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WEL

GEOLOGY / HISTORY

SIMILKAMEEN MINING DISTRICT

BRITISH COLUMBIA

PHYSIOGRAPHY

The WEL group is located about 8 miles northeast of the Hozameen Range of the Cascade Mountains. However, the claim area is generally one of low relief with an elevation of between 4800 and 5700 feet above sea level. Slopes are, for the most part, gentle with some slopes to the east ranging up to 30° with a few small vertical cliffs. Valleys are generally well rounded, commonly trending 27° east of north reflecting a regional geological feature.

Drainage on the property is imperfect with numerous muskeg areas and ponds. Glacial deposits are extensive and appear particularly thick in the northeast portion of the claim area where bedrock exposure is minimal Glacial material appears to have a local origin.

GEOLOGY

Introduction

The WEL claim group is located in the Coast Intrusions, specifically the Eagle granodiorites of the Nelson Plutonics, with an Upper Jurassic age of qbout 196 million years (K/Ar date).

General Geology

The dominant rock on the property is foliated biotite granodiorite with end members ranging from a biotite metasediment to an unfoliated coarse grained granodiorite. Quartz-K-spar-plagioclase-muscovite pegmatites, aplites, micrograpites and monzonites are common, often occurring with pyrite. Numerous vein systems align with and cross cut all rock types. Quartz veins predominate ranging from a few millimeters to over one foot. Occurring with the quartz is chlorite, epidote, pyrite, chalcopyrite and magnetite and molybdenite in various combinations and proportions. Chlorite and epidote also occur in small veins along with pyrite.

Table of Formations

E - Vein Systems
- Quartz-molybdenite (± K-feldspar) veins
- Quarts-pyrite-chalcopyrite-molybdenite veins
- Quartz-pyrite-chalcopyrite veins
- Quarts-pyrite veins
- Quartz veins
- Quartz-chlorite-pyrite veins
- quartz-chlorite-chalcopyrite veins
- Quartz-chalcopyrite veins
- Quartz-chlorite-epidote-pyrite veins
- Quartz-epidote-pyrite veins
- Quartz-magnetite veins
- Chlorite-chalcopyrite-pyrite veins
- Chlorite-chalcopyrite veins
- Epidote veins

D - Late Stage Differentiates
- Quartz-K-feldspar-plagioclase-muscovite±pyrite±garnet ±pegmatite
- Quartz-K-feldspar-plagioclase-muscovite aplites
- " " " " ± pyrite microgranite
- Quartz-biotite-plagioclase±muscovite±pyrite leucocratic monzonite-granodiorite

C - Foliate Granodiorite
- Quartz-biotite-plagioclase granodiorite
- Quartz-biotite-hornblende-plagioclase granodiorite

B - Metasedimentary Gneiss Complex
- Biotite-quartz-plagioclase gneisses
- Biotite-hornblende-plagioclase gneisses
- Biotite-hornblende-epidote-quartz-plagioclase gneisses and felsic segregations, differentiates and remobilizates

A - Metasediments
- Biotite metasediments
- Biotite hornblende metasediments
- Hornblende (amphibolite) mretasediments/metavolcanics ±carbonate,±epidote,±garnet,±pyrite

Description of Rock Units

A - Metasediments

These rocks are well layered, each layer ranging in thickness from 0.5 mm. to 1 cm. Biotite is generally very abundant composing up to 100 percent of certain layers. The metasediments are granular and poorly indurated. They are dark coloured and fine to medium grained. All proportions of the following minerals are found: quartz, plagioclase, biotite, hornblende, epidote, carbonate, garnet, pyrite.

The most common metasediment has quartz-plagioclase-biotite and is thought to originate from a greywacke. End members include a very quartz-rich rock with plagioclase and biotite thought to have originated from a dirty sandstone, a biotite-plagioclase=quartz-pyrite rock with an anerobic mud origin and a quartz-plagioglacse-biotite±hornblende ±epidote±carbonate originally a calcic sediment. Interlayer of pure hornblendic material probably have an andesitic tuff origin. The metasedimentary assemblage, therfore, is thought to have developed from a set of greywackes, muddy sandstone, calcic sandstones,anerobic muds and andesitic tuffs resulting from an environment of fluctuating water levels and rates of material supply of detrital clastic sediments and eroded volcanic sediments and tuffs (i.e. the Nicola???).

B - Metasedimentary Gneiss Complex

These rocks are intermediate in texture between the metasediments and granodiorites and grade into each. The dominant mineral is biotite with quartz, hornblende, plagioclase, garnet and epidote. The grain size is medium and the mafic minerals are well aligned. These gneisses are most common in the NW part of the WEL claims..

The Metasedimentary Gneiss Complex is a result of metamorphism, partial melting and remobilization of the metasedimentary assemblage. This is described under "Metamorphism"(6)

Two generations of minor folding are seen in the gneisses: tightly isoclinal folding with axial planes parallel to the dominant foliation and later open phase refolding of the isoclines. No major folds were observed.

C - Foliated Granodiorite

This is the most abundant rock type on the property. The foliation is a result of composition layering of felsic and mafic minerals, by grain size or by lineation of mafics, particularly biotite.

This product predates the dominant foliation, hence it is pre-second folds, probably having crystallized contemporaneously with the first folds or even earlier.

The most common rock in this assemblage is biotite granodiorite. It has a hypidiomorphic texture with plagioclase crystals often surrounded by quartz. Plagioclase crystals are found up to 0.7 cm. in width. These rocks range from medium to coarse grain. Muscovite is also present in some outcrop.

Foliated biotite-hornblende granodiorite is found less frequently. The colour index of the rock is usually slightly higher than the biotite granodiorite. Anhedral hornblende grains are found up to 0.5 cm.

D - Late Differentiates

The group includes fine and coarse grained plagioclase K-feldspar-muscovite rocks with or without pyrite. They are potassic-rich to be straight differentiates of the foliated granodiorites, yet biotite-muscovite intermediates do exist.

Pegmatites, aplites and granites lie in discrete veins and as indiscrete masses, yet all are pre-penetrative deformation, hence, are part of the orogenic product.

Plagioclase-K-feldspar-quartz-muscovite pegmatite occurs in irregular masses. Muscovite books commonly occur up to 1 cm. in width, and garnets are common throughout the rock.

Aplite dikes occur in numerous areas. They characteristically have a fine grained granitic texture and a composition of quartz, K-feldspar, plagioclase, muscovite and, commonly, small garnets.

Quartz-K-feldspar-plagioclase-muscovite microgranites with or without pyrite are present, although uncommon. Grain size is less than 2 mm. and small garnets are found throughout the rock. The colour index is very low.

Quartz-biotite-plagioclase leucocratic monzonite-granodiorite occurs with or without muscovite and pyrite. Rocks of this unit can be very similar to the more common biotite granodiorite, however, foliation is absent.

E - Vein Systems

The most common veins are quartz veins. They range from 1 mm. up to 40 cm. but veins about 1 cm. wide are most common. As shown under Table of Formations, quartz occurs with various combinations of K-feldspar, chlorite, epidote, pyrite, magnetite, chalcopyrite and molybdenite.

Pyrite and other metallic minerals are particularly common in vuggy quartz veins. Epidote veins are common and occur as fracture fillings often with slickensides. These seams rarely exceed 1 mm. in width. Chlorite and/or pyrite are often associated with these veins. Pyrite seams occur along fracture planes.

All the vein systems cross cut or lie within the foliation and therefore post-date all rock types. No vein appears to be deformed by either folding or internal shearing.

Although there is a great variety of assemblages, there essentially exists two predominant systems. A silicate system includes quartz, epidote, chlorite (+ carbonate) and a sulphide system includes pyrite, chalcopyrite and molybdenite. The systems occur in many combinations.

There appears to be a distinct geographic organization of these systems in the southwest part of the property but the various systems overlap.

The vein systems appear to represent a post "gneiss complex" Cu-Mo-Py hydrothermal system.

Structural Geology

Foliation on the property is very consistently within a few degrees of 338° with dip usually from 65° to 85° east. Vein systems most commonly trend near 060° dipping steeply to the south or vertical, cutting the foliation at approximately right angles. The geological cross section (Fig. 15) shows well the consistency of the foliation.

A strong physiographic trend of about 345° is represented by ridges and valleys corresponding with the foliation. Two creeks in particular in the SW corner of the property appear to have a fault trellis drainage pattern.

Metamorphism

Metamorphism has played a major role in the formation of the various rock units on the WEL property.

The metasediments (A) are the result of partial metamorphism of greywackes, muddy sandstones, calcic sandstones and anerobic muds with interlayers of andesitic tuff material. A period of orogenesis and metamorphism followed causing recrystallization, increased grain size, development of foliation, differentiation and development of segregation felsic elements and remobilization and movement in poorly defined units of the felsic elements resulting in the metasediment gneiss complex (B). The mineral assemblage of quartz, biotite, hornblende, garnet and epidote indicate a mid-amphibolite metamorphic facies, perhaps 500-600°C at 5 kilobars. Remobilization of this complex formed the foliated granodiorite (C). Late stage differentiates (D) are thought to be more than straight differentiates since they are too siliceous and too potassic-rich. The influence of a separate magma is suspected.

Alteration

The most widespread type of alteration is chloritization of the biotite in all rock types. In some rocks the biotite has been completely altered to chlorite producing a chlorite granodiorite. Epidote is present to a much smaller degree in some areas. Kaolinization of the feldspar occurs in K-feldspar-rich rocks and K-feldspar selvages are common along veins. Magnetite occurs as a coating along fractures in the granodiorite. Carbonate is present in some of the metasediments but is not widespread. Malachite is present at all chalcopyrite locations, often found in fractures. Limonite is very widespread and occurs as a very reddish stain with biotite or as goethite replacing pyrite in veins or disseminations.

Economic Geology

General Statement

From an economic standpoint, interest in the WEL property is directed to the southwest half of the claim area. In fact, copper and molybdenum occurrences are completely restricted to the southwest quadrant. Pyrite is found to the north and west of this quadrant. Copper is present in the form of chalcopyrite which occurs as disseminations or fracture fillings usually with quartz and pyrite. Molybdenite is present usually with quartz as very fine disseminations. Molybdenite occurrences are very limited.

History of Previous Work Completed on the Property

Five pits have been blasted in the area at the following locations: 1) L12N 07E, 2) 08 + 300'N 03E, 3) BL 20N, 4) 24 + 100'N 08W, 5) 28N 15W. They are approximately ten feet square and 5 feet deep and they are all in areas of outcrop or very shallow overburden leaving the bedrock well exposed. Also, in four southern areas grid stations were found indicating some type of previous sampling survey. The southwestern claim area has been staked for at least 8 consecutive years, but assessment work has apparently not been recorded.

Economic Mineralization

Pyrite, the most common sulphide, is most often found on the west half of the property, although there are four occurrences east of Wells Lake. Pyrite is frequently found as small blebs in granodiorite or metasediments and often occurs as small irregular seams, usually less than one millimeter thick in quartz-rich rocks. Vuggy quartz veins in particular commonly have pyrite crystals and blebs. Limonite is present at almost every pyrite occurrence, occasionally completely replacing pyrite grains in granodiorite, metasediments or quartz veins.

Chalcopyrite has a similar mode of occurrence to pyrite although much less frequent. It is the only primary copper mineral and is restricted in occurrence to the southwest quadrant of the WEL property. Strongly associated with quartz and pyrite, chalcopyrite is found as blebs along fracture planes and as disseminations. Malachite is found as a powder, coating irregular fractures and can be seen in some rocks as just a greenish tinge. It is always associated with chalcopyrite. Occurrences of copper are not widespread and usually correspond with trench locations.

Molybdenite occurrences are restricted to two areas. At the lake trench at 28 + 100'N 08W, molybdenite grains up to 5 mm. occur with pyrite and chalcopyrite in a quartz vein about 1 foot thick. The second molybdenite occurrence was at L00N within 300 feet east or west of the base line. Here the molybdenite occurred as very fine grains in quartz along with pyrite and chalcopyrite.

Numerous mineralized samples were analysed for Cu and Mo. Samples containing quartz veins and chalcopyrite commonly had high Cu values with one sample at the lake trench on 24N reaching 8900 ppm (0.89% Cu). This same sample yielded 245 ppm Mo. Samples with disseminated chalcopyrite not in a quartz vein usually had a few hundred ppm. The Mo occurrence on L00N had a Mo content of 42 ppm.

In some areas, up to 3 different directions of quartz veins are found to intersect each other, with each vein containing varying amounts of chalcopyrite and pyrite. Some selected specimens would have an overall grade of copper reaching 0.5%. Quartz vein association with sulphides is particularly strong south of L32N whereas to the north pyrtie is often found near epidote-covered fractures with no quartz veins directly associated.

In general, copper mineralization tends to trend approximately 325° over the property in a band approximately

1800' wide corresponding with the foliation trend and a strong physiographic trend. If this is the case, it is suggested that this band of mineralization might further correspond to regional foliation by dipping steeply to the northeast.

Copper and molybdenum mineralization is not extensive on the WEL property but the presence of a post "gneiss-complex" Cu-Mo-Py hydrothermal system does seem promising. Further work on the property should include detailed mapping of the 10 new claims to the south as well as prospecting to the west.

Summary of Geology and Mineralization

The most abundant rock on the property is foliated biotite granodiorite with end members ranging from biotite metasediment to unfoliated coarse grained granodiorite. Late stage differentiates include pegmatites, aplites, microgranites and monzonites. Numerous vein systems align with and cross cut all rock types and are thought to include a post "gneiss-complex" Cu-Mo-Py hydrothermal system. The associated economic minerals are concentrated in a north-westerly band through the southwest part of the property. Pyrite, chalcopyrite and molybdenite occur as disseminations and fracture fillings usually directly associated with quartz veins.