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THE ORE-FORMING SEQUENCE; BOSS MOUNTAIN MOLYBDENUM MINE

(Abstract)

The Boss Mountain molybdenum deposits, which are approximately 225 miles north-northeast of Vancouver, British Columbia, are near the east edge of an unnamed, composite batholith. The deposits are entirely within granodiorite and porphyritic biotite granodiorite phases of the batholith near a Cretaceous quartz monzonite intrusive, the Boss Mountain Stock. Andesite dykes cut the batholithic rocks and are, in turn, cut by ore structures. Rhyolite porphyry dykes and rhyolite dykes, the Boss Breccias, and the Boss Mountain Stock form a complex sequence related to molybdenum mineralization. Pleistocene (?) alkali basalt dykes cut all rocks and ore structures.

The molybdenum deposits are grouped into two general classes: 1) Breccia Deposits, and 2) Vein Deposits. Breccia deposits consist predominantly of Quartz Breccia (breccia with quartz matrix) that has been fractured and mineralized during a later phase of brecciation (Phase III) Breccia). Molybdenite occurs in fractures and along matrix-fragment boundaries. Pyrite is ubiquitous throughout the mine area.

"Fracture ore", a special type of breccia formed along the upper edge of one breccia ore zone, has a matrix composed of molybdenite with minor quartz and pyrite.

Vein deposits include the High-Grade Vein system and the Stringer Zones. High-Grade Vein is a name applied to a persistent, andesite dyke that has been sheared, altered, and mineralized with coarse molybdenite and quartz veins.















Stringer Zone is a term applied to a series of subparallel quartz-molybdenite veins that occur west and north of the Main Breccia Zone.

The sequence of ore formation, which includes rhyolite dyke emplacement, breccia formation, fracture development, mineralization, and alteration, is directly related to the emplacement of the Boss Mountain Stock. The initial event in this sequence was the development of garnet-hornblende veinlets in narrow mylonite zones formed by intrusion of the Boss Mountain Stock. Stock emplacement was succeeded by quartz vein development and intrusion of rhyolite porphyry dykes. Three phases of breccia development followed intermingled with rhyolite dyke emplacement and quartz vein development. Development of the final breccia phase (Phase III Breccia) was accompanied by biotite alteration, by the development of fractures within and above the quartz breccia, and by the first introduction of molybdenite.

Crystallization of the upper part of the Boss Mountain Stock and more quartz vein development culminated breccia development. Barren quartz veins of this age, accompanied by microperthite and sericite alteration are the first structures recorded within the stock.

The final stage of quartz vein development, which was accompanied by the most intense stage of molybdenum mineralization, formed the High-Grade Vein, the Stringer Zones, and the Fracture Ore Zone. Quartz vein development probably was caused by internal adjustments within the Boss Mountain Stock.

Post-Mineral shearing was accompanied by intense chloritization.

IGNEOUS ACTIVITY	BRECCIAS & ORE DEPOSITS	FRAC-TURES	ALTERATION & MINERALIZATION							
Rhyolite Rhyolite Porphyry Initial Magmatic Advance Crystallization of Stock	High-Grade Vein Stringer Zone	6 5								
	Phase III Breccia (Fracture Zone) Quartz Breccia	4 3	late early							
	Phase I Breccia	2 1		GARNET 	BIOTITE 	K-FELDSPAR 	SERICITE 	CHLORITE 	MOLYBDENITE 	PYRITE 

Sequence of ore formation; Boss Mountain Mine