GEOPHYSICAL SURVEY

by



June 1995

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Gold Commissioner's Office VANCOUVER, B.C.

> YJ (YELLOW JACKET) Mineral Claims Atlin Mining Division, B.C.

Grant Numbers 327903, 328067, 328068

NTS Map 104 N/12E Latitude 59° 36', Longitude 133° 33'

Owners: Bradley T. White and Gary C. Lee Work done by Bradley T. White and Gary C. Lee

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INTRODUCTION

<u>General</u>

Periodically, between May 13 and June 30, 1995, the author and Bradley T. White completed a chain and compass grid, a magnetometer survey and a VLF survey on the YELLOW JACKET claims. The YJ claims (327903: 3 units, 328067: 1 unit, and 328068: 1 unit) consist of five units and are owned my the author and Bradley T. White.

Location and Access

The property is located 12 kilometres by road from Atlin, B.C. via the Surprise Lake Road. The claims are located about 59°36' north latitude and 133°33' west longitude and were formerly known as the ARRENT 1 (three unit mineral claim), DISCOVERY (Crown grant lot 184), and WEDGE (Crown grant lot 521) claims of Homestake Mineral Development Company. The maps on pages 2 and 3 show the location of the property.

Access is easily attained throughout the property by many placer roads and a bridge.

Property History (by D. V. Lefebvre and M. H. Gunning - does not include 1988-89 drill results)

The YELLOWJACKET property (MI 104M-014) was discovered in 1899 by placer miners working along Pine Creek. Mineral claims were staked by the Nimrod Syndicate which sank a 14-metre shaft and reported visible gold within an alteration zone containing quartz veins. Surface work continued in 1902 and a 35 metre trench was completed along the zone. The North Columbia Mining Company deepened the main shaft to 30 metres the following year.

No further work was done on the property until 1983 and all of the surface workings have been destroyed by placer mining on Spruce Creek. The area was staked by local prospectors in 1983 and then optioned to Canova Resources Ltd. which completed ground geophysical surveys, five diamond-drill holes in 1984 and 10 reverse circulation rotary-drill holes in 1985. The Homestake Mineral Development Company acquired an option on the YELLOWJACKET property in 1986 and carried out a soil geochemistry program, an airborne VLF-EM survey, ground VLF-EM, magnetometer and induced polarization surveys, and metallurgical tests on a 15 kilogram sample of drill core. Fourteen diamond-drill holes totalling 2250 metres were completed.



LOCATION MAP

100 200 300

KILOMETRES





Topography

The property ranges from 2900 to 3000 feet (approximately 900 m) and, with the exception of some high coarse tailing piles, is easily traversed. The claims are covered by placer mining gravels (see colour photo, page 4*) and the occasional patch of spruce,

poplar and alder trees in the mining areas. Beyond the steep banks, where placer mining ends, the vegetation is typical of a forested area consisting of spruce, pine, poplar and alder. Access past the steep placer mining banks is easily accomplished via several roads.

Grid and Field Procedure

Approximately 7000 metres of lines, cross lines and base line were surveyed between May 13 and June 30, 1995. Homestake Minerals' drill grid was relocated and picketed in 20 m intervals.

A Geonics EM-16 was employed for the VLF survey with readings taken at 10 and 20 metre intervals. Both the in-phase and quadrature were read. All stations were read by facing the direction of the transmitting station and thence turning clockwise 90° before taking the readings. Most lines had to be read on Maine, and Hawaii since the conductor directions were unknown. With one or two exceptions, Maine turned out to be the best station and the results are plotted on maps contained in the pocket.

Magnetometer readings were taken at 10 metre spacing with a Scintrex MF-2 fluxgate magnetometer. The instrument reads the vertical component of the earth's magnetic field. Readings were taken to the nearest 10 gammas in short loops and corrected for diurnal. Each loop was subsequently corrected to adjacent loops throughout the survey.

ECONOMIC GEOLOGY

<u>General</u>

As shown on Aitken's geology map (page 4), there is one geological formation underlying the drift and/or alluvian, namely serpentinite. (OUTCROPS IN A COUPLE OF PLACES ON THE N. SIDE OF THE CREEK IN THE TAILINGS)

Of more general interest in their paper entitled "The Listwanite-Lode Gold Association in British Columbia", C.H. Ash and R.L. Arksey have noted:

> "Linears defined by aeromagnetic lows in serpentinite may delineate zones of carbonatization. Magnetite formed during the serpentinization of ultramafic rocks produces

a strong magnetic signature. Carbonatization results in the destruction of magnetite, zones of reduced creating magnetic susceptibility. The application of aeromagnetic lows as an exploration tool in delineating zones of carbonatization in ultramafics has been discussed by Gresens et al (1982). This approach has been applied by Homestake Mineral Development Co. in the Atlin camp and has proven successful (D. Marud, personal communication, 1989)."

<u>Geological Setting</u> (Lefebvre and Gunning, 1967 - and see colour photo, page 4)

The YELLOWJACKET property is located near the western edge of the Atlin terrane in the northern part of the Intermontane Belt of the Canadian Cordillera. The terrane is typically fault bounded against metamorphic rocks of the Omineca Belt and a narrow strip of Lower Mesozoic volcanic and sedimentary rocks to the east, and Lower Jurassic sedimentary rocks and Upper Triassic and older variable metamorphosed strata to the west (Monger, 1975).

The Atlin terrane consists of weakly metamorphosed chert, pelite, carbonate, and basic volcanic and ultramafic rocks of the Cache Creek Group of Pennsylvanian to Permian age. Monger (1975) has divided the volcanic and sedimentary rocks of the Cache Creek Group into the Nakina, Kedahda, Horsefeed, French Range and Teslin formations. In the immediate Atlin area (Figure B25, page *), mafic volcanic rocks belong to the Nakina Formation and the chert and clastic sedimentary rocks with local pods and beds of limestone are part of the Kedahda Formation. Numerous ultramafic intrusions, typically peridotite, are associated with Cache Creek rocks, particularly the Nakina Formation. Typically, the ultramafic rocks are in fault contact with the conformable rocks.

Younger granitic intrusions cross-cut the Cache Creek Group rocks. A large Early Cretaceous stock outcrops immediately north of Atlin, while the Late Cretaceous Surprise Lake batholith is located 23 kilometres to the east. The latter intrusion consists of monzonite, granite and syenite phases (Christopher and Pinsent, 1982).

Gold placers have been the most important type of mineral deposit in the Atlin area. The first placer claim was staked in 1898 and led to the development of one of the major placer camps in British Columbia. A total of 615,234 ounces (19 135 618 grams) of gold was recovered from placer deposits in the Atlin Mining Division between 1898 and 1982 (Debicki, 1984). More than 96% of this gold was recovered from creeks in the immediate Atlin area.

* omitted

The source of the placer gold is auriferous quartz veins hosted by altered Cache Creek rocks. The only lode gold production was 245 tonnes of ore grading 13.7 grams per tonne gold from the Imperial mine. It is this disparity between the placer and lode gold production that is stimulating current mineral exploration programs in the Atlin area.

Property Geology (1967)

Poorly exposed mafic volcanic (Nakina Formation) and ultramafic rocks of the Cache Creek Group crop out on the YELLOWJACKET property. The ultramafic rocks underlie the north side of the Pine Creek valley, while the volcanic rocks occur on the south side. Pine Creek generally coincides with a fault zone trending 250° which is the contact between the two units. Rocks within the fault zone are often intensely altered and sometimes sheared. Diamonddrilling along the fault zone intersected high-grade gold, called the YELLOWJACKET zone, on the ARENT 1 and 2 claims in the vicinity old YELLOWJACKET showing (Ronning, of the 1986). The mineralization does not outcrop.

Basalt, andesite, serpentinized peridotite, diorite, gabbro and diabase are the principal lithologies in the YELLOWJACKET zone. Narrow dykes of intermediate to felsic composition described by Ronning as feldspar porphyry and syenite were also intersected in a few diamond-drill holes. All lithologies within the YELLOWJACKET zone are altered and the volcanic and ultramafic rocks are frequently totally replaced by secondary minerals.

Ultramafic rocks, where recognizable, are typically peridotites altered to serpentinites. The serpentinites consist of antigorite with minor lizardite and chrysotile (Ronning, 1986). Magnetite is an important accessory mineral; most ultramafic rocks, even when altered, are still weakly to moderately magnetic.

The basalts and andesite are typically fine-grained with small phenocrysts visible in less altered samples. The basalt is dark green and chloritic with minor amounts of plagioclase and pyroxene phenocrysts in a groundmass of plagioclase and pyroxene microlites. Andesites in the YELLOWJACKET zone are typically lighter coloured and more obviously porphyritic than the basalts. Phenocrysts of acicular hornblende and plagioclase have been logged (Ronning, 1986). Amygdules filled with chlorite and quartz were noted in one flow.

Diorite, gabbro and diabase are unusually abundant in the YELLOWJACKET zone. These are typically the least altered rocks and consist of equigranular plagioclase and pyroxene grains with secondary chlorite, carbonate and serpentine.

Intense alteration of the ultramafic and volcanic rocks is common. It frequently obscures the original rock type. The ultramafic rocks are typically serpentinized with broad zones of carbonate alteration. Locally, they are intensely altered to talc and mariposite. Occasionally the mariposite is associated with carbonate, minor pyrite and silica which forms a listwanite (Boyle, 1979).

The volcanic rocks are commonly altered to carbonate, chlorite and sericite. Silicification occurs in both volcanic and ultramafic rocks but is restricted in extent. Sulphides, typically pyrite, are minor.



Figure B26. Plan view of the Yellowjacket zone at bedrock surface, projected from drill coles (from Homestake Mineral Development Company, 1987).

<u>Summary - 1988 Drilling</u> (From B.C. Assessment Report #18608)

The YELLOWJACKET zone is underlain by a fault melange consisting of blocks and slivers of both serpentinized ultramafics of the Atlin Intrusions (Aitken, 1959) and intermediate volcanics of the Cache Two periods of faulting have been noted. Creek Group. The first phase was predominantly low angle thrusting during the Triassic to Jurassic era and resulted in the ultramafic rocks being emplaced within Cache Creek Group rocks. The second episode of faulting was and occurred presub-vertical (Pine Creek Fault) or synintrusion of contemporaneously with the the Surprise Lake In both instances, the resultant fracturing formed a batholith. plumbing system for hydrothermal fluids which resulted in guartz carbonate alteration and guartz and carbonate vein formation. The Fault system is Cretaceous Pine Creek responsible for the introduction or remobilization of qold into economic concentrations.

A zone of economic to sub-economic gold mineralization has now been defined. It appears to be truncated by a cross fault at 14+50E and tapers out to the west at about 13+40E. The southern limit appears to be 1+70S. The northern limit of mineralization, however, is more difficult to define as lower grades over wide widths have been intersected on step-outs down-dip on the thrust fault. It appears, however, that this is a different mineralizing system and therefore leads to the conclusion that the northern limit of economic mineralization at this time is at approximtely 1+20S. With regard to depth constraints, the main mineralized zone has not been intersected above the 810 metre level or below the 760 metre level.

Another vein zone has been delineated. It lies structurally above the main zone and is prdominantly flat lying displaying a shallow westerly dip or plunge. No easterly or westerly constraints have been defined, but it does appear that it is closed off to the north and south.

Anomalous gold values have been encountered throughout the entire YELLOWJACKET zone from 12+30E to 15+00E. The most significant of these intersections includes 8.06 gpt Au over a core length of 12 metres, which includes 33 gpt Au over one metre. Several holes drilled outside the zone failed to intersect any anomalous gold.

A diamond-drill program should be commenced in 1989 to further test the down-dip extension of the thrust zone. Further drilling should be implemented to test zones within the YELLOWJACKET property where the thrust faults are cross-cut by late faults such as the Pine Creek Fault.

<u>Mineralization - for the 1988 Drill Season</u> (B.C. Assessment Report #18608)

Introduction

Phase V drilling in 1988 was designed to test the extension of existing mineralized zones laterally and to depth and to test structures outside the main zone for similar mineralization. As drilling proceeded, it became apparent that the mineralization followes a broad zone which is generally gently dipping as opposed to sub-vertical. The latter part of phase V drilling and phase VI drilling concentrated on testing this theory with short step-outs and infill drilling on the main zone. As drilling progressed, three different mineralized zones relating to two different fracturing events were noted.

Zone Definition and Geometry

Mineralization within the main zone occurs as an irregular shaped body truncated to the east by a cross fault at 14+50E and tapers out to the different about 13+40E. The southern limit appears to be approximately 1+70S. At depth it appears to be enclosed by the 760 m and 810 m levels. To the north, the mineralization roughly follows a contact zone between serpentinite and overlying volcanic rocks. This contact zone would appear to be a thrust fault dipping gently to the NW at approximately 20-30° and striking at 040°. It is apparent, however, that mineralization along this thrust fault is of a different nature than the rest of the mineralization in the main zone.

Evidence for this is listed below:

- 1. Mineralization within the main zone, between 13+40 and 14+50E and 1+30 and 1+70S, contains generally erratic gold grades with a number of high-grade intersections. Mineralization along the thrust fault north of 1+30S is, however, generally quite consistent in gold grade, averaging one gram Au/tonne (gpt). No intersections greater than 3.50 gpt Au have been noted.
- 2. Sulfide content within veining in the thrust fault averages 3% pyrite with some instances of greater than 30% pyrite. Pyrite content in veins between 1+30S and 1+90S is less than 1%. There is also a trace to 3% chalcopyrite in the thrust fault controlled veining.
- 3. Widths of veining systems and alteration envelopes along the thrust fault contact are often in excess of 10 metres. Within the southern portion of the main zone they are usually less than two metres in width and are often quite erratic.

It can be argued that the mineralization south of 1+30S has only been remobilized by the Pine Creek Fault system and has not been introduced from a younger source accompanying the hydrothermal activity. This is a valid argument and should not be discounted. More geochemical work is needed to properly distinguish between the two different mineralizing systems.

For ease of description, mineralization associated with the thrust fault will now be called the Thrust Zone, while that found between 1+30S and 1+70S will now be known as the Main Zone, previously the East Zone.

A third zone of mineralization, the West Zone, has been noted sitting structurally above the Main Zone between the 810 and 860 metre levels. The zone, defined by several anomalous and ore-grade intersections, plunges (or dips?) gently westward a 5° to 15°. It lies between lines 14+20 and 12+30E and 1+40 and 1+80S. It would appear that this zone is also related to hydrothermal activity along the Pine Creek Fault system. Drill density within the West Zone is still fairly sparse; therefore, the zone is still poorly defined.

Occurrence and Mineralogy

Based on results of the 1988 drilling program, the mineralization style for all three zones is basically the same as described in previous reports. It consists of coarse gold hosted in light grey to white quartz veinlets, generally less than two centimetres in thickness. The veining is mainly found in the <u>more brittle</u> <u>volcanic rocks</u> but also occurs in <u>altered serpentinites</u>. Carbonate bleached, silicified and pyritized envelopes are common around quartz veinlets and accompany most of the higher grade vein systems. It is important to note the difference between the carbonate bleaching and the more pervasive carbonatization of the volcanic rocks which is not directly related to mineralization.

In many instances, the veining becomes frequent enough to form stockworks. These stockwork systems host the gold grades which approach sub-economic to economic widths of 3 gpt Au or better. Some of the gold is visible and most is at least 150 microns in size.

Sulfide mineralization within the YELLOWJACKET zone continues to be an unreliable indicator of gold mineralization. Not all of the gold intersections are associated with pyrite but many of the subeconomic intersections are locally enriched with pyrite. The enrichment varies from 1% to 25% of very fine grained to fine grained,, euhedral, disseminated pyrite, occasionally as haloes around the quartz veinlets. One zone of enrichment in hole 55 contains 40% to 60% massive pyrite with a trace to 3% of chalcopyrite next to a light grey quartz veinlet with visible gold. The gold, however, is free within the veinlet and therefore was probably deposited during a different mineralizing stage than the sulfides. Gersdorffite (NiAsS) and arsenopyrite have also been noted in YELLOWJACKET drill core. Both minerals account for the anomalous arsenic values detected while gersdorffite is presumably the host to most of the antimony. Occasionally arsenic and antimony enrichment do correlate with gold.

Other sulfide minerals noted in the YELLOWJACKET zone include millerite (NiS), chalcopyrite and pyrrhotite. None of these are related to gold mineralization.

Mineralization tends to be focused near <u>lithological contacts</u>, predominantly between volcanic rocks and serpentinite. The contact zones are generally broken and fractured, due to competency contrast, creating ideal porosity for vein emplacement.

PURPOSE

To relocate grid and thence survey all magnetic contrasts and VLF conductor axes.

RESULTS

The VLF results plotted can be seen as profiles on the maps contained in the pocket. The location of the VLF conductor axis has been transferred to the magnetometer map and the VLF composite contained in the pocket.

INTERPRETATION AND CONCLUSIONS

The conductors are labelled A to F on the magnetometer map and VLF composite contained in the pocket of this report. Conductors A and B no doubt represent the south and north fault zones, respectively, discussed in the Economic Geology section. Although very little of the Homestake daata was available at the time of writing this report, holes 87-23 and 87-31 had partial results projected to bedrock surface, as shown in the Geology section. These have been plotted on the composite map and are shown in the area of line 13+00E between 1+50S and 1+85S.

These results represent sub-economic to economic mineralization ranging from 0.31 grams per ton gold over 2 metres to 15.01 grams per ton over 4 metres. It is interesting to note that this mineralization is occurring in a general area of magnetic lows (less than 500 gammas) of possible listwanite occurrence - see composite map. However, this mineralization is also on or near a locally higher magnetic readings, ranging from 540 to 580 gammas. This could represent the "brittle volcanics" which host most of the mineralization as discussed in the Geology - Occurrence and Mineralogy section. Consequently, the best targets for future drilling would be on or near the contacts of magnetic lows (listwanites?) and higher magnetic readings (over 500 gammas) which could represent these more "brittle volcanics" preferably near a conductor axis (fault).

With this in mind, one can see (on the magnetometer plan and VLF composite in pocket) that there are many targets available as drilling locations. One can see numerous targets along conductor A on the south side of the property, especially since this is where the listwanites are contacting the larger known volcanics. Although Homestake drilled here (86-11 and 88-35) on top of the conductor axis (fault?) on or near line 14+00E, there are probably better targets to the south and west. Conductors C and D, where the interesting magnetic activity occurs, make excellent targets. Also, it can be seen that there are interesting areas on conductors E and F. To the west of line 11+50E is open for possible extensions of conductors B, C, D and E along with possible magnetic correlations; thus, this area should be surveyed.

RECOMMENDATIONS

- 1. Continue geophysical program to west.
- 2. Compile all data to date, especially Homestake's drill results along with the geophysics. If data not readily available from Homestake, then compile all B.C. Assessment Reports available on the property.
- 3. Based on the above, commence another drill program.

YJ MINERAL CLAIMS Atlin Mining Division, B.C.

VALUE OF ASSESSMENT WORK - GEOPHYSICAL SURVEY

FIELD:

Engineer: 8 days @ 350/day	\$2,800.00
Assistant: 7 days @ 220/day	1,540.00
Magnetometer and VLF rental	250.00
Living allowance: 15 man days x \$50	750.00
Truck (4x4): 8 days @ 50/day	400.00
Supplies, pickets, flagging, thread, tags,	
batteries, etc.	400.00

REPORT:

Data reduction, plotting, contouring, and	
report composition	750.00
Report typing	60.00
Report reproduction (sepias, etc.)	190.00
	· · · · · · · · · · · · · · · · · · ·

TOTAL

\$ 7,140.00

STATEMENT OF QUALIFICATION

I, GARY C. LEE, of the City of Whitehorse in the Yukon Territory HEREBY CERTIFY that:

- 1. I am a self-employed Geological Engineer.
- 2. I am a graduate of the University of Toronto, Toronto, Ontario, with a degree in Applied Science - Geological Engineering (Mineral Exploration option).
- 3. I am a member of the Professional Engineering Associations of the Yukon, B.C. and Ontario.
- 4. I supervised and carried out the work described in this report.

Lee

Gary Lee P.Eng.

JULY 14 Date: 1995

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