

GEOLOGY OF THE KUTCHO CREEK MASSIVE SULPHIDE
DEPOSITS, NORTHERN ~~BRITISH COLUMBIA~~ B.C.

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128.37 W
58.20 N

The Kutcho Creek volcanogenic massive sulphide deposits occur in predominately silicic and sodic volcanic flows and pyroclastic rocks of the Upper Triassic Kutcho sequence of the King Salmon assemblage. The Kutcho sequence and overlying limestone and phyllite are underlain, internally sliced and topped by major thrust faults. The folded sequence is metamorphosed to the subgreen-schist-greenschist facies.

Ten sulphide zones within rhyolitic tuffs, with minor basaltic flows and tuffs, occur at 5 stratigraphical levels. Four massive sulphide zones of economic significance occur along the same stratigraphical horizon near the top of the last volcanic cycle.

The sulphide zones are proximal and occur in the tops of elongate domes of rhyolite lapilli tuff over a strike length of 3.5km. The footwall lapilli tuffs grade into lapilli-crystal tuffs away from the centres of the domes. The sulphide zones are overlain by rhyolite lapilli-crystal tuff, quartz feldspar crystal tuff and minor basalt flows. The domes and sulphide zones occur on a linear trend below a facies change in the hanging wall from rhyolite lapilli-crystal tuff to quartz feldspar crystal tuff. Basic flows occur in patches along the facies boundary.

The massive sulphide lenses are elongate and commonly wedge-shaped in section. They overlie barren disseminated pyrite feeder zones and occur in the tops of rhyolite lapilli tuff domes metamorphosed and altered to quartz + sericite + dolomite + chlorite schist. The zones are interbedded with schist and dolomite lenses and transgress into schist along their wide down-dip edges.

The significant sulphide minerals are massive to disseminated pyrite with sphalerite, chalcopryite and bornite. Galena occurs in trace amounts throughout and locally in minor amounts associated with massive sphalerite. Approximately half of the copper in three of the four main sulphide zones is in the form of bornite and minor chalcocite.

Vertical metal zoning within the deposits is very erratic, but lateral zoning occurs in the plane of the deposits. The sulphide zones have Cu: Zn ratios of approximately 0.5 while distal mineralization along the exhalite horizon commonly has Cu: Zn ratios of approximately 0.1. Co: Ni ratios in the Kutcho zone decrease along the mineralized horizon with increasing distance from the deposits.

The hanging wall tuffs are hematitic indicating a change from the reducing environment of sulphide deposition to an oxidizing environment due to mixing of the hydrothermal system with sea water or to a decrease in temperature accompanying the decay of the hydrothermal system.

Dolomite alteration envelops the sulphide zones; dolomite and quartz are the most common gangue minerals. Disseminated dolomite occurs in the footwall rocks while the sulphide lenses and immediate hanging wall rocks commonly contain massive dolomite-quartz lenses. Sericite is ubiquitous in the footwall rocks for an undetermined distance. The hanging wall rocks are intensely sericitized to a maximum of 23-m above the massive sulphide zone. Mg-chlorite is a minor component of the footwall schists. The quartz feldspar crystal tuff unit commonly contains Fe-chlorite probably of metamorphic origin. Clinzoisite-epidote is commonly abundant in plagioclase-bearing hanging wall rocks notably the breccia phase of the quartz feldspar crystal tuff unit and the basic flow rocks, but is absent near mineralization.

The hanging and footwall rocks are Na_2O deficient and K_2O and MgO enriched relative to the silicic rocks of the Kutcho sequence. Na_2O is deficient for 215 m below and 75 m above the deposits. K_2O is enriched for 75 m above and below the deposits. The SiO_2 content of the footwall schists averages 79.3% compared to 74.6% SiO_2 for the silicic rocks of the Kutcho sequence not associated with the main sulphide zones.

DB/aa
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