

TEXTURAL VARIATIONS AND MINERAL ZONING OF THE PILARES BRECCIA PIPE,
NACOZARI MINING DISTRICT, SONORA, MEXICO

by

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Abstract

The Pilares breccia pipe, located in the Nacozari mining district, about 7 km southeast of Nacozari, Sonora, is the host for the Pilares mine, which produced over 16,600,000 metric tons of ore with an average grade of +2.5% Cu. The well-defined oval-shaped pipe has maximum dimensions of 600 x 300 m and a known vertical extent of 725 m. The major axis trends N. 35° W. The pipe cuts vertically through a sequence of andesitic extrusive and volcanoclastic rocks overlain by latite flow breccia. The volcanic sequence generally strikes N. 45° E. and dips 20°-25° SE. Within the pipe, all volcanic units are thoroughly brecciated, and the andesite-latite contact has been displaced downward as much as 150 m, suggesting collapse during brecciation. Except for a diabase dike, no intrusive rocks are known to occur above the 700 level of the mine. Three general types of brecciation have been observed: (1) tight, (2) open, and (3) tabular. Contacts between the types are gradational, and in some places types 2 and 3 occur together. Up to 30 percent open space developed during brecciation. The entire mass of breccia comprising the pipe has been erratically mineralized; abrupt changes in total sulfide content, pyrite-chalcopyrite ratios, and copper values occur through short intervals. Previously mined, high-grade (+2% Cu) orebodies were localized in nearly continuous vertical ore shoots in the northwest and southeast noses of the oval, in narrow lenses along wall contacts, and in isolated pods ("core ore bodies") in the interior of the pipe. Detailed mapping of channels cut for sampling in rehabilitated mine workings on the 100, 500, 600, and 700 levels has provided new information on sulfide distribution in the interior of the pipe. Zones consisting predominantly of (1) pyrite and (2) chalcopyrite have been defined, as well as mixed pyrite-chalcopyrite zones. A wide belt of specularite extends from wall to wall along the minor axis of the oval on the surface but pinches out rapidly with depth. A symmetrical sulfide mineral zoning pattern is not readily apparent.

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