains and the amount of gold in the layers of pyrite increases in the layers closest to a graphitic fault zone.*

*It is suggested that the gold mineralization may be primarily related to the syngenetic sulphide concentrations formed during fumarolic activity on the seafloor along the Larder Lake Shear Zone. At a later stage a hydrothermal event associated with alkalic volcanism may have resulted in regional carbonatization and further concentration of the gold in the vicinity of fault zones.*

## Introduction

The Cheminis gold deposit is located in the Larder Lake mining camp of northeastern Ontario, 35 km east of Kirkland Lake. During 1937 and 1938 significant gold mineralization was delineated at Cheminis by diamond drilling, and a shaft was sunk to 553 ft with 4900 ft of lateral development. In 1947 the Cheminis shaft was extended to 1085 ft. A total of 320 000 tons of ore with an average grade of 0.16 oz Au/ton was outlined in the A (central), B (eastern) and C (western) zones. The tonnage was not considered to be sufficient for production.

During the most recent phase of exploration, conducted by Eldor Resources and Kerr Addison Mines, a new deep mineralized zone called the D zone has been delineated. The D zone is approximately 900 ft below the A and B zones and contains more gold than the A, B, and C zones combined.

## Regional Geology

The deposit is situated in the southern portion of the Abitibi Greenstone Belt within the Superior structural province of the Canadian Shield (Fig. 1).

The regional geology of the area has been described in

**R.J. McH Clark**

Robert J. McH Clark was born in Britain and received an M.Sc. degree in geology from the University of the Witwatersrand in the Republic of South Africa. He has worked in the mineral exploration industry since 1967 in a wide variety of metallogenic environments having been employed by Rio Tinto Zinc in Africa and Inco Limited and the Eldorado Group of Companies in Canada. Mr. Clark is currently district manager, exploration, with Eldorado based in Ottawa.

**R. Bonnar**

Robert Bonnar, was born in Ottawa, Ontario, and completed his B.Sc. degree at the University of Alberta in 1975. He has worked in the mineral exploration industry in a variety of metallogenic provinces across Canada for Eldorado Nuclear Limited from 1975 to 1985. Since 1985 Mr. Bonnar has worked in petroleum exploration for BP Canada Resources Ltd. in the frontiers division and as an operation geologist.

**Keywords:** Mineralization, Gold deposits, Cheminis deposit, Larder Lake, Sulphides.

**Paper reviewed and approved for publication by the Geology Division of CIM.**

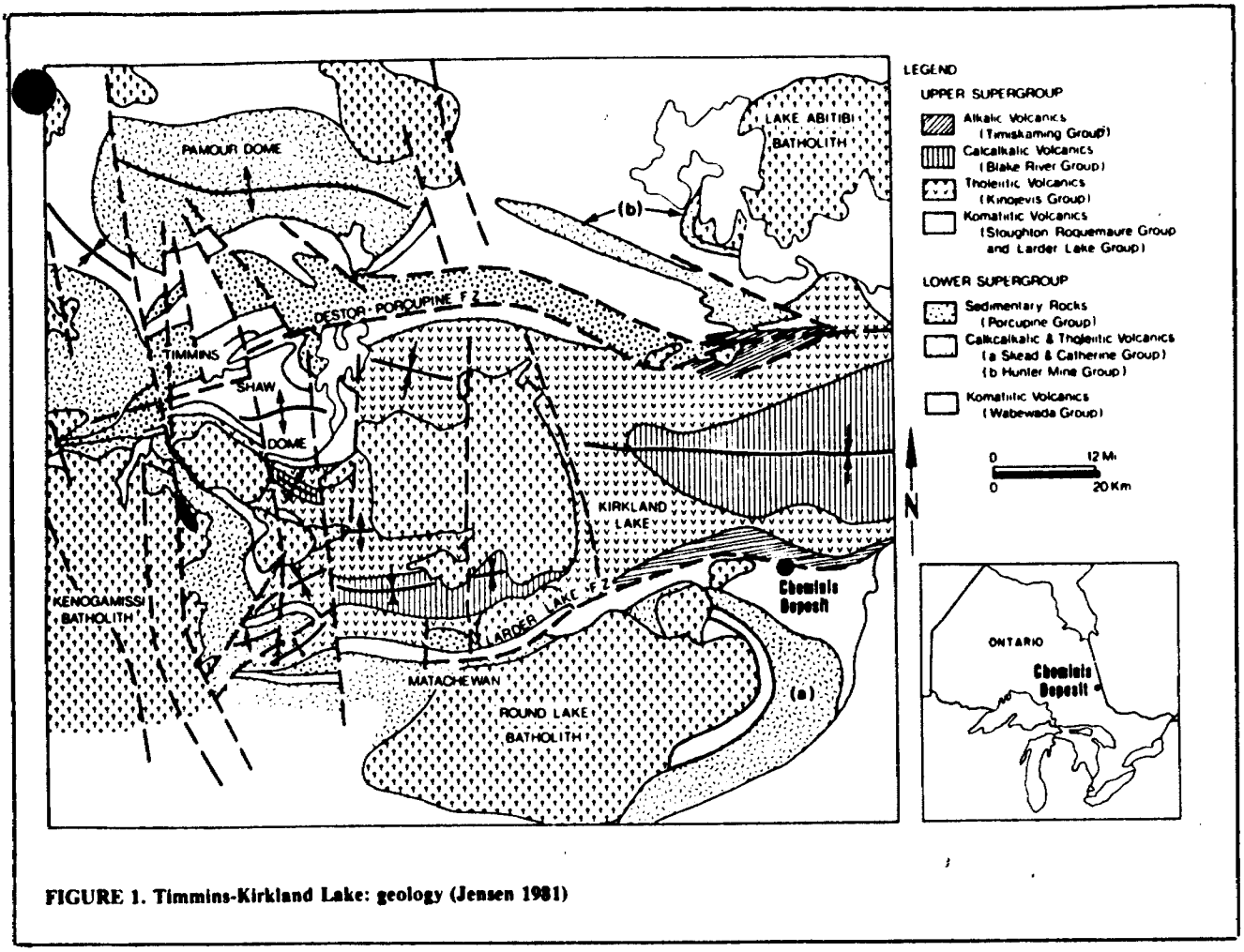


**FIGURE 1. Timmins-Kirkland Lake: geology (Jensen 1981)**

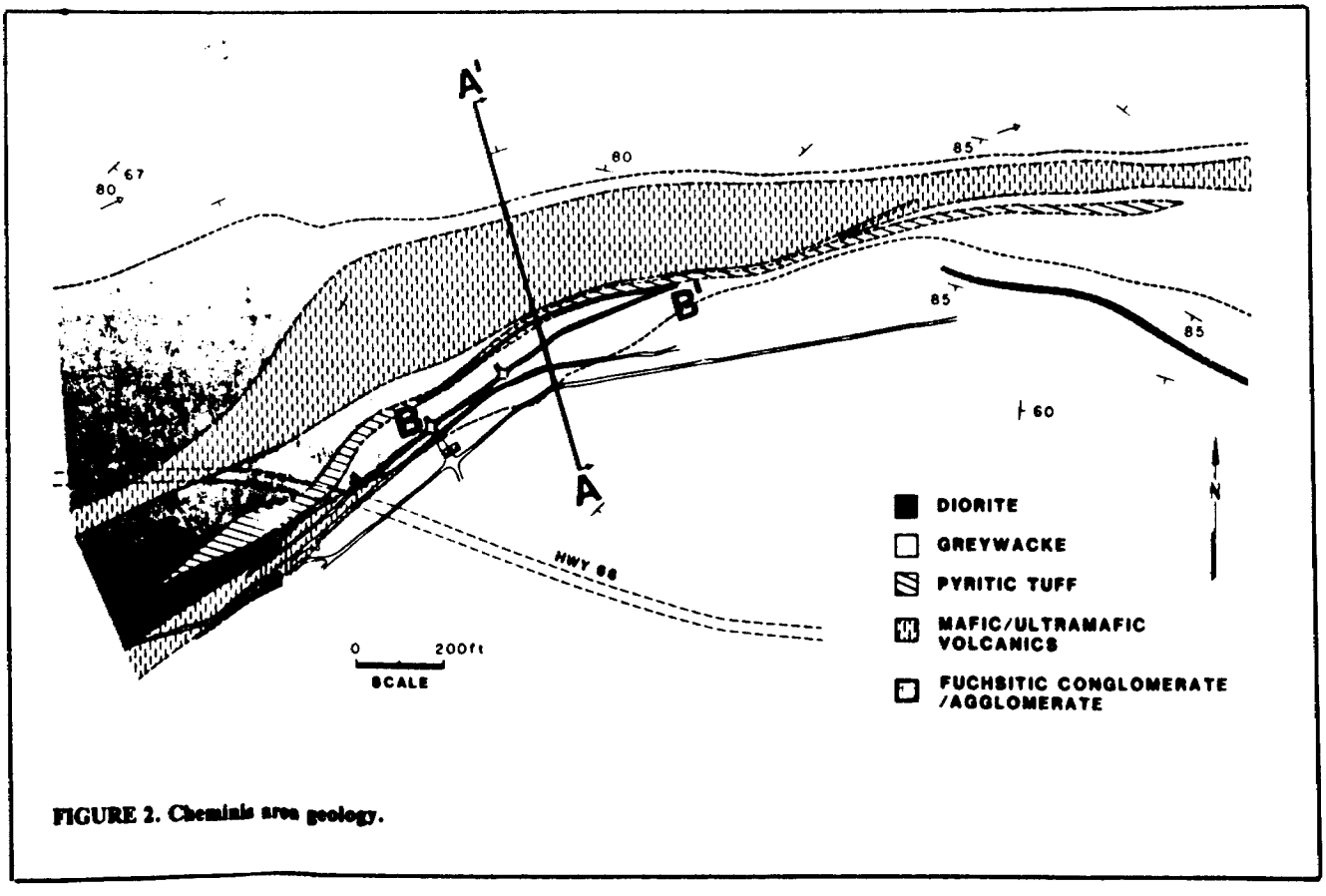


**FIGURE 2. Cheminis area geology.**

several publications. The descriptions are largely based on mapping by Thomson (1941 and 1948). The interpretation suggested by Pyke (1981) and Jensen (1981) is in broad agreement with the views of the authors and will be used here.

The Cheminis deposit lies within the Larder Lake Group of Jensen and Pyke (Jensen 1981) and is the lowest unit of the Upper Volcanic Cycle of Jensen and Pyke. This group is located on the south limb of a large east-plunging synclinorium (Fig. 1).

The gold mineralization at Cheminis is situated immediately adjacent to and within the Larder Lake Fault Zone. Although not evident from Figure 1, due to the scale, the Larder Lake Fault does not form the boundary between the younger Timiskaming Group and the older Larder Lake Group in the Cheminis area.

## Geological Setting of the Deposit

The Cheminis deposit occurs within a steeply south-dipping, isoclinally folded, sequence of Archean sediments, fragmentals and mafic to ultramafic volcanics. All the rock types in the area (Fig. 2) with the exception of the diorite belong to the Larder Lake Group, and are equated, informally by the authors and Kerr Addison geologists with the "Virginiatown sequence" as it is developed at the Kerr Addison Mine.

The Kerr Addison Mine is approximately 6.5 km east of the Cheminis deposit along the Larder Lake Break and has the following sequence of rocks developed, from south to north: greywacke; volcanics; chlorite talc breccia; volcanic rocks and tuffs which contain pyritic "flow ore"; talc chlorite and quartz carbonate schists which contain lenses of "green carbonate ore"; and greywacke.

The thickness of the individual units is variable but the overall thickness of the sequence of volcanic and volcaniclastic rocks, between the greywacke units, is in excess of 2000 ft. The entire sequence is folded into tight anticlines and synclines plunging to the west at 30 degrees to 70 degrees.

At Cheminis the "Virginiatown Sequence" is 400 ft to 800 ft thick. The sequence from south to north along section line A to A' on Figure 2, and along the trace of drill hole 83-2D on Figures 4 and 5 is: greywacke; carbonatized fuchsitic conglomerate to agglomerate (composed of fragments of mafic to ultramafic volcanics); brecciated graphitic tuff; volcanic rocks and tuffs which contain pyritic "flow ore"; chlorite carbonate schist (altered mafic to ultramafic volcanics); fuchsitic agglomerate containing lenses of "green carbonate ore"; graphitic tuff; carbonatized agglomerate; and greywacke.

As can be seen from the cross section of the Cheminis deposit (Fig. 4) the northern graphitic tuff and the agglomerate unit intersected in drilling do not outcrop. Differences in terminology at Cheminis and the Kerr Addison Mine have resulted in an exaggeration of differences between the two localities. In point of fact, the tuffaceous rocks containing the pyritic flow ore at both deposits are extremely similar in hand specimen, chemistry and mineralogy.

The most important structure in the area is undoubtedly the Larder Lake Break which has been shown as occurring at various positions within the Virginiatown Sequence. The authors' experience from detailed drilling is that the southern graphitic tuff has, by far, the greatest evidence of fault movement in the form of fault gouge and slicken-siding. This unit is immediately adjacent to the "flow ore" zone.

The Timiskaming Group is approximately 800 ft north of the area shown in Figure 2. It is represented by alkaline volcanics which overly the Larder Lake Group with a marked discordance (Downes 1981). Downes proposed that elsewhere the same discordance separated the Larder Lake Group from the Kinojevis Group based on an abrupt change in lithology from komatiitic volcanics to tholeiitic volcanics. Hamilton (1983), however, pointed out that, in places, the contact appears to be gradational with minor intercalations between the two groups. This proposed northern structural discordance or fault zone does not have gold mineralization associated with it in the Cheminis area.

The entire Virginiatown Sequence in the Cheminis area has been subjected to intense alteration to carbonate minerals. The rock types, on average, contain 60% carbonate. According to Tihor (1978) the carbonate is principally dolomite. Observations by Hamilton (1983) in McGarry Township are in agreement with the authors' findings that the degree of carbonatization increases with proximity to the Larder Lake Break. This observation suggests the carbonate alteration may have had its source in hydrothermal solutions emanating from the Break.

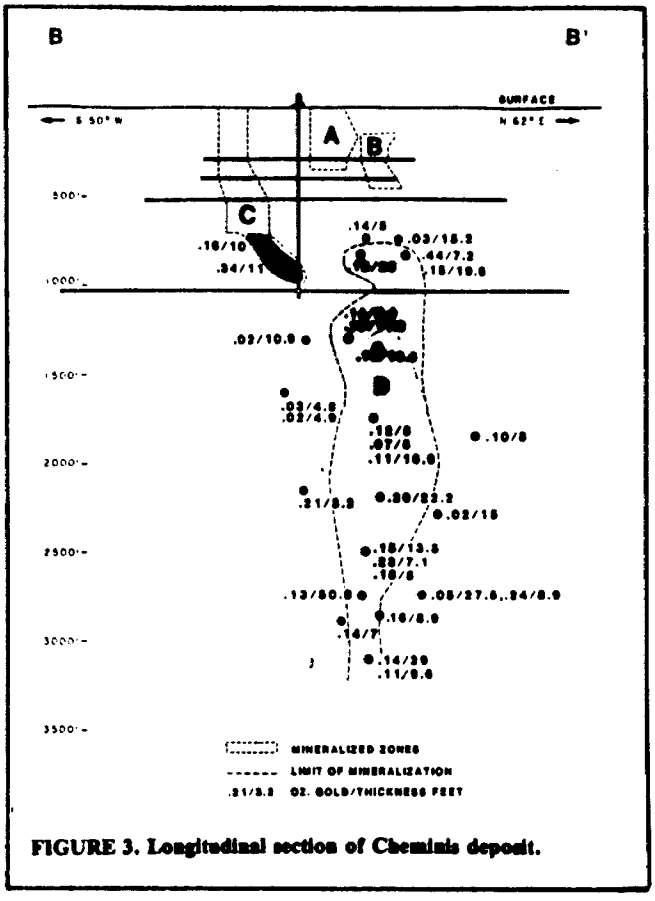


**FIGURE 3. Longitudinal section of Cheminis deposit.**

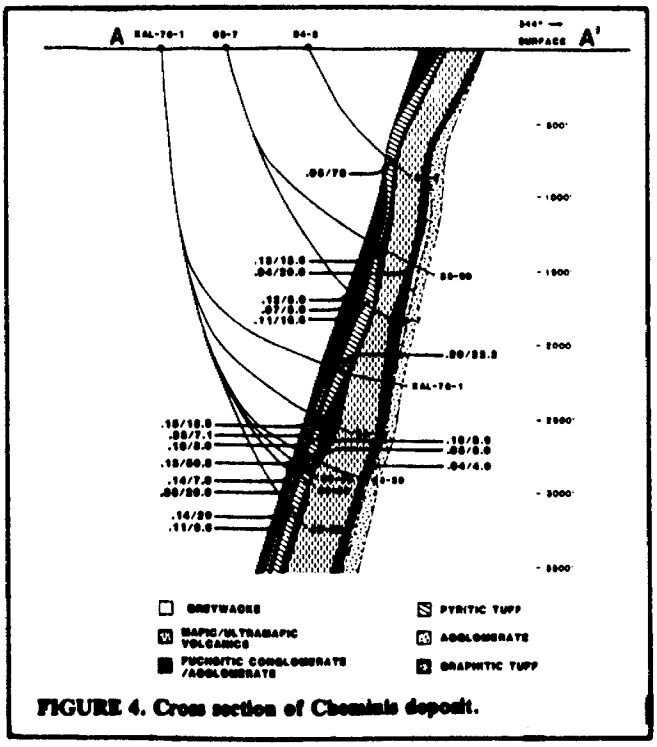


**FIGURE 4. Cross section of Cheminis deposit.**

**TABLE 1.** Cheminis deposit major oxide concentrations (in weight percent)

| Sample No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $SiO_2$ | 31.70 | 8.69 | 21.20 | N.S. | 19.60 | N.S. | 35.50 | 45.50 | 33.30 | 36.60 | 25.60 | 58.30 |
| MgO | 19.90 | 15.00 | 5.80 | N.S. | 5.40 | N.S. | 5.40 | 1.97 | 16.70 | 18.80 | 12.80 | 2.92 |
| $K_2O$ | 0.10 | 0.61 | 3.14 | N.S. | 3.07 | N.S. | 3.24 | 2.10 | 1.47 | 0.01 | 1.03 | 2.55 |
| $CO_2$ | 26.46 | 34.59 | 19.12 | N.S. | 20.52 | N.S. | 16.52 | 6.92 | 27.35 | 16.94 | 28.56 | 8.66 |

N.S. denotes no sample analyzed

| Sample No. | Rock Type |
|---|---|
| 1 | Fuchsitic Conglomerate/Agglomerate |
| 2 | Graphitic Tuff |
| 3 | Pyritic Tuff |
| 4 | Pyritic Tuff |
| 5 | Pyritic Tuff |
| 6 | Pyritic Tuff |
| 7 | Pyritic Tuff |
| 8 | Graphitic Tuff |
| 9 | Fuchsitic Agglomerate |
| 10 | Ultramafic Volcanic |
| 11 | Fuchsitic Agglomerate |
| 12 | Graphitic Tuff |

**TABLE 2.** Cheminis deposit trace elements

| Sample No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gold (ppb) | 20 | 45 | 11 730 | 9845 | 640 | 3495 | 390 | 740 | 25 | 10 | 25 | 40 |
| Silver (ppm) | N.D. | N.D. | 1.0 | 0.8 | 0.2 | 0.4 | N.D. | 0.1 | 0.1 | N.D. | N.D. | N.D. |
| Mercury (ppm) | 40 | 25 | 250 | 95 | 190 | 50 | 15 | 155 | 15 | 125 | 75 | 50 |
| Copper (ppm) | 28 | 15 | 71 | 42 | 196 | 589 | 28 | 13 | 28 | 7 | 39 | 26 |
| Chromium (ppm) | 2271 | 1769 | 49 | 33 | 54 | 36 | 16 | 19 | 3065 | 27 | 1751 | 110 |
| Nickel (ppm) | 1025 | 1018 | 64 | 43 | 77 | 87 | 291 | 54 | 1084 | 10 | 813 | 78 |
| Cobalt (ppm) | 46 | 43 | 30 | 42 | 36 | 35 | 19 | 71 | 25 | 53 | 17 | |

N.D. denotes not detected

## The Ore Deposit Dimensions

The Cheminis gold deposit consists of three small zones close to surface and one large zone at depth. The upper zones, the A, B, and C zones, have been known since the 1930s. The deep zone, designated the D zone, was discovered during the current phase of exploration conducted by Kerr Addison and Eldor Resources.

Section line A to A′ (Figs. 2 and 4) along which much of the drilling was carried out, shows that gold mineralization is contained within the pyritic tuffs. The longitudinal section, B to B′ (Figs. 2 and 3) is drawn in the plane of the pyritic tuffs and hence ore zones A, B, C, and D.

The three upper zones are small. The largest, the C or western zone, has a strike length of 150 ft to 250 ft, extends from near surface to a depth of 900 ft and averages approximately 15 ft in thickness. The average grade of this zone is 0.17 oz/ton. The A zone or central zone, has a strike length which averages 200 ft, extends from near surface to a depth of 350 ft and averages 10 ft in width. The average grade of this zone is 0.15 oz/ton. The smallest mineralized body is the eastern or B zone, which has an average strike length of 150 ft, extends from a depth of 150 ft to 450 ft and averages only 7 ft in width. The average grade of the B zone is 0.14 oz/ton.

The lower zone of mineralization or D zone, has been delineated from 700 ft to 3100 ft in depth. The zone is a narrow, chimney-like body with vertical continuity of 2400 ft but a strike length averaging only 350 ft and a width averaging 14 ft. At a cut-off grade of 0.07 oz/ton, the grade averages approximately 0.18 oz/ton.

The discovery of the D zone commenced in 1978 with the intersection of 0.20 oz/ton gold over 22.2 ft in hole K.A.L.78-1. Five follow-up deflections were drilled from this hole which were successful in extending the zone to depth. Later shallow drilling has been successful in extending the zone above 1325 ft.

## Lithology of Ore and Host Rocks

The ore zones occur in units of pyritic tuff within the Virginiatown Sequence. The high gold values in hole 83-2D (Fig. 5) occur in units of the pyritic tuff. The pyritic tuffs have a well developed, fragmental texture and contain many lapilli-sized fragments. Carbonate makes up most of the rock in its present altered state with up to 20% pyrite and lesser amounts of sericite, plagioclase and quartz. Scattered grains of leucoxene, mixed with the fine grained carbonate, are interpreted to represent original mafic rock fragments (Boutcher 1983).

Units of fuchsitic agglomerate are interlayered with the pyritic tuffs and are composed essentially of carbonate, sericite and fuchsite. In outcrop, a rusty weathered surface is formed from the oxidation of iron-rich carbonates and the rock has a rubbly texture due to the presence of large irregular fragments. On fresh surfaces the rock is bright green due to the high fuchsite content. The carbonate minerals are dolomite (Tihor 1978), ferroan dolomite and magnesite (Kerrich 1983). Although these rocks are the equivalent of the green carbonate ore at Kerr Addison and often contain quartz stockworks, they only host minor amounts of gold in the Cheminis area.

The third rock type, which is closely associated with the ore zones, is the brecciated graphitic tuff which is a fine-grained, very thinly bedded sediment with well developed graphitic layers. The rock is composed of carbonate, quartz and graphite with minor amounts of sericite and chlorite. The layering in the rock is intensely distorted. The graphite is slicken sided in several directions, indicating repeated fault movement. Splays of the Larder Lake Fault Zone are believed to cut through these units which are the least competent rock types in the sequence.

As can been seen from Figure 4, the tuffaceous rocks described above enclose a thick unit, averaging 300 ft, of mafic to ultramafic volcanics. These rocks have undergone extensive carbonate alteration and tectonic deformation, resulting in

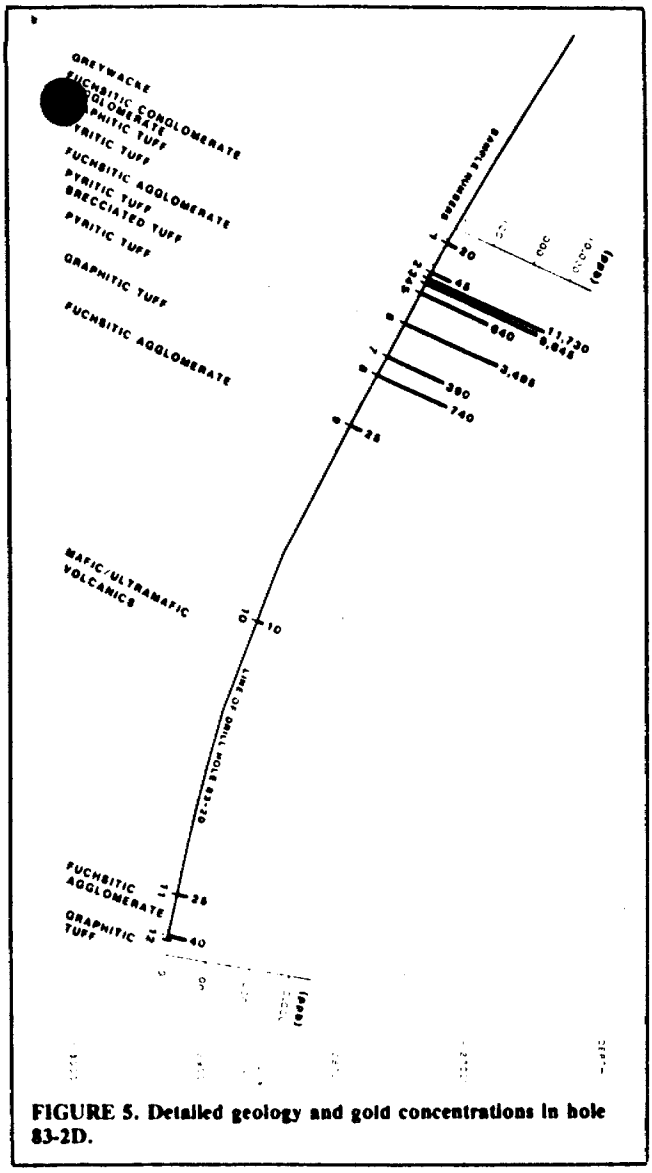


**FIGURE 5. Detailed geology and gold concentrations in hole 83-2D.**

their transformation into chlorite-carbonate schists. However, textures such as pillows, vesicles, flow top breccias, spinnifex and sub-solidus cooling structures (polyhedral jointing) confirm their mafic to ultramafic volcanic origin.

The tuffs and volcanics described above are sandwiched between units of greywacke. The greywacke is fine grained, thinly bedded and occasionally contains bands of conglomerate with fuchsitic clasts (possibly representing altered ultramafic). The evidence of graded bedding, load casts and flame structures indicates rapid reversals of facing directions. The southern greywacke contains several thin, highly folded beds of oxide facies iron formation. Both greywacke units have undergone only minor carbonate alteration.

## Mineralogy of the Ore Deposit

Scanning electron microscopic examination has shown that there are two generations of pyrite (Gasparrini 1983). The older generation is porous and contains abundant inclusions, whereas the younger generation is compact and forms overgrowths around the porous pyrite (Fig. 6).

The gold has a different habit in the two types of pyrite. In the compact pyrite rims it occurs as rounded exsolution droplets, (Fig. 7), and in the porous pyrite it occurs in coarser, angular particles (Fig. 8). The gold occurs preferentially at the contacts of pyrite grains, generally forming elongated particles. The largest individual gold grain observed was approximately 40 by 150 microns.


**FIGURE 6. Large pyrite grain with older porous core and younger, compact rim.**

**FIGURE 7. Rounded exsolution droplets of gold in compact rim.**

There is no observed preferential association of the gold with the first or second generation of pyrite. The observation made at the Kerr Addison Mine, that the grade of ore has an inverse relationship to the grain size of the pyrite (Downes 1981), is not true at Cheminis.

Other sulphides associated with the pyrite are sphalerite, pyrrhotite, arsenopyrite and tetrahedrite. Gold enclosed in arsenopyrite was found in one specimen.

The silver content of the gold is relatively constant in the 10% to 15% range, but is slightly higher in the gold occurring in fractures and in the second generation of pyrite. The only silver-bearing mineral observed was tetrahedrite.

## Geochemistry of the Ore and Host Rocks

Partial chemical analyses of samples of ore and host rock taken in drill hole 83-2D are shown in Table 1. The locations

**FIGURE 8. Angular gold in porous core (Magnification 1250 times).**

of the individual samples are shown in Figure 5.

The rocks have been carbonatized extensively since all the samples have more than 6.9% $CO_2$, with the pyritic tuff typically containing greater than 16% (samples 3, 5 and 7). This reflects a carbonate content of 40% by volume. The fuchsitic agglomerates have undergone the most intense carbonatization and most have a 60% to 80% carbonate content by volume.

All rocks samples have an extremely low $SiO_2$ content which varies from 8.6% to 58.3%. The pyritic tuffs average only approximately 25% $SiO_2$.

The high $K_2O$ and low MgO values for the gold-bearing pyritic tuffs suggest that their original composition was modified by hydrothermal alteration. The fuchsitic agglomerate (samples 1, 9 and 11) contains high concentrations of Cr and Ni, averaging 2000 ppm and 900 ppm, respectively. This suggests an ultramafic precursor to the fuchsitic agglomerates. Cobalt is also high in the fuchsitic agglomerate compared to the other rocks.

Silver has a very strong correlation with gold, reflecting the fact that most of it occurs as an alloy with gold rather than as separate silver minerals. Mercury has a strong correlation with gold. No mercury minerals have been identified in studies of the core. Copper also has a good correlation with gold values and occurs mainly as chalcopyrite.

## Genesis of Gold Mineralization

It is essential to review the key elements of the geological framework surrounding the gold in the Cheminis deposit before discussing the authors' views on genesis.

1. the gold occurs in pyrite (original grains of pyrite and recrystallized rims) within the pyritic tuffs and the best values are associated with well marked compositional banding in the tuff.
2. The best gold values occur in hole 84-2D where a major northeast trending graphitic fault zone (part of the Larder Lake Shear Zone) is in direct contact with the pyritic tuff.
3. The thickness of the "Virginiatown Sequence" bears no constant relationship to the amount of gold present.
4. The geological succession has been tightly isoclinally folded.
5. Syenitic stocks are present within 2 km of the Cheminis deposit.
6. The entire sequence has been intensely altered with the addition of carbonate and the development of sericite and fuchsite.

Based on the above observations the authors proposed that the formation of the gold deposits are intimately associated with the Larder Lake Break (shear zone).

The Break developed as a result of extensional tectonics along the edge of a sedimentary basin (Jensen 1981). It is proposed that the tuffaceous rocks of the Virginiatown Sequence of the Larder Lake Group were emplaced by eruption along the basin edge faults. It has been suggested by Wilton and Lowrie (1980) that the pyrite in the flow ore at Kerr Addison has a subaquous exhalative origin. If this origin is extended to the pyrite in the flow ore at Cheminis then the pyrite could have been emplaced at the same time as the tuffs.

The widespread carbonatization and potassic alteration which may have also further concentrated the gold, decreases in magnitude away from the shear zone "break". It is suggested by the authors that the Larder Lake Break was reactivated during the alkalic volcanism of the Timiskaming Group and that the hydrothermal alteration was related to this volcanism.

In summary, the formation of the gold deposits at Cheminis is regarded by the authors as being a hydrothermal up-grading of original syngenetic concentrations.

## Acknowledgments

The authors wish to express their appreciation to the management of Kerr Addison Mines Ltd., especially Dale Hendrick and Dave Lowrie for their valued discussion on the geology of the area and permission to publish this paper. Thanks are due to Dave Fountain and members of Eldor staff for assistance in the preparation of the paper. Howard Lowell and Gary Grabowski of the Ontario Geological Survey are thanked for the information and discussion they provided although the views expressed here do not reflect their own.

## REFERENCES

BOUTCHER, S.M.A., 1983, Petrographic reports on 14 rock samples; Unpublished report.

DOWNES, M.J., 1981, Structural and Stratigraphic Aspects of Gold Mineralization in the Larder Lake Area, Ontario; *in* Genesis of Archean, Volcanic Hosted Gold Deposits, pp. 66-70, E.G. Pye and R.G. Roberts, eds; Ontario Geological Survey, Miscellaneous Paper 97, 175 p.

GASPARRINI, C., 1983, Study of gold distribution in eight samples of cores; Report No. 391, p. 31; Unpublished report.

HAMILTON, J.V., 1983, Geological study of the area of the Kirkland Lake-Larder Lake Break in central McGarry Township; Ontario Geological Survey, Miscellaneous Paper 116, *pp. 179-184.*

JENSEN, L.S., 1981, Gold mineralization of the Kirkland Lake-Larder Lake area; *in* Genesis of Archean, Volcanic Hosted Gold Deposits, pp. 59-65, E.G. Pye and R.G. Roberts, eds; Ontario Geological Survey, Miscellaneous Paper 97, 175 p.

KERRICH, R., 1983, Geochemistry of gold deposits in the Abitibi Greenstone Belt; Special Volume 27, The Canadian Institute of Mining and Metallurgy, 75 p.

PYKE, D.R., 1981, Relationship of gold mineralization to stratigraphy and structure in Timmins and surrounding area; *in* Genesis of Archean, Volcanic Hosted Gold Deposits, pp. 1-15, E.G. Pye and R.G. Roberts, eds; Ontario Geological Survey, Miscellaneous Paper 97, 175 p.

THOMPSON, J.E., 1941, Geology of McGarry and McVittie Townships, Larder Lake Area, Timiskaming District, Ontario; Ontario Dept. of Mines, Annual Report, 1941, Volume 50, Part 7.

TIHOR, S.L., 1978, The mineralogical composition of the carbonate rocks of the Kirkland Lake-Larder Lake Gold Camp; Unpublished M.Sc. Thesis, McMaster University, 93 p.

TIHOR, S.L., 1948, Geology of Teck Township and Kenogami Lake Area, Kirkland Lake gold belt, Timiskaming District, Ontario, Ontario Dept. of Mines, Annual Report, 1948, Volume 57, Part 5, *pp. 1-53.*

WILTON, C.K. and LOWRIE, D.A., 1980, Geology of the Kerr Addison Mine, a review; D.A. Lowrie, Vice President of Exploration and C.K. Wilton, Senior Development Geologist; Kerr Addison Mines, Toronto, Ontario; Preprint for Annual General Meeting of the CIM, Toronto, April 24-24, 1980, 8 p.

# SWASTIKA LABORATORIES LIMITED

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TELEPHONE: (705) 642-3244
ANALYTICAL CHEMISTS • ASSAYERS • CONSULTANTS


## Certificate of Analysis

Certificate No. 61787 Date: Nov. 27, 1985

Received Nov. 23, 1985 15 Samples of split core and ore

Submitted by Eldor Resources Ltd., Larder Lake, Ontario

proj#577-40 shipment #10106

| SAMPLE NO. | GOLD PBB |
|---|---|
| 2521 | 100 |
| 2522 | 310 |
| 2523 | 230 |
| 2524 | 330 |
| 2525 | 820 |
| | 850 |
| 2526 | 2000 |
| | 1780 |
| second pulp | 1650 |
| | 1510 |
| 2527 | 100 |
| 2528 | 240 |
| 2529 | 100 |
| 2530 | 30 |
| 2531 | Nil |
| 2532 | 120 |
| 2533 | Nil |
| 2534 | 160 |
| | 140 |
| 2535 | 120 |

Per G. Lebel

G. Lebel, Manager

ESTABLISHED 1928

# ANNEX F

- Geophysical-Geological-Geochemical Technical Data Statement

Ministry of Northern Development and Mines

Ontario

# Geophysical-Geological-Geochemical Technical Data Statement

File _____

**TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT**
**FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT**
**TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.**

Type of Survey(s) GEOLOGICAL AND LITHO GEOCHEMICAL

Township or Area DELORO TOWNSHIP

Claim Holder(s) M STARUCH

Survey Company ELDOR RESOURCES LIMITED

Author of Report R. J CLARK

Address of Author 2751 CONSUL AVE, NEPEAN, ONT, K2H 7H8

Covering Dates of Survey _____ (linecutting to office)

Total Miles of Line Cut _____

**MINING CLAIMS TRAVERSED**
**List numerically**

| (prefix) | (number) |
|---|---|
| P | 451842 |
| P | 451843 |
| P | 452678 |
| P | 934031 |

If space insufficient, attach list

TOTAL CLAIMS _____

**SPECIAL PROVISIONS CREDITS REQUESTED**

ENTER 40 days (includes line cutting) for first survey.

ENTER 20 days for each additional survey using same grid.

| | DAYS per claim |
|---|---|
| Geophysical | |
| –Electromagnetic | |
| –Magnetometer | |
| –Radiometric | |
| –Other REPORT - 43 | |
| Geological | 14 |
| Geochemical | 3 |

**AIRBORNE CREDITS** (Special provision credits do not apply to airborne surveys)

Magnetometer _____ Electromagnetic _____ Radiometric _____ (enter days per claim)

DATE: 15/11/87 SIGNATURE: R J Mc Clark
Author of Report or Agent

Res. Geol. _____ Qualifications _____

Previous Surveys

| File No. | Type | Date | Claim Holder |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

OFFICE USE ONLY

837 (85/12)

# GEOPHYSICAL TECHNICAL DATA

GROUND SURVEYS – If more than one survey, specify data for each type of survey

Number of Stations _____ Number of Readings _____

Station interval _____ Line spacing _____

Profile scale _____

Contour interval _____

**MAGNETIC**

Instrument _____

Accuracy – Scale constant _____

Diurnal correction method _____

Base Station check-in interval (hours) _____

Base Station location and value _____

_____

**ELECTROMAGNETIC**

Instrument _____

Coil configuration _____

Coil separation _____

Accuracy _____

Method: ☐ Fixed transmitter ☐ Shoot back ☐ In line ☐ Parallel line

Frequency _____
(specify V.L.F. station)

Parameters measured _____

**GRAVITY**

Instrument _____

Scale constant _____

Corrections made _____

_____

Base station value and location _____

_____

Elevation accuracy _____

**INDUCED POLARIZATION RESISTIVITY**

Instrument _____

Method ☐ Time Domain ☐ Frequency Domain

Parameters – On time _____ Frequency _____

– Off time _____ Range _____

– Delay time _____

– Integration time _____

Power _____

Electrode array _____

Electrode spacing _____

Type of electrode _____

## SELF POTENTIAL

Instrument _____ Range _____

Survey Method _____

_____

Corrections made _____

_____

## RADIOMETRIC

Instrument _____

Values measured _____

Energy windows (levels) _____

Height of instrument _____ Background Count _____

Size of detector _____

Overburden _____

(type, depth – include outcrop map)

## OTHERS (SEISMIC, DRILL WELL LOGGING ETC.)

Type of survey _____

Instrument _____

Accuracy _____

Parameters measured _____

_____

Additional information (for understanding results) _____

_____

_____

## AIRBORNE SURVEYS

Type of survey(s) _____

Instrument(s) _____

(specify for each type of survey)

Accuracy _____

(specify for each type of survey)

Aircraft used _____

Sensor altitude _____

Navigation and flight path recovery method _____

_____

Aircraft altitude _____ Line Spacing _____

Miles flown over total area _____ Over claims only _____

# GEOCHEMICAL SURVEY – PROCEDURE RECORD

Numbers of claims from which samples taken 2

Total Number of Samples 5

Type of Sample ROCK FRAGMENTS
(Nature of Material)

Average Sample Weight 6 POUNDS

Method of Collection GEOLOGICAL PICK

Soil Horizon Sampled N.A.

Horizon Development ROCK

Sample Depth

Terrain FROM PRE-EXISTING TRENCHES

Drainage Development

Estimated Range of Overburden Thickness 0

## SAMPLE PREPARATION
(Includes drying, screening, crushing, ashing)

Mesh size of fraction used for analysis

CRUSHING, SCREENING PRIOR TO FIRE ASSAY

General

## ANALYTICAL METHODS

Values expressed in: per cent ☐
p. p. m. ☐
p. p. b. ☒

Cu, Pb, (Au) Zn, Ni, Co, Ag, Mo, As,-(circle)

Others GOLD

Field Analysis (_____ tests)

Extraction Method LEAD BEAD

Analytical Method FIRE ASSAY, AA finish

Reagents Used

Field Laboratory Analysis

No. (_____ tests)

Extraction Method

Analytical Method FIRE ASSAY

Reagents Used

Commercial Laboratory (_____ tests)

Name of Laboratory SWASTIKA LABORATORIES

Extraction Method LEAD BEAD

Analytical Method FIRE ASSAY, AA finish

Reagents Used

General

## Bibliography


| | | |
|---|---|---|
| Armstrong P. | 1949 | Report on the property of Logan-Porcupine Mines Ltd., 23 pages. |
| Ferguson S.A. et al | 1971 | Gold Deposits of Ontario; part 1, resources circular 18; 315 pages. |
| Clark R. J. McH. et al. | 1987 | Gold Mineralization associated with Archean stratabound sulphides in the Cheminis deposit near Larder Lake, Ontario, pp. 45-50, C.I.M. Bulletin, June 1987, Volume 60, No. 902. |
| Cross G.C. Newsletter | 1984 | No. 77, April 18, 1984. |
| Oja R.V. | 1963 | Progress report to shareholders of Kenilworth Mines, 6 pages. |
| Hodgson C. J. | 1983 | The Structure and Development of the Porcupine Camp - A Re-evaluation, pp. 211-225, A.C. Colvine, ed; Ontario Geological Survey, Miscellaneous Paper 110. |
| Oja R.V. | 1963 | Progress report to Kenilworth mine directors, 4 pages. |
| Hogg N. | 1948 | Letter to M.E. Hurst on Naybob Gold Mines 4 pages. |
| O.D.M. | 1924 | Volume 33, part 2, page 37, Annual Report. |
| O.D.M. | 1967 | Deloro Township Preliminary Geological Map P342 |
| Pyke D. | 1981(a) | Report on overburden drilling northwest Deloro claim group, Porcupine Mining Division, Ontario. |
| Pyke D. | 1981(b) | Relationship of gold mineralization to stratigraphy and structure in Timmins and surrounding area; in Genesis of Archean, Volcanic Hosted Gold Deposits, pp. 1-15, E.G. Pye and R.G. Roberts; eds, Ontario Geological Survey, Miscellaneous Paper 97, 175 p. |
| Wright D.G.H. | 1945 | Report on the properties belonging to Naybob (1945) 7 pages. |

Ministry of
Northern Development
and Mines

Ontario

Ministère du
Développement du Nord
et des Mines



February 2, 1988

Your File: 332/87
Our file: 2.10712

Mining Recorder
Ministry of Northern Development and Mines
60 Wilson Avenue
Timmins, Ontario
P4N 2S7

Dear Sir:

RE: Notice of Intent dated January 14, 1988
Geological Survey and Data for Assaying
submitted on Mining Claims P 451842 et al
in the Township of Deloro

The assessment work credits, as listed with the above-mentioned Notice of Intent, have been approved as of the above date.

Please inform the recorded holder of these mining claims and so indicate on your records.

Yours sincerely,

W.R. Cowan, Manager
Mining Lands Section
Mines and Minerals Division

Whitney Block, Room 6610
Queen's Park
Toronto, Ontario
M7A 1W3

Telephone: (416) 965-4888



RM
RM:pl
Enclosure: Technical Assessment Work Credits

cc: Mr. G.H. Ferguson
Mining & Lands Commissioner
Toronto, Ontario

Resident Geologist
Timmins, Ontario

Ms Mary L.E. Staruch
31 Mohawk Cres.
Nepean, Ontario
K2H 7G7

Ontario

Ministry of Northern Development and Mines

# Technical Assessment Work Credits

File: 2.10712

Date: January 14, 1988

Mining Recorder's Report of Work No.: 332/87

Recorded Holder: Mary L.E. Staruch

Township or Area: Deloro

| Type of survey and number of Assessment days credit per claim | Mining Claims Assessed |
|---|---|
| Geophysical | P 934031 |
| Electromagnetic _____ days | |
| Magnetometer _____ days | |
| Radiometric _____ days | |
| Induced polarization _____ days | |
| Other _____ days | |
| Section 77 (19) See "Mining Claims Assessed" column | |
| Geological 28 days | |
| Geochemical _____ days | |
| Man days [X] Airborne [ ] | |
| Special provision [ ] Ground [X] | |
| [ ] Credits have been reduced because of partial coverage of claims. | |
| [ ] Credits have been reduced because of corrections to work dates and figures of applicant. | |

**Special credits under section 77 (16) for the following mining claims**

**No credits have been allowed for the following mining claims**

[ ] not sufficiently covered by the survey [ ] insufficient technical data filed

The Mining Recorder may reduce the above credits if necessary in order that the total number of approved assessment days recorded on each claim does not exceed the maximum allowed as follows: Geophysical - 80; Geologocal - 40; Geochemical - 40; Section 77(19) - 60.

Ministry of Northern Development and Mines
Ontario

# Technical Assessment Work Credits

File: 2.10712

Date: January 14, 1988

Mining Recorder's Report of Work No.: 332/87

Recorded Holder: Mary L.E. Staruch

Township ~~XXXXX~~: Deloro

| Type of survey and number of Assessment days credit per claim | Mining Claims Assessed |
|---|---|
| Geophysical | $51.22 SPENT ON ALAYSES OF SAMPLES TAKEN FROM MINING CLAIMS: |
| Electromagnetic _____ days | P 451842 |
| Magnetometer _____ days | 452678 |
| Radiometric _____ days | |
| Induced polarization _____ days | |
| Other _____ days | |
| Section 77 (19) See "Mining Claims Assessed" column | |
| Geological _____ days | |
| Geochemical _____ days | |
| Man days ☐ Airborne ☐ | 3.41 ASSESSMENT WORK DAYS ARE ALLOWED WHICH MAY BE GROUPED IN ACCORDANCE WITH SECTION 76(6) OF THE MINING ACT. |
| Special provision ☐ Ground ☒ | |
| ☐ Credits have been reduced because of partial coverage of claims. | |
| ☐ Credits have been reduced because of corrections to work dates and figures of applicant. | |

**Special credits under section 77 (16) for the following mining claims**

**No credits have been allowed for the following mining claims**

☐ not sufficiently covered by the survey ☐ insufficient technical data filed

The Mining Recorder may reduce the above credits if necessary in order that the total number of approved assessment days recorded on each claim does not exceed the maximum allowed as follows: Geophysical - 80; Geologocal - 40; Geochemical - 40; Section 77(19) - 60.

GEO (85/12)

Ministry of Northern Development and Mines

Ontario

# Report of Work

(Geophysical, Geological, Geochemical and Expenditures)

#332/87

Mining Act 2.10712

#1

Instructions: – Please type or print.
– If number of mining claims traversed exceeds space on this form, attach a list.
Note: – Only days credits calculated in the "Expenditures" section may be entered in the "Expend. Days Cr." columns.
– Do not use shaded areas below.

| | |
|---|---|
| Type of Survey(s): Geological | Township or Area: Deloro |
| Claim Holder(s): MARY L. E. STARUCH (A43110) | Prospector's Licence No.: E30327 (R CLARK) |
| Address: 31 MOHAWK CRES., NEPEAN, ONT, K2H-767 | |
| Survey Company: ELDOR RESOURCES LIMITED | Date of Survey (from & to): 23 10 85 (Day Mo. Yr.) 20 06 86 (Day Mo. Yr.) |
| Total Miles of line Cut: | |
| Name and Address of Author (of Geo-Technical report): R.J. CLARK, 2751 CONSUL AVENUE., NEPEAN, ONTARIO, K2H 7H8 | |

## Credits Requested per Each Claim in Columns at right

| Special Provisions | | Days per Claim |
|---|---|---|
| For first survey: Enter 40 days. (This includes line cutting) | Geophysical | |
| | - Electromagnetic | |
| | - Magnetometer | |
| For each additional survey: using the same grid: Enter 20 days (for each) | - Radiometric | |
| | - Other | |
| | Geological | |
| | Geochemical | |

| Man Days | | Days per Claim |
|---|---|---|
| Complete reverse side and enter total(s) here | Geophysical | |
| | - Electromagnetic | |
| | - Magnetometer | |
| | - Radiometric | |
| | - Other | |
| | ~~Geological~~ re Geological | 43+.14 |
| | * LITHO-Geochemical | 3 |

| Airborne Credits | | Days per Claim |
|---|---|---|
| Note: Special provisions credits do not apply to Airborne Surveys. | Electromagnetic | |
| | Magnetometer | |
| | Radiometric | |

PORCUPINE MINING DIVISION RECEIVED DEC 10 1987 325 PM

RECEIVED JAN 08 1988 MINING LANDS SECTION

## Mining Claims Traversed (List in numerical sequence)

| Mining Claim Prefix | Mining Claim Number | Expend. Days Cr. |
|---|---|---|
| P | 934031 | 60 |

| Mining Claim Prefix | Mining Claim Number | Expend. Days Cr. |
|---|---|---|
| | | |

RECORDED DEC 10 1987

Total number of mining claims covered by this report of work: 1

## Expenditures (excludes power stripping)

Type of Work Performed: LITHO-GEOCHEMICAL SAMPLING

Performed on Claim(s): P 451842; P 452678

Calculation of Expenditure Days Credits

Total Expenditures: $ *51.22+644.93 ÷ 15 = Total Days Credits: 46

Instructions: Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

| Date | Recorded Holder or Agent (Signature) |
|---|---|
| DEC 3, 1987 | Mary Staruch |

For Office Use Only

| Total Days Cr. Recorded | Date Recorded | Mining Recorder |
|---|---|---|
| 60 | Dec. 10/87 | S. White |
| | Date Approved as Recorded | Branch Director |

## Certification Verifying Report of Work

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

| Name and Postal Address of Person Certifying | Date Certified | Certified by (Signature) |
|---|---|---|
| ROBERT JOHN McHALFIE CLARK, 2751 CONSUL AVE., NEPEAN, ONTARIO, K2H 7H8. | 15/11/87 | R.J. McClark |

1362 (85/12)

## Assessment Work Breakdown

Man Days are based on eight (8) hour Technical or Line-cutting days. Technical days include work performed by consultants, draftsmen, etc..

**Type of Survey**

GEOLOGICAL

| Technical Days | | | Technical Days Credits | | Line-cutting Days | | Total Credits | | No. of Claims | | Days per Claim |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | X | 7 | 14 | + | | = | 14 | ÷ | 1 | = | 14 |

**Type of Survey**

LITHO-GEOCHEMICAL CALCULATED BY DOLLAR COST. ($51.22)

| Technical Days | | | Technical Days Credits | | Line-cutting Days | | Total Credits | | No. of Claims | | Days per Claim |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | X | 7 | | + | | = | | ÷ | | = | 3 |

**Type of Survey**

PREPARATION OF REPORT CALCULATED BY DOLLAR COST ($44.93)

| Technical Days | | | Technical Days Credits | | Line-cutting Days | | Total Credits | | No. of Claims | | Days per Claim |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | X | 7 | | + | | = | | ÷ | | = | 3 |

**Type of Survey**

| Technical Days | | | Technical Days Credits | | Line-cutting Days | | Total Credits | | No. of Claims | | Days per Claim |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | X | 7 | | + | | = | | ÷ | | = | |

MINING LANDS: PLEASE COMPLETE THIS FORM & RETURN IT WITH REPORT TO THE GEOSCIENCE DATA CENTRE

DATE REMOVED: (from GDC) Feb. 12/88

DATE RETURNED: (to GDC) Feb 15/88

REPORT # : 2.10712

FICHE NO. : _____ (where applicable)

REASON FOR REQUESTING REPORT (complete #1-4 below):

1. INFORMATION ADDED TO EXISTING PAGES OF REPORT: ☐

IF YES, SPECIFY PAGES: _____

: _____

: _____

2. a) PAGES/MAPS ADDED TO THIS REPORT: ____ TOTAL PAGES ADDED

: ____ TOTAL MAPS ADDED

b) TYPE OF PGS ADDED: _____ CORRESPONDENCE

: _____ WORK REPORTS (AMENDED)

: _____ WORK RPTS (NEW)

: _____ MISSING PAGES OF TEXT

: _____ OTHER (PLEASE SPECIFY)

3. a) REMOVAL OF PGS FROM REPORT: _____ TOTAL PGS REMOVED

b) TYPE OF PAGES REMOVED : _____ CORRESPONDENCE

: _____ WORK REPORTS

: _____ PGS OF TEXT

: _____ OTHER (PLEASE SPECIFY)

4. REPORT NEEDED FOR REFERENCE ONLY: ☑

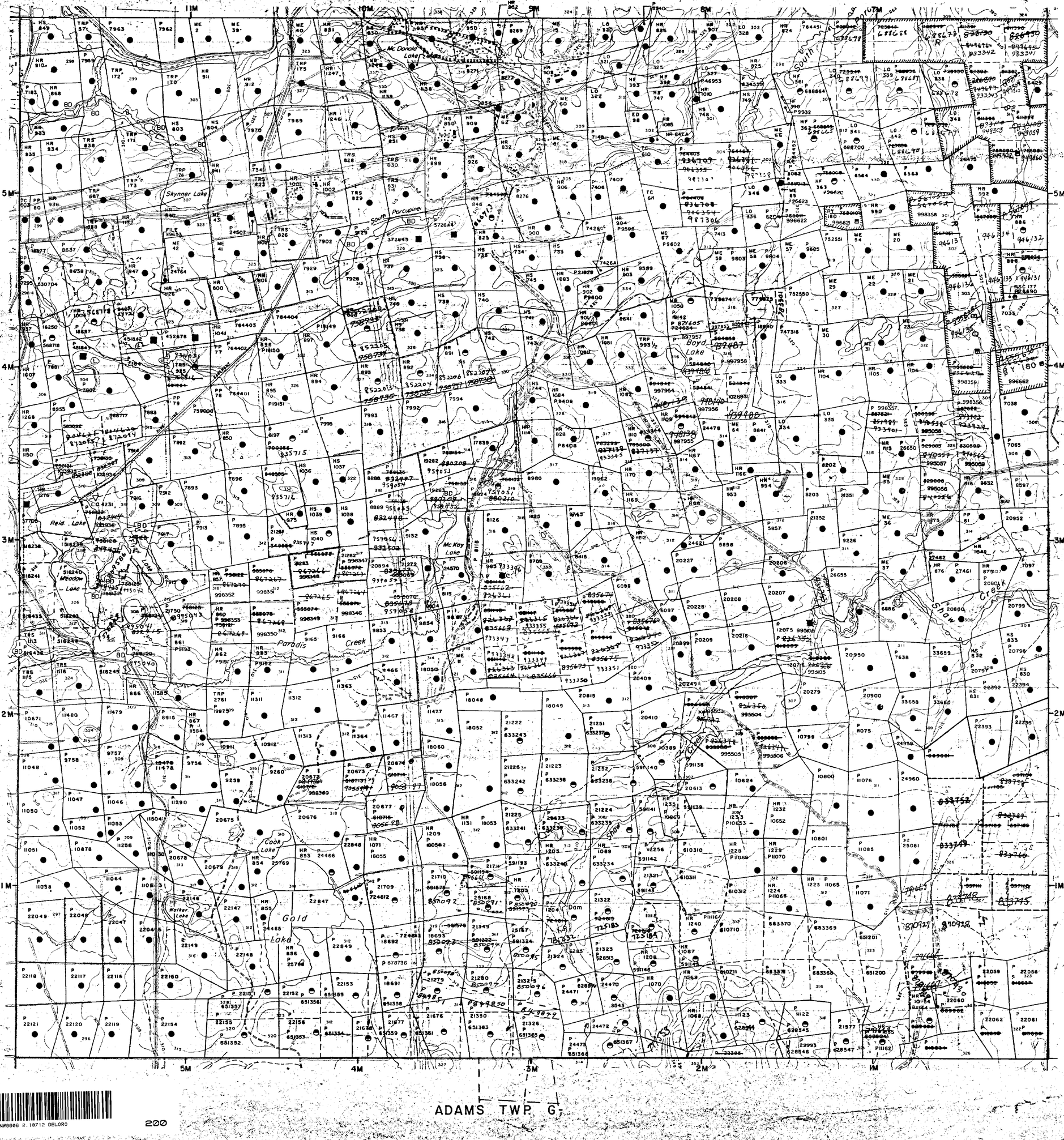
NO INFORMATION ALTERED : ☐

NO INFORMATION ADDED : ☐

NO INFORMATION DELETED : ☐

*NOTE: ENTER "X" IN APPLICABLE BOXES

# TISDALE TWP. G-3976




## LEGEND

- HIGHWAY AND ROUTE No.
- OTHER ROADS
- TRAILS
- SURVEYED LINES:
  - TOWNSHIPS, BASE LINES, ETC.
  - LOTS, MINING CLAIMS, PARCELS, ETC.
- UNSURVEYED LINES:
  - LOT LINES
  - PARCEL BOUNDARY
  - MINING CLAIMS ETC.
- RAILWAY AND RIGHT OF WAY
- UTILITY LINES
- NON-PERENNIAL STREAM
- FLOODING OR FLOODING RIGHTS
- SUBDIVISION OR COMPOSITE PLAN
- RESERVATIONS
- ORIGINAL SHORELINE
- MARSH OR MUSKEG
- MINES
- TRAVERSE MONUMENT

## DISPOSITION OF CROWN LANDS

| TYPE OF DOCUMENT | SYMBOL |
|---|---|
| PATENT, SURFACE & MINING RIGHTS | ● |
| " , SURFACE RIGHTS ONLY | ◒ |
| " , MINING RIGHTS ONLY | ◒ |
| LEASE, SURFACE & MINING RIGHTS | ■ |
| " , SURFACE RIGHTS ONLY | ▣ |
| " , MINING RIGHTS ONLY | ▣ |
| LICENCE OF OCCUPATION | ▼ |
| ORDER-IN-COUNCIL | OC |
| RESERVATION | ◔ |
| CANCELLED | ⊗ |
| SAND & GRAVEL | ◔ |

NOTE: MINING RIGHTS IN PARCELS PATENTED PRIOR TO MAY 6, 1913, VESTED IN ORIGINAL PATENTEE BY THE PUBLIC LANDS ACT, R.S.O. 1970, CHAP. 380, SEC. 63, SUBSEC 1.

500 0 1000 Metres

10 0 10 20 30 40 50 60 70 Chains

500 0 1000 2000 3000 4000 5000 Feet

SCALE 1:20 000

## NOTES

REGISTERED PLAN OF SUBDIVISION

MINING CLAIMS SHOWN WITHIN THIS AREA ARE SUBJECT TO THE RIGHTS AND PRIVILEGES GRANTED UNDER AN EASEMENT ORDER DATED MAY 13, 1937 TO DELNITE MINES LTD.

DOME MINES, LIMITED SURFACE RIGHTS LEASE #103926

APPLICATION UNDER P.L.A. FOR SURFACE RIGHTS...DUCKS UNLIMITED CANADA

RECEIVED
NOV 27 1987

TOWNSHIP

# DELORO

M.N.R. ADMINISTRATIVE DISTRICT

**TIMMINS**

MINING DIVISION

**PORCUPINE**

LAND TITLES / REGISTRY DIVISION

**COCHRANE**

Ministry of Natural Resources — Land Management Branch — Ontario

| Date | Number |
|---|---|
| FEBRUARY 1984 | G-3993 |

Received March 15/84