Creighton Creek
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82L/2W

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CREIGHTON CREEK CLAIMS

GEOLOGY AND GEOCHEMISTRY

Vernon Mining Division

N.T.S. 82 L/2

Latitude 50°12'N   Longitude 118°45'W

UTM 5560000m N
374000m E

By

A.W. Gourlay and M.G. Hadley

of

MineQuest Exploration Associates Limited

Claim Name	Record No.	Claim Name	Record No.
Echo I	1334	Hump IV	1356
Echo II	1335	Hump V	1357
Echo III	1351	Moss III	1524
Echo IV	1352	Moss IV	1525
Hump I	1353	Moss V	1526
Hump II	1354	Moss VI	1527
Hump III	1355	Bonneau I	1349
		Bonneau II	1350

January, 1985

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1.0 INTRODUCTION

The Creighton Creek claims were staked on the basis of gold associated with anomalous quantities of arsenic in heavy mineral samples taken from stream sediments. Follow-up work in 1983 was directed at locating the source of the gold found in heavy mineral concentrates, and consisted of prospecting, detailed silt sampling, and extensive grid soil sampling.

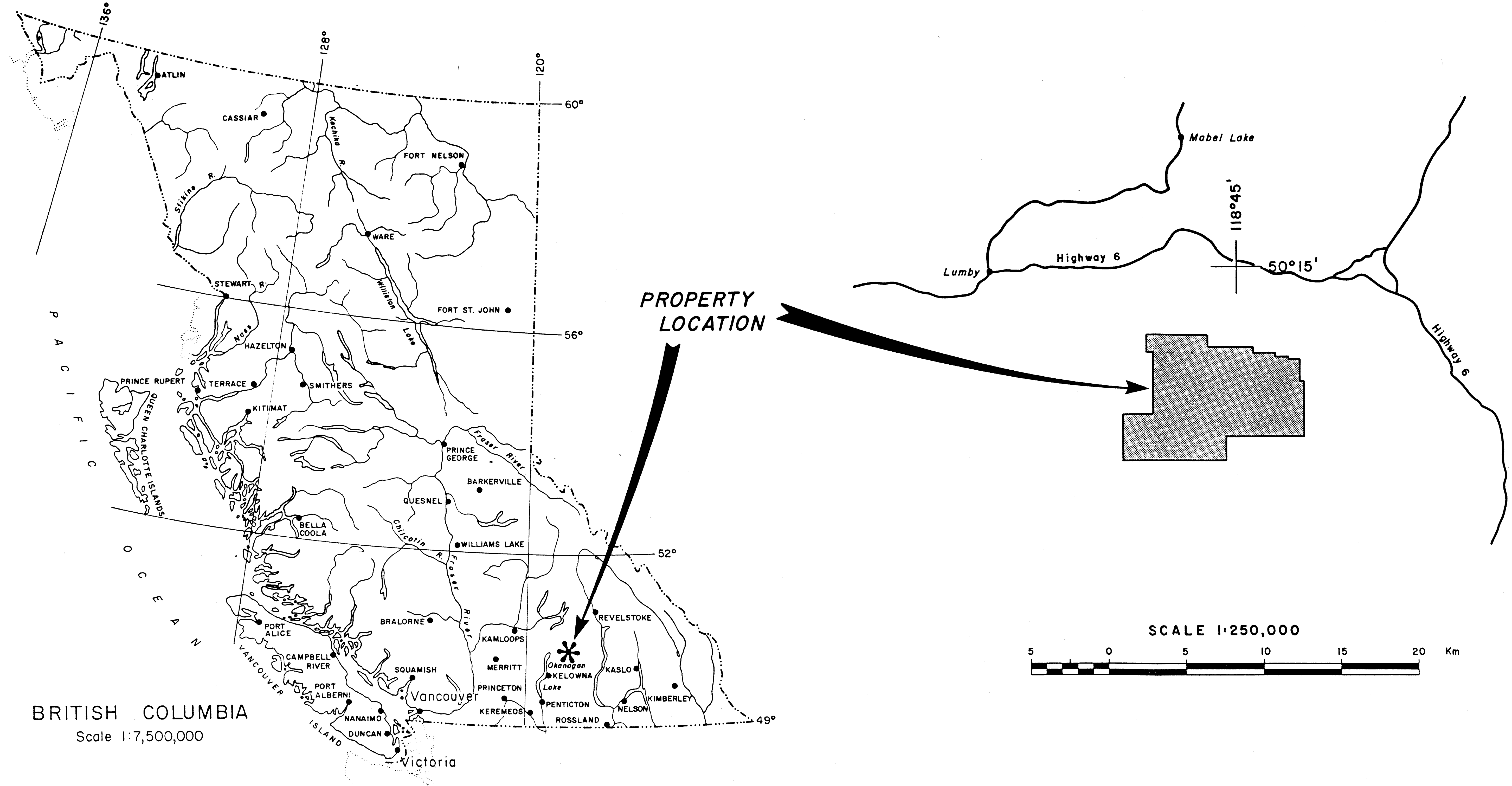
The objective of work done in 1984, described in this report, was to further define the source of the anomalies and consisted of follow-up silt and soil sampling, geological mapping, and rock chip sampling.

2.0 LOCATION, ACCESS AND TOPOGRAPHY

The Creighton Creek claims lie in south central British Columbia, 37.5 km east-southeast of Vernon and 16.5 km southeast of Lumby along the southern slope of the east-west trending Creighton Valley in the Okanagan Highlands (Figure 1).

Access to the property is by the Creighton Valley road which leaves Highway 6 one kilometre east of Lumby, and by logging roads along Harris Creek, Vidler Creek, Mosquito Creek and the southern limb of Creighton Creek. Travel on the claims is by foot.

Topography is generally rolling with steep banks into the Creighton Valley. Relief is 800 m with the highest elevations at 1800 m. Vegetation, heaviest on north facing slopes, consists of fir and pine forests with moderate to thick undergrowth. The southern end of the claim block is flat and swampy.



GOLDQUEST I PARTNERSHIP			
CREIGHTON CREEK CLAIMS			
LOCATION MAP			
PLAN NO. 505	DRAWN	DATE OCT. 1983	FIGURE 1
Revised		N.T.S. 82L/2	
MINEQUEST EXPLORATION ASSOCIATES LTD.			

EXCLUSIVE DRAFTING SERVICES LTD.

4.0 HISTORY AND PREVIOUS WORK

No metal occurrences have been reported on the Creighton Creek claims but the western portion was explored and drilled for uranium in 1977-78 by E and B Explorations Limited.[1] The Chaput Mine[2], located 18 km northwest of the claims, produced lead, zinc, gold, silver and copper from quartz veins in Cache Creek Group metasediments. A few gold, silver and lead properties were reported[3] near Harris Creek to the west and Monashee Creek to the east of the Creighton Creek claims. Mineralization was associated with quartz veining in all occurences reported. Placer gold was found in Harris Creek[4] and Cherry Creek[5].

4.1 Previous Work

The Echo, Hump, and Bonneau claims were staked by MineQuest Exploration Associates Ltd. in 1982, on the basis of gold associated with anomalous quantities of arsenic in heavy mineral concentrates. The Moss claims were staked in 1983. An initial silt sampling and prospecting program in the early part of the 1983 field season defined targets on the Echo, Hump, and Moss claims. Follow-up work of grid soil sampling was conducted late in 1983.

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1. Assessment Reports 6595, 6596, 7075 and 7178
2. Mindep File No. 82LSE 006
3. Mindep File No's 82LSE 003, 025 034, and 035
4. Assessment Report 7178
5. Mindep File No. 82LSE 013

5.0 WORK CARRIED OUT IN 1983

5.1 Geological Mapping

Geological mapping of the Creighton Creek claims at a scale of 1:10,000 focussed initially on anomalies on the grids, and ultimately encompassed the entire claim group. Outcrop is less than 5% in forested areas but cliffs and clear cuts provide up to 10% exposure elsewhere. The geological maps are presented in Figures 2 and 3.

5.2 Rock Chip Sampling

A total of 275 rock chip samples were collected. The samples wee analysed for gold, arsenic, and silver. A limited number of samples were analysed for mercury. The results are presented in Figures 6, 7, 10, 11, 12, and 13.

All samples were processed as follows. The entire samples was put through a primary jaw crusher followed by a secondary cone crusher, which reduced the sample to 80% minus 10 mesh. A representative split of approximately 250 grams was obtained by passing the entire crushed sample through a Jones Riffle splitter. This split was then pulverized for 2.5 minutes in a ring and puck grinder which reduced the particle size to 99% minus 100 mesh.

The samples were analysed by Bondar-Clegg & Co. Ltd. as follows:

Gold:	two thirds of an assay ton by fire assay and atomic absorption
Arsenic:	nitric perchloric, colourmetric
Antimony:	hydrochloric, potassium iodide, ascorbic TOPO-MIX, atomic absorption
Mercury:	Aqua regia, closed cell flameless atomic absorption

5.3 Silt Sampling

Three streams that cross the Echo II and Echo III grids were sampled at 100 metre intervals as upstream extensions of the work done in 1983. A total of 37 silt samples were collected and analysed.

Silt samples collected were analysed for five elements and the results are presented in Figure 14.

Table II
Sample Analysis

Elements	Extraction	Analytical Method
Lead	Lefort Aqua Regia	Atomic Absorption
Silver	Lefort Aqua Regia	Atomic Absorption
Arsenic	Nitric Perchloric	Colourmetric
Gold	Fire Assay	Atomic Absorption Finish
Molybdenum	Lefort Aqua Regia	Atomic Absorption

5.4 Soil Sampling

Two contour soil lines were run at 1250 metre and 1310 metre elevations on Creighton Creek, the lower line for 3.9 kilometre and the upper line for 3.85 kilometre.

Hump I grid was extended to the west 750 metres at a bearing of 390, with 500m cross lines at 250 metres and 750 metres.

Two test lines, each of 500 metres length, were run across the inferred contact between metamorphic basement and the overlying clastic unit.

All soil samples were collected from the B horizon at 10 metre intervals on each line. Along each line each batch of 10 samples were composited for analysis with a five sample overlap on adjacent intervals. A total of 173 composite samples that were analysed for gold, antimony, arsenic, silver, and lead. The results of the soil lines are presented in Figure 14.

Composite samples were made from the -80 mesh fraction of 10 samples. The composites overlap each other by five samples. Lead and silver are determined by an aqua regia digestion, followed by an atomic absorption determination. Arsenic is analysed through a perchloric-nitric digestion followed by a colourimetric determination. Twenty grams of the composite is used in gold analysis where extraction is accomplished through fire assay, producing a dore bead. An aqua regia solution (nitric-hydrochloric acid) decomposes the dore bead and atomic absorption is used to determine gold content. Antimony is extracted by hydrochloric acid-organic extraction, followed by atomic absorption determination.

5.5 Personnel

Geological mapping and sampling was carried out by A.W. Gourlay and M.G. Hadley. Sampling was carried out by P. Martin, A.R. Zuk, P.D. McCarthy, and B. Griffiths. The program was under the direction of R.V. Longe.

6.0 GEOLOGY

6.1 Regional Geology

According to Jones (1954) and Okulitch and Campbell (1979) the regional geology consists of Archean basement of Monashee Group metamorphics overlain by Paleozoic Cache Creek Group sediments and andesitic volcanics. These rocks have been intruded by Jurassic - Cretaceous Coast Intrusions, and overlain by Tertiary Kamloops Group volcanics and sediments.

The area covered by the west half of the Creighton Creek claims were mapped by E&B Explorations Limited at a scale of 1:10,000. The area is underlain predominently by Eocene rhyolite tuffs and porphyritic flows which are overlain by Miocene pitchstone breccia and agglomerate. In the southwest corner of the claims the rhyolites are overlain by a mixed sedimentary package that includes sandstone, conglomerates, siltstones, lahar, and trachyandesite flows.

6.2 Property Geology

The property covers the contact between the older, metamorphic terrain of the Sushwap Complex to the north, and the overlying unmetamorphosed volcanics and sediments that dip gently to the south.
The stratigraphy of the property is summarized in Table I.

6.3 Stratigraphy

6.3.1 Monashee Complex

The Monashee Complex, composed of intercalated biotite schist and quartz diorite forms the basement rock and outcrops along Creighton Creek and on the east half of the claims. The biotite schist is rusty brown to grey-weathering and displays a well-developed foliation. Fresh surface is dark grey and relic bedding is visible as changes in grain size from very fine to fine-grained. The biotite schist contains interbeds of quartzite that carry disseminated pyrite and minor arsenopyrite and chalcopyrite. Where the schist approaches quartz diorite intrusives and dykes it becomes increasingly coarser grained and locally gneissic.

Quartz diorite weathers rusty brown to grey colour, and on a fresh surface is dark grey to salt-and-pepper coloured. Biotite defines a well developed foliation. The rock is fine to medium grained, with an equigranular groundmass 1 to 4mm size, and is rarely porphyritic. Quartz phenocrysts comprise much less than 1% of the rock, are anhedral, and less than 5mm size. Plagioclase phenocrysts are subhedral, less than 5mm size, and less than 1% of the rock. Biotite is 1 to 4mm size, subhedral to euhedral, and is 5 to 15% of the rock, parallel to foliation. Pyrite occurs as very rare, disseminated grains.

TABLE I

Rock Types

Tertiary

Miocene (?)

Basalt: Upper sequence of black, massive, shiny lustre, slightly magnetic basalt. Aphanitic with well developed laminations or flow banding.

Lower sequence of black, massive, vesicular basalt. Aphanitic with a low lustre, and well developed columnar jointing. Both types carry small olivine phenocrysts

Miocene (?)

Coarse Clastic Unit: Massive dark brown unit that varies from a clast-supported conglomerate in the west to a matrix-supported conglomerate in the east. Fines up section into a poorly sorted grit. Dips and thickens to the south. Intense silicification of the matrix near the rhyolite complex. Majority of clasts are angular to subrounded basalt. This unit may include the sandstone and siltstone found in the southwest corner of the claims.

Eocene (?)

Rhyolite: Upper tuffs, buff to maroon colour, generally massive but local well developed flow banding. Sucrosic tuff characterized by sugary textured groundmass, and crystal tuff by distinct feldspar lathes.

Lower breccia of bleached and subrounded rhyolite clasts in a grey silicifed rhyolitic groundmass.

Proterozoic

Monashee Group: Undivided foliated biotite schist with interbeds of quartzite, and foliated granodiorite.

6.3.2 Rhyolite

To the area west of Creighton Creek the Monashee Complex is unconformably overlain by rhyolite volcaniclastics of Eocene (?) age. The lower section of the rhyolite is predominantly a breccia of bleached, subrounded clasts in a silicified rhyolite matrix. The breccia weathers light brown to light grey and is light grey to white on a fresh surface. The clasts are subrounded to angular, range in size from 2 to 20cm, are light grey to white colour, and weather light to medium brown. The groundmass is a grey, silicified rhyolite with local flow banding and possible gas streaming. The rhyolite breccia is locally interbedded with rhyolite tuff.

Rhyolite tuff forms the upper section of the rhyolite complex. The tuff is divisible into two distinct lithologies; a sucrosic tuff with a fine to very fine grained sugary groundmass, and a crystal tuff with distinct euhedral feldspar lathes. The sucrosic tuff is light grey to white and weathers light brown to light grey. It is massive with local banding or laminations. Quartz phenocrysts are anhedral to subhedral, .5 to 4mm size, Feldspar phenocrysts are 1 to 2mm size, are subhedral to euhedral, and biotite is less than 1mm size and has a salt-and-pepper habit. The groundmass is aphanitic to fine-grained, and is slightly scoriated and vuggy in places, with some quartz infillings of open spaces. The crystal tuff is characterised by euhedral, 1 to 5mm feldspar lathes set in a very glossy, aphanitic to fine-grained groundmass. On a fresh surface colour ranges from medium brown to light grey to maroon, weathered surfaces are dark grey, rusty brown, or maroon. Quartz phenocrysts are 1 to 2mm size, subhedral to anhedral, and biotite is less than 1mm size, peppered through the rock. The sucrosic and the crystal tuffs are interbedded, the contacts are occasionally marked by opal and chalcedonic infilling of open spaces and some quartz veining. East of Creighton Creek rhyolite occurs as scattered outcrops of dykes that are light grey coloured with a light brown weathered surface. Phenocrysts of both euhedral to subhedral plagioclase and subhedral to rounded quartz 'eyes' are set in an aphanitic groundmass.

6.3.3 Coarse Clastic

Unconformably overlying both the Monashee Complex and the rhyolite units is a coarse clastic unit of Miocene (?) age. This unit varies from a clast supported, basalt conglomerate in the west to matrix supported, basalt clast bearing clastic in the east, and may include the mixed sedimentary package recognized by E&B Explorations Limited. The coarse clastic is a recessive unit; outcrop is scarce making correlation from east to west difficult. Most exposure is east of Creighton Creek, where this unit grades from a matrix supported clastic up into a poorly sorted grit. Here it lies directly on Monashee Complex rocks, and forms a distinct break in slope at the lower contact, rising sharply from the relatively flat shoulders of the basement. The base of the clastic unit is more indurated than the mid and upper sections, the upper grit forms prominent cliffs only where it is capped by basalt. Here the rock weathers rusty brown to green, fresh surfaces are dark brown. Vesicular basalt clasts vary from 5 to 50cm size, with minor amounts of foliated biotite schist and quartz diorite, quartz, olivine nodules, and occasionally obsidian fragments. The clasts are all angular, and often form lag deposits with a preferred orientation, and the matrix is fine to medium grained basalt sand. The conglomerate grades up section into a poorly sorted, medium to coarse grained grit. The grit displays highly variable bedding and crossbedding, and dips gently to the south. Crude bedding in the conglomeratic section is often calcite cemented, with minor quartz cement. Calcite and aragonite veins up to 3cm width crosscut both matrix and clasts.

Although the coarse clastic unit cannot be traced from west to east, field relationships suggest that the basalt conglomerate found to the west of Creighton Creek is a proximal facies of the coarse clastic. Here the conglomerate is clast supported, with 15 to 25% matrix. The clast are angular to subrounded basalt fragments that average 5 to 10cm size but may range up to 50cm. The basalt is slightly magnetic, is finely laminated, contains up to 1% olivine phenocrysts .5 to 2mm size, and locally has alteration rinds on the clasts up to 5mm thick. Locally red coloured basalt clast predominate, giving a distinct rusty brown colour. Minor constituents are foliated biotite schist, granodiorite, and rhyolite clasts.

Fresh surface is dark grey to black, and weathered is light brown to medium grey. The matrix is fine to medium grained sand that is often cemented with blue green silica. Locally the silicification of the matrix is intense. When the basalt clasts have weathered out they leave a very coarse box work texture. In other places both the clasts and matrix have been shattered and cemented with silica.

Observable contacts with the rhyolite complex do not show any thermal metamorphism, and locally the clast supported conglomerate is interbedded with a matrix supported equivalent.

In the southwest corner of the property scattered outcrops of sandstone and siltstone are exposed in the creeks on the Moss grid. These sediments are interbedded, loosely consolidated, and poorly sorted.

6.3.4 Basalt

Unconformably overlying the coarse clastic unit are Eocene (?) basalt flows assigned to the Kamloops Group. The basalt flows fill in topography on the top of the coarse clastic unit, which results in an unusual outcrop distribution. East of, and at the headwaters of Creighton Creek the basalt is massive and vesicular with calcite and minor zeolite infilling. Colour is dark grey on both fresh and weathered surfaces, and it has a low lustre. Columnar jointing is well developed, and the flows are very scoriaceous and vesicular near the contact with the coarse clastic unit. West of Creighton Creek the vesicular basalt pinches out, and the coarse clastic is overlain by massive, slightly magnetic, aphanitic basalt. Both fresh and weathered surfaces are dark grey, and flow banding or laminations are well developed. The flows have a distinct, shiny lustre and columnar jointing is poorly developed.

7.0 GEOCHEMICAL RESULTS

7.1 Soil Sampling

The results from the soil sampling are given in Figure 14 and Appendix I.

Extension of the Hump Grid to the west produced no values of interest. The two test lines across the inferred contact between Monashee Complex and overlying coarse clastics was not successful in establishing this as an effective exploration tool. All values returned were low.

The two contour soil lines across Creighton Creek resulted in a number of significant gold anomalies on the west bank of the creek where arsenic produced only two highs. The anomalies are in areas of minimal outcrop, making definition of the source difficult.

7.2 Silt Sampling

The results from the silt sampling are given in Figure 14 and Appendix I.

Sampling the creeks above Echo II and III grids produced a number of anomalous gold values, with weak arsenic correlation. The higher values are found below the lowermost coarse clastic unit, across areas underlain by the Monashee complex.

7.3 Rock Chip Sampling

The results from the rock chip sampling are given in Figures 6, 7, 10, 11, 12, and 13, and in Appendix I.

The gold values are generally low and the source of the strong values found in the 1983 surveys has not been found.

To the east of Creighton Creek the rocks that do provide geochemically anomalous gold and arsenic values are pyrite bearing biotite schist of the Monashee Complex. West of Creighton Creek in the Hump grid area a number of higher arsenic values associated with silicification of the basalt conglomerate suggests this rock could have formed a receptive host.

8.0 DISCUSSION

The Creighton Creek claims were staked on the basis of heavy mineral samples with gold values which were highly anomalous in relation to regional values. Follow-up heavy mineral sampling confirmed the validity of the high values. Geological mapping, showed the presence of a rhyolite complex with an extensive clastic unit, - a promising target for a gold deposit in Tertiary rocks.

The 1984 program sought to outline targets through detailed prospecting of soil anomalies, rock chip sampling, and geologic mapping. The picture that has emerged is one of a classic epithermal setting that has provided a suitable host, favourable alteration close to a rhyolite centre, and weak but encouraging geochemical values in rock.

As stated in section 6.2, outcrop in general, and especially observable contacts, are rare making correlation from west to east difficult. However, geologic mapping indicates some stratigraphic control of alteration and geochemical anomalies near the base of the clastic unit. Although the Monashee Complex does provide a possible source for the gold, the magnitude of the heavy mineral anomalies, and the location of the soil anomalies suggest a Tertiary source.

West of Creighton Creek silt and soil anomalies are found both in the basalt conglomerate exposures and in the rhyolite complex. The weakly anomalous arsenic values from rock chips are all in silicified basalt conglomerate near the rhyolite, suggesting that this unit could be the source of the widespread and persistent heavy mineral anomalies.

Field relationships constrain the rhyolite to a post basement and pre coarse-clastic interval. It is postulated that the clastic unit was deposited shortly after the rhyolite was laid down. The poor sorting, low roundness, and coarseness of matrix implies rapid deposition from a quickly eroding basalt terrain. The fining upsection and development of scours and cross bedding reflects a shallowing basin.

The coarse nature of the sediment and the inherent permeability of that rock, are features which would have permitted the migration of siliceous solutions, most likely from fractures that controlled emplacement of the rhyolite complex. The siliceous, mineralized solutions migrated laterally upon encountering the basal coarse clastic, resulting in the intensely silicified basalt conglomerate observed close to the rhyolite complex.

The erratic distribution of both basalt and coarse clastic outcrop at the southern boundary of the claims implies that the clastic unit had been tilted and eroded prior to the deposition of the present basalt flows.

Further mapping, prospecting, and sampling of the coarse clastic, with emphasis on its lower contact, is required to define its distribution and to locate the source of gold anomalies.

9.0 CONCLUSIONS

1. The Proterozoic basement of metamorphic Sushwap Complex is unconformably overlain by Tertiary rhyolite breccia and tuff. Both the basement rocks and the rhyolite complex is in turn overlain by a coarse clastic unit that has been silica flooded in the vicinity of the rhyolite. The entire sequence is capped by basalt.

2. Gold and arsenic, anomalies are related to the base of the coarse clastic unit, and the silicified zones within that unit near the rhyolite complex.

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