PNC92-099

NTS: 92 L/1

Report #1

Ground Geophysical Surveys in the Adams River Area Vancouver Island

- INTERIM REPORT -

For: Falconbridge Limited

By: Marston Geophysics Ltd.

Vancouver, B.C.
20 September, 1984

M.H. Rogers

FALCONBRIDGE

Memorandum

Date: September 25, 1984
Expl. 326/84
To: L.C. Kilburn

Copies to: T.B.

From: J.B. Gammon

Subject: Report #140-098-84
Preliminary Ground Geophysical
Results, Bruno Group

Please find attached Mike Rogers interim report on ground surveys carried out at the Canamin option. Adams River claims (PN 098/099 - Bruno Group). His summary is essentially the same as that he gave you verbally during your recent visit to Delta.

J.B. Gammon

JBG:ktt
Encls. (1)

NTS: 92 L/1

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SUMMARY

A combined HLEM, VLF-EM, and magnetics survey was conducted during the summer (1984) over the Adams River property of Falconbridge Limited to follow-up a Dighem III airborne survey conducted the previous Spring. The data collected is now being draughted and interpreted and this interim report discusses the progress of this phase of the programme and gives some preliminary findings.

The surveys located many conductors and, after interpretation and correlation of the geophysical results with geochemical and geological information, a significant number of drill targets are sure to become evident. The excess of conductive responses, many from probable graphite sources, makes careful appraisal doubly important and so the only recommendation that this writer is prepared to make at present, is that time be given to properly prioritize these targets.

INTRODUCTION

Ground follow-up of a Dighem III Survey carried out by Dighem Limited over the project area entitled "Adams River Area" commenced on 22 June, 1984 and was completed on 12 September, 1984. The elements of the ground effort contracted to Marston Geophysics Ltd. included:

1. slope-chaining, labelling and picketting of all pre-cut cross-lines in preparation for HLEM surveying
2. running an HLEM (horizontal-loop electromagnetic) survey on all cross-lines, collecting data on four frequencies (222, 444, 888 & 1777 Hertz) at 25 metre intervals using the Max-Min II+ made by Apex Parametics Ltd. and
3. running VLF-EM and magnetics surveys on all cross-lines and tie lines at 25 metre intervals.

Upon completion of the ground surveying, 89.6 km of HLEM and 106 km of VLF-EM and magnetics surveying had been carried out. All save a few low-interest airborne anomalies having difficult accessibility had been located and tested.

This interim report will briefly outline the state of the programme vis-a-vis the final report, how much office work needs to be done and the preliminary results. Since the need for specific collar locations, etc. is not required at this time the discussion of results and the recommendations will be generalized. The final report will contain specific results and recommendations.

The data presentation is in two forms. Field-draughted stacked profiles at 1:2500 of all cross-lines contain from top to bottom:

(i) a VLF-EM profile of dip angle and out-of-phase using the Seattle, Washington transmitter station (f=24.8 kHz)

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(ii) the HLEM profiles of in-phase and out-of-phase components for each frequency, in order from highest to lowest frequency

(iii) a magnetic profile

(iv) a topographic profile

A series of three plan maps at 1:2500 of each grid to show the VLF-EM, magnetics and HLEM (one frequency only) spatially relate the various lines to one another and compilation maps at 1:2500 contain final interpretation. A general compilation map at 1:10,000 shows the entire programme.

STATE OF THE PROGRAMME

A Field Work

The field work has been completed as of 12 September, 1984 and the chart below shows the breakdown of work done, grid by grid, in kilometres.

GRID	HLEM	VLF-EM	MAGNETICS
A	20·025	24·025	23·175
B (Main)	23·875	28·625	28·725
B (S.E.)	24·050	25·825	25·825
B (S.W.)	5·425	6·825	6·850
C	10·600	14·900	14·350
D	5·625	6·625	6·625
Total	89·600	106·825	105·500

Location of the grids relative to one another and prominent topographic features is enclosed (in envelope).

B Draughting

The stacked profiles (at 1:2500) now contain all the data collected. To be added to many of the profiles is the interpretation which is draughted beneath the topographic profile so as to create a geophysical cross-section. As the interpretation is done from the stacked profiles, this information is added automatically as a part of the interpretation procedure.

The plan maps at 1:2500 need to have base maps drawn first, with topographic contours and features included. These base maps are nearly complete and will be meshed down to provide a background for each of the three data maps and single compilation maps covering a particular grid.

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C Interpretation

Approximately one-half of the HLEM data has been fully interpreted and the results draughted onto the stacked profiles as discussed in the previous section. The subsequent HLEM interpretation will go quickly, despite the numerous multiple conductors, since the preliminary searching for the appropriate interpretation procedure (different in each geologic environment) is complete. The correlation of magnetics and VLF-EM results onto the compilation maps will commence upon completion of the geophysical cross-sections.

D Final Report

There is ample time to complete and hand in the final report by the required date of 30 November, 1984.

PRELIMINARY RESULTS

A General

This ground follow-up to a Dighem III airborne survey effectively located the great majority of airborne anomalies. It was evident from the outset of the field work that the airborne survey was flown in the wrong direction, along rather than across valleys. As a result the depths, conductivities and especially strikes interpreted from the airborne data are of questionable validity.

The argillaceous sediments of the valley bottoms have provided a multitude of discrete bedrock conductors of consistent conductivity and large strike length. These characteristics are typical of graphitic bodies and the challenge is to distinguish any massive sulphide conductors from the host of anomalous responses caused by graphitic-rich horizons. Where the geophysical response changes rapidly from line to line, cross-structures such as faults must be suspected and it is in these complicated areas that interest will be highest for drilling. Without many adjacent conductors influencing the response due to any single conductor, interpretation of any single conductor's depth-to-top and attitude becomes extremely hard. The magnetics is also complicated by numerous dykes and sills intruding the sediments but the background magnetics do help to map the major contacts between the volcanics and the sediments. Discrete magnetic anomalies can be found to coincide with short, rapidly changing conductors--making these conductors of high priority. With forth-coming geochemical and geological information further prioritization of these conductors will be possible. No lack of drill targets exist here but only by filtering out suspected graphite conductors can a prudent drill programme take place.

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In some cases more subtle anomalous responses, possibly caused by non-graphitic conductors at depth, should be drilled. Prior to the drill programme the interpretation should be complete and the various geologic models clearly formulated and discussed in order to best position drill collars for these low-amplitute conductors.

B Grid A and Grid B (Main)

This large area is centred down the Gerald Creek valley and was first surveyed due to the numerous airborne anomalies along the valley floor. The parallel to sub-parallel conductors of consistently poor to fair conductivities and consistent dips to the south suggest graphitic horizons within the argillaceous sediments. Some responses appear to be due to faults and the interest in these conductors will probably depend on geochemical results and their priority relative to the more interesting conductive responses found later in the surveying. On the extreme east end of Grid B (Main) abrupt termination of a series of parallel conductors of probable graphitic content points to a major faulting-folding structure yet to be definitively interpreted. This could warrant a drill hole or two but prioritization and available funds may remove it from final consideration.

In the area of the Davis showing no discrete anomalies, either magnetic or electromagnetic, can be associated with the surface mineralization. This is probably due to dissemination of the ore minerals, their possible lack on continuity, and their encasement in highly insulating quartz veins. Added to this is the factor of running the lines sub-parallel to the postulated strike of the veining that hosts the mineralization.

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C Grid B (S.E. Extension)

Located over most of the airborne anomalies collectively called "Anomaly C", the structure appears to be in such a state of change from line to line at the normal 200 metre line spacing that 6 fill-in lines were added. The result was cross-lines at 100 metre intervals along 1.2 kilometres of regional strike. This grid area will contain the highest number of conductors to be recommended for drilling. Several extremely interesting anomalies deserve attention in this graphitic-rich environment. The extremely active magnetic response points to three rock units all with highly variable magnetic mineral content and after the first three lines were surveyed the data collecting interval was reduced from 25 metres to 12.5 metres.

The conductors of interest are mainly located on the south side of the grid, one being centred on L 138E and extended down strike no more than 300 metres. A strong cross-structure terminates this conductor to the west and on the other side four distinctive conductors tentatively interpreted to form a synclinal fold structure continue up the hill. One of these conductors has medium to good conductivity values. On the south-west section of the grid, which was extended to cover a bornite showing, a pair of "good" conductors with apparently coincident magnetic anomalies and having limited strike length are evident. The conductors' relative position to the showing was not defined when the field crew left the property but with that information in hand the collar location(s) can be properly positioned.

D Grid B (S.W. Extension)

The airborne survey indicated a series of good anomalies in the section of the Moakwa Creek valley covered by this grid.

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Dighem loosely assigned these conductors with the ones covered by the South-east extension of Grid B discussed above. A pair of near-surface conductors (with corresponding high amplitudes) are observable on the grid, one of lesser conductivity striking parallel to the regional strike. The more conductive of the two strikes is at a shallow angle to the regional strike and has a more limited strike length. As a result this conductor will probably have a high priority geophysically and with any positive geochemical results, could be a target of premier quality. Where the two conductors intersect must also rate high for drilling as well as at the major conductor's best conductivities. The magnetics is generally quieter than on the South-east extension and a postulated diabase dyke is probably responsible for the single-line broad anomaly on the grid.

E Grid C

This grid is centred on the Moakwa Creek, further up-stream from Grid B (S.W. Extension). The major cluster of airborne anomalies are located in the valley bottom, however the anomalies were open-ended to the south due to incomplete air coverage. As a result the lines were extended as far as possible in that direction. Except for on two lines where a cirque allowed for further access, cliffs terminated the lines in that direction. The anomalies on the valley bottom are tentatively interpreted to be mainly of graphitic origin enhanced by contact with a postulated clay-rich overburden. On the south end however, a "good" conductor in a resistive host is evident and has a similar strike to the conductor of interest on Grid B (S.W. Extension). It is located under talus slope of the cirque on one line and some 100 metres away from the cliff on an adjacent line.

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The north side of the valley is barely surveyable, being of steep slope with many small cliffs. As a single, isolated airborne anomaly was interpreted in this area extra effort was made to locate and test it. A good profile of the conductor was possible on one line that slipped between the cliffs and this line was extended to the very top of ridge dividing Moakwa Creek from Gerald Creek. On other lines the terrain was too steep to collect HLEM data and so VLF-EM and magnetics anomalies are relied on to trace the conductor. It has the desirably short strike length, is not stratabound, and has a good conductivity value. Magnetic anomalies appear to coincide with the downhill edge of the conductor. All these factors make it a very good drill target.

F Grid D

The airborne survey located several anomalies at the north ends of several flight lines in a valley of a creek flowing into the Adams River. One of these anomalies has very good conductivity but the low amplitudes, indicative of a deeper source, make the interpreted values tenuous. The grid was centred in the valley bottom and lines extended as far up each valley side as possible. Impassable cliffs terminated the lines in most cases. Again, no lack of conductors exist on this grid. The most interesting conductors are high up the valley sides where complete profiles were not always possible. At least one valley bottom conductor, having good conductivity, warrants close attention as the interpretation is concluded. Upon complete interpretation the conductors on the grid, as on the others, can be properly evaluated.

Respectfully submitted

Mike Rogers

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