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# Timing and Structural Controls on Gold Mineralization at the Bogoso Gold Mine, Ghana, West Africa

Andrew Allibone,†

*SRK Consulting, P.O. Box 250, Deakin West, ACT 2600, Australia, and School of Earth Sciences, James Cook University, Townsville, Queensland 4811, Australia*

Jonathan Teasdale, Greg Cameron, Mike Etheridge, Phillip Uttley,

*SRK Consulting, P.O. Box 250, Deakin West, ACT 2600, Australia*

Albert Soboh, John Appiah-Kubi, Alan Adanu, Richard Arthur, Jo Mamphey, Ben Odoom, John Zuta, Amegbor Tsikata, Frederick Pataye, Sammuel Famiyeh,

*Bogoso Gold Ltd, Airport Post Office, Accra, Ghana*

and Eddie Lamb

*Resource Service Group, P.O. Box 16486, Accra, Ghana*

## Abstract

The Bogoso gold deposit comprises ~20 open pits scattered along 18 km of a major fault zone which separates Birimian Supergroup turbiditic sedimentary rocks to the northwest from Tarkwaian Group rocks to the southeast. Individual pits are centered on 200- to 400-m-long ore shoots which are located in three broad structural settings.

Steeply pitching, relatively high-grade orebodies are commonly localized in left-hand dilational jogs in the strike of the controlling faults. These jogs often coincide with intersecting minor faults. Gold is largely confined to the graphitic mylonite, which defines the fault, and imbricated slices of carbonate-altered rock. Gently dipping mineralized quartz vein stockworks and disseminated auriferous pyrite and arsenopyrite form broader zones between more steeply dipping bounding faults in the vicinity of right-hand bends and splays in these faults. Smaller zones of disseminated sulfide mineralization coincide with areas where bedding and/or foliation in the adjacent Birimian sedimentary rocks is strongly discordant with the adjacent mineralized fault, generally where the faults cut the short limbs of tight, upright, east-trending folds.

Approximately 75 percent of the gold extracted from the Bogoso district has been mined from a cluster of pits that coincides with the densest and most highly connected concentration of larger faults in the Bogoso concession. The majority of ore shoots are located along the largest of these faults. The narrower faults generally host smaller and less frequent ore shoots.

The fault network originated during an early episode of regional-scale shortening involving thrusting and isoclinal folding. The structural setting and geometry of the ore shoots implies that mineralization occurred during a later minor episode of sinistral strike-slip movement on the controlling faults, after development of the fault network. The undeformed nature of the auriferous sulfides implies that this was the last phase of ductile-brittle deformation on the host faults. This conclusion is consistent with earlier work indicating that the giant Ashanti deposit ~150 km along strike from Bogoso also developed during a period of small displacement sinistral offset late in the history of the host fault network.