



**Date:** May 12, 1981  
**To:** Luca Riccio  
**From:** T. J. Crebs  
**Subject:** Progress Report on the Geophysical Surveys  
at the Indian River Project

826215  
92G/10

### Summary

To date the following geophysical field work has been completed:

#### A. Induced Polarization/Resistivity (IP/R) Survey

- 1) Baseline (10+40E → 7+60W)  
Data sampled at a) dipole a-spacing = 40 m; n = 1 → 6  
b) frequencies 0.3 and 3.0 hertz
- 2) Line 1+00W (6+20N → 2+60N)  
Data sampled at a) a-spacing = 40 m; n = 1 → 6  
b) 1.0 hertz frequency
- 3) IP/R data was plotted in pseudosection form and fairly good signatures were exhibited.
- 4) IP/R survey uses Phoenix IPV-2 transmitter/receiver system. Crew is directed by John Marsh, and is doing satisfactorily.

#### B. Ground, Total-Intensity Magnetic Survey

- 1) Lines surveyed = 1+00W; 2+00W; 0+20W; 0+80E.
- 2) Station sample-density = 5, 10 and 20 m separations
- 3) Equipment used: Geometrics Unimag II proton precession magnetometer
- 4) base stations established at 0+20W, 00N and at 6+20E, 00N
- 5) data acquired, reduced, and plotted by Steve Zymela and myself.

C. No VLF survey has been initiated as the receiver I brought to camp developed an electronic switching malfunction during calibration. I hope to fix this unit when I next return to the prospect site.

## Preliminary Inspection and Interpretation

### A. Induced Polarization Survey

The baseline survey was initiated to adjust the survey specifications and to investigate response parameters. As the lower frequency results exhibited a "cleaner" signature than the 3.0 hertz data I directed the crew to sample the rest of the remaining lines at 1.0 hertz.

Four distinct anomalous zones are identified on the baseline pseudosection. They occur at about:

440E -- small magnitude phase and lower resistivities and appear to be related to the shear/faulting (?) within the quartz diorite;

80E -- small to moderate phase which appear to be related to the "massive" pyrite within the Roy Prospect Area;

220W to 500W -- this large region contains large phase-angle magnitudes and low resistivities. It would appear to be the manifestation of the mineralized London Porphyry.

Two strong anomalies can be observed at about 220W and at 480W and appear to correlate with the mapped location of shear zones within the intrusion.

A resistivity gradient is observed at 2+40E; more resistive to the east. This feature appears to be the manifestation of the granodiorite/volcanics contact.

The partially completed survey of Line 1+00W contains a moderately strong anomaly centered at about 5+40N. This feature may be related to the granodiorite-volcanoclastic contact. This anomaly was only partially sampled, and the line may need to be extended northward for the anomaly to be fully delineated.

In general the IP/R survey would appear to be correlating quite well with the mapped geology.

### B. Ground Magnetism Survey

The magnetic signatures for the intrusive and extrusive units would appear to be moderately pronounced, even though the "noise" generated by mafic dikes and magnetic boulders is in places severe. The interpretation of the magnetic data-set is presently quite limited but good to moderate correlation is noted at :

- 1) 0+50N, L2+00W -- where the porphyry/rhyolite contact occurs;
- 2) 1+70N, L1+00W -- where the porphyry/rhyolite contact is inferred; and
- 3) 1+80N, L0+20W -- at the contact of the quartz diorite and rhyolite units.

It is my belief that the ground magnetics may assist in the interpretation of the IP/R survey by aiding in both the lithologic and structural anomaly discrimination.

### Plans

The Phoenix crew under Xenon's direction will continue lines on the west of the baseline. Zymela has been instructed to continue the magnetics survey when his time permits; chaining of the remaining lines is obviously the top priority, however.

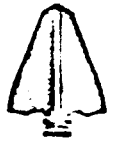
I plan to return to the prospect site during the week of the 20th in order to review the geophysical data acquired.

*Xms*

*for* T. J. Crebs  
Project Geophysicist, Anaconda

cc - G. G. Carlson  
J. D. Corbett  
S. I. Zymela  
T. Crebs

TJC:LMG



Date: May 31, 1981  
 To: Luca Riccio  
 From: T. J. Crebs  
 Subject: Final Progress Report on the Geophysical Surveys  
 at the Indian River Project

### Summary

To date the following geophysical field work has been completed:

#### A. Induced Polarization/Resistivity (IP/R) Survey

##### 1) lines surveyed:

a) baseline (10+40E to 7+60W);	1800
b) line 1+00W (6+20N to 5+80S);	1200
c) line 2+00W (6+00N to 5+20S);	1120
d) line 2+80W (6+00N to 4+80S);	1000
e) line 5+20W (7+00N to 4+60S);	1100
f) line 7+00W (0+00N to 4+40S);	400
g) line 5+40E (6+20N to 2+20S);	900
h) line 8+00E (8+40N to 4+40S);	1280
i) line 3+40E (6+20N to 0+60N);	650

2) SPECS -- IP/R data were plotted in pseudosection form and were acquired using the Phoenix IPV-2 transmitter (1KW)/receiver system. Zenon Pozniak and John Marsh directed the IP/R 4-man crew.

#### B. Total-Intensity, ground magnetic (Mag) survey

##### 1) lines surveyed:

1+00W; 2+00W; 0+20W; 0+80E; CS-1 -- (Caledonian River showing area); C-1 and C-2 -- (Caledonian porphyry area)

2) mag data were plotted in profile form and were acquired using the Geometrics Unimac proton-precession magnetometer.

3) a total of 5 base stations were established on the project site:

a) Base #1	0+20W, 00N	(56270 gammas)
b) Base #2	6+20E, 00N	(56380 gammas)
c) Base #3	lower, road bend to Caledonian Creek showing	(56850 gammas)
d) Base #4	road bend (120 m from washout) to Caledonian porphyry outcrop	(56700 gammas)
e) Base #5	40 m south of station 2+20E line C-2	(57310 gammas)

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C. Very-Low-Frequency (VLF) electromagnetic survey

1) Lines surveyed:

CS-1; C-1; C-2; 1+00W.

2) VLF data were plotted in profile form and were acquired using the Phoenix

VLF-2 receiver. Transmitter stations used were

- a) Seattle, Washington (18.6 KHz)
- b) Annapolis, Maryland (21.4 KHz)
- c) Cutler, Maine (17.8 KHz)

3) The mag base stations were utilized to monitor transmission intensity fluctuations (none observed).

D. In the London Porphyry Area the IP/R signatures are pronounced; the porphyry is generally manifested by phase angle magnitudes of 60 to 90 milliradians. Good correlation and continuation of this signature between lines has apparently been achieved. In general smaller magnitude phase angles but low resistivities have been acquired for the "massive" sulphide occurrences south of the London Porphyry. The magnetic survey in the London Area complements the resistivity data in that lithologic contacts between volcanic and intrusive units are inferred. Small to moderate strength VLF signatures were obtained over the Roy Prospect mineralization.

In the Caledonian Creek Showing Area multiple VLF-conductors were identified and implied continuation of mapped strongly disseminated sulphide occurrences to the VLF/MAG survey line. Sulphide mineralization associated with magnetite were apparently yielding 200- to 300- gamma intensity anomalies coinciding with VLF-conductors.

In the Caledonian Porphyry Area good IP/R and mag anomaly signatures were acquired. Phase angle magnitudes for the Caledonian Porphyry are between 40 and 60 milliradians implying less sulphide content compared to the London Porphyry; however, higher IP response is noted at depth on line 8+00E suggesting increasing sulphide content at depth within the Caledonian System. The magnetic expression of the Caledonian Porphyry is very pronounced. A zone of high magnetic intensity (700 to 2000 gammas contrast) appears to surround the Caledonian System. This mag signature is similar to Colorado-type, Stock-work, Moly-porphyry Systems where a magnetite "hood" is often found above the zones of strong molybdenite mineralization.

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Inspection and Interpretation of the Geophysics

A.) Induced Polarization Survey

1) Baseline

- a) Anomalous zones: 5+00W to 4+20W;  
2+40W to 1+80W;  
0+30E to 0+50E
- b) Possible anomalous zones: 5+60W to 1+80W;  
0+20E to 0+90E;  
3+60E to 3+90E

2) Line 1+00W

- a) Anomalous zones: 2+10S to 1+80S;  
1+10S to 0+95S;  
1+65N to 2+20N;  
5+20N to 5+45N.
- b) Possible anomalous zones: 3+70S to 0+95S;  
1+25N to 2+80N;  
5+10N to 5+70N (?end of line).

3) Line 2+00W

- a) Anomalous zones: 0+70N to 1+20N;  
4+75N to 5+10N.
- b) Possible Anomalous zones: 3+00S to 2+75S;  
0+15S to 1+70N;  
4+65N to 5+25N.

4) Line 2+80W

- a) Anomalous zones 0+80S to 1+60N;  
5+15N to 5+25N
- b) Possible anomalous zones: 3+10S to 2+90S  
0+80S to 2+10N

5) Line 5+20W

- a) Anomalous zones: 2+30S to 1+90S;  
0+55S to 0+25N.
- b) Possible anomalous zones: 2+50S to 0+80N;  
4+10N to 4+30N  
6+00N to 6+60 (? EOL).

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- 6) Line 7+00W
  - a) Anomalous zone: 1+90S to 1+60S.
  - b) Possible anomalous zones: 2+20S to 1+25S.
- 7) Line 3+20E
  - a) Anomalous zone: 5+45N to 5+60N (? EOL).
  - b) Possible anomalous zones: 4+30N to 4+90N;  
3+10N to 3+30N.
- 8) Line 5+40E
  - a) Anomalous zone: 5+20N to 5+40N (? EOL).
  - b) Possible anomalous zones: 0+40S to 0+10N;  
1+85N to 2+10N;  
5+00N to EOL (?).
- 9) Line 8+00E
  - a) Anomalous zones: 6+60N to 8+00N (? EOL);  
4+00N to 4+20N.
  - b) Possible anomalous zones: 5+60N to EOL (?);  
0+90S to 0+70S  
2+30S to 2+20S

#### Plans

- 1) Zenon will survey line CS-1 over the Caledonian Porphyry Area to complete the IP/R Survey.
- 2) I will model the IP/R data while in Denver and submit a preliminary interpretation on all geophysical data acquired. A report will be completed in mid-June.
- 3) Paul Cartwright of Phoenix will also complete a report on the IP survey. He will contour (n=1 (and ? n=2) ) the IP data for further definition.

#### Recommendations

I suggest that you instruct either Ken or Mike to survey additional mag lines (2 or 3) paralleling line CS-1 in order to better define the Caledonian mag signature.

TJC:LMG  
cc - G.G. Carlson  
J. D. Corbett

T. J. CREBS  
*per L. M. Gray*