Roland Bartsch - Eskay Creek Area

ABSTRACT

Eskay Creek 21 Zone is a precious and base metal volcanogenic massive sulphide and sulphosalt deposit in northwestern British Columbia, hosted in Lower Jurassic Upper Hazelton Group rocks. Geological reserves are 4.3 million tonnes grading 28.8 g/t gold and 1, 027 g/t silver (Homestake Canada Ltd., pers. com.). A significant part of the reserves are contained within the 21B Zone as stratiform, graded sulphide and sulphosalt beds, dominated by sphalerite-tetrahedrite; the deposit includes massive, stratabound lenses of stibnite-realgar-cinnabar-arsenopyrite and underlying epigenetic mineralization.

21 Zone deposit footwall rhyolite is part of a linear felsic flow dome complex several kilometers long on the western limb of the Eskay Creek anticline. Dikes feed the rhyolite domes. Four distinct rhyolite flow dome facies have been defined including peripheral facies of pyroclastic rocks, and feeder, outer, and internal flow facies. Facies reflect stages and processes of dome growth, and define individual centers along the fissure vent zone. Outer dome facies displays vapor phase volcanic features, devitrification, and enrichment in K, Sb, Ag, Hg. Intense K-silicate, sericitic, and silicic alteration, with precious and base metal mineralization, occurs in the feeder dikes to the rhyolite flow domes. The 21 Zone deposit is located within 200 metres of the main rhyolite feeder dikes, along and between synvolcanic subbasin-bounding faults. Stratiform ore occurs in argillite between volcanic vent facies footwall rhyolite and hanging wall basalt. Basalt overlying the felsic magma erupted from numerous dikes. Pillow basalt flow facies drape over the felsic flow domes; massive basalt flow facies dominate the main vent zone and grade to autobreceiated basalt flow facies in the 21 Zone subbasin. Alteration in the basalt is weak and dominantly propylitic (chlorite).

Igneous rocks are a polymodal calc-alkaline suite with two periods of hiatus recorded by fine clastic sedimentary rocks; andesite - hiatus 1 - dacite - rhyolite - dacite - hiatus 2 (peak alteration and 21 Zone mineralization) - basalt. Volcanism occurred in an extensional basinal environment. Consistent mineralogy, calc-alkaline affinities and fractionation trends, suggest the intermediate to felsic volcanic rocks are cogenetic, derived through igneous fractionation of early voluminous andesite. Fractionation involved early anhydrous minerals. K, Th, U are enriched in the rhyolites; these elements are part of a distinctive element suite (K, Th, U, Ti, P, Ce) involved in K-silicate alteration associated with precious and base metal mineralization; consequently the alteration and mineralization is an integral part of the igneous paragenetic sequence.

676560

Spring 94

alteration and mineralisation within the large hydrothermal system of the Red Bluff porphyry were closely related spatially and temporally. A genetic relationship is supported by: similarities in structural fabrics and alteration histories in the Twin zone and the porphyry, alteration and metal zoning of vein systems distributed concentrically around the porphyry, and apparently concordant Early Jurassic zircon U-Pb age from the porphyry with galena Pb-Pb signatures from the Twin zone and surrounding vein systems. Two significant structurally-controlled Au deposits in the area, Inel and Stonehouse, have similar age, mineralogy, structure, alteration and spatial relationships to Early Jurassic intrusions. They represent contemporaneous, possibly genetically related, hydrothermal systems.