The Role of the Latite Dikes at the Copper Flat Hydrothermal System

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The Copper Flat Hydrothermal System is located in Hillsboro, New Mexico, USA. It is a copper porphyry system hosted predominantly by a coarsely phaneritic quartz monzonite intrusive body. The mineralization occurs within an enigmatic breccia dominated by quartz monzonite clasts with local fragments of a latitic composition and strongly porphyritic texture. Latite dikes are present, but in the majority of the system, they are not strongly mineralized.The latite was not previously considered to be important in the genesis of the deposit due to its low copper concentrations. The role of the latite magma relative to brecciation and mineralization has not been considered in previous models regarding the genesis of the deposit. This is compounded by the fact that not all prior workers differentiated the latite intercepts from the breccia or quartz monzonite. We aim to define what role the latite played in the formation of the breccia and the mineralized system, therefore drill core intercepting the deposit was revisited with the goal of identifying latite intercepts and carefully documenting contact effects triggered by the emplacement of the latite dikes, including variation in intensity of alteration and mineralization. The core re-logging was supplemented by thin section petrographic analysis. Assay results of the drill core samples proximal to and intercepting the latite were examined for evidence of metal gradients indicating that the latites contributed to the copper mineralization. The latite samples commonly display a quenched texture indicating the exsolution of a fluid phase that support a model where the latites produced fluid for alteration and mineralization, and may have been responsible for the generation of the breccia due to volume expansion. The assay reviews indicate an increase in copper grades near most of the latite contacts suggesting that the latites played important role in the emplacement of the mineralization. Based on our observations, we recommend the consideration of a new genetic model involving the latite dikes in the generation of the breccia body and associated copper mineralization.