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Geology of the Barite Hill Gold-Silver Deposit in the Southern Carolina Slate Belt

SANDRA H.B. CLARK, KAREN J. GRAY, AND JUDITH M. BACK
U.S. Geological Survey, National Center Mail Stop 954, Reston, Virginia 20192

Abstract

Barite Hill is a stratiform gold-silver deposit associated with base metal sulfides and barite in greenschist facies rocks. The deposit, southernmost of four recently mined gold deposits in the Carolina slate belt, is located in the Lincolnton-McCormick district of Georgia and South Carolina, which includes several known gold-silver and base metal deposits in a Kuroko-type geologic setting along with deposits of kyanite and manganese. Approximately 1,835,000 g of gold was produced mainly from oxidized ores in the Main and Rainsford pits from 1990 until their closing in 1994.

Ore is hosted by sericitically altered felsic metavolcanic and metasedimentary rocks of the Late Proterozoic Persimmon Fork Formation. The deposit is stratigraphically below an overturned contact between upper and lower pyroclastic units, which overlie the Lincolnton metarhyolite, an intrusive-extrusive unit. Gold-silver-rich zones in the Main pit are partly coincident with lenses of siliceous barite rock, but not confined to them, and occur more commonly in pyrite-quartz-altered fragmental rock. The Main pit ore is stratigraphically overlain by a zone of base metal and barite enrichment, which is, in turn, overlain by a talc-tremolite alteration zone locally. Siliceous barite zones are absent in the Rainsford pit, and gold-silver minerals are associated with silicified rocks and chert.

The Barite Hill deposit is interpreted to be the result of Kuroko-type, volcanogenic, base metal sulfide mineralization, followed by gold-silver mineralization under epithermal conditions with the following stages of evolution: (1) massive sulfides, barite, and fine-grained siliceous exhalites were deposited during Late Proterozoic to Cambrian submarine volcanism, which was related to plate convergence and subduction in a microcontinental or island-arc setting distant from the North American continental plate; (2) Au-Ag-Te and base and precious metal Te-Se-Bi minerals were deposited either during waning stages of hydrothermal activity in a failed massive sulfide system or in a separate event; (3) sulfides and silica-barite rock recrystallized during regional deformation and greenschist facies metamorphism related to the Middle to Late Ordovician collision of the Carolina terrane with the North American continental plate; (4) quartz, barite, and gold were remobilized and formed veins that cut across cleavage; (5) orebodies were offset along high-angle faults; and (6) during weathering, base metal sulfides and barite dissolved and reprecipitated as supergene euhedral barite crystals that line ferric iron oxide-hydroxide gossans.