Critical Minerals in Laramide Porphyry Copper and Paleogene Molybdenum-Tungsten Deposits in Southwestern New Mexico, USA

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New Mexico lies at the eastern edge of one of the world's great metal-bearing provinces hosting numerous Laramide porphyry copper and Paleogene molybdenum-tungsten deposits. Porphyry copper deposits are large, low-grade (<0.8% Cu) deposits that contain disseminated, breccias and stockwork veinlets of copper and molybdenum sulfides associated with porphyritic intrusions. Paleogene molybdenum-tungsten deposits are found in porphyry molybdenum and skarn deposits. Recent dating has constrained these deposits into three periods. Porphyry copper deposits occurred during two pluses: ~78-71 Ma, including Piños Altos (78.55±1.75 Ma), Copper Flat (Hillsboro district; 75.9±0.66 Ma), Oro (Eureka district; 71.4±0.19 Ma), and ~59-50 Ma, including Lordsburg (59.25-57 Ma), Santa Rita (59.05±0.36 Ma), Hanover-Hermosa Mountain (Fierro-Hanover district, 58.3±0.7 Ma), McGhee Peak (Peloncillo Mountains, 57.28±0.65 Ma), Tyrone (55.2±0.6 Ma), and Lone Mountain (50.6±1.9 Ma) districts. The younger molybdenum-tungsten deposits (~40-30 Ma) includes Camel Mountain, Victorio Mountains, and Tres Hermanas districts. These deposits have potential for various critical minerals, including Cu, Zn, Bi, Co, Ni, rare earth elements (REE), Te, and W that are found as separate minerals, micro-inclusions and/or in solid solution in sulfide minerals. New and published geochemical analyses of ores, mineralized rocks, and mine wastes provide insights into critical minerals in these deposits. High Co concentrations are found in Piños Altos samples (up to 1026 ppm), whereas the Ground Hog mine in the Central district has up to 64 ppm Te. Some of these critical minerals are found in the skarns adjacent to the porphyry copper deposits. Although most samples are low in total REE, a few deposits contain elevated total REE, including Piños Altos (409 ppm), Santa Rita (717 ppm), Fierro-Hanover (937 ppm), and Oro (Eureka, 2272 ppm). Although, these values are not normally economic, the large volumes of porphyry copper deposits mined enhance the economics of REE and critical minerals in these deposits.