Magnetic and VLF Electromagnetic Surveys
by
Geosearch Consultants Limited
for
Placer Dome Inc.
on
Project 398
Mc Innes Lake, Ontario
To Accompany Maps 89-121, 122, 123, 124 (A to F)

May 19, 1989
INTRODUCTION

A VLF electromagnetic survey and a total field magnetic survey were carried out for Placer Dome Inc. on Project 398, Mc Innes Lake Area, Ontario in March and April 1989.

The survey area consists of 74 contiguous, unpatented mining claims, a list of which is appended to this report. The property is located on and around Mc Innes Lake, which is situated approximately 120 kilometers due north of the town of Red Lake, Ontario. Access to the property was made via fixed winged aircraft from the town of Red Lake.

The purpose of the surveys was to locate subsurface, geo-electrical conductors and to outline structures which may prove conducive for gold mineralization. Thirty (30) conductors were located. The magnetics outlined a number of distinct rock units, including a long iron formational unit.

The accompanying maps show the area surveyed and the results obtained.

A technical data sheet is appended to this report.
LOCATION MAP
Project 398
McInnes Lake Area, Ont.
N.T.S.: 53 C 4
Scale: 1:50,000
METHOD

The magnetic survey was completed using Gem Systems GSM-18 and GSM-19 magnetometers. The diurnal variations were corrected by means of a base station recorder with readings taken at three second intervals. The corrected data was posted (Map series 89-121) and contoured (Map series 89-123).

The VLF electromagnetic survey was completed using Geonics EM-16 receivers. The transmitting station, NSS, located near Annapolis, Maryland, was transmitting at a frequency of 21.4 kHz. The inphase and quadrature components were posted and profiled (Map series 89-122). The inphase data was fraser filtered. These values were posted and contoured (Map series 89-124). All contouring was completed by Geosearch Consultants Ltd., using Geosoft software.

RESULTS

The magnetic survey outlines four major divisions in the surveyed area. The most obvious is a very highly magnetic iron formation unit trending in a north/north-westerly direction through the property. It extends from L12+00N, 1+00E to the north edge of the survey boundary at L65+00N, 15+00W. This IF unit has a variable width along its length, generally being
wider in the north and narrowing to the south. Between lines 59+00N to 49+00N the IF unit separates into two separate bands. Much of the iron formation occurs along the lakeshore where many outcroppings are visible.

The east and west sides of this iron formation are flanked by a non-magnetic unit. On the east side of the iron formation unit, this felsic unit gradually changes to the south-east. Along the IF, it is a fairly uniform, low relief area which becomes quite spotted with many localized, short strike length "highs" and "lows". Often these "anomalies" occur along the shores of the lakes and bays, which suggests there may be little or no overburden cover.

On the west side of the iron formation unit, the felsic unit changes quite abruptly to the west. The magnetically quiet felsic unit has a sharp contact with a deep mafic unit to the west. This rock contact is located in Mc Innes Lake, parallel to its eastern shore. The contact is approximately 100 to 150 metres west of the shore. The geology present appears to have a close relationship, with the eastern shore of Mc Innes Lake.

The VLF electromagnetic survey outlined many conductive horizons. Thirty of these are listed in the following table. Many more conductive horizons are outlined by the fraser filtered contours.
### VLF-EM Conductor List

<table>
<thead>
<tr>
<th>#</th>
<th>Location</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>L 65°00', 14°00'W</td>
<td>L 14°00', 1°12'E</td>
</tr>
<tr>
<td>#2</td>
<td>L 57°00', 10°37'W</td>
<td>L 53°00', 8°60'W</td>
</tr>
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<td>#3</td>
<td>L 66°00', 12°65'W</td>
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<td>#4</td>
<td>L 63°00', 10°75'W</td>
<td>L 59°00', 9°32'W</td>
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<td>#5</td>
<td>L 57°00', 8°00'W</td>
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<tr>
<td>#6</td>
<td>L 48°00', 1°80'W</td>
<td>L 14°00', 3°85'E</td>
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<tr>
<td>#7</td>
<td>L 40°00', 6°15'W</td>
<td>L 39°00', 5°50'W</td>
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<td>#8</td>
<td>L 36°00', 25°80'W</td>
<td>L 34°00', 2°80'W</td>
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<tr>
<td>#9</td>
<td>L 46°00', 0°56'W</td>
<td>L 43°00', 0°45'E</td>
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<tr>
<td>#10</td>
<td>L 35°00', 1°37'E</td>
<td>L 33°00', 1°62'E</td>
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<tr>
<td>#11</td>
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<td>#12</td>
<td>L 34°00', 3°12'E</td>
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<td>L 31°00', 5°65'E</td>
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<td>L 36°00', 5°70'E</td>
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<td>L 19°00', 11°53'E</td>
<td>L 12°00', 12°55'E</td>
</tr>
<tr>
<td>#29</td>
<td>L 11°00', 10°95'E</td>
<td>L 6°00', 11°20'E</td>
</tr>
<tr>
<td>#30</td>
<td>L 8°00', 10°20'E</td>
<td>L 7°00', 10°45'E</td>
</tr>
</tbody>
</table>

Of the thirty conductors listed, a number have some magnetic correlation. Conductors #1, #2 and #17 are coincident with or flanking the iron formation unit. Conductor #18 is south of and along the strike of the iron formation. Conductors #5, #7, #11 and #21 are coincident with short strike length, localized magnetic anomalies. The remaining 22 conductors have no apparent magnetic correlation.
The survey results suggest that Mc Innes Lake is quite a wide conductor with its edges outlined by weak Fraser filter anomalies. The conductive edge on the west side of Mc Innes Lake is located from L 0+00, 5+00W to L 15+00N, 9+25N. The conductive edge on the east side of the lake is located from L 7+00N, 2+00W to L 15+00N, 2+00W, and from L 24+00N, 2+50W to L 63+00N, 16+00W. This wide conductive area is thought to be due to conductive lake bottom sediment and not bedrock conductors. If bedrock conductors do exist beneath the lake, they are masked by this wide conductive sheet.

The high surficial conductivity of the lake bottom suggests that other conductors located in narrow channels of the lake, or along stream beds may also be surficial in nature. Conductors #8, #13, #16, #20, #25, #26, #27 and #28 are all coincident with a lake shore or a similar feature. Conductors #22 and 24 are located in swampy environments.

Most of the VLF anomalies follow the north/north-west trend outlined by the magnetics. There is a north-west trending VLF lineament crosscutting the general trend not observed in the magnetics. This trend encompasses conductors conductors #7 and #11. Along the strike of these two conductors to the north-west is the shore line of Mc Innes Lake. As the magnetics outlined a close correlation between the shore line
and the rock contact, this crosscutting feature may have some merit. It is noted that this trend is quite weak and quite shallow.

RECOMMENDATIONS

The conductors associated with the iron formation, as well as those associated with local magnetic anomalies should be investigated further. The crosscutting VLF anomaly also merits further study.

As many of the conductors listed may be caused by surficial conductivity, caution must be exercised prior to drill testing. A more discriminating electromagnetic survey such as HLEM is suggested over conductors which cannot be explained by geology alone. The large number of outcroppings observed should yield a fairly complete geological picture.

Respectfully submitted,

Louis Racic
Geophysicist
**Northern Development and Mines**

**Ontario**

**Geophysical, Geological, Geochemical and Expenditure**

**Mining Act** 2.12572

---

### Claim Holder(s)

**Placer Dome Inc.**

### Address

**P.O. Box 350, IBM Tower, TD Centre, Toronto, Ont.**

### Survey Company

**Geosearch Consultants Limited**

### Date of Survey (from & to)

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<th>Mo.</th>
<th>Yr.</th>
<th>Day</th>
<th>Mo.</th>
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<td>89</td>
<td>19</td>
<td>06</td>
<td>89</td>
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### Total Miles of line Cut

146.1 km

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**Type of Survey**

- **VLF-EM & Magnetic**

---

### Credits Requested per Each Claim in Columns at right

**Special Provisions**

For first survey:
- Enter 40 days. (This includes line cutting)

For each additional survey:
- Using the same grid:
  - Enter 20 days (for each)

### Man Days

Complete reverse side and enter totals here

- **Geophysical**
  - Electromagnetic: 40 days
  - Magnetometer: 20 days
  - Radiometric: 
  - Other:

- **Geological**

- **Geochemical**

### Airborne Credits

Electromagnetic: 
Magnetometer: 
Radiometric:

---

**Calculation of Expenditure Days Credits**

**Total Expenditures**

| $ | + | 15 | = |

**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 Certified**

**19/06/89**

**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**

**Louis Racic, 360-111 Queen St. E., Toronto, Ont., M5C 182**

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**For Office Use Only**

**Total Days Cr.**

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**Certified by (Signature)**

**Louis Racic, 360-111 Queen St. E., Toronto, Ont., M5C 182**

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**Note:** Special provisions credits do not apply to Airborne Surveys.
LIST OF MINING CLAIMS TRAVERSED

KRL 1057380
KRL 1057381
KRL 1057382
KRL 1057383
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KRL 1057473
KRL 1057474
KRL 1062973
KRL 1062974
KRL 1062975
KRL 1062976
KRL 1062977
KRL 1062978
Ministry of Northern Development and Mines

Geophysical-Geological-Geochemical Technical Data Statement

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) VLF-Electromagnetic & Magnetic

Township or Area Mc Innes Lake Area, Ontario

Claim Holder(s) Placer Dome Inc.

Survey Company Geosearch Consultants Ltd.

Author of Report Louis Racic

Address of Author 360-111 Queen St. E., Toronto, Ont.

Covering Dates of Survey 23/03/89 - 19/06/89

(linecutting to office)

Total Miles of Line Cut 146.1 kilometers

SPECIAL PROVISIONS
CREDITS REQUESTED

Geophysical

DAYS
per claim

40

-Electromagnetic

20

-Magnetometer

Radiometric

Other

Geological

Geochemical

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

Magnetometer

Electromagnetic

Radiometric

(enter days per claim)

DATE: 19/06/89

SIGNATURE: Author of Report or Agent

Res. Geol. Qualifications

Previous Surveys

File No. Type Date Claim Holder

MINING CLAIMS TRAVERSED
List numerically

(prefix) (number)

KRL 1057380 - 1057391
KRL 1057415 - 1057445
KRL 1057450 - 1057474
KRL 1062973 - 1062978

RECEIVED
JUL - 6 1989
MINING LANDS SECTION

TOTAL CLAIMS 74
GEOPHYSICAL TECHNICAL DATA

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

| MAG | 10,840 |
| VLF | 10,852 |

Number of Stations: 5426

Station interval: 25 m (12.5 m)

Profile scale: 1 cm = 20%

Contour interval: 100 gammas

Instrument: Gem Systems GSM-18 & GSM-19

Accuracy – Scale constant: 0.1 gamma

Diurnal correction method: Base station recorder with readings taken

Base Station check-in interval (hours): at 3 second intervals

Base Station location and value:

Instrument: Geonics EM-16

Coil configuration:

Coil separation:

Accuracy: 1%

Method: VLF Fixed transmitter

Frequency: NSS Annapolis MD 21.4 kHz

Parameters measured: In phase and quadrature components of the vertical secondary field.

Instrument:

Scale constant:

Corrections made:

Base station value and location:

Elevation accuracy:

Instrument:

Method: □ Time Domain □ Frequency Domain

Parameters – On time – Off time – Delay time – Integration time

Frequency

Range

Power

Electrode array

Electrode spacing

Type of electrode
June 26, 1989

DELIVER

Projects 366/398

Ministry of Northern Development
and Mines
Mining Land Section
880 Bay Street
3rd. Floor
Toronto, Ontario
M5S 1Z8

Attention: Dr. W.R. Cowan
Provincial Manager, Mining Lands
Mines & Minerals Division

Dear Mr. Cowan:

Re: Geophysical Report
Nass Lake and McInnes Lake Area

We enclose herewith, in duplicate, Reports and Plans prepared by Geosearch Consultants Limited covering 20 days HLEM Survey in the Nass Lake area and 60 days for Magnetic and Electromagnetic Surveys in the McInnes Lake area.

Enclosed is a copy of the above-mentioned Report of Work which we forwarded to the Mining Recorder in Thunder Bay and Red Lake respectively.

Please date-stamp the enclosed copy of this letter and return it to me.

Yours very truly,

PLACER DOME INC.

RECEIVED

JUN 29 1989

MINING LANDS SECTION

M. Luba Vcislo
Land Manager

Encl.
Type of Survey(s): VLF-Electromagnetic & Magnetic
Township or Area: Mc Innes Lake Area, Ontario
Claim Holder(s): Placer Dome Inc.
Survey Company: Geosearch Consultants Ltd.
Author of Report: Louis Racic
Address of Author: 360-111 Queen St.E., Toronto, Ont.
Covering Dates of Survey: 23/03/89 - 19/06/89
Total Miles of Line Cut: 146.1 kilometers

**SPECIAL PROVISIONS CREDITS REQUESTED**

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<td>Radiometric</td>
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**AIRBORNE CREDITS** (Special provision credits do not apply to airborne surveys)

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**DATE:** 19/06/89 **SIGNATURE:** Author of Report or Agent

Res. Geol.: Qualifications:

**Previous Surveys**

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**MINING CLAIMS TRAVERSED**

List numerically

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**TOTAL CLAIMS:** 74
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<tr>
<th><strong>GEOPHYSICAL TECHNICAL DATA</strong></th>
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<tr>
<td>GROUND SURVEYS — If more than one survey, specify data for each type of survey</td>
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<tr>
<td>Number of Stations</td>
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<td>Profile scale</td>
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<td>Contour interval</td>
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**MAGNETIC**

- Instrument: Gem Systems GSM-18 & GSM-19
- Accuracy — Scale constant: 0.1 gamma
- Diurnal correction method: Base station recorder with readings taken
- Base Station check-in interval (hours): at 3 second intervals
- Base Station location and value

**ELECTROMAGNETIC**

- Instrument: Geonics EM-16
- Coil configuration
- Coil separation
- Accuracy: 1%
- Method: VLF Fixed transmitter
- Frequency: NSS Annapolis MD 21.4 kHz
- Parameters measured: In phase and quadrature components of the vertical secondary field.

**GRAVITY**

- Instrument
- Scale constant
- Corrections made
- Base station value and location
- Elevation accuracy

**RESISTIVITY**

- Instrument
- Method: Time Domain
- Frequency Domain
- Parameters — On time
- Off time
- Delay time
- Integration time
- Power
- Electrode array
- Electrode spacing
- Type of electrode
VLF - FINGER FILTER CONTOURS
TOPOGRAPHY
CLAIM POST
LAKE
STREAM
SWAMP
ACCESS ROAD
BUSH ROAD
POWER LINE

GEOSEARCH CONSULTANTS LTD.
for PLACER DOME INC.
PROJECT 398
HINES LAKE AREA, ONT.

SCALE 1:2500

GEOSEARCH CONSULTANTS LTD.
PLACER DOME INC.
PROJECT 398
HINES LAKE AREA, ONT.

2.12502
TOTAL FIELD MAGNETIC SURVEY

MAP KEY

TOPOGRAPHY
- CLAIM POST ———
- LAKE
- STREAM
- SWAMP
- ACCESS ROAD
- BUSH ROAD
- POUFR LINE

GEOSEARCH CONSULTANTS LTD.

PLACER DOME INC.
PROJECT 398
McINNES LAKE AREA, ONT.

BASE LEVEL 60,000 nT REMOVED

INSTRUMENT: GEM SYSTEMS GSM-18 MAGNETOMETER

SCALE 1: 2500

NTS: 53 C 4
MARWR 1989
J.A,R.
TOTAL FIELD MAGNETIC SURVEY
by GEOSEARCH CONSULTANTS LTD.

TOPOGRAPHY
CLAIM POST — LAKE — STREAM — SWAMP — ACCESS ROAD — BUSH ROAD — POWER LINE

MCINNES DOME INC.
BASE LEVEL 60.000 nT REMOVED
INSTRUMENT: GEM SYSTEMS GSM-18 MAGNETOMETER
PROJECT 398
MCINNES LAKE AREA, ONT.
SCALE 1 : 2,500
DATE: MAY 1989
DRAWN: J. R. NTS: 53 C 4
89 - 121 C