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Dolly Varden  
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**GEOLOGY AND GENESIS OF THE DOLLY VARDEN SILVER CAMP  
ALICE ARM AREA, NORTHWESTERN BRITISH COLUMBIA**

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**ABSTRACT**

Stratiform and volcanogenic silver-lead-zinc-barite mineralization occurs within the Lower Jurassic volcanic rocks of the Hazelton Group in the Dolly Varden camp, Alice Arm area, northwestern B.C. Stratiform mineral deposits containing significant silver and base metal values are within andesitic and dacitic tuffaceous rocks, and typically occur as layers of quartz, barite, jasper, galena and sphalerite with lesser amounts of pyrite and sparse chalcopyrite. Production from two deposits, the Dolly Varden and Torbrit mines, totaled 1,285,818 tonnes (1,414,400 tons) of ore that averaged 480 grams silver per tonne (14 oz/ton) and 0.40 percent lead.

The Hazelton Group is a thick and widespread assemblage of basaltic to rhyolitic volcanic flow rocks, their tuffaceous equivalents, and sedimentary rocks. The Dolly Varden camp is underlain by one major volcanic and one major sedimentary formation of the Hazelton Group. Sedimentary rocks underlie volcanic rocks and consist of black argillite and shale, greywacke and maroon siltstone units. Fossils collected from the greywacke unit indicate a Lower Jurassic, Toarcian age. Conformably overlying the sedimentary formation are volcanic rock units consisting of feldspar porphyry, dacite ash tuff, green andesite tuff and flows, maroon andesite lapilli and crystal-lithic tuff, and a pale green tuff unit containing shards. The stratiform mineralization rests conformably upon the underlying pale green shard tuff unit, and in places is interbedded with a siliceous tuff unit. Overlying the stratiform mineralization is another maroon lapilli tuff and tuff breccia unit which is capped by a green andesitic tuff unit, which is the youngest rock unit of the Hazelton Group in the Dolly Varden area. Basalt, andesite and lamprophyre dykes intrude all rocks of the Hazelton Group. A whole rock K-Ar date of  $22.3 \pm 0.8$  Ma for one of the basaltic dykes indicates emplacement during Tertiary, Miocene time. The rocks of the Hazelton group exposed in the Dolly Varden camp are folded into a series of anticlines and synclines with gentle, northwest plunges. Two major sets of nearly vertical block faults cut all rock units, with earlier faults trending northwest and younger faults trending north-northeast. The Tertiary dykes are subparallel to these later north-northeast faults.

Geological mapping, combined with petrologic and petrographic data, indicate that the stratiform mineralization probably formed as submarine exhalative deposits associated with andesitic and dacitic volcanism during the Lower Jurassic Hazelton period. Evidence for a volcanogenic origin is the conformity of layered mineralization with stratigraphy, lateral and vertical mineral zonation patterns, consistent hangingwall versus footwall contact relationships and fragments of stratiform ore within tuffaceous volcanic rocks of the hangingwall. Preliminary lead isotope analyses of galena obtained from the stratiform ore, supports the conclusion that stratiform mineralization is consanguinous with the enclosing rocks.