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# GEOLOGY, GEOCHEMISTRY AND GEOPHYSICS

of

# THE DOBBIN GROUPS I, II & III

N.T.S. 82-L-4 and 82-E-13

VERNON MINING DISTRICT

BRITISH COLUMBIA

CANADA

By:

M.E. (TIM) COATES, P.Eng.

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| ALFY | 1-18 | 10698-10715 |
| BEAR | 6 | 12242D |
| | 11 | 12247D |
| | 12 | 12248D |
| | 14 | 12250D |
| | 16 | 12252D |
| | 18 | 12254D |
| | 19 Fraction | 41349 |
| | 21 | 41351 |
| | 22 Fraction | 13090H |
| | 23 Fraction | 13091H |
| CHARLIE | 1-9 | 11338-11346 |
| | 11 | 11348 |
| | 13-16 | 11350-11353 |
| | 3-5 | 11460-11462 |

TELEPHONE 685-4331

ATLAS EXPLORATIONS LIMITED

330 MARINE BUILDING
355 BURRARD STREET
VANCOUVER 1, B.C.

# GEOLOGY, GEOCHEMISTRY AND GEOPHYSICS OF THE DOBBIN GROUPS I, II & III VERNON MINING DISTRICT

by

M.E. (Tim) Coates, P.Eng.

## INTRODUCTION

This report contains the results of the most recent Geological, Geochemical and Geophysical Surveys on the Dobbin Claims. As well, relevant data from previous surveys have been reviewed and re-integrated in the light of this study.

## SUMMARY

The Dobbin Claims at Whiterocks Mountain have been thoroughly examined and previous work has been reviewed in this report. Geological, Geochemical and Geophysical Surveys have been done and a small amount of drilling completed at the main showing area. Current work has extended the known area of interest and outlined several previously undiscovered bodies of mafic rock.

Induced Polarization surveys carried out over the property have produced inconclusive results. Apparently the high magnetite content of the host has rendered an accurate estimate of sulphide response impossible.

Three diamond drill holes were recommended by Jon Baird in the geophysical report on the property. Two have been retained for inclusion in the proposal for diamond drilling which accompanies this report. The third proposed hole has been replaced by two vertical holes which should gather the same information.

In all, 14 diamond drill holes with a total footage of 3200' have been recommended.

## CONCLUSIONS & RECOMMENDATIONS

The areas of mineralization have been more accurately defined by this survey and several new intrusive bodies have been outlined. The economic mineralization appears to be confined to the mafic unit (2) and is comprised almost exclusively of disseminated chalcopyrite. Bornite has been reported on the property to the north and may be present in the anomalous zone centred at 50E and 52S.

The initial area of interest on the property is overlain by a large geochemical anomaly bounded on the southeastern flank by overburden. Extensions of the mineralization in this quarter cannot be ruled out at this time.

The Induced Polarization survey detected several zones of high chargeability which coincide with copper soil-geochemical anomalies. (Seigel & Associates recommended that these zones be drilled to ascertain the character of the chargeability sources.)

## REPORT ON THE DOBBIN GROUPS: I, II & III

### OWNERSHIP

The property is jointly owned by I. Greg of 803-1450 Burnaby Street, Vancouver, and G. Schell of 2601-2020 Haro Street, Vancouver, and is currently under option to Atlas Explorations Limited, 330-355 Burrard Street, Vancouver 1, B.C.

### LOCATION AND ACCESS

The property lies about 15 miles northeast of Brenda Mines and about 16 miles northwest of Kelowna. It is accessible with 4-wheel drive vehicles via a logging road which follows Lambly Creek from a point on Okanagan Lake, north of Westbank.

### HISTORY

The first known mention of copper mineralization in the Whiterocks Mountain area appears in the Annual Report of the Minister of Mines, B.C., 1929, p.249:

> "The other area is a tract of country of uncertain dimensions, including Whiterocks Mountain on the divide between the headwaters of Lambly (Bear) Creek and Nicola River. The underlying rocks are chiefly granitic types, principally distinguished by the occurrence of abundant, conspicuous, peculiar shaped crystals of orthoclase feldspar varying from a fraction of an inch to several inches in length, but unusually narrow in proportion to their length. Otherwise these rocks vary from white to dark grey or greenish in colour and from true granites to, on the whole, intrusives having more nearly the composition of quartz syenite and syenite in which dark green amphibole (hornblende?) may be abundant and quartz relatively scarce. Other

essential minerals include microcline, microperthite, and sodic plagioclase feldspars. Accessory and secondary minerals are sphene, epidote, chlorite, magnetite and sulphides.

This body of alkaline, granitic intrusives occupies at least several square miles. It is of economic interest by reason of the many places where it was observed to carry conspicuous disseminations of pyrite, chalcopyrite, and, more locally, magnetite. As a consequence of the copper sulphide, rock outcrops are, in places, stained with copper carbonates. The sulphides are original constituents of the intrusive mass, are relatively abundant and point to this area as a particularly favourable one to prospect for more concentrated mineral occurrences, preferably in the vicinity of the granitic contacts with bodies of older formations."

Some work was done in the area shortly after the publication of the above account. Work was limited however, and appeared to have been confined to the area east of the present claims.

In 1955, a grid was cut over the northern end of the claim-group area and much of the ground to the north. The nature of the work carried out is not known.

Phelps Dodge Corporation located a molybdenum anomaly in the soils near Tadpole Lake in 1967. They later dropped the ground and it was taken up by Texas Gulf Sulphur who hold it at present. The area is said to be underlain by unaltered quartz-monzonite and appears not to have direct geological relationship to the mineralization on the Dobbin Group.

During the 1969 season, Texas Gulf Sulphur located a copper-in-soil geochemical anomaly in the ground adjoining the

northern boundary of the Dobbin Group. This anomaly is reported to coincide with areas underlain by basic to ultrabasic rocks which are restricted to four claims: Night Owl 35 & 36, and Bard 65 & 66. Approximately 1000' of percussion drilling was done in September to test this area. Two of the holes were drilled approximately 500' apart and about 400' north of the Dobbin boundary. One of the holes is collared near a bulldozer trench (1955 vintage), containing small amounts of disseminated bornite and malachite stain.

Previous work on the property by Greg and Schell was done on the Alfy 1,2,5 & 6 claims. Three short holes were in September and October of 1968, and the core was logged by Dr. A.C. Skerl. Dr. Skerl subsequently wrote a report (January 12, 1969) recommending linecutting, sampling and further drilling. (Assays of samples taken from the three holes are given in the section of this report entitled 'Economic Geology'.)

Dr. Aaro Aho visited the property on September 8, 1969, and found the property attractive enough to warrant further exploration work. A general outline of tnis proposed work is included in his memo of September 9, 1969.

In early October the present work was begun by Gerry Rayner who made a reconnaissance geological map of the property and set down preliminary guidelines for operations.

NATURE OF PRESENT STUDIES

Work completed at the property in October and November, 1969.

1. The existing road was extended by bulldozer for an additional 2 miles to provide better access to the property.
2. A grid with north-south baseline was cut over the area of interest with 400-foot line spacing. The baseline was surveyed in and cross-lines started with the aid of a transit.
3. A geochemical soil-sampling survey was carried out over the grid with samples collected at 100-foot intervals along the lines.
4. A ground-magnetometer survey was performed over the grid.
5. The area of the grid and its immediate environs was thoroughly prospected to locate further mineral occurrences.
6. An outcrop map of the geology of the grid area was prepared at a scale of 1" = 400'.

7. Independent of the work described in this report, an Induced Polarization survey was conducted over the aforementioned grid. (Data from this survey have been considered in decisions to recommend further work.)

It is hoped that results from the above surveys would indicate extensions of known mineralization and detect new areas of interest.

SOURCES OF INFORMATION

Information used as background for the writing of this report is mainly from the following sources:

1. Minister of Mines Annual Reports.
2. Maps of the Geological Survey of Canada (specifically - Rice, 1960; and, Little, 1961)
3. Unpublished Company Reports of Atlas Explorations Limited.
4. Data and core samples supplied by Greg and Schell.
5. Blow-up of ¼mile air-photographs, Department of Lands, Forests and Water Resources, Victoria, B.C.
6. Aeromagnetic maps jointly published by G.S.C. and Province of B.C. (specifically - Geophysics Paper 5207; Shorts Creek 82-L-14)

7. Field work of T.M. Skonseng, G.R. Sanford, M. Waldner and the present writer.

GENERAL GEOLOGY

The bedrock in the vicinity of Whiterocks Mountain is of sedimentary origin, being comprised in the main of argillites and siltstones of the Cache Creek Group of Permian (?) age (Rice, 1960). In general, these sediments are not limey although narrow layers of limestone or garnetiferous calc-silicate marble (lb) have been mapped on the property. The argillites are moderately contorted and show a schistosity which may or may not reflect bedding. Attitudes strike northwesterly with variable, steep dips.

The host rock which contains the mineralization of economic interest is a basic to ultrabasic unit which in places contains up to 10% magnetite. The ultrabasic portion of the unit is mainly composed of pyroxene (diopsidic augite) with mincr olivine and some interstitial hornblende and biotite. In the more felsic parts of the body, olivine is virtually absent and hornblende is the dominant mafic mineral. Magnetite is omnipresent as is apatite, an abundant accessory. The age of this intrusive phase is not definitely known but it seems certain that it predates the Cretaceous, as derivative dikes from the adjoining Cretaceous granitic batholith are found in the mafic unit.

dikes from the adjoining Cretaceous granitic batholith are found in the mafic unit.

Granitic rocks in the vicinity of the property are equigranular and medium-grained. They vary in composition from microcline rich granite to quartz-monzonite. The mafic constituent is biotite and it does not usually exceed 5% of the total. Pyrite is present in trace amounts and sometimes occurs as small clots or in druses which leave rusty spots on the weathered surface. Some pegmatite veins are present and several different types of aplitic or feldspar porphyry dikes are thought to be affiliated.

## Table of Formations

CENOZOIC

Cretaceous

Felsic Intrusive Rocks: granite, quartz-monzonite, hybrid dioritic rocks, aplite, pegmatite and feldspar porphyry dykes.

---------- intrusive contact ----------

Coryell Plutonic Rocks: ultrabasic rocks, alkalic gabbro, alkalic pegmatite.

---------- intrusive contact ----------

PALEOZOIC

Permian

Cache Creek Group: argillite, silstone, limestone, calc-silicate marble and quartzite.

ECONOMIC GEOLOGY

Mineralization of interest is restricted to basic rocks in the area covered, although copper reported from near Islaht Lake may have a different mode of occurrence. In the basic rocks, copper as chalcopyrite forms irregular clots and dissemination often in association with higher than average concentrations of magnetite. Pyrite is frequently seen but overall is much less common than chalcopyrite. Available sulphur seems to decrease to the north until about 400 feet north of the Atlas boundary in an old trench on the T.G.S. ground; the mineralization is bornite-magnetite (Rayner, 1969).

A log of chips taken from Brewer diamond drill hole #2 logged by the present writer.

TABLE 1

Log Brewer Diamond Drillhole #2

| Footage | Description | Visual estimate %Cu |
|---|---|---|
| 0'- 2' | No overburden. Fine-grained alkalic gabbro, partially epidotized, traces of chalcopyrite. Magnetic at 1 foot below surface. | 0'-10' ... 0.7% |
| 2'-38' | Lamprophyric rock; fine-grained alkalic gabbro groundmass with phenocrysts of Amphibole up to 2 cm. long; disseminated chalcopyrite throughout. Two zones with abundant medium-grained phenocrysts of hornblende (1 foot wide) at 22' and at 28' Narrow alteration zone with epidote along fractures. | 10'-20'... 1%<br>20'-30'... 0.5%<br>30'-39'... 0.4% |

TABLE 1 (contd.)

Log Brewer Diamond Drill Hole #2

| Footage | Description | Visual estimate %Cu |
|---|---|---|
| 39'-41' | Mafic band, largely pyroxene, strongly magnetic fine- to medium-grained, epidotized along fractures. | |
| 41'43' | Mafic as above - not strongly magnetic traces of chalcopyrite, porphyritic. | |
| 43'-44' | Ultramafic (pyroxenite?); strongly magnetic. | |
| 44'-48' | Fine- to medium-grained felsic band; biotite is major mafic felsic component approximately 60% "foliated mica-diorite" 1% pyrite. | |
| 48'-49' | Ultramafic layer, strongly magnetic porphyritic. | |
| 49'-50' | Fine- to medium-grained alkalic gabbro. Much pyrite introduced along fractures. | |
| 50'-60' | Ultramafic layer with up to 5% disseminated pyrite - fine- to medium-grained - strongly magnetic. | |
| 60'-64' | Alkalic gabbro - epidotic along fractures - narrow quartz-carbonate veinlets with minor pyrite. | |
| 64'-82' | Ultramafic layer with minor pyrite, slightly porphyritic with phenocrysts of hornblende; traces of chalcopyrite at 68', 75' and 77'; strongly magnetic. | |
| 82'-83' | Traces of chalcopyrite in porphyritic alkalic gabbro. | |

TABLE 1 (contd.)

Log Brewer Diamond Drill Hole #2

| Footage | Description | Visual estimate %Cu |
|---|---|---|
| 83'-89' | Porphyritic alkalic gabbro. | |
| 89'-90' | Epidotized alkalic gabbro; small inclusions of quartzite (?) - micaceous fine- to medium-grained. | |
| 90'-100' | Alkalic gabbro with pyrite; trace chalcopyrite 94'-96'. | |
| 100'-101' | Alkalic gabbro with magnetite rich layers. | |
| 101'-107' | Alkalic gabbro with quartz carbonate veinlets, minor pyrite and traces of chalcopyrite. | |
| 108'-110' | Ultramafic layer, strongly magnetic, minor pyrite. | |

No core is available for diamond drill holes #1 and #1a. The locations are shown in Fig. 2 however, and the drilling results of all three holes have been summarized by Dr. Skerl, 1969 (Table 2).

TABLE 2

| D.D.H. No. | Rock Type | Total Footage | %Cu | Remarks |
|---|---|---|---|---|
| Brewer No.1 | Fine-grained hornblende-diorite | 41 ft. | 0.38% | |
| Brewer No.1a | " " " | 26 ft. | 0.18% | poor recovery |
| Brewer No.2 | " " " | 110 ft. | 0.32% over 110 | |

A grab sample of mineralized rock from one of the pits near Brewer diamond drill hole #1, collected by Dr. Aho during his September examination of the property gave the following results (see Table 3). Results of four additional assays are shown as well (Ivan Greg).

TABLE 3

| Sample No. | Au | Ag | Total Cu | Non-Sulphide Cu |
|---|---|---|---|---|
| A-1 | .02 oz/T | 0.7 oz/T | 0.20% | 0.04% |
| G-1 | .02 | - | 1.56% | - |
| G-2 | .02 | - | 1.21% | - |
| G-3 | .02 | - | .39% | - |
| G-4 | .02 | - | .78% | - |

A spectrographic analysis made on a representative chip sample across a ten-foot section of massive sulphides at 66-S and 23-E gave results shown in Table 4. The mineralization was detected while the access road was being bulldozed.

Traces of chalcopyrite and malachite stain are present at several localities. It is my opinion at present that the main area of interest is still the area of initial trenching and drilling.

T S L

Laboratories Limited

325 HOWE STREET - VANCOUVER 1, B.C.

TELEPHONE 688-3504

ASSAYERS
CHEMISTS
GEOCHEMISTS

# CERTIFICATE OF ANALYSIS

SAMPLE(S) FROM ATLAS EXPLORATIONS LTD.

REPORT NO. V-7037

SAMPLE(S) OF ROCK

**Semiquantitative Spectrographic Analysis:**

| | Sample WR-1 | Sample | Sample | | Sample WR-1 | Sample | Sample |
|---|---|---|---|---|---|---|---|
| Antimony | - | | | Lithium ($Li_2O$) | - | | |
| Arsenic | - | | | Manganese | .2% | | |
| Barium | .03% | | | Mercury | - | | |
| Beryllium (BeO) | - | | | Molybdenum | - | | |
| Bismuth | - | | | Nickel | .01% | | |
| Cadmium | - | | | Silver | <.1 oz:t | | |
| Cerium ($CeO_2$) | - | | | Tantalum ($Ta_2O_5$) | - | | |
| Chromium | .005% | | | Thorium ($ThO_2$) | - | | |
| Cobalt | .02% | | | Tin | - | | |
| Columbium ($Cb_2O_5$) | - | | | Titanium | LM 2% | | |
| Copper | .2% | | | Tungsten | - | | |
| Gallium | - | | | Uranium ($U_3O_8$) | - | | |
| Germanium | - | | | Vanadium | .04% | | |
| Indium | - | | | Zinc | - | | |
| Iron | H | | | Zirconium ($ZrO_2$) | .01% | | |
| Lead | - | | | | | | |

Figures are approximate:

**CODE**

| | | | |
|---|---|---|---|
| H — High | — 10 — 100% approx. | TL — Trace Low | — .05 — .5% approx. |
| MH — Medium High | — 5 — 50% approx. | T — Trace | — .01 — .1% approx. |
| M — Medium | — 1 — 10% approx. | FT — Faint Trace | — approx. less than .01%. |
| LM — Low Medium | — .5 — 5% approx. | PT — Possible Trace | — Presence not certain. |
| L — Low | — .1 — 1% approx. | — — Not Detected | — Elements looked for but not found. |

DATE November 13, 1969. SIGNED R.B. Hutcheson

DIVISION OF TECHNICAL SERVICE LABORATORIES

GEOCHEMISTRY

A detailed geochemical soil-sampling survey was carried out over the grid area with samples being collected at 100-foot intervals along lines. The "B" horizon was sampled where possible; it is well developed over most of the property with the exception of swampy areas of small areal extent. In all 1,400 samples were taken.

Samples were shipped to Chemex Laboratories, Vancouver, where they were dried, screened and the minus 80 mesh fraction analysed - using Atomic Adsorption methods for Cu, Mo and Ni content in ppm. The samples were digested for total analysis using hot Aqua Regia.

Values for Cu, Mo and Ni content of each sample are shown in Figure 3. Contoured results for Cu $\geq$100 ppm, Mo $\geq$ 25 ppm and Ni $\geq$ 35 ppm, are shown in Figures 4, 5 and 6 (appended).

Discussion of Geochemical Results:

Copper - Anomalous zones coincide with areas underlain by mafic rocks which constitute the host. Copper values up to 2000 ppm are present in the largest anomalous area in the central part of the grid. Localities where anomalous copper geochemistry coincides with high Induced Polarization chargeability are required as prime targets for further work.

Molybdenum - Values, in general, are of low magnitude. The largest anomalous zone coincides with the drainage of Bit Creek and is probably transported. Elsewhere there is some coincidence of Molybdenum values with zones of anomalous copper geochemistry.

Nickel - The nickel values detected in the course of the present survey are of low order, ranging from 4 ppm to 70 ppm. In general these anomalous values may be explained by the presence of mafic rocks in their immediate vicinity. The anomaly in the southwest corner of the grid is mostly underlain by sedimentary rocks of the Cache Creek Group, but is probably caused by downslope migration of ions from the body of mafic rocks immediately to the north.

## GEOPHYSICS

A magnetometer survey of the grid area was carried out in October and November by Matt Waldner and assistants using a Sharpe MF-1 fluxgate type instrument.

The survey was successful in outlining several zones of high magnetic values (up to 29,000γ), which are probably underlain by magnetite rich ultrabasic rocks. More subtle magnetic contrasts seen in prepared profiles were a considerable aid in interpreting geological contacts in overburden-covered areas.

Contoured results of the magnetometer survey are given in Figure 7 (appended). Profiles of east-west lines were also prepared to aid in geological interpretations (Figure 8).

CONCLUSIONS AND COMMENTS

Mineralization of economic interest appears to be confined to mafic rocks of the Alkalic gabbro and ultrabasic suite. There does not appear to be a direct correlation of copper mineralization with magnetite-rich zones. The ultrabasic zones are local lens shaped concentrations and are probably of igneous-sedimentary origin (cumulates). In the vicinity of Brewer drill hole #2 the chalcopyrite-bearing zone is above the magnetite zone. This may reflect a change in the relative partial pressures of $O_2$ and S in the parent magnetic source. In the examined specimens of the mineralized zone, chalcopyrite appears to post-date the magnetite-rich phase.

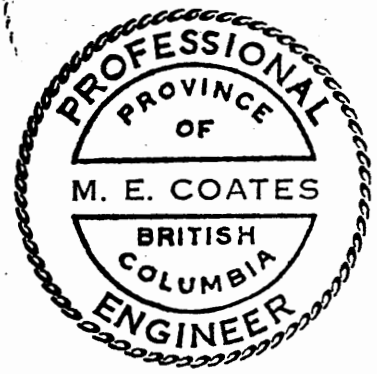
In general, the mineralization is of disseminated type. Maximum copper content in any of the samples (visual estimate) was approximately 2%. At most localities the copper content is significantly lower. The main zone of interest is the zone originally drilled by Brewer. The present work has extended the area of interest. It is in this area that any further work should be concentrated. In the vicinity of

most of the other geochemical anomalies, the only vestiges of copper mineralization are limited amounts of malachite stain which are dispersed throughout the host.

Respectfully submitted,

M.E. (Tim) Coates, P.Eng.

January 22, 1970



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