Rok 003493 82G/2E

82G/SE-037

# GEOCHEMICAL - GEOLOGICAL - GEOPHYSICAL REPORT

## HOWELL CREEK PROSPECT

## BRITISH COLUMBIA

for

CONCEPT RESOURCES LTD.

by

Ronald K. Netolitzky, M.Sc., P.Geol.

July 28, 1972

Consulting Geologist
Calgary, Alberta
265-5781 (403)

## TABLE OF CONTENTS

## INTRODUCTION

At the request of Concept Resources Ltd., a detailed evaluation of a portion of the Howell Creek property was undertaken. A party of five, consisting of geologists R.K. Netolitzky, E.W. James, C. Moell, assistant E. Williams, and cook G. Moell were retained in the field from July 4, to July 11, 1972. E.W. James arrived at and commenced work in the field on July 6, 1972. An additional day (July 12) was spent on trenching prior to demobalization. Harold H. Williams assisted in office interpretation of geochemical data.

The program comprised of detailed examination of an anomalous area previously outlined by stream geochemistry. The main components of the program were: detailed soil sampling, additional stream geochemistry, VLF - EM survey, and detailed geological mapping. Control for the surveys were vertical aerial photographs and chain and compass controlled flagged lines, except for lines 12 and 13 which have pace and compass control.

Stream sediments and soil samples were analysed by Geophoto Services Ltd. Rock samples were analysed by Loring Laboratories Ltd.

## LOCATION AND ACCESS

The Howell Creek property is located within the main ranges of the Canadian Rocky Mountains, southeast British Columbia, at the approximate latitude of 49°15' and longitude of 114°30' (N.T.S. 82-G-2E). The area thus falls within the Fort Steel Mining Division of British Columbia.

Access to the area is via the British Columbia Forest Service road from the Morissey Bridge, ten miles southwest of Fernie. Logging roads along and between Twentynine Mile Creek and Howell Creek supply access to the claims examined.

Additional claim posts to those located in the previous year's program are listed below:

| | |
|---|---|
| Initial post | ROK 7 |
| Initial post | ROK 8 |
| Final post | ROK 5 |
| Final post | ROK 6 |
| Final post | ROK 12 |
| Initial post | ROK 205 |
| Initial post | ROK 206 |
| Initial post | ROK 207 |
| Initial post | ROK 12 |
| Final post | ROK 11 |

## PHYSIOGRAPHY

The area examined is characterized by a rugged east-west trending ridge, with a maximum elevation of approximatly 7300 feet. Maximum relief is in the order of 1800 feet. Twenty-nine Mile Creek and Howell Creek,with their subsiduaries, form a rough trellis drainage pattern. The major drainage valleys are original U-shaped glacial valleys which have been deepened to V-shaped valleys in the upper high gradient regions.

Extensive logging activity and a subsequent forest fire have destroyed much of the original thick growth of evergreens. This has facilitated geological mapping and prospecting by exposing outcrop, subcrop, and tallus.

Extensive snow cover on the northern slope of the main ridge and within cirques at the headwaters of Wutluk and Howell Creek restriced exploration in these areas.

## PREVIOUS WORK

The Geological Survey of Canada (Price, 1965) mapped the area at a scale of 1" = 1 mile and outlined the alkali syenite complex in the Howell Creek area. Structural studies were conducted by Jones (1966).

The property was first staked by N.C. Lenard in 1969. During 1969 and 1970 reconnaissance stream geochemical sampling and prospecting were carried out. Some anomalous geochemical values were indicated in this initial work.

During 1971, a more detailed geochemical and geological evaluation were conducted for Canarctic Resources Ltd. by H.H. Williams Ph.D, P.Geol. and E.W. James B.Sc. For the basis of this season's program and the general geological setting, the reader is referred to their resulting report (Geological - Geochemical Report, Howell Creek Prospect, British Columbia, June 30, 1971).

# GEOLOGY

## General Geology

The Howell Creek Fenster is the main geological feature of the area. A complex alkali syenite-trachyte intrusive is exposed along the south west margin of the fenster. A late Lower Cretaceous or early Upper Cretaceous age is suggested for the intrusive. Sedimentary formations in the immediate area vary in age from Precambrian Purcell to Upper Cretaceous Wapiabi and Belly River Strata. The Lewis Thrust and subsiduary thrust faults form the main structural features of the area.

For a more detailed description of the geological setting the reader is referred to the report of Williams and James (1971).

## Detailed Geology

In conjunction with geochemical sampling and geophysical traverses, a detailed geological examination was conducted (Map 1). The rock units encountered and location of contacts confirm those indicated by previous mapping. It was necessary to utilize the composition of subcrop and tallus in the mapping program due to the scarcity of outcrop. the most important feature observed, which has not been reported in previous mapping, is the considerable development of quartz veining and associated silicification of the syenites and trachytes.

A brief description of the main rock types is located within the appendix. A limited thin section study is also in the process of being completed. The intrusive body has been divided into two main rock units: 1A, syenite, leucocratic syenite, and syenite porphyry; and 1B, trachyte, chloritized trachyte, and trachyte porphyry. The geological mapping conducted, though of more detail, was considerably more restricted in area then that previously completed. The objective of the mapping was primarily to supply control for the geochemical and geophysical surveys.

Contact Metamorphism

No obvious contact metamorphic effects were observed in the limited outcrop available. In the western portion of the area, siltstones near the intrusive contact or present as inclusions have a baked hornfels appearance.

Alteration

Considerable alteration is in evidence within the syenite-trachyte body. Although surface weathering is locally extensive, most alteration is related to post-intrusive fracturing and shearing. Alteration features which are evident include: sericitization, quartz veining-silicification, and hematization.

Structure

The trachyte-syenite intrusive has well developed jointing probably relating to the cooling of the body. In addition, a northeast trending joint set, with associated quartz veining is related to tensional features. Subsequent, at least in part, to the tensional jointing is shearing with an approximate attitude of N70°W/40°N.

Economic Geology

On the basis of geology and geochemistry completed to date, mineralization appears spatially associated with internal contacts or zoning with in the intrusive, and associated with sedimentary - intrusive contacts. However, poor outcrop exposure makes the above conclusions tentative.

Mineralogy

Hand specimen identification of the following non-silicate minerals was completed in the field:

Pyrite, present as disseminations and fracture fillings.

Galena, present as disseminations within fractured syenite and is possibly present as disseminations within quartz veining.

Sphalerite, associated with quartz veining and as disseminations within altered syenite. The mineral was also tentatively identified as weak disseminations within quartzite.

Black, metallic to semi-metallic sulphide?, has not been identified. Observed in association with vein quartz in float.

Limonite, present as common weathering product after pyrite and possibly other sulphides.

Hematite, red earthy and black metallic varieties related to shearing and alteration. May be a feature of late shear zones.

Secondary, yellow oxide stain, present on joint surfaces, vein quartz and altered syenite. Has similar appearance to secondary oxides after molybdenite (ferrimolybdite - $Fe_2O_3.3MoO_3.8H_2O$).

Ore Controls

Insufficient geologic data are available for difinitive conclusions on ore controls. From evidence of mineralization located in float, silicification and fracturing with associated quartz veining is the most important feature. The vein quartz is generally vuggy and often coarsely crystalline with good development of crystal faces. Low pressure-temperature conditions of formation would be indicated. Sphalerite, galena, or molybdenite mineralization is generally resistant to normal weathering processes. However, in this area, the oxidationof pyrite to form acidic waters, combined with steep hydrological gradients has formed a considerable leached zone.

This extensive leaching prevents a more definate evaluation of the ore potential.

The syenite-trachyte boundaries appear to form favourable loci for mineralization. Indications of mineralization appear to be invariably associated with brecciation and silicification.

## GEOCHEMISTRY

The geochemical program consisted of two main phases. The first being the detailed extension of the previous stream geochemical program. This, with the previous season's work, formed the basis for location of a more detailed soil geochemical program.

### Stream Geochemistry

The results of this season's stream geochemistry program are compiled on Map 2. Stream waters and sediments were tested for total heavy metals (THM) in the field. The field proceedures were the same as discribed in the previous year's report. The selection of background values etc. is considered valid as in the previous report. The samples were also subjected to laboratory analyses for Pb and Zn. In addition, all samples containing greater tha 500 ppm of either metal were analysed for Cu and Ag. Thus, Cu, Pb, Zn and Ag were analysed for, utilizing atomic adsorption techniques. The minus 80 mesh silt samples of 0.5 g. were run by 1:1 $HNO_3$, digested for one hour at 90°C., then diluted to 10 ml. for a dilution factor of 20x.

The main streams (Twentynine Mile, Howell and Wutluk creeks) have a relatively steep hydrological gradient in the order of 200 feet per mile. Subsiduary streams have much steeper gradients which often exceed 1000 feet per mile. The location of sedimentary fines in the upper portions of the subsiduary streams is rare and thus coarser material was often collected. These factors made it impossible to locate an upper cutoff for anomalous stream values. Anomalous values located on the north slope of the ridge would suggest that mineralization continues on both sides of the east-west ridge.

Snow and runoff conditions restricted the extent of the stream survey. In addition to the main anomalous area, which was subjected to a detailed soil geochemical program, there was some indications of anomalous Zn values coming from the headwaters of Howell and Wutluk creeks.

Soil Geochemistry

The results of the soil geochemistry program are plotted on Map 3. The profiles proceedures and background values are as discribed in the previous season's report. Approximatly one half of the soil samples were analysed for THM in the field. In addition, all samples were analysed for Pb and Zn by atomic adsorption, using the minus 80 mesh fraction. All samples which contained greater than 500 ppm of either metal were also analysed for Cu and Ag. A number of samples in close proximity to quartz veining and extensive quartz float were analysed for Mo.

For the Cu, Pb, Zn and Ag analyses 0.5 g. of soil were run by 1:1 $HNO_3$, digested for one hour at 90°C. and then diluted to 10 ml. for a dilution factor of 20x. For Mo, 1 g. of soil was digested in $HNO_3$ (conc.) and HCl (conc.) for two hours, then diluted with sodium sulphate solution to 10 ml. for a dilution factor of 10x.

No well developed soil profiles were available for sampling. On Map 3, the values for Pb and Zn have been contoured at 200, 500 and 1000 ppm intervals. A total of ten anomalous areas or values have been given letter designations of 'A' to 'J'. There is an apparent east-west zoning of Pb and Zn soil anomalies; with Pb increasing and Zn decreasing from west to east.

Anomaly A; This is the most extensive Pb anomaly and is open to the east. A maximum value of 1400 ppm Pb and 2.4 ppm Ag were obtained from one sample. Two Zn anomalies flank and overlap the Pb anomaly (F & G).

Anomaly B; This is a north-south trending combined Pb and Zn anomaly. The north south direction may reflect the downslope movement of rock and soil.

Anomaly C; This forms a partially overlapping Pb and Zn anomaly which is a northwestern extension of anomaly 'B'.

Anomaly D; This is an isolated Pb response of 600 ppm which is just upslope of an extensive Zn anomaly (E). This offset is probably the result of hydromorphic migration of Zn with Pb being closer to the source.

Anomaly E; This covers an extensive area of anomalous Zn values, which is a western extension of anomaly 'C'. However, it does not contain anomalous Pb values. One soil sample which was analysed for Cu contained 420 ppm Cu. This anomaly is open to the west.

Anomaly F; This is an area anomalous in Pb and Zn, which is upslope from anomaly 'A'.

Anomaly G; This covers an area of anomalous Zn values and occurs down slope from anomaly 'A'. Zn would be expected to be transported down slope from any Pb responses due to the greater mobility of Zn.

Anomaly H; This is a Zn anomaly located on the north slope of the main east-west ridge, and requires further definition to the south.

Anomaly I; This is an isolated Pb and Zn anomaly which appears to be related to a syenite-sedimentary contact.

Anomaly J; An isolated Pb and Zn anomaly down slope of Cambrian and Devonian dolomites having reefal formations and solution breccias.

## GEOPHYSICS

A VLF - EM survey was selected for the property for the following reasons:

1. It has the ability to detect small ore bodies.
2. It detects structures (faults, shear zones) as well as massive sulphides.
3. Some of the detection characteristics are intermediate between conventional EM and IP (disseminated sulphides).
4. It is a portable, one-man instrument which does not require line-cutting, and is relatively inexpensive to operate.
5. In conjunction with filtering techniques, interpretation is simplified and topographic effects reduced.

The instrument used was a Crone Radem VLF-EM (very low frequency) reciever, serial #61. Dip angle readings were taken on 50 foot intervals, on north-south chain and compass lines and on portions of the east-west chained base line. The resulting profiles for the north-south lines and a portion of the east-west line are shown on Map 4. Transmitting stations utilized were primarily Seattle Washington (SW) and to a minor extent Bilboa Panama (BP)for a portion of line 1.

The raw dip angle data collected has been filtered by the technique discribed by Fraser (1969). The filtering technique reduces noise and transforms dip angle data into contourable values. Only positive values have validity with regard to conductors and thus warrant contouring. Although some of the filtered values obtained have close spatial association with disseminated pyrite and/or shear zones, the values obtained were extreemly low and no definate conductors are considered to have been located.

## SUMMARY AND CONCLUSIONS

Detailed coverage of a portion of the Howell Creek property resulted in the location of significant Pb and Zn anomalies in soils. In addition, indications of Pb and Zn mineralization were found in float and outcrop. Assay results from rock samples were poor, but this is related to the heavily leached nature of surface and near surface material. With data available to date, the property should be considered to have a good potential for Pb, Zn and Ag mineralization. The possibility of associated Cu was not completely tested. The potential for massive mineralization containing considerable iron sulphides should be considered as poor on basis of VLF-EM survey. Insufficient data are available to consider ore controls.

A potential for significant molybdenite mineralization exists for the property. The anomalously high background for Mo within the area and anomalous values located in last year's survey have not been subjected to further detailed testing.

Poor outcrop exposures in most of the survey area, limited the amount of geological information obtained.

# RECOMMENDATIONS

1. Further soil geochemistry would appear desirable to completely delineate anomalies located to date.

2. Further stream geochemistry and detailed geological mapping is required on areas which were inaccessible due to snow cover. This may locate mineralization in outcrop or delineate areas warranting soil geochemistry.

3. Analyses of soil samples collected to date for Mo and Cu warrants further consideration. Further laboratory testing on some of the rocks obtained to date definitely is warranted.

4. A number of approaches are available for evaluating the geochemical anomalies located to date:

a) trenching to bed rock and if possible to fresh rock, on and upslope of geochemical anomalies with cobra rock drill.

b) utilization of a caterpiller tractor to cut trenches on and up slope of geochemical anomalies.

c) conducting an induced potential survey to define geophysical targets for trenching and/or drilling.

Respectfully submitted,

Ronald K. Netolitzky

Ronald K. Netolitzky, M.Sc., P.Geol.

Consulting Geologist

Calgary, Alberta

July 28, 1972

PROFESSIONAL GEOLOGIST ALBERTA

R. K. NETOLITZKY