# GEOCHEMICAL REPORT ON THE ASPEN CLAIM GROUP <br> GLADYS LAKE, ATLIN AREA <br> BRITISH COLUMBIA, CANADA 

NTS: 104 N14
Latitude: $59^{\circ} 51^{\prime} \mathrm{N}$
Longitude: $133^{\circ} 05^{\prime} \mathrm{W}$

## GEOLOGICALBRANCH ASSESSMENTREPORT



By
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## SUMMARY

Between August 26th and 31st a work program consisting of soil sampling was completed on the Aspen 1 and 2 claims. The purpose of this program was to identify possible base-precious metal mineralization on the property.

The Aspen property was located in 1969 as a molybdenum occurrence. In 1970 Amax conducted a detailed program of geological mapping, geochemical sampling, road building, trenching, and rock sampling. They determined that the large area of molybdenum mineralization and a wide zone of hornfelsing was caused by a buried alaskite intrusive. Further work was completed on the property in 1978 by Quest Explorations, but no economic molybdenum mineralization was discovered.

In 1990 a program of prospecting, soil and rock chip sampling was conducted, primarily searching for possible gold and/or silver mineralization.

The property is bounded by two placer gold bearing drainages. In the earlier surveys none of the analyses were for gold mineralization. This current survey provided fill-in lines in the southern half of the property between an earlier reconnaissance soil grid.

Anomalous gold, silver, molybdenum, and zinc trends are indicated by the surveys conducted to date. Gold is considered the most interesting; anomalous values appear to follow the northerly trending hornfelsed sediments in the southwestern and northerly portions of the property.

Detailed geochemical surveys and geological mapping are warranted within the anomalous areas.

## INTRODUCTION

During the period August 26 to August 31, 1993 a small party comprising one geologist and 2 field assistants conducted 4650 line meters of soil sampling along fill-in lines between an earlier grid on the Aspen property. This report details the history of the property and the current work and is filed for assessment purposes.

## LOCATION AND ACCESS

The property is located approximately 30 air miles northeast of the town of Atlin, adjoining the south side of Gladys Lake (Figures 1 and 2). It is accessible by rough gravel road which leads from the Atlin Road (connecting Atlin with the Alaska Highway) approximately six miles north of Atlin. The access road is passable only during the summer months by $4 \times 4$ vehicles.

## PHYSIOGRAPHY

The property terrain is variable from relatively flat to gently dipping ground at lower altitudes on the north to relatively steep slopes and hilly mountainous terrain at higher altitudes to the south. Relief is in the order of 400 meters from the north boundary south of Gladys Lake at an altitude of approximately 1,100 meters to the southcentral portion of the property where altitudes reach 1,500 meters or more. Timberline is at 1,400 meters. Forest cover consists of a relatively open immature growth of pine, spruce and fir. At the higher elevations, vegetation consisting largely of grass and buck brush extends for a few hundred feet in altitude above timberline.

Drainage from the property is mainly towards the north into Gladys Lake with headwaters of major streams to the south of the property. Recent stream channels are locally deeply downcut into glacial deposits and occasionally follow old glacial outwash channels.

## PROPERTY

The property originally consisted of 40 units in 2 claims, Aspen 1 Record \#3683, and Aspen 2 Record \#3682. These have subsequently been reduced to 20 units. The claims were staked September 17, 1989 and are under

option to BWI Resources Ltd. and registered in the name of the author. The claim location map is shown in Figure 2.

## PREYIOUS WORK

The Aspen property covers an original mineral occurrence discovered in 1969, known as the Gladys Lake MOS $_{2}$ prospect.

The property was optioned by Amax in 1970 from the original prospectors, and detailed geological mapping, geochemical sampling, road building, trenching and rock sampling, plus diamond drilling were carried out on a very large claim block.

Amax did not discover economic molybdenum mineralization, but did identify a wide zone of molybdenum mineralization related to an alaskite intrusive. Silver, copper and zinc also showed wide zones of anomalous values in soils geochemical surveys. In the molybdenum zone values ran between 0.02 and $0.05 \% \operatorname{MOS}_{2}$.

In 1978 Quest Explorations re-staked the central portion of the property and re-sampled drill core and trenches for molybdenum.

The author had the property staked in 1989, primarily for its gold-silver mineralization potential.

In 1990 a reconnaissance program consisting of prospecting plus soil and rock chip sampling was completed and showed the presence of anomalous copper, zinc, molybdenum, gold and silver values.

The current program was an attempt to outline possible anomalous trends in the southwest portion of the property.

## REGIONAL GEOLOGY

The property lies within a northwesterly-trending belt of deformed Late Paleozoic digeosynclinal sedimentary and volcanic rocks known as the Atlin Horst (Figure 3). Numerous intrusive bodies have been emplaced into the Atlin


Horst in the Atlin area. They range in age from Late Paleozoic to Late Mesozoic and consist of ultrabasic bodies of the Atlin Intrusions, bodies of diorite to quartz monzonite of the Coast Intrusions and an alaskite batholith (Surprise Lake Batholith) and satellitic intrusions. Youngest rocks in the area include Tertiary and Quaternary basalt flows and scoria.

Mineral occurrences of $\mathrm{Mo}, \mathrm{W}, \mathrm{Ag}, \mathrm{Pb}, \mathrm{Zn}$, and Cu predominate in the Atlin area. Au placer deposits along Pine and Spruce Creeks have had a long intermittent history of exploration and production. It is of interest to note that both the Adanac $\mathrm{MOS}_{2}$ deposit and the Gladys Lake $\mathrm{MOS}_{2}$ prospect (the current Aspen claims) are associated with small alaskite intrusions satellitic to the main alaskite batholith.

## PROPERTY GEOLOGY

The area was mapped in detail by Amax personnel in 1970 and the following description is based on Godfreys report with observations by the writer.

The Aspen property is underlain by a generally north-westerly trending and steeply westerly dipping, locally complexly folded, sequence of argillite, chert, limestone and greywacke of the late Paleozoic Cache Creek Group. Roughly within the east-central portion of the property, these rocks are intruded by small bodies of Late Mesozoic alaskite. These consist of a ring-dyke complex exposed at higher altitudes and a probably stock-like body at lower altitudes.

Roughly centered about the alaskite ring-dyke complex is a quartz vein stockwork zone (one or more quartz veins per square foot) lying within a larger zone of weakly to intensely altered rocks. Both of these zones occur within a larger concordant hornfelsed zone. Both the altered and hornfelsed zones are elongated in a northwesterly direction.

Minor amounts of molybdenite occur in quartz veins and to a lesser extent along fractures throughout the stockwork zone. Up to $3 \%$ pyrite and minor amounts of chalcopyrite and pyrrhotite largely occur peripheral to the stockwork zone along fractures and disseminated throughout large portions of the altered and hornfelsed zones. Other minerals recognized include very minor amounts of scheelite and wolframite occurring in quartz veins within the stockwork zone. Surface oxide minerals present include limonite, ferrimolybdate and powellite.


## Description of Rock Units

## Cache Creek Group:

Rocks of the Cache Creek Group have been differentiated into three major units on the property. Folding has complicated working out of the stratligraphic succession with assurance; however a tentative succession from youngest to oldest is as follows:

Unit 3 - limestone, chert, argillite
Unit 2 - massive argillite
Unit 1 - thin bedded argillite and siliceous argillite to chert

Unit 1 is exposed in a roughly north-south trending belt across the east-central portion of the property. It is characteristically thin bedded (beds 2 to 10 cm thick) and consists of fine grained brownish-black argillite beds grading into lighter-coloured fine grained beds of siliceous argillite to chert. Siliceous beds commonly are in part lensoid in nature. Lithologic variations recognized consist of one altered, dark green porphyritic andesite flow located in the central portion of the grid and thick (up to 10 meters) interbedded grey mottled chert and massive argillite located in the southeast portion of the grid. Massive thick argillite beds are also locally present within Unit 1.

Unit 2 is found on the eastern edge and much of the central to western portion of the property. It consists predominately of very dark coloured, fine grained massive argillite. Other horizons recognized within the unit include medium to coarse grained greywacke containing angular rock fragments or argillite and volcanic material and a horizon consisting mainly of thin to thick bedded argillite and chert. Argillites of Unit 2 are commonly pyritic.

Unit 3 is only exposed within the north-central portion of the property. It consists of a sequence of limestone, chert and argillite. Stratigraphy and bedding attitudes within and adjacent to the unit indicate that it lies along the core of a synclinal fold axis. The unit is differentiated into a lower horizon consisting of thick beds of interbedded massive argillite, grey mottled chert, massive light-coloured chert and chert breccia; a middle horizon consisting of massive argillite and minor thick beds of grey mottled chert and an upper horizon consisting of partly silicified crinoidal limestone and minor thick beds of massive light coloured chert and chert breccia.


#### Abstract

Alaskite:

Alaskite occurs as a ring-dyke complex within the central portion of the property at high altitudes and as a separate stock-like body in the northeastern portion of the grid area at low altitudes. In both bodies, alaskite is leucocratic and commonly porphyritic with a fine grained equigranular graphic-textured groundmass. Phenocrysts consist of approximately $15-25 \%$ medium grained, sub-rounded smoky quartz, $20-30 \%$ medium to coarse grained, euhedral, cream to flesh coloured alkali feldspar and $2-3 \%$ altered to fresh, medium grained flakes of biotite. The groundmass is cream to flesh coloured and consists of approximately $20 \%$ quartz and $30 \%$ alkali feldspar. Grain size of the groundmass is locally variable from fine to medium grained. Locally present in alaskite are medium to coarse grained and occasionally pegmatitic irregular clots and dykelets of quartz, alkali feldspar and biotite.


The alaskite ring-dyke complex has an outer diameter ranging from 450 meters to 700 meters. It consists of a series of largely discordant annular bodies having a quarter-moon or concavo-convex form in plan. All of these bodies have sharp intrusive contacts with altered hornfels. Contact attitudes are commonly steeply inclined inwards suggesting that the complex has an inverted cone-shaped form at depth. Alaskite at and near contacts in separate bodies of the complex commonly has an aphanitic groundmass. The central portion of bodies comprising the southern half of the complex commonly have wide banded zones characterized by interbedded thin bands (generally ranging from 1 mm to 20 mm ) comprised mainly of smoky quartz or alkali feldspar. Banded alaskite shows uneven grain size (fine to course grained) and mutual grain relationships between quartz and alkali feldspar. Locally present are bands of quartz with minor seams of alkali feldspar up to three feet wide. Bands often show various degrees of ptygmatic folding undoubtedly due to subsequent deformation caused by magma flow in other parts of the intrusive chamber. Banding in alaskite must be due to cyclical crystallization of quartz and alkali feldspar.

The partially exposed body of alaskite at lower altitudes to the northeast of the ring-dyke complex, appears petrographically homogeneous. Contacts with sediments were not observed. It appears to be a discordant body and is probably a portion of an inferred buried large stock-like body of alaskite underlying the hornfelsed and altered zones centered about the ring-dyke complex.

## Structure:

Structural features present include indicated fold patterns in the Cache Creek Group rocks, jointing and fracturing and faults and shear zones.

Cache Creek Group rocks predominantly strike north-northwesterly and dip steeply to the west. Variations include a predominate north-northeasterly strike and steep westerly dip in the eastern portion of the property and the indicated presence of the roughly north-south trending, westerly arcuate synclinal fold axis passing through the central portion of the property. These variations and the presence of probable correlative massive argillites (Unit 2) that underlie the east and west portions of the property strongly indicate that the Cache Creek Group rocks have in general been tightly folded.

Jointing occurs throughout the property in all rock types. Two predominant joint systems are present. They include a north-northeasterly trending and generally moderately to steeply east dipping set and a north-northwest to northwest trending and steeply dipping set. Also locally present, particularly within the main area of interest, is a flat to gently dipping joint set. Jointing appears to be best developed in the core and peripheral to the alaskite ring-dyke complex within the quartz vein stockwork zone. However, jointing is quite well developed throughout the altered zone. Fracturing generally is not intense. It is best developed within the more highly jointed area.

A series of northeasterly-trending and steeply-dipping late faults and shear zones with argillized gouge zones up to 10 meters wide cut the quartz veined alaskite ring-dyke complex and adjacent altered rocks. Horizontal displacement along faults is up to 100 meters.

## Alteration:

The hornfelsed and altered zones are both roughly centered about the alaskite ring-dyke complex. They are both elliptical in plan and elongated in a north-westerly direction.

The hornfelsed zone measures approximately 3,000 meters and 2,200 meters respectively, along its long and short axis. The zone transgresses all the major differentiated units of the Cache Creek Group and shows different mineralogical and textural changes in each unit. The degree of hornfelsing increases inwards. Thin bedded argillite and siliceous argillite of Unit 1 show slight recrystallization, buff-brown to reddish-brown colour banding and minor secondary biotite occurring disseminated and along fractures. Massive argillites of Unit 2 typically show a spotted texture which is probably due to secondary cordierite.

Limestone in Unit 3 is partly silicified or recrystallized to marble and typically contains abundant clots and irregular veinlets of tremolite. Pure cherts of Unit 3 and other units are unaffected within the hornfelsed zone or show slight recrystallization to quartzite. Hornfelsed argillite in Unit 3 are similar to those of Units 1 and 2.

The wallrock alteration zone lies within the hornfelsed zone. The long and short axis, respectively, are approximately 2,500 meters and 1,650 meters. It occurs within all differentiated units of the Cache Creek Group and within alaskite intrusions. Within all sedimentary rocks alteration is characterized by prevasive weak to intense degrees of bleaching and silicification with attendant development of sericite occurring along fractures and disseminated and along margins of quartz veins. In the outermost portion of the alteration zone, wallrock alteration commonly occurs as wide selvages along individual quartz veins up to a total width of 25 cm or along quartz vein stringer zones up to a total width of 65 meters. The degree of alteration increases towards intensely altered centers located (i) at the northern nose of the synclinal fold in Unit 3, (ii) within the core of, and partly peripheral to the alaskite ring-dyke complex and (iii) towards several small centers located at the south-eastern end of the alteration zone. Sericite is best developed within the quartz vein stockwork zone and in quartz vein stringer zones in the northwestern portion of the alteration zone. Remnants of hornfelsed sediments are relatively common within the alteration zone.

Alteration of alaskite within the alteration zone consists largely of intense sericitization of primary biotite. Alkali feldspars in alaskite are only locally altered to sericite.

## Quartz Veining:

Quartz veining occurs widespread throughout the alteration zone within sedimentary rocks and alaskite. Veins commonly range from 1 mm to 20 mm wide and are relatively continuous and sharp walled. Quartz veins occurring in altered sedimentary rocks and alaskite commonly consist, respectively, of clear to white medium grained quartz or of medium grained, sugary, smoky quartz. Locally present are bull-quartz veins commonly up to one foot wide. The quartz vein stockwork zone is roughly centered about the alaskite ring-dyke complex. Here vein frequency is approximately equal to or greater than one vein per square foot and commonly ranges up to five veins per square foot, particularly within the core of the alaskite ring-dyke complex. Several quartz vein stringer zones, up to 100 meters wide, are located to the northwest of the stockwork zone. These zones contain one to two veins per meter. Attitudes of quartz veins throughout the alteration zone show two predominant sets roughly parallel to the orientation of the two predominant joint sets. Locally joint systems were observed to control quartz veining. Also present is a gently dipping quartz vein set, at least within the stockwork zone, which also shows control by a joint system.


#### Abstract

Alaskite bodies of the ring-dyke complex are commonly less intensely quartz veined than adjacent altered sedimentary rocks within the quartz vein stockwork zone. At alaskite contacts, quartz veins have been observed to be cut off by alaskite or to transect the contact and to pinch out or grade into alkali feldspar veinlets at various distances (up to 3 meters) within alaskite from the contact. Also, some veins followed from sediments into alaskite have been observed to be off-shoots from a magmatic quartz band at alaskite contacts. Within the stockwork zone, both in altered sedimentary rocks and alaskite, quartz veins often have selvages of sericite and/or alkali feldspar borders. Some grade along strike into alkali feldspar veinlets which are relatively common throughout the stockwork zone.


Various cross-cutting relationships between different types of quartz veins and alkali feldspar veins have been observed within the stockwork zone. However, no significant age difference is believed present between different types of veins since all veins are believed genetically related to the alaskite ring-dyke complex.

Minor amounts of molybdenite and traces of scheelite and wolframite occur in quartz veins within the quartz vein stockwork zone and stringer zones.

## Mineralization:

Sulphide minerals recognized on the property include pyrite, molybdenite, chalcopyrite and pyrrhotite. Very minor amounts of scheelite and wolframite have been observed. Also present are surface oxide minerals including limonite, ferrimolybdite and powellite.

Up to $3 \%$ pyrite and minor amounts of chalcopyrite and pyrrhotite largely occur along fractures and disseminated throughout large portions of the altered and hornfelsed zones peripheral to the quartz vein stockwork zone. Up to approximately $1 \%$ pyrite is estimated to occur within the stockwork zone though it is almost wholly oxidized to limonite.

Minor medium grained flakes, books and rosettes of molybdenite occur along margins of quartz veins within the stockwork zone and in most of the stringer zones. Also, minor fine grained molybdenite occurs along dry fractures within the stockwork zone. Trace amounts of scheelite and wolframite occur disseminated in quartz veins within the stockwork zone. Ferrimolybdite locally occurs along fractures and as pseudomorphs after molybdenite. Powellite has been recognized in a few instances coating flakes of molybdenite. Limonite occurs widespread after pyrite and pyrrhotite.


## 1993 WORK PROGRAM

Three grid lines totalling 4,650 line-meters in length were sampled across the southwestern portion of the Aspen 2 claim and northwestern portion of the Aspen 1 claim. These lines ( $1 \mathrm{~N}, 0.5 \mathrm{~N}, 1.5 \mathrm{~N}$ ) lie between previously sampled lines ( 0 N and 2 N ) with 0 N following the common boundary between the two claims. The lines, 250 meters apart, were marked by flagging with soil samples taken at 50 meter intervals along east-west lines using a hipchain for distance measurement.

Where possible, samples were taken from "B" horizon soils at 3-10 inches depth, although good soil profiles are poorly developed in much of the area. Gold-silver and molybdenum-zinc values are plotted on Figures 5 and 6 respectively and tabulated in Appendix 1.

## RESULTS

As these were fill-in lines results were plotted and interpreted in conjunction with the earlier results.

Although influenced by the line spacings, gold-silver values appear to occupy several zones following northerly trends, parallel to the trend of the homfelsed sediments in the area. Higher gold and silver values both tend to be clustered in the western third ( $0-6 \mathrm{E}$ ) and towards the eastern end ( $12-15 \mathrm{E}$ ) of the area sampled, with several distinct northerly trending zones within these areas.

Assuming a northerly trend, anomalous gold zones consisting of 1 to 2 stations per line cross 2 to 3 lines. These represent zones $50-100$ meters wide by $250-500$ meters in length. Much more detailed sampling will be necessary to determine continuity within these zones.

Anomalous molybdenum values occur over the eastern portions of lines $1-5 \mathrm{~N}$ and 1 N and continue to the northeast within the previously sampled area. This occupies a large area within and surrounding the alaskite intrusive. Anomalous gold values are coincident with the molybdenum anomaly on the eastem end of lines 1-5 N and 1 N .

Most of the higher zinc values are associated with this same area of anomalous molybdenum values although anomalous values taken as greater than 200 ppm zinc are found scattered throughout the surveyed area.





## CONCLUSIONS

Fill-in sampling over a portion of the Aspen Claims has confirmed the presence of anomalous gold, silver, molybdenum and zinc values.

Molybdenum, and in part zinc, tend to be concentrated around the alaskite intrusive near the center of the property.

Both gold and silver anomalous values appear to occupy northerly trending zones paralleling the trend of the underlying sediments.

Much closer sampling is required to determine if these are distinct and continuous zones. This should be carried out in conjunction with detailed geological mapping to determine the control of these anomalous values.

## RECOMMENDATIONS

Detailed geochemical surveys at 20 by 50 meter spacing in anomalous areas on lines 0.5 N to 1.525 N between 1.5 $\mathrm{E}-6 \mathrm{E}$ and $9 \mathrm{E}-15 \mathrm{E}$. Analyse for gold and silver.

Sampling of any drainages flowing westerly into Davenport Creek, west of claims, to locate possible source of gold in Davenport Creek.

Soil sampling along line at 3.5 N to determine whether anomalous gold and silver values on 4 N north continue to the south.

## CERTIEICATE OF OUALIEICATIONS

I, Ronald H.D. Philp of \#700-555 W. Hastings Street, Vancouver, British Columbia, do hereby certify that:
I am a registered Professional Engineer of the Province of British Columbia.
I am a graduate of the University of British Columbia, (B.A.Sc. 1961).

I have practiced my profession since 1961 while in the employ of various companies and as a self-employed consulting geologist.

My report is based on a review of available maps and reports on the area plus a recent visit to the property where I supervised the geochemical program.


November 1, 1993
COSTSTATEMENT
Labour:R. Philp, P.Eng.

- 4 days @ \$350/day ..... $\$ 1,400.00$
C. Philp, Field Assistant
- 4 days @ \$100/day ..... 400.00
B. Wallis, Field Assistant, Sampler
- 4 days @ \$150/day ..... 600.00
\$2,400.00
Assays:
Soils - 12030 el ICP + geochem au @ \$8.60 ..... 1,129.92
Camp rental and equipment ..... 200.00
Meals ..... 385.90
Groceries and supplies ..... 469.93
Airfares:
R. Philp, C. Philp ..... $1,185.04$
Vehicle Rental \& fuel, etc. ..... 724.33
Report Writing \& Drafting:
- 2 days @ \$350/day ..... 700.00 ..... 4.795 .12


## BIBLIOGRAPHY

Aitken, J.D., 1959
Godfrey, T.P., 1970

Seraphim, R.H., 1978

Philp, R.H.D., 1990

GSC map 1082A Atlin District. 1:253,440 scale. Accompanying memoir 307.
1970 Geological and Geochemical Report on the Gladys Lake MOS ${ }_{2}$ Property for Amax Exploration Inc. B.C.D.M. Assessment Report 2653, September 21, 1970.

Report on Assays and Geology MOK claims. B.C.D.M. Assessment Report 6818, July 11, 1978.

Geochemical and Geological Report on the Aspen Claim Group, Gladys Lake, Atlin Area, B.C., October 1, 1990.

## APPENDIX 1

Soil Sample Results


ICP - . 500 GRAM SAMPLE IS DIGESTED WITH 3ML 3-1-2 HCL-HNO3-H20 AT 95 DEG. C FOR ONE HOUR AND IS DILUTED TO 10 ML WITH WATER. THIS LEACH IS PARTIAL FOR MN FE SR CA P LA CR MG BA TI B W AND LIMITED FOR NA K AND AL

- SAMPLE TYPE: SOIL AU* ANALYSIS BY ACID LEACH/AA FROM 10 GM SAMPLE. Samples begipning 'RE' are duplicate samples.



Sample type: SOIL. Samples beginning 'RE' are duplicate samples.


Sample type: SOIL. Samples beginning 'RE' are duplicate samples.

