# GEOLOGICAL \& GEOPHYSICAL REPORT CENTRAL NICOLA PROPERTY (NORTH-CENTRAL PORTION) 

## NICOLA MINING DIVISION, BRITISH COLUMBIA

Latitude $49^{\circ} 48^{\prime}-49^{\circ} 52^{\prime} \mathrm{N}$; Longitude $120^{\circ} 33^{\prime}-120^{\circ} 38^{\prime} \mathrm{W}$
NTS Map Numbers $92 \mathrm{H} 087,92 \mathrm{H} 088$

PREPARED FOR COPPER BELT RESOURCES LTD.


## TABLE OF CONTENTS

Page
INTRODUCTION ..... 1
LOCATION, ACCESS, CHARACTER OF THE REGION ..... 1
PROPERTY ..... 2
PREVIOUS WORK ..... 2
Exploration History ..... 3
SCOPE OF THE WORK ..... 3
GEOLOGICAL SETTING ..... 4
Regional Geology ..... 4
Regional Subdivision of the Nicola Rocks ..... 4
Local Geology ..... 5
GEOPHYSICAL SURVEYS ..... 6
Magnetometer Survey ..... 6
VLF-EM Survey ..... 6
Induced Polarization Survey ..... 7
DISCUSSION OF GEOPHYSICAL \& GEOLOGICAL SURVEYS ..... 7
CONCLUSIONS ..... 10
RECOMMENDATIONS ..... 10
REFERENCES ..... 11
STATEMENT OF COSTS ..... 12
STATEMENT OF QUALIFICATIONS ..... 12

## ILLUSTRATIONS

FIGURE 1 LOCATION MAP \& PROPERTY MAP
FIGURE 2 GEOLOGICAL \& GEOPHYSICAL MAP
Following page

FIGURE 3 MAGNETIC \& VLF-EM SURVEYS
6

# GEOLOGICAL \& GEOPHYSICAL REPORT 

## CENTRAL NICOLA PROPERTY (NORTH-CENTRAL PORTION)

## NICOLA MINING DIVISION, BRITISH COLUMBIA

## INTRODUCTION

The area surrounding the very large Central Nicola Property has been explored for copper and gold by prospectors and mining companies throughout the past century. The results of much of this work have been preserved in Assessment Reports and in MINFILE. Recent geological work by the present author (Bergey, 2004b) suggested that there were major dissimilarities in most aspects of the bedrock geology of the area when compared with the published geological maps. The objectives of the work described in this report were to initiate an evaluation of the trove of geological data in the light of the geological revision, and to carry out additional detailed mapping relating to the revised geological construct.

Most of the recent geological and geophysical work took place within a 16-square kilometre block that includes the area explored by Rayrock Yellowknife Resources Inc. (Rayrock) in 1990 and 1991. This was one of the most extensive of the earlier exploration programs, and the one that undoubtedly had the most inadequately tested targets for follow-up..

In this report "the Property" refers to the entire Central Nicola Property, and "the map area" refers to the area shown in Figure 2.

## LOCATION, ACCESS, CHARACTER OF THE REGION

The Central Nicola Property is located midway between the towns of Merritt and Princeton in south-central British Columbia, about 200 kilometres east of Vancouver. The northern boundary lies six kilometres south of the hamlet of Aspen Grove, and it extends south for about six kilometres along the both sides of Highway 5A (Figure 1).

All parts of the map area are accessible from the highway via a network of gravel and dirt roads. In addition to the roads shown on Figure 3, there are a large number of logging roads and tracks that are accessible to $4 \times 4$ vehicles.

The north-central portion of the Central Nicola Claim claims occupies a dissected upland area, the southern extension of the Fairweather Hills, with a maximum elevation of 1200 metres. The topography is characterized by high, dome-shaped hills, separated by narrow valleys. Rock exposures are fairly abundant along the main ridges but are scarce to absent in the intervening valleys.

A mixture of fairly open forest and grassland characteristic of the semi-arid environment is found throughout the region. Ranching and logging are the main economic activities.


## CENTRAL NICOLA PROPERTY

 COPPER BELT RESOURCES LTD. OPTION NICOLA MINING DIVISION, BRITISH COLUMBIAScale 1 : 100,000


Area covered by geological \& geophysical work [Figure 2]

## PROPERTY

The Central Nicola Property comprises 19 Mineral Tenures that cover approximately 9612 hectares. Title to all of the claims is held by Gary Robert Brown of North Vancouver. Copper Belt Resources Ltd. has the option to acquire an interest in the Property; the exploration work described in this report was carried out on their behalf. Assessment work was applied to all of the claims in the following table. The tenures on which the work was carried out in the program described in this report are denoted with an asterisk.

| Tenure |  | Good To | Status | Mining Division | Area |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | $103413$ |  |  |  |  |
| 509148* | $\begin{aligned} & (100 \%) \\ & 103413 \end{aligned}$ | 2007/MAR/17 | GOOD | Nicola | 458.6 |
| 515563 | $\begin{aligned} & (100 \%) \\ & 103413 \end{aligned}$ | 2007/JUN/29 | GOOD | Nicola | 499.4 |
| 516069 | $\begin{aligned} & (100 \%) \\ & 103413 \end{aligned}$ | 2006/AUG/03 | GOOD | Nicola | 729 |
| 516070* | $\begin{aligned} & \text { (100\%) } \\ & 103413 \end{aligned}$ | 2006/AUG/12 | GOOD | Nicola | 625.1 |
| 516083 | $\begin{aligned} & (100 \%) \\ & 103413 \end{aligned}$ | 2006/AUG/03 | GOOD | Similkameen | 521.8 |
| 516085 | $\begin{aligned} & (100 \%) \\ & 103413 \end{aligned}$ | 2006/NOV/18 | GOOD | Similkameen | 730.2 |
| 516110* | $\begin{aligned} & (100 \%) \\ & 103413 \end{aligned}$ | 2006/AUG/03 | GOOD | Nicola | 500.1 |
| 516114* | $\begin{aligned} & (100 \%) \\ & 103413 \end{aligned}$ | 2006/AUG/03 | GOOD | Nicola | 562.8 |
| 516118 | $\begin{aligned} & (100 \%) \\ & 103413 \end{aligned}$ | 2006/AUG/17 | GOOD | Similkameen | 417.3 |
| 516122* | $\begin{aligned} & \text { (100\%) } \\ & 103413 \end{aligned}$ | 2006/JUL/8 | GOOD | Nicola | 604.7 |
| 516123 | $\begin{aligned} & (100 \%) \\ & 103413 \end{aligned}$ | 2006/JUL/17 | GOOD | Nicola | 417 |
| 516125* | $\begin{aligned} & \text { (100\%) } \\ & 103413 \end{aligned}$ | 2006/AUG/13 | GOOD | Nicola | 333.5 |
| 516126 | $\begin{aligned} & (100 \%) \\ & 103413 \end{aligned}$ | 2006/AUG/19 | GOOD | Nicola | 521 |
| 516127 | $\begin{aligned} & (100 \%) \\ & 103413 \end{aligned}$ | 2006/AUG/14 | GOOD | Similkameen | 500.9 |
| 516128 | $\begin{aligned} & (100 \%) \\ & 103413 \end{aligned}$ | 2006/AUG/03 | GOOD | Similkameen | 438.3 |
| 516129* | $\begin{aligned} & (100 \%) \\ & 103413 \end{aligned}$ | 2006/AUG/09 | GOOD | Similkameen | 500.7 |
| 516130 | $\begin{aligned} & (100 \%) \\ & 103413 \end{aligned}$ | 2006/AUG/09 | GOOD | Similkameen | 417.5 |
| 516131 | $\begin{aligned} & (100 \%) \\ & 103413 \end{aligned}$ | 2006/JUL28 | GOOD | Nicola | 312.7 |
| 516132 | (100\%) | 2007/JUL/06 | GOOD | Nicola | 521 |

## PREVIOUS WORK

## Government Geological \& Geophysical Surveys

The most detailed regional study of the volcanic and geology of the area between Princeton and Aspen Grove was carried out by the British Columbia Geological Survey (BCGS) and published as Bulletin 69 (Preto, 1979). The map was published at a scale of $1: 50,000$. Mining industry geologists, myself included, have relied on this work for many years.

The other published geological maps of the general area are reconnaissance in scope. The most recent of these is a $1: 250,000$ sheet published by the Geological Survey of Canada (GSC) in 1989 (Monger,1989). This map is mainly a synthesis of older published and unpublished data along with newer information based on localized mapping and laboratory studies. Monger's map replaced earlier GSC Map 888A (Rice, 1947) that more accurately portrayed the generalized geology in this part of the region.

An aeromagnetic map published by the G.S.C. in 1973 at a scale of One Inch to One Mile (Aspen Grove Sheet $-92 \mathrm{H} / 15$ ) has proven to be useful in interpreting certain geological features.

## Exploration History

The Central Nicola Property covers a portion of a highly mineralized belt of rocks that has received a great deal of attention from prospectors and mining companies over the years. Only the work carried out within the area covered by Figure 2 is noted below.

1979: Cominco Ltd. drilled 6 percussion holes in the central part of present claims, based on induced polarization, magnetic and geochemical surveys. Only two holes reached bedrock, both intersecting "altered diorite." One drill hole averaged $0.141 \% \mathrm{Cu}$ over32 metres.
1985: Vanco Explorations Ltd. carried out geochemical and geological mapping on central part of present claims (Lisle, 1985).
1985: Laramide Resources Ltd. carried out a geochemical survey for gold within the northern part of the survey area (Watson, 1988).
1990: MineQuest Exploration Associates carried out 54 line kilometres of induced polarization surveying on behalf of Rayrock Yellowknife Resources Inc. (Gourlay, 1990). This survey covered most of the area described in the present report.
1991: Rayrock Yellowknife completed 8 reverse-circulation percussion holes on the Minequest property. No significant Cu or Au values are reported (Gourlay, 1991).
2004: Copper Hill Resource Corporation carried out photo-geological interpretation and reconnaissance geological mapping over most of the current property (Bergey, 2004b).

## SCOPE OF THE WORK

The objectives of the work were: 1) to carry out detailed geological mapping in parts of the area to provide a more comprehensive assessment of the geological revision described in Bergey, 2004b: 2) to commence a geological and geophysical evaluation of the numerous anomalies indicated by the induced polarization (IP) survey carried out on behalf of Rayrock Yellowknife Resources Inc..(Gourlay, 1990). The two were interrelated in that much of the detailed mapping was done in IP anomaly areas, particularly those in which some follow-up drilling had been carried out by Rayrock. Magnetometer and VLF-EM surveys were carried out to cover the eastern portion of one of the anomalies.

## GEOLOGICAL SETTING

## Regional Geology

The property covered by the present report is located within Quesnellia, an accreted terrane in the Intermontane Belt of British Columbia. In the southern part of Quesnellia volcanic rocks assigned to the Upper Triassic Nicola Group crop out within a north-trending belt, up to 50 kilometres in width, that extends for more than 200 kilometres from south of Princeton to north of Kamloops. The Location Map (Figure 1) shows a generalized outline of the belt as well as the location of the four major copper and copper-gold camps in the region (Afton/Ajax, Highland Valley, Craigmont and Copper Mountain).

The rocks of the Nicola Group were invaded by a large number of alkaline plutons that are believed to be co-magmatic in part with the volcanic assemblage that they intrude. The largest of these, the Iron Mask batholith, is the host for the Afton and Ajax copper-gold deposits. Large bodies of somewhat younger calc-alkaline intrusive rocks are found along the margins of the Nicola Volcanic Belt. These include the Guichon batholith that hosts the immense copper deposits of the Highland Valley and may be the source for the copper at the Craigmont mine along margin of the intrusion. Similar calc-alkaline granitoids of the Allison Lake suite, believed to be Late Triassic to Early Jurassic in age, are exposed west and southwest of the map area.

## Regional Subdivision of the Nicola Volcanic Rocks

The Nicola volcanic assemblage was divided into three north-trending facies by Preto (1979) as a result his study of this unit within the area between Merritt and Princeton. His partitioning was based on field observations that suggestted that major changes in the character of the volcanic assemblage took place at two regional north-south fault zones - the Summers Creek/KentuckyAlleyne /Quilchena fault zone [shortened hereinafter to Summers Creek] and the Allison fault. I have designated the latter the Otter Creek fault since my work in that area indicated that it is not co-extensive with the fault along Allison Creek (Bergey, 2004a). It was suggested by Preto (1979) that the major faulting took place during the period of deposition of the volcanic rocks.

According to Preto (1979), the Western Belt comprises a succession of calc-alkaline andesitic to dacitic volcanic rocks with minor amounts of limestone and chert. Alkaline basaltic and andesitic volcanic rocks dominate both the Central and Eastern Belts. However, the alkaline plutons that are coeval with the volcanic rocks appear to be confined mainly to the Central Belt.

Monger (1989) retained the terminology of the three Nicola volcanic belts, but he denied that they had any association with regional faulting and he defined the belts on the composition of the rocks - andesitic in the Central Belt and basaltic in the Eastern Belt.

My geological mapping tends to confirm Preto's contention that major north-south faults separate distinctive rock units. Moreover, my air-photo interpretation placed these structures close to the locations shown on his map. However, I cannot comment on the nature of the Nicola rocks in the Central Belt since volcanic rocks are very scarce between the major faults in the vicinity of the Central Nicola Property.

## Local Geology

My recent photo-geological interpretation and field mapping of the Central Nicola Property (Bergey, 2004b) indicated that the area between the Otter Creek fault on the west and the main branch of the Summers Creek fault on the east is almost completely underlain by an alkaline intrusive complex. This unit is comprised mainly of breccia in which fragments of extrusive rock are rare.. Fine-grained monzonite and syenite, with lesser amounts of diorite, are the dominant rock types in both the fragments and the matrix of the breccias. A small body of monzonite and syenite was mapped by Preto (1979). This intrusion is shown on Figure 2. It iscomposed mainly of syenite, whereas monzonite is dominant rock type in the breccias.

The intrusive breccia complex includes a heterolithic variety with well rounded clasts and very sparse groundmass, as well as a continuum of types to monolithic breccia containing sparse fragments in a matrix of the same composition. The degree of rounding of the clasts is highly variable, from angular to well rounded. It appears that areas where well rounded varieties are most common were mapped previously as "lahar" and those with angular clasts as "volcanic breccia" or "autoclastic lava." However, a principal feature of the breccia throughout the region is the lack of obvious volcanic components.

Variations within the breccia unit take place over short distances, several varieties frequently being present within the same outcrop. Consequently, I was unable to divide the breccia complex into mappable units in my field work.

A very distinctive rock type that I have termed "brick-red basalt" (BRbasalt) is found erratically throughout the breccia complex. It also crops out on both sides of an offshoot of the Summers Creek fault between Missezula lake and Bluey Lake, where it forms an unbrecciated body more than five kilometers in diameter. BR basalt has a brick-red to purplish-red matrix and generally contains abundant augite and plagioclase phenocrysts. In the western portion of the outcrop area the rock is amygdaloidal and the phenocrysts are rather small and widely spaced. Elsewhere, amygdules are lacking and the crystals frequently are larger and more abundant; locally the texture is nearly holocrystalline, with a sparse, very fine-grained brick-red groundmass.

The BRbasalt is readily distinguished within the brecccia complex by its very fine-grained, brick-red groundmass and the abundance of augite phenocrysts. BRbasalt may form the groundmass of the breccia or the clasts or both. A "dike" about ten centimetres in width composed entirely of BRbasalt clasts was noted cutting monzonitic breccia along Highway 5A in the northeastern part of the map area.

The composition of BRbasalt is well documented. I have identified eight samples of probable BRbasalt from a table in Preto (1979) of rocks that were chemically and petrographically analyzed.. All are categorized as "trachybasalt, potassic alkali series." They all are located in areas that I have interpreted to beunderlain by the intrusive breccia complex. I have confirmed in the field that two of them come from outcrops of BRbasalt surrounded by breccia. Curiously, no samples were collected from the large, well exposed body of unbrecciated BRbasalt north of Missezula Lake..


# MAGNETIC \& VLF-EM SURVEYS 

sCALE 1:5000


IEGEND
-540 Relative magnetic intensity (nT)

A large body of diorite has been mapped within the Property east of Ketchan Lake, south of the present map area. Alkalic porphyry-type Cu -Au mineralization is associated with this intrusion. The rock is darker than most of the diorite that I have observed within the Intrusive Breccia Complex. The Ketchan diorite stock probably is older than the Complex, although there is no direct evidence to support this assertion.

Aside from the possible extrusive origin of portions of the BRbasalt, the only volcanic rock that I have observed within the Central Belt on the Property is a laminated felsic tuff located within an isolated outcrop area in the southwestern part of the map area. Although felsic volcanic rocks related to the Nicola Group are widespread west of the Otter Creek fault, they are reported to be uncommon in the Central Belt (Preto, 1979). No other outcrops, except for "valley basalt", have been found for several kilometers along the strike of this exposure

Percussion drill hole R-1 located about 500 metres north of the felsic tuff reportedly intersected 30 metres of "dacite flows" (Gourlay, 1991). However, the description of the material -i.e., "subhedral feldspar phenocrysts up to 1 mm size and anhedral gray quartz phenocrysts that range up to 2 mm size" - more closely resembles that for a porphyritic intrusive rock than for a felsic lava. A rock that closely matches the description is common along Otter Creek, a little more than a kilometer to the west, where it hosts the $\mathrm{Cu}-\mathrm{Ag}$-Au mineralization at the PAR prospect (Bergey, 2004a). The fine-grained porphyritic granite is associated with coarse-grained, highly siliceous granite. Granite of the same suite crops out six kilometers south of the drill hole, where several porphyry Cu showings have been identified. I have been unable to locate any rock exposures in the intervening ground, but the aeromagnetic data suggest that the granite may underlie much of the flat-lying area east of Otter Creek.

Basaltic lava flows of Pleistocene age ("valley basalt") are present within and adjacent to the property, and they are by no means confined to the valleys. Lavas of this type were found in two of the anomaly areas that were tested by drilling. These are discussed in more detail below.

## GEOPHYSICAL SURVEYS

## Magnetometer Survey

Measurements of the total magnetic field were made at intervals of 15 metres along east-west lines spaced 100 metres apart using an MF-2 fluxgate magnetometer. The readings were recorded relative to a 56,000 gamma datum. Diurnal changes, which were small, were corrected from repeat readings several times a day at base stations. A total of 871 readings were taken along 13 kilometres of line. The corrected magnetic data were plotted at a scale of 1:5000 and contours drawn at 100-nanotesla intervals (Map 3).

## VLF-EM Survey

Dip-angle VLF-EM measurements were taken using a Crone Radem receiver tuned to Seattle ( 24.8 KHz . The readings were taken along the same lines at the same sample density as the magnetometer readings. The positive Fraser-filtered values are shown on Map 3 at a scale of 1:5000. All VLF-EM measurements and calculations are appended to this report.

## Induced Polarization Survey

This survey was not part of the field program in 2005. A description of the survey is included in this section for convenience since it is discussed in conjunction with the recent geological and geophysical surveys in the following section.

The IP survey was carried out in 1990 in two phases by Pacific Geophysical (Gourlay, 1990). The first phase was blanket coverage of most of the property held by Rayrock at that time using time-domain instrumentation (EDA Model IP-6) with a 50 metre dipole interval and recording four dipole separations. Fourteen east-west lines spaced 400 metres apart were surveyed, for a total of 49.85 metres of line. This was followed by 6.3 kilometres of detailed phase-domain surveying along portions of the same lines that had been selected by the geophysical consultant, Philip Hallof. The survey utilized a Phoenix Model IPT-1 transmitter using a 25 metre dipoledipole array. Chargeability and resistivity were determined in both phases.

## DISCUSSION OF GEOPHYSICAL \& GEOLOGICAL SURVEYS

The locations of the IP lines along with the indications of high chargeability and high conductivity are shown on Figure 2. [Note: In this account I use the term conductivity, the reciprocal of resistivity, when discussing the resistivity data.] Anomalous indications are widespread within the map area and the selection of the most favourable targets is highly subjective. I have designated six anomalous "zones" for discussion. These include the anomalies that were selected by Rayrock for drill testing, mainly on the basis of their geophysical consultant's recommendations. Geology does not appear to have played a significant role in target selection.

## Zone A

The geophysical work carried out in the current program covered the eastern portion of Zone A. The VLF-EM method was selected in part because of the indications of a linear high chargeability and high conductivity anomaly on strike with an outcrop area of felsic tuffs. This suggested the possibility of a massive sulphide occurrence. Outcrops of Intrusive Beccia Complex (BXC) crop out in the southeastern corner of the survey area. The rock suite is mainly monzonite/syenite breccia but it includes heterolithic breccias as well as a considerable amount of BRbasalt, which occurs as both matrix and clasts in the breccia. Extensive outcrops of BRB extend to the north close to the boundary of the survey area. The only other outcrops found in this portion of Zone A were fairly extensive flat-lying exposures of "valley basalt (Figure 3). The basalt does not extend west as far as drill hole B-1.

Percussion holes B-1 and B-2 were intended to test a portion of the IP anomaly that was considered to be the most attractive by the geophysical consultant. Unfortunately, B-2 failed to reach bedrock and B-1 appears to have been drilled in a relatively weak part of the anomaly (see Figure 2). Hole B-1 passed through 41 metres of overburden before intersecting about 30 metres of rock that is described as dacite lava but probably is a porphyritic intrusive rock, as discussed earlier in the present report. (The two rock types would be indistinguishable in an examination of cuttings.)

The only anomalous VLF-EM indications extend for 700 metres along the edge of the outcrop area in the southeastern corner of the survey (Figure 3). The anomaly is highly unlikely to indicate a conductor, although it probably is indicative of a change in rock type. The crossover on each line occurs at the east end of a continuous string of moderately steep, positive dips several hundred metres in width. The cause of the striking uniformity in the dip angles is uncertain. The ground slope is gentle and the IP data show no significant conductivity contrasts in this part of the survey area. All of the outcrops of "valley basalt" are found within the area of uniform dip angles.

Neither the "valley basalt" nor the the Intrusive Breccia Complex have obvious magnetic expression within the survey area.. Narrow and fairly continuous magnetic trends west of the outcrop area of intrusive breccia complex suggest stratified rocks but could just as easily be interpreted as dikes. They are unlikely to reflect BXC. Magnetic contrasts in the vicinity of the chargeability/conductivity anomalies within the survey area are weak and unoriented.

Zone A has an area of at least a square kilometre and is open to the west. I traversed the area fairly thoroughly but was unable to locate any rock exposures.

## Zone B

Zone $B$ lies about a kilometer north of Zone A and is separated from it by rocks related to the Intrusive Breccia Complex. It has about the same areal extent as Zone A, is also open to the west, and has similar IP indications. The zone borders on the western margin of a "dome" of Intrusive Breccia Complex that is reflected in a strong aeromagnetic anomaly. The magnetic intensity, in concert with the topography, drops off abruptly along the eastern margin of Zone B.

No rock exposures have been found within the area and none is likely to be found since the zone is located in flat grazing land adjacent to Highway 5A.

## Zone C

Zone C is indicated by strong chargeability but relatively low conductivity. The anomaly is more than 600 metres wide along Line $32+00 \mathrm{~N}$. Outcrops are abundant in the area selected for test drilling. This consisted of three holes along the line at intervals of about 75 metres. The two eastern holes (B-4 and B-5) cut material that can be interpreted confidently as Intrusive Breccia Complex that contains a considerable amount of BRbasalt. The western hole (B-6) was logged as diorite throughout. The nearest outcrop is pink syenite. I have not observed any extensive exposures of diorite in the area, although diorite clasts are locally common in the breccia. Rapid changes in lithology are common in the Intrusive Breccia Complex.

The report noted that the holes contained an average of $2 \%$ pyrite, which would account for the chargeability anomaly. No copper values of interest were obtained in any of the holes. Although the drilling tested only a small portion of Zone C , the profusion of rock exposures in the vicinity leaves little hope for resurrecting this prospective target.

## Zone D

The geophysical indications and the follow-up in Zone D are very similar to those in Zone C - i.e., high chargeability with low conductivity, tested along the most interesting survey line by three percussion holes at intervals of about 75 metres. The three holes in this case were very nearly identical in their results - i.e., till--"valley basalt"--semi-consolidated gravel-- finegrained purple to maroon tuff. The "tuff" almost certainly is BRbasalt, which crops out about half a kilometer to the east and is interpreted to occur at surface less than 200 metres to the north. No explanation for the anomaly was suggested by from the drilling results..

Surface exploration in this area is inhibited by the locally thick cover of lava and gravel. However the "valley basalt" is interpreted to terminate a short distance to the north at the edge of a steeper slope.

## Zone E

Zone E could be considered the southward continuation of that Zone D. No drilling was done within this zone although drilling of the anomaly on Line $28+00 \mathrm{~N}$ was recommended by the geophysical consultant. I have interpreted the area to be underlain by rocks of the intrusive breccia complex, but the interpretation is not supported by any field evidence.

Zone F
Zone F is a sinuous feature that is predominantly a conductivity anomaly. Detailed IP surveying along a portion of Line $72+00 \mathrm{~N}$ at 25 -metre dipole spacing gave a chargeability response that was considerably stronger than the indication on the 50 -metre spread. .Percussion hole B-3 was drilled in the center of the anomaly. The hole was terminated in overburden at a depth of 61 metres,. The report (Gourlay, 1991) suggested that, "a wet clay section between 35.05 and 49.36 may have produced the IP response."

There is no doubt that the thick overburden contributed to the high conductivity and the elongated character of the anomaly reinforces this interpretation. However there are a number of chargeability indications in this area that do not have a shallow source. Zone F follows a depression between ridges that are underlain by breccia complex. It coincides with a well defined aeromagnetic "low." Rock exposures are scarce in the area, but an examination of the air photos suggests that they are likely to be found on several low ridges within the zone.

## CONCLUSIONS

The objectives of the geological work carried out during our current program were to assess the earlier photo-geological interpretation that suggested a major revision of the published geological maps was in order, and to provide geological information relating to several of the IP anomaly areas. As a result of this work the geological interpretation has been modified to some extent, but the overall pattern has remained the same. One significant change is that I have eliminated all of the Nicola volcanic rocks in the Central Belt from my interpretation, with the possible exception of the small area of felsic tuff in the southwestern part of the area and the BRbasalt.

The magnetometer and VLF-EM survey in the eastern part of IP Zone A did not indicate any features that would assist in the interpretation of this wide chargeability and conductivity anomaly. In particular, the survey failed to locate any geophysical indications of massive sulphide mineralization related to the felsic volcanics that were mapped on strike.

The geophysical consultant, Philip Hallof, states, "The widespread metallic mineralization that is evidently present on the Zig Claims has led to a large number of IP anomalies" (Gourlay, 1990). Drilling has been carried out on only three of these anomalies. Drilling was attempted on two others, but the holes did not reach bedrock. In only one case was the apparent cause of the anomaly determined.

The two western anomalies (Zone A and Zone B) appear to me to be of greatest interest on the basis of my present knowledge. Both cover a large area and are open to the west. There are no outcrops in either zone, and only a single hole was drilled in the Rayrock program. . Projection of geological data from outside the map area suggests the possibility that the mineralization reflected in these anomalies could be related to highly fractured granitic intrusions of the type that hosts porphyry copper-type mineralization at the PAR prospect to the west and the coppersilver showings to the south.

It should be recognized that parallel widely spaced IP survey lines can give an erroneous impression of the trend of the bodies causing the chargeability and conductivity responses. The rocks in the area tend to be massive, and there is a good chance that the general north-south continuity of the anomalies is incorrect in some cases.

## RECOMMENDATIONS

1. It is recommended that the program of detailed geological mapping of the IP anomalies be continued.
2. Reconnaissance gradient array resistivity surveying should be carried out in the area west of the IP survey. The purpose of this survey is to broadly outline the zone of high conductivity before planning detailed geophysical work or drilling.

## REFERENCES

Bergey, W.R., 2004a, Report on seological Surveys, Otter Creek Claim Group: A.R. 27524
Bergey, W.R., 2004b, Geological report on the Ketchan Property: Assessment Report 27564
Gourlay, A.W., 1990, Zig Property - Geophysics: [Rayrock Yellowknife] A.R. 20257
Gourley, A.W., 1991, Zig Property -- Reverse circulation drilling: [Rayrock Yellowknife] Assessment Report 21406
Lisle, T.E., 1985, Geological and geochemical report on the Blood, Climax, Thor, etc.: [Vanco Explorations] Assessment Report 14141.
Monger, J.W.H., 1989, Hope, British Columbia: Geol.Surv. Canada, Map 41-1989.
Preto, V.A., 1979, Geology of the Nicola group between Merritt and Princeton: B.C. Ministry of Energy, Mines and Petroleum Resources, Bull. 69.
Rice, H.M.A., 1947, Princeton, British Columbia: Geol. Surv. Canada, Map 888A.
Watson, I.M., 1988, Geochemical report on the Bloo, Climax, Thor, etc.: [Laramide Resources] Assessment Report 17118.

Respectfully submitted,


August 23, 2005

## STATEMENT OF COSTS

Type of Work Dates Days Cost/day Cost
Geophysical work (Contract) ..... $\$ 4000$
Geological mapping 4/06/05-5/06/05 ..... 2 ..... $\$ 400$ ..... 800
0/06/05-24/96/05 ..... 5 ..... 400 ..... 2000 2/07/05-7/06/05 5 ..... 2000
Geophysical and geological interpretation ..... 2 ..... 400 ..... 800
Map \& report preparation ..... 6
400 ..... 2400
Accommodation \& vehicle expense ..... 2000

## STATEMENT OF QUALIFICATIONS

I, William Richard Bergey of $25789-8^{\text {th }}$ Ave., Aldergrove , B.C., do hereby certify that:

1. I am a Professional Engineer (Geological) in the Province of British Columbia.
2. I have been employed in mining and mineral exploration for the past 58 years.
3. I have had many years of experience in geological mapping related to mineral exploration.
4. I have had many years of experience the planning and interpretation of geophysical surveys.
5. I personally conducted all of the geological work described in the above report.


## APPENDIX

LINE 20200N STN. MAG. VLF FILTER

LINE 20300N STN. MAG. VLF FILTER
 INE 20400N MAG. VLF
nT
degrees metres 0
8 vig 离 C
45 E
60 E
75 E
90 E 105E 135E
150E 165 E
180 E 195E 210E 225 E 240E 255E 270E 285E 300 E 315 E
330 E 345E 360E 375E 300E 420 E 435E 450E 4f5E $4 \pm 5 \mathrm{E}$ 510 E
540 E 555E 570E 585E 600E 615 E
630 E 645 E 660E 675 E 705E 720 E 735E 750 E 765E 780E 795E 810 E 825E 840 E 870 E 885E 900 E

IE - 45 E 960 E 975E 990 E

| $n T$ | degrees | metres |
| :---: | :---: | :---: |
| 480 | 4 | 0 |

LINE 20600N STN. MAG. VLF FILTER metres 0 15 30E

~uE | 30 E | 520 | -1 | -3 | -2 | 30 E |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\vdots$ | 520 | 0 | -1 | -8 | 45 E |
| E | 520 | 5 | 5 | -13 | 60 E |
|  | 540 | 7 | 12 | -10 | 75 E |
|  | 540 | 8 | 15 | -7 | 90 E |
| 105 E | 520 | 11 | 19 | -1 | 105 E |
| 120 E | 520 | 5 | 16 | 9 | 120 E | 105E 120E 135E 150E 165E 180E 195E 225E 240E 255E 270E 285E 300E 315E 330E 345E 360E 375E 3905E 420E 435E 450E 465E 480E

jE 525 E 540E 555E 570E
585E 600E
615E
630E 645E 660E 690E
705E 720E
735E
750E
765E
780E
795E
810E
825E
840E
855E
870E
900E
915E
930E
5E
JE
975E
990E nT degrees $\begin{array}{lll}500 & -1 & -1 \\ 500 & -2 & -3\end{array}$ $\begin{array}{ccccc}520 & 5 & 16 & 9 & 120 \mathrm{E} \\ 520 & 5 & 10 & 7 & 135 \mathrm{E} \\ 540 & 4 & 9 & 4 & 150 \mathrm{E}\end{array}$ $540 \quad 2 \quad 6 \quad 4 \quad 165 \mathrm{E}$ $\begin{array}{lllrl}540 & 3 & 5 & 1 & 180 \mathrm{E} \\ 520 & 2 & 5 & -1 & 195 \mathrm{E}\end{array}$ $\begin{array}{lllll}520 & 4 & 6 & -2 & 210 \mathrm{E} \\ 520 & 3 & 7 & 0 & 225 \mathrm{E}\end{array}$ $\begin{array}{ccccc}540 & 3 & 6 & 0 & 240 \mathrm{E} \\ 540 & 4 & 7 & -4 & 255 \mathrm{E}\end{array}$ $\begin{array}{lllll}540 & 6 & 10 & -5 & 270 \mathrm{E} \\ 540 & 6 & 12 & -3 & 285 \mathrm{E}\end{array}$ $\begin{array}{lllll}520 & 7 & 13 & -2 & 300 \mathrm{E} \\ 500 & 7 & 14 & -1 & 315 \mathrm{E}\end{array}$ $\begin{array}{lllll}500 & 7 & 14 & -1 & 330 \mathrm{E} \\ 560 & 8 & 15 & -2 & 345 \mathrm{E}\end{array}$ $\begin{array}{lllcc}560 & 8 & 16 & -1 & 360 \mathrm{E} \\ 540 & 8 & 16 & 3 & 375 \mathrm{E}\end{array}$ $\begin{array}{lllll}560 & 5 & 13 & 6 & 390 \mathrm{E} \\ 540 & 5 & 10 & 1 & 405 \mathrm{E}\end{array}$ $\begin{array}{lllll}510 & 7 & 12 & -4 & 420 E \\ 640 & 7 & 14 & -1 & 435 E\end{array}$ $\begin{array}{lllll}620 & 6 & 13 & 3 & 450 \mathrm{E} \\ 600 & 5 & 11 & 3 & 465 \mathrm{E}\end{array}$ $\begin{array}{ccccc}620 & 5 & 10 & 0 & 480 \mathrm{E} \\ 600 & 6 & 11 & -2 & 495 \mathrm{E}\end{array}$ $\begin{array}{ccccc}580 & 6 & 12 & -1 & 510 \mathrm{E} \\ 600 & 6 & 12 & 0 & 525 \mathrm{E}\end{array}$

LINE 20700N
STN. MAG. VLF FILTER metres $n T$ degrees $n T$ 680
600
520 520
520
520 520
520
520
540
500
520
500
520
520
500
560
480
560
56
580
620
60
560
50
56
520
520
500
500
500
50
500
500
500
$\begin{array}{llll}500 & -4 & -6 & 4945 \mathrm{E} \\ 500 & -6 & -10 & 5\end{array}$
$\begin{array}{rrrr}500 & -6 & -10 & 5 \\ 500 & -5 & -11 & -1\end{array}$
$500 \quad-5 \quad-11 \quad-1975 \mathrm{E}$

LINE 20800N $\begin{array}{cccc}\text { MAG. } & \text { VLF } & \text { FILTER } & \text { STN. } \\ \text { nT } & \text { degreesFilter } & \text { metres } \\ 520 & 0 & 0\end{array}$ $\begin{array}{cc}\mathrm{nT} & \text { degreesFilter } \\ 520 & 0\end{array}$

LINE 21000N STN. MAG. VLF FILTER metres 0

- 范 15 E
30 E ~UE 90 E
105 E 1205 135E 150E 165E 180E 210E 225E 240E 255E 270E 285E 300E 330E 345E 375E 390E 420E 435E 450E 480E -.JE 525E 540E 555E 570E 585E 615E 630E 645E 660E
675E 705E 720E 735E 750E 765E 780E 795E 810E 825E 840E 855E 870E 900E 915E 930E 5 E
-JE 975E 990E
${ }^{n T}$ degrees

| LINE 21400N |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| STN. | MAG. | VLF | FILTER |  |
| metres | nT | degrees |  |  |
| 0 | 540 | -3 |  |  |
| 15 E | 540 | -3 | -6 |  |
| - | 540 | -4 | -7 | 2 |
| 45E | 560 | -4 | -8 | 1 |
| 60E | 540 | -4 | -8 | 2 |
| 75E | 560 | -6 | -10 | 3 |
| 90E | 540 | -5 | -11 | 0 |
| 105E | 540 | -5 | -10 | 1 |
| 120E | 540 | -7 | -12 | 4 |
| 135E | 540 | -7 | -14 | 1 |
| 150E | 560 | -6 | -13 | -2 |
| 165E | 560 | -6 | -12 | -3 |
| 180E | 540 | -4 | -10 | -4 |
| 195E | 560 | -4 | -8 | -3 |
| 210E | 540 | -3 | -7 | -2 |
| 225E | 540 | -3 | -6 | -3 |
| 240E | 540 | -1 | -4 | -4 |
| 255E | 560 | -1 | -2 | -3 |
| 270E | 540 | 0 | -1 | -2 |
| 285E | 540 | 0 | 0 | -3 |
| 300E | 540 | 2 | 2 | -4 |
| 315E | 540 | 2 | 4 | -3 |
| 330E | 560 | 3 | 5 | -2 |
| 345E | 560 | 3 | 6 | -2 |
| 360E | 540 | 4 | 7 | -2 |
| 375E | 540 | 4 | 8 | 0 |
| 390E | 540 | 3 | 7 | 3 |
| 405E | 560 | 2 | 5 | 4 |
| 420E | 580 | 1 | 3 | 3 |
| 435E | 540 | 1 | 2 | 1 |
| 450E | 540 | 1 | 2 | -2 |
| Af5E | 540 | 3 | 4 | -4 |
| 汭 | 540 | 3 | 6 | -2 |
| 4Y5E | 560 | 3 | 6 | 1 |
| 510E | 540 | 2 | 5 | 1 |
| 525E | 540 | 3 | 5 | 0 |
| 540E | 540 | 2 | 5 | 0 |
| 555E | 540 | 3 | 5 | -3 |
| 570E | 520 | 5 | 8 | -4 |
| 585E | 520 | 4 | 9 | 0 |
| 600E | 520 | 4 | 8 | 1 |
| 615E | 540 | 4 | 8 | 1 |
| 630E | 540 | 3 | 7 | 1 |
| 645E | 540 | 4 | 7 | -1 |
| 660E | 540 | 4 | 8 | -2 |
| 675E | 560 | 5 | 9 | -3 |
| 690E | 540 | 6 | 11 | -3 |
| 705E | 540 | 6 | 12 | 0 |
| 720E | 540 | 5 | 11 | 2 |
| 735E | 540 | 5 | 10 | 2 |
| 750E | 540 | 4 | 9 | 3 |
| 765E | 560 | 3 | 7 | 2 |
| 780E | 540 | 4 | 7 | -1 |
| 795E | 580 | 4 | 8 | -2 |
| 810E | 560 | 5 | 9 | -2 |
| 825E | 580 | 5 | 10 | 0 |
| 840E | 580 | 4 | 9 | 2 |
| 855E | 600 | 4 | 8 | 2 |
| 870E | 600 | 3 | 7 | 2 |
| 885E | 580 | 3 | 6 | 1 |
| 900E | 580 | 3 | 6 | -1 |
| 915E | 600 | 4 | 7 | -3 |
| IE | 600 | 5 | 9 | -3 |
| 945E | 580 | 5 | 10 | 1 |
| 960E | 580 | 3 | 8 | 3 |
| 975E | 560 | 4 | 7 | 0 |
| 990E | 560 | 4 | 8 |  |



