

Geochemical Studies in the Exploration for Gold, Atacocha Mining Unit, Cerro de Pasco, Peru

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The Atacocha Mining Unit is located in the Atacocha mining district, Cerro de Pasco province, central Peru. It is a Zn-Pb-Cu-Ag polymetallic deposit, being mined both underground and open pit. It is hosted by rocks of the Pucara Group and includes skarn replacement bodies, veins, and breccias. The associated intrusions are identified at Santa Barbara, San Gerardo, and Atacocha, are of dacitic composition, dated at 30-25 Ma, and are located in the Milpo-Atacocha structural corridor. The San Gerardo intrusion crops out on the surface and hosts mesothermal veins that were overprinted by a low to intermediate sulfidation epithermal gold system.

The hydrothermal alteration, mainly recognized in the San Gerardo zone, is an illite-smectite-adularia type, with also carbonate minerals characterizing the low-intermediate sulfidation deposit. The mineralization in the area of San Gerardo consists of narrow veins of galena, sphalerite, freibergite, and pyrite, located in cavities and in intrusive dacites. Scanning electron microscopy and X-ray spectroscopy studies have been carried out and confirm the presence of gold at the atomic level as structural impurities in all the sulfides. The study of fluid inclusions reveals the existence of four fluid families related to mineralization and temperatures between 250° and 450°C, with salinities from not detectable to 20 wt % NaCl equiv. Currently a geometric evaluation is being made on the occurrence of gold.