METALLOGENY AND MINERAL DEPOSITS
OF THE NELSON-ROSSLAND MAP AREA:
Part II: The Early Jurassic Rossland Group
Southeastern British Columbia

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PART II: THE EARLY JURASSIC
ROSSLAND GROUP
SOUTHEASTERN BRITISH COLUMBIA


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The Nelson-Rossland map area (NTS 082F/SW) contains a variety of mineral deposits and numerous past producers. Many historical mining camps in southern British Columbia are located in the region, and their development led directly to the settlement and growth of the interior of the province.

The area straddles the tectonic boundary between rocks of North America and the eastern edge of arc terranes. It has a complex tectonic and magmatic history which is reflected in the diversity of mineral deposits and occurrences. The eastern part of the area is within the Kootenay arc, a north-trending arcuate structural zone in the eastern part of the Omineca belt that is characterized by intense polyphase deformation and locally high-grade regional metamorphism. The arc developed mainly in Late Proterozoic and Paleozoic rocks of the Kootenay terrane and in miogeoclinal North American rocks. It contains lead-zinc carbonate-hosted deposits, most of which are concentrated in the southern part of the arc south and southwest of Salmo. The Sheep Creek gold camp, within mainly EoCambrian quartzites of the Hamill Group, has produced more than 23 035 kilograms of gold from gold-quartz veins.

Mesozoic volcanic arc rocks of Quesnellia, west of the Kootenay arc, contain important silver-lead-zinc mineral camps, such as the Ymir camp within mainly metasedimentary rocks, and gold-copper-molybdenum deposits in intrusive, mafic volcanic and metasedimentary rocks of the Rossland Group.

Porphry copper-gold deposits in the Nelson-Rossland area include Katie, Shaft and occurrences adjacent to the Eagle Creek plutonic complex, all associated with mafic stocks within Early Jurassic Elise volcanic rocks. They are typical of the alkalic porphyry gold-copper class of deposits, with magnetite mineralization associated with potassic feldspar alteration and widespread regional propylitic alteration. Porphry molybdenite deposits and related breccias are concentrated on Red Mountain west of the Rossland gold-copper vein camp and on Stewart Mountain west of Ymir. The Gold Mountain zone of Kena Gold is a new porphyry gold prospect within the Middle Jurassic, syntectonic Silver King porphyry.

A variety of skarn deposit-types are recognized within the Nelson-Rossland map-area. Copper, lead-zinc, iron and gold skarns are associated with Middle Jurassic intrusions, whereas tungsten skarns occur mainly in Early Cambrian marbles along the margins of Cretaceous intrusions. Many of these skarns are past producers, most notably the gold skarns at Second Relief and Bunker Hill, the tungsten skarns such as the Emerald Tungsten and Dodger northeast of Salmo, and the molybdenite skarns, including Coxeay and Giant on Red Mountain in the Rossland camp.

Polymetallic Ag-Pb-Zn-Au veins are the most common deposit type in the Nelson-Rossland map-area. Many of the veins of the Ymir camp, those within Elise Formation rocks southwest of Nelson, and a number in the South belt of the Rossland camp are past producers. These veins are commonly along the margins of Middle Jurassic granitic stocks or batholiths.

The Rossland mining camp, the main focus of this paper, is the second largest lode gold producing camp in British Columbia, with recovery or more than 84 000 kilograms of gold and 105 000 kilograms of silver between 1894 and 1941. Vein deposits are in three main belts within or along the margins of the Middle Jurassic Rossland pluton. The North belt and Main veins are dominantly massive, intrusion-related gold-copper pyrrhotite veins, whereas those in the South Belt are dominantly polymetallic silver-lead-zinc veins. Pronounced mineral, textural and chemical zoning of these veins reflect their proximity to the Rossland pluton and to structural levels of emplacement. Due to western tilting of the area in Eocene time, eastern exposures of the Rossland veins were formed at deeper structural levels than those in the west.

Molybdenite mineralization within the camp occurs within an intrusive breccia-skarn complex on the western slopes of Red Mountain, west of and at higher structural levels than the Rossland gold-copper veins.

The relationships between various deposit-types in the Rossland camp are now well constrained. The copper-gold veins are spatially and genetically related to the ca. 167 Ma Rossland monzonite and associated diorite porphyry dikes. These dikes are overprinted by skarn alteration and molybdenite mineralization, dated by Re-Os at ca. 163 Ma. Brecciated quartz dioresite dikes, spatially associated with the molybdenite mineralization, are dated at ca. 163 Ma, supporting a younger age for molybdenite mineralization. These dikes may be late phases of the similar ca. 166 Ma Rainy Day pluton located just south of the molybdenite breccia complex.

Although Rossland veins have many characteristics of intrusion-related hydrothermal veins, their strong preferred alignment and associated shearing indicate structural control as well. Their orientation, age, and timing, relative to compressive deformation and documented synkinematic plutons elsewhere in the Rossland-Nelson area, support a model for development in an east-west compressive stress regime. This is manifest in the Rossland area by east-verging thrust faults that emplace oceanic ultramafic assemblages and the Permo-Carboniferous Mount Roberts Formation onto the Rossland Group.
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