

Characterization of the Brecciated Philadelphia Low-Sulfidation Epithermal Gold-Silver System, Oatman District, Arizona

Lex Lambeck¹, Greg Hahn¹, Marc Stengel¹

¹Arizona Gold & Silver, Salt Lake City, United States

The Philadelphia gold-silver system in Arizona's historic Oatman Mining District defines a broad, structurally controlled low-sulfidation epithermal Au-Ag deposit developed along the Arabian Fault in the Black Mountains of Mohave County. Mineralization occurs within a ~3 km corridor defined by an east-dipping normal fault separating Precambrian granite in the footwall from Tertiary volcanic and volcanoclastic rocks in the hanging wall. Quartz-calcite veins flank a 10-50+ m stockwork corridor hosted in feldspar-porphyrritic rhyolite dikes and adjacent volcanic units. Native gold occurs with silver in acanthite and tennantite. Bladed calcite replaced by quartz and extremely low sulfide contents (<0.01% S) indicate formation near the top of the boiling zone within an upwelling epithermal system.

The Philadelphia system exhibits extensive hydrothermal brecciation and quartz-calcite stockwork veining forming corridors locally exceeding 30-40 m thickness. Alteration comprises propylitic halos outward from mineralized structures and strong argillic alteration in the hanging wall. Ag-Au ratios vary systematically across the deposit, from >100:1 in distal zones to <1:1 proximal to Red Hills, indicating it as the principal fluid upflow zone. Structural dilation along the Arabian Fault likely focused hydrothermal flow within a district-scale epithermal plumbing system, producing the broad brecciated corridor.

Recent drilling highlights expansion along the Perry zone. Core hole PC25-158 includes 24.21 m at 6.28 g/t Au and 7.18 g/t Ag and 4.33 m at 19.37 g/t Au and 19.36 g/t Ag, confirming a thick boiling-zone corridor open along strike and at depth. Hyperspectral mapping further defines targets down-dip toward Red Hills and beneath eastern and northeastern anomalies.

The broader Oatman district historically produced ~2.5 Moz Au; however, the scale of the Philadelphia system and emerging drill results suggest the property alone could host a district-scale approaching >5 Moz Au when considering Red Hills and eastern and northeastern drill targets.