Ore Controls in the White Mountain Breccia-Hosted Gold Deposit, Jilin Province, Northeastern China

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The White Mountain sediment-hosted gold deposit, owned and operated by Eldorado Gold Corp., is located in the mineral-rich Hunjiang basin of Jilin Province, northeastern China. White Mountain currently represents the most significant gold producer in the basin, with measured and indicated resources of 817,000 oz at 3.41 g/t in 2014. The nature of mineralization is enigmatic and various models for the formation of the deposit have been proposed in the past. However, minimal research has been completed on this deposit.

Gold mineralization at White Mountain is hosted in a breccia zone located along the contact between Late Proterozoic dolomite and overlying sandstone. The most abundant breccia facies along the favorable interval is a hematite matrix-supported breccia with scalloped quartz clasts, possibly representing a vanished evaporite sequence. Gold enrichment is present where this regionally distributed breccia facies is rebrecciated, creating what is referred to as the "colorful breccia" in mine terminology. The highest gold grades (up to 108 g/t) occur in rebrecciated, polymictic, silicified breccias with a wide variety of clast types, including hematite breccia clasts from the favorable interval, dolomite clasts, sandstone clasts, and texturally highly variable quartz clasts. Gold can also be associated with pyrite and/or marcasite that are now oxidized to hematite. Barite is commonly spatially associated with high-grade ore within the polymict breccias.

Hydrothermal alteration at White Mountain is dominantly restricted to the ore interval and does not produce a broad halo. Sandstone in the stratigraphic hanging wall contains abundant clay minerals that form green, friable grains and aggregates. SWIR analysis by Eldorado Gold Corp. has identified kaolinite and dickite to be the dominant clay minerals, with lesser phengitic or paragonitic illite. Except for intense hematite staining, the footwall dolomite does not show obvious alteration. Within the favorable interval, dissolution of dolomite clasts is common, resulting in a vuggy appearance of the polymict breccias. Silicification is pronounced within the ore zones and proximal to ore. Only minor clays are indicated in spectral analyses. Small euhedral quartz crystals also occur within the vuggy polymict breccia. Optical cathodoluminescence microscopy shows that multiple quartz generations exist in ore samples, some of which contain low-temperature liquid-rich fluid inclusions. Bulk geochemical analyses show that arsenic, mercury, antimony, and barium are enriched in samples with high gold grades. The style of mineralization and alteration, accompanied by the lack of high-temperature alteration minerals, suggests that ore formation occurred at comparably low temperatures of less than 300°C from moderately acidic fluids. The polymictic breccia that hosts ore is interpreted to be a hydrothermal breccia with some minor collapse breccia formed through the creation of cavities along the favorable interval during the mineralizing event. Three-dimensional modeling completed by Eldorado Gold Corp. suggests a subvertical feeder structure beneath the sandstone/dolomite contact. The general character of the ore zones and associated alteration are consistent with White Mountain being a shallow crustal hydrothermal

gold deposit. The presence of Jurassic and Cretaceous porphyritic intrusions within the Hunjiang basin may suggest that the deposit formed during late Mesozoic regional extension.